P.B.X. SYSTEMS
NO. 552A, 552B, 552D, 552E, 605A OR 701A
ATTENDANTS TELEPHONE AND DIAL CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1 Added

53A head telephone set, Figures A and B.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 In Figure A Option "F" was designated and rated A&M Only.

D.2 Circuit Note 103 was changed to delete reference to the 52A head telephone set.

D.3 In Figures A and B reference to the 53A head telephone set was added.

D.4 This circuit is rated A&M Only for the 701A P.B.X.

D.5 Circuit Note 123 was added.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2725-WVS-HHA-NH

P.B.X. SYSTEMS
NO. 552A, 552B, 552D, 552E, 605A OR 701A
ATTENDANTS TELEPHONE AND DIAL CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1 Added

2 - 364 Jacks - Opt. "G"
(Fig. A)

B.2

Superseded	Superseded By
5E Dial	6E Dial
5F Dial	6F Dial
1 M.F. Condenser Opt. "P"	2 M.F. Condenser Opt. "H"
178A Ind. Coil Fig. J	181B Ind. Coil Fig. K

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The use of the 178A induction coil (Fig. J) is rated Mfr. Disc. and superseded by the universal 181B induction coil (Fig. K). Fig. J was formerly a part of Fig. 2.

D.2 The use of Option "P" is rated Mfr. Disc. and superseded by Option "H" for transmission improvement.

D.3 Note 122 is added and Figs. J and K and Options "P", "H" and "G" are added to the Options Used Table.

D.4 The use of the 5E and 5F type dials is rated Mfr. Disc. and superseded by the 6E and 6F dials respectively to provide a dial with improved performance characteristics.

D.5 The strapping between terminals 3RB and 4LT of the (H) relay in Fig. 2 is removed to conform with the manufacturing drawing.

D.6 Option "G" is added to note 103 and Fig. A to provide an additional pair of attendant's telephone jacks when required.

D.7 Cross connection Fig. 51 is changed.

D.8 The code numbers of the component parts of the 52A head Telephone set are removed to agree with the latest practice.

E. CHANGES IN TRANSMISSION REQUIREMENTS

E.1 The 181B induction coil is added to the transmission test requirements table.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 2353-VDM-EWO-BJ

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PBX SYSTEMS
NO. 552A, 552B, 552D, 552E, 605A OR 701A
ATTENDANTS TELEPHONE AND DIAL CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded	Superseded By
63 Ind. Coil "Q" Opt.	178A Ind. Coil "R" Opt.
3A Varistor "K" Opt.	3B Varistor "J" Opt.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Notes 119, 120 and 121 are added.

D.2 Title is changed to add reference to "552B and 552E P.B.X.'s.

D.3 Options "J", "K", "M" and "N" are added to "Options Used" table.

D.4 Options "M" and "N" were formerly designated "Q" and "R" respectively.

D.5 Added reference to 552B and 552E P.B.X. in note 103 (A).

D.6 Added reference to 552B and 552E P.B.X. in circuit requirements table title.

D.7 Voltage limits changed from 32-50V to 32-52V.

E. TRANSMISSION TEST REQUIREMENTS

E.1 Transmission test requirements are added for the 178A induction coil and the 3B varistor.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3310-CJS-RLL-YP

PBX SYSTEMS
NO. 552A, 552D, 605A OR 701A
ATTENDANTS TELEPHONE AND DIAL CIRCUIT

CHANGES

C. CHANGES IN CIRCUIT REQUIREMENTS OTHER THAN THOSE APPLYING TO ADDED OR REMOVED APPARATUS

C.1 A note is added in the remarks column applying to the (H) relay.

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 "R" wiring is designated and "Q" wiring is added.

D.2 Options "R" and "Q" are added to the options used table.

D.3 Circuit note 118 is added.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3310-MHK-RLL-PH

P.B.X. SYSTEMS
NO. 552A, 552D, 605A OR 701A
ATTENDANTS TELEPHONE AND DIAL CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded	Superseded By
(D) 54B retard coil "T" option	(D) 274B retard coil "S" option
396A transmitter) L4R cord) In Figs. 716D receiver) A & B 289B plug)	52A telephone set
716D receiver in fig. A	723A receiver with 15A headband

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Options T and S are added to the options used table.

D.2 The 274B retard coil is added to the transmission test requirements table.

D.3 Circuit note 117 is added.

All other headings, no change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3330-MHK-AJB-BR

18131

A

P.B.X. SYSTEMS
NO. 552A, 552D, 605A, OR 701A
ATTENDANT'S TELEPHONE AND DIAL CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded	Superseded By
54AC Retardation Coil (D)	274AC Retardation Coil (D)
KS-8058-D Resistance (A)	KS-13490, L2 Resistance (A)
289-A Plug	289-B Plug

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Options "W" and "U" were designated and rated "MFR. DISC." and options "V" and "Z" were added.

D.2 Notes 115 and 116 were added.

D.3 "Options Used" table was added.

D.4 The 289-A Plug is superseded by the 289-B Plug.

E. CHANGES IN TRANSMISSION REQUIREMENTS

E.1 The transmission requirement table was revised to cover the addition of the 274AC retardation coil.

All other headings under "Changes", no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is used by the PBX attendant in establishing local, central office and tie trunk connections.

2. WORKING LIMITS

2.1 See range chart.

3. FUNCTIONS

3.1 To enable the attendant to talk over a PBX cord circuit.

3.2 To enable the attendant to dial over a PBX cord circuit.

3.3 To reduce the intensity of clicks to the attendant when a cord is plugged into a station line circuit or central office trunk.

3.4 To delay the opening of the short circuit on the input coil or receiver when the dial returns to normal.

3.5 To provide a low resistance bridge after dialing.

3.6 Provides repeating coil coupling to reduce noise due to unbalanced longitudinal currents.

4. CONNECTING CIRCUITS

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

4.1 Cord Circuit - SD-66198-01

4.2 Position Grouping Key Circuit - SD-66273-01

DESCRIPTION OF OPERATION

5. TALKING ON CORD CIRCUITS - FIG. 1

When the (TALK AND DIAL) key of an associated cord circuit is operated, the "T1", "R1", "T2", "R2" and "ZT" leads of the telephone and dialing circuits are connected to the cord circuit, closing the tip, ring and receiver leads, thereby affording a talking path for the attendant.

6. CIRCUIT OPERATION OF VACUUM TUBE AND ASSOCIATED APPARATUS OF FIG. D

When the (EM) key is normal, the vacuum tube circuit is connected between the induction coil and the attendant's telephone jacks and when the telephone set plug is inserted into the attendant's jack and a (TALK AND DIAL) key is operated, relay (TR) operates, closing the filament circuit for the vacuum tube. Lamp (C) or Resistance (C) in the filament circuit is used to provide a satisfactory filament current regulation. Due to the high ratio of transformation of the input transformer (A), resistance (P) is connected across the output terminals of the input transformer to reduce the speech voltage input to the vacuum tube sufficiently to prevent overloading the tube to the extent of producing noticeable distortion in speech transmission. After amplification by the tube, the voltage of the speech signal is stepped down through the output transformer (B). Any transient voltage impressed across the receiver, such as is obtained when plugging a cord into a station or trunk jack, has a high peak characteristic which would produce objectionable clicks in the attendant's

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receiver. A high peaked positive transient voltage overloads the tube and causes it to distort the click; a high peaked negative transient reduces the plate current and thereby decreases the input to the receiver.

When the telephone set plug is removed from the attendant's telephone set jacks, relay (TR) releases and the filament circuit of the vacuum tube is opened. In case of trouble in the vacuum tube circuit, the (EM) key is operated. This opens the filament circuit and connects the receiver to the induction coil in the usual fashion.

7. DIALING - FIG. E

In order to dial on a cord circuit, the associated (TALK AND DIAL) key is operated. When the dial is moved off normal, relay (H) operates, opening the attendant's telephone circuit, opening a future talking path between the front and rear cords of the cord pair via the "T1", "R1", "T2", "R2" leads, operating relay (D) and shunting resistance (D) around retardation coil (D). The operation of relay (D) short-circuits the parallel combination consisting of resistance (D) and retardation coil (D), provides a locking path for relay (H), and operates relays (S) and (R). The operation of relay (S) splits the cord circuit, leaving the impulse springs of the dial connected to the front cord, and ground and battery through relay (B) to the rear cord. Relay (R) operated, short-circuits the input coil or the attendant's receiver for a sufficient length of time to prevent an undesirable click when the dial restores after dialing each digit, and to prevent the attendant from hearing the transmission of dial pulses. Relay (B) operates over the station loop or through the retardation coil bridge in the cord, in case the station has hung up, and closes a locking path for relay (S) under control of the (TALK AND DIAL) key. Dial impulses are transmitted over the trunk in the usual manner. When the dial is completely restored, relay (D) releases, removing the short-circuit from the parallel combination consisting of retardation coil (D) and resistance (D) and releasing relays (H) and (R). The release of relay (H) removes resistance (D) shunt from around retardation coil (D) and closes the attendant's talking circuit. The release of relay (R) opens the shunt on the input coil or the attendant's receiver. Retardation coil (D) now holds the connection and the front and rear cords are connected through condensers (T1) and (R1) to enable the station to talk on the connection in case the attendant fails to restore the (TALK AND DIAL) key after dialing. When the (TALK AND DIAL) key is restored, relays (B) and (S) release, restoring the circuit to normal.

8. TALKING AND DIALING - FIG. 2

8.1 New Features Provided by Fig. 2

Fig. 2 differs from Figs. 1 and E in that the talking condition between the station and the central office after the dial restores to normal is through a retardation coil instead of through condensers. Another difference is that the bridge after each digit is one 48 ohm winding of the retardation coil instead of the 440 ohm windings of the retardation coil shunted by the 1000 ohm resistance. The low impedance of the retardation winding (which is further lowered by the 50 ohm shunt on the 1-2 winding at this time) prevents a false pulse which might occur after each digit and also provides for operation with central offices that have been arranged for increased range. The d-c bridge consisting of one winding of the retardation coil and the 18AJ resistance is normally 448 ohms to provide for making busy tests on local calls or incoming trunk calls and to avoid taking too much talking battery from the station on the front cord on a local connection.

8.2 Dialing

When the dial is moved off-normal (Assuming a (TALK AND DIAL) key operated and the associated cord in a trunk or tie trunk jack), relay (H) operates from the off-normal contact of the dial.

Relay (H) operated disconnects the "T1", "R1", and "ZT" leads from the telephone circuit, short-circuits the 3-4 winding of retardation coil (D), and closes the circuit to relay (D). (The secondary winding of relay (H) is not used in this circuit).

Relay (D) operated closes the circuit to operate relays (R) and (S) and connects condenser (R1) in series with resistance (B) across the station end of the dial circuit. Resistance (B) is in series with condenser (R1) to prevent a large flow of current through the contacts of relay (D) in case the capacity of the station loop is large.

Relay (R) operated short-circuits the attendant's receiver for purposes described later.

Relay (S) operated disconnects the station from the trunk battery supply through the cord circuit and connects the station to the by-pass battery and

ground supply circuit supplied by relay (B). Condenser (R1) in series with resistance (B) being bridged across the station circuit at this time reduces clicks to the station which may be caused by the breaking and reconnecting of talking battery.

Relay (B) operates in series with the station loop, or if the receiver is not off at the station, in series with the cord bridge, (1) short-circuits resistance (D) to provide the low resistance bridge for holding the trunk when the dial returns to normal, (2) provides a locking path for relay (S), and (3) connects winding 1-2 of retardation coil (D) across the station loop in series with condenser (R1). The 1-2 winding of retardation coil (D) is shunted at this time by resistance (B) and the 3-4 winding is shunted by relay (H) contacts to prevent the station hearing the dial pulses.

When the dial returns to normal, relay (H) releases, (1) removes the short circuit on the 3-4 winding of retardation coil (D), (2) reconnects the attendant's telephone circuit to the trunk, and (3) opens the circuit to relay (D).

Relay (D) releases slowly, (1) opening the circuit to relay (R), (2) removing the 50 ohm shunt from across the 1-2 winding of retardation coil (D), restoring the transmission circuit to the station through the retardation coil which is now used as a repeating coil.

Relay (R) releases slowly removing the short-circuit from the attendant's receiver. This prevents the attendant hearing any clicks due to charging or discharging condenser (S) when the circuit is restored to normal. Resistance (A) is bridged across condenser (R1) to dissipate any charge remaining between digits.

Upon subsequent operation of the dial the circuit functions in a similar manner except that relay (S) is operated from relay (B) which in turn remains operated from the bridge at the station or in the cord circuit.

When the (TALK AND DIAL) key is restored, all relays restore to normal.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 3320-RBL-AJB-CP