

A6 CHANNEL BANK UNITIZED TERMINAL EQUIPMENT
J98626() FRAMES
CHANNEL BANK TESTS AND ADJUSTMENTS
OUT-OF-SERVICE
COMMON EQUIPMENT
ANALOG MULTIPLEX TERMINAL EQUIPMENT

The J68929AA A6 channel bank (Fig. 1) is a frequency-division multiplex terminal that translates 12 voice-frequency (VF) channels to the 60- to 108-kHz group band in its transmitting section and translates the 60- to 108-kHz group band to 12 VF channels in its receiving section. When used in the J98626() unitized terminal equipment (UTE), the A6 channel bank is designated J68929AA (L1, L4, L5). It consists of:

12—J68929AR (MD) or J68954BG (std) channel modem units

1—J68929AU (MD) or J68954BH (std) channel bank modem unit

1—J68929AS (std) group distributing frame (GDF) interface unit (optional)

or

1—J68929BC (MD) or J68954BJ (std) carrier failure alarm (CFA) unit (optional)

1—J68929AH (A&M) or AW (std) -12 volt regulator unit.

This section provides test and adjustment procedures to ensure proper operation of the J68929AA (L1, L4, L5) A6 channel bank. These procedures are intended to be used for initial lineup and trouble location, as required. Refer to Section 356-016-302 for A6 UTE channel bank operating procedures, and to Section 356-016-500 for general maintenance considerations.

This section is reissued to change the title; to change most -16 and +7 dBm test levels to -26 and -3 dBm; and to delete the crosstalk test from old Charts 6 and 8, revise it, and reinsert it as new Charts 7 and 10. Due to extensive changes, change arrows are not used.

Equipment Test Lists are affected.

Note 1: If desired, the steps in the procedures in this section can be bypassed by referring to the applicable illustrations.

Note 2: Where equipment specifications are given in the apparatus list for any chart, this indicates only the **minimum** requirements for the tests in that chart. Any equipment meeting these requirements can be used.

Note 3: In the following charts,

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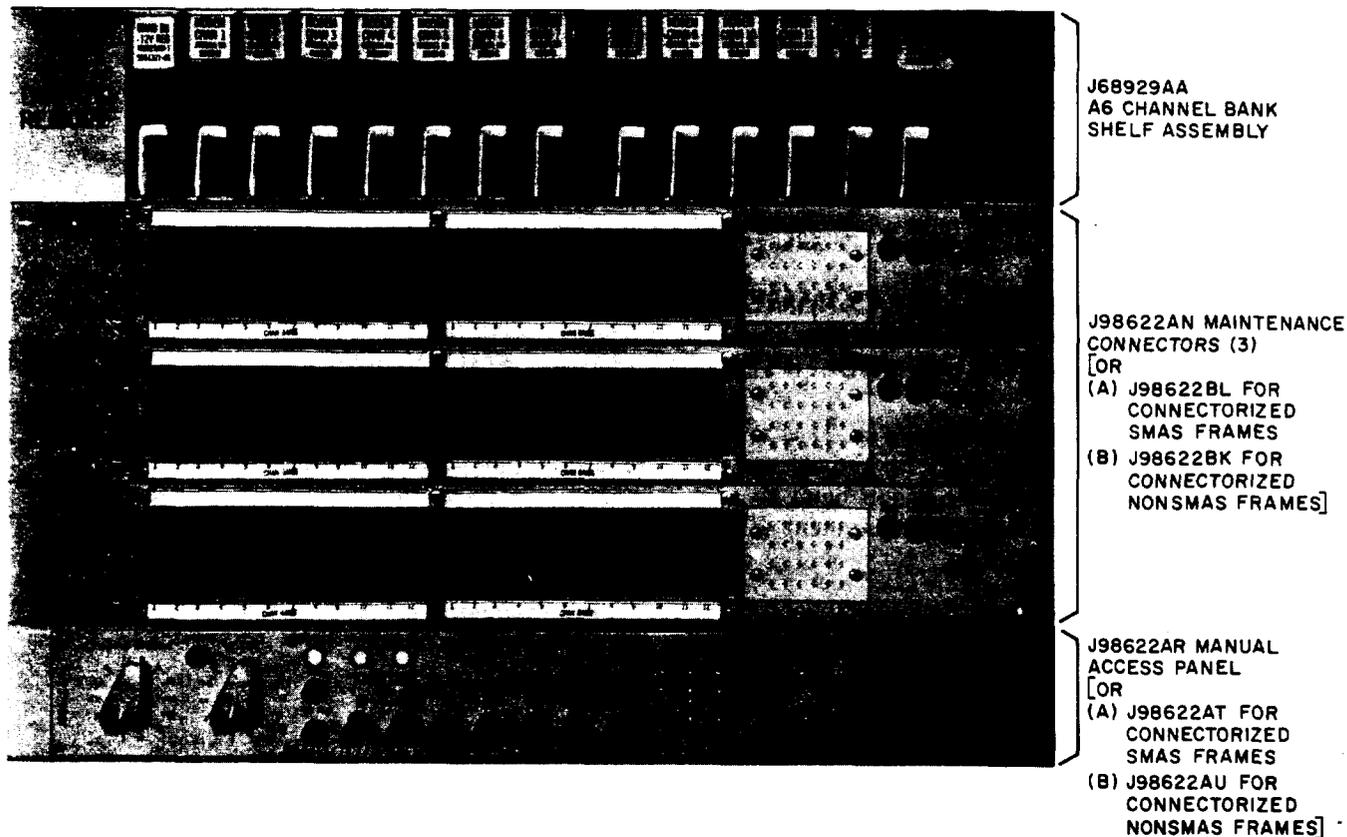


Fig. 1—A6 Channel Bank, Maintenance Connector, and Manual Access Panel

- (a) An asterisk (*) following any step number indicates that that step applies *only to the SMAS (J98622AR or AT) manual access panel (22AR or 22AT MAP)*.
- (b) A dagger (†) following any step number indicates that that step applies *only to the non-SMAS (J98622AU) manual access panel (22AU MAP)*.

Note 4: In the following charts, all operations are made at the frame under test unless specified otherwise.

Prior to making the tests and adjustments in this section, ensure that:

- (a) All test equipment has been calibrated.
- (b) The equipment under test is out of service.
- (c) The channel bank under test is fused and equipped with the -12 volt regulator, the channel bank modem, at least one channel modem, and a CFA unit (if this option is used).

Caution: *The channel bank under test should be equipped and fused as prescribed in Section 356-016-303.*

Note 5: The associated A6 carrier supply should be equipped and tested as described in Section 356-016-501.

Note 6: If the channel banks under test are equipped for CFA, the CFA plug-in unit should be in place for *all tests, except as noted in Charts 3, 8, 9, and 10.*

The jacks and controls used in making the tests in this section are located as listed in Table A.

CHART	PAGE
1--12 Volt Regulator Test	5
2--Transmitting Level Adjustment	7
3--Carrier Leak Test	11
4--Receiving Level Adjustment	15
5--Frequency Response Test--Equal-Level Looping	19
6--Noise Test--Equal-Level Looping	25
7--Crosstalk Test--Equal-Level Looping	32
8--Frequency Response Test--Unequal-Level Looping	47
9--Noise Test--Unequal-Level Looping	51
10--Crosstalk Test--Unequal-Level Looping	57

Note 1: For initial lineup, the charts should be used in the given sequence, except that (a) Chart 4 may be omitted as noted in that chart, and (b) *either* the equal-level looping tests (Charts 5, 6, and 7) *or* the unequal-level looping tests (Charts 8, 9, and 10) should be used, *but not both*. Similarly, for trouble location, applicable charts should be used in the given sequence.

Note 2: Observe the following:

- (a) Use Charts 5, 6, and 7 *if spare group equipment is available.*
 - (b) Use Charts 8, 9, and 10 *only if spare group equipment is not available.*
-

TABLE A
JACK AND CONTROL LOCATION

DESIGNATION	LOCATION
GRD jack	J68929AH or AW -12 Volt Regulator
-12V jack	J68929AH or AW -12 Volt Regulator
LINE IN jack	J98622AR, AT, or AU Manual Access Panel
LINE OUT jack	J98622AR, AT, or AU Manual Access Panel
CH BK IN jack	LMX-2 Equipment
GDF IN jack	LMX-3 Equipment
CH BK OUT ALT jack	LMX-2 Equipment
GDF OUT ALT jack	LMX-3 Equipment
GR BK IN jack	LMX-2 and LMX-3 Equipment
GR BK OUT jack	LMX-2 Equipment
GR BK OUT ALT jack	LMX-3 Equipment
TRMT ADJ control	A6 Channel Bank Modem
ADJ controls	A6 Channel Modems
CHAN BANK switch	J98622AR or AT Manual Access Panel
VF CKT switch	J98622AR or AT Manual Access Panel
ACC or ACS switch	J98622AR or AT Manual Access Panel
ACC RLS or ACS RLS switch	J98622AR or AT Manual Access Panel
SEND LINE/DROP switch	J98622AR, AT, or AU Manual Access Panel
SEND NOR/DOWN 10 DB switch	J98622AR, AT, or AU Manual Access Panel
MEAS TMS LINE/DROP switch	J98622AR, AT, or AU Manual Access Panel
MEAS NOISE LINE/DROP switch	J98622AR, AT, or AU Manual Access Panel

CHART 1

-12 VOLT REGULATOR TEST

For proper operation, the output from the J68929AH or AW -12 volt regulator must be within the specified limits of -11.60 to -12.40 volts.

APPARATUS

Digital Voltmeter (DVM) meeting the following minimum specifications:

Range: 0.00 to 30.00 volts dc

Resolution: .01 volt

Accuracy: .05 volt

STEP	PROCEDURE
1	Connect the DVM to the GRD and -12V jacks on the regulator under test [connections (1) and (2), Fig. 2A].
2	Measure the voltage at the -12V jack. Requirement: -11.60 to -12.40 volts
3	If the requirement of Step 2 is not met, (a) Remove the fuse for the regulator under test. (b) Replace the regulator module with a spare unit. Caution: No field adjustments can be made on the -12 volt regulator. (c) Reinsert the fuse removed in Step 3(a). (d) Repeat Step 2.
4	If the requirement of Step 2 cannot be met, (a) Measure the voltage between pin 1 (+) and pin 15 (-) on the regulator connector J1 (Fig. 2B). Requirement: -14.5 to -27.8 volts <i>for J68929AH regulator</i> -18.5 to -28.5 volts <i>for J68929AW regulator</i>

CHART 1 (Contd)

STEP

PROCEDURE

Note: Incorrect voltage may be an indication of trouble in the dropping resistor circuit in the fuse panel when the J68929AH regulator is used, or in the wiring between the fuse panel and the regulator when the J68929AW regulator is used.

(b) Correct the indicated trouble; then repeat from Step 1.

5 Remove connections (2) and (1), Fig. 2A.

6 Repeat applicable Steps 1 through 5 for all other J68929AH or AW regulators to be tested.

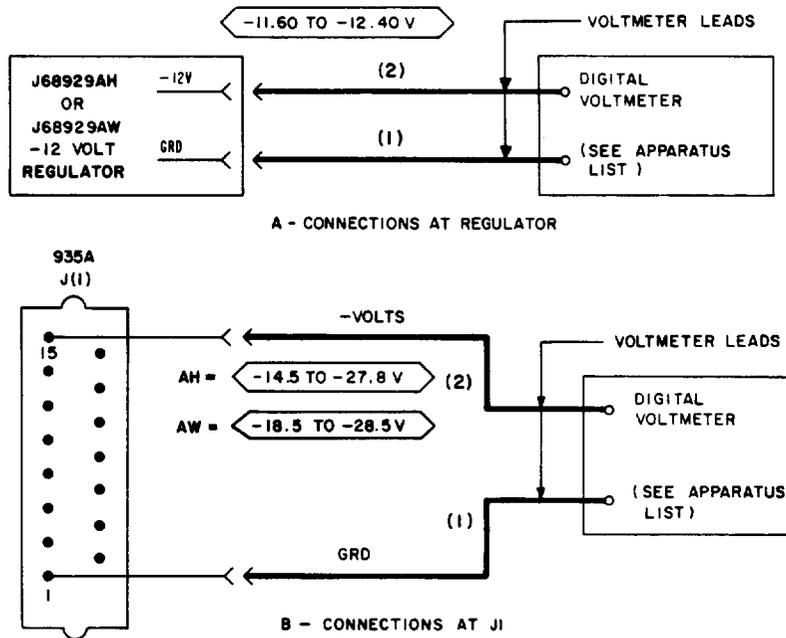


Fig. 2—Patching Diagram, -12 Volt Regulator Test

CHART 2
TRANSMITTING LEVEL ADJUSTMENT

For proper operation, the channel bank output power must be set to the standard transmission level. Using a 1-kHz VF test tone (-26 dBm) at the input to the Channel 6 modulator, adjust the TRMT ADJ control on the channel bank modem to obtain the required output (-52.0 dBm) at the CH BK OUT ALT (LMX-2) or GDF OUT ALT (LMX-3) jack. Verify that the other 11 channels are within the specified limits (-51.3 to -52.7 dBm).

Note: In a partially equipped system, this adjustment is made in the channel nearest to Channel 6, if Channel 6 is not equipped.

APPARATUS

Sending Test Equipment (STE):

Milliwatt Distributing System (MDS) (via the SEND LINE/DROP switches or the LINE IN jack on the J98622AR, AT, or AU manual access panel)

Receiving Test Equipment (RTE) (Section 356-010-500):

Frequency: 63 to 107 kHz

Power: -52 dBm

Impedance: 135 ohms balanced

3P7A Cord (for 600-ohm patches)

3P20B Cord (for 135-ohm patches)

STEP	PROCEDURE
1*	Set the CHAN BANK switch (on the 22AR or AT MAP) to the first channel bank to be tested.
2a*	Set the VF CKT switch (on the 22AR or AT MAP) to Channel 6, or to the channel nearest to Channel 6 in a partially equipped system.
2b†	Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector) for Channel 6, or for the channel nearest to Channel 6 in a partially-equipped system [patch (1), Fig. 3].
3*	Press the ACS (or ACC) switch (on the 22AR or AT MAP).

CHART 2 (Contd)

STEP	PROCEDURE
4	Adjust the RTE as follows: Impedance: 135 ohms balanced Frequency: The test frequency listed in Table B corresponding to the channel selected in Step 2. Power: -52.0 dBm
5	At the LMX equipment, connect the RTE to the CH BK OUT ALT (LMX-2) or GDF OUT ALT (LMX-3) jack [patch (2), Fig. 3].
6	Operate the SEND LINE/DROP switch to the LINE position. <i>Note:</i> If the MDS is not available via the SEND LINE switch, connect the STE to the LINE IN jack [patch (3), Fig. 3].
7	Ensure that the SEND NOR/DOWN 10 DB switch is set to the DOWN 10 DB position.
8	Adjust the TRMT ADJ control (on the channel bank modem unit) to obtain a signal power of -52.0 dBm at the CH BK OUT ALT or GDF OUT ALT jack. <i>Note:</i> The TRMT ADJ control is a 25-turn potentiometer that should produce a change of at least 9 dB when varied from maximum counterclockwise to maximum clockwise.
9	If the adjustment of Step 8 <i>cannot</i> be made, (a) Replace the channel modem under test with a spare unit. (b) Repeat Step 8.
10	If the adjustment <i>still cannot</i> be made, (a) Reinsert the channel modem removed in Step 9(a). (b) Replace the channel bank modem with a spare unit. (c) Repeat Step 8.
11	Restore the SEND LINE/DROP switch to the neutral position [or remove patch (3), if used with the 22AR or AT MAP].
12a*	Set the VF CKT switch (on the 22AR or AT MAP) to the next channel to be tested.
12b†	Connect the retractable cord (on the 22AU MAP) to the next channel to be tested [patch (1), Fig. 3].

CHART 2 (Contd)

STEP	PROCEDURE
13*	Press the ACS (or ACC) switch (on the 22AR or AT MAP).
14	At the LMX equipment, readjust the RTE to the test frequency (Table B) for the channel selected in Step 12.
15	At the LMX equipment, measure the signal power at the CH BK OUT ALT or GDF OUT ALT jack. Requirement: -51.3 to -52.7 dBm
16	If the requirement of Step 15 is <i>not</i> met, (a) Replace the channel modem under test with a spare unit. (b) Repeat Step 15.
17†	Remove the retractable cord (on the 22AU MAP) from the channel under test [patch (1), Fig. 3].
18	Repeat applicable Steps 11 through 17 for all other channels in the bank under test.
19	At the LMX equipment, remove patch (2), Fig. 3.
20	Repeat applicable Steps 1 through 19 for all other channel banks to be tested.
21*	Press the ACS (or ACC) RLS switch (on the 22AR or AT MAP).
22†	If used, remove patch (3), Fig. 3.

TABLE B

TEST FREQUENCIES AT CH BK OUT ALT OR GDF OUT ALT JACK WITH 1-KHZ INPUT

CHAN NO.	1	2	3	4	5	6	7	8	9	10	11	12
TEST FREQ (kHz)	107	103	99	95	91	87	83	79	75	71	67	63

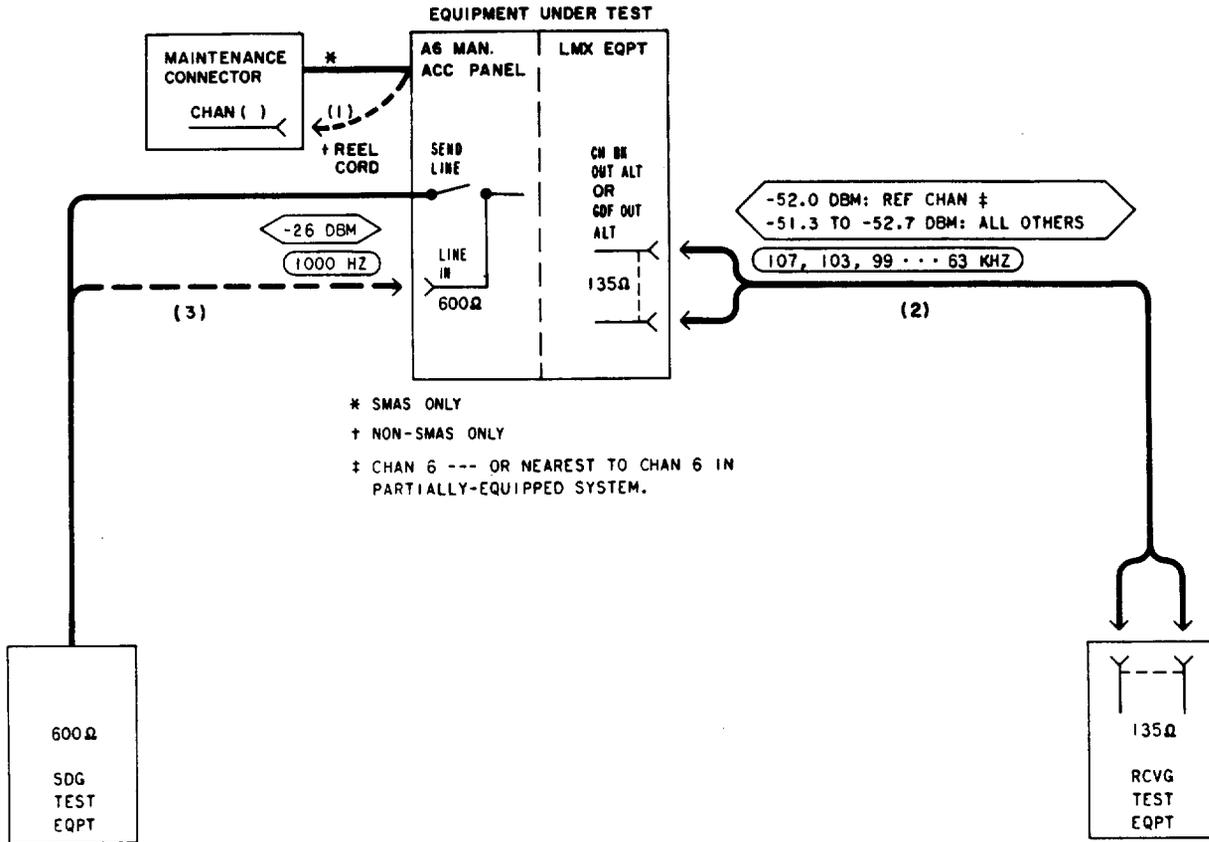


Fig. 3—Patching Diagram—Transmitting Level Adjustment

CHART 3
CARRIER LEAK TEST

For proper operation, carrier leak for the 12 channels of the A6 bank must be kept at a low value (less than -75 dBm) to avoid interference with the group and supergroup pilots and the message information.

APPARATUS**Receiving Test Equipment (RTE)** (Section 356-010-500):

Frequency: 64 to 108 kHz

Power: -75 to -85 dBm

Impedance: 75 ohms unbalanced and 135 ohms balanced

J68858AT (58AT) Pilot Filter Set

3P20B Cord (for 135-ohm patches)

P2BJ Cord (for 75-ohm patches)

262B Plug (600-ohm termination)

STEP	PROCEDURE
1*	Set the CHAN BANK switch (on the 22AR or AT MAP) to the first channel bank to be tested.
2a*	Set the VF CKT switch (on the 22AR or AT MAP) to the Channel 1 position.
2b†	Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector) for Channel 1 [patch (1), Fig. 4].
3*	Press the ACS (or ACC) switch (on the 22AR or AT MAP).
4	Adjust the RTE as follows: <p style="margin-left: 40px;">Impedance: Channels 1, 3, 4, ... 12: 135 ohms balanced</p> <p style="margin-left: 80px;">Channel 2: 75 ohms unbalanced</p> <p style="margin-left: 40px;">Frequency: 108 kHz (Channel 1, Table C)</p> <p style="margin-left: 40px;">Power: -75 dBm</p>

CHART 3 (Contd)

STEP	PROCEDURE
5	Insert a 262B plug (600-ohm termination) in the LINE IN jack (Fig. 4).
6	At the LMX equipment, connect the RTE to the CH BK OUT ALT (LMX-2) or GDF OUT ALT (LMX-3) jack [patch (2), Fig. 4].
7	Measure the signal power at the CH BK OUT ALT or GDF OUT ALT jack. Requirement: Channels 1, 3, 4 ... 12: -75 dBm or less (-76 dBm is less than -75) Channel 2: -85 dBm or less (includes 10-dB loss in 58AT pilot filter set) Note: If the channel bank is equipped for CFA, (a) <i>Remove the CFA unit while making the Channel 3 carrier leak test.</i> (b) <i>Reinsert the CFA unit after the Channel 3 carrier leak test is completed.</i>
8	If the requirement of Step 7 is <i>not</i> met, (a) Replace the channel modem with a spare unit. (b) Repeat applicable steps in Chart 2 for the channel under test. (c) Repeat applicable Steps 1 through 7.
9*	Remove the terminating plug (inserted in Step 5) from the LINE IN jack.
10†	Remove the retractable cord (on the 22AU MAP) from the channel under test [patch (1), Fig. 4].
11	Repeat applicable Steps 2 through 10 for channels 3 to 12 of the channel bank under test.
12	At the LMX equipment, remove patch (2), Fig. 4.
13	At the LMX equipment, connect the RTE, via the 104 KC CARR LEAK IN/MEAS jacks on the 58AT pilot filter set, to the CH BK OUT ALT or GDF OUT ALT jack [patch (3), Fig. 4]. Note: If desired, the correct frequency range can be located via the 104.08 KC PIL IN/MEAS jacks on the 58AT pilot filter set. The measurement is made via the 104 KC CARR LEAK IN/MEAS jacks.
14	Repeat applicable Steps 2 through 10 for Channel 2 of the channel bank under test.
15	At the LMX equipment, remove patch (3), Fig. 4.
16	Repeat applicable Steps 1 through 15 for all other channel banks to be tested.

CHART 3 (Contd)

STEP	PROCEDURE
17*	Press the ACS (or ACC) RLS switch (on the 22AR or AT MAP).
18†	Remove the terminating plug (inserted in Step 5) from the LINE IN jack.

TABLE C
CHANNEL CARRIER FREQUENCIES

CHAN NO.	1	2	3	4	5	6	7	8	9	10	11	12
TEST FREQ (kHz)	108	104	100	96	92	88	84	80	76	72	68	64

SECTION 356-016-505

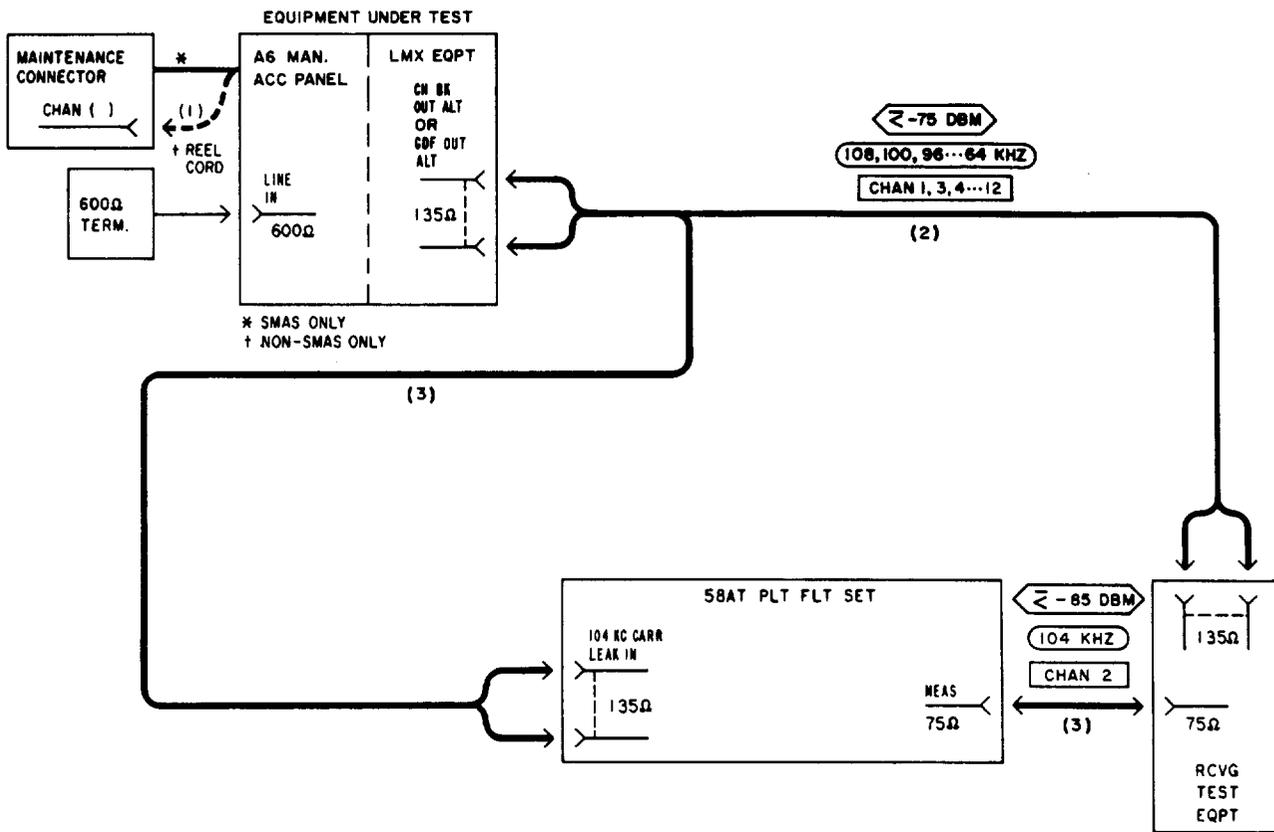


Fig. 4—Patching Diagram—Carrier Leak Test

CHART 4
RECEIVING LEVEL ADJUSTMENT

For proper operation, the outputs from the 12 VF channels of the A6 bank must be of equal level (-3.0 dBm). The gain ADJ controls on the J68929AR or J68954BG channel modems are adjusted to obtain the required output.

Note: This chart may be omitted if Charts 5 and 6, or 8 and 9 are to be used at this time.

APPARATUS

Sending Test Equipment (STE) (Section 356-010-500):

Frequency: 63 to 107 kHz

Power: -14 or -15 dBm

Impedance: 135 ohms balanced

Receiving Test Equipment (RTE):

Transmission and Noise Measuring System (T&NMS) (via the MEAS TMS LINE/DROP switch or the LINE OUT jack on the J98622AR, AT, or AU manual access panel)

3P7A Cord (for 600-ohm patches)

3P20B Cord (for 135-ohm patches)

STEP	PROCEDURE
1*	Set the CHAN BANK switch (on the 22AR or AT MAP) to the first channel bank to be tested.
2a*	Set the VF CKT switch (on the 22AR or AT MAP) to the Channel 1 position.
2b†	Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector) for Channel 1 [patch (1), Fig. 5].
3*	Press the ACS (or ACC) switch (on the 22AR or AT MAP).
4	Adjust the STE as follows: Impedance: 135 ohms balanced Frequency: 107 kHz (Channel 1, Table D)

CHART 4 (Contd)

STEP

PROCEDURE

Power: -15.0 dBm (LMX-2)

-14.0 dBm (LMX-3)

- 5 At the LMX equipment, connect the STE to the CH BK IN (LMX-2) or GDF IN (LMX-3) jack [patch (2), Fig. 5].
- 6 Momentarily operate the MEAS TMS LINE/DROP switch to the LINE position.
Note: If the T&NMS is not available via the MEAS TMS LINE switch, connect the RTE to the LINE OUT jack [patch (3), Fig. 5].
- 7 Carefully adjust the channel gain ADJ control (on the corresponding channel modem) to obtain an indication of -3.0 dBm on the T&NMS.
Note: The ADJ control should produce a change of at least 12 dB when varied from maximum counterclockwise to maximum clockwise.
- 8 If the adjustment of Step 7 **cannot** be made,
 - (a) Replace the channel modem with a spare unit.
 - (b) Repeat Step 7.
 - (c) If the adjustment **can** now be made, repeat applicable steps in Charts 2 and 3.
- 9 If the adjustment **still cannot** be made,
 - (a) Reinsert the channel modem removed in Step 8(a).
 - (b) Replace the channel bank modem with a spare unit.
 - (c) Repeat Step 7.
 - (d) If the adjustment **can** now be made, repeat applicable steps in Chart 2.
- 10* If used, remove patch (3), Fig. 5.
- 11† Remove the retractable cord (on the 22AU MAP) from the channel under test [patch (1), Fig. 5].
- 12 Repeat applicable Steps 2 through 11 for Channels 2 to 12 of the channel bank under test.
- 13 At the LMX equipment, remove patch (2), Fig. 5.
- 14 Repeat applicable Steps 1 through 13 for all other channel banks to be tested.

CHART 4 (Contd)

STEP	PROCEDURE
15*	Press the ACS (or ACC) RLS switch (on the 22AR or AT MAP).
16†	If used, remove patch (3), Fig. 5.

TABLE D**TEST FREQUENCIES AT CH BK IN OR GDF IN JACK FOR 1-KHZ OUTPUT**

CHAN NO.	1	2	3	4	5	6	7	8	9	10	11	12
TEST FREQ (kHz)	107	103	99	95	91	87	83	79	75	71	67	63

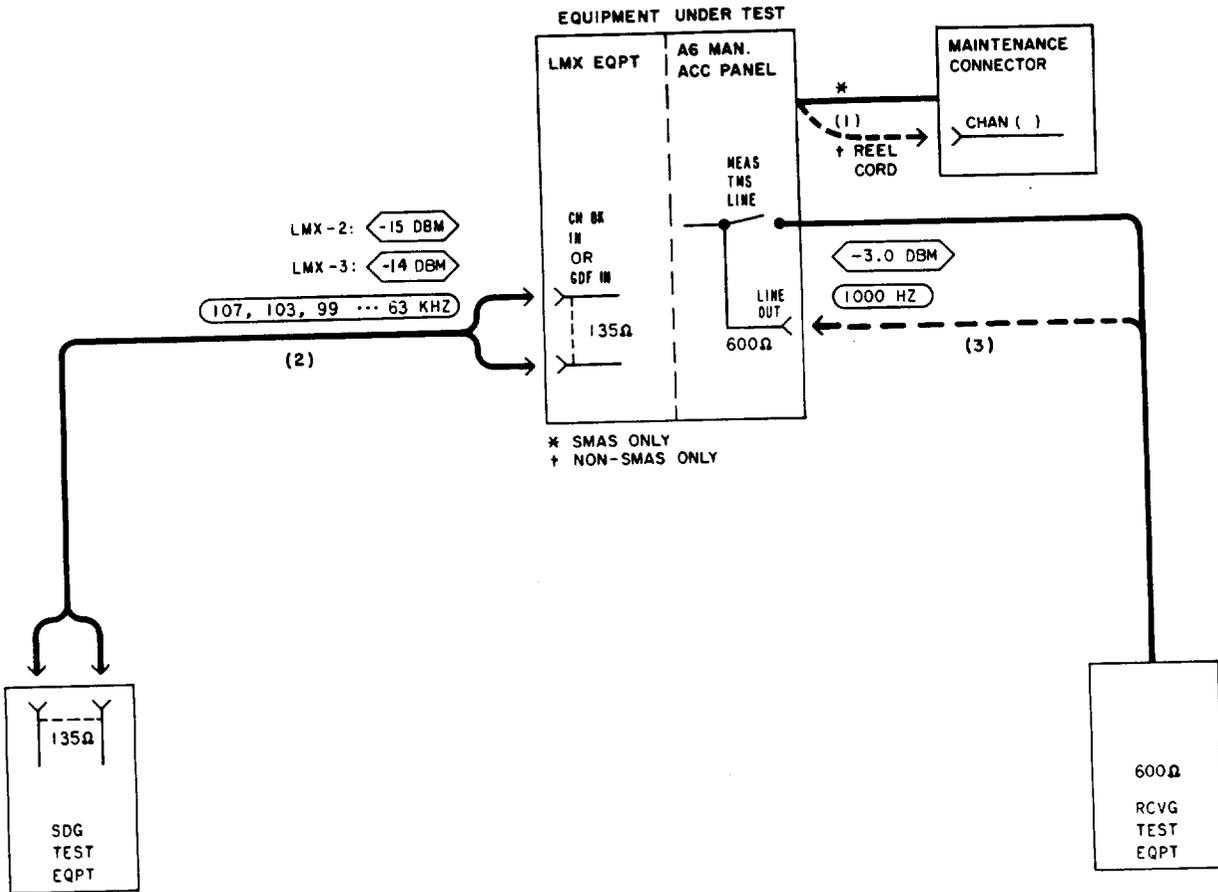


Fig. 5—Patching Diagram—Receiving Level Adjustment

CHART 5

FREQUENCY RESPONSE TEST—EQUAL-LEVEL LOOPING

The frequency response of each channel in the A6 bank must be such that when the output at 1000 Hz is -3.0 dBm, the output at 200 Hz is within the range of -2.5 to -6.0 dBm.

Note: Use this chart *if spare group equipment is available*; if not, use Chart 8.

APPARATUS

Sending Test Equipment (STE):

Frequency: 200 and 1000 Hz

Power: -26 dBm

Impedance: 600 ohms balanced

Receiving Test Equipment (RTE):

Transmission and Noise Measuring System (T&NMS) (via the MEAS TMS LINE/DROP switch or the LINE OUT jack on the J98622AR, AT, or AU manual access panel)

3P7A Cords (for 600-ohm patches)

P2BJ Cords (for 75-ohm patches)

368A Plug (75-ohm termination) if spare hybrid coil is used for looping

Spare Hybrid Coil, 3-dB T Pad (75-ohm impedance), or ***Spare Group Transmitting Trunk*** (LMX-2)

or

ED-52536-20 MTCE Group Bank Pad (LMX-3)

STEP

PROCEDURE

Note 1: The gain of the transmitting and receiving group equipment should be adjusted as prescribed in applicable sections of the 356 Division.

Note 2: The STE and RTE should be calibrated as a test group prior to use at each test frequency.

- 1 If an external RTE is used, adjust for a measurement of -3 dBm.

CHART 5 (Contd)

STEP	PROCEDURE
2	Adjust the STE as follows: Impedance: 600 ohms balanced Frequency: 1000 Hz Power: -26.0 dBm
3	At LMX-2 equipment, make looping connections as shown in Fig. 6(a) or 6(b), as applicable.
4	At LMX-3 equipment, make looping connections as shown in Fig. 7.
5*	Set the CHAN BANK switch (on the 22AR or AT MAP) to the first channel bank to be tested.
6a*	Set the VF CKT switch (on the 22AR or AT MAP) to the Channel 1 position.
6b†	Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector) for Channel 1 [patch (1), Fig. 8].
7*	Press the ACS (or ACC) switch (on the 22AR or AT MAP).
8	Connect the STE to the LINE IN jack [patch (2), Fig. 8].
9	Momentarily operate the MEAS TMS LINE/DROP switch to the LINE position. Note: If the T&NMS is not available via the MEAS TMS LINE switch, connect the RTE to the LINE OUT jack [patch (3), Fig. 8].
10	Observe that the signal power indicated on the T&NMS is -3.0 dBm. Note: If the requirement is <i>not</i> met, check the looping connections at the LMX bay. Then, if necessary, adjust the channel gain ADJ control (on the corresponding channel modem) to obtain -3.0 dBm.
11	Set the STE frequency to 200 Hz.
12	Record the signal power indicated on the T&NMS. Requirement: -2.5 to -6.0 dBm
13	If the requirement of Step 12 is <i>not</i> met, (a) Replace the channel modem under test with a spare unit. (b) Repeat applicable steps in Charts 2 and 3 for the channel under test.

CHART 5 (Contd)

STEP	PROCEDURE
	(c) Repeat applicable Steps 1 through 12.
14*	Remove patch (2), Fig. 8 [and patch (3), if used].
15†	Remove the retractable cord (on the 22AU MAP) from the channel under test [patch (1), Fig. 8].
16	Repeat applicable Steps 1 through 15 for channels 2 to 12 of the channel bank under test.
17	At the LMX equipment, remove looping connections made in Step 3 or 4.
18	Repeat applicable Steps 1 through 17 for all other channel banks to be tested.
19*	Press the ACS (or ACC) RLS switch (on the 22AR or AT MAP).
20†	Remove patch (2), Fig. 8 [and patch (3), if used].

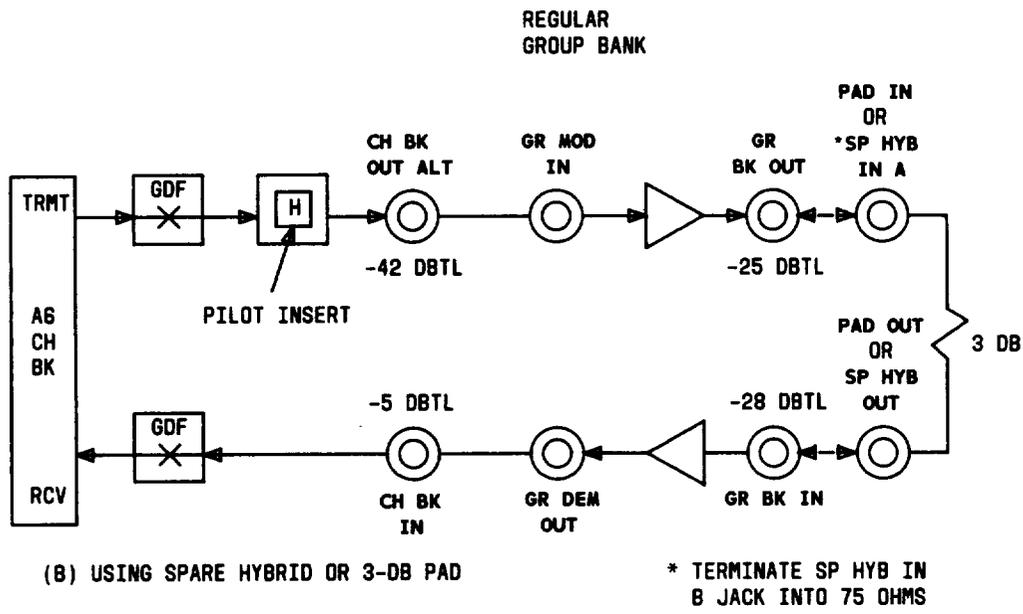
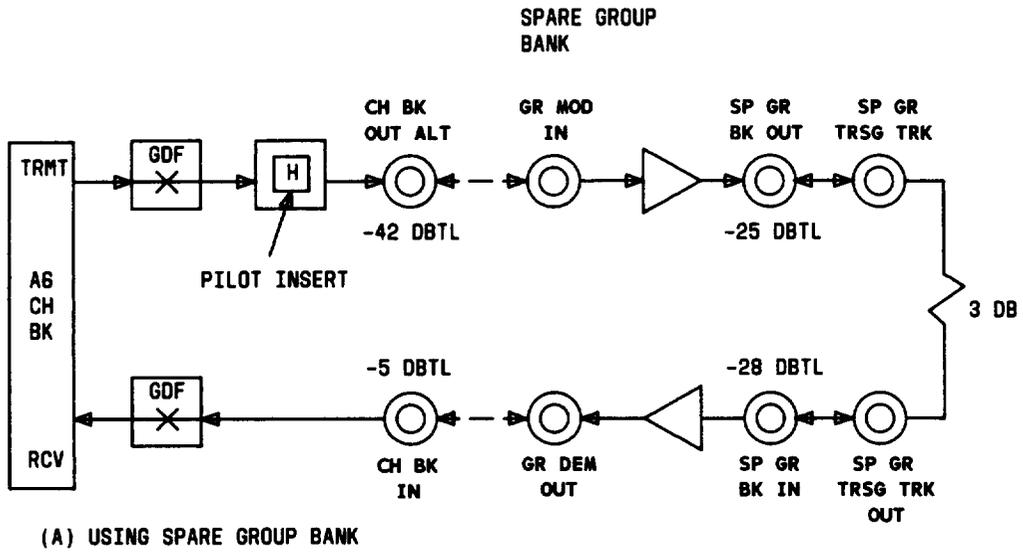


Fig. 6—Typical Channel Bank Equal-Level Looping Arrangements—LMX-2

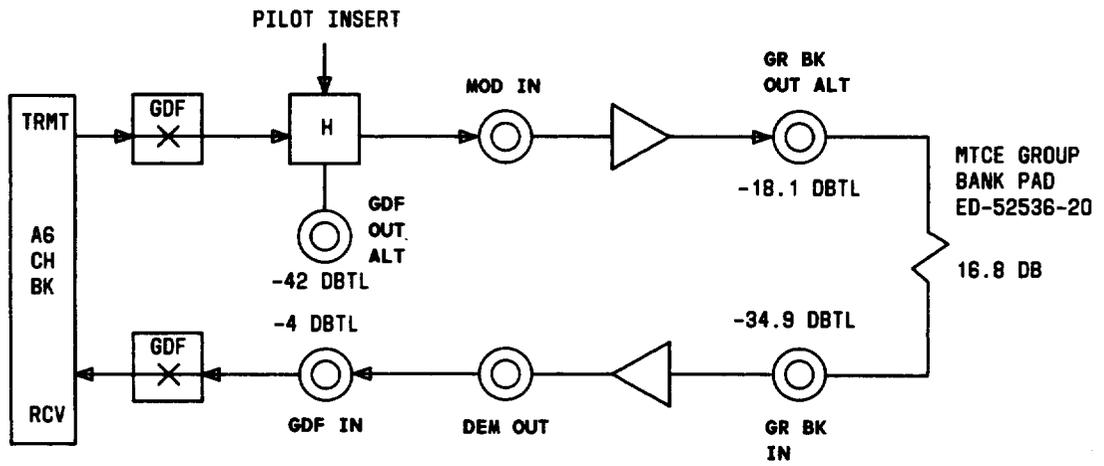


Fig. 7—Typical Channel Bank Equal-Level Looping Arrangements—LMX-3

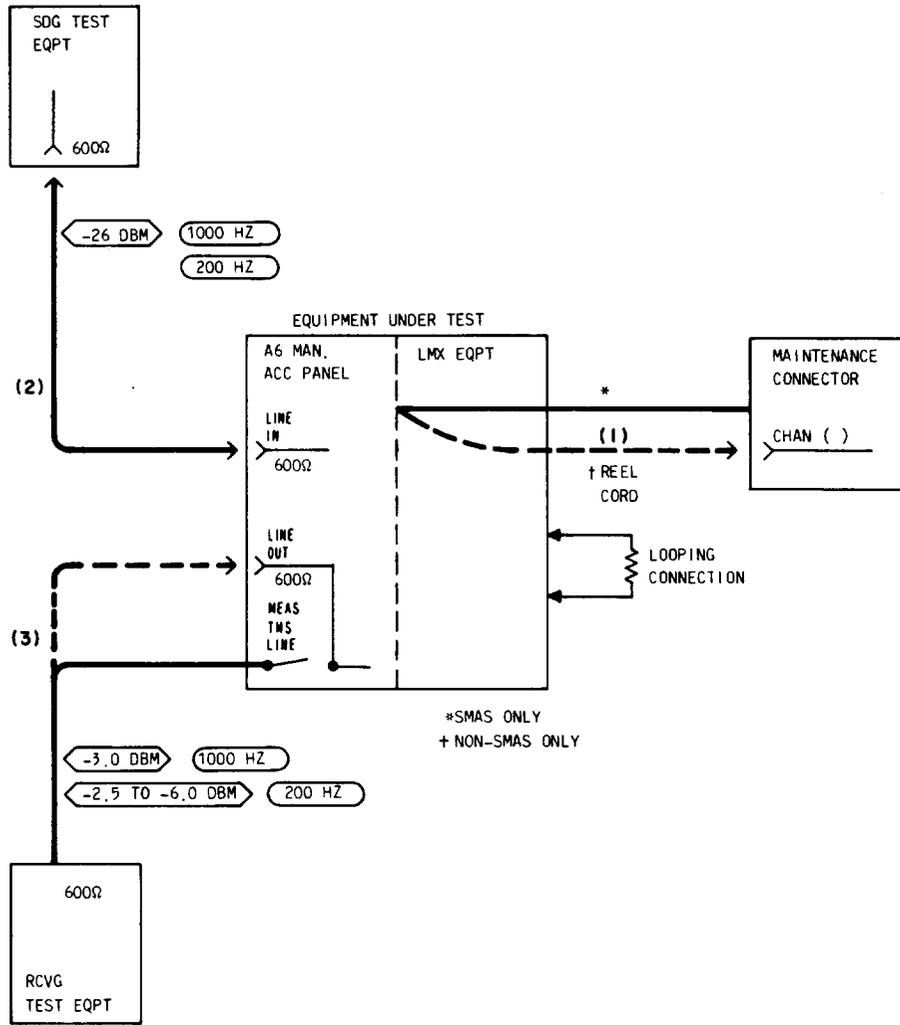


Fig. 8—Patching Diagram—Frequency Response Test—Equal-Level Looping

CHART 6
NOISE TEST—EQUAL-LEVEL LOOPING

For proper channel bank operation, the noise level in each channel of the A6 bank must not exceed the limit beyond which it interferes with normal speech.

Note: Use this chart *if spare group equipment is available; if not*, use Chart 9.

APPARATUS
Sending Test Equipment (STE):

Frequency: 1000 Hz

Power: -26 dBm

Impedance: 600 ohms balanced

Note: The 1000-Hz test tone can be obtained from the Milliwatt Distribution System (via the SEND LINE/DROP switches or the LINE IN jack on the J98622AR, AT, or AU manual access panel).

Receiving Test Equipment (RTE):

Transmission and Noise Measuring System (T&NMS) (via the MEAS TMS LINE/DROP switch or the LINE OUT jack on the J98622AR, AT, or AU manual access panel)

Noise Measuring Set (NMS):

Range: 29 to 63 dBm

Weighting: C Message and 3 kHz flat

Impedance: 600 ohms balanced

Type: 3A or 3B, or equivalent

3P7A Cords (for 600-ohm patches)

P2BJ Cords (for 75-ohm patches)

262B Plug (600-ohm termination)

368A Plug (75-ohm termination) if spare hybrid coil is used for looping

Spare Hybrid Coil, 3-dB T pad (75-ohm impedance), or **Spare Group Transmitting Trunk** (LMX-2)

or

CHART 6 (Contd)

APPARATUS(Cont)

ED-52536-20 MTCE Group Bank Pad (LMX-3)

STEP

PROCEDURE

Note 1: The gain of the transmitting and receiving group equipment should be adjusted as prescribed in applicable sections of the 356 Division.

Note 2: The STE and RTE should be calibrated as a test group prior to use at each test frequency.

Note 3: If the channel bank under test is equipped with the CFA unit, **be sure** that the RCV FAIL lamp on the CFA unit is extinguished.

Preparation

- 1 If an external RTE is used, adjust for a measurement of -3 dBm
- 2 If an external STE is used, adjust as follows:
 - Impedance: 600 ohms balanced
 - Frequency: 1000 Hz
 - Power: -26.0 dBm
- 3 At LMX-2 equipment, make looping connections as shown in Fig. 6(a) or 6(b), as applicable.
- 4 At LMX-3 equipment, make looping connections as shown in Fig. 7.
- 5* Set the CHAN BANK switch (on the 22AR or AT MAP) to the first channel bank to be tested.
- 6a* Set the VF CKT switch (on the 22AR or AT MAP) to the Channel 1 position.
- 6b† Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector) for Channel 1 [patch (1), Fig. 9].
- 7* Press the ACS (or ACC) switch (on the 22AR or AT MAP).
- 8 Operate the SEND LINE/DROP switch to the LINE position.

CHART 6 (Contd)

STEP	PROCEDURE
	Note: If the MDS is not available via the SEND LINE switch, connect the STE to the LINE IN jack [patch (2), Fig. 9].
9	Momentarily operate the MEAS TMS LINE/DROP switch to the LINE position.
	Note: If the T&NMS is not available via the MEAS TMS LINE switch, connect the RTE to the LINE OUT jack [patch (3), Fig. 9].
10	Ensure that the SEND NOR/DOWN 10 DB switch is set to the DOWN 10 DB position.
11	Observe that the signal power indicated on the T&NMS is -3.0 dBm.
	Note: If the requirement is <i>not</i> met, check the looping connections at the LMX bay. Then, if necessary, adjust the channel gain ADJ control (on the corresponding channel modem) to obtain -3.0 dBm.
12	Restore the SEND LINE/DROP switch to the neutral position [or remove patch (2), Fig. 9, if used with the 22AR or AT MAP].
13*	If used, remove patch (3), Fig. 9.
14†	Remove the retractable cord (on the 22AU MAP) from the channel under test [patch (1), Fig. 9].
15	Repeat applicable Steps 6 through 14 for channels 2 to 12 of the channel bank under test.
	Noise
16	Adjust the NMS as follows:
	Range: Minimum sensitivity (85 dBm on the 3A NMS)
	Weighting: C Message
	Impedance: 600 ohms balanced
	Damping: DAMP
17a*	Set the VF CKT switch (on the 22AR or AT MAP) to the Channel 1 position.
17b†	Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector) for Channel 1 [patch (1), Fig. 10].
18*	Press the ACS (or ACC) switch (on the 22AR or AT MAP).
19	Insert a 262B plug (600-ohm termination) in the LINE IN jack (Fig. 10).

CHART 6 (Contd)

STEP	PROCEDURE
20	Connect the NMS to the LINE OUT jack [patch (2), Fig. 10].
21	Measure the noise at the LINE OUT jack. Requirement: <i>If not equipped with 2-way CFA:</i> Channel 1: 38 dBrnc or less (37 dBrnc is less than 38) Channels 2 to 12: 29 dBrnc or less (28 dBrnc is less than 29). <i>If equipped with 2-way CFA:</i> Channels 1 and 2: 38 dBrnc or less (37 dBrnc is less than 38) Channels 3 to 12: 29 dBrnc or less (28 dBrnc is less than 29).
22	Set the NMS range switch to minimum sensitivity.
23	Set the NMS weighting to 3 kHz flat.
24	Measure the noise at the LINE OUT jack. Requirement: <i>If not equipped with 2-way CFA:</i> Channel 1: 57 dBrn or less (56 dBrn is less than 57) Channel 2: 63 dBrn or less (62 dBrn is less than 63) Channel 3 to 12: 45 dBrn or less (44 dBrn is less than 45). <i>If equipped with 2-way CFA:</i> Channel 1: 57 dBrn or less (56 dBrn is less than 57) Channels 2 and 3: 63 dBrn or less (62 dBrn is less than 63) Channels 4 to 12: 45 dBrn or less (44 dBrn is less than 45).
25	If the requirements of Steps 21 and 24 are not met, (a) Replace the channel modem under test with a spare unit. (b) Repeat applicable steps in Charts 2, 3, and 5 for the channel under test. (c) Repeat applicable Steps 1 through 24.
26	If the requirements of Steps 21 and 24 cannot be met, (a) Reinsert the channel modem replaced in Step 25(a). (b) Replace the channel bank modem under test with a spare unit.

CHART 6 (Contd)

STEP	PROCEDURE
	(c) Repeat applicable steps in Chart 2 for channels 1 to 12.
	(d) Repeat applicable Steps 1 through 24.
27	If the requirements of Steps 21 and 24 <i>still cannot</i> be met,
	(a) Reinsert the channel bank modem replaced in Step 26(b).
	(b) Check the LMX equipment and make necessary repairs.
	(c) Repeat applicable Steps 1 through 24.
28	Set the NMS range switch to minimum sensitivity.
29*	Remove patch (2), Fig. 10.
30*	Remove the 262B plug inserted in Step 19.
31†	Remove the retractable cord (on the 22AU MAP) from the channel under test [patch (1), Fig. 10].
32	Repeat applicable Steps 16 through 31 for Channels 2 to 12 of the channel bank under test.
33	At the LMX equipment, remove looping connections made in Step 3 or 4.
34	Repeat applicable Steps 1 through 33 for all other channel banks to be tested.
35*	Press the ACS (or ACC) RLS switch (on the 22AR or AT MAP).
36†	Remove patch (2), Fig. 10, and the 262B plug inserted in Step 19.

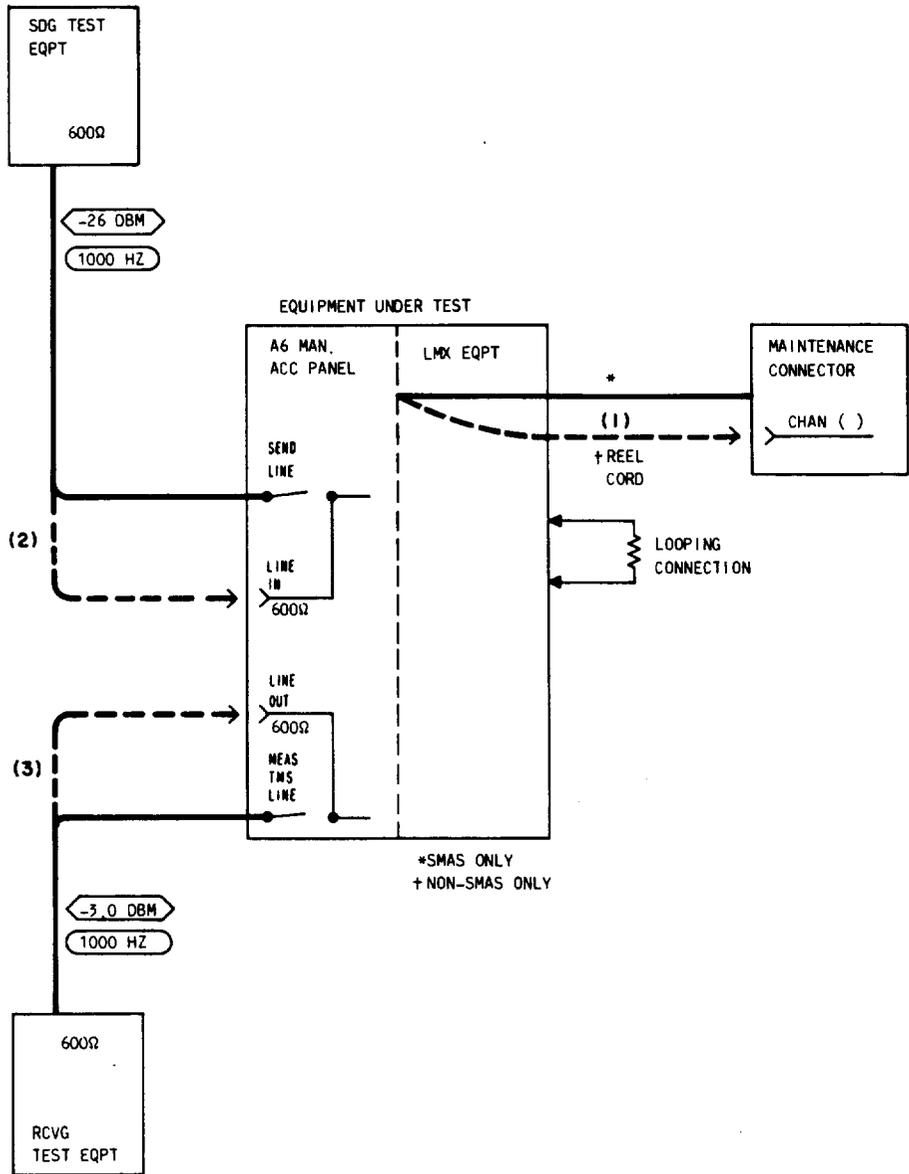


Fig. 9—Patching Diagram—Preparation—Equal-Level Looping

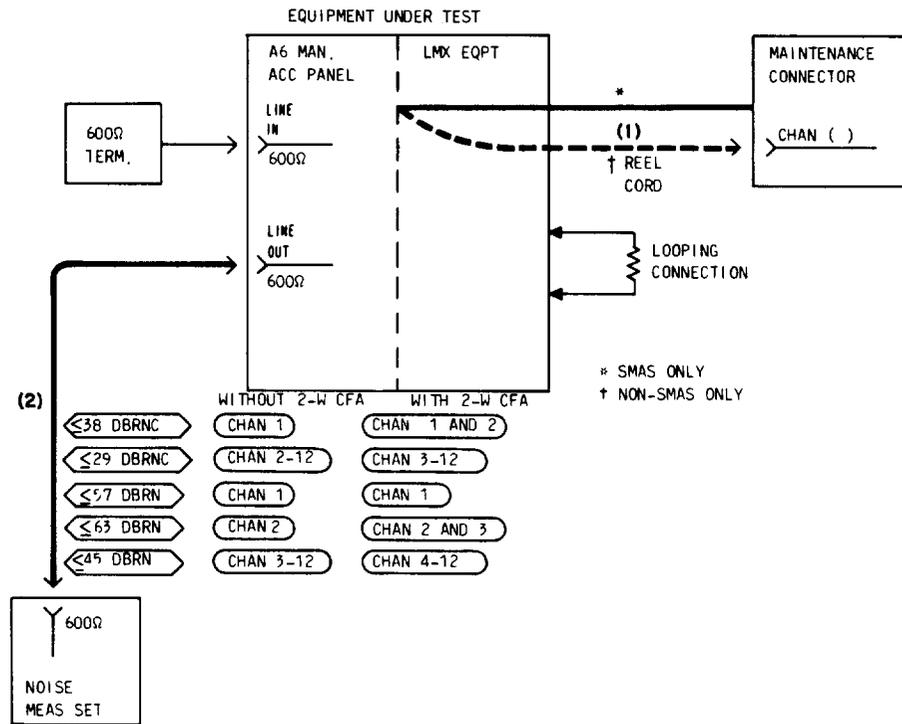


Fig. 10—Patching Diagram—Noise Test—Equal-Level Looping

CHART 7

CROSSTALK TEST—EQUAL-LEVEL LOOPING

For proper channel bank operation, the crosstalk in each channel of the A6 bank must not exceed the limit beyond which it interferes with normal speech. The test is performed via two cross-looped (frogged) channel banks, with test tone applied to one VF channel and measured in both adjacent channels.

Note: Use this chart *if spare group equipment is available*; if not, use Chart 10.

APPARATUS

Sending Test Equipment (STE):

Frequency: 1000, 3000, and 5000 Hz

Power: -16 and -26 dBm

Impedance: 600 ohms balanced

Receiving Test Equipment (RTE):

Transmission and Noise Measuring System (T&NMS) (via the MEAS TMS LINE/DROP switch or the LINE OUT jack on the J98622AR, AT, or AU manual access panel)

Noise Measuring Set (NMS):

Range: 38 to 45 dBm

Weighting: C Message

Impedance: 600 ohms balanced

Type: 3A or 3B, or equivalent

3P7A Cords (for 600-ohm patches)

P2BJ Cords (for 75-ohm patches)

ED-2C002 Cord (for SMAS only)

368A Plug (75-ohm termination) if spare hybrid coil is used for looping.

Spare Hybrid Coil, 3-dB T Pad (75-ohm impedance), or ***Spare Group Transmitting Trunk*** (LMX-2)

or

 CHART 7 (Contd)

APPARATUS(Cont)

ED-52536-20 MTCE Group Bank Pad (LMX-3)

STEP

PROCEDURE

Note 1: See Fig. 11 and ensure that all required looping and test connections are understood before proceeding with this test.

Note 2: The transmitting channel (in *looped* bank) is designated B_T and is the *disturbing* channel in which tone is sent. Adjacent receiving channels (in *looping* bank) are designated A_R and C_R and are the *disturbed* channels in which crosstalk is measured.

Note 3: The gain of the transmitting and receiving group equipment should be adjusted as prescribed in applicable sections of the 356 Division.

Note 4: The STE and RTE should be calibrated as a test group prior to use at each test frequency.

Note 5: If the channel bank under test is equipped with the CFA unit, **be sure** that the RCV FAIL lamp on the CFA unit is extinguished.

Preparation

- 1 If an external RTE is used, adjust for a measurement of -3 dBm.
- 2 Adjust the STE as follows:
 - Impedance: 600 ohms balanced
 - Frequency: 1000 Hz
 - Power: -26.0 dBm
- 3 At LMX-2 equipment, make looping connections as shown in Fig. 12(a) or 12(b), as applicable.
- 4 At LMX-3 equipment, make looping connections as shown in Fig. 13.
- 5a* Connect the STE to the *looped*-bank CONN JK MULT LINE IN jack (on the 22AR or AT MAP) [patch (1), Fig. 14].
- 5b† On an adjacent non-SMAS J98626() frame, connect the STE to the *looped*-bank LINE IN jack (on the 22AU MAP) [patch (1), Fig. 14].

CHART 7 (Contd)

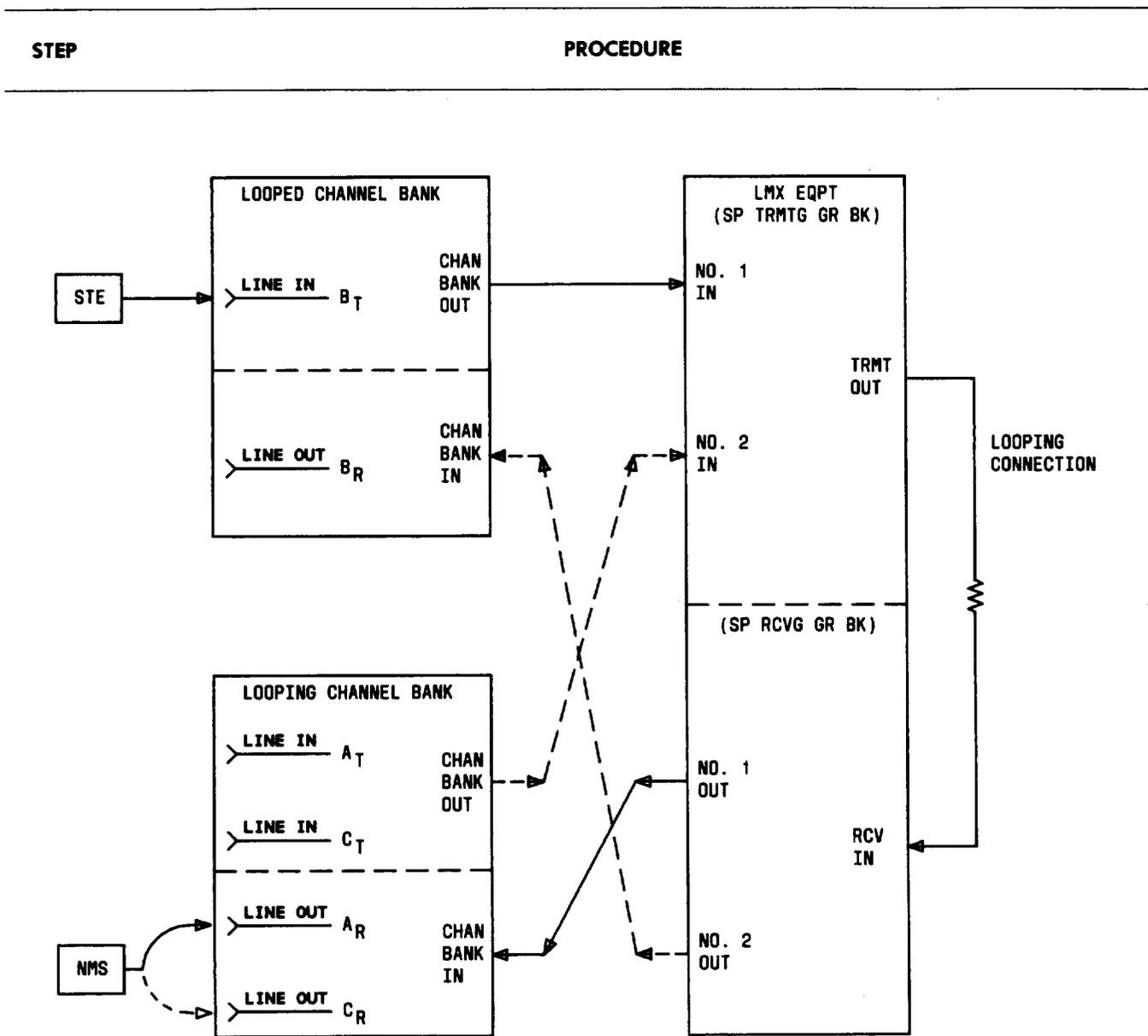


Fig. 11—Channel Bank Under Test Cross-Looped (Frogged) Via Another Bank (Looping Bank)—Typical Connections for Equal-Level Looping

6a* Connect the JK MULT connector (on the 22AR or AT MAP) to the CHAN BANK connector (on the maintenance connector) for Channel 1 of the **looped** channel bank under test [Test A, Table E, and patch (2), Fig. 14].

6b† On the adjacent non-SMAS J98626() frame, connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector on the frame under

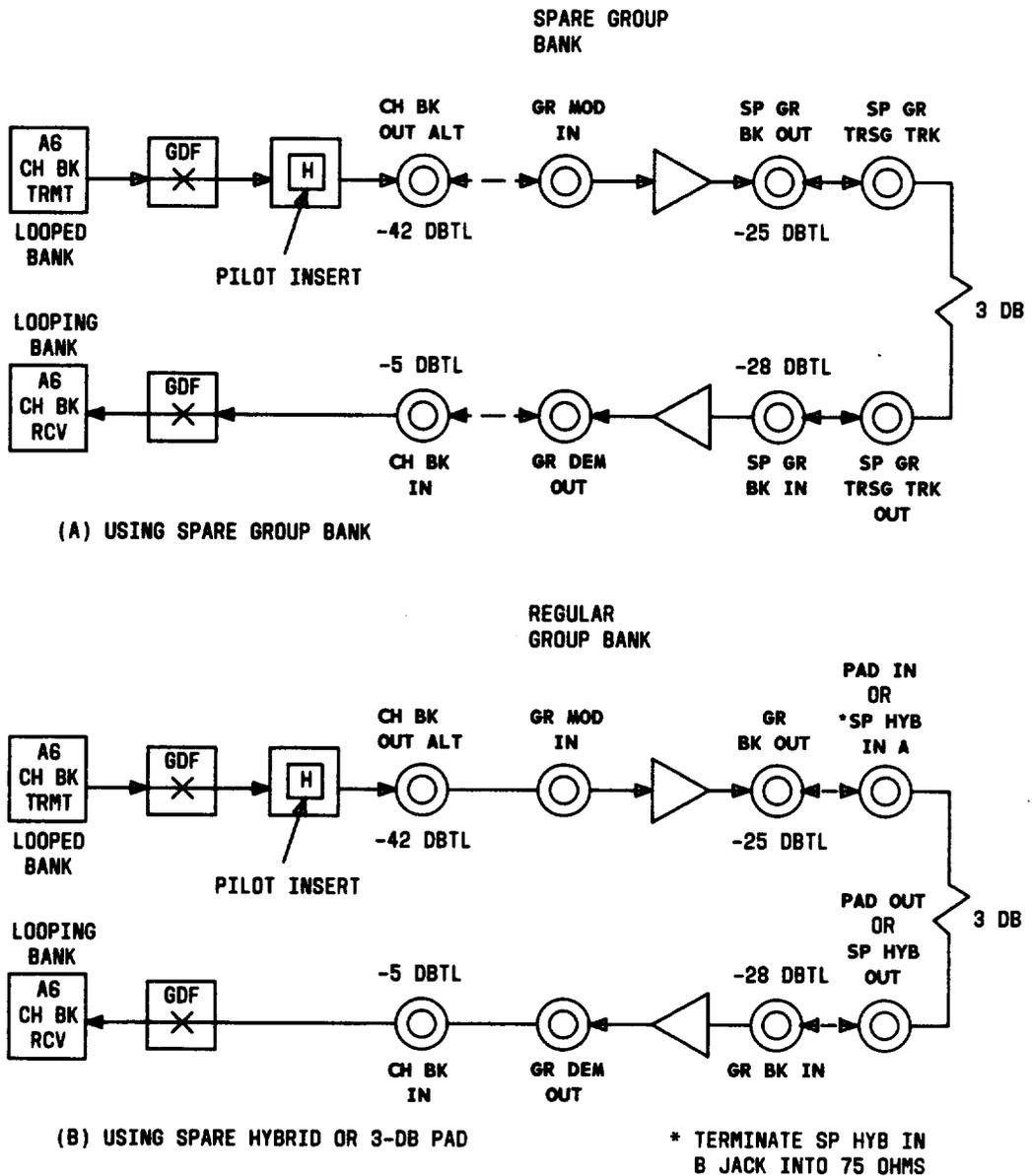


Fig. 12—Typical Channel Bank Equal-Level Cross-Looping Arrangements—LMX-2

CHART 7 (Contd)

STEP	PROCEDURE
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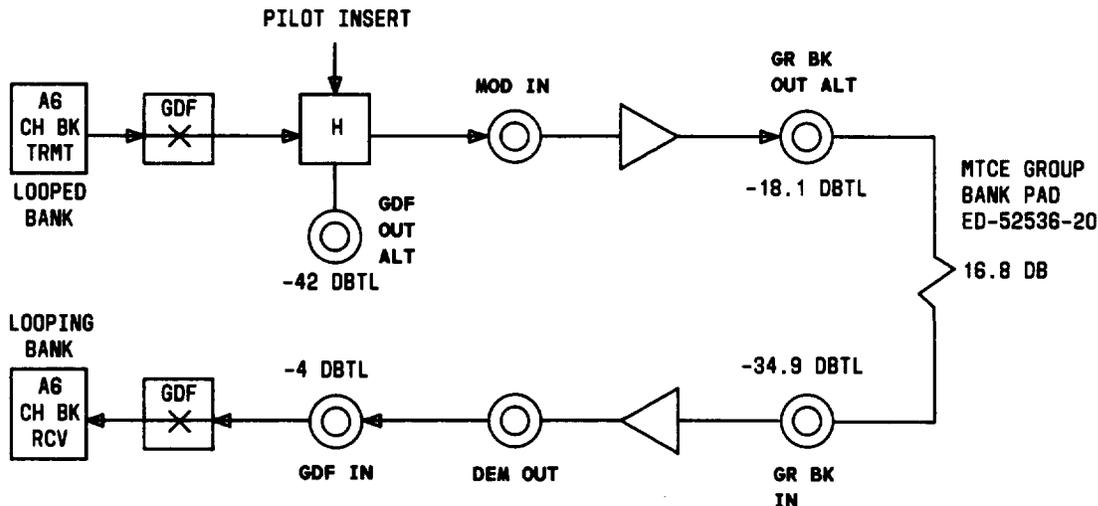


Fig. 13—Typical Channel Bank Equal-Level Cross-Looping Arrangements—LMX-3

test) for Channel 1 of the **looped** channel bank under test [Test A, Table E, and patch (2), Fig. 14].

7a* Set the VF CKT switch (on the 22AR or AT MAP) to the Channel 1 position (for the **looping** bank) for Test A in Table E.

7b† Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector for the Channel 1 position for the **looping** bank [Test A, Table E, and patch (3), Fig. 14].

8* Press the ACS (or ACC) switch (on the 22AR or AT MAP).

9 Momentarily operate the MEAS TMS LINE/DROP switch to the LINE position.

Note: If the T&NMS is not available via the MEAS TMS LINE switch, connect the RTE to the LINE OUT jack [patch (4), Fig. 14].

10 Observe that the signal power indicated on the T&NMS is -2.8 to -3.2 dBm.

Note: If the requirement is **not** met, check the looping connections at the LMX bay. Then, if necessary, adjust the channel gain ADJ control (on the corresponding channel modem) to obtain -3.0 dBm.

11 Remove patch (2), Fig. 14 [and patch (3), if used] from the maintenance connector(s).

CHART 7 (Contd)

STEP

PROCEDURE

TABLE E

CROSSTALK TEST CONNECTIONS
CHANNEL GAIN VERIFICATION (1000 HZ)

TEST	TRANSMIT CHANNEL (LOOPED BANK)	RECEIVE CHANNEL (LOOPING BANK)
	CONNECT STE TO VF INPUT OF CHANNEL	CONNECT RTE TO VF OUTPUT OF CHANNEL
A	1	1
B	2	2
C	3	3
D	4	4
E	5	5
F	6	6
G	7	7
H	8	8
I	9	9
J	10	10
K	11	11
L	12	12

Note: If the J98622AR or AT manual access panel is used, patch (4) must be removed from the LINE OUT jack.

- 12 Repeat applicable Steps 6 through 11 for Channels 2 to 12 (Tests B through L listed in Table E) of the **looped** channel bank under test.

Crosstalk

- 13 Adjust the STE as follows:

Impedance: 600 ohms balanced

Frequency: 3000 Hz

Power: -16 dBm

CHART 7 (Contd)

STEP

PROCEDURE

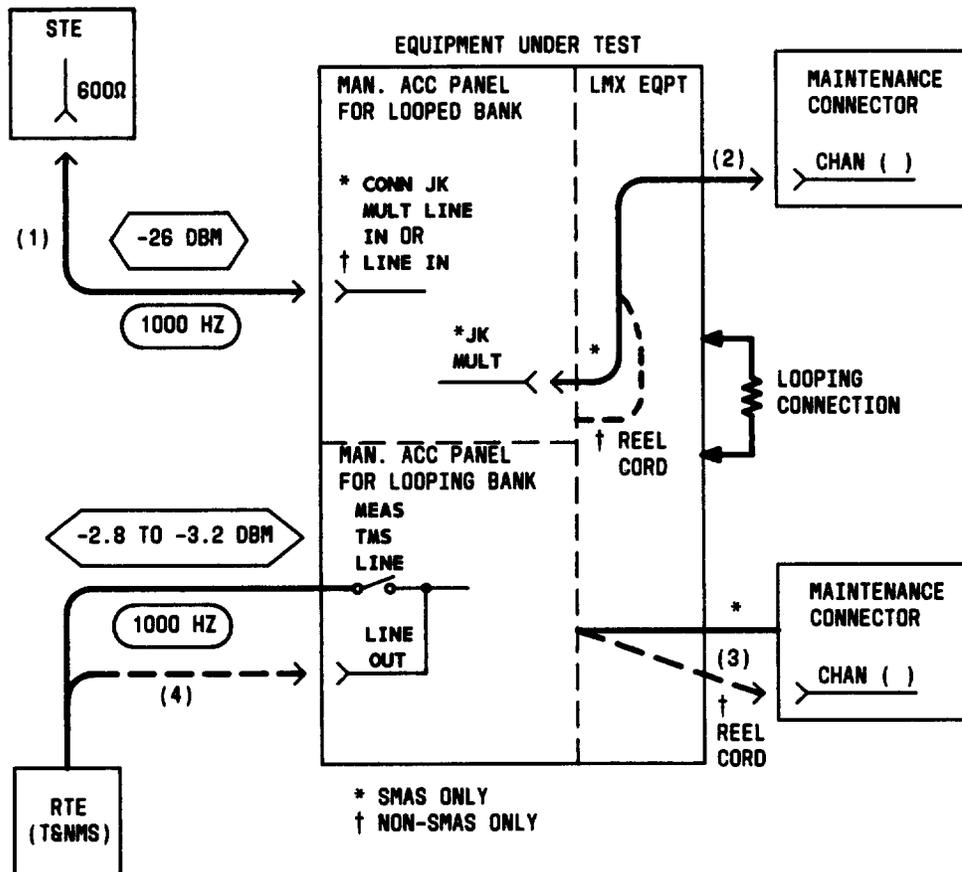


Fig. 14—Patching Diagram—Crosstalk Test—Equal-Level Looping—Channel Gain Verification (1000 Hz)

14 Adjust the NMS as follows:

Range: Minimum sensitivity (85 dB_{rn} on the 3A NMS)

Weighting: C Message

Impedance: 600 ohms balanced

Damping: DAMP

CHART 7 (Contd)

STEP	PROCEDURE
15a*	Connect the JK MULT connector (on the 22AR or AT MAP) to the CHAN BANK connector (on the maintenance connector) for the <i>looped</i> channel designated Br for Test A in Table F [patch (2), Fig. 15].

TABLE F
CROSSTALK TEST CONNECTIONS
LOWER ADJACENT CHANNEL TEST (3000 HZ)

TEST	TRANSMIT CHANNEL (LOOPED BANK)	RECEIVE CHANNEL (LOOPING BANK)
	CONNECT STE TO VF INPUT OF CHANNEL B _T *	CONNECT NMS TO VF OUTPUT OF CHANNEL A _R *
A	2	1
B	3	2
C	4	3
D	5	4
E	6	5
F	7	6
G	8	7
H	9	8
I	10	9
J	11	10
K	12	11

* Subscripts "T" and "R" denote VF transmit and receive sections of the indicated channels.
 For example, in Test A:
 Channel B_T = Channel 2, transmit section
 Channel A_R = Channel 1, receive section

CHART 7 (Contd)

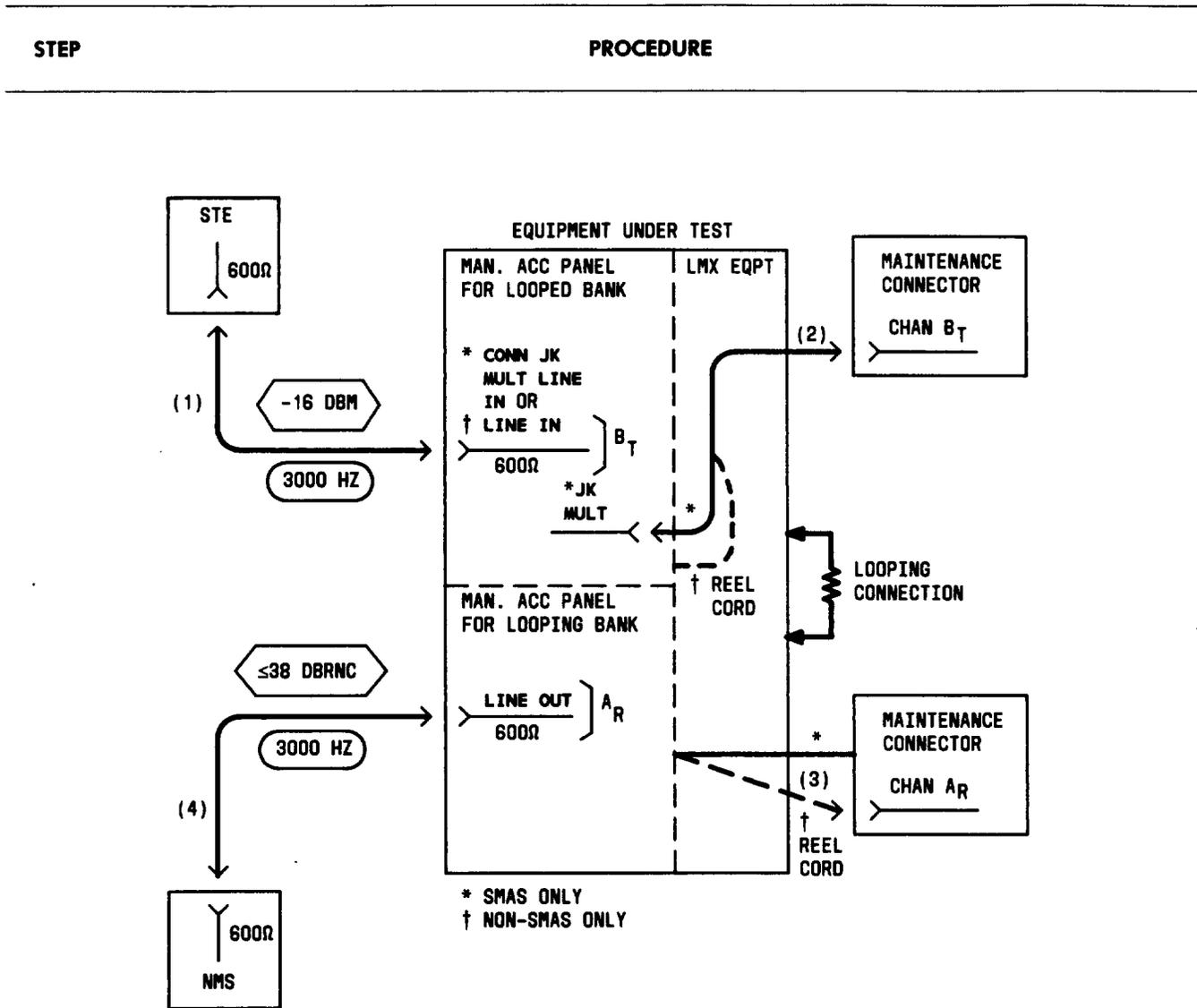


Fig. 15—Patching Diagram—Crosstalk Test—Equal-Level Looping—Lower Adjacent Channel (3000 Hz)

- 15b† On the adjacent non-SMAS J98626() frame, connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector on the frame under test) for the *looped* channel designated B_T for Test A in Table F [patch (2), Fig. 15].
- 16a* Set the VF CKT switch (on the 22AR or AT MAP) to the *looping*-channel position designated A_R for Test A in Table F.
- 16b† Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector for the *looping*-channel position designated A_R for Test A in Table F [patch (3), Fig. 15].

CHART 7 (Contd)

STEP	PROCEDURE
17*	Press the ACS (or ACC) switch (on the 22AR or AT MAP).
18	Connect the NMS to the LINE OUT jack [patch (4), Fig. 15].
19	Measure the noise at the LINE OUT jack. Requirement: 38 dBrnc or less (37 dBrnc is less than 38)
20	If the requirement of Step 19 is <i>not</i> met, (a) Replace the channel modem for Channel B (Br). (b) Repeat applicable steps in Charts 2, 3, 5, and 6 for Channel B. (c) Repeat applicable Steps 1 through 19.
21	Set the NMS range switch to minimum sensitivity.
22	Remove patch (2), Fig. 15 [and patch (3), if used] from the maintenance connector(s). Note: If the J98622AR or AT manual access panel is used, patch (4) must be removed from the LINE OUT jack.
23	Repeat applicable Steps 15 through 22 for Tests B through K listed in Table F.
24a*	Connect the JK MULT connector (on the 22AR or AT MAP) to the CHAN BANK connector (on the maintenance connector) for the <i>looped</i> channel designated Br for Test A in Table G [patch (2), Fig. 16].
24b†	On the adjacent non-SMAS J98626() frame, connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector on the frame under test) for the <i>looped</i> channel designated Br for Test A in Table G [patch (2), Fig. 16].
25a*	Set the VF CKT switch (on the 22AR or AT MAP) to the <i>looping</i> -channel position designated Cr for Test A in Table G.
25b†	Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector for the <i>looping</i> -channel position designated Cr for Test A in Table G [patch (3), Fig. 16].
26*	Press the ACS (or ACC) switch (on the 22AR or AT MAP).
27*	Connect the NMS to the LINE OUT jack [patch (4), Fig. 16].
28	Measure the noise at the LINE OUT jack. Requirement: 45 dBrnc or less (44 dBrnc is less than 45)

CHART 7 (Contd)

STEP	PROCEDURE
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TABLE G

**CROSSTALK TEST CONNECTIONS
UPPER ADJACENT CHANNEL TEST (3000 HZ)**

TEST	TRANSMIT CHANNEL (LOOPED BANK)	RECEIVE CHANNEL (LOOPING BANK)
	CONNECT STE TO VF INPUT OF CHANNEL B_T^*	CONNECT NMS TO VF OUTPUT OF CHANNEL C_R^*
A	1	2
B	2	3
C	3	4
D	4	5
E	5	6
F	6	7
G	7	8
H	8	9
I	9	10
J	10	11
K	11	12

* Subscripts "T" and "R" denote VF transmit and receive sections of the indicated channels.
For example, in Test A:
Channel B_T = Channel 1, transmit section
Channel C_R = Channel 2, receive section

- 29 If the requirement of Step 28 is **not** met,
- Replace the channel modem for Channel C (C_R).
 - Repeat applicable steps in Charts 2, 3, 5, and 6 for Channel C.
 - Repeat applicable Steps 1 through 28.
- 30 Set the NMS range switch to minimum sensitivity.
- 31 Remove patch (2), Fig. 16 [and patch (3), if used] from the maintenance connector(s).

CHART 7 (Contd)

STEP

PROCEDURE

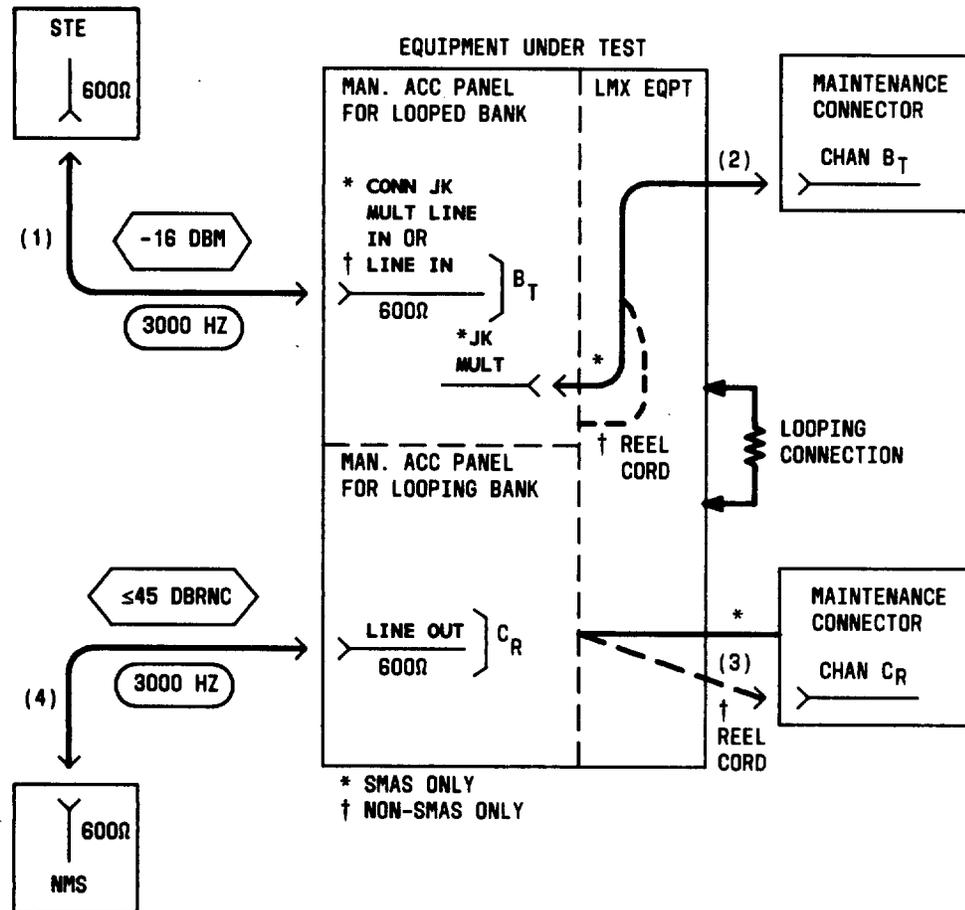


Fig. 16—Patching Diagram—Crosstalk Test—Equal-Level Looping—Upper Adjacent Channel (3000 Hz)

Note: If the J98622AR or AT manual access panel is used, patch (4) must be removed from the LINE OUT jack.

- 32 Repeat applicable Steps 24 through 31 for Tests B through K listed in Table G.
- 33 Set the STE to -16 dBm at 5000 Hz.
- 34a* Connect the JK MULT connector (on the 22AR or AT MAP) to the CHAN BANK connector (on the maintenance connector) for the *looped* channel designated B_r for Test A in Table H [patch (2), Fig. 17].

CHART 7 (Contd)

STEP	PROCEDURE
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TABLE H

**CROSSTALK TEST CONNECTIONS
UPPER ADJACENT CHANNEL TEST (5000 HZ)**

TEST	TRANSMIT CHANNEL (LOOPED BANK)	RECEIVE CHANNEL (LOOPING BANK)
	CONNECT STE TO VF INPUT OF CHANNEL B_T^*	CONNECT NMS TO VF OUTPUT OF CHANNEL C_R^*
A	1	2
B	2	3
C	3	4
D	4	5
E	5	6
F	6	7
G	7	8
H	8	9
I	9	10
J	10	11
K	11	12

* Subscripts "T" and "R" denote VF transmit and receive sections of the indicated channels. For example, in Test A:
Channel B_T = Channel 1, transmit section
Channel C_R = Channel 2, receive section

- 34b† On the adjacent non-SMAS J98626() frame, connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector on the frame under test) for the **looped** channel designated B_T for Test A in Table H [patch (2), Fig. 17].
- 35a* Set the VF CKT switch (on the 22AR or AT MAP) to the **looping**-channel position designated C_R for Test A in Table H.
- 35b† Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector for the **looping**-channel position designated C_R for Test A in Table H [patch (3), Fig. 17].
- 36* Press the ACS (or ACC) switch (on the 22AR or AT MAP).

CHART 7 (Contd)

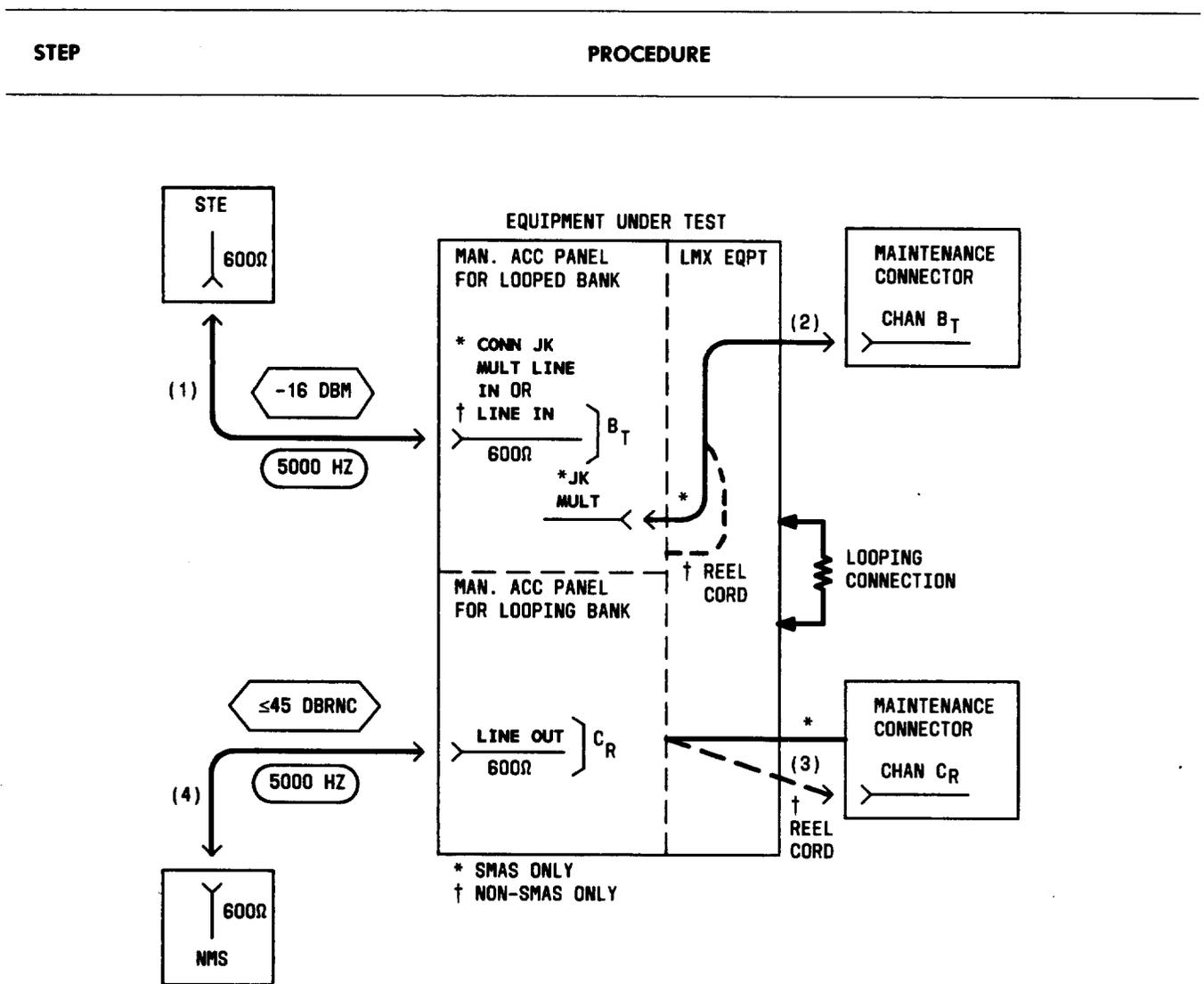


Fig. 17—Patching Diagram—Crosstalk Test—Equal-Level Looping—Upper Adjacent Channel (5000 Hz)

37* Connect the NMS to the LINE OUT jack [patch (4), Fig. 17].

38 Measure the noise at the LINE OUT jack.

Requirement: 45 dBrc or less (44 dBrc is less than 45)

39 If the requirement of Step 38 is *not* met,

(a) Replace the channel modem for Channel B (Br).

CHART 7 (Contd)

STEP	PROCEDURE
	(b) Repeat applicable steps in Charts 2, 3, 5, and 6 for Channel B.
	(c) Repeat applicable Steps 1 through 38.
40	Set the NMS range switch to minimum sensitivity.
41	Remove patch (2), Fig. 17 [and patch (3), if used] from the maintenance connector(s).
	Note: If the J98622AR or AT manual access panel is used, patch (4) must be removed from the LINE OUT jack.
42	Repeat applicable Steps 34 through 41 for Tests B through K listed in Table H.
43	At the LMX equipment, remove looping connections made in Step 3 or 4.
44	Repeat applicable Steps 1 through 43 for all other channel banks to be tested.
45	Remove patch (1), Fig. 17.
46*	Press the ACS (or ACC) RLS switch (on the 22AR or AT MAP).
47†	Remove patch (4), Fig. 17.

CHART 8

FREQUENCY RESPONSE TEST—UNEQUAL-LEVEL LOOPING

The frequency response of each channel in the A6 bank must be such that when the output at 1000 Hz is -22.0 dBm, the output at 200 Hz is within the range of -21.5 to -25.0 dBm.

Note: Use this chart *only if spare group equipment is not available.*

APPARATUS

Sending Test Equipment (STE):

Frequency: 200 and 1000 Hz

Power: -8 dBm

Impedance: 600 ohms balanced

Receiving Test Equipment (RTE):

Transmission and Noise Measuring System (T&NMS) (via the MEAS TMS LINE/DROP switch or the LINE OUT jack on the J98622AR, AT, or AU manual access panel)

3P7A Cords (for 600-ohm patches)

3P20B Cord (for 135-ohm patches)

STEP

PROCEDURE

Note 1: The STE and RTE should be calibrated as a test group prior to use at each test frequency.

Note 2: If the channel bank under test is equipped for CFA, ***remove the CFA unit before starting this test.***

- 1 If an external RTE is used, adjust for a measurement of -22 dBm.
- 2 Adjust the STE as follows:
 - Impedance: 600 ohms balanced
 - Frequency: 1000 Hz
 - Power: -8.0 dBm

CHART 8 (Contd)

STEP	PROCEDURE
3	At the LMX equipment, connect the CH BK OUT ALT (LMX-2) or GDF OUT ALT (LMX-3) jack to the CH BK IN (LMX-2) or GDF IN (LMX-3) jack [patch (1), Fig. 18].
4*	Set the CHAN BANK switch (on the 22AR or AT MAP) to the first channel bank to be tested.
5a*	Set the VF CKT switch (on the 22AR or AT MAP) to the Channel 1 position.
5b†	Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector) for Channel 1 [patch (2), Fig. 18].
6*	Press the ACS (or ACC) switch (on the 22AR or AT MAP).
7	Connect the STE to the LINE IN jack [patch (3), Fig. 18].
8	Momentarily operate the MEAS TMS LINE/DROP switch to the LINE position. Note: If the T&NMS is not available via the MEAS TMS LINE switch, connect the RTE to the LINE OUT jack [patch (4), Fig. 18].
9	Observe that the signal power indicated on the T&NMS is -22.0 dBm. Note: If the requirement is <i>not</i> met, check the looping connections at the LMX bay. Then, if necessary, adjust the channel gain ADJ control (on the corresponding channel modem) to obtain -22.0 dBm.
10	Set the STE frequency to 200 Hz.
11	Record the signal power indicated on the T&NMS. Requirement: -21.5 to -25.0 dBm
12	If the requirement of Step 11 is <i>not</i> met, (a) Replace the channel modem under test with a spare unit. (b) Repeat applicable steps in Charts 2 and 3 for the channel under test. (c) Repeat applicable Steps 1 through 11.
13*	Remove patch (3), Fig. 18 [and patch (4), if used].
14†	Remove the retractable cord (on the 22AU MAP) from the channel under test [patch (2), Fig. 18].
15	Repeat applicable Steps 1 through 14 for Channels 2 to 12 of the channel bank under test.

CHART 8 (Contd)

STEP	PROCEDURE
16†	Remove patch (3) [and patch (4), if used].
17	At the LMX equipment, remove patch (1), Fig. 18. Note: If the channel bank under test is equipped for CFA, reinsert the CFA unit.
18	Repeat applicable Steps 1 through 17 for all other channel banks to be tested.
19*	Press the ACS (for ACC) RLS switch (on the 22AR or AT MAP).
20	If noise and crosstalk tests are not to be performed, readjust the gain ADJ control for all channel banks tested, as prescribed in Chart 4.

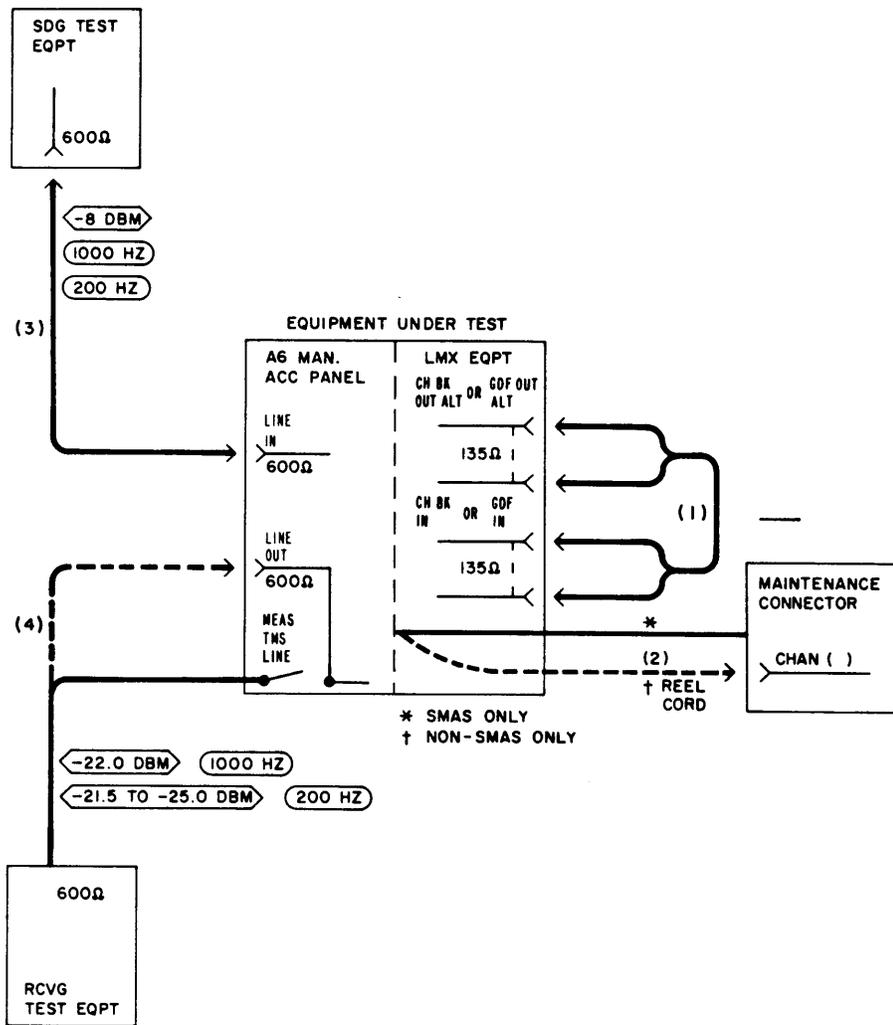


Fig. 18—Patching Diagram—Frequency Response Test—Unequal-Level Looping

CHART 9

NOISE TEST—UNEQUAL-LEVEL LOOPING

For proper channel bank operation, the noise level in each channel of the A6 bank must not exceed the limit beyond which it interferes with normal speech.

Note: Use this chart *only if spare group equipment is not available.*

APPARATUS

Sending Test Equipment (STE):

Frequency: 1000 Hz

Power: -8 dBm

Impedance: 600 ohms balanced

Receiving Test Equipment (RTE):

Transmission and Noise Measuring System (T&NMS) (via the MEAS TMS LINE/DROP switch or the LINE OUT jack on the J98622AR, AT, or AU manual access panel)

Noise Measuring Set (NMS):

Range: 17 to 27 dBrn

Weighting: C Message and 3 kHz flat

Impedance: 600 ohms balanced

Type: 3A or 3B, or equivalent

3P7A Cords (for 600-ohm patches)

3P20B Cord (for 135-ohm patches)

262B Plug (600-ohm termination)

STEP

PROCEDURE

Note 1: The STE and RTE should be calibrated as a test group prior to use at each test frequency.

Note 2: If the channel bank under test is equipped for CFA, ***remove the CFA unit before starting this test.***

CHART 9 (Contd)

STEP	PROCEDURE
Preparation	
1	If an external RTE is used, adjust for a measurement of -22 dBm.
2	Adjust the STE as follows: Impedance: 600 ohms balanced Frequency: 1000 Hz Power: -8.0 dBm
3	At the LMX equipment, connect the CH BK OUT ALT (LMX-2) or GDF OUT ALT (LMX-3) jack to the CH BK IN (LMX-2) or GDF IN (LMX-3) jack [patch (1), Fig. 19].
4*	Set the CHAN BANK switch (on the 22AR or AT MAP) to the first channel bank to be tested.
5a*	Set the VF CKT switch (on the 22AR or AT MAP) to the Channel 1 position.
5b†	Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector) for Channel 1 [patch (2), Fig. 19].
6*	Press the ACS (or ACC) switch (on the 22AR or AT MAP).
7	Connect the STE to the LINE IN jack [patch (3), Fig. 19].
8	Momentarily operate the MEAS TMS LINE/DROP switch to the LINE position. Note: If the T&NMS is not available via the MEAS TMS LINE switch, connect the RTE to the LINE OUT jack [patch (4), Fig. 19].
9	Observe that the signal power indicated on the T&NMS is -22.0 dBm. Note: If the requirement is <i>not</i> met, check the looping connections at the LMX bay. Then, if necessary, adjust the channel gain ADJ control (on the corresponding channel modem) to obtain -22.0 dBm.
10*	Remove patch (3), Fig. 19 [and patch (4), if used].
11†	Remove the retractable cord (on the 22AU MAP) from the channel under test [patch (2), Fig. 19].
12	Repeat applicable Steps 5 through 11 for Channels 2 to 12 of the channel bank under test.

CHART 9 (Contd)

STEP	PROCEDURE
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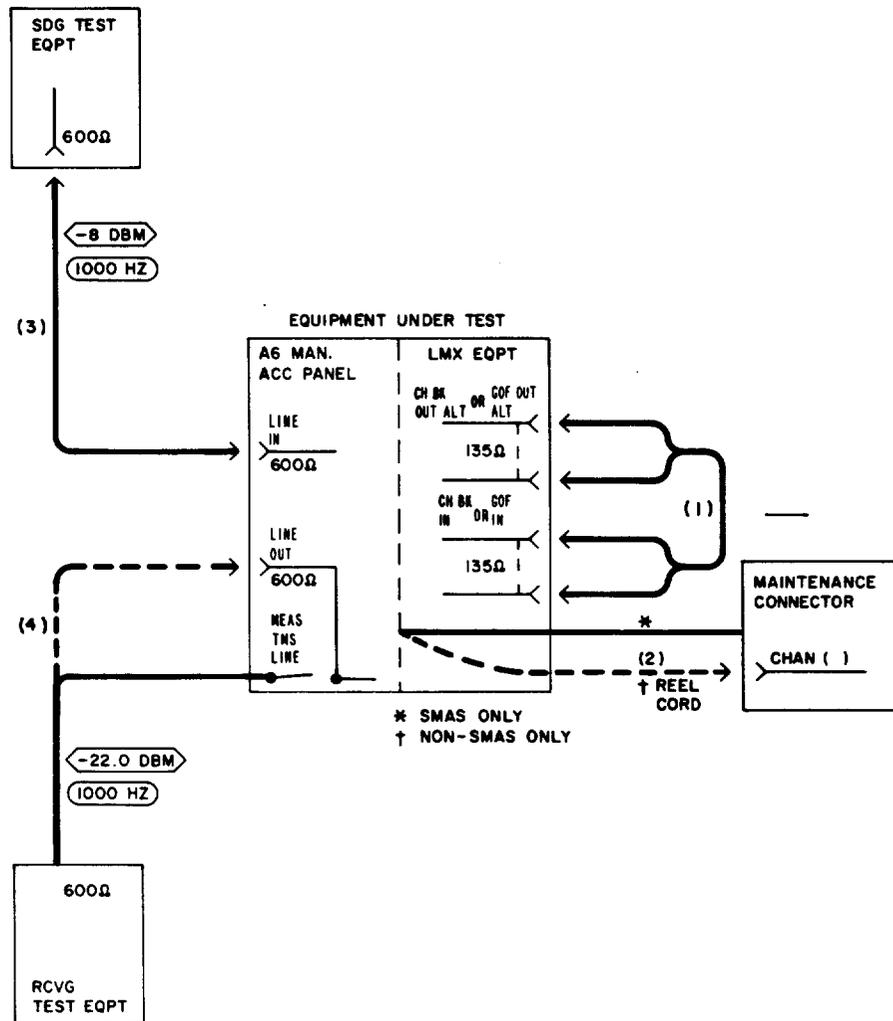


Fig. 19—Patching Diagram—Preparation—Unequal-Level Looping

Noise

13 Adjust the NMS as follows:

Range: Minimum sensitivity (85 dB_rn on the 3A NMS)

CHART 9 (Contd)

STEP	PROCEDURE
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Weighting: C Message

Impedance: 600 ohms balanced

Damping: DAMP

- 14a* Set the VF CKT switch (on the 22AR or AT MAP) to the Channel 1 position.
- 14b† Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector) for Channel 1 [patch (2), Fig. 20].
- 15* Press the ACS (or ACC) switch (on the 22AR or AT MAP).
- 16 Insert a 262B plug (600-ohm termination) in the LINE IN jack (Fig. 20).
- 17 Connect the NMS to the LINE OUT jack [patch (3), Fig. 20].
- 18 Measure the noise at the LINE OUT jack.

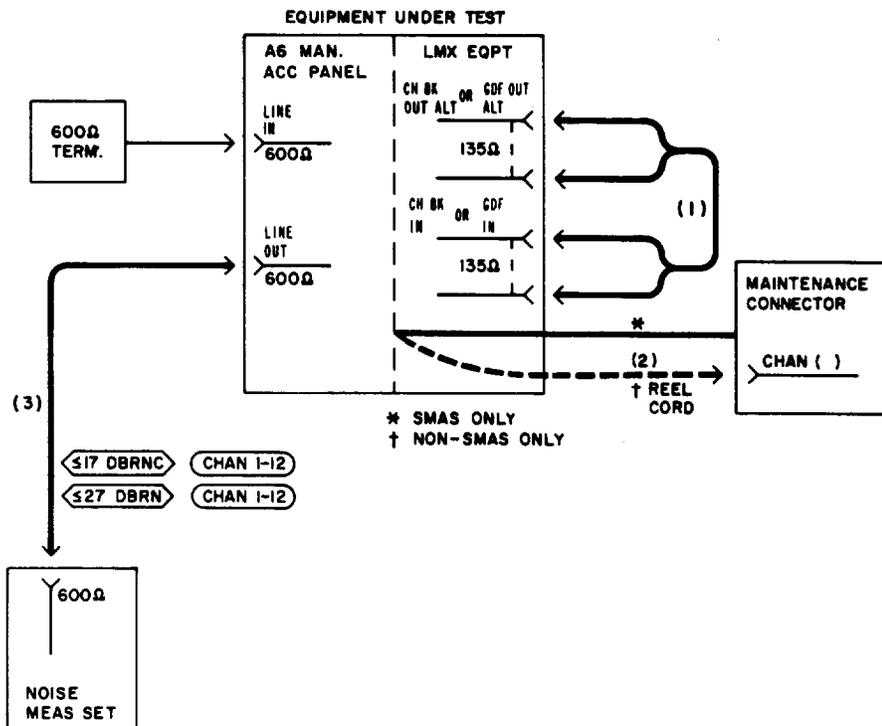


Fig. 20—Patching Diagram—Noise Test—Unequal-Level Looping

 CHART 9 (Contd)

STEP	PROCEDURE
	Requirement: 17 dBrnc or less (16 dBrnc is less than 17)
19	Set the NMS range switch to minimum sensitivity.
20	Set the NMS weighting to 3 kHz flat.
21	Measure the noise at the LINE OUT jack.
	Requirement: 27 dBrn or less (26 dBrn is less than 27)
22	If the requirements of Steps 18 and 21 are not met, <ul style="list-style-type: none"> (a) Replace the channel modem under test with a spare unit. (b) Repeat applicable steps in Charts 2, 3, and 8 for the channel under test. (c) Repeat applicable Steps 1 through 21.
23	If the requirements of Steps 18 and 21 cannot be met, <ul style="list-style-type: none"> (a) Reinsert the channel modem replaced in Step 22(a). (b) Replace the channel bank modem under test with a spare. (c) Repeat applicable steps in Chart 2 for Channels 1 to 12. (d) Repeat applicable Steps 1 through 21.
24	Set the NMS range switch to minimum sensitivity.
25*	Remove patch (3), Fig. 20, and the 262B plug (inserted in Step 16).
26†	Remove the retractable cord (on the 22AU MAP) from the channel under test [patch (2), Fig. 20].
27	Repeat applicable Steps 13 through 26 for Channels 2 to 12 of the channel bank under test.
28†	Remove patch (3), Fig. 20, and the 262B plug (inserted in Step 16).
29	At the LMX equipment, remove patch (1), Fig. 20.
	Note: If the channel bank under test is equipped for CFA, reinsert the CFA unit.
30	Repeat applicable Steps 1 through 29 for all other channel banks to be tested.

CHART 9 (Contd)

STEP	PROCEDURE
31*	Press the ACS (or ACC) RLS switch (on the 22AR or AT MAP).
32	If crosstalk test is <i>not</i> to be performed, readjust the gain ADJ control for all channels tested, as prescribed in Chart 4.

CHART 10

CROSSTALK TEST—UNEQUAL-LEVEL LOOPING

For proper channel bank operation, the crosstalk in each channel of the A6 bank must not exceed the limit beyond which it interferes with normal speech. This test is performed via two cross-looped (frogged) channel banks, with test tone applied to one VF channel and measured in both adjacent channels.

Note: Use this chart *only if spare group equipment is not available.*

APPARATUS

Sending Test Equipment (STE):

Frequency: 1000, 3000, and 5000 Hz

Power: -8 dBm

Impedance: 600 ohms balanced

Receiving Test Equipment (RTE):

Transmission and Noise Measuring System (T&NMS) (via the MEAS TMS LINE/DROP switch or the LINE OUT jack on the J98622AR, AT, or AU manual access panel)

Noise Measuring Set (NMS):

Range: 17 dBrn

Weighting: C Message

Impedance: 600 ohms balanced

Type: 3A or 3B, or equivalent

3P7A Cords (for 600-ohm patches)

3P20B Cord (for 135-ohm patches)

ED-2C002 Cord (for SMAS only)

STEP

PROCEDURE

Note 1: See Fig. 21 and ensure that all required looping and test connections are understood before proceeding with this test.

CHART 10 (Contd)

STEP	PROCEDURE
	<p>Note 2: The transmitting channel (in <i>looped</i> bank) is designated Br and is the <i>disturbing</i> channel in which tone is sent. Adjacent receiving channels (in <i>looping</i> bank) are designated Ar and Cr and are the <i>disturbed</i> channels in which crosstalk is measured.</p> <p>Note 3: The STE and RTE should be calibrated as a test group prior to use at each test frequency.</p> <p>Note 4: If the channel bank under test is equipped for CFA, <i>remove the CFA unit before starting this test.</i></p> <p>Preparation</p>
1	If an external RTE is used, adjust for a measurement of -22 dBm.
2	Adjust the STE as follows: <ul style="list-style-type: none"> Impedance: 600 ohms balanced Frequency: 1000 Hz Power: -8.0 dBm
3	At the LMX equipment, connect the CH BK OUT ALT (LMX-2) or GDF OUT ALT (LMX-3) jack of the <i>looped</i> bank to the CH BK IN (LMX-2) or GDF IN (LMX-3) jack of the <i>looping</i> bank [patch (1), Fig. 22].
4*	Set the CHAN BANK switch (on the 22AR or AT MAP) to the first channel bank to be tested.
5a*	Connect the STE to the <i>looped</i> -bank CONN JK MULT LINE IN jack (on the 22AR or AT MAP) [patch (2), Fig. 22].
5b†	On an adjacent non-SMAS J98626() frame, connect the STE to the <i>looped</i> -bank LINE IN jack (on the 22AU MAP) [patch (2), Fig. 22].
6a*	Connect the JK MULT connector (on the 22AR or AT MAP) to the CHAN BANK connector (on the maintenance connector) for Channel 1 of the <i>looped</i> channel bank under test [Test A, Table I, and patch (3), Fig. 22]
6b†	On the adjacent non-SMAS J98626() frame, connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector on the frame under test) for Channel 1 of the <i>looped</i> channel bank under test [Test A, Table I, and patch (3), Fig. 22].
7a*	Set the VF CKT switch (on the 22AR or AT MAP) to the Channel 1 position (for the <i>looping</i> bank) for Test A in Table I.

CHART 10 (Contd)

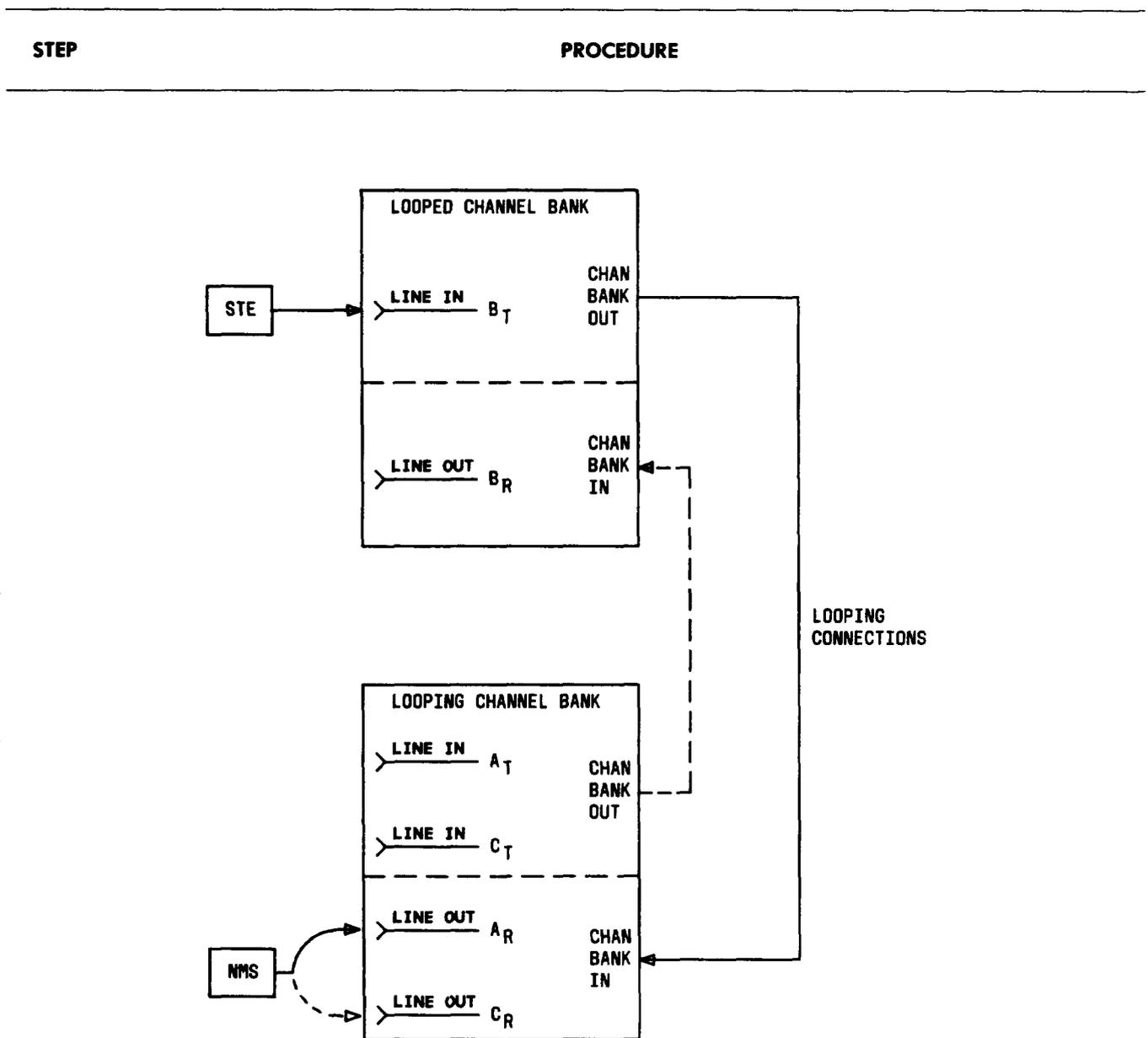


Fig. 21—Channel Bank Under Test Cross-Looped (Frogged) Via Another Bank (Looping Bank)—Typical Connections for Unequal-Level Looping

- 7b† Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector for the Channel 1 position for the **looping** bank [Test A, Table I, and patch (4), Fig. 22].
- 8* Press the ACS (or ACC) switch (on the 22AR or AT MAP).

CHART 10 (Contd)

STEP

PROCEDURE

TABLE I
CROSSTALK TEST CONNECTIONS
CHANNEL GAIN VERIFICATION (1000 HZ)

TEST	TRANSMIT CHANNEL (LOOPED BANK)	RECEIVE CHANNEL (LOOPING BANK)
	CONNECT STE TO VF INPUT OF CHANNEL	CONNECT RTE TO VF OUTPUT OF CHANNEL
A	1	1
B	2	2
C	3	3
D	4	4
E	5	5
F	6	6
G	7	7
H	8	8
I	9	9
J	10	10
K	11	11
L	12	12

- 9 Momentarily operate the MEAS TMS LINE/DROP switch to the LINE position.

Note: If the T&NMS is not available via the MEAS TMS LINE switch, connect the RTE to the LINE OUT jack [patch (5), Fig. 22].

- 10 Observe that the signal power indicated on the T&NMS is -21.8 to -22.2 dBm.

Note: If the requirement is *not* met, check the looping connections at the LMX bay. Then, if necessary, adjust the channel gain ADJ control (on the corresponding channel modem) to obtain -22.0 dBm.

- 11 Remove patch (3), Fig. 22 [and patch (4), if used] from the maintenance connector(s).

Note: If the J98622AR or AT manual access panel is used, patch (5) must be removed from the LINE OUT jack.

- 12 Repeat applicable Steps 6 through 11 for Channels 2 to 12 (Tests B through L listed in Table I) of the *looped* channel bank under test.

CHART 10 (Contd)

STEP	PROCEDURE
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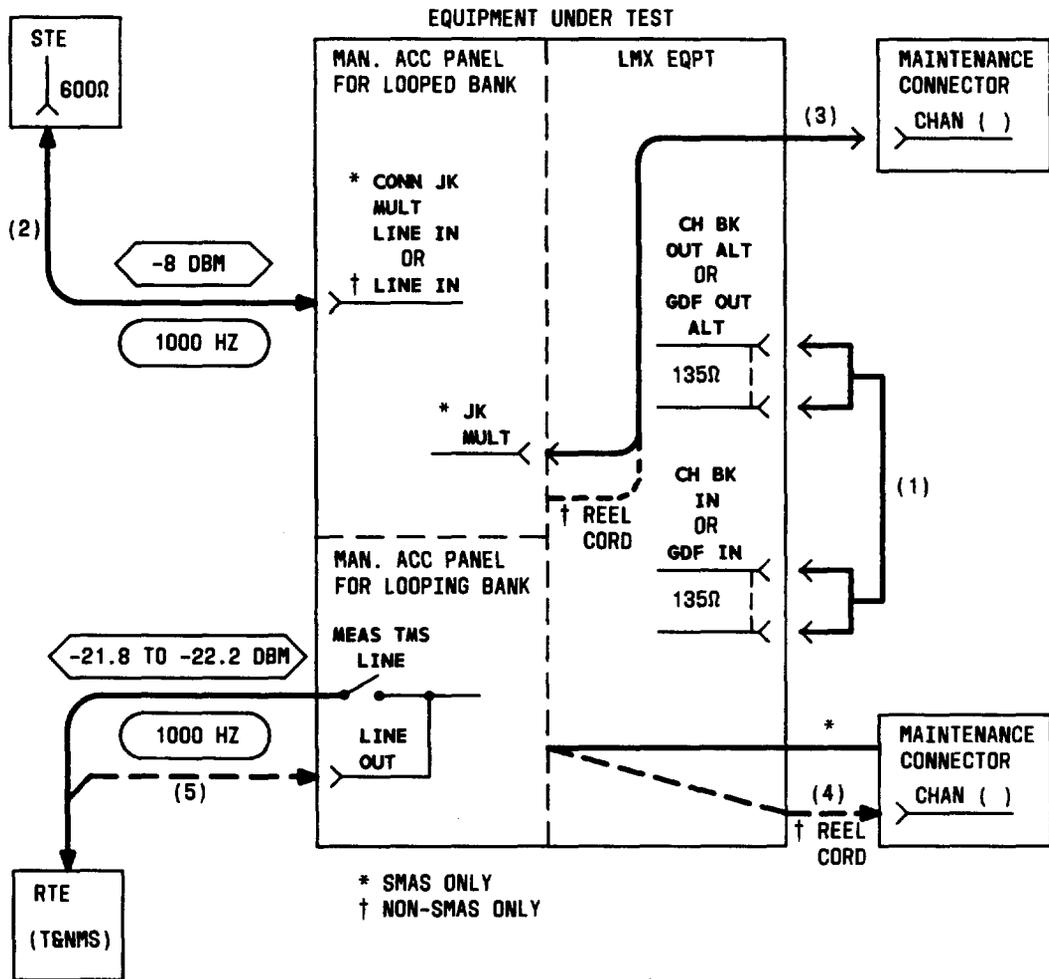


Fig. 22—Patching Diagram—Crosstalk Test—Unequal-Level Looping—Channel Gain Verification (1000 Hz)

Crosstalk

13 Adjust the STE as follows:

Impedance: 600 ohms balanced

Frequency: 3000 Hz

Power: -8.0 dBm

CHART 10 (Contd)

STEP	PROCEDURE
14	Adjust the NMS as follows: Range: Minimum sensitivity (85 dBm on the 3A NMS) Weighting: C Message Impedance: 600 ohms balanced Damping: DAMP
15a*	Connect the JK MULT connector (on the 22AR or AT MAP) to the CHAN BANK connector (on the maintenance connector) for the looped channel designated B _T for Test A in Table J [patch (3), Fig. 23].

**TABLE J
CROSSTALK TEST CONNECTIONS
LOWER ADJACENT CHANNEL TEST (3000 HZ)**

TEST	TRANSMIT CHANNEL (LOOPED BANK)	RECEIVE CHANNEL (LOOPING BANK)
	CONNECT STE TO VF INPUT OF CHANNEL B _T *	CONNECT NMS TO VF OUTPUT OF CHANNEL A _R *
A	2	1
B	3	2
C	4	3
D	5	4
E	6	5
F	7	6
G	8	7
H	9	8
I	10	9
J	11	10
K	12	11

* Subscripts "T" and "R" denote VF transmit and receive sections of the indicated channels. For example, in Test A:
 Channel B_T = Channel 2, transmit section
 Channel A_R = Channel 1, receive section

CHART 10 (Contd)

STEP

PROCEDURE

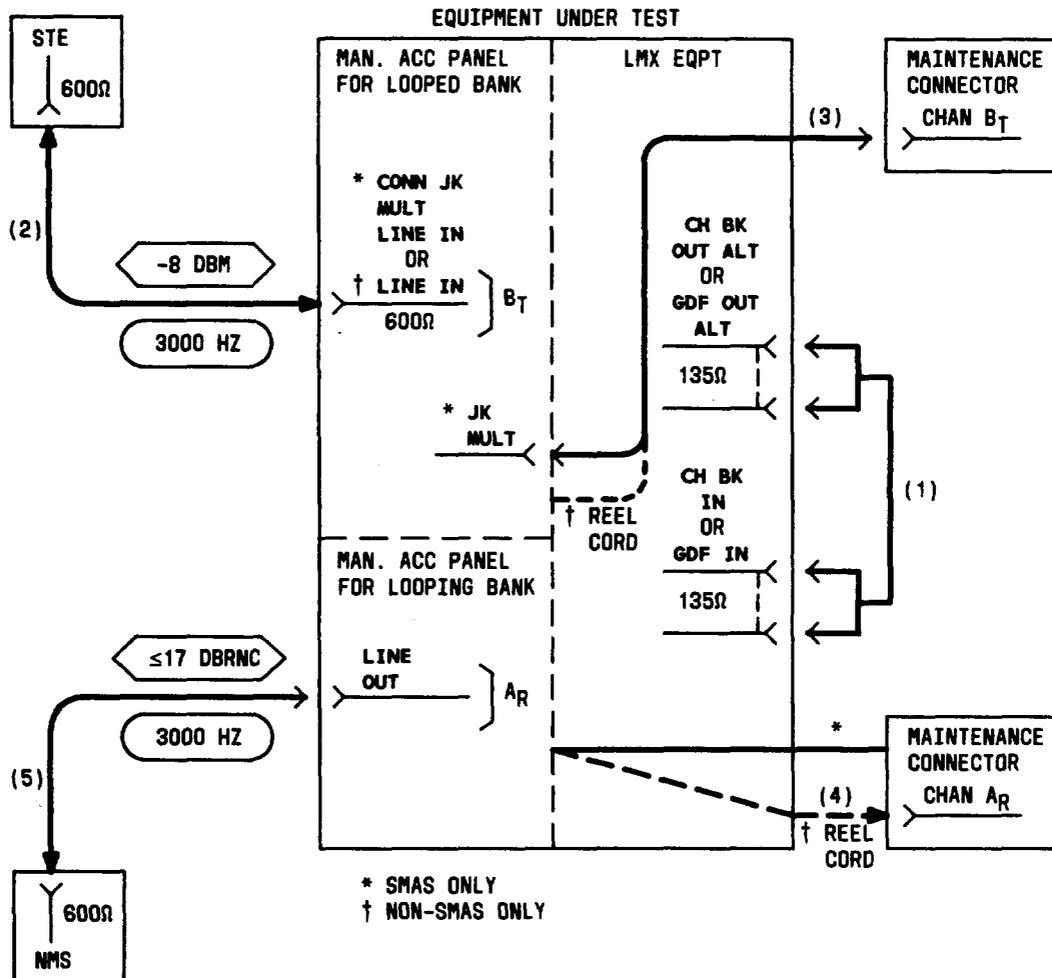


Fig. 23—Patching Diagram—Crosstalk Test—Unequal-Level Looping—Lower Adjacent Channel (3000 Hz)

- 15b† On the adjacent non-SMAS J98626() frame, connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector on the frame under test) for the **looped** channel designated B_r for Test A in Table J [patch (3), Fig. 23].
- 16a* Set the VF CKT switch (on the 22AR or AT MAP) to the **looping**-channel position designated A_R for Test A in Table J.
- 16b† Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector for the **looping**-channel position designated A_R for Test A in Table J [patch (4), Fig. 23].

CHART 10 (Contd)

STEP	PROCEDURE
17*	Press the ACS (or ACC) switch (on the 22AR or AT MAP).
18	Connect the NMS to the LINE OUT jack [patch (5), Fig. 23].
19	Measure the noise at the LINE OUT jack. Requirement: 17 dBrnc or less (16 dBrnc is less than 17)
20	If the requirement of Step 19 is <i>not</i> met, (a) Replace the channel modem for Channel B (Br). (b) Repeat applicable steps in Charts 2, 3, 8, and 9 for Channel B. (c) Repeat applicable Steps 1 through 19.
21	Set the NMS range switch to minimum sensitivity.
22	Remove patch (3), Fig. 23 [and patch (4), if used] from the maintenance connector(s). Note: If the J98622AR or AT manual access panel is used, patch (5) must be removed from the LINE OUT jack.
23	Repeat applicable Steps 15 through 22 for Tests B through K listed in Table J.
24a*	Connect the JK MULT connector (on the 22AR or AT MAP) to the CHAN BANK connector (on the maintenance connector) for the <i>looped</i> channel designated Br for Test A in Table K [patch (3), Fig. 24].
24b†	On the adjacent non-SMAS J98626() frame, connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector on the frame under test) for the <i>looped</i> channel designated Br for Test A in Table K [patch (3), Fig. 24].
25a*	Set the VF CKT switch (on the 22AR or AT MAP) to the <i>looping</i> -channel position designated Cr for Test A in Table K.
25b†	Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector for the <i>looping</i> -channel position designated Cr for Test A in Table K [patch (4), Fig. 24].
26*	Press the ACS (or ACC) switch (on the 22AR or AT MAP).
27*	Connect the NMS to the LINE OUT jack [patch (5), Fig. 24].
28	Measure the noise at the LINE OUT jack. Requirement: 17 dBrnc or less (16 dBrnc is less than 17)

CHART 10 (Contd)

STEP

PROCEDURE

TABLE K

CROSSTALK TEST CONNECTIONS
UPPER ADJACENT CHANNEL TEST (3000 HZ)

TEST	TRANSMIT CHANNEL (LOOPED BANK)	RECEIVE CHANNEL (LOOPING BANK)
	CONNECT STE TO VF INPUT OF CHANNEL B_T^*	CONNECT NMS TO VF OUTPUT OF CHANNEL C_R^*
A	1	2
B	2	3
C	3	4
D	4	5
E	5	6
F	6	7
G	7	8
H	8	9
I	9	10
J	10	11
K	11	12

* Subscripts "T" and "R" denote VF transmit and receive sections of the indicated channels. For example, in Test A:
Channel B_T = Channel 1, transmit section
Channel C_R = Channel 2, receive section

- 29 If the requirement of Step 28 is *not* met,
- (a) Relace the channel modem for Channel C (C_R).
 - (b) Repeat applicable steps in Charts 2, 3, 8, and 9 for Channel C.
 - (c) Repeat applicable Steps 1 through 28.
- 30 Set the NMS range switch to minimum sensitivity.
- 31 Remove patch (3), Fig. 24 [and patch (4), if used] from the maintenance connector(s).

CHART 10 (Contd)

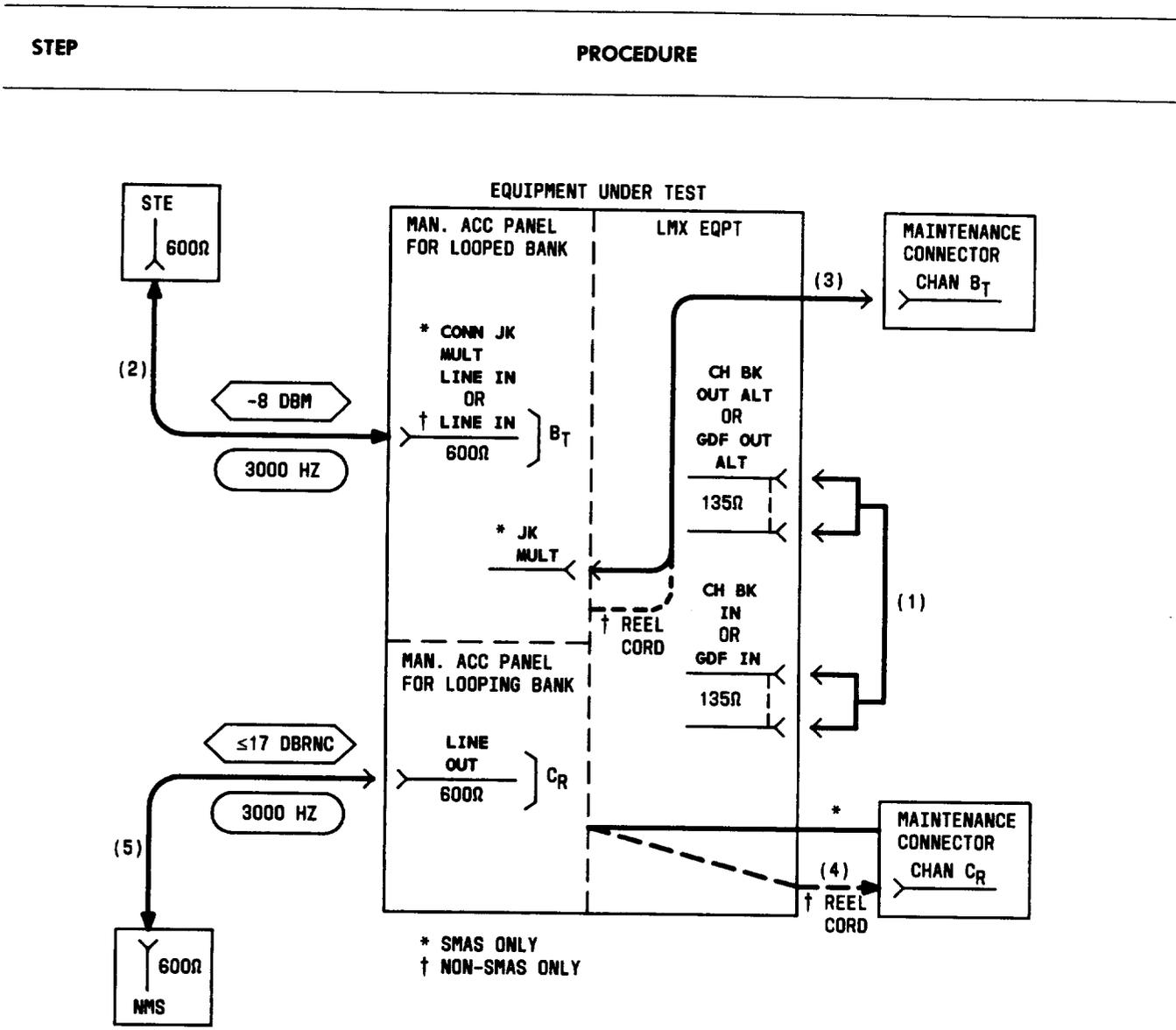


Fig. 24—Patching Diagram—Crosstalk Test—Unequal-Level Looping—Upper Adjacent Channel (3000 Hz)

Note: If the J98622AR or AT manual access panel is used, patch (5) must be removed from the LINE OUT jack.

32 Repeat applicable Steps 24 through 31 for Tests B through K listed in Table K.

33 Set the STE to -16 dBm at 5000 Hz.

CHART 10 (Contd)

STEP	PROCEDURE
34a*	Connect the JK MULT connector (on the 22AR or AT MAP) to the CHAN BANK connector (on the maintenance connector) for the <i>looped</i> channel designated Br for Test A in Table L [patch (3), Fig. 25].

TABLE L

**CROSSTALK TEST CONNECTIONS
UPPER ADJACENT CHANNEL TEST (5000 HZ)**

TEST	TRANSMIT CHANNEL (LOOPED BANK)	RECEIVE CHANNEL (LOOPING BANK)
	CONNECT STE TO VF INPUT OF CHANNEL B _T *	CONNECT NMS TO VF OUTPUT OF CHANNEL C _R *
A	1	2
B	2	3
C	3	4
D	4	5
E	5	6
F	6	7
G	7	8
H	8	9
I	9	10
J	10	11
K	11	12

* Subscripts "T" and "R" denote VF transmit and receive sections of the indicated channels. For example, in Test A:
 Channel B_T = Channel 1, transmit section
 Channel C_R = Channel 2, receive section

CHART 10 (Contd)

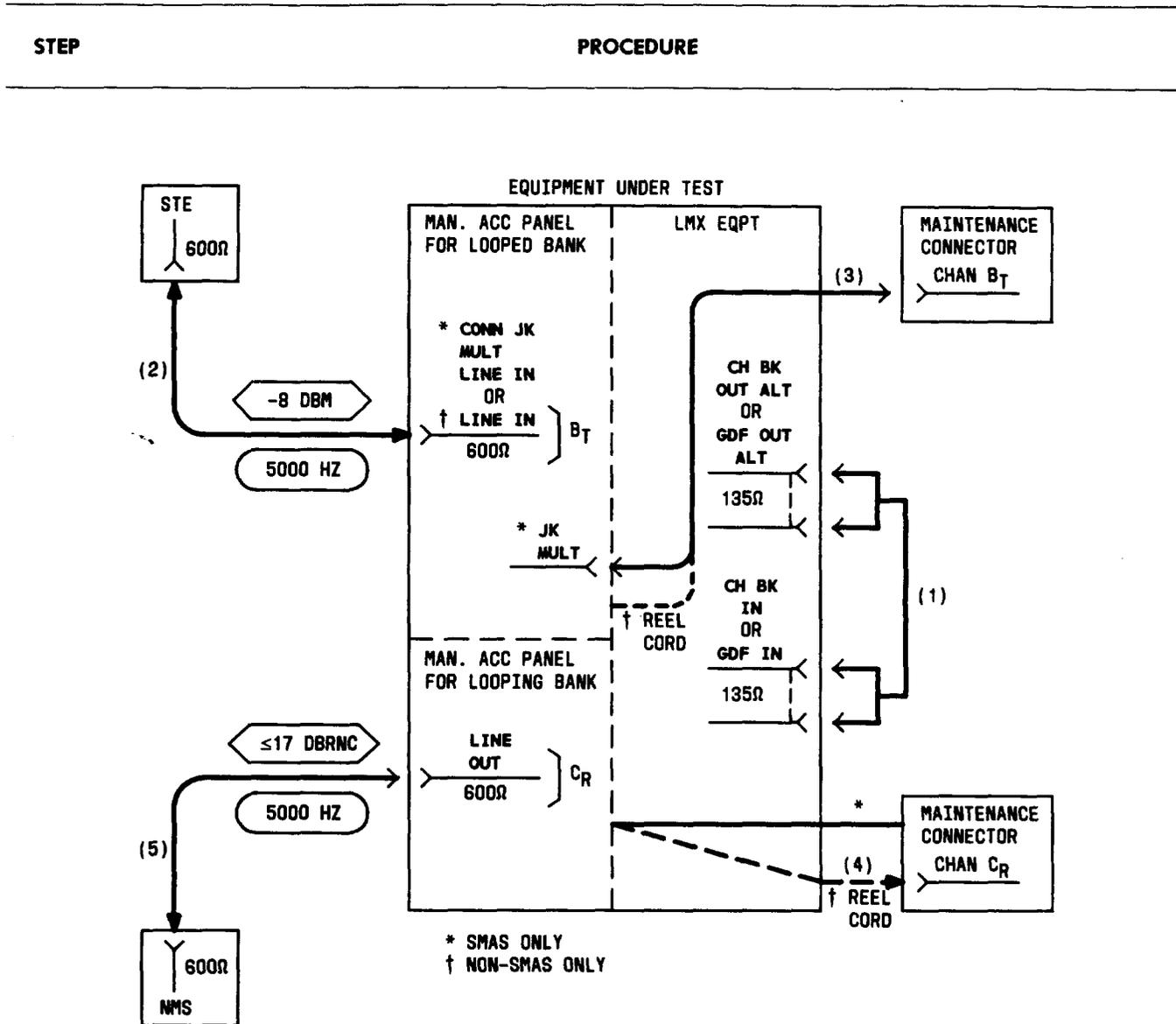


Fig. 25—Patching Diagram—Crosstalk Test—Unequal-Level Looping—Upper Adjacent Channel (5000 Hz)

- 34b† On the adjacent non-SMAS J98626() frame, connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector (on the maintenance connector on the frame under test) for the **looped** channel designated B_r for Test A in Table L [patch (3), Fig. 25].
- 35a* Set the VF CKT switch (on the 22AR or AT MAP) to the **looping**-channel position designated C_r for Test A in Table L.
- 35b† Connect the retractable cord (on the 22AU MAP) to the CHAN BANK connector for the **looping**-channel position designated C_r for Test A in Table L [patch (4), Fig. 25].

 CHART 10 (Contd)

STEP	PROCEDURE
36*	Press the ACS (or ACC) switch (on the 22AR or AT MAP).
37*	Connect the NMS to the LINE OUT jack [patch (5), Fig. 25].
38	Measure the noise at the LINE OUT jack.
	Requirement: 17 dBrc or less (16 dBrc is less than 17)
39	If the requirement of Step 38 is not met,
	(a) Replace the channel modem for Channel B (BT).
	(b) Repeat applicable steps in Charts 2, 3, 8, and 9 for Channel B.
	(c) Repeat applicable Steps 1 through 38.
40	Set the NMS range switch to minimum sensitivity.
41	Remove patch (3), Fig. 25 [and patch (4), if used] from the maintenance connector(s).
	Note: If the J98622AR or AT manual access panel is used, patch (5) must be removed from the LINE OUT jack.
42	Repeat applicable Steps 34 through 41 for Tests B through K listed in Table L.
43	At the LMX equipment, remove looping connections made in Step 3.
	Note: If the channel bank under test is equipped for CFA, reinsert the CFA unit.
44	Repeat applicable Steps 1 through 43 for all other channel banks to be tested.
45	Remove patch (2), Fig. 25.
46*	Press the ACS (or ACC) RLS switch (on the 22AR or AT MAP).
47†	Remove patch (5), Fig. 25.
48	Readjust the gain ADJ control for all channel banks tested, as prescribed in Chart 4.
