DIGITAL TRANSMISSION SYSTEMS
D3 CHANNEL BANK
INITIAL AND CIRCUIT ORDER D3 TESTS
WITH D3, D2, AND D1D

This section provides (1) optional end-to-end alarm tests, (2) optional end-to-end performance tests, and (3) general information concerning end-to-end signaling tests.

(1) ***Alarm Tests***—These out-of-service tests serve to check the installation of the system and operation of the terminal alarms.

(2) ***Performance Tests***—These tests are used to check the transmission quality of the channels before service is applied. When used as a precautionary check of the initial installation, the individual tests or entire procedure can be performed on as many channels as required by company option. Tests are not required on circuit order to add channels to an in-service system with D3 banks at both ends. The tests for a D3 to D3 connection are provided for completeness.

(3) ***Signaling Tests***—These tests are used to check signaling between D channel banks. The operations administered at the D3 bank and at the D3, D2, or D1D bank at the other end are given in the respective signaling practices. For example, when testing the signaling between D3 and D2, the testers at each location should refer to the practice for the specific type of bank and coordinate their operations.

When this section is reissued, the reason for reissue will be listed in this paragraph. This section affects the Equipment Test List.

Two D3 banks or a D3 bank and a compatible bank are considered ready for service after the single-ended tests for those banks are completed. The alarm and performance tests contained herein are optional and serve as a precautionary check of the installation and operation of the system. There are no adjustments on the D3 channel bank; however the D3 channel unit option and pad settings must be selected per circuit order information.

The T1 line must be complete and connected to the channel banks through the appropriate pads or equalizers before undertaking the tests. When the D3 bank is used with a different but compatible bank, D3 channel bank adapters are required to preserve the channel number identity at both ends. The following should be observed in fitting these adapters:

(1) Proper code of adapters is selected for the application. The ED-3C363-30, G2 (red color) adapters are required with a D2 bank at the far end. The ED-3C363-30, G1 adapters (green color) are required with a D1D bank at the far end.

(2) An adapter is placed between both the P30 and J30 connector set and between the P31 and J31 connector set for the D3 bank.

(3) Screws are used to hold the keyed adapters between the connector sets.

Alarm Tests

Performance Tests

ALARM TESTS

These tests are carried out with the channel banks taken out of service because the trunk-conditioning circuits are activated by the terminal alarms. Trouble is introduced from both ends of the system and the resulting alarms are checked at both ends.

Note: After replacing any unit, repeat the test. If the requirement is not met, reinsert the original unit and refer to the respective troubleshooting practice to determine which units affect the alarms.

CHART 1

D3 — D3

STEP	D3 NEAR END	D3 FAR END
1	Establish communications with other end.	Establish communications with the other end.
2	Connect a 3-inch wire equipped with pin plugs between the RNFAL and GRD jacks on the receive unit.	
	Requirement: The red AR lamp on the alarm control unit lights.	***Requirement:*** The yellow AY lamp on the alarm control unit lights.

STEP	D3 NEAR END	D3 FAR END
	If lamp does not light, remove the lamp with a KS-21144, L1 extractor and check it with an ohmmeter. If there is continuity, replace the alarm control unit.	If lamp does not light, remove it with a KS-21144, L1 extractor and check it with an ohmmeter. If there is continuity, replace the alarm control unit or have the transmit unit replaced at the far end.
3	Remove the wire from between the jacks. ***Requirement:*** The red AR lamp extinguishes. If requirement is not met, replace the alarm control unit.	***Requirement:*** The yellow AY lamp extinguishes after about 15 seconds. If the requirement is not met, replace the alarm control unit or have the transmit unit replaced at the far end.
4		Repeat the test in reverse direction.

CHART 2

D3 — D2

STEP	D3 END	D2 END
1	Establish communications with the other end.	Establish communications with the other end.
2	Connect a 3-inch wire equipped with wire pin plugs between the RNFAL and GRD jacks on the receive unit. ***Requirement:*** The red AR lamp on the alarm control unit lights. If lamp does not light remove it with a KS-21144, L1 extractor and check it with an ohmmeter. If there is continuity, replace the alarm control unit.	***Requirement:*** The amber REMOTE lamp on the ALARM panel (DM 45) lights. If the lamp does not light, remove it with a 553A extractor and check it with an ohmmeter. If there is continuity, replace the alarm control unit (DM57 or DM17) in the digroup.
3	Remove the wire from between the jacks. ***Requirement:*** The red AR lamp extinguishes. If requirement is not met, replace the alarm control unit.	***Requirement:*** The amber REMOTE lamp extinguishes. If requirement is not met, replace the alarm control unit (DM57 or DM17) or have the transmit unit replaced at the far end.
4	***Requirement:*** The yellow AY lamp on the alarm control unit lights.	Unplug the receiving digit counter (RDC, DM9) from the digroup under test. ***Requirement:*** The red LOCAL lamp on the ALARM panel lights.

STEP	D3 END	D2 END
3	If lamp does not light, check it with an ohmmeter. If there is continuity, replace the alarm control unit.	If lamp does not light, check it with an ohmmeter. If there is continuity, replace the alarm control unit (DM57 or DM17) in the digroup.
5		Reinsert the receiving digit counter.
	Requirement: The yellow AY lamp on the alarm control unit extinguishes after about 15 seconds.	***Requirement:*** The red LOCAL lamp on the ALARM panel extinguishes.
6	If requirement is not met, replace the D3 alarm control unit or have the D2 alarm control unit at the far end replaced.	If requirement is not met, replace the alarm control unit.

CHART 3

D3 — D1D

STEP	D3 END	D1D END
1	Establish communications with the other end.	Establish communications with the other end.
2	Connect a 3-inch wire equipped with pin plugs between the RNFAL and GRD jack on the receive unit.	
	Requirement: The red AR lamp on the alarm control unit lights.	***Requirement:*** The yellow AY lamp on the alarm control unit lights.
	If lamp does not light, remove it with a KS-21144, L1 extractor and check it with an ohmmeter. If there is continuity replace the alarm control unit.	If lamp does not light, remove it with a 553A extractor and check with an ohmmeter. If there is continuity, replace the D1D alarm control unit or RCVG CONV SIG or have the transmit unit replaced at the far end.
3	Remove the wire from between the jacks.	
	Requirement: The red AR lamp extinguishes.	***Requirement:*** The yellow AY lamp extinguishes after about 15 seconds. If the requirement is not met, replace the D1D alarm control unit or have the transmit unit replaced at the far end.
	If requirement is not met, replace the alarm control unit.	

STEP	D3 END	D1D END
4		Unplug the FR DET from position F.
	Requirement: The yellow AY lamp on the alarm control unit lights.	***Requirement:*** The red AR lamp on the alarm control unit lights.
	If lamp does not light, check the lamp with an ohmmeter. If there is continuity, replace the D3 alarm control unit or have the XMTG CONV SIG or ENC replaced at far end.	If lamp does not light, check the lamp with an ohmmeter. If there is continuity, replace the D1D alarm unit.
5		Reinsert the FR DET in position F.
	Requirement: The yellow AY lamp on the alarm control unit extinguishes after about 15 seconds.	***Requirement:*** The red AR lamp on the alarm control unit extinguishes.
	If requirement is not met, replace the D3 alarm control unit or have the XMTG CONV SIG or ENC unit at far end replaced.	If requirement is not met, replace the alarm control unit.

Performance Tests

These tests are used to check the transmission quality of the channels before service is applied. When used as a precautionary check of the initial installation, the entire procedure or individual tests can be performed on as many channels as required by company option. When required on circuit order to add channels to service, the net loss and noise tests are done on each added channel but distortion and crosstalk are carried out on one added channel.

CHART 1

D3 — D3

It is assumed that both D3 banks have been installed and single-end tested per Section 365-150-501. For complete information on signaling compatibility, refer to Section 179-100-310. Verify that the proper channel unit option and pad selections have been made per 365-150-503.

APPARATUS:

1—Hot Spare & Maintenance Shelf (Section 365-150-100)

1—J98003A or C Noise-Measuring Set (NMS) (Section 103-611-100 or -101) or equivalent

1—P6AA Cord or 2—3P6D Cords

1—3P6D Cord

2—262B Plugs (600-ohm termination) for working banks

24—258C Open Plugs for nonworking banks.

STEP	D3 NEAR END	D3 FAR END
A. Preparation for Tests		
1	Assemble test equipment and establish communications with other end. ***Note:*** On P6AA cord, the knurled edge is associated with the red sleeve on the other end.	Assemble test equipment and establish communicationns with other end. ***Note:*** On P6AA cord, the knurled edge is associated with the red sleeve on the other end.
B. Transmission Level Test		
1	Connect the test circuit as shown in Fig. 1.	Connect the test circuit as shown in Fig. 1.
2	Set switches on CAU as follows: REJ FL: OUT SEND LEVEL: 0 TEST: CHAN LINE	Set switches on CAU as follows: REJ FL: OUT SEND LEVEL: OFF TEST: CHAN LINE
3		Measure level on CAU meter. ***Requirement:*** The meter reading is in the green-black-green range (0.0 dBm $\pm$0.25 dB). In addition, the speaker on the CAU should sound.
	If requirement is not met at the other end and the local transmitter is suspected refer to Section 365-150-501 for single-ended test. Repeat the end-to-end test after trouble is cleared.	If requirement is not met, refer to Section 365-150-501 for single-ended test.
4	Continue with all channels to be tested.	Continue with all channels to be tested.
5		When the requirement is met for all channels tested, repeat the test in the reverse direction on all channels under test.
C. Idle Circuit Noise Test		
1	Verify that Test A has been completed.	Verify that Test A has been completed.
2	Connect the test circuit as shown in Fig. 1. ***Note 1:*** The following portion of the test is performed independently of the other end. ***Note 2:*** If testing on a nonworking bank, place 258C open plugs in the XMT jacks of all other channel units.	Connect the test circuit as shown in Fig. 1. ***Note 1:*** The following portion of the test is performed independently of the other end. ***Note 2:*** If testing on a nonworking bank, place 258C open plugs in the XMT jacks of all other channel units.
3	Set switches on CAU as follows: REJ FL: OUT SEND LEVEL: OFF TEST: CHAN LINE	Set switches on CAU as follows: REJ FL: OUT SEND LEVEL: OFF TEST: CHAN LINE

STEP	D3 NEAR END	D3 FAR END
4	Set switches on NMS as follows: DBRN: ON SCALE WTG: C-MSG FUNCTION: 600/900 NM (600 NM for 3A) NORM/DAMP: DAMP	Set switches on NMS as follows: DBRN: ON SCALE WTG: C-MSG FUNCTIONS: 600/900 NM (600 NM for 3A) NORM/DAMP: DAMP
5	Measure noise. ***Requirement:*** 23 dBrnC or less. If the requirement is not met, isolate the trouble by making Idle Circuit Noise Measurements single ended per Section 365-150-501 and repeat this test.	Measure noise. ***Requirement:*** 23 dBrnC or less. If the requirement is not met, isolate the trouble by making Idle Circuit Noise Measurements single ended per Section 365-150-501.
6	Continue with all channels to be tested.	Continue with all channels to be tested.
7	When the requirement is met for all channels tested, proceed to the next test or remove test connections.	When the requirement is met for all channels tested, proceed to the next test or remove test connections.
D. Distortion Test		
1	Verify that Test A has been completed.	Verify that Test A has been completed.
2	Set switches on CAU as follows: REJ FL: IN SEND LEVEL: 0 TEST: CHAN LINE	Set switches on CAU as follows: REJ FL: IN SEND LEVEL: 0 TEST: CHAN LINE
3	Connect the test circuit as shown in Fig. 1.	Connect the test circuit as shown in Fig. 1.
4		Set switches on the NMS as follows: DBRN: 85 WTG: C-MSG FUNCTION: 600/900 NM (600 NM for 3A) NORM/DAMP: DAMP
5	Set CAU SEND LEVEL DB to: −0 −10 −20 −30 −40	Adjust DBRN control on NMS as required to read meter. ***Requirement:*** dBrnC or less. 56 46 36 26 22
6	If requirement is not met, isolate the trouble by making Distortion Measurement single ended per Section 365-150-501 and repeat this test.	If requirement is not met, isolate the trouble by making Distortion Measurement single ended per Section 365-150-501 and repeat this test.

STEP	D3 NEAR END	D3 FAR END
7	When the requirements have been met, repeat the test in the reverse direction and then proceed to the next test or remove test connections.	When the requirements have been met, repeat the test in the reverse direction and then proceed to the next test or remove test connections.

E. Crosstalk Test

Tone is sent on the two most likely interfering channels alternately while noise caused by crosstalk is measured at the other end on the channel under test.

STEP	D3 NEAR END	D3 FAR END
1	Verify that Test A has been completed.	Verify that Test A has been completed.
2	Select the channel to be tested.	From Table A, determine the two most likely interfering channels for the channel under test.
3	Connect the test circuit as shown in Fig. 2 for the ***receiving end.***	Connect the test circuit as shown in Fig. 2 for the ***transmitting end.***
4	Set switches on CAU as follows: REJ FL: OUT SEND LEVEL: OFF TEST: CHAN LINE	
5	Set switches on NMS as follows: DBRN: ON SCALE WTG: C-MSG FUNCTION: 600/900 NM (600 NM for 3A) NORM/DAMP: DAMP	
6	Measure crosstalk. ***Requirement:*** 27 dBrnC or less.	
7		Move the test connection to the other most likely interfering channel.
8	Measure crosstalk. ***Requirement:*** 27 dBrnC or less. If the requirement is not met, isolate the trouble by making Crosstalk Measurements single ended per Section 365-150-501 and repeat this test.	If the requirement is not met, isolate the trouble by making Crosstalk Measurements single ended per Section 365-150-501.
9	When requirements are met, repeat the test in the reverse direction and then remove test connections.	When requirements are met, repeat the test in reverse direction and then remove test connections.

CHART 2

D3 — D2

It is assumed that the D3 bank has been installed and single-end tested per Section 365-150-501 and that the D2 bank has been installed and single-end tested per Section 365-404-500. For complete information on signaling compatibility of associated D3 and D2 trunk circuits, refer to Sections 179-100-310 and -307.

The TRANSMISSION TEST circuit pack (DM47 or digital readout DM70) provides facilities for connecting the centralized Transmission and Noise-Measuring System (T&NMS) to the channel unit under test. Access is also provided for connecting external test equipment. For a complete description and operating details of the test panel, see Section 365-400-108. The input circuits selected by the NOISE/LEVEL switch of the DM70 are self-adjusting; therefore, the DM70 has no TRANS/DBRNC range switch.

If the TRMT BSY (or LEVEL BSY on DM70) lamp or the NOISE BSY lamp is lighted, either the transmission or the noise-measuring equipment is already in use.

When making test connections with the TRANSMISSION TEST (DM47 or DM70), connect the patch cords to the DM47 circuit pack first; then connect to the channel unit under test.

Verify that the proper D3 and D2 channel options and pad selections have been made per Section 365-150-503 and Section 365-400-107, respectively.

APPARATUS:

D3 END

1—Hot Spare & Maintenance Shelf (Section 365-150-100)

1—J98003A or C Noise-Measuring Set (NMS) (Section 103-611-100 or -101) or equivalent

1—P6AA Cord or 2—3P6D Cords

1—3P6D Cord

2—262B Plugs (600-ohm termination) for working banks

24—258C Open Plugs for nonworking banks

D2 END

1—Centralized Office Transmission & Noise-Measuring System (T&NMS)

2—262B Plug (600-ohm termination) for working banks

24—258C Open Plugs for nonworking banks

1—6P8A Cord

1—3P6A Cord (optional)

CHART 2 (Cont)

The following apparatus, or equivalent, may be used if a T&NMS is not available.

1—J98021A Transmission-Measuring Set, (21A TMS) (Section 103-221-100) or equivalent

1—J98003C Noise-Measuring Set (3C NMS) (Section 103-611-101) or equivalent
1—6P8A

1—3P17B Cord

2—262B Plug (600-ohm termination) for working banks

24—258C Open Plugs for nonworking banks

1—3P6D Cord

STEP	D3 END	D2 END
A. Preparation for Tests		
1	Assemble test equipment and establish communications with the D2 office. ***Note:*** On P6AA cord, the knurled edge is associated with the red sleeve on the other end.	Assemble test equipment and establish communications with the D3 office.
2		Verify that the FUNCTION switch on the DM48 is set to OFF. In the DG position, a digital signal is applied to 24 channels, overriding all communications.
B. Transmission Level Test		
	D3 Transmitting to D2	
1	Verify that Test A has been completed.	Verify that Test A has been completed.
2	Connect the test circuit as shown in Fig. 3.	Connect the test circuit as shown in Fig. 3.
3	Set switches on CAU as follows: REJ FL: OUT SEND LEVEL: 0 TEST: CHAN LINE	For the DM47 turn the TRANS/DBRNC switch to AUTO position. When using the T&NMS, the AUTO position is equivalent to the ANOR position.
4		***Note:*** If a 21A TMS is used, set the DET INPUT switch to 0+ position. Operate the TEST FAC key on DM47 or DM70 and observe that the TEST FAC lamp lights. (If the T&NMS is used, the TRMT BSY or LEVEL BSY lamp will also light.)

STEP	D3 END	D2 END
5		Read meter. ***Requirement:*** +7.0 dBm ±0.25 dB.
	If the requirement is not met at the D2 end and the D3 end is suspected, isolate the trouble by making Net Loss Measurements per Section 365-150-501 and repeat this test.	If the requirement is not met, refer to Clearing of Nonalarm Troubles in Section 365-410-500 to isolate the trouble and repeat this test.
6	Continue with all channels to be tested.	Continue with all channels to be tested.
7	When the requirement is met for all channels, proceed to Step 8 of this test or remove test connections.	When the requirement is met for all channels, proceed to Step 8 of this test or remove test connections.
	D2 Transmitting to D3	
8	Verify that Test A has been completed.	Verify that Test A has been completed.
9	Verify that test circuit is patched as shown in Fig. 4.	Connect test circuit as shown in Fig. 4.
10	Set switches on CAU as follows: REJ FL: OUT SEND LEVEL: OFF TEST: CHAN LINE	On DM47 verify that the TRANS/DBRNC switch is in the OFF position.
11		Operate the TEST FAC key on DM47 or DM70 and observe that TEST FAC lamp lights.
12	Read meter on CAU. ***Requirement:*** Black area.	
	If the requirement is not met, isolate the trouble by making Net Loss Measurement per Section 365-150-501 and repeat this test.	If the requirement is not met at the D3 end and the D2 end is suspected, refer to Clearing of Nonalarm Troubles in Section 365-410-500 to isolate the trouble and repeat this test.
13	Continue with all channels to be tested.	Continue with all channels to be tested.
14	When the requirement is met for all channels tested, proceed to the next test or remove test connections.	When the requirement is met for all channels tested, proceed to the next test or remove test connections.
C.	**Idle Circuit Noise Test**	
1	Verify that Test A has been completed. ***Note:*** The following portion of the test is performed independently of the other end.	Verify that Test A has been completed. ***Note:*** The following portion of the test is performed independently of the other end.

STEP	D3 END	D2 END
2	Connect the test circuit shown in Fig. 5.	Connect the test circuit as shown in Fig. 5. ***Note:*** The plug in the −16 IN jack of the DM47 or DM70 disconnects the test tone for this test.
3		For the DM47 turn the TRANS/DBRNC switch to A +40 position. For the DM70 set the switch to NOISE.
	Note: If testing on a nonworking bank, place 258C open plugs in the XMT jacks of all other channel units.	***Note:*** If testing on a nonworking bank, place 258C open plugs in the FAC IN jacks of all other channel units in the digroup.
4	Set switches on CAU as follows: REJ FL: OUT SEND LEVEL: OFF TEST: CHAN LINE	
5	Set controls on NMS as follows: DBRN: ON SCALE WTG: C-MSG FUNCTION: 600/900 NM (600 NM for 3A) NORM/DAMP: DAMP	If the NMS is required, set controls as follows: DBRN: ON SCALE WTG: C-MSG FUNCTION: 600/900 NB (600 NM for 3A) NORM/DAMP: DAMP
6		Operate the TEST FAC key on DM47 or DM70 and observe that the TEST FAC lamp lights. With the T&NMS, the NOISE BSY lamp (on DM47) also lights.
7	Measure noise. ***Requirement:*** 28 dBrnC or less. If the requirement is not met, isolate the trouble by making Idle Circuit Noise Measurements single ended per Section 365-150-501 and repeat this test.	Measure noise. ***Requirement:*** 35 dBrnC or less. If the requirement is not met, isolate the trouble by making Idle Circuit Noise Measurement single ended per Section 365-404-500 and repeat this test.
8	Continue with all channels to be tested.	Continue with all channels to be tested.
9	When the requirement is met for all channels tested, proceed to the next test or remove test connections.	When the requirement is met for all channels tested, proceed to the next test or remove test connections.

D. Distortion Test

1	Verify that Test A has been completed.	Verify that Test A has been completed.
2	Connect the test circuit as shown in Fig. 6.	Connect the test circuit as shown in Fig. 6.

STEP	D3 END	D2 END
3	Set switches on CAU as follows: REJ FL: IN SEND LEVEL: OFF TEST: CHAN LINE	For the DM47 set the TRANS/DBRNC switch to A+40. For the DM70, set the switch to NOISE.
4	Set controls on NMS as follows: DBRN: 85 WTG: C-MSG FUNCTION: 600/900 NM (600 NM for 3A) NORM/DAMP: DAMP	If the NMS is required, set controls on NMS as follows: DBRN: 85 WTG: C-MSG FUNCTION: 600/900 NM (600 NM for 3A) NORM/DAMP: DAMP
5		Operate the FAC TEST key on the DM47 or DM70.
6	Adjust the DBRN control as required for an on-scale reading. ***Requirement:*** 56 dBrnC or less.	
7		Hold pad key on DM46 to position A.
	Requirement: 36 dBrnC or less.	
8		Shift pad key on DM46 to position B.
	Requirement: 24 dBrnC or less.	
9	Even if the requirements are not met, continue testing.	Release the PAD key.
10		Set the 1-kHz switch on DM46 to REJECT.
11	Set CAU SEND LEVEL DB to:	If the NMS is required, adjust controls as required for on-scale reading. ***Requirement:*** dBrnC or less.
	−0	55
	−10	46
	−20	36
	−30	26
	−40	22
	If the requirements for Steps 6, 7, and 8 are not met, isolate the trouble by making Distortion Measurement single ended per Section 365-150-501 and repeat this test.	If the requirements are not met, isolate the trouble by making Distortion Measurement single ended per Section 365-404-500 and repeat this test.
12	Continue with all channels to be tested.	Continue with all channels to be tested.

STEP	D3 END	D2 END
13	When the requirements are met for all channels, proceed to the next test or remove test connections.	When the requirements are met for all channels, proceed to the next test or remove test connections.

E. Crosstalk Test

Tone is sent on two most likely interfering channels alternately while noise caused by crosstalk is measured at the other end on the channel under test. Since the D3 bank is fitted with an adapter, the sampling sequence is identical to the D2 sequence.

STEP	D3 END	D2 END
	D2 Transmit	
1	Verify that applicable steps of Test A have been completed.	Verify that applicable steps of Test A have been completed.
2	Select the channel to be tested from 1 through 12 (group A in the D2 bank).	From Table B, determine the two most likely interfering channels for the channel under test.
3	Connect the test circuit shown in Fig. 7.	Connect the test circuit shown in Fig. 7 for the interfering channel in Column I, Table B.
4	Set switches on CAU as follows: REJ FL: OUT SEND LEVEL: OFF TEST: CHAN LINE	Operate the TEST FAC key on DM47 or DM70.
5	Set switches on NMS as follows: DBRN: ON SCALE WTG: C-MSG FUNCTION: 600/900 NM (600 NM for 3A) NORM/DAMP: DAMP	
6	Measure level on the channel under test. ***Requirement:*** 27 dBrnC or less.	
7		Move test connection to the other most likely interfering channel (Column II, Table B).
8	Measure crosstalk. ***Requirement:*** 27 dBrnC or less. If the requirement is not met, continue testing to determine if the trouble is common to both groups of the D2 bank.	Operate the TEST FAC key on DM47 or DM70.

STEP	D3 END	D2 END
9	Select a channel to be tested from the other group (group B in the D2 bank).	From Table B, determine the two most likely interfering channels for the channel under test.
10	Repeat Steps 3 through 8.	Repeat Steps 3 through 8.
	If the requirement is not met, isolate the trouble by making Crosstalk Measurements single ended per Section 365-150-501 and repeat this test.	If the requirement is not met at the D3 end and the D2 end is suspected, refer to Clearing of Nonalarm Troubles in Section 365-410-500 to isolate the trouble and repeat this test.
	D2 Receive	
11	From Table B, determine the two most likely interfering channels for the channel under test.	Select a channel to be tested from 1 through 12.
12	Connect test circuit shown in Fig. 8 for the interfering channel in Column I, Table B.	Connect test circuit shown in Fig. 8.
13	Set switches on CAU as follows: REJ FL: OUT SEND LEVEL: 0 TEST: CHAN LINE	For the DM47, set the TRANS/DBRNC switch to A+40. For the DM70, set the switch to NOISE. If the NMS is required, set switches as follows: DBRN: ON SCALE WTG: C-MSG FUNCTION: 600/900 NM (600 NM for 3A) NORM/DAMP: DAMP
14		Operate the TEST FAC key on DM47 or DM70.
15		Move 1 kHz on DM46 to PASS and hold.
16		Read meter. ***Requirement:*** 29 dBrnC or less.
17	Move test connection to the other most likely interfering channel.	Continue holding key to PASS.
18		Read meter. ***Requirement:*** 25 dBrnC or less.
	If the requirement is not met, continue testing to determine if the trouble is in one or both groups.	If the requirement is not met, continue testing to determine if the trouble is in one or both groups.

STEP	D3 END	D3 END
19	Repeat Steps 11 through 18 for channel in group 13 through 24.	Repeat Steps 11 through 18 for channel in 13 through 24 group.
	If the requirements are not met at the D2 end and the D3 end is suspected, isolate the trouble by making Crosstalk Measurements per Section 365-150-501 and repeat this test.	If the requirements are not met, refer to Clearing of Nonalarm Troubles in Section 365-410-500 to isolate the trouble and repeat this test.
	If the requirement is met, repeat test in opposite direction and then remove all cords and plugs.	If the requirement is met, repeat test in opposite direction and then remove all cords and plugs.

CHART 3

D3 — D1D

It is assumed that the D3 bank has been installed and single-end tested per Sections 365-150-501 and that the D1D bank has been installed and single-end tested per Sections 365-116-501 and -502.

For complete information on signaling compatibility of associated D3 and D1D trunk circuits, refer to Sections 179-100-310 and -302.

With a milliwatt input to the D1 matching network (J98711M), −9 dBm is applied to the D1D channel unit XMT jack which is defined as a −9.25 TLP. As a result, +0.25 ±0.25 dB will be measured at the CAU instead of 0.0 ±0.25 dB when the defined level is sent. To eliminate the difference, a 0.25-dB pad must be included in the test path of the D1D end. (See Section 365-116-500 for further description.)

Verify that the proper D3 and D1D channel options and pad selections have been made per Sections 365-150-503 and 365-115-500, respectively.

APPARATUS:

D3 END

1—Hot Spare & Maintenance Shelf (Section 365-150-100)

1—J98003A or C Noise-Measuring Set (NMS) (Section 103-611-100 or -101) or equivalent

1—P6AA Cord or 2—3P6D Cords

1—3P6D Cord

2—262B Plugs (600-ohm termination) for working banks

24—258C open plugs for nonworking banks

CHART 3 (Cont)

D1D END

1—Milliwatt Supply (Section 103-335-512)

1—J98711M Match Net (Section 365-103-500), located on side of bank bay or adjacent bay

1—4019U 1KC REJ FLT Testboard (Section 365-103-500)

1—J94003A or C Noise-Measuring Set (NMS) (Section 103-611-100 or -101) or equivalent

1—J94021A Transmission Measuring Set (Section 103-221-100) or equivalent having 600-ohm terminations

1—3P17B Cord

1—3P6A Cord

3—3P6D Cords

2—262D Plugs (2500-ohm termination) for working banks

24—258C Open Plugs for nonworking banks

STEP	D3 END	D1D END
A. Transmission Level Test		
		D3 Transmitting to D1D
1	Assemble test equipment and establish communications with the D1D office. ***Note:*** On P6AA cord, the knurled edge is associated with the red sleeve on other end.	Assemble test equipment and establish communications with the D3 office.
2	Connect the test circuit as shown in Fig. 9.	Connect the test circuit as shown in Fig. 9.
3	Set switches on CAU as follows: REJ FL: OUT SEND LEVEL: 0 TEST: CHAN LINE	Set DET INPUT switch on 21A to +0.
4		Measure receive level. ***Requirement:*** +1.5 dBm
	If the requirement is not met at the D1D end and the D3 end is suspected, isolate the trouble by making Net Loss Measurements per Section 365-150-501 and repeat this test.	If requirement is not met, adjust the GAIN potentiometer on the channel unit. If trouble persists, refer to the Net Loss Board Replacement Sequence Chart in Section 365-116-505 to isolate the trouble and repeat this test.

STEP	D3 END	D1D END
5	Continue with all channels to be tested.	Continue with all channels to be tested.
6	If the requirement is met for all channels tested, proceed to Step 7.	If the requirement is met for all channels tested, proceed to Step 7.
	D1D Transmitting to D3	
7	Verify that test circuit is patched as shown in Fig. 10.	Connect test circuit as shown in Fig. 10.
8	Set switches on CAU as follows: REJ FL: OUT SEND LEVEL: OFF TEST: CHAN LINE	Set all switches on the MATCH NET to the vertical position.
9	Measure level on CAU meter. ***Requirement:*** 0.0 $\pm$0.25 dB with $-$9.25 at far XMT jack. +0.25 $\pm$0.25 dB with $-$9.0 at far XMT jack. ***Note:*** The requirement is interpreted as reading from 0 in a positive direction to any place in the active portion of the meter movement. If a marginal condition exists and accurate measuring equipment with a wider range is available, it may be used. If the requirement is not met, isolate the trouble by making Net Loss Measurements per Section 365-150-501 and repeat this test.	If the requirement is not met at the D3 end and the D1D end is suspected, refer to the Net Loss Board Replacement Sequence Chart in Section 365-116-505 to isolate the trouble and repeat this test.
10	Continue with all channels to be tested.	Continue with all channels to be tested.
11	When the requirement is met for all channels, proceed to the next test or remove test connections.	When the requirement is met for all channels, proceed to the next test or remove test connections.
B.	**Idle Circuit Noise Test**	
1	Verify that Test A has been completed.	Verify that Test A has been completed.
2	Connect the test circuit as shown in Fig. 11. ***Note 1:*** The following portion of the test is performed independently of the other end. ***Note 2:*** If testing on a nonworking bank, place 258C open plugs in the XMT jacks of all other channel units.	Connect the test circuit as shown in Fig. 11. ***Note 1:*** The following portion of the test is performed independently of the other end. ***Note 2:*** If testing on a nonworking bank, place 258C open plugs in the XMT jacks of all other channel units.

STEP	D3 END	D1D END
3	Set switches on CAU as follows: REJ FL: OUT SEND LEVEL: OFF TEST: CHAN LINE	
4	Set switches on NMS as follows: DBRN: ON SCALE WTG: C-MSG FUNCTION: 600/900 NM (600 NM for 3A) NORM/DAMP: DAMP	Set switches on NMS as follows: DBRN: ON SCALE WTG: C-MSG FUNCTIONS: 600/900 NM (600 NM for 3A) NORM/DAMP: DAMP
5	Measure noise. ***Requirement:*** 26 dBrnC or less. If the requirement is not met, isolate the trouble by making Idle Circuit Noise Measurements single ended per Section 365-150-501 and repeat this test.	Measure noise. ***Requirement:*** 28 dBrnC or less. If the requirement is not met at the D1D end, refer to the High Receiving Noise Board Replacement Sequence Chart in Section 365-116-505 to isolate the trouble and repeat this test. If the requirement is not met at the D3 end and the D1D end is suspected, refer to the High Transmitting Noise Board Replacement Sequence Chart in Section 365-116-505 and repeat this test.
6	Continue with all channels to be tested.	Continue with all channels to be tested.
7	When the requirement is met for all channels, proceed to the next test or remove test connections.	When the requirement is met for all channels, proceed to the next test or remove test connections.
C.	**Distortion Test**	
1	Verify that Test A has been completed.	Verify that Test A has been completed.
2		Insert 1-kHz REJ FLT board in position S or Y of the channel bank.
3	Connect the test circuit as shown in Fig. 12 for D1D group 1 (channels 1 through 12).	Connect the test circuit as shown in Fig. 12 for group 1 (channels 1 through 12).
4	Set switches on CAU as follows: REJ FL: IN TEST: CHAN LINE SEND LEVEL: 0	Verify that all key switches on the MATCH NET are in the vertical position.
5	Set switches on the NMS as follows: DBRN: 85 WTG: C-MSG FUNCTION: 600/900 NM (600 NM for 3A) NORM/DAMP: DAMP	Set switches on the NMS as follows: DBRN: 85 WTG: C-MSG FUNCTION: 600/900 NM (600 NM for 3A) NORM/DAMP: DAMP

STEP	D3 END	D1D END
6	Adjust DBRN control on NMS as required to read meter. ***Requirement:*** dBrnC or less 56 46 36 26 22	Set MATCH NET keys to horizontal position. None 10 20 30 30 & 10
	If the requirements of Step 6 are not met, isolate the trouble by making Distortion Measurement single ended per Section 365-150-501 and repeat this test.	If the requirements are not met, refer to the Distortion Board Replacement Sequence Chart in Section 365-116-505 to isolate the trouble and repeat this test.
7	Even if requirements are not met, continue testing.	
8	Set CAU SEND LEVEL DB to: 0 10 20 30 40	Adjust DBRN control on NMS as required to read meter. ***Requirement:*** dBrnC or less. 53 43 33 26 22
9	Repeat Steps 3 through 8 for a channel in the D1D group 2 (channels 13 through 24).	Repeat Steps 3 through 8 for a channel in group 2 (channels 13 through 24).
10		Remove the 1-kHz REJ FLT board.
11	When the requirements have been met for two channels (one in each group of the D1D bank), proceed to the next test or remove test connections.	When the requirements have been met for two channels (one in each group), proceed to the next test or remove test connections.

D. Crosstalk Test

Tone is sent on the two most interfering channels alternately while noise caused by crosstalk is measured at the other end on the channel under test. Since the D3 bank has an adapter, the sampling sequence is like the D1D sequence.

STEP	D3 END	D1D END
	D1D Transmit	
1	Verify that Test A has been completed.	Verify that Test A has been completed.
2	Select the channel to be tested from 1 through 12 (group 1 in the D1D bank).	Determine the two most likely interfering channels from Table C.
3	Connect the test circuit as shown in Fig. 13.	Connect the test circuit as shown in Fig. 13 for one of the interfering channels.

STEP	D3 END	D1D END
4	Set switches on CAU as follows: REJ FL: OUT SEND LEVEL: OFF TEST: CHAN LINE	Verify that all switches on MATCH NET are in vertical position.
5	Set switches on NMS as follows: DBRN: ON SCALE WTG: C-MSG FUNCTION: 600/900 NM NORM/DAMP: DAMP	
6	Measure noise. ***Requirement:*** 32 dBrnC or less.	
7		Move the test connection to the other most likely interfering channel.
8	Measure noise. ***Requirement:*** 32 dBrnC or less. If the requirement is not met, continue testing to determine if the trouble is common to both groups of the D1D bank.	
9	Select a channel from the other group or from channels 13 through 24 (group 2 in the D1D bank).	Select the most likely interfering channel from Table C.
10	Repeat Steps 3 through 8 for the second channel. If the requirement is not met, isolate the trouble by making Crosstalk Measurements single ended per Section 365-150-501 and repeat this test.	Repeat Steps 3 through 8 for the second channel. If the requirement is not met at the D3 end and the D1D end is suspected, refer to the Crosstalk Board Replacement Sequence Chart in Section 365-116-505 to isolate the trouble and repeat this test.
11	When a channel in each group (1 and 2) has met the requirement, proceed to Step 12.	When a channel in each group (1 and 2) has met the requirement, proceed to Step 12.
	D1D Receive	
12	Select the most likely interfering channel from Table C.	Select the channel of interest or a channel from group 1 (1 through 12).
13	Connect the test circuit as shown in Fig. 14.	Connect the test circuit as shown in Fig. 14.
14	Set switches on CAU as follows: REJ FL: OUT SEND LEVEL: 0 TEST: CHAN LINE	Set switches on NMS as follows: DBRN: ON SCALE WTG: C-MSG FUNCTION: 600/900 NM (600 NM for 3A) NORM/DAMP: DAMP

STEP	D3 END	D1D END
15		Measure noise. ***Requirement:*** 32 dBrnC or less.
16	Move the test connection to the other most likely interfering channel.	Measure noise. ***Requirement:*** 32 dBrnC or less. If the requirement is not met, continue testing to determine if the trouble is common to both groups of the D1D bank.
17	Select another channel of interest or a channel from group 2 (13 through 24).	Select the most likely interfering channel from Table C.
18	Repeat Steps 13 through 16 for the second channel.	Repeat Steps 13 through 16 for the second channel.
19	When the requirement is not met at the D1D end and the D3 end is suspected, make Crosstalk Measurements per Section 365-150-501 to isolate the trouble and repeat this test.	When the requirement is not met, refer to the Crosstalk Board Replacement Sequence Chart in Section 365-116-505 to clear the trouble and repeat this test.
20	When a channel in each group (1 and 2) has been successfully tested, remove all plugs and cords.	When a channel in each group (1 and 2) has been successfully tested, remove all plugs and cords.

TABLE A

D3 – D3

CHANNEL UNDER TEST	MOST LIKELY INTERFERING CHANNELS		CHANNEL UNDER TEST	MOST LIKELY INTERFERING CHANNELS	
1	24	23	13	12	11
2	1	24	14	13	12
3	2	1	15	14	13
4	3	2	16	15	14
5	4	3	17	16	15
6	5	4	18	17	16
7	6	5	19	18	17
8	7	6	20	19	18
9	8	7	21	20	19
10	9	8	22	21	20
11	10	9	23	22	21
12	11	10	24	23	22

TABLE B

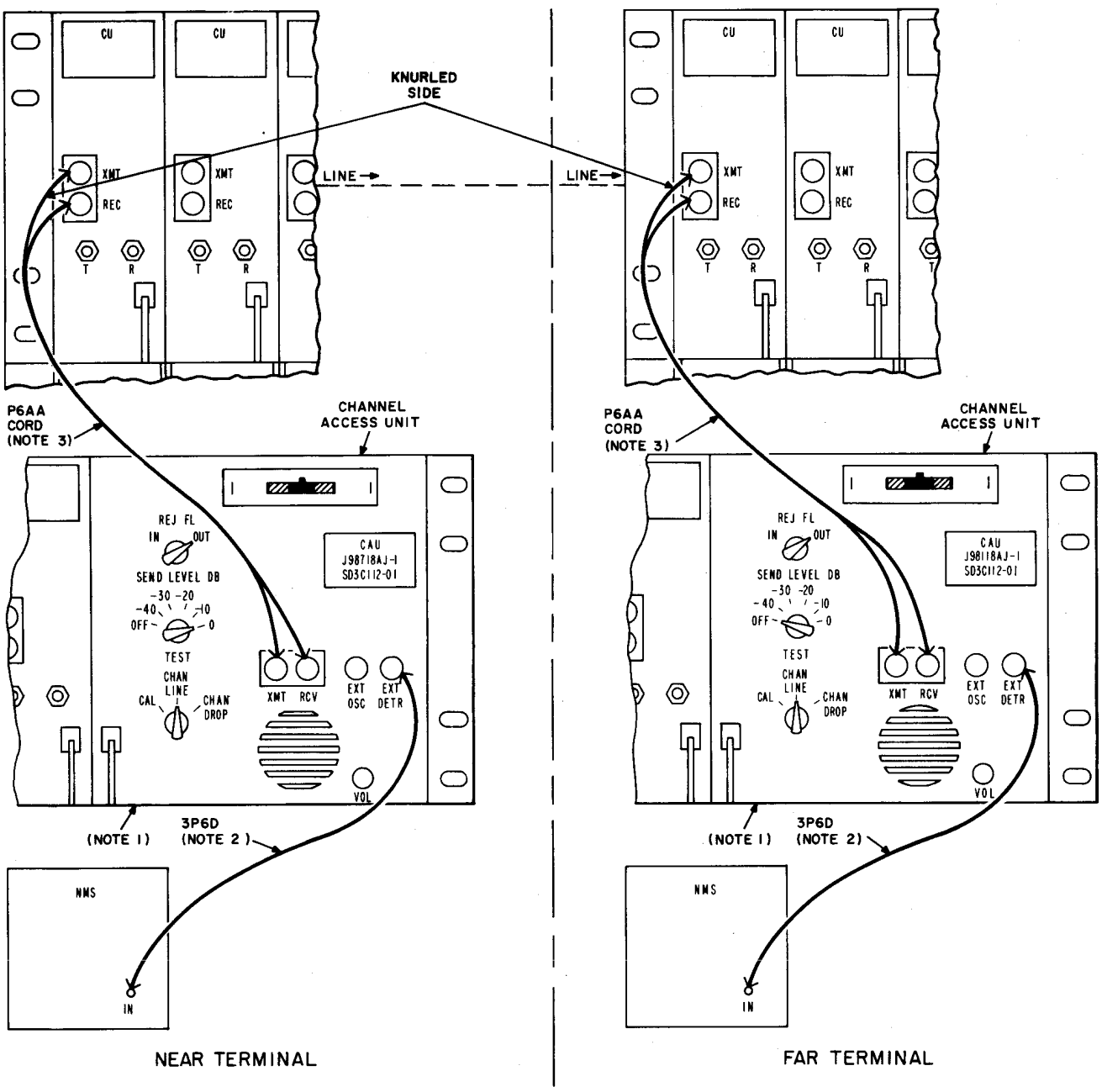
D3 – D2

GROUP A – CHANNELS 1-12			GROUP B – CHANNELS 13-24		
CHANNELS UNDER TEST	MOST LIKELY INTERFERING CHANNELS I	II	CHANNEL UNDER TEST	MOST LIKELY INTERFERING CHANNELS I	II
1	13	12	13	12	24
2	14	11	14	11	23
3	15	9	15	9	21
4	16	10	16	10	22
5	17	1	17	1	13
6	18	2	18	2	14
7	19	3	19	3	15
8	20	4	20	4	16
9	21	5	21	5	17
10	22	6	22	6	18
11	23	7	23	7	19
12	24	8	24	8	20

TABLE C

D3 – D1D

CHANNEL UNDER TEST	MOST LIKELY INTERFERING CHANNELS		CHANNEL UNDER TEST	MOST LIKELY INTERFERING CHANNELS	
1	24	12	13	1	24
2	13	1	14	2	13
3	14	2	15	3	14
4	15	3	16	4	15
5	16	4	17	5	16
6	17	5	18	6	17
7	18	6	19	7	18
8	19	7	20	8	19
9	20	8	21	9	20
10	21	9	22	10	21
11	22	10	23	11	22
12	23	11	24	12	23



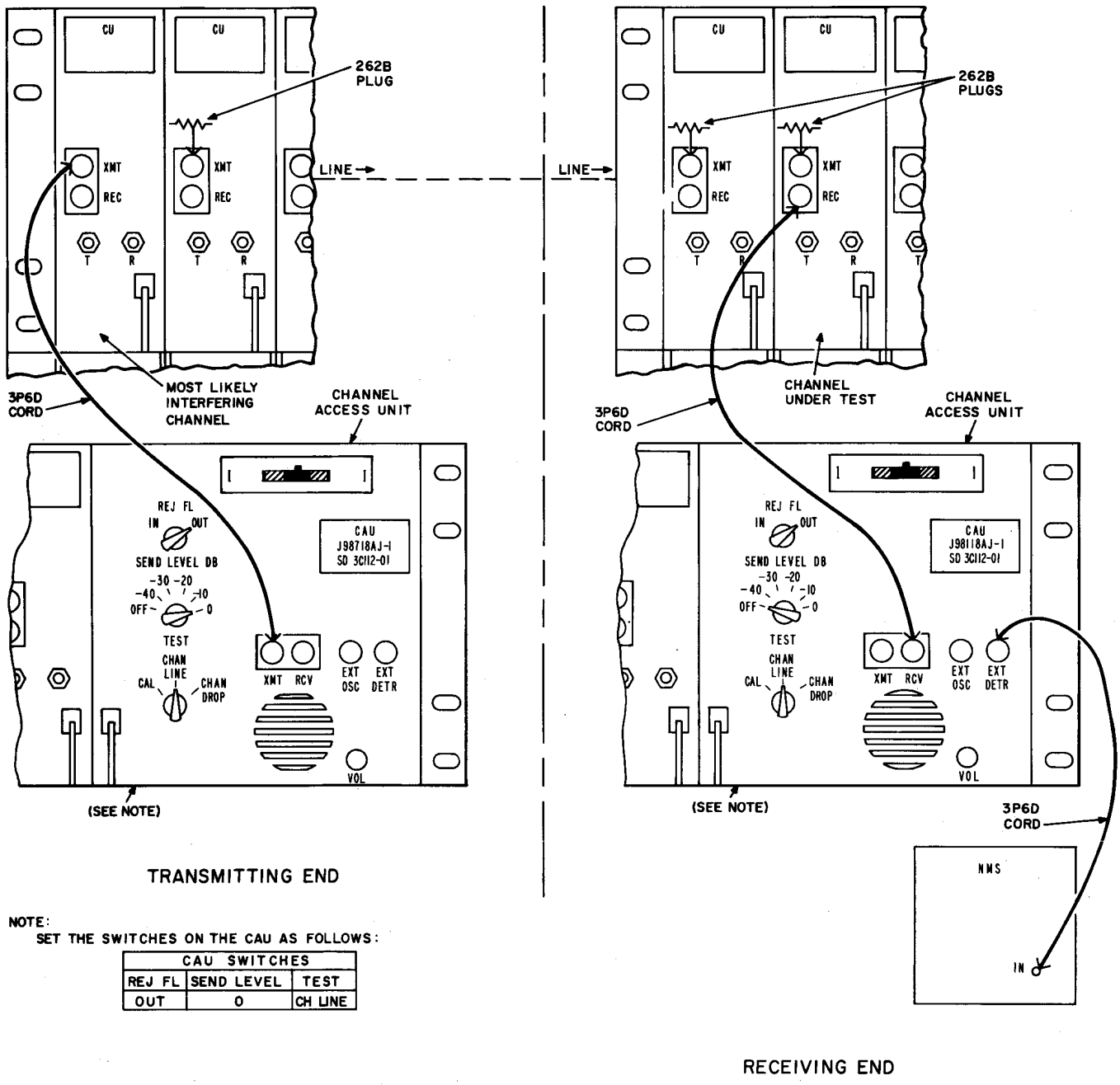
NOTES:

1. SET THE SWITCHES ON THE CAU AS FOLLOWS:

TEST	CAU SWITCHES		
	REJ FL	SEND LEVEL	TEST
NET LOSS	OUT	0	CH LINE
NOISE	OUT	OFF	CH LINE
DISTORTION	IN	0 TO 40	CH LINE

2. NMS REQUIRED FOR NOISE AND DISTORTION TEST.
3. PATCH KNURLED SIDE OF DOUBLE PLUG TO XMT JACK. PATCH RED 310 PLUG TO XMT AND BLACK 310 PLUG TO RCV.

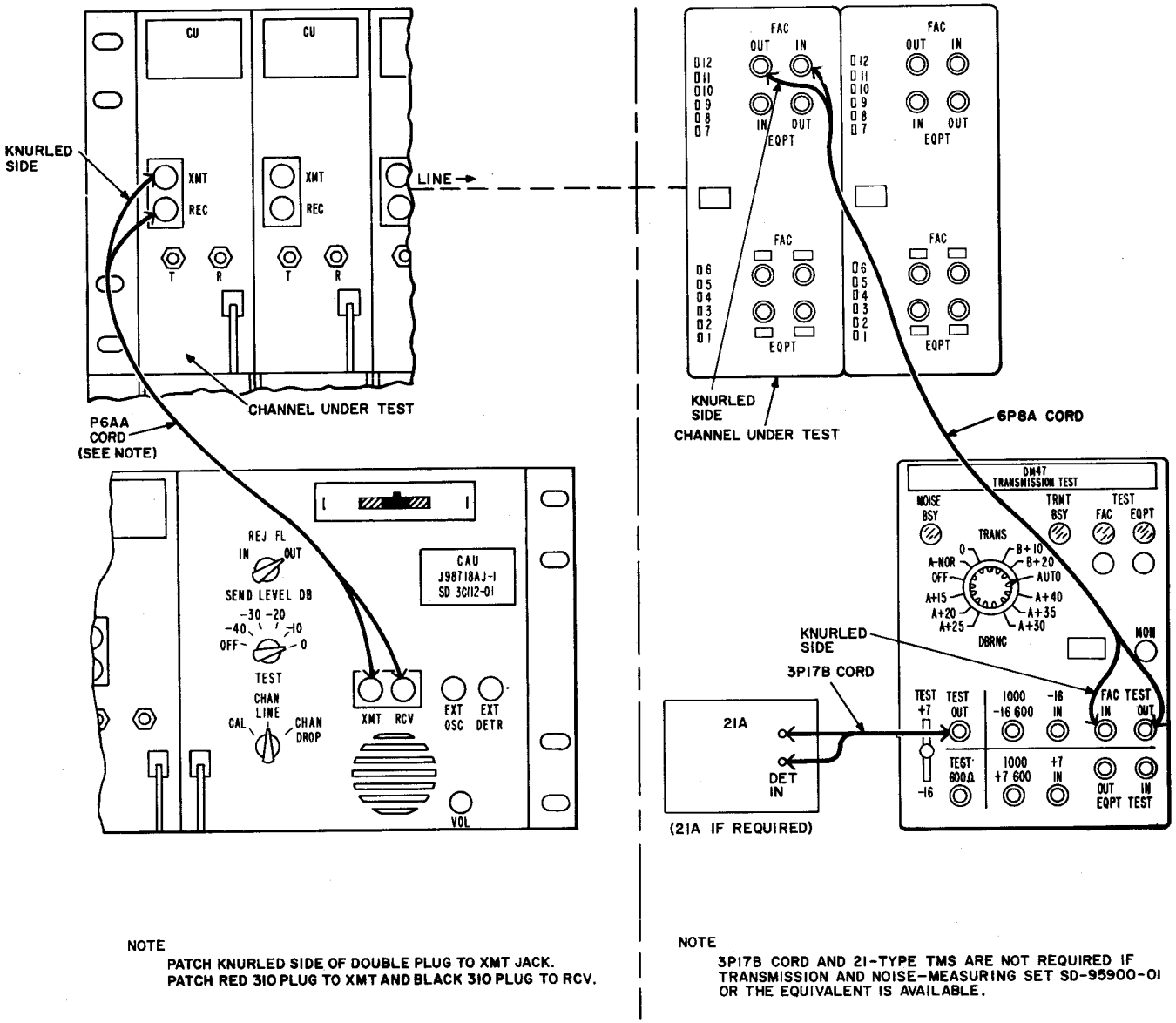
Fig. 1—Channel Net Loss, Noise, and Distortion



NOTE:
SET THE SWITCHES ON THE CAU AS FOLLOWS:

CAU SWITCHES		
REJ FL	SEND LEVEL	TEST
OUT	0	CH LINE

Fig. 2—Channel Crosstalk



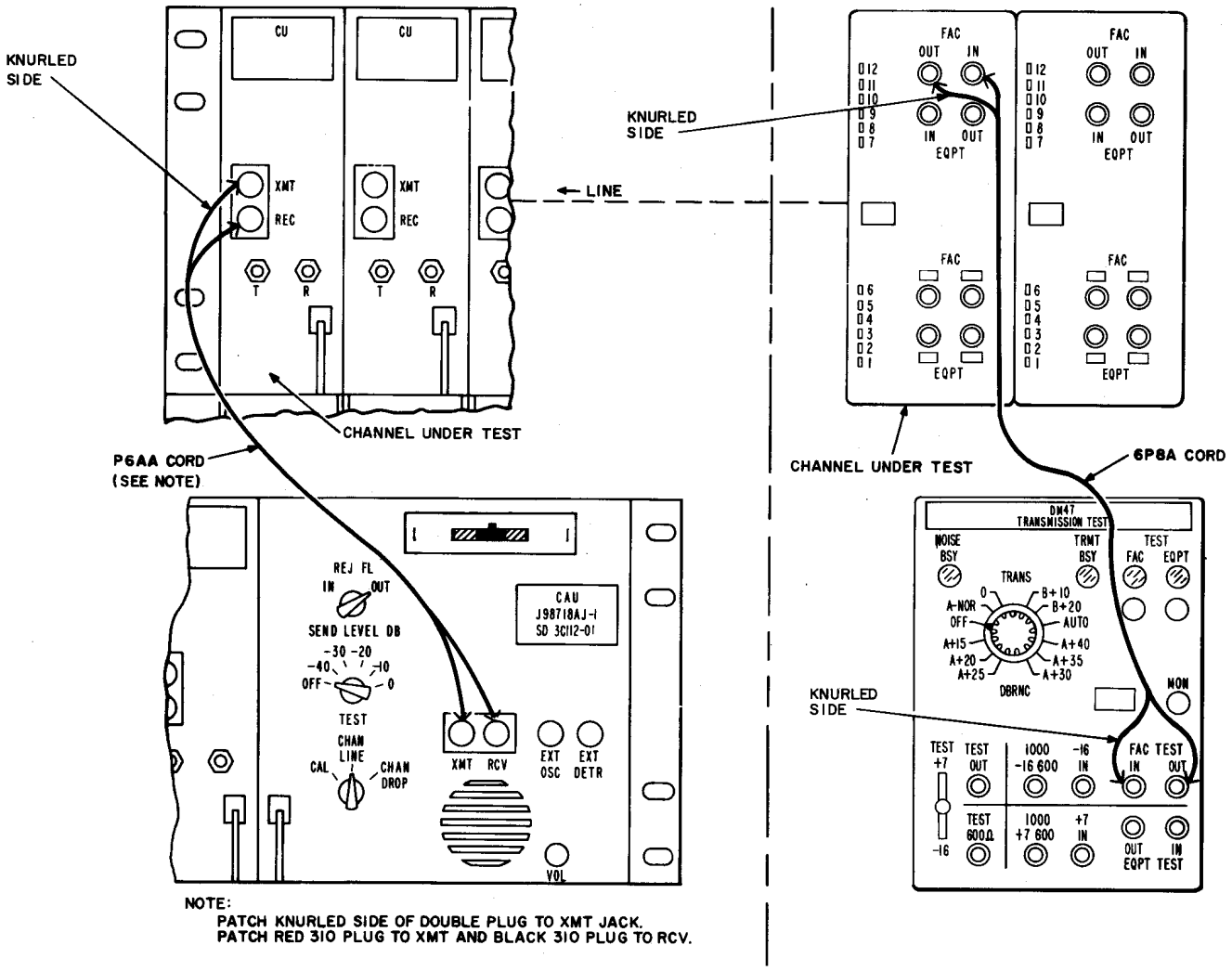
NOTE

PATCH KNURLED SIDE OF DOUBLE PLUG TO XMT JACK. PATCH RED 310 PLUG TO XMT AND BLACK 310 PLUG TO RCV.

NOTE

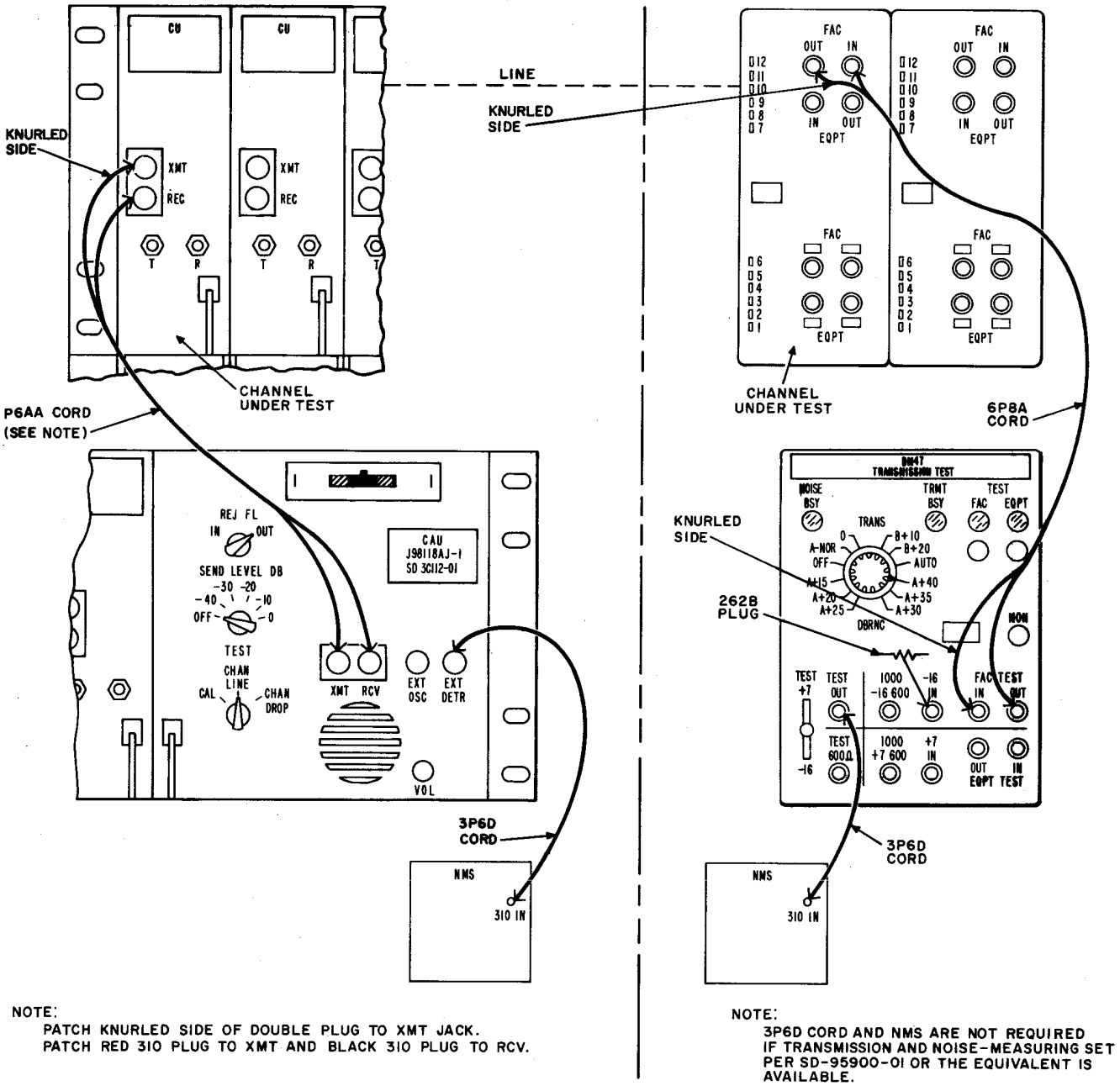
3P17B CORD AND 21-TYPE TMS ARE NOT REQUIRED IF TRANSMISSION AND NOISE-MEASURING SET SD-95900-01 OR THE EQUIVALENT IS AVAILABLE.

Fig. 3—D3 Transmitting to D2



NOTE:
PATCH KNURLED SIDE OF DOUBLE PLUG TO XMT JACK.
PATCH RED 310 PLUG TO XMT AND BLACK 310 PLUG TO RCV.

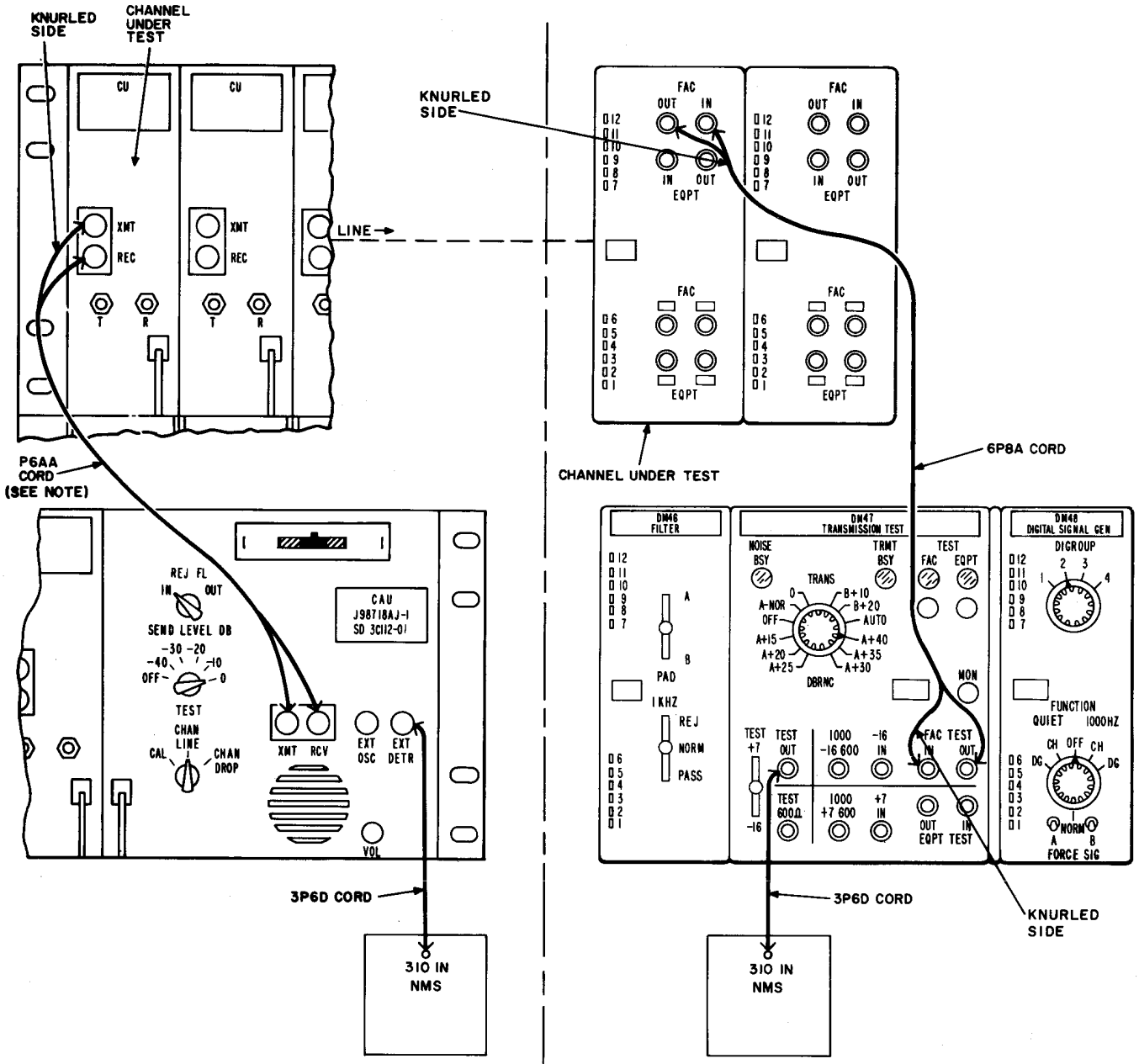
Fig. 4—D2 Transmitting to D3



NOTE:
PATCH KNURLED SIDE OF DOUBLE PLUG TO XMT JACK.
PATCH RED 310 PLUG TO XMT AND BLACK 310 PLUG TO RCV.

NOTE:
3P6D CORD AND NMS ARE NOT REQUIRED IF TRANSMISSION AND NOISE-MEASURING SET PER SD-95900-01 OR THE EQUIVALENT IS AVAILABLE.

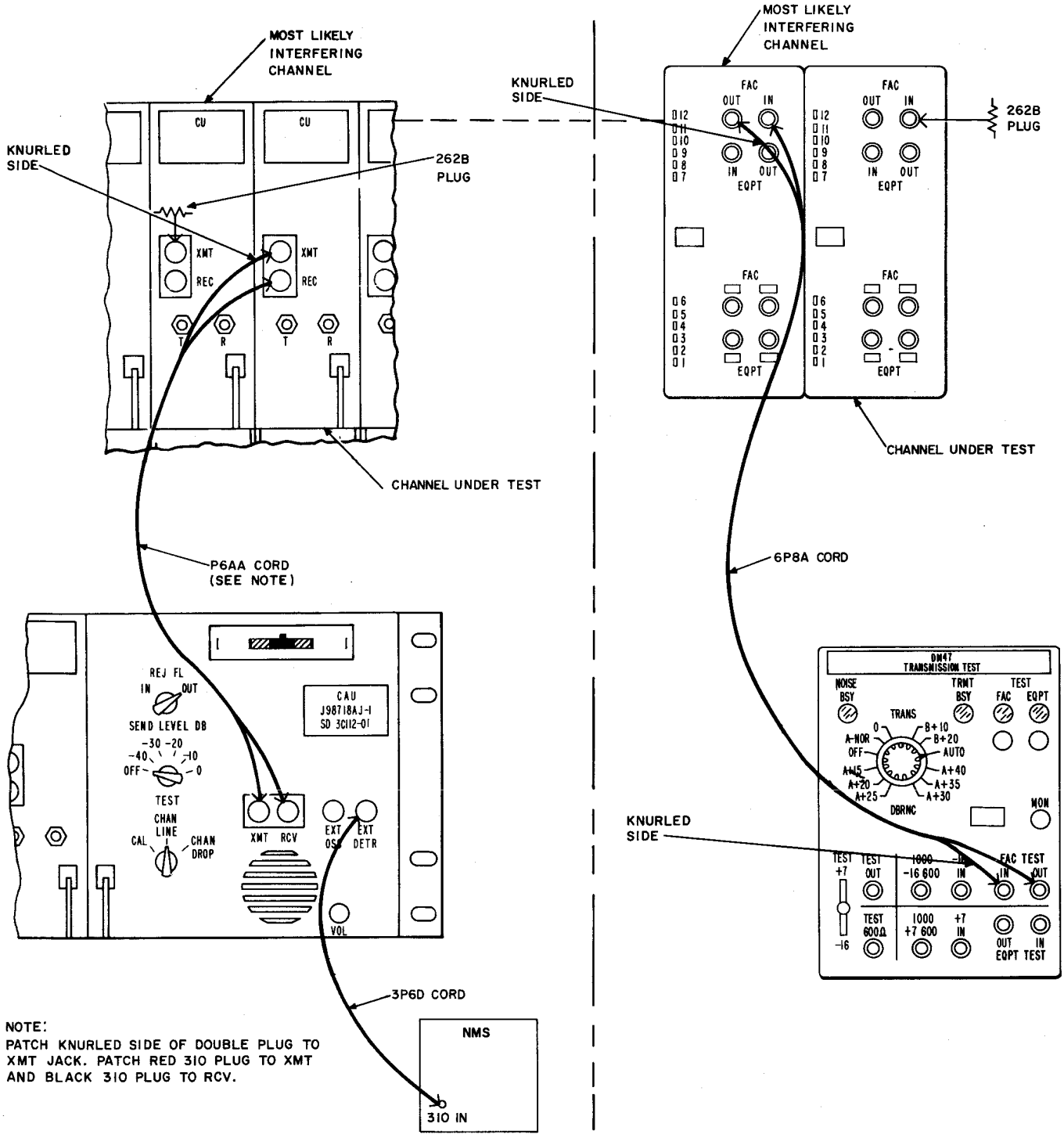
Fig. 5—D3 to D2 Idle Circuit Noise Test



NOTE:
PATCH KNURLED SIDE OF DOUBLE PLUG TO XMT JACK.
PATCH RED 310 PLUG TO XMT AND BLACK 310 PLUG TO RCV.

NOTE:
3P6D CORD AND NMS ARE NOT REQUIRED IF TRANSMISSION AND NOISE-MEASURING SET SD-95900-01 OR THE EQUIVALENT IS AVAILABLE.

Fig. 6—D3 to D2 Distortion Test



NOTE:
PATCH KNURLED SIDE OF DOUBLE PLUG TO XMT JACK. PATCH RED 310 PLUG TO XMT AND BLACK 310 PLUG TO RCV.

Fig. 7—D3 to D2 Crosstalk Test, D2 Transmit

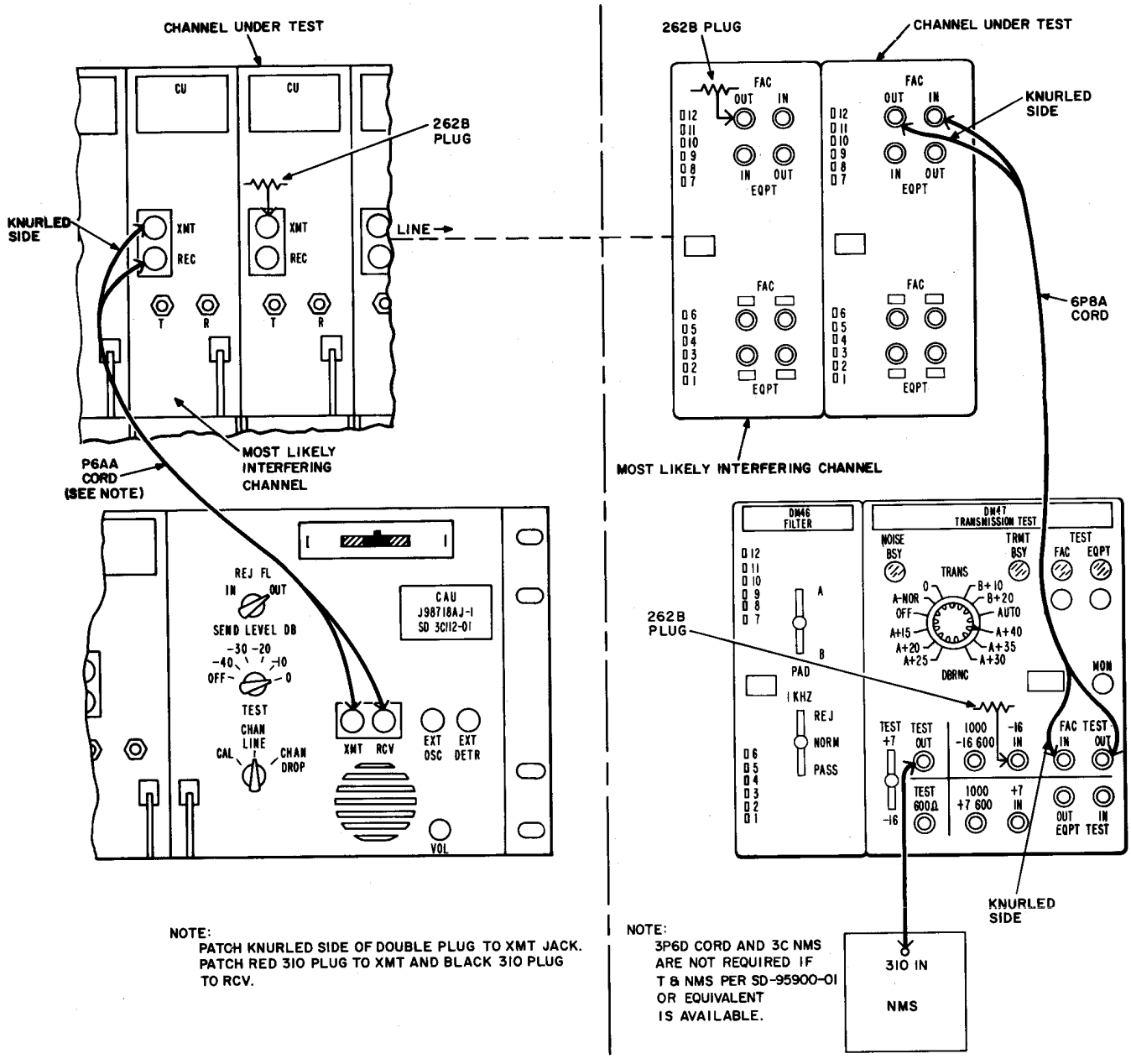
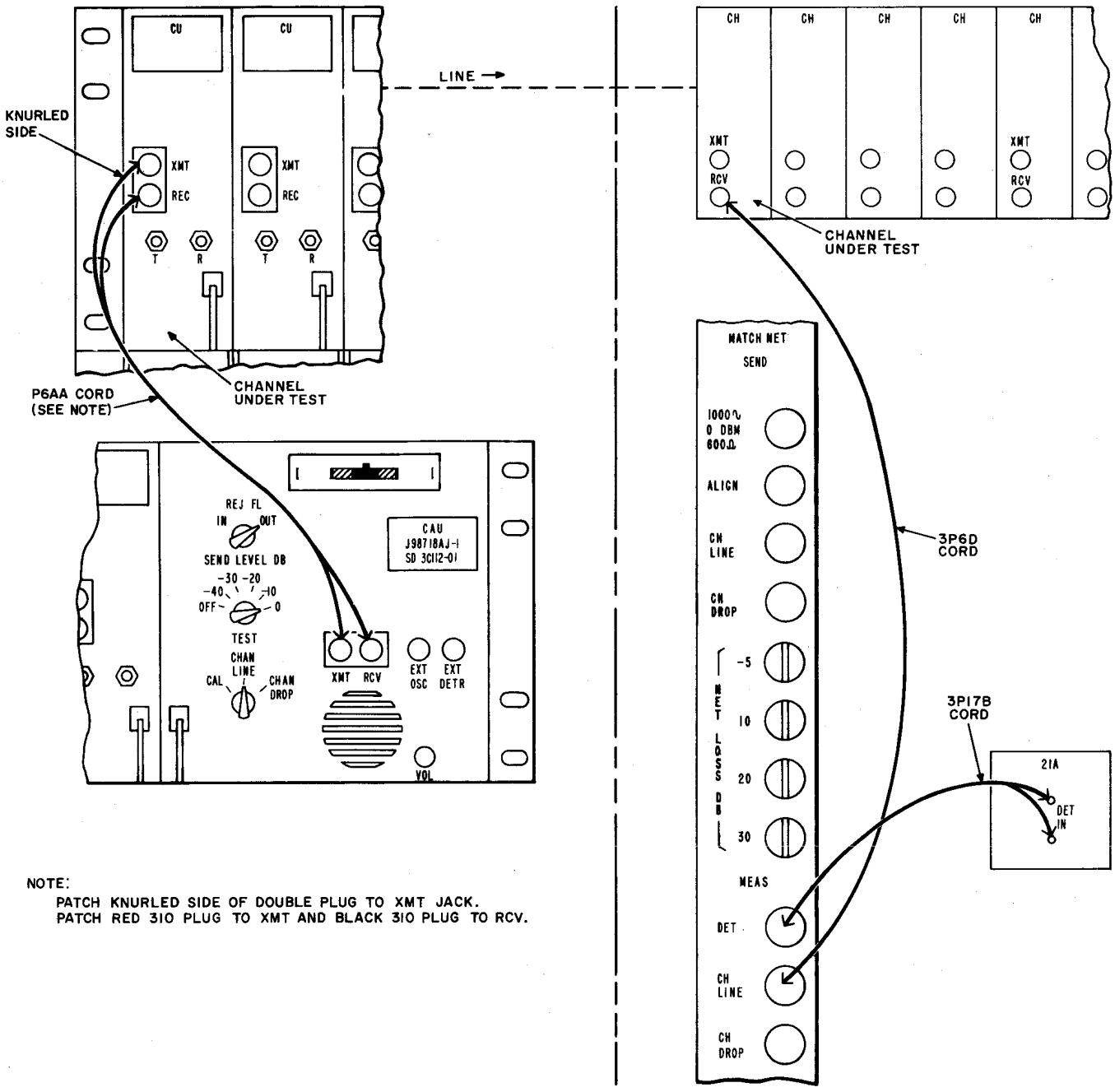
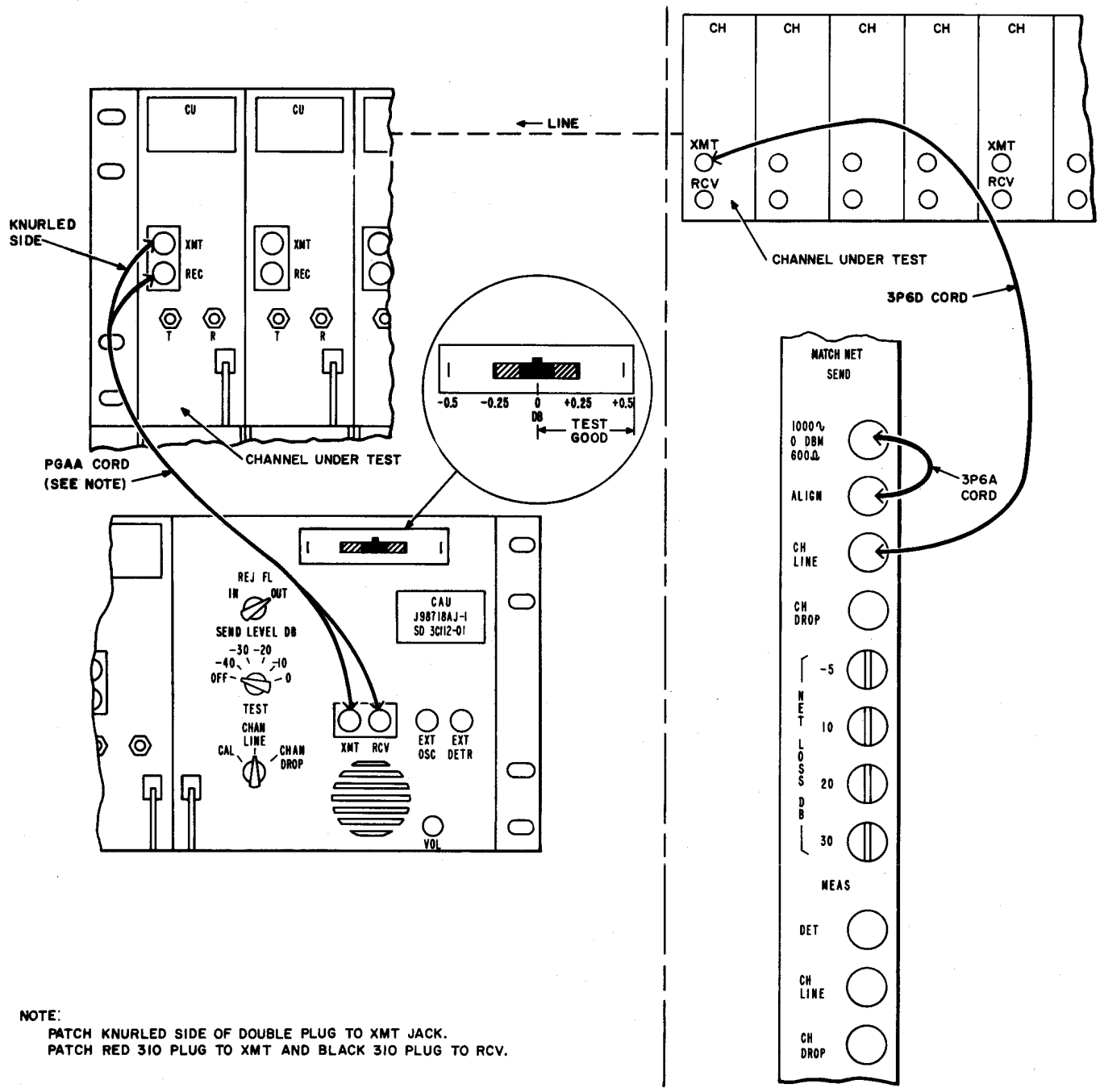


Fig. 8—D3 to D2 Crosstalk Test, D2 Receive



NOTE:
PATCH KNURLED SIDE OF DOUBLE PLUG TO XMT JACK.
PATCH RED 310 PLUG TO XMT AND BLACK 310 PLUG TO RCV.

Fig. 9—D3 Transmitting to D1D



NOTE:
PATCH KNURLED SIDE OF DOUBLE PLUG TO XMT JACK.
PATCH RED 310 PLUG TO XMT AND BLACK 310 PLUG TO RCV.

Fig. 10—D1D Transmitting to D3

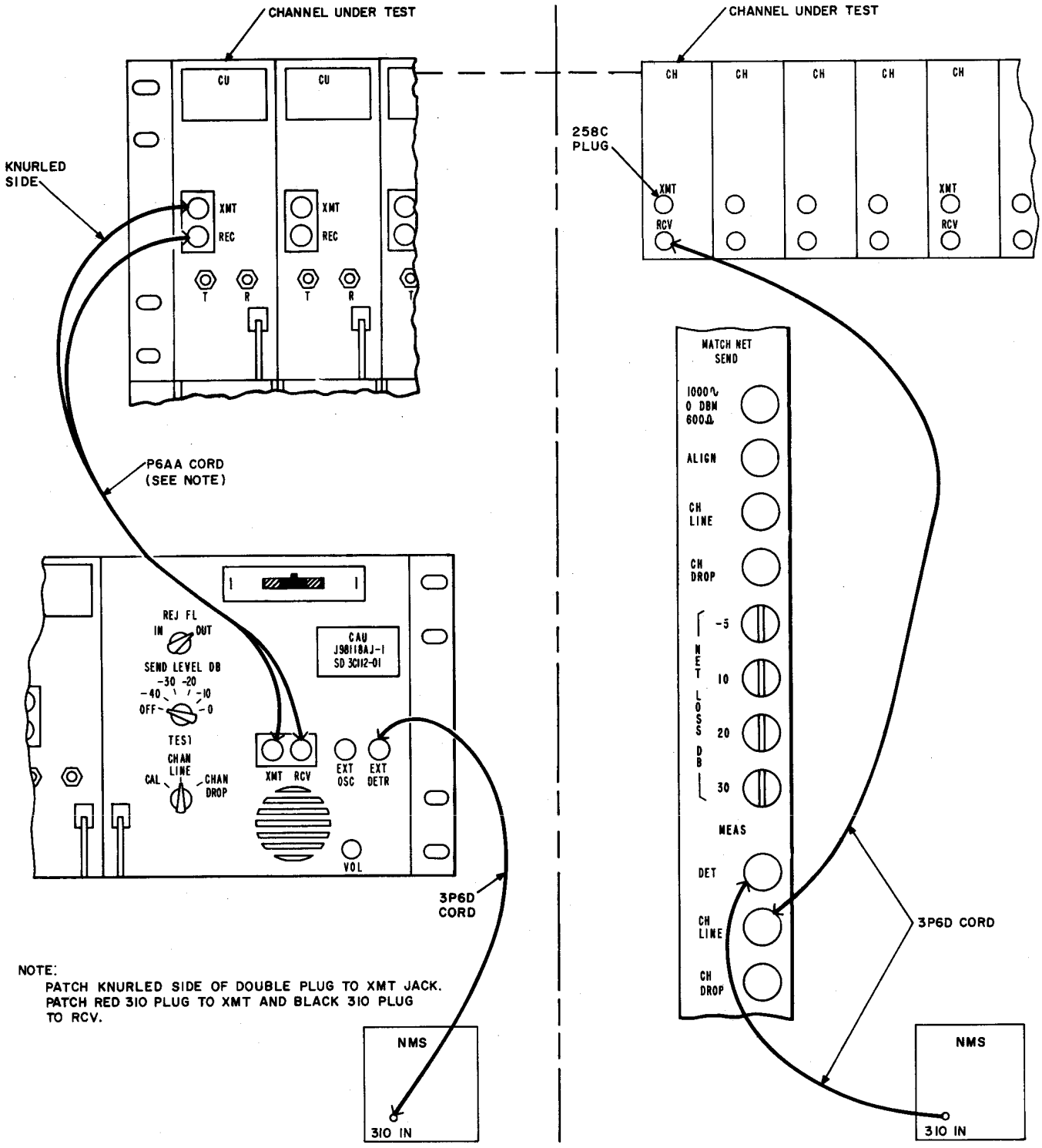
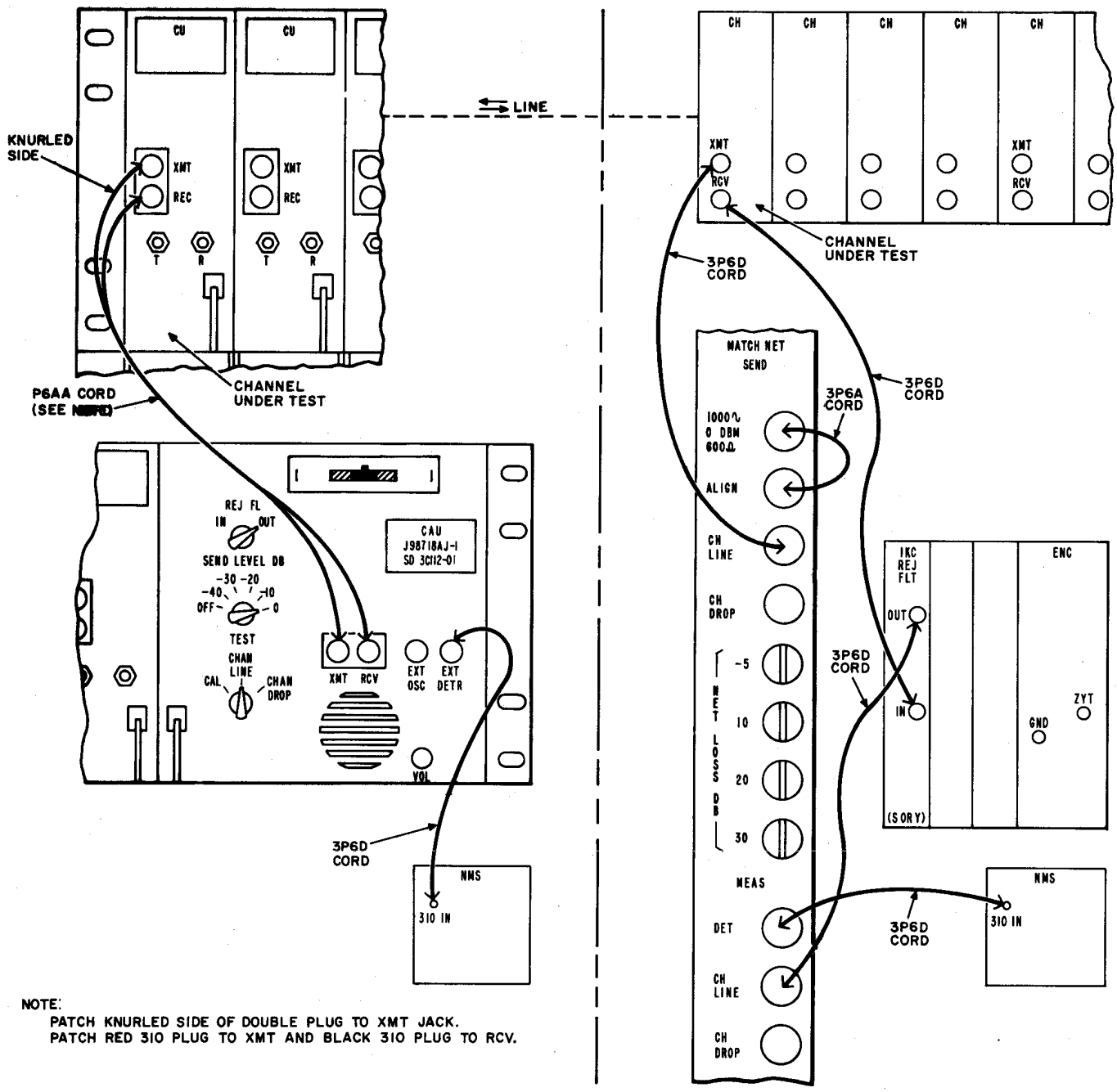
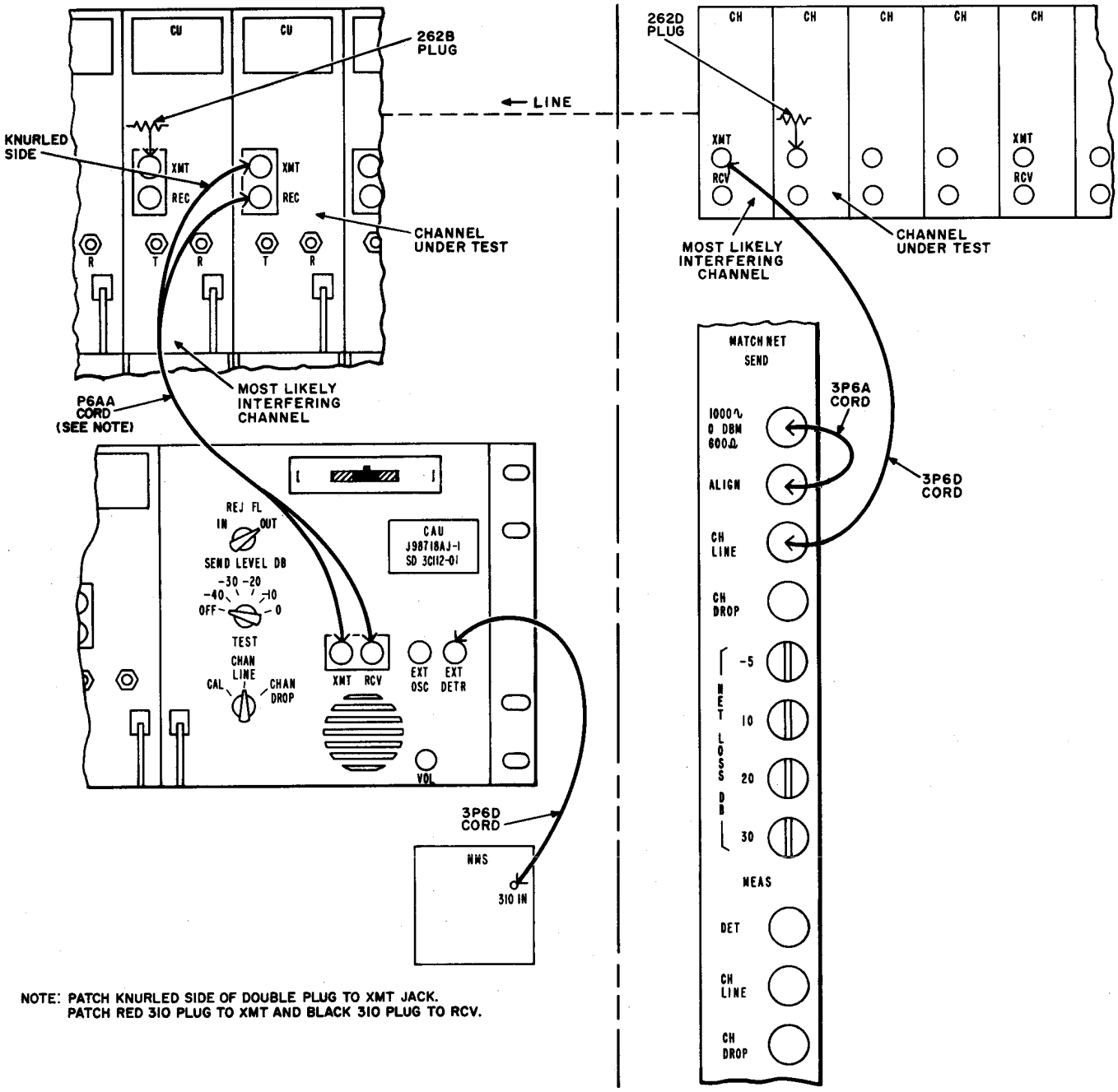


Fig. 11—D3 to D1D Idle Circuit Noise Test



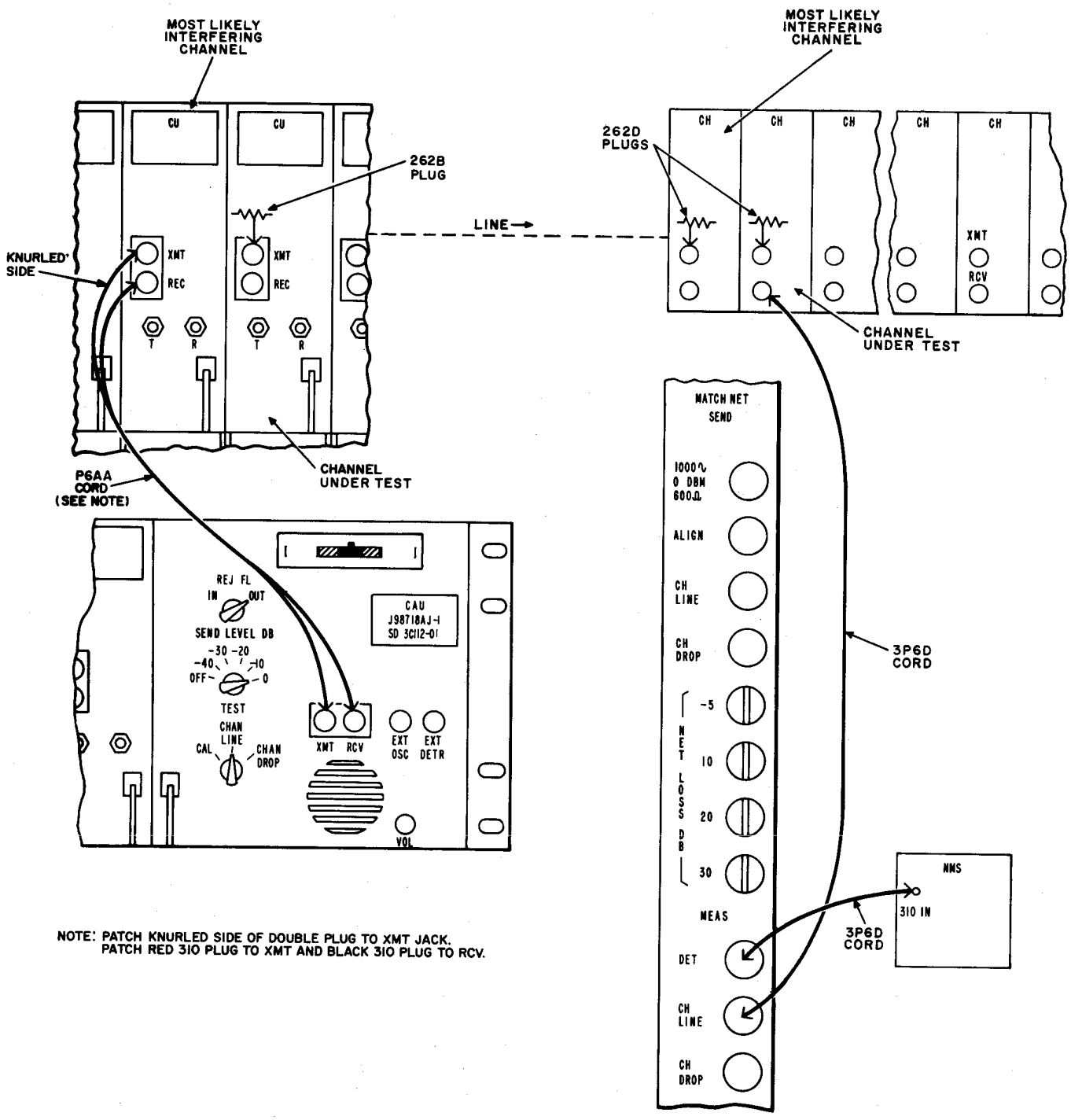
NOTE:
PATCH KNURLED SIDE OF DOUBLE PLUG TO XMT JACK.
PATCH RED 310 PLUG TO XMT AND BLACK 310 PLUG TO RCV.

Fig. 12—D3 to D1D Distortion Test



NOTE: PATCH KNURLED SIDE OF DOUBLE PLUG TO XMT JACK.
PATCH RED 310 PLUG TO XMT AND BLACK 310 PLUG TO RCV.

Fig. 13—D3 to D1D Crosstalk Test, D1D Transmit



NOTE: PATCH KNURLED SIDE OF DOUBLE PLUG TO XMT JACK.
PATCH RED 310 PLUG TO XMT AND BLACK 310 PLUG TO RCV.

Fig. 14—D3 to D1D Crosstalk Test, D1D Receive