

METHOD OF OPERATION  
TRUNK CIRCUITS

Miscellaneous - Repair Clerk's Desk - Full Mechanical Power Driven System.

GENERAL DESCRIPTION

1. Figure 1 is used as a two way trunk circuit, ring down incoming from the final selector, and automatic outgoing to a line switch, or a line finder. It is arranged for transferring incoming calls from the repair clerk's desk to the trouble desk. This figure is used also as a two way trunk to a manual switchboard position.

2. Figure 2 is used as a two way automatic trunk circuit or tie line between the repair clerk's desk and other desks.

3. Figure 3 is used as a two way ring down trunk circuit between the repair clerk's desk and desks located outside the exchange, such as desks at commercial offices, which require no common battery supervision.

4. Figure 4 is used as a two way automatic trunk circuit to provide trunking facilities between the zero operator's position at the "A" switchboard and the repair clerk's desk.

5. Figure 5 is used as a one way trunk circuit incoming from the district or office multiple, and is arranged for transferring from the repair clerk's desk to the sender monitor position at the trouble desk.

DETAILED DESCRIPTION

TRUNK LINE, TWO WAY FROM FINAL MULTIPLE AND TO LINE SWITCH, OR LINE FINDER -  
FIGURE 1

INCOMING CALLS

6. When a final selector seizes this trunk, on an incoming call, battery is connected to lead "S", operating the SILV relay. The SILV relay operated, closes in part a locking circuit for the CO relay. When ringing current is connected to the tip and ring of the trunk by the mechanical apparatus, the L relay operates through its inner winding and locks through its outer winding and the desk auxiliary signal circuit under control of the CO relay. The L relay operated, closes a circuit from battery through the interrupter, the make contact of the L relay the break contact of the CO relay, over lead "L" to ground through the trunk lamps (not shown) causing the lamps to flash until the call is answered.

7. The call is answered by operating the trunk key (not shown) closing a circuit from ground over lead "K", to battery through the 350 ohm inner winding of the CO relay and the winding of the B relay which operate. The CO relay operated, (a) locks through its outer 500 ohm winding, under control of the SILV relay (b) opens the locking circuit of the L relay, which releases (c) replaces interrupted battery with steady battery, thus causing the trunk lamps to remain lighted as busy signals. The B relay operated, shunts the 1 m.f. condenser, thereby bridging the inner winding of the L relay across the tip and ring of the trunk causing the mechanical apparatus to function.



### OUTGOING CALLS

8. When the trunk key (not shown) is operated, on an outgoing call, the B and CO relays operate. The B relay operated shunts the 1 m.f. condenser, thereby bridging the inner winding of the L relay, across the tip and ring of the line, causing the line switch or line finder to function. The CO relay operated (a) locks under control of the SLV relay, which operates after the line switch or line finder has moved off normal (b) lights the trunk lamps (not shown) as busy signals.

### DISCONNECTION

9. When the trunk key is restored to normal, the B relay releases, removing the shunt around the 1 m.f. condenser causing the mechanical apparatus to disconnect. As the final selector returns to normal the SLV relay releases, in turn releasing the CO relay. The CO relay released, extinguishes the trunk lamps, restoring the circuit to normal.

10. The function of the SLV relay is to hold the CO relay operated, to prevent a false flashing recall, when the trunk key is released before the final selector has disconnected.

### TRUNK LINE - TWO WAY TO SPECIAL A SWITCHBOARD - FIGURE 1.

#### INCOMING CALLS

11. When the plug of the cord circuit is inserted in the trunk jack of the special A operator's position, the circuit functions as described for a call, incoming from a final selector, except that ringing current is applied by the operation of the cord circuit ringing key.

12. When the trunk key is operated the circuit functions as previously described except that the bridge of the inner winding of the L relay across the tip and ring of the trunk causes the supervisory relay of the special A operator's cord circuit to operate.

#### OUTGOING CALLS

13. The circuit functions as described under "Outgoing Calls - to line switch or Line Finder", except that the trunk lamp at the special A switchboard is lighted and that the SLV relay is operated by the insertion of the plug of the cord in the answering jack.

### DISCONNECTION

14. When the trunk key is restored to normal the supervisory lamp in the operator's cord circuit is lighted as a disconnect signal. When the plug of the cord is withdrawn from the jack at the special A position, the SLV and CO relays release, restoring the circuit to normal.

### TRUNK LINE, TO OTHER DESKS - FIGURE 2.

#### INCOMING CALLS

15. On incoming calls from other desks, battery is connected to lead "3"



operating the L relay. The L relay operated, closes a circuit from battery through the interrupter, the make contact of the L relay, break contact of the CO relay, over lead "L", to ground through the trunk lamps (not shown) causing the lamps to flash until the call is answered. The L relay operated also closes a circuit to give an auxiliary signal at the desk.

16. The call is answered by operating the trunk key (not shown), closing a circuit from battery through the inner and outer windings of the CO relay in series, to ground over lead "K", operating the CO relay. The CO relay operated, (a) disconnects the L relay from lead "S", which releases, (b) connects its inner winding to lead "S", (c) disconnects the flashing battery and connects steady battery to the trunk lamps over lead "L" which light as busy signals.

#### OUTGOING CALLS

17. When the trunk key (not shown) is operated, on an outgoing call, the CO relay operates. The CO relay operated, (a) lights the trunk lamps as busy signals, (b) disconnects the winding of the L relay from lead "S" and connects battery through the inner winding of the CO relay to lead "S" causing the trunk lamp at the distant desk to light.

#### DISCONNECTION

18. When the trunk key is restored to normal, the CO relay is held operated, in a circuit from battery through its inner winding, over lead "S" to ground, through the winding of a relay at the distant desk, until the trunk is disconnected at the distant desk thus preventing a false flashing recall. When the trunk is disconnected at the distant end, the CO relay releases, restoring the circuit to normal.

#### TRUNK LINE, TWO WAY RING DOWN NOT REQUIRING C.B. SUPERVISION - FIGURE 3.

#### INCOMING CALLS

19. When ringing current is applied across the tip and ring of this trunk at a distant desk the L relay operates through its inner winding and locks through its outer winding and the desk auxiliary signal circuit under control of the CO relay. The L relay operated, connects battery through the interrupter, make contact of the L relay break contact of the CO relay to the trunk lamps over lead "L" causing the lamps to flash until the call is answered.

20. The call is answered by operating the trunk key (not shown) which connects ground on lead "K", operating the (CO) relay. The CO relay operated, (a) disconnects the locking winding of the L relay, which releases (b) disconnects the flashing battery, and connects steady battery to lead "L" causing the trunk lamps to remain lighted as busy signals.

#### OUTGOING CALLS

21. On outgoing calls the trunk key (not shown) is operated, operating the CO relay. The CO relay operated, disconnects the locking circuit of the L relay and connects battery to the trunk lamps which light as busy signals. The ringing key in the telephone circuit is then operated, operating the "L" relay



without effect during the ringing pulse and causing the trunk lamp at the distant desk to light.

#### DISCONNECTION

22. When the trunk key is restored to normal, the CO relay releases, restoring the circuit to normal.

#### TRUNK LINE TO "A" SWITCHBOARD - FIGURE 4

#### INCOMING CALLS

23. When a plug of a cord is inserted in the trunk jack at the "A" switchboard, battery is connected to lead "S", operating the L relay, under control of the CO relay. The L relay operated, closes a circuit from battery through the interrupter, its make contact, break contact of the CO relay over lead "L", to ground through the trunk lamps, flashing the lamps until the call is answered. The L relay operated, also closes a circuit to give an auxiliary signal at the desk.

24. The call is answered by operating the trunk key (not shown) which connects ground to lead "K" operating the B relay. The B relay operated, bridges the 54-B retardation coil across the tip and ring of the trunk and operates the CO relay. The CO relay operated, disconnects the flashing battery and connects steady battery to the trunk lamps as busy signals, it also disconnects the winding of the L relay from and connects the junction of the two windings of the CO relay to lead "S". The bridge of the 54-B retardation coil causes the operation of the cord supervisory relay at the "A" switchboard, thereby extinguishing the cord supervisory lamp.

#### OUTGOING CALLS

25. On outgoing calls the trunk key (not shown) is operated, operating the B relay. The B relay operated, bridges the 54-B retardation coil across the tip and ring of the trunk and operates the CO relay. The CO relay operated, lights the trunk lamps as busy signals, disconnects the L relay and connects the inner winding of the CO relay to lead "S", causing the trunk lamp at the "A" switchboard to light. When a plug of a cord is inserted on the answering jack associated with the lighted trunk lamp, the supervisory cord lamp will be shunted, due to the retardation coil being bridged across the trunk.

#### DISCONNECTION

26. When the trunk key is restored to normal, the B relay releases, disconnecting the winding of the retardation coil from across the tip and ring of the trunk, thus allowing the distant cord supervisory lamp to light as a disconnect signal. The CO relay is held operated from ground on lead "S" until the plug of the cord at the "A" switchboard is withdrawn from the jack at which time ground is removed, releasing the CO relay and restoring the circuit to normal.



TRUNK LINE, WITH AUDIBLE SINGING SIGNAL, ARRANGED TO TRANSFER TO SENDER MONITOR'S  
POSITION - FIGURE 5

INCOMING CALLS

27. When a district or an office selector seizes this trunk, a circuit is closed from ground on the break contact of the "S" relay, over the ring of the trunk, through a shunt at the mechanical apparatus, back over the tip to battery through the winding of the L relay, which operates. The L relay operated, (a) connects ringing current through the .02 m.f. condenser to the tip of the trunk, as an audible indication to the calling party that the desk is being signaled, (b) connects battery through the interrupter, make contact of the L relay break contact of the "S" relay over lead "L", to ground through the trunk lamps, causing the lamps to flash, until the call is answered.

28. The call is answered by operating the trunk key (not shown) which connects ground on lead "K", operating the "S" relay. The "S" relay operated (a) locks to ground on lead "S" (b) disconnects ground from the ring of the trunk (c) disconnects ringing tone and the winding of the L relay from the tip of the trunk causing the (L) relay to release, (c) disconnects the flashing battery and connects steady battery to the trunk lamps, causing them to remain lighted as busy signals.

DISCONNECTION

29. When the trunk key is restored to normal, the ground is removed from lead "K", but the "S" relay is held operated, until the district or office selector returns to normal. When the selector disconnects the "S" relay releases, restoring the circuit to normal.

30. This circuit is a one way trunk and is arranged to transfer calls from the repair clerks desk to the sender monitors' position at the trouble desk.

FIGURES 1, 2, 3, 4, and 5.

31. If the trunk line terminates at one position only, and if it is not arranged to transfer incoming calls to the trouble desk, the "X" wiring is omitted. The CO relay operated extinguishes the flashing trunk lamp, instead of replacing interrupted battery with steady battery to cause the lamps to burn steadily, as busy signals.



CIRCUIT REQUIREMENTS

	<u>OPERATE</u>	<u>NON-OPERATE</u>	<u>RELEASE</u>
B6 (SLV) (Fig. 1-C)	Test .007 amp. Readj. .0015 amp.		Test .0003 amp. Readj. .0005 amp.
B124 (SLV) (Fig. 1-B)	Test .106 amp. Readj. .078 amp.		Test .024 amp. Readj. .047 amp.
B244 (SLV) (Fig. 1-A) Wdgs. in series aiding	Test .0011 amp. Readj. .0010 amp.		Test .0001 amp. Readj. .0002 amp.
Inner (8000 ohms) winding	Test .0014 amp.		
E157 (CO) (Fig. 1) Inner wdg. 350 ohms	Test .036 amp. Readj. .024 amp.	Test .015 amp. Readj. .016 amp.	
Outer wdg. 500 ohms.	Test .039 amp.		
E157 (CO) (Fig. 3) Inner wdg. 350 ohms	Test .040 amp. Readj. .024 amp.	Test .015 amp. Readj. .016 amp.	
Outer wdg. 500 ohms.	Not used.		
E163 (B) (Fig. 1)	Test .039 amp. Readj. .029 amp.	Test .019 amp. Readj. .020 amp.	
E206 (L) (Fig. 2&4)	Test .017 amp. Readj. .016 amp.		Test .002 amp. Readj. .003 amp.
E226 (L) (Fig. 5)	Test .018 amp. Readj. .015 amp.		Test .002 amp. Readj. .003 amp.
E540 (CO) (Fig. 2&4)	Test .019 amp. Readj. .017 amp.	Test .010 amp. Readj. .011 amp.	
E919 (B) (Fig. 4)	Test .040 amp. Readj. .038 amp.		Test .004 amp. Readj. .007 amp.



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CIRCUIT REQUIREMENTS

	<u>OPERATE</u>	<u>NON-OPERATE</u>	<u>RELEASE</u>
E1274 (S) (Fig. 5)	Test .032 amp. Readj. .024 amp.	Test .015 amp. Readj. .016 amp.	
G18 (L) (Fig. 1 & 3) Inner wdg. 450 ohms	Test .019 amp. Readj. .018 amp.		Test .0095 amp. Readj. .010 amp.
Outer wdg. 450 ohms	Test .020 amp.		

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CHK'D.--ASP-CWF.

APPROVED - C. L. SHUYTER, G.M.L.



