17E TESTBOARD

GENERAL DESCRIPTION

CONTENTS PAGE

1. GENERAL

1.01 This section describes the equipment, equipment arrangement, and circuits for the 17E testboard. The 17E testboard is an equipment arrangement designed for use in 2-wire, No. 5 crossbar switching systems for making over-all and sectionalizing tests on 900-ohm circuits.

1.02 The equipment and circuit sketches included in this section may or may not agree with a particular installation. When exact wiring or equipment information is required, refer to the drawings for the particular installation.

1.03 Other sections associated with the 17E testboard include the following:

310-281-300	Measurement and Adjustment of Pads for the Transmission Measuring Circuit
310-281-500	Measurement and Adjustment of Office Losses
310-281-501	Operational Tests

2. EQUIPMENT ARRANGEMENT

A. General

2.01 The 17E testboard equipment is mounted on standard 11-1/2 foot, 23-inch channel-type relay racks and consists of units furnished in accordance with the requirements for the particular installation. Two face equipment bays are provided for each testboard position. The bay which contains the plugshelf and the keyshelf is referred to as the test bay (see Fig. 1); the other bay is referred to as the circuit patch bay. (See Fig. 2.)

2.02 The arrangement of the face equipment in each bay is flexible. It depends upon the number of positions to be furnished and the type of trunks to be tested. The test equipment may be placed in line with secondary or private telephone testboards or with other testing equipment.

B. Floor Plan Arrangement

2.03 The test bay and circuit patch bay for each 17E test position are placed in the same line-up, with growth in either direction. The two bays for each position are placed adjacent to each other. The equipment arrangement for a 2-position 17E testboard arranged for left-to-right growth is shown in Fig. 3.

C. Test Bay Arrangement

2.04 The test bay of a 17E testboard position (Fig. 1) consists of a lower unit containing the testing and control equipment and an upper unit with a jack field framework arranged to mount two panels of network trunk test jack and lockout lamp mountings on 8-1/2 inch panels. Circuits in these panels require six leads, necessitating the use of twin jacks and plugs for connections to transmission and control leads of 2-wire circuits. The space above the jack field framework is used to mount associated test equipment and other miscellaneous items.

2.05 ***Lower Unit (Fig. 4):*** The lower unit framework consists essentially of the following items:

(a) Keyshelf, plugshelf, and cordshelf.

(b) Cord protection panel for protecting the wiring of relay equipment.

(c) Front panel for protecting relay equipment.

(d) Foot rail for use of attendant.

(e) Mounting spaces for test equipment subunits.

2.06 The keyshelf extends outward 18-1/2 inches from the face of the relay rack and is located 40 inches above the floor. This shelf mounts keys and supervisory lamps required by the test bay equipment and the multifrequency (MF) keyset keys. (See Fig. 5.)

2.07 The plugshelf is mounted adjacent to the keyshelf on a 35-degree angle with respect to the plane of the keyshelf, as shown in Fig. 4. Mounted on the plugshelf are three pairs of communication test cords (Fig. 5), identified as TST and CON 1, 2, and 3; two patching cords, identified as PTCH, 1 and 2; two signal test circuit (SIG T) cords; and a dial.

2.08 ***Jack Field (Fig. 6A):*** The test bay jack field is arranged on a 2-panel basis and consists of the following equipment:

(a) Testing jacks and lockout lamps for 200 or more trunk and line circuits (Fig. 6B).

(b) Transmission and noise measuring panel (Fig. 6C).

(c) Miscellaneous, "as required" jacks and lamps for testing, communication, or position extension (Fig. 6D and 6E).

2.09 ***Test Equipment (Fig. 1):*** Various test equipment is provided for the 17E testboard functions. In the test bay, test equipment mounted above the jack field includes the following units:

(a) 6D noise measuring panel or KS-19260, List 1 or 3, oscillator (optional).

(b) MF signal generator.

(c) Signaling test circuits (2).

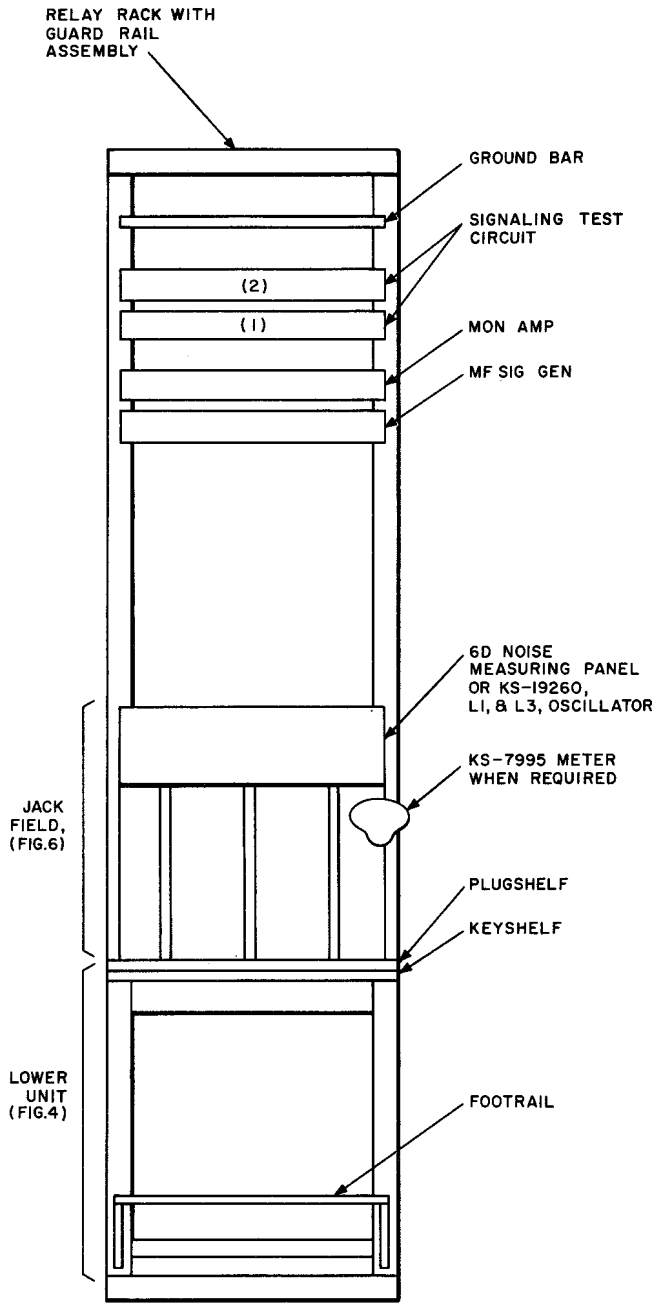


Fig. 1 — 17E Testboard — ED-6G003-01 — Typical Arrangement, Test Bay

(d) KS-7995 meter, when required, mounted as shown, or a projection meter with screen, when required, installed in such position as to be visible to all testboard attendants.

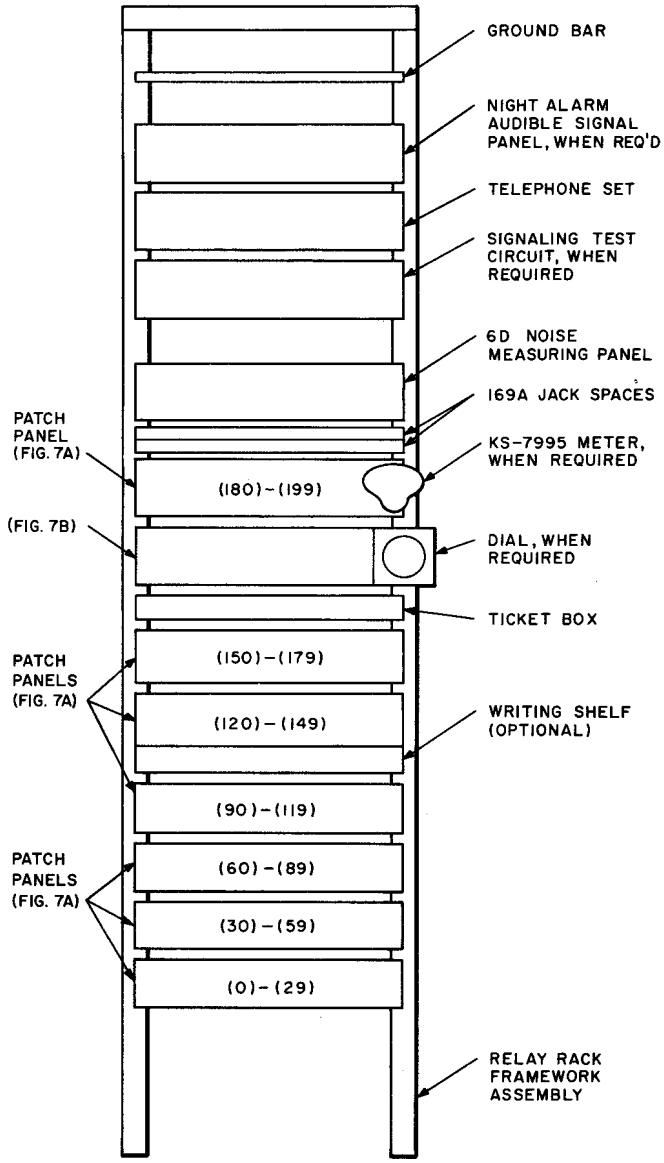


Fig. 2 — Circuit Patch Bay — ED-63046-01 — Typical Arrangement

D. Circuit Patch Bay Arrangement

2.10 The circuit patch bay of the 17E testboard position (Fig. 2) provides additional mounting spaces for test equipment and jacks required by the testboard position in association with the test bay. The circuit patch bay consists primarily of a jack field and an

optional writing shelf. Test equipment and other miscellaneous circuit components associated with the test position are mounted above the jack field.

2.11 ***6-Jack Patch Panel (Fig. 7A):*** Sufficient panels are provided in the circuit patch bay jack field for 200 or more 6-jack patch jack circuits for network trunks with composite or SF signaling.

2.12 ***Interbay or Intrabay Trunk Jack and Miscellaneous Equipment Panel (Fig. 7B):*** This panel mounts jacks for interbay or intrabay trunks and signal transmitting circuits, as well as keys, jacks, and lamps for various miscellaneous test equipment, talking trunks, and telephone communication circuits. Test equipment here mounted, on an "as required" basis, includes the following equipment:

(a) Signaling test circuit equipment (Fig. 7C).
(b) Test battery jack (Fig. 7D).
(c) Single frequency test jacks (Fig. 7E).
(d) 2B-type signaling test set battery supply jacks (Fig. 7F).
(e) Night and supervisory alarm keys (Fig. 7G).
(f) Transmission measuring equipment (Fig. 7H).

2.13 ***Test Equipment:*** Test equipment in the circuit patch bay (Fig. 2), is mounted above the jack field except for (f) below, which is bracketed at reading height on the rack, and includes the following equipment, when required:

(a) Telephone set relay equipment.
(b) 6D noise measuring panel.
(c) Night alarm audible signal panel.
(d) Signaling test circuit relay equipment.
(e) Dial.
(f) KS-7995 meter.

2.14 In a multiple position testboard line-up, only one night alarm audible signal control panel is provided. This panel and associated keys should be installed in the circuit patch bay of the first test position.

3. TEST BAY — TEST JACK CIRCUITS

3.01 Provision is made in the test bay jack field for accommodating 200 or more trunk and/or line circuit testing jack groups

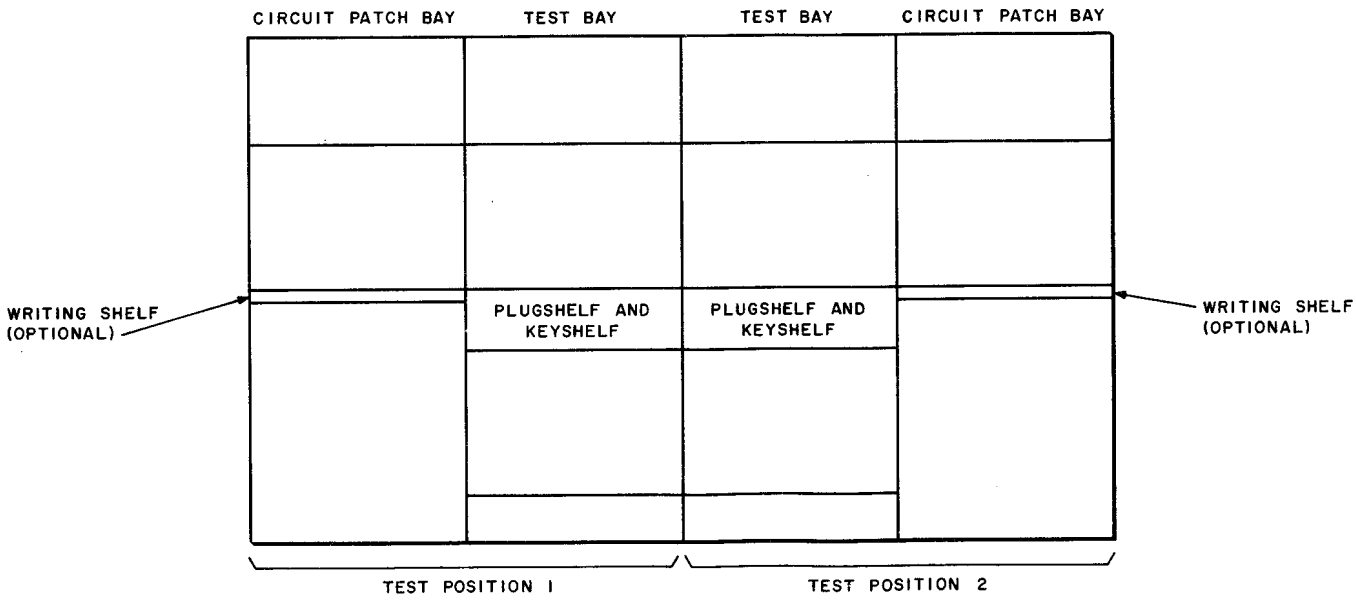


Fig. 3 — 17E Testboard — ED-63046-01 — 2-Position Line-up

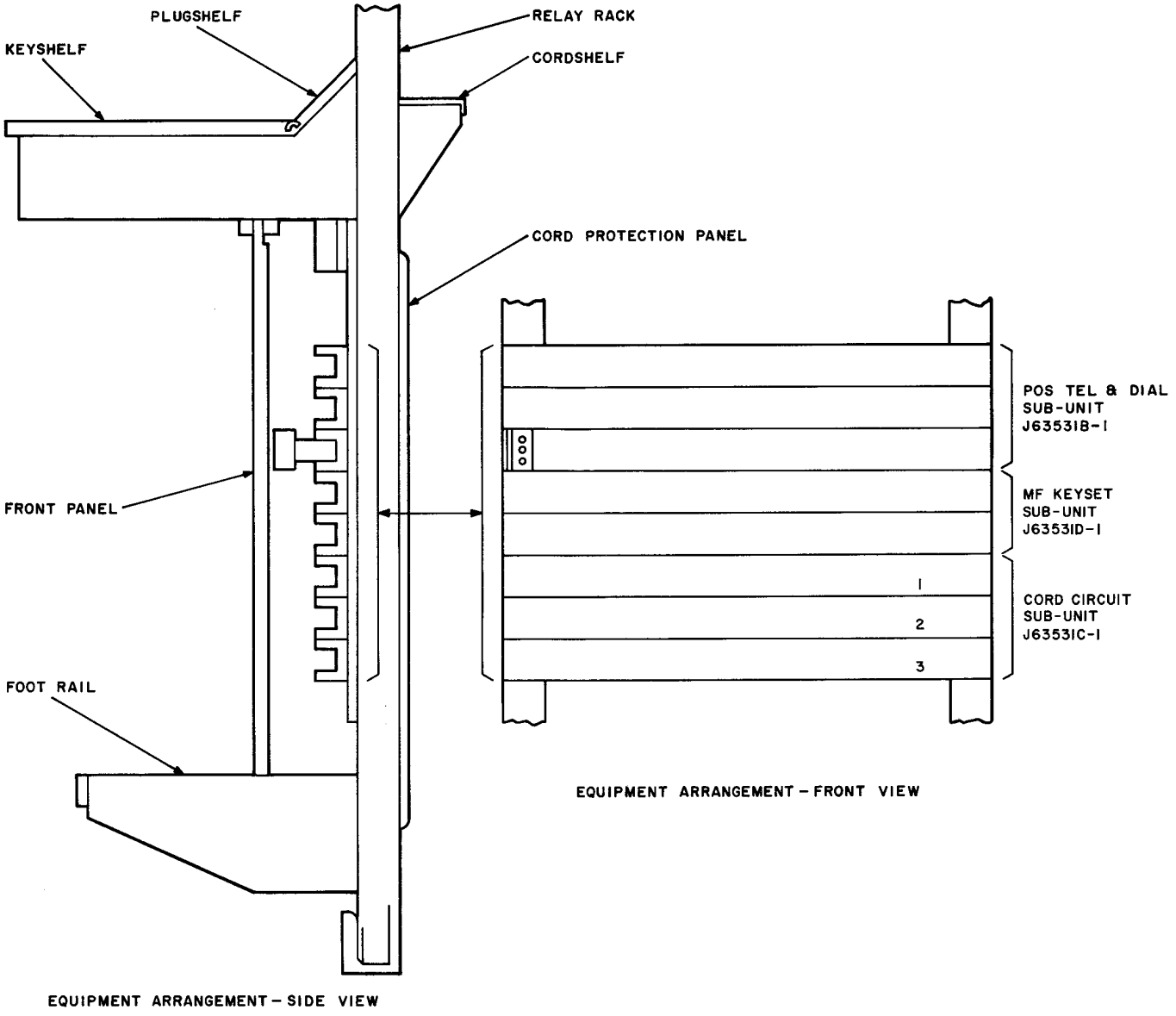


Fig. 4 — Test Bay — J63531A — Lower Unit

(Fig. 6A and 8A). The following equipment is provided for each connected circuit or trunk:

(a) ***TST Jacks:*** These twin jacks provide access to the voice circuits to permit transmission and control tests to be performed directly at the associated trunk or line circuit. Lockout, lockout across office, and holding supervisory signals may appear on the leads of these jacks.

(b) ***SIG Jacks:*** The SIG line and drop jacks permit access to signaling leads of trunks and circuits having E and M lead supervision. The TST cords of the position may be inserted in these jacks for testing or monitoring the E and M leads of the associated circuit.

(c) ***LO Lamp:*** The LO lamp is lighted whenever the associated trunk or line circuit is removed from service.

4. TEST BAY — MISCELLANEOUS TEST JACKS

A. Trunk Jack Circuits

4.01 These circuits (Fig. 8B) include the communication trunk jacks and the 101-type trunk jacks, and are used for establishing talking connections on local order wires, other than SS1-type, on trunks to central offices, and on various incoming or outgoing trunks.

4.02 The 101-type trunks are reached from a distant office via a network trunk and are used for communication or for transmission and noise measurements.

B. Communication Dial Trunk Jacks

4.03 For those communication circuits requiring dial pulsing, both a dial jack and a trunk jack are required (Fig. 8C). The position CON cord circuit is used to associate the dial with the upper DIAL jack to permit dialing. Transmission and holding functions are then performed over the TRK jack.

C. SS1 Telephone Order-Wire Jacks

4.04 These jacks provide testboard appearances for interoffice communication circuits (Fig. 8D). Sleeve supervision is provided on these jacks, with no multiplying of the sleeve being made to other positions. Transmission and signaling is performed on the lower jack.

D. Answering Lamps

4.05 Answering lamps are provided with those communication trunks which require a visual indication of an incoming call (Fig. 8E). The subsequent connection of a CON cord to the calling trunk jack and operation of the associated TALK key will answer the call and extinguish the lamp. When an answering lamp is not multipled, connection to the auxiliary signal or night alarm circuit is made in the associated trunk or order-wire circuit.

E. Position Extension Jacks

4.06 In a multiple test position line-up, interconnecting 4-wire circuitry is provided between nonadjacent test bays to permit testing assistance between these bays. This circuitry is jack-ended on twin jacks (EXT) in the test bay jack field (Fig. 6D, 6E, and 8F), permitting the use of either a position patching cord (Fig. 8G) or a P6C patching cord (Fig. 9H, 1) for patching between the EXT jacks and other bay jacks. These jacks should not be used for transmission measurements.

F. Single Frequency Tone Test Trunk Jacks

4.07 Each single frequency (SF) tone test trunk jack group (Fig. 8H) consists of two sets of twin jacks and is identified as RCV (1 and 2) and XMT (1 and 2). These jacks are used for detecting the presence of signaling tone on the receiving and the transmitting branches of a single frequency signaling unit. For monitoring on these branches, the SF tone test jack leads are patched to the monitoring jacks of the circuit being tested, either at the associated repeater or VF patch bay. Tones produced by operation of ***on-hook*** and ***off-hook*** controls can then be monitored at the testboard by patching a communication cord to the appropriate SF TONE T XMT or RCV jacks.

G. 6D Noise Measuring Circuit Jacks

4.08 A 6D noise measuring circuit may be included in the test position when required for use in measuring noise (dbrn) present on data transmission circuits or trunks. The 6D circuit consists of a 3B noise measuring set and a 6E impulse counter (Fig. 8I) which are used, respectively, to measure noise levels and to count noise pulses which exceed a predetermined level. The panel jacks consist of two sets of twin jacks, identified as MON (1 and 2) and IN (1 and 2), for each test unit. The test units may be installed in either the test bay or the circuit patch bay. Connections are made to circuits to be tested through position testing cords.

5. CIRCUIT PATCH BAY — PATCHING JACKS

5.01 The 6-jack patch jacks (Fig. 9A) provide access to the E and M leads and the 4-wire side of network trunk and line link pulsing circuits with composite or SF signaling. Appearances are provided in the circuit patch bay for 200 or more jack groups. Typical patching arrangements, using these jacks groups, are shown in Fig. 11.

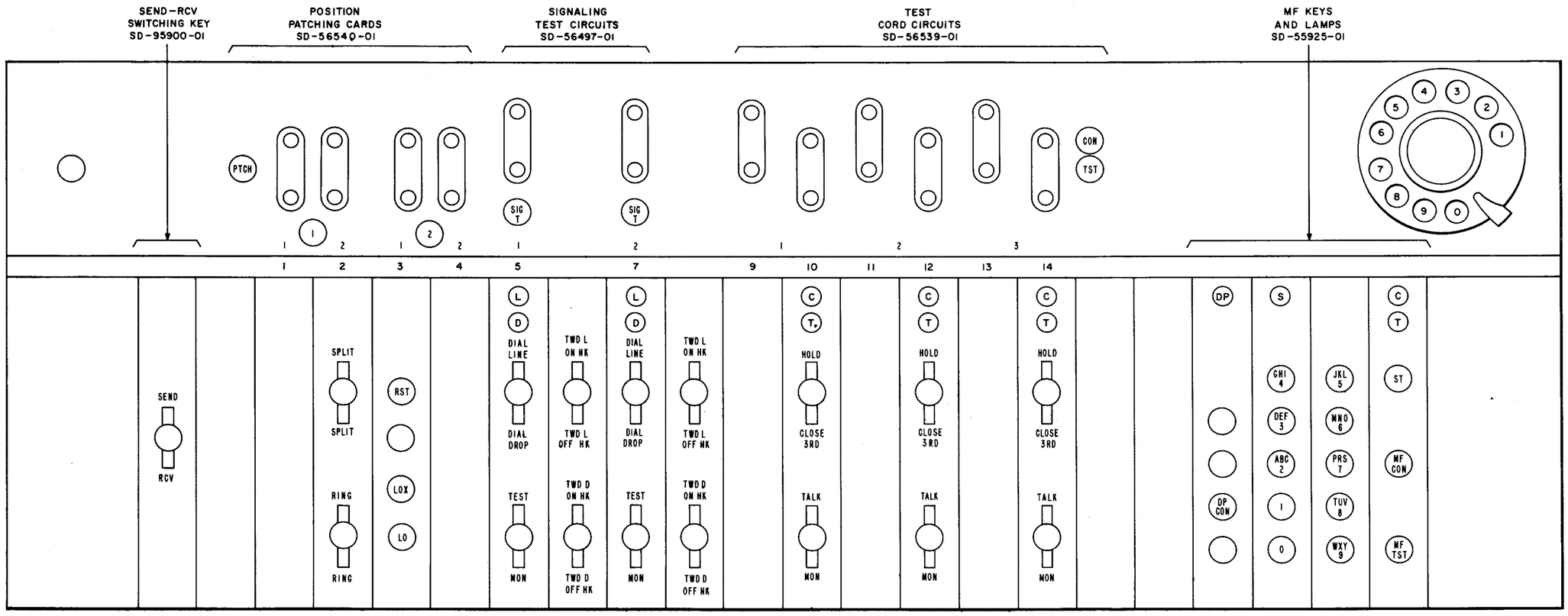


Fig. 5 — Keyshelf and Plugshelf Equipment — 17E Testboard

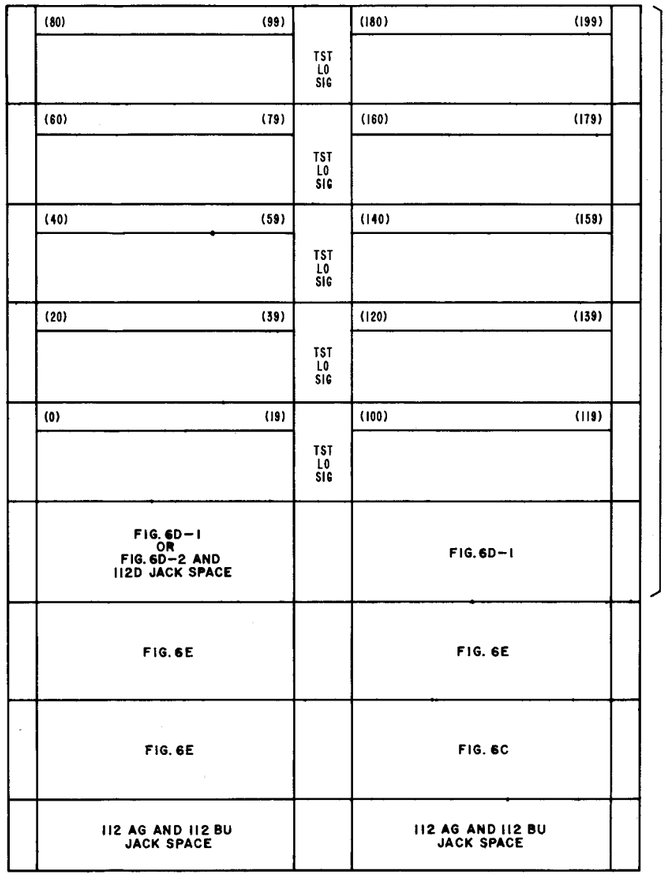


FIG. 6A- TEST BAY JACK FIELD

FIG. 6B (10)

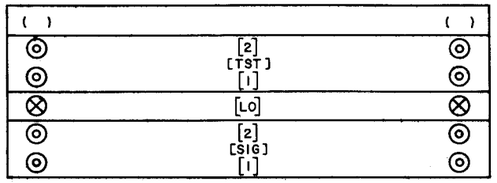


FIG. 6B- TESTING JACKS AND LOCKOUT LAMPS FOR TRK AND LINE CIRCUITS - SD-56540-01, FIG. 1.

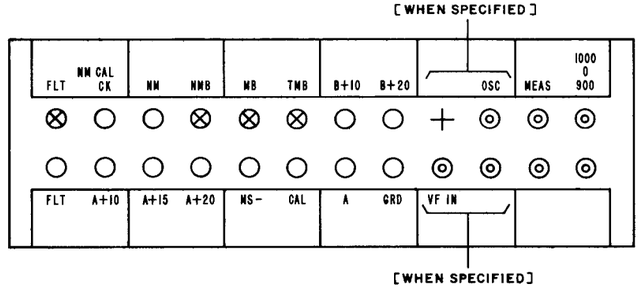


FIG. 6C - TRANSMISSION AND NOISE MEASURING PANEL - SD-95900-01, FIG. 14, 15, 17, 18, 19, 21, 22, 60, 66, 68 & ZZ OPTION, 69.

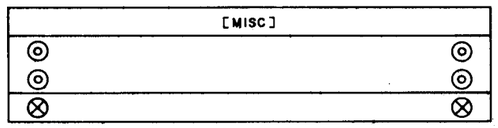


FIG. 6D- MISCELLANEOUS JACK PANELS FOR COMM TRK, OR COMM DIAL TRK, OR 101-TYPE TRK, OR SSI TEL OW, OR POSITION EXT (PANEL 2 ONLY) - SD-56540-01, FIG. 2, 3, 4, 5, 6, 8 & X OPTION.

LEGEND:
- JACK
- KEY
- LAMP

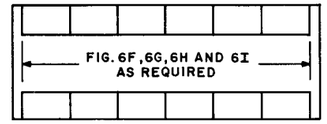


FIG. 6E- MISCELLANEOUS JACK PANEL (FIG. 6D.)

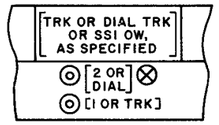


FIG. 6F- JACKS AND ANSWERING LAMP FOR COMM TRK, OR COMM DIAL TRK, OR 101-TYPE TRK, OR SSI TEL OW.

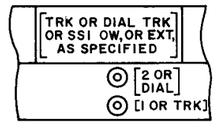


FIG. 6G- JACKS FOR COMM TRK, OR COMM DIAL TRK, OR 101-TYPE TRK, OR SSI TEL OW, OR POSITION EXT.

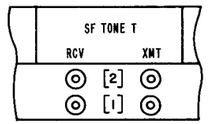


FIG. 6H- SINGLE FREQUENCY TONE TEST TRUNK JACKS.

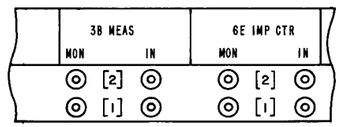


FIG. 6I- JACKS FOR 3B NMS AND 6E IMPULSE COUNTER.

Fig. 6 — Test Bay Jack Field — 17E Testboard

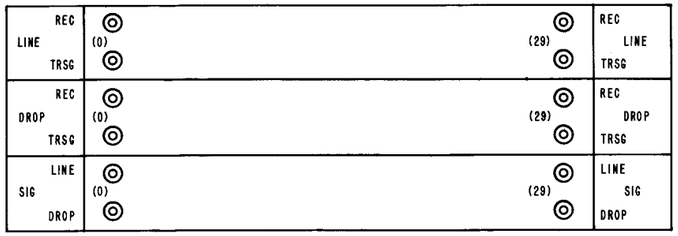


FIG. 7A-6-JACK PATCH JACK PANEL (FIG. 8A)

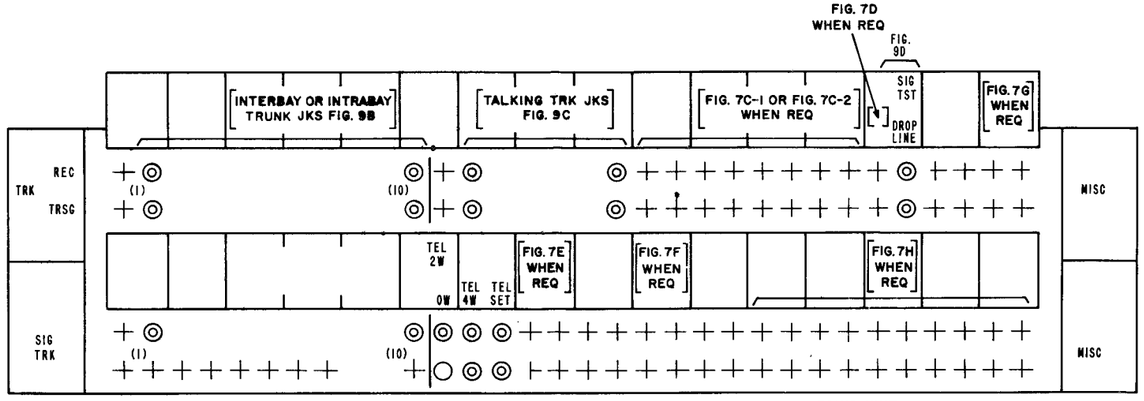
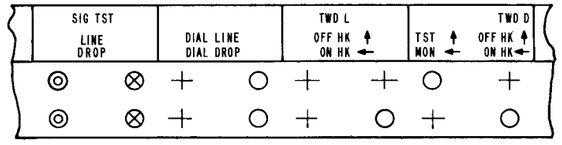
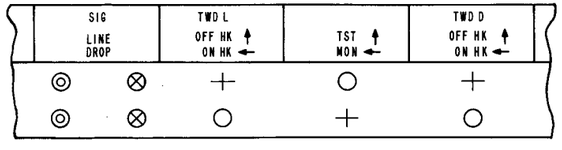


FIG. 7B-INTERBAY OR INTRABAY TRUNK JACKS AND MISCELLANEOUS EQUIPMENT
PANEL-SD-68327-01, FIG. 3 OR 4, 10 AND 16;
SD-68330-01, FIG. 2 AND C.



1. SD-56497-01 FIG. 5



2. SD-56497-01 FIG. 7
FIG. 7C SIGNALING TEST CIRCUIT EQUIPMENT

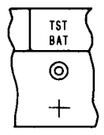


FIG. 7D-TEST. BATTERY JACK-SD-68327-01, FIG. 15

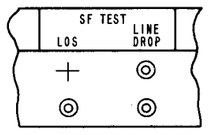


FIG. 7E-SINGLE FREQUENCY TEST JACKS - SD-68327-01, FIG. 21

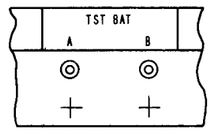


FIG. 7F-2B TYPE SIGNALING TEST SET BATTERY SUPPLY JACKS - SD-68327-01, FIG. 20

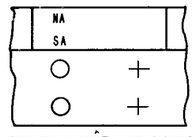


FIG. 7G-NIGHT AND SUPERVISORY ALARM KEYS SD-55039-01, FIG. 3,10

LEGEND:
- JACKS
- KEYS
- LAMPS

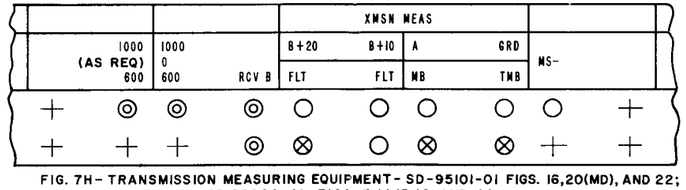


FIG. 7H-TRANSMISSION MEASURING EQUIPMENT-SD-95101-01 FIGS. 16,20(MD), AND 22;
SD 95900-01, FIGS. 3,14,15,18, AND 22

Fig. 7 — Circuit Patch Bay Jack Panels — 17E Testboard

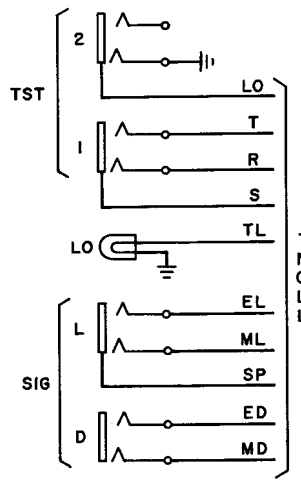


FIG. 8A TESTING JACKS AND LOCKOUT LAMPS FOR TRK AND LINE CIRCUITS SD-56540-01, FIG. 1

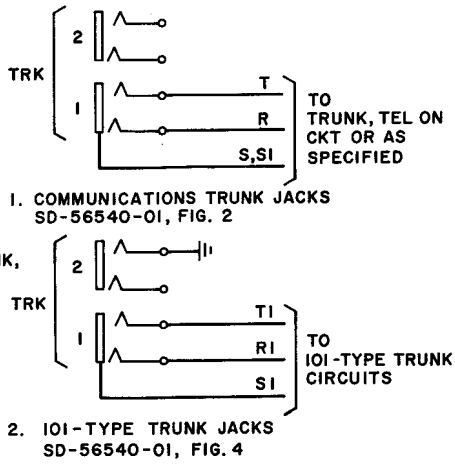


FIG. 8B TRUNK JACK CIRCUITS

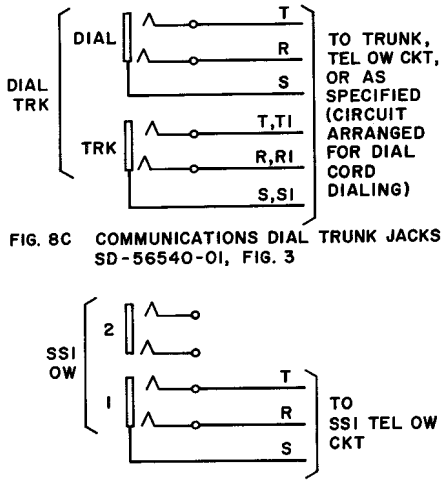


FIG. 8C COMMUNICATIONS DIAL TRUNK JACKS SD-56540-01, FIG. 3

FIG. 8D SSI TELEPHONE ORDER WIRE JACKS SD-56540-01, FIG. 6

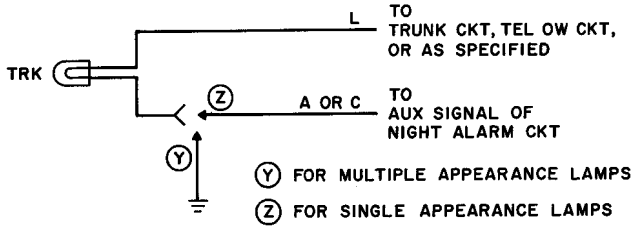


FIG. 8E ANSWERING LAMP SD-56540-01, FIG. 5

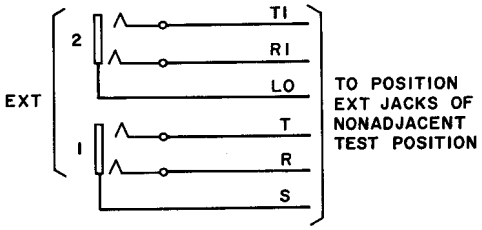


FIG. 8F POSITION EXTENSION JACKS SD-56540-01, FIG. 8

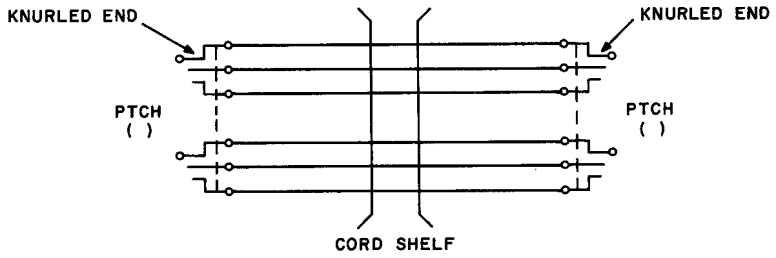


FIG. 8G POSITION PATCHING CORD SD-56540-01, FIG. 7

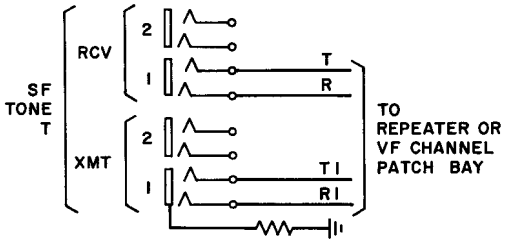


FIG. 8H SINGLE FREQUENCY TONE TEST TRUNK JACKS SD-56540-01, FIG. 9

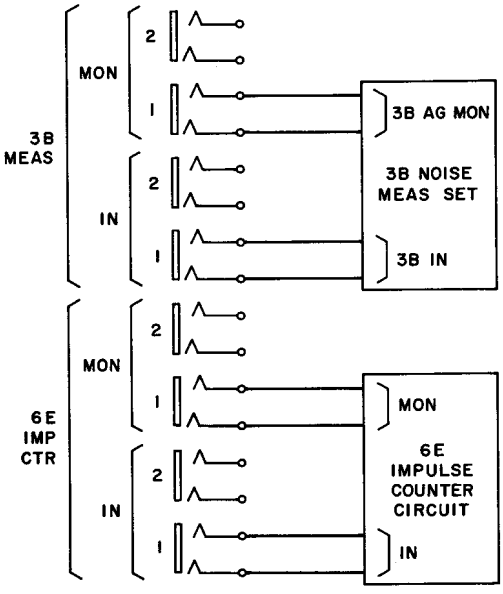


FIG. 8I JACKS FOR 6D NOISE MEASURING CIRCUIT SD-56540-01, FIG. 10

Fig. 8 — Test Bay Jack Circuits and Position Patching Cord — 17E Testboard

6. CIRCUIT PATCH BAY — MISCELLANEOUS JACK AND LAMP CIRCUITS

A. Interbay or Intrabay Jack Circuit

6.01 These jacks (Fig. 9B) are provided to permit patching between bays of the circuit patch bay, as shown in typical arrangement in Fig. 12C for patching between the circuit patch bay and the tandem patch trunk bay, as shown in typical arrangement in Fig. 12B. In each arrangement, connection between these jacks and the circuit patch bay patch jack circuit is made with a twin-plug, 6-conductor patch cord and a single plug, 3-conductor patch cord.

B. Talking Trunk Patch Jack and Lamp Circuit

6.02 These jacks and lamps terminate incoming and 2-way talking trunks appearing in the circuit patch bay, thereby enabling communication with other testboard locations (Fig. 9C). When desired, multipling of the circuit may be arranged.

C. Signaling Test Jack Circuit

6.03 These jacks (Fig. 9D) provide for patching trunk signaling leads to the signaling test circuit for B-type composite (CX) or single frequency signaling, or for extending the trunk signaling leads to the test bay when the signaling test circuit is located in that bay.

D. Test Battery Jack Circuit

6.04 This jack (Fig. 9E) provides —48 volts and ground, respectively, on the jack ring and sleeve for such use as may be required in testboard functions.

E. Single Frequency Signal Test Jack Circuit

6.05 The SF TST LINE and DROP jacks provide the means for maintaining an ***off-hook*** condition toward the line during functional or transmission tests (Fig. 9F). This ***off-hook*** condition prevents loss of test connections or the transmission of pulse disconnect signals being transmitted toward the receiving end during variable frequency tests on single frequency signaling systems. The ***off-hook*** condition is accomplished by patching the SF TST LINE and DROP jacks to the SIG L or SIG D jacks of the circuit under test, thereby grounding the E lead toward the drop, while the continuity of the M lead is maintained to hold the connection throughout the transmission test.

6.06 The SF TST LOS jack disables the signaling equipment when a test is being made on a line or trunk where it is not desired to hold the switches on the drop side of the signaling unit. This is done by patching between the SF TST LOS jack and the SIG L jack associated with the trunk to be disabled. This patch applies battery to the M lead toward the line or equipment to remove the signaling tone, and to open the E lead toward the trunk or drop. The opened E lead prevents seizure of switching equipment during a transmission test.

F. 2B-Type Signaling Test Set Battery Supply Test Jack Circuit

6.07 These jacks (Fig. 9G) provide access to the office —48 and +130 volt signaling batteries for the 2B-type signaling test set. A filter is normally supplied as shown with these jacks to prevent battery supply disturbances from affecting the test set performance.

7. CIRCUIT PATCH BAY — MISCELLANEOUS EQUIPMENT

A. Night and Supervisory Alarm Circuit (SD-55039-01)

7.01 This circuit provides means for permitting an incoming signal on a testboard telephone circuit to enable visual and audible night or supervisory alarms when the testboard is unattended. To enable the incoming call to the alarm devices, the appropriate NA or SA key, located in the miscellaneous jack field of the circuit patch bay, is operated to the "on" position.

B. Telephone Circuit (SD-68330-01)

7.02 This circuit provides means for communicating on telephone order-wire circuits, 2-wire communication circuits, network trunk circuits, and auxiliary circuits at the circuit

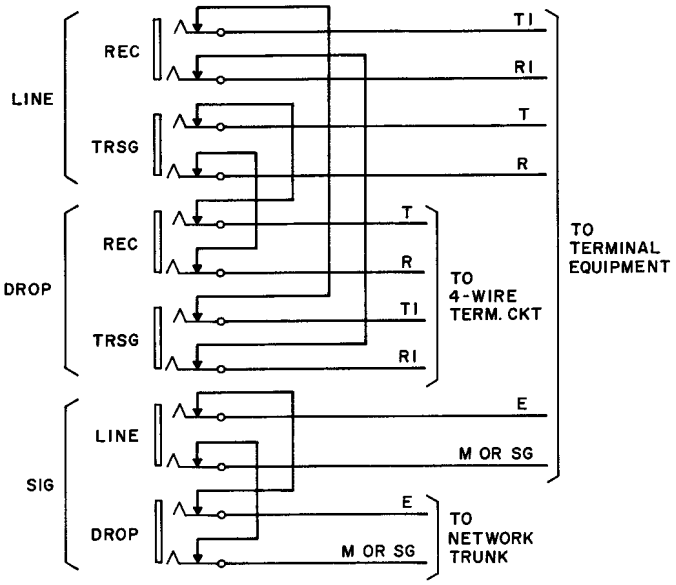


FIG. 9A 6-JACK PATCH JACK PANEL FOR NETWORK TRUNKS WITH COMPOSITE OR SF SIGNALING SD-68327-01, FIG. 19

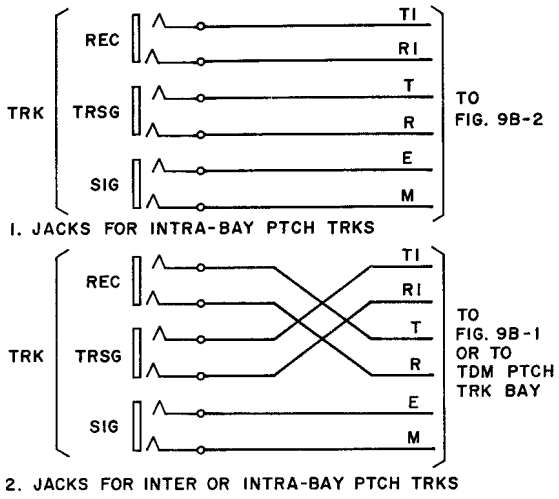


FIG. 9B JACKS FOR INTER OR INTRA-BAY PATCH TRUNKS SD-68327-01, FIG. 3 & 4

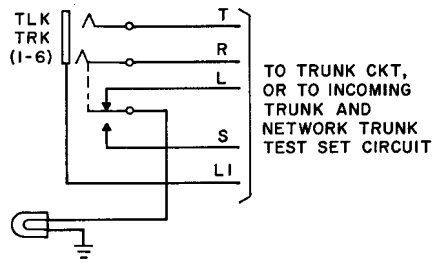


FIG. 9C TALKING TRUNK PATCH JACK AND LAMP CIRCUIT SD-68327-01, FIG. 10

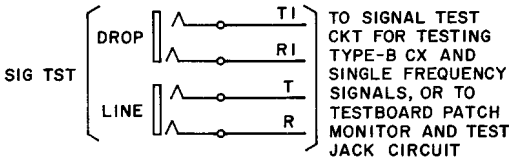


FIG. 9D SIGNALING TEST JACK CIRCUIT SD-68327-01, FIG. 16

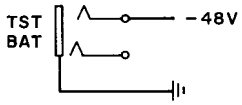


FIG. 9E TEST BATTERY JACK CIRCUIT SD-68327-01, FIG. 15

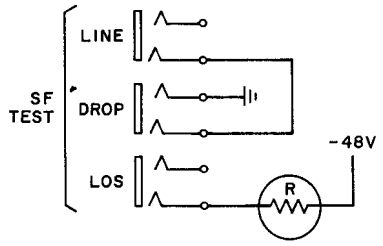


FIG. 9F SINGLE FREQUENCY TEST JACKS SD-68327-01, FIG. 21

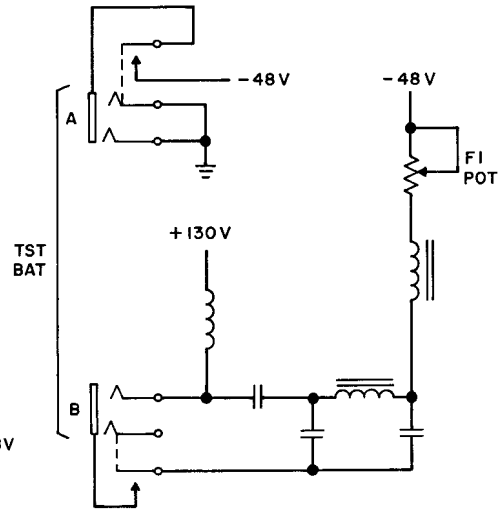


FIG. 9G 2B TYPE SIGNALING TEST SET BATTERY SUPPLY TEST CIRCUIT SD-68327-01, FIG. 20

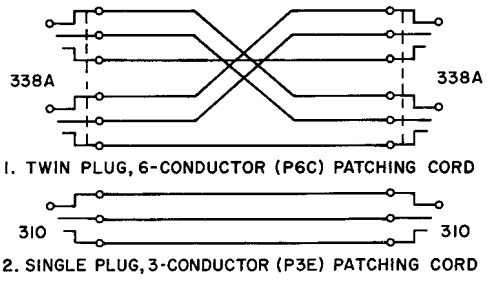


FIG. 9H PATCHING CORDS SD-68327-01, FIG. 11 & 12

Fig. 9 — Circuit Patch Bay Jack Circuits and Patching Cords — 17E Testboard

patch bay. The telephone circuit connecting jacks are mounted in the circuit patch bay miscellaneous jack field. The telephone set relay equipment is also installed in the circuit patch bay. The following circuit functions are provided with the auxiliary telephone set and associated jack circuit:

(a) ***Talking on TEL 2W Jack:*** To establish a connection for talking on communication circuits, the communication circuit jack is patched to the TEL 2W jack and an operator telephone set is connected to the TEL SET jacks.

(b) ***Talking on TEL 4W Jacks:*** To establish a connection on 4-wire circuits, a patch is made between the TEL 4W jack and the LINE REC and TRSG jacks of the circuit patch bay 6-jack patch panel when communicating toward a line. For communicating toward the drop, the TEL 4W jack is patched to the DROP REC and TRSG jacks of the 6-jack patch panel. A telephone set is patched to the 4-wire TEL jacks for these functions.

(c) ***DC Signaling on Order-Wire Circuits:*** To signal on dc selective telephone order-wire circuits, the TEL 2W jack must be patched to the order-wire circuit jack, with the OW key (Fig. 7B) being used for pulsing.

8. TEST BAY LOWER UNIT J63531A

A. General

8.01 The test bay plugshelf (Fig. 5) is equipped with 12 twin-plug cords and a dial. These cords and their functions are as follows:

(a) ***TST/CON, 1, 2, 3:*** These six cords, arranged as three cord pairs numbered 1, 2, and 3, are associated with the three test bay cord circuits. These cords are referred to as communication cords and are used in performing various test functions.

(b) ***PTCH, 1, 2:*** Both ends of two patching cords (4 plugs) appear on the plugshelf (Fig. 8G). These twin-plug cords are used for patching between the testboard circuits or, in conjunction with position extension jacks, to extend the TST or SIG jacks of one testboard position to a nonadjacent position.

(c) ***SIG T, 1, 2:*** Each cord is associated with one of the two signaling test circuits of the test bay and is used for patching trunk and circuit jacks to the associated signaling test circuit for testing functions.

The plugshelf-mounted dial is used for dialing on a communication CON cord and may also be associated with the SS1 order wire or a signal test cord of the position circuit.

8.02 The test bay keyshelf mounts keys and lamps associated with the cord circuits, signaling test circuits, MF keyset, transmission measuring circuit, and the position, telephone, and dial circuit of the 17E testboard. The specific functions of the keyshelf keys and lamps are discussed in conjunction with the description of the associated equipment.

8.03 Three communication cord circuits are provided at each test bay for use with the position, telephone, and dial circuit, and the MF keyset circuit in performing talking, monitoring, testing, and keypulsing functions. Each cord circuit is equipped with a pair of plugshelf-mounted, twin-plug communication cords designated TST (test) and CON (connect). The cord circuit control keys, designated TALK-MON and HOLD-CLOSE 3RD, are keyshelf mounted. C and T supervisory lamps indicate connection of the communication cords to trunks and circuits on either CON or TST cords, respectively.

8.04 Each testboard position is equipped with a position, telephone, and dial circuit. This circuit is used in conjunction with the cord circuits and MF keyset circuit in performing talking, monitoring, testing, and keypulsing functions at the testboard. The control keys for this circuit are keyshelf-mounted and are designated SPLIT; RING; RST (restore); LO (lockout), and LOX (lockout across office); and DP CON (dial pulse connect). A DP lamp, when lighted, indicates connection of the position, telephone, and dial circuit for dial pulsing.

8.05 Two signaling test sets are provided on each testboard position for monitoring and testing trunks equipped with E and M leads. A dial is provided at the testboard position for use in association with the signaling test circuits to permit dialing on those circuits at a testboard which require dial pulsing. The dial supervisory DP lamp is located on the test bay key shelf, and the dial is mounted on the test bay plug shelf. The signaling test (SIG T) cords of the signaling test circuit are located on the test bay plug shelf.

8.06 One (MF) keyset is provided at each testboard position for association with the position circuit for performing keypulsing. The MF keys are located on the test bay keyshelf, as are the position keys required for associating the MF keyset with the circuits and trunks connected by the TST or CON cords. SEND lamp S on the keyshelf lights when the keyset is connected to a circuit which has an MF receiver associated with it.

B. Test Cord Circuits (SD-56539-01)

8.07 Each testboard position is equipped with three cord circuits which are used to connect jack circuits appearing in the testboard jack fields to the position, telephone, and dial circuit of the testboard for testing and communication functions by the attendant. The control keys and supervisory lamps for the cord circuits are located on the test bay keyshelf.

8.08 Each cord circuit is equipped with a pair of twin-plug, 6-conductor communication cords for use in the various cord circuit functions. These cords are identified as TST and CON, with the three pairs of cords being located in the test bay plug-shelf. The TST cords are used for testing line link pulsing circuits and private network-type trunks which may require lockout and restore control as well as other testing functions. The CON cords are used for general communication purposes on order wire, 101-type trunks, local central office trunks, etc. Either communication cord may also be used for connecting to a transmission measuring system.

8.09 When the cord circuit TALK key is operated after the CLOSE 3RD key has been previously operated, functions of talking, lockout and restore, keypulsing, splitting, and ringing may be performed on those circuits with which the TST cord is associated. With only the TALK key operated, functions of busy tests, lockout and restore, splitting, and monitoring may be performed. Operation of the MON key only, with DP CON key (Fig. 5) unoperated, permits TST cord monitoring. When the CON cord is being used, operation of the TALK key enables performance of busy tests, talking, keypulsing, ringing, splitting, and dialing functions on those circuits to which the CON cord is connected. Monitoring with a CON cord requires operation of an associated MON key, with the DP CON key being unoperated.

8.10 Various arrangements provided by the cord circuit include:

(a) Connecting jack-ended trunks and/or lines together.

(b) Connecting jack-ended trunks to the position, telephone, and dial circuit for talking, monitoring, ringing, dialing, or keypulsing functions.

(c) Seizing trunks for outgoing calls, and holding the trunks until the cord is taken down.

(d) Answering incoming calls and receiving supervision from a trunk, either directly or by way of a position circuit.

(e) Connecting trunks or circuits under test to the transmission and noise measuring circuit.

(f) Connecting one cord at a time to the position, telephone, and dial circuit under control of the cord circuit TALK key.

(g) Talking on two cords at the same time by operation of the TALK key of one, and the MON and CLOSE 3RD keys of the other. With such an arrangement, the dialing, keypulsing, ringing, and splitting keys are effective only on that cord with the TALK key operated.

(h) Holding a connection into the position and dial circuit or the keyset circuit in case the TALK key is restored while dialing or key pulsing is in progress.

8.11 The various testboard functions requiring use of the cord circuits are as follows:

(a) ***Patching:*** With the keys of all the position cord circuits in the normal (center) position, the associated leads of each cord circuit TST cord and CON cord, except the bottom sleeves, are directly interconnected through the cord circuit, permitting any two jack-ended circuits to be patched together through the cord circuit. While in this condition, the cord circuit supervisory lamps are arranged to receive nonlocked-in signals from either cord connection via the lower sleeve leads.

(b) ***Holding:*** Operation of the HOLD-CLOSE 3RD key to the HOLD position splits the interconnected tip and ring leads of the TST and CON cords and places a resistor-capacitor termination across the bottom tip and ring leads of each cord. This operation also connects ground to the night alarm circuit, permitting operation of the circuit in case of recall, and applies battery to the sleeves of the TST and CON cords to make busy any circuit to which the cords are patched. The cord circuit supervisory lamps are arranged to receive nonlocked-in signals from either cord connection. When it is desired to talk on a "held" circuit while still maintaining the hold, the TALK-MON key of the same holding cord circuit is operated to TALK.

(c) ***Supervision:*** With a cord circuit key in the normal position, or operated to both MON and CLOSE 3RD, or operated to HOLD alone, the CON cord bottom sleeve is connected to battery through a night alarm relay and associated supervisory lamps. When a low-sleeve (80 ohms to ground) condition exists on a jack sleeve to which the CON cord is connected, the night alarm relay operates under control of the night alarm key and the associated supervisory lamp lights. If the HOLD-CLOSE 3RD key is in the HOLD position, the night alarm circuit will be activated. Operation of the TALK key connects the cord sleeves and the lamp leads into the position, telephone, and dial circuit, where, when a low-sleeve condition exists on a cord-connected jack, relay operation occurs which lights the associated cord supervisory lamp.

(d) ***Talking, Talking on Two Cords, Monitoring:*** These functions involving the cord circuits are made in conjunction with the position, telephone, and dial circuit and are described in 8.14 (a), (b), and (c).

C. Position, Telephone, and Dial Circuit (SD-56542-01)

8.12 A position, telephone, and dial circuit is provided in each testboard position and is located in the test bay lower unit. This circuit is used in conjunction with the three cord circuits to perform talking, monitoring, and testing on circuits and trunks appearing on jacks in the testboard position. This circuit may also be used in conjunction with an MF keyset circuit to enable ringing, MF keypulsing, busy tests, and dialing on circuits to which the cord circuit TST or CON cords may be connected. The circuit control keys are mounted in the keyshelf.

8.13 Various arrangements provided by the position, telephone, and dial circuit include:

(a) Connecting the cord circuits to the telephone set.

(b) Connecting the communication cords, one at a time, to the position and dial or keyset circuits.

(c) Ringing and busy testing on either communication cord.

(d) Splitting one pair of normally interconnected communication cords, terminating one of the two cords, but permitting talking or ringing functions to be performed on the other nonterminated cord.

(e) Being held with the position circuit connected to the cord by the dial or associated keyset circuit if the TALK key of the cord is restored prior to completion of dialing or keypulsing.

(f) Providing high impedance monitoring.

(g) Talking on two cords, as covered in 8.10(g).

(h) Providing lockout, lockout across office, and restore functions when the TST cord is associated with a line link pulsing or private network trunk circuit.

(i) Dialing with the CON cord when the associated trunk is arranged for dial-cord dialing.

(j) Indicating to the keyset circuit when the associated trunk circuit is ready for pulsing.

8.14 ***Functions:*** The various testboard functions requiring use of the position, telephone, and dial circuit include:

(a) ***Talking:*** Operation of a cord circuit TALK and CLOSE 3RD keys of a TST cord or just the TALK key of a CON cord circuit connects the tip, ring, sleeve, and lamp leads of the cord circuit to the position, telephone, and dial circuit. This initiates a relay sequence within that circuit which makes the MON and TALK operations of the other cord circuits in the test position ineffective, while permitting ringing, dialing, keypulsing, or splitting, as appropriate, on the cords of the circuit with the operated TALK key. Circuit design is such that if the TALK keys of more than one cord circuit are operated concurrently, only the first key (lower-numbered) operated is effective. Should the TALK key be restored to normal during but prior to completion of the dialing or keypulsing function, the circuit remains locked-up until completion of the function or if the cord is disconnected. With the TALK key operated, the cord circuit holding feature is ineffective.

(b) ***Talking On Two Cords:*** With the TALK key of one cord circuit and the MON and CLOSE 3RD keys of a higher-numbered cord circuit operated at the same time, the position, telephone, and dial circuit connects the two cord circuits in such manner as to permit talking through both cord circuits simultaneously. Functions of ringing, dialing, keypulsing, and splitting can be performed, however, only on the cord circuit with the operated TALK key.

(c) ***Monitoring:*** When a cord circuit MON key is operated, the position, telephone, and dial circuit connects the tip and ring leads of the associated plugged-up trunk circuit to the telephone set through the monitor amplifier while also opening the cord sleeve leads to permit circuit monitoring without making the circuit appear busy. When CON cord monitoring is used, the monitored circuit can be made busy during monitoring, if desired, by operation of the CLOSE 3RD key, which closes the open sleeve lead. Should a TALK key of a second cord circuit now be operated, the telephone set will be disconnected from the monitored circuit and connected to the circuit now conditioned for talking. The circuits are now interconnected for talking on both cords. Monitoring on a trunk may also be accomplished by operating only the MON and CLOSE 3RD keys of the associated cord circuit. This differs from MON key monitoring only in that operation of the MON key of a second cord circuit will not disable the monitoring function of the first cord circuit.

(d) ***Splitting:*** Operation of the SPLIT key of the position, telephone, and dial circuit to TST or CON splits the opposite CON or TST cord from the circuit and places a resistor-capacitor termination across the tip and ring leads of the split cord. The nonsplit cord remains connected to the telephone set and may be used for ringing.

(e) ***Supervision:*** When a trunk on which a call is received is answered or made busy, the supervisory lamp for the plugged-in cord will be lighted by a signal from the position, telephone, and dial circuit.

(f) ***Ringing:*** When the RING key of the position, telephone, and dial circuit is operated to TST or CON, 48-volt battery is applied to the lower tip of the connected cord circuit TST or CON cord, respectively, enabling the ringing function when the TALK key is operated.

(g) ***Connection to Telephone Set:*** When a TST or CON cord is connected to a jack-ended circuit, the cord tip and ring will be

connected to the telephone set of the position when the position controls are operated.

(h) ***Busy Test:*** When a cord circuit TALK key is operated, the touching of an associated cord lower plug tip to the lower jack sleeve of a busy trunk produces a clicking sound in the telephone circuit headset.

(i) ***Keypulsing:*** With a cord circuit TST or CON cord connected and the associated TALK key operated, the operation of an MF TST or MF CON key will connect the MF keyset to the position, telephone, and dial circuit, with the associated cord circuit C or T lamp or the DROP lamp of the SIG T cord lighting if the keyset has been connected to the line. Pulsing should not start until the amber sender (S) lamp on the keyshelf is lighted. The keypulsing circuits are held in the position, telephone, and dial circuit until keypulsing is completed, even though the TALK key is restored to normal prior to completion of the keypulsing function. This hold function is accomplished by a signal to the position, telephone, and dial circuit from the MF keyset. Disconnection of the cord during keypulsing will release the keyset dial circuit.

(j) ***Dialing on CON Cord:*** When dialing on the CON cord is desired, the position DP CON key must be operated. With DP CON operated, the DP lamp will light, indicating that the dial is connected and dialing may be accomplished. The position circuit prevents association of the MF keyset with a cord circuit during dialing, and also locks up the dial circuit to maintain circuit connection in case the associated TALK key should be released prior to completion of the dialing function. Following completion of dialing, operation of the ST key of the keyset will disconnect the dial circuit, extinguish the DP lamp, and reconnect the MF keyset circuit for service when desired. These release functions may also be accomplished by the disconnection of the CON cord.

(k) ***Transmission Measuring:*** With either a TST or CON cord connected to a circuit, the other cord may be connected to the transmission measuring jack (MEAS). When the connected circuit is a 101-type trunk, release of the TALK key of the cord circuit will condition the transmission measuring circuit for measuring on 101-type trunks. Only the MON key of the connected cord circuit should be operated to monitor on the connection. The bridging effect of the monitor circuit is negligible.

(l) ***Lockout and Restore:*** Whenever a cord circuit TST cord is connected to a line link pulsing or private network trunk circuit and the TALK key is operated, the connected circuit may be locked out directly or indirectly by operation of the position LO or LOX keys, respectively. Lockout is maintained after release of the LO or LOX keys until restoral is effected by operation of the position RST key.

Note: After lockout a circuit may still be seized at the distant end unless that end has also been made busy.

D. MF Keyset Circuit (SD-55925-01)

8.15 The MF keyset circuit is used to establish test connections over outgoing MF keypulsing trunk circuits or outgoing test trunks. The sequence of operations when keypulsing into a trunk is as given below:

(1) A TST or CON cord is connected to the trunk circuit over which keypulsing is desired, and the TALK-MON key of the cord circuit is operated to TALK. When a TST cord is used, the CLOSE 3RD key should also be operated. In testing toward network trunk drops, the SIG T cord should be connected to the SIG jacks.

(2) An MF TST or MF CON key, as required by the cord in use, is operated to associate the keyset with the line and light the TST or CON lamp.

(3) An outgoing sender will be selected by the central office equipment in which the call originates. When an MF receiver has been attached, the sender (S) lamp or the DROP lamp of the SIG TST circuit will light.

(4) The testboard attendant keypulses the required digits, which will be registered in the sender.

(5) After the last digit is pulsed, the ST key is operated, releasing the MF keyset.

(6) If, while keypulsing, trouble occurs or an error is made, the keyset circuit can be returned to normal by pulling down the cord associated with the keyset.

E. Signaling Test Circuit SD-56497-01

8.16 Signaling test circuits are provided in the testboard position for use in monitoring and testing of signaling circuits having E and M leads, respectively, for receiving and sending. Two signaling test circuits are provided in the test bay, while, as an option, one may also be provided in the circuit patch bay. One dial is used jointly by the two test bay mounted circuits, with a separate dial being provided in the circuit patch bay whenever a signaling test circuit is provided in that bay.

8.17 Two SIG T cords are mounted in the test bay plugshelf for the two signaling test circuits mounted in that bay. Separate control keys are mounted in the testbay keyshelf for each of the two signaling circuits. A MON-TST key allows monitoring and testing of the signaling circuits to which the associated SIG T cord is connected. Line and drop supervisory lamps which are mounted with the associated keys in the keyboard, provide for observation of the start and stop of dial signals, of ***off-hook*** and ***on-hook*** conditions, and of "hits" on the line, which affect the signaling circuit.

8.18 In performing testing and monitoring with the testbay mounted signaling test circuits, a SIG T cord is patched to the supervisory line and drop jacks of the trunk or circuit under test. Operation of the DIAL LINE or DIAL DROP key connects the position dial circuit to the SIG T cord of the associated signaling test circuit. Monitoring and testing functions are performed as covered in 8.20 and 8.21.

8.19 In performing testing, monitoring, and dialing functions with a circuit patch bay signaling test circuit, if provided, a patch cord is used to connect the line and drop jacks of the signaling test circuit equipment of the circuit patch bay miscellaneous panel (Fig. 8C, 8D) to the signaling line and drop jacks of the trunk or circuit under test. Functions of the TST-MON and DIAL LINE and DIAL DROP keys (if provided), and the line and drop supervisory lamps are the same as in the test bay equipment (8.17 and 8.18).

8.20 The signaling test circuits may be used to monitor on E and M signaling leads without taking the trunk or circuit out of service. For this purpose, the SIG T cord (test bay circuits), knurled end up, is plugged into the SIG jacks in the test bay jack field, or a circuit patch cord is connected between the signaling test circuit line and drop jacks (circuit patch bay circuits) and the line and drop jacks of the trunk or circuit to be monitored. The TST-MON key is then operated to MON. An ***on-hook*** or ***off-hook*** condition on either the E or M lead being monitored is indicated by a lighted or unlighted keyshelf line, or drop supervisory lamp. During an idle condition on the trunk (with ***on-hook*** signals being present on both the E and M leads of the trunk), these supervisory lamps will be lighted. If an ***off-hook*** condition exists on the E or M lead, the line or drop lamp will be extinguished. Dial pulses may also be observed on the supervisory lamps.

8.21 In testing with the signaling test circuits, connection is made between these circuits and the line and drop jacks of the circuits or trunks to be tested by use of either a SIG T cord or a circuit patch cord, as appropriate (8.20). The trunk or circuit to be tested is then made busy at both ends, and the appropriate TST-MON key is operated to TST, causing the E and M leads between the line and drop circuits to split when used at the test bay. The TWD L and TWD D keys are operated, in turn, to the OFF-HK and ON-HK position, thereby applying an ***off-hook*** or ***on-hook*** test condition toward the drop or line, as selected, while a holding condition is applied in the opposite direction. For each direction selected, a lighted supervisory lamp indicates an ***on-hook*** condition, while an unlighted lamp indicates the ***off-hook*** condition.

9. TRANSMISSION AND NOISE MEASURING ARRANGEMENTS

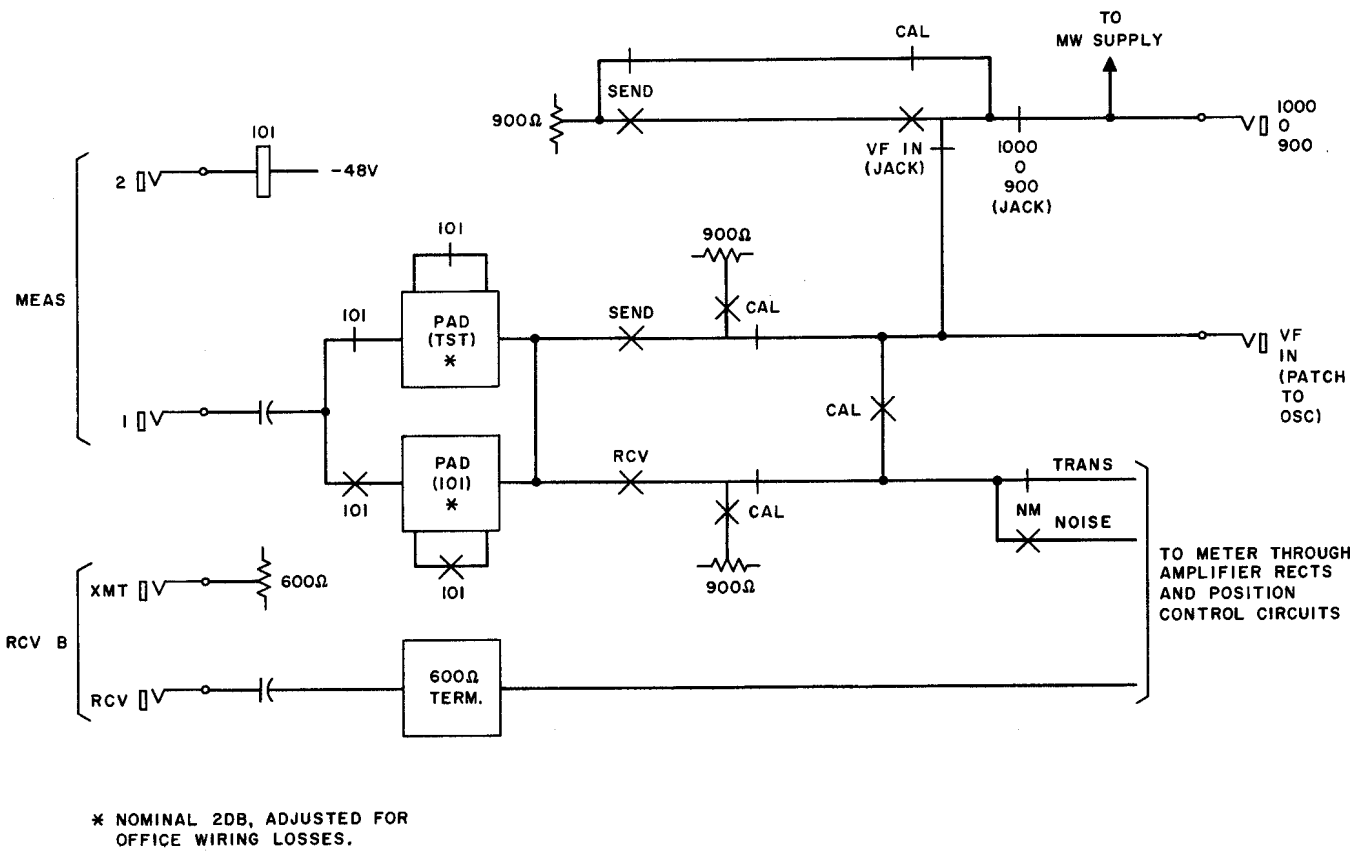
A. Common Systems Transmission and Noise Measuring Circuit (SD-95900-01)

9.01 The common systems combined transmission and noise measuring circuit is used with the 17E testboard. The jacks, keys, and lamps associated with this circuit are located on the transmission and noise measuring panel of the test bay (Fig. 7B) and as required, also on the miscellaneous panel of the circuit patch bay. Additionally, a SEND-RCV key (Fig. 5) is located on the test bay keyshelf. The circuit patch bay transmission measuring equipment (Fig. 7H) is provided when transmission measurements on 600-ohm circuits are required. A simplified single line diagram of the transmission and noise measuring circuits is shown in Fig. 10.

9.02 Adjustable pads are provided in the MEAS jack input (Fig. 10) for compensating for office wiring losses. When connection is made to a 101-type trunk, ground is automatically applied through the MEAS 2 jack to operate relay 101, thereby applying 101-type trunk signals through the 101 pad to the TMS.

9.03 The keys and lamps required by this circuit and their functions are as follows (Fig. 5, 6C, and 7H):

(a) ***SEND-RCV:*** Switches the measuring set circuitry for sending or receiving functions, as required. In the SEND position, the output of the internal MW supply is applied through the MEAS jack to the connected trunk or circuit, except when patching has been made between the OSC and VF IN jacks. Where such patching is made, the output of the VF oscillator is applied through



* NOMINAL 2DB, ADJUSTED FOR OFFICE WIRING LOSSES.

Fig. 10 — Simplified Diagram of Transmission and Noise Measuring Circuit (Single Line Per Pair) — 17E Testboard

the panel circuitry and SEND-RCV key to the MEAS jack for application to the connected trunk or circuit. The MW output is a 1000-cycle tone at 0 dbm and 900 ohms, while the VF oscillator provides a variable frequency, 900-ohm source. In the RCV position, incoming signals present at the MEAS jack are connected through the panel circuitry to the NM key for application to the required transmission or noise measuring amplifier-rectifiers. The output of the amplifier-rectifiers is applied to the associated meter for obtaining a transmission or noise level indication.

(b) ***NM:*** When operated, this key switches the measuring set circuitry from the normal transmission measuring condition to the noise measuring condition.

(c) ***CAL:*** Operation of this key permits calibration of (1) the TMS meter, by connecting the meter to the reference MW supply when the VF IN and the 1000-0-900 jacks are not plugged up (Fig. 10), and (2) the VF oscillator, when the oscillator is patched to the VF IN jack. The VF oscillator is calibrated by the TMS meter after the TMS meter has been calibrated by the MW supply. The VF oscillator must be calibrated by the TMS meter whenever the output frequency is changed.

(d) ***MS—:*** When operated, this key switches the measuring set from the normally used meter to such auxiliary meters as may be provided the testboard position.

(e) ***NM CAL CK:*** This key permits calibration of the noise measuring circuit by applying a standard 1000-cycle signal at proper level to the associated amplifier-rectifier when operated.

(f) ***FLT:*** Operation of this key connects a filter into the transmission measuring circuit to eliminate interference which may be present on open-wire circuits during the measuring function. When operated, the FLT key also lights the FLT lamp.

(g) ***GRD:*** This key conditions the meter circuit for detecting unbalance to ground in the circuit under test, as indicated by a change in the meter reading when the key is operated.

(h) ***A, A+10, A+15, A+20, B+10, B+20:*** These keys select the corresponding A or B scale of the TMS meter for measuring input levels to the TMS. The A scale readings are in db above 1 milliwatt; the B scale readings are in db below 1 milliwatt. When all keys are normal, the B scale is used; if the B+10 or B+20 key is operated, 10 or 20 db, respectively, must be added to the B scale indication to obtain the correct input level measurement. Operation of the A, A+10, A+15, or A+20 key shifts the TMS indications to the meter A scale, with a 10-, 15-, or 20-db addition to the A scale reading being required to obtain the correct input level measurement. Transmission level measurements are in dbm, and will be in the A, B, B+10, or B+20 range. Noise level measurements are in dba, and will be in the A+10, A+15, or A+20 range. (The NM key must be operated for making noise measurements.)

(i) ***MB:*** Busy lamp for meter circuit. Lamp is lighted whenever the meter circuit is in use.

(j) ***TMB:*** Busy lamp for the transmission measuring circuit. The TMB lamp is lighted whenever this circuit is being used by another testboard position.

(k) ***NMB:*** Busy lamp for the noise measuring circuit. The NMB lamp is lighted whenever this circuit is being used by another testboard position.

9.04 The jacks provided for the common systems transmission and noise measuring circuit in a 17E test position are shown in Fig. 6C and 7H, and are as follows:

(a) ***MEAS:*** Connection jack in the test bay for all 900-ohm trunks or circuits upon which level measurements are to be made. The MEAS jack is used for both receiving and transmitting measurements.

(b) ***RCV B:*** Connection jack in the circuit patch bay to the measuring circuit for all 600-ohm circuits. This jack is used only for measuring received power levels.

(c) *OSC:* This jack provides an output appearance for the test bay VF oscillator. When used, patching is made from the OSC jack to the VF IN jack on the transmission and noise measuring panel of the test bay.

(d) *VF IN:* This jack provides the means for connecting the VF oscillator output into the transmission measuring equipment for testing purposes.

(e) *1000-0-900:* This jack in the test bay provides test bay access to the milliwatt supply which supplies a 1000-cycle 0-dbm, 900-ohm test tone source for use of the TMS (Fig. 10). This jack permits testing of the MW supply and provides a milliwatt source for general use when not required by the TMS. When the output of this jack is calibrated, a 22A milliwatt reference meter, or equivalent, must be used as the calibration standard.

(f) *1000-0-600:* This jack in the circuit patch bay provides a 1000-cycle, 0-dbm, 600-ohm test tone source for use with 600-ohm circuits appearing in the circuit patch bay.

(g) *1000-[ ]-600:* This jack in the circuit patch bay is similar to (f) above, except that the output level may be any standard value other than 0 dbm as required by local needs.

B. Variable Frequency Oscillator

9.05 The KS-19260, L1 or L3 variable frequency oscillator is associated with the common system transmission and noise measuring circuit for making variable frequency transmission level measurements on 900-ohm trunks and circuits. OSC jacks in the transmission and noise measuring panel (Fig. 6C) provide test bay appearances for the oscillator. In use, the OSC jacks are patched to the VF IN jacks of the same panel, thereby disconnecting the TMS from the milliwatt supply and connecting it to the VF oscillator (Fig. 10). When making level measurements using the oscillator, the oscillator must be calibrated each time the frequency is changed. This may be accomplished by operating the CAL key (Fig. 6C) and adjusting the oscillator for 1 milliwatt output as indicated by the TMS meter.

C. KS-7995 Meter

9.06 This meter is supplied when required for use with the common systems transmission and noise measuring circuit. The meter is connected to the TMS circuit instead of the projection meter by operation of the circuit keys, as covered in 9.03. The meter may be mounted on either bay.

D. 6D Noise Measuring Circuit

9.07 The 6D noise measuring circuit is discussed in 4G.

10. PATCHING ARRANGEMENTS

10.01 Patching cords are provided with the 17E testboard for use in testing, monitoring, and patching functions of the testboard. A typical arrangement of testing and patching jacks for a typical trunk appearing at the testboard is shown in Fig. 11, and is here patched for single frequency testing at the circuit patch bay (refer to appropriate BSP for testing procedure).

10.02 Drop patches may be made in the circuit patch bay using patching cords as shown in Fig. 12. These arrangements include: (1) patching between one trunk-group drop and the line equipment of another trunk group of the same bay (Fig. 12A); (2) patching from a trunk-group drop through interbay patch jacks to combined space trunk equipment at a tandem patch trunk bay (Fig. 12B); and, (3), patching from a trunk-group drop of one line facility through intrabay jacks to the line equipment of a trunk group at a different line facility (Fig. 12C).

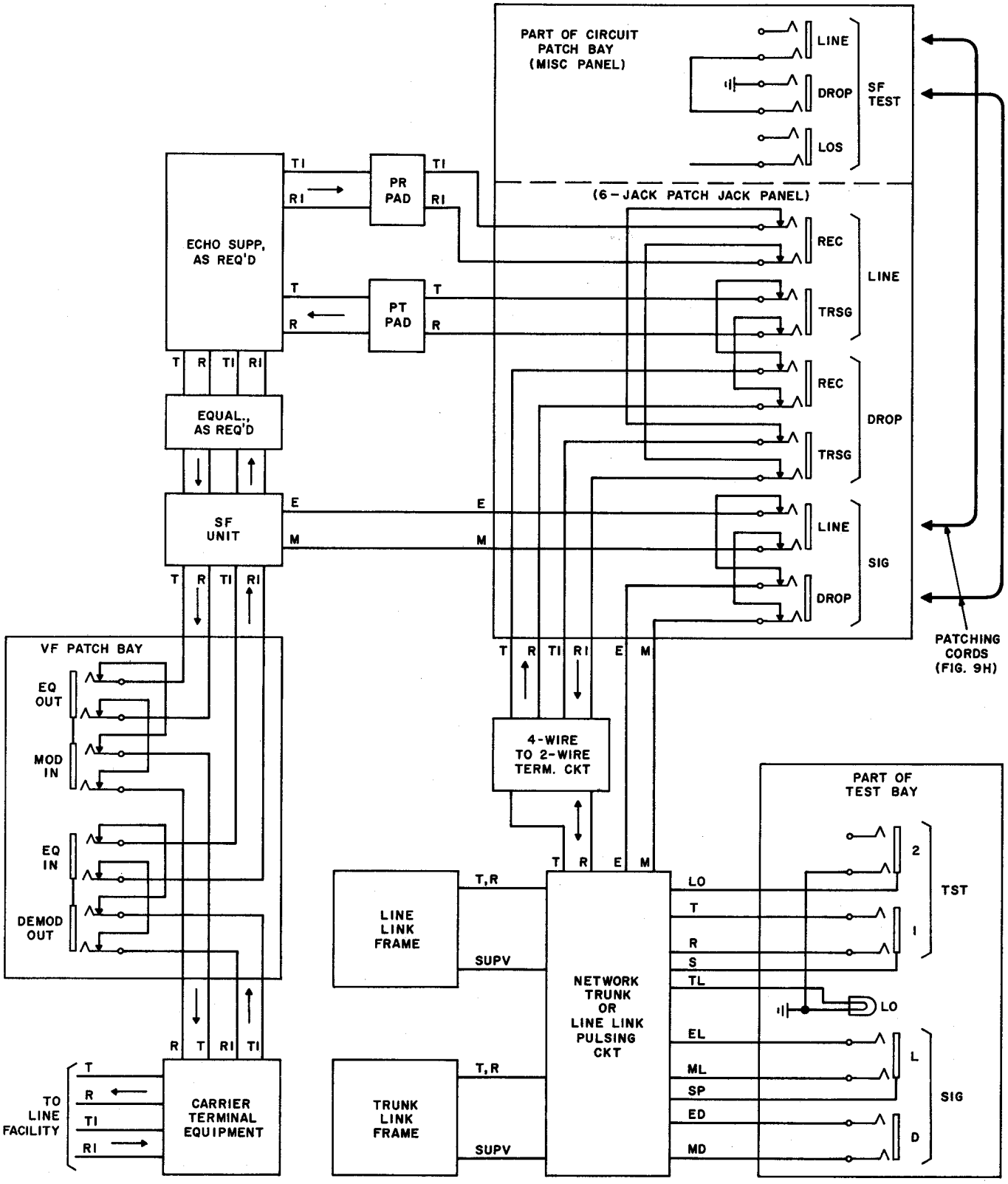


Fig. 11 — Typical Arrangement For Test and Patch Jacks (Patched For Single Frequency Testing) — 17E Testboard

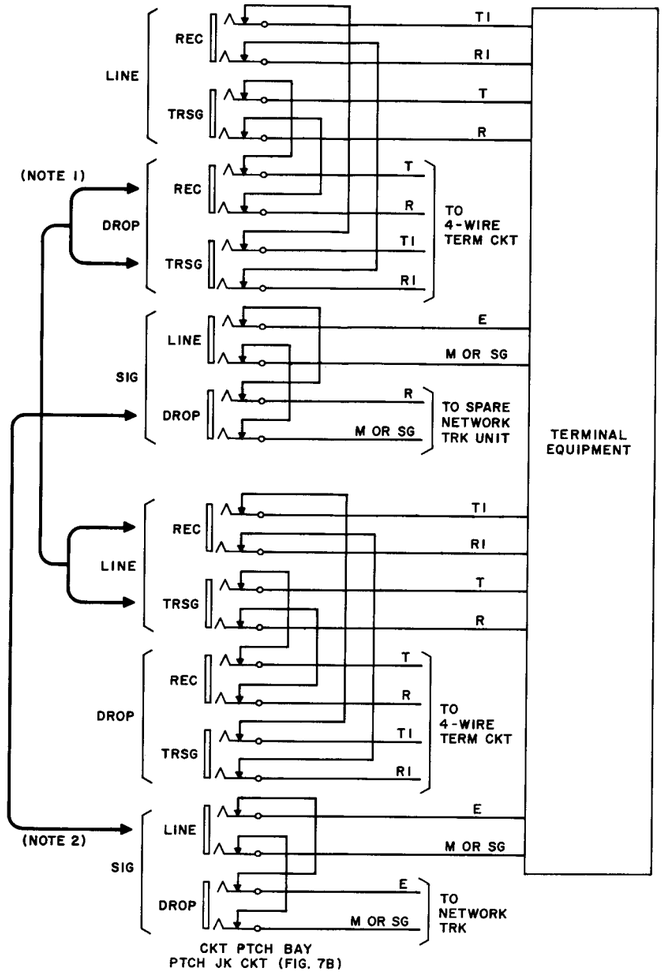


FIG. 12A TYPICAL DROP PATCH USING SPARE TRUNK UNIT ON SAME BAY SD-68327-01, FIG. 110

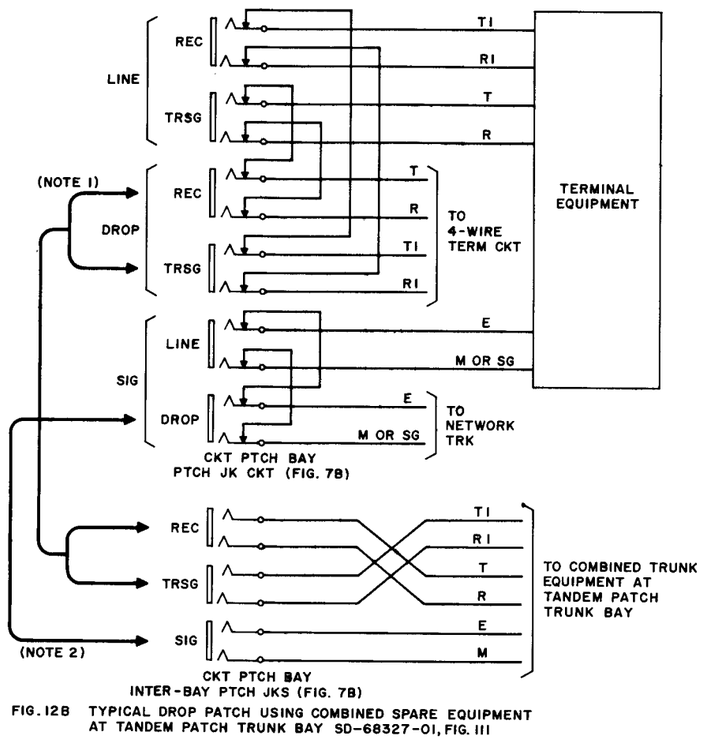


FIG. 12B TYPICAL DROP PATCH USING COMBINED SPARE EQUIPMENT AT TANDEM PATCH TRUNK BAY SD-68327-01, FIG. 111

NOTES:

1. TWIN PLUG-6-CONDUCTOR PATCHING CORD (FIG. 9H)
2. SINGLE PLUG-3-CONDUCTOR PATCHING CORD (FIG. 9H)

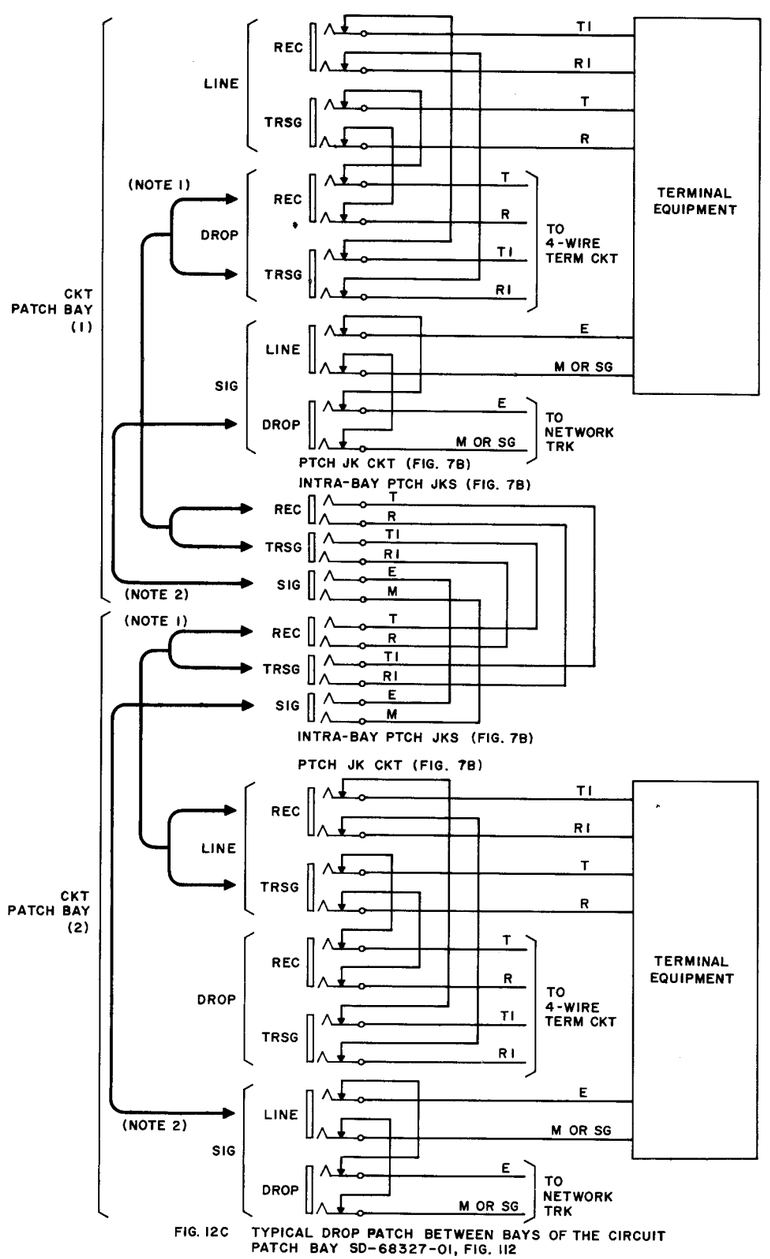


FIG. 12C TYPICAL DROP PATCH BETWEEN BAYS OF THE CIRCUIT PATCH BAY SD-68327-01, FIG. 112

Fig. 12 — Typical Circuit Patch Bay Drop Patches — 17E Testboard