

CIRCUIT DESCRIPTION
SYSTEMS DEVELOPMENT DEPARTMENT
PRINTED IN U.S.A.

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Issue 3-D
Appendix 2-D
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PBX SYSTEM
NO. 552A, 605A OR 701A
CORD CIRCUIT
FOR USE IN MULTIPLE OR NONMULTIPLE
SWITCHBOARDS

CHANGES

B. CHANGES IN APPARATUS

B.1 Added

KS-7868 Condenser (A) and (C)

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 "Z" wiring and figure 2 were added to provide a condenser shunt on the series relay in the associated buzzer circuit when "N" wiring is provided in a nonmultiple P.B.X. in order to reduce interference from the operation of the cord circuit lamps which light on through dial connections while the station is dialing.

All other headings, No change.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 332

LJB)
WLF) JD

CIRCUIT DESCRIPTION
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P.B.X. SYSTEM
NO. 552A, 605A, OR 701A
CORD CIRCUIT
FOR USE IN MULTIPLE OR NON-MULTIPLE
SWITCHBOARDS

CHANGES

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

C.1 Values for relay (AS) were changed from:

	Test	Readj.	to:	After Soak	Test	Readj.
O	9.2	8.7		60	8.2	7.8
R	3.3	3.5		60	4	4.3

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Changes were made in the Circuit Requirements of the
(AS) relay and Test Note 5 was added to the Circuit
Requirements Table for the relay (AS) to function with
the P.B.X. test set.

All other headings, no change.

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EVE)
WLF)GD

PBX SYSTEMS
NO. 552A, 605A OR 701A
CORD CIRCUIT
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SWITCHBOARDS

CHANGES

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

- C.1 Armature travels and current flow values changed to
mils instead of decimal values.

D. DESCRIPTION OF CIRCUIT CHANGES

- D.1 Redrawn on account of poor condition of tracing.
D.2 Wiring at retard coil (A) changed in accordance with
note 107 to improve transmission.
D.3 Winding terminals designations added to all relays.
D.4 Spring numbers on relay (RV) transposed.
D.5 Title changed to add 552A PBX.

F. CHANGES IN CURRENT DRAIN

- F.1 Transmission requirements for connections of retard coil
(A) per issue 4-D removed and requirements for "N" wiring
added.

All other headings under "Changes," no change.

1. PURPOSE OF CIRCUIT

- 1.1 This circuit is designed for establishing connections
between PBX stations or between PBX stations and a
manual or dial central office.

2. WORKING LIMITS

		Station Supv.	Trunk Supv.
2.1	Manual and panel cent. office areas Max. Ext. circuit loop Min. Insulation Res.	400 ω 20,000 ω	350 ω * 20,000 ω

	Station Supv.	Trunk Supv.
Step-by-Step Cent. Office areas		
Max. Ext. circuit loop	400 ω	350 ω *
Min. Insulation Res.	30,000 ω	30,000 ω
* Conductor Loop Resistance		

3. FUNCTIONS

- 3.01 To complete talking connections between local stations.
- 3.02 To complete talking connections between local stations and central office subscribers.
- 3.03 Attendant dialing on front cord.
- 3.04 Through dialing on station to central office connections.
- 3.05 Non-through supervision on all central office connections except those dialed from the station.
- 3.06 Ringing supervision on front cord for central office (toll) connections.
- 3.07 Ringing Supervision on the front cord or DC supervision on the rear cord for tie trunk connections.
- 3.08 Ringing supervision on the front cord on incoming calls from central offices following a station hang-up on through dialed connections.
- 3.09 Ringing on both front and rear cords.
- 3.10 Double supervision on local connections.
- 3.11 Means for making busy tests.
- 3.12 Means for talking on any cord circuit.
- 3.13 Local battery transmission on station to station connections.
- 3.14 Central office battery transmission on central office connections.
- 3.15 "Talk and Dial" key rendered ineffective when "night and through dial" key is operated.
- 3.16 Means for closing the attendant's transmitter circuit by use of the "Talk and Dial" Key.

4. CONNECTING CIRCUITS

- 4.1 Manual station line circuit.
- 4.2 Dial station line circuit.
- 4.3 Central office trunk circuit.
- 4.4 Standard tie trunk circuits.
- 4.5 Buzzer circuit.
- 4.6 Attendants telephone and dial circuit.
- 4.7 Ringing circuit.
- 4.8 Standard attendant trunk circuit.
- 4.9 Standard intercepting trunk circuit.

DESCRIPTION OF OPERATION

5. STATION TO STATION CONNECTIONS

The attendant answers a station call with the rear cord thereby operating the (S) relay from ground on the sleeve of the station jack. The (S) relay operated, connects battery and ground through the (A) retardation coil to the station, lights the front supervisory lamp (C) (provided the "Talk and dial" key is not operated) and couples the front and rear cords through condensers (T) and (R). The rear cord supervisory relay (AS) operates and prevents the (A) supervisory lamp from lighting. The connection is completed with the front cord, the called station being signalled in the usual way. The front supervisory lamp (C) remains lighted until the called station answers. Both stations have flashing and disconnect supervision.

6. STATION TO CENTRAL OFFICE - MANUAL

The attendant answers the station as described in paragraph 5. The front cord of the pair is then plugged into an idle central office trunk, operating the (T) relay. The (T) relay operated, removes ground from the P winding of the (CS) relay, disconnects the (CS) relay from the front cord, connects the outer end of P winding to the inner end of the S winding of the (CS) relay thereby operating the (CS) relay from a contact on the (AS) relay, releases the (S) relay and closes a bridge, consisting of one winding of the (A) retardation coil and the tertiary winding of the (T) relay across the front cord. The (S) relay released, removes the battery and ground

windings of the (A) retardation coil from the tip and ring of the rear cord, removes the ground for lighting the (C) lamp, removes the (T) and (R) condensers from the talking circuit and connects the tip and ring of the front cord to the tip and ring of the rear cord respectively. When the central office operator answers, the (AS) relay operates, (for extreme conditions of loops and voltage the (AS) relay may have released when the attendant plugged into the trunk jack). The PBX attendant passes the call and restores the "talk and dial" key. The (CS) relay operated, increases the resistance of the supervisory bridge from 350 to 1200 ohms. The calling station has disconnect and flashing supervision since the (AS) relay is under control of the switchhook. When the stations hang up, the (AS) and (CS) relays release, the (AS) relay lighting the (A) supervisory lamp as a disconnect signal and the (CS) relay reducing the supervisory bridge from 1200 to 350 ohms to hold the connection. When the cords are taken down, the circuit restores to normal.

7. CENTRAL OFFICE TO STATION - MANUAL OR DIAL CENTRAL OFFICE

The attendant answers the trunk signal with the front cord operating the (T) relay as described in paragraph 6. The rear cord of the pair is plugged into the wanted station jack, lighting the (A) supervisory lamp. The station is signalled in the usual way. When the station answers, the (AS) relay operates, extinguishing the (A) supervisory lamp and operating the (CS) relay. The (CS) relay operated increases the resistance of the cord circuit bridge from 350 to 1200 ohms. From this point, the circuit operation is the same as described in paragraph 6.

8. STATION TO CENTRAL OFFICE - ATTENDANT DIALING

The attendant answers the station signal with the rear cord and selects an idle central office trunk as described in paragraph 6. With the "talk and dial" key operated, the attendant moves the dial off-normal, an action which connects the impulse springs of the dial to the T1 and R1 leads, connects ground to the T2 lead and battery to the R2 lead for supervisory purposes. A bridge is maintained across the T1 and R1 leads from the "telephone and dial" circuit for holding the Central Office apparatus between each dial pull. When the "talk and dial" key is restored the bridge consisting of one winding of the (A) retardation coil holds the connection or in case the station hook-switch is operated the connection is held by the station. From this point the operation of the circuit is the same as described in paragraph 6.

9. STATION TO CENTRAL OFFICE - THROUGH DIALING

Outgoing central office connections extended through the cord may, in some cases, be dialed by the PBX subscriber. In such cases the subscriber reaches the manual PBX direct (manual station) or by dialing an "attendant trunk" (dial station) whence the attendant extends the connection to the central office trunk in the usual manner except that the "night and through dial" key is operated. The operation of this key establishes a dialing path through the cord encumbered only by the ringing relay bridge and series relay (AS). These relays are in circuit to provide the customary supervision. The PBX subscriber is now the same as a central office subscriber and completes the call by dialing. Either or both supervisory lamps may flash while the station is dialing. The attendant disconnects on a steady rear supervisory lamp.

10. TIE TRUNK TO CENTRAL OFFICE

Connections from tie trunks to central office are established in the same manner as described for "station to central office." (See paragraphs 6 and 8).

11. CENTRAL OFFICE TO TIE TRUNK

Calls incoming from a central office to a tie trunk are established as described for calls incoming from "central office to station." (See paragraph 7)

12. RERING

Ringing relay (RU) controls supervisory lamp (C) and is permanently connected across the cord so that in case of a rering on a central office or tie trunk connection the PBX attendant will receive a signal. Relay (RU) remains operated only while ringing current is being applied to the trunk.

13. NIGHT CONNECTIONS

This cord may be used to connect a station to a central office trunk for night service. In this case the "night and through dial" key is operated as described in paragraph 9, and the only cord apparatus not eliminated is the ringing bridge and the supervisory relay (AS).

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