

AT&T System 85 Release 2, Versions 1 and 2 Maintenance Service Manual



AT&T System 85 Release 2, Versions 1 and 2⁻

Maintenance

Service Manual

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CONTENTS

INTRODUCTION	L,
PURPOSE	l
HOW TO USE THIS MANUAL	L
ORGANIZATION	2
SWITCH MAINTENANCE OVERVIEW	3
GENERAL	3
ERROR DETECTION	3
ERROR LOGGING	1
Overview	1
Periodic Maintenance Information Data Structure (PMIDS)	1
Demand Maintenance Information Data Structure (DMIDS)	3
ALARM PLAN	6
HUMAN INTERFACES	7
PRECAUTIONS	7
MAINTENANCE AND ADMINISTRATION PANEL (MAAP)	3
ALARM PANEL	3
MICRODIAGNOSTICS	3
Overview	3
Functional Description	5
CIRCUIT PACK LEDS	7
Overview	7
LED Strategy	7
Physical Placement of LEDs	9
TOOLS AND TEST EQUIPMENT	9
PREVENTIVE MAINTENANCE	0
TROUBLE CLEARING .	2
GENERAL	2
Overview	2
Items Affecting Trouble Clearing	2
Trouble Clearing Priority	3
Maintenance Polling	3

Page

- i -

. F	RECOVERY		• •	•	•	•	·	24
	Overview					•	•	24
	Short Power Failures					•	•	24
	Long Power Failures				•	•	•	24
	GO/HALT Switch and RESET Switch				•	•	•	25
A	ALARM TROUBLES					•	•	25
	Overview				•	•	•	25
	Retiring Alarms			•	•	,	•	26
	Trouble Clearing of Alarmed Troubles			•	•		•	26
	Duplicated common control switches, TMS/network control complexes						•	27
	Release of Busied Out Circuits			•	•		•	27
τ	JSER REPORTED TROUBLES					•	•	28
	Overview							28
•	72 and 74 Series Terminals				•	•	•	29
	Data Modules						•	30
. '	PDM or TDM Self Tests				•	•	•	31
	DTDM Self Tests	•			•		•	34
	Features	•		•	•	•	•	37
	Attendant Console	•		۰.	•		•	37
Ň	NO RESPONSE FROM SWITCH			•	•	•	•	38
	Overview		• •		•		•	38
	System Down - No LEDs Lighted	•	•••				•	38
	Emergency Transfer - Processor Suicide Suspected	•			•		•	39
	Communications with Remote Maintenance Facility Lost	•	• •			•		39
	Microdiagnostics - General	•			•	•	•	40
	Microdiagnostic Testing	•			•	•	•	43
	Test 0 - Diagnostic processor circuit pack demand test	•			•		•	43
	Test 1 - Maintenance bus demand test	•			•	•	•	44
	Test 2 - Alarm interface circuit pack demand test	•			•	•	•	45
	Test 3 - Spare (reserved for future use)	•				•	•	46
	Test 4 - Spare (reserved for future use)	•				•	•	46
	Test 5 - Spare (reserved for future use)	•		•		•	•	46
	Test 6 - Spare (reserved for future use)	•		•				47
	Test 7 - 501CC processor circuit packs demand test	•		•	•	•		47
	Test 8 - System bus and buffered bus demand test	•		•				48
	Test 9 - 501CC instruction set demand test	•						48
	Test 10 - Tape subsystem demand test							49

O

35

- ii -

Test 11 - Main memory system demand test	
Test 12 - Memory protect circuit pack demand test	2
Test 13 - Spare (reserved for future use)	?
Test 14 - Cache memory circuit pack demand test	}
Test 15 - Abbreviated test and forced load	;
Repair Guide For Microdiagnostic Testing	i
MAINTENANCE PROCEDURES	,
PROCEDURAL FORMAT AND CONTENT	,
Purpose	,
Field Definitions and Codes	,
Test Equipment Required	,
Operation of Procedure	,
Repair Guide	,
MAINTENANCE PROCEDURE SELECTION	5
Overview	;
Alarm causes/error log	;
Alarm Panel	;
. General	Į
MAINTENANCE PROCEDURE DESCRIPTION	Į
Overview	ļ
General Switch Maintenance Procedures	ł
Common Control Maintenance Procedures	1
Network Area Maintenance Procedures	
Common Control Peripherals Maintenance Procedures	:
Connection Status Maintenance Procedures	
Other Maintenance Procedures	
PROC 600 - ALARM CAUSES/ERROR LOG	
PROC 601 - ENVIRONMENTAL TESTS	
PROC 610 - TAPE TESTS	
PROC 611 - COMMON CONTROL TESTS	
PROC 612 - INITIALIZATION CAUSES	ļ
PROC 613 - DUPLICATE PROCESSOR CONTROL AND TEST (R2V1 Only)	
PROC 613 - DUPLICATE PROCESSOR CONTROL AND TEST (R2V2 ONLY) 151	
PROC 614 - MEMORY READ/MEMORY MATCH TESTS	,
PROC 615 - MAAP TEST	!
PROC 616 - ALARM PANEL TEST	ļ
PROC 620 - NETWORK PROCEDURE	

- iii -

4

PROC 621 - NETWORK DUPLICATION CHANNEL		•	•	. 339
PROC 622 - NETWORK PERIPHERALS			•	. 354
PROC 623 - ANI FAILURES				. 387
PROC 624 - CONTACT INTERFACE TEST			•	. 395
PROC 625 (R2V1 Only) - SYNCHRONIZATION REFERENCE MONITOR		•		. 401
PROC 625 (R2V2 Only) - SYNCHRONIZATION REFERENCE MONITOR		•		. 410
PROC 630 - BUSY OUT/RELEASE BUSY OUT		•		419
PROC 631 - TRUNK GROUP BUSY OUT		•		. 426
PROC 632 - CARRIER BUSY		•		. 431
PROC 640 - TRUNK FAILURES				. 437
PROC 641 - TERMINAL-TO-TERMINAL TEST CALL			•	. 463
PROC 642 - TERMINAL-TO-TRUNK TEST CALL	,	•		. 470
PROC 643 - TERMINAL-TO-TONE TEST CALL	,			. 480
PROC 644 - TERMINAL-TO-AUXILIARY TONE TEST CALL	,			. 485
PROC 646 - MODEM POOLING AND FACILITY TESTING				. 491
PROC 647 - AUTOMATIC TRANSMISSION MEASUREMENT SYSTEM (ATMS	5) /	ΤE	ST	S
$(R2V2 Only) \qquad \dots \qquad $	•	•	•	. 562
	•	·	·	. 592
PROC 652 - TIME-OF-DAY CLOCK SYNCHRONIZER	•	•	·	. 613
PROC 653 - ATTENDANT CONSOLE TESTS	•	•	·	. 622
PROC 654 - DISPLAY TERMINALS TEST	•	·	•	. 629
PROC 655 - SMDR TEST	•	•	·	. 636
	•	•	·	. 658
	•	•	·	. 665
PROC 961 - CONNECTION ACTIVITY	•	·	·	. 669
PROC 962 - FACILITY CONNECTIONS	•	•	·	. 676
PROC 999 - MEMORY WORD DISPLAY	•	·	·	. 681
SWITCH COMPONENT REPLACEMENT	•	•	·	. 683
GENERAL	•	•	•	. 683
EQUIPMENT CONFIGURATION	•	·	•	. 683
	•	·	·	. 683
	•	•	•	. 684
Unduplicated Common Control Cabinet	•	·	•	. 685
Duplicated Common Control Cabinet	•	•	•	. 685
TMS/RMI Cabinet		•	•	. 688
Module Control Cabinet	•	•	·	. 688
Port Cabinet				. 691

Common Control Carrier
Unduplicated Common Control DC/DC Converter Unit
Duplicated Common Control Power Carrier
TMS Carrier
Module Control Carrier
Port Carrier
DS-1/MFAT Carrier
RMI Carrier
PRECAUTIONS
CIRCUIT PACK REPLACEMENTS
Overview
Precautions
Option Settings
Unduplicated Common Control Carrier Circuit Pack Replacement
Duplicated Common Control Carrier Circuit Pack Replacement
TMS, Module Control, or RMI Carrier Circuit Pack Replacement
Port or DS-1/MFAT Carrier Circuit Pack Replacement
Unduplicated Common Control DC/DC Converter Unit or Duplicated Common Control Power Carrier Circuit Pack Replacement
CIRCUIT PACK SWITCH OPTION SETTINGS
Overview
Common Control Carrier Circuit Pack Option Settings
Module Control or RMI Carrier Circuit Pack Option Settings
Port or DS-1/MFAT Carrier Circuit Pack Option Settings
All Cabinets Alarm Board Option Settings
Other
HIGH CAPACITY MINI-RECORDER (HCMR)
HCMR Circuit Pack Replacement
Cleaning HCMR Tape Head and Capstan
HCMR Replacement
309A OR 310A POWER SUPPLY REPLACEMENT
FREQUENCY GENERATOR REPLACEMENT
DC FAN AND FAN ASSEMBLY REPLACEMENT
DC Fan Replacement
DC Fan Wire Replacement
DC Fan Assembly Replacement

ļ

ţ

2

·_



.

TMS/RMI CABINET AC DISTRIBUTION UNIT REPLACEMENT
MODULE CONTROL OR PORT CABINET AC DISTRIBUTION UNIT REPLACEMENT
DC FILTER REPLACEMENT
CONSOLE COMPONENT REPLACEMENT
Overview
Console Power Supply Replacement
Console DSS and BLF Carrier or Button Units Replacement
Console Timing Control and Speech or Alphanumeric Control Replacement 736
Console Alphanumeric Display, Lamp Control, or Dial Key Pad Replacement
ALARM PANEL REPLACEMENT
AEH4 ALARM BOARD REPLACEMENT
SMDR COMPONENT REPLACEMENT
GENERAL
SMDR CABINET
SMDR CARRIER CIRCUIT PACK REPLACEMENT
SMDR FORMATTER CIRCUIT PACK REPLACEMENT
SMDR TAPE DRIVE CIRCUIT PACK REPLACEMENT
Circuit Pack Replacement
Adjustments for Tape Drive Circuit Packs
SMDR 207B POWER SUPPLY REPLACEMENT
SMDR FORMATTER REPLACEMENT
SMDR TAPE DRIVE REPLACEMENT
SMDR CLOCK/CALENDAR DISPLAY REPLACEMENT
AUXILIARY CABINET COMPONENT REPLACEMENT
GENERAL
AUXILIARY CABINET
ISOLATION AND REPAIR TECHNIQUES
Overview
Encode 1 - Battery Holdover
Encode 2 - Temperature Limit Sensor
Encode 3 - Fan Power
Encode 4 - Circuit Breaker/Fuse
Encode 5 - Frequency Generator
Encode 6 - Rectifier
Other Repair Steps

_)

124B FREQUENCY GENERATOR REPLACEMENT	767
DC FAN AND FAN ASSEMBLY REPLACEMENT	768
DC Fan Replacement	768
DC Fan Wire Replacement	769
DC Fan Assembly Replacement	769
AC DISTRIBUTION UNIT REPLACEMENT	770
RECTIFIER REPLACEMENT	771
MAINTENANCE AND ADMINISTRATION PANEL (MAAP)	774
DESCRIPTION OF MAAP	774
Overview	774 .
LED Indicators	774
Dual Tone Key Pad	775
Flipcharts	775
LED Data Display	776
Error Display	776
Field Identification	776
Error Code Listing	776
Control Keys	776
Use of Control Keys when performing Maintenance Procedures	777
HOW TO USE THE MAAP	779
Overview	779
Connect MAAP and Call Up Procedures:	780
Responding to Error Displays:	780

INTRODUCTION

PURPOSE

This service manual describes maintenance of the System 85 switch and switch related components. It is intended for use primarily by personnel trained in the maintenance of digital switching equipment. It may be used by others having a working knowledge of digital switching equipment while under the control and direction of a remote maintenance facility such as Remote Maintenance, Administration, and Traffic System (RMATS II).

The service manual is intended for use by maintenance personnel using the Maintenance and Administration Panel (MAAP). The manual as well as the switch maintenance process is keyed to the use of the MAAP connected to the switch.

Both R2V1 and R2V2 versions of the Release 2 switch are covered in this service manual.

This issue replaces all previous issues of this document. Reasons for reissue include addition of:

- Information on recovery of the switch.
- PROC 613 Duplicate Processor Control and Test for R2V2.
- PROC 625 Synchronization Reference Monitor for R2V1 and R2V2.
- PROC 647 Automatic Transmission Measurement System (ATMS) Tests.
- Information on the RMI cabinet, DS-1/MFAT carrier, and the RMI carrier.
- Replacement information on the High Capacity Mini-Recorder (HCMR).
- Replacement information on the DC fan and fan assembly.
- Replacement information on the alarm panel and the AEH4 alarm board.

HOW TO USE THIS MANUAL

It is recommended that you become familiar with the contents and organization of this manual. Read the sections entitled SWITCH MAINTENANCE OVERVIEW and HUMAN INTERFACES to become familiar with the maintenance processes, aids, and types of troubles you may encounter.

Read the section entitled TROUBLE CLEARING to become familiar with the trouble locating process and the methods for isolating a failure.

The detailed information on the maintenance procedure (PROC) flip charts is arranged in numerical sequence with the procedure identified at the top of the page.

Observe the switch alarm panel to identify the lighted indicator. Some indicators on the alarm panel are marked to associate the fault indicator with a particular PROC. Always start with PROC 600 (alarm causes/error log) to determine the maintenance procedure used to isolate that failure, then go to the referenced procedure for detailed information.

The failure identification and clearing process is progressive. Unless you are certain of the failure cause, always start with Test 1 (when applicable) and progress through all tests of the referenced procedure given for that failure.

If you are providing on site support for a remote maintenance facility, use the Index to locate the instruction for performing the action or replacing the component identified by the remote facility.

ORGANIZATION

This service manual is divided into the following sections:

- 1. Switch Maintenance Overview provides an overview of the error logging software and stored maintenance programs. Faults, errors, and failures are defined in their relationship to the maintenance process.
- 2. Human Interfaces describes the functions of the switch alarm panel and the MAAP. Use of switch microdiagnostic testing capabilities, LEDs on circuit packs, tools and test equipment, and preventive maintenance are also covered.
- 3. **Trouble Clearing** describes the recommended method of handling alarm, user reported, and no response from the switch trouble conditions.
- 4. **Maintenance Procedures** contains the detailed instructions for using the maintenance procedures for failure analysis and trouble clearing.
- 5. Switch Component Replacement provides description of the switch cabinets and carriers and contains instructions for checking option settings and replacing circuit packs and components.
- 6. **SMDR Component Replacement** provides instructions for replacing circuit packs and components. Adjustments required as a result of circuit pack replacement are also provided.
- 7. Auxiliary Cabinet Component Replacement provides a description of the auxiliary cabinet and contains instructions on replacing auxiliary cabinet components.
- 8. Maintenance and Administration Panel (MAAP) provides a description of the MAAP and how to use it.

Common procedures (opening cabinet doors, removing rear covers, etc.) are assumed and not illustrated or covered in the component replacement procedures.

This issue of the maintenance service manual is compatible with MAAP flip charts comcode 844179267, Issue 9 (for R2V1) and comcode 844176776, Issue 2 (for R2V2). The flip chart illustrations in this manual are not drawn to scale and should not be reproduced for use as replacements on your MAAP.

SWITCH MAINTENANCE OVERVIEW

GENERAL

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Switch maintenance uses built-in maintenance capabilities, error logging software programs, and stored diagnostic maintenance procedures.

The self-diagnostic ability and the various fault handling capabilities programmed into switch software are used as the basis for the analysis and trouble clearing processes presented.

Maintenance objectives are the fault detection, isolation, and repair of defective equipment.

Major alarms are faults affecting more than (or equal to) 64 time slots and minor alarms are faults affecting less than 64 time slots.

Faults, errors, and failures are detected and identified when they occur.

- a. A fault is a physical defect of the switch hardware that causes improper circuit operation. Some faults are intermittent because they have no predictable or regular frequency of occurrence. Others are considered solid. Possible causes of intermittent faults are noise, deterioration, and critical timing.
- b. An error is a single occurrence of an incorrect event or response and can be either hardware or software in nature. An error is the result of a fault, noise, a software bug, or an irregularity.
- c. A failure is when the number of detected errors exceeds a predetermined threshold. The signal that this threshold is exceeded is an alarm(s). The level of alarm shows the effect of the failure on the quality of service.

Tests are used for both detection and diagnosis. A test is a sequence of stimuli applied to a circuit, a group of circuits, or a software function, with the expected output or results.

A detection test determines the existence of a fault or an abnormal software condition; i.e., it indicates whether or not the circuit(s) or function(s) appears to operate correctly.

A diagnostic test analyzes the nature of detected errors and isolates the source of each. There are two subsets of diagnostic tests: identification and analytical.

- a. Identification tests provide information for the error log when an error is detected: e.g., circuit identity and error code.
- b. Analytical tests perform higher level analysis of recorded errors: e.g., patterning, manually initiated testing, and repair analysis.

ERROR DETECTION

Error detection routines determine whether or not specific circuits or system functions are operating correctly. Detection of errors can occur during an integrity check, an operational check and/or a demand test.

- a. Integrity Check: A test which is scheduled to be executed on either a periodic or timeavailable basis in order to verify the integrity of the system.
- b. Operational Check: A check which is performed when the switch carries out one of its assigned operations. The check can be done by hardware (e.g., a parity check) or by software (e.g., verification of data consistency by the call processing routines).

c. **Demand Test:** A test which is executed upon demand via a maintenance procedure. Demand tests include the set of tests that are used for integrity checks.

Once an error is detected, a diagnostic routine may be used to analyze the nature of the error and to determine its source. The error is then recorded in the error log, and if necessary appropriate recovery action is initiated.

Detection tests check the integrity of the switch's hardware components and some of the software functions on an on-going basis. These tests are scheduled either as periodic or time-available tasks and are designed to detect both hardware and software errors.

The integrity of selected portions of the switch can be verified by running corresponding demand tests. Integrity checks, as well as operation checks, record errors in the Periodic Maintenance Information Data Structure (PMIDS) while demand tests record errors in the Demand Maintenance Information Data Structure (DMIDS).

Operational checks are made to detect abnormal conditions and/or correct results that might arise during switch operation. Detection of these errors is provided by special hardware and software.

- a. For hardware detectable errors, circuitry on the circuit packs is used to find faults such as parity or data errors. Most of the errors cause a bit to be set in a special error register that is polled every second by the network (TMS and/or module) processor.
- b. A 1-second periodic task in the common control processor requests the error information from the network (TMS and/or module) processor and takes appropriate action. Other faults cause an interrupt to be sent to the module processor for immediate processing.

ERROR LOGGING

overview

To allow for automatic detection of defective circuits, and to provide information that might be required in the analysis and repair of switch problems, especially intermittent ones, each occurrence of a detected circuit malfunction is recorded in the switch error log. This error log is maintained in a portion of the common control memory called PMIDS.

When a periodic test detects an error in the operation of a circuit or functional area, an entry describing the presence and nature of the detected malfunction is made in PMIDS to record that fact. Data stored in PMIDS is used by the alarm thresholding algorithms to flag switch failures.

Periodic Maintenance Information Data Structure (PMIDS)

PMIDS is composed of a set of eight tables, containing a particular type of information about an error entry. The eight tables collectively characterize the malfunction of a particular circuit or function. The eight tables for each function or circuit type are:

- a. Circuit identification.
- b. Error rate and duration.
- c. Time count.
- d. Fault signature and alarm information.
- e. Beginning time stamp.
- f. Alarm time stamp.

- g. Ending/resolved time stamp.
- h. Error count.

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Entries in PMIDS are categorized as new, active, inactive, alarmed, or resolved.

- a. New entries are those where no entry for the circuit exists in PMIDS.
- b. Active entries are those where errors are recently detected.
- c. Inactive entries are those where the time since the most recent error exceeds 20 minutes.
- d. Alarmed entries are those where a circuit failure is detected and an alarm sent.
- e. Resolved entries are those that represent circuits that were alarmed but are repaired or the alarm manually turned off.

In a system with duplicated processors, there are two distinct PMIDS. This allows detection and identification of processor dependent problems. Most periodic tasks which update PMIDS do not run on the off-line processor. However, the addition of time stamps to PMIDS permanently establishes the time of errors, even in the off-line processor.

A facility is provided to allow the manual clearing of entries from the error log. It is possible to selectively clear the entire PMIDS, all entries for a particular circuit type, or an entry for a specific circuit. This capability is provided through two maintenance procedures.

PROC 600 (alarm causes/error log) allows individual entries or all entries for a particular unit type to be cleared (zeroed), and **PROC 612** (initialization causes) allows the clearing (zeroing) of all failure history (entries) in PMIDS.

The ability to manually clear (zero) entries in PMIDS is provided as a maintenance aid.

- a. This aid is not intended to be used in the normal course of performing switch maintenance as it destroys all failure history for the entries which are cleared (zeroed).
- b. The capability is provided when it is desirable to start with a clean failure history after correcting major problems that caused many alarms and at other times (i.e., installation).

The preferred method for clearing alarms is to **resolve** them using the appropriate maintenance procedure and its associated verification test after performing any necessary repairs.

Manual capabilities for clearing (zeroing) PMIDS entries are not provided in any of the other maintenance procedures.

Resolving of alarms can be accomplished in two ways.

- a. The preferred and normal method for clearing alarm causes is to resolve them by using the appropriate maintenance procedure, performing isolation of failures, making necessary repairs, and performing the associated verification test to ensure that the failure is corrected.
- b. A manual capability of turning off alarms and resolving the alarm causes is available by using the **CLEAR DATA; EXECUTE** sequence in most maintenance procedures.

Both of the above methods have the same result, they turn off the alarm indicator and update the alarmed entry in PMIDS as resolved. As can be determined by analyzing the above two methods, the alarm is resolved as far as the error log is concerned, but the cause of the alarm has not been determined nor repaired using the manual capability (i.e., **CLEAR DATA; EXECUTE** sequence). In addition, the alarm returns in a matter of minutes unless the cause of the alarm is eliminated.

Demand Maintenance Information Data Structure (DMIDS)

DMIDS is used when demand tests are active. DMIDS records detailed information (in a temporary buffer) concerning the nature of errors when associated maintenance procedures are performed.

Demand tests do not update or in any way alter the contents of PMIDS except for resolving alarmed entries for circuits that pass the demand test.

The information recorded by DMIDS for failing circuits may consist of a unit type, circuit identification, and specific fault code.

The specific fault code contains information that uniquely identifies the point in the decision algorithm at which the diagnosis was completed (diagnosis stopped because of a failure).

ALARM PLAN

The alarm plan is the strategy for notifying the user that a circuit or functional block of the switch is malfunctioning. When the information in PMIDS indicates that a malfunction occurred, this is considered a **failure** and an alarm is raised to serve notice of this condition.

An alarm may be indicated in several ways. It may be a lighted alarm or fault indicator on the alarm panel, a lighted alarm indicator on the attendant console, an immediate automatic call to a remote maintenance facility (if applicable), an affirmative response to a maintenance poll from the user or a remote maintenance facility, or any combination of these.

Alarms are generated for failures detected by operational error processing, periodic tests, time available tests, and/or call processing. Failures detected during maintenance procedure diagnostic testing are not alarmed.

There are two alarm thresholds which may be exceeded. The first, which is intended to flag hard failures, is one error detected in each of 3 consecutive minutes. The second, which is aimed at detecting intermittent failures, is achieved when the error rate (peg count) exceeds a set number (typically five errors in 2 hours).

The threshold value is defined in a table by the switch software for each circuit type or functional area. These values may be altered by issuing a patch to the switch tape. There is no translation or maintenance procedure which allows modification of the threshold table. The ability to modify this table of threshold values allows flexibility to vary the sensitivity of certain types of circuits as experience warrants.

In those situations where duplicated circuitry exists, a malfunctioning circuit may need to be alarmed (for a switch of equipment) much more quickly than the normal thresholding algorithms allow. In such cases the normal alarming mechanism may be bypassed and an immediate failure declared.

The routing of alarm indicators is a function of the alarm level. The routing for each alarm level is:

- a. Major or minor alarm Turns on indicator lights at the attendant's console and the alarm panel, and automatically makes a call to a remote maintenance facility (if applicable) to report the failure.
- b. Warning alarm Turns on an indicator light on the alarm panel only and waits for the user or a remote maintenance facility (if applicable) to poll the switch before reporting the failure.

HUMAN INTERFACES

PRECAUTIONS

When performing maintenance or translation procedures on System 85 switch equipment, certain precautions must be observed by user personnel.

Cautions, warnings, and danger statements contained within the service manual **must** be observed to prevent loss of service, possible equipment damage, and possibility of personnel injury.

In addition, the following precautions regarding electromagnetic interference and static electricity **must** be observed. ψ

a. Electromagnetic Interference: This equipment generates, uses, and can radiate radio frequency energy. Electromagnetic fields radiating from the switch may cause noise to be introduced into the customer's equipment. If the equipment is not installed and used in accordance with the instruction manual, interference to radio communications may be caused.

WARNING: To maintain the Electromagnetic Interference (EMI) integrity of the System 85 switch, maintenance personnel (after performing any translation or maintenance activities) must ensure that all cabinet panels, covers, etc. are firmly secured in place prior to leaving the customer's premises.

b. Static Electricity: To prevent or reduce electrostatic discharge, maintenance personnel must always attach wrist grounding straps before working on switch components or handling circuit packs.

Caution: Electrostatic discharge can damage or destroy circuit packs containing integrated circuits (ICs).

The electromagnetic compatibility (EMC) wrist strap and cable assembly (cc900698226) is placed in the bottom of the module control cabinet in a poly bag (cc900492372) next to the AC distribution unit.

Note: This wrist strap is to be used whenever troubleshooting or performing maintenance or handling any circuit packs associated with the System 85 switch.

The EMC wrist strap assembly is used in the following manner:

- a. Attach the wrist strap to either wrist.
- b. Connect the alligator clip to the cabinet frame.

A good ground connection for the alligator clip is:

- a. In equipment coded cabinets which have removable sides, attach the alligator clip to any convenient screw head that fasten the hinges to the cabinet or to the screws that fasten the door latch to the frame.
- b. In equipment coded cabinets which have intergrated sides, the front and rear cabinet formed faces (front door area or back area when viewed in an open position) which are coated with a conductive paint; the alligator clip may be attached to any of these surfaces.
- c. In either case an area close to the vertical center of the cabinet should be selected for the alligator clip allowing a more central position from which to operate.

MAINTENANCE AND ADMINISTRATION PANEL (MAAP)

The **MAAP**, (Figure 1), is the primary interface used by maintenance personnel at the customer's premises to perform maintenance tasks. The stored maintenance programs are represented on the **MAAP** by a series of flip charts.



Figure 1. MAAP

The **MAAP** provides access to maintenance procedures to perform interrogation, testing, and fault isolation.

When the switch is duplicated, it may be necessary to examine both the on-line and off-line side to determine the maintenance procedure to be performed. The problem that exists could have caused a switch to the healthier common control. When the problem is corrected, both the on-line and off-line sides should be examined to determine if potential problems exist.

For further information on a description of the **MAAP** and how to use it, read the section entitled MAINTENANCE AND ADMINISTRATION PANEL (MAAP).

ALARM PANEL

The alarm panel (Figures 2 and 3) is located at the top of the common control cabinet.

The alarm panel provides an indication of the seriousness of system problems by displaying the alarm level (major, minor, or warning) of any active alarm. A general indication of the hardware (processor/memory, environment, network, etc.) area that caused the alarm is also displayed.

The system's state of health is provided through the use of alarm and equipment failure indicators. Equipment failure indicators are grouped functionally by their potential importance to system operation and call processing integrity.

The alarm panel permits effective use of the maintenance fault isolation and repair procedures. Some indicators on the alarm panel are associated with a number in parentheses adjacent to the indicators. This number designates a **PROC** which may be used to access specific information about system problems, such as the location of faulty equipment or the exact cause of a problem. Troubleshooting the main processing unit can be done from the alarm panel. Troubleshooting the main processor is accomplished with microdiagnostic tests of the main processor and memory. The results are displayed by **PASS** and **FAIL** indicators on the alarm panel.



Figure 2. Unduplicated Common Control Alarm Panel

In addition to troubleshooting capabilities, the alarm panel provides:

- a. Manual control of the emergency transfer capability.
- b. Go/halt control of the common control processor.

- c. Control over which processor is on-line in a duplicated common control system.
- d. Reset of the suicide timer after time-out.



Figure 3. Duplicated Common Control Alarm Panel

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A description of each alarm panel indicator is given in Table A. A description of each alarm panel switch and connector is given in Table B.

TABLE A.

ALARM PANEL INDICATORS							
SECTION	INDICATION	COLOR	DEFINITION	ORIGIN			
CONTROL	GUARD	red	Warns that processor is halted.	hardware			
ALARMS	MAJOR	red	Indicates a major alarm is active.	both			
	MINOR	red	Indicates a minor alarm is active.	both			
١	WARNING	red	Indicates a warning alarm is active.	software			
PROCESSOR/ MEMORY	PROC	red	red A processor failure has been detected.				
	MEM	red	A memory failure has been detected.	hardware			
	DIAG PROC	red	Indicates that the diagnostic processor has failed.	hardware			
:	CC PWR	red	Indicates that common control power has been interrupted.	hardware			
	PASS	green	This LED is used as a system "heartbeat". It also indicates that the processor passed the se- lected microdiagnostic test.	software			
	FAIL	red	Indicates that the processor failed the selected microdiagnostic test or CC suicide.	software			
ENVIRON	PWR/TEMP AIR FLOW	red	A power, temperature, or airflow failure has been detected.	software			
COMMON CONTROL TAPE red Indicates that tape errors of som been found.		Indicates that tape errors of some kind have been found.	software				
CACHE red Indicates that cache memory error MEMORY detected.		Indicates that cache memory errors have been detected.	software				
	I/O CHANNEL	red	Indicates a failure in a CC I/O channel.	software			
NETWORK	SWITCH	red	Indicates a failure in a digital network module.	software			
•	PORT	red	Indicates a failure in a port circuit.	software			
PERIPH EQPT red Indicates a network peripheral (e.g., problem.		Indicates a network peripheral (e.g., terminal) problem.	software				

TABLE A. (Contd)

ALARM PANEL INDICATORS (Contd)							
SECTION INDICATION COLOR DEFINITION ORIGIN							
APPL PROCR	AP INTER	red	Indicates a DCIU or applications processor (ad- junct) link failure.	software			
	EXT PROC	red	Indicates an external processor problem.	hardware			
OTHER	OTHER FAILS	red	Indicates some software detected problem not covered by the equipment failure LEDs listed above.	software			
	EXT EQPT	red	Indicates a failure outside the system proper which is not detectable by software.	hardware			
EMERGENCY TRANSFER	INHIB	yellow	Indicates that an automatic switch to the emer- gency transfer condition is inhibited.	hardware			
	ACT	red	Indicates emergency transfer has been activated.	both			
CC ACTIVE	CC0	green	Indicates common control 0 is on-line.	software			
	CC1	green	Indicates common control 1 is on-line.	software			
LOCK ON LINE	CC0	yellow	Indicates common control 0 has been locked on- line.	hardware			
	CC1	yellow	Indicates common control 1 has been locked on- line.	hardware			
МААР	SMT IN USE	red	Indicates System Management Terminal (SMT) is connected to the switch which locks out RMATS or MAAP operation.	hardware			
	RMATS DIAG IN USE	red	Indicates Remote Maintenance, Administration and Traffic System (RMATS) is connected to the switch and is executing microdiagnostic test.	hardware			

ALARM PANEL CONTROLS							
SECTION	CONTROL/ CONNNECTOR	COMPONENT TYPE	REASON FOR USE				
CONTROL	GO/HALT	switch	Normally in the GO position for system opera- tion. Halts the common control processor when pressed to HALT position.				
	RESET	button	Allows the suicide timer in the common con- trol to be reset.				
PROCESSOR/ MEMORY	MICRO DIAGNOSTIC thumbwheel Allows a microdiagnostic test to be se for execution.						
	ENABLE	switch	Causes the microdiagnostic test selected to be executed.				
SYSTEM	EMERGENCY TRANSFER	switch	Allows the emergency transfer capability to be manually activated or inhibited.				
	CC LOCK ON LINE	switch	Allows one or the other common control, in a duplicated system, to be locked on-line, which prevents a software switch between common controls.				
МААР	МААР	connector	This is the connector between the MAAP and a common control processor. In a duplicated system there is one connector for each common control and one connector for whichever processor is currently on-line.				

TABLE B.

MICRODIAGNOSTICS

Overview

Microdiagnostics is a series of test programs used by the processor for fault detection and isolation of the main processor and its associated components.

Microdiagnostics are performed because:

- a. The switch is down (indicated by MJ, PROC, and FAIL indicators being lighted).
- b. Emergency transfer is indicated on the alarm panel.
- c. The generic or XRAY tape can not be loaded.
- d. To ensure that the main processor and its associated circuitry is in proper working condition.

- e. **PROC 612** (initialization causes) indicates the cache is off for recovery (fault code 37) and it is desired to test the cache memory (microdiagnostic test 14).
- f. A more complete test of the cache in an off-line common control of a duplicated common control switch is desired (microdiagnostic test 14).
- g. **PROC 600** (alarm causes/error log) indicates diagnostic processor failures (unit type 60) and it is desired to test the diagnostic processor (microdiagnostic test 0).
- h. Of unusual circumstances in which hardware or software causes for problems are equally likely.

Note: For these cases, successful pass of microdiagnostics indicates that hardware in the common control switch is less likely the cause of these types of problems.

- i. When a tape is reloaded and the current memory is not desired.
- j. After replacing an X-ray tape with a generic tape.

Caution: When a tape is reloaded or an X-ray tape is replaced with a generic tape, performing microdiagnostic test 15 does not clear MSTAT memory. False alarms may be service affecting and emergency transfer can occur. Perform all microdiagnostic tests (0 through 15) when reloading a tape or replacing an X-ray tape with a generic tape.

Sixteen microdiagnostic tests are provided. With the exception of Test 0, each test uses circuits tested by the previous test. The 16 tests are run in numerical order starting with Test 0 and progressing to Test 15.

In testing a particular part of the main processor, each test uses parts outside the area under test. A test may fail and the fault lie outside the part of the main processor under test.

Microdiagnostic tests are described according to increasing interdependencies. Execution of the microdiagnostic tests should follow this same ordering scheme. Microdiagnostic tests invoked from the alarm panel are:

- a. Test 0 Diagnostic processor circuit pack demand test.
- b. Test 1 Maintenance bus demand test.
- c. Test 2 Alarm interface circuit pack demand test.
- d. Test 3 Spare (reserved for future use).
- e. Test 4 Spare (reserved for future use).
- f. Test 5 Spare (reserved for future use).
- g. Test 6 Spare (reserved for future use).
- h. Test 7 501CC processor circuit packs demand test.
- i. Test 8 System bus and buffered bus demand test.
- j. Test 9 501CC instruction set demand test.
- k. Test 10 Tape subsystem demand test.
- l. Test 11 Main memory system demand test.
- m. Test 12 Memory protect circuit pack demand test.
- n. Test 13 Spare (reserved for future use).

- o. Test 14 Cache memory circuit pack demand test.
- p. Test 15 An abbreviated test and a forced load.

Microdiagnostics is performed starting with Test 0 and progressing in numerical order to Test 15. If a failure is indicated corrective action is performed and the test is repeated. If the test passes after corrective action, all tests are repeated starting with Test 0 and progressing through Test 15.

Functional Description

The functions tested by each microdiagnostic test are covered in the following paragraphs.

Test 0 checks the diagnostic processor circuit pack and parts of the remote interface. The diagnostic processor performs self-tests to verify the CRC checksum of the ROM, conducts a memory test of its RAM and data RAM, tests the status register and I/O registers, and performs a preliminary test of the maintenance bus control interface.

Test 1 checks the maintenance bus. The maintenance bus test begins by lighting the **RED** LEDs on all circuit packs in the common control for approximately 3 seconds. The test continues with an inventory of the circuit packs in the common control carrier, writes and reads back the complement of each circuit pack board-select number, tests for stuck-at faults and performs a test of the board select leads.

Test 2 checks the alarm interface circuit pack and the alarm panel. During this test the alarm panel LEDs may momentarily change. As part of the test the INIT* lead is set and cleared (causing and canceling the suicide condition). The software controlled alarm register and external alarm register are also tested.

Tests 3 through 6 are spare tests reserved for future use.

Note: When Tests 3 through 6 are selected and executed, an immediate **PASS** indication on the alarm panel is provided.

Test 7 checks the 501CC processor circuit packs. The 501CC processor test consists of four Signature Accumulator Chip (SAC) tests, one for each processor circuit pack.

Test 8 checks the ability of the 501CC circuit packs to communicate. Major portions of UN153, TN404, and TN491 are tested. Faults are detected on 501CC circuits that affect the ability to communicate over the system and buffered bus.

Test 9 checks the 501CC instruction set. The function of the 501CC instruction set test is to exercise the emulation microcode, verify the correct operation of most of the instruction set, and verify the correct operation of the 501CC at full speed.

Test 10 checks the tape subsystem. The test of the tape subsystem and tape interface (TN430) is performed by a call to the subsystem to perform its own self-tests.

- a. Information concerning the success or failure of these self-tests is made available in a status register. The status register bits indicate which part of the tape subsystem is faulty.
- b. The MAAP displays the value of the status register bits.

Test 11 checks the main memory system. The functions of main memory are tested by performing a main memory test, an Error Correction Circuitry (ECC) test, a memory fabric test, and parity tests.

- a. **Main Memory Test:** The main memory test reads the ID chip on each memory circuit pack, translates the code into a memory circuit pack density and decides if ECC is to be tested.
 - 1. **RED** and **GREEN** LEDs on the memory circuit packs light momentarily as part of the ID chip tests.

- 2. If the 1D chip contains a code that is not in the testable range, the main memory test fails immediately.
- 3. If an empty memory slot between two occupied memory slots exists, the main memory test fails immediately.
- 4. The common control carrier must not contain memory circuit packs of different densities, as this also causes the main memory test to fail.

b. Memory Fabric Test:

Note: The memory fabric test destroys all information in the memory configuration, including the MSTAT data.

- 1. The memory fabric test checks many functions on the equipped memory circuit packs in a series (i.e., one function is tested on all circuit packs before testing the next function).
- 2. During two of the memory fabric sub-tests the **GREEN** LED on the memory circuit pack currently being tested is lighted to indicate test progression.

c. ECC and Parity Tests:

- 1. The test of the error correcting circuitry involves testing the RAM used to store the six check bits.
- 2. The **GREEN** LED on the memory circuit pack currently being tested is lighted to indicate test progression.

Test 12 checks the memory protect circuit pack. The memory protect circuit pack (TN368) contains the system write-protect circuit, the system fetch-protect circuit, the system bus mastership-arbitration circuit, the I/O SANITY1 timer, and the power-on and clear flip-flops.

Test 13 is a spare test reserved for future use.

Note: When Test 13 is selected and executed, an immediate PASS indication on the alarm panel is provided.

Test 14 checks the cache memory circuit pack (TN369) and the bus interface circuit pack (UN153) to the cache memory.

Test 15 performs an abbreviated test and a forced load. When the abbreviated test and forced load sequence is selected, the system is cycled through a number of tests before the load is attempted. Test 15 does **not** clear MSTAT memory.

- a. The diagnostic processor circuit pack requests the 501CC to perform the SAC tests (microdiagnostic test 7). Each of the four SAC tests is executed and the results verified,
- b. The system bus and buffered bus tests (microdiagnostic test 8) are performed interactively between the 501CC and the diagnostic processor circuit pack.
- c. The 501CC instruction set test (microdiagnostic test 9) is performed.
- d. If any of these tests fail, the load from tape is aborted and the diagnostic processor circuit pack forces **suicide**.
- e. The forced load is now executed.

Note: The forced load procedure does not interrogate main memory before it makes a decision whether or not to load from tape. It assumes main memory has been corrupted and initiates a load from tape.

CIRCUIT PACK LEDS

Overview

Except for the DC/DC converter boards, each circuit pack in the digital network and common control carriers contain an ID chip.

- a. The ID chip has provision for driving RED and GREEN LEDs on the circuit pack edge. When lighted the RED LED indicates that the circuit pack is defective (failed) and the GREEN LED indicates that the circuit pack is good (passed).
- b. There may also be a GREEN **pilot** LED, and possibly one or more YELLOW **in-use** LEDs on the circuit pack edge.

LED Strategy

The RED and GREEN maintenance LEDs are useful in the demand verification mode, and in the periodic detection mode when the **MAAP** is connected to the switch.

Demand Verification Mode: The two kinds of demand verification are normal and automatic.

- a. Normal Verification: Maintenance personnel are able to run a verification test on a given circuit pack by using appropriate maintenance procedures.
 - 1. When the verification test is complete, the results are displayed on the **MAAP** and the RED or GREEN LED on the circuit pack tested is lighted depending on the outcome of the test; i.e., GREEN for pass, RED for fail.
 - 2. The lighting of the circuit pack's LED provides additional feedback to maintenance personnel on the outcome of the verification test and aids in locating the faulty circuit pack.
- b. Automatic Verification: When the diagnostic analysis and verification test is run from appropriate maintenance procedures, a faulty circuit location is displayed that points to the circuit pack to replace.
 - 1. At the same time the RED LED on that circuit pack's edge is lighted.
 - 2. While a circuit pack's RED LED is lighted in this mode, the circuit pack is scanned at a high rate to determine when it is unseated, and a circuit pack reseated or replaced.
 - 3. After the circuit pack is reseated or replaced a verification sequence is run on the circuit pack, and the results are displayed. The appropriate LED on the circuit pack edge is lighted.

Periodic Mode: Feedback on the frequency and coverage of periodic tests in the digital network is valuable for isolating serious software problems in the field. Feedback is only provided when the **MAAP** is connected to the switch.

- a. To provide this feedback, each periodic test associated with the digital network recognizes when the **MAAP** is connected and lights the GREEN LED on the edge of the main circuit pack under test. The LED is left on until the conclusion of the test.
- b. This use of the GREEN LED provides a maintenance **heartbeat** that indicates the frequency and coverage of periodic test routines in the network.

Green Pilot LEDs:

- a. Green **pilot** LEDs are used to denote that a circuit pack has power and is operational. The power supply boards, High Capacity Mini-recorder (HCMR), and 20 Hz ringing generators have GREEN pilot LEDs.
- b. The tape interface circuit pack (TN430) has a GREEN LED which provides a heartbeat that indicates the state of the tape subsystem. A fast heartbeat (5 Hz) indicates when TN430 is off the bus. A slow heartbeat (1 Hz) indicates when TN430 is allowed on the bus.

Yellow In-Use LEDs: Yellow in-use LEDs are used to denote that a circuit pack is in an idle or an in-use state. The following circuit packs contain YELLOW in-use LED indicators:

- a. TMS or module control channel (MCC) circuit pack (TN401): The MCC has two YELLOW LEDs; one flashes when the MCC is communicating with CCO, and the other flashes when the MCC is communicating with CC1.
- b. Duplication channel circuit pack (TN530): The duplication channel circuit pack has one YELLOW LED to indicate if it is in the on-line side of the common control carrier.
- c. Light guide interface circuit pack (TN481): The light guide interface circuit pack has one YELLOW LED to indicate if it is in the on-line side of the module control carrier.
- d. Port circuit packs: Except for the tone plant and the touch tone dialing senders and receivers, each port circuit pack has one YELLOW LED that is the **OR** of activity in any of the ports on the circuit pack.
 - 1. If any one of the ports on a port circuit pack are in-use, then the YELLOW LED is lighted. Removal of the circuit pack when the YELLOW LED is lighted disrupts service on the circuit(s) in-use.
 - 2. The touch tone dialing sender and receiver circuit packs have one YELLOW LED per port (four per circuit pack).

System clock synchronizer (SCS) circuit pack (TN463)

The SCS circuit pack has eight LEDs which consist of:

- a. A yellow LED in positions one and two which are dedicated to the primary and secondary synchronization reference sources respectively. If either of these LEDs are lighted, it indicates the associated reference is unusable (out of lock).
- b. A yellow LED in positions 14, 15, and 16 that indicate when lighted, which reference is online.

LED position 14 is for the internal High Accuracy Clock (HAC); position 15 is for the primary synchronization reference; and position 16 is for the secondary synchronization reference.

- c. A yellow LED in position 17 is used for duplicated module control (single module system) or duplicated TMS (multi-module system) carrier applications. When lighted, it indicates that the synchronization reference is receiving clock reference from the synchronization reference in the on-line duplicated carrier. This LED should always be lighted in the off-line carrier.
- d. A red and green LED in positions 18 and 19 indicating when lighted the FAIL and PASS status of the circuit pack when a diagnostic test is performed.

Remote Module Interface (RMI) Circuit Pack (TN456)

The RMI circuit pack has seven LEDs which consist of:

- a. A yellow LED in position 7 indicating the on-line status when lighted.
- b. A yellow LED in position 9 indicating the MAAP in-use status when lighted.

- c. A red LED in position 11 indicating the LFAIL status when lighted.
- d. A green LED in position 14 indicating the transmit (FTA) status when lighted.
- e. A green LED in position 16 indicating the receive (FRA) status when lighted.
- f. A red and green LED in positions 18 and 19 indicating when lighted the FAIL and PASS status of the circuit pack when a diagnostic test is performed.

DS-1 Circuit Pack (ANN11)

The DS-1 circuit pack has five LEDs which consist of:

- a. A green LED in position 7 indicating a red alarm if not lighted.
- b. A green LED in position 8 indicating a yellow alarm if not lighted.
- c. A yellow LED in position 9 indicating initialization or busy when lighted.
- d. A red and green LED in positions 18 and 19 indicating when lighted the FAIL and PASS status of the circuit pack when a diagnostic test is performed.

Physical Placement of LEDs

There are 19 LED positions on the edge of each circuit pack. The positions start from the top of the circuit pack (as it sits in a carrier), and extend most of the way down to the circuit pack's connector. The position at the top is number one, and at the bottom is number 19.

The standard configuration places the maintenance ID chip RED and GREEN LEDs in positions 18 and 19, respectively. When there is a single YELLOW **in-use** LED it is placed in position nine. If there are several YELLOW LEDs they are placed from position one down to as many contiguous positions as are needed. GREEN **pilot** LEDs are placed in position one to prevent confusing the pilot LED with the GREEN maintenance LED.

TOOLS AND TEST EQUIPMENT

Tools and test equipment required for maintenance of the System 85 switch consist of:

- a. Alarm Panel.
- b. MAAP.
- c. Digital multimeter KS-20599, L4 or equivalent.
- d. Looparound test fixtures.
- e. Touch-tone telephone set.
- f. Rotary dial telephone set.
- g. W1AP test cords. (2)
- h. 249A adapter.
- i. Telephone set.
- j. 1013 type hand set.
- k. ANI Data Link Test Set (J59204AJ) and connector cable (List 4).

The alarm panel and MAAP are used with the switch as on-site maintenance tools.

- a. The alarm panel provides LED indicators to denote the state of health of the system. The LEDs are used to identify the problem area(s) when a switch failure occurs. The alarm panel also provides controls for processor operation and emergency transfer.
- b. The **MAAP** is the basic interface between maintenance personnel and the switch. It provides access to maintenance procedures which are used for interrogation, testing, and fault isolation.
- c. The alarm panel and MAAP are covered in detail in other sections of this service manual.

A digital multimeter KS-20599, L4 or equivalent is required when performing **PROC 601** (environmental tests) to measure voltages at test points to determine corrective action to be performed.

Looparound test fixtures are required when performing **PROC 611** (common control tests) and **PROC 650** (DCIU) to perform manual external looparound tests.

A touch-tone telephone set, rotary dial telephone set, W1AP test cords and 249A adapter are required when making terminal-to-terminal test calls and testing rotary digit collection. These tools are used in performing **PROC 641** (terminal-to-terminal test call).

A telephone set with W1AP test cords and a 249A adapter or a 1013 hand test set and 249A adapter are required when making terminal-to-trunk test calls or listening to transmitted tones at the test line. These tools are used in performing **PROC 642** (terminal-to-trunk test call), **PROC 643** (terminal-to-tone test call), and **PROC 644** (terminal-to-auxiliary tone test call).

The ANI Data Link Test Set (J59204AJ) and connector cable (List 4) are required when running Tests 2 through 4 of **PROC 623** (ANI failures) to prevent test messages being sent to the central office. A diagram of the test configuration is shown in Figure 4.

PREVENTIVE MAINTENANCE

Preventive maintenance tasks should be performed as part of the maintenance visit. Maintenance tasks are determined by the user of the switch.

As a minimum, the following maintenance tasks should be performed after maintenance activities are completed.

- a. Check with the user of the switch to determine if any type of intermittent problems exist. Perform corrective action as appropriate.
- b. Examine the switch error log of the on-line and off-line side (if duplicated) using **PROC 600** Test 2, to determine if potential problems exist. Take corrective action as necessary.
- c. If backup batteries are provided, check replacement date(s) and replace batteries if required.
- d. Replace Gates batteries comcode 403736291 in the J87462A power unit at least once every 2 years.
- e. Clean high capacity minirecorder tape head.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on cleaning the high capacity minirecorder tape head.



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Figure 4. ANI Data Link Test Set

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TROUBLE CLEARING

GENERAL

Overview

There are four ways of indicating a trouble within the switch. The indications may be investigated locally or by a remote maintenance facility. The trouble indications are:

- a. Alarmed troubles.
- b. User reported troubles.
- c. No response from the switch.
- d. Maintenance polling.

Trouble clearing is based on the type of indication received and is covered in the paragraphs entitled: Alarmed Troubles; User Reported Troubles; and No Response from the Switch.

All of the trouble indications may initially be investigated by user personnel or a remote maintenance facility (depending on the status of the switch).

It is recommended that you read the paragraph entitled: **Recovery** prior to performing trouble clearing on System 85.

Items Affecting Trouble Clearing

- 1. The customer order document is required to identify the system assignments necessary to perform trouble clearing procedures.
- 2. Trouble clearing is directed to troubles within the System 85 switch. When troubles involve terminals or trunks, it is assumed that equipment and circuitry external to System 85 is functioning and the trouble is isolated to the System 85 switch.
- 3. The System 85 service manual is not intended to solve all levels of trouble. It is limited to troubles that can be solved by using the **MAAP**, common test equipment, and component replacements. When the limit of the trouble clearing analysis is reached and the trouble is still not cleared, the user is directed to a source of further trouble clearing information.
- 4. The equipment frame of the cabinet should always be touched before touching wiring, circuit packs or components to prevent electrostatic damage.

WARNING: All personnel who handle circuit packs, components, or wiring should be properly grounded. When using a ground wrist strap, the strap should not be worn over clothing but should touch the individual's skin.

5. The electromagnetic compatibility (EMC) wrist strap and cable assembly (cc900698226) is placed in the bottom of the module control cabinet in a poly bag (cc900492372) next to the AC distribution unit.

Note: This wrist strap is to be used when troubleshooting or performing maintenance or handling any circuit packs associated with the System 85 switch.

- 6. The EMC wrist strap assembly is used in the following manner:
 - a. Attach the wrist strap to either wrist.
 - b. Connect the alligator clip to the cabinet frame.
- 7. A good ground connection for the alligator clip is:
 - a. In equipment coded cabinets which have removable sides, attach the alligator clip to any convenient screw head that fasten the hinges to the cabinet or to the screws that fasten the door latch to the frame.
 - b. In equipment coded cabinets which have intergrated sides, the front and rear cabinet formed faces (front door area or back area when viewed in an open position) which are coated with a conductive paint; the alligator clip may be attached to any of these surfaces.
 - c. In either case an area close to the vertical center of the cabinet should be selected for the alligator clip allowing a more central position from which to operate.
- 8. Option settings (as appropriate) on original and replacement circuit packs must be verified prior to replacement.
- 9. The service manual assumes that all replacement items and test equipment used are correct and functional, to simplify trouble clearing analysis.
- 10. When replacement of equipment does not clear the trouble, the original equipment should be installed.
- 11. The AC circuit breakers on all cabinet power supplies should be checked prior to performing trouble clearing analysis.
- 12. The DC/DC converter handle should **not** be toggled when replacing circuit packs in the TMS and/or module control carriers.

Trouble Clearing Priority

When more than one category of trouble is either indicated or reported, the no response from switch trouble must be cleared first, followed by alarmed troubles, and then user reported troubles.

Maintenance Polling

Prior to maintenance personnel leaving the user's premises the switch should be polled to determine if potential problems exist. This polling can be accomplished by examining Test 2 of **PROC 600** to determine if any alarms or recorded errors exist for any circuit or unit type.

- 1. The data displayed for each unit type and circuit should be recorded and maintained for future use.
- 2. When the entry for a particular unit type and circuit is determined to be severe, the maintenance procedure for that unit type and circuit should be entered and the associated trouble analysis procedure performed.

When the switch is duplicated, both the on-line and off-line side should be examined.

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RECOVERY

Overview

System 85 has built in recovery software to restore the switch integrity and availability after power failures and hardware failures.

When some of the longer recovery processes are being executed, maintenance personnel may be tempted to take such actions as operating the **GO/HALT** switch, forcing a reload by depressing the **ENABLE** switch, etc.

Note: If such actions are taken the recovery process may be prolonged. In addition, test equipment (i.e., TN514 scamper) can interfere with the recovery process.

The estimated time for recovery software to rebuild is approximately 15 seconds per module or a maximum of 5 minutes for a large switch.

Maintenance personnel should wait the appropriate amount of time when the switch is not providing service before taking additional (or premature) trouble clearing actions in the following areas:

- a. Short power failures.
- b. Long power failures.
- c. Use of GO/HALT switch or RESET switch.

Short Power Failures

When short power failures (less than 10 minutes) are experienced in systems without optional holdover, the common control continues to operate but the modules and TMS processors stop operating after power is removed for more than 100 ms.

In duplicated 501CC switches, the common controls attempt a soft switch.

- a. The soft switch takes about a minute in switches with 2 megawords of memory.
- b. The modules initialize when power to modules are restored.

Note: Maintenance personnel should observe the module processors (TN380) for a heartbeat indicating initialization.

- c. Initialization of the modules takes less than 20 seconds for the switch.
- d. A rebuild takes place following TMS/module processor initialization.

Note: Maintenance personnel should observe the yellow LED on the on-line module control channels (TN401) which indicates the rebuild is taking place.

Long Power Failures

For long power failures, (longer than 312A holdover capacity - approximately 10 to 30 minutes), the switch recovers by loading from tape and initializing hardware.

The time for the tape load depends on the configuration of the switch and initialization takes approximately another minute or so. Maintenance personnel should wait approximately 5 minutes before taking any additional action.
The tape load should be monitored by plugging the **MAAP** into the appropriate connector and observing the LEDs on TN430 in the common control carrier.

- a. The **RED** LED in position 2 of TN430 and the **YELLOW** LED at the middle of the circuit pack are lighted to indicate the beginning of the tape load.
- b. Next, the **GREEN** LED in position 1 of TN430 starts flashing (indicating tape interface is being initialized).
- c. Then the **GREEN** LED in position 1 goes either steady on or off while the tape is moved to a load position.
- d. Next, data is read from tape and the MAAP is updated. (Encodes 1 through 4.)
- e. When the tape load is completed and successful, the **PASS** indicator on the tape alarm panel flashes at a 1-second on, 1-second off rate.

Note: There may be a small delay before the heartbeat appears.

Initialization of the modules takes less than 20 seconds for the switch.

Note: Maintenance personnel should observe the module processors (TN380) for a heartbeat indicating initialization.

GO/HALT Switch and RESET Switch

When the system is halted using the **GO/HALT** switch the recovery action takes approximately 20 seconds when the switch is returned to the **GO** position.

The same recovery action is taken when the system is removed from suicide or emergency transfer by depressing **RESET** and no serious hardware faults are experienced.

If serious hardware faults are experienced, recovery may take the rebuilding or reloading actions described above.

Before taking additional trouble clearing action, maintenance personnel should try to determine what the switch is doing by:

- a. Observing MAAP indications.
- b. Observing LEDS on the alarm panel, module control carriers (i.e., TN380 and TN401), and critical port circuits (i.e., touch-tone receivers).
- c. Waiting the appropriate time for the automatic recovery actions to take place.

ALARM TROUBLES

Overview

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Alarms can be visually observed by maintenance personnel on the customer's premises via the alarm panel or on the customer's attendant consoles. In addition, major and minor alarms are automatically reported to a remote maintenance facility (if provided).

The alarm panel contains alarm and fault indicators which are used for determining system status. Various alarms are displayed on the panel such as major, minor, and warning. Fault indicators are associated with major functional areas of the system.

Retiring Alarms

Alarms are retired by investigating, isolating, and repairing the cause of the alarm condition. After making a repair the appropriate verification test is run using the maintenance procedure associated with testing the circuit to ensure that the problem is corrected.

- 1. When the circuit verification test is successfully run without a failure, the alarmed entry in PMIDS is automatically resolved and the associated fault indicator is turned off (if no other alarmed entries are affecting the same fault indicator).
- 2. When more than one alarm cause exists at a particular level, all alarm causes must be resolved before the fault indicator is automatically turned off.
- 3. When it is necessary to further isolate an alarm cause, **PROC 600** (alarm causes/error log) may be used to manually turn off one or all fault indicators while retaining the failure history. The fault indicator is reactivated by any subsequent errors that cause an alarm threshold to be exceeded.

Trouble Clearing of Alarmed Troubles

Alarms are generated by hardware and/or software detection.

- 1. Maintenance diagnostics, which are an integral part of the system software, monitor system parameters and turn on alarm indicators when unacceptable limits are exceeded.
- 2. Specific on- and off-line maintenance procedures which are designated near the fault indicators are used to isolate the cause of the fault indicator being lighted.
- 3. When multiple fault indicators are lighted on the alarm panel it is difficult for maintenance personnel to determine where to start. One lighted fault indicator may affect or be the cause of other fault indicators being lighted.
- 4. Therefore, the primary maintenance aid for investigating and isolating the cause of the lighted fault indicator is PROC 600, Test 1 which provides the sequence of maintenance procedures to be performed.

Test 1 of **PROC 600** provides a display of alarms by order of severity and by priority (functional areas) within alarm levels.

- 1. All major alarms are displayed first, then minor alarms, and last is warning alarms. Each level of alarm is displayed by importance of functional area.
- 2. When two or more alarms of the same level are displayed, the functional area that is most important to the operation of the switch is displayed first. This alarmed entry is investigated first as its cause may affect the rest of the alarmed entries.
- 3. The maintenance procedure referenced in Field 15 of **PROC 600** is used to diagnose and isolate the cause of the alarm trouble.

Maintenance procedures (in general) consist of at least three types of tests:

1. Failure history - this test displays the results of on-line routine maintenance testing which is active during normal call processing. It is the starting point for alarm indicator trouble analysis. The failing circuits are recorded and maintained for comparison of results in later tests.

- 2. Active diagnostic testing of all circuits these tests which are under the control of maintenance personnel can check all circuits of the same type. A list of maintenance failures (if any) is recorded and maintained to determine the corrective action required to clear the alarm indicator. Corrective action to be taken is based upon failure codes, failure patterns, and/or failing circuits.
- 3. Continuous testing of individual circuits the primary purpose of this test is to check for intermittent failures and to facilitate checking of wiring problems. Circuits recorded in the failure history, but not in active diagnostic testing, should be checked using this test.

Comparison of results - when corrective action is taken (replacement of circuit pack, etc.) as a result of active diagnostic testing, the active diagnostic test is repeated to determine if the failure is corrected and to turn off the alarm indicator.

- 1. When failures still exist a comparison must be made to determine if the same failure code, failure pattern, or failing circuit is the problem. This is required because all circuits of the same type may be tested.
- 2. The comparison can be accomplished by recording each failure and comparing the new list against the original list, or by using **NEXT CIRCUIT** (or another appropriate key) and comparing the failures displayed against those initially recorded.
- 3. Further corrective action is dependent upon the results of the comparison.

Duplicated common control switches, TMS/network control complexes

When troubles exist in both common controls, the alarm indicator(s) lighted on the active (on-line) common control should be cleared first, unless the maintenance procedure referenced in Field 15 of **PROC 600** Test 1 can be performed off-line.

PROCs 600 (Alarm causes/error log), 610 (Tape tests), 611 (Common control tests), 612 (Initialization causes), 615 (MAAP test), 616 (Alarm panel test), and 650 (DCIU tests) can be performed on-line and off-line.

When alarm troubles in a duplicated TMS/network complex are indicated, tests should be performed off-line by soft locking the TMS/network complex on-line to prevent unexpected switches (if possible); repair action taken; test on-line (after releasing the soft lock) to verify the trouble is cleared; then switch to best side of the TMS/network complex (if appropriate or required).

Prior to leaving the user's premises, maintenance personnel should investigate both common controls in a duplicated common control switch by using **PROC 600** Test 2 to determine if potential problems exist. Corrective action as necessary should be performed when conditions are such that the problem could affect customer service.

Release of Busied Out Circuits

When the **BUSY OUT LED** is lighted on the **MAAP**, the use of **RLS BUSY OUT** may release busied out circuits, trunk groups, or carriers if the capability is provided by the maintenance procedure entered.

- 1. If the capability is not provided by the maintenance procedure or the **BUSY OUT** LED remains on because some other type of circuit may be busied out, **PROCs 630, 631**, and **632** can be used as necessary to release busy out circuits, trunk groups, or carriers.
- 2. **PROCs 630, 631**, and **632** (as necessary) should be entered to determine the type and number of circuits, trunk groups, or carriers busied out.

- 3. If circuits, trunk groups, or carriers are maintenance busied, the reason for their status must be determined and corrective action taken (if required) before they are released from busy.
- 4. If the **BUSY OUT** indicator on the **MAAP** is still lighted after all terminals, trunk groups, or carriers are released from busy the cause is probably a soft lock of the TMS or network duplication channel or a DCIU link.
 - a. **PROC 621** should be entered to determine the soft lock status of the TMS or network duplication channel.
 - b. PROC 650 Test 3 should be entered to determine the busy out status of DCIU links.

USER REPORTED TROUBLES

Overview

User reported troubles are normally generated as the result of troubles encountered and reported by the user. Reported troubles are normally those problems that concern a single instrument or a service. Some examples of user reported troubles are: loss of dial tone, disconnect, no ringing, or poor transmission.

The user reported trouble can also be caused by an inadvertent translation change, or be of an intermittent nature.

User trouble reports are divided into four separate types of failures: basic call failures (such as terminal or trunk), data module failures, failures of features provided by the switch, and attendant console.

Several methods are used to determine the cause of the user's reported trouble.

- 1. Determining if errors are recorded against the suspect circuit by using the alarm causes/error log maintenance procedure **PROC 600**, Test 2. The circuit may have errors recorded against it in Test 2 which do not exceed the threshold to raise an alarm.
- 2. Using the appropriate maintenance procedure for the suspect circuit and testing the circuit on a continuous basis to determine if the reported trouble is intermittent.
- 3. Performing a functional test of the user's reported trouble, e.g., call terminal extension (if possible).
- 4. Checking translation to determine if the suspect circuit is properly administered.
- 5. Using the following **PROCs** at the user's premises to determine the usability of the equipment:

PROC 641 - Terminal-to-terminal test call.

PROC 642 - Terminal-to-trunk test call.

PROC 643 - Terminal-to-tone test call.

PROC 644 - Terminal-to-auxiliary tone test call.

6. Performing self-tests (if available) for the suspect equipment. The self-test must be performed at the customer's premises.

72 and 74 Series Terminals

When troubles with terminals connected to the switch are reported by the user, perform the following steps as appropriate.

No dial tone

Use **PROC 622** Test 1 to check for errors recorded against the terminal and perform **PROC 622** Test 3 to isolate the trouble.

Cannot dial

Replace the terminal.

Cannot receive calls

Use **PROC 622** Test 1 to check for errors recorded against the terminal and perform **PROC 622** Test 3 to isolate the trouble.

Does not ring

Assuming that there are no other indications of an incoming call, perform the dial-up test for ringer.

- 1. If the ringer dial-up test does not pass, replace the 74 Series terminal or 72 Series terminal.
- 2. Repeat the ringer dial-up test. If the ringer dial-up test fails again, use **PROC 620** Test 4 to check the associated port circuit. Replace the port circuit as necessary.

Indicator does not light

Perform the dial-up test for indicator. In addition, (for MFAT or MFDT sets) perform a self test. If the indicator dial-up test or self test fails, replace the terminal.

Buttons do not work

Perform the dial-up test for buttons. If the button dial-up test fails, replace the terminal. If the button dial-up test passes, check translation of the buttons assigned to the terminal.

Cannot hear

Replace the handset or terminal.

Cannot be heard

Replace the handset or terminal.

Intermittent troubles

If intermittent troubles are suspected or reported by the user, perform the following steps:

- 1. Determine if errors are recorded against the suspect circuit by using **PROC 600**, Test 2. The circuit may have errors recorded against it in Test 2 which do not exceed the threshold to raise an alarm.
- 2. Use the appropriate maintenance procedure for the suspect circuit and test the circuit on a continuous basis.

Take corrective action as necessary.

3. Use the following **PROCs** to determine the usability of the equipment:

PROC 641 - Terminal-to-terminal test call.

PROC 642 - Terminal-to-trunk test call.

PROC 643 - Terminal-to-tone test call.

PROC 644 - Terminal-to-auxiliary tone test call.

Data Modules

When troubles with data modules PDM, TDM, or DTDM are reported by the user, perform the following steps as appropriate.

Cannot originate calls

Run a self test on the data module and 74 Series terminal (if DTDM).

- 1. If the self test fails, replace the data module or 74 Series terminal.
- 2. If the self test passes, use **PROC 622** Test 1 to check for errors recorded against the data module or 74 Series terminal. Use **PROC 622** Test 3 to isolate the trouble.

Cannot receive calls

Run a self test on the data module and 74 Series terminal (if DTDM).

- 1. If the self test fails, replace the data module or 74 Series terminal.
- 2. If the self test passes, use **PROC 622** Test 1 to check for errors recorded against the data module or 74 Series terminal. Use **PROC 622** Test 3 to isolate the trouble.

Data call is apparently set up, but no data can be sent or received

Run the following local tests (Steps 1 through 3) on the data module.

- 1. Self test If this test fails, replace the data module.
- 2. Local loop back If this test fails, there is a problem between the user's terminal equipment and the data module.

If data module is optioned for terminal dialing, try to set up a data call. If dialed characters are echoed, connection is good between data module and terminal.

3. Remote loop back or remote loop back and self test combined.

Note: If a remote loop back test using the user's terminal equipment can be performed, it is the preferred test.

Set up a connection to the remote data terminal and operate the remote loop back button.

Note: For DTL mode 0 and 1 operation, the remote loop back button must be operated before the call is set up.

Perform a remote loop back test or operate the self test button.

If the test fails, the trouble could be in either data module or in any of the circuits between the data modules.

Intermittent troubles

If intermittent troubles are suspected or reported by the user, perform the following steps:

1. Determine if errors are recorded against the suspect data module by using **PROC 600**, Test 2. The data module may have errors recorded against it in Test 2 which do not exceed the threshold to raise an alarm.

2. Use the appropriate maintenance procedure for the suspect circuit and test the circuit on a continuous basis.

Take corrective action as necessary.

PDM or TDM Self Tests

The PDM is a DCE-type device used to transmit and receive serial data over a 4-wire DTL link in the System 85. It provides an interconnection (without a voice terminal) between the system and customer-provided data terminal equipment.

The TDM serves as a data terminal equipment (DTE) to interface the System 85 data capabilities to a private line data channel via a data set or a data service unit, using an RS-232C interface.

Self tests on PDM (refer to Figure 5) or TDM (refer to Figure 6) data modules are performed as follows.

Caution: Operating the SELF TEST switch without operating the REMOTE LOOP BACK switch during a call terminates the call.



Figure 5. Processor Data Module (PDM)

Self Test

- 1. Place the **SELF TEST** switch in the **SELF TEST** position. The internal circuits of the PDM or TDM are checked.
- 2. During the test, the TEST IN PROGRESS indicator stays on.
- The TEST RSLT indicator is steadily ON if the internal circuits test passes. The TEST RSLT indicator flashes if the internal circuits test fails.
- 4. If the PDM or TDM passes the internal circuits test, a known bit sequence is looped through the internal data path and checked for errors.

Any bit error causes the TEST RSLT indicator to flutter momentarily.

If no bit errors occur, the **TEST RLST** indicator is steadily **ON**.

 At the end of the test, place the SELF TEST switch in the OFF position. The TEST IN PROGRESS and TEST RSLT indicators are turned OFF.



Figure 6. Trunk Data Module (TDM)

Local Loop Test

Caution: If a PDM or TDM is placed in a local loop back mode while a call is in progress, the call is terminated.

Note: A DTE is required for PDM testing which provides an internal loop back prior to DTL link interface. A data terminal and a data set or data service unit is required for TDM testing which provides an internal loop back prior to DTL link interface.

1. Place the LOC LOOP/REM LOOP switch in the LOC LOOP position.

The EIA interface is active in this mode and the data transmitted by the terminal is looped back to the terminal.

- 2. During the test, the TEST IN PROGRESS indicator is on.
- 3. Check the data transmitted against the data displayed on the DTE.

The test passes if no errors are found.

 At the end of the test, place the LOC LOOP/REM LOOP switch in the OFF position. The TEST IN PROGRESS indicator is turned OFF.

Remote Loop Test

1. Place the LOC LOOP/REM LOOP switch in the REM LOOP position during a call.

Data transmitted by the local DTE is looped back from the remote module prior to its EIA interface.

- 2. During the test, the **TEST IN PROGRESS** indicators on both the local and remote modules are lighted and the remote module is disabled for data transmission and reception.
- 3. Check the data transmitted against the data displayed on the DTE

The test passes if no errors are found.

- 4. The remote module, if necessary, terminates the call by turning the CD interface lead (data terminal ready) OFF.
- 5. Data transmission can be restored by placing the LOC LOOP/REM LOOP switch in the OFF position.

Caution: The call is terminated if the switch is placed in the LOC LOOP position.

The TEST IN PROGRESS indicator is turned OFF.

Remote Loop back/Self Test

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- 1. Place the LOC LOOP/REM LOOP switch in the REM LOOP position after a call is set up to put the remote module into remote loop.
- 2. Place the SELF TEST switch in the SELF TEST position.
- 3. The module generates a known bit sequence and transmits it to the remote module where the data is looped back prior to the EIA interface of the remote module.

The local module, upon receiving the bit sequence, checks it with the transmitted bit sequence for error.

4. The **TEST RSLT** indicator flashes every time an error is detected and stays steadily **ON** if no error bit is detected.

Caution: If the REM LOOP switch is placed in the OFF position before the SELF TEST switch is placed in the OFF position, any call is terminated.

- 5. After test completion, place the SELF TEST switch in the OFF position.
- 6. Place the **REM LOOP** switch in the **OFF** position.

DTDM Self Tests

The DTDM (Figure 7), is a data communications equipment (DCE) type device used to transmit and receive serial customer data from an EIA RS-232C interface over a 4-wire DTL link in the System 85.



Figure 7. Voice Terminal with a Digital Terminal Data Module (DTDM)

The DTDM provides an interconnection between the System 85 and customer-provided data terminal equipment (DTE). The DTDM serves as an adjunct module to a digital voice terminal.

The digital voice terminal provides the interconnect function to the DTL link interface. The digital voice terminal and the DTDM integrate both voice and data communications onto the same link allowing for simultaneous transmission.

Self tests on DTDM data modules (refer to Figure 8) are performed as follows.





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All incoming calls or call origination requests are not accepted while switches are in the test position. The **DTDM TEST IN PROGRESS** indicator remains **on** for the duration of each test.

Caution: Established calls are disconnected when test switches are moved from their OFF position.

Note: Placing the LOCAL LOOP/REMOTE LOOP switch in the REMOTE LOOP position does not disconnect an established call.

Self Test

1. Place the SELF TEST switch in the SELF TEST position.

This test first checks the DTDM integrity.

2. If the test fails, the **TEST RESULTS** indicator flashes continuously.

If the test passes, the TEST RESULTS indicator comes on.

3. After the DTDM integrity test passes, the self test continues.

A known bit sequence is looped through the internal data path and checks for errors.

- 4. Any errors detected cause the TEST RESULTS indicator to momentarily flutter.
- 5. If the data is looped back without any detected errors, the **TEST RESULTS** indicator comes **on**.
- 6. The indicator remains on until the SELF TEST switch is returned to the OFF position.

Local Loop Test

1. Place the LOCAL LOOP/REMOTE LOOP switch in the LOCAL LOOP position.

This test checks the data path prior to the DTL link interface.

2. Enter several DTE keyboard characters.

The DTE display should show the same characters as entered.

3. When the test is complete, return the LOCAL LOOP/REMOTE LOOP switch to the OFF position.

Remote Loop Test

- 1. Place a call to another data module.
- 2. Place the LOCAL LOOP/REMOTE LOOP switch in the REMOTE LOOP position.

This test checks the data path from the DTE to the EIA interface of the called module.

3. Enter several DTE keyboard characters.

The DTE display should show the same characters as entered.

 When the test is complete, return the LOCAL LOOP/REMOTE LOOP switch to the OFF position.

Remote Loop/Self Test

- 1. Place a call to a data module.
- 2. Place the LOCAL LOOP/REMOTE LOOP switch in the REMOTE LOOP position.

3. Place the SELF TEST switch in the SELF TEST position.

A known bit sequence is looped through the data path from the DTDM to the EIA interface of the called module and checks for errors.

4. Any errors detected cause the **TEST RESULTS** indicator to momentarily flutter.

If the data is looped back without any detected errors the indicator comes on.

5. The indicator remains on until the SELF TEST switch is returned to the OFF position.

Caution: The SELF TEST switch must be returned to the OFF position before the REMOTE LOOP switch is returned to the OFF position or the call is terminated.

Features

When troubles with features provided by the switch are reported by the user, perform the following steps:

1. Determine if the feature trouble is isolated to a single terminal or experienced by all terminals.

If the feature trouble is isolated to a single terminal, proceed to Step 3.

If the feature trouble is experienced by all terminals, proceed to Step 2.

2. Check the customer order document to determine if the feature is a valid feature.

If the feature is not valid, check with customer assistance or notify the user.

If the feature is valid, check switch translation and administer as necessary.

3. Check switch translation for the terminal experiencing the trouble.

Administer the feature as necessary.

If the feature is administered, determine from the user if the trouble is intermittent.

4. If the trouble is not intermittent, replace the terminal.

If the trouble is intermittent, proceed to Step 5.

- 5. Determine if errors are recorded against the suspect circuit by using **PROC 600**, Test 2. The circuit may have errors recorded against it in Test 2 which do not exceed the threshold to raise an alarm.
- 6. Use the appropriate maintenance procedure for the suspect circuit and test the circuit on a continuous basis.

Take corrective action as necessary.

Attendant Console

When a continuous audible tone at the attendant console is reported by the user (caused by a system power interruption or the attendant console headset is plugged in), perform the following:

Operate the test switch on the left side of the attendant console to remove the tone.

Note: The test switch is located on the front panel of the storage area containing the card for attendant use.

NO RESPONSE FROM SWITCH

Overview

Trouble clearing when there is no response from the switch depends on the symptoms of the total switch failure.

No dial tone, can't dial out, etc., reported by the customer or loss of communications between the switch and a remote maintenance facility (if provided) are types of total switch failure.

If no dial tone is reported and the common control appears to have the normal heartbeat, a condition of multiple simultaneous seizures that are not followed by dialing may be occurring.

PROC 420 allows maintenance personnel to display processor occupancy to further verify that the lack of dial tone is not the result of an overloaded processor.

If the system has alarmed DS-1 circuit packs, maintenance personnel should consider busying out the alarmed DS-1 circuit packs to eliminate a potential source of multiple seizures.

Contact with the user and examination of the alarm panel helps to determine how the switch is functioning and the type of trouble clearing procedure to perform.

If no LEDs on the alarm panel are lighted, a total switch failure has probably occurred. Perform the trouble clearing steps listed under **System Down - No LEDs Lighted** to restore the switch.

If the switch is in emergency transfer (EMERGENCY TRANSFER ACT indicator lighted), perform the trouble clearing steps listed under Emergency Transfer - Processor Suicide Suspected to restore the switch.

If a remote maintenance facility (if provided) cannot communicate with the switch, perform the trouble clearing steps listed under **Communications with Remote Maintenance Facility Lost** to restore communications.

System Down - No LEDs Lighted

1. Verify ac power is on at customer provided ac panel.

If ac power is available, proceed to Step 2.

If ac power is not available, contact the customer.

2. Visually inspect all fuses, circuit breakers, and power cables.

If no problem is found with fuses, circuit breakers, and power cables, proceed to Step 3.

If a problem is found, replace the fuse(s), reset circuit breaker(s), or replace power cable(s).

3. Check DC/DC converter and rectifier output voltages.

If all voltages are within acceptable limits, proceed to Step 4.

If abnormal voltages are noted, replace DC/DC converter circuit packs, DC/DC converter, or rectifier as appropriate.

4. Perform Microdiagnostic Testing.

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Emergency Transfer - Processor Suicide Suspected

1. Inspect the alarm panel.

If the EMERGENCY TRANSFER ACT indicator is on and the PASS indicator is flashing, ensure that the EMERGENCY TRANSFER switch is set to OFF and proceed to Step 6.

If the EMERGENCY TRANSFER ACT and MAJOR indicators are on, and the CC PWR indicator is off, proceed to Step 2.

If the EMERGENCY TRANSFER ACT, MAJOR, and CC PWR indicators are on, proceed to Step 4.

2. Inspect network cabinets for tripped circuit breakers and/or blown fuses.

If no problem is found with circuit breakers and fuses, proceed to Step 3.

If a problem is found, reset the circuit breakers and/or replace blown fuses.

3. At network cabinets, measure DC/DC converter circuit pack and rectifier output voltages.

If all voltages are within acceptable limits, proceed to Step 6.

If some voltages are out of acceptable limits, replace DC/DC converter circuit packs, rectifier or associated circuit packs, or wiring (as appropriate) to restore voltages to within acceptable limits. Proceed to Step 6.

4. Inspect common control cabinet for tripped circuit breakers and/or blown fuses.

If no problem is found with circuit breakers and fuses, proceed to Step 5.

If a problem is found, reset the circuit breakers and/or replace blown fuses.

5. At common control cabinet measure DC/DC converter output voltages.

If all voltages are within acceptable limits, proceed to Step 6.

If some voltages are out of acceptable limits, replace DC/DC converter circuit packs, rectifier or associated circuit packs, or wiring (as appropriate) to restore voltages to within acceptable limits. Proceed to Step 6.

6. At alarm panel, depress **RESET**, and momentarily set **HALT/GO** switch to **HALT**, then to **GO**.

If the **PASS** indicator is flashing, and the **CC PWR**, **MAJOR** and **ACT** indicators are off, the processor suicide trouble is corrected. Perform **PROC 600** Test 1 and 2 to determine the health of the switch.

If the **PASS** indicator is not flashing, proceed to Step 7.

7. Perform Microdiagnostic Testing.

Communications with Remote Maintenance Facility Lost

1. At common control carrier, verify that circuit breaker CB2 is not tripped.

If circuit breaker **CB2** is not tripped, proceed to Step 3.

If circuit breaker CB2 is tripped, reset the circuit breaker and proceed to Step 2.

2. Determine if contact with the remote maintenance facility is established.

If contact is established, corrective action is complete.

If contact is not established, proceed to Step 3.

3. At data set associated with the remote maintenance facility, verify that power is provided and appropriate LEDs are lighted.

If power to the data set is provided and appropriate LEDs are lighted, proceed to Step 5.

If power to the data set is not available or appropriate LEDs are not lighted, correct the problem and proceed to Step 4.

4. Determine if contact with the remote maintenance facility is established.

If contact is established, corrective action is complete.

If contact is not established, proceed to Step 5.

 At cross connect field, visually inspect wiring for the remote maintenance facility. If wiring is correct, proceed to Step 7.

If wiring is not correct, correct wiring and proceed to Step 6.

6. Determine if contact with the remote maintenance facility is established.

If contact is established, corrective action is complete.

If contact is not established, proceed to Step 7.

- 7. Replace TN492 and proceed to Step 8.
- 8. Determine if contact with the remote maintenance facility is established.

If contact is established, corrective action is complete.

If contact is not established, proceed to Step 9.

- 9. Replace the data set associated with the remote maintenance facility and proceed to Step 10.
- 10. Determine if contact with the remote maintenance facility is established.

If contact is established, corrective action is complete.

If contact is not established, check the wiring between the circuit breaker, cross connect field, TN492, and data set.

Microdiagnostics - General

Microdiagnostic test execution requires that the common control carrier is operable and can perform the tests.

- a. Tests 0 through 6 require power from DC/DC converters in the common control power carrier (slots 1 and 2 for CC0 and slots 4 and 5 for CC1).
- b. Tests 7 through 15 require power from all three DC/DC converters for each common control (slots 0, 1, and 2 for CC0 and slots 3, 4, and 5 for CC1).
- c. The HALT/GO switch associated with the common control being tested **must** be set to the GO position.

Microdiagnostics is performed starting with Test 0 and progressing in numerical order to Test 15. If a failure is indicated corrective action is performed and the test is repeated. If the test passes after corrective action, all tests are repeated starting with Test 0 and progressing through Test 15.

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Microdiagnostic Tests 3 through 6 and 13 are spare tests which are reserved for future use. Each spare test is executed in microdiagnostic test sequence.

Test 7 requires coordination between vintages of UN151, UN152, UN153, TN370, and TN491 circuit packs.

- a. Before replacing a circuit pack, check the vintage of the circuit packs.
- b. The maintenance control location should be contacted if the corresponding vintages are not known.

Test 10 tests the tape subsystem. For this test, a tape is placed in the transport and the **MAAP** is connected for consultation on failures.

Test 15 provides an abbreviated subset of tests (7, 8, and 9) and a memory load of the data on the tape. For this test, a tape is placed in the transport and the **MAAP** is connected to determine the progress of the memory load.

Test execution is accomplished by:

- a. Selecting the test to be executed.
- b. Momentarily depressing the RESET switch.
- c. Momentarily depressing the ENABLE switch.

Test execution starts by clearing most of the alarm panel LEDs and lighting the LEDs related to the test.

- a. The PASS and FAIL LEDs are cleared until the test result is determined.
- b. If a test passes, the **PASS** LED on the alarm panel is lighted.
- c. If a test fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is most likely the cause of the fault.

Other circuit packs that could be causing the test to fail are listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, in the order of their likelihood as causes of the problem.

- a. CKT 1 in Table C is the failing circuit with the RED LED lighted.
- b. The second most likely circuit pack is indicated as CKT 2 in Table C.
- c. In some cases one of the circuit packs listed in Table C may be the same as the circuit pack with the **RED** LED lighted.
- d. When a circuit pack is listed in Table C as a replacement which has already been replaced, the sequence in Table C to be followed is the lowest circuit pack **not** replaced.

Requirement: If circuit pack 4 (CKT 4) has been replaced, replace CKT 3, then CKT 5, etc.

If a test fails and the circuit pack replacements listed in Table C do not correct the problem, the following is performed:

- a. Table D, Circuit Packs Required to Perform Microdiagnostic Tests, is checked to determine which circuit packs are required to perform the failing test.
- b. Circuit packs not required to perform the test are unseated and the test repeated.
- c. If the test passes, the circuit packs are reseated one-at-a-time, repeating the failing test until the failing circuit pack(s) are located.

Microdiagnostic tests 0 through 10, 13, and 14 can be executed and call processing can be restarted from INITA by rocking the **HALT/GO** switch after the test is performed. A reload of the switch is not performed by rocking the **HALT/GO** switch if Test 15 is not performed. This method of testing is not the preferred method of microdiagnostic testing but is helpful to isolate unique problems without taking the switch down.

Caution: Transient calls (calls not fully established) are lost when this method of testing is performed. Do not use this method of testing when performing microdiagnostic tests 11, 12, and 15 as memory is destroyed or a forced reload is performed taking the switch down.

MICRODIAGNOSTICS CIRCUIT PACK REPLACEMENT SEQUENCE								
TEST	СКТ 1	CKT 2	СКТ З	СКТ 4	СКТ 5	СКТ 6	СКТ 7	СКТ 8
0	[1]	TN491 Slot 31	TN492 Slot 32	TN490 Slot 22				
1	[1] [2]	TN491 Slot 31	TN492 Slot 32	TN490 Slot 22				
2	[1]	TN490 Slot 22	TN491 Slot 31	TN492 Slot 32				
3	[1]	TN491 Slot 31	TN492 Slot 32	TN490 Slot 22				
4	[1]	TN491 Slot 31'	TN492 Slot 32	TN490 Slot 22				
5	[1]	TN491 Slot 31	TN492 Slot 32	TN490 Slot 22				
6	[1]	TN491 Slot 31	TN492 Slot 32	TN490 Slot 22				
7	[1]	UN152 Slot 02	TN491 Slot 31	TN370 Slot 00				
8	[1]	TN404 Slot 21	UN153 Slot 03	TN491 Slot 31	TN368 Slot 06			

TABLE C.

TABLE C. (Contd)

	MICRODIAGNOSTICS CIRCUIT PACK REPLACEMENT SEQUENCE (Contd)							
TEST	СКТ 1	СКТ 2	СКТ 3	СКТ 4	СКТ 5	CKT 6	СКТ 7	СКТ 8
9	[1]	UN152 Slot 02	UN153 Slot 03	TN370 Slot 00	UN151 Slot 01	TN392 Slot 07	TN404 Slot 21	TN368 Slot 06
10	[1]	TN430 Slot 20	UN153 Slot 03	TN392 Slot 07	TN368 Slot 06			
11	[1]	TN368 Slot 06	TN404 Slot 21	UN153 Slot 03	TN370 Slot 00			
12	[1]	TN368 Slot 06	TN404 Slot 21	UN153 Slot 03	TN370 Slot 00	,		
13	[1]	TN370 Slot 00	TN491 Slot 31	TN492 Slot 32				
14	[1]	TN369 Slot 04 [3]	UN152 Slot 02	TN490 Slot 22	UN153 Slot 03	TN370 Slot 00		

- [1] = Circuit pack with RED LED lighted.
- [2] = For Test 1, replace all circuit packs with RED LED lighted and all circuit packs with no LEDs lighted.
- [3] = Replace TN369 (Slot 04) if installed.

Microdiagnostic Testing

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Test 0 - Diagnostic processor circuit pack demand test

To execute microdiagnostic Test 0:

- 1. Set TEST SELECT switch to 0.
- 2. Depress RESET, ENABLE.
 - Note: While Test 0 is executing, the MAJOR and DIAG PROC indicators are lighted.
- 3. If Test 0 fails to affect alarm panel LEDS, power and cabling should be checked.

Note: Test 0 requires power from DC/DC converters in the common control power carrier (slots 1 and 2 for CC0 and slots 4 and 5 for CC1).

4. If the PASS indicator turns on, Test 0 executed successfully.

Note: The DIAG PROC indicator is also lighted when Test 0 passes.

Continue with microdiagnostic Tests 1 through 15.

5. If Test 0 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

Replace the circuit pack with the **RED** LED lighted.

6. Depress RESET, ENABLE.

If the **PASS** indicator turns on, continue with microdiagnostic Tests 1 through 15.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 0.

7. Depress RESET, ENABLE.

If the **PASS** indicator turns on, continue with microdiagnostic Tests 1 through 15.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 0.

- 8. Repeat Step 7 until the **PASS** indicator turns on, or until all circuit packs listed in Table C for Test 0 are replaced.
- 9. If Test 0 continues to fail and all circuit pack replacements listed in Table C for Test 0 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 1 - Maintenance bus demand test

To execute microdiagnostic Test 1:

- 1. Set **TEST SELECT** switch to 1.
- 2. Depress RESET, ENABLE.

Note: While Test 1 is executing, the MAJOR indicator is lighted.

3. In Test 1 the **RED** and **GREEN** LEDs (positions 18 and 19 respectively) are lighted on all common control carrier circuit packs.

Note: After the **ENABLE** switch is depressed, the **RED** LED is lighted for approximately 3 seconds and the **GREEN** LED is on until another test is selected.

4. If any circuit packs fail to light or remain with a **RED** LED lighted in position 18, the circuit pack(s) should be replaced.

Note: If a circuit pack was replaced in Step 4, repeat all microdiagnostic tests starting with Test 0.

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5. If the PASS indicator turns on, Test 1 executed successfully.

Continue with microdiagnostic Tests 2 through 15.

6. If Test 1 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

Replace the circuit pack with the **RED** LED lighted.

7. Depress RESET, ENABLE.

If the PASS indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 1.

8. Depress RESET, ENABLE.

If the **PASS** indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 1.

- 9. Repeat Step 8 until the **PASS** indicator turns on, or until all circuit packs listed in Table C for Test 1 are replaced.
- If Test 1 continues to fail and all circuit pack replacements listed in Table C for Test 1 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 2 - Alarm interface circuit pack demand test

To execute microdiagnostic Test 2:

- 1. Set **TEST SELECT** switch to 2.
- 2. Depress RESET, ENABLE.

Note: While Test 2 is executing, the MAJOR and PROC indicators are lighted.

3. If the PASS indicator turns on, Test 2 executed successfully.

Note: The PROC indicator is also lighted when Test 2 passes.

Continue with microdiagnostic Tests 3 through 15.

4. If Test 2 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

Replace the circuit pack with the **RED** LED lighted.

5. Depress RESET, ENABLE.

If the PASS indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 2.

6. Depress RESET, ENABLE.

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If the **PASS** indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 2.

- 7. Repeat Step 6 until the **PASS** indicator turns on, or until all circuit packs listed in Table C for Test 2 are replaced.
- 8. If Test 2 continues to fail and all circuit pack replacements listed in Table C for Test 2 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 3 - Spare (reserved for future use)

Note: Test 3 is reserved for future use but should be executed when microdiagnostic testing is being performed.

To execute microdiagnostic Test 3:

- 1. Set TEST SELECT switch to 3.
- 2. Depress RESET, ENABLE.
- 3. The PASS indicator is always turned on indicating Test 3 executed successfully.

Continue with microdiagnostic Tests 4 through 15.

Test 4 - Spare (reserved for future use)

Note: Test 4 is reserved for future use but should be executed when microdiagnostic testing is being performed.

To execute microdiagnostic Test 4:

- 1. Set **TEST SELECT** switch to 4.
- 2. Depress **RESET**, **ENABLE**.
- 3. The PASS indicator is always turned on indicating Test 4 executed successfully.

Continue with microdiagnostic Tests 5 through 15.

Test 5 - Spare (reserved for future use)

Note: Test 5 is reserved for future use but should be executed when microdiagnostic testing is being performed.

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To execute microdiagnostic Test 5:

- 1. Set TEST SELECT switch to 5.
- 2. Depress RESET, ENABLE.
- The PASS indicator is always turned on indicating Test 5 executed successfully. Continue with microdiagnostic Tests 6 through 15.

Test 6 - Spare (reserved for future use)

Note: Test 6 is reserved for future use but should be executed when microdiagnostic testing is being performed.

To execute microdiagnostic Test 6:

- 1. Set **TEST SELECT** switch to 6.
- 2. Depress **RESET**, **ENABLE**.
- The PASS indicator is always turned on indicating Test 6 executed successfully. Continue with microdiagnostic Tests 7 through 15.

Test 7 - 501CC processor circuit packs demand test

To execute microdiagnostic Test 7:

- 1. Set TEST SELECT switch to 7.
- 2. Depress RESET, ENABLE.

Note: While Test 7 is executing, the MAJOR and PROC indicators are lighted.

3. If the PASS indicator turns on, Test 7 executed successfully.

Note: The PROC indicator is also lighted when Test 7 passes.

Continue with microdiagnostic Tests 8 through 15.

4. If Test 7 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

Replace the circuit pack with the **RED** LED lighted.

Note: Check that the circuit pack being replaced is the correct vintage and type.

5. Depress **RESET**, **ENABLE**.

If the **PASS** indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 7.

6. Depress **RESET**, **ENABLE**.

If the **PASS** indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 7.

- 7. Repeat Step 6 until the **PASS** indicator turns on, or until all circuit packs listed in Table C for Test 7 are replaced.
- 8. If Test 7 continues to fail and all circuit pack replacements listed in Table C for Test 7 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 8 - System bus and buffered bus demand test

To execute microdiagnostic Test 8:

- 1. Set **TEST SELECT** switch to 8.
- 2. Depress **RESET**, **ENABLE**.

Note: While Test 8 is executing, the MAJOR and I/O CHANNEL indicators are lighted.

3. If the PASS indicator turns on, Test 8 executed successfully.

Note: The I/O CHANNEL indicator is also lighted when Test 8 passes.

Continue with microdiagnostic Tests 9 through 15.

4. If Test 8 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

Replace the circuit pack with the **RED** LED lighted.

5. Depress **RESET**, ENABLE.

If the **PASS** indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 8.

6. Depress RESET, ENABLE.

If the PASS indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 8.

- 7. Repeat Step 6 until the **PASS** indicator turns on, or until all circuit packs listed in Table C for Test 8 are replaced.
- 8. If Test 8 continues to fail and all circuit pack replacements listed in Table C for Test 8 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 9 - 501CC instruction set demand test

To execute microdiagnostic Test 9:

- 1. Set **TEST SELECT** switch to 9.
- 2. Depress RESET, ENABLE.

Note: While Test 9 is executing, the MAJOR and PROC indicators are lighted.

3. If the PASS indicator turns on, Test 9 executed successfully.

Note: The PROC indicator is also lighted when Test 9 passes.

Continue with microdiagnostic Tests 10 through 15.

4. If Test 9 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

Replace the circuit pack with the **RED** LED lighted.

5. Depress RESET, ENABLE.

If the PASS indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 9.

6. Depress RESET, ENABLE.

If the PASS indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 9.

- 7. Repeat Step 6 until the **PASS** indicator turns on, or until all circuit packs listed in Table C for Test 9 are replaced.
- If Test 9 continues to fail and all circuit pack replacements listed in Table C for Test 9 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 10 - Tape subsystem demand test

To execute microdiagnostic Test 10:

- 1. Ensure that a tape is in the High Capacity Mini-Recorder (HCMR) and is firmly seated.
- 2. Plug the MAAP into the MAAP connector for an unduplicated common control switch or connector CC0 or CC1 for the common control being tested in a duplicated common control switch.
- 3. Set TEST SELECT switch to 10.
- 4. Depress **RESET**, **ENABLE**.

Note: While Test 10 is executing, the MAJOR and TAPE indicators are lighted.

5. Test 10 takes approximately 50 to 75 seconds to complete. The LEDs on TN430 can be used to monitor progress of Test 10.

Initially the **RED** LED in position 2 on TN430 is lighted.

Next, the **GREEN** LED in position 1 on TN430 is lighted providing a heartbeat while the tape is read.

6. If the **PASS** indicator turns on, Test 10 executed successfully.

Note: The TAPE indicator is also lighted when Test 10 passes.

Continue with microdiagnostic Tests 11 through 15.

- 7. If Test 10 fails, the FAIL LED on the alarm panel is lighted.
- 8. The left side of the **MAAP** displays 8 digits which are designated 1 through 8 reading from left to right.

- 9. If there is no display (blanked) on the MAAP, replace TN403 in Slot 23 and proceed to Step 22.
- 10. If all 8 digits display 00000000, perform the following:
 - Verify the tape is in the transport.

Inspect power and cabling to the HCMR.

Proceed to Step 22.

Caution: If multiple failures are indicated on the MAAP display, a 1 in more than 1 field, perform the following steps in the order listed. Do not replace the HCMR until all circuit packs within the HCMR are replaced when multiple failures are displayed.

11. If digit 1 or digit 8 display a 1, replace TN430 in Slot 20 and proceed to Step 22.

Caution: Prior to replacing circuit packs in the HCMR, the power to the circuit packs must be removed or damage to the tape pin connectors or components on the circuit pack being replaced (or other circuit packs) can occur. Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of HCMR circuit packs.

- 12. If digit 6 displays a 1, replace SN446 (power supply) in the HCMR and proceed to Step 20.
- 13. If digit 2 displays a 1, replace SN441 (controller) in the HCMR and proceed to Step 20.
- 14. If digit 5 displays a 1, replace SN442 (data electronics) in the HCMR and proceed to Step 20.
- 15. If digit 4 displays a 1, replace SN443 (tape transport and preamp) in the HCMR and proceed to Step 20.
- 16. If digit 3 displays a 1, replace SN445 (servo) in the HCMR and proceed to Step 20.
- 17. If digit 7 displays a 1, perform the following:

Reinsert tape.

Depress **RESET**, **ENABLE** and proceed to Step 18.

18. If the PASS indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the FAIL indicator turns on, replace the tape.

Depress **RESET**, **ENABLE** and proceed to Step 19.

19. If the PASS indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace SN443 (tape transport and preamp) in the HCMR and proceed to Step 20.

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20. Depress RESET, ENABLE.

If the **PASS** indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the FAIL indicator turns on, replace the HCMR and proceed to Step 21.

21. Depress RESET, ENABLE.

If the **PASS** indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, check the wiring between the HCMR and the common control, carrier.

22. Depress RESET, ENABLE.

If the **PASS** indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 10 and proceed to Step 23.

23. Depress **RESET**, ENABLE.

If the PASS indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 10 and proceed to Step 24.

- 24. Repeat Step 23 until the **PASS** indicator turns on, or until all circuit packs listed in Table C for Test 10 are replaced.
- 25. If Test 10 continues to fail and all circuit pack replacements listed in Table C for Test 10 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 11 - Main memory system demand test

Note: TN392 (1 megaword) in slots 08 through 14 are tested if installed.

To execute microdiagnostic Test 11:

- 1. Set **TEST SELECT** switch to 11.
- 2. Depress RESET, ENABLE.

Note: While Test 11 is executing, the MAJOR and MEM indicators are lighted.

3. If the **PASS** indicator turns on, Test 11 executed successfully.

Note: The MEM indicator is also lighted when Test 11 passes.

Continue with microdiagnostic Tests 12 through 15.

4. If Test 11 fails, the FAIL LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

Replace the circuit pack with the **RED** LED lighted.

5. Depress RESET, ENABLE.

If the **PASS** indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 11.

6. Depress RESET, ENABLE.

If the **PASS** indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 11.

7. Repeat Step 6 until the **PASS** indicator turns on, or until all circuit packs listed in Table C for Test 11 are replaced.

8. If Test 11 continues to fail and all circuit pack replacements listed in Table C for Test 11 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 12 - Memory protect circuit pack demand test

Note: TN 392 (1 megaword) in slots 08 through 14 are tested if installed.

To execute microdiagnostic Test 12:

Note: If installed, remove TN514 (scamper) prior to performing Test 12.

1. Set TEST SELECT switch to 12.

2. Depress RESET, ENABLE.

Note: While Test 12 is executing, the MAJOR and MEM indicators are lighted.

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3. If the PASS indicator turns on, Test 12 executed successfully.

Note: The MEM indicator is also lighted when Test 12 passes.

Continue with microdiagnostic Tests 13 through 15.

4. If Test 12 fails, the **FAIL** LED on the alarm panel is lighted and a **RED** LED is lighted on position 18 of the circuit pack that is failing.

Replace the circuit pack with the **RED** LED lighted.

5. Depress **RESET**, **ENABLE**.

If the PASS indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 12.

6. Depress **RESET**, **ENABLE**.

If the **PASS** indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 12.

- 7. Repeat Step 6 until the **PASS** indicator turns on, or until all circuit packs listed in Table C for Test 12 are replaced.
- If Test 12 continues to fail and all circuit pack replacements listed in Table C for Test 12 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 13 - Spare (reserved for future use)

Note: Test 13 is reserved for future use but should be executed when microdiagnostic testing is being performed.

To execute microdiagnostic Test 13:

1. Set TEST SELECT switch to 13.

- 2. Depress **RESET**, **ENABLE**.
- 3. The PASS indicator is always turned on indicating Test 13 executed successfully.
- Continue with microdiagnostic Tests 14 and 15.

Test 14 - Cache memory circuit pack demand test

Note: TN369 (cache memory) in slot 04 is tested if installed.

To execute microdiagnostic Test 14:

- 1. Set **TEST SELECT** switch to 14.
- 2. Depress **RESET**, **ENABLE**.

Note: While Test 14 is executing, the **MAJOR** and **CACHE MEMORY** indicators are lighted.

3. If the PASS indicator turns on, Test 14 executed successfully.

Note: The CACHE MEMORY indicator is also lighted when Test 14 passes.

Continue with microdiagnostic Test 15.

4. If Test 14 fails, the FAIL LED on the alarm panel is lighted and a RED LED is lighted on position 18 of the circuit pack that is failing.

Replace the circuit pack with the **RED** LED lighted.

5. Depress RESET, ENABLE.

If the **PASS** indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 14.

6. Depress RESET, ENABLE.

If the **PASS** indicator turns on, repeat all microdiagnostic tests starting with Test 0.

If the **FAIL** indicator turns on, replace the next circuit pack listed in Table C, Microdiagnostics Circuit Pack Replacement Sequence, for Test 14.

- 7. Repeat Step 6 until the **PASS** indicator turns on, or until all circuit packs listed in Table C for Test 14 are replaced.
- .8. If Test 14 continues to fail and all circuit pack replacements listed in Table C for Test 14 do not correct the problem, perform additional corrective action as listed under Repair Guide for Microdiagnostic Testing (after Test 15).

Test 15 - Abbreviated test and forced load

Caution: If microdiagnostic test 15 is executed without performing microdiagnostic tests 0 through 14 during a reload of tape, false alarms and emergency transfer can occur which may be service affecting. MSTAT memory is not cleared by test 15.

To execute microdiagnostic Test 15:

- 1. Ensure that a tape is in the High Capacity Mini-Recorder (HCMR) and is firmly seated.
- 2. Plug the **MAAP** into the **MAAP** connector for an unduplicated common control switch or connector CC0 or CC1 for the common control being tested in a duplicated common control switch.
- 3. Set TEST SELECT switch to 15.
- 4. Depress **RESET**, **ENABLE**.

Note: While Test 15 is executing, the MAJOR, PROC and TAPE indicators are lighted.

5. Test 15 provides an abbreviated subset of tests (7 through 9).

If tests 7 through 9 pass, memory is loaded with the data on the tape.

6. The first signs of a passing sequence is the LEDs on TN430.

The **RED** LED in position 2 and the **YELLOW** LED at the middle of the circuit pack are lighted.

Next, the **GREEN** LED in position 1 of the circuit pack starts flashing (indicating tape interface is being initialized).

Then the **GREEN** LED in position 1 goes either steady on or off while the tape is moved to a load position.

- 7. Next, data is read from tape and the MAAP is updated.
- 8. The area currently being read from tape is indicated in the procedure number field of the MAAP as follows:

Encode 0 = Directory information is being read from tape.

Encode 1 = Program information is being read from tape and is being written to memory.

Encode 2 = Translation information is being read from tape and is being written to memory.

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Encode 3 = Patch information is being read from tape and is being written to memory.

Encode 4 = The reading of information from tape is complete and hardware is being tested and initialized.

Encode 5 = Hardware tests failed.

Encode 6 = Tape subsystem was successfully initialized but load attempt failed because an uncorrectable error was encountered (e.g., bad tape, no tape, bad cable to HCMR, etc.).

Encode 7 = Failed tape subsystem initialization (either HCMR, TN430, or both), of if encode 7 is seen only momentarily followed by an encode 9 then incomplete load.

Encode 8 = Not enough memory or memory bad.

• Encode 9 = Too many reloads attempted or interrupts during load process after load counter incremented.

9. When the tape load is completed and successful, the **PASS** indicator on the alarm panel flashes at a 1-second on, 1-second off rate.

In addition, the **GREEN** LED in position 2 of TN430 is flashing (indicating a heartbeat).

Note: There is a slight delay prior to the heartbeat appearing.

- 10. If the tape load is not successful, failure indicators MAJOR, PROC and TAPE are lighted. The PASS indicator does not flash.
- 11. If the **PASS** indicator does not flash or if any of the failure cases (Encodes 5 through 9) are displayed in the procedure number field of the **MAAP**, microdiagnostic tests 0 through 14 **must** be executed in order to find the cause of the failure.

Repair Guide For Microdiagnostic Testing

- 1. Determine from Table D, Circuit Packs Required to Perform Microdiagnostic Tests, which circuit packs are required to perform the microdiagnostic test being executed.
- 2. Unseat all circuit packs in the common control carrier that are **not** required to perform the microdiagnostic test being executed.
- 3. Depress RESET, ENABLE.

If the FAIL indicator turns on, reseat all circuit packs and proceed to Step 11.

If the **PASS** indicator turns on, reseat one circuit pack.

4. Depress **RESET**, ENABLE.

If the FAIL indicator turns on, proceed to Step 5.

If the **PASS** indicator turns on, proceed to Step 8.

5. Replace the reseated circuit pack, and depress **RESET**, **ENABLE**.

If the FAIL indicator turns on, proceed to Step 6.

If the PASS indicator turns on, proceed to Step 8.

6. Replace the circuit pack in the same slot.

Requirement: Do not replace more than 2 circuit packs in the same slot.

Proceed to Step 7.

7. Depress RESET, ENABLE.

If the **FAIL** indicator turns on, reseat any unseated circuit packs and proceed to Step 11.

If the **PASS** indicator turns on, proceed to Step 8.

8. Determine if other circuit packs are to be reseated.

If all circuit packs are reseated, proceed to Step 10.

If any circuit packs are unseated, reseat the next circuit pack and proceed to Step 9.

9. Depress RESET, ENABLE.

If the FAIL indicator turns on, go to step 5.

If the PASS indicator turns on, repeat Step 8.

10. Determine if any circuit pack(s) were replaced in Steps 4 through 9.

If no circuit packs were replaced, proceed to Step 11 and suspect an intermittent trouble.

If a circuit pack was replaced, repeat all microdiagnostic tests starting with Test 0.

11. If the circuit pack replacements or the power and cabling checks do not reveal the source of the problem, check the backplane wiring.

TABLE D.

CIRCUIT PACKS REQUIRED TO PERFORM MICRODIAGNOSTIC TESTS				
TEST	CIRCUIT PACKS REQUIRED FOR TEST TO EXECUTE			
0	TN490 (Slot 22), TN491 (Slot 31), and TN492 (Slot 32).			
1	TN490 (Slot 22), TN491 (Slot 31), and TN492 (Slot 32).			
2	TN490 (Slot 22), TN491 (Slot 31), and TN492 (Slot 32).			
3	TN490 (Slot 22), TN491 (Slot 31), and TN492 (Slot 32).			
4	TN490 (Slot 22), TN491 (Slot 31), and TN492 (Slot 32).			
5	TN490 (Slot 22), TN491 (Slot 31), and TN492 (Slot 32).			
6	TN490 (Slot 22), TN491 (Slot 31), and TN492 (Slot 32).			
7	TN370 (Slot 00), UN151 (Slot 01), UN152 (Slot 02), UN153 (Slot 03), TN490 (Slot 22), TN491 (Slot 31), and TN492 (Slot 32).			
8	TN370 (Slot 00), UN151 (Slot 01), UN152 (Slot 02), UN153 (Slot 03), TN368 (Slot 06), TN404 (Slot 21), TN490 (Slot 22), TN491 (Slot 31), and TN492 (Slot 32).			
9	TN370 (Slot 00), UN151 (Slot 01), UN152 (Slot 02), UN153 (Slot 03), TN368 (Slot 06), TN392 (Slot 07), TN404 (Slot 21), TN490 (Slot 22), TN491 (Slot 31), and TN492 (Slot 32).			
10	TN370 (Slot 00), UN151 (Slot 01), UN152 (Slot 02), UN153 (Slot 03), TN368 (Slot 06), TN392 (Slot 07), TN430 (Slot 20), TN404 (Slot 21), TN490 (Slot 22), TN403 (Slot 23), TN491 (Slot 31), and TN492 (Slot 32).			
11 [1]	TN370 (Slot 00), UN151 (Slot 01), UN152 (Slot 02), UN153 (Slot 03), TN368 (Slot 06), TN392 (Slot 07), TN404 (Slot 21), TN490 (Slot 22), TN491 (Slot 31), and TN492 (Slot 32).			
12 [1]	TN370 (Slot 00), UN151 (Slot 01), UN152 (Slot 02), UN153 (Slot 03), TN368 (Slot 06), TN392 (Slot 07), TN404 (Slot 21), TN490 (Slot 22), TN491 (Slot 31), and TN492 (Slot 32).			
13	TN370 (Slot 00), UN151 (Slot 01), UN152 (Slot 02), UN153 (Slot 03), TN368 (Slot 06), TN404 (Slot 21), TN490 (Slot 22), TN491 (Slot 31), and TN492 (Slot 32).			
14 [2]	TN370 (Slot 00), UN151 (Slot 01), UN152 (Slot 02), UN153 (Slot 03), TN368 (Slot 06), TN404 (Slot 21), TN490 (Slot 22), TN491 (Slot 31), and TN492 (Slot 32).			

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[1] = TN392 in slots 08 through 14 are tested (if installed).

[2] = TN369 in slot 04 is tested (if installed).

MAINTENANCE PROCEDURES

PROCEDURAL FORMAT AND CONTENT

Maintenance procedures presented in this section are divided into three to five parts depending upon the content and purpose of the procedure. The five parts of the procedure, preceded by a flip chart, consist of: purpose, field definitions and codes, test equipment required, operation of procedure, and repair guide. Each procedure consists of at least three parts; i.e., purpose, field definitions and codes, and operation of procedure.

Purpose

States the purpose of the procedure in general terms and briefly covers the contents and purpose of each test.

Field Definitions and Codes

Defines each field and the allowable values that are entered or displayed by the fields.

Test Equipment Required

States the test equipment required in order to execute one or more of the tests. The test equipment is not necessarily required for repair activities, but is required for operation of the procedure.

Operation of Procedure

Provides simplified instructions for calling up and running the procedure. Describes each test that can be run and presents the possible results, including indications that the test ran successfully.

Repair Guide

Based on the failure response provided by the test, this part lists the recommended corrective action to be taken.

- a. The recommended corrective action does not represent an exhaustive isolation procedure, but serves as a guide to isolate and repair the suspected items.
- b. Isolation and repair of elusive troubles are based primarily on switch familiarity (e.g., applicable schematic diagrams, circuit descriptions, etc.) and is not contained in the repair guide.
- c. The repair guide for some maintenance procedures includes a repair procedure table. For a given failure code or indication, a list of corrective action steps are provided. The steps are to be performed in the order listed.

Requirement: When the corrective action lists a circuit pack to be replaced, the first action is to reseat the original circuit pack; repeat the applicable test; and based on the results, replace the circuit pack (if necessary).

- d. Each replacement of a component must be followed by a rerun of the applicable test.
- e. When replacement of a circuit pack or component does not clear the failure, the original circuit pack or component is reinstalled.

MAINTENANCE PROCEDURE SELECTION

Overview

There are two methods of selecting maintenance procedures. One is the use of alarm causes/error log maintenance procedure (**PROC 600**) and the other is visual inspection of the alarm panel.

Alarm causes/error log

Maintenance procedure selection is directly related to the contents of PMIDS. Therefore, the starting point to determine which procedure to perform first for alarmed conditions and recorded errors is **PROC 600** (Alarm causes/error log).

- a. The reason for starting with **PROC 600** is that **PROC 600** dictates maintenance procedure sequencing (which maintenance procedure to perform and the order in which to perform them) by sorting the contents of PMIDS.
- b. **PROC 600** displays the contents of PMIDS by alarm severity and in the order of priority dictated by the importance of the functional area(s) (unit types) which are alarmed. All alarms are displayed; first, major alarms within priority order; second, minor alarms in priority order; and last, warning alarms by priority order.
- c. In addition, **PROC 600** provides by unit number (functional area) errors recorded for each circuit identified in PMIDS. This information may be of particular interest in isolating user reported troubles and during maintenance polling.
- d. **PROC 600** references the maintenance procedure (if any) to perform in order to investigate and isolate the cause of alarmed conditions and recorded errors. Also identified is the circuit location (if applicable) of the probable cause for each displayed entry.

PROC 600 is also valid as the starting point for user reported troubles and maintenance polling. Maintenance polling should be accomplished prior to maintenance personnel leaving the customer's premises to determine the health of the switch.

Alarm Panel

The fault indicators in the ALARM, ENVIRON, COMMON CONTROL, NETWORK, APPL PROC, and OTHER sections of the alarm panel furnish reference to:

- a. Maintenance procedures for diagnosis and repair of the failure. For example, the SWITCH fault indicator references PROC 620.
- b. Maintenance procedures that serve as a pointer to other procedures for diagnosis and repair. For example, the OTHER FAILS fault indicator references PROC 600 which in turn references other procedures.

PROC 620 (network) investigates and isolates multiple unit types and functional areas. As indicated on the alarm panel, **PROC 620** is referenced by two fault indicators: **SWITCH**, and **PORT**.

The OTHER FAILS fault indicator references PROC 600 which in turn references other procedures to isolate the cause of the lighted fault indicator. Such causes can be: SMDR, ANI, calling number display, Force Administration Data System (FADS), real time clock synchronizer, attendant console, etc.

General

The maintenance procedures that are not alarm panel oriented are used primarily to test a particular facility, busy out or release busied-out circuits, or make test calls.

The following **PROCs** can be performed both on- and off-line in a duplicated common control switch.

- a. PROC 600 Alarm causes/error log.
- b. PROC 610 Tape tests.
- c. PROC 611 Common control I/O tests.
- d. PROC 612 Initialization causes.
- e. PROC 615 MAAP test.
- f. PROC 616 Alarm panel test.
- g. PROC 650 DCIU tests.

When the switch is duplicated, it may be necessary to examine both the on-line and off-line side to determine the maintenance procedure to be performed. The problem that exists could have caused a switch to the healthier common control. When the problem has been corrected, both the on-line and off-line sides should be examined to determine if potential problems exist.

MAINTENANCE PROCEDURE DESCRIPTION

Overview

Organization of the maintenance procedures is based on:

- a. Procedures relating to the entire switch.
- b. Procedures organized by functional area according to the area's importance to continued call processing integrity.

Each of the maintenance procedures is briefly described under the following titles:

- General switch procedures.
- · Common control procedures.
- Network procedures.
- Common control peripherals procedures.
- Connection status procedures.
- Other procedures.

General Switch Maintenance Procedures

This group of maintenance procedures deals with the entire switch or with switch components that are concerned with the entire switch. General switch maintenance procedures include **PROC 600** and **PROC 601**.

PROC 600 - Alarm Causes/Error Log displays the contents of the current PMIDS error log.

- a. The unit type, present alarm status of the circuit, number of failures recorded for the circuit, time of the first and last errors recorded, and time the circuit was alarmed or resolved are displayed.
- b. The maintenance procedure used to run further tests on a circuit that is alarmed or has errors recorded is also displayed.
- c. **PROC 600** allows entries in the error log to be cleared (zeroed- out) from PMIDS singly or by unit type. Alarmed entries, either resolved or unresolved, can be cleared individually or as a whole.

PROC 601 - Environmental Test displays information as to whether the alarm is caused by a cabinet or TMS/module control carrier power, fuse/circuit breaker, DC/DC converter, frequency generator, memory holdover, airflow, or temperature problem. **PROC 601** displays the location of the trouble and provides other information to assist maintenance personnel in investigating, isolating, and repairing the alarm cause.

Common Control Maintenance Procedures

This group of maintenance procedures tests the common control and associated components. Common control procedures include **PROC 610** through **PROC 616**.

PROC 610 - Tape Tests displays the failure history for tape errors, performs an ID chip test and parity checker/generator function test of TN430, resets TN430, and diagnoses the High Capacity Mini-Recorder (HCMR).

PROC 611 - Common Control I/O Tests is used to test the I/O capabilities of the common control and to display the failure history associated with these capabilities. The I/O capabilities tested include the 4 MHz data channels and the dual-speed data channels. A test of cables associated with the 4 MHz I/O channels is also performed.

PROC 612 - Initialization Causes displays the failures which caused the common control processor to be initialized. In addition, all error log data (the entire PMIDS table) can be cleared (zeroed-out) when maintenance personnel consider it necessary to further isolate potential troubles.

PROC 613 - Duplicate Processor Control & Test displays the failures associated with processor duplication and tests the common control duplication channel. **PROC 613** allows memory updating in the off-line processor so that a soft switch can be attempted, and performs the soft switch when allowed. The health code indicators of the duplicate processors are displayed as well as the present status of the processor currently being used for testing.

PROC 614 - Memory Read/Memory Match Tests displays the recorded failure history and allows alarmed entries in the error log to be marked resolved. **PROC 614** tests identical areas of memory in both processors of a duplicated switch and provides the ability to test all or any part of main or cache memory. In addition, **PROC 614** reads and displays the contents of one or more memory locations in one processor whether the switch is duplicated or unduplicated.
PROC 615 - MAAP Test is used to test all functions of the **MAAP** which can be tested through the common control and provides indications of the severity and extent of any problems with the **MAAP**.

PROC 616 - Alarm Panel Test is used to test all software controlled LED indicators on the alarm panel and the ACK indicator on the attendant console.

Network Area Maintenance Procedures

This group of maintenance procedures deals with the digital network and its peripheral devices. Included are testing and recording capabilities for much of the hardware. Some of the network procedures are general purpose types; i.e., busy out procedures, and test calls. Network procedures include **PROC 620** through **PROC 625**, **PROC 630** through **PROC 632**, **PROC 640** through **PROC 644**, **PROC 646**, and **PROC 647**.

PROC 620 - Network Procedure displays the failure history, resolves alarmed entries, turns off alarms, and runs a test or diagnostic on any part of the network down through the port level. Each functional group of circuit packs in the network is assigned a 2-digit designation called the unit type. These unit types correspond with the unit types used in **PROC 600**.

PROC 621 - Network Duplication Channel displays the last seven switches, performs transparent soft switches (transparent to voice users), and performs hard switches of the TMS or module control complex. A re-initialization of the TMS or network module control complex can be performed whether or not the TMS or network module control complex is duplicated. Either side of a TMS or network module control complex can be soft locked off-line.

PROC 622 - Network Peripherals displays the failure history of network peripheral devices and resolves the alarmed entries. Tests necessary for fault isolation and verification of correct equipment operation can be performed.

PROC 623 - ANI Failures displays failure history for and tests ANI circuits. All available information which assists in fault isolation and repair is given.

PROC 624 - **Contact Interface Test** is a manual test used to determine if a contact interface circuit pack is defective. Any or all relay contacts on a selected contact interface circuit pack can be tested. Verification of relay operation must be visually observed at the customer's premises by monitoring associated LEDs on the circuit pack faceplate.

PROC 625 - Synchronization Reference Monitor displays the time and cause of the last eight reference switches and allows the monitoring of health for all DS-1 trunk interface circuit packs including the synchronization references. **PROC 625** provides the capability to switch between synchronization reference sources, and allows the disabling or re-enabling of the automatic reference switching by both software and hardware.

PROC 630 - Busy Out/Release Busy Out displays the busy out status and provides for the busy out or release busy out of terminals, trunks, and tone plants.

PROC 631 - Trunk Group Busy displays the busy out status for any trunk or trunk group and provides for the busy out or release busy out of trunks individually or by trunk group.

PROC 632 - Carrier Busy is used to busy out or release busy out circuits by the entire carrier or individually within a carrier. **PROC 632** also searches for and displays carriers which are completely or partially busied out.

PROC 640 - Trunk Failures displays failure history for trunks and allows the resolving of alarmed entries singly or as a whole. **PROC 640** also provides dynamic recording and concurrent or later display of single trunk data. Trunk dial access code, type of data on the trunk when a failure occurred, and the trunk equipment location is provided to aid in isolating a trouble.

PROC 641 - Terminal-to-Terminal Test Call is used for testing of touch tone dialing registers and rotary digit collection. Single registers or all registers in the switch may be tested.

PROC 642 - Terminal-to-Trunk Test Call is used to test trunks by placing test calls from a specific terminal to the trunk being tested. Trunks can be tested singly, on the basis of dial access code, or on the basis of a trunk group.

PROC 643 - Terminal-to-Tone Test Call is used to transmit tones from the tone plant to the test line to aid in diagnosing user reported tone failures. All tones generated by the tone plant or a selected set of these tones can be sent sequentially.

PROC 644 - **Terminal-to-Auxiliary Tone Test Call** is used to transmit tones from the auxiliary tone circuit to the test line to aid in diagnosing user reported auxiliary tone failures. All tones generated by the auxiliary tone circuit or a selected set of these tones can be sent sequentially.

PROC 646 - Modem Pooling and Facility Testing is used to test the Analog/Digital Facility (ADFTC) test circuit, perform detection and diagnostic tests on modem pool members, digital facilities, EIA and CP interfaces and display the test results.

PROC 647 - Automatic Transmission Measurement System (ATMS) displays failure history from PMIDS and performs demand transmission and supervision testing. Measurement and test results for each trunk tested is displayed.

Common Control Peripherals Maintenance Procedures

This group of maintenance procedures tests any equipment which can directly communicate with the common control through a nonnetwork path. Common control peripheral procedures include **PROC** 650 and **PROC** 652 through **PROC** 656.

PROC 650 - DCIU Tests is used to display the DCIU failure history, perform an ID chip and parity checker/generator function test on the DCIU circuit packs and execute loop around testing on DCIU data links. A demand re-initialization of the DCIU can also be performed.

PROC 652 - Time-of-Day Clock Synchronizer displays failure history for the time-of-day clock and allows alarmed error log entries to be resolved. The hardware and software clocks can be tested, their boundary conditions checked, and alarms reset if the clocks test good. In addition, the time-of-day clock can be set.

PROC 653 - Attendant Console Tests displays failure history for attendant consoles, allows alarmed error log entries to be resolved and tests all attendant consoles.

PROC 654 - Display Terminals Test displays failure history associated with display terminals, allows alarmed error log entries to be resolved, and tests the display terminals.

PROC 655 - Station Message Detail Recorder (SMDR) Test is used to test the SMDR function and its hardware components connected to the switch only. **PROC 655** also displays failure history associated with the SMDR equipment and resolves alarmed error log entries.

PROC 656 - Network Control Operations Support System (NCOSS) Port Test provides the capability to test NCOSS on demand and display the results to assist in fault isolation and repair.

Connection Status Maintenance Procedures

This group of maintenance procedures displays the connection status and provides the capability to trace a call through the switch. Connection status procedures include **PROC 960** through **PROC 962**.

PROC 960 - Queue Activity displays queue information for a particular equipment location or the equipment locations associated with a particular queue.

PROC 961 - Connection Activity displays connection information; i.e., connection number, accumulator number, and equipment location.

PROC 962 - Facility Connection displays the trunk number linkages for line records and the facility and conference facility linkages for trunk records.

Other Maintenance Procedures

To assist in trouble shooting memory problems, **PROC 999** is provided as an aid in displaying the data contents of a memory address via the software tables.

FL:	IPCHART	+ ALARM (CAUSES/ERROR LOG +	· +
10.				
	UNIT TYPE (FIELD 2):	23 = TMS/NETWORK DUPLICATION	47 = FACILITY TEST CIRCUIT	NUTE: THE TEST NUMBER CAN UNLY BE
1	1 = ENVIRONMENT	24 = TT SENDER	48 = ODD PORT PERIPHERALS	CHANGED BY 'NEXT TEST'.
1	2 = TAPE	25 = TT RECEIVER	49 = MAINT. AND ADMIN. PANEL	ALARM STATUS ISTAMP INDEX
	3 = INIT CAUSES	26 = NETWORK I/O	50 = TMS CLOCK DSCILLATOR	(FTELD R) (FTELD 11):
1	4 = COMMON CONTROL I/O	27 = GENERAL PURPOSE PORT	51 - LOCAL CLOCK TERMINATION	0 = NO ERRORS 1 = TIME OF MOST
1	5 = MEMORY	28 = 72 SERIES (MFET) PORT	52 = SYSTEM CLOCK SYNCHRONIZER	RECORDED RECENT ERROR
	6 = MODULE CONTROL CHANNEL	29 = LINE CIRCUIT	53 = MULTIPLEXER	1 - MA IOP TIME ALAPM
	7 = TMS/MODULE PROCESSOR	30 = EVEN PORT PERIPHERALS	54 = FANOUT	2 MINOR PECOLVED
1	8 = MAINT INTERFACE	31 = AUXILTARY TONE PLANT	55 = MODULE INTERFACE	2 - HINDR RESOLVED
J		32 = CO TRUNK	56 + INTERMODULE DATA STORE	A - CODODO ACODODO CODODO
	10 - TST ALL	39 = DTD TRUNK	57 & LIGHT GUIDE INTERFACE	4 = ERRURS RECURDED ERRUR DEGINS
	11 - TET DETORE	34 - TTE TRUNK (DATA POPT	59 - EANTN	5 = ALARM RESULVED 3 = TIME WHEN CREUK
	10 - 1/0 BUC INTEREACE	26 - DICITAL TOUNK	59 - THE MATHIENANCE	WAS ALARFIED
1	12 - 1/0 BUS INTERFACE	20 - DIGITAL HOED DODLEN	DO - DIACNOSTIC PROCESSOR/	69 = MULTIFUNCTIONAL ANALOG TERMINAL
í	13 - PURI DATA STURE	36 - DIGITAL USER PROBLEM	BU - DIRGNUSTIC FRUCESSUR/	(MFAT) PORT
	14 * PURI CUNIRUL INTERFACE	37 * CALLING NUMBER DISPLAY	REPUTE INTERFACE	70 = AUTOMATIC TRANSMISSION
Į –	15 = PORT DATA INTERFACE	38 = REAL TIME CLOCK SYNC	61 = CONFIGURATION AUDITS	MEASUREMENT SYSTEM (ATMS)
1	16 = TONE PLANT	39 = FADS DISPLAY	62 = ANALOG/DIGITAL FACILITY TEST	71 = REMOTE MODULE INTERFACE
	17 = ATTENDANT CONSOLE	40 = NON-NETWORK PERIPHERALS	63 - EXTERNAL EQUIPMENT	72 = ETA INTERFACE
	18 = CACHE	<pre>41 = TRUNK, SDFTWARE</pre>	64 = EXTERNAL PROCESSOR	GENERAL
0	19 = DCIU	42 = CALLS ABORTED	65 = MODEM POOLING	OVOTEM
R	20 = SMDR	43 = STATUS MEMORY AUDITS	66 = TONE DETECTOR 2	a staten
12.	21 = ANI	44 = ATTENDANT CONSOLE INTF	67 = UNDEFINED EXCEPTION FIFD CODE	} }
1	22 = PROCESSOR DUPLICATION	45 = AUXILIARY TRUNK	68 = DS-1 TRUNK INTERFACE	
1	1	46 = ATTENDANT CONFERENCE		600
l I			1 1 1 1 1 1 1	

FL IS	IPCHAR SUE 1	Т		+	•	-	+		ALARM CA	USES/ERR	OR LOG		+		+	
TEST 1: DISPLAYS FAILURE HISTORY IN ORDER OF IMPORTANCE FOR ALARMED FAILURES. USE 'NEXT CIRCUIT' TO DISPLAY NEXT ALARMED CIRCUIT. USE 'NEXT DATA' TO DISPLAY NEXT TIME STAMP. USE 'CLEAR DATA', 'EXECUIE' TO RETIRE ALARM FOR DISPLAYED ENTRY OR ALL ALARMS WHEN EXECUTED WITH A SUMMARY DISPLAYED.							TE WH RE DI TO DI 'E DI EN	ST 2: ICH H CORDEI SPLAY SELEI SPLAY XECUTI SPLAYI TERED	DISPLAYS FAILU AVE BEEN ALARME D BY UNIT TYPE. NEXT FAILED CI CT NEXT UNIT TY NEXT TIME STAM E' TO CLEAR FAI ED LOCATION OR UNIT TYPE.	RE HISTORY D OR WHICH USE 'NEXT RCUIT. USE 'PE, USE 'N P. USE 'C LURE HISTO ALL ENTRIE	FOR CIRCI HAVE ERRI CIRCUIT' 'NEXT UN EXT DATA' LEAR DATA RY OF THE S FOR THE	UITS ORS TO IT' TO ',	TEST 3: D TYPE. USE CIRCUIT. TYPE. USE USE 'CLEA HISTORY FI EXECUTED 1	ISPLAYS RE 'NEXT CIR USE 'NEXT 'NEXT DAT R DATA', ' OR DISPLAY WITH A DAS	SOLVED ALAR UCIT' TO DI UNIT' TO DI A' TO DISPL EXECUTE' TO ED ENTRY OF H IN FIELD	MED ENTRIES BY UNIT SPLAY MEXT RESOLVED SPLAY MEXT INIT AY MEXT TIME STAMP. I CLEAR FAILURE ALL ENTRIES WHEN 2.
	TEST 2 & 3		EQ	UIPME	NT LO	CATION						TI	ME STAMP			GENERAL
TEST NO	UNIT TYPE		MODULE OR STATUS	ABINET	ARRIER	SLOT	IRCUIT	ALARM STATUS	TOTAL FAILS	DAY	HOUR MINUTE REFE		PROC REFER.	SYSTEM		
1		2	MEMORY	3 4	ت 5	6	ย 7	8	9	15	600					

The flipcharts shown are for R2V2. The R2V1 flipcharts are similar except that unit types 52 and 68 through 72 are not included in R2V1.

Purpose

PROC 600 is the starting point for all maintenance activities.

PROC 600 is used to display the contents of the current PMIDS error log.

Each entry displayed identifies:

- a. Unit type.
- b. Present alarm status.
- c. Number of recorded errors.
- d. A time stamp for the first or last recorded error or when the entry was alarmed or resolved.
- e. A reference to the maintenance procedure (if applicable) to perform to determine the cause of the error.

PROC 600 dictates maintenance procedure sequencing by sorting the contents of PMIDS, displaying the results in alarm severity order and then by errors recorded.

PROC 600 is used to:

- 1. Display alarmed entries in descending order with major alarmed entries displayed first, followed by minor alarmed entries, and warning alarmed entries displayed last.
- 2. Display entries within each alarm category corresponding to the most important functional area to the least important functional area of the switch.

Note: Alarmed entries are **not** displayed in numerical order by unit type. The most important functional area unit type is displayed first no matter what the unit type number may be.

- 3. Display circuits with errors recorded by unit type in numerical order.
- 4. Display resolved alarm entries by unit type in numerical order.
- 5. Resolve alarmed entries, individually or all at once (which turns off the associated fault indicator, or turns off all alarms and fault indicators).
- 6. Clear (zero) the failure history in PMIDS for all entries in a given unit type, or an individual entry for a particular unit type.
- 7. Clear (zero) resolved alarmed entries, individually or all at once.

When the switch is duplicated, both the on-line and off-line side should be examined using **PROC** 600, Test 2 to determine if potential problems exist.

Field Definitions and Codes

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Each field of **PROC 600** flipchart and the possible displays for the fields during execution of the different tests are defined in Table E, PROC 600 - Field Definitions and Codes.

Field 2 is an optional entry field to enter the unit type to be investigated (Test 2 or 3 only) or to enter a null unit (Test 3 only).

Note: Unit types 52 and 68 through 72 are not included in R2V1.

PROC 600

TABLE E.

	PROC 600 FIELD DEFINITIONS AND CODES												
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION								
1	1-3	Test number	2	18	Cache								
2	1-72	Unit Type: Number des- ignation of the functional	(Conta)	19	Data communications in- terface unit (DCIU)								
		is being displayed		20	Station message detail recorder (SMDR)								
	1	Environment		21	Automatic number identi-								
	2	Tape			fication (ANI)								
	3	Initialization causes		22	Processor duplication (501CC)								
	4	Common control I/O		23	TMS or network duplica-								
	5	Memory			tion channel								
1	6	Module control channel		24	Touch-tone sender								
				25	Touch-tone receiver								
		TMS or module processor		26	Network I/O								
	8	Maintenance interface Module clock		27	General purpose port (GPP)								
	10	Time slot interchanger		28	72 Series (MFET) port								
	ļ	(TSI) – ALU		29	Line circuit								
	11	Time slot interchanger (TSI) — PSTORE		30	Even port peripherals								
	12	I/O bus interface (IOBI)		31 •	Auxiliary tone plant								
	13	Port data store (PDS)		. 32	CO trunk (hardware)								
	14	Port control interface		. 33	DID trunk (hardware)								
	15	(PCI) Port data interface (PDI)		34	TIE trunk/data port (hardware)								
	16	Tone plant		35	Digital trunk								
	17	Attendant console		36	Digital user problem								

Page 66

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TABLE E. (Contd)

PROC 600 FIELD DEFINITIONS AND CODES (Contd)												
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION							
2 (Contd)	37	Calling number display	2 (Contd)	56	Intermodule data store (IDS)							
(,	38	Real time clock synchro- nizer		57	Light guide interface							
	39	Force administration dis- play system (FADS)		58	Fan in (FI)							
	40	Non-network peripherals		59	TMS maintenance (TMI							
	41	Trunk, software		60	Diagnostic processor/ remote interface							
	42	Calls aborted	-	61	Configuration audits							
	43 44	Status memory audits Attendant console inter-		62	Analog/digital facility test (ADFTC)							
		face	i	63	External equipment							
	45	Auxiliary trunk	4	64	External processor							
	46	Attendant conference		65	Modem pooling							
	47	Facility test circuit	4	66	Tone detector 2							
	48 49	Odd port peripherals Maintenance and Admin-	-	. 67	Undefined exception FIFO errors							
		istration panel (MAAP)	-	68	DS-1 trunk interface							
	50	TMS clock oscillator (TCO)		69	Multifunctional analog							
	51	Local clock termination (LCT)		70	Automatic transmission							
	52	System Clock Synchro- nizer (SCS)			(ATMS)							
	53	Multiplexer (MPX)		71	Remote Module Interface (RMI)							
	54	Fan out (FO)		72	EIA Interface							
	55	Module interface (MI)										

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TABLE E. (Contd)

	PROC 600 FIELD DEFINITIONS AND CODES (Contd)													
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION									
3-7		Equipment location of PMIDS error log entry	3-7 3	1-32	External equipment error: Unit_number_of_external									
3-7 3	1-31	Status memory error: Status memory audit en- code	4	1-8	equipment External equipment en- code									
6	0-99	Status memory audit fault	5-7	Dashed	Not applicable for exter- nal equipment entries									
4, 5&7	Dashed	Not applicable for status	3-7		External processor error:									
9.7		memory entries	3	1-32	Unit number of external processor									
3-1	0-30	error: Module number	4-7	Dashed	Not applicable for exter- nal processor entries									
4-5	Dashed	Not applicable for unde- fined exception FIFO en-	3-7		Configuration audit errors									
6	1-12 Dashed	tries Undefined exception FIFO encode Not applicable for unde-	3	0-99 Dashed	Configuration audit fault code Not applicable for config- uration audit errors									
		fined exception FIFO en- tries	3-7		All other PMIDS error log entries:									
3-7 3	0-30	Diagnostic processor error: Module number	3	0-30	Network cabinet module number									
4	0-7	Cabinet number		99	Common control cabinet									
5	0-3	Carrier number			module number									
6	22, 31,	Slot number	4 ·	0-7	Cabinet number									
7	or 32 Dechar	Not applicable for diag	5	0-3	Carrier number									
Υ.	Dasned	nostic processor entries	6	0-32	Slot number									
				0-7	Circuit number or Dashed									

PROC 600

TABLE E. ((Contd)
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	PROC 600 FIELD DEFINITIONS AND CODES (Contd)													
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION									
8	0-5 Alarm status of displayed error log entry		11 (Contd)	2	Time of the first recorded error for the displayed error log entry									
	0	No errors recorded												
	. 1	Major		3	Time when the displayed error log entry was									
	2	Minor												
	3	Warning	12-14		Time stamp: A time stamp showing the day of									
	4	Errors recorded			the month, hour, and min- ute when the first or last									
	5 Alarm resolved				the alarm was activated									
9	0-999	Total failures recorded for displayed error log entry			or resolved for the dis- played error log entry.									
10	.0-99	Circuit entry index: Sum-	12	1-31	Day of the month									
		mary of total number of alarmed circuits (Test 1);	13	0-23	Hour of the day									
		circuits with recorded errors (Test 2); resolved	14	0-59	Minute									
		alarmed entries (Test 3)	15	01-56	PROC reference: The									
11	1-3 Stamp Index (Time Sta Index)			-	two digits displayed are the last two digits of a maintenance procedure									
	1	Latest time the displayed error log entry failed a test (Test 1 or Test 2) or time alarm was resolved for the dislayed error log entry (Test 3)			(PROC 6XX) to be per- formed in order to obtain detailed information about the cause of the dis- played error log entry.									

PROC 600 Test 1

Operation of Procedure

Overview

PROC 600 can display which entries are alarmed (causing alarm and fault indicators to be turned on), entries with errors recorded against them, and/or resolved alarm entries.

To call in **PROC 600** perform the following:

1. Depress PROC NO; 600; ENTER.

2. Test 1 is automatically selected.

Field 1 displays a 1, and all other fields are dashed.

3. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Three tests are available:

- 1. Test 1 Alarm order display.
- 2. Test 2 Unit type display.
- 3. Test 3 Resolved alarm entry display.

Test 1

Test 1 of **PROC 600** is used locally or remotely to investigate an alarmed condition or a user reported trouble.

Test 1 of **PROC 600** is also performed prior to maintenance personnel leaving the customer's premises to ensure that all alarmed conditions (including warning alarms) are cleared.

When Test 1 is executed, any unacknowledged alarms are acknowledged by **PROC 600** causing the attendant console acknowledge (ACK) indicator to be turned on.

- 1. When **EXECUTE** is depressed in Test 1 of **PROC 600** the system alarm status (alarm level indicators on the alarm panel) is checked for a **MAJOR** and/or **MINOR** alarm.
- 2. If the MAJOR and/or MINOR alarm indicators are lighted the ACK indicator on the attendant console is turned on (if not already lighted).
- 3. The ACK indicator on the attendant console can only be turned off by clearing or resolving the cause of the alarms in PMIDS.

Test 1 displays PMIDS error log data for alarmed entries.

- 1. Alarmed entries are displayed in descending order with major alarmed entries displayed first, entries with minor alarms second, and entries with warning alarms last.
- 2. Within each alarm category entries are displayed by unit type priority.
- Unit type priority is assigned according to the order of their importance to service to the customer (most important to least important functional area) and are not in numerical order.
- Within each unit type and alarm category, (circuits with the same unit type and alarm), alarmed entries are displayed as most recent first.

Test 1 allows for all alarmed entries or an individual alarmed entry to be manually resolved.

Resolving individual alarmed entries or all alarmed entries results in an individual fault indicator or all alarms and fault indicators being turned off.

Test 1 does not allow clearing (zeroing) of alarmed entries from the PMIDS error log.

1. Test 1 is the default test when entering PROC 600 or is selected by using NEXT TEST.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 1.

2. To start Test 1, depress EXECUTE.

The PMIDS error log is sorted and a summary of the total number of alarmed entries is displayed.

3. If no alarmed entries exist, the following summary is displayed:

Field 1 - 1.

Field 10 - 0 (Indicating no alarmed entries).

- 4. If any alarmed entries exist, the summary displays a 1 in Field 1 and the total number of alarmed entries in Field 10.
- 5. Depressing **NEXT CIRCUIT** displays the first alarmed entry as follows:

Field 1 - 1.

Field 2 - Unit type of alarmed entry (number designation of the type of equipment - See Table E, PROC 600 - Field Definitions and Codes).

Note: Unit types 52 and 68 through 72 are not displayed for R2V1.

Field 3 - Dashed, unit number of external equipment/processor, or module number of alarmed entry.

Field 4 - Dashed, external equipment encode, or cabinet number of alarmed entry.

Field 5 - Dashed or carrier number of alarmed entry.

Field 6 - Dashed or slot number of alarmed entry.

Field 7 - Dashed or circuit number of alarmed entry.

Field 8 - Alarm status of displayed entry (1 = major, 2 = minor, 3 = warning).

Field 9 - Total number of times alarmed entry failed.

Field 10 - Total number of alarmed entries.

Field 11 - 3 (Indicating that Fields 12 through 14 display the time when the entry was alarmed).

Fields 12 through 14 - Day, hour, and minute the displayed entry was alarmed.

Field 15 - Dashed or a 2-digit reference to a maintenance procedure.

6. Further diagnosis of the displayed alarmed entry is performed by using the maintenance procedure referenced in Field 15 (if any) to isolate and repair the cause of the alarmed entry displayed in Fields 2 through 7.

The two digits referenced in Field 15 are preceded by a 6 to determine the maintenance procedure to be performed. (Example: 20 displayed in Field 15 indicates that **PROC 620** is the maintenance procedure to be performed.)

Note: When a displayed entry does not reference a maintenance procedure to be performed (Field 15 = dash) refer to the Repair Guide part of **PROC 600** to determine the type of diagnosis or repair action to be performed (if any).

PROC 600 Test 1

7. Depressing **NEXT DATA** changes the stamp index and time stamp. Field 11 (stamp index) displays a 2 indicating that the time displayed in Fields 12 through 14 is the time the first error was recorded for the alarmed entry displayed in Fields 2 through 7.

Depressing **NEXT DATA** once more changes the stamp index and time stamp. Field 11 (stamp index) displays a 1 indicating that the time displayed in Fields 12 through 14 is the time the last error was recorded for the alarmed entry displayed in Fields 2 through 7.

Depressing **NEXT DATA** again cycles back to the initial display providing a stamp index of 3 in Field 11, and the time the entry was alarmed in Fields 12 through 14.

8. Depressing **NEXT CIRCUIT** repeatedly displays the remaining alarmed entries in the PMIDS error log.

Each time **NEXT CIRCUIT** is depressed, Field 10 is decremented by 1 to show the number of remaining alarmed entries to be displayed.

The circuit entry index (Field 10) includes in its count the alarmed entry currently being displayed.

9. Depressing **NEXT CIRCUIT** after all alarmed entries are displayed dashes Fields 2 through 15.

Depressing **NEXT CIRCUIT** again causes the display sequence to start over beginning with the summary.

10. The **CLEAR DATA**; **EXECUTE** sequence can be used to resolve individual alarmed entries or all alarmed entries after **EXECUTE** is used to initiate Test 1.

Note: When alarmed entries are resolved the circuits' failure history is not deleted from the PMIDS error log. The failure history is updated to show that the alarm status now equals 5 (alarm resolved).

11. To resolve individual alarmed entries, (turn off its associated fault indicator - when no other alarmed entries affect the same fault indicator), perform the following:

Use **NEXT CIRCUIT** to display the alarmed entry on the **MAAP**.

Requirement: The alarmed entry cannot be resolved or the fault indicator turned off unless the alarmed entry is displayed on the **MAAP**.

Depress CLEAR DATA; EXECUTE.

12. Field 8 (alarm status) displays a 5 indicating the alarmed entry is resolved.

The fault indicator associated with the alarmed entry is turned off if no other alarmed entries affecting the same fault indicator exist.

13. All alarmed entries can be resolved when the summary is initially displayed, i.e., upon entry to **PROC 600** Test 1, and after displaying and recording all alarmed entries and then using **NEXT CIRCUIT** to display the summary.

Caution: The alarmed entries should be displayed and recorded prior to resolving the alarmed entries and turning off their associated alarm and fault indicators in order that a record of the causes of the alarmed entries are available for maintenance personnel. 14. After entering Test 1 and depressing **EXECUTE** (summary is displayed), depress **CLEAR DATA; EXECUTE**.

The alarmed entries are resolved and all alarms and fault indicators are turned off.

Field 10 displays a 0 indicating no alarmed entries exist.

15. After displaying and recording all alarmed entries, depress **NEXT CIRCUIT** until the summary is displayed, then depress **CLEAR DATA; EXECUTE**.

All alarmed entries are resolved and all alarms and fault indicators are turned off.

Field 10 displays a 0 indicating no alarmed entries exist.

16. When an alarmed entry equipment location is left displayed in Test 1, the entry can be passed to other maintenance procedures as a default equipment location for further testing.

Note: Only PROC 601, PROC 611, PROC 620, PROC 622, PROC 646, and PROC 647 have the capability to accept default equipment locations passed to them by PROC 600.

Test 2

Test 2 of **PROC 600** is used to investigate user reported troubles or to determine if further analysis of potential troubles are to be performed.

Test 2 of **PROC 600** is also performed prior to maintenance personnel leaving the customer's premises to ensure that all potential troubles are investigated and cleared to eliminate future alarm conditions.

Test 2 displays alarmed circuits and circuits with errors recorded against them by unit type in numerical order.

Alarmed circuits are displayed within a unit type, therefore, all of the same type of alarms (i.e., major, minor, or warning) are not displayed by alarm category as in Test 1.

Individual entries within a unit type or all entries for a single unit type may be cleared (zeroed out) from the PMIDS error log. When entries are cleared (zeroed out) the circuit(s) failure history is deleted from the PMIDS error log.

1. Test 2 is selected by use of NEXT TEST.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 2.

- . 2. To start Test 2, depress EXECUTE.
 - 3. The PMIDS error log is sorted and a summary of the total number of circuits with recorded errors for all unit types is displayed.
 - 4. If no circuits with recorded errors exist, the following summary is displayed:

Field 1 - 2.

Field 10 - 0 (Indicating no circuits with recorded errors).

5. If any circuits with recorded errors exist, the summary displays a 2 in Field 1 and the total number of entries with recorded errors in Field 10.

Note: A display of 99 in Field 10 indicates that 99 or more entries with recorded errors exist in the error log.

6. When the initial summary is displayed, Field 2 (unit type) is flashed indicating it is an optional entry field. To select a particular unit type of interest, enter the following:

(Unit type); ENTER.

Note: Unit types 52 and 68 through 72 are not included in R2V1.

Proceed to Step 8.

7. A particular unit type of interest may also be selected by use of NEXT UNIT.

Note: Unit types 52 and 68 through 72 are not included in R2V1.

Depress **NEXT UNIT** until the unit type of interest is displayed in Field 2.

Proceed to Step 9.

8. Depress EXECUTE.

Note: EXECUTE must be depressed to display the contents for the unit type entered.

9. The first entry (if any) for the unit type entered is displayed. See Step 11 below for the description of the display.

Field 10 (circuit entry index) decreases to show the number of remaining entries to be displayed (if any) from the unit type entered, including the entry presently displayed.

If no recorded entries exist for the unit type entered, Fields 3 through 7, 9, and 11 through 15 are dashed.

Field 8 (alarm status) displays a 0 and Field 10 displays the number of remaining entries (if any) to be displayed.

10. When the summary is displayed and a particular unit of interest is not selected, use of **NEXT CIRCUIT** or **NEXT UNIT** displays the first PMIDS entry with recorded errors.

NEXT CIRCUIT is used to step through all individual circuit entries or all entries within a unit type.

NEXT UNIT is used to step to the first entry of the next unit type in numerical sequence.

Note: Unit types 52 and 68 through 72 are not included in R2V1.

11. The first entry with recorded errors is displayed as follows:

Field 1 - 2.

Field 2 - Unit type of entry with recorded errors (number designation of the type of equipment - See Table E, PROC 600 - Field Definitions and Codes).

Note: Unit types 52 and 68 through 72 are not included in R2V1.

Field 3 - Dashed, status memory audit encode, configuration audit fault code, unit number of external equipment/processor, or module number of entry with recorded errors.

Field 4 - Dashed, external equipment encode, or cabinet number of entry with recorded errors.

Field 5 - Dashed or carrier number of entry with recorded errors.

Field 6 - Dashed, status memory audit fault code, undefined exception FIFO encode, or slot number of entry with recorded errors.

Field 7 - Dashed or circuit number of entry with recorded errors.

Field 8 - Alarm status of entry with recorded errors (1 = major, 2 = minor, 3 = warning, 4 = errors recorded).

Field 9 - Total number of times entry with recorded errors failed.

Field 10 - Total number of entries with recorded errors.

Field 11 - 1 (Indicating that Fields 12 through 14 display the time when the last error was recorded for the displayed entry).

Fields 12 through 14 - Day, hour, and minute of the last error recorded for the displayed entry.

Field 15 - Dashed or a 2-digit reference to a maintenance procedure.

12. Further diagnosis of the displayed entry can be performed by using the maintenance procedure referenced in Field 15 (if any) to isolate and repair the cause of the entry displayed in Fields 2 through 7.

The two digits referenced in Field 15 are preceded by a 6 to determine the maintenance procedure to be performed. (Example: 20 displayed in Field 15 indicates that **PROC 620** is the maintenance procedure to be performed.)

Note: When a displayed entry does not reference a maintenance procedure to be performed (Field 15 = dash), refer to the Repair Guide part of **PROC 600** to determine the type of diagnosis or repair action to be performed (if any).

13. Depressing **NEXT DATA** changes the stamp index and time stamp. Field 11 (stamp index) displays a 2 indicating that the time displayed in Fields 12 through 14 is the time the first error was recorded for the entry displayed in Fields 2 through 7.

If the displayed entry is an alarmed PMIDS entry (indicated by a 1, 2, or 3 in Field 8) depressing **NEXT DATA** once more changes the stamp index and time stamp. Field 11 (stamp index) displays a 3 indicating that the time displayed in Fields 12 through 14 is the time the entry was alarmed.

If the displayed entry is not an alarmed PMIDS entry (or after displaying the time the entry was alarmed) depressing **NEXT DATA** cycles back to the initial display providing a stamp index of 1 in Field 11, and the time of the last recorded error for the entry in Fields 12 through 14.

14. Depressing **NEXT CIRCUIT** or **NEXT UNIT** displays the next entry with recorded errors in display order or another unit type of interest can be selected for display.

Note: Unit types 52 and 68 through 72 are not included in R2V1.

15. To select another unit type of interest after the first unit type is selected or **NEXT CIRCUIT** or **NEXT UNIT** is depressed, perform the following:

CHANGE FIELD; 2; ENTER; (Unit type); ENTER.

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EXECUTE must be depressed to display the contents of the unit type selected.

16. Each time **NEXT CIRCUIT** is depressed, Field 10 is decremented by 1 to show the number of remaining entries with recorded errors to be displayed.

The circuit entry index (Field 10) includes in its count the entry currently being displayed.

17. Field 10 is decremented by a multiple corresponding to the number of entries within a unit type when **NEXT UNIT** is used to step from unit to unit without examining the entries within a unit type or a unit type of interest is selected by the **CHANGE FIELD** sequence.

The circuit entry index (Field 10) includes in its count the entry currently being displayed.

18. When the last entry in a unit is currently displayed, depressing **NEXT CIRCUIT** or **NEXT UNIT** displays the first entry of the next unit with recorded errors.

Note: Unit types 52 and 68 through 72 are not included in R2V1.

19. Depressing NEXT CIRCUIT or NEXT UNIT after all entries with recorded errors are displayed dashes Fields 2 through 15.

Depressing **NEXT CIRCUIT** or **NEXT UNIT** again causes the display sequence to start over beginning with the summary.

20. The CLEAR DATA; EXECUTE sequence can be used to clear (zero out) individual entries with recorded errors or all entries with recorded errors in a particular unit type after EXECUTE is used to initiate Test 2.

Note: When an entry with recorded errors is an alarmed entry (indicated by a 1, 2, or 3 displayed in Field 8) the fault indicator associated with that entry is turned off if no other entries affecting the same fault indicator exist.

21. To clear (zero out) individual entries with recorded errors from the PMIDS error log, perform the following:

Use **NEXT CIRCUIT** and/or **NEXT UNIT** to display the entry to be cleared.

Requirement: The entry with recorded errors cannot be cleared (zeroed out) from the PMIDS error log unless the entry is displayed on the **MAAP**.

Note: Unit types 52 and 68 through 72 are not included in R2V1.

Depress CLEAR DATA; EXECUTE.

22. Field 8 (alarm status) displays a 0 indicating the entry is cleared from PMIDS.

Fields 9 and 11 through 15 are dashed.

Field 10 displays the number of remaining entries (if any) to be displayed.

23. All entries with recorded errors within a unit type are cleared (zeroed out) in two ways; when the summary is initially displayed, and after displaying and recording the entries with recorded errors in the unit type to be cleared.

Caution: The entries with recorded errors should not be cleared (zeroed out) for a unit type until all entries are displayed and recorded in order that a record of the causes of the entries are available for maintenance personnel. 24. After entering Test 2, depress **EXECUTE** to display the summary, enter the unit type to be cleared (zeroed out) in Field 2 and depress **CLEAR DATA; EXECUTE**:

(Unit type); ENTER; CLEAR DATA; EXECUTE.

25. Field 8 displays a 0 indicating no entries with recorded errors exist for the unit type displayed in Field 2.

Fields 9 and 11 through 15 are dashed.

Field 10 displays the number of remaining entries (if any) to be displayed.

26. After displaying and recording all entries with recorded errors in the unit type to be cleared (zeroed out), use the CHANGE FIELD sequence to enter the unit type in Field 2, and depress CLEAR DATA; EXECUTE:

CHANGE FIELD; 2; ENTER; (Unit type); ENTER; CLEAR DATA; EXECUTE.

Field 8 displays a 0 indicating no entries with recorded errors exist for the unit type displayed in Field 2.

Fields 9 and 11 through 15 are dashed.

Field 10 displays the number of remaining entries (if any) to be displayed.

27. When an entry with recorded errors is left displayed in Test 2, the equipment location of the entry can be passed as a default equipment location to other maintenance procedures for further testing.

Note: Only **PROC 601, PROC 611, PROC 620, PROC 622, PROC 646**, and **PROC 647** have the capability to accept default equipment locations passed to them by **PROC 600**.

Test 3

Test 3 of **PROC 600** is used to investigate which entries in the PMIDS error log are resolved.

Resolved alarmed entries in the PMIDS error log are identical whether an alarmed entry is resolved by isolating, repairing, and testing the circuit or by manually resolving the alarmed entry using **CLEAR DATA; EXECUTE** in Test 1.

Test 3 of **PROC 600** is performed by maintenance personnel to obtain an archive of alarmed entries from the PMIDS error log which are resolved.

- 1. The resolved alarmed entries display such information as the unit type, circuit identification, time the entry was resolved, time the entry was alarmed, and the time of the first recorded error for the displayed entry.
- 2. Such information can be beneficial when the same entry is later displayed as an alarmed entry or as an entry with recorded errors.

Test 3 displays resolved alarmed entries by unit type in numerical order.

Individual resolved alarmed entries or all resolved alarmed entries may be cleared (zeroed out) from the PMIDS error log. When entries are cleared (zeroed out) the circuit(s) failure history is deleted from the PMIDS error log.

1. Test 3 is selected by use of **NEXT TEST**.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 3.

PROC 600 Test 3

- 2. To start Test 3, depress EXECUTE.
- 3. The PMIDS error log is sorted and a summary of the total number of resolved alarmed entries is displayed.
- 4. If no resolved alarmed entries exist, the following summary is displayed:

Field 1 - 3.

Field 10 - 0 (Indicating no resolved alarmed entries).

- 5. If any resolved alarmed entries exist, the summary displays a 3 in Field 1 and the total number of resolved alarmed entries is displayed in Field 10.
- 6. When the initial summary is displayed, Field 2 (unit type) is flashed indicating it is an optional entry field. To select a particular unit type of interest, enter the following:

(Unit type); ENTER.

Note: Unit types 52 and 68 through 72 are not included in R2V1.

Proceed to Step 8.

7. A particular unit type of interest may also be selected by use of NEXT UNIT.

Depress NEXT UNIT until the unit type of interest is displayed in Field 2.

Note: Unit types 52 and 68 through 72 are not included in R2V1.

Proceed to Step 9.

8. Depress **EXECUTE**.

Requirement: EXECUTE must be depressed to display the contents for the unit type entered.

9. The first entry (if any) for the unit type entered is displayed. See Step 11 below for the description of the display.

Field 10 (circuit entry index) decreases to show the number of remaining entries to be displayed in order (if any) from the unit type entered, including the entry presently displayed.

If no recorded entries exist for the unit type entered, Fields 3 through 7, 9, and 11 through 15 are dashed.

Field 8 (alarm status) displays a 0 and Field 10 displays the number of remaining entries (if any) to be displayed.

10. When the summary is displayed and a particular unit of interest is not selected, use of **NEXT CIRCUIT** or **NEXT UNIT** displays the first PMIDS resolved alarmed entry.

NEXT CIRCUIT is used to step through all individual resolved alarmed entries or all entries within a unit type.

NEXT UNIT is used to step to the first entry of the next unit type in numerical sequence.

Note: Unit types 52 and 68 through 72 are not included in R2V1.

11. The first resolved alarmed entry is displayed as follows:

Field 1 - 3.

Field 2 - Unit type of resolved alarmed entry (number designation of the type of equipment - See Table E, PROC 600 - Field Definitions and Codes).

Note: Unit types 52 and 68 through 72 are not included in R2V1.

Field 3 - Dashed, unit number of external equipment/processor, or module number of resolved alarmed entry.

Field 4 - Dashed, external equipment encode, or cabinet number of resolved alarmed entry.

Field 5 - Dashed or carrier number of resolved alarmed entry.

Field 6 - Dashed or slot number of resolved alarmed entry.

Field 7 - Dashed or circuit number of resolved alarmed entry.

Field 8 - 5 (Indicating alarmed entry is resolved).

Field 9 - Total number of times resolved alarmed entry failed.

Field 10 - Total number of resolved alarmed entries.

Field 11 - 1 (Indicating that Fields 12 through 14 display the time when the alarmed entry was resolved).

Fields 12 through 14 - Day, hour, and minute the displayed entry was resolved.

Field 15 - Dashed.

12. Depressing **NEXT DATA** changes the stamp index and time stamp. Field 11 (stamp index) displays a 3 indicating that the time displayed in Fields 12 through 14 is the time the entry was alarmed.

Depressing **NEXT DATA** once more changes the stamp index and time stamp. Field 11 (stamp index) displays a 2 indicating that the time displayed in Fields 12 through 14 is the time the first error was recorded for the resolved alarmed entry displayed in Fields 3 through 7.

Depressing **NEXT DATA** again cycles back to the initial display providing a stamp index of 1 in Field 11, and the time the alarmed entry was resolved in Fields 12 through 14.

13. Depressing **NEXT CIRCUIT** or **NEXT UNIT** displays the next resolved alarmed entry in display order or another unit type of interest can be selected for display.

Note: Unit types 52 and 68 through 72 are not included in R2V1.

14. To select another unit type of interest after the first unit type is selected or **NEXT CIRCUIT** or **NEXT UNIT** is depressed, perform the following:

CHANGE FIELD; 2; ENTER; (Unit type); ENTER.

EXECUTE must be depressed to display the contents of the unit type selected.

15. Each time **NEXT CIRCUIT** is depressed, Field 10 is decremented by 1 to show the number of remaining resolved alarmed entries.

The circuit entry index (Field 10) includes in its count the entry currently being displayed.

16. Field 10 is decremented by a multiple corresponding to the number of entries within a unit type when **NEXT UNIT** is used to step from unit to unit without examining the entries within a unit type or a unit type of interest is selected by the **CHANGE FIELD** sequence.

The circuit entry index (Field 10) includes in its count the entry currently being displayed.

17. When the last entry in a unit is currently displayed, depressing **NEXT UNIT** or **NEXT CIRCUIT** displays the first entry of the next unit with resolved alarmed entries.

Note: Unit types 52 and 68 through 72 are not included in R2V1.

18. Depressing **NEXT CIRCUIT** or **NEXT UNIT** after all resolved alarmed entries are displayed, dashes Fields 2 through 15.

Depressing **NEXT CIRCUIT** or **NEXT UNIT** again causes the display sequence to start over beginning with the summary.

19. The CLEAR DATA; EXECUTE sequence can be used to clear (zero out) individual resolved alarmed entries or all resolved alarmed entries from PMIDS after EXECUTE is used to initiate Test 3.

Caution: The resolved alarmed entries should not be cleared (zeroed out) until all entries are displayed and recorded in order to provide an archive of resolved alarmed entries.

20. To clear (zero out) individual resolved alarmed entries from the PMIDS error log, perform the following:

Use **NEXT CIRCUIT** and/or **NEXT UNIT** to display the entry to be cleared.

Requirement: The resolved alarmed entry can not be cleared (zeroed out) from the PMIDS error log unless the entry is displayed on the **MAAP**.

Note: Unit types 52 and 68 through 72 are not included in R2V1.

Depress CLEAR DATA; EXECUTE.

21. Field 8 (alarm status) displays a 0 indicating the entry is cleared from PMIDS.

Fields 9 and 11 through 15 are dashed.

Field 10 displays the number of remaining entries (if any) to be displayed.

- 22. If the **CLEAR DATA**; **EXECUTE** sequence is performed when the summary is displayed or when a **null** unit is entered in Field 2, all resolved alarmed entries are cleared (zeroed out) from the PMIDS error log.
- 23. To clear (zero out) all resolved alarmed entries using the null unit method, perform the following:

CHANGE FIELD; 2; ENTER; ENTER; CLEAR DATA; EXECUTE.

Field 10 displays a 0 indicating that no resolved alarmed entries exist.

24. All resolved alarmed entries can be cleared (zeroed out) when the summary is initially displayed, i.e., upon entry to **PROC 600** Test 3, and after displaying and recording all resolved alarmed entries.

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25. After entering Test 3 and depressing **EXECUTE** (summary is displayed), depress **CLEAR DATA; EXECUTE**.

Field 10 displays a 0 indicating no resolved alarmed entries exist.

26. After displaying and recording all resolved alarmed entries, depress **NEXT CIRCUIT** until the summary is displayed, then depress **CLEAR DATA; EXECUTE**.

Field 10 displays a 0 indicating no resolved alarmed entries exist.

Repair Guide

PROC 600 displays a dash in Field 15 for several unit type entries. A dash in Field 15 indicates that a maintenance procedure is not available to diagnose and isolate these failures.

In general, unit types 42, 43, 60, 61, 63, 64, and 67 are the only unit types that display a dash in Field 15.

Unit Types 60, 63, and 64:

Unit type 60 (diagnostic processor), unit type 63 (external equipment), and unit type 64 (external processor) raise an alarm but do not reference a maintenance procedure. Entries for these unit types are displayed in Test 1 and 2 of **PROC 600** and Field 15 is dashed.

The following corrective action should be taken when entries in unit types 60, 63, and 64 are displayed by Test 1 or 2.

Unit type 60 (diagnostic processor):

1. At the equipment location displayed in Fields 3 through 6, check to ensure that the data set is plugged in.

If the data set is plugged in, proceed to Step 5.

If the data set is not plugged in, connect the data set and proceed to Step 2.

2. Clear the alarmed entry by depressing CLEAR DATA, EXECUTE when the entry is displayed in Fields 3 through 6.

Wait at least 5 to 10 minutes.

3. Enter **PROC 600** test 1 and depress **EXECUTE**.

Determine if the same entry for unit type 60 is displayed.

4. If the same entry is not displayed, corrective action is complete.

If the same entry is displayed, proceed to Step 5.

- 5. Record the slot number (22, 31, or 32) displayed in Field 6.
- 6. At the equipment location displayed in Fields 3 through 6, replace the circuit pack.
- 7. Clear the alarmed entry by depressing CLEAR DATA, EXECUTE when the entry is displayed in Fields 3 through 6.

Wait at least 5 to 10 minutes.

8. Enter PROC 600 test 1 and depress EXECUTE.

Determine if the same entry for unit type 60 is displayed.

9. If the same entry is not displayed, corrective action is complete.

If the same entry is displayed, determine if slot 22, or 32 is displayed in Field 6.

10. If slot 22 or 32 is not displayed, proceed to Step 14.

If slot 22 or 32 is displayed, replace TN491 in slot 31 at the equipment location displayed in Fields 3 through 5.

11. Clear the alarmed entry by depressing CLEAR DATA, EXECUTE when the entry is displayed in Fields 3 through 6.

Wait at least 5 to 10 minutes.

12. Enter PROC 600 test 1 and depress EXECUTE.

Determine if the same entry for unit type 60 is displayed.

- 13. If the same entry is not displayed, corrective action is complete.
- 14. If the same entry is displayed, check the UART cable E26 E26 and the wiring associated with the circuit pack(s) replaced or perform microdiagnostic test 0 in the off-line side of a duplicated common control switch. If the switch is unduplicated, perform microdiagnostic testing only when traffic permits as microdiagnostic testing takes the switch down.
- 15. Repeat Steps 1 through 14 for each diagnostic processor entry (Unit type 60) displayed in Test 1.

Unit type 63 (external equipment):

- 1. Record the unit number of the external equipment and the external equipment encode displayed in Fields 3 and 4 of each unit type 63 entry displayed in Test 1.
- 2. Determine from local records if you are at the customer's premises associated with the unit number displayed in Field 3.
- 3. If you are at the customer's premises, determine what corrective action to take depending on the external equipment encode displayed in Field 4.
- 4. External equipment encodes displayed in Field 4 are defined as follows:
 - 1 = The auxiliary cabinet battery holdover circuit alarm is active.
 - 2 = The auxiliary cabinet temperature limit sensor alarm is active.
 - 3 = The auxiliary cabinet fan power alarm is active.
 - 4 = The auxiliary cabinet circuit breaker/fuse alarm is active.
 - 5 = The auxiliary cabinet frequency generator alarm is active.
 - 6 = The auxiliary cabinet rectifier alarm is active.
 - 7 = The external equipment major or minor alarm is active.
 - 8 = Type of trouble is unknown (multiple errors).

Unit type 64 (external processor):

- 1. Record the unit number of the external processor displayed in Field 3 of each unit type 64 entry displayed in Test 1.
- 2. Determine from local records if you are at the customer's premises associated with the unit number displayed in Field 3.
- 3. If you are at the customer's premises, perform corrective action on the external processor or refer the problem to the appropriate personnel.

Unit Types 42, 43, 61, and 67:

Unit type 42 (calls aborted), unit type 43 (status memory audit), unit type 61 (configuration audits), and unit type 67 (undefined exception FIFO code) do not raise an alarm or reference a maintenance procedure. Entries for these unit types are displayed in Test 2 of **PROC 600** and Field 15 is dashed.

The following corrective action should be taken when entries in unit types 42, 43, 61, and 67 are displayed by Test 2.

Unit type 42 (calls aborted):

- 1. Record the information displayed in Fields 2 through 14 of each entry displayed in Test 2 and clear (zero out) the unit type (42) from PMIDS.
- 2. When excessive entries (based on experience) for unit type 42 are noted, refer the problem to switch software engineers for further diagnosis.

Unit type 43 (status memory audits):

- 1. Record the status memory encode displayed in Field 3 and the related information displayed in Fields 9 through 14 of each entry displayed in Test 2, and clear (zero out) the unit type (43) from PMIDS.
- 2. Table F, PROC 600 Status Memory Audit Encodes, provides a definition for each status memory encode presently being used.
- 3. Refer these type of software errors to the switch software engineers for further diagnosis.

Note: The remainder of the fault signature data for each status memory audit entry is not displayed in **PROC 600**.

Unit type 61 (configuration audits):

- 1. Record the configuration audit fault code displayed in Field 3 and the related information displayed in Fields 9 through 14 of each entry displayed in Test 2, and clear (zero out) the unit type (61) from PMIDS.
- 2. Table G, PROC 600 Configuration Audit Fault Codes, provides a definition for each configuration audit fault code presently being used.
- 3. Refer these type of software errors to the switch software engineers for further diagnosis.
 - Note: The remainder of the fault signature data for each configuration audit entry is not displayed in **PROC 600**.

TABLE F.

PROC 600										
	STATUS M									
FIELD 1 ENCODE	FIELD 6 ENCODE	DEFINITION								
1	1	Error Bad Look								
2	4 1	Bad Linkage Digit Error Bad Linkage								
3	1	Error No Activity								
4	1	Error Stuck Connection Number								
5	1	Error Stuck Accumulator								
6	1	Error Electronic Telephone Tone								
7	1	Error Electronic Telephone Status								
8	8	DCIU Hardware Error								
9	8	DCIU Software Error								
10	$\begin{array}{c}1\\4\\2\\16\end{array}$	Bad Port Audit Bad Port Digit Bad Port Information Initialization Translation Error								
11	1	Bad Time Slot Interchanger Count								
12	2 1	Bad Port Equipment Number Bad Port Equipment Number Audit								
13	1	Accumulator Zero Error								
14	16	Input/Output Selection Error								
15	4	Digit Collection Message Error								
16	4	Digit Send Error								
17	4	Busy Trunk Digit								
18	2 32	Bad originating number Invalid module FIFO 15 code								
19	2	Bad scanner message								
20	1	Queue fault								
21	1	Bad Blind Map								
22	1	Accumulator inconsistent								
23	1 ·	Bad TMS Link error								
24	32	Invalid TMS FIFO 15 code								

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TABLE G.

	PROC 600 CONFIGURATION AUDIT FAULT CODES											
FAULT CODE	DEFINITION											
1	Control register on memory board 0											
2	Control register on memory board 1											
3	Control register on memory board 2											
4	Control register on memory board 3											
5	Control register on memory board 4											
6	Control register on memory board 5											
7	Control register on memory board 6											
8	Control register on memory board 7											
17	501CC write protect											
18	Scamper write protect											
19	Duplicate controller write protect											
23	Fetch protect boundary											
24	Double write select register											
25	Double write enable register (control register)											

Unit type 67 (undefined exception FIFO code):

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- 1. Record the module number displayed in Field 3, the undefined exception FIFO encode displayed in Field 6, the related information displayed in Fields 9 through 14 of each entry displayed in Test 2 and clear (zero out) the unit type (67) from PMIDS.
- Table H, PROC 600 Exception FIFO Encodes, provides a definition for each exception FIFO encode presently being used.
- 3. Refer these type of software errors to the switch software engineers for further diagnosis.

Note: The remainder of the fault signature data for each undefined exception FIFO entry is not displayed in **PROC 600**.

TABLE H.

	PROC 600 — EXCEPTION FIFO ENCODES											
ENCODE		DEFINITION										
1	PXF_BAD_SPN	Port type incompatible with error code										
2	PXF_BAD_CODE	Error code not defined										
3	PXF_TTD_SNDR	Touch-tone digit send error										
4	PXF_NET_ORD	Network order error										
5	PXF_DIG_CCLL	Digit collecting on for an inappropriate board type										
6	PXF_RING_TYP	Ringing is on for an inappropriate board type										
7	MXF_BAD_MIN	Invalid module interface number reported										
8	MXF_BAD_CODE	Error code not defined										
9	MXF_ILEG_CON	Illegal connection										
10	MXF_ILEG_BSY	Illegal busy out										
11	MXF_ADMIN_ER	Administration error										
12	MXF_NET_ORD	Network order error										

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PROC 601 - ENVIRONMENTAL TESTS

FLIPCHART ISSUE 1			+		-	F		EN	VIRONMEN	TAL	TEST		+		+		
TEST 1: DISPLA FAILURE HISTOR ALARM SEVERITY	YS Y BY	TEST 2: TESTS ALL CABINETS OR Range of Cabinets in System For Alarm Conditions.						MCC STATUS (FIELD 4): 0 = OFF LINE 1 = ON LINE			NRM STAT DISPLAYS D = NO E	US (FIEL HIGHEST RRORS RI	D 15): CABINET # ECORDED	LARM	NOTES:		SPECIAL ERROR CODES:
USE 'NEXT CIRC		USE 'NEXT UNIT' TO READ ALARM CONDITIONS FROM OFF-LINE MODU CONTROL CHANNEL. TO DISPLAY NEXT CIRCUIT LOCATI			ALARM MODULE	CABINET ALARM CAUSE (FIELOS 5-14): 0 = PASS 1 = ALARM CONDITION PRESENT			2 = INDOR 3 = WARNING 4 = ERRORS RECORDED 5 = ALARM RESOLVED			CHANGED BY 'NEXT TEST'.		BI-MESSAGE TRANSMISSION TO MODULE CONTROL CHANNEL FAILED			
EQUIPMEI LOCATION TEST TEST 2 NO MODULE	CABINET	A MCC STATUS	CABINET POWER JW 5 6	FUSE/BRKR	CABIN MOD CO/DC 8	ET ALAM		HOLOOVER	MODULE CTRL CARRIER POWER LEFT RIGHT 2 13 14	G STATUS	NUMB CABIN NUMBER	ER OF ETS OR TESTED	TOTAL Failur	ES 17	FAILURE INDEX	18	GENERAL SYSTEM

Purpose

PROC 601 is used when referenced from **PROC 600** (Alarm causes/error log) or when the **ENVIRON PWR/TEMP AIR FLOW** and **MAJOR** or **MINOR** alarm indicators on the alarm panel are lighted.

PROC 601 is used to:

1. Display environmental failure history for the switch cabinets (System control (TMS and common control) and network cabinets).

Note: Auxiliary cabinets or any cabinet (other than TMS and common control cabinets) not containing port or module control carriers are not covered by **PROC 601**.

2. Display environmental alarm causes from all equipped cabinets or a selected cabinet in the switch.

The alarm causes consist of cabinet power, fuse, breaker, DC-DC converter, frequency generator, air flow, temperature, nominal or extended holdover, and module control carrier power trouble conditions.

- 3. Display environmental alarm causes from both on-line and off-line module control channels (TMS and network) when duplicated module control channels are provided.
- 4. Automatically turn off the ENVIRON PWR/TEMP AIR FLOW fault indicator when all cabinets pass Test 2 and the MAJOR or MINOR alarm indicator(s) if no other major or minor alarm source(s) exist.

Note: Environmental alarmed circuit entries in PMIDS are marked as resolved.

Field Definitions and Codes

Each field of **PROC 601** flip chart and the possible displays for the fields during execution of the different tests are defined in Table I, PROC 601 - Field Definitions and Codes.

PROC 601

Optional input fields are:

- 1. Field 2 Select a specific module to be tested (Test 2 only).
- 2. Fields 2 and 3 Select a specific module and cabinet to be tested (Test 2 only).

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PROC 601 FIELD DEFINITIONS AND CODES								
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION			
1	1-2	Test number	15	0-5	Alarm status of displayed equipment location			
2-3		Equipment location of dis- played cabinet		0	No errors recorded			
2	0-30	Network cabinet module number		1	Major			
-	99	System control cabinet		2	Minor			
2	0-7	module number		3	Warning			
	0.1	Casimet number		4	Errors recorded			
4		channel		5	Alarm resolved			
	0	Off-line	16	0-999	Total number of cabinets in switch or number of cabinets tested			
	1	On-line						
5-14	0-1	Cabinet alarm cause fail- ure code	17	0-999	Total number of failed cabinets			
	0 Pass		18	0-999	Index into failure table			
	1	Alarm condition present						

Operation of Procedure

Overview

PROC 601 is used to determine the cause of the **ENVIRON PWR/TEMP AIR FLOW** and **MAJOR** or **MINOR** alarm indicators being lighted resulting from an environmental failure.

To call in **PROC 601**, perform the following:

- 1. Depress PROC NO; 601; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1 and Field 16 displays the total number of cabinets in the switch. All other fields are dashed.

3. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Two tests are available:

- 1. Test 1 Displays failure history by order of alarm severity.
- 2. Test 2 Tests all cabinets or a range of cabinets for environmental alarm conditions.

Test 1

Test 1 provides a failure history of the environmental alarm causes detected by the on-line software.

Test 1 is also used to manually turn off the ENVIRON PWR/TEMP AIR FLOW fault indicator.

1. Test 1 is the default test when entering **PROC 601**, or is selected by using **NEXT TEST**.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 1.

- 2. When Test 1 is initially called in, Field 1 displays a 1, and Field 16 displays the total number of cabinets in the switch.
- 3. To start Test 1, depress EXECUTE.
- 4. The environmental failure history is sorted and a summary is displayed.
- 5. If no environmental failures exist, the following summary is displayed:

Field 1 - 1.

Field 16 - Total number of cabinets in the switch.

Field 17 - 0 (Indicating no failures).

- 6. If any environmental failures exist, the summary displays a 1 in Field 1, the total number of cabinets in the switch in Field 16, and the total number of cabinet failures in Field 17.
- 7. Depressing NEXT CIRCUIT displays the first failure in order of severity, as follows:

Field 1 - 1.

Fields 2 and 3 - Equipment location of failing cabinet.

Field 4 - Dashed.

Fields 5 through 14 - 0 or 1 (cabinet alarm cause - 0 = passed, 1 = alarm condition present).

Field 15 - Alarm status of failing cabinet.

Field 16 - Total number of cabinets in switch.

Field 17 - Total number of failed cabinets.

Field 18 - 1 (Indicating the first failing cabinet).

8. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failing cabinets in order of severity, i.e., major alarm status first, followed by minor alarm status, and errors recorded but not alarmed.

Each time **NEXT CIRCUIT** is depressed, Field 18 (failure index) is incremented by 1.

The failure index includes in its count, the failing cabinet currently being displayed.

9. After the last failing cabinet is displayed (indicated by Field 17 equaling Field 18) depressing **NEXT CIRCUIT** again dashes Fields 2 through 18.

Depressing **NEXT CIRCUIT** once more displays the summary, and the failure history can be stepped through again by use of **NEXT CIRCUIT**.

PROC 601 Test 1 and Test 2

10. The CLEAR DATA; EXECUTE sequence can be used to manually resolve individual environmental failures or all environmental failures after EXECUTE is used to initiate Test 1.

The failures that are resolved are those failures with an alarm status of 1 or 2 displayed in Field 15.

Caution: The environmental failures should be displayed and recorded prior to resolving the environmental circuit alarmed entries in order that a record of the equipment location and cause of the failure(s) is available for maintenance personnel.

11. To resolve individual environmental failures with an alarm status of 1 or 2, perform the following:

Use **NEXT CIRCUIT** to display the failing cabinet with an alarm status of 1 or 2 on the **MAAP**.

Requirement: Individual environmental failures cannot be resolved unless the failing cabinet is displayed on the **MAAP**.

Depress CLEAR DATA; EXECUTE.

12. Field 15 (alarm status) displays a 5 indicating that the failing cabinet is resolved.

The ENVIRON PWR/TEMP AIR FLOW fault indicator is turned off if no other environmental failures exist.

- 13. All environmental failures with an alarm status of 1 or 2 can be resolved when the summary is initially displayed, i.e., upon entry to **PROC 601** Test 1, and after displaying and recording all environmental failures and then using **NEXT CIRCUIT** to display the summary.
- 14. After entering Test 1 and depressing EXECUTE the summary is displayed.

Depress CLEAR DATA; EXECUTE.

All environmental failures with an alarm status of 1 or 2 are marked as resolved in PMIDS and the ENVIRON PWR/TEMP AIR FLOW fault indicator is turned off.

15. After displaying and recording all environmental failures, depress **NEXT CIRCUIT** until the summary is displayed, then depress **CLEAR DATA; EXECUTE**.

All environmental failures with an alarm status of 1 or 2 are marked as resolved in PMIDS and the ENVIRON PWR/TEMP AIR FLOW fault indicator is turned off.

16. The **MAJOR** or **MINOR** alarm indicator is also turned off when no other sources affecting the **MAJOR** or **MINOR** alarm indicator are present.

Test 2

Test 2 reads the alarm signals from each on-line MCC circuit pack and displays the status of those alarms for each of the MCC's associated cabinets.

Test 2 also reads the off-line module control channel status (TMS and network) when duplicated module control channels are provided.

In addition, Test 2 reads the alarm signals from on-line common controls' alarm interface (TN490).

Test 2 automatically turns off the ENVIRON PWR/TEMP AIR FLOW fault indicator when all cabinets that raised an alarm pass Test 2.

1. Test 2 is selected by use of **NEXT TEST**.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 2.

2. When Test 2 is initially called in, a default equipment location may be displayed in Fields 2 and 3, and the total number of cabinets in the switch is displayed in Field 16.

Field 2 is blinking, indicating an optional entry field.

The default equipment location can be the last equipment location displayed in Test 1 of **PROC 601** or can be passed from **PROC 600** (Alarm causes/error log) while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.

- 3. The entire switch, a range of cabinets, a specific cabinet, or the default equipment location can be selected for testing.
- 4. To test the default equipment location displayed in Fields 2 and 3, proceed to Step 8.
- 5. A specific cabinet can be selected for testing by use of **NEXT CIRCUIT** or by entering the module and cabinet numbers in Fields 2 and 3 as follows.

Depress **NEXT CIRCUIT** to step through the cabinets until the cabinet to be tested is displayed in Fields 2 and 3.

Enter the module and cabinet numbers in Fields 2 and 3 whether or not a default equipment location is displayed:

(Module number of cabinet to be tested); ENTER; (Cabinet number); ENTER.

Proceed to Step 8.

6. To select a range of cabinets to be tested a module number must be entered in Field 2.

If Fields 2 and 3 are dashed (no default equipment location displayed), enter the module number as follows:

(Module number to be tested); ENTER.

If a default equipment location is displayed, enter the module number as follows:

(Module number to be tested); ENTER; CLEAR ENTRY; ENTER.

All cabinets in the module selected are tested.

Proceed to Step 8.

7. To select the entire switch to be tested, Fields 2 and 3 must not contain an equipment location.

If no default equipment location is displayed, proceed to Step 8. If a default equipment location is displayed, perform the **CHANGE FIELD** sequence as follows:

CHANGE FIELD; 2; ENTER.

Field 2 is blanked and Field 3 is dashed.

Test 2 starts with the first module and first cabinet in the switch and runs until the last cabinet in the switch is tested.

Proceed to Step 8.

8. To start Test 2, depress EXECUTE.

Test 2 operation and display of test results is different when a specific cabinet or default equipment location is tested and when the entire switch or a range of cabinets is tested.

PROC 601 Test 2

9. For test operation and display of test results for a default equipment location or a specific cabinet, proceed to Step 10.

For test operation and display of test results for the entire switch or a range of cabinets, proceed to Step 14.

10. When the test is completed for a default equipment location or a specific cabinet, the following is displayed:

Field 1 - 2.

Fields 2 and 3 - Equipment location of cabinet being tested.

Field 4 - 1 (Indicating on-line module control channel was read).

Fields 5 through 14 - Cabinet alarm cause (0 = passed, 1 = alarm condition present).

Field 15 - Alarm status of cabinet tested.

Field 16 - 1 (Indicating the cabinet selected was tested).

Field 17 - 0 (Indicating no failures were detected for the cabinet tested) or 1 (Indicating that the cabinet failed the test).

Field 18 - Dashed.

11. When testing a specific cabinet or default equipment location, dcpressing **NEXT UNIT** causes the off-line module control channel's status registers to be read for the cabinet displayed in Fields 2 and 3.

Note: Depressing **NEXT UNIT** when a duplicated module control channel is not provided, results in error code 74 (equipment not part of system) being displayed, or error code 06 (wrong key, press right key and continue) being displayed when a duplicated common control cabinet is displayed in Fields 2 and 3.

Field 4 changes from 1 to 0 when **NEXT UNIT** is depressed.

EXECUTE must be depressed to read the off-line status registers.

12. Depressing **NEXT UNIT** again reverts back to the on-line status registers (Field 4 = 1) when **EXECUTE** is depressed.

Note: NEXT UNIT cannot be used to read the off-line MCC status registers when testing a range of cabinets.

13. When another cabinet is to be tested, the **CHANGE FIELD** sequence must be used to select the specific cabinet:

CHANGE FIELD; 2; ENTER; (Module number); ENTER; (Cabinet number); ENTER.

EXECUTE must be depressed to test the specific cabinet selected for testing.

14. When the entire switch or a range of cabinets is being tested for environmental failures the **WAIT** indicator is turned on and the following fields are incremented momentarily:

Fields 2 and 3 - Equipment location being tested.

Field 16 - Number of cabinets tested.

Field 17 - Total failures (if any).

15. STOP can be depressed when the entire switch or a range of cabinets is being tested.

Depressing **STOP** displays the next equipment location to be tested in Fields 2 and 3, the number of cabinets tested in Field 16, and the number of failures detected in Field 17. The **WAIT** indicator is turned off.

16. If no failures are detected for the cabinets tested when **STOP** is depressed, a 0 is displayed in Field 17.

If any failures are detected for the cabinets tested when \mathbf{STOP} is depressed, proceed to Step 20.

- 17. When **STOP** is depressed while testing the entire switch or a range of cabinets (halting the test before all cabinets are tested), the range of cabinets or the entire switch must be reentered by using the **CHANGE FIELD** sequence in order to complete the test.
- 18. When the entire switch or a range of cabinets is tested, the **WAIT** indicator is turned off and a summary is displayed.
- 19. If no cabinets failed, the following summary is displayed:

Field 1 - 2.

Field 16 - Number of cabinets tested.

Field 17 - 0 (Indicating no failures).

- 20. If any cabinets failed, the summary displays a 2 in Field 1, the total number of cabinets tested in Field 16, and the total number of failures in Field 17.
- 21. Depressing **NEXT CIRCUIT** displays the first failure, as follows:

Field 1 - 2.

Fields 2 and 3 - Equipment location of failing cabinet.

Field 4 - 1 (Indicating on-line module control channel was read).

Fields 5 through 14 - 0 or 1 (Cabinet alarm cause - 0 = passed, 1 = alarm condition present).

Field 15 = Alarm status of failing cabinet.

Field 16 - Total number of cabinets tested.

Field 17 - Total number of failed cabinets.

Field 18 - 1 (Indicating the first failing cabinet).

22. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failing cabinets.

Each time **NEXT CIRCUIT** is depressed, Field 18 (failure index) is incremented by 1.

The failure index includes in its count, the failing cabinet currently being displayed.

 After the last failing cabinet is displayed (indicated by Field 17 equaling Field 18) depressing NEXT CIRCUIT again dashes Fields 2 through 18.

Depressing **NEXT CIRCUIT** once more displays the summary, and the failing cabinets can be stepped through again by use of **NEXT CIRCUIT**.

24. To select another range of cabinets to test, the CHANGE FIELD sequence must be used:

CHANGE FIELD; 2; (Module number); ENTER.

All cabinets in the module entered in Field 2 are tested when **EXECUTE** is depressed.

PROC 601 Test 2

25. The ENVIRON PWR/TEMP AIR FLOW fault indicator is automatically turned off when Test 2 is completed with no failures detected for all cabinets that had an alarm status of 1 or 2 (major or minor).

Note: Environmental circuit alarmed entries in PMIDS are marked as resolved.

26. The **MAJOR** or **MINOR** alarm indicator is also turned off if no other sources are affecting the major or minor alarm indicators.

Repair Guide

Overview

When the ENVIRON PWR/TEMP AIR FLOW and MAJOR or MINOR alarm indicators on the alarm panel are lighted (indicating an environmental failure) or when PROC 601 is referenced from PROC 600 (Alarm causes/error log) as a potential problem, the following steps should be performed in the order listed to isolate and repair the faulty unit.

1. Execute Test 1 and manually record the failure history generated by the on-line maintenance software.

Determine which failures have an alarm status code of 1 or 2 (major or minor).

2. Execute Test 2.

Test 2 runs a variable length of time depending on the number of cabinets being tested, e.g., the entire switch, a range of cabinets, a specific cabinet, or the default equipment location.

Test 2 must be run for each equipment location recorded in Test 1 with an alarm status of 1 or 2 (major or minor) and for the default equipment location passed from **PROC 600** Test 1 or 2.

- 3. The alarm(s) are turned off if no failures are detected in Test 2 from all of the locations for which the alarm status was recorded in Test 1 as 1 or 2 (major or minor).
- 4. If any failures are detected in Test 2, step through the failures and record the equipment locations and cabinet alarm cause(s).

The cabinet alarm cause fields (Fields 5 through 14) indicate which function is detected as failing by displaying a 1 in the appropriate cabinet alarm cause field.

5. When more than one cabinet alarm cause is displayed for the failing cabinet, the alarm causes are isolated and repaired from left to right (Field 5 through Field 14).

One cabinet alarm cause may affect other cabinet alarm causes for the failing cabinet.

6. When multiple cabinet alarm causes exist and the first cabinet alarm cause is corrected, the other causes may not be valid.

Maintenance personnel must determine the effect one cabinet alarm cause has on other cabinet alarm causes and the appropriate repair action to be taken (if any).

When repeating Test 2 for one cabinet alarm cause, it may be possible that the other multiple cabinet alarm causes no longer exist.

7. Isolation and repair steps for the cabinet alarm causes are detailed in:

Cabinet Power AC. Cabinet Power 48 Volts. Fuse/Breaker. DC/DC Converter. Frequency Generator. Air Flow. Temperature. Holdover. Module Control Carrier Power (Left or Right). Other Repair Steps.

- 8. After making the necessary repair, repeat Test 2 for the appropriate equipment location.
- 9. In order to turn off the ENVIRON PWR/TEMP AIR FLOW fault indicator, all failing cabinets with an alarm status of 1 or 2 (major or minor) must pass Test 2.
- 10. The **MAJOR** or **MINOR** alarm indicator is also turned off if no other sources are affecting the major or minor alarm indicator.

Cabinet Power AC

The cabinet power AC alarm cause usually indicates that the power source's internal circuitry is not functioning properly.

1. Determine the type of power source installed in the equipment location displayed in Fields 2 and 3.

If the equipment location is a duplicated common control cabinet, a Time Multiplexed Switch (TMS) cabinet, or a Remote Module Interface (RMI) cabinet, the power source is a 334A power unit.

If the equipment location is a module control cabinet or a port cabinet, the power source is a 309A/310A power supply.

2. At the equipment location displayed in Fields 2 and 3, determine if the circuit breaker on the power source is tripped.

If the circuit breaker is tripped, proceed to Step 3.

If the circuit breaker is not tripped, proceed to Step 8.

3. Reset the circuit breaker.

If the circuit breaker trips again, perform Steps 4 through 7 (as required).

If the circuit breaker does not trip, repeat Test 2. If Test 2 fails again, refer to isolation repair step Other Repair Steps.

If Test 2 does not fail, corrective action is complete.

PROC 601

4. Replace the AEN1 circuit pack in the 334A power unit or 310A power supply, by performing the following:

Set the AC circuit breaker on the 334A power unit or 309A power supply (as appropriate) to $\mathbf{OFF}.$

Remove 2 screws (1 on each side) from the front panel of the 334A power unit or 310A power supply (as appropriate).

Unplug AEN1 circuit pack and remove the circuit pack from the 334A power unit or 310A power supply (as appropriate).

Replace the AEN1 circuit pack.

Secure the 334A power unit or 310A power supply front panel (as appropriate) with the 2 screws.

Set the circuit breaker on the 334A power unit or 309A power supply (as appropriate) to ON.

5. If the circuit breaker trips again after replacing the AEN1 circuit pack, proceed to Step 6.

If the circuit breaker does not trip, repeat Test 2. If Test 2 fails again, proceed to Step 6.

If Test 2 does not fail, corrective action is complete.

6. Replace the 334A power unit or 309A/310A power supply (as appropriate).

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the 309A/310A power supply.

7. If the circuit breaker trips again after replacing the 334A power unit or 309A/310A power supply (as appropriate), check the wiring associated with the 334A power unit or 309A/310A power supply (as appropriate).

If the circuit breaker does not trip, repeat Test 2. If Test 2 fails again, refer to isolation repair step Other Repair Steps.

If Test 2 passes, corrective action is complete.

8. Determine if the proper AC power to the power source is present.

If AC power to the power source is absent, proceed to Step 9.

If AC power to the power source is present, proceed to Step 10.

9. If AC power to the power source is absent, correct the problem and measure the power source output voltages at the test points using a digital multimeter.

If the power source voltages are not within tolerance, proceed to Step 11.

If the power source voltages are within tolerance, repeat Test 2.

If Test 2 fails again, refer to isolation repair step Other Repair Steps.

If Test 2 does not fail, corrective action is complete.

10. Measure the power source output voltages at the test points using a digital multimeter.

If the power source voltages are not within tolerance, proceed to Step 11.

If the power source voltages are within tolerance, repeat Test 2.

If Test 2 fails again, refer to isolation repair step Other Repair Steps.

If Test 2 does not fail, corrective action is complete.
11. Replace the AEN1 circuit pack in the 334A power unit or 310A power supply, by performing the following:

Set the AC circuit breaker on the 334A power unit or 309A power supply (as appropriate) to OFF.

Remove 2 screws (1 on each side) from the front panel of the 334A power unit or 310A power supply (as appropriate).

Unplug AEN1 circuit pack and remove the circuit pack from the 334A power unit or 310A power supply (as appropriate).

Replace the AEN1 circuit pack.

Secure the 334A power unit or 310A power supply front panel (as appropriate) with the 2 screws.

Set the circuit breaker on the 334A power unit or 309A power supply (as appropriate) to ON.

12. Repeat Test 2.

If Test 2 fails again, proceed to Step 13.

If Test 2 does not fail, corrective action is complete.

13. Replace the 334A power unit or 309A/310A power supply (as appropriate).

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the 309A/310A power supply.

14. Measure the power source output voltages.

If the voltages are not within tolerance, check the wiring associated with the power source.

If the voltages are within tolerance, repeat Test 2.

If Test 2 passes, corrective action is complete.

If Test 2 fails again, check the wiring associated with the power source.

Cabinet Power 48 Volts

A green pilot LED located on the front panel of the power source is on when the power source is producing -48 volts on its output.

The green pilot LED does not indicate that the output voltage is within regulation limits.

Appropriate test points are available on the front panel of the power source for measuring the output voltage and determining the power source performance.

1. Determine the type of power source installed in the equipment location displayed in Fields 2 and 3.

If the equipment location is a duplicated common control cabinet, a Time Multiplexed Switch (TMS) cabinet, or a Remote Module Interface (RMI) cabinet, the power source is a 334A power unit.

If the equipment location is a module control cabinet or a port cabinet, the power source is a 309A/310A power supply.

2. At the equipment location displayed in Fields 2 and 3, determine if the green pilot LED is on at the power source.

If the green pilot LED is not on, proceed to Step 3.

If the green pilot LED is on, proceed to Step 9.

3. At the equipment location displayed in Fields 2 and 3, determine if the circuit breaker on the power source is tripped.

If the circuit breaker is tripped, proceed to Step 4.

If the circuit breaker is not tripped, proceed to Step 9.

4. Reset the circuit breaker.

If the circuit breaker trips again, perform Steps 5 through 8 (as required).

If the circuit breaker does not trip, repeat Test 2. If Test 2 fails again, proceed to Step 9.

If Test 2 does not fail, corrective action is complete.

5. Replace the AEN1 circuit pack in the 334A power unit or 310A power supply, by performing the following:

Set the AC circuit breaker on the 334A power unit or 309A power supply (as appropriate) to **OFF**.

Remove 2 screws (1 on each side) from the front panel of the 334A power unit or 310A power supply (as appropriate).

Unplug AEN1 circuit pack and remove the circuit pack from the 334A power unit or 310A power supply (as appropriate).

Replace the AEN1 circuit pack.

Secure the 334A power unit or 310A power supply front panel (as appropriate) with the 2 screws.

Set the circuit breaker on the 334A power unit or 309A power supply (as appropriate) to ON.

6. If the circuit breaker trips again after replacing the AEN1 circuit pack, proceed to Step 7.

If the circuit breaker does not trip, repeat Test 2. If Test 2 fails again, proceed to Step 7.

If Test 2 does not fail, corrective action is complete.

7. Replace the 334A power unit or 309A/310A power supply (as appropriate).

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the 309A/310A power supply.

8. If the circuit breaker trips again after replacing the 334A power unit or 309A/310A power supply (as appropriate), check the wiring associated with the 334A power unit or 309A/310A power supply (as appropriate).

If the circuit breaker does not trip, repeat Test 2. If Test 2 fails again, refer to isolation repair step Other Repair Steps.

If Test 2 passes, corrective action is complete.

9. Measure the power source output voltages at the test points using a digital multimeter to determine if voltages are within tolerance, marginal, or fluctuating.

If all voltages are within tolerance without fluctuation, refer to isolation and repair step Other Repair Steps.

If the voltages are marginal or fluctuating, proceed to Step 10.

10. Replace the AEN1 circuit pack in the 334A power unit or 310A power supply, by performing the following:

Set the AC circuit breaker on the 334A power unit or 309A power supply (as appropriate) to **OFF**.

Remove 2 screws (1 on each side) from the front panel of the 334A power unit or 310A power supply (as appropriate).

Unplug AEN1 circuit pack and remove the circuit pack from the 334A power unit or 310A power supply (as appropriate).

Replace the AEN1 circuit pack.

Secure the 334A power unit or 310A power supply front panel (as appropriate) with the 2 screws.

Set the circuit breaker on the 334A power unit or 309A power supply (as appropriate) to ON.

11. Repeat Test 2.

If Test 2 fails again, proceed to Step 12.

If Test 2 does not fail, corrective action is complete.

12. Replace the 334A power unit or 309A/310A power supply (as appropriate).

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the 309A/310A power supply.

13. Measure the power source output voltages.

If the voltages are not within tolerance or fluctuate, check the wiring associated with the power source.

If the voltages are within tolerance, repeat Test 2.

If Test 2 passes, corrective action is complete.

If Test 2 fails again, check the wiring associated with the power source.

Fuse/Breaker

Fuses and circuit breakers provide visual indications when they operate.

1. At the equipment location displayed in Fields 2 and 3, determine if any fuses are blown or circuit breakers tripped.

If no fuses are blown or circuit breakers tripped, refer to isolation and repair step Other Repair Steps.

If any fuse is blown or circuit breaker tripped, proceed to Step 2.

2. Replace the blown fuse, or reset the circuit breaker.

If the fuse does not blow again or circuit breaker trip, repeat Test 2.

If the fuse blows again or circuit breaker trips, proceed to Step 3.

3. The corrective action to be taken depends on the blown fuse or tripped circuit breaker.

If the circuit breaker is associated with the DC/DC converter, perform isolation and repair step DC/DC Converter.

If the fuse is associated with the frequency generator, perform isolation and repair step **Frequency Generator**.

If the circuit breaker is associated with the fans, perform isolation and repair step Air Flow.

If the fuse is part of the port carrier, perform Steps 4 through 6 below.

If the fuse is associated with the consoles, perform Steps 7 through 9 below.

4. Disconnect all circuit packs associated with the blown fuse.

Replace the blown fuse.

5. Reconnect one circuit pack at a time observing the associated fuse.

If the fuse blows again, replace the faulty circuit pack.

6. Replace the blown fuse.

If the fuse does not blow again, reconnect all circuit packs and repeat Test 2.

If the fuse blows again, check the wiring associated with the faulty circuit pack.

7. Disconnect the console mounting cord associated with the blown fuse.

Replace the blown fuse.

If the fuse does not blow again, replace the console and repeat Test 2.

- 8. If the fuse blows again, disconnect the console connector cable from the common control connector.
- 9. Replace the blown fuse.

If the fuse blows again, check the wiring between the fuse and the associated console.

DC/DC Converter

The faulty DC/DC converter is identified within a cabinet by its illuminated RED LED.

In the event of protective shutdown a reset toggle switch is located behind the front panel faceplate of the DC/DC converter.

1. Check the circuit breaker associated with the DC/DC converter.

If the circuit breaker is tripped, proceed to Step 2.

If the circuit breaker is not tripped, proceed to Step 3.

2. Reset the circuit breaker.

If the circuit breaker does not trip, repeat Test 2.

If the circuit breaker trips again, check the wiring between the circuit breaker and the $\rm DC/DC$ converter.

3. At the equipment location displayed in Fields 2 and 3, measure the output voltage using a Digital Voltmeter (DVM) at the test points of the failing DC/DC converter with the RED LED lighted.

If the voltage reading is greater than 0, perform Steps 4 through 6.

If the voltage reading is 0, perform Steps 7 through 11.

4. Replace the DC/DC converter and repeat Test 2.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the DC/DC converter.

5. If Test 2 fails again, the problem could be in the program resistors on the circuit packs in the 1/2 carrier served by the DC/DC converter.

Replace circuit packs one-at-a-time in the 1/2 carrier served by the DC/DC converter, repeating Test 2 after each circuit pack is replaced.

6. If Test 2 passes, install the original circuit packs that did not cause the trouble.

If Test 2 does not pass, install all the original circuit packs and check the wiring associated with the DC/DC converter.

7. Unseat all circuit packs in the 1/2 carrier associated with the failing DC/DC converter.

Caution: Ensure that the toggle switch is in the up position before reseating the handle.

Activate the reset toggle switch by pulling the DC/DC converter handle halfway out without unseating the DC/DC circuit board, and then reseating the handle.

- 8. Measure the output voltage at the DC/DC converter.
- 9. If the voltage reading is 0, reseat all circuit packs, replace the DC/DC converter, and repeat Test 2.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the DC/DC converter.

If trouble remains after replacing the converter, check the backplane wiring for a short causing overcurrent shutdown.

10. If the voltage reading is greater than 0, reseat the circuit packs one at a time.

The RED LED lights on the DC/DC converter when the faulty circuit pack is seated.

Replace the faulty circuit pack, reseat any disconnected circuit packs and repeat Test 2.

11. If Test 2 fails again, check the wiring associated with the faulty circuit pack.

Frequency Generator

1. Check the fuse associated with the frequency generator.

If the fuse is blown, proceed to Step 2.

If the fuse is not blown, proceed to Step 3.

2. Replace the blown fuse.

If the fuse does not blow, repeat Test 2.

If the fuse blows again, check the wiring between the fuse and the frequency generator.

PROC 601

3. At the equipment location displayed in Fields 2 and 3, replace the frequency generator.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the frequency generator.

4. Repeat Test 2.

If Test 2 fails agáin, replace alarm board AEH4 at the back of the cabinet.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of alarm board AEH4.

5. Repeat Test 2.

If Test 2 fails again, check the wiring associated with the frequency generator.

Air Flow

Insufficient air flow for cooling the cabinet may be caused by dirty air filters or improperly operating fans.

1. At the equipment location displayed in Fields 2 and 3, inspect for restriction in air flow or a dirty filter.

If a restriction in air flow or a dirty filter is found, proceed to Step 2.

If no restrictions are found and the filter is clean, proceed to Step 3.

2. Clear the restriction or replace the filter.

Allow sufficient time for cabinet interior to cool and repeat Test 2.

3. Determine if the fans are running.

If no fans are running, proceed to Step 5.

If fans are running, proceed to Step 4.

4. Determine if all fans are operating properly.

If all fans are operating properly, refer to isolation and repair step Other Repair Steps.

Replace any defective fan, allow sufficient time for cabinet interior to cool, and repeat Test 2.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of fans.

5. Check the circuit breakers associated with the fans (located on the AC distribution unit).

If any circuit breaker is tripped, proceed to Step 6.

If the circuit breakers are not tripped, refer to isolation and repair step Other Repair Steps.

6. Reset the circuit breaker.

If the circuit breaker does not trip again, allow sufficient time for cabinet interior to cool and repeat Test 2.

7. If the circuit breaker trips again, replace the fan associated with the circuit breaker.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of fans.

8. Reset the circuit breaker, allow sufficient time for the cabinet interior to cool, and repeat Test 2.

Temperature

An overtemperature alarm cause signifies that a predetermined cabinet temperature is exceeded.

 At the equipment location displayed in Fields 2 and 3, determine if fans are provided. If no fans are provided, proceed to Step 7.

If fans are provided, proceed to Step 2.

2. Determine if fans are running.

If no fans are running, proceed to Step 4.

If fans are running, proceed to Step 3.

3. Determine if all fans are operating properly.

If all fans are operating properly, refer to isolation and repair step Other Repair Steps.

Replace any defective fan and allow sufficient time for cabinet interior to cool before repeating Test 2.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of fans.

4. Check the circuit breakers associated with the fans (located on the AC distribution unit).

If any circuit breaker is tripped, proceed to Step 5.

If no circuit breaker is tripped, it may be possible for excessive heat in the room to cause the temperature alarm. Proceed to Step 7.

5. Reset the circuit breaker.

If the circuit breaker does not trip again, allow sufficient time for cabinet interior to cool and repeat Test 2.

If the circuit breaker trips again, replace the fan associated with the circuit breaker.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of fans.

- 6. Reset the circuit breaker, allow sufficient time for cabinet interior to cool, and repeat Test 2.
- 7. When no fans are provided, or excessive heat in the room is suspected, determine if environmental temperature is above maximum for the switch.

If the environmental temperature is above the maximum, leave the cabinet open to allow cooling, and refer the problem to local engineering.

If the environmental temperature is not above the maximum, refer to isolation and repair step **Other Repair Steps**.

PROC 601

Holdover

Nominal or extended holdover is provided by a 312 power unit or a J87462A power unit (consisting of a charger and battery system).

The holdover alarm is detected by software when **RSV FAIL** or **BTY ON LINE** on the 312 power unit or when **RSV ALM** or **BTY ON LINE** on the J87462A power unit is active.

The LEDs on the 312 power unit or J87462A power unit determine whether the switch failed or is drawing battery power because cabinet AC voltage is absent.

Appropriate test points are available on the 312 power unit or J87462A power unit for determining the power unit's performance.

- 1. Determine the type of holdover power unit installed in the equipment location displayed in Fields 2 and 3.
- 2. Determine the type of power source installed in the equipment location displayed in Fields 2 and 3.

If the equipment location is a duplicated common control cabinet, a Time Multiplexed Switch (TMS) cabinet, or a Remote Module Interface (RMI) cabinet, the power source is a 334A power unit.

If the equipment location is a module control cabinet or a port cabinet, the power source is a 309A/310A power supply.

3. At the equipment location displayed in Fields 2 and 3, determine the cause of the holdover alarm by checking the LEDs on the appropriate power unit.

If the **BTY ON LINE** LED is lighted, check the cabinet AC voltage (the cabinet is being powered from the battery system of the appropriate power unit).

4. If the **RSV FAIL** or **RSV ALM** LED is lighted, use the test points on the appropriate power unit to determine the cause of the problem.

Check for -48 volts using a digital voltmeter connected between test points -48V and GRD.

Check for BTY (-48 volts) using a digital voltmeter connected between test points - BTY and GRD.

5. If -48 volts is present but BTY is not, proceed to Step 6.

If -48 volts is absent, check the wiring between the appropriate power unit and the voltage source.

6. Replace the CP1 circuit pack (charger and alarm board) in the 312 power unit or the AMC-1 circuit pack (power board) in the J87462A power unit by performing the following.

Note: If the AMC-1 circuit pack in the J87462A power unit has a AMD-1 circuit pack (logic board) attached to it, replace both circuit packs as a set.

Set the battery circuit breaker on the 312 power unit or J87462A power unit (as appropriate) to **OFF**.

Set the AC circuit breaker on the 334A power unit or 309A power supply (as appropriate) to OFF.

Disconnect the AC power cord from the 334A power unit or 309A power supply (as appropriate).

Remove 4 screws from the front panel of the 312 power unit or J87462A power unit (as appropriate).

Note: Do not disconnect the grounding wire from the panel of the J87462A power unit.

Unplug the CP1 or AMC-1 circuit pack (as appropriate) and remove the circuit pack from the 312 power unit or the J87462A power unit (as appropriate).

Replace the CP1 or AMC-1 circuit pack (as appropriate).

Secure the 312 power unit or J87462A power unit front panel (as appropriate) with the 4 screws.

Connect the AC power cord to the 334A power unit or 309A power supply (as appropriate).

Set the circuit breaker on the 334A power unit or 309A power supply (as appropriate) to ON.

Set the battery circuit breaker on the 312 power unit or J87462A power unit (as appropriate) to ON.

7. Repeat Test 2.

If Test 2 fails again, proceed to Step 8.

If Test 2 does not fail, corrective action is complete.

8. If the nominal or extended holdover is a 312A or 312C power unit, or a J87462A List 6 or List 7 power unit, repeat Steps 6 through 8 for the other CP1 or AMC-1 circuit pack.

If the nominal or extended holdover is a 312B power unit or a J87462A List 5 power unit, proceed to Step 9.

If both CP1 or AMC-1 circuit packs are replaced, proceed to Step 9.

- 9. At the equipment location displayed in Fields 2 and 3, replace the 312 power unit or J87462A power unit (as appropriate).
- 10. Repeat Test 2.

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If Test 2 fails again, check the wiring associated with the 312 power unit or J87462A power unit (as appropriate).

If Test 2 passes, corrective action is complete.

Module Control Carrier Power

The module control carrier power (left or right) cabinet alarm cause indicates that a change in the power to the module control carrier occurred.

- 1. At the equipment location displayed in Fields 2 and 3, measure the output voltage using a DVM at the test points of the left or right DC/DC converter associated with the cabinet alarm cause (left or right) to determine if the voltages are marginal or fluctuating.
- 2. If all voltages are within tolerance without fluctuation, refer to isolation and repair step Other Repair Steps.

If the voltages are marginal or fluctuating, proceed to Step 3.

3. Replace the DC/DC converter and measure the output voltages.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the DC/DC converter.

4. If all voltages are within tolerance and do not fluctuate, repeat Test 2.

If voltages are not within tolerance, or fluctuate, check the wiring associated with the DC/DC converter.

Other Repair Steps

- 1. In the event an alarm cause is present but the equipment associated with the alarm cause is functioning properly, (or unable to function because of a suspected sensor or detector malfunction), the sensor, detector or alarm board corresponding to the cabinet alarm cause is probably faulty.
- 2. At the rear of the failing cabinet, replace alarm board AEH4.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of alarm board AEH4.

3. Repeat Test 2.

If Test 2 fails again, proceed to Step 4.

4. Check the sensor or detector and replace as appropriate.

Repeat Test 2 (as applicable). If Test 2 passes, the failure is corrected.

- 5. If the sensor or detector is functioning correctly or after replacement of the sensor or detector the failure still exists, the wiring between the sensor or detector and the module control channel may be at fault.
- 6. A correlation of the TMS/module control carrier backplane lead names to the sensor or detector corresponding to the cabinet alarm causes displayed in Fields 5 through 14 are listed below:

Field 5 - Cabinet power AC = RCTALM (n*).

Field 6 - Cabinet power 48 Volts = L48ALM (n^*) .

Field 7 - Fuse/breaker = FUSALM (n^*) .

Field 8 - DC/DC converter = CNVALM (n^*) .

Field 9 - Frequency generator = FGNALM (n^*) .

Field 10 - Air flow = FANALM (n^*) .

Field 11 - Temperature = OTPALM (n*).

Field 12 - Holdover = HVRALM (n*).

Field 13 - Module control carrier power left = PFAILL (n^*) .

Field 14 - Module control carrier power right = $PFAILR (n^*)$.

 $n^* = Cabinet number 0 through 7.$

PROC 610 - TAPE TESTS

FL IS	IPCH SUE	ART 1			+	-			+		TAP	E TESTS		_	+	+		
TEST TAPE 'CLE TO R	1: D FAIL AR DA ETIRE	URES. TA', ALAR	USE 'EXEC	ARMED	TES RES DIA	IT 2: ET OF GNOSE	PERF(F TN43 E OF H	DRM BO ANE ICMR.	FI	ELDS 1.FIF 2.SEC 3.THI	2-8: RST INDICTMENT COND INDICTMENT RD INDICTMENT ((IF ANY) IF ANY)			ALARM 1=MAJO 2=Mino 3=Warn	STATUS (FIELD)r 4=Erro))r 5=Alari Jing	9) RS RECORDE 1 RESOLVED	D
	USE	'NEX	T CIR	CUIT	TO O	ISPLA	Y FAI	LURES			USE 'NEX	T DATA' TO	CYCLE THR	OUGH BEGIN	NING & EN	DING TIME STAMP	(TEST 1)	
-			EQ	UIPME	NT								TEST 1					
æ				HCMR				8	IRES				TIME		HOURS		· ·	
TEST NUMBE	N TAPE INFC	cont 20	DATA	cn XPCRT	en SERVO	2 PONER	∞ CARTRIDGE	o ALARM STAT	D NUMBER FAILL	X3ONI 11	FAULT CODE	DAY	HR 14	MIN 1 15	SINCE LAST RUN TAPE			COMMON CONTROL TESTS 610

Purpose

PROC 610 is used when referenced from **PROC 600** (Alarm causes/error log) or when the **COMMON CONTROL TAPE** and **MAJOR** or **MINOR** fault indicators on the alarm panel are lighted.

PROC 610 is used to:

- 1. Display failures associated with the tape subsystem.
- 2. Manually resolve the COMMON CONTROL TAPE fault indicator.

Note: Tape alarmed entries in PMIDS are marked as resolved.

3. Test the tape subsystem. The tape subsystem consists of:

TN430 - Tape interface circuit pack.

Cable between the tape interface circuit pack and the High Capacity Mini-Recorder (HCMR).

SN441 - HCMR controller circuit pack.

- SN442 HCMR data electronics circuit pack.
- SN443 HCMR transport circuit pack.
- SN445 HCMR servo circuit pack.

SN446 - HCMR power circuit pack.

Tape cartridge.

4. Automatically turn off the **COMMON CONTROL TAPE** fault indicator when the tape subsystem passes Test 2.

Note: Tape alarmed entries in PMIDS are marked as resolved.

PROC 610

Field Definitions and Codes

Each field of **PROC 610** flip chart and the possible displays for the fields during execution of the different tests are defined in Table J, PROC 610 - Field Definitions and Codes.

There are no optional input fields for PROC 610.

		PROC FIELD DEFINITIO	C 610 NS AND (CODES	
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION
1	1-2	Test number.	10		Number of failures recorded.
2-8 2	 1 1-3	Equipment. Tape interface: Not applicable. Indicates failure (Test 1). Indicates replacement		0-6 0-9	Number of failures recorded by the periodic test (Test 1). Number of failures recorded by the demand test (Test 2).
3-7	_	High Capacity Mini-recorder (HCMR): Not applicable.	11	0-9	Index. Number of failure being displayed (Test 1 or Test 2).
	1 1-3	Indicates failure (Test 1). Indicates replacement	12	0-970	Specific fault code.
. 8	 1 1-3	Sequence number (Test 2). Cartridge: Not applicable. Indicates failure (Test 1). Indicates replacement sequence number (Test 2).	13-15 13 14	1-31 0-23	Time stamp of displayed failure (Test 1 only). Day of month failure was recorded. Hour of day failure was recorded
9	1-5	Alarm status of displayed failure (Test 1 only).	15	0-59	Minute of hour failure was recorded.
	1	Major	16	0-99	Hours since last run tape
	2	Minor.			(99 indicates 99 hours or more).
	3	Warning.			
	4	Errors recorded.]		
	5	Alarm resolved.			

TABLE J.

1.

Operation of Procedure

Overview

PROC 610 is used to determine the cause of the **COMMON CONTROL TAPE** and **MAJOR** or **MINOR** fault indicators being lighted resulting from a tape failure.

To call in PROC 610, perform the following:

- 1. Depress PROC NO; 610; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1 and all other fields are dashed.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Two tests are available:

- 1. Test 1 Displays the alarmed tape failures and manually turns off the fault indicator.
- 2. Test 2 Performs an ID chip test on TN430 and a parity checker/generator function test. Resets TN430 and performs one iteration testing of the tape subsystem.

Test 1

Test 1 provides a failure history of the tape alarm causes detected by periodic on-line software.

Test 1 is also used to manually turn off the COMMON CONTROL TAPE fault indicator.

1. Test 1 is the default test when entering PROC 610, or is selected by using NEXT TEST.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 1.

- 2. To start Test 1, depress EXECUTE.
- 3. The tape failure history is sorted and a summary is displayed.
- 4. If no tape failures exist, the following summary is displayed:

Field 1 - 1.

Field 10 - 0 (Indicating no failures).

Field 16 - Hours since last run tape operation.

- 5. If any tape failures exist, the summary displays a 1 in Field 1, the total number of failures in Field 10, and the number of hours since last run tape operation in Field 16.
- 6. Depressing NEXT CIRCUIT displays the first failure in order of severity, as follows:

Field 1 - 1.

Fields 2 through 8 - Dashed or 1 (indicating equipment failure area).

Field 9 - Alarm status of displayed failure.

Field 10 - Number of failures recorded.

Field 11 - Index (number of fault codes for displayed failure).

Field 12 - Specific fault code.

Fields 13 through 15 - Beginning time stamp of displayed failure (indicates day, hour, and minute when the failure was first recorded by periodic on-line software).

Field 16 - Hours since last run tape operation.

7. Depressing **NEXT DATA** displays the ending time stamp (indicates day, hour, and minute when the failure was last recorded by periodic on-line software).

Depressing **NEXT DATA** again displays the beginning time stamp.

8. Depressing NEXT CIRCUIT repeatedly displays the remaining failures in order of severity.

Each time NEXT CIRCUIT is depressed, Field 10 (number of failures) decrements by 1.

Depressing **NEXT DATA** steps through the beginning and ending time stamp associated with the failure displayed.

9. Depressing NEXT CIRCUIT after all failures are displayed dashes Fields 2 through 16.

Depressing **NEXT CIRCUIT** once more displays the summary, and the failure history can be stepped through again by use of **NEXT CIRCUIT** and **NEXT DATA**.

10. The **CLEAR DATA**; **EXECUTE** sequence can be used to manually resolve individual tape failures or all tape failures after **EXECUTE** is used to initiate Test 1.

The tape failures that are resolved are those failures with an alarm status of 1 or 2 displayed in Field 9.

11. To manually resolve individual tape failures with an alarm status of 1 or 2, perform the following:

Use **NEXT CIRCUIT** to display the tape failure with an alarm status of 1 or 2 on the **MAAP**.

Requirement: Individual tape failures cannot be resolved unless the tape failure is displayed on the **MAAP**.

Depress CLEAR DATA; EXECUTE.

Field 9 (alarm status) displays a 5 indicating the tape failure is resolved in PMIDS.

The COMMON CONTROL TAPE fault indicator is turned off if no other tape failures exist.

12. All tape failures with an alarm status of 1 or 2 can be manually resolved when the summary is initially displayed, i.e., upon entry to **PROC 610** Test 1, and after displaying and recording all tape failures and then using **NEXT CIRCUIT** to display the summary.

Caution: The tape failures should be displayed and recorded prior to resolving all tape failure alarmed entries in order that a record of the cause of the failure(s) is available for maintenance personnel.

13. After entering Test 1 and depressing **EXECUTE** the summary is displayed.

Depress CLEAR DATA; EXECUTE.

All tape failures with an alarm status of 1 or 2 are marked as resolved in PMIDS and the **COMMON CONTROL TAPE** fault indicator is turned off.

14. After displaying and recording all tape failures, depress **NEXT CIRCUIT** until the summary is displayed, then depress **CLEAR DATA; EXECUTE**.

All tape failures with an alarm status of 1 or 2 are marked as resolved in PMIDS and the **COMMON CONTROL TAPE** fault indicator is turned off.

15. The MAJOR or MINOR alarm indicator is also turned off when no other sources affecting the MAJOR or MINOR alarm indicator are present.

Test 2

Test 2 performs an ID chip test on the tape interface (TN430). The **GREEN** and **RED** LEDs are checked for shorts and opens. A parity/checker function is performed on TN430. TN430 is reset and the tape subsystem is initialized. A diagnose opcode with read/write option is invoked and self-tests are performed on the tape subsystem.

Test 2 automatically turns off the **COMMON CONTROL TAPE** fault indicator when all alarmed tape failures pass Test 2.

Requirement: Ensure that a tape cartridge is in the HCMR prior to performing Test 2 or the test fails and an invalid replacement sequence is indicated in Fields 2 through 8.

1. Test 2 is selected by use of **NEXT TEST**.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 2.

2. To start Test 2, depress EXECUTE.

The WAIT indicator is turned on.

- 3. When Test 2 is completed, the WAIT indicator turns off and a summary is displayed.
- 4. If no tape failures exist, the following summary is displayed:

Field 1 - 2.

Field 10 - 0 (Indicating no failures).

- 5. If any tape failures exist, the summary displays a 2 in Field 1 and the total number of failures in Field 10.
- 6. Depressing **NEXT CIRCUIT** displays the first failure as follows:

Field 1 - 2.

Fields 2 through 8 - replacement sequence of failing equipment (1, 2, or 3 if appropriate).

Field 9 - Dashed.

Field 10 - Number of failures recorded.

Field 11 - Index (number of fault codes for displayed failure).

Field 12 - Specific fault code.

Fields 13 through 16 - Dashed.

7. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failures.

8. Depressing NEXT CIRCUIT after all failures are displayed dashes Fields 2 through 16.

Depressing **NEXT CIRCUIT** once more displays the summary, and the failure history can be stepped through again by use of **NEXT CIRCUIT**.

9. The **COMMON CONTROL TAPE** fault indicator is automatically turned off when Test 2 is completed with no failures detected for all failures that had an alarm status of 1 or 2.

Note: Tape alarmed entries in PMIDS are marked as resolved.

10. The **MAJOR** or **MINOR** alarm indicator is also turned off when no other sources affecting the alarm indicator(s) is present.

Repair Guide

When the **COMMON CONTROL TAPE** and **MAJOR** or **MINOR** fault indicators on the alarm panel are lighted (indicating a tape failure) or when **PROC 610** is referenced from **PROC 600** (Alarm causes/error log) as a potential problem, the following steps should be performed, in the order listed, to isolate and repair the faulty unit.

1. Execute Test 1.

Step through the failure history and record the specific fault code for each failure.

Requirement: Ensure that a tape cartridge is in the HCMR prior to performing Test 2 or the test fails and an invalid replacement sequence is indicated in Fields 2 through 8.

2. Execute Test 2 and record the test results including the specific fault code for each tape failure.

If no tape failures exist, the COMMON CONTROL TAPE fault indicator is turned off.

Note: Tape alarmed entries in PMIDS are marked as resolved.

If alarmed tape entries are displayed in Test 1 and no failures are detected in Test 2, perform microdiagnostic 10 when traffic permits to determine if intermittent tape failures exist.

3. If any failures are detected in Test 2, display the tape failure on the MAAP.

Note: If TN430 (tape interface) is failing, the **RED** LED in position 18 of TN430 is lighted.

4. Fields 2 through 8 indicate the replacement sequence to be performed in correcting the tape failure by displaying a 1, 2, and 3 in the appropriate fields.

Note: The replacement sequence for tape failures may not have 3 units to replace.

- 5. Replace the type of equipment indicated by a 1 displayed in one of the equipment type fields (2 through 8).
- 6. Repeat Test 2.

If Test 2 passes, the **COMMON CONTROL TAPE** fault indicator is turned off and the tape alarmed entries in PMIDS are marked as resolved.

7. If Test 2 fails, replace the next type of equipment (if any) indicated by a 2 displayed in one of the equipment type fields (2 through 8).

If no other replacements are indicated, proceed to Step 10.

8. Repeat Test 2.

If Test 2 passes, the **COMMON CONTROL TAPE** fault indicator is turned off and the tape alarmed entries in PMIDS are marked as resolved.

9. If Test 2 fails, replace the next type of equipment (if any) indicated by a 3 displayed in one of the equipment type fields (2 through 8).

If no other replacements are indicated, proceed to Step 10.

10. Replace the HCMR.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the HCMR.

11. Repeat Test 2.

If Test 2 passes, the **COMMON CONTROL TAPE** fault indicator is turned off and the tape alarmed entries in PMIDS are marked as resolved.

12. If Test 2 fails, further isolation of a tape failure may be accomplished by analyzing the specific fault codes recorded from Test 1 (PMIDS) and Test 2 (DMIDS).

Determine from Table K, PROC 610 - Specific Fault Code Definitions, if any additional corrective action can be performed (i.e., cabling, connectors, etc.).

Check the wiring associated with the circuit pack(s) replaced (point to point depending upon specific fault code(s) recorded) and the cabling between the tape interface (TN430) and the HCMR.

TABLE K.

			PROC 61	D SPECIFIC FAULT CODE DEFINITIONS
FAULT CODE	СКТ 1	СКТ 2	СКТ 3	DEFINITION
791	SN443	SN445	SN442	TAPE FAILED TO OPEN
792	TN430			WAITING FOR READ DIRECTORY FOLLOWING AN AUTO OPEN
793	CART			TAPE CARTRIDGE NOT FULLY INSERTED
794	TN430			DIAGNOSE OPCODE TIMED OUT, NO RESPONSE
795	TN430			INIT_TAP OPCODE TIMED OUT, DID NOT INITIALIZE
796	TN430			TN430 MAILBOX NOT INITIALIZED
797	TN430			WRITE WITH GOOD PARITY FAILED
798	TN430			CMD WITH BAD PARITY ON HIGH BYTE FAILED
799	TN430			CMD WITH BAD PARITY ON LOW BYTE FAILED
800	TN430			ACCESS TO TN430 FAILED OVER MAINTENANCE BUS
801	TN430			ACCESS TO TN430 FAILED OVER SYSTEM BUS
802	TN430			ACCESS DENIED TO TAPE MONITOR
803	 TN430			TAPE SUBSYSTEM IS SHUTDOWN
804	TN430			TAPE SUBSYSTEM RECOVERY IN PROGRESS
805	TN430			INITIALIZATION FAILED
806	TN430			INIT_TAP OPCODE NOT PRECEDED BY RESET
807	TN430			WRITE PROTECT CHECK FAILED IN INITIALIZATION
808	TN430			PARITY CHECK FAILED IN INITIALIZATION
809	TN430			MAILBOX TEST FAILED IN INITIALIZATION
810	TN430			MEMORY MAPPER FAILED IN INITIALIZATION
811	TN430			TN430 BIT SET IN MAINTENANCE REGISTER
812	SN441	SN446		HCMR CONTROLLER BIT SET IN MAINTENANCE REGISTER
813	SN445	SN443		HCMR SERVO BIT SET IN MAINTENANCE REGISTER

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TABLE K. (Contd)

		PR	OC 610 —	SPECIFIC FAULT CODE DEFINITIONS (Contd)
FAULT CODE	СКТ 1	СКТ 2	СКТ З	DEFINITION
814	SN443	CART	SN445	HCMR TRANSPORT BIT SET IN MAINTENANCE REGISTER
815	SN442	SN441		HCMR DATA ELECTRONICS BIT SET IN REGISTER
816	SN446			HCMR POWER BIT SET IN MAINTENANCE REGISTER
817	CART			TAPE PRESENT BIT IS SET
818	TN430			MAINTENANCE REGISTER COPIES DO NOT MATCH
819	TN430			NO REPLY FROM HCMR FROM DIAGNOSE OPCODE
820	TN430			ERROR IN HCMR FROM DIAGNOSE OPCODE
920	TN430			MONITOR DETECTED ERROR IN TN403 WHILE PROCESS- ING TAPE REQUEST
921	TN430			MONITOR I/O FAILURE, TIMEOUT, OR TOO MANY RESETS ATTEMPTED
922	SN441			MONITOR DETECTED ERROR IN HCMR WHILE PROCESS- ING TAPE REQUEST
923	CART			MONITOR DETECTED ERROR WITH TAPE CARTRIDGE WHILE PROCESSING TAPE REQUEST
924	TN430			PATCH RUN TAPE FAILED
925	TN430			RUN TAPE FAILED (ON- OR OFF-LINE)
940	TN430	SN441		ILLEGAL COMMAND TO HCMR. PROBLEM MAY NOT BE IN TAPE SUBSYSTEM
941	CART	SN443	SN442	ERROR IN BLOCK HEADER
942	CART			BLOCK NUMBER ERROR. PROBLEM MAY NOT BE IN TAPE SUBSYSTEM
943		SN441	TN430	HCMR BUS PARITY ERROR. PROBLEM MAY NOT BE IN TAPE SUBSYSTEM
944	CART	SN443	SN445	TAPE MOTION ERROR
945	SN441	SN442	SN443	HCMR DIAGNOSTIC ERROR

PROC 610

TABLE K. (Contd)

	PROC 610 — SPECIFIC FAULT CODE DEFINITIONS (Contd)								
FAULT CODE	CKT 1	CKT 2	СКТ З	DEFINITION					
946	CART	SN445	SN443	CORRECTABLE DATA ERROR ON TAPE					
947	CART	SN445	SN443	REREAD WAS DONE					
948	CART			UNCORRECTABLE DATA ERROR ON TAPE					
949		CART		UNABLE TO LOCATE BLOCK. PROBLEM MAY NOT BE IN TAPE SUBSYSTEM					
950	SN441	SN443	SN445	TAPE OPENING FAILURES					
951				RETENSIONS SINCE TN430 RESET					
952	SN446	SN441	TN430	NO REPLY FROM HCMR TO A COMMAND					
953	SN441	TN430		HCMR RESETS					
954	SN446	TN430	SN441	HCMR POWER SUPPLY OUT OF TOLERANCE					
955		TN430		SYSTEM BUS TIMEOUTS 1. PROBLEM MAY NOT BE IN TAPE SUBSYSTEM					
956		TN430		SYSTEM BUS SINGLE 1-BYTE PARITY ERROR. PROBLEM MAY NOT BE IN TAPE SUBSYSTEM					
957	TN392	SYSBUS		SYSTEM BUS DOUBLE 1-BYTE PARITY ERROR. PROB- LEM MAY NOT BE IN TAPE SUBSYSTEM					
958	TN430			TN430 SANITY TIMEOUTS 1					
959		TN430		SYSTEM BUS WRITE ABORTS 1. PROBLEM MAY NOT BE IN TAPE SUBSYSTEM					
960		TN430		ILLEGAL OPCODE FROM SYSTEM. PROBLEM MAY NOT BE IN TAPE SUBSYSTEM					
961		TN430		ILLEGAL BLOCK RANGE. PROBLEM MAY NOT BE IN TAPE SUBSYSTEM					
962		TN430		INCONSISTENT BLOCK RANGE. PROBLEM MAY NOT BE IN TAPE SUBSYSTEM					
963	CART	SN445	SN443	RETENSIONS IN EXCESS OF LIMITS					

TABLE K. (Contd) .

	PROC 610 - SPECIFIC FAULT CODE DEFINITIONS (Contd)								
FAULT	СКТ 1	CKT 2	СКТ 3	DEFINITION					
964		TN430		OPCODE ABORTED. PROBLEM MAY NOT BE IN TAPE SUBSYSTEM					
965	TN430	TN392		COMPARSION FAILURES BETWEEN SHARED BUFFER AND SWITCH PROCESSOR MEMORY					
966	SN443			TAPE INSERTIONS SINCE RESET					
967	TN430			TIMER AUDIT ERRORS					
968	TN430	CART	SN443	DIRECTORY AUDIT ERRORS					
969	TN430			MEMORY MAPPER AUDIT ERRORS					
970	SN446	TN430		HCMR POWER UP FAILURES. PROBLEM MAY NOT BE IN TAPE SUBSYSTEM					

PROC 611 - COMMON CONTROL TESTS

FL IS	IPCHART SUE 1	r		+		+		COM	ION	CONTROL	TESTS	<u></u>	+ 4	-		
TEST 1: DISPLAYS FAILURE HISTORY. USE 'OLEAR DATA, ' 'EXECUTE' TO RETIRE ALARM. USE 'NEXT CIRCUIT' TO DISPLAY NEXT FAILED CIRCUIT.			TESTS ALL CIRCUITS. USE 'NEXT CIRCUIT' UD ISPLAY NEXT FAILED CIRCUIT.		TEST 3: TESTC A PARTICULAR CIRCUIT CONTINUOUSLY. USE 'NEXT CIRCUIT' TO DISPLAY NEXT CIRCUIT.						ALARM STATU 1 = Major 2 = Minor 3 = Warning 4 = Errors 5 = Alarm R	S (FIELD 7):	CIRCUIT 1 = 4MH2 2 = DUAL 3 = I/O	TYPE CHAN SPEE BUFFE	(FIELD 8): INPEL ED CHANNEL ER BOARD	
e.		EQU	IPME T	NT LOCATION		SUT	TYPE						TEST 1	10 DF I/0		COMMON CONTROL
1 TEST NUMBE	MOD	CAB CAB	CAR	SLOT	CHANNEL	ALARM STJ	CIRCUIT 1	L	L	FAILURE INDEX		FAULT CODE	TRANSLATED C TEST 3 NUMBER OF TIMES TESTED	NU OF TIMES FAILED 12		TESTS 611

Purpose

PROC 611 is used when referenced from **PROC 600** (Alarm causes/error log) or when the **COMMON CONTROL I/O CHANNEL** and **MAJOR** fault indicators on the alarm panel are lighted.

PROC 611 is used to:

- 1. Display the failure history for 4 MHz channels and dual-speed data channels.
- 2. Manually turn off the fault indicator(s) activated because of 4 MHz channel and/or dual-speed data channel failures.

Note: Common control I/O alarmed circuit entries in PMIDS are marked as resolved.

- 3. Perform good data test with loop around; serial parity test with loop around; serial parity test with no loop around; and good data test with no loop around on 4 MHz channels and dual-speed data channels.
- 4. Display 4 MHz and dual-speed data channel failures and indict the I/O buffer circuit when over 50 percent of translated I/O channels fail the tests.
- 5. Continuously test a specific 4 MHz channel or dual-speed data channel to determine if intermittent failures exist.
- 6. Automatically turn off the COMMON CONTROL I/O CHANNEL fault indicator when all circuits pass Test 2.

Note: Common control I/O alarmed circuit entries in PMIDS are marked as resolved.

Maintenance personnel must be on the customer's premises to isolate failures associated with 4 MHz cables. Loop around fixtures (ED-1E422-10 Group 5 and ED-1E422-10 Group 8) must be connected in order to determine if TN402 or the 4 MHz cable is failing.

Field Definitions and Codes

Each field of **PROC 611** flip chart and the possible displays for the fields during execution of the different tests are defined in Table L, PROC 611 - Field Definitions and Codes.

Optional input fields are: Fields 2 through 6 - Select equipment location of 4 MHz channel or dualspeed data channel to be tested continuously (Test 3 only).

	PROC 611 FIELD DEFINITONS AND CODES								
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION				
1	1-3	Test number.	8	1-3	Circuit type.				
2-6		Equipment location.		1	4 MHZ channel.				
2	0-99	Module number.		2	Dual speed channel.				
3	0-7	Cabinet number.		3	I/O buffer board.				
4	0-3	Carrier number.	9	0-64	Failure index.				
5	21, 23-30	Slot number.		0-6	Index into PMIDS failures (Test 1 only).				
6	Dash, 0-15	Channel number.		0-64	Index into DMIDS failures (Test 2 only).				
7	0-5	Alarm status.	10	0-912	Specific fault code.				
	0	No errors recorded.	11	0-128	Number of translated I/O Channels (Test 1 only).				
	1	Major.]						
	2	Minor.	1	0-999	Number of times tested (Test 3 only).				
	3	Warning.	12	0-9	Number of I/O channel circuit packs installed (Test 1 only).				
	4	Errors recorded.]						
	5	Alarm resolved.		0-99	Number of times failed (Test 3 only).				

TABLE L.

Test Equipment Required

Two loop around fixtures, (loop back plug ED-1E422-10 Group 5 and loop back plug ED-1E422-10 Group 8), are required to isolate failures associated with the 4 MHz cable connecting the TN402 and the MCC.

PROC 611 Test 1

Operation of Procedure

Overview

PROC 611 is used to determine the cause of the **COMMON CONTROL I/O CHANNEL** and **MAJOR** fault indicators being lighted resulting from a common control 4 MHz channel and/or dual-speed data channel failure.

To call in **PROC 611**, perform the following:

- 1. Depress PROC NO; 611; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, and all other fields are dashed.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Three tests are available:

- 1. Test 1 Displays failure history.
- 2. Test 2 Tests all 4 MHz channels and dual-speed data channels.
- 3. Test 3 Tests a specific 4 MHz channel or dual-speed data channel continuously.

Test 1

Test 1 provides a failure history of 4 MHz channels, dual-speed data channels, and I/O buffer failures. The failure history is recorded by the on-line periodic software tests.

Test 1 is also used to manually turn off the COMMON CONTROL I/O CHANNEL fault indicator.

1. Test 1 is the default test when entering PROC 611, or is selected by using NEXT TEST.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 1.

- 2. To start Test 1, depress EXECUTE.
- 3. The failure history is sorted first by alarm status and then by circuit type, and a summary is displayed.
- 4. If no failures occurred, the summary displays a 1 in Field 1, a 0 in Field 9 (indicating no channel failures), the total number of translated channels in Field 11, the total number of I/O circuit packs in Field 12, and all other fields are dashed.
- 5. If one or more failures occurred, the following summary is displayed:

Field 1 - 1.

Fields 2 through 8 - Dashed.

Field 9 - Total number of channel failures (maximum of 6).

Field 10 - Dashed.

Field 11 - Total number of translated channels.

Field 12 - Total number of 4 MHz and dual-speed circuit packs.

 Depressing NEXT CIRCUIT displays the first failure in order of severity, as follows: Field 1 - 1.

Fields 2 through 6 - Equipment location of the first failing channel.

Note: If the failure displayed is the I/O buffer circuit pack, Field 6 is dashed.

Field 7 - Alarm status of failing channel.

Field 8 - Circuit type (1 = 4 MHz channel, 2 = dual-speed data channel, 3 = 1/0 buffer).

Field 9 - Failure index (total number of failures recorded in PMIDS).

Field 10 - Specific fault code recorded for the failing channel.

Field 11 - Total number of channels translated.

Field 12 - Total number of 4 MHz and dual-speed circuit packs.

7. Depressing **NEXT CIRCUIT** repeatedly displays the failure histories of the remaining failing channels.

Each time NEXT CIRCUIT is depressed, Field 9 (failure index) is decremented by one.

8. Depressing **NEXT CIRCUIT** after all failing channels are displayed, dashes all fields except Field 1.

Depressing **NEXT CIRCUIT** once more causes Test 1 to be executed, reading and sorting the failure history in PMIDS, and displaying a new summary.

 The CLEAR DATA; EXECUTE sequence can be used to manually resolve individual common control I/O channel failures or all common control I/O channel failures after EXECUTE is used to initiate Test 1.

The failures that are resolved are those failures with an alarm status of 1, 2, or 3 displayed in Field 7.

10. To resolve individual common control I/O channel failures with an alarm status of 1, 2, or 3, perform the following:

Use **NEXT CIRCUIT** to display the failing common control I/O channel with an alarm status of 1, 2, or 3 on the **MAAP**.

Requirement: Individual common control I/O channel failures cannot be resolved unless the failing common control channel is displayed on the **MAAP**.

Depress CLEAR DATA; EXECUTE.

11. Field 7 (alarm status) displays a 5 indicating that the failing common control I/O channel is resolved.

The COMMON CONTROL I/O CHANNEL fault indicator is turned off if no other common control channel failures exist.

12. All common control I/O channel failures with an alarm status of 1, 2, or 3 can be resolved when the summary is initially displayed, i.e., upon entry to **PROC 611** Test 1, and after displaying and recording all common control I/O channel failures and then using **NEXT CIRCUIT** to display the summary.

Caution: The common control I/O channel failures should be displayed and recorded prior to resolving the common control I/O channel alarmed entries in order that a record of the equipment location and specific fault code of the failure(s) is available for maintenance personnel.

13. After entering Test 1 and depressing EXECUTE the summary is displayed.

Depress CLEAR DATA; EXECUTE.

14. All common control I/O channel failures with an alarm status of 1, 2, or 3 are marked as resolved in PMIDS and the COMMON CONTROL I/O CHANNEL fault indicator is turned off.

Field 9 (failure index) displays a 0 indicating no alarmed common control I/O failures exist.

- 15. After displaying and recording all common control I/O channel failures, depress **NEXT CIRCUIT** until the summary is displayed, then depress **CLEAR DATA; EXECUTE**.
- 16. All common control I/O channel failures with an alarm status of 1, 2, or 3 are marked as resolved in PMIDS and the COMMON CONTROL I/O CHANNEL fault indicator is turned off.

Field 9 (failure index) displays a 0 indicating no alarmed common control VO failures exist.

17. The **MAJOR** alarm indicator is also turned off when no other sources affecting the alarm indicator are present.

Test 2

Test 2 performs the following tests to determine the status of 4 MHz channels and dual-speed data channels.

- 1. Good data test with loop around (data with accurate parity is looped from output to input on the circuit pack without affecting the peripheral) on 4 MHz channels and dual-speed data channels.
- 2. Serial data-channel parity test with loop around (bad parity is generated and sent with serial data while loop around is in effect) on 4 MHz channels and dual-speed data channels.
- 3. Good data test with no loop around (correct parity is generated and sent with serial data through the peripheral) on 4 MHz channels only.
- 4. Serial data-channel parity test with no loop around (bad parity is generated and sent with serial data when loop around is not in effect) on 4 MHz channels only.
- 5. Buffered bus parity check test with loop around (bad parity is forced on the system and buffered busses) on 4 MHz channels and dual-speed data channels.
- 6. ID chip test on all 4 MHz channels and dual-speed data channels.

Test 2 also indicts the I/O buffer circuit when over 50 percent of translated channels fail the tests.

1. Test 2 is selected by use of **NEXT TEST**.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 2.

2. To start Test 2, depress EXECUTE.

The WAIT indicator on the MAAP is turned on.

3. While the **WAIT** indicator is on, Test 2 can be halted by depressing **STOP**.

The **WAIT** indicator is turned off and the results of the test up to the time **STOP** was depressed are available beginning with a summary.

Proceed to Step 5.

4. When Test 2 completes, the WAIT indicator is turned off and a summary is displayed.

Note: The GREEN LED is turned on for any circuit pack that passes Test 2 (TN402, TN403, and/or TN404) if the I/O buffer circuit pack is not failing.

- 5. If no failures occurred, the summary displays a 2 in Field 1, a 0 in Field 9 (indicating no channel failures), and all other fields are dashed.
- 6. If one or more failures occurred, the following summary is displayed:

Field 1 - 2.

Fields 2 through 8 - Dashed.

Field 9 - Total number of channel failures.

Fields 10 through 12 - Dashed.

7. Depressing **NEXT CIRCUIT** displays the first failure as follows:

Field 1 - 2.

Fields 2 through 6 - Equipment location of the first failing channel.

Note: If the failure displayed is the I/O buffer circuit pack, Field 6 is blank.

Field 7 - Dashed.

Field 8 - Circuit type (1 = 4 MHz channel, 2 = dual-speed data channel, 3 = I/O buffer).

Field 9 - Failure index (total number of failures recorded in DMIDS).

Field 10 - Specific fault code recorded for the failing channel.

Fields 11 and 12 - Dashed.

8. While the failing channel is displayed on the **MAAP**, the **RED** LED on the failing circuit pack is turned on. The **RED** LED is turned off when the display on the **MAAP** no longer corresponds to it.

Note: If over 50 percent of the translated channels fail Test 2, the **RED** LED on the I/O buffer circuit pack is turned on instead of the **RED** LEDs on the channels that failed because of the failing I/O buffer circuit pack.

9. Depressing NEXT CIRCUIT repeatedly displays the remaining failing channels.

Note: The **RED** LED on the original circuit pack is turned off and the **RED** LED on the displayed circuit pack in Fields 2 through 5 is turned on. The **RED** LED is turned off when the display on the **MAAP** no longer corresponds to it.

Each time **NEXT CIRCUIT** is depressed, Field 9 (failure index) is decremented by one.

10. Depressing **NEXT CIRCUIT** after all failing channels are displayed, dashes all fields except Field 1.

Depressing **NEXT CIRCUIT** once more causes the failure summary information to be displayed again.

11. The **COMMON CONTROL I/O CHANNEL** fault indicator is automatically turned off (indicating the common control I/O alarm cause is resolved) when all common control channels pass Test 2.

Note: Common control I/O alarm entries in PMIDS are marked as resolved.

12. When no other alarm sources affecting the **MAJOR** alarm indicator are present in the switch, the alarm indicator is also turned off.

Test 3

Test 3 is used to continuously test any 4 MHz channel or dual-speed data channel suspected of having intermittent failures, when using test equipment to further isolate a problem, or to trace wiring problems.

Note: I/O buffer circuit packs are not tested in Test 3.

1. Test 3 is selected by use of NEXT TEST.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 3.

2. When Test 3 is initially called in, a default equipment location may be displayed in Fields 2 through 6.

The alarm status and specific fault code associated with the default equipment location may be displayed in Fields 7 and 10.

Field 2 (module) is blinking, indicating an optional entry field.

3. The default equipment location can be the last equipment location displayed in Tests 1 and 2 of **PROC 611** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.

Either the default equipment location can be tested, or another 4 MHz channel or dual-speed data channel can be selected for testing.

4. A specific 4 MHz channel or dual-speed data channel can be selected for testing by entering the equipment location in Fields 2 through 6 whether or not a default equipment location is displayed:

(Module number of 4 MHz channel or dual-speed data channel to be tested); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Channel number to be tested); ENTER.

Proceed to Step 7.

5. A specific 4 MHz data channel or dual-speed data channel can also be selected for testing by use of **NEXT CIRCUIT**.

Depress **NEXT CIRCUIT** until the 4 MHz channel or dual-speed channel to be tested is displayed in Fields 2 through 6.

Proceed to Step 7.

- 6. To test the default equipment location displayed in Fields 2 through 6, proceed to Step 7.
- 7. To start Test 3 after selecting the 4 MHz channel, dual-speed data channel, or default equipment location to be tested, depress **EXECUTE**.

The WAIT indicator is not turned on during Test 3 execution.

8. When a default equipment location, 4 MHz channel, or dual-speed data channel is being tested continuously in Test 3, the following fields are updated:

Field 10 - Specific fault code (if any).

Field 11 - Number of times the 4 MHz channel or dual-speed data channel is tested.

Note: If the circuit is tested more than 999 times, Field 11 starts counting over from 0 (i.e., 998, 999, 0, 1, 2, etc.).

Field 12 - Number of times the 4 MHz channel or dual-speed data channel failed Test 3 (if any).

Note: Test 3 stops automatically if the 4 MHz channel or dual-speed data channel tested reaches 99 failures.

9. While Test 3 is executing, the **RED** and **GREEN** LEDs on the circuit pack corresponding to the 4 MHz channel or dual-speed data channel being tested is updated.

If Test 3 continues to pass, the **GREEN** LED is turned on.

At the first failure detected, the **RED** LED is turned on.

If the channel being tested passes Test 3 after failing, the GREEN LED is turned on.

Note: Only one LED is lighted at a time. If the channel being tested is failing intermittently, the **RED** and **GREEN** LEDs turn on and off to correspond with the failing and passing interactions of each test (as appropriate).

- 10. The testing interval is determined by maintenance personnel performing the test and is ended by depressing **STOP**.
- 11. When Test 3 stops automatically (after 99 failures) or after depressing **STOP** while testing a default equipment location, a specific 4 MHz data channel, or dual-speed data channel, the following summary is displayed:

Field 9 - Failure index (number of failure records if any).

Field 11 - Number of times the 4 MHz channel or dual-speed data channel is tested.

Field 12 - Number of times the 4 MHz channel or dual-speed data channel failed Test 3 (if any).

Note: The GREEN LED is lighted on the corresponding circuit pack if the 4 MHz channel or dual-speed data channel passed Test 3.

12. When the 4 MHz channel or dual-speed data channel fails Test 3 (indicated by Fields 9 and 12), depressing **NEXT FAULT** displays the first failure record as follows:

Field 1 - 3.

Fields 2 through 6 - Equipment location of 4 MHz channel or dual-speed data channel tested.

Field 7 - Dashed.

Field 8 - Circuit type (1 = 4 MHz channel, 2 = dual-speed data channel).

Field 9 - Failure index (number of failure records).

Field 10 - Specific fault code.

Field 11 - Number of times the 4 MHz channel or dual-speed data channel was tested.

Field 12 - Number of times the 4 MHz channel or dual-speed data channel failed Test 3.

Note: The **RED** LED is lighted on the corresponding circuit pack if the 4 MHz channel or dual-speed data channel failed Test 3.

13. Depressing **NEXT FAULT** repeatedly displays all the failure records for the 4 MHz channel or dual-speed data channel being tested.

Field 9 (failure index) is decremented each time NEXT FAULT is depressed.

14. Depressing NEXT FAULT after all failure records are displayed dashes Fields 9 through 12.

Depressing **NEXT FAULT** once more displays the summary information (failure index, number of times tested, and number of times failed).

15. When another 4 MHz channel or dual-speed data channel is to be continuously tested, **NEXT** CIRCUIT or the CHANGE FIELD sequence can be used to select the specific circuit:

Depress **NEXT CIRCUIT** until the 4 MHz channel or dual-speed data channel to be tested is displayed in Fields 2 through 6.

CHANGE FIELD; 2; ENTER; (Module number of 4 MHz channel or dual-speed data channel to be tested); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Channel number to be tested); ENTER.

16. **EXECUTE** must be depressed to test the 4 MHz channel or dual-speed data channel selected for testing.

Repair Guide

When the **COMMON CONTROL I/O CHANNEL** and **MAJOR** fault indicators on the alarm panel are lighted (indicating a common control channel failure) or when **PROC 611** is referenced from **PROC 600** (Alarm causes/error log) as a potential problem, the following steps should be performed, in the order listed, to isolate and repair the faulty unit.

1. Execute Test 1.

Step through the failure history and record the specific fault code for each failure.

- 2. Execute Test 2 and record the test results including the specific fault code for each common control I/O channel failure.
- 3. If all common control I/O channels pass Test 2 the common control I/O channel alarm cause(s) is resolved, and the COMMON CONTROL I/O CHANNEL fault indicator is turned off.

Note: Common control I/O channel alarmed entries in PMIDS are marked as resolved.

When Test 2 passes and 4 MHz channel or dual-speed data channel failures are recorded in Test 1 with an alarm status of 1, 2, or 3 (major, minor, or warning) proceed to Step 11 for further testing to ensure that no intermittent failures exist.

4. If any failures are detected in Test 2, display the common control I/O channel failure on the MAAP.

Note: While the failing channel is displayed on the **MAAP**, the **RED** LED on the failing circuit pack is turned on.

- 5. If over 50 percent of the translated channels fail Test 2, the **RED** LED on the I/O buffer circuit pack is turned on instead of the **RED** LEDs on the channels that failed because of the failing I/O buffer circuit pack.
- 6. Replace the circuit pack with the **RED** LED lighted.
- 7. Repeat Test 2.

If Test 2 passes, the COMMON CONTROL I/O CHANNEL fault indicator is turned off.

Note: Common control I/O channel alarmed entries in PMIDS are marked as resolved.

8. If Test 2 fails, step through the failures to determine if the same failure exists.

If different failures exist, repeat Steps 3 through 7 (as appropriate).

9. If the same failure exists, determine if the failure is a 4 MHz channel (Slots 27 through 30 in
Field 5).

If the same failure is not a 4 MHz channel, proceed to Step 13.

10. If the same failure is a 4 MHz channel, determine if the 4 MHz cable is a potential problem (specific fault codes 827 through 845, or 900 through 903 displayed in Field 10).

If the 4 MHz cable is not a potential problem, proceed to Step 13.

If the 4 MHz cable is a potential problem, perform 4 MHz Cable Isolation Procedure listed below.

11. Execute Test 3 and continuously test the suspect 4 MHz channel or dual-speed data channel to determine if it fails.

If the 4 MHz channel or dual-speed data channel passes Test 3, corrective action is complete.

If the 4 MHz channel or dual-speed data channel fails Test 3, replace the circuit pack with the **RED** LED lighted at the equipment location displayed in Fields 2 through 5.

12. Repeat Test 3.

If Test 3 passes, repeat Test 2 to retire the cause of the COMMON CONTROL I/O CHANNEL fault indicator.

If Test 3 fails, proceed to Step 13.

13. If Tests 2 or 3 fails, further isolation of a common control channel failure may be accomplished by analyzing the specific fault codes recorded from Test 1 (PMIDS) and Test 2 (DMIDS).

Determine from Table M, PROC 611 - Specific Fault Code Definitions, if any additional corrective action can be performed (i.e., cabling, connectors, etc.).

Check the wiring associated with the circuit pack(s) replaced (point to point depending upon specific fault code (s) recorded).

TABLE M.

	PROC 611 — SPECIFIC FAULT CODE DEFINITIONS							
FAULT CODE	DEFINITION							
0	NO FAILURE							
1	SIO ERROR FROM A MAINTENANCE ROUTINE							
826	INVALID SOFTWARE GENERATED FAULT							
827	CANNOT SET BOARD TEST STATUS FOR GOOD DATA TEST WITH LOOP-AROUND							
828	CANNOT CLEAR BOARD TEST STATUS FOR GOOD DATA TEST WITH LOOP-AROUND							
829	CANNOT WRITE TEST VECTOR FOR GOOD DATA TEST WITH LOOP-AROUND							
830	ECHO CHECK FAILURE FOR GOOD DATA TEST WITH LOOP-AROUND							
831	CANNOT READ STATUS REGISTER FOR GOOD DATA TEST WITH LOOP-AROUND							
832	READ FAILED FROM DATA NOT READY FOR GOOD DATA TEST WITH LOOP-AROUND							
833	READ FAILED FROM UNKNOWN CAUSE FOR GOOD DATA TEST WITH LOOP- AROUND, HOWEVER, THE DATA ECHO CHECK WAS GOOD							
834	READ FAILED FROM UNKNOWN CAUSE FOR GOOD DATA TEST WITH LOOP-AROUND AND THE DATA ECHO CHECK WAS BAD							
835	READ FAILED FROM SERIAL PARITY ERROR FOR GOOD DATA TEST WITH LOOP- AROUND, HOWEVER, THE DATA ECHO CHECK WAS GOOD							
836	READ FAILED FROM SERIAL PARITY ERROR FOR GOOD DATA TEST WITH LOOP- AROUND AND THE DATA ECHO CHECK WAS BAD							
837	CANNOT SET BOARD TEST STATUS FOR SERIAL DATA CHANNEL PARITY TEST WITH LOOP-AROUND							
838	CANNOT CLEAR BOARD TEST STATUS FOR SERIAL DATA CHANNEL PARITY TEST WITH LOOP-AROUND							
839	CANNOT WRITE TEST VECTOR FOR SERIAL DATA CHANNEL PARITY TEST WITH LOOP-AROUND							
840	READ DID NOT FAIL FOR SERIAL DATA CHANEL PARITY TEST WITH LOOP-AROUND							
841	CANNOT READ STATUS REGISTER FOR SERIAL DATA CHANNEL PARITY TEST WITH LOOP-AROUND							

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TABLE M. (Contd)

	PROC 611 — SPECIFIC FAULT CODE DEFINITIONS (Contd)
FAULT CODE	DEFINITION
842	READ FAILED FROM DATA NOT READY FOR SERIAL DATA CHANNEL PARITY TEST WITH LOOP-AROUND
843	READ FAILED FROM UNKNOWN CAUSE FOR SERIAL DATA CHANNEL PARITY TEST WITH LOOP-AROUND, HOWEVER, THE DATA ECHO CHECK WAS GOOD
844	READ FAILED FROM UNKNOWN CAUSE FOR SERIAL DATA CHANNEL PARITY TEST WITH LOOP-AROUND AND THE DATA ECHO CHECK WAS BAD
845	ECHO CHECK FAILED FOR SERIAL DATA CHANNEL PARITY TEST WITH LOOP-AROUND
846	CANNOT SET BOARD TEST STATUS FOR SERIAL DATA CHANNEL PARITY TEST WITH NO LOOP-AROUND
847	CANNOT CLEAR BOARD TEST STATUS FOR SERIAL DATA CHANNEL PARITY TEST WITH NO LOOP-AROUND
848	CANNOT WRITE TEST VECTOR FOR SERIAL DATA CHANNEL PARITY TEST WITH NO LOOP-AROUND
849	CANNOT READ STATUS REGISTER FOR SERIAL DATA CHANNEL PARITY TEST WITH NO LOOP-AROUND
850	READ DID NOT FAIL FOR SERIAL DATA CHANNEL PARITY TEST WITH NO LOOP-AROUND
851	READ FAILED FROM DATA NOT READY FOR SERIAL DATA CHANNEL PARITY TEST WITH NO LOOP-AROUND
852	READ FAILED FROM UNKNOWN CAUSE FOR SERIAL DATA CHANNEL PARITY TEST WITH NO LOOP-AROUND, HOWEVER, THE DATA ECHO CHECK WAS GOOD.
853	READ FAILED FROM UNKNOWN CAUSE FOR SERIAL DATA CHANNEL PARITY TEST WITH NO LOOP-AROUND AND THE DATA ECHO CHECK WAS BAD
854	ECHO CHECK FAILED FOR SERIAL DATA CHANNEL PARITY TEST WITH NO LOOP-AROUND
855	CANNOT SET BOARD TEST STATUS FOR GOOD DATA TEST WITH NO LOOP-AROUND
856	CANNOT CLEAR BOARD TEST STATUS FOR GOOD DATA TEST WITH NO LOOP-AROUND

TABLE M. (Contd)

	PROC 611 SPECIFIC FAULT CODE DEFINITIONS (Contd)							
FAULT CODE	DEFINITION							
857	CANNOT WRITE TEST VECTOR FOR GOOD DATA TEST WITH NO LOOP-AROUND							
858	ECHO CHECK FAILURE FOR GOOD DATA TEST WITH NO LOOP-AROUND							
859	CANNOT READ STATUS REGISTER FOR GOOD DATA TEST WITH NO LOOP-AROUND							
860	READ FAILED FROM DATA NOT READY GOOD DATA TEST WITH NO LOOP-AROUND							
861	READ FAILED FROM UNKNOWN CAUSE FOR GOOD DATA TEST WITH NO LOOP- AROUND, HOWEVER, THE DATA ECHO CHECK WAS GOOD							
862	READ FAILED FROM UNKNOWN CAUSE FOR GOOD DATA TEST WITH NO LOOP- AROUND AND THE DATA ECHO CHECK WAS BAD							
863	READ FAILED FROM SERIAL PARITY ERROR FOR GOOD DATA TEST WITH NO LOOP- AROUND, HOWEVER, THE DATA ECHO CHECK WAS GOOD							
864	READ FAILED FROM SERIAL PARITY ERROR FOR GOOD DATA TEST WITH NO LOOP- AROUND AND THE DATA ECHO CHECK WAS BAD							
865	CANNOT SET BOARD TEST STATUS FOR BUFFERED BUS PARITY CHECK TEST WITH LOOP-AROUND							
866	CANNOT CLEAR BOARD TEST STATUS FOR BUFFERED BUS PARITY CHECK TEST WITH LOOP-AROUND							
867	BUFFERED BUS LOW BYTE ERROR NOT DETECTED							
868	BUFFERED BUS HIGH BYTE ERROR NOT DETECTED							
869	BUFFERED BUS BOTH BYTES IN ERROR NOT DETECTED							
898	COMMON CONTROL CARRIER I/O BUFFER BOARD FAILURE							
900	CONTROL STATUS REGISTER READ FAILURE FOR GOOD DATA TEST WITH LOOP- AROUND							
901	CONTROL STATUS REGISTER ECHO CHECK FAILURE FOR GOOD DATA TEST WITH LOOP-AROUND							
902	CONTROL STATUS REGISTER READ FAILURE FOR SERIAL DATA CHANNEL PARITY TEST WITH LOOP-AROUND							
903	CONTROL STATUS REGISTER ECHO CHECK FAILURE FOR SERIAL DATA CHANNEL PARITY TEST WITH LOOP-AROUND							

TABLE M. (Contd)

	PROC 611 - SPECIFIC FAULT CODE DEFINITIONS (Contd)								
FAULT CODE	DEFINITION								
904	CONTROL STATUS REGISTER READ FAILURE FOR SERIAL DATA CHANNEL PARITY TEST WITH NO LOOP-AROUND								
905	CONTROL STATUS REGISTER ECHO CHECK FAILURE FOR SERIAL DATA CHANNEL PARITY TEST WITH NO LOOP-AROUND								
906	CONTROL STATUS REGISTER READ FAILURE FOR GOOD DATA TEST WITH NO LOOP-AROUND								
907	CONTROL STATUS REGISTER ECHO CHECK FAILURE FOR GOOD DATA TEST WITH NO LOOP-AROUND								
908	CONTROL STATUS REGISTER READ FAILURE FOR BUFFERED BUS TEST								
909	CONTROL STATUS REGISTER ECHO CHECK FAILURE FOR BUFFERED BUS TEST								
910	BUFFERED BUS LOW BYTE ECHO FAILURE								
911	BUFFERED BUS HIGH BYTE ECHO FAILURE								
912	BUFFERED BUS BOTH BYTES ECHO FAILURE								

4 MHz Cable Isolation Procedure

Caution: Performance of the following procedure can affect switch performance. Care must be taken to ensure that multiple modules are not affected. Isolating 4 MHz cable problems should be performed when traffic conditions permit.

To isolate 4 MHz channel (TN402) failures with a specific fault code of 827 through 845, or 900 through 903 displayed in Field 10 when the 4 MHz cable is suspected of failing, perform the following tests (as appropriate).

Test A:

1. Disconnect the other end of the GRP 84 4 MHz cable from the backplane of the module control carrier corresponding to the MCC connected to the TN402 being tested.

Note: The term **GRP 84 4 MHz cable** refers to the cable running from the backplane connection attached to an TN402 on the common control to the corresponding MCC connection on the module control carrier.

2. When testing a duplicated module control carrier, disconnect the end of the cable that is connected to the on-line side of the module control carrier. If duplicated common controls are being tested, disconnect the end of the cable that is connected to the module control carrier associated with the TN402 being tested (on-line or off-line - CCO or CC1).

Caution: Only one loop around fixture should be placed on the MCC side of the GRP 84 4 MHz cable at a time.

- 3. Connect a loop around fixture (loop back plug ED-1E422-10 Group 5) directly to the connector end of the GRP 84 4 MHz cable (MCC side).
- 4. Execute Test 2.

Note: Passing means that specific fault code 863 was displayed in Field 10 for the TN402 being tested. Failing means that specific fault code 860 was displayed in Field 10 for the TN402 being tested. Other nonrelated specific fault codes for the TN402 being tested or other failing channels can be occurring and displayed in Test 2.

- 5. If Test 2 passes (specific fault code 863 displayed), the GRP 84 4 MHz cable is good. Connect the GRP 84 4 MHz cable to the backplane of the module control carrier.
- 6. If Test 2 fails (specific fault code 860 displayed), proceed to Test B.

Test B:

1. Disconnect the GRP 84 4 MHz cable from the backplane of the common control carrier corresponding to the TN402 to be tested. (Duplicated or unduplicated - on-line or off-line.)

Note: The term **GRP 84 4 MHz cable** refers to the cable running from the backplane connection attached to an TN402 on the common control to the corresponding MCC connection on the module control carrier.

- 2. Connect a loop around fixture (loop back plug ED-1E422-10 Group 8) directly to the common control backplane connection of the TN402 being tested.
- 3. Execute Test 2.
 - **Note:** Passing means that specific fault code 860 was displayed in Field 10 for the TN402 being tested. Failing means that specific fault code 863 was displayed in Field 10 for the TN402 being tested. Other nonrelated specific fault codes for the TN402 being tested or other failing channels can be occurring and displayed in Test 2.
- 4. If Test 2 passes (specific fault code 860 displayed), the GRP 84 4 MHz cable is good. Connect the GRP 84 4 MHz cable to the backplane of the common control and module control carriers.

Proceed to Test C.

5. If Test 2 fails (specific fault code 860 displayed), replace the GRP 84 4 MHz cable.

Test C:

If Test B above passes, the probable cause of the TN402 failing is the MCC or translation. Perform_the following:

- 1. Use **PROC 620** to test the MCC (unit type 6).
- 2. Check translation to determine if the MCC is administered.

If the MCC is not administered, add the correct translation.

If the MCC is administered, add the MCC circuit pack to the slot in the common control carrier.
PROC 612 - INITIALIZATION CAUSE

						·								
FLIPCHAF ISSUE 1	RŤ	+		+	INITIALIZ	ATION (CAUSES		+		+			
USE 'NEXT FAULT' TO DISPLAY NEXT INIT CAUSE. USE 'CLEAR DATA', 'EXECUTE' TO RETIRE ALARMS. SELECT INIT ND. = 99 AND USE 'CLEAR DATA', 'EXECUTE' TO ZERO ALL MAINTEMANCE DATA.		1-SHORT POWER FAIL 11-ILLEGAL MICRO INST 2-MICRO MEM PARITY 12-BUS TIME OUT 3-SJANITY TIME OUT 12-BUS TIME OUT 3-SJANITY TIME OUT 14-DUP ILLEGAL INST 5-MEMORY PARITY-LDIGH 15-CACHE PARITY-LDI 6-MEMORY PARITY-HIGH 15-CACHE PARITY-LDI 7-MEMORY PARITY-BOIH 17-CACHE PARITY-BOIH 3-ILLEGAL OP CODE 18-SOICC DIAG. REG.				22-MICRO DIAG 15 22-MICRO DIAG 15 23-HOLD GET AREA 24-BRANCH TO ZERO 25-INIERRUPT AREA 26=FALSE ID 27-2 PROCESSORS ONLINE 28-PROCESSOR SULCIDE 29-5 SHORT INITS			2=XRAY 3=XRAY 4=MICRI 5=PROCI 6=HALT 7=CATCI 8=MEM 9=EMER 0=NETWI	PROCI MEMOI O DIAU ESSOR /GO H RECO RECOVI TRANS	SSOR RY SNOSTIC SWITCH DVERY ERY SFEP EST CONTR	OLLER	PR((F] 0=F 1=S	ICESSOR HEALTH IELD 10): IASS 2=SOFT B IOFT A 3=HARDWARE
99 IS ONLY INPUT.	VALID	9=FETO 10=WRIT	CH ABORT		19=REC FROM SUICIDE 20=HOLD/GET OVERFLOW	30=DUP 31=PARI	MEM MATCH	4	1=DUPL 2=1/0	ICATIO	IN CHANNE	L BAD	NOT	E: MEMORY BLOCK SIZE IS 256K.
INIT FAULT NUMBER	UNIT TYPE	FAULT CODE 3	MEMORY Block	4	ADDRESS IN BLOCK (OCTAL)	DAY	TIME HOUR	MINUTE	COUNT TO	PROCESSOR HEALTH				COMMON CONTROL TESTS 612

The flipchart shown is for R2V2. The R2V1 flipchart is similar except that initialization cause codes 40 through 42 are not included in R2V1.

Purpose

PROC 612 is used when referenced from **PROC 600** (Alarm causes/error log) to verify and turn off the **OTHER FAILS, MEM** and/or **CACHE** fault indicator(s) resulting from an initialization cause.

PROC 612 is used to:

- 1. Display the reasons that caused the common control processor to be initialized.
- 2. Manually turn off the OTHER FAILS, MEM and/or CACHE fault indicator(s).
- 3. Clear all maintenance data (failure history) in memory, and turn off all lighted fault indicators (if any) and the MAJOR, MINOR, and/or WARNING alarm indicators if lighted.

Caution: PROC 612 provides a special feature to clear (zero) all maintenance data (failure history) in the PMIDS portion of memory. Use of this feature removes all failure indications that would normally be investigated by the procedure associated with the failure. This feature is not used in normal troubleshooting activities.

Field Definitions and Codes

Each field of **PROC 612** flip chart and the possible displays for the fields during execution of the procedure are defined in Table N, PROC 612 - Field Definitions and Codes.

Field 1 is an optional input field for clearing the maintenance data in PMIDS.

TABLE N.

PROC 612 FIELD DEFINITIONS AND CODES									
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION				
1		Initialization number:	3 (Contd)	18	501CC diagnostic re- gister loaded while 501CC running.				
	0	Summary.		19	Recovery from suicide.				
	1-18	Different causes.		20	Hold/Get overflow.				
	99	Used only to clear all		21	Long power failure.				
		failure history in PMIDS		22	Microdiagnostic Test 15 executed.				
2		Unit Type		23	Hold get area overflow or underflow.				
				24	Branch to zero error.				
				25	Interrupt area.				
	3	Initialization		26	False identification.				
	5 18	Cache		27	Two processors (com- mon control) on line.				
3		Fault code:		28	Processor (common control) suicide.				
		Initialization causes associated with codes		29	Five short initializations.				
		1 through 18 in field 1:		30	Duplication memory match failure				
	1	Short power failure.		31	Parity error during				
	2 3	Micro memory parity. Sanity time out.		32	X-ray program detected				
-	4	Input/output sanity time out.		33	X-ray program detected				
	5	Memory parity-low		34	Microdiagnostic				
	6	Memory parity-high		04	detected failure				
	7	Memory partiy-both		35	Processor (common				
	8	Illegal operation code.		00	control) switch.				
	9	Fetch abort.		36	Halt/Go.				
	10	Write protect.		37	Cache turned off for				
	11	Illegal micro			recovery.				
	10	instruction.		38	Memory error cor-				
	12	Bus time out.			rection turned off				
	13	Duplication channel			for recovery.				
	14	receive.		39	Emergency transfer.				
	. 14	instruction		40	Network test con-				
	15	Cache parity-low.		41	Duplication channel				
	16	Cache parity-high.			bad.				
	17	Cache parity-both.		42	I/O.				
•	_				: 				

TABLE N	. (Contd)
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	PROC 612 FIELD DEFINITIONS AND CODES (Contd)										
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION						
4	0-77	Failed memory block location.	9	0-5	Count to reload: An indicator of the						
5	0-777777	Octal address in memory block.			seriousness of the initialization causes leading to a reload of						
6-8 ·		Time stamp: A beginning time stamp showing the day of the month, hour, and minute when the first error occurred for the fault logged in PMIDS.		0	Processor health status: No failure. Codes 1 through 3 apply						
6	1-31	Day of the month			to duplicated systems only.						
7 8	0-123	Hour of the day. Minute.		1	Software A failure: Minor Software B failure: Possible problem in switching processors.						
				3	Hardware failure.						

Operation of Procedure

PROC 612 is used to determine the cause of the **OTHER FAILS**, **MEM** and/or **CACHE** fault indicator(s) being lighted resulting from an initialization cause.

To call in PROC 612, perform the following:

- 1. Depress PROC NO; 612; ENTER.
- 2. A 0 is displayed in Field 1, and all other fields are dashed.

Note: There is no test selection in this procedure.

PROC 612

Determining Initialization Causes

Depressing EXECUTE takes a summary of the failure history and displays it on the MAAP.

- 1. If no failures occurred, Fields 1 and 10 display a 0.
- 2. If one or more failures occurred, the following is displayed:

Field 1 - Init fault number = 1.

Field 10 - Processor health (0 = pass, 1 = Soft A, 2 = Soft B, 3 = Hardware).

Depressing NEXT FAULT updates the display as follows:

Field 1 - Init fault number = 1.

Field 2 - Unit type (3 = initialization, 5 = main memory, 18 = cache).

Field 3 - Fault code (initialization cause).

Field 4 - Memory block location (or dashed).

Field 5 - Octal address in memory block (or dashed).

Note: Only certain types of initialization causes display memory block location and octal address in Fields 4 and 5.

Field 6 - Day of the month when the initialization fault code displayed in Field 3 began.

Field 7 - Hour of the day when the initialization fault code displayed in Field 3 began.

Field 8 - Minute of the hour when the initialization fault code displayed in Field 3 began.

Field 9 - Count to reload (indication of the seriousness of the initialization fault code displayed in Field 3 in leading to a reload of memory).

Field 10 - Processor health (0 = Pass, 1 = Soft A, 2 = Soft B, 3 = Hardware).

4. Depressing **NEXT FAULT** displays additional initialization fault codes if more than 1 was logged for the init fault number displayed in Field 1.

Depressing NEXT FAULT after all initialization fault codes are displayed, dashes Field 3.

Depressing **NEXT FAULT** once more displays the first initialization fault code starting the sequence over.

 Depressing NEXT FAULT repeatedly sequences the display through the init fault numbers, in chronological order, until the last one is displayed.

Depressing **NEXT FAULT** after all init fault numbers are displayed dashes the display.

Depressing **NEXT FAULT** once more starts the sequence over with the failure history summary.

Turning Off Fault Indicator

To manually turn off the OTHER FAILS, MEM and/or CACHE fault indicator(s) (assuming no other sources are affecting the OTHER FAILS fault indicator), perform the following:

Depress CLEAR DATA; EXECUTE.

Fields 1 and 10 display a 0 and all other fields are dashed.

Note: Initialization causes are marked as resolved in PMIDS.

Clear all Maintenance Data

Failure history contained in PMIDS can be cleared (zeroed) when **PROC 612** is loaded from tape without first depressing **EXECUTE**, or when initialized by **RESET**, or after investigating the initialization causes.

Caution: Using the following sequence removes all failure indications (alarmed entries and entries with recorded errors) that would normally be investigated with the procedure associated with the failure. This sequence is not used in normal troubleshooting activities.

To clear (zero) maintenance data from PMIDS, perform the following:

1. For **RESET** and after initialization causes are investigated use:

CHANGE FIELD; 1; ENTER; 99; ENTER; CLEAR DATA; EXECUTE.

2. Prior to entering PROC 612 use:

PROC NO; 612; ENTER; CHANGE FIELD; 1; ENTER; 99; ENTER; CLEAR DATA; EXECUTE.

- 3. The **WAIT** indicator turns off when the maintenance data is cleared from memory several seconds after depressing **CLEAR DATA**; **EXECUTE**.
- 4. The MAAP displays a 0 in Field 10 (processor health status) and all other fields are dashed indicating the maintenance data is cleared from PMIDS.

All lighted fault indicators (if any) and the MAJOR, MINOR, or WARNING alarm indicators (if lighted) are turned off.

5. The only code that can be entered in Field 1 is 99.

Attempting to enter other codes causes special error code 03 (data wrong) to be displayed in the **MAAP** error code field.

Repair Guide

Initialization causes do not usually point to a faulty circuit pack.

- 1. Maintenance personnel should be aware of what has recently occurred in the switch to determine the corrective action to be taken.
- 2. Some causes of initialization may be a result of other repair action taken.

In such cases, no repair action is required and the alarm cause may be resolved, after recording pertinent maintenance data using **PROC 612**, by performing the **CLEAR DATA**; **EXECUTE** sequence.

3. For those situations when further investigation is required for the initialization causes, primary and secondary suspect circuit packs, or other possibilities that should be investigated are listed in Table O, PROC 612 - Initialization Causes Repair Procedure.

TABLE O.

	PROC 612 INITIALIZATION CAUSES REPAIR PROCEDURE								
	INITIALIZATION								
FAULT CODE	CAUSE	PRIMARY SUSPECT	SECONDARY SUSPECT						
1	Short power failure	Primary dropout							
2	Micro memory parity	TN370, UN151, UN152, UN153	Software						
3	Sanity time-out	UN152	Software						
4	I/O sanity time-out	TN368	-						
5	Memory parity — low	TN392							
6	Memory parity — high	TN392							
7	Memory parity — both	TN392							
8	Illegal operation code	TN370, UN151, UN152, UN153							
9	Fetch abort	Look for other init causes	Software, TN368						
10	Write protect	Look for other init causes	Software, TN368						
11	Illegal micro instruction	TN370, UN151, UN152, UN153							
12	Bus time out	UN153, (anything on bus)	Software						
13	Duplication channel receive	UN158	Cable between channels						
14	Duplication illegal instruction	Software							
15	Cache parity — low	TN369	UN153						
16	Cache parity — high	TN369	UN153						
17	Cache parity — both	TN369	UN153						

TABLE O. (Contd)

	PROC 612 INITIALIZATION CAUSES REPAIR PROCEDURE (Contd)								
	INITIALIZATION								
FAULT CODE	CAUSE	PRIMARY SUSPECT	SECONDARY SUSPECT						
.18	501CC diagnostic register loaded while 501CC running	TN491							
19	Recovery from suicide	Look for other init causes							
20	Hold/Get overflow	Software	UN151						
21	Long power failure	Power outage	Power supply						
22	Microdiagnostic Test 15	Reload from micro- diagnostic Test 15							
23	Hold get area underflow	Software	UN151						
24	Branch to zero error	Software	TN370, UN151, UN152, UN153						
25	Interrupt area	Software	TN370, UN151, UN152, UN153						
26	False identification	Software	TN370, UN151, UN152, UN153						
27	Two processors (common control) on-line	UN158	TN490						
28	Processor (common control) suicide	Look for other init causes*							
29	Five short initializations (Init B)	Look for other init causes							
30	Duplication memory match failure	Software (i.e., patches not in both machines, etc.)	TN390, UN158						
31	Parity error during audit	TN392	TN370, UN151, UN152, UN153						
32	XRAY program detected processor failure	TN370, UN151, UN152, UN153							

---- --- 0

	PROC 612 INITIALIZATION CAUSES REPAIR PROCEDURE (Contd)									
	INITIALIZATION									
FAULT CODE	CAUSE	PRIMARY SUSPECT	SECONDARY SUSPECT							
33	XRAY program detected memory failure	TN392	TN368							
34	Microdiagnostic detected failure	TN370, UN151, UN152, UN153								
35	Processor (common control) switch	23-Hour switch	Manual switch (PROC 613 Test 3), software recovery (Refer to PROC 600)							
36	Halt/Go	Switch toggled								
37	Cache turned off for recovery	TN369 .	UN153							
38	Memory error correction turned off for recovery	Look for other init causes	No other init causes, refer to PROC 600							
39	Emergency transfer	Ensure module processor is working	Ensure TMS is working							
40	Network test controller	Software error	Sanity time out							
41	Duplication channel bad	Check duplication circuit pack UN158								
42	Ι/Ο	Check SIO or TP10 failure	Check circuit pack indicated by address displayed in PROC 612, or check circuit pack TN404							

TABLE O. (Contd)

* Processor suicide is caused by:

 $Entering \ initialization \ four \ times, \ two \ processors \ (common \ controls) \ on-line, \ or \ I/O \ failures \ in \ at \ least \ 75 \ percent \ of \ the \ cabinets$

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PROC 613 - DUPLICATE PROCESSOR CONTROL AND TEST (R2V1 Only)

FLI ISS	PCH. UE	ART 4			+	-		+	DUPL	ICATE PROC	ESSO	R CONTRO	L & TES	г +	+		
TEST HISTO 'EXEC TEST CHANN FAILU ONLY TEST OF BO UNIT' SWITC	1: D RY. UTE' 2: T EL A RE C IN O 3: D TH P TO H ST.	USE TO F TO F ESTS ND DI ODE I INLINE TISPLA ROCES SWITC ATUS	AYS FI CLEAN RETIRN THE ISPLAT IN FIL PROD SORS CH PRO PERMO	AILUR R DAT E ALA DUPLI YS ELD 9 CESSO EALTH . USE DCESSI (TS.	E A', RM. CATIO . USE R. CODE 'NEXT DRS IF	FA 11 31 41 51 61 70	ILURE 0=F 1-9=P - 19=D -29=M -39=R -49=B -59=I -59=I -96=U 97=U 98=C 99=0	CODES (F1 PASS PROCESSOR S IOUPLE WRIT IEMORY UPDA EAD/WRITE ILOCK TRANS D CHIP ARITY NUSED INRESOLVED INRESOLVED INFELINE PRO	IELD S STATUS IE FF ITE FF IFER DUPLI I STAT); Catión Failure Us register R reload	(FIEL 0=PAS 1=NEA 2=EIT 3=DOU 4≠SWI	D 15): S R END FAIL HER END FA BLE WRITE TCH ATTEMP	URE FAILURE FAILURE T FAILURE	NDTES: 1. PROCESSOR D=OFFLINE 2. SWIICH STA O=SWITCH P 1=SWITCH N	STATUS (FI 1=ONLINÉ TUS (FIELE ERMITTED DT PERMITI	ELD 2):) 10): ED	SPECIAL ERROR CODE: BO-ILLEGAL SWITCH ATTEMPT
	5	HEA	LTH C	ODE	OTHER	PROC	UE UF		ΞS					FAILURE HISTORY	EATLUDE		COMMON
TEST ND	status	HARDWARE	SOFT B	SOFT A	HARDWARE	SOFT B	SOFT A	FAILURE CODE	SWITC STATU			FAILURES PER HOUR	FAILURES BEGAN (HOURS AGD)	HOURS	MINUTES	FAILURE	TESTS 613

Purpose

PROC 613 is used when referenced from **PROC 600** (Alarm causes/error log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a duplicate processor control and test failure.

PROC 613 is used to:

- 1. Display duplication channel failures.
- 2. Perform various tests on the duplication circuitry in both processors.
- 3. Initiate a soft switch from the on-line processor.

Field Definitions and Codes

Each field of **PROC 613** flipchart and the possible displays for the fields during execution of the different tests are defined in Table P, PROC 613 - Field Definitions and Codes.

Field 1 is an optional input field for changing the test number to be executed.

Operation of Procedure

Overview

PROC 613 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from a duplicate processor control and test failure.

To call in PROC 613, perform the following:

- 1. Depress PROC NO; 613; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, and all other fields are dashed.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

TABLE P.

	PROC 613 FIELD DEFINITIONS AND CODES									
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION					
1	1-3 ·	Test number.	9		Failure codes (Contd).					
2		Processor status:	(Conta)	1-9	Processor status:					
	0	Off-line. On-line.		1	Processor status inconsistency.					
3		Health code (hardware):		2-9	Unused.					
	0	Healthy.		11-19	Double write flip-flop:					
ļ		Bad hardware.		11	Double write FF cannot be cleared					
4		Health code (soit B):		12	(CDBL fails). Double write FF					
	1	Major software problem.		13-19	(SDBL fails). Unused.					
5.		Health code (soft A):		21-29	Memory update					
	01	Healthy. Minor software problem.			flip-flop:					
6		Health code of other	1	20 21	$\begin{array}{c} \text{Unused.} \\ \text{Memory update FF} \\ \text{CF} = 0 \text{ after CMU.} \end{array}$					
		processor (hardware):	l	22	Memory update FF cannot be cleared					
	1	Bad hardware.		23	(CMU fails). Memory update FF					
7		Health code of other processor (soft B):		24	Memory update FF cannot be set (SMU					
	0	Healthy.		25-29	Unused.					
<u> </u>		Major software problem.	1	31-39	Read/write:					
8		processor (soft A):		31	Read double word CF = 0 on RWD of					
	0	Healthy. Minor software problem.		32	data X(5555). Read double word CF = 0 on RWD of					
9	0-99	Failure codes.		33	data X(AAAA). Read double word					
	0	No failures.			data X(FFFF).					

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TABLE	Ρ.	(Contd)
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		PROC FIELD DEFINITIONS	C 613 AND CODE	5 (Contd)	
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION
9 (Contd)		Failure codes (Contd).	9 (Contd)		Failure codes (Contd):
(Contu)	31-39	31-39 Read/write (Contd): 34 Read double word CF = 0 on RWD of	(Contu)	61-69	Parity (Contd):
	34		62	Parity checker/gener- ator failed on bad parity low byte test.	
	35	data X (0000). Read double word data does not match X (5555)		63	Parity checker/gener- ator failed on bad parity high byte
	36	Read double word data does not match		64-69	test. Unused.
	37	X (AAAA). Read double word data		70-96	Unused.
	00	does not match X (FFFF).		97	Unresolved duplication failure.
	00	does not match X (0000).		98	Duplication status register failure.
	39 41-49	-49 Block transfer:		99	Off-line processor in process of reloading.
	41 42	Block XFER CF = 0 after DBLK. Cannot read CF = 0	10		Switch status:
	43	after RWD. Data mismatch between on-line and		0 1	Switch permitted. Switch not permitted.
	44-49	off-line memories. Unused.	11 .		Failure per hour:
İ	51-59	ID chip:		0-99	Failure summary — Sum of approximate
İ	51 52-59	ID chip test failure. Unused.		i	number of failures per hour for all failing circuits.
	61-69	Parity:		0-99	Failure history —
	61	Parity checker/gener- ator failed on good parity test.		0-33	Approximate number of failures per hour for displayed circuit.

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PROC 613 (R2V1 Only) Test 1

PROC 613 FIELD DEFINITIONS AND CODES (Contd)					
FIELD	CODE	DEFINITION			
12	0-17	Failures began (hours ago):			
		Failure summary — Number of hours since the oldest individual failure (to the nearest hour).			
		Individual failure history — Number of hours since failures started in the displayed circuit (to the nearest hour).			
13-14		Most recent failure:			
13 14	0-136 0-59	Hours ago. Minutes ago.			
15		Failure code (periodic):			
	$\begin{array}{c} 0\\ 1\\ 2\\ 3\\ 4\end{array}$	Passed. Near end failure. Either end failure. Double write failure. Switch attempt _i failure.			

TABLE P. (Contd)

Three tests are available:

- 1. Test 1 Displays failure history.
- 2. Test 2 Displays processor status and health code of both processors, and tests the duplication channel.

.

3. Test 3 - Allows updating of the memory and performs a soft switch of processors.

Test 1

Test 1 provides a failure history of duplicate processor control and test failures.

Test 1 can also be used to manually turn off the OTHER FAILS fault indicator.

1. Test 1 is the default test when entering PROC 613, or is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

- 2. To start Test 1, depress EXECUTE.
- 3. A summary of the failure history is displayed.

4. If one or more failures occurred, the following is displayed:

Field 1 - 1.

Field 2 - Processor status (0 = off-line, 1 = on-line).

Fields 11 through 14 - Failure history.

Field 15 - Failure code detected during periodic test.

5. To manually turn off the **OTHER FAILS** fault indicator (assuming no other sources are affecting the **OTHER FAILS** fault indicator) after Test 1 is executed at least once, perform the following:

Depress CLEAR DATA; EXECUTE.

Note: Duplicate control and test alarmed entries in PMIDS are marked as resolved.

6. The **OTHER FAILS** fault indicator is turned off if no other sources affecting the same fault indicator exist.

Test 2

Prior to performing Test 2, verify the following:

- 1. The MAAP is connected to the processor that is on-line, i.e., CC0 or CC1.
- 2. The off-line processor is not halted.
- 3. An off-line procedure is not in the off-line processor.

Note: Test 2 may block transfer into the off-line processor's **MAAP** procedure memory buffer and cause the off-line processor to reload if a procedure is in the off-line processor.

4. The LOCK ON LINE switch on the alarm panel is set to the OFF position.

Test 2 tests the duplication channel with five diagnostic tests.

Caution: The off-line processor may reload if a procedure is requested in the off-line processor while Test 2 is executing.

1. Test 2 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

- 2. To start Test 2, depress EXECUTE.
- 3. Depressing **EXECUTE** begins the diagnostic tests and brings up the following display:

Field 1 - 2.

Field 2 - Processor status (0 = off-line, 1 = on-line).

Fields 3 through 8 - Health codes of both processors.

Field 9 - Failure code (if any).

 Test 2 can be stopped and restarted by depressing: STOP; EXECUTE.

- 5. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.
- 6. When **STOP** is depressed, the results of the test are displayed in Field 9.

Zero (0) displayed in Field 9 - Indicates the test passed.

One (1) through 99 displayed in Field 9 - Indicates the test failed.

Note: If 99 is displayed in Field 12, Test 2 should be repeated when the off-line processor completes reloading.

7. The **OTHER FAILS** fault indicator is automatically turned off (indicating the duplicate processor alarm cause is resolved) when Test 2 passes and all other sources of the **OTHER FAILS** fault indicator are cleared.

Test 3

Prior to performing Test 3, verify the following:

- 1. The MAAP is connected to the processor that is on-line, i.e., CC0 or CC1.
- 2. The off-line processor is not halted.
- 3. An off-line procedure is not in the off-line processor.

Note: Test 3 may block transfer into the off-line processor's **MAAP** procedure memory buffer and cause the off-line processor to reload if a procedure is in the off-line processor.

4. The LOCK ON LINE switch on the alarm panel is set to the OFF position.

Test 3 allows for the memory updating of the off-line processor and the soft switching of processors.

Caution: The off-line processor may reload if a procedure is requested in the off-line processor while Test 3 is executing.

1. Test 3 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 3; ENTER.

- 2. To start Test 3, depress EXECUTE.
- 3. Depressing **EXECUTE** allows operation of **NEXT UNIT** and displays the following:

Field 1 - 3.

Field 2 - Processor status (0 = off-line, 1 = on-line).

Fields 3 through 8 - Health code of both processors.

Field 9 - Failure code (if any).

Field 10 - Processor switch status.

4. Depressing **NEXT UNIT** enables a processor switch if the switch status displayed in Field 10 allows a switch to be made.

5. To perform a soft switch of processors, check the switch status in Field 10.

If Field 10 equals 1, a soft switch cannot be performed.

Note: If a switch of processors is still required, a hard switch using the HALT/GO switch on the alarm panel must be used.

Caution: A hard switch causes a disruption of service.

6. If Field 10 equals 0, a soft switch of processors is possible.

Depress NEXT UNIT to initiate the switch.

Note: Special error code 09 (PROC must run on on-line processor) is displayed in the **MAAP** error code field if **NEXT UNIT** is depressed while the **MAAP** is connected to the off-line processor. Special error code 80 (illegal switch attempt) is displayed in the **MAAP** error code field if **NEXT UNIT** is depressed and the off-line processor is unhealthy.

7. The **WAIT** indicator on the **MAAP** is lighted while the status memory is being transferred from the on-line memory to the off-line memory.

The **PASS** indicator (heartbeat) of the off-line common control goes off while the status memory is being transferred.

8. If, after the **WAIT** indicator turns off, the switch status in Field 10 equals 0 and Fields 2 through 8 and 12 are dashed, the switch is successful.

The **PASS** indicators on both common controls are flashing and the **CC** active indicator changes to the new on-line processor.

- 9. The processor is now off-line and the **OTHER FAILS** fault indicator is automatically turned off if a switch failure was its only cause.
- The original off-line MAAP (if provided and connected to the alarm panel) displays PROC 613 Test 3 with a 1 displayed in Field 2 (processor status), 0's displayed in Fields 3 through 5 (health codes), and a 0 displayed in Field 10 (switch status).

Note: The now on-line **MAAP** is operational, however any translation or maintenance procedure (including **PROC 613**) to be used **must** be called in.

11. If the switch failed, indicated by a 1 displayed in Fields 2 and 12 (processor status and failure code) the off-line processor is probably reloading.

After the off-line processor has reloaded (as the result of a switch failure), select Test 2, depress **EXECUTE** and check the status of the duplication channel.

Repair Guide

When a duplicate processor control and test failure is indicated, **PROC 613** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted, or when a soft switch is attempted and fails, perform the following steps, in the order listed, to isolate and repair the faulty unit.

PROC 613 (R2V1 Only)

Prior to performing the repair procedure, verify the following:

- 1. The MAAP is connected to the processor that is on-line, i.e., CC0 or CC1.
- 2. The off-line processor is not halted.
- 3. An off-line procedure is not in the off-line processor.

Note: Test 2 or 3 may block transfer into the off-line processor's **MAAP** procedure memory buffer and cause the off-line processor to reload if a procedure is in the off-line processor.

4. The LOCK ON LINE switch on the alarm panel is set to the OFF position.

Caution: The off-line processor may reload if a procedure is requested in the off-line processor while Test 2 or 3 is executing.

Duplicate processor control and test failure indicated

- 1. Execute Test 1 and record the failure history including the specific fault code for each failure.
- 2. Execute Test 2 and record the failure codes (if any).
- 3. If no failures are recorded in Test 2, attempt a soft switch of processors using Test 3.

If the soft switch is successful, repeat Test 2 to turn off the **OTHER FAILS** fault indicator (assuming no other sources are affecting the **OTHER FAILS** fault indicator).

If Test 2 passes, corrective action is complete and the duplicate processor control and test alarmed entry in PMIDS is marked as resolved.

- 4. If the soft switch fails, proceed to Step 2 of the **Soft switch failure indicated** repair procedure (listed below).
- 5. When failures are recorded, refer to Table Q, PROC 613 Duplicate Processor Control and Test Repair Procedure, and perform the corrective action indicated for the failure code recorded.
- 6. After circuit pack replacement, use PROC 612 to clear the health code of the off-line processor.
- 7. Enter PROC 613 Test 3, and attempt a soft switch.
- 8. If the soft switch is successful, repeat Test 2 to turn off the **OTHER FAILS** fault indicator (assuming no other sources are affecting the **OTHER FAILS** fault indicator).

If Test 2 passes, corrective action is complete and the duplicate processor control and test alarmed entry in PMIDS is marked as resolved.

9. If Test 2 or the soft switch fails, repeat Steps 5 through 8 until all circuit packs listed in Table Q, PROC 613 - Duplicate Processor Control and Test Repair Procedure for the failure code recorded are replaced.

If the soft switch still fails, and Test 2 passes, perform Steps 2 through 6 of the **Soft switch** failure indicated repair procedure (listed below).

If Test 2 still fails, check the wiring associated with the circuit packs replaced and the alarm panel.

TABLE Q.

	PROC 613 DUPLICATE PROCESSOR CONTROL AND TEST REPAIR PROCEDURE
FAILURE CODE	CORRECTIVE ACTION
	 Replace the following components in the order listed, testing after each replacement, until the failure is corrected: A. UN158 in the off-line processor. B. UN158 in the on-line processor. C. Cabling between the UN158 circuit packs. D. TN491 in the on-line processor.
11, 12, 51, 61 through 63, and 98	Replace UN158 in the on-line processor.
21 through 24	Replace UN151 in the on-line processor.
31 through 34, 41, and 42	 Perform the necessary checking, then replace the following components in the order listed, testing after each replacement, until the failure is corrected: A. Investigate off-line common control failures using PROC 600 (Unit type 4). Take corrective action as appropriate. B. UN158 in the off-line processor. C. UN158 in the on-line processor. D. Cabling between the UN158 circuit packs.
35 through 38, 43, and 97	 Replace the following components in the order listed, testing after each replacement, until the failure is corrected: A. UN158 in the off-line processor. B. UN158 in the on-line processor. C. Cabling between the UN158 circuit packs.
99	Stop and re-execute Test 2 after the off-line processor has completed reloading.

PROC 613 (R2V1 Only)

Soft switch failure indicated

1. Execute Test 2 and record the results.

If Test 2 fails, perform steps 4 through 9 of the Duplicate processor control and test failure indicated repair procedure (above).

2. If the fault was not found in Test 2, replace the following circuit packs in the order listed:

UN158 - In the off-line processor.

UN158 - In the on-line processor.

- 3. After each circuit pack replacement, use **PROC 612** to clear the health code of the off-line processor.
- 4. Enter **PROC 613** Test 3, and attempt a soft switch.
- 5. If the soft switch is successful, repeat Test 2 to turn off the **OTHER FAILS** fault indicator (assuming no other sources are affecting the **OTHER FAILS** fault indicator).

If Test 2 passes, corrective action is complete and the duplicate processor control and test alarmed entry in PMIDS is marked as resolved.

6. If Test 2 or the soft switch fails, repeat Steps 3 through 5 until all circuit packs listed in Step 2 are replaced.

If Test 2 or the soft switch still fails, refer to **Specific Fault Codes** for further isolation techniques.

Soft A or Soft B

After all repair actions are performed and soft A or soft B failure indications are still displayed (1 in Fields 4, 5, 7, and/or 8), execute **PROC 600** Test 2 to determine if any common control problems exist.

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PROC 613 - DUPLICATE PROCESSOR CONTROL AND TEST (R2V2 ONLY)

FLIPCHART ISSUE 2	+	+ DUPLICATE PROCESSOR CONTROL & TEST + +	
(NOTES CONT F NOTES: 1. PROCESSOR D-OFFLINE 1=ONLINE 2. SWITCH STA D=SWITCH 1=SWITCH	ROM PROC 613) STATUS (FIELD 2): TUS (FIELD 10): PERMITTED NOT PERMITTED)	ALARM STATUS (FLD S): 1-MAJOR 2-MINOR 3-WARNING 4-ERRORS RECORDED 5-ALARM RESOLVED	SPECIAL ERROR CODE: 80-ILLEGAL SWITCH ATTEMPT
MORD DA			COMMON CONTROL TESTS 613

FL	IPCH SUE	ART 2			+	-			+	DUP	LICATE	PROCES	SOR CONTROL	& TI	EST +		.+		
TES HIS 'EXI USE NEX DAT	1: D ORY CUTE' 'NEXT FAIL ' TO	ISPLA USE ' TO R FAUL URE. DISPL	YS FA CLEAR ETIRE T' TO USE ' AY ST	ILURE DATA ALAR DISF NEXT RAP 1	E NY, PLAY INDEX.	TES CHA COD ONL TES BOT TO STA	T 2: INNEL INE IN INE P T 3: H PRO SWITC TUS P	TESTS AND D FIELO PROCES DISPL DESSO CH PRO PERMIT	AYS I ICESSO	DUPLI AYS FA USE (HEALTH JSE 'M DRS IF	CATION NILURE DNLY IN CODE OF NEXT UNIT' SWITCH	TEST 1 (FIELD SEE DO TEST 2 (FIELD 0 1-9 11-19 21-29	FAILURE CODES 12): CUMENTATION. & 3 FAILURE CO 12): = PASS = PROCESSOR STA = DOUBLE WRITE = MEMORY UPDATE	ides Tus FF FF	31-39 = 41-49 = 51-59 = 61-69 = 71-94 = 95 = 96 =	READ/WRITE BLOCK TRAM ID CHIP PARITY UNUSED SWITCH AT FAILED OFFLINE DO INITIALIZO	ISFER TEMPT CIU NOT ED	97 = 98 = 99 =	UNRESOLVED DUPLICATION FAILURE DUPLICATION STATUS REGISTER OFFLINE PROCESSOR RELOAD
		HEA	LTH C	ODE	HEAL DTHEF	TH COL	DE OF CESSOR			1					MIT	E STRAP	1	_	COMMON
TEST ND.	PROCESSOR STATUS	HARDWARE	SOFT B	SOFT A	HARDWARE	SOFT B	SOFT A	ALARM STATUS	SWITCH STATUS	FAULT	FAILU CODE	RE	TIMES FAILED	STAMP INDEX	DAY	HOUR	MINUTE		CONTROL TESTS 613

Purpose

PROC 613 is used when referenced from **PROC 600** (Alarm causes/error log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a duplicate processor control and test failure.

PROC 613 is used to:

- 1. Display duplication channel failures.
- 2. Perform various tests on the duplication circuitry in both processors.
- 3. Initiate a soft switch from the on-line processor.

Field Definitions and Codes

Each field of **PROC 613** flipchart and the possible displays for the fields during execution of the different tests are defined in Table R, PROC 613 - Field Definitions and Codes.

Field 1 is an optional input field for changing the test number to be executed.

PROC 613 (R2V2 Only)

TABLE 1	R.
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	PROC 613 FIELD DEFINITIONS AND CODES					
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION	
1	1-3	Test number.	9	2	Minor.	
2		Processor status:	Contd	3	Warning.	
	0	Off-line.		4	Errors recorded.	
		Unitine.	4	5	Alarm resolved.	
3		Health code (hardware):	10	/	Switch status:	
	0	Healthy. Bad hardware.		0	Switch permitted	
4		Health code (soft B):	1	1	Switch permitted.	
	0	Healthy.	11		Fault index:	
	1	Major software problem.	-	1-6	Index into failure table.	
5	0	Health code (soft A): Healthy.	12	899- 988	Specific fault code (Test 1 only).	
6		Health code of other		0-99	Failure codes (Test 2 and 3 Only).	
		Legithe		0	No failures.	
	1	Bad hardware.		1-9	Processor status:	
7		Health code of other processor (soft B):		1	Processor status	
	0	Healthy.		2-9	Unused.	
	1	Major software problem.	_	11-19	Double write flip-flop:	
8		Health code of other processor (soft A):		11	Double write FF	
	0 1	Healthy. Minor software problem.		12	cannot be cleared (CDBL fails). Double write FF	
9	1-5	Alarm status.			cannot be set (SDBL fails).	
	1	Major.	}	13-19	Unused.	

TABLE R. (Contd)

	PROC 613 FIELD DEFINITIONS AND CODES (Contd)						
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION		
12 Contd		Failure codes (Contd).	12 Contd	41-49	Block transfer:		
Conta	21-29	Memory update flip-flop:	Contu	41	Block XFER $CF = 0$ after DBLK.		
	21	Memory update FF		42	Cannot read $CF = 0$ after RWD.		
	22	Memory update FF cannot be cleared		43	Data mismatch between on-line and		
	23	(CMU fails). Memory update FF CF = 0 after SMU		44-49	Unused.		
	24	Memory update FF cannot be set (SMU		51-59	ID chip:		
	25-29	fails). Unused.		51 52-59	ID chip test failure. Unused.		
	31-39	Read/write:		61-69	Parity:		
	31	Read double word CF = 0 on RWD of		61	Parity checker/gener- ator failed on good		
	32	$\begin{array}{r} \text{data } X(5555).\\ \text{Read double word}\\ \text{CF} = 0 \text{ on } \text{RWD of} \end{array}$		62	Parity checker/gener- ator failed on bad		
	33	data X(AAAA). Read double word CF = 0 on RWD of		63	parity low byte test. Parity checker/gener- ator failed on bad		
	34	$\begin{array}{c} \text{data } X(FFFF).\\ \text{Read double word}\\ \text{CF} = 0 \text{ on RWD of} \end{array}$		64-69	test. Unused.		
	. 35	data X (0000). Read double word data		71-95	Unused.		
	36	does not match X (5555). Read double word data		96	Off-line DCIU not initialized		
	37	does not match X (AAAA). Bead double word data		97	Unresolved duplication failure.		
	200	does not match X (FFFF).		98	Duplication status register failure.		
	39	does not match X (0000). Unused.		99	Off-line processor in process of reloading.		

PROC 613 (R2V2 Only)

	PROC 613 FIELD DEFINITIONS AND CODES (Contd)						
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION		
13	0-999	Times failed: Total number of	14 Contd	3	Time when the displayed failure was alarmed		
		times the specific fault code displayed in Field 12 occurred (Test 1 only)	15-17	• •	Time stamp: A time stamp showing the day of the month, hour, and minute		
14	1-3	Stamp Index (Test 1 Only)			last error occurred, or when the alarm		
:	1	Latest time the displayed failure			was activated for the displayed failure (Test 1 only)		
			15	1-31	Day of the month		
	2	recorded error for	16	0-23	Hour of the day		
		the displayed failure	17	0-59	Minute		

TABLE R. (Contd)

Operation of Procedure

Overview

PROC 613 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from a duplicate processor control and test failure.

To call in PROC 613, perform the following:

- 1. Depress PROC NO; 613; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, and all other fields are dashed.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Three tests are available:

- 1. Test 1 Displays failure history.
- 2. Test 2 Displays processor status and health code of both processors, and tests the duplication channel.
- 3. Test 3 Allows updating of the memory and performs a soft switch of processors.

Test 1

Test 1 provides a failure history of duplicate processor control and test failures.

Test 1 can also be used to manually turn off the OTHER FAILS fault indicator.

1. Test 1 is the default test when entering **PROC 613**, or is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

- 2. To start Test 1, depress EXECUTE.
- 3. A summary of the failure history is displayed.
- If no failures (or entries with errors recorded) occurred, the summary displays a 1 in Field 1, a 0 in Field 11 (fault index), and all other fields are dashed.

If one or more failures (or entries with errors recorded) occurred, the summary displays a 1 in Field 1, the total number of failures in Field 11, and all other fields are dashed.

- 4. The failure history is displayed in alarm order severity. All major alarm failures are displayed first, then entries with errors recorded are displayed.
- 5. Depressing **NEXT FAULT** displays the first failure (or entry with errors recorded) as follows:

Field 1 - 1.

Field 2 - Processor status (0 = off-line, 1 = on-line).

Fields 3 through 8 - Dashed.

Field 9 - Alarm status of displayed failure (1 = major or 4 = errors recorded).

Field 10 - Dashed.

Field 11 - Total number of failures (maximum of 6).

Field 12 - Specific fault code.

Field 13 - Total number of times the specific fault code displayed in Field 12 occurred.

Field 14 - Stamp index of 1 if alarmed status displayed in Field 9 = 4 (errors recorded) or 3 if alarmed status displayed in Field 9 = 1 (major).

Note: A 1 in Field 14 indicates that Fields 15 through 17 display the time the last error was recorded for the displayed failure. A 3 in Field 14 indicates that Fields 15 through 17 display the time the failure was alarmed.

Fields 15 through 17 - Day, hour, and minute the last error for the displayed failure was recorded in PMIDS or the displayed failure was alarmed.

6. Depressing **NEXT DATA** changes the stamp index and time stamp. Field 14 (stamp index) displays a 2 indicating that the time displayed in Fields 15 through 17 is the time the first error was recorded for the displayed failure.

If the displayed failure is alarmed (indicated by a 1 displayed inn Field 9), depressing **NEXT DATA** once more changes the stamp index and time stamp. Field 14 (stamp index) displays a 1 indicating that the time displayed in Fields 15 through 17 is the time the last error was recorded for the displayed failure.

If the displayed failure is not alarmed, depressing **NEXT DATA** again cycles back to the initial display providing a stamp index of 1 or 3 in Field 14, and the time the last error was recorded or the displayed failure was alarmed in Fields 15 through 17.

7. Depressing **NEXT FAULT** repeatedly displays the remaining failures in the PMIDS error log.

Each time **NEXT FAULT** is depressed, Field 11 is decremented by 1 to show the number of remaining failures to be displayed.

The fault index (Field 11) includes in its count the failure currently being displayed.

- 8. NEXT DATA can be used to display the stamp index for each failure in the PMIDS error log.
- 9. Depressing **NEXT FAULT** after all failures are displayed dashes Fields 2 through 17.

Depressing **NEXT FAULT** again causes the display sequence to start over beginning with the summary.

10. The **CLEAR DATA**, **EXECUTE** sequence is used to manually resolve individual alarmed duplicate processor control failures after **EXECUTE** is used to initiate Test 1.

Note: When alarmed failures are resolved the circuits' failure history is not deleted from the PMIDS error log. The failure history is updated to show that the alarm status now equals 5 (alarm resolved).

11. To resolve individual alarmed failures with an alarm status of 1, perform the following:

Use NEXT FAULT to display the alarmed failure on the MAAP.

Requirement: Individual duplicate processor control failures cannot be resolved unless the failure is displayed on the **MAAP**.

Depress CLEAR DATA; EXECUTE.

12. Field 9 (alarm status) displays a 5 indicating that the duplicate processor control failure in PMIDS is marked as resolved.

The **OTHER FAILS** fault indicator is turned off if no other sources affecting the same fault indicator exist.

Test 2

Prior to performing Test 2, verify the following:

- 1. The MAAP is connected to the processor that is on-line, i.e., CC0 or CC1.
- 2. The off-line processor is not halted.
- 3. An off-line procedure is not in the off-line processor.

Note: Test 2 may block transfer into the off-line processor's **MAAP** procedure memory buffer and cause the off-line processor to reload if a procedure is in the off-line processor.

4. The LOCK ON LINE switch on the alarm panel is set to the OFF position.

Test 2 tests the duplication channel with five diagnostic tests.

Caution: The off-line processor may reload if a procedure is requested in the off-line processor while Test 2 is executing.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

- 2. To start Test 2, depress EXECUTE.
- Depressing EXECUTE begins the diagnostic tests and brings up the following display: Field 1 - 2.

Field 2 - Processor status (0 = off-line, 1 = on-line).

Fields 3 through 8 - Health codes of both processors.

Field 12 - Dashed or failure code.

4. Test 2 can be stopped and restarted by depressing:

STOP; EXECUTE.

- 5. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.
- 6. When STOP is depressed, the results of the test are displayed in Field 12.

Zero (0) displayed in Field 12 - Indicates the test passed.

One (1) through 99 displayed in Field 12 - Indicates the test failed.

Note: If 99 is displayed in Field 12, Test 2 should be repeated when the off-line processor completes reloading.

7. The OTHER FAILS fault indicator is automatically turned off (indicating the duplicate processor alarm cause is resolved) when Test 2 passes and all other sources of the OTHER FAILS fault indicator are cleared.

Test 3

Prior to performing Test 3, verify the following:

- 1. The MAAP is connected to the processor that is on-line, i.e., CC0 or CC1.
- 2. The off-line processor is not halted.
- 3. An off-line procedure is not in the off-line processor.

Note: Test 3 may block transfer into the off-line processor's **MAAP** procedure memory buffer and cause the off-line processor to reload if a procedure is in the off-line processor.

4. The LOCK ON LINE switch on the alarm panel is set to the OFF position.

PROC 613 (R2V2 Only) Test 3

Test 3 allows for the memory updating of the off-line processor and the soft switching of processors.

Caution: The off-line processor may reload if a procedure is requested in the off-line processor while Test 3 is executing.

1. Test 3 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 3; ENTER.

- 2. To start Test 3, depress **EXECUTE**.
- 3. Depressing EXECUTE allows operation of NEXT UNIT and displays the following:

Field 1 - 3.

Field 2 - Processor status (0 = off-line, 1 = on-line).

Fields 3 through 8 - Health code of both processors.

Field 10 - Processor switch status.

Field 12 - Dashed or failure code.

- 4. Depressing **NEXT UNIT** enables a processor switch if the switch status displayed in Field 10 allows a switch to be made.
- 5. To perform a soft switch of processors, check the switch status in Field 10.

If Field 10 equals 1, a soft switch cannot be performed.

Note: If a switch of processors is still required, a hard switch using the HALT/GO switch on the alarm panel **must** be used.

Caution: A hard switch causes a disruption of service.

6. If Field 10 equals 0, a soft switch of processors is possible.

Depress **NEXT UNIT** to initiate the switch.

Note: Special error code 09 (PROC must run on on-line processor) is displayed in the **MAAP** error code field if **NEXT UNIT** is depressed while the **MAAP** is connected to the off-line processor. Special error code 80 (illegal switch attempt) is displayed in the **MAAP** error code field if **NEXT UNIT** is depressed and the off-line processor is unhealthy.

7. The **WAIT** indicator on the **MAAP** is lighted while the status memory is being transferred from the on-line memory to the off-line memory.

The **PASS** indicator (heartbeat) of the off-line common control goes off while the status memory is being transferred.

8. If, after the WAIT indicator turns off, the switch status in Field 10 equals 0 and Fields 2 through 8 and 12 are dashed, the switch is successful.

The **PASS** indicators on both common controls are flashing and the **CC** active indicator changes to the new on-line processor.

9. The processor is now off-line and the **OTHER FAILS** fault indicator is automatically turned off if a switch failure was its only cause.

The original off-line MAAP (if provided and connected to the alarm panel) displays PROC
 613 Test 3 with a 1 displayed in Field 2 (processor status), 0's displayed in Fields 3 through 5 (health codes), and a 0 displayed in Field 10 (switch status).

Note: The now on-line **MAAP** is operational, however any translation or maintenance procedure (including **PROC 613**) to be used **must** be called in.

11. If the switch failed, indicated by a 1 displayed in Fields 2 and 12 (processor status and failure code) the off-line processor is probably reloading.

After the off-line processor has reloaded (as the result of a switch failure), select Test 2, depress **EXECUTE** and check the status of the duplication channel.

Repair Guide

When a duplicate processor control and test failure is indicated, **PROC 613** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted, or when a soft switch is attempted and fails, perform the following steps, in the order listed, to isolate and repair the faulty unit.

Prior to performing the repair procedure, verify the following:

- 1. The MAAP is connected to the processor that is on-line, i.e., CC0 or CC1.
- 2. The off-line processor is not halted.
- 3. An off-line procedure is not in the off-line processor.

Note: Test 2 or 3 may block transfer into the off-line processor's **MAAP** procedure memory buffer and cause the off-line processor to reload if a procedure is in the off-line processor.

4. The LOCK ON LINE switch on the alarm panel is set to the OFF position.

Caution: The off-line processor may reload if a procedure is requested in the off-line processor while Test 2 or 3 is executing.

Duplicate processor control and test failure indicated

- 1. Execute Test 1 and record the failure history including the specific fault code for each failure.
- 2. Execute Test 2 and record the failure codes (if any).
- 3. If no failures are recorded in Test 2, attempt a soft switch of processors using Test 3.

If the soft switch is successful, repeat Test 2 to turn off the OTHER FAILS fault indicator (assuming no other sources are affecting the OTHER FAILS fault indicator).

If Test 2 passes, corrective action is complete and the duplicate processor control and test alarmed entry in PMIDS is marked as resolved.

- 4. If the soft switch fails, proceed to Step 2 of the **Soft switch failure indicated** repair procedure (listed below).
- 5. When failures are recorded, refer to Table S, PROC 613 Duplicate Processor Control and Test Repair Procedure, and perform the corrective action indicated for the failure code recorded.

PROC 613 (R2V2 Only)

TABLE S.

	PROC 613 DUPLICATE PROCESSOR CONTROL AND TEST REPAIR PROCEDURE
FAILURE CODE	
1	Replace the following components in the order listed, testing after each replacement, until the failure is corrected:
	 A. UN158 in the off-line processor. B. UN158 in the on-line processor. C. Cabling between the UN158 circuit packs. D. TN491 in the on-line processor.
11, 12, 51, 61 through 63, and 98	Replace UN158 in the on-line processor.
21 through 24	Replace UN151 in the on-line processor.
31 through 34, 41,	Perform the necessary checking, then replace the following components in the order listed, testing after each replacement, until the failure is corrected:
and 42	 A. Investigate off-line common control failures using PROC 600 (Unit type 4). Take corrective action as appropriate. B. UN158 in the off-line processor. C. UN158 in the on-line processor. D. Cabling between the UN158 circuit packs.
35 through	Replace the following components in the order listed, testing after each replacement, until the failure is corrected:
and 97	A. UN158 in the off-line processor.B. UN158 in the on-line processor.C. Cabling between the UN158 circuit packs.
96	Check off-line DCIU status using PROC 650.
99	Stop and re-execute Test 2 after the off-line processor has completed re-loading.

- 6. After circuit pack replacement, use PROC 612 to clear the health code of the off-line processor.
- 7. Enter PROC 613 Test 3, and attempt a soft switch.
- 8. If the soft switch is successful, repeat Test 2 to turn off the **OTHER FAILS** fault indicator (assuming no other sources are affecting the **OTHER FAILS** fault indicator).

If Test 2 passes, corrective action is complete and the duplicate processor control and test alarmed entry in PMIDS is marked as resolved.

9. If Test 2 or the soft switch fails, repeat Steps 5 through 8 until all circuit packs listed in Table S, PROC 613 - Duplicate Processor Control and Test Repair Procedure for the failure code recorded are replaced.

If the soft switch still fails, and Test 2 passes, perform Steps 2 through 6 of the **Soft switch** failure indicated repair procedure (listed below).

If Test 2 still fails, refer to Specific Fault Codes for further isolation techniques.

Soft switch failure indicated

1. Execute Test 2 and record the results.

If Test 2 fails, perform steps 4 through 9 of the **Duplicate processor control and test** failure indicated repair procedure (above).

2. If the fault was not found in Test 2, replace the following circuit packs in the order listed:

UN158 - In the off-line processor.

UN158 - In the on-line processor.

- 3. After each circuit pack replacement, use **PROC 612** to clear the health code of the off-line processor.
- 4. Enter PROC 613 Test 3, and attempt a soft switch.
- 5. If the soft switch is successful, repeat Test 2 to turn off the **OTHER FAILS** fault indicator (assuming no other sources are affecting the **OTHER FAILS** fault indicator).

If Test 2 passes, corrective action is complete and the duplicate processor control and test alarmed entry in PMIDS is marked as resolved.

6. If Test 2 or the soft switch fails, repeat Steps 3 through 5 until all circuit packs listed in Step 2 are replaced.

If Test 2 or the soft switch still fails, refer to **Specific Fault Codes** for further isolation techniques.

Soft A or Soft B

After all repair actions are performed and soft A or soft B failure indications are still displayed (1 in Fields 4, 5, 7, and/or 8), execute **PROC 600** Test 2 to determine if any common control problems exist.

Specific Fault Codes

A specific fault code is a number used to provide a description of a failure.

- 1. This description provides more detail about the failure associated with a circuit.
- 2. Specific fault codes are recorded during periodic or time available testing in PMIDS.

PROC 613 (R2V2 Only)

Table T, PROC 613 - Specific Fault Code Definitions, lists the specific fault codes in numerical sequence with a definition for each specific fault code.

Further isolation of a failure may be accomplished as follows:

- 1. Analyze the specific fault codes recorded from PMIDS.
- 2. Determine from the specific fault codes recorded (using Table T, PROC 613 Specific Fault Code Definitions), if any additional corrective action can be performed (i.e., cabling, connectors, etc.).
- 3. Check the wiring associated with the circuit pack(s) and/or components replaced (point to point depending upon specific fault codes recorded).

TABLE T.

	PROC 613 - SPECIFIC FAULT CODE DEFINITIONS						
FAULT CODE	СКТ 1	СКТ 2	СКТ З	DEFINITION			
899	UN158			UNABLE TO SWITCH COMMON COMMONS			
934	UN158			PERIODIC SWITCH OF COMMON CONTROL FAILED			
974	UN158			APPEMPT TO SWITCH BECAUSE OF I/O FAILURES FAILED			
• 975	UN158/F [1]	UN158/N [2]	CABLE	UN158 DOUBLE WRITE FAILURE ERROR FLAG FOUND BY THE MAINTENANCE PERIODIC TEST			
• 976	UN158/F [1]	UN158/N [2]	CABLE	UN158 INSTRUCT FAR PROCESSOR FAILURE OR READ DOUBLE WORD FAILURE ERROR FLAG FOUND BY THE MAINTENANCE PERIODIC TEST			
• 977	UN158/F [1]	UN158/N [2]	CABLE	UN158 NEAR END FAILURE ERROR FLAG FOUND BY THE MAINTENANCE PERIODIC TEST			
978	UN158/F [1]	UN158/N [2]	CABLE	UN158 DOUBLE WRITE FAILURE ERROR FLAG SET BY THE MAINTENANCE PERIODIC TEST			
979	UN158/F [1]	UN158/N [2]	CABLE	UN158 INSTRUCT FAR PROCESSOR FAILURE OR READ DOUBLE WORD FAILURE ERROR FLAG SET BY THE MAINTENANCE PERIODIC TEST			
980	UN158/F [1]	UN158/N [2]	CABLE	UN158 NEAR END FAILURE ERROR FLAG SET BY THE MAINTENANCE PERIODIC TEST			
981	UN158/N [2]			UNABLE TO SET DOUBLE WRITE CAPABILITY			
• 982	UN158/N [2]	UN158/F [1]	CABLE	READ DOUBLE WORD INSTRUCTION FAILED BY RETURNING A CONDITION FLAG OF ZERO			
983	UN158/F [1]	UN158/N [2]	CABLE	READ DOUBLE WORD INSTRUCTION FAILED TO EXECUTE PROPERLY, SETTING THE READ DOUBLE WORD FAILURE ERROR FLAG			
984	UN158/F [1]	UN158/N [2]	CABLE	DOUBLE WRITTEN TEST VECTOR FAILED THE ECHO CHECK			
985	UN158/N [2] ·		-	UNABLE TO CLEAR THE STATUS REGISTER			

TABLE T. (Contd)

	PROC 613 — SPECIFIC FAULT CODE DEFINITIONS (Contd)						
FAULT CODE	СКТ 1	СКТ 2	СКТЗ	DEFINITION			
986	UN158/N [2]			UN158 CONTROL REGISTER AND STATUS REGISTER DISAGREE AS TO DOUBLE WRITE STATUS			
987	UN158/N [2]			UNABLE TO READ THE UN158 DOUBLE WRITE SELECT REGISTER			
988	UN158/N [2]			UNABLE TO WRITE TO THE UN158 DOUBLE WRITE SELECT REGISTER			

[1] F = FAR END OF THE DUPLICATION CHANNEL (MOST LIKELY IN THE OFF-LINE COMMON CONTROL)

[2] N = NEAR END OF THE DUPLICATION CHANNEL (MOST LIKELY IN THE ON-LINE COMMON CONTROL)

PROC 614 - MEMORY READ/MEMO	DRY MATCH TESTS
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FL IS	IPCHART + -	- MEMORY READ/MEMOR	Y MATCH TESTS +	+	
NOT 1. 2.	IS: IHE MEMORY MATCH TESTS (2-4) COMPARE THE CONTENTS OF CORRESPONDING LOCATIONS IN DUPLICATED COMMON CONTROLS. THE RANGE OF MEMORY TESTED IS RESTRICTED TO THE PROGRAM PATCH AND TRANSLATION AREAS. TEST 5 IS NOT NESTRICTED AND ALLONS THE CONTENTS OF MEMORY. HENORY ADDRESSES AND CONTENTS ARE JISPLAYED IN OCTAL.	MEMORY AREA CODE (FIELD 7): 1-PROGRAM ONLY 2-PACTO ONLY 3-PROGRAM 5 PATCH 4-TRANSLATION ONLY 5-PROGRAM 5 TRANSLATION 6-PATCH 5 TRANSLATION 7-PROGRAM, PATCH 8 TRANSLATION	8-OTHER 9-PROGRAM & OTHER 10-PATCH & OTHER 11-PROGRAM, PATCH & OTHER 12-TRANSLATION & OTHER 13-PROGRAM, TRANSLATION & OTHER 14-PATCH, TRANSLATION 5 OTHER 15-PROGRAM, PATCH, TRANSLATION & OTHER	SPECIAL ERROR COL 74-MEMORY MATCH 80-LOCATION DUT (82-USE PROC 613 DUPLICATION CO	JES: TEST NOT PERFORMED TEST NOT PERFORMED TO CLEAR HANNEL FAILURES
				NOTE: MEMORY BLOCK SIZE IS 256K.	
FAILURE CODE (FIELD 8): O-MO FAILURES 5-MEMORY I/O ERROR D-MEMORY MISMATCHES 6-MEMORY ID CHIP E 2-PARITY ERRORS 7-PARITY CHECK ERF 3-MEMORY SCRUB ERROR 8-HARD FAILURE 4-DUPLICATION CHANNEL 9-ECC TURNED OFF ERRORS		10RY J/O ERRORS 10-CACHE 10RY J/O CHIP ERRORS 11-CACHE 11-CACHE 11-CACHE 12-CACHE 10 FAILURE 12-LESS 1 2 TURNED OFF SUPERS	NOT PRESENT 14=50% OR MORE TURNED OFF SUPERSETS FJ ID CHIP ERROR 15=TAG/VALID EF HAN 50% COUNTER FAIL SETS FAILED 16=CACHE 1/0 F 1 17=CACHE INVALI	AILED ROR JURE NILURE DATION FAILURE	COMMON CONTROL TESTS 614

FLIPCHART ISSUE 1	+ + MEMORY READ/MEMO	RY MATCH TESTS +	+	
TEST 1: DISPLAYS A MEMORY FAILURE: USE 'NEXT FAULT' TO ADVANCE AND DISPLAY NEXT FAILURE. USE 'CLEAR DATA', 'EXECUTE TO RETIRE ALARM, OR ALL MEMORY ALARMS WHEN EXECUTED WATH A SUMMARY DISPLAYED. TEST 2: TESTS MEMORY TO CHIPS AND LOCATIONS, DISPLAYS SUMMARY AND RANGE OF MEMORY TESTED.	TEST 3: TESTS MEMORY LOCATIONS AND DISPLAYS RANGE OF FAILED BLOCK. DISPLAYS TYPE OF FAILURE AND MEMORY AREA FOR FAILED BLOCK. USE "NEXT FAULT' TO ADVANCE TO NEXT BLOCK. USE "NEXT DAIA" TO DISPLAY CONTENTS OF FIRST MEMORY LOCATION IN ON-LINE CC. THEN FIRST NEMORY LOCATION IN OFF-LINE CC. THEN ADVANCE TO NEXT MEMORY LOCATION IN ON-LINE CC.	TEST 4: TESTS SPECIFIED RANGE OF MEMORY CONTINUOUSLY. TEST 5: READS THE CONTENTS OF ANY MEMORY LOCATION OR ANY RANGE OF MEMORY LOCATION OR ANY RANGE OF USPLAY CONTENTS OF FIRST MEMORY LOCATION IN ON-LINE CC. USE 'NEXT DATA' TO DISPLAY CONTENTS OF FIRST MEMORY LOCATION FOR OFF-LINE CC. SUBSEQUENT 'MEXT DATA' OPERATIONS FUNCTION AS IN TEST 3.	TEST 6: CONTINUOUS TEST OF ID CHIP AND SUPERSETS OF THE CACHE MEMORY. USE 'EXECUTE' TO DISPLAY FIRST FAILURE. USE 'EXECUTE' TO ADVANCE AND DISPLAY NEXT FAILURE.	
TEST TESTS 3. NO MEMORY CACH BLOCK OR	Y LOCATIONS 4. 6.5 TEST 6 E TAG/VALID SUPERSET HEMORY SUPERSET T T T T T T T T T T T T T	ESTS 2 6 3 L FAILED WORDS MEMORY ESTS 3 6 5 G F FIRST MEM LOC	ESTS 1-3 TOTAL FAILED BLOCKS IESTS 1. , 4 & 6 FAILURE CONTROL TESTS 3. , 4 & 6 FAILURE CONTROL TESTS 3. , 4 & 6 6 1 4	

Purpose

PROC 614 is used when referenced from **PROC 600** (Alarm causes/error log) to verify and turn off the **MEM** and/or **CACHE MEMORY** fault indicator(s) resulting from a memory and/or cache failure.

PROC 614 is used when the mismatch flag is set or to read the contents of a memory location.

PROC 614

The mismatch flag is set when any of the following conditions exist:

- 1. The on-line memory comparison test detects a mismatched memory condition.
- 2. A double write operation fails to function correctly.
- 3. The run tape program detects a mismatch.

PROC 614 tests main and cache memory subsystems:

- 1. All main memory circuit packs and the processor memory interface are tested.
- 2. The cache memory circuit pack is tested.

Field Definitions and Codes

Each field of **PROC 614** flipchart and the possible displays for the fields during execution of the different tests are defined in Table U, PROC 614 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Fields 2 and 3 Select a specific memory block and address within the memory block to begin testing (Tests 3 through 5 only).
- 3. Field 3 Select a specific cache superset to test (Test 6) only.
- 4: Field 4 Select a specific memory block to end the test (Tests 4 and 5 only).

Operation of Procedure

Overview

PROC 614 is used to determine the cause of the **MEM** and/or **CACHE MEMORY** fault indicator(s) being lighted resulting from a memory or cache failure.

To call in PROC 614, perform the following:

- 1. Depress PROC NO; 614; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, and all other fields are dashed.

3. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Six tests are available:

- 1. Test 1 Displays main memory and cache memory failures detected by the on-line memory read/memory match and cache memory programs.
- 2. Test 2 Provides a picture of the switch's overall memory (main and cache) health.
- 3. Test 3 Provides specific groups of unbroken failure blocks and displays the contents of each of the failed main memory locations within the failed block for each processor.
- 4. Test 4 Allows continuous testing of a specified range of main memory locations.
- 5. Test 5 Reads the contents of any main memory location, or any range of main memory locations, for each processor in a duplicated switch.
- 6. Test 6 Tests a specified range of supersets of cache memory.

TABLE U.

PROC 614 FIELD DEFINITIONS AND CODES									
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION				
1	1-6	Test number.	7 (Contd)	6 7	Patch and translation. Program, patch, and				
2	0-77	Octal memory block number (1 block = 256K).	(,	8	translation. Other.				
3	0- 777777	Octal address within the memory block of field 2.		9 10 11	Program and other. Patch and other. Program, patch and other				
	0-255	Cache superset failing in decimal.		12 13	Translation and other. Program, translation				
4	0-77	Octal memory block number (1 block = 256K).		14	and other. Patch, translation and other.				
5		Processor memory is being read from:		15	Program, patch, translation and other.				
	0 1	On-line common control. Off-line common control.	8	0-77	Total failed blocks (Test 2); total failed blocks which are displayed at the com- plation of the test (Test 3)				
6	0- 16777215 0- 177777	Total number of failed words in decimal (Test 2); total number of failed words in decimal which displays upon test completion (Test 3). Octal contents of memory lo- cation in fields 2 and 3 are displayed when NEXT DATA is pressed (Test 3); octal contents of memory lo- cation in fields 2 and 3 are displayed when EXECUTE or NEXT DATA is pressed (Test 5).		0 1 2 3 4 5 6 7 8 9 10 11 12	pletion of the test (Test 3). Failure code (Tests 1, 3, 4, and 6): No failures. Memory mismatches. Parity errors. Memory scrub error. Duplication channel errors. Memory ID chip errors. Memory ID chip errors. Parity check errors. Hard failure. ECC turned off. Cache not present. Cache ID chip error.				
7	1	Memory area code:		13 14	Less than 50% supersets failed. 50% or more supersets				
	23	Patch only. Program and patch.		15	failed. Tag/valid error counter failure.				
	4 5	Program and translation.		16 17	Cache 1/0 failure. Cache invalidation failure.				

PROC 614 Test 1

Tests 2 and 3 perform an ID chip and parity check test on each memory circuit pack.

Tests 2 through 4 (memory match tests) compare the contents of corresponding locations in duplicated common controls. The range of memory compared in Tests 2 through 4 is restricted to the program, patch, and translation areas.

In addition, Tests 2 through 4 perform a hard fault test over the full range of main memory.

Test 5 is not restricted and displays the contents of memory to be read over the full range of main memory.

All tests can be executed on an unduplicated switch. For an unduplicated switch, Tests 2 through 4 do not perform the memory comparison test.

Test 1

Test 1 provides a history of all failed memory locations (main and cache) recorded by the on-line memory read/memory match and cache memory programs.

Test 1 can also be used to manually turn off the MEM and/or CACHE MEMORY fault indicator(s).

1. Test 1 is the default test when entering **PROC 614**, or is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

- 2. To start Test 1, depress EXECUTE.
- 3. If the on-line program has not detected memory (main and cache) failures, a 0 is displayed in Field 8.
- 4. If failures are recorded, the following summary is displayed:
- Field 1 1.

Fields 2 through 7 - Dashed.

Field 8 - Total failed blocks recorded.

5. Depressing NEXT FAULT displays the first failure as follows:

Field 1 - 1.

Field 2 - Starting block number or dashed.

Field 3 - 0 (main memory location for block number displayed in Field 2) or 1-255 (cache superset indicator).

Fields 4 through 7 - Dashed.

Field 8 - Failure code.

Note: Main memory failures are displayed first then cache memory failures. If no main memory failures are recorded, the initial display is a cache failure.

6. Depressing NEXT FAULT repeatedly displays the remaining failures.

When all failures are displayed, Fields 2 through 8 are dashed.

Depressing **NEXT FAULT** once more starts the sequence over displaying the failure summary.
7. Depressing **NEXT UNIT** when the summary is displayed or after displaying the first main memory failure (etc.) displays cache memory failures (if any).

Depressing **NEXT UNIT** when the summary is displayed decrements Field 8 corresponding to the number of main memory failures passed over (if any).

NEXT FAULT is used to display the cache memory failures.

8. To manually turn off the **MEM** and/or **CACHE MEMORY** fault indicator(s) after Test 1 is executed at least once, perform the following:

Depress **NEXT FAULT** until a summary is displayed (Field 1 = 1, Field $8 = \text{total number of failures and all other fields are dashed).$

Depress CLEAR DATA; EXECUTE.

Note: Memory read/memory match failures are marked as resolved in PMIDS.

Test 2

Test 2 performs an ID chip and parity check test, then runs a single pass test of all testable main memory. If the common control is duplicated, a comparison of the two memories is performed by Test 2.

A memory area code (Field 7) indicates the area of memory where the failures occurred (i.e., program, patch, translation, other, or any combination of the four areas).

Test 2 automatically turns off the **MEM** and/or **CACHE MEMORY** fault indicator(s) when all testable main memory locations are tested successfully.

1. Test 2 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

- 2. When Test 2 is initially called in, Fields 2 and 3 display a 0 (first block and address in memory) and Field 4 displays the last memory block in the switch.
- 3. To start Test 2, depress EXECUTE.

The WAIT indicator on the MAAP is turned on.

Note: Test 2 takes approximately 5 minutes to test each block of 256K words. The total amount of time for Test 2 depends on the memory configuration of the switch (i.e., approximately 5 minutes times the number of 256K blocks).

- 4. While Test 2 is executing, Field 3 (address within the main memory block being tested) is updated every second.
- 5. The following fields are updated every second if failures occur:

Field 6 - Number of failed words.

Field 7 - Area of memory where the failure occurred.

Field 8 - Number of failed blocks.

Note: Field 2 (memory block) is updated when a memory block is tested (approximately every 5 minutes).

6. When Test 2 is completed, the **WAIT** indicator turns off and the following summary is displayed:

Field 1 - 2.

Fields 2 and 3 - Memory location of last location tested (block number and address in block).

Field 4 - Last memory block tested (equal to last memory block in the switch configuration).

Field 5 - Dashed.

- Field 6 Total number of failed words (if any).
- Field 7 Area of memory where the failure occurred (if any).
- Field 8 Total number of failed blocks (if any).

Note: Special error code 74 (memory match test not performed) is displayed in the **MAAP** error code field when Test 2 is performed on an unduplicated switch, indicating that tests other than the memory match test was performed.

- 7. If all testable memory locations are tested successfully 0s are displayed in Fields 6 and 8.
- 8. Special error code 82 (use **PROC 613** to clear duplication channel failures) is displayed in the **MAAP** error code field after Test 2 completes if failure code 4 (duplication channel error) is detected.

Note: PROC 613 is used to correct duplication channel errors.

9. Depressing **STOP**, while Test 2 is executing, halts the test and displays the last memory block and memory address in the block tested in Fields 2 and 3. Field 4 displays the last testable memory block in the switch configuration.

Field 6 displays the total number of failed words (if any), and Field 8 displays the total number of failed blocks (if any).

- 10. Depressing **EXECUTE** after depressing **STOP** starts Test 2 over from the beginning of memory.
- 11. The **MEM** and/or **CACHE MEMORY** fault indicator(s) is automatically turned off when Test 2 completes with no failures detected for all testable main memory locations.

Test 3

Test 3 is used to test all main memory locations of the program, patch, translation, and other areas from the first memory location to the end of testable memory. Test 3 also performs an ID chip and parity check test.

Test 3 stops when a contiguous block of failed main memory locations is identified. (A contiguous block may be as small as one memory location or as large as all of testable main memory.)

1. Test 3 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 3; ENTER.

2. When Test 3 is initially called in, Fields 2 and 3 display a 0 (first block and address in memory) and Field 4 displays the last memory block in the switch configuration.

Field 2 is blinking indicating an optional entry field.

3. A starting memory block and memory location can be selected for testing or the entire main memory can be tested.

To test the entire main memory, proceed to Step 5.

Note: Test 3 takes approximately 5 minutes to test each block of 256K words. The total amount of time for Test 3 depends on the memory configuration of the switch (i.e., approximately 5 minutes times the number of 256K blocks).

 A specific starting memory block and memory location can be selected for testing by performing one of the following:

(Starting memory block to be tested); ENTER; (Memory location); ENTER.

CHANGE FIELD; 2; ENTER; (Starting memory block to be tested); ENTER; (Memory location); ENTER.

Note: Special error code 80 (location out of memory range) is displayed in the **MAAP** error code field after **EXECUTE** is depressed if the specific memory block and memory location is not in the range of testable memory.

Proceed to Step 5.

- 5. To start Test 3 after selecting the main memory to be tested, depress EXECUTE.
- 6. While Test 3 is executing, Field 3 (address within the main memory block being tested) is updated every second.

Note: Field 2 (memory block) is updated when a memory block is tested (approximately every 5 minutes).

- 7. When the first failure is located the data in Fields 2 and 3 remains constant displaying the first memory location of the failed block.
- 8. Test 3 continues to execute until the end of the failed block is identified and then stops.
- 9. Special error code 82 (use **PROC 613** to clear duplication channel failures) is displayed in the **MAAP** error code field after Test 3 stops if failure code 4 (duplication channel error) is detected.

Note: PROC 613 is used to correct duplication channel errors.

10. When Test 3 stops, after a failure is detected, the following is displayed:

Field 1 - 3.

Field 2 - Block number of failing block.

Field 3 - Last memory location to fail in the block.

Field 4 - Ending block number.

Fields 5 and 6 - Dashed.

Field 7 - Area of memory where the failure occurred.

Field 8 - Type of failure found (failure code).

- 11. Depressing **NEXT FAULT** causes Test 3 to continue from the location displayed in Field 4, plus one.
- 12. When Test 3 is completed (after the starting block and memory location entered, or the entire main memory is tested) the following is displayed:

Field 6 - 0 or total number of failed words.

Field 7 - 0 or memory area of failure.

Field 8 - 0 or total number of failed memory blocks.

Note: Special error code 74 (memory match test not performed) is displayed in the **MAAP** error code field when Test 3 is performed on an unduplicated switch, indicating that tests other than the memory match test was performed.

13. Depressing STOP while Test 3 is executing, halts the test.

If Test 3 is halted, by use of the **STOP** key in the middle of a failed block of memory locations, Field 4 displays the last testable memory block number for the switch configuration and Field 8 defines the type of failure detected.

14. If Test 3 is halted by use of the **STOP** key and no failures are detected, a dash is displayed in Field 8.

Field 4 displays the last testable main memory block location for the switch configuration and Fields 2 and 3 display the last tested memory location.

15. Depressing **NEXT FAULT** any time after Test 3 stops on its own (failure detected) causes the test to continue from where it was halted.

Note: If **STOP** is depressed to halt Test 3, **EXECUTE** must be depressed to restart Test 3. Test 3 will start from the beginning of memory after the **STOP**; **EXECUTE** sequence is used.

16. Depressing **NEXT DATA** after a failed block is identified displays the contents of the first failing memory location within a block of contiguous failures beginning at the memory location displayed in Fields 2 and 3.

The contents of the failing memory location for the on-line common control (indicated by a 0 in Field 5) are displayed in Field 6.

- 17. Depressing **NEXT DATA** again, displays (in Field 6) the contents of the off-line common control (indicated by a 1 in Field 5) for the same memory location.
- 18. Depressing NEXT DATA once more steps to the next failing memory location.

Field 6 displays the contents of the memory location alternating between the on-line common control (0 in Field 5) and the off-line common control (1 in Field 5) each time **NEXT DATA** is depressed.

19. When all failing main memory locations are displayed, depressing **NEXT DATA** once more dashes the display.

Depressing **NEXT DATA** again, starts the display over from the first failing main memory location.

Test 4

Test 4 is used to continuously test a specific range of main memory locations of the program, patch, translation, and other areas.

1. Test 4 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 4; ENTER.

2. When Test 4 is initially called in, a default range of main memory may be displayed in Fields 2 through 4. Field 2 is blinking indicating an optional entry.

Either the default range of memory can be tested, or another range of memory can be selected for testing.

Note: The default memory locations are the last block of failures displayed in Test 3.

To test the default range of memory, proceed to Step 5.

3. If no failures are found in Test 3, Fields 2 through 4 display the entire range of testable memory. Field 2 is blinking indicating an optional entry.

If starting and ending memory locations are not entered, Test 4 tests the entire range of testable main memory (i.e., program, patch, translation, and other areas).

4. A specific range of main memory can be selected for testing by entering the following:

(Starting memory block); ENTER; (Starting address); ENTER; (Ending memory block); ENTER.

Note: Special error code 80 (location out of memory range) is displayed in the **MAAP** error code field after **EXECUTE** is depressed if the specific memory block, memory location, and ending block selected is not in the range of testable memory.

Proceed to Step 5.

5. To start Test 4, depress EXECUTE.

Note: Test 4 takes approximately 5 minutes to test each block of 256K words. The total amount of time for Test 4 depends on the memory configuration of the switch (i.e., approximately 5 minutes times the number of 256K blocks).

- 6. While Test 4 is executing, Fields 7 and 8 (memory area and failure code) are updated after every pass through the range of memory selected for testing.
- 7. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.

Note: Special error code 74 (memory match test not performed) is displayed in the **MAAP** error code field when Test 4 is performed on an unduplicated switch, indicating that tests other than the memory match test was performed.

8. Special error code 82 (use **PROC 613** to clear duplication channel failures) is displayed in the **MAAP** error code field when Test 4 is stopped if failure code 4 (duplication channel error) is detected.

Note: PROC 613 is used to correct duplication channel errors.

- 9. If no failures are detected, Fields 2 through 4 display the original range selected for testing, and Fields 7 and 8 display a 0.
- 10. If any failures are detected, the following is displayed:

Field 1 - 4.

Fields 2 and 3 - Lowest failed memory location within the range of memory selected for testing.

Field 4 - Highest failed memory block within the range of memory selected for testing.

Fields 5 and 6 - Dashed.

Field 7 - Area of memory where the failure occurred.

Field 8 - Failure code for the failed memory location.

11. Test 4 can be repeated from the same range of main memory entered by depressing **EXECUTE** or another range of main memory can be selected for testing by using the **CHANGE FIELD** sequence and depressing **EXECUTE**.

Test 5

Test 5 is used to read the contents of a single main memory location, or any range of main memory locations.

Test 5 can be used with either duplicated or unduplicated common controls.

1. Test 5 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 5; ENTER.

2. When Test 5 is initially called in, a default range of main memory may be displayed in Fields 2 through 4. Fields 2 and 3 (memory block and address) are blinking indicating an optional entry.

Either the default range of memory can be tested, or another range of memory can be selected for testing.

Note: The default memory locations are the last block of failures displayed in Test 3.

To test the default range of memory, proceed to Step 5.

3. If no failures are found in Test 3 or if an unduplicated switch is being tested, Fields 2 through 4 display the entire range of testable memory.

If starting and ending memory locations are not entered, Test 5 will test the entire range of testable memory.

4. A specific range of main memory can be selected for testing by entering the following:

(Starting memory block); ENTER; (Starting address); ENTER; (Ending memory block); ENTER.

Note: Special error code 80 (location out of memory range) is displayed in the **MAAP** error code field after **EXECUTE** is depressed if the specific memory block, memory location, and ending block selected is not in the range of testable memory.

5. To start Test 5, depress **EXECUTE**.

PROC 614 Test 5 and Test 6

- 6. When **EXECUTE** is depressed, the contents of the first memory location selected for testing is displayed in Field 6 for the on-line common control (indicated by a 0 in Field 5). The memory area of the memory location is displayed in Field 7.
- 7. Special error code 82 (use **PROC 613** to clear duplication channel failures) is displayed in the **MAAP** error code field if failure code 4 (duplication channel error) is detected.

Note: PROC 613 is used to correct duplication channel errors.

8. Depressing **NEXT DATA** displays (in Field 6) the contents of the off-line common control (indicated by a 1 in Field 5) for the same memory location.

Note: If the switch is unduplicated, only the on-line common control can be read.

- 9. Depressing **NEXT DATA** steps through the memory range selected for testing (displayed in Fields 2 through 4) one at a time, alternating between the on-line common control (0 in Field 5) and the off-line common control (1 in Field 5), each time **NEXT DATA** is depressed.
- 10. When all main memory locations selected for testing are displayed, depressing **NEXT DATA** once more dashes Fields 2 and 3. Field 4 displays the ending memory block selected for testing.

Depressing **NEXT DATA** again, starts the display over at the first memory location selected for testing.

Test 6

Test 6 performs an ID chip test then tests the supersets of cache memory continuously.

1. Test 6 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 6; ENTER.

2. When Test 6 is initially called in, Field 3 displays a 0.

Field 3 is blinking indicating an optional entry field.

3. A starting cache superset can be selected for testing or the entire cache superset can be tested.

To test the entire cache superset, proceed to Step 5.

4. To start Test 6 from a specific cache superset, perform one of the following:

ENTER; (Starting cache superset to be tested); ENTER.

CHANGE FIELD; 3; ENTER; (Starting cache superset to be tested); ENTER.

Note: Test 6 starts from the cache superset entered and tests the remainder of the cache superset. If no failures are detected, Test 6 starts over from the beginning of the cache superset (0) and continuously tests the entire cache superset.

Proceed to Step 5.

- 5. To start Test 6 after selecting the cache superset to be tested, depress EXECUTE.
- 6. The testing interval is determined by maintenance personnel performing the test (as long as no failures are detected), and is ended by depressing **STOP**.

- 7. While Test 6 is executing and no failures are detected, Field 3 is updated with the number of times the entire cached superset is tested and Field 8 displays a 0 (indicating no failures).
- 8. If a cache superset failure is detected, Test 6 is stopped automatically and the following is displayed:

Field 1 - 6.

Field 2 - Dashed.

Field 3 - Cache superset failing.

Fields 4 through 7 - Dashed.

Field 8 - Failure code.

9. Depressing **EXECUTE** starts Test 6 from the failing cache superset displayed in Field 6.

If the same cache superset fails again, Test 6 stops. Field 3 displays the failing cache superset and Field 8 displays the failure code associated with the failing cache superset.

10. If the same cache superset does not fail, Test 6 continues testing the entire cache superset until a failure is detected, or until Test 6 is halted by depressing **STOP**.

Field 3 is updated with the number of times the entire cache superset is tested without a failure detected.

Repair Guide

When a memory read/memory match failure is indicated, **PROC 614** referenced from **PROC 600** as the cause for the **MEM** and/or **CACHE MEMORY** fault indicator(s) being lighted, perform the following steps, in the order listed, to isolate and repair the faulty unit.

- 1. Execute Test 1 and record the failure history generated by the on-line periodic maintenance software.
- 2. Execute Test 2.

Test 2 runs a variable length of time depending on the switch memory configuration.

- 3. If Test 2 passes, perform Test 4 (continuous test) on each memory block and address displayed in Test 1 to ensure no intermittent failures exist.
- 4. If Test 2 fails, perform Test 3 on the area of memory where the failure occurred (i.e., patch, program, translation, other, or any combination of the four areas).
- 5. Record the failure code displayed in Field 8 for the failed memory block and location detected in Test 3.
- 6. Isolation and repair steps for the failure codes are detailed in:

Failure Code 1. Failure Codes 2, 3, 6, 7, or 8. Failure Code 4. Failure Code 5 or 16. Failure Codes 10 through 15.

Failure Code 1 (Memory mismatch).

The repair guide for failure code 1 is presented in two parts; the translation repair guide (memory area encodes 4 through 7 or 12 through 15) and the patch/program repair guide (memory area encodes 1 through 3 or 9 through 11).

Good customer service is defined as follows:

- 1. The most recent changes made to the switch are added and are working properly.
- 2. No trouble reports exist.
- 3. Attendant consoles are not malfunctioning.
- 4. An abnormal number of status memory audit peg counts do not exist (refer to **PROC 600** Test 2, Unit type 43 to investigate status memory audit peg counts).
- 5. There are no initialization problems (refer to **PROC 612** to determine status of initialization problems).

Translation Repair Guide

1. Determine the status of customer service.

If customer service is good, proceed to Step 2.

If customer service is not good, proceed to Step 6.

- 2. Perform a run tape in the on-line processor and proceed to Step 3.
- 3. Load the off-line processor with the on-line tape by performing the following:

Remove the tape cartridge from the on-line minirecorder and install the tape cartridge into the off-line minirecorder.

Set the off-line processor's **TEST SELECT** switch to 15, depress the off-line processor's **RESET**, **ENABLE** and wait until the off-line processor completes reloading.

Remove the tape cartridge from the off-line minirecorder and install the tape cartridge into the on-line minirecorder.

4. Execute **PROC 614** Test 2, and check for a memory mismatch.

If the two processors match, proceed to Step 5.

If the two processors do no match, perform PROC~610 (tape test) in both processors to correct the problem.

5. Perform a run tape on the off-line tape by performing the following:

Install the original off-line tape cartridge into the off-line minirecorder.

Depress RUN TAPE, EXECUTE.

The **MEM** and/or **CACHE MEMORY** fault indicator is turned off when the memories match and no other failures are detected in Test 2.

6. Switch service to the off-line processor, by performing a hard switch.

Caution: A hard switch of common controls results in loss of service.

A hard switch of common controls is accomplished by setting the on-line common control's **GO/HALT** switch to **HALT**.

PROC 614

- 7. Set the new off-line processor's GO/HALT switch to the GO position.
- 8. Determine the status of customer service in the new on-line processor.

If customer service is good, go to Step 2 above.

If customer service is not good, proceed to Step 9.

9. Reload the new off-line processor by performing the following:

Set the off-line processor's **TEST SELECT** switch to 15, depress the off-line processor's **RESET**, **ENABLE** and wait until the off-line processor completes reloading.

Caution: A hard switch of common controls results in loss of service.

10. Perform a hard switch of common controls by setting the on-line common control **GO/HALT** switch to **HALT**.

Set the new off-line processor's GO/HALT switch to the GO position.

11. Determine the status of customer service in the new on-line processor.

If customer service is good, go to Step 3 above.

If customer service is not good, proceed to Step 12.

12. Reload the new off-line processor by performing the following:

Set the off-line processor's **TEST SELECT** switch to 15, depress the off-line processor's **RESET**, **ENABLE** and wait until the off-line processor completes reloading.

Caution: A hard switch of common controls results in loss of service.

13. Perform a hard switch of common controls by setting the on-line common control GO/HALT switch to HALT.

Set the new off-line processor's GO/HALT switch to the GO position.

14. Determine the status of customer service in the new on-line processor.

If customer service is good, go to Step 3 above.

If customer service is not good, proceed to Step 15.

15. At this point both processors are reloaded independently without achieving good customer service.

Start at Step 3 with backup tapes in an attempt to provide good customer service.

Patch and Program Repair Guide

Customer service must be good before proceeding with the patch and program repair guide. If customer service is not good, perform the translation repair guide first.

If customer service is good or if the translation repair guide fails to provide good customer service, proceed with Step 1 below.

1. Find the total number of patches on both the on-line and off-line common control tapes by using **PROC 490**.

If both tapes have the same number of patches, proceed to Step 5.

If both tapes do not have the same number of patches, proceed to Step 2.

- 2. Add the missing patches to the appropriate tape using PROC 490.
- 3. Reload the appropriate common control by performing the following:

Set the **TEST SELECT** switch to 15, depress **RESET**, **ENABLE** and wait until the processor completes reloading.

4. Execute PROC 614 Test 2, and check for a memory mismatch.

If a mismatch still exists, use **PROC 610** (tape test) to isolate the problem to the tape or minirecorder area.

If there are no mismatches, repair is complete.

The MEM and/or CACHE MEMORY fault indicator is turned off when the memories match and no other failures are detected in Test 2.

5. If the problem is in the program memory area only (encode 1 displayed in Field 7), proceed to Step 6.

If the problem is in the patch memory area only (encode 2 displayed in Field 7) or in the program and patch memory area (encode 3 displayed in Field 7), proceed to Step 14.

6. Acquire second level maintenance assistance to determine which processor is in error.

Correct the failing processor using PROC 999.

7. Reload the appropriate common control by performing the following:

Set the **TEST SELECT** switch to 15, depress **RESET**, **ENABLE** and wait until the processor completes reloading.

8. Execute **PROC 614** Test 3, and check for a memory mismatch.

If there are no mismatches, proceed to Step 11.

If a mismatch still exists, proceed to Step 9.

9. Reload the incorrect common control with the tape from the correct common control by performing the following:

Remove the tape cartridge from the correct common control minirecorder and install the tape cartridge into the incorrect common control minirecorder.

Set the **TEST SELECT** switch to 15, depress **RESET**, **ENABLE** and wait until the processor completes reloading.

Remove the tape cartridge from the incorrect common control minirecorder and install the tape cartridge into the correct common control minirecorder.

10. Execute **PROC 614** Test 3, and check for a memory mismatch.

If there are no mismatches, the tape in the incorrect common control is probably defective. Replace the tape and rerun the test from the beginning.

If a mismatch still exists, use **PROC 610** (tape test) to isolate the problem to the tape or minirecorder area on the incorrect common control.

11. Execute **PROC 614** Test 4 on the failed memory locations.

If the two tapes match, the error was probably intermittent and repair is complete.

If the two tapes mismatch, proceed to Step 12.

12. Replace the defective memory board.

The memory block displayed in Field 2 indicates which memory board to replace, i.e., if Field 2 = 0, replace memory board in Slot 07 of the common control.

- Reload the tape and execute PROC 614 Test 2 to resolve the memory mismatch cause of the MEM and/or CACHE MEMORY fault indicator.
- 14. Execute **PROC 614** Test 3 and determine which patch is missing from the defective tape by counting the number of failed locations.
- 15. Add the missing patch to the defective tape by using PROC 490.
- 16. Reload both tapes, and execute PROC 614 Test 2 to check for a memory mismatch.

If both tapes match, repair is complete.

The **MEM** and/or **CACHE MEMORY** fault indicator is turned off when the memories match and no other failures are detected in Test 2.

17. If the two tapes still mismatch, execute PROC 610 (tape test) on both common controls.

Suspect a defective tape drive.

Failure Codes 2, 3, 6, 7, or 8 (Memory failures).

1. Replace circuit pack TN392 associated with the memory block displayed in Field 2.

Memory circuit packs in the common control carrier correspond to block numbers as listed in Step 2.

 Block numbers and slot numbers are on a 4 to 1 basis when TN392 is installed in the common control carrier. Block numbers 0 through 31 displayed in Field 2 correspond to slot numbers 07 through 14 in the common control carrier.

Note: If the block number displayed in Field 2 = 4 through 7, the slot number of the TN392 circuit pack to be replaced in the common control carrier = 08.

- 3. Repeat Test 3 on the memory block and location that failed with a failure code of 2, 3, 6, 7, or 8.
- If Test 3 passes, perform Test 2 of PROC 614 to turn off the MEM and/or CACHE MEMORY fault indicator(s).
- 5. If Test 3 fails, check the wiring associated with the replaced circuit pack.

Failure Code 4 (Parity error).

- 1. Record the memory block and location displayed in Fields 2 and 3.
- 2. Perform **PROC 613** (Duplicate processor control and test) to determine the cause of the parity error.

Failure Code 5 or 16 (1/O failures).

- Perform PROC 600 (Alarm causes/error log) Test 2, and check for common control I/O failures (unit type 4).
- 2. Perform PROC 611 (Common control tests) Test 2, on the circuits displayed in Test 1 or 2 of PROC 600.

- 3. Perform corrective action (as appropriate) on failing I/O circuits.
- 4. Enter **PROC 614** Test 4 and continuously test the memory block and location that failed Test 3 with a failure code of 5 or 16.
- 5. If the memory block and location now passes, perform Test 2 of **PROC 614** to turn off the **MEM** and/or **CACHE MEMORY** fault indicator(s).

If the memory block and location fails, check the wiring between the memory or cache circuit and the common control interface.

Failure Codes 10 through 15 (Cache failures).

1. Replace TN369 in slot 04 of the common control carrier.

Repeat Test 3 on the memory block and location that failed with a failure code of 10 through 15.

- 2. If Test 3 passes, perform Test 2 of **PROC 614** to turn off the **MEM** and/or **CACHE MEMORY** fault indicator(s).
- 3. If Test 3 fails, replace UN153 in slot 03 of the common control carrier.

Repeat Test 3 on the memory block and location that failed with a failure code of 10 through 15.

- 4. If Test 3 passes, perform Test 2 of **PROC 614** to turn off the **MEM** and/or **CACHE MEMORY** fault indicator(s).
- 5. If Test 3 fails, check the wiring associated with the replaced circuit packs.

PROC 615 - MAAP TEST

FL IS	IPCH SUE	ART 1			+	-			+				MAA	P·TE	ST					+			+			
TES	r 1:			TEST	2:			TE	ST 3	:			TES	ST 4:				TEST	5:					NC	TES:	
TES DISE USE TO DISE NUME	F DIG PLAYS, 'NEXI INCREM PLAYED BER.	TAL T DAT MENT	Α'	TESTS SHOWN USE I KEYS DISPL	CONTI ON F NDICA TO CH AY FR	ROL KE Lip Ch Ted Co Ange DM 0 1	EYS HART. DNTROL TO 1.	TE KE D3 KE D3	ESTS (EY 1-5 ISPLAY EY NUR EY NUR IAL KI HE DIS	DIAL 1 9 TO 1 1 FROI 1BER. EYS TI SPLAY	KEYS. Changi 1 o ti USE I USE I D Chai From	USE E THE D THE OTHER NGE 0-1.	TES IN- INE USE TUF OR	STS BU -USE (DICAT(E 'NE) RN IN(OFF.	JSY OL S SEE DRS. KT DAT DICATO	JT, WJ Note Ta' to Drs of	чт, р	DISF USE TO F FIEL AL	LAYS CLEA ESET DS 2- L 0=) L 1=)	MAAP IR DAT Maap -25: Alarm Alarm	ALARM A', ' ALARM RESET SET	I STA1 Execu 1.	IUS. JTE'		IE TE AN ON HANGE VEXT	ST NUMBER Ly BE D By Test'
TEST	TEST 2					STOP	CLEAR DATA			NGRD.		rls Busy out	BUSY	REMOVE	ADD		CHANGE FIELD	NEXT	NEXT Fault	CHANGE	DISPLAY	EXECUTE	NEXT DATA	CIRCUIT		COMMON Control Tests
1	∾ TEST 3	1	2	3	4	5 7	6 8	7 9	8 10	9 11	CLEAR 15 Entry	0 13	ENTER 5	15	16	17	18	19	20	21	22	23	24	25		615

Purpose

PROC 615 is used when referenced from **PROC 600** (Alarm causes/error log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a transmission failure from or to the **MAAP**.

PROC 615 may also be used when a malfunction is suspected while using the MAAP.

Field Definitions and Codes

Each field of **PROC 615** flipchart and the possible displays for the fields during execution of the different tests are defined in Table V, PROC 615 - Field Definitions and Codes.

There are no optional input fields for PROC 615.

Operation of Procedure

Overview

PROC 615 is used to test the MAAP or its interface.

To call in PROC 615, perform the following:

- 1. Depress PROC NO; 615; ENTER.
- 2. Test 1 is automatically selected.
- Field 1 displays a 1 and all other fields (including the error code field) are dashed.
- 3. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

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TABLE V.

		PRO FIELD DEFINITION	C 615 DNS ANI	CODES	
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION
1	0-9	Digital Display (Test 1)	8	0-9	Digital display (Test 1).
	1-5	Test Number.			
2	0-9	Digital Display (Test 1).			CLEAR DATA control key display (Test 2):
Field	ls 3 throu	igh 25:		1	Pass test.
Fo	r Tests 1	through 4: 0 (after key pressed) = default or test failure			Dial key 6 display (Test 3):
Fo	r Test 5: () = OTHER FAILS alarm not set.		6	Pass test.
	:	I = OTHER FAILS alarm set.	9	0-9	Digital display (Test 1).
3	0-9	Digital display (Test 1).			Dial key 7 display (Test 3):
		Dial key 1 display (Test 3):		7	Pass test.
		Pass test.	10	0-9	Digital display (Test 1).
4	0-9	Digital key 1 display (Test 1):			Dial key 8 display (Test 3):
		Dial key 2 display (Test 3):		8	Pass test.
	2	Pass test.	11	0-9	Digital display (Test 1).
5	0-9	Digital display (Test 1).	4		WORD NO control key display
		Dial key 3 display (Test 3):			(Test 2):
	3	Pass test.		1	Pass test.
6	0-9	Digital display (Test 1).			Dial key 9 display (Test 3):
		Dial key 4 display (Test 3):	ļ	9	Pass test.
	4	Pass test.	12	0-9	Digital display (Test 1).
7	0-9	Digital display (Test 1).			Dial key CLEAR ENTRY display (Test 3):
	STOP control key display (Test 2):			1	Pass test.
	1	Pass test.			
		Dial key 5 display (Test 3):			
	5	Pass test.			

TABLE V. (Contd)

	PROC 615 FIELD DEFINITIONS AND CODES (Contd)										
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION						
13	0-9	Digital display (Test 1).	19		NEXT UNIT control key						
		RLS BUSY OUT control key display (Test 2):	(Conta)	1	Pass test						
	1	Pass test.	20	0-9	Digital display (Test 1)						
	1	Dial key 0 display (Test 3): Pass test.			NEXT FAULT control key display (Test 2):						
14	0-9	Digital display (Test 1).		1	Pass test						
		BUSY OUT control key display	21	0-9	Digital display (Test 1)						
	1	(Test 2): Pass test.			CHANGE control key display (Test 2):						
		Dial key ENTER display		1	Pass test						
		('Test 3):	22	0-9	Digital display (Test 1).						
15	1 0-9	Pass test. Digital display (Test 1).			DISPLAY control key display (Test 2):						
		REMOVE control key display		1	Pass test						
		(Test 2):	23	0-9	Digital display (Test 1)						
					EXECUTE control key						
10	0-9	Digital display (Test 1)	-	1	Pass test						
		(Test 2):		0_9	Digital display (Test 1)						
	1	Pass test			NEVE DATA						
17	0-9	Digital display (Test 1)			display (Test 2):						
18	0-9	Digital display (Test 1)		1	Pass test						
		CHANGE FIELD control key	25	0-9	Digital display (Test 1)						
	1	display (Test 2): Pass test			NEXT CIRCUIT control key display (Test 2):						
19	0-9	Digital display (Test 1)		1	Pass test						

Five tests are available:

- 1. Test 1 Tests MAAP digital readouts.
- 2. Test 2 Tests MAAP control keys.
- 3. Test 3 Tests MAAP dial keys.
- 4. Test 4 Tests MAAP indicators BUSY OUT, WAIT, SEE NOTE, and IN USE.
- 5. Test 5 Tests for a transmission failure.

Test 1

Test 1 displays all digits in Fields 1 through 25, and two digits in the error code field.

1. Test 1 is the default test when entering PROC 615 or is selected by use of NEXT TEST.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 1.

2. To start Test 1, depress EXECUTE.

When **EXECUTE** is depressed, 0s are displayed in all **MAAP** fields including the error code field.

3. Depressing NEXT DATA increments the display to all 1s.

Each depression of NEXT DATA increments the display from all 0s through all 9s.

4. Depressing **NEXT DATA** after all 9s are displayed causes Test 1 to be executed, starting the sequence over. Field 1 displays a 1 and all other fields (including the error code field) are dashed.

Test 2

Test 2 tests all control keys except PROC NO, RESET, and NEXT TEST.

Caution: Do not attempt to test RUN TAPE using this procedure.

- 1. Test 2 is selected by use of NEXT TEST.
 - Note: Use of the CHANGE FIELD sequence is not valid to select Test 2.
- 2. To start Test 2, depress EXECUTE.

Depressing **EXECUTE** displays a 1 in Field 23 to indicate proper operation of the **EXECUTE** key, and displays 0s in the other control key fields (Fields 7, 8, 11, 13 through 16, 18 through 22, 24 and 25).

3. Depress the other control keys in the following order and note the transition from 0 to 1, in the appropriate field, which indicates proper operation of the control keys.

Note: Special error code 06 is displayed in the error code field when keys other than control keys are depressed.

STOP - Field 7.

CLEAR DATA - Field 8.

WORD NO - Field 11.

RLS BUSY OUT - Field 13.

BUSY OUT - Field 14.

REMOVE - Field 15.

ADD - Field 16.

CHANGE FIELD - Field 18.

NEXT UNIT - Field 19.

NEXT FAULT - Field 20.

CHANGE - Field 21.

DISPLAY - Field 22.

NEXT DATA - Field 24.

NEXT CIRCUIT - Field 25.

Test 3

Test 3 tests all dial keys.

1. Test 3 is selected by use of NEXT TEST.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 3.

2. To start Test 3, depress EXECUTE.

Zeros (0s) are displayed in Fields 3 through 14 after **EXECUTE** is depressed.

3. Depress each of the dial keys. If the dial key depressed operates properly, the correct number is displayed in the appropriate field as follows:

Dial key 1 - Field 3 display = 1.

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Dial key 2 - Field 4 display = 2.
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Dial key 3 - Field 5 display = 3.

Dial key 4 - Field 6 display = 4.

Dial key 5 - Field 7 display = 5.

Dial key 6 - Field 8 display = 6.

Dial key 7 - Field 9 display = 7.

Dial key 8 - Field 10 display = 8.

Dial key 9 - Field 11 display = 9.

Dial key CLEAR ENTRY - Field 12 display = 1.

Dial key 0 - Field 13 display = 1.

Dial key **ENTER** - Field 14 display = 1.

PROC 615 Test 4 and Test 5

Test 4

Test 4 tests the IN USE, SEE NOTE, BUSY OUT, and WAIT indicators.

1. Test 4 is selected by use of **NEXT TEST**.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 4.

2. To start Test 4, depress EXECUTE.

When **EXECUTE** is depressed, the **IN USE**, **SEE NOTE**, **BUSY OUT**, and **WAIT** indicators on the **MAAP** turn on.

- 3. Depressing NEXT DATA alternately turns the MAAP indicators on and off.
- 4. When exiting Test 4, the indicators return to their original state.

Test 5

Test 5 displays the MAAP alarm status and can be used to turn off the OTHER FAILS fault indicator.

1. Test 5 is selected by use of **NEXT TEST**.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 5.

- 2. To start Test 5, depress EXECUTE.
- 3. When **EXECUTE** is depressed:

Ones (1s) are displayed in all fields if the **OTHER FAILS** fault indicator is set because of a **MAAP** failure.

Zeros (0s) are displayed in all fields if the **OTHER FAILS** fault indicator is not caused by a **MAAP** failure.

Note: The OTHER FAILS fault indicator can be turned on by other failures in the system.

4. To turn off the **OTHER FAILS** fault indicator when 1s are displayed in all fields (assuming no other sources are affecting the **OTHER FAILS** fault indicator) after Test 5 is executed at least once, perform the following:

Depress CLEAR DATA; EXECUTE.

Note: The MAAP alarmed entries in PMIDS are marked as resolved.

PROC 615

Repair Guide

When a transmission failure is indicated, **PROC 615** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted, perform the following steps in the order listed.

- 1. Replace TN403 (dual-speed data channel) associated with the MAAP.
- 2. Execute Tests 1 through 4 to verify correct operation of the MAAP.
- 3. Execute Test 5 to determine if the OTHER FAILS fault indicator is still set.
- 4. If a failure is still indicated, check the cabling and wiring between TN403 and the MAAP connector.

When a malfunction of the MAAP is suspected, perform the following steps in the order listed.

1. At the alarm panel, check the MAAP circuit breaker.

If the circuit breaker is not tripped, proceed to Step 3.

If the circuit breaker is tripped, proceed to Step 2.

2. Reset the MAAP circuit breaker.

If the circuit breaker trips again, check the cabling and wiring between the MAAP connector and the circuit breaker.

3. Execute Tests 1 through 4 to verify the extent of the problem.

If a limited number of failures is indicated, replace the MAAP.

If complete failure is indicated, replace the TN403 associated with the **MAAP**. Repeat Tests 1 through 4. If a failure is still indicated, replace the **MAAP**.

4. Repeat Tests 1 through 5. If a failure is still indicated, check the cabling and wiring between TN403 and the **MAAP** connector.

PROC 616 - ALARM PANEL TEST

FL IS	IPCH SUE	ART 2			-	+			+			AL	ARM	PAN	IEL T	EST				+			+					
TES SIM FLI USE	T 1: ULTAN P CHA 'NEX	EOUSL RT. T DAT	Y TES A' TC	TS AL	L INC	ICATO	rs Sh Is On	OWN O	N	TES IND A 1 USE USE FIE	I 2: IVIDU/ /2 SE 'NEX CHANI LD ANI	ALLY 1 Cond (T data Ge sec D ente	TESTS DN/OFI A' TO DUENCI ER A '	INDIG F RATI ADVA E TO : VALUE	CATORS E. NCE TI SELEC OF 1	S BY F O Nex' T A SF	LASHI I IND PECIF:	ING TI ICATO IC	HEM A	SР 80 ВА	ECIAL -UNAB CKGRC	. Erro	DR COL D DISA TESTS	DE: NBLE	AAOF	AND	DP	
1												TES	ST 2			_											COMMON	v
		ALARM	S		PRO	DCESSO	IR/MEM	ORY		ATND	CNSL	ENV	CC	OM CN	TRL		NET	WORK		APPL	PROC		OTHE	2			CONTRO	L
TEST NO	MAJOR	MINOR	ARNING	MAJOR CI PROC	PROC	NEE E 7	a DIAG	bASS 0	E FAIL	ACK	EXTERNAL 5 ACK	PUR/IMP 55 AIRFLOW	14PE	CACHE CACHE 51 MEMORY	1/0 CHANNEL	CIASUNU 17	E SWITCH	180d 19	DERIPH DE EQPT	C AP INTER	R EXT PROC	DTHER C FAILS	1403 24	RMATS S DIAC			616	•

Purpose

PROC 616 is used when there is a suspected malfunction in one or more of the software controlled alarm panel indicators.

PROC 616 displays the test states of the alarms (major, minor, warning), and processor/memory, attendant console, environment, common control, network, applications processor, and other fault indicators.

Maintenance personnel **must** be at the customer's premises to determine if the indicators are actually lighted when this maintenance procedure is executed.

The Automatic Alarm Origination Feature (AAOF) and the diagnostic background tests are disabled when performing **PROC 616**.

Field Definitions and Codes

Each field of **PROC 616** flipchart and the possible displays for the fields during execution of the different tests are defined in Table W, PROC 616 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Fields 2 through 25 Select indicator to be tested (Test 2 only).

Note: Field 17 is unused.

TABLE W.

	PROC 616 FIELD DEFINITIONS AND CODES										
FIELD CODE DEFINITION											
1	1, 2	Test number.									
2-16	0	Indicator is off.									
and 18-25	1	Test 1: Indicator is on. Test 2: Indicator is flashing.									
	dash	Alarm indicator is under on-line control.									
17	dash	Unused									

Operation of Procedure

Overview

PROC 616 is used to test the alarm panel indicators.

To call in **PROC 616**, perform the following:

1. Depress PROC NO; 616; ENTER.

2. Test 1 is automatically selected.

Field 1 displays a 1 and all other fields are dashed.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Two tests are available:

- 1. Test 1 Simultaneously tests all software controlled indicators.
- 2. Test 2 Individually tests any or all of the software controlled indicators.

Test 1

Test 1 displays the status when testing all indicators simultaneously. The status is displayed in Fields 2 through 25.

1. Test 1 is the default test when entering PROC 616, or is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

-1

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k

2. To start Test 1, depress EXECUTE.

A 1 is displayed in Fields 2 through 16, a dash in Field 17, a 1 in Fields 18 through 25 and the alarm panel indicators corresponding to the fields on the flipchart are turned on.

3. MAAP display fields are grouped by alarm panel areas as follows:

Fields 2 through 4 = ALARMS.

Fields 5 through 10 = **PROCESSOR/MEMORY**.

Fields 11 and 12 = Attendant console.

Note: The ACK indicator is located on the attendant console and not on the alarm panel.

Field 13 = ENVIRONMENT.

Fields 14 through 16 = COMMON CONTROL.

Note: Field 17 is unused.

Fields 18 through 20 = NETWORK.

Fields 21 and 22 = APPLICATIONS PROCESSOR.

Field 23 through 25 = OTHER.

 Depressing NEXT DATA turns off all the alarm panel indicators and a 0 is displayed in Fields 2 through 16, and 18 through 25.

Note: When NEXT DATA is depressed a dash is displayed in Field 17 which is unused.

Depressing **NEXT DATA** again turns on all the indicators and a 1 is displayed in Fields 2 through 16, and 18 through 25.

5. Depressing **NEXT DATA** repeatedly alternates between 0 and 1 in each field and turns the indicators off and on.

Note: While the indicators are off, **PROC 616** allows brief flashes of the normal indicator outputs from the on-line programs.

- 6. Test 1 is stopped by depressing NEXT TEST or RESET.
- 7. When Test 1 is exited, all indicator outputs are restored to their previous state and the AAOF and background tests are enabled.

Test 2

Test 2 tests a specific indicator. Testing status is displayed in Fields 2 through 25.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

2. When Test 2 is selected, a flashing 1 is displayed in Field 2 indicating an optional entry field and all other fields contain 0s.

Note: Field 17 which is unused displays a dash.

3. Either the indicator associated with Field 2 can be tested or another indicator can be selected in one of three ways (Steps 4 through 6).

To test the indicator displayed in Field 2, proceed to Step 7.

4. Using **NEXT DATA** to increment to the indicator to be tested.

Note: A 1 is placed in the next field and the previous field changes to a 0 each time **NEXT DATA** is depressed.

Proceed to Step 7.

5. Depressing **ENTER** repeatedly to select the field corresponding to the indicator to be tested and entering a 1 as follows:

1, ENTER.

Note: A 0 is placed in Field 1 when the indicator to be tested is selected by use of ENTER.

Proceed to Step 7.

6. Using the change field sequence:

CHANGE FIELD; (Field number of indicator to be tested); ENTER; 1; ENTER.

Note: A 0 is placed in Field 1 when the indicator to be tested is selected by use of the **CHANGE FIELD** sequence.

Proceed to Step 7.

7. To start Test 2, after selecting the indicator to be tested, depress **EXECUTE**.

The associated indicator on the alarm panel turns on and off at a 1/2-second on, 1/2-second off rate.

- 8. While the selected indicator is off, **PROC 616** allows brief flashes of the normal indicator outputs from the on-line programs.
- 9. Depressing **NEXT DATA** repeatedly, after **EXECUTE** is depressed, causes the alarm panel indicators to be tested in the sequence shown on the flipchart beginning with the indicator after the one that was selected initially for testing.
- 10. Depressing **NEXT DATA** after all indicators are cycled through using **NEXT DATA** dashes Fields 2 through 25.

Depressing **NEXT DATA** again without depressing **EXECUTE**, begins the sequence over with the indicator associated with Field 2.

11. To select another indicator to test using the change field sequence requires the **EXECUTE** key to be depressed again to initiate the test for the new indicator.

Note: The previous field selected for testing is changed to a 0.

- 12. Test 2 is stopped by depressing NEXT TEST or RESET.
- 13. When Test 2 is exited, all indicator outputs are restored to their previous state and the AAOF and background tests are enabled.

Repair Guide

When an alarm panel malfunction is suspected, the following steps should be performed, in the order listed, to isolate and repair the faulty component.

- 1. Execute Test 1 to determine whether all the indicators respond to on/off control.
- 2. If interaction between two or more indicators is suspected, execute Test 2 and observe their individual operation.
- 3. If failures are observed, replace TN490 and repeat the appropriate test(s).

Caution: Replacement of the alarm panel takes the entire switch down.

4. If a failure is still indicated, tag the appropriate indicator(s) and replace the alarm panel when traffic permits.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the alarm panel.

5. When the alarm panel is replaced and failures still exist check the wiring between TN490 and the alarm panel.

When Test 1 is executed, or the ack and external ack fault indicators are tested in Test 2, check the ACK indicator on the attendant console.

- 1. If the ACK indicator is not lighted, replace TN490 and repeat the appropriate test(s).
- 2. If a failure is still indicated, tag the ACK indicator and replace console component lamp control and carrier when traffic permits.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of console components.

3. Repeat the appropriate test(s).

If a failure is still indicated, replace the console when traffic permits.

4. Repeat the appropriate test(s).

If a failure is still indicated, check the wiring between TN490 and the console.

PROC 620 - NETWORK PROCEDURE

FL: IS	IPCHART SUE 2	+	+ NE	ETWORK	PROCEDURE		+ +		
UNIT 6=Mi 7=Ti 8=Mi 10=TS 11=TS 12=I, 13=Pi 14=Pi 15=Pi	TYPE (FIELD 2): DOULE CONTROL CHANNEL SyMODULE PROCESSOR INTI INTERFACE DOULE CLOCK SI ALU SI PSTORE O BUS INTERFACE SS II JI	16-TONE PLANT 23-TMS/NTWK DUPLICATION 24-TT SEMDER 25-TT RECEIVER 26-METWORK 1/0 27-GPP 28-72(MFET)PORT 29-LINE CIRCUIT 31-AUX TONE PLANT	22-CO TRUNK 33-DID TRUMK 33-DID TRUMK 33-TIE TRUMK/DATA POM 44-ATRON CNSL INTF 45-AUXILTARY TRUNK 65-ATTENDANI COMFEREN 47-FACILITY TEST CIR 50-TMS CLOCK SOILLA: 51-LOCAL CLOCK TERMII 52-SYSTEM CLOCK SYNCI	RT CUIT TOR NATION HRONIZER	53=MULTIPLEXER 54=FAN OUT 55=MODULE INTERFACE 56=INTERMODULE DATA 57=LIGHT GUIDE INTEF 58=FAN IN 53=TMS MAINTENANCE 1 62=ANALOG/DIBITAL F/ TEST CIRCUIT 66=TONE DETECTOR 2	STORE RFACE INTERFACE ACILITY	68:0S-1 TRUNK INTERFACE 69-MULTIFUNCTIONA AMALOG TERMINA (MFAT) PORT 71:REMOTE MODULE INTERFACE 72:EIA INTERFACE 98-INSF 99:TSI	SPECIA 80-805 ALL 81-MES MOI 82-TES COP 83-SWI AV/ 84-DMI	LL ERROR CODES: YARELEASE BUSY NOT ONED FOR THIS UNIT SAGE TRANSMISSION TO DULE PROCESSOR FAILEC TO FRANGE NOT MPLETED TCH RESOURCES NOT VILABLE OS OVERFLOW
NORD 0	ALARM STATUS (FIELD 8): 0=ND ERRORS RECORDED 1=RAJDR 2=MTNOR 3=WARNING 4=ERRORS RECORDED 5=ALARM RESOLVED	CIRCUIT STATUS (FIELD 9): D=IDLE 1=ON-LINE & IN USE 2=OFF-LINE 3=MAINT BUSY 4=NOT PLUGGED IN OR UNABLE TO COMMUNICATE	FAULT CODE INDEX (FIELD 10): 1-SPECIFIC FAULT CODE	FAULT 9999=1 SEE D	CODE (FIELD 11): FAILURE DETECTED ON OTHER THAN TESTED CIRCUIT (TEST 5) DCUMENTATION	SPECIAL 85-NON-N SPECI 86-NO CI IN TH 87-MODUL SWITC 88-SEE C REPLA	ERROR CODES (CONT IETHORK EQUIP IFICATION RECUIT OF THIS TYP RE SPECIFIED RANGE E CONTROL CHED DURING TEST DOCUMENTATION FOR ACEMENT OF CIRCUIT	PACKS	NETWORK

FLIPCHART ISSUE 2		+			+			NETWO	RK PF	ROCEDUR	E		+		+		
TEST 1: PMIDS DISPLAY.	FAILURE H	ISTORY	TE	ST 2: ONE ONE OR M	ITER DRE C	ATION IRCUI	TESTI TS.	ING TES OF	T 3: C One dr	MORE CI	S TESTING	TI Al	EST 4: D ND VERIF	IAGNOSTIC ICATION	ANALYSIS	TEST VERI	5: CIRCUIT PACK
USE 'CLEAR DA RETIRE ALARMS	TA' 'EXECUI	re' 10	US	SE 'STOP' SE 'NEXT D	TO STI ATA'	OP THI TO DI	E TEST	T. FAILURE	INFORM	ATION LIS	STS.	CA DI BC	UTION: 1 SRUPT CA	EST 4 (VE ALLS IN PF R TEST.	RIFICATION ROGRESS FOR	I) AND R ALL F	TEST 5 WILL PORTS ON THE
USE 'NEXT FAU CAUTION: OPER CAUS	USE 'NEXT FAULT' TO DISPLAY MU CAUTION: OPERATING 'BUSY OUT' CAUSES ALL CALLS ON 1					ONE C INAL N BE DR	IRCUII 4ITH E OPPED	(TESTS Bridged A	3, 4 & PPEARA	5). NCES							
	TESTS	2 THR	OUGH	5						FAULT				TESTS 1-	3	\mathbf{T}	
	E		NT LC	DCATION]			1			N	UMBER OF	CIRCUITS R LESTED	NO OF CK	7	NETWORK
	1		~		-	٤S	ti si						TES	T 3	TESTS 36		
NO TYPE	MODULE	CABINE	carra CARRIE	SLOT	4 CIRCUI	alar Brati	cIRCI co STATI	INDEX	,	FAULT	CODE	11	NUMBER SINGLE TES	DF TIMES CIRCUIT TED	NO TIMES FAILED OF FAULT LIS IDX		620

The flipcharts shown are for R2V2. The R2V1 flipcharts are similar except that unit types 69, 71, and 72 are not included in R2V1.

In addition, Test 1 is not enabled for R2V1.

Purpose

PROC 620 is used when referenced from **PROC 600** (Alarm causes/error log) or when the **NETWORK SWITCH** and/or **PORT** and **MAJOR**, and/or **MINOR** alarm indicators on the alarm panel are lighted.

The hardware tested by **PROC 620** includes all of the digital network below the 4 MHZ data channel down to and including the ports and the TMS.

PROC 620 is used to:

- 1. Display failure history for any circuit in the digital network.
- 2. Provide the capability to manually turn off the fault indicator(s) activated because of digital network failures.

Network alarmed circuit failures in PMIDS are marked as resolved.

- 3. Test one or more circuits once and display the test results.
- 4. Test one or more circuits in a continuous cycle and display the test results.
- 5. Start with a specific equipment location and diagnose a problem to determine the true location of the fault.
- 6. Perform a verification test on a specific equipment location and turn the circuit packs' RED or GREEN LED on to indicate whether or not the problem is corrected.
- 7. Automatically turn off the fault indicator(s) when all circuits that raised an alarm are tested as good.

Note: Network alarmed circuit failures in PMIDS are marked as resolved.

Field Definitions and Codes

Each field of **PROC 620** flipchart and the possible displays for the fields during execution of the different tests are defined in Table X, PROC 620 - Field Definitions and Codes.

Note: Unit types 69, 71, and 72 are not displayed in R2V1.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Field 2 Select unit type (number designation of the functional unit of equipment) to be tested or displayed.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

3. Fields 3 through 7 - Select equipment location of a specific circuit, range of circuits, or all circuits in a unit type to be tested (Tests 2 through 5 only).

Operation of Procedure

Overview

PROC 620 is used to determine the cause of the **NETWORK SWITCH** and/or **PORT** and **MAJOR** or **MINOR** alarm indicators being lighted resulting from a digital network failure.

To call in **PROC 620**, perform the following:

- 1. Depress PROC NO; 620; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1 and all other fields are dashed.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

TABLE X.

PROC 620 FIELD DEFINITIONS AND CODES										
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION					
1	1-5	Test number	2 (Contd)	27	General purpose port (GPP)					
2	6-99	Unit Type: Number de- signation of the functional		28	72 Series (MFET) port					
		tested, or which is being		29	Line circuit					
			-	31	Auxiliary tone plant					
	6	TMS or module control channel		32	CO trunk (hardware)					
	7	TMS or module processor		33	DID trunk (hardware)					
	8	(scanner) Maintenance interface		34	TIE trunk/data port (hardware)					
	9	Module clock		44	Attendant console inter- face					
	10	Time slot interchanger (TSI) — ALU		45	Auxiliary trunk					
	11	Time slot interchanger		46	Attendant conference					
		(TSI) – PSTORE	-	47	Facility test circuit					
	12	I/O bus interface (IOBI) Port data store (PDS)		50	TMS clock oscillator (TCO)					
	14	Port control interface (PCI)		51	Local clock termination (LCT)					
	15	Port data interface (PDI)		52	System clock synchronizer (SCS)					
	16	Tone plant		53	Multiplexer (MPX)					
	23	TMS or network duplica- tion channel		54	Fan out (FO)					
	24	Touch-tone dialing		55	Module interface (MI)					
	25	sender Touch-tone dialing		. 56	Intermodule data store (IDS)					
	26	receiver Network I/O		57	Light guide interface (LGI)					

TABLE X. (Contd)

	PROC 620 FIELD DEFINITIONS AND CODES (Contd)												
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION								
2	58	Fan in (FI)	8	3	Warning								
(Contd)	59	TMS maintenance inter-	(Contd)	4	Errors recorded								
		face (TMIF)		5	Alarm resolved								
	62	Analog/Digital facility test circuit (ADFTC)	9	0-4	Circuit status of circuit being displayed								
	66	Tone detector 2		0	Idle								
	68	DS-1 trunk interface	-	1	On-line and in-use								
	69	Multifunction analog ter- minal (MFAT)		2	Off-line								
	71	Remote module interface	-	3	Maintenance busy								
	72	(RMI) EIA interface		4	Not plugged in or unable to communicate								
	98	TMS fabric (TMSF)	10		Fault code index:								
	99	Time slot interchanger	1	1	Specific fault code								
		(TSI)	11	0-999	Specific fault code								
3-7		Equipment location of dis- played circuit		9999	Failure detected on other than the tested circuit								
3	0-30	Module number			(Test 5)								
4	0-7	Cabinet number	12	0-9999	Number of circuits tested								
5	0-3	Carrier number			or number of times single circuit has been tested								
6	0-27	Slot number	10	0.00									
7	0-7	Circuit number (if any)	13	0-99	in a multicircuit test								
8.	0-5	Alarm status of circuit being displayed			OR Number of times that an individual circuit has								
	0	No errors recorded			failed a test								
	1	Major			Fault list index for an								
1	2	Minor			continuous testing								

PROC 620 Test 1

Five tests are available:

1. Test 1 - Displays failure history by severity of alarm, then within alarm level by unit type, and within unit type by circuit location.

Test 1 is also used to manually resolve individual digital network alarmed failures or all digital network alarmed failures which turns off the associated fault indicator(s).

- 2. Test 2 Tests one or more circuits, an individual unit type, or a range of circuits one time.
- 3. Test 3 Tests one or more circuits, an individual unit type, or a range of circuits continuously.
- 4. Test 4 Performs a diagnostic analysis and verification test on a specific equipment location.
- 5. Test 5 Performs a verification test on a specific equipment location.

Test 1

Test 1 is not enabled and cannot be executed for R2V1.

Test 1 provides a failure history of the digital network failures detected by on-line software.

Failures are displayed in alarm order serverity. Alarmed failures are displayed in descending order with major alarmed failures displayed first, entries with minor alarms second, and failures with warning alarms last. Entries in the failure history with errors recorded are displayed after all alarmed failures.

1. Within each alarm category failures are displayed by unit type priority.

Note: Entries with errors recorded are also displayed by unit type priority.

2. Unit type priority is assigned according to the order of their importance to service to the customer (most important to least important functional area) and are **not** in numerical order.

Test 1 is also used to manually turn off the **NETWORK SWITCH** and/or **PORT** fault indicator(s).

1. Test 1 is the default test when entering PROC 620 or is selected by using NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

- 2. To start Test 1, depress EXECUTE.
- 3. The PMIDS error log is sorted and a summary of the failures and/or entries with errors recorded are displayed.
- 4. If no failures and/or entries with errors recorded exist, the following summary is displayed:

Field 1 - 1.

Field 12 - 0 (Indicating no failures and/or entries with errors recorded).

- 5. If any failures and/or entries with errors recorded exist, the summary displays a 1 in Field 1 and the total number of failures and/or entries with errors recorded in Field 12.
- 6. Depressing **NEXT CIRCUIT** displays the first failure or entry with errors recorded as follows:

Field 1 - 1.

Field 2 - Unit type of displayed circuit.

Fields 3 through 7 - Equipment location of displayed circuit.

Field 8 - Alarm status of displayed circuit (1 = major, 2 = minor, 3 = warning, 4 = errors recorded).

Fields 9 and 10 - Dashed.

Field 11 - Specific fault code.

Field 12 - Total number of failures and/or entries with errors recorded.

Field 13 - Total number of times the circuit in Fields 2 through 7 failed or had errors recorded.

Note: Field 12 includes in its count the entry currently being displayed.

- 7. Failures for unit type 26 (Network I/O) are logged in PMIDS by ORing the current fault code with the one, if any, already logged for the specific location.
 - Table Y, PROC 620 Unit Type 26 (Network I/O) Specific Fault Code Definitions, defines the meaning of the current fault code, or the ORed fault code logged in PMIDS for unit type 26.

Note: The specific fault code displayed in Field 11 for unit type 26 (Network I/O) is not passed to Tests 2, 3, 4, or 5.

•	TABL	EY.
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	PROC 620 UNIT TYPE 26 NETWORK I/O SPECIFIC FAULT CODE DEFINITIONS (SFC)											
SFC +	SFC · DEFINITION											
3	SCAN_TSK_ERR	Scan task error										
129	CALL_PROC_ERR	Call processing error										
131	SCAN_TSK_ERR; CALL_PROC_ERR	Scan task error and call processing error										
257	NACK_RESPONSE	Negative acknowledgment response										
259	SCAN_TSK_ERR; NACK_RESPONSE	Scan task error and negative acknowledgment response										
385	CALL_PROC_ERR; NACK_RESPONSE	Call processing error and negative acknowledgment response										
387	SCAN_TSK_ERR; CALL_PROC_ERR; NACK_RESPONSE	Scan task error, call processing error, and negative ac- knowledgment response										

8. Depressing **NEXT CIRCUIT** repeatedly displays the remaining digital network failures and/or entries with errors recorded in the PMIDS error log.

Each time **NEXT CIRCUIT** is depressed, Field 12 is decremented by 1 to show the number of remaining failures and/or entries with errors recorded to be displayed.

Field 12 includes in its count the failure and/or entry with errors recorded being displayed.

9. Depressing **NEXT CIRCUIT** after all failures and/or entries with errors recorded are displayed dashes Fields 2 through 13.

Depressing **NEXT CIRCUIT** again causes the display sequence to start over beginning with the summary.

10. The **CLEAR DATA**; **EXECUTE** sequence is used to manually resolve individual alarmed digital network failures or all alarmed digital network failures after **EXECUTE** is used to initiate Test 1.

Note: When alarmed failures are resolved the circuits' failure history is not deleted from the PMIDS error log. The failure history is updated to show that the alarm status now equals 5 (alarm resolved).

The digital network failures which are resolved are those failures with an alarm status of 1, 2, or 3 displayed in Field 8.

11. To resolve individual digital network failures with an alarm status of 1, 2, or 3, perform the following:

Use **NEXT CIRCUIT** to display the alarmed failure on the **MAAP**.

Requirement: Individual digital network failures cannot be resolved unless the failing digital network circuit is displayed on the **MAAP**.

Depress CLEAR DATA; EXECUTE.

12. Field 8 (alarm status) displays a 5 indicating that the failing digital network circuit in PMIDS is marked as resolved.

The **NETWORK SWITCH** or **PORT** fault indicator associated with the failing digital network circuit is turned off if no other sources affecting the same fault indicator exist.

13. All digital network failures with an alarm status of 1, 2, or 3 can be resolved when the summary is initially displayed, i.e., upon entry to **PROC 620** Test 1, and after displaying and recording all alarmed digital network failures and then using **NEXT CIRCUIT** to display the summary.

Caution: The alarmed digital network failures should be displayed and recorded prior to resolving the alarmed failures and turning off their associated alarm and fault indicators in order that a record of the causes of the alarmed failures are available for maintenance personnel.

14. After entering Test 1 and depressing **EXECUTE** the summary is displayed.

Depress CLEAR DATA; EXECUTE.

15. Field 12 (total number of failures and/or entries with errors recorded) changes to indicate the number of digital network failures with an alarm status of 1, 2, or 3 which are resolved.

Alarmed digital network failures are marked as resolved in PMIDS and the **NETWORK SWITCH** and/or **PORT** fault indicator(s) is turned off.

16. After displaying and recording all digital network failures, depress **NEXT CIRCUIT** until the summary is displayed.

Then, depress CLEAR DATA; EXECUTE.

17. Field 12 (total number of failures and/or entries with errors recorded) changes to indicate the number of digital network failures with an alarm status of 1, 2, or 3 which are resolved.

Alarmed digital network failures are marked as resolved in PMIDS and the **NETWORK SWITCH** and/or **PORT** fault indicator(s) is turned off.

18. The **MAJOR** and/or **MINOR** alarm indicator(s) is also turned off when no other sources affecting the **MAJOR** and/or **MINOR** alarm indicator(s) is present.

Test 2

Test 2 is used to test one or more circuits in the digital network once and display the results of the test.

Circuits can be selected for testing by unit type, a range of equipment locations, or on a single circuit basis.

Test 2 automatically turns off the **NETWORK SWITCH** and/or **PORT** fault indicator(s) when all circuits that raised an alarm pass Test 2. Network circuit alarmed failures in PMIDS are marked as resolved.

Test 2 Data Entry

1. Test 2 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

2. When Test 2 is initially called in, a default equipment location and unit type may be displayed in Fields 2 through 7.

The alarm status, circuit status, and specific fault code associated with the default equipment location are displayed in Fields 8, 9, and 11.

Field 2 (unit type) is blinking, indicating an optional entry field.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

3. The default equipment location can be the last equipment location displayed in Tests 1, or 3 through 5 of **PROC 620** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.

The default equipment location can also be passed from other maintenance procedures, i.e.: **PROC 621, PROC 622, PROC 625, PROC 646**, and **PROC 647** as long as the equipment location is a network digital circuit and is still displayed in **PROC 621, PROC 622, PROC 625, PROC 646**, or **PROC 647** when it is passed.

4. All digital network circuits, a range of circuits, all circuits within a unit type, a combination of unit type and range (i.e., all circuit locations of a unit type in the range specified), a specific digital network circuit, or the default equipment location can be tested.

- 5. When attendant console interface circuits (unit type 44) are tested during range testing, the associated headset(s) or handset(s) **must** be unplugged or the circuits fail.
- 6. When unit type 45 (auxiliary trunks) is selected during range testing, one-way incoming and one-way outgoing auxiliary trunks will fail with a specific fault code of 316 (insufficient 600 ohm termination reflection possibly caused by an open transmission option switch).
- 7. When unit type 68 (DS-1) is selected during range testing, all DS-1 circuit packs not busied out will fail with a specific fault code of 785 (DS-1 not maintenance busy) unless each individual DS-1 circuit pack is busied out.

To select unit type 68 (DS-1) for range testing, proceed to Step 35.

8. To select the entire switch to be tested, Fields 2 through 7 must be dashed.

If no default equipment location is displayed, depress ENTER.

If a default equipment location is displayed, depress CHANGE FIELD; 2; ENTER; ENTER.

Test 2 starts with the first module, first cabinet and carrier and runs until all digital network circuits in the switch are tested.

Proceed to Step 1 of Test 2 Execution.

- 9. In addition to testing all network circuits in the entire switch, a range of digital network circuits (all network circuits in a module, cabinet, carrier, or slot) can also be selected for testing.
- 10. Selection of a range of circuits to be tested depends on whether or not a default equipment location is displayed.

If a default equipment location is displayed, the CHANGE FIELD sequence must be used.

If no default equipment location is displayed, **ENTER** or the **CHANGE FIELD** sequence is performed to select the range of circuits to be tested.

11. To select all network circuits in a module for testing, perform one of the following depending on whether or not a default equipment location is displayed:

ENTER; (Module number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; ENTER; (Module number to be tested); ENTER.

Test 2 starts with the first network circuit in the module selected and runs until all digital network circuits in the module are tested.

Proceed to Step 1 of Test 2 Execution.

12. To select all network circuits in a cabinet for testing, perform one of the following depending on whether or not a default equipment location is displayed:

ENTER; (Module number of cabinet to be tested); ENTER; (Cabinet number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; ENTER; (Module number of cabinet to be tested); ENTER; (Cabinet number to be tested); ENTER.

Test 2 starts with the first network circuit in the cabinet selected and runs until all digital network circuits in the cabinet are tested.

Proceed to Step 1 of Test 2 Execution.

13. To select all network circuits in a carrier for testing, perform one of the following depending on whether or not a default equipment location is displayed:

ENTER; (Module number of carrier to be tested); ENTER; (Cabinet number of carrier to be tested); ENTER; (Carrier number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; ENTER; (Module number of carrier to be tested); ENTER; (Cabinet number of carrier to be tested); ENTER; (Carrier number to be tested); ENTER.

Test 2 starts with the first network circuit in the carrier selected and runs until all digital network circuits in the carrier are tested.

Proceed to Step 1 of Test 2 Execution.

14. To select all network circuits in a slot for testing, perform one of the following depending on whether or not a default equipment location is displayed:

ENTER; (Module number of slot to be tested); ENTER; (Cabinet number of slot to be tested); ENTER; (Carrier number of slot to be tested); ENTER; (Slot number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; ENTER; (Module number of slot to be tested); ENTER; (Cabinet number of slot to be tested); ENTER; (Carrier number of slot to be tested); ENTER; (Slot number to be tested); ENTER.

Note: When a slot is specified to be tested, either all circuits on the circuit pack are tested, or if the circuit pack has no circuits, then the circuit pack is tested.

Test 2 starts with the first network circuit on the circuit pack selected and runs until all digital network circuits on the circuit pack are tested.

Proceed to Step 1 of Test 2 Execution.

15. To select all circuits within a unit type to be tested, the appropriate unit type must be entered in Field 2.

Note: Refer to Table Z, PROC 620 - Unit Type to Circuit Pack Identification, to determine which circuit pack(s) is tested for a particular unit type.

16. A unit type can be selected in several ways, i.e.: by depressing **NEXT UNIT** until the correct unit type is displayed, or by entering the unit type and depressing **ENTER**.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

- 17. When unit type 44 (attendant console interface) is selected for testing, the associated headset(s) or handset(s) **must** be unplugged or the circuits fail.
- 18. When unit type 45 (auxiliary trunks) is selected during range testing, one-way incoming and one-way outgoing auxiliary trunks **will** fail with a specific fault code of 316 (insufficient 600 ohm termination reflection possibly caused by an open transmission option switch).

TABLE Z.

5

PROC 620 UNIT TYPE TO CIRCUIT PACK IDENTIFICATION									
UNIT TYPE	DEFINITION	CIRCUIT PACK							
6	TMS or module control channel (MCC)	TN401							
7	TMS or module processor	TN381 or TN380							
8	Maintenance interface (MIF)	TN444							
9	Module clock	TN460							
10	Time slot interchanger (TSI) — ALU	TN446							
11	Time slot interchanger (TSI) – PSTORE	TN445							
12	I/O bus interface (IOBI)	TN400							
13	Port data store (PDS)	TN440							
14	Port control interface (PCI)	TN452							
15	Port data interface (PDI)	TN454							
16 .	Tone plant	SN250							
23	TMS or network duplication/update channel	TN530							
24	Touch-tone dialing sender	SN252							
25	Touch-tone dialing receiver	SN251							
26	Network I/O	Not applicable							
27	General purpose port (GPP)	SN270							
28	72 Series (MFET) port	SN224							
29	Line circuit	SN228 or SN229							
31	Auxiliary tone plant	SN253							
32	CO trunk (hardware)	SN230							
- 33	DID trunk (hardware)	SN232							
34	TIE trunk/data port (hardware)	SN233 or SN243							
TABLE Z. (Contd)

PROC 620 UNIT TYPE TO CIRCUIT PACK IDENTIFICATION (Contd)		
UNIT TYPE	DEFINITION	CIRCUIT PACK
44	Attendant console interface	SN233
45	Auxiliary trunk (hardware)	SN231
46	Attendant conference	SN254
47	Facility test circuit	SN260
50	TMS clock oscillator (TCO)	TN461
51	Local clock termination (LCT)	TN462
52	System clock synchronizer (SCS)	TN463
53	Multiplexer (MPX)	TN470
54	Fan out (FO)	TN473
55	Module interface	TN480
56	Intermodule data store	TN441
57	Light guide interface (LGI)	TN481
58	Fan in (FI)	UN150
59	TMS maintenance interface (TMIF)	TN482
62	Analog/Digital facility test circuit (ADFTC)	SN261
66	Tone detector 2	SN255
68	DS-1 trunk interface	ANN11
69	Multifunction analog terminal (MFAT)	ANN17
71	Remote module interface (RMI)	TN456
72	EIA interface	SN238

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PROC 620 Test 2

19. When unit type 68 (DS-1) is to be selected for testing, proceed to Step 35.

Do not perform steps 20 through 25 to select unit type 68 (DS-1) to test all unit type 68 circuit packs in the switch, module, cabinet, carrier, or slot.

Note: When unit type 68 (DS-1) is selected during range testing, all DS-1 circuit packs not busied out **will** fail with a specific fault code of 785 (DS-1 not maintenance busy) unless each individual DS-1 circuit pack is busied out.

20. If no default equipment location is displayed, enter the unit type (except unit type 68) to be tested in Field 2 and depress ENTER or use NEXT UNIT to step through the unit types in numerical sequence until the unit type to be tested is displayed in Field 2.

If a default equipment location is displayed, enter the unit type (except unit type 68) to be tested in Field 2 and depress ENTER.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

Test 2 starts with the first module, first cabinet and carrier, and runs until all digital network circuits of the unit type selected are tested.

Proceed to Step 1 of Test 2 Execution.

- 21. In addition to testing all network circuits in a specified unit type, a range of circuits for the unit type (all circuits for a unit type in a module, cabinet, carrier, or slot) can also be selected for testing.
- 22. To select all network circuits for a unit type (except unit type 68) in a module for testing, perform one of the following depending on whether or not a default equipment location is displayed:

(Unit type to be tested); ENTER; (Module number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; (Unit type to be tested); ENTER; (Module number to be tested); ENTER.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

Test 2 starts with the first network circuit of the unit type specified, in the module selected, and runs until all digital network circuits of the unit type in the module are tested.

Proceed to Step 1 of Test 2 Execution.

23. To select all network circuits for a unit type (except unit type 68) in a cabinet for testing, perform one of the following depending on whether or not a default equipment location is displayed:

(Unit type to be tested); ENTER; (Module number of cabinet to be tested); ENTER; (Cabinet number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; (Unit type to be tested); ENTER; (Module number of cabinet to be tested); ENTER; (Cabinet number to be tested); ENTER.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

Test 2 starts with the first network circuit of the unit type specified, in the cabinet selected, and runs until all digital network circuits of the unit type in the cabinet are tested.

Proceed to Step 1 of Test 2 Execution.

24. To select all network circuits for a unit type (except unit type 68) in a carrier for testing, perform one of the following depending on whether or not a default equipment location is displayed:

(Unit type to be tested); ENTER; (Module number of carrier to be tested); ENTER; (Cabinet number of carrier to be tested); ENTER; (Carrier number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; (Unit type to be tested); ENTER; (Module number of carrier to be tested); ENTER; (Cabinet number of carrier to be tested); ENTER; (Carrier number to be tested); ENTER.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

Test 2 starts with the first network circuit of the unit type specified, in the carrier selected, and runs until all digital network circuits of the unit type in the carrier are tested.

Proceed to Step 1 of Test 2 Execution.

25. To select all network circuits for a unit type in a slot (except unit type 68) for testing, perform one of the following depending on whether or not a default equipment location is displayed:

Note: When a slot is specified to be tested, either all circuits on the circuit pack are tested, or if the circuit pack has no circuits, then the circuit pack is tested.

(Unit type to be tested); ENTER; (Module number of slot to be tested); ENTER; (Cabinet number of slot to be tested); ENTER; (Carrier number of slot to be tested); ENTER; (Slot number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; (Unit type to be tested); ENTER; (Module number of slot to be tested); ENTER; (Cabinet number of slot to be tested); ENTER; (Carrier number of slot to be tested); ENTER; (Slot number to be tested); ENTER.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

Test 2 starts with the first network circuit of the unit type specified, in the slot selected, and runs until all digital network circuits of the unit type in the slot are tested.

Proceed to Step 1 of Test 2 Execution.

26. A specific network circuit can be selected for testing by performing one of the following depending on whether or not a default equipment location is displayed:

(Unit type of circuit to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; (Unit type of circuit to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

If the specific network circuit selected for testing is a unit type 68 circuit pack (DS-1) the maintenance busy out procedure listed in Steps 30 through 34 **must** be performed.

Proceed to Step 30.

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PROC 620 Test 2

27. The unit type field is an optional input field to test a specific network circuit.

If the unit type is unknown, **CLEAR ENTRY; ENTER** is used to clear any unit type displayed in Field 2, or **ENTER** is depressed when no unit type is displayed.

28. A specific network circuit can also be selected for testing whether or not a default equipment location is displayed by use of **NEXT UNIT** and **NEXT CIRCUIT**.

Depress **NEXT UNIT** until the unit type of the circuit to be tested is displayed in Field 2.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

Depress NEXT CIRCUIT until the circuit to be tested is displayed in Fields 3 through 7.

If the specific network circuit selected for testing is a unit type 68 circuit (DS-1) the maintenance busy out procedure listed in Steps 30 through 34 **must** be performed.

Proceed to Step 30.

29. To test the default equipment location displayed in Fields 2 through 7, proceed to Step 30.

If the default equipment location displayed in Fields 2 through 7 is a unit type 68 circuit pack (DS-1) the maintenance busy out procedure listed in Steps 30 through 34 **must** be performed.

Proceed to Step 30.

30. When a specific network circuit, default equipment location, or DS-1 circuit pack is to be tested, check the circuit status in Field 9.

If Field 9 equals 1 (on-line and in-use) Test 2 cannot be performed for port circuits. Wait until the circuit is not in-use or perform tests on other circuits.

Note: Port circuits that cannot be tested while in-use are unit types 24, 25, 27, 28, 29, 32, 33, 34, 44 through 47, 62, 66, 68, 69, 71, and 72.

If Field 9 equals 4 (unable to communicate or not plugged in), proceed to Step 31.

If Field 9 does not equal 4, proceed to Step 32.

- 31. If Test 2 is being performed remotely, proceed to Step 32.
 - . If Test 2 is being run locally (or with maintenance personnel on the customer's premises), determine if the circuit pack being tested is plugged in.

If the circuit pack is not plugged in or the slot is empty, reseat or install the circuit pack, then proceed to Step 32.

If the circuit pack is firmly seated, proceed to Step 32.

Caution: Busying out a port circuit results in loss of customer calls when the port circuit is in use. Busying out a DS-1 circuit pack disrupts calls in progress on all 24 ports of the DS-1 circuit pack.

- 32. Individual port circuits or DS-1 circuit packs can be placed in maintenance busy out status for testing by checking the circuit status in Field 9.
- 33. If Field 9 equals 1 (on-line and in-use) individual port circuits should not be busied out as Test 2 results may not be valid.

Note: Port circuits that should not be busied out while in-use are unit types 24, 25, 27, 28, 29, 32, 33, 34, 44 through 47, 62, 66, 68, 69, 71, and 72.

34. If the circuit status = 3, proceed to Step 1 of Test 2 Execution.

If the circuit status does not equal 3, depress \mathbf{BUSY} \mathbf{OUT} and proceed to Step 1 of Test 2 Execution.

Note: If the circuit within a unit type cannot be busied out, special error code 80 (busy/release busy not allowed for this unit) is displayed in the **MAAP** error code field.

35. When range testing of unit type 68 (DS-1) is being performed, each DS-1 circuit pack in the range selected for testing **must** be busied out.

Note: A DS-1 circuit pack that is not busied out fails the test with a specific fault code of 785 (DS-1 not maintenance busy).

- 36. Enter unit type 68 in Field 2 and depress ENTER.
- 37. Depress **NEXT CIRCUIT**.

The first DS-1 circuit pack in the first module is displayed in Fields 3 through 6.

Note: Field 7 (circuit) is dashed for a DS-1 circuit pack.

38. Determine the type of range testing to be performed for unit type 68 (DS-1).

If all DS-1 circuit packs are to be tested, proceed to Step 39.

If all DS-1 circuit packs in a module are to be tested, proceed to Step 43.

If all DS-1 circuit packs in a cabinet are to be tested, proceed to Step 48.

If all DS-1 circuit packs in a carrier are to be tested, proceed to Step 53.

If a DS-1 circuit pack in a particular slot is to be tested, proceed to Step 58.

- 39. If all DS-1 circuit packs are to be tested, perform Steps 30 through 34 above to busy out the DS-1 circuit pack displayed in Fields 3 through 6.
- 40. Depress **NEXT CIRCUIT** to display the next DS-1 circuit pack.

Note: When all DS-1 circuit packs are displayed, Fields 3 through 7 are dashed.

41. If Fields 3 through 7 are not dashed, repeat Steps 39 through 41.

If Fields 3 through 7 are dashed, proceed to Step 42.

42. Depress CHANGE FIELD; 3; ENTER.

Test 2 starts with the first module, first cabinet and carrier, and runs until all unit type 68 circuit packs are tested.

Proceed to Step 1 of Test 2 execution.

43. Determine if the module displayed in Field 3 is the module to be tested.

If the module displayed in Field 3 is to be tested, proceed to Step 44.

If the module displayed in Field 3 is not to be tested, depress **NEXT CIRCUIT** until the module to be tested is displayed in Field 3, then proceed to Step 44.

44. Perform Steps 30 through 34 above to busy out the DS-1 circuit pack in the module to be tested.

PROC 620 Test 2

45. Depress **NEXT CIRCUIT** to display the next DS-1 circuit pack.

Note: When all DS-1 circuit packs are displayed, Fields 3 through 7 are dashed.

46. Determine if the module being tested is still displayed in Field 3.

If the same module is displayed, repeat Steps 44 through 46.

If the same module is not displayed, proceed to Step 47.

47. Depress CHANGE FIELD; 4; ENTER.

Test 2 starts with the first DS-1 circuit pack in the module selected and runs until all unit type 68 circuit packs in the module are tested.

Proceed to Step 1 of Test 2 execution.

48. Determine if the module and cabinet displayed in Fields 3 and 4 is the module and cabinet to be tested.

If the module and cabinet displayed in Fields 3 and 4 is to be tested, proceed to Step 49.

If the module and cabinet displayed in Fields 3 and 4 is not to be tested, depress **NEXT CIRCUIT** until the module and cabinet to be tested is displayed in Fields 3 and 4, then proceed to Step 49.

- 49. Perform Steps 30 through 34 above to busy out the DS-1 circuit pack in the module and cabinet to be tested.
- 50. Depress NEXT CIRCUIT to display the next DS-1 circuit pack.

Note: When all DS-1 circuit packs are displayed, Fields 3 through 7 are dashed.

51. Determine if the module and cabinet being tested is still displayed in Fields 3 and 4.

If the same module and cabinet is displayed, repeat Steps 49 through 51.

If the same module and cabinet is not displayed, proceed to Step 52.

52. Depress CHANGE FIELD; 5; ENTER.

Test 2 starts with the first DS-1 circuit pack in the cabinet selected and runs until all unit type 68 circuit packs in the cabinet are tested.

Proceed to Step 1 of Test 2 execution.

53. Determine if the module, cabinet, and carrier displayed in Fields 3 through 5 is the module, cabinet, and carrier to be tested.

If the module, cabinet, and carrier displayed in Fields 3 through 5 is to be tested, proceed to Step 54.

If the module, cabinet, and carrier displayed in Fields 3 through 5 is not to be tested, depress **NEXT CURCUIT** until the module, cabinet, and carrier to be tested is displayed in Fields 3 through 5, then proceed to Step 54.

- 54. Perform Steps 30 through 34 above to busy out the DS-1 circuit pack in the module, cabinet, and carrier to be tested.
- 55. Depress **NEXT CIRCUIT** to display the next DS-1 circuit pack.

Note: When all DS-1 circuit packs are displayed, Fields 3 through 7 are dashed.

56. Determine if the module, cabinet, and carrier being tested is still displayed in Fields 3 through 5.

If the same module, cabinet, and carrier is displayed, repeat Steps 54 through 56.

If the same module, cabinet and carrier is not displayed, proceed to Step 57.

57. Depress CHANGE FIELD; 6; ENTER.

Test 2 starts with the first DS-1 circuit pack in the carrier selected and runs until all unit type 68 circuit packs in the carrier are tested.

Proceed to Step 1 of Test 2 execution.

58. Determine if the module, cabinet, carrier, and slot displayed in Fields 3 through 6 is the module, cabinet, carrier, and slot to be tested.

If the module, cabinet, carrier, and slot displayed in Fields 3 through 6 is to be tested, proceed to Step 59.

If the module, cabinet, carrier, and slot displayed in Fields 3 through 6 is not to be tested, depress **NEXT CIRCUIT** until the module, cabinet, carrier, and slot to be tested is displayed in Fields 3 through 6, then proceed to Step 59.

- 59. Perform Steps 30 through 34 above to busy out the DS-1 circuit pack in the module, cabinet, carrier, and slot to be tested.
- 60. Depress CHANGE FIELD; 7; ENTER.

Proceed to Step 1 of Test 2 execution.

Test 2 Execution

1. To start Test 2 after selecting the circuit(s) to be tested, depress **EXECUTE**.

The WAIT indicator on the MAAP is turned on.

- 2. Test 2 operation and display of test results is different when a specific network circuit, a default equipment location, or a DS-1 circuit pack is tested and when the entire switch or a range of circuits are tested.
- 3. For test operation and display of test results for a default equipment location, a specific network circuit, or a DS-1 circuit pack proceed to Step 1 of Test 2 Execution and Test Result Display for a Single Circuit.
- 4. For test operation and display of test results for the entire switch or a range of circuits, proceed to Step 1 of Test 2 Execution and Test Result Display for a Range of Circuits.

Test 2 Execution and Test Result Display for a Single Circuit

- 1. Special error codes 81 or 83 may be displayed in the **MAAP** error code field and the test is terminated when the default equipment location or the specific network digital circuit cannot be tested.
- 2. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 2. If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7.
- 3. When special error code 83 (switch resources not available) is displayed, repeat Test 2 until the test is executed or wait until switch resources become available before testing.
- 4. If special error code 81 or 83 is not displayed, proceed to Step 5.

5. When the test is completed for a default equipment location, a specific circuit, or a DS-1 circuit pack the **WAIT** indicator is turned off and the following is displayed:

Field 1 - 2.

Fields 2 through 7 - Unit type and equipment location of circuit tested.

Note: Unit types 69, 71, and 72 are not displayed in R2V1.

Field 8 - Alarm status of displayed circuit.

Field 9 - Current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

Field 10 - Dashed.

Field 11 - Dashed.

Field 12 - 1 (Indicating one circuit tested).

Field 13 - 0 (Indicating no failures were found for the circuit tested) or 1 (Indicating that the circuit failed the test).

- 6. When a specific circuit, a default equipment location, or a DS-1 circuit pack fails Test 2 (indicated by a 1 in Field 13), depressing **NEXT CIRCUIT** displays the index and specific fault code recorded for the circuit tested in Fields 10 and 11.
- 7. When the default equipment location, specific circuit, or DS-1 circuit pack previously tested was busied out and the test passed, or the problem was corrected, the circuit, or circuit pack should be released from busy using **RLS BUSY OUT**.
- 8. When another specific circuit is to be tested, the **CHANGE FIELD** sequence must be used to select the specific circuit:

CHANGE FIELD; 2; ENTER; (Unit type of circuit to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

9. **EXECUTE** must be depressed to test the specific circuit selected.

Test 2 Execution and Test Result Display for a Range of Circuits

1. When the entire switch or a range of circuits is being tested for digital network failures, the **WAIT** indicator is turned on and the following fields are incremented as a circuit is tested:

Field 2 - Unit type of circuit being tested.

Note: Unit types 69, 71, and 72 are not displayed in R2V1.

Fields 3 through 7 - Equipment location of circuit being tested.

Note: When a range of circuits for a particular unit type is being tested and the unit type contains only one circuit pack, the display in Fields 2 through 7 may not be changing.

Field 10 - Index (if any).

Field 11 - Specific fault code (if any).

Field 12 - Number of circuits tested.

Field 13 - Number of circuits failed (if any).

. 2. The failure information returned in Test 2 is stored in the Demand Maintenance Information Data Structure (DMIDS).

If DMIDS becomes full at any time during the test, Test 2 is stopped and the **WAIT** indicator is turned off.

The last equipment location tested is displayed in Fields 2 through 7, and special error code 84 (DMIDS overflow) is displayed in the **MAAP** error code field.

3. Results of the test can be examined at this time (See Steps 14 through 20 below) and Test 2 can be continued from where it was stopped, i.e., from the equipment location displayed in Fields 3 through 7.

Caution: If Test 2 is continued from where it was stopped by a DMIDS overflow, any test results gathered to that point are lost and only new failure data is retained.

Note: Before depressing **EXECUTE** to continue Test 2 from where it was stopped because of a DMIDS overflow, the failure data should be examined and recorded.

4. If the test is halted because of a DMIDS overflow, a new range of circuits to be tested can be entered instead of continuing Test 2 from where it was stopped.

The CHANGE FIELD sequence must be used to enter the new range of circuits to be tested.

Refer to Steps 11 through 14 of Test 2 Data Entry above to select a range of digital network circuits to be tested in a module, cabinet, carrier, or slot.

Refer to Steps 22 through 25 of Test 2 Data Entry above to select a range of digital network circuits within a unit type (except unit type 68) to be tested in a module, cabinet, carrier, or slot.

Refer to Steps 35 through 60 of Test 2 Data Entry above to sclect a range of unit type 68 (DS-1) circuit packs to be tested in a module, cabinet, carrier, or slot.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

- 5. **EXECUTE** must be depressed to begin Test 2 from the new range of circuits entered or from where Test 2 was stopped.
- 6. When more than one circuit is being tested and the test of the circuit cannot be completed because switch resources are not available, special error code 83 (switch resources not available) is displayed in the **MAAP** error code field.

A fault code indicating resources were not available is stored in DMIDS and the next circuit is tested.

7. When a range of circuits is being tested and a circuit is encountered which is being used by call processing, the **IN USE** indicator on the **MAAP** is turned on momentarily when the display is updated and the in-use circuit is stored for a later retry.

PROC 620 Test 2

8. When the range of circuits specified is tested once, the stored in-use circuit locations are tried again following the same testing sequence as the first pass through the range of circuits.

The in-use list may be reduced to a few circuits which remain in-use by call processing. This condition can be recognized by the **IN USE** indicator on the **MAAP** remaining on and the display fields not changing or changing very slowly.

The test of in-use circuits continues until all circuits in the range specified are tested or until maintenance personnel halt Test 2 by depressing **STOP**.

9. When Test 2 is halted by depressing **STOP** and in-use circuits still exist, the list of in-use circuits are merged into the failed circuits list and the circuits are marked with a specific fault code of 13 indicating they were in-use.

The WAIT indicator is turned off and the results of the test can be examined at this time. (See Steps 14 through 20 below.)

10. STOP can be depressed when the entire switch or a range of circuits is being tested.

If Test 2 is stopped before one complete testing pass through the range of circuits specified is made, the total number of circuits tested and the total number of circuits failed are displayed in Fields 12 and 13.

The last equipment location tested is displayed in Fields 3 through 7 and special error code 82 (test of range not completed) is displayed in the **MAAP** error code field.

11. When Test 2 is halted by depressing **STOP** before the range of circuits is tested at least once, the in-use circuit list (if any) is merged into the failure list.

When Test 2 is continued, the in-use circuit list is added to as necessary and the circuits are retried as described in Step 8.

- 12. Test result information can be stepped through (as described in Steps 14 through 20 below) when Test 2 is halted using **STOP** even though the entire range is not tested.
- 13. To restart the test when Test 2 is halted by use of **STOP** before the range of circuits is tested at least once, **EXECUTE** is depressed and Test 2 starts at the equipment location following the last equipment location tested.

Test results gathered after restarting Test 2 are added to the test results previously stored in DMIDS.

- 14. When the entire switch or a range of circuits is tested, the **WAIT** indicator is turned off and a summary is displayed.
- 15. If no digital network circuits failed, the following summary is displayed.

Field 1 - 2.

Fields 2 through 6 - Equipment location of the range of circuits tested.

Field 12 - Number of circuits tested.

Field 13 - 0 (Indicating no failures).

16. If any digital network circuits failed, the summary displays a 2 in Field 1, the equipment location of the range of circuits tested in Fields 2 through 6, the total number of circuits tested in Field 12, and the total number of failures in Field 13.

17. Depressing **NEXT CIRCUIT** displays the first failure, as follows:

Field 1 - 2.

Field 2 - Unit type of failed circuit.

Note: Unit types 69, 71, and 72 are not displayed in R2V1.

Fields 3 through 7 - Equipment location of failed circuit.

Field 8 - Alarm status of failed circuit.

Field 9 - Current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

Field 10 - Index (1).

Field 11 - Specific fault code.

Field 12 - Number of circuits tested.

Field 13 - Number of circuits failed.

18. When one-way incoming and one-way outgoing auxiliary trunks (unit type 45) are tested during range testing they will fail with a specific fault code of 316 (insufficient 600 ohm termination reflection possibly caused by an open transmission option switch).

When DS-1 circuit packs (unit type 68) are tested during range testing, all DS-1 circuit packs not busied out will fail with a specific fault code of 785 (DS-1 not maintenance busy) unless each individual circuit pack(s) is busied out.

19. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failing digital network circuits.

When more than one unit type is tested, depressing **NEXT UNIT** causes the first circuit of the next unit type with failures to be displayed.

Note: Unit types 69, 71, and 72 are not displayed in R2V1.

Field 13 decrements, corresponding to the number of failures passed over (if any), when stepping from unit to unit.

NEXT CIRCUIT is used to step through the failures of the displayed unit type.

20. When all failing circuits are displayed, depressing **NEXT CIRCUIT** or **NEXT UNIT** dashes Fields 2 through 13.

Depressing **NEXT CIRCUIT** or **NEXT UNIT** once more causes the summary to be displayed, and the failing circuits can be stepped through again by use of **NEXT CIRCUIT** and **NEXT UNIT**.

- 21. When DS-1 circuit packs previously tested were busied out and the test passed, or the problem was corrected, the DS-1 circuit packs should be released from busy using **RLS BUSY OUT**.
- 22. To select another range of digital network circuits to test, the CHANGE FIELD sequence must be used.

Refer to Steps 11 through 14 of Test 2 Data Entry above to select a range of digital network circuits to be tested in a module, cabinet, carrier, or slot.

PROC 620 Test 2 and Test 3

- Refer to Steps 22 through 25 of Test 2 Data Entry above to select a range of digital network circuits within a unit type (except unit type 68) to be tested in a module, cabinet, carrier, or slot.
 - Refer to Steps 35 through 60 of Test 2 Data Entry above to select a range of unit type 68 (DS-1) circuit packs to be tested in a module, cabinet, carrier, or slot.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

- 23. EXECUTE must be depressed to begin Test 2 from the new range of circuits selected.
- 24. The **NETWORK SWITCH** and/or **PORT** fault indicator(s) is automatically turned off when Test 2 completes with no failures detected for all network digital circuits that raised an alarm.

Note: Network circuit alarmed entries in PMIDS are marked as resolved.

25. The MAJOR and/or MINOR alarm indicator is also turned off if no other sources are affecting both alarm indicators.

Test 3

Test 3 is used to test one or more circuits in the digital network in a continuous cycle.

Test 3 is mainly used when an intermittent fault is suspected, when using test equipment to further isolate a problem, or to trace wiring problems.

Circuits can be selected for testing by unit type, a range of equipment locations, or on a single circuit basis.

Test 3 Data Entry

1. Test 3 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 3; ENTER.

2. When Test 3 is initially called in, a default equipment location and unit type may be displayed in Fields 2 through 7.

The alarm status, circuit status, and specific fault code associated with the default equipment location are displayed in Fields 8, 9, and 11.

Field 2 (unit type) is blinking, indicating an optional entry field.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

Normally, a specific digital network circuit or the default equipment location is tested in Test
However, circuit selection for testing in Test 3 is identical to Test 2.

<u>All digital network circuits</u>, a range of circuits, all circuits within a unit type, a combination of unit type and range (i.e., all circuit locations of a unit type in the range specified), a specific digital network circuit, or the default equipment location can be tested continuously in Test 3.

4. When attendant console interface circuits (unit type 44) are tested during range testing, the associated headset(s) or handset(s) **must** be unplugged or the circuits fail.

- 5. When unit type 45 (auxiliary trunks) is selected during range testing, one-way incoming and one-way outgoing auxiliary trunks will fail with a specific fault code of 316 (insufficient 600 ohm termination reflection possibly caused by an open transmission option switch).
- 6. When unit type 68 (DS-1) is selected during range testing, all DS-1 circuit packs not busied out will fail with a specific fault code of 785 (DS-1 not maintenance busy) unless each individual DS-1 circuit pack is busied out.

To select unit type 68 (DS-1) to be tested continuously, refer to Test 2 Data Entry, Step 35.

7. When all circuits in the switch are to be tested continuously, refer to Test 2 Data Entry, Step 8 for circuit selection.

To select all circuits in a specific module to be tested continuously, refer to Test 2 Data Entry, Step 11.

To select all circuits in a specific cabinet to be tested continuously, refer to Test 2 Data Entry, Step 12.

To select all circuits in a specific carrier to be tested continuously, refer to Test 2 Data Entry, Step 13.

To select all circuits in a specific slot to be tested continuously, refer to Test 2 Data Entry, Step 14.

Proceed to Step 1 of Test 3 Execution.

8. When all circuits in a unit type (except unit type 68) are to be tested continuously, refer to Test 2 Data Entry, Steps 15 through 21 for unit type selection.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

To select all circuits of a unit type (except unit type 68) in a specific module to be tested continuously, refer to Test 2 Data Entry, Step 22.

To select all circuits of a unit type (except unit type 68) in a specific cabinet to be tested continuously, refer to Test 2 Data Entry, Step 23.

To select all circuits of a unit type (except unit type 68) in a specific carrier to be tested continuously, refer to Test 2 Data Entry, Step 24.

To select all circuits of a unit type (except unit type 68) in a specific slot to be tested continuously, refer to Test 2 Data Entry, Step 25.

To select unit type 68 (DS-1) to be tested continuously, refer to Steps 35 through 60 of Test 2 Data Entry to select and busy out a range of unit type 68 (DS-1) circuit packs to be tested in a module, cabinet, carrier, or slot.

Note: Do not perform steps 20 through 25 of Test 2 Data Entry to select unit type 68 unit (DS-1) to be tested continuously in the switch, module, cabinet, carrier, or slot. When unit type 68 (DS-1) is selected during range testing, all DS-1 circuit packs not busied out **will** fail with a specific fault code of 785 (DS-1 not maintenance busy) unless each individual DS-1 circuit pack is busied out.

Proceed to Step 1 of Test 3 Execution.

9. A specific network circuit can be selected for testing by entering the unit type (optional) and equipment location in Fields 2 through 7 whether or not a default equipment location is displayed:

Note: Specific circuits in unit types 69, 71, and 72 cannot be selected in R2V1.

(Unit type of circuit to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

If the specific network circuit selected for testing is a unit type 68 circuit (DS-1) the maintenance busy out procedure listed in Steps 13 through 18 **must** be performed.

Proceed to Step 13.

10. The unit type field is an optional input field to test a specific network circuit.

If the unit type is unknown, **CLEAR ENTRY; ENTER** is used to clear any unit type displayed in Field 2, or **ENTER** is depressed when no unit type is displayed.

11. A specific network circuit can also be selected for testing by use of NEXT UNIT and NEXT CIRCUIT.

Depress **NEXT UNIT** until the unit type of the circuit to be tested is displayed in Field 2.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

Depress **NEXT CIRCUIT** until the circuit to be tested is displayed in Fields 3 through 7.

If the specific network circuit selected for testing is a unit type 68 circuit (DS-1) the maintenance busy out procedure listed in Steps 13 through 18 **must** be performed.

Proceed to Step 13.

12. To test the default equipment location displayed in Fields 2 through 7, proceed to Step 13.

If the default equipment location displayed in Fields 2 through 7 is a unit type 68 circuit (DS-1) the maintenance busy out procedure listed in Steps 13 through 18 **must** be performed.

Proceed to Step 13.

13. When a specific network circuit, a default equipment location, or a DS-1 circuit pack is to be tested, check the circuit status in Field 9.

If Field 9 equals 1 (on-line and in-use) Test 3 cannot be performed for port circuits. Wait until the circuit is not in-use or perform tests on other circuits.

Note: Port circuits that cannot be tested while in-use are unit types 24, 25, 27, 28, 29, 32, 33, 34, 44 through 47, 62, 66, 68, 69, 71, and 72.

If Field 9 equals 4 (unable to communicate or not plugged in), proceed to Step 14.

IF Field 9 does not equal 4, proceed to Step 16.

14. If Test 3 is being performed remotely, proceed to Step 16.

If Test 3 is being run locally (or with maintenance personnel on the customer's premises), determine if the circuit pack being tested is plugged in.

15. If the circuit pack is not plugged in or the slot is empty, reseat or install the circuit pack, then proceed to Step 16.

If the circuit pack is firmly seated, proceed to Step 16.

Caution: Busying out a port circuit results in loss of customer calls when the port circuit is in use. Busying out a DS-1 circuit pack disrupts calls in progress on all 24 ports of the DS-1 circuit pack.

- 16. Individual port circuits or DS-1 circuit packs can be placed in maintenance busy out status for testing by checking the circuit status displayed in Field 9.
- 17. If Field 9 equals 1 (on-line and in-use) individual port circuits should not be busied out as Test 3 results may not be valid.

Note: Port circuits that should not be busied out while in-use are unit types 24, 25, 27, 28, 29, 32, 33, 34, 44 through 47, 62, 66, 68, 69, 71, and 72.

18. If the circuit status = 3, proceed to Step 1 of Test 3 Execution.

If the circuit status does not equal 3, depress **BUSY OUT** and proceed to Step 1 of Test 3 Execution.

Note: If the circuit within a unit type cannot be busied out, special error code 80 (busy/release busy not allowed for this unit) is displayed in the **MAAP** error code field.

Test 3 Execution

1. To start Test 3 after selecting the circuit(s) to be tested, depress EXECUTE.

The WAIT indicator is not turned on during Test 3 execution.

2. When an in-use circuit is encountered during Test 3 execution (for a range of circuits or for a single circuit) the **IN USE** indicator is lighted on the **MAAP** momentarily and the circuit is passed over for that iteration of the test.

The in-use circuit is not stored for a later retry as Test 3 is executed continuously, testing all circuits specified in physical order.

Circuits that are in-use are not merged into the failed circuits list when Test 3 is stopped.

3. When no switch resources are available to test a circuit during execution of Test 3, special error code 83 (switch resources not available) is displayed in the **MAAP** error code field.

If a single circuit is being tested, a fault code indicating no resources were available is stored in DMIDS and the single circuit is tested again.

If more than one circuit is being tested, a fault code indicating no resources were available is stored in DMIDS and the next circuit is tested.

4. If the DMIDS storage buffer becomes full either during testing of a range of circuits or a single circuit, special error code 84 (DMIDS overflow) is displayed in the **MAAP** error code field.

Note: Testing is not stopped when the DMIDS buffer becomes full.

- 5. When multiple circuits are being tested new errors found are discarded. Test results can be examined when the DMIDS buffer becomes full and **STOP** is depressed. (See Steps 1 through 5 of Test 3 Result Display for a Range of Circuits below).
- 6. When testing a single circuit new errors found are added to the failure list and the oldest errors are deleted. Test results can be examined when the DMIDS buffer becomes full and **STOP** is depressed. (See Steps 5 through 9 of Test 3 Result Display for a Single Circuit below.)

Note: Only 40 errors are displayed when the DMIDS buffer becomes full. When multiple circuits are being tested the 40 errors are the oldest errors recorded. When a single circuit is tested the 40 errors are the newest errors recorded.

- 7. When a default equipment location, a specific circuit, or a DS-1 circuit pack is being tested continuously in Test 3, Field 11 is dashed for 3 seconds and blanked for 3 seconds.
- 8. When the entire switch or a range of circuits is being tested continuously in Test 3, the following fields are incremented as a circuit is tested:

Field 2 - Unit type of circuit being tested.

Note: Unit types 69, 71, and 72 are not displayed in R2V1.

Fields 3 through 7 - Equipment location of circuit being tested.

Note: When a range of circuits for a particular unit type is being tested and the unit type contains only one circuit pack, the display in Fields 2 through 7 may not be changing.

Field 10 - Index (if any).

Field 11 - Specific fault code (if any) for circuit displayed.

Note: While testing of a circuit displayed in Fields 2 through 7 is being conducted, Field 11 will be dashed for 3 seconds and blanked for 3 seconds.

- 9. The testing interval is determined by maintenance personnel performing the test and is ended by depressing **STOP**.
- 10. Display of test results is different when a specific network circuit, a default equipment location, or a DS-1 circuit pack is tested and when the entire switch or a range of circuits are tested.
- 11. For display of test results when testing a default equipment location, a specific network circuit, or a DS-1 circuit pack proceed to Step 1 of Test 3 Result Display for a Single Circuit.
- 12. For display of test results when testing the entire switch or a range of circuits, proceed to <u>Step 1 of Test 3 Result Display</u> for a Range of <u>Circuits</u>.

Test 3 Result Display for a Single Circuit

- 1. Special error codes 81 or 83 may be displayed in the **MAAP** error code field when the default equipment location or the specific network digital circuit cannot be tested.
- When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 3. If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7.

- 3. When special error code 83 (switch resources not available) is displayed, repeat Test 3 until the test is executed or wait until switch resources become available before testing.
- 4. If special error code 81 or 83 is not displayed, proceed to Step 5.
- 5. When Test 3 is stopped while testing a default equipment location, a specific circuit, or a DS-1 circuit pack the following is displayed:

Field 1 - 3.

Field 2 - Unit type of displayed circuit.

Note: Unit types 69, 71, and 72 are not displayed in R2V1.

Fields 3 through 7 - Equipment location of circuit tested.

Field 8 - Alarm status of displayed circuit.

Field 9 - Current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

Field 10 - Dashed.

Field 11 - Dashed.

Field 12 - Number of times the circuit was tested.

Field 13 - 0 (Indicating no failures were found for the circuit tested) or number of fault information lists for the failing circuit.

- 6. When a specific circuit, a default equipment location, or a DS-1 circuit pack failed Test 3 (indicated by Field 13), depressing **NEXT CIRCUIT** displays the index and the specific fault code for the circuit tested in Fields 10 and 11.
- 7. When more than one fault information list is recorded for a single circuit location that is tested, indicated by Field 13 displaying more than 1 (which is an index to fault information lists when testing single circuits), **NEXT FAULT** is depressed to step to the next fault information list.

Note: When **NEXT FAULT** is depressed, Fields 2 through 13 may be dashed. This indicates that all remaining fault information lists contained the same type of data.

Dashing of Fields 2 through 13 can happen at any time when **NEXT FAULT** is depressed, no matter what number was displayed in Field 13 before **NEXT FAULT** was depressed.

- 8. Depressing **NEXT FAULT** may display a different specific fault code in Field 11 when a new fault information list exists.
- 9. **NEXT FAULT** is depressed once more to determine if other fault information lists exist for the circuit tested.

When no new fault information lists exist, Fields 2 through 13 are dashed when **NEXT** FAULT is depressed.

- 10. Depressing **NEXT FAULT** again displays the summary (Fields 10 and 11 are dashed).
- 11. When the default equipment location, specific circuit, or DS-1 circuit pack previously tested was busied out and the test passed, or the problem was corrected, the circuit, or circuit pack should be released from busy using **RLS BUSY OUT**.

12. When another specific circuit is to be continuously tested, the CHANGE FIELD sequence must be used to select the specific circuit:

CHANGE FIELD; 2; ENTER; (Unit type of circuit to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

Note: Circuits in unit types 69, 71, and 72 cannot be selected for testing in R2V1.

13. **EXECUTE** must be depressed to test the specific circuit selected.

Test 3 Result Display for a Range of Circuits

1. When Test 3 is stopped while testing the entire switch or a range of circuits, a summary is displayed.

If no digital network circuits failed, the following summary is displayed:

Field 1 - 3.

Fields 2 through 5 - Equipment location of the range of circuits tested.

Field 12 - Number of circuits tested.

Field 13 - 0 (Indicating no failures).

- 2. If any digital network circuits failed, the summary displays a 3 in Field 1, the equipment location of the range of circuits tested in Fields 2 through 6, the total number of circuits tested in Field 12, and the total number of circuits failed in Field 13.
- 3. Depressing NEXT CIRCUIT displays the first failure, as follows:

Field 1 - 3.

Field 2 - Unit type of failed circuit.

Note: Unit types 69, 71, and 72 are not displayed in R2V1.

Fields 3 through 7 - Equipment location of failed circuit.

Field 8 - Alarm status of failed circuit.

Field 9 - Current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

Field 10 - Index (1).

Field 11 - Specific fault code.

Field 12 - Number of circuits tested.

Field 13 - Number of circuits failed.

Note: Only one fault information list exists for each failing circuit when multiple circuits are tested.

4. Depressing NEXT CIRCUIT repeatedly displays the remaining failing digital network circuits.

5. When more than one unit type is tested, depressing **NEXT UNIT** causes the first circuit of the next unit type with failures to be displayed.

Note: Unit types 69, 71, and 72 are not displayed in R2V1.

When **NEXT UNIT** is used to step from unit to unit, without examining the circuits within the unit, Field 13 is decremented by the number of failures passed over (if any).

NEXT CIRCUIT is used to step through the failures of the displayed unit type.

6. When all failing circuits are displayed, depressing **NEXT CIRCUIT** dashes Fields 2 through 13.

Depressing **NEXT CIRCUIT** once more causes the summary to be displayed, and the failing circuits can be stepped through again by use of **NEXT CIRCUIT** and **NEXT UNIT**.

- 7. When DS-1 circuit packs previously tested were busied out and the test passed, or the problem was corrected, the DS-1 circuit packs should be released from busy using **RLS BUSY OUT**.
- 8. Test 3 can be restarted without changing the equipment location originally entered for testing by depressing **EXECUTE**.

The same equipment location or range of circuits is used as the basis for the new execution of Test 3.

Any data gathered in the last execution of Test 3 is lost when **EXECUTE** is depressed.

9. To select another range of digital network circuits to be continuously tested, the CHANGE FIELD sequence must be used.

Refer to Steps 11 through 14 of Test 2 Data Entry above to select a range of digital network circuits to be tested in a module, cabinet, carrier, or slot.

Refer to Steps 22 through 25 of Test 2 Data Entry above to select a range of digital network circuits within a unit type (except unit type 68) to be tested in a module, cabinet, carrier, or slot.

Refer to Steps 35 through 60 of Test 2 Data Entry above to select a range of unit type 68 (DS-1) circuit packs to be tested in a module, cabinet, carrier, or slot.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

10. **EXECUTE** must be depressed to begin Test 3 from the new range of circuits selected.

Test 4

Test 4 provides a diagnostic analysis on a single circuit or circuit pack, beginning with the specific equipment location of the circuit or circuit pack, to determine where a fault actually is located in the digital network.

Test 4 automatically runs a verification test on any circuit pack that is reseated or replaced (without any **MAAP** operations by maintenance personnel) to ensure that the problem is corrected.

Verification tests are destructive tests in that they automatically busy out all circuits on a port circuit pack (except DS-1 port circuit packs). After the port circuit pack is tested, all circuits on the port circuit pack are released from busy by the verification test whether or not the circuits had been previously busied out by other software routines.

Test 4 provides alternate circuit pack replacements (if any) when the first circuit pack replaced does not correct the problem.

When alternate circuit packs are replaced, Test 4 runs a verification test on the alternate circuit pack. If the alternate circuit pack passes the test, the first circuit pack replaced is also verified to be sure that it now passes, and the original failing test is executed to ensure that the problem is corrected.

Test 4 provides visual feedback to maintenance personnel on whether a problem is corrected by the use of RED and GREEN LEDs on the faceplate of the circuit pack that was reseated or replaced.

Test 4 Data Entry

1. Test 4 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 4; ENTER.

2. When Test 4 is initially called in, a default equipment location and unit type may be displayed in Fields 2 through 7.

The alarm status, circuit status, and specific fault code associated with the default equipment location are displayed in Fields 8, 9, and 11.

Field 2 (unit type) is blinking, indicating an optional entry field.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

3. Either the default equipment location can be tested, or another digital network circuit can be selected for testing.

Caution: Diagnosis of specific fault codes 607, 612, 630, or 638 displayed in Field 11 against unit type 57 (light guide interface) may affect service for approximately the last 6 seconds of Test 4 when unit type 57 is tested.

Note: A normal passing test for unit type 57 lasts approximately 2 to 3 minutes.

4. A specific digital network circuit can be selected for testing by entering the equipment location and unit type (optional) in Fields 2 through 7 whether or not a default equipment location is displayed:

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

(Unit type of circuit to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

Note: No entry is required for the circuit number field if there are no circuits on the circuit pack.

If the specific network circuit selected for testing is a unit type 68 circuit pack (DS-1) the maintenance busy out procedure listed in Steps 12 through 18 **must** be performed.

Proceed to Step 8.

5. The unit type field is an optional input field to test a specific network circuit.

If the unit type is unknown, **CLEAR ENTRY; ENTER** is used to clear any unit type displayed in Field 2, or **ENTER** is depressed when no unit type is displayed.

6. A specific network circuit can also be selected for testing by use of NEXT UNIT and NEXT CIRCUIT.

Depress NEXT UNIT until the unit type of the circuit to be tested is displayed in Field 2.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

Depress **NEXT CIRCUIT** until the circuit to be tested is displayed in Fields 3 through 7.

If the specific network circuit selected for testing is a unit type 68 circuit (DS-1) the maintenance busy out procedure listed in Steps 12 through 18 **must** be performed.

Proceed to Step 8.

7. To test the default equipment location displayed in Fields 2 through 7, proceed to Step 8.

If the default equipment location displayed in Fields 2 through 7 is a unit type 68 circuit pack (DS-1) the maintenance busy out procedure listed in Steps 12 through 18 **must** be performed.

Proceed to Step 8.

8. When an attendant console interface circuit (unit type 44) is selected for testing, the associated headset or handset **must** be unplugged or the circuit fails the diagnostic test.

Proceed to Step 12.

- 9. When a 1-way incoming or 1-way outgoing auxiliary trunk circuit (unit type 45) is selected for testing the option settings **must** be set for 2-way transmission or the circuit fails the diagnostic test.
- 10. To test an auxiliary trunk circuit, perform the following:

Remove the auxiliary trunk circuit pack (SN231) and check the option settings on the circuit to be tested.

If the auxiliary trunk circuit is 2-way transmission (option ${\bf Q}$ - switches 2 and 3 in the up position), proceed to Step 12.

If the auxiliary trunk circuit is a 1-way incoming (option S - switch 2 up and switch 3 down) or a 1-way outgoing (option R - switch 2 down and switch 3 up) record the switch settings and set both switches (2 and 3) to the up position, then proceed to Step 12.

Note: After the test has passed (corrective action taken if necessary), ensure the switch settings are correctly positioned (recorded above) for the type of transmission required (1-way incoming or 1-way outgoing) on the auxiliary trunk circuit tested.

11. When a DS-1 circuit (unit type 68) is selected for testing, the circuit pack **must** be busied out or the circuit pack fails the diagnostic test.

To test a DS-1 circuit, the maintenance busy out procedure listed in Steps 12 through 18 **must** be performed.

Proceed to Step 12.

12. When a specific network circuit or default equipment location is to be tested, check the circuit status in Field 9.

PROC 620 Test 4

13. If Field 9 equals 1 (on-line and in-use) Test 4 cannot be performed for port circuits. Wait until the circuit is not in-use or perform tests on other circuits.

Note: Port circuits that cannot be tested while in-use are unit types 24, 25, 27, 28, 29, 32, 33, 34, 44 through 47, 62, 66, 68, 69, 71, and 72.

14. If Field 9 equals 4 (unable to communicate or not plugged in), proceed to Step 15.

If Field 9 does not equal 4, proceed to Step 16.

15. If Test 4 is being performed remotely, proceed to Step 16.

If Test 4 is being run locally (or with maintenance personnel on the customer's premises), determine if the circuit pack being tested is plugged in.

If the circuit pack is not plugged in or the slot is empty, reseat or install the circuit pack, then proceed to Step 16.

If the circuit pack is firmly seated, proceed to Step 16.

Caution: Busying out a port circuit results in loss of customer calls when the port circuit is in use. Busying out a DS-1 circuit pack disrupts calls in progress on all 24 ports of the DS-1 circuit pack.

- 16. Individual port circuits or DS-1 circuit packs can be placed in maintenance busy out status for testing by checking the circuit status displayed in Field 9.
- 17. If Field 9 equals 1 (on-line and in-use) individual port circuits should not be busied out as Test 4 results may not be valid.

Note: Port circuits that should not be busied out while in-use are unit types 24, 25, 27, 28, 29, 32, 33, 34, 44 through 47, 62, 66, 68, 69, 71, and 72.

18. If the circuit status = 3, proceed to Step 1 of Test 4 Execution.

If the circuit status does not equal 3, depress **BUSY OUT** and proceed to Step 1 of Test 4 Execution.

Note: If the circuit within a unit type cannot be busied out, special error code 80 (busy/release busy not allowed for this unit) is displayed in the **MAAP** error code field.

Test 4 Execution

1. To start Test 4 after selecting the circuit to be tested, depress EXECUTE.

The WAIT indicator on the MAAP is turned on.

- 2. Special error codes 81 or 83 may be displayed in the **MAAP** error code field and the test is terminated when the default equipment location or the specific network digital circuit cannot be tested.
- 3. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 4. If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7.
- 4. When special error code 83 (switch resources not available) is displayed, repeat Test 4 until the test is executed or wait until switch resources become available before testing.

- 5. If special error code 81 or 83 is not displayed, proceed to Step 6.
- 6. During execution of Test 4, Fields 2 through 7 display the unit type and equipment location of the circuit being tested. Field 1 displays a 4, and all other fields are dashed.

Note: Unit types 69, 71, and 72 are not displayed in R2V1.

7. If **STOP** is depressed while Test 4 is executing, the test is returned to its configuration just before **EXECUTE** was depressed, i.e.: circuit selected for testing is displayed in Fields 2 through 7.

Any data gathered during testing prior to **STOP** being depressed is lost.

Test 4 Result Display

- 1. When Test 4 is completed for a default equipment location, a specific circuit, or a DS-1 circuit pack the **WAIT** indicator is turned off.
- 2. When the specific circuit, default equipment, or DS-1 circuit pack passes Test 4, the following is displayed:

Field 1 - 4.

Field 2 - Unit type of circuit tested.

Note: Unit types 69, 71, and 72 are not displayed in R2V1.

Fields 3 through 7 - Equipment location of circuit tested.

Field 8 - Alarm status of circuit tested.

Field 9 - Current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

Fields 10 through 13 - Dashed.

Note: The **GREEN** LED is lighted on the circuit pack to indicate to maintenance personnel that the circuit pack passed Test 4.

3. When the specific circuit, default equipment location, or DS-1 circuit pack fails Test 4, the following is displayed:

Field 1 - 4.

Field 2 - Unit type of failing circuit pack.

Note: Unit types 69, 71, and 72 are not displayed in R2V1.

Fields 3 through 7 - Equipment location of failing circuit pack.

Note: The unit type and equipment location displayed in Fields 2 through 7 may not be the circuit selected for testing. The diagnostic analysis may isolate the problem to a circuit pack which interfaces with the circuit pack selected for testing.

Field 8 - Alarm status of failing circuit.

Field 9 - Current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

Field 10 - Index (1).

Field 11 - Specific fault code.

Fields 12 and 13 - Dashed.

Note: The **RED** LED is lighted on the circuit pack to indicate to maintenance personnel that the circuit pack failed Test 4.

4. When Test 4 is performing the diagnostic test upon depressing **EXECUTE** only one fault information list is recorded.

Note: Depressing **NEXT FAULT** displays special error code 00 (key not allowed at this time) in the **MAAP** error code field.

- 5. When a circuit pack is reseated or replaced an automatic verification test is performed.
- 6. If the DMIDS storage buffer becomes full during the verification test, special error code 84, (DMIDS overflow) is displayed in the **MAAP** error code field.

Note: Testing is not stopped when the DMIDS buffer becomes full.

New errors found are added to the failure list, and the oldest errors are deleted.

Note: Only 40 errors are displayed when the DMIDS buffer becomes full.

- 7. During the verification test more than one fault information list may be recorded (if the circuit pack fails the verification test) for the circuit pack being tested (indicated by Field 13 displaying more than 1).
- 8. Depressing NEXT FAULT steps to the next fault information list.

Note: When **NEXT FAULT** is depressed, Fields 2 through 13 may be dashed. This indicates that all remaining fault information lists contained the same type of data.

- 9. Dashing of Fields 2 through 13 can happen at any time when **NEXT FAULT** is depressed no matter what number was displayed in Field 13 before **NEXT FAULT** was depressed.
- 10. Depressing **NEXT FAULT** may display a different specific fault code in Field 11 when a new fault information list exists.

NEXT FAULT is depressed once more to determine if other fault information lists exist for the circuit tested.

When no new fault information lists exist, Fields 2 through 13 are dashed when **NEXT** FAULT is depressed.

Depressing **NEXT FAULT** again displays the original fault information list.

11. Depressing **NEXT CIRCUIT** displays an alternate circuit pack (if any) to be replaced.

The **RED** LED on the original circuit pack is turned off and the **RED** LED on the displayed circuit pack in Fields 2 through 7 is turned on.

12. Depressing **NEXT CIRCUIT** again displays the last alternate circuit pack (if any) to be replaced.

The **RED** LED on the first alternate circuit pack is turned off and the **RED** LED on the displayed circuit pack in Fields 2 through 7 is turned on.

13. When all alternate circuit packs are displayed, depressing NEXT CIRCUIT once more dashes Fields 2 through 13.

Depressing **NEXT CIRCUIT** again displays the first circuit pack in the replacement sequence.

- 14. When the default equipment location, specific circuit, or DS-1 circuit pack previously tested was busied out and the test passed, or the problem was corrected, and the circuit status in Field 9 = 3 the circuit should be released from busy using **RLS BUSY OUT**.
- 15. When another specific circuit is to be tested, the **CHANGE FIELD** sequence must be used to select the specific circuit:

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

CHANGE FIELD; 2; ENTER; (Unit type of circuit to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

Note: No entry is required for the circuit number field if there are no circuits on the circuit pack.

- 16. **EXECUTE** must be depressed to test the circuit selected.
- 17. The **NETWORK SWITCH** and/or **PORT** fault indicator is turned off when Test 4 completes with no failures detected for all network digital circuits that raised an alarm.

Note: Network circuit alarmed entries in PMIDS are marked as resolved.

- 18. Test 4 must be repeated for each network digital circuit alarmed entry in **PROC 600** Test 1 or **PROC 620** Test 1 before the fault indicator can be turned off.
- 19. The **MAJOR** and/or **MINOR** alarm indicator is also turned off if no other sources are affecting both alarm indicators.

Test 5

Test 5 runs a verification test sequence on a circuit pack, testing all circuits (if any). The verification sequence indicates the status of the circuit pack, i.e., the circuit pack passed, the circuit pack is good but that another circuit pack is faulty, or the circuit pack failed.

Verification tests are destructive tests in that they automatically busy out all circuits on a port circuit pack (except DS-1 port circuit packs). After the port circuit pack is tested, all circuits on the port circuit pack are released from busy by the verification test whether or not the circuits had been previously busied out by other software routines.

Test 5 provides visual feedback to maintenance personnel on whether a problem is corrected by the use of RED and GREEN LEDs on the faceplate of the circuit pack that is reseated or replaced.

Test 5 Data Entry

1. Test 5 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 5; ENTER.

2. When Test 5 is initially called in, a default equipment location and unit type may be displayed in Fields 2 through 7.

3. The alarm status, circuit status, and specific fault code associated with the default equipment location are displayed in Fields 8, 9, and 11.

Field 2 (unit type) is blinking, indicating an optional entry field.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

- 4. Either the default equipment location can be tested, or another digital network circuit pack can be selected for testing.
- 5. A specific digital network circuit pack can be selected for testing by entering the equipment location and unit type (optional) in Fields 2 through 6 whether or not a default equipment location is displayed:

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

(Unit type of circuit pack to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER.

Note: All circuits (if any) on a circuit pack are tested in Test 5.

If the specific network circuit selected for testing is a unit type 68 circuit pack (DS-1) the maintenance busy out procedure listed in Steps 12 through 16 **must** be performed.

Proceed to Step 9.

6. The unit type field is an optional input field to test a specific network circuit pack.

If the unit type is unknown, **CLEAR ENTRY**; **ENTER** is used to clear any unit type displayed in Field 2, or **ENTER** is depressed when no unit type is displayed.

7. A specific network circuit pack can also be selected for testing by use of **NEXT UNIT** and **NEXT CIRCUIT**.

Depress **NEXT UNIT** until the unit type of the circuit pack to be tested is displayed in Field 2.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

Depress **NEXT CIRCUIT** until the circuit pack to be tested is displayed in Fields 3 through 6.

Note: All circuits (if any) on a circuit pack are tested in Test 5.

If the specific network circuit selected for testing is a unit type 68 circuit (DS-1) the maintenance busy out procedure listed in Steps 12 through 16 **must** be performed.

Proceed to Step 9.

8. To test the default equipment location displayed in Fields 2 through 7, proceed to Step 7.

If the default equipment location displayed in Fields 2 through 7 is a unit type 68 circuit pack :(DS-1) the maintenance busy out procedure listed in Steps 12 through 16 **must** be performed.

Proceed to Step 9.

- 9. When an attendant console interface circuit pack (unit type 44) is selected for testing, the associated headsets or handsets **must** be unplugged or the circuit pack fails.
- 10. When an auxiliary trunk circuit pack (unit type 45) is selected for testing the option settings **must** be set for 2-way transmission on **all** circuits or the circuit pack fails.
- 11. To test an auxiliary circuit pack, perform the following:

Remove the auxiliary trunk circuit pack (SN231) and check the option settings on all four circuits.

If the auxiliary trunk circuits are 2-way transmissions (option Q - switches 2 and 3 in the up position) proceed to Step 1 of Test 5 Execution.

If any of the auxiliary trunk circuits are 1-way incoming (option S - switch 2 up and switch 3 down) or 1-way outgoing (option R - switch 2 down and switch 3 up) record the switch settings for each circuit and set the switches (2 and 3) to the up position for each circuit as required, then proceed to Step 1 of Test 5 Execution.

Note: After the test has passed (corrective action taken if necessary), ensure the switch settings for each circuit are correctly positioned (recorded above) for the type of transmission required (1-way incoming or 1-way outgoing) on the auxiliary trunk circuit pack tested.

12. When a DS-1 circuit pack is to be tested, check the circuit status in Field 9.

If Field 9 equals 1 (on-line and in-use) Test 5 cannot be performed for DS-1 circuit packs. Wait until the circuit pack is not in-use or perform tests on other circuits.

If Field 9 equals 4 (unable to communicate or not plugged in), proceed to Step 13.

If Field 9 does not equal 4, proceed to Step 14.

13. If Test 5 is being performed remotely, proceed to Step 14.

If Test 5 is being run locally (or with maintenance personnel on the customer's premises), determine if the DS-1 circuit pack being tested is plugged in.

If the DS-1 circuit pack is not plugged in or the slot is empty, reseat or install the circuit pack, then proceed to Step 14.

If the DS-1 circuit pack is firmly seated, proceed to Step 14.

Caution: Busying out a DS-1 circuit pack disrupts calls in progress on all 24 ports of the DS-1 circuit pack.

- 14. DS-1 circuit packs can be placed in maintenance busy out status for testing by checking the circuit status displayed in Field 9.
- 15. If Field 9 equals 1 (on-line and in-use) individual DS-1 circuit packs should not be busied out as Test 5 results may not be valid.
- 16. If the circuit status = 3, proceed to Step 1 of Test 5 Execution.

If the circuit status does not equal 3, depress \mathbf{BUSY} \mathbf{OUT} and proceed to Step 1 of Test 5 Execution.

Note: If the circuit within a unit type cannot be busied out, special error code 80 (busy/release busy not allowed for this unit) is displayed in the **MAAP** error code field.

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Test 5 Execution

Caution: All port circuits are automatically busied out when verification tests are performed. Established calls and data transmission for all port circuits on the port circuit pack being tested are aborted.

1. To start Test 5 after selecting the circuit pack to be tested, depress **EXECUTE**.

The WAIT indicator on the MAAP is turned on.

- 2. Special error codes 81 or 83 may be displayed in the **MAAP** error code field and the test is terminated when the default equipment location or the specific ne work digital circuit pack cannot be tested.
- 3. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 5. If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7.
- 4. When special error code 83 (switch resources not available) is displayed, repeat Test 5 until the test is executed or wait until switch resources become available before testing.
- 5. If special error code 81 or 83 is not displayed, proceed to Step 6.
- 6. During execution of Test 5, Field 11 (specific fault code) is updated with the latest value received from the test.
- 7. If **STOP** is depressed while Test 5 is executing, the test is returned to its configuration just before **EXECUTE** was depressed, i.e.: circuit or circuit pack selected for testing is displayed in Fields 2 through 7.

Any data gathered during testing prior to STOP being depressed is lost.

8. If the DMIDS storage buffer becomes full, special error code 84 (DMIDS (verflow), is displayed in the MAAP error code field.

Note: Testing is not stopped when the DMIDS buffer becomes full.

New errors found are added to the failure list, and the oldest errors are deleted.

Note: Only 40 errors can be displayed when the DMIDS buffer becomes full.

Test 5 Result Display

- 1. When Test 5 is completed for a default equipment location, a specific circuit pack, or a DS-1 circuit pack the **WAIT** indicator is turned off.
- 2. When the specific circuit pack, default equipment location, or DS-1 circuit pack passes Test 5, the following is displayed:

Field 1 - 5.

Field 2 - Unit type of circuit pack tested.

Note: Unit types 69, 71, and 72 are not displayed in R2V1.

Fields 3 through 7 - Equipment location of circuit pack tested.

Field 8 - Dashed or alarm status of circuit tested.

Field 9 - Dashed or current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

Field 10 - Dashed.

Field 11 - 0 (circuit pack passed the test) or 9999 (failure is detected on other than tested circuit pack).

Fields 12 and 13 - Dashed.

Note: The **GREEN** LED is lighted on the circuit pack to indicate to maintenance personnel that the circuit pack passed Test 5.

3. When 9999 is displayed in Field 11 the circuit pack tested passed Test 5 and the **GREEN** LED is lighted on the circuit pack. However, a failure has been detected on another circuit pack that interfaces with the circuit pack tested.

Note: Test 4 should be executed on the circuit pack displaying 9999 to find the failing circuit pack that interfaces with the circuit pack tested.

Field 10 (index) and Field 13 (fault list index) display dashes.

Depressing **NEXT FAULT** displays a 1 in Field 10, the specific fault code in Field 11, and the number of fault information lists that are recorded in Field 13.

Proceed to Step 5.

 When the specific circuit pack, default equipment location, or DS-1 circuit pack fails Test 5, the following is displayed:

Field 1 - 5.

Field 2 - Unit type of circuit pack tested.

Note: Unit types 69, 71, and 72 are not displayed in R2V1.

Fields 3 through 7 - Equipment location of circuit pack tested.

Field 8 - Dashed or alarm status of circuit tested.

Field 9 - Dashed or current status of displayed circuit (0 = idle, 1 = on-line and in-use, 2 = off-line, 3 = maintenance busy, 4 = not plugged in or unable to communicate).

Field 10 - Index (1).

Field 11 - Specific fault code.

Field 12 - Dashed.

Field 13 - Index to the fault information lists recorded.

Note: The **RED** LED is lighted on the circuit pack to indicate to maintenance personnel that the circuit pack failed Test 5.

5. When more than one fault information list is recorded, indicated by Field 13 displaying more than 1 (which is an index to fault information lists), **NEXT FAULT** is depressed to step to the next fault information list.

Note: When **NEXT FAULT** is depressed, Fields 2 through 13 may be dashed. This indicates that all remaining fault information lists contained the same type of data.

Dashing of Fields 2 through 13 can happen at any time when **NEXT FAULT** is depressed, no matter what number was displayed in Field 13 before **NEXT FAULT** was depressed.

6. Depressing **NEXT FAULT** may display a different specific fault code in Field 11 when a new fault information list exists.

NEXT FAULT is depressed once more to determine if other fault information lists exist for the circuit tested.

When no new fault information lists exist, Fields 2 through 13 are dashed when **NEXT** FAULT is depressed.

Depressing **NEXT FAULT** again displays the original fault information list (last list recorded).

- 7. When DS-1 circuit packs previously tested were busied out and the test passed, or the problem was corrected, the DS-1 circuit packs should be released from busy using **RLS BUSY OUT**.
- 8. When another specific circuit pack is to be tested, the **CHANGE FIELD** sequence must be used to select the specific circuit pack:

CHANGE FIELD; 2; ENTER; (Unit type of circuit pack to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER.

Note: Unit types 69, 71, and 72 cannot be selected in R2V1.

- 9. **EXECUTE** must be depressed to test the circuit pack selected.
- 10. Test 5 must be repeated for each network digital circuit pack alarmed entry in **PROC 600** Test 1 or **PROC 620** Test 1 before the fault indicator can be turned off.

All alarmed entries for a circuit pack do not have to be tested in Test 5 if the circuit pack passes Test 5. All alarmed entries for the circuit pack are resolved when the circuit pack passes Test 5.

11. The **NETWORK SWITCH** and/or **PORT** fault indicator is turned off when Test 5 completes with no failures detected for all network digital circuits that raised an alarm.

Note: Network circuit alarmed entries in PMIDS are marked as resolved.

12. The MAJOR and/or MINOR alarm indicator is also turned off if no other sources are affecting both alarm indicators.

Repair Guide

Overview

When the **NETWORK SWITCH** and/or **PORT** and **MAJOR** and/or **MINOR** atarm-indicators on the alarm panel are lighted (indicating a digital network failure) or when **PROC 620** is referenced from **PROC 600** (Alarm causes/error log) as a potential problem, the following steps should be performed in the order listed to isolate and repair the faulty unit.

The starting point for isolation and repair of digital network circuit failures is Test 1 of **PROC 600** or Test 1 of **PROC 620**.

To isolate a digital network failure displayed in Test 1 of **PROC 600** or Test 1 of **PROC 620**, Test 4 of **PROC 620** is executed to determine where a fault actually is located in the digital network.

Test 4 of **PROC 620** performs a diagnostic analysis on the failing digital network circuit beginning at the specified circuit location.

If the circuit fails, other tests may be executed on the circuit pack and the paths leading into the circuit pack (i.e., data, 1/O, maintenance interface, etc.), to determine if a fault lies inside the circuit pack or along one of the interface paths.

If the fault lies outside of the circuit pack, Test 4 continues testing until the fault is isolated.

If the failure is found to be on another circuit pack than the one originally specified, this circuit pack is indicated as the failure.

Test 4 of PROC 620 also provides alternate circuit pack replacements (if any).

The alternate circuit packs are replaced in order of decreasing probability until the possibilities (maximum of three - 2 alternate circuit packs) are replaced, or the failure is corrected.

1. Execute Test 1 of **PROC 600** or Test 1 of **PROC 620** to determine which digital network circuits are alarmed, indicated by a 1, 2, or 3 (major, minor, or warning) displayed in Field 8, the severity of the alarms, and the order in which the digital network unit types (functional areas) are displayed.

Record the failing digital network circuits and unit types displayed in Test 1 of **PROC 600** or Test 1 of **PROC 620**.

- Determine from the digital network zircuits recorded if a pattern exists that would assist in determining the type of corrective action required.
- 3. Isolation and repair steps for digital network circuit failures are detailed in:

One digital network circuit failure.

Digital network circuit failures in different unit types.

Multiple digital network circuit failures in the same unit type.

Multi-module Switch Alarms with more than one Unit Type 13 (Port Data Store) with specific fault code 70 and more than one Unit Type 53 (Multiplexer), with specific fault code 611 failure caused by network test flag faults.

DS-1 Interface (unit type 68) failures.

Remote module interface (unit type 71) failures.

Time Slot Interchanger (TSI) demand test (if applicable).

Special error code 88.

Specific fault codes.

One Digital Network Circuit Failure

Assumption: Test 1 of **PROC 600** or Test 1 of **PROC 620** displays only one alarmed digital network circuit failure.

1. Display the failing circuit in Test 1 of **PROC 600** or Test 1 of **PROC 620**.

If the failing circuit is a DS-1 circuit pack (unit type 68) refer to isolation and repair step **DS-1 Interface (Unit Type 68) Failures** for further diagnosis of the trouble.

If the failing circuit is a remote module interface (unit type 71), refer to isolation and repair step **Remote Module Interface (Unit Type 71) Failures** for further diagnosis of the trouble.

If the failing circuit is not a unit type 68 or unit type 71 trouble, proceed to Step 2.

2. Enter PROC 620 Test 4.

Note: The alarmed circuit that was displayed in Test 1 of **PROC 600** or Test 1 of **PROC 620** is the default equipment location displayed in Test 4 of **PROC 620**.

3. Record the specific fault code displayed in Field 11 which was detected by on-line periodic software tests and logged in PMIDS.

Caution: Diagnosis of specific fault codes 607, 612, 630, or 638 displayed in Field 11 against unit type 57 (light guide interface) may affect service for approximately the last 6 seconds of Test 4 when unit type 57 is tested in an unduplicated TMS/network module complex.

Note: A normal passing test for unit type 57 lasts approximately 2 to 3 minutes.

- 4. When an attendant console interface circuit (unit type 44) is selected for testing, the associated headset or handset **must** be unplugged or the circuit fails the diagnostic test.
- 5. When a 1-way incoming or 1-way outgoing auxiliary trunk circuit (unit type 45) is selected for testing, the option settings **must** be set for 2-way transmission or the circuit fails the diagnostic test.
- 6. To test an auxiliary trunk circuit perform the following:

Remove the auxiliary trunk circuit pack (SN231) and check the option settings on the circuit to be tested.

If the auxiliary trunk circuit is a 2-way transmission (option Q - switches 2 and 3 in the up position) proceed to Step 7.

If the auxiliary trunk circuit is a 1-way incoming (option S - switch 2 up and switch 3 down) or a 1-way outgoing (option R - switch 2 down and switch 3 up) record the switch settings and set both switches (2 and 3) to the up position, then proceed to Step 7.

Note: After the test passes (corrective action taken if necessary), ensure the switch settings are correctly positioned (recorded above) for the type of transmission required (1-way incoming or 1-way outgoing) on the auxiliary trunk circuit tested.

7. Check the circuit status displayed in Field 9.

If Field 9 equals 1 (on-line and in-use), Test 4 cannot be performed for port circuits. Wait until the circuit is not in-use or perform tests on other circuits.

Note: Port circuits that cannot be tested while in-use are unit types 24, 25, 27, 28, 29, 32, 33, 34, 44 through 47, 62, 66, 68, 69, 71, and 72.

If Field 9 equals 4 (unable to communicate or not plugged in), proceed to Step 8.

Note: A possibility exists that the circuit pack is not plugged in or that a faulty ID chip on the circuit pack exists when a circuit status of 4 is displayed in Field 9 before Test 4 is executed.

If Field 9 does not equal 4, proceed to Step 9.

8. If Test 4 is being run remotely, proceed to Step 9.

If Test 4 is being run locally (or maintenance personnel are on the customer's premises), determine if the circuit pack is plugged in.

If the circuit pack is not plugged in, or the slot is empty, reseat or replace the circuit pack, then proceed to Step 9.

If the circuit pack is firmly seated, proceed to Step 9.

Caution: Busying out a port circuit results in loss of customer calls when the port circuit is in use.

9. Individual port circuits can be placed in maintenance busy out status for testing by checking the circuit status displayed in Field 9.

If Field 9 equals 1 (on-line and in-use) individual port circuits should not be busied out as Test 4 results may not be valid.

Note: Port circuits that should not be busied out while in-use are unit types 24, 25, 27, 28, 29, 32, 33, 34, 44 through 47, 62, 66, 68, 69, 71, and 72.

If the circuit status = 3, proceed to Step 10.

If the circuit status does not equal 3, depress BUSY OUT and proceed to Step 10.

Note: If the circuit within a unit type cannot be busied out, special error code 80 (busy/release busy not allowed for this unit) is displayed in the **MAAP** error code field.

10. Depress **EXECUTE**.

11. Special error codes 81 or 83 may be displayed in the **MAAP** error code field and the test is terminated when the network digital circuit cannot be tested.

If special error code 81 or 83 is not displayed, proceed to Step 14.

12. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 4.

If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7 and depressing **EXECUTE**.

If TN380 or TN381 fails, perform Steps 25 through 44 below (as appropriate).

If TN380 or TN381 passes, check the wiring associated with the circuit pack that displayed special error code 81.

- 13. When special error code 83 (switch resources not available) is displayed, repeat Test 4 until the test is executed or wait until switch resources become available before testing.
- 14. If special error code 88 (refer to documentation for replacement of circuit packs) is displayed in the **MAAP** error code field, refer to isolation and repair step **Special Error Code 88**.
- 15. If unit type 6 (module control channel) is being tested check the specific fault code displayed in Field 11.

If specific fault code 23 is displayed in Field 11, proceed to Step 16.

If specific fault code 23 is not displayed in Field 11, proceed to Step 23.

16. Check the translation for TN530 (duplication/update channel).

If TN530 is not translated, either remove TN530 or translate the circuit and repeat Test 4. If TN530 is translated, proceed to Step 23.

- 17. If unit type 27 (GPP) is being tested check the specific fault code displayed in Field 11.If specific fault code 353 (fuse blown) is displayed in Field 11, proceed to Step 18.If specific fault code 353 is not displayed in Field 11, proceed to Step 23.
- 18. At the equipment location displayed in Fields 3 through 6, determine the type of GPP circuit pack installed.

Caution: Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

If SN270 is installed, replace the blown fuse and proceed to Step 27.

If SN270B is installed, replace the circuit pack and proceed to Step 30.

Note: All versions of the GPP circuit pack (SN270 and SN270B) can have specific fault code 353 displayed in Field 11. SN270B does not have fuses mounted on the circuit pack and is replaced instead of replacing a blown fuse.

19. If unit type 72 (EIA interface) is being tested check the specific fault code displayed in Field 11.

If specific fault code 995 is displayed in Field 11, proceed to Step 20.

If specific fault code 995 is not displayed in Field 11, proceed to Step 23.

20. Perform Test 1 of PROC 646 on the equipment location displayed in Fields 3 through 7.

If the EIA interface fails Test 1 of **PROC 646**, replace circuit pack SN238 at the equipment location displayed in Fields 7 through 11 of **PROC 646**.

21. Repeat Test 1 of PROC 646.

If Test 1 of **PROC 646** passes, return to Test 4 of **PROC 620** to retire the cause of the fault indicator.

If Test 1 of **PROC 646** fails again check the option settings on the terminal associated with the equipment location displayed in Fields 7 through 11 of **PROC 646**.

22. Repeat Test 1 of PROC 646.

If Test 1 of PROC 646 passes, return to Test 4 of PROC 620 to retire the cause of the fault indicator.

If Test 1 of **PROC 646** fails again check the wiring between the SN238 and the associated terminal.

23. Determine the status of the circuit by observing the LEDs on the faceplate of the circuit pack displayed in Fields 3 through 6.

Note: The unit type and equipment location displayed in Fields 2 through 7 may not be the circuit selected for testing. Test 4 performs a diagnostic analysis test which may isolate the problem to a circuit pack which interfaces with the circuit pack selected for testing.

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24. If the circuit passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

Check the circuit status displayed in Field 9. If the circuit status = 4 (unable to communicate or not plugged in) a faulty ID chip on the circuit pack is the problem. Proceed to Step 59.

Note: When the circuit was alarmed in Test 1 of **PROC 600** or Test 1 of **PROC 620** and passes the diagnostic analysis test in Test 4 of **PROC 620**, further analysis of the problem should be performed by running a continuous test of the circuit in Test 3 of **PROC 620** to ensure that the failure is not intermittent.

If the circuit status does not equal 4, proceed to Step 50.

25. If the circuit fails, indicated by a specific fault code displayed in Field 11 and the **RED** LED lighted on the faceplate of the circuit pack, record the specific fault code displayed in Field 11 which is detected by the demand diagnostic test and logged in DMIDS.

Caution: Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

26. At the equipment location displayed in Fields 3 through 6, reseat the circuit pack.

Note: When a circuit in unit type 33 - Direct Inward Dialing (DID) trunk - is being tested, check the dip switch settings on SN232 prior to reseating the circuit pack. Each pair of switches for each circuit **must** be positioned one up, and one down or the test fails.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

27. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

Note: A verification test is automatically performed by Test 4 on the circuit pack reseated or replaced without any steps performed by maintenance personnel, other than reseating or replacing the circuit pack.

28. If the circuit pack passes, the GREEN LED is lighted on the faceplate of the circuit pack.

Check the circuit status displayed in Field 9. If the circuit status = 4 (unable to communicate or not plugged in) a faulty ID chip on the circuit pack is the problem. Proceed to Step 59.

If the circuit status does not equal 4, proceed to Step 60.

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- 29. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack. At the equipment location displayed in Fields 2 through 6, replace the circuit pack. Wait until the **WAIT** lamp on the **MAAP** goes off before checking the status of the LEDs.
- 30. Observe the RED and GREEN LEDs on the faceplate of the circuit pack.If the circuit pack passes, the GREEN LED is lighted on the faceplate of the circuit pack.Proceed to Step 60.
- 31. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack. Depress **NEXT CIRCUIT** to determine if an alternate circuit pack replacement is available. If Fields 2 through 13 are dashed, no alternate circuit pack is available for replacement. Refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

PROC 620

32. If an alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

The **RED** LED on the original circuit pack is turned off, and the **RED** LED on the alternate circuit pack is turned on.

33. At the equipment location displayed in Fields 3 through 6, reseat the alternate circuit pack.

Caution: Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

34. Observe the **RED** and **GREEN** LEDs on the faceplate of the alternate circuit pack.

If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the alternate circuit pack.

Proceed to Step 60.

35. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

At the equipment location displayed in Fields 3 through 6, replace the alternate circuit pack.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

36. Observe the RED and GREEN LEDs on the faceplate of the alternate circuit pack.

If the circuit pack passes, the $\ensuremath{\mathbf{GREEN}}$ LED is lighted on the faceplate of the alternate circuit pack.

Proceed to Step 60.

37. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

Depress **NEXT CIRCUIT** to determine if another alternate circuit pack replacement is available.

If Fields 2 through 13 are dashed, no other alternate circuit pack is available for replacement.

Refer to isolation and repair step Specific Fault Codes for further isolation techniques.

38. If another alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

The **RED** LED on the first alternate circuit pack is turned off, and the **RED** LED on the second alternate circuit pack is turned on.

39. At the equipment location displayed in Fields 3 through 6, reseat the second alternate circuit pack.

Caution: Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.
40. Observe the **RED** and **GREEN** LEDs on the faceplate of the second alternate circuit pack.

If the circuit pack passes, the ${\bf GREEN}$ LED is lighted on the face plate of the second alternate circuit pack.

Proceed to Step 60.

41. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.

At the equipment location displayed in Fields 3 through 6, replace the second alternate circuit pack.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

42. Observe the **RED** and **GREEN** LEDs on the faceplate of the second alternate circuit pack.

If the circuit pack passes, the ${\bf GREEN}$ LED is lighted on the faceplate of the second alternate circuit pack.

Proceed to Step 60.

- 43. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.
- 44. Determine if unit type 53 (multiplexer) is being tested.

If unit type 53 is being tested **and** specific fault code 636 is displayed in Field 11, proceed to Step 45.

If unit type 53 is not being tested, or specific fault code 636 is **not** displayed in Field 11 for unit type 53, refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

45. Use NEXT TEST to step to Test 3 of PROC 620.

Note: The multiplexer circuit that was displayed in Test 4 is the default equipment location displayed in Test 3.

At Slot 23 of the TMS carrier, reseat TN530.

46. Depress EXECUTE.

Allow Test 3 to execute for a period of time (or until a specific fault code is indicated in Field 11) and depress **STOP**.

If the multiplexer circuit passes Test 3 (indicated by a 0 displayed in Field 13), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

If the multiplexer circuit fails Test 3 (indicated by a 1 displayed in Field 13), replace TN530 in Slot 23 of the TMS carrier.

Depress EXECUTE.

Allow Test 3 to execute for the same period of time (or longer) and depress STOP.

If the multiplexer circuit passes Test 3 (indicated by a 0 displayed in Field 13), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

If the multiplexer circuit fails Test 3 (indicated by a 1 displayed in Field 13), reseat TN462 at Slot 11 of the TMS carrier.

48. Depress EXECUTE.

Allow Test 3 to execute for a period of time (or until a specific fault code is indicated in Field 11) and depress **STOP**.

If the multiplexer circuit passes Test 3 (indicated by a 0 displayed in Field 13), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

If the multiplexer circuit fails Test 3 (indicated by a 1 displayed in Field 13), replace TN462 in Slot 11 of the TMS carrier.

49. Depress EXECUTE.

Allow Test 3 to execute for the same period of time (or longer) and depress STOP.

If the multiplexer circuit passes Test 3 (indicated by a 0 displayed in Field 13), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

If the multiplexer circuit fails Test 3 (indicated by a 1 displayed in Field 13), refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

50. Use NEXT TEST to step to Test 3 of PROC 620.

Note: The circuit that was displayed in Test 4 is the default equipment location displayed in Test 3.

51. Depress EXECUTE.

Allow Test 3 to execute for a period of time (or until a specific fault code is indicated in Field 11) and depress **STOP**.

If the circuit passes Test 3 (indicated by a 0 displayed in Field 13), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

- 52. If the circuit fails Test 3, reseat the circuit pack at the equipment location displayed in Fields 3 through 6.
- 53. Depress **EXECUTE**.

Allow Test 3 to execute for the same period of time (or longer) and depress STOP.

- 54. If the circuit passes Test 3 (indicated by a 0 displayed in Field 13), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.
- 55. If the circuit fails Test 3, record the specific fault code displayed in Field 11 which is detected by the demand diagnostic test and logged in DMIDS.
- 56. At the equipment location displayed in Fields 3 through 6, replace the circuit pack.
- 57. Depress EXECUTE.

Allow Test 3 to execute for the same period of time (or longer) and depress STOP.

58. If the circuit passes Test 3 (indicated by a 0 displayed in Field 13), repeat Test 4 to turn off the **NETWORK SWITCH** or **PORT** fault indicator.

If the circuit fails Test 3, refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

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59. When a circuit status of 4 indicates a faulty ID chip, perform the following:

At the equipment location displayed in Fields 2 through 6, replace the circuit pack.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack. Proceed to Step 60.

If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack. Check the wiring associated with the circuit pack replaced.

60. When any circuit packs for the following unit types are replaced, isolation and repair step **TSI Demand Test** should be run before leaving the customer's premises.

Unit type 8 - Maintenance Interface (MIF).

Unit type 9 - Module clock.

Unit type 10 - TSI ALU.

Unit type 11 - TSI PSTORE.

Unit type 13 - PDS.

Unit type 15 - PDI.

61. The **NETWORK SWITCH** or **PORT** fault indicator is turned off when the circuit passes Test 4.

The **MAJOR** or **MINOR** alarm indicator is also turned off if no other sources are affecting both alarm indicators.

Digital Network Circuit Failures in Different Unit Types

Assumption: Test 1 of **PROC 600** or Test 1 of **PROC 620** displays network circuit failures in different unit types.

In Test 1 of **PROC 600** or Test 1 of **PROC 620** alarmed failures are displayed in order of severity, i.e.: major alarm failures first, followed by minor alarm failures, with warning alarm failures displayed last.

Within each alarm category, i.e.: major, minor, or warning, alarmed failures are displayed by unit types (functional areas) corresponding to the most important functional area to the least important functional area of the switch.

- 1. Record all alarmed failures in Test 1 of PROC 600 or Test 1 of PROC 620.
- 2. Display the first failing circuit in Test 1 of PROC 600 or Test 1 of PROC 620.

Note: The first failing circuit is the highest alarmed failure (i.e.: major, minor, or warning) recorded in the most important functional area (unit type).

3. If the failing circuit is a DS-1 circuit pack (unit type 68) refer to isolation and repair step **DS-1 Interface (Unit Type 68) Failures** for further diagnosis of the trouble.

4. If the failing circuit is a remote module interface (unit type 71), refer to isolation and repair step **Remote Module Interface (Unit Type 71) Failures** for further diagnosis of the trouble.

If the failing circuit is not a unit type 68 or unit type 71 trouble, proceed to Step 5.

- 5. Perform Steps 2 through 60 (as required) of isolation and repair step **One Digital Network Circuit Failure** for the first failure displayed in Test 1 of **PROC 600** or Test 1 of **PROC 620**.
- 6. When the first failure displayed is repaired and/or passes, analyze the remaining alarmed failures to determine if the first failure could have affected the remaining failures.

Example: A failure in a PCI or PDI can have some bearing on port failures.

Perform one of the following steps (7 through 9) depending on what is determined by the analysis.

- 7. Enter Test 1 of **PROC 600** or Test 1 of **PROC 620** and display the next alarmed failure in order of severity, then step to Test 4 of **PROC 620** and perform Steps 3 through 60 (as required) of isolation and repair step **One Digital Network Circuit Failure**.
- 8. Enter the next recorded failure (in alarm severity order) in Fields 2 through 7 of Test 4 using the CHANGE FIELD sequence and perform Steps 3 through 60 (as required) of isolation and repair step **One Digital Network Circuit Failure**.
- 9. Perform Test 2 of **PROC 620** for each alarmed failure recorded in Test 1 of **PROC 600** or Test 1 of **PROC 620** to test the alarmed circuit or to turn off the fault indicator.
- 10. When an attendant console interface circuit (unit type 44) is selected for testing, the associated headset or handset **must** be unplugged or the circuit fails the diagnostic test.
- 11. When a 1-way incoming or 1-way outgoing auxiliary trunk circuit (unit type 45) is selected for testing the option settings **must** be set for 2-way transmission or the circuit fails the diagnostic test.
- 12. To test an auxiliary trunk circuit, perform the following:

Remove the auxiliary trunk circuit pack (SN231) and check the option settings on the circuit to be tested.

Record the positions of switches 2 and 3.

Set both switches (2 and 3) to the up position (2-way transmission) to test the auxiliary trunk circuit.

Note: After the test passes (corrective action taken if necessary), ensure the switch settings on the auxiliary trunk circuit tested are correctly positioned as recorded above.

- 13. When Test 2 of **PROC 620** indicates a failure for the circuit entered (indicated by a 1 displayed in Field 13), Steps 2 through 60 (as required) of isolation and repair step **One Digital Network Circuit Failure** must be performed to correct the problem.
- 14. When all alarmed circuits displayed in Test 1 of PROC 600 or Test 1 of PROC 620 are repaired and/or pass, the NETWORK SWITCH and/or PORT fault indicator is turned off.

The **MAJOR** or **MINOR** alarm indicator is also turned off if no other sources are affecting both alarm indicators.

Multiple Digital Network Circuit Failures in same Unit Type

Assumption: Test 1 of **PROC 600** or Test 1 of **PROC 620** displays multiple alarmed digital network circuit failures within the same unit type and that no other failures in other unit types are alarmed.

1. When Test 1 of **PROC 600** or Test 1 of **PROC 620** displays more than one digital network circuit of the same unit type with failures, execute Test 2 of **PROC 600** for the same unit type to determine if other digital network circuits within the same unit type have errors recorded against them.

Record the unit type and digital network circuits with errors recorded against them displayed in Test 1 of **PROC 620** or Test 2 of **PROC 600**.

2. Analyze the failures recorded in Test 1 and 2 of **PROC 600** or Test 1 of **PROC 620** to determine if the failures could have been caused by a common interface.

Example: A failure in an Input/Output Bus Interface (IOBI) circuit pack can affect several PCIs; a failure in a Port Data Store (PDS) can affect several PDIs; etc.

Depending upon what is determined from the analysis of the circuits recorded in Test 1 and 2 of **PROC 600** or Test 1 of **PROC 620** perform Step 3 or 4.

3. When the analysis does not indicate a common interface, perform Steps 1 through 60 (as required) of isolation and repair step **One Digital Network Circuit Failure** starting with the first failing circuit displayed in Test 1 of **PROC 600** or Test 1 of **PROC 620**.

After the first failing circuit is repaired and/or passes, repeat Steps 1 through 60 (as required) of isolation and repair step **One Digital Network Circuit Failure** for each alarmed failure recorded in Test 1 of **PROC 600** or Test 1 of **PROC 620**.

When all alarmed failures recorded in Test 1 of **PROC 600** or Test 1 of **PROC 620** pass Test 4 of **PROC 620** the **NETWORK** or **PORT** fault indicator is turned off.

The MAJOR and/or MINOR alarm indicator is also turned off if no other sources are affecting both alarm indicators.

4. When the analysis indicates a common interface as the potential problem, enter the common interface equipment location in Fields 2 through 7 of **PROC 620** Test 4 using the **CHANGE FIELD** sequence.

Perform Steps 3 through 60 (as required) of isolation and repair step **One Digital Network** Circuit Failure.

5. When the common interface circuit is repaired and/or passes, perform Test 2 of **PROC 620** for the unit type recorded in Test 1 of **PROC 600** or Test 1 of **PROC 620** with alarmed failures in order to turn off the fault indicator and resolve the alarmed entries.

When Test 2 of **PROC 620** indicates a failure for the unit type tested, Steps 2 through 60 (as required) of isolation and repair step **One Digital Network Circuit Failure must** be performed for each failure displayed in Test 2 of **PROC 620**.

6. When all alarmed failures recorded in Test 1 of **PROC 600** or Test 1 of **PROC 620** pass Test 2 or 4 of **PROC 620** the **NETWORK** or **PORT** fault indicator is turned off.

The **MAJOR** and/or **MINOR** alarm indicator is also turned off if no other sources are affecting both alarm indicators.

PROC 620

Multi-module Switch Alarms with more than one Unit Type 13 (Port Data Store) with specific fault code 70 and more than one Unit Type 53 (Multiplexer) with specific fault code 611 failures caused by Network Test Flag Faults

Assumption: Test 1 of **PROC 600** or Test 1 of **PROC 620** displays more than one Unit Type 13 (Port Data Store) alarmed failure with specific fault code 70 and more than one Unit Type 53 (Multiplexer) alarmed failure with specific fault code 611.

If either of these conditions is not true, the failures should be analyzed using other isolation and repair steps.

Under some failure conditions, these alarmed failures only appear while the switch is running traffic. The switch runs alarm free and passes all demand tests out of hours.

Note: This is a strong indication that the fault is in a port carrier.

If both conditions are true (more than one unit type 13 alarmed failure with specific fault code 70 and more than one unit type 53 alarmed failure with specific fault code 611), perform the following steps to determine the module that is the true source of the alarms.

- 1. Use Test 2 of PROC 620 to test all unit type 57 (LGI) circuits in the switch.
- 2. Expect many unit type 57 circuits to fail with fault code 611.

Unit type 57 (LGI) circuits that fail with a fault code other than 611 indicate the source of the network test flags.

3. Display a unit type 57 circuit (LGI) with a fault code other than 611 in Test 2.

Step to Test 4 of **PROC 620**.

Note: The circuit displayed in Test 2 is now displayed in Test 4 of PROC 620.

- 4. Depress **EXECUTE**.
- 5. If a circuit pack in the TMS or the LGI is indicted, it is the failing circuit pack.

Perform corrective action as necessary to clear the problem.

6. If a circuit pack in the TMS or the LGI is **not** indicted, the failure is coming from within the same module as the LGI being tested.

Failures in a module control are generally diagnosed correctly and there should be few alarms in the failing module. If there are many alarms in the failing module, the fault is probably in a port carrier.

Port carrier failures cause alarms no matter which module control is on-line. Failures in the port carrier often require the presence of traffic to raise alarms. Demand tests on port carriers executed out of hours often pass.

DS-1 Interface (Unit Type 68) Failures

System level fault isolation for DS-1 interface (unit type 68) failures is defined as the isolation of faults among the various subsystems:

- a. System 85 DS-1 circuit packs.
- b. Channel Division Multiplexer (CDM).

- c. Channel Expansion Multiplexer (CEM).
- d. Network Channel Terminating Equipment (NCTE).
- e. Other associated equipment (i.e., on-site wiring, facility, and any special service equipment).

Fault isolation for DS-1 interface failures consist of:

- a. Fault Isolation for CEM.
- b. Fault Isolation for DS-1 Interface Alarms.
- c. Fault Isolation Techniques for CEM, CDM, and NCTE.

Fault Isolation for CEM

1. Enter **PROC 600** Test 1 and examine unit type 63 (external equipment) to determine if a CEM alarm associated with the DS-1 interface failure exists.

Note: Local records must be used to determine the external equipment encode for CEMs and the associated DS-1 interface equipment location.

- 2. Enter PROC 620 Test 1 and display the original DS-1 interface failure.
- 3. If a CEM alarm does not exist for the associated DS-1 interface failure, proceed to isolation and repair step Fault Isolation for DS-1 Interface Alarms for further diagnosis of the trouble.
- 4. If a CEM alarm is present, there is a problem in the CEM.

On-site repair actions on the CEM must be taken.

The CEM maintenance procedures are specified in AT&T practice 365-287-100.

In general, the CEM circuit pack with the RED LED lighted is first choice.

If none are lighted, power should be checked at the test points on the power unit.

Following the repair the CEM reset button must be depressed to clear the alarm condition.

- 5. Enter PROC 625 Test 1 and check the health status of the DS-1 facility.
- 6. If the health status indicates that the DS-1 facility is presently operational, the alarms should be retired in **PROC 600** Test 1 or **PROC 620** Test 1 and no destructive testing of the DS-1 facility should be performed.
- 7. If the health status indicates that the DS-1 facility is not healthy or if you desire to verify that the DS-1 facility is functioning use one of the following test calls prior to testing the DS-1 using PROC 620.

Make an ATMS supervision call using PROC 647, Test 3 on the DS-1.

Make a TVS call using the DS-1.

Make a terminal-to-trunk test call using PROC 642 on the DS-1.

Caution: The DS-1 tests executed by PROC 620, Tests 2 through 5 are service affecting and should only be executed during periods of low traffic, during outof-hours, or after a service outage has already occurred and is verified using one of the above tests. PROC 625, Test 1 should always be used when the current health of a DS-1 digital service is in question.

PROC 620

8. After repair of the CEM, the DS-1 interface circuit must be tested to clear the alarmed entry in PMIDS.

Caution: Busying out a DS-1 circuit pack disrupts calls in progress on all 24 ports of the DS-1 circuit pack.

Busy out the DS-1 interface circuit by depressing **BUSY OUT** in **PROC 620** Test 4. One circuit cannot be busied out by **PROC 620**. If all 24 circuits on the DS-1 circuit pack are busied out in any busy out procedure, testing can be performed.

Note: If the DS-1 circuit pack is not busied out the test will fail with a specific fault code of 13 or 785 (DS-1 not maintenance busy).

Perform Steps 2 through 60 (as required) of isolation and repair step **One Digital Network Circuit Failure** to retire the alarm cause.

Fault Isolation for DS-1 Interface Alarms

The DS-1 interface alarms represent conditions that could result from either on or off-site faults.

A RED alarm (specific fault code 734) is initiated by a digital switch or digital transmission equipment when the incoming DS-1 transmission bit stream on a particular facility is lost or framing for the incoming bit stream is lost. Upon initiation of a RED alarm, the switch or digital transmission equipment sends a yellow alarm code on the outgoing DS-1 transmission bit stream for that particular facility.

A YELLOW alarm (specific fault code 730) is transmitted to an "other end" switch or digital transmission equipment to indicate that the DS-1 transmission bit stream incoming from the "other end" has been lost or framing on the incoming bit stream from the "other end" is lost. The YELLOW alarm code employed is dependent on the type of framing (D4 or Fe) and signaling (Rob Bit or 24th Channel) employed. For D4 framing with Rob Bit signaling, the YELLOW alarm code is recognized as a zero for bit 2 in each time slot (channel) for a least two full frames (48 consecutive time slots).

A BLUE alarm is transmitted to an "other end" switch or digital transmission equipment to indicate that testing is being done locally which interrupts communication with the "other end". One example is running a maintenance **PROC** on System 85 which executes a looparound test on the DS-1 circuit pack itself. While this test is being performed, the BLUE alarm code is sent to the "other end". The BLUE alarm is recognized as a continuous stream of ones with no provisions for framing or signaling.

1. Check the specific fault code displayed in Field 11.

If specific fault code 729, 730, 734, 762, 773, or 786 is displayed in Field 11, you have a facility problem. Proceed to Step 3.

If any other specific fault code is displayed in Field 11, proceed to Step 2.

Caution: If this DS-1 interface is a primary or secondary reference, then busying out the DS-1 circuit pack and testing it may be service affecting to other digital facilities because the capability to communicate at a digital rate would be lost for the duration of the test. Busy out the DS-1 interface circuit by depressing BUSY OUT in PROC 620 Test 4. One circuit cannot be busied out. The entire DS-1 circuit pack is busied out by depressing BUSY OUT.

Caution: Busying out a DS-1 circuit pack disrupts calls in progress on all 24 ports of the DS-1 circuit pack.

Note: If the DS-1 circuit pack is not busied out the test will fail with a specific fault code of 785 (DS-1 not maintenance busy).

Perform Steps 2 through 60 (as required) of isolation and repair step **One Digital Network Circuit Failure** for the failing DS-1 circuit pack.

- 3. Enter PROC 625 Test 1 and check the health status of the DS-1 facility.
- 4. If the health status indicates that the DS-1 facility is presently operational, the alarms should be retired in **PROC 600** Test 1 or **PROC 620** Test 1 and no destructive testing of the DS-1 facility should be performed.
- 5. If the status indicates that the DS-1 facility is not healthy or if you desire to verify that the DS-1 facility is functioning use one of the following test calls prior to testing the DS-1 using PROC 620.

Make an ATMS supervision call using PROC 647, Test 3 on the DS-1.

Make a TVS call using the DS-1.

Make a terminal-to-trunk test call using PROC 642 on the DS-1.

Caution: The DS-1 tests executed by PROC 620, Tests 2 through 5 are service affecting and should only be executed during periods of low traffic, during outof-hours, or after a service outage has already occurred and is verified using one of the above tests. PROC 625, Test 1 should always be used when the current health of a DS-1 digital service is in question.

6. Specific fault codes 729, 730, 734, 762, 773, or 786 displayed in Field 11 indicate a red or yellow alarm indicting the facility.

The DS-1 port, the CEM's and CDM's, the on-site wiring, the NCTE, or the facility could be the problem.

7. To isolate problems with the CEM's, CDM's, NCTE, or the DS-1 port, refer to isolation and repair step

Fault Isolation Techniques for CEM, CDM, and NCTE.

Fault Isolation Techniques for CEM.

Step 8 for DS-1 port test.

8. Enter PROC 620 Test 4.

Note: The alarmed circuit that was displayed in Test 1 of **PROC 600** or Test 1 of **PROC 620** is the default equipment location displayed in Test 4 of **PROC 620**.

9. Record the specific fault code displayed in Field 11 which was detected by on-line periodic software tests and logged in PMIDS.

PROC 620

10. Check the circuit status displayed in Field 9.

If Field 9 equals 1 (on-line and in-use), Test 4 cannot be performed for the DS-1 port circuit. Wait until the circuit is not in-use or perform tests on other circuits.

If Field 9 equals 4 (unable to communicate or not plugged in), proceed to Step 11.

Note: A possibility exists that the circuit pack is not plugged in or that a faulty ID chip on the circuit pack exists when a circuit status of 4 is displayed in Field 9 before Test 4 is executed.

If Field 9 does not equal 4, proceed to Step 12.

11. If Test 4 is being run remotely, proceed to Step 12.

If Test 4 is being run locally (or maintenance personnel are on the customer's premises), determine if the circuit pack is plugged in.

If the circuit pack is not plugged in, or the slot is empty, reseat or replace the circuit pack, then proceed to Step 12.

If the circuit pack is firmly seated, proceed to Step 12.

- 12. Depress EXECUTE.
- 13. Special error codes 81 or 83 may be displayed in the MAAP error code field and the test is terminated when the network digital circuit cannot be tested.

If special error code 81 or 83 is not displayed, proceed to Step 16.

14. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 4.

If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7 and depressing **EXECUTE**.

If TN380 or TN381 fails, perform Steps 19 through 37 below (as required).

If TN380 or TN381 passes, check the wiring associated with the circuit pack that displayed special error code 81.

- 15. When special error code 83 (switch resources not available) is displayed, repeat Test 4 until the test is executed or wait until switch resources become available before testing.
- 16. Determine the status of the circuit by observing the LEDs on the faceplate of the circuit pack displayed in Fields 3 through 6.

Note: The unit type and equipment location displayed in Fields 2 through 7 may not be the circuit selected for testing. Test 4 performs a diagnostic analysis test which may isolate the problem to a circuit pack which interfaces with the circuit pack selected for testing.

- 17. If the circuit passes, the GREEN LED is lighted on the faceplate of the circuit pack.
- 18. If the DS-1 interface circuit passes, facility vendor tests or on-site action is required to isolate the problem. Refer to isolation and repair step Fault Isolation Techniques for CEM, CDM, and NCTE for recommended procedures.

19. If the circuit fails, indicated by a specific fault code displayed in Field 11 and the **RED** LED lighted on the faceplate of the circuit pack, record the specific fault code displayed in Field 11 which is detected by the demand diagnostic test and logged in DMIDS.

Caution: 1. If the DS-1 circuit pack code is ANN-11B, RED and GREEN alarms will result from running a test. A minimum of 15 seconds is required for these alarms to clear. After waiting 15 seconds re-run Test 4 to get valid results. (This problem does not occur on DS-1 circuit pack code ANN-11C.)

Caution: 2. Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

20. At the equipment location displayed in Fields 3 through 6, reseat the circuit pack.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

21. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

Note: A verification test is automatically performed by Test 4 on the circuit pack reseated or replaced without any steps performed by maintenance personnel, other than reseating or replacing the circuit pack.

22. If the circuit pack passes, the GREEN LED is lighted on the faceplate of the circuit pack.

Proceed to Step 38.

23. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack.

Caution: If the DS-1 circuit pack code is ANN-11B, RED and GREEN alarms will result from running a test. A minimum of 15 seconds is required for these alarms to clear. After waiting 15 seconds re-run Test 4 to get valid results. (This problem does not occur on DS-1 circuit pack code ANN-11C.)

At the equipment location displayed in Fields 3 through 6, replace the circuit pack.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

24. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack. Proceed to Step 38.

25. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack.

Caution: If the DS-1 circuit pack code is ANN-11B, RED and GREEN alarms will result from running a test. A minimum of 15 seconds is required for these alarms to clear. After waiting 15 seconds re-run Test 4 to get valid results. (This problem does not occur on DS-1 circuit pack code ANN-11C.)

Depress NEXT CIRCUIT to determine if an alternate circuit pack replacement is available.

If Fields 2 through 13 are dashed, no alternate circuit pack is available for replacement.

Refer to DS-1 circuit pack LEDs described in Step 39 and isolation and repair step **Specific** Fault Codes for further isolation techniques.

PROC 620

26. If an alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

The **RED** LED on the original circuit pack is turned off, and the **RED** LED on the alternate circuit pack is turned on.

27. At the equipment location displayed in Fields 3 through 6, reseat the alternate circuit pack.

Caution: Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

28. Observe the **RED** and **GREEN** LEDs on the faceplate of the alternate circuit pack.

If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the alternate circuit pack.

Proceed to Step 38.

29. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

Caution: If the DS-1 circuit pack code is ANN-11B, RED and GREEN alarms will result from running a test. A minimum of 15 seconds is required for these alarms to clear. After waiting 15 seconds re-run Test 4 to get valid results. (This problem does not occur on DS-1 circuit pack code ANN-11C.)

At the equipment location displayed in Fields 3 through 6, replace the alternate circuit pack.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

30. Observe the **RED** and **GREEN** LEDs on the faceplate of the alternate circuit pack.

If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the alternate circuit pack.

Proceed to Step 38.

31. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

Caution: If the DS-1 circuit pack code is ANN-11B, RED and GREEN alarms will result from running a test. A minimum of 15 seconds is required for these alarms to clear. After waiting 15 seconds re-run Test 4 to get valid results. (This problem does not occur on DS-1 circuit pack code ANN-11C.)

Depress **NEXT CIRCUIT** to determine if another alternate circuit pack replacement is available.

If Fields 2 through 13 are dashed, no other alternate circuit pack is available for replacement.

Refer to DS-1 circuit pack LEDs described in Step 39 and isolation and repair step **Specific** Fault Codes for further isolation techniques.

32. If another alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

The **RED** LED on the first alternate circuit pack is turned off, and the **RED** LED on the second alternate circuit pack is turned on.

33. At the equipment location displayed in Fields 3 through 6, reseat the second alternate circuit pack.

Caution: Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

34. Observe the **RED** and **GREEN** LEDs on the faceplate of the second alternate circuit pack.

If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the second alternate circuit pack.

Proceed to Step 38.

35. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.

Caution: If the DS-1 circuit pack code is ANN-11B, RED and GREEN alarms will result from running a test. A minimum of 15 seconds is required for these alarms to clear. After waiting 15 seconds re-run Test 4 to get valid results. (This problem does not occur on DS-1 circuit pack code ANN-11C.)

At the equipment location displayed in Fields 3 through 6, replace the second alternate circuit pack.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

36. Observe the RED and GREEN LEDs on the faceplate of the second alternate circuit pack.

If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the second alternate circuit pack.

Proceed to Step 38.

37. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.

Caution: If the DS-1 circuit pack code is ANN-11B, RED and GREEN alarms will result from running a test. A minimum of 15 seconds is required for these alarms to clear. After waiting 15 seconds re-run Test 4 to get valid results. (This problem does not occur on DS-1 circuit pack code ANN-11C.)

Refer to DS-1 circuit pack LEDs described in Step 39 and isolation and repair step **Specific** Fault Codes for further isolation techniques.

38. The **NETWORK SWITCH** or **PORT** fault indicator is turned off when the circuit passes Test 4.

Note: The far end DS-1 will be in a RED alarm state following the termination of Test 4. Fifteen seconds must elapse before this alarm state clears and the DS-1 circuit packs resume normal operation. (With one exception this alarm state is indicated by the **GREEN** LED in position 8 being off. The exception is when the circuit is optioned for D4 framing and 24-th channel signaling.)

The **MAJOR** or **MINOR** alarm indicator is also turned off if no other sources are affecting both alarm indicators.

- 39. The LEDS on the DS-1 circuit pack may assist in isolating problems with DS-1 interface alarms.
- 40. Examine the LEDs on the DS-1 circuit pack.

Under normal conditions, the two **GREEN** LEDs in positions 7 and 8 are lighted. This indicates the DS-1 link is up and framing is accomplished.

If the **GREEN** LED in position 7 is off (not lighted), a **RED** alarm is indicated. This implies that the incoming DS-1 bit stream is lost or that framing is lost on the incoming bit stream. Under these conditions, the **GREEN** LED in position 8 is a don't care state and may be on of off. On rare occasion the position 7 LED flutters. This indicates that the ANN11 circuit pack is not able to frame on the incoming signal. The problem could be either the signal coming from the facility, the ANN11 circuit pack, or System 85 circuitry distributing control signals to the ANN11.

If the **GREEN** LED in position 7 is lighted and the **GREEN** LED in position 8 is off (not lighted), a **YELLOW** alarm has been received from the other end. This indicates that the "other end" has lost incoming framing or transmission and is in a **RED** alarm state. A yellow alarm condition may exist even though the **GREEN** LED is lighted. Use **PROC 625** to determine if a network alarm exists.

The YELLOW LED in position 9 is on (lighted) during initialization of the DS-1 circuit pack. It will turn off (not lighted) after approximately 4 seconds indicating initialization is complete. Thereafter, the YELLOW LED will be on (lighted) when at least one trunk channel on the DS-1 link is in use and serves as a busy indicator.

Fault Isolation Techniques for CEM, CDM and NCTE

- 1. On-site isolation among the units that are provided between the DS-1 port and the span line interface is performed by activating built-in tests on individual units and by using patch cords to provide external looparound and to bypass equipment external to the DS-1 port.
- 2. On-site tests for the specific unit should be run as needed in accordance with the maintenance documentation (or other vendor documentation) provided for the specific unit.
- 3. External looparound should be performed by changing Field 11 of **PROC 260** to a 1 and executing **PROC 620** Test 2 on the DS-1 circuit pack.

Test 2 performs external looparound on the DS-1 circuit pack to the first looparound on the DS-1 link outside the switch.

4. When CEM's are provided, a preferred looparound is on a patch field such as the ED-2C780 Jack Panel (X IN to X OUT or Y IN to Y OUT).

Note: The CEM switches looparound data back to the CEM on all three DS-1 interfaces. The switches do not loop data back towards the switch.

- 5. If a CDM is also provided, the CDM should be bypassed by manually forcing it into . looparound.
- 6. If Test 2 fails the DS-1 circuit pack should be replaced and the tests repeated.

If Test 2 still fails, check the wiring between the DS-1 circuit pack and the associated units.

If Test 2 passes, activate the CEM loop switches and observed that no equipment alarm exists on the CEM.

If no alarms are observed, loop the data at the NCTE (X IN to X OUT patch cord) and remove the line Z loop on the CEM via the loop control switch.

8. Observe that the CEM runs alarm free after reset is depressed.

If the CEM displays alarms, trouble with the NCTE and the wiring to the NCTE probably exist.

If the CEM does not display alarms, trouble with the facility probably exists.

Additional DS-1 Troubleshooting Techniques

In some cases where extra-ordinary measures are needed for trouble shooting DS-1 failures, such as for infrequently occurring problems, or during facility transmission setting alignment and verification it may be desirable to connect stand-alone test equipment to the facility.

The following list of documents describe equipment which may be applicable depending upon circumstances encountered.

- 1. The AT&T 365 series of practices include general information about DS-1 facilities and specific guidance on use of some of the test equipment.
- 2. AT&T practice 103-245-100 J1C140A Digital Access Time Slot Selector; a unit that allows access to two of the voice channels multiplexed on the facility.
- 3. AT&T practice 103-488-105 J68435AH equipment to measure errored seconds.
- 4. AT&T practices 103-493-xxx through 103-494-xxx a number of units including outside suppliers equipment with various capabilities.

In addition to the equipment included in the above list, other equipment with varying capabilities are available in the industry. TEKELEC model TE-820A and VENATOR model VENCAT-24 are two examples of these.

Remote Module Interface (Unit Type 71) Failures

Fault isolation of Remote Module Interface (RMI) circuit failures depends on whether the RMI is the central (switch end) or the remote RMI.

The equipment location displayed in Fields 2 through 6 (Field 7 is dashed) for the RMI (TN456) is **always** the central RMI equipment location.

Specific fault codes displayed in Field 11 assist in determining whether the TN456 to be replaced is a central or remote RMI. Reference to Unit Type 71 in Table AB, PROC 620 - Fault Code Definitions by Unit Type, lists the central or remote TN456 to replace, depending on whether it is the first, second, or third (as appropriate) circuit pack to replace.

Perform the following procedure to isolate RMI failures.

1. Enter PROC 620 Test 4.

Note: The alarmed circuit that was displayed in Test 1 of **PROC 600** or Test 1 of **PROC 620** is the default equipment location displayed in Test 4 of **PROC 620**.

- Record the specific fault code displayed in Field 11 which was detected by on-line periodic software tests and logged in PMIDS.
- 3. Check the circuit status displayed in Field 9.

If Field 9 equals 1 (on-line and in-use), Test 4 cannot be performed for the RMI circuit. Wait until the circuit is not in-use or perform tests on other circuits.

If Field 9 equals 4 (unable to communicate or not plugged in), proceed to Step 4.

Note: A possibility exists that the circuit pack is not plugged in or that a faulty ID chip on the circuit pack exists when a circuit status of 4 is displayed in Field 9 before Test 4 is executed.

If Field 9 does not equal 4, proceed to Step 5.

4. If Test 4 is being run remotely, proceed to Step 5.

If Test 4 is being run locally (or maintenance personnel are on the customer's premises), determine if the circuit pack is plugged in.

If the circuit pack is not plugged in, or the slot is empty, reseat or replace the circuit pack, then proceed to Step 5.

If the circuit pack is firmly seated, proceed to Step 5.

5. Depress EXECUTE.

6. Special error codes 81 or 83 may be displayed in the **MAAP** error code field and the test is terminated when the network digital circuit cannot be tested.

If special error code 81 or 83 is not displayed, proceed to Step 9.

7. When special error code 81 (message transmission to TMS or module processor failed) is displayed, repeat Test 4.

If special error code 81 is displayed again, test TN380 (module processor) or TN381 (TMS processor) by entering unit type 7 and depressing **EXECUTE**.

If TN380 or TN381 fails, perform Steps 11 through 29 below (as required).

If TN380 or TN381 passes, check the wiring associated with the circuit pack that displayed special error code 81.

- 8. When special error code 83 (switch resources not available) is displayed, repeat Test 4 until the test is executed or wait until switch resources become available before testing.
- 9. Determine the status of the circuit by observing the LEDs on the faceplate of the circuit pack displayed in Fields 3 through 6.

Note: The unit type and equipment location displayed in Fields 2 through 7 may not be the circuit selected for testing. Test 4 performs a diagnostic analysis test which may isolate the problem to a circuit pack which interfaces with the circuit pack selected for testing.

10. If the circuit passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

Check the circuit status displayed in Field 9. If the circuit status = 4 (unable to communicate or not plugged in) a faulty ID chip on the circuit pack is the problem. Proceed to Step 30.

If the circuit status does not equal 4, proceed to Step 35.

11. If the circuit fails, indicated by a specific fault code displayed in Field 11 and the **RED** LED lighted on the faceplate of the circuit pack, record the specific fault code displayed in Field 11 which is detected by the demand diagnostic test and logged in DMIDS.

Caution: Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

12. Check the specific fault code displayed in Field 11.

If the specific fault code displayed in Field 11 is 396, reseat the remote RMI circuit pack. Otherwise, reseat the circuit pack at the equipment location displayed in Fields 3 through 6.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

13. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

Note: A verification test is automatically performed by Test 4 on the circuit pack reseated or replaced without any steps performed by maintenance personnel, other than reseating or replacing the circuit pack.

14. If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

Check the circuit status displayed in Field 9. If the circuit status = 4 (unable to communicate or not plugged in) a faulty ID chip on the circuit pack is the problem. Proceed to Step 30.

If the circuit status does not equal 4, proceed to Step 35.

15. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack.

Check the specific fault code displayed in Field 11.

If the specific fault code displayed in Field 11 is 396, replace the remote RMI circuit pack. Otherwise, replace the circuit pack at the equipment location displayed in Fields 2 through 6.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

16. Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack. Proceed to Step 35.

17. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the circuit pack.

Depress **NEXT CIRCUIT** to determine if an alternate circuit pack replacement is available.

If Fields 2 through 13 are dashed, no alternate circuit pack is available for replacement.

Refer to RMI circuit pack LEDs described in Step 36 and isolation and repair step **Specific** Fault Codes for further isolation techniques.

18. If an alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

The **RED** LED on the original circuit pack is turned off, and the **RED** LED on the alternate circuit pack is turned on.

19. Check the specific fault code displayed in Field 11.

If the specific fault code displayed in Field 11 is 393, 394, or 397 reseat the remote RMI circuit pack. Otherwise, reseat the circuit pack at the equipment location displayed in Fields 3 through 6.

Caution: Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

20. Observe the **RED** and **GREEN** LEDs on the faceplate of the alternate circuit pack.

If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the alternate circuit pack.

Proceed to Step 35.

21. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

Check the specific fault code displayed in Field 11.

If the specific fault code displayed in Field 11 is 393, 394, or 397, replace the remote RMI circuit pack. Otherwise, replace the circuit pack at the equipment location displayed in Fields , 2 through 6.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

22. Observe the **RED** and **GREEN** LEDs on the faceplate of the alternate circuit pack.

If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the alternate circuit pack.

Proceed to Step 35.

23. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the alternate circuit pack.

Depress **NEXT CIRCUIT** to determine if another alternate circuit pack replacement is available.

If Fields 2 through 13 are dashed, no other alternate circuit pack is available for replacement.

Refer to RMI circuit pack LEDs described in Step 36 and isolation and repair step **Specific** Fault Codes for further isolation techniques.

24. If another alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 3 through 6.

The **RED** LED on the first alternate circuit pack is turned off, and the **RED** LED on the second alternate circuit pack is turned on.

25. Check the specific fault code displayed in Field 11.

If the specific fault code displayed in Field 11 is 395, reseat the remote RMI circuit pack. Otherwise, reseat the circuit pack at the equipment location displayed in Fields 3 through 6.

Caution: Wait several seconds after unseating the circuit pack before reseating it in its slot or the verification test is not performed.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

26. Observe the **RED** and **GREEN** LEDs on the faceplate of the second alternate circuit pack.

If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the second alternate circuit pack.

Proceed to Step 35.

27. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.

Check the specific fault code displayed in Field 11.

If the specific fault code displayed in Field 11 is 395, replace the remote RMI circuit pack. Otherwise, replace the circuit pack at the equipment location displayed in Fields 2 through 6.

Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

28. Observe the RED and GREEN LEDs on the faceplate of the second alternate circuit pack.

If the circuit pack passes, the ${\bf GREEN}$ LED is lighted on the faceplate of the second alternate circuit pack.

Proceed to Step 35.

29. If the circuit pack fails again, the **RED** LED is lighted on the faceplate of the second alternate circuit pack.

Refer to RMI circuit pack LEDs described in Step 36 and isolation and repair step **Specific** Fault Codes for further isolation techniques.

- 30. When a circuit status of 4 indicates a faulty ID chip, perform Steps 31 through 34.
- 31. Check the specific fault code displayed in Field 11.

If the specific fault code displayed in Field 11 is 396, replace the remote RMI circuit pack. Otherwise, replace the circuit pack at the equipment location displayed in Fields 3 through 6.

32. Wait until the WAIT lamp on the MAAP goes off before checking the status of the LEDs.

Observe the **RED** and **GREEN** LEDs on the faceplate of the circuit pack.

33. If the circuit pack passes, the **GREEN** LED is lighted on the faceplate of the circuit pack.

Proceed to Step 35.

- 34. If the circuit pack fails, the **RED** LED is lighted on the faceplate of the circuit pack. Check the wiring associated with the circuit pack replaced.
- 35. The **NETWORK SWITCH** fault indicator is turned off when the circuit passes Test 4.

The **MAJOR** or **MINOR** alarm indicator is also turned off if no other sources are affecting both alarm indicators.

36. The LEDs on the RMI circuit pack may assist in isolating problems with RMI failures.

The **RED** LED (LFAIL indicator) in position 11 of the RMI circuit pack when lighted indicates the channel between the RMI central and remote RMI is not in communication.

The **GREEN** LED (FTA indicator) in position 14 of the RMI circuit pack when lighted indicates transmission to the remote RMI over the fiber.

The **GREEN** LED (FRA indicator) in position 16 of the RMI circuit pack when lighted indicates reception from the remote RMI over the fiber.

37. Examine the LEDs on the RMI circuit pack.

If the **RED** LED in position 11 is not lighted, than communication between the central and remote RMIs is good. Proceed to Step 38.

If the **RED** LED in position 11 is lighted, check the communication path between the central and remote RMIs.

Examine the GREEN LEDs in positions 14 and 16 of the RMI circuit pack.
Perform corrective action based on whether transmission or reception is failing.

TSI Demand Test

To run the TSI demand test, perform the following steps:

- 1. Step to Test 2 of PROC 620.
- Use the CHANGE FIELD sequence to enter unit type 99 in Field 2: CHANGE FIELD; 2; ENTER; 99; ENTER.

Note: Unit type 99 cannot be stepped to by using NEXT UNIT.

3. Depress **EXECUTE**.

If Test 2 passes the TSI demand test, all corrective action is complete.

If Test 2 fails the TSI demand test, proceed to Step 4.

4. Enter Test 4 and test the following unit types in the order listed by using NEXT UNIT and NEXT CIRCUIT (as applicable) to select the unit type and circuit pack to be tested. Perform Steps 3 through 60 (as required) of isolation and repair step One Digital Network Circuit Failure for each unit type and circuit pack (as applicable) that fails.

Unit type 11 - TSI PSTORE.

Unit type 13 - PDS (test all PDS circuit packs, 0 through 5).

Unit type 15 - PDI (test all PDI circuit packs, 0 through 23).

Unit type 9 - Module clock.

Unit type 8 - MIF.

Unit type 10 - TSI ALU.

5. When all unit types pass Test 4, corrective action is complete.

Special Error Code 88

Assumption: **PROC 620** Test 4 displays special error code 88 when testing the MCC or a trouble exists where the common control cannot communicate with a network module.

The problem lies somewhere above the MCC or in the cabling between the MCC and the 4 MHZ channels.

- 1. Execute Test 2 of PROC 611 (Common control I/O tests).
- 2. If Test 2 of **PROC 611** fails, perform the corrective action listed in the repair guide part of **PROC 611** until Test 2 passes.
- 3. Perform Test 4 of PROC 620 and test the MCC (unit type 6).

If Test 4 passes, corrective action is complete.

If Test 4 fails, check the cabling and wiring between the MCC and the common control.

Specific Fault Codes

A specific fault code is a number used to provide a description of a failure.

- 1. This description provides more detail about the failure associated with a circuit.
- 2. The failure is directly observed at a hardware sensor point or is the result of processing data observed at several hardware sensor points.

Specific fault codes are recorded during periodic or time available testing in PMIDS. Demand testing specific fault codes are recorded in DMIDS.

Both the PMIDS and DMIDS specific fault codes (normally the same) are available for display during testing.

A list of the specific fault codes is provided in 2 tables.

- 1. Table AA, PROC 620 Specific Fault Code Definitions, lists the specific fault codes in numerical sequence with a definition for each specific fault code.
- 2. Table AB, PROC 620 Specific Fault Code Definitions By Unit Type, lists the specific fault codes displayed when testing a circuit within the unit type listed. In addition, Table AB provides other circuits that could cause (with lower probability) the same failure.

Further isolation of a failure may be accomplished as follows:

- 1. Analyze the specific fault codes recorded from PMIDS (first specific fault code recorded before executing Test 4) and DMIDS (second specific fault code recorded after Test 4 failed).
- 2. Determine from the specific fault codes recorded (using Table AA, PROC 620 Specific Fault Code Definitions, or Table AB, PROC 620 - Specific Fault Code Definitions By Unit Type) if any additional corrective action can be performed (i.e., cabling, connectors, etc.).

Note: The circuit packs listed as circuits 1, 2, and 3 probably have been replaced as the primary candidate and the alternate circuit packs for the failure being investigated.

3. Check the wiring associated with the circuit pack(s) replaced (point to point depending upon specific fault code(s) recorded).

TABLE AA.

PROC 620 — SPECIFIC FAULT CODE DEFINITIONS	
FAULT CODE [1]	DEFINITION
0	NO FAILURE
2	TPIO ERROR FROM A MAINTENANCE ROUTINE
3	NO RESPONSE TO AN EOM FROM A MAINTENANCE ROUTINE
4	DATA PARITY ERROR ON A MAINTENANCE OR SCANNER BUS WRITE
5	OTHER NON-SYSIO ERROR ON A MAINTENANCE OR SCANNER BUS WRITE
6	NO POSITIVE ACKNOWLEDGE USING QUI_PORT, INIT_TSI, OR SCANNER BUS WRITE
7	DISTRIB DATA AFTER BYTE INCORRECT TO A PDI
8	DISTRIB DATA AFTER BYTE INCORRECT TO A PCI
9	DISTRIB DATA AFTER BYTE INCORRECT TO A PORT
10	NO POSITIVE ACKNOWLEDGE AFTER MAINTENANCE ORDER TO TMS PROCESSOR
11	BUS PROBLEM CAUSED MODULE (OR TMS) PROCESSOR SHUTDOWN — ALL TN400 BOARDS IN CARRIER, TN530, TN445, AND TN380 (TN381) ARE ALSO SUSPECT
12	TIME SLOT UNAVAILABLE
13	CIRCUIT IN USE BY CALL PROCESSING
14	ID CHIP FAILURE
15	MAJOR SCANNER FAILURE — NO SWITCH REQUIRED
16	MAJOR FAILURE FOUND IN SCANNER TEST
17	MAJOR DUPLICATION/UPDATE FAILURE IN SCANNER TEST
18	MAJOR SCANNER FAILURE
19	MINOR SCANNER FAILURE
21	BAD MCC/MP COMMUNICATIONS
22	MODULE PROCESSOR ADDRESS PARITY FAILURE
23	CANNOT MANIPULATE MCC STATUS REGISTER BITS
24	CRITICAL MCC CIRCUIT FAILURE
27	CANNOT MANIPULATE MCC STATUS REGISTER BITS OR AEH4 ALARM DISTRIBU- TION AND AIR FLOW MONITOR

PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
28	SAME AS SPECIFIC FAULT CODE (SFC) 11
29	CIRCUIT PACK PULLED OR 4-MHZ CABLE DISCONNECTED
30	INCORRECT CLOCK OUTPUT SEQUENCE (INCORRECT SAC)
31	MAINTENANCE INTERFACE FAILURE CAUSED INCORRECT SAC READOUT
32	GPP DATA CLOCK LOST MOMENTARILY (INCORRECT DCE READOUT)
33	MAINTENANCE INTERFACE FAILURE CAUSED INCORRECT DCE READOUT
34	CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MODULE ON-LINE
35	CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MODULE OFF-LINE
36	MIF FAILURE CAUSED INCORRECT OOL READOUT, MODULE ON-LINE
37	MIF FAILURE CAUSED INCORRECT OOL READOUT, MODULE OFF-LINE
38	CLOCK FREQUENCY GENERATOR FAILED
39	MIF FAILURE CAUSED INCORRECT DCE OOL READOUT
40	OFF-LINE CLOCK APPEARS AS MASTER WITH NO SCS/LGI PRESENT
41	MIF FAILURE CAUSED OFF-LINE CLOCK TO APPEAR AS MASTER WITH NO SCS/LGI PRESENT
42	CLOCK APPEARS AS MASTER WITH SCS/LGI PRESENT
43	MIF FAILURE CAUSED CLOCK TO APPEAR AS MASTER WITH SCS/LGI PRESENT
44	ON-LINE CLOCK APPEARS AS SLAVE WITH NO SCS/LGI PRESENT
45	MIF FAILURE CAUSED MAINTENANCE INTERFACE APPEARANCE OF ON-LINE CLOCK AS SLAVE WITH NO SCS/LGI PRESENT
50	TSI PSTORE RESOURCES NOT AVAILABLE
51	PORT RESOURCES NOT AVAILABLE
52	TSI PSTORE INTERMITTENTLY REPORTS INVALID NETWORK TEST ACTIVITY
53	A ZERO VALUE CANNOT BE READ OVER THE PST MAINTENANCE BUS PATH

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PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
54	INTERMITTENT ADDRESSING FAULT WITHIN THE TSI
55	A NON-ZERO VALUE CANNOT BE READ OVER THE PST MAINTENANCE BUS PATH
56	AT LEAST ONE PDS IS RECEIVING PCM DATA FROM A DOUBLE-CONNECT
57	INTERMODULE DATA STORE OR MODULE CLOCK OUT OF LOCK CAUSED TSI TEST FAILURE
58	TEST VECTOR 128-255 OUTPUT FROM MIF INCORRECT (BAD TEST VECTORS CAUSED BY POWER FAILURE ARE RESTORED AFTER REPORTING THIS SFC)
59	PDS DATA OR ADDRESSING IN OUTPUT STORE INCORRECT
60	PDI ADDRESSING OR CONTROL INCORRECT
61	ALU RECEIVES INCORRECT DATA FROM PDS
62	PDI OUTPUT DATA INCORRECT
63	INTERMITTENT FAULT IN PCM DATA PATH
64	INTERMITTENT PDI READ ERROR OVER PORT COMMAND BUS
65	INTERMITTENT ALU READ ERROR OVER MAINTENANCE BUS PATH
66	INTERMITTENT PDS READ ERROR OVER MAINTENANCE BUS PATH
67	PST ERRONEOUSLY REPORTS NETWORK TEST ACTIVITY
68	MIF OUTPUTS TEST VECTORS WHEN SHUT OFF
69	PDS OUTPUT STORE GENERATES NETWORK TEST FLAGS ON PORTS NOT PRESENTLY IN-USE
• 70	PDS INPUT STORE GENERATES NETWORK TEST FLAGS
71	PDI GENERATES NETWORK TEST FLAGS
73	MIF TEST VECTOR CIRCUITRY FAULTY
74	MIF TVB CONTENTS INCORRECT (BAD TEST VECTORS CAUSED BY POWER FAILURE ARE RESTORED AFTER REPORTING THIS SFC)
75	BAD PST MEMORY PARITY

PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
76	PST NOT CYCLING
77	INTERMITTENT PDS READ ERROR OVER MAINTENANCE BUS PATH
78	ALU ADDRESS PROCESSING SUSPECTED
79	PDS ADDRESS PROCESSING SUSPECTED
80	PDI LOOP-AROUND OR DATA FAILURE
81	PDS INPUT STORE ADDRESSING OR DATA FAILURE
82	PST INSTRUCTION ADDRESSING FAULT
83	PDS INTERNAL ADDRESSING FAULT
84	PST ADDRESS OR MEMORY FAULT
85	PST MEMORY OR OUTPUT FAULT
86	ALU ADDRESS PROCESSING FAULT
87	ALU PCM DATA FAULT
88	ALU DATA FAULT (ALSO CAUSED BY FAULTY INTERFACE ON PCM BUS BY TN440 PDS OR TN441 IDS)
90	FAILED THE MP BASED DUP_TST
92	DUP BOARD STATUS BITS WOULD NOT SET OR CLEAR
93	ON LINE TN530 ERROR FLAG WAS SET
94	OFF LINE TN530 ERROR FLAG WAS SET
95	STATE OF HEALTH COMPARATOR TEST FAILED
96	DOUBLE WRITE CONTROL TEST FAILED
97	DOUBLE WRITE WITH BAD PARITY TEST FAILED
98	DUPLICATION CHANNEL DID NOT DETECT BAD PARITY
100	NON-ZERO IDLE PORT CONTROL REGISTER

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PROC 620 SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
101	DEFECTIVE GATE ARRAY A
102	DEFECTIVE GATE ARRAY B
103	DEFECTIVE GATE ARRAY C
104	FAULTY PORT SELECT IN GATE ARRAY A
105	FAULTY PORT SELECT IN GATE ARRAY B
106	FAULTY PORT SELECT IN GATE ARRAY C
109	FAULTY SET OF LA FLIP-FLOP
110	FAULTY SET OF CPU FLIP-FLOP
118	FAULTY CLEAR OF LA FLIP-FLOP
120	VALID TONE PRESENT BIT STUCK ACTIVE IN SUMMARY BOARD SCAN
121	VALID TONE PRESENT NOT INDICATED IN SUMMARY BOARD SCAN (REORDER OR DATA ANSWER TONE USED)
122	VALID TONE PRESENT NOT INDICATED IN TONE REGISTER (REORDER OR DATA ANSWER TONE USED)
123	TONE NOT DETECTED IN TONE REGISTER (REORDER OR DATA ANSWER TONE USED)
124	FAULTY CLEAR OF CPU FLIP-FLOP
125	OFF-HOOK ERROR POSSIBLY FROM ATTACHED STATION
126	OFF-HOOK ERROR FROM BAD LA CLEAR OR ATTACHED STATION
128	RING DETECTION ERROR POSSIBLY FROM ATTACHED CO OR MODULE FAILED TO INITIALIZE OR DUPLICATION SWITCH FAILURE
129	GND DETECTION ERROR POSSIBLY FROM EXTERNAL CIRCUIT SIGNALING
130	ACTIVE SEZD* ERROR POSSIBLY FROM BUSY CODE CALL CKT
131	TERMINATED LINE FAILED TO INDICATE OFF-HOOK

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PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
133	OFF-HOOK STATUS FAILED TO LATCH
134	CPT REFLECTION DETECTOR FAILED TO STABILIZE
135	CPT TONE TEST DETECTION FAILED TO STABILIZE
136	CPT REFLECTION DATA READY FLAG STUCK ACTIVE
137	CPT TONE TEST DATA READY FLAG STUCK ACTIVE
138	NORM CURRENT DETECTOR STUCK ACTIVE
139	GROUND DETECTOR FAILED TO DETECT GROUND
140	GS RELAY STUCK OPERATED
141	REV CURRENT DETECTOR STUCK ACTIVE
143	CODE CALL DIGIT DONE* IMPROPERLY ACTIVE
144	CODE CALL DIGIT DONE* IMPROPERLY INACTIVE
145	FAULTY CODE CALL CHIME PERIOD
146	FAULTY DIGITAL SIGNAL PROCESSOR
147	CODE CALL SEZD* IMPROPERLY INACTIVE
149	INSUFFICIENT 440-HZ ON-HOOK REFLECTION
150	EXCESSIVE 440-HZ ON-HOOK REFLECTION
151	INSUFFICIENT 440-HZ OFF-HOOK REFLECTION
152	EXCESSIVE 440-HZ OFF-HOOK REFLECTION
153	EXCESSIVE SIGNAL AT OTHER THAN 440-HZ
154	ON-HOOK STATUS FAILED TO POWER DOWN CODEC
155	CODEC POWER UP STUCK ACTIVE
156	FAULTY FIRST TONE TEST FREQUENCY IDLE INDICATION

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PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
157	FAULTY SECOND TONE TEST FREQUENCY IDLE INDICATION
158	FAULTY FIRST TONE TEST QUIET TIME IDLE INDICATION
159	FAULTY SECOND TONE TEST QUIET TIME IDLE INDICATION
160	FAULTY 440-HZ FREQUENCY
161	FAULTY DIAL TONE FIRST TONE FREQUENCY OR TONE TEST NON-IDLE INDICATION
162	FAULTY DIAL TONE SECOND TONE FREQUENCY OR TONE TEST NON-IDLE INDICATION
163	FAULTY FIRST TONE TEST QUIET TIME NON-IDLE INDICATION
164	FAULTY SECOND TONE TEST QUIET TIME NON-IDLE INDICATION
165	FAULTY INTERRUPTED DIAL TONE FIRST TONE FREQUENCY
166	FAULTY INTERRUPTED DIAL TONE SECOND TONE FREQUENCY
167	FAULTY INTERRUPTED DIAL TONE FIRST TONE QUIET TIME
168	FAULTY INTERRUPTED DIAL TONE SECOND TONE QUIET TIME
169	FAULTY AUDIBLE RING FIRST TONE FREQUENCY
170	FAULTY AUDIBLE RING SECOND TONE FREQUENCY
171	FAULTY AUDIBLE RING FIRST TONE QUIET TIME
172	FAULTY AUDIBLE RING SECOND TONE QUIET TIME
173	FAULTY SPECIAL AUDIBLE RING FIRST TONE FREQUENCY
174	FAULTY SPECIAL AUDIBLE RING SECOND TONE FREQUENCY
175	FAULTY SPECIAL AUDIBLE RING FIRST TONE QUIET TIME
176	FAULTY SPECIAL AUDIBLE RING SECOND TONE QUIET TIME
177	FAULTY INTERCEPT FIRST TONE FREQUENCY
178	FAULTY INTERCEPT SECOND TONE FREQUENCY

PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
179	FAULTY INTERCEPT FIRST TONE QUIET TIME
180	FAULTY INTERCEPT SECOND TONE QUIET TIME
181	FAULTY BUSY FIRST TONE FREQUENCY
182	FAULTY BUSY SECOND TONE FREQUENCY
183	FAULTY BUSY FIRST TONE QUIET TIME
184	FAULTY BUSY SECOND TONE QUIET TIME
185	FAULTY REORDER FIRST TONE FREQUENCY
186	FAULTY REORDER SECOND TONE FREQUENCY
187	FAULTY REORDER FIRST TONE QUIET TIME
188	FAULTY REORDER SECOND TONE QUIET TIME
189	FAULTY 440-HZ REFLECTION DETECTOR IDLE INDICATION
190	FAULTY BROAD BAND REFLECTION DETECTOR IDLE INDICATION
191	FAULTY 440-HZ REFLECTION DETECTOR NON-IDLE INDICATION
192	FAULTY BROAD BAND REFLECTION DETECTOR NON-IDLE INDICATION
193	FAULTY RECEPTION OF AUXILIARY IMMEDIATE RINGBACK TONE
194	BATTERY FEED REVERSAL STUCK ACTIVE OR IDLE CIRCUIT INDICATES LOOP CLOSURE
196	BATTERY FIELD REVERSAL STUCK INACTIVE
199	BUSY OUT FAILED
200	ONLY IDLE
201	DEFECTIVE GATE ARRAY D
202	FAULTY PORT SELECT IN GATE ARRAY D
203	E OR M SIGNAL INDICATOR STUCK ACTIVE

	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)
FAULT CODE [1]	DEFINITION
204	FAILURE OF OP SET
205	M-SIGNAL SENT INDICATOR STUCK INACTIVE
206	POSSIBLE EXTERNAL CIRCUIT SIGNALLING
208	CLEARING LOOP-AROUND FAILS TO REMOVE 440-HZ SIGNAL
211	OFF-HOOK STATUS (GRND SIGNAL DETECTOR) FAILS TO POWER UP THE CODEC
214	FAILURE OF GATE ARRAY OR E-SIGNAL RECEIVER
215	FAILURE OF OP FLIP-FLOP
216	INCORRECT ENCODE IN TIE TRUNK ID CHIP
218	NETWORK ORDER FAILED
219	RELEASE BUSY OUT FAILED
220	DSP CHECKSUM STUCK ACTIVE
222	FTC PORT 0 STUCK OFF-HOOK
223	FTC PORT 1 STUCK OFF-HOOK
227	FTC PORT 0 STUCK ON-HOOK
228	FTC PORT 1 STUCK ON-HOOK
230	NO TRANSMISSION FROM FTC PORT 1 TO PORT 0
231	IMPROPER OUTPUT ENERGY AT FTC PORT 0
232	IMPROPER TRANSMISSION FROM FTC PORT 0 TO PORT 1
233	IMPROPER OUTPUT ENERGY AT FTC PORT 1
235	440-HZ TRANSMISSION FAILURE BETWEEN 2 PORTS
236	EXCESSIVE SIGNAL OTHER THAN 440-HZ AT SEND PORT
237	IMPROPER 440-HZ TRANSMISSION FROM RECEIVE INPUT TO SEND OUTPUT ON THE SAME PORT

PROC 620 SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
239	TEST VECTOR 0-127 OUTPUT FROM MIF INCORRECT
240	MAINTENANCE BUS TO TSI ALU IS BAD
241	TSI ALU LOSSING/LINEARIZING FAULT
242	TSI ALU OPCODE FAILURE
243	TSI ALU ACCUMULATOR FAILURE
244	TSI ALU ACCUMULATOR ADDRESSING FAULT
245	ALU/MIF INTERFACE ERROR
246	IDLE CODE GENERATOR FAILURE
247	TSI ACCUMULATOR RESOURCES NOT AVAILABLE
264	PORT COMMAND BUS - BAD TEST REGISTER VALUE FROM IOBI
265	PORT COMMAND BUS – BAD TEST REGISTER VALUE FROM PCI
266	PORT COMMAND BUS - BAD TEST REGISTER VALUE FROM PDI
267	PORT COMMAND BUS - BAD TEST REGISTER VALUE FROM PORT
268	MAINTENANCE BUS – BAD TEST REGISTER VALUE FROM MIF
269	MAINTENANCE BUS - BAD TEST REGISTER VALUE FROM TARGET BOARD
270	PORT COMMAND BUS – BAD SAC VALUE FROM IOBI
271	PORT COMMAND BUS – BAD SAC VALUE FROM PCI
272	PORT COMMAND BUS - END OF MESSAGE TIMEOUT
273	PORT COMMAND BUS – BAD CLOCK ON MIF
274	Port command bus $-$ 10bi did not flag bad parity
275	PORT COMMAND BUS - BAD (ON/OFF) LINE CONTROL
276	PORT COMMAND BUS – BAD CONTROL COMPLEX SIGNAL TO TN454 AND TN452
277	MAINTENANCE INTERFACE BUS — BAD SAC VALUE

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PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
278	MAINTENANCE BUS - MIF DID NOT FLAG BAD PARITY
280	MLP CONTROLLER FAULT
281	MLP 48-V OVERLOAD
282	MLP MFET DRIVER CIRCUITRY FAILURE
283	MLP FAILED TO RETURN ID REQUEST
284	MLP RESPONDED TO OFF-HOOK TEST WITH SOMETHING BESIDES ON, OFF, OR NO RESPONSE
285	IDLE SENDER SUM SCAN INDICATES DIAL TONE DETECTED
286	IDLE SENDER STATUS REG INDICATES PORT BUSY
287	IDLE SENDER STATUS REG INDICATES DIGIT QUEUE FULL
288	IDLE SENDER STATUS REG INDICATES TEST TONE NOT SENT
289	SENDER CKT SUM CHECK FAILURE
290	SENDER NOT BUSY WHILE TEST TONE BEING SENT
291	SENDER STATUS REG INDICATES TEST TONE COMPLETE WHILE SENDING
292	SENDER FAILS TO SEND 440-HZ TEST TONE
293	NO IDLE RECEIVER FOUND FOR SENDER RETEST
294	SENDER NOT BUSY WHILE SENDING VALID TONE
295	SENDER STATUS REG INDICATES TT SIGNAL DONE WHILE BEING SENT
296	SENDER FAILS TO SEND A VALID TOUCH-TONE
297	NO TOUCH-TONE DIGIT RECEIVED AT RECEIVER
298	SENDER FAILS TO DETECT DIAL TONE
299	SENDER DETECTS DIAL TONE AFTER DIAL TONE REMOVED
300	NO TRANSMISSION THROUGH RECEIVER, LOW PATH TO HIGH PATH

Page 272

	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION	
301	NO TRANSMISSION THROUGH RECEIVER, HIGH PATH TO LOW PATH	
302	NO IDLE SENDER FOUND FOR RECEIVER RETEST	
303	IDLE RECEIVER SUMMARY SCAN INDICATES RECEPTION OF TOUCH-TONE	
304	IDLE RECEIVER PORT CONTROL REGISTER INDICATES RECEPTION OF VALID TOUCH-TONE	
305	RECEIVER FAILS TO RECEIVE LOW LEVEL DIGIT	
306	RECEIVER FAILS TO RECOGNIZE TOUCH-TONE	
307	RECEIVER FAILS TO RECOGNIZE LOW LEVEL DIGIT	
308	RECEIVER RECEIVES FALSE TONE	
315	LOOP CLOSURE DETECTION MAY BE DUE TO CO ATTEMPTING SEIZE	
316	INSUFFICIENT 600-OHM TERMINATION REFLECTION POSSIBLY CAUSED BY OPEN TRANSMISSION OPTION SWITCH	
317	EXCESSIVE 600-OHM TERMINATION REFLECTION	
318	INSUFFICIENT SHORT CIRCUIT TERMINATION REFLECTION	
319	EXCESSIVE SHORT CIRCUIT TERMINATION REFLECTION	
330	TSI PSTORE INSTRUCTION PARITY CHECKING CIRCUITRY FAILED	
331	TSI ALU DATA PARITY CHECKING CIRCUITRY FAILED	
334	PDI DATA PARITY CHECKING CIRCUITRY FAILED	
338	DATA MODULE DOES NOT RESPOND TO A QUERY	
340	ALL GPP PORTS UNDER THIS UNIT TYPE FAILED THE DATA CLOCK TEST. OTHER INDICTMENTS ARE SN270 GPP BOARDS OR UNPLUGGED DIGITAL INSTRUMENTS IN THE SAME HALF CARRIER AS A FAILING UNIT TYPE 15, TN454 PDI	
341	PDI DATA SELECT CIRCUIT BAD	
344	INSUFFICIENT TOUCH-TONE SIGNAL REFLECTION	
345	EXCESSIVE TOUCH-TONE SIGNAL REFLECTION	
350	GPP DTL FAULT BIT SET	

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, PROC 620 SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
351	GPP OR ADFTC DTL IDLE BIT SET
352	GPP DTLI AND DTLF TOGETHER OR ADFTC DIGITAL SELF-TEST AND DTLI TOGETHER
353	GPP 48-VOL BIT SET (FUSE BLOWN) OR ADFTC ANALOG SELF-TEST FAULT
354	GPP 48-VOL AND DTLF BITS SET OR ADFTC ANALOG AND DIGITAL SELF- TEST FAULT TOGETHER
355	GPP 48-VOL AND DTLI BITS SET OR ADFTC ANALOG SELF-TEST AND DTLI TOGETHER
356	GPP 48-VOL, DTLI, AND DTLF BITS SET OR ADFTC ANALOG, DIGITAL SELF-TEST FAULT, AND DTLI TOGETHER
357	ONE S CHANNEL RETRANSMISSION TO THE PORT HAS OCCURRED
358	MORE THAN ONE S CHANNEL RETRANSMISSION TO THE PORT HAS OCCURRED
359	GPP TEST RECEIVED NO RESPONSE FROM ASSOCIATED DI AFTER ID REQUEST
360	GPP TEST FOUND STATE OF HEALTH BIT SET FOR ASSOCIATED DI
361	FAILURE OF PORT BLA SET
362	SAC FAILED TO CLEAR IN PORT DTL LOOP-AROUND TEST
363	INVALID SAC SIGNATURE IN PORT DTL LOOP-AROUND TEST
364	ERROR IN TDR IN PORT DTL LOOP-AROUND TEST OR TEST VECTOR NOT RECEIVED IN PCM PORT LOOP-AROUND TEST
365	SOFT SWITCH FAILED
366	HARD SWITCH FAILED
367	ON-LINE INITIALIZATION FAILED. ALL BOARDS IN UPPER HALF CARRIER ARE SUSPECT. 4-MHZ CABLE ALSO SUSPECT
368	OFF-LINE INITIALIZATION FAILED. ALL BOARDS IN UPPER HALF CARRIER ARE SUSPECT. 4-MHZ CABLE ALSO SUSPECT
369	UNABLE TO READ MODULE HEALTH STATUS DURING INITIALIZATION
370	UNABLE TO WRITE TO LOAD SIGNAL REGISTER DURING INITIALIZATION
371	NEGATIVE ACKNOWLEDGE FROM INITIALIZE IOBI ORDER – ALL TN400 BOARDS IN CARRIER ARE SUSPECT

PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)		
FAULT CODE [1]	DEFINITION	
373	PORT PROCESSOR FAULT	
374	SIGNALING PROCESSOR FAULT	
375	PORT PROCESSOR AND SIGNALING PROCESSOR FAULT	
376	LOSS OF DATA FAULT AND PORT PROCESSOR FAULT	
377	LOSS OF DATA, PORT PROCESSOR, AND SIGNALING PROCESSOR FAULTS	
378	SIGNALING PROCESSOR FAULT, INITIALIZATION SUCCESSFUL	
379	SIGNALING AND PORT PROCESSOR FAULTS, INITIALIZATION SUCCESSFUL	
380	LOSS OF DATA, SIGNALING AND PORT PROCESSOR FAULTS, INITIALIZATION SUCCESSFUL	
381	SIGNALING PROCESSOR FAULT, INITIALIZATION FAILED	
382	SIGNALING AND PORT PROCESSOR FAULTS, INITIALIZATION FAILED	
383	LOSS OF DATA, SIGNALING AND PORT PROCESSOR FAULTS, INITIALIZATION FAILED	
384	PORT PROCESSOR FAULT, RESET SUCCESSFUL	
385	LOSS OF DATA FAULT, RESET SUCCESSFUL	
386	PORT PROCESSOR FAULT, RESET FAILED	
387	LOSS OF DATA FAULT, RESET FAILED	
391	UNABLE TO READ REMOTE MODULE INTERFACE (RMI) STATUS	
392	UNABLE TO WRITE RMI CONTROL	
393	RMI LPFAIL BIT FOUND SET, EXPECTED TO BE CLEARED	
394	RMI FRMERR BIT FOUND SET, EXPECTED TO BE CLEARED	
395	4-MHZ CHANNEL ERROR ON REMOTE END RMI	
396	REMOTE RMI FAILURE	
397	RMI FIBER LINK OR REMOTE RMI POWER FAILURE	

PROC 620 SPECIFIC FAULT CODE DEFINITIONS (Contd)		
FAULT CODE [1]	DEFINITION	
398	4-MHZ CHANNEL TO CENTRAL RMI FAILURE (RMI STATUS NORMAL)	
399	CENTRAL RMI FAILURE (4-MHZ LOOP-BACK FAILED AND RMI STATUS FAILED)	
400	UNKNOWN FIFO 14 ERROR CODE	
401	TSI SHUTDOWN	
402	MODULE PROCESSOR INTERFACE ERROR	
403	MODULE CLOCK ERROR	
404	INTERMODULE DATA STORE ERROR	
405	MODULE SYSTEM CLOCK SYNCHRONIZER ERROR	
406	TSI PSTORE MEMORY PARITY ERROR	
407	TSI PCM DATA PARITY ERROR	
408	PDI PCM DATA PARITY ERROR	
409	LIGHT GUIDE INTERFACE ERROR	
410	ERROR FIFO DATA OUT OF SYNC	
411	TMS CLOCK OSCILLATOR ERROR (OOL BIT SET)	
412	TMS CLOCK OSCILLATOR ERROR (OTHER)	
413	TMS CLOCK OSCILLATOR AFTER INITIALIZATION ERROR (MFP BIT SET)	
414	TMS CLOCK OSCILLATOR AFTER INITIALIZATION ERROR (OTHER)	
415	LOCAL CLOCK TERMINATION ERROR (ERR BIT SET)	
416	LOCAL CLOCK TERMINATION ERROR (OTHER)	
417	LOCAL CLOCK TERMINATION AFTER INITIALIZATION ERROR (MFP OR ACT BIT SET)	
418	LOCAL CLOCK TERMINATION AFTER INITIALIZATION ERROR (OTHER)	
419	MODULE INTERFACE ERROR	
420	FAILED MPX RAM	
PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)		
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FAULT CODE [1]	DEFINITION	
421	MPX RAM PARITY ERROR RECOVERY FAILURE	
422	MPX INITIALIZATION ERROR	
423	MPX INITIALIZATION ALARM	
424	MPX RAM PARITY ERROR	
425	TSI RUNNING BUT INDICATES IT IS SHUTDOWN	
426	RING TRIP CIRCUIT FAILURE	
427	CONTROL/SUMMARY — SCAN REGISTER READ ERROR	
429	PORT DIGITAL SIGNAL PROCESSOR ERROR	
430	TMIF PFAIL/LATE MAKE ALARM	
432	BURST OF TSI PSTORE PARITY ERRORS	
433	MULTIPLE PCM DATA PARITY ERRORS FROM PDI	
434	ALL PORTS OF DVDP BOARD BAD	
436	MLP CONTROLLER FAULT, INTIALIZATION FAILED	
437	DCLOCK SIGNAL DOES NOT GET THROUGH PDS	
441	MLP CONTROLLER FAULT, INTIALIZATION SUCCESSFUL	
444	TSI PSTORE WRITE FAILURE	
445	MIF WRITE FAILURE	
446	IOBI WRITE FAILURE	
447	TMIF WRITE FAILURE	
449	INITIALIZATION TMS MPX RAM TEST ERROR	
450	INITIALIZATION TMS MPX RAM PARITY CHECKER ERROR	
451	TMS INTERFACE ERROR	
452	ILLEGAL MPX RAM ENTRY ERROR	

PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
453	TMS SYSTEM CLOCK SYNCHRONIZER ERROR
454	DTLF FAULT ON ADFTC (DIGITAL SELF-TEST)
455	48-VOL FAULT ON ADFTC (ANALOG SELF-TEST)
456	48-VOL AND DTLF FAULTS TOGETHER ON ADFTC
457	PROTOCOL ERROR ON ADFTC
458	DTL IDLE ON ADFTC
459	BLA BIT ON PORT CONTROL REG FAILED TO CLEAR OR SET
460	DTLF FAULT ON DVDP
462	PROTOCOL ERROR ON QEIA
463	QEIA SIGNALING PROCESSOR FAULT, INITIALIZATION SUCCESSFUL
464	QEIA SIGNALING PROCESSOR FAULT, INITIALIZATION FAILED
465	QEIA PORT FAULT, RESET SUCCESSFUL
466	QEIA PORT FAULT, RESET FAILED
467	QEIA LOSS OF DATA, RESET SUCCESSFUL
468	QEIA LOSS OF DATA, RESET FAILED
500	TMS CLOCK OSCILLATOR MFP FAILURE
501	SINGLE LOCAL CLOCK TERMINATION MFP FAILURE WITH MORE THAN 1 LOCAL CLOCK TERMINATION CIRCUIT INSTALLED
502	TWO LOCAL CLOCK TERMINATION MFP FAILURES WITH MORE THAN 2 LOCAL CLOCK TERMINATION CIRCUITS INSTALLED
503	THREE LOCAL CLOCK TERMINATION MFP FAILURES WITH MORE THAN 3 LOCAL CLOCK TERMINATION CIRCUITS INSTALLED
504	ALL LOCAL CLOCK TERMINATION CIRCUITS HAVE MFP FAILURES — MORE THAN 1 LOCAL CLOCK TERMINATION CIRCUIT INSTALLED
505	SINGLE LOCAL CLOCK TERMINATION MFP FAILURE – 1 LOCAL CLOCK TERMINA- TION CIRCUIT INSTALLED

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PROC 620 - SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
506	TMS CLOCK OSCILLATOR MAINTENANCE CIRCUIT HAS MFP FAULT
507	LOCAL CLOCK TERMINATION MAINTENANCE CIRCUIT HAS MFP FAULT
508	TMS CLOCK OSCILLATOR STATE DETERMINATION AND DUPLICATION CONTROL IN- CORRECT
509	MAINTENANCE INTERFACE FAILURE CAUSED TMS CLOCK OSCILLATOR FAILURE
510	TMS CLOCK OSCILLATOR OOL ERROR (OFF LINE TMS CLOCK OSCILLATOR FIRST CHOICE)
511	TMS CLOCK OSCILLATOR PFL ERROR
512	CANNOT COMPLETE TMS CLOCK OSCILLATOR FORCE ERROR SEQUENCE
513	LOCAL CLOCK TERMINATION PFL ERROR
514	IOBI BUS ERROR CAUSED LOCAL CLOCK TERMINATION FAILURE
515	LOCAL CLOCK TERMINATION ERR BIT SET – RESET WORKED
516	LOCAL CLOCK TERMINATION ERR BIT SET – CANNOT RESET
517	LOCAL CLOCK TERMINATION ACT FAILURE
518	CANNOT COMPLETE LOCAL CLOCK TERMINATION FORCE ERROR SEQUENCE
520	TMS IOBI BUS – BAD TEST REGISTER VALUE FROM IOBI
521	TMS IOBI BUS – BAD TEST REGISTER VALUE FROM UPCI
522	TMS IOBI BUS - BAD TEST REGISTER VALUE FROM IOBI SPACE BOARD
523	TMS IOBI BUS – BAD SAC VALUE FROM UPCI
524	TMS IOBI BUS — BAD SAC VALUE FROM IOBI
525	TMS IOBI BUS – END OF MESSAGE TIMEOUT
526	TMS IOBI BUS – BAD CLOCK ON TMIF
527	TMS IOBI BUS — IOBI DID NOT FLAG BAD PARITY
528	TMS MAINTENANCE BUS – BAD TEST REGISTER VALUE FROM TMIF

PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
529	TMS MAINTENANCE BUS - BAD TEST REGISTER VALUE FROM TARGET IOBI BOARD
530	TMS MAINTENANCE BUS – BAD SAC VALUE
531	TMS MAINTENANCE BUS - TMIF DID NOT FLAG BAD PARITY
550	TMS LIGHT GUIDE INTERFACE PARITY CHECKING CIRCUIT FAILED TO DETECT A BAD PARITY WORD
551	TMS MODULE INTERFACE PARITY CHECKING CIRCUIT FAILED TO DETECT A BAD PARITY WORD
552	TMS MODULE INTERFACE TIME SLOT INTEGRITY CIRCUIT FAILED TO DETECT A BUFFER ERROR
553	TMS MPX PARITY CHECKING CIRCUIT FAILED TO DETECT A BAD PARITY WORD
554	TMS CLOCK OSCILLATOR MFP CHECKING CIRCUIT FAILED TO DETECT A MISSING FRAME PULSE
555	TMS LOCAL CLOCK TERMINATION ACT CHECKING CIRCUIT FAILED TO DETECT NO ACTIVITY ERROR
556	TMS LOCAL CLOCK TERMINATION ERR CHECKING CIRCUIT FAILED TO DETECT A CLOCK ERROR
557	TMS LOCAL CLOCK TERMINATION MFP CHECKING CIRCUIT FAILED TO DETECT A MISSING FRAME PULSE
558	TMS LIGHT GUIDE INTERFACE OUT OF FRAME CIRCUIT FAILED TO DETECT A FRAMING ERROR
559	TMS MODULE INTERFACE OUT OF FRAME CIRCUIT FAILED TO DETECT A FRAMING ERROR
566	TMS LIGHT GUIDE INTERFACE PARITY ERROR CANNOT BE CLEARED
567	TMS MODULE INTERFACE PARITY ERROR CANNOT BE CLEARED
568	TMS MODULE INTERFACE TIME SLOT INTEGRITY ERROR CANNOT BE CLEARED
569	TMS MPX PARITY ERROR CANNOT BE CLEARED

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PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
570	TMS CLOCK OSCILLATOR MFP ERROR CANNOT BE CLEARED
571	TMS LOCAL CLOCK TERMINATION ACT ERROR CANNOT BE CLEARED
572	TMS LOCAL CLOCK TERMINATION ERR ERROR CANNOT BE CLEARED
573	TMS LOCAL CLOCK TERMINATION MFP ERROR CANNOT BE CLEARED
574	TMS LIGHT GUIDE INTERFACE OUT OF FRAME ERROR CANNOT BE CLEARED
575	TMS MODULE INTERFACE OUT OF FRAME ERROR CANNOT BE CLEARED
576	TMS ABBREVIATED IOBI BUS TEST FAILURE
577	TMS ABBREVIATED MAINTENANCE BUS TEST FAILURE
582	TMS MPX RAM HAS 32 OR MORE BUSIED OUT TIME SLOTS
584	TMS MPX RAM PARITY ERROR RECOVERY FAILURE CORRECTED
585	TMS MPX RAM PARITY ERROR RECOVERY FAILURE NOT CORRECTED
586	TMS MPX RAM INITIALIZATION TEST ERROR CORRECTED
587	TMS MPX RAM INITIALIZATION TEST ERROR NOT CORRECTED
588	TMS MPX FAILED RAM CORRECTED
589	TMS MPX FAILED RAM NOT CORRECTED
600	UNDIAGNOSED MODULE INTERFACE BUFFER ERROR FROM OEP (PERIODIC ONLY)
601	UNDIAGNOSED MODULE INTERFACE BUFFER ERROR FROM OEP (PERIODIC ONLY)
602	INTERMODULE DATA STORE INPUT STORE GENERATES NETWORK TEST FLAGS
604	ALU GENERATES NETWORK TEST FLAGS
605	TMIF GENERATES TEST VECTORS WHEN SHUT OFF
606	INTERMODULE DATA STORE OUTPUT STORE GENERATES NETWORK TEST FLAGS
607	LGL TO MODULE INTERFACE SUSPECTED OF GENERATING NETWORK TEST FLAGS

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	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION	
608	INTERMODULE DATA STORE TRANSMITS NETWORK TEST FLAGS TO TMS	
609	FAN OUT GENERATES NETWORK TEST FLAGS	
610	FAN IN GENERATES NETWORK TEST FLAGS	
611	MPX GENERATES NETWORK TEST FLAGS	
612	LGL TO LIGHT GUIDE INTERFACE SUSPECTED OF GENERATING NETWORK TEST FLAGS	
613	LIGHT GUIDE INTERFACE TRANSMITS NETWORK TEST FLAGS TO MODULES	
614	LIGHT GUIDE INTERFACE OUTPUT TO TMS GENERATES NETWORK TEST FLAGS	
615	LIGHT GUIDE INTERFACE INPUT FROM TMS GENERATES NETWORK TEST FLAGS	
616	LGL TO MODULE INTERFACE GENERATES NETWORK TEST FLAGS	
617	LGL TO LIGHT GUIDE INTERFACE GENERATES NETWORK TEST FLAGS	
618	MODULE INTERFACE OUTPUT GENERATES NETWORK TEST FLAGS	
619	MODULE INTERFACE INPUT GENERATES NETWORK TEST FLAGS	
620	ALU READ ERROR	
621	TMIF READ ERROR	
623	MODULE INTERFACE READ ERROR	
624	LIGHT GUIDE INTERFACE CROSS-COUPLING FAILURE	
625	INTERMODULE DATA STORE CROSS-COUPLING FAILURE	
626	ALU ADDRESSING ERROR	
627	TMIF TEST VECTOR OUTPUT INCORRECT	
628	INTERMODULE DATA STORE READ ERROR	
629	INTERMODULE DATA STORE OUTPUT STORE FAULT	
630	FAULT SUSPECTED IN LGL TO MODULE INTERFACE	

TABLE A	A. (Contd)
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PROC 620 - SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
631	INTERMODULE DATA STORE TRANSMIT TO TMS FAULT
632	FAN OUT READ ERROR
633	FAN OUT PCM ERROR
634	FAN IN READ ERROR
635	FAN IN PCM ERROR
636	MPX PCM ERROR
637	LIGHT GUIDE INTERFACE READ ERROR
638	FAULT SUSPECTED IN LGL TO LIGHT GUIDE INTERFACE
639	INTERMODULE DATA STORE INPUT STORE FAILURE
640	LIGHT GUIDE INTERFACE PCM TRANSMIT TO MODULE FAULT
641	LIGHT GUIDE INTERFACE OUTPUT TO TMS FAULT
642	LIGHT GUIDE INTERFACE INPUT FROM TMS FAULT
643	LGL TO MODULE INTERFACE FAULT
644	LGL TO LIGHT GUIDE INTERFACE FAULT
645	MODULE INTERFACE INPUT FAULT
646	MODULE INTERFACE OUTPUT FAULT
701	HIGH ACCURACY CLOCK - TEMPORARY LOSS OF SIGNAL
702	MAIN PHASE LOCKED LOOP - TEMPORARY LOSS OF SIGNAL
703	MAIN PHASE LOCKED LOOP – TEMPORARY OUT OF LOCK
704	HIGH ACCURACY CLOCK LOSS OF SIGNAL – BUILD OUT CONTROL ENABLED – MAIN PHASE LOCKED LOOP OPERATING CORRECTLY
705	HIGH ACCURACY CLOCK LOSS OF SIGNAL – BUILD OUT CONTROL HAD TO BE RE- ENABLED – MAIN PHASE LOCKED LOOP OPERATING CORRECTLY
706	MAIN PHASE LOCKED LOOP LOSS OF SIGNAL – SIMPLEX SYSTEM

PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
707	MAIN PHASE LOCKED LOOP OUT OF LOCK AND THE SYSTEM IS ON THE HIGH ACCURACY CLOCK $-$ SIMPLEX SYSTEM
708	MAIN PHASE LOCKED LOOP OUT OF LOCK AND GOING TO THE HIGH ACCURACY CLOCK FIXED THE MAIN PHASE LOCKED LOOP — SIMPLEX SYSTEM
709	MAIN PHASE LOCKED LOOP OUT OF LOCK AND GOING TO THE HIGH ACCURACY CLOCK DID NOT FIX THE MAIN PHASE LOCKED LOOP — SIMPLEX SYSTEM
710	HIGH ACCURACY CLOCK LOSS OF SIGNAL — MAIN PHASE LOCKED LOOP OK — DUPLEX SYSTEM
711	MAIN PHASE LOCKED LOOP LOSS OF SIGNAL DUPLEX SYSTEM
712	MAIN PHASE LOCKED LOOP OUT OF LOCK – DUPLEX SYSTEM
713	PRIMARY REFERENCE TEMPORARY LOSS OF SIGNAL
714	ALL TRANSLATED REFERENCES TEMPORARY LOSS OF SIGNAL
715	SECONDARY REFERENCE TEMPORARY LOSS OF SIGNAL
716	SECONDARY REFERENCE STEADY LOSS OF SIGNAL — PRIMARY REFERENCE HEALTHY
717	PRIMARY REFERENCE STEADY LOSS OF SIGNAL – SECONDARY REFERENCE HEALTHY
718	ALL TRANSLATED REFERENCES STEADY LOSS OF SIGNAL
719	SECONDARY REFERENCE TEMPORARY OUT OF LOCK
720	ALL TRANSLATED REFERENCES OUT OF LOCK
721	SECONDARY REFERENCE STEADY OUT OF LOCK
722	PRIMARY REFERENCE TEMPORARY OUT OF LOCK
723	PRIMARY REFERENCE STEADY OUT OF LOCK — SECONDARY REFERENCE HEALTHY
724	ALL TRANSLATED REFERENCES STEADY OUT OF LOCK

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PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
725	INVALID DATA IN DS-1 DATA FACILITY ERROR FIFO
726	DS-1 TO SCS CABLE(S) DISCONNECTED
727	DS-1 BOARD PROCESSOR SANITY
728	LOSS OF SIGNAL OR OUT OF LOCK AT SYSTEM CLOCK SYNCHRONIZER
729	LOSS OF SIGNAL AT DS-1
730	DS-1 YELLOW ALARM RECEIVED
731	DS-1 BOARD HEALTH
732	DS-1 MAJOR ERROR RATE
733	DS-1 MINOR ERROR RATE
734	DS-1 RED ALARM DETECTED
735	DS-1 CARRIER GROUP ALARM
736	DS-1 SLIP RATE EXCEEDED — REFERENCES SWITCHED
737	DS-1 SLIP RATE THRESHOLD EXCEEDED
738	MISFRAME THRESHOLD EXCEEDED — SYSTEM HAS ONLY ONE REFERENCE
739	MISFRAME THRESHOLD EXCEEDED
740	MISFRAME THRESHOLD EXCEEDED — SECONDARY REFERENCE AVAILABLE
741	REFERENCE SOURCE SELECTION HARDWARE DOES NOT AGREE WITH STATUS MEMORY — HIGH ACCURACY CLOCK ON LINE
742	REFERENCE SOURCE SELECTION HARDWARE DOES NOT AGREE WITH STATUS MEMORY — REFERENCES ARE REVERSED — REFERENCES SWITCHED
743	REFERENCE SOURCE SELECTION HARDWARE DOES NOT AGREE WITH STATUS MEMORY — REFERENCES ARE REVERSED — SWITCH OF REFERENCES CANNOT BE MADE
744	TMS STATUS BIT NOT CONSISTENT WITH TRANSLATION

PROC 620 SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
745	BOTH SYSTEM CLOCK SYNCHRONIZER ON LINE BITS SET OR CLEARED
746	BOTH SYSTEM CLOCK SYNCHRONIZER ON LINE BITS BACKWARDS
747	BUILD OUT CONTROL BIT HAD TO BE RESET
748	BUILD OUT CONTROL BIT SET AND CANNOT BE CLEARED
749	REFERENCE SOURCE SELECTION DOES NOT AGREE WITH STATUS MEMORY $-$ BUS TEST FAILED
750	MISFRAME THRESHOLD EXCEEDED ON PRIMARY AND SECONDARY REFERENCES
751	SYSTEM CLOCK SYNCHRONIZER CIRCUIT PACK PULLED OR ON LINE BIT STUCK
. 752	ON LINE SYSTEM CLOCK SYNCHRONIZER – OFF-LINE SYSTEM CLOCK SYNCHRONIZER HAS OUT OF LOCK CONDITION
753	SYSTEM CLOCK SYNCHRONIZER CROSS COUPLING SIGNAL INCORRECT
754	SYSTEM CLOCK SYNCHRONIZER LOSS OF SIGNAL DETECTION CIRCUITRY FAULTY
755	SYSTEM CLOCK SYNCHRONIZER PRIMARY/SECONDARY LOSS OF SIGNAL DETEC- TION CIRCUIT FAULTY
758	LOSS OF SIGNAL IN DS-1 LINK
759	MAJOR ALARM FROM ERROR RATE AFTER GLOBAL INITIALIZATION
760	MINOR ALARM FROM ERROR RATE AFTER GLOBAL INITIALIZATION
761	DAILY LIMIT EXCEEDED FOR MISFRAMES AFTER GLOBAL INITIALIZATION
762	RED ALARM RAISED AFTER GLOBAL INITIALIZATION
763	DAILY LIMIT EXCEEDED FOR SLIPS AFTER GLOBAL INITIALIZATION
764	DS-1 IS NOT ADMINISTERED
765	LOSS OF DS-1 PROCESSOR SANITY AFTER GLOBAL INITIALIZATION
766	DS-1 INTERFACE CANNOT BE GLOBALLY INITIALIZED
767	DS-1 REFERENCE JUST TESTED CANNOT BE SWITCHED ON LINE
768	HIGH ACCURACY CLOCK COULD NOT BE SWITCHED ON LINE

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PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE [1]	DEFINITION
769	HEALTH OF REQUESTED DS-1 REFERENCES IS NOT GOOD BEFORE GLOBAL INITIALIZATION
770	LOSS OF SIGNAL FROM THE DS-1 TO THE SYSTEM CLOCK SYNCHRONIZER
771	DAILY LIMIT EXCEEDED FOR SLIPS BEFORE GLOBAL INITIALIZATION
772	DAILY LIMIT EXCEEDED FOR MISFRAMES BEFORE GLOBAL INITIALIZATION
773	READ ALARM RAISED, OUT OF FRAME BEFORE GLOBAL INITIALIZATION
774	MAJOR ALARM FROM ERROR RATE BEFORE GLOBAL INITIALIZATION
775	MINOR ALARM FROM ERROR RATE BEFORE GLOBAL INITIALIZATION
777	MAINTENANCE CONTROL REGISTER IS DEFECTIVE
778	OPTION CONTROL REGISTER IS DEFECTIVE
779	SCAN MODE CONTROL REGISTER IS DEFECTIVE
780	DISABLE SIGNALING CONTROL REGISTER IS DEFECTIVE
781	PORT CONTROL REGISTER IS DEFECTIVE
782	PORT STATUS REGISTER IS DEFECTIVE
783	SUMMARY SCAN STATUS REGISTER IS DEFECTIVE
784	STATUS RESET CONTROL REGISTER IS DEFECTIVE
785	DS-1 REFERENCE IS NOT MAINTENANCE BUSY. WARNING: IF THIS INTERFACE IS A REFERENCE, THEN BUSYING OUT THE CIRCUIT AND TESTING IT MAY BE SERVICE AFFECTING TO OTHER DIGITIAL FACILITIES BECAUSE THE CAPABILITY TO COM- MUNICATE AT A DIGITAL RATE WOULD BE LOST FOR THE DURATION OF THE TEST.
786	FAR END LOOPED BACK YELLOW ALARM NOT RECEIVED
787	NO CARRIER GROUP ALARM FROM YELLOW ALARM RECEIVED
788	I/O BUS DEFECTIVE
789	MAINTENANCE BUS DEFECTIVE

	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS (Contd)
FAULT CODE [1]	DEFINITION
995	USE PROC 646 TO COMPLETE TESTS ON THIS CIRCUIT
996	DUP BOARD MUST BE TESTED IN OTHER ON-LINE OFF-LINE MODE TO PASS VERI- FICATION
997	MODULE SOFT LOCK FAILED OR MODULE ALREADY LOCKED
998	CANNOT TEST UNTRANSLATED PORT
999	REQUESTED TEST NOT PROVIDED FOR THIS UNIT
1000	COULD NOT SEND AN S MESSAGE
1001	FACILITY NOT TESTED FOR MORE THAN X CYCLES
1005	NO BITS RECEIVED ON A 1-PORT ADFTC SELF-TEST
1006	DATA TRANSMISSION INTERRUPTED: 1-PORT ADFTC SELF-TEST
1007	BIT ERROR RATE EXCEEDED FOR 1-PORT ADFTC SELF-TEST
1008	BLOCK ERROR RATE EXCEEDED FOR 1-PORT ADFTC SELF-TEST
1009	EIA UPDATE FAILURE DURING A 1-PORT ADFTC SELF-TEST
1010	ERROR OVERFLOW DURING A 1-PORT ADFTC SELF-TEST
1011	UNDEFINED ERROR DURING A 1-PORT ADFTC SELF-TEST
1012	NO BITS RECEIVED ON A 2-PORT NORMAL ADFTC SELF-TEST
1013	DATA TRANSMISSION INTERRUPTED: 2-PORT NORMAL ADFTC SELF-TEST
1014	BIT ERROR RATE EXCEEDED FOR 2-PORT NORMAL ADFTC SELF-TEST
1015	BLOCK ERROR RATE EXCEEDED FOR 2-PORT NORMAL ADFTC SELF-TEST
1016	EIA UPDATE FAILURE DURING A 2-PORT NORMAL ADFTC SELF-TEST
1017	ERROR OVERFLOW DURING A 2-PORT NORMAL ADFTC SELF-TEST
1018	UNDEFINED ERROR DURING A 2-PORT NORMAL ADFTC SELF-TEST
1019	NO BITS RECEIVED ON A 2-PORT REVERSE ADFTC SELF-TEST

	PROC 620 SPECIFIC FAULT CODE DEFINITIONS (Contd)						
FAULT CODE [1]	DEFINITION						
1020	DATA TRANSMISSION INTERRUPTED: 2-PORT REVERSE ADFTC SELF-TEST						
1021	BIT ERROR RATE EXCEEDED FOR 2-PORT REVERSE ADFTC SELF-TEST						
1022	BLOCK ERROR RATE EXCEEDED FOR 2-PORT REVERSE ADFTC SELF-TEST						
1023	EIA UPDATE FAILURE DURING A 2-PORT REVERSE ADFTC SELF-TEST						
1024	ERROR OVERFLOW DURING A 2-PORT REVERSE ADFTC SELF-TEST						
1025	UNDEFINED ERROR DURING A 2-PORT REVERSE ADFTC SELF-TEST						
. 1026	UNSENT STOP MESSAGE RECEIVED BY ADFTC						
1027	DID NOT RECEIVE EXPECTED: TEST ABORTED S MESSAGE						
1028	DID NOT RECEIVE EXPECTED: TEST COMPLETED S MESSAGE						
1029	THE BIT AND/OR BLOCK ERROR RATES WERE NOT RECEIVED						
1425	ADFTC DID NOT RETURN A SETUP (HANDSHAKE) RESULT MESSAGE						
1426	ADFTC DID NOT RECEIVE A SET TEST (START HANDSHAKE) MESSAGE						

[1] SPECIFIC FAULT CODE NUMBERS NOT LISTED IN THE TABLE ARE NOT DISPLAYED BY PROC 620 FOR RELEASE 2.

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TABLE AB.

		PRO	C 620 —	SPECIFIC I	AULT CODE DEFINITIONS BY UNIT TYPE
UNIT TYPE	FAULT	СКТ 1	СКТ 2	скт з	DEFINITION
6	11	TN401	TN444	TN400	BUS PROBLEM CAUSED MODULE (OR TMS) PROCES- SOR SHUTDOWN — ALL TN400 BOARDS IN CARRIER, TN530, TN445, AND TN380 (TN381) ARE ALSO SUSPECT
	16	TN401	TN530	TN380	MAJOR FAILURE FOUND IN SCANNER TEST
r	21	TN401	TN380		BAD MCC/MP COMMUNICATIONS
	23	TN401			CANNOT MANIPULATE MCC STATUS REGISTER BITS
	24	TN401			CRITICAL MCC CIRCUIT FAILURE
	27	TN401	AEH4		CANNOT MANIPULATE MCC STATUS REGISTER BITS OR AEH4 ALARM DISTRIBUTION AND AIR FLOW MONITOR
	28	TN401	TN444	TN400	BUS PROBLEM CAUSED MODULE (OR TMS) PROCES- SOR SHUTDOWN — ALL TN400 BOARDS IN CARRIER, TN530, TN445, AND TN380 (TN381) ARE ALSO SUSPECT
	29	TN401			CIRCUIT PACK PULLED OR 4-MHZ CABLE DISCONNECTED
	128	TN401			MODULE FAILED TO INITIALIZE OR DUPLICATION SWITCH FAILURE
	269	TN401	TN444		MAINTENANCE BUS — BAD TEST REGISTER VALUE FROM TARGET BOARD
	370	TN401	TN402	CABLE	UNABLE TO WRITE TO LOAD SIGNAL REGISTER DURING INITIALIZATION
	402	TN401			MODULE PROCESSOR INTERFACE ERROR
	529	TN401	TN482		TMS MAINTENANCE BUS — BAD TEST REGISTER VALUE FROM TARGET IOBI BOARD
7	2	TN380 OR TN381	TN401	TN402	TPIO ERROR FROM A MAINTENANCE ROUTINE
;	3	TN380 OR TN381	TN401	TN444	NO RESPONSE TO AN EOM FROM A MAINTENANCE ROUTINE

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PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)						
UNIT TYPE	FAULT CODE	СКТІ	СКТ 2	СКТ З	DEFINITION	
7 (Contd)	15	TN380	TN401	TN444	MAJOR SCANNER FAILURE — NO SWITCH RE- QUIRED	
	18	TN380	TN401	TN444	MAJOR SCANNER FAILURE	
	19	TN380	TN401	TN530	MINOR SCANNER FAILURE	
	22	TN380	TN401		MODULE PROCESSOR ADDRESS PARITY FAILURE	
	269	TN380	TN444	TN530	MAINTENANCE BUS – BAD TEST REGISTER VALUE FROM TARGET BOARD	
	367	TN380 OR TN381	TN401	TN444	ON-LINE INITIALIZATION FAILED. ALL BOARDS IN UPPER HALF CARRIER ARE SUSPECT. 4-MHZ CABLE ALSO SUSPECT.	
	368	TN380 OR TN381	TN401	TN444	OFF-LINE INITIALIZATION FAILED. ALL BOARDS IN UPPER HALF CARRIER ARE SUSPECT. 4-MHZ CABLE ALSO SUSPECT.	
	369	TN380 OR TN381	TN401		UNABLE TO READ MODULE HEALTH STATUS DURING INITIALIZATION	
	400	TN380 OR TN381			UNKNOWN FIFO 14 ERROR CODE	
t	410	TN380 OR TN381			ERROR FIFO DATA OUT OF SYNC	
	529	T N381	TN482		TMS MAINTENANCE BUS — BAD TEST REGISTER VA- LUE FROM TARGET IOBI BOARD	
8	4	TN444	TN380		DATA PARITY ERROR ON A MAINTENANCE OR SCANNER BUS WRITE	
	5	TN444	TN380		OTHER NON-SYSIO ERROR ON A MAINTENANCE OR SCANNER BUS WRITE	
	58	TN444	TN441 OR TN460		TEST VECTOR 128-255 OUTPUT FROM MIF INCORRECT (BAD TEST VECTORS CAUSED BY POWER FAILURE ARE RESTORED AFTER REPORTING THIS SPECIFIC FAULT CODE)	

ТΑ	BL	E.	AB.	(Contd)

	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)							
UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	СКТ 3	DEFINITION			
8	68	TN444		_	MIF OUTPUTS TEST VECTORS WHEN SHUT OFF			
(Contd)	73	TN444	TN441 OR TN460		MIF TEST VECTOR CIRCUITRY FAULTY			
	74	TN444			MIF TVB CONTENTS INCORRECT (BAD TEST VEC- TORS CAUSED BY POWER FAILURE ARE RESTORED AFTER REPORTING THIS SPECIFIC FAULT CODE)			
	239	TN444	TN441 OR TN460		TEST VECTOR 0-127 OUTPUT FROM MIF INCORRECT			
	245	TN444	TN446		ALU/MIF INTERFACE ERROR			
	246	TN444			IDLE CODE GENERATOR FAILURE			
	268	TN444			MAINTENANCE BUS - BAD TEST REGISTER VALUE FROM MIF			
	269	TN444	TN444		MAINTENANCE BUS — BAD TEST REGISTER VALUE FROM TARGET BOARD			
	273	TN444	TN400	TN380	PORT COMMAND BUS - BAD CLOCK ON MIF			
	277	TN444			MAINTENANCE INTERFACE BUS - BAD SAC VALUE			
	278	TN444			MAINTENANCE BUS – MIF DID NOT FLAG BAD PAR- ITY			
	402	TN444			MODULE PROCESSOR INTERFACE ERROR			
	407	TN444			TSI PCM DATA PARITY ERROR			
	445	TN444			MIF WRITE FAILURE			
9	32	TN460	TN444		GPP DATA CLOCK LOST MOMENTARILY (INCORRECT DCE READOUT)			
	33	TN460	TN444		MAINTENANCE INTERFACE FAILURE CAUSED IN- CORRECT DCE READOUT			

TABLE	AB.	(Contd)
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	PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)							
UNIT TYPE	FAULT CODE	СКТ 1	CKT 2	СКТ 3	DEFINITION			
9 (Contd)	34	T N460	TN444		CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE ON-LINE (SIMPLEX, NO SCS)			
		TN460	TN460		CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE ON-LINE (DUPLEX, NO SCS)			
		TN460	TN463	TN444	CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE ON-LINE (SIMPLEX WITH SCS)			
	35	TN460	TN444		CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE OFF-LINE (SIMPLEX, NO SCS)			
, ,		TN460	TN460		CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE OFF-LINE (DUPLEX, NO SCS)			
		TN460	TN463	TN444	CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE OFF-LINE (SIMPLEX WITH SCS)			
	36	TN460	TN444		MIF FAILURE CAUSED INCORRECT OOL READOUT, MODULE ON-LINE			
	37	TN460	TN444		MIF FAILURE CAUSED INCORRECT OOL READOUT, MODULE OFF-LINE			
	38	TN460	TN444		CLOCK FREQUENCY GENERATOR FAILED			
	39	TN460	TN444		MIF FAILURE CAUSED INCORRECT DCE OOL READOUT			
	40	TN460	TN444	TN530	OFF-LINE CLOCK APPEARS AS MASTER WITH NO SCS/LGI PRESENT			
	41	TN460	TN444		MIF FAILURE CAUSED OFF-LINE CLOCK TO APPEAR AS MASTER WITH NO SCS/LGI PRESENT			
 	42	TN460	TN463	TN444	CLOCK APPEARS AS MASTER WITH SCS/LGI PRE- SENT			
	43	TN460	TN444		MIF FAILURE CAUSED CLOCK TO APPEAR AS MAS- TER WITH SCS/LGI PRESENT			
	44	TN460	TN444		ON-LINE CLOCK APPEARS AS SLAVE WITH NO SCS/LGI PRESENT			

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• PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)							
UNIT TYPE	FAULT	СКТІ	СКТ 2	СКТ З	DEFINITION		
9 (Contd)	45	TN460	TN444		MIF FAILURE CAUSED MAINTENANCE INTERFACE APPEARANCE OF ON-LINE CLOCK AS SLAVE WITH NO SCS/LGI PRESENT		
	57	TN460			INTERMODULE DATA STORE OR MODULE CLOCK OUT OF LOCK CAUSED TSI TEST FAILURE		
	269	TN441 OR TN460	TN444		MAINTENANCE BUS — BAD TEST REGISTER VALUE FROM TARGET BOARD		
	340	TN441 OR TN460	TN440	TN454	ALL GPP PORTS UNDER THIS UNIT TYPE FAILED THE DATA CLOCK TEST. OTHER INDICTMENTS ARE SN270 GPP BOARDS OR UNPLUGGED DIGITAL IN- STRUMENTS IN THE SAME HALF CARRIER AS A FAILING UNIT TYPE 15, TN454 PDI.		
	403	TN460			MODULE CLOCK ERROR		
10	65	TN446	TN444		INTERMITTENT ALU READ ERROR OVER MAINTE- NANCE BUS PATH		
	78	TN446	TN445		ALU ADDRESS PROCESSING SUSPECTED		
	86	TN446	TN445		ALU ADDRESS PROCESSING FAULT		
	87	TN446	TN445		ALU PCM DATA FAULT		
	88	TN446	TN445		ALU DATA FAULT (ALSO CAUSED BY FAULTY IN- TERFACE ON PCM BUS BY TN440 PDS OR TN441 IDS)		
	240	TN446	TN444		MAINTENANCE BUS TO TSI ALU IS BAD		
	241	TN446	TN445		TSI ALU LOSSING/LINEARIZING FAULT		
	242	TN446	TN445		TSI ALU OPCODE FAILURE		
	243	TN446	TN445		TSI ALU ACCUMULATOR FAILURE		
	244	TN446	TN445		TSI ALU ACCUMULATOR ADDRESSING FAULT		
	247	TN446			TSI ACCUMULATOR RESOURCES NOT AVAILABLE		
	269	TN446	TN444		MAINTENANCE BUS — BAD TEST REGISTER VALUE FROM TARGET BOARD		

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TABLE AB.	(Contd)
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PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)							
UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	СКТ З	DEFINITION		
10 (Contd)	331	TN446			TSI ALU DATA PARITY CHECKING CIRCUITRY FAILED		
}	407	TN446			TSI PCM DATA PARITY ERROR		
	604	TN446	TN445	TN444	ALU GENERATES NETWORK TEST FLAGS		
	620	TN446	TN444		ALU READ ERROR		
	626	TN446	TN445	TN444	ALU ADDRESSING ERROR		
11	6	TN445	TN380		NO POSITIVE ACKNOWLEDGE USING QUI_PORT, INIT_TSI, OR SCANNER BUS WRITE		
	52	TN445	TN444	TN440	TSI PSTORE INTERMITTENTLY REPORTS INVALID NETWORK TEST ACTIVITY		
	53	TN445	TN444		A ZERO VALUE CANNOT BE READ OVER THE PST MAINTENANCE BUS PATH		
	54	TN445	TN446	TN440	INTERMITTENT ADDRESSING FAULT WITHIN THE TSI		
	55	TN445	TN444		A NON-ZERO VALUE CANNOT BE READ OVER THE PST MAINTENANCE BUS PATH		
į	67	TN445			PST ERRONEOUSLY REPORTS NETWORK TEST AC- TIVITY		
	75	TN445	TN444		BAD PST MEMORY PARITY		
	76	TN445	TN441 OR TN460	TN444	PST NOT CYCLING		
	82	_ TN445	TN444		PST INSTRUCTION ADDRESSING FAULT		
	84	TN445	TN444		PST ADDRESS OR MEMORY FAULT		
	85	TN445			PST MEMORY OR OUTPUT FAULT		
	269	TN445	TN444		MAINTENANCE BUS – BAD TEST REGISTER VALUE FROM TARGET BOARD		

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PROC 620

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	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)									
UNIT TYPE	FAULT CODE	скт 1	СКТ 2	СКТ З	DEFINITION					
11 (Contd)	330	TN445			TSI PSTORE INSTRUCTION PARITY CHECKING CIR- CUITRY FAILED					
	401	TN445			TSI SHUTDOWN					
i	402	TN445			MODULE PROCESSOR INTERFACE ERROR					
	406	TN445			TSI PSTORE MEMORY PARITY ERROR					
	425	TN445			TSI RUNNING, BUT INDICATES ĮT'S SHUTDOWN					
	432	TN445			BURST OF TSI PSTORE PARITY ERRORS					
	444	TN445			TSI PSTORE WRITE FAILURE					
12	264	TN400			PORT COMMAND BUS — BAD TEST REGISTER VALUE FROM IOBI					
	269	TN400	TN444		MAINTENANCE BUS — BAD TEST REGISTER VALUE FROM TARGET BOARD					
;	270	TN400			PORT COMMAND BUS - BAD SAC VALUE FROM IOBI					
	272	TN400			PORT COMMAND BUS - END OF MESSAGE TIMEOUT					
	274	TN400			PORT COMMAND BUS - IOBI DID NOT FLAG BAD PARITY					
	371	TN400	TN444	TN380	NEGATIVE ACKNOWLEDGE FROM INITIALIZE IOBI ORDER — ALL TN400 BOARDS IN CARRIER ARE SUS- PECT					
	402	TN400			MODULE PROCESSOR INTERFACE ERROR					
	446	TN400			IOBI WRITE FAILURE					
	451	TN400			TMS INTERFACE ERROR					
1	514	TN400	TN462		IOBI BUS ERROR CAUSED LOCAL CLOCK TERMINA- TION FAILURE					
	520	TN400			TMS IOBI BUS — BAD TEST REGISTER VALUE FROM IOBI					
	524	TN400			TMS IOBI BUS – BAD SAC VALUE FROM IOBI					

TABLE AB. (Contd)

	PROC 620 SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)										
UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	СКТ З	DEFINITION						
12 (Contd)	525	TN400			TMS IOBI BUS – END OF MESSAGE TIMEOUT						
	527	TN400			TMS IOBI BUS – IOBI DID NOT FLAG BAD PARITY						
	529	TN400	TN482		TMS MAINTENANCE BUS BAD TEST REGISTER VALUE FROM TARGET IOBI BOARD						
13	56	TN440	TN446		AT LEAST ONE PDS IS RECEIVING PCM DATA FROM A DOUBLE-CONNECT						
	59	TN440	TN446	TN444	PDS DATA OR ADDRESSING IN OUTPUT STORE IN- CORRECT						
	61	TN440	TN454	TN446	ALU RECEIVES INCORRECT DATA FROM PDS						
	63	TN440	TN446		INTERMITTENT FAULT IN PCM DATA PATH						
	66	TN440	TN444		INTERMITTENT PDS READ ERROR OVER MAINTE- NANCE BUS PATH						
	69	TN440	TN446		PDS OUTPUT STORE GENERATES NETWORK TEST FLAGS ON PORTS NOT PRESENTLY IN-USE						
	70	TN440	TN454	TN446	PDS INPUT STORE GENERATES NETWORK TEST FLAGS						
	77	TN440	TN444		INTERMITTENT PDS READ ERROR OVER MAINTE- NANCE BUS PATH						
	79	TN440	TN446		PDS ADDRESS PROCESSING SUSPECTED						
	81	TN440	TN446	TN454	PDS INPUT STORE ADDRESSING OR DATA FAILURE						
	83	TN440	TN446		PDS INTERNAL ADDRESSING FAULT						
	269	TN440	TN444		MAINTENANCE BUS – BAD TEST REGISTER VALUE FROM TARGET BOARD						
	276	TN440	TN380	CABLE	PORT COMMAND BUS — BAD CONTROL COMPLEX SIGNAL TO TN454 AND TN452						
	340	TN440	TN454	TN441 OR TN460	ALL GPP PORTS UNDER THIS UNIT TYPE FAILED THE DATA CLOCK TEST. OTHER INDICTMENTS ARE SN270 GPP BOARDS OR UNPLUGGED DIGITAL IN- STRUMENTS IN THE SAME HALF CARRIER AS A FAILING UNIT TYPE 15, TN454 PDI.						

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TABLE AB. (Contd)

PROC 620

PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)									
UNIT TYPE	FAULT CODE	скт 1	СКТ 2	СКТ З	DEFINITION				
13	407	TN440			TSI PCM DATA PARITY ERROR				
(Contd)	437	TN440			DCLOCK SIGNAL DOES NOT GET THROUGH PDS				
14	8	TN452	TN400		DISTRIB DATA AFTER BYTE INCORRECT TO A PCI				
	265	TN452	TN400		PORT COMMAND BUS - BAD TEST REGISTER VALUE FROM PCI				
	271	TN452	TN400		PORT COMMAND BUS - BAD SAC VALUE FROM PCI				
	275	TN452	TN44 0	TN380	PORT COMMAND BUS — BAD (ON/OFF) LINE CONTROL				
	521	TN452	TN400		TMS IOBI BUS — BAD TEST REGISTER VALUE FROM UPCI				
•	523	TN452	TN400		TMS IOBI BUS – BAD SAC VALUE FROM UPCI				
15	7	TN454	TN452	TN400	DISTRIB DATA AFTER BYTE INCORRECT TO A PDI				
F	60	TN454	TN440	TN452	PDI ADDRESSING OR CONTROL INCORRECT				
	62	TN454	TN440		PDI OUTPUT DATA INCORRECT				
	64	TN454	TN452		INTERMITTENT PDI READ ERROR OVER PORT COM- MAND BUS				
	71	TN454	TN440		PDI GENERATES NETWORK TEST FLAGS				
	80	TN454	TN440	TN452	PDI LOOP AROUND OR DATA FAILURE				
	266	TN454	TN452		PORT COMMAND BUS – BAD TEST REGISTER VALUE FROM PDI				
	334	TN454	TN446		PDI DATA PARITY CHECKING CIRCUITRY FAILED				
	340	TN454	TN440	TN441 OR TN460	ALL GPP PORTS UNDER THIS UNIT TYPE FAILED THE DATA CLOCK TEST. OTHER INDICTMENTS ARE SN270 GPP BOARDS OR UNPLUGGED DIGITAL IN- STRUMENTS IN THE SAME HALF CARRIER AS A FAILING UNIT TYPE 15, TN454 PDI				
	341	TN454	PORT		PDI DATA SELECT CIRCUIT BAD				
	408	TN454			PDI PCM DATA PARITY ERROR				

	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)									
UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	СКТ З	DEFINITION					
15	426	TN454			RING TRIP CIRCUIT FAILURE					
(Contd)	433	TN454			MULTIPLE PCM DATA PARITY ERRORS FROM PDI					
16	12	SN250			TIME SLOT UNAVAILABLE					
	134	SN250	TN454	TN452	CPT REFLECTION DETECTOR FAILED TO STABILIZE					
	135	SN250	TN454	TN452	CPT TONE TEST DETECTION FAILED TO STABILIZE					
	136	SN250	TN454	TN452	CPT REFLECTION DATA READY FLAG STUCK AC- TIVE					
	137	SN250	TN454	TN452	CPT TONE TEST DATA READY FLAG STUCK ACTIVE					
	156	SN250	TN454		FAULTY FIRST TONE TEST FREQUENCY IDLE INDI- CATION					
	157	SN250	TN45 4		FAULTY SECOND TONE TEST FREQUENCY IDLE IN- DICATION					
	158	SN250	TN454		FAULTY FIRST TONE TEST QUIET TIME IDLE INDI- CATION					
	159	SN250	TN454		FAULTY SECOND TONE TEST QUIET TIME IDLE INDI- CATION					
	161	SN250	TN454		FAULTY DIAL TONE FIRST TONE FREQUENCY OR TONE TEST NON-IDLE INDICATION					
	162	SN250	TN454		FAULTY DIAL TONE SECOND TONE FREQUENCY OR TONE TEST NON-IDLE INDICATION					
	163	SN250	TN454		FAULTY FIRST TONE TEST QUIET TIME NON-IDLE INDICATION					
	164	SN250	TN454		FAULTY SECOND TONE TEST QUIET TIME NON-IDLE INDICATION					
	165	SN250	TN454		FAULTY INTERRUPTED DIAL TONE FIRST TONE FREQUENCY					
	166	SN250	TN454		FAULTY INTERRUPTED DIAL TONE SECOND TONE FREQUENCY					

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	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)								
UNIT TYPE	FAULT CODE	СКТІ	CKT 2	СКТ З	DEFINITION				
16 (Contd)	167	SN250	TN454		FAULTY INTERRUPTED DIAL TONE FIRST TONE QUIET TIME				
	168	SN250	TN454		FAULTY INTERRUPTED DIAL TONE SECOND TONE QUIET TIME				
	169	SN250	TN454		FAULTY AUDIBLE RING FIRST TONE FREQUENCY				
	170	SN250	TN454		FAULTY AUDIBLE RING SECOND TONE FREQUENCY				
	171	SN250	TN454		FAULTY AUDIBLE RING FIRST TONE QUIET TIME				
	172	SN250	TN454		FAULTY AUDIBLE RING SECOND TONE QUIET TIME				
	173	SN250	TN454		FAULTY SPECIAL AUDIBLE RING FIRST TONE FRE- QUENCY				
	174	SN250	TN454		FAULTY SPECIAL AUDIBLE RING SECOND TONE FREQUENCY				
	175	SN250	TN454		FAULTY SPECIAL AUDIBLE RING FIRST TONE QUIET TIME				
	176	SN250	TN454		FAULTY SPECIAL AUDIBLE RING SECOND TONE QUIET TIME				
	177	SN250	TN454		FAULTY INTERCEPT FIRST TONE FREQUENCY				
	178	SN250	TN454		FAULTY INTERCEPT SECOND TONE FREQUENCY				
	179	SN250	TN454		FAULTY INTERCEPT FIRST TONE QUIET TIME				
	180	SN250	TN454		FAULTY INTERCEPT SECOND TONE QUIET TIME				
	181	SN250	TN454		FAULTY BUSY FIRST TONE FREQUENCY				
	182	SN250	TN454		FAULTY BUSY SECOND TONE FREQUENCY				
	183	SN250	TN454		FAULTY BUSY FIRST TONE QUIET TIME				
	184	SN250	TN454		FAULTY BUSY SECOND TONE QUIET TIME				
	185	SN250	TN454		FAULTY REORDER FIRST TONE FREQUENCY				
	186	SN250	TN454		FAULTY REORDER SECOND TONE FREQUENCY				

1		T CODE DEFINITIONS BY UNIT TYPE (Contd)			
UNIT TYPE	FAULT CODE	СКТ 1	CKT 2	СКТ З	DEFINITION
16	187	SN250	TN454		FAULTY REORDER FIRST TONE QUIET TIME
(Contd)	188	SN250	TN454		FAULTY REORDER SECOND TONE QUIET TIME
	189	SN250	TN454		FAULTY 440-HZ REFLECTION DETECTOR IDLE INDI- CATION
	190	SN250	TN454		FAULTY BROAD BAND REFLECTION DETECTOR IDLE INDICATION
	191	SN250	TN454		FAULTY 440-HZ REFLECTION DETECTOR NON-IDLE INDICATION
	192	SN250	TN454		FAULTY BROAD BAND REFLECTION DETECTOR NON-IDLE INDICATION
	199	SN250			BUSY OUT FAILED
F	218	SN250			NETWORK ORDER FAILED
	219	SN250			RELEASE BUSY OUT FAILED
	267	SN250	TN452		PORT COMMAND BUS – BAD TEST REGISTER VALUE FROM PORT
	429	SN250			PORT DIGITAL SIGNAL PROCESSOR ERROR
23	17	TN530	TN401	TN380	MAJOR DUPLICATION/UPDATE FAILURE IN SCANNER TEST
	90	TN530	TN400	TN380	FAILED THE MP BASED DUP_TST
	92	TN530	TN530	TN380	DUP BOARD STATUS BITS WOULD NOT SET OR CLEAR
	93	TN530	TN530	TN380	ON-LINE TN530 ERROR FLAG WAS SET
	94	TN530	TN445	TN380	OFF-LINE TN530 ERROR FLAG WAS SET
	95	TN530	TN530	TN400	STATE OF HEALTH COMPARATOR TEST FAILED
	96	TN530	TN530	TN400	DOUBLE WRITE CONTROL TEST FAILED
	97	TN530	TN530	TN380	DOUBLE WRITE WITH BAD PARITY TEST FAILED

TABLE AB. (Contd)

	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)									
UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	СКТ 3	DEFINITION					
23 (Contd)	98	TN530	TN530	TN380	DUPLICATION CHANNEL DID NOT DETECT BAD PARITY					
	269	TN530	TN444		MAINTENANCE BUS — BAD TEST REGISTER VALUE FROM TARGET BOARD					
	365	TN530	TN380 OR TN381	TN401	SOFT SWITCH FAILED					
	366	TN530	TN380 OR TN381	TN401	HARD SWITCH FAILED					
	402	TN530			MODULE PROCESSOR INTERFACE ERROR					
	529	TN530	TN482		TMS MAINTENANCE BUS — BAD TEST REGISTER VA- LUE FROM TARGET IOBI BOARD					
	996				DUP BOARD MUST BE TESTED IN OTHER ON-LINE — OFF-LINE MODE TO PASS VERIFICATION					
	997			м. П	MODULE SOFT-LOCK FAILED OR MODULE ALREADY LOCKED					
24	12	SN252			TIME SLOT UNAVAILABLE					
	13	SN252			CIRCUIT IN USE BY CALL PROCESSING					
	51	SN252			PORT RESOURCES NOT AVAILABLE					
	199	SN252			BUSY OUT FAILED					
	200	SN252			ONLY IDLE					
×	285	SN252	TN452	TN400	IDLE SENDER SUM SCAN INDICATES DIAL TONE DE- TECTED					
	286	SN252	TN452	TN400	IDLE SENDER STATUS REG INDICATES PORT BUSY					
	287	SN252	TN452	TN400	IDLE SENDER STATUS REG INDICATES DIGIT QUEUE FULL					
	288	SN252	TN452	TN400	IDLE SENDER STATUS REG INDICATES TEST TONE NOT SENT					

TABLE AB. (Contd)

PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)								
UNIT TYPE	FAULT	СКТІ	СКТ 2	СКТ З	DEFINITION			
24	289	SN252	TN452	TN400	SENDER CKT SUM CHECK FAILURE			
(Contd)	290	SN252	SN250	TN452	SENDER NOT BUSY WHILE TEST TONE BEING SENT			
•	291	SN252	SN250	TN452	SENDER STATUS REG INDICATES TEST TONE COM- PLETE WHILE SENDING			
	292	SN252	SN250	TN454	SENDER FAILS TO SEND 440-HZ TEST TONE			
	293	SN252			NO IDLE RECEIVER FOUND FOR SENDER RETEST			
	294	SN252	SN251	TN454	SENDER NOT BUSY WHILE SENDING VALID TONE			
	295	SN252	SN251	TN454	SENDER STATUS REG INDICATES TOUCH-TONE SIG- NAL DONE WHILE BEING SENT			
	296	SN252	SN251	TN454	SENDER FAILS TO SEND A VALID TOUCH-TONE			
	297	SN252	SN251	TN454	NO TOUCH-TONE DIGIT RECEIVED AT RECEIVER			
	298	SN252	TN454	TN400	SENDER FAILS TO DETECT DIAL TONE			
	299	SN252	TN454	TN400	SENDER DETECTS DIAL TONE AFTER DIAL TONE REMOVED			
25	12	SN251			TIME SLOT UNAVAILABLE			
	13	SN251			CIRCUIT IN USE BY CALL PROCESSING			
	51	SN251			PORT RESOURCES NOT AVAILABLE			
	199	SN251			BUSY OUT FAILED			
	200	SN251			ONLY IDLE			
	285	SN251	SN252	TN452	IDLE SENDER SUM SCAN INDICATES DIAL TONE DE- TECTED			
ĺ	286	SN251	SN252	TN452	IDLE SENDER STATUS REG INDICATES PORT BUSY			
	287	SN251	SN252	TN452	IDLE SENDER STATUS REG INDICATES DIGIT QUEUE FULL			
	288	SN251	SN252	TN452	IDLE SENDER STATUS REG INDICATES TEST TONE NOT SENT			

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TABLE AB. (Contd)

		PROC 62	0 — SPE	CIFIC FAU	LT CODE DEFINITIONS BY UNIT TYPE (Contd)
UNIT TYPE	FAULT CODE	СКТ 1	CKT 2	скт з	DEFINITION
25	297	SN251	SN252	TN454	NO TOUCH-TONE DIGIT RECEIVED AT RECEIVER
(Conta)	300	SN251	SN250	TN454	NO TRANSMISSION THROUGH RECEIVER, LOW PATH TO HIGH PATH
	301	SN251	SN250	TN454	NO TRANSMISSION THROUGH RECEIVER, HIGH PATH TO LOW PATH
	302	SN251			NO IDLE SENDER FOUND FOR RECEIVER RETEST
	303	SN251	SN252	TN452	IDLE RECEIVER SUMMARY SCAN INDICATES RE- CEPTION OF TOUCH-TONE
	304	SN251	SN252	TN452	IDLE RECEIVER PORT CONTROL REG INDICATES RE- CEPTION OF VALID TOUCH-TONE
	305	SN251	SN252	TN454	RECEIVER FAILS TO RECEIVE LOW LEVEL DIGIT
	306	SN251	SN252	TN454	RECEIVER FAILS TO RECOGNIZE TOUCH-TONE
	307	SN251	SN252	TN454	RECEIVER FAILS TO RECOGNIZE LOW LEVEL DIGIT
	308	SN251	SN252	TN454	RECEIVER RECEIVES FALSE TONE
	427	SN251			CONTROL/SUMMARY — SCAN REGISTER READ ER- ROR
27	199	SN270			BUSY OUT FAILED
	338	SN270			DATA MODULE DOES NOT RESPOND TO A QUERY
	350 _.	SN270	TN452	TN400	GPP DTL FAULT OR ADFTC DIGITAL SELF-TEST FAULT
	351	SN270	TN452	TN400	GPP OR ADFTC DTL IDLE BIT SET
	352	SN270	TN452	TN400	GPP DTLI AND DTLF TOGETHER OR ADFTC SELF- TEST AND DTLI TOGETHER
	353	SN270	TN452	TN400	GPP 48-VOL BIT SET (FUSE BLOWN) OR ADFTC ANALOG SELF-TEST FAULT
	354	SN270	TN452	TN400	GPP 48-VOL AND DTLF BITS SET OR ADFTC ANALOG AND DIGITAL SELF-TEST FAULT TOGETHER

	PROC 620 SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)									
UNIT TYPE	FAULT CODE	скт 1	СКТ 2	скт з	DEFINITION					
27 (Contd)	355	SN270	TN452	TN400	GPP 48-VOL AND DTLI BITS SET OR ADFTC ANALOG SELF-TEST AND DTLI TOGETHER					
	356	SN270	TN452	TN400	GPP 48-VOL, DTLI, AND DTLF BITS SET OR ADFTC ANALOG, DIGITAL SELF-TEST FAULT, AND DTLI TO- GETHER					
	357	SN270	TN452	TN400	ONE S CHANNEL RETRANSMISSION TO THE PORT HAS OCCURRED					
	358	SN270	TN452	TN400	MORE THAN ONE S CHANNEL RETRANSMISSION TO THE PORT HAS OCCURRED					
	361	SN270	TN452	TN400	FAILURE OF GPP BLA SET					
	362 .	SN270	TN454		SAC FAILED TO CLEAR IN PORT DTL LOOP AROUND TEST					
	363	SN270	TN454		INVALID SAC SIGNATURE IN PORT DTL LOOP AROUND TEST					
	364	SN270	TN454		ERROR IN TDR IN PORT DTL LOOP AROUND TEST					
	434	SN270			ALL PORTS OF DVDP BOARD BAD					
	459	SN270			BLA BIT ON PORT CONTROL REG FAILED TO CLEAR . OR SET					
	460	SN270			DTLF FAULT ON DVDP					
	998	SN270			CANNOT TEST UNTRANSLATED PORT					
28	13	SN224			CIRCUIT IN USE BY CALL PROCESSING					
	51	SN224			PORT RESOURCES NOT AVAILABLE					
	109	SN224	TN452	TN400	FAULTY SET OF LA FLIP-FLOP					
	110	SN224	TN452	TN400	FAULTY SET OF CPU FLIP-FLOP					
	118	SN224	TN452	TN400	FAULTY CLEAR OF LA FLIP-FLOP					
	124	SN224	TN452	TN400	FAULTY CLEAR OF CPU FLAP-FLOP					
i	125	SN224	TN452	TN400	OFF-HOOK ERROR, POSSIBLY FROM ATTACHED STATION					

PROC 620

TABLE AB. (Contd)

		PROC 62	0 — SPE	CIFIC FAU	LT CODE DEFINITIONS BY UNIT TYPE (Contd)
UNIT TYPE	FAULT CODE	скт і	СКТ 2	СКТ 3	DEFINITION
28 (Contd)	131	SN224	TN452	TN400	TERMINATED LINE FAILED TO INDICATE OFF- HOOK
	149	SN224	TN454	SN250	INSUFFICIENT 440-HZ ON-HOOK REFLECTION
	150	SN224	TN454	SN250	EXCESSIVE 440-HZ ON-HOOK REFLECTION
	152	SN224	TN454	SN250	EXCESSIVE 440-HZ OFF-HOOK REFLECTION
	154	SN224	TN454	SN250	ON-HOOK STATUS FAILED TO POWER DOWN CODEC
	267	SN224	TN452		PORT COMMAND BUS — BAD TEST REGISTER VALUE FROM PORT
	280	SN224	TN452	TN400	MLP CONTROLLER FAULT
	281	SN224	TN452	TN400	MLP 48-V OVERLOAD
	282	SN224	TN401		MLP DRIVER CIRCUITRY FAILURE
	283	SN224	TN452	TN400	MLP FAILED TO RETURN ID REQUEST
	436	SN224			MLP CONTROLLER FAULT, INITIALIZATION FAILED
	441	SN224			MLP CONTROLLER FAULT, INITIALIZATION SUCCESSFUL
	998	SN224			CANNOT TEST UNTRANSLATED PORT
	999	SN224			REQUESTED TEST NOT PROVIDED FOR THIS UNIT
29	12	SN228 OR SN229			TIME SLOT UNAVAILABLE
	13	SN228 OR SN229			CIRCUIT IN USE BY CALL PROCESSING
	51	SN228 OR SN229			PORT RESOURCES NOT AVAILABLE
	100	SN228 OR SN229	TN452	TN400	NON-ZERO IDLE PORT CONTROL REGISTER

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	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)									
UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	СКТ 3	DEFINITION					
29 (Contd)	101	SN228 OR SN229	TN452	TN400	DEFECTIVE GATE ARRAY A					
	102	SN228 OR SN229	TN452	TN400	DEFECTIVE GATE ARRAY B					
	104	SN228 OR SN229	TN452	TN400	FAULTY PORT SELECT IN GATE ARRAY A					
	105	SN228 OR SN229	TN452	TN400	FAULTY PORT SELECT IN GATE ARRAY B					
	125	SN228 OR SN229	TN452	TN400	OFF-HOOK ERROR, POSSIBLY FROM ATTACHED STATION					
	126	SN228 OR SN229	TN452	TN400	OFF-HOOK ERROR FROM BAD LA CLEAR OR AT- TACHED STATION					
	131	SN228 OR SN229	TN452	TN400	TERMINATED LINE FAILED TO INDICATE OFF- HOOK					
	133	SN228 OR SN229	TN452	TN400	OFF-HOOK STATUS FAILED TO LATCH					
	149	SN228 OR SN229	TN454	SN250	INSUFFICIENT 440-HZ ON-HOOK REFLECTION					
	150	SN228 OR SN229	TN454	SN250	EXCESSIVE 440-HZ ON-HOOK REFLECTION					
	152	SN228 OR SN229	TN454	SN250	EXCESSIVE 440-HZ OFF-HOOK REFLECTION					

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TABLE AB. (Contd)

		PROC 62	0 — SPEC	CIFIC FAU	LT CODE DEFINITIONS BY UNIT TYPE (Contd)
UNIT TYPE	FAULT	СКТ 1	СКТ 2	СКТ З	DEFINITION
29 (Contd)	153	SN228 OR SN229	TN454	SN250	EXCESSIVE SIGNAL AT OTHER THAN 440-HZ
	154	SN228 OR SN229	TN454	SN250	ON-HOOK STATUS FAILED TO POWER DOWN CODEC
	160	SN228 OR SN229	TN454	SN250	FAULTY 440-HZ FREQUENCY
	199	SN228 OR SN229			BUSY OUT FAILED
	218	SN228 OR SN229			NETWORK ORDER FAILED
	219	SN228 OR SN229			RELEASE BUSY OUT FAILED
	267	SN228 OR SN229	TN452		PORT COMMAND BUS BAD TEST REGISTER VALUE FROM PORT
	427	SN228 OR SN229	-		CONTROL/SUMMARY — SCAN REGISTER READ ER- ROR
31	13	SN253			CIRCUIT IN USE BY CALL PROCESSING
	51	SN253			PORT RESOURCES NOT AVAILABLE
	130	SN253	TN452	TN400	ACTIVE SEZD* ERROR, POSSIBLY FROM BUSY CODE CALL CKT
	143	SN253	TN452	TN400	CODE CALL DIGIT DONE* IMPROPERLY ACTIVE
	144	SN253	TN452	TN400	CODE CALL DIGIT DONE* IMPROPERLY INACTIVE
	145	SN253	TN452	TN400	FAULTY CODE CALL CHIME PERIOD

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TABLE AB. (C	ontd)
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TYPE	CODE	СКТІ	СКТ 2	скт з	DEFINITION			
31	146	SN253	TN452	TN400	FAULTY DIGITAL SIGNAL PROCESSOR			
(Contd)	147	SN253	TN452	TN400	CODE CALL SEZD* IMPROPERLY INACTIVE			
	193	SN253	TN454	SN250	FAULTY RECEPTION OF AUXILIARY IMMEDIATE RINGBACK TONE			
	199	SN253			BUSY OUT FAILED			
	219	SN253			RELEASE BUSY OUT FAILED			
	220	SN253	TN452	TN400	DSP CHECKSUM STUCK ACTIVE			
	267	SN253	TN452		PORT COMMAND BUS — BAD TEST REGISTER VALUE FROM PORT			
	429	SN253			PORT DIGITAL SIGNAL PROCESSOR ERROR			
32	13	SN230			CIRCUIT IN USE BY CALL PROCESSING			
	51	SN230			PORT RESOURCES NOT AVAILABLE			
	100	SN230	TN452	TN400	NON-ZERO IDLE PORT CONTROL REGISTER			
	101	SN230	TN452	TN400	DEFECTIVE GATE ARRAY A			
	103	SN230	TN452	TN400	DEFECTIVE GATE ARRAY C			
	104	SN230	TN452	TN400	FAULTY PORT SELECT IN GATE ARRAY A			
	106	SN230	TN452	TN400	FAULTY PORT SELECT IN GATE ARRAY C			
	128	SN230	TN452	TN400	RING DETECTION ERROR POSSIBLY FROM AT- TACHED CO			
	129	SN230	TN452	TN400	GND DETECTION ERROR POSSIBLY FROM EXTER- NAL CIRCUIT SIGNALING			
	138	SN230	TN452	TN400	NORM CURRENT DETECTOR STUCK ACTIVE			
	139	SN230	TN452	TN400	GROUND DETECTOR FAILED TO DETECT GROUND			
	140	SN230	TN452	TN400	GS RELAY STUCK OPERATED			

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PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)									
UNIT TYPE	FAULT	СКТ 1	СКТ 2	скт з	DEFINITION				
32 (Contd)	141	SN230	TN452	TN400	REV CURRENT DETECTOR STUCK ACTIVE				
	149	SN230	TN454	SN250	INSUFFICIENT 440-HZ ON-HOOK REFLECTION				
	153	SN230	TN454	SN250	EXCESSIVE SIGNAL AT OTHER THAN 440-HZ				
	155	SN230	TN454	SN250	CODEC POWER UP STUCK ACTIVE				
	199	SN230			BUSY OUT FAILED				
	200	SN230			ONLY IDLE				
	219	SN230			RELEASE BUSY OUT FAILED				
	267	SN230	TN452		PORT COMMAND BUS — BAD TEST REGISTER VALUE FROM PORT				
33	9	SN232	TN452	TN400	DISTRIB DATA AFTER BYTE INCORRECT TO A PORT				
	13	SN232			CIRCUIT IN USE BY CALL PROCESSING				
	51	SN232			PORT RESOURCES NOT AVAILABLE				
	100	SN232	TN452	TN400	NON-ZERO IDLE PORT CONTROL REGISTER				
	131	SN232	TN452	TN400	TERMINATED LINE FAILED TO INDICATE OFF- HOOK				
	149	SN232	TN454	SN250	INSUFFICIENT 440-HZ ON-HOOK REFLECTION				
	150	SN232	TN454	SN250	EXCESSIVE 440-HZ ON-HOOK REFLECTION				
	151	SN232	TN454	SN250	INSUFFICIENT 440-HZ OFF-HOOK REFLECTION				
. <u>-</u>	.152	SN232	TN454	SN250	EXCESSIVE 440-HZ OFF-HOOK REFLECTION				
	153	SN232	TN454	SN250	EXCESSIVE SIGNAL AT OTHER THAN 440-HZ				
	1.54	SN232	TN454	SN250	ON-HOOK STATUS FAILED TO POWER DOWN CODEC				
	194	SN232	TN452	TN400	BATTERY FEED REVERSAL STUCK ACTIVE OR IDLE CIRCUIT INDICATES LOOP CLOSURE				
	196	SN232	TN452	TN400	BATTERY FEED REVERSAL STUCK INACTIVE				

TABLE AB. (Con

		T CODE DEFINITIONS BY UNIT TYPE (Contd)			
UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	скт з	, DEFINITION
33	199	SN232			BUSY OUT FAILED
(Contd)	200	SN232			ONLY IDLE
	201	SN232	TN452	TN400	DEFECTIVE GATE ARRAY D
	202	SN232	TN452	TN400	FAULTY PORT SELECT IN GATE ARRAY D
	267	SN232	TN452		PORT COMMAND BUS — BAD TEST REGISTER VALUE FROM PORT
	315 ´	SN232			LOOP CLOSURE DETECTION MAY BE DUE TO CO AT- TEMPTING SEIZE
34	13	SN233 OR SN243			CIRCUIT IN USE BY CALL PROCESSING
	51	SN233 OR SN243			PORT RESOURCES NOT AVAILABLE
	100	SN233 OR SN243	TN452	TN400	NON-ZERO IDLE PORT CONTROL REGISTER
	109	SN233	TN452	TN400	FAULTY SET OF LA FLIP-FLOP
	110	SN233	TN452	TN400	FAULTY SET OF CPU FLIP-FLOP
	124	SN233	TN452	TN400	FAULTY CLEAR OF CPU FLIP-FLOP
	125	SN243	TN452	TN400	OFF-HOOK ERROR, POSSIBLY FROM ATTACHED STATION
	126	SN243	TN452	TN400	OFF-HOOK ERROR FROM BAD LA CLEAR OR AT- TACHED STATION
	131	SN243	TN452	TN400	TERMINATED LINE FAILED TO INDICATE OFF- HOOK
	133	SN243	TN452	TN400	OFF-HOOK STATUS FAILED TO LATCH

PROC 620 SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)									
UNIT TYPE	FAULT CODE	СКТІ	CKT 2	СКТ З	DEFINITION				
34 (Contd)	149	SN233 OR SN243	TN454	SN250	INSUFFICIENT 440-HZ ON-HOOK REFLECTION				
	150	SN233 OR SN243	TN454	SN250	EXCESSIVE 440-HZ ON-HOOK REFLECTION				
	152	SN243	TN454	SN250	EXCESSIVE 440-HZ OFF-HOOK REFLECTION				
	153	SN233 OR SN243	TN454	SN250	EXCESSIVE SIGNAL AT OTHER THAN 440-HZ				
	154	SN243	TN454	SN250	ON-HOOK STATUS FAILED TO POWER DOWN CODEC				
	169	SN243	TN454	SN250	FAULTY AUDIBLE RING FIRST TONE FREQUENCY				
	170	SN243	TN454	SN250	FAULTY AUDIBLE RING SECOND TONE FREQUENCY				
	171	SN243	TN454	SN250	FAULTY AUDIBLE RING FIRST TONE QUIET TIME				
	172	SN243	TN454	SN250	FAULTY AUDIBLE RING SECOND TONE QUIET TIME				
	199	SN233 OR SN243			BUSY OUT FAILED				
	200	SN233 OR SN243			ONLY IDLE				
	201	SN233 OR SN243	TN452	TN400	DEFECTIVE GATE ARRAY D				
	202	SN233 OR SN243	TN452	TN400	FAULTY PORT SELECT IN GATE ARRAY D				
	203	SN233	TN454	SN250	E OR M SIGNAL INDICATOR STUCK ACTIVE				
	204	SN233	TN454	SN250	FAILURE OF OP SET				
	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)								
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UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	СКТ З	DEFINITION				
34	205	SN233	TN452	TN400	M-SIGNAL SENT INDICATOR STUCK INACTIVE				
(Contd)	206	SN233	TN454	SN250	POSSIBLE EXTERNAL CIRCUIT SIGNALING				
	208	SN233	TN454	SN250	CLEARING LOOPAROUND FAILS TO REMOVE 440-HZ SIGNAL				
	211	SN233	TN454	SN250	OFF-HOOK STATUS (GRND SIGNAL DETECTOR) FAILS TO POWER UP THE CODEC				
	214	SN233	TN452	TN400	FAILURE OF GATE ARRAY OR E-SIGNAL RECEIVER				
	215	SN233	TN452	TN400	FAILURE OF OP FLIP-FLOP				
	216	SN233	TN452	TN400	INCORRECT ENCODE IN TIE TRUNK ID CHIP				
	219	SN243			RELEASE BUSY OUT FAILED				
	267	SN233 OR SN243	TN452		PORT COMMAND BUS — BAD TEST REGISTER VALUE FROM PORT				
44	13	SN233			CIRCUIT IN USE BY CALL PROCESSING				
	51	SN233			PORT RESOURCES NOT AVAILABLE				
	100	SN233	TN452	TN400	NON-ZERO IDLE PORT CONTROL REGISTER				
	109	SN233	TN452	TN400	FAULTY SET OF LA FLIP-FLOP				
	110	SN233	TN452	TN400	FAULTY SET OF CPU FLIP-FLOP				
	124	SN233	TN452	TN400	FAULTY CLEAR OF CPU FLIP-FLOP				
	149	SN233	TN454	SN250	INSUFFICIENT 440-HZ ON-HOOK REFLECTION				
	150	SN233	TN454	SN250	EXCESSIVE 440-HZ ON-HOOK REFLECTION				
	153	SN233	TN454	SN250	EXCESSIVE SIGNAL AT OTHER THAN 440-HZ				
	201	SN233	TN452	TN400	DEFECTIVE GATE ARRAY D				
-	202	SN233	TN452	TN400	FAULTY PORT SELECT IN GATE ARRAY D				

TABLE AB. (Contd)

PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)								
UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	СКТ З	DEFINITION			
44	203	SN233	TN454	SN250	E OR M SIGNAL INDICATOR STUCK ACTIVE			
(Contd)	204	SN233	TN454	SN250	FAILURE OF OP SET			
	205	SN233	TN452	TN400	M-SIGNAL SENT INDICATOR STUCK INACTIVE			
	206	SN233	TN454	SN250	POSSIBLE EXTERNAL CIRCUIT SIGNALING			
	208	SN233	TN454	SN250	CLEARING LOOPAROUND FAILS TO REMOVE 440-HZ SIGNAL			
	214	SN233	TN452	TN400	FAILURE OF GATE ARRAY OR E-SIGNAL RECEIVER			
	215	SN233	TN452	TN400	FAILURE OF OP FLIP-FLOP			
	216	SN233	TN452	TN400	INCORRECT ENCODE IN TIE TRUNK ID CHIP			
1	267	SN233	TN452		PORT COMMAND BUS BAD TEST REGISTER VALUE FROM PORT			
45	13	SN231			CIRCUIT IN USE BY CALL PROCESSING			
	51	SN231			PORT RESOURCES NOT AVAILABLE			
	100	SN231	TN452	TN400	NON-ZERO IDLE PORT CONTROL REGISTER			
	101	SN231	TN452	TN400	DEFECTIVE GATE ARRAY A			
	102	SN231	TN452	TN400	DEFECTIVE GATE ARRAY B			
	104	SN231	TN452	TN400	FAULTY PORT SELECT IN GATE ARRAY A			
	105	SN231	TN452	TN400	FAULTY PORT SELECT IN GATE ARRAY B			
	129	SN231	TN452	TN400	GND DETECTION ERROR POSSIBLY FROM EXTER- NAL CIRCUIT SIGNALING			
	141	SN231	TN452	TN400	REV CURRENT DETECTOR STUCK ACTIVE			
	153	SN231	TN454	SN250	EXCESSIVE SIGNAL AT OTHER THAN 440-HZ			
	199	SN231			BUSY OUT FAILED			
	200	SN231			ONLY IDLE			

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TABLE AB.	(Contd)
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	PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)								
UNIT TYPE	FAULT CODE	СКТІ	СКТ 2	СКТ 3	DEFINITION				
45	219	SN231			RELEASE BUSY OUT FAILED				
(Contd)	267	SN231	TN452		PORT COMMAND BUS — BAD TEST REGISTER VALUE FROM PORT				
	316	SN231	TN454	SN250	INSUFFICIENT 600-OHM TERMINATION REFLECTION POSSIBLY CAUSED BY OPEN TRANSMISSION OPTION SWITCH				
	317	SN231	TN454	SN250	EXCESSIVE 600-OHM TERMINATION REFLECTION				
	318	SN231	TN454	SN250	INSUFFICIENT SHORT CIRCUIT TERMINATION RE- FLECTION				
	319	SN231	TN454	SN250	EXCESSIVE SHORT CIRCUIT TERMINATION REFLEC- TION				
46	13	SN254			CIRCUIT IN USE BY CALL PROCESSING				
	51	SN254			PORT RESOURCES NOT AVAILABLE				
	153	SN254	TN454	SN250	EXCESSIVE SIGNAL AT OTHER THAN 440-HZ				
	199	SN254			BUSY OUT FAILED				
	219	SN254			RELEASE BUSY OUT FAILED				
	235	SN254	TN454	SN250	440-HZ TRANSMISSION FAILURE BETWEEN 2 PORTS				
	236	SN254	TN454	SN250	EXCESSIVE SIGNAL OTHER THAN 440-HZ AT SEND PORT				
	237	SN254	TN454	SN250	IMPROPER 440-HZ TRANSMISSION FROM RECEIVE INPUT TO SEND OUTPUT ON THE SAME PORT				
	267	SN254	TN452		PORT COMMAND BUS BAD TEST REGISTER VALUE FROM PORT				
47	13	SN260			CIRCUIT IN USE BY CALL PROCESSING				
	51	SN260			PORT RESOURCES NOT AVAILABLE				
	146	SN260	TN452	TN400	FAULTY DIGITAL SIGNAL PROCESSOR				

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TABLE AB.	(Contd)
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PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)								
UNIT TYPE	FAULT CODE	СКТ 1	CKT 2	СКТ З	DEFINITION			
47	218	SN260			NETWORK ORDER FAILED			
(Contd)	222	SN260	TN452	TN400	FTC PORT 0 STUCK OFF-HOOK			
	223	SN260	TN452	TN400	FTC PORT 1 STUCK OFF-HOOK			
	227	SN260	TN452	TN400	FTC PORT 0 STUCK ON-HOOK			
	228	SN260	TN452	TN400	FTC PORT 1 STUCK ON-HOOK			
	230	SN260	TN454	SN250	NO TRANSMISSION FROM FTC PORT 1 TO PORT 0			
	231	SN260	TN454	SN250	IMPROPER OUTPUT ENERGY AT FTC PORT 0			
	232	SN260	TN454	SN250	IMPROPER TRANSMISSION FROM FTC PORT 0 TO PORT 1			
	233	SN260	TN454	SN250	IMPROPER OUTPUT ENERGY AT FTC PORT 1			
	267	SN260	TN452		PORT COMMAND BUS — BAD TEST REGISTER VALUE FROM PORT			
50	411	TN461			TMS CLOCK OSCILLATOR ERROR (OOL BIT SET)			
	412	TN461			TMS CLOCK OSCILLATOR ERROR (OTHER)			
	413	TN461			TMS CLOCK OSCILLATOR AFTER INITIALIZATION ERROR (MFP BIT SET)			
	414	TN461			TMS CLOCK OSCILLATOR AFTER INITIALIZATION ERROR (OTHER)			
	500	TN461	CABLE		TMS CLOCK OSCILLATOR MFP FAILURE			
	504	TN461	CABLE		ALL LOCAL CLOCK TERMINATION CIRCUITS HAVE MFP FAILURES — MORE THAN 1 LOCAL CLOCK TER- MINATION CIRCUIT INSTALLED			
	506	TN461	CABLE		TMS CLOCK OSCILLATOR MAINTENANCE CIRCUIT HAS MFP FAULT			
	508	TN461	CABLE		TMS CLOCK OSCILLATOR STATE DETERMINATION AND DUPLICATION CONTROL INCORRECT			

TABLE AB. (Contd)

	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)								
UNIT TYPE	FAULT	СКТІ	СКТ 2	СКТ З	DEFINITION				
50 (Contd)	510	TN461	TN461		TMS CLOCK OSCILLATOR OOL ERROR (OFF-LINE TMS CLOCK OSCILLATOR FIRST CHOICE)				
	511	TN461			TMS CLOCK OSCILLATOR PFL ERROR				
	512	TN461			CANNOT COMPLETE TMS CLOCK OSCILLATOR FORCE ERROR SEQUENCE				
	529	T N461	TN482		TMS MAINTENANCE BUS — BAD TEST REGISTER VA- LUE FROM TARGET IOBI BOARD				
	554	TN461			TMS CLOCK OSCILLATOR MFP CHECKING CIRCUIT FAILED TO DETECT A MISSING FRAME PULSE				
	570	TN461			TMS CLOCK OSCILLATOR MFP ERROR CANNOT BE CLEARED				
	577	TN461	TN482		TMS ABBREVIATED MAINTENANCE BUS TEST FAIL- URE				
51	415	TN462			LOCAL CLOCK TERMINATION ERROR (ERR BIT SET)				
	416	TN462			LOCAL CLOCK TERMINATION ERROR (OTHER)				
	417	TN462			LOCAL CLOCK TERMINATION AFTER INITIALIZA- TION ERROR (MFP OR ACT BIT SET)				
	418	TN462			LOCAL CLOCK TERMINATION AFTER INITIALIZA- TION ERROR (OTHER)				
	501	TN462	CABLE	TN461	SINGLE LOCAL CLOCK TERMINATION MFP FAILURE WITH MORE THAN 1 LOCAL CLOCK TERMINATION CIRCUIT INSTALLED				
	502	CABLE	TN462	TN461	TWO LOCAL CLOCK TERMINATION MFP FAILURES WITH MORE THAN 2 LOCAL CLOCK TERMINATION CIRCUITS INSTALLED				
	503	CABLE	TN462	TN461	THREE LOCAL CLOCK TERMINATION MFP FAILURES WITH MORE THAN 3 LOCAL CLOCK TERMINATION CIRCUITS INSTALLED				
	505	TN462	CABLE	TN461	SINGLE LOCAL CLOCK TERMINATION MFP FAILURE — 1 LOCAL CLOCK TERMINATION CIRCUIT IN- STALLED				

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	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)								
UNIT TYPE	FAULT CODE	СКТ 1	CKT 2	скт з	DEFINITION				
51 (Contd)	507	TN462	CABLE		LOCAL CLOCK TERMINATION MAINTENANCE CIR- CUIT HAS MFP FAULT				
	513	TN462			LOCAL CLOCK TERMINATION PFL ERROR				
	515	TN462			LOCAL CLOCK TERMINATION ERR BIT SET – RESET WORKED				
	516	TN462			LOCAL CLOCK TERMINATION ERR BIT SET – CANNOT RESET				
	517	TN462	TN461		LOCAL CLOCK TERMINATION ACT FAILURE				
	518	TN462	TN461	CABLE	CANNOT COMPLETE LOCAL CLOCK TERMINATION FORCE ERROR SEQUENCE				
	522	TN462	TN452		TMS IOBI BUS – BAD TEST REGISTER VALUE FROM IOBI SPACE BOARD				
-	555	TN462			TMS LOCAL CLOCK TERMINATION ACT CHECKING CIRCUIT FAILED TO DETECT NO ACTIVITY ERROR				
	556	TN462			TMS LOCAL CLOCK TERMINATION ERR CHECKING CIRCUIT FAILED TO DETECT A CLOCK ERROR				
	557	TN462		200210	TMS LOCAL CLOCK TERMINATION MFP CHECKING CIRCUIT FAILED TO DETECT A MISSING FRAME PULSE				
	571	TN462			TMS LOCAL CLOCK TERMINATION ACT ERROR CANNOT BE CLEARED				
	572	TN462			TMS LOCAL CLOCK TERMINATION ERR ERROR CAN- NOT BE CLEARED				
	573	TN462			TMS LOCAL CLOCK TERMINATION MFP ERROR CANNOT BE CLEARED				
	576	TN462	TN452	TN400	TMS ABBREVIATED IOBI BUS TEST FAILURE				
52	269	TN463	T N444		MAINTENANCE BUS – BAD TEST REGISTER VALUE FROM TARGET BOARD				
	405	TN463			MODULE SYSTEM CLOCK SYNCHRONIZER ERROR				

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TABLE AB. (Contd)

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	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)							
UNIT TYPE	FAULT CODE	скті	СКТ 2	скт з	DEFINITION			
52 (Cantal)	453	TN463			TMS SYSTEM CLOCK SYNCHRONIZER ERROR			
(Conta)	529	TN463	TN482		TMS MAINTENANCE BUS — BAD TEST REGISTER VA- LUE FROM TARGET IOBI BOARD			
	701	TN463			HIGH ACCURACY CLOCK — TEMPORARY LOSS OF SIGNAL			
	702	TN463			MAIN PHASE LOCKED LOOP TEMPORARY LOSS OF SIGNAL			
	703	TN463			MAIN PHASE LOCKED LOOP — TEMPORARY OUT OF LOCK			
	704	TN463			HIGH ACCURACY CLOCK LOSS OF SIGNAL — BUILD OUT CONTROL ENABLED — MAIN PHASE LOCKED LOOP OPERATING CORRECTLY			
	705	TN463			HIGH ACCURRACY CLOCK LOSS OF SIGNAL — BUILD OUT CONTROL HAD TO BE RE-ENABLED — MAIN PHASE LOCKED LOOP OPERATING CORRECTLY			
	706	TN463			MAIN PHASE LOCKED LOOP LOSS OF SIGNAL - SIM- PLEX SYSTEM			
	707	TN463			MAIN PHASE LOCKED LOOP OUT OF LOCK AND THE SYSTEM IS ON THE HIGH ACCURACY CLOCK — SIM- PLEX SYSTEM			
	708	TN463			MAIN PHASE LOCKED LOOP OUT OF LOCK AND GO- ING TO THE HIGH ACCURACY CLOCK FIXED THE MAIN PHASE LOCKED LOOP — SIMPLEX SYSTEM			
,	709	. TN463			MAIN PHASE LOCKED LOOP OUT OF LOCK AND GO- ING TO THE HIGH ACCURACY CLOCK DID NOT FIX THE MAIN PHASE LOCKED LOOP — SIMPLEX SYS- TEM			
	710	TN463			HIGH ACCURACY CLOCK LOSS OF SIGNAL — MAIN PHASE LOCKED LOOP OK — DUPLEX SYSTEM			
	711	TN463			MAIN PHASE LOCKED LOOP LOSS OF SIGNAL DU- PLEX SYSTEM			

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	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)								
UNIT TYPE	FAULT CODE	СКТ 1	CKT 2	скт з	DEFINITION				
52 (Contd)	712	TN463			MAIN PHASE LOCKED LOOP OUT OF LOCK – DU- PLEX SYSTEM				
	714	TN463	ANN11	ANN11	ALL TRANSLATED REFERENCES TEMPORARY LOSS OF SIGNAL				
-	718	TN463	ANN11	ANN11	ALL TRANSLATED REFERENCES STEADY LOSS OF SIGNAL				
	720	TN463	ANN11	ANN11	ALL TRANSLATED REFERENCES OUT OF LOCK				
	724	TN463	ANN11	ANN11	ALL TRANSLATED REFERENCES STEADY OUT OF LOCK				
	726	TN463			DS-1 TO SYSTEM CLOCK SYNCHRONIZER CABLE(S) DISCONNECTED				
	728	TN463	ANN11		LOSS OF SIGNAL OR OUT OF LOCK AT SYSTEM CLOCK SYNCHRONIZER				
	741	TN463			REFERENCE SOURCE SELECTION HARDWARE DOES NOT AGREE WITH STATUS MEMORY — HIGH ACCU- RACY CLOCK ON-LINE				
	742	TN463			REFERENCE SOURCE SELECTION HARDWARE DOES NOT AGREE WITH STATUS MEMORY — REFER- ENCES ARE REVERSED — REFERENCES SWITCHED				
	743	TN463			REFERENCE SOURCE SELECTION HARDWARE DOES NOT AGREE WITH STATUS MEMORY — REFER- ENCES ARE REVERSED — SWITCH OF REFERENCES CANNOT BE MADE				
	744	TN463			TMS STATUS BIT NOT CONSISTENT WITH TRANSLA- TION				
	745	TN463			BOTH SYSTEM CLOCK SYNCHRONIZERS ON-LINE BITS SET OR CLEARED				
	746	TN463			BOTH SYSTEM CLOCK SYNCHRONIZERS ON-LINE BITS BACKWARDS				
	747	TN463			BUILD OUT CONTROL BIT HAD TO BE RESET				
	748	TN463			BUILD OUT CONTROL BIT SET AND CANNOT BE CLEARED				

TABLE AB.	(Contd)
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	PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)								
UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	СКТ З	DEFINITION				
52 (Contd)	749	TN463			REFERENCE SOURCE SELECTION DOES NOT AGREE WITH STATUS MEMORY – BUS TEST FAILED				
	751	TN463			SYSTEM CLOCK SYNCHRONIZER CIRCUIT PACK PULLED OR ON-LINE BIT STUCK				
	752	TN463			ON-LINE SYSTEM CLOCK SYNCHRONIZER OK – OFF- LINE SYSTEM CLOCK SYNCHRONIZER HAS OUT OF LOCK CONDITION				
	753	TN463			SYSTEM CLOCK SYNCHRONIZER CROSS COUPLING SIGNAL INCORRECT				
	754	TN463			SYSTEM CLOCK SYNCHRONIZER LOSS OF SIGNAL DETECTION CIRCUITRY FAULTY				
	755	TN463			SYSTEM CLOCK SYNCHRONIZER PRIMARY/SECON- DARY LOSS OF SIGNAL DETECTION CIRCUITRY FAULTY				
	768	TN463			HIGH ACCURACY CLOCK COULD NOT BE SWITCHED ON-LINE				
53	10	TN470	TN381		NO POSITIVE ACKNOWLEDGE AFTER MAINTE- NANCE ORDER TO TMSP				
	420	TN470			FAILED MPX RAM				
	421	TN470			MPX RAM PARITY ERROR RECOVERY FAILURE				
	422	TN470			MPX INITIALIZATION ERROR				
	423	TN470			MPX INITIALIZATION ALARM				
	424	TN470			MPX RAM PARITY ERROR				
	449	TN470			INITIALIZATION TMS MPX RAM TEST ERROR				
	450	TN470			INITIALIZATION TMS MPX RAM PARITY CHECKER ERROR				
	452	TN470			ILLEGAL MPX RAM ENTRY ERROR				
	522	TN470	TN452		TMS IOBI BUS – BAD TEST REGISTER VALUE FROM IOBI SPACE BOARD				

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	PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)							
UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	СКТ З	DEFINITION			
53 (Contd) -	553	TN470			TMS MPX PARITY CHECKING CIRCUIT FAILED TO DETECT A BAD PARITY WORD			
	569	TN470			TMS MPX PARITY ERROR CANNOT BE CLEARED			
	576	TN470	TN452	TN400	TMS ABBREVIATED IOBI BUS TEST FAILURE			
	582	TN470			TMS MPX RAM HAS 32 OR MORE BUSIED OUT TIME SLOTS			
	584	TN470			TMS MPX RAM PARITY ERROR RECOVERY FAILURE CORRECTED			
	585	TN470			TMS MPX RAM PARITY ERROR RECOVERY FAILURE NOT CORRECTED			
	586	TN470			TMS MPX RAM INITIALIZATION TEST ERROR COR- RECTED			
	587	TN470			TMS MPX RAM INITIALIZATION TEST ERROR NOT CORRECTED			
	588	TN470			TMS MPX FAILED RAM CORRECTED			
	589	TN470			TMS MPX FAILED RAM NOT CORRECTED			
	611	TN470	TN480 OR TN482	UN150	MPX GENERATES NETWORK TEST FLAGS			
	636	TN470	TN480 OR TN482	UN150	MPX PCM ERROR			
54	522	TN473	TN452	-	TMS IOBI BUS — BAD TEST REGISTER VALUE FROM IOBI SPACE BOARD			
	609	TN473	TN480		FAN OUT GENERATES NETWORK TEST FLAGS			
	632	TN473	TH452	TN400	FAN OUT READ ERROR			
	633	TN473	TN480 OR TN482		FAN OUT PCM ERROR			

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PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)							
UNIT TYPE	FAULT CODE	скт 1	СКТ 2	СКТ З	DEFINITION		
55	419	TN480			MODULE INTERFACE ERROR		
	522	TN480	TN452		TMS IOBI BUS — BAD TEST REGISTER VALUE FROM IOBI SPACE BOARD		
	551	TN480	TN481		TMS MODULE INTERFACE PARITY CHECKING CIR- CUIT FAILED TO DETECT A BAD PARITY WORD		
	552	TN480	TN481	TN441	TMS MODULE INTERFACE TIME SLOT INTEGRITY CIRCUIT FAILED TO DETECT A BUFFER ERROR		
	559	TN480	TN470		TMS MODULE INTERFACE OUT OF FRAME CIRCUIT FAILED TO DETECT A FRAMING ERROR		
	567	TN480	TN441		TMS MODULE INTERFACE PARITY ERROR CANNOT BE CLEARED		
	568	TN480	TN481	TN441	TMS MODULE INTERFACE TIME SLOT INTEGRITY ERROR CANNOT BE CLEARED		
	575	TN480	TN470		TMS MODULE INTERFACE OUT OF FRAME ERROR CANNOT BE CLEARED		
	576	TN480	TN452	TN400	TMS ABBREVIATED IOBI BUS TEST FAILURE		
	600	TN480	TN481		UNDIAGNOSED MODULE INTERFACE BUFFER ER- ROR FROM OEP (PERIODIC ONLY)		
	607	TN481	TN480	TN441	LGL TO MODULE INTERFACE SUSPECTED OF GEN- ERATING NETWORK TEST FLAGS		
	616	TN480	TN481		LGL TO MODULE INTERFACE GENERATES NET- WORK TEST FLAGS		
	618	TN480	TN482		MODULE INTERFACE OUTPUT GENERATES NET- WORK TEST FLAGS		
	619	TN480	TN482	TN470	MODULE INTERFACE INPUT GENERATES NETWORK TEST FLAGS		
	623	TN480	TN452	TN400	MODULE INTERFACE READ ERROR		
	630	TN481	TN480	TN441	FAULT SUSPECTED IN LGL TO MODULE INTERFACE		
	643	TN480	TN481		LGL TO MODULE INTERFACE FAULT		
	645	TN480	TN482	TN470	MODULE INTERFACE INPUT FAULT		
	646	TN480	TN482		MODULE INTERFACE OUTPUT FAULT		

	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)						
UNIT TYPE	FAULT CODE	скт 1	CKT 2	СКТ 3	DEFINITION		
56	30	TN441 OR TN460	TN444		INCORRECT CLOCK OUTPUT SEQUENCE (INCORRECT SAC)		
	31	TN441 OR TN460	TN444		MAINTENANCE INTERFACE FAILURE CAUSED IN- CORRECT SAC READOUT		
	32	TN441	TN444		GPP DATA CLOCK LOST MOMENTARILY (INCORRECT DCE READOUT)		
	33	TN441	TN444		MAINTENANCE INTERFACE FAILURE CAUSED IN- CORRECT DCE READOUT		
	34	TN441	TN444		CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE ON-LINE (SIMPLEX, NO SCS)		
		TN441	TN441		CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE ON-LINE (DUPLEX, NO SCS)		
		TN441	TN463	TN444	CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE ON-LINE (SIMPLEX WITH SCS)		
		TN441	TN463	TN462	CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE ON-LINE (DUPLEX WITH SCS)		
		TN441	TN481	TN444	CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE ON-LINE (SIMPLEX WITH SCS)		
		TN441	TN481	TN462	CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE ON-LINE (DUPLEX WITH SCS)		
	35	TN441	TN444		CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE OFF-LINE (SIMPLEX, NO SCS)		
-		TN441	T N441		CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE OFF-LINE (DUPLEX, NO SCS)		
		TN441	TN463	TN444	CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE OFF-LINE (SIMPLEX WITH SCS)		
		TN441	TN463	TN462	CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE OFF-LINE (DUPLEX WITH SCS)		

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TABLE AB.	(Contd)
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PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)							
UNIT TYPE	FAULT CODE	скті	СКТ 2	скт з	DEFINITION		
56 (Contd)	35 (Contd)	TN441	TN481	TN444	CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE OFF-LINE (SIMPLEX WITH SCS)		
		TN441	TN481	TN462	CLOCK OUT OF LOCK WITH REFERENCE CLOCK, MO- DULE OFF-LINE (DUPLEX WITH SCS)		
	36	TN441	TN444		MIF FAILURE CAUSED INCORRECT OOL READOUT, MODULE ON-LINE		
	37	TN441	TN444		MIF FAILURE CAUSED INCORRECT OOL READOUT, MODULE OFF-LINE		
	38	TN441	TN444		CLOCK FREQUENCY GENERATOR FAILED		
	39	TN441	TN444		MIF FAILURE CAUSED INCORRECT DCE OOL REA- DOUT		
	40	TN441	TN444	TN530	OFF-LINE CLOCK APPEARS AS MASTER WITH NO SCS/LGI PRESENT		
	41	TN441	TN444		MIF FAILURE CAUSED OFF-LINE CLOCK TO APPEAR AS MASTER WITH NO SCS/LGI PRESENT		
	42	TN441	TN463 OR TN481	TN444	CLOCK APPEARS AS MASTER WITH SCS/LGI PRE- SENT		
	43	TN441	TN444		MIF FAILURE CAUSED CLOCK TO APPEAR AS MAS- TER WITH SCS/LGI PRESENT		
	44	TN441	TN444		ON-LINE CLOCK APPEARS AS SLAVE WITH NO SCS/LGI PRESENT		
	45	TN441	TN444		MIF FAILURE CAUSED MAINTENANCE INTERFACE APPEARANCE OF ON-LINE LOCK AS SLAVE WITH NO SNS/LGI PRESENT		
	57	TN441		·	INTERMODULE DATA STORE OR MODULE CLOCK OUT OF LOCK CAUSED TSI TEST FAILURE		
	404	TN441			INTERMODULE DATA STORE ERROR		
	407	TN441			TSI PCM DATA PARITY ERROR		
	601	TN441			UNDIAGNOSED MODULE INTERFACE BUFFER ER- ROR FROM OEP (PERIODIC ONLY)		

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PROC 620 SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)						
UNIT TYPE	FAULT	СКТ 1	СКТ 2	СКТ 3	DEFINITION	
56 (Contd)	602	TN441	TN481	TN446	INTERMODULE DATA STORE INPUT STORE GENERATES NETWORK TEST FLAGS	
	606	TN441	TN446		INTERMODULE DATA STORE OUTPUT STORE GEN- ERATES NETWORK TEST FLAGS	
	608	TN441			INTERMODULE DATA STORE TRANSMITS NETWORK TEST FLAGS TO TMS	
	625	TN441	TN481	TN446	INTERMODULE DATA STORE CROSS-COUPLING FAILURE	
	628	TN441	TN444		INTERMODULE DATA STORE READ ERROR	
	629	TN441	TN446		INTERMODULE DATA STORE OUTPUT STORE FAULT	
	631	TN441			INTERMODULE DATA STORE TRANSMIT TO TMS FAULT	
	639	TN441	TN481	TN446	INTERMODULE DATA STORE INPUT STORE FAILURE	
57	409	TN481			LIGHT GUIDE INTERFACE ERROR	
	550	TN481	TN480		TMS LIGHT GUIDE INTERFACE PARITY CHECKING CIRCUIT FAILED TO DETECT A BAD PARITY WORD	
	558	TN481	TN441		TMS LIGHT GUIDE INTERFACE OUT OF FRAME CIR- CUIT FAILED TO DETECT A FRAMING ERROR	
	566	TN481	TN480		TMS LIGHT GUIDE INTERFACE PARITY ERROR CAN- NOT BE CLEARED	
	574	TN481	TN441		TMS LIGHT GUIDE INTERFACE OUT OF FRAME ER- ROR CANNOT BE CLEARED	
	577	TN481	TN444		TMS ABBREVIATED MAINTENANCE BUS TEST FAIL- URE	
	612	TN481	5N480	5N441	LGL TO LIGHT GUIDE INTEFACE SUSPECTED OF GENERATING NETWORK TEST FLAGS	
	613	TN481			LIGHT GUIDE INTERFACE TRANSMITS NETWORK TEST FLAGS TO MODULES	
	614	TN481	TN441		LIGHT GUIDE INTERFACE OUTPUT TO TMS GENER- ATES NETWORK TEST FLAGS	

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TABLE AB.	(Contd)
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	PROC 620 SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)							
UNIT TYPE	FAULT CODE	СКТІ	СКТ 2	СКТ З	DEFINITION			
57 (Contd)	615	TN481	TN441		LIGHT GUIDE INTERFACE INPUT FROM TMS GENER- ATES NETWORK TEST FLAGS			
	617	TN481	TN480		LGL TO LIGHT GUIDE INTERFACE GENERATES NET- WORK TEST FLAGS			
	624	TN441	TN441	TN480	LIGHT GUIDE INTERFACE CROSS-COUPLING FAIL- URE			
	637	TN481	TN444		LIGHT GUIDE INTERFACE READ ERROR			
	638	TN481	TN480	TN441	FAULT SUSPECTED IN LGL TO LIGHT GUIDE INTER- FACE			
	640	TN481			LIGHT GUIDE INTERFACE PCM TRANSMIT TO MO- DULE FAULT			
	641	TN481	TN441		LIGHT GUIDE INTERFACE OUTPUT TO TMS FAULT			
	642	TN481	TN441		LIGHT GUIDE INTERFACE INPUT FROM TMS FAULT			
	644	TN481	TN480		LGL TO LIGHT GUIDE INTERFACE FAULT			
58	522	UN150	TN452		TMS IOBI BUS — BAD TEST REGISTER VALUE FROM IOBI SPACE BOARD			
	610	UN150	TN473		FAN IN GENERATES NETWORK TEST FLAGS			
	634	UN150	TN452	TN400	FAN IN READ ERROR			
	635	UN150	TN473		FAN IN PCM ERROR			
59	430	TN482			TMIF PFAIL/LATE MAKE ALARM			
	447	TN482			TMIF WRITE FAILURE			
	451	TN482			TMS INTERFACE ERROR			
	509	TN482	TN461		MAINTENANCE INTERFACE FAILURE CAUSED TMS CLOCK OSCILLATOR FAILURE			
	522	TN482	TN452		TMS IOBI BUS – BAD TEST REGISTER VALUE FROM IOBI SPACE BOARD			
	526	TN482	TN400	TN381	TMI IOBI BUS – BUS CLOCK ON TMIF			

	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)							
UNIT TYPE	FAULT CODE	СКТ 1	CKT 2	СКТ З	DEFINITION			
59 (Contd)	528	TN482			TMS MAINTENANCE BUS - BAD TEST REGISTER VA- LUE FROM TMIF			
	529	TN482	TN482		TMS MAINTENANCE BUS BAD TEST REGISTER VA- LUE FROM TARGET IOBI BOARD			
	530	TN482			TMS MAINTENANCE BUS – BAD SAC VALUE			
	531	TN482			TMS MAINTENANCE BUS — TMIF DID NOT FLAG BAD PARITY			
	605	TN482			TMIF GENERATES TEST VECTORS WHEN SHUT OFF			
	621	TN482			TMIF READ ERROR			
	627	TN482			TMIF TEST VECTOR OUTPUT INCORRECT			
62	12	SN261			TIME SLOT UNAVAILABLE			
	199	SN261			BUSY OUT FAILED			
	218	SN261			NETWORK ORDER FAILED			
	350	SN261	TN452	TN400	GPP DTL FAULT OR ADFTC DIGITAL SELF-TEST FAULT			
	351	SN261	TN452	TN400	GPP OR ADFTC DTL IDLE BIT SET			
	352	SN261	TN452	TN400	GPP DTLI AND DTLF TOGETHER OR ADFTC DIGITAL SELF-TEST AND DTLI TOGETHER			
	353	SN261	TN452	TN400	GPP 48-VOL BIT SET (FUSE BLOWN) OR ADFTC AN- ALOG SELF-TEST FAULT			
	354	SN261	TN452	TN400	GPP 48-VOL AND DTLF BITS SET OR ADFTC ANALOG AND DIGITAL SELF-TEST FAULT TOGETHER			
	355	SN261	TN452	TN400	GPP 48-VOL AND DTLI BITS SET OR ADFTC ANALOG SELF-TEST AND DTLI TOGETHER			

	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)								
UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	СКТ З	DEFINITION				
62 (Contd)	356	SN261	TN452	TN400	GPP 48-VOL, DTLI, AND DTLI BITS SET OR ADFTC AN- ALOG, DIGITAL SELF-TEST FAULT, AND DTLI TO- GETHER				
	454	SN261			DTLF FAULT ON ADFTC (DIGITAL SELF-TEST)				
	455	SN261			48-VOL FAULT ON ADFTC (ANALOG SELF-TEST)				
	456	SN261			48-VOL AND DTLF FAULTS TOGETHER ON ADFTC				
· .	457	SN261			PROTOCOL ERROR ON ADFTC				
	458	SN261			DTL IDLE ON ADFTC				
	1000	SN261			COULD NOT SEND AN S MESSAGE				
	1001	SN261			FACILITY NOT TESTED FOR MORE THAN X CYCLES				
	1005	SN261			NO BITS RECEIVED ON A 1-PORT ADFTC SELF-TEST				
	1006	SN261			DATA TRANSMISSION INTERRUPTED: 1-PORT ADFTC SELF-TEST				
	1007	SN261			BIT ERROR RATE EXCEEDED FOR 1-PORT ADFTC SELF-TEST				
	1008	SN261			BLOCK ERROR RATE EXCEEDED FOR 1-PORT ADFTC SELF-TEST				
	1009	SN261			EIA UPDATE FAILURE DURING A 1-PORT ADFTC SELF-TEST				
~	1010	SN261			ERROR OVERFLOW DURING A 1-PORT ADFTC SELF- TEST				
	1011	SN261			UNDEFINED ERROR DURING A 1-PORT ADFTC SELF- TEST				
	1012	SN261			NO BITS RECEIVED ON A 2-PORT NORMAL ADFTC SELF-TEST				
	1013	SN261			DATA TRANSMISSION INTERRUPTED: 2-PORT NOR- MAL ADFTC SELF-TEST				

TABLE AB. (Contd)

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	PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)											
UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	СКТ З	DEFINITION							
62 (Contd)	1014	SN261			BIT ERROR RATE EXCEEDED FOR 2-PORT NORMAL ADFTC SELF-TEST							
	1015	SN261			BLOCK ERROR RATE EXCEEDED FOR 2-PORT NOR- MAL ADFTC SELF-TEST							
	1016	SN261			EIA UPDATE FAILURE DURING A 2-PORT NORMAL ADFTC SELF-TEST							
	1017	SN261			ERROR OVERFLOW DURING A 2-PORT NORMAL ADFTC SELF-TEST							
	1018	SN261			UNDEFINED ERROR DURING A 2-PORT NORMAL ADFTC SELF-TEST							
	1019	SN261			NO BITS RECEIVED ON A 2-PORT REVERSE ADFTC SELF-TEST							
	1020	SN261			DATA TRANSMISSION INTERRUPTED: 2-PORT RE- VERSE ADFTC SELF-TEST							
	1021	SN261			BIT ERROR RATE EXCEEDED FOR 2-PORT REVERSE ADFTC SELF-TEST							
	1022	SN261			BLOCK ERROR RATE EXCEEDED FOR 2-PORT RE- VERSE ADFTC SELF-TEST							
	1023	SN261			EIA UPDATE FAILURE DURING A 2-PORT REVERSE ADFTC SELF-TEST							
	1024	SN261			ERROR OVERFLOW DURING A 2-PORT REVERSE ADFTC SELF-TEST							
	1025	SN261			UNDEFINED ERROR DURING A 2-PORT REVERSE ADFTC SELF-TEST							
	1026	SN261			UNSENT STOP MESSAGE RECEIVED BY ADFTC							
	1027	SN261			DID NOT RECEIVE EXPECTED: TEST ABORTED S MESSAGE							
	1028	SN261			DID NOT RECEIVE EXPECTED: TEST COMPLETED S MESSAGE							
	1029	SN261			THE BIT AND/OR BLOCK ERROR RATES WERE NOT RECEIVED							

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		PROC 6	20 — SPE	CIFIC FAU	LT CODE DEFINITIONS BY UNIT TYPE (Contd)
UNIT TYPE	FAULT CODE	скт 1	CKT 2	скт з	DEFINITION
62 (Contd)	1425	SN261			ADFTC DID NOT RETURN A SETUP (HANDSHAKE) RESULT MESSAGE
	1426	SN261			ADFTC DID NOT RECEIVE A SET TEST (START HAND- SHAKE) MESSAGE)
66	100	SN255	TN452	TN400	NON-ZERO IDLE PORT CONTROL REGISTER
	120	SN255	TN452	TN400	VALID TONE PRESENT BIT STUCK ACTIVE IN SUM- MARY BOARD SCAN
	121	SN255	TN454	SN250 OR SN253	VALID TONE PRESENT NOT INDICATED IN SUM- MARY BOARD SCAN (REORDER OR DATA ANSWER TONE USED)
	122	SN255	TN454	SN250 OR SN253	VALID TONE PRESENT NOT INDICATED IN TONE REGISTER (REORDER OR DATA ANSWER TONE USED)
	123	SN255	TN454	SN250 OR SN253	TONE NOT DETECTED IN TONE REGISTER (REOR- DER OR DATA ANSWER TONE USED)
	146	⁻ SN255	TN452	TN400	FAULTY DIGITAL SIGNAL PROCESSOR
	427	SN255			CONTROL/SUMMARY — SCAN REGISTER READ ER- ROR
68	364	ANN11			TEST VECTOR NOT RECEIVED IN PCM PORT LOOP AROUND TEST
	713	ANN11	TN463		PRIMARY REFERENCE TEMPORARY LOSS OF SIG- NAL
	715	ANN11	TN463		SECONDARY REFERENCE TEMPORARY LOSS OF SIGNAL
	716	ANN11	TN463		SECONDARY REFERENCE STEADY LOSS OF SIG- NAL – PRIMARY REFERENCE HEALTHY
	717	ANN11	TN463		PRIMARY REFERENCE STEADY LOSS OF SIG- NAL - SECONDARY REFERENCE HEALTHY
	719	ANN11	TN463		SECONDARY REFERENCE TEMPORARILY OUT OF LOCK

	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)											
UNIT TYPE	FAULT CODE	СКТ 1	CKT 2	СКТ З	DEFINITION							
68	721	ANN11	TN463		SECONDARY REFERENCE STEADY OUT OF LOCK							
(Contd)	722	ANN11	TN463		PRIMARY REFERENCE TEMPORARILY OUT OF LOCK							
	723	ANN11	TN463		PRIMARY REFERENCE STEADY OUT OF LOCK – SECONDARY REFERENCE HEALTHY							
	725	ANN11			INVALID DATA IN DS-1 DATA FACILITY ERROR FIFO							
	727	ANN11			DS-1 BOARD PROCESSOR SANITY							
	729	FAC	ANN11		LOSS OF SIGNAL AT DS-1							
	730	FAC	ANN11		DS-1 YELLOW ALARM RECEIVED							
	731	ANN11			DS-1 BOARD HEALTH							
	732	FAC	ANN11		DS-1 MAJOR ERROR RATE							
	733	FAC	ANN11		DS-1 MINOR ERROR RATE							
	734	FAC	ANN11		DS-1 RED ALARM DETECTED							
	735	FAC	ANN11		DS-1 CARRIER GROUP ALARM							
	736	FAC	ANN11		DS-1 SLIP RATE EXCEEDED — REFERENCES SWITCHED							
	737	FAC	ANN11		DS-1 SLIP RATE THRESHOLD EXCEEDED							
	738	FAC	ANN11		MISFRAME THRESHOLD EXCEEDED — SYSTEM HAS ONLY ONE REFERENCE							
	739	FAC	ANN11		MISFRAME THRESHOLD EXCEEDED							
	740	FAC	ANN11		MISFRAME THRESHOLD EXCEEDED — SECON- DARY REFERENCE AVAILABLE							
	750	FAC	ANN11	ANN11	MISFRAME THRESHOLD EXCEEDED ON PRIMARY AND SECONDARY REFERENCES							
	758	ANN11			LOSS OF SIGNAL IN DS-1 LINK							
	759	ANN11			MAJOR ALARM FROM ERROR RATE AFTER GLOBAL INITIALIZATION							

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PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)											
UNIT TYPE	FAULT CODE	скт 1	СКТ 2	СКТ 3	DEFINITION						
68 (Contd)	760	ANN11			MINOR ALARM FROM ERROR RATE AFTER GLOBAL INITIALIZATION						
	761	FAC	ANN11		DAILY LIMIT EXCEEDED FOR MISFRAMES AFTER GLOBAL INITIALIZATION						
	762	FAC	ANN11		RED ALARM RAISED AFTER GLOBAL INITIALIZA- TION						
	763	FAC	ANN11		DAILY LIMIT EXCEEDED FOR SLIPS AFTER GLOBAL INITIALIZATION						
	764	ANN11			DS-1 IS NOT ADMINISTERED						
	765	ANN11			LOSS OF DS-1 PROCESSOR SANITY AFTER GLOBAL INITIALIZATION						
	766	ANN11			DS-1 INTERFACE CANNOT BE GLOBALLY INITIAL- IZED						
	767	ANN11			DS-1 REFERENCE JUST TESTED CANNOT BE SWITCHED ON-LINE						
	769	ANN11		-	HEALTH OF REQUESTED DS-1 REFERENCES IS NOT GOOD BEFORE GLOBAL INITIALIZATION						
	770	ANN11	TN463		LOSS OF SIGNAL FROM THE DS-1 TO THE SYSTEM CLOCK SYNCHRONIZER						
	771	FAC	ANN11		DAILY LIMIT EXCEEDED FOR SLIPS BEFORE GLOBAL INITIALIZATION						
a	772	FAC	ANN11		DAILY LIMIT EXCEEDED FOR MISFRAMES BEFORE GLOBAL INITIALIZATION						
	773	FAC	ANN11		READ ALARM RAISED, OUT OF FRAME BEFORE GLOBAL INITIALIZATION						
	774	FAC	ANN11		MAJOR ALARM FROM ERROR RATE BEFORE GLOBAL INITIALIZATION						
	775	FAC	ANN11		MINOR ALARM FROM ERROR RATE BEFORE GLOBAL INITIALIZATION						

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	PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)											
UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	СКТ З	DEFINITION							
68	777	ANN11			MAINTENANCE CONTROL REGISTER IS DEFECTIVE							
(Conta)	778	ANN11			OPTION CONTROL REGISTER IS DEFECTIVE							
	779	ANN11			SCAN MODE CONTROL REGISTER IS DEFECTIVE							
	780	ANN11			DISABLE SIGNALING CONTROL REGISTER IS DE- FECTIVE							
	781	ANN11			PORT CONTROL REGISTER IS DEFECTIVE							
	782	ANN11			PORT STATUS REGISTER IS DEFECTIVE							
	783	ANN11			SUMMARY SCAN STATUS REGISTER IS DEFECTIVE							
	784	ANN11			STATUS RESET CONTROL REGISTER IS DEFECTIVE							
	785	ANN11			DS-1 REFERENCE IS NOT MAINTENANCE BUSY. WARNING: IF THIS INTERFACE IS A REFERENCE, THEN BUSYING OUT THE CIRCUIT AND TESTING IT MAY BE SERVICE AFFECTING TO OTHER DIGITAL FACILITIES BECAUSE THE CAPABILITY TO COMMU- NICATE AT A DIGITAL RATE WOULD BE LOST FOR THE DURATION OF THE TEST							
	786	ANN11			FAR END LOOPED BACK YELLOW ALARM NOT RECEIVED							
	787	ANN11			NO CARRIER GROUP ALARM FROM YELLOW ALARM RECEIVED							
	788	ANN11			I/O BUS DEFECTIVE							
	789	ANN11			MAINTENANCE BUS DEFECTIVE							
69	13	ANN17			CIRCUIT IN USE BY CALL PROCESSING							
	51	ANN17			PORT RESOURCES NOT AVAILABLE							
	109	ANN17	TN452	TN400	FAULTY SET OF LA FLIP-FLOP							

TABLE AB. (Contd)

		PROC 6	20 — SPE	CIFIC FAU	LT CODE DEFINITIONS BY UNIT TYPE (Contd)					
UNIT TYPE	FAULT CODE	СКТ 1	CKT 2	СКТ З	DEFINITION					
69	110	ANN17	TN452	TN400	FAULTY SET OF CPU FLIP-FLOP					
(Conta)	118	ANN17	TN452	TN400	FAULTY CLEAR OF LA FLIP-FLOP					
	124	ANN17	TN452	TN400	FAULTY CLEAR OF CPU FLIP-FLOP					
	125	ANN17	TN452	TN400	OFF-HOOK ERROR, POSSIBLY FROM ATTACHED STATION					
	131	ANN17	TN452	TN400	TERMINATED LINE FAILED TO INDICATE OFF- HOOK					
	149	ANN17	TN454	SN250	INSUFFICIENT 440-HZ ON-HOOK REFLECTION					
	150	ANN17	TN454	SN250	EXCESSIVE 440-HZ ON-HOOK REFLECTION					
2	152	ANN17	TN454	SN250	EXCESSIVE 440-HZ OFF-HOOK REFLECTION					
	153	ANN17	TN454	SN250	EXCESSIVE SIGNAL AT OTHER THAN 440-HZ					
	154	ANN17	TN454	SN250	ON-HOOK STATUS FAILED TO POWER DOWN CODEC					
	267	ANN17	TN452		PORT COMMAND BUS — BAD TEST REGISTER VA- LUE FROM PORT					
	280	ANN17	TN452	TN400	MLP CONTROLLER FAULT					
	281	ANN17	TN452	TN400	MLP 48-V OVERLOAD					
:	282	ANN17	TN401		MLP DRIVER CIRCUITRY FAILURE					
	283	ANN17	TN452	TN400	MLP FAILED TO RETURN ID REQUEST					
	284	ANN17	TN452	TN400	MLP RESPONDED TO OFF-HOOK TEST WITH SOME- THING BESIDES ON, OFF, OR NO RESPONSE					
	344	ANN17	TN454	SN250	INSUFFICIENT TOUCH-TONE SIGNAL REFLECTION					

TABLE AB. (Contd)

	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)										
UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	СКТ З	DEFINITION						
69 (Contd)	345	ANN17	TN454	SN250	EXCESSIVE TOUCH-TONE SIGNAL RE- FLECTION						
	436	ANN17		MLP CONTROLLER FAULT, I. TION FAILED							
	441	ANN17			MLF CONTROLLER FAULT, INITIALIZA- TION SUCCESSFUL						
	998	ANN17			CANNOT TEST UNTRANSLATED PORT						
	999	ANN17			REQUESTED TEST NOT PROVIDED FOR THIS UNIT						
71	71 391 TN456 CENTRAL			TN400	UNABLE TO READ REMOTE MODULE IN- TERFACE STATUS						
	392	TN456 CENTRAL	TN452	TN400	UNABLE TO WRITE REMOTE MODULE IN- TERFACE STATUS						
	393	TN456 CENTRAL	TN456 REMOTE	FIBER	REMOTE MODULE INTERFACE LFAIL BIT FOUND SET, EXPECTED TO BE CLEARED						
	394	TN456 CENTRAL	TN456 REMOTE	FIBER	REMOTE MODULE INTERFACE FRMERR BIT FOUND SET, EXPECTED TO BE CLEARED						
	395	TN401	CABLE	TN456 REMOTE	4-MHZ CHANNEL ERROR ON REMOTE END REMOTE MODULE INTERFACE						
	396	TN456 REMOTE	TN456 CENTRAL	FIBER	REMOTE RMI FAILURE						
	397	FIBER	TN456 REMOTE	TN456 CENTRAL	REMOTE MODULE INTERFACE FIBER LINK OR REMOTE RMI POWER FAILURE						
	398	TN402	CABLE	TN456 CENTRAL	4-MHZ CHANNEL TO CENTRAL REMOTE MODULE INTERFACE FAILURE (RMI STATUS NORMAL)						
	399	TN456 CENTRAL	TN452	TN400	CENTRAL REMOTE MODULE INTERFACE FAILURE (4-MHZ LOOP BACK FAILED AND RMI STATUS FAILED)						

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TABLE AB. (Contd)

	PROC 620 - SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)											
UNIT TYPE	FAULT CODE	СКТ 1	СКТ 2	СКТ З	DEFINITION							
72	13	SN238			CIRCUIT IN USE BY CALL PROCESSING							
	199	SN238			BUSY OUT FAILED							
	357	SN238	TN452	TN400	ONE S CHANNEL RETRANSMISSION TO THE PORT HAS OCCURRED							
	358	SN238	TN452	TN400	MORE THAN ONE S CHANNEL RETRANSMISSION TO THE PORT HAS OCCURRED							
	359	SN238			GPP TEST RECEIVED NO RESPONSE FROM ASSOCI- ATED DI AFTER ID REQUEST							
	360	SN238			GPP TEST FOUND STATE OF HEALTH BIT SET FOR ASSOCIATED DI							
	373	SN238			PORT PROCESSOR FAULT							
	374	SN238			SIGNALING PROCESSOR FAULT							
	375	SN238			PORT PROCESSOR AND SIGNALING PROCESSOR FAULT							
	376	SN238			LOSS OF DATA FAULT AND PORT PROCESSOR FAULT							
	377	SN238			LOSS OF DATA, PORT PROCESSOR, AND SIGNALING PROCESSOR FAULTS							
	378	SN238			SIGNALING PROCESSOR FAULT, INITIALIZATION SUCCESSFUL							
	379	SN238			SIGNALING AND PORT PROCESSOR FAULTS, INITI- ALIZATION SUCCESSFUL							
	380	SN238			LOSS OF DATA, SIGNALING AND PORT PROCESSOR FAULTS, INITIALIZATION SUCCESSFUL							
	381	SN238			SIGNALING PROCESSOR FAULT, INITIALIZATION FAILED							
	382	SN238			SIGNALING AND PORT PROCESSOR FAULTS, INITI- ALIZATION FAILED							

	PROC 620 — SPECIFIC FAULT CODE DEFINITIONS BY UNIT TYPE (Contd)											
UNIT TYPE	FAULT CODE	СКТ 1	CKT 2	скт з	DEFINITION							
72 (Contd)	383	SN238			LOSS OF DATA, SIGNALING AND PORT PROCESSOR FAULTS, INITIALIZATION FAILED							
	384	SN238			PORT PROCESSOR FAULT, RESET SUCCESSFUL							
	385	SN238			LOSS OF DATA FAULT, RESET SUCCESSFUL							
	386	SN238			PORT PROCESSOR FAULT, RESET FAILED							
	387	SN238			LOSS OF DATA FAULT, RESET FAILED							
	462	SN238		-	PROTOCOL ERROR ON QEIA							
	463	SN238			QEIA SIGNALING PROCESSOR FAULT, INITIALIZA- TION SUCCESSFUL							
	464	SN238			QEIA SIGNALING PROCESSOR FAULT, INITIALIZA- TION FAILED							
	465	SN238			QEIA PORT FAULT, RESET SUCCESSFUL							
	466	SN238			QEIA PORT FAULT, RESET FAILED							
	467	SN238			QEIA LOSS OF DATA, RESET SUCCESSFUL							
	468	SN238			QEIA LOSS OF DATA, RESET FAILED							
	995	SN238			USE PROC 646 TO COMPLETE TESTS ON THIS CIRCUIT							
	998	SN238			CANNOT TEST UNTRANSLATED PORT							

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PROC 621

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PROC 621 - NETWORK DUPLICATION CHANNEL

FLIPCHART ISSUE 1	+	+	NETWORK (DUPLICATION	CHANNEL +	+	
EQUIP TYPE (FIELD 2): 1=NETWORK MODULE 2= TMS	ON-LINE STATUS (FIELD 6): O=ON-LINE 1=ON-LINE & LOCKED 2=OFF LINE 3=OFF LINE & LOCKED	SWITCH STATUS (F 0=SOFT SWITCH PE 1*SOFT SWITCH PE BUT PROBLEMS E 2=SOFT SWITCH NO	IELD 7): RMITTED RMITTED XIST T PERMITTED	ENABLED (FIELD 8): O=SWITCH/INIT DISABLED 1=SWITCH/INIT ENABLED	SWITCH CAUSE (FIELD HARD SWITCH: 1+HARDWARE FAILURE 2=CRAFT REQUEST SOFT SWITCH: 3+SOFTA1 FAILURE 4=SOFTA2 FAILURE	19): 5=SOFTA3 FAILURE 6=PERIODIC 7=CRAFT REQUEST	
WDRD O							NETWORK

FLIPCHART ISSUE 1	+	+	NETWORK DUPLIC	CATION CHANNE	L	+	+				
TEST 1: DISPLAYS SWITCH HISTORY.	TEST 2: SOFT SWITCH SET FIELD 8=1 AND PU	TEST SH 'EXECUTE'	B: HARD SWITCH WICE TO SWITCH	HARD SWITCH TEST 4: INITIALIZATION TE TO SWITCH				SPECIAL ERROR CODES: 80-SWITCH FAILED 84-TMS/MODULE CONTROL			
USE 'NEXT DATA' TO DISPLAY SWITCH HISTORY. USE 'CLEAR DATA', 'Execute' to clear Switch History.	USE 'NEXT CIRCUIT' T DISPLAYED DUPLICATIO USE 'BUSY OUT' AND ' TO CONTROL SOFT LOCK (TESTS 2 & 3)	O CHANGE N CHANNEL. RLS BUSY OUT'	USE 'NEXT CIRCUIT' TO CHANGE DISPLAYED CONTROL CARRIER. USE JT' 'EXECUTE' TO DISPLAY STATE OF HEALTH CODES.			TRANSMISSION TO ONLY TEST 4 CAN BE MODULE PROCESSOR USED FAILED 85-PUSH 'EXECUTE' TWICE 82-HARD SWITCH WILL TO SWITCH/INITIALIZE OCCUR 86-INITIALIZATION FAILE 83-LOCK/UNLOCK FAILED			(TEST 4 CAN BE) I 'EXECUTE' TWICE SWITCH/INITIALIZE TALIZATION FAILED		
TEST EQUIP	PMENT LOCATION T EST 2 THRU 4	2 T2-4 S2 W	TESTS 2 THRU 4 HEALTH CODE		TIME	TEST 1 SWITCHED D	N LINE		NETWORK		
		STAT R ENABL		BULL BULL BULL BULL BULL BULL BULL BULL	DAY	HOUR	MINUTE	SULTC CAUS	621		

Purpose

PROC 621 is used to determine the current state of health of both sides of the TMS or network duplication channel.

PROC 621 provides the capability to perform a soft or hard switch between sides of the TMS or network module control complex to support maintenance of the digital network.

PROC 621 provides the capability to re-initialize the TMS control or network module carrier, if is duplicated, on-line, off-line, or unduplicated.

PROC 621 is used to:

- 1. Display the times and causes of the last seven (maximum) switches that occurred in any TMS or module control complex.
- 2. Display the current state of health for both sides of the TMS or network module.
- 3. Perform a soft switch of the TMS or network module control complex.

- 4. Perform a hard switch of the TMS or network module control complex.
- 5. Prevent a soft switch to the off-line side of a TMS or network module.
- 6. Re-initialize the TMS control or network module carrier.

Field Definitions and Codes

Each field of **PROC 621** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AC, PROC 621 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Field 2 Select equipment type (TMS or network module duplication channel) to be tested or displayed.
- 3. Field 3 Select a specific module to be tested or displayed (Test 1 only).
- 4. Fields 3 through 5 Select a specific equipment location to be tested or displayed (Tests 2 through 4 only).
- 5. Field 8 Enable a switch (soft or hard) to be performed (Tests 2 and 3 only) or enable a reinitialization (Test 4 only).

Operation of Procedure

Overview

PROC 621 is used to determine the number and cause of switches, the current state of health for both sides of a control complex, to lock a control complex off-line, to perform a soft or hard switch of a control complex, and to perform a re-initialization of control carriers.

To call in **PROC 621** perform the following:

- 1. Depress PROC NO; 621; ENTER.
- 2. If the translation records indicate the TMS/network module is not duplicated, special error code 84 (TMS/module control channel unduplicated only Test 4 can be used) is displayed in the **MAAP** error code field immediately upon entry to Test 1 of **PROC 621**.

Field 1 (test number) is blinking indicating that no key inputs other than depressing **NEXT TEST** are allowed. However, Test 4 may be used to re-initialize an unduplicated TMS control or network module carrier.

3. For duplicated TMS control or network module complexes Test 1 is automatically selected.

Field 1 displays a 1, Field 2 displays a 1 (defaults to network module duplication channel equipment type) and all other fields are dashed.

4. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

TABLE AC.

PROC 621 FIELD DEFINITIONS AND CODES								
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION			
1	1-4	Test number	8	0	Switch/Initialization disabled			
2	1,2	Equipment type:		1	Switch/Initialization enabled			
	1	Network module duplication channel	9-14		Health Code: 0 = Condition not present			
	2	Time multiplex switch (TMS) duplication channel	9	0,1	1 = Condition present CC — Driven by MCC on command from 501CC			
3-5	0.90	Equipment location of displayed duplication channel:	10	0,1	Shutdown — Set when TMS or module processor			
ٽ	99	TMS module number 11 0,1 SOFTB – Set by TM processor		SOFTB — Set by TMS or module processor software				
4 5	0-7 0-3	Cabinet number Carrier number	12	0,1	SOFTA1 — Set by 501CC mainte- nance software			
6	0-3	On-line status:	13	0,1	SOFTA2 — Set by 501CC mainte- nance software			
	0	On-line	14	0,1	SOFTA3 — Set by 501CC mainte-			
	1	On-line & soft locked	15	0.7				
	2	Off-line	15	0-7	Index into the switch time and			
	3	Off-line & soft locked	16.19		Time switched on-line:			
7	0-2	Switch status:	16-13	1-31	Day of month			
	0	Soft switch permitted	17	0-23	Hour of day			
	1	Soft switch permitted but problems exist	18	0-59	Minute of hour			
	2	Soft switch not permitted						

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TABLE AC. (Contd)

PROC 621 FIELD DEFINITIONS AND CODES (Contd)				
FIELD	CODE	DEFINITION		
19	1-7	Switch cause:		
	1	Automatic hard switch caused by hardware failure		
	2	Hard switch caused by craft re- quest		
	3	Automatic soft switch caused by SOFTA1 failure		
	4	Automatic soft switch caused by SOFTA2 failure		
	5	Automatic soft switch caused by SOFTA3 failure		
	6	Periodic soft switch		
	7	Soft switch caused by craft request		

Four tests are available for duplicated TMS or network module control complexes. Only Test 4 can be used for unduplicated TMS or network control channels.

- 1. Test 1 Displays time and cause of last seven switches and clears the switch history.
- 2. Test 2 Allows a soft switch of the TMS or network module control complex.

Test 2 is also used to prevent a soft switch from taking place by **soft locking** the off-line TMS or network module duplication channel.

- 3. Test 3 Allows a hard switch of the network module control complex.
- 4. Test 4 Allows a re-initialization of an unduplicated or duplicated TMS control or network module carrier.

Test 1

Test 1 is used to determine the time and cause when the last seven switches occurred for the on-line duplication channel entered in Fields 2 through 5.

Test 1 is also used to clear the table of last seven switches (maximum) for the duplication channel displayed in Fields 2 through 5.

1. Test 1 is the default test when entering **PROC 621**, or is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

2. If the translation records indicate the TMS/network module is not duplicated, special error code 84 (TMS/module control channel unduplicated - only Test 4 can be used) is displayed in the **MAAP** error code field immediately upon entry to Test 1 of **PROC 621**.

Field 1 (test number) is blinking indicating that no key inputs other than depressing **NEXT TEST** are allowed. However, Test 4 may be used to re-initialize an unduplicated TMS control or network module carrier.

3. When Test 1 is initially called in, a default equipment location may be displayed in Fields 2 through 5.

Field 2 is blinking, indicating an optional entry field.

- 4. The default equipment location can be the last equipment location displayed in Test 2 through 4 of PROC 621 or can be passed from PROC 600 (alarm causes/error log) or PROC 620 (network procedure) while it is still displayed in PROC 600 or PROC 620 when it is passed.
- 5. A specific TMS or network module duplication channel or the default equipment location can be tested.

To test the default equipment location displayed in Fields 2 through 5, proceed to Step 9.

- 6. A specific TMS or network module duplication channel can be selected for testing by one of the following methods (Steps 7 and 8) depending on whether or not a default equipment location is displayed.
- 7. Depress **NEXT UNIT** until the equipment type to be tested is displayed in Field 2.

Note: Field 2 defaults to a 1 (network module duplication channel equipment type) when Test 1 is entered and no default equipment location is displayed.

Depress **NEXT CIRCUIT** to step through the duplication channels associated with the equipment type selected until the on-line duplication channel to be tested is displayed in Fields 3 through 5.

Proceed to Step 9.

8. If no default equipment location is displayed, either the duplication channel can be directly entered, or the **CHANGE FIELD** sequence can be used:

(Equipment type); ENTER; (Module number of duplication channel to be tested); ENTER.

CHANGE FIELD; 2; ENTER; (Equipment type); ENTER; (Module number of duplication channel to be tested); ENTER.

Proceed to Step 9.

PROC 621 Test 1

- 9. To start Test 1, depress EXECUTE.
- 10. If no switches occurred for the duplication channel selected for testing, the following is displayed:

Field 1 - 1.

Field 2 - Equipment type (1 = network module, 2 = TMS).

Fields 3 through 5 - Equipment location of duplication channel tested.

Field 6 - Dashed.

Fields 7 through 14 - Dashed.

Field 15 - 0 (Indicating no switches occurred for the duplication channel tested).

Fields 16 through 19 - Dashed.

11. If any switches occurred for the duplication channel selected for testing, the following is displayed:

Field 1 - 1.

Field 2 - Equipment type (1 = network module, 2 = TMS).

Fields 3 through 5 - Equipment location of duplication channel tested.

Field 6 - On-line status when switched occurred (0 = on-line, 1 = on-line and locked, 2 = off-line, 3 = off-line and locked).

Fields 7 through 14 - Dashed.

Field 15 - Number of switches that occurred (maximum of 7) for the duplication channel tested.

Field 16 - Day of month the switch occurred.

Field 17 - Hour of day the switch occurred.

Field 18 - Minute of day the switch occurred.

Field 19 - Switch cause (1 through 7).

Note: Fields 16 through 19 display the latest switch that occurred and the cause of the switch for the duplication channel tested.

- 12. When Field 15 is greater than 1, depressing **NEXT DATA** decrements Field 15 and displays (in Fields 16 through 19) when the next to last switch occurred and the cause of the switch for the duplication channel tested.
- 13. Depressing **NEXT DATA** repeatedly displays the remaining switches that occurred (and the cause for each switch) for the duplication channel tested.

When the last switch is displayed, depressing NEXT DATA again dashes Fields 7 through 19.

Depressing **NEXT DATA** once more begins the sequence over starting with the latest switch that occurred for the duplication channel tested.

14. The **CLEAR DATA**; **EXECUTE** sequence can be used to clear the table of last 7 switches for the duplication channel displayed in Fields 2 through 5 after **EXECUTE** is used to initiate Test 1.

15. To clear the table of last 7 switches for the duplication channel displayed in Fields 2 through 5, perform the following:

Depress CLEAR DATA; EXECUTE.

Fields 15 through 19 display dashes indicating the table of last 7 switches for the duplication channel displayed in Fields 2 through 5 is cleared.

Note: The tables of last 7 switches for other duplication channels are not affected. Only the table for the duplication channel displayed in Fields 2 through 5 is cleared.

16. When another duplication channel is to be tested, the CHANGE FIELD sequence or NEXT UNIT and NEXT CIRCUIT can be used to select the specific duplication channel to be tested:

CHANGE FIELD; 2; ENTER; (Equipment type); ENTER; (Module number of duplication channel to be tested); ENTER.

Depress **NEXT UNIT** until the equipment type to be tested is displayed in Field 2. Depress **NEXT CIRCUIT** to step through the duplication channels associated with the equipment type selected until the on-line duplication channel to be tested is displayed in Fields 3 through 5.

17. **EXECUTE** must be depressed to test the specific duplication channel selected for testing.

Test 2

Test 2 is used to perform a user-transparent soft switch of TMS or network module control complexes and updates memory after the switch. The soft switch may not be transparent to data connections.

Soft switches cannot be performed if the off-line state-of-health is worse than the on-line state-of-health.

Problems in the modules affect the module's state-of-health which can affect the soft switch of modules. Problems in the TMS affect the TMS's state-of-health which can affect the soft switch of TMSs.

TN481 (Light Guide Interface) installed in the module control carrier affects the soft switch of the TMS and **not** the soft switch of the modules.

To assist in troubleshooting network problems, Test 2 is used to prevent a soft switch from taking place by **soft locking** the off-line TMS or network module duplication channel.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

2. If the translation records indicate the TMS/network module is not duplicated, special error code 84 (TMS/module control channel unduplicated - only Test 4 can be used) is displayed in the **MAAP** error code field immediately upon entry to Test 2 of **PROC 621**.

Field 1 (test number) is blinking indicating that no key inputs other than depressing **NEXT TEST** are allowed. However, Test 4 may be used to re-initialize an unduplicated TMS control or network module carrier.

3. When Test 2 is initially called in, a default equipment location may be displayed in Fields 2 through 5.

Field 2 is blinking, indicating an optional entry field.

- 4. The default equipment location can be the last equipment location displayed in Test 1, 3, or 4 of PROC 621 or can be passed from PROC 600 or PROC 620 while it is still displayed in PROC 600 or PROC 620 when it is passed.
- 5. A specific on-line TMS or network module duplication channel or the default equipment location can be selected to be soft switched.

To soft switch the default equipment location displayed in Fields 2 through 5, proceed to Step 9

- 6. A specific on-line TMS or network module duplication channel can be selected to be soft switched by one of the following methods (Steps 7 and 8) depending on whether or not a default equipment location is displayed.
- 7. Depress NEXT UNIT until the equipment type to be soft switched is displayed in Field 2.

Depress NEXT CIRCUIT to step through the duplication channels associated with the equipment type selected until the on-line duplication channel to be soft switched is displayed in Fields 3 through 5.

Proceed to Step 9.

8. If no default equipment location is displayed, either the on-line duplication channel can be directly entered, or the CHANGE FIELD sequence can be used:

(Equipment type); ENTER; (Module number of on-line duplication channel to be soft-switched); ENTER.

CHANGE FIELD; 2; ENTER; (Equipment type); ENTER; (Module number of online duplication channel to be soft switched); ENTER.

Proceed to Step 9.

- 9. To start Test 2, depress EXECUTE.
- 10. When **EXECUTE** is depressed, the following is displayed:

Field 1 - 2.

Field 2 - Equipment type (1 = network module, 2 = TMS).

Fields 3 through 5 - Equipment location of duplication channel to be soft-switched.

Field 6 - On-line status (0 = on-line, 1 = on-line and locked).

Field 7 - Switch status (0 = soft switch permitted, 1 = soft switch permitted but problemsexist, 2 =soft switch not permitted).

Field 8 - 0 (Switch disabled).

Fields 9 through 14 - State of health code for the duplication channel displayed in Fields 2 through 5. (0 = pass, 1 = condition present.)

Fields 15 through 19 - Dashed.

11. To perform a soft switch of the TMS or network module control complex, check the switch status in Field 7.

If Field 7 equals 2, a soft switch cannot be performed.

Note: If a switch of the TMS or network module control complex is still required, proceed to Test 3 and perform a hard switch.

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12. If Field 7 equals 0 or 1, a soft switch of the TMS or network module control complex is , possible.

Check the on-line status displayed in Field 6.

If Field 6 equals 0, proceed to Step 15.

If Field 6 equals 1, proceed to Step 13.

Note: A soft switch of the TMS or network module control complex cannot be performed if the off-line side is **soft locked**.

13. Depress **RLS BUSY OUT** to release the TMS or network module control complex from the locked condition.

Note: In the event that the state of health for the on-line side is worse than the off-line side, a hard switch may occur. Special error code 82 (hard switch will occur) is displayed in the **MAAP** error code field.

14. If special error code 82 is not displayed, proceed to Step 15.

Caution: A hard switch causes a disruption of service and effects normal call processing.

If special error code 82 is displayed and a switch of the network control complex is still required, depress **RLS BUSY OUT** again.

Field 6 displays a 3 for the duplication channel displayed in Fields 2 through 5, indicating that the channel is off-line and locked.

15. To enable the soft switch of the TMS or network module control complex, change Field 8 to a 1 using the CHANGE FIELD sequence:

CHANGE FIELD; 8; ENTER; 1; ENTER.

Note: Prior to a switch of the TMS, the network modules must be working.

16. Depress **EXECUTE**.

The first time **EXECUTE** is depressed, the soft switch does not occur.

Note: Special error code 85 (push **EXECUTE** twice to switch) is displayed in the **MAAP** error code field indicating that **EXECUTE must** be depressed twice to perform a soft switch.

17. Depress EXECUTE.

Note: If the soft switch cannot be performed after **EXECUTE** has been depressed twice, Field 8 displays a 1 (switch enabled) and special error code 80 (switch failed) is displayed in the **MAAP** error code field.

If a switch of the TMS or network module control complex is still required, proceed to Test 3 and perform a hard switch.

18. The **WAIT** indicator on the **MAAP** is lighted while the switch is taking place.

 When the WAIT indicator turns off and the switch is successful, the following is displayed: Field 1 - 2.

Field 2 - Equipment type (1 = network module, 2 = TMS).

Fields 3 through 5 - Equipment location of the now off-line duplication channel.

Field 6 - On-line status (2 = off-line).

Field 7 - Switch status (0 = soft switch permitted, 1 = soft switch permitted but problems exist, 2 = soft switch not permitted).

Field 8 - 0 (Switch disabled).

Fields 9 through 14 - State of health code for the duplication channel displayed in Fields 2 through 5. (0 = pass, 1 = condition present.)

Fields 15 through 19 - Dashed.

Note: The cause and time of the switch is updated in status memory.

- 20. If the switch passes but automatically switches back to the previous configuration, some type of failure in the original off-line side occurred to lower its state-of-health. An alarm on the original off-line side may be indicated by **PROC 600** Test 1.
- 21. If the switch failed, indicated by a 1 displayed in Field 8 (switch enabled) and special error code 80 (switch failed) displayed in the **MAAP** error code field, use **PROC 620** Test 4 to test the duplication channel (unit type 23) displayed in Fields 2 through 5. Perform corrective action as required.

An off-line TMS or network module duplication channel can be **soft locked** to prevent a soft switch from taking place while maintenance personnel are working on the off-line TMS or network module control carrier.

A hardware failure that causes a switch of the TMS or network module control complex overrides a **soft lock**.

A **soft lock** of the off-line TMS or network module duplication channel is normally performed after a demand soft switch by maintenance personnel. However, any TMS or network module duplication channel can be **soft locked**.

A soft lock of an off-line TMS or network module duplication channel is performed as follows:

1. Depress **NEXT UNIT** until the equipment type to be **soft locked** is displayed in Field 2.

Depress **NEXT CIRCUIT** to step through the duplication channels associated with the equipment type selected until the off-line duplication channel to be **soft locked** is displayed in Fields 3 through 5.

2. Depress EXECUTE.

The on-line status and state of health for the off-line TMS or network module duplication channel is displayed in Fields 6 and 9 through 14.

3. Depress BUSY OUT.

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Field 6 changes from a 2 (off-line) to a 3 (off-line and locked).

4. The **BUSY OUT** indicator on the **MAAP** is lighted if not already lighted from another circuit that is busied out.

Page 348
Caution: If PROC 621 is exited with a TMS or network module duplication channel soft locked, a soft switch of the TMS or network module control complex cannot be performed.

5. Prior to exiting PROC 621 release the TMS or network module duplication channel that is soft locked from busy out by depressing RLS BUSY OUT when the TMS or network module duplication channel is displayed in Fields 2 through 5 and EXECUTE is depressed.

Caution: When BUSY OUT is depressed in Test 2 of PROC 621 the busy out status cannot be released by PROC 630 (Busy out/release busy out).

Test 3

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Test 3 is used to perform a hard switch of TMS or network module control complexes and updates memory after the switch.

1. Test 3 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 3; ENTER.

2. If the translation records indicate the TMS/network module is not duplicated, special error code 84 (TMS/module control channel unduplicated - only Test 4 can be used) is displayed in the **MAAP** error code field immediately upon entry to Test 3 of **PROC 621**.

Field 1 (test number) is blinking indicating that no key inputs other than depressing **NEXT TEST** are allowed. However, Test 4 may be used to re-initialize an unduplicated TMS control or network module carrier.

3. When Test 3 is initially called in, a default equipment location may be displayed in Fields 2 through 5.

Field 2 is blinking, indicating an optional entry field.

- 4. The default equipment location can be the last equipment location displayed in Test 1, 2, or 4 of **PROC 621** or can be passed from **PROC 600** or **PROC 620** while it is still displayed in **PROC 600** or **PROC 620** when it is passed.
- 5. A specific on-line TMS or network module duplication channel or the default equipment location can be selected to be hard switched.

To hard switch the default equipment location displayed in Fields 2 through 5, proceed to Step 9.

- 6. A specific on-line TMS or network module duplication channel can be selected to be hard switched by one of the following methods (Steps 7 and 8) depending on whether or not a default equipment location is displayed.
- 7. Depress **NEXT UNIT** until the equipment type to be hard switched is displayed in Field 2.

Depress **NEXT CIRCUIT** to step through the duplication channels associated with the equipment type selected until the on-line duplication channel to be hard switched is displayed in Fields 3 through 5.

Proceed to Step 9.

8. If no default equipment location is displayed, either the on-line duplication channel can be directly entered, or the CHANGE FIELD sequence can be used:

(Equipment type); ENTER; (Module number of on-line duplication channel to be hard switched); ENTER.

CHANGE FIELD; 2; ENTER; (Equipment type); ENTER; (Module number of online duplication channel to be hard switched); ENTER.

Proceed to Step 9.

- 9. To start Test 3, depress EXECUTE.
- 10. When **EXECUTE** is depressed, the following is displayed:

Field 1 - 3.

Field 2 - Equipment type (1 = network module, 2 = TMS).

Fields 3 through 5 - Equipment location of duplication channel to be hard switched.

Field 6 - On-line status (0 =on-line, 1 =on-line and locked).

Field 7 - Dashed.

Field 8 - 0 (Switch disabled).

Fields 9 through 14 - State of health code for the TMS or network module duplication channel displayed in Fields 2 through 5. (0 = pass, 1 = condition present.)

Fields 15 through 19 - Dashed.

- 11. To perform a hard switch of the TMS or network module control complex, check the on-line status in Field 6.
- 12. If Field 6 equals 0, proceed to Step 15.

If Field 6 equals 1, proceed to Step 13.

Note: A hard switch of the TMS or network module control complex cannot be performed if the off-line side is **soft locked**.

13. Depress **RLS BUSY OUT** to release the TMS or network module control complex from the locked condition.

Note: In the event that the state of health for the on-line side is worse than the off-line side, a hard switch may occur. Special error code 82 (hard switch will occur) is displayed in the **MAAP** error code field.

14. If special error code 82 is not displayed, proceed to Step 15.

Caution: A hard switch causes a disruption of service and effects normal call processing.

If special error code 82 is displayed and a switch of the TMS or network control complex is still required, depress **RLS BUSY OUT** again.

Field 6 displays a 3 for the TMS or network module duplication channel displayed in Fields 2 through 5, indicating that the channel is off-line and locked.

15. To enable the hard switch of the TMS or network module control complex, change Field 8 to a 11 using the CHANGE FIELD sequence:

CHANGE FIELD; 8; ENTER; 1; ENTER.

16. Depress EXECUTE.

1

The first time **EXECUTE** is depressed, the hard switch does not occur.

Note: Special error code 85 (push **EXECUTE** twice to switch) is displayed in the **MAAP** error code field indicating that **EXECUTE must** be depressed twice to perform a hard switch.

17. Depress EXECUTE.

The WAIT indicator on the MAAP is lighted while the switch is taking place.

18. When the WAIT indicator turns off and the switch is successful, the following is displayed:

Field 1 - 3.

Field 2 - Equipment type (1 = network module, 2 = TMS).

Fields 3 through 5 - Equipment location of the now off-line duplication channel.

Field 6 - On-line status (3 = off-line and locked).

Note: When a demand hard switch is completed, the now off-line side is automatically soft locked to prevent it from switching back in event the now off-line side's state of health is better than the on-line side.

Field 7 - Dashed.

Field 8 - 0 (Switch disabled).

Fields 9 through 14 - State of health code for the duplication channel displayed in Fields 2 through 5. (0 = pass, 1 = condition present.)

Fields 15 through 19 - Dashed.

Note: The cause and time of the switch is updated in status memory.

- 19. If the switch failed, indicated by a 1 displayed in Field 8 (switch enabled) and special error code 80 (switch failed) displayed in the MAAP error code field, use PROC 620 Test 3 to continuously test the duplication channel displayed in Fields 2 through 5. Suspect a cabling problem. Perform corrective action as required.
 - In addition, if any soft A or soft B problems exist as indicated by Fields 11 through 14, use-**PROC 600** Test 2 to determine if any type of network problems exist. Perform corrective action as required.

Test 4

Test 4 is used to perform an initialization on the TMS or module control carrier.

Test 4 can be used to re-initialize the TMS or module control carrier, if it is duplicated, on-line, offline, or unduplicated.

Test 4 is useful when the state of health bits (SOH) indicate the control carrier to be shutdown or when all tests for the TMS or module control carrier in **PROC 620** fail.

If the **GREEN** LED on TN380 (module processor) or TN381 (TMS processor) is not flashing (no heartbeat), re-initialization should be performed.

1. Test 4 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 4; ENTER.

2. When Test 4 is initially called in, a default equipment location may be displayed in Fields 2 through 5.

Field 2 is blinking, indicating an optional entry field.

- 3. The default equipment location can be the last equipment location displayed in Test 1 through 3 of **PROC 621** or can be passed from **PROC 600** (Alarm causes/error log) or **PROC 620** (Network procedure) while it is still displayed in **PROC 600** or **PROC 620** when it is passed.
- 4. A specific TMS or module control carrier or the default equipment location can be reinitialized.

To re-initialize the default equipment location displayed in Fields 2 through 5, proceed to Step 8.

- 5. A specific TMS or module control carrier can be selected for re-initialization by one of the following methods (Steps 6 and 7) depending on whether or not a default equipment location is displayed.
- 6. Depress **NEXT UNIT** until the equipment type to be re-initialize is displayed in Field 2.

Note: Field 2 defaults to a 1 (network module equipment type) when Test 4 is entered and no default equipment location is displayed.

Depress **NEXT CIRCUIT** to step through the control carriers associated with the equipment type selected until the control carrier to be re-initialized is displayed in Fields 3 through 5.

Proceed to Step 8.

7. If no default equipment location is displayed, either the TMS or module control carrier can be directly entered, or the **CHANGE FIELD** sequence can be used:

(Equipment type); ENTER; (Module number of TMS or module control carrier to be re-initialized); ENTER.

CHANGE FIELD; 2; ENTER; (Equipment type); ENTER; (Module number of TMS or module control carrier to be re-initialized); ENTER.

Proceed to Step 8.

- 8. To start Test 4, depress EXECUTE.
- 9. When **EXECUTE** is depressed, the following is displayed:

Field 1 - 4.

Field 2 - Equipment type (1 = network module, 2 = TMS).

Fields 3 through 5 - Equipment location of control carrier to be re-initialized.

Field 6 - On-line status (0 =on-line, 1 =on-line and locked, 2 =off-line, 3 =off-line and locked).

Field 7 - Dashed.

Field 8 - 0 (Initialization disabled).

Fields 9 through 14 - State of health code for the control carrier displayed in Fields 2 through 5. (0 = pass, 1 = condition present.)

Fields 15 through 19 - Dashed.

Caution: A re-initialization of the TMS or module control carrier causes a disruption of service and effects normal call processing if re-initialization of the TMS or module control carrier is performed on-line. Re-initialization should be performed on the off-line side of the TMS or module control carrier (if duplicated).

10. To enable the re-initialization of the TMS or module control carrier, change Field 8 to a 1 using the CHANGE FIELD sequence:

CHANGE FIELD; 8; ENTER; 1; ENTER.

11. Depress **EXECUTE**.

The first time **EXECUTE** is depressed, re-initialization does not occur.

Note: Special error code 85 (push **EXECUTE** twice to initialize) is displayed in the **MAAP** error code field indicating that **EXECUTE must** be depressed twice to perform re-initialization.

12. Depress EXECUTE.

The **WAIT** indicator on the **MAAP** is lighted while re-initialization is taking place.

13. When the **WAIT** indicator turns off and re-initialization is successful, the following is displayed:

Field 1 - 4.

Field 2 - Equipment type (1 = network module, 2 = TMS).

Fields 3 through 5 - Equipment location of control carrier re-initialized.

Field 6 - On-line status (0 = on-line, 1 = on-line and locked, 2 = off-line, 3 = off-line and locked).

Field 7 - Dashed.

Field 8 - 0 (Initialization disabled).

Fields 9 through 14 - State of health code for the control carrier displayed in Fields 2 through 5. (0 = pass, 1 = condition present.)

Fields 15 through 19 - Dashed.

14. If the re-initialization failed, indicated by a 1 displayed in Field 8 (initialization enabled) and special error code 86 (initialization failed) displayed in the **MAAP** error code field, use **PROC 620** Test 4 to test unit types 6 (MCC) and 7 (TMS/module processor) on the control carrier displayed in Fields 2 through 5.

PROC 622 - NETWORK PERIPHERALS

I	LIPCHART	+	+	NETWORK	PERIPHERALS	+	+			
EQUIPENT TYPE 1=PDM 2=74 SERIES 3=DTDM 4=72 SERIES 5=TDM 6=PDM/2 7=TDM/2		(FIELD 2): 8-INTEGRATED DIS TERMINAL VOIC 9-INTEGRATED DIS TERMINAL DATA 10-BGT 510 VOICE STATION 11-BGT 510 VOICE 13-BGT 515 VOICE 13-BGT 515 DATA 1	SPLAY 14=VOICE SPLAY 15=VOICE SPLAY 15=VOICE MDDULE DATA 16=AP32 CHANN 10DULE 17=AP32 STATION CHANN NDDULE 18=MFAT	DATA STATION STATION DATA STATION MODULE EVEN PORT EL EVEN PORT EL		ALARM STATUS (FIELD 8): 0-ND ERRORS RECORDED 1-MAJOR 2-MINOR 3-WAARNING 4-ERRORS RECORDED 5-ALARM RESOLVED	C 0 1 2 TI 0	CIRCUIT STATUS (FIELD D-IDLE 1-IN USE 2-BUSIED OUT TEST MODE (FIELD 1D): D-NON-SENVICE AFFECTIN 1-SERVICE AFFECTING		
	FAULT COD 0=PASSED 1=IN USE 2-99=TYPE SEE	FAULT CODE (FIELD 12): 0-PASSED TEST CAUTION: OPERATING 'BUSY OUT' FOR A DIGITAL TERMINAL WITH BRIDGED APPEARANCES CAUSES ALL CALLS ON THOSE TERMINALS TO BE OROPPED. 2-99-TYPE OF FAILURE FOUND, SEE DOCUMENTATION NOTE: THE TEST NUMBER CAN ONLY BE CHANGED BY 'NEXT TEST.'							NETWORK	
				4 1 1 1			1_1		622	

FL	IPCHART SUE 2		+		+			NET	WORK	PERIPH	RALS		+	+		
TEST 1: DISPLAYS FAILURE HISTORY BY ALARM SEVERITY, EQUIP TYPE AND/OR PORT EQUIPMENT LOCATION WITHIN EQUIP TYPE. USE 'CLEAR DATA,' 'EXECUTE' TO RETIRE ALARMS.			TEST 2: ONE ITERATION TESTING OF ONE OR MORE DEVICES. TESTING OF ONE OR MORE DEVICES.					TEST 4: CONTINUOUS TESTING OF DIGITAL TRANSMISSION LINK TO ONE OR MORE DEVICES,		SPECIAL ERROR CODES: 81-MESSAGE TRANSMISSION TO MODULE PROCESSOR FAILED 82-DHIDS OVERFLOW 83-TEST OF RANGE NOT COMPLETED 84-TEST 4 HUST BE RUN IM MODE 1 85-LOCATION RANGE ERROR 86-WATI UNILI TEST COMPLETES 87-EQUIPMENT TYPE CANNOT BE IESTED IN TEST 4						
			NOTE: IF FIELO 2 IS LEFT BLANK OR DASHED, All equip types in the specified range Will be tested.													
l	USE 'NEXT FAULT' TO ADVANCE TO NEXT FAULT CODE (TESTS 3 & 4).								OF "BUSY OUT"							
	12-4		TS 2, 3, Ment Loc	& 4 ATION			T2-4	12-4	FAU	T CODE	NUMBER DEN TESTED	ICES	NUMBER DEVICES FAILED	× _		TWORK
TEST NO	EQUIPMENT TYPE		CARRIER	SLOT	CIRCUIT	ALARM STATUS	CIRCUIT STATUS	TEST MODE	INDEX		NUMBER TIMES TESTED		NUMBER TIMES FAILED	FAILURE INDEX		522

The flipcharts shown are for R2V2. The R2V1 flipcharts are similar except that Field 2 is a single digit field and Field 11 is a 2-digit field.

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The statement - USE "NEXT DATA" TO DISPLAY THE NEXT FAULT CODE - is also contained on the R2V1 flipcharts.

In addition, equipment types 8 through 18 are not included in R2V1.

Purpose

PROC 622 is used when referenced from **PROC 600** (Alarm causes/error log) or when the **NETWORK PERIPH EQPT** and **MINOR** or **WARNING** alarm indicators on the alarm panel are lighted.

PROC 622 is used to:

1. Display the failure history for network peripherals.

Network peripherals include the Processor Data Module (PDM), 74 Series terminal, Digital Telephone Data Module (DTDM), 72 Series terminal, Trunk Data Module (TDM), Enhanced Processor Data Module (PDM/2), Enhanced Trunk Data Module (TDM/2), Integrated Display Terminal (IDT) Voice Station, IDT Data Module, BCT 510 Voice Station, BCT 510 Data Module, BCT 515 Voice Station, BCT 515 Data Module, Voice Data Station Voice Station, Voice Data Station Data Module, AP32 DCP Interface Even Port Channel, AP32 DCP Interface Odd Port Channel, and Multifunctional Analog Terminal (MFAT) family of data modules.

2. Manually turn off any alarms activated because of a network peripheral failure.

Note: When the alarm indicator is turned off, the alarmed entry for the network peripheral failure causing the alarm to be activated is marked as resolved in PMIDS.

- 3. Test one or more network peripherals once and display the test results.
- 4. Test one or more network peripherals in a continuous cycle and display the test results.
- 5. Continuously test the transmission quality to one or more network peripherals.
- 6. Automatically turn off the fault indicator when all network peripherals that caused an alarm to be raised are tested as good in Test 2 or 3.

Note: Alarmed network peripheral entries in PMIDS are marked as resolved.

Field Definitions and Codes

Each field of **PROC 622** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AD, PROC 622 - Field Definitions and Codes.

Note: Equipment types 8 through 18 are not displayed in R2V1.

Optional input fields are:

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1. Field 2 - Select equipment type to be tested (Tests 2 through 4 only).

Equipment types include: 1 = PDM, 2 = 74 Series terminal, 3 = DTDM, 4 = 72 Series terminal, 5 = TDM, 6 = PDM/2, 7 = TDM/2, 8 = IDT Voice Station, 9 = IDT Data Port, 10 = BCT 510 Voice Station, 11 = BCT 510 Data Port, 12 = BCT 515 Voice Station, 13 = BCT 515 Data Port, 14 = Voice Data Station, Voice Station, 15 = Voice Data Station, Data Port, 16 = AP32 DCP Interface Even Port Channel, 17 = AP32 DCP Interface Odd Port Channel, and 18 = MFAT.

Note: Equipment types 8 through 18 cannot be selected in R2V1.

- 2. Fields 3 through 7 Select equipment location of a specific network peripheral, range of network peripherals, or all network peripherals in a equipment type to be tested (Tests 2 through 4 only).
- 3. Field 10 Enable the mode of test (non-service affecting or service affecting) to be performed (Tests 2 through 4 only).

TABLE AD.

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PROC 622 FIELD DEFINITIONS AND CODES									
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION				
1	1-4	Test number	2 (Contd)	17	AP32 DCP interface odd port channel				
2	1-18	Equipment type:		18	Multifunctional analog				
	L L	module (PDM)			terminal (MFAT)				
	2	74 Series terminal	3-7	0.20	Equipment location:				
	3	Digital telephone data		0-30	Cabinet number				
		module (DTDM)	5	0-3	Carrier number				
	4	72 Series terminal	6	00-03, 05-08,	Slot number				
	5	Trunk data module	1	13-16, 18-21	e e e e e e e e e e e e e e e e e e e				
		(TDM)	7 ·	0-3	Circuit number				
	6	Enchanced Processor data module (PDM/2)	8	0-5	Alarm status:				
	7	Enchanced trunk data		0	No errors recorded				
		module (TDM/2)		1	Major				
	8	Integrated display		2	Minor				
	7407	voice station		3	Warning				
	9 Integrated display terminal (IDT) data module			4	Errors recorded				
				5	Alarm resolved				
	10	BCT 510 voice station	9	0-2	Circuit status:				
	11	BCT 510 data module]	0	Circuit is idle				
	12	BCT 515 voice terminal		1	Circuit is in-use				
	13	BCT 515 data module		2	Circuit is busied out				
	14	Voice data station, voice station	10	0,1	Test mode:				
	15	Voice data station,		0	Test does not affect ser- vice				
	16	AP32 DCP interface even port channel		1	Test affects service				

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TABLE AD. (Contd)

PROC 622 FIELD DEFINITIONS AND CODES (Contd)										
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION					
11	1-9 Fault code index		12 (Contd)	16	Three bits set in GPP					
12	0-99	Fault code:	(Conta)		overload, DTL idle, and DTL fault)					
	0 Test passed			17	Two hits set in MLP					
	1	In-use			status register (MFET and controller failure)					
	2 48-volt overload			18	Two bits set in MLP					
	3	DTL link idle		20	status register (48-volt overload and controller					
	4	DTL link fault			failure)					
	5	MFET set failed		19	Two bits set in MLP status register (48-volt					
	6	MLP controller failure			overload and MFET					
	7	Digital instrument has bad state of health		20	Three bits set in MLP status register (48-volt					
	8	Transmission failure to digital instrument			overload, MFET and controller failure)					
	9	DTL looparound failure at digital set		21	Digital set stuck in DTL looparound					
-	10	DTL looparound failure at GPP		22	Hyperactive data set or data module receiving too many signals					
	11	Digital set did not reset correctly		23	Network peripheral error other than 48-volt fault					
	12	No response from digi- tal set		24	Touch-tone digits sent on MFDT S channel					
	13	Both bits set in GPP status register (DTL idle and DTL fault)	13	0-9999	Number of devices tested or number of times device was tested					
	14	Both bits set in GPP status register (48-volt overload and DTL fault)	14	0-999	Number of devices failed or number of times device failed					
	15	Both bits set in GPP status register (48-volt overload and DTL idle)		0-99	Failure index: Index into PMIDS or DMIDS table of the failure record currently displayed					

PROC 622 Test 1

Operation of Procedure

Overview

PROC 622 is used to determine the cause of the **NETWORK PERIPH EQPT** and **MINOR** or **WARNING** alarm indicators being lighted resulting from a network peripheral failure.

To call in **PROC 622**, perform the following:

- 1. Depress PROC NO; 622; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1 and all other fields are dashed.

3. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Four tests are available:

1. Test 1 - Displays failure history by severity of alarm, equipment type and/or port equipment location within an equipment type.

Test 1 is also used to manually turn off the NETWORK PERIPH EQPT fault indicator.

Note: Alarmed network peripheral entries in PMIDS are marked as resolved.

- 2. Test 2 Tests one or more network peripherals one time.
- 3. Test 3 Tests one or more network peripherals continuously.
- 4. Test 4 Continuously tests the transmission quality to one or more network peripherals.

Test 1

Test 1 provides a failure history of the network peripheral failures detected by the on-line software.

Failures are displayed in alarm order, i.e., failures with an alarm status of minor followed by failures with an alarm status of warning. Network peripherals with errors recorded against them are displayed by equipment type and then by port equipment location within equipment type.

Test 1 is also used to manually turn off the **NETWORK PERIPH EQPT** fault indicator and to resolve the network peripheral alarmed entries in PMIDS.

1. Test 1 is the default test when entering PROC 622, or is selected by using NEXT TEST.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 1.

- 2. When Test 1 is initially called in, Field 1 displays a 1, and all other fields are dashed.
- 3. To start Test 1, depress **EXECUTE**.
- 4. The network peripheral failure history is sorted and a summary is displayed.
- 5. If no network peripheral failures exist, the following summary is displayed:

Field 1 - 1.

Field 14 - 0 (Indicating no failures).

6. If any network peripheral failures exist, the summary displays a 1 in Field 1, and the total number of network peripherals that failed in Field 14.

 Depressing NEXT CIRCUIT displays the first failure in order of severity, as follows: Field 1 - 1.

Field 2 - Equipment type of failing network peripheral.

Note: Equipment types 8 through 18 are not displayed in R2V1.

Fields 3 through 7 - Port equipment location of failing network peripheral.

Field 8 - Alarm status of failing network peripheral.

Fields 9 and 10 - Dashed. .

Field 11 - Fault code index.

Field 12 - Specific fault code.

Field 13 - Dashed.

Field 14 - Number of times that the network peripheral displayed in Fields 3 through 7 failed. Field 15 - Failure index.

- 8. Depressing NEXT CIRCUIT repeatedly displays the remaining failing network peripherals.
- 9. To step through the failure records for a specific equipment type, depressing **NEXT UNIT** causes the first failure of the next equipment type with failures to be displayed.

Note: Equipment types 8 through 18 are not displayed by use of NEXT UNIT in R2V1.

Field 15 decrements corresponding to the number of failures passed over (if any) when stepping from equipment type to equipment type.

NEXT CIRCUIT is used to step through the failures of the displayed equipment type.

10. When all failing network peripherals are displayed, depressing NEXT CIRCUIT or NEXT UNIT dashes Fields 2 through 15.

Depressing **NEXT CIRCUIT** once more causes the summary to be displayed, and the failing network peripherals can be stepped through again by use of **NEXT CIRCUIT** and **NEXT UNIT**.

11. The **CLEAR DATA**; **EXECUTE** sequence is used to manually resolve individual alarmed network peripheral failures or all alarmed network peripherals failures after **EXECUTE** is used to initiate Test 1.

The failures which are resolved are those failures with an alarm status of 2 or 3 displayed in Field 8.

12. To resolve individual network peripheral failures with an alarm status of 2 or 3, perform the following:

Use **NEXT CIRCUIT** to display the failing network peripheral with an alarm status of 2 or 3 on the **MAAP**.

Requirement: Individual network peripheral failures cannot be resolved unless the failing network peripheral is displayed on the **MAAP**.

Note: Specific network peripherals for equipment types 8 through 18 cannot be selected by use of **NEXT CIRCUIT** in R2V1.

PROC 622 Test 1 and Test 2

- 13. Depress CLEAR DATA; EXECUTE.
- 14. Field 8 (alarm status) displays a 5 indicating that the failing network peripheral entry in PMIDS is marked as resolved.

The **NETWORK PERIPH EQPT** fault indicator is turned off if no other network peripheral failures exist.

- 15. If the **CLEAR DATA**; **EXECUTE** sequence is performed when a dash is displayed in Field 2 (equipment type), all network peripheral failures with an alarm status of 2 or 3 are resolved and the **NETWORK PERIPH EQPT** fault indicator is turned off.
- 16. All network peripheral failures with an alarm status of 2 or 3 are resolved when the summary is initially display, i.e., upon entry to **PROC 622** Test 1, and after displaying all network peripheral failures and then using **NEXT CIRCUIT** to display the summary.

Note: When the summary is displayed, Field 2 is dashed.

Caution: The network peripheral failures should be displayed and recorded prior to resolving the failures in order that a record of the equipment location and specific fault code of the network peripheral failures are available for maintenance personnel.

17. After entering Test 1 and depressing EXECUTE the summary is displayed.

Depress CLEAR DATA; EXECUTE.

All network peripheral failures with an alarm status of 2 or 3 are marked as resolved in PMIDS and the **NETWORK PERIPH EQPT** fault indicator is turned off.

18. After displaying and recording all network peripheral failures, depress NEXT CIRCUIT until the summary is displayed, then depress CLEAR DATA; EXECUTE.

All network peripheral failures with an alarm status of 2 or 3 are marked as resolved in PMIDS and the **NETWORK PERIPH EQPT** fault indicator is turned off.

19. The **MINOR** or **WARNING** alarm indicator is also turned off when no other sources affecting the **MINOR** or **WARNING** alarm indicator are present.

Test 2

Test 2 is used to test one or more network peripherals once and display the results of the test.

Network peripherals can be selected for testing by equipment type, a range of port equipment locations, or on a single circuit basis.

Two modes of testing are provided in Test 2, i.e., service-affecting and non-service-affecting.

- 1. The use of the non-service-affecting test mode performs only transparent tests on network peripherals without affecting customer's service.
- 2. The service-affecting test mode provides complete testing of a network peripheral and is destructive, aborting any call in progress to a network peripheral and taking the network peripheral selected for testing out-of-service.

Test 2 automatically turns off the **NETWORK PERIPH EQPT** fault indicator when all network peripherals that raised an alarm pass Test 2.

Test 2 Data Entry

1. Test 2 is selected by use of **NEXT TEST**.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 2.

2. When Test 2 is initially called in, a default equipment location may be displayed in Fields 3 through 7. Field 8 displays the alarm status, Field 9 displays the circuit status, and Field 10 (test mode) displays a 0.

Field 2 (equipment type) is blinking, indicating an optional entry field.

Note: Equipment types 8 through 18 cannot be selected in R2V1.

3. The default equipment location can be the last equipment location displayed in Test 1, 3, or 4 of **PROC 622** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.

The default equipment location can also be passed from **PROC 620** as long as the equipment location is a network peripheral port equipment location and is still displayed in **PROC 620** when it is passed.

- 4. All network peripherals, a range of network peripherals, all network peripherals within an equipment type, a combination of equipment type and range (i.e., all network peripherals of an equipment type in the range specified), a specific network peripheral, or the default equipment location can be tested.
- 5. To select the entire switch to be tested, Fields 2 through 7 must be dashed.

If no default equipment location is displayed, depress ENTER.

If a default equipment location is displayed, depress CHANGE FIELD; 2; ENTER; ENTER.

Test 2 starts with the first module, first cabinet and carrier and runs until all network peripherals in the switch are tested.

Proceed to Step 23.

6. In addition to testing all network peripherals in the entire switch, a range of network peripherals (all network peripherals in a module, cabinet, carrier, or slot) can be selected for testing.

Note: Selection of a range of network peripherals to be tested depends on whether or not a default equipment location is displayed. If a default equipment location is displayed, the **CHANGE FIELD** sequence **must** be used. If no default equipment location is displayed, either **ENTER** or the **CHANGE FIELD** sequence can be performed to select the range of network peripherals to be tested.

7. To select all network peripherals in a module for testing, perform one of the following depending on whether or not a default equipment location is displayed:

ENTER; (Module number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; ENTER; (Module number to be tested); ENTER.

Test 2 starts with the first network peripheral in the module selected and runs until all network peripherals in the module are tested.

Proceed to Step 23.

8. To select all network peripherals in a cabinet for testing, perform one of the following depending on whether or not a default equipment location is displayed:

ENTER; (Module number of cabinet to be tested); ENTER; (Cabinet number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; ENTER; (Module number of cabinet to be tested); ENTER; (Cabinet number to be tested); ENTER.

Test 2 starts with the first network peripheral in the cabinet selected and runs until all network peripherals in the cabinet are tested.

Proceed to Step 23.

9. To select all network peripherals in a carrier for testing, perform one of the following depending on whether or not a default equipment location is displayed:

ENTER; (Module number of carrier to be tested); ENTER; (Cabinet number of carrier to be tested); ENTER; (Carrier number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; ENTER; (Module number of carrier to be tested); ENTER; (Cabinet number of carrier to be tested); ENTER; (Carrier number to be tested); ENTER.

Test 2 starts with the first network peripheral in the carrier selected and runs until all network peripherals in the carrier are tested.

Proceed to Step 23.

10. To select all network peripherals in a slot for testing, perform one of the following depending on whether or not a default equipment location is displayed:

ENTER; (Module number of slot to be tested); ENTER; (Cabinet number of slot to be tested); ENTER; (Carrier number of slot to be tested); ENTER; (Slot number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; ENTER; (Module number of slot to be tested); ENTER; (Cabinet number of slot to be tested); ENTER; (Carrier number of slot to be tested); ENTER; (Slot number to be tested); ENTER.

Test 2 starts with the first network peripheral in the slot selected and runs until all network peripherals in the slot are tested.

Proceed to Step 23.

11. To select all network peripherals within an equipment type to be tested, the appropriate equipment type must be entered in Field 2.

Equipment types include: 1 = PDM, 2 = 74 Series terminal, 3 = DTDM, 4 = 72 Series terminal, 5 = TDM, 6 = PDM/2, 7 = TDM/2, 8 = IDT Voice Station, 9 = IDT Data Port, 10 = BCT 510 Voice Station, 11 = BCT 510 Data Port, 12 = BCT 515 Voice Station, 13 = BCT 515 Data Port, 14 = Voice Data Station, Voice Station, 15 = Voice Data Station, Data Port, 16 = AP32 DCP Interface Even Port Channel, 17 = AP32 DCP Interface Odd Port Channel, and 18 = MFAT.

Note: Equipment types 8 through 18 cannot be selected in R2V1.

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12. An equipment type can be selected in several ways, i.e., by depressing **NEXT UNIT** until the correct equipment type is displayed, or by entering the equipment type and depressing **ENTER**.

Note: Equipment types 8 through 18 are not displayed by use of NEXT UNIT in R2V1.

13. If no default equipment location is displayed, enter the equipment type to be tested in Field 2 and depress **ENTER** or use **NEXT UNIT** to step through the equipment types in numerical sequence until the equipment type to be tested is displayed in Field 2.

If a default equipment location is displayed, enter the equipment type to be tested in Field 2 and depress ENTER.

Note: Equipment types 8 through 18 cannot be selected in R2V1.

Test 2 starts with the first network module, first cabinet and carrier, and runs until all network peripherals of the equipment type selected are tested.

Proceed to Step 23.

- 14. In addition to testing all network peripherals in a specified equipment type, a range of network peripherals for the equipment type (all network peripherals for an equipment type in a module, cabinet, carrier, or slot) can be selected for testing.
- 15. To select all network peripherals for an equipment type in a module for testing, perform one of the following depending on whether or not a default equipment location is displayed:

Note: Equipment types 8 through 18 cannot be selected in R2V1.

(Equipment type to be tested); ENTER; (Module number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; (Equipment type to be tested); ENTER; (Module number to be tested); ENTER.

Test 2 starts with the first network peripheral of the equipment type specified, in the module selected, and runs until all network peripherals of the equipment type in the module are tested.

Proceed to Step 23.

16. To select all network peripherals for an equipment type in a cabinet for testing, perform one of the following depending on whether or not a default equipment location is displayed:

Note: Equipment types 8 through 18 cannot be selected in R2V1.

(Equipment type to be tested); ENTER; (Module number of cabinet to be tested); ENTER; (Cabinet number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; (Equipment type to be tested); ENTER; (Module number of cabinet to be tested); ENTER; (Cabinet number to be tested); ENTER.

Test 2 starts with the first network peripheral of the equipment type specified, in the cabinet selected, and runs until all network peripherals of the equipment type in the cabinet are tested.

Proceed to Step 23.

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17. To select all network peripherals for an equipment type in a carrier for testing, perform one of the following depending on whether or not a default equipment location is displayed:

Note: Equipment types 8 through 18 cannot be selected in R2V1.

(Equipment type to be tested); ENTER; (Module number of carrier to be tested); ENTER; (Cabinet number of carrier to be tested); ENTER; (Carrier number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; (Equipment type to be tested); ENTER; (Module number of carrier to be tested); ENTER; (Cabinet number of carrier to be tested); ENTER; (Carrier number to be tested); ENTER.

Test 2 starts with the first network peripheral of the equipment type specified, in the carrier selected, and runs until all network peripherals of the equipment type in the carrier are tested.

Proceed to Step 23.

18. To select all network peripherals for an equipment type in a slot for testing, perform one of the following depending on whether or not a default equipment location is displayed:

Note: Equipment types 8 through 18 cannot be selected in R2V1.

(Equipment type to be tested); ENTER; (Module number of slot to be tested); ENTER; (Cabinet number of slot to be tested); ENTER; (Carrier number of slot to be tested); ENTER; (Slot number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; (Equipment type to be tested); ENTER; (Module number of slot to be tested); ENTER; (Cabinet number of slot to be tested); ENTER; (Carrier number of slot to be tested); ENTER; (Slot number to be tested); ENTER.

Test 2 starts with the first network peripheral of the equipment type specified, in the slot selected, and runs until all network peripherals of the equipment type in the slot are tested.

Proceed to Step 23.

19. A specific network peripheral can be selected for testing by performing one of the following depending on whether or not a default equipment location is displayed:

Note: Specific network peripherals for equipment types 8 through 18 cannot be selected in R2V1.

(Equipment type of network peripheral to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; (Equipment type of network peripheral to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

Proceed to Step 22.

20. A specific network peripheral can also be selected for testing by use of **NEXT UNIT** and **NEXT CIRCUIT**.

Depress **NEXT UNIT** until the equipment type of the network peripheral to be tested is displayed in Field 2.

Note: Equipment types 8 through 18 are not displayed by use of NEXT UNIT in R2V1.

Depress **NEXT CIRCUIT** until the port equipment location of the network peripheral to be tested is displayed in Fields 3 through 7.

Proceed to Step 22.

21. To test the default equipment location displayed in Fields 2 through 7, proceed to Step 22.

Caution: Busying out a port equipment location results in loss of customer calls or data when the port equipment location is in use.

22. Individual port equipment locations can be placed in maintenance busy out status for testing by performing the following:

Check the circuit status displayed in Field 9.

If the circuit status = 2, proceed to Step 23.

If the circuit status does not equal 2, depress BUSY OUT and proceed to Step 23.

Note: If Fields 3 through 7 are not entered, special error code 88 (fields 3 through 7 must be entered before use of **BUSY OUT**) is displayed in the **MAAP** error code field.

23. Prior to starting Test 2, it must be determined if non-service-affecting tests or service-affecting tests are to be executed.

Caution: A customer's normal service is aborted when service-affecting tests are performed as the network peripheral (or peripherals) is taken out-of-service while service-affecting tests are being performed.

24. To perform service-affecting tests, Field 10 (test mode) must be changed to a 1 using the CHANGE FIELD sequence:

CHANGE FIELD; 10; ENTER; 1; ENTER.

Test 2 Execution

1. To start Test 2 after selecting the network peripheral(s) to be tested and the test mode, depress **EXECUTE**.

The WAIT indicator on the MAAP is turned on.

- 2. When an in-use network peripheral is encountered during Test 2 execution in the non-serviceaffecting test mode (for a range of network peripherals or for a single network peripheral) the **IN-USE** indicator is lighted on the **MAAP** while the transparent test is being performed.
- 3. Test 2 operation and display of test results is different when a specific network peripheral or default equipment location is tested and when the entire switch or a range of network peripherals are tested.

- For test operation and display of test results for a default equipment location or a specific network peripheral, proceed to Step 1 of Test 2 Operation and Test Result Display for a Single Circuit.
- 5. For test operation and display of test results for the entire switch or a range of network peripherals, proceed to Step 1 of Test 2 Operation and Test Result Display for a Range of Circuits.

Test 2 Operation and Test Result Display for a Single Circuit

1. When Test 2 is completed for a default equipment location or a specific network peripheral, the **WAIT** indicator is turned off and the following is displayed:

Field 1 - 2.

Field 2 - Equipment type of network peripheral tested.

Note: Equipment types 8 through 18 are not displayed in R2V1.

Fields 3 through 7 - Port equipment location of network peripheral tested.

Field 8 - Alarm status of network peripheral tested.

Field 9 - Current circuit status of network peripheral tested (0 = idle, 1 = in-use, 2 = busied out).

Field 10 - Test mode (0 or 1).

Fields 11 and 12 - Dashed.

Field 13 - 1 (Indicating one network peripheral tested).

Field 14 - 0 (Indicating no failures were found for the peripheral tested) or 1 (Indicating that the network network peripheral failed the test).

Field 15 - Failure index.

2. When a specific network peripheral or the default equipment location fails Test 2 (indicated by a 1 in Field 14), depressing **NEXT DATA** displays the index and specific fault code recorded for the network peripheral tested in Fields 11 and 12.

Note: When the port equipment location was busied out and the test passed, or the problem was corrected, the circuit should be released from busy using **RLS BUSY OUT**.

3. When another specific network peripheral is to be tested, the CHANGE FIELD sequence must be used to select the specific network peripheral:

Note: Specific network peripherals for equipment types 8 through 18 cannot be selected in R2V1.

CHANGE FIELD; 2; ENTER; (Equipment type of network peripheral to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

4. **EXECUTE** must be depressed to test the specific network peripheral selected for testing.

Test 2 Operation and Test Result Display for a Range of Circuits

1. When the entire switch or a range of circuits is being tested for network peripheral failures, the **WAIT** indicator is turned on and the following fields are incremented as a circuit is tested:

Field 2 - Equipment type of network peripheral being tested.

Note: Equipment types 8 through 18 are not displayed in R2V1.

Fields 3 through 7 - Port equipment location of network peripheral being tested.

Field 8 - Alarm status of network peripheral being tested.

Field 9 - Current circuit status of network peripheral being tested (0 = idle, 1 = in-use, 2 = busied out).

Field 13 - Number of network peripherals tested.

Field 14 - Number of network peripherals failed (if any).

2. The failure information returned in the test is stored in DMIDS.

If DMIDS becomes full at any time during the test, Test 2 is stopped and the **WAIT** indicator is turned off.

The last network peripheral tested is displayed in Fields 2 through 7, Field 10 displays the test mode, and special error code 82, (DMIDS overflow), is displayed in the **MAAP** error code field.

3. Results of the test can be examined at this time (See Steps 11 through 15 below) and Test 2 can be continued from where it was stopped, i.e., from the port equipment location displayed in Fields 3 through 7.

Caution: If Test 2 is continued from where it was stopped by a DMIDS overflow, any test results gathered to that point are lost and only new failure data is retained.

Note: Before depressing **EXECUTE** to continue Test 2 from where it was stopped because of a DMIDS overflow, the failure data should be examined and recorded.

- 4. If Test 2 is halted because of a DMIDS overflow, a new range of network peripherals to be tested can be entered instead of continuing the test from where it was stopped.
- 5. The CHANGE FIELD sequence must be used to enter the new range of network peripherals to be tested.

Refer to Steps 7 through 10 of Test 2 Data Entry above to select a range of network peripherals to be tested in a module, cabinet, carrier, or slot.

Refer to Steps 15 through 18 of Test 2 Data Entry above to select a range of network peripherals within an equipment type to be tested in a module, cabinet, carrier, or slot.

Note: Equipment types 8 through 18 cannot be selected in R2V1.

EXECUTE must be depressed to begin Test 2 from the new range of network peripherals entered or from where the test was stopped.

PROC 622 Test 2

6. **STOP** can be depressed when the entire switch or a range of network peripherals is being tested.

Note: Test 2 does not stop until the network peripheral being tested is completed. Special error code 86 (wait until test completes) is displayed in the **MAAP** error code field until the test is completed.

7. If Test 2 is stopped before one complete testing pass through the range of network peripherals specified is made, the total number of network peripherals tested and the total number of network peripherals failed (if any) are displayed in Fields 13 and 14.

The equipment type and port equipment location of the last network peripheral tested is displayed in Fields 2 through 7, Field 10 displays the test mode, and special error code 83 (test of range not completed) is displayed in the **MAAP** error code field.

- 8. Test result information can be stepped through as described in Steps 10 through 15 below when Test 2 is halted using **STOP** even though the entire range is not tested.
- 9. To restart the test when Test 2 is halted by use of **STOP** before the range of network peripherals are tested at least once, **EXECUTE** is depressed and Test 2 starts at the port equipment location following the last port equipment location tested.

Note: When Test 2 is continued from where it was stopped any test results gathered to that point are lost and only new failure data is retained.

10. When the entire switch or a range of network peripherals are tested, the **WAIT** indicator is turned off and a summary is displayed.

If no network peripherals failed, the following summary is displayed:

Field 1 - 2.

Fields 2 through 6 - Equipment type and location of the range of network peripherals tested.

Field 10 - Test mode (0 or 1).

Field 13 - Number of network peripherals tested.

Field 14 - 0 (Indicating no failures).

- 11. If any network peripherals failed, the summary displays a 2 in Field 1, the equipment type and location of the range of network peripherals tested in Fields 2 through 6, the test mode in Field 10, the total number of network peripherals tested in Field 13, and the total number of failures in Field 14.
- 12. Depressing **NEXT CIRCUIT** displays the first failure, as follows:

Field 1 - 2.

Field 2 - Equipment type of failing network peripheral.

Note: Equipment types 8 through 18 are not displayed in R2V1.

Fields 3 through 7 - Port equipment location of failing network peripheral.

Field 8 - Alarm status of failing network peripheral.

Field 9 - Current circuit status of failing network peripheral (0 = idle, 1 = in-use, 2 = busied out).

Field 10 - Test mode (0 or 1).

Field 11 - Fault code index.

Field 12 - Specific fault code.

Field 13 - Number of times the network peripheral was tested.

Field 14 - Number of times the network peripheral failed.

Field 15 - Failure index.

- 13. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failing network peripherals.
- 14. When more than one equipment type is tested, depressing **NEXT UNIT** causes the first network peripheral of the next equipment type with failures to be displayed.

Field 15 decrements corresponding to the number of failures passed over (if any) when stepping from equipment type to equipment type.

NEXT CIRCUIT is used to step through the failures of the displayed equipment type.

15. When all failing network peripherals are displayed, depressing **NEXT CIRCUIT** or **NEXT UNIT** dashes Fields 2 through 9, and 11 through 15.

Depressing **NEXT CIRCUIT** once more causes the summary to be displayed, and the failing network peripherals can be stepped through again by use of **NEXT CIRCUIT** and **NEXT UNIT**.

16. To select another range of network peripherals to test, the CHANGE FIELD sequence must be used.

Refer to Steps 7 through 10 of Test 2 Data Entry above to select a range of network peripherals to be tested in a module, cabinet, carrier, or slot.

Refer to Steps 15 through 18 of Test 2 Data Entry above to select a range of network peripherals within a equipment type to be tested in a module, cabinet, carrier, or slot.

Note: Equipment types 8 through 18 cannot be selected in R2V1.

EXECUTE must be depressed to test the range of network peripherals selected for testing.

17. The **NETWORK PERIPH EQPT** fault indicator is turned off when Test 2 completes with no failures detected for all network peripherals that had raised an alarm.

Note: Network peripheral alarmed circuit entries in PMIDS are marked as resolved.

18. The **MINOR** or **WARNING** alarm indicator is also turned off if no other sources are affecting the alarm indicator.

Test 3

Test 3 is used to test one or more network peripherals in a continuous cycle.

Two modes of testing are provided in Test 3, i.e., service-affecting and non-service-affecting.

- 1. The use of the non-service-affecting test mode performs only transparent tests on network peripherals without affecting customer's service.
- 2. The service-affecting test mode provides complete testing of a network peripheral and is destructive, aborting any call in progress to a network peripheral and taking the network peripheral selected for testing out-of-service.

Test 3 is mainly used when an intermittent fault is suspected, when using test equipment to further isolate a problem, or to trace wiring problems.

Network peripherals can be selected for testing by equipment type, a range of port equipment locations, or on a single circuit basis.

Test 3 Data Entry

1. Test 3 is selected by use of **NEXT TEST**.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 3.

2. When Test 3 is initially called in, a default equipment location may be displayed in Field 3 through 7. Field 8 displays the alarm status, Field 9 displays the circuit status, and Field 10 (test mode) displays a 0.

Field 2 (equipment type) is blinking, indicating an optional entry field.

Note: Equipment types 8 through 18 cannot be selected in R2V1.

3. Normally, a specific network peripheral or the default equipment location is tested in Test 3. However, network peripheral selection for testing in Test 3 is identical to Test 2.

All network peripherals, a range of network peripherals, all network peripherals within an equipment type, a combination of equipment type and range (i.e., all network peripherals of an equipment type in the range specified), a specific network peripheral, or the default equipment location can be tested.

4. When all network peripherals in the switch are to be tested continuously, refer to Step 5 of Test 2 Data Entry for network peripheral selection.

To select all network peripherals in a specific module to be tested continuously, refer to Step 7 of Test 2 Data Entry.

To select all network peripherals in a specific cabinet to be tested continuously, refer to Step 8 of Test 2 Data Entry.

To select all network peripherals in a specific carrier to be tested continuously, refer to Step 9 of Test 2 Data Entry.

To select all network peripherals in a specific slot to be tested continuously, refer to Step 10 of Test 2 Data Entry.

Proceed to Step 10.

5. When all network peripherals in an equipment type are to be tested continuously, refer to Steps 11 and 12 of Test 2 Data Entry for equipment type selection.

Note: Equipment types 8 through 18 cannot be selected in R2V1.

To select all network peripherals of an equipment type in a specific module to be tested continuously, refer to Step 15 of Test 2 Data Entry.

To select all network peripherals of an equipment type in a specific cabinet to be tested continuously, refer to Step 16 of Test 2 Data Entry.

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To select all network peripherals of an equipment type in a specific carrier to be tested continuously, refer to Step 17 of Test 2 Data Entry.

To select all network peripherals of an equipment type in a specific slot to be tested continuously, refer to Step 18 of Test 2 Data Entry.

Proceed to Step 10.

6. A specific network peripheral can be selected for testing by performing one of the following depending on whether or not a default equipment location is displayed:

Note: Specific network peripherals for equipment types 8 through 18 cannot be selected in R2V1.

(Equipment type of network peripheral to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; (Equipment type of network peripheral to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

Proceed to Step 9.

7. A specific network peripheral can also be selected for testing by use of NEXT UNIT and NEXT CIRCUIT.

Depress **NEXT UNIT** until the equipment type of the network peripheral to be tested is displayed in Field 2.

Note: Equipment types 8 through 18 are not displayed by use of NEXT UNIT in R2V1.

Depress **NEXT CIRCUIT** until the port equipment location of the network peripheral to be tested is displayed in Fields 3 through 7.

Proceed to Step 9.

8. To test the default equipment location displayed in Fields 2 through 7, proceed to Step 9.

Caution: Busying out a port equipment location results in loss of customer calls or data when the port equipment location is in use.

9. Individual port equipment locations can be placed in maintenance busy out status for testing by performing the following:

Check the circuit status displayed in Field 9.

If the circuit status = 2, proceed to Step 10.

If the circuit status does not equal 2, depress **BUSY OUT** and proceed to Step 10.

Note: If Fields 3 through 7 are not entered, special error code 88 (fields 3 through 7 must be entered before use of **BUSY OUT**) is displayed in the **MAAP** error code field.

PROC 622 Test 3

10. Prior to starting Test 3, it must be determined if non-service-affecting tests or service-affecting tests are to be executed.

Caution: A customer's normal service is aborted when service-affecting tests are performed as the network peripheral (or peripherals) is taken out-of-service while service-affecting tests are being performed.

11. To perform service-affecting tests, Field 10 (test mode) must be changed to a 1 using the CHANGE FIELD sequence:

· CHANGE FIELD; 10; ENTER; 1; ENTER.

Test 3 Execution

1. To start Test 3 after selecting the network peripheral(s) to be tested and the test mode, depress **EXECUTE**.

The WAIT indicator is not turned on during Test 3 execution.

- 2. When an in-use network peripheral is encountered during Test 3 execution in the non-serviceaffecting test mode (for a range of network peripherals or for a single network peripheral) the IN USE indicator is lighted on the MAAP while the transparent test is being performed.
- 3. If the DMIDS storage buffer becomes full, either during testing of a range of network peripherals or a single network peripheral, special error code 82, (DMIDS overflow), is displayed in the **MAAP** error code field.

Note: Testing is not stopped when the DMIDS buffer becomes full.

4. When multiple network peripherals are being tested, new errors detected are discarded. Test results can be examined when the DMIDS buffer becomes full and **STOP** is depressed

Refer to Test 3 Result Display for a Range of Circuits below.

5. When testing a single network peripheral, new errors detected are added to the failure list, and the oldest errors are deleted. Test results can be examined when the DMIDS buffer becomes full and **STOP** is depressed.

Refer to Test 3 Result Display for a Single Circuit below.

- 6. Only 99 errors can be displayed when the DMIDS buffer becomes full. When multiple network peripherals are being tested, the 99 errors are the oldest errors recorded. When a single network peripheral is tested, the 99 errors are the newest errors recorded.
- 7. When the entire switch or a range of network peripherals is being tested continuously in Test 3, the following fields are incremented as an network peripheral is tested:

Field 2 - Equipment type of network peripheral being tested.

Note: Equipment types 8 through 18 are not displayed in R2V1.

Fields 3 through 7 - Port equipment location of network peripheral being tested.

Field 8 - Alarm status of network peripheral being tested.

Field 9 - Current circuit status of network peripheral being tested (0 = idle, 1 = in-use, 2 = busied out).

Field 13 - Number of network peripherals tested.

Field 14 - Number of network peripherals failed (if any).

8. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.

Note: Test 3 does not stop until the network peripheral being tested is completed. Special error code 86 (wait until test completes) is displayed in the **MAAP** error code field until the test is completed.

- 9. Display of test results is different when a specific network peripheral or default equipment location is tested and when the entire switch or a range of network peripherals are tested.
- 10. For display of test results when testing a default equipment location or a specific network peripheral, proceed to Step 1 of Test 3 Result Display for a Single Circuit.

For display of test results when testing the entire switch or a range of network peripherals, proceed to Step 1 of Test 3 Result Display for a Range of Circuits.

Test 3 Result Display for a Single Circuit

1. When Test 3 is stopped while testing a default equipment location or a specific network peripheral, the following is displayed:

Field 1 - 3.

Field 2 - Equipment type of network peripheral tested.

Note: Equipment types 8 through 18 are not displayed in R2V1.

Fields 3 through 7 - Port equipment location of network peripheral tested.

Field 8 - Alarm status of network peripheral tested.

Field 9 - Current circuit status of network peripheral tested (0 = idle, 1 = in-use, 2 = busied out).

Field 10 - Test mode (0 or 1).

Fields 11 and 12 - Dashed.

Field 13 - Number of times the network peripheral was tested.

Field 14 - 0 (Indicating no failures were detected for the network peripheral tested) or number of times the network peripheral failed.

Field 15 - Failure index.

2. When a specific network peripheral or the default equipment location failed Test 3 (indicated by Field 14), depressing **NEXT DATA** displays the index and specific fault code recorded for the network peripheral tested in Fields 11 and 12.

Field 15 displays the number of fault codes recorded against the failing network peripheral.

- 3. Multiple fault codes may have been recorded for the failing network peripheral displayed in Fields 3 through 7 as indicated by Field 15 displaying more than 1 (which is an index to fault codes).
- 4. Depressing **NEXT FAULT** displays in Field 12 the next fault code (if any) recorded against the failing network peripheral and Field 15 is decremented corresponding to the number of fault codes which were the same.

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Note: When **NEXT FAULT** is depressed, Fields 11 through 15 may be dashed. This indicates that all remaining fault codes were the same. Dashing of Fields 11 through 15 can occur at any time when **NEXT FAULT** is depressed, no matter what number was displayed in Field 15 before **NEXT FAULT** was depressed.

5. When all fault codes for the failing network peripheral are displayed, depressing **NEXT FAULT** once more dashes Fields 11 through 15.

Depressing **NEXT FAULT** again displays the first fault code recorded for the failing network peripheral.

- 6. When the port equipment location was busied out and the test passed, or the problem was corrected, the circuit should be released from busy using **RLS BUSY OUT**.
- 7. When another specific network peripheral is to be tested, the **CHANGE FIELD** sequence must be used to select the specific network peripheral:

CHANGE FIELD; 2; ENTER; (Equipment type of network peripheral to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

8. **EXECUTE** must be depressed to test the specific network peripheral selected for testing.

Test 3 Result Display for a Range of Circuits

- 1. When Test 3 is stopped while testing the entire switch or a range of network peripherals, a summary is displayed.
- 2. If no network peripherals failed, the following summary is displayed:

Field 1 - 3.

Fields 2 through 6 - Equipment type and location of the last network peripheral tested, or the equipment type and location of the range of network peripherals selected for testing.

Field 10 - Test mode (0 or 1).

Field 13 - Number of network peripherals tested.

Field 14 - 0 (Indicating no failures).

- 3. If any network peripherals failed, the summary displays a 3 in Field 1, the equipment type and location of the last network peripheral tested, or the equipment type and location of the range of network peripherals tested in Fields 2 through 6, the test mode in Field 10, the total number of network peripherals tested in Field 13, and the total number of failures in Field 14.
- 4. Depressing **NEXT CIRCUIT** displays the first failure, as follows:

Field 1 - 3.

Field 2 - Equipment type of failing network peripheral.

Note: Equipment types 8 through 18 are not displayed in R2V1.

Fields 3 through 7 - Port equipment location of failing network peripheral.

Field 8 - Alarm status of failing network peripheral.

Field 9 - Current circuit status of failing network peripheral (0 = idle, 1 = in-use, 2 = busied out).

Field 10 - Test mode (0 or 1).

Field 11 - Fault code index.

Field 12 - Specific fault code.

Field 13 - Number of times the network peripheral was tested.

Field 14 - Number of times the network peripheral failed.

Field 15 - Failure index.

Note: Multiple fault codes are not recorded for each failing network peripheral when a range of network peripherals are tested.

- 5. Depressing NEXT CIRCUIT repeatedly displays the remaining failing network peripherals.
- 6. When more than one equipment type is tested, depressing **NEXT UNIT** causes the first network peripheral of the next equipment type with failures to be displayed.

Note: Equipment types 8 through 18 are not displayed by use of NEXT UNIT in R2V1.

Field 15 decrements corresponding to the number of failures passed over (if any) when stepping from equipment type to equipment type.

NEXT CIRCUIT is used to step through the failures of the displayed equipment type.

7. When all failing network peripherals are displayed, depressing NEXT CIRCUIT or NEXT UNIT dashes Fields 2 through 9, and 11 through 15.

Depressing **NEXT CIRCUIT** once more causes the summary to be displayed, and the failing network peripherals can be stepped through again by use of **NEXT CIRCUIT** and **NEXT UNIT**.

8. Test 3 can be restarted without changing the default equipment location or range of network peripherals originally entered for testing by depressing **EXECUTE**.

The same default equipment location or range of network peripherals is used as the basis for the new execution of Test 3.

Any data gathered in the last execution of Test 3 is lost when EXECUTE is depressed.

9. To select another range of network peripherals to test, the CHANGE FIELD sequence must be used.

Refer to Test 2 Data Entry, Steps 7 through 10 to select a range of network peripherals to be tested in a module, cabinet, carrier, or slot.

Refer to Test 2 Data Entry, Steps 15 through 18 to select a range of network peripherals within a equipment type to be tested in a module, cabinet, carrier, or slot.

Note: Equipment types 8 through 18 cannot be selected in R2V1.

EXECUTE must be depressed to test the range of network peripherals selected for testing.

PROC 622 Test 3 and Test 4

10. The **NETWORK PERIPH EQPT** fault indicator is turned off when Test 3 completes with no failures detected for all network peripherals that had raised an alarm.

Note: Network peripheral alarmed circuit entries in PMIDS are marked as resolved.

11. The **MINOR** or **WARNING** alarm indicator is also turned off if no other sources are affecting the alarm indicator.

Test 4

Test 4 is used to continuously test the transmission quality to a specific network peripheral or a range of network peripherals.

Test 4 uses the Digital Transmission Link (DTL) looparound test to detect bit errors over the DTL link.

Test 4 must be performed in the service-affecting test mode.

Network peripherals can be selected for testing by equipment type, a range of port equipment locations, or on a single circuit basis.

Test 4 Data Entry

1. Test 4 is selected by use of NEXT TEST.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 4.

2. When Test 4 is initially called in, a default equipment location may be displayed in Fields 3 through 7. Field 8 displays the alarm status, Field 9 displays the circuit status, and Field 10 (test mode) displays a 0.

Field 2 (equipment type) is blinking, indicating an optional entry field.

Note: Equipment types 8 through 18 cannot be selected in R2V1.

3. Normally, a specific network peripheral or the default equipment location is tested in Test 4. However, network peripheral selection for testing in Test 4 is identical to Test 2.

Caution: Testing a range of network peripherals in the service-affecting test mode affects properly functioning network peripherals.

- 4. All network peripherals, a range of network peripherals, all network peripherals within an equipment type, a combination of equipment type and range (i.e., all network peripherals of an equipment type in the range specified), a specific network peripheral, or the default equipment location can be tested.
- 5. When all network peripherals in the switch are to be tested continuously, refer to Step 5 of Test 2 Data Entry for network peripheral selection.

To select all network peripherals in a specific module to be tested continuously, refer to Step 7 of Test 2 Data Entry.

To select all network peripherals in a specific cabinet to be tested continuously, refer to Step 8 of Test 2 Data Entry.

To select all network peripherals in a specific carrier to be tested continuously, refer to Step 9 of Test 2 Data Entry.

To select all network peripherals in a specific slot to be tested continuously, refer to Step 10 of Test 2 Data Entry.

Proceed to Step 11.

6. When all network peripherals in an equipment type are to be tested continuously, refer to Steps 11 and 12 of Test 2 Data Entry for equipment type selection.

Note: Equipment types 8 through 18 cannot be selected in R2V1.

To select all network peripherals of an equipment type in a specific module to be tested continuously, refer to Step 15 of Test 2 Data Entry.

To select all network peripherals of an equipment type in a specific cabinet to be tested continuously, refer to Step 16 of Test 2 Data Entry.

To select all network peripherals of an equipment type in a specific carrier to be tested continuously, refer to Step 17 of Test 2 Data Entry.

To select all network peripherals of an equipment type in a specific slot to be tested continuously, refer to Step 18 of Test 2 Data Entry.

Note: Special error code 87 (equipment type can not be tested in test 4) is displayed in the **MAAP** error code field if equipment type 4 (72 Series terminal) is selected for testing and **EXECUTE** is depressed.

Proceed to Step 11.

7. A specific network peripheral can be selected for testing by performing one of the following depending on whether or not a default equipment location is displayed:

Note: Specific network peripherals for equipment types 8 through 18 cannot be selected in R2V1.

(Equipment type of network peripheral to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

CHANGE FIELD; 2; ENTER; (Equipment type of network peripheral to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

Proceed to Step 10.

8. A specific network peripheral can also be selected for testing by use of **NEXT UNIT** and **NEXT CIRCUIT**.

Depress **NEXT UNIT** until the equipment type of the network peripheral to be tested is displayed in Field 2.

Note: Equipment types 8 through 18 are not displayed by use of NEXT UNIT in R2V1.

Depress **NEXT CIRCUIT** until the port equipment location of the network peripheral to be tested is displayed in Fields 3 through 7.

Proceed to Step 10.

9. To test the default equipment location displayed in Fields 2 through 7, proceed to Step 10.

Caution: Busying out a port equipment location results in loss of customer calls or data when the port equipment location is in use.

- 10. Individual port equipment locations can be placed in maintenance busy out status for testing by checking the circuit status displayed in Field 9.
- 11. If the circuit status = 2, proceed to Step 13.
- 12. If the circuit status does not equal 2, depress BUSY OUT and proceed to Step 13.

Note: If Fields 3 through 7 are not entered, special error code 88 (fields 3 through 7 must be entered before use of **BUSY OUT**) is displayed in the **MAAP** error code field.

Caution: A customer's normal service is aborted when service-affecting tests are performed as the network peripheral (or peripherals) is taken out-of-service while service-affecting tests are being performed.

13. To perform Test 4 (service-affecting), Field 10 (test mode) must be changed to a 1 using the CHANGE FIELD sequence:

CHANGE FIELD; 10; ENTER; 1; ENTER.

Note: Special error code 84 (test 4 must be run in mode 1) is displayed in the MAAP error code field if Field 10 is not changed to a 1 and EXECUTE is depressed.

Test 4 Execution

1. To start Test 4 after selecting the network peripheral(s) to be tested and test mode 1, depress **EXECUTE**.

The WAIT indicator is not turned on during Test 4 execution.

2. If the DMIDS storage buffer becomes full, either during testing of a range of network peripherals or a single network peripheral, special error code 82, (DMIDS overflow), is displayed in the **MAAP** error code field.

Note: Testing is not stopped when the DMIDS buffer becomes full.

3. When multiple network peripherals are being tested, new errors detected are discarded. Test results can be examined when the DMIDS buffer becomes full and **STOP** is depressed.

Refer to Test 4 Result Display for a Range of Circuits below.

4. When testing a single network peripheral, new errors detected are added to the failure list, and the oldest errors are deleted. Test results can be examined when the DMIDS buffer becomes full and **STOP** is depressed.

Refer to Test 4 Result Display for a Single Circuit below.

5. Only 99 errors can be displayed when the DMIDS buffer becomes full. When multiple network peripherals are tested, the 99 errors are the oldest errors recorded. When a single network peripheral is tested, the 99 errors are the newest errors recorded.

6. When the entire switch or a range of network peripherals is being tested continuously in Test 4, the following fields are incremented as a network peripheral is tested:

Field 2 - Equipment type of network peripheral being tested.

Note: Equipment types 8 through 18 are not displayed in R2V1.

Fields 3 through 7 - Port equipment location of network peripheral being tested.

Field 8 - Alarm status of network peripheral being tested.

Field 9 - Current circuit status of network peripheral being tested (0 = idle, 1 = in-use, 2 = busied out).

Field 13 - Number of network peripherals tested.

Field 14 - Number of network peripherals failed (if any).

7. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.

Note: Test 4 does not stop until the network peripheral being tested is completed. Special error code 86 (wait until test completes) is displayed in the **MAAP** error code field until the test is completed.

- 8. Display of test results is different when a specific network peripheral or default equipment location is tested and when the entire switch or a range of network peripherals are tested.
- 9. For display of test results when testing a default equipment location or a specific network peripheral, proceed to Step 1 of Test 4 Result Display for a Single Circuit.
- 10. For display of test results when testing the entire switch or a range of network peripherals, proceed to Step 1 of Test 4 Result Display for a Range of Circuits.

Test 4 Result Display for a Single Circuit

1. When Test 4 is stopped while testing a default equipment location or a specific network peripheral, the following is displayed:

Field 1 - 4.

Field 2 - Equipment type of network peripheral tested.

Note: Equipment types 8 through 18 are not displayed in R2V1.

Fields 3 through 7 - Port equipment location of network peripheral tested.

Field 8 - Alarm status of network peripheral tested.

Field 9 - Current circuit status of network peripheral tested (0 = idle, 1 = in-use, 2 = busied out).

Field 10 - Test mode (1).

Fields 11 and 12 - Dashed.

Field 13 - Number of times the network peripheral was tested.

Field 14 - 0 (Indicating no failures were detected for the network peripheral tested) or number of times the network peripheral failed.

Field 15 - Failure index.

2. When a specific network peripheral or the default equipment location fails Test 4 (indicated by Field 14), depressing **NEXT DATA** displays the index and specific fault code recorded for the network peripheral tested in Fields 11 and 12.

.

Field 15 displays the number of fault codes recorded against the failing network peripheral.

- 3. Multiple fault codes may have been recorded for the failing network peripheral displayed in Fields 3 through 7 as indicated by Field 15 displaying more than 1 (which is an index to fault codes).
- 4. Depressing **NEXT FAULT** displays in Field 12 the next fault code (if any) recorded against the failing network peripheral and Field 15 is decremented corresponding to the number of fault codes which were the same.

Note: When **NEXT FAULT** is depressed, Fields 11 through 15 may be dashed. This indicates that all remaining fault codes were the same. Dashing of Fields 11 through 15 can occur at any time when **NEXT FAULT** is depressed, no matter what number was displayed in Field 15 before **NEXT FAULT** was depressed.

5. When all fault codes for the failing network peripheral are displayed, depressing NEXT FAULT once more dashes Fields 11 through 15.

Depressing **NEXT FAULT** again displays the first fault code recorded for the failing network peripheral.

- 6. When the port equipment location was busied out and the test passed, or the problem was corrected, the circuit should be released from busy using **RLS BUSY OUT**.
- 7. When another specific network peripheral is to be tested, the CHANGE FIELD sequence must be used to select the specific network peripheral:

CHANGE FIELD; 2; ENTER; (Equipment type of network peripheral to be tested); ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number to be tested); ENTER.

Enter test mode 1 and depress EXECUTE.

Test 4 Result Display for a Range of Circuits

- 1. When Test 4 is stopped while testing the entire switch or a range of network peripherals, a summary is displayed.
- 2. If no network peripherals failed, the following summary is displayed:

Field 1 - 4.

Fields 2 through 6 - Equipment type and location of the last network peripheral tested, or the equipment type and location of the range of network peripherals selected for testing.

Field 10 - Test mode (1).

Field 13 - Number of network peripherals tested.

Field 14 - 0 (Indicating no failures).

3. If any network peripherals failed, the summary displays a 4 in Field J, the equipment type and location of the last network peripheral tested, or the equipment type and location of the range of network peripherals tested in Fields 2 through 6, the test mode in Field 10, the total number of network peripherals tested in Field 13, and the total number of failures in Field 14. 4. Depressing NEXT CIRCUIT displays the first failure, as follows:

Field 1 - 4.

Field 2 - Equipment type of failing network peripheral.

Note: Equipment types 8 through 18 are not displayed in R2V1.

Fields 3 through 7 - Port equipment location of failing network peripheral.

Field 8 - Alarm status of failing network peripheral.

Field 9 - Current circuit status of failing network peripheral (0 = idle, 1 = in-use, 2 = busied out).

- Field 10 Test mode (1).
- Field 11 Fault code index.
- Field 12 Specific fault code.

Field 13 - Number of network peripherals tested.

Field 14 - Number of network peripherals failed.

Field 15 - Failure index.

Note: Multiple fault codes are not recorded for each failing network peripheral when a range of network peripherals are tested.

- 5. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failing network peripherals.
- 6. When more than one equipment type is tested, depressing **NEXT UNIT** causes the first network peripheral of the next equipment type with failures to be displayed.

Note: Equipment types 8 through 18 are not displayed by use of NEXT UNIT in R2V1.

Field 15 decrements corresponding to the number of failures passed over (if any) when stepping from equipment type to equipment type.

NEXT CIRCUIT is used to step through the failures of the displayed equipment type.

7. When all failing network peripherals are displayed, depressing NEXT CIRCUIT or NEXT UNIT dashes Fields 2 through 9, and 11 through 15.

Depressing **NEXT CIRCUIT** once more causes the summary to be displayed, and the failing network peripherals can be stepped through again by use of **NEXT CIRCUIT** and **NEXT UNIT**.

8. Test 4 can be restarted without changing the default equipment location or range of network peripherals originally entered for testing by depressing **EXECUTE**.

The same default equipment location or range of network peripherals is used as the basis for the new execution of Test 4.

Any data gathered in the last execution of Test 4 is lost when **EXECUTE** is depressed.

9. To select another range of network peripherals to test, the CHANGE FIELD sequence must be used.

Refer to Test 2 Data Entry, Steps 7 through 10 to select a range off network peripherals to be tested in a module, cabinet, carrier, or slot.

Refer to Test 2 Data Entry, Steps 15 through 18 to select a range of network peripherals within a equipment type to be tested in a module, cabinet, carrier, or slot.

Note: Equipment types 8 through 18 cannot be selected in R2V1.

Enter test mode 1 and depress **EXECUTE**.

Repair Guide

Overview

The repair guide for network peripheral troubles is divided into three parts, i.e., Unterminated Terminals, Alarmed Troubles, and User Reported Troubles.

Unterminated Terminals

Unterminated terminal failures can occur any time up to 30 minutes after a power down.

If unterminated terminals are suspected as the failures, perform the following steps.

- 1. Delete the alarmed network peripherals associated with the suspected unterminated terminals in **PROC 600** Test 1.
- 2. Wait approximately 10 to 15 minutes.
- 3. If the same network peripherals are alarmed again, perform the repair guide for Alarmed Troubles below.

Alarmed Troubles

When the **NETWORK PERIPH EQPT**, and **MINOR** or **WARNING** alarm indicators on the alarm panel are lighted (indicating a network peripheral failure) or when **PROC 622** is referenced from **PROC 600** (Alarm causes/error log) as a potential problem, the following steps should be performed in the order listed to isolate and repair the faulty unit.

1. Execute Test 1 and manually record the failure history generated by the on-line maintenance software.

Determine which failures have an alarm status code of 2 or 3 (minor or warning).

2. Execute Test 2.

Test 2 runs a variable length of time depending on the number of network peripherals being tested, i.e., the entire switch, a range of network peripherals, a specific network peripheral, or the default equipment location.

3. Test 2 must be run for each network peripheral recorded in Test 1 with an alarm status of 2 or 3 (minor or warning) and for the default equipment location passed from **PROC 600** Test 1 or 2 or from **PROC 620** (Network procedure).

4. If all network peripherals pass Test 2, the **NETWORK PERIPH EQPT** fault indicator is turned off.

When Test 2 passes and network peripheral failures are recorded in Test 1 with an alarm status of 2 or 3 (minor or warning) proceed to Step 11 for further testing to ensure that no intermittent failures exist.

- 5. If any failures are detected in Test 2, display the network peripheral failure on the MAAP.
- 6. If Test 2 returns a single fault code of 2 (48 volt overload), determine the type of GPP circuit pack installed at the equipment location displayed in Fields 3 through 6.

If SN270 is installed, replace the blown fuse and proceed to Step 11.

If SN270B is installed, replace the circuit pack and proceed to Step 11.

- 7. If Test 2 returns a single fault code of 7 (digital instrument has bad state of health), replace the network peripheral and proceed to Step 11.
- 8. If Test 2 returns a single fault code of 3 (DTL link idle) or 12 (no response from network peripheral), proceed to Step 9.
- 9. When fault code 3 or 12 is displayed, maintenance personnel **must** go to the location of the suspect network peripheral and check the DTL cable.

Note: PROC 622 is unable to resolve the difference between a dead network peripheral and a severed DTL cable.

10. Check to see if phantom power is being supplied.

If no voltage can be measured, the DTL cable should be inspected and repaired or replaced.

If voltage is present, the network peripheral should be replaced with a network peripheral of the same type.

Proceed to Step 11.

11. Execute Test 3 in a non-service-affecting test mode.

It may be the case that a malfunctioning network peripheral always looks in-use.

If this is true, the non-service-affecting mode of testing does not test the network peripheral. This situation requires the service-affecting mode of testing.

Caution: Testing a large range of network peripherals in the service-affecting mode may affect many properly functioning network peripherals.

Note: It is recommended that service-affecting mode testing be performed on only one network peripheral at-a-time.

When network peripherals always look in-use (results are obtained from Test 2) use the service-affecting mode to test the network peripheral.

The network peripheral being tested is the default equipment location from Test 2 of **PROC** 622.

12. Continuously test the suspect network peripheral to determine if it fails.

If the network peripheral passes Test 3, proceed to Step 15.

If the network peripheral fails Test 3, proceed to Step 13.

13. Use **PROC 620** Test 4 (unit type 27 or 28) to test the General Purpose Port (GPP) or 72 Series terminal port associated with the failing network peripheral.

If PROC 620 fails, take the appropriate corrective action.

When **PROC 620** passes after taking corrective action, repeat Test 3 of **PROC 622** to ensure that the failure is corrected.

Proceed to Step 18.

14. If PROC 620 passes, replace the faulty network peripheral and repeat Test 3 of PROC 622.

If Test 3 passes, proceed to Step 15.

If Test 3 fails, check the wiring associated with the port equipment circuit pack and the network peripheral.

15. It may be the case that all network peripherals pass test 2 or 3, but occasional errors are still recorded in PMIDS or a user reports occasionally garbled data.

Note: These problems may be caused by noise on the DTL lines.

- 16. Test 4 tests only the transmission of the DTL lines. Test 4 detects single bit errors and thus provides a sensitive indicator of noise on the DTL lines.
- 17. The location entered for Test 4 should be that of the port circuit connected to the suspect DTL lines.

Note: Equipment locations should be tested one-at-a-time as Test 4 is a service-affecting test.

18. Execute Test 4 and operate large electrical appliances and the network peripheral in the vicinity of the DTL lines to see if they influence the noise on the DTL link.

If ambient electrical noise is the problem, the DTL lines and/or network peripheral may need to be relocated or reoriented.

19. In order to resolve the alarmed entries and turn off the NETWORK PERIPH EQPT fault indicator, all failing network peripherals with an alarm status of 2 or 3 (minor or warning) must pass Test 2 or 3.

Repeat Steps 5 through 17 for each failing network peripheral with an alarm status of 2 or 3.

20. The MINOR or WARNING alarm indicator is also turned off if no other sources are affecting the alarm indicator.

User Reported Troubles

When user troubles associated with network peripherals are reported and there are no alarms, perform the following steps (as appropriate) for the type of network peripheral reported as the trouble. Repair guidelines for PDM, TDM, or DTDM data modules, and 72 or 74 Series terminals are listed below.
PDM, TDM, and DTDM data module repair strategy:

For the following user reported troubles, the following steps are provided.

1. Cannot originate calls.

Ask the user to run a self test on the data module and 74 Series terminal (if DTDM).

If the self test fails, replace the data module or 74 Series terminal.

If the self test passes, use **PROC 622** Test 1 to check for errors recorded against the data module or 74 Series terminal. Use **PROC 622** Test 3 to isolate the trouble.

2. Cannot receive calls.

Ask the user to run a self test on the data module and 74 Series terminal (if DTDM).

If the self test fails, replace the data module or 74 Series terminal.

If the self test passes, use **PROC 622** Test 1 to check for errors recorded against the data module or 74 Series terminal. Use **PROC 622** Test 3 to isolate the trouble.

3. Data call is apparently set up, but no data can be sent or received.

Ask the user to run the following local tests (Steps 4 through 6) on the data module.

- 4. Self test If this test fails, replace the data module.
- 5. Local loopback If this test fails, there is a problem between the user's terminal equipment and the data module.
- 6. Remote loopback or remote loopback and self test combined.

Note: If the user can perform a remote loopback test using the user's terminal equipment, that is the preferred test.

Set up a connection to the remote data terminal and operate the remote loopback button.

Note: For DTL mode 0 and 1 operation, the remote loopback button must be operated before the call is set up.

Perform a remote loopback test or operate the self test button.

If the test passes, the problem is in the remote data module or the user's remote terminal equipment.

If the test fails, the trouble could be in either data module or in any of the circuits between the data modules.

72 and 74 Series terminal repair strategy:

For the following user reported troubles, the following steps are provided.

1. No dial tone.

Use **PROC 622** Test 1 to check for errors recorded against the terminal and perform **PROC 622** Test 3 to isolate the trouble.

2. Cannot dial.

Replace the terminal.

3. Cannot receive calls.

Use **PROC 622** Test 1 to check for errors recorded against the terminal and perform **PROC 622** Test 3 to isolate the trouble.

4. Does not ring.

Assuming that there are no other indications of an incoming call, ask the user to perform the dial-up test for ringer.

If the dial-up test does not pass, replace the 72 or 74 Series terminal.

Repeat the dial-up test. If the dial-up test fails again, use **PROC 620** Test 4 to check the associated port circuit. Replace the port circuit as necessary.

5. Indicator does not light.

Ask the user to perform the dial-up test for indicator.

If the dial-up test fails, replace the terminal.

6. Buttons do not work.

Ask the user to perform the dial-up test for buttons.

If the dial-up test fails, replace the terminal.

7. Cannot hear.

Replace the handset or terminal.

8. Cannot be heard.

Replace the handset or terminal.

PROC 623 - ANI FAILURES

FL IS	IPCH SUE	ART 1	+ +						A	NI FAILU	RES		+		+		
TES FAI USE 'EX RET	TEST 1: DISPLAYS FAILURE HISTORY. USE 'CLEAR DATA,' 'EXECUTE TO RETIRE ALARMS.			TEST 2: SENDS 4 TEST MESSAGES THROUGH THE DISPLAYED ANI TRUNK CIRCUIT.				SENDS A S SSAGE THROU PLAYED TRUU . USE 'NEX' CT ANOTHER	INGLE UGH NK T DATA' DATA	TEST 4: S MESSAGES CIRCUIT O TRUNK BOAI UNTIL AN OR 'STOP'	ENDS EA ALTERNA F THE S RD CONT ERROR I IS PRE	CH OF 4 TES TELY TO EAC Elected Ani Invously S detected SSED.	ST FAILU CH 0=PAS 1=N0 2=2/5 3=ALW 4=N0	RE CODES (S ACKNOWLEDG ERROR AYS BUSY WORD SHIFT	IONG CHANNEL D Error		
			US USE 'NEXT UNIT' TO DISPLAY					SE THE ANI ADDITIONA	TEST SE	T. RES AFTER TEST IS EXECUTED.			5-NU	LOUP CORRE			
	TEST		QUIPME	TRU NT LOC	NK CIRC	UIT			-				TIME	TDAMS_	OUEUE		
TEST NO	EST 3 NO DATA MODULE		САВ	CARR	SLOT	СКТ	FAILURE	FAILURES PER HOUR		ANI ATTEMPTS	ĺ	load Errors	OUT ERRORS	MISSION	OVERFLOW ERRORS		NETWORK
L_1	2		3 4	5		6 7	8	9		and A	1 10	11	1 12	13	14		623

Purpose

PROC 623 is used when referenced from **PROC 600** (Alarm causes/error log) to verify and turn off the **OTHER FAILS** fault indicator resulting from an ANI failure.

This maintenance procedure **must** be performed on the customer's premises. The ANI - Data Link Test Set (J59024AJ) must be connected to the switch and test set-up steps performed prior to executing Tests 2 through 4.

PROC 623 is used to:

- 1. Display ANI trunk circuit failures.
- 2. Send messages to test an ANI trunk circuit.
- 3. Turn off the OTHER FAILS fault indicator when all ANI trunk circuits pass Test 2.

Note: ANI alarmed entries in PMIDS are marked as resolved.

Field Definitions and Codes

Each field of **PROC 623** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AE, PROC 623 - Field Definitions and Codes.

Field 1 is an optional input field for changing the test number to be executed.

Test Equipment Required

An ANI - Data Link Test Set (J59204AJ) is required to perform Tests 2 through 4 of PROC 623.

The ANI test set verifies the 4-digit trunk and station number assignment of the switch equipped with automatic number identification.

To set up the ANI test set in order to perform Tests 2 through 4, proceed as follows:

- 1. Position the test set adjacent to the SN244 trunk circuit pack to be tested.
- 2. At the test set, set the **POWER** switch to the **OFF** position.

· · · · · ·	PROC 623 FIELD DEFINITIONS AND CODES												
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION								
1	1-4	Test Number.	8	0	Failure code:								
2		Data message being sent in tests 2, 3, and 4:		1	No acknowledgement from TN401 module control channel in SN244 trunk aircuit path								
				2	2-out-of-5 error code.								
	0	0123 4567		3	Always busy.								
	1	1357 0246		4	No word shift.								
	2	2000 3988		5	No loop current.								
	3	1010 1010		6	Wrong channel.								
3	0-30	Module number.		7	Bid error.								
4	0-7	Cabinet number.	9	0-99	Failures per hour for all cir- cuits and for individual cir-								
5	0-3	Carrier number.			cuito.								
6	0-3	SN244 slot number.	10	0- 60,000	Number, of ANI calls at- tempted.								
7	0, 1	Circuit number.	11	0-99	Load errors.								
			12	0-99	Maximum wait interval ex- exceeded.								
			13	0-99	Transmission errors.								
			14	0-99	Queue overflow errors								

- 3. Connect the furnished test cable to the ANI test set.
- 4. Connect the 117 Vac test set line cord to a 117 Vac source.
- 5. At the ANI test set, set the switches as follows:

ERROR MODE/VERIFY MODE - Set to ERROR MODE.

TRUNK/STATION - Set to STATION.

NORMAL/HOLD - Set to NORMAL.

MODE - Set to ANI OR SLF-CH.

ALARM - Set to OFF.

SELF-CHECK - Set to OFF.

POWER - Set to ON.

6. At the test cable, set the ANI TEST switch to ON.

Prior to checking any ANI trunk circuit, perform the following steps:

1. At the cross-connect field, disconnect the tip and ring leads associated with the ANI trunk circuit to be tested.

Caution: If the ANI trunk circuit being tested is connected to the central office instead of the ANI test set, test messages may be recorded as valid ANI calls.

- 2. Connect the test cable to the SN244 corresponding to the ANI trunk circuit to be tested.
- 3. Set the CHANNEL switch on the test cable as follows:

Circuit 0 displayed on the MAAP - Set CHANNEL switch to 9.

Circuit 1 displayed on the MAAP - Set CHANNEL switch to 8.

In addition to the display on the **MAAP** indicating whether the trunk circuit being tested passed or failed, the following steps and observations can be performed at the ANI test set.

1. Observe the TRUNK/STATION MATCH display on the test set.

It sequentially displays the trunk or station numbers listed for Field 2 in Table AE, PROC 623 - Field Definitions and Codes.

2. When an error is detected, the following data may be observed on the ANI test set:

ERROR COUNT advances one count.

The error word(s) on the TRUNK/STATION MATCH display is dashed or shown incorrectly.

- 3. Reverse the TRUNK/STATION switch to complete the display of the remaining messages.
- 4. Set the NORMAL/HOLD switch to the HOLD position to lock an error into the display register.

If this is not done before the next message is sent, the new message clears the register.

Note: While the switch is in the **HOLD** position, succeeding messages are not displayed. However, any message with an error advances the error counter.

Operation of Procedure

Overview

PROC 623 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from an ANI trunk circuit failure.

To call in PROC 623, perform the following:

- 1. Depress PROC NO; 623; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, and all other fields are dashed.

3. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

PROC 623 Test 1

Four tests are available:

- 1. Test 1 Displays failure history.
- 2. Test 2 Sends four messages to test each ANI trunk circuit.
- 3. Test 3 Sends a single message to test the ANI trunk circuit.
- 4. Test 4 Continuously sends each of four messages alternately to each circuit of a selected ANI trunk circuit pack.

Test 1

Test 1 provides a failure history of ANI trunk circuit failures.

Test 1 can also be used to manually turn off the OTHER FAILS fault indicator.

1. Test 1 is the default test when entering PROC 623, or is selected by using NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

2. To start Test 1, depress EXECUTE.

- 3. A summary of the failure history is displayed.
- 4. If one or more failures occurred, the following summary is displayed:

Field 1 - 1.

Field 9 - Failures per hour.

Field 10 - ANI attempts (number of ANI calls).

Field 11 - Load errors.

Field 12 - Time out errors (maximum wait interval exceeded).

Field 13 - Transmission errors.

Field 14 - Queue overflow errors.

- 5. Depressing **NEXT CIRCUIT** displays the first failing ANI equipment location in Fields 3 through 7, and updates Field 9 (failures per hour).
- 6. After the first failing circuit is displayed, depressing **NEXT CIRCUIT** repeatedly displays the failures per hour (Field 9) associated with the ANI trunk circuit failure displayed in Fields 3 through 7.
- 7. After all failures are displayed, depressing NEXT CIRCUIT dashes all fields except Field 1.

Depressing **NEXT CIRCUIT** again causes Test 1 to be displayed from the beginning, starting with the summary.

8. To manually turn off the **OTHER FAILS** fault indicator, assuming no other sources are affecting the **OTHER FAILS** fault indicator after Test 1 is executed at least once, perform the following:

Depress CLEAR DATA; EXECUTE.

Note: ANI alarmed entries in PMIDS are marked as resolved.

Test 2

Test 2 automatically sends four test messages to the ANI trunk circuit displayed in Fields 3 through 7.

Test 2 requires the use of the ANI test set to avoid sending test messages to the central office.

1. Test 2 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

- 2. Depress **NEXT CIRCUIT** until the equipment location of the ANI circuit to be tested is displayed in Fields 3 through 7.
- 3. At the cross-connect field, disconnect the tip (T) and ring (R) leads of the ANI trunk circuit displayed in Fields 3 through 7.
- 4. Connect the ANI test cable to the SN244 associated with the equipment location displayed in Fields 3 through 6.
- 5. At the test cable, set the **CHANNEL** switch to the setting which corresponds to the circuit number displayed in Field 7.

Circuit 0 displayed on the MAAP - Set CHANNEL switch to 9.

Circuit 1 displayed on the MAAP - Set CHANNEL switch to 8.

6. To start Test 2, depress EXECUTE.

The WAIT indicator turns on and Field 8 is dashed.

7. After the **WAIT** indicator turns off, the results of the test are displayed in Field 8 (failure code).

If a 0 is displayed in Field 8, Test 2 passed.

8. When a failure is detected, a failure code is displayed in Field 8.

Depressing NEXT UNIT repeatedly displays additional failure codes associated with the failed circuit.

- 9. STOP can be used to halt the test any time the WAIT indicator is turned on.
- 10. All ANI trunk circuits must be tested and pass Test 2 in order to resolve the ANI cause of the **OTHER FAILS** fault indicator.
- 11. **NEXT CIRCUIT** is used to select the next ANI trunk circuit to be tested.

Requirement: The T and R leads from the previously tested circuit should be reconnected at the cross-connect field prior to performing Steps 2 through 10 to test the next ANI trunk circuit.

12. The **OTHER FAILS** fault indicator is automatically turned off when the ANI alarm cause, and all other alarm sources affecting the **OTHER FAILS** fault indicator are cleared.

Note: ANI alarmed entries in PMIDS are marked as resolved.

Test 3

Test 3 sends a selected single test message to the ANI trunk circuit displayed in Fields 3 through 7.

Test 3 requires the use of the ANI test set to avoid sending test messages to the central office.

1. Test 3 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 3; ENTER.

- 2. Depress **NEXT CIRCUIT** until the equipment location of the ANI circuit to be tested is displayed in Fields 3 through 7.
- 3. Depress **NEXT DATA** to select a test data message to be sent.
- 4. At the cross-connect field, disconnect the T and R leads of the ANI trunk circuit displayed in Fields 3 through 7.
- 5. Connect the ANI test cable to the SN244 associated with the equipment location displayed in Fields 3 through 6.
- 6. At the test cable, set the **CHANNEL** switch to the setting which corresponds to the circuit number displayed in Field 7.

Circuit 0 displayed on the MAAP - Set CHANNEL switch to 9.

Circuit 1 displayed on the MAAP - Set CHANNEL switch to 8.

7. To start Test 3, depress EXECUTE.

The WAIT indicator turns on and Field 8 is dashed.

8. At the conclusion of Test 3, the **WAIT** indicator turns off, and the results of the test are displayed in Field 8 (failure code).

If a 0 is displayed in Field 8, Test 3 passed.

9. If a failure is detected, the following is displayed:

Field 1 - 3.

Field 2 - Data message being sent.

Fields 3 through 7 - Equipment location of ANI trunk circuit.

Field 8 - Failure code associated with failed ANI trunk circuit.

- 10. Depressing **NEXT UNIT** repeatedly displays additional failure codes associated with the displayed equipment location and the test data message sent.
- 11. STOP can be used to halt the test any time the WAIT indicator is turned on.
- 12. **NEXT DATA** advances the test data message index in Field 2, and another test pattern can be sent by depressing **EXECUTE**.
- 13. NEXT CIRCUIT is used to select the next ANI trunk circuit to be tested.

Requirement: The T and R leads from the previously tested circuit should be reconnected at the cross-connect field prior to performing Steps 2 through 12 to test the next ANI trunk circuit.

14. When Test 3 passes, Test 2 must be repeated for all ANI trunk circuits in order to resolve the ANI cause of the **OTHER FAILS** fault indicator.

Test 4

Test 4 sends four messages, first to one circuit on the displayed SN244 circuit pack equipment location, then to the other circuit on the circuit pack.

Test 4 is used to continuously test the ANI trunk circuits suspected of having intermittent failures or to trace wiring problems.

Test 4 requires the use of the ANI test set to avoid sending test messages to the central office.

1. Test 4 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 4; ENTER.

- 2. Depress **NEXT CIRCUIT** until the equipment location of the SN244 circuit pack to be tested is displayed in Fields 3 through 6.
- 3. At the cross-connect field, disconnect the T and R leads of the ANI trunk circuits associated with the SN244 circuit pack displayed in Fields 2 through 6.
- 4. Connect the ANI test cable to the SN244 associated with the equipment location displayed in Fields 3 through 6.
- 5. At the test cable, set the **CHANNEL** switch to the setting which corresponds to the circuit number displayed in Field 7.

Circuit 0 displayed on the MAAP - Set CHANNEL switch to 9.

Circuit 1 displayed on the MAAP - Set CHANNEL switch to 8.

- 6. To start Test 4, depress EXECUTE.
- 7. The test runs continuously until a failure is detected or **STOP** is depressed.

Note: The testing interval for the ANI trunk circuits is determined by maintenance personnel performing the test, and is ended by depressing **STOP**. This allows maintenance personnel to trace wiring problems associated with the SN244 circuit pack.

If a 0 is displayed in Field 8, Test 4 passed.

8. If a failure is detected, the following is displayed:

Field 1 - 4.

Fields 3 through 7 - Equipment location of ANI trunk circuit.

Field 8 - Failure code associated with ANI trunk circuit.

Field 10 - ANI attempts (number of ANI calls attempted).

- 9. Depressing **NEXT UNIT** repeatedly displays additional failure codes associated with the displayed equipment location.
- 10. STOP can be used to halt the test.
- 11. NEXT CIRCUIT is used to select the next ANI trunk circuit pack (SN244) to be tested.

Requirement: The T and R leads from the previously tested circuits should be reconnected at the cross-connect field prior to performing Steps 2 through 10 to test the next ANI trunk circuit pack (SN244).

12. When Test 4 passes, Test 2 must be repeated for all ANI trunk circuits in order to resolve the ANI cause of the **OTHER FAILS** fault indicator.

PROC 623

Repair Guide

When an ANI trunk circuit failure is indicated, **PROC 623** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted, perform the following steps in the order listed to isolate and repair the faulty unit.

- 1. Execute Test 1 and record the failure history.
- 2. Step to Test 2.
- 3. Select the ANI trunk circuit to be tested by using NEXT CIRCUIT.
- 4. At the cross-connect field disconnect the T and R leads of the ANI trunk circuit selected in Step 3.
- 5. Connect the ANI test set to the trunk circuit pack (SN244) containing the trunk circuit selected for testing.
- 6. At the test cable, set the **CHANNEL** switch to the setting which corresponds to the circuit number displayed in Field 7.

Circuit 0 displayed on the MAAP - Set CHANNEL switch to 9.

Circuit 1 displayed on the MAAP - Set CHANNEL switch to 8.

7. Execute Test 2 and record the results.

Note: Test 3 may be used as an aid which enables maintenance personnel to send the same message to the same circuit each time **EXECUTE** is depressed, or the test data message pattern can be changed by use of **NEXT DATA**.

8. When failures are recorded, replace SN244.

Repeat Test 2.

9. When Test 2 is repeated after a circuit pack has been removed and a new (or same) circuit pack inserted, the test may fail because the circuit pack is not initialized properly.

Note: Repeat Test 2 before assuming the corrective action taken has not fixed the problem.

10. If Test 2 fails again, check the failure code displayed in Field 8.

If failure code 1 is displayed, test TN401 (module control channel) using **PROC 620** Test 3, Unit type 6.

If any other failure code is displayed, check the wiring associated with SN244.

- 11. If the test initially passes, or passes after corrective action is performed, connect the T and R leads disconnected in Step 4, and repeat Steps 3 through 9 for all ANI trunk circuits.
- 12. When intermittent ANI circuit failures or wiring problems are suspected, use Test 4 to continuously test suspect circuits.
- 13. After all failures are corrected, repeat Test 2 for all ANI trunk circuits in order to resolve the ANI cause of the **OTHER FAILS** fault indicator.

PROC 624 - CONTACT INTERFACE TEST

FL1 ISS	PCHART UE 1		-	+			+		C	CONT	ACT	INTE	RFAC	E TE	ST		+	+			+			
TEST ALL CLOS RATE	1: AUTOMA Contacts o Ing Each e For 5 Sec	TICAL IN A I XCLUS	LY SE BOARD BIVELY	QUENCE T OPENING AT A 60	HRU AND IPM	TEST 2 EACH 0 For Ei	2: SAM CONTAC NTIRE	ME AS CT REA 5 SEC	TEST MAINS COND	1 EX CLOSI INTER	CEPT ED VAL .	TEST Open: For	3: MA ING AN ANY DE	NUAL D CLI SIRE	SELE DSING D TES	CTION AT A TING	OF CO 60 IP INTERV	NTACT M RAT AL	Ē	TES CON DUR	T 4: TACT ATION	SAME REMAI OF T	AS T NS C ESTI	EST 3 EXCEPT LOSED FOR NG INTERVAL.
USE TEST	STOP' THE	N 'N	EXT D/	ATA' TO A	DVANCI	E TO T	he ne:	XT CO	NTACT	-		NOTE: STATE O=OPE	FIELO OF CO N, 1=0	DS (7 DNTAC CLOSE	–14) :TWHE D	INDIC N TES	ATE CU STING 1	IRRENT IS ACT	IVE;	FAI 9-M P	LURE ESSAG ROCES	CODE: E TRA SOR F	NSMI	SSION TO MODULE D.
	CON' BOARD E	TACT	INTER IENT (FACE OCATION	Т 36-	4			CON BO/	ITACT Ard ui	STATE	S OF TEST				ая Ш								NETLIODY
ND	MODULE	CAB	CARR	SLOT	CURRENT	CUNIACI	CONTACT	CONTACT	CONTACT	CONTACT 3	CONTACT 4	CONTACT 5	CONTACT	CONTACT		FAIL								624

Purpose

PROC 624 is used when a contact interface circuit pack (SN241) is malfunctioning or suspected of being defective.

PROC 624 must be performed by maintenance personnel on the customer's premises as verification of relay operation is performed by monitoring the associated lamp(s).

Any or all relay contacts on a selected contact interface circuit pack can be tested.

After using **PROC 624**, all lamps on the System Status Indicators (SSI) are cleared from any previous state and are not reinitialized until further use.

Field Definitions and Codes

Each field of **PROC 624** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AF, PROC 624 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Fields 2 through 5 Select contact interface circuit pack for testing.
- 3. Field 6 Select contact on circuit pack to be tested (Tests 3 and 4 only).

TABLE AF.

PROC 624 FIELD DEFINITIONS AND CODES											
FIELD	CODE	DEFINITION									
1	1-4	Test number.									
2	0-30	Module number.									
3	0-7	Cabinet number.									
4	0-3	Carrier number.									
5	0-21	SN241 slot number.									
6	0-7	Contact currently selected for test.									
7-14		State of each contact:									
	0 1	Open. Closed.									
15		Failure code:									
	9	Message transmission to module processor failed.									

Operation of Procedure

Overview

PROC 624 is used to test a contact interface circuit pack.

To call in PROC 624, perform the following:

- 1. Depress PROC NO; 624; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1 and a default contact interface circuit pack is displayed in Fields 2 through 5.

Field 6 (current contact) displays a 0 and all other fields are dashed.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Four tests are available:

- 1. Test 1 Automatically sequences through all contacts on a contact interface circuit pack, opening and closing each contact exclusively at a 60 Interruptions Per Minute (IPM) rate for 5 seconds.
- 2. Test 2 Automatically sequences through all contacts on a contact interface circuit pack.

Each contact remains closed for the entire 5-second interval of the contact's test.

3. Test 3 - Manual selection of a contact to be tested.

Each contact selected for testing is tested for any desired interval. The contact opens and closes at a 60 IPM rate.

4. Test 4 - Manual selection of a contact to be tested.

Each contact selected for testing is tested for any desired interval. The contact remains closed for the duration of the testing interval.

Test 1

Test 1 automatically sequences through all contacts on a contact interface circuit pack, opening and closing each contact on the circuit pack at a 60 IPM rate for 5 seconds.

1. Test 1 is the default test when entering **PROC 624**, or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

2. When Test 1 is called in, a default contact interface circuit pack is displayed in Fields 2 through 5.

The default contact interface circuit pack can be tested or another contact interface circuit pack can be selected for testing.

- 3. A contact interface circuit pack can be selected for testing in three ways. Refer to Steps 4 through 6.
- 4. Upon entry to Test 1, Field 2 (module) is flashed, indicating it is an optional entry field. To select another contact interface circuit pack, enter its equipment location in Fields 2 through 5:

(Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER.

- 5. By depressing **NEXT CIRCUIT** until the contact interface circuit pack to be tested is displayed in Fields 2 through 5.
- 6. By using the CHANGE FIELD sequence:

CHANGE FIELD; 2; ENTER; (Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER.

- 7. To start Test 1, depress EXECUTE.
- 8. A 5-second test is run on each contact (0 through 7) at a 60 IPM rate.

This is evident by the alternating 0s and 1s in Fields 7 through 14.

Field 6 displays the current contact on the contact interface circuit pack being tested.

9. Test 1 runs continuously until STOP is depressed or until a new test is called in.

This allows maintenance personnel time to observe the status of the associated lamps.

PROC 624 Test 2 and Test 3

Test 2

Test 2 automatically sequences through all contacts on a contact interface circuit pack. The contacts remain closed during the testing interval.

1. Test 2 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

- 2. A contact interface circuit pack can be selected for testing in two ways. Refer to Steps 3 and 4.
- 3. By depressing **NEXT CIRCUIT** until the contact interface circuit pack to be tested is displayed in Fields 2 through 5.
- 4. By using the CHANGE FIELD sequence:

CHANGE FIELD; 2; ENTER; (Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER.

- 5. To start Test 2, depress **EXECUTE**.
- 6. A 5-second test is run on each contact (0 through 7) at a 60 IPM rate.

The closure of each contact is indicated by 1s in Fields 7 through 14.

Field 6 displays the current contact on the contact interface circuit pack being tested.

7. Test 2 runs continuously until STOP is depressed or until a new test is called in.

This allows maintenance personnel time to observe the status of the associated lamps.

Test 3

Test 3 individually tests a specific contact on a contact interface circuit pack. The contact opens and closes at a 60 IPM rate for the duration of the testing interval.

1. Test 3 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 3; ENTER.

- 2. A contact interface circuit pack can be selected for testing in two ways. Refer to Steps 3 and 4.
- 3. By depressing **NEXT CIRCUIT** until the contact interface circuit pack to be tested is displayed in Fields 2 through 5.
- 4. By using the CHANGE FIELD sequence:

CHANGE FIELD; 2; ENTER; (Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER.

- 5. When Test 3 is called in and a contact interface circuit pack is selected for testing, a default contact (0) is displayed in Field 6. The default contact can be tested or another contact can be selected for testing.
- 6. To select another contact for testing, perform the following:

CHANGE FIELD; 6; ENTER; (Contact number to be tested); ENTER.

- 7. To start Test 3, depress EXECUTE.
- 8. During the testing interval, alternating 0s and 1s are displayed in the field of the contact selected for testing.

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9. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.

This allows maintenance personnel time to observe the status of the associated lamp and to verify existence of intermittent failures.

10. After the first contact is tested, and **STOP** is depressed, **NEXT DATA** can be used to select another contact on the same contact interface circuit pack for testing:

NEXT DATA (depressed until desired contact is displayed); EXECUTE.

11. At this time, the displayed contact selected for testing is tested until **STOP** is depressed or until a new test is called in.

Test 4

Test 4 tests a specific contact on a contact interface circuit pack. The contact selected for testing remains closed for the duration of the testing interval.

1. Test 4 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 4; ENTER.

- 2. A contact interface circuit pack can be selected for testing in two ways. Refer to Steps 3 and 4.
- 3. By depressing **NEXT CIRCUIT** until the contact interface circuit pack to be tested is displayed in Fields 2 through 5.
- 4. By using the CHANGE FIELD sequence:

CHANGE FIELD; 2; ENTER; (Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER.

- 5. When Test 4 is called in and a contact interface circuit pack is selected for testing, a default contact (0) is displayed in Field 6. The default contact can be tested or another contact can be selected for testing.
- 6. To select another contact for testing, perform the following:

CHANGE FIELD; 6; ENTER; (Contact number to be tested); ENTER.

- 7. To start Test 4, depress EXECUTE.
- 8. During the testing interval, contact closure is indicated by a 1 in the contact field selected for testing.
- 9. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.

This allows maintenance personnel time to observe the status of the associated lamp and to verify existence of intermittent failures.

10. After the first contact is tested, and **STOP** is depressed, **NEXT DATA** can be used to select another contact on the same contact interface circuit pack for testing:

NEXT DATA (depressed until desired contact is displayed); EXECUTE.

11. At this time, the displayed contact selected for testing is tested until **STOP** is depressed or until a new test is called in.

22

PROC 624

Repair Guide

When faulty operation of a contact interface circuit pack is indicated, perform the following steps in the order listed.

- 1. Replace SN241.
- 2. Rerun Tests 1 and 2.
- 3. If a failure is still indicated, check the operation of the associated remote equipment.

Example: SSI.

- 4. If the associated remote equipment is not in working order, refer the problem to the proper personnel.
- 5. If the associated remote equipment is in working order, check the wiring between SN241 and the remote equipment.

PROC 625 (R2V1 Only) - SYNCHRONIZATION REFERENCE MONITOR

FL	IPCHAR SUE 2	IT.		+ + SYNCHRONIZATIO	N REFE	RENCE	MONI	LTOR +	+		
	FIELD	CODE	TESTS	DEFINITION	FIELD	CODE	TESTS	DEFINITION			
	9	0-2	2	AUTOMATIC SWITCH ENABLE/DISABLE FIELD D=ENABLE AUTOMATIC SWITCH OF REFERENCE	10 CONTD	0~9	1	8=MAJOR ERROR RAT 9=MINOR ERROR RAT	E ALARM E ALARM		
				1≖DISABLE SOFTWARE SWITCH 2≖DISABLE SOFTWARE AND HARDWARE SWITCH	17	0-9	1	SWITCH CAUSE FIELD D=CRAFT REQUEST			
		CAU.	TION:	ENCODES 1 AND 2 IMPAIR THE Recovery Mechanism of The Switch.				1=BOARD PROCESSOR 2=UNUSABLE REFERE 3=LOSS OF SIGNAL 4=FXCESSIVE SLIPS	SANITY NCE REPORTED E RÉPORTED BY DS	BY SCS S-1	
	10 1	0-9	1	HEALTH CODE FIELD DASH=BOARD HEALTHY				5=EXCESSIVE MISFR 6=NETWORK ALARM	AMES	·	
NORD D				O-MAINTENANCE BUSY 1=BOARO PROCESSOR SANITY 2=UNUSABLE REFERENCE REPORTED BY SCS (REF. 3=LOSS OF SIGMAL REPORTED BY DS-1 4=EXCESSIVE SLIPS 5=EXCESSIVE MISFRAMES	ONLY)			7=BOARD HEALTH 8=THE HIGH ACCURA PUT ON LINÉ 9=THE CAUSE OF TH HAS CLEARED	ICY CLOCK WAS He last switch		NETWORK FACILITY MONITOR
	.	1		6=CARRIER GROUP ALARM (LOSS OF FRAME) 7=BOARD HEALTH			. 1				625

FL	IPC SUE	HART 2		+		-	ł	SYN	CHRO	NIZATION	RE	FERENCE	MON	ITOR	+	+			
TES	129	DISPLAY STATUS SWITCH REFEREN TOGGLE	FACILITY SYNC CES AND/OR AUTO-SWITCH	FIELD 1 2 7	CODE 1-2 1-7 0-2	TES 1-2 1-2	TS 1 2 F 2 F 2 F	DEFINI TEST N ACILI 1=DS-1 2-7 RE REFERE 0=HI 1=PR 2=SE (DA	TION UMBER TY TY SERVE NCE I GH AC IMARY CONDA SH=NO	FIELD PE FIELD D FOR FUTURI NDICATION F: CURANCY CLO REFERENCE RY REFERENCE NN-REFERENCE	E US IELD CK E D)	FIELD 8	CODE 0-5	TESTS 2 VALU SWIT	DEFINITION SWITCH ENAB O-DISABLE REFEREN 1=ENABLE REFEREN 2=I/O FAI 3-UNUSABL 4=NOT ADM 5-MAINTEN IES 2-5 INDIC CH AITEMPT F/ NS CONT	LE & STATUS SWITCH OF CE SWITCH OF CE LURE E REFERENCE INISTERED ANCE BUSIED ANCE BUSIED ATES WHY A ATLED	FLD	SPECIAL 80-1/0 81-NOT DS-1 82-NOT DS-1	ERROR CODES: ERROR FAILURE A TRANSLATEO BOARD A PHYSICAL BOARD
									-			ON W	ORD 0)					
			ŤEST	1			12	T2				TES	Т 1						NETWORK
MBER	Σ		EQUIPMENT L	OCATION		병명								SW	ITCH TIME & C	AUSE			FACILITY
TEST NU	FACILI		CABINET	LAKHTEK	0T 6	REFEREN	SWITCH STATUS	AUTO 40 SWITCH	HEALTH	SLIPS	11	MISFRAMES	1 INDEX	DAY	HOUR	MINUTE	CAUSE		MONITOR

Purpose

PROC 625 is used to determine the current state of health of synchronization references and all DS-1 circuit packs.

PROC 625 provides the capability to switch between the synchronization reference sources to support maintenance of the digital network.

PROC 625 also provides the capability to disable or re-enable the automatic reference switching performed by the synchronization periodic software and by associated hardware.

PROC 625 (R2V1 Only)

PROC 625 is used to:

- 1. Display the current state of health and status information for each synchronization reference and DS-1 circuit pack.
- 2. Display the times and causes of the last eight (maximum) switches that occurred in any synchronization reference.
- 3. Perform a switch between synchronization references.
- 4. Prevent automatic reference switching by the synchronization periodic software and associated hardware.

Caution: Disabling of the automatic reference switching feature for a prolonged period of time could become service affecting by impairing the recovery mechanism of the switch.

Field Definitions and Codes

Each field of **PROC 625** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AG, PROC 625 - Field Definitions and Codes.

Optional input fields are:

- 1. Fields 3 through 6 Select a specific equipment location to be tested or displayed (Test 1 only).
- 2. Field 8 Enable a switch of synchronization references (Test 2 only).
- 3. Field 9 Enable or disable automatic reference switching of synchronization references (Test 2 only).

Operation of Procedure

Overview

PROC 625 is used to determine the number and cause of switches (determined by the state of health); the current state of health for synchronization references and DS-1 circuit packs; to perform a switch of synchronization references; and to disable or re-enable automatic reference switching of synchronization references.

To call in **PROC 625** perform the following:

- 1. Depress PROC NO; 625; ENTER.
- 2. Test 1 is automatically selected.

Fields 1 and 2 display a 1, Fields 3 trough 6 display the primary reference or the first DS-1 circuit pack in the switch.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

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TABLE AG.

		PROC FIELD DEFINITIO	CODES		
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION
1	1,2	Test number	9	0-2	Automatic switch enable or di- sable
2	1-7	Facility type			
	1	DS-1 trunk interface		0	Enable automatic switch of ref- erence
	2-7	Reserved for future use		1	Disable software switch of ref-
3-6		Equipment location of displayed		r	
		face		2	Disable software and hardware switch of reference
3	0-30	Module number	10	Dash,	Health code of displayed circuit
4	0-7	Cabinet number		0-9	
5	0-3	Carrier number		Dash	Board is healthy
6	0-21	Slot number		0	Maintenance busied
7	Dash	Reference indication		1	Board processor sanity
	0-2			2	Unusable reference reported by
	Dash	Nonreference DS-1			System Clock Synchronizer (SCS) — reference only
	0	High accuracy clock		3	Loss of signal reported by DS-1
	1 .	Primary reference		-	trunk interface
	2	Secondary reference		4	Excessive slips
8	0-5	Switch enable and status		5	Excessive misframes
	0	Disable switch of reference		6	Carrier group alarm (loss of frame)
	1	Enable switch of reference			Previl harlith
	Encod	es 2 through 5 indicate why a		7	Board health
	switch	attempt failed		8	Major error rate alarm
	2	I/O failure Unusable reference		9	Minor error rate alarm
	3			0-999	Number of slips
	4	Not administered			
	5	Maintenance busied			

PROC 625 (R2V1 Only) Test 1

	PROC 625 FIELD DEFINITIONS AND CODES (Contd)												
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION								
12	0-99	Number of misframes	17 (Contd)	2	Unusable reference reported by SCS – reference only								
13	0-8	Index: Index into the switch time and cause table		3	Loss of signal reported by DS-1 trunk interface								
14-16		Switch time:]	4	Excessive slips								
14	1-31	Day of month		5	Excessive misframes								
15	0-23	Hour of day		6	Network alarm								
16	0-59	Minute of hour		7	Board health								
17	0-9	Switch cause:		8	High accuracy clock was placed								
	0	Craft request			Course of the last switch has								
	1	Board processor sanity		9	been cleared								

TABLE AG. (Contd)

Two tests are available:

- 1. Test 1 Displays time and cause of the last eight switches and clears the switch history.
- 2. Test 2 Allows a switch of the synchronization references.

Test 2 is also used to prevent an automatic switch of references from taking place by disabling the periodic software and/or hardware switch.

Test 1

Test 1 is used to determine the health and status of the equipment location displayed in Fields 3 through 6.

Test 1 is also used to determine the time and cause when the last eight switches occurred for the synchronization reference(s).

Test 1 can also be used to clear the table of last eight switches (maximum) for the synchronization reference(s).

1. Test 1 is the default test when entering PROC 625, or is selected by use of NEXT TEST.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 1.

- 2. When Test 1 is initially called in, the primary reference (if translated) is displayed in Fields 3 through 6. If a primary reference is not translated, Fields 3 through 6 display the first DS-1 circuit pack in the switch (in lowest equipment number order).
- 3. A specific reference or DS-1 circuit pack or the default equipment location can be tested.

To test the default equipment location displayed in Fields 3 through 5, proceed to Step 5.

4. A specific reference or DS-1 circuit pack can be selected for testing by depressing NEXT CIRCUIT to step through the DS-1 circuit packs until the DS-1 circuit pack to be tested is displayed in Fields 3 through 6.

Note: If a secondary reference is translated, it always follows the primary reference when **NEXT CIRCUIT** is used to step through the circuit packs in the switch.

Proceed to Step 5.

- 5. To start Test 1, depress EXECUTE.
- 6. If the translation records indicate the equipment location entered is not a translated DS-1 circuit pack, special error code 81 (not a translated a DS-1 board) is displayed in the **MAAP** error code field when **EXECUTE** is depressed.
- 7. If the equipment location entered is not a physical DS-1 circuit pack, special error code 82 (not a physical DS-1 board) is displayed in the **MAAP** error code field when **EXECUTE** is depressed.
- 8. Special error code 80 (I/O failure) may be displayed in the **MAAP** error code field when **EXECUTE** is depressed indicating that Test 1 cannot be performed.

If special error code 80 is not displayed, proceed to Step 10.

9. When special error code 80 is displayed, repeat Test 1.

If special error code 80 is not displayed again, proceed to Step 10.

If special error code 80 is displayed again, perform **PROC 611** to test the common control I/O channels and/or **PROC 620** to test TN380 (module processor) or TN381 (TMS processor).

10. The health and status of the equipment location selected for testing is displayed as follows:

Field 1 - 1.

Field 2 - Facility type (1 = DS-1 circuit pack).

Fields 3 through 6 - Equipment location of synchronization reference or DS-1 circuit pack tested.

Field 7 - Reference indication (Dash = non-reference, 1 = primary reference, 2 = secondary reference).

Fields 8 and 9 - Dashed.

Field 10 - Health code of displayed circuit pack.

Note: A dash displayed in Field 10 indicates the circuit pack displayed in Fields 3 through 6 is healthy.

PROC 625 (R2V1 Only) Test 1

Field 11 - 0 or number of slips.

Field 12 - 0 or number of misframes.

Field 13 - Dash, 0, or number of switches that occurred (maximum of 8) for the reference displayed in Fields 3 through 6.

Note: If Field 7 displays a 1 or 2 indicating a primary or secondary reference, Fields 13 through 17 indicate the number of switches and the time and cause of the latest switch. If Field 7 displays a dash (indicating a non-reference), Fields 13 through 17 are dashed.

Field 14 - Dash or day of month the switch occurred.

Field 15 - Dash or hour of day the switch occurred.

Field 16 - Dash or minute of day the switch occurred.

Field 17 - Dash or switch cause (0 through 9).

Note: Fields 14 through 16 displays the time the latest switch occurred. Field 17 indicates the health of the reference just before it was switched off-line or the software/craft request.

- 11. When Field 13 is greater than 1, depressing **NEXT DATA** decrements Field 13 and displays (in Fields 14 through 17) when the next to last switch occurred and the cause of the switch.
- 12. Depressing **NEXT DATA** repeatedly displays the remaining switches that occurred.

When the last switch is displayed, depressing **NEXT DATA** again dashes Fields 13 through 17.

Depressing **NEXT DATA** once more begins the sequence over starting with the latest switch that occurred.

- 13. The **CLEAR DATA**; **EXECUTE** sequence can be used to clear the table of last 8 switches after **EXECUTE** is used to initiate Test 1.
- 14. To clear the table of last 8 switches for the reference(s) indicated by a 1 or 2 displayed in Field 7, after **EXECUTE** is used to initiate Test 1, perform the following:

Note: Fields 13 through 17 must not be dashed. Error code 00 (wrong key) is displayed in the **MAAP** error code field when **CLEAR DATA**; **EXECUTE** is depressed if Fields 13 through 17 are dashed.

Depress CLEAR DATA; EXECUTE.

Fields 13 through 17 display dashes indicating the table of last 8 switches for the reference(s) is cleared.

- 15. When another reference or DS-1 circuit pack is to be tested, the CHANGE FIELD sequence or NEXT CIRCUIT can be used to select the specific reference or DS-1 pack to be tested.
- 16. CHANGE FIELD; 3; ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER.
- 17. Depress **NEXT CIRCUIT** to step through the DS-1 circuit packs until the DS-1 circuit pack to be tested is displayed in Fields 3 through 6.

Note: If a secondary reference is translated, it always follows the primary reference when **NEXT CIRCUIT** is used to step through the circuit packs in the switch.

18. **EXECUTE** must be depressed to test the specific reference or DS-1 circuit pack selected for testing.

Test 2

Test 2 is used to switch synchronization references when more than one reference is translated.

The System Clock Synchronizer (SCS) circuit pack (TN463) has six yellow LEDs.

- 1. LED positions one and two are dedicated to the primary and secondary synchronization reference sources respectively. If either of these LEDs are lighted, it indicates the associated reference is unusable.
- 2. When lighted, LED positions 14, 15, and 16 indicate which reference is on-line.
- 3. LED position 14 is for the High Accuracy Clock (HAC), position 15 is for the primary reference, and position 16 is for the secondary reference.
- 4. LED position 17 is used for duplicated TMS carriers. When lighted, it indicates that the synchronization reference in this TMS carrier is being driven by the on-line reference in the on-line TMS carrier.

To assist in troubleshooting network problems, Test 2 can be used to prevent an automatic reference switch by periodic software and/or hardware from taking place by disabling the automatic reference switch.

1. Test 2 is selected by use of NEXT TEST.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 2.

2. When Test 2 is initially called in, Field 1 displays a 2; Field 2 displays a 1; the equipment location of the on-line reference is displayed in Fields 3 through 6; 0, 1, or 2 (high accuracy clock, primary reference, or secondary reference) is displayed in Field 7 (yellow LED lighted in position 14, 15, or 16 of TN463); and Fields 8 and 9 display 0's.

Note: Fields 3 through 7 are updated with a new on-line equipment location and on-line reference should an automatic reference switch occur as a result of the automatic recovery mechanism.

3. Field 8 is blinking, indicating an optional entry field.

To switch the on-line reference displayed in Fields 3 through 6, proceed to Step 4.

4. To enable the switch of references, Field 8 must be changed to a 1. Either ENTER or the CHANGE FIELD sequence can be used:

1, ENTER.

CHANGE FIELD; 8; ENTER; 1; ENTER.

- 5. Depress **EXECUTE**.
- 6. Special error code 80 (I/O failure) may be displayed in the **MAAP** error code field when **EXECUTE** is depressed indicating that Test 2 cannot be performed.

If special error code 80 is not displayed, proceed to Step 8.

7. When special error code 80 is displayed, repeat Test 2.

If special error code 80 is not displayed again, proceed to Step 8.

If special error code 80 is displayed again, perform **PROC 611** to test the common control I/O channels and/or **PROC 620** to test TN380 (module processor) or TN381 (TMS processor).

8. When the switch is successful, the following is displayed:

Field 1 - 2.

Field 2 - Facility type (1 = DS-1 circuit pack).

Fields 3 through 6 - Equipment location of the new on-line reference.

Field 7 - Reference indication (l = primary reference, 2 - secondary reference).

Field 8 - Switch status (0 = disable switch of reference).

Field 9 - 0 (if automatic switch of references is allowed).

Fields 10 through 17 - Dashed.

Note: The cause and time of the switch is updated in status memory and the yellow LED in position 15 or 16 of TN463 changes.

9. If the switch failed, Fields 3 through 6 display the original on-line reference, and Field 8 displays an encode indicating the reason the switch failed (2 = I/O failure, 3 = unusable reference, 4 = not administered, and 5 = maintenance busied).

Automatic reference switching can be disabled while maintenance personnel are working on the digital network and re-enabled when the tasks are completed.

When disabled, automatic reference switching by software periodics and the hardware SCS circuit pack (TN463) cannot be performed.

Caution: Disabling of the automatic reference switching feature for a prolonged period of time could become service affecting by impairing the recovery mechanism of the switch.

Disabling of the automatic reference switching is performed as follows:

- 1. Enter Test 2 of PROC 625.
- 2. Determine the type of automatic reference switching to be disabled; i.e., 1 = disable software switch, 2 = disable software and hardware switch.

Note: If Test 2 of **PROC 625** is exited with a 2 (software and hardware switch disabled) displayed in Field 9, the automatic switch disable is automatically changed to a 1 (software switch disabled). This allows the hardware to switch to the HAC if the reference is lost or unusable. The change from 2 to 1 is not visible to maintenance personnel.

3. To disable the automatic reference switching, Field 9 must be changed to a 1 (software) or 2 (software and hardware). The CHANGE FIELD sequence must be used to disable automatic reference switching:

CHANGE FIELD; 9; ENTER; (1 or 2); ENTER.

4. Depress **EXECUTE**.

Caution: If PROC 625 is exited with automatic reference switching disabled 1 (software switch disabled) or 2 (software and hardware switch disabled) displayed in Field 9, a soft switch of references cannot be performed.

Note: If Test 2 of **PROC 625** is exited with a 2 (software and hardware switch disabled) displayed in Field 9, the automatic switch disable is automatically changed to a 1 (software switch disabled). This allows the hardware to switch to the HAC if the reference is lost or unusable. The change from 2 to 1 is not visible to maintenance personnel.

5. Prior to exiting **PROC 625** re-enable the automatic reference switching feature by performing the **CHANGE FIELD** sequence and depressing **EXECUTE**:

CHANGE FIELD; 9; ENTER; 0; ENTER; EXECUTE.

FL	IPCHAF SUE 2	۲۲.		+ + SYNCHRONIZA	TION RE	FEREN	CE MI	ONITOR	+		Ή		
	FIELD	0-2	2 2	DEFINITION AUTOMATIC SWITCH ENABLE/DISABLE FIELD DEENABLE AUTOMATIC SWITCH OF REFERENC 1=DISABLE SOFTWARE SWITCH 2=DISABLE SOFTWARE AND HAROWARE SWITCI ENCODES 1 AND 2 IMPAIR THE RECOVERY MECHANISM OF THE SWITCH	FIE 1 COM 1	LD COU D 0-9 TD 7 0-9	1 <u>E TES</u> 9 1 9 2	STS DEFIN 9=M 2 SWITC 0=C 1=B 2=U 3=L	ITION IAJOR ERRO INOR ERRO INOR ERRO INOR ERRO INOR FROM INUSABLE F OSS OF SI	DR RATE DR RATE TELD JEST CESSOR REFEREN IGNAL R	ALARM ALARM SANITY CE REPOF EPORTED	RTED BY SA By DS-1	cs
NORD 0	10	0-9	1	HEALTH CODE FIELD DASH-BGARD HEALTHY O-MAINTENANCE BUSY 1=BOARD PROCESSOR SANITY 2=UNUSABLE REFERENCE REPORTED BY SCS 3=LOSS OF SIGNAL REPORTED BY DS-1 4=EXCESSIVE SLIPS 5=EXCESSIVE SLIPS 5=EXCESSIVE MISFRAMES 6=CARRIER GROUP ALARM (LOSS OF FRAME) 7=FOARD, HEALTH	REF. ONL	0		5=E G=N 7=B 8=T 9=T H	IXCESSIVE IETWORK AL IDARD HEAL HE HIGH A UT ON LIM HE CAUSE IAS CLEARE	MISFRA ARM- TH ACCURAC NE OF THE ED	MES Y CLOCK Last Si	WAS	NETWORK FACILITY MONITOR 625

PROC 625 (R2V2 Only) - SYNCHRONIZATION REFERENCE MONITOR



Purpose

PROC 625 is used to determine the current state of health of synchronization references and all DS-1 circuit packs.

PROC 625 provides the capability to switch between the synchronization reference sources to support maintenance of the digital network.

PROC 625 also provides the capability to disable or re-enable the automatic reference switching performed by the synchronization periodic software and by associated hardware.

PROC 625 is used to:

- 1. Display the current state of health and status information for each synchronization reference and DS-1 circuit pack.
- 2. Display the times and causes of the last eight (maximum) switches that occurred in any synchronization reference.
- 3. Clear the table of last 8 switches.
- 4. Clear the misframes count.
- 5. Perform a switch between synchronization references.
- 6. Prevent automatic reference switching by the synchronization periodic software and associated hardware.

Caution: Disabling of the automatic reference switching feature for a prolonged period of time could become service affecting by impairing the recovery mechanism of the switch.

Field Definitions and Codes

Each field of **PROC 625** flip chart and the possible displays for the fields during execution of the different tests are defined in Table AH, PROC 625 - Field Definitions and Codes.

Optional input fields are:

- 1. Fields 3 through 6 Select a specific equipment location to be tested or displayed (Test 1 only).
- 2. Field 8 Enable a switch of synchronization references (Test 2 only).
- 3. Field 9 Enable or disable automatic reference switching of synchronization references (Test 2 only).

Operation of Procedure

Overview

PROC 625 is used to determine the number and cause of switches (determined by the state of health); the current state of health for synchronization references and DS-1 circuit packs; to perform a switch of synchronization references; and to disable or re-enable automatic reference switching of synchronization references. In addition, misframe counts can be cleared for an individual facility.

To call in **PROC 625** perform the following:

- 1. Depress PROC NO; 625; ENTER.
- 2. Test 1 is automatically selected.

Fields 1 and 2 display a 1, Fields 3 trough 6 display the primary reference or the first DS-1 circuit pack in the switch.

3. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

TABLE AH.

PROC 625 FIELD DEFINITIONS AND CODES												
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION							
1	1,2	Test number	8	4	Not administered							
2	1-7	Facility type	Contd	5	Maintenance busied							
	1	DS-1 trunk interface	9	0-2	Automatic switch enable or di-							
	2	Local end of remoted pair			sable							
	3	Remote end of remoted pair		0	Enable automatic switch of ref- erence							
	4-9	Reserved for future use		1	Disable software switch of ref- erence							
3-6		Equipment location of displayed reference or DS-1		2	Disable software and hardware switch of reference							
3	0-30	Module number	10	Dash,	Health code of displayed circuit							
4	0-7	Cabinet number		0-9	· · · · · · · · · · · · · · · · · · ·							
5	0-3	Carrier number		Dash	Board is healthy							
6	0-21	Slot number		0	Maintenance busied							
7	Dash,	Reference indication		1	Board processor sanity							
	0-2			2	Unusable reference reported by							
	Dash	Nonreference DS-1			(SCS) — reference only							
	0	High accuracy clock		3	Loss of signal reported by DS-1							
	1	Primary reference		4	Excessive slips							
	2	Secondary reference		5	Excessive misframes							
8	0-5	Switch enable and status										
	0	Disable switch of reference		ю	frame)							
	1	Enable switch of reference		7	Board health							
	Encod switch	es 2 through 5 indicate why a attempt failed		8	Major error rate alarm							
	2	I/O failure		9	Minor error rate alarm							
	3	Unusable reference	11	0-999	Number of slips							

PROC 625 (R2V2 Only) Test 1

	PROC 625 FIELD DEFINITIONS AND CODES (Contd)													
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION									
12	0-99	Number of misframes	. 17 (Contd)	2	Unusable reference reported by SCS									
13	0-8	Index: Index into the switch time and cause table	(contra)	3	Loss of signal reported by DS-1									
14.10		Switch time		4	Excessive slips									
14-10		Switch time:		5	Excessive misframes									
14	1-31	Day of month		6	Network alarm									
15	0-23	Hour of day		7	Board health									
16	0-59	Minute of hour												
17	0-9	Switch cause:		8	on-line									
	0	Craft request		9	Cause of the last switch has									
	1	Board processor sanity			been createu									

TABLE AH. (Contd)

Two tests are available:

- 1. Test 1 Displays the health and status of all DS-1 circuit packs and clears the misframe count.
- 2. Test 2 Allows a switch of the synchronization references, displays the time and cause of the last eight switches, and clears the switch history.

Test 2 is also used to prevent an automatic switch of references from taking place by disabling the periodic software and/or hardware switch.

Test 1

Test 1 is used to determine the health and status of the equipment location displayed in Fields 3 through 6.

1. Test 1 is the default test when entering PROC 625, or is selected by use of NEXT TEST.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 1.

2. When Test 1 is initially called in, the primary reference (if translated) is displayed in Fields 3 through 6. If a primary reference is not translated, Fields 3 through 6 display the first DS-1 circuit pack in the switch (in lowest equipment number order).

PROC 625 (R2V2 Only) Test 1

3. A specific reference or DS-1 circuit pack or the default equipment location can be tested.

To test the default equipment location displayed in Fields 3 through 5, proceed to Step 5.

4. A specific reference or DS-1 circuit pack can be selected for testing by depressing **NEXT CIRCUIT** to step through the DS-1 circuit packs until the DS-1 circuit pack to be tested is displayed in Fields 3 through 6.

Note: If a secondary reference is translated, it always follows the primary reference when **NEXT CIRCUIT** is used to step through the circuit packs in the switch.

Proceed to Step 5.

- 5. To start Test 1, depress **EXECUTE**.
- 6. If the translation records indicate the equipment location entered is not a translated DS-1 circuit pack, special error code 81 (not a translated a DS-1 board) is displayed in the **MAAP** error code field when **EXECUTE** is depressed.
- 7. If the equipment location entered is not a physical DS-1 circuit pack, special error code 82 (not a physical DS-1 board) is displayed in the **MAAP** error code field when **EXECUTE** is depressed.
- 8. Special error code 80 (I/O failure) may be displayed in the **MAAP** error code field when **EXECUTE** is depressed indicating that Test 1 cannot be performed.

If special error code 80 is not displayed, proceed to Step 10.

9. When special error code 80 is displayed, repeat Test 1.

If special error code 80 is not displayed again, proceed to Step 10.

If special error code 80 is displayed again, perform **PROC 611** to test the common control I/O channels and/or **PROC 620** to test TN380 (module processor) or TN381 (TMS processor).

10. The health and status of the equipment location selected for testing is displayed as follows:

Field 1 - 1.

Field 2 - Facility type (1 = DS-1 circuit pack).

Fields 3 through 6 - Equipment location of synchronization reference or DS-1 circuit pack tested.

Field 7 - Reference indication (Dash = non-reference, 1 = primary reference, 2 = secondary reference).

Fields 8 and 9 - Dashed.

Field 10 - Health code of displayed circuit pack.

Note: A dash displayed in Field 10 indicates the circuit pack displayed in Fields 3 through 6 is healthy.

Field 11 - 0 or number of slips.

Field 12 - 0 or number of misframes.

Fields 13 through 17 - Dashed.

11. The **CLEAR DATA**; **EXECUTE** sequence can be used to clear the misframes displayed in Field 12, after **EXECUTE** is used to initiate Test 1.

- 12. To clear the misframes displayed in Field 12, depress CLEAR DATA; EXECUTE. Field 12 displays a 0 after EXECUTE is depressed.
- 13. When another reference or DS-1 circuit pack is to be tested, the **CHANGE FIELD** sequence or **NEXT CIRCUIT** can be used to select the specific reference or DS-1 pack to be tested.
- 14. CHANGE FIELD; 3; ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER.
- 15. Depress **NEXT CIRCUIT** to step through the DS-1 circuit packs until the DS-1 circuit pack to be tested is displayed in Fields 3 through 6.

Note: If a secondary reference is translated, it always follows the primary reference when **NEXT CIRCUIT** is used to step through the circuit packs in the switch.

16. **EXECUTE** must be depressed to test the specific reference or DS-1 circuit pack selected for testing.

Test 2

Test 2 is used to switch synchronization references when more than one reference is translated.

Test 2 is also used to determine the time and cause when the last eight switches occurred for the synchronization reference(s).

Test 2 can also be used to clear the table of last eight switches (maximum) for the synchronization reference(s).

The System Clock Synchronizer (SCS) circuit pack (TN463) has six yellow LEDs.

- 1. LED positions one and two are dedicated to the primary and secondary synchronization reference sources respectively. If either of these LEDs are lighted, it indicates the associated reference is unusable.
- 2. When lighted, LED positions 14, 15, and 16 indicate which reference is on-line.
- 3. LED position 14 is for the High Accuracy Clock (HAC), position 15 is for the primary reference, and position 16 is for the secondary reference.
- 4. LED position 17 is used for duplicated TMS carriers. When lighted, it indicates that the synchronization reference in this TMS carrier is being driven by the on-line reference in the on-line TMS carrier.

To assist in troubleshooting network problems, Test 2 can be used to prevent an automatic reference switch by periodic software and/or hardware from taking place by disabling the automatic reference switch.

1. Test 2 is selected by use of **NEXT TEST**.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 2.

2. When Test 2 is initially called in, Field 1 displays a 2; Field 2 displays the type of DS-1 circuit pack (dashed for SCS); the equipment location of the on-line reference is displayed in Fields 3 through 6; 0, 1, or 2 (high accuracy clock, primary reference, or secondary reference) is displayed in Field 7 (yellow LED lighted in position 14, 15, or 16 of TN463); and Fields 8 and 9 display 0's.

Note: Fields 3 through 7 are updated with a new on-line equipment location and on-line reference should an automatic reference switch occur as a result of the automatic recovery mechanism.

3. Field 8 is blinking, indicating an optional entry field.

To switch the on-line reference displayed in Fields 3 through 6, proceed to Step 4.

4. To enable the switch of references, Field 8 must be changed to a 1. Either ENTER or the CHANGE FIELD sequence can be used:

1, ENTER.

CHANGE FIELD; 8; ENTER; 1; ENTER.

- 5. Depress **EXECUTE**.
- 6. Special error code 80 (I/O failure) may be displayed in the MAAP error code field when **EXECUTE** is depressed indicating that Test 2 cannot be performed.

If special error code 80 is not displayed, proceed to Step 8.

7. When special error code 80 is displayed, repeat Test 2.

If special error code 80 is not displayed again, proceed to Step 8.

If special error code 80 is displayed again, perform **PROC 611** to test the common control I/O channels and/or **PROC 620** to test TN380 (module processor) or TN381 (TMS processor).

8. When the switch is successful, the following is displayed:

Field 1 - 2.

Field 2 - Facility type (1 = DS-1 circuit pack).

Fields 3 through 6 - Equipment location of the new on-line reference.

Field 7 - Reference indication (l = primary reference, 2 = secondary reference).

Field 8 - Switch status (0 = disable switch of reference).

Field 9 - 0 (if automatic switch of references is allowed).

Fields 10 through 12 - Dashed.

Field 13 - Dash, 0, or number of switches that occurred (maximum of 8) for the reference displayed in Fields 3 through 6.

Field 14 - Dash or day of month the switch occurred.

Field 15 - Dash or hour of day the switch occurred.

Field 16 - Dash or minute of day the switch occurred.

Field 17 - Dash or switch cause (0 through 9).

Note: Fields 14 through 16 display the time the latest switch occurred. Field 17 indicates the health of the reference just before it was switched off-line or the software/craft request.

- 9. The cause and time of the switch is updated in status memory and the yellow LED in position 15 or 16 of TN463 changes when the switch is successful.
- 10. If the switch failed, Fields 3 through 6 display the original on-line reference, and Field 8 displays an encode indicating the reason the switch failed (2 = I/O failure, 3 = unusable reference, 4 = not administered, and 5 = maintenance busied.
- 11. When Field 13 is greater than 1, depressing **NEXT DATA** decrements Field 13 and displays (in Fields 14 through 17) when the next to last switch occurred and the cause of the switch.
- 12. Depressing **NEXT DATA** repeatedly displays the remaining switches that occurred.

When the last switch is displayed, depressing **NEXT DATA** again dashes Fields 13 through 17.

Depressing **NEXT DATA** once more begins the sequence over starting with the latest switch that occurred.

- 13. The **CLEAR DATA**; **EXECUTE** sequence can be used to clear the table of last 8 switches after **EXECUTE** is used to initiate Test 2.
- 14. To clear the table of last 8 switches for the reference(s) after **EXECUTE** is used to initiate Test 2, perform the following:

Note: Fields 13 through 17 must not be dashed. Error code 00 (wrong key) is displayed in the **MAAP** error code field when **CLEAR DATA; EXECUTE** is depressed if Fields 13 through 17 are dashed.

Depress CLEAR DATA; EXECUTE.

Fields 13 through 17 display dashes indicating the table of last 8 switches for the reference(s) is cleared.

Automatic reference switching can be disabled while maintenance personnel are working on the digital network and re-enabled when the tasks are completed.

When disabled, automatic reference switching by software periodics and the hardware SCS circuit pack (TN463) cannot be performed.

Caution: Disabling of the automatic reference switching feature for a prolonged period of time could become service affecting by impairing the recovery mechanism of the switch.

Disabling of the automatic reference switching is performed as follows:

- 1. Enter Test 2 of PROC 625.
- 2. Determine the type of automatic reference switching to be disabled; i.e., 1 = disable software switch, 2 = disable software and hardware switch.

Note: If Test 2 of **PROC 625** is exited with a 2 (software and hardware switch disabled) displayed in Field 9, the automatic switch disable is automatically changed to a 1 (software switch disabled). This allows the hardware to switch to the HAC if the reference is lost or unusable. The change from 2 to 1 is not visible to maintenance personnel.

PROC 625 (R2V2 Only) Test 2

3. To disable the automatic reference switching, Field 9 must be changed to a 1 (software) or 2 (software and hardware). The CHANGE FIELD sequence must be used to disable automatic reference switching:

CHANGE FIELD; 9; ENTER; (1 or 2); ENTER.

4. Depress **EXECUTE**.

Caution: If PROC 625 is exited with automatic reference switching disabled 1 (software switch disabled) or 2 (software and hardware switch disabled) displayed in Field 9, a soft switch of references cannot be performed.

Note: If Test 2 of **PROC 625** is exited with a 2 (software and hardware switch disabled) displayed in Field 9, the automatic switch disable is automatically changed to a 1 (software switch disabled). This allows the hardware to switch to the HAC if the reference is lost or unusable. The change from 2 to 1 is not visible to maintenance personnel.

5. Prior to exiting **PROC 625** re-enable the automatic reference switching feature by performing the **CHANGE FIELD** sequence and depressing **EXECUTE**:

CHANGE FIELD; 9; ENTER; 0; ENTER; EXECUTE.

PROC 630 - BUSY OUT/RELEASE BUSY OUT

FLIPCHART ISSUE 1	+	+	BUSY O	UT/RELEASE	BUSY	OUT	+	+		
TEST NUMBERS (FIELD 1): 1=TEMTINALS 2=TRUNKS 3=TONE PLANTS/ AUXILIARY TONE PLANTS	USE 'NEXT TO FIND MA PARTICULAR 'NEXT DATA OUT'. USE MAINTENANC CIRCUITS I CAUTION; O	CIRCUIT TO AD INTENANCE BUS' CIRCUIT, ENTU '. 'NEXT DATA 'BUSY OUT' OR E BUSY STATUS. N A TEST USE IPERATING 'BUSY	ANCE TO NEX AND IN USE REQUIPMENT MUST BE OPH 'RELEASE BUS TO RELEASE CLEAR DATA'	T BUSIED OUT C STATUS OF A LOCAIION AND ERATED BEFORE SY' TO CHANGE BUSY OUT ON A , 'EXECUTE'. TERMINAL OR A	IRCUIT. USE 'BUSY LL TRUNK	MAINTENANCE O=NDT BU 1=BUSIED AUXILIARY TO BUSIED WHEN PLANT IS BUS CAN DROP A CUS	BUSY STATUS (F SIED INE PLANT SHOULI ITS ASSOCIATED SIED.	IELD 7): D BE Tone	SPEC: 81-NC MESS/ TO MC FAILE	TAL ERROR CODE: DT BUSIED BECAUSE Age Transmission Doule Processor ED.
TEST TESTS 1-3 TE MODULE CAB CARR	IN-BUSIED IT ISTS 1-2 IST 3 ISLOT				MTCE BUSY STATUS	TOTAL NUMBER OF CIRCUITS BUSIED OUT IN THIS TEST	DISPLAYED BUSIED OUT CIRCUIT INDEX			NETWORK BUSY OUT

Purpose

PROC 630 is used to determine the maintenance busy out status of terminals, trunks, or tone plants.

Both the total number of busied out circuits and the equipment location of each circuit of the current test type is displayed.

In addition, **PROC 630** provides the capability to busy out or release from busy terminals, trunks, or tone plants.

When all terminals, trunks, and tone plants are released from busy, the **BUSY OUT** indicator on the **MAAP** is turned off.

If the **BUSY OUT** indicator on the **MAAP** is still lighted after all terminals, trunks, and tone plants are released from busy the cause is probably a soft lock of the network or TMS duplication channel.

Use **PROC 621** Test 2 to release the soft lock of the network or TMS duplication channel and the **BUSY OUT** indicator on the **MAAP** should turn off.

Field Definitions and Codes

Each field of **PROC 630** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AI, PROC 630 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Fields 2 through 6, before **EXECUTE** Select module, cabinet, carrier, slot, and circuit to determine the maintenance busy out status of a particular terminal (Test 1), or trunk (Test 2).

If more than one circuit of a particular type (terminal or trunk) is busied out, the display defaults to the lowest equipment number of that type busied out upon depressing **EXECUTE**.

PROC 630 FIELD DEFINITIONS AND CODES							
CODE	DEFINITION						
1-3	Test number.						
0-30	Module number.						
0-7	Cabinet number.						
0-3	Carrier number.						
0-21	Slot number.						
0-7	Circuit number.						
	Maintenance busy status:						
	FIELD CODE 1-3 0-30 0-7 0-3 0-21 0-7						

Not busied.

Number of circuits busied out in the current test.

Indicates which circuit, of a group of busied out circuits, is

Busied.

0 1

0-999

1 - 999

8

9

TABLE AT

3. Fields 4 through 6, before **EXECUTE** - Select carrier, slot, and circuit to determine the maintenance busy out status of a particular terminal (Test 1), or trunk (Test 2).

being displayed.

If more than one circuit of a particular type (terminal or trunk) is busied out, the display defaults to the lowest equipment number of that type busied out upon depressing EXECUTE.

4. Fields 2 through 5, before **EXECUTE** - Select module, cabinet, carrier, and slot to determine the maintenance busy out status of a particular tone plant or auxiliary tone plant (Test 3).

If more than one tone plant or auxiliary tone plant is busied out, the display defaults to the lowest equipment number busied out upon depressing **EXECUTE**.

5. Fields 4 and 5, before **EXECUTE** - Select carrier and slot to determine the maintenance busy out status of a particular tone plant or auxiliary tone plant (Test 3).

If more than one tone plant or auxiliary tone plant is busied out, the display defaults to the lowest equipment number busied out upon depressing EXECUTE.

- 6. Fields 2 through 6. after EXECUTE Select module, cabinet, carrier, slot, and circuit of a particular terminal (Test 1) or trunk (Test 2) to determine the maintenance busy out status or to maintenance busy out the displayed circuit.
- 7. Fields 2 through 5, after EXECUTE Select module, cabinet, carrier, and slot of a particular tone plant or auxiliary tone plant (Test 3) to determine the maintenance busy out status or to maintenance busy out the displayed circuit.
Operation of Procedure

Overview

PROC 630 is used to determine the status of maintenance busy out circuits, and to busy out or release from busy terminals, trunks, or tone plants/auxiliary tone plants.

To call in **PROC 630**, perform the following:

- 1. Depress PROC NO; 630; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1 and all other fields are dashed.

3. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Three tests are available:

- 1. Test 1 Displays busied out terminals and provides the capability to busy out or release from busy terminals.
- 2. Test 2 Displays busied out trunks and provides the capability to busy out or release from busy trunks.
- 3. Test 3 Displays busied out tone plants (including auxiliary tone plants) and provides the capability to busy out or release from busy tone plants and auxiliary tone plants.

Test 1

Test 1 displays the maintenance busy out status of terminals connected to analog line ports and provides the capability to busy out or release from busy terminals.

Note: Use **PROC 632** to determine the busy out status or to busy out terminals connected to digital line ports.

1. Test 1 is the default test when entering **PROC 630**, or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

- 2. To start Test 1, depress EXECUTE.
- 3. Field 8 displays a 0 if no terminals are busied out.
- 4. When terminals are maintenance busied, the first of the busied out terminals (by lowest equipment number) is displayed as follows:

Fields 2 through 6 - Busied out terminal equipment location.

Field 7 - Busy out status.

Field 8 - Total number of busied out terminals.

Field 9 - 1 (Indicating first busied out terminal).

5. Field 2 flashes indicating an optional entry field.

Either the terminals busied out can be displayed in order using **NEXT CIRCUIT** or a specific terminal can be selected for display to determine the maintenance busy or **IN USE** status (See Step 8 below).

PROC 630 Test 1

6. Repeatedly depressing NEXT CIRCUIT displays each of the busied out terminals.

When all busied out terminals are displayed, depressing **NEXT CIRCUIT** dashes the display except for Field 1.

Depressing NEXT CIRCUIT again starts Test 1 over.

7. To change the busy out status of an individual terminal, depress **RLS BUSY OUT** when the terminal is displayed.

To release all busied out terminals, depress CLEAR DATA; EXECUTE.

Note: CLEAR DATA; EXECUTE can only be used after EXECUTE is depressed to initiate Test 1.

8. If the maintenance busy or **IN USE** status of a particular terminal is to be determined, selection can be made, after **EXECUTE** is depressed in Step 2 above, using one of the following methods:

CHANGE FIELD; 2; ENTER; (Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER; NEXT DATA.

(Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER; NEXT DATA.

9. NEXT DATA displays the maintenance busy or IN USE status of the terminal selected.

Note: When the **IN USE** indicator on the **MAAP** is lighted, the displayed terminal is active on a connection. Field 7 displays a 0 indicating the terminal is not maintenance busy. The **IN USE** indicator is turned on with the operation of **NEXT DATA** and remains lighted until the displayed terminal becomes idle or **BUSY OUT** is depressed.

10. After selecting a terminal for display to determine the maintenance busy or IN USE status by using the CHANGE FIELD sequence, or by entering the equipment location, depressing NEXT CIRCUIT displays the first busied out terminal as if EXECUTE had been depressed.

The fields and contents displayed are the same as when Test 1 is first executed.

11. To busy out a terminal:

Execute Test 1.

- 12. If any terminals are busied out, use **NEXT CIRCUIT** to determine if the terminal is already busied out.
- 13. If no terminals are busied out, or the terminal to be busied out is not displayed by use of **NEXT CIRCUIT**, refer to Step 8 above to select the terminal to be busied out.
- 14. Depress **NEXT DATA** to determine if the terminal is in-use.

Requirement: NEXT DATA must be used before BUSY OUT can be used.

15. The IN USE indicator on the MAAP lights if the terminal is in-use.

Caution: Do not busy out a terminal that is not idle unless absolutely necessary. Operation of BUSY OUT busies a terminal that is in use and terminates the connection.

16. Depress BUSY OUT.

Test 2

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Test 2 displays the maintenance busy status of trunks and provides the capability to busy out or release from busy trunks.

1. Test 2 is selected by NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

- 2. To start Test 2, depress EXECUTE.
- 3. Field 8 displays a 0 if no trunks are busied out.
- 4. When trunks are maintenance busied, the first of the busied out trunks is displayed as follows:

Fields 2 through 6 - Busied out trunk equipment location.

Field 7 - Busy out status.

Field 8 - Total number of busied out trunks.

Field 9 - 1 (Indicating first busied out trunk).

5. Field 2 flashes indicating an optional entry field.

Either the trunks busied out can be displayed in order using **NEXT CIRCUIT** or a specific trunk can be selected for display to determine the maintenance busy or **IN USE** status (See Step 8 below).

6. Repeatedly depressing **NEXT CIRCUIT** displays each of the busied out trunks.

When all busied out trunks are displayed, depressing **NEXT CIRCUIT** dashes the display except for Field 1.

Depressing NEXT CIRCUIT again starts Test 2 over.

- 7. To change the busy out status of an individual trunk, depress **RLS BUSY OUT** when the trunk is displayed.
- 8. To release all busied out trunks, depress CLEAR DATA; EXECUTE.

Note: CLEAR DATA; EXECUTE can only be used after EXECUTE is depressed to initiate Test 2.

9. If the maintenance busy or **IN USE** status of a particular trunk is to be determined, selection can be made, after **EXECUTE** is depressed in Step 2 above, using one of the following methods:

CHANGE FIELD; 2; ENTER; (Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER; NEXT DATA.

(Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER; NEXT DATA.

10. NEXT DATA displays the maintenance busy or IN USE status of the trunk selected.

Note: When the **IN USE** indicator on the **MAAP** is lighted, the displayed trunk is active on a connection. Field 7 displays a 0 indicating the trunk is not maintenance busy. The **IN USE** indicator is turned on with the operation of **NEXT DATA** and remains lighted until the displayed trunk becomes idle or **BUSY OUT** is depressed.

PROC 630 Test 2 and Test 3

11. After selecting a trunk for display to determine the maintenance busy or **IN USE** status by using the **CHANGE FIELD** sequence, or by entering the equipment location, depressing **NEXT CIRCUIT** displays the first busied out trunk as if **EXECUTE** had been depressed.

The fields and contents displayed are the same as when Test 2 is first executed.

12. To busy out a trunk:

Execute Test 2.

- 13. If any trunks are busied out, use **NEXT CIRCUIT** to determine if the trunk is already busied out.
- 14. If no trunks are busied out, or the trunk to be busied out is not displayed by use of **NEXT CIRCUIT**, refer to Step 8 above to select the trunk to be busied out.
- 15. Depress NEXT DATA to determine if the trunk is in-use.

Requirement: NEXT DATA must be used before BUSY OUT can be used.

16. The IN USE indicator on the MAAP lights if the trunk is in-use.

Caution: Do not busy out a trunk that is not idle unless absolutely necessary. Operation of BUSY OUT busies a trunk that is in use and terminates the connection.

17. Depress BUSY OUT.

Test 3

Test 3 displays the maintenance busy out status of tone plants and auxiliary tone plants. Test 3 also provides the capability to busy out or release from busy tone plants and auxiliary tone plants.

1. Test 3 is selected by NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 3; ENTER.

- 2. To start Test 3, depress EXECUTE.
- 3. Field 8 displays a 0 if no tone plants or auxiliary tone plants are busied out.
- 4. When tone plants or auxiliary tone plants are maintenance busied, the first of the busied out tone plants or auxiliary tone plants is displayed as follows:

Fields 2 through 5 - Busied out tone plant or auxiliary tone plant equipment location.

Field 7 - Busy out status.

Field 8 - Total number of busied out tone plants and auxiliary tone plants.

Field 9 - 1 (Indicating first busied out tone plant or auxiliary tone plant).

5. Field 2 flashes indicating an optional entry field.

Either the tone plants/auxiliary tone plants can be displayed in order using **NEXT CIRCUIT** or a specific tone plant/auxiliary tone plant can be selected for display to determine the maintenance busy status (See Step 9 below).

6. Repeatedly depressing **NEXT CIRCUIT** displays each of the busied out tone plants/auxiliary tone plants.

7. When all busied out tone plants/auxiliary tone plants are displayed, depressing **NEXT CIRCUIT** dashes the display except for Field 1.

Depressing **NEXT CIRCUIT** again starts Test 3 over.

- 8. To change the busy out status of an individual tone plant/auxiliary tone plant, depress **RLS BUSY OUT** when the tone plant/auxiliary tone plant is displayed.
- 9. To release all busied out tone plants/auxiliary tone plants, depress CLEAR DATA; EXECUTE.

Note: CLEAR DATA; EXECUTE can only be used after EXECUTE is depressed to initiate Test 3.

10. If the maintenance busy status of a particular tone plant/auxiliary tone plant is to be determined, selection can be made, after **EXECUTE** is depressed in Step 2 above, using one of the following methods:

CHANGE FIELD; 2; ENTER; (Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; NEXT DATA.

(Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; NEXT DATA.

Note: To select a tone plant or auxiliary tone plant for display or to busy out a tone plant or auxiliary tone plant, Field 6 (circuit) is not a required entry.

11. NEXT DATA displays the maintenance busy status of the tone plant/auxiliary tone plant selected.

When NEXT DATA is depressed, the IN USE indicator on the MAAP is not lighted.

12. After selecting a tone plant/auxiliary tone plant for display to determine the maintenance busy status by using the CHANGE FIELD sequence, or by entering the equipment location, depressing NEXT CIRCUIT displays the first busied out tone plant/auxiliary tone plant as if EXECUTE had been depressed.

The fields and contents displayed are the same as when Test 3 is first executed.

13. To busy out a tone plant/auxiliary tone plant:

Execute Test 3.

- 14. If any tone plants/auxiliary tone plants are busied out, use **NEXT CIRCUIT** to determine if the tone plant/auxiliary tone plant is already busied out.
- 15. If no tone plants/auxiliary tone plants are busied out, or the tone plant/auxiliary tone plant to be busied out is not displayed by use of **NEXT CIRCUIT**, refer to Step 8 above to select the tone plant/auxiliary tone plant to be busied out.

Requirement: NEXT DATA must be used before BUSY OUT can be used.

16. When **NEXT DATA** is depressed, the **IN USE** indicator on the **MAAP** is **not** lighted.

Caution: When a tone plant or auxiliary tone plant is busied out, some capability of generating tones is removed from the system. All tone plants or all auxiliary tone plants should not be busied out at the same time.

17. Depress **BUSY OUT**.

FLI ISS	IPCHART SUE 1	+		+	TRUNK GR	OUP BUSY OUT	+	+	
TEST BUSY ENTI USE TO N	1: OUT OR RELEA RE TRUNK GROL 'NEXT UNIT' 1 EXT EQUIPPED	SE BUSY OUT P. O ADVANCE TRUNK GROUP	TEST 2: BUSY OU CIRCUIT THE NEX DETERMI DISPLAY	T OR RELEASE BL S. USE 'NEXT CI T CIRCUIT. USE NE THE TRUNK GR ED EQUIPMENT LO	ISY OUT INDIVIDUA RCUIT' TO DISPLA 'EXECUTE' TO ROUP NUMBER FOR A ICATION.	NOTE: TRUNK GROUP INDEX DOES NOT CORRESPOND TO TRUNK NUMBER USED BY TRUNK VERIFICATION	MAINTENANCE BUSY STATUS (FIELD 13): O=NOT BUSIED 1=BUSIED	SPECIAL ERROR COD 80-MORE THAN 255 PROC 630 OR PR RELEASE BUSY O 81-NOT BUSIED BEC. TRANSMISSION T FAILED.	ES: TRUNKS IN GROUP. USE DC 632 TO BUSY OUT OR UT REST OF TRUNKS NUSE MESSAGE D MODULE PROCESSOR
	TEST 1	DIAL	ACCESS			TEST	2		NETWORK
TEST NO	trunk Group Number	FIRST DIGIT	SECOND DIGIT THIRD DIGIT	TRUNKS IN TRUNK GROUP	TRUNKS	MODULE CAB CAR	SLOT CKT	INDEX (SEE NOTE)	BUSY OUT
1	· • •	2 3	4 5		1 7	891	0 1 11 12	2 13	4 551

PROC 631 - TRUNK GROUP BUSY OUT

Purpose

PROC 631 is used to determine the maintenance busy out status of individual trunks in a trunk group or the maintenance busy out status of an entire trunk group.

PROC 631 displays the total number of maintenance busied out trunks and the equipment location of each trunk of the current trunk group and its busied out status.

PROC 631 is used to maintenance busy out or release busy out all trunks in a trunk group or to step through the trunks in a trunk group and selectively busy out or release busy out individual trunks.

Field Definitions and Codes

Each field of **PROC 631** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AJ, PROC 631 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Field 2 Select trunk group number to determine the maintenance busy status of a particular trunk group (Test 1 only).
- 3. Fields 8 through 12 Select individual trunk equipment location to determine the maintenance busy status of a particular trunk (Test 2 only).

Operation of Procedure

Overview

PROC 631 is used to determine the maintenance busy out status of trunk groups or individual trunks in a trunk group, and to busy out or release from busy an entire trunk group or individual trunks within a trunk group.

TABLE	AJ.
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	PROC 631 FIELD DEFINITIONS AND CODES												
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION								
1	1-2	Test number.	8	0-30	Module number.								
2	17-255	Trunk group number.	9	0-7	Cabinet number.								
3	1-9	First digit of dial access code	10	0-3	Carrier number.								
11, 12		Encode 11 equals touch-tone*: 12 equals	11	0-21	Slot number.								
_		touch-tone#.	12	0-3	Circuit number.								
4	0-9	Second digit of dial access code.	13		Maintenance busy status:								
5	0-9	Third digit of dial access code.		0	Not busied out.								
6	0-255 Number of trunks in trunk group.		14	0-255	Position of the trunk within the								
7	0-255	Number of trunks busied out in the trunk group.].		trunk group.								

To call in **PROC 631**, perform the following:

- 1. Depress PROC NO; 631; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, Field 2 displays the smallest trunk group number, and all other fields are dashed.

3. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Two tests are available:

- 1. Test 1 Displays the busy out status of an entire trunk group and provides the capability to busy out or release from busy an entire trunk group.
- 2. Test 2 Displays the busy out status of individual trunks within a trunk group and provides the capability to busy out or release from busy an individual trunk within a trunk group.

PROC 631 Test 1

Test 1

Test 1 is used to busy out or release from busy an entire trunk group.

- 1. Test 1 is the default test when entering PROC 631, or is selected by using NEXT TEST.
- 2. When Test 1 is selected, the smallest trunk group number in the switch is flashed in Field 2, indicating an optional entry field.
- 3. Either the trunk group displayed may be used or another trunk group may be selected.

To use the trunk group displayed, ENTER is depressed, causing Field 2 to stop flashing.

- 4. Selection of another trunk group can be accomplished by one of the following three methods (Refer to Steps 5 through 7).
- 5. (Trunk group number); ENTER.
- 6. CHANGE FIELD; 2; ENTER; (Trunk group number); ENTER.
- 7. Depressing NEXT UNIT to sequence through all the trunk groups in the switch until the trunk group to be tested is displayed in Field 2. When all trunk group numbers are displayed, depressing NEXT UNIT dashes Field 2. Depressing NEXT UNIT once more displays the smallest trunk group number again, starting the sequence over.
- 8. To start Test 1, select the trunk group to be displayed, and depress EXECUTE.
- 9. Trunk group information is displayed as follows:

Field 2 - Trunk group number.

Field 6 - Number of trunks in the trunk group.

Field 7 - Number of trunks busied out in the trunk group.

Fields 8 through 12 - Equipment location of the first trunk in the trunk group.

Field 13 - Maintenance busy status of the first trunk.

Field 14 - Trunk position in the trunk group.

10. Depressing **BUSY OUT** or **RLS BUSY OUT** changes the status of the selected trunk group.

Note: Special error code 80 may be displayed and is defined as follows: More than 255 trunks are in the trunk group. **PROC 631** will not busy out or release from busy more than 255 trunks. Use **PROC 630** (Busy out/release busy out) or **PROC 632** (Carrier busy) to busy out or release from busy the rest of the trunks.

11. To release the entire trunk group from maintenance busy, depress RLS BUSY OUT.

Caution: Depressing BUSY OUT can drop customer calls in the entire trunk group.

12. To busy out an entire trunk group, depress BUSY OUT.

Test 2

Test 2 is used to busy out or release from busy individual trunks within a trunk group.

Test 2 can also be used to search for the trunk group number of a trunk circuit.

- 1. Test 2 is selected by use of NEXT TEST.
- 2. When Test 2 is entered, either the equipment location of the first trunk in the last trunk group selected in Test 1 is displayed in Fields 8 through 12 or Field 8 is blanked and Fields 9 through 12 are dashed.
- 3. When an equipment location is displayed, Field 8 is flashed, indicating an optional entry.

Either the trunk displayed can be used or another trunk can be selected.

- 4. Selection of another trunk can be accomplished in two ways (Refer to Steps 5 and 6).
- 5. Depressing NEXT CIRCUIT to sequence through all the trunks in the trunk group displayed until the trunk to be tested is displayed in Fields 8 through 12. When all the trunks in the trunk group are displayed, depressing NEXT CIRCUIT again dashes Fields 8 through 12. Depressing NEXT CIRCUIT once more starts the sequence over with the first trunk in the trunk group.
- 6. When Field 8 is flashing, the equipment location of another trunk can be entered in Fields 8 through 12 as follows:

(Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER.

7. When Field 8 is blanked, the decimal point in the field is flashed to indicate a mandatory entry.

The equipment location of a trunk must be entered in Fields 8 through 12 as follows:

(Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER.

Note: When Field 8 is blanked, the CHANGE FIELD sequence cannot be used.

- 8. To start Test 2, select the trunk to be displayed, and depress EXECUTE.
- 9. Trunk information is displayed as follows:

Field 2 - Trunk group number for the equipment location.

Fields 3 through 5 - Dial access code (if any) for the trunk equipment location.

Fields 8 through 12 - Equipment location of the trunk.

Field 13 - Maintenance busy status of the trunk.

Field 14 - Position of the trunk in the trunk group.

10. Depressing BUSY OUT or RLS BUSY OUT changes the status of the selected trunk.

Note: Special error code 80 may be displayed and is defined as follows: More than 255 trunks in the group. Use **PROC 630** or **PROC 632** to busy out or release busy out the trunk.

PROC 631 Test 2

- 11. Trunks that are omitted (when more than 255 trunks are in a trunk group) are those with the higher internal trunk numbers.
- 12. If an equipment location of a trunk that is omitted is entered in Test 2, the first trunk of that trunk group will be displayed upon depressing **EXECUTE**.

This indicates that **PROC 630** or **PROC 632** must be used to busy out or release busy the trunk entered.

13. To release the trunk from maintenance busy, depress **RLS BUSY OUT**.

Caution: Depressing BUSY OUT can drop a customer's call.

14. To busy out the trunk, depress BUSY OUT.

To search for the trunk group number of a trunk circuit, perform the following:

- 1. Enter the equipment location of the trunk circuit in Fields 8 through 12.
- 2. Depress EXECUTE.
- 3. Information for the trunk circuit being search is displayed as follows:

Field 2 - Trunk group number for the equipment location.

Fields 3 through 5 - Dial access code (if any) for the trunk equipment location.

Fields 8 through 12 - Equipment location of the trunk.

Field 13 - Maintenance busy status of the trunk.

Field 14 - Position of the trunk in the trunk group.

PROC 632 - CARRIER BUSY

FLIPCHART ISSUE 2 +	+	CARRIER	BUSY	+	+	
TEST 1: DISPLAY BUSIED OUT TEST 2: BUSY	OUT OR RELEASE	TEST 3: BUSY OUT	OR RELEASE BUSY	CARRIER TYPE	MNT BUSY STATUS	SPECIAL ERROR CODE:
TO FIND NEXT CARRIER BUSIED 'NEXT UNIT' T	ADVANCE TO	ADVANCE TO NEXT	CIRCUIT. USE 'BUSY	1=NORMAL PORT	0=NOT BUSIED	BECAUSE MESSAGE
OUT OR PARTIALLY BUSIED OUT. NEXT CARRIER.		OUT' AND 'RLS BU	SY OUT' TO BUSY OR	CARRIER	OUT	TRANSMISSION
USE 'BUSY OUT' AND 'RLS BUSY OUT' TO BUSY	IR RELEASE	RELEASE A CIRCUI	T. USE "NEXT UNIT"	2=DS-1/MFAT	1=BUSIED OUT	TO MODULE
A CARRIER		TO ADVANCE TO NE	XT CARRIER.	CARRIER	2=PARTIALLY	PROCESSOR FAILED
CAUTION: OPERATING 'BUSY OUT' FOR A TERMINA	L DR A TRUNK I	CAN DROP A CUSTOM	ER CALL. OPERATING	3=OTHER	BUSIED OUT	
'BUSY OUT' FOR A DIGITAL TERMINAL WITH BRI	GED APPEARANCE	S CAUSES ALL CALL	S ON THOSE		CARRIER	
TERMINALS TO BE DROPPED.						
EQUIPMENT LOCATION					RUNNING	
TEST 3		TOTAL 알ሣ뜐		TOTAL	TOTAL:	NETWORK
1231 3	12 21	NDILLES 2 2 2 2 2	TOTAL	CIRCUITS	CARRIERS	BUSY DUT
TEST TEST 2		TN 국립국고	CIRCUITS	BUSIED	WITH BUSY	
	l≩ ∽ s	YSTEM 235	IN CARRIER I	N CARRIER	CIRCUITS	
MODULE CAB CARR SLOT CAT OF			-		FOUND IN	() 0
1 2 3 4 5 6	8	9 10 11	12	1 13	14	032

Purpose

PROC 632 is used to determine the maintenance busy out status of carriers. Both the total number of busied out circuits in a carrier and the total number of carriers with busied out circuits are displayed.

PROC 632 finds carriers that are completely or partially busied out and displays information pertinent to the carriers.

In addition, **PROC 632** provides the capability to busy out or release from busy a complete carrier or circuits within a carrier.

The maintenance busy status of tone plants and/or auxiliary tone plants cannot be changed using this procedure. **PROC 630 must** be used to change the maintenance busy status of tone plants and/or auxiliary tone plants.

Field Definitions and Codes

Each field of **PROC 632** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AK, PROC 632 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Fields 2 through 4 Select a specific carrier in a cabinet of a module to determine the maintenance busy out status or to busy out or release from busy the specific carrier (Test 2 only).
- 3. Fields 2 through 6 Select a specific circuit within a carrier to determine the maintenance busy out status or to busy out or release from busy the specific circuit (Test 3 only).

TABLE A	ιК.
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	PROC 632 FIELD DEFINITIONS AND CODES													
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION									
1	1-3	Test number.	9	0-30	Total modules in system.									
2	0-30	Module number.	10	1-8	Total cabinets in module									
3	0-7	Cabinet number.	11	1-4	Total carriers in cabinet.									
4	0-3	Carrier number.	12	1-154	Total circuits in carrier.									
5	0-21	Slot number.	13	1-154	Total circuits busied out in carrier.									
6	0-7	Circuit number.		1 700	Durning total of convious									
7	7 Carrier type: 1 Normal port carrier. 2 DS-1/MFAT carrier. 3 Other			1-700	with busy circuits found in Test 1.									
8*	0 1 2	Maintenance busy status: Not busied out. Busied out. Partially busied out carrier.	* In Te to th	st 3, the ma e circuit no	uintenance busy status refers t the carrier.									

Operation of Procedure

Overview

PROC 632 is used to determine the status of maintenance busied out carriers, or maintenance busied out circuits within carriers, and to busy out carriers or circuits within carriers.

To call in PROC 632, perform the following:

- 1. Depress PROC NO; 632; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1 and all other fields are dashed.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Three tests are available:

- 1. Test 1 Searches for and displays completely or partially busied out carriers.
- 2. Test 2 Provides the capability to busy out or release from busy a complete carrier.
- 3. Test 3 Provides the capability to busy out or release from busy individual circuits within a carrier.

Test 1

Test 1 is used to find a carrier that is completely or partially busied out. The carrier can then be released from busy out, or if partially busied out can be completely busied out.

Test 1 is useful for returning a cabinet to service after a total cabinet outage.

- 1. Test 1 is the default test when entering PROC 632, or is selected by using NEXT TEST.
- 2. When Test 1 is initially called in, all fields are dashed except for a 1 in the test number field.
- 3. To start Test 1, depress EXECUTE.

A search for a carrier that is busied out or partially busied out is started.

- 4. The display on the **MAAP** is continually updated while the test is executing until a carrier that is busied out or partially busied out is found (if any).
- 5. If no carriers are found which are completely or partially busied out, the MAAP displays a 1 in Field 1, a 0 in Field 14, and dashes in all other fields.
- 6. When a carrier is found that is completely busied out or partially busied out, the following information is displayed:

Field 1 - 1.

Fields 2 through 4 - Equipment location of carrier.

Fields 5 and 6 - Dashed.

Field 7 - Carrier type.

Field 8 - Maintenance busy status of carrier.

Field 9 - Total modules in switch.

Field 10 - Total cabinets in displayed module.

Field 11 - Total carriers in displayed cabinet.

Field 12 - Total circuits in displayed carrier.

Field 13 - Total circuits busied out in displayed carrier.

Field 14 - 1 (Indicating first carrier found with busied out circuits.)

7. Depressing **RLS BUSY OUT** releases from busy out the displayed carrier.

RLS BUSY OUT releases all busied out circuits in a carrier or those circuits that are busied out in a partially busied out carrier.

Caution: If a trunk or terminal that is up on a connection is busied out, the connection is dropped.

8. If the displayed carrier is partially busied out, depressing **BUSY OUT** busies out the rest of the circuits in the carrier.

Note: BUSY OUT can not be used to maintenance busy out a carrier in Test 1 unless the carrier is partially busied out, i.e., only carriers that are busied out or partially busied out are displayed in Test 1.

9. Depressing EXECUTE again with the WAIT indicator off restarts the test and the search.

The count of total carriers with busy circuits (Field 14) begins over when the test is restarted (i.e., 0 until a carrier is found (if any), then a 1 is displayed if a carrier is found).

10. Depressing **NEXT UNIT** after a busied out carrier is displayed finds the next carrier that is busied out or partially busied out.

Field 14 is incremented if a busied out or partially busied out carrier is found.

11. When the last completely or partially busied out carrier in the system is displayed, depressing **NEXT UNIT** dashes all fields except the test number and total carriers with busy circuits fields (Fields 1 and 14).

Note: After the entire switch is searched for busy carriers and the display is dashed, depressing **BUSY OUT** or **RLS BUSY OUT** causes error code 10 to be displayed.

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12. Depressing **NEXT UNIT** again causes Test 1 to be executed, starting the sequence over with the first equipped carrier that is completely or partially busied out.

The count of the total carriers with busy circuits (Field 14) starts over when the test is restarted (i.e., 0 until a carrier is found (if any), then a 1 is displayed if a carrier is found).

Test 2

Test 2 is used to busy out an entire carrier or release from busy a completely or partially busied out carrier.

Test 2 is useful for busying out a carrier or all carriers in a cabinet when making a repair that affects the entire carrier or cabinet.

- 1. Test 2 is selected by NEXT TEST.
- 2. When Test 2 is called in, a default carrier may be displayed in Fields 2 through 4.

A completely or partially busied out carrier last displayed in Test 1 (if any) is the default carrier for Test 2.

- 3. If no default carrier from Test 1 is displayed, Field 2 is blanked and the decimal point in Field 2 is flashed indicating a mandatory entry field.
- 4. To execute Test 2, an equipment location must be entered in Fields 2 through 4.
- 5. Either the default carrier displayed can be used or another carrier can be selected by entering its location in Fields 2 through 4:

(Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER.

- 6. To start Test 2, depress EXECUTE.
- 7. The status of the selected carrier is displayed as follows:

Field 1 - 2.

Fields 2 through 4 - Equipment location of carrier.

Fields 5 and 6 - Dashed.

Field 7 - Carrier type.

Field 8 - Maintenance busy status of carrier.

Field 9 - Total modules in switch.

Field 10 - Total cabinets in displayed module.

Field 11 - Total carriers in displayed cabinet.

Field 12 - Total circuits in displayed carrier.

Field 13 - Total circuits busied out in displayed carrier.

Field 14 - 0 or total carriers with busy circuits.

Note: Total number of carriers with busy out circuits are only displayed in Field 14 if the carriers were found and displayed in Test 1.

8. Depressing **RLS BUSY OUT** releases from busy the entire carrier displayed (all circuits in the carrier).

Caution: If a trunk or terminal that is up on a connection is busied out, the connection is dropped.

- 9. Depressing **BUSY OUT** busies out the entire displayed carrier (all circuits in the carrier).
- 10. Depressing **NEXT UNIT** finds the next equipped carrier in the switch and updates the display accordingly.
- 11. When the last carrier in the switch is displayed, depressing **NEXT UNIT** dashes all fields except the test number and total carriers with busy circuits fields (Fields 1 and 14).

Note: After the display is dashed, depressing **BUSY OUT** or **RLS BUSY OUT** causes error code 10 to be displayed.

12. Depressing **NEXT UNIT** again causes Test 2 to be executed, starting the sequence over with the first equipped carrier.

Test 3

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Test 3 is used to busy out or release from busy an individual circuit within a carrier.

- 1. Test 3 is selected by NEXT TEST.
- 2. When Test 3 is called in, a default carrier may be displayed in Fields 2 through 4.

A completely or partially busied out carrier last displayed in Test 1 or 2 (if any) is the default carrier for Test 3.

The first circuit within the carrier is displayed in Fields 5 and 6. Fields 7 and 8 display the carrier type and maintenance busy status of the circuit.

- 3. If no default carrier from Test 1 or 2 is displayed, Field 2 is blanked and the decimal point in Field 2 is flashed indicating a mandatory entry field.
- 4. To execute Test 3, an equipment location must be entered in Fields 2 through 6.
- 5. Either the default circuit displayed can be used or another circuit can be selected by entering its equipment location in Fields 2 through 6:

(Module number); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER.

PROC 632 Test 3

- 6. To start Test 3, depress EXECUTE.
- 7. The status of the selected circuit is displayed as follows:

Field 1 - 3.

Fields 2 through 6 - Equipment location of circuit.

Field 7 - Carrier type.

Field 8 - Maintenance busy status of circuit.

Field 9 - Total modules in switch.

Field 10 - Total cabinets in displayed module.

Field 11 - Total carriers in displayed cabinet.

Field 12 - Total circuits in displayed carrier.

Field 13 - Total circuits busied out in displayed carrier.

Field 14 - 0 or total carriers with busy circuits.

Note: Total number of carriers with busy out circuits are only displayed in Field 14 if the carriers were found and displayed in Test 1.

8. Depressing **RLS BUSY OUT** releases from busy the displayed circuit location.

Caution: If a trunk or terminal that is up on a connection is busied out, the connection is dropped.

- 9. Depressing BUSY OUT busies out the displayed circuit location.
- 10. Depressing **NEXT CIRCUIT** advances to the next equipped circuit in the carrier displayed . and updates the **MAAP** display with its status.
- 11. Depressing **NEXT UNIT** advances the test to the next equipped circuit in the next equipped carrier and updates the **MAAP** display with its status.
- 12. When the last circuit in the last carrier in the switch is displayed, depressing **NEXT UNIT** or **NEXT CIRCUIT** once more dashes all fields except the test number and the total carriers with busy circuits (Fields 1 and 14).

Note: After the display is dashed, depressing **BUSY OUT** or **RLS BUSY OUT** causes error code 10 to be displayed.

13. Depressing **NEXT CIRCUIT** or **NEXT UNIT** again causes the first equipped carrier and the first equipped circuit in that carrier to be found and displayed.

PROC 640

PROC 640 - TRUNK FAILURES

FL IS	IPCHART SUE 1			+			+		 TŔ	NNK	FAI	LURE	S			ł	<u> </u>	+			<u></u>
MA BU (F 0= 1=	INTENANCE SY STATUS IELD 10); NOT BUSY BUSY	TR FI 1= 2= 3= 4=	UNK DA ELD 14 SIGNAL DATA W DYNAMI FROZEM	ITA I: ING S HEN F IC DAT DATA	EQUENCI AILURE A (TEST	E (TÉŠ OCCUR T 2) 2)	:T 1} IRED (TI	EST 1)	FIELD 0-6=1 7=S 8=F	I 15: RUNK ICAN S AILIN IO MS.	TABLE TATUS IG STI COUM	1NDE: MULUS ITER (X (TEST TEST 2	r 1). 2)	F1E SEE DOC	LD 16: Mainte Umentat	NANCE ION.		FIELD 0-9=Pf F	17: RIOR C ROZEN	CODE INDÉX FOR DATA (TYPE 4)
6																					NETWORK
NORC																					640

FL IS	IPCHART SUE 1		+		+			TRU	NK F	FAILUF	ES		+		+			
TEST USE GROU CIRC	T 1: DISPLAY I 'NEXT UNIT' JP OF 6 FAILED CUITS ONE AT J	FAIL HIS TO DISPL D CIRCUI A TIME,	TORY. USE AY NEXT F TS. USE 'I	'NEXT ÁIL CÓ CLEAR	CÍRCUIT' DE. USE ' DATA', 'E	TO DISPLA Next fault Xecuté' to	Y NEXT ' TO I Retir	T FAI DISPL RE AL	LED (AY NE ARMED	CIRCUIT EXT	FA 1= 2= 3=	ILUR SIGN CALL QUEU	E CODES (FIEL ALING SEQUENC PROCESSING E AUDIT	D 11): E			SPE 81-	CIAL ERROR CODE: NOT BUSIED BECAUSE MESSAGE TRANSMISSION
TEST DAT/ TO 1	TEST 2 (SEE NOTE): MONITORS TRUNK DATA. USE 'EXECUTE' TO DISPLAY DYNAMIC TRUNK DATA CODE (FIELD 16). USE 'STOP' TO FREEZE DYNAMIC TRUNK DATA. USE 'NEXT UNIT' TO DISPLAY PRIOR TRUNK DATA CODES FOR DATA TYPE 4. 4-TRUNK FALSELY ACTIVE 5-QUARANTINE (T_LIMBO) 6-CAUSEO ALARM 7-SEQUENCE INITIALIZE														TO MODULE PRŌCĒSŠOR FAILED			
USE	'BUSY OUT' OF TUS. CAUTION:	R 'RELEA'	SE BUSY O	UT' TO ROP A	CHANGE M	AINTÉNANCE CALL.	BUSY		USE DATA	'NEXT DA IN FIEL	TA'	to a 5 Ani	DVANCE TRUNK D 16	NOTE: TR Call Pro	UNK DAT CESSING	A COD DOCU	ES RI	EQUIRE EXTENSIVE ATION.
		TEST 2			TRUN	K DIAL		u.	Γ				TRUNK	DATA				
l	ÉQUÍ	EPMENT LO	CATION		ACCES	IS CODE	NB SI	8	н я	۲ ۲ ۲						Ĭ		NETWORK
TEST					FIRST	2 t e t	INT STAT	, III	N N	ALL	TYPE	1DE X		CODE				
1	MODULE C	AB CARR	SLOT	CKT 6 6		e DIGI	10	EF]		2 13	14	≝ 15			1 16			640

Purpose

PROC 640 is used when referenced from **PROC 600** (Alarm causes/error log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a trunk failure.

PROC 640 does not perform any trunk tests.

PROC 640 is used to:

- 1. Display the trunk failures detected during call processing.
- 2. Monitor trunk activity.

The data displayed requires extensive call processing documentation for interpretation.

Field Definitions and Codes

Each field of **PROC 640** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AL, PROC 640 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Fields 2 through 6 Select equipment location of trunk to be monitored (Test 2 only).

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PROC 640

TABLE AL.

	PROC 640 FIELD DEFINITIONS AND CODES											
FIELD	CODE	DEFINITION										
1	1, 2	Test number.										
2	0-30	Module number.										
3	0-7	Cabinet number.										
4	0-3	Carrier number										
5	0-21	Slot number										
6	0-3	Number of circuit assigned to trunk.										
7		First digit of dial access code:										
i	1-9 11 12	1-9 * #										
8	0-9	Second digit of dial access code.										
9	0-9	Third digit of dial access code.										
10	0	Maintenance busy status: Not busied out. Busied out.										
11		Failure code:										
	1	Trunk signaling sequence failure.										
	2	Call processing failure.										
	3	Queue audit failure.										
	4	Trunk falsely active failure.										
	5	Trunk now in quarantine (T_LIMBO).										
	6	Failure caused alarm.										
	7	Sequence initialization.										
12	0-6	Number of failures.										
13	1-6	Failure index for individual failures.										

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TABLE AL. (Contd)

	FIELD	PROC 640 DEFINITIONS AND CO	DDES (Contd)							
FIELD	CODE		DEFINITION							
14	1 2 3 4	Trunk data type: Trunk signaling s Data when failur Dynamic trunk d Frozen (dynamic)	sequence failure (Test 1). e occurred (Test 1). ata (Test 2).) trunk data (Test 2).							
15	0-7 8	Trunk data index (used for trunk data t 2-4). Failing stimulus (Test 1, type 2). 10-MS cou (Test 2).								
16	0-	Trunk data code.								
		Data type 1: When trunk data type is a 1, trunk data code is the trunk signaling seque and sequence step at the time the failure occ red. (The low 2 octal chracters are the seque step and the next octal characters are the guence number.)								
		Data type 2-4, ind types 2-4 are selecter responds to the layor ble 0-6, selected by 15.	ex 0-6: When trunk data ed, this trunk data code cor- out of one word of trunk ta- the index displayed in field							
		Data type 2-4, index 7 is selected, the tru the following scan s git positions from h	7: When trunk data index nk data code corresponds to tatus encodes (counting di- eft to right in field 16):							
		DIGIT POSITION	CONTENTS							
		1, 2	Dial mask (0-17)*							
		3, 4	Last look (0-17)*							
		5,6	Demand scan (0-17)*							
		* 0-3 for most	trunks							

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TABLE AL. (Contd)

	PROC 640 FIELD DEFINITIONS AND CODES (Contd)												
FIELD CODE DEFINITION													
16 (Contd)		Data type 2-4, index 8: The stimulus from call processing at the time the failure was detected by a trunk signaling sequence, or a call process- ing routine. The trunk data for index 8 will be 0 for isolated failure codes 3 or 4 (corresponding to audit failures).											
17	0-9	Prior code index. Used only for trunk data type 4. When STOP is operated to freeze dynamic data (going from data type 3 to data type 4), 0 is displayed. The newest trunk data is displayed in field 16 when the prior code index is 0. Larger prior code in- dexes correspond to older data.											

Operation of Procedure

Overview

PROC 640 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from a trunk failure.

To call in PROC 640, perform the following:

- 1. Depress PROC NO; 640; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, and all other fields are dashed.

3. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Two tests are available:

- 1. Test 1 Displays failure history.
- 2. Test 2 Monitors trunk activity.

Test 1

Test 1 provides a failure history of trunk failures (in groups of six) recorded by the on-line maintenance software.

Test 1 can also be used to resolve the cause of the alarmed trunk circuits, one at a time.

1. Test 1 is the default test when entering **PROC 640**, or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

- 2. To start Test 1, depress EXECUTE.
- 3. A summary of the failure history is displayed in groups of six.
- 4. If no failures occurred, Field 1 displays a 1, Field 12 displays a 0, and all other fields are dashed.
- 5. If one or more failures occurred, the following is displayed:

Field 1 - 1.

Fields 2 through 6 - Equipment location of failing trunk circuit.

Fields 7 through 9 - Trunk dial access code of displayed trunk circuit.

Field 10 - Maintenance busy status of displayed trunk circuit.

Field 11 - Lowest failure code for displayed trunk circuit.

Field 12 - Number of failures (first group).

Field 13 - Failure index.

Field 14 - Trunk data type (1, 2, or dashed).

Field 15 - Trunk data index (dashed if Field 14 is dashed).

Field 16 - Trunk data code (dashed if Field 14 is dashed).

Field 17 - Dashed.

6. Depressing **NEXT UNIT** repeatedly displays the remaining failure codes (if any) associated with the displayed trunk circuit.

Depressing **NEXT UNIT** after all failure codes are displayed dashes Field 11.

Depressing **NEXT UNIT** once more displays the lowest failure code again.

7. Depressing **NEXT DATA** advances through trunk table data and scan status that were recorded when the trunk circuit failed.

Note: The trunk data displayed in Field 16 when trunk data type 2 is displayed in Field 14 requires extensive call processing documentation for interpretation.

- 8. When trunk data type 2 is displayed in Field 14, indices displayed in Field 15 ranging from 0 to 6 correspond to octal encode trunk table data from TRKTBL0 through TRKTBL6.
- 9. An index of 7 displayed in Field 15 corresponds to scan status for the trunk circuit at time of failure.

PROC 640 Test 1

10. The scan status is determined by counting digit positions from left to right in Field 16:

Digit positions 1 and 2 = Dial mask (0-17) contents.

Digit positions 3 and 4 = Last look (0-17) contents.

Digit positions 5 and 6 = Demand scan (0-17) contents.

Note: Zero (0) through 3 is displayed for most trunks.

11. The stimulus from call processing at the time the failure was detected by a trunk signaling sequence or a call processing routine corresponds to an index of 8.

The trunk data for index 8 is 0 for isolated failure codes 3 or 4 (corresponding to audit failures).

12. Depressing **NEXT CIRCUIT** repeatedly displays the failure histories (maximum of six) of the remaining failed circuits in the first group.

Depressing **NEXT CIRCUIT** after all failure histories in the group are displayed (indicated by Fields 12 and 13 being equal) dashes the display.

13. When Field 12 (number of failures) equals six, depressing **NEXT FAULT** freezes the failure histories in groups of six and causes the first failed circuit within the next group to be displayed.

Depressing **NEXT CIRCUIT** steps through the remainder of the failing circuits within the new group.

- 14. **NEXT FAULT** can be used to step to the next group of six failures when the preceding group contained at least six failures.
- 15. Depressing **NEXT FAULT** when the preceding group had less then six failures, or when no other failures are recorded by the failure history dashes the display.
- 16. Depressing **NEXT CIRCUIT** or **NEXT FAULT** after all failures are displayed (maximum of 60) causes Test 1 to be executed, starting the sequence over with an updated failure history.

Caution: Busying out a trunk when the trunk is in use disrupts service by disconnecting the call.

- 17. Once a trunk location is displayed, **BUSY OUT** and **RLS BUSY OUT** can be used to change the maintenance busy status (Field 10) of the trunk circuit.
- 18. All trunks busied out during testing should be released from the busied out condition using **RLS BUSY OUT** before leaving **PROC 640**.

Note: Field 10 should be used to determine whether the trunks being tested are released from busy out as the **BUSY OUT** indicator on the **MAAP** turns off only when all circuits interfacing with the **MAAP** are no longer busied out.

19. To turn off the **OTHER FAILS** fault indicator (assuming no other sources are affecting the **OTHER FAILS** fault indicator) after Test 1 is executed at least once, perform the following for each trunk circuit recorded as failing:

Display the failing circuit in Fields 2 through 6.

Depress CLEAR DATA; EXECUTE.

Note: Trunk circuit alarmed entries are marked as resolved in PMIDS.

20. The **OTHER FAILS** fault indicator is automatically turned off by Test 1 (indicating the trunk alarm cause is resolved) when the following conditions are met:

All trunk circuit failures are cleared.

All other sources affecting the **OTHER FAILS** fault indicator are cleared.

Test 2

Test 2 monitors trunk data for a selected trunk circuit equipment location.

1. Test 2 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

2. When Test 2 is called in, a default trunk circuit (last trunk circuit displayed in Test 1) is displayed in Fields 2 through 6, or Fields 2 through 6 are dashed.

Either the default trunk circuit can be tested or another trunk circuit can be selected for testing.

- 3. The module field of the trunk circuit equipment location (Field 2) is flashed when Test 2 is initially called in, indicating it is an optional entry field.
- 4. To select another trunk circuit for testing, enter its equipment location in Fields 2 through 6:
 - (Trunk circuit module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER.
- 5. To start Test 2, after selecting a trunk circuit to be tested, depress **EXECUTE**.
- 6. While Test 2 is executing, the following information is displayed:

Field 1 - 2.

Fields 2 through 6 - Equipment location of the trunk circuit being tested.

Fields 7 through 9 - Trunk dial access code of trunk circuit being tested.

Field 10 - Maintenance busy status of trunk circuit being tested.

Fields 11 through 13 - Dashes.

Field 14 - Trunk data type (initial value = 3).

Field 15 - Trunk data index (initial value = 0).

Field 16 - Trunk data code (changing).

Field 17 - Prior code index (if applicable).

- Prior code data is only saved when Test 2 is executing in the dynamic type 3 display mode. When the trunk data selected for display changes, all related trunk data are recorded for later display.
- 8. The maximum recording rate is approximately one sample per 30 milliseconds (ms). The dynamic type 3 display of the selected trunk data code is updated at a much slower rate.
- 9. Frozen changes may hold information which was never displayed.
- 10. Depressing STOP causes the trunk data type 3 (dynamic) in Field 10 to change to 4 (frozen data).

When STOP is depressed all trunk data are recorded and frozen.

11. NEXT DATA can be used to display related frozen trunk data that was recorded at the same time the monitored trunk data change was recorded.

Depressing **NEXT DATA** advances the trunk data index (Field 15) for either dynamic data type 3 or frozen data type 4 (both in Field 14).

Depressing NEXT DATA continuously advances the trunk data index from 0 through 8 and back to 0.

- 12. Depressing NEXT UNIT controls the display of the prior data index in Field 17, and is restricted to the display of frozen data type 4 (Field 14).
- 13. If **NEXT UNIT** is depressed once, and at least one change in the dynamic data was recorded, a 1 is displayed in Field 17.
 - This indicates that the trunk data code in Field 16 corresponds to the contents of the dynamic display field just before it changed to the value displayed when **STOP** was depressed.
- 14. Depressing **NEXT UNIT** continuously increments the prior code index in Field 17 and shows corresponding older trunk data codes in Field 16.

Depressing NEXT UNIT after the oldest prior data is displayed dashes Fields 16 and 17.

Depressing **NEXT UNIT** again displays the newest frozen data.

15. When type 4 frozen data is displayed, **NEXT UNIT** is depressed to display older trunk data as indicated by a prior index being displayed in Field 17.

Other data items that were recorded while in the dynamic data mode (type 3), can be displayed by repeatedly depressing **NEXT DATA**.

The displayed data corresponds to the definition defined in Table AL, PROC 640 - Field Definitions and Codes.

16. The relative timing between two prior data code indexes can be obtained from the two values of the 10-ms octal counter displayed (when trunk data index displayed in Field 15 = 8).

Convert this octal difference to decimal and multiply by 10 to obtain the difference in milliseconds.

- 17. When in the dynamic mode (type 3), all trunk data is recorded when the selected data changes.
- 18. PROC 640 checks for a change about every 30 ms. Therefore, time difference accuracy is about 30 ms.

19. A change in less than 30 ms may not be detected.

Heavy traffic can further degrade the accuracy of these time differences.

Caution: Busying out a trunk when the trunk is in use disrupts service by disconnecting the call.

- 20. Once a trunk location is displayed, **BUSY OUT** and **RLS BUSY OUT** can be used to change the maintenance busy status (Field 10) of the trunk circuit.
- 21. All trunks busied out during testing should be released from the busied out condition using **RLS BUSY OUT** before leaving **PROC 640**.

Note: Field 10 should be used to determine whether the trunks being tested are released from busy out as the **BUSY OUT** indicator on the **MAAP** turns off only when all circuits interfacing with the **MAAP** are no longer busied out.

22. To select another trunk circuit for testing, after the first trunk circuit is tested, use the **CHANGE FIELD** sequence:

CHANGE FIELD; 2; ENTER; (Trunk circuit module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER.

23. **EXECUTE** must be depressed to test the trunk circuit selected for testing.

Repair Guide

Overview

When a trunk failure is indicated, **PROC 640** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted, perform the following repair procedure.

This repair procedure is divided into two general cases.

- 1. Trunks in a nonidle state (T_LIMBO) which are in quarantine failure code 5 displayed in Field 11.
- 2. Trunks not in T_LIMBO no failure code 5 displayed in Field 11.

General

- 1. Execute Test 1 to display all trunk failures.
- 2. Use **NEXT UNIT** to display all of the failure codes for the first failed trunk selected for repair.
- 3. If the dial access code displayed in Fields 7 through 9 is dashed, use **PROC 100** to determine restrictions on the trunk for making test calls.

The dial access code displayed in Fields 7 through 9 may be an attendant access code that cannot be dialed from a terminal.

Description of Trunks in T_LIMBO

1. Most trunk failures are trunks that are locked in T_LIMBO by invalid conditions on the tip and ring.

2. One example is a ground on the tip of an SN230 ground start trunk.

When this failure exists, the switch quarantines the trunk from use by call processing by placing it in the T_LIMBO state.

3. Periodic attempts are made to order the T_LIMBO trunk back to its idle state.

The T_LIMBO state (Failure code 5 displayed in Field 11) of a displayed failed trunk in Test 1 is checked each time **EXECUTE** is operated, or when **NEXT CIRCUIT** displays the first failed trunk.

- 4. When a trunk has been in T_LIMBO for more than 15 consecutive minutes, failure code 6 is displayed.
- 5. Failure codes 5 and 6 = Trunk failure is the cause for the **OTHER FAILS** fault indicator being turn on, and trunk is in T_LIMBO.
- 6. Failure code 5 but not 6 = Trunk is in T_LIMBO, but not long enough to set the **OTHER FAILS** fault indicator.
- Failure code 6 but not 5 = Trunk was in T_LIMBO for more than 15 consecutive minutes and is the cause for turning on the OTHER FAILS fault indicator, but became idle and is now in service for call processing.

Trunk Signaling Sequence Failures

- 1. The Trunk Signaling Sequence Failures Table is used to decode the failure data displayed by Test 1.
- 2. This table is organized by increasing sequence number shown in octal in column 2.
- 3. If a trunk signaling sequence failure exit exists, this failure exit step is listed.

If the sequence has no failure exit, no step is listed.

4. The data displayed in Field 16 for a trunk signaling sequence failure is used to match the octal encode in column 1 of the table.

This line in the table defines the failure, or refers to another line that defines the failure.

5. A trunk signaling sequence failure is specified by the following display:

Field 1 - 1.

Field 14 - Trunk data type.

Field 16 - Trunk data code = Sequence failure number; step used to find the entry in Table AM, PROC 640 - Trunk Signaling Sequence Failures.

6. The range of octal encodes that appear in trunk table 2 (TRKTBL2) for this sequence number are shown in column 4.

The highest character (when set to 1) specifies that a trunk signaling sequence is active. The low 4 octal characters contain the packed sequence number and step.

7. The name of the sequence that controlled signaling for the trunk at the time of failure appears in column 5.

The full descriptive title for this name appears in Table AN, PROC 640 - Trunk Signaling Sequences.

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TABLE AM.

	PROC 640 TRUNK SIGNALING SEQUENCE FAILURES													
						SUCCESS	STIMU	ILUS	1					
TEST 1 OCTAL ENCODE	NUMBER	STEP	TRUNK TABLE 2 OCTAL RANGE	NAME	TYPE OF FAILURE*	SCAN DATA	ок	FAIL	SUSPECTED FAILURE					
(1) GSTKS	— Grou	ind S	Start Trunk (S	N230)										
103	103 1 3			SZGST1	Invalid Scan Data	101	1	17	SN230 if scan = 2 or 3 CO if scan = 0					
107	1	7	100021-100030	SZGST1	4-second time-out before loop current.	101, 103	2	17	CO or SN230 if scan = 0 SN230 if scan = 2					
203	2 3 100041-100046		GSINSZ	SINSZ 1 minute time out		2	17	Ground on tip if scan = 1 SN230 if scan = 3						
405	4	5	100101-100106	ANSGST	2-second time-out before loop current.	101, 102	2	17	CO if scan = 0 SN230 if scan = 1, 2, or 3					
506	5	6	100121-100131	DISGST	128-second time- out before idle.	0	0	17	Ground on ring if scan = 1 CO if scan = 2 or 3.					
607	6	7		DISGS2	128-second time- out before idle	0	0	17	SN230 if scan = 1, CO if scan = 1 or 3					
(2) GSTKP	— Grou	nd S	Start Trunk wi	th Party Te	est (SN230)									
1103	11	3		SZGSP1	Same as 103									
1107	11	7	100221-100238	SZGSP1	4-second time-out before any scan change.	102	1	17	CO or SN230 if scan = 0 SN230 if scan = 3					

*See Octal Sequence column for "same as" number.

11

TABLE AM. (Contd)

PROC 640 TRUNK SIGNALING SEQUENCE FAILURES (Contd)												
7567 1		NCE	TOUNK TABLE 2			SUCCESS	STIMULUS		SUSPECTED			
OCTAL ENCODE	NUMBER	STEP	OCTAL RANGE	NAME	TYPE OF FAILURE*	DATA	ок	FAIL	FAILURE			
(2) GSTKP – Ground Start Trunk with Party Test (SN230) (Contd)												
1114	11	14	100221-100238	SZGSP1	125 ms time-out before loop current.	102	1	17	CO if scan = 0 LC08 if scan = 2 Same as 1107			
1203	12	3	100241-100246	GSINSZ	Same as 2.							
1304	13	4	100261-100265	GSTONH	Same as 3.							
1403	14	3	100301-100306	ANSGST	Same as 4.							
1507	15	7	100321-100331	DISGST	Same as 5.							
	17		100361-100367	ABDNCL	Same as 7.							
(3) DITKS -	– Direc	et In	ward Dialing (DID) Trunk	: (SN232)							
2204	22	4	100441-100451	DIDWSS	1-second time-out before DID incoming seize.	303	2	17	CO if scan = 2 SN232 if scan = 0 or 1			
	23		100461-100465	DIDCOD		0			SN232 if scan = 2 or 3			
2403	24	3	100501-100504	DIDANS	1-second time-out before DID talk state.	303	2	17	CO if scan = 2 SN232 if scan = 0 or 1			
2504	25	4	100521-100530	DIDPDX	126-second time- out before idle.	0	1	17	CO if scan = 2 SN232 if scan = 0 or 1			
	26		100541-100547	DIDMDD		0			SN232 if scan = 1 or 3			

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*See Octal Sequence column for "same as" number.

TABLE AM.	(Contd)
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PROC 640 TRUNK SIGNALING SEQUENCE FAILURES (Contd)											
	OCTA SEQUEN	IL NCE				SUCCESS	STIMU	LUS			
TEST 1 OCTAL ENCODE	NUMBER	STEP	TRUNK TABLE 2 OCTAL RANGE	NAME	TYPE OF FAILURE*	DATA	ок	FAIL	FAILURE		
(4) TITKS -	– Tie T	runk	(SN233)				_				
3102	31	2	100621-100623	TIEOGS	1-second time-out before switch off- hook.	202	2	17	Far end if scan = 3 SN233 if scan = 0 or 1		
3202	32	2	100641-100643	TIEINC	300 ms time-out before distant end off-hook.	101	1	17	Far end if scan = 0 SN233 if scan = 2 or 3		
	33		100661-100665	TIEDOH							
	34		100701-100707	TIEANS	1-second time- out before switch off-hook.	202	2	17	Far end if scan = 3 SN233 if scan = 0 or 1		
3503	35	3	100721-100724	TIELDS	30-second time- out before switch on-hook.	0	3	17	SN233 if scan = 2 or 3 Far end if scan = 1		
	36		100000						SN233		
	36		100741-100743	TIEDAN		202,303					
	37		100761-100766	TIEMDD		0					
(5) CCSATH	x CC	SA 1	ncoming Wink	Start Trur	ık (SN233)						
4102	41	2	101021-101023	TIEOGS	Same as 31.						
4204	42	4	101041-101051	CCSAIN	300 ms time-out before both ends off-hook.	303	2	17	Far end if scan = 2 SN233 if scan = 0 or 1		
	43	1	101061-101065	TIEDOH	Same as 33.						
4406	44	6	101101-101107	TIEANS	Same as 34.						
4503	45	3	101121-101124	TIELDS	Same as 35.						

*See Octal Sequence column for "same as" number.

TABLE AM. (Contd)

PROC 640 TRUNK SIGNALING SEQUENCE FAILURES (Contd)											
TECT 1		NCE	TRINK TABLE 2			SUCCESS SCAN	STIMU	LUS	SUSPECTED		
OCTAL ENCODE	NUMBER	STEP	OCTAL RANGE	NAME	TYPE OF FAILURE*	DATA	ок	FAIL	FAILURE		
(5) CCSATE	к — СС	SA I	ncoming Wink	Start Trun	k (SN233) (Contd)						
	46		101141-101143	TIEDAN	Same as 36.						
	47		101161-101166	TIEMDD	Same as 37.						
(6) ANICT	— Auto	mati	c Number Ider	tification (ANI) Trunk (SN24	2)					
5106	51	6	101221-101227	ANI_CO	175 ms time-out before idle.	0	0	17	Central office SN242		
5206	52	6	101241-101247	ANI_CS	175 ms time-out before idle.	0	0	17	CCSA office SN242		
	53		101261-101262	ANI2DY		101-CO, 202-CCSA	-				
	54										
	55										
	56										
	57										
	•	S	equence numbe	rs 61-67 are	e the same as 51-57	7.					
(7) SPGTK	— Auxi	iliar	y Trunk (SN23	ι)	,	(
7102	71	2	101621-101623	RLSGSL	4-second time-out before sleeve grounds detected.	202	2	17	Far end SN231		
7202	72	2	101641-101643	SZAUXT	4-second time-out before sleeve grounds detected.	202	2	17	Far end SN231		
	75		101721-101723	RLSAUX		0					

*See Octal Sequence column for "same as" number.

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PROC 640

TABLE AM. (Con	itd)
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PROC 640 TRUNK SIGNALING SEQUENCE FAILURES (Contd)											
TECT)		IL VCE	TRUNK TABLE 2			SUCCESS	STIMU	LUS			
OCTAL ENCODE	NUMBER	STEP	OCTAL RANGE	NAME	TYPE OF FAILURE*	DATA	ок	FAIL	FAILURE		
(8) CCSATE	D — C	CSA	Trunk (SN233)							
10102	101	2	102021-102023	TIEOGS	Same as 31.						
10202	102	2	102041-102043	TIEINC	Same as 32.						
	103		102061-102065	TIEDOH	Same as 33.						
10406	104	6	102101-102107	TIEANS	Same as 34.						
10503	105	3	102121-102124	TIELDS	Same as 35.						
	106		102141-102143	TIEDAN	Same as 36.						
	107		102161-102166	TIEMDD	Same as 37.						
(9) CCSASH	(– CC	SA I	Delay Dial Out	going Trunl	K (SN233)						
11102	111	2	102221-102227	CCSDDO	1-second time-out before any scan change (especially switch off-hook).	20X X=don't care	ANY	17	SN233		
11202	112	2	102241-102243	TIEINC	Same as 32.						
	113		102261-102265	TIEDOH	Same as 33.						
11406	114	6	102301-102307	TIEANS	Same as 34.						
11503	115	3	102321-102324	TIELDS	Same as 35.						
	116		102341-102343	TIEDAN	Same as 36.						
	117		102361-102366	TIEMDD	Same as 37.						
(10) MSCQ	– Main	Sat	ellite (Unused	Sequence G	roup) (SN233)						
17. (16.) AME	Sequen	ce n	umbers 121-130) are unuse	d						

*Šee Octal Sequence column for "same as" number.

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TABLE	AM.	(Contd)
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PROC 640 TRUNK SIGNALING SEQUENCE FAILURES (Contd)												
		NCE				SUCCESS	STIMULUS		SUSPECTED			
OCTAL ENCODE	NUMBER	STEP	OCTAL RANGE	NAME	TYPE OF FAILURE*	DATA	ок	FAIL	FAILURE			
(11) CCSAD	02 - 0	CCSA	A Delay Dial O	utgoing, Ind	coming Wink Start	Trunk (SN	[233)					
13102	131	2	102621-102627	CCSDDO	Same as 111.							
13204	132	4	102641-102651	CCSAIN	Same as 42.							
	133		102661-102665	TIEDOH	Same as 33.							
13406	134	6	102701-102707	TIEANS	Same as 34.							
13503	135	3	102721-102724	TIELDS	Same as 35.							
	136		102741-102743	TIEDAN	Same as 36.							
	137		102761-102766	TIEMDD	Same as 37.							
(12) TIEDD	ww –	Tie V	Wink or Delay I	Dial Outgoin	g, Delay Dial Incom	ing Trunk (SN233)				
14102	141	2	103021-103027	TIEWDO	1-second time-out before any scan change (especially switch off-hook).	20X X=don't care	ANY	17	SN233			
14106	141	6	103021-103027	TIEWDO	1-second time-out before distant end on-hook.	202	0	17	Far end if scan = 3 SN233 if scan = 0 or 1			
14204	142	4	103041-103051	CCSAIN	Same as 42.	-						
	143		103061-103065	TIEDOH	Same as 33.							
14406	144	6	103101-103107	TIEANS	Same as 34.							
14503	145	3	103121-103124	TIELDS	Same as 35.							
	146		103141-103143	TIEDAN	Same as 36.							
	147		103161-103167	TIEMDD	Same as 37.							

*See Octal Sequence column for "same as" number.

TABLE AM. (Contd)

			TRUNK S	PI IGNALING S	ROC 640 EQUENCE FAILURES	(Contd)			
	OCTA SEQUE	NCE				SUCCESS	STIMULUS		
OCTAL ENCODE	NUMBER	STEP	OCTAL RANGE	NAME	TYPE OF FAILURE*	DATA	ок	FAIL	FAILURE
(13) TIETTI	M — Ti	e Wi	nk or Delay Di	ial Outgoin	g Trunk (SN233)				
15102	151	2	103221-103227	TIEWDO	Same as 141, Step 2.				
15106	151	6	103221-103227	TIEWDO	Same as 141, Step 6.				
15202	152	2	103241-103243	TIEINC	Same as 32.				
	153		103261-103265	TIEDOH	Same as 33.				
15406	154	6	103301-103307	TIEANS	Same as 34.				
15503	155	3	103321-103324	TIELDS	Same as 35.				
	156		103341-103343	TIEDAN	Same as 36.				
	157		103361-103367	TIEMDD	Same as 37.				
(14) DLTNE	ET –	Dial	Tone Detector	(SN250)					
,	Sequen	ce n	umbers 161-17() are unuse	d.			-	
(15) RLTSO	DR = 1	Relea	ase Link Trunk	(SN233)					
17102	171	2	103621-103627	RLTOGS	1-second time-out before switch off-hook.	202	0	17	SN233 if scan = 0 or 1 Far end if scan = 3
	172		103641-103654	RLTOG2		3			
17302	173	2	103661-103667	RLTDOH	1-second time-out before switch on-hook.	0	3	17	SN233 if scan = 2 or 3 Far end if scan = 1

*See Octal Sequence column for "same as" number.

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TABLE AM. (Contd)

			TRUNK S	P IGNALING S	ROC 640 SEQUENCE FAILURES	(Contd)			<u>,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,</u>	
TECT		AL NCE	TRUNK TABLE 2			SUCCESS	STIMULUS			
OCTAL ENCODE	NUMBER	STEP	OCTAL RANGE	NAME	TYPE OF FAILURE*	DATA	OK FAIL		FAILURE	
(15) RLTSO	DR _ 1	Rele	ase Link Trunk	(SN233) (0	Contd)					
17306	173	6	103661-103667	RLTDOH	1-second time-out before distant end on-hook.	0	3	17	Far end if scan = 1 SN233 if scan = 2 or 3	
17504	175	4	103721-103730	RLTDSC	30-second time- out before both ends on-hook.	0	3	17	Far end if scan = 1 SN233 if scan = 2 or 3	
	176		103741-103743	RLTFLH		202,203				
17702	177	2	103761-103770	RLTOGR	1-second time-out before switch off-hook.	202	0	17	SN233 if scan = 0 or 1 Far end if scan = 3	
(16) INCRL'	rsq —	Inco	ming Release I	Link Trunk	(SN233)	<u>.</u>		L		
20202	202	2	104041-104043	TIEINC	Same as 32.					
	203		104061-104065	TIEDOH	Same as 33.					
20406	204	6	104101-104107	TIEANS	Same as 34.					
20503	205	3	104121-104124	TIELDS	Same as 35.					
	206		104141-104147	IRLFLH						
(17) MSIS -	(17) MSIS – Main Satellite Outgoing Trunk (SN233)									
21102	211	2	104221-104223	TIEOGS	Same as 31.					
	213		104261-104277	MSFLSH		0				
21406	214	6	104301-104307	TIEANS	Same as 34.					

*See Octal Sequence column for "same as" number.

TABLE AM. (Contd)

PROC 640 TRUNK SIGNALING SEQUENCE FAILURES (Contd)											
TECT 1	OCTA SEQUEN	NCE	TPUNK TABLE 2			SUCCESS	STIMULUS		SUSPECTED		
OCTAL ENCODE	NUMBER	STEP	OCTAL RANGE	NAME	TYPE OF FAILURE*	DATA	ок	FAIL	FAILURE		
(17) MSIS -	- Main	Sate	ellite Outgoing	Trunk (SN:	233) (Contd)						
21504	215	4	104321-104330	RLTDSC	Same as 175.						
	216		104341-104343	TIEDAN	Same as 36.						
	217		104361-104366	TIEMDD	Same as 37.						
	220		104401-104403	RLTFLH	Same as 176.						
	221		104421-104432	MSGFLH		303					
	Sequen	ice n	umbers 222-230) are unuse	d.						
(18) MSWS	– Maiı	n Sa	tellite Wink St	art Outgoin	ig and Incoming Tr	unk (SN23	3)				
23102	231	2	104621-104627	MSWSOT		202					
23204	232	4	104641-104651	CCSAIN	Same as 42.						
	233		104661-104677	MSFLSH	Same a 213.						
23406	234	6	104701-104707	TIEANS	Same as 34.						
23504	235	4	104721-104730	RLTDSC	Same as 175.						
	236		104741-104743	TIEDAN	Same as 36.						
	237		104761-104766	TIEMDD	Same as 37.						
	240		105001-105003	RLTFLH	Same as 176.						
	241		105021-105032	MSGFLH	Same as 221.						
Sequence numbers 242-250 are unused.											
(19) MSDD	(19) MSDD — Main Satellite Delay Dial Outgoing Trunk (SN233)										
25102	251	2	105221-105227	CCSDDO	Same as 111.						

*See Octal Sequence column for "same as" number.

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TABLE AM. (Contd)

	PROC 640 TRUNK SIGNALING SEQUENCE FAILURES (Contd)												
TECT 1						SUCCESS	STIMULUS		SUISPECTED				
OCTAL ENCODE	NUMBER	STEP	OCTAL RANGE	NAME	TYPE OF FAILURE*	DATA	ок	FAIL	FAILURE				
(19) MSDD-	Main S	atell	ite Delay Dial	Outgoing T	'runk (SN233) (Con	itd)							
25202	252	2	105241-105243	TIEINC	Same as 32.								
	253		105261-105277	MSFLSH	Same as 213.								
25406	254	6	105301-105307	TIEANS	Same as 34.								
25504	255	4	105321-105330	RLTDSC	Same as 175.								
	256		105341-105343	TIEDAN	Same as 36.								
	257		105361-105366	TIEMDD	Same as 37.								
	260		105401-105403	RLTFLH	Same as 176.								
	261		105421-105432	MSGFLH	Same as 221.								
	Sequen	ce n	umbers 262-310) are unuse	d.								

*See Octal Sequence column for "same as" number.

Test Calls

- 1. Test calls when using this maintenance procedure are defined as any way you can make the call to exercise the trunk signaling sequences for the trunk under test.
- 2. Use **PROC 100**, and other trunk administrative procedures, to determine any trunk restrictions that may interfere with making test calls.
- 3. All of the trunk signaling sequences for a trunk type should be exercised (where valid) to ensure complete testing of a trunk when using test calls.
- 4. **PROC 642** can be used to make outgoing test calls, but other methods must be used to check the trunk for incoming calls.

When **PROC 642** is being used, **PROC 640** cannot monitor the call, but can only be used later to display a possible failure stimulated by **PROC 642**.

- 5. Use the trunk verification feature to help select the trunk being tested from many in the trunk group. Make calls to exercise as many trunk sequences for the trunk as possible.
- 6. **PROC 177** can be used to relate the trunk equipment location to the trunk number used by trunk verification.
TABLE AN.

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	TRUN	PROC 640 IK SIGNALING SEQUENCES							
NUMBER	ABBREVIATION	DEFINITION							
1	ABDNCL	Abandon Call Search							
2	ANI_CO	ANI for CO							
. 3	ANI_CS	ANI for CCSA							
4	ANI2DY	ANI Second Dial Tone Relay							
5	ANSGST	Answer Ground Start							
6	CCSAIN	CCSA Wink Start Inseize							
7	CCSDDO	CCSA Delay Dial Outseize							
8	DIDANS	DID Call Answer							
· 9	DIDCOD	DID CO Disconnect							
10	DIDMDD	DID Mutilated Dialing Disconnect							
11	DIDPDX	DID Local Disconnect							
12	DIDWSS	DID Wink Start Inseize							
13	DISGST	Disconnect Local Ground Start							
14	GSINSZ	Ground Start Inseize							
15	GSTONH	Ground Start CO Disconnect							
16	IRLFLH	Incoming Release Link Trunk Flash							
17	MSFLSH	Main-Satellite Flash							
· 18	MSGFLH	Main-Satellite Local Flash							
19	MSWSOT	Main-Satellite Wink Start Outgoing							
20	RLSAUX	Release Auxiliary Trunk							
21	RLSGSL	Seize Auxiliary Trunk Without Grounding Sleeve							
22	RLTDOH	RLT Distant On-Hook							
23	RLTDSC	RLT Local Disconnect							
24	RLTFLH	RLT Initial Flash Timing							
25	RLTOGR	RLT Outseize With Ring Control							
26	RLTOGS	RLT Outseize							
27	RLTOG2	RLT Outseize With Ring Control, Wink							

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TABLE AN. (Contd)

	PROC 640 TRUNK SIGNALING SEQUENCES (Contd)										
NUMBER	ABBREVIATION	DEFINITION									
28	SZAUXT	Seize Auxiliary Trunk									
29	9 SZGSP1 Seize Ground Start Outgoing With Party Test										
30	SZGST1	Seize Ground Start Outgoing									
31	TIEANS	CCSA or Tie Local Answer, Delay Dial									
32	TIEDAN	CCSA or Tie Distant Answer Timing									
33	TIEDOH	CCSA or Tie Distant Disconnect									
34	TIEINC	CCSA or Tie Incoming Seize, Delay Dial									
35	TIELDS	CCSA or Tie Local Disconnect									
36	TIEMDD	CCSA or Tie Mutilated Dial Disconnect									
37	TIEOGS	CCSA or Tie Outgoing Seize									
38	TIEWDO	CCSA or Tie Outgoing Seize, Delay Dial, Wink									

Isolation and Repair Steps

Isolation and repair steps for trunk failures are detailed in:

- 1. Failure Code 5 Trunk is now in T_LIMBO.
- 2. No Failure Code 5 Trunk not in T_LIMBO.
- 3. Failure Codes 1 through 7.

Failure Code 5 - Trunk is now in T_LIMBO

- 1. Using Test 1, select the first failed trunk circuit displaying failure code 5.
- 2. Depress **NEXT DATA** to record the scan data displayed in Field 16 for data type 2 and data index 7 displayed in Fields 14 and 15.
- 3. Scan data and indications for trunk type SN232 and SN233 are as follows:

Scan data 1 = Distant end off-hook, switch idle.

Scan data 2 = Distant end idle, switch off-hook.

Scan data 3 = Distant end off-hook, switch off-hook.

4. Scan data and indications for trunk type SN231 are as follows:

Scan data 1 = Reverse loop current (ground on ring) or ground on CO lead.

Scan data 2 = Ground on AL1. Also, ground on S with SSL switch closed and Ground Sleeve Lead (GSL) relay idle. $\ref{eq:GSL}$

Scan data 3 = Both 1 and 2 above.

- 5. To check scan data for SN230, the current PMI must be examined in TRKTBL1 via the index in Field 15.
- 6. The PMI, scan data, and indications for SN230 are:

PMI = TRUNK_IDLE:

Scan data 0 = CO idle.

Scan data 1 = Ground on tip.

Scan data 3 = Ground on ring.

PMI = All talk and cut through states:

Scan data 0 = CO on-hook.

Scan data 1 = CO off-hook, reverse.

Scan data 2 = CO off-hook, normal.

 $PMI = DIAL_CO:$

Scan data 0 = Valid break.

Scan data 1 = Make.

Scan data 2 = Make.

7. The idle state is 0 for all of the above circuit packs.

Note: An idle state is not expected for a trunk in T_LIMBO.

- 8. Off-hook for SN232 and SN233 is either seizure to initiate a call or answer to indicate a call is established.
- 9. Depress NEXT TEST to select Test 2.

The failed trunk equipment location last displayed by Test 1 will be carried over as a default equipment location for further testing in Test 2.

- 10. Depress **EXECUTE** and then **NEXT DATA** to display data index 7 in Field 15 so that current scan data (sampled every 30 ms) is being observed.
- 11. At the cross-connect field, open the signaling leads.

Note: The tip and ring are signaling leads for SN230 and SN232. E & M leads on SN233 and sleeves on SN231 are used for signaling.

12. If the scan goes to 0 in the low 2 characters of Field 16, the problem is most likely on the signaling leads external to the circuit pack toward the distant end.

13. If the scan does not change, replace the circuit pack.

The scan should be 0 when the circuit pack is removed.

14. If opening the signaling leads at the switch removed the problem, reconnecting the signaling leads at the switch and removing the signaling leads at the distant end may further isolate the problem between distant end switching and the wiring between locations.

No Failure Code 5 - Trunk not in T_LIMBO

- 1. Using Test 1, select the first failed trunk circuit not displaying failure code 5.
- 2. Depress NEXT DATA and record all trunk data.

The most useful data is provided in Field 16 when a trunk signaling sequence failed. This encode is displayed as a default if a sequence failure was detected, indicated by data type 1.

3. Depress NEXT TEST to select Test 2.

The trunk last displayed in Test 1 will appear as a default circuit for further testing.

4. Depress **EXECUTE** and then **NEXT DATA** (until 2 is displayed in Field 15) so that TRKTBL2 changes can be observed in Field 16.

Trunk table 2 contains trunk signaling sequence control information including the sequence number and sequence step.

- 5. Make tests calls as described in **Repair Guide Overview**.
- 6. The data displayed in Field 16 from TRKTBL2 (selected by 2 in Field 15) can be used to look up the sequence name in Table AM, PROC 640 Trunk Signaling Sequencing Failures.

The position of this sequence in the related group of sequences (for example: GSINSZ is the third sequence in the GSTKS group) indicates the type of trunk signaling.

7. The following listing shows the positions of sequence in related groups of sequences, i.e., sequence position equals type of signaling at the switch:

Sequence position 1 =Outseize (includes distant answer).

Sequence position 2 = Inseize.

Sequence position 3 = Distant disconnect.

Sequence position 4 = Answer.

Sequence position 5 = Local disconnect.

Sequence position 6 = Special sequences for DID mutilated dialing disconnect, TIE distant answer, and flash signaling (DIDMDD, TIEDAN, RLTFLH, and IRLFLH).

Sequence position 7 = Special sequences for abandon call search, TIE mutilated dialing disconnect, mutilated dialing disconnect, and RLT outgoing seize from a CAS branch PBX (ABDNCL, TIEMDD, RLTOGR).

Sequence position 8 = Special RLT flash sequence (RLTFLH).

Sequence position 9 = Special main-satellite flash sequence.

- 8. After the sequence is identified, the sequence steps recorded by Test 2 can be displayed (after **STOP** is depressed to freeze the data) by using **NEXT UNIT** to observe up to nine prior changes in the selected data.
- 9. By using **NEXT DATA** to select scan data (7 displayed in Field 15), the combined DIAL MASK, LAST LOOK, and DEMAND SCAN data corresponding to each change in TRKTBL2 (trunk table 2) can be displayed.
- 10. The relative time between changes can be computed by recording the corresponding 10-ms counter data (selected with 8 displayed in Field 15).

Table AO, PROC 640 - Example of Data Recorded in Test 2, provides an example of data recorded for the GSINSZ sequence.

	PROC 640 EXAMPLE OF DATA RECORDED IN TEST 2 BY MONITORING TRKTBL2 FOR AN SZGST1 SEQUENCE CALLING VIA NO. 5 ESS CO											
		DATA F	ROM FIELD 16			COMPUTE	D TIME					
		···7′	IN FIELD 15			"8" IN FIELD 15						
PRIOR CODE INDEX (FIELD 17)	"2" IN FIELD 15 TRKTBL 2	DIAL MASK	LAST LOOK	SCAN	10 MS OCTAL	COUNTER OCTAL DIFFERENCE	MILLISECOND DIFFERENCE					
5 (oldest)	0	—	—	0	51473	-	-					
4	100022	-	—	0	55621	4126	23,340 (1)					
3	100023	-		0	55627	6	60 (2)					
2	25	-	2	02	55650	21	170 (3)					
1 .	100027	-	2	02	55653	3	30 (4)					
0 (newest)	0	<u> </u>	1	01	55661	6	60 (5)					

(1) Time between test EXECUTE and start of sequence.

(2) Waited for 50-ms time-out after ground start.

(3) CO responded with ground on tip.

(4) Enabled loop current detector and waited 25 ms.

(5) Loop current detected; sequence is done.

- 11. Compare the data recorded (as in the example depicted in Table AO, PROC 640 Example of Data Recorded in Test 2) with the detailed trunk signaling sequence descriptions, found in the software manual, to determine if a malfunction was detected.
- 12. If the failure corresponds to a specific sequence number and step in Table AM, PROC 640 -Trunk Signaling Sequence Failures, the failure cause may be determined by the information given under **Suspected Failure**.

Failure Codes 1 through 7

Failure Code 1

- 1. Failure code 1 displayed in Field 11 provides the most specific information because it identifies the trunk signaling sequence and sequence step that failed.
- 2. When making test calls to verify this failure, focus on the specific sequence.
- 3. For example, ANSGST is the Answer Ground Start Sequence (the fourth sequence in the ground start trunks family of sequences).

If this sequence failed, testing should focus on answering an incoming call.

Failure Code 2

- 1. Failure code 2 indicates that a trunk was not idle and not involved in an active call when the failure occurred.
- 2. For example, if the tip of a ground start trunk that is 1-way outgoing is grounded, this invalid incoming seize is detected by call processing and failure code 2 is generated.
- 3. Furthermore, this trunk is put in T_LIMBO as long as the invalid ground is present to also generate failure code 5.

Failure Code 3

- 1. Failure code 3 occurs when a trunk is not correctly placed in an idle queue.
- 2. This failure generally points to a software problem or a translation table inconsistency.

Failure Code 4

- 1. Failure code 4 indicates that status memory audits have detected this trunk as being falsely active.
- 2. The status memory audit runs every 20 minutes or slower as traffic increases, so if a trunk with this failure is cleared from the failure history table, it can take up to 20 minutes or longer for this failure to reoccur.
- 3. An example of this failure is a grounded tip (TP1) for an SN233 tie trunk.

Failure Code 5

- 1. Failure code 5 indicates that the trunk is presently in T_LIMBO and is not available for call processing.
- 2. Repair guides for this condition are described in isolation and repair step Failure Code 5 -Trunk is now in T_LIMBO.

Failure Code 6

- 1. Failure code 6 means this trunk was in T_LIMBO long enough to set the OTHER FAILS fault indicator.
- 2. Repair guides for this condition are described in isolation and repair step No Failure Code 5 Trunk not in T_LIMBO.

Failure Code 7

- 1. Failure code 7 indicates that a trunk signaling sequence could not be started for this trunk.
- 2. Software or translation problems would generally cause this failure.

PROC 641 - TERMINAL-TO-TERMINAL TEST CALL

FLIPCHART ISSUE 1	+ +	TERMI	NAL TO TERMINAL T	EST CALL +	+	
TEST 1: TESTS ALL TI RECEIVERS. USE 'NEXT CIRCUIT' TO OBTAIN THE NEXT UNTESTED TI RECEIVER. USE 'NEXT UNIT' TO OBTAIN AN UNTESTED TI RECEIVER IN THE NEXT MODULE.	TEST 2: TESTS A SPECIFIED TT RECEIVER. PROVIDE THE EQUIPMENT LOCATION DF THE TT RECEIVER IN FIELDS 8-12.	TEST 3: TESTS ROTARY Digit Collection.	NOTES: 1. A DEFAULT TEST LIME IS DISPLAYED AFTER BEING AOMINISTERED IN PROC 000. 2. PLACE THE NUMBER TO BE DIALED INTO FIELD 13 TO TURN OFF HUMTING.	STATE ENCODES (FIELD 14): 0-TEST LINE OR RECEIVER NOT AVAILABLE 1-TEST LINE ON HOOK 2=DIAL TONE THRU DIALING 3-ALERIINO OR TALKING 4-BUSY OR INTERCEPT	5-END OF GROUP TEST 6-CALL ABORTED 7-NO RECEIVER OR NO TIME SLOT AVAILABLE 8-NO TRUNKS AVAILABLE	SPECIAL ERROR CODE: 80-ONLY TESTING 63 TT RECEIVERS AT A TIME.
TEST LINE EQU TEST NO MODULE	IPMENT LOCATION	T-T = 1, ROT = 0 MOD	TEST 2 . RECEIVER EQUIPMENT LO ULE CAB CARR SLOT B 9 10	DESTINATION DESTINATION NUMBER	3 TATE	NETWORK TEST CALLS 641

Purpose

PROC 641 is used to test touch tone dialing receivers and rotary digit collection by means of terminal-to-terminal test calls using the test line, terminal equipment, and a destination number.

PROC 641 is normally used when a user reported trouble concerning terminal-to-terminal calls to a particular destination number is not detected by **PROC 600** (Alarm causes/error log) and **PROC 620** (Network procedure).

The user reported trouble may be intermittent in nature and **PROC 641** can isolate the potential trouble to a particular touch tone dialing receiver with **PROC 620** providing further diagnostic analysis as required to correct the problem.

This maintenance procedure **must** be performed on the user's premises. Terminal equipment must be connected to the test line and test set-up steps performed prior to executing any test.

Field Definitions and Codes

Each field of **PROC 641** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AP, PROC 641 - Field Definitions and Codes.

Optional input fields are:

-4

- 1. Field 1 Change test number.
- 2. Fields 2 through 6 Change test line equipment location.
- 3. Fields 8 through 12 Select touch tone dialing receiver equipment location to be tested (Test 2 only).
- 4. Field 13 Enter destination number (number of terminal to be dialed to turn off hunting).

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	PROC 641 FIELD DEFINITIONS AND CODES											
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION							
1	1-3	Test number.	9	0-7	Cabinet number.							
	Test Line	e Equipment Location.	10	0-3	Carrier number.							
2	0-30	Module number.	11	. 0-21	Slot number.							
3	0-7	Cabinet number.	12	0-3	Circuit number.							
4	0-3	Carrier number.	13	Any 2-,	Dialed/destination number.							
5	0-21	Slot number of circuit pack.		3-, or 4- digit								
6	0-7	Number of circuit assigned to line.	14	number 0	Test line or specified register is not idle. Test line on-hook. Dial tone through dialing.							
7	0 1	Touch-tone. Rotary digit collection.		1 2								
Τοι	uch-Tone Ro	eceiver Equipment Location (Test 2 only).		3 4 5	Alerting or talking. Busy or intercept tone. End of group test.							
8	0-30	Module number.		6 7	Call aborted. No register or time slot avail- able.							

TABLE AP.

Test Equipment Required

A touch tone telephone set with 2 W1AP test cords and a 249A adapter is required to place test calls from the test line to a selected destination number (Test 1 and 2 only).

A rotary dial telephone set with 2 W1AP test cords and a 249A adapter is required to test rotary digit collection (Test 3 only).

Operation of Procedure

Overview

PROC 641 is used to make a terminal-to-terminal test call.

To call in PROC 641, perform the following:

- 1. Depress PROC NO; 641; ENTER.
- 2. Test 1 is automatically selected.
- 3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Three tests are available:

- 1. Test 1 Tests all touch tone dialing receivers.
- 2. Test 2 Tests a specific touch tone dialing receiver.
- 3. Test 3 Tests rotary digit collection.

Test 1

Test 1 enables maintenance personnel to test all touch tone dialing receivers by means of making terminal-to-terminal test calls.

1. Test 1 is the default test when entering **PROC 641**, or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

- 2. When Test 1 is initially called in, a default test line equipment location, after first being administered through **PROC 000** (Line translation single line), is displayed in Fields 2 through 6, and the first touch tone dialing receiver equipment location is displayed in Fields 8 through 12.
- 3. The first touch tone dialing receiver can be tested or another touch tone dialing receiver can be selected for testing.

Caution: The test line used for the test calls (Fields 2 through 6) must be in service and not busied out.

Note: The default test line equipment location can be changed or a new test line added by using translation procedure **PROC 000** (Line translation - single line).

- 4. The module field of the test line equipment location (Field 2) is flashed when Test 1 is initially called in, indicating it is an optional entry field.
- 5. To select another test line, enter its equipment location in Fields 2 through 6:

(Test line module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER.

6. If another touch tone dialing receiver is to be selected for testing, **NEXT CIRCUIT** and **NEXT UNIT** is used to sequence through all the touch tone dialing receivers in the switch.

NEXT CIRCUIT sequences to the next untested touch tone dialing receiver in the module.

NEXT UNIT sequences to the first untested touch tone dialing receiver in the next module.

7. After selecting the test line and touch tone dialing receiver, the number to be dialed during the test call may be entered in Field 13.

Note: Entering the number to be dialed in Field 13 ensures that the test call is directed to the terminal dialed by eliminating hunting.

8. The number to be dialed can be entered in Field 13 by the CHANGE FIELD sequence:

CHANGE FIELD; 13; ENTER; (Number to be dialed); ENTER.

PROC 641 Test 1 and Test 2

- 9. If a number is not entered in Field 13, or a number other than that entered in Field 13 is dialed from the test line and hunting is allowed, the test line is connected to a hunted-to terminal if the dialed terminal is busy and the call is successful.
- 10. Prior to starting Test 1, connect the touch tone telephone set to the test line.
- 11. To start Test 1, depress EXECUTE.

If the test line and touch tone dialing receiver are available for Test 1, Field 14 equals 1.

A 0 in Field 14 indicates that either the test line or touch tone dialing receiver is not available for Test 1.

12. When the telephone connected to the test line is taken off-hook and a number dialed, Field 14 advances to 2.

During dialing Field 13 contains the dialed digits.

- 13. When dialing is completed, Field 14 contains a 3 (if ringing or a conversation is in progress) or 4 (if a busy or intercept tone is received), indicating successful completion of the test for the selected touch tone dialing receiver.
- 14. After dialing is completed, Field 13 changes to display the hunt-to destination. If hunting does not occur, the dialed number is displayed.
- 15. If during Test 1, Field 14 displays a 0, 6, or 7, a problem in the test call is indicated.
- 16. Test 1 should be performed for each touch tone dialing receiver in the switch.

Touch tone dialing receivers that are in use when an attempt is made to test them are passed over.

17. When all touch tone dialing receivers are tested in Test 1, Field 14 equals 5.

If the switch has more than 63 touch tone dialing receivers, special error code 80 is displayed in the **MAAP** error code field to indicate that testing of all touch tone dialing receivers is not complete. Testing should be continued until all possible touch tone dialing receivers are tested.

Depressing **NEXT CIRCUIT** after the test of the last touch tone dialing receiver is attempted reloads the test buffer with more untested touch tone dialing receivers and causes special error code 80 to be displayed again in the **MAAP** error code field.

The next set of touch tone dialing receivers can now be tested. State 5 (displayed in Field 14) is displayed only when all touch tone dialing receivers are tested.

Test 2

Test 2 enables maintenance personnel to test a specific touch tone dialing receiver by means of making a terminal-to-terminal test call.

1. Test 2 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

- 2. When Test 2 is called in, the default test line and touch tone dialing receiver equipment locations from Test 1 may be displayed in Fields 2 through 6, and 8 through 12.
- 3. The module field of the touch tone dialing receiver equipment location (Field 8) is flashed, indicating it is an optional entry field.

- 4. Either the default touch tone dialing receiver can be tested or another touch tone dialing receiver can be selected for testing.
- 5. To select another touch tone dialing receiver for testing, enter its equipment location in Fields 8 through 12:

(Touch tone receiver module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER.

6. The number to be dialed during the test call may be entered in Field 13 by using the CHANGE FIELD sequence:

CHANGE FIELD; 13; ENTER; (Number to be dialed); ENTER.

- 7. Entering the number to be dialed in Field 13 ensures that the test call is directed to the terminal dialed by eliminating hunting.
- 8. If a number is not entered in Field 13, or a number other than that entered in Field 13 is dialed from the test line and hunting is allowed, the test line is connected to a hunted-to terminal if the dialed terminal is busy and the call is successful.
- 9. Prior to starting Test 2, connect a touch tone telephone set to the test line.
- 10. To start Test 2, depress EXECUTE.

If the test line and touch tone dialing receiver are available for Test 2, Field 14 equals 1.

A 0 in Field 14 indicates that either the test line or touch tone dialing receiver is not available for Test 2.

11. When the telephone connected to the test line is taken off-hook and a number dialed, Field 14 advances to 2.

During dialing Field 13 contains the dialed digits.

- 12. When dialing is completed, Field 14 contains a 3 (if ringing or a conversation is in progress) or 4 (if a busy or intercept tone is received), indicating successful completion of the test for the selected touch tone dialing receiver.
- 13. After dialing is completed, Field 13 changes to display the hunt-to destination. If hunting does not occur, the dialed number is displayed.
- 14. If during Test 2, Field 14 displays a 0, 6, or 7, a problem in the test call is indicated.

Test 3

Test 3 enables maintenance personnel to test rotary digit collection, where a touch tone dialing receiver is not used, by means of making a terminal-to-terminal test call.

Rotary digit collection consists primarily of the collection and counting of groups of dial pulses by the call processing software.

1. Test 3 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 3; ENTER.

- 2. When Test 3 is initially called in, a default test line equipment location is displayed in Fields 2 through 6.
- 3. If the displayed originating register (Fields 8 through 12) is for rotary digit collection, a 0 is displayed in Field 7.

- 4. When a 1 is displayed in Field 7, use **NEXT CIRCUIT** to select an originating register for rotary digit collection, indicated by a 0 in Field 7.
- 5. The number to be dialed during the test call may initially be entered in Field 13 (flashing) by using:

(Number to be dialed); ENTER.

- 6. Entering the number to be dialed in Field 13 ensures that the test call is directed to the terminal dialed by eliminating hunting.
- 7. If a number is not entered in Field 13, or a number other than that entered in Field 13 is dialed from the test line and hunting is allowed, the test line is connected to a hunted-to terminal if the dialed terminal is busy and the call is successful.
- 8. Prior to starting Test 3, connect a rotary dial telephone set to the test line.
- 9. To start Test 3, depress EXECUTE.

If the test line and originating register are available for Test 3, Field 14 equals 1.

A 0 in Field 14 indicates that either the test line or originating register is not available for Test 3.

- 10. When the telephone connected to the test line is taken off-hook and a number dialed, Field 14 advances to 2.
 - During dialing Field 13 contains the dialed digits.
- 11. When dialing is completed, Field 14 contains a 3 (if ringing or a conversation is in progress) or 4 (if a busy or intercept tone is received), indicating successful completion of the test for the selected originating register.
- 12. After dialing is completed, Field 13 changes to display the hunt-to destination. If hunting does not occur, the dialed number is displayed.
- 13. If during Test 3, Field 14 displays a 0, 6, or 7, a problem in the test call is indicated.

Repair Guide

When a terminal-to-terminal call to a particular destination number is reported by the user as a trouble, and **PROC 600** (Alarm causes/error log) or **PROC 620** (Network procedure) has not detected a touch tone dialing receiver trouble, the following steps should be performed by maintenance personnel, in the order listed, to isolate and replace the failing circuit pack.

1. Execute Test 1 for all touch tone dialing receivers, or until a failure is detected.

To test a touch tone dialing receiver, perform Steps 3 through 10 below.

2. Based on test results of Test 1, use Test 2 for further testing of failing circuits.

To test a touch tone dialing receiver, perform Steps 3 through 10 below.

3. At the test line, install a 249A adapter and a touch tone telephone set.

- 4. Select one valid directory number which contains any of the following:
 - 1, 5, and 9 used in any combination.
 - 1, 6, and 8 used in any combination.
 - 2, 4, and 9 used in any combination.
 - 2, 6, and 7 used in any combination.
 - 3, 5, and 7 used in any combination.
 - 3, 4, and 8 used in any combination.
- 5. Enter the selected directory number in Field 13.
- 6. Depress EXECUTE.
- 7. Dial the selected number.

If Field 13 displays a number different than the one dialed, the touch tone dialing receiver is failing. Replace SN251 and repeat the test.

- 8. If the touch tone dialing receiver did not fail, select another valid directory number that contains a 0 and enter it in Field 13.
- 9. Make another test call using the new number.

If Field 13 displays a number different than the one dialed, the touch tone dialing receiver is failing. Replace SN251 and repeat the test.

10. If the touch tone dialing receiver continues to fail after replacing SN251, use **PROC 620** Test 4 (unit type 25) to further isolate the cause of the problem.

If **PROC 620** is unable to correct the problem, check the wiring associated with the replaced circuit pack.

11. When the touch tone dialing receiver that was failing passes, repeat Steps 3 through 10 for all other touch tone dialing receivers in the switch.

PROC 642 - TERMINAL-TO-TRUNK TEST CALL

FL1 ISS	IPCHART			+		+		TERI	MINAL T	D TRL	INK	TEST	CALL		+		+			
TEST 1: TESTS ALL TRUNKS HAVING SPECIFIED PRIMARY TRUNK DIAL ACCESS CODE (FIELD 12-14). USE 'NEXT CIRCUIT' TO OBTAIN THE NEXT UNITESTED TRUNK TO BE TESTED. USE 'NEXT UNIT' TO OBTAIN 1ST UNITESTED TRUNK OF THIS ACCESS CODE IN NEXT MODULE					TEST SPECJ PROVJ TRUNH LOCAT (7-11	2: TESTS A FIED TRUNK DE THE EQUIPMENT ION FIELDS).	TES A S (FJ CIF UNI UNI UNI TRU	ST 3: SPECIF ELD 1 CUIT' ESTED T' TO ESTED INK GR	TESTS ALL TED TRUNK (5). USE ' TO OBTAI TRUNK. U OBTAIN 1 O TRUNK OF COUP IN NE	TRUNK GROUP NEXT N THE SE 'NE ST THIS XT -MOD	S IN NEXT XT ULE.	STATI 0=TE3 AV 1=TE5 2=DI1 CO0 3=C0 0R 4=WR1 5=EN1 6=CA1	E ENCODES ST LINE OF AILABLE ST LINE OF AL TONE TH MPLETION RESPONSE BUSY) DNG ACCESS O OF GROUP L ABORTED	(FIEL TRUM HOOM HRU DI (DIAL CODE TEST	D 17) IK NOT TAL TONE	: 7= 8= 9= IOTE: INE : INE : NFTER NOMINI PROC (NO RECEIVE ND TIME SL AVAILABLE ND TRUNK AVAILABLE TRUNK SEIZ INCOMING A DEFAULT IS DISPLAY BEING ISTERED IN 000	R OR OT ED TEST ED	SPEC CODE 80-0 82-1	CIAL ERROR ES: ONLY TESTING 63 TRUNKS AT A TIME ILLEGAL TRUNK TYPE FOR THIS TEST
	TEST L	INE E	QUIPM	IENT LOC	NOIT	TRU	W 501	TEST 2				TES	T 1 DIAL		EST 3					NETWORK
TEST NO	MODULE	CABINET	CARRIER	SLOT		FI DI	ACCESS CODE FIRST DIGIT			TRUNK Group		TRUNK TYPE	STATE 12		642					

Purpose

PROC 642 is used to test trunks by means of terminal-to-trunk test calls using the test line and terminal equipment.

PROC 642 is normally used when a user reported trouble concerning terminal-to-trunk calls is not detected by **PROC 600** (Alarm causes/error log) and **PROC 620** (Network procedure).

The user reported trouble may be intermittent in nature and **PROC 642** can isolate the potential trouble to a particular trunk circuit with **PROC 620** providing further diagnostic analysis as required to correct the problem.

This maintenance procedure **must** be performed on the user's premises. Terminal equipment must be connected to the test line and test set-up steps performed prior to executing any test.

Field Definitions and Codes

Each field of **PROC 642** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AQ, PROC 642 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Fields 2 through 6 Change test line equipment location.
- 3. Fields 7 through 11 Select trunk equipment location to be tested (Test 2 only).
- 4. Fields 12 through 14 Select trunk dial access code (Test 1 only).
- 5. Field 15 Select trunk group to be tested (Test 3 only).

TABLE AQ.

		PRO FIELD DEFINITIO	C 642 DNS AND CO	DES	
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION
1	1-3	Test number.	16	13	Wink start in/(wink start
2	0-30	Test line module number.	(Conta)		or delay dial) and dial tone out.
3	0-7	Test line cabinet number.		14 15	Delay dial in/dial tone out. Wink start in/dial tone
4	0-3	Test line carrier number.			
5	0-21	Test line slot number.		17	Regular CO trunks:
6	0-7	Test line circuit number.		11	tone and ground start.
7	0-30	Trunk module number.		18	1-way out DOD with party test, dial tone and ground
8	0-7	Trunk cabinet number.		19	start. 2-way automatic in/DOD,
9	0-3	Trunk carrier number.	- .	20	dial tone and ground start. 2-way automatic in/dial
10	0-21	Trunk slot number.			tone and ground start out with party test.
11	0-3 ັ	Trunk circuit number.			Foreign exchange CO trunks:
12		First digit of trunk dial access code:		22	1-way outgoing DOD, dial tone and ground start.
	1-9 11 12	1-9 Touch-tone * Touch-tone #		23	1-way out DOD with party test, dial tone and ground start.
13	0-9	Second digit of trunk dial access code.		24 25	2-way automatic in/DOD, dial tone and ground start. 2-way automatic in/dial
14	0-9	Third digit of trunk dial access code.			tone and ground start out with party test.
15	11-256	Trunk group number.			WATS CO trunks:
16		Trunk type:		27	1-way outgoing DOD or toll terminal access for
		All 2-way CCSA/APLT CO trunks:		00	TSPS, ground start and dial tone.
	12	Delay dial in/(wink start or delay dial) and dial tone out.		28	1-way out DOD with party test, ground start and dial tone.

TABLE AQ. (Contd)

<u></u>	PROC 642 FIELD DEFINITIONS AND CODES (Contd)												
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION								
16		Tie trunks:	17		State of trunk test call:								
(Contd)	33	1-way automatic out.		0	Test line or specific trunk								
	34	1-way dial tone out.			not idle.								
	36	2-way dial in/dial tone out.		1	Test line on-hook and trunk								
37 2-way dial tone in/automatic idle. out. 2 Dial tone throu													
	38 2-way automatic in/dial tone completion.												
	CO response (dial tone or												
	39 2-way automatic in/automatic busy).												
		out.		. 4	Wrong access code or time-								
	44	2-way dial tone or delay			out								
		dial in/dial tone out.		5	End of group test.								
	45	2-way dial tone or delay		6	Call dropped.								
· · ·		dial in/automatic out.			available.								
				8	No trunk available.								
				· 9	Trunk seized incoming.								
APLT CCSA CO DOD TSPS WATS	- Advano - Commo - Centra - Direct - Traffic - Wide a	ced private line termination on control switching arrangement l office outward dialing service position system urea telecommunication service.											

Test Equipment Required

A telephone set with 2 W1AP test cords and a 249A adapter, or a 1013 hand test set and a 249A adapter is required to place terminal-to-trunk test calls from the test line.

Operation of Procedure

Overview

PROC 642 is used to make a terminal-to-trunk test call.

To call in PROC 642, perform the following:

- 1. Depress PROC NO; 642; ENTER.
- 2. Test 1 is automatically selected.
- 3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Three tests are available:

- 1. Test 1 Tests all trunks.
- 2. Test 2 Tests a specific trunk.
- 3. Test 3 Tests all trunks in a specific trunk group.

Test 1

Test 1 enables maintenance personnel to test all trunks in a trunk group for the trunk dial access code specified in Fields 12 through 14.

- 1. Test 1 is the default test when entering PROC 642, or is selected by using NEXT TEST.
- 2. When Test 1 is initially called in, a default test line equipment location, after first being administered through **PROC 000** (Line translation single line), is displayed in Fields 2 through 6.
- 3. This test line can be used or another test line can be selected.

Note: The default test line equipment location can be changed or a new test line added by using translation procedure **PROC 000** (Line translation - single line).

- 4. The module field of the test line equipment location (Field 2) is flashed when Test 1 is initially called in, indicating it is an optional entry field.
- 5. To select another test line, enter its equipment location in Fields 2 through 6:

(Test line module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER.

Note: If Field 2 alone is changed, a new default test line equipment location is displayed in Fields 2 through 6.

- 6. A trunk dial access code must be entered in Fields 12 through 14 by one of the following two methods (Steps 7 or 8).
- 7. If a new test line is entered, Field 12 is blanked and the decimal point in that field flashed. This indicates a mandatory entry field. The trunk dial access code is entered in Fields 12 through 14 as follows:

(First digit); ENTER; (Second digit - if required); ENTER; (Third digit - if required); ENTER.

8. If the displayed test line is to be used (not changed to a new test line), a trunk dial access code is entered by using the **CHANGE FIELD** sequence:

CHANGE FIELD; 12; ENTER; (First digit); ENTER; (Second digit - if required); ENTER; (Third digit - if required); ENTER.

- 9. Prior to starting Test 1, connect the telephone set or hand test set to the test line.
- 10. To start Test 1, depress EXECUTE.

Requirement: EXECUTE must be used before going off-hook and dialing from the test line. **EXECUTE** must be depressed before each test call is placed even when repetitive calls are attempted through the same trunk.

PROC 642 Test 1

11. If the test line is on-hook and available, the following is displayed:

Field 1 - 1.

Fields 2 through 6 - Test line equipment location.

Fields 7 through 11 - Equipment location of the lowest numbered trunk in the trunk group.

Fields 12 through 14 - Trunk dial access code.

Field 15 - Trunk group number.

Field 16 - Trunk type.

Field 17 - State of the test.

12. If the test line is on-hook and available, and if the selected trunk is available, a 1 is displayed in Field 17.

If either the test line or the trunk is busy, a 0 is displayed in Field 17, and Test 1 should be repeated by depressing **EXECUTE** or another trunk selected for testing.

- 13. When the telephone or hand test set connected to the test line is taken off-hook, and the trunk dial access code displayed in Fields 12 through 14 is dialed, Field 17 changes to a 2.
- 14. If Field 17 does not change to a 2 at this time, the trunk under test has been seized by an incoming Central Office (CO), Foreign Exchange (FX), or Wide Area Telecommunications Service (WATS) call. (Field 17 should display 9.)

Wait until the trunk is idle and repeat Test 1, or select another trunk to be tested.

- 15. Field 17 displays a 2 during the dial access code dialing phase and changes to 3 at various times depending on several factors, e.g.: touch-tone or rotary test line, SMDR, trunk type, etc.
- 16. The minimum change time from a display of 2 to 3 in Field 17, after the trunk dial access code is dialed, is 1 second.

The maximum change time after the last digit is dialed to complete the call is about 10 seconds.

- 17. If the terminal-to-trunk test fails, a 4, 6, 7, or 8 is displayed in Field 17.
- 18. When 7 or 8 is displayed, repeat Test 1.
- 19. If 4 is displayed, check the dial access code in Fields 12 through 14 to determine if the correct dial access code was entered. If the correct dial access code was entered and dialed, the trunk circuit is failing.
- 20. If 6 is displayed, the trunk circuit is failing.

Note: If an intercept tone is received when making the test call, check the class of service of the test line and either change it to the least restricted class of service, or enter an unrestricted test line in Fields 2 through 6.

21. A trunk is considered to be tested successfully after **EXECUTE** is depressed, the call progresses to state 2 and either terminates by going on-hook or completes the testing sequence.

The tested trunk is then removed from the untested trunk list.

22. Test 1 should be performed for all trunks assigned to the trunk dial access code and trunk group displayed in Fields 12 through 15.

23. If another trunk equipment location in the trunk group is to be selected for testing, **NEXT CIRCUIT** and **NEXT UNIT** can be used as follows:

NEXT CIRCUIT sequences to the next untested trunk equipment location in the module.

NEXT UNIT sequences to the first untested trunk equipment location in the next module.

- 24. Sequencing beyond the end of the list of trunks in the trunk group buffer, by using **NEXT CIRCUIT** and **NEXT UNIT**, causes trunk equipment location Fields 7 through 11 to be dashed.
- 25. If all the trunks in the buffer are tested beyond state 1, depressing **NEXT CIRCUIT** or **NEXT UNIT** causes one more search for untested trunks.

If no untested trunks are found, a 5 is displayed in Field 17 to indicate that all trunks with the displayed dial access code and trunk group number are tested.

26. If any trunks in the trunk group buffer are not tested, and the trunk equipment location fields are dashed, depressing **NEXT CIRCUIT** or **NEXT UNIT** displays the lowest untested trunk, from the trunk group buffer, in Fields 7 through 11.

If the number of trunks in the trunk group exceeds the size of the trunk group buffer (63), an error code of 80 (only testing 63 trunks at a time) is displayed in the **MAAP** error code field to indicate that the sorted group of trunks is not complete. Testing should be continued until all additional trunks are tested.

If the size of a trunk group exceeds the capacity of the trunk group buffer, the buffer is loaded again with the untested trunks when all of the first group of trunks in the buffer are tested. These trunks are then sorted in ascending order.

When **NEXT CIRCUIT** or **NEXT UNIT** is depressed to search for the first untested trunk exceeding the capacity of the buffer, special error code 80 is displayed again in the **MAAP** error code field. This code indicates that the trunk group is exceptionally large and the next group of untested trunks is loaded in the buffer for testing.

The next set of trunks in the trunk group can now be tested, noting that state 5 (displayed in Field 17) is displayed only when all trunks in the trunk group are tested.

Test 2

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Test 2 enables maintenance personnel to test a specific trunk by means of making a terminal-to-trunk test call.

- 1. Test 2 is selected by use of NEXT TEST.
- 2. When Test 2 is called in, Field 7 is blanked and the decimal point in that field is flashed, indicating a mandatory entry field.
- 3. The equipment location of the trunk to be tested is entered in Fields 7 through 11 as follows:

(Trunk module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER.

- 4. Prior to starting Test 2, connect a telephone set or hand test set to the test line.
- 5. To start Test 2, depress EXECUTE.

Requirement: EXECUTE must be used before going off-hook and dialing from the test line. **EXECUTE** must be depressed before each test call is placed even when repetitive calls are attempted through the same trunk.

6. If the test line is on-hook and available, the following is displayed:

Field 1 - 2.

Fields 2 through 6 - Test line equipment location.

Fields 7 through 11 - Equipment location of the trunk selected for testing.

Fields 12 through 14 - Trunk dial access code.

Field 15 - Trunk group number.

Field 16 - Trunk type.

Field 17 - State of the test.

- 7. If the test line is on-hook and available, and if the selected trunk is available, a 1 is displayed in Field 17.
- 8. If either the test line or the trunk is busy, a 0 is displayed in Field 17, and Test 2 should be repeated by depressing **EXECUTE** or another trunk selected for testing.
- 9. When the telephone or hand test set connected to the test line is taken off-hook, and the trunk dial access code displayed in Fields 12 through 14 is dialed, Field 17 changes to a 2.
- 10. If Field 17 does not change to a 2 at this time, the trunk under test has been seized by an incoming CO, FX, or WATS call. (Field 17 should display 9.)

Wait until the trunk is idle and repeat Test 2, or select another trunk to be tested.

- 11. Field 17 displays a 2 during the dial access code dialing phase and changes to 3 at various times depending on several factors, e.g.: touch-tone or rotary test line, SMDR, trunk type, etc.
- 12. The minimum change time from a display of 2 to 3 in Field 17, after the trunk dial access code is dialed, is 1 second.

The maximum change time after the last digit is dialed to complete the call is about 10 seconds.

- 13. If the terminal-to-trunk test fails, a 4, 6, 7, or 8 is displayed in Field 17.
- 14. When 7 or 8 is displayed, repeat Test 2.
- 15. If 4 is displayed, check the dial access code in Fields 12 through 14 to determine if the correct dial access code was dialed. If the correct dial access code was dialed, the trunk circuit is failing.
- 16. If 6 is displayed, the trunk circuit is failing.

Note: If an intercept tone is received when making the test call, check the class of service of the test line and either change it to the least restricted class of service, or enter an unrestricted test line in Fields 2 through 6.

17. A trunk is considered to be tested successfully after **EXECUTE** is depressed, the call progresses to state 2 and either terminates by going on-hook or completes the testing sequence.

Test 3

Test 3 enables maintenance personnel to test all trunks in a specific trunk group by means of making terminal-to-trunk test calls.

- 1. Test 3 is selected by use of NEXT TEST.
- 2. When Test 3 is called in, Field 15 is blanked and the decimal point in that field is flashed, indicating a mandatory entry field.
- 3. The number of the trunk group to be tested is entered in Field 15 as follows:

(Trunk group number); ENTER.

- 4. Prior to starting Test 3, connect a telephone set or hand test set to the test line.
- 5. To start Test 3, depress EXECUTE.

Requirement: EXECUTE must be used before going off-hook and dialing from the test line. **EXECUTE** must be depressed before each test call is placed even when repetitive calls are attempted through the same trunk.

6. If the test line is on-hook and available, the following is displayed:

Field 1 - 3.

Fields 2 through 6 - Test line equipment location.

Fields 7 through 11 - Equipment location of the lowest numbered trunk in the trunk group.

Fields 12 through 14 - Trunk dial access code.

Field 15 - Trunk group number.

Field 16 - Trunk type.

Field 17 - State of the test.

- 7. If the test line is on-hook and available, and if the selected trunk is available, a 1 is displayed in Field 17.
- 8. If either the test line or the trunk is busy, a 0 is displayed in Field 17, and Test 3 should be repeated by depressing **EXECUTE** or another trunk selected for testing.
- 9. When the telephone or hand test set connected to the test line is taken off-hook, and the trunk dial access code displayed in Fields 12 through 14 is dialed, Field 17 changes to a 2.
- 10. If Field 17 does not change to a 2 at this time, the trunk under test has been seized by an incoming CO, FX, or WATS call. (Field 17 should display 9.)

Wait until the trunk is idle and repeat Test 3, or select another trunk to be tested.

- 11. Field 17 displays a 2 during the dial access code dialing phase and changes to 3 at various times depending on several factors, e.g.: touch-tone or rotary test line, SMDR, trunk type, etc.
- 12. The minimum change time from a display of 2 to 3 in Field 17, after the trunk dial access code is dialed, is 1 second.

The maximum change time after the last digit is dialed to complete the call is about 10 seconds.

13. If the terminal-to-trunk test fails, a 4, 6, 7, or 8 is displayed in Field 17.

- 14. When 7 or 8 is displayed, repeat Test 3.
- 15. If 4 is displayed, check the dial access code in Fields 12 through 14 to determine if the correct dial access code was dialed. If the correct dial access code was dialed, the trunk circuit is failing.
- 16. If 6 is displayed, the trunk circuit is failing.

Note: If an intercept tone is received when making the test call, check the class of service of the test line and either change it to the least restricted class of service, or enter an unrestricted test line in Fields 2 through 6.

- 17. A trunk is considered to be tested successfully after **EXECUTE** is depressed, the call progresses to state 2 and either terminates by going on-hook or completes the testing sequence.
- 18. After the first trunk is tested, another trunk in the trunk group can be selected for testing by using **NEXT CIRCUIT** or **NEXT UNIT** as follows:

Depressing **NEXT CIRCUIT** sequences to the next untested trunk equipment location in the module.

Depressing **NEXT UNIT** sequences to the first untested trunk equipment location in the next module.

19. Repeat steps 5 through 15 until all trunks in the trunk group selected for testing are tested which is indicated by a 5 in Field 17.

Repair Guide

When a terminal-to-trunk call is reported by the user as a trouble, and **PROC 600** (Alarm causes/error log) or **PROC 620** (Network procedure) has not detected a trunk failure associated with the user's problem, the following steps should be performed by maintenance personnel, in the order listed, to isolate and replace the failing circuit pack.

- 1. Determine from the user reported trouble if a particular dial access code or trunk group is the potential cause of the trouble.
- 2. For dial access codes, perform the following:

Execute Test 1 for all trunks associated with the dial access code, or until a failure is detected. (See Step 4 below.)

Based on the test results of Test 1, use Test 2 to further test failing circuits. (See Step 4 below.)

3. For trunk groups, perform the following:

Execute Test 3 for all trunks in the specified trunk group, or until a failure is detected. (See Step 4 below.)

Based on the results of Test 3, use Test 2 to further test failing circuits. (See Step 4 below.)

4. To test a trunk, proceed as follows:

At the test line, install a 249A adapter and telephone set or hand test set.

Depress **EXECUTE**.

Go off-hook and dial the displayed trunk dial access code.

Dial the appropriate number of digits to complete the call.

If a single trunk fails (Field 17 equals 6), replace the associated circuit pack.

5. Repeat Test 2.

If the test fails again, use **PROC 620**, to further isolate the problem.

If **PROC 620** cannot correct the problem, check the wiring associated with the replaced circuit pack.

A test call stuck at state 2 indicates a possible failure for CO, FX, and WATS trunks.

A test call can also be stuck at state 2 for valid CCSA/APLT and TIE trunks.

1. Listen to the test call to determine whether it is completed successfully.

2. If the call cannot be completed, replace the associated circuit pack.

3. Repeat Test 2.

If the test fails again, use PROC 620, to further isolate the problem.

If **PROC 620** cannot correct the problem, check the wiring associated with the replaced circuit pack.

PROC 643

PROC 643 - TERMINAL-TO-TONE TEST CALL

FLIPCH ISSUE	HART +	+	TERMINAL TO TONE	TEST (CALL	+		+			
TEST 1: TEST 2: NOTES: TRANSMITS ALL TONES SEQUENTIALLY TRANSMITS SELECTED TONES FROM THE 1. A DEFAULT TEST LINE IS DISPLAYED (AFTER SPECIFIED TONE PLANT, PLACE 1 IN THE FROM THE SPECIFIED TONE PLANT. SPECIFIED TONE PLANT, PLACE 1 IN THE DEING ADMINISTERED IN PROC 000). FIELDS OF THE TONES TO BE TRANSMITTED IN TEST 2: IN TEST 2: IN THE SPECIFIED TONE PLANT. FIELDS OF THE TONES TO BE TRANSMITTED. IN TEST 2:								SPECIAL ERROR CODE: 80-NO TONE SELECTED FOR TRANSMISSION			
USE 'NEX USE 'NEX USE 'NEX	USE 'NEXT CIRCUIT' TO OBTAIN THE NEXT TONE PLANT. IN NEXT MODULE.										
	TEST LINE EQUIPMENT	LOCATION	TONE PLANT EQUIPMENT LOCAION				NETHOPK				
TEST NO	MODULE 2 3 4	SLOT LINDING		T 10	8USY 80	AUD E ALERT SP AUD ALERT	DIAL BECALL	UISC NISC	TEST CALLS		

Purpose

PROC 643 provides the capability to transmit the eight tones contained on circuit pack SN250 to a test line to allow maintenance personnel to listen to each tone to determine if problems with attenuation or improper interruption rates exist.

PROC 643 is normally used when a user reported trouble concerning tone failures is not detected by **PROC 600** (Alarm causes/error log) or **PROC 620** (Network procedure).

The user reported trouble may be intermittent in nature and **PROC 643** can isolate the potential trouble to a particular tone plant with **PROC 620** providing further diagnostic analysis as required to correct the problem.

This maintenance procedure **must** be performed on the user's premises. Terminal equipment must be connected to the test line and test set-up steps performed prior to executing any test.

Field Definitions and Codes

Each field of **PROC 643** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AR, PROC 643 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Fields 2 through 6 Change test line equipment location.
- 3. Fields 7 through 10 Select tone plant equipment location to be tested.
- 4. Fields 11 through 18 Select tone to be transmitted (Test 2 only).

Test Equipment Required

A telephone set with 2 W1AP test cords and a 249A adapter or a 1013 type hand test set with a 249A adapter is required to listen to the transmitted tones at the test line.

TABLE AR.

	PROC 643 FIELD DEFINITIONS AND CODES											
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION							
1	1, 2	Test number.	In fi	elds 11 thi	ough 18:							
2	0-30	Test line module number.	0	= Tone is	not to be transmitted.							
3	0-7	Test line cabinet number.	I F	= Tone is lashing 1 =	to be transmitted = Tone is active (being							
4	0-3	Test line carrier number.	transmitted).									
5	0-21	Test line slot number.	11	0, 1	Busy tone.							
6	0-7	Test line circuit number.	12	0, 1	Reorder tone.							
7	0-30	Tone plant module number.	13	0, 1	Audible alert tone.							
	0-7	Tone plant cabinet number	14	0, 1	Special audible alert tone.							
0		Tone plant capitor number.	15	0, 1	Dial tone.							
9	0-3	Tone plant carrier number.	16	0, 1	Recall tone.							
10	0-21	10ne plant slot number.	17	0, 1	Miscellaneous tone.							
			18	0, 1	Intercept tone.							

Operation of Procedure

Overview

PROC 643 is used to listen to the tones transmitted to the test line.

To call in PROC 643, perform the following:

- 1. Depress PROC NO; 643; ENTER.
- 2. Test 1 is automatically selected.
- 3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Two tests are available:

- 1. Test 1 Sequentially transmits busy, reorder, audible alert, special audible alert, dial, recall, miscellaneous, and interrupt tones.
- 2. Test 2 Allows any of the above tones to be selected and transmitted independently of the other tones.

Test 1

Test 1 enables maintenance personnel to sequentially transmit busy, reorder, audible alert, special audible alert, dial, recall, miscellaneous, and intercept tones from a specific tone plant over a test line.

1. Test 1 is the default test when entering **PROC 643**, or is selected by using **NEXT TEST**, or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

- 2. When Test 1 is initially called in, a default test line equipment location is displayed in Fields 2 through 6, and the first tone plant equipment location is displayed in Fields 7 through 10.
- 3. The first tone plant can be used for testing or another tone plant can be selected for testing.

Note: The default test line equipment location can be changed or a new test line added by using translation procedure **PROC 000** (Line translation - single line).

- 4. The module field of the test line equipment location (Field 2) is flashed when Test 1 is initially called in, indicating it is an optional entry field.
- 5. To select another test line, enter its equipment location in Fields 2 through 6:

(Test line module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER.

Note: The test line must be in service and not busied out. If only Field 2 is changed, a default test line for the new module is provided.

6. To select both another test line and tone plant, enter their equipment locations in Fields 2 through 10:

(Test line module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER; (Tone plant module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER.

7. To select another tone plant without selecting a new test line, use the CHANGE FIELD sequence to enter the new tone plant equipment location:

CHANGE FIELD; 7; ENTER; (Tone plant module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER.

8. Depressing **NEXT CIRCUIT** repeatedly increments through all the tone plants in the switch.

Depressing **NEXT UNIT** increments to the first tone plant in the next module (and **NEXT CIRCUIT** steps through the tone plants within the selected module).

9. When Test 1 is called in, Fields 11 through 18 all contain 1's.

The 1's indicate that the tone associated with each field is selected for transmission during Test 1.

- 10. Prior to starting Test 1, connect the telephone set or hand test set to the test line.
- 11. To start Test 1, depress EXECUTE.

The transmission of the first tone (busy) is initiated when EXECUTE is depressed.

12. As the tone is transmitted, either a 0 or 1 is flashed in the associated field (Field 11).

A 0 indicates that the tone is not being transmitted; a 1 indicates that the tone is being transmitted.

13. When the telephone or hand test set connected to the test line is taken off-hook, maintenance personnel can listen to the tone being transmitted.

Maintenance personnel can determine if the tone is being transmitted or if other problems exist, such as attenuation, improper interruption rates, or if the proper tone is heard without interference from other tones.

14. Depressing **NEXT DATA** initiates transmission of the next tone in sequence.

Depressing NEXT DATA repeatedly sequences through the transmission of all the tones associated with Fields 11 through 18.

Depressing **NEXT DATA** during transmission of the last tone (intercept) sequences back to the first tone (busy), which is again transmitted.

15. Test 1 is stopped by depressing NEXT TEST or RESET.

Test 2

Test 2 enables maintenance personnel to transmit selected tones from a specific tone plant over a test line.

1. Test 2 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

2. When Test 2 is called in, the default test line and tone plant equipment locations from Test 1 are displayed in Fields 2 through 10.

Either the default tone plant can be tested or another tone plant can be selected for testing.

3. To select another tone plant for testing use the CHANGE FIELD sequence or NEXT CIRCUIT and/or NEXT UNIT:

CHANGE FIELD; 7; ENTER; (Tone plant module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER.

Depressing **NEXT CIRCUIT** increments through all the tone plants in the switch.

Depressing **NEXT UNIT** increments to the first tone plant in the next module while **NEXT CIRCUIT** steps through the tone plants within the selected module.

4. When Test 2 is called in, Fields 11 through 18 all contain 0's.

The 0's indicate that the tone associated with each field is not selected for transmission during Test 2.

- 5. The 0 in Field 11 is flashed, indicating an optional entry field.
- 6. To select the tone associated with Field 11 (busy) for transmission, a 1 must be entered in the field:

1; ENTER.

7. To leave the tone not selected for transmission, **ENTER** can be depressed to increment to the next field.

8. Each tone that is to be transmitted during Test 2 must be selected by entering a 1 in the associated field.

The order in which the tones are selected to be tested (corresponding field set to 1) is the order that the tones are transmitted.

- 9. Prior to starting Test 2, connect the telephone set or hand test set to the test line.
- 10. To start Test 2, depress EXECUTE.

Note: Depressing **EXECUTE** with no tones selected for transmission (Fields 11 through 18 all contain 0's), causes special error code 80 (no tone selected for transmission) to be displayed in the **MAAP** error code field.

- 11. The first field selected containing a 1 is flashed when **EXECUTE** is depressed, indicating that the associated tone is being transmitted.
- 12. Maintenance personnel can monitor the transmission of the tone selected by going off-hook at the test line.
- 13. Depressing **NEXT DATA** sequences to the next field containing a 1 and begins transmitting the associated tone.

Repeated use of **NEXT DATA** sequences through all the selected tones, transmitting them, and back to the first tone selected which is again transmitted.

14. Test 2 is stopped by depressing NEXT TEST or RESET.

Repair Guide

When tone failures are reported by the user as a trouble, and **PROC 600** (Alarm causes/error log) or **PROC 620** (Network procedure) has not detected a tone plant failure, the following steps should be performed by maintenance personnel, in the order listed, to isolate and replace the failing circuit pack.

- 1. At the test line, install a 249A adapter and a telephone set or hand test set.
- 2. Execute Test 1 for the first tone plant displayed upon entering **PROC 643**, and listen to each tone by going off-hook at the test line.
- 3. If the tone plant passes, execute Test 1 for all tone plants in the switch, using **NEXT** CIRCUIT and/or **NEXT UNIT** to select the next tone plant for testing.
- 4. If no tone plants indicate a failure, check the wiring between the terminal equipment experiencing the trouble and the associated connections to the switch.
- 5. If a tone plant fails, determine which tones are defective, and execute Test 2 to inhibit the transmission of the fault-free tones to verify the status of the tones suspected of being defective by listening to the selected tones at the test line.
- 6. Replace SN250 and repeat Test 1.
- 7. If the tone plant continues to fail after replacing SN250, use **PROC 620**, Test 4 (unit type 16) to further isolate the exact cause of the problem.
- 8. If the tone plant still fails after further diagnosis by **PROC 620**, check the wiring associated with the defective tones isolated in Step 5.

PROC 644 - TERMINAL-TO-AUXILIARY TONE TEST CALL

									_				
FL IS	IPCH. Sue	ART 1		+	F	+	TERMINA	L TO) AU	XILIARY	TONE	TEST CALL + +	
TEST 1: TRANSMITS ALL TONES SEQUENTIALLY FROM THE SPECIFIED AUXILIARY TONE PLANT. USE "NEXT CIRCUIT" TO OBTAIN THE NEXT ASSIGNED AN USE "NEXT CIRCUIT" TO OBTAIN THE NEXT ASSIGNED AN							TEST 2: TRANSMITS SELECTED TONES FROM THE SPECIFIED AUXILIARY TONE PLANT. PLACE 1 IN THE FIELDS OF THE TONES TO BE TRANSMITTED. SSIGNED AUXILIARY TONE PLANT.				FIELDS	NOTES: 1. A DEFAULT TEST LINE IS DISPLAYED (AFTER BEING ADMINISTERED IN PROC 000). 2. IN TEST 2 THE TONES ARE TRANSMITTED IN THE ORDER SPECIFIED. 3. FIELDS 15 & 16 ARE ONLY RELEVANT WHEN USING BOARD	SPECIAL ERROR CODE: 80-ND TONE SELECTED FOR TRANSMISSION
USE	"NEXT	DATA" TO	TRANS	SMIT	NEXT TONE.	D AUXIL.	TART TUNE PL	ANI 1	N A 5	UBSEQUENT	MUDULE	SN253C.	
	TEST LINE EQUIPMENT LOCATI					DN	AUXI EQU	LIARY IPMEN	TONE T LOC	PLANT ATION		TEST 2 TRANSMITTED	NETWORK
TEST NO		MODULE	BINET	RIER	SLOT	RCUIT	MODULE	BINET	RIER	SLOT			TEST CALLS
. 1		1 2	5 3	1 5 4	5	5	7	15	e CAF	, 10		11 12 13 14 15 16	644

Purpose

PROC 644 provides the capability to transmit the six tones contained on circuit pack SN253 to a test line to allow maintenance personnel to listen to each tone to determine if attenuation or improper interruption rate problems exist.

Note: Field 15 (precemption tone) and Field 16 (precedence audible alert tone) are tested only when circuit pack **SN253C** is installed.

PROC 644 is normally used when a user reported trouble concerning auxiliary tone failures is not detected by **PROC 600** (Alarm causes/error log) or **PROC 620** (Network procedure).

The user reported trouble may be intermittent in nature and **PROC 644** can isolate the potential problem to a particular auxiliary tone plant with **PROC 620** providing further diagnostic analysis as required to correct the problem.

This maintenance procedure **must** be performed on the user's premises. Terminal equipment must be connected to the test line and test set-up steps performed prior to executing any test.

Field Definitions and Codes

Each field of **PROC 644** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AS, PROC 644 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Fields 2 through 6 Change test line equipment location.
- 3. Fields 7 through 10 Select auxiliary tone plant equipment location to be tested.
- 4. Fields 11 through 16 Select tone to be transmitted (Test 2 only).

Note: Field 15 (preemption tone) and Field 16 (precedence audible alert tone) can only be selected when circuit pack **SN253C** is installed.

TABLE AS.

PROC 644 FIELD DEFINITIONS AND CODES								
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION			
1	1, 2	Test number.	10	0-21	Auxiliary tone plant slot			
2	0-30	Test line module number.						
3	0-7	Test line cabinet number.	In fields 11 through 16:					
4	0-3	Test line carrier number.	0 = Tone is not to be transmitted. 1 = Tone is to be transmitted. Flashing 1 = Tone is active (being transmitted).					
5	0-21	Test line slot number.						
6	0-7	Test line circuit number.	11 0, 1		Immediate audible alert			
7	0-30	Auxiliary tone plant module number.			tone.			
			12	0, 1	Zip tone.			
8	0-7	Auxiliary tone plant cabinet number.	13	0, 1	Remote hold tone.			
	0-3	Auxiliary tone plant carrier number.	14	0, 1	Data answer tone.			
9			15	0, 1	Preemption tone.			
			16	0, 1	Precedence audible alert tone.			

Test Equipment Required

A telephone set with 2 W1AP test cords and a 249A adapter or a 1013 type hand test set with a 249A adapter is required to listen to the transmitted tones at the test line.

Operation of Procedure

Overview

PROC 644 is used to listen to the auxiliary tones transmitted to the test line.

To call in PROC 644, perform the following:

- 1. Depress PROC NO; 644; ENTER.
- 2. Test 1 is automatically selected.
- 3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Two tests are available:

1. Test 1 - Sequentially transmits immediate audible alert, zip, remote hold, data answer, preemption, and precedence audible alert tones.

Note: Preemption tone and precedence audible alert tone is transmitted only when circuit pack SN253C is installed.

2. Test 2 - Allows any of the above tones to be selected and transmitted independently of the other tones.

Test 1

Test 1 enables maintenance personnel to sequentially transmit immediate audible alert, zip, remote hold, data answer, preemption, and precedence audible alert tones from a specific auxiliary tone plant over a test line.

Note: Field 15 (preemption tone) and Field 16 (precedence audible alert tone) can only be tested when circuit pack **SN253C** is installed.

1. Test 1 is the default test when entering **PROC 644**, or is selected by using **NEXT TEST**, or the **CHANGE FIELD** sequence:

```
CHANGE FIELD; 1; ENTER; 1; ENTER.
```

- 2. When Test 1 is initially called in, a default test line equipment location is displayed in Fields 2 through 6, and the first auxiliary tone plant equipment location is displayed in Fields 7 through 10.
- 3. The first auxiliary tone plant can be tested or another auxiliary tone plant can be selected for testing.

Note: The default test line equipment location can be changed or a new test line added by using translation procedure **PROC 000** (Line translation - single line).

- 4. The module field of the test line equipment location (Field 2) is flashed when Test 1 is initially called in, indicating it is an optional entry field.
- 5. To select another test line, enter its equipment location in Fields 2 through 6:

(Test line module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER.

Note: The test line must be in service and not busied out. If only Field 2 is changed, a default test line for the new module is provided.

6. To select both another test line and auxiliary tone plant, enter their equipment locations in Fields 2 through 10:

(Test line module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER; (Circuit); ENTER; (Auxiliary tone plant module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER.

PROC 644 Test 1 and Test 2

7. To select another auxiliary tone plant without selecting a new test line, use the CHANGE FIELD sequence to enter the new auxiliary tone plant equipment location:

CHANGE FIELD; 7; ENTER; (Auxiliary tone plant module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER.

- 8. Depressing **NEXT CIRCUIT** repeatedly increments through all the auxiliary tone plants in the switch.
- 9. Depressing **NEXT UNIT** increments to the first auxiliary tone plant in the next module (and **NEXT CIRCUIT** steps through the auxiliary tone plants within the selected module).
- 10. When Test 1 is called in, Fields 11 through 16 all contain 1's.

The 1's indicate that the tone associated with each field is selected for transmission during Test 1.

- 11. Prior to starting Test 1, connect the telephone set or hand test set to the test line.
- 12. To start Test 1, depress EXECUTE.

Transmission of the first tone (immediate audible alert) is initiated when EXECUTE is depressed.

13. As the tone is transmitted, either a 0 or 1 is flashed in the associated field (Field 11).

A 0 indicates that the tone is not being transmitted; a 1 indicates that the tone is being transmitted.

- 14. When the telephone or hand test set connected to the test line is taken off-hook, maintenance personnel can listen to the tone being transmitted.
- 15. Maintenance personnel can determine if the tone is being transmitted or if other problems exist, such as attenuation, improper interruption rates, or if the proper tone is heard without interference from other tones.
- 16. Depressing NEXT DATA initiates transmission of the next tone in sequence.

Depressing NEXT DATA repeatedly sequences through the transmission of all the tones associated with Fields 11 through 16.

Note: Field 15 (preemption tone) and Field 16 (precedence audible alert tone) can only be tested when circuit pack **SN253C** is installed.

- 17. Depressing **NEXT DATA** during transmission of the last tone (either data answer tone or precedence audible alert tone) sequences back to the first tone (immediate audible alert), which is again transmitted.
- 18. Test 1 is stopped by depressing NEXT TEST or RESET.

Test 2

Test 2 enables maintenance personnel to transmit selected tones from a specific auxiliary tone plant over a test line.

1. Test 2 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

2. When Test 2 is called in, the default test line and auxiliary tone plant equipment locations from Test 1 are displayed in Fields 2 through 10.

Either the default auxiliary tone plant can be tested or another auxiliary tone plant can be selected for testing.

3. To select another tone plant for testing use the CHANGE FIELD sequence or NEXT CIRCUIT and/or NEXT UNIT:

CHANGE FIELD; 7; ENTER; (Auxiliary tone plant module); ENTER; (Cabinet); ENTER; (Carrier); ENTER; (Slot); ENTER.

Depressing **NEXT CIRCUIT** increments through all the auxiliary tone plants in the switch.

Depressing **NEXT UNIT** increments to the first auxiliary tone plant in the next module (and **NEXT CIRCUIT** steps through the auxiliary tone plants within the selected module).

4. When Test 2 is called in, Fields 11 through 16 all contain 0's.

The 0's indicate that the tone associated with each field is not selected for transmission during Test 2.

- 5. The 0 in Field 11 is flashed, indicating an optional entry field.
- 6. To select the tone associated with Field 11 (immediate audible alert) for transmission, a 1 must be entered in the field:

1; ENTER.

- 7. To leave the tone not selected for transmission, **ENTER** can be depressed to increment to the next field.
- 8. Each tone that is to be transmitted during Test 2 must be selected by entering a 1 in the associated field.

Note: Field 15 (precemption tone) and Field 16 (precedence audible alert tone) can only be selected for transmission when circuit pack **SN253C** is installed.

- 9. Prior to starting Test 2, connect the telephone set or hand test set to the test line.
- 10. To start Test 2, depress EXECUTE.

Note: Depressing **EXECUTE** with no tones selected for transmission (Fields 11 through 16 all contain 0's), causes special error code 80 (no tone selected for transmission) to be displayed in the **MAAP** error code field.

- 11. The first field selected containing a 1 is flashed when **EXECUTE** is depressed, indicating that the associated tone is being transmitted.
- 12. Maintenance personnel can monitor the transmission of the tone selected by going off-hook at the test line.
- 13. Depressing **NEXT DATA** sequences to the next field containing a 1 and begins transmitting the associated tone.

Repeated use of **NEXT DATA** sequences through all the selected tones, transmitting them, and then back to the first tone selected which is again transmitted.

14. Test 2 is stopped by depressing NEXT TEST or RESET.

PROC 644

Repair Guide

When auxiliary tone failures are reported by the user as a trouble, and **PROC 600** (Alarm causes/error log) or **PROC 620** (Network procedure) has not detected an auxiliary tone plant failure, the following steps should be performed in the order listed, to isolate and replace the failing circuit pack.

- 1. At the test line, install a 249A adapter and a telephone set or hand test set.
- 2. Execute Test 1 for the first auxiliary tone plant displayed upon entering **PROC 644**, and listen to each tone by going off-hook at the test line.

Note: Field 15 (precemption tone) and Field 16 (precedence audible alert tone) can not be transmitted if circuit pack **SN253C** is not installed.

- 3. If the auxiliary tone plant passes, execute Test 1 for all auxiliary tone plants in the switch, using **NEXT CIRCUIT** and/or **NEXT UNIT** to select the next auxiliary tone plant for testing.
- 4. If no auxiliary tone plants indicate a failure, check the wiring between the terminal equipment experiencing the trouble and the associated connections to the switch.
- 5. If an auxiliary tone plant fails, determine which tones are defective, and execute Test 2 to inhibit the transmission of the fault-free tones to verify the status of the tones suspected of being defective by listening to the selected tones at the test line.

Note: Field 15 (precemption tone) and Field 16 (precedence audible alert tone) can not be transmitted if circuit pack **SN253C** is not installed.

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- 6. Replace SN253 and repeat Test 1.
- 7. If the auxiliary tone plant continues to fail after replacing SN253, use **PROC 620**, Test 4 (unit type 31) to further isolate the exact cause of the problem.
- 8. If the auxiliary tone plant still fails after further diagnosis by **PROC 620**, check the wiring associated with the defective tones isolated in Step 5.

FL	IPCHART SUE 1	+	+ MODEM POOLING A	ND FACILITY TESTING +	+	
EGUIPMENT LOCATION TYPES (FIELD 6): D=ADFTC 1=MEMBER A GAP 2=MEMBER A GAP 3=MEMBER B GPP 4=MEMBER B DATA PORT		DATA TYPES (FIELD 13 1-SPECIFIC FAULT CODI 2-BIT ERROR RATE/ BITS SENT 3-BLOCK ERROR RATE/ BLOCKS SENT 4-NUMBER OF CIRCUITS TESTED 5-MAINT BUSY 6-NOT MAINT BUSY	DATA RATE (FIELD 14): DASH=DEFAULT RATE 3=300 BPS 12=1200 BPS 42=2400 BPS 48=4800 BPS 98=9600 BPS 98=9600 BPS 192=19_2K BPS 560=56K BPS 640=64K BPS	SPECIAL ERROR CODES: B0-EQUIPMENT LOCATION NOT COMPLETE B1-MESSAGE TRANSMISSION TO MODULE PROCESSOR FALLEO B2-TEST OF RANGE NOT COMPLETED B3-NO ADFTC AVAILABLE FUR TEST B4-OHIOS OVERFLOW B5-INVALTO ELUIPMENT LOCATION B6-INVALTO LENCIT FIELDS B6-INVALTO MEMBER	89-ND MEMBER AVAILABLE 90-INVALID DATA RATE 91-WROME GULPMENT LOCATION TYPE 92-INVALID TEST TYPE FOR TRUMK GROUP MODE 93-ND CITCUIT FOUND IN RANGE 94-MEMBER BINVALID FOR DIGITAL FACILITIES 95-WAIT FOR TEST TO STOP 96-FIELDS 7-11 MUST BE ENTERED BEFORE USE OF BUSY OUT/RELEASE BUSY OUT	
WORD 0	TEST 1 TEST TYPE OFALL ADFTC SELF 1=ONE PORT ADFTC 2=TWO PORT NORMA 3=TWO PORT REVER	S (FIELD 2): TESTS SELF TEST LAOFTC SELF TEST SE ADFTC SELT TEST	TEST 2 TEST TYPES (FIELD D=ALL TESTS OR HOST ACCES 1=ALL ORIGINATING TESTS 2=TWD PORT ORIGINATING, NG 4=TWD OPRT ORIGINATING, NG 4=TWO PORT TERMINATING, NG 5=TWD PORT TERMINATING, RE 7=OME PORT TERMINATING TE 8=OME PORT TERMINATING TE	2): TEST 3 TEST TYPËS (FIE S O-ALL TESTS 1-ALL EIA REMOTE LOOPB 2-DATA MODULE REMOTE LOOP 2-DATA MODULE REMOTE A-EIA REMOTE LOOPBACK RMAL TEST S-EIA REMOTE LOOPBACK VERSE TEST ST	LU 2): MACK TESTS .OOPBACK TEST EST TEST. ORIGINATING TEST. TERMINATING	NETWORK

PROC 646 - MODEM POOLING AND FACILITY TESTING

FLIPCHART ISSUE 1	+	+ MODE	EM POOLING AND FACILITY TESTING	+	+	
TEST 1: TEST ADFTC TEST 2: RUN DETECTION TEST ON MODEM POOL MEMBERS OR DIGITAL FACILITIES.						
USE 'NEXT CIRCUIT' TO DISPLAY FAILING CIRCUITS, NEXT FAULT' TO DISPLAY FAULT CODES, BIT ERROR RATE/BITS SENT OR BLOCK ERROR RATE/BITS SENT OR UNABER OF NEXT UNIT' TO DISPLAY NEXT TRUNK GROUP'S FAILURES: AND'NEXT DATA' TO DISPLAY EQUIPMENT LOCATIONS USED DURING TEST. NDES: FIELDS 12 AND 14. NUMBER OF CIRCUITS, NDES: FIELDS 12 AND 14. NUMBER OF CIRCUITS, NDES: FIELDS 12 AND 14. NUMBER OF CIRCUITS, NDES: FIELDS 12 AND 14. NUMBER OF CIRCUITS, MODES: FIELDS 12 AND 14. NUMBER OF CIRCUITS, NDES: FIELDS 12 AND 14. NUMBER OF CIRCUITS, FIELD 12: 1-4 MINUTES.						
	TEST 2 AND 3 CIRCUIT	T 263	EQUIPMENT LOCATION TEST LENGTH (T 2 & 3)		TEST 2 & 3 DATA RATE	NETHODY
TEST TEST NO TYPE GRO 1 2	NK UP MEMBER M BER A 1 3 1 4	MEMBER TYPE MODI B	ULE CAB CARR SLOT CKT OF Circuits 7 8 9 10 11 12	TYPE	DATA .	646

The flipcharts shown are for R2V2. The R2V1 flipcharts are similar except that the input definition for Field 12 = 1.99 minutes.

Purpose

PROC 646 is used when referenced from **PROC 600** (Alarm causes/error log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a Analog/Digital Facility Test Circuit (ADFTC) failure, a modem pool member (MPM) failure, and/or a digital facility failure.

PROC 646 is used to:

- 1. Test ADFTC circuits.
- 2. Perform a detection test on MPMs and digital facilities.
- 3. Perform a diagnostic test on MPM and digital facilities.
- 4. Automatically turn off the fault indicator when all ADFTC circuits, MPMs, and/or digital facilities that caused an alarm to be raised are tested as good.

Note: Alarmed ADFTC circuits, MPM circuits, and/or digital facility circuits in PMIDS are marked as resolved.

Maintenance tests are performed on ADFTC circuits, MPMs, and data modules, EIA ports, and digital facilities that are translated as trunks.

The ADFTC (circuit pack SN261) is used in testing MPMs, data modules, EIA ports, and digital facilities.

A MPM consists of an enhanced Trunk Data Module (TDM/2) connected to a General Purpose Port (GPP) circuit pack (SN270), and an analog modem connected to a data port trunk circuit (SN243).

A MPM is a conversion resource which allows System 85 outside users to communicate through the analog network with off/on premises facilities.

The Processor Data Module (PDM) and Trunk Data Module (TDM and TDM/2) are data modules.

The EIA port (circuit pack SN238) with a Limited Distance Modem (LDM) functions similar to a GPP port and a data module.

Digital facilities include Public Switched Digital Connectivity (PSDC), Digital Data Service (DDS), private line data facilities, and host computer access that connect to a data module or EIA port which are translated as trunks.

A Modem Pool Group (MPG) is a trunk group of MPMs all with similar data transmission characteristics.

Field Definitions and Codes

Each field of **PROC 646** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AT, PROC 646 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 2 Select type of test to be performed.
- 2. Fields 3 through 5 Select trunk group and member number to be tested (Tests 2 and 3 only).
- 3. Field 6 Select equipment location type to be tested (Tests 2 and 3 only).
- 4. Fields 7 through 11 Select equipment location of the ADFTC, MPM, or digital facility to be tested.
- 5. Field 12 Select length (time in minutes) of test to be performed (Tests 2 and 3 only).
- 6. Field 14 Select data rate required to perform the test (Tests 2 and 3 only).

Note: Fields 12 and 14 are multiple use fields; however, for optional inputs they are used for test length and data rate.
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TABLE AT.

		PROG FIELD DEFINITIO	C 646 NS AND (CODES	
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION
1	1-3	Test number.	2 Contd		Test 3 test types
2	0-8	Test types.	Conta	0	EIA local loophash
	0-3	Test 1 test types:		3	tests.
	0	All ADFTC self tests.		4	EIA remote loopback
	1	One port ADFTC self test.		5	EIA remote loopback terminating tests.
	3	self test.	3-5		Circuit location.
		self test.	3	1-255	Trunk group number.
	0-8	Test 2 test types.	4	1-99	Member A.
	0	All tests or host access.	5	1-99	Member B.
	2	All originating tests.	6	0-4	Equipment location type.
	3	Two port originating normal test. Two port originating reverse test. Two port terminating normal test.		0 1 2	ADFTC. Member A GPP port. Member A data port
	5			2 3 4	Member B GPP port. Member B data port.
	6	Two port terminating reverse test.	7-11		Equipment location.
	7	One port originating test.	7	0-30	Module number.
	8 One port terminating test.	8	0-7	Cabinet number.	
	0-8	Test 3 test types:	· 9	0-3	Carrier number.
	0 1 2	All tests. All EIA remote loopback tests. Data module remote loopback tests.	10	00-03, 05-08, 13-16, 18-21	Slot number.
			11	0-3	Circuit number.

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TABLE AT. (Contd)

PROC 646 FIELD DEFINITIONS AND CODES (Contd)							
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION		
12		Test length/number of circuits failed.	14 Contd		Data: The type of information displayed		
	1-4	Test length.			execution depends on		
	1-99	Number of circuits failed.			which encode is displayed in Field 13:		
13	0-6	Data type.			13= 14=		
	1	Specific fault code.		0-1431	1 Specific fault code.		
	2	Bit error rate.		[1]	3 Block error rate.		
	3	Block error rate.		1-9999	circuits tested.		
	4	Number of circuits tested.	[1]	The first 2 block erro	digits in Field 14 are the bit or r rate; the second 2 digits in		
	5	Resource maintenance busy.		sent. O's d bits or blo	isplayed in Field 14 indicate no cks were sent.		
-	6	Resource non- maintenance busy.		To obtain multiply tl	the bit or block error rate, he first digit (left most side) by		
14		Data rate/data.	10 raised to the digit. Example: 3 2 digits		to the negative of the second nple: 3 and 5 displayed in first		
	3-640	Data rates:		2 digits:			
	3	300 bps.			$3 imes 10^{-5}$		
	12	1200 bps.		Blanks dis	splayed in the first 2 digits in-		
	24	2400 bps.	dicate a zero error rate.				
	48	4800 bps. 9600 bps		m 1			
	192	19.2 Kbps.		sent multi	inly the third digit by 10 raised		
	560	56 Kbps.		to the four	th digit. Example: 8 and 6 dis-		
	640	64 Kbps.		played in	last 2 digits.		
					$8 imes 10^6$		

Operation of Procedure

Overview

PROC 646 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from a ADFTC failure, MPM failure, and/or digital facility failure.

To call in **PROC 646**, perform the following:

- 1. Depress PROC NO; 646; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, Field 2 is blanked and blinking, Field 6 displays a 0 and all other fields are dashed.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Three tests are available:

- 1. Test 1 Tests ADFTC circuits.
- 2. Test 2 Performs detection tests on MPMs and digital facilities.
- 3. Test 3 Performs diagnostic tests on MPMs and digital facilities.

Test 1

Test 1 runs a detection test on ADFTC circuit(s). Self tests are performed on ADFTC circuit(s) as determined by the test type specified in Field 2.

ADFTC self tests consist of the following test types:

- 1. Test type 0 All ADFTC self tests which includes a one port, two port normal, and two port reverse detection test.
- 2. Test type 1 ADFTC one port self test: A connection is made between the ADFTC and itself (port 1 to port 1) through the switch and a detection test is run.
- 3. Test type 2 ADFTC two port normal test: A connection is made between the ADFTC and itself (port 1 to port 2) through the switch and a detection test is run.
- 4. Test type 3 ADFTC two port reverse test: A connection is made between the ADFTC and itself (port 1 to port 2) through the switch and a detection test is run.

ADFTC circuits can be selected for testing on a single circuit basis or a range of ADFTC circuits.

If a circuit is tested with a test type of 0 (all ADFTC self tests) and no failure occurs, any alarm on that circuit is automatically resolved in PMIDS.

Test 1 Data Entry

1. Test 1 is the default test when entering PROC 646, or is selected by using NEXT TEST.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 1.

2. When Test 1 is initially called in, Fields 7 through 11 (equipment location) are dashed, or a default equipment location may be displayed in Fields 7 through 11. Field 13 may display a default maintenance busy status and Field 14 (data) may display a specific fault code.

3. The default equipment location can be the last ADFTC equipment location displayed in Test 2 or 3 of **PROC 646** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.

The default equipment location can also be passed from **PROC 620** as long as the equipment location is a ADFTC port equipment location (circuit 1) and is still displayed in **PROC 620** when it is passed.

- 4. Field 2 (test type) is blanked and blinking indicating a mandatory entry.
- 5. Fields 3 through 5 (circuit fields) are dashed during Test 1 execution and Field 6 (type) defaults to 0 (ADFTC).
- 6. To select the type of test to be run on ADFTC circuit(s), enter the test type number in Field 2 and depress **ENTER**.

Tests that can be run on ADFTC circuits are: 0 = All ADFTC self tests; 1 = one port ADFTC self test; 2 = two port normal ADFTC self test; 3 = two port reverse ADFTC self test.

- 7. After the test type (Field 2) is entered, the module number field (Field 7) is blinking indicating that a module number may be entered.
- 8. All ADFTC circuits, a range of ADFTC circuits, a specific ADFTC circuit, or the default equipment location can be tested.
- 9. Selection of a range of ADFTC circuits to be tested depends on whether or not a default equipment location is displayed. If a default equipment location is displayed, the CHANGE FIELD sequence must be used. If no default equipment location is displayed, either ENTER or the CHANGE FIELD sequence can be performed to select the range of ADFTC circuits to be tested.
- 10. To select all ADFTC circuits in the switch for testing, Fields 7 through 11 must be dashed.

If no default equipment location is displayed, depress ENTER.

If a default equipment location is displayed, depress CHANGE FIELD; 7; ENTER; ENTER.

Test 1 starts with the first module, first cabinet and carrier and runs until all ADFTC circuits in the switch are tested.

Proceed to Step 1 of Test 1 Execution.

11. To select all ADFTC circuits in a module for testing, perform one of the following depending on whether or not a default equipment location is displayed:

(Module number to be tested); ENTER.

CHANGE FIELD; 7; ENTER; (Module number to be tested); ENTER.

Test 1 starts with the first ADFTC circuit in the module selected and runs until all ADFTC circuits in the module are tested.

Proceed to Step 1 of Test 1 Execution.

12. To select all ADFTC circuits in a cabinet for testing, perform one of the following depending on whether or not a default equipment location is displayed:

(Module number of cabinet to be tested); ENTER; (Cabinet number to be tested); ENTER.

CHANGE FIELD; 7; ENTER; (Module number of cabinet to be tested); ENTER; (Cabinet number to be tested); ENTER.

Test 1 starts with the first ADFTC circuit in the cabinet selected and runs until all ADFTC circuits in the cabinet are tested.

Proceed to Step 1 of Test 1 Execution.

13. To select all ADFTC circuits in a carrier for testing, perform one of the following depending on whether or not a default equipment location is displayed:

(Module number of carrier to be tested); ENTER; (Cabinet number of carrier to be tested); ENTER; (Carrier number to be tested); ENTER.

CHANGE FIELD; 7; ENTER; (Module number of carrier to be tested); ENTER; (Cabinet number of carrier to be tested); ENTER; (Carrier number to be tested); ENTER.

Test 1 starts with the first ADFTC circuit in the carrier selected and runs until all ADFTC circuits in the carrier are tested.

Proceed to Step 1 of Test 1 Execution.

14. To select all ADFTC circuits in a slot for testing, perform one of the following depending on whether or not a default equipment location is displayed:

(Module number of slot to be tested); ENTER; (Cabinet number of slot to be tested); ENTER; (Carrier number of slot to be tested); ENTER; (Slot number to be tested); ENTER.

CHANGE FIELD; 7; ENTER; (Module number of slot to be tested); ENTER; (Cabinet number of slot to be tested); ENTER; (Carrier number of slot to be tested); ENTER; (Slot number to be tested); ENTER.

Test 1 tests circuit 1 of the ADFTC in the slot selected.

Proceed to Step 1 of Test 1 Execution.

15. To select a specific ADFTC circuit for testing, perform one of the following depending on whether or not a default equipment location is displayed:

Note: Port 0 (circuit number 0) cannot be tested in PROC 646 but can be tested in PROC 620.

(Module number of ADFTC circuit to be tested); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number 1); ENTER.

CHANGE FIELD; 7; ENTER; (Module number of ADFTC circuit to be tested); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number 1); ENTER.

Field 13 (data type) displays the maintenance busy status of the specific ADFTC circuit selected for testing.

Note: Special error code 85 (invalid equipment location) is displayed in the **MAAP** error code field when **EXECUTE** is depressed if the correct equipment location is not entered in Fields 7 through 11.

Proceed to Step 1 of Test 1 Execution.

PROC 646 Test 1

16. A specific ADFTC circuit can also be selected for testing by use of NEXT CIRCUIT.

Depress **NEXT CIRCUIT** until the port equipment location of the ADFTC circuit to be tested is displayed in Fields 7 through 11.

Note: The **WAIT** indicator lights while a circuit is searched for. The delay is approximately 30 seconds per module.

Proceed to Step 1 of Test 1 Execution.

17. To test the default equipment location displayed in Fields 7 through 11, proceed to Step 1 of Test 1 Execution.

Test 1 Execution

1. To start Test 1 after selecting the test type and ADFTC circuit(s) to be tested, depress **EXECUTE**.

The WAIT indicator on the MAAP is turned on.

2. If test type 0 was selected, Field 2 changes to a 1 to indicate that test type 1 is currently being executed.

If any other test type was selected, Field 2 does not change.

- 3. When testing encounters an ADFTC circuit in use by the periodic test, the periodic test is stopped and the ADFTC circuit is tested.
- 4. STOP can be depressed to halt Test 1 at any time.
- 5. If Test 1 is stopped before one complete testing pass through a single ADFTC circuit or a range of ADFTC circuits is made, special error code 95 (wait for test to stop) is displayed in the **MAAP** error code field.

Note: One complete testing pass equals all test types selected for a single circuit are tested, or in a range of circuits all test types selected for each circuit in a range of circuits are tested.

- 6. After the current test is completed, special error code 82 (test of range not completed) is displayed in the **MAAP** error code field indicating that one complete pass through the ADFTC circuit or range of ADFTC circuits was not completed.
- 7. The port equipment location of the last ADFTC circuit tested is displayed in Fields 7 through 11, the total number of circuits tested is displayed in Field 14 (if all test types of a circuit are tested), and the total number of failures (if any) is displayed in Field 12.
- 8. If any failures are displayed in Field 12, test result information can be stepped through as described in Step 10 below when Test 1 is halted using **STOP** even though the ADFTC circuit or the entire range of ADFTC circuits is not tested.
- 9. To restart the test when Test 1 is halted by use of **STOP** before a single ADFTC circuit or range of ADFTC circuits are tested at least once, **EXECUTE** is depressed and Test 1 starts at the port equipment location and specific test following the last port equipment location and specific test fully tested.

Note: When Test 1 is continued from where it was stopped any test results gathered to that point are retained.

10. Test 1 operation and display of test results is different when a specific ADFTC circuit or default equipment location is tested and when a range of ADFTC circuits are tested.

For test operation and display of test results for a default equipment location or a specific ADFTC circuit, proceed to Step 1 of Test 1 Result Display for a Single Circuit.

For test operation and display of test results for a range of ADFTC circuits, proceed to Step 1 of Test 1 Result Display for a Range of Circuits.

Test 1 Result Display for a Single Circuit

1. When Test 1 is completed for a default equipment location or a specific ADFTC circuit, the **WAIT** indicator is turned off and the following is displayed:

Field 1 - 1.

Field 2 - Original test type selected for testing ADFTC circuit.

Fields 3 through 5 - Dashed.

Field 6 - 0.

Fields 7 through 11 - Port equipment location of ADFTC circuit tested.

• Field 12 - 0 (indicating no failures were found for the ADFTC circuit tested) or 1 (indicating the ADFTC circuit failed the test).

Field 13 - Data type of 4 (indicating that Field 14 indicates the number of circuits tested).

Field 14 - 0 (if **STOP** was depressed indicating all tests are not completed) or 1 (indicating 1 ADFTC circuit tested).

2. Depressing **NEXT CIRCUIT** changes the display in the data type and data fields (Fields 13 and 14).

Field 13 displays a 1 indicating that the data in Field 14 is a specific fault code.

3. Depressing **NEXT FAULT** displays a 2 in Field 13 and the bit error rate/bits sent in Field 14.

Depressing **NEXT FAULT** once more displays a 3 in Field 13 and the block error rate/blocks sent in Field 14.

Note: Refer to Table AT, PROC 646 - Field Definitions and Codes, to determine how to interpret bit, block error rates and bits/blocks sent.

4. Depressing **NEXT FAULT** repeatedly advances through each test type selected for testing displaying specific fault code (if any), bit error rate/bits sent, and block error rate/blocks sent for each test type.

After the block error rate/blocks sent of the last test type selected for testing is displayed for the circuit tested, depressing **NEXT FAULT** once more dashes all fields except Field 1.

Depressing **NEXT FAULT** again starts the cycle over with a 1 displayed in Field 13, and a specific fault code displayed in Field 14 for the same circuit.

5. When another specific ADFTC circuit is to be tested, the **CHANGE FIELD** sequence must be used to select the test type desired and the specific ADFTC circuit to be tested.

CHANGE FIELD; 2; ENTER; (Test type desired); ENTER; (Module number of ADFTC circuit to be tested); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number 1); ENTER.

PROC 646 Test 1

6. **EXECUTE** must be depressed to test the specific ADFTC circuit selected for testing.

Test 1 Result Display for a Range of Circuits

1. When a range of ADFTC circuits is being tested, the **WAIT** indicator is turned on and the following fields are incremented as a circuit is tested:

Field 2 is updated with the test type currently being executed (i.e., 1, 2, and 3) if test type 0 (all ADFTC tests) was selected.

Fields 7 through 11 - Port equipment location of the current ADFTC circuit being tested.

Field 14 - Bit error rate/bits sent (updated every 10 seconds).

- 2. When testing is completed for an ADFTC circuit, the bit error rate/bits sent, block error rate/blocks sent, any specific fault code and the port equipment location are stored in DMIDS.
- 3. When a range of ADFTC circuits has completed testing, the WAIT indicator is turned off.

Field 2 displays the original test type and Fields 7 through 11 display the original equipment range selected.

Field 12 displays the number of failures (if any).

Field 13 - 4 (indicating that Field 14 displays the number of ADFTC circuits tested).

Field 14 - Number of ADFTC circuits tested.

4. All failures with a specific fault code are displayed first followed by passing circuits with a specific fault code of 0.

Bit and block error rates are displayed for failing and passing circuits.

When multiple tests (more than one test type) are performed on ADFTC circuits, a specific fault code (if any) and bit/block error rates are displayed for all test types executed for each ADFTC circuit tested.

5. Depressing NEXT CIRCUIT displays the first ADFTC circuit tested as follows:

Field 1 - 1.

Field 2 - Test type for the displayed ADFTC circuit.

Fields 3 through 5 - Dashed.

Field 6 - 0 (default ADFTC equipment type).

Fields 7 through 11 - Equipment location of the displayed ADFTC circuit.

Field 12 - 0 or number of circuits failed.

Field 13 - 1 (indicating that Field 14 displays a specific fault code).

Field 14 - 0 or specific fault code.

6. Depressing **NEXT FAULT** displays a 2 in Field 13 and the bit error rate/bits sent in Field 14.

Depressing **NEXT FAULT** once more displays a 3 in Field 13 and the block error rate/blocks sent in Field 14.

Note: Refer to Table AT, PROC 646 - Field Definitions and Codes, to determine how to interpret bit and block error rates.

7. Depressing **NEXT FAULT** repeatedly advances through each test type selected for testing displaying specific fault code (if any), bit error rate/bits sent, and block error rate/blocks sent for each test type.

After the block error rate/blocks sent of the last test type selected for testing is displayed for the circuit tested, depressing **NEXT FAULT** once more dashes all fields except Field 1.

Depressing **NEXT FAULT** again starts the cycle over with a 1 displayed in Field 13, and a specific fault code displayed in Field 14 for the same circuit.

8. Depressing **NEXT CIRCUIT** repeatedly displays the remaining tested ADFTC circuits with a 1 displayed in Field 13 and a specific fault code displayed in Field 14.

Depressing **NEXT FAULT** displays the bit error rate/bits sent and block error rate/blocks sent.

Depressing **NEXT FAULT** repeatedly advances through each test type selected for the displayed ADFTC circuit, displaying specific fault code, bit error rate/bits sent, and block error rate/blocks sent for each test type.

9. When all ADFTC circuits are displayed, depressing NEXT CIRCUIT dashes Fields 2 through 14.

Depressing **NEXT CIRCUIT** once more starts the sequence over with the first failure or tested ADFTC circuit.

- 10. If a circuit is tested with a test type of 0 (all tests) and no failure occurs, any alarms on that circuit is automatically resolved in PMIDS.
- 11. To select another range of ADFTC circuits to test, the **CHANGE FIELD** sequence must be used to select the test type desired and the specific range of ADFTC circuits to be tested as follows:

CHANGE FIELD; 2; ENTER; (Test type desired); ENTER.

Refer to Steps 10 through 13 of Test 1 Data Entry above to select a range of ADFTC circuits to test in a module, cabinet, carrier, or slot.

- 12. **EXECUTE** must be depressed to test the range of ADFTC circuits selected for testing.
- 13. Test 1 automatically turns off the **OTHER FAILS** fault indicator when all ADFTC circuits that raised an alarm pass Test 1 assuming no MPM, digital facilities, or other alarm sources affecting the **OTHER FAILS** fault indicator are active.

Note: ADFTC alarmed circuit entries in PMIDS are marked as resolved.

Test 2

Test 2 runs detection tests on modem pool members (MPMs) and digital facilities as determined by the test type specified in Field 2.

Detection tests consist of half duplex tests and full duplex tests. (Refer to Figure 9 - Modem Pooling and Facility Test Configurations.)

1. The half duplex test is run only on MPMs. It is run four times, from both the originating and terminating modes and in both the forward and reverse direction. The half duplex test requires the use of two MPMs. Connections are made from ports 1 and 2 of the ADFTC to the GPP of each MPM and between each MPM's data (analog) port.

PROC 646 Test 2

2. The full duplex test is run on digital facilities assigned as trunks, and for diagnostic purposes on full duplex MPMs and the TDM/2 on half duplex MPMs. The full duplex test can put MPMs in either originating or terminating modes. Only one connection is necessary except when testing a full duplex MPM. It is made between port 1 of the ADFTC and the GPP of the data module to be tested. An additional connection must be made, when testing a full duplex MPM, between its data port and the data port of a known good MPM.



Figure 9. Modem Pooling and Facility Test Configurations

Types of detection tests for MPMs and digital facilities consist of all tests (test type 0 - includes test types 3 through 8); all originating tests (test type 1 - includes test types 3, 4, and 7); all terminating tests (test type 2 - includes test types 5, 6, and 8); two port originating normal test (test type 3); two port originating reverse test (test type 4); two port terminating normal test (test type 5); two port terminating reverse test (test type 6); one port originating test (test type 7); and one port terminating test (test type 8).

Each type of test is not applicable to all types of modem pool members or digital facilities. Types of modems available with modem pool members tested consist of 103J, 113C, 113D, 202S, 201C, 208B, and 212A.

Types of tests that can be run in Test 2 for modem pool members and digital facilities are:

- 1. Modem pool members that are both originating and terminating (all modems except 113C and 113D) All tests except one port test (test types 0 through 6).
- Originating only modem (i.e., 113C) All tests (test type 0) all originating tests (test type 1), and one port originating test (test type 7).
- 3. Terminating only modem (i.e., 113D) All tests (test type 0), all terminating tests (test type 2), and one port terminating test (test type 8).
- 4. Digital facilities and host access All tests (test type 0).

Several different test types may be run on one modem pooling circuit (or circuit pair).

- 1. Some test types might fail while other test types pass.
- 2. Failing test types are displayed first while passing test types are displayed after all failing test types are displayed.
- 3. When a modem pooling circuit (or circuit pair) test fails, a specific fault code is displayed. A specific fault code of 0 is displayed for passing tests.
- 4. Bit and block error rates are displayed for both failing and passing circuits (or failing and passing test types) for further diagnosis (if required).

Characteristics (i.e., modem type, loop back control, etc.) of digital trunks used in modem pooling are provided in **PROC 100** Words 1 and 2.

MPMs and digital facilities can be selected for testing on a single circuit basis or a range of MPMs or digital facilities (i.e., trunk group number; trunk group number and member A; trunk group number and member B (MPM only); or no entries).

If a circuit or circuit pair is tested with a test type of 0 (all tests) and no failure occurs, any alarm on that circuit or circuit pair is automatically resolved in PMIDS.

Test 2 Data Entry

1.

- 1. Test 2 is selected by use of NEXT TEST.
 - Note: Use of the CHANGE FIELD sequence is not valid to select Test 2.
- 2. When Test 2 is initially called in, Fields 3 through 11 (trunk group member number and equipment location) are dashed, or a default equipment location may be displayed in Fields 7 through 11. Field 13 may display a default maintenance busy status and Field 14 (data) may display a default specific fault code.
- 3. The default equipment location can be the last equipment location or trunk group and member number displayed in Test 3 of **PROC 646** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.
- 4. The default equipment location can also be passed from **PROC 620** as long as the equipment location is a GPP, data port, or ADFTC port 1 equipment location which is part of an MPM or digital facility and is still displayed in **PROC 620** when it is passed.
- 5. Field 2 (test type) is blanked and blinking indicating a mandatory entry.
- 6. Types of tests that can be run in Test 2 for modem pool members and digital facilities are:

Originating and terminating modem pool members (all modems except 113C and 113D) - All tests except one port test (test types 0 through 6).

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113C modem - All tests (test type 0), all originating tests (test type 1), and one port originating test (test type 7).

113D modem - All tests (test type 0), all terminating tests (test type 2), and one port terminating test (test type 8).

Digital facilities and host access - All tests (test type 0).

7. To select the type of test to be run on MPMs or digital facilities to be tested, enter the test type number in Field 2 and depress **ENTER**.

Note: When a default equipment location is displayed, the maintenance busy status is displayed in Field 13 (data type) when the test type is entered.

- 8. After the test type (Field 2) is entered, the trunk group number field (Field 3) is blinking indicating that a trunk group number of the MPM or digital facility to be tested may be entered.
- 9. If an equipment location was carried over from Test 3 and it is an MPM or digital facility, its trunk group and member number are displayed in Fields 3 through 5 (as appropriate) and the equipment location is displayed in Fields 7 through 11.
- 10. A range of MPMs or digital facilities, a specific MPM or digital facility, or the default equipment location can be tested.

If a default equipment location is to be tested, proceed to Step 11.

If a range of MPMs or digital facilities, a specific MPM or a specific digital facility is to be tested, proceed to Step 12.

11. To test the default equipment location, determine if the ADFTC to be used for testing is to be specified before testing.

If the ADFTC is to be specified, record the default equipment location (Fields 3 through 5, and 7 through 11 as appropriate) and proceed to Step 13.

If the ADFTC is not to be specified, proceed to Step 45.

12. If a specific ADFTC is to be used for testing, it must be selected at this time.

To select a specific ADFTC to be used for testing, proceed to Step 13.

If a specific ADFTC is not to be used for testing, proceed to Step 15.

13. The ADFTC to be used for testing can be specified by entering the complete equipment location and the correct type in Fields 6 through 11 as follows:

CHANGE FIELD; 6; ENTER; 0; ENTER; (Module number of ADFTC); ENTER; (Cabinet number of ADFTC); ENTER; (Carrier number of ADFTC); ENTER; (Slot number of ADFTC); (Circuit number of ADFTC); ENTER.

Note: If the ADFTC is incompletely specified (all fields not entered), special error code 85 (invalid equipment location) is displayed in the **MAAP** error code field when **EXECUTE** is depressed. Field 7 (module) blinks.

Proceed to Step 14.

14. If a default equipment location is being tested, enter the default equipment location (recorded in Step 11 above) in Fields 3 through 5, and 7 through 11 (as appropriate) using the CHANGE FIELD sequence and proceed to Step 45. If a range of MPMs or digital facilities, a specific MPM or a specific digital facility is being tested, proceed to Step 15.

15. MPMs or digital facilities can be selected for testing by one of two methods; i.e., by circuit (Fields 3 through 5) or by type and equipment location (Fields 6 through 11).

To select MPMs or digital facilities for testing using the circuit method, proceed to Step 16.

To select MPMs or digital facilities for testing using the type and equipment location, proceed to Step 35.

- 16. If no entries are specified in Fields 3 through 5 or 7 through 11, Test 2 is run on all trunk groups corresponding to the test type entered in Field 2.
- 17. If only the trunk group number is specified in Field 3, Test 2 is run on all members of the trunk group.
- 18. If the trunk group number and member A are specified in Fields 3 and 4, Test 2 is run only on member A using any available member B.
- 19. If the trunk group number and member B are specified in Fields 3 and 5, Test 2 is run on all member As of the trunk group using the member. B specified.
- 20. If the trunk group number and members A and B are specified in Fields 3 through 5, Test 2 is run only on that circuit pair.
- 21. Selection of a range of MPMs or digital facilities to be tested depends on whether or not a default equipment location is displayed or if a specific ADFTC is selected for testing.

If a default equipment location is displayed or if a specific ADFTC is selected for testing, the **CHANGE FIELD** sequence **must** be used.

If no default equipment location is displayed or no specific ADFTC is selected for testing, either ENTER or the CHANGE FIELD sequence can be performed to select the range of MPMs or digital facilities to be tested.

22. To select all trunk groups corresponding to the test type entered in Field 2 for testing, perform one of the following depending on whether or not a default equipment location is displayed or a specific ADFTC was selected for testing:

ENTER.

CHANGE FIELD; 3; ENTER; ENTER.

Note: Fields 3 through 11 are dashed.

Test 2 starts with the first MPM or digital facility (in equipment location order not trunk group sequence) corresponding to the test type entered in Field 2 and runs until all MPMs and/or digital facilities are tested.

Proceed to Step 47.

23. To select all MPMs or digital facilities in a trunk group for testing, perform one of the following depending on whether or not a default equipment location is displayed or a specific ADFTC was selected for testing:

(Trunk group number to be tested); ENTER.

CHANGE FIELD; 3; ENTER; (Trunk group number to be tested); ENTER.

Test 2 starts with the first MPM or digital facility in the trunk group selected (in equipment location order not trunk group sequence) and runs until all MPMs or digital facilities in the trunk group are tested.

Proceed to Step 47.

24. **NEXT UNIT** is also used to select a trunk group for testing. Depress **NEXT UNIT** until the trunk group number to be tested is displayed in Field 3. All other fields are dashed.

Test 2 starts with the first MPM or digital facility in the trunk group selected (in equipment location order not trunk group sequence) and runs until all MPMs or digital facilities in the trunk group are tested.

Proceed to Step 47.

25. To test a single member A with any member B, perform one of the following depending on whether or not a default equipment location is displayed or a specific ADFTC was selected for testing:

(Trunk group number of member B to be tested); ENTER; (Member A); ENTER.

CHANGE FIELD; 3; ENTER; (Trunk group number of member B to be tested); ENTER; (Member A); ENTER.

Note: If the trunk group number is a digital facility or MPG with one way modems, the member B field **must** be dashed.

Test 2 tests the member A specified with any member B.

Proceed to Step 47.

26. To select all member As in a trunk group for testing, perform one of the following depending on whether or not a default equipment location is displayed or a specific ADFTC was selected for testing:

(Trunk group number of member A to be tested); ENTER; ENTER; (Member B or dashed); ENTER.

CHANGE FIELD; 3; ENTER; (Trunk group number of member A to be tested); ENTER; ENTER; (Member B or dashed); ENTER.

Note: If the trunk group number is a digital facility or MPG with one way modems, the member B field **must** be dashed since it is not required for testing member As. If the trunk group is not a digital facility or a modem pool with one way members and member B was dashed, member Bs are also selected for testing.

Test 2 starts with the first member A in the trunk group selected (in equipment location order) and runs until all member As in the trunk group are tested.

Proceed to Step 47.

27. To select a specific MPM or digital facility for testing, perform one of the following depending on whether or not a default equipment location is displayed or a specific ADFTC was selected for testing:

(Trunk group number of MPM to be tested); ENTER; (Member A of MPM to be tested); ENTER; (Member B of MPM to be tested); ENTER.

CHANGE FIELD; 3; ENTER; (Trunk group number of MPM to be tested); ENTER; (Member A of MPM to be tested); ENTER; (Member B of MPM to be tested); ENTER.

Note: If a specific digital facility is being tested, Field 5 (member B) must be dashed.

Test 2 tests the MPM specified in Fields 3 through 5 or the digital facility specified in Fields 3 and 4.

Proceed to Step 32.

- 28. NEXT CIRCUIT can be used to select a circuit or circuit pair before test execution.
- 29. If nothing is specified in the circuit or equipment location fields (Fields 3 through 5 and 7 through 11), two available facilities are displayed in the circuit and equipment location fields from the first testable trunk group when **NEXT CIRCUIT** is depressed. If the trunk group contains digital facilities or MPMs with one way modems, member B (Field 5) is dashed.

Proceed to Step 32.

30. If the circuit field is specified up to member A (Fields 3 and 4), member A is incremented to the next member A when **NEXT CIRCUIT** is depressed.

Proceed to Step 32.

31. If both members A and B are specified, the member number is advanced corresponding to the type field (Field 6) of the equipment location fields when **NEXT CIRCUIT** is depressed.

Proceed to Step 32.

32. After the circuit fields are specified, the equipment location fields (Fields 7 through 11) defaults to the equipment location of member A.

The type field (Field 6) defaults to 1 indicating the GPP port of member A is displayed in Fields 7 through 11.

Proceed to Step 33.

- 33. Before test execution, **NEXT DATA** can be depressed to examine port equipment locations associated with the circuit selected for testing.
- 34. Successive depression of **NEXT DATA** displays in Fields 6 through 11 the type and port equipment locations of the member A GPP; member A data port; member B GPP; and member B data port.

Note: Depressing **NEXT DATA** does not always display 4 equipment locations before testing. The type and port equipment locations (displayed in Fields 6 through 11) used for testing depends on whether MPMs or digital facilities are being tested.

The maintenance busy status of each port equipment location is displayed in Field 13.

Proceed to Step 45.

35. MPMs or digital facilities can be selected for testing using the type and equipment location fields (Fields 6 through 11).

Only one member A GPP or one member A data port can be designated as the type of facility to test if an individual circuit is to be tested.

PROC 646 Test 2

36. A range of member A GPP (equipment location type 1) facilities can be selected for testing.

Note: Ranging is not allowed for other equipment location types.

37. To select the type of facility to test, the CHANGE FIELD sequence must be used:

CHANGE FIELD; 6; ENTER; (equipment location type); ENTER.

38. Equipment location types are: 1 = Member A GPP port, 2 = Member A data port for a fully specified circuit; or 1 = Member A GPP for a range test.

Note: Only equipment location type 1 (member A GPP) can be entered in Field 6 for testing of digital facilities.

- 39. When the equipment location type is entered in Field 6, the module field (Field 7) blinks for entry.
- 40. To select all member A GPPs in a module for testing, enter the following:

(Module number to be tested); ENTER.

Test 2 starts with the first member A GPP in the module selected and runs until all member A GPPs in the module are tested. In addition, any data port associated with a modem pool is also tested.

Proceed to Step 47.

41. To select all member A GPPs in a cabinet for testing, enter the following:

(Module number of cabinet to be tested); ENTER; (Cabinet number to be tested); ENTER.

Test 2 starts with the first member A GPP in the cabinet selected and runs until all member A GPPs in the cabinet are tested.

Proceed to Step 47.

42. To select all member A GPPs in a carrier for testing, enter the following:

(Module number of carrier to be tested); ENTER; (Cabinet number of carrier to be tested); ENTER; (Carrier number to be tested); ENTER.

Test 2 starts with the first member A GPP in the carrier selected and runs until all member A GPPs in the carrier are tested.

Proceed to Step 47.

43. To select all member A GPPs in a slot for testing, enter the following:

(Module number of slot to be tested); ENTER; (Cabinet number of slot to be tested); ENTER; (Carrier number of slot to be tested); ENTER; (Slot number to be tested); ENTER.

Test 2 starts with the first member A GPP in the slot selected and runs until all member A GPPs in the slot are tested.

Proceed to Step 47.

44. To select a specific member A GPP or member A data port for testing, enter the following:

(Module number of member A GPP or member A data, port to be tested); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number); ENTER.

Note: Equipment type (Field 6) must correspond to the equipment location selected or error code 85 (invalid equipment location) is displayed in the **MAAP** error code field.

Proceed to Step 45.

45. The maintenance busy status of the equipment location displayed in Fields 7 through 11 is displayed in Field 13.

The circuit displayed in Fields 7 through 11 can be busied out (if required).

If the circuit is to be busied out for testing, proceed to Step 46. If busy out of the circuit is not required, proceed to Step 47.

46. Individual port equipment locations can be placed in maintenance busy out status for testing by performing the following:

Check the maintenance busy status displayed in Field 13.

If the maintenance busy status = 5, proceed to Step 47.

If the maintenance busy status = 6, depress BUSY OUT and proceed to Step 47.

Note: If Fields 7 through 11 are not entered, special error code 96 (fields 7 through 11 must be entered before use of **BUSY OUT**) is displayed in the **MAAP** error code field.

47. The length of the test (maximum of 4 minutes for each test type executed - both R2V1 and R2V2) can be entered in Field 12, or a default test length can be chosen.

Note: The default test length causes a very short (less than 2 seconds) test. However, processing overhead increases the delay seen at the **MAAP** to less than 15 seconds for each test type. This default test length applies to all bit rates and test types.

48. Either Field 12 (test length) is blinking or the CHANGE FIELD sequence must be used to enter the desired test length.

If Field 12 is blinking, proceed to Step 49.

If Field 12 is not blinking, perform CHANGE FIELD; 12; ENTER; and proceed to Step 49.

49. If a default test length is desired, depress **ENTER**. If a different test length is desired, enter the time (minutes) in Field 12:

(1 through 4 - maximum of 4 minutes for both R2V1 and R2V2); ENTER.

Note: The actual test length executed for each test type selected is determined by whether the test for the test type passes or fails. If the test passes, either the default test length or the time entered in Field 12 is used for the test performed. If the test fails, the time of the test is the default test length no matter what time is entered in Field 12.

PROC 646 Test 2

50. Field 14 (data rate) blinks for entry. The data rate can be entered in Field 14, or a default data rate can be chosen.

Note: Refer to Table AU, PROC 646 Modem Bit Rates, to determine the data rate for the modem type to be tested.

PROC	646 — MODEM BIT RATES
MODEM TYPE	BIT RATE
103J	300 bits per second.
113C	300 bits per second.
113D	300 bits per second.
201C	2400 bits per second.
202S	1200 bits per second.
208B	4800 bits per second.
212A	300/1200 bits per second.

51. If a default data rate is desired, depress ENTER. If a different data rate is desired, enter the data rate in Field 14:

(Data rate); ENTER.

Data rate encodes are: 3 = 300 bps; 12 = 1200 bps; 24 = 2400 bps; 48 = 4800 bps; 96 = 9600 bps; 192 = 19.2 kbps; 560 = 56 kbps; 640 = 64 kbps.

Test 2 Execution

1. To start Test 2 after selecting the test type, the ADFTC to be used for testing, the MPM(s) and/or digital facilities to be tested, the test length and data rate, depress **EXECUTE**.

The WAIT indicator on the MAAP is turned on.

- 2. If a facility is maintenance busied out, it is released from busy while under test.
- 3. When the test encounters a facility in use, a specific fault code is logged in DMIDS records and the test is stopped.

The data call in progress is not aborted.

When testing multiple circuits (range testing) and Test 2 encounters a facility in use the test continues with the next circuit to be tested.

4. STOP can be depressed to halt Test 2 at any time.

5. If Test 2 is stopped before one complete testing pass through the facility or range of facilities specified is made, special error code 95 (wait for test to stop) is displayed in the **MAAP** error code field.

Note: One complete testing pass equals all test types selected for a single circuit are tested, or in a range of circuits all test types selected for each circuit in a range of circuits are tested.

- 6. After the current test is completed, special error code 82 (test of range not completed) is displayed in the **MAAP** error code field indicating that one complete pass through the facility or range of facilities is not completed.
- 7. The original test type selected is displayed in Field 2, the port equipment location of the last facility tested is displayed in Fields 3 through 11, the total number of circuits tested is displayed in Field 14 (if all test types of a circuit are complete), and the total number of failures (if any) is displayed in Field 12.
- 8. If any failures are displayed in Field 12, test result information can be stepped through as described in Step 10 below when Test 2 is halted using **STOP** even though the facility or range is not tested.
- 9. To restart the test when Test 2 is halted by use of **STOP** before a single facility or range of facilities are tested at least once, **EXECUTE** is depressed and Test 2 starts at the port equipment location and specific test following the last port equipment location and specific test fully tested.

Note: When Test 2 is continued from where it was stopped any test results gathered to that point are retained.

10. Test 2 operation and display of test results is different when a specific MPM, digital facility, or default equipment location is tested and when a range of MPMs or digital facilities are tested.

For test operation and display of test results for a default equipment location or a specific MPM or digital facility, proceed to Step 1 of Test 2 Result Display for a Single Circuit.

For test operation and display of test results for a range of MPMs or digital facilities, proceed to Step 1 of Test 2 Execution and Test Result Display for a Range of Circuits.

Test 2 Result Display for a Single Circuit

1. When Test 2 is completed or **STOP** is depressed for a default equipment location, a specific MPM, or digital facility the **WAIT** indicator is turned off and the following is displayed:

Field 1 - 2.

Field 2 - Test type originally selected for testing MPM or digital facility.

Fields 3 through 5 - Circuit location.

Field 6 - Type of equipment location (1 through 4).

Fields 7 through 11 - Port equipment location of MPM or digital facility tested.

Field 12 - 0 (indicating no failures were found for the MPM or digital facility tested) or 1 (indicating the MPM or digital facility failed the test).

Field 13 - Data type of 4 (indicating that Field 14 indicates the number of circuits tested).

Field 14 - 0 (if **STOP** was depressed indicating all tests are not completed) or 1 (indicating 1 MPM, MPM pair, or digital facility tested).

2. Depressing **NEXT CIRCUIT** changes the display in the data type and data fields (Fields 13 and 14) and may change the type and equipment location in Fields 6 through 11 depending on the type of failure (if any).

Field 13 displays a 1 indicating that the data in Field 14 is a specific fault code.

3. Depressing NEXT FAULT displays a 2 in Field 13 and the bit error rate/bits sent in Field 14.

Depressing **NEXT FAULT** once more displays a 3 in Field 13 and the block error rate/blocks sent in Field 14.

Note: Refer to Table AT, PROC 646 - Field Definitions and Codes, to determine how to interpret bit error rate/bits sent and block error rate/blocks sent.

4. Depressing **NEXT FAULT** repeatedly advances through each test type selected displaying type and equipment location of the failure (if any), specific fault code, bit error rate/bits sent, and block error rate/blocks sent for each test type.

After the block error rate/blocks sent of the last test type selected for testing is displayed for the circuit tested, depressing **NEXT FAULT** once more dashes all fields except Field 1.

Depressing **NEXT FAULT** again starts the cycle over with a 1 displayed in Field 13, and a specific fault code displayed in Field 14 for the same circuit.

5. To examine the port equipment locations of the GPPs, data ports, and the ADFTC used in testing a MPM or digital facility, depress **NEXT DATA**.

Note: NEXT DATA can only be depressed after NEXT CIRCUIT and/or NEXT CIRCUIT and NEXT FAULT is depressed.

6. Field 6 cycles from 0 through 4 each time **NEXT DATA** is depressed, starting at different positions depending on the type of circuit(s) tested and the failures detected, and displays in Fields 7 through 11 the port equipment locations of the ADFTC (Field 6 = 0), member A GPP (Field 6 = 1); member A data port (Field 6 = 2), member B GPP (Field 6 = 3), and member B data port (Field 6 = 4).

Note: Depressing **NEXT DATA** does not always display 5 equipment locations. The type and port equipment locations (displayed in Fields 6 through 11) used for testing depends on whether MPMs or digital facilities were tested.

7. The possible starting positions are the ADFTC (Field 6 = 0), member A GPP (Field 6 = 1), or member B GPP (Field 6 = 3).

Note: One way MPMs only display the ADFTC (Field 6 = 0), member A GPP (Field 6 = 1), or member A data port (Field 6 = 2). Digital facilities only display the ADFTC (Field 6 = 0), or member A GPP (Field 6 = 1).

8. When another specific MPM, digital facility, member A GPP, or member A data port is to be tested, the **CHANGE FIELD** sequence must be used to select the test type desired and the specific MPM, digital facility, member A GPP, or member A data port to be tested.

CHANGE FIELD; 2; ENTER; (Test type desired); ENTER.

Refer to Step 28 of Test 2 Data Entry above to select a specific MPM or digital facility to be tested using Fields 3 through 5 (circuit).

Refer to Steps 37 and 43 of Test 2 Data Entry above to select a specific member A GPP or member A data port to be tested using Fields 7 through 11 (equipment type and equipment location).

9. **EXECUTE** must be depressed to test the specific ADFTC circuit selected for testing.

Test 2 Execution and Test Result Display for a Range of Circuits

1. When a range of MPMs and/or digital facilities or member A GPPs are being tested, the **WAIT** indicator is turned on and the following fields are incremented as each facility is tested:

Field 2 - If test type 0 through 2 was entered, Field 2 increments according to the specific tests that are executed.

Note: If host access is being tested, Field 2 does not increment.

Field 3 - Trunk group number of MPM or digital facility being tested.

Field 4 - Member A number of the current MPM or digital facility being tested.

Field 5 - Dashed or member B number if a two way MPM is being tested.

Field 6 - 1 (Equipment type of member A GPP being tested).

Fields 7 through 11 - Port equipment location of the current MPM or digital facility being tested.

Field 13 - Data type 2 (indicating that bit error rate/bits sent is displayed in Field 14).

Field 14 - Bit error rate/bits sent.

Note: Fields 13 and 14 are updated every 10 seconds.

- 2. When testing is completed for two MPMs, one digital facility, or a one way MPM the bit and block error rates, any specific fault code, and the port equipment locations are stored in DMIDS.
- 3. If DMIDS becomes full at any time during the test, Test 2 is stopped and the **WAIT** indicator is turned off.

The originally selected test type is displayed in Field 2, the circuit location and port equipment location of the last MPM or digital facility tested is displayed in Fields 3 through 11, the current number of circuits tested is displayed in Field 14, and the number of circuits failed is displayed in Field 12.

Special error code 84 (DMIDS overflow) is displayed in the MAAP error code field.

4. Results of the test can be examined at this time (See Steps 9 through 17 below) and Test 2 can be continued from where it was stopped, i.e., from the next MPM and/or digital facility in the range being tested.

Caution: If Test 2 is continued from where it was stopped by a DMIDS overflow, any test results gathered to that point are lost and only new failure data is retained.

- 5. If Test 2 is halted because of a DMIDS overflow, a new test type and range of MPMs, digital facilities, or member A GPPs can be selected instead of continuing the test from where it was stopped.
- 6. The **CHANGE FIELD** sequence must be used to enter the test type desired and the new range of facilities to be tested as follows:

CHANGE FIELD; 2; ENTER; (Test type desired); ENTER.

Refer to Steps 22 through 26 of Test 2 Data Entry above to select a range of MPMs or digital facilities to be tested.

Refer to Steps 36 through 43 of Test 2 Data Entry above to select a range of member A GPPs to be tested.

7. **EXECUTE** must be depressed to begin Test 2 from the new range of facilities entered or from where the test was stopped.

Note: Before depressing **EXECUTE** to continue Test 2 from where it was stopped because of a DMIDS overflow, the failure data should be examined and recorded for future maintenance activities.

8. When a range of MPMs and/or digital facilities or member A GPPs has completed testing or **STOP** is depressed, the **WAIT** indicator is turned off.

The original test type selected is displayed in Field 2, the original range selected is displayed in Fields 3 through 11, and the number of circuits tested is displayed in Field 14.

Field 12 displays the number of failures (if any).

9. All failures with a specific fault code are displayed first followed by passing circuits with a specific fault code of 0.

Bit and block error rates are displayed for failing and passing circuits.

When multiple tests (more than one test type) are performed on MPMs, digital facilities, or member A GPPs, a specific fault code (if any) and bit/block error rates are displayed for all test types executed for each MPM, digital facility, or member A GPP tested.

10. Depressing NEXT CIRCUIT displays the first failing or tested circuit as follows:

Field 1 - 2.

Field 2 - Test type for the displayed facility.

Fields 3 through 5 - Trunk group number, member A, and member B (if applicable) of failing or tested facility.

Field 6 - Type of equipment corresponding to the equipment location displayed in Fields 7 through 11 (i.e., 0 = ADFTC, 1 = member A GPP, 2 = member A data port, 3 = member B GPP, 4 = member B data port).

Fields 7 through 11 - Equipment location of the failing or tested facility (ADFTC, member A GPP, member A data port, member B GPP, or member B data port).

Field 12 - 0 or number of failures.

Field 13 - 1 (indicating that Field 14 displays a specific fault code).

Field 14 - Specific fault code.

11. Depressing **NEXT DATA** examines the port equipment numbers of the GPPs, data ports, and the ADFTC used in testing a facility or facility pair.

Note: NEXT DATA can only be depressed after NEXT CIRCUIT and/or NEXT CIRCUIT and NEXT FAULT is depressed.

12. Successive depression of **NEXT DATA** displays in Fields 6 through 11 the type and port equipment locations of the ADFTC; member A GPP; member A data port; member B data GPP; and member B port, starting at different positions depending on the type of circuit(s) tested and the failures detected.

The possible starting positions are the ADFTC (Field 6 = 0), member A GPP (Field 6 = 11), or member B GPP (Field 6 = 3).

13. Depressing NEXT FAULT displays the bit and block error rates for the tested circuit.

The first time **NEXT FAULT** is depressed, a 2 is displayed in Field 13, and the bit error rate/bits sent is displayed in Field 14.

Depressing **NEXT FAULT** once more displays a 3 in Field 13 and the block error rate/blocks sent in Field 14.

Note: Refer to Table AT, PROC 646 - Field Definitions and Codes, to determine how to interpret bit error rate/bits sent and block error rate/blocks sent.

14. Depressing **NEXT FAULT** repeatedly advances through each test type selected displaying type and equipment location of the failure (if any), specific fault code, bit error rate/bits sent, and block error rate/blocks sent for each test type.

After the block error rate/blocks sent of the last test type selected for testing is displayed for the circuit tested, depressing **NEXT FAULT** once more dashes all fields except Field 1.

Depressing **NEXT FAULT** again starts the cycle over with a 1 displayed in Field 13, and a specific fault code displayed in Field 14 for the same circuit.

15. Depressing **NEXT CIRCUIT** displays the remaining tested circuits with a 1 displayed in Field 13 and a specific fault code displayed in Field 14.

NEXT FAULT is used to obtain the bit error rate/bits sent and block error rate/blocks sent for the tested circuits.

16. When more than one trunk group number is tested, depressing **NEXT UNIT** causes the first tested circuit of the next tested trunk group to be displayed.

NEXT CIRCUIT is used to step through the tested trunk group to display the tested circuits.

NEXT FAULT is used to obtain the bit error rate/bits sent and block error rate/blocks sent for the tested circuits.

- 17. When all tested circuits are displayed, depressing NEXT CIRCUIT and/or NEXT UNIT dashes all fields except Field 1.
- 18. If a facility is tested with a test type of 0, all tests, and no failure occurs, then any alarm on that facility is automatically resolved in PMIDS.

PROC 646 Test 2 and Test 3

19. To select another range of MPMs or digital facilities to test, the **CHANGE FIELD** sequence must be used to select the test type desired and the specific range of MPMs or digital facilities to be tested as follows:

CHANGE FIELD; 2; ENTER; (Test type desired); ENTER.

Refer to Steps 22 through 26 of Test 2 Data Entry above to select a range of MPMs or digital facilities in a trunk group, all member Bs, or all member As to be tested.

Refer to Steps 36 through 43 of Test 2 Data Entry to select a range of member A GPPs in a module, cabinet, carrier, or slot to be tested.

- 20. **EXECUTE** must be depressed to begin Test 2 from the new range of MPMs or digital facilities selected for testing.
- 21. Test 2 automatically turns off the OTHER FAILS fault indicator when all MPMs and/or digital facilities that raised an alarm pass Test 2 with a test type of 0 assuming no other alarm sources affecting the OTHER FAILS fault indicator are active.

Note: MPMs and/or digital facilities alarmed entries in PMIDS are marked as resolved if passed with a test type of 0.

Test 3

Test 3 runs diagnostic tests on modem pool members (MPMs) and digital facilities as determined by the test type specified in Field 2.

Diagnostic tests consist of data module or EIA port remote loopback, modem analog loopback, and modem remote digital loopback (212A type modems only) originating and terminating tests. (Each test type is executed in sequence to isolate the fault.)

For digital facilities, translation defined by **PROC 100** Word 2, Field 18 determines the different places that loopbacks may be done.

Types of diagnostic tests for MPMs and digital facilities consist of all tests (test type 0 - includes test types 2, 3, 4, and 5); all EIA (remote digital for 212A) remote loopback tests (test type 1 - includes test types 4 and 5); data module remote loopback test (test type 2); EIA local loopback (analog loopback) tests (test type 3); EIA remote loopback (digital) originating tests (test type 4); and EIA remote loopback (digital) terminating tests (test type 5).

Each type of test is not applicable to all types of modem pool members or digital facilities. Types of modems available with modem pool members tested consist of 103J, 113C, 113D, 202S, 203C, 208B, and 212A.

Test types that can be run in Test 3 for modem pool members and digital facilities are:

- 1. Test type 0 = Any MPM or digital facility being tested.
- 2. Test type 1 = Any MPM or digital facility if Field 18 (test type) of **PROC 100** Word 2 equals 2 (local and remote loopback control).
- 3. Test type 2 = Any MPM or digital facility.
- Test type 3 = Any MPM or digital facility if Field 18 (test type) of PROC 100 Word 2 equals 1 (local loopback control), or 2 (local and remote loopback control).
- 5. Test type 4 = Any MPM or digital facility if Field 18 (test type) of **PROC 100** Word 2 equals 2 (local and remote loopback control).
- 6. Test type 5 = Any MPM if Field 18 (test type) of **PROC 100** Word 2 equals 2 (local and remote loopback control).

Several different tests may be run on one modem pooling circuit (or circuit pair).

- 1. Some tests might fail while other tests pass.
- 2. When a modem pooling circuit (or circuit pair) test fails, a specific fault code is displayed.
- 3. Bit error rate/bits sent and block error rate/blocks sent are displayed for passing and failing tests.
- 4. The bit error rate/bits sent and block error rate/blocks sent are provided for further diagnosis (if required).

Characteristics (i.e., facility type, modem type, loopback control, etc.) of digital trunks used in modem pooling are provided in **PROC 100** Words 1 and 2.

When performing diagnostic tests on a trunk group basis, **PROC 100** Word 2 can be used to determine the loopback control of digital trunks.

- 1. If Field 18 (test type) of **PROC 100** Word 2 equals 0 (no loopback control), the following test types can be run: all tests (test type 0), and the data module remote loopback test (test type 2) on the digital trunk in Test 3.
- 2. If Field 18 (test type) of **PROC 100** Word 2 equals 1 (local loopback control), the following test types can be run: all tests (test type 0), the data module remote loopback test (test type 2), and EIA local loopback (analog loopback) tests (test type 3) on the digital trunk in Test 3.
- 3. If Field 18 (test type) of PROC 100 Word 2 equals 2 (local and remote loopback control), the following test types can be run: all tests (test type 0), all EIA remote (remote digital) loopback tests (test type 1), the data module remote loopback test (test type 2), EIA local loopback (analog loopback) tests (test type 3), EIA remote loopback originating tests (test type 4), and EIA remote loopback terminating tests (test type 5) if the trunk group contains modem pool members.

MPMs and digital facilities can be selected for testing by trunk group number and member A; trunk group number, member A, and Member B (MPM only); or by equipment location.

Test 3 Data Entry

1. Test 3 is selected by use of NEXT TEST.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 3.

- 2. When Test 3 is initially called in, Fields 3 through 11 (trunk group member number and equipment location) are dashed, or a default equipment location may be displayed in Fields 3 through 11. Field 14 (data) may display a default specific fault code.
- 3. The default equipment location can be the last equipment location or trunk group member number displayed in Test 2 of **PROC 646** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.
- 4. The default equipment location can also be passed from **PROC 620** as long as the equipment location is a GPP, data port, or ADFTC port 1 equipment location which is part of an MPM or digital facility and is still displayed in **PROC 620** when it is passed.
- 5. Field 2 (test type) is blanked and blinking indicating a mandatory entry.
- 6. Test types that can be run in Test 3 for modem pool members and digital facilities are:

Test type 0 = Any MPM or digital facility being tested.

Test type 1 = Any MPM or digital facility if Field 18 (test type) of **PROC 100** Word 2 equals 2 (local and remote loopback control).

Test type 2 = Any MPM or digital facility.

Test type 3 = Any MPM or digital facility if Field 18 (test type) of **PROC 100** Word 2 equals 1 (local loopback control), or 2 (local and remote loopback control).

,

Test type 4 = Any MPM or digital facility if Field 18 (test type) of **PROC 100** Word 2 equals 2 (local and remote loopback control).

Test type 5 = Any MPM if Field 18 (test type) of **PROC 100** Word 2 equals 2 (local and remote loopback control).

7. To select the type of test to be run on MPMs or digital facilities to be tested, enter the test type number in Field 2 and depress **ENTER**.

Note: When a default equipment location is displayed, the maintenance busy status is displayed in Field 13 (data type) when the test type is entered.

- 8. After the test type (Field 2) is entered, the trunk group number field (Field 3) is blinking indicating that a trunk group number of the MPM or digital facility to be tested may be entered.
- 9. If an equipment location was carried over from Test 2 and it is an MPM or digital facility, its trunk group and member number are displayed in Fields 3 through 5 (as appropriate) and the equipment location is displayed in Fields 7 through 11.
- 10. A specific MPM or digital facility or the default equipment location can be tested.

Note: Ranging is not allowed in Test 3 (diagnostic testing).

11. To test the default equipment location, proceed to Step 12.

To test a specific MPM or digital facility, proceed to Step 13.

12. To test the default equipment location, determine if the ADFTC to be used for testing is to be specified before testing.

If the ADFTC is to be specified, record the default equipment location (Fields 3 through 5, and 7 through 11 as appropriate) and proceed to Step 14.

If the ADFTC is not to be specified, proceed to Step 33.

13. If a specific ADFTC is to be used for testing, it **must** be selected at this time.

To select a specific ADFTC to be used for testing, proceed to Step 14.

If a specific ADFTC is not to be used for testing, proceed to Step 16.

14. The ADFTC to be used for testing can be specified by entering the complete equipment location and the correct type in Fields 6 through 11 as follows:

CHANGE FIELD; 6; ENTER; 0; ENTER; (Module number of ADFTC); ENTER; (Cabinet number of ADFTC); ENTER; (Carrier number of ADFTC); ENTER; (Slot number of ADFTC); (Circuit number of ADFTC); ENTER.

Note: If the ADFTC is incompletely specified (all fields not entered), special error code 85 (invalid equipment location) is displayed in the **MAAP** error code field when **EXECUTE** is depressed. Field 7 (module) blinks.

Proceed to Step 15.

- 15. If a default equipment location is being tested, enter the default equipment location (recorded in Step 12 above) in Fields 3 through 5, and 7 through 11 (as appropriate) using the CHANGE FIELD sequence and proceed to Step 33.
- 16. MPMs or digital facilities can be selected for testing in one of two methods; i.e., by circuit (Fields 3 through 5) or by equipment location and type (Fields 6 through 11).

To select MPMs or digital facilities for testing using the circuit method, proceed to Step 17.

To select MPMs or digital facilities for testing using the equipment location and type, proceed to Step 28.

17. Diagnostic tests of MPMs can be specified with only a member A entry or both member A and member B if the MPM is two way.

Note: Special error code 87 (invalid circuit fields) is displayed in the **MAAP** error code field if the trunk group number and member A; or trunk group number, member A, and member B are not specified when **EXECUTE** is depressed.

18. Selection of an MPM or digital facility to be tested depends on whether or not a default equipment location is displayed or if a specific ADFTC is selected for testing.

If a default equipment location is displayed or if a specific ADFTC is selected for testing, the **CHANGE FIELD** sequence **must** be used.

If no default equipment location is displayed or no specific ADFTC is selected for testing, either ENTER or the CHANGE FIELD sequence can be performed to select the MPM or digital facility to be tested.

19. To select an MPM or digital facility to be tested by using the trunk group number and member A, perform one of the following depending on whether or not a default equipment location is displayed or a specific ADFTC was selected for testing:

(Trunk group number of MPM or digital facility to be tested); ENTER; (Member A of MPM or digital facility to be tested); ENTER; ENTER.

CHANGE FIELD; 3; ENTER; (Trunk group number of MPM or digital facility to be tested); ENTER; (Member A of MPM or digital facility to be tested); ENTER; ENTER.

Note: If a specific digital facility or a one way MPM is being tested, Field 5 (member B) **must** be dashed.

Test 3 tests the MPM or digital facility specified in Fields 3 and 4.

Proceed to Step 25.

20. To select an MPM to be tested by using the trunk group number, member A, and member B, perform one of the following depending on whether or not a default equipment location is displayed or a specific ADFTC was selected for testing:

(Trunk group number of MPM to be tested); ENTER; (Member A of MPM to be tested); ENTER; (Member B of MPM to be tested); ENTER.

CHANGE FIELD; 3; ENTER; (Trunk group number of MPM to be tested); ENTER; (Member A of MPM to be tested); ENTER; (Member B of MPM to be tested); ENTER.

Note: Digital facilities cannot be tested by specifying a member B. Special error code 94 (member B invalid for digital facilities) is displayed in the **MAAP** error code field if member B is specified and the trunk group number is a digital facility trunk before **EXECUTE** is depressed.

Test 3 tests the MPM specified in Fields 3 through 5.

Proceed to Step 25.

- 21. NEXT CIRCUIT can be used to select a circuit or circuit pair before test execution.
- 22. If nothing is specified in the circuit or equipment location fields (Fields 3 through 5 and 7 through 11), two available facilities are displayed in the circuit and equipment location fields from the first testable trunk group when **NEXT CIRCUIT** is depressed. If the trunk group contains digital facilities or MPMs with one way modems, member B (Field 5) is dashed.

Proceed to Step 25.

23. If the circuit field is specified up to member A (Fields 3 and 4), member A is incremented to the next member A when **NEXT CIRCUIT** is depressed.

Proceed to Step 25.

24. If both members A and B are specified, the member number is advanced corresponding to the type field (Field 6) of the equipment location fields when **NEXT CIRCUIT** is depressed.

Proceed to Step 25.

25. After the circuit fields are specified, the equipment location fields (Fields 7 through 11) defaults to the equipment location of the member A GPP.

The type field (Field 6) defaults to 1 indicating the GPP port of member A is displayed in Fields 7 through 11.

Proceed to Step 26.

- 26. Before test execution, **NEXT DATA** can be depressed to examine port equipment locations associated with the circuit selected for testing.
- 27. Successive depression of **NEXT DATA** displays in Fields 6 through 11 the type and port equipment locations of the member A GPP; member A data port; member B GPP; and member B data port.

Note: Depressing **NEXT DATA** does not always display 4 equipment locations before testing. The type and port equipment locations (displayed in Fields 6 through 11) used for testing depends on whether MPMs or digital facilities are being tested.

The maintenance busy status of each port equipment location is displayed in Field 13.

Proceed to Step 33.

28. MPMs or digital facilities can be selected for testing using the test type and equipment location fields (Fields 6 through 11).

Member A GPP, member A data port, member B GPP, or member B data port can be designated as the type of facilities to test.

Note: Ranging is not allowed in Test 3 (diagnostic testing). Special error code 87 (invalid circuit fields) is displayed in the **MAAP** error code field after **EXECUTE** is depressed if ranging is attempted.

29. To select the type of facility to test, the CHANGE FIELD sequence must be used:

CHANGE FIELD; 6; ENTER; (equipment location type); ENTER.

Equipment location types are: 1 = Member A GPP port; 2 = Member A data port; 3 = Member B GPP port; 4 = Member B data port.

Note: Only equipment location type 1 (member A GPP) can be entered in Field 6 for testing of digital facilities.

- 30. When the equipment location type is entered in Field 6, the module field (Field 7) blinks for entry.
- 31. To select an MPM or digital facility to be tested by using the equipment location method, enter the following:

(Module number of member A GPP, member A data port, member B GPP, or member B data port to be tested); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number); ENTER.

- Note: Equipment location type (Field 6) must correspond to the equipment location selected or error code 85 (invalid equipment location) is displayed in the MAAP error code field when **EXECUTE** is depressed.
- 32. After the equipment location fields are specified, the circuit fields (Fields 3 through 5) display the trunk group number and member A number.

The equipment location's (displayed in Fields 7 through 11) maintenance busy status is displayed in Field 14 (data field).

Note: The equipment location fields (Fields 7 through 11) **must** be completely specified or special error code 80 (equipment location not complete) is displayed in the **MAAP** error code field when **EXECUTE** is depressed.

33. The maintenance busy status of the equipment location displayed in Fields 7 through 11 is displayed in Field 13.

The circuit displayed in Fields 7 through 11 can be busied out (if required).

If the circuit is to be busied out for testing, proceed to Step 34. If busy out of the circuit is not required, proceed to Step 35.

34. Individual port equipment locations can be placed in maintenance busy out status for testing by performing the following:

Check the maintenance busy status displayed in Field 13.

If the maintenance busy status = 5, proceed to Step 35.

If the maintenance busy status = 6, depress **BUSY OUT** and proceed to Step 35.

Note: If Fields 7 through 11 are not entered, special error code 96 (fields 7 through 11 must be entered before use of **BUSY OUT**) is displayed in the **MAAP** error code field.

35. The length of the test (maximum of 4 minutes for each test type executed - both R2V1 and R2V2) can be entered in Field 12, or a default test length can be chosen.

Note: The default test length causes a very short (less than 2 seconds) test. However, processing overhead increases the delay seen at the **MAAP** to less than 15 seconds for each test type. This default test length applies to all bit rates and test types.

36. Either Field 12 (test length) is blinking or the CHANGE FIELD sequence must be used to entered the desired test length.

If Field 12 is blinking, proceed to Step 37.

- If Field 12 is not blinking, perform CHANGE FIELD; 12; ENTER and proceed to Step 37.
- 37. If a default test length is desired, depress **ENTER**. If a different test length is desired, enter the time (minutes) in Field 12:

(1 through 4 - maximum of 4 minutes for both R2V1 and R2V2); ENTER.

Note: The actual test length executed for each test type selected is determined by whether the test for the test type passes or fails. If the test passes, either the default test length or the time entered in Field 12 is used for the test performed. If the test fails, the time of the test is the default test length no matter what time is entered in Field 12.

38. Field 14 (data rate) blinks for entry. The data rate can be entered in Field 14, or a default data rate can be chosen.

Note: Refer to Uable AT, PROC 646 Modem Bit Rates, to determine the data rate for the modem type to be tested.

39. If a default data rate is desired, depress ENTER. If a different data rate is desired, enter the data rate in Field 14:

(Data rate); ENTER.

Data rate encodes are: 3 = 300 bps; 12 = 1200 bps; 24 = 2400 bps; 48 = 4800 bps; 96 = 9600 bps; 192 = 19.2 kbps; 560 = 56 kbps; 640 = 64 kbps.

Test 3 Execution

1. To start Test 3 after selecting the test type, the ADFTC to be used for testing, the MPM or digital facility to be tested, the test length and baud rate, depress **EXECUTE**.

The WAIT indicator on the MAAP is turned on.

2. Field 2 displays the test type being executed.

Field 13 displays a 2 indicating the bit error rate/bits sent is being displayed in Field 14.

The bit error rate/bits sent is displayed in the data field (Field 14).

Note: Fields 13 and 14 are updated every 10 seconds.

- 3. If a facility is maintenance busied out, it is released from busy while under test.
- 4. When the test encounters a facility in use, a specific fault code is logged in DMIDS records and the test is stopped.

The data call in progress is not aborted.

5. During Test 3, STOP can be depressed to halt the test.

6. If Test 3 is stopped before one complete testing pass through a specific MPM or digital facility or the default equipment location is made, special error code 95 (wait for test to stop) is displayed in the **MAAP** error code field.

Note: One complete testing pass equals all test types selected for a specific MPM or digital facility or the default equipment location are tested.

- 7. After the current test is completed, special error code 82 (test of range not completed) is displayed in the **MAAP** error code field indicating that one complete pass through the specific MPM or digital facility or the default equipment location is not completed.
- 8. The port equipment location of the MPM or digital facility being tested is displayed in Fields 3 through 11, and the total number of failures (if any) is displayed in Field 12.
- 9. If any failures are displayed in Field 12, test result information can be stepped through as described in Test 3 Result Disply below when Test 3 is halted using **STOP** even though the facility is not tested.
- 10. To restart the test when Test 3 is halted by use of **STOP**, **EXECUTE** is depressed and Test 3 retests the MPM or digital facility selected for testing.

Note: When Test 3 is restarted after being halted by use of **STOP**, any test results gathered to that point are retained.

Test 3 Result Display

1. When Test 3 is completed or **STOP** is depressed for a default equipment location, a specific MPM or digital facility the **WAIT** indicator is turned off and the following is displayed:

Field 1 - 3.

Field 2 - Original test type selected for testing MPM or digital facility.

Fields 3 through 5 - Circuit location.

Field 6 - Type of equipment location (1 through 4).

Fields 7 through 11 - Port equipment location of MPM or digital facility tested.

Field 12 - 0 (indicating no failures were found for the MPM or digital facility tested) or 1 (indicating the MPM or digital facility failed the test).

Field 13 - Data type of 4 (indicating that Field 14 indicates the number of circuits tested).

Field 14 - 0 (if **STOP** was depressed indicating all tests are not completed) or 1 (indicating 1 MPM, MPM pair, or digital facility tested).

- 2. When multiple tests are performed on the MPM or digital facility tested, failing tests are displayed first, followed by tests that passed.
- 3. Depressing **NEXT CIRCUIT** changes the display in the data type and data fields (Fields 13 and 14) and may change the type and equipment location in Fields 6 through 11 depending on the type of failure (if any).

Field 13 displays a 1 indicating that the data in Field 14 is a specific fault code.

4. Depressing **NEXT FAULT** displays a 2 in Field 13 and the bit error rate/bits sent in Field 14.

5. Depressing **NEXT FAULT** once more displays a 3 in Field 13 and the block error rate/blocks sent in Field 14.

Note: Refer to Table AT, PROC 646 - Field Definitions and Codes, to determine how to interpret bit error rate/bits sent and block error rate/blocks sent.

6. Depressing **NEXT FAULT** repeatedly advances through each test type selected displaying type and equipment location of the failure (if any), specific fault code, bit error rate/bits sent, and block error rate/blocks sent for each test type.

After the block error rate/blocks sent of the last test type selected for testing is displayed for the circuit tested, depressing **NEXT FAULT** once more dashes all fields except Field 1.

Depressing **NEXT FAULT** again starts the cycle over with a 1 displayed in Field 13, and a specific fault code displayed in Field 14 for the same circuit.

7. To examine the port equipment locations of the GPPs, data ports, and the ADFTC used in testing a MPM or digital facility, depress **NEXT DATA**.

Note: NEXT DATA can only be depressed after NEXT CIRCUIT and/or NEXT CIRCUIT and NEXT FAULT is depressed.

8. Field 6 cycles from 0 through 4 each time **NEXT DATA** is depressed, starting at different positions depending on the type of circuit tested and the failures detected, and displays in Fields 7 through 11 the port equipment locations of the ADFTC (Field 6 = 0), member A GPP (Field 6 = 1); member A data port (Field 6 = 2), member B GPP (Field 6 = 3), and member B data port (Field 6 = 4).

Note: Depressing **NEXT DATA** does not always display 5 equipment locations. The type and port equipment locations (displayed in Fields 6 through 11) used for testing depends on whether MPMs or digital facilities were tested.

9. The possible starting positions are the ADFTC (Field 6 = 0), member A GPP (Field 6 = 1), or member B GPP (Field 6 = 3).

Note: One way MPMs only display the ADFTC (Field 6 = 0), member A GPP (Field 6 = 1), or member A data port (Field 6 = 2). Digital facilities only display the ADFTC (Field 6 = 0), or member A GPP (Field 6 = 1).

10. When another specific MPM, digital facility, member A GPP, member A data port, member B GPP, or member B data port is to be tested, the **CHANGE FIELD** sequence must be used to select the test type desired and the specific MPM, digital facility, member A GPP, member A data port, member B GPP, or member B data port to be tested.

CHANGE FIELD; 2; ENTER; (Test type desired); ENTER.

Refer to Steps 19 through 24 of Test 3 Data Entry above to select a specific MPM or digital facility to be tested using the circuit method (Fields 3 through 5).

Refer to Steps 28 through 31 of Test 3 Data Entry above to select a specific MPM or digital facility to be tested using the equipment location and type method (Fields 6 through 11).

11. **EXECUTE** must be depressed to test the specific ADFTC circuit selected for testing.

Repair Guide

When an ADFTC, MPM, or digital facility failure is indicated, **PROC 646** referenced from **PROC** 600 as the cause for the OTHER FAILS fault indicator being lighted perform the following steps, in the order listed, to isolate and repair the faulty unit.

The starting point for isolation and repair of alarmed ADFTC, MPM, or digital facilities is **PROC** 600.

1. Execute **PROC 600** Test 1 to determine which type of modem pooling circuits (ADFTC, MPM, or digital facility) are alarmed, indicated by **PROC 646** being referenced in Field 15 of **PROC 600**, the severity of the alarms, and the order in which the modem pooling circuits are displayed.

Record the failing modem pooling circuits displayed in PROC 600 Test 1.

2. Determine from the modem pooling circuits recorded if a pattern exists that would assist in determining the type of corrective action required.

If only ADFTC failures are recorded, perform isolation and repair steps detailed in: **ADFTC** Alarmed Failures.

If only MPM or digital facility failures are recorded, perform isolation and repair steps detailed in: MPM or Digital Facility Alarmed Failures.

3. When both ADFTC and MPM or digital facility failures are recorded, perform isolation and repair steps for ADFTC failures before performing isolation and repair steps for MPM or digital facility failures.

When user reported troubles associated with modem pooling members are reported, perform isolation and repair steps detailed in; User Reported Troubles.

To assist in fault isolation, **PROC 620** may be used before or after **PROC 646** to test specific GPPs, data ports, or ADFTCs. Equipment locations are automatically passed from **PROC 620** to **PROC 646** or from **PROC 646** to **PROC 620**.

ADFTC Alarmed Failures

- 1. Display the failing ADFTC circuit in Test 1 of **PROC 600**.
- 2. Enter PROC 646 Test 1.

Note: The alarmed ADFTC circuit that was displayed in Test 1 of **PROC 600** is the default equipment location displayed in Test 1 of **PROC 646**.

Record the specific fault code displayed in Field 14 (data) which was detected by on-line periodic software tests and logged in PMIDS.

3. Enter test type number 0 in Field 2 and depress ENTER.

Note: If the ADFTC circuit is tested with a test type of 0 (all ADFTC self tests) and no failure occurs, any alarm on the ADFTC circuit is automatically resolved in PMIDS.

4. Depress EXECUTE.

If the ADFTC circuit passes (indicated by a 0 in Field 12), proceed to Step 9.

If the ADFTC circuit fails (indicated by a 1 in Field 12), proceed to Step 5.

5. Depress NEXT CIRCUIT and record the specific fault code displayed in Field 14 (data).

PROC 646

- 6. Replace the CKT1 component or perform corrective action listed in Table AV, PROC 646 -Component Replacements, for the specific fault code displayed in Field 14.
- 7. Repeat Test 1.

If the ADFTC passes Test 1, proceed to Step 11.

8. If the ADFTC fails Test 1, replace CKT2 or perform any additional corrective action listed in Table AV, PROC 646 - Component Replacements for the specific fault code recorded.

If no additional corrective action is listed in Table AV, PROC 646 - Component Replacements, refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.

9. When alarmed ADFTC circuits pass Test 1 without corrective action being performed (i.e., replacing a circuit pack), further analysis of the problem should be performed by using **PROC 620** Test 4 and testing unit type 62 (ADFTC).

If Test 4 of **PROC 620** passes, check the backplane wiring associated with the ADFTC circuit pack.

If Test 4 of **PROC 620** fails, take the appropriate corrective action.

- 10. When Test 4 of **PROC 620** passes after taking corrective action, repeat Test 1 of **PROC 646** to retire the cause of the **OTHER FAILS** fault indicator.
- 11. Test 1 must be run for each alarmed ADFTC circuit recorded in Test 1 of **PROC 600**.

Use the **CHANGE FIELD** sequence to enter the next recorded ADFTC failure in Fields 7 through 11 (equipment location).

Repeat Steps 3 through 11 (as appropriate).

12. If all alarmed ADFTC circuits pass Test 1, the **OTHER FAILS** fault indicator is automatically turned off if no other sources (including MPM or digital facility failures) are affecting the fault indicator.

MPM or Digital Facility Alarmed Failures

- 1. Display the failing MPM or digital facility in Test 1 of PROC 600.
- 2. Enter PROC 646 Test 3.

Note: The alarmed MPM or digital facility that was displayed in Test 1 of **PROC 600** is the default equipment location displayed in Test 3 of **PROC 646**.

Record the specific fault code displayed in Field 14 (data) which was detected by on-line periodic software tests and logged in PMIDS.

- 3. Enter test type number 0 in Field 2 and depress ENTER.
- 4. Enter the test length in Field 12 or depress ENTER for a default test length. The MPM or digital facility can be tested from 1 to 4 minutes for each test type selected both R2V1 and R2V2 by entering the time (in minutes) in Field 12.

(1 through 4 - maximum of 4 minutes for both R2V1 and R2V2); ENTER.

Note: The actual test length executed for each test type selected is determined by whether the test for the test type passes or fails. If the test passes, either the default test length or the time entered in Field 12 is used for the test performed. If the test fails, the time of the test is the default test length no matter what time is entered in Field 12.

TABLE AV.

· · · · ·	COMPONENT REPLACEMENT OR CORRECTIVE ACTION					
FAULT CODE	CKT 1	СКТ 2	СКТ З	СКТ 4	СКТ 5	
12	Repeat test when switch is less busy. If failure continues with a fault code of 12, use PROC 620 to test time slots (i.e., range on PDIs).					
218	Run PROC 620 on module processor (unit type 7).					
454	Run PROC 646 Test 1.					
455 through 458	Run PROC 646 Test 1 and PROC 620 GPP test by specifying ADFTC unit type 62.					
1000	Run PROC 620 on module processor (unit type 7).					
1001	Run PROC 646 on unit.					
1002	Run PROC 646 on trunk group.					
1003	TDM/2	SN270				
1004	MODEM	SN243				
1005 through 1025	SN261					
1026 through 1029	SN261	Run PROC 620 on IOBI (unit type 12) and I (unit type 14).			2) and PC	
1030, 1038, 1045, 1052, 1059, 1066, 1073, 1080, 1087, 1094, 1101, 1108, 1115, 1122, 1129, 1136, 1143, 1150, 1157, 1164, 1171, 1178, 1185, 1192, 1199, 1207, 1214, 1221, 1228, 1235, 1242, 1249, 1256, 1263, 1270, 1277	MODEM	TDM/Ż	SN261			
1031, 1039, 1046, 1053, 1060, 1067, 1074, 1081, 1088, 1095, 1102, 1109, 1116, 1123, 1130, 1137, 1144, 1151, 1158, 1165, 1172, 1179, 1186, 1193, 1200, 1208, 1215, 1222, 1229, 1236, 1243, 1250, 1257, 1264, 1271, 1278	MODEM	TDM/2	SN261			
1032, 1040, 1047, 1054, 1061, 1068, 1075, 1082, 1089, 1096, 1103, 1110, 1117, 1124, 1131, 1138, 1145, 1152, 1159, 1166, 1173, 1180, 1187, 1194, 1201, 1209, 1216, 1223, 1230, 1237, 1244, 1251, 1258, 1265, 1272, 1279	MODEM	TDM/2	SN270	SN243	SN261	

COMPONENT REPLACEMENT OR CORRECTIVE ACTION					DN
FAULT CODE	СКТІ	CKT 2	СКТ 3	CKT 4	скт
1034, 1041, 1048, 1055, 1062, 1069, 1076, 1083, 1090, 1097, 1104, 1111, 1118, 1125, 1132, 1139, 1146, 1153, 1160, 1167, 1174, 1181, 1188, 1195, 1202, 1210, 1217, 1224, 1231, 1238, 1245, 1252, 1259, 1266, 1273, 1280	MODEM	TDM/2	SN270	SN243	SN24
1035, 1042, 1049, 1056, 1063, 1070, 1077, 1084, 1091, 1098, 1105, 1112, 1119, 1126, 1133, 1140, 1147, 1154, 1161, 1168, 1175, 1182, 1189, 1196, 1203, 1211, 1218, 1225, 1232, 1239, 1246, 1253, 1260, 1267, 1274, 1281	TDM/2	SN270	SN261		
1036, 1043, 1050, 1057, 1064, 1071, 1078, 1085, 1092, 1099, 1106, 1113, 1120, 1127, 1134, 1141, 1148, 1155, 1162, 1169, 1176, 1183, 1190, 1197, 1204, 1212, 1219, 1226, 1233, 1240, 1247, 1254, 1261, 1268, 1275, 1282	MODEM	TDM/2	SN270	SN243	SN26
1037, 1044, 1051, 1058, 1065, 1072, 1079, 1086, 1093, 1100, 1107, 1114, 1121, 1128, 1135, 1142, 1149, 1156, 1163, 1170, 1177, 1184, 1191, 1198, 1206, 1213, 1220, 1227, 1234, 1241, 1248, 1255, 1262, 1269, 1276, 1283	SN261				
1284	TDM/2	SN270	SN261		
1285	TDM/2	SN270	SN261		
1286, 1293, 1300, 1307, 1314, 1321, 1328, 1335, 1342, 1349, 1356, 1363, 1370, 1377, 1384, 1391, 1398, 1405, 1412	MODEM	TDM/2	SN261		

TABLE AV. (Contd)
TABLE AV.	(Contd)
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PROC 646 — COMPONENT REPLACEMENTS (Contd)					
EALILT	co	COMPONENT REPLACEMENT OR CORRECTIVE ACTION			
CODE	CKT 1	СКТ 2	СКТ З	CKT 4	СКТ 5
1287, 1294, 1301, 1308, 1315, 1322, 1329, 1336, 1343, 1350, 1357, 1364, 1371, 1378, 1385, 1392, 1399, 1406, 1413	MODEM	TDM/2	SN261		
1288, 1295, 1302, 1309, 1316, 1323, 1330, 1337, 1344, 1351, 1358, 1365, 1372, 1379, 1386, 1393, 1400, 1407, 1414	MODEM	TDM/2	SN270	SN243	SN261
1289, 1296, 1303, 1310, 1317, 1324, 1331, 1338, 1345, 1352, 1359, 1366, 1373, 1380, 1387, 1394, 1401, 1408, 1415	MODEM	TDM/2	SN270	SN243	SN261
1290, 1297, 1304, 1311, 1318, 1325, 1332, 1339, 1346, 1353, 1360, 1367, 1374, 1381, 1388, 1395, 1402, 1409, 1416	TDM/2	SN270	SN261		
1291, 1298, 1305, 1312, 1319, 1326, 1333, 1340, 1347, 1354, 1361, 1368, 1375, 1382, 1389, 1396, 1403, 1410, 1417	MODEM	TDM/2	SN270	SN243	SN261
1292, 1299, 1306, 1313, 1320, 1327, 1334, 1341, 1348, 1355, 1362, 1369, 1376, 1383, 1390, 1397, 1404, 1411, 1418	SN261				
1419 through 1421	If call can BUSY, and	be dropped, retest.	use BUSY	OUT, then	RELEASE
1422 and 1423	Use BUSY	OUT, then R	ELEASE BU	JSY, and ret	est.
1424 Wait for member to become available or use BUSY OU then RELEASE BUSY to drop customer call on a busy men ber.			USY OUT, busy mem-		

x.

PROC 646 — COMPONENT REPLACEMENTS (Contd)					
FAINT	cc	MPONENT REPL	ACEMENT OR CO	RRECTIVE ACTIO	N
CODE	СКТ 1	СКТ 2	СКТ 3	СКТ 4	СКТ 5
1425 and 1426	SN261				
1427	Ensure AD	FTC is adm	inistered.		
1428	Use BUSY OUT, then RELEASE BUSY if call using ADFTC can be dropped.				
1429	RELEASE BUSY and retest.				
1430	MODEM SN243				
1431	TDM/2 SN270				

TABLE AV. (Contd)

5. Enter the data rate in Field 14 or depress ENTER for a default data rate.

(Data rate); ENTER.

6. Depress **EXECUTE**.

If the MPM or digital facility passes (indicated by a 0 in Field 12), proceed to Step 18.

If the MPM or digital facility fails (indicated by a 1 in Field 12), proceed to Step 7.

- 7. Depress **NEXT CIRCUIT** and record the test type (first test type failed) displayed in Field 2, the equipment location displayed in Fields 7 through 11, and the specific fault code displayed in Field 14 (data).
- 8. Component replacements for the specific fault code displayed in Field 14 are listed in Table AV, PROC 646 Component Replacements.
- 9. For modem pooling, the priority order of component replacement is listed in Table AW, PROC 646 Test 3 Failure Groups for Modem Pooling.
- 10. For digital facilities, the priority order of component replacement is listed in Table AX, PROC 646 Test 3 Failure Groups for Digital Facilities.
- 11. The order of component replacement depends on the first test type failed (displayed in Field 2) and the type of facility tested.
- 12. Determine from the specific fault code, the first test type failed, and the facility tested, the first component to replace based on Table AV, and Table AW or Table AX.

Replace the component.

13. Repeat Test 3.

If the facility passes Test 3, proceed to Step 22.

- 14. If the facility fails Test 3, replace the next component listed in Table AV, and Table AW, or Table AX based on the specific fault code and the type of facility tested.
- 15. Depressing **NEXT DATA** displays in Field 6 (type) the member A GPP, member A data port, member B GPP, and member B data port equipment locations in Fields 7 through 11.

Note: The equipment location displayed in Fields 7 through 11 for data ports determines the location of the modem to be replaced for modem pooling failures. The equipment location displayed in Fields 7 through 11 for member A GPP determines the location of the digital facility to be replaced for digital facility failures.

PROC 646 TEST 3 FAILURE GROUPS FOR MODEM POOLING				
FIRST TEST	ST FAILURE GROUP FOR FAILING MEMBER ST IDENTIFIED (IN PRIORITY ORDER)			
FAILED	MEMBER A	MEMBER B [2]	ADFTC	
4 or 5 [1]	Modem B [2]; modem A; SN243 member A; SN243 member B [2]; TDM/2 member A; TDM/2 member B [2]; SN270 member A; SN261.	Modem B [2]; TDM/2 member B [2]; SN270 member B [2]; SN261.	SN261	
3	Modem A; TDM/2 member A; SN270 member A; SN261.		SN261	
2	TDM member A; SN270 member A; SN261.		SN261	
 This failure group is also applicable with members which cannot use test types 4 or 5, but pass test types 2 and 3 in Test 3 and fail test type 0 in Test 2. 				
[2] For	originating and terminating mode	em pool members only.		
[3] Run PROC 620 on individual SN270/TDM/2, SN243, or ADFTC if further isolation of trouble is required.				

TABLE AW.

- 16. Repeat Steps 13 through 15 until all components listed in Table AV, and Table AW, or Table AX based on the specific fault code and the type of facility are replaced or the problem is corrected.
- 17. If the facility still fails after all components are replaced, refer to isolation and repair step **Specific Fault Codes** for further isolation techniques.
- 18. When alarmed MPM or digital facilities pass Test 3 without corrective action being performed (i.e., replacing a circuit pack), further analysis of the problem should be performed by changing the length of the test and repeating Test 3 to ensure that the alarmed failure is not intermittent.

PROC 646

19. Four minutes (for both R2V1 and R2V2) is recommended for the length of the test to ensure no intermittent failures exist.

Proceed to Step 20.

20. Change the length of the test by performing:

CHANGE FIELD; 12; ENTER; (4); ENTER.

21. Depress EXECUTE.

If the MPM or digital facility passes (indicated by a 0 in Field 12), proceed to Step 21.

PROC 646 TEST 3 FAILURE GROUPS FOR DIGITAL FACILITIES				
FIRST FAILURE GROUP FOR FAILING MEMBER TEST IDENTIFIED (IN PRIORITY ORDER)		BER		
TYPE FAILED	MEMBER A [1] [2]	ADFTC [2]		
4	Digital facility; TIE/DSU/private line modem; TDM/2; SN270; SN261.	SN261		
3	TIE/DSU/private line modem; TDM/2; SN270; SN261.	SN261		
2	[3] TDM/2 or PDM SN270; SN261.	SN261		
 Components included in a particular failure group depend on the specific application. 				
[2] Run PROC 620 on individual SN270/TDM/2 or SN261 if further isolation of trouble is required.				
[3] When the digital facility uses an EIA port, replace SN238 instead of TDM/2 or PDM and SN270.				

TABLE AX.

If the MPM or digital facility fails (indicated by a 1 in Field 12), perform Steps 7 through 17 (as appropriate).

22. Test 3 must be run for each alarmed MPM or digital facility recorded in Test 1 of **PROC** 600.

Use the CHANGE FIELD sequence to enter the next recorded MPM or digital facility failure in Fields 6 through 11 (equipment type and equipment location).

Repeat Steps 3 through 21 (as appropriate).

23. If all alarmed failures pass Test 3, perform Test 2 to turn off the OTHER FAILS fault indicator.

User Reported Troubles

When user troubles associated with modem pooling members are reported, perform the following steps (as appropriate).

Typical user information may include data rate, asynchronous or synchronous, or dial code used which may help to isolate the failing trunk group.

- 1. For example, if the user dialed **9** and then a remote computer port, the PDM used was set at 1200 bps, asynchronous, full duplex. A modem pool trunk group with matching characteristics would be suspect.
- 2. On the other hand, if a user dialed a local host computer, then a host access type of trunk group with that dial code is suspect.
- 3. Incoming calls may also chose a specific trunk group.

To determine the data rate on a data module associated with a modem, **PROC 070** or **PROC 100** can be used.

- 1. Examine Test 1 of **PROC 600** to determine if any alarmed entries exist for unit type 62 (ADFTC), unit type 65 (modem pooling), and unit type 35 (digital facilities).
- 2. If alarmed ADFTC circuits exist, perform isolation and repair step ADFTC Alarmed Failures above for all alarmed ADFTC circuits in PROC 600 Test 1 to isolate the trouble.
- 3. If alarmed modem pooling or digital facility circuits exist, perform isolation and repair step MPM or Digital Facility Alarmed Failures above for all alarmed modem pooling or digital facility circuits in PROC 600 Test 1 to isolate the trouble.
- 4. Examine Test 2 of **PROC 600** to determine if any entries with recorded entries exist for unit type 62 (ADFTC), unit type 65 (modem pooling), or unit type 35 (digital facilities).
- 5. If entries with recorded errors exist for ADFTC circuits, perform isolation and repair step **ADFTC Alarmed Failures** above for all ADFTC entries with recorded errors in **PROC 600** Test 2 to isolate the trouble.
- 6. If entries with recorded errors exist for modem pooling or digital facilities, perform isolation and repair step **MPM or Digital Facility Alarmed Failures** above for all modem pooling or digital facility entries with recorded errors in **PROC 600** Test 2 to isolate the trouble.
- 7. Determine from the user the type of modem, data rate, and dial access code used to initiate the call.

Modem types consist of 103J, 113C, 113D, 202S, 201C, 208B, and 212A.

- 8. Characteristics (i.e., modem type, loopback control, etc.) of digital trunks used in modem pooling are provided in **PROC 100** Words 1 and 2.
- 9. Perform Test 2 of **PROC 646** on the trunk group suspected of failing by entering the trunk group number in Field 3.

Note: If the trunk group has a data rate of 300 or 1200 bps, set the test length to only 1 minute to identify severe problems quickly.

10. If any members of the trunk group fail, perform isolation and repair step **MPM or Digital Facility Alarmed Failures** above for each failing member of the trunk group to isolate the trouble.

PROC 646

- 11. If no members of the trunk group fail, use **NEXT FAULT** to determine the bit and block error rate for each member of the trunk group.
- 12. The bit and block error rate is determined by multiplying the first digit (left most side) in Field 14 by 10 raised to the negative of the second digit in Field 14.

The number of bits or blocks sent is determined by multiplying the third digit in Field 14 by 10 raised to the fourth digit in Field 14.

- 13. The threshold for bit and block error rates is 1 X 10 to the minus 5 (or 15 displayed in the first 2 digits of Field 14).
- 14. Determine which member of the trunk group has the poorest bit and block error rate.
- 15. Depress **NEXT DATA** and record the equipment location of the GPPs and data ports used in the testing of the MPM with the poorest bit and block error rate.

Note: Field 6 = 1, Fields 7 through 11 displays the equipment location of member A GPP; Field 6 = 2, Fields 7 through 11 displays the equipment location of member A data port; Field 6 = 3, Fields 7 through 11 displays the equipment location of member B GPP; Field 6 = 4, Fields 7 through 11 displays the equipment location of member B data port.

- 16. Display the member A GPP equipment location in Fields 7 through 11 of PROC 646 Test 2.
- 17. Use PROC 620 Test 4 to test the member A GPP.

Note: The circuit that was displayed in Test 2 of **PROC 646** is the default equipment location displayed in Test 4 of **PROC 620**.

18. If Test 4 of **PROC 620** fails, take the appropriate corrective action and proceed to Step 20.

Note: Some failures detected by the GPP test in PROC 620 are repaired by replacing the associated TDM/2 or PDM.

If Test 4 of PROC 620 passes, proceed to Step 19.

19. Repeat Test 4 of **PROC 620** for the member A data port, member B GPP, and member B data port using the **CHANGE FIELD** method to enter the equipment locations recorded in Step 15 above.

If Test 4 of **PROC 620** fails, take the appropriate corrective action and proceed to Step 20.

If Test 4 of **PROC 620** passes for all circuits tested (member A GPP; member A data port; member B GPP; member B data port), proceed to Step 22.

- 20. When **PROC 620** passes after taking corrective action, repeat Test 2 of **PROC 646** to ensure that the failure is corrected.
- 21. Check the bit and block error rate.

If the bit and block error rate is acceptable, no further corrective action is required.

- 22. Enter Test 2 of **PROC 646** and display the member of the trunk group with the poorest bit and block error rate.
- 23. Replace the modem associated with the member with the poorest bit and block error rate. Repeat Test 2.

24. Check the bit and block error rate.

If the bit and block error rate is acceptable, no further corrective action is required.

25. If the bit and block error rate is the same or worse, replace the data module associated with the member with the poorest bit and block error rate.

Repeat Test 2.

26. Check the bit and block error rate.

If the bit and block error rate is acceptable, no further corrective action is required.

27. If the bit and block error rate is the same or worse, check the wiring associated with the ADFTC, MPM or digital facility, modem, and data module.

Specific Fault Codes

A specific fault code is a number used to provide a description of a failure.

- 1. This description provides more detail about the failure associated with a circuit.
- 2. Specific fault codes are recorded during periodic or time available testing in PMIDS. Demand testing specific fault codes are recorded in DMIDS.
- 3. Both the PMIDS and DMIDS specific fault codes (normally the same) are available for display during testing.

Table AY, PROC 646 - Specific Fault Code Definitions, lists the specific fault codes in numerical sequence with a definition for each specific fault code.

Further isolation of a failure may be accomplished as follows:

- 1. Analyze the specific fault codes recorded from PMIDS (first specific fault code recorded before executing Test 1 or 3) and DMIDS (second specific fault code recorded after Test 1 or 3 failed).
- 2. Determine from the specific fault codes recorded (using Table AY, PROC 646 Specific Fault Code Definitions), if any additional corrective action can be performed (i.e., cabling, connectors, etc.).
- 3. Check the wiring associated with the circuit pack(s) and/or components replaced (point to point depending upon specific fault code(s) recorded).

TABLE AY.

	PROC 646 - SPECIFIC FAULT CODE DEFINITIONS
FAULT CODE	DEFINITION
12	TIME SLOT UNAVAILABLE
218	NETWORK ORDER FAILED
454	DTLF FAULT ON ADFTC (DIGITAL SELF-TEST)
. 455	48-VOL FAULT ON ADFTC (ANALOG SELF-TEST)
456	48-VOL AND DLTF FAULTS TOGETHER ON ADFTC
457	PROTOCOL ERROR ON ADFTC
458	DTL IDLE ON ADFTC
1000	COULD NOT SEND AN S MESSAGE
1001	FACILITY NOT TESTED FOR MORE THAN X CYCLES
1002	TRUNK GROUP NOT TESTED FOR MORE THAN X CYCLES
1003	DID NOT RECEIVE AN OFF-HOOK FROM THE MPM (DTIM/2)
1004	DID NOT RECEIVE A DATA SET READY FROM THE MPM (MODEM)
1005	NO BITS RECEIVED ON A 1-PORT ADFTC SELF-TEST
1006	DATA TRANSMISSION INTERRUPTED: 1-PORT ADFTC SELF-TEST
1007	BIT ERROR RATE EXCEEDED FOR 1-PORT ADFTC SELF-TEST
1008	BLOCK ERROR RATE EXCEEDED FOR 1-PORT ADFTC SELF-TEST
1009	EIA UPDATE FAILURE DURING A 1-PORT ADFTC SELF-TEST
1010	ERROR OVERFLOW DURING A 1-PORT ADFTC SELF-TEST
1011	UNDEFINED ERROR DURING A 1-PORT ADFTC SELF-TEST
1012	NO BITS RECEIVED ON A 2-PORT NORMAL ADFTC SELF-TEST
1013	DATA TRANSMISSION INTERRUPTED: 2-PORT NORMAL ADFTC SELF-TEST

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	PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)		
FAULT CODE	DEFINITION		
1014	BIT ERROR RATE EXCEEDED FOR 2-PORT NORMAL ADFTC SELF-TEST		
1015	BLOCK ERROR RATE EXCEEDED FOR 2-PORT NORMAL ADFTC SELF-TEST		
1016	EIA UPDATE FAILURE DURING A 2-PORT NORMAL ADFTC SELF-TEST		
1017	ERROR OVERFLOW DURING A 2-PORT NORMAL ADFTC SELF-TEST		
1018	UNDEFINED ERROR DURING A 2-PORT NORMAL ADFTC SELF-TEST		
1019	NO BITS RECEIVED ON A 2-PORT REVERSE ADFTC SELF-TEST		
1020	DATA TRANSMISSION INTERRUPTED: 2-PORT REVERSE ADFTC SELF-TEST		
1021	BIT ERROR RATE EXCEEDED FOR 2-PORT REVERSE ADFTC SELF-TEST		
1022	BLOCK ERROR RATE EXCEEDED FOR 2-PORT REVERSE ADFTC SELF-TEST		
1023	EIA UPDATE FAILURE DURING A 2-PORT REVERSE ADFTC SELF-TEST		
1024	ERROR OVERFLOW DURING A 2-PORT REVERSE ADFTC SELF-TEST		
1025	UNDEFINED ERROR DURING A 2-PORT REVERSE ADFTC SELF-TEST		
1026	UNSENT STOP MESSAGE RECEIVED BY ADFTC		
1027	DID NOT RECEIVE EXPECTED: TEST ABORTED S MESSAGE		
1028	DID NOT RECEIVE EXPECTED: TEST COMPLETED S MESSAGE		
1029	THE BIT AND/OR BLOCK ERROR RATES WERE NOT RECEIVED		
1030	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE		
1031	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE		

	PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)			
FAULT CODE	DEFINITION			
1032	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE			
1034	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE			
1035	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING NORMAL MODE TEST			
1036	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING NORMAL MODE TEST			
1037	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE			
1038	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, NORMAL MODE AT 300 BAUD			
1039	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORGINATING, NORMAL MODE AT 300 BAUD			
1040	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 300 BAUD			
1041	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 300 BAUD			
1042	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING NORMAL MODE TEST AT 300 BAUD			
1043	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING NORMAL MODE TEST AT 300 BAUD			
1044	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 300 BAUD			
1045	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, NORMAL MODE AT 1200 BAUD			
1046	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 1200 BAUD			
1047	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 1200 BAUD			
1048	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 1200 BAUD			
1049	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING NORMAL MODE TEST AT 1200 BAUD			
1050	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING NORMAL MODE TEST AT 1200 BAUD			

TABLE AY. (Contd)

	PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)
FAULT	DEFINITION
1051	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 1200 BAUD
1052	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, NORMAL MODE AT 2400 BAUD
1053	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 2400 BAUD
1054	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 2400 BAUD
1055	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 2400 BAUD
1056	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING NORMAL MODE TEST AT 2400 BAUD
1057	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING NORMAL MODE TEST AT 2400 BAUD
1058	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 2400 BAUD
1059	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, NORMAL MODE AT 4800 BAUD
1060	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 4800 BAUD
1061	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 4800 BAUD
1062	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 4800 BAUD
1063	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING NORMAL MODE TEST AT 4800 BAUD
1064	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING NORMAL MODE TEST AT 4800 BAUD
1065	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 4800 BAUD
1066	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, NORMAL MODE AT 9600 BAUD
1067	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 9600 BAUD

	PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)
FAULT CODE	DEFINITION
1068	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 9600 BAUD
1069	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 9600 BAUD
1070	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING NORMAL MODE TEST AT 9600 BAUD
1071	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING NORMAL MODE TEST AT 9600 BAUD
1072	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 9600 BAUD
1073	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, NORMAL MODE AT 19.2 KILOBAUD
1074	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 19.2 KILOBAUD
1075	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 19.2 KILOBAUD
1076	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 19.2 KILOBAUD
1077	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING NORMAL MODE TEST AT 19.2 KILOBAUD
1078	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING NORMAL MODE TEST AT 19.2 KILOBAUD
1079	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 19.2 KILOBAUD
1080	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, NORMAL MODE AT 56 KILOBAUD
1081	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 56 KILOBAUD
1082	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 56 KILOBAUD
1083	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 56 KILOBAUD
1084	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING NORMAL MODE TEST AT 56 KILOBAUD

TABLE AY. (Contd)

	PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)
FAULT CODE	DEFINITION
1085	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING NORMAL MODE TEST AT 56 KILOBAUD
1086	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 56 KILOBAUD
1087	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, NORMAL MODE AT 64 KILOBAUD
1088	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 64 KILOBAUD
1089	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 64 KILOBAUD
1090	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 64 KILOBAUD
1091	EIA: UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING NORMAL MODE TEST AT 64 KILOBAUD
1092	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING NORMAL MODE TEST AT 64 KILOBAUD
1093	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 64 KILOBAUD
1094	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, REVERSE MODE
1095	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE
1096	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE
1097	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE
1098	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING REVERSE MODE TEST
1099	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING REVERSE MODE TEST
1100	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE
1101	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, REVERSE MODE AT 300 BAUD

PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE	DEFINITION
1102	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 300 BAUD
1103	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 300 BAUD
1104	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 300 BAUD
1105	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING REVERSE MODE TEST AT 300 BAUD
1106	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING REVERSE MODE TEST AT 300 BAUD
1107	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 300 BAUD
1108	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, REVERSE MODE AT 1200 BAUD
1109	DATA TRÀNSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 1200 BAUD
1110	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 1200 BAUD
1111	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 1200 BAUD
1112	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING REVERSE MODE TEST AT 1200 BAUD
1113	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING REVERSE MODE TEST AT 1200 BAUD
1114	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 1200 BAUD
1115	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, REVERSE MODE AT 2400 BAUD
1116	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 2400 BAUD
1117	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 2400 BAUD
1118	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 2400 BAUD

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TABLE AY. (Contd)

PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT	DEFINITION
1119	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING REVERSE MODE TEST AT 2400 BAUD
1120	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING REVERSE MODE TEST AT 2400 BAUD
1121	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 2400 BAUD
1122	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, REVERSE MODE AT 4800 BAUD
1123	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 4800 BAUD
1124	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 4800 BAUD
1125	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN REVERSE NORMAL MODE AT 4800 BAUD
1126	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING REVERSE MODE TEST AT 4800 BAUD
1127	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING REVERSE MODE TEST AT 4800 BAUD
1128	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 4800 BAUD
1129	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, REVERSE MODE AT 9600 BAUD
1130	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 9600 BAUD
1131	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 9600 BAUD
1132	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 9600 BAUD
1133	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING REVERSE MODE TEST AT 9600 BAUD
1134	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING REVERSE MODE TEST AT 9600 BAUD

TABLE AY. (Contd)

PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT	DEFINITION
1135	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 9600 BAUD
1136	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, REVERSE MODE AT 19.2 KILOBAUD
1137	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, NORMAL MODE AT 19.2 KILOBAUD
1138	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 19.2 KILOBAUD
1139	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 19.2 KILOBAUD
1140	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING REVERSE MODE TEST AT 19.2 KILOBAUD
1141	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING REVERSE MODE TEST AT 19.2 KILOBAUD
1142	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 19.2 KILOBAUD
1143	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, REVERSE MODE AT 56 KILOBAUD
1144	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 56 KILOBAUD
1145	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 56 KILOBAUD
1146	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 56 KILOBAUD
1147	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING REVERSE MODE TEST AT 56 KILOBAUD
1148	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING REVERSE MODE TEST AT 56 KILOBAUD
1149	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 56 KILOBAUD
1150	NO BITS RECEIVED ON A HALF DUPLEX TEST IN ORIGINAT- ING, REVERSE MODE AT 64 KILOBAUD

TABLE AY. (Contd)

FAULT	DEFINITION
1151	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 64 KILOBAUD
1152	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 64 KILOBAUD
1153	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 64 KILOBAUD
1154	EIA UPDATE FAILURE DURING A HALF DUPLEX ORIGI- NATING REVERSE MODE TEST AT 64 KILOBAUD
1155	ERROR OVERFLOW DURING A HALF DUPLEX ORIGINAT- ING REVERSE MODE TEST AT 64 KILOBAUD
1156	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN ORIGINATING, REVERSE MODE AT 64 KILOBAUD
1157	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING NORMAL MODE
1158	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, NORMAL MODE
1159	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE
1160	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE
1161	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING NORMAL MODE TEST
1162	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING NORMAL MODE TEST
1163	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, NORMAL MODE
1164	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, NORMAL MODE AT 300 BAUD
1165	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 300 BAUD
1166	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 300 BAUD

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TABLE AY. (Contd)

PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE	DEFINITION
1167	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 300 BAUD
1168	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING NORMAL MODE TEST AT 300 BAUD
1169	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING NORMAL MODE TEST AT 300 BAUD
1170	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, NORMAL MODE AT 300 BAUD
1171	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, NORMAL MODE AT 1200 BAUD
1172	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 1200 BAUD
1173	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 1200 BAUD
1174	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 1200 BAUD
1175	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING NORMAL MODE TEST AT 1200 BAUD
1176	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING NORMAL MODE TEST AT 1200 BAUD
1177	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, NORMAL MODE AT 1200 BAUD
1178	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, NORMAL MODE AT 2400 BAUD
1179	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 2400 BAUD
1180	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 2400 BAUD
1181	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 2400 BAUD
1182	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING NORMAL MODE TEST AT 2400 BAUD

	PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE	DEFINITION	
1183	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING NORMAL MODE TEST AT 2400 BAUD	
1184	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, NORMAL MODE AT 2400 BAUD	
1185	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, NORMAL MODE AT 4800 BAUD	
1186	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 4800 BAUD	
1187	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 4800 BAUD	
1188	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 4800 BAUD	
1189	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING NORMAL MODE TEST AT 4800 BAUD	
1190	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING NORMAL MODE TEST AT 4800 BAUD	
1191	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, NORMAL MODE AT 4800 BAUD	
1192	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, NORMAL MODE AT 9600 BAUD	
1193	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 9600 BAUD	
1194	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 9600 BAUD	
1195	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 9600 BAUD	
1196	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING NORMAL MODE TEST AT 9600 BAUD	
1197	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING NORMAL MODE TEST AT 9600 BAUD	
1198	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, NORMAL MODE AT 9600 BAUD	

PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE	DEFINITION
1199	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, NORMAL MODE AT 19.2 KILOBAUD
1200	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 19.2 KILOBAUD
1201	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 19.2 KILOBAUD
1202	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 19.2 KILOBAUD
1203	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING NORMAL MODE TEST AT 19.2 KILOBAUD
1204	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING NORMAL MODE TEST AT 19.2 KILOBAUD
1206	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, NORMAL MODE AT 19.2 KILOBAUD
1207	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, NORMAL MODE AT 56 KILOBAUD
1208	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 56 KILOBAUD
1209	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 56 KILOBAUD
1210	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 56 KILOBAUD
1211	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING NORMAL MODE TEST AT 56 KILOBAUD
1212	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING NORMAL MODE TEST AT 56 KILOBAUD
1213	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, NORMAL MODE AT 56 KILOBAUD
1214	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, NORMAL MODE AT 64 KILOBAUD
1215	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 64 KILOBAUD

PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE	DEFINITION
1216	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 64 KILOBAUD
1217	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, NORMAL MODE AT 64 KILOBAUD
1218	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING NORMAL MODE TEST AT 64 KILOBAUD
1219	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING NORMAL MODE TEST AT 64 KILOBAUD
1220	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, NORMAL MODE AT 64 KILOBAUD
1221	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, REVERSE MODE
1222	DATA TRANSMISSION INTERRUPTED HALF DUPLEX TEST IN TERMINATING, REVERSE MODE
1223	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE
1224	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE
1225	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMINATING REVERSE MODE TEST
1226	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING REVERSE MODE TEST
1227	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, REVERSE MODE
1228	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, REVERSE MODE AT 300 BAUD
1229	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 300 BAUD
1230	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 300 BAUD
1231	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 300 BAUD

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PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE	DEFINITION
1232	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING REVERSE MODE TEST AT 300 BAUD
1233	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING REVERSE MODE TEST AT 300 BAUD
1234	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, REVERSE MODE AT 300 BAUD
1235	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, REVERSE MODE AT 1200 BAUD
1236	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 1200 BAUD
1237	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 1200 BAUD
1238	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 1200 BAUD
1239	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING REVERSE MODE TEST AT 1200 BAUD
1240	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING REVERSE MODE TEST AT 1200 BAUD
1241	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, REVERSE MODE AT 1200 BAUD
1242	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, REVERSE MODE AT 2400 BAUD
1243	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 2400 BAUD
1244	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 2400 BAUD
1245	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 2400 BAUD
1246	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING REVERSE MODE TEST AT 2400 BAUD
1247	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING REVERSE MODE TEST AT 2400 BAUD

TABLE AY. (Contd)

PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE	DEFINITION
1248	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, REVERSE MODE AT 2400 BAUD
1249	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, REVERSE MODE AT 4800 BAUD
1250	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 4800 BAUD
1251	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 4800 BAUD
1252	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 4800 BAUD
1253	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING REVERSE MODE TEST AT 4800 BAUD
1254	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING REVERSE MODE TEST AT 4800 BAUD
1255	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, REVERSE MODE AT 4800 BAUD
1256	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, REVERSE MODE AT 9600 BAUD
1257	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 9600 BAUD
1258	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 9600 BAUD
1259	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 9600 BAUD
1260	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING REVERSE MODE TEST AT 9600 BAUD
1261	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING REVERSE MODE TEST AT 9600 BAUD
1262	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, REVERSE MODE AT 9600 BAUD
1263	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, REVERSE MODE AT 19.2 KILOBAUD

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PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)	
FAULT CODE	DEFINITION
1264	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 19.2 KILOBAUD
1265	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 19.2 KILOBAUD
1266	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 19.2 KILOBAUD
1267	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING REVERSE MODE TEST AT 19.2 KILOBAUD
1268	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING REVERSE MODE TEST AT 19.2 KILOBAUD
1269	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, REVERSE MODE AT 19.2 KILOBAUD
1270	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, REVERSE MODE AT 56 KILOBAUD
1271	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 56 KILOBAUD
1272	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 56 KILOBAUD
1273	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 56 KILOBAUD
1274	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING REVERSE MODE TEST AT 56 KILOBAUD
1275	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING REVERSE MODE TEST AT 56 KILOBAUD
1276	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, REVERSE MODE AT 56 KILOBAUD
1277	NO BITS RECEIVED ON A HALF DUPLEX TEST IN TERMI- NATING, REVERSE MODE AT 64 KILOBAUD
1278	DATA TRANSMISSION INTERRUPTED: HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 64 KILOBAUD
1279	BIT ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 64 KILOBAUD

TABLE AY. (Contd)

PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)					
FAULT CODE	DEFINITION				
1280	BLOCK ERROR RATE EXCEEDED FOR HALF DUPLEX TEST IN TERMINATING, REVERSE MODE AT 64 KILOBAUD				
1281	EIA UPDATE FAILURE DURING A HALF DUPLEX TERMI- NATING REVERSE MODE TEST AT 64 KILOBAUD				
1282	ERROR OVERFLOW DURING A HALF DUPLEX TERMINAT- ING REVERSE MODE TEST AT 64 KILOBAUD				
1283	UNDEFINED ERROR DURING A HALF DUPLEX TEST IN TER- MINATING, REVERSE MODE AT 64 KILOBAUD				
1284	DID NOT RECEIVE A HANDSHAKE MESSAGE				
1285	HANDSHAKE FAILURE MESSAGE RECEIVED				
1286	NO BITS RECEIVED ON A FULL DUPLEX TEST				
1287	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST				
1288	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST				
1289	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST				
1290	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST				
1291	ERROR OVEFLOW DURING A FULL DUPLEX TEST				
1292	UNDEFINED ERROR DURING A FULL DUPLEX TEST				
1293	NO BITS RECEIVED ON A FULL DUPLEX TEST IN ORIGINAT- ING MODE				
1294	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN ORIGINATING MODE.				
1295	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE				
1296	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE				
1297	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN ORIGINATING MODE				
1298	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN ORIG- INATING MODE				

	PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)					
FAULT CODE	DEFINITION					
1299	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN ORIGINATING MODE					
1300	NO BITS RECEIVED ON A FULL DUPLEX TEST IN ORIGINAT- ING MODE AT 300 BAUD					
1301	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN ORIGINATING MODE AT 300 BAUD					
1302	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 300 BAUD					
1303	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 300 BAUD					
1304	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN ORIGINATING MODE AT 300 BAUD					
1305	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN ORIG- INATING MODE AT 300 BAUD					
1306	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN ORIGINATING MODE AT 300 BAUD					
1307	NO BITS RECEIVED ON A FULL DUPLEX TEST IN ORIGINAT- ING MODE AT 1200 BAUD					
1308	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN ORIGINATING MODE AT 1200 BAUD					
1309	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 1200 BAUD					
1310	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 1200 BAUD					
1311	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN ORIGINATING MODE AT 1200 BAUD					
1312	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN ORIG- INATING MODE AT 1200 BAUD					
1313	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN ORIGINATING MODE AT 1200 BAUD					
1314	NO BITS RECEIVED ON A FULL DUPLEX TEST IN ORIGINAT- ING MODE AT 2400 BAUD					
1315	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN ORIGINATING MODE AT 2400 BAUD					

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	PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)					
FAULT CODE	DEFINITION					
1316	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 2400 BAUD					
1317	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 2400 BAUD					
1318	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN ORIGINATING MODE AT 2400 BAUD					
1319	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN ORIG- INATING MODE AT 2400 BAUD					
1320	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN ORIGINATING MODE AT 2400 BAUD					
1321	NO BITS RECEIVED ON A FULL DUPLEX TEST IN ORIGINAT- ING MODE AT 4800 BAUD					
1322	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN ORIGINATING MODE AT 4800 BAUD					
1323	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 4800 BAUD					
1324	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 4800 BAUD					
1325	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN ORIGINATING MODE AT 4800 BAUD					
1326	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN ORIG- INATING MODE AT 4800 BAUD					
1327	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN ORIGINATING MODE AT 4800 BAUD					
1328	NO BITS RECEIVED ON A FULL DUPLEX TEST IN ORIGINAT- ING MODE AT 9600 BAUD					
1329	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN ORIGINATING MODE AT 9600 BAUD					
1330	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 9600 BAUD					
1331	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 9600 BAUD					
1332	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN ORIGINATING MODE AT 9600 BAUD					

TABLE AY. (Contd)

FAULT CODE	DEFINITION
1333	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN ORIG- INATING MODE AT 9600 BAUD
1334	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN ORIGINATING MODE AT 9600 BAUD
1335	NO BITS RECEIVED ON A FULL DUPLEX TEST IN ORIGINAT- ING MODE AT 19.2 KILOBAUD
1336	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN ORIGINATING MODE AT 19.2 KILOBAUD
1337	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 19.2 KILOBAUD
1338	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 19.2 KILOBAUD
1339	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN ORIGINATING MODE AT 19.2 KILOBAUD
1340	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN ORIG- INATING MODE AT 19.2 KILOBAUD
1341	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN ORIGINATING MODE AT 19.2 KILOBAUD
1.342	NO BITS RECEIVED ON A FULL DUPLEX TEST IN ORIGINAT- ING MODE AT 56 KILOBAUD
1343	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN ORIGINATING MODE AT 56 KILOBAUD
1344	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 56 KILOBAUD
1345	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 56 KILOBAUD
1346	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN ORIGINATING MODE AT 56 KILOBAUD
1347	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN ORIG- INATING MODE AT 56 KILOBAUD
1348	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN

	TA	BL	E	Α	Y.	(Contd)
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	PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)					
FAULT CODE	DEFINITION					
1349	NO BITS RECEIVED ON A FULL DUPLEX TEST IN ORIGINAT- ING MODE AT 64 KILOBAUD					
1350	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN ORIGINATING MODE AT 64 KILOBAUD					
1351	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 64 KILOBAUD					
1352	BLOCK ERROR RATE EXCÉEDED FOR FULL DUPLEX TEST IN ORIGINATING MODE AT 64 KILOBAUD					
1353	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN ORIGINATING MODE AT 64 KILOBAUD					
1354	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN ORIG- INATING MODE AT 64 KILOBAUD					
1355	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN ORIGINATING MODE AT 64 KILOBAUD					
1356	NO BITS RECEIVED ON A FULL DUPLEX TEST IN TERMI- NATING MODE					
1357	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN TERMINATING MODE					
1358	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE					
1359	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE					
1360	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN TERMINATING MODE					
1361	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN TER- MINATING MODE					
1362	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN TER- MINATING MODE					
1363	NO BITS RECEIVED ON A FULL DUPLEX TEST IN TERMI- NATING MODE AT 300 BAUD					

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	PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)			
FAULT	DEFINITION			
1364	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TES IN TERMINATING MODE AT 300 BAUD			
1365	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE AT 300 BAUD			
1366	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE AT 300 BAUD			
1367	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN TERMINATING MODE AT 300 BAUD			
1368	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN TER MINATING MODE AT 300 BAUD			
1369	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN TER MINATING MODE AT 300 BAUD			
1370	NO BITS RECEIVED ON A FULL DUPLEX TEST IN TERMI NATING MODE AT 1200 BAUD			
1371	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN TERMINATING MODE AT 1200 BAUD			
1372	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE AT 1200 BAUD			
1373	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TES' IN TERMINATING MODE AT 1200 BAUD			
1374	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN TERMINATING MODE AT 1200 BAUD			
1375	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN TER MINATING MODE AT 1200 BAUD			
1376	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN TER MINATING MODE AT 1200 BAUD			
1377	NO BITS RECEIVED ON A FULL DUPLEX TEST IN TERMI NATING MODE AT 2400 BAUD			
1378	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN TERMINATING MODE AT 2400 BAUD			
1379	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE AT 2400 BAUD			
1380	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE AT 2400 BAUD			

	PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)					
FAULT CODE	DEFINITION					
1381	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN TERMINATING MODE AT 2400 BAUD					
1382	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN TER- MINATING MODE AT 2400 BAUD					
1383	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN TER- MINATING MODE AT 2400 BAUD					
1384	NO BITS RECEIVED ON A FULL DUPLEX TEST IN TERMI- NATING MODE AT 4800 BAUD					
1385	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN TERMINATING MODE AT 4800 BAUD					
1386	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE AT 4800 BAUD					
1387	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE AT 4800 BAUD					
1388	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN TERMINATING MODE AT 4800 BAUD					
1389	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN TER- MINATING MODE AT 4800 BAUD					
1390	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN TER- MINATING MODE AT 4800 BAUD					
1391	NO BITS RECEIVED ON A FULL DUPLEX TEST IN TERMI- NATING MODE AT 9600 BAUD					
1392	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN TERMINATING MODE AT 9600 BAUD					
1393	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE AT 9600 BAUD					
1394	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE AT 9600 BAUD					
1395	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN TERMINATING MODE AT 9600 BAUD					
1396	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN TER- MINATING MODE AT 9600 BAUD					

PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)				
FAULT CODE	DEFINITION			
1397	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN TER- MINATING MODE AT 9600 BAUD			
1398	NO BITS RECEIVED ON A FULL DUPLEX TEST IN TERMI- NATING MODE AT 19.2 KILOBAUD			
1399	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN TERMINATING MODE AT 19.2 KILOBAUD			
1400	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE AT 19.2 KILOBAUD			
1401	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE AT 19.2 KILOBAUD			
1402	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN TERMINATING MODE AT 19.2 KILOBAUD			
1403	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN TER- MINATING MODE AT 19.2 KILOBAUD			
1404	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN TER- MINATING MODE AT 19.2 KILOBAUD			
1405	NO BITS RECEIVED ON A FULL DUPLEX TEST IN TERMI- NATING MODE AT 56 KILOBAUD			
1406	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN TERMINATING MODE AT 56 KILOBAUD			
1407	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE AT 56 KILOBAUD			
1408	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE AT 56 KILOBAUD			
1409	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN TERMINATING MODE AT 56 KILOBAUD			
1410	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN TER- MINATING MODE AT 56 KILOBAUD			
1411	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN TER- MINATING MODE AT 56 KILOBAUD			
1412	NO BITS RECEIVED ON A FULL DUPLEX TEST IN TERMI- NATING MODE AT 64 KILOBAUD			

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TABLE AY. (Contd)

PROC 646 - SPECIFIC FAULT CODE DEFINITIONS (Contd)					
FAULT CODE	DEFINITION				
1413	DATA TRANSMISSION INTERRUPTED: FULL DUPLEX TEST IN TERMINATING MODE AT 64 KILOBAUD				
1414	BIT ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE AT 64 KILOBAUD				
1415	BLOCK ERROR RATE EXCEEDED FOR FULL DUPLEX TEST IN TERMINATING MODE AT 64 KILOBAUD				
1416	EIA UPDATE FAILURE DURING A FULL DUPLEX TEST IN TERMINATING MODE AT 64 KILOBAUD				
1417	ERROR OVERFLOW DURING A FULL DUPLEX TEST IN TER- MINATING MODE AT 64 KILOBAUD				
1418	UNDEFINED ERROR DURING A FULL DUPLEX TEST IN TER- MINATING MODE AT 64 KILOBAUD				
1419	MEMBER A IN USE				
1420	MEMBER B IN USE				
1421	MEMBER A AND B IN USE				
1422	MEMBER A COULD NOT BE SEIZED				
1423	MEMBER B COULD NOT BE SEIZED				
1424	NO MEMBER AVAILABLE FOR TESTING				
1425	ADFTC DID NOT RETURN A SETUP (HANDSHAKE) RESULT MESSAGE				
1426	ADFTC DID NOT RECEIVE A SET TEST (START HANDSHAKE) MESSAGE				
1427	NO ADFTC AVAILABLE FOR TESTING				
1428	ADFTC IN USE				
1429	ADFTC MAINTENANCE BUSY				
1430	NO ON-HOOK RECEIVED FROM MODEM				
1431	TDM/2 DID NOT GO ON-HOOK AFTER TEST WAS COMPLETED				

PROC 647 - AUTOMATIC TRANSMISSION MEASUREMENT SYSTEM (ATMS) TESTS (R2V2 Only)

	LIPCHART ISSUE 2 +	+ AUTOMATIC TRANSMISSI SYSTEM (ATMS	ION MEASUREMENT) TESTS + +	
	MEASUREMENT INDEX: 10-FIRST SET OF MEASUREMENTS 20-SECON SET OF MEASUREMENTS 30-THIRD SET OF MEASUREMENTS 50-FIFTH SET OF MEASUREMENTS 60-SIXTH SET OF MEASUREMENTS FAULT CODES (FIELD 12): ASSOCIATED WITH MEST STATE 2: 1-ADFTC IN USE 2-ADFTC NOT AVAILABLE 3-ADFTC MAINTEMANCE BUSIED ASSOCIATED WITH TEST STATE 2: 4-NO TTL ADMINISTERED	ASSOCIATED WITH TEST STATE 4: 1=ADFTC IN USE (SUBSEQUENT TO STATE 2) 5 G7-NO TEST TONE FROM FAR END 68-OIL NOT ASSIGNED AS ROTARY 189-ADFTC RECEIVED UNSENT STOP TEST MESSAG 70-ADFTC SELF-TEST FAILS 71=BAD I/O TO/FROM DIL 72=CANNOT SELZE OR 73-DIALING OF TVS FEATURE FAILED 74-CODE DIALED DID NOT MATCH TVS FEATURE 75-TRUMK GROUP D.A.C. INAPPROPRIATE 76-SOFTWARE RECORD INCORRECT 77-ADFTC AND TRUNK CANNOT BE CONNECTED 79-DEFENDE TOME	BG-NU DATA RETURNED FROM FAR END 87-STEADY UNIDENTIFIABLE TONE FROM FAR END 88-BROADBAND ENERGY FROM FAR END (NOISE, VUICE, OR RECORDED ANNOUNCEMENT) E 89-FAR END TEST LINE UNAVAILABLE 90-NEAR-END SELF-TEST FAILED 91-FAR END LOSS SELF-TEST FAILED 92-FAR END NISE SELF-TEST FAILED 93-FAR END NISE SELF-TEST FAILED 94-FAR END ECHO RETURN LOSS SELF-TEST FAILED 94-FAR END SINGING RETURN LOSS SELF-TEST FAILED 95-FAR END SINGING RETURN LOSS SELF-TEST	99-FAR END NOISE WITH TONE SELF-TEST FAILED (FAUL CODES CONT ON WORD OB) TRUNK TYPE: SAME AS USED IN PROCEDURE 100.
MORD DA	5-INUMA IN USE 6-CAN'T RELEASE BUSY THE TRUNK	80-OTHER UNEXPECTED TONE 81-BING NO ANSWER FROM FAR END 82-UNIDENTIFIABLE INTERRUPTED TONE 83-BUSY FROM FAR END 84-FAR END RELEASE 85-NO RESPONSE FROM FAR END	98-FAR END LOSS SELF-TEST AT-160BM 1004HZ FAILED 97-FAR END LOSS SELF-TEST AT-160BM 404HZ FAILED 98-FAR END LOSS SELF-TEST AT-160BM 2804HZ FAILED	NETWORK ATMS TESTS 647

FLIPCHAR ISSUE 2	T + + AUT	OMATIC TRANS SYSTEM (MISSION MEASURE ATMS) TESTS	MENT +	+	
FAULT CODES (FIELD 12) CONTINUED FROM WORD DA.	ASSOCIATED WITH TEST STATE 5 & 6 : D-PASSED ALL TESTS 11=FAILED 404HZ FAR END TO NEAR END DEVI 12=FAILED 404HZ FAR END TO NEAR END DEVI 13=FAILED 400HZ NEAR END TO NEAR END DEVI 21=FAILED 400HZ NEAR END TO FAR END TO FAR END 23=FAILED 2804HZ NEAR END TO FAR END DEVI 23=FAILED 2804HZ NEAR END TO FAR END DEVI 31=FAILED 2804HZ NEAR END TO FAR END DEVI 32=FAILED 1004HZ FAR END-FAR END LEVEL I 33=FAILED NEAR END C-MESSAGE WITHOUT TOWN	ATION THRESHOLD. LOSS THRESHOLD. ATION THRESHOLD. ATION THRESHOLD. LOSS THRESHOLD. LOSS THRESHOLD. LOSS THRESHOLD. COSS THRESHOLD. E NOISE THRESHOLD.	62=FAILED FAR END THRESHOLD. 63=FAILED FAR END HIGH THRESHOLD.	ECHO RETURN LOSS	TEST LINE TV 1=102 0R OLD 2=NEW 100-T 3=LC-145 OR 4=SN-2608 5=56A DR 105 6=SN-261, ZL RETURN LOS	PES (FIELD 11): 100-TYPE PE SW-260A W/O RETURN LOSS C-12, OR 105 WITH S
W0RD 08	41-FAILED FAR END C-MESSAGE WITHOUT TOME 42-FAILED KARE PRO.C-MESSAGE WITH TOME TH 51-FAILED FAR END C-MESSAGE WITH TOME TH 51-FAILED NEAR END SINGING RETURN LOSS THREE 53-FAILED NEAR END SINGING RETURN LOSS HO 61-FAILED FAR END SINGING RETURN LOSS LO	NOISE THRESHOLD. RESHOLD. RESHOLD. JW THRESHOLD. JW THRESHOLD. GH THRESHOLD. A THRESHOLD.	(MEASUREMENT INDEX	CONT ON WORD DC)		NETWORK ATMS TESTS 647

FLI ISS	PCHART UE 2		+ + AUTOMATIC TRA System	NSMISSION 1 (ATMS) TI	MEAS Ests	UREMENT + +								
	MEASUREMENTS ORIENTED BY INDEX													
	MEASUREMENT INDEX	FIELD	MEASUREMENT	MEASUREMENT INDEX	FIELD	MEASUREMENT								
	10	13	404 HZ LOSS FAR END TO NEAR END MEASUREMENT	40	13	C - MESSAGE NOISE WITHOUT TONE - FAR END								
	20	14	O DBM LOSS FAR END TO NEAR END MEASUREMENT			PEASOREHENI								
		15 280 13 404	2804 HZ LOSS FAR END TO NEAR END MEASUREMENT		14	C - MESSAGE NOISE W/TONE-NEAR END MEASUREMENT								
			404 HT LOSS NEAR END TO EAR END MEASUREMENT		15	C - MESSAGE NOISE W/TONE-FAR END MEASUREMENT								
				50	13 SR 14 ER	SRL LOW NEAR END MEASUREMENT								
<u>⊢</u>		14	U UBM LUSS NEAR END TU FAR END MEASUREMENT			FRI - NEAR END MEASUDEMENT								
		15	2804 HZ LOSS NEAR END TO FAR END MEASUREMENT				ME THODK							
2	30	13	1004 HZ LOSS FAR END TO NEAR END MEASUREMENT		15	SRL HIGH - NEAR END MEASUREMENT	ATMO							
				60	13	SRL LOW - FAR END MEASUREMENT	TECTO							
B		14 10	TUUH TIL LUGO NEAR END TU FAR END MEASURER		14	ERI FAR END MEASUREMENT	15315							
_		15	C - MESSAGE NOISE WITHOUT TONE - NEAR END MEASUREMENT		15	SRL HIGH - FAR END MEASUREMENT	647							

FLIPCHART AUTOMATIC TRANSMISSION MEASUREMENT ISSUE 2 + + SYSTEM (ATMS) TESTS															
TEST 1: DISPLAYS FAILURE H: UISE 'NEXT CIRCUIT'' DISPLAY NEXT FAILE CIRCUIT. USE 'CLEAT GAIA'. 'EXECUIE' TI FAILURE HISTORY FOI FAILED CIRCUIT.	TEST 2: TESTS SELECTED CIRCUIT(S) AND COMPARES TRANSMISSION MEASUREMENTS TO ADMINISTERED THRESHOLDS. USE 'NEXT CIRCUIT' TO DISPLAY MEXT TESTED CIRCUIT. USE 'NEXT FAULT' TO DISPLAY ADDITIONAL FAULTS. USE 'NEXT DATA' TO DISPLAY MEASUREMENTS.				TEST 3: RUNS A SUPERVISION ONLY TEST ON SELECTED CIRCUIT(S). USE 'NEXT CIRCUIT' TO DISPLAY NEXT TESTED CIRCUIT.			0THER CODES: CIRCUIT STATUS (FIELD 9): 0=TDLE 1=TN USE 2=MAINT. BUSY ALARM STATUS (FIELD 10): 1=MAJOR 2=MINOR 3=WARNING 4=ERRORS RECORCED 5=ALARM RESOLVED		IESI SIATE (FIELD 10): 1=RESOLVING CONTENTION 2=GETING ADFIC 3=SEIZING TRUMK 4=TESI IN PROGRESS 5=TESI COMPLETED G=TESI COMPLETED UNACCEPTABLE TRUMK 9=TESI(S) TERMINATED SUMMARY DISPLAY		SPECIAL ERROR CODES: 1+MESSAGE TRANSMISSION TO MODULE PROCESSOR FAILED 82-STOP USED - RANGE NOT COMPLETED 83-DMIDS OVERFLOW - RANGE NOT COMPLETED			
TEST TRUNK NO GROUP	TESTS TRL NUM	2 & 3 INK BER	EQUINE CVBTME	PMENT LOC	3 XATIO SLO	7 B	CIRCUIT G STATUS	TEST STATE ALAHN C(TESTS 263) (TEST 1)	TEST LINE TYPE 11	MEASURE- MENT INDE) FAULT CODE	MEASU CIRCUITS TESTED FAILURE INDEX	REMENT RES CIRCUITS FAILED NUMBER OF FAILURES	ULTS TRUNK TYPE 15		NETWORK ATMS TESTS 647

Purpose

PROC 647 is used when referenced from **PROC 600** (Alarm causes/error log) to verify and turn off the **OTHER FAILS** fault indicator resulting from an Automatic Transmission Measurement System (ATMS) failure.

PROC 647 is also used to perform transmission tests between near-end and far-end facilities by measuring loss, noise, and echo impairments when the user suspects an intermittent trouble with analog trunks.

PROC 647 provides a trunk supervision test to determine if a test progress tone, or the "1004 Hz tone from the terminating test line can be obtained.

PROC 647 is used to:

- 1. Display the failure history for trunk circuits failing ATMS scheduled tests.
- 2. Manually turn off any alarms activated because of a trunk circuit failing ATMS tests.
- 3. Perform a transmission measurement on selected circuits or a group of circuits.

Note: Measurement results are only displayed in Test 2.

4. Perform a supervision test on selected circuits or a group of circuits.

Field Definitions and Codes

Each field of **PROC 647** flipchart and the possible displays for the fields during execution of the different tests are defined in Table AZ, PROC 647 - Field Definitions and Codes.

PROC 647 (R2V2 Only)

PROC 647 FIELD DEFINITIONS AND CODES										
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION					
1	1-3	Test number	10*	4	Test in progress					
2	18-255	Trunk group	(Tests 2&3) Contd	5	Test completed					
3	1-255	Trunk number	Contra	6	Test completed with unac- ceptable trunk					
4-8 4	0-99	Equipment location Module number		9	Test(s) terminated and summary information dis- played					
5	0-7	Cabinet number	11	0-6	Test line type					
6	0-3	Carrier number		0	No terminating test line administered					
7	0-21	Slot number		1	102 or old 100-type					
8	0-3	Circuit number		2	New 100-type					
9	0-2	Circuit status		3	LC145 or SN260A					
	0	Idle		4	SN260B					
	1	In use		5	56A or 105 without return loss					
	2	Maintenance busied		6	SN261, ZLC-12, or 105					
10* (Test 1)	1-5	Alarm status	10*	0.00	Foult code (Tests 1 2)					
(10301)	·1	Major	12	10.60	Macaurement index (Test					
	2	Minor		10-00	2)					
	3	Warning	13*		Failure index					
	4 Errors recorded			0-60	Index into PMIDS failures (Test 1 only)					
	5	Alarm resolved		0-99	Index into fault codes for displayed circuit (Test 2 only)					
10* (Tests	1-6, 9	Test state								
2&3)	1	1 Resolving contention		0-99	Total number of circuits tested (Tests 2 and 3 only)					
	2	Getting ADFTC	13*	0-74	Measurement results (Test 2 only)					
	3	Seizing trunk		91-99						

TABLE AZ.
PROC 647 FIELD DEFINITIONS AND CODES (Contd)										
FIELD	FIELD CODE DEFINITION									
14*		Total number of failures								
	0-60	Total number of PMIDS failures (Test 1 only)								
	0-99	Total number of failed cir cuits (Tests 2 and 3 only)								
14*	0-99	Total number of faults for the displayed failing cir cuit (Test 2 only)								
14*	0-74, 91-99	Measurement results (Test 2 only)								
15*	0-99	Trunk type (Prior to exe cution of Tests 2 and 3 only)								
15* 0-74, Measurement results 91-99 (Test 2 only)										
 Fields 10, and 12 through 15 are multiple use fields depending on the test being per- formed and when the data is displayed. 										

TABLE AZ. (Contd)

Optional input fields are:

- 1. Field 2 Select a specific trunk group to be tested (Tests 2 and 3 only).
- 2. Fields 2 and 3 Select trunk group and trunk number of a specific trunk to be tested (Tests 2 and 3 only).
- 3. Fields 4 through 8 Select equipment location of a specific circuit to be tested (Tests 2 and 3 only).

Operation of Procedure

Overview

PROC 647 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from a trunk failure detected during ATMS scheduled tests.

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To call in **PROC 647**, perform the following:

- 1. Depress PROC NO; 647; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1 and all other fields are dashed.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Three tests are available:

1. Test 1 - Displays failure history logged in PMIDS by on-line periodic testing. Up to 60 failures can be displayed.

Test 1 is also used to manually resolve all alarmed circuit failures associated with ATMS.

- 2. Test 2 Performs demand tests on selected circuits or a group of circuits and compares transmission measurements to administered thresholds.
- 3. Test 3 Performs a supervision test on selected circuits or a group of circuits.

Note: Circuit(s) indicates all trunks with translations allowing access to a terminating test line which are associated with ATMS.

Test 1

Test 1 provides a failure history of the circuit failures detected by the on-line ATMS periodic software.

Note: Circuit(s) indicates all trunks with translations allowing access to a terminating test line which are associated with ATMS.

Test 1 is also used to manually resolve the alarmed circuit failures associated with ATMS in PMIDS and to turn off the **OTHER FAILS** fault indicator if no other alarm sources affecting the **OTHER FAILS** fault indicator are active.

Note: Measurement results are not displayed in Test 1.

1. Test 1 is the default test when entering PROC 647 or is selected by using NEXT TEST.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 1.

- 2. When Test 1 is initially called in, Field 1 displays a 1 and all other fields are dashed.
- 3. To start Test 1, depress EXECUTE.
- 4. The failure history is sorted and a summary is displayed.
- 5. If no failures exist, the following summary is displayed:

Field 1 - 1.

Field 14 - 0 (Indicating no failures).

6. If any failures exist, the summary displays a 1 in Field 1 and the total number of circuits that failed in Field 14 (maximum of 60).

7. Depressing **NEXT CIRCUIT** displays the first failure as follows:

Field 1 - 1.

Field 2 - Trunk group.

Field 3 - Trunk number.

Fields 4 through 8 - Equipment location of failing circuit.

Field 9 - Circuit status of the displayed failure.

Field 10 - Alarm status of failing circuit.

Field 11 - Terminating test line type.

Field 12 - Fault code.

Note: Only one (first, or most severe) fault code is recorded for each failing circuit.

Field 13 - Failure index (equals number of failures displayed in Field 14).

Field 14 - Total number of failing circuits recorded in PMIDS.

Field 15 - Trunk type.

8. Depressing NEXT CIRCUIT repeatedly displays the remaining failing circuits (if any).

Field 13 decrements by 1 each time NEXT CIRCUIT is depressed.

9. When all failing circuits are displayed (1 displayed in Field 13), depressing **NEXT CIRCUIT** dashes Fields 2 through 15.

Depressing **NEXT CIRCUIT** once more causes the summary to be displayed, and the failing circuits can be stepped through again by use of **NEXT CIRCUIT**.

10. The CLEAR DATA; EXECUTE sequence is used to manually resolve individual alarmed circuit failures after EXECUTE is used to initiate Test 1.

The failures which are resolved are those failures with an alarm status of 2 (minor) or 3 (warning) displayed in Field 10.

- 11. To resolve individual circuit failures with an alarm status of 2 or 3, perform Steps 12 and 13.
- 12. Use **NEXT CIRCUIT** to display the failing circuit with an alarm status of 2 or 3 on the **MAAP**.

Note: Individual circuit failures cannot be resolved unless the alarmed circuit is displayed on the **MAAP**.

13. Depress CLEAR DATA; EXECUTE.

Field 10 (alarm status) displays a 5 indicating that the alarmed circuit in PMIDS is marked as resolved.

14. Repeat Steps 12 and 13 for each alarmed circuit failure to turn off the **OTHER FAILS** fault indicator, assuming no other alarm sources affecting the **OTHER FAILS** fault indicator are active.

Test 2

Test 2 is used to test one or more circuits once and compares transmission measurements to administered thresholds for the circuits tested.

Note: Circuit(s) indicates all trunks with translations allowing access to a terminating test line which are associated with ATMS.

Circuits can be selected for testing by all circuits; trunk group; trunk group and trunk number; or by equipment location.

When a range of circuits are tested, failing circuits are displayed first and passing circuits are displayed after all failing circuits are displayed.

Measurement results can be obtained for failing and passing circuits.

Note: When test states 2 through 4 (indicates test not fully completed) are displayed in Field 10 for failing circuits, measurement results are not available. Fields 13 through 15 display dashes.

Measurement results are provided for further diagnosis (if required) to determine if the passing circuits are within marginal thresholds or if the thresholds need to be adjusted.

Test 2 Data Entry

1. Test 2 is selected by use of **NEXT TEST**.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 2.

- 2. When Test 2 is initially called in, a default trunk group, trunk number, and equipment location may be displayed in Fields 2 through 8. Field 9 displays the circuit status, Field 11 displays the terminating test line type, and Field 15 displays the trunk type.
- 3. The default circuit can be the last circuit displayed in Test 1 of **PROC 647** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.
- 4. The default equipment location can also be passed from **PROC 620** as long as the equipment location is a CO trunk or tie trunk equipment location and is still displayed in **PROC 620** when it is passed.
- 5. All circuits, a range of circuits, a specific circuit, or the default circuit can be tested.

Note: Circuit(s) indicates all trunks with translations allowing access to a terminating test line which are associated with ATMS.

To test the default circuit, proceed to Step 14.

6. Selection of a range of circuits to be tested depends on whether or not a default equipment location is displayed.

If a default equipment location is displayed, the CHANGE FIELD sequence must be used.

If no default equipment location is displayed, either ENTER or the CHANGE FIELD sequence can be performed to select the range of circuits to be tested.

7. To test all circuits in the switch, Fields 2 through 8 must be dashed. Perform one of the following depending on whether or not a default equipment location is displayed:

ENTER.

CHANGE FIELD; 2; ENTER.

Test 2 starts with trunk member 1 of the first trunk group (numerically) and runs until all circuits in the switch are tested.

Proceed to Step 1 of Test 2 Execution.

8. To select all trunks in a trunk group to be tested, perform one of the following depending on whether or not a default equipment location is displayed:

(Trunk group number); ENTER.

CHANGE FIELD; 2; ENTER; (Trunk group number); ENTER.

Note: Field 11 displays the test line type and Field 15 displays the trunk type when the trunk group is entered in Field 2.

Test 2 starts with the first circuit in the trunk group selected and runs until all trunks in the trunk group are tested.

Proceed to Step 1 of Test 2 Execution.

- 9. A specific circuit can be selected for testing in one of three ways; i.e., by trunk group and trunk number; by equipment location; and by use of **NEXT CIRCUIT** and/or **NEXT UNIT**. (Refer to steps 10 through 13.)
- 10. To select a specific circuit using trunk group and trunk number, perform one of the following depending on whether a default equipment location is displayed:

(Trunk group); ENTER; (Trunk number); ENTER.

CHANGE FIELD; ENTER; 2; ENTER; (Trunk group); ENTER; (Trunk number); ENTER.

Note: Fields 4 through 8 display the equipment location of the trunk circuit, Field 9 displays the circuit status of the trunk, Field 11 displays the terminating test line type, and Field 15 displays the trunk type when the trunk group and number are entered in Fields 2 and 3.

Proceed to Step 14.

11. To select a specific circuit using the equipment location, perform one of the following depending on whether or not a default equipment location is displayed:

CHANGE FIELD; ENTER; 4; ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number); ENTER.

CHANGE FIELD; ENTER; 4; ENTER; (Module number); ENTER; CHANGE FIELD; ENTER; 5; ENTER; (Cabinet number); ENTER; CHANGE FIELD; ENTER; 6; ENTER; (Carrier number); ENTER; CHANGE FIELD; ENTER; 7; ENTER; (Slot number); ENTER; CHANGE FIELD; ENTER; 8; ENTER; (Circuit number); ENTER;

Note: Fields 2 and 3 display the trunk group and trunk number, Field 9 displays the circuit status of the trunk, Field 11 displays the terminating test line type, and Field 15 displays the trunk type when the equipment location is entered in Fields 4 through 8.

Proceed to Step 14.

12. Depressing **NEXT CIRCUIT** advances to the next trunk in the displayed trunk group or the first trunk in the next testable trunk group.

Depressing **NEXT UNIT** advances to the first trunk in the next testable trunk group.

13. To select a specific circuit using **NEXT CIRCUIT** and/or **NEXT UNIT**, perform the following:

Depress NEXT CIRCUIT until the circuit to be tested is displayed in Fields 2 through 8.

Depress **NEXT UNIT** until the trunk group is displayed in Field 2, then depress **NEXT CIRCUIT** (if necessary) until the circuit to be tested is displayed in Fields 3 through 8.

Note: Field 9 displays the circuit status, Field 11 displays the terminating test line type, and Field 15 displays the trunk type for the circuit to be tested.

Proceed to Step 14.

14. A specific circuit or the default circuit can be placed in maintenance busy out status for testing by performing the following:

Check the circuit status displayed in Field 9.

If the circuit status = 1 or 2, proceed to Step 1 of Test 2 Execution.

If the circuit status = 0, depress **BUSY OUT** and proceed to Step 1 of Test 2 Execution.

Test 2 Execution

1. To start Test 2 after selecting the circuit(s) to be tested, depress EXECUTE.

The WAIT indicator on the MAAP is turned on.

- 2. During testing of a specific circuit or the default circuit, Field 10 (test state) is incremented to indicate progress of Test 2.
- 3. When the entire switch or an entire trunk group is tested, the following fields are incremented as a circuit is tested:

Fields 2 and 3 - Trunk group and number.

Fields 4 through 8 - Equipment location of circuit being tested.

Field 9 - Circuit status of circuit being tested.

Field 10 - Test state (encodes 1 through 5).

- Field 11 Terminating test line type.
- Field 13 Total number of circuits tested.

Field 14 - Total number of failures (if any).

Field 15 - Trunk type.

4. The failure information returned in Test 2 is stored in DMIDS.

If DMIDS becomes full at any time during the test, Test 2 is stopped and the WAIT indicator is turned off.

Note: Although Fields 13 and 14 only display 99 entries, DMIDS allows testing of at least 255 trunks prior to DMIDS overflowing occurring.

- 5. The original range of circuits selected is displayed in Fields 2 through 8, and special error code 83 (DMIDS overflow range not completed) is displayed in the **MAAP** error code field.
- 6. Results of the test can be examined at this time (Refer to Test 2 Result Display below). Test 2 can be restarted from the original range of circuits entered by depressing **EXECUTE**.

Caution: If Test 2 is restarted from the original range entered any test results gathered to that point are lost and only new failure data is retained.

Note: Before depressing **EXECUTE** to restart Test 2 from the original range entered, the failure data should be examined and recorded.

- 7. If Test 2 is halted because of a DMIDS overflow, a new range of circuits to be tested can be entered instead of testing the original range of circuits.
- 8. The CHANGE FIELD sequence must be used to enter the new range of circuits to be tested.

Refer to Step 7 of Test 2 Data Entry above to select all circuits in the switch to be tested or Step 8 of Test 2 Data Entry above to select all circuits in a trunk group to be tested.

- 9. **EXECUTE** must be depressed to begin Test 2 from the new range of circuits entered or to start over from the original range of circuits.
- 10. STOP can be depressed when a specific circuit or a range of circuits is being tested.

The **WAIT** indicator is turned off, the original range of circuits selected is displayed in Fields 2 through 8 and test state 9 (test terminated) is displayed in Field 10.

Note: Special error code 82 (STOP used - range not completed) is displayed in the MAAP error code field.

- 11. Test result information can be stepped through as described in Test 2 Result Display below when Test 2 is halted using **STOP** even though the specific circuit or the entire range is not tested.
- 12. To restart the test when Test 2 is halted by use of **STOP** before the specific circuit or range of circuits are tested at least once, **EXECUTE** is depressed and Test 2 starts from the equipment location(s) originally selected.

Test 2 Result Display

1. When Test 2 is completed or **STOP** is depressed for a specific circuit, a default circuit, a trunk group, or the entire switch, the **WAIT** indicator is turned off and the following is displayed:

Fields 2 through 8 - Specific circuit, default circuit, or the range of circuits originally selected for testing.

Field 10 - Test state of 9 indicating test terminated.

Field 13 - Total number of circuits tested.

Field 14 - 0 or total number of failures (if any).

2. Depressing NEXT CIRCUIT displays the first, and then successive circuits tested.

Failing circuits are displayed first, followed by passing circuits. If STOP is depressed, circuits are displayed in the order tested.

3. The display of the first circuit tested consists of:

Field 1 - 2

Fields 2 and 3 - Trunk group and trunk number.

Fields 4 through 8 - Equipment location of the displayed circuit.

Field 9 - Current circuit status of the displayed circuit.

Field 10 - Test status (indicated by test states 2 through 6).

Field 11 - Terminating test line type.

Field 12 - Fault code.

Field 13 - 0 or failure index (equaling Field 14).

Field 14 - 0 or total number of fault codes recorded for the circuit displayed.

Field 15 - Trunk type.

- 4. If Field 10 (test state) indicates a test abort encode (2 through 4) an abort cause fault code (1 through 6, or 67 through 99) is displayed in Field 12 and no further information (including measurement data) is available.
- 5. If Field 10 displays a test completed encode (5 or 6) Field 12 displays either 0 (passed all tests) or the first of one or more fault code(s) (11 through 63) indicating some threshold was exceeded.

If Field 12 displays a fault code other than 0, Field 13 displays an index (equal to Field 14) and Field 14 displays the total number of fault codes recorded for **the displayed circuit**.

6. If Field 12 displays a 0 or Field 13 displays a 1 (indicating only one fault code) proceed to Step 10 to display measurement results.

If Field 13 displays a number greater than 1, proceed to Step 7.

7. Depressing NEXT FAULT displays a different fault code in Field 12 for the same circuit.

Field 13 is decremented each time **NEXT FAULT** is depressed.

Field 10 (test state) either displays a 5 (marginal threshold) or 6 (unacceptable threshold was not passed) for the fault code displayed in Field 12.

8. If a circuit is in-use when testing is attempted (range or single circuit selected), test state 3 is displayed in Field 10, and fault code 5 is displayed in Field 12.

Field 9 (circuit status) indicates whether the circuit is still in use at time of display.

Note: Record each in-use circuit for later testing (See Step 18 below).

9. When all fault codes are displayed, (Field 13 = 1), depressing **NEXT FAULT** once more dashes Fields 12 through 14.

Depressing NEXT FAULT again starts the sequence over.

10. Measurement results for the circuit tested, whether the circuit passed or failed, are displayed by depressing NEXT DATA.

Note: When tests states 2 through 4 are displayed in Field 10 for failing circuits, measurement results are not available. Fields 13 through 15 display dashes. Test states 5 and 6 indicate the test is completed and provide measurement data for passing and failing circuits.

11. Six sets of measurements (total of 18 measurements) are always displayed for each tested circuit by repeatedly depressing **NEXT DATA**.

Measurement results are displayed in sets of three (displayed in Fields 13 through 15) and Field 12 (measurement index) is used to indicate which set is being displayed.

Field 12 (measurement index) increments from 10 to 60; i.e., 10, 20, 30, 40, 50, and 60 indicating the six sets of measurements for the circuit tested.

12. The values displayed in Fields 13 through 15 refer to thresholds exceeded for measurements of each set. The definition for each measurement is indicated in Table BA, PROC 647 - Measurement Results.

Values range from 0 through 74, and 91 through 99. 91 through 99 indicate negative numbers 1 through 9.

Note: Dashes displayed in any of the three fields (13 through 15) indicate that the measurement is not applicable to the terminating test line (TTL) displayed in Field 11.

13. The order of measurements is the same as that implied by fault codes 11 through 63.

Fault codes 11 through 13 refer to thresholds exceeded for measurements of the first set, (Field 12 = 10), and are displayed in Fields 13 through 15.

Fault codes 21 through 23 refer to thresholds exceeded for measurements of the second set, (Field 12 = 20), and are displayed in Fields 13 through 15.

Fault codes 31 through 33 refer to thresholds exceeded for measurements of the third set, (Field 12 = 30), and are displayed in Fields 13 through 15.

Fault codes 41 through 43 refer to thresholds exceeded for measurements of the fourth set, (Field 12 = 40), and are displayed in Fields 13 through 15.

Fault codes 51 through 53 refer to thresholds exceeded for measurements of the fifth set, (Field 12 = 50), and are displayed in Fields 13 through 15.

Fault codes 61 through 63 refer to thresholds exceeded for measurements of the sixth set, (Field 12 = 60), and are displayed in Fields 13 through 15.

14. Depressing NEXT DATA after the sixth set of measurements is displayed (Field 12 = 60), dashes Fields 12 through 15.

Depressing **NEXT DATA** once more starts the sequence over with the first set of measurements displayed.

15. When a range of circuits are tested (all circuits in the switch or a trunk group) depressing **NEXT CIRCUIT** advances to the next circuit tested.

Caution: Depressing NEXT UNIT advances to the first trunk in the next trunk group and erases all data stored in DMIDS, i.e., circuits tested, fault codes, and measurement data is erased. Do not depress NEXT UNIT while displaying the tested circuits.

PROC 647 MEASUREMENT RESULTS								
FIELD 12 MEASUREMENT INDEX ==	FIELD NUMBER =	DEFINITION OF MEASUREMENT VALUES DISPLAYED IN FIELDS 13 THROUGH 15						
10	13	Far to near end 404 Hz loss measurement						
	14	Far to near end 0 dbm loss measurement						
	15	Far to near end 2804 Hz loss measurement						
20	13 Near to far end 404 Hz loss measurement							
	14	Near to far end 0 dbm loss measurement						
	15	Near to far end 2804 Hz loss measurement						
30	13	Far to near end 1004 Hz loss measurement						
	14	Near to far end 1004 Hz loss measurement						
	15	Near end C-message noise without tone measurement						
40	13	Far end C-message noise without tone measurement						
	14	Near end C-message noise with tone measurement						
	15	Far end C-message noise with tone measurement						
50	13	Low frequency near end singing return loss measurement						
	14	Near end echo return loss measurement						
	15	High frequency near end singing return loss measurement						
60	13	Low frequency far end singing return loss measurement						
	14	Far end echo return loss measurement						
	15	High frequency far end singing return loss measurement						

TABLE BA.

16. When a range of circuits are tested, **NEXT FAULT** is used to display all fault codes (if any) for the displayed circuit.

Note: Record all in-use circuits with a 3 displayed in Field 10 (test state) and a 5 displayed in Field 12 (fault code) for later testing. Refer to Step 18 for testing of in-use circuits.

NEXT DATA is used to display measurement results for the displayed circuit.

17. When all tested circuits are displayed, depressing **NEXT CIRCUIT** dashes all fields except Field 1.

Depressing **NEXT CIRCUIT** once more displays the summary information.

Depressing NEXT CIRCUIT again starts the sequence over.

18. When in-use fault encodes are recorded, **EXECUTE** may be depressed for an additional test attempt on the in-use circuit.

Caution: Retesting of in-use circuits should occur only after all Test 2 failure history is examined, since the retesting of an in-use circuit erases all prior test results.

19. To test a circuit recorded as in-use (Step 8 or Step 15 above), use **NEXT CIRCUIT** to display the circuit in Fields 2 through 8.

Note: Note that the circuit status field indicates the current status as idle, in-use, or maintenance busied (0, 1, or 2) displayed in Field 9.

If Field 9 (circuit status) displays a 1, the circuit is in use.

20. Depress EXECUTE.

If the circuit is still in use and Field 12 (fault code) displays a 5 indicating prior in-use failure, a camp-on procedure is used. Field 10 (test state) remains in state 3 until the circuit becomes available.

- 21. When an in-use circuit is tested, use **NEXT FAULT** and **NEXT DATA** as appropriate to determine the status of the circuit and the measurement results recorded.
- 22. To test other in-use circuits, perform the CHANGE FIELD sequence to select the in-use circuit recorded in Step 15 above.

Refer to Steps 10 and 11 of Test 2 Data Entry above to select an in-use circuit using the trunk group and trunk number or the equipment location of the in-use circuit.

- 23. When a circuit was busied out and the test passed, or the trouble was corrected, the circuit should be released from busy using **RLS BUSY OUT**.
- 24. When another specific circuit is to be tested, refer to Steps 10 through 13 of Test 2 Data Entry above to select the specific circuit.

EXECUTE must be depressed to test the specific circuit selected for testing.

25. To select another range of circuits to test, the CHANGE FIELD sequence must be used.

Refer to Step 7 of Test 2 Data Entry above to select all circuits in the switch to test, or Step 8 of Test 2 Data Entry above to select all circuits in a trunk group to test.

- 26. **EXECUTE** must be depressed to test the range of circuits selected for testing.
- 27. When all circuits that raised an alarm pass Test 2 perform the CLEAR DATA; EXECUTE sequence in Test 1 of PROC 647 for each alarmed circuit to resolve the alarmed circuits and to turn off the OTHER FAILS fault indicator assuming no other alarm sources affecting the OTHER FAILS fault indicator are active.

Note: Alarmed circuits in PMIDS are marked as resolved when the CLEAR DATA; EXECUTE sequence is used in Test 1 for each alarmed circuit.

Test 3

Test 3 provides a trunk supervision test on one or more circuits. Test execution causes an attempt to obtain either the test progress tone or the "1004 Hz tone from the terminating test line.

Note: Circuit(s) indicates all trunks with translations allowing access to a terminating test line which are associated with ATMS.

Circuits can be selected for testing by all circuits; trunk group; trunk group and trunk number; or by equipment location.

Note: Measurement results are not displayed in Test 3.

Test 3 Data Entry

1. Test 3 is selected by use of **NEXT TEST**.

Note: Use of the CHANGE FIELD sequence is not valid to select Test 3.

- 2. When Test 3 is initially called in, a default trunk group, trunk number, and equipment location may be displayed in Fields 2 through 8. Field 9 displays the circuit status, Field 11 displays the terminating test line type, and Field 15 displays the trunk type.
- 3. The default circuit can be the last circuit displayed in Test 1 or 2 of **PROC 647** or can be passed from **PROC 600** while it is still displayed in Test 1 or 2 of **PROC 600** when it is passed.
- 4. The default equipment location can also be passed from **PROC 620** as long as the equipment location is a CO trunk or tie trunk equipment location and is still displayed in **PROC 620** when it is passed.
- 5. All circuits, a range of circuits, a specific circuit, or the default circuit can be tested.
 - **Note:** Circuit(s) indicates all trunks with translations allowing access to a terminating test line which are associated with ATMS.

To test the default circuit, proceed to Step 14.

- 6. Selection of a range of circuits to be tested depends on whether or not a default equipment location is displayed.
 - If a default equipment location is displayed, the CHANGE FIELD sequence must be used.

If no default equipment location is displayed, either ENTER or the CHANGE FIELD sequence can be performed to select the range of circuits to be tested.

7. To test all circuits in the switch, Fields 2 through 8 must be dashed. Perform one of the following depending on whether or not a default equipment location is displayed:

ENTER.

CHANGE FIELD; 2; ENTER.

Test 3 starts with trunk member 1 of the first trunk group (numerically) and runs until all circuits in the switch are tested.

Proceed to Step 1 of Test 3 Execution.

8. To select all trunks in a trunk group to be tested, perform one of the following depending on whether or not a default equipment location is displayed:

(Trunk group number); ENTER.

CHANGE FIELD; 2; ENTER; (Trunk group number); ENTER.

Note: Field 11 displays the test line type and Field 15 displays the trunk type when the trunk group is entered in Field 2.

Test 3 starts with the first circuit in the trunk group selected and runs until all trunks in the trunk group are tested.

Proceed to Step 1 of Test 3 Execution.

- 9. A specific circuit can be selected for testing in one of three ways; i.e., by trunk group and trunk number; by equipment location; and by use of **NEXT CIRCUIT** and/or **NEXT UNIT**. (Refer to steps 10 through 13.)
- 10. To select a specific circuit using trunk group and trunk number, perform one of the following depending on whether a default equipment location is displayed:

(Trunk group); ENTER; (Trunk number); ENTER.

CHANGE FIELD; ENTER; 2; ENTER; (Trunk group); ENTER; (Trunk number); ENTER

Note: Fields 4 through 8 display the equipment location of the trunk circuit, Field 9 displays the circuit status of the trunk, Field 11 displays the terminating test line type, and Field 15 displays the trunk type when the trunk group and number are entered in Fields 2 and 3.

Proceed to Step 14.

11. To select a specific circuit using the equipment location, perform one of the following depending on whether or not a default equipment location is displayed:

CHANGE FIELD; ENTER; 4; ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number); ENTER.

CHANGE FIELD; ENTER; 4; ENTER; (Module number); ENTER; CHANGE FIELD; ENTER; 5; ENTER; (Cabinet number); ENTER; CHANGE FIELD; ENTER; 6; ENTER; (Carrier number); ENTER; CHANGE FIELD; ENTER; 7; ENTER; (Slot number); ENTER; CHANGE FIELD; ENTER; 8; ENTER; (Circuit number); ENTER;

Note: Fields 2 and 3 display the trunk group and trunk number, Field 9 displays the circuit status of the trunk, Field 11 displays the terminating test line type, and Field 15 displays the trunk type when the equipment location is entered in Fields 4 through 8.

Proceed to Step 14.

12. Depressing **NEXT CIRCUIT** advances to the next trunk in the displayed trunk group or the first trunk in the next testable trunk group.

Depressing **NEXT UNIT** advances to the first trunk in the next testable trunk group.

13. To select a specific circuit using **NEXT CIRCUIT** and/or **NEXT UNIT**, perform the following:

Depress NEXT CIRCUIT until the circuit to be tested is displayed in Fields 2 through 8.

Depress **NEXT UNIT** until the trunk group is displayed in Field 2, then depress **NEXT CIRCUIT** (if necessary) until the circuit to be tested is displayed in Fields 3 through 8.

Note: Field 9 displays the circuit status, Field 11 displays the terminating test line type, and Field 15 displays the trunk type for the circuit to be tested.

Proceed to Step 14.

14. A specific circuit or the default circuit can be placed in maintenance busy out status for testing by performing the following:

Check the circuit status displayed in Field 9.

If the circuit status = 1 or 2, proceed to Step 1 of Test 3 Execution.

If the circuit status = 0, depress BUSY OUT and proceed to Step 1 of Test 3 Execution.

Test 3 Execution

1. To start Test 3 after selecting the circuit(s) to be tested, depress EXECUTE.

The WAIT indicator on the MAAP is turned on.

- 2. During testing of a specific circuit or the default circuit, Field 10 (test state) is incremented to indicate progress of Test 3.
- 3. When the entire switch or an entire trunk group is tested, the following fields are incremented as a circuit is tested:

Fields 2 and 3 - Trunk group and number.

Fields 4 through 8 - Equipment location of circuit being tested.

Field 9 - Circuit status of circuit being tested.

Field 10 - Test state (encodes 1 through 5).

Field 11 - Terminating test line type.

Field 14 - Total number of failures (if any).

Field 15 - Trunk type.

4. The failure information returned in Test 3 is stored in DMIDS.

If DMIDS becomes full at any time during the test, Test 3 is stopped and the **WAIT** indicator is turned off.

Note: Although Fields 13 and 14 only display 99 entries, DMIDS allows testing of at least 255 trunks prior to DMIDS overflowing occurring.

5. The original range of circuits selected is displayed in Fields 2 through 8, and special error code 83 (DMIDS overflow - range not completed) is displayed in the is displayed in the **MAAP** error code field.

6. Results of the test can be examined at this time (Refer to Test 3 Result Display below). Test 3 can be restarted from the original range of circuits entered by depressing **EXECUTE**.

Caution: If Test 3 is restarted from the original range entered any test results gathered to that point are lost and only new failure data is retained.

Note: Before depressing **EXECUTE** to restart Test 3 from the original range entered, the failure data should be examined and recorded.

- 7. If Test 3 is halted because of a DMIDS overflow, a new range of circuits to be tested can be entered instead of testing the original range of circuits.
- 8. The CHANGE FIELD sequence must be used to enter the new range of circuits to be tested.

Refer to Step 7 of Test 3 Data Entry above to select all circuits in the switch to be tested or Step 8 of Test 3 Data Entry above to select all circuits in a trunk group to be tested.

- 9. **EXECUTE** must be depressed to begin Test 2 from the new range of circuits entered or to start over from the original range of circuits.
- 10. STOP can be depressed when a specific circuit or a range of circuits is being tested.

The **WAIT** indicator is turned off, the original range of circuits selected is displayed in Fields 2 through 8 and test state 9 (test terminated) is displayed in Field 10.

Note: Special error code 82 (STOP used - range not completed) is displayed in the MAAP error code field.

- 11. Test result information can be stepped through as described in Test 3 Result Display below when Test 3 is halted using **STOP** even though the specific circuit or the entire range is not tested.
- 12. To restart the test when Test 3 is halted by use of **STOP** before the specific circuit or range of circuits are tested at least once, **EXECUTE** is depressed and Test 3 starts from the equipment location(s) originally selected.

Test 3 Result Display

1. When Test 3 is completed or **STOP** is depressed for a specific circuit, a default circuit, a trunk group, or the entire switch, the **WAIT** indicator is turned off and the following is displayed:

Fields 2 through 8 - Specific circuit, default circuit, or the range of circuits originally selected for testing.

Field 10 - Test state of 9 indicating test terminated.

Field 13 - Total number of circuits tested.

Field 14 - 0 or total number of failures (if any).

2. Depressing **NEXT CIRCUIT** displays the first, and then successive circuits tested.

Failing circuits are displayed first, followed by passing circuits. If STOP is depressed, circuits are displayed in the order tested.

- The display of the first circuit tested consists of: Field 1 - 3
- Fields 2 and 3 Trunk group and trunk number.

Fields 4 through 8 - Equipment location of the displayed circuit.

Field 9 - Current circuit status of the displayed circuit.

Field 10 - Test status (indicated by test states 2 through 6).

Field 11 - Terminating test line type.

Field 12 - Fault code.

Field 13 - 0 or failure index (equaling Field 14).

Field 14 - 0 or total number of fault codes recorded for the circuit displayed.

Field 15 - Trunk type.

4. Field 10 (test state) displays either a test completed encode of 5 or a test abort encode of 2 through 4.

If Field 10 displays a test completed encode of 5, Field 12 (fault code) displays a 0 indicating successful completion of Test 3.

5. If Field 10 indicates a test abort encode (2 through 4) an abort cause fault code (1 through 6, or 67 through 99) is displayed in Field 12 and no further information is available.

Note: Only one (first, or most severe) fault code is recorded for each failing circuit.

6. If a circuit is in-use when testing is attempted (range or single circuit selected), test state 3 is displayed in Field 10, and fault code 5 is displayed in Field 12.

Field 9 (circuit status) indicates whether the circuit is still in use at time of display.

Note: Record each in-use circuit for later testing (See Step 10 below).

- 7. When a range of circuits are tested (all circuits in the switch or a trunk group) depressing **NEXT CIRCUIT** advances to the next circuit tested.
- 8. Record all in-use circuits with a 3 displayed in Field 10 (test state) and a 5 displayed in Field 12 (fault code) for later testing. Refer to Step 10 for testing of in-use circuits.

Caution: Depressing NEXT UNIT advances to the first trunk in the next trunk group and erases all data stored in DMIDS, i.e., circuits tested, fault codes, and measurement data is erased. Do not depress NEXT UNIT while displaying the tested circuits.

9. When all tested circuits are displayed, depressing **NEXT CIRCUIT** dashes all fields except Field 1.

Depressing **NEXT CIRCUIT** once more displays the summary information.

Depressing **NEXT CIRCUIT** once more starts the sequence over with the first tested circuit.

10. When in-use fault encodes are recorded, **EXECUTE** may be depressed for an additional test attempt on the in-use circuit.

Caution: Retesting of in-use circuits should occur only after all Test 3 failure history is examined, since the retesting of an in-use circuit erases all prior test results.

11. To test a circuit recorded as in-use (Steps 6 or 8 above), use **NEXT CIRCUIT** to display the circuit in Fields 2 through 8.

Note: Note that the circuit status field indicates the current status as idle, in-use, or maintenance busied (0, 1, or 2) displayed in Field 9.

If Field 9 (circuit status) displays a 1, the circuit is in use.

12. Depress EXECUTE.

When an in-use circuit is tested, use NEXT CIRCUIT to determine the status of the circuit.

- 13. If the circuit is still in use **and** Field 12 (fault code) displays a 5 indicating prior in-use failure, a camp-on procedure is used. Field 10 (test state) remains in state 3 until the circuit becomes available.
- 14. To test other in-use circuits, perform the CHANGE FIELD sequence to select the in-use circuit recorded in Step 7 above.

Refer to Steps 10 and 11 of Test 3 Data Entry above to select an in-use circuit using the trunk group and trunk number or the equipment location of the in-use circuit.

- 15. When a circuit was busied out and the test passed, or the trouble was corrected, the circuit should be released from busy using **RLS BUSY OUT**.
- 16. When another specific circuit is to be tested, refer to Steps 10 through 13 of Test 3 Data Entry above to select the specific circuit.

EXECUTE must be depressed to test the specific circuit selected for testing.

17. To select another range of circuits to test, the CHANGE FIELD sequence must be used.

Refer to Step 7 of Test 3 Data Entry above to select all circuits in the switch to test, or Step 8 of Test 2 Data Entry above to select all circuits in a trunk group to test.

18. **EXECUTE** must be depressed to test the range of circuits selected for testing.

Repair Guide

When a trunk circuit failing ATMS scheduled tests is indicated, **PROC 647** referenced from **PROC** 600 as the cause for the **OTHER FAILS** fault indicator being lighted, perform the following steps in the order listed to isolate and repair the faulty unit.

The starting point for isolation and repair of alarmed trunk circuits failing ATMS scheduled tests is Test 1 of **PROC 600** or Test 1 of **PROC 647**.

To isolate an alarmed trunk circuit failing ATMS scheduled tests displayed in Test 1 of **PROC 600** or Test 1 of **PROC 647**, Test 2 of **PROC 647** is executed to determine the extent of the trouble.

PROC 647 (R2V2 Only)

1. Execute Test 1 of **PROC 600** or Test 1 of **PROC 647** to determine which circuits are alarmed, indicated by a 2 (minor) or 3 (warning) displayed in the alarm status field.

Record the alarmed circuits displayed in Test 1 of PROC 600 or Test 1 of PROC 647.

- 2. Display the alarmed circuit in Test 1 of PROC 600 or Test 1 of PROC 647.
- 3. Enter PROC 647 Test 2.

Note: The alarmed circuit that was displayed in Test 1 of **PROC 600** or Test 1 of **PROC 647** is the default equipment location displayed in Test 2 of **PROC 647**.

4. Depress **EXECUTE**.

If Test 2 passes, proceed to Step 12.

5. If Test 2 fails, depress NEXT CIRCUIT.

Field 10 indicates the test state and Field 12 displays a fault code. Field 14 displays the number of fault codes for the failing circuit and Field 13 displays the index into the fault codes (equaling Field 14).

- 6. Record the test state displayed in Field 10 and the fault code displayed in Field 12 and proceed to Step 7.
- 7. If Field 13 (failure index) displays a 1, proceed to Step 10.

If Field 13 displays more than 1, proceed to Step 8.

8. Depressing **NEXT FAULT** repeatedly displays the remaining fault codes for the failing circuit.

Record each test state displayed in Field 10 and the associated fault code displayed in Field 12.

9. When all fault codes are displayed (Field 13 = 1) depressing **NEXT FAULT** once more dashes Fields 12 through 14.

Proceed to Step 10.

10. Refer to Table BB, PROC 647 - Fault Code Definitions, for a list of the test state, fault codes, and definitions associated with each test state and fault code.

Proceed to Step 11 to perform corrective action.

- 11. Perform the corrective action listed below associated with the test state and fault code displayed in Fields 10 and 12 for the failing circuit.
- 12. Test 2 must be run for each alarmed circuit failure recorded in Test 1 of **PROC 600** or Test 1 of **PROC 647**.

Repeat Steps 2 through 12 for each recorded alarmed circuit failure.

13. If all alarmed circuit failures pass Test 2, perform the CLEAR DATA; EXECUTE sequence in Test 1 of PROC 647 for each alarmed circuit to resolve the alarmed circuits and to turn off the OTHER FAILS fault indicator assuming no other alarm sources affecting the OTHER FAILS fault indicator are active.

TABLE BB.

PROC 647 — FAULT CODE DEFINITIONS							
FIELD 10 TEST STATE	FIELD 12 FAULT CODE	DEFINITION					
2	1	ADFTC in use					
	2	ADFTC not available					
	. 3	ADFTC maintenance busied					
3	4	No terminating test line (TTL) administered					
	5	Trunk in use					
	6	Cannot release busy the trunk					
4	1	ADFTC in use (after Test State 2)					
	67	No test tone returned from far end (105 type only)					
	68	Originating test line (OTL) not assigned as rotary					
	69	ADFTC received unsent stop test message					
	70	ADFTC self-test fails					
	71	Bad I/O to or from OTL					
	72	Cannot seize originating register					
	73	Dialing of Trunk Verification by Station (TVS) feature failed					
	74	Code dialed did not match TVS feature access					
	75	Trunk group dial access code inappropriate					
	76	Software record incorrect					
	77	ADFTC and trunk cannot be connected					
	78	Intercept tone from near end					
	79	Reorder tone from near end '					
	80	Other unexpected tone					
	81	Ring no answer from near end					
	82	Unidentifiable interrupted tone					

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PROC 647 (R2V2 Only)

TABLE BB. (Contd)

	PROC 647 — FAULT CODE DEFINITIONS (Contd)									
FIELD 10 TEST STATE	FIELD 12 FAULT CODE	DEFINITION								
4 (Contd)	83	Busy from far end								
(Conta)	84	Far end release								
	85	No response from far end								
	86	No data returned from far end								
	87	Steady unidentifiable tone from far end								
	88	Broadband energy from far end (noise, voice, or recorded announce- ment)								
	89	Far end test line unavailable, timeout after waiting for test progress tone removal								
	90 Near end self-test failed									
	91	Far end loss self-test at 0 dbm 1004 Hz failed								
	92	Far end noise self-test failed								
	93	Far end high frequency singing return loss self-test failed								
	94	Far end echo return loss self-test failed								
	95	Far end singing return loss self-test failed								
	96	Far end loss self-test at -16 dbm 1004 Hz failed								
	97	Far end loss self-test at -16 dbm 404 Hz failed								
	98	Far end loss self-test at -16 dbm 2804 Hz failed								
	99	Far end noise with tone self-test failed								
5 and 6	0	Passed all tests								
	11	Failed 404 Hz far end to near end deviation threshold								
	12	Failed 0 dbm loss far end to near end loss threshold								
	13	Failed 2804 Hz far end to near end deviation threshold								

	PROC 647 — FAULT CODE DEFINITIONS (Contd)									
FIELD 10 TEST STATE	FIELD 12 FAULT CODE	DEFINITION								
5 and 6	21	Failed 404 Hz near end to far end deviation threshold								
(Contd)	22	Failed 0 dbm loss near end to far end loss threshold								
	23	Failed 2804 Hz near end to far end deviation threshold								
	31	Failed 1004 Hz far end to near end level loss threshold								
	32	Failed 1004 Hz near end to far end level loss threshold								
	33	Failed near end C-message noise threshold								
	41	Failed far end C-message without tone noise threshold								
	42	Failed near end C-message with tone threshold								
	43	Failed far end C-message with tone threshold								
	51	Failed near end singing return loss low threshold								
	52	Failed near end echo return loss threshold								
	53	Failed near end singing return loss high threshold								
	61	Failed far end singing return loss low threshold								
	62	Failed far end echo return loss threshold								
	63	Failed far end singing return loss high threshold								

TABLE BB. (Contd)

Test state 2 - Fault codes 1 and 2

Repeat Test 2 on the same circuit.

Test state 2 - Fault code 3

1. Perform Test 1 of PROC 646 and Test 4 of PROC 620 (unit type 62) to test the ADFTC.

If the ADFTC passes both tests, proceed to Step 2.

If the ADFTC fails either test, perform corrective action as required and release the ADFTC from maintenance busy. Proceed to Step 3.

- 2. If the ADFTC passes **PROC 646** and **PROC 620**, release the ADFTC from maintenance busy status and proceed to Step 3.
- 3. Repeat Test 2 of PROC 647 on the same circuit that was failing to determine the status.

Test state 3 - Fault code 4

Administer the TTL.

PROC 647 (R2V2 Only)

Test state 3 - Fault code 5

Repeat Test 2 to camp-on the circuit until the circuit is available for testing.

Test state 3 - Fault code 6

1. Perform Test 4 of PROC 620 to test the busy circuit.

Note: The circuit that was displayed in Test 2 of **PROC 647** is the default equipment location displayed in Test 4 of **PROC 620**.

2. If Test 4 passes, release the circuit from busy and proceed to Step 3.

If Test 4 fails, take corrective action as appropriate and release the circuit from busy. Proceed to Step 3.

3. Repeat Test 2 of PROC 647 on the same circuit that was failing to determine the status.

Test state 4 - Fault code 1

Repeat Test 2 on the same circuit.

Test state 4 - Fault codes 67, 78 through 82, and 85 through 88

1. Perform Test 4 of PROC 620 to test the failing circuit.

Note: The circuit that was displayed in Test 2 of **PROC 647** is the default equipment location displayed in Test 4 of **PROC 620**.

2. If Test 4 passes, proceed to Step 3.

If Test 4 fails, take corrective action as appropriate and repeat Test 2 of **PROC 647** on the same circuit that was failing to determine the status.

Proceed to Step 8.

- 3. Use Test 2 of PROC 642 (terminal-to-trunk test call) to test the failing circuit.
- 4. Analyze how far the call went to the far end.

If the test call completely passes, repeat Test 2 of **PROC 647** on the same circuit that was failing to determine the status and proceed to Step 8.

- 5. If the test call is stuck at state 2, proceed to Step 14.
- 6. If the test call fails (test call aborted state 6), take corrective action as appropriate and repeat Test 2 of **PROC 647** on the same circuit that was failing to determine the status.

Proceed to Step 8.

- 7. If the test call is answered by someone other than the intended party, i.e., recorded announcement, proceed to Step 13.
- 8. If Test 2 fails again with the same test state and fault code (test state 4, fault code 67, 78 through 82, or 85 through 88), proceed to Step 9.

If Test 2 fails again with a different test state and/or fault code, perform corrective action as listed for the test state and fault code.

9. Perform Test 1 of PROC 646 and Test 4 of PROC 620 (unit type 62) to test the ADFTC.

If the ADFTC passes both tests, proceed to Step 10.

If the ADFTC fails either test, perform corrective action as required and proceed to Step 10.

- Repeat Test 2 of PROC 647 on the same circuit that was failing to determine the status. Proceed to Step 11.
- 11. If Test 2 fails again with the same test state and fault code (test state 4, fault code 67, 78 through 82, or 85 through 88), proceed to Step 12.

If Test 2 fails again with a different test state and/or fault code, perform corrective action as listed for the test state and fault code.

12. Perform the following step in accordance with the fault code displayed.

Perform Step 13 for fault codes 67, and 78 through 80.

Perform Step 14 for fault codes 81, 82, and 85 through 88.

- 13. Some type of translation trouble is indicated. Use translation procedure **PROC 107** to correct the trouble.
- 14. A trouble with the far end terminating test line is indicated. Refer the trouble to the far end maintenance organization for further diagnosis.

Test state 4 - Fault codes 68 and 72 through 75

When fault codes 68, and 72 through 75 are recorded with a test state of 4, some type of translation trouble is indicated.

Fault code 68:

- 1. For fault code 68 (OTL not assigned as rotary), use translation procedures **PROC 000** and **PROC 010** to determine the assignment of the OTL.
- 2. If translation is correct, refer the trouble to switch engineers for further diagnosis.
- 3. If translation is not correct, administer the OTL and repeat Test 2 for the same circuit to determine the status.

Fault code 72:

- 1. For fault code 72 (cannot seize originating register), use translation procedure **PROC** 254 to determine if originating registers are assigned.
- 2. If originating registers are assigned, refer the trouble to switch engineers for further diagnosis.

Note: Additional originating registers may be required.

3. If translation is not correct, administer the originating registers (as necessary) and repeat Test 2 for the same circuit to determine the status.

Fault code 73:

- 1. For fault code 73 (dialing of TVS feature failed), repeat Test 2.
- If Test 2 fails again with the same test state and fault code (test state 4, fault code 73) use translation procedure PROC 107 Word 1 to determine the dial code assignment and trunk type of the TVS feature and proceed to Step 3.

Note: Refer to AT&T System 85 Feature Translations Service Manual 555-101-107, Issue 2 for definition and operation of **PROC 107 Word 1**.

- 3. If Test 2 fails again with a different test state and/or fault code, perform corrective action as listed for the test state and fault code.
- 4. If translation is correct, refer the trouble to switch engineers for further diagnosis.
- 5. If translation is not correct, administer the dial code assignment of the TVS feature and repeat Test 2 for the same circuit to determine the status.

Fault code 74:

- 1. For fault code 74 (code dialed did not match TVS feature), repeat Test 2.
- 2. If Test 2 fails again with the same test state and fault code (test state 4, fault code 74) use translation procedure **PROC 350** to determine the dial access code assignment of the TVS and proceed to Step 3.

Note: Refer to AT&T System 85 Feature Translations Service Manual 555-101-107, Issue 2 for definition and operation of **PROC 350**.

- 3. If Test 2 fails again with a different test state and/or fault code, perform corrective action as listed for the test state and fault code.
- 4. If translation is correct, refer the trouble to switch engineers for further diagnosis.
- 5. If translation is not correct, administer the dial access code assignment of the TVS feature and repeat Test 2 for the same circuit to determine the status.

Fault code 75:

1. For fault code 75 (trunk group dial access code inappropriate) use translation procedures PROC 100 Word 1, PROC 175, PROC 010 Word 3, PROC 000 Word 1, and PROC 107, Word 1 to determine trunk type, trunk group translations, and restrictions.

Note: Refer to AT&T System 85 Feature Translations Service Manual 555-101-107, Issue 2 for definition and operation of PROC 100 Word 1, PROC 175, PROC 010 Word 3, PROC 001 Word 1, and PROC 107 Word 1.

- 2. If translation is correct, refer the trouble to switch engineers for further diagnosis.
- 3. If translation is not correct, administer the trunk group dial access code and repeat Test 2 for the same circuit to determine the status.

Test state 4 - Fault code 69

1. Repeat Test 2 of PROC 647 on the same circuit.

Determine the status of the circuit tested.

2. If Test 2 passes, corrective action is complete.

If Test 2 fails again with the same test state and fault code (test state 4, fault code 69) refer the trouble to the far end maintenance organization for further diagnosis.

If Test 2 fails again with a different test state and/or fault code, perform corrective action as listed for the test state and fault code.

Test state 4 - Fault codes 70, 71, and 90

 Perform Test 1 of PROC 646 and Test 4 of PROC 620 (unit type 62) to test the ADFTC. If the ADFTC passes both tests, proceed to Step 2.

If the ADFTC fails either test, perform corrective action as required and proceed to Step 2.

2. Repeat Test 2 of PROC 647 on the same circuit that was failing to determine the status.

Test state 4 - Fault codes 76 and 77

- 1. Record the information displayed in Fields 2 through 15 for each circuit with a fault code of 76 or 77.
- 2. When excessive entries (based on experience) are noted, refer the trouble to the switch engineers for further diagnosis.

Test state 4 - Fault codes 83 and 89

- 1. Record the information displayed in Fields 2 through 15 for each circuit with a fault code of 83 or 89.
- 2. When excessive entries (based on experience) are noted, refer the trouble to the far end maintenance organization for further diagnosis.

Note: If fault codes 83 (busy from far end) and 89 (far end test line unavailable) occur often enough, more equipment may be needed to perform transmission measurements between the near end and far end.

Test state 4 - Fault codes 84, and 91 through 99

Refer the trouble to the far end maintenance organization for further diagnosis.

Test state 5 or 6 - Fault codes 11 through 63

1. Perform Test 4 of **PROC 620** to test the appropriate circuit.

Note: The circuit that was displayed in Test 2 of PROC 647 is the default equipment location displayed in Test 4 of PROC 620.

2. If Test 4 passes, refer the trouble to the facility responsible for connections between the near and far end.

If Test 4 fails, take corrective action as appropriate and proceed to Step 3.

3. Repeat Test 2 of PROC 647 on the same circuit that was failing to determine the status.

Transmission Measurements

Measurement results include contributions from 3 sources:

- 1. The System 85 (near-end) switch.
- 2. The trunk circuit.
- 3. The switch at the location of the terminating test line (far-end).

PROC 647 (R2V2 Only)

Table BC, PROC 647 Measurement Conversion Factors, provides the contributions of DIMENSION PBX's and System 85 switches used as OTL or TTL to the measurement results.

For example, for a CO trunk measurement, facility loss is determined by adding the measured loss on the **MAAP** display to the OTL conversion factor listed in Table BC plus the CO gain.

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An example of computing facility loss is to add the following:

- 1. The measured loss on the MAAP display.
- 2. Table BC OTL listing.
- 3. CO gain (determined from far end switch) which is the location of the far end.

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PROC 647 — MEASUREMENT CONVERSION FACTORS									
			N	EASUREMENT TY	'PE				
SYSTEM TYPE	TEST CIRCUIT CONNECTED	TRUNK TYPE	LOSS	NOISE	RETURN LOSS				
SYSTEM 85 R2L2 (NEAR END)	ADFTC OTL (SN-261)	CO F-N CO N-F TT F-N TT N-F D F-N D N-F	$\begin{array}{r} - \ 0.125 \\ - \ 0.125 \\ - \ 1.875 \\ - \ 1.875 \\ - \ 6.0 \\ 0 \end{array}$	$\begin{array}{c} 0 \\ + \ 0.125 \\ 0 \\ + \ 1.875 \\ 0 \\ + \ 6.0 \end{array}$	$\begin{array}{c} 0 \\ - \ 0.25 \\ 0 \\ - \ 3.75 \\ 0 \\ - \ 6.0 \end{array}$				
"DIMENSION" (FAR END)	ANY TTL (ZLC-12) (56A) (LC-145)	CO F-N CO N-F TT F-N TT N-F D F-N D N-F	- 0.3 - 0.3 - 2.3 - 2.3 - 2.3 - 2.3 - 2.3	$+ 0.3 \\ 0 \\ + 2.3 \\ 0 \\ + 2.3 \\ 0 \\ - 2.$	$ \begin{array}{r} - 0.6 \\ 0 \\ - 4.6 \\ 0 \\ - 4.6 \\ 0 \end{array} $				
SYSTEM 85 R2L2 (FAR END)	ADFTC TTL (SN-261)	CO F-N CO N-F TT F-N TT N-F D F-N D N-F	$\begin{array}{r} - 0.125 \\ - 0.125 \\ - 1.875 \\ - 1.875 \\ 0 \\ - 6.0 \end{array}$	$\begin{array}{r} + \ 0.125 \\ 0 \\ + \ 1.875 \\ 0 \\ + \ 6.0 \\ 0 \end{array}$	$\begin{array}{c} - 0.25 \\ 0 \\ - 3.75 \\ 0 \\ - 6.0 \\ 0 \end{array}$				
SYSTEM 85 (FAR END)	FTC TTL (SN-260)	CO F-N CO N-F TT F-N TT N-F D F-N D N-F	$\begin{array}{r} - \ 0.125 \\ - \ 0.125 \\ - \ 1.875 \\ - \ 1.875 \\ 0 \\ - \ 6.0 \end{array}$	NA 0 NA 0 NA 0	NA 0 NA 0 NA 0				
Abbreviations: CO - Analog central office trunk circuit pack D - DS-1 interface circuit pack F-N - Far-to-near end measurement for loss where OTL end (MAAP display) is the near-end									

TABLE BC.

- Far end measurement for noise and return loss where OTL end (MAAP display) is the near-end

N-F - Near-to-far end measurement for loss where OTL end (MAAP display) is the near-end OR

- Near end measurement for noise and return loss where OTL end (MAAP display) is the near-end

NA - Not applicable

OTL - Originating test line

- TT Analog tie trunk circuit pack
- TTL Terminating test line

PROC 650 - DCIU TESTS

F	LIPCHART SSUE 1	+	+	DCI	J TESTS	+	+		
N0 1. 2. 3. 4. 5.	TES: DATA LINK MUST BE MAI BUSY-OUT AND RELEASE DATA LINKS IN TEST 3 ONLY INTERNAL OCUL L OFF-LINE COMMON CONT PROPER INTERNAL OCUL UNASSIGMED DATA LINK FAILURE RATE (FIELD BITS SENT (J.E. PER RESULTS ARE NOT CONC.	INTENANCE BUS BUSY-OUT NOT OOPBACK TEST ROL. LOOPBACK TEST MAY REQUIRE (3, TEST 3) (5 100 IN FIELD LUSIVE IF FII	IEO TO RUN TEST : VALID FOR UNITAN ING IS ALLOWED ON STING FOR AN ON-LI A LOOP-AROUND CO HOULD BE LESS THAN 14). IF FIELD 14 ELD 13 LESS THAN	3. ISLATED THE INE INECTOR. NN 1 PER 100,000 LESS THAN 1000, 10.	DATA LINK LOOPBACK ALARM STA	(FIELD 6): 1-8 TYPE (FIELD 7): D=INTERNAL MANNAL 1=EXTERNAL MANNAL 2=EXTERNAL AUTOMATIC TUS (FIELD 8): 1=MAJOR 2=MINOR 3=WARNING 4=ERNORS RECORDED 5=ALARM RESOLVED	DCIU STATUS (FI 0-00 1-0F 2=0N 3=0F DATA LINK STATU 0=1 1=1 2=L	ELD 9): ILINE AN FLINE AN FLINE AN FLINE AN S (FIELC IRANSLAT INTRANSL	D OPERATIONAL NO OPERATIONAL D OUT OF SERVICE NO OUT OF SERVICE D 10): ED AND DERATIONAL ED AND BUSIED OUT ATED
WORD 0		I I_1		1.1.4.1	11	<u> </u>			COMMON CONTROL PERIPHERALS 650

FL IS	LPCHART SUE 1			+			+			DC	IU TESTS	3		+		+			
TEST 1: DISPLAYS FAILURE HISTORY, USE 'NEXT CIRCUIT' TO DISPLAY NEXT FAILING CIRCUIT (TEST 1). USE 'NEXT FAILT' TO DISPLAY NEXT FAILING CIRCUIT (TEST 1). USE 'NEXT FAILT' TO DISPLAY NEXT FAILING CIRCUIT (TEST 1). USE 'NEXT FAILT' TO DISPLAY NEXT FAILT CODE (TEST 2). USE 'NEXT CIRCUIT' TO DISPLAY MEXT FAULT CODE (TEST 2). USE 'NEXT CIRCUIT' TO DISPLAY MEXT FAULT CODE (TEST 2). USE 'NEXT CIRCUIT' TO DISPLAY SECONDARY AND TERTIARY INDICTMENTS (TEST 2). VERIFICATION TEST. USE 'BUSYOUT' OR 'RELEASE BUSYOUT' TO CHANGE DATA LINK STATUS (TEST 2). USE 'BUSYOUT' OR 'RELEASE BUSYOUT' TO CHANGE DATA LINK STATUS (TEST 3). TEST 3: DCIU DATA LINK LOOP AROUND TEST.								2). 1).	SPECIJ 80-BU 81-SE 82-SE 83-SE 83-SE 83-SE 83-SE 85-DC 85-DC 85-CO 85-CO 87-RE LI	AL ERRO SY OUT E NOTE E NOTE ALARMS IU REIN JLD NOT STORE M NKS FAI	R COD KEY P 1 2 3 PRES IT FA COMM AINTEI LED	ES: RESSED ONCE ENT ILED UNICATE WITH DÇIU NANCE BUSY DATA							
TEST NO	EQ MODULE	CABINET	CARRIER	SLOT	TEST 3 DATA LINK 6	LODPBACK EL	ALARM STATUS	DCIU STATUS	DATA LINK	FAILURE INDEX	FAULT CODE	TEST 3 FAILURES PER 1000 BITS 1 13	TE THOU: BIT:	SAND OF S SENT					COMMON CONTROL PERIPHERALS 650

Purpose

PROC 650 is used when referenced from **PROC 600** (Alarm causes/error log) or when the **APPL PROCR AP INTER** and **MAJOR**, **MINOR**, or **WARNING** fault indicators on the alarm panel are lighted.

PROC 650 is used to:

- 1. Display the failure history for the DCIU.
- 2. Allow manual resolving of the alarms activated because of a DCIU failure (which turns off the APPL PROCR AP INTER fault indicator).

Note: DCIU alarmed circuit entries in PMIDS are marked as resolved.

3. Perform a DCIU circuit pack verification test, testing all circuits once and displaying the test results.

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- 4. Detect failures in the DCIU link to the Applications Processor (AP) and isolate the failure to the DCIU or to the interface between the DCIU and the AP by performing internal and external loopback tests.
- 5. Automatically turn off the APPL PROCR AP INTER fault indicator when all circuits that caused an alarm are tested as good.

Note: DCIU alarmed circuit entries in PMIDS are marked as resolved.

When performing an external manual looparound test, maintenance personnel **must** be at the customer's premises to further isolate failures associated with the data link between the DCIU and the AP.

Requirement: During external manual looparound testing, the data set must be set in Analog Loopback (AL), local loopback, or an RS449 looparound plug (female connector) **must** be connected to the back of the common control cabinet in order to determine if the DCIU or the interface to the AP is failing.

Field Definitions and Codes

Each field of **PROC 650** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BD, PROC 650 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Field 6 Select specific data link (1 through 8) to be tested (Test 3 only).
- 3. Field 7 Select type of loopback test to be performed (Test 3 only).

Test Equipment Required

An RS449 looparound plug (female connector) is required to perform the manual external looparound test in Test 3.

The looparound test determines if an interface problem exists between the AP or data set which interfaces with the DCIU.

Operation of Procedure

Overview

PROC 650 is used to determine the cause of the **APPL PROCR AP INTER** fault indicator being lighted resulting from a DCIU failure.

To call in **PROC 650**, perform the following:

- 1. Depress PROC NO; 650; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, Field 9 indicates the status of the DCIU and all other fields are dashed.

3. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test,

PROC 650 Test 1

Three tests are available:

- 1. Test 1 Displays DCIU failure history.
- 2. Test 2 Performs a verification test on all DCIU circuit packs.
- 3. Test 3 Performs a DCIU data link looparound test.

TABLE BD.

PROC 650 FIELD DEFINITIONS AND CODES									
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION				
1	1-3	Test number.	9	0-3	DCIU status.				
2-6		Equipment location		0	On-line and operational.				
2	0-99	Module number.		1	Off-line and operational.				
3	0-7	Cabinet number.		2	On-line and out of service.				
4	0-3	Carrier number.		3	Off-line and out of service.				
5	16-18	Slot number.	10	0-2	Data link status.				
6	1-8	Data link number.		0	Translated and operational.				
7	0-2	Loopback test type.		1	Translated and busied out.				
	0	Internal loopback.		2	Not translated.				
	1	External manual loopback.	11	0-15	Failure index.				
	2	External automatic loopback.		0-6	Index into PMIDS failures				
8	1-5	Alarm status.			(Test 1 only).				
	1	Major.		0-15	Index into DMIDS failures (Test 2 only).				
	2	Minor.	12	0-99	Fault code.				
	3	Warning.	13	0-99	Number of frames with				
	4	Errors recorded.			Tallures (1000 bits per frame).				
	5	Alarm resolved.	14	0- 9999	Thousands of loopback test bits sent.				

Test 1

Test 1 displays failure history, in order of alarm severity, of the DCIU failures recorded by periodic on-line software. The failure history includes equipment location, alarm status, DCIU status and fault code information for each recorded failure.

Test 1 is also used to manually turn off the APPL PROCR AP INTER fault indicator when all alarmed failures are resolved.

1. Test 1 is the default test when entering **PROC 650**, or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

- 2. Upon initial entry to Test 1, Field 1 displays a 1, Field 9 displays the DCIU status and all other fields are dashed.
- 3. To start Test 1, depress **EXECUTE**.
- 4. If no DCIU failures exist, Field 11 (failure index) displays a 0.
- 5. If any DCIU failures exist, the first failure is displayed as follows:

Field 1 - 1.

Field 2 - Module number of displayed failure.

Field 3 - Cabinet number of displayed failure.

Field 4 - Carrier number of displayed failure.

Field 5 - Dashed or slot number of displayed failure.

Field 6 - Dashed or data link number of displayed failure.

Note: Fields 5 and 6 are dashed if a specific DCIU circuit pack or data link cannot be identified for the fault code displayed in Field 12.

Field 7 - Dashed.

Field 8 - Alarm status (1 = major, 2 = minor, 3 = warning, or 4 = errors recorded) of displayed failure.

Field 9 - DCIU status.

Field 10 - Dashed.

Field 11 - Failure index (total number of DCIU failing circuits; maximum of 6).

Field 12 - Fault code associated with the displayed failure.

Fields 13 and 14 - Dashed.

6. Depressing **NEXT CIRCUIT** repeatedly displays the remaining failures. Field 11 (failure index) is decremented each time **NEXT CIRCUIT** is depressed.

When all failures are displayed, depressing **NEXT CIRCUIT** once more dashes all fields except Fields 1 and 9.

Depressing **NEXT CIRCUIT** again causes the first failure to be displayed.

7. The **CLEAR DATA**, **EXECUTE** sequence can be used to manually resolve individual DCIU failures or all DCIU failures after **EXECUTE** is used to initiate Test 1.

The failures that are resolved are those failures with an alarm status of 1, 2, or 3 displayed in Field 8.

8. To resolve individual DCIU failures with an alarm status of 1, 2, or 3, perform the following:

Use **NEXT CIRCUIT** to display the failing circuit with an alarm status of 1, 2, or 3 on the **MAAP**.

Requirement: Individual DCIU failures cannot be resolved unless the failing circuit is displayed on the **MAAP**.

PROC 650 Test 1 and Test 2

Depress CLEAR DATA; EXECUTE.

9. Field 8 (alarm status) displays a 5 indicating that the failing circuit is resolved.

The APPL PROCR AP INTER fault indicator is turned off if no other DCIU failures exist.

- 10. If the **CLEAR DATA**; **EXECUTE** sequence is performed when Field 1 displays a 1 and Field 9 displays the DCIU status with all other fields dashed (initial display), all DCIU failures with an alarm status of 1, 2, or 3 are resolved and the **APPL PROCR AP INTER** fault indicator is turned off.
- 11. All DCIU failures with an alarm status of 1, 2, or 3 can be resolved upon entry to **PROC 650** Test 1, and after displaying and recording all DCIU failures and then using **NEXT CIRCUIT** to display a 1 in Field 1, the DCIU status in Field 9 and all other fields dashed (initial display).

Caution: The DCIU failures should be displayed and recorded in order that a record of the equipment location and fault code of each failure is available for maintenance personnel prior to manually resolving alarmed entries.

12. After initial entry to Test 1 and depressing EXECUTE, depress CLEAR DATA; EXECUTE.

All DCIU failures with an alarm status of 1, 2, or 3 are marked as resolved in PMIDS and the **APPL PROCR AP INTER** fault indicator is turned off.

13. After displaying and recording all DCIU failures, depress **NEXT CIRCUIT** until the initial display (Field 1 = 1, Field 9 = DCIU status, with all other fields dashed) is displayed, then depress **CLEAR DATA; EXECUTE**.

All DCIU failures with an alarm status of 1, 2, or 3 are marked as resolved in PMIDS and the **APPL PROCR AP INTER** is turned off.

14. The MAJOR, MINOR, or WARNING alarm indicator is also turned off if no other sources are affecting the alarm indicator.

Test 2

Test 2 is used to test the entire DCIU. Test 2 performs the following:

- 1. Displays the current status of the DCIU.
- 2. Reads the Get-Off-The-Bus (GOTB) register to determine if the DCIU is operational or shutdown, and whether the RAM status is valid.

If RAM status is valid, reads RAM status words and stores any failures (as indicated by DCIU hardware) in DMIDS.

If RAM status is not valid, reads maintenance status register and stores circuit pack indictments in DMIDS.

- 3. Checks counters and mailbox entries for threshold failures recorded by hardware.
- 4. Performs an ID chip function test on each circuit pack.
- 5. Tests the parity checker/generator function.
- 6. Controls circuit pack LEDs for pass/fail indication.

Test 2 provides visual feedback to maintenance personnel on whether a problem is corrected by the use of RED and GREEN LEDs on the faceplate of the circuit pack that is reseated or replaced.

Test 2 provides alternate circuit pack replacements (if any) when the first circuit pack replaced does not correct the problem.

Test 2 allows for demand re-initialization of the DCIU (when required) by use of **BUSY OUT** and **RELEASE BUSY OUT**

Test 2 automatically turns off the APPL PROCR AP INTER fault indicator when all circuits that raised an alarm pass Test 2.

1. Test 2 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

- 2. Upon initial entry to Test 2, Field 1 displays a 2, Field 9 displays the DCIU status and all other fields are dashed.
- 3. To start Test 2, depress EXECUTE.

The WAIT lamp on the MAAP is turned on while Test 2 is running.

- 4. When Test 2 is completed, the WAIT lamp is turned off.
- 5. If no failures are detected, Field 1 displays a 2, Field 8 (alarm status) displays a 5 if alarmed entries existed in PMIDS indicating the alarm entries are resolved, or a dash if there were no alarmed entries and Field 11 (failure index) displays a 0.

Note: The GREEN LEDs on TN406, TN405, and UN156 are turned on when no failures exist.

6. If any failures are detected, the first failure is displayed as follows:

Field 1 - 2.

Fields 2 through 6 - Equipment location of failed circuit.

Note: Fields 5 and/or 6 are dashed if a specific DCIU circuit pack or data link cannot be identified for the fault code displayed in Field 12.

Fields 7 and 8 - Dashed.

Field 9 - DCIU status.

Field 10 - Dashed or 0 through 2 (data link status).

Note: Field 10 (data link status) is dashed if Field 6 (data link) is dashed.

Field 11 - Failure index (total number of failures recorded in DMIDS).

Field 12 - Fault code associated with the failed circuit.

Fields 13 and 14 - Dashed.

Note: The **RED** LED is lighted on the circuit pack to indicate to maintenance personnel that the circuit pack failed Test 2.

7. Depressing **NEXT CIRCUIT** displays an alternate circuit pack (if any) to be replaced.

The **RED** LED on the original circuit pack is turned off and the **RED** LED on the displayed circuit pack in Fields 2 through 6 is turned on.

8. Depressing **NEXT CIRCUIT** again displays the last alternate circuit pack (if any) to be replaced.

The **RED** LED on the first alternate circuit pack is turned off and the **RED** LED on the displayed circuit pack in Fields 2 through 6 is turned on.

9. When all alternate circuit packs are displayed, depressing **NEXT CIRCUIT** once more dashes Fields 2 through 6.

Depressing **NEXT CIRCUIT** again displays the first circuit pack in the replacement sequence.

10. Depressing **NEXT FAULT** repeatedly displays the remaining failures. Field 11 (failure index) is decremented each time **NEXT FAULT** is depressed.

When all failures are displayed, depressing **NEXT FAULT** again dashes all fields except Fields 1 and 9.

Depressing NEXT FAULT once more displays the first failure again.

11. The **APPL PROCR AP INTER** fault indicator is automatically turned off when Test 2 completes with no failures detected for all DCIU circuits that raised an alarm.

Note: DCIU alarmed circuit entries in PMIDS are marked as resolved.

12. The **MAJOR**, **MINOR**, or **WARNING** alarm indicator is also turned off if no other sources are affecting the major, minor, or warning alarm indicator.

When required, a demand re-initialization of the DCIU can be performed by use of **BUSY OUT** and **RELEASE BUSY OUT**.

Re-initialization of the DCIU is performed as follows:

- 1. Enter PROC 650 Test 2, and depress EXECUTE.
- 2. Depress BUSY OUT.
- 3. When special error code 80 (busy out key pressed once) is displayed in the **MAAP** error code field, depress **BUSY OUT** again.

Requirement: BUSY OUT must be depressed twice to re-initialize the DCIU. Special error code 80 must be displayed in the **MAAP** error code field before **BUSY OUT** is depressed the second time.

Field 9 (DCIU status) changes to 2 (on-line and out-of-service) when **BUSY OUT** is depressed the second time.

4. Depress RLS BUSY OUT

Field 9 (DCIU status) changes to 0 (on-line and operational) when RLS BUSY OUT is depressed.

- 5. If special error code 85 (DCIU reinit failed) is displayed in the MAAP error code field, demand re-initialization of the DCIU failed.
- 6. If special error code 87 (restore maintenance busy; data links failed) is displayed in the MAAP error code field, depress **BUSY OUT** to place the DCIU in maintenance busy status.

Perform Test 3 to determine the reason for the data link failures.

Test 3

Test 3 is used to test a data link continuously.

Test 3 executes three types of looparound testing and allows for busying out individual data links.

- 1. Internal looparound testing is performed to test the data link interface hardware (UN156 circuit pack).
- 2. External looparound testing is performed to test the data link cabling between the backplane and the connector; and between the connector and the data set.

The three types of looparound testing are:

- 1. Internal: for either an on-line or off-line DCIU data link loops the test vector defined by the DCIU firmware at the High Level Data Link (HDLC) interface.
- 2. External manual: for an on-line DCIU data link loops the test vector defined by the DCIU firmware at an external looparound such as a local area data set AL key operation, external looparound plug, etc.
- 3. External automatic: for an on-line DCIU data link loops the test vector defined by the DCIU firmware at an external looparound activated by the RS449 EIA loopback signal.

Note: External automatic looparound testing cannot currently be performed. An RS449 compatible data set must be used in order for external automatic looparound testing to work correctly. At present compatible RS449 data sets are not available.

Maintenance personnel **must** be on the customer's premises to perform the external manual looparound test. Equipment must be disconnected and a looparound adapter installed, or the AL key on the data set depressed.

The external manual looparound test is described in the Repair Guide part of PROC 650.

Test 3 monitors the looparound testing at a rate of about 10,000 bits sent per 90 seconds. At least 100,000 bits, requiring 15 minutes should be monitored without error prioring to halting Test 3.

1. Test 3 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 3; ENTER.

- 2. Upon initial entry to Test 3, Field 1 displays a 3, Fields 2 through 6 display the default data link, Field 7 displays a 0 (default loopback test type), Field 9 displays the DCIU status, Field 10 displays the data link status and all other fields are dashed.
- 3. To test the default data link, proceed to Step 5.
- 4. To select another data link to be tested, depress **NEXT CIRCUIT** until the data link to be tested is displayed in Field 6.

Proceed to Step 5.

Note: Depressing NEXT CIRCUIT cycles Field 6 from 1 through 8 and back to 1.

5. Prior to starting Test 3, it must be determined which type of loopback test is to be performed.

The loopback field defaults to 0 which indicates that an internal loopback test is performed without further input by maintenance personnel.

Note: An internal loopback test is used to test the UN156 circuit pack. An external loopback test is used to test the data link cabling.

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6. The internal loopback test should be performed first, and if required, the external loopback test(s) should be performed when it is necessary to further isolate a problem with the HDLC.

Note: Only an internal loopback test can be performed on the off-line DCIU data link.

7. When compatible RS449 data sets are available, the external automatic loopback test is performed without connecting any equipment by setting Field 7 to 2 as follows:

CHANGE FIELD; 7; ENTER; 2; ENTER.

Note: At present compatible RS449 data sets are not available and the external automatic loopback test cannot be performed.

Proceed to Step 9.

8. The external manual loopback test assists in isolating a problem between the DCIU and the AP.

The external manual loopback test requires that the loop be closed manually.

The external manual loopback test must be performed when maintenance personnel are on the customer's premises as equipment must be disconnected and a looparound adapter installed or the AL key depressed.

The external manual loopback test is described in the Repair Guide part of PROC 650.

9. Prior to starting Test 3, the data link must be busied out or untranslated.

Check the data link status displayed in Field 10.

10. If the data link is busied out (1 displayed in Field 10), proceed to Step 13.

If the data link is untranslated (2 displayed in Field 12), proceed to Step 13.

11. If the data link is translated and operational (0 displayed in Field 10), depress BUSY OUT.

Note: Special error code 82 (See Note 2) indicating that BUSY OUT is not valid for untranslated data links may be displayed in the MAAP error code field.

12. When special error code 80 (busy out key pressed once) is displayed in the MAAP error code field, depress **BUSY OUT** again.

Requirement: BUSY OUT must be depressed twice to perform looparound testing. Special error code 80 must be displayed in the MAAP error code field before BUSY OUT is depressed the second time.

Proceed to Step 13.

13. To start Test 3 after selecting the data link to be tested and the type of loopback, depress **EXECUTE**.

The WAIT indicator is not turned on during Test 3 execution.

14. The following special error codes may be displayed in the MAAP error code field when **EXECUTE** is depressed.

Special error code 81 (See Note 1) indicates that the data link must be busied out prior to performing Test 3.

Special error code 83 (See Note 3) indicates that only internal loopback testing of the data link is allowed on the off-line side of the common control.
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15. During execution of Test 3, the following fields are displayed:

Field 1 - 3.

Fields 2 through 6 - Equipment location of data link being tested.

Field 7 - 0, 1, or 2 (Type of loopback test).

Field 8 - Dashed.

Field 9 - DCIU status.

Field 10 - Data link status (1 = Translated and busied out, 2 = Untranslated).

Fields 11 and 12 - Dashed.

Field 13 - 0 through 99 (Number of frames with failures, 1000 bits per frame).

Field 14 - 1 through 9999 (Thousands of bits sent).

16. During execution of Test 3, the following fields are updated after every 2000 (2 frames) bits are sent:

Field 13 - Number of frames with failures, 1000 bits per frame (if any).

Field 14 - Thousands of bits sent.

Note: Test 3 monitors loopback testing at a rate of about 10,000 bits sent per 90 seconds. (Multiples of 10 displayed in Field 14.)

17. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.

The testing time required to determine if the data link is functioning properly is approximately 15 minutes. (At least 100,000 bits sent.)

It is recommended that 1 million bits (approximately 2 and 1/2 hours) be monitored when performing Test 3 in the off-line common control.

Note: Failure rate (Field 13) should be less than 1 per 100,000 bits sent (i.e., 100 displayed in Field 14). If Field 14 is less than 1000, results are not conclusive if Field 13 is less than 10.

- 18. If no failures occur after 10,000 bits are sent (10 displayed in Field 14), the GREEN LED on UN156 is turned on. As soon as a failure is detected (before or after 10,000 bits are sent) the RED LED on UN156 is turned on and the GREEN LED (if lighted) is turned off.
- 19. When Test 3 is stopped, the results of the loopback test is displayed in Fields 13 and 14 and the **RED** or **GREEN** LED is lighted on UN156.

If the failure rate displayed in Field 13 is more than 1 per 100,000 bits sent (i.e., 100 displayed in Field 14), the data link failed the loopback test.

If the **RED** LED on UN156 is lighted, at least 1 failure occurred. If the threshold is not exceeded (indicated by Fields 13 and 14), Test 3 passed. If the threshold is exceeded, Test 3 failed.

20. When Test 3 is completed for the data link being tested, the data link should be released from busy. To release busy the data link, perform the following:

Depress RLS BUSY OUT

Note: Special error code 82 (See Note 2) indicating that **RLS BUSY OUT** is not valid for untranslated data links may be displayed in the **MAAP** error code field. Untranslated data links cannot be released from busy.

21. If special error code 87 (restore maintenance busy; data links failed) is displayed in the MAAP error code field, depress BUSY OUT to place the DCIU in maintenance busy status.

Perform corrective action as required to restore the failed data links.

22. When another data link is to be continuously tested, the CHANGE FIELD sequence must be used to select the data link:

CHANGE FIELD; 6; ENTER; (Data link 1 through 8); ENTER.

23. Repeat Steps 5 through 21 to test the new data link.

Repair Guide

When the APPL PROCR AP INTER and MAJOR, MINOR, or WARNING fault indicators on the alarm panel are lighted (indicating a DCIU failure) or when PROC 650 is referenced from PROC 600 (Alarm causes/error log) as a potential problem, the following steps should be performed, in the order listed, to isolate and repair the faulty unit.

General

1. Execute Test 1.

Step through the failure history and record the equipment location and fault codes associated with each failure.

Note: Fields 5 and 6 are dashed if a specific DCIU circuit pack or data link cannot be identified for the fault code displayed in Field 12.

2. Execute Test 2.

If all circuits pass Test 2, the APPL PROCR AP INTER fault indicator is turned off.

Note: The GREEN LED on each DCIU circuit pack (TN406, TN405, and UN156) are turned on when no failures exist.

- 3. If all circuits pass Test 2, perform **Looparound Testing** (below) for those failures recorded in Test 1 with a fault code of 6, or 31 through 34 and an alarm status of major, minor, or warning (1, 2, or 3) to ensure that no intermittent problems exist with data links.
- 4. If any failures are detected in Test 2, display the failure on the MAAP.
- 5. Record the equipment location displayed in Fields 2 through 6 and the fault code displayed in Field 12 which is detected by the demand diagnostic test and logged in DMIDS.

Note: The **RED** LED is lighted on the circuit pack to indicate to maintenance personnel that the circuit pack failed Test 2.

6. Determine if fault code 20 through 35 is displayed in Field 12.

If fault code 20 through 35 is not displayed in Field 12, proceed to Step 7.

If fault code 20 through 35 is displayed in Field 12, repeat Test 2.

Note: Fault codes 20 through 35 may not be solid failures because the accumulated count needs to be cleared.

If fault code 20 through 25 is still displayed in Field 12 after repeating Test 2, proceed to Step 7.

7. At the equipment location displayed in Fields 2 through 5, replace the circuit pack with the **RED** LED lighted.

Caution: Reseating or replacing TN406 without use of the GO/HALT switch causes a partial reload. Replace TN406 in the common control carrier as detailed in SWITCH COMPONENT REPLACEMENT - CIRCUIT PACK REPLACEMENTS.

8. Repeat Test 2.

If Test 2 passes, the APPL PROCR AP INTER fault indicator is turned off.

Note: DCIU alarmed circuit entries in PMIDS are marked as resolved.

Perform **Demand Re-initialization** (below), if required.

9. If Test 2 fails, step through the failures to determine if the same failure exists.

If different failures exist, proceed to Step 21.

10. If the same failure exists, display the failure on the MAAP.

Depress NEXT CIRCUIT to determine if an alternate circuit pack replacement is available.

If all fields except Fields 1 and 9 are dashed, no alternate circuit pack is available for replacement.

Proceed to Step 20.

11. If an alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 2 through 5.

Record the equipment location displayed in Fields 2 through 6 and the fault code displayed in Field 12 which is detected by the demand diagnostic test and logged in DMIDS.

The **RED** LED on the original circuit pack is turned off, and the **RED** LED on the alternate circuit pack is turned on.

12. At the equipment location displayed in Fields 2 through 5, replace the alternate circuit pack.

Caution: Reseating or replacing TN406 without use of the GO/HALT switch causes a partial reload. Replace TN406 in the common control carrier as detailed in SWITCH COMPONENT REPLACEMENT - CIRCUIT PACK REPLACEMENTS.

13. Repeat Test 2.

If Test 2 passes, the APPL PROCR AP INTER fault indicator is turned off.

Note: DCIU alarmed circuit entries in PMIDS are marked as resolved.

PROC 650

Perform Demand Re-initialization (below), if required.

- If Test 2 fails, step through the failures to determine if the same failure exists. If different failures exist, proceed to Step 21.
- 15. If the same failure exists, display the failure on the MAAP.

Depress **NEXT CIRCUIT** to determine if another alternate circuit pack replacement is available.

If all fields except Fields 1 and 9 are dashed, no alternate circuit pack is available for replacement.

Proceed to Step 20.

16. If another alternate circuit pack exists, the equipment location of the circuit pack is displayed in Fields 2 through 5.

Record the equipment location displayed in Fields 2 through 6 and the fault code displayed in Field 12 which is detected by the demand diagnostic test and logged in DMIDS.

The **RED** LED on the first alternate circuit pack is turned off, and the **RED** LED on the second alternate circuit pack is turned on.

17. At the equipment location displayed in Fields 2 through 5, replace the second alternate circuit pack.

Caution: Reseating or replacing TN406 without use of the GO/HALT switch causes a partial reload. Replace TN406 in the common control carrier as detailed in SWITCH COMPONENT REPLACEMENT - CIRCUIT PACK REPLACEMENTS.

18. Repeat Test 2.

If Test 2 passes, the APPL PROCR AP INTER fault indicator is turned off.

Note: DCIU alarmed circuit entries in PMIDS are marked as resolved.

Perform **Demand Re-initialization** (below), if required.

19. If Test 2 fails, step through the failures to determine if the same failure exists.

If different failures exist, proceed to Step 21.

20. If the same failure exists, determine if fault codes 6, 15, or 31 through 35 were recorded.

If fault code 15 was recorded, perform **PROC 614** (Memory read/memory match tests) to isolate the cause of the problem.

If fault code 6, or 31 through 35 was recorded, perform Looparound Testing External Manual (below) to isolate the cause of the problem.

If fault codes 6, 15, or 31 through 35 were not recorded, refer to **Fault Codes** (below) for further isolation techniques.

21. If the same failure is not displayed, but Test 2 fails with other failures, repeat Steps 4 through 21 as appropriate.

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Demand Re-initialization

When required, a demand re-initialization of the DCIU can be performed by use of **BUSY OUT** and **RELEASE BUSY OUT**.

Re-initialization of the DCIU is performed as follows:

- 1. Enter **PROC 650** Test 2, and depress **EXECUTE**.
- 2. Depress BUSY OUT.
- 3. When special error code 80 (busy out key pressed once) is displayed in the **MAAP** error code field, depress **BUSY OUT** again.

Requirement: BUSY OUT must be depressed twice to re-initialize the DCIU. Special error code 80 must be displayed in the **MAAP** error code field before **BUSY OUT** is depressed the second time.

Field 9 (DCIU status) changes to 2 (on-line and out-of-service) when **BUSY OUT** is depressed the second time.

4. Depress RLS BUSY OUT

Field 9 (DCIU status) changes to 0 (on-line and operational) when RLS BUSY OUT is depressed.

- 5. If special error code 85 (DCIU reinit failed) is displayed in the MAAP error code field, demand re-initialization of the DCIU failed.
- If special error code 87 (restore maintenance busy; data links failed) is displayed in the MAAP error code field, depress BUSY OUT to place the DCIU in maintenance busy status.

Perform Looparound Testing (below) to determine the reason for the data link failures.

Looparound Testing

Overview

The three types of looparound testing are internal, external manual, and external automatic.

- 1. Internal looparound testing is performed to test the data link interface hardware (UN156 circuit pack).
- 2. External looparound testing is performed to test the data link cabling between the backplane and the connector; and between the connector and the data set.

Note: External automatic looparound testing cannot currently be performed. An RS449 compatible data set must be used in order for external automatic looparound testing to work correctly. At present compatible RS449 data sets are not available.

3. When failures are recorded in Test 1 but pass Test 2 without corrective action being taken (i.e., replacing a circuit pack) looparound testing should be performed on those failures with a fault code of 6, or 31 through 34 and an alarm status of major, minor, or warning.

The internal loopback test should be performed first, and if required, the external loopback test(s) should be performed when it is necessary to further isolate a problem with the HDLC.

4. Only an internal loopback test can be performed on the off-line DCIU data link.

PROC 650

Internal

Internal loopback testing of an on-line or off-line DCIU data link is performed as follows:

- 1. Enter Test 3 of PROC 650 and select the data link to be tested.
- 2. Busy out the data link to be tested.

Requirement: BUSY OUT must be depressed twice to perform looparound testing.

- 3. Internal loopback testing encode 0 is displayed by default in Field 7.
- 4. Depress EXECUTE.

The WAIT indicator is not turned on during Test 3 execution.

5. During execution of Test 3, the following fields are incremented:

Field 13 - Failures per thousands of bits sent.

Field 14 - Thousands of bits sent.

Note: Test 3 monitors loopback testing at a rate of about 10,000 bits sent per 90 seconds. (Multiples of 10 displayed in Field 14.)

6. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.

The testing time required to determine if the data link is functioning properly is approximately 15 minutes. (At least 100,000 bits sent.)

It is recommended that 1 million bits (approximately 2 and 1/2 hours) be monitored when performing Test 3 in the off-line common control.

- 7. If no failures occur after 10,000 bits are sent (10 displayed in Field 14), the GREEN LED on UN156 is turned on. As soon as a failure is detected (before or after 10,000 bits are sent) the RED LED on UN156 is turned on and the GREEN LED (if lighted) is turned off.
- 8. When Test 3 is stopped, the results of the loopback test is displayed in Fields 13 and 14.

The LED on UN156 is off if 10,000 bits were not sent or the **RED** or **GREEN** LED is lighted on UN156.

- 9. If the failure rate displayed in Field 13 is more than 1 per 100,000 bits sent (i.e., 100 displayed in Field 14), the data link failed the loopback test.
- 10. If the **RED** LED on UN156 is lighted at least 1 failure occurred. If the threshold is not exceeded (indicated by Fields 13 and 14), Test 3 passed. If the threshold is exceeded, Test 3 failed.

Note: Failure rate (Field 13) should be less than 1 per 100,000 bits sent (i.e., 100 displayed in Field 14). If Field 14 is less than 1000, results are not conclusive if Field 13 is less than 10.

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11. If Test 3 passes and a data link problem is still suspected, perform **External Manual** Looparound Testing (below) to isolate the trouble.

If Test 3 passes, and no data link problem is suspected, repeat Test 2 to resolve the alarm cause and turn off the **APPL PROCR AP INTER** fault indicator.

12. If Test 3 fails, replace UN156.

Repeat Test 3.

- 13. If Test 3 passes, repeat Test 2 to resolve the alarm cause and turn off the APPL PROCR AP INTER fault indicator.
- 14. If Test 3 fails again, and a data link problem is still suspected perform external manual **Looparound Testing** (below) to isolate the trouble.

If Test 3 fails again, and a data link problem is not suspected refer to Fault Codes (below) for further isolation techniques.

15. When Test 3 is completed for the data link being tested, release the data link from busy out.

External Manual

Performing the external manual loopback test to isolate an interface problem between the DCIU and the AP results in message handling being suspended for the data link being tested.

External manual loopback test is initiated with the AL key (or local loopback button) on a data set, or connecting an RS449 looparound plug to the back of the common control. Both methods are presented below.

External manual loopback testing of an on-line only DCIU data link is performed as follows:

- 1. Enter Test 3 of PROC 650 and select the data link to be tested.
- 2. Busy out the data link to be tested.

Requirement: BUSY OUT must be depressed twice to perform looparound testing.

3. Determine if a data set is the interface between the AP and the DCIU data link.

If a data set is the interface, proceed to Step 4.

If a data set is not the interface, proceed to Step 5.

4. Depress the AL key (or local loopback button) on the data set.

When AL is depressed, the MB, TR, MR, and TM LEDs on the data set are turned on.

The TR LED indicates that the data set detects the terminal ready signal from the switch.

Proceed to Step 7.

5. At the rear of the common control cabinet, disconnect the cable from the common control connector (F^*) corresponding to the UN156 slot and data link that is failing.

Cable designations are: F0 through F7 = Data link 1 through 8; i.e., F3 = Data link 4.

- 6. Connect the RS449 looparound plug to the F* connector corresponding to the UN156 slot and data link that is failing and proceed to Step 7.
- 7. The external manual loopback test is performed by setting Field 7 to 1 as follows:

CHANGE FIELD; 7; ENTER; 1; ENTER.

8. Depress **EXECUTE**.

The WAIT indicator is not turned on during Test 3 execution.

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9. During execution of Test 3, the following fields are incremented:

Field 13 - Failures per thousands of bits sent.

Field 14 - Thousands of bits sent.

Note: Test 3 monitors loopback testing at a rate of about 10,000 bits sent per 90 seconds. (Multiples of 10 displayed in Field 14.)

10. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.

The testing time required to determine if the data link is functioning properly is approximately 15 minutes. (At least 100,000 bits sent.)

- 11. If no failures occur after 10,000 bits are sent (10 displayed in Field 14), the GREEN LED on UN156 is turned on. As soon as a failure is detected (before or after 10,000 bits are sent) the RED LED on UN156 is turned on and the GREEN LED (if lighted) is turned off.
- 12. When Test 3 is stopped, the results of the loopback test is displayed in Fields 13 and 14, and the **RED** or **GREEN** LED is lighted on UN156.

If the failure rate displayed in Field 13 is more than 1 per 100,000 bits sent (i.e., 100 displayed in Field 14), the data link failed the loopback test.

If the **RED** LED on UN156 is lighted at least 1 failure occurred. If the threshold is not exceeded (indicated by Fields 13 and 14), Test 3 passed. If the threshold is exceeded, Test 3 failed.

Note: Failure rate (Field 13) should be less than 1 per 100,000 bits sent (i.e., 100 displayed in Field 14). If Field 14 is less than 1000, results are not conclusive if Field 13 is less than 10.

13. If Test 3 passes, determine which method of external manual looparound testing was performed.

If the **AL** key (or local loopback button) was depressed, repeat Test 2 to resolve the alarm cause and turn off the **APPL PROCR AP INTER** fault indicator.

If an RS449 looparound plug was used, refer the data set problem to the appropriate personnel.

14. If Test 3 fails, determine which method of external manual looparound testing was performed.

If the AL key (or local loopback button) was depressed, repeat Steps 5 through 12 using an RS449 looparound plug and proceed to Step 15.

If an RS449 looparound plug was used, refer to Fault Codes (below) for further isolation techniques.

15. If Test 3 now passes using the RS449 looparound plug, refer the data set problem to the appropriate personnel.

If Test 3 fails again, refer to Fault Codes (below) for further isolation techniques.

- 16. Release the AL key (or local loopback button) or connect the cable to the connector on the back of the common control carrier as appropriate.
- 17. When Test 3 is completed for the data link being tested, release the data link from busy out.

Fault Codes

Further isolation of a DCIU failure may be accomplished by analyzing the fault codes recorded from Test 1 (PMIDS) and Test 2 (DMIDS).

- 1. Determine from Table BE, PROC 650 Fault Code Definitions, if any additional corrective action can be performed (i.e., cabling, connectors, etc.).
- 2. Check the wiring associated with the circuit pack(s) replaced (point to point depending upon specific fault code recorded).

TABLE BE.

	PROC 650 FAULT CODE DEFINITIONS										
FAULT CODE	скт і	СКТ 2	СКТ 3	DEFINITION	ALARM TYPE						
1	TN406	TN405		Shutdown bit detected maintenance register	MAJOR						
2	TN406			RED LED on TN406 maintenance register	MAJOR						
3	TN405	TN406	UN156	TN405 unhealthy maintenance register	MAJOR						
4	UN156	TN406	TN405	UN156 unhealthy maintenance register	MAJOR						
5	TN406			No failures in maintenance register but status control RAM not good	MAJOR						
6	DL [1]	UN156		Status control RAM indicts assigned DL	MAJOR						
7	UN156	LB [2]		Status control RAM indicts unassigned DL	WARN						
8.	TN406			Status control RAM indicts 8086, DPROM, memory mapper, or firmware	MAJOR						
9	TN405	TN406	LB [2]	Status control RAM indicts local RAM	MAJOR						
10	TN406			Status control RAM indicts 501CC interface	MAJOR						
11	TN405	TN406	UN156	Status control RAM indicts DCIU I/O	MAJOR						
12	TN406			GOTB indicates shutdown by nothing else	MAJOR						
13	S/H [3]	TN406		System bus time-out	MINOR						
14	S/H [3]	TN406		Single byte parity errors	MINOR						
15	МЕМ [4]	TN406		Double byte parity errors	MINOR						
16	S/H [3]	TN406		Write protect violations	MINOR						
17	TN405	LB [2]		RAM parity errors	MAJOR						

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TABLE BE. (Contd)

	PROC 650 FAULT CODE DEFINITIONS (Contd)								
FAULT CODE	скт 1	СКТ 2	СКТ З	DEFINITION	ALARM TYPE				
18	TN406			Sanity time-outs	MAJOR				
19	TN405	TN406	UN156	Local bus time-out	MAJOR				
20	TN406	S/H [3]		Occupancy less than 9000	WARN				
21	TN406	S/H [3]		Occupancy less than 4500	MINOR				
22	TN406			Primary queue errors	MINOR				
23	TN406			Secondary queue errors	MINOR				
24	TN406			Translation errors	MINOR				
25	TN406			Memory mapper errors .	MINOR				
26	TN405	TN406		Protocol timer audits	MINOR				
27	TN405			RAM parity checker/generator	MAJOR				
28	TN405	TN406		Memory access	MAJOR				
29	S/H [३]	TN406		Write protect register audit	MAJOR				
30	S/H [3]	TN406		Write protect register test	MAJOR				
31	DL [1]	UN156		HDLC (Receive)	MAJOR				
32	DL [1]	UN156		HDLC (Transmit)	MAJOR				
33	DL [1]	UN156		Set Asynchronous Balanced Mode (SABM'S) M					
34	DL [1]	UN156		Frames retransmitted	MINOR				

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TABLE BE. (Contd)

	PROC 650 FAULT CODE DEFINITIONS (Contd)									
FAULT CODE	СКТ 1	СКТ 2	СКТ З	DEFINITION	ALARM TYPE					
35	UN156	DL [1]		Loopback test error rate (off-line only)	MINOR					
36	TN406	TN405	UN156	Re-initialization failed	MAJOR					
37	• TN406			Mailbox request failed	MINOR					
38	TN406			INIT B shutdown DCIU	MAJOR					
39				PROC 650 exited with DCIU busy	MAJOR					
40	TN406			System I/O error	MINOR					
41	TN406			Counter request failed	WARN					
42	TN406	TN405	UN156	Re-initialization failed and stopping DT tests failed also	MAJOR					
43	TN406	TN405	UN156	State vector send failed	MAJOR					
44	TN406			State of health bad, no failures in status control RAM	WARN					
45				PROC 650 ID chip failure	NONE					
46	46 TN406 PROC 650 parity CMD failure NONE									
[1] I [2] I [3] S [4] I	 [1] DL = Data link [2] LB = Local bus [3] S/H = Software/Hardware [4] MEM = Main memory 									

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PROC 652 - TIME-OF-DAY CLOCK SYNCHRONIZER

FL	IPCH SUE	ART 3			+		+	TIM	E OF	DAY	CLOCK S	YNCHR		ZER	+	-	ł		
TES FAIL 'CLI 'EXI ALAI USE FAIL	TEST 1: DISPLAYS FAILURE HISTORY. USE 'CLEAR DATA', 'CLEAR DATA', 'CLEAR DATA', 'CLEAR DATA', 'CONTINUOUSLY.' 'EXECUTE' TO RETIRE ALARMS.			S TIME K Y.	TEST 3:UISPLATS AND SET THE HARDWARE AND/OR SOFTWARE INFE OF DAY CLOCK (ONLINE SIDE ONLY). USE "NET UNIT' TO SELECT CLOCK AND DISPLAY TIME. USE 'CLEAR DATA', 'EXECUTE' TO SET CLOCKS TO DISPLAYED TIME.				MTCE BUSY (FIELD 4): 0=NOT BUSI 1=BUSIED C 2=ALARMED, BUSY (TE 3=ALARMED, (TEST 1)	STATUS ED DUT UT NOT ST 1) BUSY	FAI 1= 2= 3= 4= 5=: 6=: 7= 8= 9= 10=(FALLURE CODES (FIELD 5): CLUCK THE SPECIAL 1=ND RESPONSE (FIELD 6): CODE: 2=BATTERY FAILURE 1=HARDWARE 0=SOFTWARE 0=SOFTWARE 3=BATTERY FAILURE 1=KARDWARE 0=SOFTWARE 0=SOFTWARE 0=SOFTWARE 5=SOFTWARE UPDATE AFTER INIT 0=SOFTWARE VALUES 1=COCK 3, 1 7=LARGE CLOCK DIFF 2. 9=BAD SOFTWARE VALUES 10=CLOCK SET FAILURE 10=CLOCK SET FAILURE 10=CLOCK 10=CLOCK			SPECIAL ERROR CODE: 80-WARNING- AFTER SETTING CLOCK IN TEST 3, RUN TEST 2.				
	EQ	UIPMENT OCATION	M T	Т			_	TIME				AND DATE				FAILURE HIS	STORY		COMMON
TEST NO	TEST ES E		C E B U	S T A T	FAILURE L	LOCK TYPE	SOFTWA ONLY				TEST 3								CONTROL PERIPHERALS
1	2	3	S Y	4	. I 5	6	. 7		8	YEAR	9 10000		11	1 12	13	14	AGO)		652

Purpose

PROC 652 is used when referenced from **PROC 600** (Alarm causes/error log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a time-of-day clock synchronizer failure.

PROC 652 is used to:

- 1. Display the equipment location of the time-of-day clock synchronizer and related failures causing a failure indication.
- 2. Display the maintenance busy status and alarm status of the time-of-day clock synchronizer.
- 3. Set the time-of-day clock synchronizer to the correct time of day.

When the switch does not include a hardware clock, Test 3 of **PROC 652** may be used to set the software clock.

Field Definitions and Codes

Each field of **PROC 652** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BF, PROC 652 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Fields 7 through 12 Set time and date of software or hardware time-of-day clocks (Test 3 only).

TABLE BF.

	PROC 652 FIELD DEFINITIONS AND CODES												
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION								
1	1-3	Test number.	6		Clock type (Tests 2 and 3):								
2	0	Common control carrier.	-	0	Software clock. Hardware clock.								
3	32	LC144 slot number.	7	1-12	Month								
4		Maintenance busy status:	8	1-31	Day.								
	0	Not busied out, not alarmed	9	Dash	Not used with hard- ware clock display.								
	1 2	Busied out, not alarmed Not busied out,		1-99	Year for software clock time and date display.								
	3	alarmed Busied out, alarmed	10		Hours of the day:								
5	$\frac{1}{2}$	Failure codes: No response. Battery failure.		$ \begin{array}{c} 0 \\ 1-11 \\ 12 \\ 13-23 \end{array} $	Midnight. 1 through 11 am. Noon 1 through 11 pm.								
	3	Battery status stuck	11	0-59	Minutes.								
	4	No change in time since	12	0-59	Seconds.								
	5	Software time updated	13		Failure Index:								
	6	Small difference between software and hardware clock times.		0 1-6	Failure summary. Index into failure history.								
	7	Large difference between software and hardware clock times. Software assumed	14	1-99	Failure summary: Sum of approximate number of failures per hour for all failures.								
	8	Invalid time values			Failure History: Approximate number								
	9	Invalid time values from software.			of failures per hour for failure code being								
	10	Clock set failure.			displayed.								

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FIELD D	PROC 652 FIELD DEFINITIONS AND CODES (Contd)											
FIELD	CODE	DEFINITION										
15	1-17	Failure Summary: Number of hours since oldest individual failure code (to the nearest hour). Individual Failure His-										
		tory: Number of hours since failures started in displayed failure code (to the nearest hour).										

TABLE BF. (Contd)

Operation of Procedure

Overview

PROC 652 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from a time-of-day clock synchronizer failure.

To call in **PROC 652**, perform the following:

- 1. Depress PROC NO; 652; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, Fields 2 and 3 display the equipment location of the time-of-day clock synchronizer (if provided), and all other fields are dashed.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

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Three tests are available:

- 1. Test 1 Displays failure history.
- 2. Test 2 Continuously tests the time-of-day clock circuit and software buffer.
- 3. Test 3 Displays and allows either or both the hardware and software time-of-day clocks to be reset.

Test 1

Test 1 provides a failure history of hardware time-of-day clock synchronizer failures. The failure history is recorded by the on-line time-of-day clock program.

Test 1 can also be used to manually turn off the OTHER FAILS fault indicator.

1. Test 1 is the default test when entering **PROC 652**, or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

PROC 652 Test 1

2. To start Test 1, depress EXECUTE.

Note: If the translation records indicate the switch is not equipped with a hardware time-of-day clock synchronizer, special error code 74 is displayed in the **MAAP** error code field when **EXECUTE** is depressed. Further key inputs related to the hardware time-of-day clock synchronizer are ignored by Test 1. However, Test 3 may be used to set the software clock.

3. If no failures occurred, the following is displayed:

Field 1 - 1.

Fields 2 and 3 - Equipment location of the hardware time-of-day clock synchronizer.

Fields 4, 13, and 14 - 0.

Field 15 - Dashed.

4. If one or more failures occurred, the following summary is displayed:

Field 1 - 1.

Fields 2 and 3 - Equipment location of the hardware time-of-day clock synchronizer.

Field 4 - 0.

Field 13 - 0 (Indicating failure summary).

Fields 14 and 15 - Failure summary.

5. Depressing **NEXT DATA** displays the failure code with the highest peg count. The display is updated as follows:

Field 4 - Busy status of the hardware time-of-day clock synchronizer (indicating whether failures recorded were severe enough to cause an alarm).

Field 5 - First failure code.

Field 13 - Incremented to 1, indicating first failure code.

Fields 14 and 15 - Failure history of displayed failure code.

6. Depressing NEXT DATA repeatedly displays the remaining failure codes (if any) in descending order of peg count and updates Fields 4, 5, and 13 through 15.

When all failure codes are displayed, depressing **NEXT DATA** once more dashes Fields 4, 5, and 13 through 15.

Depressing **NEXT DATA** again executes Test 1 and an updated failure summary is displayed.

- 7. Performing Test 1 does not busy out the hardware time-of-day clock synchronizer.
- 8. To manually turn off the **OTHER FAILS** fault indicator, (assuming no other sources affecting the **OTHER FAILS** fault indicator are active), after Test 1 is executed at least once, perform the following:

Depress CLEAR DATA; EXECUTE.

9. Field 14 displays a zero (0) and Field 15 is dashed.

Note: The hardware time-of-day clock synchronizer alarmed circuit entry in PMIDS is marked as resolved.

Test 2

During execution of Test 2, the following checks are performed:

- 1. Whether a hardware time-of-day clock synchronizer is provided and appears to be functional.
- 2. Battery status and validity of battery status.
- 3. Whether the hardware time-of-day clock changed since last read (read once per second).
- 4. Whether time and date values are within obvious bounds, i.e.: non- Binary-Coded Decimal (BCD) values.

Test 2 continuously tests a combination of the hardware time-of-day clock synchronizer and the software buffer.

1. Test 2 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

2. To start Test 2, depress EXECUTE.

Note: If the translation records indicate the switch is not equipped with a hardware time-of-day clock synchronizer, special error code 74 is displayed in the **MAAP** error code field when **EXECUTE** is depressed. Further key inputs related to the hardware time-of-day clock synchronizer are ignored by Test 2. However, Test 3 may be used to set the software clock.

3. A flashing digit in Field 5 indicates Test 2 is running.

Fields 7, 8, and 10 through 13 provide a transitional display of the actual time and date generated by the hardware time-of-day clock.

- 4. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.
- 5. When STOP is depressed, the following is displayed:

Field 1 - 2.

Fields 2 and 3 - Equipment location of the hardware time-of-day clock synchronizer.

Field 4 - Busy/alarm status.

Field 5 - Failure code.

Field 6 - 1 (Indicating hardware time-of-day clock).

Fields 7, 8, and 10 through 12 - The display of the actual time and data generated by the hardware time-of-day clock up to the time **STOP** was depressed is frozen.

Fields 13 through 15 - Dashed.

- 6. If no failures occurred during Test 2, a 0 is displayed in Field 5.
- 7. If a failure occurs, the failure code for the first failure is locked into Field 5.
- 8. **NEXT DATA** can be used to sequence through all the failure codes associated with the failing hardware time-of-day clock.

PROC 652 Test 2 and Test 3

9. The **OTHER FAILS** fault indicator is automatically turned off by Test 2 (indicating the hardware time-of-day clock synchronizer alarm cause is resolved) when the following conditions are met:

The hardware time-of-day clock synchronizer failure(s) is cleared.

Note: The hardware time-of-day clock synchronizer alarmed circuit entry in PMIDS is marked as resolved.

All other sources of the OTHER FAILS fault indicator are cleared.

10. The hardware time-of-day clock synchronizer is automatically released from the busy-out condition if it was passing Test 2 when Test 2 was stopped.

Test 3

Test 3 enables maintenance personnel to set the software and/or hardware time-of-day clock.

If the switch does not include a hardware time-of-day clock the software clock can be set using Test 3.

- Test 3 is selected by use of NEXT TEST or the CHANGE FIELD sequence: CHANGE FIELD; 1; ENTER; 3; ENTER.
- 2. To start Test 3, depress EXECUTE.
- 3. When **EXECUTE** is depressed, the following is displayed:

Field 1 - 3.

Fields 2 and 3 - Equipment location of the hardware time-of-day clock.

Field 4 - Busy/alarm status.

Field 5 - Dashed.

Field 6 - 0 (Indicating software clock).

Fields 7 through 12 - Transitional display providing a real-time readout of the actual time and date generated by the software clock.

Fields 13 through 15 - Dashed.

Note: If the switch does not include a hardware time-of-day clock, Fields 2 through 5 are dashed.

4. Depressing **NEXT UNIT** causes the hardware time-of-day clock (if provided) to be displayed as follows:

Fields 1 through 5 - Same as software clock display.

Field 6 - 1 (Indicating hardware time-of-day clock).

Fields 7, 8, and 10 through 12 - Transitional display providing a real-time readout of the actual time and date generated by the hardware time-of-day clock.

Fields 9 and 13 through 15 - Dashed.

5. When both clocks are provided, repeated use of **NEXT UNIT** toggles the display between the two clocks.

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When the hardware time-of-day clock is replaced or the switch does not include a hardware timeof-day clock, the clock(s) should be set as follows:

- 1. Display the software clock in Fields 6 through 12.
- 2. Determine if the software clock time and date is correct.
- 3. If the software clock is correct:

If the switch does not include a hardware time-of-day clock, no further action is required.

If a hardware time-of-day clock is provided, depress CLEAR DATA; EXECUTE. Both clocks are set to equal each other.

4. If the software clock is not correct:

Determine which fields need to be corrected (i.e., month, day, year, hours, minutes, or seconds) and use the **CHANGE FIELD** sequence to change the required fields:

CHANGE FIELD; (Field number to be changed); ENTER; (Enter correct data, i.e., month, day, year, hours, minutes, or seconds); ENTER.

5. Repeat the **CHANGE FIELD** sequence as necessary for all fields requiring change, or depress **ENTER** until the field to be changed is indicated with a flashing decimal point.

Enter the correct data in the appropriate field.

6. When all required fields are corrected, depress CLEAR DATA; EXECUTE.

The software clock or both clocks (when a hardware time-of-day clock is provided) are set to the entered values.

When the clocks are being checked to determine any differences and the hardware time-of-day clock is not replaced, or failure code 6 is indicated, the clocks should be set as follows:

- 1. Use **NEXT UNIT** to toggle between the two clocks to determine which of the two are correct.
- 2. Leave the correct clock displayed.
- 3. Depress CLEAR DATA; EXECUTE.

Both clocks are set to equal each other.

4. If neither clock appears to be correct, toggle to the software clock and input new time and date values using the **CHANGE FIELD** sequence:

CHANGE FIELD; (Field number to be changed); ENTER; (Enter correct data); ENTER.

- 5. When other fields need to be changed, the **CHANGE FIELD** sequence or **ENTER** can be used to step to the new field and correct data can be entered.
- 6. When all required fields are corrected, depress CLEAR DATA; EXECUTE.

Both clocks are set to the entered values.

When the clocks are set, and the switch includes a hardware time-of-day clock, Test 2 should be run to determine if the hardware time-of-day clock is functioning correctly.

PROC 652

Repair Guide

When a time-of-day clock synchronizer failure is indicated, **PROC 652** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted, perform the following steps, in the order listed, to isolate and repair the faulty unit.

1. Execute Test 1.

Step through the failure history and record the results.

Determine which failure codes are accompanied by an alarm-sent indication (encode 2 or 3 in Field 4).

2. Execute Test 2.

Record any failure codes.

If the circuit passes the test, the hardware time-of-day clock synchronizer alarmed entry in PMIDS is resolved.

If the circuit was busied out, it is released from the busy out state.

The **OTHER FAILS** fault indicator is turned off if no other sources affecting the **OTHER FAILS** fault indicator are active.

- 3. When failure codes are recorded, based on the results of Test 2, refer to Table BG, PROC 652 -Time-of-Day Clock Synchronizer Repair Procedure, and perform the corrective action indicated for the failure code recorded.
- 4. When multiple failure codes are indicated, perform the corrective action for the first failure code with an alarm-sent indication (encode 2 or 3 in Field 4).
- 5. If the hardware time-of-day clock synchronizer is replaced, execute Test 3 to set the time-ofday clock to the correct time and then repeat Test 2.
- 6. If a failure is still indicated, analyze the failure codes, and perform any additional corrective action as required.

Repeat Test 3 as appropriate, and then Test 2.

7. If all corrective action is taken, and the hardware time-of-day clock still fails check the wiring associated with the replaced circuit pack and the battery.

Failure code 9 is a software problem that cannot be corrected by hardware.

TABLE BO

	PRO TIME-OF-DAY CLC REPAIR F	C 652 OCK SYNCHRONI PROCEDURE	ZER				
FAILURE CODE	CORRECTIVE ACTION	FAILURE CODE	CORRECTIVE ACTION				
1	No Response. Replace TN492.	6	There are small differences in the software and hardware clocks re- sulting in the software clock being undated by the hardware.				
2	The battery used to run the clock during power failure has failed. Replace the battery. Replace TN492.		Some counts are expected and do not indicate a fault condition. If field 4 indicates that an alarm has been sent: Replace TN492.				
3	Check the battery wiring. Cannot detect a change in bat- tery status.	7	Large differences in the software and hardware clocks have resulted in the hardware clock being up- dated by the software clock.				
	Replace TN492.		Replace TN492.				
4	The hardware clock is not run- ning.	8	Invalid time values have been re- ceived from hardware. Replace TN492.				
5	The software clock has been up- dated after initialization from a power up. This is not an alarmable	9	Invalid time values have been re- ceived from the software. This is a software problem that cannot be corrected with hard- ware.				
	condition and, therefore, does not require repair ac- tivity.	10	Clock set failure. Replace TN492.				

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PROC 653 - ATTENDANT CONSOLE TESTS

FL IS	IPCH SUE	ART 1		+		+	A	TTENDA	NT	CONSOL	E TEST	S	+	4	+		
TES DISI HIS DAT RET USE CON	T 1: PLAYS TORY. A', 'E IRE AL 'NEXT SOLE.	FAILURE USE 'CLE EXECUTE' ARMS.	AR TO ' TO	TEST 2: TESTS ALL C TO ISOLATE FAILURES US 611. DISPLAY NEX	TRCUITS. 1/0 E PROC	TEST TEST CIRCU USE ' ADVAN CIRCU DISPL	3: A PARTICUL DIT CONTINU NEXT CIRCU ICE TO NEXT DIT WITHIN AYED CARRI	.AR IDUSLY. IIT' TO ER.	NO1	TE: Handset M Plugged I Console F Tests 2 S	UST BE NTO Or 3.	FAILURE COC (FIELD 6): 0=PASS 1=ON-LINE	ES PERIODIC	CONSO 4≖A 5≠M	LE: DDRESSING ESSAGE EC	3 CHO	
			TEST	73								FAILURE HISTORY					COMMON
TEST	EQUIPMENT		LOCATION	CONSOLE	FAIL	NUMBER	NUMBE	R	FAILED	CATUR	FAILURES	MOST REC	RECENT FAILURE			CONTROL	
NO	ND E SLOT		SLOT	CHANNEL		CODE CONSOLES FAILED CONSOLE FAILURES BEGAN CONSOLES CHANNELS INDEX PER HOUR AGO 5 6 1 7 1 8 1 9 1 0 1 11 1 1 12					MINUTES AGO		653				

Purpose

PROC 653 is used when referenced from **PROC 600** (Alarm causes/error log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a console failure.

PROC 653 is used to:

- 1. Test all attendant consoles once or a particular console continuously.
- 2. Display attendant console failures.
- 3. Resolve the console alarm cause when all consoles pass Test 2.

Note: Dual-speed data channels associated with attendant consoles are tested in PROC 611.

Field Definitions and Codes

Each field of **PROC 653** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BH, PROC 653 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Fields 2 through 4 Select a specific console for testing (Test 3 only).

TABLE BH.

		PRC FIELD DEFINITION	OC 653	DES	-			
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITON			
1	1-3	Test number.	10	*	Failure Summary:			
2	. 0	Common control carrier.			Sum of approximate number of failures per hour for all failing circuits			
3	23-26	Slot number.			Failure History:			
4	0-15	Channel number.			Approximate number			
5 .	0-40	Failed console.			of failures per hour for circuit being			
6 /		Failure codes:			displayed.			
	0 1 4 5	Pass. On-line periodic. Addressing. Message echo.	11	0-17	Failure Summary: Number of hours since the oldest individual failure started (to the			
. 7	*	Number of consoles in system.			nearest hour).			
8	*	Number of failed channels: Test 1 Number of dual-			History: Number of hours since failures started in the displayed circuit (to the nearest hour.)			
		speed data channels in the failure history. Test 2 Number of dual- speed data channels that	Number of Failur circuit Failur display	f hours plu e Summar e History: ved circuit 0-136	is minutes since: y: Most-recent failure of any Most-recent failure of the Hours			
		failed the test.	13	0-59	Minutes.			
9	0 1-6	Failed console index: Failure Summary. Individual failures.	* Numb ratior	ber varies according to switch configu- n.				

PROC 653 Test 1

Operation of Procedure

Overview

PROC 653 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from a console failure.

To call in PROC 653, perform the following:

- 1. Depress PROC NO; 653; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, Field 7 displays the number of consoles in the switch, and all other fields are dashed.

3. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

Three tests are available:

- 1. Test 1 Displays failure history.
- 2. Test 2 Tests all consoles.
- 3. Test 3 Tests a specific console continuously.

Test 1

Test 1 displays the failure history of console failures. These failures are detected during call processing, not by periodic tests.

Test 1 can also be used to manually turn off the OTHER FAILS fault indicator.

1. Test 1 is the default test when entering PROC 653, or is selected by using NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

- 2. To start Test 1, depress EXECUTE.
- 3. The failure history is displayed in the form of a summary.

The failure summary displays the total number of console failures that occurred.

- 4. If no failures occurred, Fields 8 through 10 display a 0.
- 5. If one or more failures occurred, the following summary is displayed:

Field 1 - 1.

Field 7 - Total number of consoles in the switch.

Field 8 - Number of failed channels.

Field 9 - 0 (Indicating the first failure is not displayed).

Fields 10 through 13 - Failure summary.

6. Depressing **NEXT CIRCUIT** displays the first failing console in the failure history. The display includes the following:

Field 1 - 1.

Fields 2 through 4 - Equipment location of the dual-speed data channel associated with the failing console.

Field 5 - Console number.

Field 6 - Failure code associated with the failing console.

Field 7 - Total number of consoles in the switch.

Field 8 - Number of failed channels.

Field 9 - 1 (Indicating first failing console).

Fields 10 through 13 - Failure history for the displayed console.

7. Depressing **NEXT CIRCUIT** repeatedly displays the failure histories of the remaining failing consoles.

Fields 2 through 6, and 9 through 13 are updated.

- 8. Depressing NEXT CIRCUIT after all failure histories are displayed, dashes all fields except Fields 1 and 7.
- 9. Depressing **NEXT CIRCUIT** again causes Test 1 to be executed, starting the sequence over with an updated failure summary.
- 10. To manually turn off the **OTHER FAILS** fault indicator, (assuming no other sources affecting the **OTHER FAILS** fault indicator are active), after Test 1 is executed at least once, perform the following:

Depress CLEAR DATA; EXECUTE.

Note: Alarmed console entries in PMIDS are marked as resolved.

Test 2

Test 2 tests all consoles to determine if any are failing.

Prior to executing Test 2, the handset or headset must be plugged into all consoles or the consoles fail the test.

1. Test 2 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

2. To start Test 2, depress EXECUTE.

The WAIT indicator on the MAAP is turned on.

3. Upon completion of the test the WAIT indicator is turned off.

If no failures are detected in Test 2, Field 8 displays a 0.

PROC 653 Test 2 and Test 3

4. If a failure is detected, the first failed console is displayed as follows:

Field 1 - 2.

Fields 2 through 4 - Equipment location of the dual-speed data channel associated with the failing console.

Field 5 - Console number.

Field 6 - Failure code associated with the first failure.

Field 7 - Total number of consoles in the switch.

Field 8 - Number of failed channels.

Field 9 - Failed console index (1, indicating first failing console).

Fields 10 through 13 - Dashed.

5. **NEXT CIRCUIT** can be depressed repeatedly to display the remainder of the failing consoles.

Fields 2 through 6, and 9 are updated as appropriate.

6. Depressing **NEXT CIRCUIT** after all failing consoles are displayed, dashes all fields except Fields 1 and 7.

Depressing NEXT CIRCUIT again causes Test 2 to start over.

7. The console alarm cause is resolved when all attendant consoles pass Test 2.

Note: Alarmed console entries in PMIDS are marked as resolved.

The **OTHER FAILS** fault indicator is automatically turned off when the console alarm cause, and all other alarm sources affecting the **OTHER FAILS** fault indicator are cleared.

Test 3

Test 3 is used to continuously test a specific attendant console that is suspected of having intermittent failures or to trace wiring problems.

The handset or headset must be plugged into the console that is being tested in Test 3 or the console fails.

1. Test 3 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 3; ENTER.

- 2. A console to be tested must be selected prior to execution of Test 3.
- 3. A default console may be displayed in Fields 2 through 4.

Field 2 is flashing, indicating an optional entry field.

The default console is the last console failure displayed in Test 1 or 2.

4. Either the default console can be tested or another console can be selected for testing by entering the data in the flashing fields and depressing ENTER or by using the CHANGE FIELD sequence:

(Carrier number); ENTER; (Slot number); ENTER; (Channel number); ENTER.

CHANGE FIELD; 2; ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Channel number); ENTER.

5. If no failures occurred (none displayed in Test 1 or 2), Field 2 is blanked and the decimal point in that field flashed to indicate a mandatory entry field.

An equipment location must be entered in Fields 2 through 4 before Test 3 can be executed, as follows:

(Carrier number); ENTER; (Slot number); ENTER; (Channel number); ENTER.

Console selection can also be made by using NEXT CIRCUIT and/or NEXT UNIT when a default console is displayed.

NEXT CIRCUIT is used to sequence through all consoles in a carrier.

NEXT UNIT is used to sequence through all appropriately equipped carriers which contain consoles.

7. When **NEXT UNIT** is depressed to sequence to the next equipped carrier, the first applicable console in that carrier is automatically displayed.

NEXT CIRCUIT steps through the consoles within the selected carrier.

8. To start Test 3, depress EXECUTE.

A flashing digit displayed in Field 6 (failure code) indicates Test 3 is running.

- 9. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.
- 10. When **STOP** is depressed, a 0 displayed in Field 6 indicates Test 3 passed.

Any other digit displayed in Field 6 indicates Test 3 failed.

11. When another console is to be tested, perform the following:

Halt Test 3 by depressing STOP.

Select the console to be tested by using the CHANGE FIELD sequence, or NEXT CIRCUIT, NEXT UNIT, etc.

Depress **EXECUTE** to start Test 3.

12. After corrective action is taken, Test 3 must be repeated to clear any previously displayed failure code. After Test 3 indicates a 0, Test 2 must be performed to resolve the console alarm cause of the **OTHER FAILS** fault indicator.

Repair Guide

When an attendant console failure is indicated, **PROC 653** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted, the following steps should be performed, in the order listed, to isolate and repair the faulty unit.

- 1. Verify that the handsets or headsets are plugged into the attendant consoles.
- 2. Execute Test 1 and record the failure history.
- 3. Execute Test 2 and record the results.

If Test 2 passes and a console failure is suspected, perform Test 3 to check for intermittent failures. (See Step 13 below.)

4. If Test 2 fails, use Test 4 of **PROC 620** (unit type 44) to test the attendant interface circuit pack (SN233) associated with the failing console.

5. After passing Test 4 of **PROC 620**, (taking appropriate corrective action as required), enter **PROC 653** and repeat Test 2.

If Test 2 passes, the console alarm cause is resolved, and the **OTHER FAILS** fault indicator is turned off if no other alarmed causes exist.

6. If the same console fails Test 2 again, check the voltages on the console power supply circuit pack MW-4 in the attendant console indicated in Field 5.

If the voltages are correct, replace console circuit pack AEE1 and repeat Test 2.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of console circuit pack AEE1.

Proceed to Step 8.

7. If the voltages are incorrect, replace console circuit pack MW-4 and repeat Test 2.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of console circuit pack MW-4.

Proceed to Step 8.

- 8. If the same console fails Test 2 again, replace the console indicated in Field 5, and repeat Test 2.
- 9. If the same console fails Test 2 again, perform **PROC 611** Test 3, entering the equipment location displayed in Fields 2 through 4 to determine if an I/O failure exists.
- After passing Test 3 of PROC 611, (taking appropriate corrective action as required), enter PROC 653 and repeat Test 2.

If Test 2 passes, the console alarm cause is resolved, and the **OTHER FAILS** fault indicator is turned off if no other alarmed causes exist.

- 11. If the same console fails Test 2 again, check the wiring associated with the failing console and the attendant interface circuit.
- 12. Repeat Steps 4 through 11 for each failing console.
- 13. If intermittent console failures or wiring problems are suspected, execute Test 3 to continuously test the suspect consoles.

When a failure is indicated, perform corrective action listed in Steps 4 through 10, repeating Test 3 after performing each corrective action.

14. If Test 3 passes after taking corrective action, repeat Test 2 to resolve the console alarm cause.

If Test 3 fails after taking all corrective action, check the wiring associated with the failing console and the attendant interface circuit.

PROC 654 - DISPLAY TERMINALS TEST

FL IS	IPCHA SUE 1	RT			+	_		-	F	1	DISP	LAY	TERM	INALS T	EST		+		+		
TEST DISF HIST DATA RETT	TEST 1: DISPLAYS FAILURE HISTORY. USE 'CLEAR (CHO TESTS). DATA', 'EXECUTE' TO RETIRE ALARM. USE'NEXT CIRCUIT' TO ADVANCE TO NEXT FAILUNG TERMINAL.					611.	TES (CY CIR USE IN	LSI S. A PARTICULAR TERMINAL CONTINUOUSLY TESTS A PARTICULAR TERMINAL CONTINUOUSLY (CYCLES THROUGH DIGIT DISPLAYS). USE 'NEXT ISCAS/FADS ICRUIT' TO ADVANCE TO THE NEXT TERMINAL USE 'NEXT UNIT' TO ADVANCE TERMINAL TYPE IN FIELD 2. S-1 6-2 7-1,							FAILURE D=PAS 1=DAT 2=N0 3=1 & 4=BAD 5=1 & 6=2 & 7=1.	CODE S A CHA REPLY 2 REPL 4 4 2, S	S (FIELDS 8 6 9): INNEL ADDRESS -TERMINAL Y-TERMINAL 4				
					DATA EQPT	CHA LOC/	NNEL TION	AY IT	FAI	LURE	TOTAL	ļ		TIME STAM				COMMON Control			
NO	NO TYPE U		SER (TYPE 1) NIT NUMBER (TYPE 13) CARR SI		SLC	т	CHANNEL	IdSIQ DICI	ONCE	LAST	CHANNELS FAILED	D	DAY	HOUR	MINUTE			PERIPHERALS			
1		2				3	4		5	6	7	8	9	10		1 11	1 12	13	1		054

The flipchart shown is for R2V2. The R2V1 flipchart is similar except that Field 2 includes terminal type 15 (UCD/FADS) and Field 3 includes UCD group number (Type 15)

Purpose

PROC 654 is used when referenced from **PROC 600** (Alarm causes/error log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a display terminal failure.

PROC 654 is used to:

- 1. Display 102D calling number display and 102F or 102G FADS terminal failures.
- 2. Display the time stamp of each failure.
- 3. Test each terminal with a short data test to obtain the total failed circuit count.
- 4. Resolve the alarm cause when all display terminal circuits pass Test 2.

Note: Display terminal alarmed circuits in PMIDS are marked as resolved.

When Test 3 is performed to determine if the digits displayed on the display terminal are correct, or if an intermittent failure exists, the observing function of this test **must** be performed at the customer's premises.

Note: Dual-speed data channels associated with display terminals are tested in PROC 611.

Field Definitions and Codes

Each field of **PROC 654** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BI, PROC 654 - Field Definitions and Codes.

Field 1 is an optional input field for changing the test number to be executed.

.3

PROC 654

	PROC 654 FIELD DEFINITIONS AND CODES												
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION								
1	1-3	Test number.	8	2	No data reply (echo) from								
2	1 13	Calling number display. 102D terminal. CAS/FADS display. 102G or 102F terminal.	(Contd)	3 4 5	terminal. Failures 1 and 2. Bad reply from terminal - echo data nonzero, but no data transmitted. Failures 1 and 4.								
3	Any 2-, 3-, or	Directory number of the called station associated		6 7	Failures 2 and 4. Failures 1, 2 and 4.								
	4-digit number	with the selected terminal type.	9	0-7	Failure code from the last transmission to a terminal								
4	0	Common control carrier.			before the test was termi- nated. Updated in real time								
5	23-26	Slot number.			for Test 3 showing current latest failure while test is								
6	0-15	Channel number.			running. Refer to field 8 for encode descriptions.								
7	0-9, Ë,-	Digits sequenced 0 through 9, test character, and dash are alternated with blanks	10	0-99	Total number of failed chan- nels.								
		They will correspond to all digits displayed on the terminal.	11-13		Time stamp: A time stamp showing the day of the month, hour, and minute								
8		Failure code representing the ORed collection of all			when the alarm cause occurred.								
	8	failures since test started:	11	1-31	Day of the month.								
	0	Pass. Data channel address pot	12	0-23	Hour of the day.								
	Ŧ	acknowledged.	13	0-59	Minutes.								

TABLE BI.

Operation of Procedure

Overview

PROC 654 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from a display terminal failure.

To call in PROC 654, perform the following:

1. Depress PROC NO; 654; ENTER.

- 2. Test 1 is automatically selected.
 - Field 1 displays a 1 and all other fields are dashed.
- 3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Three tests are available:

- 1. Test 1 Displays failure history and time of each failure.
- 2. Test 2 Tests each display terminal with a short data test:
- 3. Test 3 Tests a specific display terminal continuously.

Test 1

Test 1 displays a failure history of display terminal failures. The failure history is generated by on-line maintenance software.

Test 1 can also be used to manually turn off the OTHER FAILS fault indicator.

1. Test 1 is the default test when entering PROC 654, or is selected by using NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

- To start Test 1, depress EXECUTE.
- 3. The total number of display terminal failures is displayed as a summary.
- 4. If no failures occurred, a 0 is displayed in Field 10.
- 5. If one or more failures occurred, the following is displayed:

Field 1 - 1.

Field 10 - Total number of failed channels.

Fields 11 through 13 - Day, hour, and minute when the first failure occurred.

6. Depressing **NEXT CIRCUIT** displays the first failing display terminal in the failure history.

Note: Calling number display failures are displayed before FADS terminal failures.

7. The display includes the following:

Field 1 - 1.

Field 2 - Terminal type.

Note: Terminal type 15 (UCD/FADS) may be displayed for R2V1.

Field 3 - Extension number for terminal type 1 or unit number for terminal type 13.

Note: A UCD group number for terminal type 15 may be displayed for R2V1.

Fields 4 through 6 - Dual-speed data channel equipment location associated with the failing display terminal.

Field 10 - Total number of failed channels.

Fields 11 through 13 - Time stamp (day, hour, and minute) when the failure occurred.

PROC 654 Test 1 and Test 2

- 8. After the first failing display terminal is displayed, depressing **NEXT CIRCUIT** repeatedly displays the failure history of the remaining failing display terminals.
- 9. Fields 2 through 6, and 11 through 13 are updated.

Note: All calling number display failures are displayed before FADS terminal failures. Display terminals with more errors recorded are displayed before display terminals with less errors recorded.

10. Depressing **NEXT CIRCUIT** after all failures are displayed, dashes Fields 2 through 13.

Depressing **NEXT CIRCUIT** again, causes Test 1 to be executed, starting the sequence over with an updated failure summary.

11. To manually turn off the **OTHER FAILS** fault indicator, assuming no other alarmed sources affecting the **OTHER FAILS** fault indicator are active, after Test 1 is executed at least once, perform the following:

Depress CLEAR DATA; EXECUTE.

Note: Display terminal alarmed circuit entries in PMIDS are marked as resolved.

Test 2

Test 2 tests all display terminals to determine if any are failing.

1. Test 2 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

2. To start Test 2, depress EXECUTE.

The WAIT indicator on the MAAP turns on and Test 2 starts from the lowest display terminal.

Note: When Test 2 encounters a FADS (type 102F or 102G) display terminal during testing, the **IN USE** lamp on the **MAAP** can remain on for up to 2 minutes while waiting for the FADS display terminal to be released from its normal function for testing.

- 3. If no failures are detected, Test 2 stops, the WAIT indicator is turned off, and a 0 is displayed in Field 10.
- 4. If a failure is detected, Test 2 stops and the **WAIT** indicator turns off. The display terminal that failed is displayed as follows:

Field 1 - 2.

Field 2 - Terminal type.

Note: Terminal type 15 (UCD/FADS) may be displayed for R2V1.

Field 3 - Extension number or unit number.

Note: A UCD group number for terminal type 15 may be displayed for R2V1.

Fields 4 through 6 - Equipment location of dual-speed data channel circuit associated with the failing display terminal.

Fields 8 and 9 - Once and last failure code associated with first failing display terminal.

Field 10 - Circuit count of 1.

Fields 11 through 13 - Dashed.

5. To resume testing, **NEXT CIRCUIT** is depressed.

Depressing **NEXT CIRCUIT**, after all failing display terminals are displayed, dashes all fields except Fields 1 and 10 (test number and total failed channels).

- 6. Depressing **NEXT CIRCUIT** again causes Test 2 to be executed from the beginning of the test.
- 7. The display terminal alarm cause is automatically resolved if all display terminals pass Test 2.

Note: Display terminal alarmed circuit entries in PMIDS are marked as resolved.

8. The **OTHER FAILS** fault indicator is turned off when the display terminal alarm cause, and all other alarm sources affecting the **OTHER FAILS** fault indicator are cleared.

Test 3

Test 3 is used to continuously test a specific display terminal which is suspected of having intermittent failures or to trace wiring problems.

In addition, Test 3 is used to verify that all digits are displayed correctly at each display terminal position.

1. Test 3 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 3; ENTER.

2. A display terminal to be tested must be selected prior to execution of Test 3.

Display terminal selection can be made as indicated in Steps 3 through 7.

- 3. If no failures occurred (none displayed in Test 1 or 2) which indicates that a default display terminal does not exist, the lowest featured display terminal type is displayed first in Field 2.
- 4. If a failure occurred, a default display terminal is displayed.

The default display terminal is the last failed display terminal displayed by Test 1 or 2.

Either the default display terminal can be tested or another display terminal can be selected for testing using NEXT UNIT and/or NEXT CIRCUIT.

- 5. **NEXT CIRCUIT** is used to display the first display terminal of the lowest display terminal type. Either this display terminal can be tested or another display terminal can be selected for testing.
- To select another display terminal, use NEXT UNIT and/or NEXT CIRCUIT to locate the display terminal to be tested.

i,

7. Depress **NEXT UNIT** repeatedly until the desired terminal type is displayed in Field 2.

Depress **NEXT CIRCUIT** repeatedly to advance the display to the display terminal location to be tested.

ii

Dashes are displayed after the last display terminal location in the last terminal type is displayed.

- 8. Depressing **NEXT CIRCUIT** again displays the first display terminal equipment location in the lowest terminal type.
- 9. To start Test 3, depress EXECUTE.

The digit displayed in Field 7 of the **MAAP** corresponds with the digit displayed at the terminal being tested.

The changing display in Field 7 indicates the test is running.

10. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.

This allows maintenance personnel time to observe the digits displayed at the display terminal being tested in order to determine if all digits are correct and to verify existence of intermittent failures.

- 11. The failure codes detected are recorded by Test 3 and displayed in Fields 8 and 9.
- 12. To select another display terminal to be tested, perform the following:

Halt Test 3 by depressing STOP.

Select the new display terminal to be tested using NEXT UNIT and/or NEXT CIRCUIT.

Depress **EXECUTE** to start Test 3.

Repair Guide

When a display terminal failure is indicated, **PROC 654** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted, the following steps should be performed, in the order listed, to isolate and repair the faulty unit.

- 1. Execute Test 1 and record the failure history.
- 2. Execute Test 2 and record the results.

If Test 2 passes and a display terminal failure is suspected, perform Test 3 and check for intermittent failures. (Refer to Step 9.)

- 3. When failures are recorded, based on the results of Test 2, refer to Table BJ, PROC 654 Display Terminals Repair Procedure, and perform the corrective action indicated.
- 4. Repeat Test 2 after each corrective action is performed.

If Test 2 passes, the display terminal alarm cause is resolved, and the **OTHER FAILS** fault indicator is turned off when all other alarmed sources (if any) affecting the **OTHER FAILS** fault indicator are cleared.

5. If the same display terminal fails Test 2 again, perform **PROC 611** Test 3, entering the equipment location displayed in Fields 4 through 6 to determine if an I/O failure exists.

TABLE BJ.

PROC 654 DISPLAY TERMINALS REPAIR PROCEDURE											
FAILURE	CORRECTIVE ACTION										
0 (Test 3	Bad data displayed on 102D, 102F, or 102G Terminal:										
only)	Replace the 102D, 102F, or 102G ter- minal.										
	Replace the 211A Power Unit for the 102D, 102F, or 102G terminal.										
1 through	Replace the 102D, 102F, or 102G ter- minal.										
7	Check the 211A Power Unit for the 102D, 102F, or 102G terminal.										
	Perform PROC 611 Test 2 to isolate dual speed data channel failures.										

6. After passing Test 3 of **PROC 611**, (taking appropriate corrective action as required), enter **PROC 654** and repeat Test 2.

If Test 2 passes, the display terminal alarm cause is resolved, and the **OTHER FAILS** fault indicator is turned off if no other alarm causes exist.

- 7. If the same display terminal fails Test 2 again, check the wiring associated with the cabling between the 211A power unit, 102D, 102F, or 102G terminal, and the switch.
 - 8. Repeat Steps 3 through 7 for each failing display terminal.
 - 9. If an intermittent failure or wiring problems are suspected, execute Test 3 to continuously test the suspect terminal.

When a failure is indicated, perform Steps 3 through 7 above.

10. If a 0 is displayed in Field 8, allow Test 3 to run and check the display on the terminal being tested.

If bad data is displayed on the terminal, perform the corrective action listed in Table BJ, PROC 654 - Display Terminals Repair Procedure.

11. If Test 3 passes after taking corrective action, repeat Test 2 to resolve the display terminal alarm cause.

PROC 655

PROC 655 - SMDR TEST

F	LIPCHART SSUE 1	PCHART + + STATION MESSAGE DETAIL RECORDING TEST +										EST +		_	+			
TE: HI: TO FA 13 'E: AL. TES TO	ST 1:DISPLAYS FA STORY. USE 'NEXT SELECT ANOTHER LLURE CODE (FIEL). USE 'CLEAR D/ KECUTE' TO RETIF ARM. T 2:ECHO TEST. ISOLATE I/O FAI	TEST 3:SENDS AN ALTERNAT- ING DNE-ZERO PATTERN CONTINUDUS!. USE PROC 275 TO DISABLE SMOR SERVICE. USE 'NEXT DATA' TO CHANGE ENCODE:				T- TEST 4 16 MESS PATTERI SMDR.	TEST 4:SENDS A 16 MESSAGE PATTERN TO THE SMDR. MESSAGE LENGTH			5:SENDS 1 JORD. USE DATA' TO F FROM OF 10 TEST OR ENTER F WORD. ROC 275 TO E SMDR	FAILURE CODES (FIELDS 7.8): 0-PASS 1:DATA CHANNEL ADDRESS 2:BAD REPLY PARITY 3-1 & 2 4:ECHO MISMATCH 5-1 & 4 6:2 & 4 7-1. 2 & 4			,8):	FAILURE CODES (FIELD 13): 0-SUMMARY DISPL. 1=NO REPLY OR ECHO MISMATCH 8=SMDR EQUIPMENT		SPECIAL ERROR CODE: 80-'EXECUTE' OPERATED WITH SMDR SERVICE ENABLED FOR TEST 3 OR TEST 5.	
USE	PROC 611.		0=12 WORDS, 1=15 WORDS,)S, 2=18 W	2=18 WORDS			ε.	8=SMDR EQUIPMENT				O=NONE		(FIELD S): 1=SMDR FAILURE
	TEST WOR	TEST WORD (TES				DATA CHA EQPT LOCA	NNEL	FAILURE		ж	TIME STAMP		>	ĕ	TESTS 3 & A	3 4		COMMON
TEST ND	OP CODE	DATA		-	CARR	SLOT	CHANNEL	ONCE	LAS	LARM CAU	DAY	HOUR	MINUTE	AILURE C	MSG LENGTH]		PERIPHERALS
	1 2		1 3		4	1 5	. 6	7	6	- 9	L 10	1 11	1 12	13		4 .		655

Purpose

PROC 655 is used when referenced from **PROC 600** (Alarm causes/error log) to verify and turn off the **OTHER FAILS** fault indicator resulting from a SMDR failure.

Tests 3 through 5 of this maintenance procedure **must** be performed on the customer's premises. Successful test completion for Tests 3 through 5 is determined by observing printouts from the SMDR equipment.

PROC 655 is used to:

- 1. Display SMDR equipment failures.
- 2. Run an echo test with the SMDR equipment.
- 3. Resolve the SMDR alarm cause when all circuits pass Test 4.

Note: Dual-speed data channels associated with SMDR equipment are tested in PROC 611.

Field Definitions and Codes

Each field of **PROC 655** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BK, PROC 655 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Fields 2 and 3 Select operation code and data of test word to be transmitted to the SMDR equipment (Test 5 only).
i.

TABLE BK.

1 . 4 . 7

1

f

	PROC 655 FIELD DEFINITIONS AND CODES													
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION									
1	1-5	Test number.	8	0-8	Failure code-last: Failure code									
2	0 3 4	Operation code (octal): Normal data word. No operation. Retransmit normal data			occurring during the last transmission to the SMDR equipment before the test ended or was stopped.									
	10 14	word. Last word in message. Retransmit last word in message.	· 9	01	Alarm cause status: None. SMDR failure.									
3	0000- 7777	Data word (octal).	10-12		Time stamp: A time stamp showing the day of the month,									
4	0	Common control carrier.			alarm cause occurred.									
5	23-26	Slot number.	10	0-31	Day of the month.									
6.	0-15	Channel number.	11	0-23	Hour of the day.									
7		Failure code-once: Accumulative "OR"ing of all	12	0-59	Minute.									
	0 1	Pass. Data channel address not	13	0	Failure codes: Logged in failure history table displayed in Test 1 only. Failure summary display									
	2	No data reply (echo) from SMDR equipment. Failures 1 and 2		1 8	No reply or echo mismatch. SMDR equipment failure.									
	4 5 6 7 8	Echo mismatch. Failures 1 and 4. Failures 2 and 4. Failures 1, 2, and 4. SMDR equipment failure (reported by SMDR after 16-message buffer filled).	14	0 1 2	Message length encode: Number of data words used in a call record. 12-word message. 15-word message. 18-word message.									

PROC 655 Test 1

Operation of Procedure

Overview

PROC 655 is used to determine the cause of the **OTHER FAILS** fault indicator being lighted resulting from an SMDR failure.

To call in PROC 655, perform the following:

- 1. Depress PROC NO; 655; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, Fields 4 through 6 display the data channel equipment location associated with the SMDR equipment, and all other fields are dashed.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Five tests are available:

- 1. Test 1 Displays failure history.
- 2. Test 2 Runs an echo test on the SMDR equipment.
- 3. Test 3 Sends an alternating one-zero pattern continuously to the SMDR equipment.
- 4. Test 4 Sends a 16-message pattern to the SMDR equipment, testing most digits in each digit's position.
- 5. Test 5 Sends a single data word to the SMDR equipment allowing manual entry of operation codes and data words.

Test 1

Test 1 provides a failure history of the SMDR equipment.

Test 1 is also used to manually turn off the OTHER FAILS fault indicator.

1. Test 1 is the default test when entering **PROC 655**, or is selected by using **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 1; ENTER.

- 2. To start Test 1, depress EXECUTE.
- 3. A summary of the failure history is displayed.
- 4. If no failures occurred, a 0 is displayed in Fields 9 and 13.
- 5. If one or more failures occurred, the summary displays a 1 in Field 1, the SMDR alarm cause in Field 9, a 1 or 8 in Field 13 (failure code), and dashes in all other fields.
- 6. Depressing **NEXT DATA** displays the first failing equipment location and associated failure code. The following information is displayed:

Field 1 - 1.

Fields 4 through 6 - Data channel equipment location associated with the SMDR equipment.

Field 9 - SMDR alarm cause.

Fields 10 through 12 - Time stamp (day, hour, and minute) when the failure code displayed in Field 13 occurred.

Field 13 - Failure code (1 or 8).

7. Depressing **NEXT DATA** repeatedly displays all failure codes (Field 13) associated with individual failures recorded in the failure history.

Depressing NEXT DATA after all failures are displayed, dashes Fields 9 through 13.

Depressing NEXT DATA again executes Test 1 and an updated failure summary is displayed.

8. To manually turn off the **OTHER FAILS** fault indicator, (assuming no other alarm sources affecting the **OTHER FAILS** fault indicator are active), after Test 1 is executed at least once, perform the following:

Depress CLEAR DATA; EXECUTE.

9. Field 9 (alarm status) displays a 0.

Note: SMDR alarmed entries in PMIDS are marked as resolved.

Test 2

Test 2 runs an echo test with the SMDR equipment.

Test 2 does not interfere with call processing recording of calls.

An alternating one-zero pattern is used for the first echo test. A complementing one-zero pattern is used for the second echo test.

1. Test 2 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

- 2. To start Test 2, depress EXECUTE.
- 3. If no failures are detected, Fields 7 and 8 display a 0.
- 4. If any failures are detected, the following is displayed:

Field 1 - 2.

Fields 4 through 6 - Data channel equipment location associated with the SMDR equipment.

Fields 7 and 8 - Failure codes (1 through 8).

Test 3

Test 3 sends a continuous alternating one-zero pattern in the format of a call record message to the SMDR equipment.

When Test 3 is performed, maintenance personnel **must** be on the customer's premises to operate SMDR equipment and to determine if the test is successful by observing the SMDR printout.

Caution: Test 3 prevents normal call processing from recording call data using the SMDR equipment. SMDR equipment must be disabled using PROC 275, Word 1 before Test 3 is executed. After Test 3 is completed, SMDR service should be restored using PROC 275, Word 1.

1. Change Field 12 of PROC 275, Word 1 from 1 to 0 to disable SMDR service.

Note: Prior to using Test 3, the customer's tape should be unloaded (with customer's permission) and a spare tape loaded.

2. Enter PROC 655 and select Test 3 by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 3; ENTER.

- 3. Upon entry to Test 3, the call record message length to be transmitted to the SMDR equipment is 12 words (indicated by a 0 in Field 14).
- 4. **NEXT DATA** is used to change the call record message length to be transmitted depending upon the type of SMDR equipment being tested.

A 1 in Field 14 indicates a 15 word message length, a 2 in Field 14 indicates a 18 word message length.

Depressing NEXT DATA repeatedly cycles Field 14 to 1, 2, and back to 0, etc.

5. To start Test 3, depress EXECUTE.

Note: Special error code 80 is displayed in the **MAAP** error code field if **EXECUTE** is depressed with the SMDR service enabled.

6. During execution of Test 3, the following fields are displayed:

Field 1 - 3.

Fields 2 and 3 - Operation code and data word currently being transmitted to the SMDR equipment.

Fields 4 through 6 - Data channel equipment location associated with the SMDR equipment.

Fields 7 and 8 - Once and last failure codes.

Field 14 - Message length encode.

7. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.

The one-zero pattern data word is complemented each time it is transmitted with 0.5 seconds between words.

Between the last word transmitted (normally word 12) and the start of the next message is a 2-second delay to allow stopping Test 3.

8. Successful test completion results in a 0 displayed in Fields 7 and 8, and a printout similar to that shown in Figure 10.

00:23	:	. 5	E	5	55 5	5-55	5-55	555	55
00:23	:	. 5	E	5	55 5	5-55	5-55	555	55

Figure 10. Sample Printout Generated From Test 3 (12-Word Format)

- 9. The printout shown was generated by the printer direct output option.
- 10. After Test 3 is successfully completed, the customer's tape should be loaded, and SMDR service enabled.

To enable SMDR service, change Field 12 of PROC 275, Word 1 from 0 to 1.

Test 4

Test 4 sends 16 messages in either 12, 15, or 18 word message formats to the SMDR equipment.

Test 4 is used to load memory in the SMDR equipment with a 16-message block. A 31-message block can be written on magnetic tape by executing Test 4 twice.

Four of the SMDR operation codes are exercised by Test 4, i.e., normal word transmission, last word of message transmission, retransmit normal word, and retransmit last word.

When Test 4 is performed, maintenance personnel **must** be on the customer's premises to operate SMDR equipment and to determine if the test is successful by observing the SMDR printouts.

- 1. Enter PROC 655 if SMDR service was enabled in Test 3 or 5 of PROC 655.
- 2. Test 4 is selected by use of **NEXT TEST** or the **CHANGE FIELD** sequence:

CHANGE FIELD; 1; ENTER; 4; ENTER.

- 3. Upon entry to Test 4, the call record message length to be transmitted to the SMDR equipment is 12 words (indicated by a 0 in Field 14).
- 4. **NEXT DATA** is used to change the call record message length to be transmitted depending upon the type of SMDR equipment being tested.

A 1 in Field 14 indicates a 15 word message length, a 2 in Field 14 indicates a 18 word message length.

Depressing NEXT DATA repeatedly cycles Field 14 to 1, 2, and back to 0, etc.

- 5. To start Test 4, depress EXECUTE.
- 6. If no failures are detected, Fields 7 and 8 display a 0. The printouts should be checked to ensure that the SMDR equipment is operating properly.
- 7. If any failures are detected, the following is displayed:

Field 1 - 4.

Fields 4 through 6 - Data channel equipment location associated with the SMDR equipment.

Fields 7 and 8 - Once and last failure codes.

Field 14 - Message length encode.

- 8. When using direct output SMDR equipment, successful completion of Test 4 results in a printout similar to that shown in Figure 11.
- 9. When using the 9-track magnetic tape SMDR equipment (12 or 15 word messages) only the numerical characters of the messages can be displayed as shown in Figure 12.
- 10. Hexadecimal dumps for Test 4 are shown in Figure 13 and Figure 14.
- 11. When Test 4 is successfully completed, the SMDR alarm cause is resolved and the **OTHER FAILS** fault indicator is turned off when all other alarm sources (if any) affecting the **OTHER FAILS** fault indicator are cleared.

Note: SMDR alarmed entries in PMIDS are marked as resolved.

12. The **MAJOR** and/or **MINOR** alarms are also turned off by Test 4 when all other major and/or minor alarm sources are cleared.

PROC 655 Test 4

The 16 messages of Figure 11 completely fill and test the direct output SMDR memory buffer, testing each digit in each digit's position.

RETRANSMITTED CORRECT TIME WILL BE NORMAL WORD PRINTED EXTENSION NUMBER _¥_ >?012 1111 07:25 0:12.3 D 567 89 <=>?-012-345-6789 <=>?0-123-456-789 2222 55523 4 07:25 1:23.4 E 678 9 RETRANSMITTED 07:25 2:34.5 F 789 <=>?01-234-567-89 3333 01299 4 END OF MESSAGE <=>?012-345-678-9 < 4444 12345 07:25 3:45.6 G 89 23456 07-25 4:56.7 H 9 <=> ?0123-456-789- <= 5555 (=)2 01234-567-89 **<=**> 6666 34567 07-25 5-67 8 T (=)20 12345.678.9 <=>? 7777 45678 07:25 6:78.9 <=> ?01 23456-789- <-=>?0 56789 07:25 7:89. 8888 07:25 8:9 . L =>? 012 34567-89 <=->?01 0000 6789 07:25 9: .< M >?0 123 45678-9 <=>-?012 1000 789 07:25 : <.= N ?01 234 56789- <-=>?-0123 011 89 < 07:25 :<=.> 0 012 345 6789 <=->?0-1234 012 9 <= <=> 07:25 <:=>.? @ 123 456 789 <=>-?01-2345 013 <=>? 07:25 =:>?.0 A 234 567 89 <-=>?-012-3456 014 <=>?0 07:25 >:?0.1 B 345 678 9 <=->?0-123-4567 015 07:25 ?:01.2 C 456 789 <=>-?01-234-5678 016 =>?01

NOTE

When call records are displayed on either the Type I or Type II displays, non-numeric characters, colons, and dashes are omitted and numeric digits are displayed in the "condition code" field.

Figure 11. Sixteen-Message Test - Sample Printout From Test 4

When using the 9-track magnetic tape SMDR equipment, Test 4 should be executed four times to fill the two 9-track SMDR 31-message memory buffers.

- 1. Executing Test 4 four times allows displaying an individual call record from each magnetic tape SMDR memory buffer as each 31-message block is written on magnetic tape.
- 2. By specifying the **EXTENSION NUMBER**, with the thumbwheel switch on the 9-track magnetic tape control panel, a specific call record message from Figure 12 is displayed on the 9-track control panel.

When running Test 4 using the 9-track magnetic tape SMDR equipment, both the tape drive units' **ON-LINE** button and the 9-track control panels' **ON-LINE** button should be depressed.

1-

TIME	DURATION	COND [®] CODE	CODE DIALED	CODE USED	DIALED	NUMBER	STATION OR ORIG TRUNK	ACCOUNT
07:23	0:12.3	4	567 8	9	-012-3	45-6789	1111	012
07:23	1:23.4	5	678 9		0-123-4	56-789	2222	55523
07:23	2:34.5	6	789		01-234-56	7-89	3333	01299
0 7 :23	2:34.5	6	789	(012-345-67	8-9	4444	12345
07:23	4:56.7	8	9	0	123-456-78	9-	5555	23456
07:23	5:67.8	9		01	234-567-89		6666	34567
07:23	6:78.9		0	12	345-678-9		7777	45678
07:23	7:89.		01	23	456-789-	0	8888	56789
0 7 :23	8:9		012	34	567-89	01	9999	6789

12-WORD MESSAGE FORMAT - TYPE I CONTROL PANEL DISPLAY

TIME	DURATION	COND CODE	CODE DIALE	COD D USE	D DIALED NU	IMBER	STATION OR ORIG TRUNK	ACCOUNT NUMBER	AUTH CODE	TQ	FAC RSTCN LEV
00:26	0:12.3	3 4	567	89	-012-34	5-6789	14111	012	345678	9.	
00:26	1:23.4	5	678	9	0-123-45	6-789	2222	0123	456755	5	
00:26	2:34.5	6	789		01-234-56	7-89	3333	01234	56789	99	9
00:26	3:45.6	7	89		012-345-67	8-9	4444	12345	6789		
00:26	4:56.7	8	9		0123-456-78	9.	5555	23456	789		0
00:26	5:67:8	9			01234-567-89		6666	34567	89	0	1
00:26	6:78.9)		0	12345-678-9		7777	45678	9	01	2
00:26	7:89.			01	23456-789-	0	8888	56789	0	12	3
00:26	8:9.		0	12	34567-89.	01	9999	6789	01	23	4

15-WORD MESSAGE FORMAT - TYPE II CONTROL PANEL DISPLAY

Figure 12. Displayable Characters on 9-Track SMDR Equipment (Note: Correct Time is Displayed) From Test 4

- 1. The mode **EXTENSION NUMBER/AUTO** switch should be set in the **EXTENSION NUMBER** mode, and the thumbwheel switch selected to the desired station or extension number to display a specific extension number call record.
- 2. Depressing **CLEAR DISPLAY** clears the control panel display prior to displaying a new call record.
- 3. Depressing **DUMP MEMORY** causes the data contained in the **ON-LINE** memory buffer to be written on tape.
 - Depressing **DUMP MEMORY** repeatedly causes the data from alternate **ON-LINE** memory to be written on tape.



Figure 13. Hexadecimal Dump For Test 4 Test Call (12-Word Format)

Test 5

Test 5 sends a single data word to the SMDR equipment and is normally used in repair of SMDR equipment. Test 5 allows sending most words or messages to the SMDR by manually entering it into Fields 2 and 3.

When Test 5 is performed, maintenance personnel **must** be on the customer's premises to operate SMDR equipment and to determine if Test 5 is successful by observing the SMDR printout.

Caution: Test 5 prevents normal call processing from recording call data using the SMDR equipment. SMDR equipment must be disabled using PROC 275, Word 1 before Test 5 is executed. After Test 5 is completed, SMDR service should be restored using PROC 275, Word 1.

1. Change Field 12 of PROC 275, Word 1 from 1 to 0 to disable SMDR service.

Note: Prior to using Test 5, the customer's tape should be unloaded (with customer's permission) and a spare tape loaded.

2. Enter PROC 655 and select Test 5 by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 5; ENTER.

PROC 655 Test 5



Figure 14. Hexadecimal Dump For Test 4 Test Call (15-Word Format)

3. When Test 5 is called in, a default test word (operation code and data word) is displayed in Fields 2 and 3.

To test the default test word, proceed to Step 7.

4. Field 2 is blinking indicating an optional entry field. To select an operation code and data word different than the default test word, enter the following:

(Operation code); ENTER; (Data word); ENTER.

Proceed to Step 7.

5. Operation codes and data words can also be selected for testing by using the **CHANGE FIELD** sequence:

CHANGE FIELD; 2; ENTER; (Operation code); ENTER; (Data word); ENTER.

Proceed to Step 7.

6. In addition, operation codes and data words can also be selected for testing by use of **NEXT DATA**.

Depressing **NEXT DATA** selects the next of ten operation codes and data words that are available to be transmitted. (Refer to Figure 15.)

When the operation code and data word to be used is displayed in Fields 2 and 3 by depressing **NEXT DATA**, proceed to Step 7.

Field 2	Field 3
OP Code	Data
3'.'2525' -	No operation op code with 01 pattern
3.5252 -	No operation op code with 10 pattern
14.2525 -	Retransmission, end of message with 01
	pattern
14.5252 -	Retransmission, end of message with 10
	pattern
4.2525 -	Retransmission with 01 pattern
4.5252 -	Retransmission with 10 pattern
10.2525 -	End of message op code with Ol pattern
10.5252 -	End of message op code with 10 pattern
0.2525 -	Normal data word op code with Ol pattern
0.5252 -	Normal data word op code with 10 pattern

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Figure 15. List of Operation Codes and Data Words Available Using the NEXT DATA Key in Test 5

7. To start Test 5, depress EXECUTE.

Note: Special error code 80 is displayed in the **MAAP** error code field if **EXECUTE** is depressed with the SMDR service enabled.

8. During execution of Test 5, the following is displayed:

Field 1 - 5.

Fields 2 and 3 - Operation code and data word currently being transmitted to the SMDR equipment.

Fields 4 through 6 - Data channel equipment location associated with the SMDR equipment.

Fields 7 and 8 - Once and last failure codes.

9. Each time **EXECUTE** is depressed, the operation code and data word displayed in Fields 2 and 3 is transmitted to the SMDR equipment.

NEXT DATA is used to select a different operation code and data word to be transmitted prior to depressing EXECUTE.

10. Successful test completion results in a 0 displayed in Fields 7 and 8 and a printout similar to that shown in Figure 16.

00:23	:	. 5	Ε	5	55 5	5-55	5-55	555	55
00:23	:	. 5	Ε	5	55 5	5-55	5-55	555	55

Figure 16. Sample Printout From Test 5, Using 11 Normal Data Word Operation Codes Followed by an End-of-Message Operation Code. The Data Word is an Alternating Ones-Zeros Pattern.

11. After Test 5 is successfully completed, the customer's tape should be loaded, and SMDR service enabled.

To enable SMDR service, change Field 12 of **PROC 275, Word 1** from 0 to 1.

Repair Guide

Overview

When a SMDR failure is indicated, **PROC 655** referenced from **PROC 600** as the cause for the **OTHER FAILS** fault indicator being lighted, perform the following steps, in the order listed, to isolate and repair the faulty unit.

- 1. Execute Test 1, step through the failure history and record the results.
- 2. Execute Test 2 and record the results.
- 3. Execute Test 4 for the direct output SMDR version or the 9-track magnetic tape SMDR version.

When the 9-track magnetic tape SMDR version is being tested, dump the memory so that when Test 4 is executed twice the 16-message test completely fills one memory buffer and the corresponding tape record.

4. Execute Test 4 (twice for a 31-message tape buffer), record the failures and compare several of the messages with Figures 11 and 12.

Repeat Test 4 for the alternate memory buffer for 9-track SMDR testing.

5. Based on the results of Tests 2 and 4, perform the corrective action indicated (in the order listed) in isolation and repair steps:

Repair procedure for direct output SMDR.

Repair procedure for 9-track SMDR.

- 6. Test 3 can be used to determine if failures are intermittent or to use the logic probe at test points on the SMDR equipment to trace wiring problems.
- 7. Test 5 can be used to transmit a single data word repeatedly (by depressing **EXECUTE** repeatedly) and to change the single data word transmitted to help isolate failures in the SMDR equipment.
- 8. When I/O failures are suspected between the dual-speed data channel and the SMDR equipment, perform **PROC 611** Test 3, entering the equipment location displayed in Fields 4 through 6.

Repair Procedure for Direct Output SMDR

Use the following steps to repair a printer or paper tape punch SMDR.

- 1. Perform the corrective action listed for the failure code recorded as a result of Test 2 and the type of message error or incorrect operation as a result of Test 4 (if appropriate).
- 2. Execute Test 3 for each corrective action taken until the final repair is made.
- 3. Verify correct operation of the SMDR equipment using Test 4.

PROC 655

- 4. Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of common control circuit packs.
- 5. Refer to SMDR COMPONENT REPLACEMENT for steps on:

Replacement of SMDR carrier circuit packs.

Replacement of SMDR clock/calendar display.

Failure code 0 - Time or date is incorrectly displayed:

At the SMDR carrier:

- 1. Replace LC66 (time).
- 2. Replace LC67 (date).
- 3. Check the wiring associated with the replaced circuit packs.
- 4. Replace the SMDR clock assembly.

Failure code 0 - No printout message:

1. Determine if HP-H05-10525T logic probe is provided or available:

If the logic probe is available, connect it to the SMDR carrier and proceed to Step 2.

If the logic probe is not available, proceed to Step 6.

- 2. At the SMDR carrier, insert the logic probe into test point **TP8** of LC63 or LC374 circuit pack for at least 5 seconds.
- 3. Execute Test 4.

If the logic probe is not flashing, proceed to Step 4.

If the logic probe is flashing, proceed to Step 5.

- At the SMDR carrier, insert the logic probe into test point TP1 of circuit pack LC62. If the logic probe is not flashing, replace LC62 at the SMDR carrier. If the logic probe is flashing, replace LC63 or LC374 at the SMDR carrier.
- 5. If the logic probe is flashing and no characters are being sent to the printer: If the date is not printed, replace LC65 at the SMDR carrier. If the date is printed, replace LC64 at the SMDR carrier.
- 6. When no logic probe is available, perform Steps 7 through 9 as appropriate.
- 7. At the SMDR carrier, replace LC62.

At the SMDR carrier, replace LC63 or LC374.

- 8. Execute Test 4.
- 9. If no characters are being sent to the printer:

If the date is not printed, replace LC65 at the SMDR carrier.

If the date is printed, replace LC64 at the SMDR carrier.

Failure Code 0 - Invalid printout message:

At the SMDR carrier:

- 1. Replace LC63 or LC374.
- 2. Replace LC39.
- 3. Replace LC64.

Failure code 1, 3, 5, 7, or 8:

- 1. Replace TN403 (dual-speed data channel associated with the SMDR) at the equipment location displayed in Fields 4 through 6.
- 2. At the SMDR carrier, replace LC62.
- 3. Check the wiring associated with the replaced circuit packs.

Failure code 2:

- 1. Verify TN403 (dual-speed data channel associated with the SMDR) at the equipment location displayed in Fields 4 through 6 is set for high speed data.
- 2. At the SMDR carrier, replace LC62.
- 3. Replace TN403 (dual-speed data channel associated with the SMDR) at the equipment location displayed in Fields 4 through 6.
- 4. Check the wiring associated with the replaced circuit packs.

Failure code 4:

- 1. At the SMDR carrier, replace LC62.
- 2. Replace TN403 (dual-speed data channel associated with the SMDR) at the equipment location displayed in Fields 4 through 6.
- 3. Check the wiring associated with the replaced circuit packs.

'Failure code 6:

- 1. At the SMDR carrier, check for a blown fuse.
- 2. At the SMDR carrier, replace LC62.
- 3. Replace TN403 (dual-speed data channel associated with the SMDR) at the equipment location displayed in Fields 4 through 6.
- 4. Check the wiring associated with the replaced circuit packs.

Repair Procedure for 9-Track SMDR

Use the following steps to repair magnetic tape SMDR equipment.

- 1. Perform the corrective action listed for the failure code recorded as a result of Test 2 and the type of message error or incorrect operation as a result of Test 4 (if appropriate).
- 2. Execute Test 2 and/or Test 4 for each corrective action taken until the final repair is made.
- 3. Verify correct operation of the SMDR equipment using Test 4.
- 4. Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of common control circuit packs.

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5. Refer to SMDR COMPONENT REPLACEMENT for steps on:

Replacement of SMDR carrier circuit packs.

Replacement of SMDR formatter circuit packs.

Replacement of SMDR tape drive circuit packs.

Photosensors adjustment.

Tape speed and ramp time adjustments.

Capstan servo zero and tension arm travel adjustments.

Replacement of SMDR clock/calendar display.

Replacement of SMDR formatter.

Replacement of SMDR tape drive.

Failure code 0 - Time and/or date failure:

At the SMDR carrier:

- 1. Replace LC66 (time).
- 2. Replace LC67 (date).
- 3. Check the wiring associated with the replaced circuit packs.
- 4. Replace the SMDR clock assembly.

Failure code 0 - Data not recorded on tape:

1. Determine if HP-H05-10525T logic probe is provided or available:

If the logic probe is available, connect it to the SMDR carrier and proceed to Step 2.

If the logic probe is not available, proceed to Step 13.

- 2. Load a spare 9-track tape. Ensure the write-enable ring is installed on the tape and verify the tape is threaded correctly.
- 3. Connect the logic probe to test point TP1 on the LC178 and execute Test 4 twice.
- 4. Determine the status of the logic probe.

If the logic probe is not flashing, proceed to Step 5.

If the logic probe is flashing, proceed to Step 6.

5. If the logic probe did not flash, perform the following at the SMDR carrier:

Check for a blown fuse.

Replace LC177.

Replace LC68.

Replace LC175.

Replace LC178.

Replace LC63 or LC374.

Replace LC40.

Check the wiring associated with the replaced circuit packs.

- 6. If the logic probe flashed, perform Steps 7 through 12 as appropriate.
- 7. At the SMDR carrier:

Replace LC175.

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Replace LC176.

Replace LC177.

8. At the SMDR formatter:

Replace board 4062.

Replace board 4257.

9. At the SMDR tape drive:

Replace board 3842.

Replace board 4843.

- Replace board 4207.
- Replace board 4188.
- Replace board 4209.

Replace board 3844 and adjust the photosensors.

- 10. Check the cabling between the formatter, tape drive, and SMDR carrier and the wiring associated with the replaced SMDR circuit packs.
- 11. Replace the SMDR formatter.
- 12. Replace the SMDR tape drive.
- 13. When no logic probe is available, perform Steps 14 through 19 as appropriate.
- 14. At the SMDR carrier:

Check for a blown fuse.

Replace LC177.

Replace LC68.

Replace LC175.

Replace LC178.

Replace LC63 or LC374.

Replace LC40.

Replace LC176.

- At the SMDR formatter: Replace board 4062. Replace board 4257.
- At the SMDR tape drive: Replace board 3842. Replace board 4843.
 - Replace board 4207.

Replace board 4188.

Replace board 4209.

Replace board 3844 and adjust the photosensors.

- 17. Check the cabling between the formatter, tape drive, and SMDR carrier and the wiring associated with the replaced SMDR circuit packs.
- 18. Replace the SMDR formatter.
- 19. Replace the SMDR tape drive.

Failure code 0 - Data not displayed at system control panel:

1. Determine if HP-H05-10525T logic probe is provided or available:

If the logic probe is available, connect it to the SMDR carrier and proceed to Step 2.

If the logic probe is not available, proceed to Step 17.

- 2. Ensure the write-enable ring is on the tape.
- 3. Connect the logic probe to test point TP1 on the LC178 circuit pack.
- 4. Execute Test 4 twice.
- 5. Determine the status of the logic probe.

If the logic probe is not flashing, proceed to Step 6.

If the logic probe is flashing, proceed to Step 10.

- 6. If the logic probe did not flash, perform Steps 7 through 9 as appropriate.
- 7. At the SMDR carrier:

Check for a blown fuse.

Check output voltages on the 207B power supply.

8. At the SMDR carrier, replace the first circuit pack listed below. If the logic probe still does not flash, replace the next circuit pack and retest; etc.

LC177.

LC68.

LC175.

LC178.

LC63 or LC374.

LC40

- 9. Check the wiring associated with the replaced circuit packs.
- 10. If the logic probe flashed, perform Steps 11 through 16 as appropriate.
- 11. At the SMDR carrier:

Replace LC175.

Replace LC176.

Replace LC177.

12. At the SMDR formatter:

Replace board 4062.

Replace board 4257.

13. At the SMDR tape drive:

Replace board 3842.

Replace board 4843.

Replace board 4207.

Replace board 4188.

Replace board 4209.

Replace board 3844 and adjust the photosensors.

- 14. Check the cabling between the formatter, tape drive, and SMDR carrier and the wiring associated with the replaced SMDR circuit packs.
- 15. Replace the SMDR formatter.
- 16. Replace the SMDR tape drive.
- 17. When no logic probe is available, perform Steps 18 through 23 as appropriate.
- 18. At the SMDR carrier:

Check for a blown fuse.

Replace LC177.

Replace LC68.

Replace LC175.

Replace LC178.

Replace LC63 or LC374.

Replace LC40.

Replace LC176.

19. At the SMDR formatter:

Replace board 4062.

Replace board 4257.

20. At the SMDR tape drive:

Replace board 3842.

Replace board 4843.

Replace board 4207.

Replace board 4188.

Replace board 4209.

Replace board 3844 and adjust the photosensors.

21. Check the cabling between the formatter, tape drive, and SMDR carrier and the wiring associated with the replaced SMDR circuit packs.

PROC 655

- 22. Replace the SMDR formatter.
- 23. Replace the SMDR tape drive.

Failure code 0 - Incorrect data display at system control panel:

1. At the SMDR carrier:

Replace LC68. Replace LC63 or LC374. Replace LC175.

Replace LC176.

Replace LC177.

Replace LC178.

2. Check for trouble in the System 85 software.

Failure code 0 - Tape fails to load:

1. Ensure the write-enable ring is installed.

The write-enable lamp lights if installed.

- 2. If the tape does not advance to the load point, perform Steps 3 through 7 (as appropriate) at the tape drive.
- 3. Adjust the photosensors on board 3844.
- 4. Replace board 3844.

Replace board 4843.

- 5. Replace board 3645 and adjust the tape speed and ramp time.
- 6. Replace board 4306 and adjust the capstan servo zero and tension arm travel.
- 7. Replace the SMDR tape drive.
- 8. If the tape does not stop at the load point, perform Steps 9 through 14 as appropriate.
- 9. Adjust the photosensors on board 3844 at the tape drive.
- 10. Replace board 3844 and adjust the photosensors at the tape drive.
- 11. Replace board 4062 at the formatter.
- 12. Check the cabling between the tape drive and formatter.
- 13. Replace the SMDR formatter.
- 14. Replace the SMDR tape drive.
- 15. If the ON LINE lamp on the tape drive does not light, refer to Failure code 0 ON LINE lamp does not light at the tape drive.

Failure code 0 - Tape fails to rewind:

- 1. Verify that the tape is threaded correctly.
- 2. Adjust the photosensors on board 3844 at the tape drive.
- 3. If the tape fails to rewind completely onto the supply reel, perform Steps 4 and 5 as appropriate.

4. Replace board 4843 at the tape drive.

Replace board 3645 at the tape drive and adjust the tape speed and ramp time.

- 5. Replace the SMDR tape drive.
- 6. If the tape fails to rewind to the load point, perform Steps 7 through 13 as appropriate.
- 7. At the SMDR carrier, replace LC177.

If the UNLOAD lamp on LC177 does not light when the TAPE UNLOAD button is depressed, check the wiring between LC177 and the TAPE UNLOAD button.

- 8. At the SMDR carrier, replace LC175.
- 9. At the SMDR formatter, replace board 4062.
- 10. At the SMDR tape drive:

Replace board 3842.

Replace board 4843.

Replace board 3645 and adjust the tape speed and ramp time.

Replace board 4306 and adjust the capstan servo zero and tension arm travel.

- 11. Check the wiring associated with the replaced circuit packs and the cabling between the SMDR carrier, formatter, and tape drive.
- 12. Replace the SMDR formatter.
- 13. Replace the SMDR tape drive.

Failure code 0 - Tape fails to move when DUMP MEMORY button is depressed:

1. Determine if HP-H05-10525T logic probe is provided or available:

If the logic probe is available, connect it to the SMDR carrier and proceed to Step 2.

If the logic probe is not available, proceed to Step 17.

- 2. Connect the logic probe to test point **TP10** on the LC177 circuit pack and observe the logic probe when **DUMP MEMORY** is depressed.
- 3. Depress **DUMP MEMORY**.
- 4. Determine the status of the logic probe.

If the logic probe is not flashing, proceed to Step 5.

If the logic probe is flashing, proceed to Step 9.

- 5. If the logic probe did not flash, perform Steps 6 through 8 as appropriate.
- 6. At the SMDR carrier, replace LC68.

Depress DUMP MEMORY.

- 7. If the logic probe still does not flash, replace LC177 at the SMDR carrier.
- 8. Check the wiring associated with the replaced circuit packs.
- 9. If the logic probe flashed, perform Steps 10 through 16 as appropriate.
- 10. Verify that the tape is threaded correctly.
- 11. At the SMDR carrier, replace LC177.

PROC 655

- 12. At the SMDR formatter, replace board 4062.
- 13. At the SMDR tape drive:
 - Replace board 3842.

Replace board 4843.

- 14. Check the wiring between LC177 and the formatter and the cabling between the formatter and tape drive.
- 15. Replace the SMDR formatter.
- 16. Replace the SMDR tape drive.
- 17. When no logic probe is available, perform Steps 18 through 24 as appropriate.
- 18. Verify that the tape is threaded correctly.
- 19. At the SMDR carrier:

Replace LC68.

Replace LC177.

- 20. At the SMDR formatter, replace board 4062.
- 21. At the SMDR tape drive:

Replace board 3842.

Replace board 4843.

- 22. Check the wiring between LC177 and the formatter and the cabling between the formatter and tape drive.
- 23. Replace the SMDR formatter.
- 24. Replace the SMDR tape drive.

Failure code 0 - ON LINE lamp does not light at the tape drive:

- 1. At the SMDR tape drive, replace board 4843.
- 2. Check the cabling between the tape drive and the formatter.
- 3. Replace the SMDR tape drive.

Failure code 1, 3, 5, 7, or 8:

- 1. Replace TN403 (dual-speed data channel associated with the SMDR) at the equipment location displayed in Fields 4 through 6.
- 2. At the SMDR carrier, replace LC62.
- 3. Check the wiring associated with the replaced circuit packs.

Failure code 2, 4, or 6:

- 1. At the SMDR carrier, replace LC62.
- 2. Replace TN403 (dual-speed data channel associated with the SMDR) at the equipment location displayed in Fields 4 through 6.
- 3. Check the wiring associated with the replaced circuit packs.

Failure code 9:

- Determine if HP-H05-10525T logic probe is provided or available: If the logic probe is available, connect it to the SMDR carrier and proceed to Step 2. If the logic probe is not available, proceed to Step 8.
- 2. Connect the logic probe to test point TP8 on the LC68 circuit pack.
- 3. Determine the status of the logic probe.

If the logic probe is not flashing, perform Steps 4 and 5 as appropriate.

If the logic probe is flashing, perform Steps 6 and 7 as appropriate.

- 4. At the SMDR carrier, replace LC62.
- 5. Check the wiring associated with the replaced circuit pack.
- 6. At the SMDR carrier:

Replace LC62.

Replace LC68.

Replace LC63 or LC374.

Replace LC40.

Replace LC177.

Replace LC178.

- 7. Check the wiring associated with the replaced circuit packs.
- 8. When no logic probe is available, perform Steps 9 and 10 as appropriate.
- 9. At the SMDR carrier:

Replace LC62.

Replace LC68.

Replace LC63 or LC374.

Replace LC40.

Replace LC177.

Replace LC178.

10. Check the wiring associated with the replaced circuit packs.

PROC 656

PROC 656 - NCOSS TEST

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ł	TEST HIST FOR	1:ND FAIL ORY AVAILA NCOSS EQUI	LURE ABLE IPMENT.		TESI TO : FAIL PROC	T 2:E ISOLA LURES C 611	CHO 1 TE 1/ USE	'EST. 'O	TES AL1 PA1	ST 3:: TERNA	SENDS TING I CONT	AN DNE-ZI INUOU	ERO Sly.	TEST 4:SENDS A 16 MESSAGE PATTER	N.	TEST 5:S USE 'NEX FROM LIS OR ENTER	ENDS (T DAT (T OF (T OF (T A TE	1 TE TA' 1 10 1 EST 1	ST WI TO SE TEST T TORD.	ORD. LECT WORD	Fi 05 11 25 35 45 55 67 77 85	AILUR = PASS = DATA = BAD = 1 & = 2 & = 1 & = 2 & = 1, 2 = NCOS	E COI REPL 2 MISI 4 4 5 EQ	DES (FIELDS 7,8): NNEL ADDRESS Y PARITY MATCH JIPMENT
T	EST NO	TEST	r word	(TES	T 5) TA		CARR	DATA EQPT SL	CHAI LOCA	INEL TION CHA	NNEL	FAI CI ONCE	LURE	T										COMMON Control Peripherals
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Purpose

PROC 656 provides the capability to test NCOSS equipment when a trouble is reported or suspected.

Tests 3 through 5 of this maintenance procedure **must** be performed on the customer's premises. Successful test completion for Tests 3 through 5 is determined by observing printouts from the NCOSS equipment.

PROC 656 is used to:

- 1. Display failures associated with the NCOSS equipment (when Test 1 is enabled).
- 2. Run an echo test with the NCOSS equipment.
 - Note: Dual-speed data channels associated with NCOSS equipment are tested in PROC 611.

Field Definitions and Codes

Each field of **PROC 656** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BL, PROC 656 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Fields 2 and 3 Select operation code and data of test word to be transmitted to the NCOSS equipment (Test 5 only).

TABLE BL.

	PROC 656 FIELD DEFINITIONS AND CODES														
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION										
1 2 3 4 5	1-5 0 3 4 10 14 0000- 7777 0 23-26	Test number. Operation code (octal): Normal data word. No operation. Retransmit normal data word. Last word in message. Retransmit last word in message. Data word (octal). Common control carrier. Slot Number.	7	0 1 2 3 4 5 6 7 8	Failure code-once: Accu- mulative "OR"ing of all failure codes that occur- red at least once during a test. Pass. Data channel address not acknowledged. No data reply (echo) from NCOSS equipment in all cases. Failures 1 and 2. Echo mismatch. Failures 1 and 4. Failures 1 and 4. Failures 1, 2, and 4. Equipment failure (re- ported by NCOSS).										
6	0-15	Channel number.	8	.0-8	Failure code-last: Failure code indicating one or more failures occurring during the last transmis- sion to the NCOSS equip- ment before the test ended or was stopped.										

Operation of Procedure

Overview

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PROC 656 is used to test NCOSS equipment.

To call in **PROC 656**, perform the following:

- 1. Depress PROC NO; 656; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, Fields 4 through 6 display the data channel equipment location associated with the NCOSS equipment, and all other fields are dashed.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Caution: NCOSS call recording is blocked under the following conditions -While Test 3, 4, and 5 are executing. In Test 4, the 16 message pattern is sent in less than 1 second. In Test 5, the blockage is extended for 2 minutes after EXECUTE is depressed.

PROC 656 Test 1, Test 2, and Test 3

Five tests are available:

- 1. Test 1 Displays failure history (when Test 1 is enabled).
- 2. Test 2 Runs an echo test on the NCOSS equipment.
- 3. Test 3 Sends an alternating one-zero pattern continuously to the NCOSS equipment.
- 4. Test 4 Sends 16 messages to the NCOSS equipment testing most digits in each digit's position.
- 5. Test 5 Sends a single data word to the NCOSS equipment allowing manual entry of operation codes and data words.

Test 1

Test 1 is disabled at the present time and no failure history is available for display.

Note: Depressing EXECUTE displays error code 06 (wrong key, press right key and continue).

Test 2

Test 2 runs an echo test with the NCOSS equipment.

Test 2 does not interfere with normal call processing recording of calls.

An alternating one-zero pattern is used for the first echo test transmission. A complementing one-zero pattern is used for the second echo test transmission.

1. Test 2 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 2; ENTER.

- 2. To start Test 2, depress EXECUTE.
- 3. If no failures are detected, Fields 7 and 8 display a 0.
- 4. If any failures are detected, the following is displayed:

Field 1 - 2.

Fields 4 through 6 - Data channel equipment location associated with the NCOSS equipment.

Fields 7 and 8 - Failure codes (1 through 8).

Test 3

Test 3 sends a continuous alternating one-zero pattern in the format of a call record message to the NCOSS equipment.

- 1. Test 3 is selected by use of NEXT TEST or the CHANGE FIELD sequence: CHANGE FIELD; 1; ENTER; 3; ENTER.
- 2. To start Test 3, depress EXECUTE.

Caution: While Test 3 is executing, NCOSS call recording is blocked.

3. During execution of Test 3, the following fields are displayed:

Field 1 - 3.

Fields 2 and 3 - Operation code and data word currently being transmitted to the NCOSS equipment.

Fields 4 through 6 - Data channel equipment location associated with the NCOSS equipment.

Fields 7 and 8 - Once and last failure codes (if any).

- 4. The testing interval is determined by maintenance personnel performing the test, and is ended by depressing **STOP**.
- 5. The one-zero pattern data word is complemented each time it is transmitted with 0.5 seconds between words.

Between the last word transmitted (normally word 18) and the start of the next message is a 2-second delay to allow stopping Test 3.

6. Successful test completion results in a 0 displayed in Fields 7 and 8.

Test 4

Test 4 sends 16 messages in either 12, 15, or 18 word message formats to the NCOSS equipment.

Four of the NCOSS operation codes are exercised by Test 4, i.e., normal word transmission, last word of message transmission, retransmit normal word, and retransmit last word.

When Test 4 is performed, maintenance personnel **must** be on the customer's premises to determine if the test is successful by observing the NCOSS printout.

1. Test 4 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 4; ENTER.

2. To start Test 4, depress EXECUTE.

Caution: While Test 4 is executing (16 message pattern sent in less than 1 second) NCOSS call recording is blocked.

3. If no failures are detected, Fields 7 and 8 display a 0.

The printout (Refer to Figure 17) should be check to ensure that the NCOSS equipment is operating properly.

4. If any failures are detected, the following is displayed:

Field 1 - 4.

Fields 4 through 6 - Data channel equipment location associated with the NCOSS equipment. Fields 7 and 8 - Once and last failure codes.



NOTE

Bit 2 of the Op Code (parity bit) may be incorrect in this table.

Figure 17. Hexadecimal Dump for Test 4 Test Call (18-Word Format)

Test 5

Test 5 sends a single data word to the NCOSS equipment and is normally used in repair of NCOSS equipment. Test 5 allows sending most words or messages to the NCOSS equipment by manually entering it into Fields 2 and 3.

When Test 5 is performed, maintenance personnel **must** be on the customer's premises to determine if the test is successful by observing the NCOSS equipment.

1. Test 5 is selected by use of NEXT TEST or the CHANGE FIELD sequence:

CHANGE FIELD; 1; ENTER; 5; ENTER.

- 2. When Test 5 is called in a test word (operation code and data word) is displayed in Fields 2 and 3.
- 3. Depressing **NEXT DATA** selects the next of ten operation codes and data words that are available to be transmitted. (Refer to Figure 18.)

Field 2	Field 3
OP Code	Data
1	
3'.'2525'	 No operation op code with 01 pattern
3.5252	- No operation op code with 10 pattern
14.2525	- Retransmission, end of message with Ol
	pattern
14.5252	- Retransmission, end of message with 10
	pattern
4.2525	- Retransmission with 01 pattern
4.5252	 Retransmission with 10 pattern
10.2525	- End of message op code with Ol pattern
10.5252	- End of message op code with 10 pattern
0.2525	- Normal data word op code with 01 pattern
0.5252	- Normal data word op code with 10 pattern

Figure 18. List of Operation Codes and Data Words Available using the NEXT DATA Key in Test 5

4. Operation codes and data words can be manually entered into Fields 2 and 3 using the CHANGE FIELD sequence:

CHANGE FIELD; 2; ENTER; (Operation code); ENTER; (Data word); ENTER.

5. To start Test 5, depress EXECUTE.

Caution: When Test 5 is executed, NCOSS call recording is blocked for 2 minutes after EXECUTE is depressed.

6. During execution of Test 5, the following fields are displayed:

Field 1 - 5.

Fields 2 and 3 - Operation code and data word currently being transmitted to the NCOSS equipment.

Fields 4 through 6 - Data channel equipment location associated with the NCOSS equipment.

Fields 7 and 8 - Once and last failure codes (if any).

7. Each time **EXECUTE** is depressed, the operation code and data word displayed in Fields 2 and 3 is transmitted to the NCOSS equipment.

NEXT DATA can be used to select a different operation code and data word to be transmitted prior to depressing **EXECUTE**.

PROC 656

Repair Guide

When an NCOSS failure is reported or suspected, perform the following steps in the order listed to isolate and repair the faulty unit.

- 1. Execute Test 2 and record the results.
- 2. Execute Test 4, record the results and look at the printout.
- 3. If Test 4 fails or the printout is not correct, the NCOSS equipment is faulty.

Refer the problem to the appropriate personnel.

- 4. Test 3 can be used to determine if failures are intermittent or to trace wiring problems.
- 5. Test 5 can be used to transmit a single data word repeatedly (by depressing **EXECUTE** repeatedly) and to change the single data word transmitted to help isolate failures in the NCOSS equipment.
- 6. When I/O failures are suspected between the dual-speed data channel and the NCOSS equipment, perform **PROC 611** Test 3, entering the equipment location displayed in Fields 4 through 6.

PROC 960 - QUEUE ACTIVITY

FL) ISS	IPCHART SUE 1			+			+	QUEUE	ACTIV	111		+	+			
TEST DISP ENTE	1: QUEUE INF RED EQUIP	ORMA LOC.	TION F	OR AN		TEST DISPL FIRST	2: (STATIC QU AYS QUEUE INF TRUNK IN QUE	UEUE) CORMATION UE FOR AN	AND	FLD 7: 0= 1=	EQUII BUSY UNEQI	PPED WITH HAROW VIPPED WITH HARO	ARE AND NOT MAI DWARE OR MAINTE	NTENA	NCE	SPECIAL ERROR CODE: 81 - CIRCUIT ASSIGNED
FOR FIE	TESTS 1 AN	ND 2: NTAIN IELD	AN II 7 Say:	NTERNAL S IT IS	TRUNK	QUEUE	IS MADE WHEN D. THIS COPY	I "EXECUTE	" IS YED.	2=	PSEU	DO TRUNK				TO ATTENDANT INTERFACE
PSEU ARE DISF MAY	JDO TRUNK. Never ente Played by t Be used as	INTE ERED, TEST S INP	RNAL THEY 2. A I UT FO	RUNK NU ARE ONL DISPLAYE R TEST 1	MBERS Y D ITN	USE " NEXT UNIT" NON-2	NEXT CIRCUIT Trunk in Queu To Advance T Ero Length	TO ADVANCI IE. USE "N To Next Qu	E TO Ext Eve of		-	1≖ON IDLE 2≖ON A BL SET. (E 3≖ON BUSY	E QUEUE JSY QUEUE WITHO Error condition / Queue	UT Q ()	BIT	
TEST	EQUIPMENT LOCATION						TEST 2	TRU	INK 1119	QUEUE		QUEUE	TRUNK	F		QUEUE
ND MODULE CAB CARR SLOT C						PUSTE	QUEUE NUMBER	8	BER 9	INDEX	10	LENGTH	TYPE	18 13		960

Purpose

PROC 960 is used to display queue information for a particular equipment location, or to display the equipment locations associated with a particular queue.

Field Definitions and Codes

Each field of **PROC 960** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BM, PROC 960 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Fields 2 through 6 Select a specific equipment location to determine the queue activity (Test 1 only).
- 3. Field 8 Select a specific queue number to determine the equipment locations on the queue (Test 2 only).

Operation of Procedure

Overview

PROC 960 is used to determine the queue activity.

To call in **PROC 960**, perform the following:

- 1. Depress PROC NO; 960; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, Field 2 is blanked and blinking, and all other fields are dashed.

3. Depressing **NEXT TEST** repeatedly advances the procedure to the desired test.

	PROC 960 FIELD DEFINITIONS AND CODES													
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION									
1	1,2	Test number	8	0-255	Queue number									
2-6		Equipment location:	9	0-255	Trunk group number									
2	0-30	Module number	10	0-999	Queue index									
3	0-6	Cabinet number	11	0-999	Queue length									
4	0-3	Carrier number			gueue length									
5	0-21	Slot number	12	0-127	Trunk type									
6	0-7	Circuit number	13	0-3	QBIT (Queue status):									
7	0-2	Busied or unequipped:		0	Not on any queue.									
	0	Equipped with hardware and not maintenance busy.		1	On idle queue.									
	1	Unequipped with hardware or maintenance busy.		2	On a busy queue without QBIT set (error condition).									
	2	Pseudo trunk.		. 3	On a busy queue.									

TABLE BM.

Two tests are available:

1. Test 1 - Displays queue information for an entered equipment location.

The equipment location contains the internal trunk number for a pseudo trunk.

2. Test 2 - Displays queue information and the first trunk in queue for an entered queue number.

Test 1

Test 1 is used to display the queue information for an entered equipment location.

The equipment location fields (4 through 6) display the internal trunk record number when Field 7 displays a 2.

- 1. Test 1 is the default test when entering PROC 960 or is selected by use of NEXT TEST.
- 2. When Test 1 is initially called in, Field 2 (module) is blanked and blinking to indicate that data must be entered.
- 3. The equipment location to be displayed is entered as follows:

(Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number); ENTER.

- 4. To start Test 1, depress EXECUTE.
- 5. The busied or unequipped status is displayed in Field 7 and the queue status is displayed in Field 13 when **EXECUTE** is depressed.

- 6. For a trunk equipment location that is not on a queue (0 displayed in Field 13) no further information is provided.
- 7. The following information is provided for trunk equipment locations that are in queue:

Field 1 - 1.

Fields 2 through 6 - Equipment location selected.

Field 7 - 0 or 2.

Field 8 - Queue number.

Field 9 - Trunk group number.

Field 10 - Dashed.

Field 11 - Queue length.

Field 12 - Trunk type.

Field 13 - QBIT (1 =on idle queue or 3 =on busy queue).

8. When another specific equipment location is to be displayed, the CHANGE FIELD sequence must be used to select the specific equipment location.

Either all or any part of the equipment location fields can be changed.

9. **EXECUTE** must be depressed to display the queue information for the specific equipment location entered.

Test 2

Test 2 is used to display the queue information and first trunk in queue for an entered queue number.

- 1. Test 2 is selected by use of NEXT TEST.
- 2. When Test 2 is initially called in, a default equipment location from Test 1 may be displayed in Fields 2 through 6 and Field 8 (queue number) is blinking to to indicate that data may be entered.

Either the default equipment location may be displayed or a specific queue number can be selected for display.

3. To select a specific queue number to be displayed, enter the following:

(Queue number); ENTER.

- 4. To start Test 2, depress EXECUTE.
- 5. The following information for the first trunk equipment location of the queue number entered is displayed as follows:

Field 1 - 2.

Fields 2 through 6 - Trunk equipment location.

Field 7 - Busied or unequipped.

Note: If Field 7 equals 2 (pseudo trunk), Fields 4 through 6 display an internal trunk number and Fields 2 and 3 are dashed.

Field 8 - Queue number selected.

- Field 9 Trunk group number.
- Field 10 Queue index.
- Field 11 Queue length.
- Field 12 Trunk type.
- Field 13 Dashed.
- 6. Depressing **NEXT CIRCUIT** repeatedly displays the remaining trunks in the queue.

When all trunks in the queue are displayed, depressing **NEXT CIRCUIT** once more dashes Fields 2 through 7, 12 and 13.

Depressing NEXT CIRCUIT again displays the first trunk equipment location in the queue.

7. Depressing NEXT UNIT steps to the next queue number.

NEXT CIRCUIT can be used to step through the new queue number if Field 11 is greater than 0.

8. When all queues are displayed, depressing **NEXT UNIT** again dashes Fields 2 through 8, 12 and 13. Fields 9 through 11 display a 0.

Depressing **NEXT UNIT** once more displays the first queue number.

9. When another specific queue number is to be displayed without stepping through all queue numbers using **NEXT UNIT**, the **CHANGE FIELD** sequence must be used to select the specific queue number:

CHANGE FIELD; 8; ENTER; (Queue number); ENTER.

10. **EXECUTE** must be depressed to display the trunk equipment locations of the specific queue number entered.

PROC 961 - CONNECTION ACTIVITY

FL	IPCHART SUE 1 +				+	CONNECT	ION	ACTIVITY	+		╋		
TEST DISF NBR, SLOT	1: "LAYS EQUIP LOC, CONSTAT 1 ACPORT TBL NBR, AND TIME "INFO FOR AN ENT CONN NBP	'BL : ?.				TEST 2: DSPL COP CONSTAT ENTERED	NN NBF Typil f TS-II	R AND NBR FOR AN D Accum Num	TEST 4: DISPLAYS AND THE F ACCUMULAT	THE CONNE IRST ACTI DR ON A M	CTION VE ODULE	NUMBER	SPECIAL ERROR CODES: NONE
USE USE USE	"NEXT CIRCUIT" TO ADVANCE "NEXT UNIT" TO ADVANCE TO "NEXT DATA" TO ADVANCE TO	to i Nex Nex	NEXTI T Cons T Bus'	PORT Stat (Con	IN ACPORT TBL TBL. NECTION NUMBER	TEST 3: DISP COM NBR, COM R, AN ENTER	NSTAT NN NBF Red Ec	TBL NBR, ACPORT TBL R, TS-ID ACC NUM FOR QUIP LOC.	USE "NEXT NEXT ACTI "NEXT UNI MODULE.	CIRCUIT" VE TIME S T" TO ADV	TO D Lot. Ance	ISPLAY USE TO NEXT	
NOTE: WHEN A MULTI MODULE CALL IS MADE. A THS TIMESLOT IS DISPLAYED IN EQUIPMENT LOCATION FIELD. MOD/CAB/CKT IS DASHED. CARRIER/SLOT CONTAINS THS TIMESLOT.													
	TEST 1			-	TEST	15		TEST :	1	LIS I	EX		
TEST	CONNECTION	8/I 8IT	ISTAT NO	- - 	TIME SLOT	IDENTITY	PORT L NO	EQUIPMENT LO	CATION	CONN POR	N.		CONNECTION ACTIVITY
NU	NUMBER (OCTAL)			SU NI "	TEST 4 A	CCUMULATOR NUMBER	a ACI	MODULE CAB CARR	SLOT		15 15		961

Purpose

PROC 961 is used to display the connection status activity, i.e., connection number, module and accumulator number, and equipment location.

Field Definitions and Codes

Each field of **PROC 961** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BN, PROC 961 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Field 2 Select a specific connection number to determine the equipment location, constat table number, acport table number, and time slot identity (Test 1 only).
- 3. Fields 6 and 7 Select a specific time slot identity to determine the connection number and constat table number (Test 2 only).
- 4. Fields 9 through 13 Select a specific equipment location to determine the constat table number, acport table number, connection number and time slot identity accumulator number (Test 3 only).
- 5. Field 6 Select a specific module to determine the connection number and the first active accumulator on a module (Test 4 only).

PROC 961 FIELD DEFINITIONS AND CODES					
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION
1	1-4	Test number	9-13		Equipment location or TMS time slot:
2	0-77777	Connection number (octal)	9	0-30	Module number
3	0,1	Busy/idle bit	10	0-6	Cabinet number
			11	0-3	Carrier number
4	1-6	Constant table number.	12	0-21	Slot number
5	0,1	In-use status	13	0-7	Circuit number
6-7		Time slot identity:	Fields 9, 10, and 13 are dashed when a multi-		
6	0-30	Module number	the TMS time slot.		
7.	1-255	Accumulator number	14	0-6	Number of ports in connection.
8	1-6	ACPORT table number.	15	1-6	Port index

TABLE BN.

Operation of Procedure

Overview

PROC 961 is used to determine the connection activity.

To call in **PROC 961**, perform the following:

- 1. Depress PROC NO; 961; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, Field 2 is blanked and blinking, and all other fields are dashed.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

Four tests are available:

1. Test 1 - Displays equipment location, constat table number, acport table number, and time slot information for an entered connection number.

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- 2. Test 2 Displays connection number and constat table number for an entered time slot identity accumulator number.
- 3. Test 3 Displays constat table number, acport table number, connection number, and time slot identity accumulator number for an entered equipment location.
- 4. Test 4 Displays the connection number and the first active accumulator on a module.

Test 1

Test 1 displays the equipment location, constat table number, acport table number, and time slot identity for an entered connection number.

- 1. Test 1 is the default test when entering **PROC 961**, or is selected by use of **NEXT TEST**.
- 2. When Test 1 is initially called in, a default connection number may be displayed in Field 2.

Field 2 (connection number) is blanked and blinking, indicating an optional entry field.

3. The default connection number can be the last connection number displayed in Tests 2 through 4 of **PROC 961**.

Either the default connection number may be displayed or a specific connection number can be selected for display.

4. A specific connection number can be selected for display by entering the connection number (in octal) in Field 2:

(Connection number); ENTER.

- 5. To start Test 1, depress EXECUTE.
- 6. The busy/idle status of the connection number is provided in Field 3 (0 = idle, 1 = busy) when **EXECUTE** is depressed.
- 7. For a connection number that is not busied (0 displayed in Field 3), no further information is provided.
- 8. For a busied connection (1 displayed in Field 3), the following information is provided:

Field 1 - 1.

Field 2 - Connection number selected.

Field 3 - 1.

Field 4 - Constat table number.

Fields 6 and 7 - Module and accumulator number.

Field 8 - Acport table number.

Fields 9 through 13 - Equipment location on the connection.

Field 14 - Number of ports in connection.

Field 15 - Port index.

9. Depressing NEXT CIRCUIT displays the next port in the acport tables.

Field 8 displays the number of the acport table and Field 14 displays the total number of acport tables being used for the current constat table number (Field 4).

10. Depressing NEXT CIRCUIT after all ports in the acport tables are displayed dashes Fields 2 through 15.

Depressing **NEXT CIRCUIT** once more causes the first entry to be displayed.

PROC 961 Test 1 and Test 2

11. Depressing NEXT UNIT decrements the constat table number displayed in Field 4.

When all constat table numbers are displayed, depressing **NEXT UNIT** again dashes Fields 2 through 15.

Depressing **NEXT UNIT** once more causes the first entry to be displayed.

12. Depressing **NEXT DATA** advances the display to the next busied connection number and displays the data for that connection number.

When all busied connection numbers are displayed, depressing NEXT DATA again dashes Fields 2 through 15.

Depressing NEXT DATA once more causes the first entry to be displayed.

13. When another specific connection number is to be displayed, the **CHANGE FIELD** sequence must be used to select the connection number:

CHANGE FIELD; 2; ENTER; (Connection number); ENTER.

14. **EXECUTE** must be depressed to display the equipment location, constat table number, acport table number, and time slot identity for the entered connection number.

Test 2

Test 2 displays the connection number and constat table number for an entered time slot identity accumulator number.

- 1. Test 2 is selected by use of NEXT TEST.
- 2. When Test 2 is initially called in, a default module and accumulator number may be displayed in Fields 6 and 7.

The default module and accumulator number can be the last module and accumulator number displayed in Test 1, 3, or 4 of **PROC 961**.

3. Field 6 (module) is blinking, indicating an optional entry field.

Either the default module and accumulator number may be displayed or a specific module and accumulator number can be selected for display.

4. A specific module and accumulator number can be selected for display by performing one of the following depending on whether or not a default module and accumulator number are displayed:

(Module number); ENTER; (Accumulator number); ENTER.

CHANGE FIELD; 6; ENTER; (Module number); ENTER; (Accumulator number); ENTER.

- 5. To start Test 2, depress EXECUTE.
- 6. A search of all of the constat tables for the entered module and accumulator number is performed when **EXECUTE** is depressed.
- 7. If the module and accumulator number are not found, the constat table number is displayed in Field 4, a 0 is displayed in Field 5 and no other information is provided.

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8. If the module and accumulator are found in the constat tables, the following information is provided:

Field 1 - 2.

Field 2 - Connection number.

Field 3 - 1.

Field 4 - Constat table number.

Field 5 - 1.

Field 6 - Module number selected.

Field 7 - Accumulator number selected.

9. When another module and accumulator number is to be displayed, the CHANGE FIELD sequence must be used to select the specific module and accumulator number:

CHANGE FIELD; 6; ENTER; (Module number); ENTER; (Accumulator number); ENTER.

10. **EXECUTE** must be depressed to display the connection number and constat table number for the module and accumulator number entered.

Test 3

Test 3 displays the constat table number, acport table number, connection number, and time slot identity for an entered equipment location.

- 1. Test 3 is selected by use of NEXT TEST.
- 2. When Test 3 is initially called in, a default equipment location may be displayed in Fields 9 through 13.

Field 9 (module) is blinking, indicating an optional entry field.

3. The default equipment location can be the last equipment location displayed in Test 1, 2, or 4 of **PROC 961**.

Either the default equipment location may be displayed or a specific equipment location can be selected for display.

4. A specific equipment location can be selected for display by performing one of the following depending on whether or not a default equipment location is displayed:

(Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number); ENTER.

CHANGE FIELD; 9; ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number); ENTER.

- 5. To start Test 3, depress EXECUTE.
- 6. A search of all of the acport tables for the entered equipment location is performed when **EXECUTE** is depressed.

PROC 961 Test 3 and Test 4

- 7. If the equipment location is not found, a 0 is displayed in Field 5 and no other information is provided.
- If the equipment location is found in the acport tables, the following information is provided: Field 1 - 3.
 - Field 2 Connection number.
 - Field 3 1.

Field 4 - Constat table number.

Field 5 - 1.

Fields 6 and 7 - Time slot identity.

Field 8 - Acport table number.

Fields 9 through 13 - Equipment location selected.

9. When another equipment location is to be displayed, the **CHANGE FIELD** sequence must be used to select the specific equipment location:

CHANGE FIELD; 9; ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number); ENTER.

10. **EXECUTE** must be depressed to display the constat table number, acport table number, connection number, and time slot identity for the entered equipment location.

Test 4

Test 4 displays the connection number and the first active accumulator for an entered module number.

- 1. Test 4 is selected by use of **NEXT TEST**.
- 2. When Test 4 is initially called in, a default module number may be displayed in Field 6.

Field 6 (module) is blinking, indicating an optional entry field.

3. The default module number can be the last module number displayed in Tests 1 through 3 of **PROC 961**.

Either the default module number can be displayed or a specific module number can be selected for display.

4. A specific module number can be selected for display by performing one of the following depending on whether or not a default module number is displayed:

(Module number); ENTER.

CHANGE FIELD; 6; ENTER; (Module number); ENTER.

5. To start Test 4, depress EXECUTE.

6. The following information is provided for the module entered:

Field 1 - 4.

Field 2 - Connection number.

Field 4 - Constat table number.

Field 5 - 1.

Field 6 - Module number selected.

Field 7 - First active accumulator in module.

7. Depressing **NEXT CIRCUIT** displays the next active accumulator in Field 7 for the module entered in Field 6.

Field 2 displays the connection number that the accumulator is on.

8. Depressing **NEXT CIRCUIT** after all active accumulators are displayed for the module entered in Field 6 dashes Fields 2 through 15.

Depressing **NEXT CIRCUIT** once more causes the first active accumulator for the module entered in Field 6 to be displayed.

9. Depressing **NEXT UNIT** increments the module number displayed in Field 6.

When all modules are displayed, depressing **NEXT UNIT** again dashes Fields 2 through 15. Depressing **NEXT UNIT** once more causes the first entry to be displayed.

-14

PROC 962 - FACILITY CONNECTIONS

FL IS	IPCHART SUE 2			+			+	FACILI	Y CO	INNECT	IONS		+			+		_		
TEST EXCE THE "EXE DISF INFO ADVA CONF "EXE	FS 1 AND 2 PT TEST 1 CONNECTION COUTE" WAS PLAYS EXIST O. USE "NEX ANCE TO NEX FERENCE POR ECUTE" TO M	ARE DISPL I INFO PRESS ING ((T CIF (T FAC (T FAC (T US)	IDENTI AYS A MADE SED & CONNEC RCUIT CILITY SE "CL FAC OF	ICAL- A COPY OF E WHEN TEST 2 CTION ' TO ' TO ' OR LEAR DATA' R CONF	FL 0 1 2 3 4 5	D 7 ANI CIRCI = UNEQF = TERMI = TRUN = 72 SI TERMI = TMS = PSEU	D 17 JIT TY T INAL ERIES INAL	FLD 8 STATUS 0 = NON-CONTROI 1 = IN-CONTROI 2 = NON-CONTROI 3 = IN CONTROI 4 = NOT ON TIM 5 = INVALID LOI 6 = MINTENANCI 7 = UNEQPO CIRI	L, NON NON- L. IN IN C E SLOT CATION E BUSY CUIT	I-CONF CONF CONF CONF	FLD 10 1 = IM 2 = QL 3 = I0 4 = A1 5 = A1 6 = D1	D INTER NTERNAL JEUING COM REC IND SWI IND OR IAL PUL	NAL NBR TY NBR TRK ORD TCH LOOP SE OR	1 FI 2 3 4 6	LD 16 = TF = TF = TF = TE = TE CC CF	S HO RK-FA RK-FA RMIN RMIN DNFER FAC1-	W LINK C1 C2 C3 AL AL- ENCE 8	ED	SPECIAL CODES: N	ERROR ONE
POR1 SEE	NOTE 1.	INIT	CIRCL	JIT FIELD	NO	TE 1: /	LTHOU	H TEST 2 IS DYNAMI IS PUSHED.	C, THE	E FACILI	TY OR	CONFER	ENCE DISPL/	Y 15	ONLY	CURR	IENT WH	HEN 1	THE EXECU	re.
	Ĩ			INITI	TING	CIRCU	IT				FA	CILITY	OR CONFERE	NCE P	ORT					
TEST	EQ	UIPME	NT LO	ICATION		ΥPE	SD	PROGRESS MARK	N R		EQUIP	MENT L	OCATION		a	ΓYPE	۶ ۲		FACI	LITY CTION
1	MODULE	CAB 3	CARR 4	SLOT	СК	т із 6 7	e STAI	(DCTAL)	INI ¹	MODUL	E CA	B CARR	SLOT	CKT 15	NOH 16	17	18 18		96	2

The flipchart shown is for R2V2. The R2V1 flipchart is similar except that Note 1 on the flipchart is not included.

Purpose

PROC 962 is used to display the trunk number linkages for line records and the facility and conference facility linkages for trunk records.

PROC 962 also displays the progress mark and linkage information for an entered equipment location.

Field Definitions and Codes

Each field of **PROC 962** flipchart and the possible displays for the fields during execution of the different tests are defined in Table BO, PROC 962 - Field Definitions and Codes.

Optional input fields are:

- 1. Field 1 Change test number.
- 2. Fields 2 through 6 Select a specific equipment location to determine the facility connection information.

Operation of Procedure

Overview

PROC 962 is used to determine the facility connections.

To call in **PROC 962**, perform the following:

- 1. Depress PROC NO; 962; ENTER.
- 2. Test 1 is automatically selected.

Field 1 displays a 1, Field 2 is blanked and blinking, and all other fields are dashed.

3. Depressing NEXT TEST repeatedly advances the procedure to the desired test.

	<u></u>	PROC FIELD DEFINITIO	962 NS AND C	ODES	
FIELD	CODE	DEFINITION	FIELD	CODE	DEFINITION
1	1,2	Test number	10	3	Intercom (ICOM) record
2-6		Initiating circuit equipment	(Contd)	4	Attendant switch loop
		location:		5	Attendant originating register
2	0-30	Module number		6	Dial pulse originating register
3	0-6	Cabinet number	11-15		Facility or conference port
4	0-3	Carrier number	11-10		equipment location:
5	0-21	Slot number	11	0-30	Module number
6	0-7	Circuit number	12	0-7	Cabinet number
7 .	0-5	Circuit type:	13	.1-3	Carrier number
	0	Unequipped	14	0-21	Slot number
	1	Line	15	0-7	Circuit number
	2	Trunk	16	1_6	How linked
	3	72 Series terminal	10	1-0	The facility 1
	4	TMS		л О	Trunk - facility 1.
	5	Pseudo trunk		2	Trunk - facility 2.
8	0-7	Status:		3	Trunk - facility 3.
	0	Noncontrol, nonconference.		4	Station
	1	In control, nonconference.		5	Not used.
	2	Noncontrol, in conference.		6	Station - Conference (Confer-
	3	In control, in conference.			chec factory i chrough cy.
	4	Not on time slot.	17	0-5	Circuit type:
	5	Invalid location.		0	Unequipped
	6	Maintenance busy.		1	Line
	7	Unequipped circuit.		2	Trunk
9	0-2047	Progress mark (octal)		3	72 Series terminal
10	1-6	Internal number type:		4	TMS
	1	Internal number		5	Pseudo trunk
	2	Queueing trunk	18	1-8	Conference port number

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TABLE BO.

PROC 962 Test 1

Two tests are available:

- 1. Test 1 A static test that displays a copy of the connection information for an initiating equipment location.
- 2. Test 2 A dynamic test that continually updates the progress mark of the initiating equipment location.

Test 1

Test 1 is a static test that displays a copy of the connection information for an initiating circuit.

The connection information is not updated until EXECUTE is depressed again.

- 1. Test 1 is the default test when entering PROC 962, or is selected by use of NEXT TEST.
- 2. When Test 1 is initially called in, a default equipment location may be displayed in Fields 2 through 6.

Field 2 (module) is blinking, indicating an optional entry field.

3. The default equipment location can be the last equipment location displayed in Test 2 of **PROC 962**.

To display the default equipment location, proceed to Step 5.

4. A specific equipment location can be selected for display by entering the following:

(Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number); ENTER.

- 5. To start Test 1, depress EXECUTE.
- 6. The initiating circuit and its status and the facility or conference port data linked to the initiating circuit is provided when **EXECUTE** is depressed.
- 7. The following information is displayed:

Field 1 - 1.

Fields 2 through 6 - Initiating circuit equipment location.

Field 7 - Initiating circuit type.

Field 8 - Initiating circuit status.

Field 9 - Progress mark (octal).

Field 10 - Internal number type (1 - indicating internal number when Field 17 = 5) or dashed.

Fields 11 through 15 - Facility or conference port equipment location or dashed.

Field 16 - How the facility or conference port is linked.

Field 17 - Facility or conference port circuit type or dashed.

Field 18 - Conference port number or dashed.

8. If the initiating circuit is a trunk record, depressing **NEXT CIRCUIT** repeatedly steps through all the facilities that are linked.

9. If the initiating circuit is a conference record, depressing **NEXT CIRCUIT** repeatedly steps through all equipment locations on the conference.

The conference port number is displayed in Field 18.

10. When all facilities or conference records are displayed, depressing **NEXT CIRCUIT** again dashes Fields 10 through 18.

Depressing NEXT CIRCUIT once more restores the display to its initial state.

- 11. When a facility or conference port equipment location is displayed, depressing **CLEAR DATA; EXECUTE** transfers the facility or conference port equipment location to the initiating circuit equipment location.
- 12. After transfer, depressing **EXECUTE** displays the new facility or conference port equipment location associated with the new initiating circuit equipment location.
- 13. When another initiating circuit equipment location is to be displayed, the CHANGE FIELD sequence must be used to select the specific initiating circuit equipment location:

CHANGE FIELD; 2; ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number); ENTER.

14. **EXECUTE** must be depressed to display a copy of the connection information for the entered initiating circuit.

Test 2

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Test 2 is a dynamic test that continually updates the progress mark of the initiating circuit.

Test 2 is similar to Test 1 except that the connection information is displayed every time the progress mark changes, instead of only when depressing **EXECUTE**.

- 1. Test 2 is selected by use of NEXT TEST.
- 2. When Test 2 is initially called in, a default equipment location may be displayed in Fields 2 through 6.

Field 2 (module) is blinking, indicating an optional entry field.

3. The default equipment location can be the last equipment location displayed in Test 1 of **PROC 962**.

To display the default equipment location, proceed to Step 5.

4. A specific equipment location can be selected for display by entering the following:

(Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number); ENTER.

5. To start Test 2, depress EXECUTE.

6. The initiating circuit and its status and the facility or conference port data linked to the initiating circuit is provided when **EXECUTE** is depressed.

7. The following information is displayed:

Field 1 - 2.

Fields 2 through 6 - Initiating circuit equipment location.

Field 7 - Initiating circuit type.

Field 8 - Initiating circuit status.

Field 9 - Progress mark (octal).

Field 10 - Internal number type (1 - indicating internal number when Field 17 = 5) or dashed.

Fields 11 through 15 - Facility or conference port equipment location or dashed.

Field 16 - How the facility or conference port is linked.

Field 17 - Facility or conference port circuit type or dashed.

Field 18 - Conference port number or dashed.

- 8. If the initiating circuit is a trunk record, depressing NEXT CIRCUIT repeatedly steps through all the facilities that are linked.
- 9. If the initiating circuit is a conference record, depressing **NEXT CIRCUIT** repeatedly steps through all equipment locations on the conference.

The conference port number is displayed in Field 18.

10. When all facilities or conference records are displayed, depressing **NEXT CIRCUIT** again dashes Fields 10 through 18.

Depressing **NEXT CIRCUIT** once more restores the display to its initial state.

- 11. When a facility or conference port equipment location is displayed, depressing **CLEAR DATA**; **EXECUTE** transfers the facility or conference port equipment location to the initiating circuit equipment location.
- 12. After transfer, depressing **EXECUTE** displays the new facility or conference port equipment location associated with the new initiating circuit equipment location.
- 13. When a change occurs in the progress mark (Field 9) of the initiating circuit after **EXECUTE** is depressed, the display is updated as the change occurs.
- 14. When another initiating circuit equipment location is to be displayed, the **CHANGE FIELD** sequence must be used to select the specific initiating circuit equipment location:

CHANGE FIELD; 2; ENTER; (Module number); ENTER; (Cabinet number); ENTER; (Carrier number); ENTER; (Slot number); ENTER; (Circuit number); ENTER.

15. **EXECUTE** must be depressed to display the connection information for the entered initiating circuit.

PROC 999 - MEMORY WORD DISPLAY

FLIPCHART ISSUE 1	+	+	MEMORY WORD DISPLAY	+	+	
TO DISPLAY MEMORY OPERATE 'DISPLAY', THEN OPERATE 'ENTE OPERATE 'NEXT DATA	WORD: ENTER ADDRESS (IM R'. DATA WILL BE ' TO DISPLAY DATA	N OCTAL), AND DISPLAYED IN OCTAL. A IN NEXT MEMORY WORD	NOTE: IF DATA = 999999, THEN TH	IE WORD HAS BAD P	ARITY.	
ADDR	ESS		DATA			MEMORY WORD DISPLAY
	L L				L 1. I	999

Purpose

PROC 999 is used to access and display the word contents of memory via the software tables.

PROC 999 is a display only maintenance procedure and is provided as an aid in displaying the data contents of a memory address.

Field Definitions and Codes

1. Field 1 is used to enter a memory address (in octal) in order to display the data contents of the memory address.

Maximum addressable memory location (based on current switch memory configuration) for Field 1 (address) is 77777777 octal which equals FFFFFF hexadecimal (or 8 megawords).

2. Field 2 (data) can display 0 through 177777 in octal (which equals 0 through FFFF hexadecimal).

Operation of Procedure

PROC 999 is used to determine the data contents of a memory address.

To determine the data contents of a memory address, perform the following:

- 1. Depress PROC NO; 999; ENTER.
- 2. Depress DISPLAY.

The address fields on the MAAP are blanked.

- 3. Enter the address (in octal) of the word contents to be displayed.
- 4. Depress ENTER.

The address and word contents are displayed in the address and data fields (Fields 1 and 2).

5. Once a software table is accessed, the next word in sequence can be displayed by depressing NEXT DATA.

The address is automatically incremented by one, and the data contents of the new address are displayed.

PROC 999

To display the data contents of all memory addresses beginning with memory address **00000001**, perform the following:

- 1. Depress PROC NO; 999; ENTER.
- 2. Depress NEXT DATA.

The address and word contents are displayed in the address and data fields (Fields 1 and 2).

3. Depressing NEXT DATA repeatedly steps through all memory addresses and displays the data contents of each memory address.

SWITCH COMPONENT REPLACEMENT

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This section provides a brief description of the switch cabinets and carriers and contains instructions for replacement of switch components.

Replacement of switch components and other maintenance tasks as determined by performing maintenance procedures consist of the following:

1. Circuit pack replacements for:

Unduplicated common control carrier circuit packs.

Duplicated common control carrier circuit packs.

TMS or module control carrier circuit packs.

Port carrier circuit packs.

Unduplicated common control DC/DC converter unit and duplicated common control power carrier circuit packs.

- 2. Circuit pack switch option settings.
- 3. High Capacity Mini-recorder (HCMR) circuit pack replacement.
- 4. Cleaning HCMR tape head and capstan.
- 5. HCMR replacement.
- 6. Power supply replacement.
- 7. Frequency generator replacement.
- 8. DC fan and fan assembly replacement.
- 9. TMS/RMI cabinet AC distribution unit replacement.
- 10. Module control or port cabinet AC distribution unit replacement.
- 11. DC filter replacement.
- 12. Console component replacement.
- 13. Alarm panel replacement.
- 14. AEH4 alarm board replacement.

EQUIPMENT CONFIGURATION

Overview

The switch consists of various arrangements of the four basic cabinets. One or more auxiliary cabinets may be provided for mounting peripheral equipment. The Station Message Detail Recorder (SMDR) cabinet, when provided and connected to the switch, is also part of the switch.

A typical System 85 equipment configuration (Refer to Figure 19) consists of a common control cabinet, one or more module control cabinets, a TMS/RMI cabinet, and one or more port cabinets.



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Figure 19. Typical System 85 Equipment Configuration

Common Control Cabinet

The common control cabinet can be either an unduplicated common control cabinet or a duplicated common control cabinet.

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Unduplicated Common Control Cabinet

An unduplicated common control cabinet contains the common control carrier and up to three port carriers or DS-1/MFAT carriers. The common control carrier and a High Capacity Mini-recorder (HCMR) make up the control complex.

An unduplicated common control cabinet (Refer to Figure 20) contains the following equipment:

- 1. An unduplicated alarm panel and thermal assembly (sensor).
- 2. Up to three port carriers.
- 3. Up to three DS-1/MFAT carriers.
- 4. One common control carrier.
- 5. A fan assembly and alarm board.
- 6. A frequency generator.
- 7. One battery reserve unit.

Note: When equipped with extended power reserve, the battery reserve unit is not included.

8. One HCMR.

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- 9. One DC/DC converter unit.
- 10. A dc filter.

Duplicated Common Control Cabinet

A duplicated common control cabinet (Refer to Figure 21) contains the following equipment:

- 1. A duplicated alarm panel and thermal assembly (sensor).
- 2. Two common control carriers.
- 3. One power carrier.
- 4. A fan assembly and alarm board.
- 5. Two HCMRs.
- 6. Two 334A power units.
- 7. One battery reserve unit.
- 8. An ac distribution unit.

Note: When equipped with an extended power reserve, the power units and battery reserve unit are not included, and a dc filter replaces the ac distribution unit.



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Figure 20. Unduplicated Common Control Cabinet



Figure 21. Duplicated Common Control Cabinet

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TMS/RMI Cabinet

The TMS/RMI cabinet is used only in multimodule switches and may contain up to four TMS carriers or 4 RMI carriers.

In the unduplicated TMS configuration, there is one basic carrier and up to three growth carriers.

In a duplicated TMS configuration, there may be two basic carriers with a no-carrier adapter between them. This arrangement can be expanded to add one growth carrier per basic carrier.

In the maximum duplicated TMS configuration, two TMS cabinets are provided, each containing one basic carrier and two or three growth carriers. Both TMS cabinets must contain the same number of growth carriers.

The TMS/RMI cabinet (Refer to Figure 22) may contain the following equipment:

- 1. A thermal assembly (sensor).
- 2. Up to four TMS carriers, or 4 RMI carriers, or a combination of both.
- 3. A fan assembly and alarm board.
- 4. One or two 334A rectifiers.
- 5. One battery reserve unit.
- 6. An ac distribution unit.

Note: When equipped with extended power reserve, the power units and battery reserve unit are not included, and a dc filter replaces the ac distribution unit.

Module Control Cabinet

The module control cabinet may be configured for duplicated or unduplicated module control.

A module control carrier and up to three port carriers (or one port carrier and two DS-1/MFAT carriers, or a combination of both) may be contained in an unduplicated module control cabinet configuration.

Two module control carriers and up to two port carriers (or two DS-1/MFAT carriers or a combination of both) may be contained in a duplicated module control cabinet configuration.

The module control cabinet (Refer to Figure 23) contains the following equipment:

- 1. A thermal assembly (sensor).
- 2. Up to three port carriers.
- 3. Up to two DS-1/MFAT carriers.
- 4. One module control carrier for an unduplicated module control or two module control carriers for a duplicated module control.
- 5. A fan assembly and alarm board.
- 6. A frequency generator.
- 7. One battery reserve unit.
- 8. A -48V rectifier.

9. An ac distribution unit.

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Note: When equipped with extended power reserve, the battery reserve unit and rectifier are not included, and a dc filter replaces the ac distribution unit.



Figure 22. Time Multiplexed Switch (TMS)/Remote Module Interface (RMI) Cabinet





Port Cabinet

The port cabinet (Refer to Figure 24) is equipped with up to four port carriers.

The port cabinet contains:

- 1. A thermal assembly (sensor).
- 2. From one to four port carriers.
- 3. Up to four DS-1/MFAT carriers.
- 4. A fan assembly and alarm board.
- 5. A frequency generator.
- 6. One battery reserve unit.
- 7. A -48V rectifier and ac distribution unit, or a dc filter.

Note: When equipped with extended power reserve, the battery reserve unit and rectifier are not included, and a dc filter replaces the ac distribution unit.

The first port cabinet in a duplicated common control switch receives power from the module control cabinet.

Common Control Carrier

The common control carrier provides primary control, memory, and input/output channels for processing, supervising, and coordinating system operations.

Backplane wiring provides connections between circuit packs in the common control carrier. Circuit breakers are provided on the right side of the common control carrier. Numbers are stamped adjacent to the circuit breakers to identify the slot numbers or components associated with each circuit breaker.

Figure 25 identifies the circuit pack type and code for each slot location in the common control carrier.



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Figure 24. Port Cabinet

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	
0 	TN370 SEQUENCER	UN151 ALU	UN152 INSTRUCTION DECODER	UN153 BUS INTERFACE	TN369 CACHE MEMORY	TN514 SCAMPER INTERFACE	TN368 MEMORY PROTECT	TN392 (1 MEGAWORD)	TN392 (1 MEGAWORD)	TN392 (1 MEGAWORD)	R S V D	R S V D	R S V D	R S V D	R S V D	N O T E	TN406 DCIU PROCESSOR MEMORY	TN405 DCIU SYSTEM INTERFACE	

Γ	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32		
	UN156 DCIU I/O	UN158 DUPLICATION CONTROLLER	TN430 TAPE INTERFACE	TN404 I/O BUFFER	TN490 ALARM INTERFACE	TN403 DUAL SPEED DATA CHANNEL	TN403 DUAL SPEED DATA CHANNEL	TN403 DUAL SPEED DATA CHANNEL	TN403 DUAL SPEED DATA CHANNEL	TN402 4MHZ DATA CHANNELS	TN4D2 4MHZ DATA CHANNELS	TN402 4MHZ DATA CHANNELS	TN402 4MHZ DATA CHANNELS	TN491 DIAGNOSTIC PROCESSOR	IN492 REMOTE INTERFACE	HO 0 HCMR 32 0 22 0	H1 C CB3 CB2 CB1 CB1 C-48

NOTE:

SLOT 15 CONTAINS TN513 (DCIU TEST SUPPORT) IF SHIPPED WITH THE SWITCH.

Figure 25. Common Control Carrier

Unduplicated Common Control DC/DC Converter Unit

The DC/DC converter unit provides operating +5 volts to the unduplicated common control carrier circuit packs.

Circuit breakers are provided on the left side of the unduplicated common control DC/DC converter unit. Numbers are stamped adjacent to the circuit breakers to identify the slot numbers associated with each circuit breaker.

Figure 26 identifies the circuit pack type and code for each slot location in the unduplicated common control DC/DC converter unit.

	00	01	02	
ං ං ං ං ං ං ං ං ං ං ං ං ං ං	496FA POWER UNIT	494FA POWER UNIT	495FA PDWER UNIT	

Figure 26. Unduplicated Common Control DC/DC Converter Unit

Duplicated Common Control Power Carrier

The common control power carrier provides operating +5 volts to the duplicated common control carrier circuit packs.

Circuit breakers are provided on the right side of a duplicated common control power carrier. Numbers are stamped adjacent to the circuit breakers to identify the slot numbers associated with each circuit breaker.

Figure 27 identifies the circuit pack type and code for each slot location in the duplicated common control power carrier.

00	01	02	03	04	05	• • • •
495FA PDWER UNIT	4946A PDWER UNIT	495FA POWER UNIT	495FA PONER UNIT	4946A POWER UNIT	495FA POWER UNIT	

Figure 27. Duplicated Common Control Power Carrier

TMS Carrier

The TMS carrier provides the time multiplexed space division switch that interconnects the modules in a multimodule switch.

Backplane wiring provides connections between circuit packs in the TMS carrier. Circuit breakers are provided on the right side of the TMS carrier. Numbers are stamped adjacent to the circuit breakers to identify the slot numbers associated with each circuit breaker.

Figure 28 identifies the circuit pack type and code for each slot location in the TMS carrier.





* = TN480 (MODULE INTERFACE)

† = TN470 (TMS MULTIPLEXOR)

NOTES:

- 1. ONE TN480 IS REQUIRED PER MODULE.
- ONE IN470 IS REQUIRED IN THE BASIC TMS CARRIER FOR THE FIRST MODULE AND ONE IN470 IS REQUIRED FOR EVERY TWO MODULES THEREAFTER.
- 3. TN480 IN SLOT 19 IS NOT INSTALLED IN THE BASIC TMS CARRIER.
- 4. CIRCUIT PACKS IN SLOTS 20-27 ARE NOT INSTALLED IN TMS GROWTH CARRIERS.
- 5. SLOT 24 CONTAINS TN512 (TEST SUPPORT) IF SHIPPED WITH THE SWITCH.

Figure 28. TMS Carrier

Module Control Carrier

The module control carrier provides the digital switch and the associated circuits that detect and process requests for service.

Backplane wiring provides connections between circuit packs in the module control carrier. Circuit breakers are provided on the right side of the module control carrier. Numbers are stamped adjacent to the circuit breakers to identify the slot numbers associated with each circuit breaker.

Figure 29 identifies the circuit pack type and code for each slot location in the module control carrier.

00A	00B	01	02	03	06	07	08	09	10	11	12	13		14	15	16	17	18	19	20	21	25	22	23		
495FA POWER UNIT	4946A POWER UNIT L H L O ∠	TN481 LIGHT GUIDE + m + O N	* 0 T E 1	† N 0 T E 1	TN440 PORT DATA STORE	TN440 PORT DATA STORE	TN440 PORT DATA STORE	TN440 PORT DATA STORE	TN440 PORT DATA STORE	TN440 PORT DATA STORE	TN446 TSI ALU	TN445 TSI PSTORE	R S V D	IN444 MAINT. INTERFACE	TNS30 DUP. UPDATE CHANNEL	R S V D	TN380 MODULE PROCESSOR	N O T E 2	TN400 I/O BUS INTERFACE	TN400 I/O BUS INTERFACE	TN400 I/0 BUS INTERFACE	TN456 REM. MODULE INTERFACE	TN401 MODULE CONTROL CH.	495FA POWER UNIT	M01 0 23 0 01 0 00 0	

* TN481 OR TN463

† TN441 OR TN460

NOTES:

1. FOR A SINGLE MODULE UNSYNCHRONIZED SWITCH, SLOTS OOB, O1, AND O2 ARE EMPTY AND TNAGO (MODULE CLOCK) IS USED IN SLOT 03. FOR A SINGLE MODULE SYNCHRONIZED SWITCH, SLOTS OOB AND 01 ARE EMPTY, TNAG3 (SYSTEM CLOCK SYNCHRONIZER) IS USED IN SLOT 02, AND TNAGO IS USED IN SLOT 03. FOR AN UNDUPLICATED MULTIMODULE SWITCH, SLOTS OOB AND 01 ARE EMPTY, TNA81 (LIGHT GUIDE INTERFACE) IS USED IN SLOT 02, AND TNA41 (TMS INTERMODULE DATA STORE) IS USED IN SLOT 03. FOR A DUPLICATED MULTIMODULE SWITCH, 494GA POWER UNIT IS USED IN SLOT 03. FOR A DUPLICATED MULTIMODULE SWITCH, 494GA POWER UNIT IS USED IN SLOT 03.

2. TN512 (TEST SUPPORT) IS INSTALLED IN SLOT 18 IF SHIPPED WITH THE SWITCH.

Figure 29. Module Control Carrier

Port Carrier

The port carrier connects the switch to peripheral equipment (analog/digital, voice/data, and lines/trunks). The port carrier provides dedicated port circuits determined by the equipment connected.

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Backplane wiring provides connections between circuit packs in the port carrier. A fuse panel is provided on the right side of the port carrier. Numbers are stamped adjacent to the fuses to identify the slot numbers associated with each fuse.

Figure 30 identifies the circuit pack type and code for each slot location in the port carrier.

Note: The port carrier for R2V1 may contain SN221 and SN222 circuit packs instead of SN228 and SN229 circuit packs.

	00	01	02	03	04	05	06	07	08	09	10	11	13	14	15	16	17	18	19	20	21			7
	_																							
-	ŝ	N	ົຈ																					
	AND	AND	AND								ΠŢ	Ш										-48	BAT	T
	+		-	÷		I =	I 🚍	÷	Ê		5	5	E	E.	÷	Ŧ		Ê	÷	÷	()	13-16		
	SE	ES	S3	μ		μ	ш	ш	щ		IER	ER	ш	ш	ш	ш		ш	ш	μ	Е	18-2	1 05-0	
	LON)	LON)	LON)	(NOT		(NDT	LON)	(NOT	LON)		РОМ	РОМ	NOT	LON)	(NOT	(NDT		(NDT	(NDT	(NOT	(NOT	F2 (00 5	d -
	-	F	Ŧ	Т	54	Ē	Ē	T	H	52	GA	GA	F	۲.	T	T	5	F	F	T	T	10	13-1	5
	POR	ğ	POR	POR	IN I	g	g	POR 0	POR -	TN4	494	494	١ <u>٣</u>	POR	SOR C	2 CR	TN4	B	g	90c	DCR	E1 /		
	4		-	-		-	-		"				-			-			-			(* ' '	00-0	3
																						11	05-0	3

NOTES:

 CARRIER POSITIONS 00-03, 05-08, 13-16, 18-21 ARE UNIVERSAL PORT POSITIONS WHICH CAN ACCEPT THE FOLLOWING CIRCUIT PACKS:

CKT PACK CODE	CIRCUIT PACK NAME	CKT PACK CODE	CIRCUIT PACK NAME
SN224	MFET LINE PORT	SN250	CALL PROGRESS TONE
SN228	OFF PREMISES LINE	SN251	TOUCH-TONE RECEIVER
SN229	ON PREMISES LINE	SN252	TOUCH-TONE SENDER
SN230	CO TRUNK	SN253	AUXILIARY TONES
SN231	AUXILIARY TRUNK	\$N254	ATTENDANT CONFERENCE
SN232	DID TRUNK	SN255	TONE DETECTOR 2
SN233	TIE TRUNK/ATTENDANT INTERFACE	SN260	FACILITY TEST
SN238	EIA INTERFACE	SN261	ANALOG/DIGITAL FACILITY TEST
SN241	CONTACT INTERFACE	SN270	GENERAL PURPOSE PORT
SN243	DATA PORT		

2. CARRIER POSITIONS OO THROUGH O2 CAN ACCEPT SN244 AUTOMATIC NUMBER IDENTIFICATION (ANI) CIRCUIT PACK

3. TN452 = UNIVERSAL PORT CONTROL INTERFACE; TN454 = PORT DATA INTERFACE

Figure 30. Port Carrier

DS-1/MFAT Carrier

The DS-1/MFAT carrier is a modified port carrier. The DS-1/MFAT carrier provides high-density dedicated interface circuits for DS-1 trunks and/or low-cost hybrid voice terminals. The DS-1/MFAT carrier also provides the same dedicated port circuits as the port carrier.

Backplane wiring provides connections between circuit packs in the DS-1/MFAT carrier. A fuse panel is provided on the right side of the DS-1/MFAT carrier. Numbers are stamped adjacent to the fuses to identify the slot numbers associated with each fuse.

Figure 31 identifies the circuit pack type and code for each slot location in the DS-1/MFAT carrier.

Note: The DS-1/MFAT carrier for R2V1 may contain SN221 and SN222 circuit packs instead of SN228 and SN229 circuit packs.

PORT (NOTE 1) PORT (NOTE 1)	00	01	1 <u>0</u>	12 0	03	<u>)3</u>	3	04	04	04	04	04	04	04	04	04	0	<u>, 23</u>	03	03	03	03	03	03	03	- 0	04	05	15	06	ļ	07	08	3	09	10	1	1	13	14	15	16	6	17	18	19	20	ן נ	21				
	PORT (NOTE 1)	PORT (NOTE 1)	PORT (NOTE 1)		PORT (NOTE 1)	PURI (NUIE 1)		TN454	TN454	TN454	TN454	TN454	TN454	TN454	TN454	TN454	TNAEA	PORT (NOTE 1)	PORT (NOTE 1)	PORT (NOTE 1)	PORT (NOTE 1)	PORT (NOTE 1)	PORT (NOTE 1)	PORT (NOTE 1)	PORT (NOTE 1)	TUREA	TN454	PORT (NOTES 1 AND 2)	PUKI (NUIES 1 ANU 2)	PORT (NOTE 1)		PORT (NOTE 1)	PORT (NOTE 1)		TN452	494GA POWER UNIT	4946A POWER UNIT		PORT (NOTE 1)	PORT (NOTE 1)	PORT (NOTE 1)	PORT (NOTE 1)		TN454	PORT (NOTES 1 AND 2)	PORT (NOTE 1)	PORT (NOTE 1)		PORT (NUTE 1)	-48 F3 13 18-2 F2 10 F1	016	0,00,00,00,00,00,00,00	

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NOTES:

1. CARRIER POSITIONS 00-03, 05-08, 13-16, 18-21 ARE UNIVERSAL PORT POSITIONS WHICH CAN ACCEPT THE FOLLOWING CIRCUIT PACKS:

CKT PACK CODE	CIRCUIT PACK NAME	CKT PACK CODE	CIRCUIT PACK
ANN17	MULTIFUNCTIONAL ANALOG	SN243	DATA PORT
	TERMINAL (MFAT)	SN250	CALL PROGRESS TONE
SN224	MFET LINE PORT	SN251	TOUCH-TONE RECEIVER
SN228	OFF PREMISES LINE	SN252	TOUCH-TONE SENDER
SN229	ON PREMISES LINE	SN253	AUXILIARY TONES
SN230	CO TRUNK	SN254	ATTENDANT CONFERENCE
SN231	AUXILIARY TRUNK	SN255	TONE DETECTOR 2
SN232	DID TRUNK	SN260	FACILITY TEST
SN233	TIE TRUNK/ATTENDANT INTERFACE	SN261	ANALOG/DIGITAL FACILITY TEST
SN238	EIA INTERFACE	SN270	GENERAL PURPOSE PORT
SN241	CONTACT INTERFACE		

2. CARRIER POSITIONS 05 AND 18 CAN ACCEPT CIRCUIT PACK ANN11 - DS-1 TRUNK INTERFACE. IF ANN11 IS USED IN SLOT 05, SLOTS 00, 01, 02, 06, AND 07 CANNOT BE USED. HOWEVER, SLOTS 03 AND 08 CAN BE USED FOR ANN17 OR ANY PORT CIRCUIT WHEN SLOT 05 IS USED FOR ANN11. IF ANN11 IS USED IN SLOT 18, SLOTS 13, 14, 15, 19, AND 20 CANNOT BE USED. HOWEVER, SLOTS 16 AND 21 CAN BE USED FOR ANN17 OR ANY PORT CIRCUIT WHEN SLOT 18 IS USED FOR ANN11.

3. THE DS-1/MFAT CARRIER IS NOT INTENDED TO REPLACE THE PORT CARRIER. USE OF SN PORT CIRCUIT PACKS IN THE DS-1/MFAT CARRIER CAUSES WALL FIELD REQUIREMENTS TO DOUBLE.

Figure 31. DS-1/MFAT Carrier

RMI Carrier

The RMI carrier houses the TN456 RMI circuit packs to support remote modules. The RMI carrier is mounted in the TMS/RMI cabinet. A maximum of two RMI carriers are possible for a switch with unduplicated module controls, and four RMI carriers for a switch with duplicated module controls.

Backplane wiring provides connections between circuit packs in the RMI carrier. A circuit breaker panel is provided on the right side of the RMI carrier. Circuit breaker **CB1** is associated with slots 00 through 10 and circuit breaker **CB2** is associated with slots 11 through 22. The **MAAP** connector on the circuit breaker panel allows the user to plug in a **MAAP** to the RMI carrier. Only one RMI carrier per TMS/RMI cabinet is equipped with the **MAAP** connector.

Figure 32 identifies the circuit pack type and code for each slot location in the RMI carrier.

Π	00	01	02	03	05	06	07	08	09	10	11	13	14	15	16	18	19	20	21		
	TN456 REMOTE MODULE INTERFACE	TN456 REMOTE MODULE INTERFACE	TN456 REMOTE MODULE INTERFACE	TN456 REMOTE MODULE INTERFACE	TN456 REMOTE MODULE INTERFACE	TN456 REMOTE MODULE INTERFACE	TN456 REMOTE MODULE INTERFACE	TN456 REMOTE MODULE INTERFACE	TN452 UNIVERSAL PORT CONTROL INTERFACE	495FA PONER UNIT	495FA POWER UNIT	TN456 REMOTE MODULE INTERFACE	TN456 REMOTE MODULE INTERFACE	TN456 REMOTE MODULE INTERFACE	TN456 REMOTE MODULE INTERFACE	TN456 REMOTE MODULE INTERFACE	TN456 REMOTE MODULE INTERFACE	TN456 REMDTE MODULE INTERFACE	TN456 REMOTE MODULE INTERFACE	SPARE	CB2 CB CB1 CB

Figure 32. Remote Module Interface (RMI) Carrier

PRECAUTIONS

When performing maintenance or translation procedures on System 85 switch equipment, certain precautions must be observed by user personnel.

Cautions, warnings, and danger statements contained within the service manual **must** be observed to prevent loss of service, possible equipment damage, and possibility of personnel injury.

In addition, the following precautions regarding electromagnetic interference and static electricity **must** be observed.

a. **Electromagnetic Interference:** This equipment generates, uses, and can radiate radio frequency energy. Electromagnetic fields radiating from the switch may cause noise to be introduced into the customer's equipment. If the equipment is not installed and used in accordance with the instruction manual, interference to radio communications may be caused.

WARNING: To maintain the Electromagnetic Interference (EMI) integrity of the System 85 switch, maintenance personnel (after performing any translation or maintenance activities) must ensure that all cabinet panels, covers, etc. are firmly secured in place prior to leaving the customer's premises.

b. Static Electricity: To prevent or reduce electrostatic discharge, maintenance personnel **must** always attach wrist grounding straps before working on switch components or handling circuit packs.

Caution: Electrostatic discharge can damage or destroy circuit packs containing integrated circuits (ICs).

CIRCUIT PACK REPLACEMENTS

Overview

When replacing circuit packs in the switch it is necessary to maintain switch integrity and identify the correct circuit pack, vintage, and series to be replaced. Switch integrity is maintained by taking the appropriate steps when replacing circuit packs in the switch carriers. Circuit packs to be replaced in the digital network can be identified by using **PROC 290**, **Word 2**.

PROC 290, Word 2 is used to search for all circuit packs installed in module control and port carriers. The prefix, number, suffix, vintage series, and vintage update of each circuit pack is displayed.

Circuit packs should be replaced with circuit packs of the same suffix or later (i.e., SN270 replaced by SN270 or SN270B).

Any circuit pack to be replaced should be unseated and reseated to ensure its connector is making good contact with the mating connector. Retest the circuit pack after reseating. If circuits are still defective, replace the circuit pack.

Precautions

To prevent or reduce electrostatic discharge, maintenance personnel should always attach wrist grounding straps before working on system components or handling circuit packs.

Caution: Electrostatic discharge can damage or destroy circuit packs containing integrated circuits (ICs).

- 1. The EMC wrist strap and cable assembly (cc900698226) is placed in the bottom of the module control cabinet in a poly bag (cc900492372) next to the AC distribution unit.
- 2. The EMC wrist strap assembly is used in the following manner:
 - a. Attach the wrist strap to either wrist.
 - b. Connect the alligator clip to the cabinet frame.
- 3. A good ground connection for the alligator clip is:
 - a. In equipment coded cabinets which have removable sides, attach the alligator clip to any convenient screw head that fasten the hinges to the cabinet or to the screws that fasten the door latch to the frame.
 - b. In equipment coded cabinets which have intergrated sides, the front and rear cabinet formed faces (front door area or back area when viewed in an open position) which are coated with a conductive paint; the alligator clip may be attached to any of these surfaces.
 - c. In either case an area close to the vertical center of the cabinet should be selected for the alligator clip allowing a more central position to operate from.

To ensure that the System 85 switch recovers from circuit pack replacement in the switch carriers certain precautions should be exercised during circuit pack replacement. These precautions consist of busying out circuits, using the **GO/HALT** switch, etc., and are covered in the parts on circuit pack replacements for each type of switch carrier.

Requirement: These precautions should also be taken when unseating and reseating circuit packs.

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Option Settings

Prior to reseating and/or replacing circuit packs in any of the switch carriers, the option settings on appropriate circuit packs should be checked to determine if the correct option setting is being used for the application required. Refer to Circuit Pack Switch Option Settings in this section for circuit packs with option settings.

Unduplicated Common Control Carrier Circuit Pack Replacement

When replacing circuit packs in an unduplicated common control carrier, use of the GO/HALT switch is required. Placing the GO/HALT switch in the HALT position before removing any circuit pack in the common control carrier stops any interactions with memory when removing or replacing circuit packs.

Caution: Reseating or replacing circuit pack TN406 (DCIU processor memory) in Slot 16 of the unduplicated common control carrier without use of the GO/HALT switch causes a partial reload.

Perform the following steps when replacing circuit packs in a unduplicated common control carrier.

Note: The following steps are performed at the alarm panel and at the common control carrier.

1. Determine if the switch is in emergency transfer.

If switch is in emergency transfer, set **EMERGENCY TRANSFER** switch to **ACT** and proceed to Step 3.

2. If switch is not in emergency transfer, set **EMERGENCY TRANSFER** switch to **INHIB** and notify the user that no new calls can be processed.

Proceed to Step 3.

- 3. Set GO/HALT switch to HALT.
- 4. Remove circuit pack being replaced.
- 5. Verify option settings on replacement circuit pack are correct (if applicable).
- 6. Replace circuit pack.
- 7. Determine status of EMERGENCY TRANSFER switch.

If EMERGENCY TRANSFER switch is in the INHIB position, proceed to Step 8.

If EMERGENCY TRANSFER switch is in the ACT position, proceed to Step 10.

Caution: In the following step, the GO/HALT switch must be set to GO within 5 seconds after depressing RESET to avoid major alarm indication.

- 8. Depress **RESET**, and set **GO/HALT** switch to **GO** within 5 seconds.
- 9. Set EMERGENCY TRANSFER switch to OFF.

Note: Replacement of circuit pack is complete.

10. Set GO/HALT switch to GO.

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11. If system appears to be functioning normally, set **EMERGENCY TRANSFER** switch to **OFF** and proceed to Step 12.

If switch does not appear to be functioning normally, investigate other possible problem areas, using **PROC 600**, **PROC 612**, and microdiagnostic testing.

- 12. Notify customer that emergency transfer service will be interrupted.
- 13. Depress RESET.

Note: Replacement of circuit pack is complete.

Duplicated Common Control Carrier Circuit Pack Replacement

When replacing circuit packs in both the on-line and off-line side of a duplicated common control carrier, use of the **GO/HALT** switch is required. Placing the **GO/HALT** switch in the **HALT** position before removing any circuit pack in the common control carrier stops any interactions with memory when removing or replacing circuit packs.

Caution: Reseating or replacing circuit pack TN406 (DCIU processor memory) in Slot 16 of the duplicated common control carrier without use of the GO/HALT switch causes a partial reload.

Perform the following steps when replacing circuit packs in a duplicated common control carrier.

Note: The following steps are performed at the alarm panel and at the common control carrier.

1. Determine if circuit pack being replaced is in the on-line or off-line side of the duplicated common control.

If circuit pack being replaced is in the on-line side of the duplicated common control, proceed to Step 2.

If circuit pack being replaced is in the off-line side of the duplicated common control, proceed to Step 3.

2. Use **PROC 613** Test 3 to soft switch the on-line common control to the off-line side, and proceed to Step 3.

Note: If the soft switch cannot be performed, replace circuit pack(s) in the on-line side using the steps for Unduplicated Common Control Carrier Circuit Pack Replacement above.

- 3. Set LOCK ON LINE switch to the active (on-line) CC position; i.e., CC0 or CC1.
- 4. At off-line common control, set GO/HALT switch to HALT.
- 5. At off-line common control, remove circuit pack being replaced.
- 6. Verify option settings on replacement circuit pack are correct (if applicable).
- 7. At off-line common control, replace the circuit pack.
- 8. At off-line common control, set GO/HALT switch to GO.

9. Set LOCK ON LINE switch to OFF.

Note: Replacement of circuit pack is complete.

- 10. Use **PROC 613** Test 3 to soft switch the off-line common control to the on-line side (if required) for further testing to determine if replacement of the circuit pack corrected the problem.
 - **Requirement:** If further testing can be accomplished in the off-line common control, do not soft switch until the appropriate test(s) complete with a pass indication.

TMS, Module Control, or RMI Carrier Circuit Pack Replacement

Perform the following steps when replacing circuit packs in the TMS, module control, or RMI carrier.

1. Determine if the TMS or module control carrier is duplicated.

If the TMS or module control carrier is duplicated, proceed to Step 2.

If the TMS or module control carrier is unduplicated, proceed to Step 4.

2. Determine if circuit pack being replaced is in the on-line or off-line side of the TMS, module control, or RMI carrier.

If circuit pack being replaced is in the on-line side of the TMS, module control, or RMI carrier, proceed to Step 3.

If circuit pack being replaced is in the off-line side of the TMS, module control, or RMI carrier, proceed to Step 4.

3. Use **PROC 621** Test 2 to soft switch the on-line TMS or module control to the off-line side, and proceed to Step 4.

Note: If the soft switch cannot be performed, proceed to Step 4.

- 4. Remove circuit pack being replaced.
- 5. Verify option settings on replacement circuit pack are correct (if applicable).
- 6. Replace circuit pack.

Caution: The DC/DC converter handle should not be toggled when replacing circuit packs in the TMS, module control, and/or RMI carriers.

- 7. Replacement of circuit pack is complete.
- 8. If the TMS or module control carrier is duplicated, and a soft switch was performed, use **PROC 621** Test 2 to soft switch the off-line TMS or module control to the on-line side (if required) for further testing to determine if replacement of the circuit pack corrected the problem.

Requirement: If further testing can be accomplished in the off-line TMS or module control, do not soft switch until the appropriate test(s) complete with a pass indication.

Port or DS-1/MFAT Carrier Circuit Pack Replacement

When replacing circuit packs in a port or DS-1/MFAT carrier, multiple circuits associated with the circuit pack being replaced should be busied out.

Caution: Busying out port circuits that are in-use (indicated by a YELLOW LED on the circuit pack's edge) results in the connection(s) being dropped.

- a. **Port Circuit Packs:** When a port circuit pack (i.e., line or trunk) is being replaced, all circuits on the circuit pack should be idle, if at all possible, before removal.
- b. PDI or PCI Circuit Packs: When a Port Data Interface (PDI) or a Port Control Interface (PCI) circuit pack is replaced, all port circuits served by the PDI (left or right side of the port or DS-1/MFAT carrier) or PCI should be busied out. Busying out the circuits associated with a PDI prevents any interaction to the circuits if the PDI comes up in looparound. Busying out the circuits associated with a PCI prevents the circuits changing to unpredicatable states when removing or replacing the PCI.

Perform the following steps when replacing circuit packs in a port or DS-1/MFAT carrier.

All circuits associated with the port circuit pack, PDI, or PCI circuit pack being replaced should be busied out before the circuit pack is removed from the port, DS-1/MFAT, or RMI carrier.

Caution: Busying out a circuit when the circuit is in-use (lighted YELLOW LED on circuit pack) results in the connection being dropped.

1. Using **PROC 632** Test 3 (carrier busy), busy out the circuit(s) affected by the circuit pack being replaced.

To busy out port circuits, display the circuit in PROC 632 Test 3, and depress BUSY OUT.

Repeat the sequence until all circuits affected by the circuit pack being replaced are busied out.

2. Remove circuit pack being replaced.

Caution: Removal of the circuit pack, when any circuit on the circuit pack is in-use (indicated by a lighted YELLOW LED on the circuit pack's edge) results in the connection(s) being dropped.

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- 3. Verify option settings on replacement circuit pack are correct (if applicable).
- 4. Replace circuit pack.

After replacement, the port circuits associated with the port circuit pack or PDI/PCI circuit pack replaced should be released from busy.

5. Use PROC 632 Test 3 to release from busy the circuits busied out in Step 1.

To release busy out port circuits, display the circuit in PROC 632 Test 3 and depress RLS BUSY OUT.

Repeat the sequence until all circuits busied out in Step 1 are released from busy.

Unduplicated Common Control DC/DC Converter Unit or Duplicated Common Control Power Carrier Circuit Pack Replacement

Perform the following steps when replacing circuit packs in the unduplicated common control DC/DC converter unit or duplicated common control power carrier.

- 1. Set the circuit breaker associated with the circuit pack to be replaced to OFF.
- 2. Remove the circuit pack by releasing the lever and pulling outward.

Note: Do not pull out the circuit pack by using the lever.

- 3. Install the replacement circuit pack by sliding inward and then pushing the lever forward.
- 4. Set the circuit breaker associated with the circuit pack replaced to ON.

CIRCUIT PACK SWITCH OPTION SETTINGS

Overview

Prior to reseating and/or replacing circuit packs in any of the switch carriers, the option settings on appropriate circuit packs should be checked to determine if the correct option setting is being used for the application required.

Option settings by means of rocker-type switches use the following convention:

- D Down (switch contacts are closed).
- U Up (switch contacts are open).
- X Don't care (switch contacts are not used and may be set in either position).

Note: Switches are set down (closed) when the rocker end adjacent to the number is depressed and up (open) when the rocker end away from the number is depressed.

The following paragraphs list the circuit packs that have option settings in the switch carriers.

Common Control Carrier Circuit Pack Option Settings

The following circuit packs in the common control carrier have circuit pack option settings. Use the referenced figure to determine if the option setting is correct for the application being used.

TN513 (Slot 15 in common control carrier), Figure 33.

TN403 (Slots 23 through 26 in common control carrier), Figure 34.

TN513 DCIU TEST SUPPORT OPTION SETTINGS

TWO SWITCH PACKAGES WITH SEVEN SWITCH SECTIONS ALLOW CONFIGURATION OF THE SERIAL PORT HARDWARE. SWITCH S1 IS USED TO CONFIGURE CHANNEL O USART AND SWITCH S2 IS USED TO CONFIGURE CHANNEL 1 USART.



THE FOLLOWING TABLE INDICATES THE S1 AND S2 SWITCH SECTION POSITIONS REQUIRED FOR EACH OPTION PROVIDED. (U) INDICATES THE ROCKER SWITCH IS DEPRESSED AT THE UPPER END AND (D) INDICATES THE SWITCH IS DEPRESSED AT THE LOWER END.

FUNCTION	SWITCH	SWITCH SECTION	POSITION
DY (TY DIDEOT HODE	1 00 0	1,4	D
RX/IX DIRECT MODE		2,3	U
	4 00 0	2,3	D
RX/IX NULL MUDE	1 UK 2	1,4	U
SHORT CTS/RTS	1 OR 2	5	D
SHORT DTR/DSR	1 OR 2	6	D
LOGICALLY (AND) CHØ	1	7	D
AND CH1 USART INTERRUPTS	2	7	U
INDEPENDENT CHØ AND	1	7	U
CH1 USART INTERRUPTS	2	7	D
DISABLE CH1 USART	1	7	U
INTERRUPTS	2	7	U

Figure 33. TN513 DCIU Test Support Option Settings

TN403 DUAL SPEED DATA CHANNEL OPTION SETTINGS

SWITCH S1 CONTROLS THE DATA TRANSMISSION RATE For Circuit Pack Channels 14 and 15.





THE FOLLOWING TABLE INDICATES THE SWITCH POSITIONS REQUIRED FOR LOW AND HIGH SPEED OPTIONS. (U) INDICATES THE ROCKER SWITCH IS DEPRESSED AT THE UPPER END AND (D) INDICATES THE ROCKER SWITCH IS DEPRESSED AT THE LOWER END.

CARRIER SLOT	CHANNEL NUMBERS	TN403 Channel Number	SWITCH SECTION	SWITCH Position				
23	00-15	15	2	D				
		14	1	0				
24	16-31	15	2	U				
		14	1	U				
25	32-47	15	2	U				
		14	1	U				
26	48-63	15	2	U				
		14	1	U				
CHANNELS 0-13 ARE NOT SPEED OPTIONABLE. THEY WILC-ONLY OPERATE AT LOW SPEED (185K BPS).								



Module Control or RMI Carrier Circuit Pack Option Settings

The following circuit pack in the module control or RMI carrier has option settings. Use the referenced figure to determine if the option setting is correct for the application being used. Carrier position 25 in the module control carrier and carrier positions 00 through 08 and 13 through 21 in the RMI carrier house the TN456 circuit pack.

TN456 REMOTE MODULE INTERFACE OPTION SETTINGS



THE SWITCH POSITION ON TN456 DEPENDS ON THE OPTION REQUIRED. FOR CENTRAL LOCATION OPERATION (COMMON CONTROL COMPLEX END OF THE LINK), SET BOTH SWITCHES IN THE UP POSITION. FOR REMOTE LOCATION OPERATION (MODULE AT THE FAR END OF THE LINK FROM THE COMMON CONTROL COMPLEX), SET BOTH SWITCHES IN THE DOWN POSITION.

Figure 35. TN456 Remote Module Interface Option Settings

Port or DS-1/MFAT Carrier Circuit Pack Option Settings

The following circuit packs in the post carrier have circuit pack option settings. Use the referenced figure to determine if the option setting is correct for the application being used. Carrier positions 00 through 03, 05 through 08, 13 through 16, and 18 through 21 are universal port positions which can accept any port circuit pack.

ANN11B or ANN11C (DS-1/MFAT Carrier Only), Figure 36.

SN221B, Figure 37.

SN224B, Figure 38.

SN228, Figure 39.

SN230, Figure 40.

SN231, Figure 41.

SN232B, Figure 42.

SN233C, Figure 43.

SN238, Figure 44.

SN243B, Figure 45.

SN253B, Figure 46.
ANNIIB AND ANNIIC DS-1 INTERFACE OPTION SETTINGS

ONE SWITCH PACKAGE (S1) CONTAINING THREE ROCKER SWITCH SECTIONS IS POSITIONED ON THE CIRCUIT PACK AS SHOWN IN THE FOLLOWING DIAGRAM.



TO SELECT ONE OF FIVE TRANSMIT EQUALIZER SETTINGS, SET THE SWITCH SECTIONS AS SHOWN IN THE FOLLOWING TABLE. IN THE TABLE, (U) INDICATES THE SWITCH IS FULLY DEPRESSED AT THE UPPER END AND (D) INDICATES THE SWITCH IS FULLY DEPRESSED AT THE LOWER END.

DISTANCE TO	SWIT	ICH SE	CTION
SPECIFIED POINT	1	2	3
0 TO 133 FEET	D	D	U
133 TO 266 FEET	D	U	D
266 TO 399 FEET	D	U	IJ
399 TO 533 FEET	U	D	D
533 TO 655 FEET	U	D	U

THE EQUALIZER SETTING REQUIRED IS BASED ON THE DISTANCE ALONG THE 606 TYPE CABLE CONNECTION FROM THE SYSTEM 85 DS-1 CONNECTOR TO A SPECIFIED POINT. THE EQUALIZERS PROVIDE PRECONDITIONING OF THE TRANSMIT SIGNAL SO THAT THE DS-1 PULSE SHAPE FALLS WITHIN DEFINED BOUNDARIES AT A COMMON SPECIFIED POINT.

Figure 36. ANN11B/ANN11C DS-1 Interface Option Settings

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SN221B OFF PREMISES STATION (OPS) OPTION SETTINGS

SELECTION OF OPTION (Z) OR (Y)

FOUR SWITCH PACKAGES, S1-S4, EACH CONTAINING TWO ROCKER SWITCH SECTIONS, ARE POSITIONED ON THE CIRCUIT PACK AS SHOWN IN THE FOLLOWING DIAGRAM. EACH SWITCH PACKAGE SERVES TWO OF THE EIGHT PORT CIRCUITS PROVIDED ON THE PACK.

END	S1 S2
CONNECTOR	S3 S4 S4 COMPONENT SIDE

A SINGLE SWITCH PACKAGE IS SHOWN BELOW TO IDENTIFY THE TWO SWITCH SECTIONS (1,2) IN THE PACKAGE.



TO SELECT THE REQUIRED OPTION FOR A PORT CIRCUIT, REFER TO THE FOLLOWING TABLE. FIRST, IDENITYF THE SWITCH PACKAGE (S1-S4) ASSOCIATED WITH THE PORT CIRCUIT. THEN SET THE SWITCH SECTION FOR THAT PORT AS SHOWN IN THE TABLE; (U) INDICATES THE SWITCH SECTION IS FULLY DEPRESSED AT THE UPPER END AND (D) INDICATES THE SWITCH SECTION IS FULLY DEPRESSED AT THE LOWER END.

			SWITCH SECTION POSITION					
PORT	SWITCH PACKAGE	SWITCH Section	OPTION (600 OHMS)	OPTION (RC NTWK)				
0	1	1	D	U				
1	1	2	D	U				
2	2	1	D	Ų				
3	2	2	· D	U				
4	3	1	D	U				
5	3	2	D	Ű –				
6	4	1	D	U				
7	4	2	0	U				

USE 600 DHM OPTION WHEN LOOP LENGTH IS LESS THAN 3500 FEET (ABOUT 600 DHMS WITHOUT SET). USE RC NETWORK OPTION FOR LOOP LENGTH GREATER THAN 3500 FEET.

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Figure 37. SN221B Off Premises Station (OPS) Option Settings

SN224B MFET LINE PORT OPTION SETTINGS AND FUSES

SN224B OPTION SETTINGS

A SINGLE SHORTING PLUG IS PROVIDED TO ADAPT THE PORT CIRCUITS TO INTERFACE WITH EITHER MULTIFUNCTION ELECTRONIC TELEPHONE (MFET) OR MULTIBUTTON ELECTRONIC TELEPHONE (MET) TERMINALS. ÀLL FOUR PORTS ARE ALTERED BY THE SINGLE PLUG. FOR MET TERMINALS, THE SHORTING PLUG IS PLACED OVER TERMINALS E1 AND E2. FOR MFET TERMINALS, THE SHORTING PLUG IS PLACED OVER TERMINAL E1 ONLY.

SN224B FUSES

THE -48 VOLT POWER SUPPLIED TO STATION APPARATUS FROM EACH OF THE FOUR PORTS ON THIS PACK IS FUSED AT EACH PORT. THE FUSES, CODED 70H(0.75 AMP.), ARE LOCATED ON THE PACK AS SHOWN IN THE FOLLOWING DIAGRAM.



WHEN MAINTENANCE PROCEDURES INDICATE A FUSE MAY NEED REPLACEMENT, ALL PORTS ON THE PACK SHOULD BE Made Maintenance Busy before removing the pack FROM THE CARRIER. PROC 630 CAN BE USED TO Make THE PORTS MAINTENANCE BUSY

Figure 38. SN224B MFET Line Port Option Settings and Fuses

SN228 OFF PREMISES STATION (OPS) OPTION SETTINGS

SELECTION OF OPTION (Z) OR (Y)

EIGHT SWITCH PACKAGES, S1-S8, EACH CONTAINING TWO ROCKER SWITCH SECTIONS, ARE POSITIONED ON THE CIRCUIT PACK AS SHOWN IN THE FOLLOWING DIAGRAM. EACH SWITCH PACKAGE SERVES ONE OF THE EIGHT PORT CIRCUITS PROVIDED ON THE PACK.



A SINGLE SWITCH PACKAGE IS SHOWN BELOW TO IDENTIFY THE TWO SWITCH SECTIONS (1,2) IN THE PACKAGE.



TO SELECT THE REQUIRED OPTION FOR A PORT CIRCUIT, REFER TO THE FOLLOWING TABLE. FIRST, IDENTIFY THE SWITCH PACKAGE (S1-S8) ASSOCIATED WITH THE PORT CIRCUIT. THEN SET THE SWITCH SECTION FOR THAT PORT AS SHOWN IN THE TABLE; (U) INDICATES THE SWITCH SECTION IS FULLY DEPRESSED AT THE UPPER END AND (D) INDICATES THE SWITCH SECTION IS FULLY DEPRESSED AT THE LOWER END.

			SWITCH SECTION POSITION				
PORT	SWITCH PACKAGE	SWITCH SECTION	OPTION (600 OHMS)	OPTION (RC NTWK)			
0	1	1 AND 2	D	U			
1	2	1 AND 2	D	U			
2	3	1 AND 2	D	U			
3	4	1 AND 2	D	U			
4	5	1 AND 2	D	U			
5	6	1 AND 2	D	U			
6	7	1 AND 2	D	U			
7	8	1 AND 2	D	U			

USE 600 0HM OPTION WHEN LOOP LENGTH IS LESS THAN 3500 FEET (ABOUT 600 0HMS WITHOUT SET). USE RC NETWORK OPTION FOR LOOP LENGTH GREATER THAN 3500 FEET.

Figure 39. SN228 Off Premises Station (OPS) Option Settings

SN230 CENTRAL OFFICE (CO) TRUNK OPTION SETTINGS

SELECTION OF OPTION (W) OR (X)

FOUR SWITCH PACKAGES, EACH CONTAINING TWO ROCKER SWITCH SECTIONS, ARE POSITIONED ON THE CIRCUIT PACK AS SHOWN IN THE FOLLOWING DIAGRAM. EACH SWITCH PACKAGE IS ASSIGNED TO A SINGLE PORT CIRCUIT AS IDENTIFIED IN THE DIAGRAM.



A SINGLE SWITCH PACKAGE IS SHOWN BELOW TO IDENTIFY THE TWO SWITCH SECTIONS (1,2) IN THE PACKAGE.



TO SELECT THE REQUIRED OPTION FOR A PORT CIRCUIT, IDENTIFY THE ASSOCIATED SWITCH PACKAGE FROM THE PACK DIAGRAM. THEN SET THE SWITCH SECTIONS FOR THAT PORT AS SHOWN IN THE FOLLOWING TABLE.

OPTION	TERMINATION	SWITCH SECTION		
0/ 110/		1 .	2	
W	RC BALANCE NTWK	U	X	
X	600 OHMS	D	X	

IN THE TABLE, (U) INDICATES THE SWITCH IS FULLY DEPRESSED AT THE UPPER END AND (D) INDICATES THE SWITCH IS FULLY DEPRESSED AT THE LOWER END. NOTE THAT SWITCH SECTION 2 IS NOT USED, AS INDICATED BY (X) AND THE POSITION OF THIS SWITCH HAS NO EFFECT ON CIRCUIT OPERATION.

USE 600 OHM OPTION WHEN LOOP LENGTH IS LESS THAN 3500 FEET. USE RC NETWORK OPTION FOR LOOP LENGTH GREATER THAN 3500 FEET.

Figure 40. SN230 Central Office (CO) Trunk Option Settings

SN231 AUXILIARY TRUNK OPTION SETTINGS

SELECTION OF OPTION Q, R, OR S

FOUR SWITCH PACKAGES, EACH CONTAINING FOUR Rocker Switch Sections are positioned on the Circuit Pack and assigned to a single Port Circuit as identified in the following Diagram.



A SINGLE SWITCH PACKAGE IS SHOWN BELOW TO IDENTIFY THE FOUR SWITCH SECTIONS IN THE PACKAGE.



TO SELECT THE REQUIRED OPTION FOR A PORT CIRCUIT, IDENTIFY THE ASSOCIATED SWITCH PACKAGE FROM THE PACK DIAGRAM. SET THE SWITCH SECTIONS FOR THAT PORT AS SHOWN IN THE FOLLOWING TABLE.

	TRANSMISSION	SWITCH SECTION			
UPIIUN	TRANSPISSION				
S	ONE-WAY INCOMING	X.	U	D	X
R	ONE-WAY OUTGOING	X	D	U	X
Q	TWO-WAY	X	U	U	X
ZA	TWO WIRE SIGNALING	D	X	X	X
ZB	FOUR WIRE SIGNALING	U	X	X	X

IN THE TABLE, (U) INDICATES THE SWITCH IS FULLY DEPRESSED AT THE UPPER END AND (D) INDICATES THE SWITCH IS FULLY DEPRESSED AT THE LOWER END. X INDICATES THAT THE POSITION OF THESE SECTIONS HAS NO EFFECT ON CIRCUIT OPERATION.

Figure 41. SN231 Auxiliary Trunk Option Settings

SN232B - DIRECT INWARD DIALING (DID) TRUNK OPTION SETTINGS

SELECTION OF OPTION (T) OR (V)TWO SWITCH PACKAGES, S1 AND S2, EACH CONTAINING FOUR ROCKER SWITCH SECTIONS, ARE POSITIONED ON THE CIRCUIT PACK AS SHOWN IN THE FOLLOWING DIAGRAM. EACH SWITCH PACKAGE SERVES TWO OF THE FOUR PORT CIRCUITS PROVIDED ON THE PACK.



A SINGLE SWITCH PACKAGE IS SHOWN BELOW TO IDENTIFY THE FOUR SWITCH SECTIONS (1-4) IN THE PACKAGE.



TO SELECT THE REQUIRED OPTION FOR A PORT CIRCUIT, REFER TO THE FOLLOWING TABLE. THE SYMBOL (U) INDICATES THE SWITCH SECTION IS FULLY DEPRESSED AT THE UPPER END AND (D) INDICATES THE SWITCH SECTION IS FULLY DEPRESSED AT THE LOWER END.

			SWITCH SECTION SETTING				
PORT CIRCUIT	SWITCH PACKAGE	SWITCH SECTION	OPTION (RC NTWK)	OPTION (600 OHMS)			
n	S1	1	U	D			
Ů	•.	2	0	U			
1	S2	1	U	D			
		2	D	U			
2	S1	3	U	D			
_	•	4	D	U			
3	S2	3	U	D			
-		4	D	U			

USE 600 OHM OPTION WHEN LOOP LENGTH IS LESS THAN 3500 FEET. USE RC NETWORK OPTION FOR LOOP LENGTH GREATER THAN 3500 FEET.

Figure 42. SN232B Direct Inward Dialing (DID) Trunk Option Settings

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SN233C TIE TRUNK/ATTENDANT INTERFACE OPTION SETTINGS

SN233C JACK FUNCTIONS

ACCESS TO BOTH TRANSMIT AND RECEIVE TRANSMISSION CHANNELS AND TO THE E AND M SIGNALING LEADS FOR EACH PORT IS PROVIDED BY JACKS ON THE FRONT OF THE PACK. THE JACK ASSIGNMENT IS SHOWN BELOW. PLUG INSERTION HALF WAY INTO THE TRANSMIT OR RECEIVE CHANNEL JACK ALLOWS MONITORING OF THE SIGNALS. FULL INSERTION OF THE JACK ACCESSES THE LOCAL END AND OPENS THE CHANNEL TOWARD THE DISTANT END. PLUG INSERTION INTO THE SIGNALING LEAD JACK ALLOWS MONITORING OF THE E AND M LEADS. THE E AND M LEADS CANNOT BE OPENED BY USE OF THIS JACK.



SWITCH ASSIGNMENT

THE TYPE OF SIGNALING USED ON THE PORT IS SET BY OPTION SWITCHES AS DESCRIBED BELOW. FOUR SWITCH PACKAGES, SI THROUGH S4, ARE LOCATED AS SHOWN ON THE PACK DIAGRAM. SI CONTAINS FOUR ROCKER SWITCH SECTIONS WHICH ARE SHARED BETWEEN PORT 0 AND PORT 1. S3 ALSO CONTAINS FOUR ROCKER SWITCH SECTIONS WHICH ARE SHARED BETWEEN PORT 2 AND PORT 3. S2 CONTAINS TEN ROCKER SWITCH SECTIONS WHICH ARE SHARED BETWEEN PORT 0 AND PORT 1. S4 ALSO CONTAINS TEN ROCKER SWITCH SECTIONS WHICH ARE SHARED BETWEEN PORT 2 AND PORT 3. THE SWITCH SETTINGS DETERMINE THE TYPE AND METHOD OF SIGNALING USED FOR THE PORT AND THE CODEC CONVERSION MODE. THE TABLE BELOW SHOWS THE SWITCH SETTINGS FOR THE VARIOUS SIGNALING TYPES FOR ANY PORT.

		A	В	C	D	E	F
SWITCH SECTION	SWITCH SECTION		b	с	d	е	f
STANDARD E&M TYPE	IA	D	D	D	0	U	U
	IΒ	U	U	D	U	U	U
	V	U	U	D	D	U	U
PROTECTED TYPE	IA	D	D	U	D	U	U
	IB	U	U	U	U	U	U
	۷	U	U	U	D	U	U
SIMPLEX TYPE	IA	D	D	U	D	D	D
	IΒ	U	U	U	U	D	D,
	V	U	U	U	D	D	D

CAPITAL LETTERS A THROUGH F = PORT 0 AND PORT 2 SMALL LETTERS A THROUGH F = PORT 1 AND PORT 3 SET SWITCH M FOR APPROPRIATE CONVERSION MODE: ulaw (DOMESTIC) = U alaw (INTERNATIONAL) = D

NOTE: SOME INTERNATIONAL COUNTRIES USE ulaw.



Figure 43. SN233C Tie Trunk/Attendant Interface Option Settings

SN238 EIA INTERFACE OPTION SETTINGS

TWO SWITCH PACKAGES, EACH CONTAINING EIGHT ROCKER SWITCH SECTIONS, ARE POSITIONED ON THE CIRCUIT PACK AS SHOWN IN THE FOLLOWING DIAGRAM.



THE EIGHT ROCKER SWITCH SECTIONS ON S1 ARE DESIGNATED AS SHOWN IN THE FOLLOWING DIAGRAM.

0/EPR	PRTY	19.2K	9600	4800	2400	1200	300]
								UĄ
								1.1
L							L	" ¥

THE EIGHT ROCKER SWITCH SECTIONS ON S2 ARE DESIGNATED AS SHOWN IN THE FOLLOWING DIAGRAM. S2

AUTO O AUTO 1 AUTO 2 AUTO 3 KYBD O KYBD 1	KYBD 2 KYBD 3	
		U₿
		₽ 🛉

S1 IS USED TO SELECT ODD OR EVEN PARITY, ENABLE OR DISABLE PARITY, AND TO MANUALLY SELECT A BAUD RATE (DATA RATE). S2 IS USED TO ENABLE OR DISABLE AUTO-BAUD AND AUTO-PARITY FOR PORTS 0, 1, 2, AND 3. S2 IS ALSO USED TO ENABLE OR DISABLE KEYBOARD DIALING FOR PORTS 0, 1, 2, AND 3.

FULLY DEPRESSING ROCKER SWITCH SECTION O/EPR ON S1 AT THE UPPER END (U) SELECTS EVEN PARITY WHILE FULLY DEPRESSING ROCKER SWITCH SECTION D/EPR AT THE LOWER END (D) SELECTS ODD PARITY.

FULLY DEPRESSING THE OTHER ROCKER SWITCH SECTIONS AN S1 AND S2 AT THE UPPER END (U) DISABLES PARITY, BAUD RATES 19.2K B/S, 9600 B/S, 4800 B/S, 2400 B/S, 1200 B/S, OR 300 BS ON S1 AND DISABLES AUTO-BAUD AND AUTO-PARITY FOR PORTS 0, 1, 2 AND 3 AND KEYBOARD DIALING FOR PORTS 0, 1, 2 AND 3. FULLY DEPRESSING THE ROCKER SWITCH SECTIONS ON S1 AND S2 AT THE LOWER END (D) SELECTS OR ENABLES PARITY, BAUD RATES, AUTO-BAUD AND AUTO-PARITY, AND KEYBOARD DIALING RESPECTIVELY.

NOTES:

- 1. IF MORE THAN ONE BAUD RATE ON S1 IS SELECTED, THE PORT BOARD WILL DETERMINE PER PORT THE HIGHEST COMMON BAUD RATE WITH THE DISTANT END.
- 2. WHEN A CALL IS DISCONNECTED OR NOT INITIATED, THE PORT FOLLOWS THE HIGHEST BAUD RATE SELECTED ON S1.
- IF AUTO-BAUD AND AUTO-PARITY IS ENABLED USING S2 FOR A PORT OR ALL PORTS, SETTINGS ON S1 ARE IGNORED.
- 4. IF AUTO-BAUD AND AUTO-PARITY IS ENABLED FOR A PORT OR PORTS, KEYBOARD DIALING FOR THE SAME PORT OR PORTS MUST BE ENABLED.

Figure 44. SN238 EIA Interface Option Settings

SN243B DATA PORT OPTION SETTINGS

TWO SWITCH PACKAGES, S1 AND S2, EACH CONTAINING TWO ROCKER Switch Sections, are located on the circuit pack as shown below. Each switch package serves two port circuits.



THE FOLLOWING TABLE INDICATES THE SWITCH PACKAGE AND SECTION ASSOCIATED WITH EACH PORT CIRCUIT. A SWITCH SECTION IS FULLY DEPRESSED AT THE UPPER (U) END TO PROVIDE THE 600 DHMS OPTION AND FULLY DEPRESSED AT THE LOWER END (D) FOR THE RC NETWORK OPTION.

PORT	SWITCH	SECTION
0	01	1
1	51	2
2	i en	1
3	92	2

USE 600 OHM OPTION WHEN LOOP LENGTH IS LESS THAN 3500 FEET (ABOUT 600 OHMS WITHOUT SET). USE RC NETWORK OPTION FOR LOOP LENGTH GREATER THAN 3500 FEET.

Figure 45. SN243B Data Port Option Settings

SN253B AUXILIARY TONES OPTION SETTINGS

SELECTION OF OPTIONS (F), (G), (J), OR (K)

A SWITCH PACKAGE CONTAINING TWO ROCKER SWITCH SECTIONS IS LOCATED ON THE CIRCUIT PACK IN THE UPPER LEFT CORNER (COMPONENT SIDE, CONNECTOR TO THE LEFT) AND SHOWN IN THE DIAGRAM BELOW.



THE FOLLOWING TABLE INDICATES THE SWITCH SECTION POSITIONS REQUIRED FOR EACH OPTION PROVIDED. IN THE TABLE, (U) INDICATES THE ROCKER SWITCH IS DEPRESSED AT THE UPPER END AND (D) INDICATES THE ROCKER SWITCH IS DEPRESSED AT THE LOWER END.

FUNCTION			SWITCH		
		OPTION	S 1	\$2	
INTERNAL SYSTEM ONLY (0.5 SEC PE	к	U	U		
EXTERNAL CHIME	J	D	U		
PERIOD (SEC.) 1.00		G	U	D	
* .	2.00	F	D	D	

* INTERNAL CHIME WILL ALSO OPERATE AT THE SAME RATE CHOSEN FOR THE EXTERNAL CHIME.

Figure 46. SN253B Auxiliary Tones Option Settings

All Cabinets Alarm Board Option Settings

Alarm board AEH4 located behind the fan assembly in each cabinet can affect the alarm strategy. Use Figure 47 to determine if the option setting is correct for the application being used.

ALARM BOARD AEH4 OPTION SETTINGS



FOUR SWITCH PACKAGES WITH SIX SWITCH SECTIONS ALLOW CONFIGURATION OF THE ALARM BOARD.

THE FOLLOWING TABLE INDICATES THE FOUR SWITCH PACKAGES POSITIONS REQUIRED FOR EACH OPTION PROVIDED. (U) INDICATES THE ROCKER SWITCH IS DEPRESSED AT THE UPPER END AND (D) INDICATES THE SWITCH IS DEPRESSED AT THE LOWER END.

										RECTIFIFR						DC FAN								
	ŕ	IIT	сн	51	16	SWITCH S2						SWITCH S3						SWITCH S4						
AEH4 LOCATED IN THIS Type of Cabinet	SECTION						SECTION						SECTION						SECTION					
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
UNDUPLICATED COMMON CONTROL (501CC) (CONTAINS PORT CIRCUITS)	U	D	D	U	U	D	0	U	U	U	U	U	U	U	U	U	U	U	D	D	υ	U	U	D
DUPLICATED COMMON CONTROL (501CC) (DDES NOT CONTAIN PORT CIRCUITS)	U	D	D	U	U	D	D	U	U	U	U	D	U	U	U	D	อ	U	U	U	U	D	U	D
MODULE CONTROL WITH 309A/310A UNDUPLICATED 501CC SYSTEM	D	บ	U	D	D	U	U	D	D	D	D	U	U	U	U	U	U	U	υ	U	U	U	D	U
MODULE CONTROL WITH 309A/310A DUPLICATED 501CC SYSTEM	D	U	U	D	D	บ	U	D	D	D	D	U	U	U	D	U	U	D	D	D	U	บ	D	U
PORT CABINET WITH 309A/31DA	D	U	U	D	D	U	U	D	D	D	D	U	Ų	U	D	U	U	D	D	D	U	U	D	U
PORT CABINET WITHOUT 309A/310A	D	U	U	D	D	U	U	D	ΞŪ,	U	J	U	U	IJ	U	U	U	U	U	U	U	U	D	U
UNDUPLICATED TMS FOR UP TO 31 MODULES	D	U	U	D	D	U	U	D	D	D	D	D	D	Ď	D .	U	U	D 	D	D	D) = (D	U
DUPLICATED TMS - ONE CABINET FOR UP TO 15 MODULES	D	ប	ປ	D	D	Ų	U	D	D	D	D	D	D	D	D	υ	U	D	D	D	D	U	D	U
DUPLICATED TMS - TWO CABINETS FOR 16 - 31 MODULES	D	U	U	D	D	บ	U	D	D	D	D	D	D	D	Ð	U	U	D	D	D	D	U	D	U
AUXILIARY CABINET WITH DC FAN ASSEMBLY	U	D	D	U	U	D	D	U	U	U	U	U	ປ	U	U	U	U	U	U	U	D	U	D	D

Figure 47. Alarm Board AEH4 Option Settings

Other

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Fuses on circuit pack SN270 which protect each port are shown in Figure 48.

Note: There are no fuses on circuit pack SN270B.

SN270 GENERAL PURPOSE PORT FUSES

SN270 FUSES

THE -48 VOLTS POWER SUPPLIED TO STATION APPARATUS FROM EACH OF THE FOUR PORTS ON THIS PACK IS FUSED AT EACH PORT. THE FUSES, CODED 70G (0.5A), ARE LOCATED ON THE PACK AS SHOWN IN THE FOLLOWING DIAGRAM.



WHEN MAINTENANCE PROCEDURES INDICATE A FUSE MAY NEED REPLACEMENT, ALL PORTS ON THE PACK SHOULD BE MADE MAINTENANCE BUSY BEFORE REMOVING THE PACK FROM THE CARRIER. PROC 632 TEST 3 CAN BE USED TO MAKE THE PORTS MAINTENANCE BUSY.

Figure 48. SN270 General Purpose Port (GPP) Fuses

HIGH CAPACITY MINI-RECORDER (HCMR)

The high capacity mini-recorder drives a tape cartridge which contains a copy of the programs, parameters, translations, and maintenance used by the switch common control. The mini-recorder reloads the switch memory when power to the switch is interrupted or when memory is lost for other reasons.

HCMR Circuit Pack Replacement

Perform the following steps when replacing circuit packs in the HCMR. (Refer to Figure 49.)





1. Remove the tape cartridge.

Note: The tape cartridge can be removed if the **YELLOW** LED on the HCMR is lighted or not lighted.

- 2. Lift up the front cover to release the catch on both sides and lower the cover.
- 3. Power down the mini-recorder.

Caution: Damage to components on the circuit pack to be removed or other circuit packs (tape pin connectors -12V) and running tape off the reel on the tape cartridge may occur if the mini-recorder is not powered down.

If SN446 (power supply) is to be replaced, set the rocker switch (plunger) on SN446 to OFF and set circuit breaker CB3 on common control carrier to OFF.

Note: The GREEN LED on SN446 goes off.

If other circuit packs in the HCMR are to be replaced, set the rocker switch (plunger) on SN446 to OFF.

Note: The GREEN LED on SN446 goes off.

4. Remove the circuit pack to be replaced by releasing the lever and pulling outward.

Note: Do not pull out the circuit pack by using the lever.

- 5. Install the replacement circuit pack by sliding inward and then pushing the lever forward.
- 6. Power up the mini-recorder.

If SN446 (power supply) was replaced, depress the rocker switch (plunger) on SN446 and set circuit breaker CB3 on common control carrier to ON.

Note: The GREEN LED on SN446 is lighted.

If other circuit packs in the HCMR were replaced, depress the rocker switch (plunger) on SN446.

Note: The GREEN LED on SN446 is lighted.

- 7. Raise the cover and secure to the HCMR.
- 8. Insert the tape cartridge.

Caution: If the test fails after replacing the HCMR circuit pack, and the circuit pack replaced was SN441 or SN445, reseat the proms on SN441 or SN445 before assuming the replacement circuit pack or any other circuit pack is faulty.

130

Cleaning HCMR Tape Head and Capstan

Perform the following steps when cleaning the HCMR tape head and capstan.

- 1. Remove the tape cartridge.
- 2. Lift up the front cover to release the catch on both sides and lower the cover.
- 3. Power down the mini-recorder.

Caution: Damage to components on the circuit pack to be removed or other circuit packs (tape pin connectors -12V) and running tape off the reel on the tape cartridge may occur if the mini-recorder is not powered down.

Set the rocker switch (plunger) on SN446 to OFF.

Note: The GREEN LED on SN446 goes off.

4. Remove SN443 circuit pack by releasing the lever and pulling outward.

Note: Do not pull out the circuit pack by using the lever.

5. Turn SN443 on its side to expose tape head, capstan, etc. (Refer to Figure 50.)



Figure 50. Cleaning Tape Head and Capstan on HCMR Circuit Pack SN443

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- 6. Cover end-of-tape sensor with cloth or suitable material.
- Wipe face of tape head with lint-free cloth moistened with 71% pure isopropyl alcohol. Dry with clean cloth.
- Wipe capstan with lint-free cloth moistened with 71% pure isopropyl alcohol. Dry with clean cloth.
- 9. Remove cloth from end-of-tape sensor.
- 10. Install SN443 into the HCMR by sliding inward and then pushing the lever forward.
- Power up the mini-recorder.
 Depress the rocker switch (plunger) on SN446.

Note: The GREEN LED on SN446 is lighted.

- 12. Raise the cover and secure to the HCMR.
- 13. Insert the tape cartridge.

HCMR Replacement

To replace the HCMR perform the following steps:

- 1. At the rear of the HCMR, pull out terminal leads (48 and 48 RET).
- 2. Remove 2 mounting screws securing the HCMR to the cabinet.
- 3. Remove the HCMR from the front of the cabinet.
- 4. Install the replacement HCMR into the cabinet.
- 5. Secure the HCMR to the cabinet using the 2 mounting screws.
- 6. Connect the terminal leads to the rear of the HCMR.

309A OR 310A POWER SUPPLY REPLACEMENT

To replace the 309A or 310A power supply perform the following steps:

- 1. Set circuit breaker ON/OFF switch on 309A power supply to OFF.
- 2. Wait one minute and set the BATT switch on the 310A power supply to OFF.
- 3. Remove the ac input power to the power supply.
- 4. Tag and disconnect the cables from the power supply.
- 5. Remove the mounting screws securing the power supply to the cabinet.

Caution: An adequate lifting device must be used to support and lift the power supply in order to prevent personnel injury.

- 6. Remove the power supply from the cabinet.
- 7. Set the switches on the replacement power supply to OFF.

- 8. Install the replacement power supply into the cabinet.
- 9. Secure the power supply to the cabinet using the mounting screws.
- 10. Connect the cables to the replacement power supply.
- 11. Apply ac input power to the replacement power supply.
- 12. Set **BATT** switch on the 310A power supply to **ON**.
- 13. Set circuit breaker ON/OFF switch on 309A power supply to ON.

After replacing the 309A or 310A power supply, perform voltage tests on 310A power supply as appropriate.

FREQUENCY GENERATOR REPLACEMENT

To replace the 124B frequency generator (Refer to Figure 51), perform the removal and installation steps below.

Removal Steps:

- 1. Disconnect the connector from PFG IN and PFG OUT.
- 2. Remove four mounting screws (2 from each side).
- 3. Remove the frequency generator from the rear shelf.

Installation steps:

- 1. Mount the replacement frequency generator on the rear shelf and secure with the four mounting screws.
- 2. Assure that the AC power cord (if applicable) is secured by the cable clamp.
- 3. Connect the connector to PFG IN and PFG OUT.

DC FAN AND FAN ASSEMBLY REPLACEMENT

The fan assembly provides three fans to maintain interior cabinet temperature within the acceptable operating limit. The fans are mounted vertically side by side. They are designed to run continuously at variable speed and operate on dc power.

DC Fan Replacement

To replace a DC fan (Refer to Figure 52), perform the removal and installation steps below.

Removal Steps:

- 1. Remove the fuse associated with the fan to be replaced.
- 2. Disconnect the plug from the fan to be replaced.
- 3. Remove two mounting screws.
- 4. Remove the fan from the fan assembly.

Installation steps:

- 1. Mount the replacement fan on the fan assembly and secure with the two mounting screws.
- 2. Install the fan plug to the replacement fan.
- 3. Install the fuse associated with the fan replaced.



Figure 51. Replacing 124B Frequency Generator



Figure 52. Replacing DC Fans

DC Fan Wire Replacement

To replace a fan wire suspected of failing, perform the removal and installation steps below. Removal Steps:

- 1. Remove the fuse associated with the fan wire to be replaced.
- 2. Disconnect the fan wire (plug) to be replaced.
- 3. Thread the fan wire through the fan assembly toward the rear.
- 4. Disconnect the fan wire from **TB1** at the rear of the fan assembly.
- 5. Remove the fan wire from the fan assembly.

Installation steps:

- 1. Connect the replacement fan wire to TB1 at the rear of the fan assembly.
- 2. Thread the fan wire through the fan assembly toward the front.
- 3. Install the replacement fan wire (plug) to the appropriate fan.
- 4. Replace the fuse associated with the fan wire replaced.

DC Fan Assembly Replacement

To replace the DC fan assembly, perform the removal and installation steps below.

Removal Steps:

- 1. Remove two mounting screws securing the fuse panel to the fan assembly.
- 2. Remove two mounting screws (left side) securing the fan assembly to the cabinet.
- 3. Remove the fan assembly from the cabinet.

Installation steps:

Note: When the DC fan assembly is shipped loose, attach 900658329 vinyl plastic tape (approximately 60 inches) to the top and bottom edges of the unit before installing the DC fan assembly into the cabinet.

- 1. Mount the replacement fan assembly and secure with the two mounting screws.
- 2. Secure the fuse panel to the fan assembly with the two mounting screws.

TMS/RMI CABINET AC DISTRIBUTION UNIT REPLACEMENT

To replace the TMS/RMI cabinet AC distribution unit (Refer to Figure 53), perform the removal and installation steps below.

Removal Steps:

- 1. Set the circuit breaker on the TMS/RMI cabinet AC distribution unit to OFF.
- 2. At the front of the TMS/RMI cabinet AC distribution unit, disconnect the cables from J1 through J3 as appropriate.
- 3. At the rear of the TMS/RMI cabinet AC distribution unit, disconnect the cables from P4 and P5 as appropriate.
- 4. Remove 2 mounting screws and remove the TMS/RMI cabinet AC distribution unit from the cabinet.

Installation steps:

- 1. Set the circuit breaker on the replacement AC distribution unit to OFF.
- 2. Install the replacement AC distribution unit into the TMS/RMI cabinet and secure the unit to the cabinet using 2 mounting screws.
- 3. At the rear of the TMS/RMI cabinet AC distribution unit, connect the cables to P4 and P5 as appropriate.
- 4. At the front of the TMS/RMI cabinet AC distribution unit, connect the cables to **J1** through **J3** as appropriate.
- 5. Set the circuit breaker on the replacement AC distribution unit to ON.



VIEW A



MODULE CONTROL OR PORT CABINET AC DISTRIBUTION UNIT REPLACEMENT

To replace the module control or port cabinet AC distribution unit (Refer to Figure 54), perform the removal and installation steps below.



VIEW A

Figure 54. Replacing Module Control or Port Cabinet AC Distribution Unit

Removal Steps:

- 1. Set circuit breaker ON/OFF switch at 309A power supply to OFF.
- 2. Wait one minute and set BATT switch on 310Å power supply to OFF.
- 3. Set the 3 circuit breakers on the AC distribution unit to be replaced to OFF.
- 4. Disconnect J1 from the 309A/310A power supply.
- 5. Disconnect the power cord from the AC INPUT connector.
- 6. Tag and disconnect the remaining cables from the AC distribution unit to be replaced.
- 7. Remove 3 mounting screws and remove the AC distribution unit from the cabinet.

Installation steps:

- 1. Set the 3 circuit breakers on the replacement AC distribution unit to OFF.
- 2. Install the replacement AC distribution unit into the cabinet and secure the unit to the cabinet using 3 mounting screws.
- 3. Connect the cables (disconnected in Step 6 of removal steps) to the replacement AC distribution unit.
- 4. Connect the power cord of the replacement AC distribution unit to the AC INPUT connector.
- 5. Connect J1 to the 309A/310A power supply.
- 6. Set the 3 circuit breakers on the replacement AC distribution unit to ON.
- 7. Set the BATT switch on the 310A power supply to ON.
- 8. Set the circuit breaker ON/OFF switch at the 309A power supply to ON.

DC FILTER REPLACEMENT

To replace the DC filter (Refer to Figure 55), perform the following steps:

- 1. At the front of the DC filter, set the -48V circuit breaker to OFF.
- 2. At the top of the DC filter, disconnect the alarm leads by pressing the clasps on both sides and lifting up.
- 3. At the rear of the DC filter, tag and disconnect the leads on both terminal strips.
- 4. Remove the mounting screws securing the DC filter to the cabinet.
- 5. Remove the DC filter from the cabinet.
- 6. Install the replacement DC filter into the cabinet ensuring the -48V circuit breaker is set to OFF.
- 7. Secure the DC filter to the cabinet using the mounting screws.
- 8. At the rear of the DC filter, connect the leads to both terminal strips on the replacement DC filter.
- 9. At the top of the replacement DC filter, connect the alarm leads.
- 10. At the front of the replacement DC filter, set the -48V circuit breaker to OFF.



Figure 55. Replacing DC Filter

CONSOLE COMPONENT REPLACEMENT

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Prior to replacing console components, disconnect the console power cord and move the console to a convenient work area for disassembly. Disconnect the handset from the console.

Console components identified as replaceable are:

- 1. Power supply (Figure 56).
- 2. DSS and BLF carrier or button units (Figure 57).
- 3. Timing control and speech or alphanumeric control (Figure 59).
- 4. Alphanumeric display, lamp control and carrier, or dial key pad (Figure 60).

Console Power Supply Replacement

To replace the console power supply (Refer to Figure 56), perform the following steps:



Figure 56. Replacing Console Power Supply

1. Tilt the console to access the bottom of the console.

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- 2. Remove 4 screws to remove the power supply cover.
- 3. Remove the screw in the center of the power supply.
- 4. Lift the power supply up and out to remove the power supply from inside the console.
- 5. Disconnect 2 connectors from the power supply.
- 6. Connect 2 connectors to the replacement power supply.
- 7. Install the power supply inside the console.
- 8. Secure the power supply to the console by mounting the screw in the center of the power supply.
- 9. Secure the power supply cover with 4 screws.

Console DSS and BLF Carrier or Button Units Replacement

To replace the console DSS and BLF carrier or button units (Refer to Figure 57), perform the following steps:



Figure 57. Replacing Console DSS and BLF Carrier or Button Units

- 1. Lift up and pull out to remove the rear access cover.
- 2. Disconnect the carrier connector.
- 3. Remove 7 flat head screws to remove the DSS and BLF carrier.
- 4. Push the DSS and BLF carrier from the front and remove the carrier from the console.
- 5. Unplug the key/lamp unit from the DSS and BLF carrier.
- 6. Plug the key/lamp unit into the replacement DSS and BLF carrier or plug the replacement key/lamp unit into the original DSS and BLF carrier.
- 7. Install the DSS and BLF carrier inside the console.
- 8. Secure the DSS and BLF carrier to the console using 7 flat head screws.
- 9. Connect the carrier connector.
- 10. Replace the rear access cover.

Console Timing Control and Speech or Alphanumeric Control Replacement

To replace the timing control and speech or alphanumeric control (Refer to Figures 58 and 59), perform the following steps:



Figure 58. Removing Console Front Access Panel



Figure 59. Replacing Console Timing Control and Speech or Alphanumeric Control

- 1. Lean console toward rear and rest console on rear of DSS faceplate.
- 2. Remove the front cover and access panel (Refer to Figure 58), by opening the front cover and removing 8 screws from the access panel.
- 3. To replace the alphanumeric control, proceed to Step 4.

To replace the timing control and speech, proceed to Step 5.

- Rotate both latches and remove the alphanumeric control. Install the alphanumeric control and rotate both latches counterclockwise. Proceed to Step 8.
- 5. Pull key pad connector forward and disconnect from timing control and speech board.
- 6. Release both latches and remove the timing control and speech board.
- 7. Install the replacement timing control and speech board.

Secure both latches by rotating counterclockwise.

Plug key pad connector into connector on front of timing control and speech board. Proceed to Step 8.

- 8. Install access panel and front cover using 8 screws.
- 9. Pull console toward front and place in normal position.

Console Alphanumeric Display, Lamp Control, or Dial Key Pad Replacement

To replace the console alphanumeric display, lamp control, or dial key pad (Refer to Figure 60), perform the following steps:

- 1. Lean console toward rear and rest console on rear of DSS faceplate.
- 2. Remove the front cover and access panel (Refer to Figure 58), by opening the front cover and removing 8 screws from the access panel.

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3. Pull out then pull up to remove the console faceplate.

To replace the alphanumeric display, proceed to Step 4.

To replace the dial key pad or lamp control and carrier, proceed to Step 5.

4. Pull up to remove the alphanumeric display.

Install the replacement alphanumeric display and proceed to Step 12.

- 5. Disconnect the dial key pad connector.
- 6. Remove 4 screws to remove the dial key pad.

To replace the dial key pad, proceed to Step 7.

To replace the lamp control and carrier, proceed to Step 8.

- 7. Install the replacement dial key pad and proceed to Step 12.
- Rotate both locks outward to remove the lamp control and carrier. Install the replacement lamp control and carrier and proceed to Step 9.
- Secure the lamp control and carrier by rotating both locks counterclockwise. Install the dial key pad and proceed to Step 10.
- 10. Secure the dial key pad to the console using 4 screws.
- 11. Connect the dial key pad connector.
- 12. Install the console faceplate.

13. Install access panel and front cover using 8 screws.

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14. Pull console toward front and place in normal position.



Figure 60. Replacing Console Alphanumeric Display, Lamp Control Carrier, or Dial Key Pad

ALARM PANEL REPLACEMENT

To replace the alarm panel (Refer to Figure 61), perform the removal and installation steps below.



PARTIAL REAR VIEW (DUPLICATED)

Figure 61. Replacing Alarm Panel

Removal Steps:

- 1. Set the GO/HALT switch(s) on the alarm panel to HALT.
- 2. Remove the tape cartridge(s) from the HCMR(s).
- 3. At the rear of the alarm panel, disconnect and tag the AP* cables.
- 4. At the rear of the alarm panel (left side), disconnect and tag PKBR and PAPPWR (2) wires.
- 5. Slide the alarm panel out the front of the common control cabinet.

Installation Steps:

- 1. On the replacement alarm panel, set switches GO/HALT to HALT, TEST SELECT to 15, EMERGENCY TRANSFER to OFF, and LOCK ON LINE (when provided) to OFF.
- 2. Slide the replacement alarm panel into the common control cabinet.
- 3. At the rear of the alarm panel (left side), connect the PBKR and PAPPWR(s) wires.
- 4. At the rear of the alarm panel, connect the AP* cables.
- 5. Insert the tape cartridge(s) into the HCMR(s).
- 6. At the front of the replacement alarm panel, set the GO/HALT switch on CC0 to GO and depress RESET, ENABLE.

Note: When the alarm panel is duplicated, set the GO/HALT switch on CC1 to GO, and depress **RESET**, **ENABLE** on CC1 after the tape is loaded in CC0.

AEH4 ALARM BOARD REPLACEMENT

To replace the AEH4 alarm board, perform the following steps:

1. At the rear of the fan assembly, remove 4 ribbon cables from the AEH4 alarm board.

Note: All 4 ribbon cables may not be connected. Record the ribbon cables that are connected and the location they are connected to.

2. Remove eight clip-on fasteners from the AEH4 alarm board plugs labeled **JTMP**, **JMISC**, **JFAN**, **JALM**, **JBKR0**, **JBKR1**, **JRSV0**, and **JRSV1**.

Note: All eight fasteners may not be connected. Record the clip-on fasteners that are connected and the location they are connected to.

- 3. Remove 2 screws mounting the AEH4 alarm board to the fan assembly shelf.
- 4. Remove the AEH4 alarm board.
- 5. Record the option settings of the four switch packages on the AEH4 alarm board.
- 6. Set the four switch packages on the replacement AEH4 alarm board to the option settings as recorded in Step 5.
- 7. Install the replacement AEH4 alarm board on the fan assembly shelf and secure with the 2 mounting screws.
- 8. Connect the eight clip-on fasteners (if appropriate) as recorded in Step 2.
- 9. Connect the four ribbon cables (if appropriate) as recorded in Step 1.

SMDR COMPONENT REPLACEMENT

GENERAL

This section provides a brief description of the Station Message Detail Recorder (SMDR) and contains instructions for replacement of SMDR components.

Replacement of SMDR components, as determined by performing maintenance procedures, consist of the following:

- 1. SMDR carrier circuit pack replacements.
- 2. SMDR formatter circuit pack replacements.
- 3. SMDR tape drive circuit pack replacements and adjustments.
- 4. SMDR power supply replacement.
- 5. SMDR formatter replacement.
- 6. SMDR tape drive replacement.
- 7. SMDR clock/calendar display unit replacement.

SMDR CABINET

The SMDR cabinet (Refer to Figure 62) contains the following:

1. A Kennedy 9800 tape drive.

Drives a 9-track magnetic tape.

2. A 9-track magnetic tape.

Stores information for approximately 330,000 calls (a readable form of the tape can be provided through machine processing).

3. A clock/calendar display.

Provides a means for setting the time and date to be recorded onto the tape.

4. A call information display.

Displays detailed call information for one call at a time.

5. A control panel.

Provides a user interface to the 9-track tape operation for functions such as changing the tape, dumping memory, and clearing the display.

6. An SMDR carrier.

Contains the circuit packs that control SMDR operations.

7. A fan assembly.

Maintains interior cabinet temperature.

8. A Kennedy 9217 tape formatter.

Records data on a standard 9-track magnetic tape.



Figure 62. Station Message Detail Recorder (SMDR) Cabinet

9. An ac distribution unit.

Distributes ac power throughout the cabinet.

SMDR CARRIER CIRCUIT PACK REPLACEMENT

To replace circuit packs in the SMDR carrier (Refer to Figure 63), proceed as follows:

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Figure 63. SMDR Carrier

- 1. At the SMDR power supply, set power switch to OFF.
- 2. At the SMDR carrier, replace circuit pack.
- 3. At the SMDR power supply, set power switch to **ON**.
- 4. At the SMDR control panel, depress the system ON LINE button.
- 5. If the ON LINE lamp on the tape drive is not lighted, depress the ON LINE button.

SMDR FORMATTER CIRCUIT PACK REPLACEMENT

To replace circuit packs in the SMDR formatter (Refer to Figure 64), proceed as follows:

- 1. Remove 2 screws from front of the SMDR formatter to remove the front cover.
- 2. At the SMDR formatter, replace circuit pack.
- 3. Replace front cover on SMDR formatter using 2 screws.
4. At the SMDR control panel, depress the system ON LINE button.

5. If the ON LINE lamp on the tape drive is not lighted, depress the ON LINE button.



FORMATTER WITH FRONT COVER REMOVED

Figure 64. Replacing SMDR Formatter Circuit Packs

SMDR TAPE DRIVE CIRCUIT PACK REPLACEMENT

Circuit Pack Replacement

To replace circuit packs in the SMDR tape drive (Refer to Figure 65), proceed as follows:

- 1. At the SMDR tape drive (behind dust cover), set power ON/OFF switch to OFF.
- 2. At top rear of the SMDR tape drive, replace circuit pack.
- 3. Refer to Table BP and perform adjustments required for circuit pack replaced.

- 4. At the SMDR tape drive, set power ON/OFF switch to ON (if off).
- 5. At the SMDR control panel, depress the SYSTEM ON LINE button.
- 6. If the ON LINE lamp on the tape drive is not lighted, depress the ON LINE button.



Figure 65. Replacing SMDR Tape Drive Circuit Packs

Adjustments for Tape Drive Circuit Packs

Tape Speed Adjustment:

This adjustment is performed on the SMDR tape drive ramp generator circuit board 3645 as follows:

- 1. At the SMDR tape drive (behind dust cover), set power ON/OFF switch to OFF.
- 2. Remove circuit board 4139 from position 4, (Refer to Figure 66) and insert a Kennedy card extender in its place.
- 3. Insert circuit board 4139 into the card extender.
- 4. At the SMDR tape drive, set power ON/OFF switch to ON.
- 5. Load the master skew tape.

TABLE BP.

TAPE DRIVE ADJUSTMENTS			
CIRCUIT PACK CODE	CIRCUIT PACK POSITION(S)	REQUIRED ADJUSTMENT(S)	
3645	11	TAPE SPEED	
		RAMP TIME	
3844	12	PHOTOSENSOR	
4139	4 and 5	READ SKEW	
4306	13	CAPSTAN ZERO OFFSET	
		BUFFER ARM TRAVEL	



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6. Connect the test panel to the test connector on circuit board 4843 (Refer to Figure 67).



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Figure 67. Test Panel Connection to Circuit Pack 4843

- 7. At the test panel, depress the STOP button.
- 8. At the test panel, depress the TEST MODE button.
- 9. At the test panel, depress the **FORWARD RUN** button to advance the tape beyond load point and then depress the **STOP** button.
- 10. Connect an oscilloscope to pin H on the extender card.
- 11. At the test panel, depress the FORWARD RUN button while observing the signal on the oscilloscope.

12. If necessary, adjust potentiometer R14 on circuit board 3645 (Refer to Figure 66) for a signal with a period (T) of 100 usec as displayed on the oscilloscope (Refer to Figure 68).





Ramp Time Adjustment:

This adjustment is performed on the ramp generator circuit board. With the test conditions as in Step 12 of **Tape Speed Adjustment** above, proceed as follows:

- 1. Connect a test lead from pin Y on card extender to the external trigger input on the oscilloscope.
- 2. Condition the oscilloscope to trigger on a high going external signal.
- 3. Connect the oscilloscope probe to point A on circuit board 3645 (Refer to Figure 66).
- 4. At the test panel, depress the **FORWARD RUN** button and observe trace of ramp-up signal (Refer to Figure 69).

This signal appears each time the tape starts to run forward.



Figure 69. Ramp-Up Signal

- 5. Alternately depress the FORWARD RUN and STOP buttons to cause the signal to repeat.
- 6. Adjust the start ramp potentiometer R3 on circuit board 3645 (Refer to Figure 66) if necessary, for a ramp-up time (tr) of 15ms (Refer to Figure 69).
- 7. Condition the oscilloscope to trigger on a low going external signal.
- 8. At the test panel, alternately depress the **FORWARD RUN** and **STOP** buttons while observing the ramp-down signal (Refer to Figure 70) on the oscilloscope.

9. If necessary, adjust stop ramp potentiometer R4 on circuit board 3645 for a ramp-down time (tr) of 15 ms (Refer to Figure 70).



Figure 70. Ramp-Down Signal

10. At the SMDR tape drive, set power ON/OFF switch to OFF.

11. Remove the test panel from circuit board 4843.

12. Remove circuit board 3645 from the card extender.

- 13. Remove the card extender and insert circuit board 3645 in its place.
- 14. Disconnect the oscilloscope probe and test cable.
- 15. At the SMDR tape drive, set power **ON/OFF** switch to **ON**.
- 16. Unload master skew tape, and load original 9-track tape.

Photosensor Adjustment:

This adjustment is performed on sensor amplifier driver circuit board 3844 as follows:

- 1. Load the master skew tape (or standard 9-track tape) and advance the tape to the load point.
- 2. Connect the test panel to test connector on circuit board 4843 (Refer to Figure 67).
- 3. At the test panel, depress the **STOP** button.
- 4. At the test panel, depress the **TEST MODE** button.

Note: Do not operate the **FAST FORWARD** or **FAST REVERSE** buttons on the test panel when using a master skew tape.

- 5. Connect a voltmeter between test points E and F on circuit board 3844 (Refer to Figure 66) and adjust potentiometer R16 to 0 volts on the voltmeter.
- 6. Disconnect the voltmeter and test panel.
- 7. Unload master skew tape and load original 9-track tape.

Read Skew Adjustment:

This adjustment is performed on the quad phase encoded read detector circuit board 4139 as follows:

1. Load master skew tape on tape drive and advance tape to the load point.

Note: Tape drive must be off-line.

- 2. Connect the test panel to test connector on circuit board 4843 (Refer to Figure 67).
- 3. At the test panel, depress the STOP button.

- 4. At the test panel, depress the **TEST MODE** button.
- 5. At the test panel, depress the FORWARD RUN button.
- 6. When the tape reaches end-of-tape marker, depress the **REVERSE RUN** button and observe the **SKEW** indicator lamp on the test panel. The **SKEW** lamp when illuminated, indicates excessive skew.
- 7. If the **SKEW** lamp lights while tape is running forward, adjust skew adjusting screw (Refer to Figure 71) until **SKEW** lamp is extinguished.
- 8. Disconnect the test panel from circuit board 4843.
- 9. Unload master skew tape and load original 9-track tape.

Capstan Servo Zero Offset Adjustment:

This adjustment is performed on the servo preamplifier circuit board 4306 as follows:

1. At the SMDR tape drive (behind dust cover), set power ON/OFF switch to OFF.

Note: Tape must be loaded.

- 2. Remove circuit board 4306 and insert the card extender in its place.
- 3. Insert circuit board 4306 into the card extender.
- 4. At the SMDR tape drive, set power **ON/OFF** switch to **ON**.
- 5. Connect a voltmeter to test point A on circuit board 4306 to observe the voltage output of the capstan servo amplifier stage.
- 6. With tape at load point, adjust potentiometer R56 to 0 volts on voltmeter.
- 7. Observe that capstan does not rotate.

Buffer Arm Travel Adjustment:

This adjustment is performed on the servo preamplifier circuit board 4306 to prevent excessive travel of the supply and take-up buffer arms during ramp-ups and ramp-downs. With the test conditions as in Step 7 of **Capstan Zero Offset Adjustment** above, proceed as follows:

- 1. Connect the test panel to test connector on circuit board 4306 (Refer to Figure 67).
- 2. With the tape drive off-line, depress the STOP button on the test panel.
- 3. At the test panel, depress the **TEST MODE** button.
- 4. At the test panel, alternately depress the FORWARD RUN and REVERSE RUN buttons while observing supply buffer arm travel.
- 5. Adjust R57 on circuit board 4306 for minimum travel of the supply buffer arm during rampups and ramp-downs.
- 6. Adjust R58 on circuit board 4306 for minimum travel of the take-up buffer arm during rampups and ramp-downs.
- 7. At the SMDR tape drive, set power ON/OFF switch to OFF.
- 8. Remove circuit board 4306 from card extender.
- 9. Remove card extender from tape drive and install circuit board 4306 in its place.

10. At the SMDR tape drive, set power ON/OFF switch to ON.

11. Remove test panel from circuit board 4843.

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Figure 71. Read Skew Adjustment

SMDR 207B POWER SUPPLY REPLACEMENT

To replace the SMDR 207B power supply (Refer to Figure 72), perform the removal and installation steps below.



Figure 72. Replacing SMDR 207B Power Supply

Removal Steps:

- 1. Set switch on SMDR power supply to OFF.
- 2. Disconnect SMDR power cord from ac receptacle.
- 3. Tag and disconnect leads from rear of power supply.
- 4. Remove 4 mounting screws securing power supply to cabinet.
- 5. Remove power supply from cabinet.

Installation steps:

- 1. Install the replacement power supply into the cabinet and secure with 4 mounting screws.
- 2. Connect leads (disconnected in Step 3 of removal steps) to rear of replacement power supply.
- 3. Connect SMDR power cord to ac receptacle.
- 4. Set switch on power supply to ON.

SMDR FORMATTER REPLACEMENT

To replace the SMDR formatter (Refer to Figure 73), perform the removal and installation steps below.

Removal Steps:

- 1. At rear of the SMDR cabinet, disconnect formatter power cord.
- 2. Tag and disconnect cables at rear of formatter.
- 3. Remove 2 mounting screws from formatter front cover and remove front cover.
- 4. Remove 4 mounting screws securing formatter to brackets.
- 5. Remove formatter from cabinet.

Installation steps:

- 1. Remove 2 mounting screws from front cover on replacement formatter and remove front cover.
- 2. Install the replacement formatter into the cabinet and secure to the brackets with 4 mounting screws.
- 3. Secure front cover on the replacement formatter using 2 mounting screws.
- 4. Connect cables (disconnected in Step 2 of removal steps) to rear of replacement formatter.
- 5. Connect formatter power cord.
- 6. At the rear of replacement formatter, set voltage switch to 115 volts.
- 7. At the SMDR control panel, depress the SYSTEM ON LINE button.
- 8. If the ON LINE lamp on the tape drive is not lighted, depress the ON LINE button.

SMDR TAPE DRIVE REPLACEMENT

To replace the SMDR tape drive (Refer to Figure 74, Sheets 1 and 2), perform the removal and installation steps below.

Removal Steps:

- 1. At the SMDR control, depress the TAPE UNLOAD button.
- 2. Rewind tape onto supply reel either manually or by depressing the **ON LINE** and **REWIND** buttons on the tape drive.



Figure 73. Replacing SMDR Formatter

- 3. Remove supply reel from the tape drive.
- 4. Set tape drive power switch to OFF.
- 5. Disconnect power cord from ac voltage source.
- 6. Tag and disconnect cables at rear of the tape drive.
- 7. Remove 8 mounting screws at front of tape drive.
- 8. At rear of the tape drive, remove 2 mounting screws securing bracket to tape drive.
- 9. Remove tape drive from the control panel.



Figure 74. Replacing SMDR Tape Drive (Sheet 1 of 2)



PARTIAL REAR VIEW



Figure 74. Replacing SMDR Tape Drive (Sheet 2 of 2)

Installation steps:

- 1. Install the replacement tape drive into the control panel and secure the tape drive to the control panel using 8 mounting screws.
- 2. Secure bracket to tape drive using 2 mounting screws.
- 3. Verify (or set) voltage switch at rear of tape drive is set to 115 volts.
- 4. Connect cables (disconnected in Step 7 of removal steps) to rear of the tape drive.
- 5. Connect power cord to ac voltage source.
- 6. At the tape drive, raise the quick release latch.
- 7. Install the supply reel on supply hub with the write enable ring side next to the tape transport deck.

- 8. Hold supply reel flush against the butt flange and secure the supply reel by depressing the quick release latch.
- 9. Thread tape and wind a few turns clockwise around the take up reel until the slack in the tape is removed.
- 10. Set the tape drive power switch to **ON**.
- 11. Close the dust cover and depress the LOAD BUTTON.
- 12. At the SMDR control panel, depress the SYSTEM ON LINE button.
- 13. At the SMDR tape drive, depress the ON LINE button.
- 14. At the SMDR control panel, depress the DUMP MEMORY button.

SMDR CLOCK/CALENDAR DISPLAY REPLACEMENT

To replace the SMDR clock/calendar display (Refer to Figure 75), perform the removal and installation steps below.



Figure 75. Replacing SMDR Clock/Calendar Display

Removal Steps:

- 1. At rear of the SMDR cabinet, disconnect connector CLK1 from CD01 jack on the SMDR carrier.
- 2. At inside front door of the SMDR cabinet, remove 4 screws securing clock/calendar display assembly.
- 3. Remove clock/calendar display assembly from the door.

Installation steps:

- 1. Install the replacement clock/calendar display assembly into the inside front door of the SMDR cabinet, and secure the clock/calendar display assembly to the door using 4 screws.
- 2. At rear of the SMDR cabinet, connect connector CLK1 to CDO1 jack on SMDR carrier.
- 3. At the clock/calendar display, set display switch to TIME.
- 4. Depress the TIME SET HRS button until correct hours digit is displayed.
- 5. Depress the TIME SET MIN button until correct minutes digit is displayed.
- 6. Set display switch to DATE.
 - 7. Depress the DATE SET button until correct date is displayed.
 - 8. Depress the **DATE PRINT** button.

AUXILIARY CABINET COMPONENT REPLACEMENT

GENERAL

This section provides a brief description of the auxiliary cabinet and contains instructions for replacement of auxiliary cabinet components.

Replacement of auxiliary cabinet components, as determined by performing maintenance procedures, consist of the following:

- 1. Frequency generator replacement.
- 2. DC fan and fan assembly replacement.
- 3. AC distribution unit replacement.
- 4. Rectifier replacement.

Other auxiliary cabinet components may require replacement based on the results of **Isolation and Repair Techniques**.

AUXILIARY CABINET

The auxiliary cabinet (Refer to Figure 76) contains System 85 auxiliary equipment required by the customer.

This cabinet can contain:

1. A fuse panel.

Provides mounting for circuit fuses which protect auxiliary equipment.

2. A sensor.

Monitors the cabinet temperature.

3. Auxiliary equipment.

Provides features such as radio paging access, recorded telephone dictation access, recorded announcement, etc.

4. A fan assembly.

Maintains interior cabinet temperature.

5. A -48V rectifier.

Provides dc power to the auxiliary cabinet.

6. An ac filter for the -48V rectifier.

Note: When equipped with extended power reserve a dc filter replaces the ac filter (ac distribution unit).

7. An auxiliary alarm unit and alarm distribution panel.

Detects and reports equipment malfunctions.

8. A dc filter.

Provides extended power reserve.



Figure 76. Auxiliary Cabinet

ISOLATION AND REPAIR TECHNIQUES

Overview

Isolation and repair of troubles in the auxiliary cabinet begins with **PROC 600** (Alarm causes/error log) unit type 63.

Test 1 of **PROC 600** displays the type of alarm for unit type 63 (external equipment) and provides an encode that defines the area in the auxiliary cabinet where the trouble exists.

The encodes displayed in Field 4 of **PROC 600** Test 1 for unit type 63 (external equipment) are:

- 1. Encode 1 = The auxiliary cabinet battery holdover circuit alarm is active.
- 2. Encode 2 = The auxiliary cabinet temperature limit sensor alarm is active.
- 3. Encode 3 = The auxiliary cabinet fan power alarm is active.
- 4. Encode 4 = The auxiliary cabinet circuit breaker/fuse alarm is active.
- 5. Encode 5 = The auxiliary cabinet frequency generator alarm is active.
- 6. Encode 6 = The auxiliary cabinet rectifier alarm is active.
- 7. Encode 7 = The external equipment major or minor alarm is active.
- 8. Encode 8 = Type of trouble is unknown (multiple errors).

Isolation techniques for the encodes displayed in \mathbf{PROC} 600 are detailed in the following paragraphs.

Encode 1 - Battery Holdover

Extended holdover or extended power reserve is provided by the DC filter.

If encode 1 is displayed in Field 4 of PROC 600 Test 1, replace the DC filter.

Note: Refer to SWITCH COMPONENT REPLACEMENT for steps on replacement of the DC filter.

Encode 2 - Temperature Limit Sensor

An overtemperature alarm cause signifies that a predetermined cabinet temperature is exceeded.

1. Determine if fans are provided in the auxiliary cabinet.

If no fans are provided, proceed to Step 7.

If fans are provided, proceed to Step 2.

2. Determine if the fans are running.

If no fans are running, proceed to Step 4.

If fans are running, proceed to Step 3.

3. Determine if all fans are operating properly.

Replace any defective fan, allow sufficient time for cabinet interior to cool and proceed to Step 8.

If all fans are operating properly, refer to isolation and repair step Other Repair Steps.

4. Check the circuit breakers associated with the fans.

If any circuit breaker is tripped, proceed to Step 5.

If no circuit breaker is tripped, it may be possible for excessive heat in the room to cause the temperature alarm. Proceed to Step 7.

5. Reset the circuit breaker.

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If the circuit breaker does not trip again, allow sufficient time for cabinet interior to cool and proceed to Step 8.

If the circuit breaker trips again, replace the fan associated with the circuit breaker.

- Reset the circuit breaker, allow sufficient time for cabinet interior to cool and proceed to Step 8.
- 7. When no fans are provided, or excessive heat in the room is suspected, determine if environmental temperature is above maximum for the auxiliary cabinet.

If the environmental temperature is above the maximum, leave the cabinet open to allow cooling, and refer the problem to local engineering.

If the environmental temperature is not above the maximum, refer to isolation and repair step **Other Repair Steps**.

8. Enter PROC 600 Test 1 and clear the alarmed entry.

Wait at least 5 to 10 minutes.

9. Enter PROC 600 Test 1 and depress EXECUTE.

Determine if the same entry for unit type 63 is displayed.

- 10. If the same entry is not displayed, corrective action is complete.
- 11. If the same entry is displayed, check the wiring associated with the circuit breaker and fan.

Encode 3 - Fan Power

Encode 3 (fan power) indicates that a fan may be malfunctioning.

1. Determine if the fans are running.

If no fans are running, proceed to Step 3.

If fans are running, proceed to Step 2.

2. Determine if all fans are operating properly.

Replace any defective fan, allow sufficient time for cabinet interior to cool and proceed to Step 6.

If all fans are operating properly, refer to isolation and repair step Other Repair Steps.

3. Check the circuit breakers associated with the fans.

If any circuit breaker is tripped, proceed to Step 4.

If the circuit breakers are not tripped, refer to isolation and repair step Other Repair Steps.

4. Reset the circuit breaker.

If the circuit breaker does not trip again, allow sufficient time for cabinet interior to cool and proceed to Step 6.

If the circuit breaker trips again, replace the fan associated with the circuit breaker.

5. Reset the circuit breaker, allow sufficient time for the cabinet interior to cool and proceed to Step 6.

- Enter PROC 600 Test 1 and clear the alarmed entry. Wait at least 5 to 10 minutes.
- 7. Enter PROC 600 Test 1 and depress EXECUTE.

Determine if the same entry for unit type 63 is displayed.

- 8. If the same entry is not displayed, corrective action is complete.
- 9. If the same entry is displayed, check the wiring associated with the fan and circuit breaker.

Encode 4 - Circuit Breaker/Fuse

Fuses and circuit breakers provide visual indications when they operate.

1. Determine if any fuses are blown or circuit breakers tripped.

If no fuses are blown or circuit breakers tripped, refer to isolation and repair step Other **Repair Steps**.

If any fuse is blown or circuit breaker tripped, proceed to Step 2.

2. Replace the blown fuse, or reset the circuit breaker.

If the fuse does not blow again or circuit breaker does not trip, proceed to Step 4.

If the fuse blows again or circuit breaker trips, proceed to Step 3.

3. The corrective action to be taken depends on the blown fuse or tripped circuit breaker.

Replacement of components associated with the blown fuse or circuit breaker may be required.

Wiring or cabling associated with the fuse or circuit breaker should be checked.

4. Enter PROC 600 Test 1 and clear the alarmed entry.

Wait at least 5 to 10 minutes.

5. Enter PROC 600 Test 1 and depress EXECUTE.

Determine if the same entry for unit type 63 is displayed.

- 6. If the same entry is not displayed, corrective action is complete.
- 7. If the same entry is displayed, check the wiring associated with the fuse or circuit breaker.

Encode 5 - Frequency Generator

1. Check the fuse associated with the frequency generator.

If the fuse is blown, proceed to Step 2.

If the fuse is not blown, proceed to Step 3.

2. Replace the blown fuse.

If the fuse does not blow, proceed to Step 4.

If the fuse blows again, check the wiring between the fuse and the frequency generator.

3. Replace the frequency generator.

4. Enter **PROC 600** Test 1 and clear the alarmed entry.

Wait at least 5 to 10 minutes.

5. Enter PROC 600 Test 1 and depress EXECUTE.

Determine if the same entry for unit type 63 is displayed.

- 6. If the same entry is not displayed, corrective action is complete.
- 7. If the same entry is displayed, check the wiring associated with the frequency generator.

Encode 6 - Rectifier

A green pilot LED located on the front panel of the rectifier is on when the rectifier is producing -48 volts on its output.

The green pilot LED does not indicate that the output voltage is within regulation limits.

Appropriate test points are available on the front panel of the rectifier for measuring the output voltage and determining the rectifier performance.

1. At the rectifier, determine if the green pilot LED is on.

If the green pilot LED is not on, proceed to Step 2.

If the green pilot LED is on, proceed to Step 6.

2. Determine if the circuit breaker associated with the rectifier is tripped.

If the circuit breaker is tripped, proceed to Step 3.

If the circuit breaker is not tripped, proceed to Step 4.

3. Reset the circuit breaker.

If the circuit breaker trips again, replace the rectifier. If the circuit breaker trips again after replacing the rectifier, check the wiring associated with the rectifier.

If the circuit breaker does not trip, proceed to Step 8.

4. Measure the rectifier output voltages at the test points using a digital multimeter.

If all voltages are within tolerance, refer to isolation and repair step Other Repair Steps.

If the voltages are not within tolerance, proceed to Step 5.

5. Replace the rectifier and measure the output voltages.

If all voltages are within tolerance, proceed to Step 8.

If voltages are not within tolerance, check the wiring associated with the rectifier.

6. Determine if marginal or fluctuating voltages exist at the rectifier test points by measuring the output voltages using a digital multimeter.

If all voltages are within tolerance without fluctuation, refer to isolation and repair step Other Repair Steps.

If the voltages are marginal or fluctuating, proceed to Step 7.

7. Replace the rectifier and measure the output voltages.

If all voltages are within tolerance and do not fluctuate, proceed to Step 8.

If voltages are not within tolerance or fluctuate, check the wiring associated with the rectifier.

8. Enter PROC 600 Test 1 and clear the alarmed entry.

Wait at least 5 to 10 minutes.

9. Enter PROC 600 Test 1 and depress EXECUTE.

Determine if the same entry for unit type 63 is displayed.

- 10. If the same entry is not displayed, corrective action is complete.
- 11. If the same entry is displayed, check the wiring associated with the rectifier.

Other Repair Steps

- 1. In the event an alarm encode is present but the equipment associated with the alarm encode is functioning properly, (or unable to function because of a suspected sensor or detector malfunction), the sensor, detector or alarm board corresponding to the auxiliary cabinet encode is probably faulty.
- 2. Replace the auxiliary cabinet alarm unit.
- 3. Enter PROC 600 Test 1 and clear the alarmed entry.

Wait at least 5 to 10 minutes.

4. Enter **PROC 600** Test 1 and depress **EXECUTE**.

Determine if the same entry for unit type 63 is displayed.

- 5. If the same entry is not displayed, corrective action is complete.
- 6. If the same entry is displayed, proceed to Step 7.
- 7. Check the sensor or detector and replace as appropriate.
- 8. Enter **PROC 600** Test 1 and clear the alarmed entry.

Wait at least 5 to 10 minutes.

9. Enter PROC 600 Test 1 and depress EXECUTE.

Determine if the same entry for unit type 63 is displayed.

- 10. If the same entry is not displayed, corrective action is complete.
- 11. If the same entry is displayed, proceed to Step 12.
- 12. If the sensor or detector is functioning correctly or after replacement of the sensor or detector the failure still exists, the wiring between the sensor or detector and the module control channel may be at fault.
- 13. Encodes 7 (major or minor alarm) and 8 (type of trouble is unknown) requires investigation of the entire auxiliary cabinet to determine the location of the trouble.

124B FREQUENCY GENERATOR REPLACEMENT

To replace the 124B frequency generator (Refer to Figure 77) in the auxiliary cabinet, perform the removal and installation steps below.



Figure 77. Replacing Auxiliary Cabinet 124B Frequency Generator

Removal Steps:

- 1. Remove the -48V fuse associated with the frequency generator.
- 2. Disconnect the connectors from PFG IN and PFG OUT.
- 3. Remove four mounting screws (2 from each side) securing the frequency generator to the front panel of the auxiliary cabinet.
- 4. Remove the frequency generator.

Installation steps:

- 1. Install the replacement frequency generator into the auxiliary cabinet and secure the frequency generator to the front panel using 4 mounting screws.
- 2. Connect the connectors to PFG IN and PFG OUT.
- 3. Replace the -48V fuse associated with the frequency generator.

DC FAN AND FAN ASSEMBLY REPLACEMENT

DC Fan Replacement

To replace a DC fan (Refer to Figure 78), in the auxiliary cabinet, perform the removal and installation steps below.



Figure 78. Replacing Auxiliary Cabinet DC Fans

Removal Steps:

- 1. Remove the fuse associated with the fan to be replaced.
- 2. Disconnect the plug from the fan to be replaced.
- 3. Remove two mounting screws.
- 4. Remove the fan from the fan assembly.

Installation Steps:

- 1. Mount the replacement fan on the fan assembly and secure with the two mounting screws.
- 2. Install the fan plug to the replacement fan.
- 3. Install the fuse associated with the fan replaced.

DC Fan Wire Replacement

To replace a fan wire suspected of failing in the auxiliary cabinet, perform the removal and installation steps below.

Removal Steps:

- 1. Remove the fuse associated with the fan wire to be replaced.
- 2. Disconnect the fan wire (plug) to be replaced.
- 3. Thread the fan wire through the fan assembly toward the rear.
- 4. Disconnect the fan wire from TB1 at the rear of the fan assembly.
- 5. Remove the fan wire from the fan assembly.

Installation Steps:

- 1. Connect the replacement fan wire to TB1 at the rear of the fan assembly.
- 2. Thread the fan wire through the fan assembly toward the front.
- 3. Install the replacement fan wire (plug) to the appropriate fan.
- 4. Replace the fuse associated with the fan wire replaced.

DC Fan Assembly Replacement

To replace the DC fan assembly in the auxiliary cabinet, perform the removal and installation steps below.

Removal Steps:

- 1. Remove two mounting screws securing the fuse panel to the fan assembly.
- 2. Remove two mounting screws (left side) securing the fan assembly to the auxiliary cabinet.
- 3. Remove the fan assembly from the cabinet.

Installation Steps:

Note: When the DC fan assembly is shipped loose, attach 900658329 vinyl plastic tape (approximately 60 inches) to the top and bottom edges of the unit before installing the DC fan assembly into the cabinet.

- 1. Mount the replacement fan assembly and secure with the two mounting screws.
- 2. Secure the fuse panel to the fan assembly with the two mounting screws.

AC DISTRIBUTION UNIT REPLACEMENT

To replace the AC distribution unit (Refer to Figure 79) in the auxiliary cabinet, perform the removal and installation steps below.



Figure 79. Replacing Auxiliary Cabinet AC Distribution Unit

Removal Steps:

- 1. Set circuit breakers CB1 through CB5 on the AC distribution unit to be replaced to OFF.
- 2. Disconnect the power cord from the ac source.
- 3. Tag and disconnect the two wires from the grounding block on the left rear side.

Note: One wire is connected to the rectifier, and the other wire is connected to terminal **TS1**.

- 4. Tag and disconnect the remaining cables from the AC distribution unit to be replaced.
- 5. At the rear of the auxiliary cabinet, remove 2 screws from mounting foot at left of AC distribution unit.
- 6. At the front of the auxiliary cabinet, remove 2 screws from the mounting bracket.
- 7. Remove the AC distribution unit from the auxiliary cabinet.

Installation steps:

- 1. Set circuit breakers CB1 through CB5 on the replacement AC distribution unit to OFF.
- 2. Install the replacement AC distribution unit into the auxiliary cabinet and secure the unit to the cabinet using 4 mounting screws (2 in mounting bracket and 2 in the mounting foot).
- 3. Connect the cables (disconnected in Step 4 of removal steps) to the replacement AC distribution unit.
- 4. Connect the two wires (disconnected in Step 3 of removal steps) to the replacement AC distribution unit grounding block.
- 5. Connect the power cord of the replacement AC distribution unit to the ac source.
- 6. Set circuit breakers **CB1** through **CB5** on the replacement AC distribution unit to **ON**.

RECTIFIER REPLACEMENT

To replace the rectifier (Refer to Figure 80) in the auxiliary cabinet perform the removal and installation steps below.

Removal Steps:

1. At the front of the rectifier:

Set the ON/OFF switch to OFF.

Remove the connector from the AC input jack.

- 2. At the rear of the rectifier, remove the connectors from the ALARMS and OUTPUT jacks.
- At the front of the auxiliary cabinet, remove two hex nuts securing mounting clip to shelf. Remove the mounting clip from the shelf.
- 4. Slide the rectifier forward and remove from the auxiliary cabinet.

Installation steps:

- 1. At the front of the replacement rectifier, set the ON/OFF switch to OFF.
- 2. Install the replacement rectifier into the auxiliary cabinet.
- 3. At the front of the auxiliary cabinet, replace the mounting clip to the shelf and secure with the two hex nuts.
- 4. At the rear of the replacement rectifier, connect the two connectors to the ALARMS and OUTPUT jacks.
- 5. At the front of the replacement rectifier:

Connect the connector to the AC input jack.

Set the ON/OFF switch to ON.







REAR VIEW



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MAINTENANCE AND ADMINISTRATION PANEL (MAAP)

DESCRIPTION OF MAAP

Overview

The various components of the MAAP (Refer to Figure 81), are described in the following paragraphs.



Figure 81. MAAP

LED Indicators

The Light Emitting Diode (LED) indicators (Refer to Figure 82), function as follows.



Figure 82. LED Indicators

- a. The MAJOR and MINOR alarm lamps (in parallel with the alarm panel) display the existence of alarm conditions.
- b. The O or 1 lamp denotes which common control (processor) in a duplicated system is on-line.

- c. The IN USE lamp denotes that a circuit selected for testing is in-use and cannot be tested.
- d. The **BUSY OUT** lamp is lighted at all times when any circuit in the switch is maintenance or software busied out.
- e. The **SEE NOTE** lamp serves as a reminder that translation changes have been made in memory and **must** be transferred to the tape.
- f. The **WAIT** lamp is lighted when the tape is in motion selecting the requested procedure, or when a maintenance procedure is being run.
- g. The IN USE, SEE NOTE, and WAIT lamps are lighted when a remote facility has control of the switch.

Dual Tone Key Pad

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 The dual tone key pad (Refer to Figure 83), is used to enter data into the procedure fields.



Figure 83. Dual Tone Key Pad

- a. The **CLEAR ENTRY** button clears existing data if depressed before the **ENTER** button. Depressing the **ENTER** button after depressing **CLEAR ENTRY** places a dash (-) in the blinking field.
- b. The ENTER button is depressed when a number entered in a field is complete; when a number already displayed is to be used as it appears; or to advance to the next higher numbered field.

Flipcharts

Each maintenance procedure is represented by one or more flipcharts. Each flipchart is used to:

- a. Identify the fields required for display or entry purposes.
- b. Identify information unique to that particular maintenance procedure.

Flipcharts are identified by the function of the procedure (procedure name) and a 3-digit procedure number. The 25-digit data portion of each flipchart is segmented into fields identified by a number and a name.

Many maintenance procedures require that data be entered in specific field(s). These fields are called **entry** fields and are identified by black triangles on the flipchart.

All data entered into a maintenance procedure is displayed at the moment it is entered. The display may be used to denote all data contained in memory for a particular flipchart.

Flipchart field boundaries are delineated in the data display by a dot (decimal point) located in the bottom right-hand corner of each field. The decimal point for a particular field flashes as an indication that the field is ready for data entry.

LED Data Display

The LED data display field is an operational display which functions with a flipchart. The display consists of 28-digits which correspond to the 25 digit locations of a flipchart and the three-digit number of the procedure.

Error Display

A 2-digit display (Refer to Figure 84), allowing the display of error codes informing the user that an invalid operation was attempted or that invalid data is entered in a field.

Field Identification

A 2-digit display (Refer to Figure 84), which denotes the number of the **MAAP** field which is ready for data entry.



Figure 84. Error Display and Field Identification

Error Code Listing

The error code listing (Refer to Figure 85), is an abbreviated listing of the most common error codes that may be displayed when performing procedures.

Control Keys

The control keys in the center of the **MAAP** are used to select the various modes and functions. They are identified as translation, common, and maintenance keys and are color-coded. Figure 86 illustrates the key designations and color coding of the control keys.

- a. The translation (blue) keys are used with the common (white) keys to execute translation procedures.
- b. The common keys are used with both translation and maintenance procedures.

c. The maintenance (yellow) keys are used in conjunction with the common keys to execute maintenance procedures.

Figure 85. Error Code Listing



Figure 86. Control Keys

Use of Control Keys when performing Maintenance Procedures

The control keys allow maintenance personnel to use and control the **PROCs**. Many of the control keys work basically the same in every situation (e.g., **NEXT TEST, STOP**, etc.) but some produce different responses depending upon the procedure being used and the function being performed.

The maintenance control keys, those common control keys required for maintenance functions, and some of their uses are described in the following paragraphs.

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- 1. **BUSY OUT** is used to place a circuit location in maintenance busy out status. It can be used either during a maintenance procedure which allows a circuit to be busied out (not all procedures allow this capability) or in one of the following three busy out **PROCs**.
 - a. PROC 630 Busy out/release busy out.
 - b. PROC 631 Trunk group busy out.
 - c. PROC 632 Carrier busy.
- 2. CHANGE FIELD: If a data entry field must be changed but is not currently selected by the maintenance procedure for entry, CHANGE FIELD is used to change it. Data entry field means any display field in which the procedure allows or requires digit entry.
- 3. CLEAR DATA: The control key sequence CLEAR DATA; EXECUTE can be used to clear the alarm sent bits in the error log without clearing the record itself.
 - a. Clearing the alarm sent bit of an error record in PMIDS causes the alarm indication on the alarm panel to turn off.
 - b. In **PROC 600** and **PROC 612**, the **CLEAR DATA**; **EXECUTE** sequence is used to clear (zero) error records in PMIDS. This is the only method available to clear PMIDS records.
- 4. **ENTER** is used to indicate that a number which is entered in a field is complete or that a number already displayed in a field is used as is. A typical entry sequence would be the specification of an equipment location for display or testing.
 - a. If the location is required, the first field (usually the module field) is blinked to indicate that an entry is necessary or can be done.
 - b. If the field is blank, the entry is mandatory. If the field is occupied, it can be accepted as is or changed.
 - c. To accept the data as is, depress ENTER with no data number entry.
- 5. EXECUTE: There are two main uses of EXECUTE.
 - a. One use is with CLEAR DATA (see above) in clearing failure history, resolving alarmed entries, and turning off fault indicators.
 - b. The second use causes the procedure being used to start the selected test. The test could be a hardware test, a test call, or a failure history snapshot and sort for display, etc.
 - c. When testing multiple circuits, the **STOP**; **EXECUTE** key sequence works in two ways depending upon which maintenance procedure is being performed.
 - 1. The first method is for the test to begin again from the first appropriate circuit (circuit of the correct type for the maintenance procedure and test being run) in the switch.
 - 2. The second method is for the test to start from a displayed location (the last circuit which was tested) and cycle to the end of the range of circuits being tested.
- 6. **NEXT CIRCUIT** causes a new circuit location to be selected and displayed by the maintenance procedure. There are two uses of **NEXT CIRCUIT**: to display stored circuit information or to select a circuit location for testing.

- a. To display test results or failure history one circuit location at a time, NEXT CIRCUIT is depressed once for each new circuit location.
- b. If maintenance personnel wish to test a single circuit location **NEXT CIRCUIT** allows the appropriate circuit locations to be stepped through and displayed one at a time until the circuit to be tested is displayed.
- 7. **NEXT DATA** is used to display demand test results, periodic failure history data, and call processing failure history data which are arranged by circuit location in records, one location per record. Successive uses of **NEXT DATA** allow data records to be displayed one part at a time.
- 8. **NEXT FAULT** is used to step through error records, which have different fault codes, one at a time.
- 9. **NEXT TEST** causes the procedure to automatically advance to the next test that can be run. If the current test displayed is the last test the procedure can run, the test selected is test number 1. The new test selected will not start until **EXECUTE** is depressed.
- 10. **NEXT UNIT**: When a hardware test is selected, **NEXT UNIT** causes the next unit type to be selected and displayed for testing. The first circuit of that unit type can be selected and displayed for testing by depressing **NEXT CIRCUIT**. When displaying failure history or test results, **NEXT UNIT** is used to look at the first circuit location recorded for the next unit type (numerically) in the failure history list.
- 11. **PROC NO** is used to call in a maintenance procedure. The default test (Test number 1) is automatically selected.
- 12. **RESET**: When **RESET** is depressed, the maintenance procedure executing or ready to be executed is returned to its initial nominal start configuration (e.g., Test number 1, initial display).
- 13. **RLS BUSY OUT**: Prior to maintenance personnel leaving the customer's premises all busied out circuits should be released from busy after corrective action is performed to restore the circuit to operation.
 - a. Whenever the **BUSY OUT LED** is lighted on the **MAAP**, **RLS BUSY OUT** is used to release a circuit location from maintenance busy status.
 - b. When the BUSY OUT LED remains lighted after all circuits are released from busy using individual maintenance procedures and the three busy out/release busy PROCs, PROC 621 should be used to release the off-line module control carrier from soft-locked status in order to turn off the BUSY OUT LED.
- 14. STOP: The use of STOP halts test execution when a test is running.

HOW TO USE THE MAAP

Overview

This section describes how the **MAAP** is used to perform maintenance procedures and how to respond to error displays in the **MAAP** error code field.

Connect MAAP and Call Up Procedures:

- 1. Remove the **MAAP** from the common control cabinet, module control cabinets housing module control carriers in a multi-module switch, or a remote module control cabinet.
- 2. Connect the **MAAP** to the appropriate connector.

Connectors are designated MAAP for an unduplicated common control switch and ON LINE, CCO, or CC1 for a duplicated common control switch. Connectors are also designated MAAP for module control cabinets housing module control carriers in a multi-module switch or a remote module control cabinet.

3. At this time a random display may appear on the MAAP indicators and display fields.

The most likely display would be zeroes in the Error, Data, and Procedure fields.

The WAIT, IN USE, BUSY OUT, and SEE NOTE indicators may be on.

- 4. Turn the flipcharts to the procedure to be used.
- 5. Depress the **PROC NO** button.

The procedure number fields go blank and dashes appear in the data fields.

6. Enter the procedure number using the data entry pad. All three digits must be entered.

The entered procedure number is displayed in the procedure display field.

7. Depress the ENTER button.

When the **WAIT** lamp goes off, the procedure is ready to be used.

8. Field indicator decimal points displayed in the data display should correspond to the field identifiers on the flipchart. Deviations may indicate that the flipchart issue is not compatible with the tape issue.

Responding to Error Displays:

An error code is displayed in the 2-digit error code display field if an invalid operation is attempted or if invalid data is entered into a field on the **MAAP**.

Standard error codes common to all procedures are displayed on the decal on the faceplate of the **MAAP**. The error codes encompass two basic areas:

- a. Operator error: Invalid button operation for the procedure involved. The error code decal identifies the invalid operation and the necessary corrective action.
- b. Input data incompatible with existing translations or program tape. Corrective action requires a review of the input data and the service requirements of the customer.

Special error codes 80 through 98 are unique to the particular procedure being used. The codes are explained by notes on the flipchart associated with the procedure. The error codes identify problems with maintenance procedure operation. Resolution of these errors requires a review of the maintenance procedure being performed.
INDEX

309A or 310A Power Supply Replacement, 725

72 and 74 Series Terminals, Trouble Clearing, 29

Adjustment SMDR Buffer Arm Travel, 751 SMDR Capstan Servo Zero Offset, 751 SMDR Photosensor, 750 SMDR Ramp Time, 749 SMDR Read Skew, 750 SMDR Tape Speed, 746 AEH4 Alarm Board Replacement, 741 Alarm Board Option Settings, All Cabinets, 720 Alarm Causes/Error Log Maintenance Procedure, PROC 600, 64 Alarm Panel, 8 Replacement, 740 Alarm Panel Test Maintenance Procedure, PROC 616, 189 Alarm Plan, 6 Alarm Troubles Overview, 25 Trouble Clearing, 26 Alarms, Retiring, 26 All Cabinets Alarm Board Option Settings, 720 ANI Failures Maintenance Procedure, PROC 623, 387 Attendant Console Tests Maintenance Procedure, PROC 653. 622 Attendant Console, Trouble Clearing, 37 Automatic Transmission Measurement System (ATMS) Tests Maintenance Procedure, PROC 647 (R2V2 Only), 562 Auxiliary Cabinet, 760 124B Frequency Generator Replacement, 767 AC Distribution Unit Replacement, 770 Component Replacement General, 760 DC Fan and Fan Assembly Replacement, 768 DC Fan Assembly Replacement, 769 DC Fan Wire Replacement, 769 Isolation and Repair Techniques Overview, 761 Rectifier Replacement, 771

Busy Out/Release Busy Out Maintenance Procedure, PROC 630, 419

Cabinet Auxiliary, 760 Common Control, 684 Duplicated Common Control, 685 Module Control, 688 Port, 691 SMDR, 742 TMS/RMI, 688 Unduplicated Common Control, 685 Carrier Busy Maintenance Procedure, PROC 632, 481 Carrier Common Control, 691 Carrier (Contd.) DS-1/MFAT, 697 Module Control, 696 Port, 696 RMI, 698 TMS, 695 Circuit Pack LEDs Overview, 17 Physical Placement, 19 Strategy, 17 Circuit Pack Option Settings Common Control Carrier, 705 Module Control or RMI Carrier, 707 Port or DS-1/MFAT Carrier, 708 Circuit Pack Replacement Duplicated Common Control Carrier, 702 Duplicated Common Control Power Carrier, 705 HCMR, 722 Port or DS-1/MFAT Carrier, 704 SMDR Carrier, 744 SMDR Formatter, 744 SMDR Tape Drive, 745 TMS, Module Control, or RMI Carrier, 703 Unduplicated Common Control Carrier, 701 Unduplicated Common Control DC/DC Converter Unit, 705 Circuit Pack Replacements Option Settings, 701 Overview, 700 Precautions, 700 Circuit Pack Switch Option Settings Overview, 705 Cleaning HCMR Tape Head and Capstan, 724 Common Control Cabinet, 684 Carrier. 691 Carrier Circuit Pack Option Settings, 705 Maintenance Procedures, 60 Peripherals Maintenance Procedures, 62 Common Control Tests Maintenance Procedure, PROC 611, 118 Communications with Remote Maintenance Facility Lost Trouble Clearing, 39 Connection Activity Maintenance Procedure, PROC 961, 669 Connection Status Maintenance Procedures, 63 Console Alphanumeric Display, Lamp Control, or Dial Key Pad Replacement, 738 Component Replacement Overview, 733 DSS and BLF Carrier or Button Units Replacement, 735 Power Supply Replacement, 734 Timing Control and Speech or Alphanumeric Control Replacement, 736 Contact Interface Test Maintenance Procedure, PROC 624,

Data Modules, Trouble Clearing, 30 DC Fan Assembly Replacement, 729 Replacement, 726 Wire Replacement, 728

395

DC Filter Replacement, 732 DC/DC Converter Unit, Unduplicated Common Control, 693 DCIU Tests Maintenance Procedure, PROC 650, 592 Demand Maintenance Information Data Structure (DMIDS), 6 Description of MAAP Overview, 774 Detection, Error, 3 Display Terminals Test Maintenance Procedure, PROC 654, 629 DS-1/MFAT Carrier, 697 DTDM Self Tests, 34 Duplicate Processor Control and Test Maintenance Procedure, PROC 613 (R2V1 Only), 141 Duplicate Processor Control and Test Maintenance Procedure, PROC 613 (R2V2 Only), 151 Duplicated Common Control Cabinet, 685 Common Control Carrier Circuit Pack Replacement, 702 Common Control Power Carrier, 694 Common Control Power Carrier Circuit Pack Replacement, 705

Emergency Transfer - Processor Suicide Suspected Trouble Clearing, 39 Environmental Tests Maintenance Procedure, PROC 601, 87 Error Detection, 3 Error Logging Overview, 4

Facility Connections Maintenance Procedure, PROC 962, 676 Features, Trouble Clearing, 87

Format and Content, Procedural, 57 Frequency Generator Replacement, 726 Functional Description, Microdiagnostics, 15

General Switch Maintenance Procedures, 60

High Capacity Mini-Recorder (HCMR), 721 Circuit Pack Replacement, 722 Replacement, 725 Tape Head and Capstan, Cleaning, 724 How To Use The MAAP Overview, 779 How to use this manual, 1 Human Interfaces, Precautions, 7

Initialization Causes Maintenance Procedure, PROC 612, 133 ¹ Items Affecting Trouble Clearing, 22

LED Strategy, Circuit Pack, 17

MAAP Test Maintenance Procedure, PROC 615, 182 Maintenance and Administration Panel (MAAP), 8 Maintenance Information Data Structure, Demand, 6

Page 782

Maintenance (Contd.) Information Data Structure, Periodic, 4 Overview, Switch, 3 Polling, 23 Procedure Description Overview, 59 Procedure Selection Overview, 58 Maintenance Procedure PROC 600 Alarm Causes/Error Log, 64 PROC 601 Environmental Tests, 87 PROC 610 Tape Tests, 107 PROC 611 Common Control Tests. 118-PROC 612 Initialization Causes, 133 PROC 613 Duplicate Processor Control and Test (R2V1 Only), 141 PROC 613 Duplicate Processor Control and Test (R2V2 Only), 151 PROC 614 Memory Read/Memory Match Tests, 165 PROC 615 MAAP Test. 182 PROC 616 Alarm Panel Test, 189 PROC 620 Network Procedure, 194 PROC 621 Network Duplication Channel, 339 PROC 622 Network Peripherals, 354 PROC 623 ANI Failures, 387 PROC 624 Contact Interface Test, 395 PROC 625 Synchronization Reference Monitor (R2V1 Only), 401 PROC 625 Synchronization Reference Monitor (R2V2 Only), 410 PROC 630 Busy Out/Release Busy Out, 419 PROC 631 Trunk Group Busy Out, 426 PROC 632 Carrier Busy, 431 PROC 640 Trunk Failures, 437 PROC 641 Terminal-to-Terminal Test Call, 463 PROC 642 Terminal-to-Trunk Test Call, 470 PROC 643 Terminal-to-Tone Test Call, 480 PROC 644 Terminal-to-Auxiliary Tone Test Call, 485 PROC 646 Modem Pooling and Facility Testing, 491 PROC 647 (R2V2 Only) Automatic Transmission Measurement System (ATMS) Tests, 562 PROC 650 DCIU Tests, 592 PROC 652 Time-of-Day Clock Synchronizer, 613 PROC 653 Attendant Console Tests, 622 PROC 654 Display Terminals Test, 629 PROC 655 SMDR Test, 636 PROC 656 NCOSS Test, 658 PROC 960 Queue Activity, 665 PROC 961 Connection Activity, 669 PROC 962 Facility Connections, 676 PROC 999 Memory Word Display, 681 Maintenance Procedures Common Control, 60 Common Control Peripherals, 62 Connection Status, 63 General Switch, 60 Network Area, 61 Other 63 Maintenance, Preventive, 20 Manual, How to use, 1 Memory Read/Memory Match Tests Maintenance Procedure, PROC 614, 165 Memory Word Display Maintenance Procedure, PROC 999, 681 Microdiagnostics Functional Description, 15 General, 40

Microdiagnostics (Contd.)

Overview, 13

Testing, 43

Modem Pooling and Facility Testing Maintenance

Procedure, PROC 646, 491

Module Control

Cabinet, 688

Carrier. 696

- Module Control or Port Cabinet AC Distribution Unit Replacement, 730
- Module Control or RMI Carrier Circuit Pack Option Settings, 707

NCOSS Test Maintenance Procedure, PROC 656, 658

- Network Area Maintenance Procedures, 61
- Network Duplication Channel Maintenance Procedure, PROC 621, 339
- Network Peripherals Maintenance Procedure, PROC 622, 354

Network Procedure Maintenance Procedure, PROC 620, 194 No Response from Switch Overview, 38

Option Settings

All Cabinets Alarm Board, 720 Circuit Pack Replacements, 701 Common Control Carrier Circuit Pack, 705 Common Control or RMI Carrier Circuit Pack, 707 Port or DS-1/MFAT Carrier Circuit Pack, 708 Organization, Service Manual, 2 Other Maintenance Procedures, 63 Overview

Alarm Troubles, 25 Auxiliary Cabinet Isolation and Repair Techniques, 761

Circuit Pack LEDs, 17

Circuit Pack Replacements, 700

Circuit Pack Switch Option Settings, 705

Console Component Replacement, 733

Description of MAAP, 774

Error Logging, 4

How To Use The MAAP, 779

Maintenance Procedure Description, 59

Maintenance Procedure Selection, 58

Microdiagnostics, 13

No Response from Switch, 38

Recovery, 24

Switch Equipment Configuration, 683

Trouble Clearing, 22

User Reported Troubles, 28

Panel, Alarm, 8 PDM or TDM Self Tests, 31 Periodic Maintenance Information Data Structure (PMIDS), 4 Physical Placement of Circuit Pack LEDs, 19 Polling, Maintenance, 23 Port Cabinet, 691 Port Carrier 696 Port or DS-1/MFAT Carrier Circuit Pack Option Settings, 708

Port or DS-1/MFAT Carrier Circuit Pack Replacement, 704 Power Carrier, Duplicated Common Control, 694

Precautions

Precautions (Contd.)

Circuit Pack Replacements, 700

Human Interfaces, 7

Switch Component Replacement, 699

Preventive Maintenance, 20

Priority, Trouble Clearing, 23

PROC

- 600 Alarm Causes/Error Log Maintenance Procedure, 64
- 601 Environmental Tests Maintenance Procedure, 87
- 610 Tape Tests Maintenance Procedure, 107
- 611 Common Control Tests Maintenance Procedure, 118
- 612 Initialization Causes Maintenance Procedure, 133
- 613 Duplicate Processor Control and Test Maintenance Procedure (R2V1 Only), 141
- 613 Duplicate Processor Control and Test Maintenance Procedure (R2V2 Only), 151
- 614 Memory Read/Memory Match Tests Maintenance Procedure 165
- 615 MAAP Test Maintenance Procedure, 182
- 616 Alarm Panel Test Maintenance Procedure, 189
- 620 Network Procedure Maintenance Procedure, 194
- 621 Network Duplication Channel Maintenance Procedure, 339
- 622 Network Peripherals Maintenance Procedure, 354
- 623 ANI Failures Maintenance Procedure, 387
- 624 Contact Interface Test Maintenance Procedure, 395
- 625 Synchronization Reference Monitor Maintenance Procedure (R2V1 Only), 401
- 625 Synchronization Reference Monitor Maintenance Procedure (R2V2 Only), 410
- 630 Busy Out/Release Busy Out Maintenance Procedure, 419
- 631 Trunk Group Busy Out Maintenance Procedure, 426
- 632 Carrier Busy Maintenance Procedure, 431
- 640 Trunk Failures Maintenance Procedure, 437
- 641 Terminal-to-Terminal Test Call Maintenance Procedure, 463
- 642 Terminal-to-Trunk Test Call Maintenance Procedure, 470
- 643 Terminal-to-Tone Test Call Maintenance Procedure, 480
- 644 Terminal-to-Auxiliary Tone Test Call Maintenance Procedure, 485
- 646 Modem Pooling and Facility Testing Maintenance Procedure, 491
- 647 (R2V2 Only) Automatic Transmission Measurement System (ATMS) Tests Maintenance Procedure, 562
- 650 DCIU Tests Maintenance Procedure, 592
- 652 Time-of-Day Clock Synchronizer Maintenance Procedure, 613
- 653 Attendant Console Tests Maintenance Procedure, 622
- 654 Display Terminals Test Maintenance Procedure, 629
- 655 SMDR Test Maintenance Procedure, 636
- 656 NCOSS Test Maintenance Procedure, 658
- 960 Queue Activity Maintenance Procedure, 665
- 961 Connection Activity Maintenance Procedure, 669
- 962 Facility Connections Maintenance Procedure, 676
- 999 Memory Word Display Maintenance Procedure, 681

Procedural Format and Content, 57

Purpose, Service Manual, 1

Queue Activity Maintenance Procedure, PROC 960, 665

Recovery Overview, 24 Replacement 309A or 310A Power Supply, 725 AEH4 Alarm Board, 741 Alarm Panel, 740 Auxiliary Cabinet 124B Frequency Generator, 767 Auxiliary Cabinet AC Distribution Unit, 770 Auxiliary Cabinet DC Fan and Fan Assembly, 768 Auxiliary Cabinet DC Fan Assembly, 769 Auxiliary Cabinet DC Fan Wire, 769 Auxiliary Cabinet Rectifier, 771 Console Alphanumeric Display, Lamp Control, or Dial Kev Pad. 738 Console DSS and BLF Carrier or Button Units, 735 Console Power Supply, 734 Console Timing Control and Speech or Alphanumeric Control 736 DC Fan, 726 DC Fan Assembly, 729 DC Fan Wire, 728 DC Filter, 732 Frequency Generator, 726 HCMR. 725 Module Control or Port Cabinet AC Distribution Unit. 730 SMDR 207B Power Supply, 753 SMDR Clock/Calendar Display, 758 SMDR Formatter, 754 SMDR Tape Drive, 754 TMS/RMI Cabinet AC Distribution Unit, 729 Retiring Alarms, 26 RMI Carrier, 698

Self Tests **DTDM**, 34 PDM or TDM, 31 Service Manual Organization, 2 Purpose, 1 SMDR 207B Power Supply Replacement, 753 Buffer Arm Travel Adjustment, 751 Cabinet, 742 Capstan Servo Zero Offset Adjustment, 751 Carrier Circuit Pack Replacement, 744 Clock/Calendar Display Replacement, 758 Component Replacement General, 742 Formatter Circuit Pack Replacement, 744 Formatter Replacement, 754 Photosensor Adjustment, 750 Ramp Time Adjustment, 749 Read Skew Adjustment, 750 Tape Drive Circuit Pack Replacement, 745 Tape Drive Replacement, 754 Tape Speed Adjustment, 746 SMDR Test Maintenance Procedure, PROC 655, 636 Switch Component Replacement General, 683 Precautions, 699 Switch Equipment Configuration Overview, 683

Switch Maintenance Overview, 3
Synchronization Reference Monitor Maintenance Procedure, PROC 625 (R2V1 Only), 401
Synchronization Reference Monitor Maintenance Procedure, PROC 625 (R2V2 Only), 410
System Down - No LEDs Lighted Trouble Clearing, 88

Tape Tests Maintenance Procedure, PROC 610, 107 Terminal-to-Auxiliary Tone Test Call Maintenance Procedure, PROC 644, 485 Terminal-to-Terminal Test Call Maintenance Procedure, PROC 641, 463 Terminal-to-Tone Test Call Maintenance Procedure, PROC 643. 480 Terminal-to-Trunk Test Call Maintenance Procedure, PROC 642, 470 Test Equipment, Tools, 19 Testing, Microdiagnostic, 43 Time-of-Day Clock Synchronizer Maintenance Procedure, PROC 652, 613 TMS Carrier, 695 TMS, Module Control, or RMI Carrier Circuit Pack Replacement, 703 TMS/RMI Cabinet, 688 TMS/RMI Cabinet AC Distribution Unit Replacement, 729 Tools and Test Equipment, 19 Trouble Clearing 72 and 74 Series Terminals, 29 Alarmed Troubles, 26 Attendant Console, 37 Communications with Remote Maintenance Facility Lost, 39 Emergency Transfer - Processor Suicide Suspected, 39 Features, 37 Items Affecting, 22 Overview. 22 Priority, 23 System Down - No LEDs Lighted, 38 Trunk Failures Maintenance Procedure, PROC 640, 437 Trunk Group Busy Out Maintenance Procedure, PROC 631, 1.96

Unduplicated Common Control Cabinet, 685 Common Control Carrier Circuit Pack Replacement, 701 Common Control DC/DC Converter Unit, 693 Common Control DC/DC Converter Unit Circuit Pack Replacement, 705 User Reported Troubles Overview, 28



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