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PBX SYSTEMS
NO. 552A, 552D, 605A, or 701A
CORD AND DIAL CIRCUITS
MODIFICATION OF EXISTING CIRCUITS
TO EXTEND TRUNK AND STATION RANGE
AND TO REMOVE RINGING BRIDGE

D. DESCRIPTION OF CHANGES

D.1 Option J is added in figures 2 and E to bypass relay contacts that do not operate mechanically when TOUCH-TONE calling is used.

D.2 Redrawn on page size sheets.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 5336-EEM-FNR-CG

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CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded	Superseded By
54N INDR Opt. "T" Fig. 1	274N INDR Opt. "S" Fig. 1
54H INDR Opt. "R" Figs. C, D & E	274H INDR Opt. "Q" Figs. C, D & E
54B INDR Opt. "W" Figs. F & G	274B INDR Opt. "N" Fig. F & Opt. "M" Fig. G
54AC INDR Opt. "U" Fig. F	274AC INDR Opt. "K" Fig. F

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 In Figure 1 option T is designated and superseded by option S.

D.2 In Figures C, D & E option R is designated and superseded by option Q.

D.3 In Figures F & G option W is superseded by options N & M respectively.

D.4 In Figure F option U is superseded by option K.

D.5 Circuit notes 102 & 103 are changed to reflect issue 5-D.

All other headings under Changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is used at the 552A, 552D, 605A or 701A P.B.X. for modifying the cord circuit so that the supervisory relay will operate on the central office battery over longer trunk loops than was possible with the original circuit arrangement.

1.2 For modifying the dial circuit so that a lower resistance bridge will be connected across the trunk after the dial has been moved off normal in order to operate the supervisory relays in panel and step-by-step central offices and in long line circuits which are operated in tandem.

1.3 To disconnect the ringing bridge or thru and night connections.

1.4 To reduce the possibility of false pulses occurring after dialing.

2. WORKING LIMITS

2.1 The working limits of this circuit are shown on central office and long line range charts.

3. FUNCTIONS

3.1 To increase the resistance of the cord holding bridge in order to give more current through the cord supervisory relay.

3.2 To reduce the resistance of the trunk holding bridge in the dial circuit after the dial has been moved off normal.

3.3 To provide means for disconnecting the ringing bridge on night and thru connections.

4. CONNECTING CIRCUITS

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

4.1 552A, 552D, 605A or 701A P.B.X. Cord Circuits - SD-66011-01 - SD-66198-01.

4.2 552A, 552D, 605A or 701A P.B.X. Dial Circuits - SD-66129-01 - SD-66425-01.

DESCRIPTION OF OPERATION

5. CORD CIRCUIT - FIG. 1

The modification of the cord circuit consists of three arrangements:

(1) Adding a resistance Fig. B in series with the (A) inductor when relay (T) is operated in order to reduce the shunting loss of the bridge upon the cord supervisory relay and the station loop. This allows more current to flow through the supervisory relay. The value of this resistance is dependent upon the resistance of the central office trunk loop and the station loop and will be determined from the range chart.

(2) Substituting the inductor (G) (120 ohms) for the 350 ohm winding of

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the inductor (A) in order to operate the supervisory and tripping relays in the central office over a longer trunk loop.

(3) Substituting the inductor (G) and a resistance (G) when the combination of trunk loop and station loop is such that neither of the other changes is satisfactory. As in the first arrangement the value of resistance (G) will be determined from the range chart.

6. DIAL CIRCUIT, FIGURES 2 AND E

This modification of the dial circuit consists of replacing the 440 ohm inductor (S) with inductor (D) and resistance (R) 19PU. Relay (S) is changed to the R94 relay which has an additional make contact. Normally, the 312 ohm winding of resistance (D) is in series with inductor (S) and simulates inductor (D) in as far as shunting the supervisory circuit in the cord and providing busy test resistance on local and incoming trunk connections.

When the dial is operated relays (H) and (D) operate in the usual manner from the off-normal contact of the dial and closes the circuit to relay (S). Relay (S) splits the circuit; connects the station to the (T1) and (R1) condensers and relay (B) and short-circuits the 312 ohm portion of resistance (D), thus placing the 120 ohm windings of inductor (D) directly across the trunk. The coil is short-circuited at this time by the contact on relay (D). When the dial restores to normal, the short-circuit is removed from the inductor (D) then the 1155 ohm shunt is removed when relay (H) releases. This resistance condition is similar to the original circuit when resistance (D) was 1000 ohms. The inductor (D) holds the central office equipment and permits an increase of 320 ohms in the trunk conductor resistance. This increase in resistance cannot always be taken advantage of because of the resistance of the station loop. The increase in range provided by this change is covered in detail in the range chart for the particular P.B.X. and central office condition.

7. REMOVAL OF RINGING BRIDGE FROM CORD CIRCUIT - FIG. 3

When Fig. 3 is used with Figs. H and K the ringing bridge is connected to the cord circuit when the "Night and Thru Dial" key is operated. When Fig. 3 is used with Figs. J and K the ringing bridge is disconnected from the cord circuit when the "Night and Thru Dial" key is operated.

The various range charts for extended range of central offices and long lines circuit operated in tandem specify the use of cord circuits with the ringing bridge disconnected while the "Night and Thru Dial" key is operated in order to obtain the range required.

8. LETTERED OPTIONS - FIG. 2

Resistances (T1) and (R1), "Z" apparatus are provided to prevent a surge in the dialing loop which may be caused by the discharge of condensers (T1) and (R1). This condition occurs due to voltage trapped upon these condensers at the end of dialing on one call, discharging into the dialing loop at the end of the first digit of a subsequently dialed number aggravating any surge which may occur due to introducing the retardation coil, thus causing the release of the pulse relay in the long line circuit or central office circuit. This condition is generally worse on long loops but in some cases it is sufficiently severe to cause false registration on short loops.

Resistance (D) is changed from 1000 ohms to 500 ohms to improve the dialing condition. A momentary sharp reduction of current occurring in the dialing loop may be caused by the insertion of the inductor between digits. This tends to release the pulse relay of either the sender on direct connections or of the relay in the long line circuit. This type of false pulse trouble occurs chiefly when there is a long loop between the P.B.X. and the pulse relay which receives the surge. The surge is reduced somewhat with the 1000 ohm resistance and has been satisfactory until tandem operation of long line circuits was investigated. Reducing the resistance to 500 ohms improves this condition satisfactorily except in some cases which are taken care of by changing the retardation coil. These limits are specified in the various range charts.

Option "W" is changed to option "U" or "K" to provide a lower inductance bridge to prevent false pulses caused by the insertion of the retardation coil in the dialing loop between digits.

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