

IBM MAINTENANCE DIAGNOSTIC PROGRAM
3704/3705 COMMUNICATIONS SCANNER ON-LINE TESTS
MAY 23, 1977

T3700

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1.0 Introduction and Use of this Document

This document was written toward the goal of providing all necessary information in a logical order that can be readily indexed. It is suggested that the first time user of On-Line Line Tests review the document in its entirety. (Sections 1.1 and 1.2 should be read in their entirety, before proceeding.)

1.1 Documents Referenced:

The following documents are referenced at various points throughout this document:

- a) TOLTEP SRL, "DOS/VS and OS/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) "On-Line Terminal Test User's Guide", form D99-3700A. This document contains information certain common On-Line Line Test Control Program error printouts.
- c) 3705 PETHM, "3705 Communications Controller Theory-Maintenance", form SY27-0107. This document contains in-depth description of the 3705 hardware. The areas dealing with the diagnostic wrap capabilities of the 3705 should be reviewed. (Equivalent document for 3704 is SY27-0115.)
- d) "3705 Communications Controller On-Line Tests and Internal Functional Tests", form D99-3705A. This document contains the descriptions of routines 15F0 and X6F0 which provide 3705 secondary station support of the SDLC Link Test. (Equivalent document for 3704 is D99-3704A.)
- e) "OS/VS TCAM Systems Programmers Guide", form GC30-2051. This document describes how to use and initiate TCAM level 10 TOTE, the TCAM Teleprocessing On-Line Test Executive (TOTE) program. It should be reviewed.

1.2 Explanation of a Few Critical Terms

The following terms are used throughout this document. It is essential that the reader be familiar with their meanings before progressing.

1.2.1 Wrap and Test Lines

The terms "wrap line" and "test line" are used to define the usage of a line being used in a test. Ordinarily, "test line" refers to the line being tested, while "wrap line" refers to the line being used as a vehicle with which to test the "test line".

In the tests that wrap data, data is transmitted via the wrap line and is received via the test line.

In the case of full duplex modem wraps, the idea of the wrap line being used as a vehicle is incorrect. Data is still sent via the wrap line, but now the wrap line is actually being tested also. (Data is transmitted via the wrap line, which is actually the transmit side of the full duplex modem.)

.2.2 Integrated Modems

For the sake of clarity, reference is often made to 1200 bps integrated modems and 2400 bps integrated modems. These are modems that have been "integrated" into the 3704/3705 line interface bases. The associated LIB types are given below.

- a) 1200 bps half-duplex integrated modem. LIB types 8 and 9.
- b) 1200 bps full duplex integrated modem. LIB type 10.
- c) 2400 bps half duplex integrated modem. LIB types 5, 6 or 7. (For 3704, line set types 1L, 1H, 1P, or 1Q.)
- d) 2400 bps full duplex integrated modem. LIB type 11. (For 3704, line set types 1X or 1Y.)
- e) 1200 bps integrated modem with break feature. LIB type 12. (For 3704, LIB type 8.)

2.0 Purpose and General Description of Tests

The 3704/3705 Communications Scanner On-Line Line Tests (OLLT's) were designed to functionally test the per-line hardware (line sets, line adapters, integrated modems, and automatic call originate features) of the 3704/3705 Communications Controller, and SDLC links attached to the 3704/3705.

The OLLT's reside in the host CPU. The individual OLLT modules build "interpretive command chains" which are passed to the On-Line Line Test Control Program (OLLTCP). The OLLTCP, in turn, puts the command chains into a Path Information Unit, or PIU. The PIU is given to the JLT executive, TOLTEP, which sends the PIU, through VTAM, to the NCP residing in the 3704/3705. The NCP decodes the individual interpretive commands and performs the indicated operation.

Some of the interpretive commands initiate certain hardware manipulations or buffering operations, e.g., set LCD/PCF, send data, etc. Other commands are used to check the results of such operations and control such things as error branching and looping.

When execution of a command chain is complete, the NCP returns certain information relating to the results of the command chain (the OLLTCB, see Appendix B) and any received data back to the OLLT in the host. The OLLT analyzes the results and sends over the next command chain or issues an error print, as appropriate.

All of the foregoing takes place while normal VTAM and NCP operations continue on all other lines not being tested.

The OLLT'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, etc. These tests are T3700LTA through T3700LTF.

Only one test falls into the second category, T3700LT. This section tests all the same functions as those in the first category, provides for an external data wrap, and also allows for the optional selection of such things as the data to be wrapped, the LCD, etc.

The following sections describe the individual tests. Appendix A describes, in detail, the specific operation of the tests. Refer to the 3704/3705 FETMM for details on the data paths and hardware operation of the individual diagnostic wraps.

- 2.1 T3700LTA - provides for an internal data wrap. Utilizing the hardware diagnostic wrap facility of the 3704/3705 communications scanner, this section tests the data path of a line set, up to (but not through) the line drivers and terminators. This section has only one routine.

- 2.2 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, 3874, and 3875 modems attached to 3704/3705 full duplex lines. The test section looks at the external clock bit in the set-mode SDF to determine the type of modem. If internally clocked, the section assumes an integrated 1200 BPS modem. If externally clocked, it assumes an integrated 2400 BPS modem or external 3872/3874/3875.

This test section has three routines. All three routines perform the same function. The only difference is in the selection of data rate select.

Routine 1 - 1200 BPS integrated modems only. (No data rate select.)

Routine 2 - 2400 BPS integrated modems or 3872, 3874, 3875. This routine runs with the higher modem speed selected. (Data rate select on.)

Routine 3 - 2400 BPS integrated modems or 3872, 3874, 3875. This routine runs with the lower modem speed selected. (Data rate select off.)

Note: If running with an external 3872/3874/3875 modem whose mode switch is not in the "external" position, both routines 2 and 3 will be run; however, the modem will actually be tested only at the speed selected by the mode switch.

- 2.3 T3700LTC - provides for execution of a modem self-test. This section was designed to test the 2400 BPS half duplex integrated modem and external 3872, 3874, and 3875 modems attached to 3704/3705 half duplex lines.

This section has two routines. Both provide the same function. The only difference is the state of data rate select. Routine 1 runs with the data rate select interface lead on (the high modem speed) and routine 2 runs with it off (the lower modem speed).

Note: If running with an external 3872/3874/3875 modem whose mode switch is not in the "external" position, both routines 1 and 2 will be run; however, the modem will actually be tested only at the speed selected by the mode switch.

- 2.4 T3700LTD - provides for a test of the Autocall Originate (ACO) feature of the integrated modems. It may also be used to exercise externally attached autocall units. Basically, the test is performed by dialing numbers selected by the operator.

There are two routines in this section, also. The first routine dials a valid telephone number and tests for successful connection. The second dials an invalid number, no answer or busy, and tests for no connection.

The numbers to be dialed may be entered by the operator at either of two times. The first is at the time the test is requested, by supplying the numbers in the EXT= field of the test request message. None, one, or both of the numbers may be entered at that time. The second is at the beginning of each of the routines. If the dial number for the individual routine was not entered in the EXT= field, a request will be made for the operator to enter it.

- 2.5 T3700LTE - provides for execution of the SDLC link test. This test is designed to aid in isolating failures on an SDLC link. Refer to section 8.3.4 for a general description of the SDLC link test.

This section automatically sends the SDLC test frame 10 times and does not allow optional data to be sent in the test frame.

- 2.6 T3700LTF - provides for a test of the break circuitry of the integrated 1200 bps modem 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.

Note: It is recommended that section T3700LTB be successfully run before attempting to run this routine.

- 2.7 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. In any of these cases, the operator may optionally specify:

- a) The data to be sent.
- b) The LCD to be utilized. (If SDLC, the operator may also specify if NRZI mode is to be used.)
- c) The set-mode SDF to be utilized.

d) In test 6, the number of frames to be sent.

When T3700LT begins execution, a request is made to determine the test to be run. The operator may select from one of the following:

- Test 1 - internal data wrap. Same function as T3700LTA.
- Test 2 - modem data wrap. Same function as T3700LTB. (If full duplex and external clocking and operator has specified the LCD or set-mode SDF, only routine 1 will be run. Data rate select will be set as selected by operator.)
- Test 3 - modem self-test. Same function as T3700LTC. (If operator has specified the LCD or set-mode SDF, only one routine is run. Data rate select is set as selected by operator.)
- Test 4 - ACO dial. Same function as T3700LTD. (Numbers to be dialed may not be entered in the test request message.)
- Test 5 - External data wrap. Provides a means of externally wrapping any two lines, thus verifying a data path outside of the 3704/3705. Although the method of wrapping would normally be the use of an external wrap block on the 3704/3705 line interface connectors, wrapping may be done "downline" at any convenient point. However, for external wrapping, the transmit side of a full duplex line may be wrapped only to its associated receive side. (i.e., the transmit side of one full duplex line may not be wrapped to the receive side of another full duplex line.)
- Test 6 - SDLC Link Test. Same function as T3700LTE.
- Test 7 - Break test. Same function as T3700LTF.

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3.0 Program Requirements.

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

- a) One of the following On-Line Test executive programs must be running in the host system:
 - The Teleprocessing On-Line Test Executive Program (TOLTEP)
 - The Teleprocessing On-Line Test Executive (TOTE) - TCAM 10 or above.
- b) A Network Control Program (NCP) that has the OLT option included must be running in the 3704/3705. (NCP level 3.0 or higher. The test sections described in this document will not run on earlier NCP versions. Refer to document D99-3704B or D99-3705B for On-Line Line Tests that will.) (T3700LTE requires NCP level 3.2 or higher.)
- c) The 3700 family of OLT's must be present in the OLT library.
- d) Each line symbolic name entered in the test request message must be defined to VTAM or TOTE, and defined in the NCP. For SNA-2 TOLTEP, or higher, and TCAM level 10 TOTE, no CDS entries are required for running these test sections. For TOLTEP versions lower than SNA-2, an NCP CDS and a line CDS for each line to be tested are required. Refer to D99-3700A-04 for descriptions of these CDS's. TOTE versions below TCAM 10 do not support On-Line Line Tests.
- e) A line being tested may not be the same line to which the control terminal is attached.
- f) Each line being tested must be varied off-line (inactive) prior to test initiation.

4.0 Hardware Requirements

In addition to the individual requirements outlined in the following paragraphs, only one of the test sections described in this document should be run on lines on the same communications scanner at one time, because of hardware restrictions. Neither should any of these tests be run on lines on the same communications scanner while NCP Panel Line Test or Line Trace is being run.

4.1 T3700LTA (and T3700LT, test 1)

The only requirement for this section is that the lines being wrapped must be on the same communications scanner.

4.2 T3700LTB (and T3700LT, test 2)

This section requires that the "test" line be an integrated 1200 bps modem, a full duplex integrated 2400 bps modem, or an external 3872/3874/3875 modem attached to a full duplex 3704/3705 line.

If the "test" line is a half duplex 1200 bps integrated modem, the "wrap" line may be any line on the same communications scanner.

If running with an external 3872/3874/3875 modem, the modem's mode switch should be in the "external" position, to allow the test section to control the modem speed. (If this is not done, the section should still run successfully; however, the modem will only be tested at the speed selected by the mode switch.)

4.3 T3700LTC (and T3700LT, test 3)

This section requires that the line being tested be either an integrated half-duplex 2400 bps modem or an externally attached half-duplex 3872/3874/3875.

If running with an external 3872/3874/3875 modem, the modem's mode switch should be in the "external" position, to allow the test section to control the modem speed. (If this is not done, the section should still run successfully; however, the modem will only be tested at the speed selected by the mode switch.)

4.4 T3700LTD (and T3700LT, test 4)

This test requires that the line being tested be a switched line with either an integrated modem with the Automatic Call Originate feature or an externally attached autocall unit.

Routine one requires that the number dialed be capable of providing an answer tone, to allow normal completion of the dialed connection.

4.5 T3700LTE (and T3700LT, test 6)

This section's only requirement is that an SDLC device or remote 3704/3705 be attached to the 3704/3705 line being tested. (In the case of full duplex lines, a wrap block, or any other means of external wrapping, may be utilized in lieu of a downline device. Refer to section 8.4.6.)

If the attached device is a remote 3704/3705, the SDLC link test IFT routine must be loaded and running in the remote machine. This is routine X6F0 for type 2 communications scanners and 15F0 for type 1 communications scanners. Refer to document D99-3704A or D99-3705A for information regarding the operation of these routines.

4.6 T3700LTF (and T3700LT, test 7)

This section requires that the line being tested be an integrated 1200 bps modem with break feature.

4.7 T3700LT (test 5)

This test requires that the lines being wrapped are connected together in such a fashion that send data of the "wrap" line is wrapped to receive data of the "test" line, and that all normal interface signals are present. The lines may be wrapped anywhere. (Refer to the 3704/3705 FETMM for a description of the use of wrap blocks.) (Switched lines may be wrapped as long as they have been manually connected beforehand.)

5.0 General Run Procedures

The prime purpose of the following paragraphs is to describe how to enter the "DEVICE" 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, or the TOTE SRL, "OS/VS TCAM System Programmer's Guide", form GC30-2051. This information was not included in this document for the sake of simplicity. The TOLTEP and TOTE documents provides more detailed, specific, and accurate information on the execution of TOLTEP and TOTE than could be provided in this document.

5.1 T3700LTA

The following illustrations show samples of the "DEV" field of the test request message and are used to illustrate the T3700LTA test sequence.

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' symbols, used below, indicate the respective transmit and receive lines of a full duplex pair.

The symbols "Wn" and "Tn" indicate the respective wrap and test lines, where 'n' indicates the sequence of the test. Examine the following examples and the descriptions that follow.

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

In example a), 'BOSTON' is used as the wrap line, throughout the test, since it is the first line entered in the test request message. Each line, in turn, is then selected as the test line. (Both transmit and receive sides of full duplex lines 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.

The sequence is the same in example b). 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.

5.2 T3700LTB

The following illustrations show samples of the "DEV" field of the test request message and are used to illustrate the T3700LTB test sequence.

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. Examine the following examples and the descriptions that follow.

a) ATLANTA,BOSTON,NEWYORK

PASS 1:	W1	T1	
PASS 2:	W2		T2

b) RICHMOND,MONTREAL,NEWYORK
(TX) (RX) (TX) (RX)

PASS 1:	W1	T1		
PASS 2:			W2	T2
PASS 3:	W3			T3

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) illustrates, however, that whenever a full duplex line is encountered, its transmit side is used as the wrap line.

Up to sixteen symbolic line names may be entered in the test request message.

5.3 T3700LTC

Since this section requires only one line at a time to run, 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.

5.4 T3700LTD

This section, also, requires only one line at a time. Enter the name of each line to be tested, up to a maximum of sixteen names. Each line will be tested, in the order entered.

The telephone numbers to be dialed by this section may be entered at the same time the lines are selected. This is done by providing them in the EXT= option of the "OPT" field of the test request message. If this is desired, enter the numbers in the EXT= option, as follows:

- a) The telephone number for routine 1, routine 2, or both may be entered. If both are entered, they must be separated by a comma. If only the number for routine 2 is entered, it must be preceded by a comma to indicate the absence of the number for routine 1. (Example: EXT=,4551). If only the number for routine 1 is entered, no comma is necessary.
- 2) Total length of the EXT= field may not exceed 54 characters. The total length of either telephone number may not exceed 34 characters. (If the total length of both numbers exceeds 54 characters, omit one of the numbers. When the routine requiring that number is executed, it will ask for it.)
- 3) Only the characters 0-9, '?', '%', or '_' may be entered, as described in section 7.1, message ITB523, paragraph (c).

5.5 T3700LTE

Since this section requires only one line at a time to run, 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.

5.6 T3700LTF

Since this section requires only one line at a time to run, 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.

5.7 T3700LT

The device entry 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. 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. Refer to section 6.0.) 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. (Refer to section 6.0.)

If no wrap line is entered (only one line name entered), and the test line is full duplex, the side not selected in response to message ITB502 will be used as the wrap line.

6.0 Selecting Options Under T3700LT

T3700LT provides for selection of five different tests in addition to allowing the operator to optionally specify the data to be wrapped and the LCD and set mode SDF to be utilized. The following paragraphs describe how to select the lines, tests, and options. Refer to section 2.6 for the individual test descriptions. Sections 4.1 through 4.6 describe the hardware requirements of each of the tests.

6.1 Selecting the Line to be Tested

Selection of the line to be tested under T3700LT consists of two phases. The first is at the time the test request message is issued. At this time, one or two symbolic line names may be entered. The first name entered will be selected as the test line. If a second name is entered, it will be selected as the wrap line.

The second phase occurs just after test initiation. If either of the lines are full-duplex, message ITB502 will occur to allow the selection of the transmit or receive side for each line. (Remember, although having only one symbolic name, full duplex lines consist of two physical 3704/3705 line addresses.)

If only one line name was entered, and it is a full duplex line, the side selected in response to message ITB502 will be used as the test line. The other side, the non-selected one, will be used as the wrap line.

Line selection occurs only once. After the lines have been selected, a request will be issued for the test desired. As each test finishes, the request will be issued again. The same lines are used for each test requested, until a new test request message is issued.

- a) Test 1 - Internal data wrap. Requires two physical 3704/3705 lines to be run. Therefore, one of the following conditions must be met.
 - 1) The names of two half duplex lines are entered. In this case, the first line will serve as the test line, and the second as the wrap line.
 - 2) The name of only one full duplex line is entered. In this case, the side selected in response to message ITB502 will serve as the test line, and the non-selected line will serve as the wrap line.
 - 3) Two line names are entered and one of them is full duplex. The same conditions apply to this case as in case 1.), above. Message ITB502 will occur for the full duplex line, allowing the selection of the transmit or receive side. Either may be chosen.
 - 4) The names of two full duplex lines are entered. Message ITB502 will occur for both lines. The selected side of the first line will serve as the test line, and the selected side of the second line will serve as the wrap line.
- b) Test 2 - Modem data wrap. Requires either an integrated 1200 bps half or full duplex modem, an integrated full duplex 2400 bps modem, or an externally attached full duplex 3872/3874/3875. The following restrictions apply:
 - 1) Half-duplex modem to be tested - The first name entered must be that of the half duplex modem. The second name be that of any other line on the same communications scanner. If the second name is that of a full-duplex line, message ITB502 will occur to allow selection of the transmit or receive side of the full duplex line.
 - 2) Full duplex modem to be tested - Only one name, that of the full duplex modem, may be entered in the test request message. When message ITB502 occurs, the receive side of the line must be selected for testing.
- c) Test 3 - Modem self-test. Requires only one name be entered. That line must be a half duplex 2400 bps integrated modem or a half duplex externally attached 3872/3874/3875. A second line name may be entered with no effect.

- d) Test 4 - ACO dial. Requires only one name be entered. That line must be a switched line with autocall. A second line name may be entered with no effect.
- e) Test 5 - External data wrap. Same considerations as in Test 1. However, for external wrapping, the transmit side of a full duplex line may be wrapped only to its associated receive side. (i.e., the transmit side of one full duplex line may not be wrapped to the receive side of another full duplex line.)
- f) Test 6 - SDLC Link Test. Requires only one name be entered. If the line name entered is that of a full duplex line, the transmit side of the line must be selected for testing in response to message ITB502.
- g) Test 7 - Break test. Requires only one name be entered. That line must be an integrated 1200 bps modem with break feature. A second line name may be entered with no effect.

6.2 Selecting the Test

After line selection, a request, message ITB504, will be issued to select the desired test. Any of the six tests may be selected, as long as valid lines have been selected for the test requested. (Refer to the preceding section.)

When the selected test has completed, message ITB504 will be repeated to allow selection of the next test. Note that device selection does not recur, and if testing on other lines is desired, 'END' must be entered in reply to message ITB504. T3700LT will terminate and a new test request message may be issued.

6.3 Selecting the Options

After a test has been selected, message ITB505 will occur, providing an opportunity to select any or none of the following options:

- a) 'WRAP' - allows selection of the set mode SDF to be used with the wrap line during the selected test. (If this option is not selected, the same set mode SDF used by the test line will be used by the wrap line.)
- b) 'TEST' - allows selection of the set mode SDF and/or LCD to be used with the test line during the selected test.
- c) 'DATA' - allows specification of the data characters to be sent.
- d) 'END' - ends the option selection process. The selected test will begin execution.

Dependent upon the test selected, some options may be invalid or have no effect. For example, selecting the "DATA" option will have no effect if test 3 or 4 is selected. Tests 3 and 4 do not use data. Also in example, selecting the 'WRAP' option is invalid, if there was no wrap line present in the test request message.

Anytime an option is not selected, standard default values are used. Each time a new test is requested, options have to be re-selected. Restrictions and defaults for each option are given in the following paragraphs.

6.3.1 Selecting the Data to be Wrapped

The 'DATA' option allows specification of the data to be transmitted during the selected test. Up to 30 bytes of data may be specified. T3700LTX will add syn and BCC characters as follows:

- BSC - Two syn characters will automatically be added in front of the data specified. (X'3232' for EBCDIC, X'1616' for ASCII). Only one of these syn characters will appear in the received data.
- SDLC - The test section will automatically generate the two BCC characters that will be inserted at the end of the specified data. These characters will be generated solely by software without the use of 3704/3705 BCC accumulation assist hardware. This is to insure that the accumulation circuitry (which will be used while receiving) works properly. The two generated characters will appear in the send and receive data streams.

None of the data entered is validity checked to insure proper format. Care should be taken to insure data is correctly entered; e.g., if an LCD is selected that has 7 data bits, the high-order bit of each byte must be off. If not, erroneous data compare and other errors may occur. Data entered is transmitted in the same order it is entered.

If the data option is selected and data has been previously entered, that same data may be used without reentering it, by replying 'EOB' to message ITB506D.

If the data option is not selected, the standard data, as shown in Figure 6.0, will be used. Syn and BCC characters are added as specified above.

Special Note: For test 6, SDLC Link Test, the first two bytes entered should be a valid SDLC station address byte and valid SDLC TEST command byte. (Refer to section 8.3.4 for a description of the SDLC test frame.) The program will not check the validity of these two bytes and unpredictable results will occur if they are not valid. If the data option is not selected, the default will consist solely of an SDLC test frame without the optional data field.

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D99-3700C-00

LCD 0 - START/STOP 9/6

X'3F3F0000'
X'2313330B'
X'2B1B3B07'
X'27211131'
X'09291939'
X'05251232'
X'0A2A1A3A'
X'06261420'
X'10300828'
X'18380424'
X'00003F3F'

LCD 2 - START/STOP 8/5

X'1F1F0000'
X'03190E09'
X'010D1A14'
X'060B0F12'
X'1C0C1816'
X'170A0510'
X'071E131D'
X'15111617'
X'13010A10'
X'15070618'
X'00001F1F'

LCD 4 - START/STOP 9/7

X'7F7F0000'
X'2313730B'
X'6B5B3B07'
X'67615131'
X'49291979'
X'45255232'
X'4A2A1A7A'
X'46265420'
X'10700868'
X'58380464'
X'00007F7F'

LCD 5 - START/STOP 10/7

X'7F7F0000'
X'2313730B'
X'6B5B3B07'
X'67615131'
X'49291979'
X'45255232'
X'4A2A1A7A'
X'46265420'
X'10700868'
X'58380464'
X'00007F7F'

LCD 6 - START/STOP 10/8

X'FFFF0000'
X'C1C2C3C4'
X'C5C6C7C8'
X'C9CACBCC'
X'CDCECFD0'
X'D1D2D3D4'
X'D5D6D7D8'
X'D9DAB0B1'
X'B2B3B4B5'
X'B6B7B8B9'
X'0000FFFF'

LCD 7 - START/STOP 11/8

X'FFFF0000'
X'C1C2C3C4'
X'C5C6C7C8'
X'C9CACBCC'
X'CDCECFD0'
X'D1D2D3D4'
X'D5D6D7D8'
X'D9DAB0B1'
X'B2B3B4B5'
X'B6B7B8B9'
X'0000FFFF'

LCD 9 - SDLC 8

X'FFFF0000'
X'C1C2C3C4'
X'C5C6C7C8'
X'C9D1D2D3'
X'D4D5D6D7'
X'D8D9E2E3'
X'E4E5E6E7'
X'E8E9F0F1'
X'F2F3F4F5'
X'F6F7F8F9'
X'7E7E0A0F'

LCD C - BSC EBCDIC

X'FFFF0000'
X'C1C2C3C4'
X'C5C6C7C8'
X'C9D1D2D3'
X'D4D5D6D7'
X'D8D9E2E3'
X'E4E5E6E7'
X'E8E9F0F1'
X'F2F3F4F5'
X'F6F7F8F9'
X'3232FFFF'

LCD D - BSC USASCII

X'FFFF0000'
X'C1C2C3C4'
X'4546C7C8'
X'494ACB4C'
X'CDCE4FD0'
X'5152D354'
X'D5D65758'
X'D9DAB031'
X'B63738B9'
X'B63738B9'
X'1616FFFF'

Standard Wrap Data
(Refer to Section 6.3.1.)

Figure 6.0

6.3.2 Selecting the LCD

The LCD for the test line may be specified by selecting the 'TEST' option. Message ITB508 will be issued to allow specification of the LCD to be used on the test line. If tests 1, 2, or 5 have been selected, this same LCD will automatically be used on the wrap line to insure compatibility.

Care must be taken to insure that any data entered via the 'DATA' option is valid for the LCD selected. Refer to section 6.3.1. If the standard data is to be utilized, the data used will be selected using this LCD.

If the LCD is not specified, the LCD normally used by the NCP on the test line will be utilized during the test. The same LCD will be used on the wrap line. If test 3 is selected, LCD C is always used. If test 6 is selected, LCD 9 is always used.

6.3.3. Selection of NRZI Mode.

If the LCD used on the test line, either by default or by selection of the 'TEST' option, is an SDLC LCD, message ITB534 will be issued to provide the opportunity of specifying if NRZI mode is to be used. If not specified, the usage of NRZI mode will be determined from the NCP. If specified to be used, NRZI mode will be used on both the wrap and test lines. If specified not to be used, neither line will utilize it.

6.3.4 Specifying Usage of New-Sync.

If the LCD used on the test line, either by default or by selection of the 'TEST' option, is an SDLC LCD, message ITB536 will be issued to provide the opportunity of specifying if the new-sync interface lead is to be utilized. If not specified, its usage is determined from the NCP. If specified, new-sync will be turned on during every transmission. (This option is valid only for test 6, the SDLC link test. In all other cases transmission is always without new-sync.)

6.3.5 Selecting the Set Mode SDF

The set mode SDF for either the wrap or test lines may be specified by replying 'WRAP' or 'TEST', respectively, when replying to message ITB505. Message ITB509 will then occur.

If the set mode SDF for a line is not selected, the set mode SDF normally used by the NCP will be modified as indicated in Appendix A, and used.

Care should be taken in specifying the set mode SDF's. Erroneous errors will occur if non-compatible set mode SDF's are selected. Things such as oscillator selection, etc., are of utmost importance. Note also that 'test 2' utilizes the external clock bit to determine the type of modem attached. If internally clocked the test assumes an integrated 1200 BPS modem. If externally clocked, it assumes an integrated 2400 BPS modem or external 3872/3874/3875. The most critical bits will always be set by the test section as indicated below.

CAUTION: Because of NCP operation, if external clocking is selected on a line attached to a Type 1 Communications Scanner, and the external clock is not present, a timeout will occur. In addition, the line will be lost to all further operations until the external clock becomes present.

Test 1:

Test line: Diagnostic wrap mode is set.
Wrap line: Diagnostic wrap mode is set.

Test 2 (half duplex):

Test line: Diagnostic wrap mode is set.
Data terminal ready is set.

Wrap line: Diagnostic wrap mode is set.

Test 2 (full duplex):

Test line: Diagnostic wrap mode is set.
Data terminal ready is set.

Wrap line: Diagnostic wrap mode is set.
Data terminal ready is set.

Test 3:

Diagnostic mode is always set.

Test 4:

Data terminal ready is always set.

Test 5:

Nothing is changed.

Test 6:

Nothing is changed.

Test 7:

Diagnostic wrap mode is set.
Data rate select is set.

7.0 Printouts

Four different kinds of printouts may be produced by execution of the test sections; messages to the operator, test section error printouts, the link test statistics, and common OLLTCP error printouts. The first three categories are described in the following sections and the latter in Appendix D.

7.1 Messages to the Operator

The following are messages issued by the test section or the OLLTCP. The messages may be placed into two categories. Those that provide information, only, have message numbers suffixed with the character "I". Those requiring a decision or response on the part of the operator have message numbers suffixed with the character "D". All of the following messages will be sent to the control terminal, unless the 'MCP' (No Control Print) option is selected. (Refer to the TOLTEP SRL.)

• ITB000I PLINK ERROR - SECTION TERMINATED

This message is issued when the OLLTCP could not be loaded by the test section due to a PLINK load error.

Operator Action:

- a) Verify that module U3700B is in the OLT library.
- b) If it is not, add it and re-enter the TRM.
- c) If it is, a TOLTEP or TOTE PLINK load error has occurred. Advise a systems programmer of the problem.

• ITB501I - PLINK LOAD FOR nnnnnnnn FAILED.

This message is issued when the test section attempts to load module nnnnnnnn and a PLINK load error occurs.

Operator Action:

- a) Verify that module nnnnnnnn is in the OLT library.
- b) If it is not, add it and re-enter the TRM.
- c) If it is, a TOLTEP or TOTE PLINK load error has occurred. Advise a systems programmer of the problem.

• ITB502I - LINE llllllll IS A FDX LINE. ITB502D - WHICH SIDE IS TO BE TESTED? REPLY 'TX' OR 'RX'.

Section T3700LT issues this message when it determines that a line specified in the TRM has been defined in the MCP generation as being a full duplex line. In the message text, llllllll is the line in question.

Operator Action:

- a) Reply 'TX' if the side normally used as the transmit side of the line is to be tested.
- b) Reply 'RX' if the side normally used as the receive side of the line is to be tested.

NOTE: Refer to Section 6.1 for special considerations which may apply.

- ITB504I - SELECT TEST TO BE RUN (1-7).
ITB504D - ENTER OPTION, OR 'END'.

Section T3700LT issues this message to allow the operator to select one of the following tests:

- 1 = internal CS data wrap
- 2 = modem data wrap
- 3 = modem self-test
- 4 = autocal dial
- 5 = external data wrap
- 6 = SDLC link test
- 7 = break feature test

(Refer to Section 2.5 for detailed descriptions of the above.)

Operator Action:

- a) If the test section is to be terminated, reply 'END'.
 - b) If it is desired to run one of the above tests, enter the number that corresponds with the desired test. Only one test may be selected at a time. (Refer to Section 6.0 for special considerations which may apply.)
- ITB505I - SELECT OPTION ('WRAP', 'TEST', OR 'DATA').
ITB505D - ENTER OPTION, OR 'END'.

Section T3700LT issues this message to allow the operator to select various options as follows:

- 'WRAP' - allows for selection of the "set mode SDF" to be used by the wrap line, during the selected test. (If this option is not selected, the same set mode SDF used by the test line will also be used by the wrap line.)
- 'TEST' - allows for selection of the LCD and "set mode SDF" to be used by the test line, during the selected test.
- 'DATA' - allows for specification of the data characters to be transmitted during the selected test.

Refer to Section 6.3 for detailed information about selecting options.

Operator Action:

- a) If no options are to be selected, or if the last option desired has been entered, reply 'END'.
- b) If an option is to be requested, enter "WRAP", "TEST", or "DATA" as desired. Enter only one option at a time. A message requesting the information required for the associated option will follow. After selection of one option is complete, this message will be repeated to allow selection of another option.

- ITB506D - ENTER DATA TO BE WRAPPED (IN HEX - 30 BYTES MAX).

This message is issued by section T3700LT when the "DATA" option has been requested. (Refer to Section 6.3.1 for detailed information about data selection.)

Operator Action:

- a) If it is desired to change the data to be transmitted, enter the data. Data must be entered in hexadecimal; each character entered is treated as one hex digit. A maximum of 30 data bytes (60 hex digits) may be entered.
- b) If it is desired to utilize the same data as previously used, reply EOB. The data previously used will be utilized. (If this action is taken and no data has been previously used, message ITB512I will follow, and the request to enter data will recur.)

- ITB507I - NO WRAP LINE IN TRM. WRAP OPTIONS INVALID.

This message is issued by T3700LT if 'WRAP' was entered in response to message ITB505 but no wrap line was present in the test request message. (Refer to Section 6.3 for detailed information about option selection.)

Operator Action:

None. Message ITB505 will be repeated.

- ITB508D - SELECT LCD. ENTER ONE HEX CHARACTER OR 'EOB'.

This message is issued by T3700LT if 'TEST' was entered in response to message ITB505. It provides the opportunity to select the LCD to be used during the test. If a wrap line is present, the same LCD will be used for it. (See Section 6.3.2 for detailed information about LCD selection.)

Operator Action:

- a) If it is not desired to select the LCD to be used, reply EOB. The LCD used by the NCP will be used during testing.
- b) If it is desired to select the LCD to be used, enter the LCD. Enter only one of the following hex characters:

- 0 = start-stop - 9/6
- 2 = start-stop - 8/5
- 4 = start-stop - 9/7
- 5 = start-stop - 10/7
- 6 = start-stop - 10/8
- 7 = start-stop - 11/8
- 9 = SDLC (8 bit code)
- C = BSC - EBCDIC
- D = BSC - ASCII

- ITB509D - SELECT SET-MODE SDF. ENTER TWO HEX CHARACTERS OR 'EOB'.

This message is issued by T3700LT if 'TEST' or 'WRAP' were entered in response to message ITB505. It provides the opportunity to select the "set-mode SDF" to be used with the designated line during the test. (See Section 6.3.5 for detailed information about selection of the "set mode SDF".)

Operator Action:

- a) If it is not desired to select the "set-mode SDF" to be used, reply EOB. The "set-mode SDF" used by the NCP will be used during testing.
- b) If it is desired to select the "set-mode SDF" to be used, enter the "set-mode SDF". Enter only two hex characters, whose bit definitions are:

<u>Bit</u>	<u>Value</u>	<u>Definition</u>
1	X'40'	Set diagnostic mode
2	X'20'	Set data terminal ready
3	X'10'	Use synchronous bit clock
4	X'08'	Use external clocking
5	X'04'	Set data rate select
6	X'02'	Oscillator select bit 1
7	X'01'	Oscillator select bit 2

(Some bit settings may be overridden by the selected test. Also, test 2 utilizes the external clock bit to determine the type of modem attached. Refer to section 6.3.5.)

CAUTION: Because of NCP operation, if external clocking is selected on a line attached to a Type 1 Communications Scanner, and the external clock is not present, a timeout will occur. In addition, the line will be lost to all further operations until the external clock becomes present.

- ITB511I - NO SECONDARY (TEST) LINE FOUND IN TRM.
ITB511I - TEST TERMINATING.

This message is issued by sections T3700LTA and T3700LTB if only one symbolic name was entered in the device field of the test request message and it was not the name of a full duplex line. These sections require at least two lines on which to run, unless a full duplex line is to be tested. (A full duplex line consists of two physical 3704/3705 lines.)

Operator Action:

None. The section will terminate. The next time the test section is requested, enter at least two symbolic line names or insure that, if only one line name is entered, the line name entered is that of a full duplex line.

- ITB512I - INVALID OPTION, TEST OR SYNTAX IN REPLY.

This message is issued by section T3700LT. It indicates that an improper reply was entered in response to the preceding message.

Operator Action:

None. The message to which the improper reply was given will be repeated. Review the description for that message before replying. For more detail about entering options, refer to Section 6.0.

- ITB513I - NO WRAP LINE FOUND. TEST BYPASSED.
ITB513I - TEST LINE (11111111 aaaa)

This message is issued by T3700LT when test one, two, or five has been selected, only one symbolic name was entered in the device field of the test request message, and it was not the name of a full duplex line. These tests require at least two lines on which to run, unless a full duplex line is to be tested. (A full duplex line consists of two physical 3704/3705 lines).

In the message text:

11111111 - provides the symbolic name of the indicated line, and
aaaa - provides the 3704/3705 address of the indicated line.

Operator Action:

Message ITB504 will follow.

- a) If it is desired to run another test, select the desired test.
- b) If it is still desired to run test one or two, reply 'END' to message ITB504. The section will terminate. Re-enter the test request message providing two symbolic names or insure, if only one name is entered, that the name entered is that of a full duplex line. Refer to Section 6.0 for a detailed description of entering the test request message for T3700LT.

- ITB514I - WRAP AND TEST LINES NOT ON SAME CS. TEST BYPASSED.
ITB514I - TEST LINE (11111111 aaaa) - WRAP LINE (11111111 aaaa)

This message is issued T3700LT, T3700LTA, and T3700LTB when it is determined that the lines being used are not on the same communications scanner. These tests utilize the diagnostic wrap facility of the 3704/3705 which requires that the lines be on the same scanner.

In the message text:

11111111 - provides the symbolic name of the indicated line, and
aaaa - provides the 3704/3705 address of the indicated line.

Operator Action:

None. Testing is bypassed. T3700LTA and T3700LTB will terminate. T3700LT will reissue message ITB504.

- ITB515I - TEST 1 ENDED.
ITB515I - TEST LINE (11111111 aaaa) - WRAP LINE (11111111 aaaa).

This message is issued by T3700LT and T3700LTA to indicate the completion of the internal CS data wrap on the lines specified. This message will always occur at completion and does not indicate whether the test was successful or not.

In the message text:

11111111 - provides the symbolic name of the indicated line, and
aaaa - provides the 3704/3705 address of the indicated line.

Operator Action:

None.

- ITB516I - OTHER OLLT RUNNING ON SAME CS, TEST BYPASSED.

This message is issued by any section that attempts to set 'diagnostic mode' and finds that another OLLT (or NCP Panel Line Test) that uses 'diagnostic mode' is running on line(s) on the same communications scanner.

Operator Action:

- a) Re-enter your test request at some later time.
- b) If it can be determined that nothing else was running, a program failure has occurred. Advise a systems programmer of the failure.

NOTE: A test section error printout will occur in conjunction with this message and the section will be abnormally terminated.

- ITB517I - 11111111 NOT HDX LINE. TEST BYPASSED.

This message is issued by sections T3700LTC and T3700LT, test 3, if they determine that the line selected for testing (11111111 in the message text) is not a half-duplex line. These tests are for 2400 bps integrated half duplex or external 3872/3874/3875 half duplex modems only. Testing is bypassed.

Operator action:

- a) If line 11111111 is not a half duplex line attached to an integrated 2400 BPS or 3872/3874/3875 modem, refrain from running this test on the specified line.
- b) If line 11111111 is attached to such a modem, the NCP sysgen does not indicate that the line is half duplex.

- ITB518I - TEST 3, RTN nn, ENDED ON 11111111.

This message is issued by T3700LT and T3700LTC to indicate the completion of routine nn of the modem self-test on the line indicated (11111111 in the message text). This message will always occur at completion and does not indicate whether or not the test was successful.

Operator Action:

None.

- ITB519I - TEST 2, RTN nn, ENDED.
ITB519I - TEST LINE (11111111 aaaa) - WRAP LINE (11111111 aaaa)

This message is issued by T3700LT and T3700LTB to indicate the completion of routine nn of the modem data wrap on the lines specified. This message will always occur at completion and does not indicate whether or not the test was successful.

In the message text:

- 11111111 - provides the symbolic name of the indicated line, and
- aaaa - provides the 3704/3705 address of the indicated line.

Operator Action:

None.

- ITB520I - TEST LINE NOT VALID FOR TEST. TEST BYPASSED.
ITB520I - TEST LINE (11111111 aaaa) - WRAP LINE (11111111 aaaa).

This message is issued by section T3700LTB and T3700LT (with test 2 selected) if they determine that the 'TEST' line is not a full duplex line and external clock is to be used. These sections assume that if external clock is to be used, the attached modem is either an integrated 2400 bps modem or an externally attached 3872/3874/3875. These modems can be tested by these sections only if they are full duplex.

Testing on the specified 'TEST' line is bypassed.

In the message text:

11111111 - provides the symbolic name of the indicated line, and
aaaa - provides the 3704/3705 address of the indicated line.

Operator action:

- a) If the indicated test line is not attached to one of the modems listed above, refrain from running this test on this line.
- b) If the indicated test line is attached to one of the modems listed above, the NCP sysgen does not indicate that it is a full duplex line. Use T3700LTC, or T3700LT, test 3, to test half duplex modems.

- ITB521I - 11111111 NOT SWITCHED LINE WITH ACU. TEST BYPASSED.

This message is issued by T3700LTD and T3700LT (with test 4 selected) if it is determined that the NCP generation has not defined line 11111111 as being a switched line with an autocall unit attached. Testing is bypassed on the indicated line.

Operator Action:

None.

- ITB522I - TEST 4, RTN nn, ENDED ON 11111111.

This message is issued by T3700LT and T3700LTC to indicate the completion of routine nn of the autocall dial test on the line indicated (11111111 in the message text). This message will always occur at completion and does not indicate whether or not the test was successful.

Operator Action:

None.

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- ITB523I - DIAL NUMBER FOR RTN-nn NOT IN EXT FIELD OR INVALID.
ITB523D - ENTER DIAL DIGITS OR 'END' AS SPECIFIED IN USERS GUIDE.

This message may be issued in any of the following cases:

- a) Test 4 under T3700LT is selected.
- b) Test 6 under T3700LT is selected and the selected test line is defined to the NCP as an autocall line.
- c) T3700LTE is being run and the selected test line is defined to the NCP as an autocall line.
- d) T3700LTD is being run and the dial number for routine nn is not found in the EXT= field of the test request message or was entered improperly.

In the message text, nn is the routine number:

- Routine 01 - dials a valid telephone number and checks for successful completion.
- Routine 02 - dials an invalid number (busy or no answer) and tests for unsuccessful completion.

Operator Action:

- a) If section T3700LTD or T3700LT, test 4, is being executed and the routine is to be ended without further testing, reply 'END.'
- b) If section T3700LTD is being executed, and the number for routine nn was entered in the EXT= field, insure that it was entered properly and there were no invalid digits entered. Then re-enter the dial number.
- c) If section T3700LTE or test 6 under T3700LT is being executed, and a manual connection is desired rather than have the test section perform a dial operation, reply 'END'. The test will proceed to allow for a manual connection, and will issue message ITB532.
- d) In all other cases, respond by entering the number to be dialed by routine nn, as follows:
 - 1) Enter up to a maximum of 34 characters.
 - 2) The question mark '?', (X'6F'), may be inserted one or more times to indicate a program delay in dialing. When this character is encountered by the NCP, it will cause a one second delay before the next digit will be dialed. This pause may be used to allow the establishment of a "secondary" dial tone.
 - 3) The underline '_', (X'6D'), may be inserted one or more times to initiate a hardware pause for "secondary" dial tone, if the attached autocall unit has the capability of detecting a 'SEP' character.
 - 4) The percent symbol '%', (X'6C'), may be inserted to indicate the last of the dial digits. This 'EON', end of numbers, digit may only be used if the attached autocall unit has the capability of detecting an 'EON' character.
 - 5) Other than the above three exceptions, the only digits that may be entered are the characters 0 through 9.

- ITB524I - TEST 5 ENDED.
ITB524I - TEST LINE (11111111 aaaa) - WRAP LINE (11111111 aaaa).

This message is issued by T3700LT to indicate the completion of the external data wrap on the lines specified. This message will always occur at completion and does not indicate whether or not the test was successful.

In the message text:

11111111 - provides the symbolic name of the specified line, and
aaaa - provides the 3704/3705 address of the indicated line.

Operator Action:

None.

- ITB525I - WRAP AND TEST LINES NOT ON SAME MODEM. TEST BYPASSED.
ITB525I - TEST LINE (11111111 aaaa) - WRAP LINE (11111111 aaaa).

This message is issued by T3700LT, with test 2 selected, when it is determined that the test line is defined by the NCP generation as a full duplex line and the wrap line selected is not the other logical half of the line. Test 2 is a modem wrap and requires that, if the test line specified is one half of a full duplex line, the wrap line specified must be the other half. Testing is bypassed.

In the message text:

11111111 - is the symbolic name of the indicated line, and
aaaa - is the 3704/3705 address of the indicated line.

Operator Action:

When selecting section T3700LT and options, insure that the selected test and wrap lines are the two halves of the full duplex line. (Refer to section 6.1 for details.)

- ITB526I - TEST LINE NOT FDX RX LEG. TEST BYPASSED.
ITB526I - TEST LINE (11111111 aaaa) - WRAP LINE (11111111 aaaa).

This message is issued by T3700LT, with test 2 selected, when it determines that the test line is not defined by the NCP generation as the receive line of a full duplex pair. Test 2 is a modem wrap and requires that if the test line is one half of a full duplex pair, it must be the receive side. Testing is bypassed.

In the message text:

11111111 - is the symbolic name of the indicated line, and
aaaa - is the 3704/3705 address of the indicated line.

Operator Action:

When selecting section T3700LT and options, insure that the selected test line is the receive half of a full duplex pair. (Refer to Section 6.1 for details.)

- ITB527I - INVALID STATION ADDRESS ENTRY

This message is issued by T3700LTE and T3700LT if an invalid station address was entered in response to message ITB531. This means that either more or less than two characters were entered or that the two characters entered were not the hex digits 0-9, or A-F.

Operator Action:

None. Reply properly to message ITB531 when it is repeated.

- ITB528D - ENTER THE NUMBER OF FRAMES TO SEND (MAX=32767)

Section T3700LT issues this request if '6' was entered in response to message ITB504. It requests the number of SDLC Link Test frames to be transmitted. Immediately following the entry of the response, the test will proceed to transmit, and attempt to receive, the number of frames entered.

Operator Action:

Enter the desired number of frames in decimal. Any number from 0 to 32767, inclusive, may be entered.

Caution: A 3 second timeout is utilized when receiving. If no response is received from the downline device, or receive failures are occurring, there will be a 3 second delay between transmissions. Entering a count of 1000, as an example, will cause the test to take a minimum of 50 minutes to run under failing conditions, while under normal conditions the length of time is solely dependent on line and device speed, and in the same example might only be around 30 seconds. It is suggested that a small count, e.g., 10, be entered at first to determine if a large number of timeouts is occurring. If so, and a large count is to be entered, remember it will take approximately 3 seconds per frame.

- ITB529I - INCORRECT ENTRY

This message is issued by T3700LT if an invalid value was entered in response to message ITB528.

Operator Action:

None. Message ITB528 will be repeated.

- ITB530D - REPEAT THE TEST? (REPLY 'YES' OR 'NO')

This message is issued by T3700LT after test 6 has been selected and the requested number of frames has been sent. This message provides the opportunity to repeat the SDLC Link Test without the line being tested being disabled and re-initialized.

Operator Action:

- a) If it is not desired to repeat the test, reply 'NO'. The test line will be disabled and message ITB504 will be repeated to allow selection of another test.
- b) If it is desired to have the link test repeated, reply 'YES'. Message ITB528 will be repeated to allow a new frame count to be entered, prior to repeating the test.

- ITB531D - ENTER THE ONE BYTE STATION ADDRESS IN HEX

This message is always issued by T3700LTE. It is also issued by test 6 of T3700LT if the 'DATA' option was not selected in response to message ITB505. It is issued to obtain the station address to be used in the SDLC test frame.

Operator Action:

Respond by entering the station address. This address should be the address that will be recognized by the SDLC downline device. Enter only two hex digits.

- ITB532D - MANUALLY CONNECT 11111111, THEN 'EOB'.

This message is issued by T3700LTE and T3700LT, test 6, to allow the opportunity to manually connect a switched SDLC link. It is always issued if the tested line is defined to the NCP as a switched line without autocall. It will also be issued if the tested line is a switched line with autocall but the operator has elected to bypass the dial operation by not providing dial digits.

In the message text:

11111111 - is the symbolic name of the line to be connected.

Operator Action:

Manually connect line 11111111, then reply by entering 'EOB'.

- ITB533I - TEST 6 ENDED ON 11111111 (aaaa/bbbb).

This message is issued by T3700LTE and T3700LT to indicate the completion of the SDLC Link Test on the line specified. This message will always occur at completion and does not indicate whether or not the test was successful.

In the message text:

11111111 - Provides the symbolic name of the tested line.

aaaa - Provides the 3704/3705 address of the tested line. If full duplex this will be the address of the transmit side of the line.

bbbb - If the tested line is half duplex, this will specify 'NONE'. If full duplex this will be the address of the receive side of the line.

Operator Action:

None.

● ITB537I - 11111111 NOT HALF-DUPLEX MODEM. TEST BYPASSED.

This message is issued by sections T3700LTF and T3700LT (test 7) if they determine that the line selected for testing (11111111 in the message text) is not a half-duplex line. These tests are for 1200 bps half-duplex modems with break feature only. Testing is bypassed.

Operator Action:

- a) If line 11111111 is not a half-duplex modem with break feature, refrain from running these tests on the specified line.
- b) If line 11111111 is attached to such a modem, the NCP sysgen does not indicate that the line is half-duplex.

● ITB538I - TEST 7, RTNnn, ENDED ON 11111111.

This message is issued by T3700LTF and T3700LT to indicate the completion of routine nn of the 1200 bps modem break test on the line indicated (11111111 in the message text). This message will always occur at completion and does not indicate whether or not the test was successful.

Operator Action:

None.

● ITB539I - 11111111 ON TYPE 3 CS. TEST BYPASSED.

This message is issued by T3700LTF or T3700LT, test 7, if they determine that the line selected for testing, 11111111 in the message text, is on a Type 3 Communications Scanner. These tests are for 1200 bps modems with break feature which are start-stop only and not supported by the Type 3 Communications Scanner.

Operator Action:

- a) If line 11111111 is attached to a Type 3 Communications Scanner, refrain from running these tests on the specified line.
- b) If line 11111111 is not attached to a Type 3 Communications Scanner, the NCP sysgen indicates that it is.

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- ITB534D - NRZI MODE TO BE USED? REPLY 'YES' 'NO' OR 'EOB'.

This message is issued by T3700LT if 'TEST' was entered in response to message ITB505 and the LCD to be used is an SDLC LCD. It provides the opportunity to specify whether or not NRZI mode is to be utilized during the test. (See section 6.3.3.)

Operator Action:

- a) If it is not desired to specify if NRZI mode is to be used, reply EOB. NRZI mode will be utilized if the NCP normally utilizes it.
- b) If it is not desired to use NRZI mode, reply 'NO'.
- c) If it is desired to use NRZI mode, reply 'YES'.

- ITB535I - 11111111 NOT SDLC LINK. TEST BYPASSED.

This message is issued by sections T3700LTE and T3700LT (test 6) if they determine that the LCD to be utilized during the test is not an SDLC LCD. These tests must be run using an SDLC LCD. Testing on the specified line is bypassed.

In the message text:

11111111 - provides the symbolic name of the selected line.

Operator Action:

- a) If running T3700LTE, the selected line was not sysgen'd in the NCP as an SDLC line. Refrain from running this section on this line.
- b) If running T3700LT, insure the selected line was sysgen'd as an SDLC line or select an SDLC LCD in response to message ITB508. (Refer to section 6.3.2.)

- ITB536D - NEW SYNC TO BE USED? REPLY 'YES' 'NO' OR 'EOB'.

This message is issued by T3700LT if 'TEST' was entered in response to message ITB505 and the LCD to be used is an SDLC LCD. It provides the opportunity to specify whether or not the new-sync interface lead is to be activated during the test. (See section 6.3.4.)

Operator Action:

- a) If it is not desired to specify if new-sync is to be used, reply EOB. The new-sync interface lead will be activated if the NCP normally (is sysgen'd) uses it.
- b) If it is not desired to use new-sync, reply 'NO'.
- c) If it is desired to use new-sync, reply 'YES'.

7.2 Test Section Error Printouts

The following provides an example of the error printouts produced by the test sections. Following the example is a description of each line of the printout. All test sections produce this same common printout. The step number, chain number, and error numbers are unique to each section, however, and provide detailed information as to when and where the failure occurred. Appendix A describes the use of these numbers and their relation to the other information provided in the printout.

7.2.1 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' SET MODE SDF X'45'                (k)
DIAL NUMBER - 9 5494551                                   (l)
XPTD DATA 32FFFF0000C1C2C3C4C5C6C7C8C9D1D2D3D4D5D6D7D8D9E2E3 (m)
            E4E5E6E7E8E9F0F1F2F3F4F5F6F7F8F93232FFFF
RCVD DATA 32FFFF0000C1C2C3C4C5C6C7C8C9D1D2D3D4D5D6D7D8D9E2E3 (n)
            E4E5E6E7E8E9F0F1F2F3F4F5F6F7F8F93232FFFF

```

7.2.2 Description

The meaning of each line is as follows:

- (a) Header - standard OLT header line.
- (b) Line address - provides the physical 3704/3705 line address on which the failure was detected.
- (c) Step, Chain, and Error Numbers - uniquely describe the error condition. Refer to Appendix A.
- (d)-(g) OLLTCB - provides a formatted print of the OLLTCB returned to the test section at the time of failure. Refer to Appendix B for a complete description of the OLLTCB.
- (h), (i) ICW Fields - provides the contents of certain ICW fields at time of failure. These fields may also be found in the OLLTCB but are formatted for the sake of convenience. The contents shown are in hexadecimal. Refer to the 3704/3705 FETMM for a description of these fields. When running on a Type 3 Communications Scanner, some of these fields are modified by the NCP. Refer to the description of these fields in the OLLTCB description, Appendix B.
- (j), (k) Line Definition - provides the parameters with which the line was being run. The first item indicates if the line was defined by NCP generation as being 'LEASED' or 'SWITCHED'. The second indicates if the line is defined in the NCP as 'HDX' (half-duplex) or 'FDX' (full duplex) (i.e., if it is composed of one or two physical 3704/3705 lines.) The next two items provide the LCD and 'set mode SDF'. Under T3700LT these two items include the result of the option selection process. (Refer to Section 6.0 for details.)
- (l) Dial Number - provides the dial number currently associated with the line. (This print line will only be present if a dial test was being run.)

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(m), (n) Expected and Received Data - These lines will only be printed if the failure occurred during a step which wraps data. The step, chain, and error numbers will indicate if a data compare error occurred. If expected data is printed but no 'received data' is printed then no data at all was received.

7.3 Link Test Statistics Table

The following 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 occurring while transmitting the frames will be printed first. Note that this table will always be printed whether or not errors occurred; however, if no errors occurred there will be no '*' on the TOLTEP test terminate message. Example of table:

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	INCORRECT DAT-0000
'CMDR' RESP -0000	'NSA' RESP	-0000	RCVD W/O ERR-0000

ACCUMULATED SCF -01
 ACCUMULATED RCVD DATA BITS IN ERROR
 0000

- a) FRMS REQUEST - The number of frames requested to be sent. (If T3700LTE, this will always be X'0A'.)
- b) FRMS TX - The actual number of frames transmitted successfully. (Transmission of frames halts if any error is detected while transmitting.)
- c) TOT RCVD FRM - The total number of frames received. This count includes all frames received, including frames in error.
- d) BCC ERRORS - The number of frames received in which block check errors occurred.
- e) HRDWARE ERR - The number of receive operations that ended because of one or more bits in error in the SCF. As each level two interrupt occurs, bits 0, 2, and 3 of the SCF should be off.
- f) TIME OUT ERR - The number of receive operations that ended in a timeout, i.e., nothing received within three seconds.
- g) 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'.
- h) DATA NT RCVD - The number of frames received that contained no optional data when optional data was included in the frames sent.

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- i) INCORRECT DAT - The number of frames received whose optional data fields did not compare with the optional data sent. This also includes the number of frames received that included data when no data was sent.
- j) 'CMDR' RESP - The number of frames received whose command field contained "CMDR", (command reject): X'97'.
- k) 'NSA' RESP - The number of frames received whose command field contained "NSA", (non-sequenced acknowledgment): X'73'.
- l) RCVD W/O ERR - The total number of frames received without error, i.e., all frames whose receipt was not included in any of the fields described in d-k, above.
- m) ACCUMULATED SCF - The accumulated SCF. As each frame is received the ending SCF is or'ed into this field.
- n) 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.

8.0 Definitions and Comments

8.1 Abbreviations

ACR	The <u>A</u> bandon <u>C</u> all and <u>R</u> etry data set lead on an autocal interface.
ACU	An <u>A</u> utomatic <u>C</u> alling <u>U</u> nit. In this document, this abbreviation is also used to refer to the Automatic Call Originate feature of the integrated modems.
CDS	<u>C</u> onfiguration <u>D</u> ata <u>S</u> et
COS	The <u>C</u> all <u>O</u> riginate <u>S</u> tatus data set lead on an autocal interface.
CS	<u>C</u> ommunications <u>S</u> canner
DLO	<u>D</u> ata <u>L</u> ine <u>O</u> ccupied data set lead on an autocal interface.
DPR	<u>D</u> igit <u>P</u> resent data set lead on an autocal interface.
ICW	<u>I</u> nterface <u>C</u> ontrol <u>W</u> ord.
LCD	<u>L</u> ine <u>C</u> ontrol <u>D</u> efiner.
NCP	<u>N</u> etwork <u>C</u> ontrol <u>P</u> rogram.
NRZI	<u>N</u> on- <u>R</u> eturn-to- <u>Z</u> ero <u>I</u> nvented
OLLT	<u>O</u> n- <u>L</u> ine <u>L</u> ine <u>T</u> est.
OLLTCB	<u>O</u> n- <u>L</u> ine <u>L</u> ine <u>T</u> est <u>C</u> ontrol <u>B</u> lock
OLLTCP	<u>O</u> n- <u>L</u> ine <u>L</u> ine <u>T</u> est <u>C</u> ontrol <u>P</u> rogram.
PCF	<u>P</u> rimary <u>C</u> ontrol <u>F</u> ield
PDF	<u>P</u> arallel <u>D</u> ata <u>F</u> ield.
PND	<u>P</u> resent <u>N</u> ext <u>D</u> igit data set lead on an autocal interface.
PWI	<u>P</u> ower <u>I</u> ndicate data set lead on an autocal interface.
SCF	<u>S</u> econdary <u>C</u> ontrol <u>F</u> ield
SDF	<u>S</u> erial <u>D</u> ata <u>F</u> ield.
SDLC	<u>S</u> ynchronous <u>D</u> ata <u>L</u> ink <u>C</u> ontrol
TRM	<u>T</u> est <u>R</u> equest <u>M</u> essage.

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8.2 Definitions

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 OLTs/OLLTs. There is at least one entry for each device on a line to be tested and others as required by the OLT executive or OLT (OLLT).
NCP	Network Control Program - this is a program written in 3704/3705 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 3704/3705 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 standalone OLT executive. The OLT executives are OLTSEP, OLTEP, TOTE, and TOLTEP.
OLLT	On-Line Line Test - this is an OLT written to run with the 3704/3705 NCP and test lines that are attached to the NCP. It interfaces to the NCP and OLT executive through the OLLTCP. The program runs in the host CPU.
OLLTCB	On Line Line Test Control Block - this is a block of data returned to the OLLTCP by the NCP which describes the current OLLT status in the NCP.
OLLTCP	On Line Line Test Control Program - this is the OLLT program interface to the NCP and OLT executive. It is called by the OLLT and runs in the host CPU.
SOSP	Standalone Online Support Processor - a utility program called at communications interval time and providing various cataloging and data manipulating functions (e.g., punch a module, add a module, etc.).
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/OLLT test is not in the system at the time this message is entered but is loaded and executed as a result of this entry.

8.3 Miscellaneous Descriptions

8.3.1 Description of the CS Wrap Capability

In each Communications Scanner attached to the 3704/3705 is a 'test data latch'. Whenever a line has been set to 'diagnostic mode' and 'transmit mode' each bit sent to that line is also set into the 'test data latch'.

Whenever a line has been set to 'diagnostic mode' and 'receive mode', instead of strobing raw line data into the 'receive data latch', the contents of the 'test data latch' is strobed in.

These two processes make up the wrap function. Note that the wrap data is not actually sent from the line in 'transmit mode' to the line in 'receive mode'. Instead, the data that is to be sent is gated directly into the 'test data latch' and from there into the 'receive data latch' of the receive line. The transmit line serves no other function than to provide timing for the data to be set into the 'test data latch'.

For a more detailed description of the wrap function, please refer to the appropriate section of the 3704/3705 FETMM.

8.3.2 Description of the Self-Test Capability of the Full Duplex Integrated Modems and the 1200 BPS Integrated Modem

Provided in these modems is a wrap, or self-test, capability which connects the transmit side of the modem to the receive side of the modem through an attenuator to simulate a minimum level signal.

On lines utilizing these integrated modems, the normal wrap capability of the 3704/3705 is modified by the use of the "data terminal ready" interface lead. When this lead is in the 'ON' condition, test data is strobed out the tested line's "send data" latch. The data is then wrapped through the modem and back into the "receive data" latch, thus checking the entire data path through the modem.

See section 8.3.1 for information about "test data". For a more detailed description of these modems and their wrap capability, see the 3704/3705 FETMM.

8.3.3 Description of the Self-Test Capability of the 2400BPS Half Duplex Integrated Modem

Provided in the 2400BPS integrated modem is a self-test capability which connects the transmit side of the modem to the receive side of the modem through an attenuator to simulate a minimum level signal.

Setting "diagnostic mode" on the line under test activates the "test" interface lead which in turn enables the modems self-test capability. Testing then proceeds as follows:

1. "Transmit mode" and the "request-to-send" interface lead are set to enable the modems transmitter circuits. A mark is set into send data.
2. After allowing enough time for "clear-to-send", the line is turned around to receive mode, leaving "request-to-send" on.

The above steps result in a steady mark being fed into the transmitters scrambler circuit which results in the transmission of a 127 bit pseudorandom sequence. The receiver processes and demodulates the transmitted signal. The proper output from the receivers descrambler is a steady mark. Any exception to this output (any "space" occurrence) is an error.

Please refer to the 3704/3705 FETMM for a more detailed description of this self-test capability.

8.3.4 Description of the SDLC Link Test

The SDLC Link Test, provided within the SNA architecture, is basically an echo test. The primary SDLC station sends an SDLC "TEST" frame down the link to the secondary station. If the secondary station receives the "TEST" frame without errors, it resends the frame to the primary station.

The SDLC Link Test is implemented in all SDLC devices. In the 3704/3705 it is implemented in two vehicles. The first is in the Internal Functional Tests (IFT's), and is commonly referred to as Link level 0. The IFT's provide support for the 3704/3705 to act as either a primary or secondary station and require that the entire 3704/3705 be dedicated to the test. Refer to the descriptions of routines X6F0 and 15F0 in D99-3700A for further detail.

The second is in the On-Line Line Tests (OLLT's), and is commonly referred to as Link Level 1. This level of the Link Test provides support for the 3704/3705 to act as a primary station only, and requires only the line to be tested be dedicated to the test. This level of the Link Test is described in the following paragraphs. The "test" frame that is sent is the same, regardless of the level of the test. Operating procedures and requirements, and statistics accumulated may be different.

All SDLC frames are of a structure as shown in figure 8.3.4. The command field for a "TEST" frame indicates "TEST". The optional data field may or may not be present. (T3700LTE does not allow the optional data field, while test 6, under T3700LT, does.)

The Link Test OLLT sends a "TEST" frame down the line. The secondary station (SDLC device or remote 3704/3705) acts as follows:

- a) Buffer the received frame.
- b) Check the block check characters.
- c) Check for valid address and command bytes.
- d) Maintain statistics
- e) If no errors in receiving the frame, return the frame to the primary. (If more optional data is received than can be buffered, the basic "test" frame is returned without the optional data.)

(Note that some SDLC devices may respond differently. These differences are beyond the scope of this document. Information relating to the responses of an individual device should be obtained from the documentation for the specific device.)

The link Test OLLT checks the frames received from the secondary station in a fashion similar to the secondary station. In addition the optional data field received is compared to the optional data field sent. Statistics are gathered and printed prior to test termination. Refer to section 7.3.

SDLC Test Frame

Pad Pad F A C dd BC BC F ee

where,

Pad = alternate data transition characters for clock correction: X'00' if NRZI mode, X'AA' if not.

F = SDLC flag character: X'7E'

A = SDLC station address byte

C = SDLC command byte: X'F3' for "TEST"

dd = optional data field.

BC = block check (CRC) characters.

ee = ending transmission of idle character: X'FF'

Note: All characters between the two flags are defined as a frame. If NRZI mode is in use, the actual bit pattern on the line will be different due to NRZI mode. Also, SDLC zero bit insertion/deletion apply to all characters within the frame.

Figure 8.3.4

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8.4 Problem Isolation Comments.

8.4.1 T3700LTA

This test section can be utilized to test the per-line hardware of the 3704/3705 up to the line drivers. It tests the ability of the receive (test) line to strobe in data and present it to the Communications Scanner.

If a problem is suspected on only one line of the 3704/3705, this section should be run first, with the failing line used as the receive (test) line. If the test indicates a failure, the problem is probably in the associated line interface cards (the problem may also possibly be in the associated Line Interface Base cards).

If several lines are failing, examine their addresses. If they are all on the same Line Interface Base (LIB), then suspect a problem in that LIB. If they are not on the same LIB, suspect a problem in the Communications Scanner itself.

Remember that the actual line drivers are not tested. Therefore, if a single line is failing, but the test section runs and the trouble still seems to lie in the 3704/3705, suspect the line drivers.

8.4.2 T3700LT

This section when used in conjunction with T3700LTA can help isolate a problem to the 3704/3705 line drivers. First, run T3700LTA to verify the operation of the line set. Then attach external wrap blocks on the 3704/3705 "tailgate", and run T3700LT. If it fails, a problem probably exists in the 3704/3705 line drivers or receivers.

8.4.3 T3700LTB

This section should be run only after successful completion of T3700LTA (to insure that the line set itself is operative). If T3700LTA runs successfully and this section does not, suspect a definite problem in the 1200 BPS integrated modem. Refer to the 3704/3705 FETMM for additional service aids and information.

8.4.4 T3700LTC

This section should be run only after successful completion of T3700LTA (to insure that the line set itself is operative). If T3700LTA runs successfully and this section does not, suspect a problem in the modem. (For externally attached modems, T3700LTA may be run first to check the 3704/3705 interface and the "Test 1" position of the modem may be used to check the modem.)

Refer to the 3704/3705 FETMM for additional service aids and information.

8.4.5 T3700LTD

If this section detects any failures in the ACO feature of the integrated modems, refer to the 3704/3705 FETMM for diagnostic flowcharts, service aids, and additional information. Also refer to section 8.7.

8.4.6 T3700LTE

This section should be run only 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. Analyzation of the statistics accumulated at the primary and secondary stations is helpful.

On full duplex links, the use of wrap blocks or other methods of wrapping the transmit and receive interfaces, may be helpful. The lines should be wrapped in such fashion that all normal interface signals are present and send data of the transmit interface is tied to receive data of the receive interface. The lines may be wrapped anywhere, even down-line. Half duplex links may not be wrapped.

8.4.7 T3700LTF

This section should be run only after successful completion of T3700LTA and T3700LTB. If both of these sections run okay and T3700LTF fails, the problem is most likely to be in the modem's break feature circuitry.

8.5 Use of Dynamic ICW Display Facility

Included in all NCPs is a facility that provides a continuous display of a line's ICW. The ICW contains line related hardware status information and controls the activities on a line.

A good technique to use to gather additional information about failures, would be to run the desired test section while displaying the test line's ICW. Each operation and the accompanying change in the data set leads may be seen as the test progresses.

For further information on the use of the ICW Display Facility, refer to the "Guide to Using the IBM 3705 Communications Controller Control Panel", form # GA27-3087. (For 3704, form # GA27-3086.) Also refer to the "IBM 3704/3705 Communications Controller Principles of Operation", form # GC30-3004, for a detailed description of the ICW fields.

8.6 NCP and the Type 1 CS

Much of the information contained in this document refers to items commonly related to the Type 2 CS of the 3704/3705, such as LCD, ICW, etc. If the 3704/3705 on which these tests are being run has a Type 1 CS, these terms may seem to be meaningless. However, NCP's gened to run with a Type 1 CS contain code which assembles and deassembles characters as the Type 2 CS does. This code, to a great degree, emulates the operation of the Type 2 CS. Therefore, if this document refers to a Type 2 CS function, such as "setting the SDF", and the machine being tested contains a Type 1 CS, the NCP's Type 1 CS "bit service" code is providing the similar function.

For additional information about the NCP's Type 1 CS "bit service" code and its relation to the Type 1 CS and the NCP, refer to the NCP Program Logic Manual, document #SY30-3003.

8.7 Autocall Errors

Figure 8.7 may be helpful in diagnosing errors 5 and 6 occurring in dialing, step 2, of section T3700LTD (or T3700LT, test 4). Analyze the autocall SDF, byte 8 of the OLLTCB, and compare it to the different conditions in figure 8.7. The following lists the probable cause of the error, for each set of conditions shown in figure 8.7.

<u>Error description number from Fig. 8.7</u>	<u>Probable Cause of Error</u>
1.	DLO was on before CRQ was set.
2.	PND failed to set as a result of setting CRQ.
3.	PND failed to reset after DPR was set.
4.	PND failed to set after DPR was reset.
5.	Distant Station Answered but COS failed to set.
6.	Distant station did not answer and ACR failed to set.
7.	No dial tone present.
8.	An invalid digit was presented to the ACU or no digit was presented within the ACR timeout.
9.	Distant Station failed to answer within the ACR timeout. (This is the condition expected by routine 2. It is an error condition in routine 1.)
10.	Distant Station answered. (This is the condition expected by routine 1. It is an error condition in routine 2.)

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<u>CRQ</u>	<u>DLO</u>	<u>PND</u>	<u>DPR</u>	<u>ACR</u>	<u>LAST</u> <u>(NOTE 1)</u>	<u>COUNT</u> <u>(NOTE 2)</u>	<u>DESCRIPTION</u> <u>NUMBER</u>
0	1	0	0	0	NO	0	1
1	1	0	0	0	NO	0	2
1	1	1	0	0	NO	>0	3
1	1	0	0	0	NO	>0	4
1	1	0	0	0	YES	>0	5
1	1	1	0	0	YES	>0	6
1	1	0	0	1	NO	0	7
1	1	0	0	1	NO	>0	8
1	1	1	0	1	YES	>0	9
0	1	0	0	0	YES	>0	10

NOTE 1: The number of digits thus far dialed when the error was detected is contained in byte 10 of the OLLTCB. This column asks whether or not the last digit had been dialed.

NOTE 2: See note 1. This column asks if the first digit had been dialed.

Autocall SDF bit definitions:

Bit 0 - Interrupt remember
 Bit 1 - PWI
 Bit 2 - CRQ
 Bit 3 - DLO
 Bit 4 - PND
 Bit 5 - DPR
 Bit 6 - COS
 Bit 7 - ACR

FIGURE 8.7

APPENDIX A - Section and Interpretive Command Chain Outlines

I. Instructions On Use Of This Appendix.

This appendix, when used in conjunction with the error printouts provided by the test sections, should aid in determining what was being attempted when a failure occurred and what caused the failure. The following paragraphs should be read thoroughly before attempting to use this appendix.

Each test section (or test under T3700LT) is composed of several main steps. Each step initiates the execution of one or more interpretive command chains which are executed in the 3700. It is these interpretive command chains which perform the necessary hardware manipulations required. The results of most of these hardware manipulations are checked to insure the correct results. If a failure is detected, command chain execution is halted, and certain information (the OLLTCB) is returned to the test section, indicating an error condition. When an error condition is indicated to the test section, an error printout results.

Each error printout contains the number of the step initiating the command chain in which the failure was detected. Section II of this appendix contains an outline of the steps that compose each test section. These outlines provide an overall view of what the test section does.

Following the step number, each error printout contains an interpretive command chain number. This number indicates which interpretive command chain was being executed at the time of failure. The error number, which follows the chain number, identifies the point in the chain at which the error was detected. Section III of this appendix contains detailed descriptions of each of the interpretive command chains with the error detection points identified.

II. Test Section Outlines - Steps are listed in the sequence they occur.)

A. T3700LTA (or T3700LT, test 1):

1. Disable - Both the test and wrap lines are disabled.
2. Set-mode - A set-mode operation is performed on both the test and wrap lines. Unless the 'TEST' or 'WRAP' options under T3700LT are selected, the sysgen'd set mode SDF for the test line will be copied for the wrap line. The set mode SDF's will then be modified as follows:
Test line:
 - a.) Data Terminal Ready will be reset.
 - b.) External clock will be reset.
 - c.) Diagnostic wrap mode will be set.Wrap line:
 - a.) Synchronous clock bit will be reset.
 - b.) Data Rate Select bit will be reset.
 - c.) Data Terminal Ready will be reset.
 - d.) External clock bit will be reset.
 - e.) Diagnostic wrap mode will be set.
3. Enable - An enable sequence is performed on both the test and wrap lines.
4. Wrap data - An interpretive command chain performing a receive operation is executed on the test line, and a chain performing a transmit operation is executed on the wrap line. Following the successful operation of both chains, the data received is compared to the data sent.
5. Disable - Both the test and wrap lines are again disabled. (If any error occurs in steps 2, 3, or 4, this step will be executed following the failing step and each line disabled.)

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B. T3700LTB (or T3700LT, test 2):

1. Disable - Both the test and wrap lines are disabled.
2. Set-mode - A set-mode operation is performed on both the test and wrap lines. Unless the 'TEST' or 'WRAP' options under T3700LT are selected, the sysgen'ed set mode SDF for the test line will be copied for the wrap line. The set mode SDF's will then be modified as follows:

Test line:

- a.) Diagnostic wrap mode is set.
- b.) Data Terminal Ready is set.

Wrap line:

If test line is full duplex:

- a.) Diagnostic wrap mode is set.
- b.) Data Terminal Ready is set.

If test line is half duplex:

- a.) Diagnostic wrap mode is set.
- b.) Data Terminal Ready is reset.
- c.) Synchronous clock bit is reset.
- d.) Data Rate Select is reset.

3. Enable - An enable sequence is performed on both the test and wrap lines.
4. Wrap data - An interpretive command chain performing a receive operation is executed on the test line, and a chain performing a transmit operation is executed on the wrap line. Following the successful operation of both chains, the data received is compared to the data sent.
5. Disable - Both the test and wrap lines are again disabled. (If any error occurs in steps 2, 3, or 4, this step will be executed following the failing step and each line disabled.)

C. T3700LTC (or T3700LT, test 3):

1. Disable - test line is disabled.
2. Set-mode - a set-mode operation is performed on the tested line. Unless the 'TEST' option under T3700LT has been selected, the following set mode SDF will be used:
 - a.) Diagnostic mode will be set.
 - b.) Data Terminal Ready will be set.
 - c.) Synchronous clock bit will be set.
 - d.) External clock bit will be set.
 - e.) Data Rate Select will be set as provided by the routine number. (Refer to section 2.3.)
 - f.) Both oscillator select bits will be reset.
3. Enable - an enable sequence is performed on the tested line.
4. Self-test - an interpretive command chain which performs the main portion of the modem self-test is executed.
5. Disable - The tested line is again disabled. (If any error occurs in steps 2, 3, or 4, this step will be executed following the failing step.)

D. T3700LTD (or T3700LT, test 4):

1. Disable - the data interface of the tested line is disabled.
2. Dial - A dial operation is completed on the autocal interface. (Routine 1 checks to insure call completion and routine 2 checks for the call to be incomplete.)
3. Set-mode - A set-mode operation is performed on the data interface. (This step is not executed in routine 2.) Unless the 'TEST' option under T3700LT has been selected, the sysgen'ed set mode SDF for the data line will be used as is except that Data Terminal Ready will always be set.
4. Enable - An enable operation is performed on the data interface to insure line connection. (This step is not executed in routine 2.)
5. Disable - The data interface is disabled. (If any error occurs in steps 2, 3, or 4, this step will be executed following the failing step.)

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E. T3700LTE (or T3700LT, test 6):

1. Disable - The test line is disabled. If test line is full duplex both line interfaces are disabled, i.e., both the transmit and receive sides.
2. Connect - If switched line, a connection operation is performed. (If the line is defined in the NCP as an autocall line, a dial operation is initiated unless bypassed by the operator. If bypassed, or the line does not have autocall, the opportunity to manually connect the line is provided.)
3. Set-mode - A set-mode operation is performed on the tested line. (If the tested line is full duplex, a set-mode is initiated on both interfaces.) Unless the 'TEST' or 'WRAP' option(s) under T3700LT have been selected, the sysgened set-mode SDF will be utilized.
4. Enable - An enable sequence is performed on the tested line. (Both interfaces if full duplex.)
5. 'Request #1' - At this point, if T3700LT is being executed, a request will be issued to obtain the number of SDLC Link Test frames to be sent. (Refer to message ITB528.)
6. Link Test - The SDLC Link Test frames are transmitted. Following the transmission of each frame, a receive operation is initiated to read the response from the secondary station.
7. 'Request #2' - At this point, if T3700LT is being executed, an opportunity is provided to return to step 5, rather than continue with step 8. (Refer to message ITB530.)
8. Disable - The tested line is disabled. (Both interfaces if full duplex.) (If an error occurs in steps 2, 3, 4, or 6, this step will be executed following the failing step.)

F. T3700LTF (or T3700LT, test 7):

1. Disable - test line is disabled.
2. Set-mode - a set-mode operation is performed on the tested line. The following set mode SDF will be used:
 - a.) Diagnostic mode will be set.
 - b.) Data Terminal Ready will be set.
 - c.) Synchronous clock bit will be set.
 - d.) Data Rate Select will be set.
3. Enable - an enable sequence is performed on the tested line.
4. Self-test - an interpretive command chain which performs the main portion of the modem self-test is executed. Data sent is dependent upon routine running. (Refer to section 2.6.)
5. Disable - The tested line is again disabled. (If any error occurs in steps 2, 3, or 4, this step will be executed following the failing step.)

G. T3700LT, test 5:

1. Disable - Both the test and wrap lines are disabled.
2. Set-mode - A set-mode operation is performed on both the test and wrap lines. The set mode SDF's will be handled as follows:
 - a.) If the 'TEST' option has not been selected, the sysgened set mode SDF for the test line will be used on that line.
 - b.) If the 'TEST' option has been selected, the set mode SDF provided by the operator will be used for that line.
 - c.) If the 'WRAP' option has not been selected, the set mode SDF used by the test line will be copied for the wrap line.
 - d.) If the 'WRAP' option has been selected, the set mode SDF provided by the operator will be used for that line.
3. Enable - An enable sequence is performed on both the test and wrap lines.
4. Wrap data - An interpretive command chain performing a receive operation is executed on the test line, and a chain performing a transmit operation is executed on the wrap line. Following the successful operation of both chains, the data received is compared to the data sent.
5. Disable - Both the test and wrap lines are again disabled. (If any error occurs in steps 2, 3, or 4, this step will be executed following the failing step and each line disabled.)

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III. Interpretive Command Chain Outlines.

Command chains are listed by chain number. Numbers in parenthesis identify error numbers. Descriptions beside error numbers describe conditions checked for.

Chain 01 - Switched Line Disable.

- Disable. LCD is set to 0 and PCF is set to F.

(01) - Level 2 interrupt should occur within 60 seconds.

(02) - PCF should go to 0.

Chain 02 - Leased Line Disable.

- Disable. LCD is set to 0 and PCF is set to F.

- If no interrupt occurs within 1 second, set PCF to 0.

(01) - PCF should be 0.

Chain 03 - Set Mode.

(01) - If diagnostic mode is to be set, insure no one else is using diagnostic mode on same scanner.

- Output the set-mode SDF.

- Set PCF to 1 to initiate set mode. LCD selected for test is also set.

(02) - Interrupt should occur within one second and bits 0, 2, and 3 of the SCF should be off.

(03) - PCF should go to 0. LCD should remain same as when PCF was set to 1.

Chain 04 - Start-stop Enable.

- Enable. Set PCF to 2 to initiate enable.

(01) - Interrupt should occur within one second (data set ready should be up) and bits 0, 2, and 3 of the SCF should be off.

(02) - PCF should go to 0. LCD should remain as set in Set Mode Chain.

Chain 05 - Start-stop or BSC Receive.

- (01) - Post the transmit chain to start transmitting. Error if post is unsuccessful. (Unsuccessful post indicates the transmit command chain was not ready to transmit on the other line.)
- Receive. NCP sets PCF to 7, for start-stop lines, or to 5, for BSC lines. NCP buffers each character as it is received.
- (02) - While receiving data characters, and while hunting for phase if BSC, there should certainly be no more than 3 seconds between interrupts. Also, each time an interrupt occurs, SCF bits 0, 2, and 3 should be off. SCF bit 4 should be on (except during T3700LTA or T3700LT, test 1).
- (03) - At completion of the receive operation, the PCF should be at 7 and the LCD should have remained as set in the set-mode chain.
- (FF) - The received data, if any, is returned to the host and compared with the expected data.

Chain 06 - SDLC Receive.

- Set SDF to set NRZI mode bit, ICW bit 44, as needed.
- (01) - Post the transmit chain to start transmitting. Error if post is unsuccessful. (Unsuccessful post indicates the transmit command chain was not ready to transmit on the other line.)
- Receive SDLC. NCP sets PCF state 5 and handles all succeeding interrupts until the final flag byte is received. NCP buffers each character as it is received and accumulates the 'BCC' characters.
- (02) - While hunting for phase, and in between received characters, there should be no more than 3 seconds between interrupts. Also, each time an interrupt occurs, SCF bits 0, 2, and 3 should be off. SCF bit 4 should be on (except during T3700LTA or T3700LT, test 1).
- (03) - At completion of the receive, the PCF should be 6 and the LCD should be 9.
- (04) - At completion of the receive, the NCP compares the received and accumulated BCC's. They should compare.
- (FF) - The received data is returned to the host and compared with the expected data.

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Chain 07 - Transmit.

- Set initial SDF:
 - Start-stop - X'FF'
 - BSC - X'AA'
 - SDLC:
 - NRZI mode - X'00' (ICW bit 44 is also set)
 - Non-NRZI mode - X'AA' (ICW bit 44 is not set)
- Set pad flag and initial PDF:
 - Start-stop - X'FF'
 - BSC - X'AA'
 - SDLC:
 - NRZI mode - X'00'
 - Non-NRZI mode - X'AA'
- Set transmit initial. PCF is set to 8. (LCD is unchanged.)
- (01) - Interrupt should occur within 3 seconds. Bits 0, 2, and 3 of the SCF should be off when the interrupt occurs.
- (02) - When interrupt occurs, PCF should have changed to 9. (LCD should remain unchanged.)
- Set pad flag and PDF again:
 - Start-stop - X'FF'
 - BSC - X'AA'
 - SDLC - X'7E'
- Wait for the receive interpretive command chain to begin execution. (When the receive chain has been started, it will "post" this chain, ending the wait). During this wait, the line is transmitting:
 - Start-stop - X'FF'
 - BSC - X'AA'
 - SDLC - X'7E'
- Transmit on Count. As each character service interrupt occurs, the NCP takes each character to be sent and places it into the PDF.
- (03) - There should be no more than one second in between each transmit interrupt, and bits 0, 2, and 3 of the SCF should be off each time an interrupt occurs.
- (04) - After all characters have been sent, the PCF should still be at 9 and the LCD should be unchanged.

Chain 08 - Modem Self-Test.

- Set PDF to X'FF'.
- Set SDF to X'03'.
- Set transmit-initial. PCF is set to 8, LCD to C.
- (01) - Interrupt should occur within one second. Bits 0, 2, and 3 of the SCF should be off.
- (02) - PCF should change to 9 and LCD should still be C.
 - Set PDF to X'FF', again.
 - Transmit-turn. PCF is set to D (LCD still C) to initiate a transmit turnaround, leaving Request-to-Send on.
- (03) - Interrupt should occur within one second, when turnaround completes, and bits 0, 2, 3, and 5 of the SCF should be off when the interrupt occurs.
- (04) - As a result of the turnaround, the PCF should be 5; LCD should be unchanged.
 - Clear the SDF (X'00') to insure that mark bits are being serialized.
- (05) - Wait one second for an interrupt. The PCF is 5, LCD is C, hunting for BSC phase; therefore, no interrupts should occur during this time. (Should be receiving all marks.)
- (06) - At the end of the one second, RLSD should be up; and,
- (07) - the SDF should be serializing all one bits.
 - Reset the PDF to X'00' to insure all one bits are being transferred from the SDF.
 - Set receive-in-phase. PCF is set to 7. (LCD is still C.)
- (08) - Interrupts should now start occurring every character time. Wait up to one second for the first one. SCF bits 0, 2, 3, and 5 should all be off. SCF bit 4 should be on (RLSD up).
- (09) - PCF should still be 7 and LCD should still be C.
 - Receive and compare. Over the next two seconds, the NCP compares each received character with X'FF'. A count is maintained of each time a received character is X'FF' and each time it is not. (Refer to Appendix B for a description of the compare and non-compare count fields of the OLLTCB.)

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- (0A) - While receiving, there should be no more than one second between interrupts.
- (0B) - As each interrupt occurs, bits 0, 2, 3, and 5 of the SCF should be off and bit 4 (RLSD) should be on.
- (0C) - After receiving for the two seconds, the PCF should still be 7 and the LCD should still be C.
- (0D) - Examine the resultant compare count fields. All received characters should have been X'FF'.

Chain 09 - ACU Dial.

- Disable the ACU interface. PCF is set to F, LCD to 3.
- (01) - Interrupt should occur within 60 seconds.
- (02) - Disabling should cause the PCF to go to zero. LCD should still be 3.
 - Set data terminal ready on the data interface. Set SDF to X'20', and PCF to 1 to set mode. LCD is set to value selected for test.
- (03) - Set mode should cause interrupt within one second.
- (04) - When interrupt occurs, PCF should be zero and the LCD should be unchanged.
 - Dial. Initiate the dial sequence. The NCP dials the selected number. Dial ends when either NCP detects an error or COS comes up.
- (05) - Abandon Call and Retry (ACR) should not come up at any time. (Refer to section 8.7.)
- (06) - NCP should not detect any failures during the dial operation. (Refer to section 8.7.)
 - No-op the ACU interface. The PCF is set to 0.
- (07) - No interrupt should occur after the line has been no-op'ed.
- (08) - After the no-op, the PCF should be zero and the LCD unchanged.

Chain 0A - BSC and SDLC Enable.

- Enable. Set PCF to 2 to initiate enable.
- (01) - Interrupt should occur within one second (data set ready should be up) and bits 0, 2, and 3 of the SCF should be off.
- (02) - The PCF should change to 4 as a result of the enable. The LCD should be unchanged.
- No-op. Set the PCF to 0.
- (03) - PCF should now be 0 and LCD should still be unchanged.

Chain 0B - Switched Line With Autocall Disable.

- Disable autocall interface. LCD is set to 3 and PCF is set to F. This is done to drop CRO before attempting to disable the data interface.
- No-op the autocall interface. LCD is left at 3 and PCF is set to 0. This is done to prevent any interrupts from the autocall interface.
- Disable the data interface. LCD is set to 0 and PCF is set to F.
- (01) - Level 2 interrupt from the data interface should occur within 60 seconds.
- (02) - PCF should go to 0.
- Disable autocall interface, again. LCD is set to 3 and PCF is set to F. This is done to insure the line connection has been dropped.
- (03) - Level 2 interrupt should occur within one second.
- (04) - PCF should go to 0.

Chain 0C - Manual Dial.

- Set data terminal ready. The SDF is set to X'20', the LCD to 0, and the PCF to 1 to set mode.
- (01) - Set mode should cause interrupt within one second, and bits 0, 2, and 3 of the SCF should be off when the interrupt occurs.
- (02) - PCF should go to 0 as a result of the set mode, and the LCD should remain 0.
- It is at this point that message ITB532 will occur, instructing the operator to manually connect the selected line. Data terminal ready has been set on the selected line, and after manual connection is complete, an enable operation performed by another command chain should successfully complete.

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Chain 0D - SDLC Link Test Receive (full duplex lines).

- Set SDF to set NRZI mode, ICW bit 44, if required. Otherwise, reset the NRZI mode bit.
- Reset the SCF and the disable stuffer remembrance bit by outputting X'F400' to the SCF/PDF.
- Set the LCD to 8. (The PCF is set to whatever its current value.)
- (01) - Post the transmit chain to start transmitting. Error if post is unsuccessful. (Unsuccessful post indicates the transmit command chain was not ready to begin transmitting.)
- Receive SDLC. NCP sets PCF state 5 and handles all succeeding interrupts until the final flag is received. NCP buffers each character received and accumulates the 'BCC' characters.
- The number of frames expected is decremented by one. If more frames are expected, the command chain branches back to the start of the chain to initiate the next receive operation. If not, command chain execution is terminated.

Chain 0E - SDLC Link Test Transmit (full duplex lines).

- Wait for the receive interpretive command chain (chain 0E) to begin execution. When the receive chain has been started, it will "post" this chain, ending the wait.
 - Set initial SDF:
 - NRZI mode - X'00' (ICW bit 44 is set also)
 - Non-NRZI mode - X'AA' (ICW bit 44 is not set)
 - Reset the SCF, setting bit 7 (disable stuffer), and set the initial PDF:
 - NRZI mode - X'00'
 - non-NRZI mode - x'AA'
 - Transmit initial. LCD/PCF is set to X'98' to wait for clear-to-send.
- (01) - Interrupt should occur within 23.5 seconds when clear-to-send comes up. When the interrupt occurs, bits 0, 2, and 3 of the SCF should be off and bits 1 and 7 should be on.
- Set first flag character into the PDF, reset the SCF, and set disable stuffer by outputting X'F17E' to the SCF/PDF. Note: From this point until the NCP decodes and executes the next command, a variable number of flag characters will be transmitted.
 - Transmit on Count. The NCP takes the SDLC Link Test frame and as each character service interrupt occurs, places the next character to be sent into the PDF while resetting bit 1 (service request) of the SCF. On the first interrupt the NCP resets the disable stuffer (bit 7) bit of the SCF, which was set in the previous step when the flag character was sent. When the last character of the frame (the second BCC character) has been sent, the NCP sets the disable stuffer bit again and the ending flag character is transmitted. Following that character a 'FF' is placed into the PDF to "idle" the line and the operation is ended.
- (02) - There should be no more than one second between each transmit interrupt. Also, as each interrupt occurs, bits 0, 2, and 3 of the SCF should be off and bit 1 should be on.
- The number of frames to be sent is decremented by one. If more frames remain to be sent, the command chain branches back to the start of the chain to send the next frame. If not, command chain execution is terminated.

Chain 0F - SDLC Link Test (half duplex lines).

- Set initial SDF:
 - NRZI mode - X'00' (ICW bit 44 is set also)
 - non-NRZI mode - X'AA' (ICW bit 44 is not set)
 - Reset the SCF, setting bit 7 (disable stuffer), and set the initial PDF:
 - NRZI mode - X'00'
 - Non-NRZI mode - X'AA'
 - Transmit initial. LCD/PCF is set to X'98' to wait for clear-to-send.
- (01) - Interrupt should occur within 23.5 seconds when clear-to-send comes up. When the interrupt occurs, bits 0, 2, and 3 of the SCF should be off and bits 1 and 7 should be on.
- Set first flag character into the PDF, reset the SCF, and set disable stuffer by outputting X'F17E' to the SCF/PDF. Note: From this point until the NCP decodes and executes the next command, a variable number of flag characters will be transmitted.
 - Transmit on Count. The NCP takes the SDLC Link Test frame and as each character service interrupt occurs, places the next character to be sent into the PDF while resetting bit 1 (service request) of the SCF. On the first interrupt the NCP resets the disable stuffer (bit 7) bit of the SCF, which was set in the previous step when the flag character was sent. When the last character of the frame (the second BCC character) has been sent, the NCP sets the disable stuffer bit again and the ending flag character is transmitted. Following that character a 'FF' is placed into the PDF to "idle" the line and the operation is ended.
- (02) - There should be no more than one second between each transmit interrupt. Also, as each interrupt occurs, bits 0, 2, and 3 of the SCF should be off and bit 1 should be on.
- Transmit turn. The PDF is set to "idle", X'FF', and the LCD/PCF is set to X'8C' to initiate a transmit turn operation.
- (03) - An interrupt should occur within one second.
- Receive SDLC. NCP sets PCF state 5 and handles all succeeding interrupts until the final flag is received. NCP buffers each character received and accumulates the 'BCC' characters.
 - The number of frames to be sent is decremented by one. If more frames are to be sent, the command chain branches back to the start of the chain to send another frame. If not, command chain execution is terminated.

Chain 10 - Break Test.

- Set PDF to X'FF'. (See note following this chain.)
- Set SDF to X'03'.
- Set transmit-initial. PCF is set to 8, LCD to C.
- (01) - Interrupt should occur within one second. Bits 0, 2, and 3 of the SCF should be off.
- (02) - PCF should change to 9 and LCD should still be C.
 - Set PDF to X'FF', again. (See note following this chain.)
 - Transmit-turn. PCF is set to C (LCD still C) to initiate a transmit turnaround, turning Request-to-Send off.
- (03) - Interrupt should occur within one second, when turnaround completes, and bits 0, 2, 3, and 5 of the SCF should be off when the interrupt occurs.
- (04) - As a result of the turnaround, the PCF should be 5; LCD should be unchanged.
 - Clear the SDF (X'00') to insure that mark bits are being serialized. (See note following this chain.)
- (05) - Wait one second for an interrupt. The PCF is 5, LCD is C, hunting for BSC phase; therefore, no interrupts should occur during this time. (Should be receiving all marks.) (See note following this chain.)
- (06) - At the end of the one second, RLSD should be down; and,
- (07) - the SDF should be serializing all one bits. (See note following this chain.)
 - Reset the PDF to X'00' to insure all one bits are being transferred from the SDF. (See note following this chain.)
 - Set receive-in-phase. PCF is set to 7. (LCD is still C.)
- (08) - Interrupts should now start occurring every character time. Wait up to one second for the first one. SCF bits 0, 2, 3, and 5 should all be off. SCF bit 4 should also be off (RLSD down).
- (09) - PCF should still be 7 and LCD should still be C.
 - Receive and compare. Over the next two seconds, the NCP compares each received character with X'FF'. A count is maintained of each time a received character is X'FF' and each time it is not. (Refer to Appendix B for a description of the compare and non-compare count fields of the OLLTCB.) (See note following this chain.)

- (0A) - While receiving, there should be no more than one second between interrupts.
- (0B) - As each interrupt occurs, bits 0, 2, 3, 4, and 5 of the SCF should be off.
- (0C) - After receiving for the two seconds, the PCF should still be 7 and the LCD should still be C.
- (0D) - Examine the resultant compare count fields. All received characters should have been X'FF'. (See note.)

NOTE: In T3700LTF, or test 7 under T3700LT, the data is x'FF' in routine 1 and x'00' in routine 2.

Chain 11 - CS-3 SDLC Receive.

- (01) - Post the transmit chain to start transmitting. Error if post is unsuccessful. (Unsuccessful post indicates the transmit chain was not ready to transmit on the other line.)
 - Receive SDLC. NCP sets PCF state 5 to receive the data and handles the succeeding interrupt.
- (02) - The receive interrupt should occur within 3 seconds. Also, when the interrupt occurs, SCF bits 0, 2, and 3 should be off. SCF bit 4 should be on (except during T3700LTA or T3700LT, test 1).
- (03) - At receive completion, the PCF should be 7 and the LCD should be 9.
- (04) - At receive completion, no BCC error should be present.
- (FF) - The received data is returned to the host and compared with the data expected.

Chain 12 - CS-3 Transmit.

- Transmit. The NCP sets PCF state to 8 to send the data and handles the succeeding interrupt.
- (01) - The transmit interrupt should occur within 3 seconds and bits 2 and 3 of the SCF should be off.
- (02) - At transmit completion, the LCD should be unchanged and the PCF should be 9.

Chain 13 - CS-3 Modem Self-Test.

- Set LCD to C, and PCF to 0.
- Transmit and Turn. The NCP sets PCF to 8 to transmit a byte of x'FF' and turn to receive leaving Request-to-Send on.
- (01) - The transmit-and-turn interrupt should occur within one second.
- (02) - When the transmit-and-turn interrupt occurs, SCF bits 2 and 3 should be off.
- (03) - When the transmit-and-turn interrupt occurs, the LCD should be C and the PCF should be 5.
 - Clear the SDF (x'00') to insure that mark (one) bits are being serialized.
- (04) - Wait one second for an interrupt. The PCF is 5, LCD is C, hunting for BSC phase; therefore, no interrupt should occur. (Should be receiving all marks.)
- (05) - At the end of the one second, RLSD should be up; and,
- (06) - the SDF should be serializing all one bits.
 - Set receive-in-phase. PCF is set to 7, EPCF to C. (LCD is still C.)
 - Receive-and-Compare. Over the next 2 seconds the NCP compares the contents of each buffer received to insure that every character received is x'FF'. A count is maintained of each received character that is x'FF' and each character that is not. (Refer to Appendix B for a description of the compare and non-compare count fields of the OLLTCB.)
- (07) - At least one interrupt should occur during the receive-and-compare.
- (08) - As each interrupt occurs, bits 2 and 3 of the SCF should be off and bit 4 (RLSD) should be on.
- (09) - At completion of the receive-and-compare, the PCF should still be 7 and the LCD should still be C.
- (0A) - Examine the resultant compare count fields. All received characters should have been x'FF'.

Chain 14 - CS-3 SDLC Link Test (half duplex lines).

- Transmit-on-Count. The NCP gives the Type 3 Scanner the SDLC Link Test frame to be transmitted. The scanner will automatically do a turn to receive upon completion and receive the response.
- (01) - (This error code is reserved.)
- (02) - No more than 3 seconds should elapse before the transmit operation completes and an interrupt occurs. Also, when the interrupt occurs, bits 0, 2, and 3 of the SCF should be off and bit 1 should be on.
- (03) - (This error code is reserved.)
- As each response is received, it is returned to the host to be compared with the frame sent. Each time the above sequence is executed, the number of frames to be sent is decremented by one. If more frames are to be sent, the same sequence is repeated until the requested number of frames has been sent.

Chain 15 - CS-3 SDLC Link Test Transmit (full duplex lines).

- Wait for the receive interpretive command chain (chain 16) to begin execution. When the receive chain has been started, it will "post" this chain, ending the wait.
- Transmit-on-Count. The NCP gives the Type 3 Scanner the SDLC Link Test frame to be transmitted.
- (01) - (This error code is reserved.)
- (02) - No more than 3 seconds should elapse before the transmit operation completes and an interrupt occurs. Also, when the interrupt occurs, bits 0, 2, and 3 of the SCF should be off and bit 1 should be on.
- (03) - (This error code is reserved.)
- Each time the above sequence is executed, the number of frames to be sent is decremented by one. If more frames are to be sent, the same sequence is repeated until the requested number of frames has been sent.

Chain 16 - CS-3 SDLC Link Test Receive (full duplex lines).

- (01) - Post the transmit chain to start transmitting. Error if post is unsuccessful. (Unsuccessful post indicates the transmit command chain was not ready to begin transmitting.)
- Receive SDLC. NCP sets PCF state 5 and handles the succeeding interrupt.
- The number of frames expected is decremented by one. If more frames are expected, the command chain branches back to the start of the chain to initiate the next receive operation. If not, command chain execution is terminated.

APPENDIX B - The On-Line Line Test Control Block (OLLTCB).

For each interpretive command chain being executed in the 3704/3705, an OLLTCB is created in 3704/3705 storage by the NCP. The OLLTCB is used as nothing more than an area in which to temporarily store information used to control the interpretive command chains. Some areas of the OLLTCB are also used to store the results of certain operations. (An example of this is the area in which the ICW is saved.)

Whenever an interpretive command chain finishes processing, its OLLTCB is returned to the host from the 3704/3705. The test section may then analyze the OLLTCB to determine the results of the command chain. This appendix describes each of the fields that may be of interest in analyzing an error. Figure B.1 shows the layout of the OLLTCB.

<u>OLLTCB Byte:</u>	<u>Description:</u>
0-1	Residual transmit count - When transmitting data, this field is loaded with the number of bytes to be sent and is decremented each time a data byte is placed into the PDF. If an error occurs while transmitting, this field will indicate the number of bytes left to be sent. (This field is valid only during a "transmit on count" operation.)
2-3	Residual receive count - When receiving data, this field is loaded with the number of bytes to be received (if receiving SDLC, the maximum number of bytes to be received) and is decremented each time a data byte is obtained from the PDF. If an error occurs while receiving, this field will contain the number of bytes left to be received. This field is only valid during "receive" or "receive SDLC" operations. The compare and non-compare count fields are used during "receive and compare" operations.
4-5	Compare count - While the NCP is receiving and comparing characters, this field is incremented each time a character is received that is equal to the one being compared against. (This field is valid only during a "receive and compare" operation.)
6-7	Non-compare count - While the NCP is receiving and comparing characters, this field is incremented each time a character is received that is not equal to the one being compared against. (This field is valid only during a "receive and compare" operation.)
8	Autocall SDF - At the end of a dial operation or if the NCP detects a dial failure while dialing, this field will contain the contents of the SDF on the autocall interface at the time of failure.
9	Autocall PDF - At the end of a dial operation or if the NCP detects a dial failure while dialing, this field will contain the contents of the PDF on the autocall interface at the time of failure.
10	Autocall digit count - At the end of a dial operation or if the NCP detects a dial failure while dialing, this field will contain the number of digits thus far dialed. (In the case of a dial failure, this will therefore indicate which digit was being dialed at the time of failure.)
11-15	Reserved.

16-21

ICW Input Reg - At the end of any operation or if an error is detected during any operation, these bytes will contain bits 0-45 of the ICW of the associated line. Refer to Section 8.6 for information relating to operation on a Type 1 Communications Scanner. To provide more complete error information when running on a Type 3 Communications Scanner, the following bits are modified by the NCP to contain the indicated data:

<u>BIT</u>	<u>TYPE 3 CS ICW BIT</u>	<u>CONTENTS</u>
4	= 14.0	Receive Line Signal Detect
5	= 14.1	Idle Detect
6	= 14.4	Off-Boundary Flag
7	= 14.7	Length Check
42-45	= 16.4 - 16.7	Extended PCF

22-23

OLLT System Flags - The individual bits in this field are set to indicate various error conditions. The bit definitions are:

- Bit 0 Wait error. No level 2 interrupt occurred within the time expected.
- Bit 1 SCF error - When a level 2 interrupt occurred, one or more of the SCF bits was not in the expected state.
- Bit 2 SDLC BCC Error. At the end of a receive SDLC operation, the received BCC did not compare to the accumulated BCC.
- Bits 3-5 Ignore.
- Bit 6 Dial Error. During a dial operation, Abandon Call and Retry was set.
- Bit 7 Dial Error. During a dial operation, the NCP detected a dial failure.
- Bit 8 Compare Overflow. The compare counter's (bytes 4 and 5) maximum value has been exceeded and has wrapped-around.
- Bit 9 Non-Compare Overflow. The non-compare counter's (bytes 6 and 7) maximum value has been exceeded and has wrapped-around.
- Bits 10-15 Ignore.

On-Line Line Test Control Block

0	1	2	3
RESIDUAL TRANSMIT COUNT		RESIDUAL RECEIVE COUNT	
4	5	6	7
COMPARE COUNT		NON-COMPARE COUNT	
8	9	10	11
ACO SDF	ACO PDF	ACO DIGIT COUNT	
12	13	14	15
16	17	18	19
ICW INPUT REG 0-15		ICW INPUT REG 16-31	
20	21	22	23
ICW INPUT REG 32-45		OLLT SYSTEM FLAGS	

FIGURE B.1

APPENDIX C Common OLLTCP Error Printouts

The following messages are produced by the OLLTCP when it detects a condition which will prevent proper execution of the base modules. The error print may include such items as CCW's, CSW, Condition Code, PIU's, etc. Refer to the "On-Line Terminal Test User's Guide", form D99-3700A, for a description of the formats of these items.

010 BRANCH DISPLACEMENT TABLE CAPACITY EXCEEDED

This message is printed when the OLLTCP Branch Table length is exceeded. This message indicates an OLLTCP programming problem. The section is terminated.

Operator Action:

- a) Request OLLT programmer assistance.

011 TABLE OF CONTENTS CAPACITY EXCEEDED

This message is printed when the OLLTCP Table of Contents length is exceeded. This message indicates an OLLTCP programming problem. The section is terminated.

Operator Action:

- a) Request OLLT programmer assistance.

012 INPUT/OUTPUT BUFFER CAPACITY EXCEEDED

This message is printed when the OLLTCP builds an Input/Output Buffer greater than 512 bytes. This buffer is composed of text data and interpretive commands ready for NCP execution. A message with pointers to the current and previous OLLT macros processed is included with this message. The section is terminated.

Operator Action:

- a) Request OLLT programmer assistance.

013 INVALID OLLT MACRO TYPE FOUND

This message is printed when the OLLTCP macro processor encounters an undefined OLLT macro ID. A message with pointers to the current and previous OLLT macros processed is included with this message. The section is terminated.

Operator Action:

- a) Request OLLT programmer assistance.

015 RIOB MACRO ALREADY PROCESSED

This message is printed when the OLLTCP macro processor detects more than 1 RIOB macro in a test section. The section is terminated.

Operator Action:

- a) Request OLLT programmer assistance.

016 RIOB MACRO SIZE ERROR

This message is printed when the OLLTCP detects an invalid RIOB macro buffer size. The section is terminated. (See the OLLT Programmer's Guide)

Operator Action:

- a) Request OLLT programmer assistance.

017 PLINK ERROR - CODE=XX, MODULE=AAAAAAA, FUNCTION=LOAD
DELETE

This message is printed when the OLLTCP gets a bad return code from the OLT Executive PLINK macro. XX is the return code received from PLINK as defined in the OLTEP/OLTSEP Macro Directory. AAAAAAA is the PLINKed module ID. The PLINK function being attempted on this module is either LOAD or DELETE.

Operator Action:

- a) If the module = AAAAAAA is not in the OLT library, add it.
- b) If it is, the problem is most likely an OLT Executive problem -- request system programmer assistance.

018 RESPONSE TABLE CAPACITY EXCEEDED

This message is printed when the OLLTCP cannot find an unassigned entry in his response table. The section is terminated.

Operator Action:

- a) Request OLLT programmer assistance.

020 INVALID VALUE IN RESOURCE TAG FIELD

This message is printed when the Request Tag field in a BTH response from NCP was not the value expected for OLLT responses X'E000'. It indicates that the section received an NCP response designated for another resource. The response BTU (BTH and BDU) is printed as "RCVD DATA" with this message and the section is terminated.

Operator Action:

- a) Analyze the response BTU and fix the problem if you can.
- b) Otherwise, request system programmer assistance.

021 INVALID DESTINATION NAME

This message is printed when the Destination Name in a BTH response from NCP was not the value for the device being tested. This indicates that the OLLT received a response from some other device than the test device. The response BTU (BTH and BDU) is printed as "RCVD DATA" with this message and the section is terminated.

Operator Action:

- a) Verify that the CDS defined Destination Name is the same as that defined for the device in the Stage 1 NCP Sysgen listing.

022 OLLT INTERPRETIVE COMMAND ERROR

This message is printed when the NCP system response indicates that the NCP detected an error in the current interpretive command block being executed. The BTU (BTH and BDU) and OLLTCB defining the interpretive command in error are returned to the host and printed as "RCVD DATA" along with this message. The section is terminated.

Operator Action:

- a) Request OLLT and NCP programmer assistance.

023 INVALID SYSTEM RESPONSE

This message is printed when an undefined NCP system response is detected by the OLLT in an NCP phase 2 error response BTH. The BTU (BTH and BDU) is printed as "RCVD DATA" along with this message and the section is terminated.

Operator Action:

- a) Analyze the BTU and fix the problem if you can.
- b) Otherwise, request NCP programmer assistance.

024 OLLT RESET BY OPERATOR CONTROL

This message is printed when the current NCP command has been abnormally terminated due to the execution of a deactivate line operation. The section is terminated.

Operator Action:

None.

025 INVALID COMMAND

This message is printed when the command in the response BTU is not the one expectede.g., the section was waiting for a response to a previously issued command but received a response from some other command. The response BTU (BTH and BDU) is printed as "RCVD DATA" along with this message. The section is terminated.

Operator Action:

- a) Analyze the response BTU and fix the problem if you can.
- b) Otherwise, request system programmer assistance.

026 NO OLLT CONTROL BLOCK ATTACHED

This message is printed when an NCP response is received for an NCP OLT command in progress, but no OLLT control block (OLLTCB) is returned to allow the OLLTCP to determine the reason for the response. The response BTU (BTH and BDU) is printed as "RCVD DATA" along with this message and the section is terminated.

Operator Action:

- a) Request NCP programmer assistance.

027 INVALID STEP COUNTER VALUE

This message is printed when the OLLT step counter indicates an unused step position in the address table of processed OLLT macros under NCP operation. The response BTU (BTH and BDU) is printed as "RCVD DATA" along with this message and the section is terminated.

Operator Action:

- a) Request OLLT and NCP programmer assistance.

028 UNABLE TO RESET ERROR LOCK

This message is printed when a previous operation ended with an "ERROR LOCK SET" indication and the attempt to "RESET ERROR LOCK" failed e.g., the NCP response to a "RESET ERROR LOCK" sequence was not "ERROR LOCK RESET". The response BTU (BTH and BDU) is printed as "RCVD DATA" along with this message and the section is terminated.

Operator Action:

- a) Analyze the response BTU and fix the problem if you can.
- b) Otherwise, request NCP programmer assistance.

029 LINE INACTIVE - RUN T3700ACT TO ACTIVATE

This message is printed when an attempt to establish a session on a line under OLTEP/OLTSEP ends with an NCP system response indicating that the line is not active. The section is terminated.

Operator Action:

- a) Run "TEST" = T3700ACT to the test terminal line symbolic name.

030 UNABLE TO ESTABLISH SESSION

This message is printed when the OLLTCP attempts to initiate an NCP session via a TEST with CONTACT command but can not. The NCP response BTU (BTH and BDU) and IOB are printed along with this message and the section is terminated.

Operator Action:

- a) Analyze the response BTU to determine the reason the session can not be established and fix the problem if you can.
- b) Otherwise, request system programmer assistance.

033 LINE INACTIVE - ACCESS METHOD MUST ACTIVATE

This message is printed when an attempt to establish a session on a line under TCAM/TOTE ends with an NCP system response indicating that the line is not active. The section is terminated.

Operator Action:

- a) Activate the line using the OS "vary" operator commande.g., 'vary (line group name, relative line #) ontp'.

034 UNABLE TO TERMINATE SESSION

This message is printed when the OLLTCP attempts to terminate a session via a TEST with DISCONNECT command but the NCP system response indicates the session did not terminate properly. The NCP response BTU (BTH and BDU) is printed as "RCVD DATA" along with this message and the section is terminated.

Operator Action:

- a) Analyze the response BTU and fix the problem if you can.
- b) Otherwise, request system programmer assistance.

037 UNABLE TO SET DIAGNOSTIC MODE

This message is issued after the OLLTCP has attempted a 'Test and Contact' command to establish a session on the line and the command failed. The section is terminated.

Operator Action:

- a) Request OLLT programmer assistance.

040 WAITIO TIME DELAY RETURN CODE ERROR RC=RR

This message is printed when the OLT Executive returns a return code different than 8, in response to a non-device, timing WAITIO. 'RR' is the return code. The section is terminated.

Operator Action:

- a) Request OLLT programmer assistance.

041 INVALID RPASS MACRO RESOURCE

This message is printed when an RPASS macro has been issued to a resource for which no line table can be found. The section is terminated.

Operator Action:

- a) Request OLLT programmer assistance.

042 GRAB RETURN CODE ERROR RC=RR

This message is printed by the OLLTCP when the OLT executive returns a bad return code in response to a GRAB. The section is terminated. RR is the return code as defined below:

RR = 04 = Function not available.
08 = Device could not be found to satisfy GRAB requirements.
0C = Device entry table has only one device.

Operator Action:

- a) If return code was '08' or '0C', examine the test request message for errors, and then re-enter your test request.
- b) If return code is other than '08' or '0C', or action a) above fails, request OLLT programmer assistance.

043 GETCONFIG RETURN CODE ERROR RC=RR

This message is printed by the OLLTCP when the OLT executive returns a bad return code in response to a GETCONFIG for the CDS for secondary line. The section is terminated. RR is the return code as defined below:

RR = 04 = Function not available.
08 = Number of CDS bytes is greater than buffer size.
0C = Requested CDS not found.

Operator Action:

- a) If return code was '08' or '0C', check the CDS entry for the line. Correct it and re-enter the test request.
- b) If return code is other than '08' or '0C', or action a) above fails, request OLLT programmer assistance.

044 CDS DOES NOT DEFINE A LINE

The device type field of the line CDS is not a hexadecimal value between 'E0' and 'EF', inclusive. The section is terminated.

Operator Action:

- a) Reconfigure the CDS for the line, correcting the Device Type field.
- b) Rerun the test.

046 INVALID RGRAB MACRO RESOURCE

This message is printed when the section attempts to 'GRAB' a primary device. The section is terminated.

Operator Action:

- a) Request OLLT programmer assistance.

047 OLT DRIVER DOES NOT SUPPORT MULTIPLE DEVICES ON SAME NCP

This message is printed if the test section attempts to GRAB more than one resource on the same sub-channel address and the OLT executive cannot support multiple devices. The section is terminated.

Operator Action:

- a) The section is being run with an un-supported executive. Review the "Program Requirements" section of this document and rerun under a supported executive.

048 OLT DRIVER DOES NOT SUPPORT MULTIPLE SECONDARY DEVICES

This message is printed if the test section attempts to GRAB more than one secondary device and the OLT executive cannot support multiple secondary devices. The section is terminated.

Operator Action:

- a) Rerun under an executive that can support multiple secondary devices.

049 INVALID REMSG MACRO RESOURCE

This message is printed if the OLLT attempts to print an error message for a resource that is not being tested. The section is terminated.

Operator Action:

- a) Request OLLT programmer assistance.

050 INVALID RCDS MACRO RESOURCE

This message is printed if an OLLT attempts to get the CDS for a resource that is neither the primary or a secondary resource. The section is terminated.

Operator Action:

- a) Request OLLT programmer assistance.

070 EXECUTE TEST REQUEST FAILED - EXCEPTION BIT SET

This message is printed when the OLLTCP issues an EXECUTE TEST REQUEST command to the NCP and the command can not be executed by the NCP. The section is terminated. Four (4) bytes of sense data will follow the RH field of the PIU and may be used to determine the cause of the exception. Only the first 2 bytes of this field are significant for the EXECUTE TEST command and they are defined as follows:

1001 - RU data error - An invalid command or modifier is specified within the EXECUTE TEST RU.

0809 - Mode inconsistency -

- An OLLT command is received when an OLTT command is in progress on that link.
- An OLTT command is received when an OLLT command is active on that link.

080C - Function not supported - An OLTT PIU is received, but the network address in the RU is not that of a device.

0815 - Request rejected - function active -

- The required link is active. For OLLTs the link must be inactive.
- A test is already active on the required link.

0816 - Request rejected - function inactive - The EXECUTE TEST RU contains a reset command but the OLLT or OLTT is inactive.

Operation Action:

- a) Analyze the sense data in the received PIU and take appropriate action.
- b) Check the received PIU to verify that the DAF, RH, and TH are valid. The TH should be a hexadecimal 1E00XXXXYYYYNNNN0000, where XXXX is the DAF (Destination Address Field) of the NCP-3 Physical Services, YYYY is the OAF (Origination Address Field) of the host SSCP (System Service Control Point), and NNNN is the current SNF (Sequence Number Field). The RH byte 0 should be a hexadecimal 9B. If the DAF/OAF is in error, verify the device CDS for the test terminal and if in error reconfigure it.
- c) If any other fields are not as indicated, an OLLT/NCP-3 programming interface specification has been violated. Request PSR assistance.

071 INVALID RESPONSE TO EXECUTE TEST REQUEST

This message is printed when the OLLTCP detects a command response sequence other than an EXECUTE TEST response (X'010301') in the RU Prefix and Request Code fields of the PIU response to the EXECUTE TEST REQUEST. The section is terminated.

Operation Action:

- a) An OLLT/NCP-3 programming interface specification has been violated. Request PSR assistance.

072 RESPONSE BIT NOT SET IN EXECUTE TEST RESPONSE

This message is printed when a PIU is received in response to an EXECUTE TEST REQUEST but the response bit is not set in the PIU received. The section is terminated.

Operator Action:

- a) An OLLT/NCP-3 programming interface specification has been violated. Request PSR assistance.

073 PIU RECEIVED WAS NOT A RECORD TEST DATA REQUEST PIU

This message is printed when an EXECUTE TEST REQUEST and RESPONSE has completed OK and another request/response is received which is not a RECORD TEST DATA REQUEST PIU. The section is terminated.

Operator Action:

- a) An OLLT/NCP-3 programming interface specification has been violated. Request PSR assistance.

074 PIU RECEIVED DOES NOT HAVE A FID1 FORMAT

This message is printed when a PIU is received that is not a FID1 format PIU. The section is terminated.

Operator Action:

- a) An OLLT/MCP-3 programming interface specification has been violated. Request PSR assistance.

075 PIU RECEIVED DOES NOT CONTAIN A WHOLE NIR

This message is printed when a PIU is received that indicates that multiple NIRs are mapped together or the RU is segmented. The OLLTCP can not handle multiple NIRs or segmented RU's. The section is terminated.

Operator Action:

- a) An OLLT/MCP-3 programming interface specification has been violated. Request PSR assistance.

102 INVALID CDS DEVICE CLASS - NOT 44

This message is printed when the test terminal CDS or the MCP CDS is not a CLASS= X'44' CDS. The section is terminated.

Operator Action:

- a) Correct the CDS in error via reconfigure and rerun the test. Note that the problem may be the MCP CDS name in the 3704/3705 CLASS= X'40' CDS.

103 CANNOT GET CDS FOR COMMUNICATION CONTROL UNIT

This message is printed when the section can not get the 270X or 3704/3705 Transmission Control Unit (TCU) CLASS= X'40' CDS due to a bad return code from the TCU GETCONF. The section is terminated.

Operator Action:

- a) Verify that a CLASS= X'40 TCU CDS is defined. If not, configure it and rerun the test.
- b) Otherwise, an OLT Executive problem most likely exists -- request system programmer assistance.

104 INVALID COMMUNICATIONS CONTROL UNIT CLASS - NOT 40

This message is printed when the 270X or 3704/3705 TCU CDS CLASS= value is not X'40' as it must be. The section is terminated.

Operator Action:

- a) Verify that the CDS for the symbolic name of the device entered in the TRM is correct.
- b) Verify that the TCU CDS CLASS= value is X'40'.
- c) Correct any error via reconfiguring and rerun the test.

105 UNSUPPORTED COMMUNICATIONS CONTROL UNIT TYPE

This message is printed when the TCU CDS TYPE= operand indicates the CDS is for a TCU that the OLLT does not support e.g. other than 2701, 2702, 2703, 3704, or 3705. The section is terminated.

Operator Action:

- a) Verify that the CDS for the symbolic name of the device entered in the TRM is correct.
- b) Verify that the TCU CDS TYPE= value is correct.
- c) Correct any error via reconfiguring and rerun the test.

106 CANNOT GET CDS FOR DEVICE

This message is printed if the section can not get the test terminal CDS on the line CDS due to a bad return code from GETCONFG. The section is terminated.

Operator Action:

- a) Verify that the line and test terminal CDS's are properly defined and in the CDS library.
- b) Correct any errors via reconfiguring and rerun the test.

107 UNSUPPORTED OLT EXECUTIVE

This message is printed when the section is being run under an OLT Executive that it does not support e.g. OLTSEP, DOS/OLTEP, OS/OLTEP, or levels of TCAM/TOTE below level 10 (section T3700ACT will issue this message if run under TCAM/TOTE levels below level 10). The section is terminated.

Operator Action:

- a) Rerun the test under one of the supported executives.

108 CECOM ERROR RC=RR

This message is printed when the section detects a bad return code from the CECOM macro used to prompt for NCP CDS parameters. 'RR' is the return code. The section is terminated.

Operator Action:

- a) Request system programmer assistance - an OLT Executive problem most likely exists.

110 HOST BUFFER SIZE EXCEEDS OLLT BUFFER SIZE

This message is printed when the Host Buffer size specified in the NCP CDS is greater than the OLLT Input/Output Buffer (IOB) size (The IOB is 512 bytes for the OLLT.). The section is terminated.

Operator Action:

- a) Verify that the Host Buffer Size specified in the NCP CDS is the value specified by the UNITSZ= operand of the HOST macro in the Stage 1 Sysgen listing.
- b) If the Host Buffer Size is specified incorrectly, reconfigure the NCP CDS and rerun the test.
- c) If the Host Buffer Size is correct, the NCP will have to be re-sysgened with a UNITSZ= of 512 or less before OLLTs can be run.

112 CANNOT GET CDS FOR NCP

This message is printed if the section can not get the NCP CDS due to a bad return code from the OLT Executive GETCONFIG macro. The section is terminated.

Operator Action:

- a) Verify that the TCU CDS symbolic name for the NCP CDS is correct.
- b) Verify that the NCP CDS is in the OLT CDS library.
- c) Correct any CDS errors via configuring and rerun the test.

113 INVALID DEVICE FIELD IN NCP CDS

This message is printed when the Device Type value in the NCP CDS is not X'F0' to X'FF'. The section is terminated.

Operator Action:

- a) Correct the NCP CDS Device Type value by reconfiguring and rerun the test.

114 HOST BUFFER SIZE OF ZERO IS INVALID

This message is printed when the OLLTCP detects a 0 value in the NCP CDS Host Buffer size field. The section is terminated.

Operator Action:

- a) Correct the Host Buffer Size specified in the NCP CDS to indicate the value of the UNITSZ= operand in the HOST macro of the Stage 1 NCP Sysgen listing and rerun the test.

201 EXIO WAS NOT ACCEPTED

This message is printed when the section issued an EXIO (does Start I/O) request to the OLT Executive and the return code indicated the EXIO was not executed. The section is terminated.

Operator Action:

- a) Request system programmer assistance - an OLT Executive problem probably exists.

202 EVENT DID NOT COMPLETE IN ALLOTTED TIME

This message is printed when no response is received from the 3704/3705 NCP or 270X within 5 minutes after the start of an OLT Executive EXIO macro (does Start IO). The section is terminated.

Operator Action:

- a) The TP activity is probably too high. Wait until the activity diminishes and rerun the test.
- b) If the problem persists, request system programmer assistance.

203 WAITIO WAS NOT ACCEPTED

This message is printed when the OLLTCP receives a bad return code from the OLT Executive WAITIO macro execution, indicating that the WAITIO was not executed. It is also printed if an event occurred but was not posted in the section TECB. The section is terminated.

Operator Action:

- a) Request system programmer assistance - an OLT Executive problem probably exists.

204 CONDITION CODE ERROR ON EXIO

This message is printed when a section Start IO ends with a condition code equal to 2 (Busy) or 3 (unit not operational). The actual condition code is printed in the error message and the section is terminated.

Operator Action:

- a) Define and correct the reason for the indicated condition code error and rerun the test.

205 CHANNEL STATUS ERROR

This message is printed when channel status other than X'00' is posted in the second command status byte in the CSW for a READ or WRITE operation. This indicates that some sort of channel error has occurred. The actual CSW is printed along with this message and the section is terminated.

Operator Action:

- a) Define and correct the reason for the indicated channel status error and rerun the test.

207 3705 STATUS ERROR
3704

This message is printed when the section receives a command status error in the first status byte of the CSW in error. The actual CSW and sense are printed along with this message and the section is terminated.

Operator Action:

- a) Define and correct the reason for the indicated status error and rerun the test.

210 EXIO RETURN CODE ERROR RC=RR

This message is printed when the OLT executive returns an unacceptable return code in response to an EXIO. 'RR' is the return code. The section is terminated.

Operator Action:

- a) Request OLLT programmer assistance.

211 WAITIO RETURN CODE ERROR RC=RR

This message is printed when the OLT executive returns an unacceptable return code in response to a device WAITIO. 'RR' is the return code. The section is terminated.

Operator Action:

- a) Request OLLT programmer assistance.

400 ILLOGICAL STATUS RECEIVED FROM NCP

This message is printed when the NCP response status is not recognizable to the section.

The response PIU is printed as "RCVD DATA" along with this message and the section is terminated.

Operator Action:

- a) Analyze the response PIU and fix the problem if you can.
- b) Otherwise, request system programmer assistance.

PFO INVALID ERROR MESSAGE DETECTED

This message is printed when the OLLTCP is linked to for an error print, but the message to be printed is not in his table. This indicates an OLLTCP programming problem.

Operator Action:

- a) Request OLLT programmer assistance.

OLLT MACRO POINTERS - CURRENT= CCCCCC - PREVIOUS= PPPPPP

This message is printed when:

- the OLLT Input/Output Buffer capacity is exceeded.
- an invalid OLLT macro type is found.

The current pointer is a pointer to the OLLT macro being processed when the error occurred. The previous pointer is a pointer to the last macro successfully processed. The reason for this message is explained by previous messages.

OLLT IS BEING TERMINATED

This message says that the OLLT is terminating due to critical errors. The reason for the termination is explained by the previous message(s).