D3 CHANNEL BANK
SYSTEM LINEUP PROCEDURES WITH WESCOM 330 DIGITAL TRANSMISSION SYSTEMS

CONTENTS PAGE

1. GENERAL

1.01 This section includes overall tests with banks out of service and single channel tests with banks in service. Transmission loss and idle channel noise should be measured for all channels added or reassigned to an in-service bank. Crosstalk and distortion should be measured on only one added channel.

1.02 When this section is reissued, the reason for reissue will be listed in this paragraph.

1.03 It is assumed that both banks have been installed and single-end tested per Section 365-150-501 and Section 395-330-501 (Wescom). For complete information on signaling compatibility, refer to Section 179-100-310. Verify that the proper channel unit options and pad selection have been made in accordance with the circuit layout record card.

1.04 When T1 terminals are to be used for special services (for example, private line data service) and the special service requirements are stricter than those specified for the T1 system, then the more stringent requirements must also be met. See Section 365-010-500.

1.05 When troubleshooting, each board removed because of suspicion of a defective network, but found not to be responsible for the trouble, should be reinserted in the bank into the original slot from which it was removed.

2. APPARATUS

2.01 The following apparatus or the equivalent is required at the Western Electric D3 end:

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

1—J94003A or C Noise Measuring Set (NMS) [Section 103-611-100 (3A) or 103-611-101 (3C)]

1—3-Inch Shorting Straps per Section 365-150-500

1—P6AA Cord or 2—P3BH Cords

2—P3BH Cords

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

24—258C Open Plugs for nonworking banks.

2.02 The following apparatus or the equivalent is required at the Wescom 330 end:

1—3316 Test Unit

1—TTS-37B Test Set

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

24—258C Open Plugs for nonworking banks

1—Test Cord with 310 Plug at one end and Pin Plugs at one end.

3. END-TO-END TEST PROCEDURES

STEP	WESTERN ELECTRIC D3 END	WESCOM 330 END
A. Preparation for Tests		
1	Verify that all trunks to be tested are made busy and special services are patched off or turned down for overall tests.	Verify that all trunks to be tested are made busy and special services are patched off or turned down for overall tests.
2	Assemble test equipment and establish communication with other end.	Assemble test equipment and establish communication with other end.
3	Verify that all lamps on the alarm and control unit are extinguished.	Verify that all lamps on the alarm unit are extinguished.
B. Transmission Test Level		
	Receiving End	***Transmitting End***
1	Connect the test circuit for channel to be checked as shown in Fig. 1B. ***Note 1:*** On the P6AA cord, the knurled edge is associated with the red sleeve on the other end. ***Note 2:*** Do not connect NMS at this time.	Patch from MEAS jack on 3316 test unit to LINE jack on TTS-37B.
2	Set switches on CAU as follows: REJ FL to OUT SEND LEVEL to OFF TEST to CHAN LINE.	Depress ON switch on the 3316 test unit and select transmit channel type and impedance on test unit.
3	No action.	Depress MEAS switch on the test unit.
4	No action.	Depress XMT LVL switch on the test unit and adjust the front accessible LVL ADJ potentiometer for the following indication: 0 dBm for 2-wire channels 16 dBm for 4-wire channels.
5	No action.	Release XMT LVL switch on test unit.

STEP	WESTERN ELECTRIC D3 END	WESCOM 330 END
6	No action.	Patch from XMT jack on the test unit to T and R pin jacks on channel unit to be checked.
7	Measure level on CAU meter. ***Requirement:*** The meter reading is in the green/black range (0.0 dBm ±0.25 dBm). In addition the speaker on the CAU should sound. ***Note 1:*** If meter is not in green/black range, sound will not be heard from speaker. ***Note 2:*** If meter is out of range an external meter may be used to check level.	Adjust potentiometer TA on the channel unit for the proper indication at other end.
8	If the requirement of Step 7 is met, proceed to Step 10. If the requirement is ***not*** met and the Western Electric D3 is suspected, replace the channel unit properly optioned and with proper pad selections.	If the requirement at other end is met proceed to Step 10. If the requirement is ***not*** met and the Wescom 330 is suspected, replace the channel unit properly optioned and with proper pad selections.
9	If the requirement is still ***not*** met, perform single-ended tests according to Section 365-150-501 and repeat this test.	If the requirement at other end is still ***not*** met, perform single-ended tests according to Section 395-330-501 and repeat this test.
10	Repeat Steps 1 through 9 for all channels to be tested.	Repeat Steps 1 through 9 for all channels to be tested.
	Transmitting End	***Receiving End***
11	Connect the test circuit for channel to be checked as shown in Fig. 1A.	Patch from the RCV jack on the test unit to channel T and R pin jacks (if 2 wire) or T1 and R1 (if 4 wire) to channel to be checked.
12	Set switches on CAU as follows: REJ FL to OUT SEND LEVEL to 0 TEST to CHAN LINE.	Set switches on TTS-37B as follows: FILTER SWITCH to 3 KHZ INPUT to 600-OHM BRIDGE SENSITIVITY to 0 DBM for 2-wire units or +10 for 4-wire units.
13	No action.	Measure level on TTS-37B meter. ***Requirement:*** -2 dBm for 2-wire channels; +7 dBm for 4-wire channels.

STEP	WESTERN ELECTRIC D3 END	WESCOM 330 END
14	If the requirement at other end is met, proceed to Step 16. If the requirement is ***not*** met and the Western Electric D3 is suspected, replace the channel unit properly optioned and with proper pad selections.	If the requirement is met, proceed to Step 16. If the requirement is ***not*** met and the Wescom 330 is suspected, replace the channel unit with proper pad selections.
15	If the requirement at other end is still ***not*** met, perform single-ended tests according to Section 365-150-501 and repeat this test.	If the requirement is still ***not*** met, perform single-ended tests according to Section 395-330-501 and repeat this test.
16	Repeat Steps 11 through 15 for all channels to be tested.	Repeat Steps 11 through 15 for all channels to be tested.
C. Idle Channel Noise Test		
1	Verify that Preparation for Tests and Transmission Test have been completed.	Verify that Preparation for Tests and Transmission Test have been completed.
2	Connect the test circuit for channel to be checked as shown in Fig. 1B.	Patch MEAS jack on the test unit to the LINE jack on the TTS-37B.
3	Place 258C open plugs in XMT jacks of all channel units not in service.	Place 258C open plugs in XMT jacks of all channel units not in service.
4	Set switches on CAU as follows: REJ FL to OUT SEND LEVEL to OFF TEST to CHAN LINE.	Patch T and R (2 wire) or T1 and R1 (4 wire) of channel to be checked to the RCV jack on the test unit.
5	Set switches on NMS as follows: DBRN to on scale WTG to C-MSG FUNCTION to 600/900 NM (3C) or 600 NM (3A) NORM/DAMP to DAMP. ***Note:*** The following portion of this test is performed independently of the other end.	Set switches on TTS-37B as follows: INPUT SWITCH to 600-OHM BRDG HOLD to OFF FILTER SWITCH to C-MSG. ***Note:*** The following portion of this test is performed independently of the other end.
6	Measure noise. ***Requirement:*** 23 dBrnc or less.	Measure noise. ***Requirement:*** 23 dBrnc or less. ***Note:*** When testing from a 4-wire channel unit, subtract 7 dBrnc from the test set indication. The resulting figure must be 23 dBrnc or less.

STEP	WESTERN ELECTRIC D3 END	WESCOM 330 END
7	If the requirement of Step 6 is met, proceed to Step 8. If the requirement is ***not*** met, perform idle channel noise measurements single-ended per Section 365-150-501 and repeat this test.	If the requirement of Step 6 is met, proceed to Step 8. If the requirement is ***not*** met, perform idle channel noise measurements single-ended per Section 395-330-501 and repeat this test.
8	Repeat Steps 1 through 7 for all channels to be tested.	Repeat Steps 1 through 7 for all channels to be tested.
9	Remove 258C open plugs.	Remove 258C open plugs.
10	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. Quantizing Distortion Test		
1	Verify that Preparation for Tests and Transmission Test have been completed.	Verify that Preparation for Tests and Transmission Test have been completed.
	Transmitting End	***Receiving End***
2	Connect the test circuit for channel to be checked as shown in Fig. 1A.	Patch from pin jacks T and R (2 wire) or T1 and R1 (4 wire) on channel to be checked to the RCV jack on the test set.
3	Set switches on CAU as follows: REJ FL to IN SEND LEVEL to 0 TEST to CHAN LINE.	Set switches on TTS-37B as follows: INPUT SWITCH to 600-OHM BRDG HOLD to OFF FILTER SWITCH to C-MSG.
4	No action.	Patch from MEAS jack of the test unit to the LINE jack of the TTS-37B.

STEP	WESTERN ELECTRIC D3 END	WESCOM 330 END
5	Set CAU SEND LEVEL to:	Depress DISTN switch on the test unit.
		Requirement:
		2W CHANNEL / **4W CHANNEL**
	0	55 dBrnc or less / 64 dBrnc or less
	-30	25 dBrnc or less / 34 dBrnc or less
	-40.	21 dBrnc or less / 30 dBrnc or less
6	If requirements at other end are ***not*** met, perform distortion measurements single-ended per Section 365-150-501 and repeat this test.	If requirements are not met, perform distortion measurements single-ended per Section 395-330-501 and repeat this test.
	Receiving End	***Transmitting End***
7	Connect the test circuit for channel to be checked as shown in Fig. 1B.	Patch from XMT jack on the test set to the T and R pin jacks of channel under test.
8	Set switches on CAU as follows: REJ FL to IN SEND LEVEL to OFF TEST to CHAN LINE.	No action.
9	Set switches on NMS as follows: DBRN to 85 WTG to C-MSG FUNCTION to 600/900 NM (3C) or 600 NM (3A) NORM/DAMP to DAMP.	No action.
10	Adjust DBRN control on NMS as required and read meter. ***Requirement:***	Set ATTEN switches send level to:
	56 dBrnc or less	Send 0 DB
	36 dBrnc or less	Send 30 DB
	24 dBrnc or less.	Send 40 DB.
11	If requirements are ***not*** met, perform distortion measurements single-ended per Section 365-150-501 and repeat this test.	If the requirements at the other end are ***not*** met, perform distortion measurements single-ended per Section 395-330-501 and repeat this test.

STEP	WESTERN ELECTRIC D3 END	WESCOM 330 END
12	When the requirements have been met, proceed to the next test or remove test connections.	When the requirements have been met, proceed to the next test or remove test connections.

E. Crosstalk Test

In this test, tone is sent alternately on the two most likely interfering channels while noise caused by crosstalk is measured at the other end of the channel under test.

1	Verify that Preparation for Tests and Transmission Test have been completed.	Verify that Preparation for Tests and Transmission Test have been completed.
2	Select the channel to be tested.	From Table A determine the two most likely interfering channels for the channel under test.
	Receiving End	***Transmitting End***
3	Connect the test circuit as shown in Fig. 2B.	For transmit, patch from the T and R pin jack of the first most likely interfering channel from Table A to the XMT jack on the test unit.
4	Insert 262B plugs in XMT jack of channel under test and most likely interferring channels.	No action.
5	Set switches on CAU as follows: REJ FL to OUT SEND LEVEL to OFF TEST to CHAN LINE.	No action.
6	Set switches on NMS as follows: DBRN to on scale WTG to C-MSG FUNCTION to 600/900 NM (3C) or 600 NM (3A) NORM/DAMP to DAMP.	No action.
7	Measure crosstalk. ***Requirement:*** 27 dBrnc or less.	No action.
8	No action.	Move the test connection to the other most likely interfering channel.
9	Measure crosstalk.	No action.

STEP	WESTERN ELECTRIC D3 END	WESCOM 330 END
	Requirement: 27 dBrnc or less.	
10	If the requirement of Step 7 or 9 is ***not*** met, perform crosstalk measurements single-ended per Section 365-150-501 and repeat this test.	If the requirements at other end are ***not*** met, perform crosstalk measurements single-ended per Section 395-330-501 and repeat this test.
11	From Table A, determine the two most likely interfering channels for the channel under test.	Select the channel to be tested.
	Transmitting End	***Receiving End***
12	Connect the test circuit as shown in Fig. 2A to first most likely interfering channel.	For receive, patch from the jack on the test set to the T and R (2 wire) or T1 and R1 (4 wire) pin jacks of channel to be tested.
13	Insert 262B plug in the XMT jack of channel under test.	Patch from the MEAS jack on the test unit to the LINE jack on the TTS-37B.
14	Set switches on CAU as follows: REJ FL to OUT SEND LEVEL to 0 TEST to CHAN LINE.	Set switches on TTS-37B as follows: INPUT to 600-OHM BRDG HOLD to OFF FILTER to C-MSG.
15	No action.	Depress CRSTLK switch on the test unit.
16	No action.	Measure crosstalk. ***Requirement:*** 23 dBrnc (2 wire) or 32 dBrnc (4 wire).
17	Move the test connection to the other most likely interfering channel.	No action.
18	No action.	Measure crosstalk. ***Requirement:*** 23 dBrnc (2 wire) or 32 dBrnc (4 wire).
19	If requirements at other end are ***not*** met, perform crosstalk measurements single-ended per Section 365-150-501 and repeat this test.	If requirement of Step 16 or 18 is ***not*** met, perform crosstalk measurements single-ended per Section 395-330-501 and repeat this test.
20	Disconnect patch cords and plugs from channel units.	Disconnect patch cords from channel units.

STEP	WESTERN ELECTRIC D3 END	WESCOM 330 END
21	Disconnect test setup and turn off power on test sets as applicable.	Disconnect test setup and turn off power on test sets as applicable.

F. Alarm Test

Caution: This test should not be performed on working banks until all circuits have been made busy or removed from service.

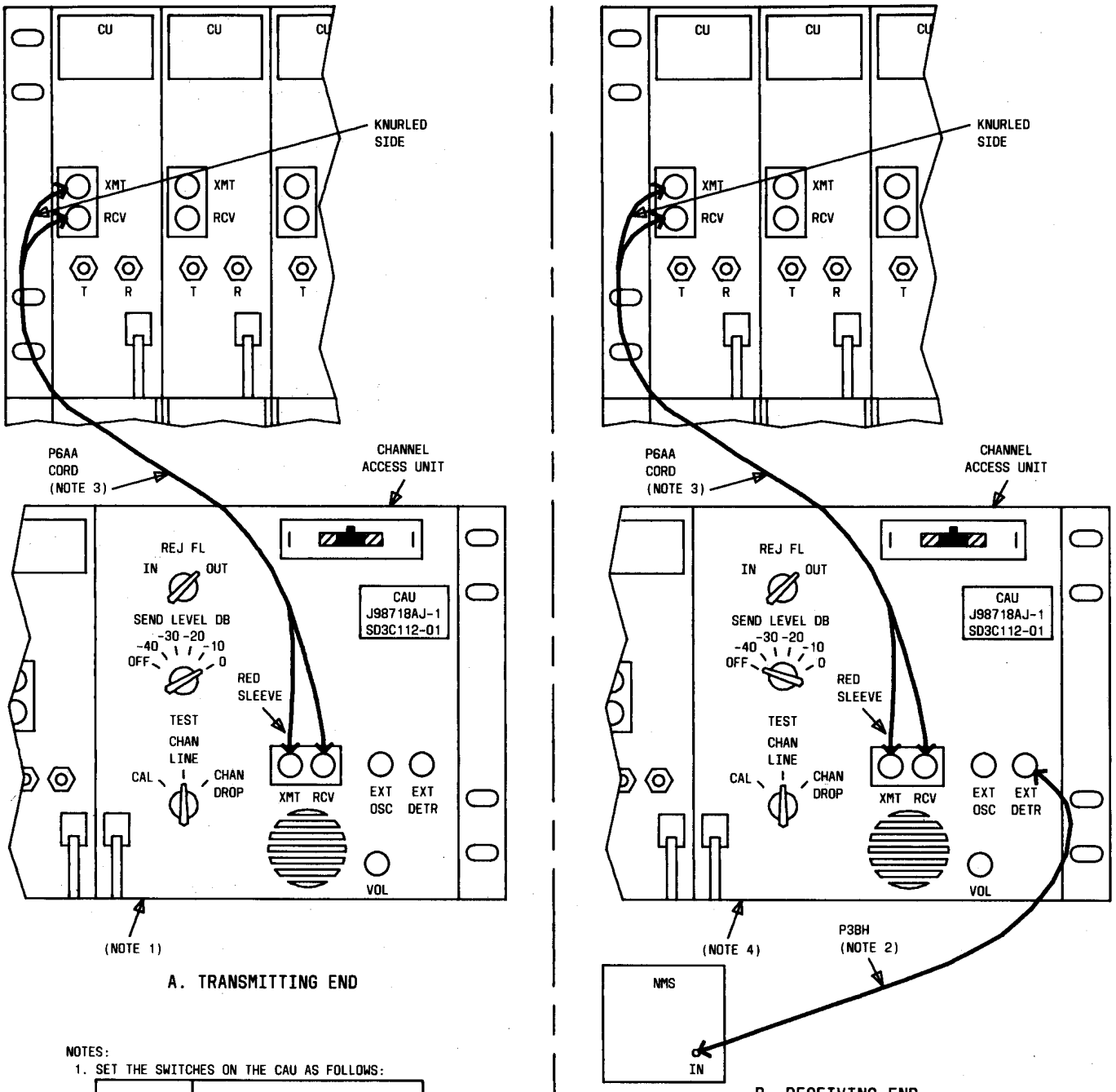
Note: Disregard the lighting or extinguishing of lamps not specifically referred to in this test.

1	Connect a 3-inch wire equipped with pin plugs between the RNFAL and GRD jacks on the receiver unit. ***Requirement:*** The red AR lamp on the alarm control unit lights.	Observe the alarm unit. ***Requirement:*** The yellow REMOTE lamp lights on the alarm unit.
2	Depress ACO button. ***Requirement:*** The ACO lamp lights and the audible alarms silence.	Depress ACO button. ***Requirement:*** The white lamp lights and audible alarms silence.
3	If the lamp does not light, remove the lamp and check it with an ohmmeter. If there is continuity, replace the alarm control unit.	If the lamp does not light, remove the lamp and check it with an ohmmeter. If there is continuity, replace the alarm unit.
4	Remove the wire from between RNFAL and GRD jacks. ***Requirement:*** The red AR lamp extinguishes.	Observe the alarm unit. ***Requirement:*** The yellow REMOTE lamp extinguishes after about 15 seconds.
5	If the requirement is ***not*** met, replace the alarm control unit.	If the requirement is ***not*** met, replace the alarm unit.
6	Disengage the transmit unit. ***Requirement:*** The yellow AY lamp on the alarm control unit lights.	Observe the alarm unit. ***Requirement:*** The PCM FAIL and red LOCAL lamps light on the ALARM unit.
7	Depress ACO button. ***Requirement:*** The ACO lamp lights and the audible alarms silence.	Depress ACO button. ***Requirement:*** The ACO lamp lights and the audible alarms silence.
8	Reinsert transmit unit. ***Requirement:*** Yellow AY lamp on the alarm control unit extinguishes.	Observe the alarm unit. ***Requirement:*** PCM FAIL and LOCAL lamps extinguish after about 10 seconds.

STEP	WESTERN ELECTRIC D3 END	WESCOM 330 END
9	If requirements are ***not*** met, replace the alarm control unit.	If requirements are ***not*** met, replace the alarm unit.
10	Depress the MEM RESET button on TPU if provided.	No action.

TABLE A

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



NOTES:

1. SET THE SWITCHES ON THE CAU AS FOLLOWS:

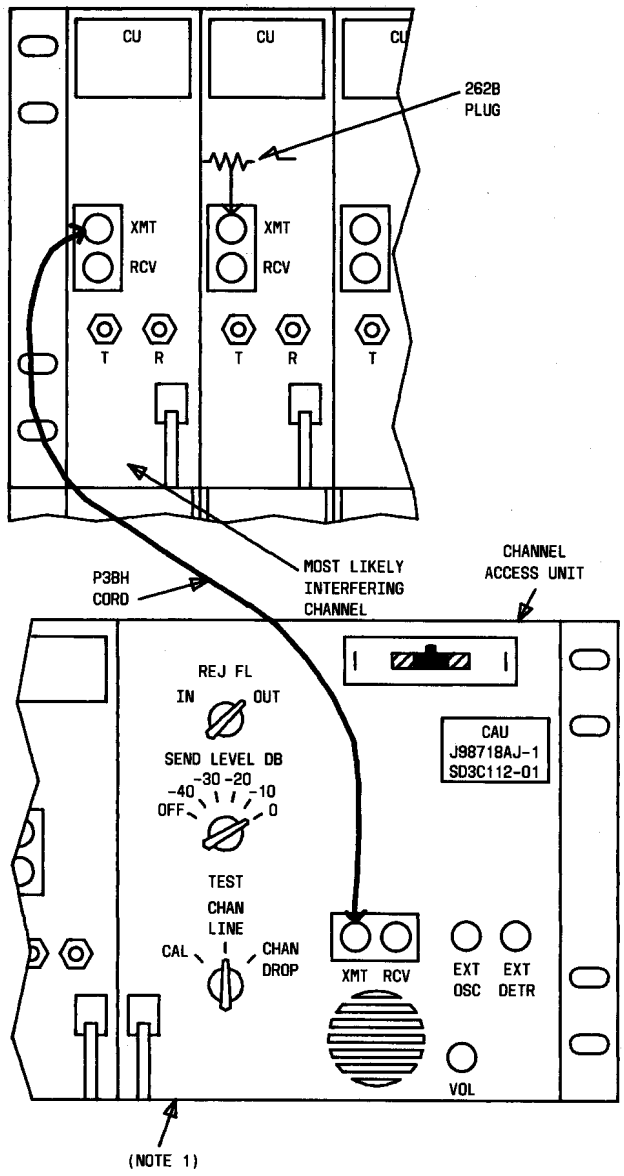
TEST	CAU SWITCHES		
	REJ FL	SEND LEVEL	TEST
NET LOSS	OUT	0	CH LINE
NOISE	OUT	OFF	CH LINE
DISTORTION	IN	0 TO 40	CH LINE

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.

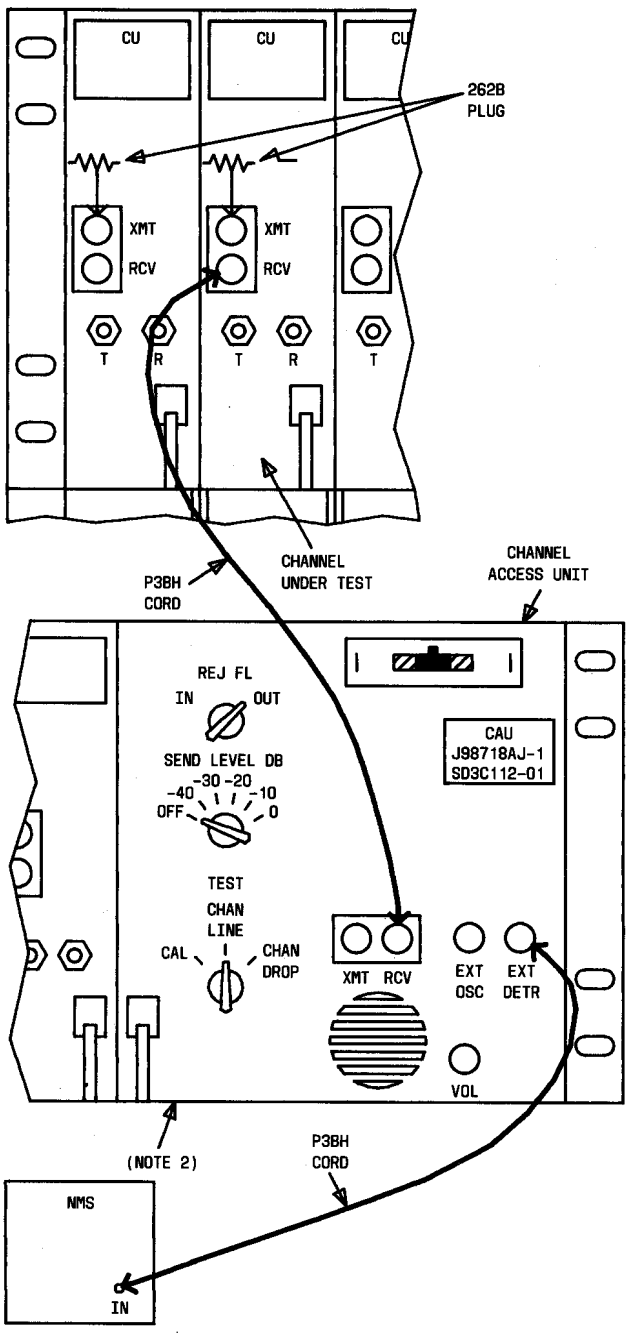
4. SET THE SWITCHES ON THE CAU AS FOLLOWS:

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

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



A. TRANSMITTING END



B. RECEIVING END

NOTES:

1. SET THE SWITCHES ON THE CAU AS FOLLOWS:

CAU SWITCHES		
REJ FL	SEND LEVEL	TEST
OUT	0	CH LINE

2. SET THE SWITCHES ON THE CAU AS FOLLOWS:

CAU SWITCHES		
REJ FL	SEND LEVEL	TEST
OUT	OFF	CH LINE

Fig. 2—Channel Crosstalk—Western Electric D3 Terminal