IBM

International Systems Centers

ACF/SNA SYSTEM PROBLEM DETERMINATION GUIDE VOL. I

GG24-1514-1

IBM
International
Systems
Center

Technical
Bulletin

ACF/SNA SYSTEM PROBLEM DETERMINATION GUIDE

VOLUME I

J. A. Gabor
Customer Support Centre
Sydney, Australia

H. J. Liberty, Jr. (Project Advisor)
Raleigh International Systems Center
Raleigh, N.C.
USA

GG24-1514-1
May 1984

Third Edition (May 1984)

This edition is a major revision and replacement of GG24-1514-0.

Publications are not stocked at the address below. Requests for copies of IBM publications should be made to your IBM representative or to the IBM branch office serving your locality.

A form for readers' comments is provided at the back of this publication. If the form has been removed, comments may be addressed to:

Raleigh International Systems Center
IBM Corporation (986/B622-3)
P.O. Box 12195
Research Triangle Park, N.C. 27709, USA

IBM may use or distribute any of the information you supply without incurring any obligation to you. You may, of course, continue to use the information you supply.

PREFACE

The material contained in this document reflects the experiences of those who contributed to this guide. IBM gives no warranty and makes no representation as to the accuracy of material in the guide and does not accept liability of any kind howsoever arising out of the use of this document.

The ACF/SNA System Problem Determination Guide represents a completely restructured revision of the SNA System Problem Determination Guide (GG24-1514-0), which is still valid for the products it supports. In the revised format, the emphasis has been placed on illustrating the usefulness of the current, state-of-the-art, interactive Problem Determination tools and Problem Management aids. It should be noted that this guide is based on ACF/VTAM Version 2.

The authors wish to express their appreciation to those people who have contributed to this guide. Valuable input has been provided by the staff of IBM Field Engineering (Branch offices, Regions and Product Development Centers), and by IBM System Engineers from numerous branch offices.

CONTENTS

VOLUME I

CONTENTS

ENTER USER NOTES HERE:

CHAPTER 1 : INTRODUCTION

The purpose of this document is to assist ACF/SNA system users in problem determination. The guide should be used as supporting documentation for customer review prior to installation of ACF/SNA products. The guide's intent is to provide review information, not to replace the standard SNA education. This document contains much of the information needed for problem isolation and is intended to act as the basis for a customer-prepared System Problem Determination Notebook.

The following products have been added to this document:

- Network Management Productivity Facility (NMPF)
- Network Logical Data Manager (NLDM)
- System/34
- System/36
- System/38
- 5280
- 8100
- Series/1
- Personal Computer

The last chapter, titled ACF/VTAM BUFFERS AND STATISTICS, has also been added. The purpose of this chapter is to give the ACF/SNA system users an insight into the various ACF/VTAM buffers, ACF/VTAM statistics, methods of observing and resolving buffering problems, and general ACF/VTAM-to-NCP tuning.

Finally, manual and product references, screen displays, errors, and omissions have been updated and corrected. If any errors or omissions are encountered while using this manual, please be kind enough to inform us by sending the reader's comment form (back page) to the specified address.

Note:
=====
This guide is based on ACF/VTAM Version 2.

PRODUCTS SUPPORTED BY THIS GUIDE

The following products are supported by this guide. The name in parenthesis is normally used throughout the guide.

Advanced Communications Function for the Virtual Telecommunications Access Method (ACF/VTAM)

Advanced Communications Function for the Network Control Program/Virtual Storage (ACF/NCP/VS)

3704/3705 Network Control Program/Virtual Storage (NCP/VS)

Network Communications Control Facility (NCCF)

Network Management Productivity Facility (NMPF)

Network Problem Determination Application (NPDA)

Network Logical Data Manager (NLDM)

Information/System Release 2 (INFO/SYS)

Information/Management (INFO/MANAGEMENT)

Operating System/Virtual Storage 2 (OS/VS2)

- Multiple Virtual Storage (MVS)
- Single Virtual Storage (SVS)
- Time Sharing Option (TSO)
- Job Entry Subsystem 2 (JES2)

Operating System/Virtual Storage 1 (OS/VS1)

Disk Operating System/Virtual Storage Extended (DOS/VSE)

Virtual Storage Access Method (VSAM)

Customer Information Control System/Virtual Storage (CICS/VS)

Information Management System/Virtual Storage (IMS/VS)

3270 Information Display System (3270)

3600 Finance Communication System (3600)

3650 Retail Store System (3650)

3767 Communication Terminal (3767)

3770 Data Communication System (3770)

System/34

System/36

System/38

5280

8100

Series/1

Personal Computer

ENTER USER NOTES HERE:

CHAPTER 2 : NETWORK MANAGEMENT

This section provides suggestions for various network management functions. A naming convention is described that provides flexibility in network configuration definition and eliminates the need for defining a terminal or logical unit more than once in an application for backup purposes. Another section of this chapter is concerned with installation management and suggestions for developing operator procedures.

CONTENTS

2.1 : CONFIGURATION MANAGEMENT

2.1.1 : NAMING CONVENTION CONSIDERATIONS

Networking allows more flexibility in LU connections.

- The same LU name can be associated with a leased line and later with a switched port.
- The same LU name can be associated with leased lines on different 3705s (All will be in a not acquired status 'NACQ' except the one in use.)
- Applications need to know only the one name.
- Physical connection information in the LU name may not be appropriate:
  - Subarea numbers will not be correct if EIA RS232 patch panels swap lines between 3705s.
  - Line numbers will not be correct if Switched Network Backup is used.
  - Physical unit and line numbers may not be correct when dynamic reconfiguration of NCP is used with ACF/VTAM Release 2 or 3.
  - Terminals are reconfigured on a line for load balancing a growing network.
  - Owning host may change with dynamic domain boundaries.
- Physical names can always be associated with the current LU name with an ACF/VTAM display.

2.1.2 : NAMING CONVENTION SUGGESTION

An ACF/VTAM display of a logical unit includes the following items:

NCP name
Line Group Name
Line Name
PU Name
LU Name and Status

This display relates all those items as they currently exist. If the names contain physical information which will never change for that network component, then the LU display can reflect dynamic changes such as switched backup and dynamic reconfiguration.

The most meaningful characteristics of each component type are used in its name. Since current active names in a network must be unique, subarea is used where it does not change.

In the following discussion these abbreviations are used:
sss = Subarea number
uu = Unit Address
vv = Variable based on user needs
lia = Line interface address on 3705

At the end of this section is a table used as a guideline for naming conventions. This table was copied from the ACF/VTAM installation guides and modified slightly. The conventions described in this table are used by the Raleigh International Systems Center for its systems and all its publications.

NCP

The NCP name can help differentiate between levels or versions of NCPs. The letter 'N' identifies the component as an NCP. The remaining characters identify the subarea and the version of the NCP.

Examples:

Nssuuvv
N14BF3P for an NCP with a subarea of 014, a channel unit address of 0BF, and a level of 3P, where 3P is ACF/NCP Release 3 with NPA.

Nssuuvv
N245F35 for an NCP with a subarea of 024, a channel unit address of 05F, and a level of 35, where '35' is ACF/NCP Release 3 with 5 indicating a unique version.

NOTE: If there is only one 3705, than the name can be adjusted to reflect other data if necessary.

GROUP

The Line Group name can help differentiate between 3270s which are SDLC and BSC using ACF/VTAM's PU=YES support. The letter 'G' identifies a line group with the subarea following.

Examples:

```
    Gssvvvv
    G14S1     for an SDLC line group on an NCP with subarea 014.
    G14B1     for an BSC  line group on an NCP with subarea 014.
```

LINE/LINK

The Line name includes the subarea and the 3705 hardware LIB address. The last character could be the line set type for special line sets. The letter 'L' (as an abbreviation for link) represents a line.

Example:

```
    Lssliav
    L140020   for a line with an interface address of 020.
```

PHYSICAL UNIT

The Physical Unit name should relate to the physical unit as it is physically attached to the network. In the examples in this guide 'P' is used for SDLC physical units and 'B' is used for BSC 3270 control units. This distinction is made so that the two types of units could be distinguished by an NCCF CLIST and appropiate error recovery invoked. BSC 3270s and SDLC units have different ACF/VTAM error recovery support.

Example:

```
    Pssliap
    P140A0F  for an SDLC Physical unit located on line address 0A0
             on the 3705 with subarea 014. The physical unit's SDLC
             address is 'F' of X'C6'.

    bssliap
    B24023   for a BSC 3270 control unit located on line address 023
             on the 3705 with subarea 024. The control unit's address
             is ' ' or X'40', being the first unit in the line.
```

NOTE: The last character of the name is more useful when it reflects the polling/selection address of the control unit. None of the VTAM display commands indicate the unit's address. In order to determine the control unit's address, it is necessary to examine the NCP source statements.

LOGICAL UNIT

The Logical Unit name must also be defined to applications such as CICS, IMS, RJE, etc. and, therefore, should not change very often. The LU name only contains logical information about the user. The LU can then be moved (with Release and Acquire commands or dynamic reconfiguration) to different Physical Units and an ACF/VTAM display meaningfully reflects the change. The letter 'L' represents a Logical Unit.

Example:
Tvvvvvvv
TDEPT79P for a user in department 79P

NOTE: The first two characters of the name may have to have special identifiers on the first LU/Terminal on a PU/Ctrl Unit. These names are an exception to the use of the letter 'T', but still relate only logical information.

CROSS-DOMAIN RESOURCE MANAGER

The Cross-Domain Resource Manager (CDRM) names should be recognizable to the operator as to which host it is. The letter 'M' (for Manager) is followed by host subarea. The user could also add the location if desired.

Example:
M02 for host subarea 2.
M11RAL for host subarea 11 in Raleigh.

NAMING CONVENTIONS

<table>
<tr><th colspan="3">Type of resource</th><th>Name</th><th rowspan="2">Meaning of Symbols. Capital letters are constants, lower case are variables as described below.

cuu = 3 char physical address of the connection for local devices and clusters.
g = group sequence: A-Z/1-9
lia = 3 char physical addr of the conn for line internal attachment
p = PU sequence: A-Z/1-9
ss = 2 char subarea in this domain
t = LU sequence: A-Z/0-9
v = variations within the same suba definition (for example, lines originally active (A) or inactive (I)
xx = 2 char suba number in other domain
yy = 2 char adj NCP suba number
. = filler char</th></tr>
<tr><td colspan="3">Application program major node</td><td>Assv....</td></tr>
<tr><td rowspan="6">Application program minor node</td><td colspan="2">General</td><td>Ass.....</td></tr>
<tr><td colspan="2">CICS</td><td>AssCICSv</td></tr>
<tr><td colspan="2">IMS</td><td>AssIMSv.</td></tr>
<tr><td colspan="2">NCCF</td><td>AssNCFv.</td></tr>
<tr><td colspan="2">TSO</td><td>AssTSOv.</td></tr>
<tr><td colspan="2"></td><td></td></tr>
<tr><td colspan="3">CDRM major node</td><td>M00v....</td></tr>
<tr><td>CDRM minor node</td><td colspan="2">own domain
other domain</td><td>Mssv.
Mxxv.</td></tr>
<tr><td rowspan="6">CDRSC major node consisting of:</td><td colspan="2">Application programs</td><td>RxxAv..</td></tr>
<tr><td colspan="2">CICS
TSO</td><td>RxxACICS
RxxATSO.</td></tr>
<tr><td rowspan="4">Logical Units defined under a</td><td>Group</td><td>RxxGg.</td></tr>
<tr><td>Line</td><td>RxxLlia</td></tr>
<tr><td>PU</td><td>RxxPliap</td></tr>
<tr><td>NCP</td><td>RxxNyyv</td></tr>
<tr><td colspan="2">LOCAL
non-sna
sna</td><td>
RxxHLv
RxxHSv</td></tr>
<tr><td colspan="3">CDRSC minor node</td><td>Name of original definition statement</td></tr>
</table>

Type of resource		Name	Meaning of Symbols. Capital letters are constants, lower case are variables as described below.
Component		Cssliapt	cuu = 3 char physical address of the connection for local devices and clusters. g = group type: B = BSC P = S/S S = SDLC X = X-D LINK lia = 3 char physical addr of the conn for line internal attachment p = PU sequence: A-Z/1-9 ss = 2 char subarea in this domain t = LU sequence: 1-9/A-Z v = variations within the same suba definition (for example, lines originally active (A) or inactive (I) xx = 2 char suba number in other domain yy = 2 char adj NCP suba number . = filler char uu = channel/link address most often used for loading *p = CTRL address X'40',A-Z
Group		Gssg..	
Line		Lsslia	
Local Non-SNA	Major node Minor node	HssLv... HssLcuu	
Local S N A	Major node Cluster Terminal	HssSv... HsscuuP Hsscuutt	
LU/Terminal (Optional except for the following group of terminals)	Terminals LOCADDR 1-35	Tssliapt	
	or whatever is acceptable by the system support staff, the operations staff, or the end users.		
First LU or terminal specified to SSS for a PU or Control Unit	3631	FAssliap	
	3614	FCssliap	
	3650	QEssliap	
	3663	QDssliap	
	3790	INssliap	
NCP major node		Nssuu..	
Path	Major node	DssPATH.	
	Minor node	no name	
PU/Control Unit SDLC PU/Control Unit BSC		Pssliap Bssliap*	

2.1.3 : NCP NAMING CONVENTION EXAMPLE WITH DUPLICATE 3705S

(USING MSNF OWNER/BACKUP PARAMETERS)

The following example illustrates the definition and operation of a network, where the LU is only defined to the application once but the LU is accessible from the backup NCP.

NCP GENERATION DECK FOR N245F35 AND N043F35

DECK FOR N245F35

```
          PCCU OWNER=VTAMA,
               BACKUP=YES
L24020    LINE OWNER=VTAMA
P24020A   PU
TUSER1    LU
L24022    LINE OWNER=VTAMZ
P24022A   PU
TUSER2    LU
```

DECK FOR N043F35

```
          PCCU  OWNER=VTAMA,
                BACKUP=YES
L040A0    LINE OWNER=VTAMZ
P040A0A   PU
TUSER1    LU
L040A2    LINE OWNER=VTAMA
P040A2A   PU
TUSER2    LU
```

The above configurations allow the LUs to be defined in each NCP. VTAMZ does not exist but because of the 'OWNER = VTAMZ' parameter, VTAMA will not acquire the resources belonging to VTAMZ without operator intervention.

The NCP generations do not have to be identical, but to help reduce operation difficuties, the definitions and characteristics of the lines that are to back up each other should be identical. That is, the LU names should be the same on the lines that will be used for backup.

If another ACF/VTAM does exist, another pair of owner parameter labels could be used to divide NCP resources between the 2 NCPs in the additional ACF/VTAM.

NOTE: Any line without an owner specified is the same as the owner labels matching. Also, an acquire of the NCP will make all non-matching owner parameter labelled resources known to ACF/VTAM.

INFORMATION IN ACF/VTAM DISPLAY OF AN LU

EXAMPLE OF A LOGICAL UNIT ACF/VTAM DISPLAY

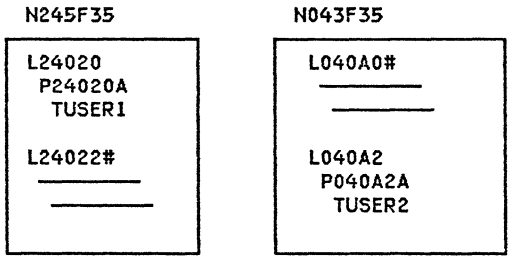
```
D NET,E,ID=T140A0F4
 IST097I  DISPLAY  ACCEPTED
 IST075I  VTAM DISPLAY - NODE TYPE= LOGICAL UNIT
 IST486I  NAME= T140A0F4 ,STATUS= ACT/S           ,DESIRED STATE= ACTIV
 IST081I  LINE NAME= L140A0    , LINE GROUP= G14S1     , MAJNOD= N14BF3P
 IST135I  PHYSICAL UNIT= P140A0F  ,
 IST082I  DEVTYPE= LU    , ALLOC TO= NPA11     ,CONTROLLING APPL=
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST675I  VR =  0 , TP =  0
 IST314I  END
```

N14BF3P	NCP is subarea 014, channel address 0bf, and level 3P.
G14S1	Line is SDLC link group 1.
L140A0	Hardware line address on 3705 is 0A0
P140A0F	Physical Unit is address F (C6).
T140A0F4	Logical Unit is fourth logical unit.

VTAMA KNOWLEDGE OF NCP RESOURCES
OWNER/BACKUP EXAMPLE

V NET,ACT,ID=N245F35
V NET,ACT,ID=N043F35

STATUS OF NETWORK AFTER COMMANDS.



#--RESOURCES KNOWN TO ACF/VTAM BUT
CAN NOT BE DISPLAYED OR USED.

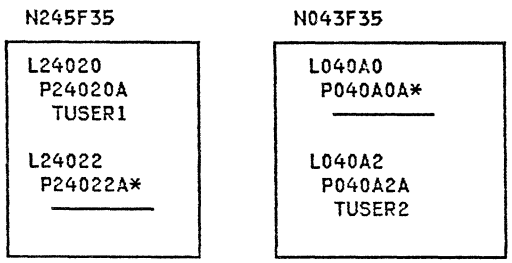
Sample Console output

```
d net,e,id=n245f35
 IST097I DISPLAY ACCEPTED
 IST075I  VTAM DISPLAY - NODE TYPE= PU_T4/5
 IST486I  NAME= N245F35  ,STATUS= ACTIV           ,DESIRED STATE= ACTIV
 IST247I  LOAD/DUMP PROCEDURE STATUS = RESET
 IST484I  SUBAREA = 024
 IST391I  ADJ LINK STATION = P14040   LINE = L14040   ,NODE = N14BF3P
 IST391I  ADJ LINK STATION = P040A6   LINE = L040A6   ,NODE = N043F35
 IST391I  ADJ LINK STATION = P04024   LINE = L04024   ,NODE = N043F35
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST675I  VR =  1 , TP =  2
 IST170I  LINES:
 IST080I  L24032   NEVAC      L24033   ACTIV----E L24020   ACTIV
 IST080I  L24022   RESET-N---
 IST314I  END

d net,e,id=l24022
 IST097I  DISPLAY ACCEPTED
 IST088I  DISPLAY COMMAND REJECTED - INVALID NODE NAME = L24022

d net,e,id=p24022A
 IST097I  DISPLAY ACCEPTED
 IST088I  DISPLAY COMMAND REJECTED - INVALID NODE NAME = P24022A

d net,e,id=tuser2
 IST097I  DISPLAY  ACCEPTED
 IST075I  VTAM DISPLAY - NODE TYPE= LOGICAL UNIT
 IST486I  NAME= TUSER2   ,STATUS= ACT/S           ,DESIRED STATE= ACTIV
 IST081I  LINE NAME= L040A2   , LINE GROUP= G04S1    , MAJNOD= N043F35
 IST135I  PHYSICAL UNIT= P040A2   ,
 IST082I  DEVTYPE= LU   , ALLOC TO=          ,CONTROLLING APPL=
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST314I  END
```

NOTE THAT TUSER2 IS ACTIVE AND CONNECTED TO N043F35

```
V NET,ACQ,ID=N245F35
V NET,ACQ,ID=N043F35
V NET,ACT,ID=L24022
```

VTAMA BECOMES AN OWNER OF LINES THAT HAVE 'OWNER = VTAMZ'



*--RESOURCES KNOWN TO ACF/VTAM WITH STATUS OF RELSD

NOTE: After the NCPs have been acquired, the links should be activated. If a link is not active when a 'v net,acq,id=pXXXXX,act' is issued, the vary will fail. The following sequence illustrates the effect when the link is already active.

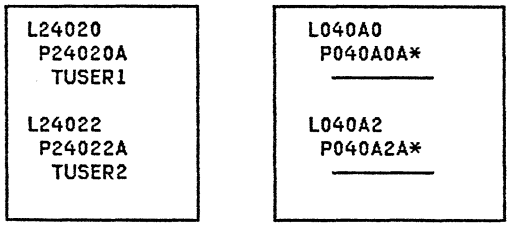
Sample Console output

```
v net,acq,id=n245f35
 IST097I VARY      ACCEPTED
 IST670I VARY ACQ PROCESSING FOR ID= N245F35 COMPLETE

d net,e,id=n245f35
 IST097I DISPLAY ACCEPTED
 IST075I  VTAM DISPLAY - NODE TYPE= PU_T4/5
 IST486I  NAME= N245F35  ,STATUS= ACTIV           ,DESIRED STATE= ACTIV
 IST247I  LOAD/DUMP PROCEDURE STATUS = RESET
 IST484I  SUBAREA = 024
 IST391I  ADJ LINK STATION = P14040   LINE = L14040   ,NODE = N14BF3P
 IST391I  ADJ LINK STATION = P040A6   LINE = L040A6   ,NODE = N043F35
 IST391I  ADJ LINK STATION = P04024   LINE = L04024   ,NODE = N043F35
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST675I  VR =  1 , TP =  2
 IST170I  LINES:
 IST080I  L24032   NEVAC      L24033   ACTIV----E L24020   ACTIV
 IST080I  L24022   NEVAC-N---
 IST314I  END

d net,ID=l24022
 IST097I DISPLAY ACCEPTED
 IST075I  VTAM DISPLAY - NODE TYPE= LINE
 IST486I  NAME= L24022   ,STATUS= NEVAC           ,DESIRED STATE= INACT
 IST087I  LINE TYPE= LEASED     LINE GROUP= G24S1
 IST134I  MAJNOD= N245F35
 IST329I  THIS NODE WAS NOT ORIGINALLY OWNED BY THIS HOST
 IST655I  LINE TRACE STATUS = TRRES TG TRACE STATUS = TRRES
 IST314I  END

d net,e,id=p24022a
 IST097I DISPLAY ACCEPTED
 IST075I  VTAM DISPLAY - NODE TYPE= PHYSICAL UNIT
 IST486I  NAME= P24022A  ,STATUS= RELSD           ,DESIRED STATE= RELSD
 IST081I  LINE NAME= L24022   , LINE GROUP= G24S1    , MAJNOD= N245F35
 IST329I THIS NODE WAS NOT ORIGINALLY OWNED BY THIS HOST
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST355I  LOGICAL UNITS:
 IST080I  TUSER2   RESET
 IST314I  END

v net,act,id=l14022
 IST097I  VARY     ACCEPTED

 IST093I  L24022   ACTIVE
```

In the event that the path to TUSER2 fails, the operator could switch the link or physical unit from NCP N043F35 to NCP N245F35 using a cross-bar switch or by moving cables. The operator would then issue the following commands. The 'acquire' and 'activate' operands may both be specified on the same 'vary' command.

```
V NET,REL,ID=P040A2A,I
V NET,ACQ,ID=P24022A,ACT
```

TUSER2 IS KNOWN TO ACF/VTAM AS A PART OF N245F35



*--RESOURCES KNOWN TO ACF/VTAM WITH STATUS OF RELSD (Released)

Sample Console output

```
v net,rel,id=p040a2,i
 IST097I  VARY     ACCEPTED
 IST487I  VARY INACT SCHEDULED FOR ID = P040A2A BY VARY REL
 IST105I  P040A2A NODE NOW INACTIVE
 IST670I  VARY REL  PROCESSING FOR ID= P040A2A COMPLETE

v net,acq,id=p24022a,act
 IST097I VARY      ACCEPTED
 IST670I VARY ACQ PROCESSING FOR ID= P24022A COMPLETE
 IST487I VARY ACT  FOR ID = P24022A   SCHEDULED BY VARY ACQ

 IST093I  P24022A  ACTIVE

d net,id=p14022a,e
 IST097I DISPLAY ACCEPTED
 IST075I  VTAM DISPLAY - NODE TYPE= PHYSICAL UNIT
 IST486I  NAME= P24022A  ,STATUS= ACTIV           ,DESIRED STATE= ACTIV
 IST081I  LINE NAME= L24022   , LINE GROUP= G24S1    , MAJNOD= N245F35
 IST329I  THIS NODE WAS NOT ORIGINALLY OWNED BY THIS HOST
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST355I  LOGICAL UNITS:
 IST080I  TUSER2
 IST314I  END

d net,id=tuser2
 IST097I DISPLAY ACCEPTED
 IST075I  VTAM DISPLAY - NODE TYPE= LOGICAL UNIT
 IST486I  NAME= TUSER2   ,STATUS= ACTIV           ,DESIRED STATE= ACTIV
 IST081I  LINE NAME= L24022   , LINE GROUP= G24S1    , MAJNOD= N245F35
 IST329I  THIS NODE WAS NOT ORIGINALLY OWNED BY THIS HOST
 IST135I  PHYSICAL UNIT= P24022A  ,
 IST082I  DEVTYPE= LU   , ALLOC TO=          ,CONTROLLING APPL=
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST314I  END
```

2.1.4 : NETWORK MAINTENANCE STATUS

In the context of Problem Determination, an accurate and up-to-date record of the maintenance levels of all systems components, hardware as well as software, must be kept available. The sample shown here reflects the pattern that should be followed and is useful as a planning chart. Keeping this type of record in manual format, however, is not recommended. The IBM Program Product 'Info/Management' permits recordkeeping in a structured and interactive manner.

An example of the usefulness of Info/Management in a PD situation is provided in chapter 4, section 4.3 'Info/Management'.

System Type:	Maintenance Level:	Additional PTFs:
Access Method:	Maintenance Level:	Additional PTFs:
Access Method:	Maintenance Level:	Additional PTFs:
NCP Level:	Maintenance Level:	Additional PTFs:

2.2 : OPERATIONAL NETWORK MANAGEMENT

Operational Network Management deals with the day-to-day issues of effective operation. For best results, this work should be proceduralized and structured into:

- Normal operating procedures
- Operating procedures in exception situations
- Network test procedures in case of failures

This section discusses each of these in turn.

2.2.1 : DEVELOPING OPERATION PROCEDURES

Operating procedures must be tailored to each particular situation. Typically an installation has to consider the development and documentation of operating procedures for normal conditions and for exception situations. Examples of 'normal operation procedures' would be:

- Network bringup procedures
- Network shutdown procedures
- Planned network reconfiguration procedures, such as may be neccessary when domains in other than the home time zone must be serviced

Exception situations will occur in all environments and can be responded to in a proceduralized manner. Examples of such situations are:

- Invoking backup links
- Restoring normal links after repairs
- Performing tests

The subject of testing is covered in subsequent sections. At this time, it should suffice to review the above examples and think about the issues of:

- Documenting the procedures
- Making the documentation available to the network operators in the most convenient manner

The IBM Program Product 'Network Communications Control Facility (NCCF)' offers an important function that can be used to advantage for this purpose in an interactive way. Please refer to Chapter 4, section 4.2.1 for examples of the use of CLISTs. This facility is flexible enough to enter an entire Operators' Guide on line.

2.2.2 : SAMPLE INSTALLATION TESTS

INTRODUCTION

In this section we list a collection of tests for an SNA installation. These tests are grouped in the two classes:

- Tests relating to Service Aids
- Tests relating to Error Recovery.

TESTS RELATING TO SERVICE AIDS

T E S T	O P E R A T I O N
1.- Test Link Level 2 Test. (with an active PU)	- Activate the PU - Issue the command LL2 Test - It should fail
2.- Test Link Level 2 Test. (with an inactive PU)	- Inactivate the PU - Issue the command LL2 Test - Results should be displayed - Use NPDA if in error Note: Not supported by all PU's.
3.- Test VTAM Trace. (I/O and buffer)	- Start VTAM and NCCF - Start Application - Trace application (from NCCF) - Trace terminal(from NCCF) - STOP TRACE (from NCCF) Symptoms: The trace commands should be accepted. Displays should indicate that traces are on.
4.- Print VTAM Traces using local batch job and printer.	- Use Traces of previous test (N. 3) - Start TPRINT Batch Job (VSE) - Use AMDPRDMP utility if MVS - Print Job Output - Review Output
5.- Print VTAM Traces using RJE to submit and print.	- Use Traces of previous test (N. 3) - Submit TPRINT Job from Central site - Or AMDPRDMP utility if MVS - Examine Output at central site - Print Output
6.- Test IMR on 3705 to Remote	- Establish net - Begin IMR on 3705 link - Cause temporary errors - Use NPDA to review errors
7.- Test NCP Dump/Recovery	- Establish net - Press IPL button on 3705 - Dump and Load should be Auto - Observe symptoms - Recover Net

8.- Test NCPDUMP Print Utility.	- Print NCPDUMP from Test Number 7 - Examine Output
9.- Test NPDA (Remote system)	- Establish session with Local NCCF - Start C-D session with Remote NCCF - Enter NPDA - Set domain to Remote NCCF - Preview errors on Remote system
10. Print Remote system log at Central site.	- Establish C-D session - RJE - Submit job at central site - Job should be sent to remote site - Output should come to central site
11. Print Logrec in remote system.	- Establish C-D session - RJE - repeat previous operations - Output should go to Power queue
12. Test Communication Adapter Line Trace.	- Deactivate the PU - Start Adapter Trace - Activate PU - STOP Trace
13. Print Communication Adapter Line Trace.	- Print data from the previous Test(N.12)
14. Test SMS (VTAMBUF) on VSE.	- Establish C-D sessions (NCCF) - Start SMS Trace (NCCF) - Start SDAID with VTAMBUF (Tape)(DCCF) - Stop SDAID - Print Output
15. Test I/O activity Trace (VTAMIO).	- Start SMS Trace (VTAM/NCCF) - S SDAID with VTAMIO (Tape) - Stop SDAID - Print Output
16. Test PDZAP from NCCF/DCCF.	- Establish NCCF/DCCF SPSSIUT - Use PDZAP to change Modetab - Deactivate resource - Reactivate and trace Bind for change verification.
17. Test DOSVSDMP. (Refer to LY33-9101 ppv24)	- Setup and test DOSVSDMP - Print Dump
18. Test ACFTAP.	- Use ACFTAP to print Line Trace - Use ACFTAP to print I/O Buf Data

TESTS RELATING TO ERROR RECOVERY

T E S T	S E T U P
1.- Test to validate Local Modem. (Remote error symptoms)	- Deactivate C-D Link - Turn off local (NCP) modem - Activate C-D Link - Note error - Fix and retry
2.- Test to validate Local Modem in use.	- Activate C-D Link - Turn off local modem - Note error - Fix and retry
3.- Open Link, validate ERP. Remote error symptoms	- Activate C-D Link - Open Link - Observe errors at 3033 and VSE - Fix and note recovery
4.- Test of Network Capacity. (It is for Performance/Capacity)	- Establish TSO session - Send large output from OS to VSE - Observe TSO response times - Note errors if they occur - Use VSE/PT to observe performance.
5.- Open Link, prior to activation.	- Inactivate the link - Open the Link - Activate Link and PU - Note should indicate Pending - Should be no problem at 4331
6.- Power off of remote modem, inactive line.	- Deactivate the C-D link (MVS) - At 4331, deactivate C-D link - Turn off 4331 modem - Activate C-D link at 4331 - Activate C-D link at MVS
7.- Remote modem failure with active link	- Activate C-D session - Turn off remote modem - Note errors - Turn on remote modem - Activate Link at 4331.

8.- VSE errors, CPU failure	- Establish running net - IPL 4331 - Restart 4331 - Monitor symptoms at host - Take Host recovery action
9.- VSE VTAM failure	- Establish running net - Cancel VTAM - Observe symptoms at 4331 - Observe symptoms at 3033 - Recover net
10. VSE power failure	- Establish running net - Cancel power - Observe symptoms at 4331 - Observe symptoms at 3033 - Recover net, wait 1 minute.
11. VSE OCCF failure.	- Establish running net - Cancel OCCF - Observe symptoms at 4331 - Observe symptoms at 3033 - Restart OCCF
12. VSE NCCF failure.	- Establish running net - Close NCCF IMMED (DOS console) - Observe symptoms at 4331 - Observe symptoms at 3033 - Restart NCCF/OCCF
13. VSE local 327X failure.	- Establish running net - Establish TSO session - Power off local 327X - Observe symptoms in network (use display) - Check NPDA (VSE), Power on.
14. VSE remote 327X failure.	- Establish TSO session - Power off remote 327X on VSE - Observe symptoms in network (use display) - Power on and validate recovery.

15. VSE application failure.	- Establish CICS sessions - Cancel CICS in VSE - Observe symptoms in network(use NCCF) - Restart CICS - Observe recovery.
16. VSE to VSE, 3705 failure.	- Establish net - Establish VSE to VSE session - Issue V NCP,INACT,R - Observe symptoms - Recover VSE to VSE session.
17. Line printer.	- Start printer job - Stop printer - Observe messages - Start printer.
18. Simulate disk drive failure.	- Backup system pack - Establish net, start utility - Disable system pack - Restore tape to alternate pack - Restart utility.
19. Remote system power failure	- Establish net - Power down CPU - Power down local devices - Observe errors at 3033 - Power up and restart system, observing any recovery problems.

2.2.3 : INSTALLATION TEST PLANS

MASTER SCHEDULE

Test:_____ Page ___ of ____

Test Number	Test	Date Started	Date Completed

UNIT TEST

Test Number:_____ Date Started :_____

Date Completed:_____

Test Description:_____

Error Simulated:_____

_____

_____

_____

Test Procedure: _____

_____

_____

_____

_____

TEST RESULTS

Test Number:_____ Date Started :_____

Date Completed:_____

Test Description:_____

External Symptoms:_____

_____

_____

Error Messages:_____

_____

_____

ACF/VTAM Display Verification (Before):

LU Status:_____ PU Status:_____ Line Status:_____

APPL Status:_____ NCP Status:_____

ACF/VTAM Display Verification (After):

LU Status:_____ PU Status:_____ Line Status:_____

APPL Status:_____ NCP Status:_____

Recovery Procedures:

1._____

2._____

3._____

4._____

5._____

ENTER USER NOTES HERE:

CHAPTER 3 : PROBLEM DETERMINATION/ISOLATION PROCEDURES

This section of the guide contains typical Problem Determination Isolation Procedures (PD/IPs) for many of the problems which may be encountered in an SNA system. The PD/IPs contain procedures that should be used to isolate the failing sequence or component.

Preceding each Problem Determination/Isolation Procedure (PD/IP) is a list of commonly experienced problems and their causes. A review of these typical installation problems may isolate the problem before the PD/IPs are entered.

CONTENTS

3.1 : GENERAL PROBLEM ISOLATION HINTS

There are some basic ground rules for doing problem isolation in a VTAM based SNA network. This section establishes the basic isolation steps that are prerequisite for most of the problem determination procedures that follow this section.

As a general rule, the interactive tools are preferred over the batch ones, specifically:

- Network Communication Control Facility (NCCF), see Section 4.2.1.
- Network Problem Determination Application (NPDA), see Section 4.2.2.
- Network Performance Analyzer (NPA), see Section 4.3.2.

Insufficient VTAM buffer specifications	Now with the dynamic buffering of Release 3, these problems are minimized. Only watch the IO buffers.
Insufficient virtual storage	DOS/VSE - VTAM uses VPBUF for dynamic storage requirements such as 'OPNDST', 'CLSDST', and building of major node resource definition tables (RDT).
Insufficient system resources	During activation, deactivation, and error recovery VTAM requires additional virtual storage. This can increase the paging rate for the system.
Incorrect VTAM definitions	Most SNA network problems are due to incorrect network definitions. Installation guides should be used for initial network definitions. SNA Product Installation Guide (G320-6028) is recommended.
Sessions/Routing anomalies	One general recommendation is to have ready several sessions with different possibilities of: • Transmission groups • Explicit routes • Virtual routes • Priorities and when having a session/routing problem, determine where the fault is by activating another similar session.

Problem Isolation Steps	Reference Page(s)	Description
VTAM buffer utilization must always be monitored. Start SMS trace for VTAM buffers.	4-114	Shortage of VTAM buffers is the most common problem in the installation or operation of a VTAM2 based SNA system.
Or also display VTAM buffers with the command D NET,BFRUSE).	5-17	The display will indicate condition of ACF/VTAM buffers. Buffer use should be monitored for abnormal buffer use, steady-state, and expansion frequency.
RNIO and BUFFER traces should always be started for the NCP when isolating problems with devices attached to the NCP.	4-114 4-133 6-1	All errors for lines, physical units and for the NCP can only be detected by tracing the NCP (or using NPDA).
If ACF/VTAM, the VTAM internal trace should be used for random errors or if all activity is to be monitored. (A previous level of internal trace allows D NET,MSGMOD=YES which gives the names of VTAM modules that originated the messages).	4-114	All activity with VTAM will be recorded. IO and Buffer traces are not recommended when running internal trace.
Examine the console log.		The console log is the most important debugging tool available for problem isolation. Always save the console log for validating previous operational problems or failing sequences.
Print the VTAM network definition at the time of failure.	4-140	Many network problems can be resolved by examining the VTAM definitions and comparing them with good samples. The SNA Product Installation Guide (G320-6028) is a good reference.
Performance problems		The interactive tool NPA is useful to determine quickly if the problem is in the network.

Documentation required for IBM	Ref. Page	Special Instructions
Trace reports.	4-114 4-133 6-1	
Console log.		

3.2 : VTAM WILL NOT INITIALIZE

SYMPTOM:

VTAM indicates that it cannot be initialized or VTAM does not indicate at the console that it has been initialized. Message IST020I(5A20I) 'VTAM INITIALIZATION COMPLETE' is not displayed.

Insufficient buffer specifications	VTAM buffer specifications are dependent on the individual network definition. A certain number of buffers must be available for VTAM to activate the network. ACF/VTAM buffers should be computed for the steady state, then allow VTAM to expand for unusual conditions, such as startup, shutdown or an application being cancelled.
VTAM partition/region virtual size not adequate	In all operating systems except MVS, VTAM's partition must be large enough to contain all program modules and buffers. Check the appropriate storage estimates reference manual and confirm that the region or partition size is large enough. MVS requires an initial startup of approximately 1024K. This value should be specified in the region parameter.
VTAM partition real allocation too small (DOS/VSE)	DOS/VSE requires that the real storage allocated to a partition be equal to or greater than VTAM's fixed buffer requirements plus VTAM's fixed module requirements.
VTAM not installed correctly	The operating system must be generated to include VTAM. A full sysgen is required.

Problem Isolation Steps	Reference Page(s)	Description
Try to initiate VTAM using a minimum startup procedure. File member ATCSTR00 in SYS1.VTAMLST (B.book for DOS/VSE) with only CONFIG=00 and SSCPID=01 specified. Next, file a member ATCCON00 consisting of one blank card in SYS1.VTAMLST (B.book for DOS/VSE).		If VTAM initializes with this minimum startup procedure, we know VTAM was installed in the system correctly.
If the minimum startup procedure does not work, check the sysgen to confirm that VTAM has been included in the system correctly.		VTAM must be included in the system at sysgen time.
If the minimum startup procedure works, check that the region or partition size is sufficient.		This is one of the most common causes of this problem. Recalculate the storage requirements for your configuration.
Recheck the startup parameters you are using.	4-140	Insufficient buffers will cause VTAM to initialize in a minimum configuration but fail to initialize with your network configuration. Recheck your buffer calculations. Verify that there are no missing commas in the startup member or the onfiguration member being used from VTAMLST (B.book in DOS/VSE). Reconfirm that continuation characters are in column 72.

Documentation required for IBM	Ref. Page	Special Instructions
Dump of VTAM partition/region		Check VTAM buffer pools in dump to see if any pools are depleted
Dump of CSA (MVS)		
Console log		
Copy of VTAMLST or B.book for DOS/VSE		

3.3 : VTAM WILL NOT TERMINATE

SYMPTOM:

'VTAM IS NOW INACTIVE' message is not received after entering 'Z NET' command.

Application program still active

VTAM will not terminate if an application program has an open ACB. Applications should either be cancelled from the operator's console or should issue a CLOSE ACB macro when their TPEND exit is driven.

Insufficient VTAM buffers

VTAM requires buffers to terminate. If there are insufficient buffers available, VTAM will not be able to terminate. Check your buffer specifications or take a dump and check the buffer pools for depletion.

Resource is hung

VTAM attempts to terminate all sessions in an orderly fashion. If no response is received to the termination sequence for a node, VTAM will wait and will not terminate.

If a logical unit is in session with an application program, the logical unit will not deactivate regardless of the VTAM vary inactive modifier used, until the application does a 'CLSDST'. If the application does not have a LOSTERM exit routine, the session must be terminated by an application operator command, or by terminating the application program. Refer to the VTAM operator commands section of this manual to see what each of the VTAM vary command modifiers do. VTAM will not terminate until all active sessions are terminated.

Operator reply outstanding

If there is a TOLTEP operator reply outstanding, VTAM will not terminate.

Application partition/region size insufficient

If there is not enough storage available in the application region or partition for CLSDST processing, the application program may not be able to terminate. This prevents VTAM from terminating.

Problem Isolation Steps	Reference Page(s)	Description
Display status of each application using VTAM display commands.	5-3	This display of the applications will indicate if any sessions still exist. If the display indicates there are nodes in session, display the nodes. If the status of the node is ACT, the application has not issued 'CLSDST'. Issue the VTAM vary inactive command with the immediate modifier for the node. This will drive the application's LOSTERM exit, which should issue 'CLSDST'. If the display of the node indicates its status is ACT/U, the application has issued 'CLSDST', but VTAM has not completed the UNBIND. In this case, enter 'V NET,INACT,F,ID=nodename (VTAM vary inactive command with the force modifier) to free the node. Each application program must close its ACB, or be cancelled, in order for VTAM to terminate. The Z NET command drives each active application's TPEND exit routine with a reason code of 0. The TPEND exit routine may or may not close its ACB. The Z NET,QUICK command drives each active application's TPEND exit routine with a reason code of 4. In this case the application should issue a 'CLOSE' macro for its ACB.
Display the status of the NCP to see which lines are still active. D NET,E,ID=ncpname	5-4	If no application sessions exist, VTAM is probably hung trying to free one of its own sessions. Find the lines that are marked active.
Display the status of the active lines and determine which PUs are active. D NET,E,ID=linename	5-5	The objective is to find the lowest level node that is hung and to issue a 'V NET,INACT,F,ID=' against it. This should free the system.
Display the status of the active PUs to determine which LUs are active. D NET,E,ID=puname	5-7	This display will give you a list of active logical units on this PU.
Issue a vary inactive with the force option to the active logical units one at a time until VTAM terminates. V NET,INACT,F,ID=luname	5-27	Determine which logical unit was hanging up the termination process and investigate further.

Problem Isolation Steps (continued from last page)	Reference Page(s)	Description
Issue Z NET,CANCEL if this feature is available	5-25	IF Z NET,CANCEL is not available, the system will probably have to be re-IPLed to terminate VTAM. This situation is not normal, and the IBM Program Support Representative should be contacted.

Documentation required for IBM	Ref. Page	Special Instructions
Dump of the VTAM partition/region		The VTAM partition will be dumped if the Z NET,CANCEL command is issued, providing the NET procedure contains a SYSABEND statement.
Dump of CSA (MVS)		
Console log		

3.4 : VTAM ABENDS OR WAITS

SYMPTOM:

VTAM ABENDS or waits during operation.

Insufficient Buffers

The most common cause of VTAM waits is a depletion of the I/O buffer pool (IOBUF in MVS, and LFBUF in DOS/VSE). If a terminal has a malfunction in which it continuously sends in data, the I/O buffers will quickly become exhausted and VTAM cannot do any further processing. If the number of I/O buffers is small, a READ FULL BUFFER command to a display can cause this also. On OS/VS systems, if the priority of GTF is low, and the VTAM trace activity is high, the trace data may back up in the I/O buffers and finally deplete the pool.

If the BUFLIM and BUFFACT values exceed the amount of buffers specified (VTAM 2 only), VTAM buffer depletion will take place.

VTAM not authorized

VTAM will abend if the main task and all subtasks are not authorized by placing them in OS/VS member IEAAPFxx (MVS ONLY). SYS1.VTAMLIB and the NCP load library must be authorized.

VTAM allocation for DOS/VSE partition too small

When operating a subtask in VTAM's partition, the partition size should be increased by the value the subtask would require if running in its own partition.

Subtask abends

Any program that operates as a VTAM subtask, such as NCCF(DOS) or the BTP (Batch Transfer Program), can contaminate VTAM's storage, causing it to abend.

API (VTAM Application Program Interface) routines not resident

On MVS systems, certain VTAM modules should be made resident. Chapter 8 of the MVS VTAM System Programmer's Guide (GC28-0688) discusses the PAK and FIX lists (IEAFIXnn and IEAPAKnn in SYS1.PARMLIB).

Bad application

VTAM application programs can cause VTAM to abend by improper usage of VTAM control blocks (DOS/VTAM only).

Problem Isolation Steps	Reference Page(s)	Description
On OS/VS systems, verify that libraries containing VTAM, VTAM subtasks, NCP load modules, and NCP utilities are authorized.		Refer to SNA Product Installation Guide (G320-6028), for sample JCL to authorize these libraries.
Review console log for a subtask abend.		The abending program should be placed in another partition/region until the problem can be resolved. This will often allow VTAM to continue operation.
Examine application program logic for routines that reuse an active RPL or that free the storage associated with an active control block.		If a new application has just been added to the system, it should be suspect.

Documentation required for IBM	Ref. Page	Special Instructions
Dump of VTAM partition or address space		VTAM being a system task, will dump to the SYS1.DUMPxx dataset.
Dump of CSA (MVS)		
Console Log		

3.5 : VTAM COMMANDS DO NOT WORK

SYMPTOM:

VTAM does not appear to be accepting any operator commands

Insufficient buffers

VTAM requires that buffers be available to create the control blocks which represent operator commands.

Insufficient storage

On OS/VS systems, VTAM does a GETMAIN for CSA in order to build a control block used for operator commands. Also, a 'VARY' command may result in the application program having to issue certain VTAM macros. If there is not enough free storage in the application partition, the command may not complete.

Application not issuing CLSDST

A 'V NET,INACT' command does not complete until the application program in session with the logical unit issues a 'CLSDST' macro.

Operator error

Improper use of VTAM operator commands can cause depletion of buffers used by VTAM for commands.

The 'V NET,INACT' command without a modifier (I or F) is intended to be used to prevent new sessions, not to terminate an existing session. VTAM will only schedule the action, it will not take action until the session is terminated by the application. If the session is to be ended at once, either the 'I' or the 'F' modifier should be used.

The 'V NET,INACT' command with the immediate (I) modifier will drive the application's LOSTERM exit. It is the responsibility of the application to issue 'CLSDST' to end the session. Only when the application issues 'CLSDST' will the vary command complete.

The 'V NET,INACT' command with the force (F) modifier will also drive the application's LOSTERM exit. When the application issues 'CLSDST', VTAM will respond immediately and not generate I/O for the resulting SNA CLEAR/UNBIND sequence. If the application does not issue 'CLSDST' in its LOSTERM exit, or does not have an LOSTERM exit, the vary command will not complete.

Problem Isolation Steps	Reference Page(s)	Description
If VTAM does not indicate that the command has been accepted, then VTAM is probably hung up.	DUMPS	A dump of VTAM's partition/region should be taken. The first thing to be suspected is buffer pool depletion or a VTAM internal problem.
If VTAM indicates the command has been accepted, and the command was a VARY, issue a 'VARY NET,INACT,ID=nodename,I' command.	5-27	The 'V NET,INACT' without a modifier does nothing if an application is in session with a node. In this case the node will only be varied inactive when the session has ended, because the application has issued 'CLSDST'. However, the 'V NET,INACT' with the immediate option will schedule the application's LOSTERM exit routine. If the application issues 'CLSDST' in its LOSTERM exit, the vary will complete.
If the vary was issued on a higher level node than the logical unit or terminal, issue VTAM display commands with the 'every' option to the higher level node. Then issue a VTAM display on the logical units or terminals.	5-8	If the status of the logical units or terminals is ACT/U, it means that the application has issued a 'CLSDST' macro, and a path error to the logical unit or terminal probably exists. If a status of ACT and ALLOCATED to a application exists, we know the application has not issued a 'CLSDST'. If the application cannot be made to 'CLSDST' the LU or terminal it may be necessary to cancel the application.
Issue a VTAM 'V NET,INACT' command with the force (F) modifier if the display indicates ACT/U for the logical unit.	5-27	This should free the logical unit or terminal hung with the ACT/U status.

Documentation required for IBM	Ref. Page	Special Instructions
Dump of CSA (MVS)		
Console log		The sequence of commands issued is necessary.
Dump of application		If the display commands show that the application never issued 'CLSDST'
Dump of VTAM's partition/region		Check for buffer pool depletion.

3.6 : LOCAL DEVICE WILL NOT ACTIVATE

SYMPTOM:

A local SNA controller will not activate at startup time, or when a 'V NET,ACT' command is issued.

NOTE

Here 'local SNA' means local-channel-attached SNA devices (IBM 3274-1A). The IBM 3272 and IBM 3274-1B are not SNA devices! The 'SNA appearance' of these devices (as well as BSC 3271s, above the link level), is implemented wholly in VTAM code. The SNA appearance of SDLC 3271/5 devices (again, above the link level), is implemented in NCP/VS code. Keep this in mind when going through the PD/IPs. In spite of the above, this PD/IP still applies to IBM 3272s and IBM 3274-1Bs, with the following exceptions. The Immediate (I) modifier is the only valid modifier (other than none) on the VTAM VARY command. This is because ACT/B, INA/B, INA/U, etc. states should not occur for these devices, because these physical unit functions are implemented in VTAM code, as stated above.

Inadequate VTAM buffers

If VTAM has insufficient buffers, it will not be able to activate a local device. The IOBUF(BUFSIZE) parameter must equal the UNITSIZE value in the NCP HOST macro definition.

IOBUF size (3274)

VTAM definition of UNITSZ must have minimum value of 80, and value of IOBUF is equal to MAXBFRU.

System allocation error

A system allocation error will occur if the device is offline, allocated to another access method, or not included in the sysgen. A system allocation error will also occur if the unit address in the VBUILD definition is not the actual ccu address of the 3270/3790.

ISTATUS of PU

If ISTATUS=INACTIVE is coded on the PU macro, the physical unit will not activate when the VBUILD major node is activated.

Problem Isolation Steps	Reference Page(s)	Description
Review VTAM buffer specifications.		Ensure that block size of IOBUF is at least 300 bytes, if local 3790 systems are included in the system. The minimum number of IOBUF buffers specified should be two times the sum of the MAXBFRU values coded on the 3790 PU f macros, the VBUILD major node, and the MAXBFRU values coded on the HOST macros of all the local NCPs.
Review LOGREC MDR records	4-89	If I/O errors occurred, the MDR records in LOGREC may be helpful in isolating the problem (also NPDA).
Run VTAM I/O and buffer traces for the physical unit, along with GTF I/O and SIO traces.	4-114 4-133 6-1	Check to see if an SNA 'ACTPU' command is sent to the 3790, and if a positive response is received.

Documentation required for IBM	Ref. Page	Special Instructions
Console log		
MDR records	4-89	
Traces gathered		

3.7 : LOCAL DEVICE WILL NOT DEACTIVATE

SYMPTOM:

A local SNA will not deactivate at network shutdown time, or when a 'V NET,INACT' command is issued.

NOTE

Here 'local SNA' means local-channel-attached SNA devices (IBM 3274-1A). The IBM 3272 and IBM 3274-1B are not SNA devices! The 'SNA appearance' of these devices (as well as BSC 3271s, above the link level), is implemented within the VTAM code. The SNA appearance of SDLC 3271/5 devices (again, above the link level), is implemented in NCP/VS code. Keep this in mind when going through the PD/IPs. In spite of the above, this PD/IP still applies to IBM 3272s and IBM 3274-1Bs, with the following exceptions. The Immediate (I) modifier is the only valid modifier (other than none) on the VTAM VARY command. This is because ACT/B, INA/B, INA/U, etc. states should not occur for these devices, because these physical unit functions are implemented in VTAM code, as stated above.

Inadequate VTAM buffers

If VTAM does not have sufficient buffers, it may not be able to deactivate the device.

LU still in session

If a logical unit is in session with an application program, the logical unit or local 3270 will not deactivate until the application issues 'CLSDST' to terminate the session. If a VTAM vary command with the immediate modifier is issued for the major node, the application's LOSTERM exit will be driven, for any existing sessions, and should issue 'CLSDST' to terminate the session. If the application does not have an LOSTERM exit, or is not issuing 'CLSDST', the local device will not be able to deactivate.

Problem Isolation Steps	Reference Page(s)	Description
Issue the VTAM display command with the every option, for the physical unit. For local 3270s, display the terminal.	5-7 5-8	If the status of any logical unit or terminal is ACT, the application has not issued 'CLSDST' to terminate the session. If the status of any logical unit is ACT/U, the application has issued 'CLSDST', but a response to the SNA CLEAR and UNBIND command sequence has not been received. A VTAM vary command, with the force modifier, should clear this condition.
If the status of any logical unit or terminal is ACT, issue a VTAM vary command with the immediate modifier to the physical unit, or to the terminal, for local 3277s attached via a 3272.	5-27	This will drive the application's LOSTERM exit, and the application should issue 'CLSDST' to terminate the session. If the application does not issue 'CLSDST', or does not have an LOSTERM exit, the device will not deactivate. Either use an application operator procedure to force 'CLSDST' to be issued, or the application may have to be cancelled.
If the status of the logical unit is ACT/U, issue a VTAM vary inactive command with the force (F) modifier.	5-27	This should clear the condition.
If the status of any logical unit was ACT/U, and the deactivate hang up is reproducible, run VTAM's I/O and buffer traces on the logical unit.	4-114 6-1	Check to see if the SNA CLEAR and UNBIND commands were sent, and whether a positive response was received. This will indicate whether the problem is in VTAM or in the physical unit.

Documentation required for IBM	Ref. Page	Special Instructions
Console log		
Copy of VTAMLST/B.book	4-140	
Traces gathered		

3.8 : LOCAL DEVICE ACTIVE BUT NOT COMMUNICATING

SYMPTOM:

A local SNA LU can be activated and establish a session, but no data transfer occurs.

NOTE

Here 'local SNA' means local-channel-attached SNA devices (IBM 3274-1A). The IBM 3272 and IBM 3274-1B are not SNA devices! The 'SNA appearance' of these devices (as well as BSC 3271s, above the link level), is implemented within the VTAM code. The SNA appearance of SDLC 3271/5 devices (again, above the link level), is implemented in NCP/VS code. Keep this in mind when going through the PD/IPs. In spite of the above, this PD/IP still applies to IBM 3272s and IBM 3274-1Bs, with the following exceptions. The Immediate (I) modifier is the only valid modifier (other than none) on the VTAM VARY command. This is because ACT/B, INA/B, INA/U, etc. states should not occur for these devices, because these physical unit functions are implemented in VTAM code, as stated above.

Inadequate VTAM buffers

If VTAM has an insufficient number of I/O buffers, it may not be able to communicate with the local device.

Local 3277 not in session

A local 3277 connected via a 3272 must be in session with an application in order for the system available light to come on. The light should stay on until a keyboard command is entered. The device status will show active, even if it is not logged on to an application.

Problem Isolation Steps	Reference Page(s)	Description
Issue a VTAM display command for the local 3270.	5-7	Check to see if the device is allocated to an application. If it is not, use the VTAM vary command with the logon option to allocate it to NETSOL or to the application desired.
If the problem can be repeated and the display indicates the device is allocated to an application, run VTAM's buffer trace for the device. Also, start a GTF I/O and SIO trace (OS/VS) or a VTAM trace (DOS/VSE) for the device.	4-114 4-133 6-1	Check if an attention interrupt is generated when the Enter key is hit. If an attention interrupt is not generated, a hardware problem should be suspected. If the attention interrupt is generated, but an SIO is not being issued, then VTAM is not doing a read. A VTAM buffer shortage should be suspected. If an SIO is generated, then VTAM has issued a read, and the buffer trace entries will indicate whether the application is receiving the data. A C/L entry indicates that the application has issued a RECEIVE macro and that VTAM has moved the data to the application's data area.

Documentation required for IBM	Ref. Page	Special Instructions
Console log		
Traces gathered		

3.9 : LOCAL DEVICE SESSION TERMINATES ABNORMALLY

SYMPTOM:

A local SNA LU can be activated and communicated with, but the session terminates during normal operation.

NOTE

Here 'local SNA' means local-channel-attached SNA devices (IBM 3274-1A). The IBM 3272 and IBM 3274-1B are not SNA devices! The 'SNA appearance' of these devices (as well as BSC 3271s, above the link level), is implemented within the VTAM code. The SNA appearance of SDLC 3271/5 devices (again, above the link level), is implemented in NCP/VS code. Keep this in mind when going through the PD/IPs. In spite of the above, this PD/IP still applies to IBM 3272s and IBM 3274-1Bs, with the following exceptions. The Immediate (I) modifier is the only valid modifier (other than none) on the VTAM VARY command. This is because ACT/B, INA/B, INA/U, etc. states should not occur for these devices, because these physical unit functions are implemented in VTAM code, as stated above.

Application program terminates the session

In VTAM Level 2 if the product of BUFLIM (coded on the LOCAL or LU macro), and BUFFACT (coded on the application major node defined in VTAMLST/B.book), is exceeded by the amount of input data queued by VTAM from a terminal or logical unit, VTAM will free the buffers containing the data, and drive the application's LOSTERM exit. The application should issue 'CLSDST' in its LOSTERM exit.

Storage shortage

On a DOS/VSE ACF/VTAM system, if the application does not have a RECEIVE macro outstanding, VTAM will place the data received in VPBUF. If VPBUF is short on storage, then the session will be terminated; there is no ACF/VTAM dynamic buffer allocation for VPBUF.

On OS/VS versions of ACF/VTAM, if the application does not have a RECEIVE macro outstanding, VTAM will place data received from a logical unit in the application's region. If storage is not available in the application's region, VTAM will free the data received, issue an SNA 'CLEAR' command to the logical unit, and drive the application's LOSTERM exit routine.

(continued)

Application program error	The application may be terminating the session because of an error condition. For example, a no-data-entered timeout condition on TSO, will cause TSO to issue 'CLSDST', and terminate the session.
Test Request key	If the Test Request key is hit on a local 3270, VTAM drives the application's LOSTERM exit, and the application may terminate the session. A zap is available to prevent this from occurring. Refer to the VTAM/NCP problem isolation information section of this manual.

Problem Isolation Steps	Reference Page(s)	Description
For local 3270s, review the terminal operator's procedures prior to the failure.		If the Test Request key was hit, it is the reason for session termination. If a very large screen of data was entered and/or the reset and enter keys were pressed several times, the BUFFACT/BUFLIM values may have been exceeded, thus terminating the session.
Review application logs or traces.		If the application recorded feedback codes when its LOSTERM exit was driven, they may help to isolate the problem.
For local SNA devices (3274-1A), see the PD/IP for 'LOGICAL UNIT'S SESSION TERMINATES ABNORMALLY'.		

Documentation required for IBM	Ref. Page	Special Instructions
Console log		
Copy of VTAMLST/B.book	4-140	
Application logs or traces		If available

3.10 : APPLICATION DATA LOST

SYMPTOM:

An application program can communicate with an LU or terminal, but all the inbound or outbound data is not received.

Application program error

Improper application program coding can cause message truncation or loss of messages. For Basic Mode devices, a program should issue a READ-SPECIFIC to obtain data in excess of the read-area size in the initial read. The same holds true for Record Mode devices and their RECEIVE macros.

If a program does not have an LOSTERM exit, and the product of BUFLIM and BUFFACT is exceeded for the terminal, VTAM will post an active READ or RECEIVE RPL with a feedback code, indicating the data was purged. This error is applicable to BASIC mode terminals for all levels of VTAM and to RECORD mode devices for VTAM level 2. Inadvertent specification of the 'TRUNC' option on the RPL or NIB can also cause data to be lost.

Problem Isolation Steps	Reference Page(s)	Description
Run VTAM's I/O and buffer traces on the logical unit or terminal.	4-114	This will indicate whether all the data was received by VTAM and passed to the application program. Comparing the data and length in the TPIOS buffer entry, to the data and length in the C/L buffer entry will help in isolating the problem.
For ACF/VTAM, if data is being lost between the application and ACF/VTAM, run the ACF/VTAM internal trace with the API and PIU options.		This will trace all the Application Program Interface activity, at a detailed level.
If the data is being lost outbound from the host, run an NCP line trace.	4-114	This will determine if the data is being lost by the NCP, or by the logical unit/terminal.

Documentation required for IBM	Ref. Page	Special Instructions
Traces gathered		
Terminal output		
Application trace		If available

3.11 : APPLICATION PROGRAM CANNOT OPEN ITS ACB

An application program gets an abnormal return code when it tries to open an ACB.

Inadequate VTAM buffers

If VTAM has insufficient buffers, it will reject the application's OPEN macro and will not open the application's ACB. The return code to the OPEN macro will indicate this condition.

ACB already active

If an application abends, or closes its ACB without doing a 'CLSDST' for all of its active sessions, VTAM will terminate all the application's sessions. VTAM, however, will not indicate that the ACB (to VTAM, the ACB IS the application) is inactive until all SNA 'UNBIND' commands have been responded to by the logical units. It is possible then, for the application program to restart before VTAM has completed this procedure, because one or more logical units may be hung, and may not respond to the SNA 'UNBIND' command. In this case, the application's (second) OPEN ACB request will be rejected, and the return code will indicate that the application is already active.

Application program not defined to VTAM

Application programs must be defined in an active application major node. The correct password must also be provided, if one is specified in the 'APPL' statement.

Application program at higher priority than VTAM (DOS/VSE)

The partition in which the VTAM application program is running must be at a lower priority than the VTAM partition (DOS/VSE only).

Problem Isolation Steps	Reference Page(s)	Description
Issue a VTAM display command to the application with the every option, and an operating system display for the job name of the application.	5-3	If the application is still active to VTAM, but not to the operating system, see the PD/IP for APPLICATION-STICKS-IN-SYSTEM. If the application is shown as active to the operating system, terminate it or cancel it with a dump.
Review the application's OPEN ACB return code.		The return code should indicate the reason for the problem.
Review VTAMLST/B.book and the application's ACB definition.		Verify that the right names and passwords correspond.
Run an SMS buffer pool trace, and attempt to start the application. For ACF/VTAM, the VTAM buffer pool status can be displayed on the network console.	4-114	If the display or trace shows a buffer shortage, review your buffer calculations.

Documentation required for IBM	Ref. Page	Special Instructions
Console log		
VTAM dump		
Dump of CSA (MVS)		
VTAMLST/B.book	4-140	
Application log,trace, or dump		Check the return code from the OPEN ACB.

3.12 : APPLICATION PROGRAM STICKS IN SYSTEM

SYMPTOM:

An application program cannot close its ACB, or the program terminates, and VTAM still shows it as being active.

Hung LU

If an application issues 'CLSDST' on all sessions when it is shutdown, it may not terminate completely until all the logical units respond to the SNA 'UNBIND' commands, and the CLSDST's complete. If the application closes its ACB, VTAM will terminate the application's active sessions. VTAM, however, does not indicate the application is inactive, until a response is received for all the SNA 'UNBIND' commands sent to the logical units to terminate the sessions.

Inadequate VTAM buffers

If the application does not limit the number of 'CLSDST' macros it issues concurrently, VTAM buffer specifications may not be enough to support this peak demand for certain buffer pools at application shutdown.

Inadequate application program partition/region

Each concurrent OPNDST or CLSDST, requires approximately 2.5K of available storage in the MVS CSA (Common System Area), and approximately .8K of the application's partition in OS/VS1 Release 6. Approximately 1K of storage is required in VPBUF for DOS/VTAM.

Problem Isolation Steps	Reference Page(s)	Description
Issue the VTAM display command with the every option, for the application.	5-3	If any sessions show active, refer to the PD/IPs entitled 'LOGICAL-UNIT-WON'T-DEACTIVATE' or 'BSC WON'T-DEACTIVATE'.
Run an SMS buffer pool trace, or display the buffer status on ACF/VTAM.	4-114	If any buffer pool is being depleted increase both its number ('bno') and threshold ('bth').
If no sessions are hung, cancel the application with a dump.		This dump will show if any RPLs are outstanding.

Documentation required for IBM	Ref. Page	Special Instructions
Console log		
SMS trace or VTAM dump (CSA dump in MVS)		Check for buffer pool depletion
Application dump		

3.13 : NCP WILL NOT ACTIVATE

SYMPTOM:

VTAM does not indicate that the NCP is active.

Insufficient buffers

VTAM will not activate the NCP if there are insufficient VTAM buffers. VTAM must have sufficient buffers to allocate for receiving messages from the NCP. IOBUF (OS/VS) or LFBUF (DOS/VSE) should be 2 to 2.5 times the sum of the MAXBFRU values specified in the HOST macros of the NCPs. An SMS buffer pool entry will show this is the case.

Bad NCP generation

If an I/O error message is received after NCP loaded message check that the BUILD macro properly reflects the type of channel adapters installed in the 3705. An I/O error will occur after VTAM indicates that the 370X has been loaded if the 370X has failing channel hardware or the NCP was generated incorrectly.

Loader utility not in SYS1.LINKLIB

Confirm that the NCP load utilities (OS/VS: PGM=IFLOADRN, DOS/VSE: PHASE CXWMAXI1, CXWMAX2, CXWMINI1, and CXWMINI2) and the initial test utilities are available to VTAM. VTAM will abend if SYS1.LINKLIB or a library contained in LNKLSTnn does not contain the 370X utilities called for by VTAM for initial testing and loading of the 370X. For OS/VS, the SSPLIB data set provided on the NCP tape must be added to SYS1.LINKLIB or pointed to by LNKLSTnn.

Down-level loader utility

A down-level NCP loader utility may cause an I/O error or may cause VTAM to wait for a response that it will never get.

Internal name of NCP is not the same as the NEWNAME operand on the BUILD macro

When a message is received saying the vary failed for the NCP, check that the internal name of the NCP is the same as the NEWNAME operand specified on the BUILD macro. If the internal name of the NCP is not the same as the NEWNAME operand defined in the NCP definition filed in VTAMLST/B.book, VTAM will indicate that it cannot activate the NCP.

VTAM start definition in error

If a continuation on the startup list for VTAM is missing or a comma is left off, the NCP activation may fail because of defaults.

NCP WILL NOT ACTIVATE

(continued)

NCP load module and NCP definition in VTAMLST/B.book is not the same	When a new NCP is generated and the VTAMLST/B.book definition is updated, but the VTAM JCL start procedure does not point to the new NCP, VTAM will abend.
NCP requires more time to activate	The NCP may still be in the process of activation if some of its lines are not operational and a large ENABLTO (enable timeout) value has been specified on the BUILD macro. VTAM must activate all lines or wait for the enable timeout to occur, before VTAM will indicate that the NCP is active. VTAM activates the lines on the NCP sequentially. The data set ready signal must come up on the MODEM or the enable timeout value must be reached, before VTAM will issue an activate-link command to the next line. If there are many lines on the NCP which have MODEMs that require time to equalize before bringing up data set ready and there are lines without MODEMs at the NCP end, the time for VTAM to indicate the NCP is active may be considerable.
NCP parameter error	VTAM will reject the request to activate the NCP because of missing parameters or incorrect continuation control in column 72 of the NCP source deck filed in VTAMLST/B.book.
370X channel adapter subchannel addresses not plugged for correct range	In a PEP configuration, the 370X channel adapter hardware must be plugged for the correct range of subchannel addresses. These addresses must include the range of subchannel addresses specified in the LOCHAN-HICHAN operands of the BUILD macro. Furthermore, in the case of the Type 4 Channel Adapter, the native subchannel address of the 370X must not be in the HICHAN-LOCHAN range.
Second 3705 channel adapter not disabled	When PEP is loaded into a 3705 with more than one channel adapter, the 'other' channel adapter must be disabled, else PEP will loop. This channel adapter may be manually enabled after the load is complete; this applies to NCP/VS Version 5.

NCP WILL NOT ACTIVATE

(continued)

3705 channel adapter not enabled	The 3705 channel adapter must be enabled. Be aware that if the NCP abends and the 3705 goes into a HARD STOP state, the NCP (or PEP) will vary the channel adapter(s) offline INTERNALLY within the 3705 with no visual indication of this having happened on the 3705 control panel. The CHANNEL ADAPTER ENABLED light(s) on the panel will remain lit! It will not be possible to reload the 3705 (load program will program check), without first manually disabling the channel adapter(s) at the 3705 control panel, selecting the IPL adapter (on 3705s with the IPL channel adapter select switch), doing a RESET, enabling the channel adapter(s), and pressing LOAD. If you are loading PEP, then disable the non-IPL adapter at this point; see comments above.

Problem Isolation Steps	Reference Page(s)	Description
If VTAM indicates that the activation of the NCP was rejected, examine the NCP source definition in VTAMLST/B.book.		Incorrect continuation control in column 72, or missing VTAM-only operands are a common cause of this problem.
Set VTAM startup parameters in ATCSTRxx to start buffer, I/O ,and SMS buffer pool trace.	4-114 6-1	The CONFIG=xx specification in the VTAMLST/B.book member ATCSTRnn must precede the start trace commands or errors will result. Member ATTCONxx should include the name of the NCP you wish to activate. With these startup parameters VTAM will automatically attempt to load and activate the NCP.
Start GTF to trace SIOs and I/O interrupts for the 370X, and also user (USR) data.	4-133	The user data will be from the VTAM traces.
Press reset and load on the 370X and start VTAM.		VTAM will automatically attempt to load and activate the NCP and traces will be recorded.
Issue a VTAM display to the NCP twice and see if the SIO count is still increasing.	5-4	If the SIO count to the NCP is increasing, then we know that the NCP is still in the process of activating. If the SIO count is static, then we are probably in a hung condition.
Compare the trace output to the sample NCP startup in the control and flow section of this manual.	6-5	This will indicate how far along the activation process has gotten.

Documentation required for IBM	Ref. Page	Special Instructions
NCP dump	4-138	
Traces gathered		
Record 370X control panel lights at the time of failure		

3.14 : NCP ABENDS

SYMPTOM:

The NCP abends and stores an abend code at x'760'. The presence of the abend code is indicated by a non-zero value.

User error	If a new NCP is generated and the user uses the old name, the VTAMOBJ file will contain the old description. The user may also have mixed the old RRT (NCPxxxxR) with a new NCP. A new NCP should always have a different NEWNAME than the old NCP (BUILD macro).
NCP generation and hardware incompatibility	The physical hardware and the NCP generation must match for channel type, model type, and CSB type. The NCP generation manual (GC30-3008) should be checked for mandatory parameters. Activation of a line when the 370X does not contain the appropriate features may cause an abend.
PIU too large (inbound only)	The product of MAXBFRU and UNITSZ must be greater than the largest PIU handled by the NCP. NCP will abend with an ABEND code X'0005'.
Transfer line error	The TRANSFR operand of the LINE macro specifies the number of NCP buffers that will be filled by the NCP prior to scheduling channel output to VTAM. If a generation value is specified that is higher than the NCP default value, the NCP will abend. The default value should be used for SDLC links but should be calculated for BSC lines. Reference the SNA Product Installation Guide (G320-6028) 'Sample NCP Source' for help in choosing the transfer value.

Problem Isolation Steps	Reference Page(s)	Description
If the problem can be reproduced, turn on VTAM's I/O and buffer traces for all the nodes in the network. Also start the SMS buffer trace.	4-114 4-133 6-1	It is often necessary to see the sequence of events leading up to the hung condition.
Take an NCP dump.	4-138	NCP stores an abend code at X'760'. The 3705 handbook has a description of these codes and their meaning.

Documentation required for IBM	Ref. Page	Special Instructions
NCP dump	4-138	NCP stores the abend code at X'760' if an abend occurred.
CSA dump (MVS)		
Copy of VTAMLST or B.book		
Trace of all nodes in the network		This trace should not be printed unless requested by IBM.

3.15 : NCP WILL NOT DEACTIVATE

SYMPTOM:

The message indicating that the NCP is inactive is not received.

Lower level node still in session	An application program has not issued a 'CLSDST' macro, or a logical unit has not sent a response to the SNA UNBIND command.
Insufficient VTAM buffers	If VTAM does not have sufficient buffers, the NCP may not deactivate.
VPBUF too small (DOS/VSE)	If using ACF/VTAM and VPBUF is too small. ACF/VTAM cannot activate the NCP. VTAM may also hang if this occurs.
Deactivation is slow	The larger the DELAY operand specified in the HOST macro of the NCP and the larger the network, the longer the NCP will take to deactivate. In addition, the NCP generates an end-of-day statistical MDR record for each non-SNA device and each SNA physical unit and line. This can take a significant amount of time.

Problem Isolation Steps	Reference Page(s)	Description
Issue the VTAM display command for the NCP twice. D NET,ID=ncpname	5-4	You will know that the NCP is still actively in the process of deactivating if the SIO count is changing.
Issue the VTAM display command for each of the applications. D NET, ID=application name	5-3	If any application still has an active session with a logical unit or terminal on the NCP, the NCP will not deactivate.
If no application has an active session, issue the VTAM command to display the NCP with the every option. D NET,ID=ncpname,E.	5-4	This will tell you what lines are still active.
Issue the VTAM display command for each active line with the every option. D NET,ID=linename,e.	5-5	This will tell you what physical units are still active.
Issue a VTAM vary inactive command with the force option for each active PU (VARY NET,INACT,F,ID=xxxxx).	5-27	This should allow the NCP to deactivate.

Documentation required for IBM	Ref. Page	Special Instructions
Dump of VTAM partition/region		
Dump of CSA (MVS)		
I/O and buffer trace of all nodes		
Dump of NCP	4-138	A dump of NCP is only needed if the traces were running.

3.16 : NCP ENTERS SLOWDOWN

SYMPTOM:

The NCP enters slowdown.

Insufficient buffers

If the NCP starts running out of buffers, it will signal VTAM that it is entering slowdown. This can be caused by VTAM running out of buffers, and not accepting input from the NCP.

Line trace running

If the NCP is tracing a line and the system is heavily loaded, the NCP may go into slowdown.

Tuning

This type of problem is usually related to improper tuning of the system. NCP operands that affect outbound message queuing on the line can cause this: primarily MAXOUT and PACING. PASSLIM, and the ratio of BFRS to MAXDATA may also be culprits. BFRS should be chosen, as close as possible, to be wholly divisible into MAXDATA. A segmented or unsegmented PIU always starts on a BFRS boundary. Poor line quality can also be a contributing factor, due to excessive use of NCP buffers for retransmissions.

370X too small

If the NCP goes into slowdown often, the storage and performance estimates of the 370X should be reviewed by IBM.

Problem Isolation Steps	Reference Page(s)	Description
Run a VTAM I/O trace for a short period of time, on all NCP nodes.		From the trace output, determine the average message lengths and transaction rates to identify tuning problems and/or arrive at storage and performance specifications.
Review NPDA information or 3705 LOGREC MDR records.	4-89	The records will indicate the number of SIOs and soft errors occurring on the links.
For ACF/VTAM environments, the tuning statistics option can provide useful information on demand. This is a new feature available through the ACF/VTAM Program Product.		This will assist in identifying tuning problems.

Documentation required for IBM	Ref. Page	Special Instructions
VTAM I/O traces		
Console log		
Copy of VTAMLST/B.book		

3.17 : LINE/LINK WILL NOT ACTIVATE

SYMPTOM:

Link does not come up active and cannot be varied active.

MODEM not turned on	If the MODEM is not turned on, or the cable is not plugged in, the link will not come active. In order to activate a link, the NCP brings up the data terminal ready (DTR) lead, and waits for the dataset ready (DSR) lead on the MODEM to come up. The ENABLTO operand on the NCP BUILD macro is the length of time the NCP will wait for the DSR lead to come up.
Mismatch between the NCP generation and the 370X hardware	If the wrong line set type is implied (e.g., full-duplex 1H vs. half-duplex 1D), or the wrong line interface address is specified, the link will not come active. Be sure to consult the Teleprocessing Preinstallation Guide, GC30-3020, for the correct set of NCP generation parameters to specify for the various device types.
LIB-Line Set cable mismatch	If the wrong cable group is used for the line set, the link may not activate.

Problem Isolation Steps	Reference Page(s)	Description
Run the VTAM I/O trace on the NCP and attempt to activate the link.	4-114	An exception response of x'08020000' to the SNA activate link command indicates a path failure. Check that the MODEM is powered on, plugged in, etc.
If there is a path failure, monitor the MODEM EIA interface leads.	4-145	Check to see if DSR comes up.
Look at the 370X LOGREC MDR records.	4-89	Look at NPDA and or an MDR record for the line, showing an enable failure.

Documentation required for IBM	Ref. Page	Special Instructions
Copy of VTAMLST/B.book		

3.18 : LINE/LINK DIAL PROBLEMS

SYMPTOM:

Common problems with dial-up facilities.

SDLC XID mismatch	The Station ID of the physical unit must have a match in the PU parameters of an active switched node definition (VBUILD). If the XID does not match, or the major node is not active, VTAM will disconnect the dialed-in device.
VBUILD LU count greater than the NCP MAXLU value	VTAM will check that the MAXLU value on the PU macro for the switched line is equal to or greater than the number of LUs defined on the PU macro in the VBUILD major node.
PU or LU inactive	The physical unit must be active.
No active application for UTERM/VTERM	If there is no active SIMLOGON for the UTERM/VTERM VTAM will also immediately disconnect.
Hardware mismatch	A MODEM mismatch will also cause the dialing terminal to be disconnected.

LINE/LINK DIAL PROBLEMS

(continued)

VIDLST or IDLST ID feature mismatch	If the VIDLST and or IDLST macro is coded in the NCP, the code of the dialing station must match, or VTAM will immediately disconnect.
Insufficient CSA(MVS), VPBUF storage(DOS), or Application region(VS1)	VTAM will not be able to honor an application's 'OPNDST' macro if there is insufficient storage in CSA(MVS) for VTAM to create temporary control blocks. If a DOS/VSE system, VTAM gets its temporary storage from VPBUF. VTAM will obtain dynamic storage for 'OPNDST' from the application region. This error is normally indicated to the application by a 'Short on storage error return code'.
Link inactive because of previous error	If a link failure occurs on a dial-in SDLC link, VTAM varies the link inactive. The link remains inactive until the network operator varies it active again.
Application program rejects the logon	On BSC dial-in ports, if the application rejects the logon, VTAM will immediately disconnect. This could be caused by not having the terminal name in the application's list, the application not accepting logons, etc.

Problem Isolation Steps	Reference Page(s)	Description
Check NCP definitions and switched VBUILD definitions against the samples in the SNA Product Installation Guide (G320-6028).		The sample definitions in G320-6028 are known to work, and can be a good starting point. Definitions are provided for each operating system and most of the common terminal types.
Start VTAM I/O, BUF, and NCP line traces for the NCP, line, physical unit, terminal or logical unit, and the UTERM/VTERM, as appropriate.	4-114 6-1	In order to isolate this type of problem, the command and data traffic that occurs must be seen.
For BSC or S/S, use VTAM operator display commands to verify that the line, port, and UTERM/VTERM are active.		If the line or port are not active, the port will not answer. If the UTERM/VTERM is not active, the port will answer, and immediately disconnect.
For S/S or BSC, use the VTAM operator display command to display UTERM/VTERM.		If the display for the UTERM/VTERM has SIMLOGON=application name, and the application is not active, or active and not accepting logons, VTAM will immediately disconnect. This also happens if there is no SIMLOGON indicated. The SIMLOGON is created by having LOGAPPL=application-name specified for the UTERM/VTERM, or by the network operator varying the UTERM/VTERM active with the LOGON option.
For SDLC links, use the VTAM display command to view the status of the physical unit.	5-7	The physical unit must be active.
For SDLC links, have the remote physical unit dial in. IO and buffer trace for the NCP should have been started. Line trace should also be initiated prior to dialing into the NCP.	4-114 6-1	An operator message will be generated if the Station ID (XID) of the physical unit dialing into the NCP does not match an XID value implied in any PU macro of a VBUILD major node. This message contains the actual XID of the physical unit dialing in. VTAM immediately disconnects in this case.

Problem Isolation Steps (continued from last page)	Reference Page(s)	Description
For SDLC links, if no message is generated, and VTAM disconnects the link, use the VTAM display command to check that the VBUILD major node is active.		If the VBUILD major node is not active, VTAM will disconnect.
Print the traces	4-134 4-133	For SDLC links, examine the line trace to see if the physical unit dialing into the NCP transmitted anything in response to the SDLC Exchange ID command. If nothing was received, the problem is at the remote end. Check the physical unit and MODEM for NRZI incompatibility. If the line trace shows the NCP never sent an Exchange ID SDLC command, you can suspect a problem in the NCP. Check for a local MODEM problem or an NCP specification problem.
Check the sample flow in the SNA device control and flow section of this manual.	6-1	

Documentation required for IBM	Ref. Page	Special Instructions
Look at the NPDA and/or 370X LOGREC MDR records.	4-89	Look for MDR records for the line.
VTAM I/O, BUF, and NCP line trace		Check against sample flow.
Copy of VTAMLST/B.book		

3.19 : LINE/LINK DEGRADATION

SYMPTOM:

Line/link not operating at the speed it should be.

MODEM strapping	Clear-to-send (CTS) delay, transmit-DB level, and equalization setting all can affect line performance.
Line quality	Noise levels on the line can cause excessive retransmissions.
Remote unit strapping or generation specifications	The control program generation options for the remote physical unit may not be specified correctly for the communication facilities being used (e.g. SYSIMOD parameters for an IBM 3790 Communication System).
NRZI specification errors	NRZI encoding may, or may not be required for the MODEMs being used.
NCP generation not specified correctly	The duplex parameter on the line macro should represent the type of communication facilities being used or unnecessary delay may be introduced.
Recovery parameters miscalculated	The REPLYTO or RETRIES parameter coded for the line may be higher than necessary. The RETRIES parameter specified too high can result in degradation on multipoint lines.
NCP line capacity exceeded	If the 370X's communication scanners' total line speed limit is exceeded, severe degradation can occur due to link overruns.
Physical units defined as ISTATUS=ACTIVE on SDLC multipoint links are not physically on the link, or are powered off.	This will cause unnecessary link degradation on multipoint links. For SDLC physical units, an SNA 'CONTACT' command is perpetually active. The degradation caused depends on the REPLYTO value coded for the line and the number of physical units powered off or not physically connected.

LINE/LINK DEGRADATION

(continued)

Low priority	In this case the session has no time cares (by design).
Using two-wire half-duplex MODEM facilities	Two-wire half-duplex facilities should not be used on an SDLC link using multipoint protocol. The turnaround times required by NCP and the MODEMs will degrade performance. NCP may be required to retransmit PIUs because the receiving PU may not have completely turned around and missed the NCP's SDLC flag character.

Problem Isolation Steps	Reference Page(s)	Description
If NPA is installed check NCP and link utilization.		If the NCP utilization is too high Or the links/lines have high number of characters transmitted or negative pollings.
If NPDA is installed check the history of the resources.		Look for temporary errors in the congested component.
Determine the priority of the session.		Analyze this VR/ER. Several sessions could be affected in the performance, and could be using the same Virtual Route and or Explicit Route
Review MDR records (NPDA OR LOGREC)	4-89	MDR records will indicate the SIO count, soft error counts and hard error counts. MDR records should be regularly monitored to resolve degradation problems and to monitor line quality.
Issue a VTAM display command with the EVERY option, for the degraded links.	5-7	Check for any physical units which have CONTACTs pending. These are physical units which have a status of ACT/C or INA/C, if the initial CONTACT failed. Use the VTAM vary command to deactivate these physical units.
Run the NCP line trace for the degraded line for a short period of time.	4-114	Analyze the line trace to see where degradation is being introduced. The time field in the NCP line trace entries can be used for this.

Documentation required for IBM	Ref. Page	Special Instructions
NCP line trace		Run TG trace, specially in case of several links per TG.
Copy of VTAMLST/B.book		
LOGREC MDR summary	4-89	

3.20 : PHYSICAL UNIT WILL NOT ACTIVATE

SYMPTOM:

The 'nodename NOW ACTIVE' message is not received after a 'V NET,ACT' command is issued for a physical unit.

Insufficient buffers available	VTAM will not activate a physical unit if there are insufficient buffers available. This possibility can be checked by having GTF running with the VTAM SMS buffer trace on. The 'NOW ACTIVE' message will not be received, until all logical units on the PU with ISTATUS=ACTIVE coded, are activated.
Physical unit powered off	The path to the physical unit will be inoperative, if the physical unit is powered off or the path is open. For example, if the remote MODEM is powered off or inoperative.
Physical unit SDLC address is incorrect	Check that the address coded in the PU macro matches the address of the physical unit.
Line between the PU and the 370X is incomplete	Check that the cable from the 370X is connected to the MODEM and the MODEM is powered on. Also check the connections at the physical unit side.
Bad NCP generation	The 370X interface does not match the NCP definition. Examples of this are the use of a 1H interface (two NCP line addresses) and a 1D (one line address) is required, or a discrepancy between the line speed generated in the NCP and the actual external clocking speed in the MODEM.
NRZI mismatch	The NRZI parameter in the line macro of the NCP must be coded to conform to the encoding scheme the physical unit will use.
IBM 3790 SSCP ID mismatch	If the SYSHOST option of the IBM 3790 is specified for a specific SSCP ID, and that SSCP ID is not in the SNA ACTPU command, the physical unit will not activate.

PHYSICAL UNIT WILL NOT ACTIVATE

(continued) MODEMs incompatible	If the two MODEMs are not compatible, data transfer over the link is impossible. Some common problems are: dissimilar MODEMs, and line speed incompatibility.
Physical unit not initialized for host contact	Some physical units require their host interface be enabled by the operator at the physical unit. For example, on the IBM 3790, the SYSHOST function must be performed.
Physical unit owned by another SSCP	If a physical unit is owned by another host (SSCP), the 'CONTACT' will fail immediately. This will be indicated by message IST604I 'UNABLE TO CONTACT'.

Problem Isolation Steps	Reference Page(s)	Description
Issue the VTAM display command with the every option, to the physical unit.	5-7	A status of ACT/C or INA/C, indicates the NCP is polling the physical unit but is not getting a response. If the status of the PU is INACT, it indicates the PU has rejected the activation. If the status is active, but the operator message indicating the PU is active has not been received, the problem is that one of the logical units specified as ISTATUS=ACTIVE has not activated. Refer to the LU-WON'T-ACTIVATE PD/IP.
Run MODEM test, if available	4-147	This will determine whether a path between the MODEMs exists.
Run RNIO TRACE if message IST604I	4-114	The trace should indicate the reason code for the 'CONTACT' failure.
Run link level tests using TOLTEP.	4-142	This allows you to change the NRZI value by trying the test both ways. This test also does an SDLC general poll which causes the physical unit to send back its SDLC address.
Perform a communications wraptest on the physical unit if one is available		Most remote physical units have a wrap test available. This should be run to isolate remote problems.

Documentation required for IBM	Ref. Page	Special Instructions
VTAM I/O trace for the physical unit and logical units.		Check to see if the SNA 'ACTPU' command was sent to the physical unit.
NCP line trace		Check that an SDLC 'SNRM' command is transmitted and an 'NSA' response is received.
Dump of VTAM partition/region		Check for buffer pool depletion.
Dump of CSA (MVS)		
Copy of VTAMLST/B.book		

3.21 : PHYSICAL UNIT WILL NOT DEACTIVATE

SYMPTOM:

A Physical unit will not deactivate when a 'V NET,INACT' command has been issued, or when NCP or VTAM is being terminated.

Logical unit still in session

If a logical unit is still in session with an application, the physical unit will not deactivate. See the LU-WILL-NOT-DEACTIVATE PD/IP.

Inadequate VTAM buffers

If VTAM does not have sufficient buffers, the physical unit will not deactivate. IF ACF/VTAM on DOS/VSE, the VPBUF pool may be depleted.

Problem Isolation Steps	Reference Page(s)	Description
Verify that all of the LUs associated with the PU are inactive by issuing a VTAM display command with the every option, for the PU (D NET,ID=puname,E).	5-7	A PU cannot be deactivated if any of the associated LUs are still in session. If any LU shows up as other than INACT, see the UNABLE-TO-DEACTIVATE-LU PD/IP.
If all of the logical units' status display as INACT or a logical unit has a status of ACT/U, issue a VTAM vary inactive command with the force (F) modifier for the physical unit: V NET,ID=puname,INACT,F.	5-27	This should cause the physical unit to deactivate. This is not a normal situation. For 3600 subsystems, the subsystem control operator should IPL with the warm option before the system operator reactivates the physical unit. This will retain the error log in the 3601/3602 controller.
If the problem is reproducible, start a VTAM I/O trace for the PU and the NCP. Also start VTAM's SMS buffer pool trace.	4-114 6-1	This trace will indicate how far into the deactivation sequence the physical unit has gotten.
If ACF/VTAM, display buffer use.		Check that dynamic buffering is being used. Examine VPBUF(DOS/VSE) and see if all pages are being used.

Documentation required for IBM	Ref. Page	Special Instructions
VTAM I/O and SMS buffer traces gathered		
Console log		

3.22 : PHYSICAL UNIT FAILS

SYMPTOM:

A physical unit is activated, but fails during normal operation.

Link quality or link failure	If the path to the physical unit is disrupted, the NCP will timeout. These types of problems should be tracked via NPDA or via LOGREC MDR records. If the information or MDR records indicate frequent timeouts, the values coded on the LINE macro for REPLYTO or RETRIES may not be adequate for the quality of the path. If MDR records indicate a request online (ROL) SDLC command was received, this means the physical unit has gone through a reset sequence, due probably to a timeout. Refer to the device dependencies section in this manual for your particular physical unit.
Operator Error	If the physical unit has been powered off or reset, this type of error will occur. VTAM writes the message indicating the physical unit has failed after the NCP has finished all its retries and sent VTAM the MDR record which indicates the cause of the failure. Review the MDR record.

Problem Isolation Steps	Reference Page(s)	Description
Review NPDA or LOGREC MDR records.	4-89	MDR records should indicate the type of failure being experienced. If the MDR records show a timeout, this could be due to the remote physical unit being powered off or reset. It could also be due to a path error, MODEM failure, etc. Check that the REPLYTO and RETRIES operands on the LINE macro are adequate for the line quality. Consult the device dependencies section of this manual for advice in choosing these values.
Observe the operation of the MODEMs.		Indicators on the MODEMs may indicate loss of carrier, loss of synchronization, etc. Refer to the user's guide provided with the MODEM for indicators and testing procedures available.
If this problem persists, or the status of the physical unit remains ACT/C after VTAM indicates recovery in progress, run the MODEM wrap tests.	4-147	If the MODEM wrap tests are successful but the physical unit still will not activate, check the operation of the physical unit.

Documentation required for IBM	Ref. Page	Special Instructions
Operator console log		
LOGREC MDR records	4-89	
Copy of VTAMLST/B.book		

3.23 : LOGICAL UNIT WILL NOT ACTIVATE

SYMPTOM:

A logical unit will not come active, either at network startup time, (if ISTATUS=ACTIVE is coded for the logical unit), or when a 'V NET,ACT' command is issued for the logical unit.

Inadequate VTAM buffers	If there are insufficient VTAM buffers, VTAM will not activate the logical unit. The VTAM System Programmers Reference Guide for the applicable system should be referenced.
LU hung (non-operational)	On 3600 Finance Communication Subsystems, if the 3600 Control Program does not have enough HOST buffers defined for the number of logical units on the physical unit, the logical unit may not activate.
Logical unit not defined in the physical unit.	If the logical unit is not defined or activated at the physical unit level, the SNA 'ACTLU' command will fail. VTAM issues a message to the network operator indicating the resource is unavailable.
Physical unit not active	In order for a logical unit to activate, the physical unit must be active.

Problem Isolation Steps	Reference Page(s)	Description
Issue a VTAM display command with the every option, on the physical unit: D NET,ID=puname,E.	5-7	If the PUs status is INA/C, the physical unit is not active, and no logical units will activate. See the UNABLE-TO-ACTIVATE-PHYSICAL-UNIT PD/IP.
If the physical unit's status is ACT, examine the status of the logical units in question to see if they are active.	5-8	If the logical unit is inactive, check that ISTATUS=ACTIVE was coded for the logical unit on the LU macro, or that the logical unit was varied active. If the PU macro has ISTATUS=INACTIVE coded, and the LU macros are not coded with ISTATUS=ACTIVE, varying the physical unit active will not activate the logical units. If the LU status is ACT/A, the physical unit has not responded to the SNA 'ACTLU' command. A logical unit status of ACT/B indicates the logical unit has not responded to the SNA 'BIND' command. See the PD/IP for logical unit logon problems.
If the problem can be reproduced, run a VTAM SMS buffer pool trace along with a VTAM I/O and buffer trace for the NCP, physical unit, and logical unit affected.	4-114 6-1	The SMS buffer trace will indicate if the problem is due to VTAM buffer depletion. The other traces will indicate how far the activation sequence has completed. Refer to the SNA data flow section of this manual.
If the traces indicate the problem is between the NCP and the physical unit, and the problem has not been isolated to the physical unit, an NCP line trace may be necessary.	4-114	The line trace will show whether the SNA ACTLU command is being sent (by the NCP), or that the physical unit is failing to respond to it.

Documentation required for IBM	Ref. Page	Special Instructions
Console log		
Copy of VTAMLST/B.book		
Traces gathered		

3.24 : LOGICAL UNIT WILL NOT DEACTIVATE

SYMPTOM:

A logical unit is 'hung' when it will not show inactive, after a 'V NET,INACT' command is issued.

Inadequate VTAM buffers

If VTAM does not have sufficient buffers, the logical unit will not deactivate.

Logical unit in session

If a logical unit is in session with an application program, the logical unit will not deactivate, regardless of the VTAM vary inactive modifier used, until the application issues a 'CLSDST'. If the application does not have a LOSTERM exit routine, the session must be terminated by an application operator command, or by terminating the application program. Refer to the VTAM operator commands section of this manual to see what each of the VTAM vary command modifiers does.

LU inoperable

If the logical unit does not respond to the SNA CLEAR/UNBIND sequence generated by the CLSDST macro, the logical unit will not deactivate. A vary inactive for the logical unit with the force modifier will clear this condition.

On SDLC 3270s, if the logical unit is powered off while still in session, the physical unit may not respond to the SNA CLEAR/UNBIND sequence correctly. This will prevent the logical unit from deactivating. A hardware engineering change (EC747014) to the 3271 control unit corrects this problem. The IBM Customer Engineer should be contacted if this problem is detected.

Vary processor hung

VTAM's vary processor is serial. If a vary inactive has not completed for a previous logical unit on the same physical unit, all subsequent logical units will not deactivate until the previous process has completed.

Application program limits number of 'CLSDSTs'

The application program may be limited by storage availability or design in the number of concurrent 'CLSDSTs' it can issue. If the application program is waiting for responses to the SNA 'CLEAR/UNBIND' sequences generated by previous 'CLSDSTs', it will be unable to issue any more 'CLSDST' macros. CICS/VS limits concurrent 'OPNDST' and 'CLSDST' operations to ten.

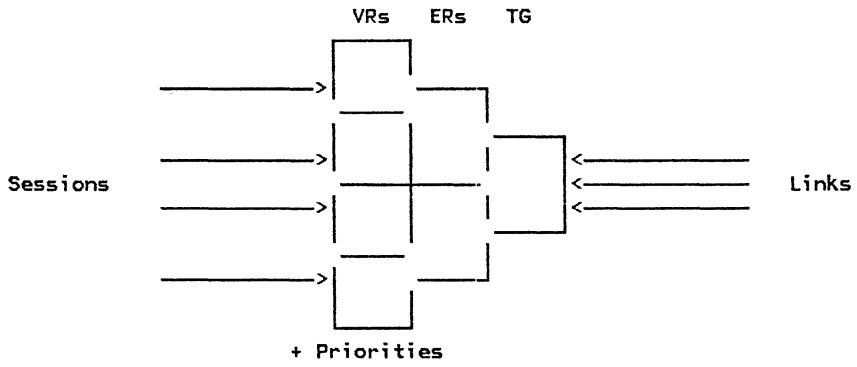
Problem Isolation Steps	Reference Page(s)	Description
Issue the VTAM display command for the logical unit	5-8	If the status of the logical unit is ACT, and it is allocated to an application, the application has not issued 'CLSDST'.
Issue the VTAM vary inactive command with the I modifier and then display the logical unit.	5-8 5-27	This will drive the application's LOSTERM exit routine. If the logical unit's status still shows as ACT, the application is not issuing 'CLSDST', and the application program's LOSTERM exit (or absence thereof), should be investigated.
If the status of the logical unit is ACT/U, issue a vary inact command with the force (F) modifier.	5-27	This should cause both the 'CLSDST' to complete and the logical unit to deactivate. This condition can be caused by the logical unit not responding to the SNA CLEAR/UNBIND sequence generated by the 'CLSDST'. The hardware EC/REA level, and the software of the subsystem should be investigated.
If the problem can be reproduced, start a VTAM SMS buffer pool trace and a VTAM I/O trace for the physical unit and logical unit. If the application has internal traces, run them if appropriate.	4-114 6-1	The SMS buffer pool trace will indicate a VTAM buffer pool depletion problem. The I/O trace will show how far into the deactivation sequence the operation has been able to get. An application trace is useful to determine if the application's LOSTERM exit has been driven and the application has issued 'CLSDST'.

Documentation required for IBM	Ref. Page	Special Instructions
Console log		
Traces gathered		
Copy of VTAMLST/B.book		

3.25 : LOGICAL UNIT LOGON PROBLEMS

SYMPTOM:

A terminal or logical unit cannot logon, or be varied on, to an application program.



May be a convenient measure to have prepared several sessions with combinations of:

- Transmission groups
- Explicit routes
- Virtual routes
- Transmission priorities

When one problem appears it is easier to isolate it by seeing the sessions affected.

LOGICAL UNIT LOGON PROBLEMS

(continued)

Incorrect session parameters	A session is established by the application program issuing an 'OPNDST' macro. This results in an SNA 'BIND' command being sent to the logical unit. The BIND command contains parameters which define the protocols to be used during the session. The logical unit may reject the bind if the session parameters are incompatible with its design or logical operation. The parameters for the SNA BIND command are obtained from an entry in a LOGMODE table, or from an application built BINDAREA. If there is no BINDAREA specified in the NIB, the LOGMODE table used is the one coded in the LU macro or the IBM-supplied default table ISTINCLM. The entry to be used in the LOGMODE table is coded in the NIB macro. If a LOGMODE entry is not coded in the NIB, the LOGMODE entry specified on the SNA 'INITIATE-SELF' command (LOGON, for a Type 1 PU), or the first entry in the default LOGMODE table is used. Check the COS table if the VR and priorities are suited to real configuration.
Inadequate VTAM buffers	If VTAM does not have sufficient buffers, the logon may be queued until buffers become available.
Application rejection	If the application does not support the terminal type or the specific logical unit name, it may reject the INITIATE SELF/LOGON. For a Type 1 physical unit, VTAM will send the logical unit a 'SESSION NOT BOUND' message. For a Type 2 physical unit, VTAM will send a negative response to the SNA INITIATE-SELF command (0821 SNA sense).
Application not accepting logons	If the application is not accepting logons, the logon request may be queued with no response.
Application's region/partition too small	VTAM requires storage to be available in the user partition/region in order to process the 'OPNDST' macro.

Problem Isolation Steps	Reference Page(s)	Description
See if problem is with one or several logical units.		If several LUs but same VR/ER, the problem can be with the ER.
Issue the VTAM display command for the logical unit.	5-8	Check to see if the logical unit is active and allocated to an application.
Issue the VTAM display command for the application.	5-3	Check to see if the application has any session requests outstanding. A session request indicates the application has logon requests queued.
Issue the VTAM vary command with the LOGON option to log the logical unit onto the application.		VTAM treats this as a priority request. If this works, a VTAM buffer pool is probably at threshold.
Run a VTAM SMS buffer pool trace and a VTAM I/O and buffer trace for the logical unit.	4-114 6-1	If the trace shows a negative response to an SNA INITIATE-SELF command was received, the sense data included should indicate why. If a positive response is received to an INITIATE-SELF followed by an SNA 'PROCEDURE ERROR' command, the application rejected the logon. For a Type 1 physical unit, this is indicated by a 'SESSION NOT BOUND' message being sent to the terminal. Check the session-limit specified in the SESSION operand of the NCP LINE macro. If a positive response is received, but is not followed by an SNA 'PROCEDURE ERROR' command, the application is queuing logons or is short on storage. If the traces indicate that an SNA 'BIND' command was issued and rejected by the logical unit, check the sense data included with the negative response. If the sense indicates invalid session parameters, check LOGMODE specifications. Some applications such as JES, CICS/VS, and IMS/VS create their own BIND images and they may differ from the LOGMODE specifications. I/O and buffer traces may be the only way to determine the session parameters that the application is using.

Documentation required for IBM	Ref. Page	Special Instructions

VTAMLST, Paths table, COS table

Traces gathered

3.26 : LOGICAL UNIT HANGS

SYMPTOM:

A logical unit does not respond to any message traffic or commands.

Path failure

If a path failure has occurred on an SDLC link, VTAM drives the application's LOSTERM exit for all active sessions on the link. The sessions will be terminated if the application issues 'CLSDST'.

Inadequate VTAM buffers

If VTAM has insufficient buffers available, the application may not be able to issue SEND or RECEIVE macros. CRPLBUF,IOBUF and PPBUF buffer pool depletion can cause this problem.

Incorrect session parameters

The BIND parameters may be acceptable to the logical unit, but not applicable to the session being conducted. For example, if the BIND parameters specify an interactive session is to be used, but a batch session is attempted, the logical unit may hang.

Terminal operator error

The terminal operator may have put the logical unit in a system state where it cannot communicate with the Primary Logical Unit, the application. For example, the operator pressing the System Request key on an IBM 3767.

Application program error

If the application program fails to issue a SEND or RECEIVE macro for the logical unit, the logical unit will hang. Also, if the application program fails to follow the protocols established for the session on the BIND command, the logical unit may hang. Session parameters are neither validated nor enforced by VTAM or NCP. Conforming to these protocols is the sole responsibility of the logical units involved in the session.

LOGICAL UNIT HANGS

(continued)

Subsystem buffers inadequate

On the 3600 subsystem, if insufficient host input buffers are specified, inactive work stations can cause other work stations to hang. Normally a receive buffer should be provided for each active logical unit.

Logical unit not in session

Not all devices indicate the session has been terminated by the application. The session may have been terminated by the application program because of an error. Some common causes are:

An input message from the logical unit longer than the maximum set by the system programmer for that unit.

This can also happen if the application sends an output message longer than the maximum specified by the system programmer.

BUFFACT and BUFLIM settings should also be checked.

BSC 3270 cluster fails

For BSC 3270 terminals, if there is a general poll failure for the cluster (mainly timeout, but also hardware failure, sometimes the Test Request key), the terminal will be hung until the network operator varies the cluster inactive with the immediate option and then, after VTAM indicates that the cluster is inactive, varies the cluster active. A general poll failure will create an MDR record.

BSC 3270 Test Request

If a remote 3270 terminal operator hits the Test Request key, and there is data on the screen that can be interpreted as a TOLTEP request, the cluster may be hung waiting to logon to TOLTEP. A zap to the NCP is available to have the NCP ignore the Test Request key. Instead of using the Test Request key, TOLTEP can be logged on to by adding capability to the USSTAB provided for the LU or the Interpret Table for terminals.

Problem Isolation Steps	Reference Page(s)	Description
Issue the VTAM display command with the every option, for the physical unit.	5-7	Check to see if both the physical unit and logical unit are active.
Issue the VTAM display command for the logical unit.	5-8	Check to see if the logical unit is active and in session with an application program.
Start VTAM I/O and buffer traces for the physical unit and logical unit. Also start VTAM's SMS buffer pool trace. Attempt to enter data from the logical unit.	4-114 6-1	If there is an inbound RNIO entry and TPIOS buffer entry for the data you entered, then you know that VTAM is getting the data. If there is an inbound Control Layer (C/L) buffer entry, the data has been received by the application. An outbound C/L buffer entry in response to the data, indicates that the application program has issued a SEND. TPIOS and RNIO outbound entries will show that the data has been sent to the NCP. Interpreting this flow should indicate the failing component.
If the trace indicates that data is not being received by the NCP, or that data is not being sent from the NCP to the logical unit, an NCP line trace should be started on the line.	4-114	The line trace will indicate if the messages are being sent in from the logical unit to the NCP or being sent from the NCP to the terminal.
If the problem is on the 3600 Subsystem, display/print the statistical counters.	7-9	The 3600 counters three and twelve will indicate if the 3600 has sending or receiving problems.

Documentation required for IBM	Ref. Page	Special Instructions
Traces gathered		

HUNG LU TRACING EXAMPLE

This sequence shows a typical 'HUNG LU' situation and the isolation procedures used. The problem shows up as the inability to shut down VTAM because the UNBIND is not completing for an LU. The situation can be reproduced by varying the LU inactive. The network operator first displays the status of the terminal to verify it is in session and traces have been activated.

```
d net,id=lu3270v2
11.25.56 STC  329  IST097I  DISPLAY  ACCEPTED
11.25.57 STC  329  IEE932I 408
 IST075I  VTAM DISPLAY- NODE TYPE= TERM  ,NAME= LU3270V2 ,STATUS= ACT
 IST081I  LINE NAME= SDLC13C  , LINE GROUP= SDLCGV1  , 370X= NCPCH2
 IST135I  PHYSICAL UNIT= PU3270V  ,
 IST082I  DEVICE TYPE= LU01 , ALLOC TO= TSO0001  ,SIMLOGON=
 IST654I  I/O TRACE= ON  ,BUFFER TRACE= ON
```

In order to validate the flow between the LU and NCP, a line trace is now started.

```
f net,trace,type=line,id=sdlc13c
11.26.22 STC  329  IST097I  MODIFY   ACCEPTED
11.26.23 STC  329  IST513I  TRACE INITIATED FOR NODE SDLC13C
```

The Logical Unit is now varied inactive with the 'I' modifier and a display is performed in order to verify that the status is 'ACT/U' as expected. At this point, the traces should show the complete flow, so the line trace is turned off immediately to minimize the amount of trace data.

```
v net,inact,i,id=lu3270v2
11.26.41 STC  329  IST097I  VARY     ACCEPTED

d net,id=lu3270v2
11.26.57 STC  329  IST097I  DISPLAY  ACCEPTED
11.26.57 STC  329  IEE932I 416
 IST075I  VTAM DISPLAY- NODE TYPE= TERM  ,NAME= LU3270V2 ,STATUS= ACT/U
 IST081I  LINE NAME= SDLC13C  , LINE GROUP= SDLCGV1  , 370X= NCPCH2
 IST135I  PHYSICAL UNIT= PU3270V  ,
 IST082I  DEVICE TYPE= LU01 , ALLOC TO= TSO0001  ,SIMLOGON=
 IST654I  I/O TRACE= ON  ,BUFFER TRACE= ON

f net,notrace,type=line,id=sdlc13c
```

```
11.27.17 STC  329  IST097I  MODIFY   ACCEPTED
11.27.18 STC  329  IST512I  TRACE TERMINATED FOR NODE= SDLC13C
```

These trace entries are a result of the vary command. It can be determined that a CLEAR request was sent out by VTAM through the NCP to the LU (in this case a 3277 attached to a 3271-12). A negative response is returned, which according to SNA protocol is treated the same as a positive response on a CLEAR request. But an apparent error has been made because the sequence number for the response is different than the number of the request. This causes VTAM to disregard the response and wait for one with the proper sequence number. NCP generated the incorrect sequence number because it received a PIU from the 3271 that indicated in the TH that it was 'NORMAL FLOW' instead of 'EXPEDITED FLOW' (NCP uses this bit for 3270 support to determine whether to assign the sequence number for the SSCP-LU session or the LU-LU session). The 3271 would give this erroneous response when it received a CLEAR to a 3277 that was powered off. An engineering change (EC747014) to the 3271 controller was required to fix this problem.

```
USRFD FEF ASCB 00FE3918  JOBN YGL0
          TPIOS OUT ANODE TSO0001    FDB  00000000 00B81A20 000E0000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE LU3270V2   THRH 1C002849 08010000 00006B80 00
                                     TEXT A1
         TIME    41202.396266
RNIO ASCB 00FE3918  CPU 0000 JOBN YGL0         OUT 1F002849 08010002 00046B80 00A1
         TIME    41202.487020
RNIO ASCB 00FE3918  CPU 0000 JOBN YGL0          IN 1E000801 28490006 00078F90 00000000 10
         TIME    41202.663579
USRFD FEF ASCB 00FE3918  JOBN YGL0
          TPIOS IN  ANODE TSO0001    FDB  00000000 00B814D1 00040000   RSVD 0830   LNG2 00DC
            REMOTE  DNODE LU3270V2   FSB  022C0000 00000000 08012849 00060000 00000000 00000000 00000000 00070000
                                     THRH 1E000801 28490006 00078F90 00
                                     TEXT 00000010                                    *....
        TIME    41202.687004
USRFD FF2 ASCB 00FED158  JOBN NET
          LINE      DNODE NCPCH2        EP 00       TIME D7
                          LCD 9  PCF 7  TIME C2  SCF 4A  PDF 11      LCD 9  PCF 7  TIME C2  SCF 4A  PDF 5D
                          LCD 9  PCF 7  TIME C2  SCF 4A  PDF BA      LCD 9  PCF 6  TIME C2  SCF 0E  PDF BA
                          LCD 9  PCF 6  TIME C3  SCF 0E  PDF BA      LCD 9  PCF 7  TIME C3  SCF 4A  PDF C5
                          LCD 9  PCF 7  TIME C3  SCF 4A  PDF 2E      LCD 9  PCF 7  TIME C3  SCF 4A  PDF 3E
                          LCD 9  PCF 7  TIME C3  SCF 4A  PDF C2      LCD 9  PCF 7  TIME C3  SCF 4A  PDF 8F
                          LCD 9  PCF 7  TIME C3  SCF 4A  PDF 90      LCD 9  PCF 7  TIME C3  SCF 4A  PDF 00
                          LCD 9  PCF 7  TIME C3  SCF 4A  PDF 00      LCD 9  PCF 7  TIME C3  SCF 4A  PDF 00
                          LCD 9  PCF 7  TIME C3  SCF 4A  PDF 00      LCD 9  PCF 7  TIME C3  SCF 4A  PDF 10
                          LCD 9  PCF 7  TIME C3  SCF 4A  PDF 3E      LCD 9  PCF 7  TIME C3  SCF 4A  PDF C8
                          LCD 9  PCF 6  TIME C3  SCF 0E  PDF C8      LCD 9  PCF 7  TIME C3  SCF 4A  PDF C5
                          LCD 9  PCF 7  TIME C3  SCF 4A  PDF 35      LCD 9  PCF 7  TIME C3  SCF 4A  PDF 7B
        TIME    41204.736221
USRFD FF2 ASCB 00FED158  JOBN NET
          LINE      DNODE NCPCH2        EP 00       TIME D7
                          LCD 9  PCF A  TIME C2  SCF 40  PDF F1      LCD 9  PCF A  TIME C2  SCF 40  PDF 53
                          LCD 9  PCF 9  TIME C2  SCF 40  PDF 5D      LCD 9  PCF 9  TIME C2  SCF 45  PDF 7E
                          LCD 9  PCF 9  TIME C2  SCF 45  PDF 7E      LCD 9  PCF 9  TIME C2  SCF 40  PDF C5
```

```
                        LCD 9  PCF 9  TIME C2  SCF 40  PDF E0      LCD 9  PCF 9  TIME C2  SCF 40  PDF 3F
                        LCD 9  PCF 9  TIME C2  SCF 40  PDF C2      LCD 9  PCF 9  TIME C2  SCF 40  PDF 6B
                        LCD 9  PCF 9  TIME C2  SCF 40  PDF 80      LCD 9  PCF 9  TIME C2  SCF 40  PDF 00
                        LCD 9  PCF 9  TIME C2  SCF 40  PDF A1      LCD 9  PCF 9  TIME C2  SCF 40  PDF A1
                        LCD 9  PCF 9  TIME C2  SCF 40  PDF DE      LCD 9  PCF 9  TIME C2  SCF 45  PDF 7E
                        LCD 9  PCF 9  TIME C3  SCF 45  PDF 7E      LCD 9  PCF 9  TIME C3  SCF 40  PDF C5
                        LCD 9  PCF A  TIME C3  SCF 40  PDF F1      LCD 9  PCF A  TIME C3  SCF 40  PDF 53
                        LCD 9  PCF 9  TIME C3  SCF 40  PDF 5D      LCD 9  PCF 9  TIME C3  SCF 45  PDF 7E
        TIME    41204.891504
```

The operator now issues the vary inactive command, but this time with the 'F' modifier, which will inactivate the LU without any I/O operations. This command breaks both LU-LU session and SSCP-LU session.

```
            v net,inact,f,id=lu3270v2
            11.27.35 STC  329  IST097I  VARY     ACCEPTED
            11.27.35 STC  329  IST619I  NETWORK NODE LU3270V2 HAS FAILED - RECOVERY IN PROGRESS
            11.27.36 STC  329  IST141I  NODE LU3270V2 NOW DORMANT
            11.27.36 STC  329  IST129I  UNRECOVERABLE ERROR ON NODE LU3270V2 - VARY INACT SCHEDULED
            11.27.36 STC  329  IST104I  VARY FAILED FOR ID= LU3270V2 - NODE ALREADY INACTIVE
            11.27.37 STC  329  IST105I  LU3270V2 NODE NOW INACTIVE
```

The trace entries below show the result of the vary inactive with the force modifier.

```
USRFD FEF ASCB 00FE3918  JOBN YGL0
          TPIOS OUT ANODE TSO0001    FDB  00000000 00B803C8 000E0000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE LU3270V2   THRH 1C002849 08010000 00006B80 00
                                     TEXT A1                                    *.                  *
          TIME    41256.342975
USRFD FEF ASCB 00FE3918  JOBN YGL0
          TPIOS OUT ANODE TSO0001    FDB  00000000 00B80680 000F0000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE LU3270V2   THRH 1C002849 08010000 00006B80 00
                                     TEXT 3201                                  *..                 *
          TIME    41256.369013
USRFD FEF ASCB 00FED158  JOBN NET
          TPIOS OUT ANODE VTAM       FDB  00000000 00B802E0 000E0000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE LU3270V2   THRH 1C002849 08000000 00006B80 00
                                     TEXT A1                                    *.                  *
          TIME    41256.407693
USRFD FEF ASCB 00FED158  JOBN NET
          TPIOS IN  ANODE VTAM       FDB  00000000 00B80301 000E0000   RSVD 0000   LNG2 00C0
            REMOTE  DNODE LU3270V2   FSB  022C0000 00000000 08002849 00020000 00000000 00000000 00000000 00040000
                                     THRH 1F000800 28490002 0004EB80 00
                                     TEXT A1E5E3C1 D4404000 00000000 0000               *.VTAM  .......     *
```

```
         TIME    41256.417069
USRFD FEF ASCB 00FE3918  JOBN YGL0
          TPIOS IN  ANODE TSO0001    FDB  00000000 00B803E9 000E0000   RSVD 0000   LNG2 00C0
            REMOTE  DNODE LU3270V2   FSB  022C0000 00000000 08012849 00030000 00000000 00000000 00000000 00040000
                                     THRH 1F000801 28490003 0004EB80 00
                                     TEXT A1E3E2D6 F0F0F000 00000000 0000               *.TSO000.......      *
         TIME    41256.618492
USRFD FEF ASCB 00FE3918  JOBN YGL0
          TPIOS IN  ANODE TSO0001    FDB  00000000 00B806A1 000F0000   RSVD 0000   LNG2 00C0
            REMOTE  DNODE LU3270V2   FSB  022C0000 00000000 08012849 00040000 00000000 00000000 00000000 00050000
                                     THRH 1F000801 28490004 0005EB80 00
                                     TEXT 3201E3E2 D6F0F000 00000000 000000             *..TSO00........     *
         TIME    41256.628858
USRFD FEF ASCB 00FED158  JOBN NET
          TPIOS OUT ANODE VTAM       FDB  00000000 00B80680 000E0000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE LU3270V2   THRH 1C002849 08000000 00006B80 00
                                     TEXT A1                                        *.                   *
         TIME    41256.818202
USRFD FEF ASCB 00FED158  JOBN NET
          TPIOS IN  ANODE VTAM       FDB  00000000 00B806A1 000E0000   RSVD 0000   LNG2 00C0
            REMOTE  DNODE LU3270V2   FSB  022C0000 00000000 08002849 00030000 00000000 00000000 00000000 00040000
                                     THRH 1F000800 28490003 0004EB80 00
                                     TEXT A1E5E3C1 D4404000 00000000 0000               *.VTAM  .......      *
         TIME    41256.827562
```

The status of the logical unit is displayed again to verify that it is inactive. NCP and VTAM can now be terminated.

```
d net,id=lu3270v2
11.27.50 STC  329  IST097I  DISPLAY  ACCEPTED
11.27.50 STC  329  IEE932I 429
 IST075I  VTAM DISPLAY- NODE TYPE= TERM  ,NAME= LU3270V2 ,STATUS= INACT
 IST081I  LINE NAME= SDLC13C  , LINE GROUP= SDLCGV1  , 370X= NCPCH2
 IST135I  PHYSICAL UNIT= PU3270V  ,
 IST082I  DEVICE TYPE= LU01 , ALLOC TO=          ,SIMLOGON=
 IST654I  I/O TRACE= ON  ,BUFFER TRACE= ON
```

3.27 : LOGICAL UNIT SESSION TERMINATES ABNORMALLY

SYMPTOM:

A logical unit can establish a session, but fails during normal operation.

DOS/VSE ACF/VTAM

On a DOS/VSE ACF/VTAM system if the application does not have a RECEIVE macro outstanding, VTAM will place the data received in VPBUF. If VPBUF is short on storage, the session will be terminated. The dynamic buffer allocation feature of ACF/VTAM works only within the VPBUF allocation!

Application's partition/region too small

On OS/VS versions of ACF/VTAM, if the application does not have a RECEIVE outstanding, VTAM will place the data received from a logical unit in the application's region/partition. If the storage is not available in the application's region/partition, VTAM will free the data received, issue an SNA 'CLEAR' command to the logical unit and drive the application's LOSTERM exit routine.

Session terminated by application

The application may be terminating the session because of a valid error condition. For example, a no-data-entered timeout condition on TSO will cause TSO to issue 'CLSDST' and terminate the session.

NCP specifications

If the application sends a message larger than the MAXDATA value coded on the NCP PCCU macro, the session will be terminated. If the application sends a message to a non-segmenting physical unit, which exceeds the MAXDATA value coded on the PU macro, the session will be terminated.

Link failure

If there is a loss of contact with the physical unit, the logical unit's sessions will be terminated.

Terminal operator error

For local 3270s, if the terminal operator presses the Test Request key, VTAM drives the application's LOSTERM exit, and a 'CLSDST' macro will probably be issued by the application, terminating the session.

(continued)

IBM 3767 terminal error	If the IBM 3767 hardware is not at the correct engineering change level for SDLC operation, the session can be suddenly terminated after it has been working for a while. This error is indicated to the application by an SNA Exception Response to a 'SEND' with sense data of '081B0000'. VTAM traces can be used to isolate this problem.
BUFLIM/BUFFACT exceeded	On VTAM Level 2, if the product of BUFLIM (coded on the NCP LU macro), and BUFFACT (coded on the application major node defined in VTAMLST/B.book), is exceeded for queued input from a logical unit, VTAM will free the buffers containing the data, issue an SNA 'CLEAR' command to the logical unit, and drive the application's LOSTERM exit. The application may terminate the session. This problem does not exist for RECORD mode sessions if using ACF/VTAM.

Problem Isolation Steps	Reference Page(s)	Description
Review the network console log for a problem indication.		If a console message indicates a physical path problem, see the link failure PD/IP. Error messages may also be sent to the system console by the application, indicating the reason for the failure.
Review appropriate application logs.		The application may have facilities to record error conditions. For example, both CICS/VS and IMS/VS have error recording facilities.
Review the appropriate physical unit logs.		Most Type 2 physical units record error conditions. These logs should be investigated. The IBM Customer Engineer should be able to assist the user in obtaining and interpreting the contents.
If the source of the error is not determined, and it may be repeated, start VTAM I/O and buffer traces for the physical unit and the logical unit. The VTAM SMS buffer pool trace should also be run.	4-114 6-1	These traces are necessary to determine exactly what occurred. If this problem is intermittent and can occur on any logical unit, the VTAM zap to start the I/O and buffer traces on all nodes may be needed.

Documentation required for IBM	Ref. Page	Special Instructions
Console log		
Copy of VTAMLST/B.book		
Traces gathered		

3.28 : LOGICAL UNIT RESPONSE TIME SLOW

SYMPTOM:

A logical unit can maintain a session with an application program, but the message traffic is very slow.

See also LINE/LINK DEGRADATION

Inadequate VTAM buffers	If VTAM has insufficient buffers, the application's SEND and RECEIVE requests may be queued by VTAM. CRPL and UECB buffer specifications should be checked.
Application program slow	The application may not have enough RECEIVE RPLs for the traffic on the system. The application program may be using single-threaded programming, have too low a priority, etc. Look for excessive use of PPBUFs in VTAM Level 2, and VPBUF in DOS/VSE ACF/VTAM. An examination of the time between the inbound TPIOS layer and the inbound CL01 may indicate a shortage of RECEIVE RPLs for an application. This is the only way a user can determine a shortage if the OS version of ACF/VTAM/VS is installed.
Host system performance or capacity	System real storage may not be adequate and heavy paging may be occurring.
Link errors	Recoverable errors at the link level may be causing response time degradation.
NCP specifications	NCP specifications at the link level can cause performance problems. Some common problems are: line speed too slow for the traffic, BFRS size vs. MAXOUT value incorrectly specified, service limit (SERVLIM on the NCP LINE macro) set too high, PASSLIM and PACING set too low for the subject LU, etc. Refer to the examples in the SNA Product Installation Guide (G320-6028).
Contact pending on shared link	On a multipoint link, if PU macros are coded ISTATUS=ACTIVE, and a physical unit is unavailable, link performance is degraded.

Problem Isolation Steps	Reference Page(s)	Description
NPDA and/or review MDR records in LOGREC	4-89	Check to see if the link is getting excessive soft errors. MDR records should be reviewed regularly.
Run VTAM I/O and buffer traces for the physical unit(s) and logical unit(s) experiencing the response time problem. In addition, run a VTAM SMS buffer pool trace. GTF must be started with TIME=YES specified; options required are USR and RNIO. The DOS/VSE trace facility does not timestamp trace entries.	4-114 6-1	If the time difference between an RNIO trace entry and its corresponding TPIOS trace entry is large, a heavy system load should be suspected. These entries should occur at almost the same time. On a DOS/VSE VTAM system, missing trace entries indicate a heavily loaded system. VTAM will write a record on the trace file when it is forced to drop data but does not indicate this when it prints the file. If the time difference between the TPIOS inbound entry and its corresponding Control Layer (C/L) inbound entry is large, the application program may not have enough concurrent RECEIVE macros active. This problem also shows up as PPBUF buffer usage. This can be seen in the SMS buffer pool trace entries. The time between a C/L inbound entry and the next C/L outbound entry to the same logical unit is the applications processing time. This may indicate application performance problems. The time between a C/L outbound entry and its corresponding TPIOS outbound entry indicates VTAM's processing time. If this time difference is large, the VTAM buffers may be going into a threshold condition, thus causing SENDs to be queued by VTAM. The time between an RNIO outbound trace entry and the next RNIO inbound trace entry for the same logical unit indicates transmission and processing time in the channel, NCP, link, physical unit, and logical unit.
If the problem is outboard of the NCP, the NCP line trace should be run.	4-114	Analyze the line trace to see where degradation is being introduced. The time field in the NCP line trace entries can be used for this.

Documentation required for IBM	Ref. Page	Special Instructions

Traces gathered

Copy of VTAMLST/B.book

3.29 : BSC WILL NOT ACTIVATE

SYMPTOM:

A Bisync device cannot be activated.

Inadequate VTAM buffers	If there are insufficient VTAM buffers available, VTAM will not activate the terminal.
ISTATUS specification incorrect	Unless ISTATUS=ACTIVE is specified at the terminal and VTERM level, activating the line and cluster will not activate the terminal or VTERM/UTERM. The UTERM and VTERM are identified by VTAM as separate nodes, and they must be active.
Line/link problem	The status of the clusters and terminals on a link may show inactive because the link has failed, and is inactive. Refer to the appropriate LINE/LINK PD/IP if the link cannot be varied active.
3270 cluster failure	If the general poll to the cluster fails at initial startup, the terminals will not activate. The cluster must be varied active. Unless ISTATUS=ACTIVE was coded on each terminal macro, each terminal will have to be varied active.

Problem Isolation Steps	Reference Page(s)	Description
Issue a VTAM display command with the every option for the line.	5-5	Verify that all node levels have a status of ACT. If the status of all node levels is ACT, see the BSC ACTIVE-BUT-NOT-COMMUNICATING PD/IP.
If the status of any node in the path is not ACT, issue a VTAM vary command to activate it.	5-26	If a node cannot be varied active, see the PD/IP for VTAM-COMMANDS-DO-NOT-WORK.
Start VTAM's I/O trace for the NCP and also VTAM'S SMS buffer pool trace.	4-114 6-1	Check to see that the SNA 'ACTLINK' command was sent to the NCP for the line in question, and a positive response was received. Check that the SMS buffer pool trace does not show buffer pool depletion.

Documentation required for IBM	Ref. Page	Special Instructions
Console log		
Copy of VTAMLST/B.book		
Traces gathered		

3.30 : BSC WILL NOT DEACTIVATE

SYMPTOM:

A bisync device will not deactivate.

Inadequate VTAM buffers	If VTAM has insufficient buffers, the deactivation process may not complete.
Terminal is still in session	Terminals cannot be deactivated if they are still in session. The application program they are in session with must issue 'CLSDST'.
NCP error	For BSC, VTAM sends the NCP FID 0 (BTU) commands to deactivate the node. If the NCP does not respond to the 'V NET,INACT' command, an NCP problem should be suspected.

Problem Isolation Steps	Reference Page(s)	Description
Run a VTAM SMS buffer pool trace, and an I/O trace for the NCP, cluster, and terminal.	4-114 6-1	Check that the SMS buffer pool trace does not show a buffer pool depletion. Also check that the FID 0 reset/disconnect sequence has been sent to the cluster and terminals and that positive responses were received. The reset/disconnect sequence for the terminals is generated when the application program issues 'CLSDST'. If no sessions are active, the reset and disconnect commands are not sent to the terminals. Refer to the 370X Program Reference Handbook, GY30-3012, Section 3: BTU COMMANDS AND MODIFIERS.
Issue the VTAM display command to display the status of the terminal (UTERM/VTERM for dial ports).		Determine if the terminal (UTERM/VTERM for dial ports) is allocated to an application.
If the terminal (UTERM/VTERM for dial ports) is connected to an application, issue the VTAM vary command with the immediate (I) modifier for the terminal (UTERM/VTERM for dial ports). The recovery (R) and force (F) modifiers do not work on BSC or local 3270 devices.	5-27	If the application program has a LOSTERM exit and issues 'CLSDST', a reset/disconnect sequence is sent to the terminal. If the application does not issue 'CLSDST', the terminal will not deactivate. If no response to the reset/disconnect sequence is seen in the I/O trace, a dump of the NCP should be taken. If a negative response to the reset/disconnect sequence is received, sense data should be included. Refer to the 370X Program Reference Handbook, GY30-3012, Section 8: BTU RESPONSES.

Documentation required for IBM	Ref. Page	Special Instructions
Traces gathered		
Console log		
NCP dump	4-138	Needed only if no response to the reset/disconnect sequence was received.

3.31 : BSC ACTIVE BUT NOT COMMUNICATING

SYMPTOM:

A bisync device can be activated, but cannot get into session and communicate with an application program.

Not logged on to an Application

The status of the cluster or terminal will indicate ACT, but the cluster or terminal will not be polled until an application issues an 'OPNDST' macro. NETSOL is considered a VTAM application program and normally S/S and BSC terminals are logged onto NETSOL. For dial ports, see the PD/IP for line/link dial problems.

A BSC terminal can be logged on to an application in three ways:

1) The application issuing an 'OPNDST' macro, with the ACQUIRE option for the terminal, or issuing a 'SIMLOGON' macro.

2) Coding the LOGAPPL parameter on the TERMINAL macro.

3) The network operator issuing the 'V NET,ACT' command with the LOGON option.

Inadequate VTAM buffers

If VTAM has insufficient buffers to establish the session, the 'OPNDST' will be rejected.

Incorrect NCP specifications

Incorrect line parameters coded in the NCP for the type of hardware used can cause this problem. Common problems are incompatible MODEMs, wrong transmission code specified, misuse of the direction (DIRECTN) operand of the TERMINAL macro, etc.

3270 cluster failure

A 3270 cluster failure does not drive the application's LOSTERM exit. The cluster must be varied inactive with the immediate option. After VTAM indicates the cluster is inactive, the cluster may be varied active.

Problem Isolation Steps	Reference Page(s)	Description
Issue the VTAM display command for the terminal.	5-8	If the terminal is not allocated to an application program, no communication is possible. Use the VTAM vary command to log the terminal onto the application. Check your procedure for logging a terminal onto an application.
If the terminal is allocated to an application program, issue the VTAM vary inactive command with the immediate modifier, for the cluster (or terminal, if the terminal is not on a cluster).	5-27	This will drive the application's LOSTERM exit, which should issue the 'CLSDST' macro.
Start VTAM's I/O and buffer traces for the cluster and terminal, and vary the cluster and terminal active.		If the failure recurs, compare the failing sequence with the sample flow provided in publication G320-6016(SNA System Problem Determination Guide).

Documentation required for IBM	Ref. Page	Special Instructions
Traces gathered		
Console log		
Copy of VTAMLST/B.book		

3.32 : BSC SESSION TERMINATES ABNORMALLY

A bisync device can be activated and establish a session, but the session terminates during normal operation.

Inadequate VTAM buffers

If VTAM buffers are at threshold, the application program's SEND and RECEIVE macros will be rejected by VTAM, and the application may choose to terminate the session after a number of retries.

BSC 3270s and IOBUF

For BSC 3270 devices, VTAM will not move the input data from IOBUF to the application input data area (or PPBUF if no RECEIVE or READ outstanding) until an EOT has been received by the NCP. The NCP informs VTAM of this via the Extended Response Byte in the Basic Transmission Unit (BTU). The BTU is used between VTAM and the NCP for communications relating to BSC and S/S devices. It shows up in a VTAM I/O trace as an FID 0 PIU. See the 370X Program Reference Handbook, GY30-3012, Section 8: BTU RESPONSES for details. Thus, if an EOT is not being received from the cluster, (page-fixed) IOBUF buffers will be tied up indefinitely. A hardware problem with a 3270 cluster which never sent EOTs could conceivably bring the whole network down.

Incorrect VTAM/NCP parameters

If the TEXTTO parameter for the terminal, coded on the GROUP macro, is incorrectly specified, or is too short, the application may terminate the session.

In VTAM Level 2, if the product of BUFLIM, (coded on the TERMINAL macro), and BUFFACT (coded in the application major node defined in VTAMLST/B.book), is exceeded by the amount of input queued by VTAM from the terminal, VTAM will free the buffers containing the data, and drive the application's LOSTERM exit. This will only occur if the application does not have a RECEIVE pending and VTAM must move the input to PPBUFs. If ACF/VTAM/VS is installed this applies only to BASIC mode sessions. The application may terminate the session.

If the application program sends a message whose length is greater than the value specified in the MAXDATA operand of the NCP PCCU macro, the session will be terminated.

(continued)

Line/link error	For BSC point-to-point lines, if a link failure occurs, VTAM will drive the application's LOSTERM exit for all terminals in session. The application should issue 'CLSDST'.

Problem Isolation Steps	Reference Page(s)	Description
Review the console log for messages indicating that a path failure occurred.		This may indicate that the session was terminated because of a line problem.
Review the LOGREC MDR records.	4-89	MDR records may indicate line problems that did not generate network operator messages.
If the problem is reproducible, start VTAM I/O and buffer traces for the terminal. Also start an NCP line trace on the line.	4-114 6-1	Find the reset/disconnect sequence in the trace. This indicates where the application issued 'CLSDST', and terminated the session. Review the sequence of events before this point. The symptom recognized by the terminal operator, output received, and input at time of failure may be necessary. Since there may be a lot of line trace data, a two-pass trace-printing procedure may be used. First, just print the VTAM I/O and buffer trace entries. If line trace data is needed, a second printing of the trace dataset, for the line trace entries around the time of failure, may be done.

Documentation required for IBM	Ref. Page	Special Instructions
Console log		
LOGREC MDR entries	4-89	
Traces gathered		
Terminal output		

CHAPTER 4 : TOOLS/SERVICE AIDS

This section describes the various tools and service aids available in an SNA network. A description of each aid is included along with installation considerations, sample output, and references to the appropriate documentation for its use.

CONTENTS

4.0 : INTRODUCTION

Problem Determination can be viewed as a process of directing questions about a component failure either to the affected component or to one that is closer to the appropriate SSCP. Most IBM hardware components generate information about internal failures and failures on their interfaces. This information is available to an operating system upon request.

In many cases such a request will be made as soon as there is an indication that an operation has not completed successfully. The maintenance data obtained in this way from the unit in question will be stored in a dataset, where it can be viewed afterwards by using a program. Since this type of information is automatically available after the error occured, it is considered to be "unsolicited" maintenance data.

In some cases, such automatic recording will not take place and the maintenance data must be explicitly solicited before it can be viewed.

Performing a test usually implies that a unit, component or link is singled out and heavily exercised for the purpose of either increasing its failure rate or proving that it does not fail at all. The maintenance data obtained in this way does not differ from that obtained during normal operation.

Proper failure analysis, or Problem Determination, can only be performed if the service person is familiar with the types, sources and the contents of the maintenance records in an SNA network. These relationships are depicted in Figure 1 on page 4-4 and will be referenced in other parts of this document.

A trace involves the recording of all events and/or datastreams of one or more specified types in a dataset. There may or may not be any maintenance data recorded in a trace dataset. Since traces usually yield substantial amounts of data, they are not easily analyzed. In many cases a data reduction program or a data formatting program, or both should be used to facilitate trace analysis.

4.1 : MAINTENANCE DATA EVALUATION

It is important to know what maintenance data is available in the SNA environment, and where it gets generated. Figure 1 on page 4-4 illustrates where, in fundamental network configuration, the various types of maintenance data originate. The maintenance records, which are created as the result of system detected failures appear in the bottom part of the panel, while trace data origins appear in the upper part.

Once maintenance records are retrieved, they are usually stored in a database and can be viewed by employing either a batch or an interactive program. The various maintenance data repositories are cross referenced against the appropriate viewing tools in Figure 2 on page 4-5.

For overview purposes, a brief summary of this maintenance data has been provided in Figure 3 on page 4-6. The summary descriptions given there are, for system generated records, enhanced in the subsequent paragraphs and tables.

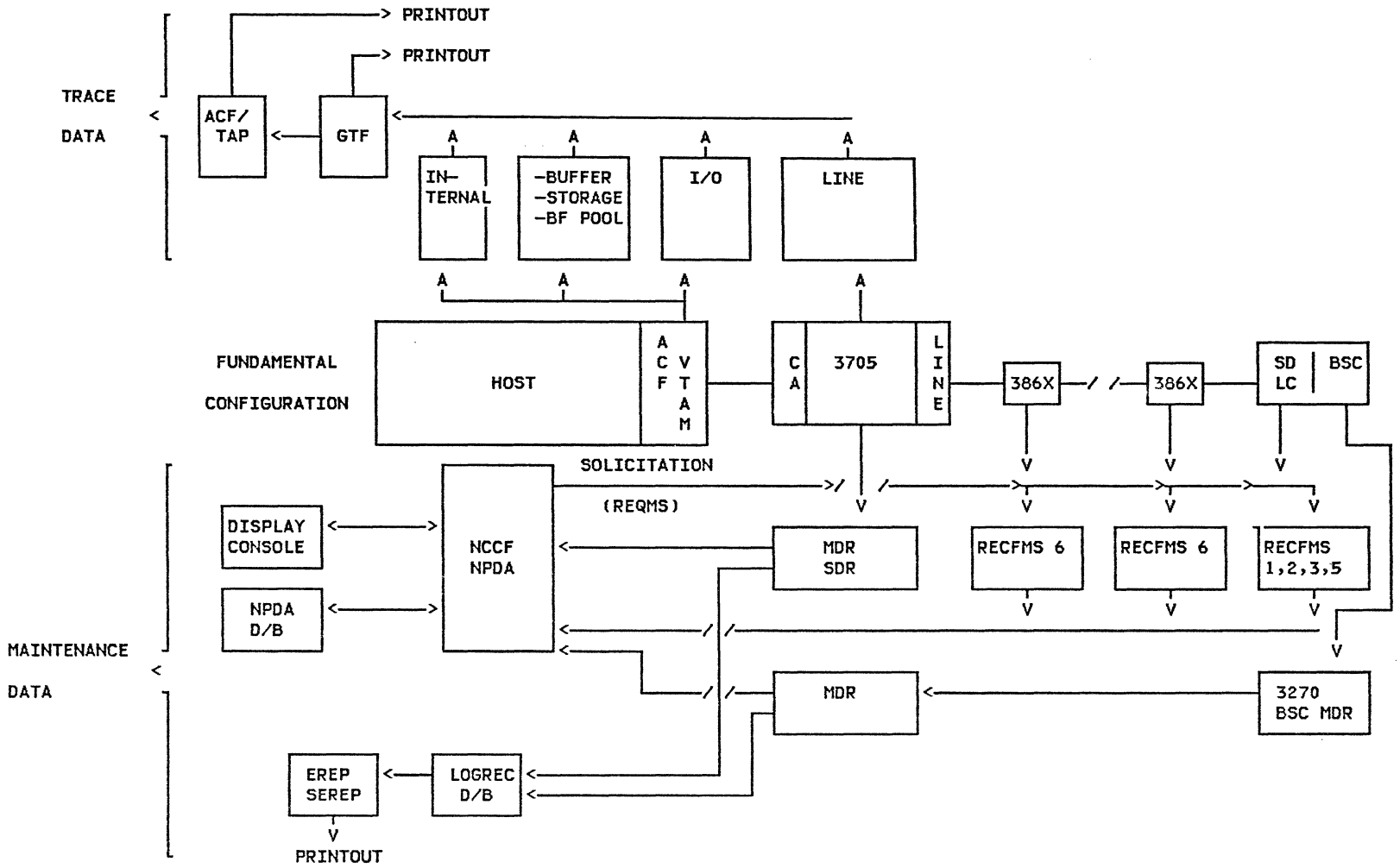


Figure 1. Maintenance Data Origins

	Data Repository			
Viewing Tool	GTF	LOGREC	NPDA	DEVICE LOG
Erep/Serep		X		X 1)
NPDA			1) X 2)	1) X 2)
ACF/TAP	X			

NOTES: 1) Unsolicited records
2) Solicited records

Figure 2. Maintenance Data Origins vs. Viewing Tools

DATABASE	RECORD	DEVICE	DESCRIPTION	Unsolicited/ Solicited
Logrec NPDA	MDR (U)	3705	-Permanent BSC/SS Device or line errors -Station statistics for BSC/SS -Type 1/4 channel adapter error -Type 2/3 channel adapter error -Type 2 scanner errors -Type 3 scanner errors -Input/Output instruction exception -Program level 1 interrupt request -Unresolved program L 3 interrupt request -SNA link permanent errors -SNA station permanent errors -BSC/3270 status/sense -SNA statistics -Intensive mode record SNA station error -Pseudo last intensive mode record	U
NPDA	RECFMS TYPE 1	327X SNA CNTL	Link test statistics (Used after LL2 Test)	S
NPDA	RECFMS TYPE 2	327X SNA CNTL	Summary error data (never sent unsolicited)	S
NPDA	RECFMS TYPE 3	327X SNA CNTL	Communication Adapter Data	S
NPDA	RECFMS TYPE 4	327X SNA CNTL	Controller data (PU/LU)	S
NPDA	RECFMS TYPE 5	327X SNA CNTL	Configuration EC level	S
NPDA	RECFMS TYPE 6	327X SNA CNTL	368X modem error data (gathered and displayed by NPDA but not stored in database)	S
GTF	TRACE DATA I/O,BUFF, LINE		Traces events of failing component in a network	

Figure 3. Maintenance Data Summary

4.1.1 : MISCELLANEOUS DATA RECORD (MDR)

MDR (MISCELLANEOUS DATA RECORD) DESCRIPTION

MDRs are recorded for device failures on teleprocessing devices connected to an IBM 3704 or 3705 device. They are also recorded for Buffer Overflow, Demounts, and Device Failures.

The format of the MDR is described in the following table.

BYTE	BIT	DESCRIPTION
0		Source
	0=1	Always on
	1,2	Unused
	3=1	Always on
	4,5	Unused
	6-7	'00'- MDR formatted by DDR or SVC91
		'01'- Original MDR
		'11'- Converted MDR
1		System/Release level
	0-2	'000'- OS/360
		'001'- DOS
		'010'- OS/VS1
		'011'- CP67 or VM/370
		'100'- OS/VS2
	3-7	Release level, 0 - 1F
2	0=0	Last record
	0=1	More records to follow
	1=0	Time of Day clock(IBM System/360)
	1=1	(IBM System/370)
	2=1	Truncated record
	3	Reserved
	4=1	TIME macro used
	5-7	Reserved
3	0	Not used by MDR
	1=1	Record incomplete
	2-7	Not used by MDR
4	0-2	Reserved
	3-7	'00001'- IBM 3330
		'00010'- IBM 2305 MOD 2
		'00011'- IBM 3270
		'00100'- IBM 3211
		'00101'- IBM 3705
		'00110'- IBM 3670
		'01000'- IBM 2715
		'01001'- IBM 3340 and 3344
		'01010'- IBM 3330 MOD 11
		'01100'- IBM 3800
		'01110'- IBM 3850
		'10001'- IBM 3350
		'10010'- IBM 2305 MOD 1
		All other combinations are reserved.
5	0=0	Two byte sub-ID field used by record
	0=1	variable-length sub-ID field used
	1-3	Reserved
	4-7	Number of characters in sub-ID field, starting in at byte 26(dec), 1a(hex).
6	0-3	Sequence of the physical record.
	4-7	Total number of physical records in this logical record.
7		Reserved
8-11		System date when incident recorded.
12-15		System time when incident recorded.
16	0-5	Reserved
	6=0	Version 1 CPUs
	6=1	Version 11 CPUs
	7	Reserved
17-19		CPU serial number
20-21		CPU machine model number
22-23		Not used for MDR.
24-25		Device address of data identified in this record.
26-?		Identifies device in bytes 24-25. Length(2-16 bytes) defined in byte 5. OR Device dependent information supplied by ERP that detected error.

TABLE 1: MDR FORMAT

4.1.2 : RECORD FORMATTED MAINTENANCE STATISTIC (RECFMS)

REQMS-RECFMS DESCRIPTION

Request Maintenance Statistic (REQMS) is sent by the SSCP to request that specific network management information be sent back via the RECFMS request.

A REQMS is sent normally and can be recognized by its NS HEADER, which is X'410304'.

An SNA controller (note 1) will respond to the REQMS with the following RECFMS records:

TYPE 1 test statistic

TYPE 2 summary error data

TYPE 3 communication error data

TYPE 4 PU/LU data

TYPE 5 E/C level or configuration

TYPE 6 386x error record data

TYPE 6 3867 link diagnostic unit error record data

Possible negative response to REQMS is sense X'080C0000'. This is to indicate the type code is not supported.

Another negative response is X'10030000' which means: 'function not supported'. RU-0 to RU-4 is not equal to X'4103040000'.

NOTE 1: Refer to the proper terminal component description manual for a specific record format. Record Formatted Maintenance Statistic (RECFMS) is sent from the PU to the SSCP to communicate pertinent network management information. It is sent in response to a REQMS in which case the format of the RECFMS RU is dictated by the type code received in the REQMS, or is sent unsolicited when any communication adapter error counter reaches its limit threshold.

TYPE	BYTE	CONTENTS
	0-2	X'410304' NS HEADER
LINK TEST STATISTIC		
1	3-4 5-6 7	X'0000' reserved bit 0, reset(note1) bit 1-7, type code= B'0000001'
SUMMARY ERROR DATA		
2	3-4 5-6 7	X'0000' reserved bit 0, reset(note1) bit 1-7, type code= B'0000010'
COMMUNICATION ADAPTER DATA		
3	3-4 5-6 7	X'0000' reserved bit 0, reset(note1) bit 1-7,type code= B'0000011'
PU/LU DATA		
4	3-4 5-6 7	X'0000' reserved bit 0, reset(note1) bit 1-7,type code= B'0000100'
E/C LEVEL OR CONFIGURATION		
5	3-4 5-6 7	X'0000' reserved bit 0,reset(note1) bit 1-7,type code= B'0000101'
386X ERROR RECORD DATA		
6	3-4 5-6 7	X'0000' reserved bit 0,reset(note1) bit 1-7,type code=B'0000110'

Note 1: Set to 1 if data is to be reset when RECFMS is sent.

Table 2: REQMS Format

BYTE	BIT	DESCRIPTION
0-2		NS HEADER X'410384'
3-4		X'0000'
5-6		Reserved.The contents of this field will be echoed on a solicited request and X'0000' on an unsolicited request.
7	0=1 1-7	Solicited. Sent in reply to REQMS. Type code = B'0000001'
8-11		Station ID: bits 0-11 block no. of sending PU bits 12-31, specified ID of sending PU
12-13		Reserved
14-15		Counter: the number of times the secondary SDLC station has received an SDLC TEST command.
16-17		Counter: the number of times the secondary SDLC station has transmitted an SDLC TEST command.

Table 3: RECFMS Type 01 Format (Link Statistics)

BYTE	BIT	DESCRIPTION
0-2		X'410384'
3-4		X'0000'
5-6		The content of this field will be echoed on a solicited request and X'0000' on an unsolicited request.
7	0=1 1-7	Solicited, sent in reply to REQMS. Type code=B'0000010'.
8-11		Station ID= bits 0-11,block no.of sending PU bits 12-31, specific ID of sending PU.
12-13		Reserved
14	0=0 1=1 2=1 3-7	Summary counter validity mask: bit 0,set to 0,product check counter not valid. Communication counter is valid. SNA error counter is valid. Reserved.
15-16		Reserved
17-18		Product check counter.
19-20		Communication check counter.
21-22		Count of all SNA negative response originated at this PU.

Table 4: RECFMS Type 02 Format (Summary Error Data)

BYTE	BIT	DESCRIPTION
0-2		X'410384'
3-4		X'0000'
5-6		Reserved (same as previous RECFMS).
7	0=0 0=1	Unsolicited. Solicited; sent in reply to REQMS.
8-11		Same as previous RECFMS.
12-13		Reserved
14		Adapter type
15		Communication adapter counter validity mask.byte 1.
	0=1 1=1 2=1 3=1 4=1 5=1 6=1 7=1	Non-productive timeout counter is valid. Idle timeout counter is valid. Write retry counter is valid. Overrun counter is valid. Underrun is valid. Connection problem counter is valid. FCS error counter is valid. Primary station abort counter is valid.
16		Communication adapter counter validity mask.byte 2.
	0=1 1=1 2=1 3=1 4=0 5-7	Command reject counter is valid. DCE error counter is valid. Write timeout counter is valid. Invalid status counter is valid. I/O machine check counter is not valid. Reserved.
17		Reserved
18		Non-productive timeout/receive overrun counter.
19		Idle timeout counter
20		Write retry counter
21		Overrun counter
22		Underrun counter
23		Connection problem counter
24		FCS counter
25		Primary station abort
26		Command reject counter
27		DCE error
28		Write timeout counter
29		Invalid status counter
30		I/O machine check counter (not valid)

Table 5: RECFMS Type 03 Format (COMMUNICATION ADAPTER DATA)

BYTE	BIT	DESCRIPTION
0-2		X'410384'
3-4		X'0000'
5-6		Reserved. The contents of this field will be echoed.
7	0=1 1-7	Solicited Type code=B'0000101'
8-11		Station ID
12-13		Reserved
14-n		Microcode level

Table 6: RECFMS Type 05 Format (E/C LEVEL or CONFIGURATION)

BYTE	BIT	DESCRIPTION
0-2		X'410384'
3-4		SM target identification
5-6	0-1	reserved
	2-3	CSM target descriptor
	4-15	procedure related identifier
7	0	solicitation indicator
	1	not-last-request indicator
	2-7	type code=B'000110'
8-11	0-11	block number
	12-31	sending PU identifier
12-13		reserved
14		X'02' request echo for link status and test. X'03' request echo for DTE interface status.
15		X'01' link subsystem type (386X) X'03' to X'ff', reserved
16		Control byte 1
	0-1	B'00' Valid remote probe status -other- Invalid remote probe status (indicates usability of bytes 18,19)
	2-3	B'00' Valid local probe status -other- Invalid local probe status (indicates usability of bytes 20,21)
	4-5	B'00' Valid probe self test -other- Invalid probe self test (indicates usability of bytes 22,23,24)
	6-7	Reserved
17		Control byte 2
	0-1	B'00' Valid DTE int'face status -other- Invalid DTE int'face status (indicates usability of bytes 25,26)
	2-7	Reserved

BYTE	BIT	
18		Remote probe status byte 1
	0-5	Zeros, not used
	6	Probe reinitialization indicator
	7	Carrier loss in data mode indicator
19		Remote probe status byte 2
	0-3	Byte errors during test
	4	Remote DTE power off indicator
	5	Remote DTE ready dropped indicator
	6	SNBU connected
	7	Streaming indicator
20		Local probe status byte 1
	0-5	Zeros, not used
	6	Probe reinitialization indicator
	7	Carrier loss in data mode indicator
21		Local probe status byte 2
	0-3	Byte errors during test
	4	Remote probe power loss indicator
	5	Always B'1' Full speed
	6	SNBU connected indicator
	7	Reserved
22		Probe self test byte 1
	0	Always B'1'
	1	Always B'1'
	2	Always B'1'
	3	B'0' Leased line - B'1' Switched line
	4	B'0' Point-to-point - B'1' Multipoint
	5	B'0' Primary sta. - B'1' Secondary sta.
	6	Reserved
	7	Reserved
23		Probe self test byte 2
	0	Always B'1'
	1	Local self test failed (only when bit 2 is off)
	2	Remote tone test failed
	3	Suspect TAC failure
	4-6	Zeros, not used
	7	Reserved

Table 7: RECFMS Type 06 - 386x Modem Error Record (Part 1 of 2)

BYTE	BIT	DESCRIPTION
24		Probe self test byte 3
	0	B'0' TAC not installed - B'1' inst'ld
	1	B'0' No SNBU - B'1' SNBU installed
	2	B'0' No CHANNEL - B'1' CHANNEL inst'ld
	3	Zero, not used
	4-7	Microcode EC level
25		Remote DTE interface current status
	0	B'1' Request to send is on
	1	B'1' Clear to send or ready for s'ndng
	2	Reserved
	3	B'1' Transmitted data
	4	Reserved
	5	B'1' Data terminal ready
	6	Always B'1' Full speed
	7	B'1' DTE power off
26		Remote DTE interface transient status
	0	B'1' RTS has been up at least once
	1	B'1' CTS has been up at least once
	2	B'1' RD - data has been received
	3	B'1' TD - data has been transmitted
	4	B'1' CD - carrier loss at least once
	5	B'1' DTR - ready dropped at least once
	6	B'1' Speed change at least once
	7	B'1' DTE power loss at least once

Table 8: RECFMS Type 06 - 386X MODEM ERROR RECORD (Part 2 of 2)

4.1.3 : INTENSIVE MODE RECORDING (IMR)

DESCRIPTION

The operator can request detailed information concerning temporary line errors or other hardware conditions using intensive mode recording (IMR). The error information can be requested for an SDLC communication link between an NCP and one of its peripheral PUs, or between two NCP major nodes.

Recording occurs when any of the following conditions are encountered:

- Permanent hardware errors
- Temporary hardware errors
- Counter overflow
- End-of-day

Intensive mode recording can be used closely with an ACF/VTAM Line Trace to analyze temporary line errors. Using the time stamp on the IMR record, we can determine where to look in the line trace.

OPERATION

For intensive mode recording, the link between the NCP and PU or the two NCPs, whichever the case, must be active.

To start intensive mode recording, specify:

```
MODIFY procname,IMR,ID=nodename
              (,RECLIM=n)
              (,OPT= ACT,INACT)
```

When the RECLIM value (maximum number of temporary errors that are to be recorded for the named link station or PU, default 10) is reached, or IMR is cancelled with OPT=INACT, the NCP reverts to sending only permanent error records to ACF/VTAM.

ACF/VTAM converts each IMR record to a miscellaneous data recorder (MDR) record. MDR records are written to the SYS1.LOGREC dataset in OS/VS systems or to the SYSREC file in VSE systems. Refer to Section 4.1.1 for the format of the MDR record.

If the Network Problem Determination Application (NPDA) is installed, ACF/VTAM can send a copy of the IMR records to NPDA. Refer to the section on NPDA for information on how to display the records.

SOFTWARE DEPENDENCIES

The following software must be at least at the specified levels:

- ACF/NCP R2.1
- ACF/VTAM R2
- NCCF R1
- NPDA 2

REFERENCE MANUALS

- ACF/VTAM Operation SC27-0612
- ACF/VTAM Diagnosis Guide . . SC27-0615 (OS/VS)
  . . SC27-0615 (VSE)

4.2 : INTERACTIVE PROBLEM DETERMINATION TOOLS

The interactive Problem Determination Tools represent the state-of-the-art and should be employed wherever possible. Most of them are driven by actual problems that are detected by the system, and among their many advantages are the following:

- Fast remote problem determination.
- Immediate, interactive access to maintanence databases.
- Immediate execution of tests, often without even the need to take the units under test offline.
- Immediate awareness of developing communications problems through unsolicited, threshold-driven alerts.
- Immediate, interactive access to historical problem data.
- Immediate, interactive access to network configuration data.

It should be noted that the accent is on the immediate and interactive properties of these tools. In a modern network, where high availability is important, these properties are of the utmost importance.

4.2.1 : NETWORK COMMUNICATIONS CONTROL FACILITY (NCCF)

DESCRIPTION

Basic network control, in a given SNA domain, is accomplished with the ACF/VTAM commands described in chapter 5. The Network Communications Control Facility (NCCF) program product offers the following advantages in an ACF/VTAM environment:

- It allows dedicated network consoles, i.e., separating the network message traffic from host control and subsystem control messages.
- Operator access control, along with its security and auditing advantages, is achieved through a password-protected logon. Under MVS, the password may be RACF controlled.
- A continuous log of operator activity is maintained via the NCCF Log.
- A hardcopy log is supported.
- Operator keystrokes can be significantly reduced for repetitive command sequences through the use of command lists (CLIST).
- An operator's span of control can be defined to include all ACF/VTAM defined network resources, or a defined subset.
- A network operator can be authorized to issue all available commands, or a defined subset.
- NCCF supports exit routines, which may be used to examine and edit NCCF Commands and messages. This permits extended use of CLISTs via user definable Program Function Keys (PFKs).
- Timer initiated command support is available.
- User defined commands can be designed and implemented via the NCCF Command Processor support facility.
- Commands can be given user-defined names.
- IBM Command Processor P/Ps can be installed and operated under NCCF, notably the Network Problem Determination Application (NPDA) and the Info/System program products (Info/Management - Info/MVS - Info/Access).
- Cross-Domain network control is achieved through NCCF to NCCF sessions, which provides an unrestricted view of cross-domain resources and also permits cross-domain problem determination.
- NCCF operates in the environments shown in Figure 4 on page 4-20.
- NCCF is parameter driven and requires no generation for installation.

This chapter does not cover the new functions provided by NCCF Version 2. A future revision of this guide will reflect the new features of NCCF Version 2.

	NCCF Releases 1 and 2											Functions Unique to NCCF Release 2
									Presentation Services			
	User Custom-ization	CNM Interface Support	Oper'r Control	Data Security/ Auditing	Data Services	Cross-Domain	Span of Control	CLISTS	Standard NCCF	Full-Line	Full-Screen	
VTAM Level 2 OS/VS2 MVS, OS/VS1	X			X	X			X	X	X	X	
ACF/VTAM Release 1 OS/VS2(MVS) OS/VS1	X		X	X	X	X	X	X	X	X	X	
ACF/VTAM Release 2 OS/VS2(MVS) OS/VS1, VSE	X	X	X	X	X	X	X	X	X	X	X	X
ACF/VTAM Release 3 OS/VS2(MVS) OS/VS1, VSE	X	X	X	X	X	X	X	X	X	X	X	X
ACF/VTAME	X	X	X	X	X	X	X	X	X	X	X	X

Figure 4. NCCF Capabilities in Various Environments

NCCF PROBLEM DETERMINATION HIGHLIGHTS

Problem Determination often starts in NCCF. Using the NCCF CLIST capability, a fully customized set of problem determination procedures can be developed and made available to the network operators, which can make it easier to perform PD in the home domain, and enables it in a cross-domain. In addition, a dictionary of message explanations can be put online.

A series of examples is provided in this section. Also of particular value is the NCCF log, which records all events that have taken place in the NCCF address space.

AVAILABILITY

IBM Program Product 5735-XX6

PRODUCT DEPENDENCIES

- VSAM (for NCCF Rel. 2 log)
- ACF/VTAM

REFERENCE MANUALS

- NCCF General Info . . . GC27-0429
- NCCF R2 Installation . . SC27-0430
- NCCF R2 Messages SC27-0431
- NCCF R2 Terminal Use . . SC27-0432
- NCCF R2 Customization . SC27-0433
- NCCF R2 Logic. LY38-3010
- NCCF V2 Installation . . SC27-0660
- NCCF V2 Customization . SC27-0661
  Command Lists
- NCCF V2 Customization . SC27-0662
  Command Processors
- NCCF V2 Operation. . . . SC27-0664

OPERATION

NCCF can be operated from any number of locally or remotely attached terminals, as well as from terminals located in another domain.

Only defined operators are permitted to log-on to NCCF. Each operator has a personal password to verify his/her logon authority. The password can be controlled by NCCF, or, if desirable in an MVS environment, by RACF (Resource Access Control Facility).

NCCF provides for an action-oriented, line by line, wraparound display. The wrap mode can be turned on or off under operator control.

As distributed, NCCF supports the ACF/VTAM command set plus a set of its own commands. Since, in principle, it is a command driver of considerable flexibility, the usable command set can be customized by the user as follows:

- All commands can readily be re-named and synonymed for convenience. This permits the use of synonyms in languages other than English.
- Program function keys can be set to execute many commands.
- Commands can be removed, thus made inoperable.
- User developed commands (verbs and processors) can be added to the command set.

The number of operator keystrokes can be significantly reduced through the use of CLISTs, which allow the grouping and executing of commands under user defined names. CLISTs may also be executed from PFKs. In this case, however, a user written NCCF exit routine must be provided which translates the code returned by the PFK into a PDS member name. (Refer to the NCCF Customization manual for sample exits.)

OPERATOR PROFILE DEFINITION

An operator may be given global control over all the network resources in a given SNA domain. Optionally, however, his/her profile may be set up to limit his span of control, i.e., hide specific resources from his/her view. This is accomplished via the "scope of control" facility.

Another facility, called "scope of commands", may be used within an operator's profile to restrict the range of commands, keywords, and keyword values available to him/her. This means that the available command set may be divided into command classes at the option of the user. Operators can then be permitted to execute commands of predefined classes only.

COMMAND SUMMARY

This section summarizes all of the commands in the original syntax. The table lists the commands in alphabetical order by command name. Operands are shown only when necessary.

The "Type" column indicates whether the command is regular (R), immediate (I), both regular and immediate (B), or regular and data services (RD), or not applicable for the command type (N).

The "Where" column indicates where details about the command can be found. The entries have the following meanings:

VTAM — An ACF/VTAM command. Refer to ACF/VTAM publications for the description.

NCCF — An NCCF command, summarized here and found in NCCF manuals.

The "Span" column indicates whether or not the command can be restricted by span of control.

The last four columns indicate from where the commands may be issued. The column headings and their meanings are as follows:

TERMINAL: The operator may issue the command at the physical operator station.

COMMAND LIST: The command may be used in a command list.

SYSTEM CONSOLE: The command may be entered from the system console to NCCF.

COMMAND PROCESSOR: The command may be issued by a command processor to NCCF.

The numbers in the columns refer to the notes that follow the table.

Command	Type	Where	SPAN Applies	Issued From			
				Terminal	CLIST	System Console	Command Processor
AGAIN	(1)	NCCF	NO	X			
AUTOWRAP	I	NCCF	NO	X			
CANCEL	I	NCCF	NO	X			
CLEAR key	I	NCCF	NO	X			
clistname	R	NCCF	(2)	X	X		X
CLOSE	I	NCCF	NO	X	X	X	X
DISPLAY	R	VTAM	YES	X	X	3	X
GO	I	NCCF	NO	X			
HALT	N	VTAM	NO			3	
LIST	R	NCCF	NO	X	X		X
LOGOFF	R	NCCF	NO	X			
LOGOFF	N	VTAM	NO	(5)			
LOGON	N	VTAM	NO	(6)			
MODIFY	R	VTAM	YES	X	X	3	X
MOVE	R	NCCF	NO	X	X		X
MSG	R	NCCF	NO	X	X	X	X
no data enter	I	NCCF	NO	X			
PAUSE	R	NCCF	NO		X		X
REPLY	R	VTAM	NO	X	X	7	X
RESET	I	NCCF	NO	X			X
ROUTE	R	NCCF	NO	X	X		X
START	N	VTAM	NO			3	
START	R	NCCF	(8)	X	X		X
STOP	R	NCCF	(8)	X	X		X
SWITCH	RD	NCCF	NO	X	X		X
user command	(10)	NCCF	NO	X	X		X
VARY	R	VTAM	YES	X	X	3	X

Table 9: NCCF Command Summary

1. Only regular and RD commands may be repeated.
2. The generated commands are checked, the original command is not.
3. Goes directly to the access method, not to NCCF.
4. Establishes an SNA session between the terminal and the device message handler or NCCF application program.
5. Data is entered from the termial, but is received by the access method and becomes available to NCCF only through the facilities of the LOGON exit.
6. Data is entered from the terminal but is received by ACF/VTAM and results in entry to the NCCF LOSTERM exit routine.
7. Goes directly to ACF/VTAM or to NCCF.
8. Applies to START|STOP (resource|span) only.
9. Breaks the SNA session between the SNA device and the device message handler or NCCF application program.
10. Defined by user as R,I,B,D, or RD.

Operation	Operands
AGAIN	
AUTOWRAP	YES|NO
CANCEL	
clistname	[operand...]
CLOSE	[NORMAL|IMMED|DUMP]
DISPLAY D	NET, ID=[domainid.] name [domainid.] [MAJNODES|BFRUSE|APPLS|TERMS|LINES|CDRMS|CDRSCS] [,EVERY|E,|,ACT|A|,INACT|I|,NONE|N]
GO	
LIST	CLIST=clistname PROFILE=profilename stationname|'' hclname terminalname taskname SPAN=spanname STATUS=(NNT|OPS|TASKS|OPT|SPANS|PROFILES)
LOGOFF	
LOGON	APPLID(applid) [LOGMODE (DSILGMOD)]
MODIFY F	NET, DUMP,ID=[domainid.] ncpname [,RMPO|DYNA] NEGPOLL=number,ID=[domainid.] linename [domainid.] NETSOL=(YES|NO) POLL=number,ID=[domainid.] linename SESSION=number,ID=[domainid.] linename [domainid.] SUPP=... [domainid.] TEST TRACE,ID=[domainid.] name,TYPE NOTRACE,ID=[domainid.] name,TYPE=... TRANLIM=number,ID=[domainid.] terminalname [domainid.] TNSTAT [...] | [domainid.] NOTNSTAT[...
MOVE	FROM=terminalname,TO=terminalname

Operation	Operands
MSG	(LOG|ALL|SYSOP|stationname),text
PAUSE	[text]
REPLY R	Pnn|Lnn, text
RESET	[NORMAL|IMMED|DUMP]
ROUTE	domainid,command text
START	OP=stationname HCL=hclname [,OP=(stationname|"|ALL)] DOMAIN=domainid TERM=terminalname SPAN=spanname [,OP=stationname|"] RESOURCE=resourcename TASK=taskname
STOP	OP=stationname HCL=hclname [,OP=(stationname|"|ALL)] DOMAIN=domainid TERM=terminalname SPAN=spanname [,OP=stationname|"] RESOURCE=resourcename FORCE=(taskname|hclname|terminalname)
SWITCH	taskname,(P|S|T)
VARY V	NET, ACT,ID=[domainid.] name INACT [,(I|F|R)] ,ID=[domainid.] name PATH=(NOUSE|USE),(PID=n|GID=n),ID=[domainid.] name INOP,ID=[domainid.] linename [,END]

Table 10: NCCF Command Quick Reference

INTERPRETATION

This section has a number of examples which are organized as follows:

1. CLIST examples, which show how the operation of the network can be simplified for the network operator when CLISTs are used.

   Please note that the CLIST capability provides the user with a great deal of "personalized" command flexibility. None of the CLISTS shown in the subsequent examples are delivered as part of the NCCF product, they have all been created as samples by the authors of this publication. In one case a source listing has also been shown.

2. Cross-domain examples, which are subdivided into:

   a. Starting an NCCF to NCCF cross-domain session

   b. Performing inquiries in another domain

3. Example of an NCCF log printout

EXAMPLE 1: CLIST EXAMPLES

The following CLISTs are examples of how the network operator's job can be simplified, and how errors and keystrokes can be reduced. These examples have been created and tried by the authors, but the users are invited to customize them or create their own.

CLIST ILLUSTRATION 1: DIS

The CLIST "DIS" creates a D NET,... command and in turn calls imbedded CLISTS by the same name as selected ACF/VTAM ISTxxxx messages.

```
          "DIS" CLIST entered here
NCCFL     14:00:33 * DIS LU360260

          Response starts here
NCCFL     14:00:33 C Enter: ST or STATUS xxxxx(xxxxx) for status description
NCCFL     14:00:34 C DISPLAY NET,ID=LU360260,E
NCCFL     14:00:34 C DSI013I COMMAND LIST DIS      COMPLETE
NCCFL     14:00:35   IST075I  VTAM DISPLAY - NODE TYPE= LOGICAL UNIT
NCCFL     14:00:35   IST486I  NAME= LU360260 ,STATUS= ACT/S           ,DESIRED STATE= ACTIV
NCCFL     14:00:35   IST081I  LINE NAME= L36026    , LINE GROUP= G36S2     , MAJNOD= N36R21
NCCFL     14:00:35   IST135I  PHYSICAL UNIT= PU36026  ,
NCCFL     14:00:35   IST675I  VR =  0 , TP =  0
NCCFL     14:00:35   IST314I  END
NCCFL     14:00:35 C IST082I  The device type is LU.
NCCFL     14:00:35 C .        It is in session with LNETMON.
NCCFL     14:00:35 C .        The assigned application is LNETMON.
```

Source listing of the CLIST "DIS".
Provided as a sample only.

```
&CONTROL CMD
&IF .&1 EQ .? &THEN &GOTO -TELL
&IF .&1 EQ .  &THEN &GOTO -TELL
&WRITE Enter: ST or STATUS xxxxx(xxxxx) for status description
&IF &1 = APPLS &THEN &GOTO -SHRT
&IF &1 = CLSTRS &THEN &GOTO -SHRT
&IF &1 = TERMS &THEN &GOTO -SHRT
&IF &1 = LINES &THEN &GOTO -SHRT
&IF &1 = CDRMS &THEN &GOTO -SHRT
&IF &1 = PATHS &THEN &GOTO -SHRT
&IF &1 = CDRSCS &THEN &GOTO -SHRT
&IF &1 = BFRUSE &THEN &GOTO -SHRT
&IF &1 = MAJNODES &THEN &GOTO -SHRT
&IF &1 = PENDING &THEN &GOTO -SHRT
&IF &1 = PATHTAB &THEN &GOTO -SHRT
&IF &1 = P &THEN &GOTO -SHRT
&IF &1 = NCPSTOR &THEN &GOTO -NCPS
&IF &1 = CLSTRS &THEN &GOTO -SHRT
&PAR2 = &2
&IF .&PAR2 EQ . &THEN &PAR2 = E
*WRITE DISPLAY NET,ID=&1,&PAR2
DISPLAY NET,ID=&1,&PAR2
&EXIT
-SHRT
DISPLAY NET,&1,&2
&EXIT
-NCPS
&IF &PARMCNT GT 3 &THEN &GOTO -PAR3
DISPLAY NET,&1,ID=&2,ADDR=&3
&EXIT
-PAR3
DISPLAY NET,&1,ID=&2,ADDR=&3,LENGTH=&4
&EXIT
-TELL
&WRITE This CLIST requires one parameter; the second is optional.
&WRITE DIS nn nn
&WRITE Basic VTAM format: DISPLAY NET,ID=userid,<E | A | I>
&EXIT
```

CLIST ILLUSTRATION 2: STATUS

The "STATUS" CLIST is particularly useful for problem determination, since it explains status information on the screen.

This information can be enhanced to make it more understandable for the operator.

```
          "STATUS" CLIST entered here
NCCFL     14:00:44 * STATUS ACT/S

          Response starts here
NCCFL     14:00:44 C ACT.. Active
NCCFL     14:00:44 C       The resource  is in  the active  state. ACTIV  terminals
NCCFL     14:00:44 C       with  no active  or  pending-active  sessions will  have
NCCFL     14:00:44 C       ACT-NOSESS status in response to DISPLAY TERMS.
NCCFL     14:00:45 C .../S A session is in progress for this logical unit or terminal.
```

CLIST ILLUSTRATION 3: DIS and STATUS

Another example of "DIS" with subsequent "STATUS"

```
        DIS CLIST entered here.
NCCFL   15:36:53 * DIS LSSCMVS2
NCCFL   15:36:55 C Enter: ST or STATUS xxxxx(xxxxx) for status description
NCCFL   15:36:55 C DISPLAY NET,ID=LSSCMVS2,E
NCCFL   15:36:56 C DSI013I COMMAND LIST DIS      COMPLETE
NCCFL   15:36:57   IST075I  VTAM DISPLAY - NODE TYPE= CDRM
NCCFL   15:36:57   IST486I  NAME= LSSCMVS2 ,STATUS= ACTIV           ,DESIRED STATE= ACTIV
NCCFL   15:36:58   IST476I  CDRM TYPE = EXTERNAL ,SUBAREA = 032
NCCFL   15:36:58   IST389I  PREDEFINITION OF CDRSC = OPT
NCCFL   15:36:58   IST478I  CDRSCS:
NCCFL   15:36:58   IST080I  NCCFZ    ACTIV      ZTSO     ACTIV      ZJES2MVS ACTIV
NCCFL   15:36:58   IST080I  ZCICS    ACTIV      ZIIS     ACTIV      ZIM1     ACTIV
NCCFL   15:36:58   IST080I  ZIM2     ACTIV      ZIM3     ACTIV      ZIM4     ACTIV
NCCFL   15:36:58   IST080I  ZIM5     ACTIV      ZIM6     ACTIV      ZIM6A    ACTIV
NCCFL   15:36:58   IST080I  ZIM6F    ACTIV      ZIMX     ACTIV      ZNETMON  ACTIV
NCCFL   15:36:58   IST080I  ZHELP    ACTIV      ZNETOPR  ACTIV      ZFCO     ACTIV
        Reponse contains complex status codes.
NCCFL   15:36:58   IST080I  ZVSPC    ACTIV      ZTSO0001 ACT/S----Y NCCFZ000 ACT/S----Y
NCCFL   15:36:58   IST314I  END


        Status CLIST explains most status codes.
NCCFL   15:37:21 * STATUS ACT/S----Y
NCCFL   15:37:23 C ACT.. Active
NCCFL   15:37:23 C       The resource  is in  the active  state. ACTIV  terminals
NCCFL   15:37:23 C       with  no active  or  pending-active  sessions will  have
NCCFL   15:37:23 C       ACT-NOSESS status in response to DISPLAY TERMS.
NCCFL   15:37:23 C .../S A session is in progress for this logical unit or terminal.
NCCFL   15:37:24 C ....Y This cross-domain resource was created dynamically.
```

CLIST ILLUSTRATION 4: STATUS

Example of 2 "STATUS" CLISTs

```
          "PCTD2" is the status code queried.
NCCFL     15:38:11 * STATUS PCTD2
NCCFL     15:38:11 C PCTD2 Pending Contacted (2) Response
NCCFL     15:38:11 C       A node such as a link station or a PU, is being activated
NCCFL     15:38:11 C       and the final contacted request was sent to the appropriate
NCCFL     15:38:11 C       PU services and the response received, but the associated
NCCFL     15:38:11 C       Contacted request was not received. A communication
NCCFL     15:38:11 C       controller will also be found in this state (it is a
NCCFL     15:38:11 C       suspended state in this case) during activation while waiting
NCCFL     15:38:11 C       for a link station connected to it to be activated; the
NCCFL     15:38:11 C       difference between PTCD2 and PCTD1 is that a communication
NCCFL     15:38:11 C       controller in the PCTD1 state may be loaded if a link station
NCCFL     15:38:11 C       receives a Contacted request indicating the NCP needs to be
NCCFL     15:38:11 C       loaded, whereas in the PCTD2 state, both the link station and
NCCFL     15:38:11 C       the NCP would be deactivated.



          "PANNA" is queried.
NCCFL     15:38:36 * STATUS PANNA
NCCFL     15:38:37 C PANNA Pending Allocate Node Network Address
NCCFL     15:38:37 C       A node,  for example,  a DR  added, PU  or LU,  is being
NCCFL     15:38:37 C       activated, and  the Request  Network Address  Assignment
NCCFL     15:38:37 C       request was sent to the appropriate PU services, but the
NCCFL     15:38:37 C       associated response was not received.
```

CLIST ILLUSTRATION 5: SENSE

The "SENSE" CLIST explains sense information

```
          The SENSE CLIST explains most sense codes.
NCCFL     15:39:00 * SENSE 0806
          "0806" is queried.
NCCFL     15:39:00 C DSI219I COMMAND LIST SENSE    - STATEMENT ECHO SUPPRESSED
NCCFL     15:39:00 C * REQUEST REJECT  CATEGORY CODE = X'08'
NCCFL     15:39:00 C * Modifier (in hexadecimal):
NCCFL     15:39:00 C *
NCCFL     15:39:00 C * 06   Resource Unknown:  The logical unit, physical unit, link, or
NCCFL     15:39:00 C *       link station name specified in a request is not known to the
NCCFL     15:39:00 C *       receiver.
NCCFL     15:39:00 C *
NCCFL     15:39:00 C DSI013I COMMAND LIST SEN00806 COMPLETE
NCCFL     15:39:00 C ENTER : SENSE 08 for general description of sense category
```

CLIST ILLUSTRATION 6: LL2 with prompting

Example of CLIST prompting: if the parameter is a "?", it is a "help" request.

```
NCCFL     15:51:20 * LL2 ?

NCCFL     15:51:20 C For Link Level 2 Test enter:
NCCFL     15:51:20 C   LL2,id                          link station or PU name
NCCFL     15:51:20 C       (,CANCEL|CONT|NTRANS=10|N)  default
NCCFL     15:51:20 C                  *********        *******
NCCFL     15:51:20 C       (,NFRAMES=1|n)              default
NCCFL     15:51:20 C         *********                 *******
NCCFL     15:51:20 C       (,DATA=data)                optional
NCCFL     15:51:21 C DSI013I COMMAND LIST LL2      COMPLETE
```

This CLIST is intended to execute a LL2 test, which is further explained in section 4.2.2. The ACF/VTAM command required has a complex stucture which needs further explanation. The operator, therefore, asks for prompting.

Parameters can now be entered as per instructions.

```
NCCFL     15:53:05 * LL2 PU36026,NTRANS=300,DATA=ABCDEFGH
NCCFL     15:53:06 C F NET,LL2,ID=PU36026,NTRANS=300,DATA=ABCDEFGH
NCCFL     15:53:07 C DSI013I COMMAND LIST LL2      COMPLETE

NCCFL     15:54:29   IST549I  LL2 TEST FOR ID= PU36026  ENDED WITH ERRORS
NCCFL     15:54:29   IST243I  FRAMES SENT = 00300 RCVD = 00247 RCVD WITHOUT ERRORS = 00247
```

EXAMPLE 2: ESTABLISHING A CROSS-DOMAIN NCCF TO NCCF SESSION

The following commented printout matches the NCCF screen displays for establishing a cross-domain session between two NCCFs. The home-domain NCCF is named "NCCFL", while the other domain name is "NCCFZ".

```
          Operator 'HEINZ' Logging on
          to home-domain NCCF

The initial logon CLIST is named "WELCOME",
it invokes a second CLIST by the name "WHO"
which shows all home-domain and cross-domain
operators currently logged on.

The lefthand column identifies the NCCF
that displays the message.
```

```
NCCFL      12:34:45 - DSI020I OPERATOR HEINZ    LOGGED ON FROM TERMINAL LSL06D   USING PROFILE(GLOBAL
NCCFL                 ),HCL(         )
NCCFL      12:34:45 * WELCOME
NCCFL      12:34:45 ! DSI082I AUTOWRAP STARTED
NCCFL      12:34:45 C CLEAR
NCCFL      12:34:45 C ************************************************************
NCCFL      12:34:45 C *                                                          *
NCCFL      12:34:45 C *                                                          *
NCCFL      12:34:45 C *                                                          *
NCCFL      12:34:45 C *       WELCOME TO THE LARGE SYSTEMS SUPPORT CENTRE        *
NCCFL      12:34:45 C *                                                          *
NCCFL      12:34:45 C *               SNA DEMONSTRATION NETWORK                  *
NCCFL      12:34:45 C *                                                          *
NCCFL      12:34:45 C *                                                          *
NCCFL      12:34:45 C *                                                          *
NCCFL      12:34:45 C ************************************************************
NCCFL      12:34:45 C *
NCCFL      12:34:45 C ===> THESE HOME-DOMAIN OPERATORS ARE LOGGED ON <==
NCCFL      12:34:45 C . . . . . |
NCCFL      12:34:45 C . . . . . V
NCCFL      12:34:45 - OPERATOR: HEINZ    TERM: LSL06D   STATUS: ACTIVE
NCCFL      12:34:45 - END OF STATUS DISPLAY
NCCFL      12:34:45 C ===> THESE CROSS-DOMAIN OPERATORS ARE LOGGED ON <==
NCCFL      12:34:45 C . . . . . |
NCCFL      12:34:45 C . . . . . V
NCCFL      12:34:45 - MAX SESS: 00000008
NCCFL      12:34:45 - NO ACTIVE NCCF TO NCCF SESSIONS FOUND
```

Contacting the NCCF in the other domain via the command:

"START DOMAIN=domain"

```
NCCFL      12:35:01 * START DOMAIN=NCCFZ
NCCFL      12:35:02 - DSI033I NCCFZ    SESSION STARTING FOR HEINZ
```

The cross-domain NCCF (NCCFZ) prompts for a user ID and password to complete the cross-domain logon. Note that the ID of the NCCF at which the message originates is listed in the left margin.

```
NCCFZ      13:28:49 - DSI809A PLEASE ROUTE OPID,PASSWORD,PROFILE,HARDCOPY,INITIAL CMD
```

Displaying the status of the cross-domain NCCF using the "DIS" CLIST.

```
NCCFL      13:28:49 * DIS NCCFZ
NCCFL      13:28:49 C Enter: ST or STATUS xxxxx(xxxxx) for status description
NCCFL      13:28:49 C DISPLAY NET,ID=NCCFZ,E
NCCFL      13:28:50 C DSI013I COMMAND LIST DIS      COMPLETE
```

The following display shows that NCCFZ is an active cross-domain resource under the cross-domain resource manager LSSCMVS2.

```
NCCFL      13:28:50   IST075I  VTAM DISPLAY - NODE TYPE= CDRSC
NCCFL      13:28:51   IST486I  NAME= NCCFZ    ,STATUS= ACTIV          ,DESIRED STATE= ACTIV
NCCFL      13:28:51   IST479I  CDRM NAME = LSSCMVS2
NCCFL      13:28:51   IST171I  ACTIVE SESSIONS = 0000 SESSION REQUESTS = 0000
NCCFL      13:28:51   IST206I  SESSIONS:
NCCFL      13:28:51   IST172I  NO SESSIONS      EXIST
NCCFL      13:28:51   IST314I  END
```

Routing the user ID "HEINZ" and the
password "PSWD" to the cross-domain NCCF.

```
NCCFL      13:32:22 * ROUTE NCCFZ,HEINZ,PSWD
```

The cross-domain NCCF replies and indicates
that it has processed the logon request.

The CLIST "WHO", which is automatically
executed at logon time, shows that user
"BILL" is logged on from a home-domain
terminal, while user "HEINZ" is logged on
cross-domain from the NCCFZ perspective.

```
NCCFZ      13:32:58 - DSI810I NCCF ACF/VTAM READY
NCCFZ      13:33:05 - DSI020I OPERATOR HEINZ    LOGGED ON FROM TERMINAL NCCFL000 USING PROFILE(GLOBAL
                    ),HCL(         )
NCCFZ      13:33:05 * WELCOME
NCCFZ      13:33:10 C AUTO ON
NCCFZ      13:33:10 C CLEAR
NCCFZ      13:33:10 C ************************************************************
NCCFZ      13:33:10 C *                                                          *
NCCFZ      13:33:13 C *                                                          *
NCCFZ      13:33:13 C *                                                          *
NCCFZ      13:33:13 C *       WELCOME TO THE LARGE SYSTEMS SUPPORT CENTRE        *
NCCFZ      13:33:13 C *                                                          *
NCCFZ      13:33:14 C *               SNA DEMONSTRATION NETWORK                  *
NCCFZ      13:33:16 C *                                                          *
NCCFZ      13:33:16 C *                                                          *
NCCFZ      13:33:16 C *                                                          *
NCCFZ      13:33:16 C ************************************************************
NCCFZ      13:33:16 C *
NCCFZ      13:33:19 C ===> THESE HOME-DOMAIN OPERATORS ARE LOGGED ON <==
NCCFZ      13:33:19 C . . . . . |
NCCFZ      13:33:19 C . . . . . V
NCCFZ      13:33:19 - OPERATOR: BILL     TERM: LSZ020   STATUS: ACTIVE
NCCFZ      13:33:19 - END OF STATUS DISPLAY
NCCFZ      13:33:19 C ===> THESE CROSS-DOMAIN OPERATORS ARE LOGGED ON <==
NCCFZ      13:33:19 C . . . . . |
NCCFZ      13:33:19 C . . . . . V
NCCFZ      13:33:22 - MAX SESS: 00000008
NCCFZ      13:33:22 - OPERATOR: HEINZ    TERM: NCCFL000 STATUS: ACTIVE
NCCFZ      13:33:23 - END OF STATUS DISPLAY
```

EXAMPLE 3: PERFORMING A CROSS-DOMAIN INQUIRY

The following example shows how inquiries can be directed to the cross-domain NCCF.

```
NCCFL      14:35:28 * ROUTE NCCFZ,MAJNODES
NCCFZ      14:36:03 * MAJNODES
NCCFZ      14:36:06 C DISPLAY NET,MAJNODES
NCCFZ      14:36:10   IST097I  DISPLAY  ACCEPTED
NCCFZ      14:36:10   IST350I  VTAM DISPLAY - DOMAIN TYPE= MAJOR NODES
NCCFZ      14:36:10   IST089I  VTAMSEG  TYPE= APPL SEGMENT      , ACTIV
NCCFZ      14:36:10   IST089I  ZATSO    TYPE= APPL SEGMENT      , ACTIV
NCCFZ      14:36:10   IST089I  ZACICS   TYPE= APPL SEGMENT      , ACTIV
NCCFZ      14:36:13   IST089I  ZAIMS    TYPE= APPL SEGMENT      , ACTIV
NCCFZ      14:36:13   IST089I  ZANSOL   TYPE= APPL SEGMENT      , ACTIV
NCCFZ      14:36:17   IST089I  ZANCCF   TYPE= APPL SEGMENT      , ACTIV
NCCFZ      14:36:17   IST089I  ZAJES    TYPE= APPL SEGMENT      , ACTIV
NCCFZ      14:36:17   IST089I  CDRSCHA0 TYPE= CDRSC SEGMENT     , ACTIV
NCCFZ      14:36:17   IST089I  CDRSCHA1 TYPE= CDRSC SEGMENT     , ACTIV
NCCFZ      14:36:41   IST089I  CDRSCLA1 TYPE= CDRSC SEGMENT     , ACTIV
NCCFZ      14:36:41   IST089I  CDRSCLA2 TYPE= CDRSC SEGMENT     , ACTIV
NCCFZ      14:37:07   IST089I  ZLOCAL02 TYPE= LCL 3270 MAJ NODE , ACTIV
NCCFZ      14:37:07   IST089I  ZLOCAL03 TYPE= LCL 3270 MAJ NODE , ACTIV
NCCFZ      14:37:07   IST089I  ZLOCAL06 TYPE= LCL 3270 MAJ NODE , ACTIV
NCCFZ      14:37:08   IST089I  ZCONSOLE TYPE= LCL 3270 MAJ NODE , ACTIV
NCCFZ      14:37:08   IST089I  N37R21   TYPE= NCP MAJOR NODE    , ACTIV      ,CUA=505
NCCFZ      14:37:11   IST089I  CDRSCRL0 TYPE= CDRSC SEGMENT     , ACTIV
NCCFZ      14:37:11   IST089I  CDRMZ    TYPE= CDRM SEGMENT      , ACTIV
NCCFZ      14:37:11   IST314I  END
NCCFZ      14:37:14 C DSI013I COMMAND LIST MAJNODES COMPLETE
```

```
LOOK AT NCCFZ'S CDRMS.

CLIST "CDRMS" is being used.
```

```
NCCFL      14:38:57 C ROUTE NCCFZ,CDRMS
NCCFZ      14:39:08 * CDRMS
NCCFZ      14:39:16 C DISPLAY NET,CDRMS,EVERY
NCCFZ      14:39:24   IST097I  DISPLAY  ACCEPTED
NCCFZ      14:39:24   IST350I  VTAM DISPLAY - DOMAIN TYPE= CROSS-DOM. RSRC MGR
NCCFZ      14:39:24   IST089I  CDRMZ    TYPE= CDRM SEGMENT      , ACTIV
NCCFZ      14:39:24   IST482I  LSSCMVS2 ACTIV ,SUBAREA = 032
NCCFZ      14:39:24   IST482I  LSSCMVS1 ACTIV ,SUBAREA = 031
NCCFZ      14:39:24   IST482I  TOROMVSV ACTIV ,SUBAREA = 001
```

```
NCCFZ      14:39:24   IST482I  TORORTT  NEVAC ,SUBAREA = 012
NCCFZ      14:39:24   IST314I  END
```

Displaying the CDRM segment CDRMZ.

```
NCCFL      14:40:00 C ROUTE NCCFZ,DIS CDRMZ
NCCFZ      14:40:07 * DIS CDRMZ
NCCFZ      14:40:10 C Enter: ST or STATUS xxxxx(xxxxx) for status description
NCCFZ      14:40:12 C DISPLAY NET,ID=CDRMZ,E
NCCFZ      14:40:12 C DSI013I COMMAND LIST DIS      COMPLETE
NCCFZ      14:40:12   IST097I  DISPLAY  ACCEPTED
NCCFZ      14:40:12   IST075I  VTAM DISPLAY - NODE TYPE= CDRM SEGMENT
NCCFZ      14:40:12   IST486I  NAME = CDRMZ    , STATUS = ACTIV
NCCFZ      14:40:12   IST477I  CDRMS:
NCCFZ      14:40:12   IST482I  LSSCMVS2 ACTIV ,SUBAREA = 032
NCCFZ      14:40:12   IST482I  LSSCMVS1 ACTIV ,SUBAREA = 031
NCCFZ      14:40:12   IST482I  TOROMVSV ACTIV ,SUBAREA = 001
NCCFZ      14:40:15   IST482I  TORORTT  NEVAC ,SUBAREA = 012
NCCFZ      14:40:16   IST314I  END
```

Look at the terminals in domain NCCFZ (cross-domain).

```
NCCFL      14:42:49 C ROUTE NCCFZ,TERMS
NCCFZ      14:42:55 * TERMS
NCCFZ      14:43:01 C DISPLAY NET,TERMS,
NCCFZ      14:43:04   IST097I  DISPLAY  ACCEPTED
NCCFZ      14:43:04   IST350I  VTAM DISPLAY - DOMAIN TYPE= LOGICAL UNITS/TERMS
NCCFZ      14:43:04   IST351I  LOCAL 3270 MAJOR NODE: NAME = ZLOCAL02
NCCFZ      14:43:04   IST089I  LSZ020   TYPE= LOGICAL UNIT      , ACTIV      ,CUA=020
NCCFZ      14:43:04   IST089I  LSZ021   TYPE= LOGICAL UNIT      , ACTIV      ,CUA=021
NCCFZ      14:43:04   IST089I  LSZ022   TYPE= LOGICAL UNIT      , NEVAC      ,CUA=022
NCCFZ      14:43:05   IST089I  LSZ023   TYPE= LOGICAL UNIT      , ACTIV      ,CUA=023
NCCFZ      14:43:05   IST089I  LSZ024   TYPE= LOGICAL UNIT      , ACTIV      ,CUA=024
NCCFZ      14:43:05   IST089I  LSZ025   TYPE= LOGICAL UNIT      , ACTIV      ,CUA=025
NCCFZ      14:43:05   IST089I  LSZ026   TYPE= LOGICAL UNIT      , ACTIV      ,CUA=026
NCCFZ      14:43:05   IST089I  LSZ027   TYPE= LOGICAL UNIT      , NEVAC      ,CUA=027
NCCFZ      14:43:10   IST351I  LOCAL 3270 MAJOR NODE: NAME = ZLOCAL03
NCCFZ      14:43:10   IST089I  LSZ030   TYPE= LOGICAL UNIT      , ACTIV      ,CUA=030
NCCFZ      14:43:10   IST089I  LSZ031   TYPE= LOGICAL UNIT      , ACTIV      ,CUA=031
NCCFZ      14:43:11   IST089I  LSZ032   TYPE= LOGICAL UNIT      , ACTIV      ,CUA=032
NCCFZ      14:43:11   IST089I  LSZ033   TYPE= LOGICAL UNIT      , ACTIV      ,CUA=033
NCCFZ      14:43:11   IST089I  LSZ034   TYPE= LOGICAL UNIT      , ACTIV      ,CUA=034
NCCFZ      14:43:30   IST351I  LOCAL 3270 MAJOR NODE: NAME = ZLOCAL0D
```

```
NCCFZ      14:43:30   IST089I  LSZ0D0   TYPE= LOGICAL UNIT      , ACTIV      ,CUA=0D0
NCCFZ      14:43:31   IST089I  LSZ0D1   TYPE= LOGICAL UNIT      , ACTIV      ,CUA=0D1
NCCFZ      14:43:34   IST354I  NCP MAJOR NODE: NAME = N37R21  ,CUA=505
NCCFZ      14:43:36   IST146I  LINE NAME: L370B0   STATUS: ACTIV
NCCFZ      14:43:36   IST359I  ATTACHMENT = LEASED
NCCFZ      14:43:36   IST146I  LINE NAME: L37DUMMY STATUS: NEVAC
NCCFZ      14:43:36   IST359I  ATTACHMENT = LEASED
NCCFZ      14:43:36   IST314I  END
NCCFZ      14:43:36 C DSI013I COMMAND LIST TERMS    COMPLETE
```

Display a specific terminal in the home-domain.

```
NCCFL      14:44:36 * DIS LU360263
NCCFL      14:44:36 C Enter: ST or STATUS xxxxx(xxxxx) for status description
NCCFL      14:44:36 C DISPLAY NET,ID=LU360263,E
NCCFL      14:44:36 C DSI013I COMMAND LIST DIS      COMPLETE
NCCFL      14:44:37   IST075I  VTAM DISPLAY - NODE TYPE= LOGICAL UNIT
NCCFL      14:44:37   IST486I  NAME= LU360263 ,STATUS= ACT/S           ,DESIRED STATE= ACTIV
NCCFL      14:44:37   IST081I  LINE NAME= L36026    , LINE GROUP= G36S2    , MAJNOD= N36R21
NCCFL      14:44:37   IST135I  PHYSICAL UNIT= PU36026  ,
NCCFL      14:44:37   IST675I  VR =  0 , TP =  0
NCCFL      14:44:37   IST314I  END
NCCFL      14:44:37 C IST082I  The device type is LU.
NCCFL      14:44:37 C .        It is in session with LTSO0003.
NCCFL      14:44:37 C .        The assigned application is LNETMON.
```

Display a TSO user ID in the home-domain.

```
NCCFL      14:46:55 * DTSO LS86584
NCCFL      14:46:55 C DISPLAY NET,U,ID=LS86584
NCCFL      14:46:55 C DSI013I COMMAND LIST DTSO     COMPLETE
NCCFL      14:46:56   IST075I  VTAM DISPLAY - NODE TYPE= TSO USERID
NCCFL      14:46:56   IST486I  NAME= LS86584  ,STATUS= ACTIV           ,DESIRED STATE=  N/A
NCCFL      14:46:56   IST576I  TSO TRACE=OFF
NCCFL      14:46:56   IST262I  APPLNAME = TSO0003  , STATUS = ACTIV
NCCFL      14:46:56   IST262I  LUNAME   = LU360263 , STATUS = ACT/S
NCCFL      14:46:56   IST314I  END
```

```
        Displaying Terminal LU360260

Note:
LNETMON is the controlling application
        it is in the home-domain ("L")
ZTSO    is the cross-domain ("Z") application
        the terminal is allocated to
```

```
NCCFL     14:49:55 C D NET,E,ID=LU360260
NCCFL     14:49:55 C DSI013I COMMAND LIST PD       COMPLETE
NCCFL     14:49:56   IST075I  VTAM DISPLAY - NODE TYPE= LOGICAL UNIT
NCCFL     14:49:56   IST486I  NAME= LU360260 ,STATUS= ACT/S           ,DESIRED STATE= ACTIV
NCCFL     14:49:56   IST081I  LINE NAME= L36026    , LINE GROUP= G36S2     , MAJNOD= N36R21
NCCFL     14:49:56   IST135I  PHYSICAL UNIT= PU36026  ,
NCCFL     14:49:56   IST314I  END
NCCFL     14:49:56 C IST082I  The device type is LU.
NCCFL     14:49:56 C .        It is in session with ZTSO.
NCCFL     14:49:56 C .        The assigned application is LNETMON.
```

```
Display a cross-domain ("Z" domain) TSO
application.
```

```
NCCFL     15:08:37 * ROUTE NCCFZ,DIS ZTSO0001
NCCFZ     15:08:45 * DIS ZTSO0001
NCCFZ     15:08:46 C Enter: ST or STATUS xxxxx(xxxxx) for status description
NCCFZ     15:08:46 C DISPLAY NET,ID=ZTSO0001,E
NCCFZ     15:08:51   IST097I  DISPLAY  ACCEPTED
NCCFZ     15:08:51   IST075I  VTAM DISPLAY - NODE TYPE= APPL
NCCFZ     15:08:51   IST486I  NAME = ZTSO0001 , STATUS = ACTIV
NCCFZ     15:08:51   IST212I  ACBNAME = TSO0001
NCCFZ     15:08:51   IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
NCCFZ     15:08:51   IST271I  JOBNAME = TEAM02   STEPNAME = LSSCUSER
NCCFZ     15:08:51   IST171I  ACTIVE SESSIONS = 0001 SESSION REQUESTS = 0000
NCCFZ     15:08:51   IST206I  SESSIONS:
NCCFZ     15:08:54   IST634I  NAME     STATUS     SESS ID  SEND RECV
NCCFZ     15:08:54   IST635I  LU360260 ACTIV-SEC  40064813 0017 0002
NCCFZ     15:08:54   IST314I  END
```

EXAMPLE 4: NCCF LOG PRINTOUT

Example of an NCCF log printout showing excerpts from a cross-domain session.

Note: Comments can be written into the log in the form of invalid commands.

The home-domain is NCCFL.
The other domain is NCCFZ.

```
                    14:34:25 * ===== WHO IS ON NCCFZ ?????
                    14:34:25 - DSI002I INVALID COMMAND
                    14:34:37 * P4    WHO
                    14:34:38 C ROUTE NCCFZ,WHO
                    14:34:38 C DSI013I COMMAND LIST P4       COMPLETE
          NCCFZ     14:34:51 * WHO
                    14:34:58 C ===> THESE HOME-DOMAIN OPERATORS ARE LOGGED ON <==
                    14:35:01 C . . . . . |
                    14:35:01 C . . . . . V
                    14:35:01 - OPERATOR: BILL     TERM: LSZ020   STATUS: ACTIVE
                    14:35:01 - END OF STATUS DISPLAY
                    14:35:01 C ===> THESE CROSS-DOMAIN OPERATORS ARE LOGGED ON <==
                    14:35:01 C . . . . . |
                    14:35:01 C . . . . . V
                    14:35:05 - MAX SESS: 00000008
                    14:35:05 - OPERATOR: HEINZ    TERM: NCCFL000 STATUS: ACTIVE
                    14:35:05 - END OF STATUS DISPLAY
          NCCFL     14:35:34 * ==== WHAT ARE NCCFZ MAJNODES ????
                    14:35:34 - DSI002I INVALID COMMAND
                    14:35:44 * P4    MAJNODES
                    14:35:44 C ROUTE NCCFZ,MAJNODES
                    14:35:45 C DSI013I COMMAND LIST P4       COMPLETE
          NCCFZ     14:36:03 * MAJNODES
                    14:36:06 C DSI209I COMMAND LIST MAJNODES WARNING - INVALID COMMAND ENCOUNTERED - COMMAND
                               IGNORED
                    14:36:06 C K
                    14:36:06 C DISPLAY NET,MAJNODES
                    14:36:10   IST097I  DISPLAY  ACCEPTED
                    14:36:10   IST350I  VTAM DISPLAY - DOMAIN TYPE= MAJOR NODES
                    14:36:10   IST089I  VTAMSEG  TYPE= APPL SEGMENT      , ACTIV
                    14:36:10   IST089I  ZATSO    TYPE= APPL SEGMENT      , ACTIV
1          NETWORK COMMUNICATIONS CONTROL FACILITY PRINT LOG UTILITY                    06/24/81            19
                    14:36:10   IST089I  ZATSOP   TYPE= APPL SEGMENT      , ACTIV
```

```
                    14:36:10   IST089I  ZACICS   TYPE= APPL SEGMENT      , ACTIV
                    14:36:13   IST089I  ZAIMS    TYPE= APPL SEGMENT      , ACTIV
                    14:36:13   IST089I  ZAIIS    TYPE= APPL SEGMENT      , ACTIV
                    14:36:13   IST089I  ZAVSPC   TYPE= APPL SEGMENT      , ACTIV
                    14:36:13   IST089I  ZANSOL   TYPE= APPL SEGMENT      , ACTIV
                    14:36:13   IST089I  ZADDP    TYPE= APPL SEGMENT      , ACTIV
                    14:36:17   IST089I  ZANCCF   TYPE= APPL SEGMENT      , ACTIV
                    14:36:17   IST089I  ZAJES    TYPE= APPL SEGMENT      , ACTIV
                    14:36:17   IST089I  CDRSCHA0 TYPE= CDRSC SEGMENT     , ACTIV
                    14:36:17   IST089I  CDRSCHA1 TYPE= CDRSC SEGMENT     , ACTIV
                    14:36:17   IST089I  CDRSCHA2 TYPE= CDRSC SEGMENT     , ACTIV
                    14:36:41   IST089I  CDRSCHA3 TYPE= CDRSC SEGMENT     , ACTIV
                    14:36:41   IST089I  CDRSCLA0 TYPE= CDRSC SEGMENT     , ACTIV
0HEINZ      NCCFZ   14:36:41   IST089I  CDRSCLA1 TYPE= CDRSC SEGMENT     , ACTIV
                    14:36:41   IST089I  CDRSCLA2 TYPE= CDRSC SEGMENT     , ACTIV
                    14:36:41   IST089I  CDRSCRA0 TYPE= CDRSC SEGMENT     , ACTIV
                    14:37:07   IST089I  CDRSCRA1 TYPE= CDRSC SEGMENT     , ACTIV
                    14:37:07   IST089I  ZLOCAL02 TYPE= LCL 3270 MAJ NODE , ACTIV
                    14:37:07   IST089I  ZLOCAL03 TYPE= LCL 3270 MAJ NODE , ACTIV
                    14:37:07   IST089I  ZLOCAL06 TYPE= LCL 3270 MAJ NODE , ACTIV
                    14:37:07   IST089I  ZLOCAL07 TYPE= LCL 3270 MAJ NODE , ACTIV
                    14:37:08   IST089I  ZLOCAL0C TYPE= LCL 3270 MAJ NODE , ACTIV
                    14:37:08   IST089I  ZLOCAL0D TYPE= LCL 3270 MAJ NODE , ACTIV
                    14:37:08   IST089I  ZCONSOLE TYPE= LCL 3270 MAJ NODE , ACTIV
                    14:37:08   IST089I  N37R21   TYPE= NCP MAJOR NODE    , ACTIV      ,CUA=505
                    14:37:08   IST089I  CDRSCHL0 TYPE= CDRSC SEGMENT     , ACTIV
                    14:37:11   IST089I  CDRSCLL0 TYPE= CDRSC SEGMENT     , ACTIV
                    14:37:11   IST089I  CDRSCLL1 TYPE= CDRSC SEGMENT     , ACTIV
                    14:37:11   IST089I  CDRSCRL0 TYPE= CDRSC SEGMENT     , ACTIV
                    14:37:11   IST089I  CDRMZ    TYPE= CDRM SEGMENT      , ACTIV
                    14:37:11   IST314I  END
                    14:37:14 C DSI013I COMMAND LIST MAJNODES COMPLETE
            NCCFL   14:37:50 * === LOOK AT NCCFZ'S CDRMS (CDRMZ)
                    14:37:51 - DSI002I INVALID COMMAND
                    14:38:56 * P4    CDRMS
                    14:38:57 C ROUTE NCCFZ,CDRMS
                    14:38:57 C DSI013I COMMAND LIST P4       COMPLETE
            NCCFZ   14:39:08 * CDRMS
                    14:39:16 C DISPLAY NET,CDRMS,EVERY
                    14:39:24   IST097I  DISPLAY  ACCEPTED
                    14:39:24   IST350I  VTAM DISPLAY - DOMAIN TYPE= CROSS-DOM. RSRC MGR
                    14:39:24   IST089I  CDRMZ    TYPE= CDRM SEGMENT      , ACTIV
                    14:39:24   IST482I  LSSCMVS2 ACTIV ,SUBAREA = 032
                    14:39:24   IST482I  LSSCMVS1 ACTIV ,SUBAREA = 031
                    14:39:24   IST482I  TOROMVSV ACTIV ,SUBAREA = 001
                    14:39:24   IST482I  TORORTT  NEVAC ,SUBAREA = 012
                    14:39:24   IST314I  END
            NCCFL   14:39:59 * P4    DIS CDRMZ
                    14:40:00 C ROUTE NCCFZ,DIS CDRMZ
                    14:40:00 C DSI013I COMMAND LIST P4       COMPLETE
1       NETWORK COMMUNICATIONS CONTROL FACILITY PRINT LOG UTILITY                    06/24/81          20
            NCCFZ   14:40:07 * DIS CDRMZ
```

```
                14:40:10 C Enter: ST or STATUS xxxxx(xxxxx) for status description
                14:40:12 C DISPLAY NET,ID=CDRMZ,E
                14:40:12 C DSI013I COMMAND LIST DIS      COMPLETE
                14:40:12   IST097I  DISPLAY  ACCEPTED
                14:40:12   IST075I  VTAM DISPLAY - NODE TYPE= CDRM SEGMENT
                14:40:12   IST486I  NAME = CDRMZ    , STATUS = ACTIV
                14:40:12   IST477I  CDRMS:
                14:40:12   IST482I  LSSCMVS2 ACTIV ,SUBAREA = 032
                14:40:12   IST482I  LSSCMVS1 ACTIV ,SUBAREA = 031
                14:40:12   IST482I  TOROMVSV ACTIV ,SUBAREA = 001
                14:40:15   IST482I  TORORTT  NEVAC ,SUBAREA = 012
                14:40:16   IST314I  END
NCCFL           14:41:49 * ==== WHAT TERMINALS ???
                14:41:49 - DSI002I INVALID COMMAND
```

4.2.2 : NETWORK MANAGEMENT PRODUCTIVITY FACILITY (NMPF)

DESCRIPTION

Network Management Productivity Facility (NMPF) is intended to help network systems and operations personnel install, learn, and productively use many of IBM's systems and network management products (NCCF, NPDA, NLDM, NPA, OCCF, Info/Mgmt, TAF, VNCA, TARA, SOF, and HCF). It is built on NCCF and uses standard command lists (CLISTS), command processor, and user exit functions.

NMPF contains:

- tutorials
- HELP facilities
- operational scenarios
- sample databases
- sample procedures for the Systems/Network Management products

Other functions provided by NMPF enable the NCCF operator to:

- Interpret VTAM sense codes and status modifiers online.
- Browse NCCF and VTAM definitions online.
- Display NCCF control blocks.
- Display MVS storage.
- Assign PF keys dynamically.

NMPF contains the following components:

- Job streams to aid in installing and customizing System/Network management (S/NM) programs.
- NCCF, OCCF, and SOF CLISTs.
- NCCF definitions for S/NM programs that require them.
- NCCF command processors and exit routines.
- Sample databases for NPDA, NLDM, TARA, NPA, and Info/Mgmt.
- Sample VTAM definitions.

The personnel most likely to use NMPF are those who:

- Are not familiar with NCCF.
- Require an introduction to S/NM products.
- Are network operators requiring assistance.
- Are responsible for problem determination and need to know what techniques are available to help them.

AVAILABILITY

IBM Program Product 5798-DPC.

PRODUCT DEPENDENCIES

- NCCF Rel. 2
- VSAM
- ACF/VTAM

REFERENCE MANUALS

- Network Management Productivity Facility Program Description and Operation Manual (SH20-0038).

OPERATION

NMPF can be available to all NCCF users whether local, remote, or in another domain.

The online menu-driven tutorials provided by NMPF should help with most of the problems encountered during normal operations and make the initial educat n process easier. They remain accessible and can be recalled whenever additional assistance is required.

The NMPF tutorials are presented using standard NCCF features, complemented with NMPF command processors, CLISTs and panels. A command for an NCCF based S/NM program may be entered directly from the tutorial screen, while the tutorial continues to provide guidance.

The NMPF tutorials can be invoked immediately after having signed-on to NCCF (see Example 1). Alternatively, to enter the NMPF tutorials at any time from NCCF, enter 'NMPF' on the NCCF panel.

EXAMPLE 1: INVOKING NMPF

The following example shows how to invoke NMPF immediately after having signed-on to NCCF.

```
FSMNOTES  NETWORK MANAGEMENT PRODUCTIVITY FACILITY (NMPF)
                5798-DPC COPYRIGHT IBM CORP. 1983

  ********              SYSTEM  NEWS                **********

  07/04/83 Network Management Productivity Facility installed.
           Please notify operations support if any problems.




    t  Enter T for tutorial mode, Enter H  for help,  or  PF3: END
```

Enter 't' for tutorial mode.

The resulting panel is shown next.

```
TUTMENU   NETWORK MANAGEMENT PRODUCTIVITY FACILITY (NMPF)
                5798-DPC COPYRIGHT IBM CORP. 1983
   SELECTION          CONTENTS
   ------------       ---------

   G.  GENERAL        A general overview of NMPF
   H.  HELP           HELP facilities in NMPF
   P.  PFK            How to use PFKs in NMPF
   1.  VTAM           To show VTAM CLISTs and commands
   2.  NCCF           To show the format of NCCF commands
   3.  OCCF           To show what OCCF is and how to use it
   4.  TAF            To show what TAF  is and how to use it
   5.  NPDA           To show what NPDA is and how to use it
   6.  NLDM           To show what NLDM is and how to use it
   7.  TARA           To show what TARA is and how to use it
   8.  HCF            To show what HCF is and how to use it
   9.  VNCA           To show what VNCA is and how to use it
   A.  INFO           To show what INFO/MANAGEMENT is and how to use it
   B.  SCENARIOS      To demonstrate different operational scenarios

       Select an option, or press ENTER to display more options.

OPTION ===>          PF1= HELP  3= RETURN          8/ENTER= NEXT PAGE
TO NCCF (PF9)
```

Main menu for tutorials. From here, simply follow the menu-driven tutorial through the desired path.

Operators may forget the syntax of a command or the correct meaning of an operand. NMPF provides many CLISTs for HELP in different products.

The HELP facilities can be accessed at different levels:

1. HELP XXXX or XXXX PFK1

   gives a general scope of the products or CLIST commands (in this case XXXX). See Example 2.

2. HELP XXXX COMMAND or HELP XXXX CLIST

   XXXX COMMAND PFK1 or XXXX CLIST PFK1

gives a list of all the commands and/or CLISTs for every CNM Product. XXXX can be VTAM, NCCF, NPDA, NLDM, OCCF, TAF, TARA, VCNA or Info/Mgmt.

EXAMPLE 2: USING THE 'HELP' FACILITY

The following example shows the screen that results after having typed 'HELP VTAM' on the NCCF panel.

```
TUCLIVTA  NETWORK MANAGEMENT PRODUCTIVITY FACILITY (NMPF)
               5798-DPC COPYRIGHT IBM CORP. 1983
            ONLINE VTAM COMMANDS AND CLISTs
------------------------------------------------------------------
   1.  CLISTs       Alphabetical list of available NCCF CLISTs

   2.  DISPLAY      VTAM DISPLAY command
                    CLISTs: APPLS,BFRS,BFRUSE,CDRMS,CDRSCS,CLSTRS,
                            DRDS,NODE,LINES,MAJNODES,NCPSTOR,PATHS,
                            PATHTAB,PENDING,DROUTE,STATIONS,TERMS,DTSO

   3.  VARY         VTAM VARY command
                    CLISTs: ACQ,ACT,DRDS,INACT,INOP,REL,VTERM

   4.  MODIFY       VTAM MODIFY command
                    CLISTs: DYNA,LL2,NOVTAMI,NOSTAT,STATS,TNSTAT,
                            TRACE,TRLINE,VTAMI

   5.  START/STOP   VTAM command

   6.  REPLY        VTAM command

OPTION ===>                    PF3= RETURN  4= MENU
TO NCCF (PF9) ===>
```

From this panel we can select one of the six options for the desired information.

The HELPDESK facility helps the operator follow through the logic of problem determination via a menu-driven system, and then suggests a course of action.

To invoke the HELPDESK facility of NMPF, enter HELPDESK on the NCCF panel, then select the appropriate options (example 3).

EXAMPLE 3: USING THE 'HELPDESK' FACILITY

The following example shows a sample path taken through the NMPF HELPDESK facility.

```
HPDMENU   NETWORK MANAGEMENT PRODUCTIVITY FACILITY (NMPF)
               5798-DPC COPYRIGHT IBM CORP. 1983
            ON-LINE GUIDANCE IN PROBLEM DETERMINATION

   HH     HH EEEEEEEE LL       PPPPP    DDDDD    EEEEEEEE   SSSSSS KK    KK
   HH     HH EEEEEEEE LL       PP  PPP  DD  DD   EEEEEEEE  SS      KK   KK
   HH     HH EE       LL       PP    PP DD   DD  EE       SS       KK  KK
   HH     HH EE       LL       PP    PP DD    DD EE       SS       KK KK
   HHHHHHHHH EEEEEEEE LL       PP  PPP  DD    DD EEEEEEEE  SSSSS   KKKK
   HHHHHHHHH EEEEEEEE LL       PPPPP    DD    DD EEEEEEEE    SSSSS KKKK
   HH     HH EE       LL       PP       DD    DD EE             SS KK KK
   HH     HH EE       LL       PP       DD   DD  EE             SS KK  KK
   HH     HH EEEEEEEE LLLLLLLL PP       DD  DD   EEEEEEEE      SS  KK   KK
   HH     HH EEEEEEEE LLLLLLLL PP       DDDDD    EEEEEEEE SSSSSS   KK    KK

  ----------------- Select one of the following options -------------------

   1. OPERATIONAL PROBLEM - An end user cannot get his terminal to work.
   2. APPLICATION PROBLEM - An end user cannot run a certain transaction/appl.
   3. BAD RESPONSE TIME   - An end user complains about bad response times.
   4. HARDWARE PROBLEM    - A hardware problem is reported
   5. SYSTEM MESSAGES     - A system message indicates a problem

SELECT OPTION ===> 3         PF1: HELP  PF3: END  PF4: MENU  PF9: TO/FROM NCCF
```

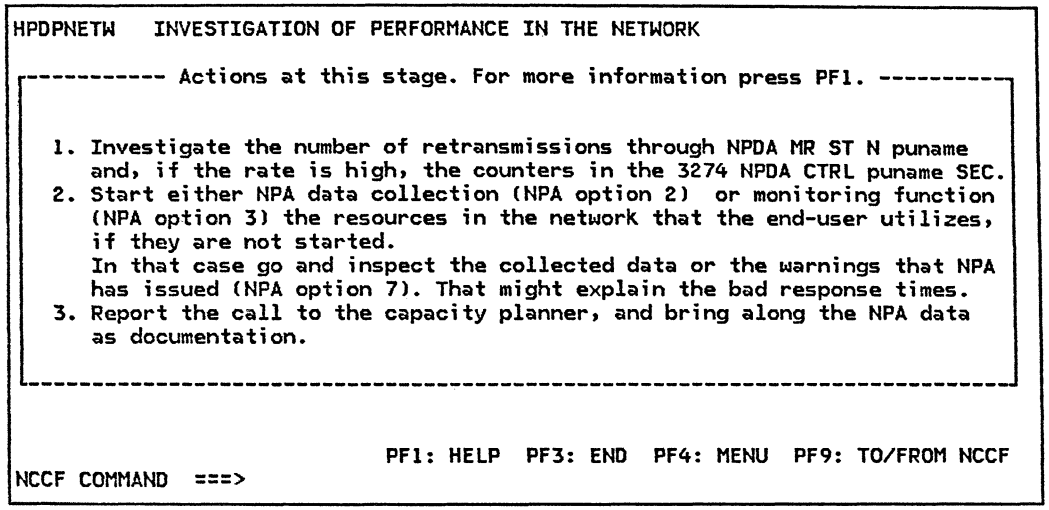
The end user is complaining about bad response times. (Option 3)

```
HPDPERF                 PERFORMANCE PROBLEMS

---------- Actions at this stage. For more information press PF1. ----------

  1. Record the call in the phone log - userid, address, phone number and
     error code.
  2. The purpose of the following action is mainly to collect documentation
     and to check if the problem is a performance problem.
  3. Go to next panel depending on how the terminal is connected.

----------------- Now select one of the following options ---------------------

   1. 3270          - The terminal is connected to a 3274 controller.
   2. 3600          - The terminal is connected to a 3600 system.
   3. 8100          - The terminal is connected to a 8100 system.

SELECT OPTION ===> 1          PF1: HELP  PF3: END  PF4: MENU  PF9: TO/FROM NCCF
```

The terminal suffering bad response times is connected to a 3274 controller.
(Option 1)

```
HPDP3274   3270 USERS COMPLAIN ABOUT BAD RESPONSE TIMES

---------- Actions at this stage. For more information press PF1. ----------

  1. Try to isolate the problem through questions to the end-user about when
     he has the bad response times.
  2. Calculate the end-user's response times through the information in NLDM
     The HELP panel gives an example.

------------------- Select one of the following options ----------------------

   1. NETWORK           - Investigation of performance in the network
   2. HOST              - Investigation of performance in the host
   3. SUBSYSTEM         - Investigation of performance in the subsystem

SELECT OPTION ===> 1          PF1: HELP  PF3: END  PF4: MENU  PF9: TO/FROM NCCF
NCCF COMMAND  ===>
```

Suspect the problem is in the network.
(Option 1)



NMPF suggested actions.

Most of the licensed programs supported by NMPF provide extensive opportunities for customization. NMPF supplies a 'starter' set, which each user may wish to customize further in accordance with installation-specific requirements. For example, default names can be changed, CLISTs can be added, and the full-screen tutorial can be customized dynamically.

The 'BROWSE' facility in NMPF allows users to browse NCCF and VTAMLST members. This feature can be helpful in dealing with problems related to such things as the definition of a VTAM resource, the sequence of the statements in a CLIST, or the content of any member used by NCCF. The implementation of the browse command is similar to the browse option of Systems Productivity Facility (SPF). Standard NCCF security features are used to ensure that the installation has control over the operator's authority to view the data.

The 'SHOW' command is a working version of a sample program (DSIUSP) documented in NCCF Customization (SC27-0433). This command processor allows any authorized operator to examine NCCF control blocks and MVS storage. It is useful for debugging user-written exits and command processors.

Finally, the NMPF installation procedure documents a way to run two copies of NCCF in the same VTAM domain. This provides the ability to have both a test (or training) version and a production version on the same system. It also allows for the simulation of multisystem networking.

4.2.3 : NPDA

DESCRIPTION

NPDA (a program product) was the first IBM tool based on NCCF. It relies on the fact that most of the IBM hardware or software monitors itself and its surroundings. The 3705/3725 and the NCP both monitor components in the 3705/3725 and they monitor also the line as far as possible - this means to the local modem, if LPDA (introduced with ACF/NCP Version 1 Release 2.1) is not used. If LPDA is used, however, not only the remote modem, but also the PU behind the remote modem can be monitored to some extent. If a component becomes unusable, NCP reports what is wrong by sending a record to the access methods, which have a session with the NCP. The NCP also reports when it has lost contact with a PU, and will at the same time send all counters associated with the PU to the access method. The software will also send a record if an error counter reaches its maximum and is about to wrap around. The cluster controllers in the network behave in a similar way.

The central hardware has sent the same kind of records to the system log for many years. The records are made available to the CE through a batch system (EREP). From the reports, the CE knows when a disk is about to create problems. These records are also sent to NPDA, and NPDA is, therefore, able to inform the network operator about difficulties with a disk or another local device.

Commands

NPDA is an NCCF command and can be controlled with a set of subcommands. Since retrieval of maintenance data stored in its datasets is one of the most frequently performed functions, the required search arguments can be used by responding to a series of prompting screens presented to the user.

Dataset

NPDA has one VSAM dataset (KSDS organization in which error data is kept.

FEATURES

NPDA is invoked by NCCF in response to the NPDA command, no separate logon is required. It can be operated by responding to full-screen menus, or by issuing explicit commands. Responding to menu prompting permits interactive, structured browsing of the error information starting at a summary level and continuing to a detail level.

If a cross-domain NCCF to NCCF session is in progress, NPDA can extract error information from the SNA database of the NPDA in the other domain for viewing in the home-domain.

NPDA introduces five major types of transactions which can be regarded as an extension to NCCF. They:

- Retrieve data from the system either through a direct operator command, or indirectly as a result of something happening in the network and store it in the database, if specified.
- Store unsolicited records generated by the system in the database, if specified.
- Generate an alert if certain specified conditions are met.
- Display the data in a readable format on a screen.
- Set and allow the different parameters controlling NPDA to change.

AVAILABILITY

P/P 5668-920 (Current release: Version 3 for MVS).

P/P 5666-295 (Current release: Version 3 for DOS/VSE).

NOTE: While there are earlier versions and releases available, Version 3 should be used because it contains more.

PRODUCT DEPENDENCIES

- NCCF Release 2 or Version 2
- ACF/VTAM (or ACF/TCAM)
- ACF/NCP
- VSAM

REFERENCE MANUALS

- NPDA General Info . . . GC34-2111
- NPDA Installation . . . SC34-2117
- NPDA Messages SC34-2115
- NPDA Recommended Action Guide SC34-2113
- NPDA User Reference . . SC34-2114
- NPDA Diagnosis SC34-2130

OPERATION

MESSAGE FLOW FOR DATA COLLECTION

The following main areas are covered as follows:

- Errors or exception conditions detected by an NCP
- Solicited errors/statistics requested from a PU
- Unsolicited errors/statistics sent by a PU

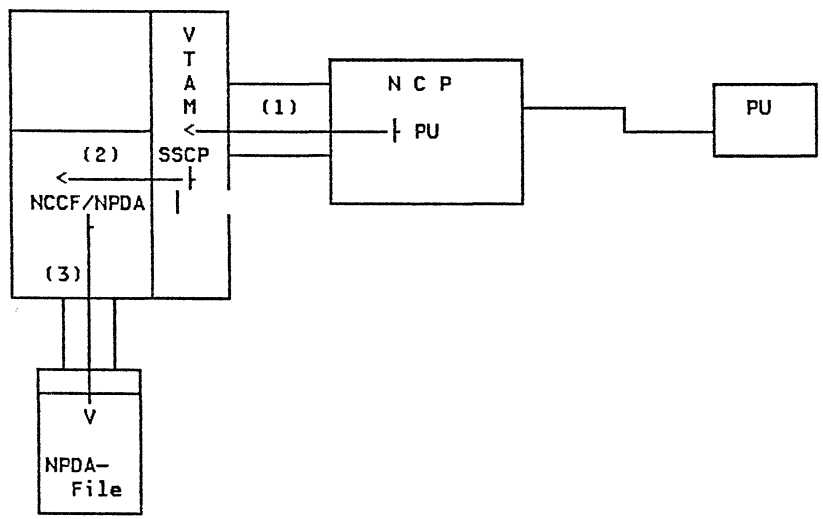


Figure 5. Message Flow of NCP-detected Errors

In Figure 5 the flow for NCP-detected errors or exception conditions is shown. The NCP uses for this purpose the SNA Command 'RECMS', which it sends to the SSCP. This is indicated by (1).

It should be pointed out that the NCP sends the information regarding a PU to the host (SSCP) which owns the PU. A PU can be owned by only one host, whereas a line can have up to 8 owners, which means that the NCP can send information related to a line to as many as 8 hosts (SSCPs).

The SSCP then sends this information via the CNM interface to the NPDA. This is indicated by (2) and the SSCP uses for this purpose the 'DELIVER'-Command, which contains the original 'RECMS'.

It should be mentioned here that the VTAM module 'ISTMGC00' (for MVS) defines the name of the VTAM application to which VTAM has to deliver the 'RECMS' and 'RECFMS' commands (over the CNM interface). This application is normally called 'BNJDSERV' and has to be defined as a VTAM APPL with 'AUTH=CNM'. Further information can be found in the NPDA Version 3 Installation Manual (C34-2117) or in the SNA Installation Guide (GG24-1557).

NPDA stores the information received on its active dataset as event, and possibly, as alert data. This is shown as (3).

SOLICITED ERRORS/STATISTICS FROM A PU

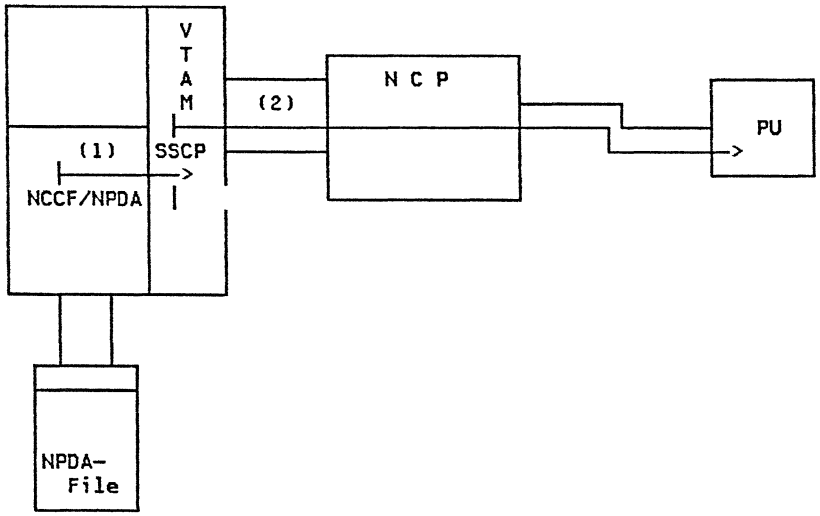


Figure 6. Message Flow for soliciting error stats from a PU

In Figure 6 the flow for soliciting errors or statistics stored in a PU is shown. The response from the PU can be seen in the next figure, together with the unsolicited errors or statistics sent by a PU.

If NPDA wants to have this information it sends the request over the CNM interface to the SSCP in the form of a 'FORWARD' command, which contains the 'REQMS' command. This can be seen under (1).

The SSCP then sends the 'REQMS' command (Request for Maintenance Statistics) to the specified PU. This is shown under (2).

UNSOLICITED ERRORS/STATISTICS SENT BY A PU

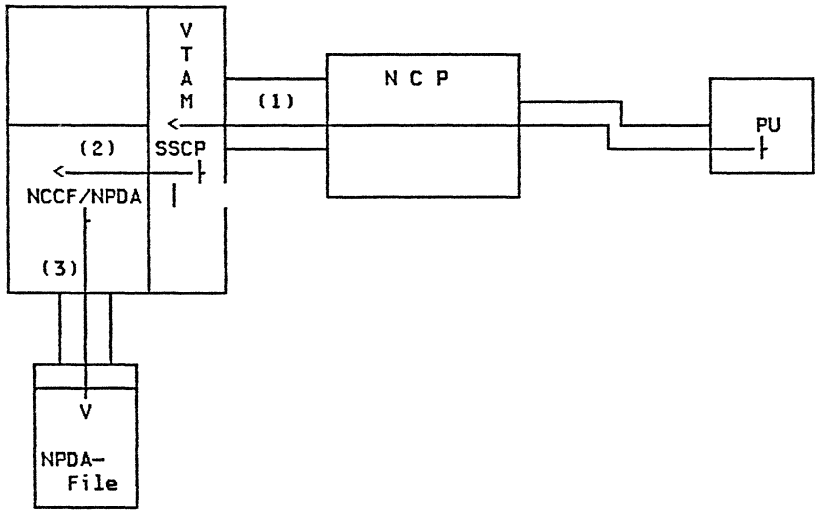


Figure 7. Message Flow of PU sending error stats unsolicited

Figure 7 shows both the message flow of a PU answering to a solicitation for the accumulated error statistics as well as sending these informations unsolicited under certain circumstances.

The PU does this by sending the 'RECFMS' command (RECord Formatted Maintenance Statistics) to the SSCP. This is shown under (1). In the case of unsolicited error statistics, the 'RECFMS' is always a 'type 0 RECFMS'. For the solicited error statistics there are types 1 through 5.

The SSCP then sends this information via the CNM interface to NPDA. This is indicated by (2) and the SSCP uses for this purpose the 'DELIVER' command, which contains the original 'RECFMS'.

The SSCP uses the CNM interface to deliver the 'RECFMS' command in much the same way as for the 'RECMS' command, which has been explained and discussed before.

NPDA then stores the information received on its active dataset as event or statistics information. This is shown as (3).

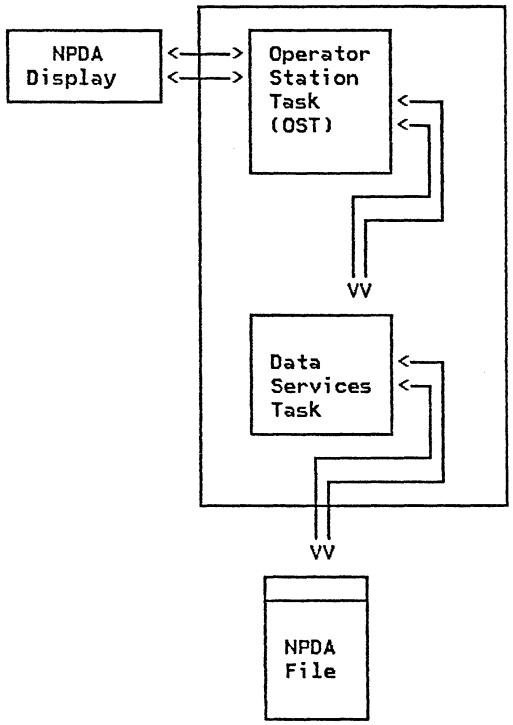


Figure 8. Single Domain Data Flow for NPDA Data Retrieval

CROSS-DOMAIN

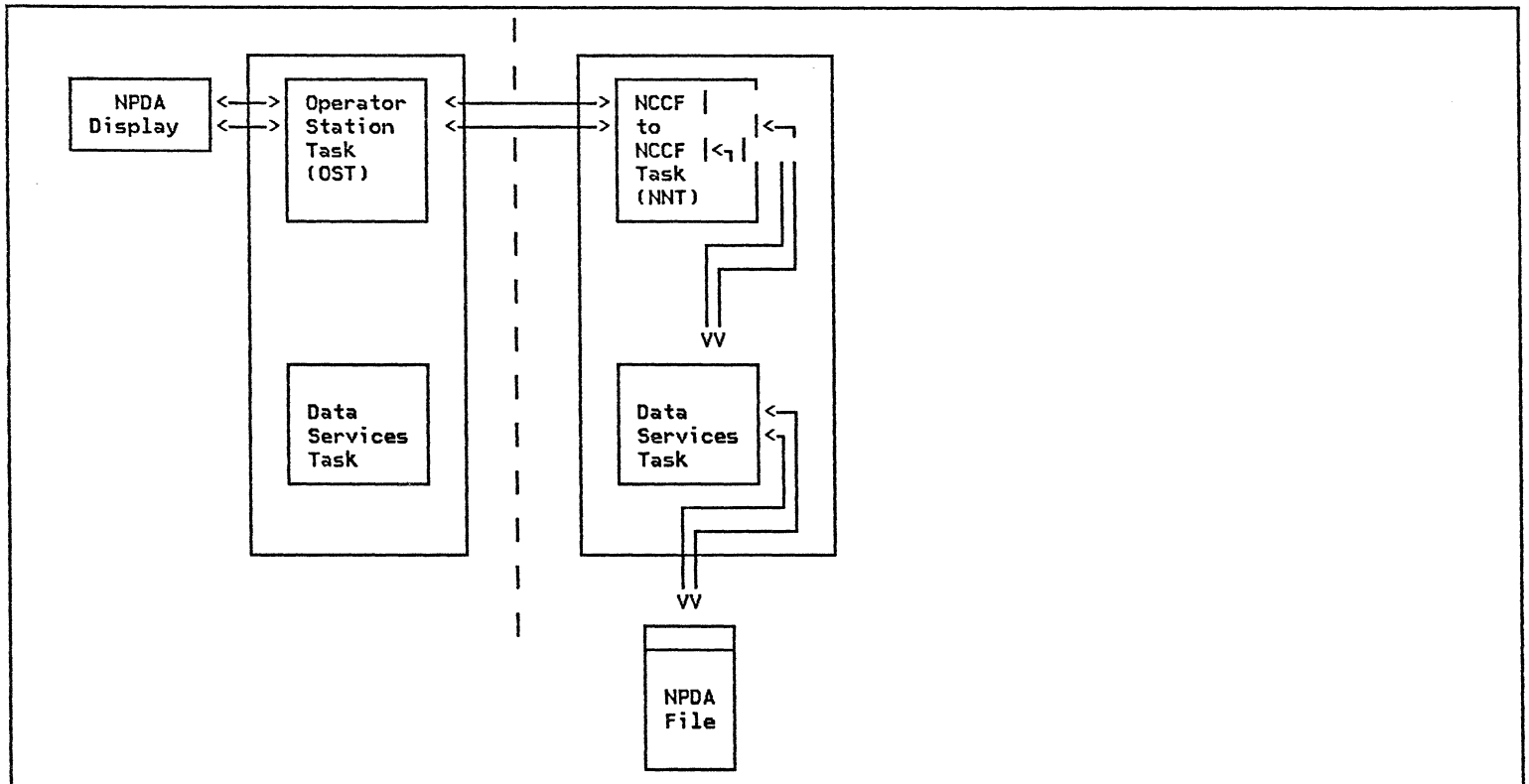


Figure 9. Cross-Domain Data Flow for NPDA Data Retrieval

Retrieval of NPDA data from another network domain can be accomplished, provided both systems are running under the same version and release of NPDA. In Figure 9 the data flow between the NPDA/NCCF facilities contained within two separate network domains is depicted. The NPDA user invokes this function by executing the SDOMAIN command, subsequent to an NCCF START DOMAIN command, indicating the domain where he/she wishes to view NPDA data.

Cross-domain requests sent by the native domain OST are directed to an NCCF to NCCF task (NNT) in the foreign domain. Control is then passed to the data service task, which retrieves NPDA data from its database and

transfers it (via the NNT task and the cross-domain path) to the native domain for display service.

Using the NCCF to NCCF task for communication with an NPDA in another domain is, of course, an alternative for a normal cross-domain logon to that NCCF/NPDA. And, this can be extended by using TAF enabling to have multiple concurrent active sessions to all NPDAs needed.

4.2.4 : NETWORK LOGICAL DATA MANAGER (NLDM)

DESCRIPTION

Network Logical Data Manager (NLDM) is intended to help the network systems and operations personnel solve logical errors which result in HUNG sessions.

NLDM is a program product which operates with NCCF R2 and which:

- Collects data related to SNA sessions and data flows for certain non-SNA devices
  - in virtual storage for the active sessions.
  - in a VSAM database for the terminated sessions.
- Gives online hierarchical presentation to the NCCF/NLDM operator of the collected data
  - from this domain.
  - from a remote domain also running NLDM V1R1 using the NCCF cross-domain facility.

AVAILABILITY

IBM Program Product 5668-971.

REFERENCE MANUALS

- NLDM Installation and Operation . . SC30-3165
- NLDM Diagnosis GC30-3166

PRODUCT DEPENDENCIES

- NCCF Rel. 2
- ACF/NCP Ver. 2
- ACF/VTAM V1R2 or V2 (with the required PTF)

FUNCTIONS

NLDM collects two types of session data:

- 'Session Awareness Data' each time a session activates successfully or terminates.
- 'Session Trace Data' during the trace operation consisting of:
  - session activation parameters
  - access method PIU data
  - NCP data

NLDM supports:

- single or multi-domain sessions with at least one end point (primary or secondary) in the NLDM host
- the following types of sessions:
  - SSCP - SSCP
  - SSCP - PU
  - SSCP - LU
  - LU - LU

NLDM traces:

- local
  - SNA
  - non-SNA
- remote
  - SNA
  - BSC 3270
  - switched
  - DR added (dynamic reconfiguration)
  - NTO supported devices

DATA COLLECTED

All types of NLDM data can be collected only for sessions which are activated after NCCF/NLDM initialization. For the remote resources this will occur if the NCP was activated after NLDM initialization. For DR added or switched resources, since their addresses are dynamically assigned, tracing may be accomplished if global tracing is activated.

SESSION AWARENESS DATA is collected for all data, traced or not, at session activation and session termination. The following data is collected:

- session type
- session start/stop time
- partner names
- partner addresses
- partner configuration information

ACCESS METHOD PIU DATA continuously collected for traced sessions is comprised of the TH, RH, and the first eleven RU bytes.

NCP DATA (only if ACF/NCP V2) collected for traced sessions at:

- the SNA session end or device failure for FIDO devices
- the operator's request

consists of:

- the last two IN and OUT PIU sequence numbers (except for the SSCP - LU session), or the last three OUT reference numbers and the last IN reference number for FIDO devices
- selected contents of NCP control blocks related to the type of resources
  - SNA PU T4 - PSB, SNP
  - SNA PU T2 - CUB, LKB, LXB, CCB, AXB
  - SNA PU T1 - CUB, LKB, LXB, CCB, AXB
  - SNA LU - LUB
  - non-SNA - DVB, LLB, IOB, LCB, AXB

NLDM DATA COLLECTED VERSUS TYPE OF RESOURCE

RESOURCE TYPE	SESSION AWARENESS DATA	SESSION TRACE DATA		
		PARA-METERS	PIUs	NCP DATA
HOST LU APPL	X	X	X	
LOCAL:				
SNA	X	X	X	
NON-SNA	X	X	X	
REMOTE				
SNA	X	X	X	X
BSC 3270 (NCP ATT.)	X		X	X
NTO	X	X	X	
DR ADDED OR SWITCHED	X	X	X	X

Table 11

NLDM INPUT DATA

For single domain sessions the NLDM data comes from two sources:

- the access method
- the boundary NCP function (for ACF/NCP V2 only)

using two paths:

- the CNM interface
  - FORWARD RUs
    1. to the access method
    2. to the NCP
  - DELIVER RUs
- the NCCF LU - ACF/VTAM LU session (PIU data)

For multi-domain sessions the data comes from an alternate domain using an NCCF-NCCF cross-domain session.

The DELIVER RUs can be either:

- unsolicited RUs presented to NLDM when the data is generated, for:
  - session awareness data at session activation/termination.
  - NCP trace data at SNA session termination or at device failure for FID0 devices.

- solicited RUs presented to NLDM only on request, as a result of an NLDM operator intervention, for:

  - NCP trace data.

DATA RECORDING

Alternate recording in two VSAM databases (primary/secondary).

- at session termination. For FIDO devices the NCP data will be recorded only if it was in storage, as a result of a device failure or an operator request.

- by operator command.

```
FORCE name1 < name2 >
```

The FORCE command will record only the data existing in storage. The NCP data and the last PIUs, which are not yet sent by the access method to NLDM, are in storage as a result of an operator request and/or a device failure for FIDO devices.

Switch between the databases using the NCCF command

```
SWITCH AAUTSKLP,P   to the primary database
SWITCH AAUTSKLP,S   to the secondary database
```

The number of sessions retained per network node can be displayed using the command

```
DISKEEP SESS name1 ( name2 | ALL )
```

and dynamically changed using the command

```
KEEP nnn SESS name1 ( name2 | ALL )
```

There is no support of the VSAM shared option.

NLDM COMMANDS

There are two modes of operation for NLDM commands:

- panel mode. All NLDM commands can be issued from an NLDM full-screen panel.

- line mode. A subset of the NLDM commands (preceded by the verb NLDM) can be entered directly from the NCCF screen, and can be used in CLISTs.

All the NLDM commands are explained using the NLDM HELP panel facility, with the exception of two commands:

END	stops the NLDM panel processing and returns control to NCCF. It also resets outstanding operator requests.
FORCE name1 < name2 >	causes session data from storage to be recorded in the current database.

The NLDM commands available in line mode are:

```
NLDM TRACE START  name | ALL  < domainid >

NLDM TRACE STOP  name | ALL  < domainid >

NLDM KEEP  nnn  PIUS  name1 < name2 | ALL >

NLDM KEEP  nnn  SESS  name1 < name2 | ALL >

NLDM FORCE  name1 < name2 >

NLDM END
```

MULTI-DOMAIN SUPPORT

PREREQUISITES:

- an NCCF-NCCF session between the domains
- an NLDM V1R1 active in each domain to coordinate the routing of requests between the domains through the NCCF-NCCF session

TYPE OF SUPPORT:

- IMPLICIT Used to view session data of a partner residing in another domain. NLDM from the alternate domain will collect the data corresponding to this session if a trace was started
  - either from the alternate domain using the command TRACE START name | ALL
  - or from this domain using the command TRACE START name | ALL domainid where domainid is alternate domain identification
- EXPLICIT Used to view only the data collected by NLDM from the alternate domain. It requires the NLDM set domain command

  SDOMAIN domainid

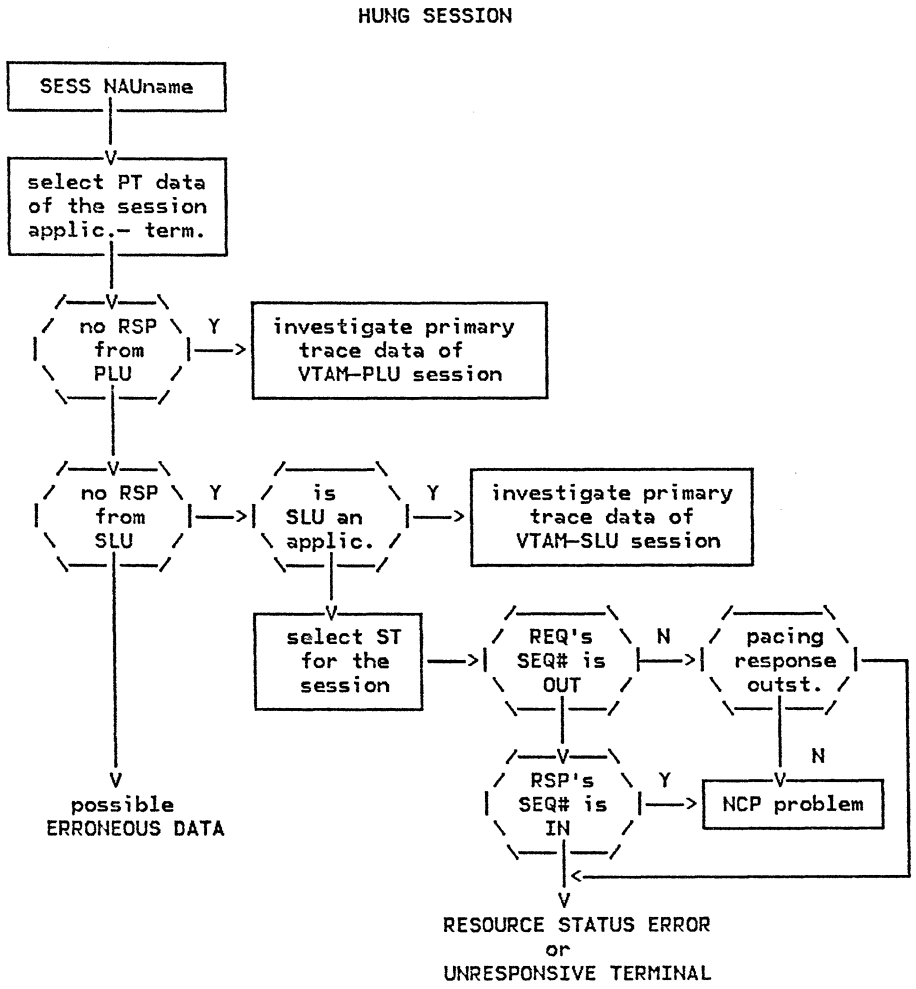
- DIRECT The NLDM command

  TRACE START/STOP name | ALL domainid

  is sent directly to the alternate domain

EXAMPLE 1

The following is an example of when and how to use NLDM. It looks at the logic and the panels required to determine the reason for a hung session.



```
NLDM.SESS
                        SESSION HISTORY FOR SELECTED NAU
NAME: T140A0F8                                              DOMAIN: NCF11
------------------------------------------------------------------------------
      ***** PRIMARY *****  **** SECONDARY ****
 SEL#   NAME    TYPE  DOM     NAME    TYPE  DOM     START TIME       END TIME
 ( 1) NCF11002 LU    NCF11  T140A0F8 LU    NCF11  09/19 16:11:32  *** ACTIVE ***
 ( 2) VTAM     SSCP  NCF11  T140A0F8 LU    NCF11  09/19 16:09:10  *** ACTIVE ***
 ( 3) NCF11    LU    NCF11  T140A0F8 LU    NCF11  09/19 16:11:27  09/19 16:11:43
 ( 4) NCF11002 LU    NCF11  T140A0F8 LU    NCF11  09/19 15:59:29  09/19 16:09:02
 ( 5) NCF11    LU    NCF11  T140A0F8 LU    NCF11  09/19 15:59:24  09/19 15:59:40
 ( 6) NCF11002 LU    NCF11  T140A0F8 LU    NCF11  09/19 11:35:07  09/19 11:37:32
 ( 7) NCF11    LU    NCF11  T140A0F8 LU    NCF11  09/19 11:35:00  09/19 11:35:15
 ( 8) VTAM     SSCP  NCF11  T140A0F8 LU    NCF11  09/19 11:34:23  09/19 16:09:03
 ( 9) NCF11001 LU    NCF11  T140A0F8 LU    NCF11  09/17 07:03:16  09/17 09:58:39
 (10) TSO1104  LU    NCF11  T140A0F8 LU    NCF11  09/16 19:57:08  09/16 20:32:22
 (11) TSO11    LU    NCF11  T140A0F8 LU    NCF11  09/16 19:57:04  09/16 19:57:21
 (12) VTAM     SSCP  NCF11  T140A0F8 LU    NCF11  09/16 19:55:38  09/16 20:32:27
 (13) TSO1104  LU    NCF11  T140A0F8 LU    NCF11  09/16 19:44:33  09/16 19:55:42
 (14) TSO11    LU    NCF11  T140A0F8 LU    NCF11  09/16 19:44:30  09/16 19:44:45

ENTER TO VIEW MORE DATA
ENTER SEL# AND PT(P-TRACE), ST(S-TRACE), P(SES PARMS), PC(P-CON) OR SC(-CON)
1 PT
```

Select primary trace data of the hung session.

```
NLDM.PIUT                SPECIFIC SESSION TRACE DATA
---------- PRIMARY ------------- ---------- SECONDARY ------------- - DOM -
NAME NCF11002 SA 0000000B EL 0075 | NAME T140A0F8 SA 0000000E EL 00B4 | NCF11
--------------------------------- ---------------------------------- -------
SEL#   GMT     SEQ# DIR   TYPE   ******** REQ/RESP HEADER ******** RULEN SENS T
( 1) 21:12:07 0018 P-S DATA     ....OC.DR.......BBEB.............    25
( 2) 21:12:09 0018 S-P (+)RSP   ....OC.DR.........................     0
( 3) 21:12:22 0007 S-P DATA     ....OC.ER.......BB...CD..........     6
( 4) 21:12:23 0019 P-S DATA     ....OC.DR.........EB.............    50
( 5) 21:12:24 0019 S-P (+)RSP   ....OC.DR.........................     0
( 6) 21:12:24 001A P-S DATA     ....OC.DR.......BBEB.............    14
( 7) 21:12:24 001A S-P (+)RSP   ....OC.DR.........................     0
( 8) 21:12:25 001B P-S DATA     ....FC.ER.......BBEB.............  1536
(14) 21:12:25 001C P-S DATA     ....LC.DR.........................   681



END OF DATA
ENTER SEL# OR COMMAND
R
```

```
No response from terminal to the last PIU which requested
a DR (SEQ# 1C). Note the sequence numbers:
SLU ---> PLU (IN-BOUND)       PLU ---> SLU (OUT-BOUND)
   19,1A                          1B,1C
Return to MOST RECENT SESSIONS display to select NCP data.
```

```
NLDM.SESS
                          SESSION HISTORY FOR SELECTED NAU
NAME: T140A0F8                                                  DOMAIN: NCF11
-------------------------------------------------------------------------------
      ***** PRIMARY *****  **** SECONDARY ****
 SEL#   NAME    TYPE  DOM     NAME    TYPE  DOM     START TIME       END TIME
 ( 1) NCF11002 LU   NCF11   T140A0F8 LU   NCF11   09/19 16:11:32  *** ACTIVE ***
 ( 2) VTAM     SSCP NCF11   T140A0F8 LU   NCF11   09/19 16:09:10  *** ACTIVE ***
 ( 3) NCF11    LU   NCF11   T140A0F8 LU   NCF11   09/19 16:11:27  09/19 16:11:43
 ( 4) NCF11002 LU   NCF11   T140A0F8 LU   NCF11   09/19 15:59:29  09/19 16:09:02
 ( 5) NCF11    LU   NCF11   T140A0F8 LU   NCF11   09/19 15:59:24  09/19 15:59:40
 ( 6) NCF11002 LU   NCF11   T140A0F8 LU   NCF11   09/19 11:35:07  09/19 11:37:32
 ( 7) NCF11    LU   NCF11   T140A0F8 LU   NCF11   09/19 11:35:00  09/19 11:35:15
 ( 8) VTAM     SSCP NCF11   T140A0F8 LU   NCF11   09/19 11:34:23  09/19 16:09:03
 ( 9) NCF11001 LU   NCF11   T140A0F8 LU   NCF11   09/17 07:03:16  09/17 09:58:39
 (10) TSO1104  LU   NCF11   T140A0F8 LU   NCF11   09/16 19:57:08  09/16 20:32:22
 (11) TSO11    LU   NCF11   T140A0F8 LU   NCF11   09/16 19:57:04  09/16 19:57:21
 (12) VTAM     SSCP NCF11   T140A0F8 LU   NCF11   09/16 19:55:38  09/16 20:32:27
 (13) TSO1104  LU   NCF11   T140A0F8 LU   NCF11   09/16 19:44:33  09/16 19:55:42
 (14) TSO11    LU   NCF11   T140A0F8 LU   NCF11   09/16 19:44:30  09/16 19:44:45

ENTER TO VIEW MORE DATA
ENTER SEL# AND PT(P-TRACE), ST(S-TRACE), P(SES PARMS), PC(P-CON) OR SC(-CON)
1 ST
```

Select secondary trace data of the hung session.

```
NLDM.NCPT                SPECIFIC SESSION TRACE DATA
---------- PRIMARY ------------- ---------- SECONDARY ------------- - DOM -
NAME NCF11002 SA 0000000B EL 0075 | NAME T140A0F8 SA 0000000E EL 00B4 | NCF11
---------------------------------- ---------------------------------- -------
 NCP LEVEL: V2     RESOURCE TYPE: SNA LU       SEQNO: 001C, 001B, 001A, 0019
      01......05........10........15........20........25........30........35
 LUB: 000000000000000008000001CB400000E000000000000000800000167500900580 20
      000000000090002000000000000000000000000000000000000
```

The latest SEQ# OUT is 1C and the latest SEQ# IN is 1A. There is no response from the terminal with SEQ# 1C in the IN flow.

4.3 : NETWORK MANAGEMENT TOOLS

4.3.1 : INFORMATION/MANAGEMENT

DESCRIPTION

Information/Management is a repository for Sytems Management information. It is used for storage and retrieval of the following information items:

- Problem management records
- Change management records
- Configuration management records

D/B access is controlled through a privilege class structure.

There are two versions of Information/System. While version 1 is still available and can be executed under NCCF, it is recommended that users use version 2 because of improved usability. If Information/Management is executed within NCCF, each operator using it requires a large amount of storage (about 800K bytes). The operation for opening problems from NPDA is identical for both versions, however, more information is passed from NPDA V3 to Information/Management V2 than the other levels of NPDA and Information/Management

INFORMATION MANAGEMENT V1

Information/Management Version 1 operates under Information/System Rel. 2, which, in turn, can operate under both TSO and NCCF as a command processor. This product is MVS dependent.

Primary differences:

NCCF : All users in same address space.

Advantage : Screen is shared with NCCF

Disadvantage : High Virtual Storage requirements

TSO : All users have their own address space.

Advantage : Less VS requirement

Disadvantage : Requires second display unit or a TAF session.

FEATURES

- Single database for all 4 record types
- Maintains
  1. Problem Management records
  2. Change Management records
  3. Configuration Management records, which are chained together
  4. Privilege Class Records
- Powerful search facilities

PROBLEM DETERMINATION HIGHLIGHTS

- Problem entry by NCCF operator ensures no lost problems
- Duplicate Problem recognition
- Identifying components in a configuration path
- Identifying component features
- Problem/Change relationship recognition

AVAILABILITY

P/P 5735-OZS

PRODUCT DEPENDENCIES

- Information/System Rel. 2
- NCCF or TSO
- VSAM
- OS/VS2 (MVS)

REFERENCE MANUALS

- Information/System Pre-Installation Information. SC34-2027
- Information/Sys Installation and Customization . SC34-2029
- Information/Management Users Guide SC34-2031
- Information/System Messages and Codes. SC34-2043
- Information/Management Scenarios and Panel Flow. SC34-2045

OPERATION

- From TSO via CLIST
- From NCCF via command

4.3.2 : NETWORK PERFORMANCE ANALYZER

DESCRIPTION

The Network Performance Analyzer FDP (NPA) monitors, collects, and displays network performance data which may be used for:

- Highlighting causes of performance degradation
- Tuning networks for better performance
- Capacity planning for future growth

The data gathered by NPA are available for online and offline evaluation. The FDP comprises two products, a HOST program and a NCP/NPA program.

NPA has a companion FDP (NETPARS) which creates structured reports from the NPA log output.

FEATURES

- Performance data collection
- Interactive data display
- Threshold controlled monitoring

PROBLEM DETERMINATION HIGHLIGHTS

- Collects 3705, NCP, Message Traffic and Line Control statistics by user criterion.
- Provides immediate display of statistics.
- Provides display of previously collected statistics.
- Time of Day initiated monitoring.

AVAILABILITY

- FDP 5798-CZT (Controller)
- FDP 5798-CZR (Host)

PRODUCT DEPENDENCIES

- VTAM and/or TCAM
- NCP 5 or ACF/NCP Rel 1
- Network Performance Analysis Reporting System (NETPARS)

  This FDP is optional, but highly recommended.

REFERENCE MANUALS

- NPA AVAILABILITY NOTICE (GB21-2478)
- NPA PROGRAM DESCRIPTION/OPERATIONS MANUAL (SB21-2479)

OPERATION

After the user logs on to NPA, he/she can enter commands. A summary of the NPA commands are listed here for reference.

- START/STOP COLLECT tells NPA to begin collecting data (immediately or at a future time).
- START/STOP DISPLAY initiates collection and display of data (the data displayed is changed at periodic intervals).
- START/STOP MONITOR is similar to Display, but accepts a range of values and if the measured

parameter falls outside of the range, a message is displayed at the terminal.

- REVIEW causes the display of interval and total records for a given resource.

- STATUS shows which of the commands START COLLECT, DISPLAY and MONITOR are active at this time.

All data collected by any START command are recorded in 2 files: the log and the review files. The review file is a VSAM file that keeps information for online reviewing by the operator if necessary. In the log file is the same information for offline processing, normally by NPA LOGPRINT program. In these files there are 3 types of records:

- Interval records, that contain data collected over the period specified by the interval parameter, originated by any of the commands START COLLECT, START DISPLAY or START MONITOR.

- Totals records with the information accumulated over a number of intervals.

- Monitor records that contain exception data from an interval or a totals record. Each time a data value falls outside of the user limits (specified by START MONITOR) is generated one monitor record.

INTERPRETATION

This section includes one example of the use of NPA. Because NPA is interactive, the following log analysis has been produced by NETPARS.

DATE= TIME= SYSTEM=VS NETPARS REPORTS
COMPOSITE DISTRIBUTIONS

RESOURCE OUTBOUND QUEUE LENGTH

AVERAGE	STD DV	MAX VALUE
0.06	3.873	1

RANGE DISTRIB 3 TO MAXIMUM	COUNT IN RANGE	LINES, TERMINALS AND CLUSTERS
90	0	
80	0	
70	0	
60	0	
50	0	
40	0	
30	0	
20	0	
10	16	**********
TOTAL=	16	10 20 30 40 50

LINE UTILIZATION PERCENTAGE

AVERAGE	STD DV	MAX VALUE
39.12	.428	59

RANGE DISTRIB 3 TO MAXIMUM	COUNT IN RANGE	ALL LINES
90	0	
80	0	
70	0	
60	18	**********
50	7	******
40	9	*******
30	4	***
20	12	**********
10	0	
TOTAL=	50	10 20 30 40 50

LINE UTILIZATION PERCENTAGE

AVERAGE	STD DV	MAX VALUE
39.12	.428	59

RANGE DISTRIB 4 TO MAXIMUM	COUNT IN RANGE	ALL LINES
190	0	
180	0	
170	0	
160	0	
150	0	
140	0	
130	0	
120	0	
110	50	**********
TOTAL=	50	10 20 30 40 50

NCP FREE BUFFER QUEUE LENGTH

AVERAGE	STD DV	MAX VALUE
0.01	2.198	0

RANGE DISTRIB 3 TO MAXIMUM	COUNT IN RANGE	NUMBER OF BUFFERS IN QUEUE
90	0	
80	0	
70	0	
60	0	
50	0	
40	0	
30	0	
20	0	
10	16	**********
TOTAL=	16	10 20 30 40 50

```
 DATE=          TIME=                  SYSTEM=VS          NETPARS REPORTS
 10/01/81
  TIME     VALUE |       TOTAL PIUS SENT AND RECEIVED PER SECOND    |     VALUE |     TOTAL BYTES SENT AND RECEIVED PER SECOND     |
HH.MM.SS        |  0.11 0.22 0.32 0.43 0.54 0.65 0.76 0.87 0.97 1.08          |       8,740    17,480    26,220    34,960    43,700
 8.57.00        |----|----|----|----|----|----|----|----|----|----|          |----|----|----|----|----|----|----|----|----|----|
 8.58.00    1.1 |**********************************//////////////////    43655 |**********************************//////////////////
 DATE=          TIME=                  SYSTEM=VS          NETPARS REPORTS
 10/01/81
  TIME     VALUE |             PIUS RETRANSMITTED PER SECOND       |     VALUE |            BYTES RETRANSMITTED PER SECOND       |
HH.MM.SS        |   10   20   30   40   50   60   70   80   90   100          |   10   20   30   40   50   60   70   80   90   100
 8.57.00        |----|----|----|----|----|----|----|----|----|----|          |----|----|----|----|----|----|----|----|----|----|
 8.58.00    0.0 |                                                      0.0 |
 DATE=          TIME=                  SYSTEM=VS          NETPARS REPORTS
 10/01/81
  TIME     VALUE |       POSITIVE POLL COUNT     TOTAL FOR ALL     |     VALUE |     TOTAL POLL COUNT     TOTAL FOR ALL          |
HH.MM.SS        |  0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90   1            |   250  500  750 1000 1250 1500 1750 2000 2250 2500
 8.57.00        |----|----|----|----|----|----|----|----|----|----|          |----|----|----|----|----|----|----|----|----|----|
 8.58.00    0.6 |****************************                      2,485.0 |**************************************************
 DATE=          TIME=                  SYSTEM=VS          NETPARS REPORTS
 10/01/81
  TIME     DIFFC     VALUE |            TEMPORARY ERRORS PER SECOND     TOTAL FOR ALL
HH.MM.SS    SECS            |    5   10   15   20   25   30   35   40   45   50   55   60   65   70   75   80   85   90   95   100
 8.57.00                    |----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
 8.58.00      60       0.0 |
 DATE=          TIME=                  SYSTEM=VS          NETPARS REPORTS
 10/01/81
  TIME     DIFFC     VALUE |            RESOURCE OUTBOUND QUEUE LENGTH     TOTAL FOR ALL
HH.MM.SS    SECS            |  0.05 0.10 0.15 0.20 0.25 0.30 0.35 0.40 0.45 0.50 0.55 0.60 0.65 0.70 0.75 0.80 0.85 0.90 0.95   1
 8.57.00                    |----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
 8.58.00      60       1.0 |**************************************************************************************************
 DATE=          TIME=                  SYSTEM=VS          NETPARS REPORTS
 10/01/81
  TIME     VALUE |       FREE BUFFER LOW AND HIGH WATER MARKS      |     VALUE |                FREE BUFFER QUEUE LENGTH          |
HH.MM.SS        |   370  740 1110 1480 1850 2220 2590 2960 3330 3700          |   190  380  570  760  950 1140 1330 1520 1710 1900
 8.57.13        |----|----|----|----|----|----|----|----|----|----|          |----|----|----|----|----|----|----|----|----|----|
 8.57.14 3,688.0 |************************//////////////////////////   1,852.0 |**************************************************
 DATE=          TIME=                  SYSTEM=VS          NETPARS REPORTS
 10/01/81
  TIME     VALUE |                CHANNEL HOLD QUEUE LENGTH         |     VALUE |        CHANNEL INTERMEDIATE QUEUE LENGTH         |
HH.MM.SS        |  0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90   1            |  0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90   1
 8.57.13        |----|----|----|----|----|----|----|----|----|----|          |----|----|----|----|----|----|----|----|----|----|
 8.57.14     1.0 |************************************************      1.0 |**************************************************
 DATE=          TIME=                  SYSTEM=VS          NETPARS REPORTS
 10/01/81
  TIME     VALUE |       NCP TIME IN SLOWDOWN (TENTHS OF SECONDS)  |     VALUE |         NCP IDLE TIME(TENTHS OF SECONDS)         |
HH.MM.SS        |   10   20   30   40   50   60   70   80   90   100          |   50   100  150  200  250  300  350  400  450  500
 8.57.13        |----|----|----|----|----|----|----|----|----|----|          |----|----|----|----|----|----|----|----|----|----|
 8.57.14     0.0 |                                                    498.0 |**************************************************
```

```
 DATE=           TIME=                  SYSTEM=VS         NETPARS REPORTS
START=10/01/81  08.57.13.93             SYSTEM=VS         NETPARS REPORTS                  END 10/01/81 08.57.15.02  PAGE      1
                                                      RESOURCE USAGE GRAPHS
                                                    ___________________________
MAXIMUM RATE BY ANY RESOURCE   PIUS      PIUS      BYTES      BYTES QUE   TOTAL   POSITIVE ERRORS  RETRY      RETRY
ELASPED TIME          0        SENT      REC.      SENT       REC.  LGTH  POLLS   POLLS    PER     PIU        BYTE
                               MINUTE    MINUTE    SECOND     SECOND      SECOND  SEC.     MINUTE  MINUTE     SECOND
MAX USAGE BY ANY                 10         5      2,872      1,441    1    239     0        0       0          0
AVERAGE USAGE FOR  PIUS SENT           LINES                                                      MAXIMUM AVERAGE =     10.30
RESOURCE NAME      --------10--------20--------30--------40--------50--------60--------70--------80--------90-------100% OF MAX.
L140A0         10.30****************************************************************************************************
L140A5           .25***
L14028           .25***
START=10/01/81  08.57.13.93             SYSTEM=VS         NETPARS REPORTS                  END 10/01/81 08.57.15.02  PAGE      2
                                                      RESOURCE USAGE GRAPHS
                                                    ___________________________
MAXIMUM RATE BY ANY RESOURCE   PIUS      PIUS      BYTES      BYTES QUE   TOTAL   POSITIVE ERRORS  RETRY      RETRY
ELASPED TIME          0        SENT      REC.      SENT       REC.  LGTH  POLLS   POLLS    PER     PIU        BYTE
                               MINUTE    MINUTE    SECOND     SECOND      SECOND  SEC.     MINUTE  MINUTE     SECOND
MAX USAGE BY ANY                 10         5      2,872      1,441    1    239     0        0       0          0
AVERAGE USAGE FOR  PIUS RECEIVED       LINES                                                      MAXIMUM AVERAGE =      5.52
RESOURCE NAME      --------10--------20--------30--------40--------50--------60--------70--------80--------90-------100% OF MAX.
L140A0          5.52****************************************************************************************************
START=10/01/81  08.57.13.93             SYSTEM=VS         NETPARS REPORTS                  END 10/01/81 08.57.15.02  PAGE      3
                                                      RESOURCE USAGE GRAPHS
                                                    ___________________________
MAXIMUM RATE BY ANY RESOURCE   PIUS      PIUS      BYTES      BYTES QUE   TOTAL   POSITIVE ERRORS  RETRY      RETRY
ELASPED TIME          0        SENT      REC.      SENT       REC.  LGTH  POLLS   POLLS    PER     PIU        BYTE
                               MINUTE    MINUTE    SECOND     SECOND      SECOND  SEC.     MINUTE  MINUTE     SECOND
MAX USAGE BY ANY                 10         5      2,872      1,441    1    239     0        0       0          0
AVERAGE USAGE FOR  BYTES SENT          LINES                                                      MAXIMUM AVERAGE =  2,872.15
RESOURCE NAME      --------10--------20--------30--------40--------50--------60--------70--------80--------90-------100% OF MAX.
L140A0        149.94******
L140A4         18.77**
L140A5        368.45**************
L1402C      2,872.15****************************************************************************************************
L14028      2,871.51****************************************************************************************************
L14040        926.54*********************************
START=10/01/81  08.57.13.93             SYSTEM=VS         NETPARS REPORTS                  END 10/01/81 08.57.15.02  PAGE      4
                                                      RESOURCE USAGE GRAPHS
                                                    ___________________________
MAXIMUM RATE BY ANY RESOURCE   PIUS      PIUS      BYTES      BYTES QUE   TOTAL   POSITIVE ERRORS  RETRY      RETRY
ELASPED TIME          0        SENT      REC.      SENT       REC.  LGTH  POLLS   POLLS    PER     PIU        BYTE
                               MINUTE    MINUTE    SECOND     SECOND      SECOND  SEC.     MINUTE  MINUTE     SECOND
MAX USAGE BY ANY                 10         5      2,872      1,441    1    239     0        0       0          0
AVERAGE USAGE FOR  BYTES RECEIVED      LINES                                                      MAXIMUM AVERAGE =  1,441.53
RESOURCE NAME      --------10--------20--------30--------40--------50--------60--------70--------80--------90-------100% OF MAX.
L140A0         35.56***
L140A4         18.77**
L140A5        369.80***************************
L1402C      1,436.91****************************************************************************************************
```

L14028 1,441.53**********
L14040 463.28**********

```
START=10/01/81  08.57.13.93            SYSTEM=VS          NETPARS REPORTS                      END 10/01/81 08.57.15.02  PAGE      5
                                                       RESOURCE USAGE GRAPHS

MAXIMUM RATE BY ANY RESOURCE   PIUS      PIUS       BYTES      BYTES QUE   TOTAL    POSITIVE ERRORS  RETRY      RETRY
ELASPED TIME           0       SENT      REC.       SENT       REC.  LGTH  POLLS    POLLS    PER     PIU        BYTE
                               MINUTE    MINUTE     SECOND     SECOND      SECOND   SEC.     MINUTE  MINUTE     SECOND
MAX USAGE BY ANY                10         5        2,872      1,441    1   239       0        0       0          0
AVERAGE USAGE FOR  QUE LENTH. AVG.     LINES                                                    MAXIMUM AVERAGE =      1.00
RESOURCE NAME      --------10--------20--------30--------40--------50--------60--------70--------80--------90-------100% OF MAX.
L140A0         1.00**************************************************************************************************
START=10/01/81  08.57.13.93            SYSTEM=VS          NETPARS REPORTS                      END 10/01/81 08.57.15.02  PAGE      6
                                                       RESOURCE USAGE GRAPHS

MAXIMUM RATE BY ANY RESOURCE   PIUS      PIUS       BYTES      BYTES QUE   TOTAL    POSITIVE ERRORS  RETRY      RETRY
ELASPED TIME           0       SENT      REC.       SENT       REC.  LGTH  POLLS    POLLS    PER     PIU        BYTE
                               MINUTE    MINUTE     SECOND     SECOND      SECOND   SEC.     MINUTE  MINUTE     SECOND
MAX USAGE BY ANY                10         5        2,872      1,441    1   239       0        0       0          0
AVERAGE USAGE FOR  TOTAL POLLS         LINES                                                    MAXIMUM AVERAGE =    239.34
RESOURCE NAME      --------10--------20--------30--------40--------50--------60--------70--------80--------90-------100% OF MAX.
L140A0          4.91***
L140A4          2.50**
L140A5         61.38******************************
L1402C        239.34**************************************************************************************************
L14028        239.27**************************************************************************************************
L14040         77.21************************************
START=10/01/81  08.57.13.93            SYSTEM=VS          NETPARS REPORTS                      END 10/01/81 08.57.15.02  PAGE      7
                                                       RESOURCE USAGE GRAPHS

MAXIMUM RATE BY ANY RESOURCE   PIUS      PIUS       BYTES      BYTES QUE   TOTAL    POSITIVE ERRORS  RETRY      RETRY
ELASPED TIME           0       SENT      REC.       SENT       REC.  LGTH  POLLS    POLLS    PER     PIU        BYTE
                               MINUTE    MINUTE     SECOND     SECOND      SECOND   SEC.     MINUTE  MINUTE     SECOND
MAX USAGE BY ANY                10         5        2,872      1,441    1   239       0        0       0          0
AVERAGE USAGE FOR  POSITIVE POLLS      LINES                                                    MAXIMUM AVERAGE =      .09
RESOURCE NAME      --------10--------20--------30--------40--------50--------60--------70--------80--------90-------100% OF MAX.
L140A0           .09**************************************************************************************************
L140A5           .02************************
L1402C           .00******
L14028           .02**********************************
START=10/01/81  08.57.13.93            SYSTEM=VS          NETPARS REPORTS                                                PAGE      1
                                                       NCP DETAIL TRACE REPORT

TIME      NCP      TOT   NCP    FREE   FREE   FREE   CHANNEL   CHANNEL NCP      NCP      MAXIMUM   INTERVAL
LOGGED    RESOURCE       IDLE   BUFF   BUFF   BUFF   INTER.    HOLD    SLOW     SLOW     AVAIABLE
          NAME           TIME   QUEUE  HIGH   LOW    QUEUE     QUEUE   DOWN     DOWN     NCP       SIZE
                                 LENGTH MARK   MARK   LENGTH    LENGTH  TIME     LIMIT    BUFFERS   SECONDS
08.57.13  N14BF3P         49.8   1852   1859   1829     1         1       0       206       1655     238.7
```

START=10/01/81 08.57.13.93 SYSTEM=VS NETPARS REPORTS PAGE 1

RESOURCE DETAIL TRACE REPORT

TIME	NAME	TYPE	TOT	PIUS SENT	PIUS REC.	BYTES SENT	BYTES REC.	QUE LGTH	TOTAL POLL COUNT	POS. POLL COUNT	ERROR COUNT	RETRY PIU COUNT	RETRY BYTE COUNT	SAMPLE SIZE SECONDS	LINE UTIL. PRI.	SEC
08.57.14	L14020	LINE		0	0	0	0	0	0	0	0	0	0	238	00	00
08.57.14	L14022	LINE		0	0	0	0	0	0	0	0	0	0	238	00	NO
08.57.14	L140A0	LINE		41	22	35,791	8,490	1	1173	22	0	0	0	238	25	06
08.57.14	L140A2	LINE		0	0	0	0	0	0	0	0	0	0	238	00	NO
08.57.14	L140A4	LINE		0	0	4,482	4,482	0	597	0	0	0	0	238	06	NO
08.57.14	L140A7	LINE		0	0	0	0	0	0	0	0	0	0	238	00	NO
08.57.14	L14043	LINE		0	0	0	0	0	0	0	0	0	0	238	00	NO
08.57.14	L14023	LINE		0	0	0	0	0	0	0	0	0	0	238	00	NO
08.57.14	L140A3	LINE		0	0	0	0	0	0	0	0	0	0	238	00	NO
08.57.14	L14024	LINE		0	0	0	0	0	0	0	0	0	0	238	00	NO
08.57.14	L14026	LINE		0	0	0	0	0	0	0	0	0	0	238	00	NO
08.57.14	L14028	LINE		1	0	685,430	344,095	0	8420	7	0	0	0	238	288	144
08.57.14	L1402C	LINE		0	0	685,584	342,991	0	8404	1	0	0	0	238	289	144
08.57.14	L14040	LINE		0	0	221,166	110,586	0	18431	0	0	0	0	238	77	39
08.57.15	L14042	LINE		0	0	0	0	0	0	0	0	0	0	238	00	NO
08.57.15	L140A5	LINE		1	0	87,950	88,273	0	14653	5	0	0	0	238	62	NO
SUBTOTAL INTV. RECS			16	43	22	1,720,403	898,917	1	49102	35	0	0	0	3819		
AVG. PER SEC.				0	0	450	235	0	39	0	0	0	0	3		
GRAND TOTALS.			32	43	22	1,720,403	898,917	1	49102	35	0	0	0	3819		
AVG. PER SEC.				0	0	450	235	0	39	0	0	0	0	3		

START=10/01/81 08.57.13.93 SYSTEM=VS NETPARS REPORTS PAGE 1

MANAGEMENT EXCEPTION REPORT

TIME	NAME	TYPE	NEGATIVE POLLS MINUTE	POSITIVE POLLS MINUTE	PIU RATE	BYTE RATE	LINE UTILZ. PERCENT	ERROR COUNT	QUEUE LENGTH	3705 UTILZ. PERCENT	FREE BUFF. PERCENT	SLOWDOWN PERCENT	TIME SAMPLED
08.57.13	N14BF3P	NCP								79	112		238
08.57.14	L14020	LINE											238
08.57.14	L14022	LINE											238
08.57.14	L140A0	LINE	289	5	15		15		1				238
08.57.14	L140A2	LINE											238
08.57.14	L140A4	LINE	150				6						238
08.57.14	L140A7	LINE											238
08.57.14	L14043	LINE											238
08.57.14	L14023	LINE											238
08.57.14	L140A3	LINE											238
08.57.14	L14024	LINE											238
08.57.14	L14026	LINE											238
08.57.14	L14028	LINE	2,118	1			59						238
08.57.14	L1402C	LINE	2,112				59						238
08.57.14	L14040	LINE	4,632				58						238
08.57.15	L14042	LINE											238
08.57.15	L140A5	LINE	3,681	1			62						238

4.3.3 : EREP1

DESCRIPTION

EREP1 is an IBM Service Aid Program that permits the analysis of error data accumulated in the SYS1.LOGREC(OS/VS) or SYSREC(DOS/VSE) datasets. It operates as a batch job. Its primary importance for SNA Problem Determination is realized in installations that do not use NPDA.

BASIC FUNCTIONS

- CREATE AN ACCUMULATION DATASET FROM SYS1.LOGREC AND CLEAR SYS1.LOGR EC

  EREP1 can create an accumulation dataset (history) either selectively by record criteria or in full. Whenever a full copy is created, the SYS1.LOGREC can be cleared.

- COPY AN INPUT ACCUMULATION DATASET TO AN OUTPUT ACCUMULATION DATASET

  EREP1 can generate an output dataset from an input accumulation dataset. The output can be a full copy of the input or can be a selective copy containing only the desired record types. One output dataset can be generated from several input datasets by concatenating the input DD statements.

- MERGE DATA FROM AN ACCUMULATION DATASET AND SYS1.LOGREC

  EREP1 can accept input from both an accumulation dataset and SYS1.LOGREC in a single step. The output dataset can be a full copy of both input sets or can be a selective copy containing only the desired record types.

- PRINT DETAILED DESCRIPTION OF THE HARDWARE AND SOFTWARE ERROR RECORDS

  All records or selected records on the input dataset can be printed in a detailed format which is dependent upon record type.

- SUMMARIZE AND PRINT STATISTICS FOR DEVICE FAILURES

  Data contained on SYS1.LOGREC and/or an accumulation dataset can be summarized by device type or system function. Several reports are available via parameter keywords, e.g., SYSUM=Y requests a system summary report of all records on the input dataset.

- FORMAT RELIABILITY MEASUREMENT DATA

  EREP1 can format a report of reliability data from IPL records on an accumulation dataset.

EREP1 REPORTING FUNCTIONS

During an EREP1 execution only one of the following functions can be performed:

- SYSTEM SUMMARY REPORTING

  EREP1 can be used to generate a comprehensive condensed report of errors for the principal system elements. The system summary provides data in three major categories:

  1. CPU/Channels/Storage/SCP
  2. Condensed I/O Subsystem Summary
  3. MDR Summary Reporting

- TREND REPORTING

  This function enables the user to specify a time frame -max of 30 days- for which data is to be summarized by daily activity. The number of days reported depends on the input data and parameters. When no date range is specified, thirty days of data ending with the current day are presented. Trend Reporting is recommended to be done every seven days, using a DATE parameter of the last seven days.

- EVENT HISTORY REPORTING

  EREP1 can be used to generate a report of one line abstracts of all records recorded within a specified time frame. This report also permits examination of selected record types within the context of the overall recorded activity.

- MEDIA ERROR STATISTICS/THRESHOLD REPORTING

  EREP1 can be used to generate reports of error statistics for 3410 and 3420 tape subsystems or a summary report for a 3420 tape subsystem.

- RECORD DETAIL AND SUMMARY REPORTING

  EREP1 can be used to edit and print all or any selected records on the input dataset. Data from the records can be summarized and the summary printed. The parameter-PRINT-indicates whether detailed and/or summaries are to be printed.

- RDE SUMMARY REPORTING

  If RDE has been included as a system option, EREP1 can be used to generate a summary of IPL and error records from an accumulation data set. Control information must be input via control cards following the SYSIN DD statement to specify the reporting period and the IPL clustering interval.

- SYS1.LOGREC OFFLOAD

  This function is provided for AN EMERGENCY CAPABILITY TO CLEAR SYS1.LOGREC at a time when it is imperative to clear the dataset and not feasible to execute EREP1 using normal execution. If it is required to examine the error that can not be logged, run EREP to retreive that record first.

AVAILABILITY

EREP1 is supported by the following system/releases:

* OS/VS1 Release 5.0
  Independent Component Release UX99936
* OS/VS1 Release 6.0
  Selectable Unit VS1.06.601
  Selectable Unit 5741-620
* OS/VS2 Release 1.7 (SVS)
  Independent Component Release UX99942
  Independent Component Release UX99951
* OS/VS2 Release 3.0 and 3.6(MVS)
  Independent Component Release UX99946
* OS/VS2 Release 3.7(MVS)
  Selectable Unit VS2.03.827
  Selectable Unit 5752-851
* OS/VS2 Release 3.8(MVS)
* DOS/VSE
* VM/370 Release 6 and up

REFERENCE MANUALS

SVS, VS1, MVS, DOS/VSE, and VM/370
OS/VS ,DOS/VSE, VM/370 Environmental Recording and
and Printing (EREP) Program GC28-1178
OS/VS Message Library: EREP Messages. GC38-1179
EREP Program Reference. GC29-8300
VS1
OS/VS1 SYS1.LOGREC Error Recording. GC28-0668
OS/VS1 Message Library: Service Aids and OLTEP Messages GC23-0005
SVS
OS/VS SYS1.LOGREC Error Recording. GQ28-0638
OS/VS Message Library: Service Aids and OLTEP Messages. GT00-0129
MVS
OS/VS2 SYS1.LOGREC Error Recording. GC28-0677
OS/VS2 System Programming Library : Service Aids. GC28-0674

OPERATION

Each record on SYS1.LOGREC contains complete and specific information for the device, and type of failure or system condition that caused it to be written. For example, if a device failure occurs on a teleprocessing device connected to an IBM 3704 or 3705 device or on an IBM 3704 or 3705, the respective device-dependent 3704 or 3705 ERP receives control. If the error is of the kind that inherently cannot be recovered, the Network Control Program (NCP) makes no error recovery attempt but immediately indicates a permanent error by sending an MDR record to the host CPU. The following is a list of errors that NCP considers permanent and no error recovery is attempted:

1. Received SDLC Command Reject Response (CMDR).
2. Received Invalid SDLC Command.
3. Adapter Check.
4. Adapter Feedback Check.
5. Modem Error.
6. Transmit clock or clear to send failure.
7. Data set ready turn on or off check.
8. Auto call check.
9. Program failure.

Temporary errors in NCP are separated into three separate recovery procedures depending on the error type.

1. The first temporary error recovery procedure is to handle I-format receive errors. This procedure handles retry of the following:

   - Data check
   - Format check
   - Abort

   A common field in the Station Control Block is used to maintain a count of this type of temporary error. When this field reaches the preset limit of 64, a permanent MDR record is generated with the Monitor Count Overflow bit set in the LXB extended status field.

2. The second temporary error recovery procedure is for Underrun errors. This is an error that occurs during a transmit operation. A field in Link XIO Control Block is used to maintain a count of this error. When this count reaches the preset limit of

127 a permanent MDR recorded is generated with the Underrun bit set in the LXB extended status field.

3. If the temporary error is not of the I-format receive or Underrun type, then the common error recovery procedures are used to handle the error. When the number of retries has been done without recovery, a permanent MDR is generated indicating the initial and the final error conditions.

SAMPLE OUTPUT

In this section, there are samples of the output records that are available from EREP1. The following format is used in this section:

- A sample of the record is displayed.
- A description of what fields you should look at and what they mean.
- A list of the parameters that were used to generate the report.

NETWORK MONITORING

The purpose of error recording on the SYS1.LOGREC (OS/VS) and SYSREC (DOS/VS) datasets is to provide a record of all hardware failures, selected software errors, and system conditions. Information about each incident is written onto SYS1.LOGREC or SYSREC by the system recording routines and can be retrieved by using a service aid. The service aid output can be used for diagnostic and/or measurement purposes to maintain the devices and support the system control program.

It is essential that the users set up procedures for listing and monitoring SYS1.LOGREC or SYSREC. A communication system requires daily monitoring and if procedures are not set up, the following is recommended:

- The System Summary report should be run on a daily basis, and the totals scanned to determine if there is a problem that requires further analysis. The temporary and permanent error counts should be compared to your trend reports to establish an average error rate for each I/O and system component. These daily reports should be retained until a trend report has been run which includes the data in this report.

- The trend report should be used to determine the day to day operation of your system. Retaining a copy of the trend report in a history book will allow you to establish an average level of line errors and a normal level of system problems. If the error levels start to rise, using trend will enable you to determine what type of action needs to be taken before the errors reach the point of impacting your system operations.

Example 1: SYSTEM SUMMARY MDR SAMPLE

```
S Y S T E M  S U M M A R Y                    REPORT DATE 027 78
        (PART 1)                              PERIOD FROM 027 78
CPU/CHANNEL/STORAGE/SCP                               TO 027 78

                      TOTAL CPU-A
IPL                       0     0

MACHINE CHECK

  RECOVERABLE             0     0
  NON-RECOVERABLE         0     0

CHANNEL CHECK

  CHANNEL 0               0     0
  CHANNEL 1               0     0
  CHANNEL 2               0     0
  CHANNEL 3               0     0
  CHANNEL 4               0     0
  CHANNEL 5               0     0
  CHANNEL 6               0     0
  CHANNEL 7               0     0
  CHANNEL 8               0     0
  CHANNEL 9               0     0
  CHANNEL A               0     0
  CHANNEL B               0     0
  CHANNEL C               0     0
  CHANNEL D               0     0
  CHANNEL E               0     0
  CHANNEL F               0     0

PROGRAM ERROR

 PRGM INT                 1     1
 ABEND                    9     9
 RESTART                  0     0

END OF DAY                0     0
TOTAL RECORDS            10    10

CPU   MODEL   SERIAL NO.
 A     0168     060009
```

```
S Y S T E M  S U M M A R Y                    REPORT DATE 027 78
        (PART 2)                              PERIOD FROM 027 78
      I/O SUBSYSTEM                                    TO 027 78

              TOTAL        CPU-A
            PERM  TEMP    PERM TEMP
TP CNTRL  ****************************

3705  01B
   LINES       1     0      1    0
2701  034
   CNTRLR      1     0      1    0
2701  057
   CNTRLR      4     0      4    0
2701  076
   CNTRLR      1     0      1    0
3705  11B
   LINES      75    39     75   39
3705  11C
   LINES     380   239    380  239

TOTALS       469  1380    469 1380
CPU   MODEL   SERIAL NO.
 A     0168     060009
```

EREP1 INFORMATIONAL MESSAGES DATE - 027 78

```
INPUT PARAMETER STRING          ACC=N,SYSUM=Y

PARAMETER OPTIONS VALID FOR THIS EXECUTION
   RECORD TYPES(MCH,CCH,OBR,SOFT,IPL,DDR,MIH,EOD,MDR),SYSTEM SUMMARY,LOGREC INPUT,DUMP SDR COUNTERS
   DATE/TIME RANGE - ALL



****************END OF SAMPLE REPORT**************
```

The parameters used to obtain this sample report limited the output in the I/O section to 3705s, DEV=(3705), did not create a history tape ACC=N, and did not zero out SYS1.LOGREC. For a normal report, you would include all I/O (no DEV), generate a history tape, ACC=Y, and zero out SYS1.LOGREC, ZERO=Y. This report should be run on a daily basis, and the totals scanned to determine if there is a problem that requires further analysis. The temporary and permanent error counts should be compared to your trend reports to establish an average error rate for each I/O and system component. These daily reports should be retained until a trend report has been run which includes the data in this report.

The parameters used were:

```
//STEP1 EXEC PGM=IFCEREP1,
// PARM='ACC=N,PRINT=SU,DEV=(3705),TYPE=CDEHIMOST'
//SYSPRINT DD SYSOUT=A
//SERLOG DD DSN=SYS1.LOGREC,DISP=SHR
//EREPPT DD SYSOUT=A,DCB=BLKSIZE=133
//SYSUDMP DD SYSOUT=A,DCB=BLKSIZE=133
```

Example 2: MDR SUMMARY REPORT SAMPLE

---SUMMARY OF ENTRY TYPE - 3705 MDR DEVICE TYPE 3705 MODEL-- 0168 SERIAL NO. 060009

DAY YEAR DAY YEAR
DATE RANGE- 256 78 TO 256 78
CHANNEL UNIT ADDRESS 00041C TOTAL NUMBER OF RECORDS 0079

							- - - - - - - PERMANENT ERROR TYPES - - - - - - -					
TERM NAME	RIB	LIB ADDR	# I/O OPS	TEMP ERRORS	PERM ERRORS		HDWR	TM OUT	DATA CK	RCV	ITV RQD	MISC
LNPA01T	8286	0039	00000000	000000	000001	XX	00001	00000	00000	00000	00000	00000
LNPA02T	8290	003A	00000000	000000	000001	XX	00001	00000	00000	00000	00000	00000
LNPA01S	829A	0026	00000000	000000	000001	XX	00001	00000	00000	00000	00000	00000
LNPA1	82D4	0025	00000000	000000	000001	XX	00001	00000	00000	00000	00000	00000
LNPA4	837C	0029	00000000	000000	000001	XX	00001	00000	00000	00000	00000	00000
CLPA05T	8210	002E	00000002	000002	000002	XX	00000	00002	00000	00000	00000	00000
CLPACIT	827D	0038	00000002	000002	000002	XX	00000	00002	00000	00000	00000	00000
TUPA05T1	8211	002E	00000000	000000	000001	XX	00000	00001	00000	00000	00000	00000
TUPACIT1	827E	0038	00000000	000000	000001	XX	00000	00001	00000	00000	00000	00000
TUPA05T2	8212	002E	00000000	000000	000001	XX	00000	00001	00000	00000	00000	00000
TUPACIT2	827F	0038	00000000	000000	000001	XX	00000	00001	00000	00000	00000	00000
TUPA05T3	8213	002E	00000000	000000	000001	XX	00000	00001	00000	00000	00000	00000
TUPACIT3	8280	0038	00000000	000000	000001	XX	00000	00001	00000	00000	00000	00000
TUPACIT4	8281	0038	00000000	000000	000001	XX	00000	00001	00000	00000	00000	00000
TUPA05T4	8214	002E	00000000	000000	000001	XX	00000	00001	00000	00000	00000	00000
TUPACIT5	8282	0038	00000000	000000	000001	XX	00000	00001	00000	00000	00000	00000
TUPA02K1	82AB	003E	00000326	000000	000011	XX	00004	00000	00000	00007	00000	00000
TUPA02K2	82AC	003E	00000000	000000	000003	XX	00001	00002	00000	00000	00000	00000
TUPA02K3	82AD	003E	00000000	000000	000003	XX	00001	00002	00000	00000	00000	00000
TUPA02K4	82AE	003E	00000000	000000	000003	XX	00001	00002	00000	00000	00000	00000
CLPA02K	82AA	003E	00000096	000000	000004	XX	00004	00000	00000	00000	00000	00000
TUPA01K1	82A5	003D	00000000	000000	000001	XX	00000	00000	00000	00000	00000	00001
TUPA01K2	82A6	003D	00000001	000001	000001	XX	00000	00001	00000	00000	00000	00000
TUPA01K3	82A7	003D	00000001	000001	000001	XX	00000	00001	00000	00000	00000	00000
TUPA01K4	82A8	003D	00000000	000000	000001	XX	00001	00000	00000	00000	00000	00000
LNPA02K	82A9	003E	00000000	000000	000003	XX	00003	00000	00000	00000	00000	00000
CLPA01K	82A4	003D	00000326	000016	000005	XX	00000	00005	00000	00000	00000	00000
CLPA02T	8291	003A	00000894	000040	000004	XX	00000	00004	00000	00000	00000	00000
TUPA02T2	8293	003A	00000101	000002	000003	XX	00000	00001	00000	00000	00000	00002
TUPA02T3	8294	003A	00000087	000005	000004	XX	00000	00001	00000	00000	00000	00003
TUPA02T1	8292	003A	00000261	000013	000007	XX	00000	00000	00000	00000	00000	00007
CLPA01T	8287	0039	00000002	000002	000002	XX	00000	00002	00000	00000	00000	00000
TUPA01T1	8288	0039	00000000	000000	000002	XX	00000	00002	00000	00000	00000	00000
TUPA01T2	8289	0039	00000000	000000	000001	XX	00000	00001	00000	00000	00000	00000
TUPA01T3	828A	0039	00000000	000000	000001	XX	00000	00001	00000	00000	00000	00000

**********END OF SAMPLE REPORT**********

The parameters used to obtain this sample report limited the output in the I/O section to 3705s, DEV=(3705), did not create a history tape ACC=N, and did not zero out SYS1.LOGREC. For a normal report, you would include all I/O (no DEV), generate a history tape, ACC=Y, and zero out SYS1.LOGREC, ZERO=Y. This report should be run on a daily basis, and the totals scanned to determine if there is a problem that requires further analysis. The temporary and permanent error counts should be compared to your trend reports to establish an average error rate for each I/O and system component. These daily reports should be retained until a trend report has been run which includes the data in this report.

The parameters used were:

```
//STEP1 EXEC PGM=IFCEREP1,
// PARM='ACC=N,PRINT=SU,DEV=(3705),TYPE=EOT'
//SYSPRINT DD SYSOUT=A
//SERLOG DD DSN=SYS1.LOGREC,DISP=SHR
//EREPPT DD SYSOUT=A,DCB=BLKSIZE=133
//SYSUDMP DD SYSOUT=A,DCB=BLKSIZE=133
```

Example 3: TRENDS REPORT MDR SAMPLE

```
T R E N D S   R E P O R T                    REPORT DATE 030 78
        (PART 1)                             PERIOD FROM 027 78
 CPU/CHANNEL/STORAGE/SCP                            TO   030 78

 JULIAN   78
   DAY    23  24  25  26  27  28  29  30


IPL
  CPU  A   0   0   0   0   0   0   0   0

MACHINE CHECK
  CPU  A   0   0   0   0   0   0   0   0

CHANNEL CHECK
  CPU  A   0   0   0   0   0   0   0   0

PROGRAM ERROR
  CPU  A   0   0   0   0   0   0   0   0

CPU   MODEL   SERIAL NO.

 A     0168   060009
T R E N D S   R E P O R T                    REPORT DATE 030 78
        (PART 2)                             PERIOD FROM 027 78
     I/O SUBSYSTEM                                  TO   030 78

 JULIAN   78
   DAY    23  24  25  26  27  28  29  30

TP CNTRL
3705
 01B A
  LINES
  PERM     0   0   0   0   1   0   0   1
  TEMP     0   0   0   0   0   0   0   0
 11B A
  LINES
  PERM     0   0   0   0  87   0   0  71
  TEMP     0   0   0   0  51   0   0  28
 11C A
  LINES
  PERM     0   0   0   0 380   0   0 116
  TEMP     0   0   0   0 239   0   0  58

CPU   MODEL   SERIAL NO.

 A     0168   060009
```

```
INPUT PARAMETER STRING          ACC=N,DEV=(3705),TYPE=EOT,TRENDS=Y,DATE=(78023,78030)

PARAMETER OPTIONS VALID FOR THIS EXECUTION
   RECORD TYPES(OBR,EOD,MDR),TREND REPORT,LOGREC INPUT,DUMP SDR COUNTERS
   DATE/TIME RANGE - 78023,78030/00000000:24000000
   TABLE SIZE - 024K,LINE COUNT - 050
DEVICE ENTRIES
   DEVICE TYPES(OBR,MIH,DDR)-3705(4035),3705(4025),3705(4015),3705(4005)
   DEVICE TYPES(MDR)-3705(05)
IFC120I         0  RECORDS SAVED FOR TREND PART1
IFC120I       656  RECORDS SAVED FOR TREND PART2

*****************END OF SAMPLE REPORT***************
```

The JCL used to run this sample used SYS1.LOGREC instead of a history tape. For a customer system, the trend report would be run using the history tape or tapes for input instead of logrec. The parameters to do this would be ,HIST=Y, in the PARM statement and a //ACCIN DD statement defining where the accumulation dataset is. The trend report should be used to determine the day to day operation of your system. Retaining a copy of the trend report in a history book will allow you to establish an average level of line errors and a normal level of system problems. If the error levels start to rise, using trend will enable you to determine what type of action needs to be taken before the errors reach the point of impacting your system operations.

The parameters used were:

```
//STEP1 EXEC PGM=IFCEREP1,
// PARM='ACC=N,DEV=(3705),TYPE=CDEHIMOST,TRENDS=Y,DATE=(78023,78030)'
//SYSPRINT DD SYSOUT=A
//SERLOG DD DSN=SYS1.LOGREC,DISP=SHR
//EREPPT DD SYSOUT=A,DCB=BLKSIZE=133
//SYSUDMP DD SYSOUT=A,DCB=BLKSIZE=133
```

Example 4: PERMANENT LINE ERRORS FOR BSC & S/S MDR SAMPLE

```
---RECORD ENTRY TYPE - 3705 MDR    SOURCE - OUTBOARD                MODEL- 0168      SERIAL NO.   060009
   VS 2 REL.   03
                        DAY YEAR                      HH MM SS.TH
                    DATE- 256   78                TIME 04 53 09 59
 DEVICE TYPE           3705
 CHANNEL UNIT ADDRESS 001A
 RESOURCE I.D.         8401

RECORD TYPE - BSC/SS PERMANENT LINE ERROR
 LIB ADDR.             004B
 TERMINAL NAME         LNPA10T
  BASIC TRANSMISSION UNIT
   BTU COMMAND  00              IOB COMMAND          8D        IOB INITIAL ERROR STATUS   0000
   BTU MODIFIER 00              IOB MODIFIERS        0000      IOB INITIAL ERR EXT STAT   00
   BTU FLAGS    0000            IOB IMMED CTL CMMND  00        IOB STATUS                 06F4
                                                               IOB EXTENDED STATUS        00
   INITIAL ERROR STATUS 00    INITIAL ERR EXT STAT 00    LAST ERROR STATUS    06    LAST ERR EXT STAT    00
      FIRST BYTE                                            FIRST BYTE
   EXTENDED ERR STAT FLG 0    OVERRUN/UNDERRUN FLAG 0    EXTENDED ERR STAT FLG 0    OVERRUN/UNDERRUN FLAG 0
   FORMAT EXCEPTION FLAG 0    LINE QUIET TIMEOUT FG 0    FORMAT EXCEPTION FLAG 0    LINE QUIET TIMEOUT FG 0
   SYNC CHECK FLAG       0    LEADING DLE FORMAT CH 0    SYNC CHECK FLAG       0    LEADING DLE FORMAT CH 0
   DATA CHECK FLAG       0    SUB BLOCK ERROR FLAG  0    DATA CHECK FLAG       0    SUB BLOCK ERROR FLAG  0
   PH    ER              0    UNUSED                0    PH    ER              0    UNUSED                0
     AS    RO            0    UNUSED                0      AS    RO            1    UNUSED                0
       E     R           0    UNUSED                0        E     R           1    UNUSED                0
   LENGTH CHECK FLAG     0    UNUSED                0    LENGTH CHECK FLAG     0    UNUSED                0
  SIO COUNTER 0000  TEMPORARY ERROR COUNTER 00
  2770              00
   HEX DUMP OF RECORD
   HEADER    91830800    058A0000    0078256F    04530959        01060009    01680588

       0018  001AD3D5    D7C1F1F0    E3408401    004B0005        00000000    8D000000    06F40000    00000000
       0038  00000000    00010000    00000000    00000000        00000000    0000

*****************END OF SAMPLE REPORT***************
```

MEANING OF THE DATA FIELDS TO LOOK AT

IOB COMMAND

10 Write initial.
12 Write continue.
16 Write recover.
17 Write delay.
19 Write.
25 Read.
27 Read delay.
28 Read initial.
2A Read continue.
83 Disable.
8D Enable.
8F Dial.
94 Write EOT.
9B Write control.
AC Read status.

IOB STATUS AND INITIAL STATUS BY READ/WRITE GROUP

00 No errors.
02 Receive text.
04 Receive text reply.
06 Receive control; command reject.
08 Status outstanding when command issued; command not executed.
0A Send text reply.
0C Send text.
0E Send control.

DATA SET CONTROL GROUP

00 No errors.
02 Recive ID.
04 Receive ID reply.
06 Connect.
08 Status outstanding when command issued.
0A Error in dialing phase.
0C Send ID.
0E Disconnect.

IOB STATUS AND INITIAL STATUS BYTE 1 HARDWARE/USER ERROR

E0 User error, normally indicates an incorrect NCP generation
E4 Level 1 communication check.
E8 Communications line adapter check.
EA Communications scanner adapter feedback check.
EC Equipment check.
F0 Modem error, modem check bit in SCF field of ICW.
F2 Modem transmit clock or clear-to-send error.
F4 DSR-on check, dataset ready did not come up.
F8 DSR-off check, dataset ready did not go down.
FC ACU check, autodial problem.
FF Program failure.

These MDR records are logged by terminal (TERMINAL NAME LNPA10T) and using the IOB COMMAND and the IOB ERROR STATUS fields. This should help to determine if the error is something you can correct yourself.

For certain errors (e.g., Timeouts, Modem Interface error, etc.) EREP analyzes the STATUS fields and prints the error below the 'RECORD TYPE' field. In this example, 'BSC/SS PERMANENT LINE ERROR' is printed.

The DEVICE TYPE, CHANNEL UNIT ADDRESS, RESOURCE I.D., LIB ADDR., and TERMINAL NAME fields allow you to identify the 3705 and the TP line experiencing trouble. In the above example the IOB command is 8D, which is an enable command. The IOB status is 06F4, the 06 would be in the dataset control group because the command is an 'ENABLE', therefore 06=CONNECT. the second byte is an F4 which is a DSR-on check. Looking up near the top, we see the LIB address is 004B.

Using the Teleprocessing Installation Record for IBM 3704 and 3705 Communications Controllers (GC30-3021) and looking up which dataset is connected to 004B we can determine where to look to find out if the dataset did not bring up DSR or the 3705 could not recognize that DSR was up. This MDR detail would be run when it had been determined from the System Summary report or from the operator there was a problem.

If you already knew what the address or terminal name was, it would reduce the system time and the amount of paper printed to specify the LIB address or terminal name by using these additional parameters 'DEV=(3705),LIBADR=004B' for LIB address or 'DEV=(3705),TERMN=LNPA10T' for the terminal name.

The parameters used were:

```
//STEP1 EXEC PGM=IFCEREP1,
// PARM='ACC=N,DEV=(3705),TYPE=EOT,PRINT=PS'
//SYSPRINT DD SYSOUT=A
//SERLOG DD DSN=SYS1.LOGREC,DISP=SHR
//EREPPT DD SYSOUT=A,DCB=BLKSIZE=133
//SYSUDMP DD SYSOUT=A,DCB=BLKSIZE=133
```

Example 5: PERMANENT SDLC LINE ERROR MDR SAMPLE

```
---RECORD ENTRY TYPE - 3705 MDR    SOURCE - OUTBOARD                MODEL- 0168      SERIAL NO.   060009
   VS 2 REL.   03
                       DAY YEAR                      HH MM SS.TH
                  DATE- 027   78                TIME 04 55 20 93

 DEVICE TYPE          3705
 CHANNEL UNIT ADDRESS 011B
 RESOURCE I.D.        A07F


 NETWORK ADDRESS      A07F      NETWORK NAME LNDET

 RECORD TYPE - PERMANENT SDLC LINE ERROR
 SUSPECTED MODEM INTERFACE ERROR
 LIB ADDR             0030

  LINK INFORMATION

   CCB TYPE CONNECTION FLG    00        LXB COMMAND                 8D     LXB LAST ERROR STATUS          06F4
   CCB TYPE FLAGS             31        LXB MODIFIERS               0000   LXB LAST ERR EXT STATUS        00
                                        LXB IMMED. CTL CMD.         00     LXB FIRST ERROR STATUS         0000
                                                                           LXB FIRST ERR EXT STATUS       00

   LAST ERR BIT DECODE        LAST ERR EXT STAT          FIRST ERR BIT DECODE       FIRST ERR EXT STAT
   EXTENDED ERR STAT FLG 0    OVERRUN/UNDERRUN FLAG 0    EXTENDED ERR STAT FLG 0    OVERRUN/UNDERRUN FLAG 0
   FORMAT EXCEPTION FLG  0    BLOCK OVERRUN         0    FORMAT EXCEPTION FLG  0    BLOCK OVERRUN         0
   CHAR SYNC CHECK       0    ABORT                 0    CHAR SYNC CHECK       0    ABORT                 0
   DATA CHECK            0    MONITOR COUNT OVERFLO 0    DATA CHECK            0    MONITOR COUNT OVERFLO 0
   SDLC POLL FINAL BIT   0                               SDLC POLL FINAL BIT   0


   HEX DUMP OF RECORD
   HEADER    91830800    058A0000    0078027F    04552093        01060009    01680588

       0018  011BD3D5    C4C5E340    4040A07F    00300205        00000000    8D000000    06F40000    00000000
       0038  00000000    00000000    00000031    00000000        00000000    000000

*****************END OF SAMPLE REPORT***************
```

MEANING OF THE DATA FIELDS TO LOOK AT

LXB COMMAND	LXB STATUS AND INITIAL STATUS BYTE 0 meaning by bit ....1 bit 7 on	LXB STATUS AND INITIAL STATUS BYTE 1 HARDWARE/USER ERROR
00 No I/O occurred.	1... .... see extended error status	
30 Run SDLC link.	.1.. .... Format exception-invalid SDLC format.	E8 Communications line adapter check.
32 Run initial (remote ncp)	...1 .... FCS error (data check).	EA Communications scanner adapter feedback check.
83 Disable.	.... 000. No command active.	F0 Modem error, modem check bit in SCF field of ICW.
8D Enable.	.... 001. SDLC I-format sent or RR sent	F2 Modem transmit clock or clear-to-send error.
8F Dial.	.... 010. SDLC RNR sent.	F4 DSR-on check, dataset ready did not come up.
	.... 011. SDLC NS command sent.	F8 DSR-off check, dataset ready did not go down.
	.... 100. Transmit.	FC ACU check, autodial problem.
	.... 101. Error while sending text.	FF Program failure.
	.... 110. Error while sending normal polling or response S-format.	
	.... 111. Error while sending NS control sequence.	

FORMAT EXECPTION FLG -INVALID SDLC FORMAT

- 0E Rec REJ, line is not duplex.
- 1C Rec RR or in NS phase.
- 1E Rec XID in RR or RNR phase.
- A2 Rec invalid SDLC command.
- A8 Rec SDLC DISC.
- AC Rec RQI
- B2 Rec SDLC SNRM.
- B6 Rec SDLC ROL.
- BC Rec NSA in RR or RNR phase.
- BD Sent SNRM did not rec NSA.

These MDR records are logged by network (NETWORK NAME LNDET) and using the LXB COMMAND and the LXB ERROR STATUS fields should enable you to determine if the error is something you can correct yourself. In the case of some errors (i.e., Timeouts, Modem Interface error, etc.) EREP will analyze the STATUS fields and print the error below the 'RECORD TYPE' field. In this example, 'SUSPECTED MODEM INTERFACE ERROR' is printed.

The DEVICE TYPE, CHANNEL UNIT ADDRESS, RESOURCE I.D., LIB ADDR., and NETWORK NAME fields will allow you to identify the 3705 and line with trouble. In the example above, the LXB command is 8D which is an enable command. The LXB status is 06F4, the 06 would mean SDLC NS command sent. The second byte is an F4 which is a DSR-on check. Looking near the top we see the LIB address is 0030.

Using the installation guide (GC30-3021) and looking up which dataset is attached to 0030, we can find out where to look to find out if the dataset did not bring up DSR or the 3705 could not recognize that DSR was up. This MDR detail would be run when it had been determined from the System Summary report or from the operator there was a problem.

If you already knew what the address or terminal name was, it will reduce the system time and the amount of paper printed to specify the LIB address or terminal name by using these additional parameters 'DEV=(3705),LIBADR=0030' for LIB address or 'DEV=(3705),TERMN=LNDET' for the terminal name.

The parameters used were:

```
//STEP1 EXEC PGM=IFCEREP1,
// PARM='ACC=N,DEV=(3705),TYPE=EOT,PRINT=PS'
//SYSPRINT DD SYSOUT=A
//SERLOG DD DSN=SYS1.LOGREC,DISP=SHR
//EREPPT DD SYSOUT=A,DCB=BLKSIZE=133
//SYSUDMP DD SYSOUT=A,DCB=BLKSIZE=133
```

Example 6: SDLC STATION ERROR MDR SAMPLE

```
---RECORD ENTRY TYPE - 3705 MDR    SOURCE - OUTBOARD                MODEL- 0168      SERIAL NO.   060009
   VS 2 REL.   03
                        DAY YEAR                    HH MM SS.TH
                   DATE- 256   78               TIME 10 13 10 68
 DEVICE TYPE          3705
 CHANNEL UNIT ADDRESS 041C
 RESOURCE I.D.        8315

 NETWORK ADDRESS      8315      NETWORK NAME PUPA2Z
 RECORD TYPE - PERMANENT SDLC STATION ERROR
 TIME-OUT, NOTHING RECEIVED
 LIB ADDR             0027
  LINK INFORMATION
   CCB CONTROL FLG            00        LXB COMMAND                  30     LXB FINAL ERROR STATUS          0280
   CCB LINE TYPE              21        LXB MODIFIERS                0000   LXB FINAL ERR EXT STATUS        00
                                        LXB IMMED. CTL CMD           00     LXB INITIAL ERROR STATUS        0280
                                                                            LXB INITIAL ERR EXT STATUS      00
   FINAL ERR BIT DECODE       FINAL ERR EXT STAT        INITIAL ERR BIT DECODE     INITIAL ERR EXT STAT
   EXTENDED ERR STAT FLG 0    OVERRUN/UNDERRUN FLAG 0   EXTENDED ERR STAT FLG 0    OVERRUN/UNDERRUN FLAG 0
   FORMAT EXCEPTION FLG  0    BLOCK OVERRUN         0   FORMAT EXCEPTION FLG  0    BLOCK OVERRUN         0
                         0    ABORT                 0                         0    ABORT                 0
   DATA CHECK            0    MONITOR COUNT OVERFLO 0   DATA CHECK            0    MONITOR COUNT OVERFLO 0
   SDLC POLL FINAL BIT   0                              SDLC POLL FINAL BIT   0

 LOCAL PRI STATION INFORMATION

   SCB STATION TYPE           02
   SCB SERV. SEEKING CMD FLGS 0001
   SCB OUTPUT CONTROL FLAGS   C0
   XMTD BLU CMD FLD           00
   RCVD BLU CMD FLD           31
   N(R)                       02
   N(S)                       07
   SCB CRNT OUTSTANDING CNT   000
   SCB PASS COUNT             007
   SCB I-FORMAT TRANSMIT CNT  000008
   SCB RETRY COUNT            037


   HEX DUMP OF RECORD
   HEADER    91830800    058A00D5    0078256F    10131068        01060009    01680588

       0018  041CD7E4    D7C1F2E9    40408315    00270305        0001C000    30000000    02800002    80000008
       0038  25310000    02000007    44EE0021    00000002        D3D5D7C1    F2404040    00000000    00000000
****************END OF SAMPLE REPORT***************
```

MEANING OF THE DATA FIELDS TO LOOK AT

LXB COMMAND

00 No I/O occurred.
30 Run SDLC link.
32 Run initial (remote ncp)
83 Disable.
8D Enable.
8F Dial.

SCB DEVICE TYPE

x... .... 1=Duplex station
0= Half duplex
..1. .... Switched SDLC
.... .1.. Terminal node
.... ..1. Cluster node
....x 1=Intermediate node
0=Boundary node

LXB STATUS AND INITIAL STATUS BYTE 0
meaning by bit (.... ...1)= bit 7 on

1... .... see extended error status
.1.. .... Format exception-invalid SDLC format.
...1 .... FCS error (data check).
.... 000. No command active.
.... 001. SDLC I-format sent or RR sent
.... 010. SDLC RNR sent.
.... 011. SDLC NS command sent.
.... 100. Transmit.
.... 101. Error while sending text.
.... 110. Error while sending normal polling or response S-format.
.... 111. Error while sending NS control sequence.

LXB STATUS AND INITIAL STATUS BYTE 1
HARDWARE/USER ERROR

E8 Communications line adapter check.
EA Communications scanner adapter feedback check.
F0 Modem error, modem check bit in SCF field of ICW.
F2 Modem transmit clock or clear-to-send error.
F4 DSR-on check, dataset ready did not come up.
F8 DSR-off check, dataset ready did not go down.
FC ACU check, autodial problem.
FF Program failure.

FORMAT EXECPTION FLG-INVALID SDLC FORMAT

0E Rec REJ, line is not duplex.
1C Rec RR or in NS phase.
1E Rec XID in RR or RNR phase.
A2 Rec invalid SDLC command.
A8 Rec SDLC DISC.
AC Rec RQI
B2 Rec SDLC SNRM.
B6 Rec SDLC ROL.
BC Rec NSA in RR or RNR phase.
BD Sent SNRM did not rec NSA.

SCB LINK SCHEDULING FLAGS

BYTE 0 BITS. SERVICE SEEKING COMMANDS.

1... .... Poll skip flag.
.1.. .... Halt service seeking.
..1. .... Not operational.
....1 Contact poll command active.

BYTE 1 BITS. CONTACT POLL COMMANDS.

1... .... Disconnect (DISC).
.1.. .... Set Normal Response mode (SNRM).
.... .1.. Set Initialization mode (SIM).
.... ..1. Exchange Identification (XID).
....x Contact poll command field.

These MDR records are logged by network (NETWORK NAME PUPA2Z) and using the LXB COMMAND and the LXB ERROR STATUS fields should enable you to determine if the error is something you can correct yourself. In the case of some errors (i.e., Time Outs, Modem Interface errors, etc.) EREP will analyze the STATUS fields and print the error below the 'RECORD TYPE' field. In this example, 'TIMEOUT, NOTHING RECEIVED' is printed. The DEVICE TYPE, CHANNEL UNIT ADDRESS, RESOURCE I.D., LIB ADDR., and NETWORK NAME fields will allow you to identify the 3705 and line with trouble.

In the example above the LXB command is 30 which is RUN SDLC LINK. The LXB status is 0280, the 02 would mean SDLC I-format sent or SDLC RR sent. The second byte is an 80 which indicates Time-out: nothing received. Looking near the top we see the LIB address is 0027 so using the pre-installation guide and looking up which device/station is attached to 0027, we can run the appropriate tests to determine the status of the device/station.

This MDR detail would be run when it had been determined from the System Summary report or from the operator there was a problem. If you already knew what the address or terminal name was it would reduce the system time and the amount of paper printed to specify the LIB address or terminal name by using these additional parameters ,DEV=(3705),LIBADR=0027, for LIB address or DEV=(3705),TERMN=PUPA2Z, for the terminal name.

The parameters used were:

```
//STEP1 EXEC PGM=IFCEREP1,
// PARM='ACC=N,DEV=(3705),TYPE=EOT,PRINT=PS'
//SYSPRINT DD SYSOUT=A
//SERLOG DD DSN=SYS1.LOGREC,DISP=SHR
//EREPPT DD SYSOUT=A,DCB=BLKSIZE=133
//SYSUDMP DD SYSOUT=A,DCB=BLKSIZE=133
```

Example 7: BSC STATION STATISTICS MDR SAMPLE

```
---RECORD ENTRY TYPE - 3705 MDR    SOURCE - OUTBOARD                MODEL- 0168      SERIAL NO.   060009
   VS 2 REL.   03
                        DAY YEAR                        HH MM SS.TH
                  DATE- 033   78                TIME 19 01 28 77

 DEVICE TYPE          3705
 CHANNEL UNIT ADDRESS 011B
 RESOURCE I.D.        A004


 LIB ADDR.            0020
 TERMINAL NAME        DE2

  BASIC TRANSMISSION UNIT
   BTU COMMAND  00              IOB COMMAND          00       IOB INITIAL ERROR STATUS   0000
   BTU MODIFIER 00              IOB MODIFIERS        0000     IOB INITIAL ERR EXT STAT   00
   BTU FLAGS    0000            IOB IMMED CTL CMMND  00       IOB STATUS                 0000
                                                              IOB EXTENDED STATUS        00

   INITIAL ERROR STATUS 00    INITIAL ERR EXT STAT 00    LAST ERROR STATUS    00    LAST ERR EXT STAT    00
      FIRST BYTE                                           FIRST BYTE
   EXTENDED ERR STAT FLG 0    OVERRUN/UNDERRUN FLAG 0    EXTENDED ERR STAT FLG 0    OVERRUN/UNDERRUN FLAG 0
   FORMAT EXCEPTION FLAG 0    LINE QUIET TIMEOUT FG 0    FORMAT EXCEPTION FLAG 0    LINE QUIET TIMEOUT FG 0
   SYNC CHECK FLAG       0    LEADING DLE FORMAT CH 0    SYNC CHECK FLAG       0    LEADING DLE FORMAT CH 0
   DATA CHECK FLAG       0    SUB BLOCK ERROR FLAG  0    DATA CHECK FLAG       0    SUB BLOCK ERROR FLAG  0
   PH    ER              0    UNUSED                0    PH    ER              0    UNUSED                0
     AS    RO            0    UNUSED                0      AS    RO            0    UNUSED                0
       E     R           0    UNUSED                0        E     R           0    UNUSED                0
   LENGTH CHECK FLAG     0    UNUSED                0    LENGTH CHECK FLAG     0    UNUSED                0

  SIO COUNTER 03C6  TEMPORARY ERROR COUNTER 00

  2770                                        00
   HEX DUMP OF RECORD
   HEADER    91830800    058A0000    0078033F    19012877        01060009    01680588

       0018  011BC4C5    F2404040    4040A004    00200105        00000000    00000000    00000000    000003C6
       0038  00001007    4C3C407E    601DE8C3    D6

*****************END OF SAMPLE REPORT***************
```

This type of record gives a count of the number of Start Input/Output operations (SIO), and the number of temporary errors that occurred by terminal.

There will be a record recorded whenever one of the counters overflows. The overflow records are identified by the fact that there all zeros in the status fields and IOB command field. The LIB addr and the terminal name identify the terminal (0020 and DE2). The number of Start I/Os count is 'SIO CNTR 003C6', and the error counter is 'TEMPORARY ERR CNTR 00'.

The parameters used were:

```
//STEP1 EXEC PGM=IFCEREP1,
// PARM='ACC=N,DEV=(3705),TYPE=EOT,PRINT=PS,TERMN=LLEAS71K'
//SYSPRINT DD SYSOUT=A
//SERLOG DD DSN=SYS1.LOGREC,DISP=SHR
//EREPPT DD SYSOUT=A,DCB=BLKSIZE=133
//SYSUDMP DD SYSOUT=A,DCB=BLKSIZE=133
/*
```

Example 8: COMMUNICATION SCANNER MDR SAMPLE

```
---RECORD ENTRY TYPE - 3705 MDR     SOURCE - OUTBOARD                  MODEL- 0168       SERIAL NO.    060009
   VS 2 REL.   03
                         DAY YEAR                      HH MM SS.TH
                   DATE- 002   78                TIME 08 13 52 39

 DEVICE TYPE          3705
 CHANNEL UNIT ADDRESS 001A
 RESOURCE I.D.        9000

 TYPE 2 CRECORD TYPE - UNKNOWN - IFCETRN1
 RECORD TYPE - COMMUNICATION SCANNER TYPE 2 CSB1      ABEND CODE 0000

    LAGGING ADDRESS REG 74     000011DE         INTERRUPTED LEVEL IAR          000011E2
    EXTERNAL REGISTER 79       0043

        COMMUNICATIONS SCANNER STATUS 43=       0200

          LIB POS 1 BIT CLOCK CHECK          0
          LIB POS 2 BIT CLOCK CHECK          0
          LIB POS 3 BIT CLOCK CHECK          0
          LIB POS 4 BIT CLOCK CHECK          0
          LIB POS 5 BIT CLOCK CHECK          0
          LIB POS 6 BIT CLOCK CHECK          0

          LIB SELECT CHECK                   1

          ICW IN REGISTER CHECK              0

          ICW WORK REGISTER CHECK            0

          PRIORITY REGISTER AVAILABLE CHECK  0

          CCU OUTBUS CHECK                   0

          LINE ADBUS CHECK                   0

          UNUSED                             0

          UNUSED                             0

 HEX DUMP OF RECORD

 HEADER    91830800     058A0000     0060002F     08135239         01060009     01680588

     0018  001AD5C3     D7C14040     40409000     00001105         40000200     000011DE     000011E2     00430000

*****************END OF SAMPLE REPORT***************
```

This was a sample of the type of record that would print out if MDR had logged any errors for the 3705. Other types of detail records for the 3705 are:

- Type 1/4 channel errors
- Type 2/3 channel errors
- Type 1 communication scanner
- Type 3 communication scanner
- Input/Output instruction exceptions
- Unresolved Program level 1 interrupt requests
- Unresolved program level 3 interrupt requests
- Invalid instruction operation code check
- Address exception
- Protection check
- branch to zero by level 5.

The parameters used were:

```
//STEP1 EXEC PGM=IFCEREP1,
// PARM='ACC=N,DEV=(3705),TYPE=EOT,PRINT=PS'
//SYSPRINT DD SYSOUT=A
//SERLOG DD DSN=SYS1.LOGREC,DISP=SHR
//EREPPT DD SYSOUT=A,DCB=BLKSIZE=133
//SYSUDMP DD SYSOUT=A,DCB=BLKSIZE=133
```

Example 9: LINE SUMMARY RECORD MDR SUMMARY

```
---SUMMARY OF ENTRY TYPE - 3705 MDR        DEVICE TYPE 3705          MODEL- 0168        SERIAL NO. 060009
                DAY YEAR      DAY YEAR
   DATE RANGE- 027   78 TO  030   78

    CHANNEL UNIT ADDRESS 00001B                    TOTAL NUMBER OF RECORDS0002

  T.P.LINE ERRORS                0002
  PERM. SDLC LINE ERRORS         0000
  CHANNEL ADAPTER TYPE1 ERRORS 0000                 ADDRESS EXECPTION CHECK      0000
  CHANNEL ADAPTER TYPE2 PORT1  0000                 IN/OUT CHECK                 0000
  CHANNEL ADAPTER TYPE2 PORT2  0000                 PROTECTION CHECK             0000
                                                    INVALID OP CODE CHECK        0000
  COMMUNICATIONS SCANNER TYPE1       0000
  COMMUNICATIONS SCANNER TYPE2 CSB1 0022            MISCELLANEOUS PROGRAM LEVEL 10000
  COMMUNICATIONS SCANNER TYPE2 CSB2 0000            MISCELLANEOUS PROGRAM LEVEL 30000
  COMMUNICATIONS SCANNER TYPE2 CSB3 0000
  COMMUNICATIONS SCANNER TYPE2 CSB4 0000
  COMMUNICATIONS SCANNER TYPE3 CSB1 0000
  COMMUNICATIONS SCANNER TYPE3 CSB2 0000
  COMMUNICATIONS SCANNER TYPE3 CSB3 0000
  COMMUNICATIONS SCANNER TYPE3 CSB4 0000


**********END OF SAMPLE REPORT**********
```

The MDR summary record will print one record for each line or terminal that has logged one or more MDR records in SYS1.LOGREC. The summary records print when the PRINT parameter is PS (print full record and summary), or SU (print summary only).

In the above summary, there are three major areas that you should look at to determine if there are any problems that will require action on your part or if you require CE service from IBM.

The first area is the area labelled CHANNEL ADAPTER and COMMUNICATIONS SCANNER. If there are error counts in either category (such as the count of 0022 for SCANNER TYPE2 CSB1), you have a hardware problem. Print an EREP1 detail for the 3705 and call IBM for service.

The second area is the section that has the CHECKS and MISC. PROGRAM LEVELs. If there is a count in any of these fields, you have a software or hardware 3705 problem and should call IBM for a PSR to look at the problem. Note that on the two lines labelled MISCELLANEOUS PROGRAM LEVEL, there is no space between the level and the four digits for the count. (10000 is level 1 count of zero.)

The third area is the group with lines labeled LINE ERRORS. If the count for either of the two line types are abnormally high, you are having problems that are showing up as line errors. The line errors may be due to a 3705 problem (sending bad data), a dataset problem, a line problem, or a terminal problem.

To determine what the problem is, you should print the EREP1 detail record for that 3705 to determine if the problem is a 3705, or line-related problem. If the errors point to various lines, it probably is a 3705 problem.

If the errors are on one line, you should look at the commands and status fields (for more information on permanent line errors, see the MDR records on line errors) in the MDR records and you may have to run a line trace.

The parameters used were:

```
//STEP1 EXEC PGM=IFCEREP1,
// PARM='ACC=N,DEV=(3705),TYPE=EOT,PRINT=PS,TERMN=LLEAS71K'
//SYSPRINT DD SYSOUT=A
//SERLOG DD DSN=SYS1.LOGREC,DISP=SHR
//EREPPT DD SYSOUT=A,DCB=BLKSIZE=133
//SYSUDMP DD SYSOUT=A,DCB=BLKSIZE=133
```

Example 10: END OF DAY RECORD MDR SUMMARY

```
--- RECORD ENTRY TYPE - UNIT CHECK      SOURCE    VTAM OUTBOARD          MODEL- 0168       SERIAL NO.    060009
    VS 2 REL.   03
                       DAY YEAR                              HH MM SS.TH                   JOB IDENTITY
                 DATE- 033   78                         TIME 19 00 34 89                                  0000000000000000

 DEVICE TYPE                          NONE
 PRIMARY   CHANNEL UNIT ADDRESS      00001A
 ALTERNATE CHANNEL UNIT ADDRESS      00001A

              CC   DA    FL     CT                           K     CA     US CS  CT
FAILING CCW  00 000000 00 00 0000                      CSW  00 000000  00 00 0000

UNIT STATUS                            CHANNEL STATUS
 ATTENTION         0                     PRGM-CTLD IRPT     0
 STATUS MODIFIER   0                     INCORRECT LENGTH   0
 CONTROL UNIT END  0                     PROGRAM CHECK      0
 BUSY              0                     PROTECTION CHECK   0
 CHANNEL END       0                     CHAN DATA CHECK    0
 DEVICE END        0                     CHAN CTL CHECK     0
 UNIT CHECK        0                     I/F CTL CHECK      0
 UNIT EXECPTION    0                     CHAINING CHECK     0

SENSE BYTE DATA                                                           STATISTICAL DATA

 INITIAL FAILURE              FINAL RETRY

  BYTE 0   00000000         BYTE 0     00000000          3270                          3270
   CMND REJ     0            CMND REJ       0         READ DC         000          WRITE DC       000
   INTV REQD    0            INTV REQD      0         INTV REQD       000          BUS OUT        000
   BUS O CHK    0            BUS O CHK      0         EQUIP CHK       000          NOT USED       000
   EQUIP CHK    0            EQUIP CHK      0         CNTL CHK        000          NOT USED       000
   DATA CHK     0            DATA CHK       0         NOT USED        000          NOT USED       000
   UNIT SPEC    0            UNIT SPEC      0         NOT USED        000          DATA CHK US    000
   CNTL CHK     0            CNTL CHK       0         INT REQ US      000          INTREQ EC US   000
   OPRTN        0            OPRTN          0         EQ US           000

RESOURCE NAME JOB IDENTITY NCPA         RECORDING MODE   *END OF DAY*
INITIAL SELECTION  0
SIO CNTR  00024                         TEMPORARY ERR CNTR  00000
COMMAND CODE 1 00                       COMMAND CODE 2 00

   HEX DUMP OF RECORD
     HEADER  36830840    00000000    0078033F    19003489    01060009    01680588
       0000  00000000    00000000    00000000    00000000    00000000    00000000    0200001A    50004015
       0020  0000001A    00000000    00180000    00002000    D5C3D7C1    40404040    00000000    00000000
       0040  00000000    0000

****************END OF SAMPLE REPORT**************
```

This OBR record is used to log the SIO and TEMPORARY ERROR counters for each line that has a count in either of the counters. The SIO counter shows the number of Start I/Os for that line. The Temporary Error counter has a count of the number of times that the Error Recovery Program was used to recover from a temporary error, if the error was unrecoverable there will be an MDR record for that permanent error.

The parameters used were:

```
//STEP1 EXEC PGM=IFCEREP1,
// PARM='ACC=N,DEV=(3705),TYPE=EOT,PRINT=PS,SHORT=Y'
//SYSPRINT DD SYSOUT=A
//SERLOG DD DSN=SYS1.LOGREC,DISP=SHR
//EREPPT DD SYSOUT=A,DCB=BLKSIZE=133
//SYSUDMP DD SYSOUT=A,DCB=BLKSIZE=133
```

4.4 : TRACES AND DUMPS

4.4.1 : TRACES

DESCRIPTION

This section discusses when and how to use some of the ACF/VTAM traces and provides examples to help interpret them. The examples in this section are not in ACF/TAP format, however, ACF/TAP formatted trace examples can be found in Chapter 6 of the second volume of this guide.

Each ACF/VTAM trace occurs at a different point in the network. This allows you to narrow down where the problem occurred by following an RU through the network and determining where in the network the RU is incorrect, out of sequence, or disappeared.

OPERATION

To invoke the traces, specify either:

- MODIFY procname,TRACE,TYPE=nnnn,ID=name
- START procname,....,TRACE,TYPE=nnnn,ID=name

Use the START command to initiate the trace when ACF/VTAM is being started. Use the MODIFY command to initiate a trace when ACF/VTAM is already running. Both commands have additional operands that are unique to the type of trace being started. For more information about starting the ACF/VTAM traces, see the ACF/VTAM Operation Manual (SC27-0612).

For OS/VS systems, ACF/VTAM passes all trace data to OS/VS GTF, which records all the system trace data. Therefore, GTF must be active in order to use ACF/VTAM traces. See the section on OS/VS GTF in this chapter for more information on OS/VS GTF.

The BUFFER CONTENTS Trace

The buffer contents trace can help you determine whether a problem is in the host (ACF/VTAM or an application program) or in the network. For example, if an application program sends a message to a terminal, and the message is correct in the output of the ACF/VTAM buffer contents trace, but the message does not appear correctly at the terminal, then the problem is probably in a system resource other than ACF/VTAM or the application program.

The buffer contents trace records the contents of message buffers in two places: in the application program interface (API) and in the transmission subsystem component (TSC). Data sent by an application program gets processed by the API first, and then by the TSC. This is indicated by an entry of 'USER' in the listing. Flow the other way (i.e., from the network to the application) is indicated by an entry of 'VTAM' in the listing.

The I/O Trace

The I/O trace records the order of PIUs flowing between network nodes and ACF/VTAM. For example, you might use this trace to determine whether an application program receives all the replies it should and whether ACF/VTAM forwards all the requests issued by the application program.

The contents of the I/O trace are similar to those of the buffer trace, except that the I/O trace records less user data. If you do not need this user data, you can save trace file space by using the I/O trace.

You can trace I/O activity for any of the following types of nodes:

- application program
- PU
- LU
- SNA cluster controller
- NCP
- SSCP

- host PU
- host as an intermediate routing node
- channel attached major node
- cross-domain resource
- cross-domain resource manager

The LINE Trace

The line trace is useful when submitting an APAR on the NCP. You might also use this trace if you suspect a device problem. If data appears correctly in the line trace but the terminal/printer does not react appropriately, the terminal/printer itself is probably causing the failure.

The line trace function is shared by ACF/VTAM and the NCP. Although the trace is controlled by ACF/VTAM, the information in the trace records is gathered by the NCP. The NCP sends the data to ACF/VTAM in a PIU. A trace type indicator in the PIU indicates whether the trace is a byte line trace (type 2 scanner) or block line trace (type 3 scanner).

The TRANSMISSION GROUP Trace

The TG (transmission group) trace should be used instead of a line trace if there is more than one active line in a TG, and you do not know which line is causing the problem. The TG trace also shows more data than the line trace.

The TG trace facility traces PIU traffic on a TG as if the TG were a single line. The sequence of PIUs traced is the sequence of their entry to and exit from the TG, not the sequence of actual transmission along the physical lines the TG comprises.

PRINTING

To print ACF/VTAM trace output (OS/VS systems), use either ACF/TAP or the PRDMP service aid. (We suggest the use of the program ACF/TAP to obtain all the listings of the GTF traces.) See section 4.4.5. for information about operating ACF/TAP and interpreting the output.

In DOS/VSE systems, the ACF/VTAM trace print utility runs as a subtask under ACF/VTAM or as a job step in another partition. Therefore, you can start printing in one of two ways:

- use a separate job, whether ACF/VTAM is active or not.
- use the
  MODIFY NET,SUBTASK,ID=TPRINT,FUNCTION=ATTACH
  command while ACF/VTAM is active.

If ACF/VTAM is active when TPRINT is requested, and if the trace file is on disk, trace recording is suspended. Therefore, either stop the trace or switch it to an internal trace table.

The ACF/VTAM trace utility records trace records in a wraparound fashion, either in main storage or in a trace file assigned to disk or tape. Therefore, if trace data is being produced faster than TPRINT can print it, trace data is lost. If the trace file is on disk or tape, the operator is notified when the end of the trace file is reached.

REFERENCE MANUALS

- ACF/VTAM OPERATION SC27-0612
- ACF/VTAM V2 DIAGNOSIS Reference SC27-0621
- ACF/VTAM DIAGNOSIS GUIDE . . . . SC27-0615 (OS/VS)
  . . . . SC27-0630 (VSE)

Following is a list of some of the important traces:

-ACF/VTAM Storage Pool Trace
-ACF/VTAM Buffer Trace
-ACF/VTAM I/O Trace
-DOS/VSE VTAM Trace
-ACF/VTAM Internal Trace
-ACF/NCP Line Trace
-ACF/NCP Transmision Group Trace

TYPES	Listings		Useful for
	ACF/TAP	PRDMP	
ACF/VTAM Storage Pool Trace	——	Yes	To monitor the use of VTAM buffers
ACF/VTAM Buffer Trace	Yes	Yes	To identify changes in data transmitted between 2 nodes. Or appl. msg. not appearing on terminal.
ACF/VTAM I/O Trace	Yes	Yes	To see order of IO events between 3705 and VTAM.
DOS/VSE VTAM Trace	——	——	The utility program is PDAID.
ACF/VTAM Internal Trace	——	Yes	To fix a problem with the VTAM.
ACF/NCP Line Trace	Yes	Yes	For checking of NCP, line data and transmision protocols.
ACF/NCP TG Trace	Yes	Yes	To check one TG, specially if has sequence and/or protocol problems.

Figure 10 on page 4-117 shows where traces can be taken. Chapter 6 (SNA Device Flow) shows several examples of an ACF/VTAM Buffer trace, which is one of the most often used. It also shows how ACF/TAP can be used to format these traces for analysis.

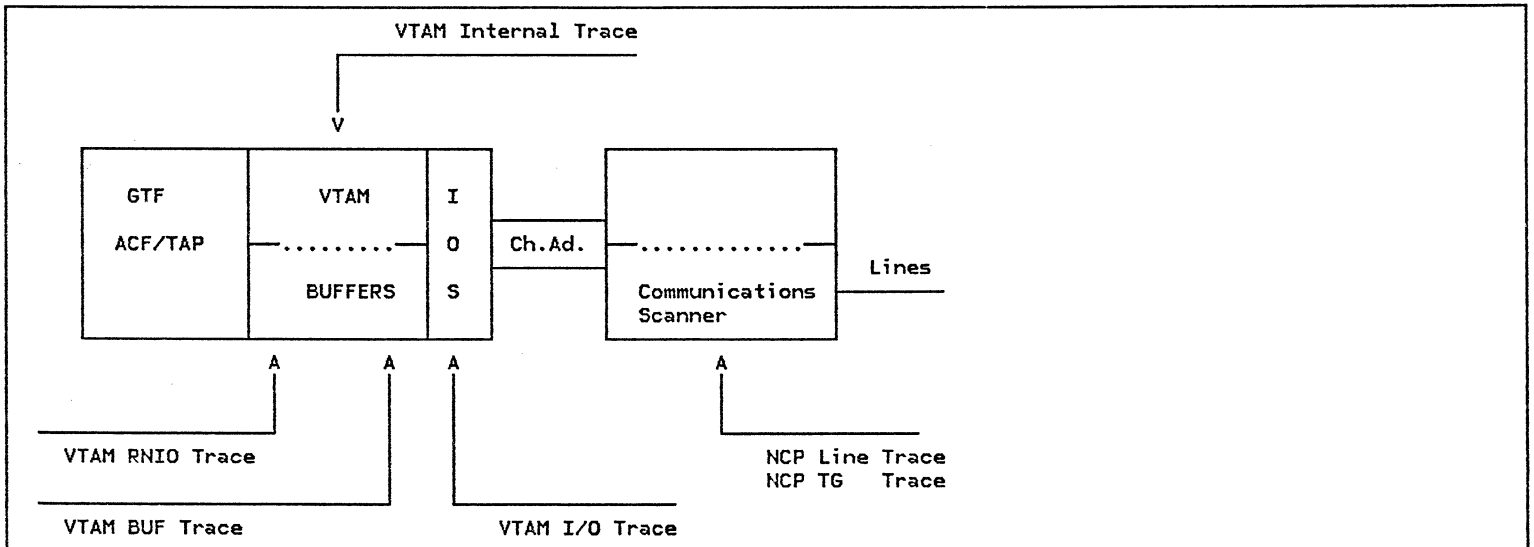


Figure 10. Origins Of The Various Traces

DOS/VSE JOB TO PRINT TRACE

```
// JOB TRPRINT
// DLBL TRFILE,'VSEIPOE.SNA.VTAM.TRACE.FILE'
// EXTENT SYS004,SYSWK1
// ASSGN SYS004,241
// ASSGN SYSLST,00E
// EXEC TPRINT
```

SYSLST can be assigned to a printer, tape, or disk with IJSYSLS

BUFFER CONTENTS TRACE OUTPUT EXAMPLE

```
COMMAND : F NET,TRACE,TYPE=BUF,ID=T14022K1


                                                    EXTERNAL TRACE - DD TRACE                    PAGE 0003
USRFD FEF ASCB 00FEF3C8            JOBN NCF11
          BUFF    T14022K1/NCF11001    LRC(000,000)    OUTBOUND
          VTAM    TH=40000012 00000000 0000000E 0000000B 1C000134 000D001E 01D7  RH=0380C0
                                       F1C21140 7BF0F961 F2F061F8 F340F1F8 7AF2F77A  *1B. #09/20/83 18:27 *
                                       F5F01D60 C1404011 D2F03CD4 400011D2 F0C9E2E3  *50.-A  .K0.M ..K0IST*
                                       F6F5F4C9 4040C961 D640E3D9 C1C3C57E 40D6C6C6  *654I  I/O TRACE= OFF*
                                       406BC2E4 C6C6C5D9 40E3D9C1 C3C57E40 D6D511D4  * ,BUFFER TRACE= ON.M*
                                       403CD550 0011D440 C9E2E3F7 F5F2C940 40C7D7E3  * .N&..M IST752I  GPT*
                                       40E3D9C1 C3C540E2 E3C1E3E4 E2407E40 E3D9D9C5  * TRACE STATUS = TRRE*
                                       E211D550 3CD66000 11D550C9 E2E3F1F7 F1C94040  *S.N&.O-..N&IST171I  *
                                       C1C3E3C9 E5C540E2 C5E2E2C9 D6D5E240 7E40F0F0  *ACTIVE SESSIONS = 00*
                                       F0F140E2 C5E2E2C9 D6D540D9 C5D8E4C5 E2E3E240  *01 SESSION REQUESTS *
                                       7E40F0F0 F0F111D6 603CD7F0 0011D6             *= 0001.O-.P0..O     *
          TIME    66470.673900
USRFD FEF ASCB 00FEF3C8            JOBN NCF11
          BUFF    NCF11001/T14022K1    LRC(000,000)    INBOUND
          VTAM    TH=40001012 20008F51 0000000B 0000000E 1C00000D 0134001E 0003  RH=838000
          TIME    66472.752918
USRFD FEF ASCB 00FEF3C8            JOBN NCF11
          BUFF    NCF11001/T14022K1    LRC(000,000)    INBOUND
          VTAM    TH=40001012 20000F52 0000000B 0000000E 1C00000D 01340008 0013  RH=0390A0
                                       7DE67A11 E6F08489 A2408286 99A4A285           *'W:.W0dis bfruse    *
          TIME    66514.321921
USRFD FF1 ASCB 00FEF3C8            JOBN NCF11
          BUFF    NCF11001/T14022K1    LRC(000,000)    INBOUND
          USER                         7DE67A11 E6F08489 A2408286 99A4A285           *'W:.W0dis bfruse    *
          TIME    66514.358501
USRFD FF1 ASCB 00FEF3C8            JOBN NCF11
          BUFF    T14022K1/NCF11001    LRC(000,000)    OUTBOUND
          USER                         F1401140 7BF0F961 F2F061F8 F340F1F8 7AF2F87A  *1 . #09/20/83 18:28 *
                                       F3F41D60 C1404011 E5E93CE6 6F0011E5 E94011C1  *34.-A  .VZ.W?..VZ .A*
                                       4DC14040                                      *(A                  *
          TIME    66514.689698
USRFD FEF ASCB 00FEF3C8            JOBN NCF11
          BUFF    T14022K1/NCF11001    LRC(000,000)    OUTBOUND
          VTAM    TH=40000012 00000000 0000000E 0000000B 1C000134 000D001F 002F  RH=038040
                                       F1401140 7BF0F961 F2F061F8 F340F1F8 7AF2F87A  *1 . #09/20/83 18:28 *
                                       F3F41D60 C1404011 E5E93CE6 6F0011E5 E94011C1  *34.-A  .VZ.W?..VZ .A*
                                       4DC14040                                      *(A                  *
          TIME    66514.693377
USRFD FEF ASCB 00FEF3C8            JOBN NCF11
          BUFF    NCF11001/T14022K1    LRC(000,000)    INBOUND
          VTAM    TH=40001012 20000F53 0000000B 0000000E 1C00000D 0134001F 0003  RH=838000
```

```
         TIME    66516.785159
USRFD FF1 ASCB 00FEF3C8            JOBN NCF11
          BUFF    T14022K1/NCF11001    LRC(000,000)    OUTBOUND
          USER                            F1C21140 7BF0F961 F2F061F8 F340F1F8 7AF2F87A  *1B. #09/20/83 18:28 *
                                          F3F61D60 C1404011 5CF03C5E 4000115C F01D605C  *36.-A  .*0.; ..*0.-**
                                          40D5C3C6 F1F14040 4040C4C9 E240C2C6 D9E4E2C5  * NCF11    DIS BFRUSE*
                                          115E401D 603C5F50 6011C14D C1404011 E5616F6F  *.; .-.¬&-.A(A  .V/??*
                                          6F11E6F0 12404011 40400513                    *?.W0.  .  ..       *
         TIME    66516.800940
```

USRxx nnn - identifies the formatting routine (in this example AMDUSRFD). nnn is the event ID that represents the buffer contents trace (FEF and FF1 in this example).

ASCB nnnnnnnn(MVS only) - indicates the address of the ASCB for the address space that created the record (00FEF3C8 in this example).

JOBN cccccccc - indicates the name of the job associated with the address space or partition. We were working with application NCF11.

dddddddd/oooooooo - dddddddd indicates the destination of the RU. oooooooo indicates the origin of the RU. The RU was flowing between the terminal (T14022K1) and the application program (NCF11001).

LRC(xxx,yyy) - indicates the number of records lost since the last trace record was written due to the inability of the trace facility to obtain an ACF/VTAM buffer. xxx is the destination's lost record count, and yyy is the source's lost record count. No records were lost in this example.

INBOUND or OUTBOUND - indicates the direction of the traced data (INBOUND or OUTBOUND) with respect to this host subarea. By use of this field and the PIU sequence number in the TH, requests and corresponding responses can be matched.

VTAM or USER - indicates where the message buffers are traced. VTAM means the buffers were traced in TSC (in which case the TH and the RH are included in the trace record). USER means the buffers were traced in API (in which case the TH and the RH are not included).

TH - indicates the 26-byte transmission header portion of the path information unit (PIU).

RH - indicates the 3-byte request/response header portion of the PIU.

TIME nnnnn.nnnnnn - indicates the time, in seconds, that each record was traced. This time can be used to determine whether a delay, if one exists, is in the application.

The rest of the trace record shows the contents of the buffer. Each line contains 20 bytes of user data in 5 groups of 8 hexadecimal digits followed by the equivalent 20 EBCDIC characters. Confidential data will not be recorded in trace records.

I/O TRACE OUTPUT EXAMPLE

```
COMMAND : F,NET,TRACE,TYPE=IO,ID=T14022K1


                                                        EXTERNAL TRACE - DD TRACE                PAGE 0001
RNIO  ASCB 00FEF3C8  CPU 0000  JOBN NCF11
  IN 40001012 20000F95 0000000B 0000000E 1C00000D 01340010 00130390 A07DE67A 11E6F084
          TIME    69246.469800
RNIO  ASCB 00FEF3C8  CPU 0000  JOBN NCF11
 OUT 40001012 20000790 0000000E 0000000B 1C000134 000D0044 002F0380 40F14011 407BF0F9
          TIME    69246.743733
RNIO  ASCB 00FEF3C8  CPU 0000  JOBN NCF11
  IN 40001012 20008F96 0000000B 0000000E 1C00000D 01340044 00038380 00
          TIME    69248.532742
RNIO  ASCB 00FEF3C8  CPU 0000  JOBN NCF11
 OUT 40001012 20000791 0000000E 0000000B 1C000134 000D0045 005F0380 C0F1C211 407BF0F9
          TIME    69248.545638
RNIO  ASCB 00FEF3C8  CPU 0000  JOBN NCF11
  IN 40001012 20000F97 0000000B 0000000E 1C00000D 01340045 00038380 00
          TIME    69249.899074
RNIO  ASCB 00FEF3C8  CPU 0000  JOBN NCF11
 OUT 40001012 20008792 0000000E 0000000B 1C000134 000D0046 00830380 C0F14011 407BF0F9
          TIME    69252.397974
RNIO  ASCB 00FEF3C8  CPU 0000  JOBN NCF11
  IN 40001012 20000F98 0000000B 0000000E 1C00000D 01340046 00078790 00081B00 00
          TIME    69253.345774
RNIO  ASCB 00FEF3C8  CPU 0000  JOBN NCF11
 OUT 40001012 20000793 0000000E 0000000B 1C000134 000D0047 00890380 C0F14011 407BF0F9
          TIME    69253.552844
RNIO  ASCB 00FEF3C8  CPU 0000  JOBN NCF11
  IN 40001012 20008F99 0000000B 0000000E 1C00000D 01340047 00078790 00081B00 00
          TIME    69254.024283
RNIO  ASCB 00FEF3C8  CPU 0000  JOBN NCF11
  IN 40001012 20000F9A 0000000B 0000000E 1C00000D 01340011 00090390 A07DE6F0 11E6F0
          TIME    69270.510143
RNIO  ASCB 00FEF3C8  CPU 0000  JOBN NCF11
 OUT 40001012 20000794 0000000E 0000000B 1C000134 000D0048 009B0380 40F1C211 407BF0F9
          TIME    69270.706226
```

RNIO - indicates the trace record was created by the GTF RNIO trace.

ASCB nnnnnnnn - indicates the address of the ASCB (MVS) of the current address space or partition when the trace entry was taken.

CPU nnnn - indicates the ID of the host processor in which the trace was run (applies only in a multiprocessor configuration).

JOBN cccccccc - indicates the name of the job associated with the I/O operation (in this example NCF11)

IN/OUT - indicates the direction of the trace record: IN for inbound to ACF/VTAM, and OUT for outbound to the specified node. When ISTINN is specified, each RU will be traced twice - once when it enters ACF/VTAM (IN) and once when it leaves (OUT).

TIME nnnnn.nnnnnn - indicates the time, in seconds, that each record was traced. This time can be used to determine whether a delay, if one exists, is in the host or external (e.g., NCP).

The rest of the trace record is some or all of the path information unit (PIU). It consists of a 26-byte transmission header (TH), a request/response header (RH), and as much of the request/response unit (RU) as will fit. The data length field in the TH indicates the length of the RH and RU in bytes.

LINE TRACE OUTPUT EXAMPLE (CS TYPE 2)

```
COMMAND : F NET,TRACE,TYPE=LINE,ID=L140A0


USRFD FF2 ASCB 00FDA9C8           JOBN NET
          LINE    L140A0      LRC(000,000)    INBOUND     ACTIVE        RNTIME=69
                              LCD 9  PCF 9  TIME 67  SCF 48  PDF 14     LCD 9  PCF 9  TIME 67  SCF 4D  PDF 7E
                              LCD 9  PCF 5  TIME 67  SCF 4D  PDF 7E     LCD 9  PCF 6  TIME 67  SCF 0D  PDF 7E
                              LCD 9  PCF 7  TIME 67  SCF 49  PDF C6     LCD 9  PCF 7  TIME 67  SCF 49  PDF 71
                              LCD 9  PCF 7  TIME 67  SCF 49  PDF 33     LCD 9  PCF 7  TIME 67  SCF 49  PDF F3
                              LCD 9  PCF 6  TIME 67  SCF 0D  PDF F3     LCD 9  PCF 9  TIME 68  SCF 4D  PDF 00
                              LCD 9  PCF 9  TIME 69  SCF 4D  PDF 7E     LCD 9  PCF 9  TIME 69  SCF 48  PDF C6
          TIME    07217.244118
```

USRxx nnn - identifies the formatting routine and nnn is the event ID that represents the line trace. In this example the formatting routine is AMDUSRFD and the event ID is FF2.

ASCB nnnnnnnn(MVS only)- indicates the address of the ASCB for the address space that created the record (in this example 00FDA9C8).

JOBN cccccccc - indicates the name of the job associated with the address space or partition (in this example NET).

LINE nnnnnnnn - nnnnnnnn indicates the name of the node being traced (in this example line L140A0).

LRC(xxx,yyy) - indicates the number of records lost since the last trace record was written because of the inability of the trace facility to obtain an ACF/VTAM buffer. xxx is the destination's lost record count, and yyy is the source's lost record count. No records were lost in this example.

INBOUND - indicates the direction of the data with respect to the host. Hence, it always says inbound because ACF/VTAM always receives the trace records from the NCP.

LINE STATUS - has one of three values: ACTIVE, DEACTIVATE, or SLOWDOWN. ACTIVE means that the line trace is active. DEACTIVATE means that the trace is not active because the NCP is in slowdown mode. A status of DEACTIVATE or SLOWDOWN appears only in the last record sent for that

line. It means that no more data will be sent until the trace is activated again for that line.

RNTIME=hh - is a timer field, where hh is a hexadecimal v alue indicating, in tenths of a second, the time at which the communications controller sent the completed line trace record to ACF/VTAM. This value is taken from a timer that is reset to 0 after 25.5 seconds. This value can be compared with the TIME value for the first level-two interruption data contained in the second part of the line trace record. This comparison will show the elapsed time covered by this trace record. Comparing this with the number of level-two interruptions contained in the trace record indicates the I/O activity during the elapsed time. In this example, there were 6 level-two interrupts in 2 tenths of a second, which does not indicate any I/O activity problems during the creation of this record.

The second part of the line trace record contains a timer value and values from the interface control word (ICW) and communications controller hardware registers at each level-two interruption. Each printed line will contain up to two sets of data, one for each of two level-two interruptions. Refer to the NCP Handbook (LY30-3058) and the 3705 Communications Controller Principles of Operations (GC30-3074) for detailed descriptions of these fields.

LCD - the line control definer defines the type of protocol being used over the line. The LCD for a line is generally set when the NCP is loaded and remains unchanged throughout normal operation.

PFC - the primary control field (PCF) defines the state of the line interface at any particular time. The exact meaning of the PCF depends on the value of the LCD.

TIME tt - this hexadecimal value indicates, in tenths of a second, the time elapsed between the activation of the line trace and the interruption represented by the data. The value of this timer is reset to 0 after 25.5 seconds.

SCF - the secondary control field (SCF) is used as a sense, status, and operation modifier by the communication scanner and the control program.

PDF - the parallel data field (PDF) is used as a character buffer. For a transmission, the characters to be sent are placed in the PDF by the program, transferred to the serial data field (SDF) by the hardware circuitry, and transmitted to the line interface. For a receive station, the character is assembled in the SDF and transferred by hardware to the PDF.

LINE TRACE OUTPUT EXAMPLE (CS TYPE 3)

COMMAND : F NET,TRACE,TYPE=LINE,ID=L14022

```
         TIME    64865.647953
USRFD FF2 ASCB 00FDA9C8            JOBN NET
          LINE    L14022      LRC(000,000)    INBOUND     ACTIVE        RNTIME=37
                   STATUS    SCF   LCD   PCF   EPCF   STAT1   STAT2  TIME   ADDR   CNTL   IOBLXB   DISP   ICW   CCBLV
                              47    9     9     00     00      01     02     D2     F1      30      AA     11    1CD0
                                         TEXT AB99                                      *.r                 *
                   STATUS    SCF   LCD   PCF   EPCF   STAT1   STAT2  TIME   ADDR   CNTL   IOBLXB   DISP   ICW   CCBLV
                              43    9     6     03     80      00     03     D2     B1      30      B2     33    1DBC
                              47    9     7     05     80      00     03     D2     B1      30      B2     66    1E2F
                                         TEXT CEC7                                      *.G                 *
                   STATUS    SCF   LCD   PCF   EPCF   STAT1   STAT2  TIME   ADDR   CNTL   IOBLXB   DISP   ICW   CCBLV
                              47    9     9     00     00      01     04     D2     F1      30      AA     11    1CD0
                                         TEXT AB99                                      *.r                 *
                   STATUS    SCF   LCD   PCF   EPCF   STAT1   STAT2  TIME   ADDR   CNTL   IOBLXB   DISP   ICW   CCBLV
                              43    9     6     03     80      00     05     D2     B1      30      B2     33    1DBC
                              47    9     7     05     80      00     05     D2     B1      30      B2     66    1E2F
                                         TEXT CEC7                                      *.G                 *
                   STATUS    SCF   LCD   PCF   EPCF   STAT1   STAT2  TIME   ADDR   CNTL   IOBLXB   DISP   ICW   CCBLV
                              47    9     9     00     80      01     05     C2     93      30      BA     11    1CD0
                                         TEXT DB4A                                      *..                 *
                   STATUS    SCF   LCD   PCF   EPCF   STAT1   STAT2  TIME   ADDR   CNTL   IOBLXB   DISP   ICW   CCBLV
                              47    9     9     00     00      01     10     D2     F1      30      AA     11    1CD0
                                         TEXT AB99                                      *.r                 *
                   STATUS    SCF   LCD   PCF   EPCF   STAT1   STAT2  TIME   ADDR   CNTL   IOBLXB   DISP   ICW   CCBLV
                              43    9     6     03     80      00     11     D2     B1      30      B2     33    1DBC
                              47    9     7     05     80      00     11     D2     B1      30      B2     66    1E2F
                                         TEXT CEC7                                      *.G                 *
                   STATUS    SCF   LCD   PCF   EPCF   STAT1   STAT2  TIME   ADDR   CNTL   IOBLXB   DISP   ICW   CCBLV
                              47    9     9     00     80      01     11     D2     F1      30      BA     11    1CD0
                                         TEXT AB99                                      *.r                 *
                   STATUS    SCF   LCD   PCF   EPCF   STAT1   STAT2  TIME   ADDR   CNTL   IOBLXB   DISP   ICW   CCBLV
                              43    9     6     03     80      00     11     D2     B1      30      B2     33    1DBC
         TIME    64950.695403
USRFD FF2 ASCB 00FDA9C8            JOBN NET
          LINE    L14022      LRC(000,000)    INBOUND     ACTIVE        RNTIME=37
```

USRxx nnn - identifies the formatting routine and nnn is the event ID that represents the line trace. In this example the formatting routine is AMDUSRFD and the event ID is FF2.

ASCB nnnnnnnn (MVS only) - indicates the address of the ASCB for the address space that created the record (in this example 00FDA9C8).

JOBN cccccccc - indicates the name of the job associated with the address space or partition (in this example NET).

LINE nnnnnnnn - nnnnnnnn indicates the name of the node being traced (in this example line L14022).

LRC(xxx,yyy) - indicates the number of records lost since the last trace record was written because of the inability of the trace facility to obtain an ACF/VTAM buffer. xxx is the destination's lost record count, and yyy is the source's lost record count. No records were lost in this example.

INBOUND - indicates the direction of the data with respect to the host. Hence, it always says inbound because ACF/VTAM always receives the trace records from the NCP.

LINE STATUS - has one of three values: ACTIVE, DEACTIVATE, or SLOWDOWN. ACTIVE means that the line trace is active. DEACTIVATE means that the trace is not active because the NCP is in slowdown mode. A status of DEACTIVATE or SLOWDOWN appears only in the last record sent for that line. It means that no more data will be sent until the trace is activated again for that line.

RNTIME=hh - is a timer field, where hh is a hexadecimal value indicating, in tenths of a second, the time at which the communications controller sent the completed line trace record to ACF/VTAM. This value is taken from a timer that is reset to 0 after 25.5 seconds. This value can be compared with the TIME value for the first level-two interruption data contained in the second part of the line trace record. This comparison will show the elapsed time covered by this trace record. Comparing this with the number of level-two interruptions contained in the trace record indicates the I/O activity during the elapsed time. In this example, there were 9 level-two interrupts in 53 (H'35') tenths of a second, which indicates an I/O activity problem during the creation of this record.

The second part of the line trace record shows the operating parameters of a line each time an NCP buffer is filled, instead of each time a character is transmitted. The meanings of these additional fields in the type 3 scanner line trace record are explained in the 37x5 Communication Controllers Principle of Operation and the NCP Handbook.

SCF - the secondary control field (SCF) is used as a sense, status, and operation modifier by the communication scanner and the control program.

LCD - the line control definer defines the type of protocol being used over the line. The LCD for a line is generally set when the NCP is loaded and remains unchanged throughout normal operation.

PFC - the primary control field (PCF) defines the state of the line interface at any particular time. The exact meaning of the PCF depends on the value of the LCD.

EPCF - the extended primary control field; these bits extend the meaning of the PCF.

STAT1 - status byte 14 of the ICW.

STAT2 - status byte 15 of the ICW.

TIME nn - this hexadecimal value indicates, in tenths of a second, the time elapsed between the activation of the line trace and the interruption represented by the data. The value of this timer is reset to 0 after 25.5 seconds.

ADDR - the SDLC address field.

CNTL - the SDLC control field.

IOBLXB - the 1-byte command field from the IOB/LXB control block.

DISP - byte 0 from the communication scanner display register.

ICW - byte 13 of the interface control word.

CCBLV - the address of the level-two interruption processor routine, taken from the NCP CCBLV control block.

The text portion of the line trace record shows the contents of the NCP buffer being transmitted, in both hexadecimal and EBCDIC.

TRANSMISSION GROUP TRACE OUTPUT EXAMPLE

```
COMMAND : F NET,TRACE,TYPE=TG,ID=L2402C


                                                    EXTERNAL TRACE - DD TRACE                    PAGE 0001
*** DATE   DAY 264    YEAR 1983          TIME 22.43.05.596214                                          ***
USRFD FF2 ASCB 00FDA7D0           JOBN NET
          LINE    L2402C      LRC(000,000)    INBOUND     ACTIVE        RNTIME=B7
                                TEXT 40004742 2000002D 0000000B 00000018 1C000001  * ..................*
                                     00000014 00AC0B80 00010383 601687             *...........c-.g     *
                                TEXT 40001012 247F820C 00000015 0000000E 1C000036  * ....'b............*
                                     00AD002D 000F0390 A0                          *.........           *
                                TEXT 41001012 10004000 0000000E 00000015 1D000000  *...... ............*
                                     00000000 0000                                 *......              *
                                TEXT 40001012 200001A9 0000000E 00000015 1C0000AD  * ......z............*
                                     003600F6 002F0380 40                          *...6....            *
                                TEXT 40001012 2480020D 00000015 0000000E 1C000036  * ..................*
                                     00AD00F6 00038380 00                          *...6..c..           *
```

USRxx nnn - identifies the formatting routine (e.g., AMDUSRFD). nnn is the event ID that represents the TG trace.

ACSB nnnnnnnn (MVS only) - indicates the address of the ASCB for the address space that created the record.

JOBN cccccccc - indicates the name of the job associated with the address space or partition.

LINE cccccccc - indicates the name of the line "associated" with the TG trace. This line name was specified in the MODIFY TRACE command that started the TG trace. In this example, we ran the trace using line L2402C.

LRC(xxx,yyy) - indicates the number of records lost since the last trace record was written due to the inability of the trace facility to obtain an ACF/VTAM buffer. xxx is the destination's lost record count, and yyy is the source's lost record count. No records were lost in this example.

INBOUND - indicates the direction of the data with respect to the host. It always says INBOUND because the data is always received from the NCP.

LINE STATUS - has one of three values: ACTIVE, DEACTIVATE, or SLOWDOWN. ACTIVE means that the line trace is active. DEACTIVATE means that the trace is not active because the NCP is in slowdown mode. A status of DEACTIVATE or SLOWDOWN appears only in the last record sent for that line. It means that no more data will be sent until the trace is activated again for that line.

RNTIME=hh - is a timer field, where hh is a hexadecimal value indicating, in tenths of a second, the time at which the communications controller sent the completed line trace record to ACF/VTAM. This value is taken from a timer that is reset to 0 after 25.5 seconds. This value can be compared with the TIME value for the first level-two interruption data contained in the second part of the line trace record. This comparison will show the elapsed time covered by this trace record. Comparing this with the number of level-two interruptions contained in the trace record indicates the I/O activity during the elapsed time.

TEXT - shows the TH and RH for each PIU that traversed the data path through the transmission group. If the PIU is for data flow control, session control, or network control, the full RU portion of the PIU is also included in the trace record. If the PIU is function management data (FMD), and contains an FM header, 6 bytes of the RU are included in the TG trace record. If an FMD PIU without an FM header is traced, the RU is not included.

4.4.2 : VTAM INTERNAL TRACE

DESCRIPTION

The VTAM internal trace (VIT) differs from other ACF/VTAM service aids because it provides a record of events within ACF/VTAM, rather than information flow between ACF/VTAM and other network components. The VIT will show the sequence of internal events such as scheduling of processes (POST, WAIT, DISPATCH, etc.), storage management (GETSTOR, VTALLOC, etc.), and the flow of internal PIUs between ACF/VTAM components.

Specifically, the internal trace can trace one or more of the following types of internal ACF/VTAM functions:

- Application program interface (API)
- Process scheduling services (PSS)
- Locking and unlocking (LOCK)
- Storage management services (SMS)
- Path information unit flow (PIU)
- Messages (MSG)
- SSCP request scheduling and response posting (SSCP)
- Channel input/output (CIO)

The internal trace output permits the reconstruction of sequences of ACF/VTAM events. In conjunction with the operator's console sheet and a dump, the internal trace can be used by the system programmer or a program systems representative as a debugging tool to locate the cause of an ACF/VTAM failure. The internal trace can also be used to monitor ACF/VTAM control and resource flow. Certain performance conclusions can be drawn from analysis of internal trace output.

OPERATION

To start the ACF/VTAM internal trace, use one of the following commands:

- MODIFY procname,TRACE,TYPE=VTAM(,OPTION=options)
- START procname,TRACE,TYPE=VTAM(,OPTION=options)

Use the START command to initiate the trace when ACF/VTAM is being started. Use the MODIFY command to initiate the trace when ACF/VTAM is already running.

The operator can specify one or more of the following OPTION operands: API, LOCK, MSG, PIU, PSS, SMS, SSCP, CIO, or ALL. If OPTION=ALL is specified, all internal trace options will be in effect.

The API, PIU, SSCP, and SMS trace records are written when an error condition is encountered and any internal trace option is active, whether or not the option for those records has been specified.

In OS/VS systems, if the MODE=EXT option is specified, the records of the trace can be printed by GTF. In VSE systems, if the MODE=EXT option is specified, the records of the trace can be printed using the MODIFY TPRINT command or a separate batch job that uses the EXEC PGM=TPRINT statement.

REFERENCE MANUALS

For additional information, refer to the following manuals:

- ACF/VTAM Operation manual for information about starting/stopping the ACF/VTAM internal trace, and the various options (SC27-0612).
- ACF/VTAM Diagnosis Guide for internal trace record descriptions (SC27-0615).

4.4.3 : LINK LEVEL 2 (LL2) TEST

DESCRIPTION

The link level 2 SDLC line test tests an SDLC communication line between an NCP (or ICA) and one of its peripheral physical units, or a link between two NCPs (ICAs). To test the link, ACF/VTAM sends test data over the link from the controlling NCP (ICA) to the remote station. The data is then echoed back to the sending NCP (ICA). This NCP (ICA) then compares the data received with the data sent and forwards the result to ACF/VTAM. ACF/VTAM sends a message to the console indicating how the link level 2 test ended.

OPERATION

The station being tested must be dedicated to the test. Therefore, it is not available to network users while it is being tested. Other stations on the same link, however, may continue to operate.

The operator must first deactivate the link station or PU through the SSCP that owns the link, then issue the command

```
MODIFY procname,LL2,ID=nodename,...
```

The operator can specify:

- Either a continuous link test or the number of test transmissions to be sent.
- The cancellation of an ongoing link test.
- Any user data to be included in the test transmissions (otherwise ACF/VTAM supplies a default alphanumeric datastream).

This command causes the SSCP to send in an Enter Test Mode RU to the NCP to which this terminal is connected. The NCP returns Test results to the requesting SSCP in a Record Test Data RU. When the test is completed, the operator receives the following:

```
IST549I  LL2 TEST FOR ID= P14022K  ENDED SUCCESSFULLY
IST243I  FRAMES SENT = 00100 RCVD = 00100 RCVD WITHOUT ERRORS = 00100
```

which indicates:

- the number of test frames transmitted by the host or communications controller.
- the total number of test frames returned to the host or communications controller.
- the number of test frames returned without error.

The IBM 3274 and 3276 controllers will also record the results of the test and this data can be collected by the NPDA operator by using the following command:

```
NPDA CTRL puname LINK
```

Refer to Example 5 in the NPDA section for more details about the LL2 test and its interaction with NPDA.

REFERENCE MANUALS

- ACF/VTAM Operation SC27-0612
- ACF/VTAM Diagnosis Guide . . SC27-0615 (OS/VS)
  SC27-0630 (VSE)

4.4.4 : OS/VS GTF

DESCRIPTION

The GTF is a facility of all the OS operating systems that allows the tracing and diagnosing of events. Other programs can also pass data to GTF for recording. The events that can be traced are system events such as I/O interrupts and all SVC interrupts and also user-defined events.

However, we suggest the use of the program ACF/TAP to obtain all the listings of the GTF traces, as we have done in this guide.

AVAILABILITY

Both the trace and the print modules are included as part of the operating system. No special considerations are required during the SYSGEN.

REFERENCE MANUALS

- OS/VS1 SERVICE AIDS. GC28-0665
- OS/VS2 SPL: SERVICE AIDS GC28-0674

OPERATION

The GTF procedure that is supplied by IBM in SYS1.PROCLIB does not have the 'TIME=YES' parameter. For problem isolation in a teleprocessing environment, this parameter is generally necessary. Therefore, the procedure should be changed to add this feature. GTF should be started as a system task or in a partition/region that has high priority. This will put the least load on ACF/VTAM's buffers. If ACF/VTAM goes to a wait state during the running of line trace, ACF/VTAM either has insufficent IOBUFs or GTF's priority is too low.

The initiation of a trace and the starting of GTF are not dependent on each other. However, no trace data will be recorded unless both are running.

ACF/VTAM uses two GTF trace options: 'RNIO' and 'USR'. If GTF is being used to trace the SIO's and Interrupts to a channel-connected device, such as a 370X or Local 3274 or 3791, then the 'IOP' and 'SIOP' options should also be specified.

When using a DASD dataset to hold the trace data, GTF will 'wraparound' when the end of extent(s) is reached. Tracing to a tape can eliminate this if it becomes a problem.

To initiate the GTF the START command must be used in accordance with the format

```
S GTF,(parm)
```

normally the parm is not keyed (The procedure should use TIME=YES). The trace options are also required. The options may be read from a member or entered when GTF prompts the operator after it is started. The minimum option that is necessary is USR.

The GTF is stopped with the command

```
P GTF
```

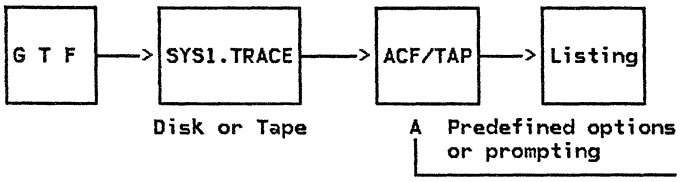
4.4.5 : ACF/TAP

DESCRIPTION

This is a service aid that provides formatting and summary functions for ACF/VTAM trace datasets. It can simplify the analysis by providing a report that is easy to read and understand.

To use the ACF/TAP:

- -Create the trace files
- -Start ACF/TAP, entering the options
- -Interpret the output



AVAILABILITY

ACF/TAP is supplied as part of Release 6 of NCP as a System Support Program (SSP).

REFERENCE MANUALS

- ACF/NCP UTILITIES SC30-3143

OPERATION

The ACF/TAP processes the following traces:

- -ACF/NCP Line traces from CS 2 and 3.
- -ACF/VTAM RNIO traces
- -ACF/VTAM Buffer traces
- -DOS/VSE IO traces
- -TCAM PIU traces

But not

- -ACF/VTAM Internal traces
- -ACF/VTAM Storage Management Services traces

The trace dataset created by DOS/VSE ACF/VTAM or by OS/VS GTF (ACF/VTAM) is used as input to ACF/TAP. Based upon user specified options, ACF/TAP will print detail, summary or error reports. Trace records can be included in the analysis based upon record type, node name, or time-of-day. These options can be selected either by SYSIN statements or through the System Console. Refer to ACF/TAP USER'S GUIDE for operational procedures.

Since ACF/TAP allows many selection and formatting options, and the trace file may contain many records, it is often advisable to run with a 'Summary' option first (such as the SNA SUMMARY ANALYSIS option). Based on what is shown at this level, the decision to run a Detail Report can be made. This procedure will require that the SYS1.TRACE or COMWRITE dataset in OS/VS or the TRFILE in DOS/VSE be retained until the problem can be identified.

One very useful feature of analyzing line trace data is the ability to suppress the Receive Ready (RR) frames from the listing. This can reduce the size of the report significantly. There is also a feature for flagging when timeouts occur on a line.

INTERPRETATION

ACF/TAP assigns sequence numbers to trace records, messages, and line trace events. In order to relate different reports to each other, it is critical that you understand the way in which ACF/TAP assigns these

sequence numbers. Refer to Chapter 6 of the USER'S GUIDE for an explanation of the algorithm.

The time-of-day of the trace record is available only on the SYSPRINT or SYSLST. If this is relevant to the problem analysis, this option must be selected in order to relate time-of-day to the ACF/TAP sequence numbers.

SAMPLE OUTPUT

For samples of the output produced by ACF/TAP refer to Chapter 6, SNA Device Flow.

4.4.6 : DYNADUMP

DESCRIPTION

The dynamic dump facility (DYNADUMP) is a service aid that transmits communication controller storage contents to the host over an emulator subchannel. This facility allows you to dump the NCP without stopping execution of the Network Controller Emulation Program.

AVAILABILITY

This service aid is only available if the NCP is generated with a partition emulator program (PEP). You include this service aid by specifying the DYNADMP operand in the NCP BUILD macro. If only one channel adapter is installed on the 370X, an emulated sub-channel must be used for DYNADUMP, since NCP uses the native sub-channel address.

REFERENCE MANUALS

IBM 3704 AND 3705 COMMUNICATIONS CONTROLLERS:
NCP/VS GENERATION AND UTILITIES: GUIDE
AND REFERENCE MANUAL. GC30-3008

OPERATION

A batch job must be submitted to retrieve and format the storage dump. Refer to the NCP Generation and Utilities manual for a detailed explanation of how to use this facility.

SAMPLE JCL

DOS

```
// JOB     SEVP
// ASSGN   SYSLST,X'00E'                                  (output file)
// ASSGN   SYS010,X'280'          (X'280' represents an unlabeled tape)
// ASSGN   SYS011,X'001'      (X'001' represents the controller address)
// EXEC    IFUSVEP
   DYNADMP STORAGE
   PRINT
   END
/*
/&
```

OS/VS

```
//SVEP     JOB   MSGLEVEL=(1,1),...
//        EXEC  PGM=IFLSVEP
//SYSPRINT DD    SYSOUT=A
//SYSUT1   DD    UNIT=007             (communication controller address)
//SYSUT2   DD    UNIT=TAPE,VOL=SER=SVTAPE,label=(,BLP),DISP=OLD,
//      DSN=WORK                      (optional temporary work dataset)
//SYSIN    DD    *
   PRINT
   END
/*
```

4.4.7 : ACF/NCP DUMP

DESCRIPTION

The NCP can be dumped through ACF/VTAM or by an independent dump utility supplied by NCP.

AVAILABILITY

The NCP dump utility program is supplied as a system service program on the SSPLIB file of the ACF/NCP distribution tape.

In order to dump the NCP either through ACF/VTAM, or independently, the dump utility program must be copied from the NCP distribution tape to an authorized OS/VS library or the CORE IMAGE LIBRARY for DOS/VSE.

REFERENCE MANUALS

IBM 3704 AND 3705 COMMUNICATIONS CONTROLLERS:
NCP/VS GENERATION AND UTILITIES: GUIDE
AND REFERENCE MANUAL. GC30-3008

OPERATION

When ACF/VTAM is used to dump the NCP, the dump is initiated at the console with the following commands:

```
DOS/VSE -      F NET,DUMP,ID=ncp-major-node-name
OS/VS   -      F procname,DUMP,ID=ncp-major-node-name
```

ACF/VTAM dumps the communication controller's storage to the dataset specified in the DUMPDS operand of the PCCU macro.

The dump can then be printed from this dataset using the appropriate dump print utility program, IFUDUMP for DOS/VSE or IFLDUMP for OS/VS.

The communications controller storage can be dumped independently using the dump utility program, IFUREAD for DOS/VSE or IFLREAD for OS/VS.

It is advisable to specify FORMAT=Y and BUF=Y.

SAMPLE JCL

DOS/VSE JCL to dump a 3705 and print the dump

```
// JOB      DUMP DOS NCP
// ASSGN    SYS007,X'0BF' (0BF is the controller address)
// DLBL     NCPDUMP,'NCP3DUMP',,DA
// EXTENT   SYS008,,,,6880,12
// ASSGN    SYS008,SYSRES
// EXEC     IFUREAD
   DUMP     FORMAT=Y,BUF=Y
/*
```

DOS/VSE JCL to print a 3705 dumped by VTAM

```
// JOB      DUMPRT
// ASSGN    SYS008,X'131' (131 is unit containing storage dumped by VTAM)
// DLBL     NCPDUMP,'NCP3DUMP',,DA
// EXTENT   SYS008,111111
// EXEC     IFUDUMP
   DUMP     FORMAT=Y,BUF=Y
/*
```

OS/VS JCL to dump a 3705 and print the dump

```
//CCDUMP   JOB   MSGLEVEL=(1,1),...
//EXEC     EXEC  PGM=IFLREAD
//SYSPRINT DD    SYSOUT=A
//SYSUT1   DD    UNIT=007  (communication controller subchannel used)
//SYSUT2   DD    UNIT=SYSDA,DISP=NEW,SPACE=(512,(513),,CONTIG),
//       DCB=(DSORG=DA) (DASD work dataset)
//SYSIN    DD    *
   DUMP FORMAT=Y,BUF=Y
/*
```

4.5 : ACCESS METHOD DEFINITIONS

4.5.1 : VTAMLST

DESCRIPTION

For OS/VS versions of ACF/VTAM, the network is defined ACF/VTAM by filing members representing each major node in SYS1.VTAMLST. On DOS/VSE systems, these statements are filed in the source statement library.

ACF/VTAM currently has five types of major nodes.

1. Application program major nodes
2. Application cross-domain major nodes
3. Local 3270 major nodes
4. Local SNA major nodes
5. Path major nodes
6. NCP major nodes
7. Terminal,LU cross-domain resources
8. CDRMs

For DOS/VSE, the statements describing each major node included in the system are filed in VTAMLST/B.BOOK.

Members describing ACF/VTAM startup parameters (ATCSTRxx) and network configurations (ATCCONxx) are also filed in VTAMLST or B.BOOK. By filing multiple members the account can specify different startup parameters and configuration to be used at ACF/VTAM startup time.

REFERENCE MANUALS

ACF/VTAM PROGRAMMING SC27-0449
ACF/VTAM PIR SC27-0584

OPERATION

When ACF/VTAM is started, the start parameters (LIST=) and the configuration (CONFIG=) to be used are specified. Start parameters can also be overridden on the start command. If LIST= and CONFIG= operands are omitted on the start command, the default members ATCSTR00 and ATCCON00 are used.

4.6 : HARDWARE TOOLS

4.6.1 : 3704/3705 PANEL TEST

DESCRIPTION

The 3705 panel switches allow the operator to use the following functions:

1. Dynamic display of an ICW
2. Dynamic store (NCP 6 only)
3. Network shutdown (if ANS=YES in NCP build macro)
4. Address trace facility (if TRACE=YES in NCP build macro)
5. Activate/deactivate level 3 channel adapter trace (only ACF/NCP, NCP5 must be included in generation only when needed)
6. Line test function (NCP5)
   a. Transmit test character
   b. Transmit test character and turn to receive
   c. Auto answer
   d. Dial operate
   e. Receive mode
   f. Transmit buffer
   g. Link Level Test

AVAILABILITY

These control panel procedures are included in the NCP program in version 5 and later and in version 2 if PNLTEST=YES is specified on the build macro at generation time.

REFERENCE MANUALS

GUIDE TO USING THE IBM 3704 COMMUNICATIONS CONTROLLER CONTROL PANEL GA27-3086
GUIDE TO USING THE IBM 3705 COMMUNICATIONS CONTROLLER CONTROL PANEL GA27-3087

OPERATION

To use the panel test facility refer to the proper operator guide for step-by-step procedures. The control panel procedures for NCP are in the above manuals.

INTERPRETATION

Refer to the 3705/3704 operator's guide for display panel output indicating the progress of test.

SAMPLE OUTPUT

Refer to Appendix I of the ACF/NCP/VS: INSTALLATION, for several sample programs.

4.6.2 : 370X ON-LINE TESTS

DESCRIPTION

The 3704/3705 (370X) Communication Scanner On-line Tests (OLLTs) were designed to functionally test the hardware (line sets, line adapters, intergrated modems, and automatic call originate features) of the 370X communications controller, and SDLC links attached to the 370X. The OLLTs reside in the host CPU and are called in using TOLTEP or TOTE and only affect the line being tested. The OLLTs may be divided into two categories:

1. Those primarily designed for customer problem identification.
2. Those primarily designed for use by the CE.

The tests in the first category were designed to be simple and to verify proper operation in the normal environment; i.e, use the same line control values as used by the NCP. The tests are T3700LTA through T3700LTF. Only one test falls into the second category, T3700LT. This section tests all the same functions as those in the first category, provides for an external data wrap, and also allows for the optional selection of the data to be wrapped. Chapter 12 describes the individual tests.

AVAILABILITY

Before any of the test sections can be run, the following program requirements must be met:

1. TOLTEP or TOTE must be running in the system
2. A Network Control Program (NCP) that has the OLT option of the BUILD macro must be included in the 3704/3705.
3. The 3700 family of OLTs must be present in the OLT library.
4. Each line's symbolic name entered in the test request message must be defined to VTAM and defined in the NCP.
5. A line being tested may not be the same to which the control terminal is attached.
6. Each line being tested must be varied off-line (inactive) prior to test initiation.

REFERENCE MANUALS

On-Line Terminal Test User's Guide. D99-3700C
DOS/VSE and OS/VS TOLTEP for VTAM. GC28-0663

This guide can only be obtained from an IBM Customer Engineer.

OPERATION

Information on the initiation and termination of testing and the options available may be found in the TOLTEP SRL, "DOS/VSE and OS/VS TOLTEP for VTAM".

4.6.3 : 3725

DESCRIPTION

The 3727 (3725's operator console) allows the operator to perform the following functions:

- Address Compare (to force the CCU to perform a specific action whenever a specified storage address is detected).
- Branch Trace (to save information about non-sequential instructions in the branch trace buffer).
- Display/Alter (to display CCU storage, local store registers, or work areas and to alter the CCU data being displayed).
- Display Long (to display CCU storage, local store registers, work registers, or CCU input registers in detail).
- System Control (to execute any of the following functions):
  - set the control program in instruction step mode.
  - request a CCU level 3 interrupt.
  - let the CCU continue to run when a check condition occurs.
  - force the CCU to hard-check when an IOC-detected level 1 interrupt occurs.
  - generate a 'reset tag' pulse on the IOC bus.
  - set the MOSS online to the control program and reset the data and time.
  - transfer to the CCU control program information necessary to select and execute NCP or EP functions and subroutines.
- Address Compare and Trace Parameter Display.
- Channel Adapter State and Register Display
  - to display the states of each channel adapter (enabled or disabled) as well as the current interface.
  - to display the registers of each channel adapter.
- Reset CCU/LSSD
  - to reset the entire CUU (LSSD, IOC, local store registers, 3725 storage
  - to reset only the LSSD
- Run a Wrap test
  - Cable level wrap
  - Modem level wrap
- Line Interface Block Display (to display, at any time, and for a specific line, the following fields; SDF ,SCF, SET MODE, CONTROL, MODEM-IN, MODEM-OUT, and the Hexadecimal Mask)
- Error Log Functions (once an error is detected, a Box Error Record (BER) is stored in the BER file to collect information on the error

The following are NCP functions:

- Line Test
- Dynamic Store
- Display of Storage
- Display of Registers
- Channel Discontact
- Address Trace
- Channel Adapter Trace

AVAILABILITY

These console functions are available to all 3725 users.

PRODUCT DEPENDENCIES

ACF/NCP Version 2

REFERENCE MANUAL

IBM 3725 COMMUNICATION CONTROLLER OPERATING GUIDE GA33-0014

OPERATION

To use the 3727 console facilities, refer to the operator guide for step-by-step procedures.

4.6.4 : PT-2 TP LINE MONITOR

DESCRIPTION

The PT-2 TP Line Monitor (TPLM) can display and record information appearing on a teleprocessing line. Line monitor capability is accomplished by an adapter, a PT-2, and a series of programs which execute in the PT-2. The line monitor has the capability of monitoring transitions appearing on the EIA/CCITT interface or selected probe points within equipment containing integrated modems. Information can be recorded from start/stop, BSC, or SDLC lines. The user has the option to display only, record only, or display and record simultaneously at line speeds up to 9600 BPS. Prior to recording, the clock speeds are verified and the user specifies additional parameters to the program. During playback of the recorded data, the user can enter commands to the program to search for an event mark, optional probe change, record number, or a hex data pattern.

AVAILABILITY

The PT-2 is a tool that the Field Engineering Division has available for their use in problem determination.

REFERENCE MANUALS

The operator's manual for the PT-2, and the manual for the TP Line Monitor that comes with the tool.

INTERPRETATION

When data is displayed on the PT-2, the receive data is always underlined and control characters are always displayed in hex. The display program has many options that the user can select to format how the data will be displayed. The more common options are:

- Data only in hex
- Data only with text translation
- Data+pads with control changes, data in hex
- Data+pads with control changes, data with text translation

SAMPLE OUTPUT

EXAMPLE OF BSC DATA ONLY

```
55323240407F7F2DFF
55323237FF
```

EXAMPLE OF BSC DATA WITH TEXT TRANSLATION

```
553232606040402DFF
5532321070FF
55323202 T H I S   I S   T E X T   T R A N S L A T I O N 036B3EFF
5532321061FF
```

EXAMPLE OF BSC DATA+PADS AND CONTROL CHANGES

```
FFFFRTS+FFFFFFFFCTS+FFFFFFFFFFFFFFFFFFFFRTS- CD+CTS-FFFFFF55323237FF
FFFFRTS+FFFFFFFFCTS+55323240407F7F2DFFRTS- CD+CTS-FFFFFFFFFFFFFFFF
```

EXAMPLE OF DATA+PADS AND CONTROL CHANGES WITH TEXT TRANSLATION

This would be the same format as above except that the hex characters between the start of text control character and end of text control character would be translated from hex into English.

4.6.5 : LINE MONITORING AIDS

DESCRIPTION

There are several devices that can be used to help determine the status of a line. Indicators and tests in the dataset, indicators that can be displayed in the 370X, and speakers that a telephone company can install that can be switched from line to line.

DATASET INDICATORS

Many of the datasets now in use have several indicators that are very useful in line problem determination. These indicators usually include dataset ready, request to send, clear to send, carrier detect, and data terminal ready.

370X INDICATORS

Refer to page 4-141 of this manual for a description of the 3704/3705 panel tests.

LINE SPEAKERS

Some telephone companies have speakers and switches that can be installed on their lines so that you can switch a speaker onto a failing line. Listening to a line when it is operating can enable you to determine if terminals are timing out, if one terminal has a low signal, if there is too much background noise, if an autodial line is operating properly, and if there is too much crosstalk on a line.

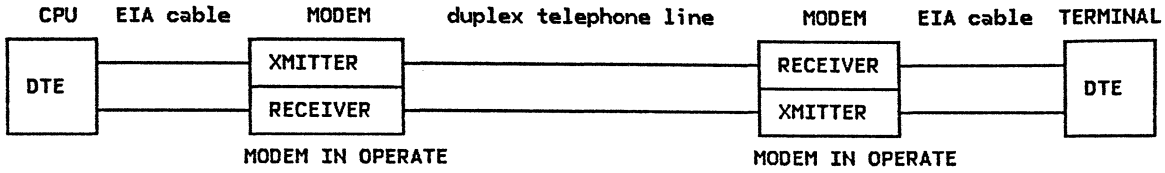
IBM MODEM TESTS

The tests refered to in this section apply to the IBM 3872, 3874, 3875, and integrated modems. Tests A, B, C, and D may be carried out for a centralized multipoint or point to point full-duplex configuration. In a multipoint configuration, end-to-end testing is always done between the control modem and one of the tributary modems. Tests A, B, and E can be used to test switched network modems.

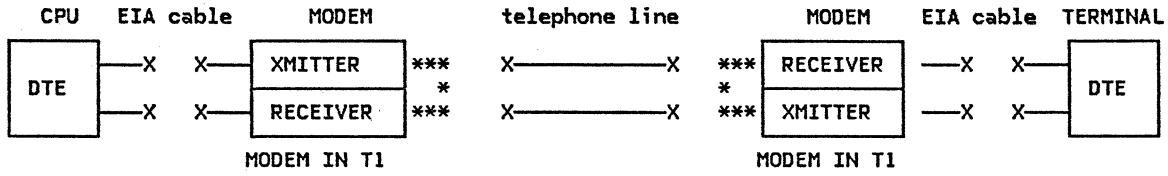
Tests C through E require the cooperation of the other-end operator. The operators need to communicate to coordinate what test is to be performed, how long the test will run, and to watch the operate lights and signal meter. In each of the tests with the exception of test B, a fault is indicated by the operate lamp on the receiving modem going out.

In the following block diagrams the asterisks show the flow of the test data and the X's show the normal path that is not being used (--X X--).

BLOCK DIAGRAM SHOWING NORMAL OPERATION

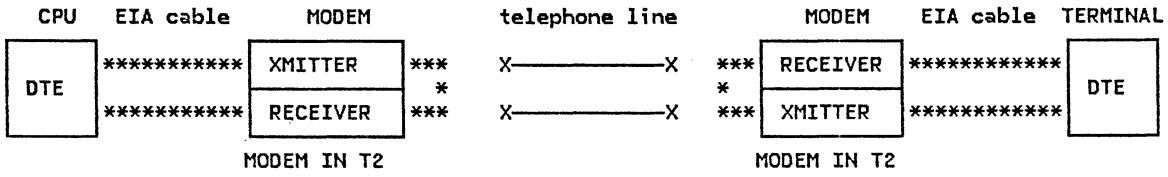


TEST A (T1) MODEM INTERNAL WRAP TEST



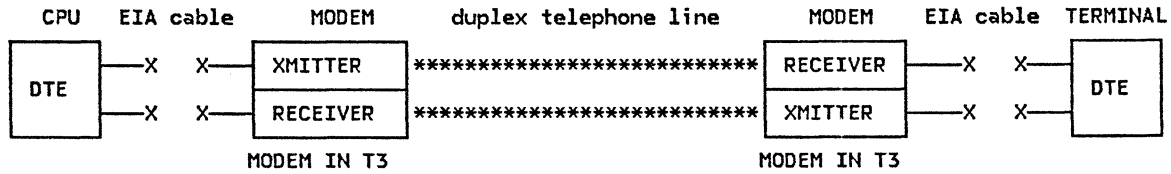
In test T1 the modem does not use the EIA interface and the line. The modem generates a test pattern, sends it through the transmitter, loops the pattern back to its own receiver, decodes the test data and checks it to determine if the modem circuits are working properly. The operate light will blink if the test fails. If the test fails, there is a problem with that modem.

TEST B (T2) MODEM WRAP FROM THE TERMINAL



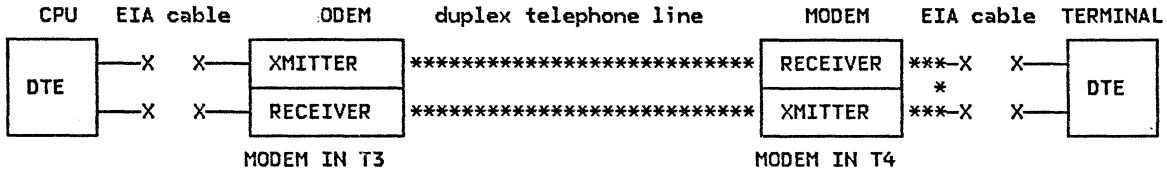
In test T2, the terminal generates the test pattern, sends it to the modem, the modem sends the data through the transmitter, loops it back to its own receiver, demodulates the signal, and sends it back to the terminal which checks it to determine if the pattern has changed. (NOTE: not all terminals can use test T2.) If this test fails, there is a problem with either the modem or terminal.

TEST C (T3 AND T3) MODEM END-TO-END TEST



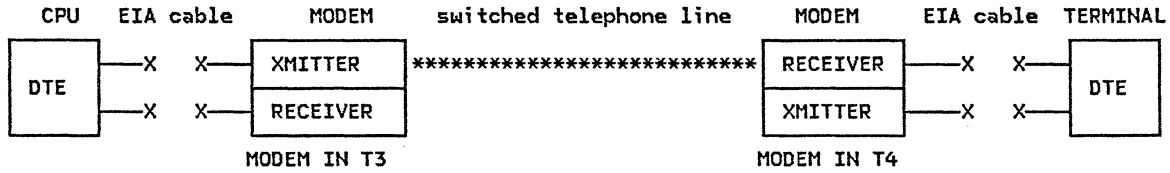
The modem that is in test T3 generates the test pattern, sends it through its transmitter down the line to the other modem which demodulates the test pattern in its receiver and checks it to determine if the pattern has changed. If both modems test good in T1 but not in T3, the problem is with the line.

TEST D (T3 AND T4) MODEM REMOTE WRAP TEST



The modem that is in test T3 generates the test pattern, sends it through its transmitter down the line to the other modem which demodulates the test pattern in its receiver and checks it to determine if the pattern has changed. It then loops it into the transmitter which modulates it and sends it back on the telephone line to the other modem which demodulates the test pattern in its receiver and checks it to determine if the test pattern has changed. The operate light will blink every time the pattern has changed. This test will only work if the telephone lines are full duplex. Failure in this test indicates a line problem. Not all terminals can use test T2. If this test fails, there is a problem with either the modem or terminal.

TEST E (T3/T4) MODEM END-TO-END TEST ON SWITCHED LINES



For switched lines, the test can only be run in one direction at a time. Run the test one way then change the switch setting and run the test the other way. A failure indicates a line problem.

Reference: GA27-3053 3705 OEM INFO.

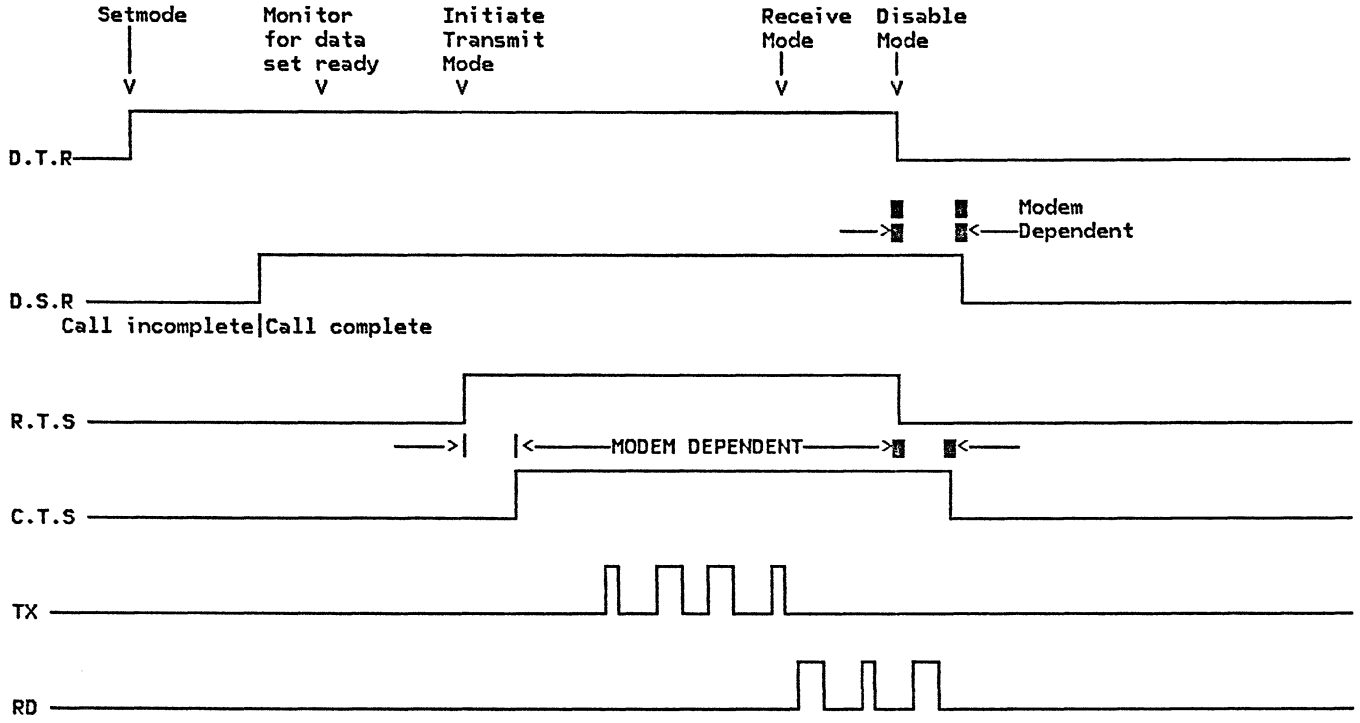


Figure 11. EIA Interface Sequences: Start/Stop Mode on Switched Duplex Modem

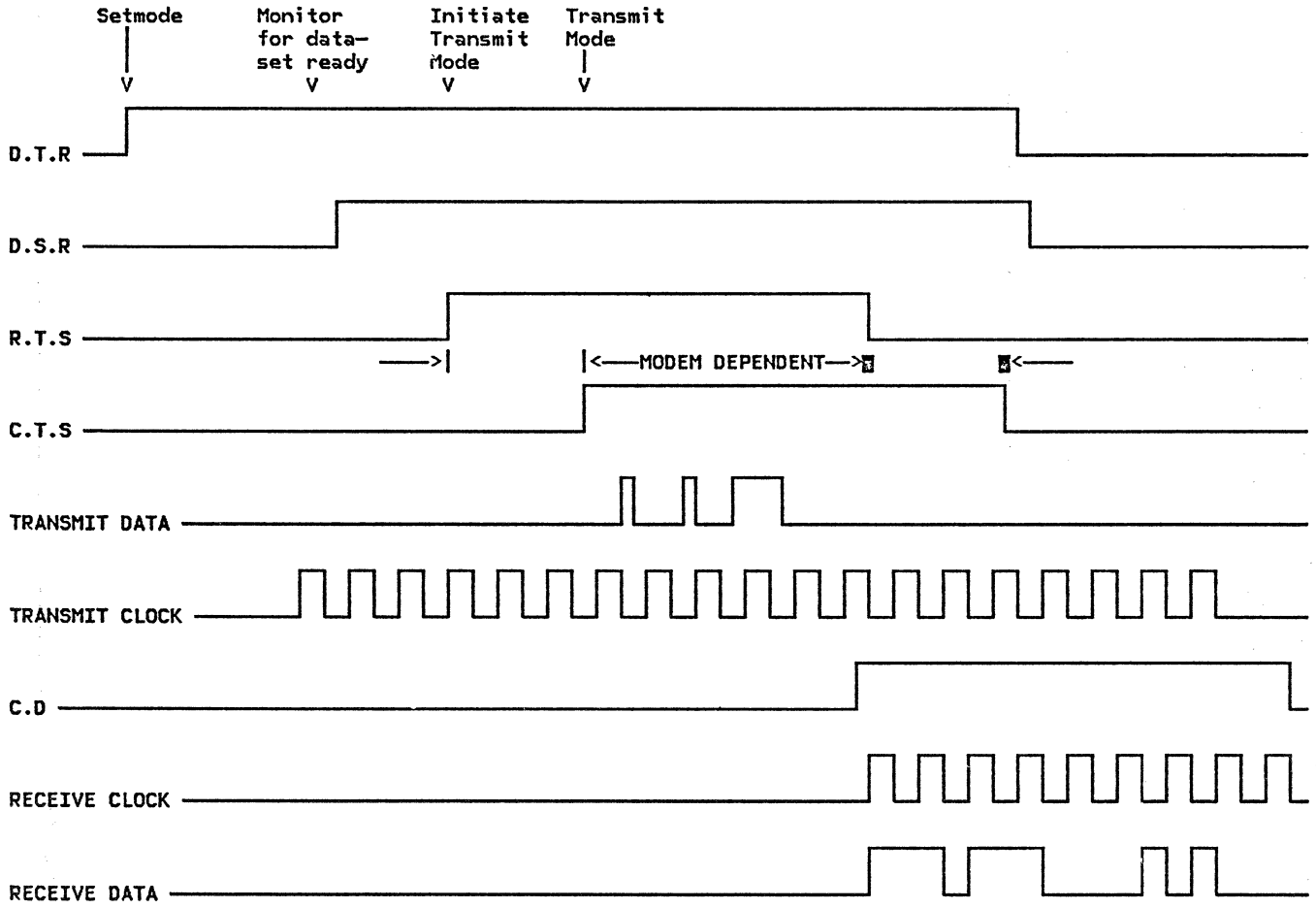


Figure 12. EIA Interface Sequences: Synchronous Mode on Switched Half-Duplex

ACF/SNA SYSTEM PROBLEM
DETERMINATION GUIDE VOL. I
GG24-1514-1

READER'S COMMENT FORM

You may use this form to communicate your comments about this publication, its organization, or subject matter, with the understanding that IBM may use or distribute whatever information you supply in any way it believes appropriate without incurring any obligation to you.

Your comments will be sent to the author's department for whatever review and action, if any, is deemed appropriate. Comments may be written in your own language; use of English is not required.

Note: *Copies of IBM publications are not stocked at the location to which this form is addressed. Please direct any requests for copies of publications, or for assistance in using your IBM system. to your IBM representative or to the IBM branch office serving your locality.*

Possible topics for comment are:

Clarity Accuracy Completeness Organization Coding Retrieval Legibility

If you wish a reply, give your name, company, mailing address, and date:

_____

_____

_____

_____

What is your occupation? _____

Note: Staples can cause problems with automated mail sorting equipment. Please use pressure sensitive or other gummed tape to seal this form.

Cut or Fold Along Line

Reader's Comment Form

Fold and tape | **Please Do Not Staple** | Fold and tape

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 40 ARMONK, N.Y.

POSTAGE WILL BE PAID BY ADDRESSEE:

IBM International Systems Center
Department 985, Building 622-3
P.O. Box 12195
Research Triangle Park
Raleigh, North Carolina 27709
U.S.A.

Fold and tape | **Please Do Not Staple** | Fold and tape

IBM®

ACF/SNA SYSTEM PROBLEM DETERMINATION GUIDE VOL. I

GG24-1514-1 PRINTED IN THE U.S.A.

GG24-1514-1