CIRCUIT ORDER OR TRUNK ORDER TESTS FOR OVERSEAS OPERATOR BRIDGED ACCESS TRUNKS IOC AND IOTC OPERATION 4A AND 4M TOLL SWITCHING SYSTEMS AND 3C OR 3CL SWITCHBOARDS

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1. GENERAL

1.01 This section provides information and methods for performing circuit order or trunk order tests on overseas operator bridged access trunks equipped with SD-68706-01 intraoffice trunks and SD-1B106-01 switchboard trunks. It includes the use of these circuits for TSPS residual switchboards located in an International Operating Center (IOC) or an International Originating Toll Center (IOTC)). These tests should be completed before the trunks are placed in service.

1.02 When overseas calls are completed by cordboard operators, and the cordboards are remotely located from the associated toll switching machine (4A or 4M), overseas bridged access trunks are required to satisfy transmission requirements. These bridged access trunk circuits will connect the domestic customer and the overseas customer

together on a 4-wire basis at the 4A or 4M toll switching office. The operator will be connected via a bridge when it is necessary to be in on the call while it is being set up, or after it has been completed.

1.03 The SD-68706-01 intraoffice trunk, located at the 4A or 4M toll switching machine, consists of two parts, A and B. Part A is a 2-way trunk and part B is one-way incoming to the switching machine. Switched A pads are provided in one part of the intraoffice trunk to maintain proper transmission levels when connected to high-loss trunks.

1.04 The SD-1B106-01 switchboard trunk, located at the switchboard end, also consists of two parts, A and B. Part A is a 2-way trunk and part B is one-way outgoing to the switching machine.

1.05 The trunks use E and M supervision. The remote facilities between the toll switching machine and the switchboard can be 4-wire physical or carrier (including radio) systems or a combination of both.

1.06 The transmission loss of the circuits between the switchboard and the switch depends on the direction of transmission and the distance between the two points. Tables are provided where necessary to give the desired transmission measurements versus distance.

2. TEST EQUIPMENT AND TEST FACILITIES

2.01 Dedicated 17C testboards with special jack arrangements are provided at the toll switching machine location for testing the intraoffice end of the trunks. At the switchboard location, 17B testboards are provided to test the switchboard end of the trunk. Most tests will be performed using the facilities furnished at the testboards. ***It is important that the transmission test equipment is known to be accurately calibrated.*** Additional test equipment required at each location:

1—KS-20501 Return Loss Measuring Set

1—21A Transmission Measuring Set (21A TMS).

Note: If another type of measuring set is used in lieu of the test equipment specified, it should be ascertained that the test equipment is as accurate as, or better than, that specified.

2.02 Values given in this section are for both TP2 (2-dB test pads) and TP0 (0 level) testing arrangements. In all cases, the TP2 testing value will be given followed by the TP0 value in parentheses. If only one value is given, this value will apply to both testing arrangements.

3. NON-HANGUP AND CALL-BACK TESTS

3.01 It is very important that all preliminary tests be coordinated between all work groups and locations involved to avoid confusion and wasted time and effort. For example, the facilities and drop portions of the same trunk, or group of trunks, can be aligned during the same period of time. This would allow overall tests to begin when preliminary tests on that trunk, or group of trunks, have been completed, rather than waiting until all preliminary tests have been completed on all trunks.

A. Preliminary Tests at 4A or 4M Toll Switching Location

3.02 Plug in the 227-type amplifiers at the SD-68706-01 trunks. Preset the gain of the amplifiers by means of the screw-type switch positions and potentiometer settings (Section 332-104-501) to the values shown in Table A. The presetting of the amplifiers is approximate. Fine adjustments will be made using Chart 1. Any amplifier requiring an adjustment considerably different from the preset level indicates a defective amplifier or trouble on the circuit.

3.03 Insert the P_t and P_r pads, located in the trunk relay bays, according to the values specified by the circuit order.

Note: Due to the variance in office cabling, it may be necessary to change the value of these pads to meet requirements of the drop lineup of the A and B segments of the trunks.

3.04 When testing SD-68706-01 trunks from the 17C testboard, the trunk must be seized at the 17C testboard in order to properly operate the A pads in the SD-68706-01 trunks.

TABLE A

PRESET LEVELS FOR 227-TYPE AMPLIFIERS IN TRUNK CIRCUIT SD-68706-01
USED FOR NON-HANGUP AND CALL-BACK OPERATION

AMPLIFIER DESIGNATION	SCREW-TYPE SWITCH POSITIONS	POTENTIOMETER SETTING	APPROXIMATE GAIN (dB)
P1-IN	(S1) open, (S2) closed, (S3) open	6	+6
P1-OUT	(S1) open, (S2) closed, (S3) open	9	+9
P2-IN	(S1) open, (S2) open, (S3) closed	3	+13
P2-OUT	(S1) open, (S2) open, (S3) closed	6	+16

CHART 1

ALIGNMENT OF P1 AND P2 AMPLIFIERS

STEP	PROCEDURE
1	Manually operate and block the TBA relays on the trunk circuits to be tested.
2	At the 17C testboard, seize the trunk to be tested. Plug a TEST cord into the DOM A jack of the trunk to be tested (Fig. 1), and the associated CON cord into a TST MEAS jack.
3	Operate the SEND-RCV key to the SEND position and the TALK key to the normal position.
4	Connect the detector of the 21A TMS to the J6 jack of the trunk under test.
5	Adjust the P2-IN amplifier to obtain a level of +4.0 dBm at 1 kHz on the 21A TMS.
6	When the requirement of Step 5 has been met, connect the detector of the 21A TMS to the J2 jack and then to the J3 jack of the trunk under test to check the outputs of the bridge circuit. ***Requirement:*** A level of −11.0 dBm ±0.3 dB should be obtained on the 21A TMS meter. ***Note:*** If this requirement is not met, check the 44-type bridge circuit. If the requirement is met, remove the 21A TMS from the J2 or J3 jack.
7	At an adjacent 17C testboard, plug a TEST cord into the OVS B jack of the trunk under test, and the associated CON cord into a TST MEAS jack. ***Note:*** The TST MEAS jack used for this step should be associated with a different TMS circuit from that used in Step 2.
8	Operate the SEND-RCV key to the RCV position, and the TALK key to the normal position.

CHART 1 (Cont)

STEP	PROCEDURE
9	Adjust the P1-OUT amplifier to obtain an indication of −10.7 dBm (−6.7 dBm for TP0 testing) on the position TMS meter. ***Note:*** The path through the switching network has approximately 0.3 dB of loss which should be offset by the gain setting of amplifier P1; therefore, the desired reading is −10.7 (−6.7) dBm, rather than −11.0 (−7.0) dBm.
10	At the 17C testboard connected to the DOM A jack of the trunk under test, operate the SEND-RCV key to RCV, with the TALK key normal.
11	At the 17C testboard connected to the OVS B jack of the trunk under test, operate the SEND-RCV key to SEND, with the TALK key normal.
12	At the trunk relay circuit, connect the 21A TMS detector to the J1 jack of the trunk under test. Adjust the P1-IN amplifier to obtain an indication of −3.0 dBm on the 21A TMS meter.
13	When the requirement of Step 12 is met, connect the 21A TMS detector to the J3 jack and then to the J5 jack of the trunk under test to check the outputs of the bridge circuit. ***Requirement:*** A level of −18.0 dBm ±0.3 dB should be obtained on the 21A TMS meter. ***Note:*** If this requirement is not met, check the 44-type bridge circuit. If the requirement is met, remove the 21A TMS from the J3 or J5 jack. The trunk under test is now connected to the two 17C testboards.
14	Adjust the P2-OUT amplifier of the trunk under test to obtain an indication of −10.7 dBm (−6.7 dBm for TP0 testing) on the position TMS meter. ***Note:*** When any P1 or P2 amplifier requires a considerable deviation from the initial setting (more than 5 marks of the potentiometer), the circuit may have too much loss, or the amplifier may be defective.
15	When all tests have been satisfactorily completed, unblock the TBA relay, remove the test connections, and proceed to the next trunk to be tested.

3.05 When the tests of Chart 1 have been completed, the dual channel receiver circuit, SD-95956-01, can be adjusted per Section 179-615-701.

3.06 After the dual channel receivers have been aligned, the drop portion of the trunks to the 17C testboard can be aligned.

CHART 2

DROP LINEUP OF 4A OR 4M TOLL SWITCHING LOCATION

STEP	PROCEDURE
1	At the 44V4 patch bay or voice-frequency patch bay (VFPB), open the RVC OUT line jack of the B trunk to be tested (Fig. 2).
2	Calibrate the 21A TMS oscillator to send +7.0 dB at 1000 Hz. Connect the 21A TMS oscillator to the RCV MON jack of the B trunk under test.
3	At the 17C testboard, connect a TEST cord to the OVS B jack of the trunk under test. Connect the associated CON cord to the TST MEAS jack.
4	Operate the SEND-RCV key to the RCV position, with the TALK key normal. ***Requirement:*** The requirements of Table B apply. ***Note:*** If necessary, change the appropriate P_r pad to meet this requirement.
5	Remove the 21A TMS oscillator from the RCV MON jack, and connect the 21A TMS detector to the TRMT MON jack. Open the TRMT IN line jack.
6	At the 17C testboard, operate the SEND-RCV key to the SEND position, with the TALK key normal. ***Requirement:*** A level of −23.0 dBm ±0.3 dB should be obtained on the 21A TMS meter. ***Note:*** If necessary, change the appropriate P_t pad to meet this requirement.
7	At the 44V4 patch bay or VFPB, open the RCV OUT line jack of the A trunk under test.
8	Calibrate the 21A TMS oscillator to send +7.0 dB at 1000 Hz. Connect the 21A TMS oscillator to the RCV MON jack of the A trunk.
9	At the 17C testboard, remove the TEST cord from the OVS B jack, and connect it to the DOM A jack of the trunk under test.

TABLE B

MILAGE BAND	TP2 (dBm)	TP0 (dBm)	ALLOWABLE DEVIATION (dB)
0-50	−10.7	−6.7	±0.3
51-80	−11.2	−7.2	±0.3
81-120	−11.7	−7.7	±0.3
121-180	−12.2	−8.2	±0.3
181-270	−12.7	−8.7	±0.3

CHART 2 (Cont)	
STEP	**PROCEDURE**
10	Operate the SEND-RCV key to the RCV position, with the TALK key normal. ***Requirement:*** The requirements of Table B apply. ***Note:*** If necessary, change the appropriate P_r pad to meet this requirement.
11	Remove the 21A TMS oscillator from the RCV MON jack and connect the 21A TMS detector to the TRMT MON jack. Open the TRMT IN line jack.
12	At the 17C testboard, operate the SEND-RCV key to the SEND position. ***Requirement:*** A level of -16.0 dBm ± 0.3 dB should be obtained on the 21A TMS meter. ***Note:*** If necessary, change the appropriate P_t pad to meet this requirement.
13	When all tests have been satisfactorily completed, remove the test connections and restore the circuits to normal.

B. Preliminary Tests at 3C or 3CL Switchboard Location

CHART 3 DROP LINEUP OF A AND B TRUNK SEGMENTS	
STEP	**PROCEDURE**
1	Check the multifrequency supply, using the appropriate test equipment and procedures for the equipment being tested.
2	Insert the P_r and P_t pads in the terminating sets according to the values specified by the circuit order. ***Note:*** Due to variance in the office cabling, it may be necessary to change the value of these pads to meet the drop lineup of the trunks.
3	At the 44V4 patch bay or VFPB, open the RCV line jack of the A trunk to be tested.
4	Calibrate the 21A TMS oscillator to send $+7.0$ dB at 1000 Hz. Connect the oscillator of the 21A TMS to the OUT MON jack of the A segment of the SD-1B106-01 trunk circuit (Fig. 3).

CHART 3 (Cont)

STEP	PROCEDURE
5	At the 17B testboard, connect the rear cord of a test cord circuit to the DOM A jack of the trunk under test and the front cord to the position TMS. Operate the SEND-RCV key to the RCV position. ***Requirement:*** The requirements of Table C apply. ***Note:*** If necessary, change the appropriate P_r pad to meet this requirement.
6	Remove the 21A TMS oscillator from the OUT MON jack and connect the 21A TMS detector to the IN MON jack of the A trunk under test. Open the TRMT line jack.
7	At the 17B testboard, operate the SEND-RCV key to the SEND position. ***Requirement:*** A level of -16 dBm ± 0.3 dB should be obtained on the 21A TMS meter. ***Note:*** If necessary, change the appropriate P_t pad to meet this requirement.
8	When the requirements are met, remove the test connections and restore the circuit to normal.
9	At the 44V4 patch bay or VFPB, open the RCV line jack of the B trunk to be tested.
10	Calibrate the 21A TMS oscillator to send +7.0 dB at 1000 Hz. Connect the oscillator of the 21A TMS to the OUT MON jack of the B trunk to be tested.
11	At the 17B testboard, connect the rear cord of a test cord circuit to the DOM B jack of the trunk under test and the front cord to the position TMS. Operate the SEND-RCV key to the RCV position. ***Requirement:*** The requirements of Table C apply. ***Note:*** If necessary, change the appropriate P_r pad to meet this requirement.
12	Remove the 21A TMS oscillator from the OUT MON jack and connect the detector of the 21A TMS to the IN MON jack of the B trunk under test. Open the TRMT line jack.

TABLE C

MILAGE BAND	TP2 (dBm)	TP0 (dBm)	ALLOWABLE DEVIATION (dB)
0-50	−10.0	−6.0	±0.3
51-80	−9.5	−5.5	±0.3
81-120	−9.0	−5.0	±0.3
121-180	−8.5	−4.5	±0.3
181-270	−8.0	−4.0	±0.3

CHART 3 (Cont)

STEP	PROCEDURE
13	At the 17B testboard, operate the SEND-RCV key to the SEND position. ***Requirement:*** A level of −16.0 dBm ±0.3 dB should be obtained on the 21A TMS meter. ***Note:*** If necessary, change the appropriate P_t pad to meet this requirement.
14	When all tests have been satisfactorily completed, remove all test connections and restore the circuits to normal.

CHART 4

SWITCHBOARD BALANCE TESTS

STEP	PROCEDURE
1	Calibrate the KS-20501 return loss measuring set (RLMS) as follows: SWITCH / SETTING NETWORK — INT THL — 0.0 TEST LOCATION — 4-XB TEST TYPE — ERL ADD dB — 0 Turn the meter adjusting screw to obtain a reading of 0 on the meter.
2	At the terminating set of the A segment of the trunk to be tested, turn the COMP NET screw all the way down, and connect the TRMT jack of the RLMS to the RA jack of the terminating set (Fig. 4).
3	Connect the RCV jack of the RLMS to the TA jack of the terminating set.
4	Place a short across the 2-wire side of the terminating set (terminals 12 and 13).
5	Set the TEST LOCATION switch of the RLMS to TST HYBRID. Adjust the THL switches to obtain an indication of 0 dB on the RLMS meter.
6	Remove the short from terminals 12 and 13 of the terminating set.

CHART 4 (Cont)

STEP	PROCEDURE
7	Adjust the ADD dB switch of the RLMS until on-scale reading is obtained. The meter reading plus the ADD dB setting is the echo return loss (ERL) to the idle line termination. ***Requirement:***

50% OF TRUNKS SHOULD EQUAL OR EXCEED	MIN REQT	TURN-DOWN LIMIT
27 dB	21 dB	18 dB

STEP	PROCEDURE
8	Measure the values of switch settings SRL HI and SRL LO. Record the lower of the two values. This value is the singing return loss (SRL) to the idle line termination. ***Requirement:***

50% OF TRUNKS SHOULD EQUAL OR EXCEED	MIN REQT	TURN-DOWN LIMIT
20 dB	14 dB	11 dB

STEP	PROCEDURE
	Note: Should the readings obtained in Steps 7 and 8 fall below the minimum requirement, check the testing procedure, replace the terminating set, check the wiring, and repeat Steps 4 through 8.
9	Record the results of the test in the office balance record.
10	At the 17B testboard, with the TALK key operated, connect the rear test cord to the DOM A jack of the trunk under test and the front cord to the balance termination (600 ohms and 2.16 microfarads). Restore the TALK key to normal.
11	At the terminating set of the trunk under test, set the TEST TYPE switch of the RLMS to the SRL HI position and adjust the NBO capacitor to obtain a maximum reading on the RLMS. Record the value obtained.

CHART 4 (Cont)

STEP	PROCEDURE
12	Without changing the NBO setting, read and record the values obtained with the TEST TYPE switch of the RLMS set to SRL LO and then to ERL. ***Requirement:***
13	Record the NBO setting and the ERL and SRL values in the office balance record. ***Note:*** Records should be kept by trunk number, trunk circuit number, and application, ie, non-hangup and delayed call.
14	Using the RB and TB jacks at the terminating set, complete Steps 1 through 13 on the B segment of the trunk.
15	When all tests are completed satisfactorily, remove the test connections and restore the circuit to normal.

	50% OF TRUNKS SHOULD EQUAL OR EXCEED	MIN REQT	TURN-DOWN LIMIT
ERL	22 dB	16 dB	13 dB
SRL	14 dB	8 dB	5 dB

3.07 Transmission facilities between the 4A or 4M toll switching machine and the 3C or 3CL switchboard location (Fig. 5) can be carrier (including radio), 4-wire physical (with voice repeaters), or a combination of both.

The facilities must be aligned for standard levels (+ 7.0 dB receive and − 16.0 dB transmit) in order for the transmission levels of this section to apply. Coordinate the work operations so as to have the facilities aligned prior to starting operation tests and overall tests between the two locations.

C. Operation Tests Using Test Set Circuit SD-68359-01

3.08 When the facilities have been aligned and preliminary tests completed at the toll switching location and at the switchboard location on the same trunk, or group of trunks, operation tests can be performed.

3.09 At the SD-68706-01 trunk location in the toll switching office, manually operate the OS relay. After a short delay the OS1 relay should operate, indicating continuity of the E and M signal leads between the locations.

Note: Failure of the OS1 relay to operate indicates improper signaling of the trunk.

3.10 After determining that the procedure outlined in 3.09 can be properly completed, perform the SD-68706-01 intraoffice trunk circuit tests using the SD-68359-01 test set circuit per Section 212-583-501.

D. Overall Lineup—Testboard to Testboard

3.11 The following tests should be completed only after all tests through 3.10 of this section have been satisfactorily completed.

3.12 The 17C testboard cannot call the 17B testboard over the trunk under test. Therefore, a separate talk circuit must be established over an order wire, or by some other means.

CHART 5

OVERALL LINEUP

STEP	PROCEDURE
1	Establish a talk circuit between the 17B testboard location and the 17C testboard location. ***Note:*** Tests from the 17C testboard will be performed using Section 664-500-500. Tests from the 17B testboard will be performed using Section 664-100-500.
2	At the 17B testboard, using a position test cord circuit with the TALK key operated, plug into the A jack of the trunk to be tested (Fig. 6), and key pulse the assigned special (101-type) code to reach the 17C testboard. The 17C testboard should answer at the 101 trunk jack.
3	At the 17C testboard, when the answering F lamp associated with the incoming code 101 trunk lights, connect a TEST cord to the 101 trunk jacks.
4	Operate the associated TALK-MON key to the TALK position and momentarily operate the ANS key. ***Note:*** Operation of the ANS key extinguishes the F lamp and silences any audible signal which may be provided.
5	Send 1000 Hz and measure and record the loss of the trunk for both directions of transmission. ***Requirement:*** According to the length of the circuit, the direction of transmission, and whether TP2 or TP0 testing is being performed, the requirements of Table D apply.

TABLE D

EML RECEIVE LEVEL VALUES

MILEAGE BAND	A TRUNKS (NON-HANGUP AND CALL-BACK) B TRUNKS (INWARD ASSISTANCE)				B TRUNKS (NON-HANGUP AND CALL-BACK) A TRUNKS (INWARD ASSISTANCE)			
	MEASURED FROM (dBm)				MEASURED FROM (dBm)			
	17B		17C		17B		17C	
	TP2	TP0	TP2	TP0	TP2	TP0	TP2	TP0
0-50	−10.0	−6.0	−4.0	0.0	−17.0	−13.0	−11.0	−7.0
51-80	−9.5	−5.5	−4.5	−0.5	−16.5	−12.5	−11.5	−7.5
81-120	−9.0	−5.0	−5.0	−1.0	−16.0	−12.0	−12.0	−8.0
121-180	−8.5	−4.5	−5.5	−1.5	−15.5	−11.5	−12.5	−8.5
181-270	−8.0	−4.0	−6.0	−1.0	−15.0	−11.0	−13.0	−9.0

Note: EMLs for Table D assume a 7-dB switching pad in the A trunk when used for non-hangup and call-back operation, and a 7-dB switching pad in the B trunk when used for inward assistance operation. (Refer to SD-68706-01.)

CHART 5 (Cont)

STEP	PROCEDURE
6	Measure the noise of the trunk in both directions. ***Requirement:*** According to the length of the circuit and the direction of measurement, the requirements of Table E apply.

TABLE E

NOISE MEASUREMENT LIMITS (dBrnc)

MILEAGE BAND	A TRUNKS		B TRUNKS	
	MEASURED FROM		MEASURED FROM	
	17B	17C	17B	17C
WIRE FACILITIES	*15/31	*21/37	*15/31	*14/30
CARRIER				
0-50	23/31	29/37	23/31	22/30
50.1-80	24/31	29/36	24/31	22/29
80.1-100	25/32	29/36	25/32	22/29
100.1-120	27/32	31/36	27/32	24/29
120.1-180	27/32	31/35	27/32	23/28
180.1-200	28/33	30/35	28/33	23/28
200.1-270	30/37	32/39	30/37	25/32

* X/Y: X = Circuit order and maintenance limit
Y = Immediate action limit

7	Send frequencies of 400 Hz and 2800 Hz and measure the loss in both directions. ***Requirement:*** As compared to the losses measured at 1000 Hz (Step 5), the requirements of Table F apply.

CHART 5 (Cont)

STEP	PROCEDURE

TABLE F

GAIN-SLOPE REQUIREMENTS AT 400 AND 2800 Hz

TYPE OF FACILITY	GAIN-SLOPE DEVIATION RELATIVE TO 1000 Hz	
	400 Hz	2800 Hz
Type A Channel Bank	Within 2.0 dB more and 1.0 dB less loss	Within 0.5 dB more and 0.0 dB less loss
N1 Carrier	Within 1.5 dB more and 1.0 dB less loss	Within 3.0 dB more and 1.0 dB less loss
N2 Carrier	Within 1.5 dB more and 1.0 dB less loss	Within 2.0 dB more and 1.0 dB less loss
N3 Carrier	Within 2.0 dB more and 1.0 dB less loss	Within 1.5 dB more and 1.0 dB less loss
O (ON) Carrier	Within 2.0 dB more and 1.0 dB less loss	Within 1.5 dB more and 1.0 dB less loss
D1, D2 Channel Bank	Within 2.0 dB more and 1.0 dB less loss	Within 2.0 dB more and 1.0 dB less loss
Repeatered Cable	Within 3.0 dB more and 1.0 dB less loss	Within 4.5 dB more and 1.0 dB less loss

Note: This table conforms to the requirements of Section 660-450-301, Issue 3.

8 With the same test arrangements used for Step 5, send 1000 Hz from the 17B testboard and measure at the 17C testboard.

9 At the 17C testboard, operate the API key.

Requirement: The change in the level read in Step 5 shall not exceed $\pm$0.1 dB.

10 Release the API key and send 1000 Hz to the 17B testboard. Measure the loss at the 17B testboard.

11 Operate the API key.

Requirement: The change in the level received at the 17B testboard in Step 10 shall not exceed $\pm$0.1 dB.

12 Release the A trunk at both locations.

CHART 5 (Cont)

STEP	PROCEDURE
13	At the 17B testboard, using the rear cord of a test cord circuit, plug into the B jack of the same trunk circuit used in Step 2 and key pulse the assigned special (101-type) code to reach the 17C testboard.
14	Repeat Steps 3 through 7 to test the B trunk.
15	When all tests have been satisfactorily completed, release the connections and restore the circuit to normal.
	Loop-Around Tests
16	At the 17B testboard, using the rear cord of a test cord circuit with the TALK key operated, plug into the B jack of the trunk under test and key pulse the assigned special (101-type) code to reach the 17C testboard (Fig. 7).
17	At the 17C testboard, answer the call as in Steps 3 and 4.
18	At an adjacent 17C testboard, plug a test cord into the A jack of the trunk under test.
19	At the 17B testboard, connect the front cord of the test cord circuit to the A jack of the trunk under test.
20	At the 17C testboard, put tone on the B trunk under test. ***Requirement:*** The 17B testboard should be able to hear the tone on the A trunk. No tone should be heard on the B trunk, indicating the proper operation of the TBA relay in trunk circuit SD-68706-01.
21	Restore the TALK keys to normal at all positions, and remove the tone. ***Note:*** The A and B trunks are now connected to the two 17C testboards via the bridge circuit (Fig. 7).
22	Send 1000 Hz and measure and record the level at both 17C testboards. ***Requirement:*** The 1000-Hz level obtained at each position should be −11.0 dBm (−7.0 dBm) ±0.6 dB. ***Note:*** A different TMS should be used at each position.
	A Pad Test
23	At the 17C testboard connected to the A trunk, operate the API key while receiving 1000 Hz. ***Requirement:*** The received level should be −18.0 dBm (−14.0 dBm) ±0.1 dB.

CHART 5 (Cont)	
STEP	**PROCEDURE**
	Frequency Tests
24	Send 400, 2300, and 3400 Hz and measure the levels at both 17C testboards. ***Requirement:*** As compared to the 1000-Hz losses measured in Step 22, the levels measured at each frequency should be as follows: At 400 Hz—within $\pm$1.5 dB At 2300 Hz—within $\pm$1.5 dB At 3400 Hz—within 4.0 dB more and 2.0 dB less loss.
25	Perform noise measurements on the trunks at both 17C testboards. ***Requirement:*** Measured at the B trunk: not more than 9 dBrnc Measured at the A trunk: not more than 16 dBrnc ***Note:*** The difference in noise requirements is due to the absence of an A pad in the B trunk, while TP9 (TP7) is still in the test path.
	Talk Tests
26	At both 17C testboards, and at the 17B testboard, operate the TALK keys. ***Requirement:*** The 17B testboard should be able to talk to both 17C testboards via the bridge and the DOM A jack at one 17C testboard, and via the bridge and the 101-type trunk at the other 17C testboard.
27	When all tests have been completed satisfactorily, release the connections and restore the circuits to normal.

4. INWARD ASSISTANCE TESTS

4.01 When an SD-68706-01 intraoffice trunk circuit is used for inward assistance calls from overseas, the A pads are located in the B segment of the trunks rather than in the A segment. The tests will be performed in the same basic procedure, but due to the presence of A pads in the B segment of the trunk, some of the levels will be different.

Transmission facilities should be aligned for + 7.0 dB receive and − 16.0 dB transmit. Preliminary tests should be coordinated as stated in 3.01.

A. Preliminary Tests at 4A or 4M Toll Switching Location

4.02 Plug in the 227-type amplifiers at the SD-68706-01 trunk. Preset the gain of the amplifier by means of the screw-type switch positions and potentiometer settings (Section 332-104-501) to the values shown in Table G. The presetting of the amplifiers is approximate. Fine adjustments will be made using Chart 6. Any amplifier requiring an adjustment considerably different from the preset level indicates a defective amplifier or trouble on the circuit.

4.03 Insert the P_t and P_r pads, located in the trunk relay bays, according to the value specified by the circuit order.

Note: Due to the variance in office cabling, it may be necessary to change the value of these pads to meet requirements of the drop lineup of the A and B segments of the trunks.

4.04 When testing SD-68706-01 trunks from the 17C testboard, the trunk must be seized at the 17C testboard in order to properly operate the A pads in the SD-68706-01 trunks.

TABLE G

PRESET LEVELS FOR 227-TYPE AMPLIFIERS IN TRUNK CIRCUIT SD-68706-01 USED FOR INWARD ASSISTANCE OPERATION

AMPLIFIER DESIGNATION	SCREW-TYPE SWITCH POSITIONS	POTENTIOMETER SETTING	APPROXIMATE GAIN (dB)
P1-IN	(S1) open, (S2) open, (S3) closed	3	+13
P1-OUT	(S1) open, (S2) open, (S3) closed	6	+16
P2-IN	(S1) open, (S2) closed, (S3) open	6	+6
P2-OUT	(S1) open, (S2) closed, (S3) open	9	+9

CHART 6

ALIGNMENT OF P1 AND P2 AMPLIFIERS

STEP	PROCEDURE
1	Manually operate and block the TBA relays of the trunk circuits to be tested.
2	At the 17C testboard, seize the trunk to be tested. Plug a TEST cord into the DOM A jack of the trunk (Fig. 1) and the associated CON cord into a TST MEAS jack.
3	Operate the SEND-RCV key to the SEND position and the TALK key to the normal position.
4	Connect the detector of the 21A TMS to the J6 jack of the trunk under test.
5	Adjust the P2-IN amplifier to obtain a level of −3.0 dBm at 1 kHz on the 21A TMS.
6	When the requirement of Step 5 has been met, connect the detector of the 21A TMS to the J2 jack and then to the J3 jack of the trunk under test to check the outputs of the bridge circuit. ***Requirement:*** A level of −18.0 dBm ±0.3 dB should be obtained on the 21A TMS meter. ***Note:*** If this requirement is not met, check the 44-type bridge circuit. If the requirement is met, remove the 21A TMS from the J2 or J3 jack.

CHART 6 (Cont)

STEP	PROCEDURE
7	At an adjacent 17C testboard, plug a TEST cord into the OVS B jack of the trunk under test, and the associated CON cord into a TST MEAS jack. ***Note:*** The TST MEAS jack used for this step should be associated with a different TMS circuit from that used for Step 2.
8	Operate the SEND-RCV key to the RCV position, and the TALK key to the normal position.
9	Adjust the P1-OUT amplifier to obtain an indication of −10.7 dBm (−6.7 dBm for TP0 testing) on the position TMS meter.
10	At the 17C testboard connected to the DOM A jack of the trunk under test, operate the SEND-RCV key to the RCV position, with the TALK key normal.
11	At the 17C testboard connected to the OVS B jack of the trunk under test, operate the SEND-RCV key to SEND, with the TALK key normal.
12	At the trunk relay circuit, connect the 21A TMS detector to the J1 jack of the trunk under test. Adjust the P1-IN amplifier to obtain an indication of +4.0 dBm on the 21A TMS meter.
13	When the requirement of Step 12 is met, connect the 21A TMS detector to the J3 jack and then to the J5 jack of the trunk under test to check the outputs of the bridge circuit. ***Requirement:*** A level of −11.0 dBm ±0.3 dB should be obtained on the 21A TMS meter. ***Note:*** If this requirement is not met, check the 44-type bridge circuit. If the requirement is met, remove the 21A TMS from the J3 or J5 jack. The trunk under test is now connected to the two 17C testboards.
14	Adjust the P2-OUT amplifier of the trunk under test to obtain an indication of −10.7 dBm (−6.7 dBm) on the position TMS meter. ***Note:*** When any P1 or P2 amplifier requires a considerable deviation from the initial setting (more than 5 marks of the potentiometer), the circuit may have too much loss, or the amplifier may be defective.
15	When all tests have been satisfactorily completed, unblock the TBA relay, remove the test connections, and proceed to the next trunk to be tested.

4.05 When the tests of Chart 6 have been completed, the dual channel receiver circuit, SD-95956-01, can be adjusted per Section 179-615-701.

4.06 After the dual channel receivers have been aligned, the drop portion of the trunks to the 17C testboard can be aligned.

CHART 7

DROP LINEUP OF 4A OR 4M TOLL SWITCHING LOCATION

STEP	PROCEDURE
1	At the 44V4 or VFPB, open the RCV OUT line jack of the B trunk to be tested (Fig. 2).
2	Calibrate the 21A TMS oscillator to send +7.0 dB at 1000 Hz. Connect the 21A TMS oscillator to the RCV MON jack of the B trunk to be tested.
3	At the 17C testboard, connect a TEST cord to the DOM B jack of the trunk under test. Connect the associated CON cord to a TST MEAS jack.
4	Operate the SEND-RCV key to the RCV position with the TALK key normal. ***Requirement:*** The requirements of Table H apply. ***Note:*** If necessary, change the appropriate P_r pad to meet this requirement.
5	Remove the 21A TMS oscillator from the RCV MON jack and connect the 21A TMS detector to the TRMT MON jack. Open the TRMT IN line jack.
6	At the 17C testboard, operate the SEND-RCV key to the SEND position, with the TALK key normal. ***Requirement:*** A level of −16.0 dBm ±0.3 dB should be obtained on the 21A TMS meter. ***Note:*** If necessary, change the appropriate P_t pad to meet this requirement.
7	At the 44V4 patch bay or VFPB, open the RCV OUT line jack of the A trunk under test.
8	Calibrate the 21A TMS oscillator to send +7.0 dB at 1000 Hz. Connect the 21A TMS oscillator to the RCV MON jack of the A trunk.

TABLE H

MILAGE BAND	TP2 (dBm)	TP0 (dBm)	ALLOWABLE DEVIATION (dB)
0-50	−3.7	+0.3	±0.3
51-80	−4.2	−0.2	±0.3
81-120	−4.7	−0.7	±0.3
121-180	−5.2	−1.2	±0.3
181-270	−5.7	−1.7	±0.3

CHART 7 (Cont)

STEP	PROCEDURE
9	At the 17C testboard, remove the TEST cord from the DOM B jack and connect it to the OVS A jack of the trunk under test.
10	Operate the SEND-RCV key to the RCV position, with the TALK key normal. ***Requirement:*** The requirements of Table I apply. ***Note:*** If necessary, change the appropriate P_r pad to meet this requirement.
11	Remove the 21A TMS oscillator from the RCV MON jack and connect the 21A TMS detector to the TRMT MON jack. Open the TRMT IN line jack.
12	At the 17C testboard, operate the SEND-RCV key to the SEND position. ***Requirement:*** A level of −23.0 dBm ±0.3 dB should be obtained on the 21A TMS meter. ***Note:*** If necessary, change the appropriate P_t pad to meet this requirement.
13	When the tests have been satisfactorily completed, remove the test connections and restore the circuits to normal.

TABLE I

MILAGE BAND	TP2 (dBm)	TP0 (dBm)	ALLOWABLE DEVIATION (dB)
0-50	−10.7	−6.7	±0.3
51-80	−11.2	−7.2	±0.3
81-120	−11.7	−7.7	±0.3
121-180	−12.2	−8.2	±0.3
181-270	−12.7	−8.7	±0.3

B. Preliminary Tests at 3C or 3CL Switchboard Location

4.07 Preliminary tests should be performed at the switchboard location using Charts 3 and 4 of this section.

C. Operation Tests Using Test Set Circuit SD-68359-01

4.08 When facilities have been aligned and preliminary tests completed at the toll switching location at the switchboard location on the same trunk, or group of trunks, operation tests can be performed.

4.09 At the SD-68706-01 trunk circuit location in the toll switching office, manually operate the OS relay. After a short delay the OS1 relay should operate, indicating continuity of the E and M signal leads between locations.

Note: Failure of the OS1 relay to operate indicates improper signaling of the trunk.

4.10 After determining that the procedure outlined in 4.09 can be properly completed, perform the SD-68706-01 intraoffice trunk circuit tests, using the SD-68359-01 test set circuit per Section 212-583-501.

D. Overall Lineup—Testboard to Testboard

4.11 Perform the overall lineup per Chart 5 of this section.

Note: When making the A pad test using Step 23 of Chart 5, it should be remembered that the A pad is now in the B trunk. Perform Step 23 at the 17C testboard connected to the B trunk.

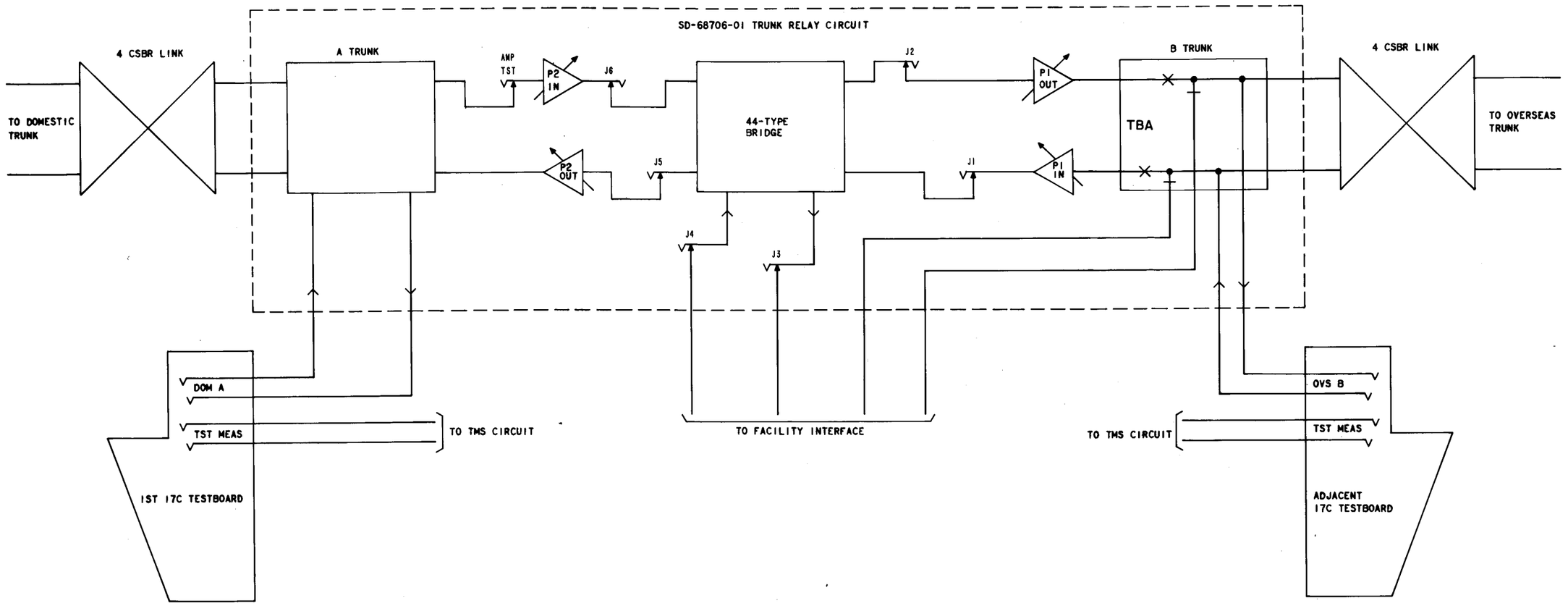
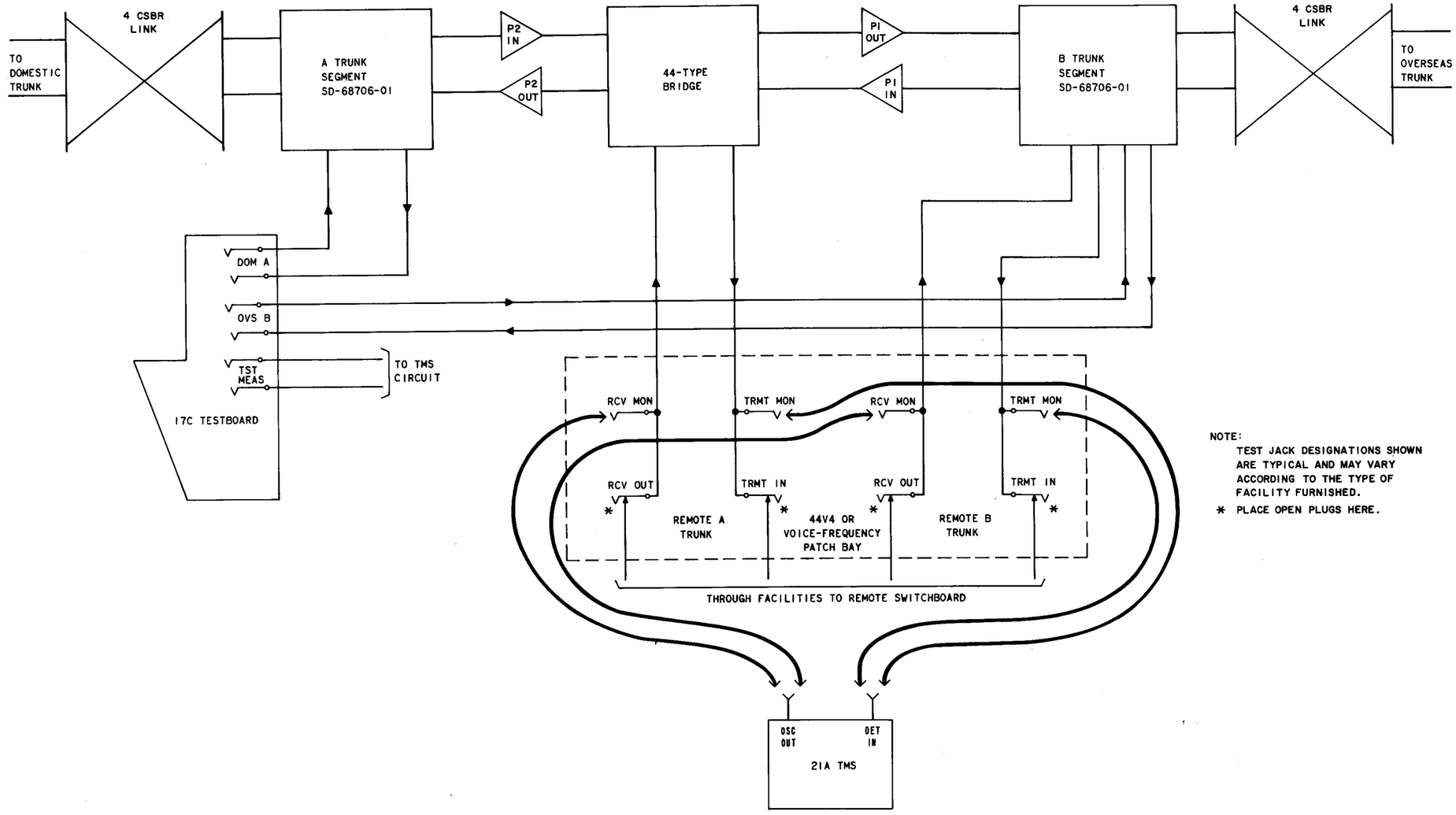


Fig. 1—Alignment of P1 and P2 Amplifiers of SD-68706-01 Trunk Circuit



NOTE:
TEST JACK DESIGNATIONS SHOWN ARE TYPICAL AND MAY VARY ACCORDING TO THE TYPE OF FACILITY FURNISHED.

* PLACE OPEN PLUGS HERE.

Fig. 2—Drop Lineup of A and B Trunk Segments (SD-68706-01) at Toll Switching Machine Location

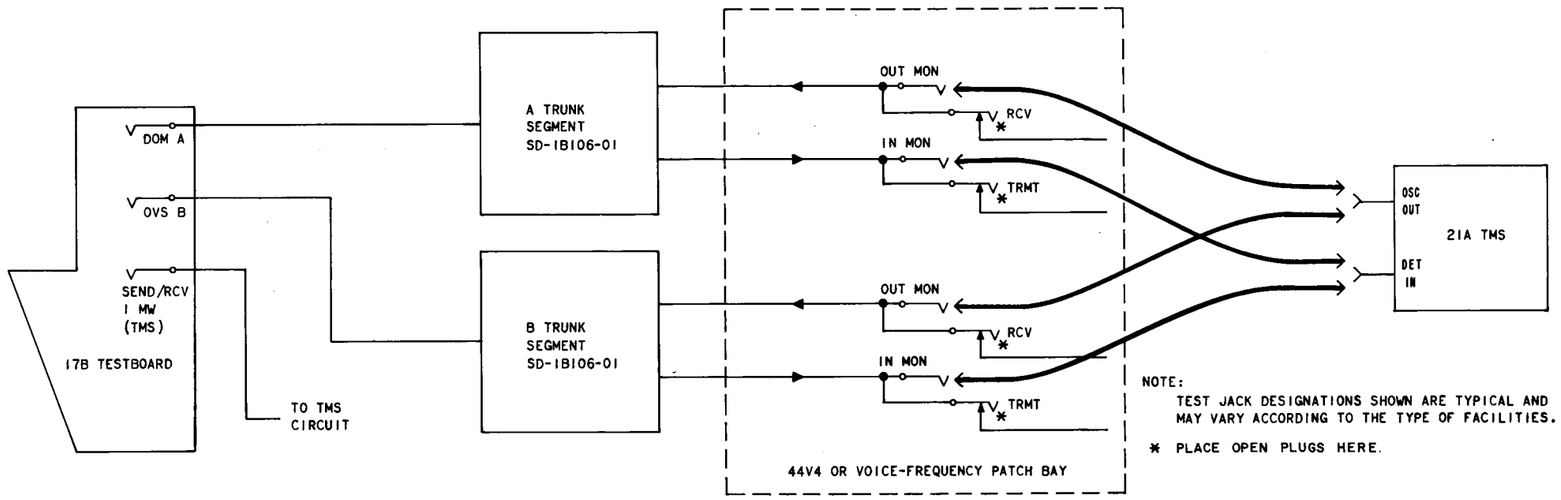


Fig. 3—Drop Lineup of A and B Trunk Segments (SD-1B106-01) at Switchboard Location

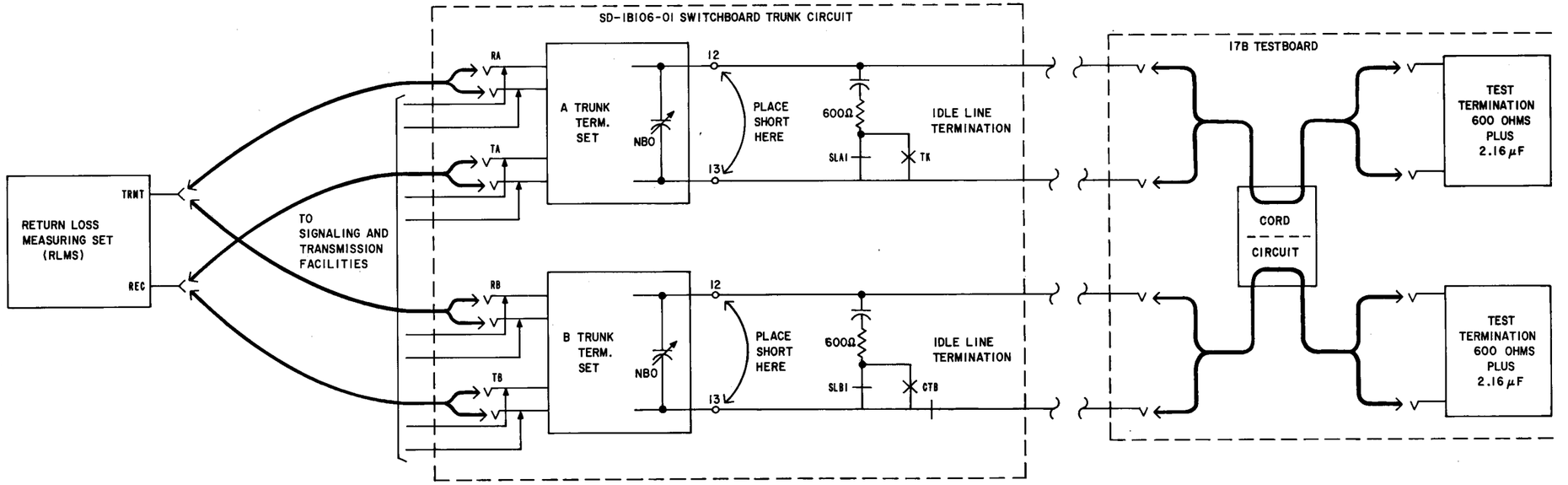


Fig. 4—Switchboard Balance Tests

Fig. 3 and 4

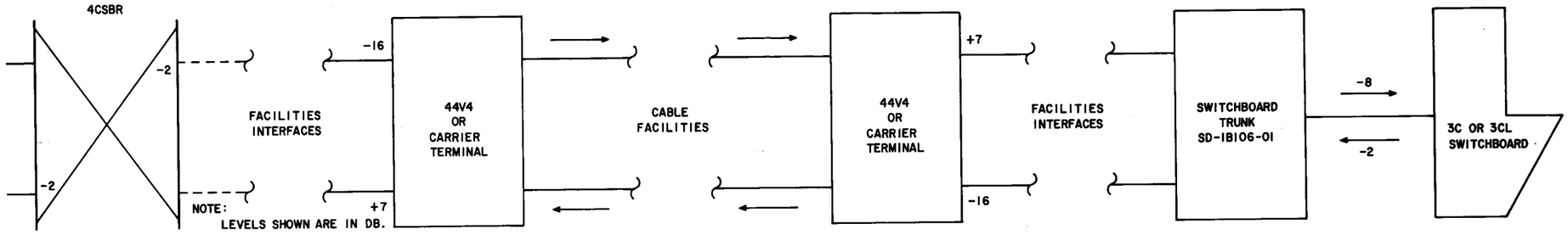


Fig. 5—Facilities Block Diagram

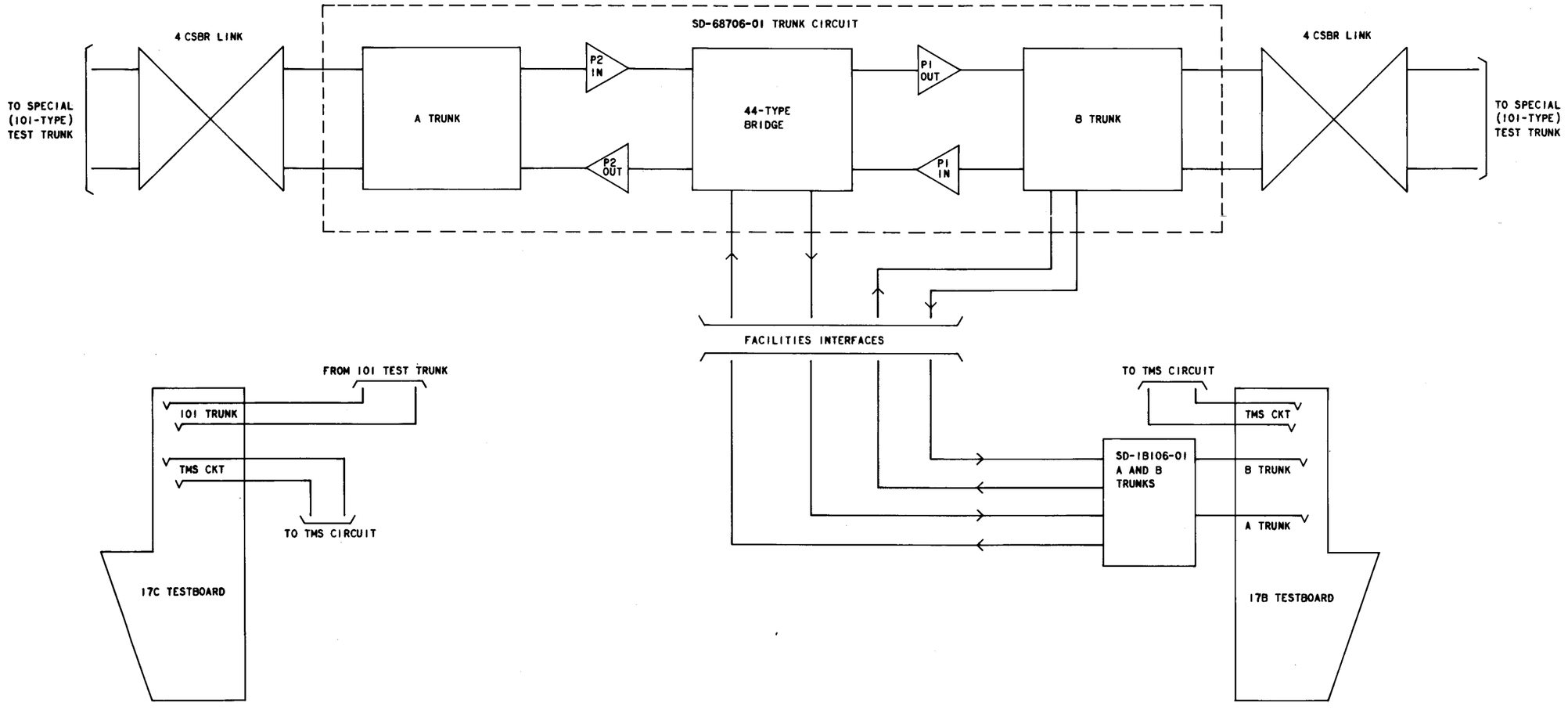


Fig. 6—Overall Lineup—17B Testboard to 17C Testboard

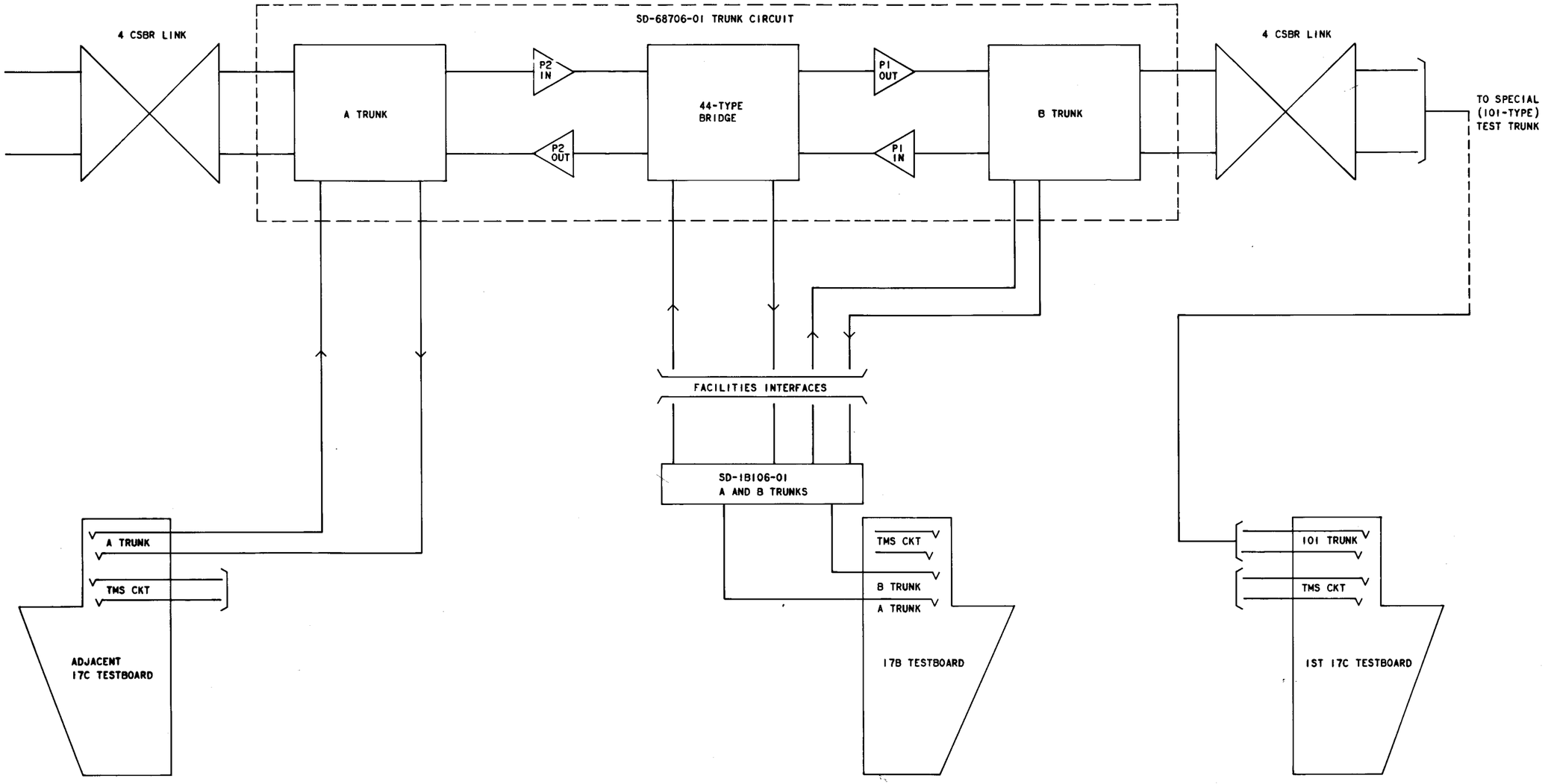


Fig. 7—Loop-Around Tests