

DIMENSION® 600/2000 PBX
LINK TEST
(PROC 511)

1. GENERAL

- 1.1 This section is issued in order to make available the information contained in the Administration and Maintenance Manual, 500-497, PROC 511.
- 1.2 The attachment provides test and troubleshooting procedures for the link circuits (LC100s) used for intermodule connections.

ATTACHMENT

PROC 511 (9 pages)

Reason for Issue:
New Section

Manager, Denver PBX PECC

PRIVATE

THE INFORMATION CONTAINED HEREIN SHOULD NOT BE DISCLOSED TO UNAUTHORIZED PERSONS. IT IS MEANT SOLELY FOR USE BY AUTHORIZED BELL SYSTEM EMPLOYEES.

Printed in U.S.A.

PROCEDURE 511 - LINK TESTS

PROC 511

A. DESCRIPTION

Procedure 511 should be used when the NETWORK LINKS - 511 and MINOR alarm indicators are turned on.

Procedure 511 is used to:

- Display the link circuit (LC100) failures.
- Test all link circuits.
- Retire the alarm when all link circuits pass Test 2.

Four tests are available:

- Test 1 - Failure history.
- Test 2 - Tests all circuits and displays failure summary.
- Test 3 - Tests all circuits and displays each failure.
- Test 4 - Tests an individual circuit continuously.

| | | | | | |
|--|---|---|---|---|--|
| <p>TEST 1: DISPLAYS FAILURE HISTORY. USE 'CLEAR DATA', 'EXECUTE' TO CLEAR FAILURE HISTORY.</p> <p>TEST 2: TESTS ALL CIRCUITS (DISPLAYS SUMMARY ONLY). USE 'NEXT CIRCUIT' TO ADVANCE TO NEXT ORIGINATING LINK EQPT LOCATION (NOT TEST 2).</p> | <p>TEST 3: TESTS ALL CIRCUITS (DISPLAYS EACH FAILURE). USE 'BUSY OUT' AND 'RLS BUSYOUT' TO CHANGE BUSY OUT STATUS.</p> | <p>TEST 4: TESTS A PARTICULAR CIRCUIT CONTINUOUSLY. USE 'NEXT UNIT' TO ADVANCE TO NEXT ORIGINATING MODULE.</p> | <p>FAILURE CODES:</p> <p>0-PASS 1-NO TRANSMISSION OR LOW TRANSMISSION 2-GAIN PAD STUCK OUT OR GAIN HIGH 3-GAIN PAD STUCK IN 4-MORE THAN ONE OF ABOVE</p> | <p>6-SEE NOTE 7-NO LINE CARRIER 8-NETWK ORDER INCOMPLETE 9-NO TIME SLOT</p> | <p>NOTE: LINK CIRCUIT IS BUSY. EITHER WAIT UNTIL TEST AUTOMATICALLY STARTS OR USE 'STOP' AND SELECT ANOTHER LINK.</p> |
| ISSUE 5 | | PROC 511 | | | |

| | | | | | | | | | | | | | | | | |
|----------------------|---------------------------|------------|------|------|-----|---------------------------|-----|------|------|-----|------------------------------------|--------------|-----------------------|----|-----------------------|----|
| FLIPCHART ISSUE 5 | | LINK TESTS | | | | | | | | | | | PROC 511 | | | |
| TEST NO | TEST 4 | | | | | FAILURE HISTORY (TEST 1) | | | | | S MBT TUA CST EYU S | FAIL CODE | NUMBER OF FAILURES | | FAILING CIRCUIT INDEX | |
| | ORIGINATING LINK EQPT LOC | | | | | TERMINATING LINK EQPT LOC | | | | | | | SUMMARY (TESTS 2&3) | | | |
| | MODULE | CAB | CARR | SLOT | CKT | MODULE | CAB | CARR | SLOT | CKT | | | TOTAL CIRCUITS TESTED | | TOTAL CIRCUITS FAILED | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | | 11 | 12 | 13 | 14 |

3. 0.0.2. 5.1. 1.0.2. 5.1.0.2. 11. 1. 511

B. FIELD DEFINITIONS AND CODES

| Field | Code | Definition |
|--------------------------------------|-----------------------------------|--------------------------|
| 1 | 1-4 | Test number. |
| Originating link equipment location: | | |
| 2 | 0-24 | Module number. |
| 3 | 0-4 | Cabinet number. |
| 4 | 2-4 | Carrier number. |
| 5 | 4-8, 10-15, 17-21, 23-28 | Slot number. |
| 6 | 0-3 | LC100 circuit number. |
| Terminating link equipment location: | | |
| 7 | 0-24 | Module number. |
| 8 | 0-4 | Cabinet number. |
| 9 | 2-4 | Carrier number. |
| 10 | 4-8, 10-15, 17-21, 23-28 | Slot number. |
| 11 | 0-3 | LC100 circuit number. |
| 12 | | Maintenance busy status: |
| | 0 | Not busied out. |
| | 1 | Busied out. |
| | 2 | Unequipped. |

| Field | Code | Definition |
|--|---|---|
| 13 | 0 1 2 3 4 6 7 8 9 | Failure code: 0 Pass (Test 4 only). 1 No transmission or gain low. 2 Gain pad stuck out or gain high. 3 Gain pad stuck in (Test 1 only). 4 More than one of the above. 6 Circuit busy (Test 4 only). 7 No line carrier in module for testing (Tests 3 and 4 only). 8 Network order incomplete (Tests 3 and 4 only). 9 No time slot available (Tests 3 and 4 only). |
| 14 | 0-6 * | Test 1: Number of link circuit failures. Test 2 and 3: Total number of link circuits tested. |
| 15 | 0-6 * | Test 1: Individual failures. Test 2 and 3: Total number of circuits failed. |
| * Number varies according to system configuration. | | |

C. TEST PROCEDURES

A list of link tests, what each one does, and how each is run follows:

Call in Procedure 511:

PROC NO.; 511; ENTER

All on-line maintenance PAM and link testing is turned off. Test 1 is automatically selected.

Depressing the NEXT TEST key repeatedly advances the procedure to the desired test.

Test 1:

Test 1 provides a failure history of link circuit failures. The failure history is generated by the on-line software and is displayed in fields 14 and 15.

To start the test, select Test 1 and depress the EXECUTE key. EXECUTE takes a snapshot of the failure history and displays it on the MAAP. If one or more failures have occurred, the following is displayed:

| Field | Contents |
|-------|---|
| 2-6 | Equipment location if originating link. |

| Field | Contents |
|-------|---|
| 7-11 | Equipment location of terminating link. |
| 13 | Failure code. |
| 14 | Number of link circuit failures. |
| 15 | 1 |

Depressing the NEXT CIRCUIT key displays the next failing circuit and increments field 15 by 1. Repeatedly depressing NEXT CIRCUIT displays the remaining failing circuits. Depressing NEXT CIRCUIT after all failure histories have been displayed dashes all fields. Depressing NEXT CIRCUIT again causes the first failure to be displayed again.

Refer to paragraph 2C in Section 4 for information on clearing the failure history.

Test 2:

Test 2 tests all the link circuits for failures and displays a testing summary.

To start the test, select Test 2 and depress the EXECUTE key. The WAIT indicator on the MAAP turns on.

The first link pair in the system's first link group is tested. All during the testing of the link pairs in that link group, the equipment locations of the first link pair are displayed in fields 2 through 12. A 1 is displayed in field 14 and a 0 in field 15.

When the next link group is reached, the first link pair in the group is tested. At the beginning of the test, fields 14 and 15 are updated to show testing progress. All during testing of the link group, the equipment locations of the first pair in the group are displayed. The remaining link groups are tested in the same manner.

If a failure is detected, the NETWORK LINKS-511 and MINOR alarm indicators are turned on.

NOTE

The IN USE lamp flashes momentarily, during testing, each time a busy link pair is encountered.

When all links have been tested, the WAIT indicator turns off, field 2 through 13 are dashed and the failure summary for the entire test is displayed in fields 14 and 15. Field 14 alternately displays the total number of links tested.

The STOP key can be used to halt testing. The point at which testing is stopped is displayed in fields 2 through 12, 14 and 15.

The NETWORK LINK-511 indicator is automatically turned off (indicating the link alarm is retired) when all link circuits pass Test 2. The link alarm should be retired using Procedure 511.

Test 3:

Test 3 tests all link circuits and displays each failure.

To start the test, select Test 3 and depress the EXECUTE key. Test 3 operates the same as Test 2 except the testing stops at each failure.

When a failure is detected, the NETWORK LINK-511 indicator is turned on and the WAIT indicator turns off. The first failed link circuit is displayed as follows:

| Field | Contents |
|-------|---|
| 2-6 | Equipment location of originating link. |
| 7-11 | Equipment location of terminating link. |
| 12 | Maintenance busy status. |

C. TEST PROCEDURES (Contd)

PROC 511

| Field | Contents |
|-------|------------------|
| 13 | Failure code. |
| 14,15 | Testing summary. |

Depressing the NEXT CIRCUIT key resumes testing. Depressing NEXT CIRCUIT after all failures have been displayed, reinitiates Test 3, starting with the first link pair.

The EXECUTE key can be used to restart testing from the beginning anytime the WAIT indicator is off.

The BUSY OUT and RLS BUSY OUT keys can be used to change the maintenance busy status of a link circuit.

NOTE

The BUSY OUT indicator on the MAAP turns off only when all circuits interfacing with the MAAP are no longer busied out. Therefore, use field 12 to determine the maintenance busy status of the link circuits being tested.

The STOP key can be used to halt testing. The point at which testing is stopped is displayed in fields 2 through 12, 14 and 15. Depressing the NEXT CIRCUIT key resumes testing from the point at which it was stopped.

Test 4:

Test 4 is used to continuously test an individual link circuit suspected of having intermittent failures or to trace wiring problems.

Test 4 can be initialized in two ways:

1. If no failures have occurred (default circuit does not exist), field 2 is blanked and the decimal point in that field flashed to indicate a mandatory entry field. To run Test 4, an originating link circuit location must be entered in fields 2 through 6; eg:

(Module); ENTER; (Cabinet); ENTER;
(Carrier); ENTER (Slot); ENTER; (Circuit);
ENTER

If the module selected in the terminating link is smaller than the originating link, when EXECUTE is depressed the equipment locations are switched on the display, but the test is run normally. This is done because the originating link must always be smaller than the terminating link.

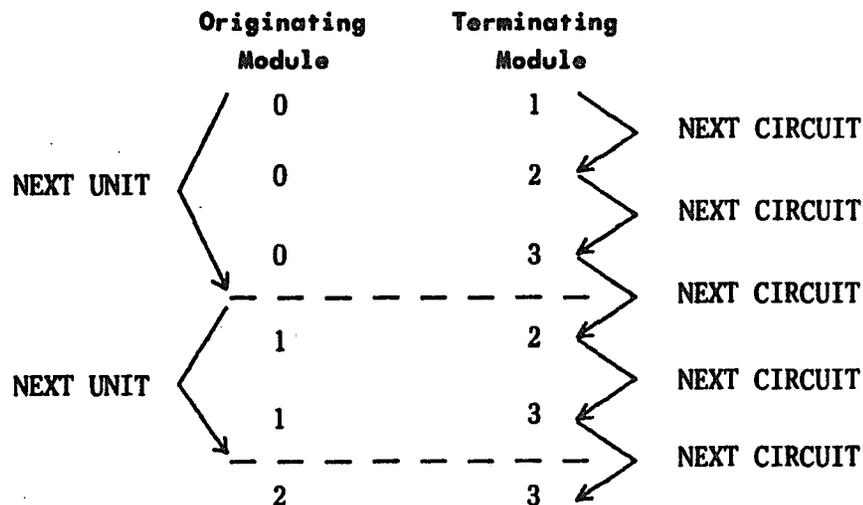
2. If a failure has occurred, a default circuit is displayed. The default circuit is the last link circuit that failed. Either the

default circuit can be tested, or another circuit can be selected by entering its location in fields 2 through 6.

The NEXT CIRCUIT key can be used to increment the display through all the link circuits in the system.

Depressing the NEXT UNIT key displays the equipment location of the next originating module (fields 2 through 6) and the next higher numbered terminating module (field 7 through 11).

For example:



To start the test, depress EXECUTE. A flashing 0 in field 13 indicates the test is running. If a failure occurs, the NETWORK LINK-511 and MINOR alarm indicators are turned on. The failure code for the first failure detected is locked into field 13 and flashed. The flashing display

indicates the test is being run continuously. Dashes appear in fields 14 and 15.

If the link is busy, the IN USE indicator on the MAAP is turned on and a fail code of 6 is displayed (but does not blink because testing has not started). When the link becomes idle, testing starts automatically and the IN USE indicator turns off. As long as the link pair passes the repetitive tests, a flashing 0 appears in field 13.

The EXECUTE key starts the test from the beginning. The stop key halts the test during testing.

When it is desired to test another circuit, stop the test, select the new circuit, and restart the test; eg:

STOP; (Select new circuit); EXECUTE

The BUSY OUT and RLS BUSY OUT keys can be used to change the maintenance busy status of a link circuit. Use of these keys when the link circuit is already in the desired state results in error code 21 or 22.

D. REPAIR GUIDE

When a link circuit failure is indicated, the following steps should be performed in the order shown to isolate and repair the faulty unit.

NOTE

When the NETWORK PAM-508 indicator is on, verify that all circuits pass the PAM amplifier tests covered by unit types 1 and 2 in Procedure 508 and 580 before using Procedure 511.

Step Isolation Procedure

1. Using Test 1, step through the failure history and record the results.
2. Execute Test 3 to determine if a link circuit is failing and record the results.
3. Based on test results, take the corrective action indicated in the order listed in Table 511-1 for each failed circuit. After each step, repeat the test to verify that the fault has been corrected.
4. If intermittent link circuit failures or wiring problems are suspected, use Test 4 to continuously test suspect circuits.
5. If a circuit tested, using Test 4, proves to be faulty, follow the repair sequence in Table 511-1. Re-execute Test 4 after each failure code indication has been corrected.

Table 511-1. Link Test Repair Procedure

| Failure Code | Corrective Action |
|--------------|---|
| 1 | <p>For a single link (one direction or both directions) or for all links in one slot:</p> <p>Replace LC100 for the originating link.</p> <p>Replace LC100 for the terminating link.</p> <p>Using Procedure 552, check the cables and the cross-connect field.</p> |
| | <p>For more than one terminating link slot in a carrier:</p> <p>Replace LC101 for the terminating links.</p> <p>Disconnect LC100 circuit packs for the terminating links one at a time, executing Test 3 or 4 each time. If only the links on the disconnected circuit pack fail, replace that LC100.</p> <p>Using Procedure 552, check the cables and the cross-connect field.</p> |
| | <p>For all links in a cabinet, replace LC122.</p> |

Table 511-1. Link Test Repair Procedure (Contd)

| Failure Code | Corrective Action |
|--------------|--|
| 2,3 | For a single originating link or for all originating links in one slot: Replace LC100. Replace LC101. Replace LC49. Replace LC105. |
| | For more than one originating link slot in a carrier: Replace LC101. Replace LC49. Disconnect LC100 circuit packs for the originating links in the carrier one at a time, executing Test 3 each time. If only the links on the disconnected circuit pack fail, replace that LC100. Replace LC46. Replace LC105. |
| | For all originating links in one cabinet: Replace LC46. Disconnect LC101 circuit packs one at a time. If only the links in the carrier with the disconnected circuit pack fail, replace that LC101. |

| Failure Code | Corrective Action | | | | | | | | |
|----------------|--|-----------|--------------|-----|-------|-----|---------------------|-----|------|
| 2,3 (Contd) | Disconnect LC49 circuit packs one at a time. If only the links in the carrier with the disconnected circuit pack fail, replace that LC49. Replace LC105. | | | | | | | | |
| 6 | This failure code is used only with Test 4 to indicate that a busy link was not tested. Busy links are not tested in Tests 2 and 3 since transmission testing interferes with the customer's use of the PBX. Thus, the total number of circuits tested (field 14) varies with traffic. When a failure code of 6 is displayed in Test 4, the IN USE indicator turns on for a busy link. When the link becomes idle, testing starts automatically. To select a different link, the STOP key must be depressed first. | | | | | | | | |
| 7 | At least one line carrier must be equipped in each module to perform link testing. | | | | | | | | |
| 8 | Use the following procedure to test the corresponding circuit packs: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Procedure</th> <th>Circuit Pack</th> </tr> </thead> <tbody> <tr> <td>501</td> <td>LC130</td> </tr> <tr> <td>505</td> <td>LC123, LC124, LC130</td> </tr> <tr> <td>506</td> <td>LC46</td> </tr> </tbody> </table> | Procedure | Circuit Pack | 501 | LC130 | 505 | LC123, LC124, LC130 | 506 | LC46 |
| Procedure | Circuit Pack | | | | | | | | |
| 501 | LC130 | | | | | | | | |
| 505 | LC123, LC124, LC130 | | | | | | | | |
| 506 | LC46 | | | | | | | | |

Table 511-1. Link Test Repair Procedure (Contd)

| Failure Code | Corrective Action |
|--------------|--|
| 9 | If traffic is heavy, all time slots may be in use. These tests require a time slot that is idle on both time slot buses. In this case, continue testing until a time slot becomes available. |