

DMS-1* DIGITAL MULTIPLEX SYSTEM

SYSTEM OPERATION TESTS

1. GENERAL

1.01 This section describes test procedures for system lineup during initial installation or system expansion.

1.02 *Reason for Reissue:* to add new and revised information.

1.03 *Chart 1* in this section gives system tests to be conducted after initial installation and terminal lineup of the CCT bay (363-2011-205 and 363-2011-210), the RCT bays (363-2011-206 and 363-2011-211), and the DS1 line interconnecting the CCT and the RCT (363-2011-212).

1.04 *Chart 2* gives system tests to be conducted when new subscriber lines are added to a working system.

1.05 *Charts 3 through 11* give separate test procedures for use when optional common features, and the circuit packs associated with them, are being added to a DMS-1 system. The tests may be used either during initial installation of the DMS-1 system, or when adding the optional features to an in-service system. The tests are:

- Chart 3 Priority/Dedicated Option Tests
- Chart 4 Dual Digroup Option Tests
- Chart 5 Local Link Option Test
- Chart 6 System Controller Backup Option Test
- Chart 7 B-Word Backup Option Test

- Chart 8 Reorder Tone Option Test
- Chart 9 Protection Switch Option Tests
- Chart 10 Ring Generator Backup Option Test
- Chart 11 Traffic Measurement Option Test
- Chart 12 Subscriber Line Testing Option Test
- Chart 13 Subscriber Line Test
Extension – Tests
- Chart 14 Signaling Tests.

REFERENCE DOCUMENTS

1.06 The following sections containing DMS-1 installation and maintenance procedures must be available for use during the procedure described in this section:

- 363-2011-205 CCT Circuit Pack Installation
- 363-2011-206 RCT Circuit Pack Installation
- 363-2011-210 CCT Initial Operating Tests
- 363-2011-211 RCT Initial Operating Tests
- 363-2011-300 System Operation
- 363-2011-500 System Fault Locating
- 363-2011-505 System Performance Tests.

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**CHART 1
SYSTEM TEST: INITIAL INSTALLATION**

This chart gives test procedures for verifying end-to-end performance of the system during initial installation. Use Chart 2 when adding subscriber lines to a working system.

Note: In a distributed system, do the tests in this chart at each RCT in turn, beginning at the RCT nearest to the CCT.

PREREQUISITES FOR THE TESTS:

- (1) *Test Lines.* Two subscriber line circuits must be wired from the office switching machine to the CCT. One test line should be a single-party line. If multiparty or 2-party service is provided, the second test line should be a multiparty line. Otherwise the second test line should be another single-party line.

Note: Lines 1 and 2 on line shelf 0 are specified for use in this procedure for convenience only. Other lines can be used on separate line circuit packs as desired.

If coin service is provided, the two test lines may be coin lines wired from the office switching machine to terminations on a QPP410A or QPP410B at the CCT. The lines can be any combination of loop-start, ground-start, or special types of loop-start (e.g., GI, FASN, FEC, or semi-postpay). When connected to the CCT, the two lines are referred to as line 0 and line 1 on the QPP410.

- (2) At the CCT and every RCT in the system, all circuit packs specified for the initial installation must be installed (see 363-2011-205 and 363-2011-206), and the CCT and RCT must meet the test requirements of 363-2011-210 and 363-2011-211.
- (3) Personnel must be present at both the CCT and at each RCT in turn as it is tested. Communications between the CCT and the RCT to coordinate the test procedures should be on the system order-wire.
- (4) The procedures in this chart assume that the optional jackfields are installed on the line shelves. If the jackfields are not installed, the 2-wire vf circuits at both the CCT and RCT may be accessed at the cross-connect field for patching and connecting the test circuits.

APPARATUS:

Required at the CCT:

- 2 P3Q1C Patch Cords, 15-foot
- 2 P3Q3C Patch Cords, 15-foot
- 1 HP236A Telephone Test Oscillator
- 1 HP3555B Transmission Measuring Set
- 1 Copy each of 363-2011-500 and 363-2011-505.

Required at the RCT:

- 2 Telephone Sets, single-party (Note 1)
- 1 Telephone Set, wired for tip-party ANI service (Notes 1 and 2)
- 1 Telephone Set, wired for ring-party service (Notes 1 and 2)
- 1 Test Cord; two jacks wired in parallel to a cord equipped with a Switchcraft TT253 plug (see Fig. 5).

Chart Continued

**CHART 1 Continued
SYSTEM TEST: INITIAL INSTALLATION**

Required at the RCT:

2 Coin Telephone Sets, selected from the following list as required for use on the types of coin lines available at the CCT for test:

- (a) Coin Telephone, loop-start,
- with or without ground isolation (i.e., GI or non-GI);
 - with or without free access to selected numbers (FASN);
 - with or without free emergency calling (FEC);
 - postpay or semi-postpay;
- (b) Coin Telephone, ground-start.

Note 1: All telephone sets must be equipped with ringers, and Switchcraft TT253 plugs on the cable ends.

Note 2: Required only for testing line positions which are to provide 2-party service and which are equipped with universal line circuit packs at the CCT and RCT.

STEP	PROCEDURE
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PREPARATION

- 1 Verify that the test prerequisites, 1 through 4 at the head of this chart have been satisfied.
- 2 At the CCT, simultaneously press the RESTART and RESTART ARM buttons on the QPP431 SYS CONT.

CHECK FOR UNEXPECTED SYSTEM ALARMS

Note: Certain alarms can be expected at the RCT and at the CCT (e.g., DOOR at the RCT, and OPEN DOOR at the CCT for RCT mounted in cabinets or huts). These alarms do not directly affect system operation and should be ignored during the test procedures.

- 3 At the RCT under test, switch on the QPP420 ALM REM circuit pack by switching the ON/OFF switch to the ON position.

Requirement: No unexpected system alarms.

- 4 At the CCT, on the QPP421 ALARM OFFICE circuit pack,
 - 4.1 Set the MTCE/ALM switch to ALM.
 - 4.2 Set the RCT/CCT selector to the RCT under test.

Requirement: No unexpected system alarms.

If an unexpected alarm indication appears at Steps 3 or 4 refer to 363-2011-500, paragraph 1.03, to locate and correct the fault.

Chart Continued

CHART 1 Continued
SYSTEM TEST: INITIAL INSTALLATION

STEP	PROCEDURE
VF TEST	
5	Between the CCT and the RCT under test, do level and idle-channel noise tests on all lines assigned to the RCT. Test in both directions using Charts 1 through 4 of 363-2011-505.
SIGNALING TESTS	
	<i>Purpose:</i> To verify dial pulsing, ringing, and coin control on the lines assigned to the RCT under test.
6	At the RCT, choose any single-party (or coin) line. Connect a telephone set (set A, Fig. 1) to the EQPT jack for the chosen line on the jackfield of the applicable line shelf.
7	At the CCT, using a P3Q1C patch cord, patch the EQPT jack for the line chosen at Step 6 to the LINE jack of line 1 on line shelf 0.
8	At the RCT, choose another line for test, and connect a telephone set (set B, Fig. 1) to the EQPT jack of the chosen line on the jackfield of the applicable line shelf as follows: <ul style="list-style-type: none"> (a) if the line position is equipped with single-party type line cards at the CCT and RCT, use a single-party telephone set, or (b) if the line position is equipped with multiparty-type line cards at the CCT and RCT, use a telephone set wired for tip-party service. (c) if the line position is equipped with coin-type line cards, use a coin telephone equipped as required (see APPARATUS).
9	At the CCT patch the EQPT jack of the line chosen at Step 8 to the LINE jack of line 2 on line shelf 0.
10	At the RCT, check signaling, and coin control if applicable, on the lines under test as directed here. <p><i>Note:</i> If one or both lines under test are coin lines, start at 10.1; if neither line is a coin line, start at 10.7.</p>
10.1	If only one line is equipped with a coin telephone, identify the coin telephone as set B and the other as set A for this test.
10.2	On set B, pick up the handpiece. <p><i>Requirement:</i> (a) If the line is loop-start, dial tone appears; or (b) If the line is ground-start, dial tone does not appear.</p>
10.3	Insert the required coins into set B. <p><i>Requirement:</i> If the line is ground-start, dial tone appears.</p>
10.4	On Set B, dial the directory number of line 1 on shelf 0 of the CCT (test line 1, Fig. 1). <p><i>Requirement:</i> Set A rings.</p>

Chart Continued

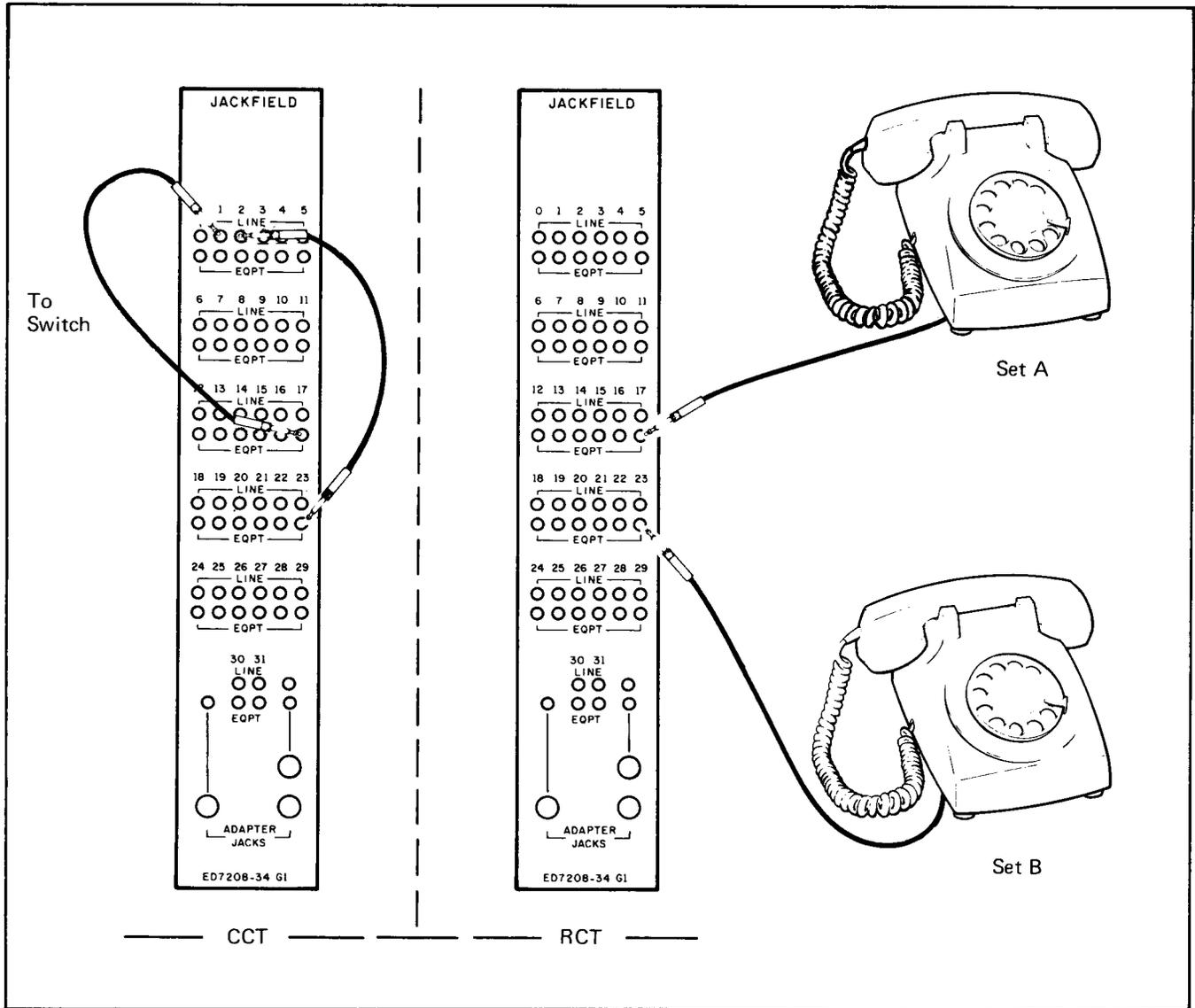


Fig. 1 — Signaling Test Connection (Chart 1)

CHART 1 Continued
SYSTEM TEST: INITIAL INSTALLATION

STEP	PROCEDURE
10.5	Do not answer set A; replace the handpiece on set B while set A is ringing. <i>Requirement:</i> Coins deposited at Step 10.3 are returned.
10.6	Repeat 10.2 and 10.3 only, and then continue with 10.7.
10.7	On set B, dial the directory number of line 1 on line shelf 0 at the CCT (test line 1, Fig. 1). <i>Requirement:</i> Set A rings.
10.8	Pick up the handpiece of set A. <i>Requirement:</i> Ringing on set A is tripped, and a voice channel is established between sets A and B.
10.9	Replace the handpiece on both sets A and B.
10.10	On set A, dial the directory number of line 2 on line shelf 0 at the CCT (test line 2, Fig. 1). <i>Note:</i> If the line under test is a multiparty line, dial the directory number of the tip party on test line 2; dial the ring party when the test is repeated in accordance with Step 10.7. <i>Requirement:</i> Set B rings.
10.11	Pick up the handpiece on set B. <i>Requirement:</i> Ringing on set B is tripped, and a voice channel is established between sets A and B.
10.12	Replace the handpiece of both sets A and B.
10.13	If the line under test is equipped with multiparty-type line cards at the CCT and RCT, replace the tip-party telephone set at set B (Step 8 [b]), with a telephone set wired for ring-party service. Then repeat Steps 10.7 through 10.12.
10.14	If the line under test is equipped with multiparty-type line cards at the CCT and RCT, connect one tip-party set and one ring-party set to the jacks on the test cord (Fig. 5). Plug the test cord into the EQPT jack of the line under test. Then, on the tip-party set, dial the number of the ring party set to place a revertive call. <i>Requirement:</i> The correct revertive call operation occurs. If the requirement is not met, replace the line circuit pack.
10.15	Repeat Step 10.14 by calling the tip-party from the ring-party set. <i>Requirement:</i> The correct revertive call operation occurs. If correct revertive operation does not occur, replace the line circuit pack.

Chart Continued

CHART 1 Continued
SYSTEM TEST: INITIAL INSTALLATION

STEP	PROCEDURE
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- | | |
|----|---|
| 11 | Remove the test connections set up for Step 10.14. |
| 12 | At the CCT remove the patch between the line just tested and line 2 on line shelf 0. Leave the patch between line 1 on shelf 0 and the line to which set A is connected at the RCT. |
| 13 | Repeat Steps 8 through 12 until all lines assigned to the RCT have been tested. |
| 14 | When all lines assigned to the RCT under test have been tested, disconnect both sets A and B at the RCT, and both line patches at the CCT. |

RESTORING THE RCT FOR OPERATION

Note: Before doing Steps 15 through 17, it would be convenient to test any optional common circuit packs as described in Chart 3 of this section.

- | | |
|----|---|
| 15 | Verify that no unexpected alarms exist at the RCT under test. If alarms are present, refer to 363-2011-500, paragraph 1.03 to locate the trouble. |
| 16 | At the RCT, switch off the QPP420 ALM REM unit by switching the ON/OFF switch to OFF. |
| 17 | Proceed to the next RCT further away from the CCT and repeat the procedures until all RCT are tested. |

When the tests in this chart have been completed for every RCT, the system is ready for subscriber lines and drops to be connected and placed in service.

CHART 2
SYSTEM TESTS: EXPANDING THE NUMBER OF LINES

This chart gives end-to-end tests for use when adding new lines to an operating system. Use Chart 1 of this section for initial installation tests of a DMS-1 system.

Caution: This is an in-service procedure. Take care to avoid disruptions of service on operating lines.

PREREQUISITES:

- (1) The new line circuit packs must have been installed in the assigned line shelf positions at both the CCT and the RCT to which the new lines are assigned. Refer to 363-2011-205 and 363-2011-206.

Note: The FAULT LOCATE lamp lights to indicate a line identification change. The QPP431 system controller must be restarted before the software accepts the new line identification and the office alarm operates.

- (2) The newly added line circuits at the CCT and RCT must meet the loopback test requirements for new lines as described in 363-2011-210 and 363-2011-211.
- (3) The new line circuits must be wired from the switching machine to the assigned line shelf positions on the CCT.
- (4) The subscriber line drops must not yet be connected to the RCT.
- (5) A test line must be available for testing new lines. If two or more lines are being added, the test line can be one of the new lines (preferably a single-party line). However, if only one new line is being added, use either an existing line (for which purpose the subscriber must be temporarily disconnected); or wire a test line from the switching machine to an unassigned line shelf position and equip the test line positions with line circuit packs at both the CCT and the RCT.

APPARATUS:

At the CCT:

- 1 HP236A Telephone Test Oscillator
- 1 HP3555B Transmission Measuring Set
- 2 P3Q3C Patch Cords, 15-foot
- 1 Copy each of 363-2011-205, 363-2011-206, 363-2011-210, 363-2011-211, 363-2011-500, and 363-2011-505.

At the RCT:

- 2 Telephone Sets; single-party (Note 1)
- 1 Telephone Set; wired for tip-party ANI service (Notes 1 and 2)
- 1 Telephone Set; wired for ring-party service (Notes 1 and 2)
- 1 Test Cord; 2 jacks wired in parallel to a cord equipped with a Switchcraft TT253 plug (see Fig. 5).

Note 1: Equipped with ringers, and Switchcraft TT253 plugs on the cable ends.

Note 2: Required only for testing lines which are to provide 2-party ANI service and which are equipped with multiparty-type line circuit packs at the CCT and RCT.

Chart Continued

CHART 2 Continued
SYSTEM TESTS: EXPANDING THE NUMBER OF LINES

STEP	PROCEDURE
1	Verify that the prerequisites at the head of this chart have been satisfied.
<i>VF TESTS</i>	
2	On each of the new lines being added, verify level and idle-channel noise performance in both directions between the CCT and RCT. See 363-2011-505, Charts 1 through 4.
<i>SIGNALING TESTS</i>	
3	At the RCT, on the applicable line shelf jackfield, connect a telephone set to the EQPT jack of the line selected as the test line in accordance with prerequisite 5 at the head of this chart (set A, Fig. 2). <i>Note:</i> If the test line is equipped with multiparty-type line cards at both the CCT and the RCT, use a telephone set wired for tip-party ANI service.
4	At the RCT, connect a telephone set to the EQPT jack on the applicable line shelf jackfield, for the line to be tested. Use either, (a) a single-party telephone set if the line shelf positions are equipped with single-party type line cards, or (b) a telephone set wired for tip-party ANI service if the line shelf positions are equipped with multiparty-type line cards.
5	At the RCT, verify signaling performance on the line test as follows: 5.1 On set B (Fig. 2), dial the directory number of the line to which set A is connected. <i>Requirement:</i> Set A rings. 5.2 Pick up the handpiece of set A. <i>Requirement:</i> Ringing on set A trips, and a voice connection between set A and B is established. 5.3 Replace the handpiece on both sets A and B. 5.4 On set A, dial the directory number of the line under test to which set B is connected. <i>Requirement:</i> Set B rings. 5.5 Pick up the handpiece of set B. <i>Requirement:</i> Ringing on set B trips, and a voice connection between sets A and B is established. 5.6 Replace the handpiece of both set A and B. 5.7 If the test line is equipped with multiparty-type line cards (see Step 3), replace set A with a telephone set wired for ring-party ANI service, and repeat Steps 5.1 through 5.6 to test the second party on the test line. Then proceed to Step 5.8.

Chart Continued

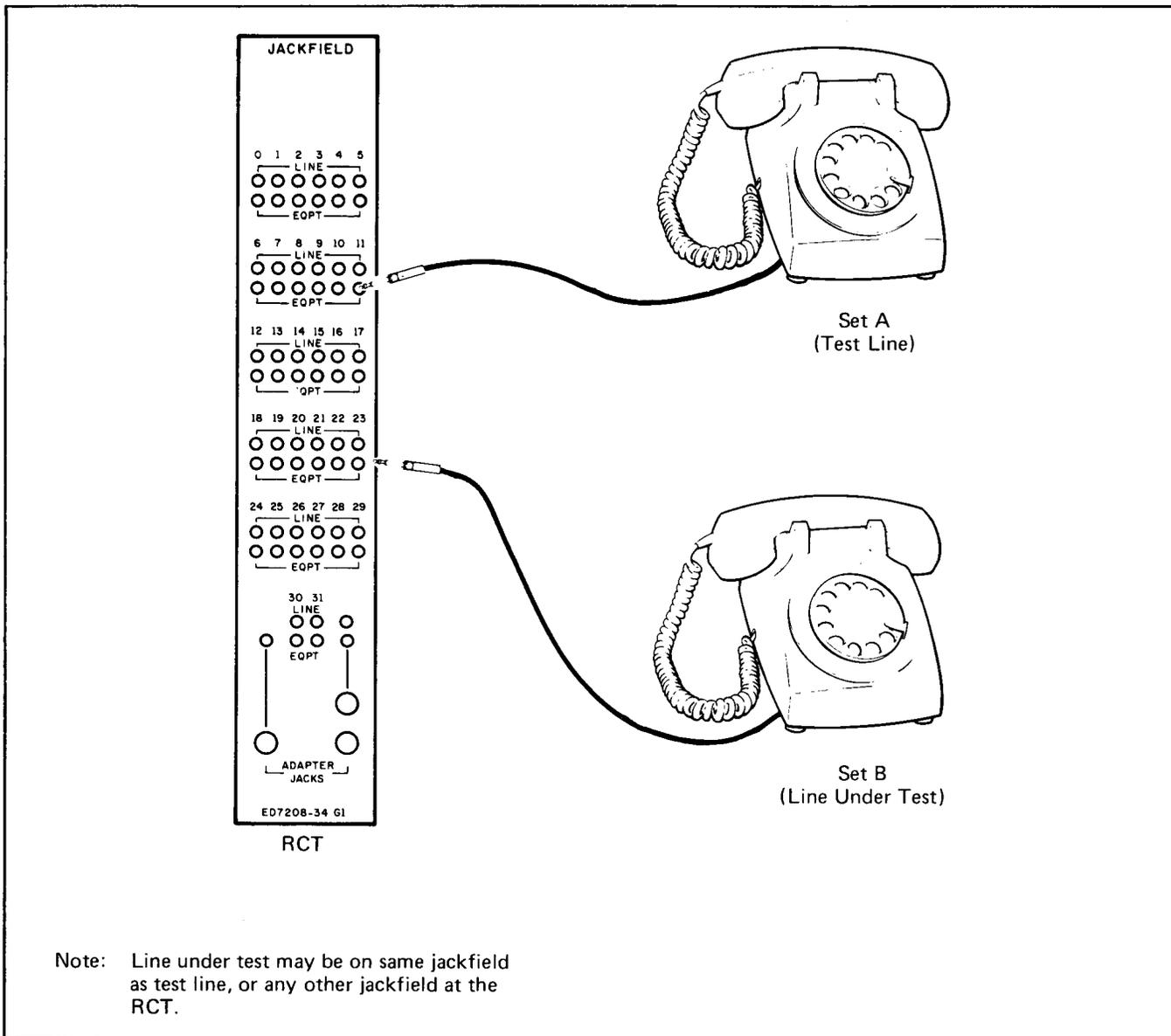


Fig. 2 — Signaling Test Connection (Chart 2)

CHART 2 Continued
SYSTEM TESTS: EXPANDING THE NUMBER OF LINES

STEP	PROCEDURE
5.8	If the line under test provides multiparty service, replace set B with a telephone set wired for ring-party ANI service (see Step 4) and repeat Steps 5.1 through 5.6.
5.9	If the line under test provides multiparty service, connect one tip-party set and one ring-party set to the jacks on the test cord (Fig. 5). Plug the test cord into the EQPT jack of the line under test. On the tip-party set, dial the number of the ring party. <i>Requirement:</i> Correct revertive call operation shall occur. If the requirement is not met, replace the line circuit pack.
5.10	Repeat 5.9 by calling the ring-party tip-party from the set. If the requirement is not met, replace the line circuit pack.
6	At the RCT, reconnect set A to the test line (Step 3). If set B is still connected from Step 4, disconnect set B.
7	Repeats Steps 4 through 6 for each line being added to the RCT under test until all have been tested.
8	When all lines being added have been tested, disconnect sets A and B.
9	The subscriber drops can now be wired to the newly equipped line positions at the RCT, and placed in service.

CHART 3
PRIORITY/DEDICATED OPTION TESTS

This test verifies the performance of line circuits equipped with QPP411 priority/dedicated line circuit packs at the CCT.

The tests may be conducted during initial installation of a DMS-1 system, or when priority/dedicated lines are being added to a working system.

PREREQUISITES:

- (1) At the CCT, a QPP411 line circuit pack must have been installed in the assigned line shelf position. See 363-2011-205.

Caution: On a working system, ensure that the four line selectors on the front of the QPP411 are set to their P (priority) positions. If one or more switches are set to D, interruptions of service on working channels may result.

- (2) At the RCT, a QPP405 line circuit pack must have been installed in the assigned line shelf position. See 363-2011-206.
- (3) The optional line-shelf jackfields should be provided at the CCT and RCT. If the jackfields are not provided, arrangements must be made to break the subscriber lines or to wire temporary splitting jacks in the lines, for patching and connecting the test circuits.
- (4) Personnel must be available at both the CCT and the RCT. Communications to coordinate the test procedures should be on the order-wire of the DMS-1 system.

APPARATUS:

- 1 HP3555B Transmission Measuring Set
- 1 HP236A Telephone Test Oscillator
- 2 P3Q3C Patch Cords, 15-foot
- 2 Telephone Sets, with ringers and Switchcraft TT253 plugs on the cable ends
- 1 Copy each of 363-2011-205, 363-2011-206, 363-2011-500, and 363-2011-505.

STEP	PROCEDURE
1	Verify that the prerequisites (1 through 4) at the head of this chart are satisfied.
2	If the DMS-1 system is not in service, proceed to Step 3. If the system is in service, observe the line Light Emitting Diode (LED) indicators on all installed line circuit packs. Do not proceed to Step 3 until <ul style="list-style-type: none"> (a) less than 20 LED are lit, for a single-digroup system; or (b) less than 40 line LED are lit, for a dual-digroup system.

Chart Continued

CHART 3 Continued
PRIORITY/DEDICATED OPTION TESTS

STEP	PROCEDURE
3	When the condition of Step 2 is satisfied, set one of the line priority/dedicated toggle switches on the QPP411 to the dedicated (D) position.
4	On the line selected at Step 3, do level tests in both directions using the procedures in Charts 1 and 2 of 363-2011-505. <i>Note:</i> On the test sets at the CCT and RCT, ensure that (a) on the HP3555B TMS, the HOLD button is out, and (b) on the HP236A telephone test oscillator, the selector switch is set for 900-ohm termination. <i>Requirement:</i> On the QPP411 at the CCT and on the QPP405 at the RCT, the LED for the line under test remains off.
5	At both the RCT and the CCT, remove the test connections.
6	On the QPP411 at the CCT, set the priority/dedicated switch for the line under test back to the P position.
7	On the line under test, measure the levels and idle-channel noise in both direction by following the procedures in Charts 1 through 4 of 363-2011-505.
8	Remove the test connections at both the CCT and RCT.
9	Repeat Steps 2 through 8 for each of the other three lines on the QPP411 circuit pack under test.
10	On each of the four lines on the QPP411 circuit pack under test, verify dial pulsing, ringing, and ring trip performance as follows: (a) On new DMS-1 system installation, use Steps 6 through 14 in Chart 1 of this section. (b) When adding priority/dedicated lines to an in-service system, use Steps 3 through 8 in Chart 2 of this section.
11	Repeat Steps 2 through 10 for all QPP411 priority/dedicated circuit packs being installed in the system.

**CHART 4
DUAL DIGROUP OPTION TESTS**

This test verifies that both digroups in a dual-digroup system are operating; and that if one digroup fails, traffic being carried on the failed digroup is transferred to the digroup still working.

The procedures in this chart can be done either during initial installation, or while the DMS-1 system is in service.

PREREQUISITES:

(1) One digroup must have been installed and tested, and must meet the system performance requirements of 363-2011-505, Charts 1 through 4.

(2) At the CCT, the following common circuit packs for the second digroup must have been installed and meet the requirements of 363-2011-205:

QPP413 Driver
QPP418 Address Control Office
QPP419 Digroup
QPC85 5/12 V Converter

(3) At the RCT, the following common circuit packs for the second digroup must have been installed and meet the requirements of 363-2011-206:

QPP413 Driver
QPP417 Address Control Remote
QPP419 Digroup
QPC85 5/12-V Converter

(4) Personnel are required at both the CCT and the RCT. Communications to coordinate the procedures should be on the DMS-1 system order wire.

(5) At least two test lines are needed. If there are unused lines on line circuit packs already installed, they may be used. If all existing lines are in service, install a line circuit pack in a vacant shelf position at the CCT and an equivalent remote line circuit pack in the corresponding line shelf position at the RCT to which the line shelf position is assigned.

(6) One of the test lines must be wired to the switching machine for the duration of this test.

APPARATUS:

2 Telephone Sets; with ringers, and Switchcraft TT253 plugs on the cable ends

1 Copy each of the DMS-1 sections listed in 1.05.

STEP PROCEDURE

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- | | |
|---|---|
| 1 | Verify that the system is equipped for dual digroup operation (see Prerequisites 2 and 3). |
| 3 | Verify that there are no digroup alarms on the QPP421 circuit pack at the CCT.

If alarms are present, refer to 363-2011-500, paragraph 1.03 to locate the fault. |
| 3 | At the RCT under test, on the applicable line shelf jackfield, connect one telephone set to the EQPT jack of the test line which is wired from the CCT to the switching machine (see Prerequisite 6). |

Chart Continued

**CHART 4 Continued
DUAL DIGROUP OPTION TESTS**

STEP	PROCEDURE
4	Lift the handpiece of the telephone set, and verify that dial tone is present. If dial tone is not present, the test line is not connected through to the switching machine.
5	On the telephone set at the RCT, dial the directory number of a telephone set in the central office which is conveniently near the CCT bay.
6	At the called number, lift the telephone handpiece and verify that a vf channel to the test telephone at the RCT is established.
7	At the CCT, count the total number of line LED on all line circuit packs which are lit. <i>Caution: Do not proceed, if more than 20 LED line indicators are lit.</i>
8	While listening on one or both of the telephone sets connected at Step 6, withdraw the digroup A QPP419 circuit pack from common shelf 1 at the CCT. <i>Requirement 1:</i> DGP FAIL A alarm indicator lights on the QPP421 circuit pack. <i>Requirement 2:</i> The office major alarm sounds. <i>Requirement 3:</i> The voice channel connection established at Step 6 remains. See Note after Step 10.
9	Replace the digroup A QPP419 circuit pack. <i>Requirement 1:</i> The DGP FAIL A alarm indicator on QPP421 at the CCT goes out. <i>Requirement 2:</i> The office major alarm is silenced.
10	While listening on one or both of the telephone sets connected at Step 6, withdraw the digroup B QPP419 from common shelf 1 at the CCT. <i>Requirement 1:</i> The DGP FAIL B alarm indicator lights up on the QPP421 at the CCT. <i>Requirement 2:</i> The office major alarm sounds. <i>Requirement 3:</i> The voice channel connection established at Step 6 remains. See the following note. <i>Note:</i> As a QPP419 DIGR is withdrawn from its shelf position, a click should be heard on the voice connection. This indicates that the line connection has been transferred from the digroup which has been failed to the digroup still in operation.
11	Replace the digroup B QPP419 circuit pack. <i>Requirement 1:</i> The DGR FAIL B indicator on the QPP421 at the CCT goes out. <i>Requirement 2:</i> The office major alarm is silenced.
12	Replace the handpieces on the telephone sets at the RCT and at the central office number called.
13	Remove all test connections.

**CHART 5
LOCAL LINK OPTION TEST**

This test verifies the operation of the local link circuits when the option is installed in a DMS-1 system.

This test may be performed during initial installation or when the DMS-1 system is in service.

PREREQUISITES:

- (1) At the CCT, the following circuit packs must have been installed in accordance with the procedures in 363-2011-205.

QPP415 LOC LK
QPP416 LOC LK DET

Note: The QPP439A Line Power Converter must be installed on line shelf 1 to power the QPP416 circuit pack.

- (2) At the RCT, the QPP414 LOC SW must have been installed in accordance with the procedures in 363-2011-206.
- (3) Personnel are required at both the CCT and RCT.

APPARATUS:

- 1 Telephone Set, with ringer and Switchcraft TT253 plug on the cable end
- 1 HP3555B, Transmission Measuring Set
- 1 HP236A, Telephone Test Oscillator
- 1 QSE4A1, Dial Hand Test Set, or equivalent
- 2 NE-P3Q3, Patch Cords, or equivalent
- 1 NE-310-to-Bantam Adapter plug.

STEP PROCEDURE

- 1 At the CCT, remove the QPP416 circuit pack from common shelf 2.
- 2 At the RCT:
 - 2.1 Set the test oscillator for 0 dBm0 output (nominal 1004 Hz).
 - 2.2 On jackfield on the applicable line shelf, connect the the test oscillator output to a line which is terminated by line circuit packs at both the CCT and RCT, and is connected to the central office switching equipment.

Chart Continued

**CHART 5 Continued
LOCAL LINK OPTION TEST**

STEP	PROCEDURE
3	<p>Connect the leads of the dial hand test set to the T and R clips on the test oscillator, and turn the test oscillator FUNCTION switch to DIAL/DC.</p> <p><i>Requirement 1:</i> On the applicable line circuit pack, the LED for the test line lights.</p> <p><i>Requirement 2:</i> Dial tone is heard on the dial hand test set.</p>
4	<p>On the applicable line shelf jackfield, plug the telephone set cord into a second test line which is terminated by line circuit packs at both the CCT and RCT, and which is connected to the central office switching equipment.</p>
5	<p>On the dial hand test set, dial the directory number of the second test line.</p> <p><i>Requirement:</i> The telephone set on the second test line rings.</p>
6	<p>At the RCT:</p> <p>6.1 On the TMS, set the INPUT switch to 900 TERMINATED, and connect a patch cord to the TMS input.</p> <p>6.2 On the line shelf jackfield, remove the telephone set cord from the second test line, and replace the jack connection with the patch cord from the TMS.</p>
7	<p>At the RCT:</p> <p>7.1 On the test oscillator, turn the FUNCTION switch to 900 HOLD.</p> <p>7.2 On the TMS, depress the HOLD switch.</p> <p><i>Requirement:</i> The TMS meter reads -4 ± 1.5 dBm.</p> <p>If the requirement is not met, repeat Steps 2 through 7 on a different pair of test lines to determine whether the fault is in the switching machine.</p>
8	<p>At the RCT:</p> <p>8.1 On the test oscillator, turn the FUNCTION switch to 900.</p> <p>8.2 On the TMS, release the HOLD switch.</p>
9	<p>At the CCT:</p> <p>9.1 Verify that plug P4 is installed in the QPP416 circuit pack. Remove and store plug P5 (see 363-2011-205, Table C).</p> <p>9.2 Plug the QPP416 into its position on common shelf 2 (Fig. 3).</p>

Chart Continued

**CHART 5 Continued
LOCAL LINK OPTION TEST**

STEP	PROCEDURE
10	At the RCT, on the test oscillator, turn the FUNCTION switch to DIAL/DC, and repeat the procedures of Steps 5 and 6.
11	At the RCT: <ul style="list-style-type: none"> 11.1 On the test oscillator turn the FUNCTION switch to 900 HOLD. 11.2 On the TMS, depress the HOLD switch. <p><i>Requirement:</i> The TMS meter reads 2 ± 0.5 dB higher than the reading in Step 7.2.</p> <p><i>Note:</i> The TMS reading at Step 11.2 indicates lower end-to-end loss than for the similar test at Step 7. The difference in the readings is an indication that the local link circuits have transferred the transmission between the two test lines to the QPP414 LOC SW circuits at the RCT.</p> <p>If the requirement at Step 11.2 is not met (i.e., if there is no difference from the reading at Step 7), check that plug P4 is correctly installed in the QPP416 (see 363-2011-205, Table C).</p> <p>If plug P4 is correctly installed in the QPP416, replace plug P5 and repeat the tests. If the requirement is still not met, replace QPP416 and repeat the tests. If the requirement is still not met, replace the QPP414 at the RCT, and repeat the tests.</p>
12	When the test requirements are met, remove all test connections, and restore the system to its operating conditions (ensure P4 and P5 are set according to the operating company requirement).

**CHART 6
SYSTEM CONTROLLER BACKUP OPTION TEST**

This test verifies that the backup QPP431 SYS CONT circuit pack operates when the primary QPP431 fails.

The test procedure may be performed during initial installation of a DMS-1 system or when the system is in service.

PREREQUISITES:

- (1) The backup QPP431 circuit pack must have been installed at the CCT (see 363-2011-205).
- (2) Both the primary and backup QPP431 must be operating with no SYS CONT alarm indicated on the QPP421 circuit pack.
- (3) Personnel are required only at the CCT.

Chart Continued

CHART 6 Continued
SYSTEM CONTROLLER BACKUP OPTION TEST

STEP PROCEDURE

Note: If the test is being performed during an initial installation, it may be necessary to restart one or both system controllers. This is done by simultaneously depressing and then releasing the RESTART and RESTART ARM buttons on the QPP431 circuit pack.

1 At the CCT, on the QPP425 or QPP450 circuit pack:

1.1 Depress the ON/OFF switch.

1.2 Set the CHANNEL thumbwheel selector to A24.

1.3 Set the LINE thumbwheel selector to the number of a line which is equipped with a line circuit pack.

Note: If the system is in service, observe the LED for the selected line on the applicable line circuit pack. Do not proceed while the LED is lit. When the LED is out, proceed quickly with the test to minimize any inconvenience to the subscriber.

1.4 On the QPP425A, depress the LOOP OFFICE button; press and hold the button on the QPP425B or QPP450.

Requirement: The OK indicator lights up.

1.5 Release the LOOP OFFICE button.

Requirement: The OK indicator goes out.

If the requirements are not met, check the QPP425 or QPP450 by using the information of 363-2011-300, Chart 8. Replace the QPP425, if it cannot be correctly calibrated.

2 On the QPP421 circuit pack set the RCT/CCT selector to CCT and the MTCE/ALM switch to ALM.

3 Fail the *primary* QPP431 (Fig. 3) by simultaneously pressing and holding the RESTART and RESTART ARM buttons on the circuit pack. Continue to hold the buttons pressed until Step 6.

Requirement 1: The SYS CONT indicator on QPP421 lights up.

Requirement 2: The office major alarm sounds.

4 On the QPP421 circuit pack, press the ACO button.

Requirement: The office alarm is silenced.

5 On the QPP425A, depress the LOOP OFFICE button; press and hold the button on the QPP425B or QPP450.

Requirement: The OK indicator lights up.

If the requirement is not met, the backup QPP431 system controller is faulty. Replace the backup QPP431 and repeat the test.

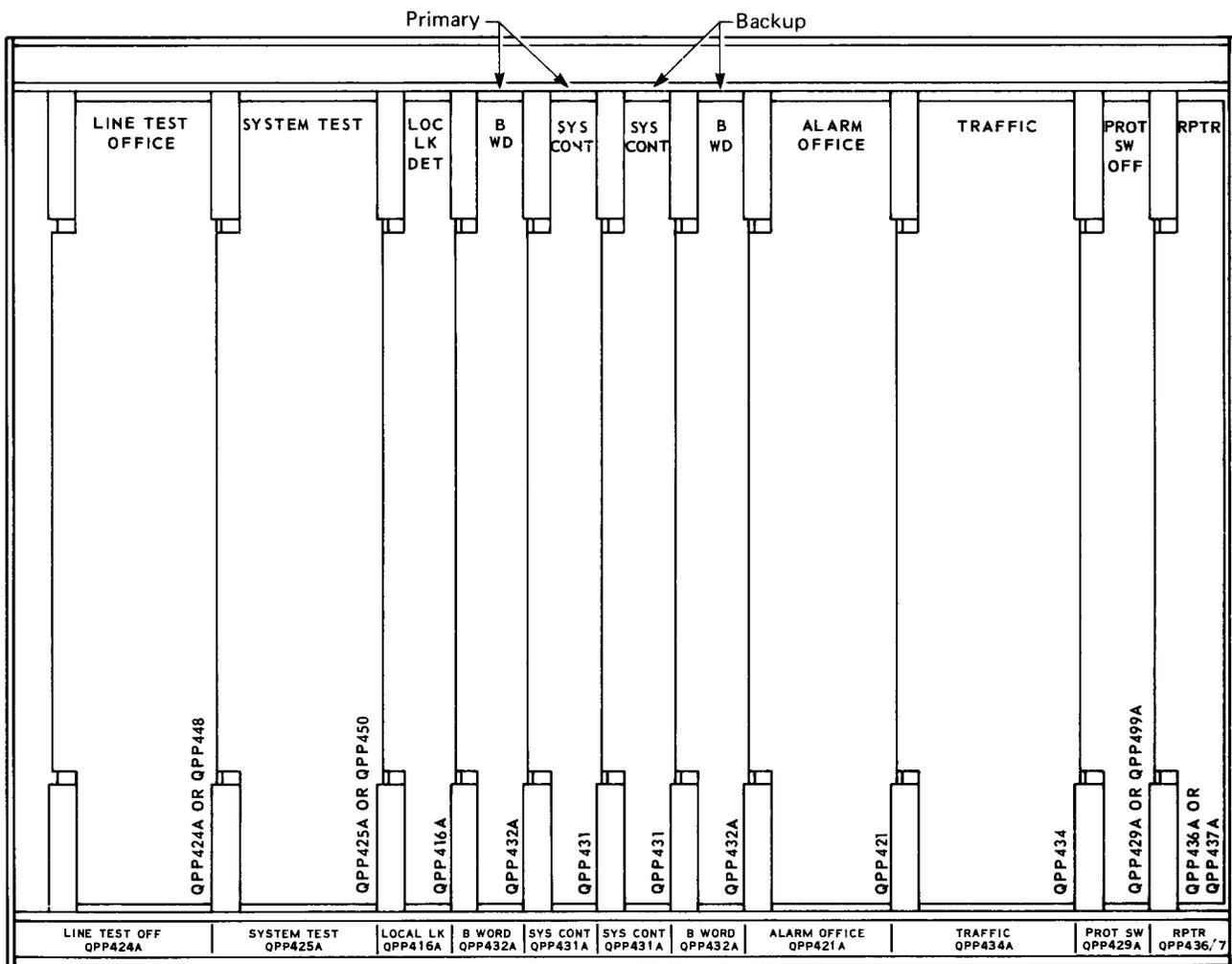
6 Release the RESTART and RESTART ARM buttons on the primary QPP431 (from Step 3).

Requirement: The SYS CONT alarm indicator on the QPP421 circuit pack goes out.

Chart Continued

CHART 6 Continued
SYSTEM CONTROLLER BACKUP OPTION TEST

STEP	PROCEDURE
7	<p>Release the LOOP OFFICE button.</p> <p><i>Requirement:</i> The OK indicator goes out.</p> <p>If the requirements are not met, first check the QPP425 or QPP450 by using the information on 363-2011-300, Chart 8. If the QPP425 or QPP450 checks satisfactorily, refer to 363-2011-500, Part 4 to locate the fault.</p>
8	Repeat Steps 3 through 7 for the backup QPP431 system controller.
9	On the QPP425 or QPP450, release the ON/OFF button.



Note: QPP448 test access office, QPP450 test control, and QPP499 1-for-N protection switch office can be used in place of the QPP424, QPP425, and QPP429.

Fig. 3 – CCT Common Shelf 2

**CHART 7
B-WORD BACKUP OPTION TEST**

This test verifies the operation of the backup QPP432 B WD circuit pack if a failure occurs in the primary QPP432 circuit pack.

This test can be performed during initial installation of a DMS-1 system, or while the system is in service.

PREREQUISITES:

- (1) The backup QPP432 circuit pack must have been installed on common shelf 2 at the CCT. See 363-2011-205.
- (2) Personnel are required for the test only at the CCT.

STEP	PROCEDURE
1	<p>Verify the operation of the QPP425 or QPP450 circuit pack:</p> <ol style="list-style-type: none"> 1.1 Depress the ON/OFF button on QPP425 or QPP450. 1.2 Set the CHANNEL thumbwheel selector to A24. 1.3 Set the LINE thumbwheel selector to the number of a line which is equipped with line circuit packs. <p><i>Note:</i> If the system is in service, observe the busy indicators adjacent to the thumbwheel selectors. Also observe the line LED on the line circuit pack concerned for the line selected for test. Do not proceed until all line LED are out. Then proceed quickly with the test to minimize inconvenience to the subscriber on the selected line.</p> <ol style="list-style-type: none"> 1.4 On the QPP425A, depress the LOOP OFFICE button; press and hold the button on the QPP425B or QPP450. <p><i>Requirement:</i> The OK indicator lights up.</p> <ol style="list-style-type: none"> 1.5 Release the LOOP OFFICE button. <p><i>Requirement:</i> The OK lamp goes out.</p> <p>If the requirements are not met, check the QPP425 or QPP450 by using the information in 363-2011-300, Chart 8. Replace the circuit pack, if it cannot be correctly calibrated.</p>
2	<p>Fail the primary QPP432 circuits by removing the <i>primary</i> QPP432 circuit pack from the common shelf 2 (Fig. 3).</p> <p><i>Requirement:</i> No alarms; the system continues to operate normally.</p>
3	<p>On the QPP425A, depress the LOOP OFFICE button; press and hold the button on the QPP425B or QPP450.</p> <p><i>Requirement:</i> The OK indicator lights up.</p>
4	<p>On the QPP425 or QPP450, release the LOOP OFFICE and ON/OFF switches.</p> <p>If the requirements are not met, the backup QPP432 is faulty. Replace the backup QPP432 and repeat the test from Step 2.</p>

Chart Continued

**CHART 7 Continued
B-WORD BACKUP OPTION TEST**

STEP	PROCEDURE
5	Return the primary QPP432 circuit pack to its position on common shelf 2.
6	Remove the backup QPP432 from common shelf 2. <i>Requirement:</i> No alarms; the system continues to operate normally.
7	On the QPP425A depress the LOOP OFFICE button; on the QPP425B or QPP450, press and hold the button. <i>Requirement:</i> The OK indicator lights up.
8	On the QPP425 or QPP450, release the LOOP OFFICE and ON/OFF switches. If the requirement at Step 7 was not met, the primary QPP432 is faulty. Replace the primary QPP432 and repeat the test from Step 6.

**CHART 8
REORDER TONE OPTION TEST**

This test verifies that, when all channels are busy, ringing received by the CCT is tripped, and reorder tone is returned to the calling subscriber.

Caution: This test removes the system from service. The test must be conducted during installation or during no-activity periods.

PREREQUISITES:

- (1) At the CCT, the following circuit packs must have been installed in accordance with the procedures in 363-2011-205.
 - (a) B versions of the line circuit packs;
QPP406B, QPP408B, QPP410B, QPP441B and QPP446B.
 - (b) QPP427 REORD TONE.
- (2) Personnel are required at both the CCT and the RCT.

APPARATUS:

- 1 Telephone Set; equipped with ringer and Switchcraft TT253 plugs on the cable end.
- 1 Plug; Switchcraft TT253, with no termination (open-circuit plug).

Chart Continued

CHART 8 Continued
REORDER TONE OPTION TEST

STEP	PROCEDURE
1	At the CCT, busy out digroup B (if two digroups are installed) by plugging an open circuit plug into the LIN jack on the digroup B QPP437 repeater.
2	At the RCT distribution frame, short the T and R leads for lines 0 to 23 on line shelf 0 to busy out 24 channels. <i>Note:</i> If lines 0 to 23 are not equipped use any 24 equipped lines on the shelf.
3	At the CCT, plug the telephone set into the LINE jack on line 0 (or test line, if provided), on the shelf under test.
4	From the telephone set, dial the number assigned to line 24 on the shelf under test. <i>Requirement:</i> Reorder tone shall be heard. <i>Note:</i> The Reorder tone times-out after 12 to 24 seconds on a single-RCT system, and may extend to 30 to 60 seconds on a distributed RCT system. If the requirement is not met, repeat Steps 3 and 4 with the telephone set plugged into another line on another line circuit pack. If the requirement is met on the second line, replace the line circuit pack for the first line and repeat Steps 3 and 4. If the requirement is not met on both test lines, replace the QPP427 circuit pack. <i>Note 1:</i> The time of reorder tone return varies for different switching systems. The time depends on the length of time the originating or terminating switching system maintains the connection between an off-hook originating party and an on-hook terminating party. <i>Note 2:</i> A short burst of ringing may be heard. The length of the burst depends not only on the line scan timing but also on whether or not the ring-forward signal is synchronous with the ring-back signal from the switching equipment.
5	Repeat Step 4 for all other lines equipped on the shelf under test.
6	At the RCT distribution frame, remove the shorts from lines 0 to 23 on line shelf 0, and short the T and R leads for lines 0 to 23 on line shelf 1. <i>Note:</i> If lines 0 to 23 are not equipped, use any 24 equipped lines on the shelf.
7	Repeat Steps 3 and 4 for the numbers assigned to lines 0 to 23 on the shelf under test.
8	At the RCT remove all T-to-R shorts on the distribution frame; and at the CCT remove the telephone set plug from the line jacks.

**CHART 9
PROTECTION SWITCH OPTION TESTS**

This test verifies:

- (a) the DS1 protection line switching,
- (b) RCT bypass operation,
- (c) RCT loopback operation.

Caution: *The protection line switching test may be performed with the system in service or out of service. The RCT bypass and RCT loopback operations cause service interruptions at one or more RCT and therefore should be done only with the system out of service.*

PREREQUISITES:

- (1) A QPP429 or QPP499 circuit pack must have been installed at the CCT (see 363-2011-205).
- (2) A QPP428 or QPP498 circuit pack must have been installed at each RCT (see 363-2011-206).
- (3) Personnel are required at both the CCT and at the RCT to be used for the test.

APPARATUS:

- 2 Telephone Sets, with ringers and Switchcraft TT253 plugs
 - 1 Plug; Switchcraft TT253, with no termination (open-circuit plug).
-

STEP	PROCEDURE
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A. Protection Line Switching Test

Note: This test can be performed on a DMS-1 equipped with either one working line and one protection DS1 line, or two working lines and one protection DS1 line.

- 1 At the CCT and RCT, on the QPP437 or QPP436 terminal repeaters for the protection line, verify that all LINE FAIL indicators are out.

If a LINE FAIL indicator is lit, the protection line is faulty. Refer to 368-2101-503 to locate the trouble.

- 2 Establish a call on the system. See Chart 4, Steps 3 through 6. Ensure that the call is on Digroup A by momentarily removing the QPP419 from the Digroup B position on the shelf.
- 3 At the RCT nearest to the CCT, fail DS1 line A by plugging an open-circuit plug into the LIN jack of the digroup A transmit repeater.

Requirement 1: At the CCT, the PS A indicator on the QPP429 circuit pack lights, and the PS OPS counter increments by one count.

Requirement 2: At the CCT, the PS OPS counter on the QPP429 increments by one count (not applicable if the CCT is equipped with a QPP499).

Requirement 3: At the CCT, on the QPP421, the LINE FAIL indicator for the failed line A lights up.

Chart Continued

**CHART 9 Continued
PROTECTION SWITCH OPTION TESTS**

STEP	PROCEDURE
	<i>Requirement 4:</i> On the QPP421 at the CCT, the DGP FAIL A or B indicator must not light.
	<i>Requirement 5:</i> The connection established at Step 2 remains.
	<i>Requirement 6:</i> At all RCT, SWITCH A indicators on the QPP428 or QPP498 light up.
4	At the RCT, remove the plug inserted at Step 3. <i>Requirement 1:</i> The alarm and status indications from Step 2 all go out after 10 seconds; or after 80 seconds if the 80-second option is selected on the QPP499. <i>Requirement 2:</i> The connection established at Step 2 remains. If the requirements of Steps 3 and 4 are not met, refer to 363-2011-500, paragraph 1.03 to locate the fault.
5	Establish a call on Digroup B by momentarily removing the QPP419 from the Digroup A position on the shelf.
6	Repeat Steps 3 and 4 on the working line B repeater.
7	Repeat Steps 3 through 6 at each RCT in turn.
B. RCT Bypass Test	
	<i>Note:</i> This test and the RCT loopback test which follows are not required on DMS-1 systems equipped with only one RCT. Use the tests only on systems with two or more RCT.
	<i>Caution:</i> This test causes loss of service to all subscribers on the RCT which is bypassed. Do the tests only when authorized.
8	At the RCT nearest to the CCT, remove fuses F8 and F9 from the fuse panel (F8 only in single-digroup systems). <i>Requirement 1:</i> On the QPP421 at the CCT, with the RCT/CCT selector switched to the lighted RCT position, the BYPASS OP indicator lights up. <i>Requirement 2:</i> At the CCT, the office major alarm sounds.
9	At the RCT under test, reinsert fuses F8 and F9 on the fuse panel. <i>Requirement:</i> All indications and alarms from Step 8 go out or are silenced. If the requirement of Steps 7 and 8 are not met, refer to 363-2011-500, Flowchart 3 to locate the fault.
10	Repeat Steps 8 and 9 at each RCT in turn.

Chart Continued

CHART 9 Continued
PROTECTION SWITCH OPTION TESTS

STEP PROCEDURE

C. RCT Loopback Test

Note: This test is not required on a DMS-1 system equipped with only one RCT. Perform the test only on systems with two or more RCT.

Caution: This test causes loss of service to the subscribers on all RCT farther away from the CCT than the RCT under test. Perform the tests only during initial installation, or when authorized.

11 Verify that option switch S12 on QPP429 (or S13 on QPP499) is in the ON position. If the switch setting has to be changed, note its original position for resetting at Step 18.

12 Go to the RCT farthest away from the CCT.

13 At the RCT remove all QPP436 or QPP437 repeaters from the power shelf.

Requirement 1: On the QPP421 at the CCT, with the RCT/CCT selector set to the first lighted RCT position, the LPBK OP alarm indicator lights up. (e.g., If RCT 3 is failed [repeaters removed], LPBK OP is indicated at RCT 2.)

Requirement 2: At the CCT, the office major alarm sounds.

14 At the RCT, reinsert the QPP436 or QPP437 repeaters in the power shelf.

15 On the QPP429;

(a) set the LOOP switch for the looped-back RCT to the RELEASE position.

(b) set the ARM switch to the ON position.

Requirement: All alarm and loopback indications from Step 13 go out or are silenced.

If the requirements of Steps 13 and 15 are not met, refer to 363-2011-500, Flowchart 4 to locate the fault.

16 Return the LOOP switch to the center position and the ARM switch to the downward position.

17 Repeat Steps 13 through 16 at all RCT, one at a time, except at the RCT closest to the CCT.

18 On the QPP429 (or QPP499), return option switch S12 (or S13) to its original position, if required; see Step 11.

Chart Continued

CHART 9 Continued
PROTECTION SWITCH OPTION TESTS

STEP	PROCEDURE
<i>D. 1-FOR-N Interlock Test</i>	
	<p>Caution: <i>This test may cause service interruptions. Do the test only on systems that are out of service.</i></p> <p>Note 1: This test applies only when two or more DMS-1 systems, equipped with QPP498 and QPP499 circuit packs, share one DS1 protection line.</p> <p>Note 2: In this test, SYSTEM 1 is defined as the DMS-1 system with the higher restoration priority; System 2 is the system with lower priority.</p>
19	<p>On System 2, fail DS1 line A by plugging an open-circuit plug into the LIN jack of the digroup A repeater at the CCT.</p> <p>Requirement 1: At the System 2 CCT, the PSA indicator on the QPP499 lights.</p> <p>Requirement 2: On the System 2 QPP421, at the CCT, the LINE FAIL-A indicator lights for each equipped terminal.</p> <p>Requirement 3: The office minor alarm sounds.</p> <p>Requirement 4: At the System 1 CCT, the BUSY indicator on the QPP499 lights.</p> <p>Requirement 5: There shall be no other alarm indications.</p>
20	<p>Leaving the plug inserted at Step 19 in place, plug another open-circuit plug into the LIN jack of the digroup A repeater in System 1.</p> <p>Requirement 1: The PSA indicator on the System 2 QPP499 goes out.</p> <p>Requirement 2: On the QPP421 of the System 2 CCT, the DIGROUP FAIL-A indicator lights.</p> <p>Requirement 3: The office major alarm sounds.</p> <p>Requirement 4: On the QPP499 in the System 2 CCT, the BUSY indicator lights.</p> <p>Requirement 5: On the QPP499 of the System 1 CCT, the PSA indicator lights.</p> <p>Requirement 6: On the QPP421 of the System 1 CCT, the LINE FAIL-A indicator lights.</p>
Chart Continued	

CHART 9 Continued
PROTECTION SWITCH OPTION TESTS

STEP	PROCEDURE
	<i>Requirement 7:</i> On the QPP499 of the System 1 CCT, the BUSY indicator goes out.
21	Remove the open-circuit plug from the LIN jack of the repeater in System 1, and wait for either 10 or 80 seconds (whichever has been preset on the QPP499). <i>Requirement 1:</i> On the QPP421 of the System 1 CCT, the LINE FAIL-A indicator goes out. <i>Requirement 2:</i> On the QPP421 of the System 2 CCT, the DIGROUP FAIL-A indicator goes out. <i>Requirement 3:</i> On the QPP499 of the System 2 CCT, the PSA indicator lights. <i>Requirement 4:</i> On the QPP499 of the System 2 CCT, the BUSY indicator goes out. <i>Requirement 5:</i> On the QPP499 of the System 1 CCT, the BUSY indicator lights.
22	Remove the open-circuit plug from the LIN jack of the repeater in System 2, and wait for either 10 or 80 seconds, whichever has been preset on the QPP499. <i>Requirement:</i> All indicators go out, and the systems return to normal operation.
E. Failsafe Test	
	<i>Caution:</i> This test may cause service interruptions. Do the test only on systems that are out of service.
	<i>Note:</i> This test applies only to systems equipped with P0577076 Failsafe Office Assemblies and P0577078 Failsafe Remote Assemblies.
23	Establish a call through the system (Chart 4, Steps 3 through 6).
24	With no protection switch operated remove first the QPP499 from the CCT, and then, one at a time, the QPP498 from each of the RCT in the system. <i>Requirement:</i> The call established at Step 23 is not disconnected.

Chart Continued

CHART 9 Continued
PROTECTION SWITCH OPTION TESTS

STEP	PROCEDURE
25	<p>Replace the QPP498 at the RCT one at a time, and then the QPP499 at the CCT.</p> <p><i>Requirement:</i> The call established at Step 23 is not disconnected.</p>
26	<p>Disconnect the call established at Step 23.</p>
27	<p>On the QPP499 at the CCT, operate the PSA switch and then the ARM switch.</p> <p><i>Requirement:</i> The PSA indicators on the QPP499 at the CCT and the QPP498 at each RCT light.</p>
28	<p>At the CCT, remove the QPP499.</p> <p><i>Requirement:</i> Following a delay of less than 10 seconds, the PSA indicators on the QPP498 at each RCT go out.</p>
29	<p>Establish a call through the system (Chart 4).</p> <p><i>Requirement:</i> The call shall be established with no trouble.</p>
30	<p>Disconnect the call.</p>
31	<p>Replace the QPP499 at the CCT.</p>
32	<p>On the QPP431 SYS CONT at the CCT, simultaneously press RESTART and RESTART ARM.</p> <p><i>Requirement 1:</i> All alarm indicators go out.</p> <p><i>Requirement 2:</i> On the QPP499 at the CCT, the PSA indicator lights, remains on for either 10 or 80 seconds (depending on the delay option selected on the QPP499), and then goes out.</p>

**CHART 10
RING GENERATOR BACKUP OPTION TEST**

This test verifies that the ring generator circuit pack operates when the other ring generator circuit pack fails. The test may be done either during initial installation of the DMS-1, or when the system is in service.

PREREQUISITES:

- (1) The backup ring generator circuit packs (QPP426, QPP430 or QPP435 as required) must have been installed at the RCT under test.
- (2) Personnel are required at both the CCT and the RCT under test.

APPARATUS:

At the RCT:

- 2 Telephone Sets; with ringers and Switchcraft TT253 plugs on the cable ends.

STEP PROCEDURE

- 1 At the RCT under test, connect the two telephone sets (A and B) to the EQPT jacks on the applicable line shelf jackfield of two lines which are equipped with line circuit packs at the RCT and the CCT.

Note: The two lines must be connected to the switching machine at the CCT. It is preferable, but not essential, that the lines do not have subscribers connected to them.

- 2 From telephone set A, dial the directory number of the line to which set B is connected.

Requirement: Set B rings.

- 3 With set B ringing, withdraw the ring generator 1 fuse, F2, from the fuse panel.

Requirement 1: Set B continues to ring at the RCT.

Requirement 2: On the QPP421 at the CCT, with RCT/CCT selector set to the lighted RCT position, the RING GEN alarm indicator lights up.

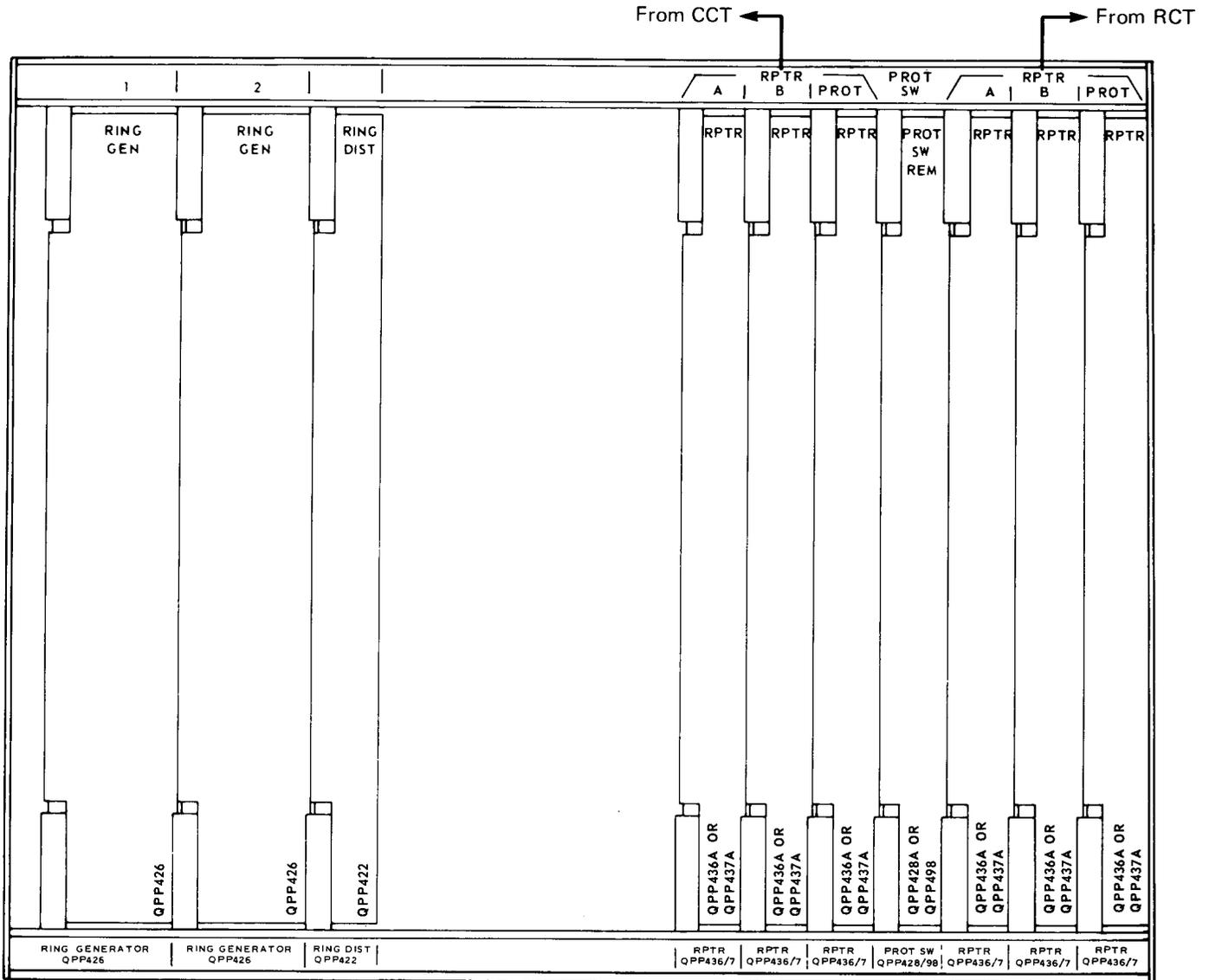
- 4 At the RCT, reinsert fuse F2 on the fuse panel.

Requirement: The alarm indications from Step 3 go out, and set B continues to ring.

If the requirements of Steps 3 and 4 are not met, refer to 363-2011-500, Flowchart 7 to locate the fault.

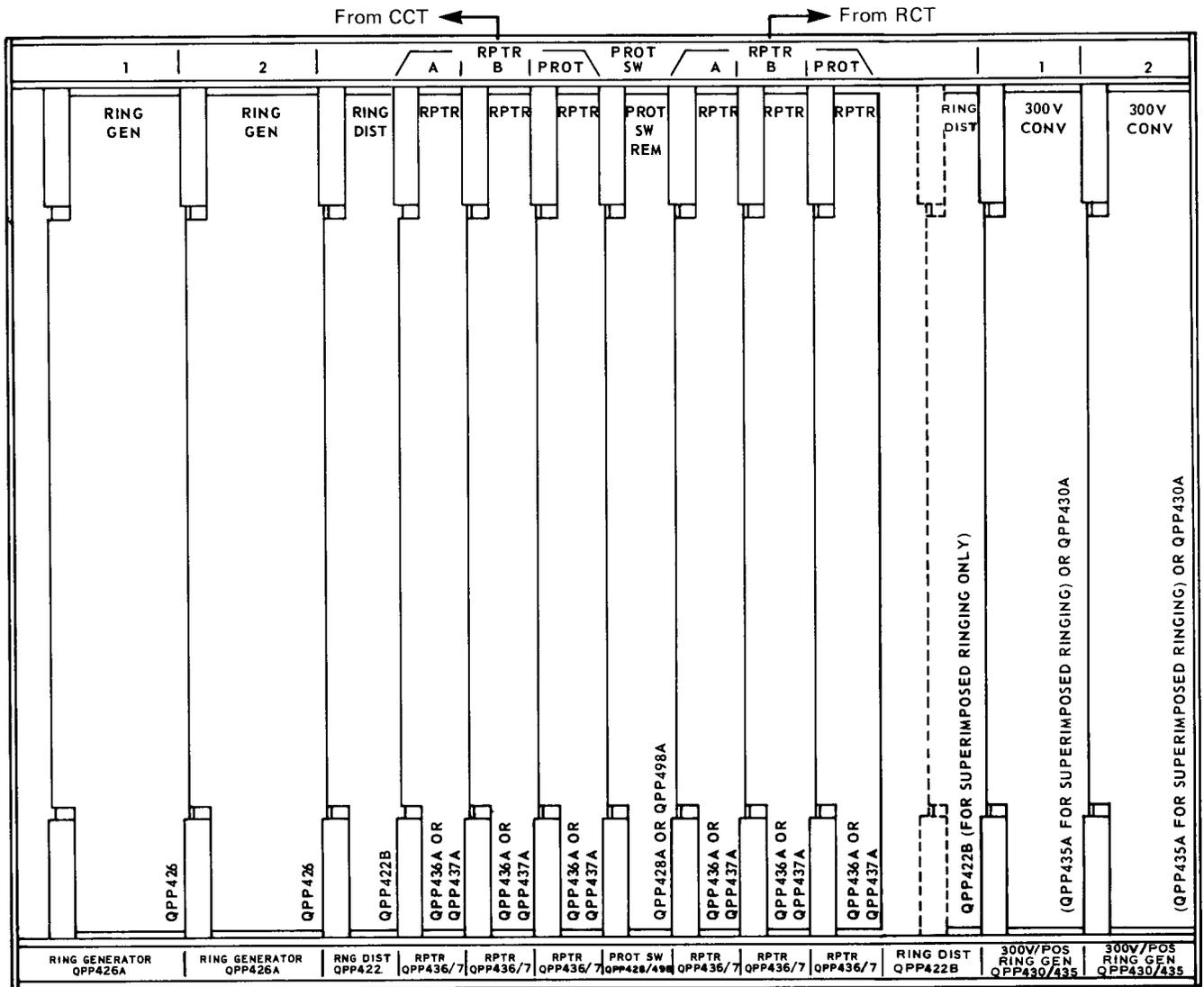
- 5 Lift, and then replace the handpiece on telephone set B at the RCT.

- 6 Disconnect telephone sets A and B.
-



(a) – AC/DC Ringing – Power Backplane

Fig. 4 – RCT Power Shelf Layout



Note: Layout is for a Shelf Fully-Equipped with Both AC/DC and Frequency-Selective Ringing Supplies.

(b) – AC/DC, Frequency-Selective, and Superimposed Ringing – FSR Backplane

Fig. 4 Continued – RCT Power Shelf Layout

**CHART 11
TRAFFIC MEASUREMENT OPTION TEST**

This test verifies the operation of the QPP434A or QPP434B TRAFFIC circuit pack.

The test may be performed during initial installation, or when the system is in service.

PREREQUISITES:

- (1) The QPP434A or QPP434B circuit pack must have been installed at the CCT. See 363-2011-205.
- (2) If the QPP434B circuit is installed at the CCT, suitable external counters (14-type or equivalent) must have been connected to the circuit pack.
- (3) Personnel are required for the test at the CCT and at one of the RCT.

APPARATUS:

At the RCT:

2 Telephone Sets; with ringers and Switchcraft TT253 plugs on the cable ends.

STEP	PROCEDURE
1	<p>At the RCT, connect the two telephone sets (A and B) to the EQPT jacks on the applicable line-shelf jackfields of two lines which are equipped with line circuit packs at the RCT and at the CCT.</p> <p><i>Note:</i> The two lines must be connected at the CCT to the switching machine. It is preferable, but not essential, that the lines do not have subscribers connected to them.</p>
2	<p>From telephone set A, dial the directory number of the line to which set B is connected.</p>
3	<p>With an observer watching the counters on the QPP434 circuit pack at the CCT, lift the handpiece of telephone set B at the RCT.</p> <p><i>Requirement 1:</i> On the QPP434 at the CCT, the COMP ORIG CALLS (completed originating calls) counter is incremented by one count.</p> <p><i>Requirement 2:</i> On the QPP434, the COMP TERM CALLS (completed terminating calls) counter is incremented by one count.</p> <p><i>Requirement 3:</i> If the CCT and the RCT are both equipped with local link circuit packs, the TOTAL LL CCS counter increments by a count of one after a waiting period of about 50 seconds.</p> <p>If the requirements of Step 3 are not met, replace the QPP434 circuit pack, and repeat the test.</p>
4	<p>At the RCT, replace the handpiece on telephone set A and B, and disconnect the sets.</p>

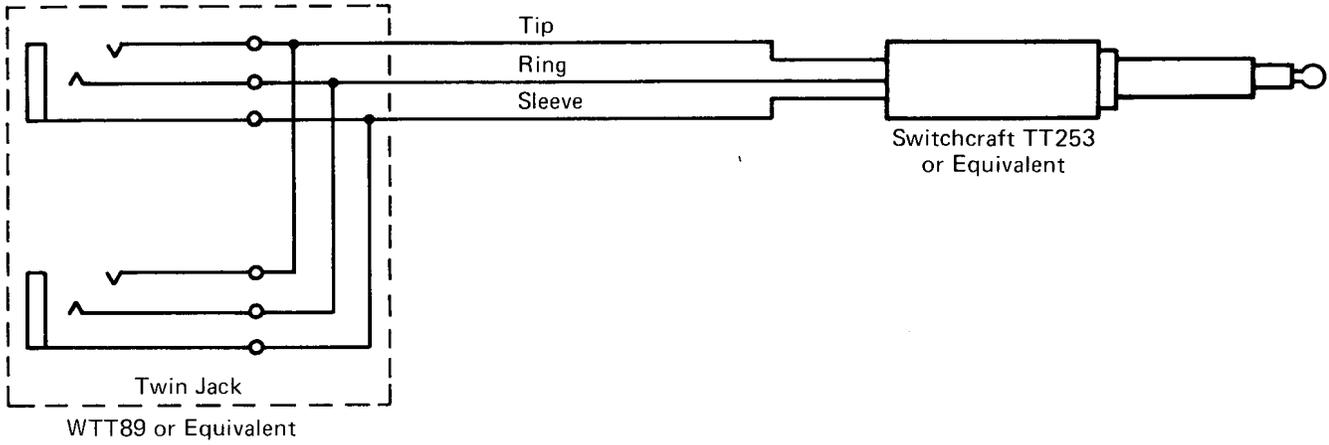


Fig. 5 – Test Cord (Local Manufacture) for System Tests

CHART 12
SUBSCRIBER LINE TESTING OPTION TEST

This chart describes the procedures for testing subscriber lines from the CCT.

Caution: *These are service-affecting test procedures. The test should be performed either on a test line or during a period of low activity.*

PREREQUISITES:

- (1) The QPP423 LINE TEST-REMOTE circuit pack must be installed in the RCT (see 363-2011-206).
- (2) The QPP424 LINE TEST-OFFICE circuit pack must be installed in the CCT (see 363-2011-205).
- (3) Personnel are required at both the CCT and the RCT in which the QPP423 and QPP424 have been installed.

APPARATUS:

2 Telephone sets, with ringers and Switchcraft TT253 plugs.

STEP	PROCEDURE
1	<p>At the CCT, depress the ON/OFF button on the QPP424 circuit pack until it latches. All other buttons should be out.</p> <p>Requirement 1: All lamps on the QPP424 light, and the displays indicate — .8 .8 .8 for about 1 second as a lamp test.</p> <p>Requirement 2: All lamps except the TESTING lamp go out, and the displays indicate — — (dashes) for about 5 seconds. (These dashes indicate that the QPP423 circuit pack at the RCT is carrying out a self-test and calibration check.)</p> <p>Requirement 3: —The TESTING lamp goes out and the dashes remain on the displays. (This indicates that the QPP423 has completed the calibration check.)</p> <p>If the CAL CHECK FAIL lamp lights, replace the QPP423 circuit pack, and repeat Step 1.</p> <p>If the above requirements are not met, refer to 363-2011-500, Table F for fault location.</p>
2	<p>On the QPP425 or QPP450 at the CCT, select the test line number on the LINE thumbwheel switch.</p> <p>Requirement 1: The line BUSY lamp on the QPP425 or QPP450 must be out.</p> <p>Requirement 2: The SHELF RINGING lamp on the QPP425 or QPP450 must be out.</p> <p>Note 1: The system controller selects an unused channel for the test regardless of the setting on the CHANNEL selector.</p> <p>Note 2: Tests can be carried out on a busy line by continuing with this procedure but subscriber service will be interrupted.</p> <p>Note 3: The shelf ringing condition cannot be overridden, and tests must be delayed until no lines are ringing on the test line shelf.</p> <p>Note 4: The ON/OFF button on the QPP425 or QPP450 must be in the OFF (out) position; subscriber line and system testing cannot be done at the same time.</p>

Chart Continued

CHART 12 Continued
SUBSCRIBER LINE TESTING OPTION TEST

STEP PROCEDURE

- 3 At the RCT, plug the telephone set into the EQPT jack for the line under test. Ensure that the handpiece is on-hook.
- 4 At the CCT, on the QPP424 LINE TEST OFFICE circuit pack;
- 4.1 Depress the CAP button until it latches to display all test results in sequence shown in Requirement 3.
- 4.2 Ensure that SEL/AUTO button is in the AUTO (out) position.
- 4.3 Press the START/STOP button.

Requirement 1: The TESTING lamp lights.

Requirement 2: The displays indicate the following values for the time shown, and the lamps shown turn on and off in sequence.

LAMP	DISPLAY			TIME (seconds)
	TIP-RING	TIP-GRN	RING-GRN	
VAC	blank	0 or 1	0 or 1	5
VDC	blank	0 or ± 1	0 or 1	8
K OHM	750	750	750	11
μ F	between 0.4 and 0.6	<0.05	<0.05	16 (Note 1)

Requirement 3: The TESTING lamp goes out.

Note 1: The test is complete when the capacitance measurement has been displayed. The capacitance measurement remains displayed until another test is started or until the ON/OFF button is released.

Note 2: The >RANGE/OVLD lamp on the QPP424 may light briefly while the resistance measurement is displayed to indicate that the actual resistance is greater than the 750 Ω .

- 4.4 Depress the AC VOLTS button until it latches.

Requirement: The displays indicate the same values as those indicated in Step 4.3.

- 4.5 One-by-one, depress the FEMF (DC), RES, and CAP buttons.

Requirement: The displays indicate the same values as those indicated in Step 4.3.

Chart Continued

CHART 12 Continued
SUBSCRIBER LINE TESTING OPTION TEST

STEP	PROCEDURE						
5	At the RCT, remove the handpiece from the telephone set (off-hook).						
6	Repeat Steps 4.3 through 4.5 at the CCT. <i>Requirement 1:</i> Same as those in Step 4.3 except that the resistance displays indicate the following values:						
	<table border="1"> <thead> <tr> <th style="text-align: center;">TIP-RING</th> <th style="text-align: center;">TIP-GRD</th> <th style="text-align: center;">RING-GRD</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">between 0.0 and 0.3</td> <td style="text-align: center;">blank</td> <td style="text-align: center;">blank</td> </tr> </tbody> </table>	TIP-RING	TIP-GRD	RING-GRD	between 0.0 and 0.3	blank	blank
TIP-RING	TIP-GRD	RING-GRD					
between 0.0 and 0.3	blank	blank					
	<i>Requirement 2:</i> No capacitance measurement is displayed because capacitance cannot be measured when it is shunted by a resistance value of less than 10k Ω						
7	At the CCT, on the QPP424 circuit pack;						
	7.1 Depress the SEL/AUTO button on the QPP424 until it latches.						
	7.2 Depress the RES button until it latches.						
	<i>Requirement:</i> The K OHM lamp lights.						
	7.3 Press the START/STOP button.						
8	At the RCT, replace and remove the handpiece from the telephone set several times, and observe the displays on the QPP424 at the CCT. <i>Requirement:</i> The resistance display changes from the values shown in Step 4.3 to those shown in Step 6 within 5 seconds every time the handpiece is replaced and removed from the telephone set.						
9	At the RCT, plug the second telephone into the EQPT jack of another test line on the same shelf.						
10	Dial all but the last digit of the directory number of the second test line from an outside telephone (not connected through DMS-1) or by using the first telephone plugged into the EQPT jack of a third test line at the RCT.						
11	At the CCT, if the tests of Step 8 have timed out (testing lamp is out), press the START/STOP button on the QPP424 circuit pack.						

Chart Continued

CHART 12 Continued
SUBSCRIBER LINE TESTING OPTION TEST

STEP	PROCEDURE
12	<p>While the tests are being performed, at the RCT dial the last digit of the directory number of the second test line.</p> <p><i>Requirement:</i> The following events occur at the CCT when the telephone set on the second test line at the RCT rings.</p> <ul style="list-style-type: none">(a) The SHELF RINGING lamp lights on the QPP425 or QPP450.(b) The TESTING lamp on QPP424 goes out.(c) The HALTED lamp on QPP424 lights.
13	<p>Pick up and place the handpiece of the second test telephone set to trip the ringing.</p> <p><i>Requirement 1:</i> The SHELF RINGING lamp on QPP425 or QPP450 goes out.</p> <p><i>Requirement 2:</i> The HALTED lamp on QPP424 goes out.</p> <p><i>Requirement 3:</i> The TESTING lamp on QPP424 lights.</p> <p><i>Requirement 4:</i> The resistance display on QPP424 is updated about every 4 seconds.</p>
14	<p>At the CCT, depress the ON/OFF button on QPP424 until it unlatches.</p>
15	<p>Remove the test connections at the RCT.</p>

CHART 13
SUBSCRIBER LINE TEST EXPANSION – TESTS

Caution: *The tests in this chart affect service on subscriber lines. Do the tests on lines specifically assigned as test lines, or during periods of low activity.*

Terminology: The following test-center terms are used in this chart:

- POST** to gain access to a subscriber line from the test desk for test purposes; e.g., by dialing a 4- to 7-digit number.
- SIGNATURE** an indication from a line which has been posted and which is unique to the type of line; the signature serves as a means of identifying the type of line which has been posted; the signature of a DMS-1 line is a tip-to-ground or ring-to-ground resistance reading of 80k to 100k ohms.

PREREQUISITES:

- (1) A QPP447 test access-remote circuit pack, and ED7208-32, G4 remote bypass assemblies must be installed at the RCT (363-2011-206).
- (2) A QPP448 test access-office circuit pack, and ED7208-32, G3 office bypass assemblies must be installed at the CCT (363-2011-205).
- (3) Personnel are required at the CCT, at the RCT to which the lines to be tested are connected, and at the test center.
- (4) All option selections required for the DMS-1 system being tested have been made as specified for the system (see 363-2011-205, 363-2011-206).

APPARATUS:

- 2 Telephone Sets, with ringer and a Switchcraft TT253 plug on the cable end (required at the RCT).

STEP PROCEDURE

- 1 At the CCT, set the option selectors of the QPP448 circuit pack as follows:

Selector S1, all sections ON

Selector S2, section	1	AUTO SPARE	OFF (enabled)
	2	MANUAL SPARE	OFF
	3	MANUAL BYPASS	OFF
	4	MANUAL INHIBIT	OFF
	5	SYSTEM TEST REPORTING	ON (disabled)
	6	BYPASS TIMEOUT	OFF
	7	TEST TRAIN SLEEVE	OFF if test train sleeve option is in use; otherwise ON.
	8	SLTE AUDIT	OFF

- 2 At the RCT, plug the telephone set into the EQPT jack on the jackfield for DMS-1 line no. 0.

Chart Continued

CHART 13 Continued
SUBSCRIBER LINE TEST EXTENSION – TESTS

STEP	PROCEDURE
3	<p>At the CCT, on the QPP431 system controller simultaneously press RESTART and RESTART ARM.</p> <p><i>Requirement:</i> No alarms.</p> <p>If any audit alarms appear, they must be cleared before continuing.</p> <p><i>Note:</i> This procedure assumes the use of a Northern Telecom Type 14 Local Test Desk (LTD), or equivalent, at the test center.</p>
4	<p>At the test desk, post DMS-1 line no. 0 and note the signature.</p> <p><i>Requirement:</i> The DMS-1 signature is present (80k – 10k ohms).</p>
5	<p>At the test desk, apply a Coin Control (CC) signal for at least 1 second (5 seconds, if the line is a universal coin line).</p> <p><i>Requirement:</i> The DMS-1 signature disappears.</p> <p>The tester should now verify the presence of the telephone connected at Step 2, and that the order-wire terminals have been disconnected from the test pair. The telephone hook-switch should be operated to confirm that the correct set has been reached. Check that the BUSY lamp on QPP447 and QPP448 are on.</p>
6	<p>At the test desk, apply a Coin Return (CR) pulse for 1 second (5 seconds for a coin line).</p> <p><i>Requirement:</i> The DMS-1 signature reappears.</p>
7	<p>Repeat Steps 2 through 6 for all DMS-1 lines on the system, moving the telephone set plug from line to line as required.</p> <p><i>Note:</i> For the steps which follow, verify that the designated spare line on the same shelf as the line under test, is equipped with line cards which are compatible with the type of line under test (see 363-2011-205).</p>
8	<p>At the RCT, plug a telephone set into the EQPT jack on the jackfield for DMS-1 line no. 1. Place the telephone off-hook.</p>
9	<p>Verify that a connection exists to the switching machine; and note on the line cards at the RCT and CCT, that line no. 1 is shown as being off-hook, and line no. 0 is shown on-hook.</p>
10	<p>At the CCT,</p> <p>10.1 Set the line selector on the QPP425, or QPP450, to line no. 1.</p> <p>10.2 On the QPP448, set both the ON/OFF and MANUAL SPARE switches to ON. Set selector SW1, section 1 OFF; restart the system controller.</p>

Chart Continued

CHART 13 Continued
SUBSCRIBER LINE TEST EXPANSION – TESTS

STEP	PROCEDURE
11	<p>Verify that;</p> <p>(a) a connection to the office switching machine still exists,</p> <p>(b) the line cards at the RCT and CCT show line no. 1 as on-hook,</p> <p>(c) the line cards at the RCT and CCT show the designated spare line 0 as off-hook,</p> <p>(d) on the QPP447 at the RCT, and QPP448 at the CCT, the BUSY and LINE SPARED indicators are on.</p>
12	<p>Repeat Steps 8 through 11 for at least one line on each shelf.</p> <p>Option switch SW1 should be set to designate a spare line only for the shelf being tested (363-2011-205).</p>
12a	<p>Reconfigure the line cards and selector SW1 on the QPP448 to provide a spare line for each type of line card in the system.</p>
13	<p>At the RCT, plug a telephone into the EQPT jack for line 4 on the jackfield. Remove the line card from position 2 (lines 4 to 7).</p>
14	<p>At the CCT, on the QPP431, simultaneously press RESTART and RESTART ARM.</p> <p><i>Requirement 1:</i> A path from the telephone set to the switching machine through the designated spare line.</p> <p><i>Requirement 2:</i> On the QPP448 at the CCT, and the QPP447 at the RCT, the BUSY and LINE SPARED indicators are on.</p>
15	<p>At the RCT, replace the line card in position 2 . At the CCT, restart the system (simultaneously press RESTART and RESTART ARM on the QPP431).</p>
16	<p>16.1 On the QPP425 or QPP450, set the line selector to line no. 2.</p> <p>16.2 On the QPP448, depress the ON/OFF and MANUAL TEST buttons.</p>
17.	<p>At the test desk, post line no. 2.</p> <p><i>Requirement:</i> An open-circuit indication.</p>
18	<p>Post line no. 1, and apply a CC pulse for 1 second (5 seconds for a universal coin line).</p> <p><i>Requirement 1:</i> A busy tone is returned for 30 seconds.</p> <p><i>Requirement 2:</i> The 80-k ohm signature is still present.</p>
19	<p>On the QPP448 at the CCT, release the MANUAL TEST button, and depress INHIBIT.</p>

Chart Continued

CHART 13 Continued
SUBSCRIBER LINE TEST EXPANSION – TESTS

STEP	PROCEDURE
20	At the test desk post line no. 1, and apply a CC pulse. <i>Requirement 1:</i> Reorder tone is returned for 30 seconds. <i>Requirement 2:</i> The 80-k ohm signature is still present.
21	On the QPP448 at the CCT, release the ON/OFF and INHIBIT buttons.
22	On the QPP448, enable the system test reporting option by setting selector switch S2, section 5 to OFF.
23	On the QPP431, simultaneously press RESTART and RESTART ARM.
24	At the test desk, post line no. 1. <i>Requirement:</i> The 80-k ohm DMS-1 signature appears.
25	Apply a CC pulse at the test desk. <i>Requirement:</i> The 80-k ohm signature is removed.
26	Apply a CR pulse. <i>Requirement 1:</i> A continuous 1600-Hz, -23 dBm tone is returned to the test desk. <i>Requirement 2:</i> The tip-to-ground (or ring-to-ground) resistance is 300k ohm.
27	At the test desk, apply another CR pulse. <i>Requirement 1:</i> The continuous tone ceases. <i>Requirement 2:</i> The 80-k ohm signature reappears.
28	28.1. At the RCT, remove the line card from the line corresponding to the line at position 1 in line shelf 0 at the CCT. 28.2. At the CCT, restart the system. <i>Requirement:</i> An audit alarm identifies the missing line card.
29	At the test desk, apply a CC pulse, and then a CR pulse. <i>Requirement 1:</i> A 1600-Hz, 120-imp tone is returned to the test desk. <i>Requirement 2:</i> The tip-ground, or ring-ground resistance is 30k ohms.
30	Apply a second CR pulse. <i>Requirement:</i> The 80-k ohm signature returns and the returned tone ceases.

Chart Continued

CHART 13 Continued
SUBSCRIBER LINE TEST EXTENSION – TESTS

STEP	PROCEDURE
31	<p>31.1 At the RCT, replace the line card removed at Step 28.</p> <p>32.1 At the CCT, restart the system.</p> <p><i>Requirement:</i> No alarms.</p> <p>If any alarms appear, they must be cleared (363-2011-500).</p> <p><i>Note:</i> If the CCT is not fitted with a QPP450, go to Step 37; otherwise, continue with Step 32.</p>
32	<p>At the CCT, on the QPP450;</p> <p>(a) depress the ON/OFF button,</p> <p>(b) press and hold the SELF TEST button while the test desk performs Steps 33.</p>
33	<p>At the test desk, apply a CC pulse and then a CR pulse.</p> <p><i>Requirement 1:</i> A 1600-Hz, 15-ipm tone is returned to the test desk.</p> <p><i>Requirement 2:</i> The tip-ground, or ring-ground resistance is that normally expected for an open-circuit on the test trunk being used.</p>
34	At the CCT, release the SELF TEST and ON/OFF buttons on the QPP450.
35	<p>At the desk, apply another CR pulse.</p> <p><i>Requirement:</i> The 80-k ohm signature returns, and the tone being returned to the test desk ceases.</p>
36	<p>At the test desk, apply a CC pulse, and then wait.</p> <p><i>Requirement:</i> After 10 minutes, the bypass is automatically removed.</p> <p><i>Note:</i> If the DMS-1 system under test uses the test train sleeve option, continue with Steps 37 to 39; if test train sleeves are not used, go to Step 40.</p> <p>If test train sleeves are used, there should be a test train sleeve on the DMS-1 for each test trunk serving the DMS-1.</p>
37	<p>At the test desk, post and bypass a DMS-1 line.</p> <p>Ensure that all other serving test trunks are idle, and stay idle for the duration of this test.</p>
38	<p>At the test desk, disconnect the test train.</p> <p><i>Requirement:</i> The bypass is removed.</p>
39	<p>Repeat Steps 37 and 38 for each serving trunk. Then go to Step 40.</p> <p><i>Note:</i> Steps 40 to 43 are to be done only on systems with interconnected CCT using a common test pair.</p>

Chart Continued

CHART 13 Continued
SUBSCRIBER LINE TEST EXPANSION – TESTS

STEP	PROCEDURE
40	<p>At the CCT of system no. 1, on the QPP448 depress the ON/OFF and MANUAL TEST buttons. Depress the ON/OFF button on the QPP448 of all other CCT.</p> <p><i>Requirement:</i> On the QPP448 of all interconnected CCT, and on the QPP447 of all RCT, the BUSY indicators shall light.</p>
41	<p>On the QPP448 of the CCT for system no. 1, release the MANUAL TEST button, and depress the INHIBIT button.</p> <p><i>Requirement:</i> At all CCT and RCT, the INHIBITED indicators are lit.</p>
42	<p>On the CCT of system no. 1, release the INHIBIT button.</p>
43	<p>Repeat Steps 40 through 42 on all other interconnected CCT.</p> <p><i>Note:</i> Steps 44 to 47 are to be done only on systems using the test line option.</p>
44	<p>At the RCT, plug a telephone set into the EQPT jack for line no. 1 on the jackfield.</p>
45	<p>Manually bypass line no. 1.</p>
46	<p>At the test center, post the test line with the 3WO (3rd wire open) key operated.</p> <p><i>Requirement:</i> The presence of the telephone on the line is indicated.</p>
47	<p>Release the 3WO key.</p> <p><i>Requirement 1:</i> On the QPP448 at the CCT, the TEST LINE OVERRIDE lamp must light.</p> <p><i>Requirement 2:</i> The indication at the test desk must show the telephone disconnected.</p>

**CHART 14
SIGNALING TEST**

This test is for use primarily during initial installation of a DMS-1 system. However, it may be used at any time.

Caution: This is a service-affecting test. Before starting the test, ensure that the lines to be tested are not in service.

APPARATUS: Required at both terminals of a line.

1 Signaling Test Set: Northeast Electronics TTS26B with TTX26BXC-4 cover, or equivalent.

1 Test Cord: P3Q3-type, Bantam-to-NE310, or equivalent.

STEP	PROCEDURE
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Note: The signaling test is made on individual lines. Repeat the procedure on each line to be tested.

PREPARATION

- 1 Verify the operation of the signaling test set according to instructions in the manual for the test set.
- 2 Check the calibration of the test set.
- 3 At both terminals, verify that the lines to be tested are not in service.
- 4 At both terminals:

Check that there are no alarms. These conditions must be met before the test is started.

Chart Continued

CHART 14 Continued
SIGNALING TEST

STEP	PROCEDURE												
<i>SIGNALING TEST</i>													
5	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; width: 50%;">TRANSMIT AT RCT</th> <th style="text-align: center; width: 50%;">RECEIVE AT CCT</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;">5.1 Connect output of signaling test set to the EQPT jack of the line to be tested (Fig. 6).</td> <td style="vertical-align: top;">5.1 Connect input of signaling test set to the EQPT jack of the line to be tested (Fig. 6).</td> </tr> <tr> <td style="vertical-align: top;">5.2 Set signaling test set to transmit an on-hook signal.</td> <td style="vertical-align: top;">5.2 Measure break percentage. <i>Requirement:</i> 100-percent break</td> </tr> <tr> <td style="vertical-align: top;">5.3 Set signaling test set to transmit an off-hook signal.</td> <td style="vertical-align: top;">5.3 Measure break percentage. <i>Requirement:</i> 0-percent break.</td> </tr> <tr> <td style="vertical-align: top;">5.4 Set signaling test set to transmit 10 ± 2.5 apps pulses per second through a LEAK "A" circuit with 0 loop resistance and a break of 60 percent.</td> <td style="vertical-align: top;">5.4 Measure break percentage. <i>Requirement:</i> 58- to 64-percent break.</td> </tr> <tr> <td style="vertical-align: top;">5.5 Repeat 5.4 with leak "A" circuit removed and loop resistance set to 1500 OHM.</td> <td style="vertical-align: top;">5.5 Measure break percentage. <i>Requirement:</i> 58- to 64-percent break.</td> </tr> </tbody> </table>	TRANSMIT AT RCT	RECEIVE AT CCT	5.1 Connect output of signaling test set to the EQPT jack of the line to be tested (Fig. 6).	5.1 Connect input of signaling test set to the EQPT jack of the line to be tested (Fig. 6).	5.2 Set signaling test set to transmit an on-hook signal.	5.2 Measure break percentage. <i>Requirement:</i> 100-percent break	5.3 Set signaling test set to transmit an off-hook signal.	5.3 Measure break percentage. <i>Requirement:</i> 0-percent break.	5.4 Set signaling test set to transmit 10 ± 2.5 apps pulses per second through a LEAK "A" circuit with 0 loop resistance and a break of 60 percent.	5.4 Measure break percentage. <i>Requirement:</i> 58- to 64-percent break.	5.5 Repeat 5.4 with leak "A" circuit removed and loop resistance set to 1500 OHM.	5.5 Measure break percentage. <i>Requirement:</i> 58- to 64-percent break.
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5.3 Set signaling test set to transmit an off-hook signal.	5.3 Measure break percentage. <i>Requirement:</i> 0-percent break.												
5.4 Set signaling test set to transmit 10 ± 2.5 apps pulses per second through a LEAK "A" circuit with 0 loop resistance and a break of 60 percent.	5.4 Measure break percentage. <i>Requirement:</i> 58- to 64-percent break.												
5.5 Repeat 5.4 with leak "A" circuit removed and loop resistance set to 1500 OHM.	5.5 Measure break percentage. <i>Requirement:</i> 58- to 64-percent break.												
6	If any of the requirements in Step 5 cannot be met, replace each of the line circuit packs under test in turn.												
7	Remove the test connection to restore the line to service.												

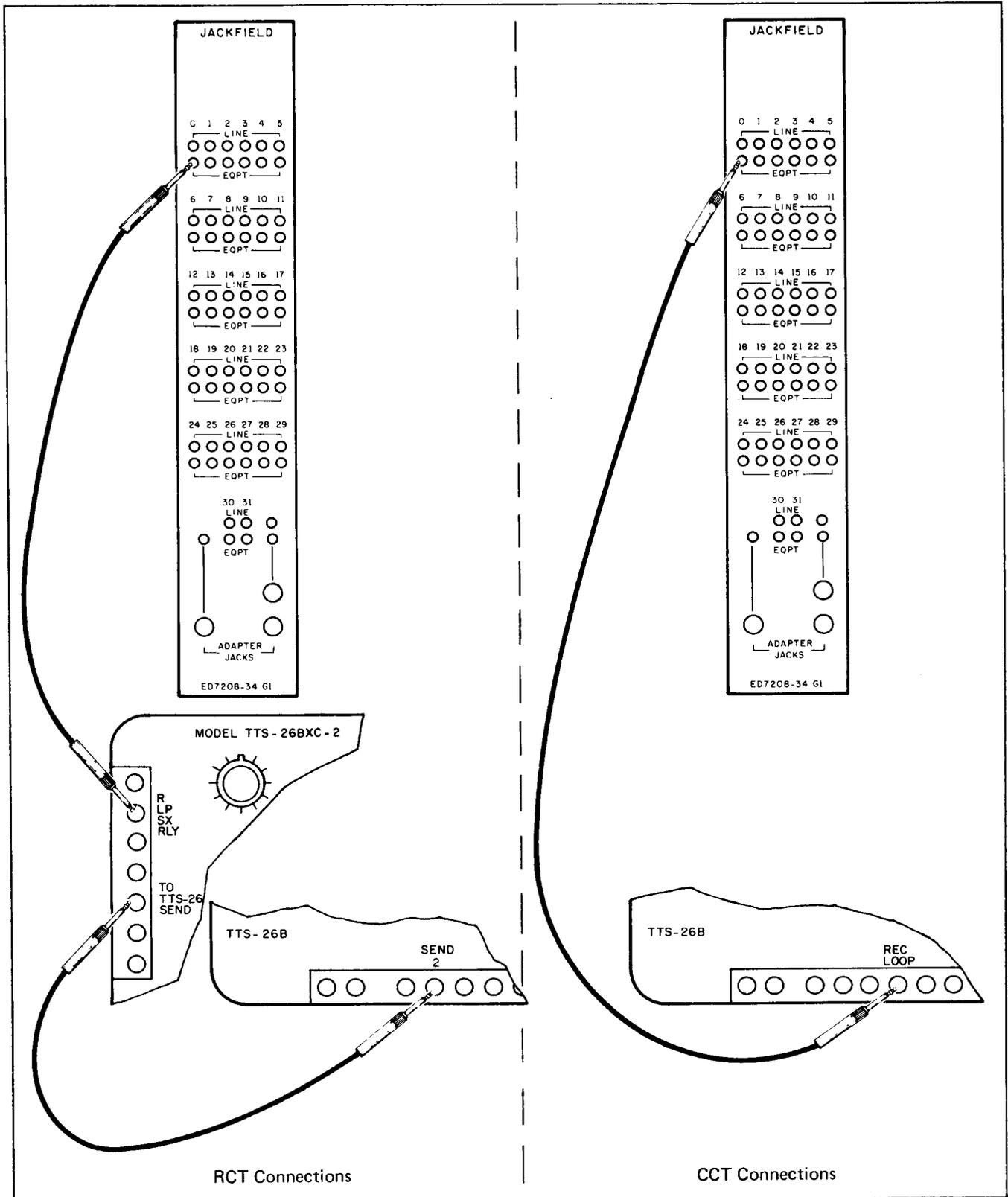


Fig. 6 - Signaling Test - Typical Test Connections