P.B.X. SYSTEMS
NO. 550C, 551A OR 551B
CORD CIRCUIT

CHANGES

B. CHANGES IN APPARATUS

	Superseded	Superseded By
B.1	Relay 178AF	Relay 178CM

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 The use of the 178AF relay is rated Mfr. Disc. to show realistic ratings for obolescent apparatus.

D.2 The rating of the circuit is changed from A&M Only, Mfr. Disc. for 550C P.B.X., to Mfr. Disc. to agree with the rating of the 551A and 551B P.B.X.

D.3 Note 106 is added.

All other headings under changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is used at a No. 550C, 551A or 551B P.B.X. switchboard to establish connections between two local stations or a local station and a central office trunk.

2. WORKING LIMITS

STATION TO STATION

	Supv. 14V	15V	17V	19V	21V
Max. Ext. Ckt. Loop	185ω	200ω	235ω	270ω	305ω

Min. Ins. Res. 20,000ω

Trunk Supv.
See Range Charts.

3. FUNCTIONS

3.1 Completing talking connections between local stations.

3.2 Completing talking connections between local stations and central office trunks.

3.3 Attendant dialing on front cord.

3.4 Thru dialing and supervision on station to central office connections.

3.5 Thru supervision with cord splitting on central office connections.

3.6 Nonthru supervision.

3.7 Ringing supervision on front cord on central office connections.

3.8 Ringing on front and rear cords.

3.9 Double supervision on local connections.

4. CONNECTING CIRCUITS

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

4.1 No. 550C, 551A or 551B P.B.X. station line circuit SD-66110-01.

4.2 No. 550C, 551A or 551B P.B.X. trunk circuit SD-66109-01.

4.3 No. 550C, 551A or 551B P.B.X. ringing circuit SD-65118-01.

4.4 No. 550C, 551A or 551B auxiliary signal and battery cut-off key circuit SD-66123-01.

4.5 No. 550C, 551A or 551B P.B.X. attendant's telephone circuit and dial circuit SD-66023-01.

DESCRIPTION OF OPERATION

5. COMPLETING LOCAL CONNECTIONS

When the rear cord plug is inserted in the jack associated with the lighted line lamp, the

lamp is extinguished, the supervisory lamp associated with the front cord is lighted and relay (A) operates preventing the supervisory lamp associated with the rear cord from lighting. The talk and dial key is then operated connecting the attendant's telephone set across the cord for talking. On learning that a local connection is wanted, the plug of the corresponding front cord is inserted in the station jack of the called line. The front cord ringing key is then operated connecting ringing current to the line to signal the called station.

When the receiver is removed from the switchhook at the called station, relay (C) operates. Relay (C) operated causes the front cord supervisory lamp to be extinguished as an indication that the called party has answered.

5.1 The operation of the switchhook at either station will cause the corresponding relay (A) or (C) to release and reoperate in turn flashing the associated supervisory lamp as a recall signal.

5.2 Disconnection on Local Call

When the receivers are replaced on the switchhooks at the calling and called stations, relays (A) and (C) release in turn allowing the associated cord supervisory lamps to light as disconnect signals. The plugs of the front and rear cords are then withdrawn from the associated jacks and the circuit restores to normal.

6. COMPLETING CALLS DIAL CENTRAL OFFICE

6.1 Calls Dialed by Attendant

The call is answered as described in paragraph 5. With the talk and dial key operated, the plug of the front cord is inserted in an idle trunk jack operating relay (T). Relay (T) operated prevents the front cord supervisory lamp from lighting, disconnects P.B.X. battery and ground from the cord, short-circuits relay (C) and causes (E) to operate. Relay (E) operated, removes the retardation coil from across the tip and ring of the cord and short-circuits the secondary (36 ohm) winding of relay (A). The circuit is now in condition for the attendant to dial the central office. After dialing is completed, the talk and dial key is restored causing relay (E) to lock thru its own contacts under control of the talk and dial key.

6.2 Disconnection on Attendant Dial Calls (Thru Supervision)

When the receiver is replaced on the switchhook at the local station at the end of the call, relay (A) releases relighting the rear cord supervisory lamp as a disconnect signal and operating relay (S), and the apparatus at the central office releases. Relay (S) operated, splits the cord to prevent ringing the station falsely should the trunk be reseized at the central office before the cords at this P.B.X. are withdrawn from the jacks. When the plugs of the cords are withdrawn from the associated jacks, all operated apparatus releases restoring the circuit to normal.

Should the trunk be seized by the central office apparatus before disconnection by the attendant, relay (R) operates on central office ringing current and holds over the ringing interval. This causes the front cord supervisory lamp to light as a recall signal. When the talk and dial key is operated the retardation coil of the dial circuit is bridged across the line and relay (E) is released. Relay (E) released connects the retardation coil across the tip and ring of the cord to trip machine ringing and also releases relay (S). Relay (S) released connects the tip and ring of the rear cord to the tip and ring of the front cord. The call is then completed by inserting the plug in the called station line jack and operating the rear ringing key.

6.3 Disconnection on Attendant Dial Calls (Non-thru Supervision)

When the receiver is replaced on the switchhook at the local station at the end of a call, relay (A) releases relighting the rear cord supervisory lamp as a disconnect signal and releasing the (E) relay. Relay (E) prevents the (S) relay operating and connects the retardation coil across the tip and ring of the cord for holding the central office connection. The plugs of the cords are then withdrawn from the associated jacks releasing all operated relays and restoring the circuit to normal.

6.4 Calls Dialed from Station (Thru Dial Calls)

With the night and thru dial key operated the plug of the front cord is inserted in the jack of an idle trunk. Operation of this key disconnects

all apparatus in the cord except the rear supervisory relay and relay (R) in series with the 2 mf condenser bridged across the cord. Either or both supervisory lamps may or may not flicker during dialing.

6.5 Disconnection on Thru Dialed Calls

When the receiver is replaced on the switchhook, the central office apparatus is released and relay (A) releases lighting the rear supervisory lamp as a disconnect signal. If the trunk is seized by the central office apparatus before disconnection by the attendant, the station bell will ring and relay (R) will operate lighting the front supervisory lamp during ringing intervals. The attendant answers the call by restoring the night and thru dialing key and operating the talk and dial key. From this point on the circuit functions as previously described.

7. OUTGOING CALLS TO MANUAL CENTRAL OFFICE

The call is answered as described in paragraph 5. The plug of the front cord is then inserted in an idle trunk jack causing relay (T) to operate. Relay (T) operated, disconnects the P.B.X. battery and ground from the retard coil in the cord circuit, bridging it across the cord, lighting the line lamp at the central office. Relay (A) may or may not remain operated during the interval between the disconnection of P.B.X. battery by relay (T) and the connection of central office battery from the central office cord circuit. When the call is answered by the central office operator, relay (A) operates if released and extinguishes the rear cord supervisory lamp if lighted. The call is then passed with the talk and dial key operated. The talk and dial key is then released and the circuit functions as described in paragraph 6.1.

8. INCOMING CALLS FROM DIAL OR MANUAL CENTRAL OFFICE

When the plug of the front cord is inserted in the trunk jack associated with the lighted trunk lamp and the talk and dial key is operated, the trunk lamp is extinguished and relay (T) operates. Relay (T) operated disconnects P.B.X. battery and ground from the retardation coil in the cord circuit, bridging the retardation coil across the tip and ring of the cord to trip machine ringing, and short-circuits relay (C).

The call is completed by inserting the plug of the rear cord in the called station jack and ringing current is applied to the line. When the receiver is removed from the switchhook at the called station, relay (A) operates extinguishing the rear supervisory lamp and operating relay (E) which locks under control of the talk and dial key. Relay (E) operated opens the circuit of the retardation coil bridged across the tip and ring of the cord and short-circuits the secondary (36 ohm) non-inductive winding of relay (A) if lead "A" is connected.

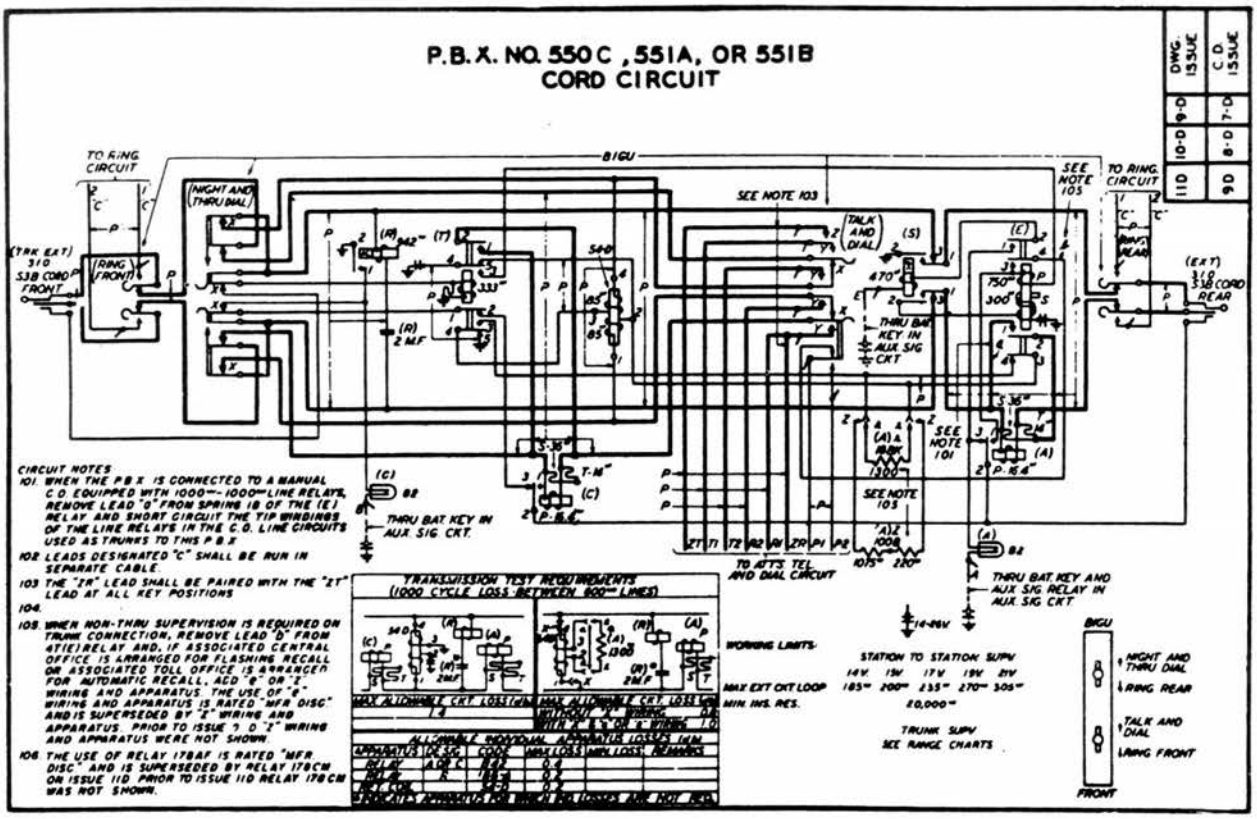
9. DISCONNECTION

When the receiver is replaced on the switchhook at the called station, relay (A) releases relighting the rear supervisory lamp as a disconnect signal and operates relay (S) if the cord is arranged for thru supervision or releases relay (E) if the cord is arranged for nonthru supervision. From this point on, the circuit functions as described in paragraph 6.2 or 6.3.

10. MISCELLANEOUS APPARATUS

10.1 (A) Resistance

The (A) resistance provides a permanent bridge across the cord for nonthru supervision on trunk calls to prevent falsely recalling the central office or toll operator.



CIRCUIT REQUIREMENTS

NO. 550C, 551A, OR 551B P.B.X.-CORD CIRCUIT (CD)

CKT ASS. NO.

APPARATUS DESIG	APPARATUS CODE	MECH. REQ. B.S.P. FIG.	MECH. REQ. CONT. PRESS.	MECH. REQ. ARM. TRVL.	CIRCUIT PREPARATION SEQ. SW. POS.	CIRCUIT PREPARATION BLOCK	CIRCUIT PREPARATION TEST CLIP DATA CONN. BAT.	CIRCUIT PREPARATION TEST CLIP DATA CONN. GRD.	TEST SET PREF.	SEE TEST NOTE NO.	DIRECT CURRENT FLOW REQ. TEST WDG.	DIRECT CURRENT FLOW REQ. REST	DIRECT CURRENT FLOW REQ. W. ITEM SOAK AMP.	DIRECT CURRENT FLOW REQ. TEST AMP.	DIRECT CURRENT FLOW REQ. READ. AMP.	REMARKS
RELAYS																
A	B42	3		.030				EXT-CD-R	GRD.		1W	O	.150		.012	
								EXT-CD-R	GRD.		1W	R	.150		.004	
								EXT-CD-R	GRD.	1	1W	O	.150	.0126		
								EXT-CD-R	GRD.	1	1W	R	.150	.0036		
C	B42	3		.030				TRK-CD-R	GRD.		1W	O	.150		.012	
								TRK-CD-R	GRD.		1W	R	.150		.004	
								TRK-CD-R	GRD.	1	1W	O	.150	.0126		
								TRK-CD-R	GRD.	1	1W	R	.150	.0036		
E	E803	11/10	L	.015		A(T) O		EXT-CD-S	GRD.		P	O		.016	.014	OPERATE (TALK AND DIAL) KEY
R	196-A						U WDG (R)		BAT.			O		.0085	.0075	
							U WDG (P)		BAT.			NO		.0036	.004	
S	178-AJ	D/D						2T (E)	GRD.	2		O		.026	.023	NORMALLY CLOSED CONTACTS SHALL BE
	178CM							2T (E)	GRD.	2		NO		.013	.017	TENSIONED TO MIN. 10 GMS. CONT. PRESSURE
Y	E804	8/7	L	.020			TRK-CD-S		BAT.		W/S	O		.032	.029	
MISC.																
	B1GU KEY									3/4						

TEST NOTES:

1. REQUIREMENTS FOR TESTING FROM FRONT OF BOARD: GROUND SLEEVE OF REAR (EXTENSION) CORD ONLY TO LIGHT SUPERVISORY LAMP. ACTION OF B42 RELAY OBSERVED FROM FLASHING OF SUPERVISORY LAMP.
2. PRIOR TO ISSUE 3-D THE REQUIREMENT FOR RELAY (S) WAS OPR. TEST .0255, READ. .024, NON-OPR. TEST .017, READ. .018, AND THE CONTACT PRESSURE WAS NOT SHOWN.
3. (TALK AND DIAL) KEY: ALL "Y" CONTACTS SHALL MAKE BEFORE ANY "X" CONTACT BREAKS. "Z" CONTACT SHALL MAKE LAST.
4. NON-CLICK REQUIREMENT.
   (A). (NIGHT AND THRU DIAL) KEY: WHEN LEVER IS RESTORED FROM (RING REAR) POSITION "X" CONTACTS SHALL NOT BREAK.
   (B). (RING REAR) KEY: WHEN LEVER IS RESTORED FROM (NIGHT AND THRU DIAL) POSITION NORMALLY OPEN CONTACTS SHALL NOT CLOSE.
   (C). (RING FRONT) KEY: WHEN LEVER IS RESTORED FROM (TALK AND DIAL) POSITION NORMALLY CLOSED CONTACTS SHALL NOT OPEN.
   (D). (TALK AND DIAL) KEY: NON-CLICK REQUIREMENT WAIVED WHEN LEVER IS RESTORED TO NORMAL FROM (RING FRONT) POSITION.