

CROSSBAR SYSTEMS
NO. 3
OUTGOING PLUG-ENDED TRUNK
CIRCUIT
TO INFORMATION DESK OR
REPAIR SERVICE DESK
E AND M LEAD SUPERVISION

CHANGES

B. Changes in Apparatus

B.1 Superseded Superseded By
M - 18BH Resistor - M - 533A Diode -
Fig. 1, Option Z Fig. 1, Option Y

D. Description of Changes

D.1 The FS1 has been revised to show
the addition of Y option. Option Z
was formerly not designated and was rated

Standard. Circuit Note 104 has been
revised to show the addition of Z and Y
options.

D.2 The FS1 and CAD 2 reference to
"Transmission and Signaling Facil-
ities with Type I Interface" is added.

F. Changes in CD SECTION II

F.1 In 4.04, change the reference to
"Resistance M and lamp M" to read:
"Diode M and lamp M".

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-GFC

WE DEPT 25820-JRF-GWC-BT

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 TO INFORMATION DESK OR
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 E AND M LEAD SUPERVISION

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SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 This circuit is provided to handle local information, repair service, business office, or official PBX, on an E and M lead basis. It completes to either a composite or SF signaling circuit or to a carrier circuit.

2. GENERAL DESCRIPTION OF OPERATION

2.01 This circuit, when selected by the marker, connects the calling party to the information desk, repair service desk, local test desk, business office, or official PBX. Ringing tone is applied to the line when seized and is removed when the distant operator answers. Supervision

between this trunk and the distant incoming trunk is on an E and M lead basis.

SECTION II - DETAILED DESCRIPTION

1. SEIZE AND CONNECT

1.01 After the marker has determined that a trunk of this type is required, it finds and selects an idle trunk in the following manner.

- (a) Ground supplied by the trunk over the FT lead indicates to the marker that at least one trunk in the required group on the associated trunk switch and connector circuit is idle.
- (b) Ground supplied by the marker is looped through the idle trunk on leads TG and TT and is directed by the marker connector, trunk block, and trunk group relays to operate one of 12 TT- relays.
- (c) Battery supplied by the marker and directed by the marker connector, trunk block, and TT- relay through lead TF, operates the F relay in the trunk.

1.02 The operation of relay F:

- (a) Locks the F relay directly to lead TF.
- (b) Grounds the SW and JC leads to operate the associated SW and JC relays in the trunk switch and connector circuit.
- (c) Transfers the incoming T, R, and S leads from the trunk to the marker (T1, R1, and S1 leads, respectively) for test purposes.
- (d) Operates the S1 relay.

1.03 The operation of relay S1:

- (a) Supplies ground to the S lead, after the F relay releases, to hold the switch connections and to activate the TUR circuit.
- (b) Opens the MB lead to the test circuit.

- (c) Supplies a holding ground for the SA relay.
 - (d) Closes its own holding circuit to a make-contact on the S relay.
 - (e) Operates the BY relay.
- 1.04 The operation of relay BY:
- (a) Opens the FT lead.
 - (b) Opens the loop through the TG and TT leads.
 - (c) Opens the operate path of the F relay.
- 1.05 When the marker has connected the line through the network to the trunk it:
- (a) Tests the tip and ring leads for continuity.
 - (b) Tests the sleeve lead for a false ground.
 - (c) If above tests are successful, it releases the F relay.
 - (d) Releases itself.
- 1.06 The release of relay F:
- (a) Grounds the S lead to hold the connection.
 - (b) Connects the incoming T and R leads to the trunk.
- 1.07 The customers bridge across the T and R leads operates the S relay.
- 1.08 The operation of relay S:
- (a) Connects ringing tone to the line.
 - (b) Operates the SA relay.
 - (c) Supplies a holding ground for the S1 relay.
 - (d) Removes the idle terminating network across the T and R leads.
- 1.09 The operation of relay SA:
- (a) Locks to a make-contact on the S1 relay.
 - (b) Replaces ground with resistance battery on the M lead as an off-hook signal to the distant office.
- 1.10 When the distant operator answers, the E lead is grounded operating the E relay.

- 1.11 The operation of relay E:
- (a) Removes ringing tone from the line.
 - (b) Opens the MB lead to the test circuit.
 - (c) Opens the FT lead.
 - (d) Opens the loop through the TG and TT leads.
 - (e) Closes a second operating path for the BY relay.

1.12 The customer can now talk to the distant operator.

2. DISCONNECT

2.01 When the customer hangs up, the bridge across the line is opened releasing the S relay.

2.02 The release of relay S releases the S1 relay.

2.03 The release of relay S1:

- (a) Removes ground from the S lead releasing the network switches.
- (b) Releases the SA relay.

2.04 The release of the SA relay replaces resistance battery with ground on the M lead as an on-hook signal to the distant office.

2.05 When the distant operator disconnects, ground is removed from the E lead releasing the E relay.

2.06 The release of relay E releases the BY relay.

2.07 The trunk is now in its idle state.

3. TESTING

3.01 Testing of this trunk is performed by setting up a test connection to this trunk from a test line. Routine operations are performed from the test line to the distant operator in the same manner as for a regular service call.

4. MISCELLANEOUS

4.01 Network T is provided as an idle terminating network across the T and R leads.

4.02 Network E is provided to protect the E lead from voltage surges caused by the release of the E relay.

- 4.03 Network S is provided to protect the diodes in the line circuits.
- 4.04 Resistance M and lamp M are provided for use with the M lead signaling circuit.
- 4.05 The A capacitor is provided to isolate the AC tone from the DC signals.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

- 1.01 See the No. 3 crossbar keysheet for customer line supervision limits.

2. FUNCTIONAL DESIGNATIONS

2.01 Relays

<u>Designation</u>	<u>Meaning</u>
BY	Busy
E	Ear
F	Frame (Marker Function)
S	Supervisory
SA	Auxiliary Supervisory
Sl	Sleeve

3. FUNCTIONS

- 3.01 Indicate to marker which trunk switch units have one or more idle trunks for this route.
- 3.02 Indicate to marker which trunks in selected group are idle.
- 3.03 Provide for operation of F relay.
- 3.04 Establish connection to calling customer when marker disconnects.
- 3.05 Provide an idle circuit termination and remove said termination when relay S operates.
- 3.06 Provide for signaling on an E and M lead basis.
- 3.07 Provide a talking path over leads T and R.

- 3.08 Hold the circuit busy under control of either party.
- 3.09 Provide ringing tone for calling customer until called operator answers.
- 3.10 Provide connection to TUR circuit.
- 3.11 Restore to normal when calling and called ends disconnect.
- 3.12 Provide a means of making this circuit busy from the test circuit.

4. CONNECTING CIRCUITS

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

- (a) Trunk Switch and Connector Circuit - SD-26383-01.
- (b) Traffic Usage Recorder Circuit - SD-96494-01.
- (c) Test Circuit - SD-26411-01.
- (d) PRFD Circuit - SD-26414-01.
- (e) N1 Carrier Application Schematic - SD-95121-01 (Typical).
- (f) Line and Balancing Composite Set and Repeating Coil Circuit - SD-95004-01.
- (g) "A" Composite Signalling Circuit Type B - SD-95032-01 (Typical).
- (h) Single Frequency Signaling Circuit - SD-56202-01.
- (i) 4-Wire Terminating Circuit - SD-95489-01.

5. MANUFACTURING TESTING REQUIREMENTS

- 5.01 This circuit shall be capable of performing all 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 If it is desired to remove this trunk from service for trouble or other

reasons, the test circuit is arranged to ground the MB lead which operates the BY relay. This sets the trunk in the busy state.

6.02 The test circuit can ground the MB lead by either of the following methods:

(a) Insertion of a make-busy plug in the associated TRK MB- jack.

(b) Operation of the remote make-busy facilities if they are provided.

6.03 Removal of ground from the MB lead will restore this circuit to service.

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