

17E TESTBOARD

MEASUREMENT AND ADJUSTMENT OF PADS

FOR THE TRANSMISSION MEASURING CIRCUIT

CONTENTS	PAGE
1. GENERAL	1
2. APPARATUS REQUIRED	2
3. DETERMINING REQUIRED LOSS COMPENSATION	3
A. General	3
B. Measuring Wiring Losses	3
4. ADJUSTING PAD LOSSES	6

systems combined transmission and noise measuring circuit when associated with the 17E testboard.

1.02 Two adjustable loss pads are provided in the J94005 circuit of each 17E testboard position and are located in the test bay MEAS jack circuit as shown in Fig. 1. The 101 pad is used only to make measurements over code-101 test line circuits (relay 101 operated), while the TST pad is used to make measurements using TST jack appearances of trunks. Automatic pad-switching is provided by a ground signal applied to the MEAS 2 jack tip by code-101 trunks, only, to operate relay 101.

1.01 This section describes the procedure to determine and adjust the loss of the adjustable loss pads of the SD-9500-01 (J94005) common

1.03 Transmission and noise levels incoming from network trunks or line link pulsing (LLP) circuits are measured through the office

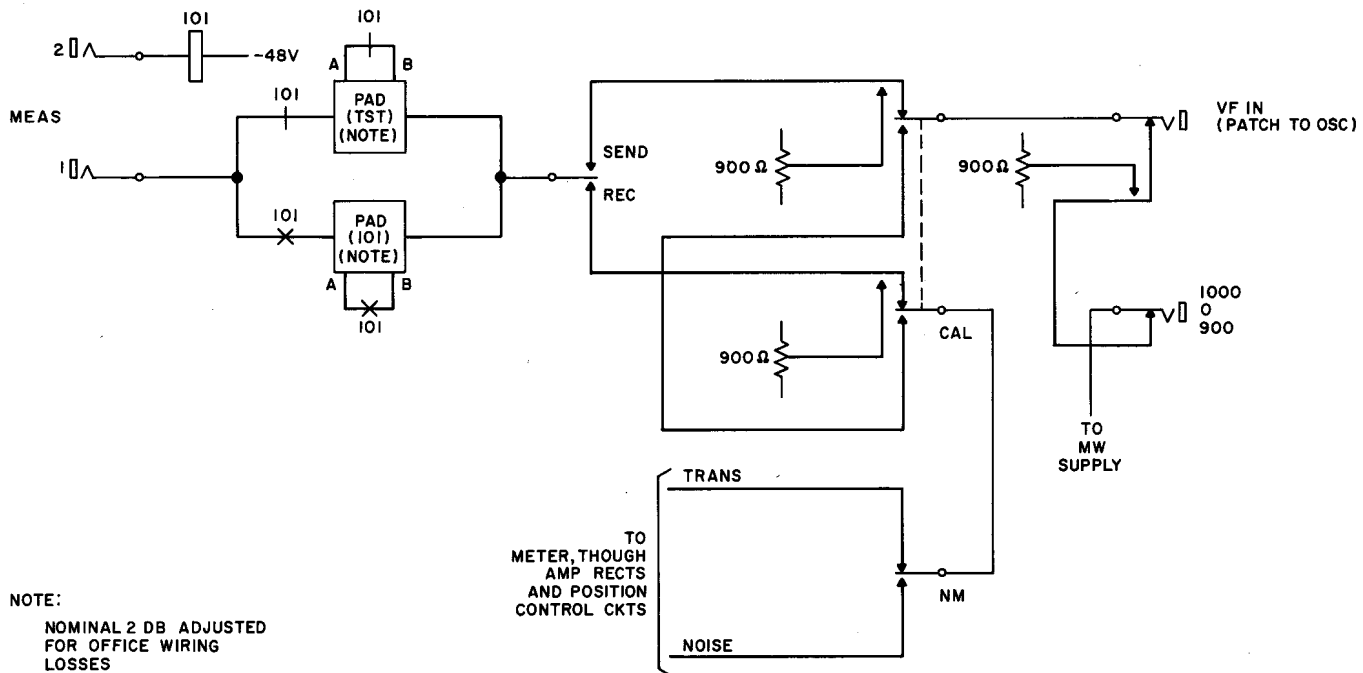


Fig. 1 — Simplified Diagram of Transmission and Noise Measuring Circuit—17E Testboard (Single Line per Pair)

wiring between the 2-way trunk or line equipment and the associated TST jacks at the testboard. This path may or may not have the same loss as the wiring path from the trunk or line equipment to the associated trunk or line link frame appearances (Fig. 2). For measurements made at the TST jacks to be indicative of the levels appearing at the trunk or line link frame, compensation must be provided in the measuring circuit for the differences in wiring losses between the two wiring paths. Measurements with the J94005 measuring circuit assume the use of a 2-db test pad. The test pad associated with the TST jack measurements must be adjusted, therefore, so that the combined pad and incremental difference in wiring losses shall provide the 2-db loss.

1.04 The test pad associated with code-101 trunks must also be adjusted. In this case, the combined pad and MEAS jack wiring losses plus the loss from the trunk link or line link frame to the associated code-101 TRK jack shall total 2 db (Fig. 1).

1.05 The adjustable 900-ohm loss pad is shown in Fig. 3. Various loss values are obtained by optional strapping arrangements as shown. Leads A and B are shorted by relay 101 (Fig. 1) when the pad is connected to the MEAS jack circuit. In the nonconnected pad, the leads are open to prevent shunting of the connected pad on their common side (Fig. 1).

1.06 The following drawings are related to this section.

SD-95900-01 — Transmission and Noise Measuring Circuit

SD-56540-01 — 17E Testboard Jack Circuit

2. APPARATUS REQUIRED

2.01 The following apparatus, or the equivalent, are required for measuring wiring losses and for adjusting the pads.

22A Milliwatt Reference Meter

71B Milliwatt Reference Generator

900-Ohm +2MF Termination

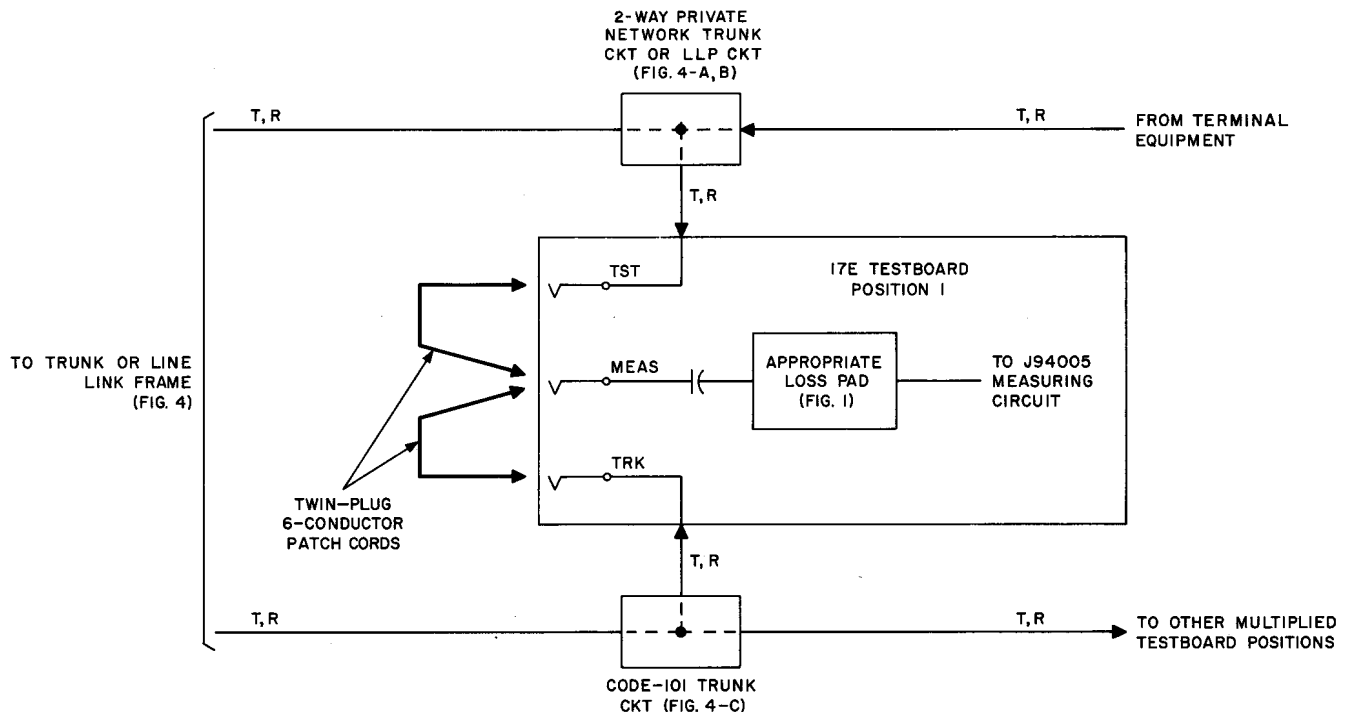
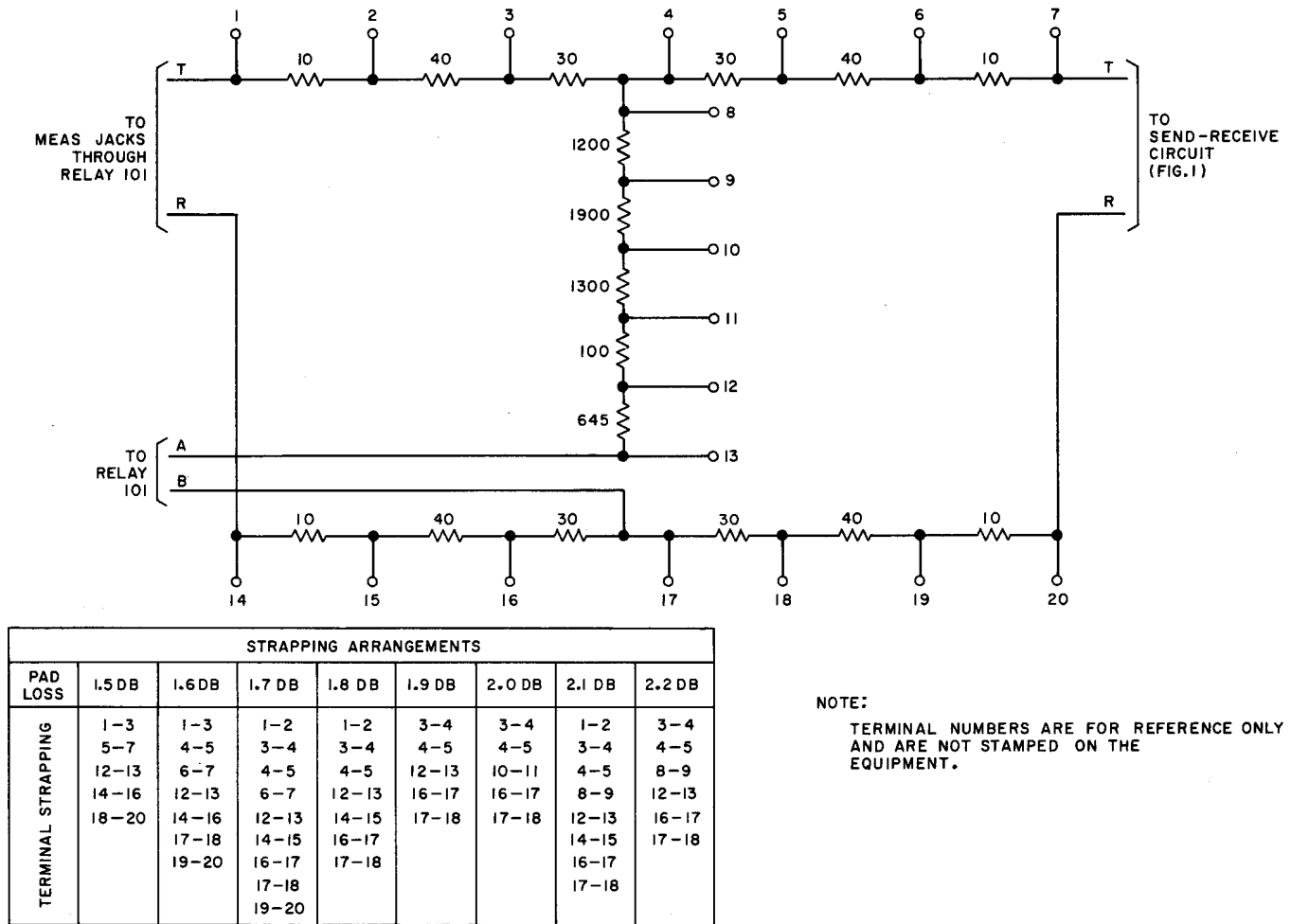


Fig. 2 — Simplified Arrangements for Transmission and Noise Level Measurements



NOTE:
 TERMINAL NUMBERS ARE FOR REFERENCE ONLY
 AND ARE NOT STAMPED ON THE
 EQUIPMENT.

Fig. 3 — Adjustable 900-Ohm Pad Circuit — 17E Testboard

Test Cords, as required
 371B Plugs

3. DETERMINING REQUIRED LOSS COMPENSATION

A. General

3.01 The same loss pads are used for measurements on many different trunks having different office wiring losses. The pads are therefore strapped to compensate for the average effect of office wiring losses of the associated trunks. When a single line of test positions comprises a testboard, the corresponding pads of each test position shall be adjusted to provide the same measuring circuit loss compensation. Where multiple lines of test positions are in use, the pad values of each line must be determined separately.

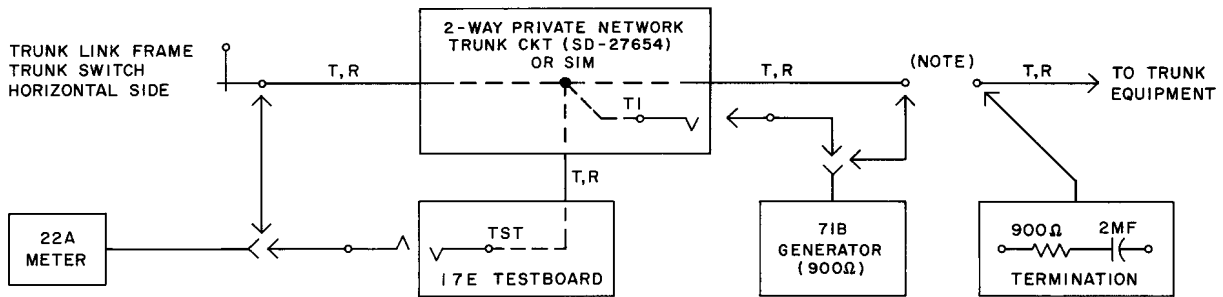
B. Measuring Wiring Losses

3.02 Measurements must be made on all code-101 test lines and on a representative sample of all other trunks having appearances at the testboard. The sample trunks should have appearances which are distributed over the entire array of trunk link or line link frames and testboard positions and should include both the longest and the shortest wiring branches from the trunk relay equipment to both the trunk link or line link frame and the TST jacks.

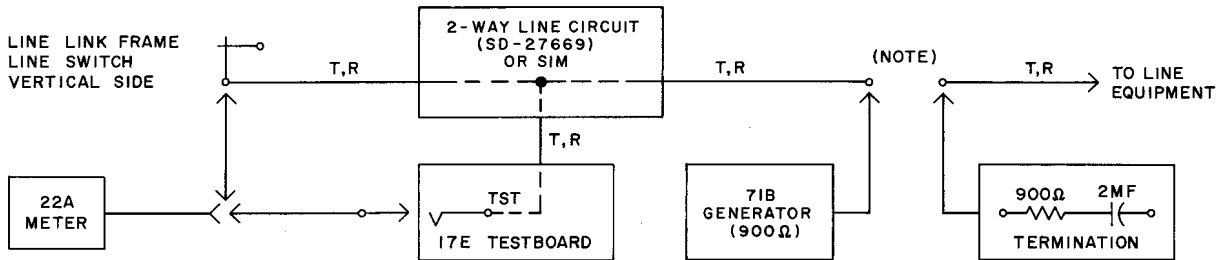
3.03 Wiring loss differentials (1.03) on network or LLP trunks are determined by measuring from the trunk link or line link frame and the TST 1 jack to a point in the trunk common to both wiring branches (Fig. 4A and 4B). This common point may be, as available, the T1 jack or

line-side terminal strip of the trunk or line circuit or the distributing frame. If any trunks being measured have idle circuit terminations, these terminations must be removed during measurement with care being taken not to open the path

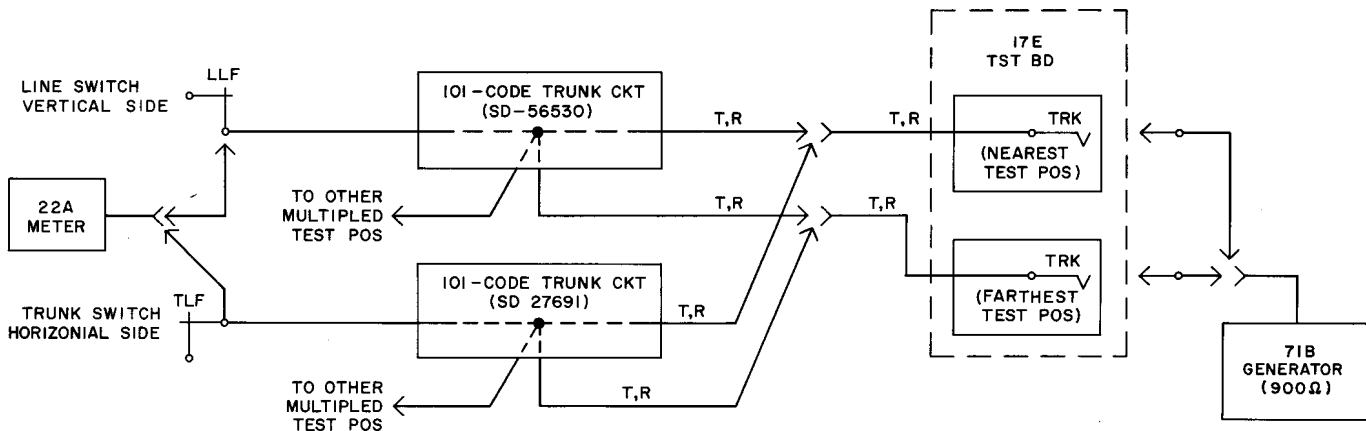
to the trunk link or line link frame. Measurements on code-101 trunks shall be made from the extreme testboard positions of each trunk to the associated trunk link or line link frame appearance as shown in Fig. 4C.



A. NETWORK TRUNK



B. LINE LINK PULSING CIRCUIT



C. CODE-101 TEST LINE CIRCUITS

NOTE:
OPENING MAY BE EITHER AT THE
TERMINAL STRIP OR AT THE
DISTRIBUTING FRAME.

Fig. 4—Arrangements for Wiring Loss Measurements

3.04 If the spread of loss measurements in a single line of testboard positions is greater than about 0.2 db, the office wiring layout should be examined with a view to reducing the spread. Once the pads are adjusted, no more than a routine yearly check of the pad values is normally required, but any changes in office wiring layout

should be followed by tests on the involved trunks to determine the possible need for pad readjustment.

3.05 The sample form shown in Fig. 5 is used in determining wiring losses and required loss compensation. The measuring procedure is as follows.

STEP	PROCEDURE
DETERMINING REQUIRED LOSS COMPENSATION — NETWORK OR LLP TRUNKS	
1	Select sample trunks to be measured per 3.02.
2	Remove selected trunks from service and make busy at <i>both</i> ends.
3	Disconnect all line equipment from the trunk relay equipment and terminate line side in 900 ohms +2 MF (Fig. 4).
4	Remove trunk circuit idle line terminations per 3.03.
5	Adjust the 71B reference generator with the 22A meter for an output of 0 dbm at 900 ohms.
6	Connect the 900-ohm output of 71B generator to the common point of a selected trunk per 3.03.
7	With the 22A meter arranged for measuring 0 dbm at 900 ohms, measure the level at the trunk link or line link frame appearance and at the TST jacks of the trunk selected in Step 6 (Fig. 4). Record the indicated losses in Columns (4) and (5) as indicated in Fig. 5.
8	Compute the trunk wiring loss differential by subtracting Column (5) from Column (4), Fig. 5, for each trunk. Record differential in Column (6) using minus (—) sign when (5) is larger than (4).
9	Perform Steps 6, 7, and 8 for remaining selected trunks.
10	Add all Column (6) entries algebraically and divide by number of trunks measured to determine average loss differential (7).
11	Add average loss differential (7) algebraically to 2 db to determine the required test pad value.
12	Disconnect all test equipment, release relays operated in Step 4, remove line termination and splitting plugs, and restore all selected trunks to service.

STEP	PROCEDURE
	<p align="center">DETERMINING REQUIRED LOSS COMPENSATION — CODE-101 TRUNKS</p>
13	At a testboard position which is electrically extreme (near or far) from the trunk link or line link frame, calibrate a 71B generator with a 22A meter for an output of 0 dbm at 900 ohms and connect it to a code-101 TRK jack (calibrated 1000-0-900 test tone supply may also be used).
14	Arrange a 22A meter for measuring 0 dbm at 900 ohms and connect it at the trunk link or line link frame to the T and R leads of the code-101 trunk selected in Step 13. Record the indicated wiring loss in Column (12), Fig. 5.
15	Repeat Steps 13 and 14 for all code-101 trunks having appearances at the testboard selected in Step 13.
16	Repeat Steps 13, 14, and 15 for the testboard position at opposite extreme from one selected in Step 13.
17	Add all Column (12) entries and divide by the number of code-101 trunks measured to determine the average wiring loss (13).
18	Subtract the average wiring loss (13) from 2 db to determine the required test pad value.

4. ADJUSTING PAD LOSSES

- 4.01 After determining the required loss compensation to be provided in the MEAS jack circuit, adjustment of the pads will be made as follows.

STEP	PROCEDURE
1	Using a patch cord equipped with type-309 plugs, connect the 22A meter to the 1000-0-900 (lower) jack of the first test position. Indication shall be 0 ± 0.03 dbm at 900 ohms. Adjust the outlet, if necessary, in accordance with the appropriate practice.
2	Disconnect the 22A meter from the 1000-0-900 jacks and connect to the MEAS 1 (lower) jack. Operate the keyboard SEND-RCV key to SEND.
3	Adjust the TST pad according to the table in Fig. 3 to obtain the required loss (± 0.05 db) determined in Fig. 5, (8).
4	Connect a second patch cord equipped with type-309 plugs from the MEAS 2 (upper) jack to the upper jack of one of the code-101 trunk jack pairs in the test bay communication trunk jack panel.
5	Adjust the 101 pad according to the table in Fig. 3 to obtain the required loss (± 0.05 db) determined in Fig. 5, (14).
6	Repeat Steps 1 through 4 at all other testboard positions.
7	Disconnect all test equipment and restore the SEND-RCV key to the normal position.

FORM FOR DETERMINING REQUIRED LOSS COMPENSATION IN MEASURING CIRCUIT OF 17E TESTBOARD													
TRUNKS ASSOCIATED WITH TEST JACK						CODE-101 TEST LINE CIRCUITS							
TRUNK DESIG	TESTBOARD POSITION	TRUNK OR LINE LINK FRAME DESIG	WIRING LOSS, COMMON POINT TO:		LOSS DIFFERENTIAL [(4) — (5)] (NOTE 1)	REQUIRED LOSS COMPENSATION	CODE-101 TRUNK DESIG	TESTBOARD POSITION	TRUNK OR LINE LINK FRAME DESIG	WIRING LOSS, TRUNK OR LINE LINK FRAME TO TRK JACK	REQUIRED LOSS COMPENSATION (NOTE 3)		
			TRUNK OR LINE LINK FRAME	TST JACK									
(1)	(2)	(3)	(4)	(5)	(6)	X	(9)	(10)	(11)	(12)	X		
					(7)	(8) (Note 2)						(13)	(14) (Note 3)
					AVERAGE	REQUIRED PAD VALUE						AVERAGE	REQUIRED PAD VALUE

Note 1: Use minus (—) sign when (5) exceeds (4).
Note 2: Algebraic sum of 2 db plus average, (7).
Note 3: 2 db minus average, (13).

Fig. 5 — Form for Determining Required Measuring Circuit Loss Compensation