

**CORD CIRCUITS
OPERATION TESTS
606B AND 607A PBX**

1. GENERAL

- 1.01 This section describes a method of testing the operating features of cord circuits in the No. 606B and No. 607A P.B.X.'s. It also covers the purpose of each test.
- 1.02 This section is reissued to include the No. 607A P B X The rating formerly was AT & T Co Provisional.
- 1.03 The tests covered are:
- (A) Supervisory, Recall and Ringing Features under Trunk-to-Station Condition
 - (B) Supervisory, Recall and Ringing Features under Condition of Front Cord Alone Connected to Station
 - (C) Supervisory, Recall and Ringing Features under Station-to-Trunk Condition
 - (D) Overthrow on Talk and Dial Key
 - (E) Overthrow on Night and Through Dial Key
 - (F) Audible Ringing Signal on Call from Station to Station
 - (G) Continuity of "S" Lead from Telephone and Dialing Circuit to Front Cord
 - (H) Tip Circuit Features
 - (I) A-C Continuity of Talking Circuits
 - (J) Resistance of Sleeve Circuits
 - (K) Resistance of Low D-C Bridge
 - (L) Battery on Ring of Front Cord in Normal Condition
 - (M) Release of T Relay
 - (N) Test for Lamp Sockets Crossed with Battery
- 1.04 The application of these tests has the following limitations:
- Test (G) is required only at P B X's equipped with dial repeating tie trunk circuits or similar circuits arranged for dialing on the front cord while the front cord lamp is lighted.
 - Test (J) is required only at P B X's equipped with switchboard multiple jacks on dial station lines.
 - Test (K) is required only on cord circuits from which the high d-c bridge has not been disconnected.
 - Test (N) is required only at P B X's equipped with No. 13 lamp sockets without insulators.
- 1.05 Cord circuit test line circuit SD-66625-01 and a-c continuity test circuit SD-66240-01 are employed in making these tests.
- 1.06 While these tests are being performed at an attendant position, the position should be vacated by the attendant.
- 1.07 When making tests which require the use of a test receiver, keep the receiver slightly away from the ear, so that clicks which occur during testing will not act directly on the ear.

2. APPARATUS

2.01 The apparatus required for each test is shown in the following table. The details for each item are given in the indicated paragraphs.

Apparatus		Number Required for Tests													
		A	B	C	D	E	F	G	H	I	J	K	L	M	N
Subscriber set	2.02	1	1	1	—	—	1	1	—	—	—	—	—	—	—
Test set	2.03	1	1	1	—	—	—	—	—	—	—	1	1	—	
Telephone set	2.04	1	—	1	—	—	1	—	1	—	—	—	—	—	
Receiver	2.05	—	—	1	1	1	—	—	—	1	—	—	—	—	
Test set	2.06	—	—	—	—	—	—	—	—	—	1	1	—	—	
Receiver	2.07	—	—	—	—	—	—	—	—	—	—	—	—	1	
Patching cord	2.08	—	—	—	—	—	—	—	—	—	—	1	—	—	

- 2.02 Subscriber set connected to cord and plug unless permanently installed as shown on cord circuit test line circuit SD-66625-01.
- 2.03 No. 32B test set.
- 2.04 Attendant telephone set.
- 2.05 No. 716E receiver or No. 528 receiver equipped with one R2CU cord and one No. 309 plug (2W29A cord).
- 2.06 No. 35F current flow test set (or equivalent).
- 2.07 No. 716E receiver or No. 528 receiver equipped with one W2AB cord and No. 360 tools (2W21A cord and two No. 365B tools).
- 2.08 No. 893 cord 6 feet long, equipped with No. 360 tools (1W13B cord), and one No. 364 tool and one No. 365 tool.

3. METHOD

(A) Supervisory, Recall, and Ringing Features Under Trunk-to-Station Condition

- 3.01 This test checks the operating features of the cord circuit under the condition of a trunk-to-station call.
- 3.02 Connect a spare rear cord at the position of the cord under test to the nearest SP jack of the test line circuit. Observe that the rear cord lamp is lighted. If the plug ended subscriber set is used, connect the plug to an FC jack at another multiple appearance of the test line circuit, near enough for the bell to be heard. Connect the No. 32B test set to the nearest T jack of the test line circuit. Connect the attendant telephone set to the position of the cord under test.
- 3.03 **D-C Bridge on Rear Cord Alone:** Connect the rear cord under test to the nearest RA jack of the test line circuit. Observe that the spare cord lamp is extinguished. Observe that the rear lamp of the cord under test does not light.
- 3.04 **Operation of RU Relay:** Operate the rear cord ringing key of the spare cord and observe that the front and rear lamps of the cord under test light. Observe that the rear lamp of the spare cord also lights. (In some No. 607A P B X's where the RU relay is under control of the NIGHT AND THRU DIAL key, operate the NIGHT AND THRU DIAL key, of the cord under test and observe that the front and rear lamps of the cord under test go out. Restore the NIGHT AND THRU DIAL key to normal and observe that the cord lamps light again). Restore the ringing key and operate the TALK AND DIAL key to stop the flashing recall signal on the spare cord. Then restore this key to normal. Observe that the lamps of the cord under test are extinguished. Disconnect the spare rear cord from the SP jack. Connect the spare front cord to the SP jack.
- 3.05 **Machine Ringing:** Connect the front cord under test to the nearest FC jack of the test line circuit. Observe that the front cord supervisory lamp lights. Note that the bell in the subscriber set rings intermittently at the rate of 2 seconds ringing and 4 seconds silence (or 1 second ringing and 2 seconds silence on small boards having QD type ringing machines).
- 3.06 **No Audible Ringing on Trunk Call:** Operate the talk and dial key of the spare cord while listening in the receiver of the attendant's telephone set. Note that an audible ringing signal is not heard or is heard only faintly, then restore the talk and dial key of the spare cord.
- 3.07 **Pre-Tripping:** Operate the white button of the No. 32B test set and note that the subscriber set bell continues to ring while the button is depressed. Release the white button.

SECTION 538-050-524

3.08 **Operation of Tripping and S Relays:** Operate and hold the red button of the No. 32B test set during a silent period in the machine ringing cycle. Note that ringing ceases and observe that the front cord lamp is extinguished.

3.09 **High Resistance D-C Bridge:** Release the red button of the No. 32B test set and observe that the front lamp of the cord under test lights, and that the lamp of the spare cord does not light.

Note: If the cord circuit under test has been modified to disconnect the high resistance bridge, the lamp of the spare cord will flash. In this case, operate and restore the talk and dial key of the spare cord to stop the flashing signal.

3.10 **Flashing Recall on Front Cord Lamp from A1 and A2 Relays:** Operate and hold the red button of the No. 32B test set and observe that the front lamp of the cord under test flashes twice a second. Note that the position buzzer taps in unison with the flashes.

3.11 **Operation of K Relay:** Operate the talk and dial key of the cord under test for a moment and then restore it. Observe that the flashing of the front cord lamp ceases and the lamp is extinguished. Release the red button of the No. 32B test set and observe that the front lamp of the cord under test lights. If the lamp in the spare cord flashes, operate the talk and dial key of this cord to stop the flashing.

3.12 **Manual Ringing on Front Cord:** Operate the front ringing key of the cord under test and observe that the bell in the subscriber set rings. Restore the ringing key and note that the bell is silenced.

3.13 **Disconnection of Cords:** Disconnect the front and rear cords under test from the FC and RA jacks of the test line circuit. Disconnect the spare front cord from the SP jack. Connect the spare rear cord to the SP jack and proceed with 3.14.

3.14 **Test of Other Cords at Same Position:** Repeat 3.03 to 3.13 inclusive, on each of the other cord circuits to be tested. Then disconnect the No. 32B test set, the spare cord, the attendant's telephone set and the plug ended subscriber set, if used.

(B) Supervisory, Recall and Ringing Features under Condition of Front Cord Alone Connected to Station

3.15 This test checks the operation of the cord circuit when the front cord alone is connected to a station.

3.16 Connect the No. 32B test set to the nearest T jack of the test line circuit. If the plug ended subscriber set is used, connect the plug to an FC jack at another multiple appearance of the test line circuit, near enough for the bell to be heard.

3.17 **No Machine Ringing with Rear Cord Disconnected:** Connect the front cord under test to the nearest FC jack of the test line circuit while the rear cord under test is free. Wait at least four seconds and note that the bell in the subscriber set does not ring. Observe that the front cord lamp lights.

3.18 **Operation of B Relay:** Operate the red button of the No. 32B test set and observe that the front cord lamp is extinguished. (On boards having single flashing recall, the front cord lamp will not be extinguished.)

3.19 **Flashing Recall on Front Lamp from C1 and C2 Relays:** Release and reoperate the red button of the No. 32B test set. Observe that the front cord lamp flashes while the red button is held operated and note that the position buzzer taps in unison with the flashes. Release the red button of the test set and observe that the front cord lamp is lighted steadily. Disconnect the front cord from the FC jack.

3.20 **Test of Other Cords at Same Position:** Repeat 3.17 to 3.19 inclusive, on each of the other cord circuits to be tested. Then disconnect the No. 32B test set and the plug ended subscriber set, if used.

(C) Supervisory, Recall and Ringing Features under Station-to-Trunk Condition

3.21 This test checks the operation of the cord circuit under the condition of a station-to-trunk call.

3.22 Connect a spare front cord to the nearest SP jack of the test line circuit. If the plug ended subscriber set is used, connect the plug to an FC jack at another multiple appearance of the test line circuit, near enough for the bell to be heard. Connect the attendant's telephone set to the position under test. Connect the No. 32B test set to the nearest T jack of the test line circuit.

3.23 **Battery Supply from Windings of A Relay:** Connect the rear cord under test to the nearest FC jack of the test line circuit. Observe that the rear cord lamp lights. Operate the red button of the No. 32B test set and observe that the rear cord lamp is extinguished. Release the red button and observe that the rear cord lamp lights.

3.24 **Manual Ringing on Rear Cord:** Operate the rear ringing key of the cord under test and note that the bell in the subscriber set rings. Release the ringing key and note that the bell is silenced.

3.25 **Short-Circuit across Rear Cord:** Connect the plug of the R2CU cord attached to the test receiver to another multiple FC jack of the test line circuit. Listen in the test receiver while the plug of the front cord under test is inserted into the RA jack of the test line circuit and note that no loud clicks are heard. Disconnect the test receiver.

3.26 **Flashing Recall on Rear Cord Lamps:** Operate the talk and dial key of the spare cord. Operate and release and then operate again the red button of the No. 32B test set. Observe that the rear lamp of the cord under test flashes while the red button is held operated, and that the position buzzer taps in unison with the flashes. Release the red button of the test set and observe that the rear lamp is lighted steadily. Disconnect the rear cord under test from the FC jack.

3.27 **Overthrow on Rear Ringing Key:** Listen in the receiver of the attendant's telephone set (the talk and dial key of the spare cord having been operated in 3.26) while the rear ringing key of the cord under test is operated and allowed to restore unrestrained to normal. Note that no unusually loud click is heard. Restore the talk and dial key of the spare cord.

3.28 Remove the spare front cord from the SP jack of the test line circuit, and connect a spare rear cord to the SP jack. Observe that the rear lamp of the spare cord does not light. Disconnect the front cord under test from the RA jack of the test line circuit, and observe that the rear lamp of the spare cord lights. Disconnect the spare rear cord from the SP jack and insert the spare front cord in the SP jack.

3.29 **Test of Other Cords at Same Position:** Repeat 3.23 to 3.28 inclusive, on each of the other cord circuits to be tested. Then disconnect the spare cord, the No. 32B test set, the attendant's telephone set and the plug ended subscriber set, if used.

(D) Overthrow on Talk and Dial Key

3.30 This test checks whether the TALK AND DIAL key overthrows into the RING FRONT position when allowed to return to normal without restraint.

3.31 Connect a spare rear cord to the nearest SP jack of the test line circuit. Connect the plug of the R2CU cord attached to the test receiver to the next multiple FC jack beyond the nearest FC jack of the test line circuit.

3.32 Operate the night and through dial key of the cord under test. Connect the associated rear cord to the nearest RA jack of the test line circuit and the associated front cord to the nearest FC jack of the test line circuit. The lamp of the spare cord should be extinguished. Listen in the test receiver while the talk and dial key of the cord under test is operated and then allowed to restore unrestrained to its

normal position. Note that no click is heard. Disconnect the cord under test from the FC and RA jacks and restore the night and through dial key.

3.33 **Test of Other Cords at Same Position:** Repeat 3.32 on each of the other cord circuits to be tested. Then disconnect the test receiver and the spare cord.

(E) Overthrow on Night and Through Dial Key

3.34 This test checks whether the NIGHT AND THRU DIAL key overthrows into the RING REAR position when allowed to return to normal without restraint.

3.35 Connect the plug of the R2CU cord attached to the test receiver to the nearest SP jack of the test line circuit.

3.36 Connect the rear cord under test to the nearest RA jack of the test line circuit. Listen in the test receiver while the night and through dial key of the cord under test is operated and allowed to restore unrestrained to its normal position. Note that no loud click is heard. Disconnect the cord under test from the RA jack.

3.37 **Test of Other Cords at Same Position:** Repeat 3.36 on each of the other cord circuits to be tested. Then disconnect the test receiver.

(F) Audible Ringing Signal on Call from Station to Station

3.38 This test checks that audible ringing is returned to the calling party on a station-to-station call.

3.39 Connect a spare cord to the nearest RA jack of the test line circuit. Operate the talk and dial key of the spare cord. Connect the attendant's telephone set to the position. If the plug ended subscriber set is used, connect the plug to an FC jack at another multiple appearance of the test line circuit, near enough for the bell to be heard.

3.40 Connect the rear cord under test to the nearest SP jack of the test line circuit. Then connect the front cord under test to the nearest FC jack of the test line circuit. Note that the bell in the subscriber set rings and that audible ringing signals are heard in the attendant's telephone set receiver. Disconnect the cords under test from the SP and FC jacks.

3.41 **Test of Other Cords at Same Position:** Repeat 3.40 on each of the other cord circuits to be tested. Disconnect the spare cord, the attendant's telephone set and the plug ended subscriber set, if used.

(G) Continuity of "S" Lead from Telephone and Dialing Circuit to Front Cord

3.42 This test checks the continuity of the "S" lead used in dialing on dial repeating tie trunk circuits.

3.43 If the plug ended subscriber set is used, connect the plug to an FC jack at another multiple appearance of the test line circuit, near enough for the bell to be heard.

3.44 Connect the rear cord under test to the nearest RA jack of the test line circuit. Then connect the associated front cord to the nearest FC jack of the test line circuit. Observe that the front cord lamp lights and note that the subscriber set bell rings. Operate the talk and dial key of the cord under test and pull the dial off normal. Note that the bell is silenced. While holding the dial off normal, disconnect the front cord under test from the FC jack and observe that the front cord lamp remains lighted after the cord is disconnected. Restore the talk and dial key and observe that the front cord lamp is extinguished within approximately two seconds. (This also tests the release of the K relay.) Let the dial return to normal. Disconnect the rear cord from the RA jack.

3.45 **Test of Other Cords at Same Position:** Repeat 3.44 on each of the other cord circuits to be tested. Disconnect the plug ended subscriber set, if used.

(H) Tip Circuit Features

3.46 This test checks the busy test feature on the tip of the front cord and the open circuit on the tip of the rear cord.

3.47 **Busy Test on Each Front Cord:** Connect the attendant's telephone set to the position under test and listen in the receiver while the sleeve of an idle rear cord is touched successively to each of the tips of the front cords. Note that a click is heard on each cord.

3.48 **Normally Open Tip Circuit to Each Rear Cord:** While listening in the receiver of the attendant's telephone set, touch the tip of one of the front plugs at the position to the tip of each of the back plugs successively. Note that clicks are not heard. Disconnect the attendant's telephone set.

(I) A-C Continuity of Talking Circuits

3.49 This test provides a check of the cord circuit through the use of the a-c continuity test circuit SD-66240-01.

3.50 While performing this test disregard the supervisory lamp signals.

3.51 Connect the plug of the R2CU cord attached to the test receiver to the nearest REC jack of the a-c continuity test circuit and listen in the receiver.

3.52 Connect the front plug of the cord under test to the CON FRONT jack of the test circuit. A low volume of tone should be heard in the test receiver. This volume can be expected and is not an indication of trouble. After testing several cords the tester should become familiar with the normal volume of tone which should be heard. Cords on which the volume is appreciably greater than normal should be considered in trouble.

3.53 Listen in the test receiver during the following operations for clicks or changes in the volume of tone which may indicate cut-outs or other trouble conditions.

3.54 Hold the plug of the cord under test in the jack with one hand and shake the cord with the other hand.

3.55 Turn the plug around in the jack so that the jack springs will make contact with all possible points on the tip and ring of the plug.

Note: Scratchy noises heard while the plug is being rotated should be disregarded.

3.56 Tap lightly on the top of the key associated with the cord under test near the front and rear key levers.

3.57 Disconnect the front cord from the CON FRONT jack of the test circuit and then connect the rear cord of the same pair to the same jack. Repeat 3.54, 3.55, and 3.56 with the rear cord.

3.58 Connect the front plug of the cord under test to the CON REAR jack of the test circuit while the rear cord is connected to the CON FRONT jack.

3.59 Operate the talk and dial key. Tap lightly on the top of the key near the front key lever. This key should not be operated while the talk and dial key of any other cord circuit at the same position is operated. Release the talk and dial key.

3.60 Operate the night and through dial key. Disregard any change in the volume of tone while the key lever is moving.

3.61 Tap lightly on the top of the key of the cord circuit under test near the rear key lever. Release the night and through dial key.

3.62 Disconnect the front and rear plugs of the cord under test from the CON REAR and CON FRONT jacks.

3.63 **Test of Other Cords at Same Position:** Repeat 3.52 to 3.62 inclusive, on each of the other cord circuits to be tested. Then disconnect the test receiver from the REC jack.

(J) Resistance of Sleeve Circuits

3.64 This test checks the sleeve resistance of the front and rear cords.

3.65 Connect the front plug of a spare cord circuit to the BAT & GRD jack of the No. 35F test set.

SECTION 538-050-524

3.66 Connect the plug of another cord to the S jack of the test set. Using this as a reference cord, adjust the current flow through the test set to 25 milliamperes. Disconnect the reference cord.

Note: It will be necessary to assume that the sleeve circuit relays in the reference cord are within requirements so that this test set adjustment will provide approximately the test operate value for the FM and RM relays of the cord circuits to be tested.

3.67 Connect the first cord to be tested to the S jack of the test set and observe that the current flow indicated by the meter is 25 milliamperes. Disconnect the cord from the S jack and repeat this operation on each of the other front and rear cords to be tested.

Note: If a current flow other than 25 milliamperes is observed on several cords, this can be taken as an indication that the sleeve circuit relays in the reference cord are not within requirements. In this case readjust the test set resistance using a different reference cord and repeat the test.

(K) Resistance of Low D-C Bridge

3.68 This test checks the retardation coil-resistance bridge across the cord circuit, under the low resistance condition.

3.69 Connect a spare rear cord to the T&R jack of the No. 35F test set. Connect the No. 364 tool of the No. 893 cord to the L1 terminal of the test set, and the No. 365 tool of the No. 893 cord to ground at a key cam. Connect another rear cord to the BAT & GRD jack of the test set. Connect the associated front cord to the SP jack of the test line circuit and operate the night and through dial key. The test set keys should be normal, with the L switch operated to the 10 position. Connect a rear cord to the RA jack of the test line circuit. Using this as a reference cord, adjust the current through the test set to 40 milliamperes. Disconnect the reference cord from the RA jack. Connect the No. 32B test set to the nearest T jack of the test line circuit.

3.70 Connect the rear cord under test to the RA jack of the test line circuit and observe that approximately 40 milliamperes flow through the No. 35F test set.

3.71 Connect the front cord under test to the nearest FC jack of the test line circuit. Operate and release the red button of the No. 32B test set. Observe that the current flowing through the No. 35F test set is still approximately 40 milliamperes. Disconnect the front and rear cords from the FC and RA jacks.

3.72 **Test of Other Cords at Same Position:** Repeat 3.70 and 3.71 on each of the cord circuits to be tested. Then disconnect the spare cords, the No. 32B test set and the No. 35F test set.

(L) Battery on Ring of Front Cord in Normal Condition

3.73 This test checks for the presence of battery on the ring of idle front cords.

3.74 Touch the sleeve of the front plug of a spare cord to the ring of each of the front plugs at the same position successively. Observe that the front lamp of the spare cord lights each time.

(M) Release of T Relay

3.75 This test checks that the T relay releases when the cord is disconnected from a trunk jack.

3.76 Connect the No. 32B test set to the T jack of the test line circuit.

3.77 Connect the front cord under test to the RA jack of the test line circuit. Connect the rear cord under test to the FC jack of the test line circuit and observe that the rear cord lamp operates. Operate and hold the red button of the No. 32B test set. Observe that the rear cord lamp remains lighted. With the red button held operated, disconnect the front cord from the RA jack and observe that the rear lamp of the cord under test is extinguished within about two seconds. Release the red button of the No. 32B test set and disconnect the rear cord from the FC jack.

3.78 **Test of Other Cords at Same Position:** Repeat 3.77 on each of the cord circuits to be tested. Then disconnect the No. 32B test set from the T jack.

(N) Test for Lamp Sockets Crossed with Battery

3.79 This test checks for battery crosses on the metal frame of No. 13 lamp sockets without insulators.

3.80 Use the test receiver attached to the 2W21A cord for this test. Connect one clip to ground at a key cam and touch the other clip to the metal frame of each of the cord circuit lamp caps. Note that no click is heard. Disconnect the test receiver from the key cam.

4. REPORTS

4.01 The required record of these tests should be entered on the proper form.