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TRAFFIC SERVICE SYSTEMS  
SUPERVISOR TELEPHONE CIRCUIT  
OPERATING ROOM DESK NO. 23A, B, C, OR D

CHANGES

B. Changes in Apparatus (Components)

B.1 Superseded                      Superseded By

Resistor A,                      KS-14603,L2C  
KS-8512,L3A

D.2 Resistor A, KS-8512,L3A is replaced on a line out basis with a KS-14603,L2C unit, in accordance with the WE-KY standardization program.

D.3 Drafting errors are corrected on the drawings as follows:

D. Description of Changes

D.1 Option ZI is rerated from Mfr Disc. to A&M Only and information is added to circuit note 102 to provide for proper interconnection of Fig. 15 in this circuit through use of ZI option, when the associated incoming trunk switch circuit is not arranged for dual control, and this circuit connects to the centralized supervisory console circuit.

(a) The resistance value of the winding (830 ohms) is added at relay L1 in Fig. 1;

(b) At lead D2, Fig. 22, the destination information is changed to read:

TO FIG. 22 OF SUCC. EVEN POS OR  
TO FIG. 1

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5245-GFC

WE DEPT 14KY183260-HCG-JK

NOTICE

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TRAFFIC SERVICE SYSTEMS  
 SUPERVISOR TELEPHONE CIRCUIT  
 OPERATING ROOM DESK NO. 23A, B, C, or D

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<u>A. Supervisor Call Bell</u>	1	<u>1. PURPOSE OF CIRCUIT</u>	
<u>B. Supervisor Call Lamp</u>	2	1.01 This circuit is used by the operating room desk No. 23A, B, C, or D supervisor to answer calls transferred by the desk operators. It provides keys and lamps required by the operators for signaling the supervisor or a messenger and provides means whereby an operator may transfer a call to the supervisor at the centralized supervisory console.	
S LP AND MC KEY - FIG. 10	2	<u>2. GENERAL DESCRIPTION OF OPERATION</u>	
<u>A. Supervisor Call Lamp</u>	2	2.01 Two supervisor transfer circuits are provided for transferring a customer call to a supervisor. One transfer circuit is preferred by one-half of the positions and overflow to a second transfer circuit. The second transfer circuit is preferred by the rest of the positions and overflow to the first transfer circuit. The supervisor circuit is associated with one vertical unit of the crossbar switch of the Incoming Trunk Switch Circuit. When a desk operator transfers an incoming trunk to the supervisor, the select magnet, corresponding to the incoming trunk, and the hold magnet, corresponding to the supervisor, are operated. Thus, both the supervisor and the desk operator are connected to the incoming trunk. The operation of relay SC short-circuits a relay in the Operators Telephone and Position Circuit to release the hold magnet that corresponds to the desk operators position, releasing the connection between the position and the incoming trunk.	
<u>B. Messenger Call Key</u>	2	<u>SECTION II - DETAILED DESCRIPTION</u>	
MISCELLANEOUS	2	<u>1. SUPERVISOR CALL AND MESSENGER CALL KEYS</u>	
<u>2. TRANSFER OF CALL TO THE SUPERVISOR</u>	2	S LP AND S BELL KEY - FIG. 12	
WITHOUT CENTRALIZED SUPERVISORY CONSOLE	2	<u>A. Supervisor Call Bell</u>	
WITH CENTRALIZED SUPERVISORY CONSOLE	4	1.01 The operation of the S BELL key connects ringing current through the R resistance lamp to the SC subset. The subset operates to inform the supervisor that a desk operator is calling.	
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B. Supervisor Call Lamp

1.02 Operation of the S LP key:

- (a) Operates relay SA.
- (b) Lights an MP lamp on each side of the desk position (W option) at desk No.-23A, B, and C, to indicate the particular position that is calling.
- (c) Lights an MP lamp at the No. 23D desk position to indicate the particular position that is calling.

1.03 The operated SA relay:

- (a) Connects ground (Fig. B) or battery (Fig. C) through a break contact on relay RL to the Service Observing Circuit.
- (b) Connects ground (V option) to the CS lead to the Operating Room Calling Signal Circuit. With V option, the toll switchboard operating room call lamps and the supervisor call lamps in the No. 23 desk light simultaneously if either a toll or No. 23 desk operator calls the supervisor.

S LP AND MC KEY - FIG. 10

A. Supervisor Call Lamp

1.04 The operation of the S LP key performs the same functions described in B above. In addition:

- (a) Connects interrupted battery from the INT relay to the SC lamps in the operating room. The lamps flash to inform the supervisor that a desk operator is calling.
- (b) With J option, lights the MPA lamps associated with the No. 23D desk.

B. Messenger Call Key

1.05 The operation of the MC key:

- (a) Lights lamp P at the messenger desk or cabinet equipment and indicates that a No. 23D desk position is requesting the services of a messenger.
- (b) Lights lamp MC at the desk position to mark the position that is calling for messenger service.

MISCELLANEOUS

1.06 The interrupter relay of Fig. 7 operates at the rate of 60 IPM. The B varistor and C inductor are provided to absorb voltage variations when the INT relay closes the path, to light the SC lamps.

2. TRANSFER OF CALL TO THE SUPERVISOR

WITHOUT CENTRALIZED SUPERVISORY CONSOLE

Note: With figures and options per circuit note 104, plus Fig. 1.

2.01 When an incoming trunk is to be transferred to the supervisor, the TR S key is operated by the supervisor. The operated TR S key connects ground from the first Fig. 2, through the back contacts of the continuity transfer chain on all ST- relays of the supervisor division, through a back contact on the SO relay, through the operated TR S key, through a closed path between L and L1 leads in the Operators Telephone and Position Circuit, to relay ST, which operates.

2.02 In Fig. 2, the operated ST relay:

- (a) Locks to the ground of the first Fig. 2, in the supervisor division under control of the closed circuit between the L1 and L leads in the Operators Telephone and Position Circuit.
- (b) Opens the operate path of higher numbered ST relays.
- (c) Prepares a locking path for relay STG.
- (d) Partially closes the path between the SEL and S leads of the Incoming Trunk Switch Circuit.
- (e) Partially closes the path for operating relay OE.
- (f) Prepares the operate path of relay STG.

2.03 When the TR S key is released, relay STG operates. The operated STG relay:

- (a) Locks to relay ST.
- (b) Partially closes the operate path of relay SC.
- (c) Connects ground to lead STG1 and, with option S, to lead STG2 of the Incoming Trunk Switch Circuit through relay L1 released.
- (d) Closes the path between leads STB1 and TB1 and, with options S and ZJ, between leads STB2 and TB2 of the Incoming Trunk Switch Circuit or Dual Control Circuit through relay L1 released.
- (e) Opens battery to lower number STG relays.
- (f) Partially closes the operate path of relay SH.

- (g) Closes the circuit between the SEL and S leads of the Incoming Trunk Switch Circuit.

2.04 The Incoming Trunk Switch Circuit now functions to connect ground to the SEL lead of this circuit, which is returned over lead S to operate the select magnet corresponding to the incoming trunk being transferred. After a time interval, the Incoming Trunk Switch Circuit connects battery to the HLD lead of this circuit, operating relay SH.

2.05 The operated SH relay:

- (a) Prepares paths for connecting separately fused batteries to operate relay RL of the Incoming Trunk Switch Circuit when relay SC operates.
- (b) Connects ground on one of the SM - leads (corresponding to the switch on which the incoming trunk is located) to the corresponding HM- lead of the Incoming Trunk Switch Circuit, to operate the hold magnet corresponding to this supervisor division.
- (c) Completes the path from lead OD to relay OE, which operates if the incoming trunk being transferred is an odd-numbered trunk.

2.06 The operated OE relay connects the T1 and R1 leads of the Incoming Trunk Switch Circuit to this circuit (odd trunk).

2.07 The operation of the hold magnet in the Incoming Trunk Switch Circuit connects ground to lead SO, operating relay SO. The operated SO relay:

- (a) Locks relay OE, if operated, and prepares a locking path for relay CT.
- (b) Opens the operate path of the ST relays in the supervisor division to prevent other incoming trunks from being connected to this supervisor.
- (c) Connects relay L across the tip and ring. Relay L operates in parallel with a relay in the Operators Telephone and Position Circuit.
- (d) Lights the S lamp at all positions in the supervisor division (ZC option).
- (e) Lights the SR lamp in Fig. 14 (ZC option).

2.08 The operated L relay operates relay L1.

2.09 The operated L1 relay:

- (a) Removes ground from the STG1 lead and, with S option, the STG2 lead of the Incoming Trunk Switch Circuit.

- (b) Opens the path between leads STB1 and TB1 and, with S and ZJ options, between leads STB1 and TB2 of the Incoming Trunk Switch Circuit or Dual Control Circuit.

- (c) Partially completes the operate path of relay CT.

- (d) Operates relay SC from ground on relay STG- operated.

- (e) Connects ground to lead SLH of the Incoming Trunk Switch Circuit or Dual Control Circuit to lock the hold magnet.

2.10 The operated SC relay:

- (a) Short-circuits the tip and ring to release a relay in the Operators Telephone and Position Circuit and relay L of this circuit.

- (b) Connects ground to the winding of relay L1 which remains operated when relay L releases.

- (c) Opens the operate path of relay CT.

- (d) Connects battery to the RG and RB leads of the Incoming Trunk Switch Circuit, which operates relay RL in that circuit, starting the sequence that releases relay SH.

2.11 The released L relay performs no function at this time. The release of the relay in the Operators Telephone and Position Circuit releases the hold magnet of the position circuit, disconnecting the position from the incoming trunk. The release of the position circuit opens the circuit between the L1 and L leads, releasing relay ST.

2.12 The released ST relay releases relay STG.

2.13 The released STG relay:

- (a) Releases relay SC.
- (b) Connects battery to higher-numbered STG relays.

2.14 The released SC relay:

- (a) Removes the short circuit from the tip and ring, operating relay L.
- (b) Removes ground from the winding of relay L1. Relay L1 is slow release, and does not release at this time.
- (c) Removes battery from the RG- and RB- leads of the Incoming Trunk Switch Circuit.

- (d) Partially closes the operate path of relay CT.

2.15 The released SH relay partially completes the operate path of relay CT.

2.16 The incoming trunk is now connected to the supervisor circuit. When the supervisor inserts the plug of her headset into the A and B jacks, relay RL operates. The operated RL relay:

- (a) Partially completes a path from the tip side of the talking circuit through the winding of relay L, contact on relay CT and FL or FL1, to the ring side of the talking circuit.
- (b) Closes ground through a back contact on relay SH, a front contact on relay L1, and a back contact on relay SC, to operate relay CT.

2.17 The operated CT relay:

- (a) Locks to relay SO operated.
- (b) Closes the talking circuit to the supervisor.
- (c) Transfers relay L from a direct connection across tip and ring to a path in series with contacts on relays RL and FL or FL1.

2.18 The talking circuit is now complete.

WITH CENTRALIZED SUPERVISORY CONSOLE

Note: With figures and options per Circuit Note 102.

2.19 When an incoming trunk is to be transferred to the supervisor, the TR S key is operated by the operator.

2.20 When the TR S key is operated in an odd position, it connects ground from the first odd ST relay through the back contacts of the continuity transfer chain on all odd ST- relays, and then through back contacts of the continuity transfer chain on all even ST- relays, through a back contact on the SO relay of the first Fig. 1 in parallel with a back contact on the second SO relay, through the operated TR S key, through a closed path between the L and L1 leads in the Operators Telephone and Position Circuit, to the ST-relay associated with the particular odd position. With battery connected to the ST lead in the Operators Telephone and Position Circuit, relay ST- operates.

2.21 When the TR S key is operated in an even position, the circuit action is the same as described in 2.20 above except that the operated ST- relay would be one associated with the particular even position.

2.22 The operated ST- relay (odd or even).

- (a) Locks to ground from the first odd ST relay in the chain under control of the closed circuit between the L and L1 leads in the position circuit.
- (b) Opens the operate paths of other ST-relays depending on which one is operated (that is the first odd operated would prevent all others from operating and the last even would prevent no others from operating).
- (c) Prepares a locking path for relay STG-.
- (d) Partially closes the path between the SEL and S leads of the Incoming Trunk Switch Circuit. The odd-numbered ST-relays are associated with the odd-numbered S leads, and the even-numbered ST-relays with the even-numbered S leads. The S leads are furnished on a one-per-position basis.
- (e) Partially closes the operate path of relay OE.
- (f) Partially closes the operate path of relay STG-.

2.23 The STG- relays are furnished four per desk, and are associated as follows:

<u>Position</u>	<u>STG-</u>	<u>Supv Transfer Ckt No.</u>
Odd	STG1	One (preferred)
Odd	STG2	Two (alternate)
Even	STG3	Two (preferred)
Even	STG4	One (alternate)

2.24 In the following description, it is assumed that both transfer circuits are idle and the first call transferred is from an odd position. With battery through a chain on the other STG- relays connected to one side of the STG1 relay, its operate path is closed when the TR S key is released. Ground through a break contact of the TR S key on the N lead, through a make contact of the ST- relay on the F1 lead, through a back contact of the first SOM relay (associated with first transfer circuit) on the NC1 lead to the winding of the STG1 relay operates relay STG1.

2.25 The operated STG1 relay:

- (a) Locks to ground from relay ST- and battery through its own make contact.
- (b) Partially closes the operate path of relay SC over the SC1 lead.

- (c) Connects ground through a back contact of relay L1 to the STG1 lead of the Incoming Trunk Switch Circuit (ZI option).
- (d) Closes the path between leads STB1 and TB1 of the Incoming Trunk Switch Circuit or Dual Control Circuit through a back contact of relay L1.
- (e) Connects relay SH to the HLD lead of the Incoming Trunk Switch Circuit or Dual Control Circuit.
- (f) Closes the circuit between the SEL and S leads of the Incoming Trunk Switch Circuit or Dual Control Circuit.
- (g) Closes another link in the operate path of relay OE.
- (h) Opens the operate path of the STG2 relay.
- (i) Connects ground through a back contact of relay L1 to the STB2 lead to the Dual Control Circuit (ZJ option).

2.26 The Incoming Trunk Circuit or Dual Control Circuit now functions to connect ground to the SEL lead of this circuit, which is returned over lead S to operate the select magnet corresponding to the incoming trunk being transferred. After a time interval, the Incoming Trunk Switch Circuit connects battery to the HLD lead of this circuit, operating relay SH.

2.27 The operated SH relay:

- (a) Prepares paths for connecting separately fused batteries to operate relay RL of the Incoming Trunk Switch Circuit when relay SC operates.
- (b) Connects ground on one of the SM-leads (corresponding to the switch on which the incoming trunk is located) to the corresponding HM-lead of the Incoming Trunk Switch Circuit, to operate the hold magnet corresponding to this transfer circuit.
- (c) Completes the path from lead OD to relay OE, which operates if the incoming trunk being transferred is an odd-numbered trunk.

2.28 The operated OE relay connects the T1 and R1 leads of the Incoming Trunk Switch Circuit to this circuit (odd trunk).

2.29 The operation of the hold magnet in the Incoming Trunk Switch Circuit connects ground to lead SO, operating relay SO. The operated SO relay:

- (a) Locks relay OE, if operated, and prepares a locking path for relay CT.

- (b) Partially opens the operate path of all the odd ST- relays.
- (c) Connects relay L across the tip and ring. Relay L operates in parallel with a relay in the Operators Telephone and Position Circuit.
- (d) Operates the first SOM relay over the SO1 lead.

2.30 The operated SOM relay:

- (a) Connects ground to lead SG to the Centralized Supervisory Console Circuit as a calling indication.
- (b) Partially closes the circuit to light the TR BY lamps in the desk positions.
- (c) Opens the operate path of the STG1 relay.
- (d) Partially closes the operate path of the STG2 relay.
- (e) Partially opens the operate path to the even ST- relays.

2.31 The operated L relay operates relay L1.

2.32 The operated L1 relay:

- (a) Removes ground from the STG1 lead of the Incoming Trunk Switch Circuit (ZI option).
- (b) Opens the path between leads STB1 and TB1 of the Incoming Trunk Switch Circuit or Dual Control Circuit.
- (c) Partially completes the operate path of relay CT.
- (d) Operates relay SC from ground on relay STG1 operated.
- (e) Connects ground to lead SLH of the Incoming Trunk Switch Circuit to lock the hold magnet.

2.33 The operated SC relay:

- (a) Short-circuits the tip and ring to release a relay in the Operators Telephone and Position Circuit to lock the hold magnet.

2.33 The operated SC relay:

- (a) Short-circuits the tip and ring to release a relay in the Operators Telephone and Position Circuit and relay L of this circuit.
- (b) Connects ground to the winding of relay L1 which remains operated when relay L releases.

- (c) Opens the operate path of relay CT.
- (d) Connects battery to the RG and RB leads of the Incoming Trunk Switch Circuit, which operates relay RL in that circuit, starting the sequence that releases relay SH.
- (e) Removes ground from the STB2 lead of the Dual Control Circuit (ZJ option).

2.34 The released L relay performs no function at this time. The release of the relay in the Operators Telephone and Position Circuit releases the hold magnet of the position circuit, disconnecting the position from the incoming trunk. The release of the position circuit opens the circuit between the L1 and L leads, releasing relay ST-.

2.35 The released ST- relay:

- (a) Releases relay STG1.
- (b) Partially closes the operate path of the higher-numbered odd ST- relays.
- (c) Opens the circuit between the SEL and S leads of the Incoming Trunk Switch Circuit or Dual Control Circuit.
- (d) Opens the operate path of relay OE, if not already opened by the release of relay SH.

2.36 The released STG1 relay:

- (a) Releases relay SC.
- (b) Releases relay SH, if not already released by the Incoming Trunk Switch Circuit.
- (c) Partially closes the operate path to relay STG2.

2.37 The released SC relay:

- (a) Removes the short-circuit from the tip and ring, allowing relay L to operate.
- (b) Removes ground from the winding of relay L1. Relay L1 is slow to release and will remain operated long enough for relay L to operate.
- (c) Removes battery from the RG- and RB-leads of the Incoming Trunk Switch Circuit.
- (d) Partially closes the operate path of relay CT.

2.38 The released SH relay:

- (a) Closes another link in the operate path of relay CT.
- (b) Opens the circuit between the SM- and HM- leads.

2.39 The incoming trunk is now connected to the Centralized Supervisory Console Circuit.

2.40 When the supervisor answers, ground is connected to the SV lead, operating relay RL. The operated RL relay:

- (a) Partially completes a path from the tip side of the talking circuit through the winding of relay L, contact on relays CT and FL or FL1 to the ring side of the talking circuit.
- (b) Closes ground through a back contact on relay SH, a front contact on relay L1, and a back contact on relay SC, to operate relay CT.

2.41 The operated CT relay:

- (a) Locks to relay SO operated.
- (b) Closes the talking circuit to the supervisor.
- (c) Transfers relay L from a direct connection across tip and ring to a path in series with contacts on relays RL and FL or FL1.

2.42 The talking circuit is now complete.

#### A. Second Call Transferred to Supervisor

2.43 In the following discussion, it is assumed that the second call is transferred from another odd position. When the TR S key is operated, it connects ground from the first odd ST relay through the back contacts of the continuity transfer chain on all odd ST- relays, through a back contact on the second SOM relay, through the operated TR S key, through a closed path between the L and L1 leads in the Operators Telephone and Position Circuit, to the ST- relay associated with the particular odd position. With battery connected to the ST lead in the Operators Telephone and Position Circuit, relay ST- operates.

2.44 The operated ST- relay:

- (a) Locks to ground from the first ST relay in the chain under control of the closed circuit between the L and L1 leads in the position circuit.
- (b) Opens the operate path of the higher numbered ST- relays in the chain.
- (c) Prepares a locking path for relay STG2.
- (d) Partially closes the circuit between the SEL and S leads of the Incoming Trunk Switch Circuit or Dual Control Circuit.

- (e) Partially closes the operate path of the OE relay in the second transfer circuit.
- (f) Partially closes the operate path of relay STG2.

2.45 With battery through a chain on the STG3 and STG4 relays connected to one side of the STG2 relay, its operate path is closed when the TR S key is released. Ground through a break contact of the TR S key on the N lead, through a make contact of the STrelay on the F1 lead, through a make contact of the first SOM relay on the NO1 lead, to the winding of the STG2 relay operates relay STG2.

2.46 The operated STG2 relay:

- (a) Locks to ground from relay ST- and battery through its own make contact.
- (b) Partially closes the operate path of the SC relay associated with the second transfer circuit over the SC2 lead.
- (c) Connects ground through a back contact of relay L1 of the second transfer circuit to the STG1 lead of the Incoming Trunk Switch Circuit (ZI option).
- (d) Closes the path between leads STB1 and TB1 of the Incoming Trunk Switch Circuit or Dual Control Circuit through a back contact of the second transfer circuit.
- (e) Connects relay SH of the second transfer circuit to the HLD lead of the Incoming Trunk Switch Circuit or Dual Control Circuit.
- (f) Closes the circuit between the SEL and S leads of the Incoming Trunk Switch Circuit.
- (g) Closes another link in the operate path of the OE relay in the second transfer circuit.
- (h) Connects ground through a back contact of relay L1 of the second transfer circuit to the STB2 lead of the Dual Control Circuit (ZJ option).

2.47 The Incoming Trunk Switch Circuit or Dual Control Circuit now functions to connect ground to the SEL lead of this circuit, which is returned over lead S to operate the select magnet corresponding to the incoming trunk being transferred. After a time interval, the Incoming Trunk Switch Circuit or Dual Control Circuit connects a battery to the HLD lead of this circuit, operating relay SH of the second transfer circuit.

2.48 The operated SH relay:

- (a) Prepares paths for connecting separately fused batteries to operate relay RL of the Incoming Trunk Switch Circuit when relay SC operates.
- (b) Connects ground on one of the SM-leads (corresponding to the switch on which the incoming trunk is located) to the corresponding HM- lead of the Incoming Trunk Switch Circuit, to operate the hold magnet corresponding to this transfer circuit.
- (c) Completes the path from lead OD to relay OE, which operates if the incoming trunk being transferred is an odd-numbered trunk.

2.49 The operated OE relay connects the T1 and R1 leads of the Incoming Trunk Switch Circuit to this circuit (odd trunk).

2.50 The operation of the hold magnet in the Incoming Trunk Switch Circuit connects ground to lead SO, operating relay SO of the second transfer circuit. The operated SO relay:

- (a) Locks relay OE, if operated, and prepares a locking path for relay CT.
- (b) Opens the operate path of all the even ST- relays.
- (c) Connects relay L across the tip and ring. Relay L operates in parallel with a relay in the Operators Telephone and Position Circuit.
- (d) Operates the second SOM relay over the SO2 lead.

2.51 The operated SOM relay:

- (a) Connects ground to lead SG to the Centralized Supervisory Console Circuit as a calling indication.
- (b) Lights the TR BY lamps in all the desk positions as an indication that both transfer circuits are busy.
- (c) Opens the operate path of the STG2 relay.
- (d) Opens the operate path to all the odd ST-relays.

2.52 The operated L relay operates relay L1.

2.53 The operated L1 relay:

- (a) Removes ground from the STG1 lead of the Incoming Trunk Switch Circuit (ZI option).
- (b) Opens the path between leads STB1 and TB1 of the Incoming Trunk Switch Circuit.

- (c) Partially completes the operate path of relay CT.
- (d) Operates relay SC from ground on relay STG2 operated.
- (e) Connects ground to lead SLH of the Incoming Trunk Switch Circuit to lock the hold magnet.
- (f) Removes ground from the STB2 lead Dual Control Circuit (ZJ option).

2.54 The operated SC option:

- (a) Short-circuits the tip and ring to release a relay in the Operators Telephone and Position Circuit and relay L of this circuit.
- (b) Connects ground to the winding of relay L1, which remains operated when relay L releases.
- (c) Opens the operate path of relay CT.
- (d) Connects battery to the RG and RB leads of the Incoming Trunk Switch Circuit, which operates relay RL in that circuit, starting the sequence that releases relay SH.

2.55 The released L relay performs no function at this time. The release of the relay in the Operators Telephone and Position Circuit releases the hold magnet of the position circuit, disconnecting the position from the incoming trunk. The release of the position circuit opens the circuit between the L1 and L leads, releasing relay ST.

2.56 The released ST- relay:

- (a) Releases relay STG2.
- (b) Partially closes the operate path of the higher-numbered odd ST- relays.
- (c) Opens the circuit between the SEL and S leads of the Incoming Trunk Switch Circuit.
- (d) Opens the operate path of relay OE, if not already opened by the release of relay SH.

2.57 The released STG2 relay:

- (a) Releases relay SC.
- (b) Releases relay SH, if not already released by the Incoming Trunk Switch Circuit.
- (c) Partially closes the operate path to relay STG1.

2.58 The released SC relay:

- (a) Removes the short circuit from the tip and ring, allowing relay L to operate.
- (b) Removes ground from the winding of relay L1. Relay L1 is slow to release and will remain operated long enough for relay L to operate.
- (c) Removes battery from the RG- and RB-leads of the Incoming Trunk Switch Circuit.
- (d) Partially closes the operate path of relay CT.

2.59 The released SH relay:

- (a) Closes another link in the operate path of relay CT.
- (b) Opens the circuit between the SM- and HM- leads.

2.60 The incoming trunk is now connected to the Centralized Supervisory Console Circuit.

2.61 When the supervisor answers, ground is connected to the SV lead, operating relay RL of the second transfer circuit. The operated RL relay:

- (a) Partially completes a path from the tip side of the talking circuit through the winding of relay L, contact on relays CT and FL or FL1 to the ring side of the talking circuit.
- (b) Closes ground through a back contact on relay SH, a front contact on relay L1, and a back contact on relay SC, to operate relay CT.

2.62 The operated CT relay:

- (a) Locks to relay SO operated.
- (b) Closes the talking circuit to the supervisor.
- (c) Transfers relay L from a direct connection across tip and ring to a path in series with contacts on relays RL and FL or FL1.

2.63 The talking circuit is now complete.

2.64 In the following discussion, it is assumed that the second call is transferred from an even position. When the TR S key is operated, it connects ground from the first even ST relay through the back contacts of the continuity transfer chain on all even ST- relays, through a back contact on the second SOM relay, through the TR S key operated, through a closed path between the L and L1 leads in the Operators Telephone

and Position Circuit to the ST- relay associated with the particular even position. With battery connected to the ST lead in the Operators Telephone and Position Circuit, relay ST- operates.

2.65 The operated ST- relay:

- (a) Locks to ground from the first ST relay in the chain under control of the closed circuit between the L and L1 leads in the position circuit.
- (b) Opens the operate path of the higher numbered ST- relays in the chain.
- (c) Prepares a locking path for relay STG3.
- (d) Partially closes the circuit between the SEL and S leads of the Incoming Trunk Switch Circuit or Dual Control Circuit.
- (e) Partially closes the operate path of the OE relay in the second transfer circuit.
- (f) Partially closes the operate path of relay STG3.

2.66 With battery through a back contact on the STG4 relay connected to one side of the STG3 relay, its operate path is closed when the TR S key is released. Ground through a break contact of the TR S key on the N lead, through a make contact of the ST- relay on the F2 lead, through a back contact of the second SOM relay (associated with second transfer circuit) on the NC2 lead, to the winding of the STG3 relay operates relay STG3.

2.67 The remainder of the circuit operation is the same as described in 2.46 through 2.61, except for the following:

- (a) Relay STG2 is replaced by relay STG3.
- (b) Relay STG3, when released, partially closes the operate path of relay STG2 as well as that of relay STG1.

3. HOLD AND TR OR FL KEY

FLASHING (R OPTION)

3.01 The operation of the FL key operates relay H. The operated H relay:

- (a) Opens the tip and ring to the telephone circuit to prevent a click to the supervisor.
- (b) Operates relay FL.

3.02 The operated FL relay:

- (a) Closes a path in parallel with a back contact on relay FL1 to hold relay L operated when relay FL1 operates.

- (b) Operates relay FL1.

3.03 The operated FL1 relay:

- (a) Connects ground to the winding of relay H to hold relay H operated when FL is released.
- (b) Connects battery through the A resistor to a back contact on relay FL.
- (c) Opens a path which is in parallel with a front contact on relay FL.

3.04 The release of key FL releases relay FL. The released FL relay:

- (a) Releases relay FL1, which is a slow-release relay.
- (b) Through the continuity transfer, and a front contact on relay FL1, battery is closed through the A resistor to the winding of relay L, which remains operated to ground on the tip from the Incoming Trunk Circuit.
- (c) Opens the path between the winding of relay L and the ring of the Incoming Trunk Circuit, to release a relay in that circuit to flash the originating operator.

3.05 The duration of the flash is dependent upon the slow release time of relay FL1. The released FL1 relay:

- (a) Releases relay H.
- (b) Reestablishes the path from the winding of relay L to the ring of the Incoming Trunk Circuit, to reoperate the relay in that circuit, which terminates the flash.
- (c) Removes battery through the A resistor from relay L, which now holds in series with the relay in the Incoming Trunk Circuit.

3.06 The released H relay restores the tip and ring to the telephone circuit.

TONE REMOVAL (Q OPTION)

3.07 Some of the incoming trunks may have tone applied to them as a signal to the operator that the call is from a particular area or is a call transferred from a machine announcement, etc.

3.08 If the tone is still present when the call is transferred, the supervisor may remove the tone by operating the TR key. Operation of the TR key operates relay H. The operated H relay:

- (a) Opens tip and ring to prevent a click to the operator.
- (b) Operates relay FL.

3.09 The operated FL relay:

- (a) Connects ground to the winding of relay H to hold relay H operated when key TR is released until relay FL releases.
- (b) Connects battery through the A resistor to the winding of relay L to hold it operated to ground in the Incoming Trunk Circuit.
- (c) Opens the circuit between the L relay winding and the ring of the Incoming Trunk Circuit to release a relay in the Incoming Trunk Circuit, to remove the tone when provided in the trunk.

3.10 The release of the TR key releases relay FL. The released FL relay:

- (a) Releases relay H.
- (b) Removes battery through the A resistor from the winding of relay L.
- (c) Closes the circuit between the winding of relay L and the ring of the incoming trunk, which reoperates the relay on the ring side of that circuit.

HOLDING

3.11 The operation of the H key operates relay H, which disconnects the supervisor telephone circuit from the Incoming Trunk Circuit. Release of the H key releases relay H, which restores the telephone circuit to the Incoming Trunk Circuit.

4. RELEASE

WITHOUT CENTRALIZED SUPERVISORY CONSOLE

4.01 When the originating end disconnects first, the tip and ring circuit is opened in the Incoming Trunk Circuit, releasing relay L, which in turn releases relay L1. The released L1 relay:

- (a) Removes ground from lead SLH to release the hold magnet of the cross-bar switch of the Incoming Trunk Switch Circuit, thereby releasing the connection to the Incoming Trunk Circuit.
- (b) Opens the operate path of relay CT.

4.02 The release of the hold magnet of the Incoming Trunk Switch Circuit removes ground from lead SO, releasing relay SO. The released SO relay:

- (a) Releases relay OE, if operated.
- (b) Releases relay CT.

(c) Closes the operate path of the ST relays in the supervisor circuit. When the supervisor headset is removed from the jacks, the RL relay releases.

(d) Extinguishes the S lamp.

4.03 The supervisor circuit is now prepared to receive another call.

4.04 When the supervisor disconnects first by removing her headset from the A and B jacks, relay RL releases. The released RL relay:

- (a) Releases relay L, which in turn releases relay L1.
- (b) Opens the operate path of relay CT.

4.05 The released L1 relay:

- (a) Removes ground from lead SLH to release the hold magnet of the cross-bar switch of the Incoming Trunk Switch Circuit, thereby releasing the connection to the Incoming Trunk Circuit.
- (b) Opens another link in the operate path of relay CT.

4.06 The release of the hold magnet of the Incoming Trunk Circuit removes ground from lead SO, releasing relay SO. The released SO relay:

- (a) Releases relay OE, if operated.
- (b) Releases relay CT.
- (c) Closes the operate paths of the ST relays in the supervisor circuit.

4.07 The supervisor transfer circuit is now prepared to receive another call.

WITH CENTRALIZED SUPERVISORY CONSOLE

4.08 When the originating end disconnects first, the tip and ring circuit is opened in the Incoming Trunk Circuit, releasing relay L, which in turn releases relay L1. The released L1 relay:

- (a) Removes ground from lead SLH to release the hold magnet of the cross-bar switch of the Incoming Trunk Switch Circuit, thereby releasing the connection to the Incoming Trunk Circuit.
- (b) Opens the operate path of relay CT.

4.09 The release of the hold magnet of the Incoming Trunk Switch Circuit removes ground from lead SO, releasing relay SO. The released SO relay:

- (a) Releases relay OE, if operated.
- (b) Releases relay CT.
- (c) Closes the operate path of the odd-position ST- relays if relay SO is in the first transfer circuit.
- (d) Closes the operate path of the even-position ST- relays if relay SO is in the second transfer circuit.
- (e) Releases relay SOM.

4.10 The released SOM relay:

- (a) Removes ground from lead SG to the Centralized Supervisory Console Circuit.
- (b) Extinguishes the TR BY lamps in the desk positions if both transfer circuits are busy.
- (c) Closes a second operate path for the odd-position ST- relays if relay SOM is associated with the second transfer circuit.
- (d) Closes a second operate path for the even-position ST- relays if relay SOM is associated with the first transfer circuit.
- (e) Partially closes the operate path of the STG1 relay if relay SOM is associated with the first transfer circuit.
- (f) Partially closes the operate path of the STG3 relay if relay SOM is associated with the second transfer circuit.

4.11 When the supervisor disconnects, ground is removed from lead SV, releasing relay RL. The supervisor transfer circuit is now prepared to receive another call.

4.12 When the supervisor disconnects first, ground is removed from lead SV, releasing relay RL. The released RL relay:

- (a) Releases relay L, which in turn releases relay L1.
- (b) Opens the operate path of relay CT.

4.13 The released L1 relay:

- (a) Removes ground from lead SLH to release the hold magnet of the crossbar switch of the Incoming Trunk Switch Circuit, thereby releasing the connection to the Incoming Trunk Circuit.
- (b) Opens another link in the operate path of relay CT.

4.14 The release of the hold magnet of the Incoming Trunk Switch Circuit removes ground from lead SO, releasing relay SO.

4.15 The remainder of the circuit operation is as described in 4.09 through 4.14.

5. OUTGOING TRUNKS

5.01 The supervisor can use her head telephone to initiate calls on the Outgoing Trunk Circuit. When the supervisor inserts her head telephone set into the A and B jacks, relay RL operates. The operated RL relay performs no useful functions at this time. With the head telephone set in the A and B jacks, the talking path is complete to the Outgoing Trunk Circuit.

6. HOLD-FOR-TRACE FEATURE

6.01 If a trouble condition such as a double connection is encountered, the operator will signal the supervisor. She will request the operator to transfer the call to her position circuit. When the call is transferred to this position, the call is transferred from the crosspoints of the crossbar switch of the operator position to the crosspoints of the supervisor position. Thus the operator is allowed to receive other calls. If it is desired to trace a call, the TRC key is operated. This places a holding ground on the SLH lead, which will hold the call. The operator will then notify the maintenance man of the condition and her division number. The maintenance man notes the operated hold magnet of this circuit and the trapped select finger. This information will reveal one of two particular trunks (odd or even). By noting whether the OE relay of the transfer circuit is operated or released, he can pinpoint his trace to a particular trunk.

6.02 During the time this trace is being made, the supervisor transfer circuit is out of service to other calls, but the Incoming Trunk Circuit is open for reseizure.

7. TRANSMISSION TEST JACKS - FIG. 14

TESTING INCOMING TRUNK CIRCUITS

7.01 To test incoming trunks, the operator will transfer the trunk to the supervisor during a specified light-load period. The operation is the same as described in 2., except that the operated SO relay also lights lamp SR at the relay rack equipment. The craftsman will then plug his headset into the C and D jacks, which connect his headset to the telephone circuit, and operate relay RL.

## 7.02 The operated RL relay:

- (a) Partially completes a path from the tip side of the talking circuit through the winding of relay L, contact on relay CT and FL or FL1 to the ring side of the talking circuit.
- (b) Closes ground through a back contact on relay SH, a front contact on relay L1, and a back contact on relay SC, to operate relay CT.

## 7.03 The operated CT relay:

- (a) Locks to relay SO operated.
- (b) Closes the talking circuit to the craftsman.
- (c) Transfers relay L from a direct connection across the tip and ring to a path in series with contacts on relay RL and FL or the FL1.

7.04 The talking circuit is now complete.

7.05 The craftsman can now converse with the originating end. Ordinarily the craftsman will request that tone be sent for a specified period of time. He now plugs a 2AB auxiliary and 12B measuring set into the TK jack. Ground from the TK jack operates relay H, which transfers the Incoming Trunk Circuit from the telephone circuit to the TK jack. Subsequently, the craftsman will patch a connection between the TK jack and an appearance of the Transmission Test Line Circuit SEND 900 jack, and send tone to the originating end. During these tests, the headset is left in the C and D jacks.

7.06 When testing is completed, the craftsman will remove the headset from the C and D jacks, releasing relay RL. The remainder of the circuit operation is as described in 4.04 through 4.07.

## TESTING THE SUPERVISOR TELEPHONE CIRCUIT

7.07 The supervisor telephone circuit may be tested by plugging an 82A test set into the C and D jacks of Fig. 14 and patching the TL jack to an appearance of the Transmission Test Line Circuit SEND 600 jack. Ground from the D jack will operate

relay RL, which performs no useful functions at this time.

SECTION III - REFERENCE DATA1. WORKING LIMITS

None.

2. FUNCTIONAL DESIGNATIONS

None.

3. FUNCTIONS

3.01 Provides means for the operator to call the supervisor by the operation of the S BELL or S LP key.

3.02 Provides means for an operator to transfer an incoming trunk to the supervisor by the operation of the TR S key.

3.03 Provides a talking circuit between the trunk circuits and the supervisor.

3.04 Provides means for selecting the odd or even trunk of the pair, which are connected to the supervisor by the Incoming Trunk Switch Circuit.

3.05 Provides a timed flash to the originating operator by the operation of the FL key (R option).

3.06 Provides means to disconnect the supervisor head telephone set and hold the trunk connected to the supervisor circuit by the operation of the H key.

3.07 Provides means to release the incoming trunk from the supervisor circuit when the supervisor set is removed from the A and B jacks.

3.08 Provides a lighted S lamp at the desk position to indicate the supervisor has a trunk connected to this circuit.

3.09 Provides means to prevent trunks from being transferred to the supervisor when this circuit is busy.

3.10 Provides a flashing SC lamp, when key S LP is operated, to indicate to the supervisor that an operator is calling her.

3.11 Provides lighted MP lamps, when key S LP is operated, to mark the position calling a supervisor.

3.12 Provides means for calling a messenger by the operation of key MC at a 23D desk.

3.13 Provides a lighted P lamp at the messenger desk or cabinet equipment, when key MC is operated, to indicate that a 23D desk operator requires a messenger.

3.14 Provides a lighted MC lamp at the 23D desk, when key MC is operated, to mark the position calling for a messenger.

3.15 Provides means for simultaneous lighting of the toll switchboard operating room call lamps and the SO call lamps when either a toll operator or a 23 desk operator calls the supervisor.

3.16 Provides means for transferring incoming calls to a supervisor at the centralized supervisory console.

3.17 Provides means for making transmission tests of the incoming trunks and the supervisor telephone circuit.

4. CONNECTING CIRCUITS

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

- (a) Incoming Trunk Switch Circuit - SD-95500--01.
- (b) Operators Telephone and Position Circuit - SD-95502-01.
- (c) Service Observing Circuit - SD-90266-01 (typical).
- (d) Incoming Trunk Circuit - SD-95513-01 (typical).
- (e) Outgoing Trunk Circuit - SD-95542-01.
- (f) Step-by-Step Office, 60 and 120 IPM Interrupter Circuit - SD-31606-01.
- (g) Toll Switchboards No. 1, 1B, 3, 3B, 3C, or Intertoll Dialing, 30, 60 or 120 IPM Interrupter Circuit Distributing Circuit - SD-95078-01.
- (h) Panel Office, Miscellaneous Circuit for Miscellaneous Interrupter Frame - SD-21666-01.
- (i) Toll Switching System No. 4 or 4A Interrupter Frame Circuit - SD-68058-01.

- (j) No. 1 or Tandem Crossbar Office Interrupter Frame Circuit - SD-25062-01.
- (k) Operating Room Calling Signal Circuit - SD-96087-01.
- (l) Amplifier Circuit - SD-95396-01.
- (m) Transmission Test Line Circuit - SD-98100-01.
- (n) Centralized Supervisory Console Circuit - SD-95979-01.
- (o) Dual Control Circuit - SD-1B108-01.

5. MANUFACTURING TESTING REQUIREMENTS

5.01 This circuit shall be capable of performing in accordance with the requirements of 3. FUNCTIONS and the Circuit Requirements Table.

SECTION IV - REASONS FOR REISSUE

B. Changes in Apparatus (Components)

B.1 Added

533F diodes, (TR) in both Fig. 21 and 22.

D. Description of Changes

D.1 This change is being made to prevent locking up the incoming trunk switch circuit, thereby blocking all traffic through the No. 23 desk, which could occur as follows:

If after operating a position TR S key to operate the associated ST- relay, the position operator holds this key operated, within an interval under control of the connected customer, one or more other position operators can operate their ST-relays by operating their TR S keys. One or more ST-relays operated cause the incoming trunk switch circuit to lock up, stopping all traffic through the No. 23 desk. This condition is being eliminated by the addition of a diode per position, to remove the operate ground presently available to operate more than one ST- relay.

D.2 CAD Fig. 65 is corrected to show lead D2 "to Fig. 64" connected to terminal 8 instead of terminal 6.

BELL TELEPHONE LABORATORIES, INCORPORATED

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