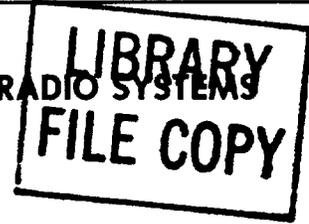


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MULTIMASTERGROUP RESTORATION TRUNKS FOR RADIO SYSTEMS  
TESTS  
COMMON EQUIPMENT  
ANALOG MULTIPLEX TERMINAL EQUIPMENT

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Multimastergroup trunks (SD-50742-01) are provided for radio systems to interconnect the radio equipment, mastergroup multiplex terminals, line branching/mastergroup combining bays, and restoration patch bays.

This section is reissued to add test procedures for trunks for mastergroup translator A (MGTA), to correct errors, to include references to the 263C amplifier which is used to replace the 263A amplifier in trunks used for four-mastergroup transmission, to include references to the 1521A filter used with digital mastergroup transmission, and to show the changes for 2.048-MHz reference frequency transmission. Arrows are used to indicate significant changes. **Equipment Test Lists are affected.**

Multimastergroup trunk jacks appear in the following bays: restoration patch, line branching/mastergroup combining, wire line entrance link (WLEL), ♦MGTA bay,♦ and MMX-2R terminal. Multimastergroup trunk equipment is on panels mounted in a multimastergroup trunk bay, a line branching/mastergroup combining bay, ♦MGTA bays,♦ and MMX-2R terminals. Each panel in the multimastergroup trunk bay is marked as to the radio system or ♦mastergroup multiplex♦ terminal to which the trunk is connected.

Receiving restoration switches for regular mastergroup banks **without** mastergroup branching are mounted in the multimastergroup trunk bay. Receiving restoration switches for regular mastergroup banks **with** mastergroup branching are mounted in the line branching/mastergroup combining bay.

Adjustments of trunk circuit amplifiers, attenuators, and cable equalizers are required to provide the proper signal levels. Adjustment controls are on the front of the trunk circuit panels in the multimastergroup trunk bay. ♦The multimastergroup radio trunk panels J68953AH in MGTA bays and trunk equalizer panels J68882BC in MMX-2R terminals have both front and rear adjustment controls. A coverplate must be raised or♦ removed to reach the front-panel controls.

**Caution: Take care to locate the proper control before making any adjustment. Always note the original position of a control so it can be returned to that position, if required.**

Chart 10 is a procedure for adjusting the gain of 266K amplifiers in the zero-loss trunks. Chart 11 is a procedure for testing the fixed-gain 263A ♦and 263C♦ amplifiers in the other trunks.

Attenuators have two controls (0 to 10 dB and 1 to 2 dB) which permit loss adjustment in 0.1-dB steps from 1 to 12 dB. With both attenuator controls on 0, the attenuator loss is 1 dB.

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**NOTICE**

Not for use or disclosure outside the  
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**SECTION 356-041-500**

Cable equalizer controls are set during installation according to the length of cable in a trunk and, normally, the cable equalizer settings will not need changing. Cable equalizer settings are given in SD-50742 for various lengths of cable. Chart 12 is a procedure for checking the cable equalizer settings, if required.

Fixed pads in the trunks are cable pads located adjacent to the trunk panels. In case of trouble indicating that individual equipment units in a trunk should be checked, refer to SD-50742. **Be sure to replace any plugs removed during testing.**

**Note:** When signal tracing to locate trouble, remember that the band is flat only at certain jacks as indicated in Figures 1 through 10. The cable and/or cable equalizers slope the band at other points in the trunks.

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**APPARATUS:**

The tests in this section require suitable transmission test equipment. Refer to Section 356-010-500 and select from available equipment sending and receiving units having the following capabilities:

**Sending test equipment** (STE) capable of delivering, into 75-ohm circuits, signals between 600 kHz and 12 MHz at powers between -10 and -52 dBm

**Receiving test equipment** (RTE) capable of detecting, from 75-ohm circuits, signals between 600 kHz and 12 MHz at powers between -10 and -52 dBm.

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CHART 1

TRANSMITTING REGULAR OR SPARE RADIO TRUNK WITHOUT MASTERGROUP BRANCHING

STEP	PROCEDURE
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**Caution:** This test cannot be performed on a trunk in service.

- 1 Remove the plug connecting the appropriate TERM OUT and LINE IN jacks for a regular mastergroup bank in the MMX-2R transmitting bay.
- 2 Prepare the STE to produce a 600-kHz signal at -31.6 dBm.
- 3 Prepare the RTE for a 75-ohm terminated measurement of 600 kHz at -50 dBm.
- 4 Connect the STE to the LINE IN or SP TRMTG LINE IN TRK jack in the MMX-2R transmitting bay [patch (1), Fig. 1].
- 5 Connect the RTE to the appropriate **FROM MMX-2R** jack in the WLEL bay [patch (2), Fig. 1].

**Note:** Jack designations in a WLEL bay are not the same for all radio systems. Refer to office layout records for jack designation.

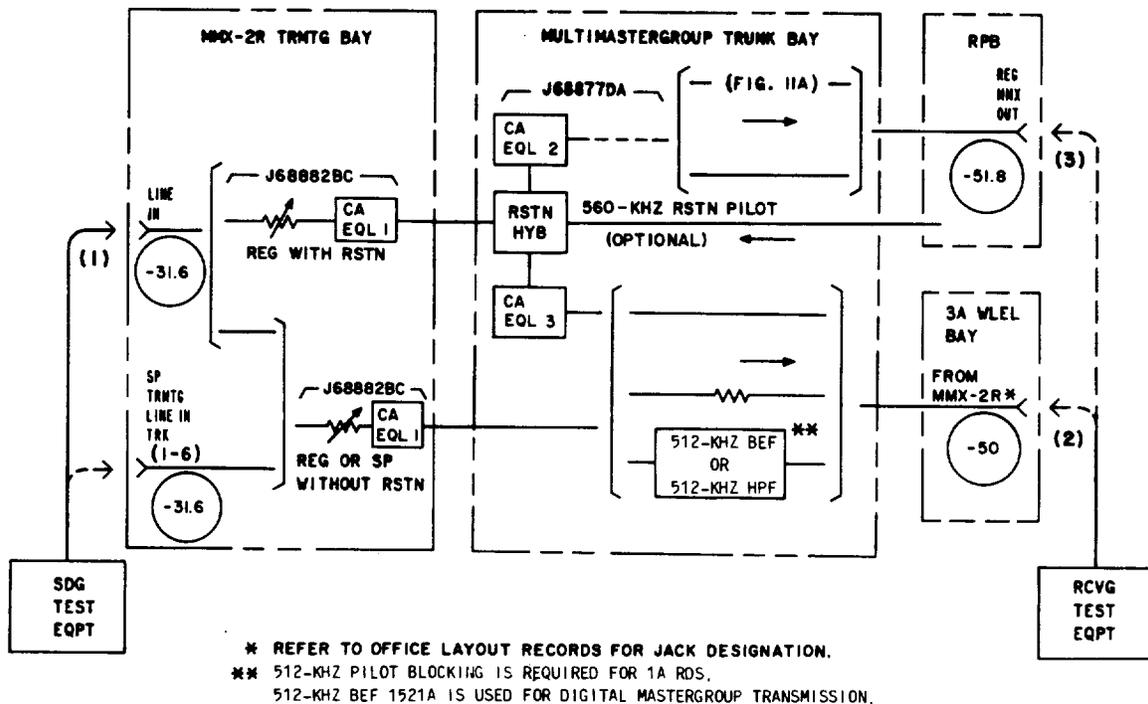


Fig. 1 — Transmitting Regular or Spare Radio Trunk Without Mastergroup Branching

## CHART 1 (Contd)

STEP	PROCEDURE
6	Measure and record the power at the jack.  <b>Requirement:</b> $-50.0 \text{ dBm} \pm 0.5 \text{ dB}$
7	Proceed to Step 9 for a regular mastergroup bank trunk circuit <i>with</i> restoration if the requirement of Step 6 is met, or proceed to Step 19 for a regular or spare trunk circuit <i>without</i> restoration. Otherwise, adjust the appropriate attenuator controls on the J68882BC panel in the MMX-2R transmitting bay to meet the requirement.  <b>Note:</b> ♦Trunk equalizer panel J68882BC serves six transmitting or receiving trunks. Attenuator and equalizer controls are provided on both the front and rear of the panel.♦
8	Continue signal tracing, if the requirement <i>cannot</i> be met, to locate and clear the trouble. Then repeat Steps 2 through 7.  <b>Note:</b> Chart 11 is a procedure for checking the cable equalizer in the J68882BC panel.
9	Remove patch (2), Fig. 1.
10	Connect the RTE to the REG MMX OUT jack in the restoration patch bay [patch (3), Fig. 1]
11	Measure and record the power at the REG MMX OUT jack.  <b>Requirement:</b> $-51.8 \text{ dBm} \pm 0.5 \text{ dB}$
12	Proceed to Step 14 if the requirement is met. Otherwise, adjust the appropriate CKT ( ) ATTEN controls on the J68877DA panel in the multimastergroup trunk bay to meet the requirement.  <b>Note:</b> Attenuator controls for the two trunk circuits in a J68877DA panel are designated CKT 1 ATTEN and CKT 2 ATTEN.
13	Proceed to Step 14 if the requirement of Step 11 is met. Otherwise, continue signal tracing to locate and clear the trouble. Then repeat Steps 10 through 12, as required.  <b>Note 1:</b> A zero-loss trunk (Fig. 9A) may be used in conjunction with this trunk. In this case, the zero-loss trunk should be tested as prescribed in Chart 9A. The zero-loss trunk is indicated in Fig. 1 by the designation Fig. 9A.  <b>Note 2:</b> Chart 10 is a procedure for checking the 263A amplifier provided in earlier J68877DA panels.  <b>Note 3:</b> Chart 11 is a procedure for checking the cable equalizers in the J68877DA and J68882BC panels.
14	Proceed to Step 15 for a trunk with optional 560-kHz restoration pilot input from restoration patch bay. Otherwise, proceed to Step 19.

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**CHART 1 (Contd)**


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STEP	PROCEDURE
15	Apply a steady 560-kHz restoration pilot signal to the trunk under test.  <b>Note:</b> Turn switch on 560-kHz supply panel to STDY. Turn appropriate switch to vertical position to apply the 560-kHz restoration pilot <i>or</i> patch from one of the 560-kHz SUPPLY jacks to the jack on the jack and indicator mounting for the trunk under test.
16	Measure the 560-kHz pilot power at the REG MMX OUT jack in the restoration patch bay.  <b>Requirement:</b> $-71.8 \text{ dBm} \pm 1.0 \text{ dB}$
17	Measure the 560-kHz pilot power at the <b>FROM MMX-2R</b> jack in the WLEL bay.  <b>Requirement:</b> $-70.0 \text{ dBm} \pm 1.0 \text{ dB}$
18	Restore all controls to normal at the restoration patch bay.
19	Remove all test equipment connected during testing.
20	Replace all plugs removed during testing.
21	Check that all front-panel indicators are normal at the restoration patch bay.

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**CHART 2****RECEIVING REGULAR OR SPARE RADIO TRUNK WITHOUT MASTERGROUP BRANCHING**

STEP	PROCEDURE
<b>Caution:</b> <i>This test cannot be performed on a trunk in service.</i>	
1	Remove the plug connecting the appropriate LINE OUT and TERM IN jacks for a regular mastergroup bank in the MMX-2R receiving bay.
2	Prepare the STE to produce a 600-kHz signal at $-10 \text{ dBm}$ .
3	Prepare the RTE for a 75-ohm terminated measurement of 600 kHz at $-25.2 \text{ dBm}$ .
4	Connect the STE to the appropriate <b>TO MMX-2R</b> jack in the WLEL bay [patch (1), Fig. 2].

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## CHART 2 (Contd)

STEP	PROCEDURE
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- Note:** Jack designations in a WLEL bay are not the same for all radio systems. Refer to office layout records for jack designation.
- 5 Connect the RTE to the LINE OUT or SP RCVG LINE OUT TRK jack in the MMX-2R receiving bay [patch (2), Fig. 2]
- 6 Measure and record the power at the LINE OUT or SP RCVG LINE OUT TRK jack.  
**Requirement:**  $-25.2 \text{ dBm} \pm 0.5 \text{ dB}$

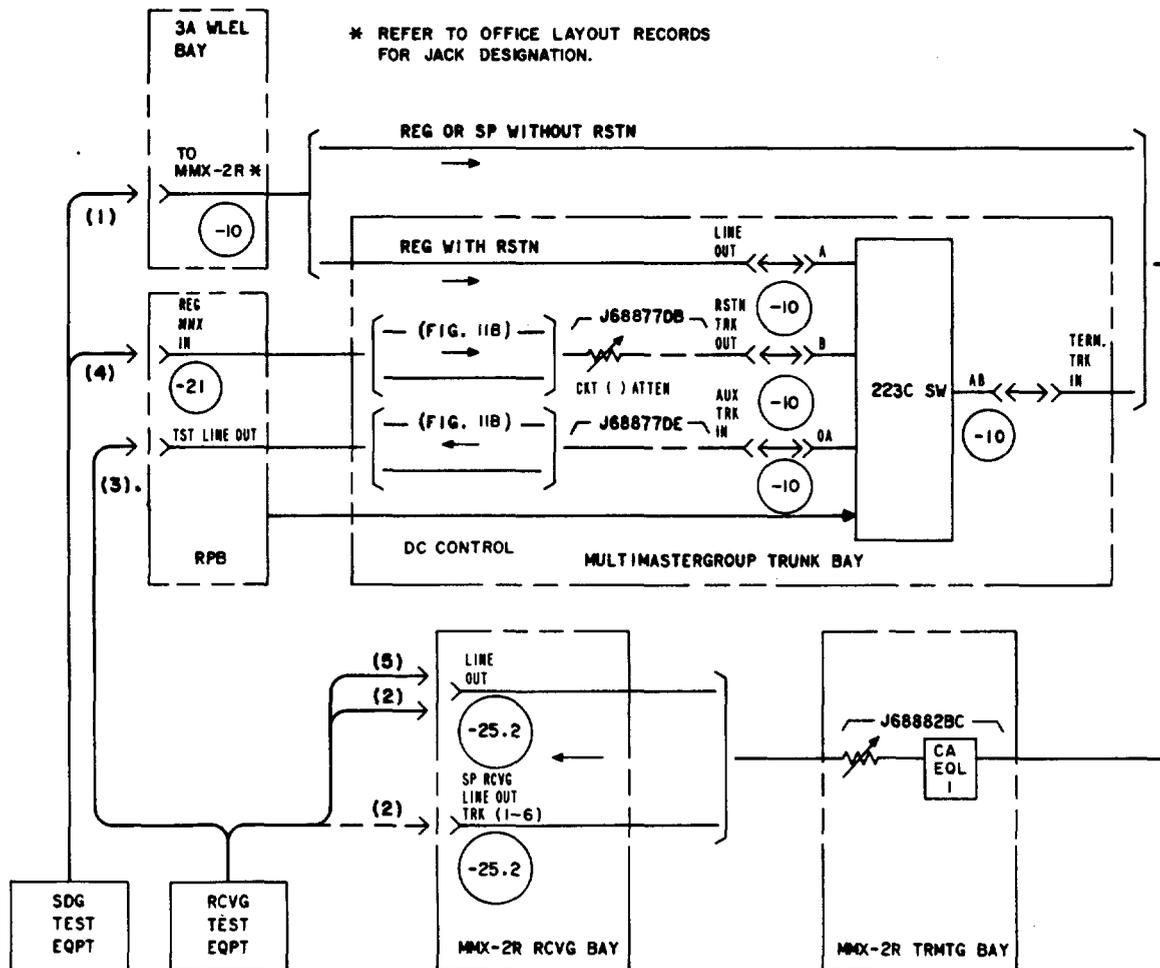


Fig. 2—Receiving Regular or Spare Radio Trunk Without Mastergroup Branching

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**CHART 2 (Contd)**


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STEP	PROCEDURE
7	<p>Proceed to Step 10 for a regular mastergroup bank trunk <i>with</i> restoration if the requirement of Step 6 is met, <i>or</i> proceed to Step 23 for a regular or spare trunk <i>without</i> restoration. Otherwise, adjust the appropriate attenuator controls on the J68882BC panel in the MMX-2R receiving bay to meet the requirement.</p> <p><b>Note:</b> Trunk equalizer panel J68882BC serves six transmitting or receiving trunks. Attenuator and equalizer controls are provided on both the front and rear of the panel.</p>
8	<p>Continue signal tracing, if the requirement <i>cannot</i> be met, to locate and clear the trouble. Then repeat Steps 2 through 7.</p> <p><b>Note:</b> Chart 11 is a procedure for checking the cable equalizer in a J68882BC panel.</p>
9	Remove patch (2), Fig. 2.
10	<p>Insert a plug in the appropriate REG MMX IN jack at the restoration patch bay.</p> <p><b>Note:</b> The associated 223C coaxial switch operates in the multimastergroup trunk bay. The appropriate RSTN SW OPR lamp lights on the receiving patch and test panel in the MMX-2R terminal.</p>
11	<p>Make patch (3), Fig. 2.</p> <p><b>Note:</b> The operated 223C switch completes a signal path between the A and OA jacks on the switch.</p>
12	<p>Measure the power at the TST LINE OUT jack in the restoration patch bay.</p> <p><b>Note:</b> This test checks the continuity of the trunk to the TST LINE OUT jack.</p> <p><b>Requirement:</b> Approximately -21 dBm</p>
13	<p>Proceed to Step 14 if the requirement is met. Otherwise, continue signal tracing to locate and clear the trouble. Then repeat Steps 10 through 12.</p> <p><b>Note 1:</b> Two zero-loss trunks (Fig. 9B) may be used in conjunction with this trunk. In this case, the zero-loss trunks should be tested as prescribed in Chart 9B. The zero-loss trunks are indicated in Fig. 2 by the designation Fig. 9B.</p> <p><b>Note 2:</b> Chart 11 is a procedure for checking the cable equalizers in the J68877DB, J68877DE, and J68882BC panels.</p>

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## CHART 2 (Contd)

STEP	PROCEDURE
14	Remove the plug from the REG MMX IN jack. <i>Note:</i> The 223C switch releases and the RSTN SW OPR lamp is extinguished.
15	Remove patches (1) and (3), Fig. 2.
16	Prepare the STE to produce a 600-kHz signal at -21 dBm.
17	Connect the STE to the REG MMX IN jack in the restoration patch bay [patch (4), (Fig. 2)]. <i>Note:</i> The 223C switch operates and the RSTN SW OPR lamp lights.
18	Connect the RTE to the LINE OUT jack in the MMX-2R receiving bay [patch (5), Fig. 2]. <i>Note:</i> The operated 223C switch completes a signal path between the B and AB jacks on the switch.
19	Measure and record the power at the LINE OUT jack. <i>Requirement:</i> -25.2 dBm $\pm$ 0.5 dB
20	Proceed to Step 22 if the requirement is met. Otherwise, adjust the appropriate CKT ( ) ATTEN controls on the J68877DB panel in the multimastergroup trunk bay to meet the requirement. <i>Note:</i> Attenuator controls for the two trunk circuits in a J68877DB panel are designated CKT 1 ATTEN and CKT 2 ATTEN.
21	Continue signal tracing, if the requirement of Step 19 <i>cannot</i> be met, to locate and clear the trouble. Then repeat Steps 17 through 20. <i>Note 1:</i> Chart 10 is a procedure for checking the 263A or 263C amplifier in a J68877DB panel. <i>Note 2:</i> See <i>Notes</i> in Step 13.
22	Remove all test equipment connected during testing. <i>Note:</i> The RSTN SW OPR lamp is extinguished.
23	Replace all plugs removed during testing.
24	Check that all front-panel indicators are normal at the restoration patch bay.

## CHART 3

## TRANSMITTING SPARE MASTERGROUP BANK RESTORATION TRUNK

STEP	PROCEDURE
	<p><b>Caution:</b> <i>This test cannot be performed on a trunk in service.</i></p>
1	Prepare the STE to produce a 600-kHz signal at $-25.1$ dBm.
2	Prepare the RTE for a 75-ohm terminated measurement of 600 kHz at $-51.8$ dBm.
3	Connect the STE to the AUX COMB IN jack of a spare transmitting mastergroup bank in the transmitting patch and test panel of the MMX-2R terminal [patch (1), Fig. 3].
4	Connect the RTE to the appropriate SP MMX OUT jack in the restoration patch bay [patch (2), Fig. 3].
5	Measure and record the power at the SP MMX OUT jack.
	<p><b>Requirement:</b> <math>-51.8</math> dBm <math>\pm 0.5</math> dB</p>
6	Proceed to Step 8 if the requirement is met. Otherwise, adjust the appropriate CKT ( ) ATTEN controls on the J68877DF panel in the multimastergroup trunk bay to meet the requirement.
	<p><b>Note:</b> Attenuator controls for the two trunk circuits in a J68877DF panel are designated CKT 1 ATTEN and CKT 2 ATTEN.</p>
7	Continue signal tracing, if the requirement of Step 5 <b>cannot</b> be met, to locate and clear the trouble. Then repeat Steps 1 through 6.
	<p><b>Note 1:</b> A zero-loss trunk (Fig. 9A) may be used in conjunction with this trunk. In this case, the zero-loss trunk should be checked as prescribed in Chart 9A. The zero-loss trunk is indicated in Fig. 3 by the designation Fig. 9A.</p>

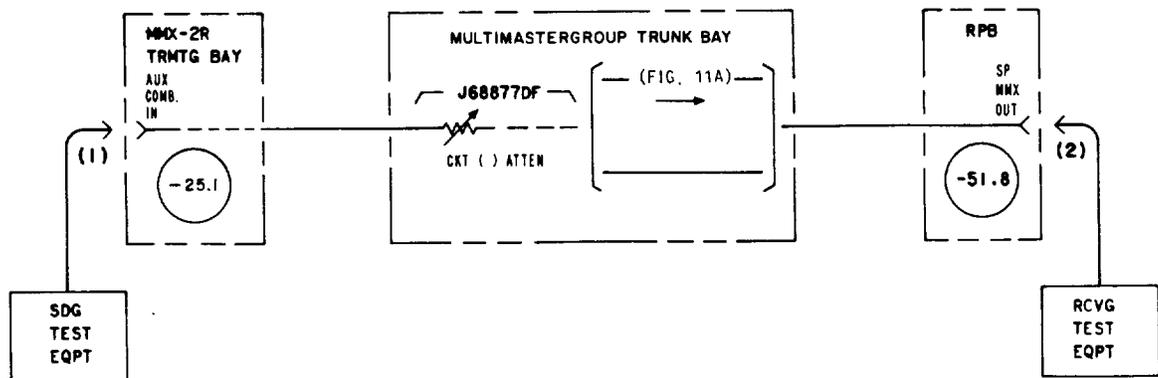


Fig. 3—Transmitted Spare Mastergroup Bank Restoration Trunk

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**CHART 3 (Contd)**


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STEP	PROCEDURE
	<b>Note 2:</b> Chart 11 is a procedure for checking the cable equalizer in a J68877DF panel.
8	Remove all test equipment connected during testing.
9	Replace all plugs removed during testing.
10	Check that all front-panel indicators are normal at the restoration patch bay and at the MMX-2R terminal.

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**CHART 4****RECEIVING SPARE MASTERGROUP BANK RESTORATION TRUNK**

STEP	PROCEDURE
	<b>Caution:</b> <i>This test cannot be performed on a trunk in service.</i>
1	Remove the plug connecting the RSTN TRK OUT and RSTN SW IN jacks on the receiving patch and test panel in the MMX-2R terminal.
2	Prepare the STE to produce a 600-kHz signal at -21 dBm.
3	Prepare the RTE for a 75-ohm terminated measurement of 600 kHz at -25.2 dBm.
4	Connect the STE to the SP MMX IN jack in the restoration patch bay [patch (1), Fig. 4].
	<b>Note:</b> The associated RSTN SW OPR lamp lights on the patch and test panel in the MMX-2R receiving bay when the plug is inserted in the SP MMX IN jack at the restoration patch bay.
5	Connect the RTE to the RSTN TRK OUT jack [patch (2), Fig. 4].
6	Measure and record the power at the RSTN TRK OUT jack.
	<b>Requirement:</b> -25.2 dBm $\pm$ 0.5 dB
7	Proceed to Step 9 if the requirement is met. Otherwise, adjust the appropriate CKT ( ) ATTEN controls on the J68877DG panel in the multimastergroup trunk bay to meet the requirement.
	<b>Note:</b> Attenuator controls for the two trunk circuits in a J68877DG panel are designated CKT 1 ATTEN and CKT 2 ATTEN.

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## CHART 4 (Contd)

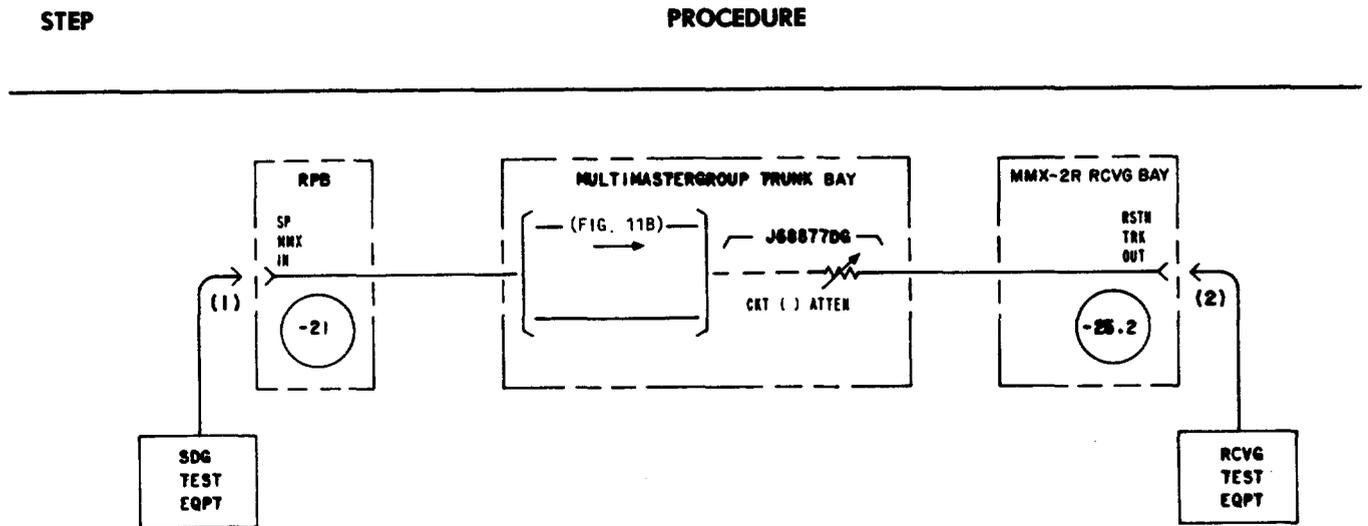


Fig. 4—Receiving Spare Mastergroup Bank Restoration Trunk

- 8 Continue signal tracing, if the requirement of Step 6 *cannot* be met, to locate and clear the trouble. Then repeat Steps 2 through 7.

**Note 1:** A zero-loss trunk (Fig. 9B) may be used in conjunction with this trunk. In this case, the zero-loss trunk should be tested as prescribed in Chart 9B. The zero-loss trunk is indicated in Fig. 4 by the designation Fig. 9B.

**Note 2:** Chart 10 is a procedure for checking the 263A or 263C amplifier in a J68877DG panel.

**Note 3:** Chart 11 is a procedure for checking the cable equalizer in a J68877DG panel.

- 9 Remove all test equipment connected during testing.
- 10 Replace all plugs removed during testing.
- 11 Check that all front-panel indicators are normal at the restoration patch bay and at the MMX-2R terminal.

## CHART 5

## TRANSMITTING REGULAR OR SPARE RADIO TRUNK FOR MASTERGROUP BRANCHING

STEP	PROCEDURE
	<b>Caution:</b> <i>This test cannot be performed on a trunk in service.</i>
1	Remove the plug connecting the appropriate TERM OUT and LINE IN jacks for a regular mastergroup bank on the transmitting patch and test panel in the MMX-2R terminal.
2	Prepare the STE to produce a 600-kHz signal at $-31.6$ dBm.
3	Prepare the RTE for a 75-ohm terminated measurement of 600 kHz at $-46.8$ dBm.
4	Connect the STE to the LINE IN or the SP TRMTG LINE IN TRK jack in the MMX-2R transmitting bay [patch (1), Fig. 5].
5	Connect the RTE to the MMX OUT jack in the line branching/mastergroup combining bay [patch (2), Fig. 5].
6	Measure and record the power at the MMX OUT jack.
	<b>Requirement:</b> $-43.6$ dBm $\pm 0.5$ dB
	<b>Note:</b> In earlier equipment, now manufacture discontinued, the line branching/mastergroup combining panel does <i>not</i> include hybrid T5, and a 3.2-dB cable pad is provided adjacent to the J68882BC panel in the MMX-2R transmitting bay. In this case, the requirement is $-46.8$ dBm $\pm 0.5$ dB.
7	Proceed to Step 9 if the requirement is met. Otherwise, adjust the appropriate attenuator controls on the J68882BC panel in the MMX-2R transmitting bay to meet the requirement.
8	Continue signal tracing, if the requirement of Step 6 <i>cannot</i> be met, to locate and clear the trouble. Then repeat Steps 2 through 7.
9	Remove all test equipment connected during testing.

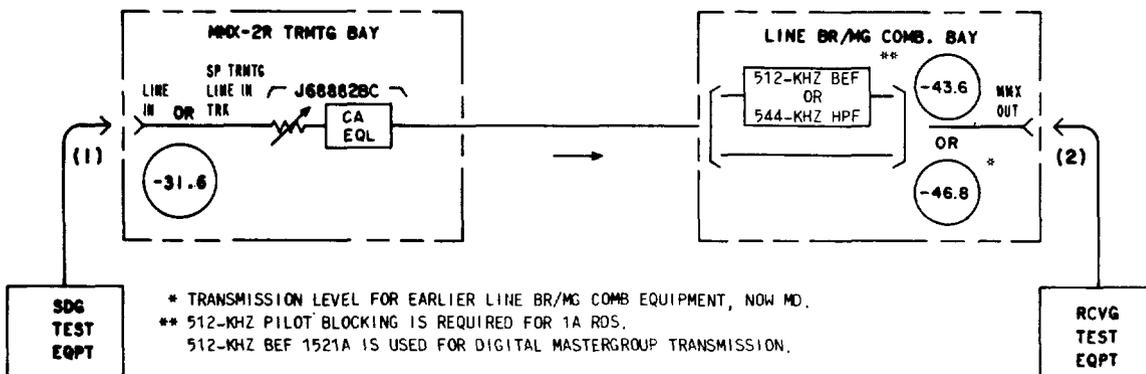


Fig. 5—Transmitting Regular or Spare Radio Trunk for Mastergroup Branching

## CHART 5 (Contd)

STEP	PROCEDURE
10	Replace all plugs removed during testing.
11	Check that all front-panel indicators are normal at the MMX-2R terminal.

## CHART 6

## RECEIVING REGULAR OR SPARE RADIO TRUNK FOR MASTERGROUP BRANCHING

STEP	PROCEDURE
<b>Caution:</b> <i>This test cannot be performed on a trunk in service.</i>	
1	Remove the plug connecting the appropriate LINE OUT and TERM IN jacks for a regular mastergroup bank on the receiving patch and test panel in the MMX-2R terminal.
2	Prepare the STE to produce a 600-kHz signal at $-16.8$ dBm. <b>Note:</b> ♦Use a test signal at $-17.4$ dBm (Fig. 6) if the 2.048-MHz reference frequency is received on the trunk under test.♦
3	Prepare the RTE for a 75-ohm terminated measurement of 600 kHz at $-25.2$ dBm.
4	Connect the sending test equipment to the MMX IN jack in the line branching/mastergroup combining bay [patch (1), Fig. 6].
5	Connect the RTE to the LINE OUT or SP RCVG LINE OUT TRK jack in the MMX-2R receiving bay [patch (2), Fig. 6].

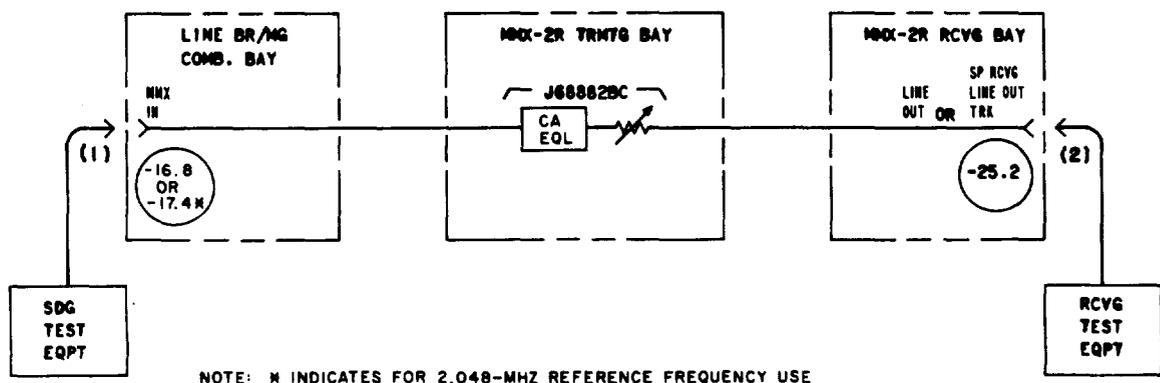


Fig. 6—♦Receiving Regular or Spare Radio Trunk for Mastergroup Branching♦

## CHART 6 (Contd)

STEP	PROCEDURE
6	Measure and record the power at the LINE OUT or SP RCVG LINE OUT TRK jack. <b>Requirement:</b> $-25.2 \text{ dBm} \pm 0.5 \text{ dB}$
7	Proceed to Step 9 if the requirement is met. Otherwise, adjust the appropriate attenuator controls on the J68882BC panel in the MMX-2R transmitting bay to meet the requirement.
8	Continue signal tracing, if the requirement of Step 6 <i>cannot</i> be met, to locate the trouble. Then repeat Steps 2 through 7.
9	Remove all test equipment connected during testing.
10	Replace all plugs removed during testing.
11	Check that all front-panel indicators are normal at the MMX-2R terminal.

## CHART 7

## TRANSMITTING RESTORATION TRUNK FOR MASTERGROUP BRANCHING

STEP	PROCEDURE
	<b>Caution:</b> <i>This test cannot be performed on a trunk in service.</i>
1	Prepare the STE to produce a 600-kHz signal at $-50 \text{ dBm}$ .
2	Prepare the RTE for a 75-ohm terminated measurement of 600 kHz at $-51.8 \text{ dBm}$ .
3	Connect the STE to the RSTN TRK IN jack in the line branching/mastergroup combining bay [patch (1), Fig. 7].
4	Connect the RTE to the appropriate MMX OUT jack in the restoration patch bay [patch (2), Fig. 7].
5	Measure and record the power at the MMX OUT jack. <b>Requirement:</b> $-51.8 \text{ dBm} \pm 0.5 \text{ dB}$
6	Proceed to Step 8 if the requirement is met. Otherwise, adjust the appropriate CKT ( ) ATTEN controls on the J68877DA panel in the multimastergroup trunk bay to meet the requirement.

## CHART 7 (Contd)

STEP	PROCEDURE
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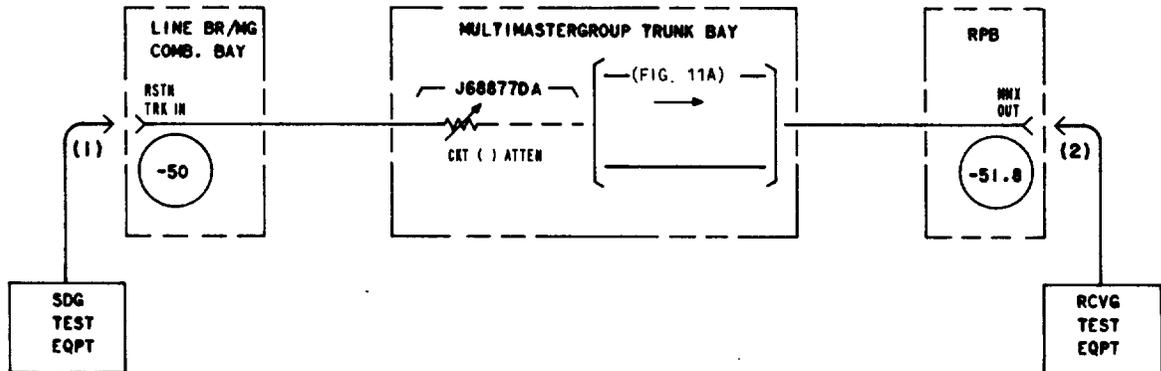


Fig. 7—Transmitting Restoration Trunk for Mastergroup Branching

**Note:** Attenuator controls for the two trunk circuits in a J68877DA panel are designated CKT 1 ATTEN and CKT 2 ATTEN.

- 7 Continue signal tracing, if the requirement of Step 5 *cannot* be met, to locate and clear the trouble. Then repeat Steps 1 through 6.

**Note 1:** A zero-loss trunk (Fig. 9A) may be used in conjunction with this trunk. In this case, the zero-loss trunk should be tested as prescribed in Chart 9A. The zero-loss trunk is indicated in Fig. 7 by the designation Fig. 9A.

**Note 2:** Chart 10 is a procedure for checking the 263A or 263C amplifier in a J68877DA panel.

**Note 3:** Chart 11 is a procedure for checking the cable equalizer in a J68877DA panel.

- 8 Remove all test equipment connected during testing.
- 9 Replace all plugs removed during testing.
- 10 Check that all front-panel indicators are normal at the restoration patch bay.

## CHART 8

## RECEIVING RESTORATION TRUNK FOR MASTERGROUP BRANCHING

## STEP PROCEDURE

**Caution:** This test cannot be performed on a trunk in service.

- 1 Prepare the STE to produce a 600-kHz signal at -10 dBm.
- 2 Prepare the RTE for a 75-ohm terminated measurement of 600 kHz at -10 dBm.
- 3 Connect the STE to the appropriate **TO LINE BR/MG COMB BAY** jack in the WLEL bay [patch (1), Fig. 8].

**Note:** Jack designations in a WLEL bay are not the same for all radio systems. Refer to office layout records for jack designation.

- 4 Connect the RTE to the WLEL OUT jack in the line branching/mastergroup combining bay [patch (2), Fig. 8].
- 5 Measure and record the power at the WLEL OUT jack.

**Requirement:** -10.0 dBm  $\pm$ 0.5 dB

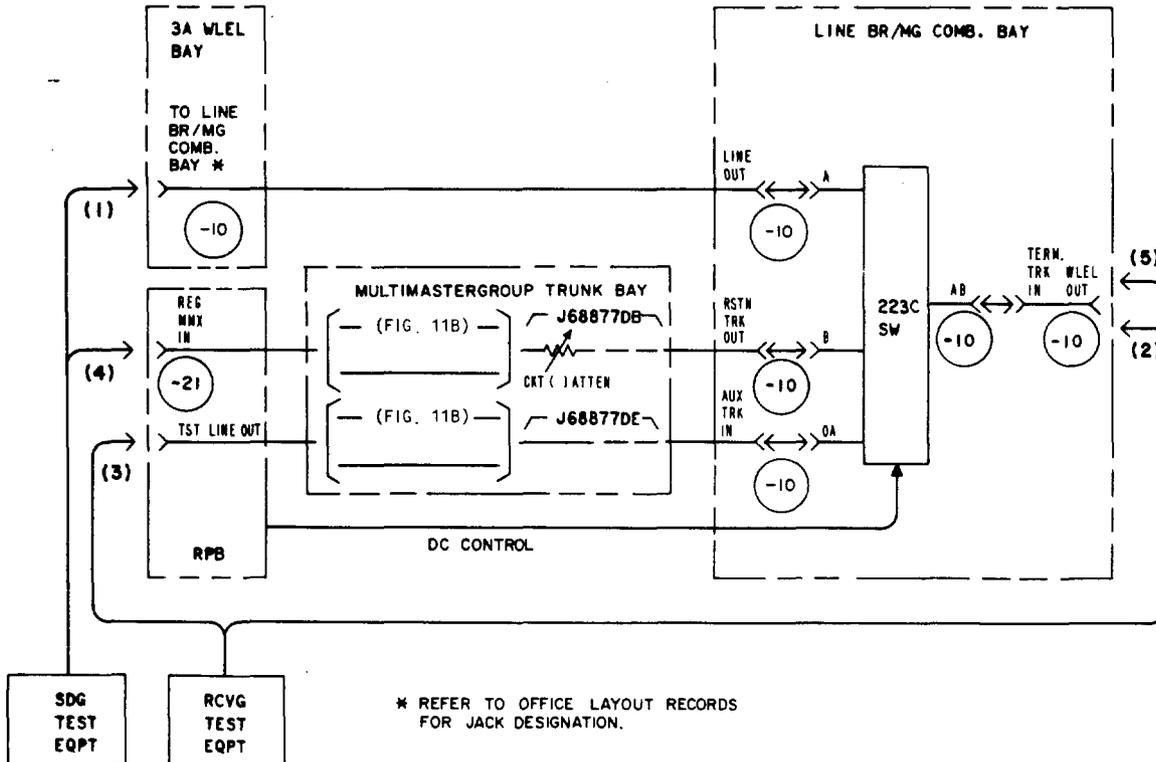


Fig. 8—Receiving Restoration Trunk for Mastergroup Branching

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**CHART 8 (Contd)**


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STEP	PROCEDURE
6	Proceed to Step 7 if the requirement is met. Otherwise, continue signal tracing to locate and clear the trouble. Then repeat Steps 1 through 5.
7	Remove patch (2), Fig. 8.
8	Insert a plug in the appropriate REG MMX IN jack at the restoration patch bay. <b>Note:</b> The associated 223C coaxial switch operates in the line branching/mastergroup combining bay.
9	Make patch (3), Fig. 8. <b>Note:</b> The operated 223C switch completes a signal path between the A and OA jacks on the switch.
10	Measure the power at the TST LINE OUT jack in the restoration patch bay. <b>Note:</b> This test checks the continuity of the trunk to the TST LINE OUT jack. <b>Requirement:</b> Approximately $-21$ dBm
11	Proceed to Step 12 if the requirement is met. Otherwise, continue signal tracing to locate and clear the trouble. Then repeat Steps 8 through 10. <b>Note 1:</b> Two zero-loss trunks (Fig. 9B) may be used in conjunction with this trunk. In this case, the zero-loss trunks should be tested as prescribed in Chart 9B. The zero-loss trunks are indicated in Fig. 8 by the designation Fig. 9B. <b>Note 2:</b> Chart 11 is a procedure for checking the cable equalizers in the J68877DB and J68877DE panels.
12	Remove the plug from the REG MMX IN jack. <b>Note:</b> The 223C switch releases.
13	Remove patches (1) and (3), Fig. 8.
14	Prepare the STE to produce a 600-kHz signal at $-21$ dBm.
15	Connect the STE to the REG MMX IN jack in the restoration patch bay [patch (4), Fig. 8]. <b>Note:</b> The 223C switch operates.
16	Connect the RTE to the WLEL OUT jack in the line branching/mastergroup combining bay [patch (5), Fig. 8]. <b>Note:</b> The operated 223C switch completes a signal path between the B and AB jacks on the switch.

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## CHART 8 (Contd)

STEP	PROCEDURE
17	<p>Measure the power at the WLEL OUT jack.</p> <p><b>Requirement:</b> <math>-10.0 \text{ dBm} \pm 0.5 \text{ dB}</math></p>
18	<p>Proceed to Step 20 if the requirement is met. Otherwise, adjust the appropriate CKT ( ) ATTEN controls on the J68877DB panel in the multimastergroup trunk bay to meet the requirement.</p> <p><b>Note:</b> Attenuator controls for the two trunk circuits in a J68877DB panel are designated CKT 1 ATTEN and CKT 2 ATTEN.</p>
19	<p>Continue signal tracing, if the requirement of Step 17 <b>cannot</b> be met, to locate and clear the trouble. Then repeat Steps 15 through 18.</p> <p><b>Note 1:</b> Chart 10 is a procedure for checking the 263A or 263C amplifier in a J68877DB panel.</p> <p><b>Note 2:</b> See <i>Notes</i> in Step 11.</p>
20	Remove all test equipment connected during testing.
21	Replace all plugs removed during testing.
22	Check that all front-panel indicators are normal at the restoration patch bay.

## CHART 9

## TRANSMITTING AND RECEIVING TRUNKS FOR MGTA

STEP	PROCEDURE
1	<p>Proceed to Part A to test a transmitting trunk or proceed to Part B to test a receiving trunk.</p> <p><b>A. Transmitting Trunks</b></p> <p><b>Caution:</b> <i>This test cannot be performed on a trunk in service.</i></p>
2	Prepare the STE to produce a 600-kHz signal at $-31.6 \text{ dBm}$ .
3	Prepare the RTE for a 75-ohm terminated measurement of 600 kHz at $-50 \text{ dBm}$ .
4	Remove the cable plug connected to the appropriate TRMTG LINE jack in the MGTA bay.
5	Connect the STE to the plug removed from the TRMTG LINE jack in the MGTA bay [patch (1), Fig. 9].

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 CHART 9 (Contd)
 

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STEP	PROCEDURE
6	Connect the RTE to the appropriate <b>FROM MGTA</b> jack in the WLEL bay [patch (2), Fig. 9]. <b>Note:</b> Jack designations in a WLEL bay are not the same for all radio systems. Refer to office layout records for jack designation.
7	Measure and record the power at the jack. <b>Requirement:</b> $-50.0 \text{ dBm} \pm 0.5 \text{ dB}$
8	Proceed to Step 10 for a regular mastergroup bank trunk circuit <b>with</b> restoration if the requirement of Step 7 is met, or proceed to Step 20 for a regular or spare trunk circuit <b>without</b> restoration. Otherwise, adjust the appropriate attenuator controls on the J68953AH panel in the MGTA bay to meet the requirement. <b>Note:</b> Multimastergroup radio trunk panel J68953AH serves four transmitting and four receiving trunks. Attenuator and equalizer controls are provided on both the front and rear of the panel.
9	Continue signal tracing, if the requirement <b>cannot</b> be met, to locate and clear the trouble. Then repeat Steps 2 through 8. <b>Note:</b> Chart 12 is a procedure for checking the cable equalizer in the J68953AH panel.
10	Remove patch (2), Fig. 9.
11	Connect the RTE to the REG MMX OUT jack in the restoration patch bay [patch (3), Fig. 9].
12	Measure and record the power at the REG MMX OUT jack. <b>Requirement:</b> $-51.8 \text{ dBm} \pm 0.5 \text{ dB}$
13	Proceed to Step 15 if the requirement is met. Otherwise, adjust the appropriate CKT ( ) ATTEN controls on the J68877DA panel in the multimastergroup trunk bay to meet the requirement. <b>Note:</b> Attenuator controls for the two trunk circuits in a J68877DA panel are designated CKT 1 ATTEN and CKT 2 ATTEN.
14	Proceed to Step 15 if the requirement of Step 12 is met. Otherwise, continue signal tracing to locate and clear the trouble. Then repeat Steps 11 through 13, as required. <b>Note 1:</b> A zero-loss trunk (Fig. 11A) may be used in conjunction with this trunk. In this case, the zero-loss trunk should be tested as prescribed in Chart 10A. The zero-loss trunk is indicated in Fig. 9 by the designation Fig. 11A.

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## CHART 94(Contd)

## STEP

## PROCEDURE

- Note 2:** Chart 11 is a procedure for checking the 263A or 263C amplifier provided in earlier J68877DA panels.
- Note 3:** Chart 12 is a procedure for checking the cable equalizers in the J68877DA and J68953AH panels.
- 15 Proceed to Step 16 for a trunk with optional 560-kHz restoration pilot input from restoration patch bay. Otherwise, proceed to Step 20.
- 16 Apply a steady 560-kHz restoration pilot signal to the trunk under test.
- Note:** Turn switch on 560-kHz supply panel to STDY. Turn appropriate switch to vertical position to apply the 560-kHz restoration pilot *or* patch from one of the 560-kHz SUPPLY jacks to the jack on the jack and indicator mounting for the trunk under test.
- 17 Measure the 560-kHz pilot power at the REG MMX OUT jack in the restoration patch bay.
- Requirement:**  $-71.8 \text{ dBm} \pm 1.0 \text{ dB}$
- 18 Measure the 560-kHz pilot power at the **FROM MGTA** jack in the WLEL bay.
- Requirement:**  $-70.0 \text{ dBm} \pm 1.0 \text{ dB}$
- 19 Restore all controls to normal at the restoration patch bay.
- 20 Remove all test equipment connected during testing.
- 21 Reconnect the cable to the TRMTG LINE jack and replace all plugs removed during testing.
- 22 Check that all front-panel indicators are normal at the restoration patch bay.
- B. Receiving Trunks**
- Caution:** *This test cannot be performed on a trunk in service.*
- 23 Prepare the STE to produce a 600-kHz signal at  $-10 \text{ dBm}$ .
- 24 Prepare the RTE for a 75-ohm terminated measurement of 600 kHz at  $-25.2 \text{ dBm}$ .
- 25 Remove the cable plug connected to the appropriate RCVG LINE jack in the MGTA bay.
- 26 Connect the STE to the appropriate **TO MGTA** jack in the WLEL bay [patch (1), Fig. 10].
- Note:** Jack designations in a WLEL bay are not the same for all radio systems. Refer to office layout records for jack designation.

## ◆CHART 9◆(Contd)

STEP	PROCEDURE
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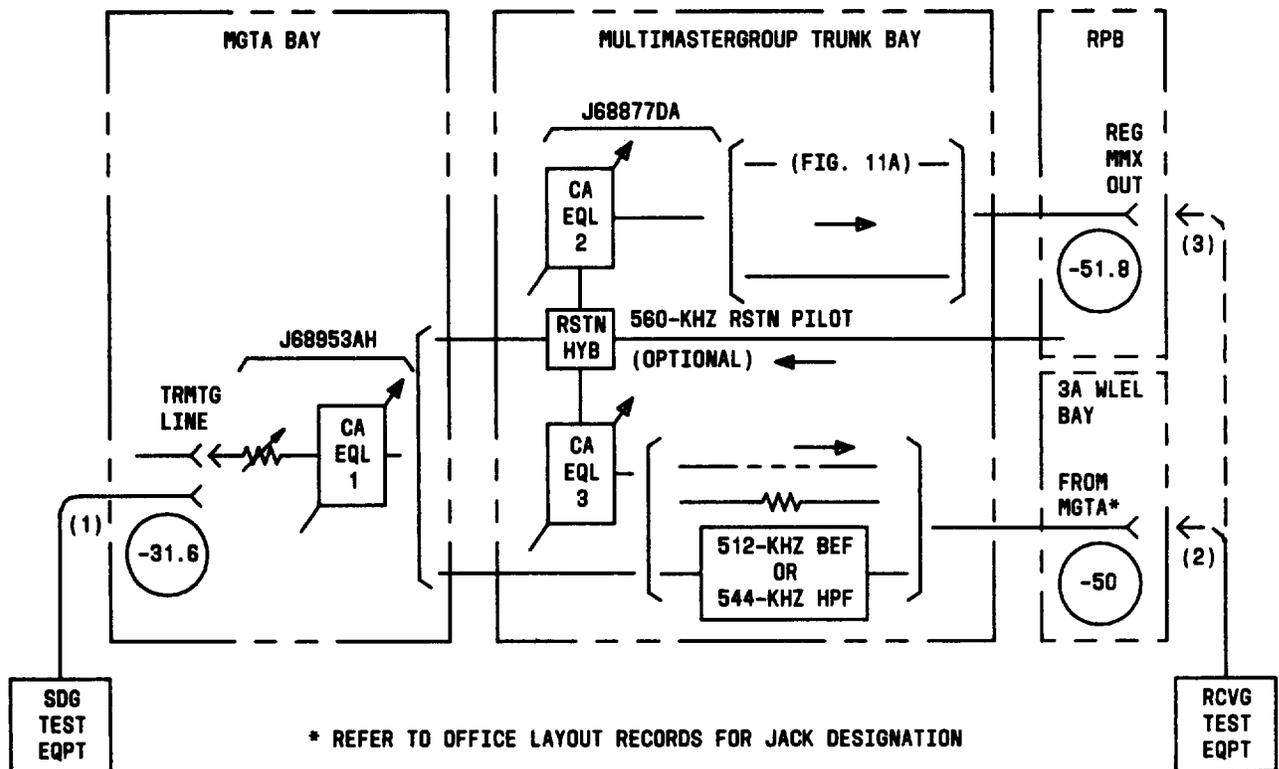


Fig. 9—◆Transmitting Trunks for MGTA◆

- 27 Connect the RTE to the plug removed from the RCVG LINE jack in the MGTA bay [patch (2), Fig. 10].
- 28 Measure and record the power at the plug.  
**Requirement:**  $-25.2 \text{ dBm} \pm 0.5 \text{ dB}$
- 29 Proceed to Step 32 for a regular mastergroup bank trunk **with** restoration if the requirement is met, **or** proceed to Step 45 for a regular or spare trunk **without** restoration. Otherwise, adjust the appropriate attenuator controls on the J68953AH panel in the MGTA bay to meet the requirement.  
**Note:** Multimastergroup radio trunk panel J68953AH serves four transmitting and four re-

## CHART 94(Contd)

STEP	PROCEDURE
	ceiving trunks. Attenuator and equalizer controls are provided on both the front and rear of the panel.
30	Continue signal tracing, if the requirement <i>cannot</i> be met, to locate and clear the trouble. Then repeat Steps 23 through 29.  <b>Note:</b> Chart 12 is a procedure for checking the cable equalizer in a J68953AH panel.
31	Remove patch (2), Fig. 10
32	Insert a plug in the appropriate REG MMX IN jack at the restoration patch bay.  <b>Note:</b> The associated 223C coaxial switch operates in the multimastergroup trunk bay.
33	Make patch (3), Fig. 10.  <b>Note:</b> The operated 223C switch completes a signal path between the A and 0A jacks on the switch.
34	Measure the power at the TST LINE OUT jack in the restoration patch bay.  <b>Requirement:</b> Approximately -21 dBm  <b>Note:</b> This test checks the continuity of the trunk to the TST LINE OUT jack.
35	Proceed to Step 36 if the requirement is met. Otherwise, continue signal tracing to locate and clear the trouble. Then repeat Steps 32 through 34.  <b>Note 1:</b> Two zero-loss trunks (Fig. 11B) may be used in conjunction with this trunk. In this case, the zero-loss trunks should be tested as prescribed in Chart 10B. The zero-loss trunks are indicated in Fig. 10 by the designation Fig. 11B.  <b>Note 2:</b> Chart 12 is a procedure for checking the cable equalizers in the J68877DB, J68877DE, and J68953AH panels.
36	Remove the plug from the REG MMX IN jack.  <b>Note:</b> The 223C switch releases.
37	Remove patches (1) and (3), Fig. 10.
38	Prepare the STE to produce a 600-kHz signal at -21 dBm.
39	Connect the STE to the REG MMX IN jack in the restoration patch bay [patch (4), Fig. 10].

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**CHART 94(Contd)**


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STEP	PROCEDURE
	<p><b>Note:</b> The 223C switch operates.</p>
40	<p>Connect the RTE to the plug removed from the RCVG LINE jack in the MGTA bay [patch (2), Fig. 10].</p> <p><b>Note:</b> The operated 223C switch completes a signal path between B and AB jacks on the switch.</p>
41	<p>Measure and record the power at the plug.</p> <p><b>Requirement:</b> <math>-25.2 \text{ dBm} \pm 0.5 \text{ dB}</math></p>
42	<p>Proceed to Step 44 if the requirement is met. Otherwise, adjust the appropriate CKT ( ) ATTEN controls on the J68877DB panel in the multimastergroup trunk bay to meet the requirement.</p> <p><b>Note:</b> Attenuator controls for the two trunk circuits in a J68877DB panel are designated CKT 1 ATTEN and CKT 2 ATTEN.</p>
43	<p>Continue signal tracing, if the requirement of Step 41 <b>cannot</b> be met, to locate and clear the trouble. Then repeat Steps 39 through 42.</p> <p><b>Note 1:</b> Chart 11 is a procedure for checking the 263A or 263C amplifier in a J68877DB panel.</p> <p><b>Note 2:</b> See <b>Notes</b> in Step 35.</p>
44	<p>Remove all test equipment connected during testing.</p>
45	<p>Reconnect the cable to the RCVG LINE jack and replace all plugs removed during testing.</p>
46	<p>Check that all front-panel indicators are normal at the restoration patch bay.</p>

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\* REFER TO OFFICE LAYOUT RECORDS FOR JACK DESIGNATION

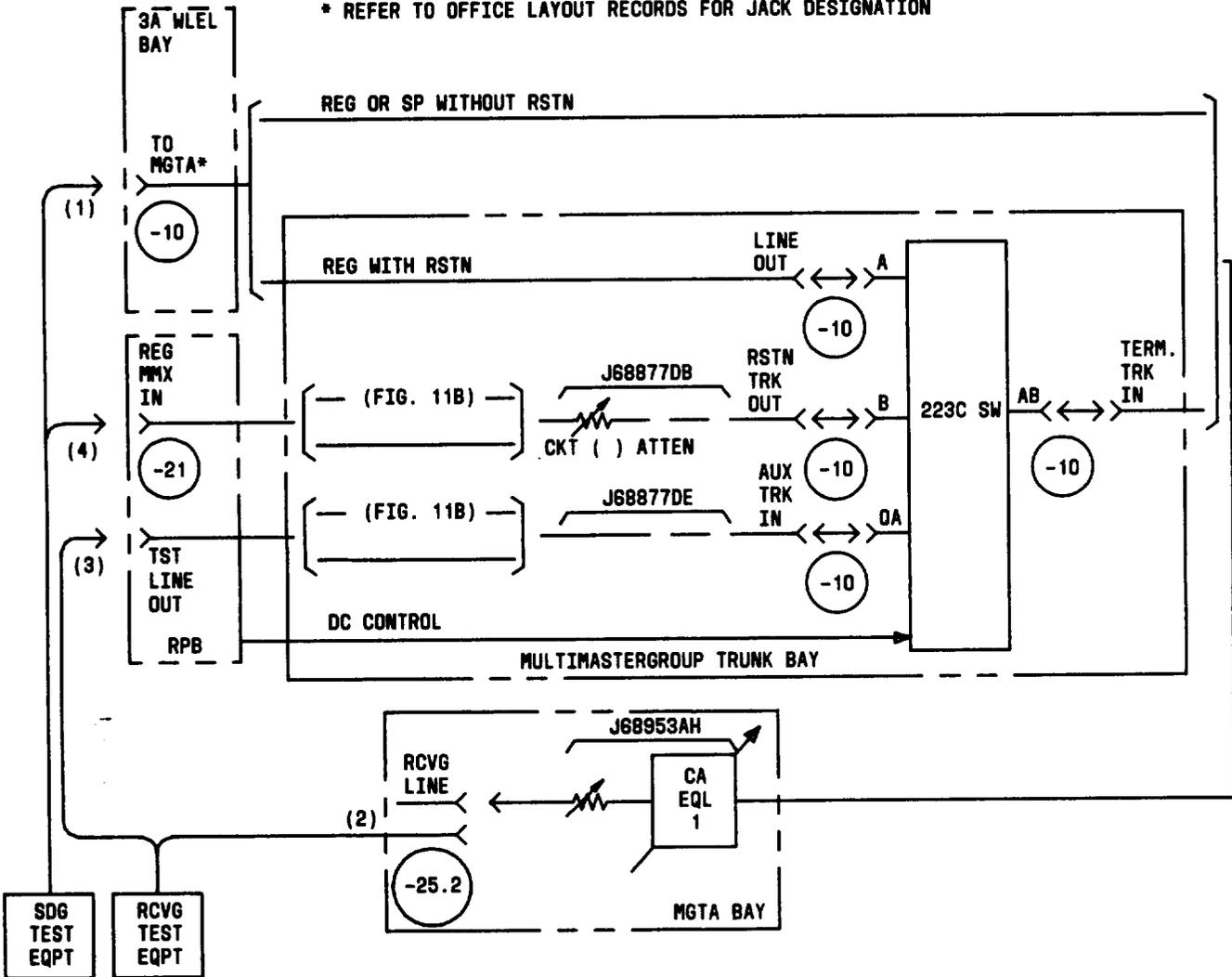


Fig. 10—Receiving Trunks for MGTA

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**CHART 10**  
**ZERO-LOSS TRUNKS**

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STEP	PROCEDURE
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**Caution:** *This test cannot be performed on a trunk in service.*

**A. Low-Level Trunk**

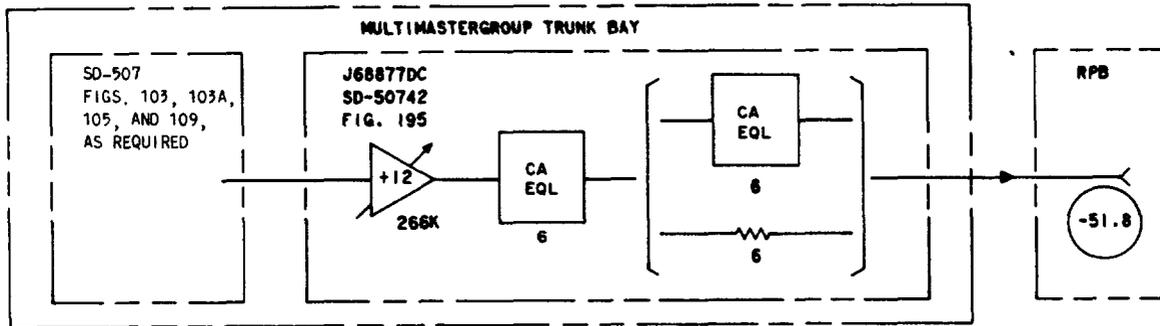
**Note:** Figure 11A is a simplified schematic of a low-level zero-loss trunk. This trunk can be used with the trunks tested in Charts 1, 3, 7, and 9A of this section.

- 1 Locate the panel containing the trunk to be tested.  
  
**Note:** ♦Low-level zero-loss trunk panels J68877DC for MMX-2R are located in the multimastergroup trunk bay and are stamped MMX-2 TRMTG ZERO LOSS TRK. Zero-loss trunk panels J68953AJ for MGTA are located in the MGTA bay.♦
  - 2 Remove the four screws holding this panel in the bay.
  - 3 Withdraw the panel until the coaxial connectors on the amplifiers can be reached.
  - 4 Remove the coaxial connector from the IN connection on the 266K amplifier in the trunk to be tested.
  - 5 Prepare the STE to produce a 600-kHz signal at  $-51.8$  dBm.
  - 6 Prepare the RTE for a 75-ohm terminated measurement of 600 kHz at  $-51.8$  dBm.
  - 7 Connect the STE to the IN connector on the 266K amplifier.
  - 8 Connect the RTE to the appropriate jack in the restoration patch bay.
  - 9 Measure and record the power at the restoration patch bay jack.  
  
**Requirement:**  $-51.8$  dBm  $\pm 0.5$  dB
  - 10 Proceed to Step 12 if the requirement of Step 9 is met. Otherwise, adjust the amplifier gain to meet the requirement.  
  
**Note:** ♦Amplifier gain controls for the four trunk circuits in a J68877DC panel are located at the front. Amplifier gain controls for the four trunk circuits in a J68953AJ panel are located at the rear.♦
  - 11 Continue signal tracing, if the requirement of Step 9 **cannot** be met, to locate and clear the trouble. Then repeat Steps 5 through 10.
-

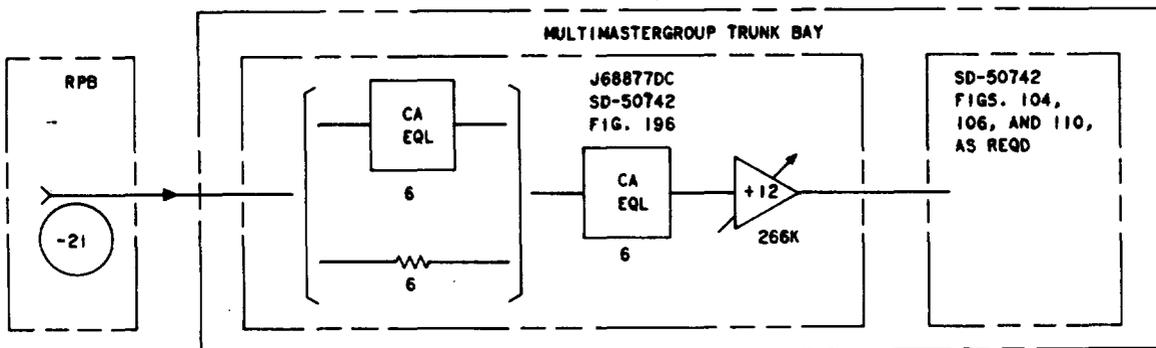
## CHART 10 (Contd)

STEP

PROCEDURE



A - LOW-LEVEL ZERO-LOSS TRUNK CIRCUIT



B - HIGH-LEVEL ZERO-LOSS TRUNK CIRCUIT

Fig. 11—Zero-Loss Trunks

**Note:** Chart 12 is a procedure for checking the cable equalizer(s) in the panel.

- 12 Remove all test equipment connected during testing.
- 13 Replace the coaxial connector on the IN connector of the 266K amplifier.
- 14 Replace the four screws which hold the panel.
- 15 Continue with the test procedure in the appropriate chart.

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**CHART 10 (Contd)**


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STEP	PROCEDURE
	<p><b>B. High-Level Trunk</b></p> <p><b>Note:</b> Figure 11B is a simplified schematic of a high-level zero-loss trunk. This trunk can be used with the trunks tested in Charts 2, 4, 8, and 9B of this section.</p>
16	Locate the panel containing the trunk to be tested.
	<p><b>Note:</b> ♦High-level zero-loss trunk panels J68877DC for MMX-2R are located in the multimastergroup trunk bay and are stamped MMX-2 RCVG ZERO LOSS TRK. Zero-loss trunk panels J68953AJ for MGTA are located in the MGTA bay.♦</p>
17	Remove the four screws holding this panel in the bay.
18	Withdraw the panel until the coaxial connectors on the amplifiers can be reached.
19	Remove the coaxial connector from the OUT connection on the 266K amplifier in the trunk to be tested.
20	Prepare the STE to produce a 600-kHz signal at $-21$ dBm.
21	Prepare the RTE for a 75-ohm terminated measurement of 600 kHz at $-21$ dBm.
22	Connect the STE to the appropriate jack in the restoration patch bay.
23	Connect the RTE to the OUT connector on the 266K amplifier.
24	Measure and record the power at the amplifier output.
	<p><b>Requirement:</b> <math>-21.0</math> dBm <math>\pm 0.5</math> dB</p>
25	Proceed to Step 27 if the requirement of Step 24 is met. Otherwise, adjust the amplifier gain to meet the requirement.
	<p><b>Note:</b> ♦Amplifier gain controls for the four trunk circuits in a J68877DC panel are located at the front. Amplifier gain controls for the four trunk circuits in a J68953AJ panel are located at the rear.♦</p>
26	Continue signal tracing, if the requirement of Step 24 <i>cannot</i> be met, to locate and clear the trouble. Then repeat Steps 20 through 25.
	<p><b>Note:</b> Chart 12 is a procedure for checking the cable equalizer(s) in a J68877DC panel.</p>
27	Remove all test equipment connected during testing.

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**CHART 10 (Contd)**


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STEP	PROCEDURE
28	Replace the coaxial connector on the OUT connector of the 266K amplifier.
29	Replace the four screws which hold the panel.
30	Continue with the test procedure in the appropriate chart.

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**CHART 11****MEASURING GAIN OF 263A OR 263C AMPLIFIER**

STEP	PROCEDURE
<b>Caution:</b> <i>This test cannot be performed for an amplifier in a trunk in service.</i>	
1	-Locate the panel containing the amplifier to be tested.
2	Remove the four screws holding this panel in the multimastergroup trunk bay.
3	Withdraw the panel until the coaxial connectors on the amplifier can be reached.
4	Remove the coaxial connectors from the amplifier IN and OUT connections.
5	Prepare the STE to produce a 600-kHz signal at -30 dBm.
6	Prepare the RTE for a 75-ohm terminated measurement of 600 kHz at approximately -10 dBm.
7	Connect the STE to the amplifier IN connection.
8	Connect the RTE to the amplifier OUT connection.
9	Measure the power of the amplifier output signal.

**Requirement:** -10 dBm  $\pm$ 1 dB

**Note:** When trouble indicates that the loss-frequency characteristic of a trunk should be checked, repeat Steps 5 through 9 at 8.5 MHz for a 263A amplifier or at 11.5 MHz for a 263C amplifier. The amplifier output power at 8.5 MHz (263A) or at 11.5 MHz (263C) must be within  $\pm$ 0.3 dB of the power at 600 kHz.

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**CHART 11 (Contd)**


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STEP	PROCEDURE
10	Proceed to Step 14 if the requirement is met. Otherwise, proceed to Step 11.
11	Measure the voltage between the -24V and RTN terminals at the left rear of the panel. <b>Requirement:</b> -24 $\pm$ 2 volts dc
12	Replace the amplifier under test if the requirement of Step 11 is met.
13	Repeat Steps 7 through 9 to check the new amplifier.
14	Remove all test equipment connected during testing.
15	Replace the coaxial connectors on the amplifier.
16	Replace the four screws which hold the panel.
17	Continue with the test procedure in the appropriate chart in this section.

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**CHART 12**
**CHECKING 907A CABLE EQUALIZER SETTING**


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STEP	PROCEDURE
	<b>Note:</b> Perform this test <i>only</i> when trouble indicates that the loss-frequency characteristic of a trunk should be checked.
	<b>Caution:</b> <i>This test cannot be performed for a cable equalizer in a trunk in service.</i>
1	Prepare the STE to produce a 600-kHz signal at the proper power for the trunk to be tested (refer to the appropriate chart in this section).
2	Prepare the RTE for a 75-ohm terminated measurement of 600 kHz at the proper power for the trunk to be tested.
3	Connect the STE and RTE to the proper trunk circuit jacks.
4	Record the power indication on the RTE.

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## CHART 12 (Contd)

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STEP	PROCEDURE
5	Repeat Steps 1 through 4 for a test signal of 11 MHz.  <b>Requirement:</b> The power at 11 MHz shall be within $\pm 0.1$ dB of the 600-kHz power recorded in Step 4.
6	Proceed to Step 11 if the requirement is met. Otherwise, proceed to Step 7.
7	Turn the cable equalizer control to the next <b>lower</b> number if the power at 11 MHz is <b>greater</b> than the power at 600 kHz. If the power at 11 MHz is <b>less</b> than the power at 600 kHz, turn the cable equalizer control to the next <b>higher</b> number.  <b>Note:</b> Each step changes the 11-MHz power approximately 0.15 dB more than it changes the 600-kHz power. The actual change depends on the length of cable in the trunk.
8	Record the 11-MHz power with the new cable equalizer setting.
9	Repeat Steps 1 through 4 using a 600-kHz test signal.  <b>Requirement:</b> The power at 600 kHz shall be within $\pm 0.1$ dB of the 11-MHz power recorded in Step 8.
10	Proceed to Step 11 if the requirement is met. Otherwise, repeat Steps 7 through 9.
11	Remove all test equipment connected during testing.
12	Replace all plugs removed during testing.
13	Check and, if necessary, adjust the gain of the trunk as prescribed in the appropriate chart in this section.

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