

IBM MAINTENANCE DIAGNOSTIC PROGRAM

API ECHO USER'S GUIDE

DATE: 10/19/77

Preface      Introduction and Use of This Document

This document was written toward the goal of providing all necessary information for the API Echo Test in a logical order that can be readily indexed. It is suggested that the first time user of API Echo Test review the document in its entirety. (Section 1.1 should be read in its entirety before proceeding.)

CONTENTS

1.0 Introduction . . . . . 1  
 1.1 T3700SNA - API ECHO OLT . . . . . 1

2.0 Requirements . . . . . 2  
 2.1 Program Requirements. . . . . 2  
 2.2 Documents Required: . . . . . 2  
 2.3 Equipment Requirements. . . . . 2  
 2.4 Products Supported. . . . . 2

3.0 Use Procedures . . . . . 3  
 3.1 Test Request Message Entry. . . . . 3  
 3.2 Selecting the Echo Options. . . . . 4  
 3.3 Selecting the Echo Data . . . . . 4

4.0 Printouts. . . . . 5  
 4.1 Messages to the Operator. . . . . 5  
 4.2 Test Section Error Printouts. . . . . 12

5.0 COMMENTS . . . . . 16

Appendix A - The Terminal CDS. . . . . 17

Appendix B - TRM Examples. . . . . 19

Appendix C - Examples of Test. . . . . 21

Appendix D - Sense Data Codes. . . . . 27

Appendix E - User Sense Codes. . . . . 37

Appendix F - Bracket Termination Rules . . . . . 39

GLOSSARY . . . . . 41

1.0 INTRODUCTION

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.

The above takes place while normal VTAM or TCAM level 10 and NCP operations continue on all terminals not being tested, including other terminals on a multidropped teleprocessing line.

1.1 T3700SNA - API ECHO OLT

The test will repeat the requested data the number of times specified. In addition, if no data is requested, the test will send default test data to the test terminal.

## 2.0 REQUIREMENTS

### 2.1 PROGRAM REQUIREMENTS

Before any of the test sections described in this document can be run, the following program requirements must be met:

- a. The VTAM Teleprocessing On-Line Test Executive Program (TOLTEP), TCAM level 10 Teleprocessing On-Line Test Executive (TOTE), or an equivalent On-line Test Executive 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. (Refer to Appendix A for a description of the CDS.)

### 2.2 DOCUMENTS REQUIRED:

The following document is referenced at various points throughout this document:

- a. TOLTEP SRL, DOS/VS TOLTEP for VTAM, form GC28-0663. This document describes how to use and initiate TOLTEP, the Teleprocessing On-Line Test Executive Program. It should be thoroughly reviewed.
- b. "OS/VS TCAM System Programmer's Guide", form GC30-2051. Chapter 14 of this document describes how to generate and use TOTE. It should be thoroughly reviewed.
- c. EXTM Program Reference Manual, form SH20-1704.

### 2.3 EQUIPMENT REQUIREMENTS

The only requirement is that the terminal must be removed from customer operation.

### 2.4 PRODUCTS SUPPORTED

3270 SNA  
3767  
3770  
3270 BSC (if running with VTAM/TOLTEP with Advanced Communications Function (ACF))

### 3.0 USE PROCEDURES

The prime purpose of the following paragraphs is to describe how to enter the 'Device' field and the EXT= option of the 'OPT' field of the test request message. Information on the initiation and termination of testing and the options available may be found in the TOLTEP SRL, "DOS/VS and OS/VS TOLTEP for VTAM", form GC28-0663, the OS/VS TCAM Systems Programmers Guide, form GC30-2051, or the CONCURRENT ON-LINE TELECOMMUNICATION TEST (COLTT) FUNCTION section of the EXTM PROGRAM REFERENCE MANUAL, form SH20-1704. This information was not included in this document for the sake of simplicity. These documents provide more detailed information on the execution of on-line tests than could be provided in this document.

### 3.1 TEST REQUEST MESSAGE ENTRY

#### 1 - DEVICE FIELD

This section will test only one terminal at a time. Enter the symbolic name of the terminal (LU) to be tested.

NOTE: If running with EXTM/COLTT, enter the 4-character CICS terminal ID. No CDS is required for EXTM/COLTT. For more information, reference the EXTM/COLTT write-up described above.

#### 2 - TEST FIELD

T3700SNA is the test section name.

#### 3 - OPTION FIELD

Data to be echoed by this section may be entered at the same time the terminal is selected. This is done by providing it in the EXT= option of the "OPT" field of the test request message. (See Note) If this is desired, enter the request in the EXT= option, as follows:

- a. 2 digit number for the times to receive the data followed by the data. (Example: EXT=99ABC..Z) (This will send ABC...Z to the test terminal 99 times.)

NOTE: Only Alpha-numeric characters will be echoed. Caution: Over-printing will result on Test devices that require a carriage return character in its data stream.

- b. 2 digit number for the times to receive the standard message. (Example: EXT=99) (This will send A-Z, 0-9

to the test terminal 99 times)

- c. 2 digit number for the times to receive the data followed by X' then data. (Example: EXT=99X'FFFF) (This will send the Hex text (FFFF) to the terminal 99 times.)

NOTE: If the test terminal cannot request data, the EXT=Option must be used to request YYDATA.

- d. The word BIND to display the bind parameters for the symbolic unit in the Test field.

### 3.2 SELECTING THE ECHO OPTIONS

T3700SNA provides for selection of three different options in addition to allowing the operator to specify the data to be echoed.

This message 'ENTER YYDATA, PROMPT, OR END' will occur, providing an opportunity to select any of the following options:

- a. 'YYDATA' - YY is number of times to repeat the data. Data is the information to be echoed.
- b. 'PROMPT' - This will prompt the user on the YYDATA format.
- c. 'END' - Terminates the Echo Test.

NOTE: If no options are selected, the test will repeat the last requested option (YYDATA).

### 3.3 SELECTING THE ECHO DATA

The 'DATA' option allows specification of the data to be transmitted during the selected test. Up to 100 bytes of data may be specified.

The data can be one of two formats:

- (1) Normal keyboard data: ie. ABC.....Z
- (2) Hex data: ie. X'F1F2

Hex data must be preceded by X' and consist of an even number of characters.

4.0 PRINTOUTS

Different kinds of printouts may be produced by execution of the test section: - messages to the operator, and test section error printouts.

4.1 MESSAGES TO THE OPERATOR

The following are messages issued by the test section.

901 ENTER YYDATA, PROMPT, OR END

The Test Section issues this message when the test is started and after each request is ended.

Operator Action -

- a. Reply 'YYDATA' to perform an Echo Test.
- b. Reply 'PROMPT' to see the YYDATA format.
- c. Reply 'END' to terminate the test.

902 THE ECHO FORMAT IS YYDATA  
902 YY IS NO. TIMES TO SEND THE DATA  
902 DATA IS AN OPTIONAL FIELD  
902 IF OMITTED  
902 THE TEST WILL SEND A-Z,0-9  
902 IF PRESENT  
902 EXAMPLES:  
902 YY SENDS A-Z,0-9 YY TIMES  
902 YYX'FFFF SENDS HEX FFFF YY TIMES  
902 YYABC SENDS ABC YY TIMES

The Test Section issues this message when Message 901 was replied to with any data other than END or valid YYDATA.

Operator Action -

None.

- 903 INVALID HEX DATA HAS BEEN ENTERED ENTER YYDATA,  
PROMPT, OR END

The Test Section issues this message when it detects the HEX (X') entry has an invalid HEX character, ie. other than 0-9, A-F.

Operator Action -

Re-enter the request with valid HEX characters following the YYX'.

- 904 HEX REQUIRES EVEN NO. OF CHARACTERS ENTER YYDATA,  
PROMPT, OR END

The Test Section issues this message when it detects the HEX (X') entry had an odd number of characters.

Operator Action -

Re-enter the request with an even number of characters following the YYX'.

- 905 END OF ECHO TESTING

The Test Section issues this message when the test option 'END' is entered. Testing will then be terminated.

Operator Action -

None.

912 BIND IS NOT COMPATIBLE WITH T3700SNA

This message will occur if a bind parameter(s) cannot be supported by ECHO. This message should not occur when running T3700SNA with TOTE, because TOTE forces the bind parameters that are acceptable to T3700SNA.

Operator Action -

Determine valid bind parameters using Message 913 description, then enter proper bind parameters using TOLTEP Bind Option. In response to ENTER DEV/TEST/OPT/ enter DEV (X'030321903040')/3700SNA//.

913 BIND IS XFPMTSPSPSPC1C2

This message will occur if the EXT=BIND option is used or following a 912 (not compatible bind) message.

In the Message Text:

XX = IGNORE

FM = FM Profile

TS = TS Profile

PP = Primary NAU Protocols

Bit 0 = Chaining Use

1 = Multiple element chains are allowed from the Primary NAU.

0 = Only single element chains are allowed from the Primary NAU.

1 = Request Mode Selection

0 = Immediate Request Mode

\*1 = Delayed Request Mode

2-3 = Chain Response Protocol used by Primary NAU      Chains from Primary will ask for:

- \*00 - No response
- \*01 - Exception Response
- 10 - Definite Response
- 11 - Definite Response or Exception Response

4 = Reserved

5 = Reserved

6 = Compression Indicator

- 1 = Compression may be used
- 0 = Compression will not be used on requests from Primary.

7 = Send EB Indicator

- 1 = Primary may send EB
- 0 = Primary will not send EB

SP = Secondary NAU Protocols

Bit 0 = Chaining Use

- 1 = Multiple element chains are allowed from the Secondary NAU.
- 0 = Only single element chains are allowed from the Secondary NAU.

Bit 1 = Request Mode Selection

- 0 = Immediate Request Mode
- \*1 = Delayed Request Mode

Bit 2-3=Chain Response used by the Secondary NAU

(See encoding in Primary NAU Protocol Field)

Bit 4 = Reserved

Bit 5 = Reserved

Bit 6 = Compression Indicator	1 = Compression may be used
	0 = Compression must not be used on requests from Secondary.
Bit 7 = Send EB Indicator	1 = Secondary may send EB
	0 = Secondary will not send EB

C1 = Common NAU Protocol Byte 1

Bit 0 = Reserved	
Bit 1 = FM Header Usage	0 = FM Headers not allowed
	1 = FM Headers allowed
Bit 2 = Brackets	1 = Brackets will be used during this session.
	0 = Brackets will not be used.
Bit 3 = Brackets Termination Rules	0 = Bracket Termination rule will be used during the session.
(See Appendix F for Detail)	1 = Bracket Termination rule #1 will be used during the session.
Bit 4 = Alternate Code Set Allowed Parameter	1 = Alternate Code set may be used.
	0 = Alternate Code set will not be used.

Bit 5-7=Reserved

C2 = Common NAU Protocol Byte 2

Bit 0-1=FM Transaction Mode	*00 = Full Duplex
	01 = HDX Contention
	10 = HDX Flip Flop
	*11 = Master Slave
Bit 2 = No Recovery Responsibility	0 = Primary NAU responsible.
	1 = Sender of RU responsible.
Bit 3 = Bckts First Spkr	0 = Secondary is 1st
	1 = Primary is 1st
Bits 4-6=Reserved	
Bit 7 = Contention Resolution	0 = Secondary speaks first in Data Traffic Active State

if HDX-FF, Secondary wins  
contention if HDX-CON

1 = Primary speaks first in  
Data Traffic Active State  
if HDX-FF or wins contention  
if HDX-CON.

NOTE: \* means bind parameters not supported with this test.

Operator Action -

None.

914 WARNING A BIND THAT ALLOWS FM HEADERS HAS BEEN DETECTED

This message will occur if a bind parameter allows FM headers (Bit 1 on of the common NAU protocol byte - see MSG 913 for byte/bit layout). This message should not occur when running T3700SNA with TOTE, because TOTE forces the bind parameters that are acceptable to T3700SNA.

Operator Action -

Respond to 915 message.

915 DO YOU WISH TO CONTINUE? REPLY YES OR NO.

This message follows the 914 MSG and gives you the opportunity to cancel or continue Echo. FM header support by Echo is extremely limited.

- Echo will not append a FM header to any of its data or turn on the indication of a header in the request header.
- Echo cannot strip or detect headers from incoming data.

Because of this, no device that appends a header to its data can request an Echo pattern (response to the 901 message).

Operator Action -

Respond yes to continue if the test device is a: 3767

Otherwise, respond no.

Testing of the device can be done if you will restart T3700SNA with an option EXT=BIND.

Example - Respond to Enter DEV/TEST/OPT with  
//EXT=BIND/

This will display the BIND parameters for the  
test device.

Example -

913 BIND is XX030321907040. Now  
restart T3700SNA and using the TOLTEP  
BIND option enter the same BIND parameters  
that were displayed, except turn off the  
FM header bit (Bit 1 of the C1 Byte -  
Reference the Message format of the 913  
MSG).

Example - Symbolic Name (X'030321903040')/3700SNA//

4.2 TEST SECTION ERROR PRINTOUTS

The following are error messages issued by the Test section.

906 RESPONSE ERROR, RESPONSE = RR, SYS SNS=SSMMUUUU

The Test Section will issue this message when the test device responds with a response other than definite response 1.

In the message text:

RR - Binary Coded Response Byte

- Bit 5 = Exception Response
- 6 = Not Definite Response 1
- 7 = Definite Response 2

SS - System Sense Information (See Appendix D)

- Bit 0 = Path Error
- 1 = Request Header Error
- 2 = State Error
- 3 = Request Error
- 4 = Request Reject Error
- 5 = Undefined
- 6 = Undefined
- 7 = Undefined

MM - System Sense Modifier (See Appendix D)

UUUU - User Sense

907 RETURN CODE ERROR, CODE ERROR, CODE IS CC

The Test Section will issue this message when it cannot successfully communicate with the test device.

In the Message Text:

CC - Return Codes are:  
04 = Function Not Available  
08 = Device Not Primary (or Grabbed)  
0C = Unrecoverable Error  
10 = Timeout on RECEIVE

908 STATUS ERROR SSMMUUUU

The Test Section issues this message, if it encounters a non-zero system sense in a response from the Test Device.

In the Message Text:

SS - System Sense (See Appendix D)

Bit 0 = Path Error  
1 = Request Header Error  
2 = State Error  
3 = Request Error  
4 = Request Reject Error  
5 = Undefined  
6 = Undefined  
7 = Undefined

MM - System Sense Modifier (See Appendix D)

UUUU - User Sense (See Appendix E)

Operator Action -

Using Appendices D and E decode Sense information and take appropriate action.

909 TOTAL NO. ERRORS = NN

This message will occur if one or more status errors (908) occurred during looping of data and the 'END' option has been entered.

In the Message Text:

NN - Number of Errors (in Hex)

Operator Action -

None - The Test Terminates.

910 TERMINAL REQUESTED CANCEL, CTRL = AABBC

The Test Section issues this message, if the test device issues any kind of expedited flow request (ie., shutdown key depressed). The 3 bytes (AABBC) show the control(s) in effect at the time the expedited request was received.

NOTE: Only bits noted with X can cause an expedited REQ in the Message Text.

AA - Control Byte 1

Bit 0 = Data  
1 = Cancel  
2 = Quiesce - Completed  
X 3 = Quiesce at End of Chain  
4 = Chase  
X 5 = Release Quiesce Indicator  
6 = Undefined  
7 = Undefined

BB - Control Byte 2

Bit 0 = BID  
1 = Ready to Receive  
2 = Logical Unit Status Indicator  
X 3 = Signal  
4-7 = Undefined

CC - Control Byte 3

Bit 0 = Start Data Traffic  
1 = Clear  
2 = STSN  
3 = SHUTD Shutdown - Indicator  
X 4 = SHUTC Shutdown - Indicator  
5 = RQR Request - Recovery  
X 6 = RSHUTD Shutdown - Requested  
7 = Undefined

Operator Action -

None - Test Terminates.

911 CANCEL DUE TO INTR REQD ON TEST DEVICE

This message will occur if the test section encounters an intervention required on the test device for more than three minutes.

Operator Action -

Correct the intervention required and recall the test.

5.0 COMMENTS

APPENDIX A - THE TERMINAL CDS

<u>CC</u>	<u>CDS BYTE</u>	
1	-	Always Blank
2-4	-	CDS
5-9	-	Always Blank
10-17	0-3	Unit Address
		The native subchannel address of the 3704/3705 to be used for communication with the terminal. This address is right justified... e.g., address 0A would be punched 0000000A.
18-19	4	Terminal Flags - leave blank
20-21	5	Feature Byte - Hex '80' if terminal is ASCII or otherwise leave blank.
22-23	6	Class - Hex '44' ('42' for 3270)
24-25	7	Type - Hex '20' ('1D' for 3270)
26-29	8	CDS Byte Count
		Leave blank (calculated by SOSF)

<u>CC</u>	<u>CDS BYTE</u>	<u>DESCRIPTION</u>
30-31	9	<p>FLAGS</p> <p>Bit 0=0            Bit 1=1 if this terminal is shared with another system. This is an OLT Executive requirement. It is not used by the OLT's. It is normally 0, but would be 1 under the following conditions:</p> <ul style="list-style-type: none"> <li>• If the 3704/3705 has two type 2 channel adapters installed, and the BUILD macro in the Stage 1 NCP System listing has "CHANTYP= (TYPE 2, TYPE 2)" and "SECCHAN= BACKUP" coded.</li> <li>• If the terminal has a TP path to 2 different CPU's and is capable of being controlled by either one.</li> </ul> <p>Bit 2=0            Bit 3=0            Bit 4=1 (must be 1)            Bit 5=0            Bit 6=1 (must be 1)            Bit 7=0</p>
32-35	10-11	Reserved - leave blank
36-43	12-19	<p>Symbolic Name (left justified)</p> <p>The alpha-numeric name assigned to this terminal. This name will be as follows:</p> <ul style="list-style-type: none"> <li>• NCP - The name given in the Stage 1 NCP Sysgen listing for the LU macro defining this terminal.</li> </ul> <p>The name is punched left justified... e.g., if the symbolic name is RAL1, card columns 36-39 would be punched RAL1 followed by 4 blanks in card columns 40-43.</p>
44-51	20-23	Leave blank.
52	24	'/' slash.

NOTE: The CDS for running API Echo on a 3270 is the same as for the 3270 test (R3270D). Only one CDS is required for both tests.

APPENDIX B - TRM EXAMPLES

Example 1 (TOLTEP) - NAME/T3700SNA//

Where: NAME is the symbolic name of the terminal to be tested. T3700SNA is API Echo Test.

This example will select the terminal called 'NAME' and send a message to it requesting what data to echo.

Example 2 (TOLTEP) - \*/T3700SNA//

This example is used when the test terminal and control terminal are the same. Only the \* is required for the symbolic name.

Example 3 (TOLTEP) - NAME/3700SNA/OPT,EXT=YYDATA/

Where: NAME is the symbolic name of the terminal. 3700SNA is the Echo Test. OPT is a TOLTEP option the user wishes to use. EXT=YYDATA is requesting the Echo Test to send 'DATA' to the terminal YY times.

Example 4 (TOLTEP) - NAME/T3700SNA/OPT, EXT=YY/

Where: NAME is symbolic name of the terminal. 3700SNA is Echo Test. OPT is a TOLTEP option the user wishes to use. EXT=YY is requesting the Echo Test to send Default Test Data (A-Z,0-9) to the terminal YY times.

Example 5 (TOLTEP) - NAME/3700SNA/OPT,EXT=YYX'DATA/

Where: NAME is the symbolic name of the terminal. 3700SNA is the Echo Test. OPT is a TOLTEP option the user wishes to use. EXT=YYX'DATA is requesting the Echo Test to send the data in Hex to the terminal YY times.

Example 6 (TOLTEP) -BIND PARAMETERS FOR SNA DEVICES

BIND PARAMETERERS are used to define how TOLTEP communicates with SNA test terminals.

To specify bind parameters for SNA test devices,

enter the parentheses and field yyy in the device field as:

DEV (yyy)/TEST/OPT/

Where field yyy is either:

- the entry name in the logon mode table in VTAM which contains the bind parameters for the devices to be tested such as:

SNA3275A (S3270) /

- the actual bind parameters consisting of 12 hexadecimal digits written as X'nnnnnnnnnnnn' such as:

D3770A (X'030321913040') /

If bind parameters are not specified in the device field, such as D3700A/, then the default set of bind parameters in the logon mode table are used.

See your system programmer for the bind parameters appropriate for SNA devices. TOLTEP uses the 6 bytes of the session parameters starting with the FM profile (byte 1) of DSECT ISTDBIND. Vtam Macro Language Reference, GC27-6995, for information.

Example 7 (TOTE) - IEDTOTE/NAME/NAME/3700SNA//

This example is used when the test terminal and the control terminal are the same device.

where: IEDTOTE is the TCAM/TOTE TRM prefix for SDLC devices.

NAME is the symbolic name of the test and control terminal.

APPENDIX C - EXAMPLES OF TEST

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 (TOLTEP) - Control and Test Terminal is the same device.

```
Logon applid(istoltep) (a)
F102I ISTOLTEP REL.2.0 INITIALIZATION IN PROGRESS (b)
F107I OPTIONS ARE NTL, NEL, NPP, 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 YDATA,PROMPT, OR END (e)
4test data (f)
test data (g)
test data (g)
test data (g)
test data (g)
901 ENTER YDATA,PROMPT, OR END (h)
end (i)
905 END OF ECHO TESTING (j)
```

DESCRIPTION

The meaning of each line is as follows:

- (a) The logon to TOLTEP
- (b) Standard OLT messages
- (c) 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 Echo (3700SNA).

No options were modified.

- (d) Standard OLT message. Note symbolic name of test. Device is given here (RTS2LU1).
- (e) Echo is requesting TEST DATA,PROMPT or END.
- (f) A response of 4test data - request that test data be repeated four times.
- (g) The data is being Echoed.

- (h) Echo invites more ECHO DATA, PROMPT or END the test.
- (i) A request of END of testing has been entered.
- (j) Ending message of Echo (no errors).

**Example 2 (TOLTEP) - 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

- (a) Standard TOLTEP start message.
- (b) Echo encountered status (non-zero system sense) errors during the echo portion of testing the system sense = 1002 which is (see Appendix D) a Request Error - RU Length Error.
- (c) The number of errors encountered was 5.
- (d) Standard TOLTEP \*Terminate Message.

Example 3 (TOLTEP) - Non-Compatible Bind and Recovery

```
S T3700SNA Unit 00CF RTS2LU1 (c)
F100I 912 Bind is not compatible with T3700SNA (a)
F100I 913 Bind is XX030320907040 (b)
F158I *T T3700SNA Unit 00CF RTS2LU1 (c)
F107I Options are NTL, NEL, NPP, FE, NMI, EP, CP, PR, NTR, NAP (d)
F105D Enter DEV/TEST/OPT/ (e)
RTS2LU1(X'030321903040')/// (f)
```

Description

- (a) Echo Error Message - T3700SNA cannot run the test device with this bind parameter.
- (b) The non-compatible bind parameter is displayed using the Description of the 913 Message (Section 7.1). The C1 byte has bit 1 on (Fm Headers Allowed) which Echo cannot support.
- (c) Standard TOLTEP Message.
- (d) Standard TOLTEP Message.
- (e) Standard TOLTEP Message.
- (f) To recover re-enter test request using optional bind parameter entry in the Device field.

Example 4 (TOTE) - Control and test terminal are the same device  
- an SDLC 3767

Press the SYSTEM REQUEST key on the 3767 to establish an LU to  
SSCP session (device to TCAM).

ENTER:

IEDTOTE/HL3767/HL3767/T3700SNA// (a)

The the following messages will print at the HL3767 device:

IED211I ON-LINE TESTING ACTIVE (b)  
IED335I nnnnnnnn \*\*\*CONTROL TERMINAL ID IS xx\*\*\* (c)  
IED333I S T3700SNA UNIT HL3767 (d)  
901 ENTER YYDATA, PROMPT, OR END (e)  
4 abcd (return) (f)  
abcd (g)  
abcd (g)  
abcd (g)  
abcd (g)  
901 ENTER YYDATA, PROMPT, OR END (h)  
end (i)  
905 END OF ECHO TESTING (j)  
IED334I T T3700SNA UNIT HL3767 (k)  
IED219I ON-LINE TESTING ENDED (l)

Description

- (a) Test request entry from the test device.
- (b) Information message from TOTE indicating that on-line testing is active-preliminary TOTE OLT setup was successful.
- (c) Information message from TOTE indicating the OLT control block address (nnnnnnnn) and the OLT control terminal ID xx that should be prefixed to all control terminal response messages.
- (d) Standard TOTE start message.
- (e) T3700SNA message requesting test data, prompt, or end.
- (f) A response of 4abcd, requesting T3700SNA to repeat abcd four times.
- (g) The abcd test data is being echoed.
- (h) T3700SNA invite more test data, prompt, or end.
- (i) A request of END of testing has been entered.
- (j) Ending message of T3700SNA (no errors).

- (k) Standard TOTE OLT terminate message.
- (l) Last TOTE message indicating end of on-line testing.

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK

APPENDIX D - SENSE DATA CODES

Path Error - Major Code = 80

Indicates that the request could not be delivered to the intended receiver due to path outage or Transmission Header Error. The SSCP may initiate Path recovery action after notification of a path outage by means of the NS command INOPERATIVE. Sessions may be suspended or unbound.

Modifier

- 01 Intermediate Node Failure: Machine or Program Check in an intermediate node; request discarded. A response may or may not be possible.
- 02 Link Failure. Data link failure.
- 03 L U Inoperative: The LU is unable to process requests.
- 04 Unrecognized D A F: An Intermediate or Boundary Node has no routing information for the DAF, or an end node has no LU with indicated DAF' (FID2 or FID3) or DAF (FID1).
- 05 No Sesion: No session is bound in the receiver for the pair in a Communication Controller node providing a Boundary Function. This exception does not apply to BIND, ACTPU or ACTLU.
- 06 F I D: Invalid FID for the receiving node.
- 07 Segmenting Error: Mapping field error, such as first, last, middle, or segmenting not supported and MPP ≠ 11.
- 08 P U Not active: The Physical Unit in the receiving node has not been activated and request is not ACTPU for this PU.
- 09 L U Not Active: The LU indicated by the DAF has not been activated and the request is not ACTLU.
- 0A Reserved.
- 0B Incomplete TH: Transmission received shorter than TH.
- 0C D C F: 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 (8002) is sent.

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK

R H Error - Major Code = 40

Indicates that the value of a field or combination of fields in the RH violates architectural rules or BIND options previously selected. These errors are independent of the current states of the session or data flows. They result from the failure of the sender to enforce Session rules. It is not required that the receiver check for these conditions.

Modifier

- 01 Reserved
- 02 Reserved
- 03 BB not allowed: The BB bit was set on MOC or LOC.
- 04 EB not allowed: The EB bit was set on MOC or LOC, or by the Primary when only the Secondary 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: A definite response was requested when not permitted.
- 08 Pacing Not Supported: The Pacing bit was set on a request, but the receiving CPM does not support pacing for this session.
- 09 CD not allowed: The CD bit was set on FOC or MOC.
- 0A No Response Not Allowed: No response was specified on a request when not permitted.
- 0B Chaining Not Supported: Chaining bits indicate other than "only in chain", but multi-request chains are not supported on the session.
- 0C Brackets Not Supported: A Bracket bit was set, but Brackets are not used on the session.
- 0D CD Not Supported: Change Direction bit was set, but is not supported.
- 0E Sense Data Included not allowed: The Sense Data Included bit was set on a request (EXR) when not allowed by session rules.
- 0F Format Indicator Not Allowed: The Format Indicator was set when not supported on the session, or when BC was not set.

- 10 Alternate Code Not Supported: The Code Indicator was set when  
not supported on the session.

State Error - Major Code = 20

Indicates a sequence number error, or an RH field or RU which is not allowed in the current session control or data flow control state of the receiver.

Modifier

- 01 Sequence Number: Sequence number received on normal flow request was not one greater than the last.
- 02 Chaining: Chaining field error such as first, middle, first.
- 03 Bracket: Error resulting from failure of sender to enforce Bracket rules for session. Does not include contention errors or race errors.
- 04 Direction: FM Data request received while in the HDX-ff transmit state.
- 05 Data Traffic Reset: An FM Data or DFC request received in a session which is bound but which is in the Data Traffic Reset State.
- 06 Data Traffic Quiesced: FM Data or DFC request received from an LU which has previously sent Quiesce Complete or Shutdown Complete and has not responded to Release Quiesce.
- 07 Data Traffic Not Reset: A Session Control request allowed only in the Data Traffic Reset state (e.g., STSN) was received while Data Traffic was not reset.

Request Error - Major Code = 10

Indicates that the RU was delivered to the intended NAU, but could not be interpreted or processed. This condition represents a mismatch in FM capabilities.

Modifier

- 01 RU Data Error: User Data in the RU is not acceptable to the receiving FM, such as a character code not in the set supported, or a formatted data field which is not acceptable to Presentation Services.
- 02 RU Length Error: RU 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 of the range allowed by the receiver.
- 06 Reserved
- 07 Category Not Supported: DFC, SC or NC request received by a NAU not supporting any requests in the Category, or Network Services request with byte 0  $\neq$  01, or byte 1  $\neq$  valid NS Category supported by the receiver.
- 08 Invalid FM Header: The FM header is not understood or translatable by the receiver, or FM header is expected but not present.

Request Reject - Major Code = 08

Indicates that the request was delivered to the intended NAU and understood and supported, but was not executed.

Modifier

- 01 Resource Not Available: The requested resource (LU, PU, Link) specified in an RU is not available.
- 02 Intervention Required: Forms or cards are required at an output device, 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 bound as one of the NAUs is at its session limit. Applies to INITIATE, BIND and CINIT commands.
- 06 Resource Unknown: The resource (LU, PU or Link) name or address in an RU is not recognized by the receiver.
- 07 Reserved
- 08 Reserved
- 09 Mode Inconsistency: The requested function cannot be performed in the present mode of the receiver.
- 0A Permission Rejected: The receiver has denied an implicit or explicit request of the sender.
- 0B Bracket Race Error: Recoverable apparent violation of Bracket Protocols. Arises when Bracket initiation/termination is allowed by both NAUs in a session.
- 0C Procedure Not Supported: A named procedure (Test, Measurement, Trace) specified in an RU is not supported by the receiver.
- 0D Reserved
- 0E LU Not Authorized: The requesting LU does not have access to the requested resource.
- 0F LU Not Authorized: The requesting End User does not have access to the requested resource.
- 10 Missing Requestor ID: Required Requestor ID was missing.

- 11 Break: Asks the receiver of Break to terminate present chain with Cancel or EOC. Sender enters purging Chain 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: BID (or BB) is received while INB or while BETB and the FM denies permission. RTR will not be sent.
- 14 Bracket Bid Reject - RTR: BID (or BB) is received while INB or while BETB and the FM denies 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 terminate a procedure or deactivate a network element was received but the element or procedure was not active.
- 17 Link Inactive: A request requires the use of a link, but the link is inactive.
- 18 Link Procedure in Process: Contact, Discontact, IPL or other link procedure in progress when a conflicting request is received.
- 19 RTR Not Required: Receiver of Ready to Receive has nothing to send.
- 1A Request Sequence Error: Invalid sequence of requests.
- 1B Receiver in Transmit Mode: Sent to notify the sender that a transmission cannot be accepted because receiver is in HDX contention transmit mode.
- 1C Request not executable: The requested function could not be executed due to a permanent error condition in the receiver.
- 1D Invalid Station/SSCP ID: The Station or SSCP ID was found to be invalid by the receiver.
- 1E Session Reference Error: A request contains a reference to a session which is not bound or in process. Generally applies to Network Service Commands.
- 1F Reserved
- 20 Control Vector Error: Data is invalid for the Control Vector specified by the target network address and key. Applies to Set and Sense Control Vector.

- 21 Invalid Session Parameters: Session Parameters are invalid or not supported by the NAU(s) for which the session is requested.
- 22 Link Procedure Failure: A link-level procedure has failed due to link hardware failure, loss of contact with a link station or an invalid response to a link ccommand. (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 which had been selected has been aborted due to an error condition or resource depletion.
- 25 Component Not Available: The LU component selected in an FM Header is not available.
- 26 FM Function Not Supported: A function requested in an FM data 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 reply, but the outbound data flow is Quiesced or Shutdown, and there is no queueing capability at the LU.
- 29 Change Direction Required: A request requires a reply, but the data flow is in HDX-ff receive state; CD was not set on the request and there is no queueing capability at the NAU.

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK

APPENDIX E - USER SENSE CODES

3270

X'0800'	Busy
X'0400'	Unit Specify
X'0200'	Device End
X'0020'	Command Reject
X'0010'	Intervention Required
X'0008'	Equipment Check
X'0004'	Data Check
X'0002'	Control Check
X'0001'	Operation Check

3767

None Used

3770

None Used

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK

APPENDIX F - BRACKET TERMINATION RULES

Two modes of ending a bracket are associated with two bracket termination rules, one of which is selected when the session is bound:

Bracket Termination Rule 1:

Bracket Termination is controlled by the response requested to the chain containing EB. If the chain requests definite response, the bracket is not terminated until the response is processed. If the chain requests an Exception response, the bracket is terminated unconditionally when the last request of the chain carrying EB in its first request is processed. If BB and EB appear on the same chain, the bracket is unconditionally terminated regardless of the type of response requested.

Bracket Termination Rule 2:

A bracket is always terminated unconditionally when the last request of the chain carrying EB in its first request is processed, regardless of the type response requested.

THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK

GLOSSARY

Abbreviations

API	Application Program Interface
CDS	Configuration Data Set
NCP	Network Control Program
SDLC	Synchronous Data Link Control
TRM	Test Request Message

Definitions

**BIND** - Starts a session between two logical units. Parameters passed with the bind define all of the protocols that must be observed during this session.

**BIND PARAMETERS** - The interface rules that will be enforced during a session (ie, when Echo talks to you through your terminal).

**CDS** - Configuration Data Set - a data set catalogued on a library accessible to the OLT executive which contains the system configuration information required to test a device using OLT's. There is one entry for each device to be tested.

**NCP** - Network Control Program - this is a program written in 3705 machine language and designed to control the data flow from the host CPU to terminals in such a way as to minimize CPU intervention. The NCP is loaded from the CPU into the 3705 for execution.

**OLT EXECUTIVE** - This is a program that is executed in the host CPU, which provides an interface between the OLT and the system devices (Printers, terminals, system consoles, etc.) Most executives do not interface directly to the devices but do so through an access method or operating system. OLTSEP is an exception - it is a stand-alone OLT executive. The OLT executives are OLTSEP, OLTEP, TOTE, and TOLTEP.

**SESSION** - (1) From a terminal operator's viewpoint, the period of time during which he engages in a conversation with an interactive system or subsystem; the elapsed time from when the terminal operator logs on until he logs off.

(2) From an internal viewpoint, the period during which two telecommunication entities (devices or program units) are logically and physically connected and can communicate.

**SESSION PARAMETERS** - The interface rules that will be enforced during a session (ie, when Echo talks to you through your terminal).

**TRM** - Test Request Message - This is a message input to the OLT executive at communications interval time which defines the test device, the test to be run, and any test options or parameters. The OLT test is not in the system at the time this message is entered but is loaded and executed as a result of this entry.

END OF DOCUMENT