6

CROSSBAR SYSTEMS
NO. 3
INCOMING PLUG-ENDED TRUNK CIRCUIT
FROM LOCAL TEST DESK NO. 14, 15B, OR 16
OR LOCAL TEST CABINET NO. 3

TABLE OF CONTENTS

SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This circuit provides trunk type supervision and a clear metallic path between a local test desk in a distant building, or a local test cabinet in the same building, to No. 3 crossbar customer lines. No-test operation provides access to the desired line whether it is idle or busy. The circuit is also arranged for no-hunt or special-hunt operation, as well as dial or multifrequency pulsing.

2. GENERAL DESCRIPTION OF OPERATION

2.01 This circuit is used to connect a local test desk in a distant building or a local test cabinet in the same building to No. 3 crossbar customers lines, using a clear metallic path to permit unimpaired testing of the customers lines. No provision for ringing is made in this circuit, but all involved leads are included to satisfy the marker as well as to indicate line-busy, overflow, and also whether the called number is for a tip party or a ring party station. No-test operation enables the connection to be completed to the desired line whether it is idle or busy. The marker can also be advised to operate on a no-hunt or special-hunt basis when working with PBX lines, if this is desired by the operating company. This circuit will function with either DP or MF incoming registers.

SECTION II - DETAILED DESCRIPTION

1. SEIZURE - SC1

1.01 When the test employee at the local test desk or cabinet selects this trunk and operates the dial key, a bridge is closed across the T and R leads which operates the A relay.

1.02 The A relay operates the A1 relay which:

(a) Closes low-resistance battery on the S lead to operate the D and S relays.

(b) Partially closes resistance battery on the ST lead to the IRL.

(c) Operates the FL relay (option X).

(d) Provides its own lock path.

(e) Partially closes a lock path for the BY relay.

1.03 The operation of the FL relay supplies continuous low tone through the A repeating coil to the tip and ring of the trunk. This tone is an indication

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to the test employee that the trunk is not ready for tests to be made over it to the called line (option X).

1.04 The operation of the S relay operates the S1 relay which:

(a) Partially closes the operating path of the CT relay.

(b) Breaks the operating path of the SW relay.

1.05 The operation of the D relay operates the D1 relay directly (option R) or after the D-D1 loop is closed by the TT frequency test applique circuit (option S). The D1 relay:

(a) Partially closes a second operating path for the A relay.

(b) Closes resistance battery on the ST lead to the IRL.

(c) Breaks one of the A relay locking paths.

(d) Partially closes a second ground path to the T lead.

(e) Breaks the reorder flashing ground path to the R lead.

(f) Operates the D2 relay.

(g) Partially closes a locking path for the BY relay.

1.06 The operation of the D2 relay breaks the operating path of the CT relay.

1.07 The incoming register grounds the CO lead operating the CO relay which:

(a) Grounds the BL lead and operates the BY relay.

(b) Opens the resistance battery to the ST lead, opens the ST lead, and connects the B relay to its locking path.

(c) Releases the A relay.

(d) Removes ground from the T lead.

(e) Connects the A1 relay to an alternate locking path.

1.08 The operation of the BY relay:

(a) Opens the resistance battery to the ST lead at a second point to prevent a new start signal to the IRL if the test employee should disconnect and cause the incoming register to release the CO relay.

(b) Locks on its primary winding.

1.09 The test employee dials the called number and upon completion of dialing, the incoming register grounds the CT lead operating the B relay which:

(a) Reconnects the A relay and ground to the R and T leads, respectively, reoperating the A relay.

(b) Closes its own locking circuit.

(c) Transfers the A1 relay locking circuit to a break-contact on the D1 relay.

(d) Releases the BY relay by opening both its operating and its locking paths.

(e) Holds the CO relay operated.

(f) Provides a locking ground for relays RO, RC, and DS.

(g) Partially closes the operating circuits of the CT and SW relays.

1.10 The incoming register calls upon a marker to perform its functions. The marker operates the F relay over lead F to the IRL circuit. The operation of the F relay:

(a) Grounds the NT, NH, or NN leads if options T, U, or V, respectively, are provided.

(b) Transfers the outgoing T and R leads from the incoming T and R leads to the T1 and R1 leads, respectively.

(c) Opens the RC relay locking path and connects the RC locking ground to the RA lead.

(d) Transfers the trunk switch S lead from its grounding path to the SL lead.

(e) Operates the F1 and DS relays.

(f) Closes the RO relay operating path.

1.11 The operation of the F1 relay:

(a) Closes the BY, TP, RC, R2, and R3 relay operating paths.

(b) Breaks the operating path of the CT relay.

(c) Grounds the TTI, SW, and JC leads.

1.12 The operation of the DS relay:

(a) Provides its own lock path.

(b) Supplies a holding ground for later use on the S lead to the trunk switch circuit.

2. CHANNEL NOT AVAILABLE - SC3

2.01 The marker grounds the RO lead operating the RO relay which:

(a) Locks to ground through a B relay contact.

(b) Connects ground to the STO lead and connects the FL relay to the OF lead to cause the FL relay to pulse or flash.

(c) Partially closes flashing ground on the R lead.

(d) Opens the CT relay operating path.

2.02 The flashing FL relay:

(a) Removes steady low-tone from the tip and ring leads of the trunk (X option).

(b) Places overflow tone on the tip and ring leads of the trunk.

(c) Partially closes flashing ground on the R lead.

2.03 When the marker has completed its functions, it releases the F relay.

2.04 The F relay releases the F1 relay.

2.05 When the test employee releases the dial key, current flow over the S lead is reduced releasing the D relay but holding the S relay.

2.06 The D relay releases the D1 relay.

2.07 The release of the D1 relay:

(a) Releases the A relay.

(b) Connects flashing ground to the R lead, which can be observed on the voltmeter or supervisory lamp and is recognized by the test employee as an overflow or reorder signal.

(c) Releases the D2 relay.

3. CHANNEL AVAILABLE - SC2

3.01 The marker grounds:

(a) The R2 and R3 leads in accordance with the station ringing requirements and operates the corresponding R2 and R3 relays.

(b) The TPR lead to operate the TP relay if the call is to a tip party station.

(c) The BY lead to operate the BY relay if the called line is busy.

(d) The RC lead to operate the RC relay unless the line is busy and NH or NN cross-connection is used.

3.02 Relays R2 and R3 return locking ground to satisfy the marker.

3.03 The operation of relay TP:

(a) Returns locking ground to satisfy the marker.

(b) Transfers resistance battery from the R lead to the T lead for later use as a tip party indication to the test employee.

(c) Transfers high-tone from the T lead to the R lead for later use as a busy line indication on ring party lines and tip party lines, respectively.

3.04 The operation of the BY relay:

(a) Returns locking ground to satisfy the marker.

(b) Partially connects high-tone to the T or R lead for later use as a busy line indication to the test employee.

3.05 The operation of relay RC:

(a) Returns locking ground on the RA lead to satisfy the marker.

(b) Supplies the locking ground for the BY, TP, R2, and R3 relays.

3.06 When the marker has completed its functions, it releases the F relay.

3.07 The F relay releases the F1 relay.

3.08 When the test employee releases the dial key, current flow over the S lead is reduced releasing the D relay but holding the S relay.

3.09 The D relay releases the D1 relay.

3.10 The release of the D1 relay:

(a) Releases the A relay.

(b) Releases the D2 relay.

3.11 The D2 relay operates the CT relay.

3.12 The operation of the CT relay:

(a) Locks to ground on a contact of the B relay.

(b) Transfers the incoming T and R leads from the IRL circuit to the trunk switch circuit with clear metallic connections.

(c) Releases the FL relay (option X) which removes steady low-tone from the trunk, advising the test employee that the trunk is now ready for testing on the connected line.

(d) Supplies a locking ground for the A1 relay.

4. LINE IDENTIFICATION - SC4 AND SC5

4.01 To receive a type of line indication, the test employee opens the sleeve lead causing the S relay to release. This releases the S1 relay.

4.02 The release of the S1 relay operates the SW relay which:

(a) Provides an additional holding ground for the A1 relay.

(b) Transfers the incoming T and R leads from the outgoing T and R leads to circuitry which sends the line identification information to the test employee with the following signals:

	T Lead	R Lead
Idle Tip Party	-48V	-
Idle Ring Party	-	-48
Busy Tip Party	-48V	HT
Busy Ring Party	HT	-48

4.03 When the test employee recloses high-resistance battery to the sleeve lead, relay S reoperates, in turn reoperating the S1 relay, which in turn releases the SW relay removing the line identification signals and restoring the trunk to its ready for test condition.

5. DISCONNECT - SC6

5.01 To release the trunk, the test employee must open the bridge across the T and R leads and must place high current on the sleeve lead. This operates the D, D1, and D2 relays in tandem.

5.02 Operation of the D2 relay releases the CT relay.

5.03 Release of the CT relay releases the A1 relay.

5.04 Release of the A1 relay releases the B, S, and D relays.

5.05 Release of the D relay releases the D1 and D2 relays in tandem.

5.06 Release of the S relay releases the S1 relay.

5.07 Release of the B relay releases the DS and CO relay and the RC and RO relays if they are operated.

5.08 Release of the RO relay releases the FL relay.

5.09 Release of the RC relay, releases the TP, R2, R3, and BY relays if they are operated.

5.10 Release of the CO relay restores the trunk to its idle state with the A relay winding connected to the R lead and ground connected to the T lead.

6. TESTING

6.01 Testing of this trunk is performed by setting up a test connection to a terminating test line from the local test desk or cabinet. Routine operations are performed in the same manner as for a regular line test call.

7. MISCELLANEOUS

7.01 Resistor B is provided to limit the current when flashing ground is applied to the R lead.

7.02 Resistors C and D are provided to supply resistance battery signals for tip party identification, and IRL start, respectively.

7.03 Capacitors A, B, and D are provided to isolate the AC tones from the DC signals.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 See table on SD-26413-01 Sheet D1.

2. FUNCTIONAL DESIGNATIONS

2.01 Relays

Designation	Meaning
A	Supervisory
A1	Auxiliary Supervisory
B	IR Complete
BY	Busy
CO	Cut-Off
CT	Cut-Through
D	Marginal Supervisory
D1	Auxiliary Marginal Supervisory
D2	Auxiliary Marginal Supervisory
DS	Delay Sleeve
F	Frame (Marker Function)
F1	Auxiliary Frame (Marker Function)
FL	Flashing
RO	Reorder
RC	Ringing Control
R2	Ring Selection
R3	Ring Selection
S	Sleeve
S1	Auxiliary Sleeve
SW	Switching
TP	Tip Party

3. FUNCTIONS

3.01 On seizure, provides for operation of relay A from the test desk or cabinet.

3.02 Provides for operation of relays S and D from the test desk or cabinet.

3.03 Provides for summoning an idle incoming register through the IRL when this trunk is seized.

3.04 With X option, provides steady low-tone on the trunk until cut-through to warn the test employee to wait until after dialing before making any tests.

3.05 Clears the tip and ring of ground and battery when relay CO is operated by the incoming register.

3.06 Provides for operating relay B from the incoming register when pulsing has been completed to return control to the trunk.

3.07 Provides for operation of relay F from the marker through the IRL.

3.08 Provides for operation of relays RO, RC, TP, R2, R3, and BY from the marker.

3.09 Provides overflow tone on the trunk if a channel is not available.

3.10 Provides a flashing ground on the ring lead if a channel is not available.

3.11 Provides a ground on leads NT, NH, or NN to the marker to request no-test, no-hunt, or special hunt operation, respectively.

3.12 Provides for connection to the desired line through the switching network with a clear metallic connection to permit unimpaired testing of the line.

3.13 Provides for signals on the T and R leads to advise the test employee if the called party is a tip party station or a ring party station and also if the line is busy or idle. Also provides a means of connecting and removing these signals.

3.14 Provides a ground on the S lead to hold the connection.

3.15 Holds the trunk until the high current condition on the sleeve and the open tip and ring bridge occur simultaneously to initiate the disconnect operations.

4. CONNECTING CIRCUITS

4.01 When this circuit is listed on a keysheet, the connecting information thereon shall be followed.

(a) Trunk Switch and Connector Circuit - SD-26383-01.

(b) Incoming Register Link Circuit - SD-26394-01.

(c) Interrupter Circuit - SD-26407-01.

(d) PRTD Circuit - SD-26414-01.

(e) Test Trunk Ringing Circuit - SD-96474-01.

(f) Test Trunk Frequency Test Applique Circuit - SD-99321-01.

(g) Test Trunk - LTD No. 14 or 16 - SD-95737-01.

(h) Test Trunk - LTC No. 3 - SD-96229-01.

(i) Remote Test - Far-End - SD-99311-01.

(j) Control and Access - LTD No. 15B - SD-1C461-01.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 This circuit shall be capable of performing all of the functions listed in this Circuit Description and meeting the requirements listed in the Circuit Requirement Tables.

6. TAKING EQUIPMENT OUT OF SERVICE

6.01 To take this trunk circuit out of service, the associated test trunk in the local test desk or cabinet should be made busy.

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