AT&T System 85
Release 2, Version 2

X-Ray Tests

Service Manual

555-101-114 Issue 2, February 1986

AT&T System 85
Release 2, Version 2

X-RAY TESTS

SERVICE MANUAL

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INTRODUCTION

PURPOSE

This service manual provides information and instruction for running the X-RAY tests on System 85, Release 2, Version 2, Switching equipment. It is primarily intended for use by personnel trained in installation, testing, and maintenance of a System 85 Switch. It can be used by others under the direction of a remote testing facility; the person at the switch doing the mechanical operations (inserting the tape, replacing circuit packs, etc.) with the testing being performed by the remote facility. Since it requires the switch to be off-line, X-RAY should be considered only as a last resort for maintenance/troubleshooting on a working switch.

This issue replaces all previous issues of this document. The reason for reissue is:

- To incorporate changes covered in the latest issue of the flipchart drawing, 844176776, ▶Issue 5.◀

Revision arrows are used to emphasize significant changes in this issue of the document.

HOW TO USE THIS MANUAL

This manual is based on the Release 2, Version 2 X-RAY tape (J58889TS-1, List 2) and the MAAP Flipchart Set, comcode 844176776, ▶Issue 5.◀

This manual provides a "start-to-finish" sequence of running the X-RAY tests. When a new System 85 Switch is being installed, it is recommended that the entire sequence of tests be used before the program tape is loaded in the switch. This requires running Microdiagnostics (see "APPENDIX"), then installing the X-RAY tape and running the individual X-RAY procedures (PROCs) as required. The X-RAY PROCs are run in the sequence listed in the section entitled "X-RAY TESTS—OPERATING PROCEDURES."

This manual must be used with the System 85 Maintenance Manual (Section 555-101-108) so it is necessary that you obtain a System 85 Maintenance Manual before running X-RAY tests. The 600-Series maintenance PROCs are included in the X-RAY tape, so that it is not necessary to replace the X-RAY tape with the program tape when you are involved in a maintenance or trouble locating process.

It is recommended that you become familiar with the contents and organization of the entire manual before starting to test. Being familiar with the descriptive information on the X-RAY tests, the operating procedures, and the test control structure will help you to understand the results of the individual tests.

The following manual is referenced and should be obtained before beginning the X-RAY tests:

- 555-101-108 AT&T System 85 Maintenance Manual.

ORGANIZATION

The rest of this manual is divided into six sections:

- DESCRIPTION OF X-RAY TESTS —Provides a brief description of the X-RAY tests and the associated operating control structure.
- X-RAY TEST—OPERATING PROCEDURES —Contains instructions for running X-RAY tests.
- X-RAY TEST PROCEDURES, TECHNICAL SUPPORT DATA —Displays flipcharts and describes their operating procedures.
- GLOSSARY
- INDEX
- APPENDIX A —Provides instructions for running Microdiagnostics.
- APPENDIX B —Provides a list of problems (and solutions) encountered in the field while running the R2V2 X-RAY.

DESCRIPTION OF X-RAY TESTS

OVERVIEW

X-RAY is a software test program designed to test the hardware operation of the System 85 Switch. The program is contained in the X-RAY tape cartridge.

X-RAY uses maintenance flipcharts and software to detect faults in the common control equipment. Faults are detected down to the circuit pack level.

X-RAY consists of individual tests loaded into memory via the X-RAY tape. Each test instructs the equipment to do a specific operation. The results are then compared to expected results. If the results do not match, a fault indication is displayed on the Maintenance and Administration Panel (MAAP) (Figure 1).

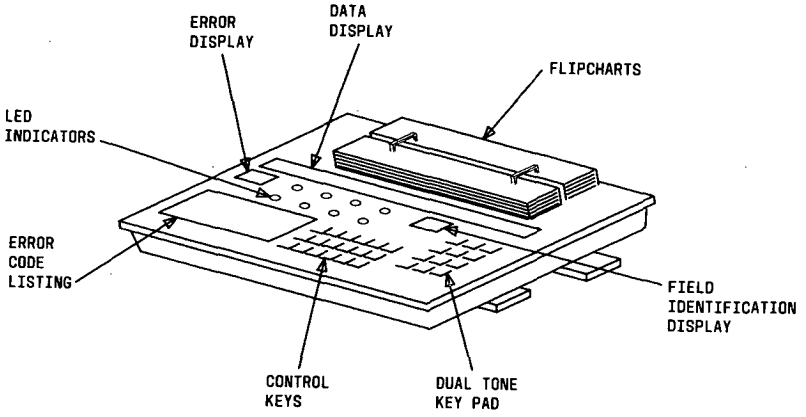


Figure 1. MAAP

X-RAY is run by inserting the X-RAY tape into the minirecorder. If the switch is equipped with duplicate common controls, an X-RAY tape must be inserted in each minirecorder and loaded into each common control. At the alarm panel (Figures 2 or 3), set **MICRO DIAGNOSTIC TEST SELECT** switch to **15**, and depress **ENABLE**. Wait for the tape to load. This takes 2 to 8 minutes. The **PASS** LED on the alarm panel begins to blink when the tape is loaded. If the switch is equipped with duplicate common controls, repeat procedure to load the second X-RAY tape. The desired PROC is then selected and entered at the MAAP. The PROC may also be entered remotely from INADS/RMATS II (Initialization and Administration System/Remote Maintenance and Traffic System II) by the remote access port.

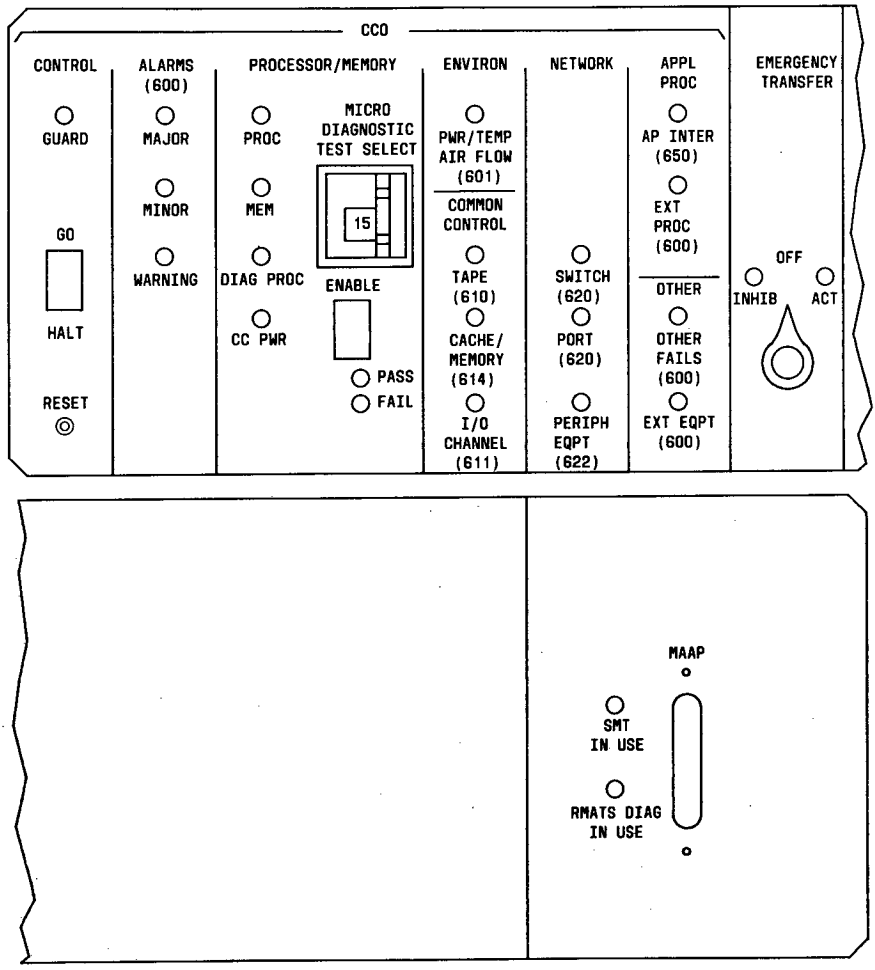


Figure 2. UNDUPLICATED ALARM PANEL

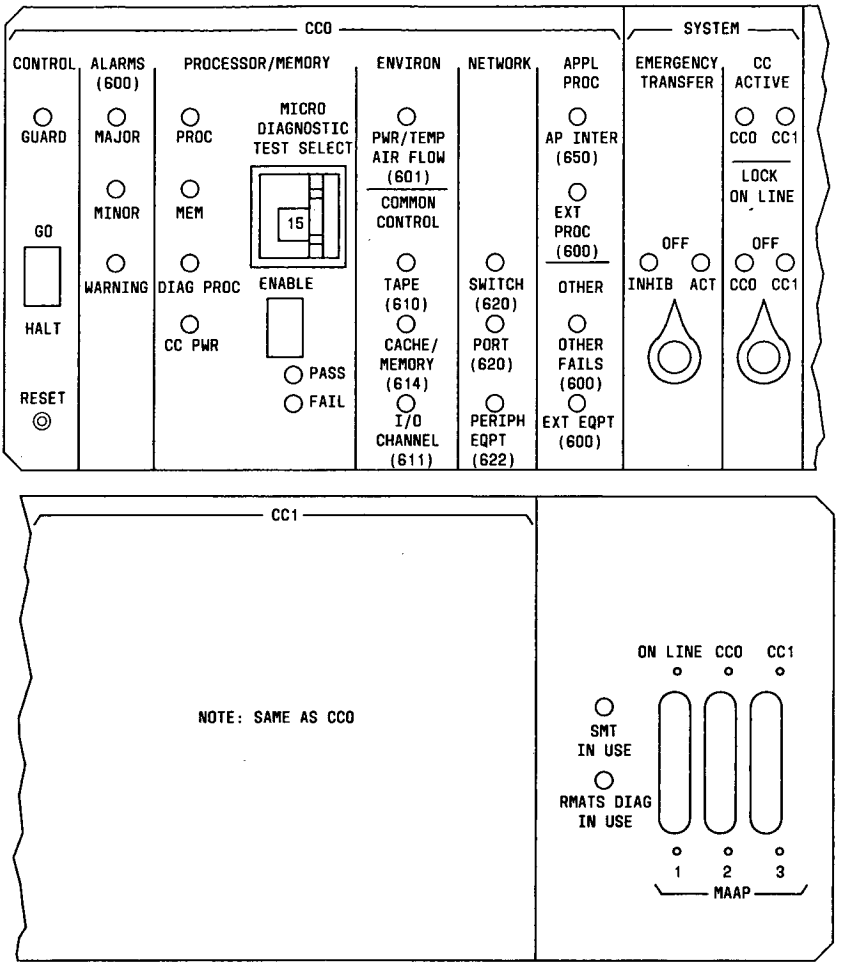


Figure 3. DUPLICATED ALARM PANEL

A translation generation procedure (PROC 901) establishes a standard hardware configuration for X-RAY testing. The specific hardware configuration of the switch can be displayed on the MAAP by the "System Configuration Display" procedure (PROC 902).

X-RAY checks for faults in the following switch components:

- Common control (CC)
- Minirecorder
- MAAP
- Data Communications Interface Unit (DCIU)
- Module control (MC) and network ports
- Console
- Time multiplexed switch (TMS)

When an alarm/fault is detected while running PROC 900, Test 1, go to PROC 600 to identify the cause of the alarm/fault. When an alarm/fault is identified, refer to the System 85 Maintenance Manual (Section 555-101-108) for information on repairing the trouble.

X-RAY TEST OPERATING CONTROL STRUCTURE

X-RAY is based on the switch routine maintenance structure and maintenance test modules. The X-RAY tape is comparable to the switch program tape except it does not have call processing capability. This allows X-RAY fault detection and diagnostic routines to use real time without interference from switch call processing programs.

X-RAY Software Structure

Control software in the X-RAY environment schedules the tasks associated with running X-RAY tests without interference from call-processing functions. This ensures a faster rate of testing for the port circuits.

The software contains switch maintenance procedures in memory. These maintenance procedures are on-line. This allows an efficient use of real time and expedites running the X-RAY test.

X-RAY Test Modules

Test modules, in most cases, use the same software as switch maintenance, periodic, and demand tests. X-RAY fault detection meets all switch maintenance requirements with respect to hardware tested, fault isolation, alarms, and errors logged.

X-RAY Test Modes

The "X-RAY Control" procedure (PROC 900) has four modes for running the complete X-RAY test. These modes are:

- Continuous—test runs continuously until it is manually stopped.
- Stop-on-error—test stops automatically when a fault is detected.
- Burn-in—test time accumulation stops automatically when a switch failure occurs, testing continues.
- Stop after one pass—test stops automatically after one complete pass (test) is made.

Console Button and Lamp Test

The console button and lamp test is contained in the X-RAY software. It tests the console lamps, buttons, and audible signals. PROC 210 is contained in the X-RAY tape and is used to administer the consoles which are to be tested.

Each console must be administered and the handset/headset plugged in before the test can be run. Once the handset/headset is plugged in, the lamps cycle as long as the X-RAY tape is running unless PROC 901, Test 3 has been run since the attendant consoles were administered. If this is the case, the consoles must be readministered using PROC 210.

X-RAY TESTS—OPERATING PROCEDURES

OVERVIEW

Running X-RAY consists of running Microdiagnostics, if required, installing the X-RAY tape cartridge(s) into the minirecorder(s) and loading X-RAY into the switch memory. The various test procedures are then entered in sequence to exercise the switch components and identify any failures.

When the switch is equipped with duplicate common controls, an X-RAY tape must be inserted in each minirecorder.

The following PROCs are used in the X-RAY environment:

- PROC 210, Console Equipment Location
- PROC 600, Alarm Causes/Error Log
- PROC 612, Initialization Causes
- PROC 652, Time-of-day Clock Synchronizer
- PROC 900, X-RAY Control
- PROC 901, X-RAY Translation Generation
- PROC 902, System Configuration Display

The X-RAY PROCs are run in the following sequence:

1. PROC 901 is used to generate translations in the switch memory. Also, it performs an error checking function for missing circuit packs within the switch.
2. PROC 652 is used to synchronize the time-of-day clock.
3. PROC 612 is used to clear all maintenance data.
4. PROC 902 is used to verify the switch hardware configuration after translations have been generated by PROC 901.
5. PROC 210 is used to assign the attendant console. The handset must be plugged into the console during administration of the procedure.
6. PROC 900, Test 1 provides the overall System 85 Switch test. ⧫If the switch is equipped with a DCIU, four loop-around cables are required to properly test the DCIU. See Table A, Note 3. Refer to System 85 Maintenance Manual (Section 555-101-108) for loop-around cable connections.⧫
7. PROC 600 is used to display network errors detected while running PROC 900, Test 1. PROC 600 (Field 15) also displays the 600-series maintenance PROCs used to correct any network errors. Refer to the System 85 Maintenance Manual (Section 555-101-108) for repair procedures.

In addition to the PROCs previously listed, the PROCs listed in Table A are also used to support X-RAY. They are all contained in the X-RAY tape so it is not necessary to replace the X-RAY tape with the program tape when you are involved in a maintenance or trouble locating process. Refer to the System 85 Maintenance Manual (Section 555-101-108) for information on how to use the 600-Series Maintenance PROCs. ⧫PROC 600 may refer you to PROC 622 for trouble detection. PROC 622 is not contained in the X-RAY tape. Reference to PROC 622, with a unit type 30, usually means there is a blown fuse or power problem on the indicated SN270 circuit pack.⧫

TABLE A. ADMINISTRATION AND MAINTENANCE PROCS USED TO SUPPORT X-RAY

PROC	TITLE
253	System Configurations Data Channel Assignments
290	Installed Circuit Pack Identification
490	Patch
497	Customer Identification Encodes
601	Environmental Test
610	Tape Tests
611	Common Control Tests
613	Duplicate Processor Control and Test
614	Memory Read/Memory Match Test
615	MAAP Test
616	Alarm Panel
◗618	Diagnostic Proc/Rem Intf./Alarm Intf. Test◖
620	Network Procedure
621	Network Duplication Channel
◗622	Network Peripherals (Note 1)◖
624	Contact Interface Test
625	DS-1 Synchronization Reference Monitor
630	Busy out/Release Busy Out
644	Terminal to Auxiliary Tone Test Call ◗(Note 2)◖
◗646	Modem Pooling and Facility Testing (Note 1)◖
650	DCIU Tests ◗(Note 3)◖
653	Attendant Console Tests ◗(Note 4)◖
654	Display Terminals Test ◗(Note 5)◖
655	Station Message Detail Recording Test
656	Network Control Operations Support System Port Test

◗Note 1—This PROC is not loaded in the X-RAY tape. If PROC 622 is referenced by PROC 600, check for blown fuses or a power problem on the indicated circuit pack. If PROC 646 is referenced, use PROC 620 to test the indicated circuit.

Note 2—Test line is first valid electrical line circuit.

Note 3—Four external loop-around cables (ED-1E422, GRP 9) must be in place for all links before PROC 650 and PROC 900 are run. These cables must be configured to connect link 1 to link 2, link 3 to link 4, link 5 to link 6, and link 7 to link 8. However, PROC 650, Test 3 requires eight loop around cables (ED-1E422, GRP 6) to run properly.

Note 4—PROC 210 must be used first to administer Attendant Consoles.

Note 5—PROC 253 must be used first to administer Display Terminals.◖

If it is necessary to run Microdiagnostics before loading the X-RAY tape, refer to the "APPENDIX" for information.

The MAAP (Figure 1) is the primary on-site interface between you and the switch. In the following sequence of PROCs, all commands are entered from the MAAP. Ensure the MAAP is connected to the **MAAP** connector on the unduplicated alarm panel (Figure 2) and the **ON LINE** connector on the duplicated alarm panel (Figure 3).

Single Common Control

1. At the alarm panel (Figure 2), set **MICRODIAGNOSTIC TEST SELECT** switch to **15**.
2. Insert X-RAY tape in minirecorder.
3. At the alarm panel, depress **ENABLE**. It takes 2 to 8 minutes for the X-RAY tape to load. The **PASS** indicator begins to blink when the X-RAY tape is correctly loaded.

Duplicated Common Control

1. At **CC0**, set **MICRODIAGNOSTIC TEST SELECT** switch to **15** (Figure 3).
2. Set **LOCK ON LINE** switch to **CC0** (Figure 3).
3. Insert X-RAY tape in CC0 minirecorder.
4. Depress **ENABLE**. It takes 2 to 8 minutes for the tape to load. The CC0 **PASS** indicator begins to blink when the tape is loaded.
5. At **CC1**, set **MICRODIAGNOSTIC TEST SELECT** to **15** (Figure 3).
6. Insert X-RAY tape in CC1 minirecorder.
7. Depress **ENABLE**. It takes 2 to 8 minutes for the tape to load. The CC1 **PASS** indicator begins to blink when the tape is loaded.

RUNNING X-RAY

Once the X-RAY tape has been successfully loaded on-site, translations can be generated and the following test sequences can be run remotely from INADS/REMATS II via the remote access port. The X-RAY tests are run in the sequence listed in the following paragraphs.

PROCEDURE 901, TRANSLATION GENERATOR

PROC 901 is the X-RAY translation generator. It consists of three words: Word 1 creates physical to electrical address correspondences, Word 2 verifies physical to electrical address correspondences, and Word 3 creates translations and detects faults. The procedure interrogates the switch hardware and enters the acquired information into translation tables. These translations provide the data necessary to support X-RAY testing. This procedure provides maximum flexibility allowed by the switch configuration and cabling.

Remote modules (RM) and Remote Module Interfaces (RMI) are also supported by PROC 901. The remote RMI is always located in slot 25 of the RM Module Control Carrier. There are two possible locations for the local RMI:

a. It can be located in slot 25 of the local module Module Control Carrier.

b. It can be located in a slot (0-3, 5-8, 13-16, or 18-21) of a special RMI carrier mounted in one of the switch control cabinets. This carrier is accessed (for maintenance purposes) by an electrical carrier address from one of the local modules.

♦PROC 901 makes several assumptions when translating a system clock synchronizer (SCS) board (TN463). These assumptions are based an the number of DS1 boards in the switch. Some of these assumptions require the craft personnel to configure the switch in a specific way. If the system is not configured as described in the following paragraphs, switch timing problems may develop which in turn may cause false alarms.

One SCS Board with no DS1 Board

If there are no DS1 boards in the switch, the primary and secondary references are not translated and the high accuracy clock on the SCS board is assumed to be the master clock for the switch. In this configuration, the circuitry on the SCS board associated with the primary and secondary references cannot be tested. For this reason, this configuration is not recommended.

One SCS Board with at least two DS1 Boards

With at least two DS1 boards in the switch, the primary and secondary references are translated and a clock external to the switch is assumed to be the master clock. This external clock may be a T1 interface connected to the first two DS1 boards in the switch that are in turn connected to the primary and secondary clock inputs on the SCS board; or the external clock may be a high accuracy 8kHz clock (+/-32 ppm or better, such as the 127R precision-fixed frequency oscillator) connected directly to the inputs of the primary and secondary references on the SCS board. The advantage of this configuration is that the circuitry on the SCS board associated with the primary and secondary references can be tested. This is the recommended configuration for testing the SCS board.

One SCS Board with one DS1 Board

If there is only one DS1 board in the switch, the primary reference is translated and the secondary reference is not. This configuration still assumes that the master clock for the system is external to the switch. Again, this clock may be a T1 interface or an 8kHz clock, but only the primary reference can be connected. During Test 2 of PROC 625, Field 9 must be set to **1** to keep the software from trying to switch to the secondary reference. This configuration is not recommended because the circuitry on the SCS board associated with the secondary reference is not tested and the software does not support it.♦

Procedure 901, Word 1

Enter PROC 901, depress **ENTER** —1 appears in Field 1; 0 appears in Fields 4-6; dashes appear in Fields 10-13. Table type appears in Field 2, maximum equipped network module appears in Field 3, and the electrical address (if not dashed) of the carrier type displayed in Field 9 is displayed in Fields 7 and 8.

To use the default values

Depress **WORD NO.** —2 appears in Field 1. If error code 81 is displayed, an error has been found in the electrical to physical correlations and must be corrected.

To change the default values

1. Enter Table Type number in Field 2, depress **ENTER**.

> ***Note:*** Table types 0 and 1 are used for the standard switch configuration with two port carriers and the module control carrier(s) in cabinet 0 of each module. Table types 2 and 3 are used for the standard switch configuration with the common control and three port carriers in cabinet 0, and the module control carrier(s) in cabinet 1 of module 0. Table type cannot be entered from the MAAP and is just an indication that modifications have been made to the standard tables in the physical to electrical correlations of PROC 901.

2. Enter highest network module equipped in Field 3, depress **ENTER** (e.g., enter 3 for a four module system, modules are numbered 0, 1, 2, 3, etc.).

To change Electrical Equipment Location

1. Enter module number in Field 4, depress **ENTER**.
2. Enter cabinet number in Field 5, depress **ENTER**.
3. Enter carrier number in Field 6, depress **ENTER, EXECUTE**.
4. Enter IOBI Index number in Field 7, depress **ENTER**.
5. Enter carrier location in Field 8, depress **ENTER**.
6. Enter carrier type in Field 9, depress **ENTER**.

> ***Note:*** If an RMI Carrier is present in the switch, the electrical address used to access it (for maintenance purposes) must be supplied (Fields 7 and 8) when the carrier is entered in Word 1. In this case, Field 10 is used to show the module that the electrical carrier address is taken from. There can be a maximum of four RMI Carriers in a switch. An RMI Carrier cannot be located in cabinet 0, carrier 0 of the system control cabinets nor can it have an Electrical Equipment Location (Fields 7 and 8) of 0 assigned to it.

7. Enter RMI local module number in Field 10, depress **ENTER**.
8. Enter RMI local cabinet number in Field 11, depress **ENTER**.
9. Enter RMI local carrier number in Field 12, depress **ENTER**.
10. Enter RMI local slot number in Field 13, depress **ENTER**.

> ***Note:*** The RMI local information (Fields 10-13) needs to be entered only when entering the module control carriers of the remote module. The purpose of these fields (10-13) is to point to the slot location of the local RMI board for that module control carrier. If the local RMI board is located in the system control cabinets, the module entered should be **99**.

11. Depress **NEXT CIRCUIT** —Fields 4, 5, and 6 advance to the next carrier, cabinet, and module in the switch. Physical equipment locations appear sequentially in Fields 4-6 and corresponding electrical equipment locations and carrier types appear in Fields 7-9. Field 7 (IOBI Index) blinks to indicate entry field.
12. Repeat Step 11 until all carriers in the switch have been displayed and/or modified. When all carriers in the switch have been displayed, Field 4 (module) advances to the first carrier of module 99 to show that the carrier configuration of the switch control cabinets must be entered. The display returns to module 0, cabinet 0, and carrier 0 after module 99 has been displayed.

To return to a specific equipment location

1. Depress **CHANGE FIELD**, enter number (4, 5, or 6) of field to be changed, depress **ENTER**.
2. Enter appropriate number in Field 4, 5, or 6, depress **ENTER, EXECUTE**.
3. Enter IOBI Index number in Field 7, depress **ENTER**.
4. Enter carrier location in Field 8, depress **ENTER**.
5. Enter carrier type in Field 9, depress **ENTER**.

Procedure 901, Word 2

This word verifies the port carrier physical to electrical address correspondences as established in Word 1. The word starts with module 0, cabinet 0, and carrier 0 unless otherwise specified.

Enter PROC 901, depress **ENTER, WORD NO.** —2 appears in Field 1; the first electrical address appears in Fields 6 and 7; dashes appear in Fields 3, 4, and 5 and 9-12. The current test mode appears in Field 2 and the carrier type appears in Field 8.

Automatic Test Mode

Enter the module, cabinet, and carrier that you wish to start on, in Fields 3, 4, and 5, respectively. Depress **EXECUTE** —the **WAIT** lamp turns on and the physical and electrical address of the first equipped carrier, starting from this location, and its type are displayed in Fields 3-8 for 2 seconds. All red and green LEDs on the indicated carrier are illuminated; the only exceptions are the red LEDs on the Module Processor (TN380) and TMS Processor (TN381), and all LEDs on the off-line common control boards. Each carrier is visually verified in sequence by the flashing LEDs. When the entire switch has been verified, the **WAIT** lamp on the MAAP goes dark.

Manual Test Mode

1. Depress **CHANGE FIELD**, dial **2**, depress **ENTER**; dial **1**, depress **ENTER;** enter the module, cabinet, and carrier that you wish to start with in Fields 3, 4, and 5, respectively; depress **EXECUTE** —physical and electrical address of the starting carrier and its type are displayed in Fields 3-8. All red and green LEDs on the indicated carrier are illuminated; the only exceptions are the red LEDs on the Module Processor (TN380) and TMS Processor (TN381), and all LEDs on the off-line common control boards. The LEDs in the carrier remain lit until **NEXT CIRCUIT** is depressed.
2. Depress **NEXT CIRCUIT** until all carriers have been verified—same results as Step 1.
3. Depress **NEXT UNIT** —Field 5 steps to carrier 0 in the next cabinet in the module. Not required if Field 4 was advanced by using **NEXT CIRCUIT**
4. Repeat Steps 2 and 3 until all carriers in the module have been verified—same results as Steps 2 and 3.
5. When all cabinets in the module have been verified, depress **NEXT UNIT** —Field 3 steps to the next module in the switch; Fields 4 and 5 return to 0. Not required if Field 3 was advanced by using **NEXT CIRCUIT**.
6. Repeat Steps 2 through 5 until all modules have been verified—when all modules have been displayed, the display goes to 0 for module, cabinet, and carrier (Fields 3, 4, and 5, respectively).

Note: In both automatic and manual modes, the green LED on the on-line IOBI and PDS boards associated with the displayed port carrier are illuminated. If the displayed carrier is in a remote module, the green LEDs on the local and remote RMI board are illuminated.

Procedure 901, Word 3

This word interrogates each module to determine the hardware contained in the switch. Switch hardware status fills the translation tables required to support the X-RAY tests. Errors detected while generating translations are logged into memory as they are detected and then displayed at the end of the test.

The minimal circuit pack configuration (Figure 4) of the on-line common control carrier is verified before Word 3 is terminated successfully. At least 4 meg of memory is required to successfully load the X-RAY tape.

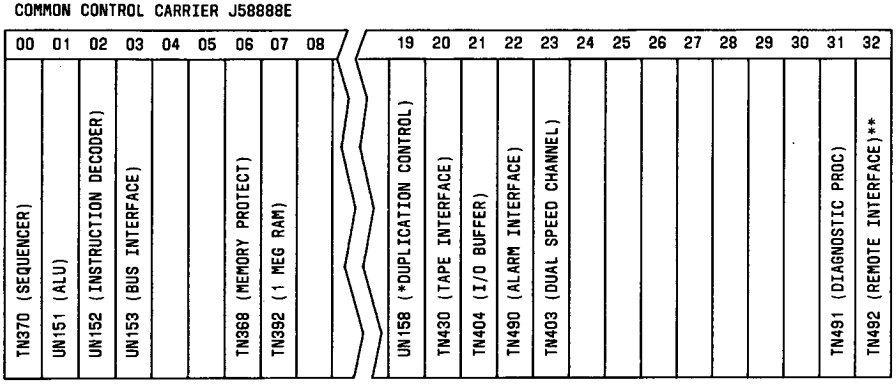


Figure 4. ▶COMMON CONTROL CARRIER (MINIMUM CIRCUIT PACK CONFIGURATION FOR RUNNING PROC 901, WORD 3)◀

Word 3 also checks for minimal configurations in each module control and TMS carrier. These carriers are configured as follows:

- Minimal module control carrier configuration. (See Table B.)
- Minimal TMS control carrier configuration, modules 0-6. (See Table C.)
- Minimal TMS (1st) growth carrier configuration, modules 7-14. (See Table D.)
- Minimal TMS (2nd) growth carrier configuration, modules 15-22. (See Table E.)
- Minimal TMS (3rd) growth carrier configuration, modules 23-30. (See Table F.)

TABLE B. MODULE CONTROL CARRIER (MINIMUM CIRCUIT BOARD CONFIGURATION FOR RUNNING PROC 901, WORD 3)

SLOT	BOARD	DESCRIPTION	X-RAY MIN. CONFIG.
00A	495FA	DC Power	Always required
00B	◗495GA◖	DC Power	◗Only if TMS is equipped (multimodule) and MC Carrier is duplicated◖
01	TN481	Light Guide Interface (LGI)	
02	TN463	System Clock Sync (SCS)	If DS-1 ports are present and TMS is not equipped, only one SCS per system
	TN481	LGI	Only if TMS is equipped (multi-module) and MC carrier is not duplicated
03	TN460	Module clock	If TMS is not equipped (single module)
	TN441	Intermodule Data Store (IDS)	If TMS is equipped (multi module)
06	TN440	Port Data Store 0 (PDS 0)	Only if Port Carriers 0/1 are equipped
07	TN440	PDS 1	Only if Port Carriers 2/3 are equipped
08	TN440	PDS 2	Only if Port Carriers 4/5 are equipped
09	TN440	PDS 3	Only if Port Carriers 6/7 are equipped
10	TN440	PDS 4	Only if Port Carriers 8/9 are equipped
11	TN440	PDS 5	Only if Port Carriers 10/11 are equipped
12	TN446	Time Slot Interchange Arithmetic Logic Unit (TSI ALU)	Always required
13	TN445	TSI PSTORE	Always required
14	TN444	Maintenance Interface (MIF)	Always required
15	TN530	Duplication Controller	Only if MC carrier is duplicated
17	TN380	Module Processor	Always required
19	TN400	I/O Bus Interface 0 (IOBI 0)	Only if Port Carriers 0/1/2/3 are equipped
20	TN400	IOBI 1	Only if Port Carriers 4/5/6/7 are equipped
21	TN400	IOBI 2	Only if Port Carriers 8/9/10/11 are equipped
22	TN401	MC Channel	Always required
23	495FA	DC Power	Always required

TABLE C. TMS CONTROL CARRIER, MODULES 0-6 (MINIMUM CIRCUIT BOARD CONFIGURATION FOR RUNNING PROC 901, WORD 3)

SLOT*	BOARD	DESCRIPTION	X-RAY MIN. CONFIG.
00	494GA	DC Power	Always required
01	494GA	DC Power	Always required
02	TN480	Module Interface 4 (MI 4)	If Module 3 is equipped
03	TN480	MI 5	If Module 4 is equipped
04	TN480	MI 6	If Module 5 is equipped
05	TN480	MI 7	If Module 6 is equipped
06	TN473	Fanout 1 (FO 1)	Always required
07	UN150	Fanin 1 (FI 1)	Always required
08	TN470	Multiplexer 4/5 (MPX 4/5)	If Module 3/4 is equipped
09	TN470	MPX 6/7	If Module 5/6 is equipped
10	TN452	Universal Port Control Interface 0 (UPCI 0)	Always required
11	TN462	Local Clock Terminal 0 (LCT 0)	Always required
12	TN470	MPX 2/3	If Module 1/2 is equipped
13	TN470	MPX 0/1	Always required
14	UN150	FI 0	Always required
15	UN150	FO 0	Always required
16	TN480	MI 3	If Module 2 is equipped
17	TN480	MI 2	If Module 1 is equipped
18	TN480	MI 1	If Module 0 is equipped
20	TN463	SCS	If DS-1 Boards are present
21	TN461	TMS Clock Oscillator (TCO)	Always required
22	TN482	TMS Maintenance Interface (TMIF)	Always required
23	TN530	Duplication Controller	If TMS is duplicated
25	TN381	TMS Processor	Always required
26	TN400	IOBI	Always required
27	TN401	MC Channel	Always required
28	495FA	DC Power	Always required

* The slots in the TMS Control Carrier are listed exactly as they appear, from left to right, in the carrier.

TABLE D. FIRST TMS GROWTH CARRIER, MODULES 7-14 (MINIMUM CIRCUIT BOARD CONFIGURATION FOR RUNNING PROC 901, WORD 3)

SLOT*	BOARD	DESCRIPTION	X-RAY MIN CONFIG.
00	494GA	DC Power	Always required
01	494GA	DC Power	Always required
02	TN480	Module Interface (MI 12)	If Module 11 is equipped
03	TN480	MI 13	If Module 12 is equipped
04	TN480	MI 14	If Module 13 is equipped
05	TN480	MI 15	If Module 14 is equipped
06	TN473	Fanout (FO 3)	Always required
07	UN150	Fanin (FI 3)	Always required
08	TN470	Multiplexer (MPX 12/13)	If Module 11/12 is equipped
09	TN470	MPX 14/15	If Module 23/14 is equipped
10	TN452	Universal Port Control Interface 1 (UPCI 1)	Always required
11	TN462	Local Clock Terminal 1 (LCT 1)	Always required
12	TN470	MPX 10/11	If Module 9/10 is equipped
13	TN470	MPX 8/9	If Module 7/8 is equipped
14	UN150	FI 2	Always required
15	UN150	FO 2	Always required
16	TN480	MI 11	If Module 10 is equipped
17	TN480	MI 10	If Module 9 is equipped
18	TN480	MI 9	If Module 8 is equipped
19	TN480	MI 8	If Module 7 is equipped
28	495FA	DC Power	Always required

* The slots in the first TMS Growth Carrier are listed exactly as they appear, from left to right, in the carrier.

TABLE E. SECOND TMS GROWTH CARRIER, MODULES 15-22 (MINIMUM CIRCUIT BOARD CONFIGURATION FOR RUNNING PROC 901, WORD 3)

SLOT*	BOARD	DESCRIPTION	X-RAY MINIMUM CONFIGURATION
00	494GA	DC Power	Always required
01	494GA	DC Power	Always required
02	TN480	Module Interface (MI 20)	If Module 19 is equipped
03	TN480	MI 21	If Module 20 is equipped
04	TN480	MI 22	If Module 21 is equipped
05	TN480	MI 23	If Module 22 is equipped
06	TN473	Fanout (FO 5)	Always required
07	UN150	Fanin (FI 5)	Always required
08	TN470	Multiplexer (MPX 20/21)	If Module 19/20 is equipped
09	TN470	MPX 22/23	If Module 21/22 is equipped
10	TN452	Universal Port Control Interface (UPCI 2)	Always required
11	TN462	Local Clock Terminal 2 (LCT 2)	Always required
12	TN470	MPX 18/19	If Module 17/18 is equipped
13	TN470	MPX 16/17	If Module 15/16 is equipped
14	UN150	FI 4	Always required
15	UN150	FO 4	Always required
16	TN480	MI 19	If Module 18 is equipped
17	TN480	MI 18	If Module 17 is equipped
18	TN480	MI 17	If Module 16 is present
19	TN480	MI 16	If Module 15 is present
28	495FA	DC Power	Always required

* The slots in the second TMS Growth Carrier are listed exactly as they appear, from right to left, in the carrier.

TABLE F. THIRD TMS GROWTH CARRIER, MODULES 23-30 (MINIMUM CIRCUIT BOARD CONFIGURATION FOR RUNNING PROC 901, WORD 3)

SLOT*	BOARD	DESCRIPTION	X-RAY MIN. CONFIG.
00	494GA	DC Power	Always required
01	494GA	DC Power	Always required
02	TN480	Module Interface (MI 28)	If Module 27 is equipped
03	TN480	MI 29	If Module 28 is equipped
04	TN480	MI 30	If Module 29 is equipped
05	TN480	MI 31	If Module 30 is equipped
06	TN473	Fanout (FO 7)	Always required
07	UN150	Fanin (FI 7)	Always required
08	TN470	Multiplexer (MPX 28/29)	If Module 27/28 is equipped
09	TN470	MPX30/31	If Module 29/30 is equipped
10	TN452	Universal Port Control Interface (UPCI 3)	Always required
11	TN462	Local Clock Terminal 3 (LCT 3)	Always required
12	TN470	MPX 26/27	If Module 25/26 is equipped
13	TN470	MPX 24/25	If Module 23/24 is equipped
14	UN150	FI 6	Always required
15	UN150	FO 6	Always required
16	TN480	MI 27	If Module 26 is equipped
17	TN480	MI 26	If Module 25 is equipped
18	TN480	MI 25	If Module 24 is equipped
19	TN480	MI 24	If Module 23 is equipped
28	495FA	DC Power	Always required

* The slots in the third TMS Growth Carrier are listed exactly as they appear, from left to right, in the carrier.

1. If the common control is duplicated, set the **LOCK ON LINE** switch to **CC0** before entering Word 3.
2. Enter PROC 901, depress **ENTER, WORD NO., WORD NO.** –3 appears in Field 1; dashes appear in Fields 2-9.
3. Depress **EXECUTE** – **WAIT** lamp is lit while translations are being generated. When the translation tables are filled, the **WAIT** lamp goes dark and the **SEE NOTE** lamp lights. The number of PROC 901 errors appears in Field 8 and dashes appear in Fields 2-7 and 9.
4. If there is a fault, depress **NEXT FAULT**. The physical location and type of the fault are displayed in Fields 2-7. Field 9 steps to 1. Fault types of 50 or greater indicate fatal errors that cause translation generation to be incomplete. These errors must be removed before continuing.
    a. Record the error information.
    b. Check the Customer System Document (CSD) to ensure the fault is a valid trouble and not just a missing circuit pack.
    c. If fault is valid, refer to the System 85 Maintenance Manual (555-101-108) for information on repairing the fault.

    Note: If an error with Fault Type 60 (cannot communicate with off-line common control) is logged, a slot location of 59, 60, 61, or 62 is an indication of what type of communication the off-line common control is refusing to acknowledge. Persistent Fault Type 60 errors indicate problems with the duplication channel and/or the off-line common control processor.
5. Repeat Step 3 for each fault detected. Field 9 is incremented each time **NEXT FAULT**. is depressed. After the last fault is displayed, the display (Field 9) resets to the first fault.
6. When translation generation is successfully completed, depress **RUN TAPE, EXECUTE** –translation tables are stored on the X-RAY tape.

Notes

1. Attendant consoles previously administered on the X-RAY tape will be removed from translations by PROC 901, Word 3. Use PROC 210 to readminister the consoles if it is required.
2. If the common control is duplicated, the **LOCK ON LINE** switch should be set to **OFF** after PROC 901, Test 3 is successfully completed.

PROCEDURE 652, TIME OF DAY CLOCK SYNCHRONIZER

PROC 652, Test 3 is used to set the time-of-day clock before PROC 900, Test 1 is run. After the time-of-day clock is set, Test 2 is run to test the clock.

Use PROC 652 as follows:

Test 3

1. Enter PROC 652, depress **ENTER, NEXT TEST, NEXT TEST** –3 appears in Field 1; Fields 2 and 3 display the clock location (if provided); dashes appear in Fields 4-15.
2. Depress **CHANGE FIELD**; dial **7**, depress **ENTER**.
3. Enter month in Field 7, depress **ENTER**.

4. Enter day in Field 8, depress **ENTER**.
5. Enter year (software only) in Field 9, depress **ENTER**.
6. Enter hours in Field 10, depress **ENTER**.
7. Enter minutes in Field 11, depress **ENTER**.
8. Enter seconds in Field 12, depress **ENTER, CLEAR DATA, EXECUTE**.

Test 2

Depress **CHANGE FIELD**; dial **1**, depress **ENTER**; dial **2**, depress, **ENTER, EXECUTE** —if there are no faults, a **0** blinks in Field 5. Failures are identified by their respective fault codes.

PROCEDURE 612, INITIALIZATION CAUSES

PROC 612 is used to clear all maintenance data in memory and turn off any lighted fault indicators.

Use PROC 612 as follows:

1. Enter PROC 612, depress **ENTER**.
2. Depress **CHANGE FIELD**, dial **1**, depress **ENTER**.
3. Dial **99**, depress **ENTER**.
4. Depress **CLEAR DATA, EXECUTE**. This clears all maintenance data from memory.

PROCEDURE 902, SYSTEM CONFIGURATION

This procedure summarizes and displays the switch hardware configuration acquired from the X-RAY translation data base established by PROC 901. The procedure consists of nine words (displays) which support the following levels of resolution:

(a) System

- Word 1—Common Control Equipment
- Word 2—Network Equipment I (Terminals)
- Word 3—Network Equipment II (Trunks)

(b) Module

- Word 4—Common Control Equipment
- Word 5—Network Equipment I (Terminals)
- Word 6—Network Equipment II (Trunks)

(c) Cabinet

- Word 7— Common Control/Tone/TT Senders/Receivers
- Word 8— Network Terminal Side and Trunk Side Equipment

(d) Carrier

- Word 9—Carrier Display

If the switch is equipped with a local printer, PROC 902 has the capability to provide a hard copy of the switch configuration data. To obtain a printout:

1. Enter PROC 902, Word 1, depress **ENTER, EXECUTE**.
2. Depress the unmarked button immediately to the left of the **WORD NO.** button.
3. The switch configuration report will run asynchronously with the MAAP display. This allows you to exit PROC 902 or change words within PROC 902 without affecting the report.
4. To stop the printer, depress **EXECUTE**, then depress the unmarked button immediately to the left of the **WORD NO.** button.

Procedure 902, Word 1

This word displays the total count of all hardware (modules, cabinets, and carriers) in the switch.

1. Enter PROC 902, depress **ENTER** —1 appears in Field 1; dashes appear in Fields 2-16.
2. Depress **EXECUTE** —total count of all switch hardware displayed in Fields 2-16. Verify count shown against CSD (to determine data channel port count, add numbers shown in Fields 7 and 8 and divide by 16).

Procedure 902, Word 2

This word displays the terminal side port circuit pack count of the switch.

1. Enter PROC 902, depress **ENTER**.
2. Depress **WORD NO.**, dial **2**, depress **ENTER** —2 appears in Field 1; dashes appear in Fields 2-8.
3. Depress **EXECUTE** —total count of all terminal side port circuit packs appears in Fields 2-8. Verify count shown against CSD.

Procedure 902, Word 3

This word displays the trunk side port circuit pack count of the switch.

1. Enter PROC 902, depress **ENTER**.
2. Depress **WORD NO.**, dial **3**, depress **ENTER** —3 appears in Field 1; dashes appear in Fields 2-6.
3. Depress **EXECUTE** —total count of all trunk side circuit packs appears in Fields 2-6. Verify count shown against CSD.

Procedure 902, Word 4

This word displays the common control equipment within a selected module.

1. Enter PROC 902, depress **ENTER**.
2. Depress **WORD NO.**, dial **4**, depress **ENTER** —4 appears in Field 1; 0 appears in Field 2; dashes appear in Fields 3-18.

3. Depress **EXECUTE** —total count of module common control equipment in module 0 appears in Fields 3-18.
4. Depress **NEXT UNIT** —number in Field 2 incremented, module common control equipment count appears in Fields 3-18.
5. Repeat Step 4 until all modules have been displayed—0 appears in Field 2 when all modules have been displayed.

Procedure 902, Word 5

This word displays the terminal side port circuit pack count in a selected module.

1. Enter PROC 902, depress **ENTER**.
2. Depress **WORD NO.**, dial **5**, depress **ENTER** —5 appears in Field 1; 0 appears in Field 2; dashes appear in Fields 3-9.
3. Depress **EXECUTE** —terminal side circuit pack count of module 0 appears in Fields 3-9. Verify count shown against CSD.
4. Depress **NEXT UNIT** —module number in Field 2 incremented. Terminal side circuit pack count of module appears in Fields 3-9. Verify count shown against CSD.
5. Repeat Step 4 until all modules have been displayed—0 appears in Field 2 when all modules have been displayed.

Procedure 902, Word 6

This word displays the trunk side circuit pack count in a selected module.

1. Enter PROC 902, depress **ENTER**.
2. Depress **WORD NO.**, dial **6**, depress **ENTER** —6 appears in Field 1; 0 appears in Field 2; dashes appear in Fields 3-7.
3. Depress **EXECUTE** —trunk side circuit pack count of module 0 appears in Fields 3-7. Verify count shown against CSD.
4. Depress **NEXT UNIT** —module number in Field 2 incremented. Trunk side circuit pack count of module appears in Fields 3-7. Verify count shown against CSD.
5. Repeat Step 4 until all modules have been displayed—0 appears in Field 2 when all modules have been displayed.

Procedure 902, Word 7

This word displays the common control equipment in a selected cabinet.

1. Enter PROC 902, depress **ENTER**.
2. Depress **WORD NO.**, dial **7**, depress **ENTER** —7 appears in Field 1; 0 appears in Fields 2 and 3; dashes appear in Fields 4-12.
3. Depress **EXECUTE** —carrier position and circuit pack count for module 0 and cabinet 0 appear in Fields 4-12. LEDs blink on the IOBI, PCI, and PDI boards of the carrier being displayed. Verify count shown against the CSD.
4. Depress **NEXT CIRCUIT** —cabinet number in Field 3 incremented. Carrier position and circuit pack count of cabinet appear in Fields 4-12.

5. Repeat Step 4 until all cabinets have been displayed—0 appears in Field 3 when all cabinets have been displayed.
6. Depress **NEXT UNIT** —module number in Field 2 incremented. Carrier position and circuit pack counts of module and cabinet appear in Fields 4-12.
7. Repeat Steps 4 through 6 until all modules have been displayed—0 appears in Fields 2 and 3 when all cabinets have been displayed.

Procedure 902, Word 8

This word displays the terminal side and trunk side circuit pack count of a selected cabinet.

1. Enter PROC 902, depress **ENTER**.
2. Depress **WORD NO.**, dial **8**, depress **ENTER** —8 appears in Field 1; 0 appears in Fields 2 and 3; dashes appear in Fields 4-12.
3. Depress **EXECUTE** —terminal and trunk side circuit pack count for module 0 and cabinet 0 appear in Fields 4-12. LEDs blink on the IOBI, PCI, and PDI boards of the carrier being displayed. Verify count shown against the CSD.
4. Depress **NEXT CIRCUIT** —cabinet number in Field 3 incremented. Line and trunk side circuit pack count of cabinet appear in Fields 4-12. Verify count shown against the CSD.
5. Repeat Step 4 until all cabinets in module have been displayed—0 appears in Field 3 when all cabinets have been displayed.
6. Depress **NEXT UNIT** —module number in Field 2 incremented. Terminal and trunk side circuit pack counts of module and cabinet appear in Fields 4-12.
7. Repeat Steps 4 through 6 until all modules have been displayed—0 appears in Fields 2 and 3 when all cabinets have been displayed.

Procedure 902, Word 9

This word displays the three digit circuit pack code for the circuit packs located in each carrier (including port carriers), four slots at a time (from left to right).

1. Enter PROC 902, depress **ENTER**.
2. Depress **WORD NO.**, dial **9**, depress **ENTER** —9 appears in Field 1; 0 appears in Fields 2, 3, and 4; dashes appear in Fields 6-14; 1 appears in Field 5.
3. Depress **EXECUTE** —circuit pack codes for first slot group of first carrier appear in Fields 6-14. LEDs blink on the IOBI, PCI, and PDI circuit packs of the carrier being tested. Verify codes shown against the CSD.
4. Depress **NEXT CIRCUIT** —circuit pack codes of next slot group appear in Fields 6-14, 2 appears in Field 5. Verify codes shown against CSD for circuit pack numbers.
5. Repeat Step 4 until 1 appears in Field 5. One appears in Field 5 when all slot groups in the first port carrier have been displayed and the carrier number in Field 4 is incremented.

6. Repeat Step 4 until all carriers in cabinet have been displayed. Zero appears in Field 4 when all carriers have been displayed.
7. Repeat Steps 4 through 6 until all cabinets in the module have been displayed. Zero appears in Field 3 when all cabinets have been displayed.
8. Repeat Steps 4 through 7 until all modules have been displayed. Zero appears in Field 2 when all modules have been displayed.

PROCEDURE 210, CONSOLE EQUIPMENT LOCATION

It is necessary to administer the console(s) (Figure 5) before X-RAY can test the console LEDs, buttons, and audible signals.

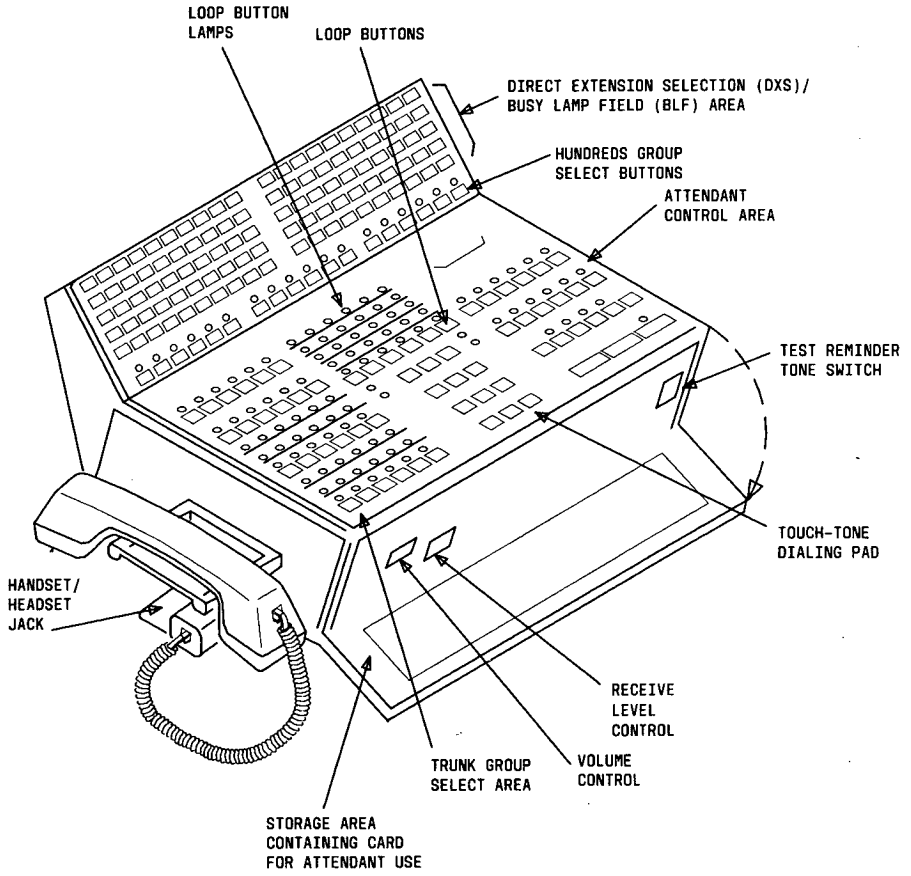


Figure 5. TYPICAL ATTENDANT CONSOLE

Use PROC 210 as follows to add console equipment location to the X-RAY tape.

1. Enter PROC 210, depress **ENTER**.
2. Enter console number in Field 1, depress **ENTER**.

Attendant Interface Equipment Location

3. Enter module number in Field 2, depress **ENTER**.
4. Enter cabinet number in Field 3, depress **ENTER**.
5. Enter carrier number in Field 4, depress **ENTER**.
6. Enter slot number in Field 5, depress **ENTER**.
7. Enter circuit number in Field 6, depress **ENTER**.

Data Channel Equipment Location

8. Enter carrier number in Field 7, depress **ENTER**.
9. Enter slot number in Field 8, depress **ENTER**.
10. Enter circuit number in Field 9, depress **ENTER, ADD, EXECUTE, DISPLAY, EXECUTE.**
11. Repeat Steps 2 through 10 for each console in the switch.

Console Lamp and Button Test

This test checks the console LEDs, buttons, and audible signals.

The test is run as follows:

1. Use PROC 210 to administer each console to be tested.
2. Plug handset/headset into a console. A 440 Hz tone should be heard for 10 seconds, then the LEDs should start to cycle in the following sequence:
    - Left hand set of columns cycle from left to right and top to bottom.
    - Center set of columns cycle from left to right and top to bottom.
    - Right hand set of columns cycle from left to right and top to bottom.
    - DSS field cycles from left to right and top to bottom.
    - Alphanumeric display cycles through all letters, numbers, and characters.
3. Depress a touch-tone telephone pad button. The cycling should stop and the number depressed should appear in all eight alphanumeric displays. After 30 seconds, the cycling will start again.
4. Repeat Step 3 for each pad button.
5. Depress any console button. The LEDs cycling should stop and the LEDs associated with the button depressed should light. After 30 seconds, the LEDs should start to cycle again.
6. Open front panel on console (Figure 5) and depress **LTEST** switch. All LEDs should light and ringer should sound.
7. Repeat Steps 2 through 6 for each console to be tested.

If a console does not pass the lamp and button test, check the console cabling. If the cabling is correct and the console still will not pass, replace it with another console and rerun the test.

PROCEDURE 900, TEST 1, X-RAY CONTROL

PROC 900, Test 1 checks the overall switch control/network system. In the Burn-in mode, the clock stops after a switch failure (alarm). After the switch failure has been resolved and PROC 900, Test 1 is re-entered in the Burn-in mode, the clock will be restored to the time the failure occurred. The clock will not be incremented until one complete pass has been completed without additional failures. The time consumed during the single pass will be added when the clock resumes. The **WAIT** lamp will be turned on at the restart of Test 1 (in Burn-in mode) and will remain on until one pass is completed or a failure occurs.

PROC 652 must be used to synchronize the time-of-day clocks before PROC 900 is run.

Notes:

1. Even though the time (hours/minutes/seconds) is set in PROC 652, it will be zeroed when PROC 900 starts running. The only function that PROC 652 performs that is needed by X-RAY is the synchronizing of the hardware and software clocks.
2. If there is a power failure, PROC 900 will automatically return to it's active state after the power is restored if it was in the Burn-in mode. To facilitate this feature, PROC 900 must periodically save data on the tape cartridge. When this procedure is in progress, the **WAIT** lamp on the MAAP is lighted and no MAAP buttons should be depressed until it goes off. When exiting PROC 900, a short "run tape" occurs, but only if it is in the Burn-in mode and more than 3 cycles have been completed. Again, the MAAP buttons should not be depressed while the **WAIT** lamp is lighted. When the "run tape" is completed, the **WAIT** lamp goes off and the MAAP display is completely dashed.
3. The MAAP must be connected when PROC 900, Test 1 is being run. When PROC 900 is run on-site, the MAAP must be connected for the duration of the test. If the PROC is being run remotely, the INADS/RMATS II link must be connected via the remote access port for the duration of the test. Disconnecting either one will stop the test.
4. Four external loop around cables (ED-1E422, GRP 9) must be installed for all links before the DCIU will function properly while PROC 900 is running. These cables must be configured to connect Link 1 to Link 2, Link 3 to Link 4, Link 5 to Link 6, and Link 7 to Link 8.

A hard copy of the error log (as displayed on the MAAP by PROC 600) may be provided on a local printer. For this feature, the printer must be connected to a RS-232 board (TN489) located in a spare slot of the on-line Common Control Carrier. The hard copy lists the following items:

- Switch name
- Date and time
- Mode of PROC 900 (Continuous, Stop-on-error, Burn-in, or Stop after one pass)
- X-RAY clock (elapsed time)
- Summary of all alarms, warnings, and peg counts sorted by level, unit type, and time of occurrence

To Print Hard Copy of Error Report

1. On the MAAP, depress the unmarked button to the immediate left of the **WORD NO.** button (anytime during execution of PROC 900)—starts printing of error report.
2. Depress the same button again to stop the printer.

Note: Exiting PROC 900 also stops the printer.

Procedure 900, Test 1

This test is used after PROCs 901 and 902 have been run. It checks the switch common control and network systems.

1. If the system is equipped with a DCIU, install the loop-around cables as described in the System 85 System 85 Maintenance Manual (555-101-108).
2. Enter PROC 900, depress **ENTER** —1 appears in Field 1; dashes in Fields 2-12.
3. Select test mode:
    - Continuous test mode=0
    - Stop-on-error test mode=1
    - Burn-in test mode=2
    - Stop-after-one-pass test mode=3

Continuous Test Mode

1. Dial **0**, depress **ENTER** —0 appears in Field 2; dashes in Fields 3-12.
2. Depress **EXECUTE** —equipment location in Fields 3-6 begins to cycle; clock monitors time since test was started; Field 12 is incremented each time the switch is tested; 0 appears in Field 10 or 11.
3. If a 1 appears in Field 10 or 11, depress **STOP** and enter PROC 600 to determine the cause of the alarm/fault.
4. After the alarm/fault cause has been found and corrected, use PROC 612 to clear the alarm record.
5. Reenter PROC 900 to continue testing.

Stop-on-Error Test mode

1. Dial **1**, depress **ENTER** —1 appears in Field 2; dashes in Fields 3-12.

    Note: Test runs until an alarm/fault is detected or the test is manually stopped.

2. Depress **EXECUTE** —equipment location in Fields 3-6 begins to cycle; clock monitors time since test was started; Field 12 is incremented each time test is run; 0 appears in Field 10 or 11.
3. If a 1 appears in Field 10 or 11, depress **STOP** and enter PROC 600 to determine the cause of the alarm/fault.
4. After the alarm/fault cause has been found and corrected, use PROC 612 to clear the alarm record.
5. Reenter PROC 900 to continue testing.
6. Depress **STOP** (if no alarm/faults are detected to stop test)—test stops.

Burn-in Test Mode

1. Dial **2**, depress **ENTER** —2 appears in Field 2; dashes in Fields 3-12.
2. Depress **EXECUTE** —equipment locations in Fields 3-6 begin to cycle; clock monitors time from the start of the test until there is an alarm/fault. At this time the clock stops, although testing continues.

3. If an alarm/fault stops the clock, depress **STOP** and enter PROC 600 to determine the cause of the alarm/fault. A "run tape" will occur on exiting PROC 900 if 4 or more cycles have been completed.
4. After the alarm/fault cause has been found and corrected, use PROC 612 to clear the alarm record.
5. Enter PROC 900, depress **ENTER**, dial **2**, depress **ENTER, EXECUTE** —the clock will start with the value it had when the alarm/fault occurred. It will continue to display this value until one error-free pass has been made. The clock will then restart. The **WAIT** lamp will light until an alarm/fault occurs or the error-free pass is completed.

Stop After One Pass Mode

1. Dial **3**, depress —3 appears in Field 2; dashes in Fields 3-12.
2. Depress **EXECUTE** —0 appears in Fields 10 and 11; clock runs until one pass has been completed. After one pass, the clock stops running and a 1 appears in Field 12.
3. If a 1 appears in Field 10 or 11, use PROC 600 to determine the cause of the alarm/fault. **ENTER**
4. After the alarm/fault cause has been found and corrected, use PROC 612 to clear the alarm record.

PROCEDURE 600, ALARM CAUSE/ERROR LOG

Overview

PROC 600 displays and/or clears the switch alarms detected while running PROC 900, Test 1. It consists of three tests: Test 1 is the alarm order display, Test 2 is the unit type display, and Test 3 displays the cleared alarms.

> ***Note:*** In the X-RAY environment, Unit Type 30 errors indicate that a fuse is blown on the specified GPP board.

Procedure 600, Test 1

This test displays alarms in the following order: Major alarms, Minor alarms, and Warning alarms. Entries in this test constitute switch failures.

1. Enter PROC 600, depress **ENTER** —1 appears in Field 1, dashes appear in Fields 2-15.
2. Depress **EXECUTE** —if there are no alarms, 0 appears in Field 10. If there are alarms, the total is shown in Field 10; dashes appear in Fields 2-9 and 11-15.
3. Depress **NEXT CIRCUIT** —information pertaining to first alarm appears in Fields 2-15. Field 11 will display a 3 indicating that the time displayed in Fields 12-14 is the time the entry in Fields 3-7 was alarmed.
4. Depress **NEXT DATA** —same as Step 3 except 2 appears in Field 11 and the time displayed in Fields 12-14 is the time the first alarm was recorded for the entry in Fields 3-7.
5. Depress **NEXT DATA** —same as Step 3 except 1 appears in Field 11 and the time displayed in Fields 12-14 is the time the last alarm was recorded for the entry in Fields 3-7. Refer to the PROC displayed in Field 15 to repair the alarm shown in Fields 3-7.

Notes:

a. Only two digits are shown in Field 15. They represent the last two digits of a 600-series maintenance PROC. For example, if 20 is displayed in Field 15, that refers to PROC 620.

b. PROC 600 may refer you to PROC 622 for trouble detection, usually in conjunction with Unit Type 30 errors. PROC 622 is not included in the X-RAY tape. Reference to PROC 622 with Unit Type 30 errors usually indicates a fuse is blown on the SN270 board or the board has a power problem.

6. Depress **NEXT CIRCUIT** (if alarm is to be repaired) —information pertaining to next alarm appears in Fields 2-15. Repeat Steps 4 through 6 until all alarms have been repaired.

7. Depress **CLEAR DATA, EXECUTE** (if alarm is to be retired rather than repaired) —information pertaining to alarm appears in Fields 2-9 and 11-15; 5 appears in Field 8.

8. Repeat Step 7 until all alarms have been retired. Retired alarms are not deleted from PMIDS error log. PROC 612 may be used to do this.

Procedure 600, Test 2

This test displays circuits that have alarms logged against them. The alarmed circuits are displayed in numerical sequence and by unit type. This test is entered for diagnostic purposes only, entries unique to this test (as compared to Test 1) are not switch failures.

1. Enter PROC 600, depress **ENTER, NEXT TEST** —2 appears in Field 1; dashes appear in Fields 2-15.

2. Depress **EXECUTE** —0 appears in Field 10 if there are no circuits with recorded alarms. If there are recorded alarms, the total number of circuits with recorded alarms appears in Field 10. Dashes appear in Fields 3-9 and 11-15. Field 2 flashes.

3. Depress **NEXT CIRCUIT** —the first PMIDS entry with recorded alarms is displayed in Fields 2-15. A 1 appearing in Field 11 indicates that the time displayed in Fields 12-14 is the time the last alarm was recorded for the display appearing in Fields 3-7.

4. Depress **NEXT UNIT** —steps to the first entry of the next unit type with recorded alarms. Continuously depressing **NEXT UNIT** steps through the unit types in numerical order.

5. Depress **NEXT DATA** —same as Step 3 except 2 appears in Field 11 and the time displayed in Fields 12-14 is the time the first alarm was recorded for the display appearing in Fields 3-7.

6. Depress **NEXT DATA** —same as Step 3 if this entry was not alarmed. If the entry was alarmed, 3 appears in Field 11 and the time displayed in Fields 12-14 is the time the entry displayed in Fields 3-7 was alarmed. Refer to PROC displayed in Field 15 to correct the fault. If dashes appear in Field 15, no repair is necessary.

   Note: Only two digits are shown in Field 15. They represent the last two digits of a 600-series maintenance PROC. For example, if 20 is displayed in Field 15, that refers to PROC 620.

7. Repeat Steps 3, 4, 5, and 6 until all alarms have been displayed. Same results as Step 3 except Field 10 is decremented.

8. If it is desired to display a particular unit instead of stepping through all units when Field 2 is flashing, enter unit type, depress **ENTER, EXECUTE** —information pertaining to selected unit appears in Fields 3-15.

9. If alarm is to be retired rather than repaired, depress **CLEAR DATA, EXECUTE** —0 appears in Field 8 for displayed unit to indicate the alarm has been retired.

10. If alarms associated with a particular unit are to be retired rather than repaired, enter unit type in Field 2, depress **ENTER, CLEAR DATA, EXECUTE** —0 appears in Field 8 for displayed unit to indicate the alarm has been retired.

Procedure 600, Test 3

This test displays the cleared alarms by unit type in numerical sequence.

1. Enter PROC 600, depress **ENTER, NEXT TEST, NEXT TEST** —3 appears in Field 1; dashes appear in Fields 2-15.

2. Depress **EXECUTE** —0 appears in Field 10 if there are no cleared alarms. If there are cleared alarms, the total number of these alarms appears in Field 10.

3. Depress **NEXT CIRCUIT** —the first PMIDS entry with resolved alarms is displayed in Fields 2-15. A 1 appearing in Field 11 indicates that the time displayed in Fields 12-14 is the time the alarmed entry appearing in Fields 3-7 was resolved.

4. Depress **NEXT UNIT** —steps to the first entry of the next unit type with recorded alarms. Continually depressing **NEXT UNIT** steps through the unit types in numerical order.

5. Depress **NEXT DATA** —same as Step 3 if this entry was not alarmed. If the entry was alarmed, 3 appears in Field 11 and the time displayed in Fields 12-14 is the time the last alarm was recorded for the display appearing in Fields 3-7.

6. Depress **NEXT DATA** —same as Step 3 except 2 appears in Field 11 and the time displayed in Fields 12-14 is the time the first alarm was recorded for the display appearing in Fields 3-7.

7. Repeat Steps 3, 4, 5, and 6 until all cleared alarms associated with unit shown in Field 2 have been displayed. Same results as Step 3 except Field 10 is decremented.

8. If it is desired to display a particular unit instead of stepping through all units, depress **CHANGE FIELD**, dial **2**, depress **ENTER**; enter unit type, depress **ENTER, EXECUTE** —information pertaining to selected unit appears in Fields 3-15.

9. If the individual cleared alarm is to be cleared (zeroed out), depress **CLEAR DATA, EXECUTE** —0 appears in Field 8 for displayed unit to indicate no cleared alarms exist.

10. To clear (zero out) all cleared alarms, display and record all alarms (Steps 3 through 6). Depress **CHANGE FIELD**, dial **2**, depress **ENTER, CLEAR DATA, EXECUTE** —0 appears in Field 10 indicating no cleared alarms exist.

◗PROCEDURE 210◖

FLIPCHART ISSUE 1 + + CONSOLE EQUIPMENT LOCATION + + 844176776

INPUT FIELDS:

DISPLAY: 1
ADD: 1-9 SEE NOTE 1
REMOVE: AFTER DISPLAY ONLY SEE NOTE 3
CHANGE 2-6 OR 7-9 SEE NOTE 2

NOTES:

1. IN MULTI-CONSOLE SYSTEMS, THE CONSOLES MUST BE NUMBERED CONSECUTIVELY. DO NOT LEAVE GAPS
2. EITHER THE ATTENDANT INTERFACE LOC OR DATA CHANNEL EQUIP LOC BUT NOT BOTH CAN BE CHANGED.
3. ONLY HIGHEST NUMBER CONSOLE CAN BE REMOVED.

FIELD 7: 0 = CONTROL CARRIER

SPECIAL ERROR CODES.
81-SEE NOTE 1
82-SEE NOTE 2
83-SEE NOTE 3

WORD 1	ATTENDANT INTERFACE EQUIPMENT LOCATION					DATA CHANNEL EQUIPMENT LOCATION			CONSOLE EQUIPMENT LOCATION
CONSOLE NUMBER	MODULE	CABINET	CARRIER	SLOT	CIRCUIT	CARRIER	SLOT	CIRCUIT	210
1	2	3	4	5	6	7	8	9	

Field Definition and Codes

Each field of PROC 210 and the displays in the fields during execution are shown in Table G.

TABLE G. PROC 210, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION		
1	1-40	Console number		
2	0-30	Attendant interface equipment location	Module number	
3	0-7		Cabinet number	
4	0-3		Carrier number	
5	0-21		Slot number of SN223 Circuit Pack	
6	0-3		Circuit number	
7	0-2	Data Channel equipment location	Carrier no.	0—Control Carrier
				1—I/O growth in Control Carrier
				2—I/O Growth Carrier
8	30-38		Slot no.	If Field 7=0
	20-33			If Field 7=1
	20-33			If Field 7=2
9	0-3		Circuit number	

Description of Procedure

PROC 210 assigns the attendant interface equipment location plus the data channel associated with each attendant console.

MAAP Control Keys

The following MAAP keys are valid for use with PROC 210:

- **ADD** - To add displayed data.
- **CHANGE** - To enter specific data changes.
- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR ENTRY** - Clears last field entered.
- **DISPLAY** - To display data.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start or restart a test.
- **PROC NO.** - To select a procedure.
- **REMOVE** - To remove displayed data.
- **RESET** - To return procedure to original condition.

◗PROCEDURE 600, TEST 1◖

FLIPCHART ISSUE 1 + + ALARM CAUSES/ERROR LOG + + 844176776

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', 'EXECUTE' TO RETIRE ALARM FOR DISPLAYED ENTRY OR ALL ALARMS WHEN EXECUTED WITH A SUMMARY DISPLAYED.

TEST 2: DISPLAYS FAILURE HISTORY FOR CIRCUITS WHICH HAVE BEEN ALARMED OR WHICH HAVE ERRORS RECORDED BY UNIT TYPE. USE 'NEXT CIRCUIT' TO DISPLAY NEXT FAILED CIRCUIT. USE 'NEXT UNIT' TO SELECT NEXT UNIT TYPE. USE 'NEXT DATA' TO DISPLAY NEXT TIME STAMP. USE 'CLEAR DATA,' 'EXECUTE' TO CLEAR FAILURE HISTORY OF THE DISPLAYED LOCATION OR ALL ENTRIES FOR THE ENTERED UNIT TYPE.

TEST 3: DISPLAYS RESOLVED ALARMED ENTRIES BY UNIT TYPE. USE 'NEXT CIRCUIT' TO DISPLAY NEXT RESOLVED CIRCUIT. USE 'NEXT UNIT' TO DISPLAY NEXT UNIT TYPE. USE 'NEXT DATA' TO DISPLAY NEXT TIME STAMP. USE 'CLEAR DATA,' 'EXECUTE' TO CLEAR FAILURE HISTORY FOR DISPLAYED ENTRY OR ALL ENTRIES WHEN EXECUTED WITH A DASH IN FIELD 2.

TEST NO	TEST 2 & 3	EQUIPMENT LOCATION					ALARM STATUS	TOTAL FAILS	CIRCUIT ENTRY INDEX	TIME STAMP				PROC REFER.	GENERAL SYSTEM
	UNIT TYPE	MODULE OR STATUS MEMORY	CABINET	CARRIER	SLOT	CIRCUIT				STAMP INDEX	DAY	HOUR	MINUTE		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	600

FLIPCHART ISSUE 3 + + ALARM CAUSES/ERROR LOG + + 844176776

UNIT TYPE (FIELD 2):
1 = ENVIRONMENT
2 = TAPE
3 = INIT CAUSES
4 = COMMON CONTROL I/O
5 = MEMORY
6 = MODULE CONTROL CHANNEL
7 = TMS/MODULE PROCESSOR
8 = MAINT INTERFACE
9 = MODULE CLOCK
10 = TSI ALU
11 = TSI PSTORE
12 = I/O BUS INTERFACE
13 = PORT DATA STORE
14 = PORT CONTROL INTERFACE
15 = PORT DATA INTERFACE
16 = TONE PLANT
17 = ATTENDANT CONSOLE
18 = CACHE
19 = DCIU
20 = SMDR
21 = ANI
22 = PROCESSOR DUPLICATION
23 = TMS/NETWORK DUPLIC.
24 = TT SENDER
25 = TT RECEIVER
26 = NETWORK I/O
27 = GENERAL PURPOSE PORT
28 = 72 SERIES (MFET) PORT
29 = LINE CIRCUIT
30 = EVEN PORT PERIPHERALS
31 = AUXILIARY TONE PLANT
32 = CO TRUNK
33 = DID TRUNK
34 = TIE TRUNK/DATA PORT
35 = DIGITAL TRUNK
36 = DIGITAL USER PROBLEM
37 = CALLING NUMBER DISPLAY
38 = REAL TIME CLOCK SYNC
39 = FADS DISPLAY
40 = NON-NETWORK PERIPHERALS
41 = TRUNK, SOFTWARE
42 = CALLS ABORTED
43 = STATUS MEMORY AUDITS
44 = ATTENDANT CONSOLE INTF
45 = AUXILIARY TRUNK
46 = ATTENDANT CONFERENCE
47 = FACILITY TEST CIRCUIT
48 = ODD PORT PERIPHERALS
49 = MAINT. AND ADMIN. PANEL
50 = TMS CLOCK OSCILATOR
51 = LOCAL CLOCK TERMINATION
52 = SYSTEM CLOCK SYNC.
53 = MULTIPLEXER
54 = FANOUT
55 = MODULE INTERFACE
56 = INTERMODULE DATA STORE
57 = LIGHT GUIDE INTERFACE
58 = FANIN
59 = TMS MAINTENANCE
60 = DIAGNOSTIC PROCESSOR/ REMOTE INTERFACE
61 = CONFIGURATION AUDITS
62 = ANALOG/DIGITAL FACILITY TST
63 = EXTERNAL EQUIPMENT
64 = EXTERNAL PROCESSOR
65 = MODEM POOLING
66 = TONE DETECTOR 2
67 = UNDEFINED EXCEPTION FIFO CODE
68 = DS1 69 = MFAT
70 = AUTOMATIC TRANS. MEASUREMENT SYSTEM
71 = REMOTE MODULE INTERFACE
72 = EIA

ALARM STATUS (FIELD 8):
0 = NO ERRORS RECORDED
1 = MAJOR
2 = MINOR
3 = WARNING
4 = ERRORS RECORDED
5 = ALARM RESOLVED

WORD 0

NOTE: THE TEST NUMBER CAN ONLY BE CHANGED BY 'NEXT TEST'.

STAMP INDEX (FIELD 11):
1 = TIME OF MOST RECENT ERROR/ TIME ALARM RESOLVED
2 = TIME WHEN ERROR BEGINS
3 = TIME WHEN ERROR WAS ALARMED

GENERAL SYSTEM 600

Field Definition and Codes

Each field of PROC 600 and the displays in the fields during the execution of Test 1 are shown in Table H.

Description of Test

This test displays alarms in the following order: Major alarms, Minor alarms and Warning alarms. The alarms in each category are displayed in numerical order by unit type and in ascending order. Entries in this test constitute switch failures.

TABLE H. PROC 600, TESTS 1, 2, AND 3, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION		
1	1-3	Test number		
2	1-72	Unit type (See flipchart for codes)		
3	0-30,99	Equipment location	Module or status memory	
4	0-7		Cabinet	
5	0-3		Carrier	
6	0-31		Slot	
7	0-7		Circuit	
8	0-5	Alarm status	0—No errors recorded	
			1—Major	
			2—Minor	
			3—Warning	
			4—Errors recorded	
			5—Alarm resolved	
9	0-999	Total failures recorded for display error log entry		
10	0-99	Circuit Entry Index	Summary of	Alarmed circuits (Test 1)
				Circuits with recorded errors (Test 2)
				Resolved alarmed entries (Test 3)
11	0-3	Time stamp	Stamp index	1—Time most recent error/ time alarm was resolved
				2—Time error begins
				3—Time error was alarmed
12	0-31		Day	
13	0-23		Hour	
14	0-59		Minute	
15	0-99	PROC Reference *		

* The two digits displayed are the last two digits of a maintenance PROC containing detailed information about the cause of the displayed error log entry.

MAAP Control Keys

The following MAAP keys are valid for use with Test 1:

- **CLEAR DATA** - The sequence **CLEAR DATA, EXECUTE** retires the alarm for the displayed entry.
- **CLEAR ENTRY** - Clears last field entered.
- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start or restart test.
- **NEXT CIRCUIT** - To display next alarmed circuit.
- **NEXT DATA** - To display next time stamp.
- **NEXT TEST** - To step to the next test.
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.
- **STOP** - To stop test.

PROCEDURE 600, TEST 2

Field Definition and Codes

Each field of PROC 600 and the displays in the fields during the execution of Test 2 are shown in Table H.

Description of Test

This test displays alarmed circuits and circuits with errors logged against them in numerical sequence and by unit type. It is used for diagnostic purposes only. Entries unique to this test (as compared to Test 1) are not switch failures.

MAAP Control Keys

The following MAAP keys are valid for use with Test 2:

- **CLEAR DATA** - The sequence **CLEAR DATA, EXECUTE** retires the alarm for the displayed entry.
- **CLEAR ENTRY** - Clears the last field entered.
- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start or restart a test.
- **NEXT CIRCUIT** - To display next failed circuit.
- **NEXT DATA** - To display next time stamp.
- **NEXT TEST** - To step to next test.
- **NEXT UNIT** - To select next unit type.
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.
- **STOP** - To stop test.

PROCEDURE 600, TEST 3

Field Definition and Codes

Each field of PROC 600 and the displays in the fields during the execution of Test 3 is shown in Table H.

Description of Test

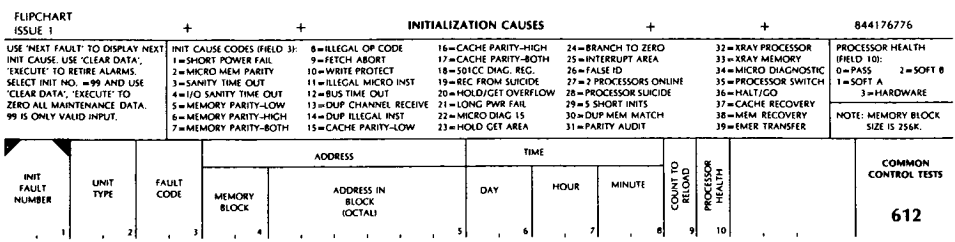
This test displays cleared alarms by unit type and in numerical sequence. It can turn off (zero) an individual alarm indicator or all alarm indicators.

MAAP Control Keys

The following MAAP keys are valid for use with Test 3:

- **CLEAR DATA** - The sequence **CLEAR DATA, EXECUTE** clears the failure history for the displayed entry.
- **CLEAR ENTRY** - Clears the last field entered.
- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start or restart a test.
- **NEXT CIRCUIT** - To display next resolved circuit.
- **NEXT DATA** - To display next time stamp.
- **NEXT TEST** - To step to next test.
- **NEXT UNIT** - To display next unit type.
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.
- **STOP** - To stop test.

PROCEDURE 612



Field Definition and Codes

Each field of PROC 612 and the displays in the fields during execution are shown in Table I.

Description of Procedure

This procedure is used to clear all maintenance data (failure history) from memory and turn off any lighted fault indicators.

MAAP Control Keys

The following MAAP keys are valid for use with PROC 612:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR DATA** - The sequence **CLEAR DATA, EXECUTE** will retire alarms or zero maintenance data.
- **ENTER** - To enter a data input.
- **EXECUTE** - To display failure history.
- **NEXT FAULT** - To display initialization fault code.
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.

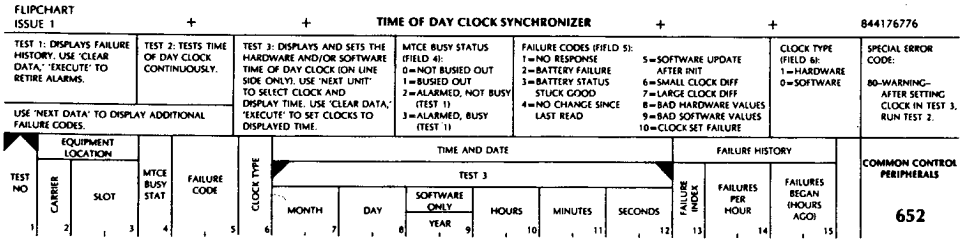
TABLE I. PROC 612, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION
1		Initialization number:
	0	Summary
	1-18	Different causes
	99	Used only to clear all failure history in PMIDS
2		Unit type:
	3	Initialization
	5	Main memory
	18	Cache
3		Fault codes; initialization causes associated with codes 1-18 in Field 1:
	1	Short power failure
	2	Micro memory parity
	3	Sanity timeout
	4	Input/output sanity timeout
	5	Memory parity-low
	6	Memory parity-high
	7	Memory parity-both
	8	Illegal operation code
	9	Fetch abort
	10	Write protect
	11	Illegal micro instruction
	12	Bus timeout
	13	Duplication channel receive
	14	Duplication illegal instruction
	15	Cache parity-low
	16	Cache parity-high
	17	Cache parity-both
	18	501CC diagnostic register loaded while 501CC is running
	19	Recovery from suicide
	20	Hold/get overflow
	21	Long power failure
	22	Microdiagnostic Test 15 executed
	23	Hold/get area overflow or underflow
	24	Branch to zero error
	25	Interrupt area
	26	False identification
	27	Two processors on line
	28	Processor suicide
	29	Five short initializations
	30	Duplication memory match failure
	31	Parity error during audit
	32	X-ray test detected processor failure
	33	X-ray test detected memory failure
	34	Microdiagnostic detected failure

TABLE I(Contd). PROC 612, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION
3 (Cont)	35	Processor switch
	36	Halt/go
	37	Cache turned off for recovery
	38	Memory error turned off for recovery
	39	Emergency transfer
4	0-77	Failed memory block location
5	0-777777	Octal address in memory block
		Time stamp; displays time first error occurred for the fault logged in PMIDS:
6	1-31	Day of the month
7	0-23	Hour of the day
8	0-59	Minute of the hour
9	0-5	Count to reload: An indicator of the seriousness of the initialization causes leading to a memory reload
10		Processor health status:
	0	No failure
		Codes 1-3 apply to duplicated systems only:
	1	Software A failure; minor
	2	Software B failure; possible problem in switching processors
	3	Hardware failure

PROCEDURE 652, TEST 2



Field Definition and Codes

Each field of PROC 652 and the displays in the fields during the execution of Test 2 are shown in Table J.

Description of Test

This test continuously tests the time-of-day clock and software buffer.

MAAP Control Keys

The following MAAP keys are valid for use with Test 2:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start or restart a test.
- **NEXT DATA** - To step through failure codes.
- **NEXT TEST** - To step to next test.
- **PROC NO.** - To select a procedure.
- **STOP** - To stop a test.

TABLE J. PROC 652, TEST 2, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION	
1	1-3	Test number	
2	0-3	Equipment location	Carrier number
3	0-32		Slot number
4	0-3	Maintenance busy status	0—Not busied out
			1—Busied out
5	1-10	Failure codes	1—No response
			2—Battery failure
			3—Battery status stuck good
			4—No charge since last read
			5—Software update after initialization
			6—Small clock difference
			7—Large clock difference
			8—Bad hardware values
			9—Bad software values
			10—Clock set failure
6	0-1	Clock type	0—Software
			1—Hardware
7	1-12	Time and date	Month
8	1-31		Day
10	0-23		Hours
11	0-59		Minutes
12	0-59		Seconds

PROCEDURE 652, TEST 3

Field Definition and Codes

Each field of PROC 652 and the displays in the fields during the execution of Test 3 are shown in Table K.

TABLE K. PROC 652, TEST 3, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION	
1	1-3	Test number	
2	0-3	Equipment location	Carrier number
3	0-32		Slot number
4	0-3	Maintenance busy status	0—Not busied out
			1—Busied out
6	0-1	Clock type	0—Software
			1—Hardware
7	1-12	Time and date	Month
8	1-31		Day
9	0-99		Year (software only)
10	0-23		Hours
11	0-59		Minutes
12	0-59		Seconds

Description of Test

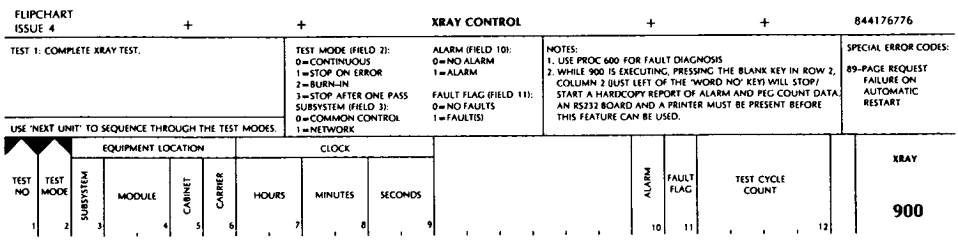
This test displays and sets the software and time-of-day clock.

MAAP Control Keys

The following MAAP keys are valid for use with Test 3:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR DATA** - The sequence **CLEAR DATA, EXECUTE** sets the clock to the displayed time.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start or restart a test.
- **NEXT TEST** - To step to next test.
- **NEXT UNIT** - To select clock and display time.
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.

◗PROCEDURE 900, TEST 1◖



Field Definition and Codes

Each field of PROC 900 and the displays in the fields during the execution of Test 1 are shown in Table L.

Description of Test

This test is used after PROC 901 has been run. It tests the switch common control and network systems in Continuous, Stop-on-Error, Burn-in, or Stop-after-one-pass modes. A clock maintains a record of the time the test has run. The TEST CYCLE COUNT (Field 12) is incremented at the completion of each test cycle. If the switch is equipped with a local printer, PROC 900 has the capability to provide a hard copy of the error log (same as the information displayed on the MAAP by PROC 600).

MAAP Control Keys

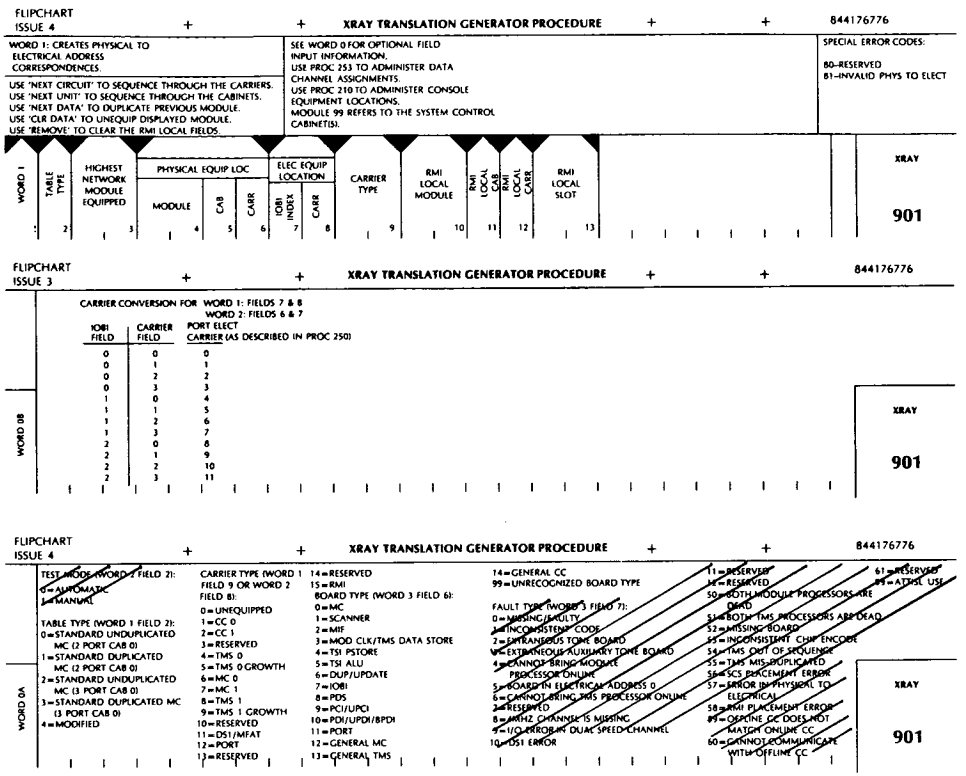
The following MAAP keys are valid for use with Test 1:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR ENTRY** - Clears last field entered.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start or restart test.
- ◗**PRINT** - To print an alarm report on a local printer (unmarked blue key, second col, second row)◖
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.
- **STOP** - Use to stop test before depressing **RESET** or **PROC NO.**.

TABLE L. PROC 900, TEST 1, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION	
1	1-3	Test number	
2	0-3	Test mode	0—Continuous
			1—Stop-on-error
			2—Burn-in
			3—Stop after one pass
3	0-1	Subsystem	0—Common control
			1—Network
4	0-30	Equipment location	Identifies module in which testing is occurring
5	0-3		Identifies cabinet in which testing is occurring
6	0-3		Identifies carrier in which testing is occurring
7	0-23	Clock	Hours elapsed since test was started
8	0-59		Minutes elapsed since test was started
9	0-59		Seconds elapsed since test was started
10	0-1	Alarm	0—No alarm detected
			1—Alarm detected
11	0-1	Fault flag	0—No faults detected
			1—One or more faults detected
12	0-999	Test cycle counts number of times Test 1 has run successfully	

◗PROCEDURE 901, WORD 1◖



Field Definition and Codes

Each field of PROC 901 and the displays in the fields during the execution of Word 1 are shown in Table M.

Description of Word

This word establishes physical to electrical address correspondences when a cabling scheme other than the standard configuration is used. The physical addresses are displayed sequentially on the MAAP. This allows the corresponding electrical address and carrier type to be changed as required.

TABLE M. PROC 901, WORD 1, FIELD DEFINITION AND CODES

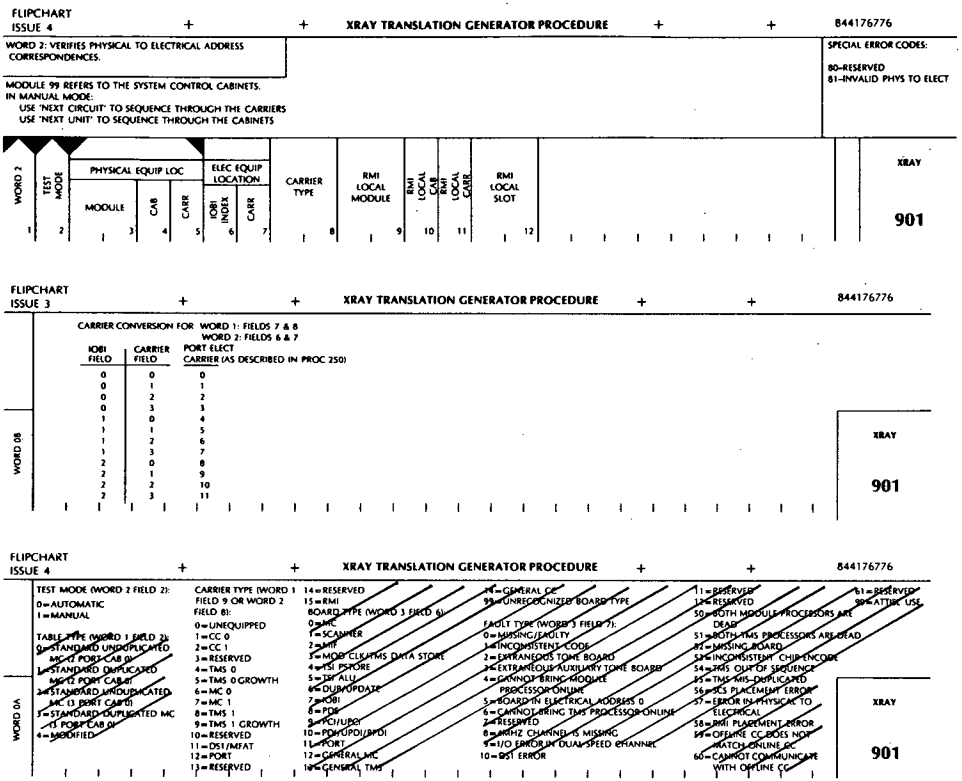
FIELD	RANGE	DEFINITION	
1	1-3	Word number	
2	0-6	Table type	0—Standard unduplicated MC (2 port CAB 0)
			1—Standard duplicated MC (2 port CAB 0)
			2—Standard unduplicated MC (3 port CAB 0)
			3—Standard duplicated MC (3 port CAB 0)
			4—Modified
3	0-30	Highest network module equipped	
4	0-30,99	Physical equipment location	Module
5	0-3		Cabinet
6	0-3		Carrier
7	0-2	Electrical equipment location	IOBI index
8	0-3		Carrier
9	0-15	Carrier type	0—Unequipped
			1—CC 0
			2—CC 1
			3—Reserved
			4—TMS 0
			5—TMS growth
			6—MC 0
			7—MC 1
			8—TMS 1
			9—TMS 1 growth
			10—Reserved
			11—DS-1/MFAT
			12—Port
			13—Reserved
			14—Reserved
			15—RMI
10	0-99	RMI local	Module
11	0-3		Cabinet
12	0-3		Carrier
13	0-31		Slot

MAAP Control Keys

The following MAAP keys are valid for use with Word 1:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR DATA** - Fills current module as unequipped starting at displayed location.
- **CLEAR ENTRY** - Clears last field entered before **ENTER** is depressed.
- **ENTER** - To enter a data input.
- **EXECUTE** - To make transition from Fields 2-6 to Fields 7-13
- **NEXT CIRCUIT** - To step through the physical addresses of each carrier in the switch.
- **NEXT DATA** - Duplicates preceding module as the current module starting at displayed location.
- **NEXT UNIT** - To step to the first carrier of the next cabinet in the switch.
- **PROC NO.** - To select a procedure.
- **REMOVE** - Removes the RMI local information from the currently displayed carrier.
- **RESET** - Returns procedure to initial condition.
- **WORD NO.** - Invokes a default display and prepares the procedure for a word number to be input. Also, use to advance to the next word.

PROCEDURE 901, WORD 2



Field Definition and Codes

Each field of PROC 901 and the possible displays in the fields during the execution of Word 2 is shown in Table N.

Description of Word

This word verifies the port carrier physical to electrical address correspondences established in Word 1. This is done by sequencing through the port carriers of the switch to light the IOBI, UPCI, and UPDI LEDs on the corresponding port carriers. This displays the physical and electrical address of each carrier on the MAAP. The word is executed in either manual or automatic mode.

TABLE N. PROC 901, WORD 2, FIELD DEFINITION AND CODES

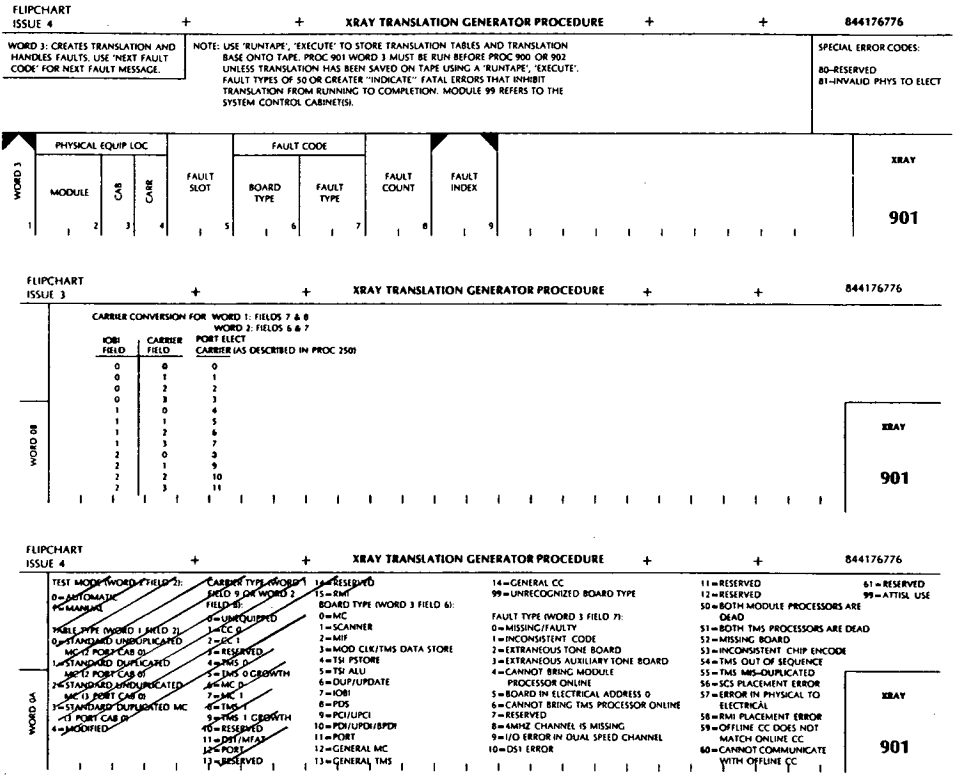
FIELD	RANGE	DEFINITION	
1	1-3	Word number	
2	0-1	Test mode	0—Automatic
			1—Manual
3	0-30,99	Physical equipment location	Module
4	0-3		Cabinet
5	0-3		Carrier
6	0-2	Electrical equipment location	IOBI index
7	0-3		Carrier
8	0-15	Carrier type	0—Unequipped
			1—CC 0
			2—CC 1
			3—Reserved
			4—TMS 0
			5—TMS growth
			6—MC 0
			7—MC 1
			8—TMS 1
			9—TMS 1 growth
			10—Reserved
			11—DS-1/MFAT
			12—Port
			13—Reserved
			14—Reserved
			15—RMI
9	0-99	RMI local	Module
10	0-3		Cabinet
11	0-3		Carrier
12	0-31		Slot

MAAP Control Keys

The following MAAP keys are valid for use in Word 2:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR ENTRY** - Clears last field entered before **ENTER** is depressed.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start cycling through the carriers (manual or automatic).
- **NEXT CIRCUIT** - To step through the physical addresses of the carriers in the switch when in the manual test mode.
- **NEXT UNIT** - To step to the first carrier of the next cabinet in the switch.
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.
- **STOP** - To stop test. This is valid only in the automatic test mode.
- **WORD NO.** - Invokes a default display and prepares the procedure for a word number to be input. Also, use to advance to the next word.

◗PROCEDURE 901, WORD 3◖



Field Definition and Codes

Each field of PROC 901 and the displays in the fields during the execution of Word 3 are shown in Table O.

Description of Word

This word interrogates each module to determine the hardware contained in the switch. The switch hardware status allows the translation tables to be filled to the extent required to support the X-RAY tests.

TABLE O. PROC 901, WORD 3, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION		
1	1-3	Word number		
2	0-30,99	Physical equipment location	Module	
3	0-3		Cabinet	
4	0-3		Carrier	
5	0-99	Fault slot		
6	0-99	Fault code	Board type	0—MC
				1—Scanner
				2—MIF
				3—Mod clk/TMS data store
				4—TSI PSTORE
				5—TSI ALU
				6—Dup/Update
				7—IOBI
				8—PDS
				9—PCI/UPCI
				10—PDI/UPDI/BPDI
				11—Port
				12—General MC
				13—General TMS
				14—General CC
				99—Unrecognized board type
7	0-99	Fault code	Fault type	0—Missing/faulty
				1—Inconsistent code
				2—Extraneous tone board
				3—Extraneous auxiliary tone board
				4—Cannot bring module processor on line
				5—Board in electrical address 0

TABLE O(Contd). PROC 901, WORD 3, FIELD DEFINITION AND CODES

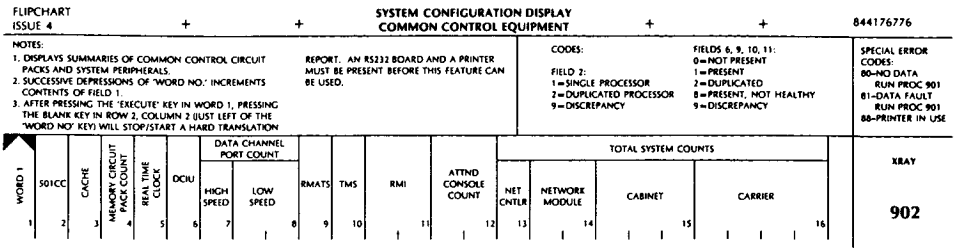
FIELD	RANGE	DEFINITION		
7 (Contd)	0-99	Fault code	Fault type	6—Cannot bring TMS processor on line
				7—Reserved
				8—4 MHZ Channel missing
				9—I/O error in dual speed channel
				10—DS-1 error
				11—Reserved
				12—Reserved
				50—Both module processors are dead
				51—Both TMS processors are dead
				52—Missing board
				53—Inconsistent chip encode
				54—TMS out of sequence
				55—TMS misduplicated
				56—Error in SCS placement
				57—Error in physical to electrical
				58—RMI placement error
				59—Offline CC does not match with online CC
				60—Cannot communicate with offline CC
				61—Reserved
				99—ATTISL use
8	0-99	Fault count—indicates number of faults which have occurred		
9	0-99	Fault index—index of associated faults		

MAAP Control Keys

The following MAAP keys are valid for use with Word 3:

- **CLEAR ENTRY** - Clears last field entered before **ENTER** is depressed.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start generating translations.
- **NEXT FAULT** - Displays next fault message if errors occur during translations.
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.
- **RUN TAPE, EXECUTE** - To store translation tables and translation base onto tape.
- **WORD NO.** - Invokes a default display and prepares the procedure for a word number to be input. Also, use to advance to the next word.

▶PROCEDURE 902, WORD 1◀



Field Definition and Codes

Each field of PROC 902 and the displays in the fields during the execution of Word 1 are shown in Table P.

Description of Word

This word displays summaries of common control circuit packs and switch peripherals. It provides the total count of all hardware (modules, cabinets, and carriers) translated in the switch.

MAAP Control Keys

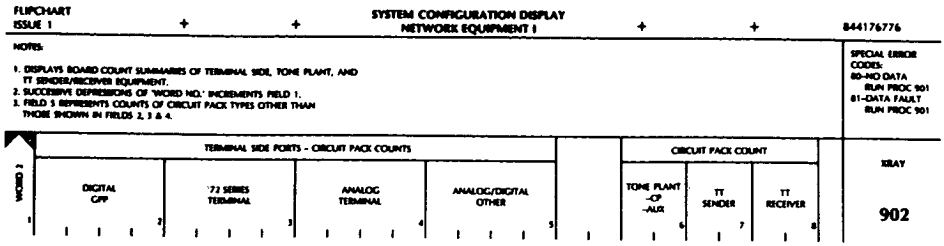
The following MAAP keys are valid for use with Word 1:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR ENTRY** - Clears last field entered.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start a word.
- ▶**PRINT** - To print a configuration report on a local printer (unmarked blue key, second col, second row).◀
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.
- **WORD NO.** - Invokes a default display and prepares the procedure for a word number to be input. Also, use to advance to the next word.

TABLE P. PROC 902, WORD 1, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION	
1	1-3	Word number	
2	1,2,9	501CC	1—Single processor
			2—Two processors
			9—Discrepancy
3	0,1,8	CACHE	0—Not equipped
			1—Equipped
			8—Discrepancy
4	0-8	Memory circuit pack count	
5	0-9	Real time clock	0—Not present
			1—Present
6	0,1,2,8,9	DCIU	0—Not present
			1—Present
			2—Duplicated
			8—Present, not healthy
			9—Discrepancy
7	0-8	Data channel port count	High speed
8	0-48		Low speed
9	0,1,2,8,9	RMATS	0—Not present
			1—Present
10		TMS	2—Duplicated
11		RMI	8—Present, not healthy
			9—Discrepancy
12	0-40	Attendant console count	
13	0-4	Total system count	Network controllers (TN402)
14	0-30		Modules
15	0-180		Cabinets
16	0-720		Carriers

▶PROCEDURE 902, WORD 2◀



Field Definition and Codes

Each field of PROC 902 and the displays in the fields during the execution of Word 2 are shown in Table Q.

TABLE Q. PROC 902, WORD 2, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION	
1	1-9	Word number	
2	0-448	Terminal side ports-circuit pack count	Digital GPP
3			72 Series Terminal
4			Analog Terminal
5			Analog/Digital Other
6	0-61	Circuit pack count	Tone plant, CP, and Aux tones
7	0-20		TT Senders
8	0-50		TT Receivers

Description of Word

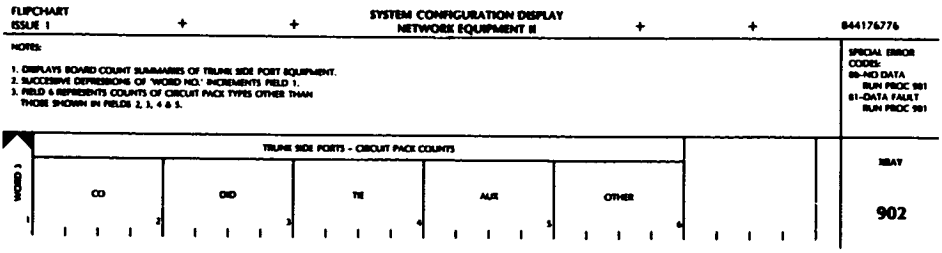
This word displays the terminal side port circuit pack count of the network hardware. This includes terminal side, tone plant, and touch-tone sender and receiver equipment.

MAAP Control Keys

The following MAAP keys are valid for use with Word 2:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR ENTRY** - Clears last field entered.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start or restart a word.
- **WORD NO.** - Invokes a default display and prepares the procedure for a word number to be input. Also, use to advance to the next word.
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.

◗PROCEDURE 902, WORD 3◖



Field Definition and Codes

Each field of PROC 902 and the displays in the fields during the execution of Word 3 are shown in Table R.

TABLE R. PROC 902, WORD 3, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION	
1	1-9	Word number	
2	0-384	Trunk side ports-circuit pack count	CO Trunk
3			DID Trunk
4			TIE Trunk
5			AUX Trunk
6			Other

Description of Word

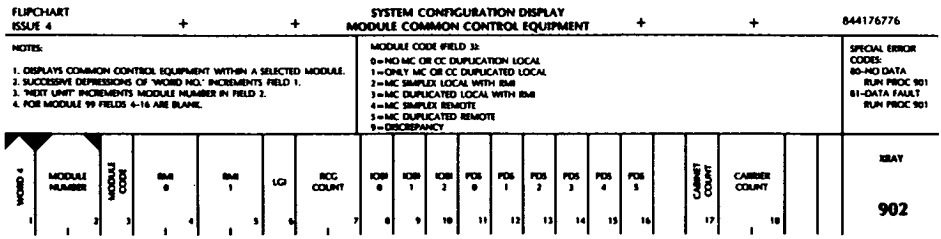
This word displays the total count of trunk side port circuit packs in the switch.

MAAP Control Keys

The following MAAP keys are valid for use with Word 3:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR ENTRY** - Clears last field entered.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start or restart a word.
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.
- **WORD NO.** - Invokes a default display and prepares the procedure for a word number to be input. Also, use to advance to the next word.

▶PROCEDURE 902, WORD 4◀



Field Definition and Codes

Each field of PROC 902 and the displays in the fields during the execution of Word 4 are shown in Table S.

Description of Word

This word displays the common control equipment (circuit packs, cabinets, and carriers) count within a selected module.

MAAP Control Keys

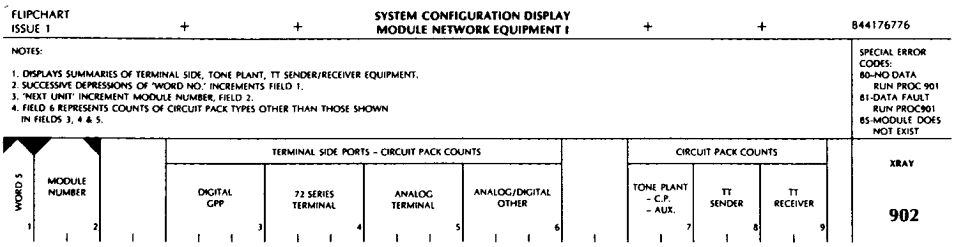
The following MAAP keys are valid for use with Word 4:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR ENTRY** - Clears last field entered.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start or restart a word.
- **NEXT UNIT** - To step through switch modules.
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.
- **WORD NO.** - Involves a default display and prepares the procedure for a word number to be input. Also, use to advance to the next word.

TABLE S. PROC 902, WORD 4, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION	
1	1-9	Word number	
2	0-30	Module number	
3	0,1,2,3,9	Module code	0—◗No MC or CC duplication local◖
			1—◗Only MC or CC duplicated local◖
			2—◗MC simplex, local with RMI◖
			3—◗MC duplicated, local with RMI◖
			4—◗MC simplex remote◖
			5—◗MC duplicated remote◖
			9—Discrepancy
4	0-3	Circuit pack count	RMI 0
5	0-6		RMI 1
6	0-1	Light Guide Interface	0—Unequipped
			1—Equipped
7	0-99	Remote carrier ◗group◖ count	
8-10	—	IOBI Code	
11-16	—	PDS Code	
17	0-7	Cabinet count	
18	0-28	Carrier count	

PROCEDURE 902, WORD 5



Field Definition and Codes

Each field of PROC 902 and the displays in the fields during the execution of Word 5 are shown in Table T.

TABLE T. PROC 902, WORD 5, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION	
1	1-9	Word number	
2	0-30	Module number	
3	0-399	Terminal side ports-circuit pack count	Digital GPP
4			72 Series Terminal
5			Analog Terminal
6			Analog/Digital Other
7	0-2	Circuit pack count	Tone Plant, CP, and Aux Tones
8			TT Sender
9			TT Receiver

Description of Word

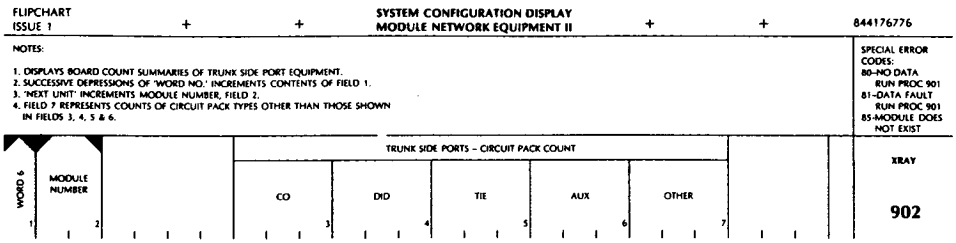
This word displays the terminal side port circuit pack counts. The terminal equipment, tone plant, and touch-tone receiver/sender equipment in each module are displayed. The module number is manually incremented by a button push to display each module in the switch.

MAAP Control Keys

The following MAAP keys are valid for use with Word 5:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR ENTRY** - Clears last field entered.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start or restart a word.
- **NEXT UNIT** - To step through switch modules.
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.
- **WORD NO.** - Invokes a default display and prepares the procedure for a word number to be input. Also, use to advance to the next word.

PROCEDURE 902, WORD 6



Field Definition and Codes

Each field of PROC 902 and the displays in the fields during the execution of Word 6 are shown in Table U.

TABLE U. PROC 902, WORD 6, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION	
1	1-9	Word number	
2	0-30	Module number	
3	0-99	Trunk side ports-circuit pack count	CO Trunk
4			DID Trunk
5			TIE Trunk
6			AUX Trunk
7			Other

Description of Word

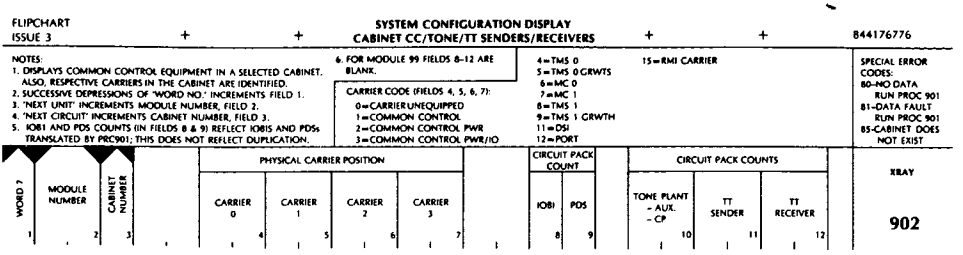
This word displays the circuit pack count of the various types of trunk side equipment in a module. The module number is incremented by a button push to display all trunk side port equipment in the switch.

MAAP Control Keys

The following MAAP keys are valid for use with Word 6:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR ENTRY** - Clears last field entered.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start or restart a word.
- **NEXT UNIT** - To step through switch modules.
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.
- **WORD NO.** - Invokes a default display and prepares the procedure for a word number to be input. Also, use to advance to the next word.

▶PROCEDURE 902, WORD 7◀



Field Definitions and Codes

Each field of PROC 902 and the displays in the fields during the execution of Word 7 are shown in Table V.

Description of Word

This word displays the common control equipment in a selected cabinet. Included in the counts are circuit packs, carriers, tone plant, and touch-tone sender/receiver equipment. The cabinet and module numbers are incremented manually by a button push.

MAAP Control Keys

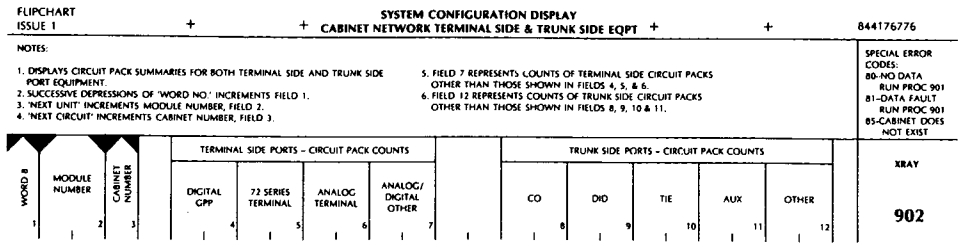
The following MAAP keys are valid for use with Word 7:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR ENTRY** - Clears last field entered.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start or restart a word.
- **NEXT CIRCUIT** - To step through the cabinets of the switch.
- **NEXT UNIT** - To step through the modules of the switch.
- **PROC NO.** - To select or restart a procedure.
- **RESET** - Returns procedure to initial condition.
- **WORD NO.** - Invokes a default display and prepares the procedure for a word number to be input. Also, use to advance to the next word.

TABLE V. PROC 902, WORD 7, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION	
1	1-9	Word number	
2	0-30	Module number	
3	0-7	Cabinet number	
4-7	◗0-9, 11-15◖	Physical carrier position	0—Carrier unequipped
			1—CC
			2—◗CC power◖
			3—◗CC power I/O◖
			4—TMS 0
			5—TMS 0 Growth
			6—MC 0
			7—MC 1
			8—TMS 1
			9—TMS 1 Growth
			11—DS-1
			12—Port
			15—RMI Carrier
8	0-3	Circuit pack count	IOBI
9	0-6		PDS
10	0-2	Circuit pack count	Tone Plant, Aux, CP
11			TT Sender
12			TT Receiver

PROCEDURE 902, WORD 8



Field Definition and Codes

Each field of PROC 902 and the displays in the fields during the execution of Word 8 are shown in Table W.

TABLE W. PROC 902, WORD 8, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION	
1	1-9	Word number	
2	0-30	Module number	
3	0-7	Cabinet number	
4	0-99	Terminal side ports-circuit pack count	Digital GPP
5			72 Series Terminal
6			Analog Terminal
7			Analog/Digital Other
8	0-99	Trunk side ports-circuit pack count	CO Trunk
9			DID Trunk
10			TIE Trunk
11			AUX Trunk
12			Other

Description of Word

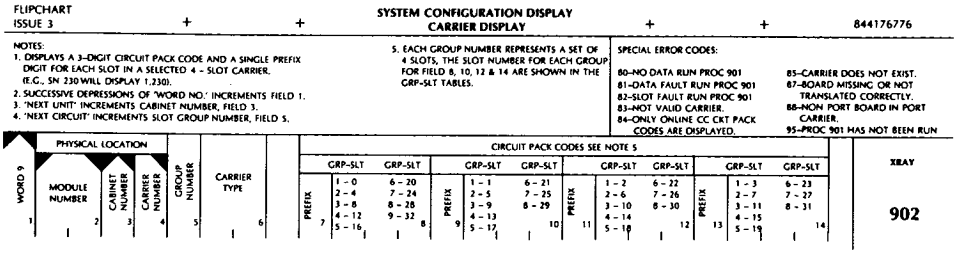
This word displays the terminal side and trunk side circuit pack counts of a selected cabinet.

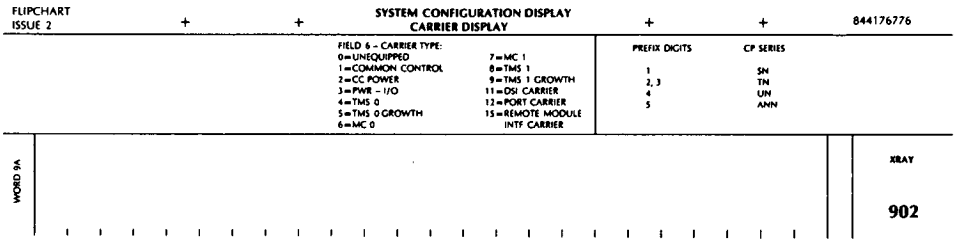
MAAP Control Keys

The following MAAP keys are valid for use with Word 8:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR ENTRY** - Clears last field entered.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start or restart a word.
- **NEXT CIRCUIT** - To step through cabinets of the module.
- **NEXT UNIT** - To step through modules of the switch.
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.
- **WORD NO.** - Invokes a default display and prepares the procedure for a word number to be input. Also, use to step to the next word.

◗PROCEDURE 902, WORD 9◖





Field Definition and Codes

Each field of PROC 902 and the displays in the fields during the execution of Word 9 are shown in Table X.

Description of Word

Each carrier (including port carriers) is divided into four slot groups. This word displays the 3-digit circuit pack code for each slot in any selected slot group.

MAAP Control Keys

The following MAAP keys are valid for use with Word 9:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR ENTRY** - Clears last field entered.
- **ENTER** - To enter a data input.
- **EXECUTE** - To start or restart a word.
- **NEXT CIRCUIT** - To step through slot groups of the switch.
- **NEXT UNIT** - To step through cabinets of the switch.
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.
- **WORD NO.** - Invokes a default display and prepares the procedure for a word number to be input. Also, use to step to Word 1.

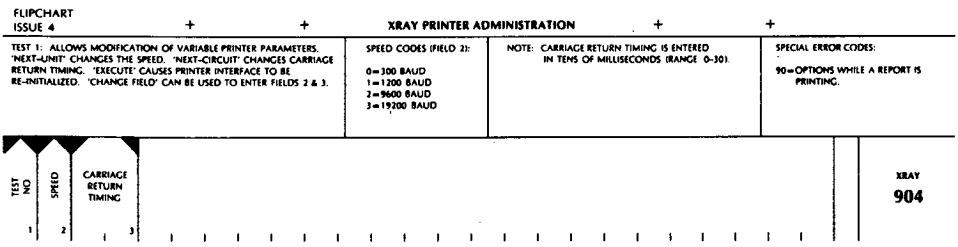
TABLE X. PROC 902, WORD 9, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION	
1	1-9	Word number	
2	0-30	Physical location	Module number
3	0-7		Cabinet number
4	0-3		Carrier number
5	0-9	Group number	
6	0-15	Carrier type	0—Unequipped
			1—CC
			2—CC power
			3—PWR/IO
			4—TMS 0
			5—TMS 0 growth
			6—MC 0
			7—MC 1
			8—TMS 1
			9—TMS 1 growth
			11—DS-1 carrier
			12—Port carrier
			15—RMI carrier
7,9,11,13	1-5	Prefix	1—SN Series CP
			2, 3—TN Series CP
			4—UN Series CP
			5—ANN Series CP

TABLE X(Contd). PROC 902, WORD 9, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION				
8	0-999	Slot grp no.	1-0 2-4 3-8 4-12 5-16	Slot no.	6-20 7-24 8-28 9-32	Code of circuit pack located in slot
10	0-999	Slot grp no.	1-1 2-5 3-9 4-13 5-17	Slot no.	6-21 7-25 8-29	
12	0-999	Slot grp no.	1-2 2-6 3-10 4-14 5-18	Slot no.	6-22 7-26 8-30	
14	0-999	Slot grp no.	1-3 2-7 3-11 4-15 5-19	Slot no.	6-23 7-27 8-31	

◗PROCEDURE 904



Field Definition and Codes

Each field of PROC 904 and the displays in the fields during execution are shown in Table Y.

TABLE Y. PROC 904, FIELD DEFINITION AND CODES

FIELD	RANGE	DEFINITION	
1	1-3	Test number	
2	0-3	Speed codes	0—300 Baud
			1—1200 Baud
			2—9600 Baud
			3—19200 Baud
3	0-30	Carriage return timing (entered in tens of milliseconds)	

Description of Word

This procedure is used to initialize and set the speed of the optional system printer.

MAAP Control Keys

The following MAAP keys are valid for use with PROC 904:

- **CHANGE FIELD** - The sequence **CHANGE FIELD**; field number; **ENTER** selects the desired field.
- **CLEAR ENTRY** - Clears last field entered.
- **ENTER** - To enter a data input.
- **EXECUTE** - To initialize the printer.
- **NEXT CIRCUIT** - To change printer carriage return timing.
- **NEXT UNIT** - To change printer speed (baud rate).
- **PRINT** - To print test string (unmarked blue button in second row of second column)
- **PROC NO.** - To select a procedure.
- **RESET** - Returns procedure to initial condition.

GLOSSARY

Administer

To access or change software programs to provide services or features.

Alarm Panel

The alarm panel appears in the common control cabinet. It contains alarm indicator lamps and control switches used to diagnose switch faults.

Alphanumeric Display

A display area on the console which displays alphabetic characters, numeric digits and special characters.

Alarmed circuit

A malfunctioning circuit.

Attendant

An operator of a console.

Automatic Test Mode

Runs a test continuously from start to finish.

Burn-in Test Mode

Runs test continuously until it is stopped by on-site personnel.

Common Control

Circuitry that controls, supervises, and coordinates switch operations.

Console

An electronic communications terminal used to handle incoming and outgoing calls and trunks. Also provides basic telephone services such as placing and receiving calls.

Data Communications Interface Unit

Provides special applications data channels between the switch processor and the Applications Processor.

DC/DC Converter

The DC/DC converters change the -48 volt power to the lower voltages required by the switch circuitry.

Default Display

The static display appearing on the MAAP after a procedure is entered.

Electrical Address

The address of a particular circuit in the switch software.

Encode

A numeric value displayed by or entered into a field.

Equipment Location

A designated position of a line or a trunk in the switch hardware.

FAIL Indicator

An alarm panel LED that lights when a microdiagnostic test fails.

Field

A subdivision of a PROC or of a WORD where specified numeric data is stored and/or displayed.

Hardware

The physical components (mechanical and electrical) that make up the switch.

Interface

A common boundary between two switches or pieces of equipment.

MAAP

A maintenance and administration panel used to perform maintenance and administration procedures.

MAAP Control Keys

Buttons on the MAAP used to administer the various procedures and functions.

MAJOR Indicator

An alarm panel LED that lights when the switch has a major alarm.

Manual Test Mode

Requires that a test be manually selected, started, and stopped.

Microdiagnostics

A series of tests used to test the processor before the X-RAY tape is loaded.

Minirecorder

A tape recorder/player used to load the software into the switch memory.

MINOR Indicator

An alarm panel LED that lights when the switch has a minor alarm.

Network

An interconnected system of transmission lines that provides connections between voice terminals (stations).

PASS Indicator

An alarm panel LED that lights when a microdiagnostic test passes.

Physical Address

The actual location of a circuit in it's circuit pack, carrier, cabinet, etc.

PROC

A procedure used with the System Management Terminal (SMT) to manipulate specific translations.

Program Tape

A tape cartridge containing the program, parameters, and translations used by the switch processor.

Random Access Memory

A storage arrangement where information can be written into and retrieved from memory with a speed that is independent of the location of the information in storage.

Read Only Memory

A storage arrangement for information retrieval applications.

Software

A set of computer programs designed to accomplish specific tasks.

Stop-after-one-pass Test Mode

The test is stopped after one successful pass.

Stop-on-Error Test Mode

The test is stopped when an error is detected.

Tape Indicator

An alarm panel LED that lights when the tape subsystem is being tested by the microdiagnostic tests.

Tape Subsystem

The equipment and associated circuits that control, read from and write into the switch memory tape.

Touch-tone Pad

A multifrequency pushbutton dial.

Translation Generator

A procedure that allows translations to be generated for different switch configurations.

X-RAY Tape

A tape cartridge containing a series of software programs used to test the switch.

X-RAY Test

A test program used to test the hardware operation of the switch.

INDEX

APPENDIX A

MICRODIAGNOSTIC TESTS

Overview

Microdiagnostic (MD) Tests 0 through 14 are run before the X-RAY tape is loaded. These tests verify that the processor is capable of accepting input from the X-RAY tape. If the switch is equipped with dual processors, MD Tests 0 through 14 must be run for each processor (CC0 and CC1). After MD Tests 0 through 14 have run successfully, the X-RAY tape is inserted in the minirecorder and MD15 is run to load X-RAY into memory.

Use of GO/HALT Switch

When it is necessary to replace a circuit pack in the common control carrier (Figure 1), proceed as follows:

1. At alarm panel (Figure 2 or 3), set **GO/HALT** to **HALT.**
2. Replace circuit pack.
3. At alarm panel, depress **RESET** and set **GO/HALT** to **GO.**

Note: If the replacement component does not solve the problem, remove the replacement and install the original.

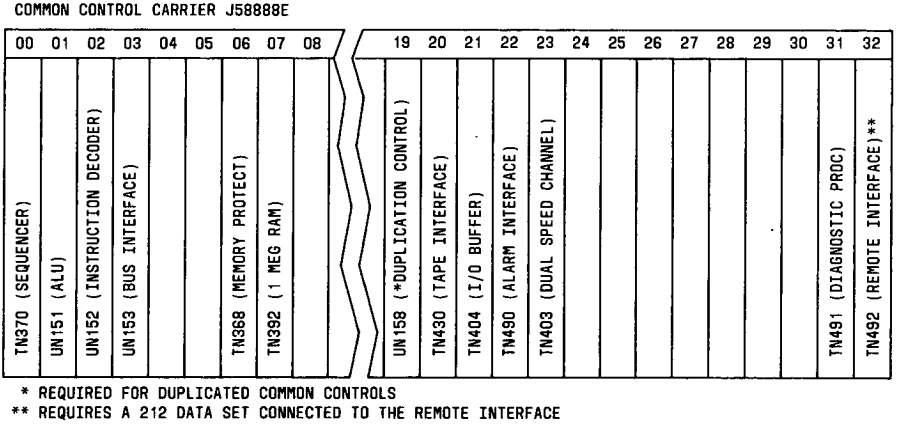


Figure 1. ♦Common Control Carrier (Minimum Circuit Pack Configuration for Running X-RAY)♦

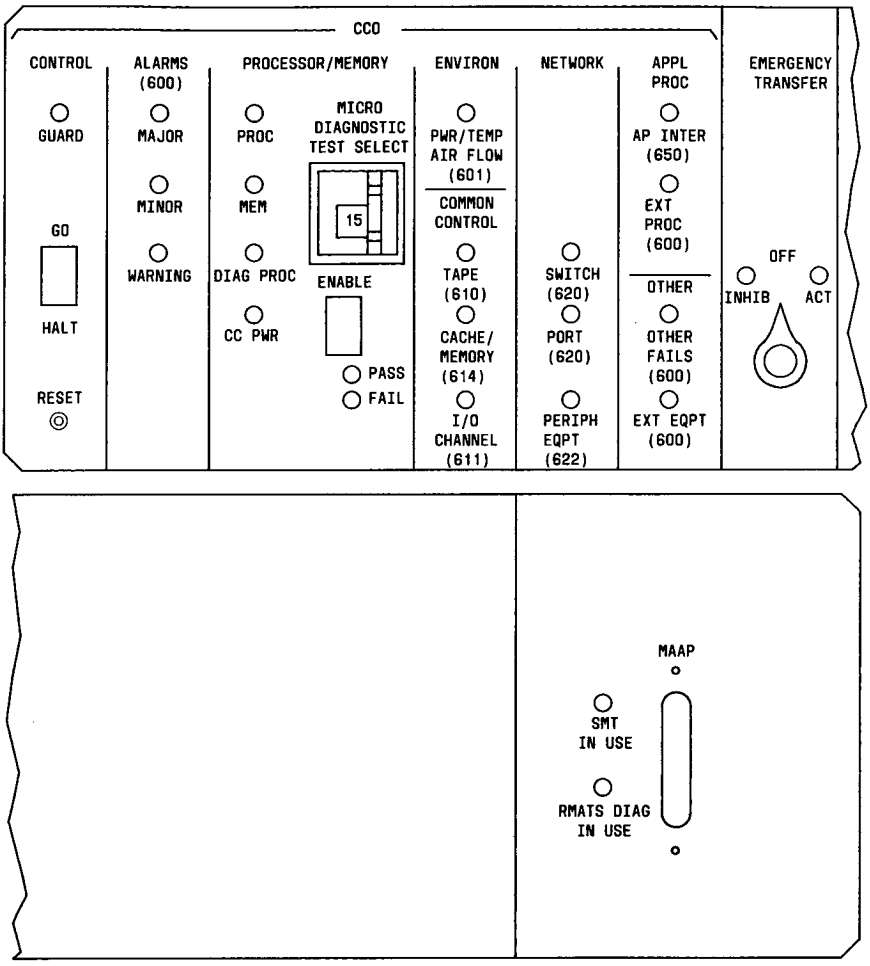


Figure 2. UNDUPLICATED ALARM PANEL

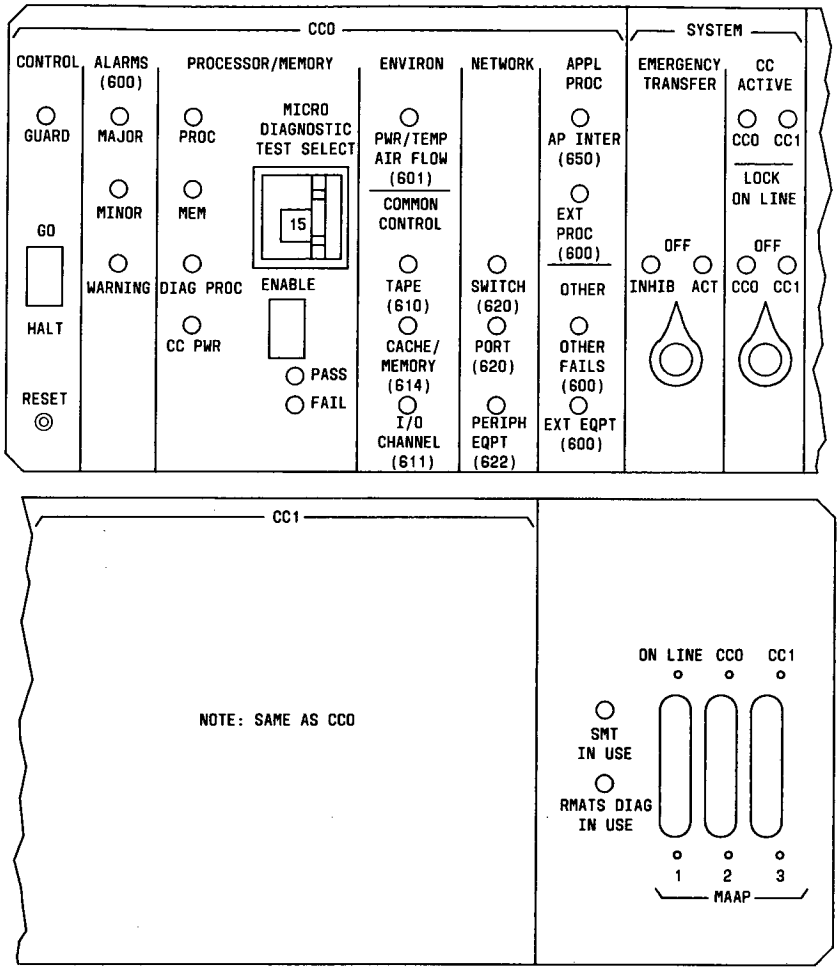


Figure 3. DUPLICATED ALARM PANEL

Microdiagnostics

Microdiagnostics is a series of tests used to test the processor before attempting to load the X-RAY tape. These tests are contained in the read only memory (ROM) of the central processor and are individually selectable using the alarm panel **TEST SELECT** switch. The tests (0 through 15) are run in numerical order since circuits tested in a previous test may be used in a later test. All except Test 15 run continuously until another test begins. Test status is shown by the **PASS** or **FAIL** indicators on the alarm panel.

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).

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).

Microdiagnostics start with Test 0 and end with 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.

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 circuit packs. When replacing a circuit pack in the switch, it is necessary to identify the vintage and series of the circuit pack to be replaced. Circuit packs should be replaced with circuit packs of the same suffix or later (i.e., SN270 replaced by an SN270 or 270B).

Test 10 tests the tape subsystem. For this test, a tape is placed in the minirecorder and the MAAP must be connected to provide information on any failures detected.

Test 15 provides an abbreviated subset of tests 0-14 and a memory load of the data on the tape. For this test, the X-RAY tape is placed in the minirecorder and the MAAP is connected to display the progress of the memory load.

The **GO/HALT** switch associated with the common control being tested must be set to the **GO** position.

To run a specific test:

1. At common control alarm panel, set **MICRODIAGNOSTIC TEST SELECT** switch to desired test.
2. Depress **RESET** switch.
3. Depress **ENABLE** switch.

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

a. The **PASS** and **FAIL** indicators are dark until the test result is determined.

b. If a test passes, the **PASS** indicator on the alarm panel is lighted.

c. If a test fails, the **FAIL** indicator on the alarm panel lights and a red LED lights on the circuit pack most likely to be the cause of the fault.

Other circuit packs that could be causing the test to fail are listed in Table A, in the order they are most likely to cause a problem.

a. CKT 1 in Table A is the failing circuit pack with the red LED lighted.

b. The second most likely failing circuit pack is indicated as CKT 2 in Table A.

c. In some cases, one of the circuit packs listed in Table B as a probable source of trouble may be the same as the circuit pack with the red LED lighted.

d. When a circuit pack listed in Table A as a replacement has already been replaced, replace the next lowest circuit pack not replaced.

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

TABLE A. MICRODIAGNOSTICS CIRCUIT PACK REPLACEMENT SEQUENCE

TEST	CKT 1	CKT 2	CKT 3	CKT 4	CKT 5	CKT 6	CKT 7	CKT 8
0	[1]	TN491 Slot 31	TN492 Slot 32	TN490 Slot 22				
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			
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]—Replace all circuit packs with red LED lighted plus all circuit packs with no LEDs lighted.
[3]—Replace TN369 (Slot 04) if installed.

Initially, X-RAY should be run using the equipment provided with the system.

If X-RAY cannot be run using the original equipment, strip the Common Control Carrier down to the minimum equipment configuration to get X-RAY started. Figure 1 shows the circuit packs required in the Common Control Carrier to run X-RAY.

If a test fails and the circuit pack replacements listed in Table A do not correct the problem, proceed as follows:

1. Check Table B to determine which circuit packs are required to perform the failing test.
2. Unseat any circuit packs not required to perform the test and repeat the test.
3. If the test passes, reseat the circuit packs one-at-a-time, repeating the failing test until the failing circuit pack is located.

Test 0

Note: See paragraph entitled "Use of GO/HALT Switch."

To run Test 0:

1. Set **TEST SELECT** switch to **0.**
2. Depress **RESET, ENABLE.**

   Note: While Test 0 is running, the **MAJOR** and **DIAG PROC** indicators are lighted. When the test passes, the **PROC** indicator lights.

3. If Test 0 fails to affect alarm panel indicators, power and cabling should be checked.
4. If the **PASS** indicator turns on, go to Test 1.
5. If the test fails (the **FAIL** indicator on the alarm panel lights and a red LED lights on the failing common control carrier circuit pack), replace the circuit pack with the red LED lighted.
6. Depress **RESET, ENABLE.**
7. If the **PASS** indicator turns on, go to Test 1.
8. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.
9. Depress **RESET, ENABLE.**
10. Repeat Steps 7 through 9 until the **PASS** indicator turns on, or all circuit packs listed in Table A for Test 0 are replaced.
11. If Test 0 continues to fail and the circuit pack replacements listed in Table A do not correct the problem, refer to Table B for the circuit packs required for Test 0.
12. Unseat all circuit packs in the common control carrier not required for Test 0.
13. Depress **RESET, ENABLE.**
14. If the **FAIL** indicator turns on, reseat all circuit packs and check the backplane wiring.
15. If the **PASS** indicator turns on, reseat one circuit pack and depress **RESET, ENABLE.**
16. If the **FAIL** indicator now turns on, replace the reseated circuit pack, and depress **RESET, ENABLE.**

TABLE B. CIRCUIT PACKS REQUIRED TO PERFORM MICRODIAGNOSTIC TESTS

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	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	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	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). TN390 or TN392 in slots 8 through 14 are tested (if installed). TN369 in slot 04 is tested (if installed).

17. Repeat Steps 15 and 16 for the next circuit pack. Continue to reseat and test circuit packs until all have been reseated.
18. If the **PASS** indicator turns on, go to Test 1.
19. If the **FAIL** indicator turns on, check the backplane wiring.

Test 1

Note: See paragraph entitled "Use of GO/HALT Switch."

To run Test 1:

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

   Note: After **ENABLE** is depressed, the red LEDs on the common control carrier circuit packs light for about 5 seconds and the green LEDs light and remain on until another test is selected. The **MAJOR** indicator is lighted while the test is running.

3. If the **PASS** indicator turns on, go to Test 2.
4. If the test fails (the **FAIL** indicator lights and a red LED lights on the failing circuit pack), replace the circuit pack.
5. Depress **RESET, ENABLE.**
6. If the **PASS** indicator turns on, repeat tests starting with Test 0.
7. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.
8. Depress **RESET, ENABLE.**
9. If the **PASS** indicator turns on, repeat tests starting with Test 0.
10. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.
11. Repeat Steps 8 through 10 until the **PASS** indicator turns on, or until all circuit packs listed in Table A for Test 1 are replaced.
12. If the test continues to fail and the circuit pack replacements listed in Table A do not correct the problem, refer to Table B for the circuit packs required to run Test 1.
13. Unseat all circuit packs in the common control carrier not required to run Test 1.
14. Depress **RESET, ENABLE.**
15. If the **FAIL** indicator turns on, reseat all circuit packs and check the backplane wiring.
16. If the **PASS** indicator turns on, reseat one circuit pack.
17. Depress **RESET, ENABLE.**
18. If the **FAIL** indicator now turns on, replace the circuit pack just reseated and depress **RESET, ENABLE.**
19. Repeat Steps 15 through 18 for the next circuit pack. Continue to reseat and test circuit packs until all have been reseated.
20. If the **PASS** indicator turns on, repeat tests starting with Test 0.
21. If the **FAIL** indicator turns on, check the backplane wiring.

Test 2

Note: See paragraph entitled "Use of GO/HALT Switch."

To run Test 2:

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

   Note: The **MAJOR** indicator lights while the test is running.

3. If the **PASS** indicator turns on, go to Test 3.
4. If the test fails (the **FAIL** indicator lights and a red LED lights on the failing circuit pack), replace the circuit pack.
5. Depress **RESET, ENABLE.**
6. If the **PASS** indicator turns on, repeat tests starting with Test 0.
7. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.
8. Depress **RESET, ENABLE.**
9. If the **PASS** indicator turns on, repeat tests starting with Test 0.
10. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.
11. Repeat Steps 8 through 10 until the **PASS** indicator turns on, or all circuit packs listed in Table A for Test 2 are replaced.
12. If the test continues to fail and the circuit pack replacements listed in Table A do not correct the problem, refer to Table B for the circuit packs required to run Test 2.
13. Unseat all circuit packs in the common control carrier not required to run Test 2.
14. Depress **RESET, ENABLE.**
15. If the **FAIL** indicator turns on, reseat all circuit packs and check the backplane wiring.
16. If the **PASS** indicator turns on, reseat one circuit pack and depress **RESET, ENABLE.**
17. If the **FAIL** indicator now turns on, replace the reseated circuit pack, and depress **RESET, ENABLE.**
18. Repeat Steps 16 and 17 for the next circuit pack. Continue to reseat and test circuit packs until all have been reseated.
19. If the **PASS** indicator turns on, repeat tests starting with Test 0.
20. If the **FAIL** indicator turns on, check the backplane wiring.

Test 3

To run Test 3:

1. Set **TEST SELECT** switch to **3.**
2. Depress **RESET, ENABLE.**

Note: While Test 3 is running, the **MAJOR** indicator is lighted. The **PASS** indicator is always turned on.

3. Go to Test 4.

Test 4

To run Test 4:

1. Set **TEST SELECT** switch to **4.**
2. Depress **RESET, ENABLE.**

Note: While Test 4 is running, the **MAJOR** indicator is lighted. The **PASS** indicator is always turned on.

3. Go to Test 5.

Test 5

To run Test 5:

1. Set **TEST SELECT** switch to **5.**
2. Depress **RESET, ENABLE.**

Note: While Test 5 is running, the **MAJOR** indicator is lighted. The **PASS** indicator is always turned on.

3. Go to Test 6.

Test 6

To run Test 6:

1. Set **TEST SELECT** switch to **6.**
2. Depress **RESET, ENABLE.**

Note: While Test 6 is running, the **MAJOR** indicator is lighted. The **PASS** ir always turned on.

3. Go to Test 7.

Test 7

Note: See paragraph entitled "Use of GO/HALT Switch."

To run Test 7:

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

Note: The **MAJOR** and **PROC** indicators light while the test is running.

3. If the **PASS** indicator turns on, go to Test 8.
4. If the test fails (the **FAIL** indicator lights and a red LED lights on the failing circuit pack), replace the circuit pack.

   Note: Before replacing a circuit pack, ensure the vintage of the replacement is compatible with the original circuit pack. Circuit packs should be replaced with circuit packs of the same suffix or later (i.e., SN270 replaced by SN270 or 270B).

5. Depress **RESET, ENABLE.**
6. If the **PASS** indicator turns on, repeat tests starting with Test 0.
7. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.
8. Depress **RESET, ENABLE.**
9. If the **PASS** indicator turns on, repeat tests starting with Test 0.
10. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.
11. Repeat Steps 8 through 10 until the **PASS** indicator turns on, or all circuit packs listed in Table A for Test 7 are replaced.
12. If the test continues to fail and the circuit pack replacements listed in Table A do not correct the problem, refer to Table B for the circuit packs required to run Test 7.
13. Unseat all circuit packs in the common control carrier not required to run Test 7.
14. Depress **RESET, ENABLE.**
15. If the **FAIL** indicator turns on, reseat all circuit packs and check the backplane wiring.
16. If the **PASS** indicator turns on, reseat one circuit pack.
17. Depress **RESET, ENABLE.**
18. If the **FAIL** indicator now turns on, replace the circuit pack just reseated and depress **RESET, ENABLE.**
19. Repeat Steps 16 through 18 the next circuit pack. Continue to reseat and test circuit packs until all have been reseated.
20. Repeat tests starting with Test 0.
21. If the **FAIL** indicator turns on, check the backplane wiring.

Test 8

Note: See paragraph entitled "Use of GO/HALT Switch."

To run Test 8:

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

   Note: The **MAJOR** and **I/O CHANNEL** indicators light while the test is running. The **I/O CHANNEL** indicator also lights when Test 8 passes.

3. If the **PASS** indicator turns on, go to Test 9.
4. If the test fails (the **FAIL** indicator lights and a red LED lights on the failing circuit pack), replace the circuit pack.
5. Depress **RESET, ENABLE.**
6. If the **PASS** indicator turns on, repeat tests starting with Test 0.
7. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.
8. Depress **RESET, ENABLE.**
9. If the **PASS** indicator turns on, repeat tests starting with Test 0.
10. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.
11. Repeat Steps 8 through 10 until the **PASS** indicator turns on, or all circuit packs listed in Table A for Test 8 are replaced.
12. If the test continues to fail and the circuit pack replacements listed in Table A do not correct the problem, refer to Table B for the circuit packs required to run Test 8.
13. Unseat all circuit packs in the common control carrier not required to run Test 8.
14. Depress **RESET, ENABLE.**
15. If the **FAIL** indicator turns on, reseat all circuit packs and check the backplane wiring.
16. If the **PASS** indicator turns on, reseat one circuit pack and depress **RESET, ENABLE.**
17. If the **FAIL** indicator now turns on, replace the reseated circuit pack, and depress **RESET, ENABLE.**
18. Repeat Steps 16 and 17 for the next circuit pack. Continue to reseat and test circuit packs until all have been reseated.
19. If the **PASS** indicator turns on, repeat tests starting with Test 0.
20. If the **FAIL** indicator turns on, check the backplane wiring.

Test 9

Note: See paragraph entitled "Use of GO/HALT Switch."

To run Test 9:

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

   Note: The **MAJOR** and **PROC** indicators light while the test is running. The **PROC** indicator also lights when Test 9 passes.

3. If the **PASS** indicator turns on, go to Test 10.
4. If the test fails (the **FAIL** indicator lights and a red LED lights on the failing circuit pack), replace the circuit pack.
5. Depress **RESET, ENABLE.**
6. If the **PASS** indicator turns on, repeat tests starting with Test 0.

7. If the **FAIL** indicator turns, replace the next circuit pack listed in Table A.
8. Depress **RESET, ENABLE.**
9. If the **PASS** indicator turns on, repeat tests starting with Test 0.
10. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.
11. Repeat Steps 8 through 10 until the **PASS** indicator turns on, or all circuit packs listed in Table A for Test 9 are replaced.
12. If the test continues to fail and the circuit pack replacements listed in Table A do not correct the problem, refer to Table B for the circuit packs required to run Test 9.
13. Unseat all circuit packs in the common control carrier not required to run Test 9.
14. Depress **RESET, ENABLE.**
15. If the **FAIL** indicator turns on, reseat all circuit packs and check the backplane wiring.
16. If the **PASS** indicator turns on, reseat one circuit pack and depress **RESET, ENABLE.**
17. If the **FAIL** indicator now turns on, replace the reseated circuit pack, and depress **RESET, ENABLE.**
18. Repeat Steps 16 and 17 for the next circuit pack. Continue to reseat and test circuit packs until all have been reseated.
19. If the **PASS** indicator turns on, repeat tests starting with Test 0.
20. If the **FAIL** indicator turns on, check the backplane wiring.

Test 10

Note: See paragraph entitled "Use of GO/HALT Switch."

To run Test 10:

1. Install X-RAY tape in the minirecorder.
2. Plug MAAP (Figure 4) into the **MAAP** connector associated with the common control being tested (Figure 2 or 3).
3. Set **TEST SELECT** switch to **10.**
4. Depress **RESET, ENABLE.**

   Note: The **MAJOR** and **TAPE** indicators light while the test is running. The **TAPE** indicator also lights when Test 10 passes.

5. If the **PASS** indicator turns on, remove X-RAY tape and go to Test 11.
6. If Test 10 fails (the **FAIL** indicator lights), observe the eight field positions on the left side of the MAAP display (Figure 4). The eight fields (digits) should contain either a **0** (pass) or **1** (fail) to indicate the component of the tape system causing the failure.
7. If there is no display (all fields blanked) on the MAAP, replace TN403 in common control carrier slot 23 and depress **RESET, ENABLE.**
8. If all eight fields display **0**, verify the tape is in the minirecorder and the minirecorder is properly connected, then depress **RESET, ENABLE.**
9. If field 1 or 8 displays a 1, replace TN430 in common control carrier slot 20 and depress **RESET, ENABLE.**

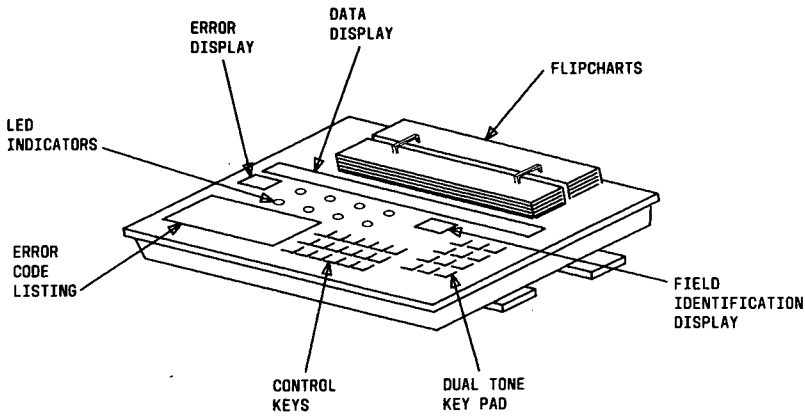


Figure 4. MAAP

Note: If multiple failures are indicated on the MAAP display (a 1 in more than one field), perform the following steps in the order listed. Do not replace the minirecorder until all circuit packs indicated as failing have been replaced.

10. If Field 3 displays a 1, replace power supply circuit pack (SN446) in the minirecorder and go to Step 19.
11. If Field 7 displays a 1, replace controller circuit pack (SN441) in the minirecorder and go to Step 19.
12. If Field 4 displays a 1, replace data electronics circuit pack (SN442) in the minirecorder and go to Step 19.
13. If Field 5 displays a 1, replace tape transport and preamp circuit pack (SN443) in the minirecorder and go to Step 19.
14. If Field 6 displays a 1, replace servo circuit pack (SN445) in the minirecorder and go to Step 19.
15. If Field 2 displays a 1, remove and reinsert the X-RAY tape.
16. Depress **RESET, ENABLE.**
17. If the **PASS** indicator turns on, repeat tests starting with Test 0.
18. If the **FAIL** indicator turns on, replace the tape.
19. Depress **RESET, ENABLE.**
20. If the **PASS** indicator turns on, repeat tests starting with Test 0.
21. If the **FAIL** indicator turns on, replace tape transport and preamp circuit pack (SN443) in the minirecorder.
22. Depress **RESET, ENABLE.**
23. If the **PASS** indicator turns on, repeat tests starting with Test 0.
24. If the **FAIL** indicator turns on, replace the minirecorder.

25. Depress **RESET, ENABLE.**
26. If the **PASS** indicator turns on, repeat tests starting with Test 0.
27. If the **FAIL** indicator turns on, check the wiring between the minirecorder and the common control carrier.
28. Depress **RESET, ENABLE.**
29. If the **PASS** indicator turns on, repeat tests starting with Test 0.
30. If the **FAIL** indicator turns on, replace the next circuit pack listed as CKT 2 in Table A.
31. Depress **RESET, ENABLE.**
32. If the **PASS** indicator turns on, repeat tests starting with Test 0.
33. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.
34. Repeat Steps 31 through 33 until the **PASS** indicator turns on, or until all circuit packs listed in Table A for Test 10 are replaced.
35. If the test continues to fail and the circuit pack replacements listed in Table A do not correct the problem, unseat all circuit packs in the common control carrier not required to run Test 10 (Table A).
36. Depress **RESET, ENABLE.**
37. If the **FAIL** indicator turns on, reseat all circuit packs and check the backplane wiring.
38. If the **PASS** indicator turns on, reseat one circuit pack and depress **RESET, ENABLE.**
39. If the **FAIL** indicator now turns on, replace the circuit pack just reseated and depress **RESET, ENABLE.**
40. Repeat Steps 38 and 39 for the next circuit pack. Continue to reseat and test circuit packs until all have been reseated.
41. If the **PASS** indicator turns on, repeat tests starting with Test 0.
42. If the **FAIL** indicator turns on, check backplane wiring.

Test 11

Note: See paragraph entitled "Use of GO/HALT Switch."

To run Test 11:

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

   Note: The **MAJOR** and **MEM** indicators light while the test is running. The **MEM** indicator also lights when Test 11 passes.
3. If the **PASS** indicator turns on, go to Test 12.
4. If the test fails (the **FAIL** indicator lights and a red LED lights on the failing circuit pack), replace the circuit pack.
5. Depress **RESET, ENABLE.**

6. If the **PASS** indicator turns on, repeat tests starting with Test 0.
7. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.
8. Depress **RESET, ENABLE.**
9. If the **PASS** indicator turns on, repeat tests starting with Test 0.
10. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.
11. Repeat Steps 8 through 10 until the **PASS** indicator turns on, or all circuit packs listed in Table A for Test 11 are replaced.
12. If the test continues to fail and the circuit pack replacements listed in Table A do not correct the problem, refer to Table B for the circuit packs required to run Test 11.
13. Unseat all circuit packs in the common control carrier not required to run Test 11.
14. Depress **RESET, ENABLE.**
15. If the **FAIL** indicator turns on, reseat all circuit packs and check the backplane wiring.
16. If the **PASS** indicator turns on, reseat one circuit pack.
17. Depress **RESET, ENABLE.**
18. If the **FAIL** indicator now turns on, replace the circuit pack just reseated and depress **RESET, ENABLE.**
19. Repeat Steps 16 through 18 for the next circuit pack. Continue to reseat and test circuit packs until all have been reseated.
20. If the **PASS** indicator turns on, repeat tests starting with Test 0.
21. If the **FAIL** indicator turns on, check the backplane wiring.

Test 12

Note: See paragraph entitled "Use of GO/HALT Switch."

To run Test 12:

1. Set **TEST SELECT** switch to **12.**
2. Depress **RESET, ENABLE.**

   Note: The **MAJOR** and **MEM** indicators light while the test is running. The **MEM** indicator also lights when Test 12 passes.

3. If the **PASS** indicator turns on, go to Test 13.
4. If the test fails (the **FAIL** indicator lights and a red LED lights on the failing circuit pack), replace the circuit pack.
5. Depress **RESET, ENABLE.**
6. If the **PASS** indicator turns on, repeat tests starting with Test 0.
7. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.
8. Depress **RESET, ENABLE.**
9. If the **PASS** indicator turns on, repeat tests starting with Test 0.
10. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.

11. Repeat Steps 8 through 10 until the **PASS** indicator turns on, or all circuit packs listed in Table A for Test 12 are replaced.
12. If the test continues to fail and the circuit pack replacements listed in Table A do not correct the problem, refer to Table B for the circuit packs required to run Test 12.
13. Unseat all circuit packs in the common control carrier not required to run Test 12.
14. Depress **RESET, ENABLE.**
15. If the **FAIL** indicator turns on, reseat all circuit packs and check the backplane wiring.
16. If the **PASS** indicator turns on, reseat one circuit pack.
17. Depress **RESET, ENABLE.**
18. If the **FAIL** indicator now turns on, replace the circuit pack just reseated and depress **RESET, ENABLE.**
19. Repeat Steps 16 through 18 for the next circuit pack. Continue to reseat and test circuit packs until all have been reseated.
20. If the **PASS** indicator turns on, repeat tests starting with Test 0.
21. If the **FAIL** indicator turns on, check the backplane wiring.

Test 13

To run Test 13:

1. Set **TEST SELECT** switch to **13.**
2. Depress **RESET, ENABLE.**

   Note: While Test 13 is running, the **MAJOR** indicator is lighted and the **PASS** indicator is always turned on.

3. Go to Test 14.

Test 14

Note: See paragraph entitled "Use of GO/HALT Switch."

To run Test 14:

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

   Note: The **MAJOR** and **CACHE MEMORY** indicators light while the test is running. The **CACHE MEMORY** indicator also lights when Test 14 passes.

3. If the **PASS** indicator turns on, go to Test 15.
4. If the test fails (the **FAIL** indicator lights and a red LED lights on the failing circuit pack), replace the circuit pack.
5. Depress **RESET, ENABLE.**
6. If the **PASS** indicator turns on, repeat tests starting with Test 0.
7. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.

8. Depress **RESET, ENABLE.**
9. If the **PASS** indicator turns on, repeat tests starting with Test 0.
10. If the **FAIL** indicator turns on, replace the next circuit pack listed in Table A.
11. Repeat Steps 8 through 10 until the **PASS** indicator turns on, or all circuit packs listed in Table A for Test 14 are replaced.
12. If the test continues to fail and the circuit pack replacements listed in Table A do not correct the problem, refer to Table B for the circuit packs required to run Test 14.
13. Unseat all circuit packs in the common control carrier not required to run Test 14.
14. Depress **RESET, ENABLE.**
15. If the **FAIL** indicator turns on, reseat all circuit packs and check the backplane wiring.
16. If the **PASS** indicator turns on, reseat one circuit pack.
17. Depress **RESET, ENABLE.**
18. If the **FAIL** indicator now turns on, replace the circuit pack just reseated and depress **RESET, ENABLE.**
19. Repeat Steps 16 through 18 for the next circuit pack. Continue to reseat and test circuit packs until all have been reseated.
20. If the **PASS** indicator turns on, repeat tests starting with Test 0.
21. If the **FAIL** indicator turns on, check the backplane wiring.

Test 15

Test 15 provides an abbreviated subset of microdiagnostic tests 0-14. When all tests (0-14) pass, the memory is loaded with the data from the tape.

To run Test 15:

1. Plug the MAAP (Figure 4) into the **MAAP** connector associated with the common control being tested (Figure 2 or 3).
2. Insert X-RAY tape into minirecorder.
3. Set **TEST SELECT** switch to **15.**
4. Depress **RESET, ENABLE.**

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

If the tape loads successfully, the **PASS** indicator and the green LED on circuit pack TN430 will blink.

If the **PASS** indicator does not blink or any of the failure encodes (5-9) are displayed on the MAAP, Tests 0-14 must be rerun to find the cause of failure. Failure encodes are:

- Encode 5 - Hardware tests failed.
- Encode 6 - Tape subsystem successfully initialized, but load attempt failed because of an uncorrectable error (no tape, bad tape, faulty minirecorder, etc.).
- Encode 7 - Tape subsystem failed to initialize (faulty minirecorder, TN430 circuit pack or both).
- Encode 8 - Memory bad or not enough memory.
- Encode 9 - Too many reloads attempted or too many interruptions during loading.

APPENDIX B

General

This appendix covers a list of problems (and their solutions) encountered in the field while running R2V2 X-RAY tests. It is not an all encompassing list of the troubles found, only those that have been reported to DDO.

Problem List

The problems and solutions are:

1. **Problem:** X-RAY tape Issue 0.0 will sometimes fail a good MFAT line port (ANN17B) with a specific fault code 110 or 124.

   Solution: Ignore these specific fault codes. The system tape will test the failing circuits to determine if the circuit pack is really failing. The Issue 1.0 X-RAY tape corrects this problem.

2. **Problem:** X-RAY raises Unit Type 60 alarms showing the Remote Interface (TN492) bad for no apparent reason.

   Solution: Most alarms are caused by incorrect cabling from the Remote Interface board to the data set or lack of a data set. Detailed testing of the Remote Interface will be possible when Issue 1.1 of the X-RAY tape is released.

3. **Problem:** The DCIU alarms while running X-RAY.

   Solution: If a DCIU is installed in the system, four external loop-around cables (ED-1E422, Grp 9) must be in place for all links before PROCs 650 and 900 are run. These cables must be configured to connect Link 1 to Link 2, Link 3 to Link 4, Link 5 to Link 6, and Link 7 to Link 8. However, PROC 650, Test 3 requires 8 loop-around plugs (ED-1E422, Grp 6) to run properly.

4. **Problem:** Replacing MC carrier circuit packs in the off-line MC carrier in a switch with a duplicated MC often results in alarms or customer outages.

   Solution: Replace the circuit packs in the off-line MC carrier as follows:

   a. Use PROC 621 to lock the on-line MC on-line.

   b. Disconnect the left-most converter.

   c. Disconnect the right-most converter.

   d. Make repairs.

   e. Connect right-most converter.

   f. Connect left-most converter.

   g. Unlock the on-line MC.

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