

DMS-1* DIGITAL MULTIPLEX SYSTEM

REMOTE CONCENTRATOR TERMINAL

INITIAL OPERATING TESTS

1. GENERAL

1.01 This section describes the test procedures used after initial installation of circuit packs in a Remote Concentrator Terminal (RCT), and when expanding an RCT. The test procedures described in this section are as follows:

(a) *Chart 1* describes the test procedures to be performed during initial installation of the RCT bay. Chart 1 is used after the circuit pack installation procedures (363-2011-206) have been completed. All tests are performed before the system is placed in service, and may be performed on single or dual digroup installations.

(b) *Chart 2* describes the test procedures which must be performed on the RCT bay when the number of subscriber lines is increased. The tests verify RCT operation during the addition of line circuit packs, and are performed while the system is in service. Chart 2 is used after the circuit pack installation procedures described in 363-2011-206, and the CCT lineup procedures in Chart 2 of 363-2011-210 have been completed.

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

1.03 *Test Coordination.* Personnel are required at the Control Concentrator Terminal (CCT) and at the RCT being tested. The test procedures must be coordinated by order-wire communication between the CCT and RCT.

1.04 *Test Prerequisites.* The RCT requires control signals from the CCT for operation. Consequently, the procedures of this section must be carried out only after the steps in 363-2011-205, -206, and -210 have been completed. The digital line must also be installed between the CCT and RCT, and meet the test requirements of 363-2011-212.

1.05 *Testing Optional Common Circuits.* All optional common circuit packs must be tested according to the procedures described in 363-2011-213. Optional common circuit packs may be left in position, while the procedures of this section are performed.

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**TABLE A
RCT RING GENERATOR CONFIGURATION**

CONFIG SERIES	WIRING OPTION (J Sheet)	QPP420 SWITCH S1 POSITION 2	NO. OF RING GEN QPP426	RING DIST QPP422A/B	NO. OF 300 V CONV QPP430	NO. OF POS RING GEN QPP435
1(a)	N/A	Open	1	422A	0	0
1(b)	N/A	Closed	2	422A	0	0
2(a)	Q	Open	1	422B	0	0
2(b)	Q	Closed	2	422B	0	0
3(a)	None	Open	1	422B	1	0
3(b)	None	Closed	2	422B	1	0
3(c)	None	Closed	2	422B	2	0
3(d)	None	Closed	1	422B	2	0
4(a)	R	Open	0	None	1	0
4(b)	R	Closed	0	None	2	0
5(a)	None	Open	1	2-422B	0	1
5(b)	None	Closed	2	2-422B	0	2

**TABLE B
RING GENERATOR ALARMS**

CONFIG SERIES	RCT	CCT			
	QPP420 ALM REM	QPP421 ALM OFF (RCT Position)	TOP OF BAY LIGHT	OFFICE	
				MAJOR	MINOR
1(a)	RMJ, RMN	Ring Gen	ON	ON	ON
1(b)	RMN	Ring Gen	ON	OFF	ON
2(a)	RMJ, RMN	Ring Gen	ON	ON	ON
2(b)	RMN	Ring Gen	ON	OFF	ON
3(a)	RMJ, RMN	Ring Gen	ON	ON	ON
3(b)	RMJ	Ring Gen	ON	ON	ON
3(c)	RMN	Ring Gen	ON	OFF	ON
3(d)	RMJ	Ring Gen	ON	ON	ON
4(a)	RMJ, RMN	Ring Gen	ON	ON	ON
4(b)	RMN	Ring Gen	ON	OFF	ON
5(a)	RMJ, RMN	Ring Gen	ON	ON	ON
5(b)	RMN	Ring Gen	ON	OFF	ON

**CHART 1
INITIAL INSTALLATION TESTS**

Note 1: The DS1 carrier system must be connected between the RCT and CCT, and must meet the test requirements of 363-2011-212.

Note 2: The RCT are tested one at a time, beginning with the RCT nearest to the CCT and working outward to the farthest RCT.

STEP PROCEDURE

CHECK FOR ALARMS AT CCT AND RCT BEING TESTED

- 1 At the RCT being tested, ensure that one of the configurations in Table A has been fully set up. Switch the ON/OFF switch on the QPP420 ALM REM to ON.

Requirement: No unexpected system alarms indicated on the ALM REM unit.

If alarms other than expected alarms are displayed (e.g., DOOR alarm at RCT installed in cabinets or huts), refer to 363-2011-500 to locate and correct the cause of the alarms before proceeding.

RING GENERATOR ALARM VERIFICATION

- 2 At the CCT, on the QPP421 ALARM OFFICE circuit pack, select the RCT under test for display.

- 3 At the RCT, remove fuse F2 (ring generator) from the fuse panel.

Requirement: For the configuration setup (see Table A), observe that the RCT and CCT alarms which have been activated are only those indicated in the appropriate section of Table B.

- 4 Replace fuse F2 in its assigned position.

Requirement: Those alarms present in Step 2 for the particular configuration selected must go out.

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

DIGROUP FAIL ALARM VERIFICATION

Note: Perform this test on dual digroup systems only.

- 5 At the RCT, remove the fuse from the F4 holder (digroup A repeater) on the fuse panel. This action simulates digroup A failure.

Requirement 1: At the RCT, the DFA lamp lights on QPP420.

Requirement 2: At the CCT, the DGP FAIL A lamp lights on QPP421 (with the RCT under test selected for display, Step 2).

Requirement 3: At the CCT, the office major alarms sounds.

Chart Continued

**CHART 1 Continued
INITIAL INSTALLATION TESTS**

STEP PROCEDURE

- 6 At the RCT, replace the fuse in the F4 fuseholder on the fuse panel.

Requirement 1: The DFA lamp on QPP420 at the RCT goes out.

Requirement 2: The DGP FAIL A lamp on the QPP421 at the CCT goes out.

Requirement 3: The office major alarm at the CCT is silenced.

If the requirements of Steps 5 and 6 are not met, refer to 363-2011-500 to locate and correct the fault.

LINE POWER CONVERTER FAIL (LPF) ALARM VERIFICATION

- 7 At the RCT, for any one of the equipped line shelves, remove the fuse from the associated fuseholder on the fuse panel as follows:

LINE SHELF	FUSE
0	F11
1	F13
2	F15
3	F17
4	F19
5	F21
6	F23
7	F25

Requirement 1: At the RCT, the LPF lamp lights on the QPP420 ALM REM unit.

Requirement 2: At the CCT the LINE PWR lamp lights on the QPP421 ALARM OFFICE unit (with the RCT under test selected for display, from Step 2).

Requirement 3: The office major alarm sounds at the CCT.

- 8 At the RCT, replace the fuse on the fuse panel.

Requirement 1: The LPF lamp at the RCT goes out.

Requirement 2: The LINE PWR lamp at the CCT goes out.

Requirement 3: The office major alarm at the CCT is silenced.

Note: There may be up to a 10-second delay before the system controller automatically resets the line power converter on the shelf concerned. Alternatively, press the RESET button on the line power converter to manually reset it.

- 9 Repeat Steps 7 and 8 for each line shelf installed at the RCT.

Chart Continued

**TABLE C
COMMON POWER CONVERTOR A ALARMS**

CONFIG SERIES	RCT	CCT (2 Digroup System)			
	QPP420 ALM REM	QPP421 ALM OFF (RCT Position)	TOP OF BAY LIGHT	OFFICE	
				MAJOR	MINOR
1(a)	DFA, CPF, RMJ RMN	DGP FAIL A, COM PWR, RING GEN	ON	ON	ON
1(b)	DFA, CPF, RMN	DGP FAIL A, COM PWR, RING GEN	ON	ON	ON
2(a)	DFA, CPF	DGP FAIL A, COM PWR	ON	ON	ON
2(b)	DFA, CPF	DGP FAIL A, COM PWR	ON	ON	ON
3(a)	DFA, CPF	DGP FAIL A, COM PWR	ON	ON	ON
3(b)	DFA, CPF	DGP FAIL A, COM PWR	ON	ON	ON
3(c)	DFA, CPF	DGP FAIL A, COM PWR	ON	ON	ON
3(d)	DFA, CPF	DGP FAIL A, COM PWR	ON	ON	ON
4(a)	DFA, CPF	DGP FAIL A, COM PWR	ON	ON	ON
4(b)	DFA, CPF	DGP FAIL A, COM PWR	ON	ON	ON
5(a)	DFA, CPF RMJ, RMN	DGP FAIL A, COM PWR RING GEN	ON	ON	ON
5(b)	DFA, CPF	DGP FAIL A, COM PWR	ON	ON	ON

**CHART 1 Continued
INITIAL INSTALLATION TESTS**

STEP	PROCEDURE
<i>COMMON POWER FAIL (CPF) ALARM VERIFICATION</i>	
10	<p>At the RCT, remove the fuse from the F8 fuseholder on the fuse panel (to fail the QPC85 5/12-V common converter A).</p> <p><i>Requirement:</i> For the configuration setup (see Table A), observe that the RCT and CCT alarms which have been activated are only those indicated in the appropriate section of Table C.</p>
11	<p>At the RCT, replace the fuse in the F8 fuseholder on the fuse panel.</p> <p><i>Requirement:</i> Those alarms which had been activated in Step 10 must go out.</p> <p>If the requirements of Steps 10 and 11 are not met, refer to 363-2011-500 to locate and correct the fault.</p>
12	<p>At the RCT, remove the fuse from the F9 fuseholder on the fuse panel to fail the common converter B.</p> <p><i>Requirement:</i> For the configuration setup (see Table A), observe that the RCT and CCT alarms which have been activated are only those indicated in the appropriate section of Table D.</p>
13	<p>At the RCT, replace F9 on the fuse panel.</p> <p><i>Requirement:</i> Those alarms which had been activated in Step 12 must go out.</p> <p>If the requirements of Steps 12 and 13 are not met, refer to 363-2011-500 to locate and correct the fault.</p>
14	<p>At the RCT, switch off the 115/230-V ac supply to the RCT rectifier.</p> <p><i>Requirement 1:</i> At the RCT, the AC lamp lights on the QPP420 ALM REM unit.</p> <p><i>Requirement 2:</i> At the CCT, the AC FAIL lamp lights on the QPP421 ALARM OFFICE unit (with the RCT under test selected for display from Step 2).</p> <p><i>Requirement 3:</i> The office minor alarm sounds at the CCT.</p>
15	<p>At the RCT, switch on the AC supply to the RCT rectifier.</p> <p><i>Requirement 1:</i> The AC lamp at the RCT goes out.</p> <p><i>Requirement 2:</i> The AC FAIL lamp at the CCT goes out.</p> <p><i>Requirement 3:</i> The office minor alarm at the CCT is silenced.</p>

Chart Continued

**TABLE D
COMMON POWER CONVERTER B ALARMS**

CONFIG SERIES	RCT		CCT		
	QPP420 ALM REM	QPP421 ALM OFF (RCT Position)	TOP OF BAY LIGHT	OFFICE	
				MAJOR	MINOR
1(a)	DFB, CPF	DGP FAIL B, COM PWR	ON	ON	ON
1(b)	DFB, CPF, RMN	DGP FAIL B, COM PWR, RING GEN	ON	ON	ON
2(a)	DFB, CPF	DGP FAIL B, COM PWR	ON	ON	ON
2(b)	DFB, CPF	DGP FAIL B, COM PWR	ON	ON	ON
3(a)	DFB, CPF	DGP FAIL B, COM PWR	ON	ON	ON
3(b)	DFB, CPF	DGP FAIL B, COM PWR	ON	ON	ON
3(c)	DFB, CPF	DGP FAIL B, COM PWR	ON	ON	ON
3(d)	DFB, CPF	DGP FAIL B, COM PWR	ON	ON	ON
4(a)	DFB, CPF	DGP FAIL B, COM PWR	ON	ON	ON
4(b)	DFB, CPF	DGP FAIL B, COM PWR	ON	ON	ON
5(a)	DFB, CPF	DGP FAIL B, COM PWR	ON	ON	ON
5(b)	DFB, CPF	DGP FAIL B, COM PWR	ON	ON	ON

CHART 1 Continued
INITIAL INSTALLATION TESTS

STEP	PROCEDURE
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***SELF CHECK OF QPP425 SYSTEM TEST OR QPP450
TEST CONTROL CIRCUIT PACK AT THE CCT***

- 16 At the CCT, do the following self-checks on the QPP425 or QPP450 circuit pack:
- 16.1 Depress the ON/OFF button.
Requirement: On QPP450 only: all indicator lamps must light for about 1 second.
If this requirement is not met on the QPP450, replace the QPP450 circuit pack and repeat the test.
- 16.2 *On QPP425 only:* Depress and hold the LAMP TEST button while observing all indicator lamps on the QPP425; then release the button.
Requirement: All indicator lamps on the QPP425 must be lit while the LAMP TEST button is being pressed.
If this requirement is not met on the QPP425, replace the QPP425 circuit pack and repeat the test.
- 16.3 On the QPP425A depress the SELF TEST button; press and hold the button on the QPP425B or QPP450.
Requirement: The OK lamp lights.
Note: Brief transient illumination of other lamps may occur before the OK lamp lights steadily.
- 16.4 Release the SELF TEST button.
Requirement: The OK lamp goes out.
If the requirements of 16.3 and 16.4 are not met, replace the circuit pack.
- 16.5 Press and release the ON/OFF button.

LOOPBACK TEST: LINES

Purpose: This test verifies the loss of each RCT line circuit pack in a loopback mode, using a test tone generated by the QPP425 circuit pack at the CCT.

- 17 At the CCT adjust the controls of the QPP425 or QPP450 as follows:
- 17.1 Depress the ON/OFF button.
- 17.2 Adjust the CHANNEL thumbwheel selector to A00.
- 17.3 Select the first line to be tested by setting the LINE thumbwheel selector appropriately.
Note: Line numbers indicated on the thumbwheel switch are related to line circuit pack plug-in positions by shelf designations. Line circuit packs located in the RCT must correspond to line circuit packs located in the CCT terminal (e.g., QPP405 single party at the RCT and QPP406 single party at the CCT).

Chart Continued

**CHART 1 Continued
INITIAL INSTALLATION TESTS**

STEP	PROCEDURE
17.4	<p>On QPP425A, depress the LOOP REM button; press and hold LOOP REM on QPP450 and QPP425B.</p> <p><i>Requirement 1:</i> The OK lamp lights.</p> <p><i>Requirement 2:</i> The DC SUPV HOOK lamp lights.</p> <p><i>Requirement 3:</i> The ANI lamp lights if the line circuit pack being tested is a QPP407 universal, QPP409 coin, QPP440 FSR, or QPP445 superimposed.</p>
17.5	Release the LOOP REM button.
17.6	Repeat Steps 17.3 through 17.5 for each line in the RCT.
	<p><i>Note:</i> After any change of the thumbwheel switches, recycle the LOOP REM switch as in Steps 17.4 and 17.5.</p> <p>Replace the appropriate line circuit pack if a line fails to test satisfactorily. If several circuit packs on a line shelf do not test satisfactorily, refer to 63-2011-500 Part 4 to locate and correct the fault.</p>
17.7	Press and release the ON/OFF button.
LOOPBACK TEST: CHANNELS	
	<p><i>Purpose:</i> This test verifies the vf loss of one RCT line circuit in a loopback mode through each of the digital channels.</p>
18	At the CCT, adjust the controls of the QPP425 or QPP450 as follows:
18.1	Depress the ON/OFF button.
18.2	Adjust the LINE thumbwheel selector to a line number for which a line circuit pack exists in the RCT.
18.3	Set the CHANNEL thumbwheel selector to A00.
18.4	On QPP425A, depress the LOOP REM button; press and hold LOOP REM on QPP450 and QPP425B.
	<p><i>Requirement 1:</i> The OK lamp lights.</p> <p><i>Requirement 2:</i> The DC SUPV HOOK lamp lights.</p> <p><i>Requirement 3:</i> The ANI lamp lights, if the circuit pack being tested is a QPP407 universal, QPP409 coin, QPP440 FSR, or QPP445 superimposed.</p>
Chart Continued	

**CHART 1 Continued
INITIAL INSTALLATION TESTS**

STEP	PROCEDURE
18.5	Release the LOOP REM button.
18.6	Repeat Steps 18.3 through 18.5 for channels A00 through A23. If the system is equipped for dual digroup operation continue repeating Steps 18.3 through 18.5 for channels B00 through B23.
18.7	Press and release the ON/OFF button.

LOOPBACK TEST: LINES, WHEN SYSTEM IS EQUIPPED FOR DUAL DIGROUP OPERATION

Note: This test is necessary, in addition to the tests outlined in Steps 17 and 18, when the system is equipped for dual digroup operation.

- 19 At the CCT, adjust the controls of the QPP425 or QPP450 as follows:
- 19.1 Depress the ON/OFF button.
- 19.2 Adjust the CHANNEL thumbwheel selector to B00.
- 19.3 Adjust the LINE thumbwheel selector to correspond to any line in one shelf in the RCT.
- 19.4 On QPP425A, depress the LOOP REM button; press and hold LOOP REM on QPP450 and QPP425B.

Requirement 1: The OK lamp lights.

Requirement 2: The DC SUPV HOOK lamp lights.

Requirement 3: The ANI lamp lights, if the circuit pack being tested is a QPP407 universal, QPP409 coin, QPP440 FSR, or QPP445 superimposed.

- 19.5 Release the LOOP REM button.
- 19.6 Repeat Steps 19.3 through 19.5 for each line shelf in the RCT.
- If any line fails to test OK, refer to 363-2011-500 Part 4 to locate and correct the fault.

Note: After any change in the thumbwheel switches, recycle the LOOP REM switch as in Steps 19.4 and 19.5.

- 19.7 Press and release the ON/OFF button.

RESTORING RCT FOR OPERATION

- 20 Verify that no system alarms exist at the RCT.
- Note:* Alarms such as DOOR (for a hut- or cabinet-mounted RCT) may be present.
- 21 Switch off the QPP420 ALM REM circuit pack at the RCT.
- 22 Proceed to the next RCT away from the CCT, and repeat the tests in this chart until all RCT in the system have been checked.

**CHART 2
EXPANDING NUMBER OF LINES AT RCT**

STEP	PROCEDURE
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Note 1: This test is done at the CCT.

Note 2: The line circuit packs for the new lines must be installed at both the CCT and RCT. Refer to 363-2011-205 and 363-2011-206 for circuit pack installation procedures.

***SELF-CHECK OF QPP425 SYSTEM TEST OR
QPP450 TEST CONTROL CIRCUIT PACK AT THE CCT***

1 At the CCT, do the following self-checks on the QPP425 or QPP450 circuit packs:

1.1 Depress the ON/OFF button.

Requirement: On QPP450 only: all indicator lamps must light for about 1 second.

If this requirement is not met on the QPP450, replace the QPP450 circuit pack, and repeat the test.

1.2 *On QPP425 only:* Depress and hold the LAMP TEST button while observing all indicator lamps on the QPP425; then release the button.

Requirement: All indicator lamps on the QPP425 must be lit while the LAMP TEST button is being pressed.

If this requirement is not met on the QPP425, replace the QPP425 circuit pack, and repeat the test.

1.3 On the QPP425A depress the SELF TEST button; press and hold the button on the QPP425B or QPP450.

Requirement: The OK lamp lights.

Note: Brief transient illumination of other lamps may occur before the OK lamp lights steadily.

1.4 Press and release the SELF TEST button.

Requirement: The OK lamp goes out.

1.5 Press and release the ON/OFF button.

If the requirements of the self-check are not met, check the calibration according to 363-2011-300. If through adjustments, the requirements are not attained, replace the QPP425 circuit pack, and repeat Steps 1.1 through 1.5.

Chart Continued

CHART 2 Continued
EXPANDING NUMBER OF LINES AT RCT

STEP PROCEDURE

LOOPBACK TEST

Purpose: This test verifies the vf operation of new line circuit packs at the RCT in a loopback mode by using a test tone generated and detected in the QPP425 system test unit at the CCT.

- 2 At the CCT adjust the controls of the QPP425 or QPP450 as follows:
 - 2.1 Depress the ON/OFF button.
 - 2.2 Set the CHANNEL thumbwheel selector to A24.
 - 2.3 Set the LINE thumbwheel selector to the new line to be tested.

Note: Line numbers are related to line circuit pack plug-in positions by shelf designations.

Caution: *The BUSY lamps must be out. Pressing the LOOP REM button while a BUSY lamp is on results in service interruption on the line and/or channel indicated on the thumbwheel selectors. If a BUSY lamp is lit, check the applicable thumbwheel for the desired setting.*

- 2.4 On QPP425A, depress the LOOP REM button; press and hold LOOP REM on QPP450 and QPP425B.

Requirement 1: The OK lamp lights.

Requirement 2: The DC SUPV HOOK lamp lights.

Requirement 3: The ANI lamp lights if the line circuit pack is a QPP407 universal, QPP409 coin, QPP440 FSR, or QPP445 superimposed.

If a line fails this test, the line circuit pack at the RCT must be replaced.

- 2.5 Release the LOOP REM button.
 - 3 Repeat Steps 2.3 through 2.5 for each additional line added to the RCT.
 - 4 At the CCT press and release the ON/OFF button on the QPP425 SYSTEM TEST, or QPP450 TEST CONTROL.
-