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SNA System Problem Determination Guide

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This edition is a Major Revision and Replacement of G320-6016.

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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.

This edition of the SNA System Problem Determination Guide reflects a major revision of its format so that it can be more easily used and maintained. Updates to the guide include the new service aids reflected in the ACF program products and the addition of appendices that will increase the usability of the guide.

The author wishes to express his appreciation to those people who have contributed to this guide. Input has been provided from the staff of the IBM Palo Alto Systems Center, Installation Support Center (IBM United Kingdom), IBM Field Engineering (Branch offices, regions, and product development centers), and IBM Data Processing System Engineers from many branch offices.

CONTENTS

CHAPTER 1 : INTRODUCTION

The purpose of this document is to assist SNA system users in problem determination. The guide should be used as supporting documentation for customer review prior to installation of 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 parts of this guide ARE NOT applicable to VTAM-ONLY systems and MAY BE REMOVED:

CHAPTER 3.8 thru 3.19
CHAPTER 4.2

The following parts of this guide ARE NOT applicable to TCAM-ONLY systems and MAY BE REMOVED:

CHAPTER 2, SECTIONS 2.1 thru 2.14
CHAPTER 3, SECTIONS 3.1 thru 3.7
CHAPTER 4, SECTION 4.1
CHAPTER 6
CHAPTER 11

DO NOT remove any parts of this guide for MIXED TCAM-VTAM systems.

NOTE that CHAPTER 5 (SNA DEVICE CONTROL AND FLOW) SHOULD BE LEFT INTACT for both TCAM-ONLY and VTAM-ONLY systems since these examples of flow can be used for either access method.

It is recommended that the following appendices of the Systems Network Architecture Format and Protocol Reference Manual: Architectural Logic (SC30-3112) be added to this guide when setting up a systems problem determination notebook:

Appendix A. Session Parameters: Common Reference

Appendix E. Request-Response Unit (RU) Formats

Appendix G. Sense Codes

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 Network Control Program/Virtual Storage (ACF/NCP/VS)

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

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

Virtual Storage Access Method (VSAM)

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

Information Management System/Virtual Storage (IMS/VS)

Virtual Storage Personal Computing (VSPC)

Network Operation Support Program (NOSP)

Disk Operating System/Virtual Stoage (DOS/VS)

Operating System/Virtual Storage 1 (OS/VS1)

- Remote Entry System (RES)
- Remote Terminal Access Method (RTAM)

Operating System/Virtual Storage 2 (OS/VS2)

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

Telecommunications Access Method (TCAM)

Virtual Telecommunications Access Method (VTAM)

2741 Communications Terminal (2741)

2740 Communications Terminal (2740)

TWX Line Control Type (TWX)

3270 Information Display System (3270)

3600 Finance Communication System (3600)

3650 Retail Store System (3650)

3767 Communication Terminal (3767)

3770 Data Communication System (3770)

3790 Communication System (3790)

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

ENTER USER NOTES HERE:

CHAPTER 2 : PROBLEM DETERMINATION/ISOLATION PROCEDURES

This section of the guide contains typical Problem Determination Isolation Procedures (PD/IP's) for many of the problems which may be encountered in an SNA system. The PD/IP's 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/IP's are entered.

CONTENTS

2.1 : 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.

Insufficient VTAM buffer specifications	VTAM buffer specifications are dependent on the individual network definition. VTAM-2, and ACF/VTAM without dynamic buffering specified, may hang if they run out of buffers.
Insufficient virtual storage	DOS/VS - VTAM uses VPBUF for dynamic storage requirements such as 'OPNDST', 'CLSDST', and building of major node resource definition tables (RDT). OS/VS1(R6) - VTAM uses virtual storage in its own region for building RDT's and for 'OPNDST' and 'CLSDST' for NETSOL. VTAM uses the application region for 'OPNDST' and 'CLSDST' for application programs. OS/MVS - VTAM uses common storage area (CSA) for 'OPNDST', 'CLSDST', and building RDT's.
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 intial network definitions. SNA Product Installation Guide (G320-6028) is recommended.

Problem Isolation Steps	Reference Page(s)	Description
VTAM buffer utilization must always be monitored. Start SMS trace for VTAM buffers.	3-3	Shortage of VTAM buffers is the most common problem in the installation or operation of a VTAM2 based SNA system.
If ACF/VTAM, display VTAM buffers (d net,bfruse).	4-15	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.	3-6 3-9 3-64	All errors for lines, physical units and for the NCP can only be detected by tracing the NCP.
If ACF/VTAM, the VTAM internal trace should be used for random errors or if all activity is to be monitored.	3-13	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.	3-12	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.

Documentation Required For IBM	Ref. Page	Special Instructions
Trace reports.	3-3 3-6 3-9 3-64	
Console log		
Copy of VTAMLST or B.book for DOS/VS	3-12	

2.2 : VTAM WILL NOT INITIALIZE

SYMPTOM:

VTAM indicates that it can not 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 adaquate	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 start up of approximately 1024k. This value should be specified in the region parameter on the job card.
VTAM partition real allocation too small (DOS/VS)	DOS/VS 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 start up proceedure. File member ATCSTR00 in SYS1.VTAMLST (B.book for DOS/VS) 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/VS).	BIB-1	If VTAM initializes with this minimum start up proceedure we know VTAM was installed in the system correctly.
If the minimum start up proceedure doesn't 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 start up proceedure 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 start-up parameters you are using	3-12	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 start up member or the configuration member being used from VTAMLST (B.book in DOS/VS). Reconfirm for 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/VS		

2.3 : 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 canceled 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.	4-3	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 canceled, 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	4-4	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 PU's are active. D NET,E,ID=linename	4-5	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 PU's to determine which LU's are active. D NET,E,ID=puname	4-6	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	4-21	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	4-19	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		

2.4 : 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 VS1 and MVS, and LFBUF in DOS/VS). 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/VS 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 NETSOL 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 data set.
Dump of CSA (MVS)		
Console Log		

2.5 : 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 that the command has been accepted, and the command was a VARY, issue a 'VARY NET,INACT,ID=nodename,I' command.	4-21	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.	4-7	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.	4-21	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 neccesary.
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.

2.6 : LOCAL DEVICE WON'T ACTIVATE

SYMPTOM:

A local 327X/3790 controller will not activate at start-up time, or when a 'V NET,ACT' command is issued.

NOTE

Here 'local 327X/3790' means local-channel-attached SNA devices (IBM 3274-1A and 3790). The IBM 3272 and IBM 3274-1B are not SNA devices! The 'SNA appearance' of these devices (as well as BSC 3271's, 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/IP's. In spite of the above, this PD/IP still applies to IBM 3272's and IBM 3274-1B's, 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.

IOBUF size (3790)

VTAM IOBUF size must be at least 300 bytes if local 3790 physical units are included in the network.

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.

Control operator error

The 3790 SYSHOST procedure must be performed before the physical unit can be activated by the network operator. If this is not done, VTAM will indicate that an I/O error has occurred.

Problem Isolation Steps	Reference Page(s)	Description
Review console log		VTAM messages may indicate the type of problem. An I/O error message may indicate the 3790 is not initialized.
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	9-1	If I/O errors occurred, the MDR records in LOGREC may be helpful in isolating the problem.
Run VTAM I/O and buffer traces for the physical unit, along with GTF I/O and SIO traces.	3-6 3-9 3-64	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	9-1	
Traces gathered		

2.7 : LOCAL DEVICE WON'T DEACTIVATE

SYMPTOM:

A local 327X/3790 won't deactivate at network shutdown time, or when a 'V NET,INACT' command is issued.

NOTE

Here 'local 327X/3790' means local-channel-attached SNA devices (IBM 3274-1A and 3790). The IBM 3272 and IBM 3274-1B are not SNA devices! The 'SNA appearance' of these devices (as well as BSC 3271's, 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/IP's. In spite of the above, this PD/IP still applies to IBM 3272's and IBM 3274-1B's, 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 3270's, display the terminal.	4-6 4-7	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 3277's attached via a 3272.	4-21	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.	4-21	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.	3-6 3-9	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	3-12	
Traces gathered		

2.8 : LOCAL DEVICE ACTIVE BUT NOT COMMUNICATING

SYMPTOM:

A local 327X/3790 LU can be activated and establish a session, but no data transfer occurs.

NOTE

Here 'local 327X/3790' means local-channel-attached SNA devices (IBM 3274-1A and 3790). The IBM 3272 and IBM 3274-1B are not SNA devices! The 'SNA appearance' of these devices (as well as BSC 3271's, 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/IP's. In spite of the above, this PD/IP still applies to IBM 3272's and IBM 3274-1B's, 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. Local 3277's will be initially logged on to NETSOL if LOGAPPL=NETSOL is coded and NETSOL is started. No data will be accepted by VTAM unless the terminal is allocated to an application.

Problem Isolation Steps	Reference Page(s)	Description
Issue a VTAM display command for the local 3270.	4-6	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 that 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/VS) for the device.	3-6 3-9 3-64	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 a SIO is not being issued, then VTAM is not doing a read. A VTAM buffer shortage should be suspected. If a 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		

2.9 : LOCAL DEVICE SESSION TERMINATES ABNORMALLY

SYMPTOM:

A local 327X/3790 LU can be activated and communicated with, but the session terminates during normal operation.

NOTE

Here 'local 327X/3790' means local-channel-attached SNA devices (IBM 3274-1A and 3790). The IBM 3272 and IBM 3274-1B are not SNA devices! The 'SNA appearance' of these devices (as well as BSC 3271's, 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/IP's. In spite of the above, this PD/IP still applies to IBM 3272's and IBM 3274-1B's, 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/VS 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.

LOCAL DEVICE SESSION TERMINATES ABNORMALLY

(continued)

Application program error	The application may be terminating the session because of an error condition. For example, a no-data-entered-time-out 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 3270's, 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 (3790,3274-1A), 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	3-12	
Application logs or traces		If available

2.10 : 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 exeeceded for the terminal, VTAM will post an active READ or RECEIVE RPL with a feedback code, indicating that 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.	3-6 3-9	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.	3-50	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

2.11 : 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.

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.	4-3	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.	3-3	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	3-12	
Application log,trace, or dump		Check the return code from the OPEN ACB.

2.12 : APPLICATION PROGRAM STICKS IN SYSTEM

SYMPTOM:

An application program cannot close it's 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 that 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.	4-3	If any sessions show active, refer to the PD/IP's entitled 'LOGICAL-UNIT-WON'T-DEACTIVATE' or 'BSC/SS-WON'T-DEACTIVATE'.
Run an SMS buffer pool trace, or display the buffer status on ACF/VTAM.	3-3	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 RPL's 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		

2.13 : NETSOL ABENDS

SYMPTOM:

The Network Solicitor (NETSOL) program terminates abnormally. It may or may not be reactivated by VTAM.

NETSOL ABEND U001	This abend usually indicates that NETSOL's OPEN ACB request failed because NETSOL was already active. This problem usually occurs, when NETSOL is restarted, after it has abended or was stopped, and before all of it's sessions have been terminated. Refer to the PD/IP entitled 'APPLICATION-PROGRAM-STICKS-IN-SYSTEM'.
NETSOL ABEND U004	This is the abend code NETSOL issues if it has an unexpected error! There are many possible causes for this abend. If this occurs, the dump should be submitted as documentation included with the APAR.
Inadequate VTAM buffers	If VTAM has insufficient buffers, it may abend NETSOL.
VTAM/NETSOL partition/region too small	VTAM may also abend NETSOL, if there is insufficient CSA in an MVS system, or insufficient storage in NETSOL's region/partition in an OS/VS1 or DOS/VS system, if NETSOL is running in its own partition/region.

Problem Isolation Steps	Reference Page(s)	Description
Issue a VTAM display command for NETSOL.	4-3	This will indicate if the ACB for NETSOL is open.
Start NETSOL in its own partition/region, if possible.	11-1	This will facilitate getting a (reasonable-sized) dump of NETSOL, and at the same time, isolate VTAM from NETSOL abend contamination. It will also eliminate a VTAM region/partition size problem.
Run VTAM's I/O and buffer traces on all the NETSOL devices, NCP, and start the SMS buffer pool trace.	3-6 3-9	The traces may show the sequence that caused NETSOL to abend.

Documentation Required For IBM	Ref. Page	Special Instructions
Traces gathered		
NETSOL dump		

2.14 : NETSOL HANGS

The Network Solicitor (NETSOL) does not respond to logon requests.

Insufficient RPL'S specified in NETSOL	NETSOL services each terminal asynchronously. However, NETSOL limits the number of concurent 'OPNDST' macros issued to the number of RPL's specified in the assembly of the NETSOL macro. It will issue an 'OPNDST' macro with the ACCEPT option, and then write a 'Enter-Logon' request message (3270 only) to the terminal, before releasing the RPL so that it may be used for another 'LOGON' request. If this sequence hangs at any point (no response received to the write), that RPL is unavailable to process the logon for another terminal. The default number of RPL's is ten. This may not be adequate for all networks. If possible, this number should be increased in proportion to the size of the network. Keep in mind that this will require a larger number of VTAM buffers, and a larger MVS CSA area (or partition in OS/VS1 and DOS/VS) to support an increased number of concurrent 'OPNDST' macros. Each concurrent 'OPNDST' requires approximately 2.5K of CSA in an MVS system and .8K of user partition in OS/VS1.
Inadequate VTAM buffers	If VTAM has insufficient buffers to handle the number of RPL's specified for NETSOL, a hang condition can occur.
NETSOL not at correct maintenance level	Because of design changes to NETSOL, maintenance to NETSOL should be kept at the latest level.

Problem Isolation Steps	Reference Page(s)	Description
Issue a VTAM display command twice for NETSOL.	4-3	If there are any SESSION REQUESTS displayed, and this value increases a short time later, this may indicate that NETSOL is hung. The SESSION REQUESTS field of the display command indicates the number of LOGON requests which are queued to the application by VTAM. NETSOL should be running fast enough so that the value in this field is not accumulating. If the number of SESSION REQUESTS is incrementing in the time it takes to enter consecutive VTAM display commands, it usually means that the 3277 terminals are not responding to NETSOL Message 12 (the Enter-Logon request message), and that all of NETSOL's RPL's are active waiting for a response.
Run the VTAM SMS buffer pool trace, or display the buffer status on ACF/VTAM.	3-3	This will allow you to determine if the hang condition is due to VTAM buffer shortage.
If the default number of RPL's has been generated in NETSOL, reassemble NETSOL with a larger value specified (NUMBER= parameter).		VTAM buffers and MVS CSA, or OS/VS1 or DOS/VS partition/region size may have to be increased to compensate for the increased number of concurrent 'OPNDST' macros NETSOL can issue. Specifying too large a value may cause an NCP slowdown condition.
An alternative to increasing the number of RPL's is to make a modification to NETSOL to bypass sending the 'Enter-Logon' request message to the 3277's during network startup.	11-1	This bypass will reduce the resource usage by NETSOL at network start up time. By not sending out the message until the terminal is attended, the chance of a write causing a hang is minimized.
Move NETSOL to a separate partition/region	11-1	This will allow a dump to be taken of NETSOL only, if it hangs in the system.

Documentation Required For IBM	Ref. Page	Special Instructions
Dump of NETSOL		

2.15 : 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/VS) should be 2 to 2.5 times the sum of the MAXBFRU values specified in the HOST macros of the NCP's. An SMS buffer pool entry will show that 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/VS: 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 that 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 start-up 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 time-out) value has been specified on the BUILD macro. VTAM must activate all lines or wait for the enable time-out 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 time-out 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 that 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 3705's with the IPL channel adapter select switch), doing a RESET, enabling the channel adapter(s), and pressing LOAD. If your 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 start-up parameters in ATCSTRxx to start buffer, I/O ,and SMS buffer pool trace.	3-3 3-6 3-9	The CONFIG=xx specification in the VTAMLST/B.book member ATCSTRnn must preceed the start trace commands or errors will result. Member ATTCONxx should include the name of the NCP you wish to activate. With these start-up parameters VTAM will automatically attempt to load and activate the NCP.
Start GTF to trace SIO's and I/O interrupts for the 370X, and also user (USR) data.	3-64	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.	4-4	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.	5-17	This will indicate how far along the activation process has gotten.

Documentation Required For IBM	Ref. Page	Special Instructions
NCP dump	3-67	
Traces gathered		
Record 370X control panel lights at the time of failure		

2.16 : 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 appropiate 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 a 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 or TCAM. 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 and start-stop 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.	3-3 3-6 3-9 3-64	It is often necessary to see the sequence of events leading up to the hung condition.
Take an NCP dump.	3-67	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	3-67	NCP stores the abend code at X'760' if an abend occured.
CSA dump (MVS)		
Copy of VTAMLST or B.book		
Trace of all nodes in the network	11-2	This trace should not be printed unless requested by IBM.

2.17 : 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 doesn't have sufficient buffers, the NCP may not deactivate.
VPBUF too small (DOS/VS)	If using ACF/VTAM and VPBUF is too small. ACF/VTAM can not 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	4-4	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	4-3	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.	4-4	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.	4-5	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).	4-21	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	11-2	
Dump of NCP	3-67	A dump of NCP is only needed if the traces were running.

2.18 : 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 or TCAM BUFFER trace for a short period of time, on all NCP nodes.	11-2	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 370X LOGREC MDR records.	9-1	The MDR records will indicate the number of SIO's 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		

2.19 : 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 data set 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 or the TCAM PIU trace on the NCP and attempt to activate the link.	3-9	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.	3-72	Check to see if DSR comes up.
Look at the 370X LOGREC MDR records.	9-1	Look for an MDR record for the line, showing an enable failure.

Documentation Required For IBM	Ref. Page	Special Instructions
Copy of VTAMLST/B.book		

2.20 : 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 doesn't 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 LU's defined on the PU macro in the VBUILD major node.
PU or UTERM/VTERM inactive	For SDLC links, the physical unit must be active. For BSC/SS, if UTERM/VTERM is not specified for the port, VTAM will disconnect the line. If the terminal is inactive, the same will occur.
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.
REPLYTO value too small	For start-stop, the REPLYTO value on the GROUP macro has a default that is too small. For normal switched start-stop ports, the REPLYTO value should be specified as NONE. If you specify a value, the value should be the maximum time you want a start-stop terminal to remain connected, without any input received from the terminal.

(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 temorary control blocks. If a DOS/VS 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.
MTA retry (MTARTO,MTARTRY) too small	On start-stop dial ports defined as MTA devices, the retry default is zero and the time-to-identify is just one second. This means that after the terminal has dialed in, the terminal operator has one second to type in the identification sequence or the NCP will disconnect. If this id sequence is typed in error, the default MTARTRY allows no retry. Recommended values are MTARTO=30(30 seconds) and MTARTRY=10, coded on the BUILD macro.
Can't dial in after disconnecting	On switched start-stop lines, if the terminal disconnects, the port will remain busy for a period of time, typically, one minute or less. Coding SECURE=YES on the LINE macro corrects this condition because NCP will monitor the link and notify the access method immediately when the loss of connection is detected.
Application program rejects the logon	On start-stop or 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.	3-3 3-9 3-50	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.	4-6	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.	3-3 3-9 3-50	An operator message will be generated if the Station ID (XID) of the physical unit dialing in 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	3-53 3-64	For SDLC links, examine the line trace to see if the physical unit dialing in 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 that 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.	5-31	

Documentation Required For IBM	Ref. Page	Special Instructions
Look at the 370X LOGREC MDR records.	9-1	Look for MDR records for the line.
VTAM I/O, BUF, and NCP line trace		Check against sample flow.
Copy of VTAMLST/B.book		

2.21 : 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 multi-point links are not physically on the link, or are powered off.	This will cause unnecessary link degradation on multi-point 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.

(continued)

Using two-wire half duplex modem facilities	Two-wire half duplex facilities should not be used on an SDLC link using multi-point protocol. The turn around times required by NCP and the modems will degrade performance. NCP may be required to retransmit PIU's because the receiving PU may not have commpletly turned around and missed the NCP's SDLC flag character.

Problem Isolation Steps	Reference Page(s)	Description
Review LOGREC MDR records.	9-1	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.	4-6	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.	3-50	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		
Copy of VTAMLST/B.book		
LOGREC MDR summary	9-1	

2.22 : 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 that 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.	4-6	A status of ACT/C or INA/C, indicates that the NCP is polling the physical unit but is not getting a response. If the status of the PU is INACT, it indicates that 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	3-74	This will determine whether a path between the modems exists.
Run RNIO TRACE if message IST604I	3-9	The trace should indicate the reason code for the 'CONTACT' failure.
Run link level tests using TOLTEP.	12-1	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 wrap-test 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		

2.23 : PHYSICAL UNIT WON'T 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 doesn't have sufficient buffers, the physical unit won't deactivate. IF ACF/VTAM on DOS/VS, the VPBUF pool may be depleted.

Problem Isolation Steps	Reference Page(s)	Description
Verify that all of the LU's associated with the PU are inactive by issuing a VTAM display command with the every option, for the PU (D NET,ID=puname,E).	4-6	A PU cannot be deactivated if any of the associated LU's are still in session. If any LU shows up as other then 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.	4-21	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.	3-3 3-6 3-9	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/VS) 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		

2.24 : 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 LOGREC MDR records. If 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 that a request on line (ROL) SDLC command was received, this means that 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 that 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 LOGREC MDR records.	9-1	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 modem user's guide 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.	3-74	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	9-1	
Copy of VTAMLST/B.book		

2.25 : LOGICAL UNIT WON'T ACTIVATE

SYMPTOM:

A logical unit will not come active, either at network start-up 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 that 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.	4-6	If the PU's 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.	4-7	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.	3-3 3-6 3-9	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 that 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.	3-50	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		

2.26 : LOGICAL UNIT WON'T 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 3270's, 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 id 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(10).

Problem Isolation Steps	Reference Page(s)	Description
Issue the VTAM display command for the logical unit	4-7	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.	4-7 4-21	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.	4-21	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.	3-3 3-9	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		

2.27 : LOGICAL UNIT LOGON PROBLEMS

SYMPTOM:

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

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.

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
Issue the VTAM display command for the logical unit.	4-7	Check to see if the logical unit is active and allocated to an application.
Issue the VTAM display command for the application.	4-3	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.	3-3 3-6 3-9	If the trace shows that 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 a 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
Traces gathered		

2.28 : 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 that 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. On a local 3270 device, pressing the Test Request key will terminate the session and the terminal will appear hung, unless NETSOL is used, in which case the terminal will be automatically logged back onto NETSOL. A PTF is available to bypass this problem.
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 that 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 time-out, 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.	4-6	Check to see if both the physical unit and logical unit are active.
Issue the VTAM display command for the logical unit.	4-7	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.	3-6 3-9 3-3	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.	3-50	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.	10-5	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		

2.29 : LOGICAL UNIT SESSION TERMINATES ABNORMALLY

SYMPTOM:

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

DOS/VS ACF/VTAM	On a DOS/VS 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 time-out 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 3270's, 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.

LOGICAL UNIT SESSION FAILURES

(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.	3-3 3-6 3-9 11-2	These traces are neccesary 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		

2.30 : LOGICAL UNIT RESPONSE TIME SLOW

SYMPTOM:

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

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/VS 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 multi-point link, if PU macros are coded ISTATUS=ACTIVE, and a physical unit is unavailable, link performance is degraded.
IBM 3790 resource bottleneck	In an IBM 3790 Communication System examine the paging rate and/or task roll-in/roll-out, excessive disk activity, etc. Use SYSDC to collect IBM 3790 utilization statistics.

Problem Isolation Steps	Reference Page(s)	Description
Review MDR records in LOGREC	9-1	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/VS trace facility does not timestamp trace entries.	3-6 3-9 3-3	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/VS VTAM system, missing trace entries indicates 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.	3-50	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		

2.31 : BSC/SS WON'T ACTIVATE

SYMPTOM:

A Bisync or Start-Stop 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 start up, 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.	4-5	Verify that all node levels have a status of ACT. If the status of all node levels is ACT, see the BSC/SS-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.	4-20	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.	3-3 3-9	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		

2.32 : BSC/SS WON'T DEACTIVATE

SYMPTOM:

A bisync or start-stop device won't 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/SS, 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.	3-3 3-9	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.	4-21	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	3-67	Needed only if no response to the reset/disconnect sequence was received.

2.33 : BSC/SS ACTIVE BUT NOT COMMUNICATING

SYMPTOM:

A bisync or start-stop device can be activated, but can't 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/SS 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.	4-7	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).	4-21	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 this manual (page 5-46).

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

2.34 : BSC/SS SESSION TERMINATES ABNORMALLY

A bisync or start-stop 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 3270's 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 outatanding) until an EOT has been received by the NCP. The NCP informs VTAM 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 a 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 EOT's 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.

BSC/SS SESSION TERMINATES ABNORMALLY

(continued)

S/S Test Request (99999)	For S/S terminals if five sequential nines (99999) are entered, the session will be terminated, and the terminal will be automatically logged-on to TOLTEP.
Line/link error	For S/S or 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.	9-1	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.	3-6 3-9 3-50	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 neccesary. 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 data set, 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	9-1	
Traces gathered		
Terminal output		

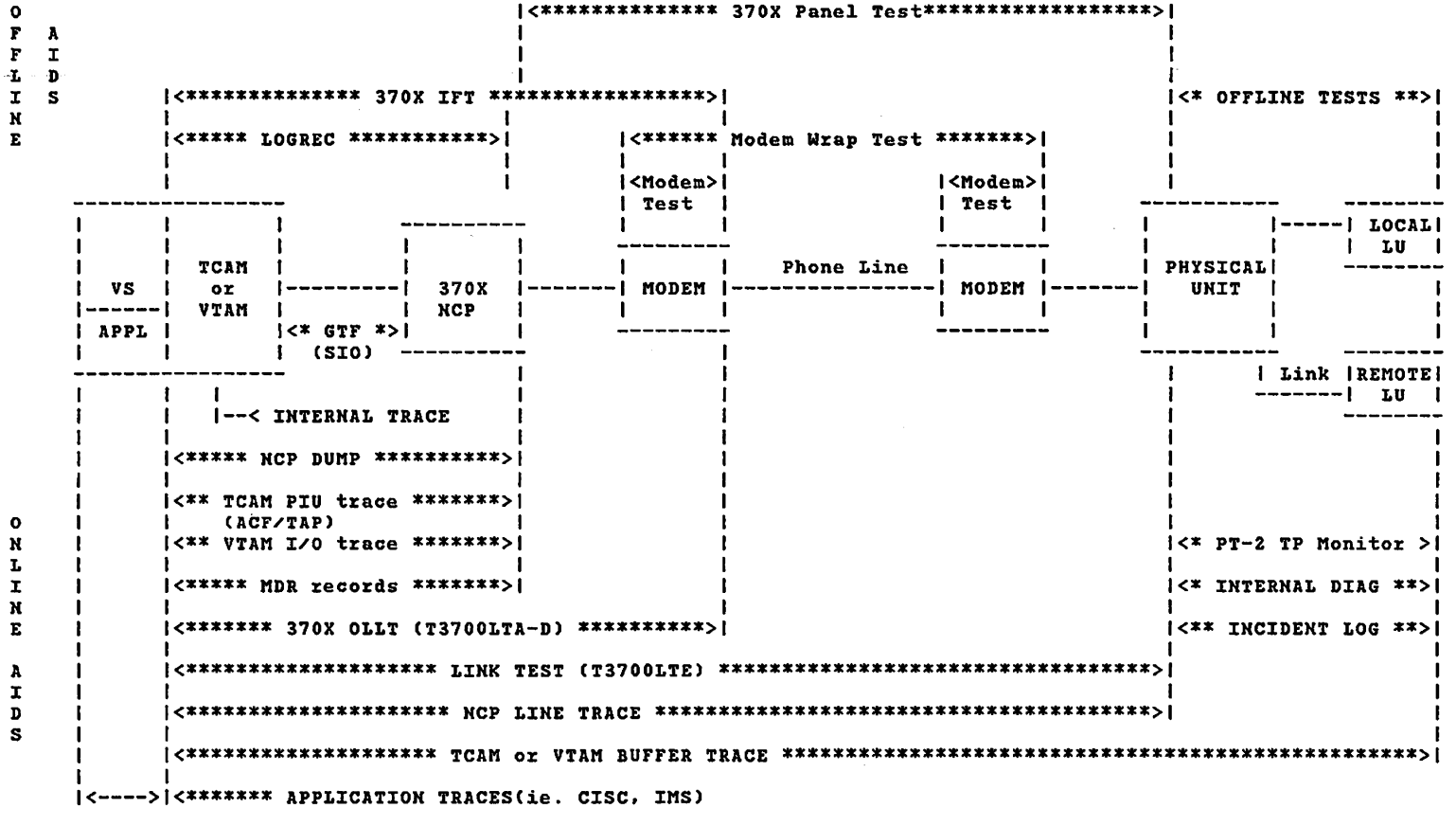
ENTER USER NOTES HERE:

CHAPTER 3 : 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

SERVICE AIDS FOR A SNA NETWORK



3.1 : VTAM AND ACF/VTAM STORAGE POOL TRACE (OS/VS)

DESCRIPTION

This is a facility of VTAM and ACF/VTAM that allows the user to monitor the usage of the various VTAM and ACF/VTAM buffers. It is very critical that these buffers be specified in a large enough quantity to support normal and abnormal situations. However, too high a value will waste virtual and real storage. Using the suggested buffer calculation formulas will give a starting point for buffer specifications, but this aid should be used to adjust those specifications to an individual network. The user should be aware that the formulas are for steady state and that monitoring of the network is essential during during peak opening and closing of sessions. Tracing during activation and deactivation of major nodes is also mandatory.

AVAILABILITY

This trace is a standard feature of of the OS versions of VTAM and ACF/VTAM. For OS/VS systems, the Generalized Trace Facility (GTF) must also be included in the system. For DOS/VS systems, the internal trace option of VTAM is required to obtain SMS data.

Note: A DOS/VS user may obtain a quick report on the status of VTAM buffers by dumping part of VTAM Storage. A 'dsply 000010' will indicate the address of the VTAM CVT. A display of this CVT address plus "7C" will indicate the start of the VTAM buffer pool directory. By issuing a DOS "dump" of this address to the address of the CVT, the user will get a dump of the directory. The DOS/VS VTAM Data Areas (SY27-7265) describes the format of the directory.

REFERENCE MANUALS

VTAM and ACF/VTAM SYSTEM PROGRAMMER'S GUIDE
VTAM and ACF/VTAM DEBUGGING GUIDE
VTAM and ACF/VTAM REFERENCE SUMMARY
OS SERVICE AIDS

Please reference Bibliography for form numbers for the applicable systems.

OPERATION

The storage pool trace is initiated and terminated at the system console with the following commands:

initiation
OS - F procname,TRACE,ID=VTAMBUF,TYPE=SMS

termination
OS - F procname,NOTRACE,ID=VTAMBUF,TYPE=SMS

The trace may also be initiated at VTAM and ACF/VTAM startup time by including the following statement in the ATCSTRxx member called in:

```
TRACE,ID=VTAMBUF,TYPE=SMS
```

For OS/VS systems, this VTAM and ACF/VTAM trace can be started regardless of whether GTF has been previously initiated. However, no trace records are recorded until GTF is active. Because of this, and because there is very little overhead associated with this trace, it is advisable to always start-up VTAM and ACF/VTAM with the SMS trace active. By doing this, the Storage Pool data will be available whenever GTF is running. GTF must be started with the 'USR' option.

INTERPRETATION

VTAM (OS/VS)

VTAM will create a trace record which contains three fields for each of the buffer types. These three fields are:

- MAXU - the maximum number of buffers used at any one time during the recording period. This field may be zero if the value has not changed since the last recording period. When using ACF/VTAM, this value will reflect only the usage of the current increment of buffers, not the total usage.
- MAXQ - the number of conditional requests for buffers that have been queued. Note that this field does not reflect the number of additional buffers required to satisfy all requests since it is the count of requests and not buffers. Also, unconditional buffer requests will not increment this value. Constant queuing should be eliminated by raising the threshold and number for the buffer type. VTAM queues requests when the buffer threshold is exceeded.
- AVNO - the number of buffers available at the instant the snapshot dump was taken. Be careful not to lower the VTAM buffer specifications based only upon a 'steady-state' analysis indicating a large number of buffers available. The number of available buffers must be large enough to support major changes in the state of a network, such as the deactivation/activation of the largest major node, or the initiation of an application program that acquires a large number of sessions at start-up time.

SAMPLE OUTPUT

```
USRFD FF0     VTAM BUFFERS      MAXU MAXQ AVNO    MAXU MAXQ AVNO    MAXU MAXQ AVNO    MAXU MAXQ AVNO
                           IO 0014 0000 0048 PP 0000 0000 0082 LP 0000 0000 004F WP 0009 0000 0079
                           NP 0000 0000 0056 LF 0000 0000 0015 CR 0007 0000 0072 UE 0000 0000 0082
                           SP 0000 0000 0022 SP 0000 0000 000C AP 0000 0000 0039
        TIME     55865.570672
USRFD FF0     VTAM BUFFERS      MAXU MAXQ AVNO    MAXU MAXQ AVNO    MAXU MAXQ AVNO    MAXU MAXQ AVNO
                           IO 0015 0000 0047 PP 0001 0000 0081 LP 0000 0000 004F WP 000A 0000 007B
                           NP 0000 0000 0056 LF 0000 0000 0015 CR 0000 0000 0072 UE 0000 0000 0082
                           SP 0000 0000 0022 SP 0000 0000 000C AP 0008 0000 0039
        TIME     55866.222874
```

INTERPRETATION

ACF/VTAM/VS (OS/VS) ACF/VTAM will create a trace record which contains six fields for each of the buffer types. These six fields are:

MAXU - the maximum number of buffers used at any one time during the recording period. This field may be zero if the value has not changed since the last recording period. This value will reflect only the usage of the current increment of buffers, not the total usage.

MAXQ - the number of conditional requests for buffers that have been queued. Note that this field does not reflect the number of additional buffers required to satisfy all requests since it is the count of requests and not buffers. Also, unconditional buffer requests will not increment this value. Constant queuing should be eliminated by raising the threshold and number for the buffer type. ACF/VTAM queues requests when the buffer threshold is exceeded.

AVNO - the number of buffers available at the instant the snapshot dump was taken. Be careful not to lower the ACF/VTAM buffer specifications based only upon a 'steady-state' analysis indicating a large number of buffers available. The number of available buffers must be large enough to support major changes in the state of a network, such as the deactivation/activation of the largest major node, or the initiation of an application program that acquires a large number of sessions at start-up time.

TEXP - the number of times the buffer pool was expanded during the time covered by the snapshot dump.

MBUF - the maximum number of buffers that were in the pool at any one time during the time covered by the snapshot dump.

TOTL - the number of buffers that were in the pool at the time the snapshot dump was taken.

SAMPLE OUTPUT

```
USRFD FF0 ASCB 00FED268  JOBN NET
            VTAM BUFFERS       MAXU MAXQ AVNO TEXP MBUF TOTL     MAXU MAXQ AVNO TEXP MBUF TOTL
                             IO 0017 0000 0068 0000 007C 007C PP 0000 0000 0023 0000 0023 0023
                             LP 000F 0000 0012 0000 0020 0020 WP 0000 0000 001E 0000 001E 001E
                             NP 0010 0000 000E 0000 001E 001E LF 0000 0000 001E 0000 001E 001E
                             CR 0013 0000 0022 0000 0034 0034 UE 0004 0000 001E 0000 001E 001E
                             SF 0011 0000 002B 0000 003C 003C SP 0013 0000 0034 0000 0044 0044
                             AP 0011 0000 002C 0000 003C 003C
          TIME     23880.583310
```

3.2 : VTAM BUFFER TRACE

DESCRIPTION

This is a facility of VTAM that allows the user to trace the flow of data at the Application Program Interface (CL) and the channel interface point (TPIOS). Both inbound and outbound data, up to 223 bytes (VTAM 2), is printed in hex and character format. ACF/VTAM/VS print the entire PIU in hex and character format. At the TPIOS level, many of the TH/RH fields are also printed.

AVAILABILITY

This trace is a standard feature of VTAM. For OS systems, the Generalized Trace Facility (GTF) must also be included in the system.

REFERENCE MANUALS

VTAM SYSTEM PROGRAMMER'S GUIDE
VTAM DEBUGGING GUIDE
VTAM REFERENCE SUMMARY
OS SERVICE AIDS

Please reference Bibliography for form numbers for the applicable systems.

OPERATION

The buffer trace is initiated and terminated at the system console with the following commands:

```
initiation
  DOS   -     F NET,TRACE,TYPE=BUF,ID=nodename
  OS    -     F procname,TRACE,TYPE=BUF,ID=nodename

termination
  DOS   -     F NET,NOTRACE,TYPE=BUF,ID=nodename
  OS    -     F procname,NOTRACE,TYPE=BUF,ID=nodename
```

The trace may also be initiated at VTAM startup time by including the following statement in the ATCSTRxx member called in:

```
TRACE,TYPE=BUF,ID=nodename
```

For OS systems, this VTAM trace can be started regardless of whether GTF has been previously initiated. However, no trace records are recorded until GTF is active. GTF must be running with the 'USR' option.

INTERPRETATION

VTAM will create 4 trace records for a typical transaction from a LU that has trace active. These four trace records are:

TPIOS IN - created as the inbound data is received from the channel. This entry indicates that the data is in VTAM's I/O buffers.

C/L IN - created as the inbound data is passed through VTAM to the application program interface. This entry indicates that the data is in the application program's input area.

C/L OUT - created as the outbound data is passed from the application program to VTAM. This entry indicates that the application program has issued a SEND command, but the data is not in VTAM's I/O buffers.

TPIOS OUT - created as the outbound data is transmitted to the channel. This entry indicates that the data is in VTAM'S I/O buffers.

SAMPLE OUTPUT

```
VTAM 2 (MVS)
USRFD FF1 ASCB 00FE3918  JOBN YGL0
          C/L  OUT  ANODE TS00001    TEXT F1C1115D 7F1D4011 C1501DC8 E8C7D3F0 40D3D6C7  *1A.)". .A&.HYGL0 LOG*
                    DNODE LU3270V2       D6D540C9 D540D7D9 D6C7D9C5 E2E240C1 E340F1F1  *ON IN PROGRESS AT 11*
                                         7AF2F57A F0F940D6 D540C6C5 C2D9E4C1 D9E840F8  *:25:09 ON FEBRUARY 8*
                                         6B40F1F9 F7F81D40 11C26013                    *, 1978. .B-.        *
         TIME    41109.602399
USRFD FEF ASCB 00FE3918  JOBN YGL0
          TPIOS OUT ANODE TS00001    FDB  00000000 00B81938 00550000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE LU3270V2   THRH 1C002849 08010000 00000380 80
                                     TEXT F1C1115D 7F1D4011 C1501DC8 E8C7D3F0 40D3D6C7  *1A.)". .A&.HYGL0 LOG*
                                          D6D540C9 D540D7D9 D6C7D9C5 E2E240C1 E340F1F1  *ON IN PROGRESS AT 11*
                                          7AF2F57A F0F940D6 D540C6C5 C2D9E4C1 D9E840F8  *:25:09 ON FEBRUARY 8*
                                          6B40F1F9 F7F81D40 11C26013                    *, 1978. .B-.        *
         TIME    41109.615820
USRFD FEF ASCB 00FE3918  JOBN YGL0
          TPIOS IN  ANODE TS00001    FDB  00000000 00B81049 00090000   RSVD 0830   LNG2 00DC
            REMOTE  DNODE LU3270V2   FSB  022C0000 00000000 08012849 00010000 00000000 00000000 000C0000
                                     THRH 1C000801 28490001 000C0300 00
                                     TEXT 7DC8F311 C7E8A297 86                     *'H3.GYspf           *
         TIME    41129.942781
USRFD FF1 ASCB 00FE3918  JOBN YGL0
          C/L  IN   ANODE TS00001    TEXT 7DC8F311 C7E8A297 86                     *'H3.GYspf           *
```

```
                DNODE LU3270V2
          TIME    41129.998773
```

SAMPLE OUTPUT

```
ACF/VTAM  (MVS)
 USRFD FEF ASCB 00FF9CD0 JOBN NET
            BUFF     MVSVMVT /P70LU1       LRC(000,000)     INBOUND
            VTAM        TH=1C006800 A87C0000 000C  RH= 038000
                                             93968740 9596A297 F1
           TIME     38739.350394
 USRFD FEF ASCB 00FF9CD0  JOBN NET
            BUFF     P70LU1  /MVSVMVT      LRC(000,000)     OUTBOUND
            VTAM        TH=1C00A87C 68000000 0003  RH= 838000
           TIME     38741.343959
 USRFD FEF ASCB 00FEE980  JOBN NOSP
            BUFF     P70LU1  /NOSP1        LRC(000,000)     OUTBOUND
            VTAM        TH=1D00A87C 681F0001 0025  RH= 6B8000
                                             31010303 B1B07080 00018585 02000131
                                             08000000 00000005 D5D6E2D7 F100
           TIME     38745.694141
 USRFD FEF ASCB 00FEE980  JOBN NOSP
            BUFF     NOSP1   /P70LU1       LRC(000,000)     INBOUND
            VTAM        TH=1D00681F A87C0001 0004  RH= EB8000
                                             31
           TIME     38747.485417
 USRFD FEF ASCB 00FEE980  JOBN NOSP
            BUFF     P70LU1  /NOSP1        LRC(000,000)     OUTBOUND
            VTAM        TH=1D00A87C 681F0002 0005  RH= 6B8000
                                             3201
           TIME     38765.599523
 USRFD FEF ASCB 00FEE980  JOBN NOSP
            BUFF     NOSP1   /P70LU1       LRC(000,000)     INBOUND
            VTAM        TH=1D00681F A87C0002 0004  RH= EB8000
                                             32
           TIME     38766.023784
 USRFD FEF ASCB 00FEE980  JOBN NOSP
            BUFF     P70LU1  /NOSP1        LRC(000,000)     OUTBOUND
            VTAM        TH=1D00A87C 681F0003 0005  RH= 6B8000
                                             3201
           TIME     38766.287482
 USRFD FEF ASCB 00FEE980  JOBN NOSP
            BUFF     NOSP1   /P70LU1       LRC(000,000)     INBOUND
            VTAM        TH=1D00681F A87C0003 0004  RH= EB8000
                                             32
           TIME     38766.291482
```

3.3 : VTAM I/O TRACE

DESCRIPTION

This is a facility of VTAM that allows the user to trace the TH/RH/SNA-COMMAND sequence of all PIU's to and from any node except local 3277's. For local 3277's, see sections titled 'OS GTF' and 'DOS/VS VTAM TRACE'. This trace is particularly useful to diagnose activation/deactivation problems since it presents a concise list of commands and responses.

AVAILABILITY

This trace is a standard feature of VTAM. For OS systems, the Generalized Trace Facility (GTF) must also be included in the system.

REFERENCE MANUALS

VTAM SYSTEM PROGRAMMER'S GUIDE
VTAM DEBUGGING GUIDE
VTAM REFERENCE SUMMARY
OS SERVICE AIDS
SNA REFERENCE SUMMARY

Please reference Bibliography for form numbers for the applicable systems.

OPERATION

The I/O trace is initiated and terminated at the system console with the following commands:

```
initiation
  DOS    -      F NET,TRACE,TYPE=IO,ID=nodename
  OS     -      F procname,TRACE,TYPE=IO,ID=nodename

termination
  DOS    -      F NET,NOTRACE,TYPE=IO,ID=nodename
  OS     -      F procname,NOTRACE,TYPE=IO,ID=nodename
```

The trace may also be initiated at VTAM startup time by including the following statement in the ATCSTRxx member called in:

```
TRACE,TYPE=IO,ID=nodename
```

For OS systems, this VTAM trace can be started regardless of whether GTF has been previously initiated. However, no trace records are recorded until GTF is active. GTF must be running with the 'RNIO' option.

INTERPRETATION

VTAM will create 2 types of trace records depending upon the direction of the flow of the PIU.

RNIO IN - created as the inbound PIU is received from the channel.

RNIO OUT - created as the inbound PIU is passed to the channel.

When using an I/O trace to isolate problems with activation, deactivation, or sessions, look for negative responses and missing responses.

Also, it may be necessary to trace all nodes in the path in order to spot the failing node. For example, if there is a logical unit not activiating, an I/O trace on that node may show that no ACTLU command was sent. But the problem may be that the PU never responded to the ACTPU. Don't forget that NCP is also a node that should be traced.

SAMPLE OUTPUT

This is a sample I/O trace for a Logical Unit initiating a session. The format of the IO trace is the same for VTAM2 and ACF/VTAM. The sequence shows the logical unit being activated, after which the LU sends in an 'INITIATE SELF' request which the application program responds to with an 'OPNDST OPTCD=ACCEPT.' This causes a 'BIND' and 'START DATA TRAFFIC' to be sent. All of these commands use positive response mode.

Note that on the 'INITIATE SELF' and 'BIND' command, only a few data bytes are shown. If a display of the entire string is required, then a VTAM BUFFER trace must also be started.

```
RNIO     TCB 0001B628    JOBN CNET       R0  00000010     OUT     1F001022 08000001 00066B80 000D0101          (Activate Logical)
          TIME    57258.137253
RNIO     TCB 0001B628    JOBN CNET       R0  0000000F     IN      1F000800 10220001 0005EB80 000D01            (Response)
          TIME    57259.795638
RNIO     TCB 0001B628    JOBN CNET       R0  00000014     IN      1C000800 10220001 001C0B80 00010681 00404040 (Initiate Self)
          TIME    57260.477230
RNIO     TCB 0001B628    JOBN CNET       R0  00000010     OUT     1C001022 08000001 00069B80 00010681          (Response)
          TIME    57263.720293
RNIO     TCB 0001B628    JOBN CNET       R0  00000014     OUT     1F001022 08010001 00286B80 00310103 03B1A030 (BIND)
          TIME    57264.739584
RNIO     TCB 0001B628    JOBN CNET       R0  0000000E     IN      1F000801 10220001 0004EB80 0031              (Response)
          TIME    57267.320668
RNIO     TCB 0001B628    JOBN CNET       R0  0000000E     OUT     1F001022 08000002 00046B80 00A0              (SDT)
          TIME    57267.406973
RNIO     TCB 0001B628    JOBN CNET       R0  0000000E     IN      1F000801 10220002 0004EB80 00A0              (Response)
          TIME    57270.303415
```

3.4 : DOS/VS VTAM TRACE

DESCRIPTION

This trace is an option of the PDAIDS utility of DOS/VS. It allows the user to trace all SIO's and I/O Interrupts associated with one or more devices on a channel. It also provides for tracing the VTAM SVC's.

AVAILABILITY

PDAIDS are a standard feature of DOS/VS. During the system generation, specify a minimum of 1400 in the PD parameter of the FOPT macro.

REFERENCE MANUALS

DOS/VS SERVICEABILITY AND DEBUGGING PROCEDURES	GC33-5380
DOS/VS VTAM DEBUGGING GUIDE	GC27-0021

OPERATION

The trace data can be directed to a line printer, a tape drive, or to a main storage area. If one of the latter two options is chosen, the PDLIST program is used to print the trace at some subsequent time.

After the trace is initiated in BG, that partition becomes available for other jobs. To terminate the trace and/or print the stored trace data, execute PDAIDS in BG once again.

When tracing I/O activity, up to three devices may be traced simultaneously, or all devices may be traced with the option of excluding three.

Also, for the purposes of tracing the VTAM SVC's, selective partitions can be specified. This allows the user who is running more than one VTAM application program to limit the scope of the trace.

SAMPLE JCL

The sequence below shows the initiation of a trace of I/O activity to a 3705 at address 0A1, and the VTAM SVC activity for the F2 partition. The trace data will be stored on tape at address 283.

```
// JOB PDVTAM
// EXEC PDAID
PDAID=VT,
TRACE DEVICE=0A1,
TRACE PARTITION=F2,
OUTPUT DEVICE=283,
GO
/*
/&
```

The sequence below will terminate the trace, and print the trace that was stored on tape.

```
// JOB PDVTAM
// EXEC PDAID
PDAID=XX
/*
// ASSGN SYSLST,X'00E'
// ASSGN SYS005,X'283'
// EXEC PDLIST
/&
```

3.5 : VTAMLST

DESCRIPTION

For OS versions of VTAM, the network is defined to VTAM by filing members representing each major node in SYS1.VTAMLST. On DOS VTAM systems these statements are filed in the source statement library.

VTAM2 currently has five types of major nodes.

1. Application program major nodes
2. Local 3270 major nodes
3. Local SNA major nodes
4. Switched SNA major nodes
5. NCP major nodes

The statements describing each major node included in the system are filed in VTAMLST/B.BOOK.

Members describing VTAM start up parameters (ATCSTRxx) and network configurations (ATCCONxx) are also filed in VTAMLST or B.BOOK. By filing multiple members the account can specify different start up parameters and configuration to be used at VTAM start up time.

AVAILABILITY

This data set must be defined by the account and the major node definitions, start up parameters, and configurations used in the account filed in it.

REFERENCE MANUALS

VTAM SYSTEM PROGRAMMER'S GUIDE

Please reference Bibliography for form numbers for the applicable systems.

OPERATION

When 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.

3.6 : ACF/VTAM INTERNAL TRACE

DESCRIPTION

This facility of ACF/VTAM allows the user to trace the following 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)
- Operator message (MSG)
- Request/response posting (SSCP)

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 an IBM 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. (See examples below.)

AVAILABILITY

This trace is a standard feature of ACF/VTAM. For OS/VS systems, the Generalized Trace Facility (GTF) must also be included in the system if the trace output is directed to an external data set.

REFERENCE MANUALS

ACF/VTAM NETWORK OPERATING PROCEDURES (for activating and deactivating the internal trace)

ACF/VTAM DEBUGGING GUIDE (for interpreting the internal trace output)

ACF/VTAM REFERENCE SUMMARY (for a summary of trace commands)

OS SERVICE AIDS (for a discussion of GTF)

Please refer to Bibliography for form numbers for the applicable systems.

OPERATION

The internal trace is activated and deactivated at the system console by issuing the MODIFY TRACE|NOTRACE command with TYPE=VTAM specified. The operator indicates which functions are to be traced by specifying one or more of the following in the OPTIONS operand: API, PSS, LOCK, SMS, PIU, MSG, or SSCP. To trace all functions OPTIONS=ALL is specified. In OS/VS only, the operator also specifies whether the trace data is to be recorded in the internal, wraparound trace table (MODE=INT) or on an external GTF data set (MODE=EXT). The default is MODE=INT. If MODE=EXT is specified in OS/VS, GTF USR trace must be active when trace is started. When output is directed to an internal, wraparound trace table, the SIZE operand specifies the number of pages (1-999) to be allocated to the table.

In DOS/VS the DUMP and DSPLY commands are used to print the internal trace table. Address X'10' in low storage points to the ATCVT. At displacement X'33C' in the ATCVT is a pointer to the internal trace table header. See DOS/VS DEBUGGING GUIDE for more information on the trace table header, including times and addresses of last and current entries.

Following are some sample activation and deactivation commands for the internal trace:

Activation

The internal trace is activated for all ACF/VTAM functions. Trace data is recorded in an in-core, wraparound trace table. Three pages are allocated to the in-core trace table.

```
DOS - F NET,TRACE,TYPE=VTAM,OPTIONS=ALL,SIZE=3
OS -  F procname,TRACE,TYPE=VTAM,OPTIONS=ALL,SIZE=3
```

Deactivation

The internal trace is deactivated for all ACF/VTAM functions. The in-core trace table is freed.

```
DOS - F NET,NOTRACE,TYPE=VTAM,OPTIONS=END
OS  - F procname,NOTRACE,TYPE=VTAM,OPTIONS=END
```

Activation

The internal trace is activated for API, PIU, MSG, and SMS functions only. Trace data is recorded on an external data set.

```
OS                              -                              F
procname,TRACE,TYPE=VTAM,MODE=EXT,OPT=(API,PIU,MSG,SMS)
```

If MODE=EXT is specified in OS/VS, GTF USR trace must be active before ACF/VTAM is started. Deactivation

The internal trace is deactivated.

```
OS                              -                              F
procname,NOTRACE,TYPE=VTAM,MODE=EXT,OPT=(API,PIU,MSG,SMS)
```

INTERPRETATION

See ACF/VTAM DEBUGGING GUIDE for description of internal trace records.

SAMPLE OUTPUT

The internal trace can be used to determine whether there are enough RECEIVE's outstanding to handle the input message traffic. This example, produced under MVS with OPTIONS=(API,PIU,SMS), shows a RECEIVE outstanding at the time that the PIU came out of the Transmission Subsystem Component (TSC) path router. ACF/VTAM placed the data directly in the input area pointed to by the RPL associated with the outstanding RECEIVE.

```
USRFD FE1 ASCB 00FE38F0  JOBN CICS
          AI   0B RQ 23 OP1 20 TCB 000000 RPL 00B446C8 PAB/RC 00B430E8 ECB 003091 RH3 58 TYP 00 FL1 00 FL2 20 EX 04
               CHN   40  CNTL 800000
          TIME    40285.196466
USRFD FE1 ASCB 00.0E5B0  JOBN N/A
          PIU  00 FLAG    00     TSCB  B51A58  PIU  1C00681AA88B00180103  009000  C7C7C7C7C7C7C7C7C7C7C7
          TIME    40285.348786
USRFD FE1 ASCB 0000E5B0  JOBN N/A
          RQS 00 ISSR    C3007E PST  80B21B20 BUF  00B501E8 REG1    00B210B0 BUF*   0002     RC    0000
               INFO  00000000
          TIME    40285.356201
USRFD FE1 ASCB 00FE38F0  JOBN CICS
          RELS 0B ISSR    C24572 PST  80B0AAF8 BUF  00B51A58 REG1    00B49C3C NXTBUF 00B4FC38
          TIME    40285.383480
USRFD FE1 ASCB 00FE38F0  JOBN CICS
          RELS 0B ISSR    C24572 PST  80B0AAF8 BUF  00B4FC38 REG1    00B49C3C NXTBUF 00000000
          TIME    40285.385726
```

In this example, also produced under MVS with OPTIONS=(API,PIU,SMS), the application program fell behing and did not have a RECEIVE outstanding at the time that the PIU came out of the TSC path router. As a result, ACF/VTAM issued a GETSTOR for 300 bytes in subpool 229 and moved the input message there. Once the RECEIVE was issued, ACF/VTAM moved the data to the RPL input area and issued a FREESTOR on the 300 bytes in subpool 229. (GETSTOR and FREESTOR are internal ACF/VTAM macros which issue GETMAIN and FREEMAIN respectively.)

```
USRFD FE1 ASCB 00FE38F0  JOBN CICS
          PIU  0B FLAG    00     TSCB  B4FC38  PIU  1C00681AA88A00110103  009000  C6C6C6C6C6C6C6C6C6C6C6
          TIME    40264.551449
USRFD FE1 ASCB 00FE38F0  JOBN CICS
          RECS 0B ISSR    C3007E PST  80B21B20 BUF  00B51A58 REG1    00B210B0 BUF*   0002     RC    0000
             INFO  00000000
          TIME    40264.554233
USRFD FE1 ASCB 00FE38F0  JOBN CICS
          GET  0B ISSR    C25BB0 AREA 007DCED0 SP*  000000E5 LENGTH  0000012C RC     00000000
          TIME    40264.571335
USRFD FE1 ASCB 00FE38F0  JOBN CICS
          RELS 0B ISSR    C25D82 PST  80B0AAF8 BUF  00B4FC38 REG1    00B49C3C NXTBUF 00B51878
          TIME    40264.573593
USRFD FE1 ASCB 00FE38F0  JOBN CICS
          RELS 0B ISSR    C25D82 PST  80B0AAF8 BUF  00B51878 REG1    00B49C3C NXTBUF 00000000
          TIME    40264.575573
USRFD FE1 ASCB 00FE38F0  JOBN CICS
          AI   0B RQ 23 OP1 00 TCB 000000 RPL 00B44648 PAB/RC 00B43198 ECB 003091 RH3 58 TYP 00 FL1 00 FL2 20 EX 84
             CHN   80  CNTL 800000
          TIME    40264.657399
USRFD FE1 ASCB 00FE38F0  JOBN CICS
          FREE 0B ISSR    C2452C AREA 007DCED0 SP*  000000E5 LENGTH  0000012C RC     00000000
          TIME    40264.680644
```

When there is no RECEIVE outstanding for an input PIU coming out of the TSC path router, processing is less efficient because ACF/VTAM must acquire an area in private user storage, move the data there, and then free the area once the RECEIVE has been issued.

While the RECEIVE entries in the preceding trace examples are actually for RECEIVE SPECIFIC's, the user can determine whether he has enough RECEIVE ANY's outstanding by looking for the same GETSTOR/FREESTOR from private user storage. If the number of RECEIVE ANY's outstanding at any given time is not adequate for the number of input messages received, ACF/VTAM will issue GETSTOR/FREESTOR to place the data temporarily in private user storage.

3.7 : TOLTEP

DESCRIPTION

The Teleprocessing Online Test Executive Program (TOLTEP) operates with the online test (OLT) programs and the Virtual Telecommunications Access Method (VTAM). TOLTEP controls the selection and execution of the OLT's used for testing the teleprocessing terminals supported by VTAM. You can use the OLT programs to:

- perform preventive maintenance
- perform problem determination
- diagnose I/O errors
- verify device repairs and engineering changes

TOLTEP supports online testing for:

- Start/Stop terminals such as 1050, 2740, 2741, 3767.
- BCS terminals such as 2770, 2780, 3770, 3270, 3650, 3660, 3780.
- SDLC terminals such as 3270, 3767, 3770.
- local 3270 and 370X line hardware.
- SDLC link test to 3270, 3770, 3650, 3790, 3600, 3660, 3767

TOLTEP does not support online testing for 3704 and 3705 Controllers.

AVAILABILITY

To include and run TOLTEP in your system:

- VTAM must be the access method used.
- For a device (terminal, control unit, teleprocessing line) to be

tested, TOLTEP requires that device be allocated to VTAM, and that an online test (OLT) and configuration data set (CDS) are available for the device.

- For OS/VS, the appropriate DD statements must be included in the VTAM START procedure so that TOLTEP can refer to the OLTCDSDD and SYMSYM libraries.
  The VTAM System Programmer's Guide include's this information.

- OLT=YES should be specified during NCP generation.

- Symbolic names specified in the CDS must agree with the names assigned during NCP generation and VTAM system definition. TOLTEP associates the terminal to be tested with the CDS.

- TOLTEP does not support duplicate symbolic names.

- TOLTEP requires a CDS for all test terminals and for SNA control terminals and alternate printers.

- TOLTEP consists of two load modules that are loaded in virtual storage with VTAM. TOLTEP requires 79K bytes of virtual storage for DOS/VS and 85K bytes of virtual storage for OS/VS. For each user that invokes TOLTEP, including the first user, an additional 35K bytes of virtual storage are required for the OLT and a work area.

TOLTEP RESTRICTIONS.

- For any line test, the line must be inactive.

- The UPDATE verb is not available on a DOS/VS system.

- The UPDATE verb is permitted only when there is one TOLTEP user.

- Some OLT routines might not be executed if the control terminal or alternate printer are on the same line as the test terminal. These tests are usually related to line/link testing.

- Only one of the terminals connected to a local 3272 can be tested at a time. No other requests for TOLTEP are allowed until control unit testing is completed.

REFERENCE MANUALS

DOS/VS and OS/VS TOLTEP for VTAM	GC28-0663
OS/VS Message Library: Service Aids and OLTEP Messages	GC38-1006
OS/VS1 VTAM System Programers Guide	GC27-6996
OS/VS2 System Programming Library: VTAM	GC28-0688
Advanced Communications Function for VTAM TOLTEP	SC38-0283
OS/VS2 System Programming Library: OLTEP	GC28-0675

OPERATION

To start TOLTEP from the System operator's console, enter one of the following commands. The network console may be a system console, an alternate console, or a terminal that interfaces to VTAM's Program Operator Facility.

DOS/VS

```
n F TEST   where (n) is VTAM's partition number.
n MODIFY TEST
n MODIFY NET,TEST
```

OS/VS

```
F procname,TEST
MODIFY procname,TEST
VARY NET,ID=termname,LOGON=ISTOLTEP(,LOGMODE=logon mode)
```

Where 'procname' is the name of the VTAM start cataloged procedure and 'termname' is the name of the terminal to be logged on to TOLTEP as the control terminal. If either of the MODIFY commands are entered, the operator's console becomes the control terminal. If the VARY command is entered, the terminal being logged-on becomes the control terminal. Note that the system name for TOLTEP is ISTOLTEP. TOLTEP requires an entry in the Configuration Data Set (CDS) for all test terminals, control terminals, and alternate printers. The CE at your central site will generate the CDS for your system.

To start TOLTEP from a terminal other than the System operator's console, use the logon procedure defined at your installation. A LOGTAB may be created for non-SNA devices to simplify logons. A USSTAB for SNA devices may also be added to allow logon to ISTOLTEP.

LOGON APPLID (ISTOLTEP)

If you cannot logon to TOLTEP, it may be because the System operator denied the request, the device is not supported as a TOLTEP control terminal, VTAM cannot honor the request, or there is not a CDS for an SNA device.

ACQUIRING DEVICES

You can acquire terminals for TOLTEP use only when the terminals are not in session with an application program. When the desired terminals are not in session with an application, TOLTEP obtains use of the terminals in the same manner as other application programs. You can disconnect terminals from an application program by:

- using the logoff procedure defined at your installation.

- Issuing a VARY inactive immediate command from the System operator's console.

HOW TO DEFINE AND RUN TESTS

Once you are in session with TOLTEP, a message will prompt you to request a test as follows;

```
 ITA105D ENTER-DEV/TEST/OPT/   (OS/VS)
   F105D ENTER-DEV/TEST/OPT/   (DOS/VS)
```

The message serial number (identification) and message text are identical for both the DOS/VS and OS/VS systems. The operator responds to this message as for OLTEP requests.

The following TOLTEP verbs may be entered:

PROMPT	asking for help
CT=term	switching the TOLTEP control terminal
DUMP	causing a dump
CANCEL	terminating a TOLTEP session
TALK	communicate with the OLT

DEV (device field): The device address field may contain up to 16 symbolic names or physical device addresses of devices to be tested. Symbolic names may contain from one to eight characters and are the names the customer assigns to the device in the VTAM network definition. Physical device addresses must be specified for devices locally attached to the system, symbolic names must be

used for remote terminals and if the remote terminal is operating on an SDLC line the device field must include the bind parameters. If the bind is not valid for TOLTEP the test request is rejected with an error message giving a RTN code of 1001.

Following are sample device field entries:

```
BSC001,BSC002,BSC003/      (to test three remote terminals)
081,082,083/               (to test three local devices)
081-088/                   (to test a group of eight local devices)
SNA3270A(S3270)/           (entry name in the logon mode table for bind)
SNA3270A(X'030321913040')/ (actual bind parameter entered in hex)
```

Note that symbolic named devices must be specified individually, and to test the same devices in subsequent communication intervals just enter a '*/' without entering any devices. Test SNA3270A only uses the first six(6) bytes of bind data.

INTERPRETATION

To determine if the test executed correctly see if the requested number of test messages were displayed or printed correctly at the test terminal. At the control terminal, cancel the test request to get the test terminate message and any error printouts. The test failed if there is an asterisk in front of the T in the test terminate message as follows:

```
ITA158I  S T3700SNA UNIT 0033 T3767Z P00     (test start message)
ITA158I *T T3700SNA UNIT 0033 T3767Z P00     (test failed)
If the test ran successfully the following message will be printed:
ITA158I  T T3700SNA UNIT 0033 T3767Z P00
```

If the test failed there will be other console messages to indicate what has happened. Look up the messages in the TOLTEP error message manual for more information on the failure and save the console log in case IBM service is required.

SAMPLE OUTPUT

CONSOLE PRINTOUT EXAMPLE

```
f net,test                                  (call in TOLTEP)
 IST097I MODIFY ACCEPTED
 ITA102I ISTOLTEP R.2.0 INITIALIZATION IN PROGRESS
```

```
 ITA107I OPTIONS ARE NTL,NEL,NPP, FE,NMI, EP, CP, PR,NTR,NAP
*01 ITA105D ENTER DEV/TEST/OPT/

r 01,t3767z/3700sna/nfe/                    (run API echo on a 3767)
 IEE600I REPLY TO 01 IS 'T3767Z/3700SNA/NFE/'
 ITA158I  S T3700SNA UNIT 0033 T3767Z
 ITA158I  T T3700SNA UNIT 0033 T3767Z
 ITA107I OPTIONS ARE NTL,NEL,NPP,NFE,NMI, EP, CP, PR,NTR,NAP
*02 ITA105D ENTER DEV/TEST/OPT/

r 2,cancel                                  (cancelling TOLTEP)
 IEE600I REPLY TO 02 IS 'CANCEL'
 ITA548I ISTOLTEP NO LONGER RE2UIRES T3767Z
 .sp 1
v net,id=t3767z,logon=istoltep              (log on a 3767 to run TOLTEP)
 IST097I  VARY     ACCEPTED                  (the 3767 will be the contro l terminal)
 IST120I  LOGON COMPLETE FOR NODE T3767Z
*03 ITA920D MAY T3767Z   BE USED FOR TESTING-REPLY Y/N

r 3,y
 IEE600I REPLY TO 03 IS 'Y'
```

TERMINAL PRINTOUT EXAMPLE

```
logon applid (istoltep)
ITA102I ISTOLTEP REL.2.0 INITIALIZATION IN PROGRESS
ITA107I OPTIONS ARE NTL,NEL,NPP, FE,NMI, EP, CP, PR,NTR,NAP
ITA105D ENTER DEV/TEST/OPT
```

SAMPLE JCL FOR INSTALLING TOLTEP

The IBM Customer Engineer will provide the CDS file and the OLT library to put in the CNTRLIN file. The reference document for this is OS/VS2 System Programming Library: OLTEP (GC28-0675).

THIS SAMPLE JCL WILL CREATE THE DATA SETS FOR TOLTEP.

```
//INTOLTEP JOB xxxxxxxxxxxx,MSGCLASS=A
//STEP1  EXEC  PGM=IFDOLT99
//DIAGMSG  DD SYSOUT=A
//*   THIS STEP WILL ALLOCATE THE NECESSARY TOLTEP DATA SETS.
//OLTCDSDD DD UNIT=unit-type,VOL=SER=volume-serial,DISP=(,CATLG),DSN=OLTLIB,
//   SPACE=(CYL,(10,5,160))
//SYMSYM DD UNIT=unit-type,VOL=SER=volume-serial,DISP=(,CATLG),DSN=CDSLIB,
```

```
//   SPACE=(1024,(25,10,5))
//CNTRLIN DD UNIT=(TAPE,,DEFER),DISP=OLD,DSN=NOLABL,LABEL=(,NL),
//           VOL=SER=DATA
/*
```

THIS SAMPLE JCL IS TO AUTHORIZE THE DATA SETS.

```
./ ADD LIST=ALL,NAME=IEAAPF00
SYS1.VTAMLIB volume-serial,
SYS1.SSPLIB volume-serial,              (NCP utility library)
CDSLIB volume-serial,
OLTLIB volume-serial,
SYS1.NCPLOAD volume-serial,             (NCP load library)
```

THIS IS SAMPLE JCL TO CHANGE THE VTAM START PROC TO INCLUDE THE TOLTEP DATA SETS.

```
//PROCUP JOB xxxxxxxxxx
//       EXEC  PGM=IEBUPDTE,PARM=NEW
//SYSPRINT DD SYSOUT=A
//SYSUT2 DD    DSNAME=SYS1.PROCLIB,DISP=SHR
//SYSIN  DD    DATA
./      ADD LIST=ALL,NAME=procname(usually NET)
./   NUMBER  NEW1=10,INCR=10
//NET    EXEC  PGM=ISTINx01
//VTAMLIB  DD   DSN=SYS1.VTAMLIB,DISP=SHR
//VTAMLST  DD   DSN=SYS1.VTAMLST,DISP=SHR
//VTAMOBJ  DD   DSN=SYS1.VTAMOBJ,DISP=SHR
//INITEST  DD   DSN=SYS1.SSPLIB,DISP=SHR
//OLTCDSDD DD   DSN=OLTLIB,DISP=SHR
//SYMSYM   DD   DSN=CDSLIB,DISP=SHR
//NCPLOAD  DD   DSN=SYS1.NCPLOAD,DISP=SHR
//NCPDUMP  DD   DSN=NCPDUMP,DISP=MOD
//SYSABEND DD   SYSOUT=A
./   ENDUP
```

TOLTEP CAN BE STARTED WITH THE FOLLOWING VTAM MODIFY COMMAND AND USED TO UPDATE THE CDS FILE.

```
f net,test
 IST097I  MODIFY   ACCEPTED
 ITA102I ISTOLTEP REL.2.0 INITIALIZATION IN PROGRESS
 ITA107I OPTIONS ARE NTL,NEL,NPP, FE,NMI, EP, CP, PR,NTR,NAP
```

```
*14 ITA105D ENTER DEV/TEST/OPT/
```

CREATING A CDS FOR SNA DEVICE.

```
14update
 IEE600I REPLY TO 14 IS 'UPDATE'
*15 ITA560D ENTER EXHIBIT,ADD,CHANGE,DELETE,COPY OR NONE
15add
 IEE600I REPLY TO 15 IS 'ADD'
*16 ITA578D ENTER SYMBOLIC NAME OR  UNIT ADDR
16tr3727s
 IEE600I REPLY TO 16 IS 'TR3727S'
 ITA380I TR3727S  CANNOT BE USED, DOES NOT EXIST TO VTAM
```

***** NOTE: TERMINAL MUST BE DEFINED IN AN ACTIVE MAJOR NODE

```
*18 ITA560D ENTER EXHIBIT,ADD,CHANGE,DELETE,COPY OR NONE
18add
 IEE600I REPLY TO 18 IS 'ADD'
*19 ITA578D ENTER SYMBOLIC NAME OR  UNIT ADDR
19tr3767s
 IEE600I REPLY TO 19 IS 'TR3767S'
*21 ITA580D ENTER P/PROMPT OR CDS DATA FOLLOWED BY END
21ua=0bf,c=44,t=20,fl=0a0000,end
 IEE600I REPLY TO 21 IS 'UA=0BF,C=44,T=20,FL=0A0000,END'
 ITA562I CDS ADDED TO LIBRARY
```

CREATING A CDS FILE BY COPING AN EXISTING CDS FILE.

```
*22 ITA560D ENTER EXHIBIT,ADD,CHANGE,DELETE,COPY OR NONE
22copy
 IEE600I REPLY TO 22 IS 'COPY'
*23 ITA578D ENTER SYMBOLIC NAME OR  UNIT ADDR
23tr3767s
 IEE600I REPLY TO 23 IS 'TR3767S'
*24 ITA582D ENTER NEW SYMBOLIC NAME OR UNIT ADDR (SN= OR UA=)
24sn=rje1f
 IEE600I REPLY TO 24 IS 'SN=RJE1F'
 ITA380I RJE1F7S  CANNOT BE USED, DOES NOT EXIST TO VTAM
 ITA581I INVALID SYMBOLIC NAME FIELD. RE-ENTER LAST LINE
```

NOTE: TOLTEP DOES NOT ALLOW COPY TO A SYMBOLIC NAME THAT HAS LESS CHARACTERS THAN THE SOURCE CDS FILE(TOLTEP DESIGN ERROR).

```
*26 ITA582D ENTER NEW SYMBOLIC NAME OR UNIT ADDR (SN= OR UA=)
```

```
26sn=batch2as
 IEE600I REPLY TO 26 IS 'SN=BATCH2AS'
 ITA562I CDS ADDED TO LIBRARY
*27 ITA560D ENTER EXHIBIT,ADD,CHANGE,DELETE,COPY OR NONE
27add
 IEE600I REPLY TO 27 IS 'ADD'
*28 ITA578D ENTER SYMBOLIC NAME OR  UNIT ADDR
```

DEFINING CDS FOR SNA DEVICE (3270 SDLC).

```
28lu3270f0
 IEE600I REPLY TO 28 IS 'LU3270F0'
*29 ITA580D ENTER P/PROMPT OR CDS DATA FOLLOWED BY END
29ua=0bf,c=42,t=1d,fl=0a0000,end
 IEE600I REPLY TO 29 IS 'UA=0BF,C=42,T=1D,FL=0A0000,END'
 ITA562I CDS ADDED TO LIBRARY
```

EXHIBITING CDS CONFIGURATION DATA.

```
*30 ITA560D ENTER EXHIBIT,ADD,CHANGE,DELETE,COPY OR NONE
30exhibit
 IEE600I REPLY TO 30 IS 'EXHIBIT'
*31 ITA578D ENTER SYMBOLIC NAME OR  UNIT ADDR
31lu3270f0
 IEE600I REPLY TO 31 IS 'LU3270F0'
 ITA579I CONFIGURATION DATA
 ITA579I    FIELD          BYTES    CONTENTS
 ITA579I UNIT ADDRESS      00-03    000000BF
 ITA579I MODEL                04    00
 ITA579I FEATURE              05    00
 ITA579I CLASS                06    42
 ITA579I TYPE                 07    1D
 ITA579I BYTE COUNT           08    14
 ITA579I FLAGS             09-11    0A0000
 ITA579I SYMBOLIC NAME     12-19    LU3270F0
*32 ITA560D ENTER EXHIBIT,ADD,CHANGE,DELETE,COPY OR NONE
32exhibit
 IEE600I REPLY TO 32 IS 'EXHIBIT'
*33 ITA578D ENTER SYMBOLIC NAME OR  UNIT ADDR
33tr3767f
 IEE600I REPLY TO 33 IS 'TR3767F'
 ITA579I CONFIGURATION DATA
 ITA579I    FIELD          BYTES    CONTENTS
 ITA579I UNIT ADDRESS      00-03    000000BF
```

```
 ITA579I MODEL                 04     00
 ITA579I FEATURE               05     00
 ITA579I CLASS                 06     44
 ITA579I TYPE                  07     20
 ITA579I BYTE COUNT            08     14
 ITA579I FLAGS              09-11     0A0000
 ITA579I SYMBOLIC NAME      12-19     TR3767F
```

TERMINATING UPDATE FUNCTION AND STARTING A SNA DEVICE TEST.

```
*34 ITA560D ENTER EXHIBIT,ADD,CHANGE,DELETE,COPY OR NONE
34none
 IEE600I REPLY TO 34 IS 'NONE'
*35 ITA105D ENTER DEV/TEST/OPT/
35tr3767f/t3700sna//
 IEE600I REPLY TO 35 IS 'TR3767F/T3700SNA//'
 ITA158I  S T3700SNA UNIT 00BF TR3767F
 ITA158I  T T3700SNA UNIT 00BF TR3767F
```

PRECEEDING MESSAGES ARE SENT TO TERMINAL INITIATING TEST.

ENTERING CANCEL TERMINATES ISTOLTEP

```
 ITA107I OPTIONS ARE NTL,NEL,NPP, FE,NMI, EP, CP, PR,NTR,NAP
*36 ITA105D ENTER DEV/TEST/OPT/
36cancel
 IEE600I REPLY TO 36 IS 'CANCEL'
 ITA548I ISTOLTEP NO LONGER REQUIRES TR3767F
```

IF TEST INITIATED FROM REMOTE TERMINAL, THE FOLLOWING MESSAGE IS SENT TO THE SYSTEM OPERATOR.

```
*37 ITA920D MAY TR3767F  BE USED FOR TESTING-REPLY Y/N
37y
 IEE600I REPLY TO 37 IS 'Y'
```

THE FOLLOWING MESSAGES ARE SENT TO THE SYSTEM OPERATOR WHEN THE TERMINAL OPERATOR HAS TERMINATED THE TEST.

```
 ITA548I ISTOLTEP NO LONGER REQUIRES TR3767F
 ITA549I TR3767F  HAS RELEASED ALL DEVICES AND IS DONE TESTING
```

3.8 : SIRF

DESCRIPTION

The 3790 Subsystem Information Retrieval Facility (SIRF), is a VTAM application program that supports batch retrieval from a 3790. SIRF will work for local-channel-attached or remote 3791's. SIRF can be used to obtain information from the controller to allow problem determination to be done from the central site location. SIRF commands can be used to perform the following functions:

- Retrieve selected records from the transaction, print, and message data sets.
- Retrieve the installation diskette, which provides the host system programmer with a list of all features installed on a controller.
- Retrieve the request for engineering activity (REA) log, which provides the host system programmer with a list of all changes installed on the controller.
- Establish a host-initiated echo test that can be used to test the communication link and the ability of the controller to receive, store, and return a predetermined data stream.
- Retrieve the condition incident log (CIL), which provides the host system programmer with a SYSLERR capability similar to that available to the control operator. A detailed description of SYSLERR can be found in the Operations Guide for the 3790 Communication System, GA27-2822.

AVAILABILITY

SIRF will be installed and maintained by the IBM FE Division.

REFERENCE MANUALS

SIRF User's Guide is located on the SIRF installation tape and can be printed when SIRF is installed.

IBM 3790 Communications System: Host Systems Programmers Guide (with TNL GN31-0651) GC22-9033

Operations Guide for the 3790 Communication System GA27-2822

OPERATION

For detailed information on how to use SIRF refer to the SIRF Users Guide and the Host Systems Programmers Guide (GC22-9033). Following is a summary of the message headers:

SELECTED DATA SET RECORDS TO HOST

Three message headers are provided that allow the type 1 batch function to transmit selected records from the transaction, print, and message data sets. These are:

Query for data set record.
Transmit record block to host.
End queries for data set records.

SYSTEM CONFIGURATION TO HOST

Two message headers are provided that allow the type 1 batch function to transmit a list of the features installed on the controller. These are:

Query for installation list.
Transmit installation list to host.

REA LOG TO HOST

Two message headers are provided that allow the type 1 batch function to transmit a list of the REA's installed on the controller. These are:

Query for REA Log.
Transmit REA Log to Host.

HOST INITIATED ECHO TEST

Three message headers are provided that allow the type 1 batch function to store two 256-byte echo data RU's in the controller and repetitively transmit these echo data RU's to the host. These message headers are:

Transmit host to 3790 echo data.
Query for Echo Data.
Transmit 3790 to host echo data.

The transmit host to 3790 echo data message header indicates to the type 1 batch function that the following RU's contain echo data. A maximum of two data RU's can follow. They may be from 1 to 256 bytes in length. The echo data is stored in the 3791 controller until it is changed by a subsequent transmit host to 3790 echo data message header.

If any data RU following this message header has a length of zero, any existing echo data is cleared, and a user sense code 45 (zero length echo data) is returned to the SIRF application program.

If more than two data RU's follow this message header, any existing echo data is cleared, and a user sense code 48 (more than 2 echo RU's received) is returned to the SIRF application program.

The query for echo data is used to indicate to the type 1 batch function the number of times the echo data RU's are to be transmitted. 'nn' is a hexidecimal number from '00' to 'ff'. If 'nn' is coded as 0, the controller sends echo data RU's until a negative response is sent by the host.

The transmit 3790 to host echo data message header indicates to the SIRF application program that the remaining RU's in this chain contain previously stored echo data. If no echo data is stored, the controller returns a Status-Negative Query Response message header.

CONDITION INCIDENT LOG TO HOST

Two message headers are provided that allow the type 1 batch function to transmit records stored in the condition incident log (CIL) in the controller. For a detailed description of the types of records stored in the CIL, refer to the 3790 Operations Guide(GA27-2822). The message headers are:

Query for Condition Incident Log.
Transmit 3790 to host Condition Incident Log.

SAMPLE OUTPUT

For detailed information on SIRF output refer to the SIRF User's Guide.

3.9 : TCAM DUMP FORMATTING

DESCRIPTION

THE TCAM 10 AND ACF/TCAM ABDUMP FORMATTING ROUTINE HAS 3 TYPES OF OUTPUT:

1) A hex offset dump of the basic control blocks (TCTCX,AVT,SAVT,OPCAVT,SAT,RESPL,OLTCBs).

2) A table of relevant data and addresses driven by the terminal table connected index (TTCIN). This eliminates the need for specifying a CROSS-REFERENCE TABLE.

3) An optional hex dump of control blocks whose addresses appeared in the previous section's table. The blocks that appear here are determined by the ABEFMT parameter on the INTRO macro - ABEFMT=(xxx,xxx) where xxxx is:

   AMWA - ACCESS METHOD WORK AREA
   DCB - DATA CONTROL BLOCK
   DCT - DEVICE CHARACTERISTICS TABLE
   DEB - DATA EXTENT BLOCK
   LCB - LINE CONTROL BLOCK
   LGB - LINE GROUP BLOCK
   OPT - OPTIONS DATA AND NAME INFORMATION
   PCB - PROCESS CONTROL BLOCK
   PEWA - PROCESS ENTRY WORK AREA
   PLCB - PSEUDO LINE CONTROL BLOCK
   QCB - QUEUE CONTROL BLOCK
   RVT - RESOURCE VECTOR TABLE
   SCB - STATION CONTROL BLOCK
   SIB - SESSION INFORMATION BLOCK
   TTE - TERMINAL TABLE ENTRY
   UCB - UNIT CONTROL BLOCK

RECOMMENDATION - Specify only the ones that you use all the time when debugging since the formatting of these control blocks takes additional time for the dump.

AVAILABILITY

This is a standard feature of TCAM 10 and OS/VS.

REFERENCE MANUALS

~~TCAM-DEBUGGING-GUIDE~~
TCAM SYSTEM PROGRAMMER'S GUIDE

Please reference Bibliography for form numbers for the applicable form numbers.

OPERATION

Operation is automatic when a dump is taken.

SAMPLE OUTPUT

TERMNAME	INDX	TYPE	NETADDR	TTE	QCB	LCB	SCB	DCB/LGB	DCT/AMWA	1STOPT	DEB	UCB/PEWA	RVT	SIB/AIB
A3270I	0001	PROC	5005	0896A0	08965C			085964	B87CD8		7DDBC8	B87CD8		
A32700	0002	PROC		0896FC	0896B8			085964	B87940		7DDB68	B87940		
A7090I	0003	PROC		089758	089714			0859C4	B87A78		7DCBC8	B87A78		
A70900	0004	PROC		0897B4	089770			0859C4	B87808		7DCB68	B87808		
BA3770F	0007	LU	2852	08A040	089FEC			088D40	08B7A0	08AFE6				000000
BA3770PF	0008	LU	282D	08A0E8	08A094			088D40	08B7A0	08B033				000000
BLKPRTV	0009	LU	2835	08A4BC	08A468			088D40	08B7A6	08B24D				000000
CLNE	000A	PROC	0000	089810	0897CC			0858A4	000000		000000	000000		
C90L	000B	PROC	0000	0898C8	089884			085904	000000		000000	000000		
DL0	000C	PROC	0000	089644	089600			085964	000000		000000	000000		
DSC1V	000D	LU	2832	08A324	08A2D0			088D40	08B7A6	08B163				000000
DSC2V	000E	LU	2833	08A3AC	08A358			088D40	08B7A6	08B1B1				000000
DSC3V	000F	LU	2834	08A434	08A3E0			088D40	08B7A6	08B1FF				000000
GSNA	0010	GRP		088D54	0862C4									
INBATCHV	0011	LU	282F	08A190	08A13C			088D40	08B7A6	08B080				000000
IN01V	0012	LU	283A	08A750	08A6FC			088D40	08B7A6	08B3BA				000000
IN02V	0013	LU	283B	08A7D8	08A784			088D40	08B7A6	08B407				000000
IN03V	0014	LU	283C	08A860	08A80C			088D40	08B7A6	08B454				000000
LU3270V0	001A	LU	2847	089B38	089AE4			088D40	08B79A	08AD67				0DF6D4
LU3270V1	001B	LU	2848	089BC0	089B6C	0DE7B8	0DE878	088D40	08B79A	08ADAE				0DF6F0
LU3270V2	001C	LU	2849	089C48	089BF4			088D40	08B79A	08ADF5				0DF62C
LU3270V3	001D	LU	284A	089CD0	089C7C			088D40	08B79A	08AE3C				0DF648
LU3270V4	001E	LU	284B	089D58	089D04			088D40	08B79A	08AE83				0DF664
LU3270V5	001F	LU	284C	089DE0	089D8C			088D40	08B79A	08AECA				0DF680
LU3270V6	0020	LU	284D	089E68	089E14			088D40	08B79A	08AF11				0DF69C
LU3270V7	0021	LU	284E	089EF0	089E9C			088D40	08B79A	08AF58				0DF6B8
L3277A	0023	TRM		089980	08993C	0B6D80	08B700	085AC4	08B788	08AD30				
L3277B	0024	TRM		0899E8	0899A4	0B6D80	08B700	085AC4	08B788	08AD45				
L3284	0025	TRM		089A50	089A0C	0B6D80	08B700	085AC4	08B788	08AD5A				
NCP	0026	LNCP	2800	08AC14	08ABDC	0B6CB8		085A48	08B7AC		7E0A9C	005228	084E18	0DF5BC
PU3270V	0027	PU	2846	089AC8	089AE4			088D40	08B794					0DF5D8
PU3767V	0029	PU	2844	08AB40	08AB5C			088D40	08B794					000000
PU3770F	002A	PU	2851	089FD0	089FEC			088D40	08B794					000000
PU3770PF	002B	PU	282C	08A078	08A094			088D40	08B794					000000
PU3790V	002C	PU	282E	08A120	08A13C			088D40	08B794					000000
RJE1V	002D	LU	2836	08A540	08A4EC			088D40	08B7A6	08B296				000000
SDLC13C	002E	SDLC	282B	089AA8	089A70			088D40	08B78E					
SSCP	002F	SSCP	5000	08AC54	085400								0DFF74	000000
TLNE	0030	PROC	0000	08986C	089828			0858A4	000000		000000	000000		
TR3767V	0031	LU	2845	08ABB0	08AB5C			088D40	08B7A0	08B622				000000
T90L	0032	PROC	0000	089924	0898E0			085904	000000		000000	000000		
IED0TCAM	0033	MH	5002		000000									
MHS3270	0034	MH	5003		0862C4									
MHEMU90	0035	MH	5004		086C50									

3.10 : TCAM MESSAGE QUEUE PRINT

DESCRIPTION

This is a standard facility of TCAM used to give a hardcopy listing of the TCAM disk message queues.

REFERENCE MANUALS

TCAM DEBUGGING GUIDE
TCAM SYSTEM PROGRAMMER'S GUIDE

Please reference Bibliography for form numbers for the applicable form numbers.

OPERATION

This is a utility program that is run as an OS job. It does not run under TCAM.

SAMPLE JCL

```
//PRINT  JOB  'xxxxxxxxxxx'
//STEPNAME EXEC PGM=IEDQXC,PARM='Q=zzzzzz'
//DISKQ01   DD  DSN=dsname,DISP=SHR
//SYSPRINT  DD  SYSOUT=A
```

WHERE zzzzzz IS THE OPTION REQUESTED. IT MAY BE ONE OF THE FOLLOWING:

DMP or xxxx,DMP	PRINTS ALL MESSAGES SEQUENTIALLY BY RECORD NO. (DEFAULT)
xxxx,ALL(,DS)(,FMT) (,DU)	PRINTS ALL MESSAGES SEQUENTIALLY BY QUEUE. xxxx IS THE TOTAL NO. OF QUEUES. DS PRINTS ONLY SERVICED MESSAGES. DU PRINTS ONLY UNSERVICED MESSAGES. OMISSION OF DS AND DU PRINTS BOTH SERVICED AND UNSERVICED MESSAGES. FMT CAUSES THE DATFLAGS BYTE TO BE PRINTED.
xxxx,n1,n2,(,DS)(,FMT) (,DU)	PRINTS ALL MESSAGES SEQUENTIALLY FOR QUEUES n1,n2 ETC.
PART	ALLOWS THE RANGE OF RECORDS TO BE ENTERED AT THE CONSOLE.

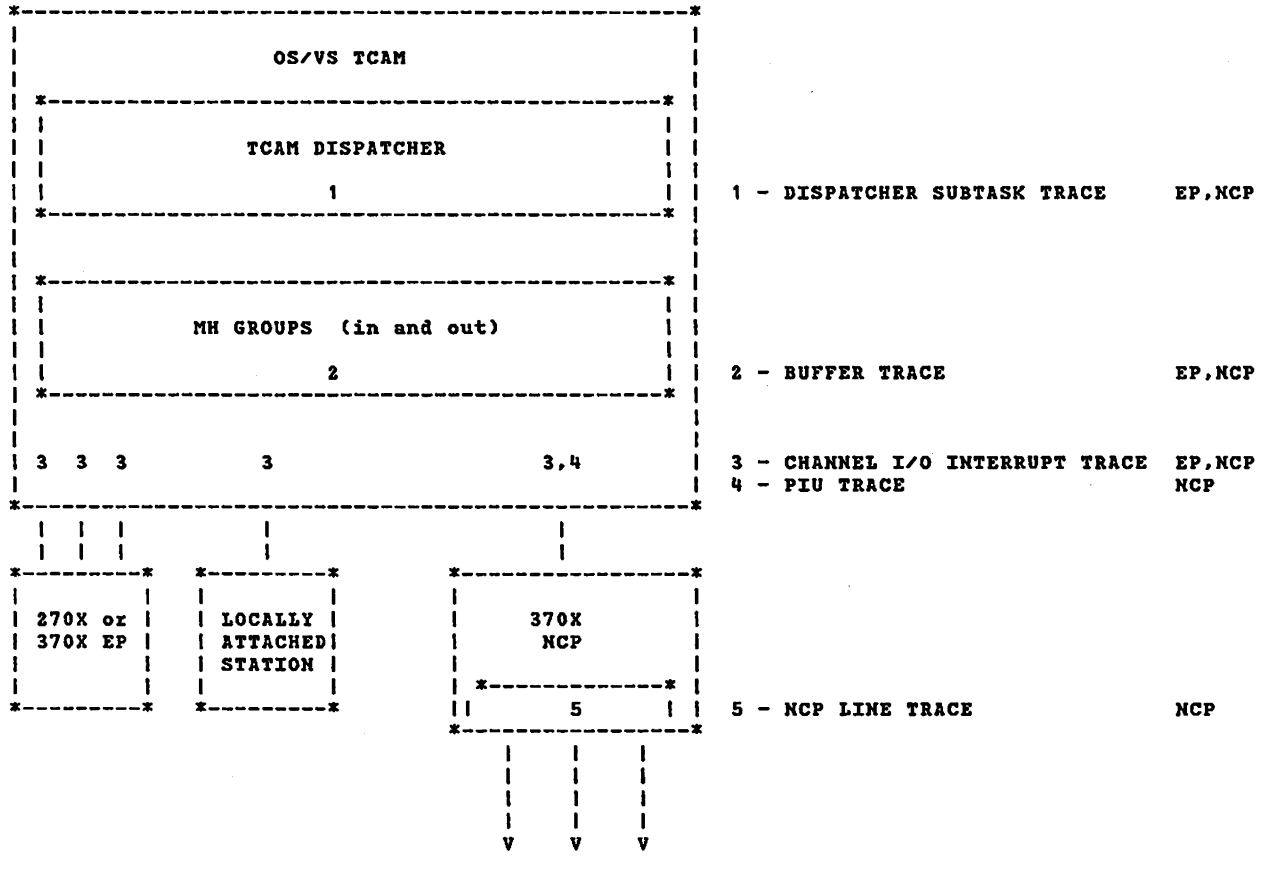
SAMPLE OUTPUT

```
********** FIRST MESSAGE FOR QUEUE 000002 *******
HDR000007  NT LCB    SRCE  SIZE  ST  NXTREC  SCAN  NXTTXT  FSTREC  NXTHDR   QBACK  SEQO  DEST
           010DE7B8  001A  0038  00  000000  0029  0000DF  000007  0000EF  000000  0000  0001
           0037001A 00040004 030000D7 D9C9D5E3  D3E4F3F2 F7F0E5F1 0004F0E5 F040D3E4   *.*.........PRINTLU3270V1..0V0 LU*
           F3F2F7F0 E5F140C4 D3D84061 40E3C5E2  E340F2E4 00089B38 0000001A 01088D40   *3270V1 DLQ / TEST 2U.......... *
           0000009C 000D0BBC 000851A8 600D0C8E  00000000 00000000 00000000 00000000   *...........$-..................*
           00000022 0861BC00 08590402 00000000  00000000 00000000 00000000 00004800   *...../.........................*
           00EF0001                                                                   *....                          *
HDR0000EF  NT LCB    SRCE  SIZE  ST  NXTREC  SCAN  NXTTXT  FSTREC  NXTHDR   QBACK  SEQO  DEST
           010DE6A4  001A  0038  00  000000  0029  00010F  0000EF  00011B  000007  0000  0001
           0037001A 00090004 030000D7 D9C9D5E3  D3E4F3F2 F7F0E5F1 00094A55 979C4A3E   *.*.........PRINTLU3270V1....$...*
           969C0E3E 969D0E3E 979D4AC5 979D4A91  979D4A55 979D4A3E 969D0E3E 969E0E3E   *$...$...$..E$..$$...$...$...$...*
           979E4AC5 979E4A91 979E4A55 979E4A3E  969E0E3E 969F0E3E 979F4AC5 979F4A91   *$..E$..$$...$...$...$...$..E$..$*
           979F4A55 979F4A3E 969F0E3E 96A00E3E  97A04AC5 97A04A91 97A04A55 97A04800   *$...$...$...$...$..E$..$$...$...*
           011B0002                                                                   *....                          *
HDR00011B  NT LCB    SRCE  SIZE  ST  NXTREC  SCAN  NXTTXT  FSTREC  NXTHDR   QBACK  SEQO  DEST
           010DE6A4  001A  0031  00  000000  002A  000113  00011B  000127  0000EF  0000  0001
           0037001A 000A0011 030000C9 40F1F2F3  F4F5F6F1 F2F3F4F5 F6924AC5 97924A91   *.*.........I 123456123456$.E$$.$*
           97924A55 97924A3E 96920E3E 96930E3E  97934AC5 97934A91 97934A55 97934A3E   *$$..$$..$$..$$..$$.E$$.$$$..$$..*
           96930E3E 96940E3E 97944AC5 97944A91  97944A55 97944A3E 96940E3E 96950E3E   *$$..$$..$$.E$$.$$$..$$..$$..$$..*
           97954AC5 97954A91 97954A55 97954A3E  96950E3E 96960E3E 97964AC5 97964800   *$$.E$$.$$$..$$..$$..$$..$$.E$$..*
           01270003                                                                   *....                          *
HDR000127  NT LCB    SRCE  SIZE  ST  NXTREC  SCAN  NXTTXT  FSTREC  NXTHDR   QBACK  SEQO  DEST
           010DE6A4  001A  0038  00  000000  0029  000123  000127  000133  00011B  0000  0001
           0037001A 000B0004 030000D7 D9C9D5E3  D3E4F3F2 F7F0E5F1 000B4AF8 96080EF8   *.*.........PRINTLU3270V1...8$..8*
           96090EF8 97094AC5 97094A51 97094A59  97094AF8 96090EF8 960A0EF8 970A4AC5   *$..8$..E$...$...$..8$..8$..8$..E*
           970A4A51 970A4A59 970A4AF8 960A0EF8  960B0EF8 970B4AC5 970B4A51 970B4A59   *$...$...$..8$..8$..8$..E$...$...*
           970B4AF8 960B0EF8 960C0EF8 970C4AC5  970C4A51 970C4A59 970C4AF8 960C4800   *$..8$..8$..8$..E$...$...$..8$...*
           01330004                                                                   *....                          *
HDR000133  NT LCB    SRCE  SIZE  ST  NXTREC  SCAN  NXTTXT  FSTREC  NXTHDR   QBACK  SEQO  DEST
           010DE6A4  001A  002E  00  000000  002E  00000B  000133  000147  000127  0000  0001
           0037001A 000D000E 030000C3 D3D6E2C5  C1839396 A285A285 97174AC5 97174AB1   *.*.........CLOSEA$$$$$$$$..E$...*
           97174A57 97174A1F 96170E1F 96180E1F  97184AC5 97184AB1 97184A57 97184A1F   *$...$...$...$...$..E$...$...$...*
           96180E1F 96190E1F 97194AC5 97194AB1  97194A57 97194A1F 96190E1F 961A0E1F   *$...$...$..E$...$...$...$...$...*
           971A4AC5 971A4AB1 971A4A57 971A4A1F  961A0E1F 961B0E1F 971B4AC5 971B4000   *$..E$...$...$...$...$...$..E$. .*
           00000005                                                                   *....                          *
   000147  HEADER IS ALL ZEROES
```

3.11 : TCAM TRACE MAP

This is a layout of TCAM's trace facilities and where they are taken in the system.

TCAM TRACE MAP



3.12 : TCAM'S COMWRITE DATA SET

DESCRIPTION

All of TCAM's trace facilities use the COMWRITE data set to log the data. COMWRITE is an OS sequential data set.

OPERATION

All of TCAM'S traces are logged on COMWRITE if the correct routine has been loaded. The internal trace tables are divided into 2 parts. When half of the table has been filled, TCAM schedules it to be written to COMWRITE and continues tracing into the other half of the table. The traces assume that by the time the other half of the trace table is full, that the previous half has already been written to disk. If the user specifies only a few entries in the trace table, then there is a good chance that the previous half didn't yet get written so it would be overlaid by the trace routine and lost. This could also happen if the system is under a heavy load because it will take longer to schedule and execute the writing of the trace to COMWRITE. The number of entries to specify to avoid losing any entries will vary with each system, but on each TCAM trace description, recommended values that experience has shown to work on most systems are included.

3.13 : TCAM DISPATCHER SUBTASK TRACE

DESCRIPTION

The DISPATCHER SUBTASK TRACE records the flow of all dispatched elements. It shows where elements go in the TCAM system and which subtasks work on them. It optionally shows when elements are posted on the synchronous and asynchronous ready queues.

AVAILABILITY

This is a standard feature of TCAM.

REFERENCE MANUALS

TCAM DEBUGGING GUIDE

Please reference Bibliography for form numbers for the applicable release level.

OPERATION

```
     INTRO macro - DTRACE=(n,option)
                 - COMWRTE=YES          required
                                option - ON   - activate at intro time
                                         OFF  - do not activate
                                         POST - same as ON but also traces
                                                the posting of elements
                                                on the ready queue

                           (500,POST) recommended

 TO DUMP TO COMWRITE:
     F id,DEBUG=L,IED0FE10          where 'id' could be jobname or procname.

 ACTIVATING:
     Comes up active when specified on INTRO    or
```

```
F id,DTRACE=option
```

SIZE OF TABLE:
16(n+1)

SAMPLE OUTPUT

```
**SUBTASK TRACE**          SEQUENCE- 01     AVT ADDRESS- 0850D0                                    DATE- 78.031   TIME- 08.19.42
  FIRST TYPE QCB     PRI  ELE    FG  ENTRY FL  QCB    ML  STCB    SECOND TYPE QCB    PRI  ELE    FG  ENTRY FL  QCB    ML  STCB
  (IF POST  SYNC)    (FE)           ( 14 )    ( 12 )    ( 15 )  (IF POST ASYNC)    (FF)           (-00-)    (-00-)    (-00-)
 POST ON ASYNC QUEUE FF 0CFAAC 00 000000 00 000000 00 000000 AVAILABLE BUFFER     E4 0CFAAC 00 09AD82 E5 0853DC 04 09AD80
 POST ON SYNC  QUEUE FE 0CFAAC B0 09AEC0 00 09AD82 E5 0B8428                      E4 0CFAAC 00 0CE6BA 02 0CFB88 02 0CFB88
 BUFFER RETURN       E0 0B7420 FE 09AFA6 02 0853E8 04 440980                      00 08538C 00 0CE6A8 00 085240 00 08538C
 POST ON ASYNC QUEUE FF 0B8428 00 000000 00 000000 00 000000 POST ON ASYNC QUEUE FF 0CFAAC 00 000000 00 000000 00 000000
 AVAILABLE BUFFER    E4 0CFAAC 00 09AD82 E4 0853DC 04 09AD80 POST ON SYNC  QUEUE FE 0CFAAC B0 09AEC0 00 09AD82 E4 0B7420
                     E4 0CFAAC 00 0CE6BA 02 0CFB88 02 0CFB88 BUFFER RETURN       E0 0B8428 FE 09AFA6 02 0853E8 04 440980
                     00 08538C 00 0CE6A8 00 085240 00 08538C POST ON ASYNC QUEUE FF 0B7420 00 000000 00 000000 00 000000
 POST ON ASYNC QUEUE FF 0CFAAC 00 000000 00 000000 00 000000 AVAILABLE BUFFER     E4 0CFAAC 00 09AD82 E4 0853DC 04 09AD80
 POST ON SYNC  QUEUE FE 0CFAAC B0 09AEC0 00 09AD82 E4 0B8428                      E4 0CFAAC 00 0CE6BA 02 0CFB88 02 0CFB88
 BUFFER RETURN       E0 0B7420 FE 09AFA6 02 0853E8 04 440980                      00 08538C 00 0CE6A8 00 085240 00 08538C
 POST ON ASYNC QUEUE FF 0B82C8 00 000000 00 000000 00 000000 POST ON ASYNC QUEUE FF 0B8378 00 000000 00 000000 00 000000
 POST ON ASYNC QUEUE FF 0B7370 00 000000 00 000000 00 000000 POST ON ASYNC QUEUE FF 0CFAAC 00 000000 00 000000 00 000000
 AVAILABLE BUFFER    E4 0CFAAC 00 09AD82 E4 0853DC 04 09AD80 POST ON SYNC  QUEUE FE 0CFAAC B0 09AEC0 00 09AD82 E4 0B7420
                     E4 0CFAAC 00 0CE6BA 02 0CFB88 02 0CFB88 BUFFER RETURN       E0 0B82C8 FE 09AFA6 02 0853E8 04 01020A
 BUFFER RETURN       E0 0B8378 FE 09AFA6 02 0853E8 04 015001 BUFFER RETURN       E0 0B7370 FE 09AFA6 02 0853E8 04 442282
                     00 08538C 00 0CE6A8 00 085240 00 08538C POST ON ASYNC QUEUE FF 0CFAAC 00 000000 00 000000 00 000000
 AVAILABLE BUFFER    E4 0CFAAC 00 09AD82 E0 0853DC 04 09AD80 POST ON SYNC  QUEUE FE 0CFAAC B0 09AEC0 00 09AD82 E0 0B7370
                     E4 0CFAAC 00 0CE6BA 02 0CFB88 02 0CFB88                      00 08538C 00 0CE6A8 00 085240 00 08538C
 POST ON ASYNC QUEUE FF 0CFAAC 00 000000 00 000000 00 000000 AVAILABLE BUFFER     E4 0CFAAC 00 09AD82 E0 0853DC 04 09AD80
 POST ON SYNC  QUEUE FE 0CFAAC B0 09AEC0 00 09AD82 E0 0B8378                      E4 0CFAAC 00 0CE6BA 02 0CFB88 02 0CFB88
                     00 08538C 00 0CE6A8 00 085240 00 08538C POST ON ASYNC QUEUE FF 0B7370 00 000000 00 000000 00 000000
 POST ON ASYNC QUEUE FF 0B8378 00 000000 00 000000 00 000000                      E4 0B8378 FE 093AD8 00 088DEC 0A 000000
                     E4 0B8378 FE 0B46F6 00 088DEC 08 000000 POST ON SYNC  QUEUE FE 0DE590 80 0B472A 00 0B46F0 00 0CE4B0
 BUFFER RETURN       E0 0B7370 FE 09AFA6 02 0853E8 04 010201 QCB POSTED TO SELF  E0 0DE590 00 093AD8 E0 0DE590 0A 093AD0
 POST ON SYNC  QUEUE FE 0DE590 50 093B7A 24 093AD0 00 0CE4B4 TWO BYTE STCB       E4 0B8378 FE 09EBAA 00 085B10 04 0DE590
                     E4 0B8378 FE 08F98C 00 08F980 06 0DE590 POST ON SYNC  QUEUE FE 0B8378 60 09047A 00 08F980 00 0CE4B4
                     E7 0DE590 00 09DEF4 C9 09DEE8 06 09DEF0 POST ON SYNC  QUEUE FE 0DE590 60 09E46E 00 08F980 00 09DEF4
```

3.14 : TCAM BUFFER TRACE

DESCRIPTION

The BUFFER TRACE dumps TCAM buffer contents and status to COMWRITE. You can only trace buffers for a non-NCP line that is being traced by the I/O INTERRUPT trace or for an NCP resource that is being traced by the PIU trace. Instructions to modify TCAM buffer trace to trace all lines or the size of trace entry are documented in the microfiche for IED0FE30. The application program interface can also be traced with this modification.

AVAILABILITY

This is a standard feature of TCAM.

REFERENCE MANUALS

TCAM DEBUGGING GUIDE
TCAM SYSTEM PROGRAMMER'S GUIDE

Please reference Bibliography for form numbers for the applicable release level.

OPERATION

INTRO macro - COMWRTE=YES

TO DUMP TO COMWRITE:
F id,DEBUG=L,IED0FE30

ACTIVATING:
requires PIU trace or I/O INTERRUPT trace to be active

SIZE OF TABLE:
96n - n is number specified on TRACE= parameter of INTRO

SAMPLE OUTPUT

```
**BUFFER TRACE**      SEQUENCE- F1000001   BUFF1                                        DATE- 78.031   TIME- 08.23.47
          000B8588 00000000 00000000 00000001  81000000 010DE590 00320026 00000000   *..EH.............A.....V.........*
          00000000 00000000 00000000 00000000  00260103 02282B01 FF000000 00000000   *.................................*
          00000000 00000000 00000000 00000000  00000000 00000000 00000000 00000000   *.................................*
          E40C4568 00000000 01000000 00000001  02040000 010DE7B8 001A004B 00000000   *U.....................X.........*
          000B0000 00000000 00000000 00000000  00370037 001A0005 00250300 007D405D   *.............................. .*
          1140C161 944093A4 F3F2F7F0 A5F04093  A4F3F2F7 F0A5F140 6140A385 A2A3F49C   *. A.M LU3270V0 LU3270V1 . TEST4.*
          E40B82C8 00000000 00000000 00000041  01040000 010DE7B8 001A0047 40000000   *U.BH.....................X..... ...*
          290B0000 F70000F7 0000FF00 00EB0000  001A0000 00009A11 40119A11 40E2F3F2   *....7..7................ ... S32*
          60F0F640 E4D5D2D5 D6E6D540 C9D5D7E4  E36B40D9 C560C5D5 E3C5D912 457E9913   *.06 UNKNOWN INPUT. RE.ENTER...R.*
          E40B7C60 00000000 01000000 00000001  02040000 010DE7B8 001A004B 00000000   *U.....................X.........*
          000B0000 00000000 00000000 00000000  00370037 001A0006 00250300 007D405D   *.............................. .*
          1140C194 4093A4F3 F2F7F0A5 F04093A4  F3F2F7F0 A5F14061 40A385A2 A340F5C5   *. AM LU3270V0 LU3270V1 . TEST 5E*
          E40B84D8 00000000 00000000 00000041  01040000 010DE6A4 001A0045 08000000   *U.DQ.....................WU........*
          3E0B0000 FF0000F3 00010700 00E70000  001B0037 001A0006 00250300 00D440D3   *.......3.....X..............M L*
          E4F3F2F7 F0E5F040 D3E4F3F2 F7F0E5F1  406140E3 C5E2E340 F5A385A2 A340F5C5   *U3270V0 LU3270V1 . TEST 5TEST 5E*
          E40C4568 00000000 01000000 00000041  01040000 010DE7B8 001A0045 00000000   *U.....................X.........*
          3E0B0000 FF0000FF 00010300 00F70000  001A0037 001A0006 00250300 00D440D3   *.............7..............M L*
          E4F3F2F7 F0E5F040 D3E4F3F2 F7F0E5F1  406140E3 C5E2E340 F5A385A2 A340F5C5   *U3270V0 LU3270V1 . TEST 5TEST 5E*
          E40C4568 00000000 01000000 00000001  02040000 010DE6A4 001A004B 00000000   *U.....................WU........*
          000B0000 00000000 00000000 00000000  00370037 001A0007 00250300 007D405D   *.............................. .*
          1140C1D4 40D3E4F3 F2F7F0E5 F040D3E4  F3F2F7F0 E5F14061 40E3C5E2 E340F640   *. AM LU3270V0 LU3270V1 . TEST 6 *
          E40B7A50 00000000 00000000 00000041  01040000 010DE7B8 001A0045 08000000   *U.....................X.........*
          3E0B0001 03000107 00010F00 00F30000  001B0037 001A0007 00250300 00D440D3   *.............3..............M L*
          E4F3F2F7 F0E5F040 D3E4F3F2 F7F0E5F1  406140E3 C5E2E340 F6E3C5E2 E340F640   *U3270V0 LU3270V1 . TEST 6TEST 6 *
          E40B74D0 00000000 00000000 00000041  01040000 010DE6A4 001A0045 00000000   *U.....................WU........*
          3E0B0001 03000103 00010B00 00F30000  001A0037 001A0007 00250300 00D440D3   *.............3..............M L*
          E4F3F2F7 F0E5F040 D3E4F3F2 F7F0E5F1  406140E3 C5E2E340 F6E3C5E2 E340F640   *U3270V0 LU3270V1 . TEST 6TEST 6 *
          E40B9428 00000000 01000000 00000001  02040000 010DE7B8 001A004B 00000000   *U.M...................X.........*
          000B0000 00000000 00000000 00000000  00370037 001A0008 00250300 007D405D   *.............................. .*
          1140C1D4 40D3E4F3 F2F7F0E5 F040D3E4  F3F2F7F0 E5F14061 40E3C5E2 E340F780   *. AM LU3270V0 LU3270V1 . TEST 7.*
```

3.15 : TCAM CHANNEL I/O INTERRUPT TRACE

DESCRIPTION

This records the I/O interruptions that occur on a specified non-NCP line or on a channel to a 370x containing NCP. When an I/O interruption occurs for a line or NCP channel address being traced, TCAM stores information about the interruption, including the CSW, CCW's, and data transferred, as an entry in the trace table. A maximum of 50 lines may be traced concurrently. When subsequent PCI interrupts are traced, CCW entries are not duplicated.

AVAILABILITY

This is a standard feature of TCAM.

REFERENCE MANUALS

TCAM DEBUGGING GUIDE
TCAM SYSTEM PROGRAMMER'S GUIDE

Please reference Bibliography for form numbers for the applicable release level.

OPERATION

```
    INTRO macro - TRACE=n          300 recommended
                - COMWRTE=YES      required

 TO DUMP TO COMWRITE:
     F id,DEBUG=L,IED0FE20

 ACTIVATING:
     F id,TRACE=xxxx,ON        xxxx - line no- TRACES A SPECIFIC LINE
                                    - ERRORS - STARTS THE TRACE ON ANY LINE ERROR

                               ON   - STARTS THE TRACE AND STOPS WHEN ERRORS CEASE OR
                                      WHEN OFF IS ENTERED DEPENDING ON THE ABOVE OPTION

                               OFF  - STOPS THE TRACE

                               HOLD - KEEPS THE TRACE RUNNING EVEN WHEN ERRORS CEASE

 SIZE OF TABLE:
     16(n+1)
```

SAMPLE OUTPUT

```
**LINE I/O TRACE**      SEQUENCE- 0000000C                                    DATE- 78.025   TIME- 08.21.09
ID LINE SEQ* IOBFLAG1 SN      CSW          CCW          CCW        DATA (ALL IF LESS THAN TWENTY BYTES      TP
   ADDR      CP START                      ADDR                        OR IF NCP FIRST 20 BYTES             OP
                                                                      OR FIRST EIGHT AND LAST TEN BYTES) CODE
                                          0EFB80 2F0EFB51 60110001 000000                                   11
00 00C3 021F E60EFB80 80 0EFB88 0E000001
FA                                        TERM - EPBOST   LCBTTCIN - 00AB
F0
FF
```

3.16 : TCAM PIU TRACE

DESCRIPTION

This trace records the path information units (PIU) that are sent to and received from the NCP resources that have been requested.
You can use these PIU entries to recreate exactly the sequence of commands directed to stations and lines and the responses they returned.

AVAILABILITY

This is a standard feature of TCAM.

REFERENCE MANUALS

TCAM DEBUGGING GUIDE
TCAM SYSTEM PROGRAMMER'S GUIDE

Please reference Bibliography for form numbers for the applicable release level.

OPERATION

```
    INTRO macro - BTRACE=n          300 recommended
                - COMWRTE=YES       required

 TO DUMP TO COMWRITE:
     F id,DEBUG=L,IEDQFE40

 ACTIVATING:
     F id,BTRACE=xxxx,ON            Activating a trace for a resource also traces
all subordinate
                                    resources if started after NCP is activated.

 SIZE OF TABLE:
     20 + 32(n)
```

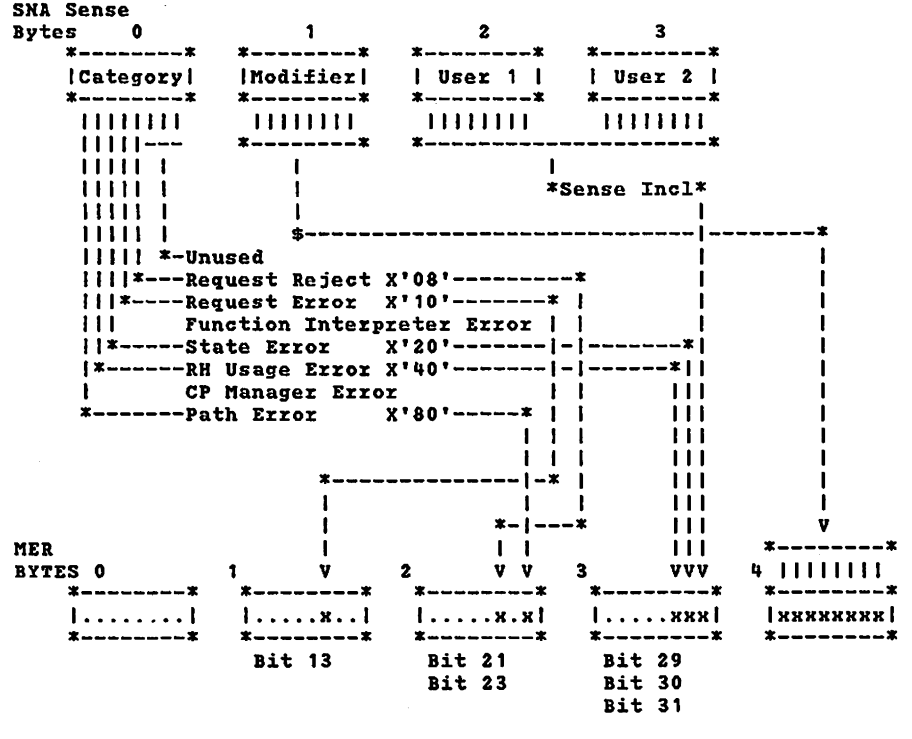
SAMPLE OUTPUT

```
**PATH INFORMATION UNIT (PIU) TRACE**  SEQUENCE- 00000007                    DATE- 78.038   TIME- 16.04.01
TNT INDICES     *-------TRANSMISSION HEADER--------*     *-REQUEST HEADER-*     *--------REQUEST UNIT--------*
DEST    SRCE     BYTE0 BYTE1   DAF  OAF   TAG1 TAG2   DCF     BYTE0 BYTE1 BYTE2
0032    0026       1C    00   5000 2800   05   84   027C       0B    00    00      0103832841012600C1991A457E991A
0032    0026       1C    00   5000 2800   05   85   027C       0B    00    00      0103832841012600819610E7C971A
0032    0026       1C    00   5000 2800   05   86   0294       0B    00    00      0103832841013200C19926457E9926
0032    0026       1C    00   5000 2800   05   87   0294       0B    00    00      0103832841013200819626 0E7C9726
0032    0026       1C    00   5000 2800   05   88   027C       0B    00    00      0103832841013E00C19932457E9932
0032    0026       1C    00   5000 2800   05   89   027C       0B    00    00      0103832841013E00819632 0E7C9732
0032    0026       1C    00   5000 2800   05   8A   0294       0B    00    00      0103832841014A00C1993E457E993E
0032    0026       1C    00   5000 2800   05   8B   0294       0B    00    00      0103832841014A00819630E0E7C973E
0032    0026       1C    00   5000 2800   05   8C   027C       0B    00    00      0103832841015600C1994A457E994A
0032    0026       1C    00   5000 2800   05   8D   027C       0B    00    00      0103832841015600819640E7C974A
0032    0026       1C    00   5000 2800   05   8E   0288       0B    00    00      0103832841016200C19956457E9956
0032    0026       1C    00   5000 2800   05   8F   0294       0B    00    00      0103832841016200819656 0E7C9756
0032    0026       1C    00   5000 2800   05   90   0288       0B    00    00      0103832841016E00C19A6240519962
0032    0026       1C    00   5000 2800   05   91   027C       0B    00    00      0103832841016E00819662 0E7C9762
0032    0026       1C    00   5000 2800   05   92   027C       0B    00    00      0103832841017A00C1996E457E996E
0032    0026       1C    00   5000 2800   05   93   028C       0B    00    00      0103832841017A00819660E0E7C976E
0032    0026       1C    00   5000 2800   05   94   0294       0B    00    00      0103832841018600C1997A457E997A
0032    0026       1C    00   5000 2800   05   95   0284       0B    00    00      0103832841018600819774A4A7C967A
0032    0026       1C    00   5000 2800   05   96   027C       0B    00    00      0103832841019200C19986457E9986
0032    0026       1C    00   5000 2800   05   97   0284       0B    00    00      0103832841019200819686 0E7C9786
0032    0026       1C    00   5000 2800   05   98   0294       0B    00    00      0103832841019E00C19992457E9992
0032    0026       1C    00   5000 2800   05   99   028C       0B    00    00      0103832841019E00819792 4AD19792
0032    0026       1C    00   5000 2800   05   9A   027C       0B    00    00      0103832841 01AA00C1999E457E999E
0032    0026       1C    00   5000 2800   05   9B   027C       0B    00    00      0103832841 01AA00819690E0E7C979E
0032    0026       1C    00   5000 2800   05   9C   0294       0B    00    00      0103832841 01B600C199AA457E99AA
0032    0026       1C    00   5000 2800   05   9D   0294       0B    00    00      0103832841 01B600819 6AA0E7C97AA
0020    0032       1D    00   2863 5000   00   10   0004       6B    80    00      0E0000000000000000000000000000
0032    0020       1D    00   5000 2863   00   10   0004       EB    80    00      0E0000000000000000000000000000
0032    0026       1C    00   5000 2800   05   9E   027C       0B    00    00      0103832841 01C200C199B6457E99B6
0032    0026       1C    00   5000 2800   05   9F   027C       0B    00    00      0103832841 01C200819 6B60E7C97B6
```

3.17 : SNA SENSE BYTES MAPPED INTO TCAM'S MER

DESCRIPTION

Some bits in the TCAM MER have been redefined for use with SNA. The MER plays an important part in determining if errors have occurred and in taking action based on the presence or absence of these error conditions. A general layout of the bits in the SNA Sense Bytes is shown along with their locations in the Message Error Record.



3.18 : TCAM SAMPLE JCL AND CONSOLE LISTING

```
          NAME=TCAM
//SCRQ     EXEC PGM=IEFBR14
//REQUEUE   DD  DSN=TCAM.REQUEUE,DISP=(OLD,DELETE)
//FORMATQ EXEC PGM=IEDQXA
//IEDQDATA DD  DSN=TCAM.REQUEUE,DISP=(,CATLG),DCB=KEYLEN=156,
//             VOL=SER=xxxxxx,UNIT=3330-1,SPACE=(CYL,(5,5),,CONTIG)
//TCAM     EXEC PGM=IEDQTCAM,TIME=1440,DPRTY=(11,10),REGION=500K
//STEPLIB   DD  DSN=SYS1.NCPLIB,DISP=SHR
//REQUEUE   DD  DSN=TCAM.REQUEUE,DISP=OLD
//COMWRITE DD  DSN=TCAM.COMWRITE,DISP=OLD
//NCPDUMP   DD  DSN=TCAM.NCPDUMP,DISP=OLD
//DDIPL     DD  DSN=SYS1.NCPLIB,DISP=SHR
//NCP       DD  UNIT=0F7,DCB=IPLTXID=NCPCH2
//SYSABEND DD  SYSOUT=A,SPACE=(CYL,(5,1))

          NAME=PRTQ
//QUEUE    EXEC PGM=IEDQXC,PARM='Q=038,ALL'
//DISKQ01   DD  DSN=TCAM.REQUEUE,DISP=OLD
//SYSPRINT DD  SYSOUT=A,SPACE=(CYL,(5,1))
```

NOTE THAT THE TRACES ARE PRINTED IN SEPERATE JOB STEPS - THIS IS RECOMMENDED SINCE OTHERWISE THE TRACES ARE PRINTED AS THEY ARE ENCOUNTERED ON COMWRITE AND MAY MAKE THEM MUCH HARDER TO FOLLOW.

```
          NAME=TRACES
//PIU      EXEC PGM=IEDQXB,PARM='PIUT'
//SYSUT1    DD  DSN=TCAM.COMWRITE,DISP=OLD
//SYSPRINT DD  SYSOUT=A,SPACE=(CYL,(5,1))
//BUFF     EXEC PGM=IEDQXB,PARM='BUFF'
//SYSUT1    DD  DSN=TCAM.COMWRITE,DISP=OLD
//SYSPRINT DD  SYSOUT=A,SPACE=(CYL,(5,1))
//LINE     EXEC PGM=IEDQXB,PARM='LINT,LIN3'
//SYSUT1    DD  DSN=TCAM.COMWRITE,DISP=OLD
//SYSPRINT DD  SYSOUT=A,SPACE=(CYL,(5,1))
//STCB     EXEC PGM=IEDQXB,PARM='IOTR'
//SYSUT1    DD  DSN=TCAM.COMWRITE,DISP=OLD
//SYSPRINT DD  SYSOUT=A,SPACE=(CYL,(5,1))
//STCB     EXEC PGM=IEDQXB,PARM='STCB'
//SYSUT1    DD  DSN=TCAM.COMWRITE,DISP=OLD
//SYSPRINT DD  SYSOUT=A,SPACE=(CYL,(5,1))
```

IED@XB also allows the entries to be printed for a given time period.
Add BLOCK=hhmmddd-hhmmddd to the PARM field on the EXEC card.

```
s tcam
08.07.29 STC  100  $HASP100 TCAM     ON STCINRDR
08.07.32 STC  100  $HASP373 TCAM     STARTED
08.07.37 STC  100  +IED067I TCAM INITIALIZATION BEGUN
08.07.44 STC  100  +IED075I END OF EXTENT.  RECORD COUNT IS 00003515, TIME IS 0006 SEC
08.07.44 STC  100  +IED074I TCAM INITIALIZATION COMPLETE
f tcam,ipl=ncp
08.08.54 STC  100 *01 IED519D 3705 NCP      ALREADY IPLED ***REPLY 'CONTINUE','CANCEL' OR 'ACTIV'
1continue
08.09.04           IEE600I REPLY TO 01 IS;CONTINUE
08.09.04 STC  100  IED520I 3705 NCP      IPL  IN PROGRESS
08.10.04 STC  100  IED194I 3705 NCP      IPL ENDED
f tcam,debug=1,iedqfe10
08.10.36 STC  100  IED099I ROUTINE LOADED
f tcam,debug=1,iedqfe20
08.10.47 STC  100  IED099I ROUTINE LOADED
f tcam,debug=1,iedqfe30
08.10.53 STC  100  IED099I ROUTINE LOADED
f tcam,debug=1,iedqfe40
08.10.59 STC  100  IED099I ROUTINE LOADED
f tcam,activ=ncp
08.12.14 STC  100  IED382I NCP      ACTIVATE COMPLETE
f tcam,activ=sdlc13c
08.12.52 STC  100  IED382I SDLC13C  ACTIVATE COMPLETE
f tcam,activ=pu3270v
08.19.43 STC  101  IED382I PU3270V  ACTIVATE COMPLETE
d tp,act,ncp
08.20.30 STC  100  IED036I NCP            ACTIVE= GSNA    ,001
f tcam,btrace=ncp,on
08.22.18 STC  101  IED188I PIU TRACE STARTED FOR NCP
f tcam,trace=gsna,1,on
08.22.36 STC  101  IED023I TRACE STARTED FOR LINE GSNA    ,001
f tcam,trace=0f7,hold
08.22.52 STC  101  IED023I TRACE STARTED FOR LINE 0F7
c tcam
08.25.10           IEE301I TCAM     CANCEL COMMAND ACCEPTED
08.25.19 STC  101  IEF450I TCAM TCAM - ABEND S222 U0000
08.25.19 STC  101  $HASP395 TCAM     ENDED
08.25.20 STC  101  $HASP250 TCAM     IS PURGED
s prtq
08.25.44 STC  102  $HASP100 PRT@     ON STCINRDR
08.25.47 STC  102  $HASP373 PRT@     STARTED
```

```
08.25.51 STC  102  IEC130I DISK202  DD STATEMENT MISSING

08.25.54 STC  102  IEC130I DISK216  DD STATEMENT MISSING
08.26.29 STC  102  $HASP395 PRT2     ENDED
08.26.30 STC  102  $HASP150 PRT2     ON PRINTER4     2,123 LINES
08.26.42           $HASP160 PRINTER4 INACTIVE - CLASS=A
08.26.42 STC  102  $HASP250 PRT2     IS PURGED
s traces
08.26.48 STC  103  $HASP100 TRACES   ON STCINRDR
08.26.52 STC  103  $HASP373 TRACES   STARTED
08.28.15 STC  103  $HASP395 TRACES   ENDED
```

3.19 : TOTE

DESCRIPTION

The Teleprocessing On-Line Test Executive (TOTE) is an attached subtask of TCAM that controls the selection, loading, and execution of on-line tests (OLTs) for all stations supported by TCAM. As an executive TOTE:

- Schedules and controls the test
- Conveys messages to the user about the test
- Prompts the user to enter changes to the configuration data stored in a configuration data set (CDS)

You can use the OLT programs to:

- Perform preventive maintenance
- Perform problem determination
- Diagnose I/O errors
- Verify device repairs and engineering changes
- Test stations

AVAILABILITY

To include and run TOTE in your system:
- TCAM must be the access method used
- The OLTEST= operand of the INTRO macro in the MCP must be coded to allow storage to be reserved for running TOTE.
- The parameter, OLTERM= of the TTABLE macro should be specified. This parameter specifies the number of dummy entries in the terminal name table available for TOTE's use as well as a work area.
- The OLT library and the configuration library must be defined in the JCL for execution.
- Each on-line test request must fit within a single TCAM buffer.
- The parameter, TOTE=YES of the IEDMHGEN macro must be coded in order to include the TOTE MH.
- The parameter, TOTE=YES of the IEDDEND macro must be coded so that the bind images TOTE uses to establish sessions with SNA stations will be generated.

* Refer to the TCAM DEBUGGING GUIDE for other requirements.

REFERENCE MANUALS

OS/VS Message Library: Service Aids and OLTEP Messages
TCAM DEBUGGING GUIDE

Please reference Bibliography for form numbers for the applicable release level.

OPERATION

For details on TOTE operation refer to the above manuals.

3.20 : NCP LINE TRACE

DESCRIPTION

This is a facility of NCP that allows the user to trace the flow of data and control on an NCP line. NCP will trace the data at the 370X-modem interface and pass the information to the host for recording. This trace can be very useful to isolate link level problems, such as terminal protocol errors, line problems, etc.

AVAILABILITY

This trace is a standard feature of NCP. For OS systems, the Generalized Trace Facility (GTF) must also be included in the system.

REFERENCE MANUALS

TCAM DEBUGGING GUIDE
VTAM DEBUGGING GUIDE
VTAM REFERENCE SUMMARY
3704 and 3705 PROGRAM REFERENCE HANDBOOK
OS SERVICE AIDS

Please reference Bibliography for form numbers for the applicable release level.

OPERATION

The line trace is initiated and terminated at the system console with the following commands:

```
 VTAM initiation
     DOS    -      F NET,TRACE,TYPE=LINE,ID=linename
     OS     -      F procname,TRACE,TYPE=LINE,ID=linename

 VTAM termination
     DOS    -      F NET,NOTRACE,TYPE=LINE,ID=linename
     OS     -      F procname,NOTRACE,TYPE=LINE,ID=linename
```

The trace may also be initiated at VTAM startup time by including the following statement in the ATCSTRxx member called in:

```
     TRACE,TYPE=LINE,ID=linename
```

TCAM OPERATION:

```
 SPECIFICATION:
     INTRO macro - COMWRTE=YES

 TO DUMP TO COMWRITE:
     AUTOMATIC TO TCAM  -  SPECIFIED IN NCP GEN

 TCAM INITIATION -
     F procname,TRACE=grpname,xln,ON(,255,100)

 TCAM TERMINATION -
     F procname,TRACE=grpname,xln,OFF

 SIZE OF TABLE:
     104 + 4(n)     (n=100 default)
```

Only one line can have a line trace active unless ACF/NCP is being used. Because of the volume of data that can be traced in a short period of time, especially at the higher baud rates, judicious use of this trace is suggested. If the failure can be predicted, then this trace should be the last one turned on before causing the failure, and the first one turned off after the failure has been traced. This trace will be terminated by NCP if slowdown occurs.

For OS systems, the VTAM trace can be started regardless of whether GTF has been previously initiated. However, no trace records are recorded until GTF is active. GTF must be running with the 'USR' option. For TCAM systems, logging occurs if COMWRTE=YES has been specified on the INTRO macro.

INTERPRETATION

For a Type 1 or Type 2 Scanner, each time data is sent or received on the line, and for specific control state changes, NCP traces five fields. These five fields and some typical values are shown below. For a list of all values, refer to the 3704 AND 3705 PROGRAM REFERENCE HANDBOOK, Section 13.

LCD - the type of protocol (operating mode).
0 - S/S 6 of 9
9 - SDLC
C - BSC EBCDIC

PCF - the line interface state. The usage of this field depends upon the type of protocol being used (LCD).
5 - Monitor for Flag (SDLC) - Monitor for SYN (BSC)
7 - Receive information - data byte received in PDF
9 - Transmit normal - data byte in PDF

SCF - the sense status and operation modifier.
40 - normal transmit service request
45 - Flag or Pad on transmit

PDF - the character being received/transmitted

TIME - relative time of event - a hex expression in 1/10 seconds

The data received can be easily found by examining those entries that have a PCF state of '7'. Transmitted data will have a PCF state of '9'. If the concern is only what the line data looks like, then only these entries are needed. The data feild is invalid when state changes.

SDLC Flags will be shown only for transmitted data. On receiving, a PCF state of 6 indicates a flag has been received.

For SDLC duplex links, the trace on a line is actually two separate traces, one for the outbound leg and one for the inbound leg. The data from each of these two traces is sent by NCP to the host in seperate blocks. Therefore, to associate a given remote reply to an NCP poll, it is necessary to correlate them by the values in the TIMER field. With a point-to-point circuit, TX-RX sequences may have the same time value. If this becomes an obstacle to problem isolation, then a substitute method of tracing, such as the PT-2 or equivalent, must be employed.

The TIMER field can also be used to assist in determining the source of a response time problem on a given link. It should be relatively easy to spot a given PU being slow to respond, or NCP not polling frequently enough.

Because the TIMER field cycles every 25.6 seconds, it is impossible to determine the Time-of-Day that the event occurred. On OS systems, a close determination can be made by using the 'TIME=YES' parameter in the GTF procedure. This will show the time when the trace record was passed to GTF by VTAM.

SAMPLE OUTPUT

TCAM OUTPUT

```
**LINE TRACE FOR GSNA     ,001**      SEQUENCE- 00000003                                    DATE- 78.031   TIME- 08.22.39
97104A1F 96100E1F 96110E1F 97114AC5 97114AB1 97114A57 97114A1F 96110E1F 96120E1F 97124AC5 97124AB1 97124A57
97124A1F 96120E1F 96130E1F 97134AC5 97134AB1 97134A57 97134A1F 96130E1F 96140E1F 97144AC5 97144AB1 97144A57
97144A1F 96140E1F 96150E1F 97154AC5 97154AB1 97154A57 97154A1F 96150E1F 96160E1F 97164AC5 97164AB1 97164A57
97164A1F 96160E1F 96170E1F 97174AC5 97174AB1 97174A57 97174A1F 96170E1F 96180E1F 97184AC5 97184AB1 97184A57
97184A1F 96180E1F
**LINE TRACE FOR GSNA     ,001**      SEQUENCE- 0000000B                                    DATE- 78.031   TIME- 08.22.42
97344A1F 96340E1F 96350E1F 97354AC5 97354AB1 97354A57 97354A1F 96350E1F 96360E1F 97364AC5 97364AB1 97364A57
97364A1F 96360E1F 96370E1F 97374AC5 97374AB1 97374A57 97374A1F 96370E1F 96380E1F 97384AC5 97384AB1 97384A57
97384A1F 96380E1F 96390E1F 97394AC5 97394AB1 97394A57 97394A1F 96390E1F 963A0E1F 973A4AC5 973A4AB1 973A4A57
973A4A1F 963A0E1F 963B0E1F 973B4AC5 973B4AB1 973B4A57 973B4A1F 963B0E1F 963C0E1F 973C4AC5 973C4AB1 973C4A57
973C4A1F 963C0E1F
```

VTAM OUTPUT - (FULL DUPLEX)

```
USRFD FF2 ASCB 00FED158  JOBN NET
          LINE      DNODE NCPCH2        EP 00       TIME 5E
                          LCD 9  PCF 6  TIME 3F  SCF 0E  PDF BA      LCD 9  PCF 7  TIME 3F  SCF 4A  PDF C5
                          LCD 9  PCF 7  TIME 3F  SCF 4A  PDF 11      LCD 9  PCF 7  TIME 3F  SCF 4A  PDF 5D
                          LCD 9  PCF 7  TIME 3F  SCF 4A  PDF BA      LCD 9  PCF 6  TIME 3F  SCF 0E  PDF BA
                          LCD 9  PCF 6  TIME 40  SCF 0E  PDF BA      LCD 9  PCF 7  TIME 40  SCF 4A  PDF C5
                          LCD 9  PCF 7  TIME 40  SCF 4A  PDF 11      LCD 9  PCF 7  TIME 40  SCF 4A  PDF 5D
                          LCD 9  PCF 7  TIME 40  SCF 4A  PDF BA      LCD 9  PCF 6  TIME 40  SCF 0E  PDF BA
                          LCD 9  PCF 6  TIME 41  SCF 0E  PDF BA      LCD 9  PCF 7  TIME 41  SCF 4A  PDF C5
                          LCD 9  PCF 7  TIME 41  SCF 4A  PDF 11      LCD 9  PCF 7  TIME 41  SCF 4A  PDF 5D
                          LCD 9  PCF 7  TIME 41  SCF 4A  PDF BA      LCD 9  PCF 6  TIME 41  SCF 0E  PDF BA
                          LCD 9  PCF 6  TIME 42  SCF 0E  PDF BA      LCD 9  PCF 7  TIME 42  SCF 4A  PDF C5
                          LCD 9  PCF 7  TIME 42  SCF 4A  PDF 11      LCD 9  PCF 7  TIME 42  SCF 4A  PDF 5D
          TIME    41192.938802
USRFD FF2 ASCB 00FED158  JOBN NET
          LINE      DNODE NCPCH2        EP 00       TIME 5E
                          LCD 9  PCF 9  TIME 3F  SCF 45  PDF 7E      LCD 9  PCF 9  TIME 3F  SCF 40  PDF C5
                          LCD 9  PCF A  TIME 3F  SCF 40  PDF F1      LCD 9  PCF A  TIME 3F  SCF 40  PDF 53
                          LCD 9  PCF 9  TIME 3F  SCF 40  PDF 5D      LCD 9  PCF 9  TIME 3F  SCF 45  PDF 7E
                          LCD 9  PCF 9  TIME 40  SCF 45  PDF 7E      LCD 9  PCF 9  TIME 40  SCF 40  PDF C5
                          LCD 9  PCF A  TIME 40  SCF 40  PDF F1      LCD 9  PCF A  TIME 40  SCF 40  PDF 53
                          LCD 9  PCF 9  TIME 40  SCF 40  PDF 5D      LCD 9  PCF 9  TIME 40  SCF 45  PDF 7E
                          LCD 9  PCF 9  TIME 41  SCF 45  PDF 7E      LCD 9  PCF 9  TIME 41  SCF 40  PDF C5
                          LCD 9  PCF A  TIME 41  SCF 40  PDF F1      LCD 9  PCF A  TIME 41  SCF 40  PDF 53
                          LCD 9  PCF 9  TIME 41  SCF 40  PDF 5D      LCD 9  PCF 9  TIME 41  SCF 45  PDF 7E
                          LCD 9  PCF 9  TIME 42  SCF 45  PDF 7E      LCD 9  PCF 9  TIME 42  SCF 40  PDF C5
                          LCD 9  PCF A  TIME 42  SCF 40  PDF F1      LCD 9  PCF A  TIME 42  SCF 40  PDF 53
          TIME    41192.989848
```

3.21 : ACF/TAP

DESCRIPTION

This is a service aid that provides formatting and summary functions for ACF/VTAM and ACF/TCAM trace data sets. It can simplify the analysis by providing a report that is easy to read and understand.

AVAILABILITY

ACF/TAP is supplied as part of Release 6 of NCP as a System Support Program (SSP).

REFERENCE MANUALS

ACF/TAP USER'S GUIDE	SC30-3115

OPERATION

The trace data set created by DOS ACF/VTAM or by OS GTF (ACF/VTAM) or COMWRITE (ACF/TCAM) 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 upon 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 data set in OS or the TRFILE in DOS 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

The following reports were created with various ACF/TAP options. Preceding each option are the options used to create the report.

```
OPTIONS:
DSJ050I ACFTAP PARAMETERS:
DSJ051I INPUT   = L  S=SCAN L=LINE B=BUFFER(PIU) I=IO(RNIO) A=ALL
DSJ052I SOURCE  = G  G=GTF  D=DOS  C=COMWRITE
DSJ053I LDPRT   = Y  Y=YES  N=NO  X=ERROR (LINE TRACE DETAIL)
```

Note: This option should only be used for link-type failures. It should not be executed on the first pass but after the other line reports have been examined.

ADVANCED COMMUNICATIONS FUNCTION
TRACE ANALYSIS PROGRAM
LINE TRACE DETAIL

DATE: 08:15:78 PAGE: 00001

ELEMENT NUMBER	*TRACE ENTRY FIELDS* LCD	PCF	SCF	PDF	TIME	STATUS / ACTION	DESCRIPTIVE ANALYSIS	PROGRAM RESULT
0000001	9	9	4D	7E	A5	TRANSMIT FLAG	SCF (01001101)	START OUTPUT
0000002	9	9	48	01	A5	TRANSMIT DATA	SCF (01001000)	CHAR STORED
0000003	9	9	48	31	A5	TRANSMIT DATA	SCF (01001000)	CHAR STORED
0000004	9	9	48	95	A5	TRANSMIT DATA	SCF (01001000)	CHAR STORED
0000005	9	9	48	36	A5	TRANSMIT DATA	SCF (01001000)	CHAR STORED
0000006	9	9	4D	7E	A5	TRANSMIT FLAG	SCF (01001101)	END 00000001
0000007	9	5	4D	7E	A5	SCAN FOR FLAG (PDF NOT RELEVANT)	SCF (01001101)	RESET INPUT
0000008	9	6	0D	7E	A5	RECEIVE FLAG (PDF NOT RELEVANT)	SCF (00001101)	START INPUT
0000009	9	7	49	01	A5	RECEIVE DATA	SCF (01001001)	CHAR STORED
0000010	9	7	49	D1	A5	RECEIVE DATA	SCF (01001001)	CHAR STORED
0000011	9	7	49	9B	A5	RECEIVE DATA	SCF (01001001)	CHAR STORED
0000012	9	7	49	D1	A5	RECEIVE DATA	SCF (01001001)	CHAR STORED
0000013	9	6	0D	D1	A5	RECEIVE FLAG (PDF NOT RELEVANT)	SCF (00001101)	END I0000002
0000014	9	9	4D	7E	A7	TRANSMIT FLAG	SCF (01001101)	CHAR IGNORED
0000015	9	9	48	01	A7	TRANSMIT DATA	SCF (01001000)	CHAR STORED
0000016	9	9	48	31	A7	TRANSMIT DATA	SCF (01001000)	CHAR STORED
0000017	9	9	48	95	A7	TRANSMIT DATA	SCF (01001000)	CHAR STORED

```
DSJ050I ACFTAP PARAMETERS:
DSJ051I INPUT   = L  S=SCAN L=LINE B=BUFFER(PIU) I=IO(RNIO) A=ALL
DSJ052I SOURCE  = G  G=GTF  D=DOS  C=COMWRITE
DSJ054I LSPRT   = Y  Y=YES  N=NO          (LINE TRACE SUMMARY)
```

Note: This option should only be used for link-type failures. It should not be executed on the first pass but after the other line reports have been examined.

ADVANCED COMMUNICATIONS FUNCTION
TRACE ANALYSIS PROGRAM
LINE TRACE SUMMARY

DATE: 08:15:78 PAGE: 00001

ELEMENT REC/MSG	TRACE FIELDS																																		PROGRAM RESULT
					V					V				V				V				V				V				V				V	
0000035	LCDPCF	99	99	99	99	99	99	95	96	97	97	97	97	96	99	99	99	99	99	99	95	96	97	97	97	97	96	99	99	99	99	99	99	95	96	97	I-IGNOR CHR
	TIME	A5	A5	A5	A5	A5	A5	A5	A5	A5	A5	A5	A5	A5	A7	A7	A7	A7	A7	A7	A7	A7	A7	A7	A7	A7	A7	A9	A9	A9	A9	A9	A9	A9	A9	A9	R-RESET BFR
0000005	SCF	4D	48	48	48	48	4D	4D	0D	49	49	49	49	0D	4D	48	48	48	48	4D	4D	0D	49	49	49	49	0D	4D	48	48	48	48	4D	4D	0D	49	S-START MSG
	PDF	7E	01	31	95	36	7E	7E	7E	01	D1	9B	D1	D1	7E	01	31	95	36	7E	7E	7E	01	D1	9B	D1	D1	7E	01	31	95	36	7E	7E	7E	01	E-END MSG
0000005		S					E	R	S					E	I					E	R	S					E	I					E	R	S		X-EXCEPTION
0000070	LCDPCF	97	97	97	96	99	99	99	99	99	99	95	96	97	97	97	97	97	96	99	99	99	99	99	99	95	96	97	97	97	97	96	99	99	99	99	I-IGNOR CHR
	TIME	A9	A9	A9	A9	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AB	AD	AD	AD	AD	AD	AD	AD	AD	AD	AD	AD	AD	AD	AF	AF	AF	AF	R-RESET BFR
0000006	SCF	49	49	49	0D	4D	48	48	48	48	4D	4D	0D	49	49	49	49	0D	4D	48	48	48	48	4D	4D	0D	49	49	49	49	0D	4D	48	48	48	48	S-START MSG
	PDF	D1	9B	D1	D1	7E	01	31	95	36	7E	7E	7E	01	D1	9B	D1	D1	7E	01	31	95	36	7E	7E	7E	01	D1	9B	D1	D1	7E	01	31	95	36	E-END MSG
0000010					E	I					E	R	S					E	I					E	R	S					E	I					X-EXCEPTION
0000105	LCDPCF	99	95	96	97	97	97	97	96	99	99	99	99	99	99	95	96	97	97	97	97	96	99	99	99	99	99	99	95	96	97	97	97	96	99	I-IGNOR CHR
	TIME	AF	AF	AF	AF	AF	AF	AF	AF	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B1	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B3	B5	R-RESET BFR
0000014	SCF	4D	4D	0D	49	49	49	49	0D	4D	48	48	48	48	4D	4D	0D	49	49	49	49	0D	4D	48	48	48	48	4D	4D	0D	49	49	49	49	0D	4D	S-START MSG
	PDF	7E	7E	7E	01	D1	9B	D1	D1	7E	01	31	95	36	7E	7E	7E	01	D1	9B	D1	D1	7E	01	31	95	36	7E	7E	7E	01	D1	9B	D1	D1	7E	E-END MSG
0000016		E	R	S				E	I					E	R	S					E	I					E	R	S					E	I	X-EXCEPTION
0000140	LCDPCF	99	99	99	99	99	95	96	97	97	97	97	96	99	99	99	99	99	99	99	95	96	97	97	97	97	96	99	99	99	99	99	95	96	97	97	I-IGNOR CHR
	TIME	B5	B5	B5	B5	B5	B5	B5	B5	B5	B5	B5	B5	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	B7	B9	B9	B9	B9	B9	B9	B9	B9	B9	B9	R-RESET BFR
0000015	SCF	48	48	48	48	4D	4D	0D	49	49	49	49	0D	4D	48	48	48	48	4D	4D	0D	49	49	49	49	0D	4D	48	48	48	48	4D	4D	0D	49	49	S-START MSG
	PDF	01	31	95	36	7E	7E	7E	01	D1	9B	D1	D1	7E	01	31	95	36	7E	7E	7E	01	D1	9B	D1	D1	7E	01	31	95	36	7E	7E	7E	01	D1	E-END MSG
0000021					E	R	S					E	I					E	R	S					E	I					E	R	S			X-EXCEPTION
0000175	LCDPCF	97	97	96	99	99	99	99	99	99	95	96	97	97	97	97	96	99	99	99	99	99	99	95	96	97	97	97	97	96	99	99	99	99	99	99	I-IGNOR CHR
	TIME	B9	B9	B9	BB	BB	BB	BB	BB	BB	BB	BB	BB	BB	BB	BB	BB	BB	BD	BD	BD	BD	BD	BD	BD	BD	BD	BD	BD	BD	BD	BF	BF	BF	BF	BF	BF	R-RESET BFR
0000023	SCF	49	49	0D	4D	48	48	48	48	4D	4D	0D	49	49	49	49	0D	4D	48	48	48	48	4D	4D	0D	49	49	49	49	0D	4D	48	48	48	48	4D	S-START MSG
	PDF	9B	D1	D1	7E	01	31	95	36	7E	7E	7E	01	D1	9B	D1	D1	7E	01	31	95	36	7E	7E	7E	01	D1	9B	D1	D1	7E	01	31	95	36	7E	E-END MSG
0000026				E	I					E	R	S					E	I					E	R	S					E	I					E	X-EXCEPTION
0000210	LCDPCF	95	96	97	97	97	97	96	99	99	99	99	99	99	95	96	97	97	97	97	96	99	99	99	99	99	99	95	96	97	97	97	97	96	99	99	I-IGNOR CHR
	TIME	BF	BF	BF	BF	BF	BF	BF	C1	C1	C1	C1	C1	C1	C1	C1	C1	C1	C1	C1	C1	C1	C3	C3	C3	C3	C3	C3	C3	C3	C3	C3	C3	C5	C5		R-RESET BFR
0000024	SCF	4D	0D	49	49	49	49	0D	4D	48	48	48	48	4D	4D	0D	49	49	49	49	0D	4D	48	48	48	48	4D	4D	0D	49	49	49	49	0D	4D	48	S-START MSG
	PDF	7E	7E	01	D1	9B	D1	D1	7E	01	31	95	36	7E	7E	7E	01	D1	9B	D1	D1	7E	01	31	95	36	7E	7E	7E	01	D1	9B	D1	D1	7E	01	E-END MSG
0000032		R	S				E	I					E	R	S					E	I					E	R	S					E	I			X-EXCEPTION

```
DSJ050I ACFTAP PARAMETERS:
DSJ051I INPUT   = L  S=SCAN L=LINE B=BUFFER(PIU) I=IO(RNIO) A=ALL
DSJ052I SOURCE  = G  G=GTF  D=DOS  C=COMWRITE
DSJ056I SDPRT   = Y  Y=YES  N=NO          (SNA  SUMMARY)


                                        ADVANCED COMMUNICATIONS FUNCTION
                                             TRACE ANALYSIS PROGRAM
        DATE: 08:15:78                    SYSTEMS NETWORK ARCHITECTURE DETAIL                          PAGE: 00001
MESSAGE    GROUP                                                                                                ENTRY
 NUMBER    SUMMARY                                D E S C R I P T I V E   A N A L Y S I S                     SUMMARY
0000064  DATA FLOW   01 D2 2C 00 00 03 00 00 03 80 00 83 89 83 A2 F1 F3 42 B1
         SDLC CMND   SDLC DATA RECEIVED                    RECEIVE ( 6 )   SEND ( 1 )    POLL/FINAL = ON
         SDLC LINK   ADDRESS:  01  COMMAND: D2  (11010010)  BLOCK CHECK: 42B1 BCC COMPLEMENT:   1011110101001110 (48462)
         TH  00-00   FORMAT ID (FID): 2 * SEGMENT (MPF): ENTIRE *                          * FLOW (EFI): NORMAL    *
         TH  02-05   ORIGIN (OAF): 03   DESTINATION (DAF): 00   * SEQUENCE NUMBER (SNF):00000 *                    *
         RH  00-02   RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1              * CHAIN: ONLY ELEMENT   *
                     RU FORMAT: UNFORMATTED               * PACING INDICATOR: OFF           *                       *
                     BRACKET:                             * CHANGE DIRECTION INDICATOR: OFF * RU CODE: EBCDIC       *
0000064  USER DATA  *CICS13                                                                                       *
0000079  DATA FLOW   01 4C 2C 00 03 00 00 00 83 80 00 B7 A2
         SDLC CMND   SDLC DATA TRANSMITTED                 RECEIVE ( 2 )   SEND ( 6 )    POLL/FINAL = OFF
         SDLC LINK   ADDRESS:  01  COMMAND: 4C  (01001100)  BLOCK CHECK: B7A2 BCC COMPLEMENT:   0100100001011101 (18525)
         TH  00-00   FORMAT ID (FID): 2 * SEGMENT (MPF): ENTIRE *                          * FLOW (EFI): NORMAL    *
         TH  02-05   ORIGIN (OAF): 00   DESTINATION (DAF): 03   * SEQUENCE NUMBER (SNF):00000 *                    *
         RH  00-02   RU TYPE: FM DATA FLOW      RESPONSE * RESPONSE/REQUEST: DR1              * CHAIN: ONLY ELEMENT   *
                     RU FORMAT: UNFORMATTED               * PACING INDICATOR: OFF           *                       *
0000082  DATA FLOW   01 4E 2C 00 03 00 00 13 03 80 00 15 40 15 40 15 C3 D6 D4 D4 C1 D5 C4 40 C3 D6 D4 D7 D3 C5 E3 C5 C4
                     40 D6 D2 7A 40 15 40 15 40 15 40 15 C9 86 40 D3 D6 C7 D6 D5 6B 40 97 99 85 A2 A2 40 C1 D3 E3 61 E2
                     E8 E2 40 D9 C5 D8 40 4D E3 C5 E2 E3 40 D9 C5 D8 61 C3 D3 C5 C1 D9 40 86 96 99 40 F3 F2 F7 F7 5D 40
                     15 40 15 40 15 C9 86 40 D3 D6 C7 D6 C6 C6 6B 40 85 95 A3 85 99 40 95 85 A7 A3 40 83 96 94 94 81 95
                     84 40 96 99 40 97 99 85 A2 A2 40 85 95 A3 85 99 40 86 96 99 40 93 96 87 96 95 40 83 96 94 94 81 95
                     84 40 A2 A8 95 A3 81 A7 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40
                     40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40
                     40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 15 01 F9
         SDLC CMND   SDLC DATA TRANSMITTED                 RECEIVE ( 2 )   SEND ( 7 )    POLL/FINAL = OFF
         SDLC LINK   ADDRESS:  01  COMMAND: 4E  (01001110)  BLOCK CHECK: 01F9 BCC COMPLEMENT:   1111111000000110 (65030)
         TH  00-00   FORMAT ID (FID): 2 * SEGMENT (MPF): ENTIRE *                          * FLOW (EFI): NORMAL    *
         TH  02-05   ORIGIN (OAF): 00   DESTINATION (DAF): 03   * SEQUENCE NUMBER (SNF):00019 *                    *
         RH  00-02   RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1              * CHAIN: ONLY ELEMENT   *
                     RU FORMAT: UNFORMATTED               * PACING INDICATOR: OFF           *                       *
                     BRACKET:                             * CHANGE DIRECTION INDICATOR: OFF * RU CODE: EBCDIC       *
```

```
OPTIONS:
DSJ050I ACFTAP PARAMETERS:
DSJ051I INPUT   = L  S=SCAN L=LINE B=BUFFER(PIU) I=IO(RNIO) A=ALL
DSJ052I SOURCE  = G  G=GTF  D=DOS  C=COMWRITE
DSJ056I SSPRT   = Y  Y=YES  N=NO          (SNA  SUMMARY)
```

ADVANCED COMMUNICATIONS FUNCTION
TRACE ANALYSIS PROGRAM
SYSTEMS NETWORK ARCHITECTURE SUMMARY

DATE: 08:15:78 PAGE: 00001

MESSAGE NUMBER	DIRECTION	TYPE	SDLC ADDRESS	CMND/RESP	POLL/FINAL	RECEIVE	SEND	TYPE	CMND	FORMAT IDENTIFIER (FID)	F/M/L/(=ENTIRE)SEGMENT	EXPEDITED	FROM/TO SSCP(FID3)	FROM/TO PU(FID3)	OAF	DAF	SEQNO	COUNT	FID3 LSID	REQUEST(Q) OR RESPONSE(S)	SC/DFC/NC/(=FMDATA)RU	FORMATTED	F/M/L(=ONLY)CHAIN	REQUEST/RESPONSES	PACING INDICATOR	BEGIN BRACKET INDICATOR	END BRACKET INDICATOR	CHANGE DIRECTION IND	ALT CODE	RU COMMAND	RU SENSE
0000130	L	I	01		S	2	3	I		2					02	00	00000			Q				DR1							
0000143	L	O	01			4	2	I		2					00	02	00000			S				DR1							
0000146	L	O	01			4	3	I		2					00	02	00011			Q				DR1							
0000150	L	I	01		S	4	4	I		2					02	00	00011			S				DR1							
0000161	L	O	01			5	4	I		2	E				01	02	00001			Q	S	F		DR1						BIND	
0000165	L	I	01		S	5	5	I		2	E				02	01	00001			S	S	F		DR1						BIND	
0000170	L	O	01			6	5	I		2	E				01	02	00002			Q	S	F		DR1						SDT	
0000172	L	I	01		S	6	6	I		2	E				02	01	00002			S	S	F		DR1						SDT	
0000210	L	I	01		S	6	7	I		2					02	01	00001			Q	D	F		DR1					S	LUSTAT	
0000217	L	O	01			0	6	I		2					01	02	00001			S	D	F		DR1						LUSTAT	
0000251	L	I	01		S	7	0	I		2					02	01	00002			Q				DR1	EXCEPTION		B		S		
0000260	L	O	01			1	7	I		2					01	02	00001			Q				DR1					S		
0000264	L	I	01		S	0	1	I		2					02	01	00001			S				DR1							
0000350	L	I	01		S	0	2	I		2					02	01	00003			Q				DR1	EXCEPTION				S		
0000357	L	O	01			3	0	I		2					01	02	00002			Q				DR1					S		
0000361	L	I	01		S	1	3	I		2					02	01	00002			S				DR1							
0000387	L	I	01		S	1	4	I		2					02	01	00004			Q				DR1	EXCEPTION				S		
0000394	L	O	01			5	1	I		2					01	02	00003			Q				DR1					S		
0000396	L	I	01		S	2	5	I		2					02	01	00003			S				DR1							
0000458	L	I	01		S	2	6	I		2					02	01	00005			Q				DR1	EXCEPTION				S		
0000463	L	O	01			7	2	I		2					01	02	00004			Q				DR1				E			
0000467	L	I	01		S	3	7	I		2					02	01	00004			S				DR1							
0000495	L	I	01		S	3	0	I		2					02	01	00006			Q				DR1	EXCEPTION		B		S		
0000500	L	O	01			1	3	I		2					01	02	00005			Q				DR1				E			
0000504	L	I	01		S	4	1	I		2					02	01	00005			S				DR1							
0000570	L	I	01		S	4	2	I		2					02	00	00000			Q				DR1							
0000579	L	O	01			3	4	I		2					00	02	00000			S				DR1							
0000580	L	O	01			3	5	I		2					00	02	00012			Q				DR1							

```
DSJ050I ACFTAP PARAMETERS:
DSJ051I INPUT   = A  S=SCAN L=LINE B=BUFFER(PIU) I=IO(RNIO) A=ALL
DSJ052I SOURCE  = G  G=GTF  D=DOS  C=COMWRITE
DSJ055I SDPRT   = Y  Y=YES  N=NO          (SNA  DETAIL)

                                        ADVANCED COMMUNICATIONS FUNCTION
                                             TRACE ANALYSIS PROGRAM
         DATE: 08:15:78                 SYSTEMS NETWORK ARCHITECTURE DETAIL                    PAGE: 00001
MESSAGE    GROUP                                                                                  ENTRY
 NUMBER   SUMMARY                      D E S C R I P T I V E   A N A L Y S I S                    SUMMARY
0000001  DATA FLOW   1C 00 68 00 A8 97 00 00 00 09 03 80 00 83 89 83 A2 F1 F3
         TH  00-00   FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                 * FLOW (EFI): NORMAL    *
         TH  02-09   ORIGIN (OAF): A897 DESTINATION (DAF): 6800 * SEQUENCE NUMBER (SNF):00000 * COUNT (DCF):  00009   *
         RH  00-02   RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1             * CHAIN: ONLY ELEMENT   *
                     RU FORMAT: UNFORMATTED              * PACING INDICATOR: OFF             *                       *
                     BRACKET:                            * CHANGE DIRECTION INDICATOR: OFF   * RU CODE: EBCDIC       *
0000001  USER DATA  *CICS13                                                                                          *
0000002  DATA FLOW   1C 00 68 00 A8 97 00 00 00 09 03 80 00 83 89 83 A2 F1 F3
         TH  00-00   FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                 * FLOW (EFI): NORMAL    *
         TH  02-09   ORIGIN (OAF): A897 DESTINATION (DAF): 6800 * SEQUENCE NUMBER (SNF):00000 * COUNT (DCF):  00009   *
         RH  00-02   RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1             * CHAIN: ONLY ELEMENT   *
                     RU FORMAT: UNFORMATTED              * PACING INDICATOR: OFF             *                       *
                     BRACKET:                            * CHANGE DIRECTION INDICATOR: OFF   * RU CODE: EBCDIC       *
0000002  USER DATA  *CICS13                                                                                          *
0000003  DATA FLOW   1C 00 A8 97 68 00 00 00 00 03 83 80 00
         TH  00-00   FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                 * FLOW (EFI): NORMAL    *
         TH  02-09   ORIGIN (OAF): 6800 DESTINATION (DAF): A897 * SEQUENCE NUMBER (SNF):00000 * COUNT (DCF):  00003   *
         RH  00-02   RU TYPE: FM DATA FLOW      RESPONSE * RESPONSE/REQUEST: DR1             * CHAIN: ONLY ELEMENT   *
                     RU FORMAT: UNFORMATTED              * PACING INDICATOR: OFF             *                       *
0000004  DATA FLOW   1C 00 A8 97 68 00 00 00 00 03 83 80 00
         TH  00-00   FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                 * FLOW (EFI): NORMAL    *
         TH  02-09   ORIGIN (OAF): 6800 DESTINATION (DAF): A897 * SEQUENCE NUMBER (SNF):00000 * COUNT (DCF):  00003   *
         RH  00-02   RU TYPE: FM DATA FLOW      RESPONSE * RESPONSE/REQUEST: DR1             * CHAIN: ONLY ELEMENT   *
                     RU FORMAT: UNFORMATTED              * PACING INDICATOR: OFF             *                       *
```

```
                                    ADVANCED COMMUNICATIONS FUNCTION
                                         TRACE ANALYSIS PROGRAM
        DATE: 08:15:78                SYSTEMS NETWORK ARCHITECTURE DETAIL                          PAGE: 00002
MESSAGE    GROUP                                                                                      ENTRY
 NUMBER    SUMMARY                          D E S C R I P T I V E   A N A L Y S I S                   SUMMARY
0000005  DATA FLOW   1C 00 A8 97 68 00 00 13 00 FE 03 80 00 15 40 15 40 15 C3 D6 D4 D4 C1 D5 C4 40 C3 D6 D4 D7 D3 C5 E3
                     C5 C4 40 D6 D2 7A 40 15 40 15 40 15 40 15 C9 86 40 D3 D6 C7 D6 D5 6B 40 97 99 85 A2 A2 40 C1 D3 E3
                     61 E2 E8 E2 40 D9 C5 D8 40 4D E3 C5 E2 E3 40 D9 C5 D8 61 C3 D3 C5 C1 D9 40 86 96 99 40 F3 F2 F7 F7
                     5D 40 15 40 15 40 15 C9 86 40 D3 D6 C7 D6 C6 C6 6B 40 85 95 A3 85 99 40 95 85 A7 A3 40 83 96 94 94
                     81 95 84 40 96 99 40 97 99 85 A2 A2 40 85 95 A3 85 99 40 86 96 99 40 93 96 87 96 95 40 83 96 94 94
                     81 95 84 40 A2 A8 95 A3 81 A7 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40
                     40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40
        TH  00-00    FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                          * FLOW (EFI): NORMAL    *
        TH  02-09    ORIGIN (OAF): 6800 DESTINATION (DAF): A897 * SEQUENCE NUMBER (SNF):00019 * COUNT (DCF):  00254   *
        RH  00-02    RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1              * CHAIN: ONLY ELEMENT   *
                     RU FORMAT: UNFORMATTED              * PACING INDICATOR: OFF              *                       *
                     BRACKET:                            * CHANGE DIRECTION INDICATOR: OFF    * RU CODE: EBCDIC       *
0000005  USER DATA  *. . .COMMAND COMPLETED OK: . . . .IF LOGON, PRESS ALT/SYS REQ (TEST REQ/CLEAR FOR 3277) . . .IF L*
                    *OGOFF, EMTER MEXT COMMAMD OR PRESS EMTER FOR LOGOM COMMAMD SYMTAX                             *
                    *                                                                                             *
```

```
DSJ050I ACFTAP PARAMETERS:
DSJ051I INPUT   = A  S=SCAN L=LINE B=BUFFER(PIU) I=IO(RNIO) A=ALL
DSJ052I SOURCE  = G  G=GTF  D=DOS  C=COMWRITE
DSJ056I SSPRT   = Y  Y=YES  N=NO          (SNA  SUMMARY)
                                   ADVANCED COMMUNICATIONS FUNCTION
                                        TRACE ANALYSIS PROGRAM
      DATE: 08:15:78                SYSTEMS NETWORK ARCHITECTURE SUMMARY                    PAGE: 00001
        *******SDLC******  **********TRANSMISSION HEADER*********  **********************REQUEST HEADER**********************
        ..-SDLC ADDRESS    .-FORMAT IDENTIFIER (FID)                .-REQUEST(Q) OR RESPONSE(S)  .-PACING INDICATOR
        || .-CMND/RESP     | .-F/M/L/( =ENTIRE)SEGMENT              | .-SC/DFC/NC/( =FMDATA)RU   | .-BEGIN BRACKET INDICATOR
DIRECTION-. || | .-POLL/FINAL | | .-EXPEDITED                      | | .-FORMATTED              | | .-END BRACKET INDICATOR
        | || | | .-RECEIVE  | | |                                  | | | .-F/M/L( =ONLY)CHAIN     | | | .-CHANGE DIRECTION IND
  TYPE--. | || | | | .-SEND   | | |     FROM/TO SSCP(FID3)---.       | | | |                        | | | | .-ALT CODE
------- | | || | | | | .-TYPE | | |     FROM/TO PU(FID3)---. | FID3  | | | |                        | | | | |    *********RU********
MESSAGE | | || | | | | | CMND | | |  OAF  DAF  SEQNO COUNT | | LSID  | | | |  REQUEST/RESPONSES     | | | | | |    COMMAND   SENSE
NUMBER  V V VV V V V V V ____ V V V  ____ ____ _____ _____ V V ____  V V V  V  _____________________ V V V V V    _________ ________
0000001 I I                  1      A897 6800 00000 00009          Q        DR1                                          
0000002 B I                  1      A897 6800 00000 00009          Q        DR1                                          
0000003 B O                  1      6800 A897 00000 00003          S        DR1                                          
0000004 I O                  1      6800 A897 00000 00003          S        DR1                                          
0000005 B O                  1      6800 A897 00019 00254          Q        DR1                                          
0000006 I O                  1      6800 A897 00019 00254          Q        DR1                                          
0000007 I I                  1      A897 6800 00019 00003          S        DR1                                          
0000008 B I                  1      A897 6800 00019 00003          S        DR1                                          
0000009 B O                  1   E  681A A897 00001 00038          Q S F    DR1                                  BIND    
0000010 I O                  1   E  681A A897 00001 00038          Q S F    DR1                                  BIND    
0000011 I I                  1   E  A897 681A 00001 00004          S S F    DR1                                  BIND    
0000012 B I                  1   E  A897 681A 00001 00004          S S F    DR1                                  BIND    
0000013 B O                  1   E  681A A897 00002 00004          Q S F    DR1                                  SDT     
0000014 I O                  1   E  681A A897 00002 00004          Q S F    DR1                                  SDT     
0000015 I I                  1   E  A897 681A 00002 00004          S S F    DR1                                  SDT     
0000016 B I                  1   E  A897 681A 00002 00004          S S F    DR1                                  SDT     
0000017 I I                  1      A897 681A 00001 00008          Q D F    DR1                        S         LUSTAT  
0000018 B I                  1      A897 681A 00001 00008          Q D F    DR1                        S         LUSTAT  
0000019 B O                  1      681A A897 00001 00004          S D F    DR1                                  LUSTAT  
0000020 I O                  1      681A A897 00001 00004          S D F    DR1                                  LUSTAT  
0000021 I I                  1      A897 681A 00002 00010          Q        DR1      EXCEPTION       B    S            
0000022 B I                  1      A897 681A 00002 00010          Q        DR1      EXCEPTION       B    S            
0000023 B O                  1      681A A897 00001 00089          Q        DR1                          S            
0000024 I O                  1      681A A897 00001 00089          Q        DR1                          S            
0000025 I I                  1      A897 681A 00001 00003          S        DR1                                          
0000026 B I                  1      A897 681A 00001 00003          S        DR1                                          
0000027 I I                  1      A897 681A 00003 00015          Q        DR1      EXCEPTION           S            
0000028 B I                  1      A897 681A 00003 00015          Q        DR1      EXCEPTION           S            
0000029 B O                  1      681A A897 00002 00014          Q        DR1                          S            
0000030 I O                  1      681A A897 00002 00014          Q        DR1                          S            
```

```
DSJ050I ACFTAP PARAMETERS:
DSJ058I NEPRT   = Y  Y=YES  N=NO          (NETWORK ERROR)
                                        ADVANCED COMMUNICATIONS FUNCTION
                                            TRACE ANALYSIS PROGRAM
         DATE: 06:27:78                     NETWORK ERROR ANALYSIS                                  PAGE: 00001
 ERROR  MESSAGE  NUMBER   E R R O R  C O N D I T I O N          A D D I T I O N A L  I N F O R M A T I O N          SUMMARY
DSJ126I MESSAGE 0000087 SENSE DATA FIELD PRESENT        080F0000                                                SENSE DATA
DSJ126I MESSAGE 0000088 SENSE DATA FIELD PRESENT        080F0000                                                SENSE DATA
DSJ126I MESSAGE 0000133 SENSE DATA FIELD PRESENT        080F0000                                                SENSE DATA
DSJ126I MESSAGE 0000134 SENSE DATA FIELD PRESENT        080F0000                                                SENSE DATA
DSJ126I MESSAGE 0000141 SENSE DATA FIELD PRESENT        080F0000                                                SENSE DATA
DSJ126I MESSAGE 0000142 SENSE DATA FIELD PRESENT        080F0000                                                SENSE DATA
DSJ126I MESSAGE 0000155 SENSE DATA FIELD PRESENT        080F0000                                                SENSE DATA
DSJ126I MESSAGE 0000156 SENSE DATA FIELD PRESENT        080F0000                                                SENSE DATA
```

```
DSJ050I ACFTAP PARAMETERS:
DSJ059I SUMMARY = Y  Y=YES  N=NO  A=ALL  E=EVERY (INPUT SUMMARY)
DSJ060I DUMP    = N  Y=YES  N=NO   (TRACE RECORD DUMP)
DSJ073I PRINT   = N  N=NO  Y=YES  (TRACE DATA TO SYSPRINT/SYSLST)

                                          ADVANCED COMMUNICATIONS FUNCTION
        DATE: 08:15:78                         TRACE ANALYSIS PROGRAM                    PAGE: 00001
DSJ021I PARAMETERS ARE RESET TO DEFAULT STATUS
DSJ020A ENTER ACFTAP PARAMETERS OR READ, QUIT, LIST, GO, RESET
DSJ029I READ
DSJ022I SYSIN/SYSIPT PARAMETER INPUT FILE OPENED
DSJ089I INPUT=ALL                                                          00000100
DSJ089I SSPRT=YES                                                          00000200
DSJ089I SDPRT=YES                                                          00000300
DSJ089I LDPRT=NO                                                           00000400
DSJ089I LSPRT=NO                                                           00000500
DSJ089I NEPRT=YES                                                          00000600
DSJ089I MAXSUBA=031                                                        00000700
DSJ089I PRINT=NO                                                           00000800
DSJ089I SUMMARY=YES                                                        00000900
DSJ089I DTPRT=NO                                                           00001000
DSJ089I SOURCE=GTF                                                         00001100
DSJ089I GO                                                                 00001200
DSJ082I GO COMMAND ISSUED FROM SYSIN/SYSIPT
DSJ050I ACFTAP PARAMETERS:
DSJ051I INPUT   = A  S=SCAN L=LINE B=BUFFER(PIU) I=IO(RNIO) A=ALL
DSJ052I SOURCE  = G  G=GTF  D=DOS  C=COMWRITE
DSJ053I LDPRT   = N  Y=YES  N=NO  X=ERROR (LINE TRACE DETAIL)
DSJ054I LSPRT   = N  Y=YES  N=NO          (LINE TRACE SUMMARY)
DSJ055I SDPRT   = Y  Y=YES  N=NO          (SNA  DETAIL)
DSJ056I SSPRT   = Y  Y=YES  N=NO          (SNA  SUMMARY)
DSJ057I DTPRT   = N  Y=YES  N=NO          (NETWORK DATA TRAFFIC)
DSJ058I NEPRT   = Y  Y=YES  N=NO          (NETWORK ERROR)
DSJ059I SUMMARY = Y  Y=YES  N=NO  A=ALL  E=EVERY (INPUT SUMMARY)
DSJ060I DUMP    = N  Y=YES  N=NO   (TRACE RECORD DUMP)
DSJ070I RRSUP   = Y  P=PAIR  N=NO  Y=YES
DSJ073I PRINT   = N  N=NO  Y=YES  (TRACE DATA TO SYSPRINT/SYSLST)
DSJ066I MAXSUBA = 031  (3, 7, 15, 31, 63, 127, 255)
DSJ067I SSCP    = (001,00000)
DSJ068I CDRM    = (001,00001)
DSJ069I LINECNT = 00000060  (25 TO 99999999)
DSJ071I TIMEOUT = 010  (0 TO 255)
DSJ072I UNIT    = TAPE (TAPE 3330 3340 2314 2311)
DSJ079I SSCP NETWORK ADDRESS FOR SUBAREA 001 IS 0800
DSJ079I CDRM NETWORK ADDRESS FOR SUBAREA 001 IS 0801
```

```
DSJ002I SYSTRACE/SYS008 INPUT FILE OPENED
DSJ004I TRACE FILE PROCESSING BEGINS.....
DSJ220I TRACE FILE RECORDED BY MVS GTF
DSJ223I GTF COMPREHENSIVE TRACE RECORDING MODE
DSJ224I GTF TRACE RECORDS ARE TIMESTAMPED
DSJ228I GTF USR OPTION IN EFFECT
DSJ227I GTF RNIO OPTION NEEDED FOR VTAM TRACE TYPE=RNIO
DSJ201I GTF RECORD 0000050 LENG(00054) D(08.15.78) T(17.29.01.480490) AID(FF) FID(04) EID(8100)          VTAM RNIO IN
DSJ203I VTAM TRACE 0000050 LENG(00051) D(08.15.78) T(17.29.01.480490) LRC(00/00) S(A897    ) D(6800    ) VTAM IO/RNIO IN   0000001
DSJ201I GTF RECORD 0000052 LENG(00079) D(08.15.78) T(17.29.01.495575) AID(FF) FID(FD) EID(EFEF)          VTAM BUFFER
DSJ203I VTAM TRACE 0000052 LENG(00051) D(08.15.78) T(17.29.01.491510) LRC(00/00) S(SDLC76P2) D(MVSVM   ) VTAM BUFFER  IN   0000002
DSJ201I GTF RECORD 0000091 LENG(00073) D(08.15.78) T(17.29.02.652355) AID(FF) FID(FD) EID(EFEF)          VTAM BUFFER
DSJ203I VTAM TRACE 0000091 LENG(00045) D(08.15.78) T(17.29.02.643949) LRC(00/00) S(MVSVM   ) D(SDLC76P2) VTAM BUFFER  OUT  0000003
DSJ201I GTF RECORD 0000094 LENG(00054) D(08.15.78) T(17.29.02.659514) AID(FF) FID(04) EID(8200)          VTAM RNIO OUT
DSJ203I VTAM TRACE 0000094 LENG(00045) D(08.15.78) T(17.29.02.659514) LRC(00/00) S(6800    ) D(A897    ) VTAM IO/RNIO OUT  0000004
DSJ201I GTF RECORD 0000097 LENG(00284) D(08.15.78) T(17.29.02.812413) AID(FF) FID(FD) EID(EFEF)          VTAM BUFFER
DSJ203I VTAM TRACE 0000097 LENG(00256) D(08.15.78) T(17.29.02.810774) LRC(00/00) S(MVSVM   ) D(SDLC76P2) VTAM BUFFER  OUT  0000005
DSJ201I GTF RECORD 0000101 LENG(00054) D(08.15.78) T(17.29.02.833533) AID(FF) FID(04) EID(8200)          VTAM RNIO OUT
DSJ203I VTAM TRACE 0000101 LENG(00052) D(08.15.78) T(17.29.02.833533) LRC(00/00) S(6800    ) D(A897    ) VTAM IO/RNIO OUT  0000006
DSJ201I GTF RECORD 0000128 LENG(00054) D(08.15.78) T(17.29.03.605553) AID(FF) FID(04) EID(8100)          VTAM RNIO IN
DSJ203I VTAM TRACE 0000128 LENG(00045) D(08.15.78) T(17.29.03.605553) LRC(00/00) S(A897    ) D(6800    ) VTAM IO/RNIO IN   0000007
```

3.22 : OS GTF

DESCRIPTION

This is a facility of all OS operating systems that allows the user to trace and print various events in the operating system. Other programs can also pass data to GTF for recording.

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 SERVICE AIDS

Please reference Bibliography for form numbers for the applicable systems.

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 VTAM's buffers. If VTAM goes to a wait state during the running of line trace, 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.

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 data set 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.

A GTF trace of certain SVC's may be required by IBM to assist in debugging some TCAM problems.

3.23 : 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 control or 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 used for DYNADUMP, since NCP uses the native sub-channel address.

REFERENCE MANUALS

IBM 3704 AND 3705 CONTROL PROGRAM GENERATION AND UTILITIES GUIDE AND REFERENCE MANUAL

Please reference Bibliography for form numbers for the applicable systems.

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 data set)
//SYSIN    DD    *
   PRINT
   END
/*
```

3.24 : NCP DUMP

DESCRIPTION

The NCP can be dumped either thru VTAM or TCAM 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 NCP distribution tape.

In order to dump the NCP either thru VTAM, TCAM or independently, the dump utility program must be copied from the NCP distribution tape to an authorized OS library or the CORE IMAGE LIBRARY for DOS.

REFERENCE MANUALS

IBM 3704 and 3705 CONTROL PROGRAM GENERATION AND UTILITIES GUIDE AND REFERENCE MANUAL

Please reference Bibliography for form numbers for the applicable release level.

OPERATION

When VTAM is used to dump the NCP, the dump is initiated at the console with the following commands:

```
DOS   -   F NET,DUMP,ID=ncp-major-node-name
OS    -   F procname,DUMP,ID=ncp-major-node-name
```

VTAM dumps the communication controller's storage to the data set specified in the DUMPDS operand of the PCCU macro.

When TCAM is used to dump the NCP the dump is initiated with the following command:

```
F procname,DUMP=ncpname
```

TCAM dumps the communication controllers storage to the data set specified in the NCP TERMINAL macro for NCP.

The dump can then be printed from this data set using the appropriate dump print utility program, IFUDUMP for DOS or IFLDUMP for OS/VS.

The communications controller storage can be dumped independently using the dump utility program, IFUREAD for DOS or IFLREAD for OS/VS.

It is advisable to specify FORMAT=Y and BUF=Y

SAMPLE JCL

DOS 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 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),...other parameters
//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 data set)
//SYSIN     DD     *
   DUMP FORMAT=Y,BUF=Y
/*
```

OS/VS JCL to print a 3705 dumped by VTAM or TCAM

```
//CCDUMP    JOB    MSGLEVEL=(1,1),...other parameters
//EXEC      EXEC   PGM=IFLDUMP
//SYSPRINT  DD     SYSOUT=A
//SYSUT2    DD     DSN=DUMPDSET,DISP=OLD  (NCP dump data set)
//SYSIN     DD     *
   DUMP FORMAT=Y,BUF=Y
/*
```

3.25 : 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 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 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 section 4 of the manual.

INTERPRETATION

Refer to operators guide for display panel output indicating the progress of test.

SAMPLE OUTPUT

Refer to section 4 of the proper guide for several sample programs.

3.26 : 370X ON-LINE TESTS

DESCRIPTION

The 3704/3705 (370X) communication scanner On-line Tests (OLLT's) 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 OLLT's reside in the host CPU and are called in using TOLTEP or TOTE and only affect the line being tested. The OLLT's 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 though 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 OLT's must be present in the OLT library.

4. Each line's symbolic name entered in the test request message must be defined to VTAM or TCAM 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

This guide can only be obtained from the IBM Customer Engineer.

OPERATION

For operation of the 370X on-line tests refer to the Chapter 12 on OLLTS.

3.27 : LOGREC

DESCRIPTION

The purpose of error recording on the SYS1.LOGREC data set is to provide a record of all hardware failures, selected software errors, and system conditions. Information about each incident is written onto SYS1.LOGREC 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 of a computer system.

Nine types of records containing device- or incident-dependent information can be recorded on SYS1.LOGREC:

- CCH records for channel failures.

- DDR records for information describing operator and system swaps.

- EOD records for information related to end-of-day conditions.

- IPL records for information related to system initializations.

- MCH records for CPU and storage.

- MDR records for device failures on teleprocessing devices connected to an IBM 3704 or 3705.

- MIH records for information describing pending channel and device ends of all devices except the teleprocessing devices.

- OBR records for counter overflow statistics and device failures on devices supported by the teleprocessing access methods and for end-of-day requests.

- Software records.

AVAILABILITY

The SYS1.LOGREC data set, a non-sharable system data set (only one operating system may access it), must be initialized on the system residence volume during system generation. Initializing SYS1.LOGREC creates a header record and a time stamp record on the data set and allocates space for the data set.

REFERENCE MANUALS

Refer to the System Programming Library: System Generation Reference for your system for information about SYS1.LOGREC space allocation.

OPERATION

The service aid program, IEFCEREP1 should be used on a daily basis to retrieve and print a system summary which should be analyzed to determine if there is a problem that you need to look at. If the summary indicates a device with a high error rate, you can use the service aid to retrieve and print a detailed EREP for a device, DEV=(3705), or a device serial number, DEVSER=(012345), or a line interface base number, LIBADR=023D, or terminal name, TERMN=name, or by time, TIME=(hhmm,hhmm). The service aid should be used on a weekly basis to print a trend report which should be saved to provide a history of the system's performance. For details on using the service aids refer to the chapter on Network Monitoring (MDR).

INTERPRETATION

For details on output from the service aid program refer to the chapter on Network Monitoring (MDR).

3.28 : 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.

SAMPLE OUTPUT

EXAMPLE OF BSC DATA ONLY

55323240407F7F2DFF
55323237FF

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

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+FFFFFFFFFCTS+FFFFFFFFFFFFFFFFFFFFRTS- CD+CTS-FFFFFF55323237FF
FFFFRTS+FFFFFFFFFCTS+553232404O7F7F2DFFRTS- 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.

3.29 : 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 data set, indicators that can be displayed in the 370X, and speakers that a telephone company can install that can be switched from line to line.

DATA SET INDICATORS

Many of the data sets now in use have several indicators that are very useful in line problem determination. These indicators usually include data set ready, request to send, clear to send, carrier detect, and data terminal ready.

370X INDICATORS

Refer to page 3-69 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.

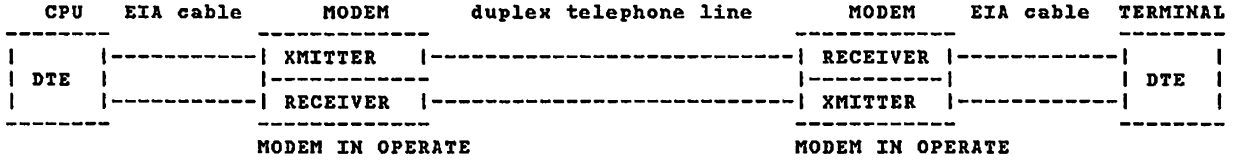
IBM MODEM TESTS

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.

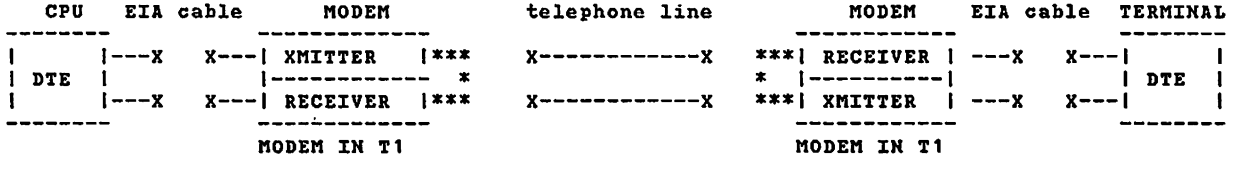
Tests C through E require the cooperation of the other-end operator. The operators need to communicate to coordinate what test is to be performed, how long the test will run, and to watch the operate lights and signal meter. In each of the tests with the exception of test B, a fault is indicated by the 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's not being used (--X X--)

BLOCK DIAGRAM SHOWING NORMAL OPERATION

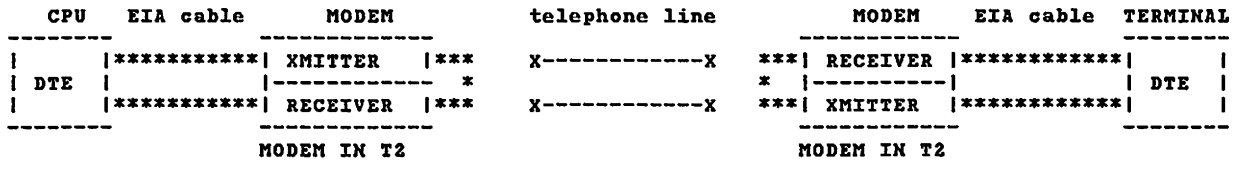


TEST A (T1) MODEM INTERNAL WRAP TEST



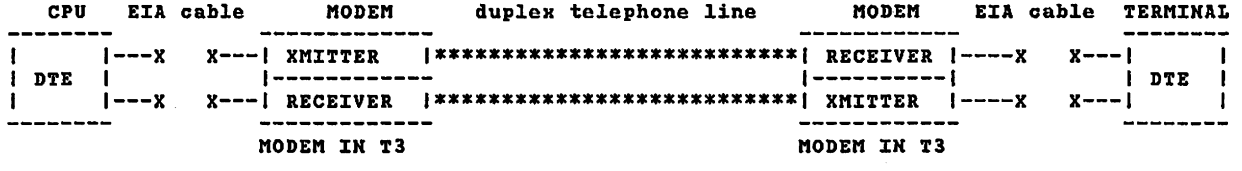
In test T1 the modem doesn't use the EIA interface and the line. The modem generates a test pattern, sends it through the transmitter, loops the pattern back to its own receiver, decodes the test data and checks it to determine if the modem circuits are working properly. The operate light will blink if the test fails. If the test fails, there is a problem with that modem.

TEST B (T2) MODEM WRAP FROM THE TERMINAL



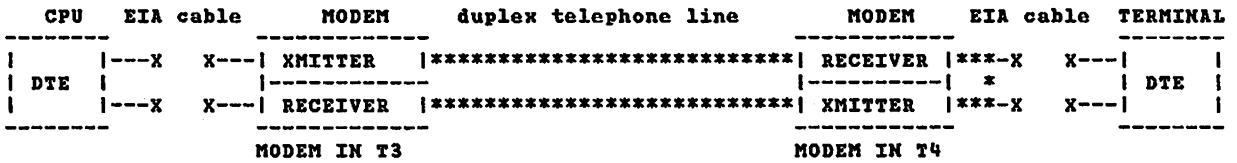
In test T2, the terminal generates the test pattern, sends it to the modem, the modem sends the data through the transmitter, loops it back to its own receiver, demodulates the signal, and sends it back to the terminal which checks it to determine if the pattern has changed. (NOTE: not all terminals 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



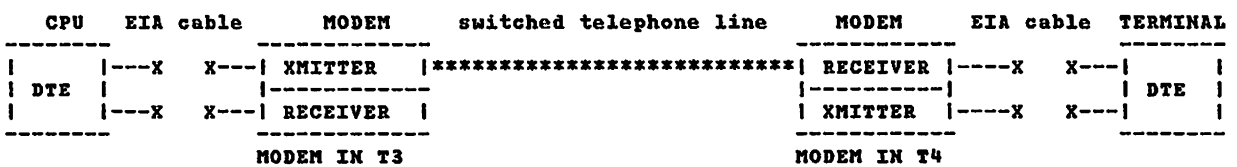
The modem that is in test T3 generates the test pattern, sends it though its transmitter down the line to the other modem which demodulates the test pattern in its receiver and checks it to determine if the pattern has changed. If both modems test good in T1 but not in T3, the problem is with the line.

TEST D (T3 AND T4) MODEM REMOTE WRAP TEST



The modem that is in test T3 generates the test pattern, sends it though 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.

3.30 : CICS AXILIARY TRACE

DESCRIPTION

This is a CICS facility that allows the user to trace the CICS activities handled by various CICS modules. VTAM terminal activities are handled by the DFHZCP module. By looking into the ZCP trace entries along with the other entries (e.g. KCP entries), the user can obtain CICS terminal activities, such as, input/output from a particular terminal, which traction is associated with that terminal, which task id is assigned to it, and etc. Thus helps the user for problem determination, if necessary. It is recommanded that the user also uses the VTAM BUF/IO trace concurrently with the CICS aux trace to get a complete picture of the terminal activities between CICS and the terminal. For VTAM BUF/IO trace information, refer to its respective sections in this charpter.

AVAILABILITY

To have the CICS trace facility available to user's installation, the user should include the Trace Contral Program (DFHTRP) in the CICS gen by specifying:

```
DFHSG PROGRAM=TRP,AUX=YES  also,include the following  DD card  in the
```

CICS start up procedure:

```
//DFHAUXTR  DD  DSN=data-set-name,DISP=shr
```

REFERENCE MANUALS

CICS/VS SYSTEM/APPLICATION DESIGN GUIDE	SC33-0068
CICS/VS SYSTEM PROGRAMMERS REFERENCE MANUAL	SC33-0069
CICS/VS APPLICATION PROGRAMMERS REFERENCE MANUAL	SC33-0079
CICS/VS SYSTEM PROGRAMMER'S GUIDE (DOS/VS)	SC33-0070
CICS/VS SYSTEM PROGRAMMER'S GUIDE (OS/VS)	SC33-0071
CICS/VS REFERENCE SUMMARY: MASTER TERMINAL OPERATOR	Sx33-6011
CICS/VS SYSTEM ADMINISTRATOR'S GUIDE	SH20-9006
CICS/VS REFERENCE SUMMARY: PROGRAM DEBUGGING	SX33-6010

OPERATION

The auxiliary trace is initiated and terminated at the master terminal with the following commands:

```
initiation
  CSMT  RUN,0        (if runaway task interval is not set to zero)
  CSMT  ATR,ON       (turn on aux trace)

termination
  CSMT  ATR,ATC      (close aux trace file)
  CSMT  ATR,OFF      (turn off aux trace)
  CSMT  RUN,X        (reset runaway task interval to original
                      value, if necessary)
```

To print the auxiliary trace record from the aux trace data set, use the Trace Utility Program (DFHTUP) with the following JCL's:

```
//STP1  EXEC PGM=DFHTUP
//STEPLIB DD  DSN=cics.LOADLIB,DISP=SHR
//DFHAUXTR DD  DSN=cics.DFHAUXTR,DISP=SHR
//DFHAXPRT DD  SYSOUT=A
//DFHAXPRM  DD  *
   ALL
```

INTERPRETATION

Reference CICS/VS REFERENCE: PROGRAM DEBUGGING

or CICS/VS APPLICATION PROGRAMMERS REFERENCE MANUAL for trace record interpretation.

SAMPLE OUTPUT

```
        CUSTOMER INFORMATION CONTROL SYSTEM  -  T R A C E   U T I L I T Y   P R O G R A M                PAGE 0001
        SELECTION PARAMETERS ARE
ALL                                                                  00000100
  TIME OF DAY      ID REG14  REQD TASK FIELD A  FIELD B   CHAR-DISPLAY      TRACE TYPE                          INTERVAL TIME
AUXILIARY TRACE ACTIVATED AT -  14:39:38.02
  14:39:38.020384  F1 2C8EEA CC00 0004 00400047 012FB4C4  1........ .....D  SCP GETMAIN-INIT                       00.000384
  14:39:38.020768  C8 2F629A 0000 0004 0009E290 8C400058  H.........S.. ..  SCP ACQUIRED USER STORAGE              00.000384
  14:39:38.027424  FC 2C9806 0B04 0004 00450000 042FB4C4  ..............D  ZCP APPL REQ                          00.006656
  14:39:38.027808  FC 3064FE 0102 0004 00284880 002FB4C4  ..............D  ZCP SEND DFSYN                        00.000384
  14:39:38.028064  FC 309856 0302 0004 00284880 002FB4C4  ..............D  ZCP SEND RESPONSE                     00.000256
  14:39:38.028704  F0 30795E 0D00 0004 0009D130 00000000  0.........J.....  KCP ATTACH HTA                        00.000640
  14:39:38.103200  F0 30672E 4000 0004 10000000 002F45B8  0... ..........  KCP WAIT                            * 00.074496
  14:39:38.103456  D0 311B7E 0A00 0004 00000000 00000000  ..............  KCP SUSPEND                           00.000256
  14:39:38.103712  D0 311B7E 0500 E3C3 00000000 00000000  ......TC........  KCP DISPATCH                          00.000256
  14:39:38.104480  F0 305E7C 0800 E3C3 0009E080 FF000004  0.....TC........  KCP RESUME                            00.000768
  14:39:38.104736  F0 305B0E 4000 E3C3 40000000 002FD92C  0... .TC .....R.  KCP WAIT                            00.000256
  14:39:38.104864  D0 311B7E 0500 0004 00000000 00000000  ..............  KCP DISPATCH                          00.000128
  14:39:38.105248  FC 2C9838 0B04 0004 00040000 022FB4C4  ..............D  ZCP APPL REQ                          00.000384
  14:39:38.105376  F0 306714 4000 0004 20000000 002F45B8  0... ..........  KCP WAIT                              00.000128
  14:39:38.105632  D0 311B7E 0500 0004 00000000 00000000  ..............  KCP DISPATCH                          00.000256
  14:39:38.105888  F2 2C9000 1000 0004 C4C6C8D4 E3D7C540  2.......DFHMTPE   PCP RETURN                            00.000256
  14:39:38.106144  F0 2F41C2 8000 0004 00000000 00000000  0..B............  KCP DETACH                            00.000256
  14:39:38.106272  D8 3110D2 0000 0004 02000004 00000000  Q..K............  SPP SYSTEM                            00.000128
  14:39:38.106528  F0 30FEE4 0300 0004 002F45B8 00000000  0..U............  KCP DEQALL                            00.000256
  14:39:38.106656  D0 311B7E 0500 0004 00000000 00000000  ..............  KCP DISPATCH                          00.000128
  14:39:38.106912  FC 311150 3202 0004 00280080 F92FB4C4  ............9..D  ZCP DETACH                            00.000256
  14:39:38.107040  FC 307426 0102 0004 00280080 002FB4C4  ..............D  ZCP SEND DFSYN                        00.000128
  14:39:38.107552  F0 30795E 0D00 0004 0009D130 00000000  0.........J.....  KCP ATTACH HTA                        00.000512
  14:39:38.167200  D0 311B7E 0700 0004 00000000 00000000  ..............  KCP TERMINATE                       * 00.059648
  14:39:38.167456  F1 3111D2 4A00 D2C3 0009E000 00000000  1..K..KC........  SCP FREEMAIN                          00.000256
  14:39:38.169248  C9 2F63CA 0000 D2C3 0009E000 8A040288  I.....KC........  SCP RELEASED TCA STORAGE              00.001792
  14:39:38.178080  D0 311B7E 0500 E3C3 00000000 00000000  ......TC........  KCP DISPATCH                          00.008832
  14:39:38.178720  F0 305B0E 4000 E3C3 40000000 002FD92C  0... .TC .....R.  KCP WAIT                            00.000640
  14:39:38.179104  D0 311B7E 0800 E3C3 00012C30 00000000  ......TC........  KCP SYSTEM WAIT                       00.000384
  14:39:38.597408  D0 311B7E 0900 E3C3 40000000 00000000  ......TC .......  KCP SYSTEM RESUME                   * 00.418304
  14:39:38.600608  D0 311B7E 0800 E3C3 00012C30 00000000  ......TC........  KCP SYSTEM WAIT                       00.003200
  14:39:39.484576  D0 311B7E 0900 E3C3 40000000 00000000  ......TC .......  KCP SYSTEM RESUME                   * 00.883968
  14:39:39.485856  D0 311B7E 0500 E3C3 00000000 00000000  ......TC........  KCP DISPATCH                          00.001280
  14:39:39.486240  FC 305FAE C002 E3C3 00280000 F32FB4C4  ......TC....3..D  ZCP FREEMAIN                          00.000384
  14:39:39.486368  F1 307666 4000 E3C3 0009B480 012FB4C4  1... .TC.......D  SCP FREEMAIN                          00.000128
  14:39:39.488544  C9 2F63CA 0000 E3C3 0009B480 85090418  I.....TC........  SCP RELEASED TERMINAL STORAGE         00.002176
```

3.31 : IMS INTERNAL TRACE

DESCRIPTION

The /TRACE command is used to direct and control the IMS/VS capabilities for tracing internal IMS/VS events.The detail of trace events can be controlled by the LEVEL and MODULE operands of the /TRACE command as described in the IMS/VS Operator's Reference Manual. In order to get a complete picture of the activity between IMS and the terminal,it is necessary to use the VTAM BUF/IO traces also.

AVAILABILITY

In order to obtain the IMS/VS trace records,only the IMS log tape is needed.The information is logged in the type '67' record when the trace has been initiated.

REFERENCE MANUALS

IMS/VS Systems Programming Reference Manual	SH20-9027
IMS/VS Utilities Reference Manual	SH20-9029
IMS/VS Operator's Reference Manual	SH20-9028
IMS/VS Messages and Codes Reference Manual	SH20-9030
IMS/VS Advanced Function for Communications	SH20-9054
IMS/VS Program Logic Manual	
VTAM Network Operating Procedures	GC27-6997

OPERATION

The IMS/VS internal trace is initiated and terminated at the IMS master terminal by the following commands:

```
/trace set on node xxx level y module zzz
/trace set off node xxx
```

To print the internal trace from the IMS log tape, use the IMS supplied File Select and Formatting Print Program - DFSERA10, executing the exit routine, DFSERA30, to specifically format the type'67' log records.

```
//* Procedure to print the trace records on an IMS log dataset
//*
//* Enter console command:
//*
//* s prntrace
//*     or
//* s prntrace,sout=x
//*
//prntrace proc sout=a
//print exec pgm=dfsera10
//steplib dd dsn=ims115.reslib,disp=shr
//sysprint dd sysout=&sout
//sysut1 dd dsn=ims115.logtape,disp=shr
//sysin dd dsn=sys1.parmlib2(prntrace),disp=shr

*********************************************************************

sys1.parmlib2(prntrace)

000100 control  cntl  stopaft=eof
000200 option   print offset=5,fldtyp=x,value=67,cond=e,e=dfsera30
000300 end

*********************************************************************
```

SAMPLE OUTPUT

```
 CONTROL  CNTL  STOPAFT=EOF                                          00000100
 OPTION   PRINT OFFSET=5,FLDTYP=X,VALUE=6701,COND=E,E=DFSERA30       00000200
 END                                                                 00000300
-INTERNAL TRACE RECORD          ID = D 07  SEGNO=00  RECNO = 0046  TIME  14.08.24.55   DATE  78.298
 CLB
```

```
  0F6FB8  000000   40D3C7E7 00000000  00000000 00000000   00000000 00000000  00000000 00000000   * LGX.................
  0F6FD8  000020   00000000 00000000  E2C4D3C3 D7C1F0F2   00000100 000FA470  00000000 00000000   *........SDLCPA02......U
  0F6FF8  000040   00000000 00000000  00010000 00000000   000FA470 01000000  00000000 00000000   *..................U....
  0F7018  000060   00000000 00000000  00000000 10000000   00000000 00000000  00000000 00AB7F20   *.....................
 CTB
  0FA470  000000   001005F8 000F6FB8  00000000 000B2000   00000000 182A0000  0000FFFF 000FF650   *...8..?.............
  0FA490  000020   00000000 00000000  000FDDC8 000FCB14   00000000 00000000  00000000 00000000   *...........H.........
  0FA4B0  000040   00000000 00000000  00000000 00000000   00000000 00000000  00000000 00210001   *.....................
  0FA4D0  000060   00000000 00000000  00000000 00000000   00000000                               *.....................
 CRB
  0FDDC8  000000   00000000 00000000  00000000 00008000   000FA470 00000000  00000000 00000000   *..................U....
-INTERNAL TRACE RECORD            ID = C 08   SEGNO=00   RECNO = 0047   TIME   14.08.24.77    DATE   78.298
 CLB
  0F6FB8  000000   40D3C7E7 00000000  00000000 00000000   00000000 00000000  00000000 00000000   * LGX.................
  0F6FD8  000020   00000000 00000000  E2C4D3C3 D7C1F0F2   00000100 000FA470  00000000 00000000   *........SDLCPA02......U
  0F6FF8  000040   00000000 00000000  00010000 00000000   000FA470 01000000  00000000 00000000   *..................U....
  0F7018  000060   00000000 00000000  00000000 10000000   00000000 00000000  00000000 00AB7F20   *.....................
 CTB
  0FA470  000000   001005F8 000F6FB8  00000000 000B2000   00000000 182A0000  0000FFFF 000FF650   *...8..?.............
  0FA490  000020   00000000 00000000  000FDDC8 000FCB14   00000000 00000000  00000000 00000000   *...........H.........
  0FA4B0  000040   00000000 00000000  00000000 00000000   00000000 00000000  00000000 00210001   *.....................
  0FA4D0  000060   00000000 00000000  00000000 00000000   00000000                               *.....................
 CIB
  0FCB14  000000   40404040 40404040  10000000 00004040   40404040 00000000  00000000 447F0000   *        ......      ...
  0FCB34  000020   00000000 00000000  00004040 40404040   40400000 00004040  40404040 00000000   *.........           ....
  0FCB54  000040   00000000 002B0050  80000000                                                   *.......&....
 CRB
  0FDDC8  000000   00000000 00000000  00000000 00008000   000FA470 00000000  00000000 00000000   *..................U....
 SAVE ALL
  161A20  000000   80AB5600 80000000  00161A68 00A83188   00100F30 00000007  000F6FB8 00000070   *.............Y.H.......
  161A40  000020   0000004E 00A68088  001618F8 00000000   000F6FB8 000F6FB0  00AB7F20 00AB5600   *...+.W.H...8......?...?
  161A60  000040   00ABB358 00A82EF0  00000000 00161A20   0016AAB0 00000008  00126618 4012666A   *.....Y.0.............
  161A80  000060   8010252C 00ABB358  00ABB358 0010320C   8010253C 00102520  000FA470 001005F8   *.....................
  161AA0  000080   000F6FB8 00AB5600  00ABB358 001019B0   00000000 00161A68  00161AF8 80124008   *..?.................
  161AC0  0000A0   0011DB68 00ABB358  000F6FB8 00000070   001031F0 000FCB14  000FDDC8 00000000   *.........?........0...
  161AE0  0000C0   000FA470 001005F8  000F6FB8 00AB5600   00ABB358 00126CD8  00000000 00161AB0   *..U....8..?..........%
  161B00  0000E0   00161B40 4011DBCE  00102410 00000020   00161A68 00000070  000001C8 000FCB14   *...  ...............
  161B20  000100   000FDDC8 00000000  000FA470 001005F8   000F6FB8 00AB5600  00ABB358 0011DB68   *...H......U....8..?....
  161B40  000120   00000080 00161AF8  00161B88 FFAA1272   00A833CA 00ABB358  001024A0 00102410   *.......8...H.....Y.....
  161B60  000140   00000020 00161A68  00000070 C3084500   000F5FC0 80AA116C  000F5FB8 00A24000   *.............C.....-....
  161B80  000160   00ABB358 00AA10D0  00000000 00161B40   00161BD0 FFA7D57A  00A833CA 40E6D9E3   *.............. .....XN
  161BA0  000180   00A1B0E8 00000036  0000001A 00A1BD8E   00000030 00A1B0E0  00A24C7F 90A7D4CE   *...Y.................
  161BC0  0001A0   000F5FB8 00AB83A0  00ABB358 00A7D268   00161B88 00161B88  00161C18 701030C6   *..-...C......XK....H...
  161BE0  0001C0   00119E88 00000010  C340F0F8 030C8002   000001C8 00103240  B0102458 00102520   *...H....C 08.......H...
  161C00  0001E0   000FA470 001005F8  000F6FB8 00AB5600   00ABB358 001019B0  00000080 00161BD0   *..U....8..?..........
  161C20  000200   00161C60 60119EE8  00B33048 00000001   4082477C 00161A20  000002D0 00119D9C   *...--..Y........ B.∂...
  161C40  000220   B0102458 00119E00  00000001 001005F8   000F6FB8 00AB5600  00ABB358 00119E88   *..............8..?....
```

ENTER USER NOTES HERE:

CHAPTER 4 : NETWORK OPERATOR COMMANDS

This section describes the use of the various operator commands for problem isolation and network monitoring. Sample output of the 'DISPLAY' and 'VARY' commands are provided.

The access method operator commands can be used:

* FIND STATUS OF NETWORK COMPONENTS.

* MONITOR NETWORK ACTIVITY.

* ASSIST IN PERFORMANCE OF PROBLEM DETERMINATION ACTIVITIES.

CONTENTS

4.1 : VTAM OS/VS OPERATOR COMMANDS

```
***
Operator input is lower case.
***
```

4.1.1 : DISPLAY APPLICATION STATUS

```
d net,id=netsol,e   (Note 1)

 IST097I  DISPLAY  ACCEPTED

 IST075I  VTAM DISPLAY- NODE TYPE= APPL  ,NAME= NETSOL   ,STATUS= ACT
 IST171I  ACTIVE SESSIONS = 0016 SESSION REQUESTS = 0000
 IST079I  TERMINALS:
 IST080I  LU3270L0   ACT        LU3270L1   ACT        LU3270L2   ACT
 IST080I  LU3270L3   ACT        LU3270L4   ACT        LU3270L5   ACT
 IST080I  LU3270L6   ACT        LU3270L7   ACT        LU3270L8   ACT
 IST080I  LU3270L9   ACT        LU3270LA   ACT        LU3270LB   ACT
 IST080I  LU3270LC   ACT        LU3270LD   ACT        LU3270LE   ACT
 IST080I  LU3270LF   ACT
```

Note 1: VTAM will indicate the status of each session with the application. The Session Request value should be noted. During steady state operation, this value should be zero. If the value increases as terminals attempt to LOGON, the LOGON exit of the application is probably hung.

```
d net,id=netsol,e   (Note 2)

 IST097I  DISPLAY  ACCEPTED


 IST075I  VTAM DISPLAY- NODE TYPE= APPL  ,NAME= NETSOL   ,STATUS= ACT
 IST171I  ACTIVE SESSIONS = 0008 SESSION REQUESTS = 0008
 IST079I  TERMINALS:
 IST080I  LU3270L0   ACT        LU3270L1   ACT        LU3270L2   ACT
 IST080I  LU3270L3   ACT        LU3270L4   ACT        LU3270L5   ACT
 IST080I  LU3270L6   ACT        LU3270L7   ACT        LU3270L8   ACT
 IST080I  LU3270L9   ACT        LU3270LA   ACT        LU3270LB   ACT
 IST080I  LU3270LC   ACT        LU3270LD   ACT        LU3270LE   ACT
```

Note 2: If the Session Request value is high when an application is first started, the application is probably limiting OPNDSTs.

If the Session Request indicates 1 and all but one terminal can LOGON and LOGOFF, it is likely that the application is not doing a CLSDST which is required if it does not do an OPNDST. This may happen if an application has an error in its error handling routine.

4.1.2 : DISPLAY NCP STATUS

```
d net,e,id=ncp1003   (Note 3)

 IST097I  DISPLAY  ACCEPTED


 IST075I  VTAM DISPLAY- NODE TYPE= 3705  ,NAME= NCP1003  ,STATUS= ACT
 IST076I  CTL PROGRAM= NCP1003  , ATTACHMENT= LOCAL
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST077I  SIO= 00003227 ,ERROR CT= 00000000 CUA= 520
 IST170I  LINES:
 IST080I  MLINEA0    ACT        MLINEA1    ACT        PLINEA2    INACT
 IST080I  SLINEA3    ACT        SLINEA4    ACT        TLINEA5    ACT
 IST080I  BSC130     INACT      SDLC138    INACT      SDLC13C    ACT

d net,id=ncp1003  (Note 4)

 IST097I  DISPLAY  ACCEPTED


 IST075I  VTAM DISPLAY- NODE TYPE= 3705  ,NAME= NCP1003  ,STATUS= ACT
 IST076I  CTL PROGRAM= NCP1003  , ATTACHMENT= LOCAL
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST077I  SIO= 00000897 ,ERROR CT= 00000000 CUA= 520


d t
 IEE136I  TIME=08.45.24 DATE=78.059

d net,id=ncp1003

 IST097I  DISPLAY  ACCEPTED


 IST075I  VTAM DISPLAY- NODE TYPE= 3705  ,NAME= NCP1003  ,STATUS= ACT
 IST076I  CTL PROGRAM= NCP1003  , ATTACHMENT= LOCAL
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST077I  SIO= 00000917 ,ERROR CT= 00000000 CUA= 520

d t

 IEE136I  TIME=08.46.39 DATE=78.059
```

Note 3: A status of INACT for the NCP indicates that VTAM has not completed the termination of all sessions with devices on the NCP. This state can be caused by a shortage of VTAM buffers or a hangup in the VTAM "VARY" processor. A status of ACT/A indicates that VTAM is waiting for the NCP to respond to a "ACTIVATE PHYSICAL".

Note 4: A display of the NCP node without a modifier is useful for determining if VTAM and the NCP are communicating. By also displaying the system time and repeating the displays, a rough tranaction rate can be calculated. If a user enters data from a terminal and the SIO count does not increase, a dump of NCP is required.

4.1.3 : DISPLAY LINE STATUS

```
d net,id=sdlc13c   (Note 5)

 IST097I  DISPLAY  ACCEPTED


 IST075I  VTAM DISPLAY- NODE TYPE= LINE  ,NAME= SDLC13C  ,STATUS= ACT
 IST087I  LINE TYPE= LEASED     LINE GROUP= SDLCGV1
 IST134I  370X= NCP1003
 IST655I  LINETRACE= OFF

d net,id=sdlc13c,a

 IST097I  DISPLAY  ACCEPTED


 IST075I  VTAM DISPLAY- NODE TYPE= LINE  ,NAME= SDLC13C  ,STATUS= ACT
 IST087I  LINE TYPE= LEASED     LINE GROUP= SDLCGV1
 IST134I  370X= NCP1003
 IST655I  LINETRACE= OFF
 IST084I  NETWORK NODES:
 IST089I  PU3270V  TYPE= PU      , ACT   ,
 IST089I  LU3270V0 TYPE= TERM    , ACT   ,
 IST089I  LU3270V1 TYPE= TERM    , ACT   ,
 IST089I  LU3270V2 TYPE= TERM    , ACT   ,
 IST089I  LU3270V3 TYPE= TERM    , ACT   ,
 IST089I  LU3270V4 TYPE= TERM    , ACT   ,
 IST089I  LU3270V5 TYPE= TERM    , ACT   ,
 IST089I  LU3270V6 TYPE= TERM    , ACT   ,
 IST089I  LU3270V7 TYPE= TERM    , ACT   ,

d net,id=sdlc13c,e   (Note 6)

 IST097I  DISPLAY  ACCEPTED


 IST075I  VTAM DISPLAY- NODE TYPE= LINE  ,NAME= SDLC13C  ,STATUS= ACT
 IST087I  LINE TYPE= LEASED     LINE GROUP= SDLCGV1
 IST134I  370X= NCP1003
 IST655I  LINETRACE= OFF
 IST084I  NETWORK NODES:
 IST089I  PU3760   TYPE= PU      , INACT ,
 IST089I  INBATCH3 TYPE= TERM    , INACT ,
 IST089I  PU3767V  TYPE= PU      , INA/C ,
 IST089I  TR3767V  TYPE= TERM    , INACT ,
 IST089I  PU3270V  TYPE= PU      , ACT   ,
 IST089I  LU3270V0 TYPE= TERM    , ACT   ,
```

Note 5: A status of "ACT" indicates that the 370X and the local modem are connected and the line is operational. A status of INACT means that either the line was made INACTIVE with the VARY command or the NCP had a local modem or interface error. The "VARY NET, ACTIVE" command will be required on the line before it can be used.

Note 6: A status of "INACT" on the PU indicates that its "ISTATUS" was inactive in the VTAMLST or the operator issued a "VARY NET, INACTIVE" against the PU.
A status of "INA/C" on the PU indicates that a "CONTACT" has been issued but the PU has not responded to the 370X.
A status of "ACT" indicates that the PU is active and accepting commands from SSCP.
A status of "ACT/C" indicates that the PU was active, the NCP lost contact with the PU, and the NCP has not been able to contact the PU again.

```
 IST089I  LU3270V1 TYPE= TERM    , ACT    ,
 IST089I  LU3270V2 TYPE= TERM    , ACT    ,
 IST089I  LU3270V3 TYPE= TERM    , ACT    ,
 IST089I  LU3270V4 TYPE= TERM    , ACT    ,
 IST089I  LU3270V5 TYPE= TERM    , ACT    ,
 IST089I  LU3270V6 TYPE= TERM    , ACT    ,
 IST089I  LU3270V7 TYPE= TERM    , ACT    ,
 IST089I  PU3275V  TYPE= PU      , ACT/C  ,
 IST089I  LU3275V0 TYPE= TERM    , ACT    ,
```

4.1.4 : DISPLAY PHYSICAL UNIT STATUS

```
d net,id=pu3767v   (Note 7)

 IST097I  DISPLAY  ACCEPTED

 IST075I  VTAM DISPLAY- NODE TYPE= PU     ,NAME= PU3767V  ,STATUS= INA/C
 IST081I  LINE NAME= SDLC13C  , LINE GROUP= SDLCGV1  , 370X= NCP1003
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
```

Note 7: Display indicates physical unit has a CONTACT pending but the unit has not responded to the SNRM from the NCP.

```
d net,id=pu3270x   (Note 8)

 IST097I  DISPLAY  ACCEPTED
 IST088I  DISPLAY FAILED- NODE NAME INVALID OR INACTIVE
```

Note 8: Display indicates physical unit is not defined to VTAM.

```
d net,id=sdlc3276

 IST097I  DISPLAY  ACCEPTED

 IST075I  VTAM DISPLAY- NODE TYPE= PU     ,NAME= SDLC3276 ,STATUS= INACT
 IST081I  LINE NAME= SDLC136  , LINE GROUP= SDLCGV1  , 370X= NCP1003
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
```

4.1.5 : DISPLAY PHYSICAL UNIT FAILURE STATUS

```
 IST619I  NETWORK NODE SDLC3274 HAS FAILED - RECOVERY IN PROGRESS
d net,id=sdlc3274
```

Note 9: Message IST619I indicated a physical unit failure. A display of the PU status indicates "ACT/C".

```
 IST097I  DISPLAY  ACCEPTED

 IST075I  VTAM DISPLAY- NODE TYPE= PU     ,NAME= SDLC3274 ,STATUS= ACT/C
 IST081I  LINE NAME= SDLC136  , LINE GROUP= SDLCGV1  , 370X= NCP1003
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF

 IST268I  RESTART OF SDLC3274 SUCCESSFUL
 IST621I  RECOVERY SUCCESSFUL FOR NETWORK NODE SDLC327

d net,id=sdlc3274

 IST097I  DISPLAY  ACCEPTED


 IST075I  VTAM DISPLAY- NODE TYPE= PU     ,NAME= SDLC3274 ,STATUS= ACT
 IST081I  LINE NAME= SDLC136  , LINE GROUP= SDLCGV1  , 370X= NCP1003
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF

d net,a,id=sdlc3274

 IST097I  DISPLAY  ACCEPTED


 IST075I  VTAM DISPLAY- NODE TYPE= PU     ,NAME= SDLC3274 ,STATUS= ACT
 IST081I  LINE NAME= SDLC136  , LINE GROUP= SDLCGV1  , 370X= NCP1003
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST079I  TERMINALS:
 IST080I  SDLCPA01   ACT        SDLCPA02   ACT        SDLCPA03   ACT
 IST080I  SDLCPA04   ACT        SDLCPA05   ACT        SDLCPA06   ACT
 IST080I  SDLCPA07   ACT        SDLCPA08   ACT        SDLCPB01   ACT
 IST080I  SDLCPB02   ACT        SDLCPB03   ACT        SDLCPB04   ACT
```

This status will remain until messages IST268I and IST621I are presented by VTAM.

4.1.6 : DISPLAY LOGICAL UNIT STATUS

```
d net,a,id=sdlcpa01    (Note 10)

 IST097I  DISPLAY  ACCEPTED


 IST075I  VTAM DISPLAY- NODE TYPE= TERM   ,NAME= SDLCPA01 ,STATUS= ACT
 IST081I  LINE NAME= SDLC136  , LINE GROUP= SDLCGV1  , 370X= NCP1003
 IST135I  PHYSICAL UNIT= SDLC3274 ,
 IST082I  DEVICE TYPE= LU01 , ALLOC TO= CICS13    ,SIMLOGON= CICS13
```

Note 10: An application name in the "SIMLOGON" field indicates that either a LOGAPPL statement on the terminal exists or a operator

```
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF

d net,id=lu3270v7  (Note 11)

 IST097I  DISPLAY  ACCEPTED


 IST075I  VTAM DISPLAY- NODE TYPE= TERM  ,NAME= LU3270V7 ,STATUS= ACT/U
 IST081I  LINE NAME= SDLC13C  , LINE GROUP= SDLCGV1  , 370X= NCP1003
 IST135I  PHYSICAL UNIT= PU3270V  ,
 IST082I  DEVICE TYPE= LU01 , ALLOC TO= TSO0001  ,SIMLOGON=
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF

d net,id=lu3270l1

 IST097I  DISPLAY  ACCEPTED


 IST075I  VTAM DISPLAY- NODE TYPE= LOCAL ,NAME= LU3270L1 ,STATUS= ACT
 IST082I  DEVICE TYPE= 3277 , ALLOC TO=          ,SIMLOGON= NETSOL
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST077I  SIO= 00000000 ,ERROR CT= 00000000 CUA= 3E1

s netsol(NETSOL started as a task)

 $HASP100 NETSOL   ON STCINRDR
 $HASP373 NETSOL   STARTED

d net,id=lu3270l1    (Local 3277)

 IST097I  DISPLAY  ACCEPTED

 IST075I  VTAM DISPLAY- NODE TYPE= LOCAL ,NAME= LU3270L1 ,STATUS= ACT
 IST082I  DEVICE TYPE= 3277 , ALLOC TO= NETSOL   ,SIMLOGON= NETSOL
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST077I  SIO= 00000000 ,ERROR CT= 00000000 CUA= 3E1


d net,id=lu3270v0    (Remote terminal - Note 12)

 IST097I  DISPLAY  ACCEPTED

 IST075I  VTAM DISPLAY- NODE TYPE= TERM  ,NAME= LU3270V0 ,STATUS= ACT/B
 IST081I  LINE NAME= SDLC13C  , LINE GROUP= SDLCGV1  , 370X= NCP1003
 IST135I  PHYSICAL UNIT= PU3270V  ,
 IST082I  DEVICE TYPE= LU01 , ALLOC TO= TSO      ,SIMLOGON= TSO
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
```

issued a "V NET,LOGON= ,ID= " for the terminal. If the application or the terminal becomes active, the terminal will be "logged on" to the application. If the terminal is allocated to another application, VTAM will drive the "LOGON EXIT" of the application specified in the SIMLOGON field when the current application does a CLSDST.

If an entry appears in the ALLOC TO field, the terminal has been allocated to an application.

Note 11: If the status is "ACT/U", a V NET,INACT,F,ID=xxx is required. This failure usually is caused by the SDLC physical unit not responding to a CLEAR and UNBIND.

Note 12: If the status is "ACT/B", the logical unit is not responding to the BIND command. A VARY INACT with the FORCE option is required to recover from this failure. This failure is common on 3600 Systems when the application does an OPNDST (ACQUIRE) and the logical unit is in input mode.

4.2 : ACF/VTAM OS/VS OPERATOR COMMANDS

4.2.1 : DISPLAY MAJOR NODES

```
d net,majnodes    (Note 13)

 IST097I  DISPLAY  ACCEPTED

 IST350I  VTAM DISPLAY - DOMAIN TYPE= MAJOR NODES
 IST089I  VTAMSEG  TYPE= APPL SEGMENT      , ACT
 IST089I  IMSAPAC  TYPE= APPL SEGMENT      , ACT
 IST089I  LOC3272  TYPE= LCL 3270 MAJ NODE , ACT
 IST089I  TSOAPAC  TYPE= APPL SEGMENT      , ACT
 IST089I  CICSAPAC TYPE= APPL SEGMENT      , ACT
 IST089I  SWITCHAC TYPE= SW SNA MAJ NODE   , ACT
 IST089I  JESAPAC  TYPE= APPL SEGMENT      , ACT
 IST089I  NCPACF   TYPE= NCP MAJOR NODE    , ACT        ,CUA=0F6
 IST314I  END
```

Note 13: This is a convenient way to determine the status of all active major nodes in the domain. These include:

- -- Application program major nodes
- -- NCP major nodes (local and remote)
- -- Local non-SNA major nodes (local 3270)
- -- Local SNA major nodes (local 3790)
- -- Switched SNA major nodes that are active in the domain.

With VTAM-2, it was necessary to display the status of each one individually.

4.2.2 : DISPLAY APPLICATIONS

```
d net,appls,a    (Note 14)

 IST097I  DISPLAY  ACCEPTED

 IST350I  VTAM DISPLAY - DOMAIN TYPE= APPL MAJ NODES/NAMES
 IST089I  VTAMSEG  TYPE= APPL SEGMENT      , ACT
 IST360I  APPLICATIONS:
 IST080I  VTAM     ACT        ISTOLTEP ACT        ISTATA00 ACT
 IST080I  NETSOL   ACT
 IST089I  IMSAPAC  TYPE= APPL SEGMENT      , ACT
 IST089I  TSOAPAC  TYPE= APPL SEGMENT      , ACT
 IST360I  APPLICATIONS:
 IST080I  TSO      ACT        TSO0002  ACT
 IST089I  CICSAPAC TYPE= APPL SEGMENT      , ACT
 IST360I  APPLICATIONS:
 IST080I  CICS13   ACT
 IST089I  JESAPAC  TYPE= APPL SEGMENT      , ACT
 IST360I  APPLICATIONS:
 IST080I  VTAMWHO  ACT
```

Note 14: Three available options exist, with EVERY the default. All three possible options are illustrated here. The network operator may determine on a collective basis which major nodes are active, inactive, or both. (Inactive application major nodes are ignored.)

```
 IST314I  END

d net,appls,e

 IST097I  DISPLAY  ACCEPTED

 IST350I  VTAM DISPLAY - DOMAIN TYPE= APPL MAJ NODES/NAMES
 IST089I  VTAMSEG  TYPE= APPL SEGMENT      , ACT
 IST360I  APPLICATIONS:
 IST080I  PUNS     INACT      VTAM     ACT        ISTOLTEP ACT
 IST080I  ISTATA00 ACT        NETSOL   ACT        VTAMTERM INACT
 IST089I  IMSAPAC  TYPE= APPL SEGMENT      , ACT
 IST360I  APPLICATIONS:
 IST080I  IMS      INACT      VAPPL    INACT      WHO      INACT
 IST080I  HELP     INACT      SYSSSS   INACT      BTS3770  INACT
 IST080I  DSPRINT  INACT      DUMMY    INACT      HECHO90  INACT
 IST080I  IKJACCNT INACT
 IST089I  TSOAPAC  TYPE= APPL SEGMENT      , ACT
 IST360I  APPLICATIONS:
 IST080I  TSO      ACT        TSO0001  INACT      TSO0002  ACT
 IST080I  TSO0003  INACT      TSO0004  INACT      TSO0005  INACT
 IST080I  TSO0006  INACT      TSO0007  INACT      TSO0008  INACT
 IST080I  TSO0009  INACT      TSO0010  INACT
 IST089I  CICSAPAC TYPE= APPL SEGMENT      , ACT
 IST360I  APPLICATIONS:
 IST080I  CICS13   ACT        CICS     INACT
 IST089I  JESAPAC  TYPE= APPL SEGMENT      , ACT
 IST360I  APPLICATIONS:
 IST080I  JES2     INACT      VTAMWHO  ACT
 IST314I  END

d net,appls,i

 IST097I  DISPLAY  ACCEPTED

  IST350I     VTAM DISPLAY - DOMAIN TYPE= APPL MAJ NODES/NAMES
  IST089I     VTAMSEG  TYPE= APPL SEGMENT      , ACT
  IST360I     APPLICATIONS:
  IST080I     PUNS     INACT      VTAMTERM INACT
  IST089I     IMSAPAC  TYPE= APPL SEGMENT      , ACT
  IST360I     APPLICATIONS:
  IST080I     IMS      INACT      VAPPL    INACT      WHO      INACT
  IST080I     HELP     INACT      SYSSSS   INACT      BTS3770  INACT
  IST080I     DSPRINT  INACT      DUMMY    INACT      HECHO90  INACT
  IST080I     IKJACCNT INACT
  IST089I     TSOAPAC  TYPE= APPL SEGMENT      , ACT
```

```
 IST360I     APPLICATIONS:
 IST080I     TSO00002  INACT       TSO00003  INACT       TSO00004  INACT
 IST080I     TSO00005  INACT       TSO00006  INACT       TSO00007  INACT
 IST080I     TSO00008  INACT       TSO00009  INACT       TSO00010  INACT
 IST089I     CICSAPAC TYPE= APPL SEGMENT      , ACT
 IST360I     APPLICATIONS:
 IST080I     CICS13    INACT       CICS      INACT
 IST089I     JESAPAC  TYPE= APPL SEGMENT      , ACT
 IST360I     APPLICATIONS:
 IST080I     JESA      INACT
 IST089I     NOSP     TYPE= APPL SEGMENT      , ACT
 IST360I     APPLICATIONS:
 IST080I     NOSP1     INACT       NOSP1PPT INACT       NOSP1000 INACT
 IST080I     NOSP1001 INACT       NOSP1002 INACT       NOSP1003 INACT
 IST080I     NOSP1004 INACT
 IST089I     DSXAPPL  TYPE= APPL SEGMENT      , ACT
 IST360I     APPLICATIONS:
 IST080I     DSXUTIL  INACT
 IST314I     END
```

4.2.3 : DISPLAY LINES

```
d net,lines,a    (Note 15)

 IST097I  DISPLAY  ACCEPTED

 IST350I  VTAM DISPLAY - DOMAIN TYPE= LINES
 IST354I  NCP MAJOR NODE: NAME = NCPACF  ,CUA=0F6
 IST170I  LINES:
 IST080I  SLINEA4  ACT        SDLC13C  ACT        SDLC13A  ACT
 IST080I  SDLC136  ACT        SDLC13E  ACT        SDLC13F  ACT
 IST314I  END
```

Note 15: For each active NCP in the domain, the name of each active local NCP, and the name of each remote NCP and its associated local NCP (and the name of the line connecting them), is spelled out. Then the names and status of all associated lines are listed, depending on the ACT | INACT | EVERY specification. The operator is thus provided with the capability for a collective display via a single command.

```
d net,lines,i

 IST097I  DISPLAY  ACCEPTED

 IST350I      VTAM DISPLAY - DOMAIN TYPE= LINES
 IST354I      NCP MAJOR NODE: NAME = NCPACFI ,CUA=418
 IST170I      LINES:
```

```
 IST080I      SDLCI2C  NEVAC      SDLCI28  NEVAC      SDLCI26  NEVAC
 IST314I      END
```

```
d net,lines,e

 IST097I  DISPLAY  ACCEPTED

 IST350I      VTAM DISPLAY - DOMAIN TYPE= LINES
 IST354I      NCP MAJOR NODE: NAME = NCPACFI ,CUA=418
 IST170I      LINES:
 IST080I      BSCI25   ACT        SDLCI20  ACT        SDLCI2C  NEVAC
 IST080I      SDLCI28  NEVAC      SDLCI29  ACT        SDLCI24  ACT
 IST080I      SDLCI26  NEVAC      SDLCI22  ACT        SDLCI23  ACT
 IST080I      SDLCI2E  ACT        SDLCI2F  ACT
 IST314I      END
```

4.2.4 : DISPLAY CLUSTERS

```
d net,clstrs    (Note 16)

 IST097I  DISPLAY  ACCEPTED

 IST350I  VTAM DISPLAY - DOMAIN TYPE= CLUSTERS/PHYS UNITS
 IST089I  SWITCHAC TYPE= SW SNA MAJOR NODE , ACT
 IST089I  CL3790A  TYPE= PHYSICAL UNIT     , ACT
 IST089I  NCPACF   TYPE= NCP MAJOR NODE    , ACT        ,CUA=0F6
 IST089I  BSC3274  TYPE= PHYSICAL UNIT     , NEVAC
 IST089I  BSC3276  TYPE= PHYSICAL UNIT     , NEVAC
 IST089I  PU3774X  TYPE= PHYSICAL UNIT     , NEVAC
 IST089I  PU3790X  TYPE= PHYSICAL UNIT     , NEVAC
 IST089I  PU3776X  TYPE= PHYSICAL UNIT     , NEVAC
 IST089I  PU3767X  TYPE= PHYSICAL UNIT     , NEVAC
 IST089I  PU3275X  TYPE= PHYSICAL UNIT     , NEVAC
 IST089I  PU3777X  TYPE= PHYSICAL UNIT     , NEVAC
 IST089I  PU3770PF TYPE= PHYSICAL UNIT     , NEVAC
 IST089I  PU3790V  TYPE= PHYSICAL UNIT     , NEVAC
 IST089I  PU3760   TYPE= PHYSICAL UNIT     , NEVAC
 IST089I  PU3767V  TYPE= PHYSICAL UNIT     , NEVAC
 IST089I  PU3270V  TYPE= PHYSICAL UNIT     , ACT
 IST089I  PU3275V  TYPE= PHYSICAL UNIT     , NEVAC
```

Note 16: The resulting display shows not only the status of each cluster/PU, depending on the ACT | INACT | EVERY option, but also the associated major node name and type: NCP, local, or switched SNA major node. A single command provides a collective display.

```
IST089I  PU3770F  TYPE= PHYSICAL UNIT     , NEVAC
IST089I  PU3600V  TYPE= PHYSICAL UNIT     , NEVAC
IST089I  PU3770P  TYPE= PHYSICAL UNIT     , ACT
IST089I  PU3790H  TYPE= PHYSICAL UNIT     , NEVAC
IST089I  PU3767H  TYPE= PHYSICAL UNIT     , NEVAC
IST089I  PU3270H  TYPE= PHYSICAL UNIT     , NEVAC
IST089I  PU3275H  TYPE= PHYSICAL UNIT     , NEVAC
IST089I  PU3770V  TYPE= PHYSICAL UNIT     , NEVAC
IST089I  SDLC3274 TYPE= PHYSICAL UNIT     , ACT
IST089I  SDLC3276 TYPE= PHYSICAL UNIT     , NEVAC
IST314I  END
```

4.2.5 : DISPLAY TERMINALS

```
d net,terms,a    (Note 17)

 IST097I  DISPLAY  ACCEPTED

 IST350I  VTAM DISPLAY - DOMAIN TYPE= LOGICAL UNITS/TERMS
 IST351I  LOCAL 3270 MAJOR NODE: NAME = LOC3272
 IST089I  LU4C0     TYPE= TERMINAL          , ACT         ,CUA=4C0
 IST089I  LU4C2     TYPE= TERMINAL          , ACT         ,CUA=4C2
 IST089I  LU4C3     TYPE= TERMINAL          , ACT         ,CUA=4C3
 IST089I  LU4C4     TYPE= TERMINAL          , ACT         ,CUA=4C4
 IST089I  LU4C5     TYPE= TERMINAL          , ACT         ,CUA=4C5
 IST089I  LU4C6     TYPE= TERMINAL          , ACT         ,CUA=4C6
 IST089I  LU4C7     TYPE= TERMINAL          , ACT         ,CUA=4C7
 IST089I  LU4CA     TYPE= TERMINAL          , ACT         ,CUA=4CA
 IST089I  LU4CB     TYPE= TERMINAL          , ACT         ,CUA=4CB
 IST089I  LU4CC     TYPE= TERMINAL          , ACT         ,CUA=4CC
 IST353I  SWITCHED SNA MAJOR NODE: NAME = SWITCHAC
 IST089I  CL3790A  TYPE= PHYSICAL UNIT      , ACT
 IST355I  LOGICAL UNITS:
 IST080I  INBATCH1 ACT-NOSESS IN202    ACT-NOSESS IN203    ACT-NOSESS
 IST080I  IN204    ACT-NOSESS IN205    ACT-NOSESS BT379011 ACT-NOSESS
 IST080I  BT379012 ACT-NOSESS RJE01    ACT-NOSESS RJE02    ACT-NOSESS
 IST080I  RJE03    ACT-NOSESS RJE04    ACT-NOSESS RJE05    ACT-NOSESS
 IST080I  CM379011 ACT-NOSESS CM379012 ACT-NOSESS CM379013 ACT-NOSESS
 IST080I  CM379014 ACT-NOSESS BP379011 ACT-NOSESS BP379012 ACT-NOSESS
 IST354I  NCP MAJOR NODE: NAME = NCPACF   ,CUA=0F6
 IST146I  LINE NAME: SDLC13C  STATUS: ACT
 IST359I  ATTACHMENT = LEASED
 IST089I  PU3270V  TYPE= PHYSICAL UNIT      , ACT
 IST355I  LOGICAL UNITS:
 IST080I  LU3270V0 ACT-NOSESS LU3270V1 ACT-NOSESS LU3270V2 ACT-NOSESS
 IST080I  LU3270V3 ACT-NOSESS LU3270V4 ACT-NOSESS LU3270V5 ACT-NOSESS
 IST146I  LINE NAME: SDLC13A  STATUS: ACT
 IST359I  ATTACHMENT = LEASED
 IST089I  PU3770P  TYPE= PHYSICAL UNIT      , ACT
 IST355I  LOGICAL UNITS:
 IST080I  LU13     ACT
 IST146I  LINE NAME: SDLC136  STATUS: ACT
 IST359I  ATTACHMENT = LEASED
 IST089I  SDLC3274 TYPE= PHYSICAL UNIT      , ACT
 IST355I  LOGICAL UNITS:
 IST080I  SDLCPA01 ACT-NOSESS SDLCPA02 ACT-NOSESS SDLCPA03 ACT-NOSESS
 IST080I  SDLCPA04 ACT-NOSESS SDLCPA05 ACT-NOSESS SDLCPA06 ACT-NOSESS
 IST080I  SDLCPA07 ACT-NOSESS SDLCPA08 ACT-NOSESS SDLCPB01 ACT-NOSESS
 IST314I  END
```

Note 17: This display type is valid for local terminals/LUs as well as for remotes. In addition to showing the status of units according to the operator's request (ACT | INACT | EVERY), the reply also indicates the name of the associated major node. CUU addresses are also displayed, where applicable. As with several other DISPLAY commands mentioned previously, the important enhancement in ACF/VTAM is that a single command occurrence can indicate the status of a multitude of units.

4.2.6 : DISPLAY BUFFER USE

```
d net,bfruse    (Note 18)

 IST097I  DISPLAY  ACCEPTED

 IST350I       VTAM DISPLAY - DOMAIN TYPE= BUFFER POOL DATA
 IST632I       BUFF    BUFF  CURR    CURR    MAX     MAX   TIMES    EXP/CONT     EXP
 IST633I       ID      SIZE TOTAL   AVAIL   TOTAL   USED    EXP    THRESHOLD    INCR
 IST356I       IO00   00227 00077   00045   00094 00055   00005 00026/00060 00017
 IST356I       PP00   00200 00029   00029   00029 00001   00000 00003/-----  00019
 IST356I       LP00   01016 00032   00013   00032 00025   00000 00002/-----  00004
 IST356I       WP00   00176 00027   00023   00027 00005   00000 00003/-----  00022
 IST356I       NP00   00200 00023   00008   00023 00016   00000 00003/-----  00019
 IST356I       LF00   00120 00037   00037   00037 00000   00000 00003/-----  00032
 IST356I       CRPL   00116 00040   00019   00040 00035   00000 00003/-----  00032
 IST356I       UECB   00112 00039   00039   00039 00016   00000 00003/-----  00034
 IST356I       SF00   00072 00060   00026   00060 00049   00000 00003/-----  00051
 IST356I       SP00   00100 00066   00052   00066 00017   00000 00003/-----  00036
 IST356I       AP00   00060 00066   00047   00066 00021   00000 00003/-----  00056
 IST314I       END
```

Note 18: Buffer use should be monitored for usage and numbers of times expanded. During normal operation expansion of buffers should be kept to a minimum. Note that if SMS buffer trace is on, the values displayed here are from the last SMS recording. SMS trace should be off if using this command to monitor buffer use.

4.2.7 : DISPLAY PENDING SSCP INPUT/OUTPUT

```
d net,pending     (Note 19)

 IST097I  DISPLAY  ACCEPTED

 IST350I  VTAM DISPLAY - DOMAIN TYPE= PENDING
 IST159I  I/O PENDING FOR THE FOLLOWING NETWORK NODES
 IST172I  NO PENDING I/O   EXISTS
 IST314I  END
```

Note 19: This command is employed to determine whether any pending I/O exists between VTAM System Services Control Point (SSCP) and any network node. As part of problem determination procedures, it can indicate a "hang" type of condition in the network.

4.2.8 : DISPLAY CROSS-DOMAIN RESOURCE MANAGER

```
d net,cdrms    (Note 20)

 IST097I  DISPLAY  ACCEPTED

 IST350I      VTAM DISPLAY - DOMAIN TYPE= CROSS-DOM. RSRC MGR
 IST089I      CDRMLIST TYPE= CDRM SEGMENT      , ACT
 IST482I      MVSVTAM  INACT ,SUBAREA = 018
 IST482I      MVSVM    ACT   ,SUBAREA = 013
 IST482I      MVSTCAM  INACT ,SUBAREA = 014
 IST482I      VS1VTAM  INACT ,SUBAREA = 011
 IST482I      DOSVTAM  INACT ,SUBAREA = 015
 IST314I      END
```

Note 20: This command is valid when your system is part of an ACF multi-domain network. You can display the status of Cross-Domain Manager (CDRM) major nodes in your domain. The options provide for display of all active, inactive, or all CDRM major nodes, per the ACT | INACT | EVERY specification, with EVERY the default (shown here).

4.2.9 : DISPLAY CROSS-DOMAIN RESOURCES

```
d net,cdrscs    (Note 21)

 IST097I  DISPLAY  ACCEPTED

 IST350I      VTAM DISPLAY - DOMAIN TYPE= CROSS-DOM. RESOURCES
 IST089I      CDRSCAPL TYPE= CDRSC SEGMENT      , ACT
 IST483I      MVSTSO   ACT   ,CDRM = MVSVTAM
 IST483I      MVSIMS   ACT   ,CDRM = MVSVTAM
 IST483I      MVSCICS  ACT   ,CDRM = MVSVTAM
 IST483I      NOSP2    ACT   ,CDRM = MVSVTAM
 IST483I      NOSP2000 ACT   ,CDRM = MVSVTAM
 IST483I      NOSP2001 ACT   ,CDRM = MVSVTAM
 IST314I      END
```

Note 21: This command is valid when your system is part of an ACF multi-domain network. You can display information about Cross-Domain Resources (CDRSCS) in an active CDRSCS major node in your domain. The options provide for display of all active, inactive, or all CDRSCS, per the ACT | INACT | EVERY specification, with EVERY the default (shown here).

4.2.10 : DISPLAY PATH TABLE CONTENTS

```
d net,pathtab    (Note 22)

 IST097I  DISPLAY  ACCEPTED

 IST350I       VTAM DISPLAY - DOMAIN TYPE= PATH TABLE CONTENTS
 IST439I       ADJSUB DESTSUB PATH STATUS   ADJSUB DESTSUB PATH STATUS
 IST438I       007      007      ACTIVE       008      008      ACTIVE
 IST438I       022      011      INACTIVE     013      013      ACTIVE
 IST438I       021      014      ACTIVE       022      015      INACTIVE
 IST438I       022      018      INACTIVE     021      021      ACTIVE
 IST314I       END
```

```
d net,pathtab,adjsub=022

 IST097I  DISPLAY  ACCEPTED

 IST350I       VTAM DISPLAY - DOMAIN TYPE= PATH TABLE CONTENTS
 IST439I       ADJSUB DESTSUB PATH STATUS   ADJSUB DESTSUB PATH STATUS
 IST438I       022      011      INACTIVE     022      015      INACTIVE
 IST438I       022      018      INACTIVE
 IST314I       END
```

```
d net,pathtab,destsub=008

 IST097I  DISPLAY  ACCEPTED

 IST350I       VTAM DISPLAY - DOMAIN TYPE= PATH TABLE CONTENTS
 IST439I       ADJSUB DESTSUB PATH STATUS   ADJSUB DESTSUB PATH STATUS
 IST438I       008      008      ACTIVE
 IST314I       END
```

4.2.11 : FINDING A TSO USER ID

```
d net,appls,a

  IST097I  DISPLAY  ACCEPTED

 IST350I      VTAM DISPLAY - DOMAIN TYPE= APPL MAJ NODES/NAMES
 IST089I      VTAMSEG  TYPE= APPL SEGMENT      , ACT
 IST360I      APPLICATIONS:
 IST080I      MVSVMVT  ACT         ISTOLTEP ACT         ISTATA00 ACT
 IST080I      NETSOL   ACT
 IST089I      TSOAPAC  TYPE= APPL SEGMENT      , ACT
 IST360I      APPLICATIONS:
 IST080I      TSO      ACT         TSO0001  ACT
 IST089I      NOSP     TYPE= APPL SEGMENT      , ACT
 IST360I      APPLICATIONS:
 IST080I      NOSP1    ACT         NOSP1PPT ACT         NOSP1000 ACT
 IST080I      NOSP1001 ACT         NOSP1002 ACT         NOSP1003 ACT
 IST080I      NOSP1004 ACT         NOSP1005 ACT         NOSP1006 ACT
 IST314I      END

d net,id=tso0001,e
     IST097I  DISPLAY  ACCEPTED

 IST075I      VTAM DISPLAY - NODE TYPE= APPL
 IST486I      NAME = TSO0001   , STATUS = ACT
 IST271I      JOBNAME = UrID      STEPNAME = IKJSPF24
 IST654I      I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST171I      ACTIVE SESSIONS = 0001 SESSION RE2UESTS = 0000
 IST206I      SESSIONS:
 IST080I      LU4C0    ACT  -SEC
 IST314I      END
```

4.2.12 : GENERATE AND DISPLAY TUNING STATISTICS

(Note 22)

```
 IST440I  TIME = 16044084 DATE = 78101 LOCAL PC NAME = NCPACF
 IST441I  DLRMAX = 1        CHWR  = 18       CHRD  = 24
 IST442I  ATTN   = 24       RDATN = 0        IPIU  = 25
 IST443I  OPIU   = 18       RDBUF = 25       SLODN = 0
 IST314I  END
```

Note 22: The new ACF/VTAM tuning statistics can provide valuable information as a basis for adjusting ACF/VTAM and NCP variables to improve system performance. To generate this data, be sure to specify the TNSTAT parameter in the 'START' command

4.2.13 : HALT NET COMMAND

OPERATION	OPERAND	MODIFIER	CONDITIOND	VTAM ACTION	APPLICATION ACTION	DISPLAY STATUS
HALT NET z net	NONE			Deactivates all active devices not in session. Drives TPEND exit with reason code 0. VTAM remains active until application closes ACB.	None required.	INACT for all devices not in session.
HALT NET, z net,	QUICK quick		Devices active and inactive.	Deactivates all active devices not in session. Drives TPEND exit with reason code 4. VTAM remains active until application closes ACB.	Application should close ACB.	INACT for all devices not in session until VTAM shutdown complete.
HALT NET, z net,	CANCEL cancel		Devices active and inactive.	Drives TPEND exit with reason code 8.	Application should expect error when closing ACB.	None because VTAM is not active.

4.2.14 : VARY NET ACTIVE COMMAND

OPERATION	OPERAND	MODIFIER	CONDITIONS	VTAM ACTION	APPLICATION ACTION	DISPLAY STATUS
VARY NET, v net,	ACTIVE, act,		Device inactive	Activates device. (IST093I) when Vary complete. Drives LOGON exit if LOGAPPL specified and device becomes active.	Application should issue OPNDST.	INACT/C until CONTACT complete. act if contact complete.
VARY NET, v net,	ACTIVE, act,		Devices active and inactive.	Activates inactive devices if issued against NCP. Gives error message for device other than NCP if already active (IST067I).	NA	Same as above.

4.2.15 : VARY NET INACT COMMAND

OPERATION	OPERAND	MODIFIER	CONDITIONS	VTAM ACTION	APPLICATION ACTION	DISPLAY STATUS
VARY NET v net,	INACT, inact,	NONE	device inactive.	Error message indicating already inactive (IST104I).	NA	INACT
VARY NET, v net,	INACT, inact,	NONE	device Inactive, and contact pending.	Error message (IST604I), (unable to contact).	NA	INACT/C (before) INACT (after).
VARY NET, v net,	INACT, inact,	NONE	Active and not in session.	VTAM deactivates and message indicating completion is returned (IST105I).	NA	INACT
VARY NET, v net,	INACT, inact,	NONE	Active and in session.	VTAM saves command and does nothing until application does CLSDST.	LOSTERM is not driven.	ACT until CLSDST issued.
VARY NET, v net,	INACT, inact,	IMMEDIATE, i,	Active and in session.	VTAM drives losterm exit. When application does CLSDST, VTAM does CLEAR,and UNBIND. When CLSDST completes, VTAM indicates device INACT.	Application must do CLSDST. If application does not do a CLSDST, device remains active.	ACT until CLSDST issued.
VARY NET, v net,	INACT, inact,	FORCE, f,	Active, in session, but no path	VTAM sets indicator and drives LOSTERM exit. VTAM does not do a CLEAR, and UNBIND, but responds to CLSDST immediately. VTAM will indicate when vary is complete (IST105I).	Application must do CLSDST. If application does not, device remains active.	ACT until CLSDST issued.
VARY NET, v net,	INACT, INACT,	RESTART, r,	Active, in session, but no path	VTAM sets indicator and drives LOSTERM exit. VTAM does not do a CLEAR, and UNBIND, but responds to CLSDST immediately. VTAM will indicate when vary is complete and device is active again (IST621I).	Application must do CLSDST. If,application does not, device remains active.	ACT until CLSDST issued.

4.3 : TCAM OS/VS OPERATOR COMMANDS

```
***
Operator input is lower case.
***
```

4.3.1 : DISPLAY NCP STATUS

```
d tp,term,ncp

 IED033I NCP       STATUS= NCP                                          INTENSE=
 NO     IN-SEQ=0001, OUT-SEQ=0001

d tp,status,ncp

 IED176I NCP       STATUS=ACTIVE    BACKUP=NONE      SWITCHING=VOID      LOAD=NCP1003

d tp,act,ncp
 IED036I NCP             ACTIVE= NONE
```

4.3.2 : DISPLAY LINE STATUS

```
d tp,term,sdlc136

 IED033I SDLC136   STATUS= LINEENT                                      INTENSE=
 NO     IN-SEQ=0001, OUT-SEQ=0001

d tp,inact,gsna,1

 IED037I GSNA      001 INACTIVE= PU3770F   PU3275V   PU3270V   PU3767V   PU3790V   PU37
 70PF

d tp,inact,gsna,2
```

```
 IED037I GSNA     002 INACTIVE= SDLC3276 SDLC3274

f tcam,activ=sdlc3274

 IED382I SDLC3274 ACTIVATE COMPLETE

d tp,inact,gsna,2

 IED037I GSNA     002 INACTIVE= SDLC3276
```

4.3.3 : DISPLAY PHYSICAL UNIT STATUS

```
d tp,term,sdlc3274

 IED033I SDLC3274 STATUS= PU                                          INTENSE=
 NO    IN-SEQ=0001, OUT-SEQ=0001

f tcam,activ=sdlc3274

 IED382I SDLC3274 ACTIVATE COMPLETE

d tp,act,gsna,2

 IED036I GSNA     002   ACTIVE= SDLC3274

d tp,act,sdlc3274

 IED036I SDLC3274       ACTIVE= SDLCPA08 SDLCPA07 SDLCPA06 SDLCPA05 SDLCPA04 SDLC
 PA03 SDLCPA02 SDLCPA01

d tp,pend,sdlc3274

 IED566I SDLC3274 PENDING = NONE
```

4.3.4 : DISPLAY LOGICAL UNIT STATUS

```
d tp,term,sdlcpa07

 IED033I SDLCPA07 STATUS= LU      OPTFLDS SCNDARY NOTSESS              INTENSE=       (Logical unit not in session.)
 NO     IN-SEQ=0001, OUT-SEQ=0001

d tp,term,sdlcpa05

 IED033I SDLCPA05 STATUS= LU      OPTFLDS SCNDARY                      INTENSE=       (Logical unit in session.)
 NO     IN-SEQ=0001, OUT-SEQ=0001
```

CHAPTER 5 : SNA DEVICE CONTROL AND FLOW

This section provides device dependent characteristics of various SNA devices. The NCP and VBUILD source decks should be compared with the special device information. Data flow and control is described for each SNA device and traces are provided to indicate the correct operation of the device in the system.

Some of the traces are TCAM PIU and BUFFER traces and others are VTAM I/O and BUFFER traces. Although the format of the outputs are different, the basic SNA data and flow is the same. Therefore, a VTAM user should also look at the TCAM trace examples and the TCAM user should also look at the VTAM trace examples.

CONTENTS

5.1 : SAMPLE TCAM PIU TRACES

The trace examples which follow are PIU traces. The intent of these traces is to show the data flow for various types of SNA terminals. With these traces, you should be able to understand the sequence of commands that will flow between the terminal and the host.

The PIU traces shown are abbreviated so the data flow between the various Network Addressable Units (NAU) could be shown. The fields that have been deleted are the TNT Indices for both destination and source, BYTE 1 and TAG 1 of the Transmission Header. The remaining fields are left unmodified. It should be noted that the field labeled T2 is the TAG2 field and contains the sequence number count between NAUs for normal flow or an ID field for expedited flow.

Following is the network address table which goes along with the PIU traces. The control blocks have been eliminated.

TERMNAME	INDX	TYPE	NETADDR
APPL3790	0001	PROC	4009
APP32IN	0002	PROC	
APP32OUT	0003	PROC	
BATCH2AV	0004	LU	2006
BATCH2BV	0005	LU	2007
BLKPRTV	0006	LU	2008
B4NCP	0007	LNCP	2000
CLNE	0008	PROC	
C67L	0009	PROC	
C76L	000A	PROC	
C90L	000B	PROC	
DLQ	000C	PROC	
DSC1V	000D	LU	2008
DSC2V	000E	LU	2009
DSC3V	000F	LU	200A
GROUPSNA	0010	GRP	
INBATCHV	0011	LU	2005
INQ1V	0012	LU	2010
INQ2V	0013	LU	2011
INQ3V	0014	LU	2012
INQ4V	0015	LU	2013
INQ5V	0016	LU	2014
INQ6V	0017	LU	2015
INQ7V	0018	LU	2016
INQ8V	0019	LU	2017
LU3270V0	001A	LU	201D

```
LU3275V0   001B  LU     2022
L3277A     001C  TRM
PUTQUEUE   001D  PROC
PU3270V    001E  PU     201C
PU3275V    001F  PU     2021
PU3767V    0020  PU     201A
PU3790V    0021  PU     2004
RJE1V      0022  LU     200C
RJE2V      0023  LU     200D
RJE3V      0024  LU     200E
RJE4V      0025  LU     200F
SDLCV20    0026  SDLC   2001
SSCP       0027  SSCP   4000
TLNE       0028  PROC
TR3767V    0029  LU     201B
T67L       002A  PROC
T76L       002B  PROC
T90L       002C  PROC
IEDIMCP    002D  MH     4002
TSOMHSNA   002E  MH     4003
SYSSSS     002F  MH     4004
MHS3270    0030  MH     4005
MH3767     0031  MH     4006
MHEMU90    0032  MH     4007
SNAMH      0033  MH     4008
```

5.1.1 : NCP ACTIVATION PIU TRACE

This PIU trace shows the activation of the NCP, the SDLC line and the Physical Units on the SDLC line. The first seven lines are the result of activating the NCP with the operator command 'f¢tcam,activ=b4ncp'. The remaining lines of the trace are the result of activating the SDLC line with the operator command 'f¢tcam,activ=sdlcv20'. It should be noted that the 3790 did not respond with a CONTACTED command. This response will not flow until the 3790 host communication is activated through SYSHOST.

```
*************************************************************************************************************
*          DATA FLOW BETWEEN NAU'S                *   ABBREVIATED PIU TRACE - TH and RU have been abbreviated       *
*************************************************************************************************************
 TCAM     SSCP                NCP       PU      LU   *---------TH----------*  *---RH---*  *--------REQUEST UNIT--------*
  |        |                   |        |       |    B0   DAF   OAF   T2   DCF   B0  B1  B2
          -------ACTPU-------->                      1D  2000  4000  02  000C  6B  80  00  1102550500000000A000000000000
          <---INIT COMPLETE---                       1D  0000  2000  00  000A  2B  00  00  5009003400E325000000000000000
          <--+DR1 to ACTPU----                       1D  4000  2000  02  000D  EB  80  00  1101D5C3D7F0F5E540400000000000
          --------SDT-------->                       1D  2000  4000  03  0004  6B  80  00  A0000000000000000000000000000
          <--+DR1 to SDT------                       1D  4000  2000  03  0004  EB  80  00  A0000000000000000000000000000
          -SETCV TIME/DATE--->                       1C  2000  4000  01  001D  0B  80  00  010211200001F1F261F1F561F7F74B
          <--+DR1 to SETCV----                       1C  4000  2000  01  0006  8B  80  00  0102110000000000000000000000000
          --ACTLINK--SDLCV20---> LINE                1C  2000  4000  02  0008  0B  80  00  01020A2001000000000000000000000
          <--+DR1 to ACTLINK----                     1C  4000  2000  02  0006  8B  80  00  01020A0000000000000000000000000
          --CONTACT--PU3790V---> PU                  1C  2000  4000  03  0008  0B  80  00  0102012004000000000000000000000
          <--+DR1 to CONTACT----                     1C  4000  2000  03  0006  8B  80  00  0102010000000000000000000000000
          --CONTACT--PU3767V---> PU                  1C  2000  4000  04  0008  0B  80  00  010201201A000000000000000000000
          <--+DR1 to CONTACT----                     1C  4000  2000  04  0006  8B  80  00  0102010000000000000000000000000
          --CONTACT--PU3270V---> PU                  1C  2000  4000  05  0008  0B  80  00  010201201C000000000000000000000
          <--+DR1 to CONTACT----                     1C  4000  2000  05  0006  8B  80  00  0102010000000000000000000000000
          <-CONTACTED--PU3767V-- PU                  1C  4000  2000  01  0009  0B  00  00  010280201A010000000000000000000
          <-CONTACTED--PU3270V-- PU                  1C  4000  2000  02  0009  0B  00  00  010280201C010000000000000000000
          -------ACTPU--PU3767V------>               1D  201A  4000  03  000C  6B  80  00  1101010500000000A000000000000
          <------+DR1 to ACTPU--------               1D  4000  201A  03  000D  EB  80  00  1101404040404040404000000000000
          -------ACTLU--TR3767V--------------->      1D  201B  4000  04  0006  6B  80  00  0D0101000000000000000000000000
          <------+DR1 to ACTLU-----------------      1D  4000  201B  04  0005  EB  80  00  0D0101000000000000000000000000
          -------ACTPU--PU3270V------>               1D  201C  4000  05  000C  6B  80  00  1101010500000000A000000000000
          <------+DR1 to ACTPU--------               1D  4000  201C  05  000D  EB  80  00  1101404040404040404000000000000
          -------ACTLU--LU3270V0-------------->      1D  201D  4000  06  0006  6B  80  00  0D0101000000000000000000000000
          <------+DR1 to ACTLU-----------------      1D  4000  201D  06  0005  EB  80  00  0D0101000000000000000000000000
```

5.1.2 : 3767 PIU TRACE

This PIU trace is of the IBM 3767 operating in SNA mode. The flow shows the terminal operator requesting a session between a TCAM message handler (MH3767) and the 3767 LU. This request is made by typing in 'inits¢t3767'. The TCAM USS table is used to convert the logon to a formated init-self command. This causes the BIND to flow which establishes the LU-LU session.

The terminal operator then enters a message which is sent back to the 3767 terminal. The begin bracket indicator is set on the first message sent to the terminal. Bracket indicators will not be used for the rest of the session.

The last step shown is the terminal logoff which is accomplished by pressing the SYSTEM REQUEST key and entering in 'terms¢t3676'. This causes the CLEAR and the UNBIND command to flow.

```
*****************************************************************************************************************
*          DATA FLOW BETWEEN NAU'S                *  ABBREVIATED PIU TRACE - TH and RU have been abbreviated      *
*****************************************************************************************************************
MH3767   SSCP              NCP  PU3767  TR3767  *---------TH----------*  *---RH---*  *--------REQUEST UNIT--------*
  |       |                 |       |       |   B0   DAF  OAF  T2   DCF  B0  B1  B2
          <---inits t3767 ---------------------   1C  4000 201B  00  000E  03  80  00  899589A3A240A3F3F7F6F700000000
          ----+DR1---------------------------->   1C  201B 4000  00  0003  83  80  00  00000000000000000000000000000000
  ------------BIND--------------------------->   1D  201B 4006  00  0026  6B  80  00  31010303A1A030400000858500000000
  <-----------+DR1-----------------------------   1D  4006 201B  00  0004  EB  80  00  31000000000000000000000000000000
  ------------SDT---------------------------->   1D  201B 4006  00  0004  6B  80  00  A0000000000000000000000000000000
  <-----------+DR1-----------------------------   1D  4006 201B  00  0004  EB  80  00  A0000000000000000000000000000000
  <---/m tr3767v tr3767v / ... --(inquiry,BB)-   1C  4006 201B  01  001F  03  A0  80  619440A399F3F7F6F7A540A399F3F7
  ------------+DR1---------------------------->   1C  201B 4006  01  0003  83  A0  80  00000000000000000000000000000000
  ----CL/M TR3767V TR3767V /... - (response)->   1C  201B 4006  01  002A  03  81  00  0D2561D44040E3D9F3F7F6F7E540F1
      RF
  <-----------+DR1-----------------------------   1C  4006 201B  01  0003  83  81  00  00000000000000000000000000000000
          <---terms t3767---------------------   1C  4000 201B  01  000E  03  80  00  A3859994A240A3F3F7F6F700000000
          ----+DR1---------------------------->   1C  201B 4000  01  0003  83  80  00  00000000000000000000000000000000
  ------------CLEAR-------------------------->   1D  201B 4006  00  0004  6B  80  00  A1000000000000000000000000000000
  <-----------+DR1 to CLEAR-------------------   1D  4006 201B  00  0004  EB  80  00  A1000000000000000000000000000000
  ------------UNBIND------------------------->   1D  201B 4006  00  0005  6B  80  00  32010000000000000000000000000000
  <-----------+DR1 to UNBIND-----------------   1D  4006 201B  00  0004  EB  80  00  32000000000000000000000000000000
```

5.1.3 : 3275 SDLC PIU TRACE

The PIU trace for the 3275 SDLC terminal shows data flow with errors. The logon is similar to what was shown with the 3767. After the BIND has established the session, TCAM tries to send a message that was in the TCAM queue. The message causes SNA Sense bytes to be sent back to TCAM indicating intervention is required on the printer. The terminal operator presses the clear key which causes an ERASE WRITE command to be sent back to the terminal.

The terminal user then tries to logoff of the terminal, but keys in the wrong message handler name. The log off request is rejected and TCAM sends back to the terminal both SNA Sense bytes and an error message. The operator then keys in the correct log off and the session is ended.

```
*************************************************************************************************************
*          DATA FLOW BETWEEN NAU'S                *  ABBREVIATED PIU TRACE - TH and RU have been abbreviated       *
*************************************************************************************************************
MHS3270  SSCP              NCP  PU3270  LU3270  *---------TH----------*  *---RH---*  *--------REQUEST UNIT--------*
  |       |                 |       |       |   B0   DAF  OAF  T2   DCF  B0  B1  B2
         <---inits mhs3270 bi3270nb----------   1C  4000 201D 03  001C 03  00  00  7D40D6C9D5C9E3E240D4C8E2F3F2F7
  ------------BIND---------------------------->  1D  201D 4005 00  0027 6B  80  00  3101020220400000000008585000000
  <-----------+DR1----------------------------  1D  4005 201D 00  0004 EB  80  00  3100000000000000000000000000000
  ----/M TR3767V LU3270V0 /...---------------->  1C  201D 4005 01  0033 03  81  00  F57B1140401D401361D440E3D9F3F7
  <---(-)DR1 error intervention required------   1E  4005 201D 01  0007 87  91  00  0000001000000000000000000000000
  <---clear key------------------------------   1C  4005 201D 01  0004 03  00  00  6D0000000000000000000000000000
  ----ERASE WRITE CMD------------------------>  1C  201D 4005 02  000B 03  80  00  F5C71140401D401300000000000000
  <-----------+DR1----------------------------  1E  4005 201D 02  0003 83  80  00  0000000000000000000000000000000
         <---terms mns3270--(wrong mh)-------   1C  4000 201D 04  0017 03  00  00  016C61021140C1E3C5D9D4E240D4D5
         ----session reference error resp.-->   1C  201D 4000 04  0007 87  10  00  081E0000000000000000000000000000
         ----IED572I ERROR ....-------------->  1C  201D 4000 0B  005F 03  80  00  F1C3C9C5C4F5F7F2C940C5D9D9D6D9
         <---+DR1----------------------------   1E  4000 201D 0B  0003 83  80  00  0000000000000000000000000000000
         <---terms mhs3270-------------------   1C  4000 201D 05  0017 03  00  00  016C61021140C1E3C5D9D4E240D4C8
         ----+DR1---------------------------->  1C  201D 4000 05  0003 83  00  00  0000000000000000000000000000000
  ------------CLEAR--------------------------->  1D  201D 4005 00  0004 6B  80  00  A1000000000000000000000000000000
  <-----------+DR1 to CLEAR-------------------   1F  4005 201D 00  0004 EB  80  00  A1000000000000000000000000000000
  ------------UNBIND------------------------->  1D  201D 4005 00  0005 6B  80  00  3201000000000000000000000000000
  <-----------+DR1 to UNBIND-----------------   1D  4005 201D 00  0004 EB  80  00  3200000000000000000000000000000
```

The next trace for the 3270 shows the result of the console operator deactivating the 3270 by entering: 'f¢tcam,deact=b4ncp,f'. This command causes the deactivation of the LU and the PU.

```
*************************************************************************************************************
*          DATA FLOW BETWEEN NAU'S                    *  ABBREVIATED PIU TRACE - TH and RU have been abbreviated        *
*************************************************************************************************************
MHS3270  SSCP              NCP  PU3270  LU3270  *---------TH----------*  *---RH---*  *--------REQUEST UNIT--------*
  |       |                 |       |       |   B0   DAF  OAF  T2   DCF  B0  B1  B2
         ----DACTLU-------------------------->   1D  201D 4000  19  0004  6B  80  00  0E000000000000000000000000000000
         <---+DR1 to DACTLU-------------------   1D  4000 201D  19  0004  EB  80  00  0E000000000000000000000000000000
         ----DACTPU----------------->           1D  201C 4000  1A  0005  6B  80  00  12010000000000000000000000000000
         <---+DR1 to DACTPU----------           1D  4000 201C  1A  0004  EB  80  00  12000000000000000000000000000000
         ----DISCONTACT----->  PU3270V          1C  2000 4000  07  0008  0B  80  00  010202201C0000000000000000000000
         <---+DR1------------                   1C  4000 2000  07  0006  8B  80  00  0102020000000000000000000000000000
```

5.1.4 : ACTIVATION OF THE 3790

This PIU trace is caused by the activation of the 3790 through the SYSHOST function. TCAM has already activated the link and has scheduled the activation of the PU and the LU. The activation of the 3790 by SYSHOST prepares the 3790 to respond to the activation commands that are sent by the SSCP to establish communication on the link and also the SSCP-PU and SSCP-LU sessions. The BIND for LU, DSC1V, was rejected because the 3277 was currently being used by another function program.

```
*************************************************************************************************************************
*          DATA FLOW BETWEEN NAU'S                  *  ABBREVIATED PIU TRACE - TH and RU have been abbreviated        *
*************************************************************************************************************************
MHEMU90  SSCP                NCP   PU3790     LU    *---------TH----------*  *---RH---*  *--------REQUEST UNIT--------*
  |       |                   |       |       |     BO   DAF  OAF   T2   DCF  BO  B1  B2
         <-CONTACTED-PU3790--                        1C  4000 2000  03  0009  0B  00  00  0102802004010000000000000000000
         ----ACTPU---------------->                  1D  2004 4000  0C  000C  6B  80  80  1101010500000000A000000000000
         <---+DR1 to ACTPU----------                 1D  4000 2004  0C  000D  EB  80  00  1101F3F7F9F0F0F0F0F0F000000000000
         ----ACTLU to DSC1V------------------>       1D  2008 4000  0D  0006  6B  80  00  0D0101000000000000000000000000
         ----ACTLU to DSC2V------------------>       1D  2009 4000  0E  0006  6B  80  00  0D0101000000000000000000000000
         ----ACTLU to DSC3V------------------>       1D  200A 4000  0F  0006  6B  80  00  0D0101000000000000000000000000
         ----ACTLU to BLKPRTV----------------->      1D  200B 4000  10  0006  6B  80  00  0D0101000000000000000000000000
         <---+DR1 to ACTLU from DSC1V--------        1D  4000 2008  0D  0004  EB  80  00  0D0000000000000000000000000000
         <---+DR1 to ACTLU from DSC2V--------        1D  4000 2009  0E  0004  EB  80  00  0D0000000000000000000000000000
         <---+DR1 to ACTLU from DSC3V--------        1D  4000 200A  0F  0004  EB  80  00  0D0000000000000000000000000000
         <---+DR1 to ACTLU from BLKPRTV------        1D  4000 200B  10  0004  EB  80  00  0D0000000000000000000000000000
                                                       ---  ALL LU'S UNDER THE 3790 ARE ACTIVATED  ---
                                                    -- SHOWN HERE ARE ONLY THE ACTIVATION OF THE DSC AND BULK PRINT LUs
  ----------BIND for DSC1V (TCAM initiated)-->      1D  2008 4007  00  0028  6B  80  00  31010303A1B030800000858500000 2
  <---bind rejection DSC1V not available------      1D  4007 2008  00  000B  EF  90  00  0801000031010303000000000000000
```

5.1.5 : 3790 DSC PIU TRACE

This PIU trace is of a 3790 using the DSC function program. The terminal (dsc3v) is logging on. The 3790 sends a formatted INIT-SELF command. Once the session is established, the TCAM 'good morning' message is sent to the terminal. Notice the use of Begin Brackets, End Brackets and Change of Direction indicators.

The terminal user then pressed the clear key which causes an ERASE WRITE to be sent to the terminal. Notice that the ERASE WRITE sends an End Bracket and Change Direction indicator in the RH. The Change Direction indicator really has no meaning when out of bracket state. Either the host or the LU can be the next speaker as shown in the flow. Next, a message is sent to TCAM and is switched back to DSC3V. It should be noted that the data in the RU is similar to what would be seen using a 3270 SDLC terminal. However, the maximum element size is 1536 for the DSC terminal.

DATA FLOW BETWEEN NAU'S	ABBREVIATED PIU TRACE - TH and RU have been abbreviated								
MHEMU90 SSCP NCP PU3790 DSC3V	TH					RH			REQUEST UNIT
	B0	DAF	OAF	T2	DCF	B0	B1	B2	
<---INIT-SELF	1C	4000	200A	01	001C	0B	80	00	01068100C5D4E4F3F7F9F040F308D4
----+DR1 to INIT-SELF--->	1C	200A	4000	01	0006	8B	80	00	0106810000000000000000000000000
----BIND--->	1D	200A	4007	00	0027	6B	80	00	31010303A1B030800000858500000 2
<----+DR1 to BIND----	1D	4007	200A	00	0004	EB	80	00	3100000000000000000000000000000
----SDT--->	1D	200A	4007	00	0004	6B	80	00	A0000000000000000000000000000000
<----+DR1 to SDT----	1D	4007	200A	00	0004	EB	80	00	A0000000000000000000000000000000
----TCAM good morning message----- (BB,EB)->	1C	200A	4007	01	003A	03	81	C0	F57B1140401D40134040E6C5D3C3D6
<----+DR1	1C	4007	200A	01	0003	83	81	00	0000000000000000000000000000000
<---clear key---------- (BB,CD)--	1C	4007	200A	01	0004	03	90	A0	6D0000000000000000000000000000
----ERASE WRITE---------- (EB,CD)->	1C	200A	4007	02	000B	03	80	60	F5C71140401D401300000000000000
<----+DR1 to erase write----	1C	4007	200A	02	0003	83	80	00	0000000000000000000000000000000
<---m dsc3v dsc3v /message switch- (BB,CD)--	1C	4007	200A	02	001A	03	90	A0	7D405C1140C1944084A283F3A54084
----ERASE WRITE---------- (EB,CD)->	1C	200A	4007	03	000B	03	81	60	F5C71140401D401300000000000000
<----+DR1 to erase write----	1C	4007	200A	03	0003	83	81	00	0000000000000000000000000000000
---M DSC3V DSC3V /MESSAGE SWITCH-- (BB,EB)->	1C	200A	4007	04	001C	03	80	C0	F57B1140401D4013D440C4E2C3F3E5
<----+DR1 to message----	1C	4007	200A	04	0003	83	80	00	0000000000000000000000000000000

This PIU trace shows a large message with multiple buffers being sent and received by a DSC terminal. The message being sent to the terminal uses pacing on every third buffer. The message sent is 1841 bytes long which filled the 3270 screen.

```
*************************************************************************************************************************
*          DATA FLOW BETWEEN NAU'S                *  ABBREVIATED PIU TRACE - TH and RU have been abbreviated        *
*************************************************************************************************************************
MHEMU90  SSCP              NCP  PU3790  DSC3V  *---------TH----------*  *---RH---*  *--------REQUEST UNIT--------*
  |       |                 |       |       |   B0   DAF  OAF  T2   DCF  B0  B1  B2
  <---full screen message (fic)---- (BB) -----   1C  4007 200A 03  0103  02  90  80  7D5C5B944084A283F1A54084A283F3
  <---second buffer ---- (mic)----------------   1C  4007 200A 04  0103  00  90  00  60606060606060606060606060606060
  <---third buffer ----- (mic)----------------   1C  4007 200A 05  0103  00  90  00  60606060606060606060606060606060
  <---fourth buffer ---- (mic)----------------   1C  4007 200A 06  0103  00  90  00  60606060606060606060606060606060
  <---fifth buffer ----- (mic)----------------   1C  4007 200A 07  0103  00  90  00  60606060606060606060606060606060
  <---sixth buffer ----- (mic)----------------   1C  4007 200A 08  0103  00  90  00  606060F1F7606060606060606060606060
  <---seventh buffer --- (mic)----------------   1C  4007 200A 09  0103  00  90  00  60606060606060606060606060606060
  <---last buffer ------ (lic)----- (CD) -----   1C  4007 200A 0A  0021  01  90  20  88854085958440968640A388854082
  ------------ERASE WRITE---------- (EB,CD)-->   1C  200A 4007 07  000B  03  80  60  F5C71140401D401300000000000000000
  <-----------+DR1 to erase write-------------   1C  4007 200A 07  0003  83  80  00  00000000000000000000000000000000
  --full screen msg -(fic with pacing,BB,EB)->   1C  200A 4007 08  00E2  02  91  C0  F57B1140401D4013D440C4E2C3F3E5
  <-----------IPR-----------------------------   1C  4007 200A 08  0003  83  01  00  00000000000000000000000000000000
  ----second buffer ---- (mic)--------------->   1C  200A 4007 09  00EC  00  90  00  60606060606060606060606060606060
  ----third buffer ----- (mic)--------------->   1C  200A 4007 0A  00EC  00  90  00  60606060606060606060606060606060
  ----fourth buffer ---- (mic with pacing )-->   1C  200A 4007 0B  00EC  00  91  00  60606060606060606060606060606060
  <-----------IPR-----------------------------   1C  4007 200A 0B  0003  83  01  00  00000000000000000000000000000000
  ----fifth buffer ----- (mic)--------------->   1C  200A 4007 0C  00EC  00  90  00  60606060606060606060606060606060
  ----sixth buffer ----- (mic)--------------->   1C  200A 4007 0D  00EC  00  90  00  60606060606060606060606060606060
  ----seventh buffer --- (mic with pacing)--->   1C  200A 4007 0E  00EC  00  91  00  60606060606060606060606060606060
  <-----------IPR-----------------------------   1C  4007 200A 0E  0003  83  01  00  00000000000000000000000000000000
  ----last buffer ------ (lic,definite resp)->   1C  200A 4007 0F  00D1  01  80  00  60606060606060606060606060606060
  <-----------+DR1 to message----------------   1C  4007 200A 0F  0003  83  80  00  00000000000000000000000000000000
```

5.1.6 : 3790 BULK PRINT PIU TRACE

This PIU trace shows the trace using the Bulk Printer function program on the 3790. In the trace, a message is sent from a DSC terminal (DSC3V) to the Bulk Printer (BLKPRTV). This message causes TCAM to initiate a session by sending a BIND to BLKPRTV. After the session has been established the message is sent followed by an UNBIND to end the session. This frees the printer for use by the DSC terminals on the 3790.

```
*****************************************************************************************************************
*          DATA FLOW BETWEEN NAU'S                *  ABBREVIATED PIU TRACE - TH and RU have been abbreviated       *
*****************************************************************************************************************
MHEMU90  SSCP              NCP  PU3790  BLKPRTV *---------TH----------*  *---RH---*  *--------REQUEST UNIT--------*
  |       |                 |       |       |   B0   DAF  OAF  T2   DCF  B0  B1  B2
  <---m dsc3v blkprtv /message text --(DSC3V)-   1C  4007 200A  0B  002C  03  90  A0  7D40E41140C1944084A283F3A54082
  ------------ERASE WRITE--(DSC3V)-- (EB,CD)->   1C  200A 4007  0E  000B  03  81  60  F5C71140401D401300000000000000
  ------------BIND to BLKPRTV----------------->   1D  200B 4007  00  0028  6B  80  00  31010303A1B03080001858500001
  <------------+DR1 to erase write---(DSC3V)---   1C  4007 200A  0E  0003  83  81  00  00000000000000000000000000000000
  <------------+DR1 to BIND for BLKPRTV--------   1D  4007 200B  00  0004  EB  80  00  31000000000000000000000000000000
  ------------SDT------------------------------>   1D  200B 4007  00  0004  6B  80  00  A0000000000000000000000000000000
  <------------+DR1 to SDT----------------------   1D  4007 200B  00  0004  EB  80  00  A0000000000000000000000000000000
  ----message sent to BLKPRTV--- (fic,BB,EB)->   1C  200B 4007  01  00DA  02  91  C0  D440C4E2C3F3E540C2D3D2D7D9E3E5
  ----second buffer to BLKPRTV------ (mic) -->   1C  200B 4007  02  00EC  00  90  00  60606060606060606060606060606060
  ----third buffer to BLKPRTV---(mic,pace)--->   1C  200B 4007  03  00EC  00  90  00  60606060606060606060606060606060
  <------------IPR-----------------------------   1C  4007 200B  01  0003  83  01  00  00000000000000000000000000000000
  ----fourth buffer to BLKPRTV------ (mic) -->   1C  200B 4007  04  00EC  00  91  00  60606060606060606060606060606060
  ----last buffer to BLKPRTV-------- (lic) -->   1C  200B 4007  05  00B1  01  80  00  60606060606060606060606060606060
  <------------IPR-----------------------------   1C  4007 200B  04  0003  83  01  00  00000000000000000000000000000000
  <------------+DR1 to message-----------------   1C  4007 200B  05  0003  83  80  00  00000000000000000000000000000000
  ------------CLEAR------------------------------>   1D  200B 4007  00  0004  6B  80  00  A1000000000000000000000000000000
  <------------+DR1 to CLEAR--------------------   1D  4007 200B  00  0004  EB  80  00  A1000000000000000000000000000000
  ------------UNBIND----------------------------->   1D  200B 4007  00  0005  6B  80  00  32010000000000000000000000000000
          <---TERM-SELF-----------------------   1C  4000 200B  01  0009  0B  00  00  01068300F30000000000000000000000
          ----+DR1 to TERM-SELF--------------->   1C  200B 4000  01  0006  8B  00  00  01068300000000000000000000000000
  <------------+DR1 to UNBIND-----------------   1D  4007 200B  00  0004  EB  80  00  32000000000000000000000000000000
```

5.1.7 : 3790 TYPE 2 BATCH PIU TRACE

The trace shown below is a data flow used by the 3790 using Type 2 Batch. In the trace, TCAM initiates the session by sending a BIND when the first message enters into the TCAM queue. The BIND is followed by a FMH1 and FMH2 header concatenated in a single RU. The FMH2 is a QUERY requesting data from the Message Data Set (M00000). The Function Management Header request with bid for bracket was rejected (Sense Code 0813) since the 3790 had already requested brackets and is the "first speaker" (byte 7, bit 3 of BIND). (The FMH1 from the 3790 was the result of options selected in the Batch Profile Control Table under SYSHOST.) The 3790 sent a Begin Bracket with its FMH1 which is a request to send a Transmit Data Set. Once the Transmit Data Set is transmitted, TCAM again sends the FMH1 and FMH2 requesting the Message Data Set to be transmitted. The 3790 responds by sending a null data set since there is no data in the message data set.

DATA FLOW BETWEEN NAU'S	ABBREVIATED PIU TRACE - TH and RU have been abbreviated									
SNAMH SSCP NCP PU3790 BATCH2AV	TH					RH			REQUEST UNIT	
	B0	DAF	OAF	T2	DCF	B0	B1	B2		
BIND----->	1D	2006	4008	00	0026	6B	80	00	31010304A1B070800000858500000001	
<-----DR1 to BIND-----	1D	4008	2006	00	0004	EB	80	00	31000000000000000000000000000000	
SDT----->	1D	2006	4008	00	0004	6B	80	00	A0000000000000000000000000000000	
<-----DR1 to SDT-----	1D	4008	2006	00	0004	EB	80	00	A0000000000000000000000000000000	
FMH1 BDS/EDS,M00000,FMH2 QUERY-(BB,CD)->	1C	2006	4008	01	0016	0B	81	A0	0F817000600000000 6D4F0F0F0F0F0	
<---FMH1 BDS,T00000-----(BB)-----	1C	4008	2006	01	0012	0B	80	80	0F016000400000000 6E3F0F0F0F0F0	
<---(-)DR1 bracket bid reject-----	1C	4008	2006	01	0007	8F	91	00	08130000000000000000000000000000	
DR1 to receive transmit rec.-->	1C	2006	4008	01	0003	8B	80	80	00000000000000000000000000000000	
<---first transmit record-----	1C	4008	2006	02	0010	03	90	00	F21DF0F0F11DF0F1F1F0F2F0F00000	
<---second transmit record-----	1C	4008	2006	03	0024	03	90	00	F21DF0F1F01DF0F0F1F2F3F4F51DF0	
<---third transmit record-----	1C	4008	2006	04	0004	03	90	00	F2000000000000000000000000000000	
<---fourth transmit record-----	1C	4008	2006	05	002A	03	90	00	F2F7F01DF41DD94B40C74B40E6C1D9	
<---fifth transmit record-----	1C	4008	2006	06	0048	03	90	00	F2F7F01DF51DD94B40C74B40E6C1D9	
<---last transmit record-----	1C	4008	2006	07	002F	03	90	00	F41DF0F1F01DF0F0F1F2F3F4F51DF0	
<---CHASE Data Flow Control Command---	1C	4008	2006	08	0004	4B	80	00	84000000000000000000000000000000	
DR1 to CHASE----->	1C	2006	4008	08	0004	CB	80	00	84000000000000000000000000000000	
<---FMH1 EDS-----(CD)-----	1C	4008	2006	09	0009	0B	80	20	06016000200000000000000000000000	
DR1 to FMH1----->	1C	2006	4008	09	0003	8B	80	20	00000000000000000000000000000000	
FMH1 BDS/EDS,M00000,FMH2 QUERY-(CD)---->	1C	2006	4008	02	0016	0B	80	20	0F817000600000000 6D4F0F0F0F0F0	
<-----DR1 to FMH1-----	1C	4008	2006	02	0003	8B	80	00	00000000000000000000000000000000	
<---FMH1 BDS,M00000-----	1C	4008	2006	0A	0012	0B	80	00	0F016000400000000 6D4F0F0F0F0F0	
DR1 to FMH1----->	1C	2006	4008	0A	0003	8B	80	00	00000000000000000000000000000000	
<---FMH1 EDS----(no data)-----(CD)-----	1C	4008	2006	09	0009	0B	80	20	06016000200000000000000000000000	
DR1 to FMH1----->	1C	2006	4008	09	0003	8B	80	20	00000000000000000000000000000000	

5.1.8 : 3790 REMOTE JOB ENTRY PIU TRACE

The PIU trace shown below is the result of the RJE operator starting the RJE session (SYSRJE 3.1 option). The enabling of the RJE function causes a formated INIT-SELF command to be sent to TCAM for each RJE LU started. TCAM will then send a BIND to each RJE LU to initiate the sessions. TCAM does not interface to JES but a application can interface to the IBM support for 3790 RJE through a TCAM message handler.

```
*****************************************************************************************************************
*          DATA FLOW BETWEEN NAU'S                *  ABBREVIATED PIU TRACE - TH and RU have been abbreviated      *
*****************************************************************************************************************
SNAMH    SSCP              NCP  PU3790   RJE1V  *---------TH----------*  *---RH---*  *--------REQUEST UNIT--------*
  |       |                 |       |       |   BO   DAF  OAF  T2   DCF  BO  B1  B2
          <---INIT-SELF-----------------------   1C  4000 200C 01   001C 0B  80  00  01068100D9D1C5F3F7F9F0C1F308E2
          ----+DR1 to INIT-SELF--------------->   1C  200C 4000 01   0006 8B  80  00  01068100000000000000000000000000
  ------------BIND---------------------------->   1D  200C 4008 00   0027 6B  80  00  31010303A3A170800008585000001
  <------------+DR1 to BIND--------------------   1D  4008 200C 00   0004 EB  80  00  31000000000000000000000000000000
  ------------SDT----------------------------->   1D  200C 4008 00   0004 6B  80  00  A0000000000000000000000000000000
  <------------+DR1 to SDT---------------------   1D  4008 200C 00   0004 EB  80  00  A0000000000000000000000000000000
                                                 -- the above sequence will be repeated for each lu --
                                                 -----   RJE2V, RJE3V, and RJE4V   -----
```

The PIU trace shown below is of data being sent from the 3790 RJE reader to the host.

```
*****************************************************************************************************************
*          DATA FLOW BETWEEN NAU'S                *  ABBREVIATED PIU TRACE - TH and RU have been abbreviated      *
*****************************************************************************************************************
SNAMH    SSCP              NCP  PU3790   RJE1V  *---------TH----------*  *---RH---*  *--------REQUEST UNIT--------*
  |       |                 |       |       |   BO   DAF  OAF  T2   DCF  BO  B1  B2
  <---FMH1 BDS ---------- (oic, +BB) ---------   1C  4008 200C 01   0009 0B  80  80  06012000400000000000000000000000
  ------------+DR1 to FMH1------------------->   1C  200C 4008 01   0003 8B  80  80  00000000000000000000000000000000
  <---first buffer from reader - (fic) -------   1C  4008 200C 02   00F6 02  90  00  35F0616140D1D6C240D9D1C5E3C5E2
  <---second buffer ----- (mic) --------------   1C  4008 200C 03   00F6 00  90  00  35F05B5BC4C9E3E3D640C3D7404040
  <---third buffer ------ (mic) --------------   1C  4008 200C 04   00F6 00  90  00  35F0C1C2C3C4C5C6C7404040404040
  <---last buffer ------- (lic) --------------   1C  4008 200C 05   00F6 01  80  00  35F0C4C5D940C8C1E340E9C1C5C8D5
  ------------+DR1 to message---------------->   1C  200C 4008 05   0003 83  80  00  00000000000000000000000000000000
  <---FMH1 EDS ---------- (oic, +EB) ---------   1C  4008 200C 06   0009 0B  80  40  06012000200000000000000000000000
  ------------+DR1 to FMH1------------------->   1C  200C 4008 06   0003 8B  80  40  00000000000000000000000000000000
```

The trace shown below is of data going to the RJE printer 1 (060130) which will be printed directly on the 3790 printer. This data is immediately followed by data directed to printer 3 (060132) which will be sent to the spool and printed later via the RJE operator function (SYSRJE option 6.6). Notice that pacing is being used and that Begin Brackets is set on the TYPE 1 BDS header and the End Brackets is set on the TYPE 1 EDS header.

```
*************************************************************************************************************************
*        DATA FLOW BETWEEN NAU'S                *  ABBREVIATED PIU TRACE - TH and RU have been abbreviated        *
*************************************************************************************************************************
SNAMH    SSCP              NCP  PU3790   RJE2V  *---------TH----------*  *---RH---*  *--------REQUEST UNIT--------*
  |       |                 |       |       |   B0   DAF  OAF  T2   DCF  B0  B1  B2
  ----FMH1 BDS sel printer 1--- (oic, +BB) -->   1C  200D 4008  01  0009  0B  81  80  060130004000000000000000000000
  <-----------+DR1 to FMH1 & pace response----   1C  4008 200D  01  0003  8B  81  00  000000000000000000000000000000
  ----FMH2 PDIR---------(oic)---------------->   1C  200D 4008  02  0047  0B  80  00  44020100F0F761F0F661F7F7F1F24B
  <-----------+DR1 to FMH2--------------------   1C  4008 200D  02  0003  8B  80  00  000000000000000000000000000000
  ----first buffer to be printed (fic)------->   1C  200D 4008  03  00E4  02  90  00  F0F0F0F0F14040E3C8C9E240C9E240
  ----second buffer --- (mic with pacing) --->   1C  200D 4008  04  00EC  00  91  00  F8F9F0F1F2F3F4F5F6F7F8F9F0F1F2
  <-----------IPR-----------------------------   1C  4008 200D  04  0003  83  01  00  000000000000000000000000000000
  ----third buffer ---- (mic) --------------->   1C  200D 4008  05  00EC  00  90  00  F5F6F7F8F9F0F1F2F3F4F5F6F7F8F9
  ----fourth buffer --- (mic) --------------->   1C  200D 4008  06  00EC  00  90  00  40D9C5C3D6D9C440D3C5D5C7E3C840
  ----fifth buffer ---- (mic with pacing) --->   1C  200D 4008  07  00EC  00  91  00  F2F3F4F5F61540F0F0F0F0F84040E3
  <-----------IPR-----------------------------   1C  4008 200D  07  0003  83  01  00  000000000000000000000000000000
  ----sixth buffer ---- (mic) --------------->   1C  200D 4008  08  00EC  00  90  00  F9F0F1F2F3F4F5F6F7F8F9F0F1F2F3
  ----seventh buffer -- (mic) --------------->   1C  200D 4008  09  00EC  00  90  00  F6F7F8F9F0F1F2F3F4F5F6F7F8F9F0
  ----eighth buffer --- (mic with pacing) --->   1C  200D 4008  0A  00EC  00  91  00  D9C5C3D6D9C440D3C5D5C7E3C84040
  <-----------IPR-----------------------------   1C  4008 200D  0A  0003  83  01  00  000000000000000000000000000000
  ----ninth buffer ---- (lic with def. rep.)->   1C  200D 4008  0B  008D  01  80  00  F3F4F5F61540F0F0F0F1F54040E3C8
  <-----------+DR1 to definite response-------   1C  4008 200D  0B  0003  83  80  00  000000000000000000000000000000
  ----FMH1 EDS -------- (oic, +EB) ----------->   1C  200D 4008  0C  0009  0B  80  40  060130002000000000000000000000
  <-----------+DR1 to FMH1--------------------   1C  4008 200D  0C  0003  8B  80  00  000000000000000000000000000000
  ----FMH1 BDS sel ptr3 spool-- (oic, +BB) -->   1C  200D 4008  0D  0009  0B  81  80  060132004000000000000000000000
  <-----------+DR1 to FMH1 & pace response----   1C  4008 200D  0D  0003  8B  81  00  000000000000000000000000000000
  ----FMH2 PDIR---------(oic)---------------->   1C  200D 4008  0E  0047  0B  80  00  44020100F0F761F0F661F7F7F1F24B
  <-----------+DR1 to FMH2--------------------   1C  4008 200D  0E  0003  8B  80  00  000000000000000000000000000000
  ----first buffer to be printed (fic)------->   1C  200D 4008  0F  00E4  02  90  00  F0F0F0F0F14040E3C8C9E240C9E240
  ----second buffer --- (mic with pacing) --->   1C  200D 4008  10  00EC  00  91  00  F8F9F0F1F2F3F4F5F6F7F8F9F0F1F2
  <-----------IPR-----------------------------   1C  4008 200D  10  0003  83  01  00  000000000000000000000000000000
  ----last buffer ----- (lic with def. rep.)->   1C  200D 4008  11  00EC  01  80  00  F5F6F7F8F9F0F1F2F3F4F5F6F7F8F9
  <-----------+DR1 to definite response-------   1C  4008 200D  11  0003  83  80  00  000000000000000000000000000000
  ----FMH1 EDS -------- (oic, +EB) ----------->   1C  200D 4008  12  0009  0B  80  40  060130002000000000000000000000
  <-----------+DR1 to FMH1--------------------   1C  4008 200D  12  0003  8B  80  00  000000000000000000000000000000
```

5.1.9 : 3790 TYPE 1 BATCH PIU TRACE

The PIU trace shown below is of SSS using Type 1 Batch. In the trace, TCAM initiates the session by sending a BIND. This BIND is followed by a delete and add sequence. The last delete tries to delete a panel which was not in the 3790. This delete causes an error response to be sent to TCAM.

```
*****************************************************************************************************************
*          DATA FLOW BETWEEN NAU'S                *  ABBREVIATED PIU TRACE - TH and RU have been abbreviated       *
*****************************************************************************************************************
SYSSSS   SSCP                NCP   PU3790   INBATCH *---------TH----------*  *---RH---*  *--------REQUEST UNIT--------*
  |       |                   |       |       |    BO   DAF  OAF  T2   DCF   BO  B1  B2
  ------------BIND--------------------------------->   1D  2005 4004  00  0027  6B  80  00  3101030320000000000000000000000
  <-----------+DR1 to BIND---------------------------   1D  4004 2005  00  0004  EB  80  00  3100000000000000000000000000000
  ------------SDT---------------------------------->   1D  2005 4004  00  0004  6B  80  00  A0000000000000000000000000000000
  <-----------+DR1 to SDT----------------------------   1D  4004 2005  00  0004  EB  80  00  A0000000000000000000000000000000
  ----host transmission ready-------(pace)--->   1C  2005 4004  01  0039  03  81  00  0201000040404040404040404040
  <-----------+DR1 with pace response---------   1C  4004 2005  01  0003  83  81  00  0000000000000000000000000000000
  ----delete full-screen panel--------------->   1C  2005 4004  02  0103  03  80  00  0283000104040000000000000000000
  <-----------+DR1----------------------------   1C  4004 2005  02  0003  83  80  00  0000000000000000000000000000000
  ----status-end of data transfer------------>   1C  2005 4004  03  000A  03  80  00  058800C82ADA860000000000000000
  <-----------+DR1----------------------------   1C  4004 2005  03  0003  83  80  00  0000000000000000000000000000000
  <---status-complete-------------------------   1C  4004 2005  01  000A  03  20  00  0581000000000000000000000000000
  ------------+DR2---------------------------->   1C  2005 4004  01  0003  83  20  00  0000000000000000000000000000000
  ----host transmission ready-------(pace)--->   1C  2005 4004  04  0039  03  81  00  0201000040404040404040404040
  <-----------+DR1 with pace response---------   1C  4004 2005  04  0003  83  81  00  0000000000000000000000000000000
  ----add full screen panel--------- (fic) --->   1C  2005 4004  05  0103  02  90  00  0281000104040000000000000000000
  ----panel data------------------- (mic) --->   1C  2005 4004  06  0103  00  90  00  11C1C51DF8C1E2C4C540F1F0F5F111
  ----panel data-----------------(lic,pace)-->   1C  2005 4004  07  0103  01  81  00  50D21D4011505D1DF011D87F1DF011
  <-----------+DR1 with pace response---------   1C  4004 2005  07  0003  83  81  00  0000000000000000000000000000000
  ----status-end of data transfer------------>   1C  2005 4004  08  000A  03  80  00  058800C82ADAEE7600000000000000
  <-----------+DR1----------------------------   1C  4004 2005  08  0003  83  80  00  0000000000000000000000000000000
  <---status-complete-------------------------   1C  4004 2005  02  000A  03  20  00  0581000000000000000000000000000
  ------------+DR2---------------------------->   1C  2005 4004  02  0003  83  20  00  0000000000000000000000000000000
  ----host transmission ready---------------->   1C  2005 4004  09  0039  03  80  00  0201000040404040404040404040
  <-----------+DR1----------------------------   1C  4004 2005  09  0003  83  80  00  0000000000000000000000000000000
  ----delete full-screen panel------(pace)--->   1C  2005 4004  0A  0103  03  81  00  0283000104040000000000000000000
  <---(-)DR1 sense included (panel not found)-   1C  4004 2005  0A  0007  87  91  00  0000440000000000000000000000000
  ------------CLEAR-------------------------->   1D  2005 4004  00  0004  6B  80  00  A1000000000000000000000000000000
  <-----------+DR1 to CLEAR------------------   1D  4004 2005  00  0004  EB  80  00  A1000000000000000000000000000000
  ------------UNBIND------------------------->   1D  2005 4004  00  0005  6B  80  00  3201000000000000000000000000000
  <-----------+DR1 to UNBIND-----------------   1D  4004 2005  00  0004  EB  80  00  3200000000000000000000000000000
```

5.1.10 : SAMPLE PIU AND BUFFER TRACE

The intent of this section is to show the interrelationship between the two traces. It should be noted that some of the PIU traces entries will not be seen in the buffer trace (e.g. +DR1 responses and control flow messages). TCAM does not pass these types of messages through the message handler.

```
**PATH INFORMATION UNIT (PIU) TRACE**  SEQUENCE- 00000001                    DATE- 77.349   TIME- 13.54.56
TNT INDICES     *-------TRANSMISSION HEADER--------*    *-REQUEST HEADER-*    *--------REQUEST UNIT--------*
DEST   SRCE     BYTE0 BYTE1  DAF  OAF  TAG1 TAG2  DCF    BYTE0 BYTE1 BYTE2
0027   0029       1C    00  4000 201B  00   00   000E     03    80    00      899589A3A240A3F3F7F6F700000000 ---- LOGON
0029   0027       1C    00  201B 4000  00   00   0003     83    80    00      00000000000000000000000000000000
0029   0031       1D    00  201B 4006  00   00   0026     6B    80    00      31010303A1A030400000858500000000 ---- BIND
0031   0029       1D    00  4006 201B  00   00   0004     EB    80    00      31000000000000000000000000000000
0029   0031       1D    00  201B 4006  00   00   0004     6B    80    00      A0000000000000000000000000000000 ---- SDT
0031   0029       1D    00  4006 201B  00   00   0004     EB    80    00      A0000000000000000000000000000000
0031   0029       1C    00  4006 201B  00   01   001F     03    A0    80      61944040A399F3F7F6F7A540A399F3 ---- MESSAGE
0029   0031       1C    00  201B 4006  00   01   0003     83    A0    80      00000000000000000000000000000000       TO HOST
0029   0031       1C    00  201B 4004  00   01   002A     03    81    00      0D2561D44040E3D9F3F7F6F7E540F1 ---- MESSAGE
0031   0029       1C    00  4006 201B  00   01   0003     83    81    80      00000000000000000000000000000000       TO LU
0027   0029       1C    00  4000 201B  00   01   000E     03    80    00      A3859994A240A3F3F7F6F700000000 ---- LOGOFF
0029   0027       1C    00  201B 4000  00   01   0003     83    80    80      00000000000000000000000000000000
0029   0031       1D    00  201B 4006  00   00   0004     6B    80    00      A1000000000000000000000000000000 ---- CLEAR
0031   0029       1D    00  4006 201B  00   00   0004     EB    80    00      A1000000000000000000000000000000
0029   0031       1D    00  201B 4006  00   00   0005     6B    80    00      32010000000000000000000000000000 ---- UNBIND
0031   0029       1D    00  4006 201B  00   00   0004     EB    80    00      32000000000000000000000000000000
```

```
**BUFFER TRACE**      SEQUENCE- F1000001   BUFF1                                        DATE- 77.349   TIME- 14.13.13
LOGON ---- E031F168 00000000 89000000 00000001  02000000 01312968 00290034 00000000   *..1.....I.....................*
           000B0000 00000000 00000000 00000000  00270027 00290000 000E0380 00899589   *.............................INI*
           A3A240A3 F3F7F6F7 00000000 00000000  00000000 00000000 00000000 00000000   *TS T3767.....................*
MESSAGE -- E431E418 00000000 01000000 00000001  02040000 01312A7C 00290045 00000000   *U.U..........................*
TO HOST    000B0000 00000000 00000000 00000000  00310031 00290001 001F03A0 80619440   *.............................M *
           40A399F3 F7F6F7A5 40A399F3 F7F6F7A5  40618889 40F3F7F6 F7000000 00000000   * TR3767V TR3767V .HI 3767.....*
MESSAGE -- E431F168 00000000 00000000 00000041  01040000 01312A7C 00290045 00000000   *U.1..........................*
TO LU      3E020000 5F00005F 00007700 00000000  00290031 61D44040 E3D9F3F7 F6F7E540   *.....................M  TR3767V *
           F1F34BF5 F54BF4F6 40E3D9F3 F7F6F7E5  4061C8C9 40F3F7F6 F7000000 00000000   *13.55.46 TR3767V .HI 3767.....*
LOGOFF --- E031F168 00000000 99000000 00000001  02000000 01312968 00290034 00000000   *..1.....R.....................*
           000B0000 00000000 00000000 00000000  00270027 00290001 000E0380 00A38599   *.............................TER*
           94A240A3 F3F7F6F7 00000000 00000000  00000000 00000000 00000000 00000000   *MS T3767.....................*
```

NOTE: The buffer trace has been edited by the author and the lowercase has been translated to upper case characters.

5.2 : VTAM CONSOLE LOGS AND TRACES

5.2.1 : VTAM-NCP ACTIVATION

```
*****************************************************************************************************
*                                                                                                   *
*  This section shows the sequence of events that occur when VTAM is started and an NCP is activated.  Console *
*  log output and trace entries are interspersed along with comments (enclosed in asterisks) describing the    *
*  flow.                                                                                            *
*                                                                                                   *
*  The following console messages show GTF being activated to trace I/O interrupts and SIO's to the NCP.  The  *
*  USR and RNIO options are also selected.  This will allow GTF to accept trace data from VTAM.     *
*                                                                                                   *
*  An MVS system with VTAM 2 and ACF/NCP was used to create the following traces and console output.           *
*                                                                                                   *
*****************************************************************************************************

              s gtfdisk

              12.52.06 STC  340  $HASP100 GTFDISK  ON STCINRDR
              12.52.09 STC  340  $HASP373 GTFDISK  STARTED
              12.52.14 STC  340  AHL121I  SYS1.PARMLIB INPUT INDICATED
              12.52.15 STC  340  TRACE=USR,RNIO
              12.52.15 STC  340  AHL103I  TRACE OPTIONS SELECTED --USR,RNIO
              12.52.15 STC  340 *06 AHL125A  RESPECIFY TRACE OPTIONS OR REPLY U

              6,trace=usr,rnio,iop,siop

              12.52.38           IEE600I REPLY TO 06 IS;TRACE=USR,RNIO,IOP,SIOP
              12.52.39 STC  340  TRACE=USR,RNIO,IOP,SIOP
              12.52.39 STC  340 *07 AHL101A  SPECIFY TRACE EVENT KEYWORDS --IO=,SIO=,IO=SIO=

              7,io=sio=520

              12.52.58           IEE600I REPLY TO 07 IS;IO=SIO=520
              12.52.58 STC  340  IO=SIO=520
              12.52.58 STC  340 *08 AHL102A  CONTINUE TRACE DEFINITION OR REPLY END

              8,end

              12.53.05           IEE600I REPLY TO 08 IS;END
              12.53.05 STC  340  END
              12.53.05 STC  340  AHL103I  TRACE OPTIONS SELECTED --USR,RNIO,IO=SIO=(520)
              12.53.05 STC  340 *09 AHL125A  RESPECIFY TRACE OPTIONS OR REPLY U
```

```
9,u

12.53.11           IEE600I REPLY TO 09 IS;U
12.53.11 STC  340  U
12.53.15 STC  340  AHL031I GTF INITIALIZATION COMPLETE
```

```
*************************************************************************************************************
*                                                                                                           *
*  At this point, VTAM is started.  The start-up parameters will be obtained from member ATCSTRPS of       *
*  SYS1.VTAMLST.  The network configuration to be activated will be obtained from member ATCCONPS of        *
*  SYS1.VTAMLST.  Since the major nodes listed in ATCCONPS are already members of SYS1.VTAMOBJ, VTAM will   *
*  not have to create a member on SYS1.VTAMOBJ.  This saves activation time in bringing up the              *
*  network.                                                                                                 *
*                                                                                                           *
*  Trace commands are included in our start parameters (ATCSTRPS) to start VTAM's SMS buffer pool trace and *
*  and VTAM's I/O and buffer trace for the NCP.                                                             *
*                                                                                                           *
*************************************************************************************************************
```

```
s net,,,(list=ps)
12.53.41 STC  341  $HASP100 NET      ON STCINRDR
12.53.45 STC  341  $HASP373 NET      STARTED
12.54.14 STC  341  IST110I  NETWORK SOLICITOR STARTED
12.54.17 STC  341  IST197I  SAVED CONFIGURATION IMSAPP01 READ FROM VTAMOBJ
12.54.18 STC  341  IST093I  IMSAPP01 ACTIVE
12.54.19 STC  341  IST197I  SAVED CONFIGURATION IMSLOCPS READ FROM VTAMOBJ
12.54.31 STC  341  IST093I  IMSLOCPS ACTIVE
12.54.32 STC  341  IST197I  SAVED CONFIGURATION TSOAPP01 READ FROM VTAMOBJ
12.54.32 STC  341  IST093I  TSOAPP01 ACTIVE
12.54.33 STC  341  IST197I  SAVED CONFIGURATION CICSAP01 READ FROM VTAMOBJ
12.54.34 STC  341  IST093I  CICSAP01 ACTIVE
12.54.35 STC  341  IST197I  SAVED CONFIGURATION SWITCH01 READ FROM VTAMOBJ
12.54.36 STC  341  IST093I  SWITCH01 ACTIVE
12.54.37 STC  341  IST197I  SAVED CONFIGURATION JES2APP  READ FROM VTAMOBJ
12.54.37 STC  341  IST093I  JES2APP  ACTIVE
12.54.42 STC  341  IST197I  SAVED CONFIGURATION NCP6CH2  READ FROM VTAMOBJ
12.54.47 STC  341  IST513I  TRACE INITIATED FOR NODE VTAMBUF
12.54.47 STC  341  IST513I  TRACE INITIATED FOR NODE NCP6CH2
12.54.48 STC  341  IST513I  TRACE INITIATED FOR NODE NCP6CH2
12.54.48 STC  341  IST020I  VTAM INITIALIZATION COMPLETE
```

```
*****************************************************************************************************
*                                                                                                   *
*  Since GTF SIO trace entries do not give the CCW commands that the SIO is for, or the data transfered,  *
*  not all the information presented in this discussion can be obtained from the trace entries. However,  *
*  the discussion does give the general flow of NCP load and the SIO and IO interrupt trace entries are  *
*  useful in determining how far the load process has obtained.                                     *
*                                                                                                   *
*  VTAM has to allocate the 370X.  In order to check whether it is online and whether a path is available  *
*  a NOOP CCW is executed.  An 'ALLOCATION UNSUCESSFUL' message would be written to the system console if  *
*  this channel program failed.  The following trace entries are for this NOOP CCW.                *
*                                                                                                   *
*****************************************************************************************************

SIO  0520 ASCB 00FED0B8  CPU 0000  JOBN NET       R/V CPA 003BBEB8 00FD8EB8  CAW 003BBEB8  DSID 007FC897
          FLGS 00852088 000A       STAT 0C80      SK ADDR 00000000 00000000  CC 0
          TIME    46487.386772
IO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 070C3000 00013D3C  TCB 007FC898  DSID 007FC897
          CSW  013BBEC0 0C000001   SNS  N/A       R/V CPA 003BBEB8 00FD8EB8  FLG 0088000A  00000520 00
          TIME    46487.392299
IO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 070C3000 00013D3C  TCB 007FC898  DSID 007FC897
          CSW  013BBEC0 0C000001   SNS  N/A       R/V CPA 003BBEB8 00FD8EB8  FLG 0088000A  A0000520 00
          TIME    46487.396233

*****************************************************************************************************
*                                                                                                   *
*  At this point, VTAM has to check the status of the 3705.  If it is already loaded with the correct NCP, no  *
*  loading is required.  A SENSE CCW is sent to the 370X to retrieve the status.                    *
*                                                                                                   *
*  If the STATUS indicates the 370X is loaded an SNA 'ACTPU' command is sent to the NCP to get the name of the  *
*  NCP load module currently executing in the 370X.  The name of the NCP load module is returned in the  *
*  'ACTPU' response.  In this case, the STATUS is 'LOADED' and VTAM will send the 'ACTPU' command to the NCP.  *
*                                                                                                   *
*****************************************************************************************************

SIO  0520 ASCB 00FED0B8  CPU 0000  JOBN NET       R/V CPA 005F6050 00FF6050  CAW 605F6050  DSID 00B323A8
          FLGS 00000008 0002       STAT 0C00      SK ADDR 00000000 00000000  CC 0
          TIME    46514.072721
IO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 070C3000 00013D3C  TCB 007E2B70  DSID 00B323A8
          CSW  605F6060 0C000001   SNS  N/A       R/V CPA 005F6050 00FF6050  FLG 40080002  A2000520 00
          TIME    46514.082768


*****************************************************************************************************
*                                                                                                   *
*  The following trace entries show the SNA 'ACTPU' command being sent to the NCP.  The 'ACTPU' response  *
*  indicates that the NCP executing in the 370X is not NCP6CH2.  Therefore the 370X will have to be  *
*  reloaded.                                                                                        *
*                                                                                                   *
```

```
**************************************************************************************************************

SIO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       R/V CPA 005F64E8 00FF64E8  CAW 605F64E8  DSID 00B323A8
           FLGS 00000008 0002       STAT 0C00      SK ADDR 00000000 00000000  CC 0
           TIME    46514.148523
IO    0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 070C3000 00013D3C  TCB 007E2B70  DSID 00B323A8
           CSW  605F64F8 0C000001   SNS  N/A       R/V CPA 005F64E8 00FF64E8  FLG 40080002  A2000520 00
           TIME    46514.151860
USRFD FEF ASCB 00FED0B8  JOBN NET
            TPIOS OUT ANODE VTAM       FDB  00000000 00B82028 00160000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
              REMOTE  DNODE NCP6CH2    THRH 1C002800 08000000 00006B80 00
                                       TEXT 11025505 00000000 01                          *.........          *
           TIME    46520.647220
SIO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       R/V CPA 000CE300 00B32300  CAW 000CE300  DSID 00B323C0
           FLGS 00000050 0004       STAT 0C00      SK ADDR 00000000 00000000  CC 0
           TIME    46520.692880
IO    0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 076C3000 00F3842C  TCB N/A       DSID 00B323C0
           CSW  000CE328 05000001   SNS  N/A       R/V CPA 000CE300 00B32300  FLG 00500004  A2000520 00
           TIME    46520.696751
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET          OUT 1F002800 08000001 000C6B80 00110255 05000000
           TIME    46520.728345
IO    0520 ASCB U/A       CPU 0000  JOBN U/A       OLD PSW 070C0000 00D8BBE8  TCB U/A       DSID U/A
           CSW  00000000 80000000   SNS  U/A       R/V CPA U/A                FLG U/A       00000520 00
           TIME    46520.761122
SIO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       R/V CPA 000CE320 00B32320  CAW 000CE320  DSID 00B323C0
           FLGS 00000050 0004       STAT 8000      SK ADDR 00000000 00000000  CC 0
           TIME    46520.784459
IO    0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 070C3000 00F3842C  TCB N/A       DSID 00B323C0
           CSW  001C61E8 05000069   SNS  N/A       R/V CPA 000CE320 00B32320  FLG 00500004  A2000520 00
           TIME    46520.787875
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET           IN 1D000800 28000000 00052B00 000703
           TIME    46520.801316
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET           IN 1F000800 28000001 000DEB80 001102D5 C3D7C3C8
           TIME    46520.803793
USRFD FEF ASCB 00FED0B8  JOBN NET
            TPIOS IN  ANODE VTAM       FDB  00000000 00B83301 00020000   RSVD 081C   LNG2 00DC
              REMOTE  DNODE NCP6CH2    FSB  022C0000 00000000 08002800 00000000 00000000 00000000 00000000 00050000
                                       THRH 1D000800 28000000 00052B00 00
                                       TEXT 0703                                          *..                 *
           TIME    46520.824666

USRFD FEF ASCB 00FED0B8  JOBN NET
                                                  EXTERNAL TRACE - DD TRACE                          PAGE 0003
            TPIOS IN  ANODE VTAM       FDB  00000000 00B83219 000A0000   RSVD 081C   LNG2 00DC
              REMOTE  DNODE NCP6CH2    FSB  022C0000 00000000 08002800 00010000 00000000 00000000 00000000 000D0000
                                       THRH 1F000800 28000001 000DEB80 00
                                       TEXT 1102D5C3 D7C3C8F2 4040                        *..NCPCH2           *
           TIME    46520.833934
```

```
USRFD FEF ASCB 00FED0B8  JOBN NET
          TPIOS OUT ANODE VTAM       FDB  00000000 00B831F8 000D0000   RSVD FF00   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE NCP6CH2    THRH 1C002800 08000000 00006B80 00
                                     TEXT
          TIME    46520.943333

*************************************************************************************************************
*                                                                                                           *
*  The following trace entries show the loading of the NCP.  The NCP loader routine consists of two loaders.   *
*  The first loader sets the NCP for loading the second.   A 'WRITE BREAK' CCW command is issued to send the   *
*  first loader to the communication controller.  The first loader is loaded starting at location x'400'.      *
*                                                                                                           *
*  The CSW on the following I/O interrupt trace entry shows Channel End (CE) only indicating that the         *
*  first loader got control and is performing the following tasks:                                          *
*                                                                                                           *
*            1. Disables all other channel adapters responding with Unit Exception (UE)                     *
*               to channel programs started to the 370X.                                                    *
*            2. Does an input 70 to get the storage size of the 370X                                        *
*            3. Subtracts the second loader size from the high storage address                              *
*               to calculate the starting address for the second loader.                                    *
*            4. Sends Device End (DE) to accept the second loader.                                          *
*                                                                                                           *
*************************************************************************************************************

SIO  0520 ASCB 00FED0B8  CPU 0000  JOBN NET       R/V CPA 005F6AD0 00FF6AD0  CAW 605F6AD0  DSID 00B323A8
          FLGS 00000008 0002       STAT 0C00      SK ADDR 00000000 00000000  CC 0
          TIME    46530.177631
IO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 070E0000 00000000  TCB 007E1AE8  DSID 00B323A8
          CSW  605F6AE0 08000000   SNS  N/A       R/V CPA 005F6AD0 00FF6AD0  FLG 40080002  A2000520 00
          TIME    46530.333603

*************************************************************************************************************
*                                                                                                           *
*  The CSW associated with the next I/O interrupt shows device end (DE) and VTAM starts the channel program    *
*  to send the second loader                                                                                *
*                                                                                                           *
*************************************************************************************************************

IO   0520 ASCB U/A       CPU 0000  JOBN U/A       OLD PSW 070E0000 00000000  TCB U/A       DSID U/A
          CSW  00000000 04000000   SNS  U/A       R/V CPA U/A                FLG U/A       80000520 00
          TIME    46531.201750

*************************************************************************************************************
*                                                                                                           *
*  These trace entries represent  the second loader being sent.  The first loader gets the second loader,     *
*  places it into high core using the address calculated previously, and passes control to the second loader.  *
*  The second loader gets control and loads the entire NCP in 512 byte blocks (channel programs contain only   *
*  one WRITE and one NOOP CCW).  Only a few of the many SIO and IO interrupt trace entries are shown here.    *
```

```
*  Since the NCP is loaded in 512k blocks, the number of trace entries depends on the size of the NCP load     *
*  module.  Our NCP was very large and we actually had 256 SIO and IO interrupt trace entries at this point.   *
*  The last NCP block is sent with a 'WRITE BREAK' CCW telling the second loader that all NCP blocks have      *
*  been sent.                                                                                                  *
*                                                                                                              *
****************************************************************************************************************

SIO  0520 ASCB 00FED0B8  CPU 0000  JOBN NET       R/V CPA 005F6EC0 00FF6EC0  CAW 605F6EC0  DSID 00B323A8
          FLGS 00000008 0002       STAT 0400      SK ADDR 00000000 00000000  CC 0
          TIME    46531.207325
IO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 060C3000 00015752  TCB 007E1AE8  DSID 00B323A8
          CSW  615F6EC8 0C000001   SNS  N/A       R/V CPA 005F6EC0 00FF6EC0  FLG 40080002  00000520 00
          TIME    46531.210624
IO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 060C3000 00015752  TCB 007E1AE8  DSID 00B323A8
          CSW  615F6EC8 0C000001   SNS  N/A       R/V CPA 005F6EC0 00FF6EC0  FLG 40080002  A0000520 00
          TIME    46531.213051
SIO  0520 ASCB 00FED0B8  CPU 0000  JOBN NET       R/V CPA 005F6638 00FF6638  CAW 605F6638  DSID 00B323A8
          FLGS 00000008 0002       STAT 0C00      SK ADDR 00000000 00000000  CC 0
          TIME    46531.262282
IO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 070C3000 00013D3C  TCB 007E1AE8  DSID 00B323A8
          CSW  605F6648 0C000001   SNS  N/A       R/V CPA 005F6638 00FF6638  FLG 40080002  A2000520 00
          TIME    46531.266046
SIO  0520 ASCB 00FED0B8  CPU 0000  JOBN NET       R/V CPA 005F60F8 00FF60F8  CAW 605F60F8  DSID 00B323A8
          FLGS 00000008 0002       STAT 0C00      SK ADDR 00000000 00000000  CC 0
          TIME    46531.312026
IO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 076C0000 000ED0C0  TCB 007E1AE8  DSID 00B323A8
          CSW  605F6108 0C000001   SNS  N/A       R/V CPA 005F60F8 00FF60F8  FLG 40080002  A2000520 00
          TIME    46531.334022
SIO  0520 ASCB 00FED0B8  CPU 0000  JOBN NET       R/V CPA 005F6AD0 00FF6AD0  CAW 605F6AD0  DSID 00B323A8
          FLGS 00000008 0002       STAT 0C00      SK ADDR 00000000 00000000  CC 0
          TIME    46531.565598
IO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 070C3000 00013D3C  TCB 007E1AE8  DSID 00B323A8
          CSW  605F6AE0 0C000001   SNS  N/A       R/V CPA 005F6AD0 00FF6AD0  FLG 40080002  A2000520 00
          TIME    46531.569060

****************************************************************************************************************
*                                                                                                              *
*  The second loader has to know where to give control to the NCP so it gets 4 bytes of data from the host     *
*  load utility containing the entry point address of NCP routine CXDINIT.  It sends channel end (CE) only     *
*  to prevent other channel programs from interrupting at this time and gives control to CXDINIT.              *
*  The following trace entries show this happening.                                                            *
*                                                                                                              *
****************************************************************************************************************

SIO  0520 ASCB 00FED0B8  CPU 0000  JOBN NET       R/V CPA 005F6980 00FF6980  CAW 605F6980  DSID 00B323A8
          FLGS 00000008 0002       STAT 0C00      SK ADDR 00000000 00000000  CC 0
```

```
          TIME    46600.610358
IO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 070C3000 00013D3C  TCB 007E1AE8  DSID 00B323A8
          CSW  605F6988 08000000   SNS  N/A       R/V CPA 005F6980 00FF6980  FLG 40080002  A2000520 00
          TIME    46600.613556

*************************************************************************************************************
*                                                                                                           *
*  CXDINIT got control, formatted the buffer pool, set the storage keys, disabled all scanners, generated the  *
*  'INIT COMPLETE' PIU (but did not send it), enabled the channel adapters and sent device end.             *
*                                                                                                           *
*  The following trace entry shows the IO interrupt for the device end.                                     *
*                                                                                                           *
*************************************************************************************************************

IO   0520 ASCB U/A       CPU 0000  JOBN U/A       OLD PSW 070E0000 00000000  TCB U/A       DSID U/A
          CSW  00000000 04000000   SNS  U/A       R/V CPA U/A                FLG U/A       80000520 00
          TIME    46601.061169

*************************************************************************************************************
*                                                                                                           *
*  Control is passed from the loader program in the CPU to VTAM and loading is complete.                    *
*                                                                                                           *
*************************************************************************************************************

SIO  0520 ASCB 00FED0B8  CPU 0000  JOBN NET       R/V CPA 005F60F8 00FF60F8  CAW 605F60F8  DSID 00B323A8
          FLGS 00000008 0002       STAT 0400      SK ADDR 00000000 00000000  CC 0
          TIME    46601.066640
IO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 060C3000 00015752  TCB 007E1AE8  DSID 00B323A8
          CSW  615F6100 0C000001   SNS  N/A       R/V CPA 005F60F8 00FF60F8  FLG 40080002  00000520 00
          TIME    46601.069754
IO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 060C3000 00015752  TCB 007E1AE8  DSID 00B323A8
          CSW  615F6100 0C000001   SNS  N/A       R/V CPA 005F60F8 00FF60F8  FLG 40080002  A0000520 00
          TIME    46601.071575


*************************************************************************************************************
*                                                                                                           *
*  The following message is now received at the system operator's console.                                  *
*                                                                                                           *
*************************************************************************************************************

          12.56.42 STC  341  IST270I  370X NCP6CH2  NOW LOADED WITH␣LOADMOD NCP6CH2

*************************************************************************************************************
*                                                                                                           *
*  VTAM sends the NCP an SNA 'ACTPU' command and tries to read data from the controller with the same channel  *
*  program.  The I/O interupt trace entry shows status of DE, and UE.  This indicates that the controller has  *
*  no data to send.                                                                                         *
```

```
*                                                                                                                    *
**********************************************************************************************************************

USRFD FEF ASCB 00FED0B8  JOBN NET
          TPIOS OUT ANODE VTAM       FDB  00000000 00B831F8 00160000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE NCP6CH2    THRH 1C002800 08000000 00006B80 00
                                     TEXT 11025505 00000000 01                          *.........          *
          TIME    46608.090418
SIO  0520 ASCB 00FED0B8  CPU 0000  JOBN NET       R/V CPA 000CE300 00B32300  CAW 000CE300  DSID 00B323C0
          FLGS 00000050 0004       STAT 0C00      SK ADDR 00000000 00000000  CC 0
          TIME    46608.154583
IO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 076C3000 00F3842C  TCB N/A       DSID 00B323C0
          CSW  000CE328 05000001   SNS  N/A       R/V CPA 000CE300 00B32300  FLG 00500004  A2000520 00
          TIME    46608.164838
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET          OUT 1F002800 08000001 000C6B80 00110255 05000000
          TIME    46608.342953

**********************************************************************************************************************
*                                                                                                                    *
*  The NCP raises an attention interrupt as soon as it has data for VTAM.  The following trace entry                 *
*  shows this occuring.                                                                                              *
*                                                                                                                    *
**********************************************************************************************************************

IO   0520 ASCB U/A       CPU 0000  JOBN U/A       OLD PSW 070C2000 0002A468  TCB U/A       DSID U/A
          CSW  00000000 80000000   SNS  U/A       R/V CPA U/A                FLG U/A       00000520 00
          TIME    46608.347074


**********************************************************************************************************************
*                                                                                                                    *
*  A read channel program is started which contains several READ CCW's. The first reads the SNA                      *
*  'INITIALIZATION COMPLETE' PIU.  The second reads the 'ACTPU' response.  The UE status on the IO interrupt         *
*  trace entry shows that no more data is available.                                                                 *
*                                                                                                                    *
*  The CSW in the IO interrupt trace entry also shows a residual count of X'69' (105).  Since our                   *
*  VTAM IO buffer size is X'9C' (156) bytes, by subtracting the 28 bytes of pad characters sent by the NCP,          *
*  we know that the amount of data read was X'17' (23) bytes.  That is a TH of 10 bytes and an RH + RU of           *
*  13 bytes.  This is the 'ACTPU' response.  The 'ACTPU' response contains the name of the NCP load module           *
*  currently active in the controller (NCP6CH2).                                                                     *
*                                                                                                                    *
*  From here on, the GTF SIO and IO trace entries recorded in the trace output will be deleted.                      *
*                                                                                                                    *
*                                                                                                                    *
**********************************************************************************************************************

SIO  0520 ASCB 00FED0B8  CPU 0000  JOBN NET       R/V CPA 000CE320 00B32320  CAW 000CE320  DSID 00B323C0
          FLGS 00000050 0004       STAT 8000      SK ADDR 00000000 00000000  CC 0
```

```
          TIME    46608.384839
IO   0520 ASCB 00FED0B8  CPU 0000  JOBN NET       OLD PSW 070C3000 00F3842C  TCB N/A       DSID 00B323C0
          CSW  001C6018 05000069   SNS  N/A       R/V CPA 000CE320 00B32320  FLG 00500004  A2000520 00
          TIME    46608.390434
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET          IN 1D000800 28000000 000A2B00 00500900 44069412
          TIME    46608.403667
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET          IN 1F000800 28000001 000DEB80 001102D5 C3D7F6C3
          TIME    46608.406474
USRFD FEF ASCB 00FED0B8  JOBN NET
           TPIOS IN  ANODE VTAM       FDB  00000000 00B83131 00070000   RSVD 081C   LNG2 00DC
             REMOTE  DNODE NCP6CH2    FSB  022C0000 00000000 08002800 00000000 00000000 00000000 00000000 000A0000
                                      THRH 1D000800 28000000 000A2B00 00
                                      TEXT 50090044 069412                              *&....m.             *
          TIME    46608.435386
USRFD FEF ASCB 00FED0B8  JOBN NET
           TPIOS IN  ANODE VTAM       FDB  00000000 00B83049 000A0000   RSVD 0819   LNG2 00DC
             REMOTE  DNODE NCP6CH2    FSB  022C0000 00000000 08002800 00010000 00000000 00000000 00000000 000D0000
                                      THRH 1F000800 28000001 000DEB80 00
                                      TEXT 1102D5C3 D7F6C3C8 F240                       *..NCP6CH2           *
          TIME    46608.472517

*****************************************************************************************************************
*                                                                                                               *
*  The following SNA 'START DATA TRAFFIC' and 'SET CONTROL VECTOR' commands are sent from VTAM to the NCP.      *
*                                                                                                               *
*                                                                                                               *
*****************************************************************************************************************

USRFD FEF ASCB 00FED0B8  JOBN NET
           TPIOS OUT ANODE VTAM       FDB  00000000 00B83028 000E0000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
             REMOTE  DNODE NCP6CH2    THRH 1C002800 08000000 00006B80 00
                                      TEXT A0                                           *.                   *
          TIME    46608.565679
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET          OUT 1F002800 08000002 00046B80 00A0
          TIME    46608.615733
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET           IN 1F000800 28000002 0004EB80 00A0
          TIME    46608.815981
USRFD FEF ASCB 00FED0B8  JOBN NET
           TPIOS IN  ANODE VTAM       FDB  00000000 00B82EC9 00010000   RSVD 0819   LNG2 00DC
             REMOTE  DNODE NCP6CH2    FSB  022C0000 00000000 08002800 00020000 00000000 00000000 00000000 00040000
                                      THRH 1F000800 28000002 0004EB80 00
                                      TEXT A0                                           *.                   *
          TIME    46608.825985
USRFD FEF ASCB 00FED0B8  JOBN NET
           TPIOS OUT ANODE VTAM       FDB  00000000 00B82EA8 00270000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
             REMOTE  DNODE NCP6CH2    THRH 1C002800 08000000 00000B80 00
                                      TEXT 01021128 0001F0F2 61F0F861 F7F84BF0 F3F9F2F0  *......02/08/78.03920*
                                           4BF5F64B F4F7                                *.56.47              *
```

```
         TIME    46608.875219
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET          OUT 1E002800 08000001 001D0B80 00010211 280001F0
         TIME    46609.073536
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET           IN 1E000800 28000001 00068B80 00010211
         TIME    46609.136924
USRFD FEF ASCB 00FED0B8  JOBN NET
          TPIOS IN  ANODE VTAM       FDB  00000000 00B82DE1 00030000   RSVD 0819   LNG2 00DC
            REMOTE  DNODE NCP6CH2    FSB  022C0000 00000000 08002800 00010000 00000000 00000000 00000000 00060000
                                     THRH 1E000800 28000001 00068B80 00
                                     TEXT 010211                                    *...                 *
         TIME    46609.212466
USRFD FEF ASCB 00FED0B8  JOBN NET
          TPIOS OUT ANODE VTAM       FDB  00000000 00B82DC0 00150000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE NCP6CH2    THRH 1C002800 08000000 00000B80 00
                                     TEXT 01021128 00050000                         *........            *
         TIME    46609.243723
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET          OUT 1E002800 08000002 000B0B80 00010211 28000500
         TIME    46609.318180
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET           IN 1E000800 28000002 00068B80 00010211
         TIME    46609.374894
USRFD FEF ASCB 00FED0B8  JOBN NET
          TPIOS IN  ANODE VTAM       FDB  00000000 00B82CF9 00030000   RSVD 0819   LNG2 00DC
            REMOTE  DNODE NCP6CH2    FSB  022C0000 00000000 08002800 00020000 00000000 00000000 00000000 00060000
                                     THRH 1E000800 28000002 00068B80 00
                                     TEXT 010211                                    *...                 *
         TIME    46609.398331

*************************************************************************************************************
*                                                                                                           *
*  VTAM now sends the NCP an SNA 'CHANGE DEVICE TRAMSMISSION LIMIT' for some BSC and S/S lines.  These are  *
*  generated because of values coded in member NCP6CH2 in SYS1.VTAMLST for these devices.                   *
*                                                                                                           *
*************************************************************************************************************

USRFD FEF ASCB 00FED0B8  JOBN NET
          TPIOS OUT ANODE VTAM       FDB  00000000 00B82CD8 00130000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE NCP6CH2    THRH 1C002800 08000000 00000B80 00
                                     TEXT 01000128 2001                             *......              *
         TIME    46609.561157
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET          OUT 1E002800 08000003 00090B80 00010001 282001
         TIME    46609.625654
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET           IN 1E000800 28000003 00068B80 00010001
         TIME    46609.667890
USRFD FEF ASCB 00FED0B8  JOBN NET
          TPIOS IN  ANODE VTAM       FDB  00000000 00B82C11 00030000   RSVD 0819   LNG2 00DC
            REMOTE  DNODE NCP6CH2    FSB  022C0000 00000000 08002800 00030000 00000000 00000000 00000000 00060000
                                     THRH 1E000800 28000003 00068B80 00
                                     TEXT 010001                                    *...                 *
```

```
         TIME    46609.680650
USRFD FEF ASCB 00FED0B8  JOBN NET
          TPIOS OUT ANODE VTAM       FDB  00000000 00B82BF0 00130000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE NCP6CH2    THRH 1C002800 08000000 00000B80 00
                                     TEXT 01000128 1F01                                  *......              *
         TIME    46609.712943
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET          OUT 1E002800 08000004 00090B80 00010001 281F01
         TIME    46609.782554
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET           IN 1E000800 28000004 00068B80 00010001
         TIME    46609.824761
USRFD FEF ASCB 00FED0B8  JOBN NET
          TPIOS IN  ANODE VTAM       FDB  00000000 00B82B29 00030000   RSVD 0819   LNG2 00DC
            REMOTE  DNODE NCP6CH2    FSB  022C0000 00000000 08002800 00040000 00000000 00000000 00000000 00060000
                                     THRH 1E000800 28000004 00068B80 00
                                     TEXT 010001                                         *...                 *
         TIME    46609.835011

*****************************************************************************************************************
*                                                                                                               *
*  VTAM now sends the NCP SNA commands to activate the links.  Although this NCP contains 13 lines, three of   *
*  which do not have the modems powered up, the trace entries for one line that comes active and one that       *
*  doesn't will be shown.                                                                                       *
*                                                                                                               *
*  The trace entries show that the link with a NAU of 2801 is activated.  The NCP gives a positive response    *
*  to the SNA 'ACTLINK' command when the data set ready (DSR) lead on the MODEM EIA interface comes up.         *
*  A negative response with sense data included is returned to the 'ACTLINK' command if DSR does not come up   *
*  before the ENABLETO value coded on the BUILD macro expires.  This is the case for the link with a NAU of    *
*  2805.  The sense data included is x'80020000' (path error).                                                  *
*                                                                                                               *
*  Notice that the time difference between the RNIO out and the RNIO in trace entries is 7 sec.  This is the   *
*  ENABLTO value.  Also notice the trace entry that indicates an MDR record was generated for this link        *
*  failure. This record will be written to LOGREC.                                                              *
*                                                                                                               *
*  The NCP will attempt to activate all links (ISTATUS=INACTIVE on the LINE macro is invalid and ignored).      *
*  The NCP activates links sequentially; therefore, the time required to activate the NCP depends on the       *
*  number of lines and the number of path errors encountered.                                                   *
*                                                                                                               *
*****************************************************************************************************************

USRFD FEF ASCB 00FED0B8  JOBN NET
          TPIOS OUT ANODE VTAM       FDB  00000000 00B83A20 00120000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE NCP6CH2    THRH 1C002800 08000000 00000B80 00
                                     TEXT 01020A28 01                                    *.....               *
         TIME    46614.409806
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET          OUT 1E002800 0800001B 00080B80 0001020A 2801
         TIME    46614.491780
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET           IN 1E000800 2800001B 00068B80 0001020A
         TIME    46614.536196
```

```
USRFD FEF ASCB 00FED0B8  JOBN NET
           TPIOS IN  ANODE VTAM       FDB  00000000 00B83959 00030000   RSVD 081C   LNG2 00DC
             REMOTE  DNODE NCP6CH2    FSB  022C0000 00000000 08002800 001B0000 00000000 00000000 00000000 00060000
                                      THRH 1E000800 2800001B 00068B80 00
                                      TEXT 01020A                                    *...                 *
          TIME    46614.546300
USRFD FEF ASCB 00FED0B8  JOBN NET
           TPIOS OUT ANODE VTAM       FDB  00000000 00B83850 00120000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
             REMOTE  DNODE NCP6CH2    THRH 1C002800 08000000 00000B80 00
                                      TEXT 01020A28 05                               *.....               *
          TIME    46615.673168
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET          OUT 1E002800 0800001D 00080B80 0001020A 2805
          TIME    46615.716228
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET           IN 1C000800 28000001 00210B00 00010381 280500A2
          TIME    46622.324957
RNIO ASCB 00FED0B8  CPU 0000 JOBN NET           IN 1E000800 2800001D 000A8F90 00800200 0001020A
          TIME    46622.328350

USRFD FEF ASCB 00FED0B8  JOBN NET
           TPIOS IN  ANODE VTAM       FDB  00000000 00B834D1 00070000   RSVD 081C   LNG2 00DC
             REMOTE  DNODE NCP6CH2    FSB  022C0000 00000000 08002800 001D0000 00000000 00000000 00000000 000A0000
                                      THRH 1E000800 2800001D 000A8F90 00
                                      TEXT 80020000 01020A                           *.......             *
          TIME    46622.981188
```

```
*****************************************************************************************************
*                                                                                                   *
*  The following messages are issued to the network operator for lines that fail to come active because  *
*  the local modem is either not connected to the NCP or it is powered off.                         *
*                                                                                                   *
*****************************************************************************************************

          12.57.03 STC  341  IST631I  UNABLE TO ACTIVATE LINK PLINEA2  - I/O ERROR
          12.57.15 STC  341  IST631I  UNABLE TO ACTIVATE LINK SDLC138  - I/O ERROR
          12.57.26 STC  341  IST631I  UNABLE TO ACTIVATE LINK SDLC136  - I/O ERROR

*****************************************************************************************************
*                                                                                                   *
*  After the lines have been activated or have timed-out, VTAM attempts to activate all physical units and  *
*  logical units that have ISTATUS=ACTIVE coded. Only after this has been done will VTAM write      *
*  the message indicating the NCP is active. The trace entries for this are not included here.  Refer to the  *
*  flow in other sections of this chapter for the devices you are interested in.                    *
*                                                                                                   *
*  VTAM issues a message to the network operator indicating that VTAM was unable to activate two units  *
*  on one of the inoperable links.                                                                  *
*                                                                                                   *
*  After every network addressable unit coded with ISTATUS=ACTIVE has been activated, VTAM issues the message  *
*  indicating the NCP is active.                                                                    *
```

```
*                                                                                                                    *
**********************************************************************************************************************

             12.57.27 STC  341  IST608I  VARY FAILED FOR ID= SDLC3274 - SDLC136  NOT ACTIVE
             12.57.27 STC  341  IST608I  VARY FAILED FOR ID= SDLC3276 - SDLC136  NOT ACTIVE
             12.57.29 STC  341  IST093I  NCP6CH2  ACTIVE


**********************************************************************************************************************
*                                                                                                                    *
*  A display of the NCP with the every option at this point indicated the status of all the lines.                   *
*                                                                                                                    *
**********************************************************************************************************************

             D NET,E,ID=NCP6CH2
             12.57.30 STC  341  IST097I  DISPLAY  ACCEPTED
             12.57.30 STC  341  IEE932I 867
              IST075I  VTAM DISPLAY- NODE TYPE= 3705  ,NAME= NCP6CH2  ,STATUS= ACT
              IST076I  CTL PROGRAM= NCP6CH2  , ATTACHMENT= LOCAL
              IST654I  I/O TRACE= ON  ,BUFFER TRACE= ON
              IST077I  SIO= 00000111 ,ERROR CT= 00000000 CUA= 520
              IST170I  LINES:
              IST080I  MLINEA0    ACT        MLINEA1    ACT        PLINEA2    INACT
              IST080I  SLINEA3    ACT        SLINEA4    ACT        TLINEA5    ACT
              IST080I  BSC130     ACT        SDLC138    INACT      SDLC13C    ACT
              IST080I  SDLC13A    ACT        SDLC136    INACT      SDLC13E    ACT
              IST080I  SDLC13F    ACT

**********************************************************************************************************************
*                                                                                                                    *
*  The following messages are generated as a result of NETSOL issuing 'OPNDST' macros for the devices on             *
*  these two BSC 3270 clusters.  For BSC 3270 clusters, VTAM will mark them as active but no FID0 PIU commands       *
*  will be generated or polling started until an application issues 'OPNDST' for one of the devices on the           *
*  cluster.  As you can see, one of the clusters came active and the other had a general poll failure because        *
*  the modem (at the cluster end) was powered off.                                                                   *
*                                                                                                                    *
**********************************************************************************************************************

             12.57.35 STC  341  IST093I  PU3270V  ACTIVE
             12.58.26 STC  341  IST202I  BSC3276  PERMANENT I/O ERROR  0506 - NCP RESPONSE = AB - 80
             12.58.26 STC  341 *IST852I  POLL FOR CLUSTER BSC3276  FAILED- CLUSTER NOW UNAVAILABLE


**********************************************************************************************************************
*                                                                                                                    *
*  At this point TSO was started and TSO user YGL0 logged on to TSO.   This user was on a BSC 3270 cluster          *
*  and the 3277 was logged-on to NETSOL.   The operator entered the logon request and NETSOL issued a 'CLSDST'      *
*  with the pass option and VTAM drove  TSO's LOGON exit.  TSO issued 'OPNDST' and thereby established               *
```

```
*  a session with the terminal.                                                                                    *
*                                                                                                                  *
*  GTF was then stopped.                                                                                           *
*                                                                                                                  *
********************************************************************************************************************

              s tso

              13.00.33 STC  342  $HASP100 TSO      ON STCINRDR
              13.00.37 STC  342  $HASP373 TSO      STARTED
              13.00.46 STC  342  IKT007I TCAS ACCEPTING LOGONS
              13.00.46 STC  342  IKT005I TCAS IS INITIALIZED
              13.01.53 TSU   82  $HASP100 YGL0     ON TSOINRDR
              13.01.57 TSU   82  $HASP373 YGL0     STARTED

              p 159 (Stops GTF, it was recording on dasd)

              13.02.29 STC  340  AHL006I GTF ACKNOWLEDGES STOP COMMAND
              13.02.32 STC  340  $HASP395 GTFDISK  ENDED
              13.02.34 STC  340  $HASP250 GTFDISK  IS PURGED
```

5.2.2 : 3790 DIAL IN SEQUENCE

```
*****************************************************************************************************
*                                                                                                   *
*  The sequence below shows the SNA data flow associated with a dial 3790.  Console output and trace data      *
*  are interspersed.  Network operator commands are shown in lower case.                            *
*                                                                                                   *
*  All terminals on the 3790 are operating in 3270 compatibility mode.   This trace shows the sequence         *
*  of events when the 3790 dials in, when a terminal attempts to initiate a session with an application that   *
*  is not active, when a terminal initiates a session with TOLTEP and TOLTEP breaks the session, and when a    *
*  terminal initiates a session with IMS and the terminal requests termination of the session.      *
*                                                                                                   *
*  VTAM has activated the link at start-up time.  At this point the network operator starts VTAM IO and buffer *
*  traces for the NCP (NCP1003), the physical unit (CL3790A), and a terminal (CL379011).  The following         *
*  console log reflects this occurring.                                                             *
*                                                                                                   *
*****************************************************************************************************

f net,trace,type=io,id=ncp1003

08.56.01 STC  588  IST097I  MODIFY   ACCEPTED
08.56.02 STC  588  IST513I  TRACE INITIATED FOR NODE NCP1003

f net,trace,type=buf,id=ncp1003
08.56.16 STC  588  IST097I  MODIFY   ACCEPTED
08.56.16 STC  588  IST513I  TRACE INITIATED FOR NODE NCP1003

f net,trace,type=io,id=cl3790a
08.56.34 STC  588  IST097I  MODIFY   ACCEPTED
08.56.34 STC  588  IST513I  TRACE INITIATED FOR NODE CL3790A

f net,trace,id=cl3790a,type=buf
08.56.55 STC  588  IST097I  MODIFY   ACCEPTED
08.56.55 STC  588  IST513I  TRACE INITIATED FOR NODE CL3790A

f net,trace,type=io,id=cm379011
08.58.28 STC  588  IST097I  MODIFY   ACCEPTED
08.58.28 STC  588  IST513I  TRACE INITIATED FOR NODE CM379011

f net,trace,type=buf,id=cm379011
08.58.46 STC  588  IST097I  MODIFY   ACCEPTED
08.58.46 STC  588  IST513I  TRACE INITIATED FOR NODE CM379011
```

```
*****************************************************************************************************
*                                                                                                   *
*  At this point, the operator starts GTF with the USER and RNIO options.  The operator then decides to start  *
*  an NCP line trace for the dial in line (SDLC13E).                                                *
*                                                                                                   *
*****************************************************************************************************

s gtfdisk
08.58.59 STC  593  $HASP100 GTFDISK  ON STCINRDR
08.59.02 STC  593  $HASP373 GTFDISK  STARTED
08.59.08 STC  593  AHL121I  SYS1.PARMLIB INPUT INDICATED
08.59.09 STC  593  TRACE=USR,RNIO
08.59.09 STC  593  AHL103I  TRACE OPTIONS SELECTED --USR,RNIO
08.59.09 STC  593 *06 AHL125A  RESPECIFY TRACE OPTIONS OR REPLY U
6u
08.59.14          IEE600I REPLY TO 06 IS;U
08.59.14 STC  593  U
08.59.16 STC  593  AHL031I GTF INITIALIZATION COMPLETE
f net,trace,type=line,id=sdlc13e
09.03.05 STC  588  IST097I  MODIFY   ACCEPTED
09.03.07 STC  588  IST513I  TRACE INITIATED FOR NODE SDLC13E

*****************************************************************************************************
*                                                                                                   *
*  The following trace record is produced when the line trace is started. VTAM sends the NCP an SNA            *
*  'ACTIVATE LINE TRACE' command with the NAU of the line (28A9) in bytes 3 and 4 of the request unit. A       *
*  positive response is received and the next trace entry is a 'RECORD TRACE DATA' command.  Since no one      *
*  has dialed-in yet, there is no trace data included.                                              *
*                                                                                                   *
*****************************************************************************************************

USRFD FEF ASCB 00FEF900  JOBN NET
          TPIOS OUT ANODE VTAM       FDB  00000000 00B7F850 00150000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE NCP1003    THRH 1C002800 08000000 00000B80 00
                                     TEXT 01030228 A901FF00                              *....z...            *
          TIME    32586.890660
RNIO ASCB 00FEF900  CPU 0000 JOBN NET          OUT 1E002800 08000033 000B0B80 00010302 28A901FF
          TIME    32587.061088
RNIO ASCB 00FEF900  CPU 0000 JOBN NET           IN 1E000800 28000033 00068B80 00010302
          TIME    32587.094433
USRFD FEF ASCB 00FEF900  JOBN NET
          TPIOS IN  ANODE VTAM       FDB  00000000 00B80301 00030000   RSVD 0833   LNG2 00DC
            REMOTE  DNODE NCP1003    FSB  022C0000 00000000 08002800 00330000 00000000 00000000 00000000 00060000
                                     THRH 1E000800 28000033 00068B80 00
                                     TEXT 010302                                         *...                 *
          TIME    32587.134936
RNIO ASCB 00FEF900  CPU 0000 JOBN NET           IN 1C000800 28000006 000C0B00 00010383 28A901FF
          TIME    32612.745675
```

```
USRFD FF2 ASCB 00FEF900  JOBN NET
          LINE      DNODE NCP1003       EP 00       TIME FF
         TIME    32612.788813

*************************************************************************************************************
*                                                                                                           *
*  A display of the line with the every option shows that the line, PU, and terminals are active. The line  *
*  trace is also displayed as being on.                                                                     *
*                                                                                                           *
*************************************************************************************************************

d net,id=sdlc13e,e
09.04.19 STC  588  IST097I  DISPLAY  ACCEPTED
09.04.19 STC  588  IEE932I 359
 IST075I  VTAM DISPLAY- NODE TYPE= LINE  ,NAME= SDLC13E  ,STATUS= ACT
 IST087I  LINE TYPE= SWITCHED   LINE GROUP= SDLCGV2
 IST134I  370X= NCP1003
 IST655I  LINETRACE= ON
 IST084I  NETWORK NODES:
 IST089I  CL3790A  TYPE= PU     , ACT   ,
 IST089I  INBATCH1 TYPE= TERM   , ACT   ,
 IST089I  INQ02    TYPE= TERM   , ACT   ,
 IST089I  INQ03    TYPE= TERM   , ACT   ,
 IST089I  INQ04    TYPE= TERM   , ACT   ,
 IST089I  INQ05    TYPE= TERM   , ACT   ,
 IST089I  BT379011 TYPE= TERM   , ACT   ,
 IST089I  BT379012 TYPE= TERM   , ACT   ,
 IST089I  RJE01    TYPE= TERM   , ACT   ,
 IST089I  RJE02    TYPE= TERM   , ACT   ,
 IST089I  RJE03    TYPE= TERM   , ACT   ,
 IST089I  RJE04    TYPE= TERM   , ACT   ,
 IST089I  RJE05    TYPE= TERM   , ACT   ,
 IST089I  CM379011 TYPE= TERM   , ACT   ,
 IST089I  CM379012 TYPE= TERM   , ACT   ,
 IST089I  CM379013 TYPE= TERM   , ACT   ,
 IST089I  CM379014 TYPE= TERM   , ACT   ,
 IST089I  BP379011 TYPE= TERM   , ACT   ,
 IST089I  BP379012 TYPE= TERM   , ACT   ,
 IST089I  BP379013 TYPE= TERM   , ACT   ,
 IST089I  UP379011 TYPE= TERM   , ACT   ,
 IST089I  UP379013 TYPE= TERM   , ACT   ,
 IST089I  UP379014 TYPE= TERM   , ACT   ,
 IST089I  UP379015 TYPE= TERM   , ACT   ,
 IST089I  UP379016 TYPE= TERM   , ACT   ,
 IST089I  UP379017 TYPE= TERM   , ACT   ,
 IST089I  UP379018 TYPE= TERM   , ACT   ,
 IST089I  UP379019 TYPE= TERM   , ACT   ,
 IST089I  UP379021 TYPE= TERM   , ACT   ,
```

```
 IST089I  UP379022 TYPE= TERM   , ACT   ,
 IST089I  UP379023 TYPE= TERM   , ACT   ,
 IST089I  UP379024 TYPE= TERM   , ACT   ,
 IST089I  UP379025 TYPE= TERM   , ACT   ,
 IST089I  UP379026 TYPE= TERM   , ACT   ,
 IST089I  UP379027 TYPE= TERM   , ACT/A ,
 IST089I  UP379028 TYPE= TERM   , ACT   ,
 IST089I  UP379029 TYPE= TERM   , ACT   ,
```

```
*************************************************************************************************************
*                                                                                                           *
*  Before the control operator at the 3790 can establish a connection, the 3790 SYSHOST function must be done. *
*  The control operator at the 3790 dials into the NCP and the following line trace entries show            *
*  the connection sequence.  The NCP sends an SDLC exchange ID command (XID) on the line.  The address of the *
*  secondary station in this frame is FF since the NCP does not know the address of the PU at this point.   *
*  The next SDLC frame shows an SDLC XID response.  The station identification is in the 'I' field of this  *
*  frame and is X'020000603791'.                                                                            *
*                                                                                                           *
*  The NCP then sends VTAM an SNA 'REQUEST CONTACT' (OFFHOOK) command with the station ID in the request unit. *
*  From the request header of this command, we know that no response was requested.  VTAM compares the station *
*  ID received with values coded in the VBUILD major node representing the switched nodes.  A match is found  *
*  and VTAM sends the NCP a  SNA 'SET CONTROL VECTOR' command. The key indicates it is a SDLC secondary station*
*  control vector. Byte 6 of this command tells the NCP that the address of the secondary station is X'C1'.  *
*  The remaining bytes in the request unit tell the NCP the PU type of the physical unit and parameters to   *
*  be used when communicating with it.  This SNA command is to the NCP and, therefore, does not generate line *
*  trace data.                                                                                              *
*                                                                                                           *
*  VTAM receives a positive response to the 'SET CONTROL VECTOR' and sends the NCP a SNA 'CONTACT' command  *
*  for the physical unit (28AA).  The NCP sends an SDLC 'SNRM' frame on the line and sends VTAM a positive  *
*  response to the 'CONTACT' command.  Notice that the address of the secondary station in the 'SNRM' frame  *
*  was X'C1'.  The next frame received on the line is an SDLC 'NSA' response.  This will cause the NCP to    *
*  send VTAM an SNA 'CONTACTED' command with the address of the physical unit (28AA) in the request unit.   *
*  At this point, the NCP and the secondary station start trading SDLC 'RECEIVE READY' commands (polling).  *
*                                                                                                           *
*  The following trace records show this sequence.  Remember that since the NCP must send the line trace data *
*  to VTAM for recording on GTF, the VTAM IO and buffer trace entries can be a few pages ahead of the line  *
*  trace data entries they cause.  These will be the last line trace entries shown in this sample.          *
*                                                                                                           *
*************************************************************************************************************
```

```
RNIO ASCB 00FEF900  CPU 0000 JOBN NET          IN 1C000800 28000007 000E0B00 00010284 28A90200
          TIME    32615.340875
USRFD FEF ASCB 00FEF900  JOBN NET
           TPIOS IN  ANODE VTAM       FDB  00000000 00B804D1 000B0000   RSVD 0833   LNG2 00DC
             REMOTE  DNODE NCP1003    FSB  022C0000 00000000 08002800 00070000 00000000 00000000 00000000 000E0000
                                      THRH 1C000800 28000007 000E0B00 00
                                      TEXT 01028428 A9020000 603791                        *..d.z...-.j         *
          TIME    32615.398679
```

```
USRFD FEF ASCB 00FEF900  JOBN NET
          TPIOS OUT ANODE VTAM       FDB  00000000 00B804B0 001D0000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE NCP1003    THRH 1C002800 08000000 00000B80 00
                                     TEXT 01021128 AA03C102 00070780 00000109          *......A.........    *
          TIME    32615.891136
RNIO ASCB 00FEF900  CPU 0000 JOBN NET          OUT 1E002800 08000034 00130B80 00010211 28AA03C1
          TIME    32615.936289
RNIO ASCB 00FEF900  CPU 0000 JOBN NET           IN 1E000800 28000034 00068B80 00010211
          TIME    32616.015053
USRFD FEF ASCB 00FEF900  JOBN NET
          TPIOS IN  ANODE VTAM       FDB  00000000 00B7F131 00030000   RSVD 0833   LNG2 00DC
            REMOTE  DNODE NCP1003    FSB  022C0000 00000000 08002800 00340000 00000000 00000000 00000000 00060000
                                     THRH 1E000800 28000034 00068B80 00
                                     TEXT 010211                                       *...                 *
          TIME    32616.044101
USRFD FEF ASCB 00FEF900  JOBN NET
          TPIOS OUT ANODE VTAM       FDB  00000000 00B7F110 00120000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE NCP1003    THRH 1C002800 08000000 00000B80 00
                                     TEXT 01020128 AA                                  *.....               *
          TIME    32616.078379
RNIO ASCB 00FEF900  CPU 0000 JOBN NET          OUT 1E002800 08000035 00080B80 00010201 28AA
          TIME    32616.137381
RNIO ASCB 00FEF900  CPU 0000 JOBN NET           IN 1E000800 28000035 00068B80 00010201
          TIME    32616.209817
USRFD FEF ASCB 00FEF900  JOBN NET
          TPIOS IN  ANODE VTAM       FDB  00000000 00B7F049 00030000   RSVD 0833   LNG2 00DC
            REMOTE  DNODE NCP1003    FSB  022C0000 00000000 08002800 00350000 00000000 00000000 00000000 00060000
                                     THRH 1E000800 28000035 00068B80 00
                                     TEXT 010201                                       *...                 *
          TIME    32616.231353
RNIO ASCB 00FEF900  CPU 0000 JOBN NET           IN 1C000800 28000008 00090B00 00010280 28AA01
          TIME    32618.036569
USRFD FEF ASCB 00FEF900  JOBN NET
          TPIOS IN  ANODE VTAM       FDB  00000000 00B7F219 00060000   RSVD 0833   LNG2 00DC
            REMOTE  DNODE NCP1003    FSB  022C0000 00000000 08002800 00080000 00000000 00000000 00000000 00090000
                                     THRH 1C000800 28000008 00090B00 00
                                     TEXT 01028028 AA01                                *......              *
          TIME    32618.060675
USRFD FF2 ASCB 00FEF900  JOBN NET
           LINE      DNODE NCP1003       EP 00       TIME 57
                       LCD 0  PCF 0  TIME 15  SCF 42  PDF 20      LCD 9  PCF 9  TIME 17  SCF 4D  PDF 7E
                       LCD 9  PCF 9  TIME 17  SCF 48  PDF FF      LCD 9  PCF 9  TIME 17  SCF 48  PDF BF
                       LCD 9  PCF 9  TIME 17  SCF 48  PDF FB      LCD 9  PCF 9  TIME 17  SCF 48  PDF BD
                       LCD 9  PCF 9  TIME 17  SCF 4D  PDF 7E      LCD 9  PCF 5  TIME 17  SCF 4D  PDF 7E
                       LCD 9  PCF 6  TIME 19  SCF 0D  PDF 7E      LCD 9  PCF 7  TIME 1A  SCF 49  PDF C1
                       LCD 9  PCF 7  TIME 1A  SCF 49  PDF BF      LCD 9  PCF 7  TIME 1A  SCF 49  PDF 02
                       LCD 9  PCF 7  TIME 1A  SCF 49  PDF 00      LCD 9  PCF 7  TIME 1A  SCF 49  PDF 00
                       LCD 9  PCF 7  TIME 1A  SCF 49  PDF 60      LCD 9  PCF 7  TIME 1A  SCF 49  PDF 37
```

```
                          LCD 9  PCF 7  TIME 1A  SCF 49  PDF 91      LCD 9  PCF 7  TIME 1A  SCF 49  PDF CD
                          LCD 9  PCF 7  TIME 1A  SCF 49  PDF 96      LCD 9  PCF 6  TIME 1A  SCF 0D  PDF 96
                          LCD 9  PCF 9  TIME 32  SCF 4D  PDF 7E      LCD 9  PCF 9  TIME 32  SCF 48  PDF C1
          TIME    32621.348598
USRFD FF2 ASCB 00FEF900  JOBN NET
           LINE       DNODE NCP1003       EP 00       TIME 57
                          LCD 9  PCF 9  TIME 32  SCF 48  PDF 93      LCD 9  PCF 9  TIME 32  SCF 48  PDF 27
                          LCD 9  PCF 9  TIME 32  SCF 48  PDF 7A      LCD 9  PCF 9  TIME 33  SCF 4D  PDF 7E
                          LCD 9  PCF 5  TIME 33  SCF 4D  PDF 7E      LCD 9  PCF 6  TIME 35  SCF 0D  PDF 7E
                          LCD 9  PCF 7  TIME 35  SCF 49  PDF C1      LCD 9  PCF 7  TIME 35  SCF 49  PDF 73
                          LCD 9  PCF 7  TIME 35  SCF 49  PDF 29      LCD 9  PCF 7  TIME 35  SCF 49  PDF 9D
                          LCD 9  PCF 6  TIME 35  SCF 0D  PDF 9D      LCD 9  PCF 9  TIME 37  SCF 4D  PDF 7E
                          LCD 9  PCF 9  TIME 37  SCF 48  PDF C1      LCD 9  PCF 9  TIME 37  SCF 48  PDF 11
                          LCD 9  PCF 9  TIME 37  SCF 48  PDF 3D      LCD 9  PCF 9  TIME 37  SCF 48  PDF DD
                          LCD 9  PCF 9  TIME 37  SCF 4D  PDF 7E      LCD 9  PCF 5  TIME 37  SCF 4D  PDF 7E
                          LCD 9  PCF 6  TIME 39  SCF 0D  PDF 7E      LCD 9  PCF 7  TIME 39  SCF 49  PDF C1
                          LCD 9  PCF 7  TIME 39  SCF 49  PDF 11      LCD 9  PCF 7  TIME 39  SCF 49  PDF 3D
          TIME    32621.363211
USRFD FF2 ASCB 00FEF900  JOBN NET
           LINE       DNODE NCP1003       EP 00       TIME 57
                          LCD 9  PCF 7  TIME 39  SCF 49  PDF DD      LCD 9  PCF 6  TIME 39  SCF 0D  PDF DD
                          LCD 9  PCF 9  TIME 3B  SCF 4D  PDF 7E      LCD 9  PCF 9  TIME 3B  SCF 48  PDF C1
                          LCD 9  PCF 9  TIME 3B  SCF 48  PDF 11      LCD 9  PCF 9  TIME 3B  SCF 48  PDF 3D
                          LCD 9  PCF 9  TIME 3B  SCF 48  PDF DD      LCD 9  PCF 9  TIME 3B  SCF 4D  PDF 7E
                          LCD 9  PCF 5  TIME 3B  SCF 4D  PDF 7E      LCD 9  PCF 6  TIME 3D  SCF 0D  PDF 7E
                          LCD 9  PCF 7  TIME 3D  SCF 49  PDF C1      LCD 9  PCF 7  TIME 3D  SCF 49  PDF 11
                          LCD 9  PCF 7  TIME 3D  SCF 49  PDF 3D      LCD 9  PCF 7  TIME 3D  SCF 49  PDF DD
                          LCD 9  PCF 6  TIME 3D  SCF 0D  PDF DD      LCD 9  PCF 9  TIME 3F  SCF 4D  PDF 7E
                          LCD 9  PCF 9  TIME 3F  SCF 48  PDF C1      LCD 9  PCF 9  TIME 3F  SCF 48  PDF 00
                          LCD 9  PCF 9  TIME 3F  SCF 48  PDF 2F      LCD 9  PCF 9  TIME 3F  SCF 48  PDF 00
                          LCD 9  PCF 9  TIME 3F  SCF 48  PDF 00      LCD 9  PCF 9  TIME 3F  SCF 48  PDF 00
          TIME    32621.365369

*****************************************************************************************************************
*                                                                                                               *
*  VTAM now sends a SNA 'ACTIVATE PHYSICAL' command to the physical unit and receives a positive response.      *
*  The SSCP ID is contained in the request unit of this command. If the 3790 is coded to look for a specific   *
*  SSCP ID and that SSCP ID is not the one sent in the activate physical command the 3790 will reject the      *
*  command.  The physical unit sends a positive response to the activate physical and bytes 2 thru 9 of the    *
*  response unit contain the name of the load module active in the PU (37900000).                               *
*                                                                                                               *
*  VTAM now sends the NCP a SNA 'ASSIGN NETWORK ADDRESSES' command for this physical unit.  The request unit   *
*  shows that 36 logical unit addresses from 28AD to 28D0 are to be assigned by the NCP for this physical       *
*  unit.  VTAM determined this number and the addresses from the VBUILD major node coded in VTAMLST.           *
*  NCP returns a positive response to this command.                                                             *
*                                                                                                               *
*  VTAM then sends a SNA 'SET CONTROL VECTOR' command to the NCP for each of the logical units assigned,        *
*  to set options to be used by the NCP in dealing with the LU (pacing, DLC dequeuing priority, etc.).  All     *
```

```
*  trace entries are not shown in this example.                                                    *
*                                                                                                  *
****************************************************************************************************

USRFD FEF ASCB 00FEF900  JOBN NET
           TPIOS OUT ANODE VTAM       FDB  00000000 00B7F1F8 00160000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
             REMOTE  DNODE CL3790A    THRH 1C0028AA 08000000 00006B80 00
                                      TEXT 11010105 00000000 01                          *.........          *
          TIME    32618.427056
RNIO ASCB 00FEF900  CPU 0000 JOBN NET          OUT 1F0028AA 08000001 000C6B80 00110101 05000000
          TIME    32618.475157
RNIO ASCB 00FEF900  CPU 0000 JOBN NET           IN 1D000800 28AA0001 000DEB80 001101F3 F7F9F0F0
          TIME    32620.718949
USRFD FEF ASCB 00FEF900  JOBN NET
           TPIOS IN  ANODE VTAM       FDB  00000000 00B7FCF9 000A0000   RSVD 0833   LNG2 00DC
             REMOTE  DNODE CL3790A    FSB  022C0000 00000000 08002001 00010000 00000000 00000000 00000000 000D0000
                                      THRH 1D000800 20010001 000DEB80 00
                                      TEXT 1101F3F7 F9F0F0F0 F0F0                        *..37900000          *
          TIME    32620.738831
USRFD FEF ASCB 00FEF900  JOBN NET
           TPIOS OUT ANODE VTAM       FDB  00000000 00B7FCD8 005C0000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
             REMOTE  DNODE NCP1003    THRH 1C002800 08000000 00000B80 00
                                      TEXT 01021928 AA248028 AD28AE28 AF28B028 B128B228  *.....................*
                                           B328B428 B528B628 B728B828 B928BA28 BB28BC28  *.....................*
                                           BD28BE28 BF28C028 C128C228 C328C428 C528C628  *........A.B.C.D.E.F.*
                                           C728C828 C928CA28 CB28CC28 CD28CE28 CF28D0    *G.H.I.............. *
          TIME    32620.813810
RNIO ASCB 00FEF900  CPU 0000 JOBN NET          OUT 1E002800 08000036 00520B80 00010219 28AA2480
          TIME    32620.851934
RNIO ASCB 00FEF900  CPU 0000 JOBN NET           IN 1E000800 28000036 00068B80 00010219
          TIME    32620.962753
USRFD FEF ASCB 00FEF900  JOBN NET
           TPIOS IN  ANODE VTAM       FDB  00000000 00B7FEC9 00030000   RSVD 0833   LNG2 00DC
             REMOTE  DNODE NCP1003    FSB  022C0000 00000000 08002800 00360000 00000000 00000000 00000000 00060000
                                      THRH 1E000800 28000036 00068B80 00
                                      TEXT 010219                                        *...                 *
          TIME    32620.968176
USRFD FEF ASCB 00FEF900  JOBN NET
           TPIOS OUT ANODE VTAM       FDB  00000000 00B7FEA8 00170000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
             REMOTE  DNODE NCP1003    THRH 1C002800 08000000 00000B80 00
                                      TEXT 01021128 AD040101 0101                        *.........           *
          TIME    32620.989764
RNIO ASCB 00FEF900  CPU 0000 JOBN NET          OUT 1E002800 08000037 000D0B80 00010211 28AD0401
          TIME    32621.028988
RNIO ASCB 00FEF900  CPU 0000 JOBN NET           IN 1E000800 28000037 00068B80 00010211
          TIME    32621.145729
USRFD FEF ASCB 00FEF900  JOBN NET
           TPIOS IN  ANODE VTAM       FDB  00000000 00B7FDE1 00030000   RSVD 0833   LNG2 00DC
```

```
            REMOTE  DNODE NCP1003    FSB  022C0000 00000000 08002800 00370000 00000000 00000000 00000000 00060000
                                     THRH 1E000800 28000037 00068B80 00
                                     TEXT 010211                                          *...                *
          TIME    32621.167011
USRFD FEF ASCB 00FEF900  JOBN NET
           TPIOS OUT ANODE VTAM      FDB  00000000 00B803C8 00170000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE NCP1003    THRH 1C002800 08000000 00000B80 00
                                     TEXT 01021128 AE040201 0102                          *.........          *
          TIME    32622.581185
RNIO ASCB 00FEF900  CPU 0000 JOBN NET          OUT 1E002800 08000038 000D0B80 00010211 28AE0402
          TIME    32622.861622
RNIO ASCB 00FEF900  CPU 0000 JOBN NET           IN 1E000800 28000038 00068B80 00010211
          TIME    32622.926027
USRFD FEF ASCB 00FEF900  JOBN NET
           TPIOS IN  ANODE VTAM      FDB  00000000 00B80789 00030000   RSVD 0833   LNG2 00DC
            REMOTE  DNODE NCP1003    FSB  022C0000 00000000 08002800 00380000 00000000 00000000 00000000 00060000
                                     THRH 1E000800 28000038 00068B80 00
                                     TEXT 010211                                          *...                *
          TIME    32622.933986

*****************************************************************************************************************
*                                                                                                               *
*  VTAM now sends an SNA 'ACTIVATE LOGICAL' command to all the logical units.  Since we had only started       *
*  traces for LU cm379011, we will only see the activate logical command sent to it.  A positive response is   *
*  received to the activate logical command. A session now exists between VTAM and the logical unit.           *
*                                                                                                               *
*****************************************************************************************************************

USRFD FEF ASCB 00FEF900  JOBN NET
           TPIOS OUT ANODE VTAM      FDB  00000000 00B80768 00100000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE CM379011   THRH 1C0028B9 08000000 00006B80 00
                                     TEXT 0D0101                                          *...                *
          TIME    32635.387032
RNIO ASCB 00FEF900  CPU 0000 JOBN NET          OUT 1F0028B9 08000001 00066B80 000D0101
          TIME    32635.438016
RNIO ASCB 00FEF900  CPU 0000 JOBN NET           IN 1D000800 28B90001 0004EB80 000D
          TIME    32636.129180
USRFD FEF ASCB 00FEF900  JOBN NET
           TPIOS IN  ANODE VTAM      FDB  00000000 00B7F871 00010000   RSVD 0833   LNG2 00DC
            REMOTE  DNODE CM379011   FSB  022C0000 00000000 0800200E 00010000 00000000 00000000 00000000 00040000
                                     THRH 1D000800 200E0001 0004EB80 00
                                     TEXT 0D                                              *.                  *
          TIME    32636.148014
*****************************************************************************************************************
*                                                                                                               *
*  A terminal operator at a 3277 terminal connected to the 3790, and who is assigned to logical unit cm379011  *
*  by the LU/LA table in the 3790, initiates the 3270 compatibility mode FP (932).  In response to the          *
*  'ENTER HOST APPLICATION NAME' prompt, the terminal operator enters CICS13.  The compatibility mode FP        *
```

```
*  causes the logical unit to send VTAM an SNA 'INITIATE SELF ' command.  The request unit in this command     *
*  specifies a logmode table entry of EMU3790 and a symbolic name for the other LU of CICS. VTAM sends a       *
*  positive response to the initiate self command.  VTAM would normally drive the application's logon exit.    *
*  However, in this case, CICS was not active in the system.  This causes VTAM to send a SNA 'PROCEEDURE ERROR'*
*  command to the logical unit.  The 3277 terminal operator sees the 'UNABLE TO START HOST SESSION' message on *
*  the terminal.                                                                                               *
*                                                                                                              *
****************************************************************************************************************
RNIO ASCB 00FEF900  CPU 0000 JOBN NET           IN 1C000800 28B90001 001C0B80 00010681 00C5D4E4
         TIME    32716.324368
USRFD FEF ASCB 00FEF900  JOBN NET
          TPIOS IN  ANODE VTAM       FDB  00000000 00B7FC11 00190000   RSVD 0833   LNG2 00DC
            REMOTE  DNODE CM379011   FSB  022C0000 00000000 0800200E 00010000 00000000 00000000 00000000 001C0000
                                     THRH 1C000800 200E0001 001C0B80 00
                                     TEXT 01068100 C5D4E4F3 F7F9F040 F308C3C9 C3E24040  *..a.EMU3790 3.CICS  *
                                          40400000 00                                   *  ...               *
         TIME    32716.359475
USRFD FEF ASCB 00FEF900  JOBN NET
          TPIOS OUT ANODE VTAM       FDB  00000000 00B7FBF0 00100000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE CM379011   THRH 1C0028B9 08000000 00009B80 00
                                     TEXT 010681                                   *..a                 *
         TIME    32716.461500
USRFD FEF ASCB 00FEF900  JOBN NET
          TPIOS OUT ANODE VTAM       FDB  00000000 00B7FB08 00130000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE CM379011   THRH 1C0028B9 08000000 00000B80 00
                                     TEXT 01060420 0000                            *......              *
         TIME    32716.521284
RNIO ASCB 00FEF900  CPU 0000 JOBN NET          OUT 1C0028B9 08000001 00069B80 00010681
         TIME    32716.527278
RNIO ASCB 00FEF900  CPU 0000 JOBN NET          OUT 1E0028B9 08000001 00090B80 00010604 200000
         TIME    32716.560432
RNIO ASCB 00FEF900  CPU 0000 JOBN NET           IN 1C000800 28B90001 00048B80 0001
         TIME    32717.312311
USRFD FEF ASCB 00FEF900  JOBN NET
          TPIOS IN  ANODE VTAM       FDB  00000000 00B7F4D1 00010000   RSVD 0833   LNG2 00DC
            REMOTE  DNODE CM379011   FSB  022C0000 00000000 0800200E 00010000 00000000 00000000 00000000 00040000
                                     THRH 1C000800 200E0001 00048B80 00
                                     TEXT 01                                       *.                   *
         TIME    32717.328435
****************************************************************************************************************
*                                                                                                              *
*  The following message appears on the network operator's console.                                            *
*                                                                                                              *
****************************************************************************************************************

09.05.17 STC  588  IST696I  LOGON REJECT FOR ID= CM379011 APPLICATION= CICS     NOT ACTIVE
```

5.2.3 : HUNG LU

```
*****************************************************************************************************
*                                                                                                   *
*   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 TS00001    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 TS00001    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 TS00001    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 TS00001    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
```

5.2.4 : SDLC TIME-OUT

```
*****************************************************************************************************
*                                                                                                   *
*   The sequence below shows the action taken when a remote location reported inability to communicate with the*
*   host system.  The network operator used display commands to determine the status of the nodes involved.    *
*                                                                                                   *
*****************************************************************************************************

          d net,id=ncpch2,e
          09.44.11 STC   82  IST097I  DISPLAY  ACCEPTED
          09.44.11 STC   82  IEE932I 382
           IST075I  VTAM DISPLAY- NODE TYPE= 3705  ,NAME= NCPCH2   ,STATUS= ACT
           IST076I  CTL PROGRAM= NCPCH2    , ATTACHMENT= LOCAL
           IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
           IST077I  SIO= 00001268 ,ERROR CT= 00000000 CUA= 520
           IST170I  LINES:
           IST080I  LBLINE44   INACT      SDLC138    INACT      SDLC13C    ACT
           IST080I  SDLC13A    ACT        SDLC13E    ACT        SDLC13F    ACT

          d net,e,id=sdlc13a
          09.44.35 STC   82  IST097I  DISPLAY  ACCEPTED
          09.44.35 STC   82  IEE932I 385
           IST075I  VTAM DISPLAY- NODE TYPE= LINE  ,NAME= SDLC13A  ,STATUS= ACT
           IST087I  LINE TYPE= LEASED     LINE GROUP= SDLCGV1
           IST134I  370X= NCPCH2
           IST655I  LINETRACE= OFF
           IST084I  NETWORK NODES:
           IST089I  PU3770P  TYPE= PU     , INA/C ,
           IST089I  LU13     TYPE= TERM   , INACT ,
           IST089I  BA3770PV TYPE= TERM   , INACT ,

*****************************************************************************************************
*                                                                                                   *
*   These two displays have shown that the NCP and link (SDLC13A) are both active.  However, the Physical      *
*   Unit (PU3770P) has never been 'CONTACTED'.  This is the type of status to expect with an open link or a    *
*   remote PU or modem that is inoperative.  Traces are now started to validate the timeout condition.         *
*                                                                                                   *
*****************************************************************************************************

          f net,trace,type=buf,id=pu3770p
          10.07.48 STC   82  IST097I  MODIFY   ACCEPTED
```

```
10.07.48 STC   82  IST513I  TRACE INITIATED FOR NODE PU3770P

f net,trace,type=io,id=pu3770p
10.07.49 STC   82  IST097I  MODIFY   ACCEPTED      d
10.07.49 STC   82  IST513I  TRACE INITIATED FOR NODE PU3770P

f net,trace,type=line,id=sdlc13a
10.09.01 STC   82  IST097I  MODIFY   ACCEPTED
10.09.01 STC   82  IST513I  TRACE INITIATED FOR NODE SDLC13A
```

```
*************************************************************************************************************
*                                                                                                           *
*   The output below shows the GTF printout of the VTAM/NCP line trace.  Note that all of the PCF states    *
*   reflect 'TRANSMIT NORMAL'.  Because this link is full-duplex, and there is no data being received, there *
*   will be no entries for the receive side of the link.  Also, it can be determined from the increment     *
*   on the time field between successive frames transmitted, that NCP is  waiting 3.4 seconds for a reply   *
*   to the 'SET NORMAL RESPONSE' SDLC command.  This value is coded as the 'REPLYTO' for the link.          *
*   In this case, there is no other active PU on the link.  If another had been active, it would            *
*   have experienced performance degradation due to the link being unavailable while NCP is trying to contact *
*   the failing PU.  Because NCP will retry indefinitely to establish this session (or until the PU is      *
*   varied inactive with the 'I' modifier),  it is important on a multidrop circuit to minimize the impact  *
*   of a failing PU on operational PU's.  This can be done by reducing the 'REPLYTO' value or by increasing *
*   the 'SERVLIM' value.   The line trace is on a 1H line set.                                              *
*                                                                                                           *
*************************************************************************************************************
```

```
USRFD FF2 ASCB 00FEFF18  JOBN NET
          LINE      DNODE NCPCH2        EP 00       TIME FF
                           LCD 9  PCF 9  TIME 9A  SCF 45  PDF 7E     LCD 9  PCF 9  TIME 9A  SCF 40  PDF C1
                           LCD 9  PCF 9  TIME 9A  SCF 40  PDF 93     LCD 9  PCF 9  TIME 9A  SCF 40  PDF 27
                           LCD 9  PCF 9  TIME 9A  SCF 40  PDF 7A     LCD 9  PCF 9  TIME 9A  SCF 45  PDF 7E
                           LCD 9  PCF 9  TIME BC  SCF 45  PDF 7E     LCD 9  PCF 9  TIME BC  SCF 40  PDF C1
                           LCD 9  PCF 9  TIME BC  SCF 40  PDF 93     LCD 9  PCF 9  TIME BC  SCF 40  PDF 27
                           LCD 9  PCF 9  TIME BC  SCF 40  PDF 7A     LCD 9  PCF 9  TIME BC  SCF 45  PDF 7E
                           LCD 9  PCF 9  TIME DE  SCF 45  PDF 7E     LCD 9  PCF 9  TIME DE  SCF 40  PDF C1
                           LCD 9  PCF 9  TIME DE  SCF 40  PDF 93     LCD 9  PCF 9  TIME DE  SCF 40  PDF 27
                           LCD 9  PCF 9  TIME DE  SCF 40  PDF 7A     LCD 9  PCF 9  TIME DE  SCF 45  PDF 7E
          TIME    36567.116362
```

```
*************************************************************************************************************
*                                                                                                           *
*   The operator now stops the trace to print and analyze it.  Alternative methods of determining that NCP *
*   was polling the PU could have been used.  Among these are Line Data Monitors (PT-2,  etc.) or           *
*   a speaker or headset attached to each side of the circuit in turn.  The poll could have been heard on   *
*   the transmit side of the circuit, but the receive side would have been silent.                          *
*                                                                                                           *
*************************************************************************************************************
```

```
f net,notrace,type=line,id=sdlc13a
10.09.50 STC   82  IST097I  MODIFY   ACCEPTED
10.09.51 STC   82  IST512I  TRACE TERMINATED FOR NODE= SDLC13A

*****************************************************************************************************
*                                                                                                   *
*   In this case, the remote 3770 had the BSC/SDLC switch in the BSC position.  The problem was corrected and  *
*   the trace below shows the NCP sending to VTAM a 'CONTACTED' PIU to indicate that it has received an SDLC   *
*   'NSA' response to the 'SNRM' command.                                                           *
*                                                                                                   *
*****************************************************************************************************

RNIO ASCB 00FEFF18  CPU 0000 JOBN NET          IN 1C000800 28000019 00090B00 00010280 284601
         TIME    36680.135742
USRFD FEF ASCB 00FEFF18  JOBN NET
          TPIOS IN  ANODE VTAM       FDB  00000000 00B80789 00060000   RSVD 0833   LNG2 00DC
            REMOTE  DNODE NCPCH2     FSB  022C0000 00000000 08002800 00190000 00000000 00000000 00000000 00090000
                                     THRH 1C000800 28000019 00090B00 00
                                     TEXT 01028028 4601                                  *......              *
         TIME    36680.156885

*****************************************************************************************************
*                                                                                                   *
*   VTAM will now respond to the previous 'V NET,ACT,..' command for the Physical Unit.             *
*                                                                                                   *
*****************************************************************************************************

          10.11.21 STC   82  IST093I  PU3770P  ACTIVE
```

5.2.5 : BSC 3270 DATA FLOW SEQUENCE

```
*****************************************************************************************************
*                                                                                                   *
*   The sequence below shows the SNA  data flow associated with a BSC 3270 terminal.  Console output and  *
*   trace data are interspersed.  Network operator commands are in lower case.                      *
*                                                                                                   *
*   This display command shows that the bsc cluster 'BSC3276' is inactive.  Since the every option was  *
*   specified on the display command, the status of all the terminals on the cluster is listed. The status of  *
*   each device is ACT since ISTATUS=ACTIVE was coded on the terminal macros.  Therefore, when the cluster is  *
*   varied active, the devices will come up active.                                                 *
*                                                                                                   *
*****************************************************************************************************

          d net,id=bsc3276,e
          15.05.45 STC  341  IST097I  DISPLAY  ACCEPTED
```

```
15.05.46 STC  341  IEE932I 227
 IST075I  VTAM DISPLAY- NODE TYPE= PU     ,NAME= BSC3276  ,STATUS= INACT
 IST081I  LINE NAME= BSC130    , LINE GROUP= GRP3270  , 370X= NCP6CH2
 IST654I  I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST079I  TERMINALS:
 IST080I  BSC76P1    ACT         BSC76P2    ACT         BSC76P3    ACT
 IST080I  BSC76P4    ACT
```

```
*                                                                                                                    *
*   VTAM I/O and buffer trace was started for both the cluster and the first device on the cluster (BSC76P1).        *
*                                                                                                                    *
```

```
f net,id=bsc76p1,trace,type=io
15.06.19 STC  341  IST097I  MODIFY   ACCEPTED
15.06.20 STC  341  IST513I  TRACE INITIATED FOR NODE BSC76P1
f net,id=bsc76p1,trace,type=buf
15.07.21 STC  341  IST097I  MODIFY   ACCEPTED
15.07.22 STC  341  IST513I  TRACE INITIATED FOR NODE BSC76P1
f net,id=bsc3276,trace,type=io
15.07.42 STC  341  IST097I  MODIFY   ACCEPTED
15.07.43 STC  341  IST513I  TRACE INITIATED FOR NODE BSC3276
f net,id=bsc3276,trace,type=buf
15.08.14 STC  341  IST097I  MODIFY   ACCEPTED
15.08.14 STC  341  IST513I  TRACE INITIATED FOR NODE BSC3276
```

```
*                                                                                                                    *
*   The cluster was varied active and since LOGAPPL=NETSOL was coded for each device, VTAM drives NETSOL's          *
*   logon exit and NETSOL issues 'OPNDST' for each device and writes an opening message. BSC76P2 and                 *
*   BSC76p3 are not physically connected, so this initial '020A' (write with contact command) fails with status*
*   'EA18' (BSC error status -  EOT received).                                                                       *
*                                                                                                                    *
```

```
v net,id=bsc3276,act
15.08.43 STC  341  IST097I  VARY     ACCEPTED
15.08.44 STC  341  IST093I  BSC3276  ACTIVE
15.08.53 STC  341  IST209A  BSC76P2  INTERVENTION REQD  020A - BSC STATUS = EA - 18
15.08.53 STC  341  IST209A  BSC76P3  INTERVENTION REQD  020A - BSC STATUS = EA - 18
```

```
*                                                                                                                    *
*   The following trace entries were generated by the vary active command.  Due to NETSOL's issuing 'OPNDST'       *
*   to the terminal VTAM, sends a 'set destination mode' (080A) and an 'invite perpetual' (0506) command to        *
*   the cluster.  NETSOL then sends the enter logon message.  This results in a 'set destination mode' and a       *
*   'write with contact' (020A) BTU command.                                                                         *
```

```
*                                                                                                                    *
**********************************************************************************************************************

RNIO ASCB 00FEFF18  CPU 0000 JOBN NET          OUT 0E00280F 08011001 000C0000 0000089A 00000000
          TIME    58545.868568
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET           IN 0E000801 280F1001 000A9B80 0000089A 00006000
          TIME    58545.974492
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET          OUT 0E00280F 08010000 000A0000 00000506 00000000
          TIME    58546.095837
USRFD FF1 ASCB 00FEFF18  JOBN NET
           C/L  OUT  ANODE NETSOL     TEXT C3114040 1311C36F 1D60D4E5 E2E5D440 E2E8E2E3  *C.  ..C?.-MVSVM SYST*
                     DNODE BSC76P1         C5D46B40 C5D5E3C5 D940D3D6 C7D6D540 C3D6D4D4  *EM, ENTER LOGON COMM*
                                           C1D5C4E2 3CC5E800 1D40                        *ANDS.EY..           *
          TIME    58546.329009
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET          OUT 0E002810 08011001 000D0000 0000089A 00000000
          TIME    58546.576391
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET           IN 0E000801 28101001 000A9B80 0000089A 00006000
          TIME    58546.636748
USRFD FEF ASCB 00FEFF18  JOBN NET
           TPIOS OUT ANODE NETSOL     FDB  00000000 00B7E110 00480000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
             REMOTE  DNODE BSC76P1    THRH 0E002810 08010182 000C0000 0000020A 10020000
                                      TEXT 27F5C311 40401311 C36F1D60 D4E5E2E5 D440E2E8  *.5C.  ..C?.-MVSVM SY*
                                           E2E3C5D4 6B40C5D5 E3C5D940 D3D6C7D6 D540C3D6  *STEM, ENTER LOGON CO*
                                           D4D4C1D5 C4E23CC5 E8001D40                    *MMANDS.EY..         *
          TIME    58546.889333
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET          OUT 0E002810 08010182 003E0000 0000020A 10020000
          TIME    58546.985592
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET           IN 0E000801 28100182 000A9B80 0000020A 10026098
          TIME    58552.570776

**********************************************************************************************************************
*                                                                                                                    *
*   A display of the terminal (BSC76P1) indicates it is in session with NETSOL.                                      *
*                                                                                                                    *
**********************************************************************************************************************

              d net,id=bsc76p1
              15.09.42 STC  341  IST097I  DISPLAY  ACCEPTED
              15.09.42 STC  341  IEE932I 248
               IST075I  VTAM DISPLAY- NODE TYPE= TERM  ,NAME= BSC76P1  ,STATUS= ACT
               IST081I  LINE NAME= BSC130   , LINE GROUP= GRP3270  , 370X= NCP6CH2
               IST082I  DEVICE TYPE= 3277 , ALLOC TO= NETSOL   ,SIMLOGON= NETSOL
               IST654I  I/O TRACE= ON  ,BUFFER TRACE= ON
               IST651I  TRANSMISSION LIMIT= 0001

**********************************************************************************************************************
*                                                                                                                    *
*   At this point, the terminal operator logged on to TSO.   The following trace entries are generated as a          *
```

```
*   result of this logon.                                                                                                *
*                                                                                                                        *
**************************************************************************************************************************

RNIO ASCB 00FEFF18  CPU 0000 JOBN NET           IN 0E000801 28100000 00249B80 00000103 50006218
          TIME    58681.628312
USRFD FEF ASCB 00FEFF18  JOBN NET
           TPIOS IN  ANODE NETSOL     FDB  00000000 00B7E3F0 001A0000   RSVD 0833   LNG2 00DC
             REMOTE  DNODE BSC76P1    FSB  022C0000 00000000 08012810 00006218 00000000 00000000 00000000
                                      THRH 0E002810 08010000 001A9B80 00000103 50006218
                                      TEXT 40407D40 D211C5E9 93968796 9540A887 93F06193  *  ' K.EZlogon ygl0/l*
                                           89828599 A3A8                                 *iberty              *
          TIME    58681.641484
USRFD FF1 ASCB 00FEFF18  JOBN NET
           C/L  IN   ANODE NETSOL     TEXT 7D40D211 C5E99396 87969540 A88793F0 61938982  *' K.EZlogon ygl0/lib*
                     DNODE BSC76P1         8599A3A8                                      *erty                *
          TIME    58681.685336
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET          OUT 0E002810 08010187 000A0000 00000700 00000000
          TIME    58681.946538
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET           IN 0E000801 28100187 000A9B80 00000700 00006098
          TIME    58682.119336
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET          OUT 0E002810 08011001 000D0000 0000089A 00000000
          TIME    58682.841202
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET           IN 0E000801 28101001 000A9B80 0000089A 00006000
          TIME    58682.895836
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET          OUT 0E002810 08011001 000D0000 0000089A 00000000
          TIME    58685.027976
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET           IN 0E000801 28101001 000A9B80 0000089A 00006000
          TIME    58685.124444
USRFD FF1 ASCB 00FD92C8  JOBN YGL0
           C/L  OUT  ANODE TSO0002    TEXT F1C1115D 7F1D4011 C1501DC8 E8C7D3F0 40D3D6C7  *1A.)". .A&.HYGL0 LOG*
                     DNODE BSC76P1         D6D540C9 D540D7D9 D6C7D9C5 E2E240C1 E340F1F6  *ON IN PROGRESS AT 16*
                                           7AF1F87A F0F640D6 D540C6C5 C2D9E4C1 D9E840F1  *:18:06 ON FEBRUARY 1*
                                           F56B40F1 F9F7F81D 4011C260 13                 *5, 1978. .B-.       *
          TIME    58686.298175
USRFD FEF ASCB 00FD92C8  JOBN YGL0
           TPIOS OUT ANODE TSO0002    FDB  00000000 00B7F110 005E0000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
             REMOTE  DNODE BSC76P1    THRH 0E002810 08010182 000C0000 0000020A 10000000
                                      TEXT 27F1C111 5D7F1D40 11C1501D C8E8C7D3 F040D3D6  *.1A.)". .A&.HYGL0 LO*
                                           C7D6D540 C9D540D7 D9D6C7D9 C5E2E240 C1E340F1  *GON IN PROGRESS AT 1*
                                           F67AF1F8 7AF0F640 D6D540C6 C5C2D9E4 C1D9E840  *6:18:06 ON FEBRUARY *
                                           F1F56B40 F1F9F7F8 1D4011C2 6013               *15, 1978. .B-.      *
          TIME    58686.327864
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0          OUT 0E002810 08010182 00540000 0000020A 10000000
          TIME    58686.381104
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0           IN 0E000801 28100182 000A9B80 0000020A 10006098
          TIME    58686.799192
USRFD FEF ASCB 00FD92C8  JOBN YGL0
```

```
          TPIOS OUT ANODE TSO0002    FDB  00000000 00B7F1F8 00500000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE BSC76P1    THRH 0E002810 08010183 000C0000 00000202 10000000
                                     TEXT 27F1C111 C2601DC8 40D7C1D3 D640C1D3 E3D640E2  *.1A.B-.H PALO ALTO S*
                                          E8E2E3C5 D4E240C3 C5D5E3C5 D940D4E5 E240E2E8  *YSTEMS CENTER MVS SY*
                                          E2E3C5D4 406040C9 D7D640F2 4BF01D40 11C3F013  *STEM - IPO 2.0. .C0.*
          TIME    58691.991831
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0         OUT 0E002810 08010183 00460000 00000202 10000000
          TIME    58692.049606
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0          IN 0E000801 28100183 000A9B80 00000202 10006098
          TIME    58692.420583
USRFD FEF ASCB 00FD92C8  JOBN YGL0
          TPIOS OUT ANODE TSO0002    FDB  00000000 00B7F680 00440000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE BSC76P1    THRH 0E002810 08010184 000C0000 00000202 10000000
                                     TEXT 27F1C111 C3F01DC8 401D4011 C5401DC8 F0F240E4  *.1A.C0.H . .E .H02 U*
                                          E2C5D9E2 40C3E4D9 D9C5D5E3 D3E840D6 D5D3C9D5  *SERS CURRENTLY ONLIN*
                                          C54B1D40 11C65013                             *E.. .F&.            *
          TIME    58699.591160
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0         OUT 0E002810 08010184 003A0000 00000202 10000000
          TIME    58699.772407
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0          IN 0E000801 28100184 000A9B80 00000202 10006098
          TIME    58700.133211
USRFD FEF ASCB 00FD92C8  JOBN YGL0
          TPIOS OUT ANODE TSO0002    FDB  00000000 00B7E028 00300000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE BSC76P1    THRH 0E002810 08010185 000C0000 00000202 10000000
                                     TEXT 27F1C311 C6501DC8 401D4011 C7601DC8 D9C5C1C4  *.1C.F&.H . .G-.HREAD*
                                          E8401D40 11C8F013                             *Y . .H0.            *
          TIME    58700.335404
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0         OUT 0E002810 08010185 00260000 00000202 10000000
          TIME    58700.510110
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0          IN 0E000801 28100185 000A9B80 00000202 10006098
          TIME    58700.701771
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0          IN 0E000801 28100000 00159B80 00000103 50006218
          TIME    58705.770391
USRFD FEF ASCB 00FD92C8  JOBN YGL0
          TPIOS IN  ANODE TSO0002    FDB  00000000 00B7E138 000B0000   RSVD 0833   LNG2 00DC
            REMOTE  DNODE BSC76P1    FSB  022C0000 00000000 08012810 00006218 00000000 00000000 00000000
                                     THRH 0E002810 08010000 000B9B80 00000103 50006218
                                     TEXT 40407DC8 F311C7E8 A29786                      *  'H3.GYsp£         *
          TIME    58705.953899
USRFD FF1 ASCB 00FD92C8  JOBN YGL0
           C/L  IN    ANODE TSO0002  TEXT 7DC8F311 C7E8A297 86                          *'H3.GYsp£           *
                      DNODE BSC76P1
          TIME    58706.034061
USRFD FEF ASCB 00FD92C8  JOBN YGL0
          TPIOS OUT ANODE TSO0002    FDB  00000000 00B7ECD8 002E0000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE BSC76P1    THRH 0E002810 08010186 000C0000 00000202 10000000
                                     TEXT 27F14011 5D7F1140 403CC760 003C4F40 003CD660  *.1 .)".  .G-..| ..O-*
                                          003C4040 0013                                 *..  ..              *
```

```
         TIME    58712.352998
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0         OUT 0E002810 08010186 00240000 00000202 10000000
         TIME    58712.405290
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0          IN 0E000801 28100186 000A9B80 00000202 10006098
         TIME    58712.699798
USRFD FEF ASCB 00FD92C8  JOBN YGL0
          TPIOS OUT ANODE TS00002    FDB  00B7E91C 00B7F4B0 00C00000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE BSC76P1    THRH 0E002810 08010187 000C0000 00000202 10000000
                                     TEXT 27F14211 5D7F1140 401DE83C 40D86040 40E2D7C6  *.1..)".  .Y. Q-  SPF*
                                          40D7D9C9 D4C1D9E8 40D6D7E3 C9D6D540 D4C5D5E4  * PRIMARY OPTION MENU*
                                          4040603C C150601D E8E2C5D3 C5C3E340 D6D7E3C9  *  -.A&-.YSELECT OPTI*
                                          D6D5407E 7E7E6E1D C83CC16C 401D603C C260401D  *ON ===>.H.A% .-.B- .*
                                          E83CC3F0 401DE840 40F1401D 60C2D9D6 E6E2C53C  *Y.C0 .Y  1 .-BROWSE.*
                                          C4C14060 40E2C3C1 D540E2                      *DA - SCAN S         *
         TIME    58734.047880
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0         OUT 0E002810 08010187 03AB0000 00000202 10000000
         TIME    58734.177376
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0          IN 0E000801 28100187 000A9B80 00000202 10006098
         TIME    58735.997598
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0          IN 0E000801 28100000 000F9B80 00000103 50006218
         TIME    58738.439290
USRFD FEF ASCB 00FD92C8  JOBN YGL0
          TPIOS IN  ANODE TS00002    FDB  00000000 00B7EDE8 00050000   RSVD 0833   LNG2 00DC
            REMOTE  DNODE BSC76P1    FSB  022C0000 00000000 08012810 00006218 00000000 00000000 00000000 00000000
                                     THRH 0E002810 08010000 00059B80 00000103 50006218
                                     TEXT 4040F3C1 E4                              *  3AU               *
         TIME    58738.857488
USRFD FF1 ASCB 00FD92C8  JOBN YGL0
          C/L  IN   ANODE TS00002    TEXT F3C1E4                                   *3AU                 *
                    DNODE BSC76P1
         TIME    58738.986223
USRFD FEF ASCB 00FD92C8  JOBN YGL0
          TPIOS OUT ANODE TS00002    FDB  00B7E664 00B7EDC0 00C00000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE BSC76P1    THRH 0E002810 08010188 000C0000 00000202 10000000
                                     TEXT 27F14211 5D7F1140 C1E2D7C5 C3C9C6E8 40C4C9E2  *.1..)". ASPECIFY DIS*
                                          D7D6E2C9 E3C9D6D5 40D6C640 1DE8E2D7 C6F04BD3  *POSITION OF .YSPF0.L*
                                          C9E2E340 1DE8C1D5 C4401DE8 E2D7C6D3 D6C7F04B  *IST .YAND .YSPFLOG0.*
                                          D3C9E2E3 401DE811 C16C1DE8 11C3F3D1 C411C3F6  *LIST .Y.A%.Y.C3JD.C6*
                                          40E2E4C2 D4C9E340 D1D6C240 E3D640D7 D9C9D5E3  * SUBMIT JOB TO PRINT*
                                          40C1D5C4 40C4C5D3 C5E3C5                      * AND DELETE         *
         TIME    58739.324457
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0         OUT 0E002810 08010188 01F70000 00000202 10000000
         TIME    58739.455954
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0          IN 0E000801 28100188 000A9B80 00000202 10006098
         TIME    58740.564845
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0          IN 0E000801 28100000 001A9B80 00000103 50006218
         TIME    58744.706539
USRFD FEF ASCB 00FD92C8  JOBN YGL0
```

```
          TPIOS IN  ANODE TSO0002    FDB  00000000 00B7E3F0 00100000   RSVD 0833   LNG2 00DC
            REMOTE  DNODE BSC76P1    FSB  022C0000 00000000 08012810 00006218 00000000 00000000 00000000
                                     THRH 0E002810 08010000 00109B80 00000103 50006218
                                     TEXT 40407DC1 E511C1E4 84404040 40404040          *  'AV.AUd           *
          TIME    58745.037669
USRFD FF1 ASCB 00FD92C8  JOBN YGL0
           C/L  IN   ANODE TSO0002    TEXT 7DC1E511 C1E48440 40404040 4040              *'AV.AUd             *
                     DNODE BSC76P1
          TIME    58745.120038
USRFD FEF ASCB 00FD92C8  JOBN YGL0
          TPIOS OUT ANODE TSO0002    FDB  00000000 00B7E3C8 002E0000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE BSC76P1    THRH 0E002810 08010189 000C0000 00000202 10000000
                                     TEXT 27F14011 5D7E1140 403CC760 003C4F40 003CD660  *.1 .)=.  .G-..| ..O-*
                                          003C4040 0013                                 *..  ..             *
          TIME    58753.007157
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0         OUT 0E002810 08010189 00240000 00000202 10000000
          TIME    58753.075324
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0          IN 0E000801 28100189 000A9B80 00000202 10006098
          TIME    58753.406857
USRFD FEF ASCB 00FD92C8  JOBN YGL0
          TPIOS OUT ANODE TSO0002    FDB  00000000 00B7E768 00280000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE BSC76P1    THRH 0E002810 0801018A 000C0000 00000202 10000000
                                     TEXT 27F1C311 C1501DC8 D9C5C1C4 E8401D40 11C26013  *.1C.A&.HREADY . .B-.*
          TIME    58753.509440
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0         OUT 0E002810 0801018A 001E0000 00000202 10000000
          TIME    58753.592605
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0          IN 0E000801 2810018A 000A9B80 00000202 10006098
          TIME    58753.919485
```

```
*****************************************************************************************************************
*                                                                                                               *
*   The following messages appeared on the system operator's console.                                           *
*                                                                                                               *
*****************************************************************************************************************

             15.11.53 TSU   83  $HASP100 YGL0     ON TSOINRDR
             15.11.56 TSU   83  $HASP373 YGL0     STARTED


*****************************************************************************************************************
*                                                                                                               *
*  At this point a display of the terminal indicates it is in session  with TSO.                               *
*                                                                                                               *
*****************************************************************************************************************

             d net,id=bsc76p1
             15.12.40 STC  341  IST097I  DISPLAY  ACCEPTED
             15.12.41 STC  341  IEE932I 254
```

```
            IST075I  VTAM DISPLAY- NODE TYPE= TERM  ,NAME= BSC76P1  ,STATUS= ACT
            IST081I  LINE NAME= BSC130   , LINE GROUP= GRP3270  , 370X= NCP6CH2
            IST082I  DEVICE TYPE= 3277 , ALLOC TO= TSO0001  ,SIMLOGON= NETSOL
            IST654I  I/O TRACE= ON  ,BUFFER TRACE= ON
            IST651I  TRANSMISSION LIMIT= 0001

*****************************************************************************************************
*                                                                                                   *
*  At this point the terminal operator logs off TSO and since LOGAPPL=NETSOL was coded on the TERMINAL NETSOL's*
*  logon exit is driven and NETSOL issues an 'OPNDST' to the terminal. The following trace entries reflect     *
*  this sequence.                                                                                   *
*                                                                                                   *
*****************************************************************************************************
RNIO ASCB 00FD92C8  CPU 0000 JOBN YGL0          IN 0E000801 28100000 00189B80 00000103 50006218
         TIME    58757.335462
USRFD FEF ASCB 00FD92C8  JOBN YGL0
          TPIOS IN  ANODE TSO0002    FDB  00000000 00B7F138 000E0000   RSVD 0833   LNG2 00DC
            REMOTE  DNODE BSC76P1    FSB  022C0000 00000000 08012810 00006218 00000000 00000000 00000000
                                     THRH 0E002810 08010000 000E9B80 00000103 50006218
                                     TEXT 40407DC2 E611C1D8 93968796 8686               *  'BW.AQlogoff      *
         TIME    58757.666976
USRFD FF1 ASCB 00FD92C8  JOBN YGL0
          C/L  IN   ANODE TSO0002    TEXT 7DC2E611 C1D89396 87968686                    *'BW.AQlogoff        *
                    DNODE BSC76P1
         TIME    58757.777407
USRFD FF1 ASCB 00FD92C8  JOBN N/A
          C/L  OUT  ANODE TSO0002    TEXT F1C111C3 F01DC8E8 C7D3F040 D3D6C7C7 C5C440D6  *1A.C0.HYGL0 LOGGED O*
                    DNODE BSC76P1         C6C640E3 E2D640C1 E340F1F6 7AF1F97A F2F340D6  *FF TSO AT 16:19:23 O*
                                          D540C6C5 C2D9E4C1 D9E840F1 F56B40F1 F9F7F81D  *N FEBRUARY 15, 1978.*
                                          4011C540 13                                  * .E .               *
         TIME    58763.221367
USRFD FEF ASCB 00FD92C8  JOBN N/A
          TPIOS OUT ANODE TSO0002    FDB  00000000 00B7F110 00560000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE BSC76P1    THRH 0E002810 0801018B 000C0000 00000202 10000000
                                     TEXT 27F1C111 C3F01DC8 E8C7D3F0 40D3D6C7 C7C5C440  *.1A.C0.HYGL0 LOGGED *
                                          D6C6C640 E3E2D640 C1E340F1 F67AF1F9 7AF2F340  *OFF TSO AT 16:19:23 *
                                          D6D540C6 C5C2D9E4 C1D9E840 F1F56B40 F1F9F7F8  *ON FEBRUARY 15, 1978*
                                          1D4011C5 4013                                *. .E .              *
         TIME    58763.231763
RNIO ASCB 00FD92C8  CPU 0000 JOBN N/A          OUT 0E002810 0801018B 004C0000 00000202 10000000
         TIME    58763.279268
RNIO ASCB 00FD92C8  CPU 0000 JOBN N/A           IN 0E000801 2810018B 000A9B80 00000202 10006098
         TIME    58763.648570
USRFD FF1 ASCB 00FD92C8  JOBN N/A
          C/L  OUT  ANODE TSO0002    TEXT F1C111C5 401DC85C 5C5C5C5C 5C1D4011 C65013    *1A.E .H******. .F&. *
                    DNODE BSC76P1
         TIME    58763.799484
USRFD FEF ASCB 00FD92C8  JOBN N/A
```

```
          TPIOS OUT ANODE TSO0002     FDB  00000000 00B7E4B0 00280000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
            REMOTE  DNODE BSC76P1     THRH 0E002810 0801018C 000C0000 00000202 10000000
                                      TEXT 27F1C111 C5401DC8 5C5C5C5C 5C5C1D40 11C65013  *.1A.E .H******. .F&.*
          TIME    58763.806126
RNIO ASCB 00FD92C8  CPU 0000 JOBN N/A          OUT 0E002810 0801018C 001E0000 00000202 10000000
          TIME    58763.886748
RNIO ASCB 00FD92C8  CPU 0000 JOBN N/A           IN 0E000801 2810018C 000A9B80 00000202 10006098
          TIME    58764.216335
RNIO ASCB 00FD92C8  CPU 0000 JOBN N/A          OUT 0E002810 0801018E 000A0000 00000700 00000000
          TIME    58764.799730
RNIO ASCB 00FD92C8  CPU 0000 JOBN N/A           IN 0E000801 2810018E 000A9B80 00000700 00006098
          TIME    58764.914442
USRFD FF1 ASCB 00FEFF18  JOBN NET
           C/L  OUT  ANODE NETSOL     TEXT C3114040 1311C36F 1D60D4E5 E2E5D440 E2E8E2E3  *C.  ..C?.-MVSVM SYST*
                     DNODE BSC76P1         C5D46B40 C5D5E3C5 D940D3D6 C7D6D540 C3D6D4D4  *EM, ENTER LOGON COMM*
                                           C1D5C4E2 3CC5E800 1D40                        *ANDS.EY..           *
          TIME    58765.733238
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET          OUT 0E002810 08011001 000D0000 0000089A 00000000
          TIME    58765.794727
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET           IN 0E000801 28101001 000A9B80 0000089A 00006000
          TIME    58765.908386
USRFD FEF ASCB 00FEFF18  JOBN NET
           TPIOS OUT ANODE NETSOL     FDB  00000000 00B7E598 00480000   RSVD 0000   LNG2 00C0   RSVD  00000000 00000000
             REMOTE  DNODE BSC76P1    THRH 0E002810 08010182 000C0000 0000020A 10020000
                                      TEXT 27F5C311 40401311 C36F1D60 D4E5E2E5 D440E2E8  *.5C.  ..C?.-MVSVM SY*
                                           E2E3C5D4 6B40C5D5 E3C5D940 D3D6C7D6 D540C3D6  *STEM, ENTER LOGON CO*
                                           D4D4C1D5 C4E23CC5 E8001D40                    *MMANDS.EY..         *
          TIME    58765.934916
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET          OUT 0E002810 08010182 003E0000 0000020A 10020000
          TIME    58765.986337
RNIO ASCB 00FEFF18  CPU 0000 JOBN NET           IN 0E000801 28100182 000A9B80 0000020A 10026098
          TIME    58766.311067

*****************************************************************************************************
*                                                                                                   *
*  The following messages appear on the operator's console.                                         *
*                                                                                                   *
*****************************************************************************************************

              15.13.04 TSU    83  $HASP395 YGL0     ENDED
              15.13.05 TSU    83  $HASP250 YGL0     IS PURGED
```

5.2.6 : CICS AUXILIARY TRACE/VTAM TRACE

The traces included in this section are: CICS AXILIARY TRACE, VTAM GTF TRACE AND ACF/TAP TRACE. The intent of these traces is to show the data flow between CICS and SNA terminals. CICS/OS/VS 1.3 and 3274/3278 SNA terminals are actually used to produce these traces. By matching the CICS trace entries with the VTAM trace entries, the user may have the information of the data flow between CICS and the SNA terminals as well as how CICS handles the data flow.

Sequence of events at the system console and CICS terminals to produce these traces are as follows:

step	ACTION	CONSOLE/TERMINAL
1	Start CICS	System Console
2	Start GTF BUF/IO Trace	"
3	Start acf/tap Trace	"
4	Logon at CICS master terminal	PA03
5	Hit sys req key	"
6	CSMT RUN,0	"
7	CSMT ATR,ON	"
8	CSMT TER,SIN,ACQ,TERMID=PA05	"
9	Hit sys req key	PA05
10	CSFE	"
11	Enter 'PRINT'	"
12	Enter 'END'	"
13	CSMT TER,SIN,REL,TERMID=PA05	PA03
14	CSMT ATR,ATC	"
15	CSMT ATR,OFF	"
16	CSMT RUN,5000	"
17	CSMT SHUT,YES	"
18	Print GTF trace	system console
19	Print ACF/TAP	"
20	Print CICS aux trace	"

The following samples show the actual traces of CICS auxiliary trace, GTF VTAM BUF/IO trace and ACF/TAP trace. The GTF VTAM BUF/IO trace and ACF/TAP trace begin (step 2 & step 3) before the CICS auxiliary trace is started (step 7).

CICS AUXILIARY TRACE

TIME OF DAY	ID	REG14	REQD	TASK	FIELD A	FIELD B	CHAR-DISPLAY	TRACE TYPE		INTERVAL TIME
AUXILIARY TRACE ACTIVATED AT - 14:39:38.02										
14:41:56.852512	D0	311B7E	0500	E3C3	00000000	00000000	......TC........	KCP DISPATCH	*	00.032768
14:41:56.867872	FC	305A4E	0C02	E3C3	00280000	002FB4C4	......TC.......D	ZCP RECEIVE ANY COMPLETION	*	00.015360
14:41:56.868128	F1	307E9E	F000	E3C3	00000084	012FB4C4	1...0.TC.......D	SCP GETMAIN-COND-INIT		00.000256
14:41:56.895264	C8	2F629A	0000	E3C3	0009C000	90000090	H.....TC........	SCP ACQUIRED RPL STORAGE	*	00.027136
14:41:56.895648	F1	308220	A500	E3C3	00090400	012FB4C4	1.....TC.......D	SCP GETMAIN-CONDITIONAL		00.000384
14:41:56.895904	C8	2F629A	0000	E3C3	0009B480	85090418	H.....TC........	SCP ACQUIRED TERMINAL STORAGE		00.000256
14:41:56.896416	FC	3084C2	4002	E3C3	00284880	002FB4C4	...B .TC.......D	ZCP ATTACH		00.000512
14:41:56.896672	F0	306FA0	1100	E3C3	012FB4C4	C3E2D4E3	0.....TC...DCSMT	KCP ATTACH-CONDITIONAL		00.000256
14:41:56.913824	C8	2F629A	0000	E3C3	0009E000	8A040288	H.....TC........	SCP ACQUIRED TCA STORAGE		00.005760
14:41:56.915104	D0	311B7E	0600	0008	D7C1F0F3	C3E2D4E3	........PA03CSMT	KCP CREATE		00.001280
14:41:56.915232	D0	311B7E	0500	E3C3	00000000	00000000	......TC........	KCP DISPATCH		00.000128
14:41:56.915872	F0	305B0E	4000	E3C3	40000000	002FD92C	0... .TC .....R.	KCP WAIT		00.000640
14:41:56.916128	D0	311B7E	0500	0008	00000000	00000000	/...............	KCP DISPATCH		00.000256
14:41:56.926624	F2	30A5EC	0200	0008	C4C6C8D4	E3D7C140	2.......DFHMTPA	PCP XCTL		00.010496
14:41:57.080480	F1	2CA4D2	CC00	0008	00400009	012FB4C4	1..K..... .....D	SCP GETMAIN-INIT	*	00.153856
14:41:57.080864	C8	2F629A	0000	0008	0009E290	8C400018	H.........S.. ..	SCP ACQUIRED USER STORAGE		00.000384
14:41:57.081248	F1	2CA552	CC00	0008	00400019	012FB4C4	1........ .....D	SCP GETMAIN-INIT		00.000384
14:41:57.081504	C8	2F629A	0000	0008	0009E2B0	8C400028	H.........S.. ..	SCP ACQUIRED USER STORAGE		00.000256
14:41:57.084448	F1	2CA87E	4000	0008	0009E2B0	012FB4C4	1... .....S....D	SCP FREEMAIN		00.002944
14:41:57.084576	C9	2F63CA	0000	0008	0009E2B0	8C400028	I.........S.. ..	SCP RELEASED USER STORAGE		00.000128
14:41:57.084832	F2	2CA300	0200	0008	C4C6C8D4	E3D7C340	2.......DFHMTPC	PCP XCTL		00.000256
14:41:57.109792	FC	2C55AE	3404	0008	0101C4C6	D42FB4C4	.........DFM..D	ZCP LOCATE	*	00.024960
14:41:57.110304	FC	2C57F4	3404	0008	04010001	D42FB4C4	...4........M..D	ZCP LOCATE		00.000512
14:41:57.151136	F1	2C6932	CC00	0008	0040004A	012FB4C4	1........ .....D	SCP GETMAIN-INIT	*	00.040832
14:41:57.151520	C8	2F629A	0000	0008	0009E2B0	8C400058	H.........S.. ..	SCP ACQUIRED USER STORAGE		00.000384
14:41:57.153312	FC	2C724E	0B04	0008	00450000	042FB4C4	...............D	ZCP APPL REQ		00.001792
14:41:57.153696	FC	3064FE	0102	0008	00284880	002FB4C4	...............D	ZCP SEND DFSYN		00.000384
14:41:57.153952	FC	309856	0302	0008	00284880	002FB4C4	...............D	ZCP SEND RESPONSE		00.000256
14:41:57.154592	F0	30795E	0D00	0008	0009D130	00000000	0.........J.....	KCP ATTACH HTA		00.000640
14:41:57.283104	F0	30672E	4000	0008	10000000	00000000	0...	KCP WAIT	*	00.128512
14:41:57.283360	D0	311B7E	0A00	0008	00000000	00000000	....	KCP SUSPEND		00.000256
14:41:57.283616	D0	311B7E	0500	E3C3	00000000	00000000	......TC........	KCP DISPATCH		00.000256
14:41:57.284384	FC	305FAE	0502	E3C3	00080000	002FB72C	......TC........	ZCP SIMLOGON		00.000768
14:41:57.284640	F1	30D9EC	F000	E3C3	00000084	012FB72C	1.R.0.TC........	SCP GETMAIN-COND-INIT		00.000256
14:41:57.284896	C8	2F629A	0000	E3C3	0009C090	90000090	H.....TC........	SCP ACQUIRED RPL STORAGE		00.000256
14:41:57.841696	F0	305E7C	0800	E3C3	0009E080	FF000008	0.....TC........	KCP RESUME	*	00.556800

```
14:41:57.842208  FC 305FAE 0602 E3C3 00080000 F52FB72C  ......TC....5...  ZCP OPNDST                          00.000512
14:41:57.961888  F0 305B0E 4000 E3C3 40000000 002FD92C  0... .TC .....R.  KCP WAIT                    *   00.119680
14:41:57.962400  D0 311B7E 0500 0008 00000000 00000000  ................  KCP DISPATCH                      00.000512
14:41:57.962656  FC 2C7280 0B04 0008 00040000 022FB4C4  ..............D   ZCP APPL RE0                      00.000256
14:41:57.962784  F0 306714 4000 0008 20000000 00000000  0... ............  KCP WAIT                          00.000128
14:41:57.963040  D0 311B7E 0500 0008 00000000 00000000  ................  KCP DISPATCH                      00.000256
14:41:57.963296  F2 2C6A48 1000 0008 C4C6C8D4 E3D7C340  2.......DFHMTPC   PCP RETURN                        00.000256
14:41:57.963552  F0 2F41C2 8000 0008 00000000 00000000  0..B............  KCP DETACH                        00.000256
14:41:57.982880  D8 3110D2 0000 0008 02000004 00000000  0..K............  SPP SYSTEM                    *   00.019328
14:41:57.983008  F0 30FEE4 0300 0008 00000000 00000000  0..U............  KCP DE0ALL                        00.000128
14:41:57.983264  D0 311B7E 0500 0008 00000000 00000000  ................  KCP DISPATCH                      00.000256
14:41:57.983520  FC 311150 3202 0008 00280080 F92FB4C4  ............9..D  ZCP DETACH                        00.000256
14:41:57.983776  FC 307426 0102 0008 00280080 002FB4C4  ..............D   ZCP SEND DFSYN                    00.000256
```

GTF VTAM BUF/IO TRACE

```
RNIO ASCB 00FE4578  CPU 0000 JOBN CICS          IN 1C00681A A88D0008 00250390 A07DC77D 11C76183
         TIME    52917.279538
USRFD FEF ASCB 00FE4578  JOBN CICS
          BUFF    CICS13  /SDLCPA03    LRC(000,000)    INBOUND
          VTAM      TH=1C00681A A88D0008 0025  RH= 0390A0
                                  7DC77D11 C76183A2 94A340A3 85996BA2 89956B81  *'G'.G/csmt ter,sin,a*
                                  83986BA3 85999489 847E9781 F0F5               *cq,termid=pa05      *
         TIME    52917.352603
USRFD FF1 ASCB 00FE4578  JOBN CICS
          BUFF    CICS13  /SDLCPA03    LRC(000,000)    INBOUND
                    USER                7DC77D11 C76183A2 94A340A3 85996BA2 89956B81  *'G'.G/csmt ter,sin,a*
                                        83986BA3 85999489 847E9781 F0F5               *cq,termid=pa05      *
         TIME    52917.362222
USRFD FF1 ASCB 00FE4578  JOBN CICS
          BUFF    SDLCPA03/CICS13     LRC(000,000)    OUTBOUND
                    USER                F5C31DF0 40404040 40404040 40404040 40404040  *5C.0                *
                                        40404040 40404040 40404040 40404040 40404040  *                    *
                                        40404040 40404040 40404040 40404040 40404040  *                    *
                                        40404040 40404040 40404040 40404040 40404040  *                    *
                                        404040E2 E3C1E3E4 E240C9E2 40404040 40404040  *   STATUS IS        *
                                        40404040 40404040 40404040 40404040 40404040  *                    *
                                        40404040 40404040 40404040 40404040 40404040  *                    *
                                        40404040 40404040 40404040 40404040 40404040  *                    *
                                        404040C9 D540E2C5 D9E5C9C3 C5404040 40404040  *   IN SERVICE       *
                                        40404040 40404040 40404040 40404040 40404040  *                    *
                                        40404040 40404040 40404040 40404040 40404040  *                    *
                                        40404040                                      *                    *
         TIME    52917.992523
```

```
USRFD FEF ASCB 00FE4578  JOBN CICS
           BUFF     SDLCPA03/CICS13      LRC(000,000)    OUTBOUND
           VTAM        TH=1C00A88D 681A000C 01E9  RH= 039000
                                       F5C31DF0 40404040 40404040 40404040 40404040  *5C.0                *
                                       40404040 40404040 40404040 40404040 40404040  *                    *
                                       40404040 40404040 40404040 40404040 40404040  *                    *
                                       40404040 40404040 40404040 40404040 40404040  *                    *
                                       404040E2 E3C1E3E4 E240C9E2 40404040 40404040  *   STATUS IS        *
                                       40404040 40404040 40404040 40404040 40404040  *                    *
                                       40404040 40404040 40404040 40404040 40404040  *                    *
                                       40404040 40404040 40404040 40404040 40404040  *                    *
                                       404040C9 D540E2C5 D9E5C9C3 C5404040 40404040  *   IN SERVICE       *
                                       40404040 40404040 40404040 40404040 40404040  *                    *
                                       40404040 40404040 404040                      *                    *
           TIME     52918.028919
RNIO ASCB 00FE4578  CPU 0000 JOBN CICS          OUT 1C00A88D 681A000C 01E90390 00F5C31D F0404040
           TIME     52918.032400
USRFD FEF ASCB 00FE4578  JOBN CICS
           BUFF     SDLCPA05/CICS13      LRC(000,000)    OUTBOUND
           VTAM        TH=1D00A88F 681A0001 0026  RH= 6B8000
                                       31010303 B1B03080 000085C7 00000200 00000000  *.........eG........*
                                       00000000 00000006 C3C9C3E2 F1F300             *........CICS13.     *
           TIME     52918.718544
RNIO ASCB 00FE4578  CPU 0000 JOBN CICS          OUT 1D00A88F 681A0001 00266B80 00310103 03B1B030
           TIME     52918.723469
USRFD FEF ASCB 00FE4578  JOBN CICS
           BUFF     SDLCPA03/CICS13      LRC(000,000)    OUTBOUND
           VTAM        TH=1C00A88D 681A000D 0003  RH= 038040
           TIME     52918.792132
RNIO ASCB 00FE4578  CPU 0000 JOBN CICS          OUT 1C00A88D 681A000D 00030380 40
           TIME     52918.797606
```

ACF/TAP TRACE

```
0000067  USER DATA  *'G'.G/C                                                                                *
0000068  DATA FLOW   1C 00 68 1A A8 8D 00 08 00 25 03 90 A0 7D C7 7D 11 C7 61 83 A2 94 A3 40 A3 85 99 6B A2 89 95 6B 81
                    83 98 6B A3 85 99 94 89 84 7E 97 81 F0 F5
         TH  00-00  FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                    * FLOW (EFI): NORMAL    *
         TH  02-09  ORIGIN (OAF): A88D DESTINATION (DAF): 681A * SEQUENCE NUMBER (SNF):00008 * COUNT (DCF):  00037   *
         RH  00-02  RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1     EXCEPTION* CHAIN: ONLY ELEMENT   *
                    RU FORMAT: UNFORMATTED              * PACING INDICATOR: OFF             *                      *
                    BRACKET: BEGIN BRACKET              * CHANGE DIRECTION INDICATOR: SET   * RU CODE: EBCDIC       *
0000068  USER DATA  *'G'.G/CSMT TER,SIM,ACQ,TERMID=PA05                                                      *
0000069  DATA FLOW   1C 00 A8 8D 68 1A 00 0C 01 E9 03 90 00 F5 C3 1D F0 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40
```

```
                  40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40
                  40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 E2 E3 C1
                  E3 E4 E2 40 C9 E2 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40
                  40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40
                  40 40 40 40 40 40 40 40 40 40 40 C9 D5 40 E2 C5 D9 E5 C9 C3 C5 40 40 40 40 40 40 40 40 40 40
                  40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40
        TH  00-00 FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                                 * FLOW (EFI): NORMAL    *
        TH  02-09 ORIGIN (OAF): 681A DESTINATION (DAF): A88D * SEQUENCE NUMBER (SNF):00012 * COUNT (DCF):  00489   *
        RH  00-02 RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1     EXCEPTION* CHAIN: ONLY ELEMENT   *
                  RU FORMAT: UNFORMATTED              * PACING INDICATOR: OFF               *                        *
                  BRACKET:                            * CHANGE DIRECTION INDICATOR: OFF    * RU CODE: EBCDIC       *
0000069 USER DATA *5C.0                                                                          STATUS IS     *
                  *                                                          IN SERVICE                          *
                  *                                                                                              *
0000070 DATA FLOW  1C 00 A8 8D 68 1A 00 0C 01 E9 03 90 00 F5 C3 1D F0 40 40 40
        TH  00-00 FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                                 * FLOW (EFI): NORMAL    *
        TH  02-09 ORIGIN (OAF): 681A DESTINATION (DAF): A88D * SEQUENCE NUMBER (SNF):00012 * COUNT (DCF):  00489   *
        RH  00-02 RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1     EXCEPTION* CHAIN: ONLY ELEMENT   *
                  RU FORMAT: UNFORMATTED              * PACING INDICATOR: OFF               *                        *
                  BRACKET:                            * CHANGE DIRECTION INDICATOR: OFF    * RU CODE: EBCDIC       *
0000070 USER DATA *5C.0                                                                                          *
0000071 DATA FLOW  1D 00 A8 8F 68 1A 00 01 00 26 6B 80 00 31 01 03 03 B1 B0 30 80 00 00 85 C7 00 00 02 00 00 00 00 00
                  00 00 00 00 00 00 00 06 C3 C9 C3 E2 F1 F3 00
        TH  00-00 FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                                 * FLOW (EFI): EXPEDITED *
        TH  02-09 ORIGIN (OAF): 681A DESTINATION (DAF): A88F * SEQUENCE NUMBER (SNF):00001 * COUNT (DCF):  00038   *
        RH  00-02 RU TYPE: SESSION CONTROL   REQUEST  * RESPONSE/REQUEST: DR1               * CHAIN: ONLY ELEMENT   *
                  RU FORMAT:   FORMATTED              * PACING INDICATOR: OFF               *                        *
                  BRACKET:                            * CHANGE DIRECTION INDICATOR: OFF    * RU CODE: EBCDIC       *
        RU  00-   COMMAND: BIND    BIND SESSION            CMD DATA: 01 03 03 B1 B0 30 80 00 00 85 C7 00 00 02          BIND
0000071 USER DATA *.........EG.................CICS13.                                                               *
0000072 DATA FLOW  1D 00 A8 8F 68 1A 00 01 00 26 6B 80 00 31 01 03 03 B1 B0 30
        TH  00-00 FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                                 * FLOW (EFI): EXPEDITED *
        TH  02-09 ORIGIN (OAF): 681A DESTINATION (DAF): A88F * SEQUENCE NUMBER (SNF):00001 * COUNT (DCF):  00038   *
        RH  00-02 RU TYPE: SESSION CONTROL   REQUEST  * RESPONSE/REQUEST: DR1               * CHAIN: ONLY ELEMENT   *
                  RU FORMAT:   FORMATTED              * PACING INDICATOR: OFF               *                        *
                  BRACKET:                            * CHANGE DIRECTION INDICATOR: OFF    * RU CODE: EBCDIC       *
        RU  00-   COMMAND: BIND    BIND SESSION            CMD DATA: 01 03 03 B1 B0 30                               BIND
0000072 USER DATA *......                                                                                        *
0000073 DATA FLOW  1C 00 A8 8D 68 1A 00 0D 00 03 03 80 40
        TH  00-00 FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                                 * FLOW (EFI): NORMAL    *
        TH  02-09 ORIGIN (OAF): 681A DESTINATION (DAF): A88D * SEQUENCE NUMBER (SNF):00013 * COUNT (DCF):  00003   *
        RH  00-02 RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1               * CHAIN: ONLY ELEMENT   *
                  RU FORMAT: UNFORMATTED              * PACING INDICATOR: OFF               *                        *
                  BRACKET:          END BRACKET       * CHANGE DIRECTION INDICATOR: OFF    * RU CODE: EBCDIC       *
0000074 DATA FLOW  1C 00 A8 8D 68 1A 00 0D 00 03 03 80 40
        TH  00-00 FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                                 * FLOW (EFI): NORMAL    *
        TH  02-09 ORIGIN (OAF): 681A DESTINATION (DAF): A88D * SEQUENCE NUMBER (SNF):00013 * COUNT (DCF):  00003   *
        RH  00-02 RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1               * CHAIN: ONLY ELEMENT   *
```

```
RU FORMAT: UNFORMATTED          * PACING INDICATOR: OFF          *                    *
BRACKET:              END BRACKET * CHANGE DIRECTION INDICATOR: OFF    * RU CODE: EBCDIC    *
```

EXAMPLE OF RELATED CICS TRACE AND VTAM TRACE AND ACF/TAP TRACE

```
  14:41:56.852512  D0 311B7E 0500 E3C3 00000000 00000000  ......TC........  KCP DISPATCH                                  *   00.032768

RNIO ASCB 00FE4578  CPU 0000 JOBN CICS          IN 1C00681A A88D0008 00250390 A07DC77D 11C76183**************** ********************
         TIME    52917.279538                                                                                      *inbound,trmnl A88D
USRFD FEF ASCB 00FE4578  JOBN CICS                                                                                 *request,exception
          BUFF    CICS13  /SDLCPA03    LRC(000,000)    INBO                                                        *response,begin
          VTAM       TH=1C00681A A88D0008 0025  RH= 0390A0                                                        *bracket
                                    7DC77D11 C76183A2 94A340A3 85996BA2 89956B81  *'G'.G/csmt ter,sin,a*********************
                                    83986BA3 85999489 847E9781 F0F5               *cq,termid=pa05      *
         TIME    52917.352603
USRFD FF1 ASCB 00FE4578  JOBN CICS
          BUFF    CICS13  /SDLCPA03    LRC(000,000)    INBOUND
                    USER               7DC77D11 C76183A2 94A340A3 85996BA2 89956B81  *'G'.G/csmt ter,sin,a*
                                       83986BA3 85999489 847E9781 F0F5               *cq,termid=pa05      *
         TIME    52917.362222


0000067  DATA FLOW   1C 00 68 1A A8 8D 00 08 00 25 03 90 A0 7D C7 7D 11 C7 61 83
         TH  00-00   FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                          * FLOW (EFI): NORMAL    *
         TH  02-09   ORIGIN (OAF): A88D DESTINATION (DAF): 681A * SEQUENCE NUMBER (SNF):00008 * COUNT (DCF):  00037   *
         RH  00-02   RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1     EXCEPTION* CHAIN: ONLY ELEMENT   *
                     RU FORMAT: UNFORMATTED              * PACING INDICATOR: OFF              *                        *
                     BRACKET: BEGIN BRACKET              * CHANGE DIRECTION INDICATOR: SET    * RU CODE: EBCDIC       *
0000067  USER DATA  *'G'.G/C                                                                                        *
0000068  DATA FLOW   1C 00 68 1A A8 8D 00 08 00 25 03 90 A0 7D C7 7D 11 C7 61 83 A2 94 A3 40 A3 85 99 6B A2 89 95 6B 81
                     83 98 6B A3 85 99 94 89 84 7E 97 81 F0 F5
         TH  00-00   FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                          * FLOW (EFI): NORMAL    *
         TH  02-09   ORIGIN (OAF): A88D DESTINATION (DAF): 681A * SEQUENCE NUMBER (SNF):00008 * COUNT (DCF):  00037   *
         RH  00-02   RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1     EXCEPTION* CHAIN: ONLY ELEMENT   *
                     RU FORMAT: UNFORMATTED              * PACING INDICATOR: OFF              *                        *
                     BRACKET: BEGIN BRACKET              * CHANGE DIRECTION INDICATOR: SET    * RU CODE: EBCDIC       *
0000068  USER DATA  *'G'.G/CSMT TER,SIM,ACQ,TERMID=PA05                                                             *

  14:41:56.867872  FC 305A4E 0C02 E3C3 00280000 002FB4C4  ......TC.......D  ZCP RECEIVE ANY COMPLETION                    *   00.015360
  14:41:56.867872  FC 305A4E 0C02 E3C3 00280000 002FB4C4  ......TC.......D  ZCP RECEIVE ANY COMPLETION                    *   00.015360
  14:41:56.868128  F1 307E9E F000 E3C3 00000084 012FB4C4  1...0.TC.......D  SCP GETMAIN-COND-INIT                             00.000256
  14:41:56.895264  C8 2F629A 0000 E3C3 0009C000 90000090  H.....TC........  SCP ACQUIRED RPL STORAGE                      *   00.027136
  14:41:56.895648  F1 308220 A500 E3C3 00090400 012FB4C4  1.....TC.......D  SCP GETMAIN-CONDITIONAL                           00.000384
  14:41:56.895904  C8 2F629A 0000 E3C3 0009B480 85090418  H.....TC........  SCP ACQUIRED TERMINAL STORAGE                     00.000256
  14:41:56.896416  FC 3084C2 4002 E3C3 00284880 002FB4C4  ...B .TC.......D  ZCP ATTACH                                        00.000512
  14:41:56.896672  F0 306FA0 1100 E3C3 012FB4C4 C3E2D4E3  0.....TC...DCSMT  KCP ATTACH-CONDITIONAL                            00.000256
  14:41:56.913824  C8 2F629A 0000 E3C3 0009E000 8A040288  H.....TC........  SCP ACQUIRED TCA STORAGE                          00.005760
  14:41:56.915104  D0 311B7E 0600 0008 D7C1F0F3 C3E2D4E3  ........PA03CSMT  KCP CREATE                                        00.001280
```

```
14:41:56.915232  D0 311B7E 0500 E3C3 00000000 00000000  ......TC........  KCP DISPATCH                                  00.000128
14:41:56.915872  F0 305B0E 4000 E3C3 40000000 002FD92C  0... .TC .....R.  KCP WAIT                                      00.000640
14:41:56.916128  D0 311B7E 0500 0008 00000000 00000000  ................  KCP DISPATCH                                  00.000256
14:41:56.926624  F2 30A5EC 0200 0008 C4C6C8D4 E3D7C140  2.......DFHMTPA   PCP XCTL                                      00.010496
14:41:57.080480  F1 2CA4D2 CC00 0008 00400009 012FB4C4  1..K..... .....D  SCP GETMAIN-INIT                          *   00.153856
14:41:57.080864  C8 2F629A 0000 0008 0009E290 8C400018  H.........S.. ..  SCP ACQUIRED USER STORAGE                      00.000384
14:41:57.081248  F1 2CA552 CC00 0008 00400019 012FB4C4  1........ .....D  SCP GETMAIN-INIT                              00.000384
14:41:57.081504  C8 2F629A 0000 0008 0009E2B0 8C400028  H.........S.. ..  SCP ACQUIRED USER STORAGE                      00.000256
14:41:57.084448  F1 2CA87E 4000 0008 0009E2B0 012FB4C4  1... .....S....D  SCP FREEMAIN                                  00.002944
14:41:57.084576  C9 2F63CA 0000 0008 0009E2B0 8C400028  I.........S.. ..  SCP RELEASED USER STORAGE                     00.000128
14:41:57.084832  F2 2CA300 0200 0008 C4C6C8D4 E3D7C340  2.......DFHMTPC   PCP XCTL                                      00.000256
14:41:57.109792  FC 2C55AE 3404 0008 0101C4C6 D42FB4C4  ..........DFM..D  ZCP LOCATE                                *   00.024960
14:41:57.110304  FC 2C57F4 3404 0008 04010001 D42FB4C4  ...4........M..D  ZCP LOCATE                                    00.000512
14:41:57.151136  F1 2C6932 CC00 0008 0040004A 012FB4C4  1........ .....D  SCP GETMAIN-INIT                          *   00.040832
14:41:57.151520  C8 2F629A 0000 0008 0009E2B0 8C400058  H.........S.. ..  SCP ACQUIRED USER STORAGE                      00.000384
14:41:57.153312  FC 2C724E 0B04 0008 00450000 042FB4C4  ..............D  ZCP APPL REQ                                  00.001792
14:41:57.153696  FC 3064FE 0102 0008 00284880 002FB4C4  ..............D  ZCP SEND DFSYN                                00.000384
14:41:57.153952  FC 309856 0302 0008 00284880 002FB4C4  ..............D  ZCP SEND RESPONSE                             00.000256

USRFD FF1 ASCB 00FE4578  JOBN CICS                                                                  **********************
          BUFF    SDLCPA03/CICS13      LRC(000,000)    OUTB                                         *outbound,trmnl A88D
                    USER                 F5C31DF0 40404040 40404040 40404040 40404040  *5C.0       *request,exception
                                         40404040 40404040 40404040 40404040 40404040  *             *response
                                         40404040 40404040 40404040 40404040 40404040  *             **********************
                                         40404040 40404040 40404040 40404040 40404040  *             *
                                         404040E2 E3C1E3E4 E240C9E2 40404040 40404040  *   STATUS IS *
                                         40404040 40404040 40404040 40404040 40404040  *             *
                                         40404040 40404040 40404040 40404040 40404040  *             *
                                         40404040 40404040 40404040 40404040 40404040  *             *
                                         404040C9 D540E2C5 D9E5C9C3 C5404040 40404040  *   IN SERVICE *
                                         40404040 40404040 40404040 40404040 40404040  *             *
                                         40404040 40404040 40404040 40404040 40404040  *             *
                                         40404040                                      *             *
        TIME    52917.992523
USRFD FEF ASCB 00FE4578  JOBN CICS
          BUFF    SDLCPA03/CICS13      LRC(000,000)    OUTBOUND
          VTAM      TH=1C00A88D 681A000C 01E9  RH= 039000
                                         F5C31DF0 40404040 40404040 40404040 40404040  *5C.0       *
                                         40404040 40404040 40404040 40404040 40404040  *             *
                                         40404040 40404040 40404040 40404040 40404040  *             *
                                         40404040 40404040 40404040 40404040 40404040  *             *
                                         404040E2 E3C1E3E4 E240C9E2 40404040 40404040  *   STATUS IS *
                                         40404040 40404040 40404040 40404040 40404040  *             *
                                         40404040 40404040 40404040 40404040 40404040  *             *
                                         40404040 40404040 40404040 40404040 40404040  *             *
                                         404040C9 D540E2C5 D9E5C9C3 C5404040 40404040  *   IN SERVICE *
                                         40404040 40404040 40404040 40404040 40404040  *             *
```

```
                                        40404040 40404040 404040                    *                    *
         TIME    52918.028919
RNIO ASCB 00FE4578  CPU 0000 JOBN CICS        OUT 1C00A88D 681A000C 01E90390 00F5C31D F0404040
         TIME    52918.032400


0000069  DATA FLOW   1C 00 A8 8D 68 1A 00 0C 01 E9 03 90 00 F5 C3 1D F0 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40
                    40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40
                    40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 E2 E3 C1
                    E3 E4 E2 40 C9 E2 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40
                    40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40
                    40 40 40 40 40 40 40 40 40 40 40 C9 D5 40 E2 C5 D9 E5 C9 C3 C5 40 40 40 40 40 40 40 40 40 40 40
                    40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40 40
         TH  00-00  FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                          * FLOW (EFI): NORMAL    *
         TH  02-09  ORIGIN (OAF): 681A DESTINATION (DAF): A88D * SEQUENCE NUMBER (SNF):00012 * COUNT (DCF):  00489   *
         RH  00-02  RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1     EXCEPTION* CHAIN: ONLY ELEMENT   *
                    RU FORMAT: UNFORMATTED              * PACING INDICATOR: OFF              *                        *
                    BRACKET:                            * CHANGE DIRECTION INDICATOR: OFF    * RU CODE: EBCDIC       *
0000069  USER DATA  *5C.0                                                                          STATUS IS     *
                    *                                                          IN SERVICE                          *
                    *                                                                                              *
0000070  DATA FLOW   1C 00 A8 8D 68 1A 00 0C 01 E9 03 90 00 F5 C3 1D F0 40 40 40
         TH  00-00  FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                          * FLOW (EFI): NORMAL    *
         TH  02-09  ORIGIN (OAF): 681A DESTINATION (DAF): A88D * SEQUENCE NUMBER (SNF):00012 * COUNT (DCF):  00489   *
         RH  00-02  RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1     EXCEPTION* CHAIN: ONLY ELEMENT   *
                    RU FORMAT: UNFORMATTED              * PACING INDICATOR: OFF              *                        *
                    BRACKET:                            * CHANGE DIRECTION INDICATOR: OFF    * RU CODE: EBCDIC       *
0000070  USER DATA  *5C.0                                                                                              *


  14:41:57.154592  F0 30795E 0D00 0008 0009D130 00000000  0.........J.....  KCP ATTACH HTA                                  00.000640
  14:41:57.283104  F0 30672E 4000 0008 10000000 00000000  0... ............  KCP WAIT                                *   00.128512
  14:41:57.283360  D0 311B7E 0A00 0008 00000000 00000000  .......:........  KCP SUSPEND                                     00.000256
  14:41:57.283616  D0 311B7E 0500 E3C3 00000000 00000000  ......TC........  KCP DISPATCH                                    00.000256
  14:41:57.284384  FC 305FAE 0502 E3C3 00080000 002FB72C  ......TC........  ZCP SIMLOGON                                    00.000768
  14:41:57.284640  F1 30D9EC F000 E3C3 00000084 012FB72C  1.R.0.TC........  SCP GETMAIN-COND-INIT                           00.000256
  14:41:57.284896  C8 2F629A 0000 E3C3 0009C090 90000090  H.....TC........  SCP ACQUIRED RPL STORAGE                        00.000256
  14:41:57.841696  F0 305E7C 0800 E3C3 0009E080 FF000008  0.....TC........  KCP RESUME                              *   00.556800
  14:41:57.842208  FC 305FAE 0602 E3C3 00080000 F52FB72C  ......TC....5...  ZCP OPNDST                                      00.000512


USRFD FEF ASCB 00FE4578  JOBN CICS                                                                  **********************
          BUFF    SDLCPA05/CICS13      LRC(000,000)    OUTBOUND                                      *outbound,trmnl A88F
          VTAM       TH=1D00A88F 681A0001 0026  RH= 6B8000                                         *session control
                                 31010303 B1B03080 000085C7 00000200 00000000  *.........eG........*definite response
                                 00000000 00000006 C3C9C3E2 F1F300             *........CICS13.     *bind
         TIME    52918.718544                                                                     **********************
RNIO ASCB 00FE4578  CPU 0000 JOBN CICS         OUT 1D00A88F 681A0001 00266B80 00310103 03B1B030
```

```
          TIME     52918.723469

0000071  DATA FLOW   1D 00 A8 8F 68 1A 00 01 00 26 6B 80 00 31 01 03 03 B1 B0 30 80 00 00 85 C7 00 00 02 00 00 00 00 00
                     00 00 00 00 00 00 00 06 C3 C9 C3 E2 F1 F3 00
         TH  00-00   FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                              * FLOW (EFI): EXPEDITED *
         TH  02-09   ORIGIN (OAF): 681A DESTINATION (DAF): A88F * SEQUENCE NUMBER (SNF):00001 * COUNT (DCF):  00038   *
         RH  00-02   RU TYPE: SESSION CONTROL   REQUEST  * RESPONSE/REQUEST: DR1              * CHAIN: ONLY ELEMENT   *
                     RU FORMAT:   FORMATTED              * PACING INDICATOR: OFF             *                       *
                     BRACKET:                            * CHANGE DIRECTION INDICATOR: OFF   * RU CODE: EBCDIC       *
         RU  00-     COMMAND: BIND    BIND SESSION            CMD DATA: 01 03 03 B1 B0 30 80 00 00 85 C7 00 00 02        BIND
0000071  USER DATA  *.........EG.................CICS13.                                                                  *
0000072  DATA FLOW   1D 00 A8 8F 68 1A 00 01 00 26 6B 80 00 31 01 03 03 B1 B0 30
         TH  00-00   FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                              * FLOW (EFI): EXPEDITED *
         TH  02-09   ORIGIN (OAF): 681A DESTINATION (DAF): A88F * SEQUENCE NUMBER (SNF):00001 * COUNT (DCF):  00038   *
         RH  00-02   RU TYPE: SESSION CONTROL   REQUEST  * RESPONSE/REQUEST: DR1              * CHAIN: ONLY ELEMENT   *
                     RU FORMAT:   FORMATTED              * PACING INDICATOR: OFF             *                       *
                     BRACKET:                            * CHANGE DIRECTION INDICATOR: OFF   * RU CODE: EBCDIC       *
         RU  00-     COMMAND: BIND    BIND SESSION            CMD DATA: 01 03 03 B1 B0 30                              BIND
0000072  USER DATA  *......                                                                                           *

  14:41:57.961888  F0 305B0E 4000 E3C3 40000000 002FD92C  0... .TC .....R.  KCP WAIT                                *  00.119680
  14:41:57.962400  D0 311B7E 0500 0008 00000000 00000000  ................  KCP DISPATCH                                00.000512
  14:41:57.962656  FC 2C7280 0B04 0008 00040000 022FB4C4  ..............D  ZCP APPL REQ                                00.000256
  14:41:57.962784  F0 306714 4000 0008 20000000 00000000  0... ............  KCP WAIT                                    00.000128
  14:41:57.963040  D0 311B7E 0500 0008 00000000 00000000  ................  KCP DISPATCH                                00.000256
  14:41:57.963296  F2 2C6A48 1000 0008 C4C6C8D4 E3D7C340  2.......DFHMTPC   PCP RETURN                                  00.000256
  14:41:57.963552  F0 2F41C2 8000 0008 00000000 00000000  0..B............  KCP DETACH                                  00.000256
  14:41:57.982880  D8 3110D2 0000 0008 02000004 00000000  Q..K............  SPP SYSTEM                                  *  00.019328
  14:41:57.983008  F0 30FEE4 0300 0008 00000000 00000000  0..U............  KCP DEQALL                                  00.000128
  14:41:57.983264  D0 311B7E 0500 0008 00000000 00000000  ................  KCP DISPATCH                                00.000256
  14:41:57.983520  FC 311150 3202 0008 00280080 F92FB4C4  ............9..D  ZCP DETACH                                  00.000256
  14:41:57.983776  FC 307426 0102 0008 00280080 002FB4C4  ..............D  ZCP SEND DFSYN                              00.000256

USRFD FEF ASCB 00FE4578  JOBN CICS                                                    **********************
           BUFF    SDLCPA03/CICS13      LRC(000,000)    OUTBOUND                    *outbound,trmnl A88D
           VTAM       TH=1C00A88D 681A000D 0003  RH= 038040                       *request,definite
          TIME     52918.792132                                                    *response,end
RNIO ASCB 00FE4578  CPU 0000 JOBN CICS         OUT 1C00A88D 681A000D 00030380 40   *bracket
          TIME     52918.797606                                                    **********************

0000073  DATA FLOW   1C 00 A8 8D 68 1A 00 0D 00 03 03 80 40
         TH  00-00   FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                              * FLOW (EFI): NORMAL    *
         TH  02-09   ORIGIN (OAF): 681A DESTINATION (DAF): A88D * SEQUENCE NUMBER (SNF):00013 * COUNT (DCF):  00003   *
         RH  00-02   RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1              * CHAIN: ONLY ELEMENT   *
```

```
                RU FORMAT: UNFORMATTED              * PACING INDICATOR: OFF              *                        *
                BRACKET:                END BRACKET * CHANGE DIRECTION INDICATOR: OFF    * RU CODE: EBCDIC        *
0000074  DATA FLOW   1C 00 A8 8D 68 1A 00 0D 00 03 03 80 40
         TH  00-00   FORMAT ID (FID): 1 * SEGMENT (MPF): ENTIRE *                        * FLOW (EFI): NORMAL     *
         TH  02-09   ORIGIN (OAF): 681A DESTINATION (DAF): A88D * SEQUENCE NUMBER (SNF):00013 * COUNT (DCF):  00003   *
         RH  00-02   RU TYPE: FM DATA FLOW      REQUEST  * RESPONSE/REQUEST: DR1             * CHAIN: ONLY ELEMENT    *
                RU FORMAT: UNFORMATTED              * PACING INDICATOR: OFF              *                        *
                BRACKET:                END BRACKET * CHANGE DIRECTION INDICATOR: OFF    * RU CODE: EBCDIC        *
```

5.2.7 : IMS INTERNAL TRACE/VTAM TRACE

The traces included in this section are: IMS INTERNAL TRACE, VTAM GTF TRACE AND ACF/TAP TRACE. The intent of these traces is to show the data flow between IMS and SNA terminals. IMS/VS 1.1.5 and 3274/3278 SNA terminals are actually used to produce these traces. By matching the IMS trace entries with the VTAM trace entries, the user may have the information of the data flow between IMS and the SNA terminals as well as how IMS handles the data flow.

Sequence of events at the system console and IMS terminals to produce these traces are as follows:

step	ACTION	CONSOLE/TERMINAL
1	Start IMS	System Console
2	Start GTF BUF/IO Trace	"
3	Start IMS Trace	"
4	Logon to IMS (enter IMS)	sdclpa02
5	Hit sys req key	"
6	Rec 'DFS2002 term connected' msg	"
7	Stop GTF BUF/IO Trace	System Console
8	Stop IMS Trace	"
9	Print GTF Trace	"
10	Print ACF/TAP	"
11	Print IMS Trace	"

The following is the actual output of IMS internal trace, GTF VTAM BUF/IO trace and ACF/TAP trace.Message numbers have been added in the far right column of the GTF and IMS traces to correspond to the message numbers of the ACF/TAP traces.

```
                                    ADVANCED COMMUNICATIONS FUNCTION
                                         TRACE ANALYSIS PROGRAM
        DATE: 10:25:78                SYSTEMS NETWORK ARCHITECTURE SUMMARY                    PAGE: 00001
          *******SDLC******  **********TRANSMISSION HEADER*********  **********************REQUEST HEADER**********************
          ..-SDLC ADDRESS    .-FORMAT IDENTIFIER (FID)                .-REQUEST(Q) OR RESPONSE(S)  .-PACING INDICATOR
          || .-CMND/RESP     | .-F/M/L/( =ENTIRE)SEGMENT              | .-SC/DFC/NC/( =FMDATA)RU   | .-BEGIN BRACKET INDICATOR
DIRECTION-. || | .-POLL/FINAL | | .-EXPEDITED                        | | .-FORMATTED              | | .-END BRACKET INDICATOR
         | || | | .-RECEIVE  | | |                                  | | |  .-F/M/L( =ONLY)CHAIN  | | | .-CHANGE DIRECTION IND
  TYPE--. | || | | | .-SEND   | | |     FROM/TO SSCP(FID3)---.       | | |  |                     | | | | .-ALT CODE
------- | | || | | | | .-TYPE | | |     FROM/TO PU(FID3)---. | FID3  | | |  |                     | | | | |    **********RU*********
MESSAGE | | || | | | | | CMND | | |  OAF  DAF  SEQNO COUNT | | LSID  | | |  |  REQUEST/RESPONSES  | | | | |    COMMAND   SENSE
NUMBER  V V VV V V V V V ____ V V V  ____ ____ _____ _____ V V ____  V V V  V  ___________________ V V V V V    _________ ________
0000001 I I                    1      A8A6 6800 00000 00006        Q        DR1
0000002 B I                    1      A8A6 6800 00000 00006        Q        DR1
0000003 B O                    1      6800 A8A6 00000 00003        S        DR1
0000004 I O                    1      6800 A8A6 00000 00003        S        DR1
0000005 B O                    1      6800 A8A6 00007 00254        Q        DR1
0000006 I O                    1      6800 A8A6 00007 00254        Q        DR1
0000007 I I                    1      A8A6 6800 00007 00004        S        DR1
0000008 B I                    1      A8A6 6800 00007 00004        S        DR1
0000009 B O                    1   E  6806 A8A6 00001 00035        Q S F    DR1                      BIND
0000010 I O                    1   E  6806 A8A6 00001 00035        Q S F    DR1                      BIND
0000011 I I                    1   E  A8A6 6806 00001 00004        S S F    DR1                      BIND
0000012 B I                    1   E  A8A6 6806 00001 00004        S S F    DR1                      BIND
0000013 B O                    1   E  6806 A8A6 00002 00004        Q S F    DR1                      SDT
0000014 I O                    1   E  6806 A8A6 00002 00004        Q S F    DR1                      SDT
0000015 I I                    1   E  A8A6 6806 00002 00004        S S F    DR1                      SDT
0000016 B I                    1   E  A8A6 6806 00002 00004        S S F    DR1                      SDT
0000017 B O                    1      6806 A8A6 00001 00076        Q        DR1                B E
0000018 I O                    1      6806 A8A6 00001 00076        Q        DR1                B E
0000019 I I                    1      A8A6 6806 00001 00003        S        DR1
0000020 B I                    1      A8A6 6806 00001 00003        S        DR1
                                    ADVANCED COMMUNICATIONS FUNCTION
        DATE: 10:25:78                   TRACE ANALYSIS PROGRAM                                  PAGE: 00002
DSJ002I SYSTRACE/SYS008 INPUT FILE OPENED
DSJ004I TRACE FILE PROCESSING BEGINS.....
DSJ220I TRACE FILE RECORDED BY MVS GTF
DSJ223I GTF COMPREHENSIVE TRACE RECORDING MODE
DSJ224I GTF TRACE RECORDS ARE TIMESTAMPED
DSJ228I GTF USR OPTION IN EFFECT
DSJ227I GTF RNIO OPTION NEEDED FOR VTAM TRACE TYPE=RNIO
DSJ201I GTF RECORD 0000053 LENG(00054) D(10.25.78) T(14.08.14.768281) AID(FF) FID(04) EID(8100)          VTAM RNIO IN
DSJ203I VTAM TRACE 0000053 LENG(00048) D(10.25.78) T(14.08.14.768281) LRC(00/00) S(A8A6     ) D(6800     ) VTAM IO/RNIO IN   0000001
DSJ201I GTF RECORD 0000055 LENG(00076) D(10.25.78) T(14.08.14.993680) AID(FF) FID(FD) EID(EFEF)          VTAM BUFFER
DSJ203I VTAM TRACE 0000055 LENG(00048) D(10.25.78) T(14.08.14.978532) LRC(00/00) S(SDLCPA02) D(MVSVMVT ) VTAM BUFFER  IN   0000002
DSJ201I GTF RECORD 0000086 LENG(00073) D(10.25.78) T(14.08.18.004151) AID(FF) FID(FD) EID(EFEF)          VTAM BUFFER
```

```
DSJ203I VTAM TRACE 0000086 LENG(00045) D(10.25.78) T(14.08.18.000508) LRC(00/00) S(MVSVMVT ) D(SDLCPA02) VTAM BUFFER  OUT  0000003
DSJ201I GTF RECORD 0000089 LENG(00054) D(10.25.78) T(14.08.18.019825) AID(FF) FID(04) EID(8200)           VTAM RNIO OUT
DSJ203I VTAM TRACE 0000089 LENG(00045) D(10.25.78) T(14.08.18.019825) LRC(00/00) S(6800     ) D(A8A6     ) VTAM IO/RNIO OUT  0000004
DSJ201I GTF RECORD 0000092 LENG(00284) D(10.25.78) T(14.08.18.126678) AID(FF) FID(FD) EID(EFEF)           VTAM BUFFER
DSJ203I VTAM TRACE 0000092 LENG(00256) D(10.25.78) T(14.08.18.121548) LRC(00/00) S(MVSVMVT ) D(SDLCPA02) VTAM BUFFER  OUT  0000005
DSJ201I GTF RECORD 0000095 LENG(00054) D(10.25.78) T(14.08.18.212141) AID(FF) FID(04) EID(8200)           VTAM RNIO OUT
DSJ203I VTAM TRACE 0000095 LENG(00052) D(10.25.78) T(14.08.18.212141) LRC(00/00) S(6800     ) D(A8A6     ) VTAM IO/RNIO OUT  0000006
DSJ201I GTF RECORD 0000099 LENG(00054) D(10.25.78) T(14.08.20.933939) AID(FF) FID(04) EID(8100)           VTAM RNIO IN
DSJ203I VTAM TRACE 0000099 LENG(00046) D(10.25.78) T(14.08.20.933939) LRC(00/00) S(A8A6     ) D(6800     ) VTAM IO/RNIO IN   0000007
DSJ201I GTF RECORD 0000101 LENG(00074) D(10.25.78) T(14.08.20.951646) AID(FF) FID(FD) EID(EFEF)           VTAM BUFFER
DSJ203I VTAM TRACE 0000101 LENG(00046) D(10.25.78) T(14.08.20.943369) LRC(00/00) S(SDLCPA02) D(MVSVMVT ) VTAM BUFFER  IN   0000008
DSJ201I GTF RECORD 0000140 LENG(00105) D(10.25.78) T(14.08.27.054712) AID(FF) FID(FD) EID(EFEF)           VTAM BUFFER
DSJ203I VTAM TRACE 0000140 LENG(00077) D(10.25.78) T(14.08.27.053208) LRC(00/00) S(IMS      ) D(SDLCPA02) VTAM BUFFER  OUT  0000009
DSJ201I GTF RECORD 0000143 LENG(00054) D(10.25.78) T(14.08.27.226325) AID(FF) FID(04) EID(8200)           VTAM RNIO OUT
DSJ203I VTAM TRACE 0000143 LENG(00052) D(10.25.78) T(14.08.27.226325) LRC(00/00) S(6806     ) D(A8A6     ) VTAM IO/RNIO OUT  0000010
DSJ201I GTF RECORD 0000145 LENG(00054) D(10.25.78) T(14.08.27.873595) AID(FF) FID(04) EID(8100)           VTAM RNIO IN
DSJ203I VTAM TRACE 0000145 LENG(00046) D(10.25.78) T(14.08.27.873595) LRC(00/00) S(A8A6     ) D(6806     ) VTAM IO/RNIO IN   0000011
DSJ201I GTF RECORD 0000147 LENG(00074) D(10.25.78) T(14.08.27.888847) AID(FF) FID(FD) EID(EFEF)           VTAM BUFFER
DSJ203I VTAM TRACE 0000147 LENG(00046) D(10.25.78) T(14.08.27.886674) LRC(00/00) S(SDLCPA02) D(IMS      ) VTAM BUFFER  IN   0000012
DSJ201I GTF RECORD 0000161 LENG(00074) D(10.25.78) T(14.08.28.425524) AID(FF) FID(FD) EID(EFEF)           VTAM BUFFER
DSJ203I VTAM TRACE 0000161 LENG(00046) D(10.25.78) T(14.08.28.415572) LRC(00/00) S(IMS      ) D(SDLCPA02) VTAM BUFFER  OUT  0000013
DSJ201I GTF RECORD 0000164 LENG(00054) D(10.25.78) T(14.08.28.481202) AID(FF) FID(04) EID(8200)           VTAM RNIO OUT
DSJ203I VTAM TRACE 0000164 LENG(00046) D(10.25.78) T(14.08.28.481202) LRC(00/00) S(6806     ) D(A8A6     ) VTAM IO/RNIO OUT  0000014
DSJ201I GTF RECORD 0000166 LENG(00054) D(10.25.78) T(14.08.29.105803) AID(FF) FID(04) EID(8100)           VTAM RNIO IN
DSJ203I VTAM TRACE 0000166 LENG(00046) D(10.25.78) T(14.08.29.105803) LRC(00/00) S(A8A6     ) D(6806     ) VTAM IO/RNIO IN   0000015
DSJ201I GTF RECORD 0000168 LENG(00074) D(10.25.78) T(14.08.29.145742) AID(FF) FID(FD) EID(EFEF)           VTAM BUFFER
DSJ203I VTAM TRACE 0000168 LENG(00046) D(10.25.78) T(14.08.29.131877) LRC(00/00) S(SDLCPA02) D(IMS      ) VTAM BUFFER  IN   0000016
DSJ201I GTF RECORD 0000181 LENG(00146) D(10.25.78) T(14.08.31.551687) AID(FF) FID(FD) EID(EFEF)           VTAM BUFFER
DSJ203I VTAM TRACE 0000181 LENG(00118) D(10.25.78) T(14.08.31.546830) LRC(00/00) S(IMS      ) D(SDLCPA02) VTAM BUFFER  OUT  0000017
DSJ201I GTF RECORD 0000184 LENG(00054) D(10.25.78) T(14.08.31.566084) AID(FF) FID(04) EID(8200)           VTAM RNIO OUT
DSJ203I VTAM TRACE 0000184 LENG(00052) D(10.25.78) T(14.08.31.566084) LRC(00/00) S(6806     ) D(A8A6     ) VTAM IO/RNIO OUT  0000018
DSJ201I GTF RECORD 0000186 LENG(00054) D(10.25.78) T(14.08.32.183446) AID(FF) FID(04) EID(8100)           VTAM RNIO IN
DSJ203I VTAM TRACE 0000186 LENG(00045) D(10.25.78) T(14.08.32.183446) LRC(00/00) S(A8A6     ) D(6806     ) VTAM IO/RNIO IN   0000019
DSJ201I GTF RECORD 0000188 LENG(00073) D(10.25.78) T(14.08.32.212082) AID(FF) FID(FD) EID(EFEF)           VTAM BUFFER
DSJ203I VTAM TRACE 0000188 LENG(00045) D(10.25.78) T(14.08.32.210321) LRC(00/00) S(SDLCPA02) D(IMS      ) VTAM BUFFER  IN   0000020
DSJ005I TRACE FILE END OF FILE
```

GTF VTAM BUF/IO TRACE

```
+
                              * * * *    E D I T    * * * *
                GTF OPTIONS IN EFFECT-  FORMAT=SYS
                                        SVC=NONE
                                        SIO=NONE
                                         PI=NONE
```

```
                                        IO=NONE
                                       EXT=NO
                                        RR=NO
                                       USR=YES
                                       GTF=NO
                                       DSP=NO
                                       PCI=NO
                                      RNIO=YES
                                       SRM=NO
                                  USERTIME=YES

1                                                    EXTERNAL TRACE - DD TRACE                          PAGE 0001
0*** DATE   DAY 298    YEAR 1978            TIME 22.05.34.702638                                                ***
 RNIO ASCB 00FF9968  CPU 0000 JOBN NET           IN 1C006800 A8A60000 00060380 008994A21                        1
          TIME    50894.768281
 USRFD FEF ASCB 00FF9968  JOBN NET                                                                              2
           BUFF    MVSVMVT /SDLCPA02    LRC(000,000)    INBOUND2
           VTAM       TH=1C006800 A8A60000 0006  RH= 038000
                                  8994A2                                          *ims                *
          TIME    50894.993680
 USRFD FEF ASCB 00FF9968  JOBN NET                                                                              3
           BUFF    SDLCPA02/MVSVMVT     LRC(000,000)    OUTBOUND
           VTAM       TH=1C00A8A6 68000000 0003  RH= 838000
          TIME    50898.004151
 RNIO ASCB 00FF9968  CPU 0000 JOBN NET          OUT 1C00A8A6 68000000 00038380 00                              4
          TIME    50898.019825
 USRFD FEF ASCB 00FF9968  JOBN NET                                                                              5
           BUFF    SDLCPA02/MVSVMVT     LRC(000,000)    OUTBOUND
           VTAM       TH=1C00A8A6 68000007 00FE  RH= 038000
                                  15401540 15C3D6D4 D4C1D5C4 40C3D6D4 D7D3C5E3  *. . .COMMAND COMPLET*
                                  C5C440D6 D27A4015 40154015 4015C986 40D3D6C7  *ED OK: . . . .If LOG*
                                  D6D56B40 979985A2 A240C1D3 E361E2E8 E240D9C5  *ON, press ALT/SYS RE*
                                  D8404DE3 C5E2E340 D9C5D861 C3D3C5C1 D9408696  *Q (TEST REQ/CLEAR fo*
                                  9940F3F2 F7F75D40 15401540 15C98640 D3D6C7D6  *r 3277) . . .If LOGO*
                                  C6C66B40 8595A385 99409585 A7A34083 96949481  *FF, enter next comma*
                                  95844096 99409799 85A2A240 8595A385 99408696  *nd or press enter fo*
                                  99409396 87969540 83969494 81958440 A2A895A3  *r logon command synt*
                                  81A74040 40404040 40404040 40404040 40404040  *ax                 *
                                  40404040 40404040 40404040 40404040 40404040  *                   *
                                  40404040 40404040 404040                      *                   *
          TIME    50898.126678
 RNIO ASCB 00FF9968  CPU 0000 JOBN NET          OUT 1C00A8A6 68000007 00FE0380 00154015 4015C3D6               6
          TIME    50898.212141
 RNIO ASCB 00FF9968  CPU 0000 JOBN NET           IN 1C006800 A8A60007 00048380 0015                             7
          TIME    50900.933939
 USRFD FEF ASCB 00FF9968  JOBN NET                                                                              8
           BUFF    MVSVMVT /SDLCPA02    LRC(000,000)    INBOUND
           VTAM       TH=1C006800 A8A60007 0004  RH= 838000
```

```
                                    15                                          *.                  *
          TIME    50900.951646
USRFD FEF ASCB 00FEEA30  JOBN IMS115                                                                 9
           BUFF    SDLCPA02/IMS          LRC(000,000)    OUTBOUND
           VTAM       TH=1D00A8A6 68060001 0023  RH= 6B8000
                                    31010303 B1903080 0000F8F8 00000200 00000000  *.........88........*
                                    18502B50 7F000003 C9D4E200                    *.&.&"...IMS.       *
          TIME    50907.054712
RNIO ASCB 00FEEA30  CPU 0000 JOBN IMS115       OUT 1D00A8A6 68060001 00236B80 00310103 03B19030      10
          TIME    50907.226325
RNIO ASCB 00FEEA30  CPU 0000 JOBN IMS115        IN 1D006806 A8A60001 0004EB80 0031                   11
          TIME    50907.873595
USRFD FEF ASCB 00FEEA30  JOBN IMS115                                                                 12
           BUFF    IMS     /SDLCPA02     LRC(000,000)    INBOUND
           VTAM       TH=1D006806 A8A60001 0004  RH= EB8000
                                    31                                          *.                  *
          TIME    50907.888847
USRFD FEF ASCB 00FEEA30  JOBN IMS115                                                                 13
           BUFF    SDLCPA02/IMS          LRC(000,000)    OUTBOUND
           VTAM       TH=1D00A8A6 68060002 0004  RH= 6B8000
                                    A0                                          *.                  *
          TIME    50908.425524
RNIO ASCB 00FEEA30  CPU 0000 JOBN IMS115       OUT 1D00A8A6 68060002 00046B80 00A0                   14
          TIME    50908.481202
RNIO ASCB 00FEEA30  CPU 0000 JOBN IMS115        IN 1D006806 A8A60002 0004EB80 00A0                   15
          TIME    50909.105803
USRFD FEF ASCB 00FEEA30  JOBN IMS115                                                                 16
           BUFF    IMS     /SDLCPA02     LRC(000,000)    INBOUND
           VTAM       TH=1D006806 A8A60002 0004  RH= EB8000
                                    A0                                          *.                  *
          TIME    50909.145742
USRFD FF1 ASCB 00FEEA30  JOBN IMS115                                                                 17
           BUFF    SDLCPA02/IMS          LRC(000,000)    OUTBOUND
             USER                       F5C31140 401DF000 C4C6E2F2 F0F0F240 F1F47AF0  *5C.  .0.DFS2002 14:0*
                                        F87AF2F9 40E3C5D9 D4C9D5C1 D340C3D6 D5D5C5C3  *8:29 TERMINAL CONNEC*
                                        E3C5C400 11C2601D 4011C540 1D4011C1 F81D7C11  *TED..B-. .E . .A8.@.*
                                        C4D81D7C 11C6F81D 7C11C261 13                 *DQ.@.F8.@.B/.      *
          TIME    50911.515735
USRFD FEF ASCB 00FEEA30  JOBN IMS115                                                                 18
           BUFF    SDLCPA02/IMS          LRC(000,000)    OUTBOUND
           VTAM       TH=1C00A8A6 68060001 004C  RH= 0380C0
                                    F5C31140 401DF000 C4C6E2F2 F0F0F240 F1F47AF0  *5C.  .0.DFS2002 14:0*
                                    F87AF2F9 40E3C5D9 D4C9D5C1 D340C3D6 D5D5C5C3  *8:29 TERMINAL CONNEC*
                                    E3C5C400 11C2601D 4011C540 1D4011C1 F81D7C11  *TED..B-. .E . .A8.@.*
                                    C4D81D7C 11C6F81D 7C11C261 13                 *DQ.@.F8.@.B/.      *
          TIME    50911.551687
RNIO ASCB 00FEEA30  CPU 0000 JOBN IMS115       OUT 1C00A8A6 68060001 004C0380 C0F5C311 40401DF0      19
          TIME    50911.566084
```

```
 RNIO ASCB 00FEEA30  CPU 0000 JOBN IMS115        IN 1C006806 A8A60001 00038380 00                                    20
           TIME    50912.183446
```

IMS INTERNAL TRACE MESSAGE

```
 CONTROL   CNTL  STOPAFT=EOF                                                  00000100
 OPTION    PRINT OFFSET=5,FLDTYP=X,VALUE=6701,COND=E,E=DFSERA30              00000200
 END                                                                         00000300
-INTERNAL TRACE RECORD            ID = D 07  SEGNO=00  RECNO = 0046  TIME  14.08.24.55   DATE  78.298
 CLB
  0F6FB8  000000   40D3C7E7 00000000  00000000 00000000   00000000 00000000  00000000 00000000   * LGX..................  8<-->9
  0F6FD8  000020   00000000 00000000  E2C4D3C3 D7C1F0F2   00000100 000FA470  00000000 00000000   *........SDLCPA02......U
  0F6FF8  000040   00000000 00000000  00010000 00000000   000FA470 01000000  00000000 00000000   *..................U....
  0F7018  000060   00000000 00000000  00000000 10000000   00000000 00000000  00000000 00AB7F20   *.......................
 CTB
  0FA470  000000   001005F8 000F6FB8  00000000 000B2000   00000000 182A0000  0000FFFF 000FF650   *...8..?................
  0FA490  000020   00000000 00000000  000FDDC8 000FCB14   00000000 00000000  00000000 00000000   *............H...........
  0FA4B0  000040   00000000 00000000  00000000 00000000   00000000 00000000  00000000 00210001   *.......................
  0FA4D0  000060   00000000 00000000  00000000 00000000   00000000                               *.....................
 CRB
  0FDDC8  000000   00000000 00000000  00000000 00008000   000FA470 00000000  00000000 00000000   *..................U....

**** Contents of following record deleted for clarity ***

-INTERNAL TRACE RECORD            ID = C 08  SEGNO=00  RECNO = 0047  TIME  14.08.24.77   DATE  78.298
-INTERNAL TRACE RECORD            ID = A 05  SEGNO=00  RECNO = 0049  TIME  14.08.25.65   DATE  78.298
 CLB                                                                                                  8<-->9
  0F6FB8  000000   00D3C7E7 00000000  00000000 000DDE70   00000000 00000000  00000000 00000000   *.LGX..................
  0F6FD8  000020   00000000 00000000  E2C4D3C3 D7C1F0F2   10000100 000FA470  00000000 00000000   *........SDLCPA02......U
  0F6FF8  000040   01C80000 00000000  00010000 00000000   000FA470 01000000  00000000 00000000   *.H.................U....
  0F7018  000060   00000000 000DDE68  00000000 10000000   00000000 00000000  00000000 00AB7F20   *.......................
 CTB
  0FA470  000000   001005F8 000F6FB8  00000000 000B2000   00000000 182A0000  0000FFFF 000FF650   *...8..?................
  0FA490  000020   00000000 00000000  000FDDC8 000FCB14   00000000 00000000  00000000 00000000   *............H...........
  0FA4B0  000040   00000000 00000000  00000000 00000000   00000000 00000000  00000000 00210001   *.......................
  0FA4D0  000060   00000000 00000000  00000000 00000000   00000000                               *.....................
 CRB
  0FDDC8  000000   00000000 00000000  00000000 00008000   000FA470 00000000  00000000 00000000   *..................U....
 O TP BUF
  0DDE68  000000   01C80088 00000000  00201770 00000000   00000000 00000000  00001000 00800000   *.H.H...................
  0DDE88  000020   00000000 00000000  00000000 000DDEF0   28800000 00000000  00000000 00000000   *................0.......
  0DDEA8  000040   90308450 00000000  80800000 44000000   00000000 00000000  00000000 00000000   *..D&...................
  0DDEC8  000060   00000000 00000000  80008010 00000000   00000000 00000000  00000000 00000000   *.......................
  0DDEE8  000080   00000000 00000000  D0000040 00000000   000F6FB8 E2C4D3C3  D7C1F0F2 D9C5C3D6   *............ ......?.SDL
  0DDF08  0000A0   D9C44040 00000000  00000000 41000002   00000001 00000000  00000000 00000000   *RD  ...................
```

```
  0DDF28  0000C0   000DDF30 00000000  010303B1 90308000   00F8F800 00020000  00000018 502B507F   *.................88....
  0DDF48  0000E0   00000000 00000000  00000000 40404040   40404040 40404040  40404040 40404040   *............
  0DDF68  000100   00840000 00004011  5AE71DF8 40404040   00688000 C4C6E2F9  F7F0C940 F1F47AF0   *.D.... ..X.8    ....DFS
  0DDF88  000120   F27AF2F1 40E4D5C5  E7D7C5C3 E3C5C440   40E2E3C1 E3E4E240  40406BD5 D6C4C540   *2:21 UNEXPECTED  STATUS
  0DDFA8  000140   D3E4F4C3 F7404040  6BE2C5D5 C440406B   D9C37EF1 F46BC6C4  C2F27EF1 F36BD3D6   *LU4C7   ,SEND  ,RC=14,F
  0DDFC8  000160   E2E3C5D9 D47EF0F0  6BE2C5D5 E2C57EF0   F0F0F0F0 F0F0F040  4040C9D4 E2F50200   *STERM=00,SENSE=00000000
  0DDFE8  000180   42007C11 5B601D40  13115CF0 1D40115B   61130000 00000000  00000000 00000000   *..@.$-. ..*0. .$/......
  0DE008  0001A0   00000000 00000000  00000000 00000000   00000000 00000000  00000000 00000000   *........................
  0DE028  0001C0   00000000 00000000  00000000                                                    *............
-INTERNAL TRACE RECORD            ID = D 07  SEGNO=00  RECNO = 004A  TIME  14.08.29.30   DATE  78.298
 CLB                                                                                                          16<-->17
  0F6FB8  000000   40000000 00000000  00000000 000DDE70   00000000 00000000  00000000 00000000   *  .....................
  0F6FD8  000020   00000000 00000000  E2C4D3C3 D7C1F0F2   10020100 000FA470  00000000 00000000   *........SDLCPA02......U
  0F6FF8  000040   01C80000 00000000  00010000 00000000   000FA470 01000000  00000000 00000000   *.H................U....
  0F7018  000060   00000000 000DDE68  00000000 10000000   00000000 00000000  00000000 00AB7F20   *........................
 CTB
  0FA470  000000   001005F8 000F6FB8  00000000 000B2000   00000000 182A0000  0000FFFF 000FF650   *...8..?.............
  0FA490  000020   00000000 00000000  000FDDC8 000FCB14   00000000 00000000  00000000 00000000   *............H...........
  0FA4B0  000040   00000000 00000000  00000000 00000000   00000000 00000000  00000000 00210001   *.....................
  0FA4D0  000060   00000000 00000000  00000000 00000000   00000000                               *.....................
  0FDDC8  000000   00000000 00000000  00000000 00008000   000FA470 00000000  00000000 00000000   *...................U....
 0 TP BUF
  0DDE68  000000   01C80088 00000000  00201770 00000000   000F6FB8 00000000  00001000 00800000   *.H.H..............?....
  0DDE88  000020   000F926C 00000000  000DDEF0 A8A66806   29800000 00000000  00000000 00000000   *..K%.......0YW.........
  0DDEA8  000040   90308450 00000000  80800000 40FF0000   00000000 00000000  00000000 00000000   *..D&........ ..........
  0DDEC8  000060   00000000 00000000  80008010 00000000   00000000 00000000  00000000 00000000   *........................
  0DDEE8  000080   00000000 00000000  D0000040 A8A66806   000F6FB8 E2C4D3C3  D7C1F0F2 D9C5C3D6   *............ YW....?.SDL
  0DDF08  0000A0   D9C44040 C06D0000  03800000 41000002   48000001 00000000  00000000 00000000   *RD  ._..................
  0DDF28  0000C0   000DDF30 00000000  010303B1 90308000   00F8F800 00020000  00000018 502B507F   *.................88....
  0DDF48  0000E0   00000000 00000000  00000000 40404040   40404040 40404040  40404040 40404040   *............
  0DDF68  000100   00840000 00004011  5AE71DF8 40404040   00688000 C4C6E2F9  F7F0C940 F1F47AF0   *.D.... ..X.8    ....DFS
  0DDF88  000120   F27AF2F1 40E4D5C5  E7D7C5C3 E3C5C440   40E2E3C1 E3E4E240  40406BD5 D6C4C540   *2:21 UNEXPECTED  STATUS
  0DDFA8  000140   D3E4F4C3 F7404040  6BE2C5D5 C440406B   D9C37EF1 F46BC6C4  C2F27EF1 F36BD3D6   *LU4C7   ,SEND  ,RC=14,F
  0DDFC8  000160   E2E3C5D9 D47EF0F0  6BE2C5D5 E2C57EF0   F0F0F0F0 F0F0F040  4040C9D4 E2F50200   *STERM=00,SENSE=00000000
  0DDFE8  000180   42007C11 5B601D40  13115CF0 1D40115B   61130000 00000000  00000000 00000000   *..@.$-. ..*0. .$/......
  0DE008  0001A0   00000000 00000000  00000000 00000000   00000000 00000000  00000000 00000000   *........................
  0DE028  0001C0   00000000 00000000  00000000                                                    *............
```

**** Contents of following records deleted for clarity ***

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-INTERNAL TRACE RECORD            ID = A 09  SEGNO=00  RECNO = 004B  TIME  14.08.29.39   DATE  78.298
-INTERNAL TRACE RECORD            ID = A 03  SEGNO=00  RECNO = 004C  TIME  14.08.29.61   DATE  78.298
-INTERNAL TRACE RECORD            ID = COFC  SEGNO=00  RECNO = 004D  TIME  14.08.29.61   DATE  78.298
-INTERNAL TRACE RECORD            ID = C 08  SEGNO=00  RECNO = 004E  TIME  14.08.29.67DATE  78.298
-INTERNAL TRACE RECORD            ID = C 08  SEGNO=01  RECNO = 004F  TIME  14.08.29.67   DATE  78.298
-INTERNAL TRACE RECORD            ID = DD8   SEGNO=00  RECNO = 0050  TIME  14.08.29.67   DATE  78.298
-INTERNAL TRACE RECORD            ID = DD8   SEGNO=01  RECNO = 0051  TIME  14.08.29.67   DATE  78.298
-INTERNAL TRACE RECORD            ID = DD8   SEGNO=03  RECNO = 0053  TIME  14.08.29.67   DATE  78.298
```

```
-INTERNAL TRACE RECORD            ID = DD8   SEGNO=04  RECNO = 0054  TIME  14.08.29.67   DATE  78.298
-INTERNAL TRACE RECORD            ID = C 06  SEGNO=00  RECNO = 0055  TIME  14.08.30.05   DATE  78.298
-INTERNAL TRACE RECORD            ID = C 06  SEGNO=01  RECNO = 0056  TIME  14.08.30.05   DATE  78.298
-INTERNAL TRACE RECORD            ID = C 01  SEGNO=00  RECNO = 0057  TIME  14.08.31.31   DATE  78.298
-INTERNAL TRACE RECORD            ID = C 01  SEGNO=01  RECNO = 0058  TIME  14.08.31.31   DATE  78.298
-INTERNAL TRACE RECORD            ID = C 08  SEGNO=00  RECNO = 0059  TIME  14.08.31.31   DATE  78.298
 CLB
  0F6FB8  000000   7F000000 0080009D  000E0060 000CEB58   000ABD60 00000000  00000000 00000000   *"..........-.......-...
  0F6FD8  000020   A8A66806 00000000  E2C4D3C3 D7C1F0F2   10020100 000FA470  F00FCB14 001024A0   *YW......SDLCPA02......U
  0F6FF8  000040   0E982080 000007D2  00010000 00000000   000FA470 01000000  00000000 00000000   *.Q.....K..........U....
  0F7018  000060   00000000 000DDE68  00000000 00000000   00000000 00000000  00000000 00AB7F20   *.......................

**** Contents of following records deleted for clarity ***

-INTERNAL TRACE RECORD            ID = C 08  SEGNO=01  RECNO = 005A  TIME  14.08.31.31   DATE  78.298
-INTERNAL TRACE RECORD            ID = C 01  SEGNO=01  RECNO = 005C  TIME  14.08.31.32   DATE  78.298
-INTERNAL TRACE RECORD            ID = DDM1  SEGNO=00  RECNO = 005D  TIME  14.08.31.33   DATE  78.298
 CLB                                                                                                  16<-->17
  0F6FB8  000000   00000000 0480009D  000E0060 000CEB58   000ABD60 00000000  00000000 00000000   *..........-.......-...
  0F6FD8  000020   A8A66806 00000000  E2C4D3C3 D7C1F0F2   10020100 000FA470  F00FCB14 001024A0   *YW......SDLCPA02......U
  0F6FF8  000040   02172080 000007D2  00010000 00000000   000FA470 01000000  00000000 00000000   *.......K..........U....
  0F7018  000060   00000000 000DDE68  00000000 00000000   00000000 00000000  00000000 00AB7F20   *.......................
 CTB
  0FA470  000000   001005F8 000F6FB8  00000010 000B2080   50000000 182A0000  0000FFFF 000FF650   *...8..?.........&......
  0FA490  000020   00000000 00000000  000FDDC8 000FCB14   00008002 04000002  000CEB18 0A000000   *............H...........
  0FA4B0  000040   000FE348 00400000  00000000 00000000   00000000 00000000  00000000 00210001   *..T.. .................
  0FA4D0  000060   00000000 00000000  00000000 00000000   00000000                               *.....................
 CNT
  0FE348  000000   00000000 0A000000  00000000 00000000   00820084 00000000  C2D7F1F1 40404040   *.................B.D...
  0FE368  000020   00000000 000F9DA4  00000000 FFFF0000   7F000000 00A00000                      *.......U........".......
 CIB
  0FCB14  000000   C4C6E2D4 D6F14040  140E2FBC 447FC4C6   E2C4C6F1 640E2ECC  E0000240 447F0000   *DFSMO1  .....'DFSDF1...
  0FCB34  000020   00000000 00000000  0000C4C6 E2D4C9F1   4040E0D9 0000C4C6  E2C4C6F1 00000000   *.........DFSMI1  .R..D
  0FCB54  000040   00000144 002B0050  80000000                                                   *.......&....
 CRB
  0FDDC8  000000   00000000 00000000  00000000 00008200   000FA470 00000000  00000000 00000000   *..............B...U....
 O TP BUF
  0DDE68  000000   021700D1 00000000  00200070 00000000   000F6FB8 00000000  00001000 00800000   *...J.............?.....
  0DDE88  000020   000F926C 00000000  000DDEF0 A8A66806   29800000 00000000  00000000 00000000   *..K%.......0YW.........
  0DDEA8  000040   90308450 00000000  80800000 40000000   00000000 00000000  00000000 00000000   *..D&.....  ............
  0DDEC8  000060   00000000 00000000  80008010 00000000   00000000 00000000  00000000 00000000   *.......................
  0DDEE8  000080   00000000 00000000  D0001140 401DF000   C4C6E2F2 F0F0F240  F1F47AF0 F87AF2F9   *..........  .0.DFS2002
  0DDF08  0000A0   40E3C5D9 D4C9D5C1  D340C3D6 D5D5C5C3   E3C5C400 11C2601D  4011C540 1D4011C1   * TERMINAL CONNECTED..B-
- 0DDF28  0000C0   F81D7C11 C4D81D7C  11C6F81D 7C11C261   13F8F800 00020000  00000018 502B507F   *8.@.D@.@.F8.@.B/.88....
  0DDF48  0000E0   00000000 00000000  00000000 40404040   40404040 40404040  40404040 40404040   *.....................
  0DDF68  000100   00840000 00004011  5AE71DF8 40404040   00688000 C4C6E2F9  F7F0C940 F1F47AF0   *.D.... ..X.8    ....DFS
  0DDF88  000120   F27AF2F1 40E4D5C5  E7D7C5C3 E3C5C440   40E2E3C1 E3E4E240  40406BD5 D6C4C540   *2:21 UNEXPECTED  STATUS
  0DDFA8  000140   D3E4F4C3 F7404040  6BE2C5D5 C4404068   D9C37EF1 F46BC6C4  C2F27EF1 F36BD3D6   *LU4C7   ,SEND  ,RC=14,F
```

```
  0DDFC8  000160   E2E3C5D9 D47EF0F0  6BE2C5D5 E2C57EF0   F0F0F0F0 F0F0F040  4040C9D4 E2F50200   *STERM=00,SENSE=00000000
  0DDFE8  000180   42007C11 5B601D40  13115CF0 1D40115B   61130000 00000000  00000000 00000000   *..ð.$-. ..*0. .$/......
  0DE008  0001A0   00000000 00000000  00000000 00000000   00000000 00000000  00000000 00000000   *........................
  0DE028  0001C0                    SAME AS ABOVE
  0DE048  0001E0   00000000 00000000  00000000 00000000   00000000 00000000                      *........................

**** Contents of following record deleted for clarity ***

-INTERNAL TRACE RECORD            ID = DDM1  SEGNO=01  RECNO = 005E  TIME  14.08.31.33   DATE  78.298
-INTERNAL TRACE RECORD            ID = A 05  SEGNO=00  RECNO = 005F  TIME  14.08.31.43   DATE  78.298                    16<-->17
 CLB
  0F6FB8  000000   00000000 0480009D  000E0060 000DDE70   000ABD60 00000000  00000000 00000000   *...........-.......-...
  0F6FD8  000020   A8A66806 00000000  E2C4D3C3 D7C1F0F2   10020100 000FA470  F00FCB14 001024A0   *YW......SDLCPA02......U
  0F6FF8  000040   02172080 000007D2  000100C0 00000000   000FA470 01000000  00000000 00000000   *.......K..........U....
  0F7018  000060   00000000 000DDE68  00000000 00000000   00000000 00000000  00000000 00AB7F20   *........................
 CTB
  0FA470  000000   001005F8 000F6FB8  00000010 000B2080   50000000 182A0000  0000FFFF 000FF650   *...8..?.........&......
  0FA490  000020   00000000 00000000  000FDDC8 000FCB14   00008002 04000002  000CEB18 0A000000   *...........H...........
  0FA4B0  000040   000FE348 00400000  00000000 00000000   00000000 00000000  00000000 00210001   *..T.. .................
  0FA4D0  000060   00000000 00000000  00000000 00000000   00000000                               *.....................
 CRB
  0FDDC8  000000   00000000 00000000  00000001 00008200   000FA470 00000000  00010000 00000000   *..............B...U....
 O TP BUF
  0DDE68  000000   021700D1 00000000  00202270 00000000   00000000 00000000  C00A1000 00800000   *...J...................
  0DDE88  000020   00000000 00000000  000DDEF0 A8A66806   28800000 00000000  00000049 00000000   *............0YW.........
  0DDEA8  000040   00309450 00000000  80800000 40000000   00000000 00000000  00000000 00000000   *..M&..... ..... .......
  0DDEC8  000060   00000000 00000000  80008010 00000000   00000000 00000000  00000000 00000000   *........................
  0DDEE8  000080   00000000 00000000  F5C31140 401DF000   C4C6E2F2 F0F0F240  F1F47AF0 F87AF2F9   *........5C.  .0.DFS2002
  0DDF08  0000A0   40E3C5D9 D4C9D5C1  D340C3D6 D5D5C5C3   E3C5C400 11C2601D  4011C540 1D4011C1   * TERMINAL CONNECTED..B-
  0DDF28  0000C0   F81D7C11 C4D81D7C  11C6F81D 7C11C261   13F8F800 00020000  00000018 502B507F   *8.ð.D¤.ð.F8.ð.B/.88....
  0DDF48  0000E0   00000000 00000000  00000000 40404040   40404040 40404040  40404040 40404040   *........................
  0DDF68  000100   00840000 00004011  5AE71DF8 40404040   00688000 C4C6E2F9  F7F0C940 F1F47AF0   *.D.... ..X.8     ....DFS
- 0DDF88  000120   F27AF2F1 40E4D5C5  E7D7C5C3 E3C5C440   40E2E3C1 E3E4E240  40406BD5 D6C4C540   *2:21 UNEXPECTED  STATUS
  0DDFA8  000140   D3E4F4C3 F7404040  6BE2C5D5 C440406B   D9C37EF1 F46BC6C4  C2F27EF1 F36BD3D6   *LU4C7   ,SEND  ,RC=14,F
  0DDFC8  000160   E2E3C5D9 D47EF0F0  6BE2C5D5 E2C57EF0   F0F0F0F0 F0F0F040  4040C9D4 E2F50200   *STERM=00,SENSE=00000000
  0DDFE8  000180   42007C11 5B601D40  13115CF0 1D40115B   61130000 00000000  00000000 00000000   *..ð.$-. ..*0. .$/......
  0DE008  0001A0   00000000 00000000  00000000 00000000   00000000 00000000  00000000 00000000   *........................
  0DE028  0001C0 TO 0DE048  0001E0    SAME AS ABOVE
  0DE068  000200   00000000 00000000  00000000 00000000   00000000 00000000  00000000            *........................

**** Contents of following records deleted for clarity ***

-INTERNAL TRACE RECORD            ID = D 02  SEGNO=00  RECNO = 0060  TIME  14.08.32.29   DATE  78.298                    after
-INTERNAL TRACE RECORD            ID = A 03  SEGNO=00  RECNO = 0062  TIME  14.08.32.33   DATE  78.298                    msg.no.
-INTERNAL TRACE RECORD            ID = A 12  SEGNO=00  RECNO = 0064  TIME  14.08.32.33   DATE  78.298                      20
 CLB
  0F6FB8  000000   00008A00 0980009D  00ABB018 000CEA58   000ABD60 00000000  00000001 00000000   *...................-...
  0F6FD8  000020   A8A66806 00000000  E2C4D3C3 D7C1F0F2   00020100 000FA470  F00FCB14 001024A0   *YW......SDLCPA02......U
```

```
 0F6FF8  000040   02172080 000007D2  000100C0 00000000   000FA470 01000000  00000000 00000000   *.......K.........U....
 0F7018  000060   00000000 00000001  00000000 00000000   07000000 00000000  00000000 00AB7F20   *.......................
CTB
 0FA470  000000   001005F8 000F6FB8  00000010 000B2000   80100000 182A0000  0001FFFF 000FF650   *...8..?................
 0FA490  000020   00000000 00000000  000FDDC8 000FCB14   00008002 00000000  00000000 00000000   *............H...........
 0FA4B0  000040   000FE348 00000000  00000000 00000000   00000000 00000000  00000000 00210001   *..T....................
 0FA4D0  000060   00000000 00000000  00000000 00000000   00000000                               *.....................
CRB
 0FDDC8  000000   00000000 00000000  00000001 00008200   000FA470 00000000  00010000 00000000   *..............B...U....
DFS707I END OF FILE ON INPUT
DFS708I OPTION COMPLETE
DFS703I END OF JOB
```

ENTER USER NOTES HERE:

CHAPTER 6 : VTAM BUFFER MANAGEMENT

One of the most common and frustrating problems encountered in a VTAM Level 2 SNA environment is VTAM buffer pool depletion. New buffering techniques in ACF/VTAM can help in solving the problem of buffer depletion. ACF/VTAM dynamically allocates and deallocates space in the ACF/VTAM buffer pools for ACT/VTAM control blocks, I/O buffers, and channel programs that control the transmitting of data.

One should bear in mind, however, that buffer utilization even in a ACF/VTAM environment can impact the performance and useability of the teleprocessing system.

CONTENTS

6.1 : ACF/VTAM BUFFER POOLS

ACF/VTAM buffer utilization should be monitored continuously in order to provide the most positive management of ACF/VTAM resources.

One needs to keep in mind two facts:

1. ACF/VTAM's storage requirements are dependent on:
   - Network size
   - Number of ACF/VTAM application programs
   - Message sizes
   - Transaction rates
   - Amount of ACF/VTAM command and trace activity
   - Amount of OPNDST/CLSDST activity
   - Number of dial ports
   - NCP parameters

   ...and maybe even some other things!

2. A shortage of ACF/VTAM buffers can still be a very serious condition. Without using dynamic buffer allocation, ACF/VTAM will stop processing without sufficient buffers. In addition, if dynamic buffer allocation is being used without any thought given to tuning, system performance can suffer!

6.2 : VTAM BUFFERING INSIGHTS

Reaching the buffer threshold ("bth") of a VTAM buffer pool, for all practical purposes, suspends VTAM operation until: the number of buffers in the pool drops to bth minus 10% of the number of elements in the pool, AND no buffer requests are queued for the pool. If the "water level" in the pool never drops, then there is a good chance of getting the system into a "hung" condition, relative to VTAM operation. Reaching the buffer threshold is referred to as "Slowdown" mode, because only "priority requests" are satisfied. Finally, if the buffer pool is completely drained, further priority and non-priority requests are queued, until perhaps, there are not even any more queuing elements (Request Parameter Headers - RPH's) left. (RPH's must themselves come out of a VTAM buffer pool, named LPBUF.) These buffer requests and their priority are generated internally within VTAM. When a buffer pool is depleted, subsequent requests do not "spill over" to another pool. On the other hand, if VTAM's buffer pool allocations are large enough so that the buffer threshold is never reached, then just increasing the allocations will not improve response time, logon time, or start-up time. To affect these areas, one would have to make VTAM application code changes, or ISTATUS=ACTIVE/INACTIVE changes for the PU's and LU's, in conjunction with altering the VTAM buffer pool allocations.

VTAM's request for the use of buffers then, is not related to the total number of buffers defined in the pool.

Reiterating:

1. VTAM buffer requirements are complicated (dependent on many variables having to do with the network's size and activity, and with transaction sizes and rates).

2. VTAM "stops" when it runs out of buffers.

Therefore, be sure to read the section of this chapter titled "VTAM BUFFER TUNING HINTS".

There are 11 VTAM buffer pools in OS/VS systems, 10 in DOS/VS systems.
A pool is defined by:

```
poolname  (bno,bsz,bth)
```

where:
"bno" is the number of buffers defined in the pool,
"bsz" is the size in bytes of each buffer,
"bth" is the buffer threshold.

The pools are identified by various pool names such as "APBUF" and "LFBUF". Where in the computer these pools are actually allocated, and how they are used, is operating system dependent. Generally speaking, the implementations under OS/VS1 and MVS are similar, while DOS/VS differs substantially.

Under OS/VS, SFBUF, LFBUF, and IOBUF are page-fixed. Under DOS/VS, SFBUF, LFBUF, and VFBUF are page-fixed.

Under OS/VS, SFBUF contains the VTAM control blocks which represent the LU's and PU's in the network. These control blocks serve as anchor points for VTAM's internal process scheduling. For example, in MVS, SFBUF contains MVS Service Request Blocks (SRB's).
SFBUF is unused in DOS/VS, but one block must still be allocated.

Under OS/VS, LFBUF contains VTAM control blocks used throughout the life of a transaction. LFBUF is also the home of the Remote Cluster Node Control Block (HCNCB, yes, "H"), which is VTAM's representation of a remote BSC 3270. This reflects VTAM's support of the "SNA appearance" (at the RECORD mode API) of BSC 3270 devices.
Under DOS/VS, LFBUF contains only message data, no control blocks; the control blocks are in SPBUF and VFBUF instead. LFBUF, under DOS/VS VTAM is similar in function to IOBUF in OS/VS, with the exception that in MVS, the front of each buffer contains an SRB.

VFBUF, which is defined in DOS/VS only, contains node descriptions and some control blocks used in process scheduling.

In the MVS implementation, there is a VTAM address space, but the VTAM buffers are not allocated there; instead the buffers are allocated from the MVS Common Systems Area (CSA).

Under OS/VS1 Release 6, there is a VTAM partition, and the VTAM buffers are all allocated there. Prior to Release 6, there was no VTAM partition, and both VTAM buffers and code were in the OS/VS1 Pageable Supervisor Area (PSA).

Under DOS/VS, there is a VTAM partition, and it does contain VTAM's buffer pools.

VTAM tends to implement function by defining control blocks (data), rather than by implementing the function in logic (instructions). In this spirit, there are about forty different kinds of VTAM control blocks which come into play, depending on the type of VTAM request. These control blocks are generally allocated from VTAM pools on a "best-fit" basis, rather than say, a best-fit-within-function basis. As a result, control blocks are distributed among the various VTAM buffer pools, and the depletion of any one pool may break the path (or create an interlock situation) for SOME critical function.

BE WARY of any VTAM performance estimates or path length figures, which assume zero paging!!

Heavy VTAM buffer requirements during network start-up and shutdown can occur if all the PU's and LU's are coded as ISTATUS=ACTIVE. Then an activate/deactivate for the NCP could cause a large amount of concurrent OPNDST/CLSDST and VTAM VARY-ACT/VARY-INACT activity.

Under MVS only, to find out which VTAM control blocks are allocated from which buffer pools, find the VTAM Buffer Pool Directory (BPDTY), pointed to by the VTAM Communications Vector Table (ATCVT). The BPDTY contains a pointer to VTAM's Storage Management Control Block ID Table (CBIDT). The CBIDT (actually, ISTCBIDT), consists of eight-byte entries for each type of VTAM control block. Each CBIDT entry points to the appropriate VTAM Buffer Pool Control Block (BPCB); there is one BPCB for each VTAM buffer pool. Space for control blocks not found in the CBIDT, is obtained dynamically by VTAM, using an internal macro called GETSTOR. GETSTOR results in an OS GETMAIN from CSA (MVS subpools 227 and 228), or from the VTAM application's address space (MVS subpools 229 and 230). Under MVS, all of VTAM's buffer pools reside in subpools 231 and 241. The ACF/VTAMs are also implementing the CBIDT concept.

VTAM STORAGE POOL SUMMARY:

APBUF - Active and inactive connection pool in Pageable storage. Contains control blocks which associate a VTAM application with a terminal.

LPBUF - Large Pageable storage pool for VTAM's process scheduling and internal audit trail. LPBUF contains Component Recovery Areas (CRA's); each CRA roughly represents a "macro's worth" of work, though in some cases multiple CRA's are required. LPBUF is generally used for "working storage".

SPBUF - Small Pageable storage pool for processing purge, close, or deactivate requests. (Heavily used in DOS/VS, where it provides the OS/VS functions of UECBUF, CRPLBUF, and LFBUF.

NPBUF - Non-working set session characteristics pool in Pageable storage. Contains Function Management Control Blocks (FMCB's), which are the anchor points for Application-to-LU session dependent process scheduling.

WPBUF - Working-set session characteristics pool in Pageable storage. Contains FMCB's for SSCP-to-LU session dependent processing.

UECBUF - User Exit routine Control pool in pageable storage (OS/VS only). Used in scheduling user specified RPL Exit Routines (DFASY, RESP, SCIP, LOGON, LOSTERM, LERAD, SYNAD, ATTN, TPEND). Heavily used during VARY command and LOGON activity.

CRPLBUF - Copied Request Parameter List in pageable storage, for VTAM macro processing at the VTAM Application Program Interface (API). Defined in OS/VS only.

LFBUF - Large Fixed storage pool for VTAM process scheduling and start-stop, bisynch, and local 3270 control blocks (OS/VS). (Under DOS/VS, used for message data only, analogous to IOBUF in OS/VS).

SFBUF - Small Fixed storage pool to hold control blocks which are VTAM's representation of PU's and LU's.

PPBUF - Application Program data's Pageable storage pool for holding inbound (to the System/370) data, in the event that a RECEIVE or READ request has not been made by the application program.

IOBUF - Input/Output fixed storage pool (OS/VS only). Used for all I/O (both directions) across the System/370 I/O channels.

VPBUF - Variable length Pageable storage pool for VTAM Resource Definition Tables (RDT's), NCP Symbol Resolution Table (SRT) from the NCP gen, process scheduling control blocks, et al. Defined in DOS/VS only.

VFBUF - Variable length Fixed storage pool for the Symbolic Name Table (SNT) containing the network names, and control blocks representing 3705's, NCP's, and local 3270's. Defined in DOS/VS only.

6.3 : ACF/VTAM BUFFERING INSIGHTS

ACF/VTAM tends to implement function by defining control blocks (data), rather than by implementing the function in logic (instructions). Because of this, there are a multitude of different kinds of ACF/VTAM control blocks which come into play, depending on the type of ACF/VTAM request. These control blocks are generally allocated from ACF/VTAM pools on a "best-fit" basis, rather than say, a "best-fit-within-function" basis. As a result, control blocks are distributed among the various ACF/VTAM buffer pools, and the depletion of any one pool may break the path (or create an interlock situation) for SOME critical function.

Be WARY of any ACF/VTAM performance estimates or path length

figures, which assume zero paging!!

Dynamic allocation of buffer pools in ACF/VTAM will better handle peaks, but may ultimately, only defer a ACF/VTAM buffer depletion situation. There do not appear to be any ACF/VTAM buffer pools which can intentionally be set low to "throttle down" ACF/VTAM's overall storage utilization. This is significant, because ACF/VTAM has a tendency to "overeat", that is, to continue to accept data from the 3705/NCP(s) and local attached devices, past the point that it is probably still headlthy to do so, from a ACF/VTAM buffering standpoint. One ACF/VTAM solution to this, is its support of SNA inbound pacing; currently, only remote SDLC 3770's, 3600's, 3650's have implemented this.

Heavy ACF/VTAM buffer requirements during network start-up and shutdown can occur if all the PU's and LU's are coded as ISTATUS=ACTIVE. Then an activate/deactivate for the NCP could cause a large amount of concurrent OPNDST/CLSDST and ACF/VTAM VARY-ACT/VARY-INACT activity. Dynamic buffering could be considered as a solution to the problem of start-up,shutdown and unusual peak conditions.

The following is a list and description of ACF/VTAM buffer pools:

APBUF - Active and inactive connection pool in Pageable storage. Contains control blocks which associate an ACF/VTAM application with a terminal.

CRPLBUF- Copied Request Parameter LIst in pageable storage, for ACF/VTAM macro processing at the ACF/VTAM Application Program Interface (API).

IOBUF - Input/Output fixed storage pool. Used for all I/O (both directions) across the System/370 I/O channels.

LFBUF - Large Fixed storage pool for ACF/VTAM process scheduling and start-stop, bisynch, and local 3270 control blocks.

LPBUF - Large Pageable storage pool for ACF/VTAM's Process scheduling and internal audit trail. LPBUF contains Component Recovery Areas (CRA's)' each CRA roughly represnets a "macors's worth" of work, though in some cases multiple CRA's are required. LPBUF is generally used for "working storage".

NPBUF - Non-working set session characteristics pool in Pageable storage. Contains Function Management Control Blocks (FMCB's), which are the anchor points for Application-to-LU session dependent process scheduling.

PPBUF - Application Program data's Pageable storage pool for holding inbound (to the System/370) data, in the event that a RECEIVE READ request has not been made by the application program. for Basic Mode devices only. A variable getmain is done from the application's address space to statify the storage requirements.

SFBUF - Small Fixed storage pool to hold control blocks which are ACF/VTAM's representation of PU's and Lu's.

SPBUF - Small Pageable storage pool for processing purge, close, or deactivate request.

UECBUF - User Exit routine Control pool in pageable storage. Used in scheduling user specified RPL Exit Routines (DFASY, RESP, SCIP, LOGON, LOSTERM, LERAD, SYNAD, ATTN, and TPEND). Heavily used during VARY command and LOGON activity.

WPBUF - Working-set session characteristics pool in Pageable storage Contains FMCB's for SSCP-to-LU session dependent processing.

VPBUF - Variable length Pageable storage pool for ACF/VTAM Resource Definition Tables (RDT's), NCP Symbol Resolution Table (SRT) from the NCP generation, processing scheduling control blocks, et al. Also, used for dynamic buffer building and pageable I/O. Defined in DOS/VS only.

VFBUF - Variable length Fixed storage pool for the Symbolic Name Table (SNT) containing the network names, and control blocks representing 3705's NCP's and local devices. Defined in DOS/VS only.

6.4 : TYPES OF BUFFER POOL ALLOCATION

ACF/VTAM provides two types of buffer pool allocations. One type, basic allocation, is made for each buffer pool when ACF/VTAM is started. The other type, dynamic allocation, is a process by which ACF/VTAM temporarily increases the size of a buffer pool when there are heavy demands for space in that pool. Dynamic allocation, which takes place only if the user asks for it, allows the system programmer to reduce the amount of storage that must be permanently allocated for ACF/VTAM buffer pools. It also enables the system programmer to provide for temporary peak demands or for unexpectdly high demands for buffers, a feature that is useful when initializing a system.

6.5 : EFFECT OF THE SLOWDOWN POINT

When the number of buffers remaining available in a pool is equal to or less than the slowdown point (slowpt), the pool enters slowdown processing. During slowdown processing, buffers are allocated only for priority request. (Priority requests are those requests for storage that must be satisfied to prevent system interlocking.) Nonpriority request are not honored if doing so would cause the pool to enter slowdown processing. Nonpriority requests are queued or are rejected with a return code. Slowdown processing ends as soon as the number of available buffers becomes equal to or greater than slowpt and there are no queued requests for storage.

6.6 : ACF/VTAM BUFFER POOLS

ACF/VTAM has 11 buffer pools to control the buffering of data. A pool is defined by:

poolname (baseno,bufsize,slowpt,F,xpanno,xpanpt)

where:

baseno - indicates the initial number of buffers provided in the buffer pool. After ACF/VTAM is started, the pool always contains at least this number of buffers.

bufsize - indicates the size in bytes of each buffer in the buffer pool.

slowpt - indicates the point at which the buffer pool is to enter slowdown processing. The pool enters slowdown processing when the number of buffers currently not in use in the pool is less than or equal to slowpt. Do not confuse slowpt with a VTAM Level 2 start parameter, "bth", which referred to the number of buffers in use.

F - indicates that a buffer pool that is normally in pageable storage is to be put in fixed storage. Defined in OS/VS only.

xpanno - indicates the number of buffers to be added to the buffer pool whenever dynamic allocation is needed. Whenever the buffer pool is to be expanded, ACF/VTAM acquires the smallest number of whole pages of storage that are sufficient to provide the number of buffers specified in xpanno. (For example, if 5 buffers will fit on on page of storage, and if xpanno is specified as 6, ACF/VTAM acquires two pages of storage whenever the buffer pool must be expanded, and expands the pool by 10 buffers.)

xpanpt - is a decimal integer that specifies the expansion point for this buffer pool. When the number of buffers not in use in the buffer pool falls to a value that is equal to or less than xpanpt, ACF/VTAM schedules an asynchronous routine to expand the buffer pool by the number of buffers specified by xpanno. The value of xpanpt must be greater than the value of slowpt, but less than the value of baseno minus "adjval", where "adjval" is an adjustment value for this buffer pool. (See Chart IBM SUPPLIED BUFFER POOL VALUES below.) If you specify an xpanpt value, but omit the slowpt value, make sure that the xpanpt value is greater than the default slowpt value for the pool. If xpanpt is not specified, no buffer pool expansion occurs.

Dynamic expansion takes place only when the user specifies both the xpanno and xpanpt parameters for the pool. If xpanno and xpanpt are not both specified, the pool always remains the size specified by the baseno and bufsize parameters.

The buffers acquired by dynamic expansion are functionally the same as the buffers provided by the base allocation.

6.7 : PURPOSE OF DYNAMIC EXPANSION

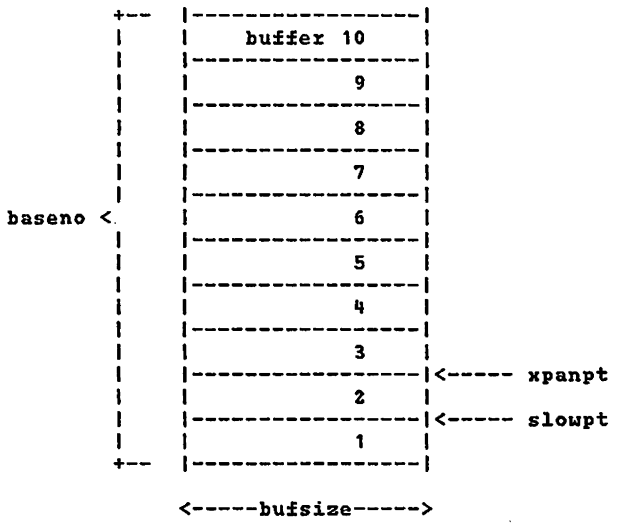
Without dynamic expansion of a pool, you would have to specify basic allocation parameters large enough to meet the greatest possible demands on the pool. With dynamic expansion, smaller basic allocation values can be specified and peak demands on the pool can be met with dynamic expansion.

Dynamic expansion is not intended to be used frequently; it is intended only to meet peak demands on the pool. For example, if a user experiences peak demands at certain times of the day, dynamic expansion could be used to meet those periods of peak demand. The basic allocation parameters would be specified to provide enough buffers for the periods of normal activity.

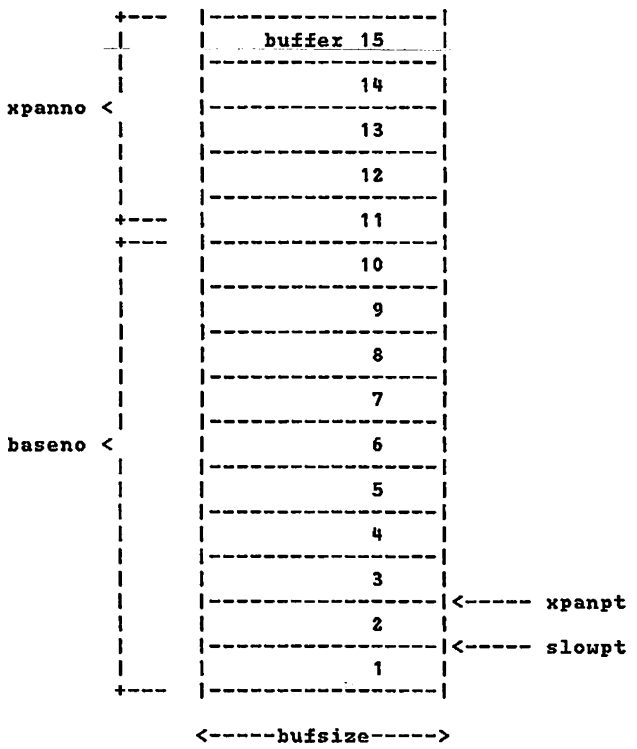
The user should consider cafefully whether dynamic expansion is appropriate for the type of demands the system makes on each pool. A large basic allocation for the pool means that pool processing is more efficient, but more storage is tied up for that pool. Dynamic expansion provides more efficient use of storage, but reduces processing efficiency.

The following example shows the structure of a pool (A) after basic allocation, and (B) after one dynamic expansion of the pool.

A - AFTER INITIAL ALLOCATION



B - AFTER ONE EXPANSION



A This example shows a buffer pool for which the start options were specified as poolname=(10,bufsize,1,,5,2). After initial allocation, the pool contains 10 buffers (baseno=10), the length in bytes of each buffer is "bufsize", the slowdown point is 1, the expansion size is 5 buffers (assume that 5 buffers fill one one page of storage), and the expansion point is 2.

B After one expansion, there are 15 buffers in the pool. Each of the 5 additional buffers has a length of "bufsize" and the same expansion point and slowdown point as before.

6.8 : IBM SUPPLIED VALUES FOR BASIC ALLOCATION

When the user does not specify a base allocation paramter for a pool, an IBM supplied value is used to construct the pool. If the IBM supplied values are inadequate or inappropriate, you can calculate your own values. For techniques in buffer pool calculation see the section entitled "Storage Estimates and Buffer Pool Calculations" in the appropriate SYSTEM PROGRAMMER'S GUIDE for OS/VS or DOS/VS.

WARNING: The default values for "slowpt" do NOT agree with the recommendations in the ACF/VTAM SYSTEM PROGRAMMER'S GUIDE. Experience shows that the default values in the table below should be changed per the guidelines specified in the section titled ACF/VTAM BUFFER TUNING HINTS of this document.

IBM SUPPLIED BUFFER POOL VALUES

	OS/VS1				OS/MVS				DOS/VS **		
Buffer pool name	baseno	bufsize	slowpt	adjval	baseno	bufsize	slowpt	adjval	baseno	bufsize	slowpt
APBUF	25	60	3	0	129	64	13	0	20	64	0
CRPLBUF	20	116	2	0	208	120	15	0	NOT APPLICABLE		
IOBUF	5	64*	1	0	100	64*	19	0	NOT APPLICABLE		
LFBUF	10	120	0	1	102	120	0	0	5	*	2
LPBUF	15	1016	2	5	64	1016	0	4	15	1131	0
NPBUF	15	200	1	0	192	200	16	0	5	288	0
PPBUF	5	64*	1	0	175	64*	18	0	5	*	0
SFBUF	10	72	0	1	163	72	0	5	10	120	0
SPBUF	5	64	0	0	3	64	0	0	25	156	0
UECBUF	10	112	1	0	34	112	4	0	25	100	4
WPBUF	15	168	0	0	78	168	0	0	10	164	0
VFBUF	NOT APPLICABLE				NOT APPLICABLE				VBSZ = 6144		
VPBUF	NOT APPLICABLE				NOT APPLICABLE				VBSZ = 62488		

* This value must be overriden to equal the value specified for the UNITSZ operand in the NCP HOST macro instruction.

** "adjval" for DOS/VS is 0 in all cases.

6.9 : VTAM OR ACF/VTAM-TO-NCP BUFFER TUNING

Each channel program used by VTAM or ACF/VTAM to write data to a SNA controller consists of a write channel program followed by a read channel program. If the controller has data ready to go to VTAM or ACF/VTAM when it finishes a write operation, VTAM or ACF/VTAM immediately begins to read data without any prompting from the controller. If, however, the SNA controller has data to send to VTAM or ACF/VTAM, and VTAM or ACF/VTAM has not attempted to write or read during a specified interval, or if the controller has reached a predefined buffer limit, the controller sends an attention to VTAM or ACF/VTAM requesting that it start a read operation. If VTAM or ACF/VTAM is able to accept the data, VTAM or ACF/VTAM starts a read channel program to satisfy the request.

Therefore, VTAM or ACF/VTAM can read data in either of two ways: as an immediate sequel to a write operation (which is fast and efficient) or as a separate operation initiated by an attention interruption from the SNA controller (which is less efficient).

The amount of data that VTAM or ACF/VTAM can read in one operation depends on the number of buffers used by a read channel program and on the size of each buffer

The basic objectives of tuning VTAM or ACF/VTAM data-transfer operation are:

- To read data from the controller as often as possible as an immediate sequel to an VTAM or ACF/VTAM write operation, thereby reducing the number of attention interruptions that VTAM or ACF/VTAM must process.
- To read more than one path information unit (PIU) on each read operation.

These objectives can be met by adjusting parameters in the VTAM or ACF/VTAM and NCP macro instructions.

ACF/VTAM TNSTAT Option

To assist the user in adjusting these parameters ACF/VTAM provides tuning statistics. Tuning statistics can be specified with the TNSTAT start option, and the specification can be changed with the MODIFY network operator command. Among the items that can be regulated are how often the records are to be written, and whether the records are to be written only to the system management facility (SMF) file, or to that file and to the network operator's console.

Each tuning statistics record contains information about the state of the data-transfer operation between ACF/VTAM and one local SNA controller. Each record contains statistics that cover the time period since the last tuning statistics record was written for that controller.

If tuning statistics are not specified by the TNSTAT parameter at start up time, it can be activated and deactivated by the network operator with the following commands:

To start collecting tuning statistics -

```
F NET,TNSTAT,CNSL,TIME=n   where n is the number of minutes that should
                           elapse between each record (1-1440).
```

To end collecting tuning statistics -

```
F NET,NOTNSTAT
```

This is the format of the tuning statistics report that appears (if requested) at the network operator's console:

```
IST440I  TIME=12402308  DATE=78079  LOCAL PC NAME=NCPLOC
IST441I  DLRMAX=1       CHWR=14     CHRD=15
IST442I  ATTN=15        RDATN=0     IPIU=15
IST443I  OPIU=14        RDBUF=15    SLODN=0
```

TIME - indicates the time (in hours, minutes, seconds and hundredths of seconds) at which the record was recorded.

DATE - is the date on which the tuning statistics were recorded.

LOCAL PC NAME - is the name of the local SNA controller for which the statistics were gathered.

DLRMAX - a decimal value that indicates the maximum number of dump-load-restarts requests that were awaiting processing or were being processedat one time during the interval. This number refers to the entire domain, not to the SNA controller named in the report.

ATTN - total number of attentions received from the controller.

SLODN - total number of times controller went into slowdown mode.

RDATN - total number of times the attention was included in the ending status on a read channel program.

IPIU - total number of inbound PIUs received from the controller

OPIU - total number of outbound PIUs send to the controller.

RDBUF - total number of ACF/VTAM buffers used for read operations.

CHWR - total number of write channel programs issued.

CHRD - total number of read channel programs issued.

The DELAY operand controls the length of time a 370x communications controller holds data before it requests ACF/VTAM to read the data.

The tuning characteristics of the DELAY operand are:

If the DELAY time is too long, the response time can be poor.

If the DELAY time is too short, ACF/VTAM must process too many

For VTAM or ACF/VTAM, MAXBFRU specifies the maximum number of buffers that can be used in one read operation when reading data from a controller. For the controller, MAXBFRU specifies how many buffers the controller must reserve for holding data awaiting transmission into VTAM or ACF/VTAM.

VTAM or ACF/VTAM operates more efficiently if MAXBFRU is set to a higher value because more buffers are available for each read operation. The controller, however, must be able to buffer both the current read channel program and the last read channel program; therefore, the higher the MAXBFRU value, the greater the demand on the controller's buffer resources.

The tuning characteristics of the MAXBFRU operand are:

If MAXBFRU is too low, many more VTAM or ACF/VTAM read operations are required and, consequently, the number of attention occuring on a read operation is higher.

if MAXBFRU is too high, the NCP enters slowdown mode frequently.

The IOBUF "bufsize" parameter affects the number of buffers that VTAM or ACF/VTAM must use for each PIU to be transmitted.

If the "bufsize" is much larger than the average size of a PIU, storage is wasted because VTAM or ACF/VTAM puts only one PIU into each buffer. On the other hand, if "bufsize" is smaller than the average PIU, VTAM or ACF/VTAM breaks the PIU into blocks just large enough to fill one buffer and chains the buffers together. Therefore, when "bufsize" is too small, VTAM or ACF/VTAM must do extra processing to handle the chaining, and VTAM or ACF/VTAM's I/O operations become less efficient.

The best results are obtained when "bufsize" is such that, on the average, slightly more than one buffer is used for each inbound PIU. If the average number of buffers used for each inbound PIU (found be dividing RDBUF by IPIU) is exactly one, the "bufsize" value is too large, and if it is greater than two, the "bufsize" value is too small.

VPACING controls the amount of data that VTAM or ACF/VTAM can send to a controller in one write operation. Indirectly, it influences the frequency with which VTAM or ACF/VTAM can read data at the end of a write operation

In terms of ACF/VTAM tuning statistics, the effects of the VPACING operands are:

If the n parameter of VPACING is too low, ACF/VTAM write operations occur less frequently and the controller must issue read attention more often.

If the n parameter of VPACING is too high, there tends to be a greater demand on the controller's buffer resources, and the controller tends to enter slowdown processing more frequently.

In summary one might say that tuning is a process of adjusting variables until processing meets the requirements of the user and the network. The following chart which shows some of the symptoms and causes of tuning imbalances, can help in the tuning process.

SYMPTON	Possible Causes			
	DELAY time	MAXBFRU value	VPACING value	IOBUF bufsize
Too many attentions (ATTN is high)	Too low		Too low	
Poor response time at low data rate	Too high			
Too many NCP slowdowns (SLODN is high)		Too high	Too high	
Too many attentions for read (RDATN is high)		Too low		Too small
ACF/VTAM's inbound data rate is poor (IPIU low)			Too high	
ACF/VTAM's outbound data rate is poor (OPIU low)			Too low	
RDBUF about the same as IPIU				Too large
IPIU much less than RDBUF				Too small
OPIU much less than CHWR			Too low	
No NCP slowdowns occur (SLODN is always 0)		Too low		
RDBUF less than (MAXBFRU x CHRD)		Too high		

Other considerations for using the tuning statistics output are:

The value for SLODN should be low, but not zero. If the controller never goes into slowdown mode, it indicates that a substantial fraction of the controller's resources are never used, and therefore wasted. Generally, the ratio of controller slowdowns to the total number of PIUs processed should be about the same as the ratio of the number of hours of peak load to the total number of hours of operation.

The RDATN value should be as small as possible. A large RDATN value indicates that there are not enough ACF/VTAM read buffers.

The ATTN value should usually be less than the CHRD value. The smaller the ATTN is in proportion to CHRD, the greater the proportion of reads that were done as part of a write operation. If ATTN is about the same as CHRD, the DELAY value is too low.

The following points provide additional information as to the configuration of data flow between ACF/VTAM and NCP:

1.) A PIU is: TH + RH + RU.

2.) Between ACF/VTAM and the NCP: the TH is 10 bytes long, the RH is 3 bytes, (FID 1 format).

3.) ACF/VTAM has page-fixed I/O buffers (IOBUFs in OS/VS, LFBUFs in DOS/VS.

4.) NCP allocates and manages buffers in the 370x, termed "BFRS".

5.) A System/370 channel program transfers data:
FROM one or more IOBUFs
TO one or more BFRS , or vice-versa.

6.) ACF/VTAM and NCP will not allow a PIU to be split across multiple System/370 channel programs (SIO's).

7.) BFRPAD is the padding that NCP adds to the front of inbount (NCP to ACF/VTAM) data. For ACF/VTAM the length of this BFRPAD is 0.

8.) "UNITSZ" is NCP's term for the size of ACF/VTAM's channel program I/O buffers (IOBUF in OS/VS, LFBUF in DOS/VS).

9.) "MAXBFRU" is NCP's term for the maximum number of ACF/VTAM IOBUFs (LFBUFs in DOS/VS) that will be used in one SIO data transfer from the NCP to ACF/VTAM. ACF/VTAM will set up MAXBFRU READ ccw's (each one for UNITSZ bytes) and read buffers (IOBUFs or LFBUFs), for each inbound (NCP to ACF/VTAM) channel operation.

10.) Points 5, 6, 7, 8, and 9 above, say that the largest inbound PIU must be less than or equal to (MAXBFRU x UNITSZ) - BFRPAD bytes, and that MAXBFRU must be less than the total number of IOBUFs (LFBUFs in DOS/VS) defined to ACF/VTAM. The NCP will transfer both segmented and unsegmented PIU's to ACF/VTAM.

11.) Outbound (ACF/VTAM to NCP), "MAXDATA" (on the ACF/VTAM-only PCCU macro in the NCP gen) is the term for the maximum amount of data that ACF/VTAM will transfer to the NCP in one SIO. From point number 6, we conclude that the size of the largest outbound PIU must be less than or equal to MAXDATA bytes. Note: the maximum PIU size for 3790 Data Stream Compatility is 1549 bytes (10 byte TH + 3 byte RH + maximum 1536 byte RU).

12.) Under some error conditions, the NCP will send outbound data BACK to ACF/VTAM. From a buffering point of view, this is the same as the inbound (NCP to ACF/VTAM) case, and point number 10 still applies: MAXDATA must be less than or equal to (MAXBFRU x UNITSZ) - BFRPAD.

13.) Points 10 and 12 say that the size of the largest PIU (inbound or outbound) must be less than or equal to (MAXBFRU x UNITSZ) - BFRPAD bytes.

14.) "INBFRS" is NCP's term for the number of 370x BFRS that the NCP reserves for data transfers from ACF/VTAM to the NCP. If, during a data transfer, the INBFRS number of BFRS are filled, System/370 channel operation is temporarily suspended until another INBFRS number of BFRS are reserved by the NCP. This suspension is very temporary - the

System/370 channel program is still active. If there are reserved, but unused, 370x BFRS remaining at the end of the channel operation, they remain reserved, and are used as the initial allocation for the next ACF/VTAM-to-NCP channel operation.
A reasonable choice for INBFRS is:

$$\frac{\text{10 byte NCP "ECB" + 10 byte TH + 3 byte RH + RU size}}{\text{BFRS}}$$

$$= \frac{\text{RU size + 23}}{\text{BFRS}}\text{ , rounded up to an integer.}$$

15.) THE NCP STARTS EACH PIU ON A NEW BFRS BOUNDARY. SNA responses, like DR1's and DR2's are short, and can comprise a significant percentage of the network traffic.
For example, a typical SNA response looks like:

BFRPAD (28 bytes max) + 10 byte TH + 3 byte RH =
= 41 bytes max.

ACF/VTAM Network Control PIU's look like:

10 byte NCP ECB + 10 byte TH + 3 byte RH + 3 byte RU
= only 26 bytes total.

Each of these will occupy an individual NCP buffer. Unless, another value is determined to be better, a BFRS=64 should be specified. This will also result in optimum segmenting on SDLC links.

6.10 : ACF/VTAM BUFFER TUNING HINTS

You can use the ACF/VTAM buffer use trace (See the section titled ACF/VTAM STORAGE POOL TRACE) to adjust the ACF/VTAM pool values to accurately represent you requirements (such as network configuration and maximum transaction rate.) One procedure for doing this is (1) initially operate ACF/VTAM using the IBM-supplied or the user-calculated pool values, (2)fix additional and optional pageable pools (if any) in storage, (3) activate the buffer use trace, and (4) adjust the pool values as indicated by the trace data.

When analyzing the ACF/VTAM buffer use trace data and adjusting the buffer pool values for initial allocation, consider these guidelines:

ACF/VTAM should be operated using the user's requirements fora application programs and workload, for the network configuration, and for the maximum transaction rate.

If a specific pool often goes into slowdown mode or runs out of buffers, that pool's slowpt value should be decreased or its baseno value should be increased.

If a pool has a low number of requests, storage can be saved by reducing its baseno value.

For IOBUF, NPBUF, PPBUF and UECBUF, the baseno value should be a multiple of the number of buffers for each page.

For Basic Mode, if an application program stops accepting input data, PPBUF must be large enough to hold all the data that ACF/VTAM can receive from the terminals connected to the application program (until the program begins accepting input data again). Therefore, do not assume that low utilization figures (from the buffer use trace) indicate a need to change the "slowpt" or "baseno" values for PPBUF.

The size of PPBUF is based on the assumption that BUFFACT=1 for all application programs (APPL definition statements) and BUFLIM=2 for all basic mode terminals (LOCAL definition statements and TERMINAL, VTERM, or COMP macro instructions). Therefore, the "baseno" value should allow two buffers for each basic mode terminal.

The following points will help in buffer pool definitions:

1.) PLAN to pay a lot of attention to ACF/VTAM buffer monitoring and tuning. This important step may save much work and aggravation later.

2.) The Systems Engineer should run the STORVTAM HONE AID, to obtain the initial guesstimate of the proper ACF/VTAM buffer pool parameters. The formulas are all documented in the SRL's, but STORVTAM is quicker, less prone to clerical errors, produces comprehensive nicely formatted output, and may be more current, especially if you don't have all the latest TNL's. At any rate, whether you do the computations manually or with STORVTAM, the resulting ACF/VTAM buffer parameters SHOULD BE USED AS INITIAL VALUES ONLY. FINE TUNING IS NECESSARY! - using ACF/VTAM's Storage Management Services (SMS) buffer pool trace.

3.) The formulas documented in the SRL's and used by STORVTAM, request information such as the number of terminals, transaction rate, etc. Following is additional information to help clarify some of these parameters.

Number of ACB's ("NACB") - Total from the following table:

JES/POWER	1
IMS/VS	1
CICS/VS	1
IIS	1 (Interactive Instructional System)
TSO/VTAM	1 for TCAS plus 1 for each logged-on TSO user
VSPC	1 for each VSPC partition/address space
NETSOL	1 (ACF/VTAM NETwork SOLicitor)
BTP	1 (IBM 3760 Batch Transfer Program)
SSS	1 (Subsystem Support Services)
ACF/VTAM	2 (ACF/VTAM always opens internal ACB'S: 1 for ACF/VTAM itself, and 1 for TOLTEP, which is automatically included)
NOSP	2 for NOSP plus 1 for each hardcopy device and 1 for each operator.

...plus the number of ACB's opened by user-written ACF/VTAM applications.

If you're not sure about whether you have one of these subsystems, include it for initial estimating purposes.

Number of non-SNA terminals locally attached ("NTERM"); count each printer and display station; plus the number of remotly attached terminals on BSC and start-stop lines.

Number of remotly ("NBSCCLUS") attached 3271, 3275 and 2972 cluster controllers on BSC lines.

Number of local non-SNA devices ("NLOCTERM") in the network.

Number of logical units ("NLU") - Refers only to the number of (concurrently active) SNA logical units. These are only the ones defined via LU statements in an NCP generation or Local SNA Major Node definition. Do not count any BSC or S/S terminals/control-units (including BSC 3270's), or any local channel attached 3270's. Do count LU's defined for IBM 3274-1A's, and local channel attached IBM 3790's.

Number of SDLC "Cluster Controllers" ("LOCSNA") - Means the number of IBM SDLC:

3271/5 Models 11 or 12
3274/6's
3601/2's
3651's
3661's
3791's

...NOT 3767's, 3770's, remote 370x's, or 3271/5 Models 1/2.

Number ("NPU") of locally attached record-mode cluster controllers, plus the number of remotly attached SNA cluster controllers on SDLC lines.

Number of dial-up switched lines ("NPORT").

Number of concurrent TOLTEP users ("NTOLTEP") - If you don't know, use 2.

Number of concurrent operator commands ("NCOMMAND") - THIS IS AN IMPORTANT ONE. Use a starting value of

100 or more. These "operator commands" are NOT just commands entered by the ACF/VTAM Network Operator. ACF/VTAM generates "operator commands" internally as well. For example, a 'V NET,INACT,R' issued to the NCP results in ACF/VTAM generating internal VARY INACT commands for every active LU and PU!

Number of concurrent ACF/VTAM buffer (TYPE=BUF) traces ("NTRACE") - If you're not sure, use 4.

"MAXBFRU" specified on the NCP HOST macro - If you aren't sure, use 20.

"MAXBFRU" specified for a local channel attached 3790 - If you aren't sure, use 7.

"UNITSZ" specified on the NCP HOST macro - If you aren't sure, use 152. If you have more than say, 30 CONCURRENTLY ACTIVE local channel attached displays and printers, use 336. The value specified for the ACF/VTAM IOBUF (LFBUF in DOS/VS) block size must match the UNITSZ value.

"IOBUF" ("LFBUF" in DOS/VS) block size - Same considerations/values as for UNITSZ, above.

"NBUFMSG" for local 3270 terminals - "Number of IOBUFs (LFBUF's in DOS/VS) per 3270 input message". Don't use the NBUFMSG tables in the SRL's. They assume READ FULL BUFFER (!) to the 3270's. Use the input (3270 to ACF/VTAM) message length which applies to your environment viz.:

$$\text{NBUFMSG} = \frac{\text{Your local 3270 input message length}}{\text{IOBUF block size}}$$

4.) Run ACF/VTAM's SMS buffer pool trace often. See the ACF/VTAM STORAGE POOL TRACE section of the chapter title TOOLS/SERVICE AIDS, for details.

5.) Review the SMS output to insure that the "MAXU" values are ALWAYS less than the "baseno" minus "slowpt" for their respective buffer pool thresholds. Furthermore, the "MAXQ" values should always be zero.

6.) "AVNO", the number of buffers in a pool at the instant that the SMS trace record was created, is not that meaningful/important, compared to MAXU and MAXQ. AVNO IS interesting if the zap to reduce the trace interval to a low number (like 4 or 1), is applied. The ACF/VTAM SMS trace logic is entered on EVERY call to the buffer allocation routine, so the statistics are captured/computed regardless of the trace interval value. The SMS trace interval only controls when an SMS trace record is written. As supplied, ACF/VTAM writes an SMS trace record for every 1,000 CALLS to the buffer allocation routine. There are approximately four calls to buffer allocation per transaction (a message in and a message out). That is, one call each for TPIOS inbound, Control Layer inbound, Control Layer outbound, and TPIOS outbound. A "call" to the buffer allocation routine may be a request for multiple buffers.

7.) "TEXP" gives the number of times dynamic expansion occured and if this number is "large", one should possibly increase initial buffer allocations.

8.) Do NOT specify any blocksize (bsz) parameters for ACF/VTAM buffers, except for IOBUF and PPBUF in OS/VS, and LFBUF and PPBUF in DOS/VS. The bsz parameters are release dependent for each SCP.

9.) TRY TO BE VERY SURE, that prior to decreasing any ACF/VTAM buffer pool parameters, that the SMS traces (which would be the basis for the decision) have included the start-up and shutdown of the full network, as well as peak load transaction rates.

10.) SFBUF is unused in DOS/VS, but 1 MUST be allocated.

11.) In a TSO/ACF/VTAM environment, UECBUF usage will increase.

12.) In an IMS/VS or CICS/VS environment, CRPLBUF usage will increase due to the RECEIVE ANY macro usage in the subsystems.

13.) In a BSC 3270 environment, watch LFBUF.

14.) ACF/VTAM requires one entry in SPBUF for each local 3270 logged on the system.

15.) Local 3270's are represented by Local Device Node Control Blocks (LDNCB's). In MVS, LDNCB's are GETMAINed by ACF/VTAM out of CSA; they do not reside in a ACF/VTAM buffer pool.

16.) One technique for lowering ACF/VTAM buffer requirements during network start-up is to code all PU's as ISTATUS=INACTIVE and all LU's as ISTATUS=ACTIVE. Then 'VARY NET,ACT' commands for the PU can be entered, spaced apart in time. The ACF/VTAM Programmed Operator Facility and the MVS Secondary Operator Facility FDP (Program Number 5798-CRE), can be used to minimize operator intervention and still bring a network up in phases.

17.) Be aware that ACF/VTAM operator commands can place a significant demand on ACF/VTAM storage. If ACF/VTAM is in a short-on-storage condition, then entering say, the DISPLAY command, to help diagnose the situation may also aggravate the condition considerably. In MVS, for example, operator commands require buffers from CRPLBUF and LPBUF. CRPLBUF is transaction-rate sensitive, and LPBUF contains control blocks which are essential for ACF/VTAM's process scheduling (RPH's and CRA's).

Because of the above though, one technique for determining that ACF/VTAM is hung due to a buffer shortage, is to simply enter a DISPLAY command at the ACF/VTAM Network Operator's console. If the system does not even respond with "DISPLAY ACCEPTED" (much less the actual status display), then the odds are good that ACF/VTAM has depleted (or hit the threshold), on one or more buffer pools.

18.) Experience has shown, that if logons are done from the terminals rather than OPNDST ACQUIRES issued from the ACF/VTAM applications, a major potential source of ACF/VTAM buffer problems can be avoided. This is because of the more staggerred logon sequence that occurs when people are entering the request, which places less of a concurrent load on ACF/VTAM.

19.) CICS/VS limits the number of concurrent OPNDST's or CLSDST's to ten (default).

20.) The "xpanpt" value for IOBUF(OS/VS) OR LFBUF(DOS/VS) must be greater than the largest MAXBFRU plus the "slowpt" value.

6.11 : ACF/VTAM AND VTAM BUFFERING REFERENCE PUBLICATIONS

MVS:

OS/VS2 System Programming Library: VTAM Chapter 8: Tuning VTAM	GC28-0688

OS/VS1:

OS/VS1 Storage Estimates - Release 6 Access Method Storage: VTAM	GC24-5094
OS/VS1 VTAM System Programmer's Guide Appendix F: Determining Values for the VTAM Storage Pool Start Parameters	GC27-6996

DOS/VS:

DOS/VS System Generation Module 22: VTAM	GC33-5377
DOS/VS VTAM System Programmer's Guide Chapter 4: Starting and Controlling the Network	GC27-6957

ACF:

ACF/VTAM System Programmer's Guide Program Number 5735-RC2 (OS/VS) Appendix C: Storage Estimates and Buffer Pool Calculations	SC38-0258
ACF/VTAM System Programmer's Guide Program Number 5735-RC3 (DOS/VS) Chapter 7: Storage Estimates and Tuning for ACF/VTAM	SC38-0268

ENTER USER NOTES HERE:

CHAPTER 7 : 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 suggests for developing operator procedures.

CONTENTS

NAMING CONVENTIONS

NAMING CONVENTION CONSIDERATIONS IN BACKUP CONFIGURATIONS

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 3705's (All will be in a not acquired status 'NACQ' except the one in use).
- Applications need to know (or gen) 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 3705's.
  - 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.
  - Reconfiguration of terminals 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 a VTAM display.

NAMING CONVENTION SUGGESTION

A VTAM display of a logical unit includes the following items:

- NCP name
- Line Group Name
- Line Name
- PU Name
- LU Name

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 abreviations are used:

- sss = Subarea number
- v = Variable based on user needs
- lia = Line interface address on 3705

NCP

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

Examples:

- Nsssvvv
- N010000 for an NCP with a subarea of 010, and a version level of 000.
- N020002 for an NCP with a subarea of 020, and a version level of 002.

GROUP

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

Examples:

- Gsssvvvv
- G010SDLC for an SDLC line group on an NCP with subarea 010.
- G010BSC for an BSC line group on an NCP with subarea 010.

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 'K' (as an abreviation for link) represents a line.

Example:
Kssslіav
K010020 for a line with an interface address of 020.

PHYSICAL UNIT

The Physical Unit name has physical characteristics of the hardware such as terminal type and/or terminal location. A terminal sequence within physical location could be included in the name.

Example:
Psssvvvv
P010ADN1 for a PU type A (which could represent a 3270) which was the first PU in location DN.

LOGICAL UNIT

The Logical Unit name must also be defined to applications such as CICS, IMS, RJE, and 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 a VTAM display meaningfully reflects the change. The letter 'L' represents a Locical Unit.

Example:
Lvvvvvvv
LDEPT79P for a user in department 79P
NOTE: The SSS needs to have a special coding for the first two characters of the first LU/Terminal on a PU/Ctrl Unit. These names are an exception to the use of the letter 'L', 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 and the location.

Example:
M002RAL for host subarea 2 in Raleigh NOTE: A human factors consideration is to separate numeric groups by letters. For example, the line name example could be changed from K010020 to k010L020 or K010L20 for usability. Likewise, N010000 could be changed to N010V00.

INFORMATION IN VTAM DISPLAY OF AN LU

EXAMPLE OF A LOGICAL UNIT VTAM DISPLAY

```
D NET,ID=LDP106A
 IST097I  DISPLAY  ACCEPTED P00
 IST075I  VTAM DISPLAY - NODE TYPE= LOGICAL UNIT
 IST486I  NAME = LDP106A  , STATUS = ACT
 IST081I  LINE NAME= K010020  , LINE GROUP= G010SDLC , 3704/5= N010000
 IST135I  PHYSICAL UNIT= PDEN3270 ,
 IST082I  DEVTYPE= LU   , ALLOC TO=          ,CONTROLLING APPL=
 IST654I  I/O TRACE= ON  ,BUFFER TRACE= ON
 IST314I  END
```

N010000	NCP is subarea 010
G010SDLC	Line is SDLC link
K010020	Hardware line address on 3705 is 020
PDEN3270	Physical Unit is 3270 located in Denver
LDP106A	Logical Unit is first logical unit in DP Branch # 106

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 N010000 AND N020002

DECK FOR N010000

```
          PCCU OWNER=VTAMA,
               BACKUP=YES
K010020   LINE OWNER=VTAMA
P010XDEN  PU
LUSER1    LU
K010022   LINE OWNER=VTAMZ
P010XRAL  PU
LUSER2    LU
```

DECK FOR N020002

```
          PCCU  OWNER=VTAMA,
                BACKUP=YES
K020020   LINE OWNER=VTAMZ
P020XDEN  PU
LUSER1    LU
K020022   LINE OWNER=VTAMA
P020XRAL  PU
LUSER2    LU
```

The above configurations allow the LU's 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.

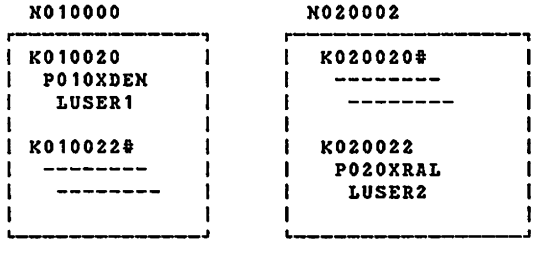
If another VTAM does exist, another pair of owner parameter labels could be used to divide NCP resources between the 2 NCP's in the additional VTAM.

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

VTAM KNOWLEDGE OF NCP RESOURCES
OWNER/BACKUP EXAMPLE

```
V NET,ACT,ID=N010000
V NET,ACT,ID=N020002
```

STATUS OF NETWORK AFTER COMMANDS.



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

Sample Console output

```
d net,id=n010000,e
 IST097I  DISPLAY  ACCEPTED P00
 IST075I       VTAM DISPLAY - NODE TYPE= 3705
 IST486I       NAME = N010000   , STATUS = ACT
 IST076I       CTL PROGRAM= N010000   , ATTACHMENT= LOCAL
 IST484I       SUBAREA = 010
 IST654I       I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST077I       SIO= 00000038 ,ERROR CT= 00000000 CUA= 05F
 IST170I       LINES:
 IST080I       K010020  ACT         K010022  NAC2 -N
 IST314I       END

d net,id=k010022
 IST097I  DISPLAY  ACCEPTED P00
 IST088I  DISPLAY FAILED- NODE NAME INVALID OR INACTIVE P00

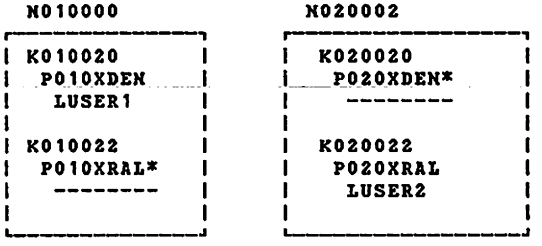
d net,id=p010xral
 IST097I  DISPLAY  ACCEPTED P00
 IST088I  DISPLAY FAILED- NODE NAME INVALID OR INACTIVE P00

d net,id=luser2
 IST097I  DISPLAY  ACCEPTED P00
 IST075I       VTAM DISPLAY - NODE TYPE= LOGICAL UNIT
 IST486I       NAME = LUSER2    , STATUS = ACT
 IST081I       LINE NAME= K020022   , LINE GROUP= G20SDLC   , 3704/5= N020002
 IST135I       PHYSICAL UNIT= P020XRAL ,
 IST082I       DEVTYPE= LU    , ALLOC TO=           ,CONTROLLING APPL=
 IST654I       I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST314I       END
```

NOTE THAT LUSER2 IS ACTIVE AND CONNECTED TO N020002

```
V NET,ACQ,ID=N010000
V NET,ACQ,ID=N020002
V NET,ACT,ID=K010020
```

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



*--RESOURCES KNOWN TO VTAM WITH STATUS
OF NACQ (NOT ACQUIRED)

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

Sample Console output

```
v net,acq,id=n010000
 IST097I  VARY     ACCEPTED P00
 IST670I  VARY ACQ  PROCESSING FOR ID= N010000  COMPLETE P00

d net,id=n010000,e
 IST097I  DISPLAY  ACCEPTED P00
 IST075I      VTAM DISPLAY - NODE TYPE= 3705
 IST486I      NAME = N010000  , STATUS = ACT
 IST076I      CTL PROGRAM= N010000  , ATTACHMENT= LOCAL
 IST484I      SUBAREA = 010
 IST336I      THIS NCP MAJOR NODE IS ACQUIRED
 IST654I      I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST077I      SIO= 00000038 ,ERROR CT= 0000000 CUA= 05F
 IST170I      LINES:
 IST080I      K010020  ACT        K010022  INACT-N
 IST314I      END

d net,id=k010022
 IST097I  DISPLAY  ACCEPTED P00
 IST075I      VTAM DISPLAY - NODE TYPE= LINE
 IST486I      NAME = LINE2    , STATUS = INACT
 IST087I      LINE TYPE= LEASED     LINE GROUP= G10SDLC
 IST134I      3704/5= N010000
 IST329I      THIS NODE WAS NOT ORIGINALLY OWNED BY THIS HOST
 IST655I      LINETRACE= OFF
 IST314I      END

d net,id=p010xral,e
 IST097I  DISPLAY  ACCEPTED P00
 IST075I      VTAM DISPLAY - NODE TYPE= PHYSICAL UNIT
 IST486I      NAME = P010XRAL , STATUS = NACQ
 IST081I      LINE NAME= LINE2    , LINE GROUP= G10SDLC  , 3704/5= N010000
 IST329I      THIS NODE WAS NOT ORIGINALLY OWNED BY THIS HOST
 IST654I      I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST355I      LOGICAL UNITS:
 IST080I      LUSER2   NACQ
 IST314I      END

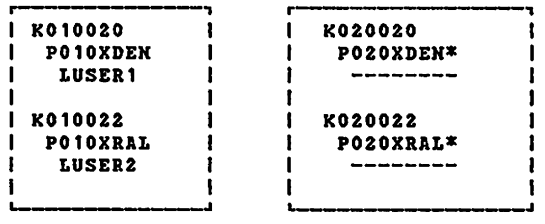
v net,act,id=k010022
 IST097I  VARY     ACCEPTED P00

 IST093I  K010022  ACTIVE P00
```

In the event that the path to LUSER2 fails, the operator could switch the link or physical unit from NCP N020001 to NCP N010000 using a cross-bar switch or by moving cables. The operator would than issue the following commands. The 'acquire' and 'activate' operands may both be specified on the same 'vary' command.

```
V NET,REL,ID=P020XRAL,I
V NET,ACQ,ID=P010XRAL,ACT
```

LUSER2 IS KNOWN TO VTAM AS A PART OF N010000



*--RESOURCES KNOWN TO VTAM WITH STATUS OF NACQ (NOT ACQUIRED)

Sample Console output

```
v net,rel,ID=p020xral,i
 IST097I  VARY     ACCEPTED P00
 IST487I  VARY INACT SCHEDULED FOR ID = P020XRAL BY RELEASE P00
 IST601I  LAST DEVICE ON LINK K020022  NOW INACTIVE P00
 IST141I  NODE P020XRAL NOW DORMANT P00
 IST105I  P020XRAL NODE NOW INACTIVE P00
 IST670I  VARY REL  PROCESSING FOR ID= P020XRAL COMPLETE P00

v net,acq,id=p010xral,act
 IST097I  VARY     ACCEPTED P00
 IST670I  VARY ACQ  PROCESSING FOR ID= P010XRAL COMPLETE P00
 IST487I  VARY ACT   SCHEDULED FOR ID= P010XRAL BY ACQUIRE        P00

 IST093I  P010XRAL ACTIVE P00

d net,id=p010xral,e
 IST097I  DISPLAY  ACCEPTED P00
 IST075I      VTAM DISPLAY - NODE TYPE= PHYSICAL UNIT
 IST486I      NAME = P010XRAL , STATUS = ACT
 IST081I      LINE NAME= K010022  , LINE GROUP= G10SDLC  , 3704/5= N010000
 IST329I      THIS NODE WAS NOT ORIGINALLY OWNED BY THIS HOST
 IST654I      I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST355I      LOGICAL UNITS:
 IST080I      LUSER2   ACT
 IST314I      END

d net,id=luser2
 IST097I  DISPLAY  ACCEPTED P00
 IST075I      VTAM DISPLAY - NODE TYPE= LOGICAL UNIT
 IST486I      NAME = LUSER2   , STATUS = ACT
 IST081I      LINE NAME= K010022  , LINE GROUP= G10SDLC  , 3704/5= N010000
 IST329I      THIS NODE WAS NOT ORIGINALLY OWNED BY THIS HOST
 IST135I      PHYSICAL UNIT= P010XRAL ,
 IST082I      DEVTYPE= LU    , ALLOC TO=          ,CONTROLLING APPL=
 IST654I      I/O TRACE= OFF ,BUFFER TRACE= OFF
 IST314I      END
```

DEVELOPING OPERATION PROCEDURES

This section provides forms that allow the user to develop problem isolation procedures for the network operator. These procedures should be developed during installation of the SNA products.

The installation tests suggested in this section produce errors that will happen in most installations. By creating failures, procedures can be developed that prepare the network operator for the actual errors. The purpose of the tests is to determine what indications are available to the Network operator. By evaluating the commands issued, network operator procedures can be developed that should help isolate the problem with the fewest operator steps.

The format of Chapter 2 provides a possible method of documenting the problem determination, isolation, and recovery procedures for the Network Operator.

SAMPLE INSTALLATION TESTS

* Modem at 370X powered off.
* Cable to local modem disconnected.
* Modem at remote cluster/terminal turned off.
* Input to remote modem removed.
* Remote cluster powered off before network activation.
* Remote cluster powered off after network activation.
* Remote terminal powered off before network activation.
* Remote terminal powered off after network activation.
* Remote cluster reset or IMPL'd while in use.
* Load or Reset button on 370X pressed.
* Channel disabled.

INSTALLATION TEST PLANS

MASTER SCHEDULE

Test:_____ Page ___ of ____

Test Number	Test	Date Started	Date Completed

INSTALLATION TEST PLAN

UNIT TEST

Test Number:_____ Date Started :_____

Date Completed:_____

Test Description:_____

Error Simulated:_____

_____

_____

_____

Test Procedure: _____

_____

_____

_____

_____

INSTALLATION TEST PLAN

TEST RESULTS

Test Number:_____ Date Started :_____

Date Completed:_____

Test Description:_____

External Symptoms:_____

_____

_____

Error Messages:_____

_____

_____

VTAM Display Verification (Before):

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

APPL Status:_____ NCP Status:_____

VTAM Display Verification (After):

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

APPL Status:_____ NCP Status:_____

Recovery Procedures:

1._____

2._____

3._____

4._____

5._____

CHAPTER 8 : NETWORK MAINTENANCE STATUS

This section is provided so that information about maintence levels on the system can easily be referenced. The user should indicate in this section the level of applied maintenance on VTAM, TCAM, NCP, and other related products currently installed.

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

ENTER USER NOTES HERE:

CHAPTER 9 : NETWORK MONITORING (MDR)

The purpose of error recording on the SYS1.LOGREC (OS/VS) and SYSREC (DOS/VS) data sets 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 a 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 a 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.

CONTENTS

9.1 : EREP1 PROGRAM FUNCTIONS

The following section refers to SYS1.LOGREC but is applicable to SYSREC.

1. BASIC FUNCTIONS

EREP1 is a service aid program that provides information for management and maintenance of a computer system and can perform the following functions:

* CREATE AN ACCUMULATION DATA SET FROM SYS1.LOGREC AND CLEAR SYS1.LOGREC

EREP1 can create an accumulation data set (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 DATA SET TO AN OUTPUT ACCUMULATION DATA SET

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

* MERGE DATA FROM AN ACCUMULATION DATA SET AND SYS1.LOGREC

EREP1 can accept input from both an accumulation data set and SYS1.LOGREC in a single step. The output data set 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 data set 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 data set 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 data set.

* FORMAT RELIABILITY MEASUREMENT DATA

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

2. 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 two major categories:

* CPU/Channels/Storage/SCP
* Condensed I/O Subsystem Summary
* 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 contest 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 data set. 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 data set 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
* DOS/VSE
* VM/370 Release 6

REFERENCE MANUALS

SVS, VS1, MVS, DOS/VSE, and VM/370
OS/VS ,DOS/VSE, VM/370 Environmental Recording and
and Printing (EREP) Program GC28-0772-2

OS/VS Message Library: EREP Messages	GC38-1045
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	GC28-0638
OS/VS Message Library: Service Aids and OLTEP Messages	GT00-0129
MVS	
OS/VS2 SYS1.LOGREC Error Recording	GC28-0677
OS/VS2 Message Library: Service Aids and OLTEP Messages	GC23-0006

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.

9.2 : 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
```



```
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 3705's, DEV=(3705), didn't create a history tape ACC=N, and didn't 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
//TOURIST DD SYSOUT=A,DCB=BLKSIZE=133
```

9.3 : 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 3705's, DEV=(3705), didn't create a history tape ACC=N, and didn't 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
//TOURIST DD SYSOUT=A,DCB=BLKSIZE=133
```

9.4 : 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
                                          EREP1 INFORMATIONAL MESSAGES                DATE - 030 78

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 data set 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 a 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
//TOURIST DD SYSOUT=A,DCB=BLKSIZE=133
```

9.5 : 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 MCP generation
E4	Level 1 communication check.
E8	Communications line adapter check.
EA	Communications scanner adapter feedback check.
EC	Equiptment 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, data set ready didn't come up.
F8	DSR-off check, data set ready didn't 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 should enable you to determine if the error is something you can correct yourself. In the case of some errors (ie. Time Outs, Modem Interface error, etc.) EREP will analize the STATUS field's and print 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 will allow you to identify the 3705 and line with trouble. In the example above 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', therefor 06= connect. The second byte is a F4 which is a DSR-on check. Looking up near the top, we see the LIB address is 00A0. Using the Teleprocessing Installation Record for IBM 3704 and 3705 Communications Controllers (GC30-3021) and looking up which dataset is connected to 00A0 we can find out where to look to find out if the dataset didn't bring up DSR or the 3705 couldn't 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=00A0' for LIB address or 'DEV=(3705),TERMN=LLEAS71K' 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
//TOURIST DD SYSOUT=A,DCB=BLKSIZE=133
```

9.6 : 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

 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)		EA Communications scanner adapter feedback check.
83 Disable.	...1 .... FCS error (data check).	F0 Modem error, modem check bit in SCF field of ICW.
8D Enable.	.... 000. No command active.	F2 Modem transmit clock or clear-to-send error.
8F Dial.	.... 001. SDLC I-format sent or RR sent	F4 DSR-on check, data set ready didn't come up.
	.... 010. SDLC RNR sent.	F8 DSR-off check, data set ready didn't go down.
	.... 011. SDLC NS command sent.	FC ACU check, autodial problem.
	.... 100. Transmit.	FF program failure.
	.... 101. Error while sending text.	
	.... 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 (ie. Time Outs, Modem Interface error, etc.) EREP will analize the STATUS field's 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 didn't bring up DSR or the 3705 couldn't 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
//TOURIST DD SYSOUT=A,DCB=BLKSIZE=133
```

9.7 : 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, data set ready didn't come up.
F8 DSR-off check, data set ready didn't 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 PAPU2Z) 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 (ie. Time Outs, Modem Interface error, etc.) EREP will analize the STATUS field's and print the error below the 'RECORD TYPE' field. In this example, 'TIME OUT, 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 06F0, the 06 would mean SDLC NS command sent. The second byte is a F0 which is a modem error. Looking near the top we see the LIB address is 002C so using the pre-installation guide and looking up which dataset is attached to 002C we can find out where to look to find out if the dataset didn't bring up DSR or the 3705 couldn't 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=002C, for LIB address or DEV=(3705),TERMN=PUSW1E, 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
//TOURIST DD SYSOUT=A,DCB=BLKSIZE=133
```

9.8 : 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 is all zero's 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/O's 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
//TOURIST DD SYSOUT=A,DCB=BLKSIZE=133
/*
```

9.9 : 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 execptions, Unresolved Program level 1 interrupt requests, unresolved program level 3 interrupt requests, Invalid instruction operation code check, address exception, protection check, and 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
//TOURIST DD SYSOUT=A,DCB=BLKSIZE=133
```

9.10 : 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 labeled CHANNEL ADAPTER and COMMUNICATIONS SCANNER. If there are error counts in either catagory (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 labeled 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 data set 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
//TOURIST DD SYSOUT=A,DCB=BLKSIZE=133
```

9.11 : 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/O's 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 a 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
//TOURIST DD SYSOUT=A,DCB=BLKSIZE=133
```

CHAPTER 10 : TERMINAL TESTS AND ERROR LOGS

This section of the guide describes the tests and error logs that are available in the terminals that are in common use on BSC and SDLC lines. The terminals included are 3270, 3600, 3650, 3660, 3767, 3770, and 3790.

The online tests described here are available using either TOLTEP (VTAM) or TOTE (TCAM). For information on using TOLTEP or TOTE, refer to the sections describing them.

Each section includes the following information:

1. Customer problem determination procedures (PD/IP's) to do problem determination on a subsystem level.

2. Maintenance analysis procedures (MAP's) for the IBM customer engineer to use to repair the terminal subsystem.

3. OFF-LINE tests to allow the operator or customer engineer to test the subsystem prior to putting it online.

4. ON-LINE tests to operate the terminal ON-LINE with link level tests or T3700sna.

5. Error logs which contain information on terminal hardware, software, and line errors.

CONTENTS

10.1 : 3270 BSC AND SNA SYSTEMS

The maintenance package for the 3270 system consists of:

1 PROBLEM DETERMINATION PROCEDURES

The customer is supplied with an Operator's Guide (GA27-2750) which contains problem isolation procedures. These charts will enable the customer to perform subsystem problem determination.

2 MAINTENANCE ANALYSIS PROCEDURES

MAP's are used by the CE to analyse problems with the 3270 system and these are located with the machine.

3 OFFLINE TESTS

Off-line testing is provided through the use of the following: The following FE tools are available to service the 3270 system offline:

A. Switch Indicator Unit (SIU).

B. Pre-recorded cassette tapes.

C. Cassette Record Adapter Unit

4 ONLINE TESTS

R3270B
The BSC tests have the same patterns and use the same options as the SDLC tests. If you have both BSC and SDLC 3271(MOD. 11/12) terminals installed in your system, the BSC terminals can use R3270D if they are defined as SDLC on the CDS records. The advantages of using R3270D over R3270B are as follows;

* A simpler CDS is used.
* Improved performance for the same OLT functions.
* No performance degradation to other devices on the same line.
* OLT=YES is not required on the NCP generation statements for R3270D.

R3270D
The 3271(MOD. 11/12) SDLC OLT tests and patterns can be invoked from the host CPU or via a test request message from a remote keyboard. The OLT's operate

concurrently with a customer program. The 3270 Operators Guide has a description of how to request tests from the terminal.

An example of running the tests from a system console would be;

```
R 01, termname/R3270D/NFE,MI,EXT=PAT/        (for BSC devices)

R 01, termname(BIND)/R3270D/NFE,MI,EXT=PAT/  (for SDLC devices)
```

termname is the name of the terminal under test.
(BIND) is the bind name or bind parameters for SDLC devices.
R3270D is the name of the 3270 diagnostic to be run.
EXT=PAT is the option field and is requesting the pattern test.

The valid options that can be requested by the EXT= option are;

CHK	check tests, (functional checkout) this is the default option.
MAN	manual test (includes both KEY and MAG).
KEY	keyboard tests.
MAG	magnetic card reader.
PAT	patterns for displays or buffered printers.
PAT,DPRT	patterns for nonbuffered printers.

the MAN, KEY, MAG, PAT, and PAT,DPRT entries must also specify NFE,MI in the option field.

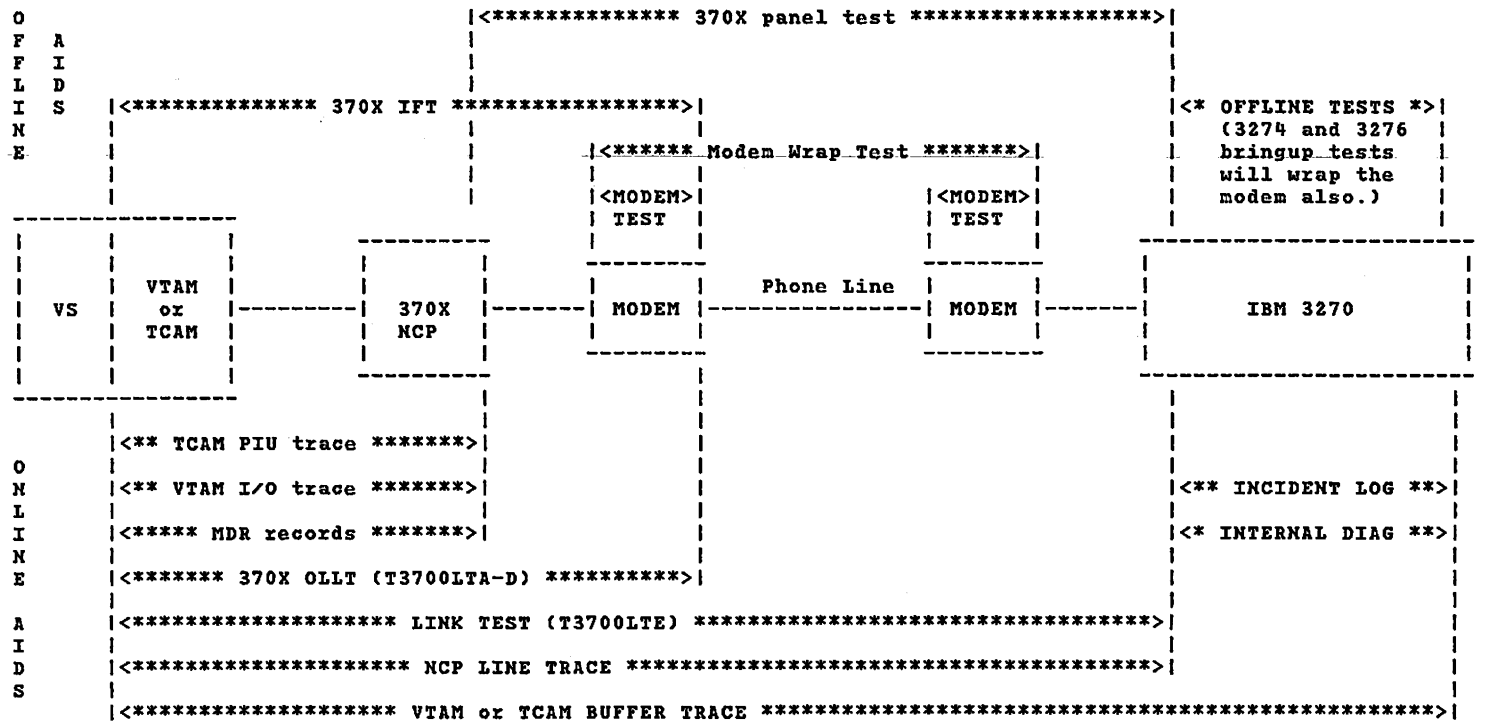
B. API Echo (T3700SNA)

API Echo tests run on SDLC 3271(MOD. 11/12)'s and BSC 3270's if the BSC 3270's have their CDS records configured the same as SDLC CDS records. Test data in the form of characters or patterns are entered via the remote keyboard. The operator (customer or CE) specifies the number of times the test data will be repeated. The host system sends the test data to the remote display or printer specified, the number of times as indicated in the Echo Test message. The Echo Test is invoked from any remote keyboard and requires the dedication of the remote control unit under test. For more information on how to run API ECHO see the chapter on TOLTEP.

C. SDLC Link Test (T3700LTE)

The SDLC Link Test is provided for installation verification and for definition and isolation of link problems. The Link Test is invokable from the host CPU. For more information on how to run T3700LTE see the chapter on TOLTEP.

SERVICE AIDS FOR A NETWORK WITH 3270 TERMINALS



The block diagram represents the major components in a 3270 network. The lines of asterisks indicate from what point to what point a service aid covers. The service aids above the block diagram only run when that portion of the network covered is off line. The service aids below the block diagram are service aids that run concurrently with customer operations.

10.2 : 3600 SUBSYSTEMS

The maintemance package for the 3600 consists of:

1 PROBLEM DETERMINATION PROCEDURES (PD/IP)

PD/IP's are available to the customer and are located in the Operating Guide for the IBM 3600 Finance Communication System, GA27-2776. Use of the PD/IP's will enable the customer to direct the CE to the problem area of the 3600 after system problem determination procedures have determinated that the problem is a 3600 problem.

2 MAINTENANCE ANALYSIS PROCEDURES (MAP)

MAP's are used by the CE to analyse problems with the controller and the connected terminals and are included in the Maintenance Information Manual.

3 Controller LOG

The controller log is a file located on the diskette. The system monitor places messages in this log that relate to maintenance and engineering. The user's programs also have the ability to place messages in this log. In addition to recording errors in the log, the controller maintains device statistical counters for each of the following components of the system;

Controller host communication link
Controller diskette
Controller disk file
Controller loop control (for each loop)
3604 keyboard
3604 display
3604 magnetic stripe encoder
3606 or 3608 keyboard, display, and magnetic stripe reader
3608 printer
3610 document printer
3611 passbook printer
3612 document printer
3612 passbook printer
3614/3624 consumer transaction facility
3615/3619 administrative terminal printer
3618 printer
RPQ devices

Keyboard commands are available to display or print the contents of device statistics counters. NOTE: device statistics counts are located in functional storage and are lost each time there is a startup (warm or cold). In contrast , the controller log is located on the diskette. Thus, this log is lost only on a cold start.

4 The HOST LINK STATISTICS COUNTERS

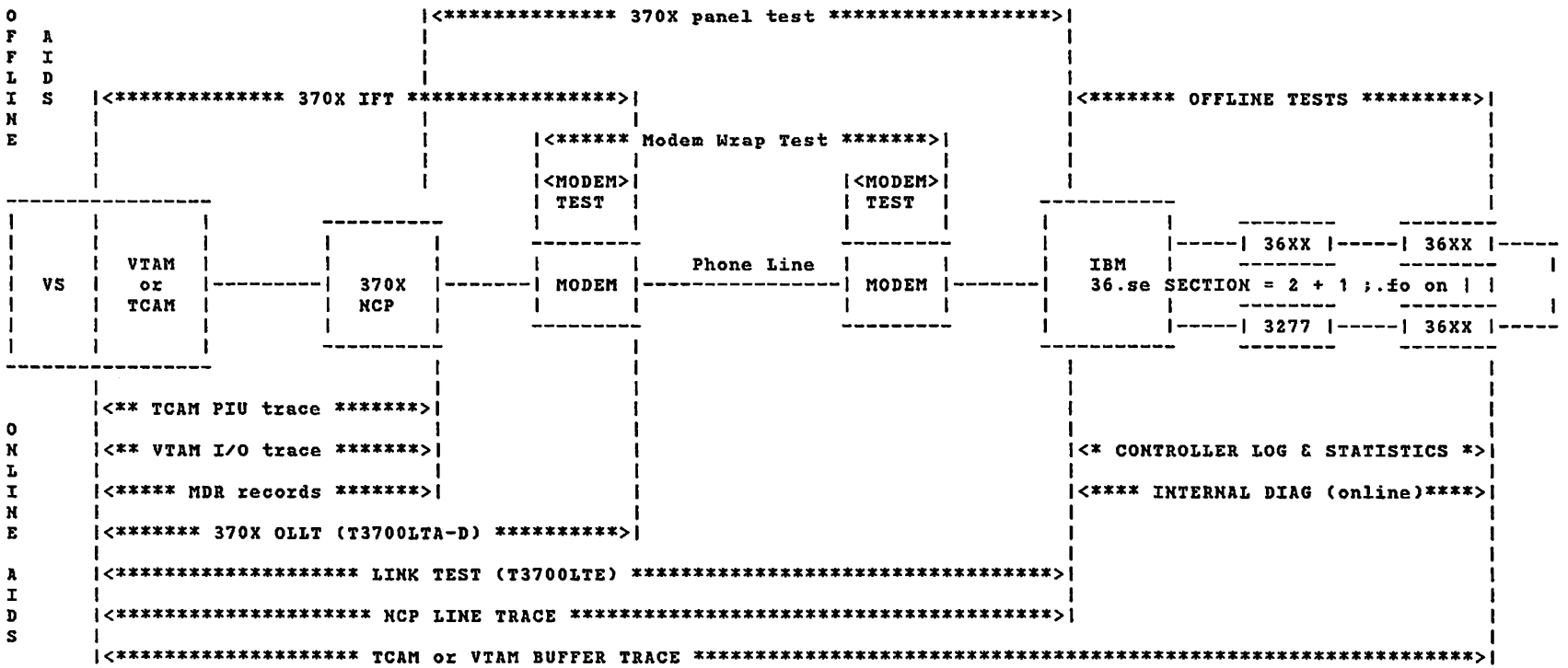
counter	stepped by
1	Receipt of a valid set response mode command from host. If BSC, receipt of a valid poll.
2	Receipt of a test message from host.
3	Write retry - Used when the controller has to resend a message.
4	Timeout - The line has been inactive for a period specified by user. This timout will cause an autowrap of the adapter.
5	Overrun - 3601 problem.
6	Underrun - 3601 problem.
7	Connection problem - If a complete message has to be resent 20 times this counter is incremented (3 counts each time resent).
8	Invalid controller data - Indicates a failure in 3601.
9	Block check count (BCC) - Indicates a probable line problem.
10	The 3601 detected a not-normal termination of a message by the host. Indicates a network problem.
11	Data communication equipment (DCE) error - A modem problem.
12	3601 busy because of no available receive buffers.
13	Command reject condition - Messages received out of sequence.
14	Machine check - 3601 problem.
15	Command reject condition - Data in frame when no data should be. If BSC, receipt of a valid selection sequence.
16	Command reject condition - Received an invalid command.

5 ONLINE TESTS

SDLC Link Test (T3700LTE)

The SDLC Link Test is provided for installation verification and for definition and isolation of link problems. The Link Test is invokable from the host CPU.
For more information on how to run T3700LTE see the chapter on TOLTEP.

SERVICE AIDS FOR A SNA NETWORK WITH 3600 TERMINALS



The block diagram represents the major components in a 3600 network. The lines of asterisks indicate from what point to what point a service aid covers. The service aids above the block diagram only run when that portion of the network covered is off line. The service aids below the block diagram are service aids that run concurrently with customer operations.

10.3 : 3650 SUBSYSTEMS

The maintenance package for the 3650 consists of:

1 PROBLEM DETERMINATION PROCEDURES

Problem determination procedures are included in the IBM 3650 Retail System Problem Determination Procedures and Operator Messages, GA27-3109.
These procedures tell the user how to determine fault responsibility between IBM and other equipment manufacturers. In some cases the CE may have to use these procedures during trouble analysis. they are included in the MAP's for CE use.

2 MAINTENANCE ANALYSIS PROCEDURES

Maintenance analysis procedures (MAPs) are used by the CE to analyse problems with the 3650 Retail Store System. The MAPs are arranged in frames, with each frame representing one item of information or a task to be performed. The CE should begin a service action by starting at the first frame and proceding as directed by the MAPs.

3 DIAGNOSTIC TESTS

Diagnostic tests are to be used only as directed by the MAPs and/or problem determination procedure. When the MAPs or problem determination procedures require a diagnostic test, they will give the instructions for executing the test. There are two groups of diagnostic tests, offline and online. When offline diagnostic tests are operating, the system is not available for normal store support operations. When the online diagnostic tests are operating, store operations are normal, except for the device being tested. The MAPs or problem determination procedures dictate which tests are to be run.

4 3650 ERROR LOG DISPLAY

The error log is a reserved area on the 3651 disk used to store system error information. When an error is detected by the system, an entry is written in the log area. The entry is made even if the system recovers from the error. The 3650 log contains for each error entry, a sequence number for this entry, the date this entry was made, the time this entry was made, the device type, the device address, and the error data. The 3650 log contains entries for the following components:

3651 Disk

3651 Controller
3651 Store loops
3651 Host interface adapter
3651 Terminals

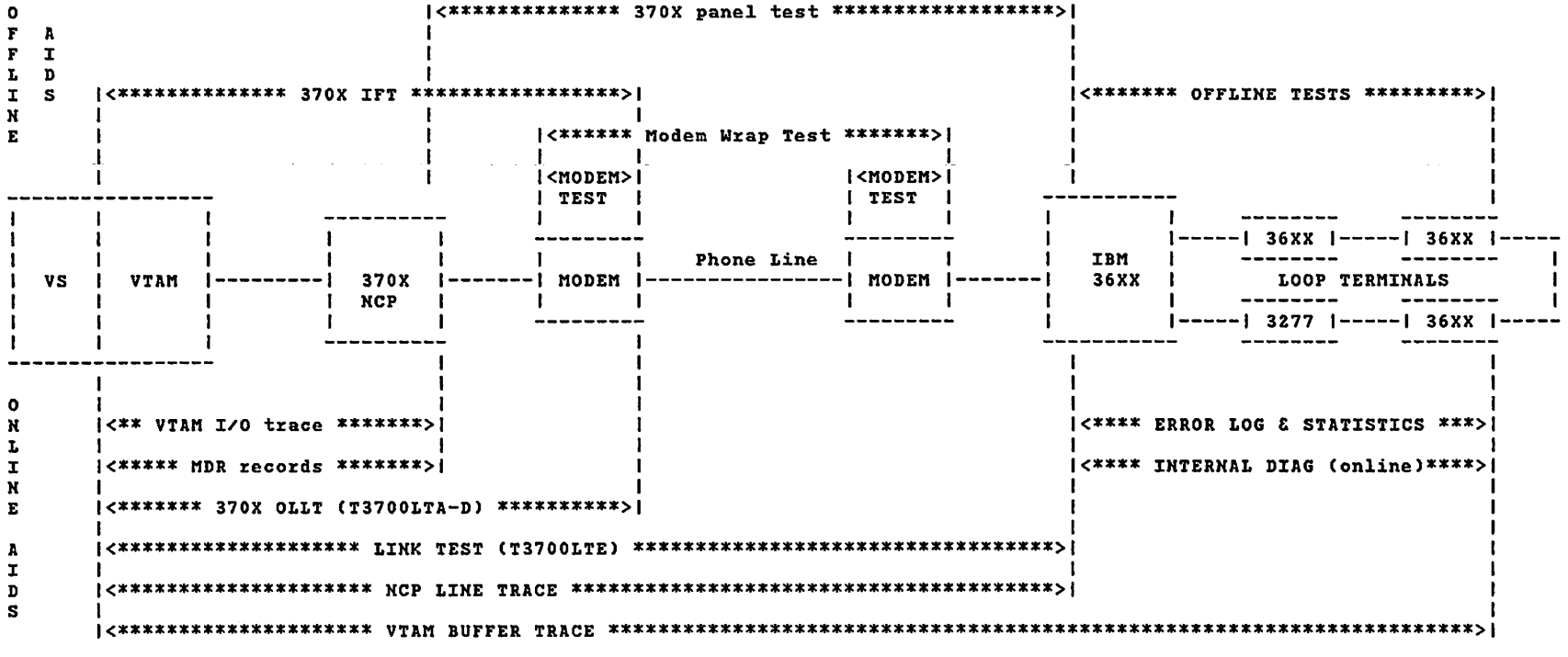
There are entries in the HOST INTERFACE LOG for the following items:
SXRM received, Disconnect received, Write retry, Idle timeout, Overrun, Underrun, Connection problem, Dump message, Invalid BSTAT, BCC error, DCE error, Write timeout, Machine check, Primary abort, Read timeout, NR sequence error, Count exceeded, Data with invalid command, and invalid command.

5 ONLINE TESTS

SDLC Link Test (T3700LTE)

The SDLC Link Test is provided for installation verification and for definition and isolation of link problems. The Link Test is invokable from the host CPU. For more information on how to run T3700LTE see the chapter on TOLTEP.

SERVICE AIDS FOR A SNA NETWORK WITH 3650 TERMINALS



The block diagram represents the major components in a 3650 network. The lines of asterisks indicate from what point to what point a service aid covers. The service aids above the block diagram only run when that portion of the network covered is off line. The service aids below the block diagram are service aids that run concurrently with customer operations.

10.4 : 3660 SUBSYSTEMS

The maintenance package for the 3660 system consists of;

1 PROBLEM DETERMINATION PROCEDURES

Problem determination procedures are included in the IBM 3660 Supermarket System Administrative Operations guide. These procedures tell the user how to determine fault responsibility between IBM and other equipment manufacturers. In some cases the CE may have to use these procedures during trouble analysis. They are included in the MAP's for CE use.

2 MAINTENANCE ANALYSIS PROCEDURES

Maintenance analysis procedures (MAPs) are used by the CE to analyse problems with the 3660 Supermarket System. The MAPs are arranged in frames, with each frame representing one item of information or a task to be performed. The CE should begin a service action by starting at the first frame and proceding as directed by the MAPs.

3 DIAGNOSTIC TESTS

Diagnostic tests are to be used only as directed by the MAPs and/or problem determination procedure. When the MAPs or problem determination procedures require a diagnostic test, they will give the instructions for executing the test. There are two groups of diagnostic tests, offline and online. When offline diagnostic tests are operating, the system is not available for normal store support operations. When the online diagnostic tests are operating, store operations are normal, except for the device being tested. The MAPs or problem determination procedures dictate which tests are to be run.

4 3660 ERROR LOG

The error log is a group of four areas on the store controller disk used to store error information. Each device in the supermarket system is assigned to a specific area. The four error log areas are:

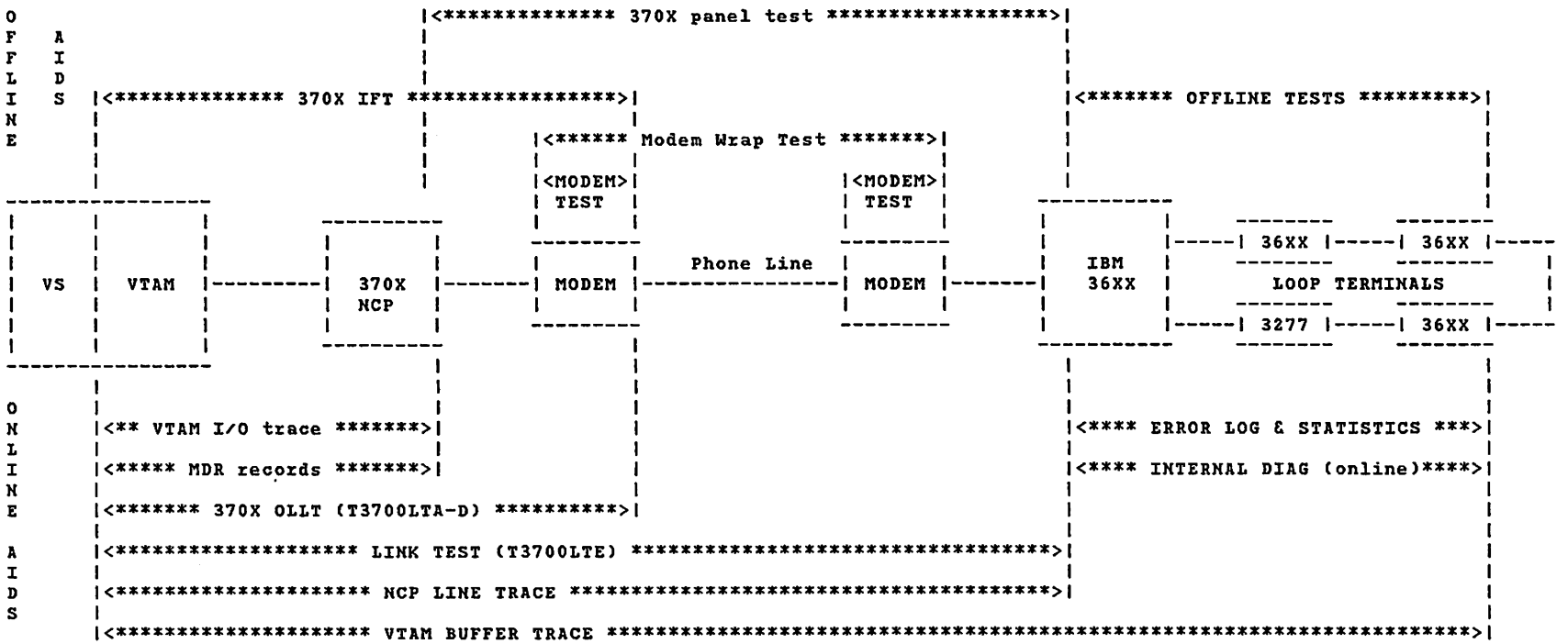
3651 hardware error log.
Disk operational log.
Communications error log.
Terminal hardware error log.

5 ONLINE TESTS

SDLC Link Test (T3700LTE)

The SDLC Link Test is provided for installation verification and for definition and isolation of link problems. The Link Test is invokable from the host CPU. For more information on how to run T3700LTE see the chapter on TOLTEP.

SERVICE AIDS FOR A SNA NETWORK WITH 3660 TERMINALS



The block diagram represents the major components in a 3660 network. The lines of asterisks indicate from what point to what point a service aid covers. The service aids above the block diagram only run when that portion of the network covered is off line. The service aids below the block diagram are service aids that run concurrently with customer operations.

10.5 : 3767 TERMINALS

The maintenance package for the 3767 consists of;

1 PROBLEM DETERMINATION PROCEDURES

Problem determination procedures are included in the IBM 3767 Communications terminal Operations guide, GA18-2000 and the Problem Determination Guide GA18-2012. These procedures tell the user how to determine fault responsibility between IBM and other equipment manufacturers. In some cases the CE may have to use these procedures during trouble analysis. They are included in the MAP's for CE use.

2 MAINTENANCE ANALYSIS PROCEDURES

Maintenance analysis procedures (MAPs) are used by the CE to analyse problems with the 3767 terminal. The MAPs are arranged in frames, with each frame representing one item of information or a task to be performed. The CE should begin a service action by starting at the first frame and proceding as directed by the MAPs.

3 OFFLINE TESTS

The 3767 has built in Basic Assurance Tests (BAT) that run whenever power is turned on. The BAT test checks the internal logic of the 3767 and will display a failure number in the ANR lights if any test fails.

If the terminal is already powered up, the tests can be run manually by doing the following steps;

1. Turn the Comm/Local switch to Local.
2. If performing Terminal/indepth or Loop test, perform the modem wrap procedure.
3. Press and hold Test switch.
4. Press appropriate key as follows to select test;
   a. Terminal/indepth test = only test switch needed
   b. BAT section 0 = test switch and 0 key.
   c. Terminal loop test = test switch and 1 key.
5. Release test switch.
   All indicator lights turn off except test.
   Alarm sounds once.
6. The test selected will execute. If an error is detected, the type of error is displayed in the indicator lights at the end of the test.

4 ONLINE TESTS

The following tests can support the 3767 in SDLC mode;

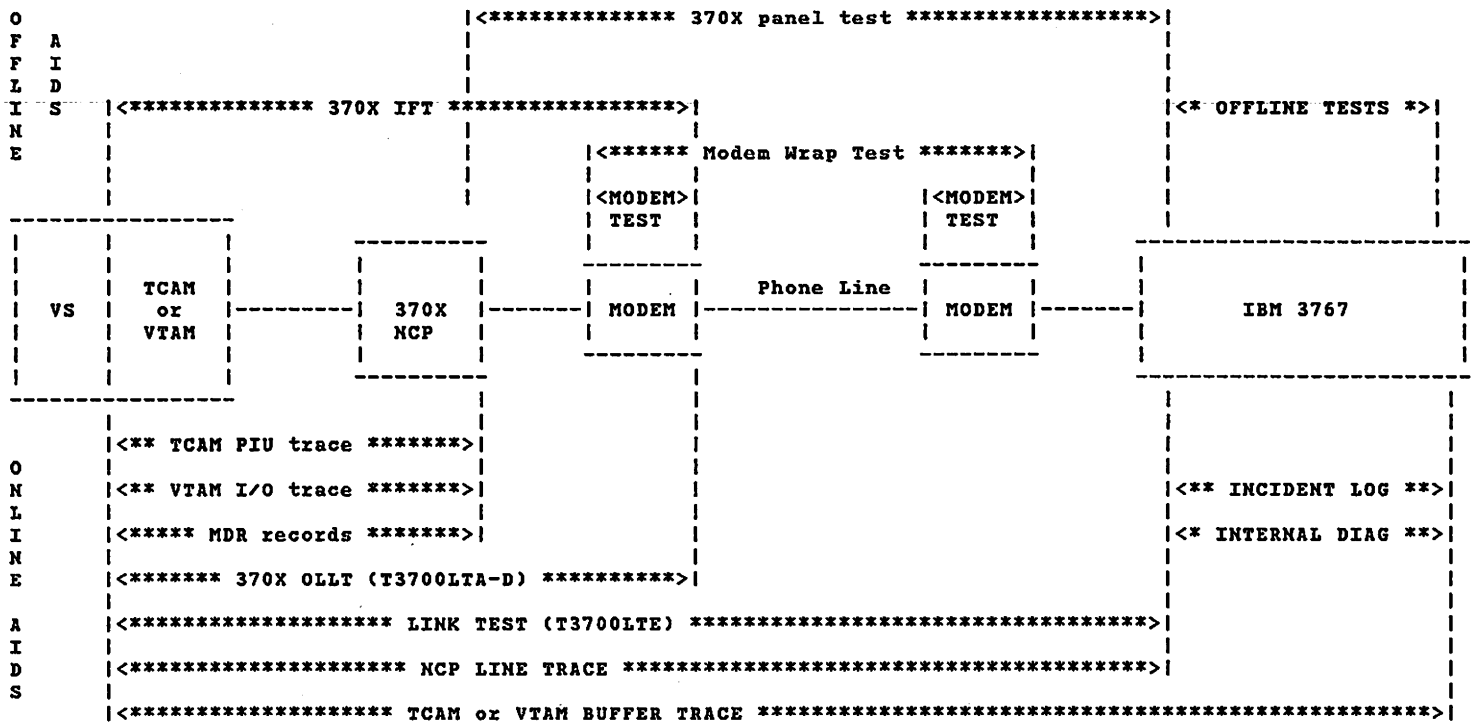
LINK TEST (T3700LTE)

The SDLC Link Test is basically an echo test initiated by the host. The primary station sends a SDLC 'TEST' frame down the link to a secondary station. If the secondary station (3767) receives the 'TEST' frame without errors, it resends the frame to the primary.

API ECHO TEST (T3700SNA)

The API echo test is designed to verify the intergrity of the link between the terminal (3767) and the central site (370X). This is done by sending to the terminal the data that was requested the number of times specified. This test can be initiated from either host or terminal.

SERVICE AIDS FOR A NETWORK WITH 3767 TERMINALS



10.6 : 3770 SUBSYSTEM

The maintenance package for the 3770 system consists of;

1 PROBLEM RECOVERY PROCEDURES(PRP)

The customer is supplied with an Operator Guide GA27-3114 containing the PRP's. These charts will enable the customer to isolate the problem to the IBM subsystem, OEM, or common-carrier equipment.

2 MAINTENANCE ANALYSIS PROCEDURES

MAP's are used by the CE to analyse problems with the 3770 system and are located with the terminal.

3 OFFLINE TESTS

A. BRING-UP DIAGNOSTIC TEST

This test runs following any power on reset or system reset. The following areas are tested; Controller, ROS, RAM, System Card, Keyboard Adapter, and Operator Panel. Successful completion or an error condition will be indicated by the operator panel lights and NPR.

B. COMMUNICATION TESTS

This series of tests assists in determining whether the 3770, local modem, line, or remote modem is causing the problem. These tests include the following.

TEST 0 Terminal Communication Test. (test controller)

TEST 2 Modem Wrap Test. (Modem T2 test)

TEST 3 Modem transmit test. (Modem T3 test)

TEST 4 Modem receive test. (Modem T4 test)

C. CE DIAGNOSTIC TESTS

Located on the CE cassette tape supplied with the terminal, these tests are read into the terminal RAM using the cassette tape player. If an error is detected during a selected test, an error code is displayed in the keyboard NPR's or the operator panel lights if no keyboard. This error code acts as a key entry point

into the MAP's.

4 ONLINE TESTS

API ECHO TEST (T3700SNA)

The API echo test is designed to verify the integrity of the link between the terminal (3770) and the central site (370X). This is done by sending to the terminal the data that was requested the number of times specified. This test can be initiated from either host or terminal. API echo will test BSC or SDLC terminals. For information on on using API echo refer to the chapter on TOLTEP.

SDLC Link Test (T3700LTE)

The SDLC Link Test is provided for installation verification and for definition and isolation of link problems. The Link Test is invokable from the host CPU. For information on how to run T3700LTE see the chapter on TOLTEP.

5 ERROR LOG

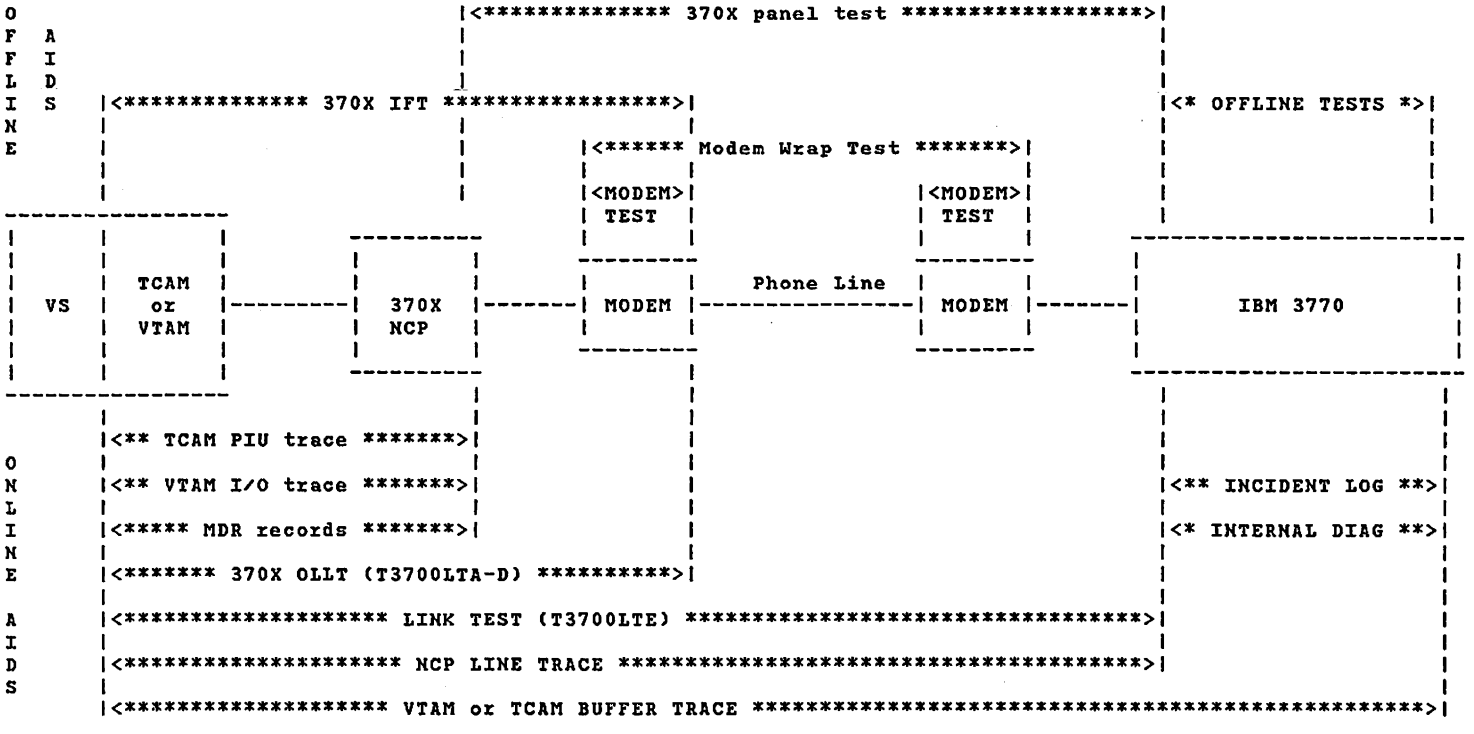
The 3770 has an error log which contains detailed hardware, software, and machine check information. To print this error log, hold the 'code' key down and press the numeric 2 key. This information is destroyed with power-on-reset. The operator must print this error log before powering the machine off and save the printout if there is a failure.

EXAMPLE 3770 ERROR LOG

ERROR CODE	01	02	03	04	05	06	07	08	09	10	11	12
ID reader	000											
Keyboard	000											
console prntr	000	000	000	000	000							
Card Reader	000	000	000	000	000	000	000	000				
Diskette #1	000	000	000	000	000	000	000					
Diskette #2	000	000	000	000	000	000	000					
Card Punch	000	000	000	000	000	000	000	000				
Machine check	000	000	000	000	000	000	000	000				
BSC or SDLC	617	618	619	620	621	622	623	623	625	626	627	628
Last error NPR	000											
Next to last	000											
3rd from last	000											
4th from last	000											
5th from last	000											

The entries in the BSC or SDLC line will correspond to NPR error diplays and provide the operator an explanation of what has happened and provide the CE with an enrty point into the MAP's.

SERVICE AIDS FOR A NETWORK WITH 3770 TERMINALS



The block diagram represents the major components in a 3770 network. The lines of asterisks indicate from what point to what point a service aid covers. The service aids above the block diagram only run when that portion of the network covered is off line. The service aids below the block diagram are service aids that run concurrently with customer operations.

10.7 : 3790 SUBSYSTEMS

The maintenance package for the 3790 consists of:

1 PROBLEM RECOVERY PROCEDURES (PRP)

PRP's are available to the customer and are located in the Operations Guide, GA27-2786 for version 1-5 Configuration Support 9431, GA27-2822 for version 6 Configuration Support 9165, and GA27-2830 for version 6 configuration Support 9169. Use of the PRP's may enable the customer to direct the CE to the problem area of the 3790 after system problem determination procedures have determinated that the problem is a 3790 problem.

2 MAINTENANCE ANALYSIS PROCEDURES (MAP)

MAP's are used by the CE to analyse problems with the 3791 and the connected terminals and are included in the Maintenance Information Manual.

3 OFFLINE TESTS

A. BRING UP TESTS

The Bring-up tests test the Unit Controller, Control Storage/Extended Storage, Operator panel, and the Diskette drive. Failures in the 3790 are detected and repairs are verified by running the Bring-up tests. To run the Bring-up test, the Diagnostic Diskette or Operating Diskette must be in the Diskette drive. Turn power on. When power is turned on there is a ten second delay, during which 1500 is displayed. If the data/Function Select switch is set to position 0, the entire test should run properly, ending with BC80 displayed. If the test stops with any display other than BC80, a failure occured. If power was already on, set the Data/Function Select to position F. Press reset switch. When Digit Display indicates FF00, press Enter Function to start test. When tests are completed, BC80 will be displayed. If the test stops with any display other than BC80, a failure occured.

B. ADAPTER/DEVICE TESTS

The adapter/device tests allow the CE to run diagnostics on all the attached devices to the 3790 System, such as the Diskette drive, the fixed disk, the Line Adapter, printers, displays,etc.

4 ONLINE TESTS

Online condition allows normal 3790 System customer data processing operations. Online service operations, share the 3790 System with customer operations. Online functions provide the CE with additional system support. The CE can select these functions:

* SYSLDEV list device status
* SYSREQ system messages
* SYSTRACE trace system operation
* SYSLPROG list functions
* SYSPAT emergency patches
* SYSIMOD installation parameters/modification
* SYSLERR list condition/incident records
* SYSTCM online tests
* SYSHOST SNA link test

5 CONDITION/INCIDENT LOG

The 3791 records selected system events in a condition/incident log. This log resides on disk storage LA=21. Each event is identified by an incident type and a sequence number. Sequence numbers are assigned in order of occurrence, sequentially from 1 to 4095. The log will wrap around at 4095, starting over at 1, and any previous recordings will be over-written. (NOTE: some condition/incident log records may be lost after a 3791 power-off sequence if the Control Operator did not perform a normal termination of system operations prior to power-off or the CE did not initialize the 3791 prior to power-off). There are three types of Condition/Incident records:

1. Type 1 records, associated with adapter or device failures.

2. Type 2 records, associated with Machine Check failures.

3. Type 4 records, associated with various system events such as System Start, System Abend, System Shutdown, and TP adapter logs. See the chart on the next page for information on decoding Tp adapter logs.

Incident records are obtained by using the CE function SYSLERR or from the CPU site by using SIRF.

6 LINK TEST

T3700LT tests

The Host 3704/3705 Communications Controller provides an SDLC Link Test that may be used for Host data link problem determination and repair verification. The SDLC Link Test is basically an Echo Test with the 370X sending an SDLC test frame to a 3791. The 3791 will echo the test sequence back to the 370X, if it is

received without error. The receiving of SDLC Test Frames and the echoing back to the 370X is handled by the SYSHOST function of the operating code. With the SYSHOST function selected, the 3791 will receive and check all test frames. Test frames that are received good and have 9 or less data bytes will be transmitted back to the 370X exactly as received. Test frames that are received good but have more than 9 data bytes will cause a CMDREJ sequence to be transmitted back to the 370X. The 3791 will not send a response to any frame received bad. The results of the Link Test are recorded in the 3791 Condition/Incident Log as Type 4 COND-20 records. For further information concering Link Test operation procedure refer to SY27-2392.

SIRF

SIRF provides a Host Initated Echo Test that allows the type 1 batch function to store up to two 256 byte Echo Data RU's in the controller and repetitively transmit these Echo Data RU's to the host. The host can request the number of times the Echo Data RU's are to be sent back in a range from 0 to 256 times. If the count is 0 the 3790 will send the Echo Data RU's until the host sends a negative response.

TYPE 4 RECORD FORMAT

4-TYPE I-REC SEQ-0001 SYS-COND-xx

D01-xx D02-xx D03-xx D04-xx D05-xx

X= any value 0= always zero	D01 field HEX	D02 field HEX	D03 field status Flags in binary							
			0	1	2	3	4	5	6	7
Write complete	0 2	X 8	X	X	X	X	X	X	X	X
Read intermediate Completion	0 1	X 1	XID Rcvd	Link Test	Rd T.O.	lost data	Sec Busy	Rd FBI	RD MSG Aval	Poll Rcvd
write Complete and Read Intermediate Completion	0 2 0 1	X 9	0	0	0	Lost data	0	0	RD MSG Aval	0
Read/Write execption	0 1 0 2	X 2	Sx Rm Rcvd	Disc Rcvd	Wr Retry	Idle T.O.	Over Run	Under Run	Conn Prob	Dump Msg
Write-Error	0 2	X C	Inv BStat	0	DCE Error	Write T.O.	0	MC	0	0
Write-Halted	0 2	X A	X	X	X	X	X	X	X	X
Read(Sense) Normal Completion	0 1	X 8	X	X	X	X	X	X	X	X
Open-Normal Completion	0 0	X 8	0	0	0	RI	0	0	0	0
Open-Intermediate Completion	0 0	X 2	0	0	0	Rtry T.O.	0	0	0	0
Open-Error	0 0	X C	Inv BStat	0	DCE Error	Write T.O.	0	MC	0	0
Open-Halted	0 0	X A	X	X	X	X	X	X	X	X
Close-Normal Completion	0 4	X 8	X	X	X	X	X	X	X	X
Close-Error	0 4	X C	Inv BStat	0	DCE Error	0	0	MC	0	0

3790 STATUS FLAG BYTE DESCRIPTION

Status flag bits (D03 field) are described below. Standard SDLC and data communication terminology apply.

CONN PROB

Some condition exits in the link that is preventing the proper establishment or reestablishment of communication with the remote station.

DCE ERROR

A DCE interrupt or other unexpected DCE condition has occured. (DSR down when it should be on)

DISC RCVD

Set Disconnect Response Mode command received and acknowledged.

DUMP MSG

One or more significant errors have occurred and are Command Reject conditions. All data in the buffer is bad due to this condition.

IDLE T.O.

On a switched or leased line, there has been inactivity (no flags received) for a period of 20 seconds.

INV BSTAT

Adapter basic status was not meaningful. The probable cause was a hardware error.

LINK TEST

Posted at command time upon receiving and decoding Link Test command. (NOTE BCC check has not been made yet). Also indicated along with RD MSG AVAL at END FLAG time if valid Link Test has been received.

LOST DATA

This bit set along with the RD MSG AVAL bit and indicates that a count exceeded condition exists in an otherwise normal read completion.

MC

A non-recoverable machine check has occurred.

OVERRUN

An overrun condition has been detected by the hardware (RCV mode) and the adapter is attempting recovery.

POLL RCVD

The poll bit has been detected in the command field and no Write Function Request is outstanding. (NOTE Poll cannot be verified until end frame time)

RD FBI

The storing of the last character Read has caused the count to go to zero.

RD MSG AVAL

A complete message has been received with no detectable errors and is now available for processing. Or a valid Link Test has been received and the 3791 code has sent the correct response.

RD T.O.

This completion is posted when the 3791 code has been receiving (in sync) for a period longer than 20 seconds without receiving a Flag character interrupt, possibly indicating:

* intermediate Flag characters missed due to line noise.

* Continuous Flags being received.

* Long message being received.

* Line hung at 'space' or valid data character.

* Receive clock failure (modem).

RI

A Ring Indicate signal had been detected while the Open Function Request was active.

RTY T.O.

An indication during an Open Function Request that a timeout has occurred while awaiting the data set to become ready. The condition will prevail until either the data set becomes ready or a halt request is received (on switched line only).

SEC BUSY

An RNR response has been sent to the primary station due to lack of receive buffers in the 3791.

SXRM

A valid SARM or SNRM was received, acknowledged and the 3791 Host code resequenced. The NSA response will be automatically sent.

UNDERRUN

An underrun condition has been detected by the hardware (xmit node) and the adapter is attempting recovery. (secondary abort)

WR RTRY

The adapter is required to send a previously transmitted message (I frame) or series of message, in its entirety, due to lack of confirmation by sequence number from the primary station.

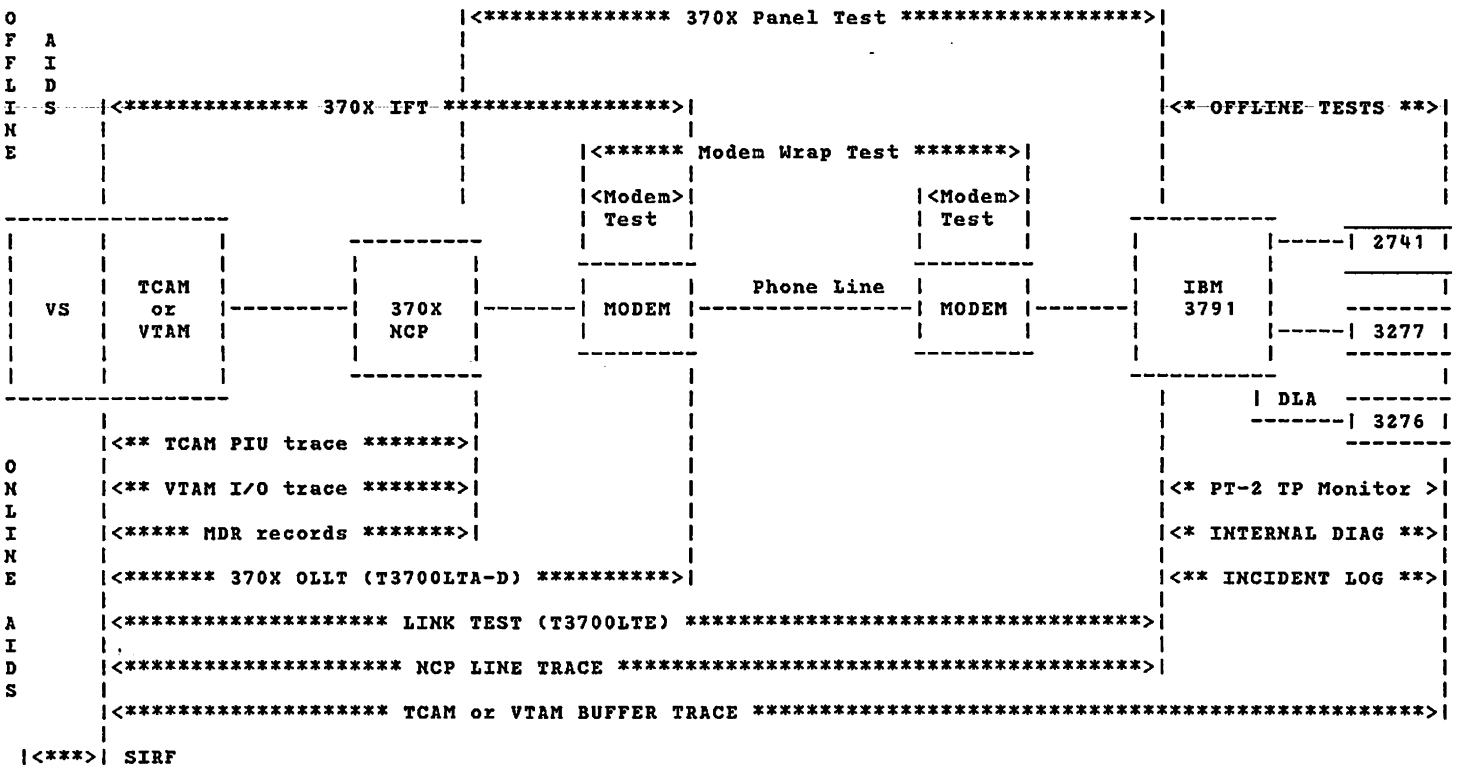
WRITE T.O.

A timeout condition has occurred during a write operation (or while sending tone during Open) and indicates a potential hardware problem. (modem clock failure)

XID RCVD

A valid XID was received. (NOTE XID is normally received with either no associated data field or with a six byte data field.)

SERVICE AIDS FOR A SNA NETWORK WITH 3790 TERMINALS



The block diagram represents the major components in a 3790 network. The lines of asterisks indicate from what point to what point a service aid covers. The service aids above the block diagram only run when that portion of the network covered is off line. The service aids below the block diagram are service aids that run concurrently with customer operations.

CHAPTER 11 : VTAM/NCP PROBLEM ISOLATION INFORMATION

This section contains information that may be helpful to the user in isolating and gathering documentation for SNA problems. A number of patches are described that can aid in problem isolation. There are also some patchs described that will allow the user to tailor his VTAM SNA system. The patches described in this document are discussed so that the user is aware that these patches exist. If the need arises for any of these patches, the IBM PSR should be asked to contact the VTAM change team for assistance in developing a current version of the patches.

CONTENTS

11.1 : NETSOL PROBLEM ISOLATION

This procedure will allow NETSOL to run as a job in a separate region. It is useful when trying to isolate problems that may be related to NETSOL. This procedure should be considered for for both VTAM and ACF/VTAM.

NETSOL=NO must be specified in the VTAM start definition. NETSOL can be started as a job by entering 'S NETSOL' or 'S NETSOL.Px' if a VS1 system. NETSOL can be stopped by halting VTAM or cancelling NETSOL (C NETSOL,DUMP).

```
//PROCUP  JOB 'xxxxxxxxxxx'
//       EXEC  PGM=IEBUPDTE,PARM=NEW
//* RUNS NETSOL IS SEPARATE REGION
//SYSPRINT DD SYSOUT=A
//SYSUT2 DD    DSNAME=SYS1.PROCLIB,DISP=SHR
//SYSIN  DD    DATA
./      ADD   LIST=ALL,SSI=20000104,NAME=NETSOL
//NETSOL PROC
//A  EXEC  PGM=ISTNSC00,TIME=1440
//STEPLIB DD DSN=SYS1.VTAMLIB,DISP=SHR
//SYSPRINT DD SYSOUT=A
//SYSABEND DD SYSOUT=A
./ ENDUP
/*
```

11.2 : NETSOL DELAY FOR MESSAGE 12

NETSOL will write message 12 to all 3277'S and 3275'S which it controls as soon as it accepts the LOGON. This can significantly slow down network startup. Also, if any display is powered off, an error message is written to the system console. In order to eliminate these conditions, a patch to NETSOL may be added to cause it not to write this message until a period of time after NETSOL is started.

A PTF for NETSOL is available to provide a bypass to sending MSG 12 for a user specified time. The default time is 5 minutes. This is a standard option in ACF/VTAM.

11.3 : NETSOL RESPONSE TO CLEAR KEY

NETSOL normally will not respond to a CLEAR key from a 3277 or a 3275, on the assumption that the user is already keying in the LOGON request. This modification will cause MESSAGE 12 to be written back to the terminal when CLEAR is depressed, so there is a positive response of NETSOL's session. This change is not affected by the addition of the 'NETSOL DELAY OF MESSAGE 12' patch, in that it will respond even if the delay interval has not expired.

The NETSOL macro should be patched in the receive any completion exit after the CLI and BNE instructions under LABEL 'TYPE3270'.

```
*************************************************************
*                                                           *
*   THIS MODIFICATION WILL CAUSE NETSOL TO RESPOND TO A     *
*   CLEAR KEY WITH MESSAGE 12, INSTEAD OF JUST RE-READING   *
*                                                           *
*************************************************************
      LA     R0,MSG12            YES, RESET SCREEN
      B      WRITEMSG            CLEAR AND UPDATE SCREEN
```

11.4 : START VTAM IO TRACE FOR ALL NODES

Patches can be put onto VTAM to start VTAM's IO trace for all the nodes in the network. For random problems that can strike any node, this may be the only way to insure that trace data is available for the correct node when the problem occurs. After the failure occurs only the trace records at the time of failure need be printed.

This patch should not be necessary for ACF/VTAM users. IO traces can be started against the SSCP and for each application as desired.

11.5 : START VTAM TPIO TRACE FOR ALL NODES

Patches can be put into VTAM to record TPIO trace for all the nodes in the network. For random problems that can strike any node, this may be the only way to insure that trace data is available for the correct node when the problem occurs. After the failure occurs only the trace records at the time of failure need be printed. This modification is required if the data portion of all traffic is to be examined.

This patch should not be necessary for ACF/VTAM users. TPIO traces can be started against the SSCP and for each application as desired.

11.6 : CHANGE VTAM SMS TRACE INTERVAL

Patches can be put into VTAM to change the frequency that VTAM writes SMS buffer pool trace entries. VTAM will write an SMS entry after every 1000 requests for buffers. During installation time when little activity is occurring this sampling rate may be too high.

MVS module requiring modification is ISTORFPO.

VS1 module requiring modification is ISTORAPO.

SVS module requiring modification is ISTORSPO.

11.7 : LOCAL 3270 TEST REQUEST KEY

Currently if the test request key is hit on a local 3270 the session will be terminated. A patch can be added to VTAM to prevent accidental depression of the test request key from terminating the session.

This patch is not required if using ACF/VTAM.

With the patch applied the test request key is functional only if the following sequence is used:

1. Clear screen with CLEAR key.
2. Key in CCU address of the terminal in the first three positions of the screen. (EXAMPLE 4CA or 0F2)
3. Hit test request key

If test request key is hit accidently, input inhibit will stay on until the reset key is hit. When reset and enter keys are hit, processing will continue normally as if test request had not been hit.

11.8 : VTAM/TSO PATCH TO DISABLE DATA SUPPRESSION

Using TSO/VTAM the text data in VTAM's buffer trace entries is suppressed because TSO codes CDATA=YES in the NIB for the terminals, indicating that TSO wishs his data to be considered confidential. VTAM will not record the contents of the TEXT field in the buffer trace entries. Sometimes the contents of the TEXT field is neccesary for problem isolation. A patch to TSO will allow VTAM to record the contents of the TEXT field in VTAM's buffer trace entries.

This patch is very level dependent and should be obtained via the IBM PSR from the VTAM change team. The patch changes a bit in the NIB that is used for session establishment by TCAS.

ENTER USER NOTES HERE:

CHAPTER 12 : TOLTEP ONLINE TESTS

12.1 : T3700LT TESTS (OLT'S)

DESCRIPTION

The 3704/3705 (370X) communication scanner On-line Tests (OLT's) 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 OLT's reside in the host CPU and are called in using TOLTEP and only affect the line being tested. The OLT's may be divided into two categories:

1. Those primarily designed for customer problem identification,and

2. Those primarily designed for use by the CE.

The tests in the first category were designed to be simple to run 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 though 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 such things as the data to be wrapped. The section under operation will describe the individual tests.

AVAILABILITY

Before any of the test sections can be run, the following program requirements must be met:

1. The Teleprocessing On-Line Test Executive Program (TOLTEP) must be running in the system

2. A Network Control Program (NCP) that has the OLT option included must be running in the 3704/3705. (NCP level 3.0 or higher, T3700LTE requires 3.2 or higher.)

3. The 3700 family of OLT's must be present in the OLT libary.

4. Each line 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

DOS/VS and OS/VS TOLTEP for VTAM (GC28-0663)

On-Line Terminal Test User's Guide (D99-3700C)
Available through FE Branch Office.

HARDWARE REQUIREMENTS

Only one of the test sections should be on line on the same communications scanner at one time. These tests should not be run on lines on the same scanner while NCP Panel Test or Line Trace is being run.

T3700LTA

Provides for an internal data wrap ulitizing the hardware diagnostic wrap facilities of the 370X scanner. This section tests the data path of a line set, up to but not through the

line drivers. This test would be called by putting t3700lta in the TEST field of the test request message when running TOLTEP. The lines being wrapped must be on the same communications scanner.

T3700LTB

Provides for a modem data wrap. This section was designed to test the 1200 BPS half and full duplex integrated modems and the 2400 BPS FULL DUPLEX integrated modem. This section may also be used to test external 3872, and 3875 modems attached to 370X FULL DUPLEX lines. This test would be called by putting t3700ltb in the TEST field. 1200 Half Duplex wrap line must be in the same scanner. Full Duplex modems wrap from the transmit side to the receive side. External modems mode switch should be in the external position to allow testing half speed operation.

T3700LTC

Provides for the execution of a modem self-test. This section will test the 2400 BPS HALF DUPEX integrated modem and external 3872, 3874, and 3875 modems attached to 370X HALF DUPLEX lines. This section would be called by putting t3700ltc in the TEST field. External modems mode switch should be in external to allow testing of half speed.

T3700LTD

Provides for a test of the autocall originate (ACO) feature of the integrated modem. It may also be used to exercise externally attached autocall units. Basically, the test is performed by dialing numbers selected by the operator. This section has two routines the first dials a valid number and test for a successful connection. The second dials a invalid number and tests for no connection. The telephone numbers can be entered by using EXT=number1,number2 in the OPT field or wait until the diagnostic asks for the numbers. This section would be called by putting t3700ltd in the TEST field field. Routine one requires that the number dialed be capable of providing answer tone to allow normal completion of the dialed connection.

T3700LTE

Provides for testing of the SDLC link. This test is designed to aid in isolating failures on an SDLC link. This section automatically sends the SDLC test frame 10 times and does not allow optional data to be sent in the test frame. The data sent is Flag, Address, Command with no data. This test section should only be run after successful completion of T3700LTA, and T3700LTB or T3700LTC if integrated modems or 3872/3874/3875 modems are being used. This section is used to help isolate failures on an SDLC link. Analysis of the statistics accumulated at the primary and secondary stations is helpful. This test would be called by putting t3700lte in the TEST field. NOTE - The LU, PU, and line must be deactivated in order to run this test.

T3700LTF

Provides for a test of the circuitry of integrated modems with break feature. This section has two routines. The first tests the ability of the break circuitry to detect a mark frequency and the second routine tests its ability to detect a space frequency. This section should be run only after successful completion of T3700LTA and T3700LTB. If both of these sections run oK and T3700LTf fails, the problem is most likely to be in the modem's break feature circuitry. This test would be called by putting t3700ltf in the TEST field.

T3700LT

CE utility and external data wrap. This section provides for testing any of the same functions tested by T3700LTA through T3700LTE. It also provides for an external data wrap. The external wrap may be a wrap block or switched lines as long as they have been manually connected beforehand. In any of these cases, the operator may optionally specify:

* The data to be sent.
* The LCD to be utilized. (If SDLC, the operator may also specify if NRZI mode is to be used).
* The set-mode SDF to be utilized.

The device entry (DEV) for this section differs from that of the other test sections. For this section, only one or two symbolic line names may be entered in the test request message (instead of up to sixteen). The second line name entered, if there is one, will be used as the wrap line. Some tests under

T3700LT do not require a wrap line. In addition, if either of the lines whose names are entered are full duplex lines, message ITB502 will occur. This message is a request to select the side of the line to be utilized, i.e., transmit or receive. If no wrap line is entered, and the test line is full duplex, the side not selected in response to message ITB502 will be used as the wrap line. In tests that use a wrap line and a test line the wrap line is used to send the test data and the test line is used to receive the test data. This test allows selection of up to 30 bytes of optional data. For BSC two syn characters will be added in front of the data specified, for SDLC the first two bytes should be a valid station address and a valid command.

OPERATION

The prime purpose of the following paragraphs is to describe how to enter the 'DEVICE' field of the test message, and explain what happens in the different T3700LT tests:

T3700LTA

Since full duplex lines have only one symbolic name but are made up of two 3704/3705 addresses, the internal wrap will be run twice for each full duplex line to be tested. The TX and RX symboles, used below, indicate the respective transmit and receive lines of a full duplex pair. The symbols Wn and Tn indicate the wrap and test lines.

A.

	Boston,Richmond,Atlanta (TX)(RX)		
pass 1	W1	T1	
pass 2	W2	T2	
pass 3	W3		T3
pass 4	T4		W4

B.

	Richmond,Boston (TX)(RX)	
pass 1	W1	T1
pass 2	W2	T2
pass 3	T3	W3

EXAMPLE A.

Boston is used as the wrap line, throughout the test, since it is the first line entered in the test message. Each line, in turn, is then selected as the test line. Both transmit and receive sides of full duplex are tested. When the last line entered has been tested, it is then used as the wrap line, and the first line which has not yet been tested is used as the test line.

EXAMPLE B.

The sequence is the same as in example A. Note that the transmit line side of Richmond is used throughout as the wrap line, just as Boston was in example A. Up to sixteen symbolic names may be entered in the 'DEV' field of the test request message.

T3700LTB

The sequence of testing is similar to that of T3700LTA. Since

T3700LTB tests modems, however, there is a difference. When a full duplex line is encountered by T3700LTB, the transmit side is always used as the wrap line and the receive side is always used as the test line.

```
A.
            Atlanta,Boston,New York
pass 1        W1      T1
pass 2        W2              T2

B.
            Richmond,Montreal,New York
            (TX)(RX) (TX)(RX)
pass 1       W1  T1
pass 2               W2  T2
pass 3       W3                  T3
```

EXAMPLE A.

In example A, Atlanta is used as the wrap line, throughout the test, since it was the first line entered. Each line in turn is then selected as the test line. Note that Atlanta will not be tested.

EXAMPLE B.

This example illustrates that whenever a full duplex line is encountered its transmit side is used as the wrap line. In T3700LTB up to sixteen symbolic line names may be entered in the test request message.

T3700LTC, LTD, LTE, LTF,

These test sections require only one line at a time to run, therefore illustrations are unnecessary. Enter the name of each line to be tested. Each line, in the order entered will be tested. Up to sixteen line names may be entered.

T3700LT

The device entry for the test section differs from that of the other test sections. For this section only one or two line names may be entered in the test request message. The second line name entered will be used as the wrap line.

TEST SECTION ERROR PRINTOUTS

The following provides an example of the error printouts produced by the test sections. Appendix A in D99-3700C (Available through FE Branch Office), provides a detailed discription of the different error printouts.

EXAMPLE OF PRINTOUT

```
*T3700LTA-00  RTN 001     DEV/LN 000A LINE1     ECA 0     REFNUM 00000          (a)
 LINE ADDR - 0842                                                               (b)
 STEP 01    CHAIN 01      ERROR 02                                              (c)
 OLLTCB -                                                                       (d)
   BYTES  0- 7    00000000 00000000                                             (e)
   BYTES  8-15    00000000 01FD8000                                             (f)
   BYTES 16-23    4000CF00 00000000                                             (g)
 ICW FIELDS (IN HEX) -                                                          (h)
   SCF 40    PDF 00    LCD/PCF CF     SDF 00                                    (i)
 LINE DEFINITION -                                                              (j)
   SWITCHED  HDX  LCD X'C'  DET MODE SDF X'45'                                  (k)
 DIAL NUMBER - 9 5494551                                                        (l)
 XPTD DATA 32FFFF0000C1C2C3C4C5C6C7C8C9D1D2D3D4D5D6D7D8D9E2E3                   (m)
           E4E5E6E7E8E9F0F1F2F3F4F5F6F7F8F93232FFFF
 RCVD DATA 32FFFF0000C1C2C3C4C5C6C7C8C9D1D2D3D4D5D6D7D8D9E2E3                   (n)
           E4E5E6E7E8E9F)F1F2F3F4F5F6F7F8F93232FFFF
```

DESCPRIPTION OF PRINTOUT

(a) Standard OLT header line.

(b) Line address - physical 3704/3705 line address of failure.

(c) Step, Chain, and Error numbers - describe the error condition.

(d)-(g) OLLTCB - print of the OLLTCB at time of failure.

(h)-(i) ICW fields - contents of certain ICW fields at time of failure.

(j)-(k) LINE DEFINITION - parameters with which line was being run.

(l) DIAL NUMBER - only present if this was a dial line.

(m)-(n) EXPECTED AND RECEIVED DATA only printed if failure occurred during a step which wraps data.

LINK TEST STATISTICS TABLE

The following section describes the Link Test statistics table. This table is immediately printed following the transmission of the requested number of SDLC test frames. Any hardware errors occuring while transmitting the frames will be printed first. Note that this table will always be printed whether or not errors occured.

```
T3700LT -00 RTN 001    DEV/LN 000B SLBSCAD    ECA 0    REFNUM 00000

              LINK TEST STATISTICS (IN HEX)

FRMS REQUEST-000A     FRMS TX       -000A   TOT RCVD FRM-0000
BCC ERRORS  -0000     HRDWARE ERR   -0000   TIME OUT ERR-000A
INV A/C FLD -0000     DATA NT RCVD -0000    INCORRCT DAT-0000
'CMDR' RESP -0000     'NSA' RESP    -0000   RCVD W/O ERR      0000

ACCUMULATED SCF    -01
ACCUMULATED RCVD DATA BITS IN ERROR
     0000
```

DESCRIPTION OF PRINTOUT

FRMS REQUEST - The number of frames requested to be sent. (If T3700LTE, this will always be X'0A'.)

FRMS TX - The actual number of frames transmitted successfully. (Transmission of frames halts if any error is detected while transmitting.)

TOT RCVD FRM - The total number of frames received. This count includes all frames received, including frames in error.

BCC ERRORS - The number of frames received in which block check errors occurred.

HRDWARE ERR - The number of receive operations that ended because of of one or more bits in error in the SCF.

TIME OUT ERR - The number of receive operations that ended in a timeout. Nothing received in three seconds.

INV A/C FLD - The number of frames received whose station address was not equal to the station address sent, or whose command field did not contain X'F3'.

DATA NT RCVD - The number of frames received that contained no optional data when optional data was included in the frames sent.

INCORRCT DAT - The number of frames received whose optional data field did not compare with the optional data sent. This also includes the number of frames received that included data when no data was sent.

'CMDR' RESP - The number of frames received whose command field contained command reject.

'NSA' RESP - The number of frames received whose command field contained non-sequenced acknowledgment.

RCVD W/O ERR - The total number of frames received without error.

ACCUMULATED SCF - The accumulated SCF. As each frame is received the ending SCF is or'ed into this field.

ACCUMULATED RCVD DATA BITS IN ERROR - As each frame is received, the frame is compared with the frame sent. Each bit in error is or'ed into this field.

SAMPLE OUTPUT

CONSOLE PRINTOUTS TO RUN T3700LT TESTS
ALL UNDERLINED LINES ARE ADDED COMMENTS NOT PART OF THE CONSOLE LOG.

```
f net,test
13.56.12 STC  811  IST097I  MODIFY   ACCEPTED
13.56.12 STC  811  ITA102I ISTOLTEP REL.2.0 INITIALIZATION IN PROGRESS
13.56.12 STC  811  ITA107I OPTIONS ARE NTL,NEL,NPP, FE,NMI, EP, CP, PR,NTR,NAP
13.56.12 STC  811 *00 ITA105D ENTER DEV/TEST/OPT/
```

EXAMPLE TO RUN LINK TEST (T3700LTE) TO A SDLC LINE CALLED SDLC136

```
00sdlc136/t3700lte//
13.57.32          IEE600I REPLY TO 00 IS;SDLC136/T3700LTE//
13.57.34 STC  811  ITA158I  S T3700LTE UNIT 0000 SDLC136
13.57.39 STC  811 *01 ITB531D  - ENTER THE ONE BYTE STATION ADDRESS IN HEX
```

FF IS THE ALL STATIONS ADDRESS.
IT CAN BE USED TO GET DEVICE ADDRESS,
BUT ONLY ONE DEVICE ON LINE AT A TIME.

```
01ff
13.57.54          IEE600I REPLY TO 01 IS;FF
13.58.06 STC  811  *T3700LTE-00  RTN 001   DEV/LN 0000 SDLC136   ECA 0    REFNUM 00000
13.58.06 STC  811
13.58.06 STC  811           LINK TEST STATISTICS (IN HEX)
13.58.06 STC  811
13.58.06 STC  811    FRMS REQUEST-000A   FRMS TX     -000A   TOT RCVD FRM-000A
```

```
13.58.06 STC  811    BCC ERRORS  -0000   HRDWARE ERR -0000   TIME OUT ERR-0000
13.58.06 STC  811    INV A/C FLD -000A   DATA NT RCVD-0000   INCORRCT DAT-0000
13.58.06 STC  811    'CMDR' RESP -0000   'NSA' RESP  -0000   RCVD W/O ERR-0000
13.58.06 STC  811
13.58.06 STC  811    ACCUMULATED SCF    -0C
13.58.06 STC  811    ACCUMULATED RCVD DATA BITS IN ERROR
13.58.06 STC  811       3E00B22C
13.58.06 STC  811
13.58.06 STC  811
13.58.06 STC  811  ITA129I FIRST ERROR COMMUNICATION T3700LTE 001 UNIT 0000 SDLC136
```

IN THE ABOVE EXAMPLE THE STATION ADDRESS WAS GIVEN AS FF WHICH IS THE ALL STATIONS ADDRESS. THE TERMINAL RESPONDED WITH HIS ADDRESS WHICH WAS C1. THE LINK TEST STATISTICS TABLE SHOWS THAT THE RECEIVED BITS IN ERROR WERE 3E00B22C. 3E IS THE BITS THAT DIDN'T MATCH. TO GET THE ADDRESS OF THE TERMINAL INVERT 3E AND GET C1 WHICH IS THE ADDRESS. B22C IS THE BCC CHAR.

```
13.58.06 STC  811  ITA107I OPTIONS ARE NTL,NEL,NPP, FE,NMI, EP, CP, PR,NTR,NAP
13.58.06 STC  811 *02 ITA105D ENTER DEV/TEST/OPT/
```

FIRST ERROR COMMUNICATION. GIVES YOU A CHANCE TO CHANGE OPTIONS.

```
02///
13.58.31          IEE600I REPLY TO 02 IS;///
13.58.36 STC  811  ITB533I  - TEST 6 ENDED ON SDLC136  (0A6C/0A6E).
13.58.37 STC  811  ITA158I *T T3700LTE UNIT 0000 SDLC136
13.58.37 STC  811  ITA107I OPTIONS ARE NTL,NEL,NPP, FE,NMI, EP, CP, PR,NTR,NAP
13.58.37 STC  811 *03 ITA105D ENTER DEV/TEST/OPT/
```

REQUEST FOR NEXT TEST. REQUESTED THE SAME TEST TO THE SAME LINE.

```
03///
13.58.58          IEE600I REPLY TO 03 IS;///
13.58.59 STC  811  ITA158I  S T3700LTE UNIT 0000 SDLC136
13.59.04 STC  811 *04 ITB531D  - ENTER THE ONE BYTE STATION ADDRESS IN HEX
```

ENTERED THE CORRECT ADDRESS NOW THAT ITS KNOWN.

```
04c1
13.59.14          IEE600I REPLY TO 04 IS;C1
13.59.27 STC  811   T3700LTE-00  RTN 001   DEV/LN 0000 SDLC136   ECA 0    REFNUM 00000
13.59.27 STC  811
13.59.27 STC  811          LINK TEST STATISTICS (IN HEX)
13.59.27 STC  811
13.59.27 STC  811    FRMS REQUEST-000A   FRMS TX     -000A   TOT RCVD FRM-000A
13.59.27 STC  811    BCC ERRORS  -0000   HRDWARE ERR -0000   TIME OUT ERR-0000
13.59.27 STC  811    INV A/C FLD -0000   DATA NT RCVD-0000   INCORRCT DAT-0000
13.59.27 STC  811    'CMDR' RESP -0000   'NSA' RESP  -0000   RCVD W/O ERR-000A
13.59.27 STC  811
```

```
13.59.27 STC  811    ACCUMULATED SCF    -0C
13.59.27 STC  811    ACCUMULATED RCVD DATA BITS IN ERROR
13.59.27 STC  811       00000000
13.59.27 STC  811
13.59.27 STC  811
13.59.32 STC  811  ITB533I  - TEST 6 ENDED ON SDLC136  (0A6C/0A6E).
13.59.33 STC  811  ITA158I  T T3700LTE UNIT 0000 SDLC136
```

TEST NOW RUNS CORRECTLY. ALL ZERO'S IN BITS IN ERROR FIELD AND NO (*) IN TERMINATE MESSAGE.

```
13.59.33 STC  811  ITA107I OPTIONS ARE NTL,NEL,NPP, FE,NMI, EP, CP, PR,NTR,NAP
13.59.33 STC  811 *05 ITA105D ENTER DEV/TEST/OPT/
```

REQUESTING T3700LTA TO SAME LINE WHICH IS FULL DUPLEX OTHERWISE A WRAP LINE IS NEEDED.

```
05/t3700lta//
13.59.57          IEE600I REPLY TO 05 IS;/T3700LTA//
13.59.58 STC  811  ITA158I  S T3700LTA UNIT 0000 SDLC136
14.00.20 STC  811  ITB515I  - TEST 1 ENDED.
14.00.20 STC  811  ITB515I  - TEST LINE (SDLC136  0A6E) - WRAP LINE (SDLC136  0A6C)
14.00.38 STC  811  ITB515I  - TEST 1 ENDED.
14.00.38 STC  811  ITB515I  - TEST LINE (SDLC136  0A6C) - WRAP LINE (SDLC136  0A6E)
14.00.38 STC  811  ITA158I  T T3700LTA UNIT 0000 SDLC136
14.00.38 STC  811  ITA107I OPTIONS ARE NTL,NEL,NPP, FE,NMI, EP, CP, PR,NTR,NAP
14.00.38 STC  811 *06 ITA105D ENTER DEV/TEST/OPT/
```

EXAMPLE OF RUNNING T3700LT TEST AND THE OPTIONS THAT ARE AVAILABLE.

```
06/t3700lt//
14.05.15          IEE600I REPLY TO 06 IS;/T3700LT//
14.05.16 STC  811  ITA158I  S T3700LT  UNIT 0000 SDLC136
14.05.22 STC  811  ITB502I  - LINE SDLC136  IS A FDX LINE.
14.05.22 STC  811 *07 ITB502D  - WHICH SIDE IS TO BE TESTED? REPLY 'TX' OR 'RX'.
07tx
14.06.31          IEE600I REPLY TO 07 IS;TX
14.06.33 STC  811  ITB504I  - SELECT TEST TO BE RUN (1-7).
14.06.33 STC  811 *08 ITB504D  - ENTER OPTION, OR 'END'.
```

TEST 6 IS THE SAME TEST AS T3700LTE.

```
08,6
14.07.31          IEE600I REPLY TO 08 IS;6
14.07.31 STC  811  ITB505I  - SELECT OPTION ('WRAP', 'TEST', OR 'DATA').
14.07.31 STC  811 *09 ITB505D  - ENTER OPTION, OR 'END'.
```

WRAP ALLOWS THE SET MODE SDF TO BE CHANGED FOR THE WRAP LINE.
TEST ALLOWS THE SET MODE SDF AND/OR LCD TO BE CHANGED FOR THE TEST LINE.
DATA ALLOWS THE SELECTION OF UP TO 30 BYTES OF HEX DATA.

```
09data
14.08.38           IEE600I REPLY TO 09 IS;DATA
14.08.38 STC  811 *10 ITB506D  - ENTER DATA TO BE WRAPPED (IN HEX - 30 BYTES MAX).
10,c1f3c1c2c3c4c5c6c7c8c9c0f1f2f3f4f5f6f7f8f9f0
14.09.34           IEE600I REPLY TO 10 IS;C1F3C1C2C3C4C5C6C7C8C9C0F1F2F3F4F5F6F7F8F9F
14.09.35 STC  811  ITB505I  - SELECT OPTION ('WRAP', 'TEST', OR 'DATA').
14.09.35 STC  811 *11 ITB505D  - ENTER OPTION, OR 'END'.

AFTER ALL OPTIONS ARE CHANGED ENTERING (END) WILL START THE TEST.

11end
14.09.46           IEE600I REPLY TO 11 IS;END
14.09.58 STC  811 *12 ITB528D  - ENTER THE NUMBER OF FRAMES TO SEND (MAX=32767)
12,50
14.10.11           IEE600I REPLY TO 12 IS;50
14.10.23 STC  811   T3700LT -00  RTN 001   DEV/LN 0000 SDLC136   ECA 0    REFNUM 00000
14.10.23 STC  811
14.10.23 STC  811           LINK TEST STATISTICS (IN HEX)
14.10.23 STC  811
14.10.23 STC  811    FRMS REQUEST-0032   FRMS TX     -0032   TOT RCVD FRM-0032
14.10.23 STC  811    BCC ERRORS  -0000   HRDWARE ERR -0000   TIME OUT ERR-0000
14.10.23 STC  811    INV A/C FLD -0000   DATA NT RCVD-0000   INCORRCT DAT-0000
14.10.23 STC  811    'CMDR' RESP -0000   'NSA' RESP  -0000   RCVD W/O ERR-0032
14.10.23 STC  811
14.10.23 STC  811    ACCUMULATED SCF    -0C
14.10.23 STC  811    ACCUMULATED RCVD DATA BITS IN ERROR
14.10.23 STC  811       00000000000000000000000000000000
14.10.23 STC  811
14.10.23 STC  811
14.10.23 STC  811 *13 ITB530D  - REPEAT THE TEST? (REPLY 'YES' OR 'NO'.)
13no
14.10.44           IEE600I REPLY TO 13 IS;NO
14.10.50 STC  811  ITB533I  - TEST 6 ENDED ON SDLC136  (0A6C/0A6E).
14.10.52 STC  811  ITB504I  - SELECT TEST TO BE RUN (1-7).
14.10.52 STC  811 *14 ITB504D  - ENTER OPTION, OR 'END'.
14end
14.11.01           IEE600I REPLY TO 14 IS;END
14.11.01 STC  811  ITA158I  T T3700LT  UNIT 0000 SDLC136
14.11.01 STC  811  ITA107I OPTIONS ARE NTL,NEL,NPP, FE,NMI, EP, CP, PR,NTR,NAP
14.11.01 STC  811 *15 ITA105D ENTER DEV/TEST/OPT/
15cancel
14.12.47           IEE600I REPLY TO 15 IS;CANCEL                        GHIJKLMNO/
14.12.47 STC  811  ITA548I ISTOLTEP NO LONGER REQUIRES SDLC136
```

12.2 : T3700SNA (API ECHO)

DESCRIPTION

The API Echo Test is designed to verify the integrity of the link between the terminal and the central site. This is done by sending to the terminal the data that was requested the number of times specified. This takes place while normal VTAM and NCP operations continue on all terminals not being tested, including other terminals on a multidropped T.P. line. T3700SNA provides for echoing the data to the terminal. The test will repeat the requested data the number of times specified. In addition, if no data is requested, the test will send a predetermined test data pattern to the test terminal. The terminals supported by API Echo (T3700SNA) are 3270, 3767, and 3770 when attached to SNA lines and BSC 3270's when the CDS records are defined as SDLC records.

AVAILABILITY

Before any of the tests described in this section can be run, the following program requirements must be met:

A. The Teleprocessing On-Line Test Executive Program (TOLTEP) must be running in the host system.

B. Each symbolic name entered in the test request message must be defined in the Configuration Data Set (CDS) for TOLTEP and VTAM.

REFERENCE MANUALS

DOS/VS and OS/VS TOLTEP for VTAM GC28-0663. This document describes how to use and initiate TOLTEP.

IBM MAINTENANCE DIAGNOSTIC PROGRAM T3700SNA D99-3700D (Available through FE Branch Office). This document provides all necessary information for the API Echo Test.

TEST OPERATION

To use API Echo Tests, TOLTEP must be started in the host system. When TOLTEP has been started, a message will be printed on the system console requesting that the DEVICE/TEST/OPTION/ parameters be entered. Test request message entry for the three fields is as follows:

DEVICE field

API echo can only test one terminal at a time. For this field enter the symbolic name of one terminal to be tested, and the bind parameters to be used for this test. The bind parameters can be entered either in a hex format or the entry name in the logon mode table in VTAM which contains the bind parameters for the devices to be tested such as:

```
DEVNAME(X'030321903040')/
DEVNAME(S3270)/
```

If bind parameters are not specified in the device field, such as DEVNAME/, then the default set of bind parameters in the logon mode table are used. See your system programmer for the bind parameters appropriate for your SNA devices. TOLTEP uses the 6 bytes of the session parameters starting with the FM profile (byte 1) of DSECT ISTDBIND. Refer to 'VTAM Macro Language Reference, GC27-6995' for information.

TEST field

T3700SNA is the test section name for API Echo.

OPTION field

Data to be echoed by this test may be entered at the same time the terminal is selected. This is done by providing it in the EXT= parameter of the option field of the test request message. If this is desired, enter the option field as follows:

A. A 2 digit number for the times to receive the data followed by the data. Example to send ABC...XYZ to the test terminal 99 times enter
   EXT=99ABC...XYZ

B. A 2 digit number for the times to receive the standard message . (Standard message is A to Z, 0 to 9.) Example to send message 9 times
   EXT=09

C. A 2 digit number for the times to receive the data followed by X' then data will send hex data. NOTE you must enter an even number of characters for the hex data. Example to send C1C2C3E7E8E9 to the terminal 40 times enter
   EXT=40X'C1C2C3E7E8E9

D. The word bind can be used to display the bind parameters for the symbolic unit in the test field as follows:
   EXT=BIND

E. If the system operator doesn't enter anything in the option field, T3700SNA program will send a message to the terminal requesting the terminal to enter the test data. The message printed is:
   'ENTER YYDATA, PROMPT, OR END'

   YYDATA - YY for times to repeat data. DATA in format as above.
   PROMPT - entering this will prompt the user on the format to use.
   END - entering this will end the test.

When entering the test data up to 100 bytes of data may be entered.

EXAMPLES OF TESTS.

The following are examples of some test runs with and without errors. Note in the error example that you are not informed of an error in the echo data until an 'END' of echo testing is requested.

EXAMPLE 1

```
Logon applid(istoltep)                                    (a)
F102I ISTOLTEP REL.2.0 INITIALIZATION IN PROGRESS          (b)
F107I OPTIONS ARENTL, NEL, FE, NMI, EP, CP, PR, NTR, NAP  (b)
F105D ENTER DEV/TEST/OPT/                                 (b)
*/3700sna//                                               (c)
F158I S T3700SNA UNIT 00CF RTS2LU1                        (d)
901 ENTER YYDATA,PROMPT, OR END                           (e)
4test data                                                (f)
test data                                                 (g)
test data                                                 (g)
test data                                                 (g)
test data                                                 (g)
901 ENTER YYDATA,PROMPT, OR END                           (h)
end                                                       (i)
05 END OF ECHO TESTING                                    (j)
```

Description of messages. (a) The logon to TOLTEP. At this point the system operator will get a message asking the system operator for permission for TOLTEP to use the terminal that is requesting the logon.

(b) Standard OLT messages.

(c) The asterisk in the device field designates that the test device is the one that is now communicating (logged on) with TOLTEP.

The test field contains the test number for API Echo (3700SNA)

No options were modified.

(d) Standard OLT message. Note the symbolic name of the test device is given here. (RTS2LU1)

(e) API Echo is requesting what data to use.

(f) A response of 4test data - requests that 'test data' be repeated four times.

(g) The data is being echoed.

(h) API Echo is requesting what data to use.

(i) A request of END of testing has been entered.

(j) Ending message of API Echo.

EXAMPLE 2 ERROR PRINTOUT AS DISPLAYED ON THE CONTROL TERMINAL.

```
F158I  S  T3700SNA UNIT 00CF RTS2LU1              (a)
F100I 908 STATUS ERROR 10020000                   (b)
F100I 909 TOTAL NO. ERRORS = 05                   (c)
F158I *T  T3700SNA UNIT 00CF RTS2LU1              (d)
```

Description of messages.

(a) Standard TOLTEP start message.

(b) API Echo encountered status errors during the echo portion of testing. See D99-3700D (Available through FE Branch Office), Appendix D for a description of the sense. (1002 is a request error - RU length error.

(c) The number of errors encountered was 5.

(d) Standard TOLTEP message. The * in front of TERMINATE indicates that there were errors during the test.

EXAMPLE 3 NON-COMPATIBLE BIND AND RECOVERY

```
rts2lu1/3700sna//                                          (a)
F158I  S  T3700SNA UNIT 00CF RTS2LU1                       (b)
F100I 912 BIND IS NOT COMPATIBLE WITH T3700SNA             (c)
F100I 913 BIND IS XX030320907040                           (d)
F158I *T T3700SNA UNIT 00CF RTS2LU1                        (b)
F107I OPTIONS ARE NTL, NEL, NPP, FE, MMI, EP, CP, PR, NTR, NAP  (b)
F105D ENTER DEV/TEST/OPT/                                  (b)
RTS2LU1(X'030321903040')///                                (e)
```

Description of messages.

(a) reply to a test request message (F105D).

(b) Standard TOLTEP message.

(c) error message - T3700SNA cannot run the test device with this bind.

(d) Error message - the invalid bind parameter is displayed.

(e) new test request with the bind parameter specified with the device.

The bind parameter is displayed and inputted in this format
XXFMTSPPSPC1C2 where in the message test the bytes have this meaning:

XX = ignore. Not used

FM = FM profile.

TS = TS profile.

PP = Primary NAU Protocols. Bit expansion follows:
 0 Chaining use. On allows chaining. Off no chaining
 1 Request mode. On delayed mode. Off immediate mode.
 2-3 Chain response. 00= No, 01= Execption, 10= Definite, 11= Both.
 4-5 Reserved bits.
 6 Compression Indicator. On may be used. Off can not be used.
 7 Send EB Indicator. On EB may be used. Off can not be used.

SP = Secondary NAU Protocols. Bit expansion same as PP byte.

C1 = Common NAU Protocol byte 1. Bit expansion follows:
 0 Reserved.
 1 FM HEADER usage. On FM headers allowed, Off not allowed.
 2 BRACKETS. On brackets will be used, Off will not be used.
 3 BRACKETS TERMINATION. On rule 1 used, Off rule 2 used.
 4 ALTERNATE CODE. On Alt code may be used, Off will not be used.
 5-7 RESERVED.

C2 COMMON NAU PROTOCOL byte 2. Bit expansion follows:
 0-1 FM TRANSACTION mode. 00= Full duplex, 01= HDX Contention,
 10= HDX Flip Flop, 11 Master slave.
 (00 and 11 not supported by T3700SNA)
 2 NO RECOVERY RESPONSIBILITY. On sender of RU responsible,
 Off primary NAU responsible.
 3 BRACKETS FIRST SPEAKER. On primary is first, Off secondary is first.
 4-6 RESERVED.
 7 CONTENTION RESOLUTION. On primary speaks first, Off secondary first.

SAMPLE OUTPUT

CONSOLE SAMPLE FOR T3700SNA (API ECHO)

```
f net,test
15.17.41 STC  811  IST097I  MODIFY   ACCEPTED
15.17.42 STC  811  ITA102I ISTOLTEP REL.2.0 INITIALIZATION IN PROGRESS
15.17.42 STC  811  ITA107I OPTIONS ARE NTL,NEL,NPP, FE,NMI, EP, CP, PR,NTR,NAP
15.18.38 STC  811 *27 ITA105D ENTER DEV/TEST/OPT/
```

RUN API ECHO TO A SDLC 3271 20 TIMES WITH ABCDEFGHIJKLM

```
27lu3270v7(s3270)/t3700sna/ext=20abcdefghijklm/
15.24.08           IEE600I REPLY TO 27 IS;LU3270V7(S3270)/T3700SNA/EXT=20ABCDEFGHIJKL
15.24.32 STC  811  ITA158I  S T3700SNA UNIT 0520 LU3270V7
15.25.39 STC  811  ITA158I  T T3700SNA UNIT 0520 LU3270V7
15.25.39 STC  811  ITA107I OPTIONS ARE NTL,NEL,NPP, FE,NMI, EP, CP, PR,NTR,NAP
15.25.39 STC  811  ITA327I EXT=20ABCDEFGHIJKLM
15.30.21 STC  811 *30 ITA105D ENTER DEV/TEST/OPT/
30cancel
15.30.44           IEE600I REPLY TO 30 IS;CANCEL
15.30.44 STC  811  ITA548I ISTOLTEP NO LONGER REQUIRES LU3270V7
```

12.3 : R3270 (3270 BSC AND SDLC TESTS)

DESCRIPTION

The diagnostic programs detailed in this section are designed to test and provide functional exercises for:

* 3271 Remote Multiplexor Control Units.

* 3275 Remote Standalone Display Station.

3270 BSC (R3270B) and 3270 SNA (R3270D) tests use the same options. If a BSC 3270 device has a configuration data set (CDS) defined like a SDLC 3270 CDS, R3270D can be run. R3270D has the following advantages over the R3270B OLT for BSC 3270 devices.

* A simpler CDS is needed.
* Improved performance for the same OLT function in R3270D
* No performance degradation to other devices on the same line.
* OLT=YES is not required on the NCP generation statements for R3270D.

The OLT programs and patterns can be invoked from the host CPU or via a test request message from a remote keyboard. The OLT's operate concurrently with a customer program. The 3270 operators guide has a description of how to request tests from the terminal. An example of running the test from a system console would be;

R 01, termname/R3270C/NFE,MI,EXT=PAT/ (for BSC terminals)

R 01, termname(BIND)/R3270D/NFE,MI,EXT=PAT/ (for SDLC terminals)

termname is the name of the terminal under test.
(BIND) is the name of the entry in the bind table or the bind in hex.
R3270D is the name of the 3270 diagnostic to be run.
(R3270C for BSC, R3270D for SDLC)
EXT=PAT is the option field and is requesting the pattern test.

The valid options that can be requested by the EXT= option are;

CHK check tests, (functional checkout) this is the default option.
MAN manual test (includes both KEY and MAG).
KEY keyboard tests.
MAG magnetic card reader.
PAT patterns for displays or buffered printers.
PAT,DPRT patterns for nonbuffered printers.

the MAN, KEY, MAG, PAT, and PAT,DPRT entries must also specify NFE,MI in the option field.

COMPOSITE ERROR MESSAGE DESCRIPTION

```
*R3270D-VL RTN NN DEV/LN xxxx SYMBOLIC          line 1
 ECA LLL REFNUM yyzzz
 PLINK ID = Y3270xx-VL                             2
 TEST DESCRIPTION                                  3
 FAILURE DESCRIPTION                               4
 XPTD DATA x (--up to 256 bytes--) x               5
 RCVD DATA x (--up to 256 bytes--) x               6
 WRTN DATA x (--varies--) x                        7
 ADDITIONAL COMMENTS                               8
```

EXPLANATION OF LINE CONTENT

1 - Heading as generated by the executive control program where; * = error indicator, R3270D = test ID, VL = version and level, NN = decimal value of routine, xxxx = 370X address SYMBOLIC = name of terminal tested, ECA = engineering change level, LLL = FE announcement letter multiplier, yyzzz = specific failure.

2 - Y3270xx-VL = plink id and VL level of test.

3 - This line(s) provides a basic description of what is being tested.

4 - a description of what is failing.

5,6 - These two lines define the expected and received data in hex.

7 - Depicts the data written to the 3270 in hex.

8 - Up to five additional lines with error information and error status.

SAMPLE OUTPUT

CONSOLE SAMPLE FOR R3270D TESTS

```
f net,test
13.56.12 STC  811  IST097I  MODIFY   ACCEPTED
13.56.12 STC  811  ITA102I ISTOLTEP REL.2.0 INITIALIZATION IN PROGRESS
13.56.12 STC  811  ITA107I OPTIONS ARE NTL,NEL,NPP, FE,NMI, EP, CP, PR,NTR,NAP
13.56.12 STC  811 *00 ITA105D ENTER DEV/TEST/OPT/
00sdlc3270v7(s3270)/r3270d//
13.57.32           IEE600I REPLY TO 00 IS;SDLC3270V7(S3270)/R3270D//
13.57.34 STC  811  ITA158I  S R3270D   UNIT 0520 SDLC136
14.11.01 STC  811  ITA158I  T R3270D   UNIT 0520 SDLC136
14.11.01 STC  811  ITA107I OPTIONS ARE NTL,NEL,NPP, FE,NMI, EP, CP, PR,NTR,NAP
14.11.01 STC  811 *15 ITA105D ENTER DEV/TEST/OPT/
15cancel
14.12.47           IEE600I REPLY TO 15 IS;CANCEL
14.12.47 STC  811  ITA548I ISTOLTEP NO LONGER REQUIRES SDLC3270V7
```

12.4 : T3700RSP (BSC REQUEST FOR TEST)

DESCRIPTION

Binary Synchronous Communications Online Test (T3700RSP)

This Online Test provides a means for transmitting test messages to and from the central processer. The online test program that resides in the central processor controls the tests. You initiate test requests from the terminal by entering online test mode and transmitting a request for test to the central processor. The Terminals Operators Guide has detailed information on how to enter a request into the system, defining the text message and the number of times the operator wants to receive it. Not all tests will run to all devices, for example the tests that are compatible with 3770's are test 01 and test 14. Test 01 allows the terminal operator to enter the text message to be sent back. The maximum length text message is 256 characters including the RFT message. Test 14 requests standard EBCDIC code message of 36 characters which is 'A through Z, and 0 through 9' the number of times requested by the RFT.

XX VALUE DEFINITIONS

The following chart gives a description of the pattern and sourse of data defined by XX values. XX values 02 through 22 request T3700RSP to send a specific test message data pattern to the requestor. XX value 00 or 01 defines the requestor as the source of data.

XX = 00 Requestor sends yy blocks of data (50 bytes maxium), the first is preceded by the RFT request header, SOH%00YY0, and the T3700RSP acknowledges the data by sending ACK1. Transparent data is not supported by XX = 00.

XX = 01 Requestor sends one block (50 bytes maxium) containing the RFT, followed by test data. T3700RSP will return the test data yy times.

XX = 02 256 characters, EBCDIC Transparency, hex 00 through FF.

XX = 03 128 characters, ASCII Transparency, all valid characters.

XX = 04 245 characters, EBCDIC, no control characters in text.

XX = 05 117 characters, ASCII, no control characters in text.

XX = 06 36 characters, ASCII, A to Z and 0 to 9

XX = 07 36 characters, ASCII, 2780 printer message

XX = 08 36 characters, ASCII, 2780 punch message

XX = 09 36 characters, 6 bit, 2780 printer message

XX = 10 36 characters, 6 bit, 2780 punch message

XX = 11 36 characters, 6 bit, A to Z and 0 to 9

XX = 12 36 characters, EBCDIC, 2780 printer message

XX = 13 36 characters, EBCDIC, 2780 punch message

XX = 14 36 characters, EBCDIC, A to Z and 0 to 9

XX = 15 80 characters, modem weak pattern, EBCDIC hex 00

XX = 16 80 characters, modem weak pattern, EBCDIC hex AA

XX = 17 80 characters, modem weak pattern, 6 bit hex 00

XX = 18 80 characters, modem weak pattern, 6 bit 40 N and 40 ESC

XX = 19 290 characters, modem weak pattern, EBCDIC hex 00

ENTER USER NOTES HERE:

Appendix A

SNA Flow Diagrams

SNA FLOW DIAGRAMS

This section describes the SNA flow for maney of the more common activities. This section, when used in conjuction with a trace, should allow the user to determine the failing sequence when the trace and the flow disagree.

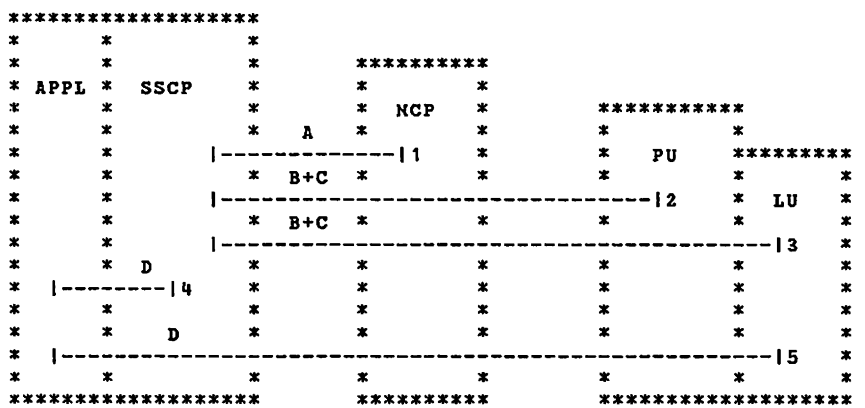
CONTENTS

SNA FLOWS

FOR MORE DETAILS SEE: ACF/VTAM MACRO LANGUAGE GUIDE (APPENDIX C) OR
INTRODUCTION TO ACF/VTAM LOGIC OR
NCP PLM

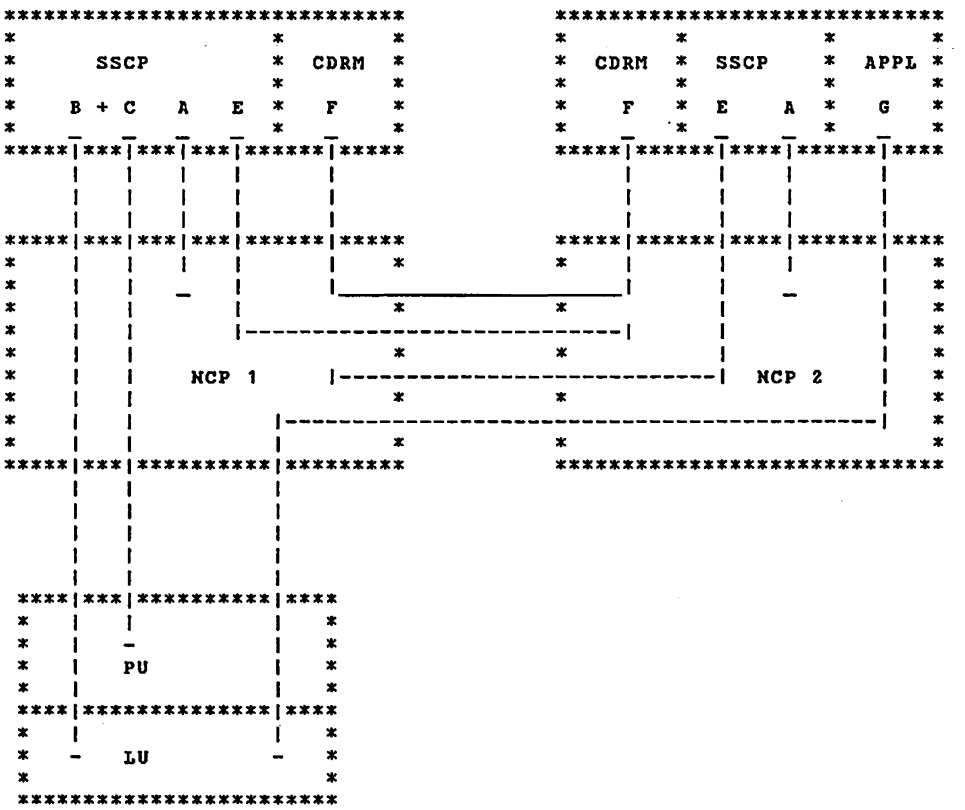
SESSION CONCEPT

SINGLE DOMAIN.



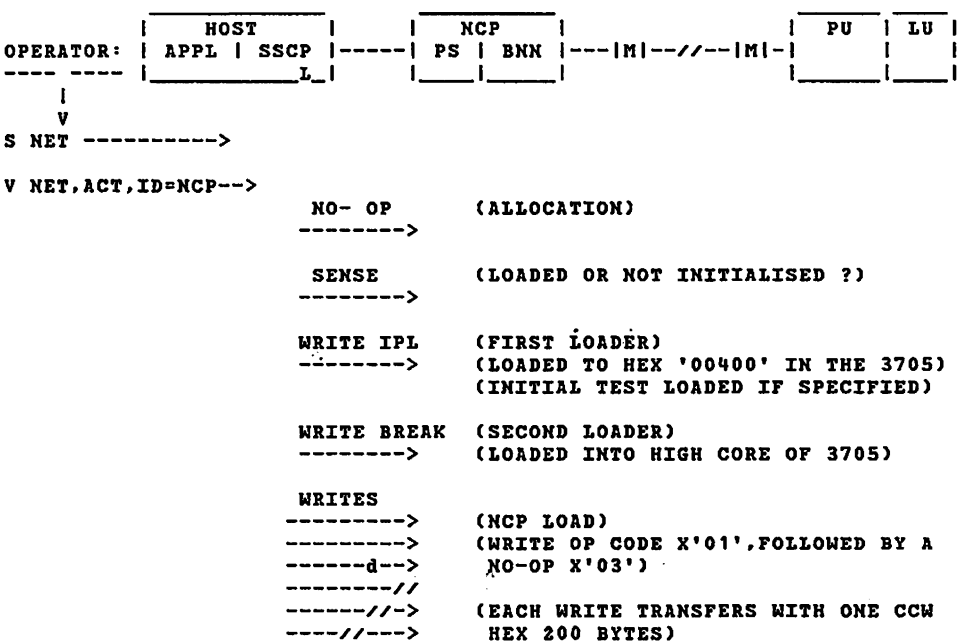
SESSION CONCEPT

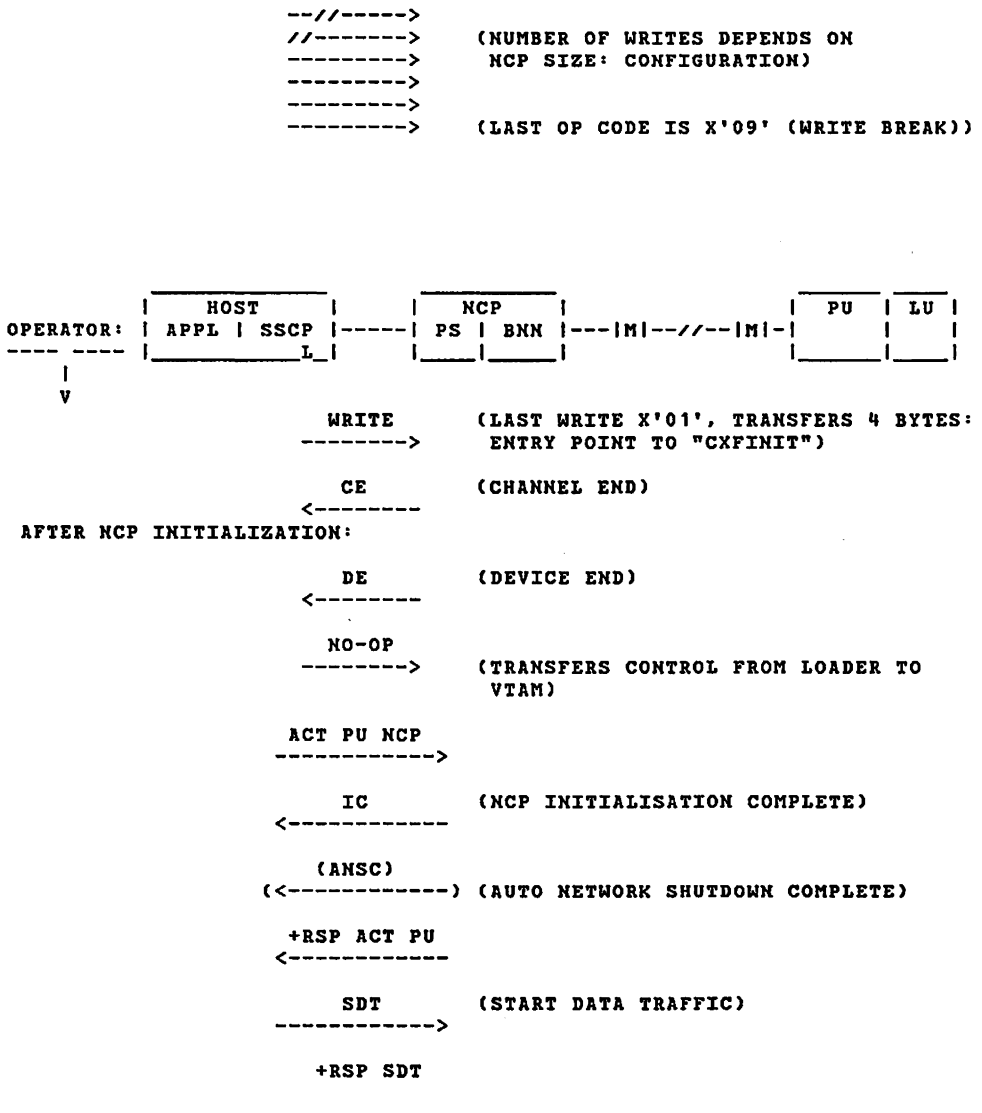
MULTI DOMAIN



A : ACTIVATION OF NCP

```
**************************************************************************
*                                                                        *
*           A : ACTIVATION OF NCP                                        *
*                                                                        *
*                 1. LOAD NCP                                            *
*                                                                        *
*                 2. ACTIVATE NCP                                        *
*                                                                        *
*                 3. ACTIVATE LINKS                                      *
*                                                                        *
**************************************************************************
```




--//----->
//------->
(NUMBER OF WRITES DEPENDS ON
NCP SIZE: CONFIGURATION)
--------->
--------->
--------->
(LAST OP CODE IS X'09' (WRITE BREAK))
HOST
APPL
SSCP
NCP
PS
BNN
M
M
PU
LU
OPERATOR:
WRITE
(LAST WRITE X'01', TRANSFERS 4 BYTES:
ENTRY POINT TO "CXFINIT")
CE
(CHANNEL END)
AFTER NCP INITIALIZATION:
DE
(DEVICE END)
NO-OP
(TRANSFERS CONTROL FROM LOADER TO
VTAM)
ACT PU NCP
IC
(NCP INITIALISATION COMPLETE)
(ANSC)
(AUTO NETWORK SHUTDOWN COMPLETE)
+RSP ACT PU
SDT
(START DATA TRAFFIC)
+RSP SDT

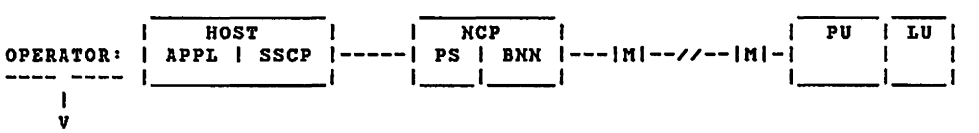
```
                    <------------

                         SCV        (SET CONTROL VECTOR:
                    ------------>      DATE AND TIME)

                       +RSP SCV
                    <------------

                         SCV        (SET CHANNEL ATTENTION DELAY TO ZERO)
                    ------------>

                       +RSP SCV
                    <------------
```




```
          V

     ISTATUS ACTIVE:

                       ACT LINK
                    ------------>
                                        DTR   SET "DATA TERMINAL READY"
                                     ------>
                                       DSR
                                     <------ EXPECTS "DATA SET READY"
                                             (IF NO "DSR":
                                              ENABLE TIMEOUT: -RSP)

                    +RSP ACT LINK
                    <------------


     ISTATUS INACTIVE:

                       INACT LINK
                    ------------>

                   +RSP INACT LINK        POSITIVE RESPONSE:
```

```
                <------------                ONLY IF LINK WAS ACTIVE
                                OR:
              -RES INACT LINK          SENSE: LINK WAS ALREADY
                <------------                 INACTIVE.

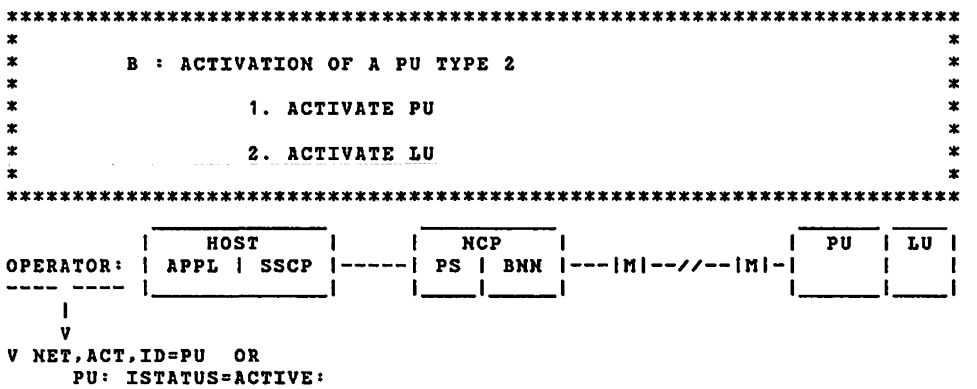

     AFTER ALL LINKS HAVE BEEN ACTIVATED OR INACTIVATED
     ACCORDING TO "ISTATUS = :

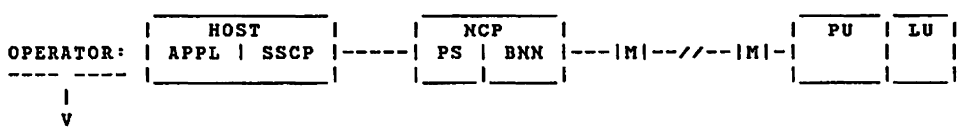
                    SCV                SET CHANNEL ATTENTION DELAY
                ------------>          TO THE NCP GENERATED VALUE.

                  +RSP SCV
                <------------

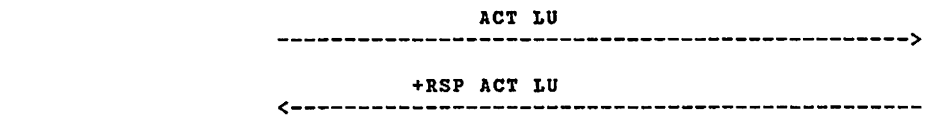

CONSOLE MESSAGE:NCPXXX ACTIVE
```

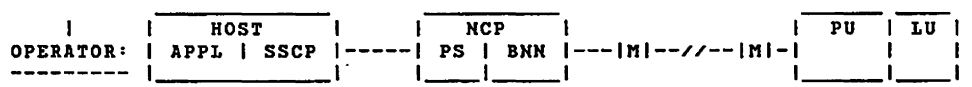
B : ACTIVATION OF A PU TYPE 2





V NET,ACT,ID=LU OR:
ISTATUS=ACTIVE





SESSION TO THE LU TYPE 2 IS ESTABLISHED.

LU IS READY FOR

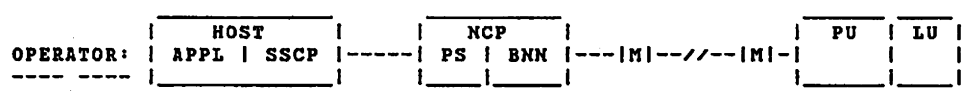
A: LOGON

B: ACQUIRE

SINGLE- OR CROSS- DOMAIN

C : ACTIVATION OF A PU TYPE 1

```
**************************************************************************
*                                                                        *
*           C : ACTIVATION OF A PU TYPE 1                                *
*                                                                        *
*                 1. ACTIVATE PU                                         *
*                                                                        *
*                 2. ACTIVATE LU                                         *
*                                                                        *
**************************************************************************
```




```
V NET,ACT,ID=PU  OR
     PU: ISTATUS=ACTIVE:
```

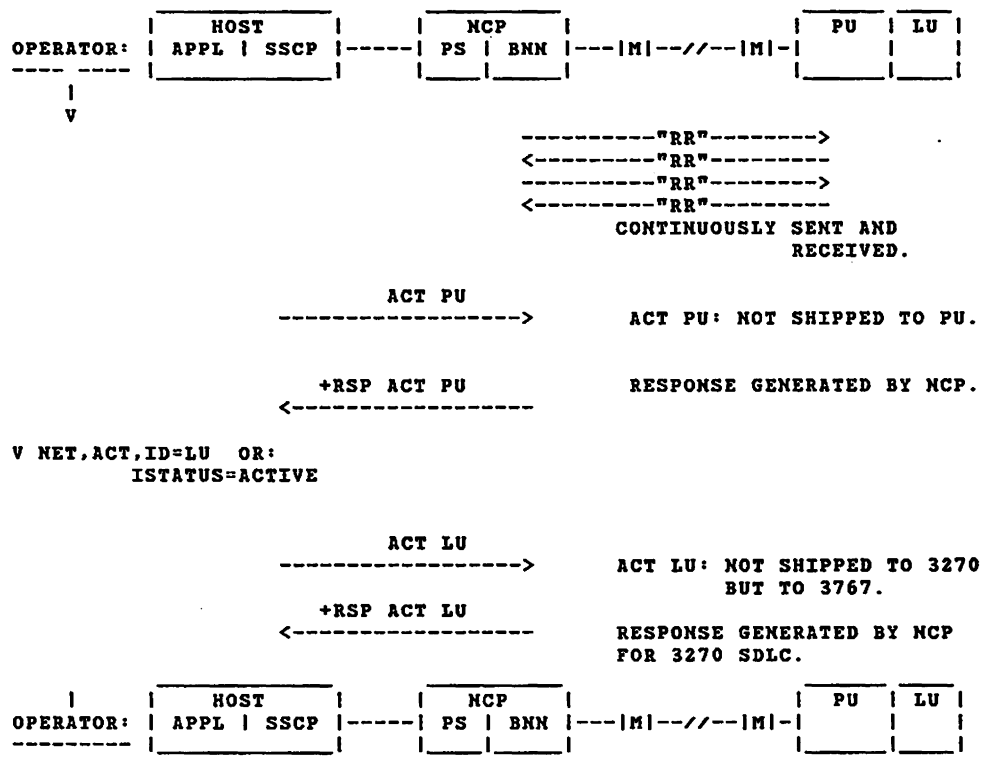
```
                  CONTACT
              ------------>
                                        SDLC COMMAND:
                                    "SNRM" = HEX '93'
              +RSP CONTACT      ---------------------->
              <------------          IF NO RESPONSE RECEIVED:
                                     "SNRM" IS SENT AGAIN AFTER
                                     "REPLY TIMEOUT" EXPIRED.

                                     VTAM DISPAY OF PU STATUS
                                     SHOWS: "ACT/C"

                                     3705 PANEL "ICW DISPLAY"
                                     SHOWES "PCF" OF HEX '5',
                                     CHECK RECEIVE LEG IF
                                     "1H LINE" SET.

                          NORMAL OPERATION:

                                        SDLC COMMAND:
                                    "NSA" = HEX '73'
                                  <----------------------
            CONTACTED             "RR" POLLING STARTS AFTER "NSA"
          <------------------      WAS RECEIVED.
```



SESSION TO THE LU TYPE 1 IS ESTABLISHED.

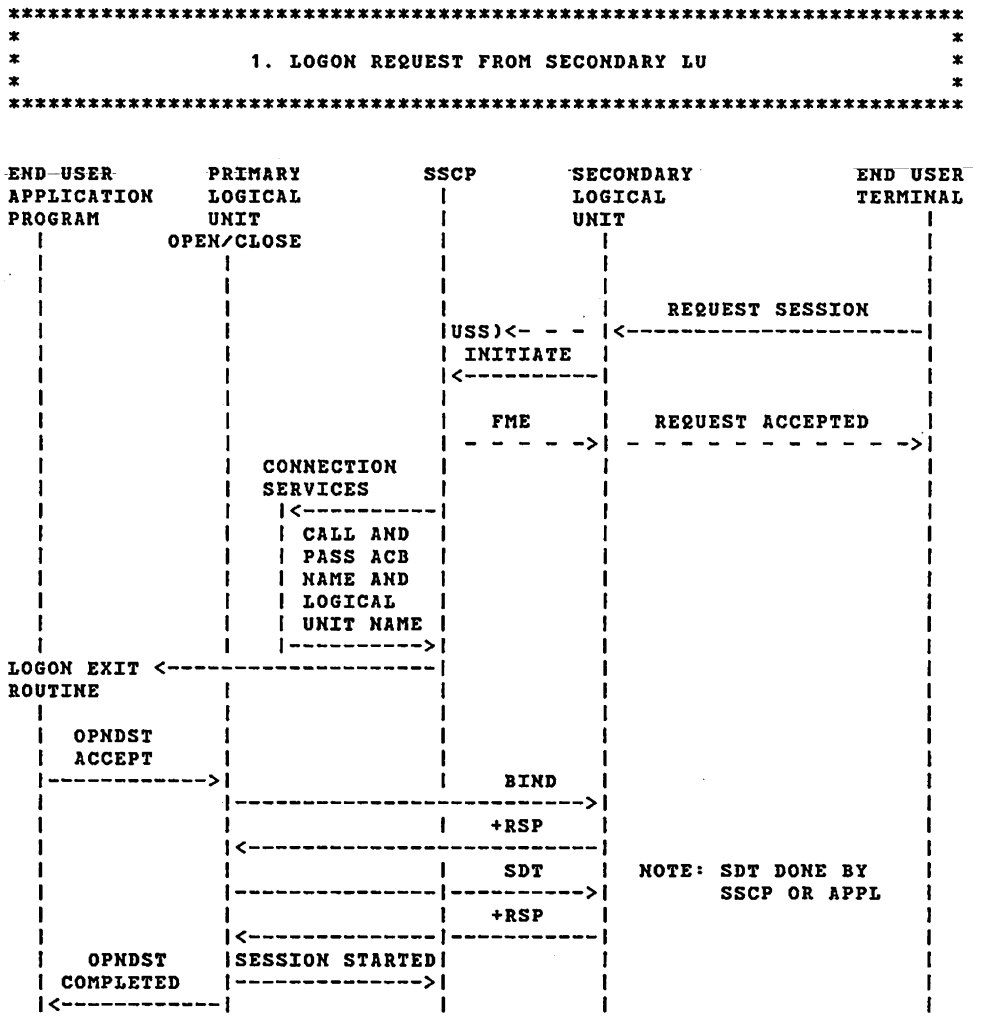
LU IS READY FOR

A: LOGON

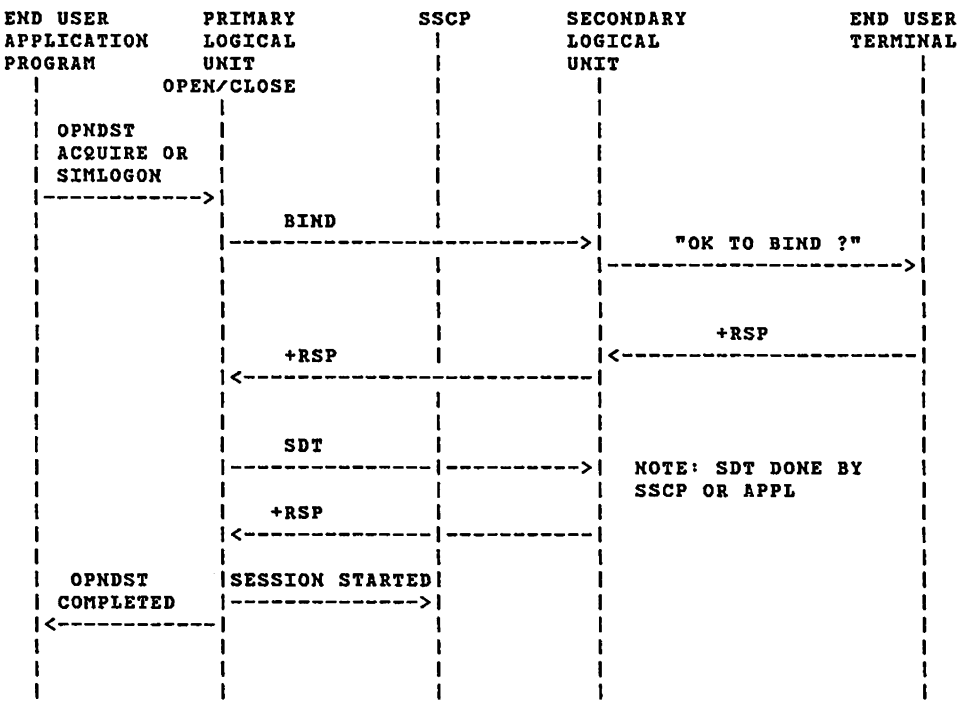
B: ACQUIRE

SINGLE- OR CROSS- DOMAIN

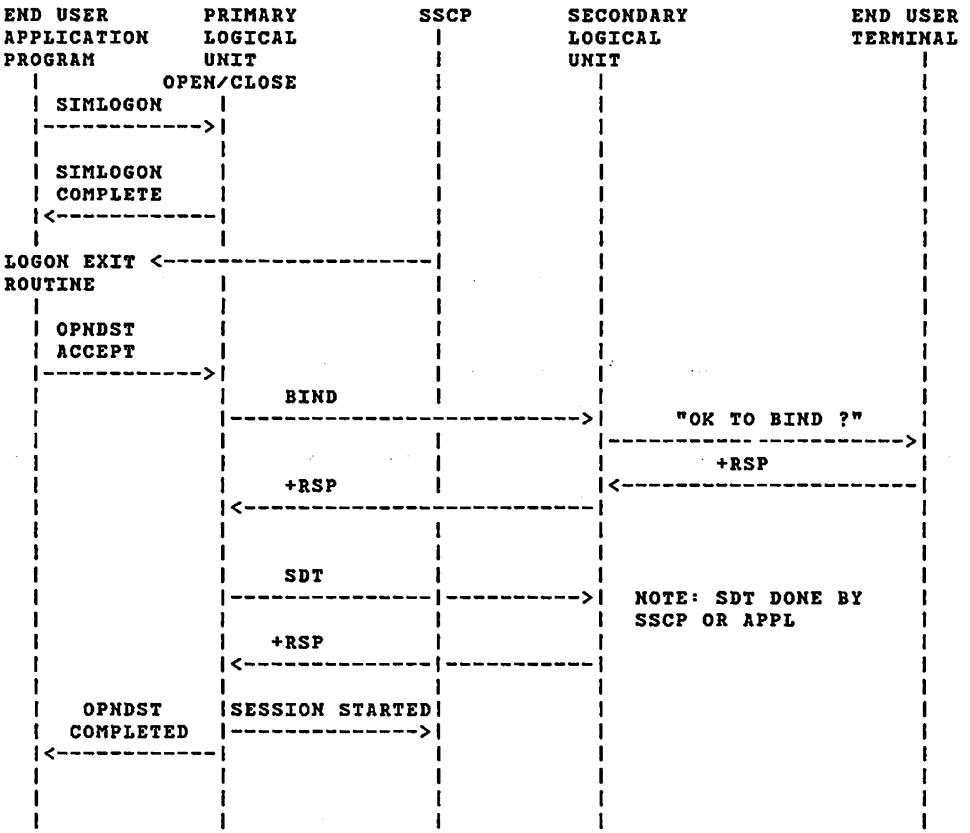
D : LOGON LU TO LU.



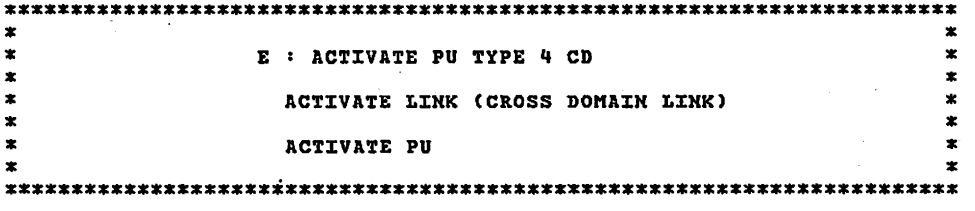
```
**************************************************************************
*                                                                        *
*           D : LOGON  LU TO LU.                                         *
*                                                                        *
*                 2. OPNDST ACQUIRE                                      *
*                                                                        *
**************************************************************************
```



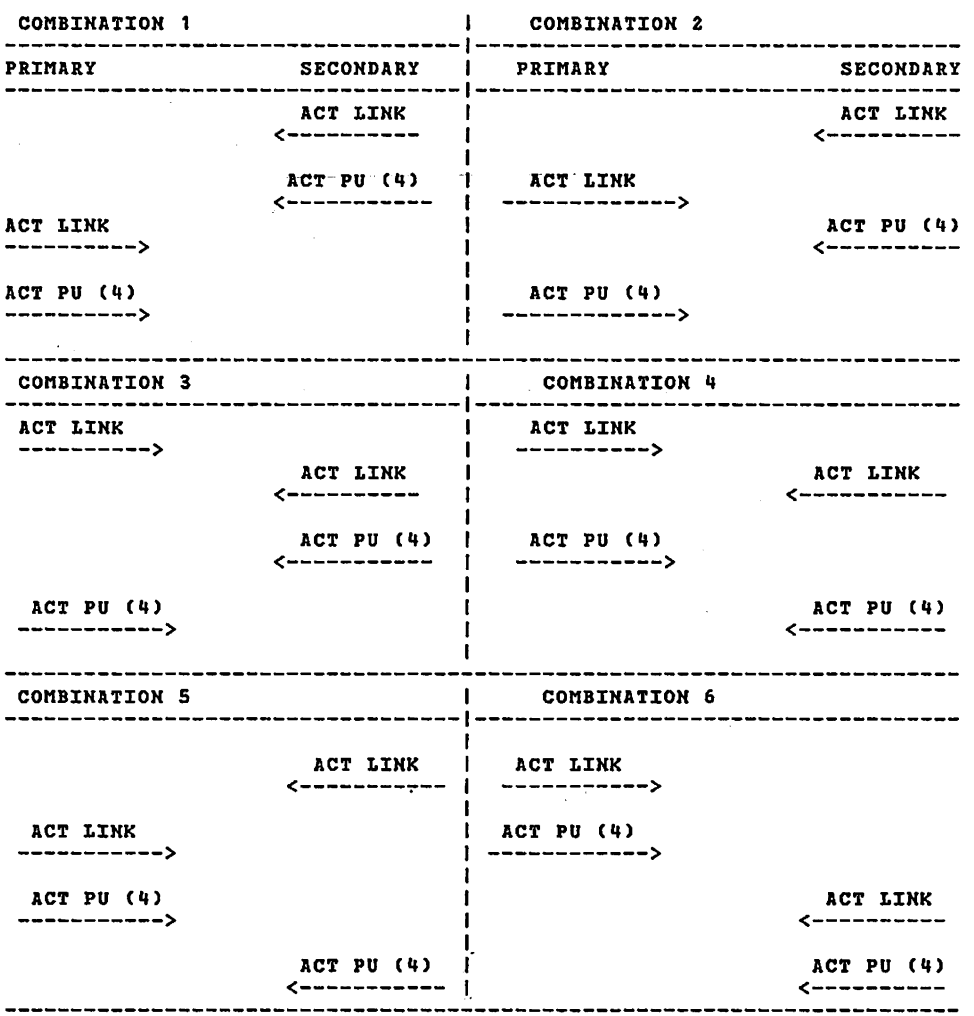
```
**************************************************************************
*                                                                        *
*           D : LOGON  LU TO LU.                                         *
*                                                                        *
*                 3. SIMLOGON.                                           *
*                                                                        *
**************************************************************************
```

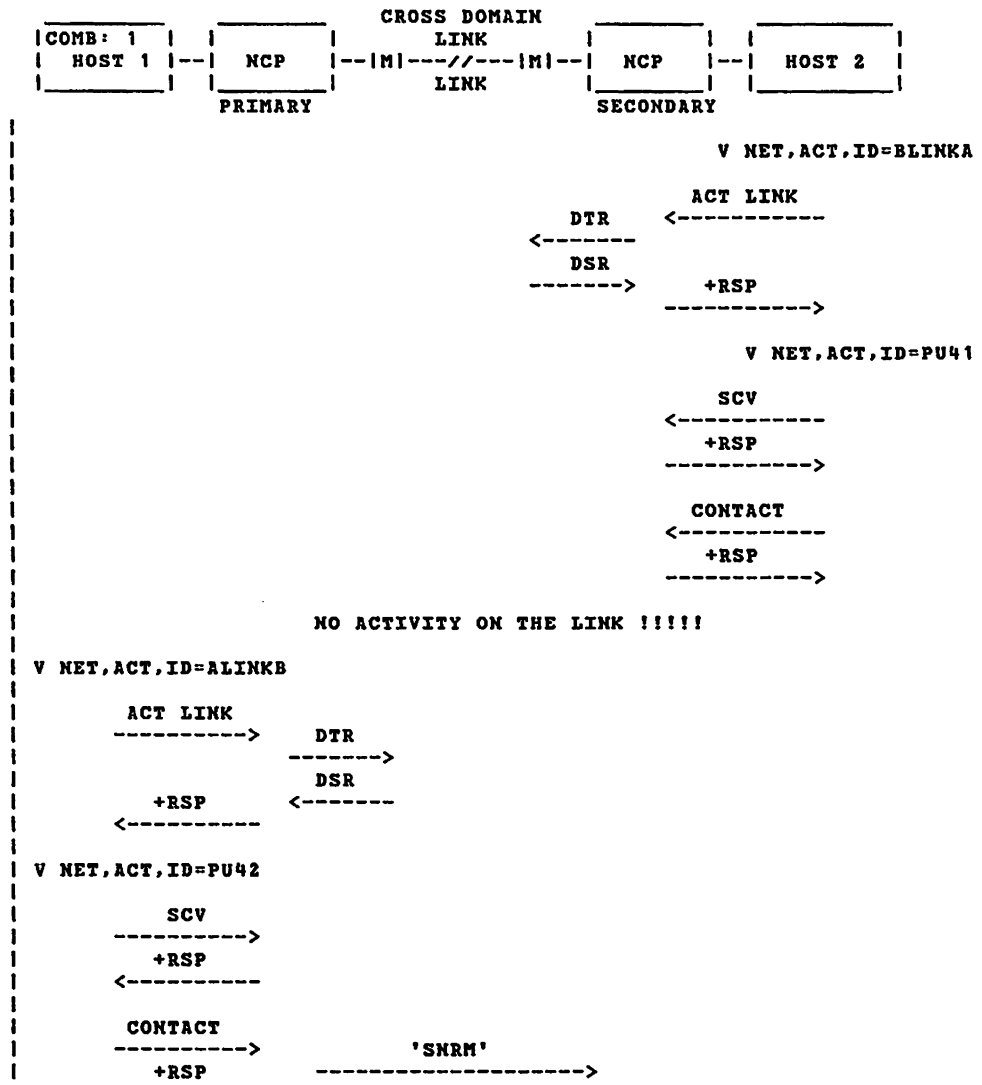


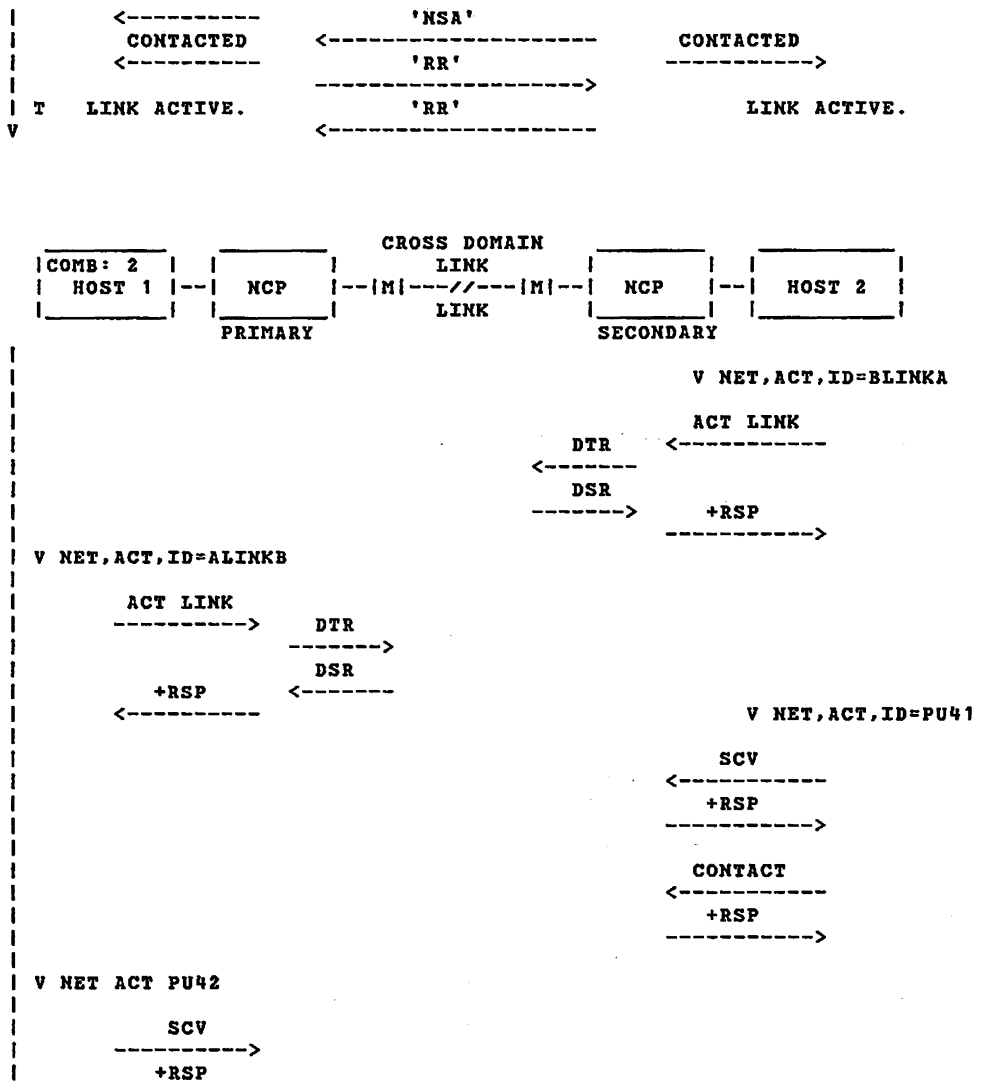
E : ACTIVATE PU TYPE 4 CD

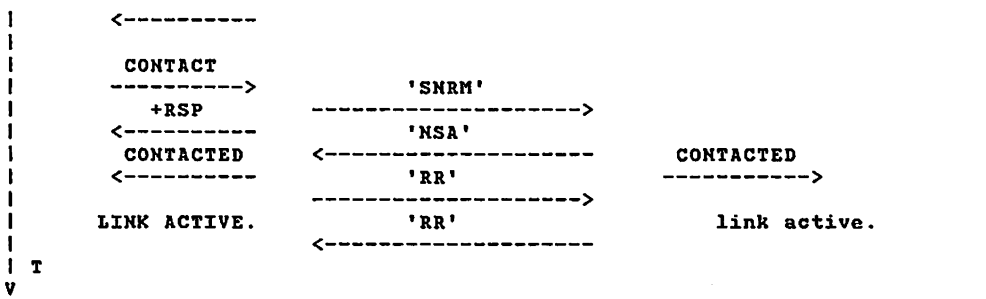


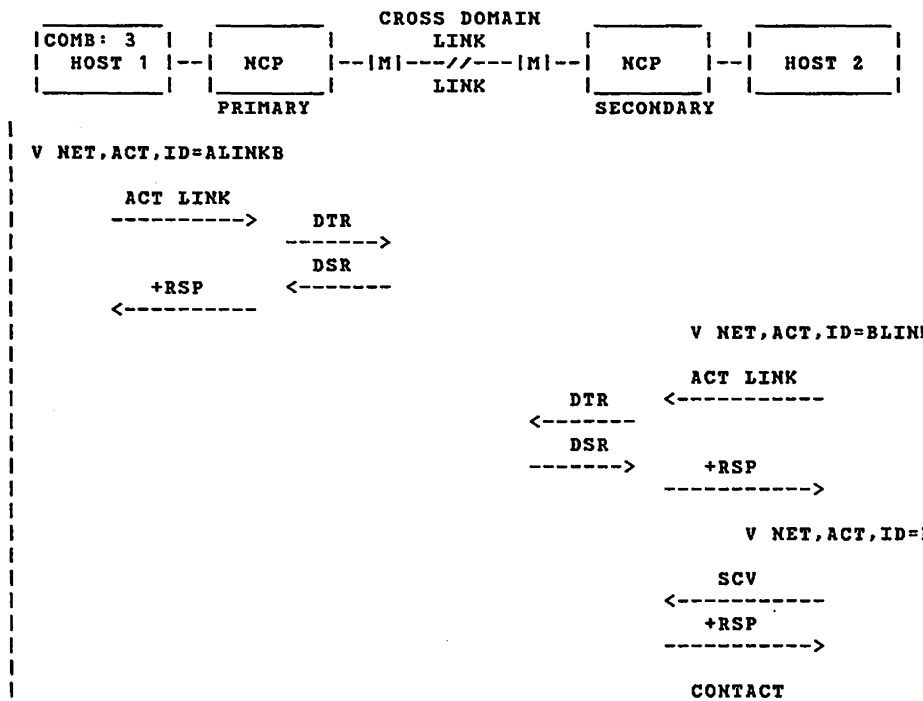
TIMING SEQUENCE FOR ACTIVATION OF CROSS DOMAIN LINK

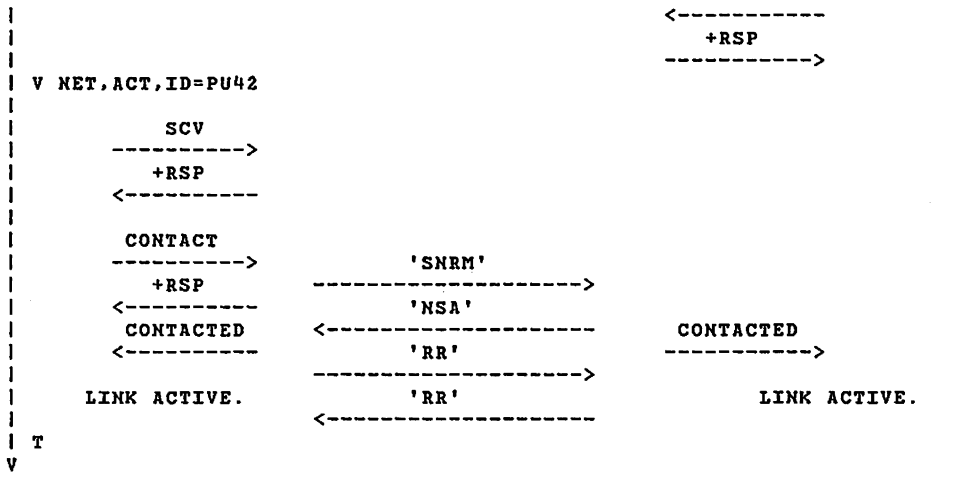


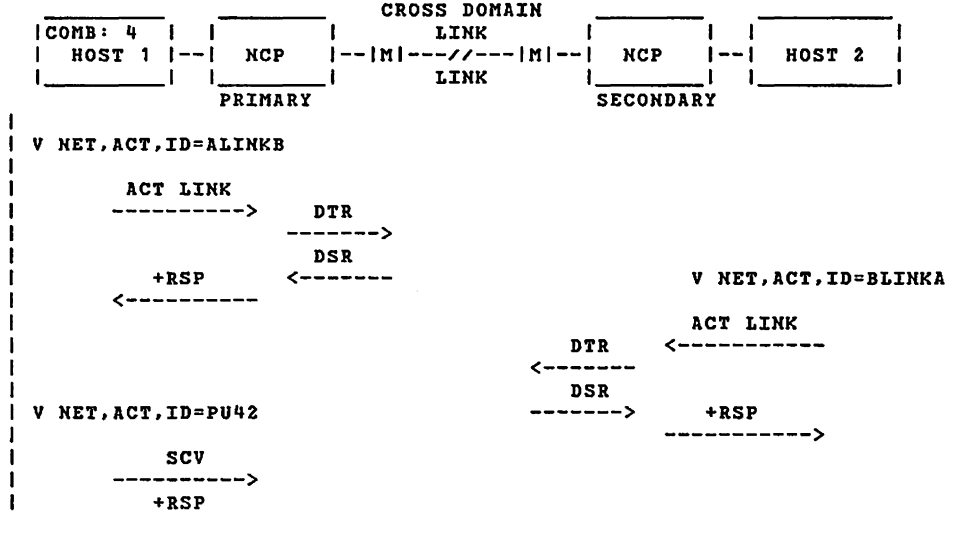

COMB: 1
HOST 1
NCP
PRIMARY
CROSS DOMAIN
LINK
M
LINK
NCP
SECONDARY
HOST 2
V NET,ACT,ID=BLINKA
ACT LINK
DTR
DSR
+RSP
V NET,ACT,ID=PU41
SCV
+RSP
CONTACT
+RSP
NO ACTIVITY ON THE LINK !!!!!
V NET,ACT,ID=ALINKB
ACT LINK
DTR
DSR
+RSP
V NET,ACT,ID=PU42
SCV
+RSP
CONTACT
+RSP
'SNRM'

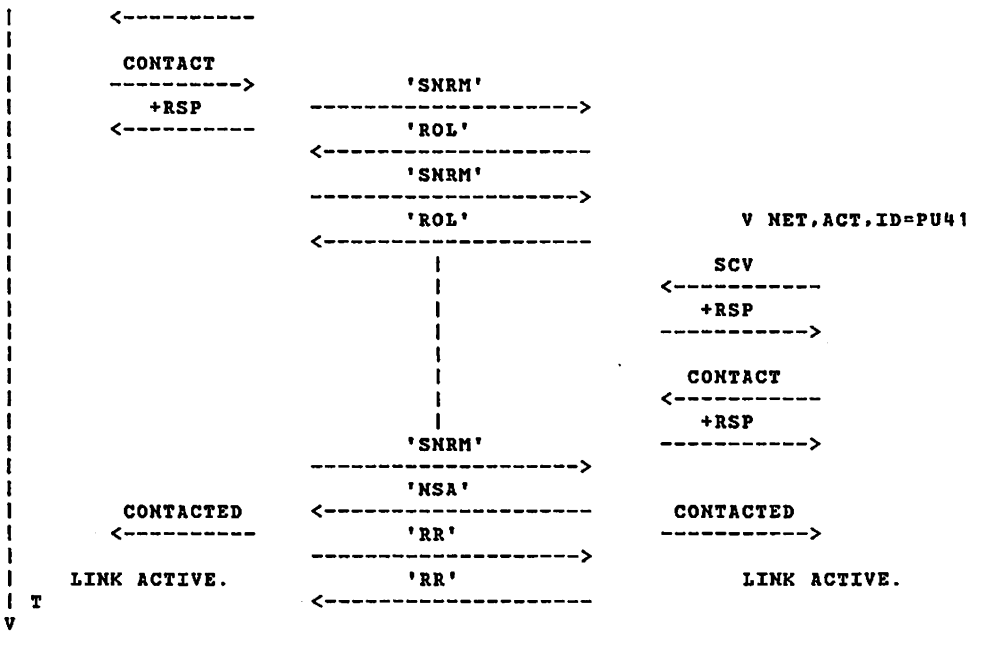

'NSA'
<----------
CONTACTED
<----------
'RR'
---------->
T LINK ACTIVE.
'RR'
<----------
CONTACTED
---------->
LINK ACTIVE.
COMB: 2 HOST 1
NCP
PRIMARY
CROSS DOMAIN LINK
LINK
NCP
SECONDARY
HOST 2
V NET,ACT,ID=BLINKA
ACT LINK
DTR
DSR
+RSP
V NET,ACT,ID=ALINKB
ACT LINK
DTR
DSR
+RSP
V NET,ACT,ID=PU41
SCV
+RSP
CONTACT
+RSP
V NET ACT PU42
SCV
+RSP

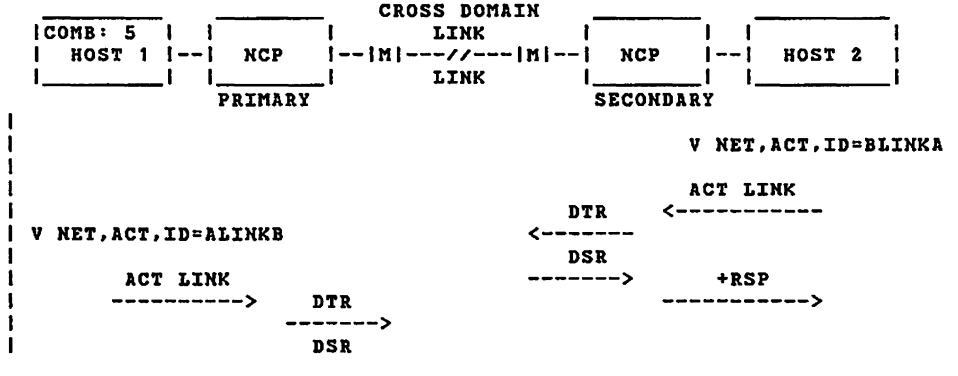

CONTACT
+RSP
CONTACTED
LINK ACTIVE.
'SNRM'
'NSA'
'RR'
'RR'
CONTACTED
link active.
T

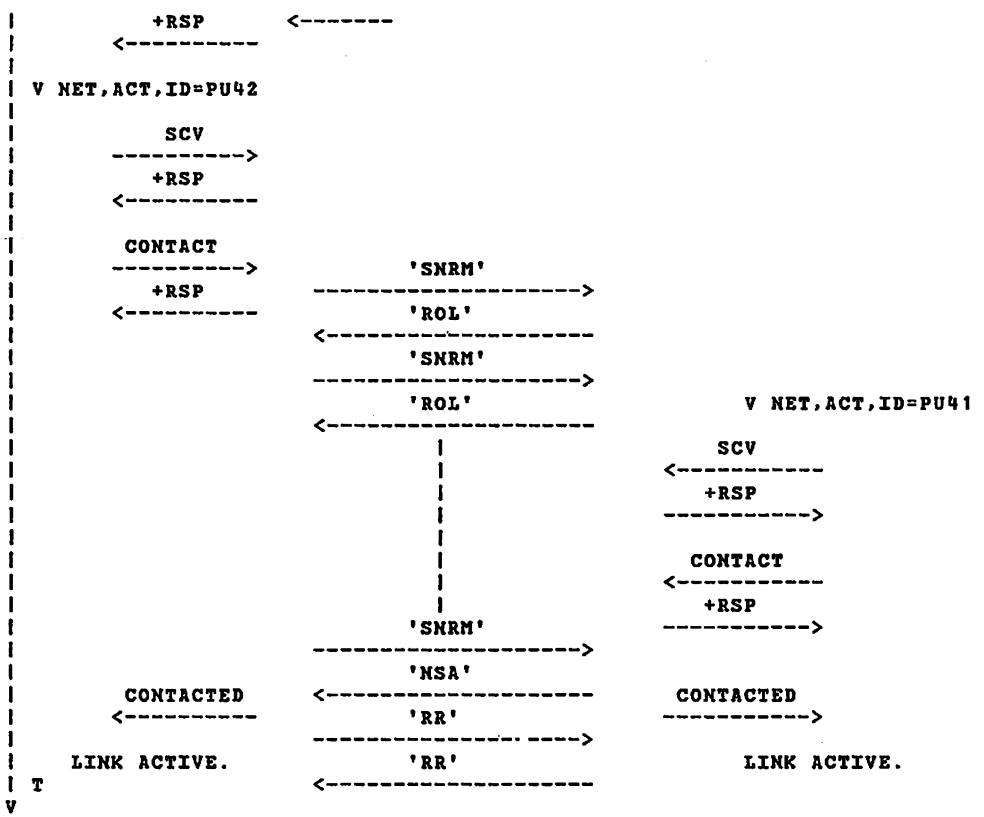

COMB: 3 HOST 1
NCP
PRIMARY
CROSS DOMAIN LINK
LINK
NCP
SECONDARY
HOST 2
V NET,ACT,ID=ALINKB
ACT LINK
DTR
DSR
+RSP
V NET,ACT,ID=BLINKA
ACT LINK
DTR
DSR
+RSP
V NET,ACT,ID=PU41
SCV
+RSP
CONTACT

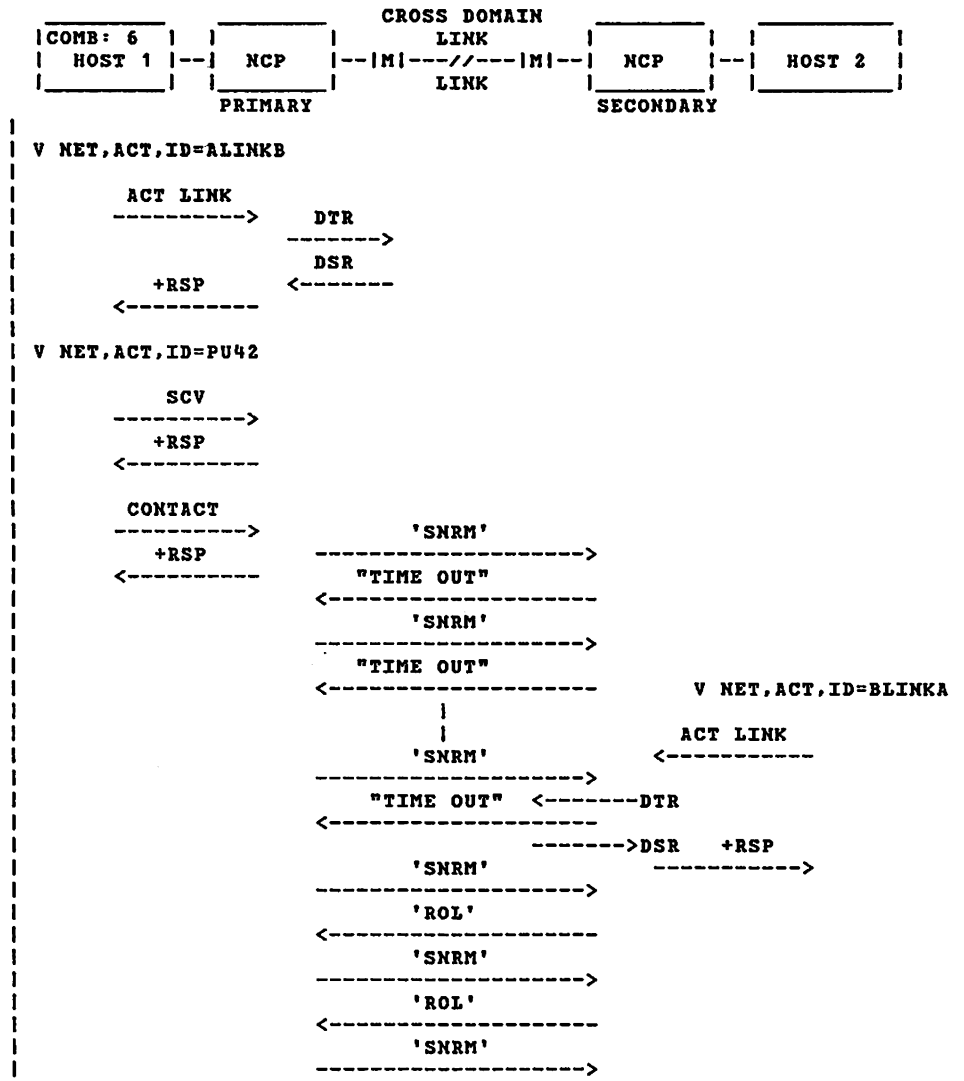

<-----------
+RSP
----------->
V NET,ACT,ID=PU42
SCV
---------->
+RSP
<----------
CONTACT
---------->
'SNRM'
+RSP
---------->
<----------
'NSA'
CONTACTED
<----------
'RR'
CONTACTED
---------->
LINK ACTIVE.
'RR'
LINK ACTIVE.
<----------
T

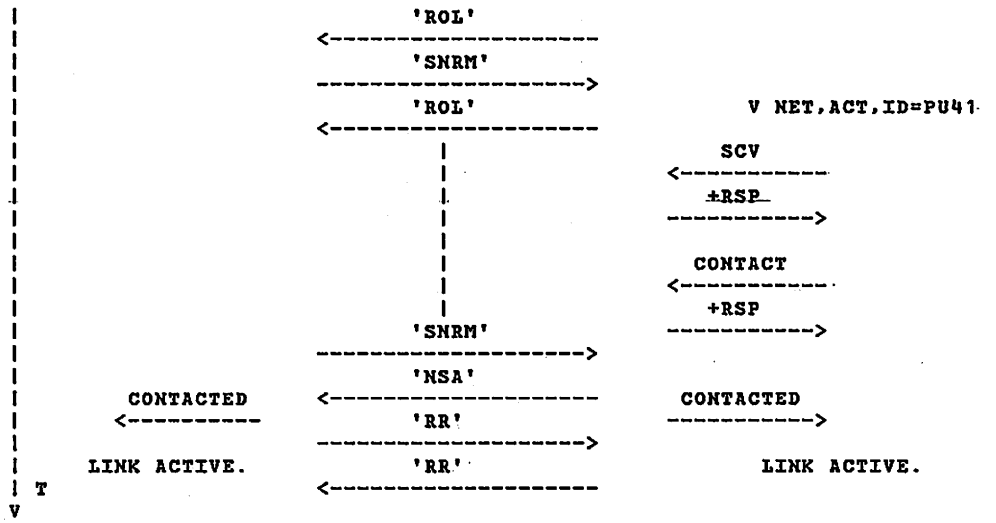

CROSS DOMAIN
COMB: 4 HOST 1
NCP
PRIMARY
LINK
LINK
NCP
SECONDARY
HOST 2
V NET,ACT,ID=ALINKB
ACT LINK
---------->
DTR
------->
DSR
+RSP
<-------
<----------
V NET,ACT,ID=BLINKA
ACT LINK
DTR
<----------
<-------
DSR
V NET,ACT,ID=PU42
------->
+RSP
---------->
SCV
---------->
+RSP


V NET,ACT,ID=PU41
SCV
+RSP
CONTACT
+RSP
'SNRM'
'ROL'
'SNRM'
'ROL'
'SNRM'
'NSA'
'RR'
'RR'
CONTACT
CONTACTED
CONTACTED
LINK ACTIVE.
LINK ACTIVE.
T
V


COMB: 5
HOST 1
NCP
PRIMARY
CROSS DOMAIN
LINK
LINK
NCP
SECONDARY
HOST 2
V NET,ACT,ID=BLINKA
ACT LINK
DTR
DSR
+RSP
V NET,ACT,ID=ALINKB
ACT LINK
DTR
DSR

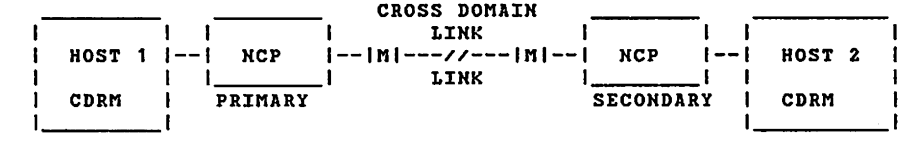

+RSP
V NET,ACT,ID=PU42
SCV
+RSP
CONTACT
+RSP
'SNRM'
'ROL'
'SNRM'
'ROL'
V NET,ACT,ID=PU41
SCV
+RSP
CONTACT
+RSP
'SNRM'
'NSA'
CONTACTED
'RR'
CONTACTED
LINK ACTIVE.
'RR'
LINK ACTIVE.
T


COMB: 6 HOST 1
NCP
PRIMARY
CROSS DOMAIN LINK
M
LINK
NCP
SECONDARY
HOST 2
V NET,ACT,ID=ALINKB
ACT LINK
DTR
DSR
+RSP
V NET,ACT,ID=PU42
SCV
+RSP
CONTACT
+RSP
'SNRM'
"TIME OUT"
'SNRM'
"TIME OUT"
V NET,ACT,ID=BLINKA
ACT LINK
'SNRM'
"TIME OUT"
DTR
DSR
+RSP
'SNRM'
'ROL'
'SNRM'
'ROL'
'SNRM'


'ROL'
'SNRM'
'ROL'
V NET,ACT,ID=PU41
SCV
+RSP
CONTACT
+RSP
'SNRM'
'NSA'
CONTACTED
'RR'
CONTACTED
LINK ACTIVE.
'RR'
LINK ACTIVE.
T

F : ACTIVATION OF CDRM

```
**************************************************************************
*                                                                        *
*           F : ACTIVATION OF CDRM                                       *
*                                                                        *
*            CDRM TO CDRM SESSION                                        *
*                                                                        *
**************************************************************************
```



V NET,ACT,ID=CDRM

```
                        ACTCDRM
      ---------------------------------------------------------->
         FID 1                  FID 1                    FID 1

                         +RSP
      <----------------------------------------------------------

                                                  CONSOLE MESSAGE:

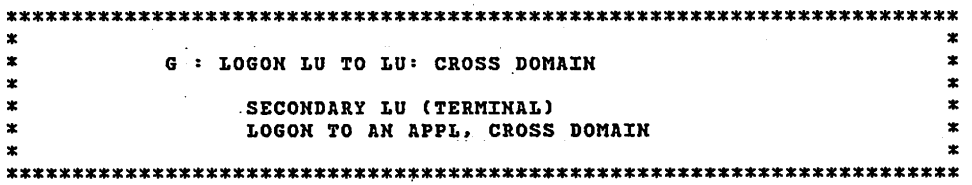
                                                 CDRM ACTIVATION
                                                 CAUSED BY REMOTE
                                                 ACTCDRM.

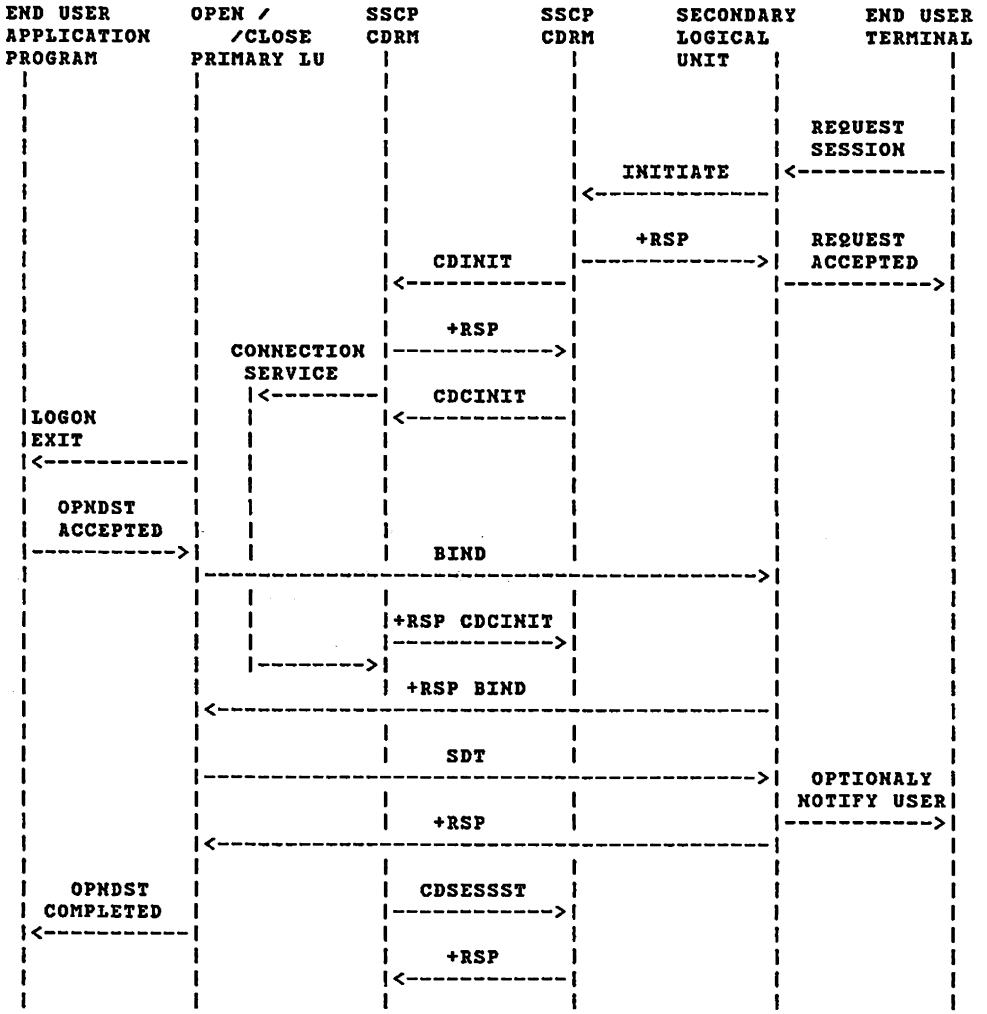
                  SDT (START DATA TRAFFIC)
      ---------------------------------------------------------->

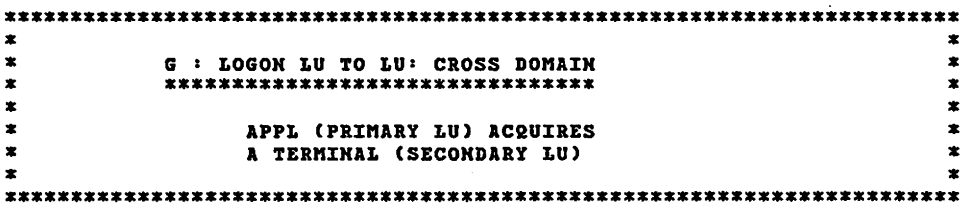
                         +RSP
      <----------------------------------------------------------

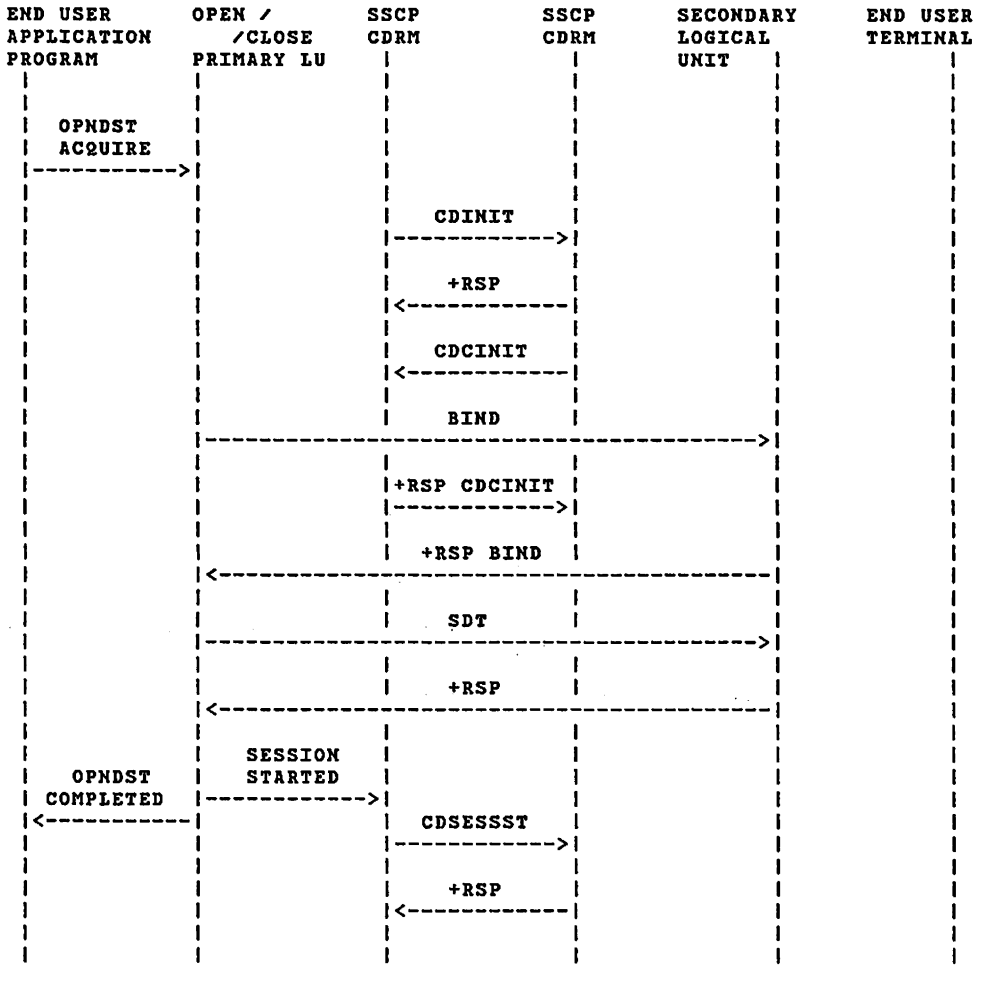
CONSOLE MESSAGE:                                  CONSOLE MESSAGE:
CDRM ACTIVE.                                      CDRM ACTIVE.
```

G : LOGON LU TO LU: CROSS DOMAIN




END USER APPLICATION PROGRAM
OPEN / /CLOSE PRIMARY LU
SSCP CDRM
SSCP CDRM
SECONDARY LOGICAL UNIT
END USER TERMINAL
REQUEST SESSION
INITIATE
+RSP
REQUEST ACCEPTED
CDINIT
+RSP
CONNECTION SERVICE
CDCINIT
LOGON EXIT
OPNDST ACCEPTED
BIND
+RSP CDCINIT
+RSP BIND
SDT
OPTIONALY NOTIFY USER
+RSP
CDSESSST
+RSP
OPNDST COMPLETED


G : LOGON LU TO LU: CROSS DOMAIN
APPL (PRIMARY LU) ACQUIRES
A TERMINAL (SECONDARY LU)


END USER APPLICATION PROGRAM
OPEN / /CLOSE PRIMARY LU
SSCP CDRM
SSCP CDRM
SECONDARY LOGICAL UNIT
END USER TERMINAL
OPNDST ACQUIRE
CDINIT
+RSP
CDCINIT
BIND
+RSP CDCINIT
+RSP BIND
SDT
+RSP
SESSION STARTED
OPNDST COMPLETED
CDSESSST
+RSP

ENTER USER NOTES HERE:

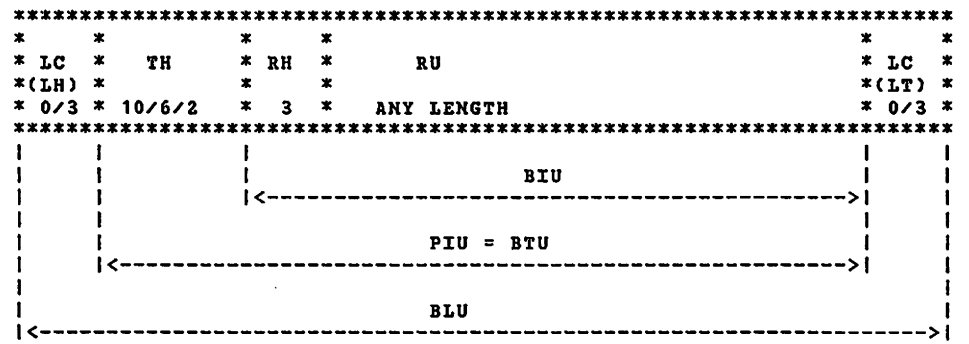
Appendix B

SNA Transmission Formats

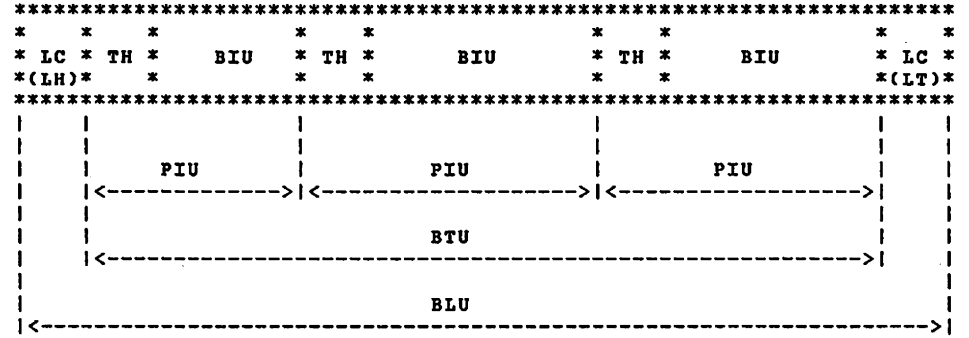
CONTENTS

SNA TRANSMISION DECODING

TH / RH / RU / BIU / PIU / BTU / BLU RELATION



A : WITHOUT BLOCKING.



B : WITH BLOCKING.

TH = TRANSMISSION HEADER
RH = REQUEST-/RESPONSE- HEADER
RU = REQUEST-/RESPONSE- UNIT
PIU = PATH INFORMATION UNIT
LC = LINK CONTROL
BLU = BASIC LINK UNIT
BTU = BASIC TRANSMISSION UNIT
LC = LINK CONTROL
LH = LINK HEADER
LT = LINK TRAILER

FIGURE C-1

DATA UNITS

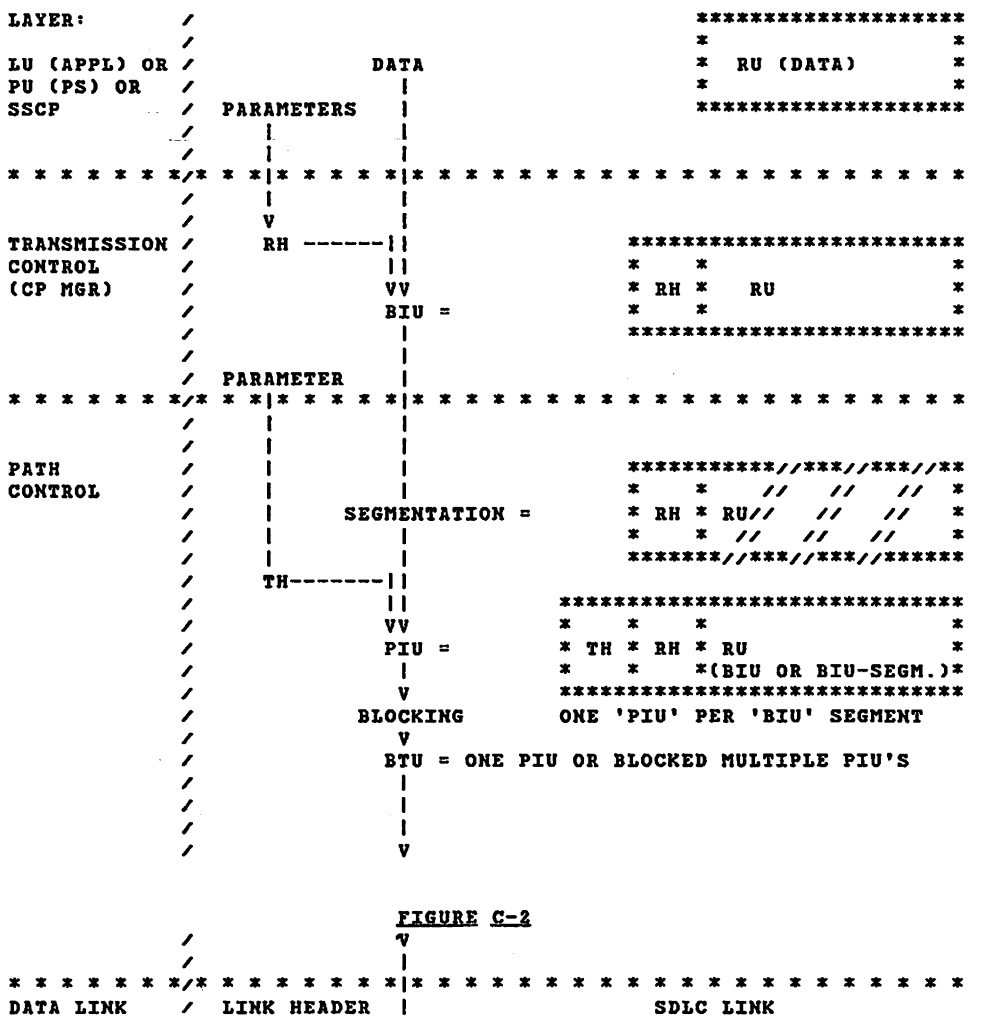


FIGURE C-2

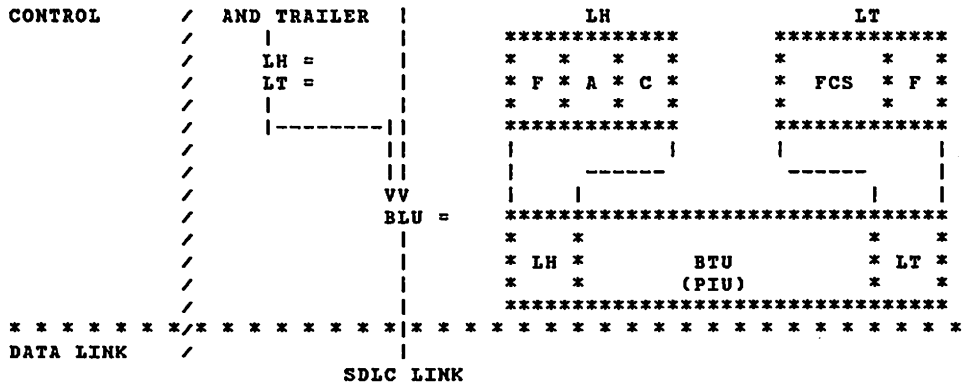


FIGURE C-2 (CONT).

TRANSMISSION HEADER (TH)

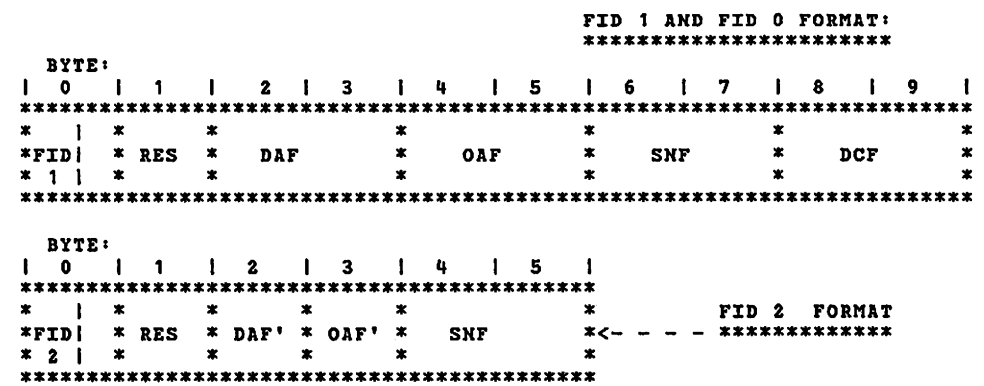


FIGURE C-3

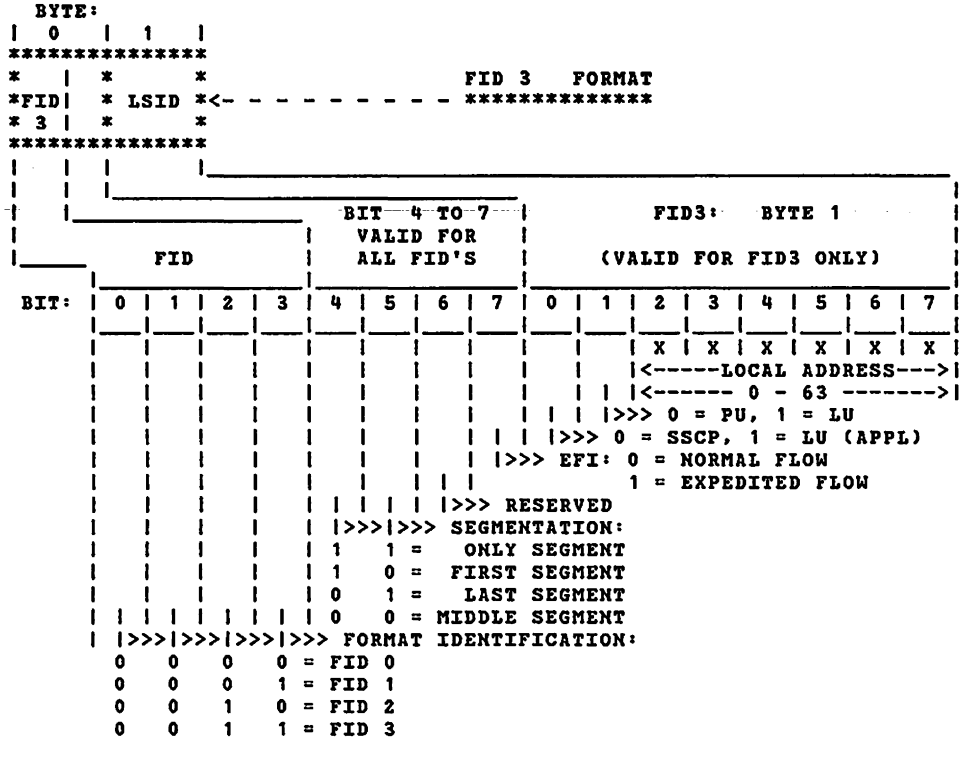


FIGURE C-3 (CONT).

PHYSICAL UNIT TYPES VS. FID TYPES

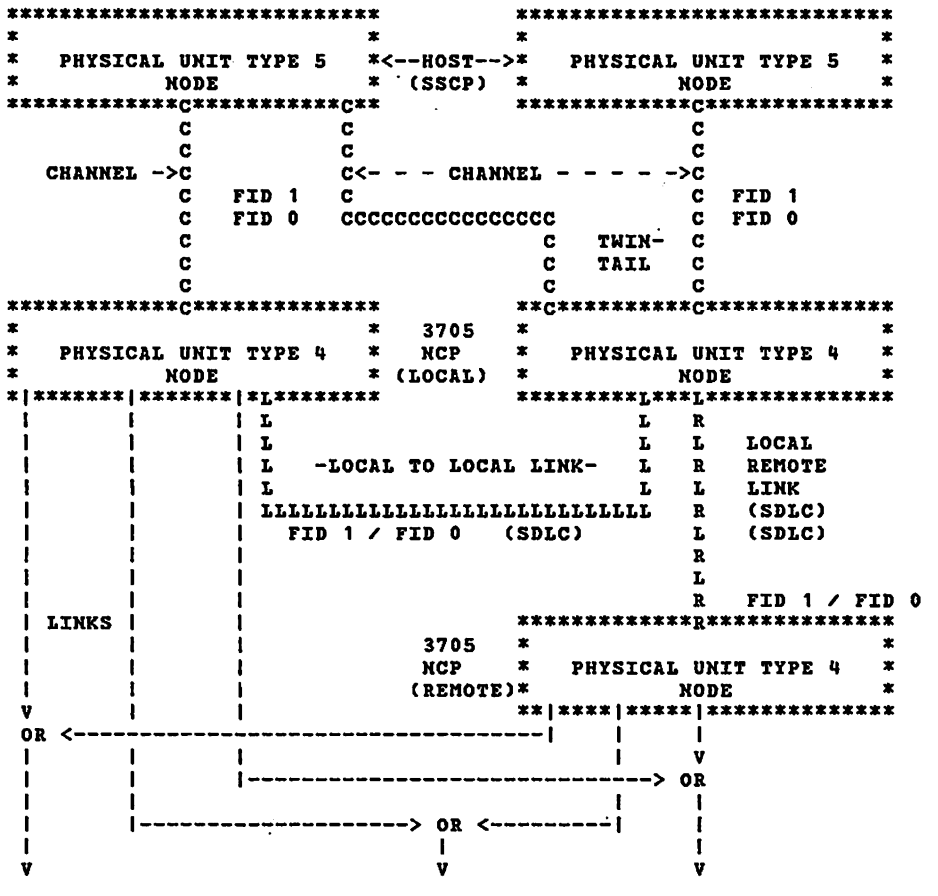


FIGURE C-4

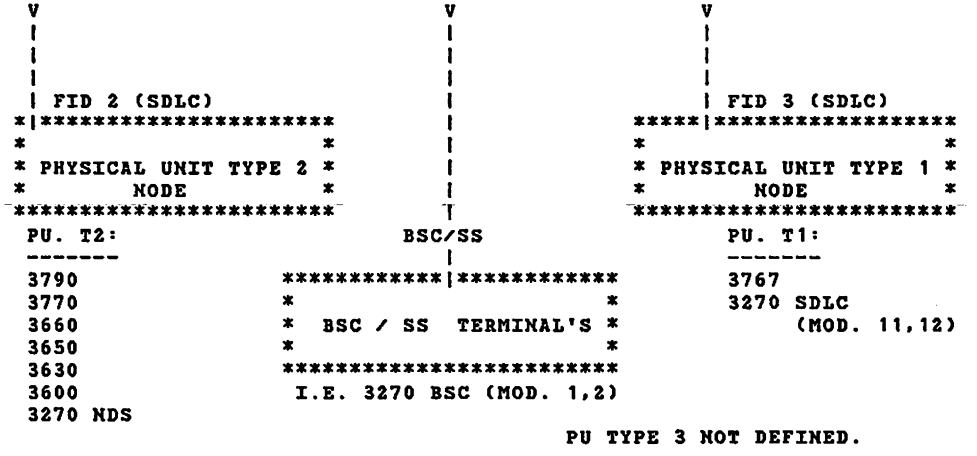


FIGURE C-4 (CONT).

SNA RH BIT DEFINITION R E Q U E S T FORMAT

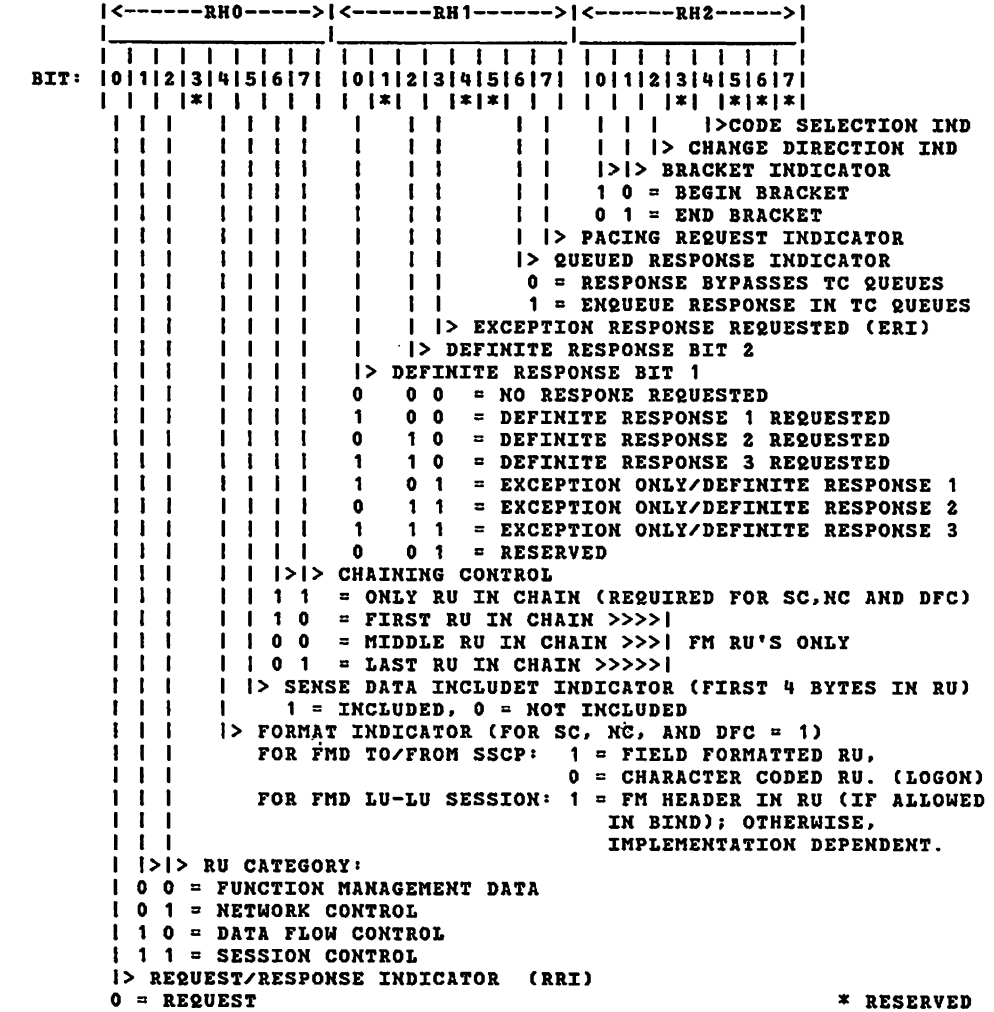
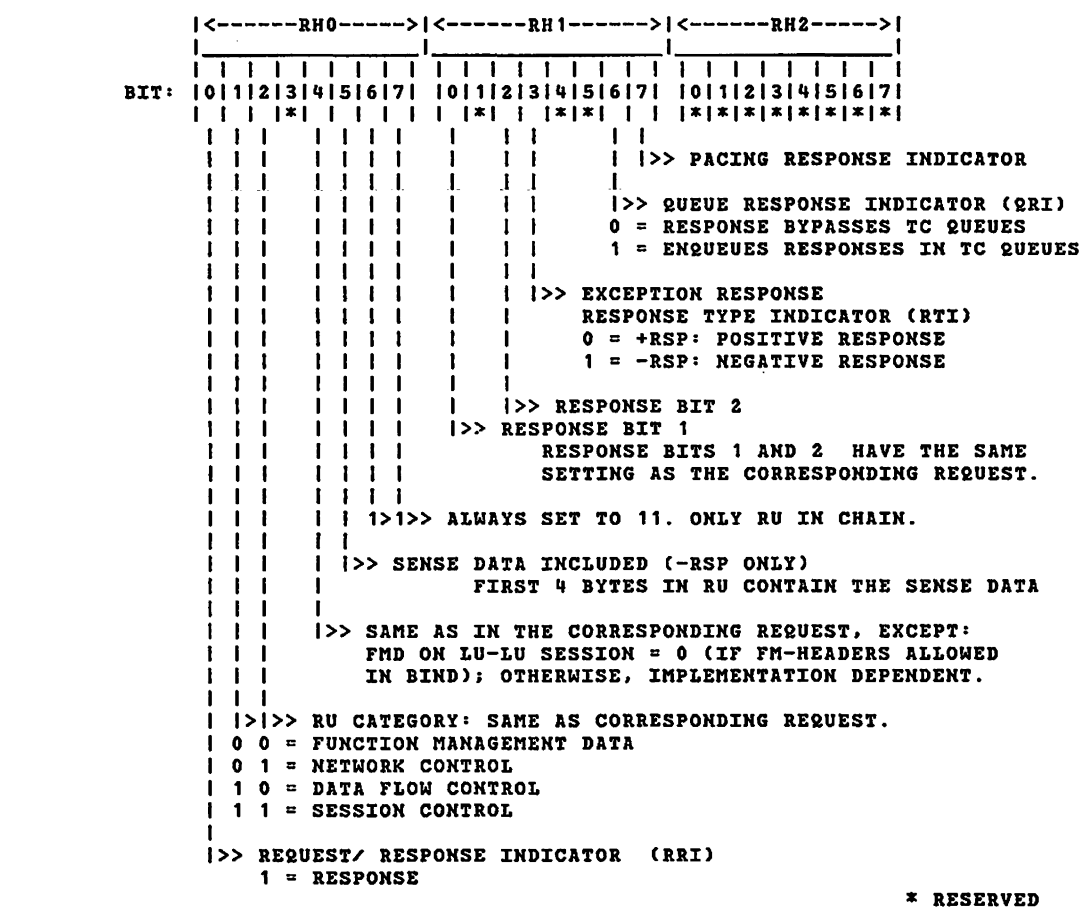


FIGURE C-5

SNA RH BIT DEFINITION R E S P O N S E FORMAT



For additional information see: ACF/ DATA AREAS; Section "RH"

FIGURE C-6

SNA COMMAND CATEGORY DECODING (RH0)

DEFINITION OF COMMAND- OR DATA- PIU.

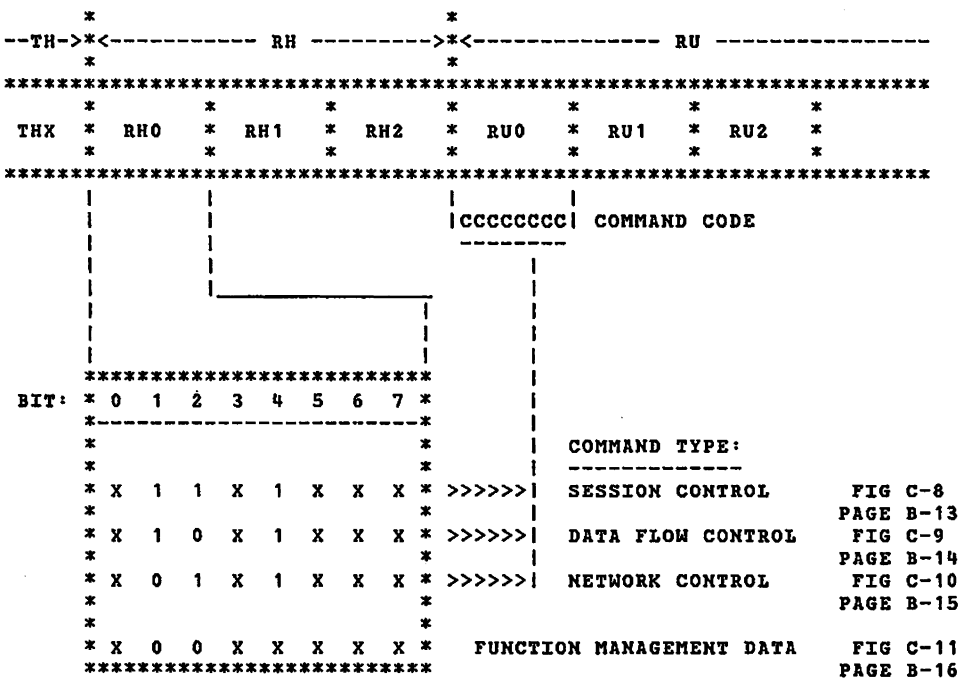


FIGURE C-7

OR:

SESSION CONTROL	RH0 = HEX :	'6X', '7X',	'EX', 'FX'		FIG C-8 PAGE B-13
DATA FLOW CONTROL	RH0 = HEX :	'4X', '5X',	'CX', 'DX'		FIG C-9 PAGE B-14
NETWORK CONTROL	RH0 = HEX :	'2X', '3X',	'AX', 'BX'		FIG C-10 PAGE B-15
FUNTION MANAGEMENT DATA NS	RH0 = HEX :	'0X', '1X',	'8X', '9X'		FIG C-11 PAGE B-18
		REQUESTS	RESPONSES		

FIGURE C-7 (CONT).

SESSION CONTROL COMMANDS: RH0 = B'X11X 1XXXX'

```
                ****************************
                *                          *
                *  RH0 =  X 1 1 X  1 X X X  *
                *                          *
                ****************************
                RH0 = HEX '6X','7X','EX','FX'

 <<<<<  RU0 = COMMAND CODE   ( SEE FIGURE C-7, PAGE B-11 )
V
V     <<<<<<<<<  NORMAL- / EXPEDITED- FLOW
V    V
V    V   <<<<<<<  MNEMONIC
V    V  V
V    V  V          <<<<<<  SESSION TYPE
V    V  V          V
V    V  V          V              <<<<<< FULL TITLE
V    V  V          V             V

0D   E  ACTLU      SSCP - LU     ACTIVATE LOGICAL UNIT
0E   E  DACTLU     SSCP - LU     DEACTIVATE LOGICAL UNIT
11   E  ACTPU      SSCP - PU     ACTIVATE PHYSICAL UNIT
12   E  DACTPU     SSCP - PU     DEACTIVATE PHYSICAL UNIT
14   E  ACTCDRM   *CDRM - CDRM   ACTIVATE CDRM SESSION
15   E  DACTCDRM  *CDRM - CDRM   DEACTIVATE CDRM SESSION
31   E  BIND       PLU  - SLU    BIND SESSION
32   E  UNBIND     PLU  - SLU    UNBIND SESSION
A0   E  SDT      #*PLU  - SLU    START DATA TRAFFIC
A1   E  CLEAR      PLU  - SLU    CLEAR
A2   E  STSN       PLU  - SLU    SET AND TEST SEQUENCE NUMBERS
A3   E  RQR        SLU  - PLU    REQUEST RECOVERY

        NOTE   * SSCP -  SSCP
               # SSCP -  PU (PU TYPE 5 -CDRM-  OR  PU TYPE 4 -NCP-)
```

For additional information see: SNA Format and Protocol Reference Manual (SC30-3112), Apppendix E.

FIGURE C-8

DATA FLOW CONTROL COMMANDS: RH0 = B'X10X 1XXXX'

```
*****************************
*                           *
*  RH0 = X 1 0 X  1 X X X   *
*                           *
*****************************
RH0 = HEX '4X','5X','CX','DX'
```

```
 <<<<<  RU0 = COMMAND CODE  (SEE FIGURE C-7, PAGE B-11 )
V
V     <<<<<<<<<  NORMAL- / EXPEDITED- FLOW
V    V
V    V   <<<<<<<  MNEMONIC
V    V  V
V    V  V          <<<<<<  SESSION TYPE
V    V  V         V
V    V  V         V             <<<<<< FULL TITLE
V    V  V         V            V
```

04	N	LUSTAT	LU	- LU	LOGICAL UNIT STATUS
05	N	RTR	LU	- LU	READY TO RECEIVE
70	N	BIS	LU	- LU	BRACKET INITIALISATION STOPPED
71	E	SBI	LU	- LU	STOP BRACKET INITIALISATION
80	E	QEC	LU	- LU	QUIESCE AT END OF CHAIN
81	N	QC	LU	- LU	QUIESCE COMPLETE
82	E	RELQ	LU	- LU	RELEASE QUIESCE
83	N	CANCEL	LU	- LU	CANCEL
84	N	CHASE	LU	- LU	CHASE
C0	E	SHUTD	PLU	- SLU	SHUTDOWN
C1	E	SHUTC	SLU	- PLU	SHUTDOWN COMPLETE
C2	E	RSHUTD	SLU	- PLU	REQUEST SHUTDOWN
C8	N	BID	LU	- LU	BID
C9	E	SIG	LU	- LU	SIGNAL

For additional information see: SNA Format and Protocol Reference Manual (SC30-3112), Apppendix E.

FIGURE C-9

NETWORK CONTROL COMMANDS: RH0 = B'X01X 1XXXX'

```
                ****************************
                *                          *
                *  RH0 =  X 0 1 X  1 X X X  *
                *                          *
                ****************************
                RH0 = HEX '2X','3X','AX','BX'

 <<<<<  RU0 = COMMAND CODE   (SEE FIGURE C-7, PAGE B-11 )
V
V      <<<<<<<<<  NORMAL- / EXPEDITED- FLOW
V     V
V     V   <<<<<<<  MNEMONIC
V     V  V
V     V  V          <<<<<<  SESSION TYPE
V     V  V         V
V     V  V         V             <<<<<< FULL TITLE
V     V  V         V            V

 05   E  NC-LSA   *NCP  -  NCP  LOST SUBAREA TO ADJACENT
 07   E  ANSC     NCP  -  SSCP AUTO NETWORK SHUTDOWN COMPLETE
 50   E  IC       NCP  -  SSCP INITIALIZATION COMPLETE
 51   N  SWNCP    SSCP -  NCP  SWITCH BSC/SS LINE TO NCP MODE
 52   N  SWEP     SSCP -  NCP  SWITCH BSC/SS LINE TO EP MODE

               * NCP - SSCP
```

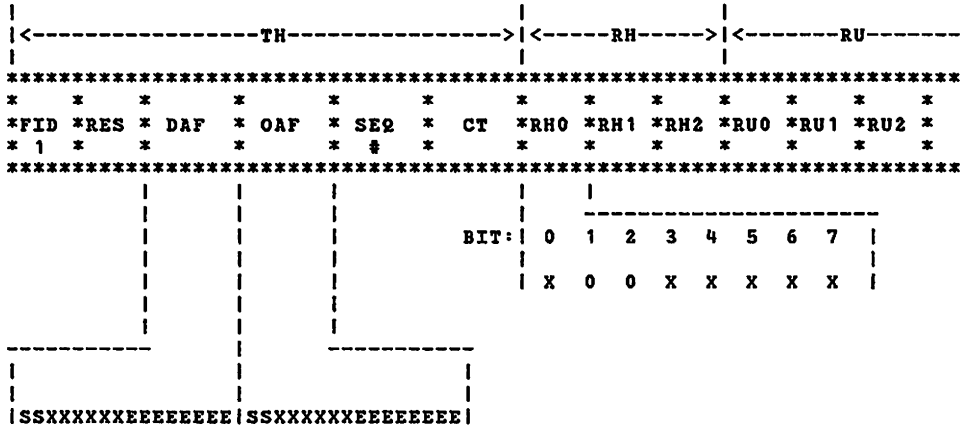
For additional information see: SNA Format and Protocol Reference Manual (SC30-3112), Apppendix E.

FIGURE C-10

FUNCTION MANAGEMENT DATA (FMD) COMMAND FID 1 DECODING

ALL FUNCTION MANAGEMENT DATA COMMANDS ARE NORMAL FLOW

FID1:



S = SUBAREA ADDRESS
X = FLOATING BOUNDARY (COULD BE EITHER S OR E)
E = ELEMENT ADDRESS

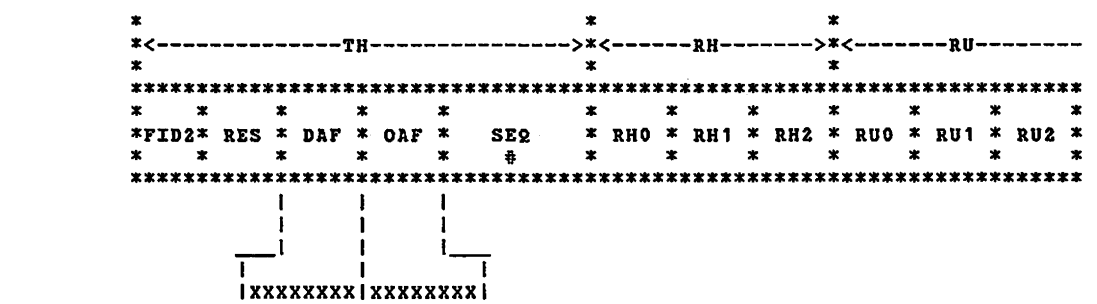
NOTE: IF EITHER ELEMENT ADDRESS OF 'DAF' OR 'OAF' IS "ZERO" OR "ONE":

THE RU CONTAINS A FMD-COMMAND : SEE FIGURE C-12

FIGURE C-11 A

FUNCTION MANAGEMENT DATA (FMD) COMMAND FID 2 AND FID 3 DECODING

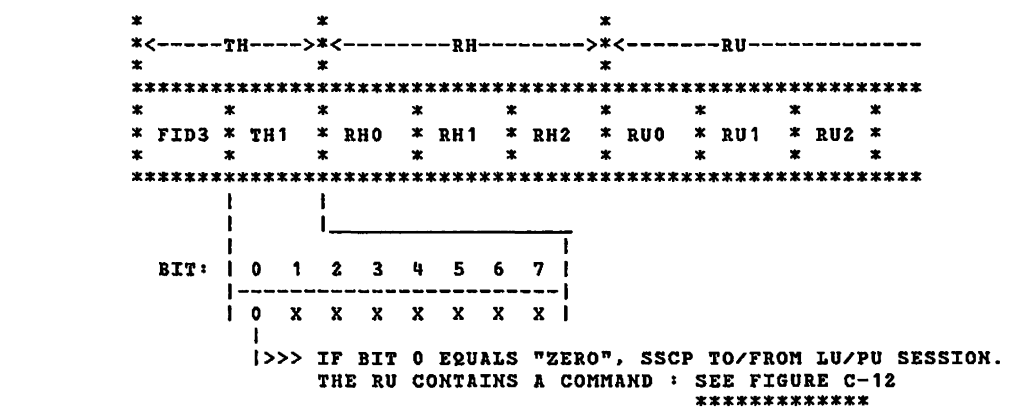
FID2



"DAF" OR "OAF" ADDRESS EQUAL 'ZERO', THE RU CONTAINS A FMD COMMAND : SEE FIGURE C-12

FIGURE C-11 B

FID3



>>> IF BIT 0 EQUALS "ZERO", SSCP TO/FROM LU/PU SESSION. THE RU CONTAINS A COMMAND : SEE FIGURE C-12

FIGURE C-11 C

FUNCTION MANAGEMENT DATA (FMD) NS RU COMMAND CATEGORY DECODING

ALL FUNCTION MANAGEMENT DATA COMMANDS ARE NORMAL FLOW

RH2	RU0	RU1	RU2		
NS				SINGLE DOMAIN COMMANDS RU0 = X'01'	
BS	01	00		BSC/SS SERVICE	FIG C-13 PAGE B-19
C	01	02	COMMAND	PHYSICAL CONFIGURATION SERVICE	FIG C-14 PAGE B-21
MA	01	03	MAND	PHYSICAL MAINTENANCE SERVICE	FIG C-15 PAGE B-22
S	01	06		SESSION SERVICE	FIG C-16 PAGE B-23
			BYTE	CROSS DOMAIN COMMANDS RU0 = 81	
	81	06		SESSION SERVICE (CDRM TO/FROM LU)	FIG C-17 PAGE B-24
S	81	86		SESSION SERVICE (CDRM TO CDRM)	FIG C-18 PAGE B-25

FIGURE C-12

FMD NS RU BSC/SS COMMAND DECODING: RU1 = X'00'

```
                ******************************
                *                            *
                *  RH0 = X 0 0 X  X X X X    *
                *                            *
                ******************************
                RH0 = HEX '0X','1X','8X','9X'


 <<<< RU0 = X'01' SINGLE DOMAIN
V
V   <<<< RU1 = X'00' BSC/SS SERVICE  NS (BS)
V  V
V  V   <<<<<  RU2 = COMMAND CODE (SEE FIGURE C-11, PAGE B-16 )
V  V  V
V  V  V              <<<<<<  SESSION TYPE
V  V  V             V
V  V  V             V              <<<<<< FULL TITLE
V  V  V             V             V
V  V  V             V             V

01 00 01            SSCP -  NCP  CHANGE DEVICE TRANSMISSION
                                   LIMIT
01 00 02            SSCP -  NCP  CHANGE LINE NEGATIVE POLL
                                   RESPONSE LIMIT
01 00 03            SSCP -  NCP  CHANGE LINE SESSION LIMIT
01 00 04            SSCP -  NCP  CHANGE LINE SERVICE SEEKING
|  |  |                            PAUSE
|  |  |
|  |  |<<<RU2
|  |
|  |<<< RU1
|
|<<< RU0
```

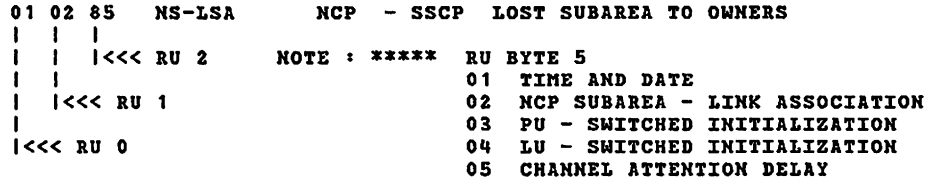
For additional information see: SNA Format and Protocol Reference Manual (SC30-3112), Apppendix E.

FIGURE C-13

FMD NS RU PHYSICAL CONFIGURATION SERVICE: RU1 = X'02'

```
                  ****************************
                  *                          *
                  *  RH0 = X 0 0 X  X X X X  *
                  *                          *
                  ****************************
                  RH0 = HEX '0X','1X','8X','9X'


 <<<<  RU0 = X'01'    SINGLE DOMAIN
V
V   <<<<<<<*   RU1 = X'02' PHYSICAL CONFIGURATION SERVICE  NS (C)
V  V
V  V   <<<<  RU2 = COMMAND CODE      (SEE FIGURE C-11, PAGE B-16 )
V  V  V
V  V  V      <<<<  MNEMONIC
V  V  V     V
V  V  V     V             <<<<<<  SESSION TYPE
V  V  V     V            V
V  V  V     V            V              <<<<<< FULL TITLE
V  V  V     V            V             V
01 02 01    CONTACT      SSCP - NCP    CONTACT
01 02 02    DISCONTACT   SSCP - NCP    DISCONTACT
01 02 03    IPLINIT      SSCP - NCP    IPL INITIAL (LOAD INITIAL)
01 02 04    IPLTEXT      SSCP - NCP    IPL TEXT (LOAD DATA)
01 02 05    IPLFINAL     SSCP - NCP    IPL FINAL (LOAD FINAL)
01 02 06    DUMPINIT     SSCP-  NCP    DUMP INITIAL
01 02 07    DUMPTEXT     SSCP - NCP    DUMP TEXT (DUMP DATA)
01 02 08    DUMPFINAL    SSCP - NCP    DUMP FINAL
01 02 09    RPO          SSCP - NCP    REMOTE POWER OFF
01 02 0A    ACTLINK      SSCP - NCP    ACTIVATE LINK
01 02 0B    DACTLINK     SSCP - NCP    DEACTIVATE LINK
01 02 0E    CONNOUT      SSCP - NCP    CONNECT OUT (DIAL)
01 02 0F    ABCONN       SSCP - NCP    ABANDON CONNECTION
01 02 11    SETCV        SSCP - NCP    SET CONTROL VECTOR      *****
01 02 14    ESLOW        NCP  - SSCP   ENTERING SLOWDOWN
01 02 15    EXSLOW       NCP  - SSCP   EXIT SLOWDOWN (EXIT.SLOWDOWN)
01 02 16    ACTCONNIN    SSCP - NCP    ACTIVATE CONNECT IN (ANSWER)
01 02 17    DACTCONNIN   SSCP - NCP    DEACTIVATE CONNECT IN
01 02 18    ABCONNOUT    SSCP - NCP    ABANDON CONNECT OUT
01 02 19    ANA          SSCP - NCP    ASSIGN NETWORK ADDRESSES
01 02 1A    FNA          SSCP - NCP    FREE NETWORK ADDRESSES
01 02 1B    REQDISCONT   SPU  _ SSCP   REQUEST DISCONTACT
01 02 80    CONTACTED    NCP  - SSCP   CONTACTED
01 02 81    INOP         NCP  - SSCP   INOPERATIVE
01 02 84    REQCONT      NCP  - SSCP   REQUEST CONTACT
```



For additional information see: SNA Format and Protocol Reference Manual (SC30-3112), Apppendix E.

FIGURE C-14

FMD NS RU PHYSICAL MAINTENANCE SERVICE: RU1 = X'03'

```
                ****************************
                *                          *
                *  RH0 = X 0 0 X  X X X X  *
                *                          *
                ****************************
                RH0 = HEX '0X','1X','8X','9X'


 <<<<  RU0 = X'01'  SINGLE DOMAIN
V
V   <<<< RU1 = X'03' PHYSICAL MAINTENANCE SERVICE NS (MA)
V  V
V  V  <<<<<  RU2 = COMMAND CODE    (SEE FIGURE C-11, PAGE B-16 )
V  V  V
V  V  V     <<<<  MNEMONIC
V  V  V     V
V  V  V     V            <<<<<<  SESSION TYPE
V  V  V     V            V
V  V  V     V            V             <<<<<< FULL TITLE
V  V  V     V            V            V

01 03 01    EXECTEST     SSCP - NCP   EXECUTE TEST
01 03 02    ACTTRACE     SSCP - NCP   ACTIVATE LINE TRACE
01 03 03    DACTTRACE    SSCP - NCP   DEACTIVATE LINE TRACE
01 03 81    RECMS        NCP  - SSCP  RECORD MAINTENANCE STATISTICS
01 03 82    RECTD        NCP  - SSCP  RECORD TEST DATA
01 03 83    RECTRD       NCP  - SSCP  RECORD TRACE DATA
|  |  |
|  |  |
|  |  |<<<RU2
|  |
|  |<<< RU1
|
|<<< RU0
```

For additional information see: SNA Format and Protocol Reference Manual (SC30-3112), Apppendix E.

FIGURE C-15

FMD NS RU SESSION SERVICE (SINGLE DOMAIN): RU1 = X'06'

```
                ******************************
                *                            *
                *  RH0 = X 0 0 X  X X X X    *
                *                            *
                ******************************
                RH0 = HEX '0X','1X','8X','9X'


 <<<<  RU0 = X'01' SINGLE DOMAIN
V
V   <<<<  RU1 = X'06' SESSION SERVICE  NS (S)
V  V                    SINGLE DOMAIN (SSCP - LU)
V  V
V  V   <<<<  RU2 = COMMAND CODE   (SEE FIGURE C-11, PAGE B-16 )
V  V  V
V  V  V     <<<<  MNEMONIC
V  V  V     V
V  V  V     V            <<<<<<  SESSION TYPE
V  V  V     V           V
V  V  V     V           V             <<<<<< FULL TITLE
V  V  V     V           V            V

01 06 01   CINIT        SSCP - PLU   CONTROL INITIATE
01 06 02   CTERM        SSCP - PLU   CONTROL TERMINATE
01 06 04   NSPE         SSCP - LU    NS PROCEDURE ERROR
01 06 80   INIT-OTHER   ILU  - SSCP  INITIATE OTHER
01 06 81   INIT-SELF    ILU  - SSCP  INITIATE OTHER
01 06 82   TERM-OTHER   TLU  - SSCP  TERMINATE OTHER
01 06 83   TERM-SELF    TLU  - SSCP  TERMINATE SELF
01 06 85   BINDF        PLU  - SSCP  BIND FAILURE
01 06 86   SESSST       PLU  - SSCP  SESSION STARTED
01 06 87   UNBINDF      PLU  - SSCP  UNBIND FAILURE
01 06 88   SESSEND      PLU  - SSCP  SESSION ENDED
|  |  |
|  |  |
|  |  |<<<RU2           NOTE:   ILU = INITIATE LOGICAL UNIT
|  |                             TLU = TERMINATE LOGICAL UNIT
|  |<<< RU1
|
|<<< RU0
```

For additional information see: SNA Format and Protocol Reference Manual (SC30-3112), Apppendix E.

FIGURE C-16

FMD NS RU SESSION SERVICE (CROSS DOMAIN): RU1 = X'06'

```
                ****************************
                *                          *
                *  RH0 = X 0 0 X  X X X X  *
                *                          *
                ****************************
                RH0 = HEX '0X','1X','8X','9X'


 <<<<  RU0 = X'81' SINGLE DOMAIN
V
V   <<<<  RU1 = X'06' SESSION SERVICE  NS (S)
V  V                    CROSS DOMAIN (CDRM - LU)
V  V
V  V   <<<<  RU2 = COMMAND CODE   (SEE FIGURE C-11, PAGE B-16 )
V  V  V
V  V  V    <<<<<  MNEMONIC
V  V  V   V
V  V  V   V             <<<<<<  SESSION TYPE
V  V  V   V            V
V  V  V   V            V             <<<<<< FULL TITLE
V  V  V   V            V            V

81 06 01  CINIT        SSCP -  PLU  CONTROL INITIATE
81 06 02  CTERM        SSCP -  PLU  CONTROL TERMINATE
81 06 20  NOTIFY       SSCP -   LU  NOTIFY
81 06 27  DSRLST       SSCP - SSCP  DIRECT SEARCH LIST
81 06 29  CLEANUP      SSCP -  SLU  CLEANUP SESSION
81 06 80  INIT OTHER   ILU  - SSCP  INITIATE OTHER
81 06 81  INIT-SELF  # LU   - SSCP  INITIATE SELF
81 06 82  TERM OTHER   TLU  - SSCP  TRMINATE OTHER
81 06 83  TERM-SELF  # LU   - SSCP  TERMINATE SELF
81 06 85  BINDF        PLU  - SSCP  BIND FAILURE
81 06 86  SESSST       PLU  - SSCP  SESSION STARTED
81 06 87  UNBINDF      PLU  - SSCP  UNBIND FAILURE
81 06 88  SESSEND      LU   - SSCP  SESSION ENDED
|  |  |
|  |  |              #: SINGLE- OR CROSS DOMAIN
|  |  |<<<RU2
|  |
|  |<<< RU1
|
|<<< RU0
```

FIGURE C-17

FMD NS RU SESSION SERVICE (CROSS DOMAIN): RU1 = X'86'

```
                ****************************
                *                          *
                *  RH0 = X 0 0 X  X X X X  *
                *                          *
                ****************************
                RH0 = HEX '0X','1X','8X','9X'


 <<<<  RU0 = X'81' CROSS DOMAIN
V
V   <<<<  RU1 = X'86' SESSION SERVICE  NS (S)
V  V                      CROSS DOMAIN (CDRM - CDRM)
V  V
V  V   <<<<  RU2 = COMMAND CODE (SEE FIGURE C-11, PAGE B-16 )
V  V  V
V  V  V     <<<<  MNEMONIC
V  V  V    V
V  V  V    V            <<<<<<  SESSION TYPE
V  V  V    V           V
V  V  V    V           V             <<<<<< FULL TITLE
V  V  V    V           V            V

81 86 27   DSRLST      SSCP - SSCP  DIRECT SEARCH LIST
81 86 40   INIT OTHER  SSCP - SSCP  INITIATE OTHER CD
81 86 41   CDINIT      SSCP - SSCP  CROSS DOMAIN INITIATE
81 86 42   TERM-OTHER  SSCP - SSCP  TERM OTHER CROSS DOMAIN
81 86 43   CDTERM      SSCP - SSCP  CROSS DOMAIN TERMINATE
81 86 45   CDSESSSF    SSCP - SSCP  CROSS DOMAIN SESSION
                                      SET UP FAILURE
81 86 46   CDSESSST    SSCP - SSCP  CROSS DOMAIN SESSION
                                      STARTED
81 86 47   CDSESSTF    SSCP - SSCP  CROSS DOMAIN SESSION
                                      TAKEDOWN FAILURE
81 86 48   CDSESSEND   SSCP - SSCP  CROSS DOMAIN SESSION ENDED
81 86 49   CDTAKED     SSCP - SSCP  CROSS DOMAIN TAKEDOWN
81 86 4A   CDTAKEDC    SSCP - SSCP  CROSS DOMAIN TAKEDOWN
                                      COMPLETE
81 86 4B   CDCINIT     SSCP - SSCP  CROSS DOMAIN CONTROL
|  |  |                              INITIATE
|  |  |<<<RU2
|  |
|  |<<< RU1
|
|<<< RU0
```

FIGURE C-18

ENTER USER NOTES HERE:

Appendix C

SNA Sense Codes

CONTENTS

```
**********************
*                    *
*  SENSE CODES       *
*                    *
**********************
```

The sense data included with an EXR or a negative response is a four-byte field (see Figure G-1) that generally includes a one-byte category value, a one-byte modifier data (hereafter referred to as user-defined data). In a few cases, user-defined data is not included in the sense data; in its place is (1) a binary count that indexes the first byte found to be in error in the received request, and (2) possibly also the indexed byte.

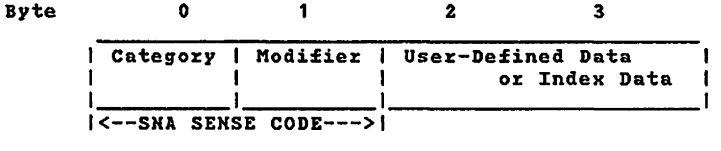


Figure A-1. Sense Data Format

Together, the category and modifier bytes hold the sense code (SNC) defined for the exception condition that has occurred.

The following categories are defined; all others are reserved:

Value	Category
X'80'	Path Error
X'40'	RH Usage Error
X'20'	State Error
X'10'	Request Error
X'08'	Request Reject
X'00'	User Sense Data Only

The category User Sense Data Only (X'00') allows the end users to exchange sense data in bytes 2-3 for conditions not defined by SNA within the other categories (and perhaps unique to the end users involved). The modifier value is also X'00'.

The sense codes for the other categories are discussed below. For these categories, a modifier value of X'00' can be used (as an implementation option) when no definition of the exception condition beyond the major category is to be identified.

Example: 3270 Status: X'00 00 XX XX'. (XX XX = 3270 Status/Sense Byte)

PATH ERROR (CATEGORY CODE = X'80')

This category indicates that the request could not be delivered to the intended receiver, due to a path outage or an invalid sequence of activation requests or one of the listed transmission header errors. (Some TH errors, i.e., SQN errors, are category X'20'.)

Modifer (in hexadecimal):

01 Intermediate Node Failure: Machine or program check in an intermediate PC (e.g., PC.T4 of a PU.T4 node); request discarded. A response may or may not be possible.

02 Link Failure: Data link failure.

03 LU Inoperative: The LU is unable to process request.

04 Unrecognized DAF: An intermediate or boundary PC has no routing information for the DAF, or an end node PC has no LU with indicated DAF(FID1), DAF(FID2), or local address (FID3).

05 No Session: No half-session is active in the receiving end node for the indicated OAF-DAF pair, or no BF.SESS.RCV is active for the OAF.DAF pair in a node providing the boundary function. This exception does not apply to BIND, ACTCDRM, ACTPU, or ACTLU. (Note 1)

06 FID: Invalid FID for the receiving node. (Note 2)

07 Segmenting Error: First BIU segment had less than 10 bytes; or mapping field sequencing error, such as first, last, middle; or segmenting not supported and MPF not set to 11. (Note 3)

08 PU Not Active: The PU.ACT.CAN FSM in the receiving node has not been activated and the request was not ACTPU for this half-session, or the request was ACTLU from an SSCP that does not have an active (SSCP,PU) session with the PU associated with the addressed LU. (Note 1)

09 LU Not Active: A DAF addresses an LU for which the LU.ACT.CAN FSM has not been activated and the request was not ACTLU. (Note 1)

0A Too Long PIU: Transmission was truncated by the receiving link station because sufficient buffering was not available.

0B Incomplete TH: Transmission received was shorter than a TH. (Note 2)

0C DCF: Data Count Field inconsistent with transmission length.

0D Lost Contact: Contact with the link station for which the transmission was intended has been lost, but the link has not failed. If the difference between link failure and loss of contact is not detectable, link failure (X'8002') is sent.

0E Unrecognized OAF: The OAF (FID1) was not recognized.

0F Invalid Address Combination: The (DAF,OAF) (FID2) combination or the LSID (FID3) specified an invalid type of session, e.g., a (PU,LU) combination.

Notes:

1. This error is listed as a path error since the request cannot be delivered to the intended TC element.

2. It is generally not possible to send a response for this exception condition, since information (FID, addresses) required to generate a response is not available. It is logged as an error if this capability exists in the receiver.

3. If segmenting is not supported, a negative response is returned for the first segment only, since this contains the RH. Subsequent segments are discarded.

RH USAGE ERROR (CATEGORY CODE = X'40')

This category indicates that the value of a field or combination of fields in the RH violates architectural rules or BIND options previously selected. These errors prevent delivery of the request to the intended half-session protocol machine and are independent of the current states of the session. They may result form the failure of the sender to enforce session rules. Detection by the receiver of each of these errors is optional.

Modifer (in hexadecimal):

01 Invalid SC or NC RH: The RH of a SC or NC request was invalid. For example an SC RH was pacing request indicator set to one is invalid

02 Used for crypto

03 BB Not Allowed: Begin Bracket (BB) was indicated with ¬BC. (cont.)

04 EB Not Allowed: End Bracket (EB) was indicated with ¬BC, or by the primary when only the secondary may send EB, or by the secondary when only the primary may send EB.

05 Incomplete RH: Transmission shorter than full TH-RH.

06 Exception Not Allowed: Exception response was requested when not permitted.

07 Definite Response Not Allowed: Definite response was requested when not permitted.

08 Pacing Not Supported: The Pacing indicator was set on a request, but the receiving CPMGR does not support pacing for this session.

09 CD Not Allowed: Change Direction (CD) was indicated with ¬EC.

0A No-Response Not Allowed: No-response was specified on a request when not permitted. (Used only on EXR)

0B Chaining Not Supported: Chaining bits indicated other than (BC, EC), but multiple-request chains are not supported for the session.

0C Brackets Not Supported: A bracket indicator was set, but brackets are not used for the session.

0D CD Not Supported: The Change-Direction indicator was set, but is not supported.

0E Reserved.

0F Format Indicator Not Allowed: The Format Indicator bit was set when not supported for the session, or when Begin-Chain (BC) was not set.

10 Alternate Code Not Supported: The Code Selection Indicator was set when not supported for the session.

STATE ERROR (CATEGORY CODE = X'20')

This category indicates a sequence number error, or an RH or RU which is not allowed for the receiver's current session control or data flow control state. These errors prevent delivery of the request to the intended half-session protocol machine.

Modifier (in hexadecimal):

01 Sequence Number: sequence number received on normal flow request was not one greater than the last.

02 Chaining: Error in the sequence of the chain indicator settings, such as first, middle, first.

03 Bracket: Error resulting from failure of sender to enforce bracket rules for session. (This error does not apply to contention or race conditions.)

04 Direction: Error resulting from a normal-flow request received while HDX-FF FSM state was (*S,R). (Contrast this sense code with X'081B' which signals a race condition.)

05 Data Traffic Reset: An FMD or normal-flow DFC request received by a half-session whose SESS.(SEND/RCV) was active, but whose DT FSM was not in the ACTIVE state.

06 Data Traffic Quiesced: An FMD or DFC request received from a half-session which has sent QUIESCE COMPLETE or SHUTDOWN COMPLETE and has not responded to RELEASE QUIESCE.

07 Data Traffic Not Reset: A session control request (e.g., STSN), allowed only while the DT FSM is in the RESET state, was received while the DT FSM state was not RESET.

08 No Begin-Bracket: A BID or an FMD request specifying BB was received while SBI.SEND was in the NOBB state.

REQUEST ERROR (CATEGORY CODE = X'10')

This category indicates that the RU was delivered to the intended half- session, but could not be interpreted or processed. This condition represents a mismatch in half-session capabilities.

Modifier (in hexadecimal):

01 RU Data Error: Data in the request RU is not acceptable to the receiving FI.FMD; for example, a character code not in the set supported, or a formatted data field not acceptable to presentation services.

02 RU Length Error: The request RU was too long or too short.

03 Function Not Supported: The function requested is not supported. The function may have been specified by a formatted request code, a field in an RU, or a control character.

04 Reserved.

05 Parameter Error: A parameter modifying a control function is invalid, or outside the range allowed by the receiver.

06 Reserved.

07 Category Not Supported: DFC, SC, NC, or FMD request received by a half-session not supporting any requests in that category; or an NS request with byte 0 not set to 01, or byte 1 not set to an NS category supported by the receiver.

08 Invalid FM Header: The FM header was not understood or translat- able by the receiver, or an FM header was expected but not present.

REQUEST REJECT (CATEGORY CODE = X'08')

This category indicates that the request was delivered to intended half-session protocol machine and was understood and supported, but not executed.

Modifier (in hexadecimal):

01 Resource Not Available: The LU, PU, or link specified in an RU is not available.

02 Intervention Required: Forms or cards are required at an output device, or device is temporarily in local mode, or other conditions requiring intervention.

03 Missing Password: The required password was not supplied.

04 Invalid Password: Password was not valid.

05 Session Limit Exceeded: The requested session cannot be activated, as one of the NAU's is at its session limit. Applies to ACTCDRM, INIT, BIND, and CINIT commands.

06 Resource Unknown: The request contained a name or address not identifying a PU, LU, or link known to the receiver.

07 Resource Not Available--LUSTAT Forthcoming: A subsidiary device will be unavailable for an indeterminate period of time. LUSTAT will be sent when the device becomes available.

08 Invalid Contents ID: The contents ID contained on the ACTCDRM request was found to be invalid.

09 Mode Inconsistency: The requested function cannot be performed in the present state of the receiver.

0A Permission Rejected: The receiver has denied an implicit or explicit request of the sender; when sent in response to BIND, it implies that the secondary half-session's LU will not notify the SSCP when a BIND can be accepted. (See the X'0845' sense code for a contrasting response.)

0B Bracket Race Error: Loss of contention within the bracket protocol. Arises when bracket initiation/termination by both NAU's is allowed.

0C Procedure Not Supported: A named procedure (Test, Measurement, Trace) specified in an RU is not supported by the receiver.

0D NAU Contention: A request to activate a session was received while the receiving half-session was awaiting a response to a previously sent activation request for the same session (e.g., ACTCDRM was received when the (SSCP1,SSCP2).PRI.SESS.RCV-SEND FSM state was PEND.ACT.PRI).

0E NAU Not Authorized: The requesting NAU does not have access to the requested resource.

0F End User Not Authorized: The requesting end user does not have access to the requested resource.

10 Missing Requestor ID: The required requested ID was missing.

11 Break: Asks the receiver of this sense code to terminate the present chain with CANCEL or with an FMD request carrying EC. The CHAIN.RCV FSM of the half-session sending the Break sense code enters PURGE state when Break is sent.

12 Insufficient Resource: Receiver cannot act on request because of a temporary lack of resources.

13 Bracket Bid Reject--No RTR Forthcoming: BID (or BB) was received while the BSM.FSP.FSM state was INB, or while the state was BETB and the first speaker denied permission. RTR will not be sent.

14 Bracket Bid Reject--RTR Forthcoming: BID (or BB) was received while the BSN.FSP FSM state was INB, or while the state was BETB and the first speaker denied permission. RTR will be sent.

15 Function Active: A request to activate a network element or procedure was received, but the element or procedure was already active.

16 Function Inactive: A request to deactivate a network element or procedure was received, but the element or procedure was not active

17 Link Inactive: A request requires the user of a link, but the link is not active.

18 Link Procedure in Process: CONTACT, DISCONTACT, IPL or other link procedure in progress when a conflicting request was received.

19 RTR Not Required: Receiver of READY TO RECEIVE has nothing to send.

1A Request Sequence Error: Invalid sequence of reqeusts.

1B Receiver in Transmit Mode: A race condition; normal-flow request received while the HDX-CONT FSM state was (*S,¬R) or the RES FSM state was UNAVL. (Contrast this sense code with X'2004', which signals a protocol violation.)

1C Request Not Executable: The requested function cannot be executed, due to a permanent error condition in the receiver.

1D Invalid Station/SSCP ID: The Station ID or SSCP ID in the request was found to be invalid.

1E Session Reference Error: The request contained reference to a half-session that was neither active nor in the process of being activated (generally applies to network services commands).

1F Reserved.

20 Control Vector Error: Invalid data for the control vector specified by the target network address and key. Applies to SET CONTROL VECTOR and SENSE CONTROL VECTOR.

21 Invalid Session Parameters: Session parameters were not valid or not supported by the half-session whose activation was requested.

22 Link Procedure Failure: A link-level procedure has failed due to link equipment failure, loss of contact with a link station, or an invalid response to a link command. (This is not a path error, since the request being rejected was delivered to its destination.)

23 Unknown Control Vector: The control vector specified by a network address and key is not known to the receiver.

24 Component Aborted: The LU component (device indicated by an FM header) that was selected has been aborted, due to an error condition or resource depletion.

25 Component Not Available: The LU component (device indicated by an FM header) is not available.

26 FM Function Not Supported: A function requested in an FMD RU is not supported by the receiver.

27 Intermittent Error--Retry Requested: An error at the receiver caused an RU to be lost. The error is not permanent and retry of the RU (or chain) is requested.

28 Reply Not Allowed: A request requires a normal-flow reply but the outbound data flow for this half-session is quiesced or shut down, and there is not delayed reply capability.

29 Change Direction Required: A request requires a normal-flow reply, but the HDX-FF FSM state implies (¬S,*R), CD was not set on the request, and there is no delayed reply capability.

2A Presentation Space Alteration: Presentation space altered by end user while the HDX FSM state was (¬S,*R).

2B Presentation Space Integrity Lost: Presentation space error due to other than end user action, e.g., transient error in regeneration buffer.

2C Resource-Sharing Limit Reached: The request received from an SSCP was to activate a half-session, a link, or a procedure, when that resource was at its sharing limit.

2D LU Busy: The LU resources needed to process the request are being used; for example, the LU resources needed to process the request received from the SSCP are being used for the (LU,LU) session.

2E Intervention Required at Subsidiary Device: A condition requiring intervention, such as out of paper, or power-off, or cover inter- lock open, exists at a subsidiary device.

2F Request Not Executable, Subsidiary Device: The requested function cannot be executed, due to a permanent error condition in one or more of the receiver's subsidiary devices.

30 Reserved.

31 Reserved.

32 Invalid Count Field: A count field contained in the request indicates a value too long or too short to be interpreted by the receiver, or the count field is inconsistent with the length of the remaining fields. Bytes 2 and 3 following the sense code are not used for user-defined data; they contain a binary count that indexes (zero-origin) the first byte of the invalid count field.

33 Invalid Parameter in Fixed-Length Field: One or more parameters contained in fixed-length fields of the request are invalid or not supported by the NAU that received the request. Bytes 2 and 3 following the sense code are not used for user-defined data. Byte 2 contains a binary value that indexes (zero-origin) the first byte that contained an invalid parameter. Byte 3 contains a transform of the first byte that contained an invalid parameter: the bits that constitute the invalid parameter(s) are complemented and all other bits are copied.

34 RPO Not Initiated: A power-off procedure for the specified SPU node was not initiated because one or more other SSCP's have contacted the SPU node, or because a CONTACT, DUMP, IPL, or DISCONTACT procedure is in progress for that SPU node.

35 Invalid Parameter in Fixed- or Variable-Length Field: The request contained a fixed- or variable-length field whose contents are invalid or not supported by the NAU that received the request. Bytes 2 and 3 following the sense code are not used for user- defined data; they contain a binary count that indexes (zero- origin) the first byte of the field- or variable-length field having invalid contents.

36 PLU/SLU Specification Mismatch: For a specified (LU,LU) session, both the OLU and DLU have only the primary capability or have only the secondary capability.

37 Queuing Limit Exceeded: For an (LU,LU) session initiation request (INIT-CDINIT, or INIT-OTHER-CD) specifying (1) Initiate or Queue (if Initiate not possible) or (2) Queue Only, the queuing limit of either the OLU or DLU, or both, was exceeded.

38 Queuing Not Supported: For an (LU,LU) session initiation request specifying (1) Initiate or Queue (if initiate not possible) or (2) Queue Only, either an SSCP(ILU) cannot support initiate-queuing, or an SSCP(OLU) or an SSPC(DLU) cannot support setup-queuing.

39 (LU,LU) Sessions Being Taken Down: At the time an (LU,LU) session initiation or termination request is received, the SSCP of at least one of the Lus (OLU or DLU) is processing a CDTAKED request, i.e., the (SSCP,SSCP').SSCP.CDTAKED(Q|O|F,PCID).SEND.RCV FSM is in ACTIVE.RCV or ACTIVE.SEND state.

3A LU Not Enabled: At the time an (LU,LU) session initiation request is received at the SSCP, at least one of the two LU's, although having an active session with its SSCP, is not ready to accept CINIT or BIND requests.

3B Invalid PCID: An invalid PCID, one containing an invalid network address of the SSCP(ILU|TLU), has been received in CDINIT, INIT- OTHER-CD, CDTERM, or TERM-OTHER-CD; or a PCID that does not identify a previously queued request has been received in CDINIT (Dequeue) or INIT-OTHER-CD (Dequeue); or, a PCID that cannot be associated with the PCID of any previously processed CDINIT has been received on CDCINIT.

3C Domain Takedown Contention: While waiting for a response to a CDTAKED a CDTAKED request is received by the SVC.MGR.SSCP (primary) Contention is resolved by giving preference to the CDTAKED sent by the SSCP (primary).

3D Dequeue Retry Unsuccessful--Removed from Queue: The SSCP cannot successfully honor a CDINIT(Dequeue) request, which specifies "leave on queue if dequeue-retry is unsuccessful," to dequeue and process a previously queued CDINIT request (e.g., the LU in its domain is still not available for the specified session), and removes the queued CDINIT request from its queue.

3E Network Name Resolution Problem: An SSCP receiving a CDTERM request (with Session Key X'06') does not have the capability to resolve the OLU network name to a network address; it requires Session Key X'08', which carries the network address of the OLU.

3F Terminate Contention: While waiting for a response to a CDTERM, a CDTERM is received by the SVC.MGR.SSCP(SLU). Contention is resolved by giving preference to the CDTERM sent by the SSCP(SLU).

40 Reserved

41 Duplicate Network Address: In a cross-domain (LU,LU) session initiation request the SSCP (DLU) determines that the OLU network address specified in the CDINIT request is a duplicate of an LU network address in the domain of the SSCP(DLU).

42 (SSCP,SSCP) Session Not Active: At the time an (LU,LU) session initiation or termination request is received, at least one of the following conditions exists:

- The SSCP(ILU) and SSCP(OLU) do not have an active session with each other, and therefore INIT-OTHER-CD cannot flow.
- The SSCP(TLU) and SSCP(OLU) do not have an active session with each other, and therefore TERM-OTHER-CD cannot flow.
- The SSCP(OLU) and SSCP(DLU) do not have an active session with each other, and therefore CDINIT or CDTERM cannot flow.

43 Reserved.

44 Initiation Dequeue Contention: While waiting for a response to a DCINIT(Dequeue), a CDINIT(Dequeue) is received by the SVC.MGR.SSCP (SLU). Contention is resolved by giving preference to the CDINIT (Dequeue) sent by the SSCP(SLU).

45 Permission Rejected--SSCP Will Be Notified: The receiver has denied an implicit or explicit request of the sender; when sent in response to BIND, it implies that the secondary half-session's LU will notify the SSCP (via LUSTAT) when a BIND can be accepted. (See the X'080A' sense code for a contrasting response.)

46 ERP Message Forthcoming: The received request was rejected for a reason to be specified in a forthcoming request.

47 Resynchronizing Restart Required: The secondary half-session is awaiting resynchronization via STSN and cannot successfully process the received request, such as SDT or BIND (specifying a TS Profile not allowing STSN).

48 Reserved.

49 Invalid Requested Procedure: The procedure requested is invalid for the resource named in the request.

```
*******************************
*                             *
*      FMH Sense Codes        *
*                             *
*******************************
```

The extended definition of FM Headers introduces a new group of error conditions. The logical errors concerned with FM Header hierarchy, format, and protocol are reflected in new user codes appended to the system sense code X'1008' (Invalid FM Header). FM Header session errors and data processing errors also follow this approach. If this level of error detection is not provided, then the sense code X'10080000' is returned.

The lists of FM Header error conditions and sense codes follow.

In addition to FM Header errors (sense codes X'10080000' or X'1008XXXX') other Request Error as well as Request Reject errors and Transmission Subsystem errors may be sent or received to a chain containing only FM Header(s) or FM Header(s) and End User Data.

100840XX	SESSION ERRORS
4001	Invalid FMH Type
4002	Invalid FMH Code
4003	Compression not supported
4004	Compaction not supported
4005	Basic Exchange not supported
4006	Only Basic Exchange supported
4007	Medium not supported
4008	Code selection compression violation
4009	FMHC not supported
400A	Demand Select not supported
400B	DSNAME not supported
400C	Invalid Medium Subaddress field
400D	Insufficient resources to perform FMH function

100820XX	FM HEADER PROTOCOL ERRORS
2001	Invalid Destination -- Active
2002	Invalid Destination -- Inactive
2003	Invalid Destination -- Suspended
2004	Invalid Suspend - Resume Sequence
2005	Interruption Level violation
2007	Destination (MEDIUM.SUBADDRESS.DSNAME) not available
2008	Invalid End sequence
2009	Invalid FM Header length
200A	Invalid field setting -- Reserved field set to one or setting not defined
200B	Invalid Destination -- Destination does not exist
200C	Invalid ERCL
200D	Invalid DST
200E	Invalid concatenation -- Header cannot be concatenated
200F	FM data not allowed for header
2010	Bind FM Header Subset violation
2014	FM Header not sent concatenated
2019	Stack Reference Indicator invalidly set to one for BEG N, SUSPEND RESUME, END FM Header or Type 2 FM Header
201A	Unable to Accept CMI Modification
201B	Unable to Accept CPI Modification
201C	Unable to Accept ERCL Modification

100808XX	DATA PROCESSING ERRORS
0801	Invalid function code parameters
0803	Forms function cannot be performed
0805	Unable to perform copy function
0806	Compaction table outside supported subset
0807	Invalid PDIR identification
0808	Train function cannot be performed
0809	FCB Load function cannot be performed
080B	Invalid compaction table name
080C	Invalid ACCESS
080D	Invalid RECLEN
080E	Invalid NUMRECS
080F	Data set in use
0810	Data set not found
0811	Invalid password
0812	Function not allowed for data set
0813	Record too long
0814	Data set too full
0815	Invalid RECID
0817	Invalid VOLID format
0818	Number of logical records per chain exceeded
0819	Data set exists
081A	No space available

100808XX Data Processing Errors (cont.)

081B Invalid VOLID

081C Invalid DSACCESS

081D Invalid RECTYPE

081E Insufficient resolution space

081F Invalid key technique

0820 Invalid key displacement

0821 Invalid key

0822 Invalid N

0823 Invalid KEYIND

0824 Invalid SERID

0826 Invalid RECID format

0827 Password not supplied

0828 Record ID not supplied

0829 Volume ID not supplied

082A Invalid PGMNAME

(Note: The capitalized words are Type 2 or 3 FM Header parameters. Reference the Sections on Type 2 and 3 FM Headers.)

COMPONENT STATUS

Component Status (CCMP.STAT) FSMs track the status of LU Components. In general each SLU maintains a set of SLU.COMP.STAT for each of its own components and the PLU maintains a set of PLU.COMP.STAT FSMs for each component of each SLU with which it is in session. It is a characteristic of 'PRIMARY RESPONSIBLE FOR RECOVERY' that the SLU only tracks the status of its own components. The PLU tracks the status of SLU components as well as of its own.

The COMP STAT FSMs currently defined are listed below with their Set and Reset Signals. All FSMs are in the Data Traffic Reset Subtree. These codes are listed by level. Once a Level one condition has been reported subsequent conditions at a higher level (2 or 3) must be reported. Subsequent conditions at a lower or the same level may be reported.

Set (-RSP|LUSTAT)		Name	Reset (LUSTAT)
Level 1	0802	Intervention R'qd	0001|082B|081C
	082E	Int R'qd: Sub. Res	0001|081C
	082D	SLU Busy	0001|082B|081C
	0807	SLU Busy: Sub.Res	0001|081C
Level 2	0831	Power Off	0001|082B|081C
Level 3	081C	Permanent Error	Note 1
	082F	Permanent Error SUB.RES	Note 1

Note 1: These conditions are reset after the component has been repaired.

The negative responses for subsidiary resources, (082E\|0807\|082F) mean that the primary resource (e.g., screen) was successfully updated. The secondary function was not done.

BIBLIOGRAPHY

This section lists the manuals required by the personnel responsible for system problem determination and installation.

The SNA Product Installation Guide (G320-2028) is reccommended as a reference guide for iniatial installation of most of the SNA products. It is samples for all operating systems, SNA access methods, IBM 370X control units, and most of the SNA supported terminal products.

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SNA Product Installation Guide	G320-6028
Systems Network Architecture Reference Summary	GA27-3136
Introduction to Advanced Communication Function	GC30-3033
Systems Network Architecture Format and Protocol Reference Manual: Architectural Logic	SC30-3112

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OS/VS TCAM Concepts and Applications	GC30-2049
OS/VS TCAM System Programmer's Guide	GC30-2051
OS/VS TCAM Macro Reference Guide	GC30-2052
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OS/VS TCAM Operator's Library	GC30-3037
OS/VS TCAM Installation and Migration Guide	GC30-3039
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ACF/TCAM Concepts and Planning	GC30-3049
ACF/TCAM MSNF Logic Supplement	LD21-0002
ACF/TCAM MSNF Program Reference Summary Supplement	LD21-0003
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VTAM Data Areas	SY27-7265

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