

**17B TOLL TESTBOARD ARRANGED FOR TESTING WADS TRUNKS
2-WIRE SWITCHING NO. 5 CROSSBAR OFFICES**

CONTENTS	PAGE	CONTENTS	PAGE
1. GENERAL	2	(B) Sensitivity Keys and Lamps for 1U Amplifier-Rectifier — SD-95900-01 — Fig. 15	5
2. MODIFIED 17B TOLL TESTBOARD — TESTING ARRANGEMENTS	2	(C) Impedance Converter and Pad Test Jacks — SD-56526-01 — Figs. 24 & 25	5
3. WADS TRUNK APPEARANCES IN THE TESTBOARD	3	8. TESTBOARD EQUIPMENT BAY — LOWER UNIT J-63516E MODIFIED FOR TESTING WADS TRUNKS	5
(A) Trunk Test Jacks — SD-56526-01 — Fig. 1	3	(A) Position Cord Circuits — SD-64613-01	6
(B) Make Busy, Monitor and Signal Jacks — SD-56526-01 — Fig. 2	3	(B) MF Keyset Unit — SD-55925-01	6
4. TESTBOARD EQUIPMENT BAY — MISCELLANEOUS JACK CIRCUITS	3	(C) Send Receiving Switching Key — SD-95900-01 — Fig. 16	6
(A) Trunk Jacks, Answering Lamps and Dial Jack Circuits — SD-56526-01 — Figs. 9, 10 & 11	3	(D) Neon Lamp and Rering Test Circuit — SD-64616-01 — Fig. 6	6
(B) Position Extension Jacks — SD-56526-01 — Fig. 15	3	(E) Neon Lamp Signaling Test Circuit — SD-56497-01	6
5. WADS TRUNK APPEARANCES IN THE LINE TEST AND PATCH BAY	3	(F) Monitoring and Talking Test Cord Circuit — SD-56512-01	7
(A) 6-Wire Circuit Patch Jacks — SD-56526-01 — Fig. 4	3	(G) Dial Cord Circuit — SD-64761-01	7
6. LINE TEST AND PATCH BAY — MISCELLANEOUS JACK CIRCUITS	4	9. OVER-ALL MAINTENANCE — WADS TRUNK CIRCUITS	7
(A) Jacks for Interbay Patch Trunks — SD-56526-01 — Fig. 16	4	(A) General Information	7
(B) Plug Converting Jack Circuit — SD-56526-01 — Fig. 17	4	(B) Test for Busy Trunks	8
(C) Trunk Jack and Lamp Circuit for Talking Trunks — SD-56526-01 — Fig. 18	4	(C) Monitor on Trunks	8
(D) Battery Supply Jacks for 2B Signaling Test Set — SD-56526-01 — Figs. 19 & 20	4	(D) Originating Calls on Outgoing and 2-way Trunks	8
(E) Single Frequency Signaling Jacks — SD-56526-01 — Figs. 21 & 22	4	(E) Removing Outgoing and 2-way Trunks from Service	8
7. TESTBOARD EQUIPMENT BAY — TRANSMISSION MEASURING CIRCUITS	4	(F) Restoring Outgoing and 2-way Trunks to Service	8
(A) Jack Circuits — SD-95900-01 — Figs. 2, 6, 7, 16, 19, 22 & 36	4	(G) Removing Incoming Trunks from Service	8
		(H) Restoring Incoming Trunks to Service	8
		(I) Monitoring and Testing "E" and "M" Signaling Leads	9
		(J) Pre-cutover Tests — Line Test and Patch Bay	10

1. GENERAL

1.01 This section provides general information on the equipment arrangements and operating features of the modified 17B toll testboard and associated line test and patch bay. The equipment and test circuits mounted in these bays are provided to facilitate maintenance testing on the trunks used for Wide Area Data Service (WADS).

1.02 Section 314-016-301 outlines the initial line-up, circuit order and routine test requirements for voice-band WADS trunks.

1.03 Bell System Practices have been issued in Division 972 of the Plant Series describing Wide Area Data Service and 4-Row Teletypewriter Service. As discussed in the descriptive information covering the WADS switching plan, WADS trunks and access lines are switched on a 2-wire basis at No. 5 crossbar switching offices. Through connections are switched at 600-ohm impedance and terminal connections to access lines are switched at 900-ohm impedance. Four types of trunks are used in providing WADS service between switching offices as follows:

- (1) Full voice bandwidth trunks wherein the original station signals are transmitted over the line facility.
- (2) B1 data carrier system trunks, wherein six "narrow-band" channels plus a seventh or supervisory channel are derived from a full voice bandwidth facility.
- (3) "Data only" trunks which operate as full voice-band trunks to provide connections between the DDD and WADS networks.
- (4) 6A switchboard trunks which operate as access lines to provide connection for operator assistance.

1.04 The modified 17B toll testboard and associated line test and patch bay is provided for testing of WADS voice-band trunks. Combined testing of both DDD and WADS trunks from the same testboard position is not readily feasible. Transmission requirements (levels, impedances, etc.) of DDD trunks differ considerably from the WADS trunks. Different test procedures must be employed for each type of service.

1.05 Initially WADS trunks will employ voice-band facilities. B1 data carrier system terminals will be provided later and the over-all maintenance of the derived "narrow-band" trunks will be tested using the WADS trunk testboard, designated "No. 20A Toll Testboard". WADS offices will be equipped with the 20A toll testboard. Conversion of a modified 17B toll testboard to the 20A toll testboard will require replacing the lower unit and adding the required equipment for making the various additional data tests.

1.06 The equipment and circuit sketches included in this section are for the purpose of illustrating the text. They may or may not agree in detail with a particular installation. When the exact wiring or equipment information is needed for any installation, reference should be made to the drawings for the installation involved.

2. MODIFIED 17B TOLL TESTBOARD — TESTING ARRANGEMENTS

2.01 A typical 17B toll testboard equipment arrangement modified for WADS voice-band trunks is shown in Fig. 1 of this section. Each testboard equipment bay consists of an upper and lower unit. The upper unit jack fields have a capacity for 200 trunks per bay. These jack fields provide testing access to incoming, outgoing and 2-way trunk circuits for over-all trunk maintenance. Miscellaneous jack panels are also provided in the upper unit for terminating communication trunks, transmission measuring circuits and other test circuits of a specialized nature. The jacks, lamps and keys for the miscellaneous testing facilities are located directly above the keyshelf.

2.02 An associated line test and patch bay is located adjacent to the 17B toll testboard equipment bay. This bay is also provided with jack circuit capacity for 200 circuit patch jacks. These jack circuits are provided to facilitate testing and patching of the transmission and signaling leads of voice-band trunk circuits. A typical line test and patch bay arranged for 200 WADS circuit patch jacks is also shown in Fig. 1 of this section.

3. WADS TRUNK APPEARANCES IN THE TESTBOARD

3.01 A typical arrangement for terminating WADS trunks in a modified 17B testboard position is shown in Fig. 2 of this section. The jack circuits, lamps and other miscellaneous items provided in the upper unit of the testboard and associated line test and patch bay are shown on Drawing SD-56526-01. The following jack circuits are provided in the upper unit of the testboard equipment bay on a per trunk basis:

(A) Trunk Test Jacks — SD-56526-01 — Fig. 1

3.02 The *TST* jack circuit permits access to outgoing and 2-way trunks for testing purposes from the testboard position.

(B) Make Busy, Monitor and Signal Jacks — SD-56526-01 — Fig. 2

3.03 The *MB* jack circuit is connected to terminals B1 and B2 of the WADS trunk circuit. Insertion of a make-busy plug (322A plug with the ring and sleeve shorted) into a *MB* jack, shorts leads B1 and B2 of the associated trunk circuit thereby making the trunk appear busy for outgoing service.

3.04 The *MON* jack circuit permits monitoring access to WADS trunks on a "high impedance" basis. The *MON* jack is wired in series with 10,000-ohm isolation resistors in the associated trunk equipment. Isolation resistors are used in the tip and ring leads to make the transmission path of WADS trunks less vulnerable to noise or inadvertent hits from the testboard position.

3.05 The *SIG L* and *SIG D* jacks permit access to the "E" and "M" leads of the associated trunk circuit for testing and monitoring purposes. This circuit is arranged to operate an "E" and "M" splitting relay (EMS) in the trunk circuit when a ground is applied to the sleeve of the *SIG L* jack at the testboard.

4. TESTBOARD EQUIPMENT BAY — MISCELLANEOUS JACK CIRCUITS

(A) Trunk Jacks, Answering Lamps and Dial Jack Circuits — SD-56526-01 — Figs. 9, 10 & 11

4.01 Trunk jacks, answering lamps and dial jack circuits are provided as required in the miscellaneous jack panels located in the

testboard upper unit. These circuits are used in conjunction with a position cord circuit for establishing talking connections on local order wires, trunks to central offices and various incoming and outgoing communication trunks. For those communication circuits requiring an incoming signal, a lamp is associated with the proper jack circuit. The lamp lights on an incoming call and is extinguished when answered at the testboard. Where the lamp is not multiplied, connection to the auxiliary signal or night alarm circuit is made in the associated trunk or order wire circuit. For trunks requiring dial pulsing, a *DIAL* jack as well as a *TRK* jack is provided.

(B) Position Extension Jacks — SD-56526-01 — Fig. 15

4.02 Position extension jack circuits are provided as required to permit extending test circuit jacks to a nonadjacent test position.

5. WADS TRUNK APPEARANCES IN THE LINE TEST AND PATCH BAY

5.01 Circuit patching jacks are provided in the line test and patch bay for assignment to each voice-band trunk. These jack circuits provide access to the transmission and signaling leads of the associated line facility and 4-wire terminating set. Fig. 2 of this section shows a typical arrangement for connecting voice-band trunks through the line test and patch bay.

(A) 6-Wire Circuit Patch Jacks — Voice-Band Trunks — SD-56526-01 — Fig. 4

5.02 The 4-wire jack access for testing and patching toward the line facility are designated *LXMT* for transmitting toward the line, and *LREC* for receiving from the line. The 4-wire jack access for testing and patching toward the drop or 4-wire terminating set are designated *DXMT* for transmitting and *DREC* for receiving. The 2-wire jacks designated *SIG L* and *D SIG* are provided for testing and patching the "E" and "M" signaling leads toward the line and drop.

6. LINE TEST AND PATCH BAY — MISCELLANEOUS JACK CIRCUITS

(A) Jacks for Interbay Patch Trunks — SD-56526-01 — Fig. 16

6.01 Extension jack circuits are provided in the miscellaneous jack panel in the line test and patch bay. These jacks are provided for interbay trunks to a nonadjacent line test and patch bay.

(B) Plug Converting Jack Circuit — SD-56526-01 — Fig. 17

6.02 The majority of jacks in the line test and patch bay use 238- or 482-type jacks which require use of 310-type plugs. The jacks in the testboard equipment bay use 92-type or 246-type jacks which require 309-type plugs. Jack circuits for converting a 310 profile plug to a 309-type plug are provided as required in the miscellaneous jack panel in the line test and patch bay. Provision of these jack circuits permits interconnection between jacks at the test position or line test and patch bay with patching or positional cords.

(C) Trunk Jack and Lamp Circuit for Talking Trunks — SD-56526-01 — Fig. 18

6.03 Jack and lamp terminations for incoming or two-way talking trunks which appear in the line test and patch bay are provided as required. The *TK* jack is associated with a patch cord, the other end of which is connected to the line test and patch bay telephone circuit. The *L* lamp furnishes supervision from the connected trunk circuit.

(D) Battery Supply Jacks for 2B Signaling Test Set — SD-56526-01 — Figs. 19 & 20

6.04 Battery supply jacks and a battery supply filter are provided as required for the 2B signaling test set. These jacks provide means for employing the office 48- and 130-volt signaling batteries for the 2B signaling test set through two low resistance cords which are part of the set. Ground is applied over the tip and ring and 48-volt battery over the sleeve of the *A* jack. 130-volt battery is supplied over the tip and 24 volts over the sleeve of the *B* jack.

(E) Single Frequency Signaling Jacks — SD-56526-01 — Figs. 21 & 22

6.05 Single frequency signaling test jacks are provided as required. Test jacks *LINE* and *DROP* provide means to maintain an OFF-HOOK condition toward the line and drop during transmission tests. By patching the *LINE* and *DROP* jacks to the *SIG L* and *D SIG* jacks associated with the WADS trunk at the line test and patch bay, ground is placed on the "E" lead toward the drop of the trunk and continuity of the "M" lead is maintained holding the connection throughout the transmission test.

6.06 Test jack *LOS* provides means to disable the signaling equipment when a transmission test is being made on a trunk and it is not desired to hold the switches on the drop side of the signaling unit. By patching one end of a patch cord into the *LOS* jack and the other end into the *SIG L* jack associated with the trunk to be disabled, battery is applied to the "M" lead toward the line removing signaling tone. This patch also opens the "E" lead toward the drop to prevent seizure of switching equipment.

7. TESTBOARD EQUIPMENT BAY — TRANSMISSION MEASURING CIRCUITS

7.01 A block diagram illustrating the transmission measuring circuits provided for testing WADS trunks is shown in Fig. 3 of this section.

7.02 The test circuits, jacks, keys and lamps are terminated in separate miscellaneous jack panels in the upper unit of the testboard equipment bay. The test circuits have been selected from figures and building block arrangements shown on Drawings SD-95900-01 and SD-56526-01. A brief description of the equipment arrangements provided for making transmission measurements is as follows:

(A) Jack Circuits — SD-95900-01 — Figs. 2, 6, 7, 16, 19, 22 & 36

7.03 The jack circuit designated *MEAS* (Fig. 2) is used for making both sending and receiving measurements under control of the *SEND-RCV* switching key (Fig. 16). The *SEND-RCV* key is located in the lower unit keyshelf to the left of existing keys and is operated to *SEND*

or *RCV*, depending upon whether it is desired to send test power over the trunk under test, or to measure test power sent from the distant end.

7.04 The jack circuit designated *OSC* (Fig. 6) is used to gain access to the 19C or KS-19260 oscillator for external use or for patching into the jack designated *VF IN* (Fig. 22).

7.05 When a 19C oscillator is provided, an impedance matching 600:900 repeating coil (Fig. 7) is used at the output of the *VF IN* jack circuit to match the oscillator to the 900-ohm measuring circuit. When the KS-19260 oscillator is used, the jack circuit designated *OSC* (Fig. 6) is 900-ohm impedance and the impedance matching coil (Fig. 7) is not provided.

7.06 Operation of the key designated *CAL* (Fig. 19) operates a relay in the sending and calibration circuit (Fig. 34) thereby connecting the oscillator output to the measuring circuit. The loss of the impedance matching coil (when used) is included in the calibration procedure by operation of the *CAL* key while adjusting the oscillator output. The *CAL* key is also used to terminate the milliwatt supply directly in the measuring circuit for checking the calibration of the meter.

7.07 The jack circuit designated 1000 0 900 (Fig. 36) is used for checking the level of the 900-ohm, 1000-cycle test power supplied to the testboard position. No adjustment of this level should be made unless it is checked with a 22A milliwatt reference meter or equivalent. This jack circuit can also be used for checking portable test equipment or for any other purpose where test power of 1000 cycles at 900 ohms and 0 dbm is required.

(B) Sensitivity Keys and Lamps for 1U Amplifier-Rectifier — SD-95900-01 — Fig. 15

7.08 In the normal condition the 1U amplifier-rectifier is arranged for use of the *B* scale of the meter. Operation of the *B + 10* key changes the output so that the measurement is equal to the meter reading +10. Operation of the *B + 20* key changes the output so that the measurement is equal to the meter reading +20. Operation of the *A* key changes the circuit so that readings are read on the *A* scale of the meter.

7.09 Operation of the *GRD* key, grounds the midpoint of the input to the measuring system to permit indications of unbalance in the circuit under test. When the circuit is balanced, there should be no change in the meter reading if the *GRD* key is operated.

7.10 The meter busy lamp *MB* is provided to indicate when the projection meter is in use at another position. The *TMB* lamp indicates that the measuring system is in use at another position.

(C) Impedance Converter and Pad Test Jack Circuits — SD-56526-01 — Figs. 24 & 25

7.11 Trunks between WADS offices are designed to include a 3.7 db pad and a 1.5:1 ratio transformer combination at each end of the trunk. These pads and transformers are introduced by the trunk circuit equipment whenever a call originates or terminates at a primary or secondary office but are switched out at WADS primary offices on a trunk to trunk switch. Through calls are switched at 600-ohm impedance and terminal calls to access lines are switched at 900-ohm impedance.

7.12 The impedance of the 17B testboard measuring circuit is 900 ohms. Measurements made at the *TST* jack should be at 600 ohms and at the -14 level, therefore, it is necessary to match the impedances and provide the correct level before accurate measurements can be made. The impedance converters and test pads shown on Drawing SD-56526-01 — Figs. 24 and 25 are provided for use in making transmission measurements originating at the *TST* jack of outgoing and 2-way WADS trunks. Each test pad consists of a 3.7 db pad and 1.5:1 transformer combination (4.0 db total loss) which is wired in series with the jack circuits designated 900 and 600. These pads are designated TP(1) and TP(2).

8. TESTBOARD EQUIPMENT BAY—LOWER UNIT — J-63516E MODIFIED FOR TESTING WADS TRUNKS

8.01 A plan view of the lower unit provided in the testboard equipment bay is shown in Fig. 4 of this section. The lower unit is equipped with a modified face equipment layout

made available specifically for WADS trunk testing.

8.02 WADS trunks are cross connected to the *TST*, *MB*, *MON* and *SIG* test jacks provided in the upper unit of the testboard equipment bay as shown in Fig. 2 of this section.

8.03 The lower unit is equipped with test circuits terminated on plug ended cords. By means of the test circuits, testboard attendants can test for busy trunks, remove trunks from service and gain access to the trunks for signaling tests and transmission measurements.

(A) Position Cord Circuits — SD-64613-01

8.04 Three pairs of test cords — designated 1, 2 and 3 — are provided for testing the operational and transmission features of WADS trunks. The test circuit of each cord pair is provided with keys and associated supervisory lamps in the position circuit shown on Drawing SD-64616-01.

8.05 The test circuit of each pair of cords is arranged to provide sleeve supervision directly to the *FS* or *RS* supervisory lamp when the *TALK* key is normal or under control of the position relays when the *TALK* key is operated.

8.06 When the *TALK-MON* key is operated to *TALK*, the tip and ring of the cord is connected to the busy test relay. When the tip of a cord is touched to the sleeve of a busy trunk at the *TST* jack, the busy test relay will operate and cause a click to be heard in the attendant's telephone set. When the trunk is idle, no busy click will be heard.

8.07 To monitor on a trunk that "tests busy", the *TALK-MON* key is operated to *MON*, and the test cord inserted into the *MON* jack. Operation of the *TALK-MON* key to *MON*, operates a relay in the position circuit which cause the tip and ring leads of the test cord to be connected through the monitoring amplifier to the telephone set.

(B) MF Keyset Unit — SD-55925-01

8.08 The MF keyset unit is provided for MF pulsing through the testboard position and telephone circuit shown on Drawing SD-64616-01.

8.09 When the *TALK-MON* key is operated to *TALK* and the front or rear test cord has been connected to the *TST* jack of an idle WADS trunk, key pulsing is under control of the *KP* key which should be operated to the front or rear — depending upon which cord is used. The *KR* or *KF* lamp will light to indicate that the keyset has been connected to the cord circuit. The *S* lamp will light when the trunk is ready to receive MF pulses from the keyset.

8.10 When key pulsing has been completed, it is necessary to momentarily operate the *ST* key to release the keyset. Release of the keyset will cause the *S* and *KR* or *KF* lamps to go out. Supervision from the called end of the trunk will be received on the *FS* or *RS* supervisory lamp associated with the front or rear test cord.

(C) Send Receive Switching Key — SD-95900-01 — Fig. 16

8.11 The *SEND-RCV* key located in the lower unit keyshelf — to the left of existing keys — is used for making transmission measurements on WADS trunks. This key is operated to *SEND* or *RCV* — depending upon whether it is desired to send test power over the trunk under test, or to measure test power sent from the distant end.

(D) Neon Lamp and Rering Test Circuit — SD-64616-01 — Fig. 6

8.12 A rering test feature is provided in the position circuit. This feature provides visual detection of short supervisory signals on the rear test cords. Operation of the rering test *RRT* key connects a fast-acting electron tube and a neon lamp to the supervisory relay path of any rear test cord. The neon lamp is not as bright as the regular supervisory lamp but is adequate for special testing.

(E) Neon Lamp Signaling Test Circuit — SD-56497-01

8.13 The neon lamp signaling test circuit is provided for monitoring and testing the "E" and "M" signaling leads of WADS trunk circuits. The signaling test circuit is equipped with keys, lamps and a plug ended cord designated *SIG TST*.

8.14 The *SIG TST* cord is used for connecting the test circuit to the WADS trunk *SIG L* and *SIG D* jacks at the testboard. "E" and "M" lead signals are then indicated on the L and D neon lamps. The L lamp is always associated with the "E" lead from the line equipment. The D lamp is always associated with the "M" lead from the drop equipment. During the idle condition of a trunk — with "ON-HOOK" signals being received from both directions — the L and D lamps will both be lighted. An "OFF-HOOK" signal from either direction extinguishes the lamp associated with that direction. The neon lamps will also indicate "hits" which may occur in the trunk under test.

**(F) Monitoring and Talking Test Cord Circuit —
SD-56512-01**

8.15 The monitoring and talking test circuit is equipped with a plug ended cord designated *TRK*. When it is desired to monitor with the *TRK* cord, the *CLOSE 3RD* key is operated and the *TALK-MON* key is operated to *MON* position. The *TRK* cord is then inserted into the *MON* jack of the trunk to be tested.

8.16 Due to isolation resistors being placed in the monitoring leads of incoming, outgoing and 2-way trunks, it is not possible to use the *TRK* cord for MF pulsing over the *MON* jack. However, by means of a plug converting jack circuit, the *TRK* cord may be used for MF pulsing in conjunction with a 2B signaling test set at the line test and patch bay. The trunk seizure is made with the 2B signaling test set and the *TRK* cord is used for MF pulsing over the transmission path of the trunk.

(G) Dial Cord Circuit — SD-64761-01

8.17 The dial circuit is provided with a *DIAL* cord to be used in conjunction with a position test cord. For trunks requiring dial pulsing a *DIAL* jack as well as a *TRK* jack is provided for establishing talking connections on local order wires, trunks to central offices and various outgoing communication trunks. To dial, the *DIAL* cord is connected to the *DIAL* jack and communication is done by the position test cord connected to the *TRK* jack.

8.18 An associated *DP* lamp, located adjacent to the dial will light when the trunk circuit is ready to receive dial pulses. When the

connected trunk is arranged for "stop dialing" indications, the *DP* lamp and the *FS* or *RS* supervisory lamp will be extinguished when the sleeve resistance of the trunk increases. This serves as a signal to "stop dialing" until the lamps light again. Dialing may then be resumed.

**9. OVER-ALL MAINTENANCE —
WADS TRUNK CIRCUITS**

(A) General Information

9.01 WADS trunks are cross connected to the *TST*, *MB*, *MON* and *SIG* test jacks provided in the upper unit of the testboard equipment bay as shown in Fig. 2 of this section.

9.02 Outgoing and 2-way trunks are cross connected as shown on Drawing SD-56526-01 — Figs. 1 and 2. It should be noted that no provision is made for *TST* jack access on incoming trunks, however, these trunks are cross connected to the *MON* and *SIG* test jacks as shown on Drawing SD-56526-01 — Fig. 2.

9.03 *When WADS trunk circuits are seized from one appearance, the other appearances are immediately made busy. When a trunk is seized via the crossbar switches, battery is supplied to the S1 lead of the testboard TST jack to provide a busy indication.*

9.04 *Before key pulsing can be accomplished on an outgoing or 2-way trunk, the trunk must be in the "idle condition". The tip and ring conductors of the TST jack are normally open until relays have been operated in the associated trunk circuit from the testboard position. These relays cannot be operated by the testboard when the trunk is already busy on a seizure through the crossbar switches.*

9.05 *When testing on outgoing and 2-way WADS trunks at the TST jack, it should be remembered that the testboard impedance is 900 ohms and the TST jack appearance is 600 ohms. An impedance converter and test pad must be used to match the impedances and provide the correct transmission levels at the TST jack. Two impedance converters and test pad combinations — total loss 4.0 db — are provided in the miscellaneous jack panel for use in testing on outgoing and 2-way trunks at the TST jack. These pads are designated TP(1) and*

TP(2). When testing on incoming trunks through the crossbar switches, a 1:1.5 ratio transformer and a 3.7 db pad — total loss 4.0 db — is included in the incoming trunk circuit, therefore, an external impedance converter and test pad should not be used.

9.06 Initial line-up, circuit order and routine test requirements for voice-band WADS trunks are covered in Section 314-016-301. The test circuits provided in the lower unit of the testboard are shown in Fig. 4 of this section. Use of the test circuits provided for testing the operational and transmission features of WADS trunks are outlined below:

(B) Test for Busy Trunks

9.07 When it is desired to test for a busy trunk — any one of the position test cords designated 1, 2 or 3 may be used as follows:

(a) With a patch cord equipped with 309-type plugs — patch from the **TP(1) 600** jack to the **TST** jack of the trunk to be tested.

(b) The **HOLD-CLOSE 3RD** and **TALK-MON** keys associated with the test cord being used should be operated to the **CLOSE 3RD** and **TALK** positions — touch the tip of the test cord to the sleeve of the **TP(1) 900** jack. If the trunk is busy, battery on the sleeve will give a “busy click”. If the trunk is idle, no “busy click” will be heard.

(C) Monitor on Trunks

9.08 When it is desired to monitor on a trunk which tests busy — the **TALK-MON** key associated with the test cord being used is operated to **MON**. The patch cord is inserted into the **MON** jack of the trunk, and the test cord inserted into the **TP(1) 900** jack.

(D) Originating Calls on Outgoing and 2-way Trunks

9.09 When it is desired to establish test calls to test lines or testboards in distant offices, the procedure is as follows:

(a) With a patch cord equipped with 309-type plugs, patch from the **TP(1) 600** jack to the **TST** jack of the trunk to be used.

(b) The **HOLD-CLOSE 3RD** and **TALK-MON** keys associated with the test cord being used should be operated to **CLOSE 3RD** and **TALK** positions. Make busy test as outlined in (B) above.

(c) When the trunk tests idle — insert the test cord into the **TP(1) 900** jack and momentarily operate the keyset **KP** key to the front or rear, depending upon which cord is being used. The **KR** or **KF** lamp will light — the keyset **S** lamp will light and the **FS** or **RS** supervisory lamp associated with the front or rear test cord will light to indicate a “start pulse” signal.

(d) Key pulse the desired test line or testboard number and momentarily operate the keyset **ST** key.

(e) Supervision from the called end of the trunk will be received on the **FS** or **RS** supervisory lamp associated with the front or rear test cord.

(E) Removing Outgoing and 2-way Trunks from Service

9.10 Outgoing and 2-way trunks should be removed from service at both ends. To remove an outgoing or 2-way trunk from service — insert a make-busy plug (322A plug with the ring and sleeve shorted) into the **MB** jack of the trunk.

(F) Restoring Outgoing and 2-way Trunks to Service

9.11 Outgoing and 2-way trunks should be restored to service at both ends. To restore outgoing and 2-way trunks to service — remove the 322A plug from the **MB** jack and make operational tests to verify that the trunk is satisfactory for service.

(G) Removing Incoming Trunks from Service

9.12 Incoming trunks should be removed from service at both ends. Incoming trunks are removed from service by inserting an open plug in the **D SIG** jack of the trunk at the line test and patch bay.

(H) Restoring Incoming Trunks to Service

9.13 Remove the open plug from the **D SIG** jack of the trunk at the line test and patch bay. Have outgoing end make operational test and restore to service.

(I) Monitoring and Testing "E" and "M" Signaling Leads

9.14 The neon lamp signaling test circuit is used for analyzing and sectionalizing troubles on the "E" and "M" signaling leads of WADS trunk circuits.

9.15 When it is desired to determine whether the proper "ON-HK" and "OFF-HK" signals are being received from or sent to the far end of a trunk — the procedure is as follows:

- (a) All test keys associated with the *SIG TST* cord should be in the normal nonoperated position.
- (b) Operate the *TST-MON* key to *MON* position and insert the *SIG TST* cord into the *SIG L* and *SIG D* jacks of the trunk to be tested.
- (c) Observe the L and D neon lamps. During the idle condition of a trunk with "ON-HK" signals being received from both

directions, the L and D lamps will be lighted. An "OFF-HK" signal from either direction extinguishes the lamp associated with that direction. See Table 1 for lamp indications and "E" and "M" lead conditions during a typical call.

9.16 When it is desired to split the line and drop equipments in order to make sectionalizing tests, the *TWD L* and *TWD D* keys associated with the *SIG TST* cord are used for applying "ON-HK" and "OFF-HK" conditions on the "E" and "M" signaling leads as outlined below:

- (a) When the trunk is in the idle condition — neon lamps both lighted — operation of the *TST-MON* key associated with the *SIG TST* cord to the TST position, places ground on the SP lead of the *SIG L* jack to operate the splitting relay in the associated trunk.

TABLE 1
SEQUENCE OF LAMP OPERATIONS AND E AND M LEAD CONDITIONS DURING A TYPICAL CALL

CALLING END					CALLED END				
TRUNK OPERATION	LINE LAMP	"E" LEAD	DROP LAMP	"M" LEAD	LINE LAMP	"E" LEAD	DROP LAMP	"M" LEAD	TRUNK OPERATION
IDLE CONDITION		OPEN		GND		OPEN		GND	IDLE CONDITION
SEIZURE AT CALLING END		OPEN		BAT		GND		GND	SEIZURE FROM CALLING END
DELAY PULSING SIGNAL FROM CALLED END		GND		BAT		GND		BAT	DELAY PULSING RETURNED TO CALLING END
START PULSING SIGNAL FROM CALLED END		OPEN		BAT		GND		GND	START PULSING RETURNED TO CALLING END
AWAIT CALLED NUMBER TO ANSWER		OPEN		BAT		GND		GND	AWAIT CALLED NUMBER TO ANSWER
CALLED NUMBER ANSWERS AND TALKS		GND		BAT		GND		BAT	CALLED NUMBER ANSWERS AND TALKS
CALLED NUMBER DISCONNECTS		OPEN		BAT		GND		GND	CALLED NUMBER DISCONNECTS
CALLING NUMBER DISCONNECTS		OPEN		GND		OPEN		GND	IDLE CONDITION

Dark Lamp "OFF HOOK"
 Lighted Lamp "ON HOOK"

(b) To place an "OFF-HK" condition toward the line — operate the *TWD L* key to "OFF-HK" position. Restoring the *TWD L* key to normal or to "ON-HK" position places an "ON-HK" condition toward the line equipment.

(c) To place an "OFF-HK" condition toward the drop — operate the *TWD D* key to "OFF-HK" position. Restoring the *TWD D* key to normal or to "ON-HK" position places an "ON-HK" condition toward the drop equipment.

(J) Pre-cutover Tests — Line Test and Patch Bay

9.17 Section 314-016-515 describes the procedure for making thru and terminal balance tests on WADS trunk circuits. The tests are made at the line test and patch bay on a pre-cutover basis in advance of actual circuit line-ups. When setting up test calls through the crossbar switches, the monitoring and talking test cord — designated *TRK* — is used for MF pulsing in conjunction with a 2B signaling test set. The trunk seizure is made with the 2B signaling test set connected to the "E" and "M" signaling leads of the trunk and the *TRK* cord is used for MF pulsing over the transmission path as outlined below:

(a) Operate the *TALK-MON* key associated with the *TRK* cord to *TALK* and insert the *TRK* cord into the lower jack of a plug converting jack circuit at the line test and patch bay.

(b) Patch the upper jack of the plug converting jack circuit to the *LXMT* jack of the trunk to be tested.

(c) The trunk seizure is made by placing an "OFF-HK" condition toward the drop equipment with the 2B signaling test set "E" and "M" leads connected to the *D SIG* jack of the trunk.

(d) When the 2B signaling set *DROP* lamp lights, momentarily operate the position keyset *KP* key to the front position. The *KF* lamp will light to indicate that the keyset has been connected to the *TRK* cord.

(e) The keyset *S* lamp will light to indicate when the trunk is ready to receive MF pulses. Key pulse the test line number and momentarily operate the *ST* key to release the keyset.

(f) Supervision from the trunk will be received on the *DROP* lamp of the 2B signaling test set.

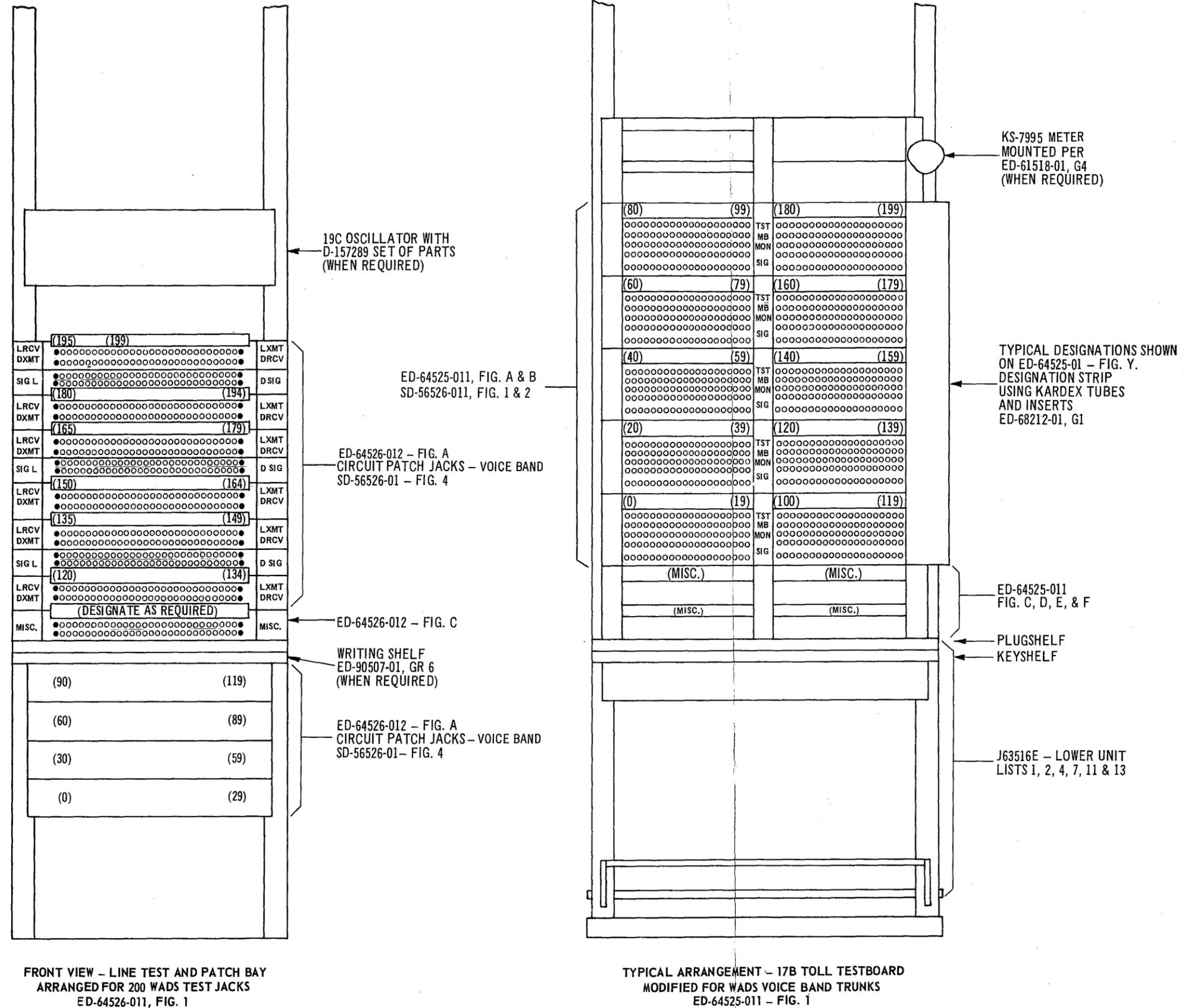
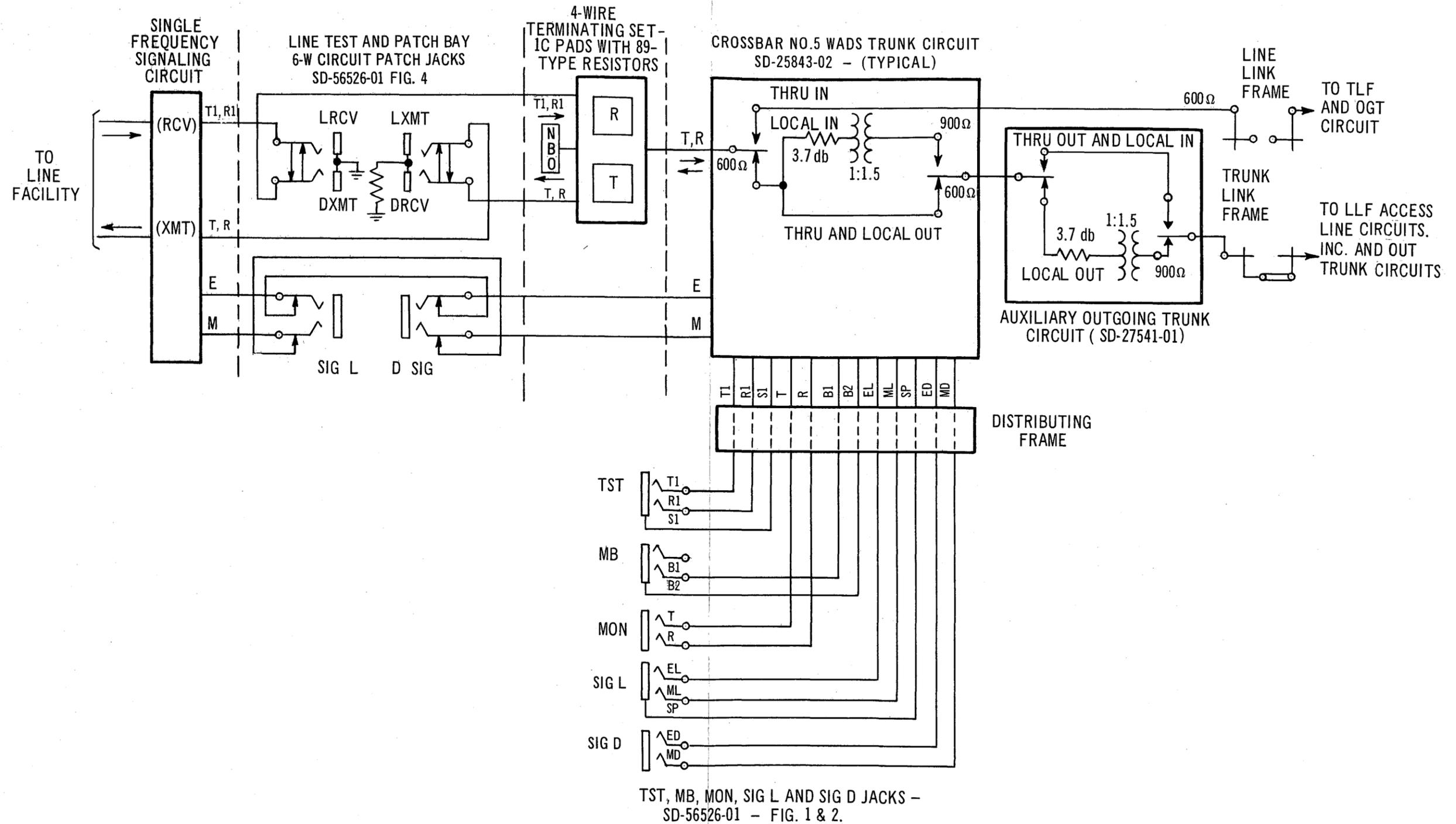
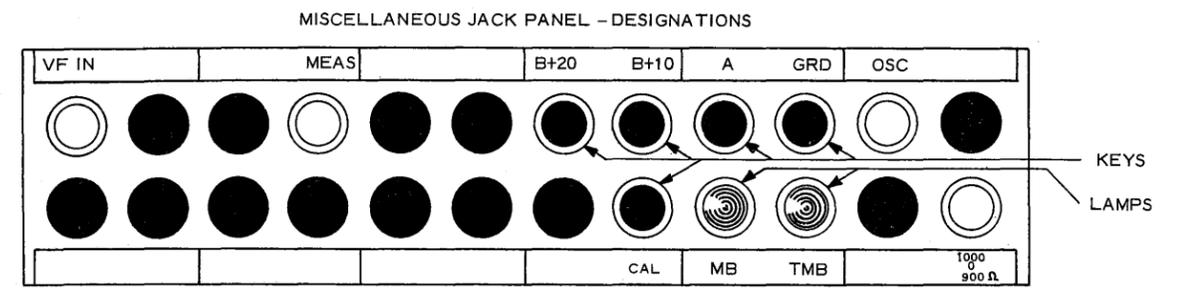
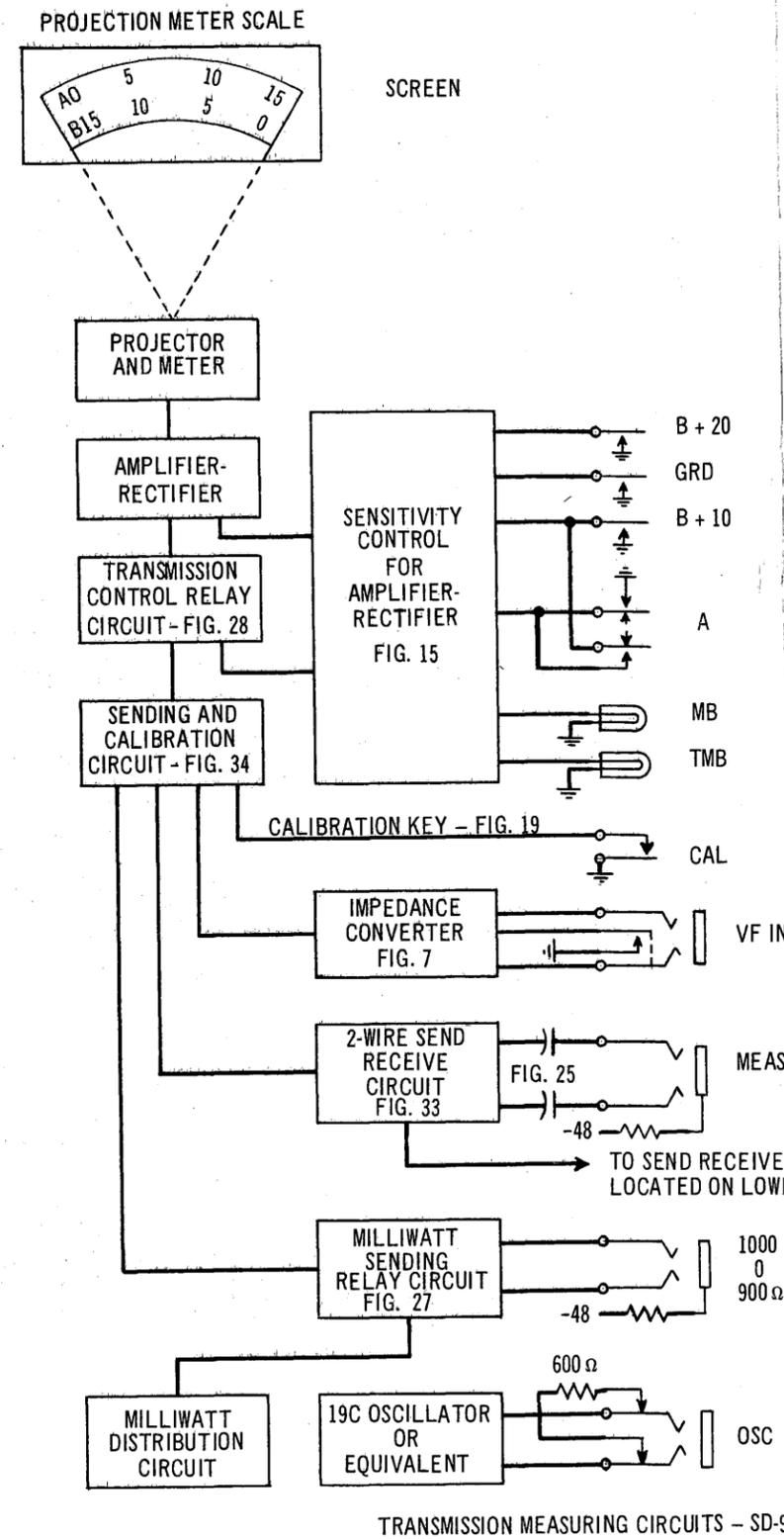


Fig. 1 - 17B Toll Testboard and Line Test and Patch Bays - Equipment Arrangements for WADS Voice-Band Trunks



TST, MB, MON, SIG L AND SIG D JACKS - SD-56526-01 - FIG. 1 & 2.

Fig. 2 - Typical Arrangement for Terminating WADS Trunks in 17B Toll Testboard and Line Test and Patch Bay



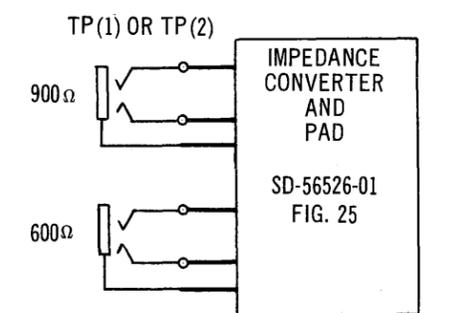
TRANSMISSION MEASURING CIRCUITS
SD-95900-01, FIG. 2, 6, 15, 19, 22 & 36

2-W VARIABLE FREQUENCY
INPUT JACK CIRCUIT - FIG. 22

2-W MEASURING JACK
CIRCUIT - FIG. 2

2-W MILLIWATT JACK
CIRCUIT - FIG. 36

2-W VARIABLE FREQUENCY
SUPPLY CIRCUIT - FIG. 6



MISCELLANEOUS JACK PANEL - DESIGNATIONS
SD-56526-01 - FIG. 24

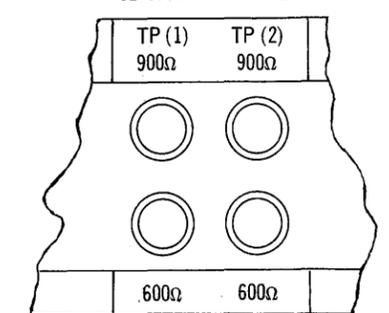


Fig. 3 - Transmission Measuring Circuits for Measuring WADS Voice-Band Trunks

