

11CROSSBAR SYSTEMS
NO. 5
INCOMING TRUNK CIRCUIT
FROM LOCAL TEST DESK NO. 14, 15B OR 16
OR LOCAL TEST CABINET NO. 3 OR
OFFICE TEST FRAME TEST CIRCUIT
DIAL OR MULTIFREQUENCY PULSING

CHANGES

D. Description of Changes

D.1 Change is made to add connecting information to the line status verification trunk applique circuit and to the line status verification trunk access switch circuit.

D.2 Change Title of the Circuit from:

CROSSBAR SYSTEMS
NO. 5
INCOMING TRUNK CIRCUIT
FROM LOCAL TEST DESK NO. 14 OR
LOCAL TEST CABINET NO. 3 OR
OFFICE TEST FRAME TEST CIRCUIT
DIAL OR MULTIFREQUENCY PULSING

to:

CROSSBAR SYSTEMS
NO. 5
INCOMING TRUNK CIRCUIT
FROM LOCAL TEST DESK NO. 14, 15B OR 16
OR LOCAL TEST CABINET NO. 3 OR
OFFICE TEST FRAME TEST CIRCUIT
DIAL OR MULTIFREQUENCY PULSING

D.3 The No. 16 LTD replaces the No. 14 LTD which is rated A&M Only. The No. 15B LTD is used to test PICTUREPHONE® circuits.

F. Changes in CD SECTION III

F.1 Under 3. CONNECTING CIRCUITS, change the second entry under 3.01 to read:

Test Trunk at Local Test Desk No. 14
or 16 - SD-95737-01.

F.2 Under 3.01 add new subparagraphs as follows:

Control and Access Circuit - Local
Test Desk No. 15B - SD-1C461-01.Line Status Verification Trunk
Applique Circuit - SD-95553-01.Line Status Verification Trunk
Access Switch Circuit - SD-1C398-01.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5241-AAA-RBC-MH

CROSSBAR SYSTEMS

NO. 5

INCOMING TRUNK CIRCUIT
FROM LOCAL TEST DESK NO. 14 OR
LOCAL TEST CABINET NO. 3 OR
OFFICE TEST FRAME TEST CIRCUIT
DIAL OR MULTIFREQUENCY PULSING

CHANGES

D. Description of Changes

D.1 Information is added to FS 1 to show that leads T, R, and S may connect to the Common Systems Test Trunk Selector Circuit, SD-95709-01. The circuits are compatible.

(a) For several years, CD-95709-01 has listed SD-25708-01 and SD-25708-02 as connecting circuits. SD-26136-01 replaces SD-25708-01 and SD-25708-02.

(b) SD-95709-01 serves as an intermediate switching point for selecting one test trunk of a group to a central office. Access to a maximum of ten test trunk groups is provided.

(c) Information Note 302 and CADs 3, 4, 5, and 6 are modified to reflect the change.

D.2 A typographical error in FS 1 showed leads T, R, and S connecting to the "office test frame (test frame)." This is changed to read "office test frame test circuit."

D.3 A typographical error in information Note 302, the block diagram, is corrected. In one place where the TOUCH-TONE Frequency Test Applique Circuit, SD-99321-01, is shown, the SD number was incorrectly shown as SD-97321-01.

F. Changes in Description of Operation

F.1 Add the following information under
3. CONNECTING CIRCUITS in SECTION
III:

Common Systems Test Trunk Selector
Circuit - SD-95709-01.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5611-GSW-RBC-BH

This is the best reproduction
available at this time.

CROSSBAR SYSTEMS
NO. 5
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the pulsing is completed it is operated by a bridge across the tip and ring to hold the connection whenever high current is flowing in the sleeve. It operates the A1 relay.

1.02 The A1 relay is slow to release, to hold over the switching of its operating path from one place to another. After its original operation by the A relay it remains operated for the remainder of the call until high current on the sleeve exists and there is no bridge across the tip and ring to operate the A relay. The A1 relay operated closes the sleeve lead to the test desk, and holds the B relay when it operates after pulsing is completed. With "V" option the A1 relay operated, operates the FL relay which supplies continuous low tone until dialing is completed and the marker has completed its functions as an indication not to start testing.

1.03 The B relay is operated by the incoming register circuit when pulsing is completed and remains operated for the remainder of the call under control of the A1 relay. It supplies 10-ohm ground to hold the connection to an idle line and other off-normal grounds.

1.04 Busy relay (BY) is operated from the ringing selection switch 9th level on overflow or when the called line is busy and is not connected through the "no-test" connector circuit.

1.05 The C relay is operated by the F relay and remains operated if the line is idle or if connected to a busy line through a "no-test" connector. It releases when the line, connected through the "no-test" connector, goes idle. With the H1 relay operated and the C relay released, a flashing indication for line-busy or overflow is transmitted to the test desk.

1.06 The CO relay is operated by the incoming register, freeing tip and ring of potential while pulsing into the register. It remains operated for the duration of the call.

1.07 Cut-through relay (CT) is operated when the dial key at the test desk is released. This connects the test desk through to the line tip and ring except, of course, the "non-no-test" trunks will not establish the connection to a busy line.

1.08 The D relay is marginal and is operated on the high current condition during pulsing and again on disconnect. It controls the D1 relay which provides the necessary spring load functions to be performed by the operation of the D relay.

1.09 The D1 relay is directly under control of the D relay. The D1 relay operated on seizure starts the incoming register link to call in an idle register. After the dialing is completed the D1 relay operated places the control of the trunk with relay A and connects the A relay and ground on the tip and ring so that the A relay is under control of a dry bridge at the test desk. Each time the D1 relay operates, relay D2 also operates.

1.10 The D2 relay is a slow releasing relay directly under control of the D1 relay. The D2 relay operated releases the cut-through relay (CT).

1.11 The F relay is operated by the marker through the incoming register link to connect this trunk to the marker through the trunk link frame in order to set up the connection.

1.12 The F1 relay is operated under control of the F relay and in turn operates the select magnets of the "no-test" connector. The F1 relay is used only in the "no-test" trunks, App Fig. 2.

1.13 Figure 3, relay F2, is a slave of relay F and is operated while the marker is setting the connection. Relay F2 provides a make contact for isolation of the "LOLP" lead multiple.

1.14 Flashing relay (FL) is operated to provide certain tone and flash interruptions in case of line busy or overflow. With "V" option, relay FL is operated on seizure to connect steady low tone to the trunk as a warning signal that the connection is not yet established. Relay FL remains operated until the marker has completed its function.

1.15 The H relay is operated from ground on the sleeve of the busy line through the "no-test" connector. Relay H operated supplies ground to lead "H" to hold operated the no-test connector hold magnet and the line link no-test vertical hold magnet. The

winding of relay H is made high-resistance to prevent any interference on lines equipped with message registers.

1.16 The HA relay is operated when the no-test connector hold magnet operates. The HA relay operated connects the tip and ring of the trunk through the "no-test" connector to the called line and provides an operate path for the H1 and C relays.

1.17 Relay H1 is operated if the called line is busy or an overflow condition is encountered and provides for the necessary flashing indications to the testman.

1.18 Hunting field relay (HF) is operated by the marker if the call is to a PBX trunk hunting group. It provides for this information to be transmitted to the testman.

1.19 Figure 3, relay LOLP, is operated by the marker when a connection is set to a long-loop line (1300 to 2500 ohms) and remains locked operated to off-normal ground from the B relay for the duration of the call. The LOLP relay operated grounds lead "LL" to signal the test trunk ringing circuit, remote testing circuit - far-end, or TOUCH-TONE[®] frequency test applique circuit to connect high-voltage ringing, connect -72 volt talking battery, and provide a distinct tone to the testman. Relay LOLP also provides a distinct signal to the test desk to indicate a tip party, ring party, or line in a PBX hunting group, which is a long-loop station. These signals are: -24 volts on the tip lead to the test desk; -24 volts on the ring lead; and 1000-ohm ground on the ring lead, respectively.

1.20 Ringing control relay (RC) does not perform ringing control functions in this circuit because this trunk does not provide ringing but it does satisfy the marker and provides for operating the ringing selection switch. The ringing selection switch is used to give overflow and line-busy and indicates on which side of the line the called party is rung on regular calls.

1.21 Reversing relay (RV) reverses the potentials on the tip and ring at the time the testman makes line identification. It is operated by the ringing control switch if the called party is rung on the tip side of the line on regular calls. It is also used on seizure of a register to hold the link start lead open until pulsing is completed.

1.22 The S relay is the sensitive relay on the sleeve to the test desk. It directly controls the S1 relay.

1.23 The S1 relay is directly under control of the S relay. It controls the cut-through of the trunk for test and, when it is released, gives line identification information.

1.24 Switching relay (SW) is operated to give line identification to determine whether the called line is in a PBX hunting group and whether ringing is on the tip or ring on a regular call.

1.25 The TC relay is operated by the marker whenever a connection is established to the called line. This performs no useful function in this circuit but makes the operation of the marker the same as on a trunk from an operator. The TC relay also operates on overflow from the ringing selection switch to supply overflow indication to the test desk.

1.26 Repeating coil A is used to put the necessary tone indications on the tip and ring of the trunk.

2. SEIZURE

2.01 When the testman selects this trunk and operates the dial key a bridge is closed across the tip and ring to operate the A relay. The A relay operated, operates the A1 relay. In order to hold over momentary releases of the A relay the A1 relay is made slow release.

2.02 The A1 relay operated, closes low-resistance battery from the "S" lead to operate relays D and S. With "V" option, the A1 relay in operating, operates the FL relay which supplies continuous low tone through the A repeating coil to the tip and ring of the trunk. This tone is an indication to the testman that the trunk is not ready for tests to be made over it to the called line.

2.03 The S relay operated, operates the S1 relay, and the D relay operated, operates the D1 and D2 relays in tandem. The D1 relay supplies battery through its make contacts and the make contacts of the A1 relay to the "ST" lead to the incoming register link circuit. This causes the register link circuit to summon an idle incoming register circuit. When an idle register is selected the CO relay operates from the register over the "CO" lead.

2.04 The CO relay operated does the following:

- (a) Grounds the "BL" lead through the link to the incoming register circuit as an indication that the CO relay has operated.
- (b) Disconnects ground and A relay from the tip and ring, releasing the A relay.
- (c) Closes a locking path for relay A1.
- (d) Operates relay RV which locks either under control of A1 and B relays if option "W" is provided or under control of A1, B, and D1 relays if option "V" is provided.

2.05 If at this time or any time before dialing is completed the testman should disconnect, the register will open the "CO" lead releasing relay CO. Relay CO releases relay A1. Relay A1 released, opens the start lead to the incoming register link, releases relay RV and opens the sleeve circuit to release relays S and D which in turn release relays S1, D1, and D2 restoring the circuit to normal.

3. DIALING COMPLETED

3.01 When the pulsing into the incoming register circuit has been completed, that circuit grounds the "D" lead to operate relay B.

3.02 The B relay operated does the following:

- (a) Supplies 10-ohm ground on lead "S" to the trunk link frame.
- (b) Locks under control of relays CO and A1.
- (c) Provides a locking path for relay CO.
- (d) Releases relay RV, opening both windings.
- (e) Closes a path for the reoperation of relay A across the tip and ring from ground on make contacts of relay D1.

Note: If the testman does not have his keys properly thrown at this time to supply a bridge the connection will be released.

- (f) Removes holding ground from relay A1. However, the A relay reoperates before the slow releasing A1 relay can release and holds it operated.

4. DIAL KEY RELEASED

4.01 When the testman releases the dial key the current flow over the sleeve is reduced releasing the D relay but holding the S relay. The D relay released, releases the D1 relay.

4.02 The D1 relay released, releases the D2 relay and disconnects the ground from the bridge across the tip and ring to release relay A. Relay D1 released supplies holding ground for the A1 relay through make contacts of relays B and CO operated. This operation may occur before, during, or after the time the marker is connected to the trunk.

5. MARKER OPERATION

5.01 The incoming register circuit calls for one of the special markers which are arranged to handle certain classes of calls including no-test and non-no-test. When the marker is ready to set up the connection it operates the F relay through the incoming register and register link. The F relay operated supplies ground over the "FA" lead to the trunk link and connector circuit operating a relay in that circuit which transfers the tip and ring away from this trunk to the marker through the trunk link frame circuit and similarly transfers its sleeve as on other trunks, but the continuity and trouble ground tests are omitted by the marker. If this particular trunk is a non-no-test trunk the F relay operated supplies ground on the "NN" lead to tell the marker that this is a non-no-test call. If this is a no-test trunk the F relay operated, operates the F1 relay which grounds the "NT" lead indicating that this is a no-test call. The F1 relay operated also operates the select magnet of each no-test connector switch for the level on which this trunk appears. The F relay operated also operates the C relay. If the called line is in a PBX hunting group the marker operates the HF relay which locks in order to indicate later, if required, that this call is for a line in a PBX hunting group.

5.02 It should be mentioned that the special marker cancels the "HF" indication on no-test calls, otherwise the terminal hunting feature might divert the connection from the desired line, if the latter were busy, to some other line.

CONNECTION TO AN IDLE LINE

5.03 The marker operates the select magnets of the associated ringing selection switch in the same way as a regular call but there will be no ringing because the connection between the "RB" and "RT" leads of the ringing selection switch is omitted. The marker supplies ground to the "TP" lead and the "RC" lead. The ground on the "RC" lead operates the RC relay which extends the "TP" lead ground to the ringing selection switch hold magnet operating it and closing the crosspoints. The crosspoints closed supply locking ground for the RC relay from the B relay over the "G" lead. This ground is returned over the "RC" lead to the marker. If the called party is a tip station the ringing selection switch supplies ground over the "R" lead operating the RV relay. This establishes a condition which may be used later by the testman for line identification.

OVERFLOW

5.04 If the called line is idle but there is no channel available from this incoming trunk to the line or if for any other reason the marker is unable to establish this connection the marker sets up the ringing selection switch with crosspoints 0 and 9 closed. This supplies ground on the "BY" and "T" leads. The ground on the "BY" lead operates the BY relay which locks under control of the B relay, operates the H1 relay and extends the grounded "T" lead to operate the TC relay. The TC relay operated locks under control of the BY relay. The H1 relay operated opens the locking circuit of relay C, and with "V" option releases relay FL removing continuous low tone from the trunk.

5.05 When the marker completes its functions it releases the F relay which transfers the control of the ringing selection switch

hold magnet to the B relay and releases the C relay. The C relay released with the H1 and TC relays operated supplies ground on the "STO" lead of the interrupter circuit to be sure the interrupter is operating and the FL relay flashes under control of the interrupted ground on the "OF" lead. The FL relay supplies interrupted low tone to the trunk through the A repeating coil with "V" option or through the A repeating coil and operated contacts of the B relay with "W" option. When the dial key at the test desk is released the D1 relay releases as previously described, and the FL relay supplies interrupted ground to the ring which can be observed on the voltmeter or supervisory lamp depending on the key setting at the test desk or cabinet.

LINE BUSY - "NO-TEST" TRUNK

5.06 When the trunk used is arranged for no-test and the called line is busy the marker supplies a positive potential to the sleeve of the called busy line which gives a slight positive potential through the 10-ohm resistance through which the busy ground is applied. The marker then looks at the 10 line links from the horizontal group in which this line is located and finding this positive potential on one of those links operates the corresponding select magnet of that line switch and the associated hold magnet of the no-test connector circuit. The hold magnet in operating extends its operating ground which operates the line link no-test vertical hold magnet and relay HA. Relay HA in operating, operates relay H1. Relay H1 operates when the line link no-test vertical crosspoints close. Relay H1 supplies ground over lead "H" to the no-test connector circuit hold magnet and the line link no-test vertical hold magnet to maintain the connection after the marker disconnects. The marker sets up the ringing selection switch as on a call to an idle line in order to give correct line identification operation, but cancels the "HF" feature.

A. Line Busy - "No-test" Trunk - No Channel Available

5.07 If the called line is busy but there is no channel to that line through the

no-test connector the marker sets up the ringing selection switch with crosspoints 0 and 9 closed. This causes the same operation as described for overflow. The FL relay will flash under control of interrupted ground on the "OF" lead at the overflow rate.

B. Line Busy - "No-Test" Trunk - Channel Available but Marker Unable to Connect

5.08 The marker sets up the ringing selection switch with crosspoints 1 and 9 closed. This causes the same operation as described for overflow except that the TC relay does not operate. Ground will be supplied to the "STB" instead of the "STO" lead and the FL relay will flash under control of interrupted ground on the "LB" lead at the line busy rate.

6. TEST CONNECTION TO IDLE LINE

6.01 When the marker has completed its functions it releases the F relay which transfers the control of the ringing selection switch hold magnet to the B relay. The C relay remains operated under control of the B relay and normal contacts of the H1 relay.

6.02 When the dial key is released, relay D2 releases as previously described. With the S1 and C relays operated and the F and D2 relays released the CT relay operates. The CT relay operated, connects the tip and ring of the trunk to the called line free of all bridges or series apparatus and provides additional holding ground for relay A1. With "V" option the CT relay operated, releases the FL relay which removes continuous low tone from the A repeating coil.

6.03 Option "Q" prevents disconnection of the circuit when the D relay operates due to the positive high-current signal on the sleeve lead during a TOUCH-TONE test call.

LINE IDENTIFICATION

6.04 The circuit is arranged to indicate whether the station under test is a tip or ring party, or whether the test call is to a line in a PBX hunting group, and also (Fig. 3 provided) whether the line being tested is a "short loop" (less than 1300 ohms) or a "long loop" (1300 to 2500 ohms). The signaling scheme uses

battery and ground conditions of the tip and ring which are measured by a meter at the test desk. The circuit operates as follows.

6.05 Resistance battery from the C resistor is the signal used to distinguish long-loop lines from lines of 1300 ohms or less. On a long-loop connection the LOLP relay is operated by the marker and connects ground to one end of the C resistor so that the potential at the midpoint of this resistor is reduced to -24 volts. If a test call is to a line of less than 1300 ohms, relay LOLP is not operated and the voltage supplied by the C resistor is approximately -48 volts.

6.06 If a connection is to a line in a PBX hunting group, relay HF is operated by the marker and the signal to the test desk will be a direct ground if relay LOLP is normal or 1000-ohm ground if relay LOLP is operated (long-loop call).

6.07 To receive a type of line indication, the testman opens the sleeve lead at the test desk. This causes relays S and S1 to release. Relay S1 released operates relay SW which opens the transmission path toward the called station and connects the tip and ring leads from the test desk to the make and break springs of an RV relay transfer contact. The RV relay is operated by ground over lead "R" from the ring switch when a call is to a tip party station, and the battery and ground signals described above are connected through the RV relay transfer contact to either the tip or the ring lead to indicate a tip party or ring party station, respectively.

6.07 After line identification, relay S is again operated over the sleeve lead, operating relay S1. Relay S1 operated releases the SW relay which reconnects the transmission path to the line under test.

7. TEST CONNECTION TO BUSY LINE THROUGH "NO-TEST" CONNECTOR

7.01 This operation is the same as the connection to an idle line with the following differences. The connection to the line is not free of all bridges because the established connection usually will have talking battery connected to the tip and ring. When the SW relay is operated for line identification continuous high tone

is supplied to the opposite side of the trunk from the dc potential as an indication that this is a no-test connection. If the called line goes idle the H relay releases which releases the HA relay and the hold magnets for the no-test connector and the no-test vertical of the line switch. The HA relay released, opens the tip and ring to the no-test connector and releases relay C. The C relay released, releases the CT relay, supplies ground to the "STB lead to the interrupter circuit and connects interrupted ground on the "LB" lead to the FL relay. This causes interrupted low tone to be supplied over the trunk at the line busy rate but high tone is supplied between the low tone intervals. Interrupted ground is connected to the ring of the trunk in the same way as on line busy. Thus the testman is given an indication that he has lost the test connection to a line when the line becomes idle. The testman will still be able to make the line identification test described previously regardless of the no-test connection being dropped.

7.02 In offices where "range extension for unigauge cabling", apparatus Fig. 3, is required, leads "T" and "R" which would otherwise connect directly to the no-test connector circuit, connect to the no-test connector circuit through the voice operated switched gain repeater circuit. The voice operated switched gain repeater circuit presents a high impedance across the customer line which prevents the unigauge amplifier being unstable when a connection is established to a long-loop (1300 to 2500 ohms) line. This arrangement causes no harm when a connection is established to a short-loop (less than 1300 ohms) line.

8. DISCONNECT

8.01 Opening of the tip and ring at the switchboard has no affect on this circuit with the sleeve current low, relay D released, or open because the tip and ring are free of any supervisory apparatus. Thus the testman can remove the test cord from this trunk and still hold the connection in case he wishes to use the test cord for other purposes before he is through with the connection over this trunk. To disconnect, the high-current condition on the sleeve must be reestablished with no bridge across the tip and ring. With the high current over the "S" lead the D and S relays will be operated and also the D1, D2, and S1 relays will be operated and the CT and SW relays released. This connects ground to the tip of the trunk and battery through the A relay to the ring. If there is a bridge across the tip and ring the A relay will operate holding the A1 relay. However, on disconnect, there will be no bridge across the tip and ring and the A relay will not operate. The D1 relay operated with

the CT and SW relays released, releases the A1 relay. The A1 relay is slow releasing to hold over momentary loss of current flow in advancing from one stage of operation to another. The A1 relay released, releases the B relay and opens the "S" lead to the test desk or cabinet. The B relay released, releases the CO and RC relays, the ringing selection switch hold magnet and, if operated, the C, H1, BY, HF, and RV relays. The C relay released, releases the H relay, if operated, which releases the HA relay. The BY relay releases the TC relay if operated. The "S" lead being opened by the A1 relay, releases the D and S relays. The S relay releases the S1 relay, and the D relay releases the D1 and D2 relays in tandem. The CO relay released continues the condition of ground on the tip of the trunk and battery through the A relay on the ring. All relays are now released and the circuit is normal.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

	"Z" Option			"Y" Option	
	A Relay	D Relay	S Relay	D Relay	S Relay
Max Ext Ckt Res	9,000	1,025	5,600	1,800	8,450
Min Ins Res	60,000	60,000	60,000	60,000	60,000
Max Earth Potential		+15V	+15V		

2. FUNCTIONS

- 2.01 On seizure, provides for operation of relay A from the test desk.
- 2.02 Provides for operation of S and D relays from the test desk.
- 2.03 Provides for summoning an idle incoming register circuit through the link when the testman selects this trunk.
- 2.04 With "Y" option provides steady low tone on the trunk, until a marker is called in, to warn the testman to wait until after dialing before making any tests.
- 2.05 Clears the tip and ring of battery and the ground when relay CO is operated from the incoming register.
- 2.06 Provides for operating relay B from the incoming register when pulsing it into the register has been completed. Trunk takes over control of call.
- 2.07 Provides for operation of relay F from the marker through the register and register link.

- 2.08 Provides for operation of relay RC from the marker.
- 2.09 Provides for operating the ringing selection switch hold magnet from the marker.
- 2.10 Operates the FB relay on the trunk link frame over the "FA" lead.
- 2.11 Provides for operating the HF relay from the marker if the called line is in a PBX trunk hunting group. Only on non-no-test calls.
- 2.12 Provides for operating the RV relay from the ringing selection switch if the called line is a tip party.
- 2.13 Provides a path for the marker to check that the TC relay operates from the ringing control switch on overflow.
- 2.14 Provides for the marker to reset the ringing selection switch.
- 2.15 Provides for the marker to record a line-busy or overflow indication through the setting of the ringing selection switch.
- 2.16 On a non-no-test trunk, grounds the "NW" lead to indicate this special class to the marker (option "X").
- 2.17 On a no-test trunk, grounds the "NT" lead to indicate this special class to the marker (App Fig. 2 provided).
- 2.18 Provides 10-ohm sleeve ground to hold the connection to an idle line under test after the marker disconnects.
- 2.19 Provides clear tip and ring connection to an idle line under test.
- 2.20 On a no-test trunk provides a tip-and-ring connection to a called line for test through the no-test connector if that line is busy (App Fig. 2 provided).
- 2.21 On a no-test trunk connection to a busy line, signals the test desk and frees the line if the line goes idle.
- 2.22 Provides signals controlled by test-man to indicate the called line is in a PBX hunting group, is for a ring party, or is for a tip party; and whether the line is short-loop (less than 1300 ohms) or long-loop (1300 to 2500 ohms).
- 2.23 On a no-test trunk superimpose an added signal if the called line was reached over the no-test connector.

- 2.24 Hold the trunk until the high-current condition on the sleeve and open tip-and-ring bridge occur simultaneously for release.

3. CONNECTING CIRCUITS

- 3.01 When this circuit is listed on a key-sheet the connecting information thereon is to be followed.

Test Trunk Ringing Circuit - SD-96474-01

Test Trunk at Test Desk - SD-95737-01

Trunk Link Circuit - SD-26032-01

Trunk Link Connector Circuit - SD-26033-01

Incoming Register Link Circuit - SD-26048-01

Ringing Selection Switch Circuit - SD-26080-01, (6-wire), SD-25706-01, (4-wire)

60 and 120 IPM Interrupter Circuit - SD-25814-01

No-Test Connector Circuit - SD-25702-01

Test Trunk at Local Test Cabinet No. 3 - SD-96229-01

Office Test Frame Test Circuit - SD-27633-01

Remote Testing Circuit- Far-End - SD-99311-01

TOUCH-TONE® Frequency Test Applique Circuit - SD-99321-01

Voice Operated Switched Gain Repeater Circuit - SD-99488-01

SECTION IV - REASONS FOR REISSUE

D. Description of Changes

- D.1 Provision is made for connecting the Voice Operated Switched Gain Repeater Circuit, SD-99488-01, between SD-26136-01 and the No-Test Connector Circuit, SD-25702-01, when SD-26136-01 is used as a no-test trunk circuit and "range extension for unigauge cabling" is also required. Connection to SD-99488-01 is necessary to prevent the unigauge amplifier being unstable when a no-test connection is established to a long-loop line. The unigauge amplifier becomes unstable when the normal impedance of the customer loop is altered by the bridged impedance of the no-test trunk SD-99488-01 presents a high-impedance across the customer line and, therefore, does not alter the normal impedance of the customer loop.

D.11 FS1 is changed to show leads "T" and "R", which formerly connected to the no-test connector circuit, connecting to either the no-test connector circuit, option "N" provided, or the voice operated switched gain repeater circuit, Fig. 3 provided.

D.12 Information Note 302, the block diagram, is changed to include the voice operated switched gain repeater circuit.

D.13 CAD 2 is changed to show connection to the voice operated switched gain repeater circuit.

D.2 Provision is made to connect lead "LL" to the Remote Testing Circuit - Far-End, SD-99311-01 and the TOUCH-TONE Frequency Test Applique Circuit, SD-99321-01, to provide for unigauge remote testing.

D.21 Lead "LL" is grounded by SD-26136-01 for the duration of the connection to a long-loop line. This signals the connecting circuits to connect high-voltage ringing, connect -72 volt talking battery, and provide a distinct tone to the testman.

D.22 Information Note 302, the block diagram, is changed to reflect the addition of lead "LL".

D.23 CADs 3, 4, and 6 are changed to reflect the addition of lead "LL".

D.3 The title of a connecting circuit, the "remote testing circuit - far-end", is corrected.

D.31 FS1, Information Note 302, and CADs 3, 4, 5, and 6 are changed to show the correct title.

D.4 The block diagram, Information Note 302, is clarified.

BELL TELEPHONE LABORATORIES, INCORPORATED

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