

CIRCUIT DESCRIPTION

CD-65715-01  
Issue 3D  
Appendix 1D  
Dwg Issue 4D

PBX SYSTEMS  
NO. 555 OR 557A  
CENTRAL OFFICE TRUNK CIRCUIT

Drawings for SD-65715-01 have been converted to 8-1/2 by  
11 inch handbook size.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 5336-LEVD-EVL

PLEASE NOTE AND RETURN:  
BURNS, J. G. 3  
DI LBS, G. G. 5  
JACKSON, G. G. 5  
MILLER, W. J. 2  
PERRY, A. B. 2

PBX SYSTEMS  
NO. 555 OR 557A  
CENTRAL OFFICE TRUNK CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1	Superseded	Superseded By
	15A Res. lamp "B" Figs. 1 and 2	15B Res. lamp "B" Figs. 1 and 2

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 Figures 1 and 3 are rated (Mfr. Disc.)
- D.2 Figures 7 and 8 are added.
- D.3 Resistance lamp "B" in Figures 1 and 2 is designated as Option "W" and rated as (Mfr. Disc.) Resistance lamp "B" is superseded by a new 15B lamp designated as "X" Option and rated as standard.
- D.4 Circuit Note 102 was changed to reflect changes on Issue 3-D.
- D.5 Table of record of figures, wiring and apparatus changes is added.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

- 1.1 This circuit provides for two way service from a manual PBX to a manual or dial central office.

2. WORKING LIMITS

	Supervision Signaling	
Max. Con. Res.	*	1,200
Min. Insulation Res.		
Manual, Panel or X-bar	20,000	20,000
Step-by-Step	30,000	

\*The trunk conductor loop resistance plus the maximum station loop resistance shall not exceed the central office subscribers loop resistance less 35 ohms.

3. FUNCTIONS

- 3.1 To light the trunk lamps when ringing is applied in the central office.
- 3.2 To extinguish the trunk lamp when the attendant answers.
- 3.3 To light a busy lamp when an incoming call is waiting and while the trunk is in use.

4. CONNECTING CIRCUITS

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

4.1 Subscribers Line Circuit in Manual Panel, Step-by-Step or Crossbar Central Office SD-11560-01, SD-21712-01, SD-32133-01, SD-25003-01 (TYPICAL).

4.2 Cord, Telephone, Dial, Auxiliary Signal, Station Line, Ringing and Battery Circuit SD-65714-01.

DESCRIPTION

5. INCOMING CALLS

- 5.1 Nonmultiple Trunk (Figs. 1 and 3) (Mfr. Disc.)

When ringing current is applied to this trunk from the central office, relay (R) operates through condensers (T) and (R) thermistors (T) and (R), and varistor (A). Relay (R) operated locks to battery through resistance lamp (B) and resistance (J) under control of jack (T) and grounds lead "L" to light lamp (L) and operate an audible signal over lead "A". When the attendant answers the call by inserting a cord plug in jack (T), battery through resistance lamp (B) is connected to the sleeve of jack (T) and relay (R) releases. Relay (R) released, extinguishes lamp (L) and silences the audible signal. The "T" and "R" conductors are then connected from the central office to the attendants cord circuit. When the attendant removes the cord plug from jack (T), the connection is broken.

- 5.2 Incoming Call (Figs. 7 and 8)

When ringing current is applied to the trunk at the C.O., one half cycle will flow thru condenser T, thermistor T, and varistor B and by-pass relay R, but the other half cycle will be blocked by varistor B causing the current to flow thru the secondary winding of relay R, thermistor T, and condenser T to operate relay R. Relay R operated, (1) locks operated thru P winding and contacts of the jack (2) lights the trunk lamp and (3) operate the auxiliary signal ckt.

- 5.3 Multiple Trunk (Figs. 2, 4, 5 and 6)

When ringing current is applied to this trunk from the central office, relay (R)

operates on its secondary winding through condenser (R), thermistor (R), and varistor (T). Relay (R) operated, locks on its primary winding to battery under control of relay (F) and through resistance (A) to ground at its own contact, lights the busy lamps and applies battery to lead "L" to light lamps (L) and operate an audible signal over lead "D". When the attendant answers the call by inserting a cord plug in jack (T), battery through resistance lamp (B) is connected to the sleeve of the jack, and relay (F) operates. The operation of relay (F) allows relay (R) to release extinguishing lamps (L), keeps lamps (BUSY) lighted, and closes lead "R" from the central office to jack (T). When the attendant removes the cord plug from jack (T), relay (F) releases and the connection is broken. Relay (F) released, extinguishes lamps (BUSY), and opens lead "R".

## 6. OUTGOING CALLS

### 6.1 Non-Multiple Trunk (Figs. 1 and 3)

When the attendant inserts a cord plug in jack (T) to make an outgoing call, battery through resistance lamp (B) is connected to the sleeve of jack (T).

### 6.2 Multiple Trunk (Figs. 2, 4, 5, and 6)

When the attendant inserts a cord plug in jack (T) to make an outgoing call, battery through resistance lamp (B) is connected to the sleeve of the jack, and relay (F) operates. Relay (F) operated, closes the "R" lead from the central office to jack (T) and lights lamps (BUSY). When the attendant removes the cord plug from jack (T), relay (F) releases, extinguishing lamps (BUSY) and opening lead "R".

## 7. RERING

### 7.1 Nonmultiple Trunk (Figs. 1 and 3)

A rering from the central office operates relay (R) as in paragraph 5.1. Relay (R) does not lock, but follows the

ringing cycle. Relay (R) operated lights lamp (L) and applies ground to lead "A" to operate an audible signal.

### 7.2 Multiple Trunk (Figs. 2, 4, 5, and 6)

A rering from the central office operates relay (R) as in paragraph 5.2, but relay (F) operated prevents lamp (L) from lighting and prevents relay (R) from locking operated.

## 8. MISCELLANEOUS

8.1 This circuit is equipped with thermistors in the ring-up relay circuits to provide a delay in order to prevent false line signals when the central office equipment functions after a connection is taken down at the P.B.X. These elements normally are extremely high resistance (over 50,000 ohms) but when ringing current is applied for approximately half a second or longer, the resistance of the thermistor is reduced to less than 3,000 ohms thus giving an operating circuit for relay (R).

8.2 Varistors (A) in Figure 1 and (T) in Figure 2 are provided for two purposes, (1) to provide a low resistance operating path for the thermistor and (2) to shunt relay (R) on one-half of the ringing current cycle so that relay (R) will operate steadily during the other one-half cycle.

8.3 The 317A varistor in Figs. 1 and 2 is in shunt with the thermistors so as to shunt any high voltage transients or surges away from the thermistors and varistors.

8.4 The springs of jack (T) of Figure 3 are arranged so that battery is connected to the sleeve of the jack before the ring spring is connected to the central office "R" lead to prevent a false pulse being sent to the central office.

8.5 The springs of jack (T) of Figure 4 are arranged so that battery is connected to the sleeve of the jack before relay (F) is operated to close lead "R" to prevent a false pulse being sent to the central office.

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