

CIRCUIT DESCRIPTION

CD-65727-01
Issue 6D
Appendix 1D
Dwg Issue 7D

PBX SYSTEMS
NO. 557A
SECRETARIAL LINE AND LINE LAMP
TEST CIRCUIT

Drawings for SD-65727-01 have been converted to 8-1/2 by
11 inch handbook size.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5336-LEVD-EVL

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PBX SYSTEMS
NO. 557A
SECRETARIAL LINE AND LINE LAMP
TEST CIRCUITSECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.1 This circuit provides a means for answering calls at a secretarial switchboard, for isolating the secretarial switchboard from the subscriber's line for secrecy, and for preventing outgoing calls from being made on a subscriber's line. Provisions are incorporated in the circuit to provide for locked in line signal with or without secrecy.

SECTION II - DETAILED DESCRIPTION

1. GENERAL

Figures 1, 2 and 3 all operate in essentially the same manner, the difference being in the kind of ringing current needed to operate the circuit and the equipment layout of the circuit. Figure 1 is electrically the same as Figure 3 with Figure A and Figure 2 is electrically the same as Figure 3 with Figure B. Figure 1 operates on ac-dc or negative superimposed ringing current while Figure 2 operates on ac only or positive superimposed ringing current.

Figures 1, 2 and 3 are arranged for secrecy with nonlocking line lamps. Figure 6 is arranged for locked in line signal without secrecy and can be used in conjunction with Figure 8 to provide the secrecy feature. Figure 7 can be used with Figure 2 or with Figures 3 and B to provide a locked in signal feature to those circuits.

1.1 Secretarial Line Circuit - Figures 1, 2, 3, 7, A and B

1.21 Arranged for secrecy with nonlocking line signal - Figures 1, 2, 3, A and B. When ringing current is received from the Central Office, tube (R) fires which operates relay (R). Relay (R) is shunted by varistors (R) and (R1) during alternate half cycles of ringing in order that relay (R) will operate steadily. Relay (R) operated lights line lamp (L) in series with the "A" lead to the auxiliary signaling circuit which sounds the auxiliary signal, closes the talking leads through to the jack, and removes the short circuit from resistance (R) which decreases the current in the ringing circuit and prevents pretripping of the ringing. When ringing stops, relay (R) releases, the line lamp is extinguished, and

the talking leads are disconnected. Relay (R) follows each ringing cycle until a plug is placed in the jack. If a plug is placed in the jack during a silent interval, when relay (R) is released, nothing happens.

If a plug is placed in the jack during a ringing cycle, or when the first ringing cycle occurs after a plug is placed in the jack during a silent interval relay (R) locks through resistance (H) to a make contact on the jack. A plug in the jack also extinguishes the line lamp and connects resistance (S) across the tip and ring to prevent dialing from the switchboard.

When the plug is removed from the jack after the incoming call is completed, relay (R) releases, opening the talking path and removing resistance (S) from across the tip and ring.

1.22 Modified for locked in line signal -

Figures 2, 3, 7 and B. Either Figure 2 or Figure 3, if used with Figure B, can be provided with locked in line signal if used with the Applique Circuit of Figure 7.

When ringing current is received from the central office, the equipment in Figure 7 operates as follows. Tube (R) fires, operating relay (R) which is shunted by varistors (R) and (R1) during alternate half cycles of ringing to operate steadily. Relay (R) operated operates relay (LR) and removes the short circuit from resistance (R) to decrease the current in the ringing circuit and to prevent pretripping of the ringing. Relay (LR) operated closes the ringing supply lead through on the "T" lead to the equipment in Figure 2 or Figures 3 and B. Relay (R) follows each ringing cycle until a plug is placed in the jack of the connecting circuit. Relay (LR), however, is locked through a make contact on itself to ground and remains operated. In Figure 2 or Figures 3 and B, ringing current over the ringing supply lead fires tube (R), operating relay (R) which is shunted by varistors (R) and (R1) during alternate half cycles to operate steadily. Relay (R) operated lights line lamp (L) in series with the "A" lead to the auxiliary signaling circuit to sound the auxiliary signal, closes the talking path through to the jack, and removes the short circuit from resistance (R) to decrease the ringing current and prevent pretripping of the ringing. Relay (R) will remain operated and line lamp (L) will remain lighted until

a plug is placed in the jack since relay (LR) in Figure 7 operates steadily and supplies steady ringing to the (R) tubes 2 or 3 and B.

When a plug is placed in the jack, relay (R) of Figure 2 or Figure 3 and B locks through resistance (H) to a make contact on the jack. Relay (TR) of Figure 7 operates from ringing current and locks to a contact on relay (R). The plug in the jack also extinguishes the line lamp and connects resistance (S) across the tip and ring to prevent dialing from the switchboard and relay (R) holds the talking path through to the jack. The operation of relay (TR) short circuits the winding of relay (LR) thereby releasing that relay to close the talking path through to the central office. When the ringing current on the line ceases, relay (R) releases, releasing relay (TR) and readying the circuit for conversation.

When the plug is removed from the jack at the completion of the call, relay (R) of Figure 2 or Figure 3 and B releases, opening the talking path. The (S) resistance is also removed from across the tip and ring when the plug is removed from the jack.

1.3 Universal Secretarial Line Circuit - Figures 6, 8, A and B. Figure 6 is furnished to provide for nonsecrecy operation with locked in line signal and can be used with either Figure A or Figure B depending on the type of signaling current. If secrecy is desired with this circuit, it may be modified by the addition of Figure 8.

1.31 Arranged for locked in line signal without secrecy - Figures 6, A and B. Ringing current from the central office fires tube (R), operating relay (R) which is shunted by varistors (R) and (R1) during alternate half cycles of ringing to operate steadily. Relay (R) operated lights line lamp (L) in series with the "A" lead to the auxiliary signaling circuit to sound the auxiliary signal, removes the short circuit from resistance (R) to decrease the ringing current and prevent pretripping of the ringing, and locks itself through resistance (H) and a contact on the jack. The line lamp (L) remains lighted until a plug is placed in the jack.

When a plug is placed into the jack, relay (R) releases, extinguishing lamp (L). The plug in the jack also connects resistance (S) across the tip and ring to prevent dialing from the switchboard.

At the completion of the incoming call the plug is removed from the jack, disconnecting resistance (S) from across the tip and ring.

Figure 6 used without Figure 8 is not dependent upon ringing current of an incoming

call to close through the talking path to the jack.

1.32 Modification for Secrecy Feature -

Figures 6, 8, A and B. The operation of the equipment in Figure 8 when ringing current is received from the central office is as follows: tube (R) fires, operating relay (R). Relay (R) operated, operates relay (R1) to close the talking path through to Figure 6 and removes the short circuit from resistance (R) to decrease the ringing current.

When relay (R1) operates, ringing current is closed through to the "R" lead of Figure 6, causing tube (R) in that Figure to fire. Tube (R) fired, operates relay (R) of Figure 6 which lights the line lamp (L) in series with lead "A" to sound the auxiliary signal, removes the short circuit from resistance (R) of this circuit, and locks itself through resistance (H) and a contact on the jack. The line lamp (L) remains lighted as it is under control of the (R) relay.

When a plug is placed in the jack relay (R) of Figure 6 releases extinguishing the line lamp. Relay (AR) of Figure 8 operates over the loop to lock relay (R) of the same figure through resistance (H) which in turn holds relay (R1) operated. Resistance (S) is connected across the tip and ring to prevent dialing from the switchboard.

When the plug is removed at the completion of the incoming call, relay (AR) of Figure 8 releases to release relay (R) of the same circuit. The release of this relay releases relay (R1). The removal of the plug also disconnects resistance (S) from across the tip and ring.

1.4 Secretarial Line Circuit for use with the Concentrator-Identifier Circuit - Figure 5.

When an incoming call is received from the concentrator-identifier, battery is connected to the tip which lights line lamp (L) and sounds the auxiliary signal over lead "A." When a plug is placed in the jack, the lamp is extinguished and the auxiliary signal is silenced. When the plug is removed from the jack at the completion of the call, the circuit is restored to normal.

2. RESISTANCE LAMP CIRCUIT - FIGURE 4

The resistance lamp (B) is provided to operate cord circuit relays over the sleeve of the jack and to prevent ground on the jack sleeve from blowing the fuse.

3. MAKE BUSY PLUG

A 349A plug may be inserted in the jack to make the circuit "busy." This plug operates only the ring spring of the jack,

thus preventing the lamp from lighting or the auxiliary signal from sounding.

SECTION III - REFERENCE DATA**1. WORKING LIMITS**

Max Earth Potential $\pm 5V$

Conductor Loop to PBX For All Central Offices Except No. 1 Crossbar

No. of Main Station Ringing Bridges	Superimposed Ringing 84-88V AC, 37-40V DC		AC-DC Ringing 84-88V AC, 45-52V DC		AC-DC Ringing 95-103V AC, 16-19V DC With 48V Silent Interval	
	10,000 Ω Leak	50,000 Ω Leak	10,000 Ω Leak	50,000 Ω Leak	10,000 Ω Leak	50,000 Ω Leak
1	1350 Ω	1600 Ω	2000 Ω	2000 Ω	200 Ω	500 Ω
2	1150 Ω	1500 Ω	1800 Ω	2000 Ω		200 Ω
3	700 Ω	1200 Ω	1400 Ω	2000 Ω		
4	500 Ω	900 Ω	1200 Ω	1600 Ω		
Conductor Loop to PBX From No. 1 Crossbar Central Office						
4	100 Ω	100 Ω	100 Ω	100 Ω		

2. FUNCTIONS

- 2.1 To light the line lamp on incoming calls during the time ringing is applied to the line if the nonlocking feature is provided.
- 2.2 To light the line lamp on incoming calls during ringing and then locking it under control of an operated relay to remain lighted until the call is answered if the locking feature is provided.
- 2.3 To provide for operating an audible signal on an incoming call.
- 2.4 To provide a talking circuit on an incoming call.
- 2.5 To prevent an outgoing call from being made from the secretarial switchboard.
- 2.6 To prevent connection to the central office except when an incoming call is received when the secrecy feature is provided.
- 2.7 To provide a termination for a concentrator-identifier line.
- 2.8 To provide for modification of a nonlocking line signal to a locking line signal.

- 2.9 To provide for modification of a line circuit without secrecy to a line circuit with secrecy.

3. CONNECTING CIRCUITS

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

- 3.1 Subscriber's Line Circuit in Manual, Panel, Step-by-Step, or Crossbar Office, SD-11560-01, SD-21712-01, SD-31531-01, SD-25003-01 (Typical).
- 3.2 Line Concentrator-Identifier Circuit SD-95748-01.
- 3.3 Cord, Telephone, Dial, Auxiliary Signal, Station Line, Position Grouping, Ringing and Battery Circuit, SD-65714-01.
- 3.4 Ringing Leads Ckt. - SD-90230-01, (Typical).

SECTION IV - REASONS FOR REISSUE**CHANGES****A. CHANGED AND ADDED FUNCTIONS**

- A.1 Added
- A.2 Secretarial Line Lamp Test - Enables the attendant to test for defective

Secretarial line lamps, by depressing a push button type key (one key per 20 lamps).

A.2 To prevent a false operation of a Secretarial Line Lamp when a negative potential is applied to the Subscribers line for Automatic Number Identification two party test.

B. CHANGES IN APPARATUS

B.1 Added

- 1 - 400J diode per incoming Secretarial line lamp
- 1 - 92A Push-button type key (Fig. 9) per 20 line lamps
- 1 - KS-8512, L8 - 20 ohm resistor

D. DESCRIPTION OF CHANGES

D.1 Operation of the 92A key per Fig. 9 will light 20 line lamps from battery (Fig. 10) thru J-resistor to line lamps Figs. 1, 2, 3, 5 & 6. The battery lead

is chained through the 92A keys to prevent overloading the battery lead.

D.2 Prevent False Operation of Secretarial Line Lamps

Added "N" wiring to prevent cold cathode tube from firing when negative potential is applied to both sides of the line.

Added Circuit Notes 104 & 105.

3. FUNCTIONS

3.5 To provide for testing Secretarial Line Lamps in Multiples of 20.

F. DESCRIPTION OF OPERATION

8. SECRETARIAL LINE LAMP TEST

8.1 The attendant depresses one of 5 keys which lights 20 line lamps. Defective line lamps are immediately apparent, however a shorted line lamp will make the TEST circuit inoperative. Removal of the defective lamp will restore the circuit to normal.

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