

CROSSBAR SYSTEMS
NO. 3
RECORDING COMPLETING OR SPECIAL SERVICE
PLUG-ENDED TRUNK
CIRCUIT
E AND M LEAD SUPERVISION
COIN WITH OR WITHOUT NON-COIN

CHANGES

C. Changes in Circuit Requirements Other
Than Those Caused by Changes in
Apparatus

- C.1 Reference to Test Note 1 is added
for the CB relay.
- C.2 Blocking information has been added
for the F relay.

- C.3 Blocking information has been added
to the timing requirements for the
CT timer.

D. Description of Changes

- D.1 Contact 9 of the SL relay and 6 of
the TD relay are added in parallel
with 7 of the CRL relay.
- D.2 SC4 has been revised.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-GFC

WE DEPT 25820-JRF-GWC-BT

CROSSBAR SYSTEMS
NO. 3
RECORDING COMPLETING OR SPECIAL SERVICE
PLUG-ENDED TRUNK
CIRCUIT
E AND M LEAD SUPERVISION
COIN WITH OR WITHOUT NON-COIN

CHANGES

D. Description of ChangesB. Changes in Apparatus

<u>B.1</u>	<u>Superseded</u>	<u>Superseded By</u>
	M - 18BH Resistor - Fig. 1, Option N	M - 533A Diode - Fig. 1, Option M

- D.1 The FS1 and CAD 2 reference to "Transmission and Signaling Facilities with Type I Interface" is added.
- D.2 The FS1 has been revised to show the addition of N option. Option M was not formerly designated and is rated Mfr Disc.
- D.3 Circuit Note 104 is revised.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-GFC

WE DEPT 25820-JRF-GWC-BT

11

CROSSBAR SYSTEMS
NO. 3
RECORDING COMPLETING OR SPECIAL SERVICE
PLUG-ENDED TRUNK
CIRCUIT
E AND M LEAD SUPERVISION
COIN WITH OR WITHOUT NON-COIN

TABLE OF CONTENTS	PAGE	TABLE OF CONTENTS (CONT)	PAGE
<u>SECTION I - GENERAL DESCRIPTION.</u>	1	<u>RESTRICTED RINGBACK.</u>	7
<u>1. PURPOSE OF CIRCUIT</u>	1	<u>CIRCUIT OPERATION ON RECALL.</u>	7
<u>2. GENERAL DESCRIPTION OF OPERATION</u>	1	<u>9. SIGNALING THE OPERATOR</u>	8
SEIZURE FOR COMPLETION OF A CALL	1	<u>10. HOLD AND DISCONNECT.</u>	8
OPERATOR ANSWERS	2	<u>11. TESTING.</u>	8
OPERATOR COIN CONTROL AND RECALL	2	<u>SECTION III - REFERENCE DATA</u>	9
DISCONNECT	2	<u>1. WORKING LIMITS</u>	9
<u>SECTION II - DETAILED DESCRIPTION.</u>	2	<u>2. FUNCTIONAL DESIGNATIONS.</u>	9
<u>1. TRUNK SELECTION AND SEIZURE BY THE</u> <u>MARKER</u>	2	<u>3. FUNCTIONS.</u>	9
<u>2. SEIZURE SIGNAL TO THE OPERATOR</u>	3	<u>4. CONNECTING CIRCUITS.</u>	10
<u>3. CALL ABANDONED BY CUSTOMER BEFORE</u> <u>OPERATOR ANSWERS</u>	3	<u>5. MANUFACTURING TESTING REQUIREMENTS</u>	11
<u>4. OPERATOR ANSWERS</u>	3	<u>6. TAKING EQUIPMENT OUT OF SERVICE.</u>	11
<u>5. AUTOMATIC COIN CONTROL CYCLES.</u>	4	<u>SECTION I - GENERAL DESCRIPTION</u>	
AUTOMATIC COIN RETURN CYCLE.	4	<u>1. PURPOSE OF CIRCUIT</u>	
AUTOMATIC COIN COLLECT CYCLE	5	1.01 This circuit is used to complete spe- cial service or toll calls from a coin customer, in a No. 3 crossbar office to a distant toll switchboard. This circuit is also arranged to complete calls from a noncoin customer on a route advance or shared group basis.	
<u>6. TONE INDICATION TO OPERATOR -</u> <u>OPTION P</u>	5	1.02 This circuit is arranged for control- ling the disposal of coins by means of in-band signaling using two frequencies over the tip and ring to collect, return, and rering.	
<u>7. COIN CONTROL FROM DISTANT SWITCH-</u> <u>BOARD.</u>	5	<u>2. GENERAL DESCRIPTION OF OPERATION</u>	
COIN COLLECT	5	SEIZURE FOR COMPLETION OF A CALL	
COIN RETURN.	6	2.01 When the marker receives an indication that a trunk of this type is required,	
FALSE WINKS.	7		
<u>8. RECALLING THE CUSTOMER</u>	7		
UNRESTRICTED RINGBACK - OPTION X	7		

it selects an idle trunk switch and connector circuit, an idle trunk on that circuit associated with the desired route. After the marker completes certain tests, the selected trunk is connected to the calling customer.

OPERATOR ANSWERS

2.02 When the operator at the distant switchboard answers, ground is received by the trunk over the E lead. Answer supervision is returned toward the calling end since this trunk may be accessed by an intercept trunk that is being transferred from an announcement machine for live intercept.

2.03 On coin calls with option P provided the operator is sent an identification tone that this is a coin call, this identification tone is required only when noncoin calls are also served, either by route advance or common group basis.

OPERATOR COIN CONTROL AND RECALL

2.04 To return coins, collect coins, or to recall a customer the operator operates the appropriate key causing the dual channel receiver in the trunk to be connected, after which the proper MF tones are transmitted from the switchboard to set the trunk into the proper mode to perform the coin return, coin collect, and recall features.

DISCONNECT

2.05 When the customer disconnects at the end of a call an on-hook signal is transmitted forward. On coin calls the automatic coin collect cycle is started, any coins which the operator failed to return or collect at the end of the call are automatically collected.

SECTION II - DETAILED DESCRIPTION

1. TRUNK SELECTION AND SEIZURE BY THE MARKER

1.01 The marker receives information from the originating register and from this information selects an idle trunk of this type in the following manner. The marker first selects an idle trunk switch and connector circuit with at least one such idle trunk of the desired route. If there is at least one idle trunk of this type on a trunk switch and connector circuit the FT lead from the trunk will be grounded. The marker then connects to the selected idle trunk switch

and connector circuit, and selects an idle trunk by supplying battery to lead TF operating F. The F operated:

- (a) Transfers the T, R, and S leads from this trunk to the marker via the Tl, Rl, and SL leads for certain tests.
- (b) Locks operated through its 6M contact to lead TF under control of the marker.
- (c) Grounds lead JC and SW to the trunk switch and connector circuit.
- (d) Operates the Sl and AR relays also operates CN relay if this is a coin call.

The AR operated:

- (e) Prepares a locking ground for itself through its 4M contact.
- (f) Provides an auxiliary locking path for CL.
- (g) Connects ringing induction tone to the customer through the E capacitor.

If this is a coin call the CN operated:

- (h) Provides its own lock path through its 12 make contact.
- (i) Provides battery to the windings of CC and CR.
- (j) Partially prepares the operate path of R.
- (k) Prepares an operate path for CNl.
- (l) Opens an operate path of CRL.
- (m) Prepares the tone indication path for the BT3 lead (with option P).

The Sl operated:

- (n) Connects 18.7-ohm ground to the S lead to the trunk switch and connector circuit to hold the connection to the customer line.
- (o) Opens lead MB to the test circuit to prevent seizure of the trunk for test calls.

(p) Opens the operating path of F to prevent this trunk from being seized for other service calls while this trunk is busy.

(q) Operates BY.

(r) Provides a locking ground for relay CN, if this is a coin call.

(s) Provides an operating ground for CC.

The operation of BY:

(t) Removes an idle indicating ground from lead FT.

2. SEIZURE SIGNAL TO THE OPERATOR

2.01 After the marker has complete its functions and is satisfied that the connections to the trunk are in order, the marker disconnects from the trunk releasing the F relay. The release of F connects the T, R, and S leads of trunk through the trunk switch and connector circuit with the T and R leads extending to the customer line. The L will then operate over the customer loop. The operation of L:

(a) Provides a locking path for AR. The AR is slow to release so that it will remain operated from the time F releases and until L operates.

(b) Operates Ll.

The operation of Ll:

(c) Sends an off-hook signal forward.

(d) Cuts through the transmission path.

(e) Removes the T network used as an idle circuit termination.

(f) Prepares an operating path for R.

3. CALL ABANDONED BY CUSTOMER BEFORE OPERATOR ANSWERS

3.01 When the customer disconnects L releases, releasing Ll, and if the operator has not answered L releases AR which releases Sl. The Sl released:

(a) Disconnects ground from the sleeve and trunk switch and connector circuit releasing the channel to the customer line.

(b) Releases CN and BY.

The release of BY:

(c) Grounds the FT lead to the trunk switch and connector circuit as a mark that this trunk is idle.

3.02 When BY releases this circuit is normal.

4. OPERATOR ANSWERS

4.01 The operation of Ll caused on off-hook signal to be sent forward, which results in the lighting of the operator supervisory lamp. When the operator answers E is operated. The operation of E:

(a) Opens the operating path for F and opens lead FT at a second place.

(b) Partially closes the operating path for ER.

(c) Operates SL.

The operation of SL:

(d) Provides an auxiliary holding path for AR so that AR will not release until both the customer and operator have disconnected.

(e) Removes ringing induction tone from the customer line.

(f) Operates CL.

(g) Operates CR if option V is provided and CN is operated.

(h) Provides an operating path for CT.

(i) Opens the operating path for CC at another point.

(j) Prepares the tone indication path to the operator, (option P provided) if CN is operated.

(k) Partially closes the operate path for El.

4.02 The SL is a slow-release relay to hold the trunk when E releases to initiate the coin or ringing feature. The operation of CR:

(a) Activates the automatic coin return cycle - see SECTION II 5. for details.

(b) Causes the tone indication to be sent to the operator if this is a coin call and option P is provided.

The operation of CL:

- (c) Locks operated to SL.
- (d) Partially prepares the operating path of CC.
- (e) Operates CRL if this is a noncoin call, or option W is provided.
- (f) Replaces 18.7-ohm holding ground on lead S with full ground to hold the channel hold magnets and in doing so, returns answer supervision to an intercept trunk if this call was transferred from an announcement machine.

The operation of CRL:

- (g) Causes the tone indication to be sent to the operator if this is a coin call and option W is provided.
- (h) Activates the CT timing circuit. When the timer operates, CT operates removing the tone indication to the operator, and the circuit is now set for conversation.
- (i) Opens the operating path of CR.
- (j) Prepares the operating path partially of CC.
- (k) Prepares the operating path of CRL and CCL.
- (l) Prepares the operating path of TD.

5. AUTOMATIC COIN CONTROL CYCLES

5.01 The automatic coin return cycle is used to return the initial coin when the operator answers. The automatic coin collect cycle is used to collect any coin which may be in the box when both customer and operator have disconnected. The coin cycles are timed by a timer circuit to insure a minimum application of coin potential to the customer line for 0.5 second.

5.02 On abandoned calls before the operator has answered the coins are returned by the associated auxiliary coin line circuit. With option V provided the coin will be returned on operator answer. With option W provided the operator must operate the coin return key to return initial coins.

5.03 The coin collect and coin return cycles are very similar in operation; therefore, only one will be discussed in detail.

AUTOMATIC COIN RETURN CYCLE

5.04 The automatic coin return cycle is started by CR operating. The CR is operated by SL operating if option V is provided. The SL operates when the operator answers. The operation of CR:

- (a) Connects the winding of CT relay to terminal 10 of the CT timer.
- (b) Connects a make-contact of CRL through resistor H to a make-contact on CB.
- (c) Operates CRL.

The operation of CRL:

- (d) Provides holding paths for SL and L.
- (e) Extends coin return potential to a make-contact of CB.
- (f) Operates CB.

The operation of CB:

- (g) Disconnects talking battery from the customer line.
- (h) Connects coin return potential to the tip of the customer line through the 70-ohm resistor H.
- (i) Provides an auxiliary holding path for L.
- (j) Opens the operating path of CC.
- (k) Charges capacitor G by opening the shunting path through resistor F.

5.05 The coin return potential is applied to the customer line from the time CB operates and until CR releases.

5.06 The charging time necessary to build up the voltage across capacitor G to a magnitude that will cause the operation of timer CT is about 0.5 to 0.75 second. The timer operated operates relay CT. The operation of CT:

- (a) Locks CT operated through SL operated.
- (b) Resets the timer.
- (c) Operates CRL.

5.07 When CRL operates, it locks to SL operated and releases CR. The CR releasing disconnects the coin potential from

the customer line and releases CRL. The CRL releasing opens an auxiliary holding path for L and SL, and releases CB. The release of CB:

- (a) Opens a holding path for L.
- (b) Reconnects talking battery to the customer line.
- (c) Removes the discharge network capacitor F, resistor J and K from the customer line.

This discharge network is connected to the customer line for at least 0.4 second after the coin potential is removed, the time being determined by the release time of CRL and CB. Thus, the customer line is discharged before talking battery is reconnected.

5.08 After CB has released, the circuit is in the talking condition.

AUTOMATIC COIN COLLECT CYCLE

5.09 The automatic coin collect feature is used only at the end of a call. This feature is similar to the automatic coin return feature, which is described in greater detail. When the customer and operator have both disconnected, causing both L and SL to release, AR releases. The AR released, closes ground through SL, CL, and CRL operated, and SL and CB released to operate CC. The CC operates CCL and connects the winding of CT to terminal 10 of the CT timer. The CCL operates CB which connects coin collect potential to the customer line and allows capacitor G to charge. When timer CT operates, CT operates and locks through CC. The CT operated resets the timer and releases CL. The CL releases CC to remove the coin potential from the customer line and releases CCL. The CCL releases SL and CB. The CB removes the discharge network from the customer line. The SL releasing, releases CRL, CN, and BY. The BY released restores the circuit to normal.

6. TONE INDICATION TO OPERATOR - OPTION P

6.01 When the trunk circuit is arranged to serve coin and noncoin customers, a spurt of low-tone is used to distinguish the coin from the noncoin customer.

6.02 If the call is originated from a coin customer the marker operates CN. When the operator answers SL will operate. The SL operates CL and if option V is provided, CR is operated to start the automatic coin return cycle. When option W is provided CL operates CRL. The CR or CRL operating connects low-tone to the ring of the trunk. The duration of this tone is determined by the CT timing circuit. This timing circuit is activated by CB if option V is provided and by CRL if option W is provided. The CT operating removes this low-tone.

6.03 If the call is from a noncoin customer the marker does not operate CN, and thus no tone is transmitted to the operator distinguishing this call as noncoin.

7. COIN CONTROL FROM DISTANT SWITCHBOARD

COIN COLLECT

7.01 When the operator collects a coin a wink signal is received. When E releases EL operates, and when E reoperates ER operates. Shortly after E reoperates 1100- and 700-Hz tones are received as a coin collect code. The operation of EL:

- (a) Partially prepares a locking path for EL.
- (b) Opens the tone supply lead.
- (c) Releases CT.
- (d) Operates TD.
- (e) Prepares the operating path for ER.

The operation of ER:

- (f) Connects the trunk to the receiver circuit, and the combination of 1100- and 700-Hz tones causes F2 and F1 to operate, respectively.
- (g) Provides a holding path for L.
- (h) Provides an operating path for CT.
- (i) Removes the short circuit from capacitor G allowing it to charge.

The operation of F2:

- (j) Holds ER operated.
- (k) Opens the tone supply lead.
- (l) Partially closes the operating path for CNL.
- (m) Releases TD.

The operation of F1:

- (n) Holds ER operated.
- (o) Partially closes the operating path of CCl.

The release of TD:

- (p) Operates CT.
- (q) Operates CNL.
- (r) Releases EL.

The operation of CNL:

- (s) Prepares a path to connect coin collect potential to the tip of customer line.
- (t) Operates CCl.
- (u) Provides a locking ground for CCl.

The operation of CCl:

- (v) Locks CCl operated to CNL.
- (w) Operates CB.
- (x) Opens the operating path of CRL.
- (y) Provides a holding path for L and SL.
- (z) Connects coin collect battery to a make-contact of CB.

The operation of CB:

- (aa) Provides a holding path for L.
- (ab) Removes the talking battery from and connects coin collect potential to the tip of the customer line.
- (ac) Opens the operating path of CC.

7.02 The application of the coin collect potential for approximately one-half second insures the operation of the coin magnet.

7.03 When the coin collect key is released the 1100- and 700-Hz tones are removed releasing F2 and F1, which releases ER. The F2 also releases CNL. The release of CNL:

- (a) Releases CCl.
- (b) Removes coin collect potential from the customer line.

The release of CCl:

- (c) Removes a holding path for L and SL.
- (d) Releases CB.

The release of CB:

- (e) Removes the last holding path for L.
- (f) Restores talking battery to the customer line.
- (g) Removes the line discharge network from the customer line.

7.04 When CB has released the circuit is set up for conversation.

COIN RETURN

7.05 When the operator returns a coin, a wink signal is received. The E in releasing operates EL, and when E reoperates ER operates. Shortly after E reoperates 1700- and 1100-Hz tones are received as a coin return code. The operation of EL:

- (a) Partially provides a locking path for EL.
- (b) Opens the tone supply lead.
- (c) Releases CT.
- (d) Prepares the operating path for ER.
- (e) Operates TD.

The operation of ER:

- (f) Connects the trunk to the receiver circuit, and the 1100-Hz tone causes F2 to operate.
- (g) Provides a holding path for L.
- (h) Provides an operating path for CT.
- (i) Removes a short circuit from capacitor G allowing it to charge.

The operation of F2:

- (j) Holds ER operated.
- (k) Opens the tone supply lead.
- (l) Partially closes the operating path for CN1.
- (m) Releases TD.

The release of TD:

- (n) Operates CT.
- (o) Operates CN1.
- (p) Releases EL.

7.06 The remaining coin return operations are the same as for coin collect, with the exception that CN1 operates CR1 instead of CCL, and coin return instead of coin collect potential is applied to the customer line.

7.07 When the coin return key is released the 1700- and 1100-Hz tone are removed. Removal of 1100-Hz tone causes F2 to release and release ER. The F2 also releases CN1. The remaining circuit functions are the same as for coin collect, except that CN1 releasing releases CR1, and CR1 releasing removes coin return potential from the customer line.

FLASE WINKS

7.08 Due to possible false wink signals a circuit function has been designed to check this hazard. When relay E releases it operates EL, and if relay E reoperates before SL releases and the signal is recognized as a wink signal. When EL operated it released CT. The E in reoperating operates ER, which removes the short circuit of capacitor G allowing it to charge to the threshold potential of CT. The time constant of the CT timer RC network is 500 to 750 ms. If tones are not received before this time elapses timer CT will operate operating CT. The CT in operating releases EL which in turn releases ER, reestablishing the transmission path between the customer and operator.

7.09 This false wink function is also activated whenever R releases and reoperates before SL releases.

8. RECALLING THE CUSTOMER

8.01 The ringing feature of this trunk is used to recall the coin customer after a call is completed to request overtime payment, and to recall noncoin and PBX customers to inform these customers of the charges.

8.02 Because this circuit may serve noncoin customer lines restricted ringback and unrestricted ringback features are provided. These features are superfluous when a coin customer is calling, since CN operated allows the operator to ring the customer under all conditions.

UNRESTRICTED RINGBACK - OPTION X

8.03 With unrestricted ringback any customer or PBX line connected to this trunk can be recalled at any time. In this case an operating path is provided for R regardless of the customer switchhook condition. Unrestricted ringback is usually used only if party lines are not served by this trunk.

RESTRICTED RINGBACK

8.04 With restricted ringback R can only operate if L1 is operated, which is the condition existing when the customer receiver is off-hook. This feature is usually used for a PBX line after the extension has disconnected.

CIRCUIT OPERATION ON RECALL

8.05 When the ringing key is operated a wink signal is received. The E in releasing operates EL and TD, and when E reoperates ER operates. Shortly after E reoperates 1700- and 700-Hz tones are received as a rering code. The operation of EL:

- (a) Partially provides a locking path for EL.
- (b) Opens the tone supply lead.
- (c) Releases CT.
- (d) Prepares the operating path for ER.
- (e) Operates TD.

The operation of ER:

- (f) Connects the trunk to the receiver circuit, and the 700-Hz tone causes Fl to operate.
- (g) Provides holding path for L.
- (h) Provides an operating path for CT.
- (i) Removes a short circuit from capacitor G allowing it to charge.

The operation of Fl:

- (j) Holds ER operated.
- (k) Opens the tone supply lead.
- (l) Operates R.
- (m) Releases TD.

The release of TD:

- (n) Operates CT.
- (o) Releases El.

The operation of R:

- (p) Provides a holding path for L.
- (q) Removes talking battery from and connects 20-Hz ringing voltage to the customer line.

8.06 When the recall signal is completed the 1700- and 700-Hz tones are removed. Removal of the 700-Hz tone causes Fl to release, which releases R and ER. The release of R:

- (a) Removes a holding path for L.
- (b) Disconnects the ringing voltage and re-connects talking battery to the customer line.

9. SIGNALING THE OPERATOR

9.01 To signal the operator after the operator has answered the customer depresses and releases the switchhook, causing L to follow the switchhook. The Ll follows the release and operation of L, transmitting off-hook and on-hook signals forward flashing the supervisory lamp at the switchboard.

9.02 If the operator disconnects while the customers receiver is off-hook, an off-hook signal will be sent forward causing the supervisory lamp to flash. When the operator disconnected E released and released SL. The SL releasing, connects ringing induction tone to the customer line. The operator will answer again and when SL operates and the ringing induction tone is removed, and the circuit is set up for conversation.

10. HOLD AND DISCONNECT

10.01 The trunk connection is maintained if the operators cord is connected to the trunk or if the calling customer has the receiver off-hook. When the customer disconnects, L releases releasing Ll. The Ll releasing, sends an on-hook signal forward causing the operator supervisory lamp to light steadily as a disconnect signal.

10.02 When the operator disconnects E will release and release SL, which will release AR. On coin calls the release of AR operates CC to start the automatic coin collect cycle as described in 5. of this section. At the end of this cycle Sl releases. If the call is noncoin AR releasing releases Sl. The release of Sl:

- (a) Disconnects ground from the sleeve to the trunk switch and connector circuit releasing the connection to the customer line.
- (b) Reconnects lead MB lead to the test circuit.
- (c) Releases CRL, CN, and BY.

The release of BY:

- (d) Grounds lead FT to the trunk switch and connector circuit as an indication that this trunk is idle.

10.03 When BY releases the trunk is normal.

11. TESTING

11.01 Routine tests are made on this trunk by setting up a test connection to this trunk from the test circuit. The test circuit primes a marker which selects this trunk in same general manner as for a regular call. However, if the trunk has been

plugged busy the marker can be directed to temporarily remove ground from lead MB to permit this circuit to be selected by the marker. Routine tests are then made from the test circuit.

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>
AR	All Release
BY	Busy
CB	Coin Battery
CC	Coin Collect
CC1	Coin Collect Auxiliary
CL	Coin Lock
CN	Coin
CN1	Coin Auxiliary
CR	Coin Return
CRL	Auxiliary to CR
CRL	Coin Released
CT	Coin Timer
E	Receive
E1	Auxiliary to E
ER	Enter Receiver
F	Frame
F1	Frequency 1
F2	Frequency 2
L	Calling Customer Supervision

Designation

Meaning

L1	Auxiliary to L
R	Ringing
S1	Sleeve
SL	Called End Supervision
TD	Time Delay

3. FUNCTIONS

3.01 When this circuit is available for seizure, a ground is provided on lead FT to the trunk switch and connector circuit indicating to the markers that there is an idle trunk, in the desired trunk group, on the frame.

3.02 Provides an F relay associated with lead TF which is operated by the marker when it seizes this trunk. The F transfers the T, R, and S leads from this trunk to the marker for making a tip and ring continuity test and S lead false ground test.

3.03 Provides for the removal of ground from lead FT as a busy indication to the markers.

3.04 Provides a slow-release relay, which causes the connection to be held after the marker releases and before the customer line supervisory circuit takes control.

3.05 A tone indication is provided on an optional basis to indicate to the operator that this call is a coin call when both coin and noncoin calls can be routed to this trunk circuit.

3.06 To provide a means for the marker to indicate to the trunk that a coin call is being routed to this trunk by grounding the CN lead.

3.07 To provide the marker with a ground check over lead CN as a check that CN has operated.

3.08 Provides for holding the connection over extra dial pulses.

3.09 Provides an off-hook indication to the distant switchboard when the customer is off-hook.

- 3.10 Provides the customer with ringing induction tone until the operator answers and permits the return of ringing induction tone if the operator disconnects while the customer receiver is off-hook.
- 3.11 Permits the customer to abandon the call and release the connection before the operator answers.
- 3.12 Provides means for holding the connection until both the customer and operator disconnect after a complete connection has been established.
- 3.13 Provides automatic return of the initial coin when the operator answers if option V is provided.
- 3.14 Provides for direct control of the coin control features by the distant operator.
- 3.15 Provides for removal of talking battery when coin potential is applied to the customer line.
- 3.16 Provides approximately a half-second interval after the coin potential is removed from the customer line, to discharge the line of coin potential. This interval also permits the coin magnet to restore to normal before talking battery is reconnected to the line.
- 3.17 Provides an automatic coin collect cycle after the customer and operator have disconnected.
- 3.18 Provides a short spurt of tone to the operator as an indication, that this call is a coin call when both coin and non-coin calls may be routed to this trunk.
- 3.19 Provides for reapplying the identification tone if the operator disconnects and replugs before the customer disconnects.
- 3.20 Provides an 18.7-ohm holding ground to the S lead of the trunk switch and connector circuit to hold the channel.

- 3.21 Provides a means of bridging the 18.7-ohm holding ground with full ground upon operator answer this change in potential is used for "answer supervision" when this trunk may be accessed by an intercept trunk in conjunction with an announcement machine.
- 3.22 Provides for recalling a noncoin customer or PBX when the customer receiver is off-hook; or provides for recalling the customer under all conditions if the unrestricted ringback option is provided. If the calling customer is coin the operator may ring the customer if the receiver is off-hook or on-hook.
- 3.23 Provides switchhook supervision to the operator.
- 3.24 Provides a connection to an associated make-busy MB jack on the test circuit to make the trunk busy without interfering with an established call.
- 3.25 Provides means for overriding a make-busy condition on test calls. The marker may set up a test connection by causing removal of ground from lead MB long enough to permit trunk selection.

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) Power Ringing and Tone Distributing Circuit - SD-26414-01.
 - (c) Test Circuit - SD-26411-01.
 - (d) Traffic Usage Recorder Circuit - SD-96494-01.
 - (e) Signaling and Transmission Facilities Computability - SD-99421-01.
 - (f) Time Delay Control Circuit - SD-94820-01.

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 Requirements Tables.

6. TAKING EQUIPMENT OUT OF SERVICE

6.01 If it is desired to remove this trunk from service for trouble or other reasons, a short-circuit plug is inserted into the MB jack, on the test circuit, associated with this circuit. This connects ground through a normal contact of relay TST

in the test circuit to the MB lead in this circuit causing the BY relay to operate. The operation of BY disconnects ground from lead FT which indicates the associated trunk switch and connector circuit is busy insofar as this circuit is concerned.

6.02 When remote make-busy facilities are provided, the MB lead to the trunk can be grounded by the operation of an associated latching relay located in the remote make-busy and restore translator circuit via the MB jack at the test circuit.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-LCB

WE DEPT 355-JLS-KLF-DM

