

**NO. 552-A AND NO. 605-A**  
**PRIVATE BRANCH EXCHANGES**

**1. GENERAL**

1.01 This section covers the detailed methods to be followed in making transmission tests on circuits associated with the No. 552-A and No. 605-A private branch exchanges.

1.02 Information covered in this section of Practices is outlined as follows:

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1.03 Reference should be made to Section K20.01 for general testing methods and to Section K20.11 for general testing apparatus requirements.

**2. TESTING METHODS**

**(A) Cord Circuits**

2.01 Cord circuits should be tested for the extension-to-extension and extension-to-trunk

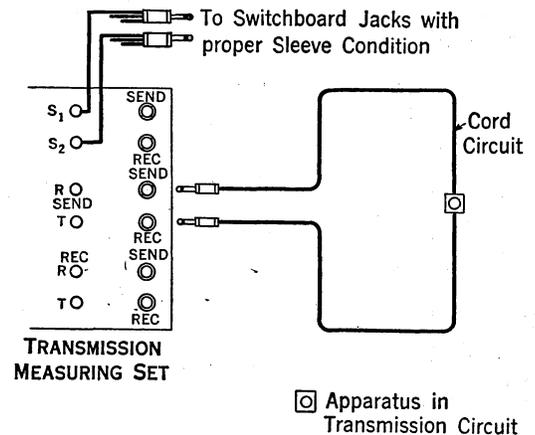
conditions. The two conditions are tested in the same manner; the only difference in the procedure is involved in setting up the condition and is accomplished by obtaining the proper sleeve conditions for the cord circuit under test.

2.02 The extension-to-extension condition is obtained by the use of a patching cord equipped on one end with a plug of the same type as is used on the cord circuit under test and having the sleeve conductor free on the other end. The free sleeve conductor of the patching cord is connected to the  $S_2$  terminal of the transmission measuring set and the plug end is inserted in an idle subscriber jack.

2.03 The extension-to-trunk condition is obtained in the same manner as outlined in paragraph 2.02, except that an additional patching cord is required, the free sleeve conductor of which is connected to the  $S_1$  terminal of the transmission measuring set and the plug end is inserted in an idle trunk jack.

2.04 Insert the front and rear cords of a cord circuit to be tested respectively in the sending and receiving jacks of the transmission measuring set.

2.05 Figure 1 shows schematically the connections for the test.



**Figure 1**

2.06 Restore to normal any keys associated with the cord circuit under test.

2.07 With the transmission measuring set in the measuring condition perform the operations outlined in paragraphs 2.08 and 2.09.

2.08 Manipulate the cords and plugs in the following manner to detect possible cutouts or faulty connections: Pull on each cord directly

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outward, and outward at an angle to the right and to the left and shake the cord. Hold the plug in the jack with one hand and grasp the cord with the other hand approximately four inches from the plug. Move the cord about the plug with a cranking motion. Turn the plug around in the jack so as to cause the jack springs to make contact at all possible points to the tip and ring of the plug.

2.09 Test all keys associated with the cord circuit for cutouts in the normal and operated position (except ringing keys in the operated position) by tapping the key top lightly using the rubber eraser end of a pencil. Move the lever slightly forward and backward while exerting a slight pressure to the left and right to take up any play or side-lash.

2.10 Measure the transmission loss of the cord circuit with all keys normal.

### (B) Attendant's Telephone and Dialing Circuits

#### Attendant's Telephone Circuits (Without Dialing Connection)

2.11 Where a vacuum tube click reduction circuit is provided, the attendant's telephone circuit should be tested without the click reduction circuit. The click reduction circuit is tested as outlined in paragraphs 2.29 to 2.39 inclusive.

Note: The click reduction circuit is disconnected from the attendant's telephone circuit by the operation of the EM key provided on the click reduction unit.

2.12 Figure 2 shows schematically the connections for the test of the attendant's telephone circuit.

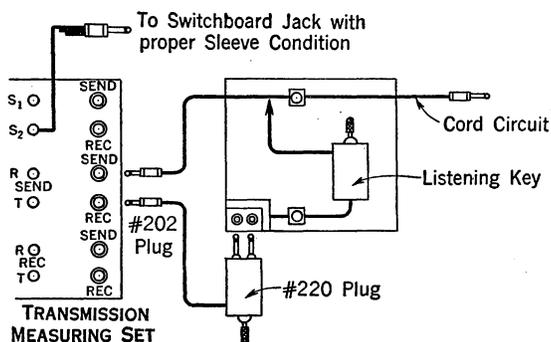


Figure 2  
 □ Apparatus in  
 Transmission Circuit

2.13 Insert the No. 220 plug in the telephone set jack associated with the position under test, with the key of the plug in the normal position.

Note: In the No. 552-A P.B.X., where the attendant's transmitter is mounted on an arm it will be necessary to disconnect the transmitter while making the test.

2.14 On the transmission measuring set connect the sending T and R terminals respectively to the receiving T and R terminals.

Note: When a transmission measuring set of the No. 3 type is used, these connections are made through the jack contacts of the set when a dummy plug is removed from a jack other than the one to be used in this test.

2.15 From the results of tests on the cord circuits of the position, choose a cord circuit which shows no transmission troubles and use it to make the following tests of the attendant's telephone circuit.

2.16 Insert the front plug of the cord circuit in the sending jack of the transmission measuring set.

2.17 Measure the transmission loss with all keys of the cord circuit normal.

2.18 Operate the TALK AND DIAL key associated with the cord circuit so that the attendant's telephone circuit is connected across the cord circuit in the talking condition.

2.19 Measure the transmission loss.

Note: The difference between measurements made in paragraphs 2.17 and 2.19 will be the loss of the attendant's telephone circuit in the bridged talking condition.

2.20 Remove the strapping between the sending and receiving T and R terminals of the transmission measuring set.

2.21 Insert the No. 202 plug associated with the No. 220 plug in the receiving jack of the transmission measuring set.

2.22 Operate the key of the No. 220 plug to the T position.

2.23 Measure the transmission loss.

Note: The difference between the measurements made in paragraphs 2.17 and 2.23 will be the loss of the attendant's telephone circuit in the transmitting condition.

#### Attendant's Telephone Circuit (After Dialing Connection)

2.24 The attendant's telephone and dialing circuit is arranged so that the cord circuit is split for dialing. However, after the attendant completes the dialing on the front cord, a talking path is provided between the front and rear cords of the cord pair in case the attendant fails to restore the TALK AND DIAL key after dialing. This condition is tested as outlined in the following paragraphs.

2.25 Proceed as outlined in paragraphs 2.13 to 2.18, inclusive. Move the dial off normal momentarily and allow to restore.

2.26 Measure the transmission loss.

Note: The difference between the measurements made in paragraphs 2.17 and 2.26 will be the loss of the attendant's telephone circuit in the bridged talking condition.

2.27 Proceed as outlined in paragraphs 2.20 to 2.22, inclusive. Move the dial off normal momentarily and allow to restore.

2.28 Measure the transmission loss.

Note: The difference between the measurements made in paragraphs 2.17 and 2.28 will be the loss of the attendant's telephone circuit in the transmitting condition.

#### Click Reduction Circuit

2.29 The click reduction circuit is tested independently of the attendant's telephone circuit.

2.30 This circuit is tested at the click reduction equipment in the rear of the switchboard and a 1-A attenuator set for 35 db or a 35 db resistance network is used in order to prevent overloading the click reduction circuit.

2.31 Figure 3 shows schematically the connections for the test.

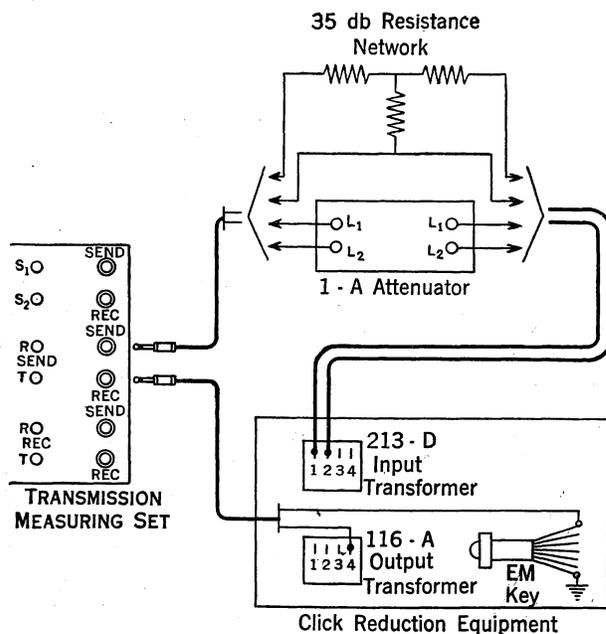


Figure 3

2.32 If a 1-A attenuator is not available, a 35 db resistance network, as shown in Figure 4, can be used.

2.33 Ground the lower transfer contact of the EM key, using a single conductor cord equipped on each end with clips.

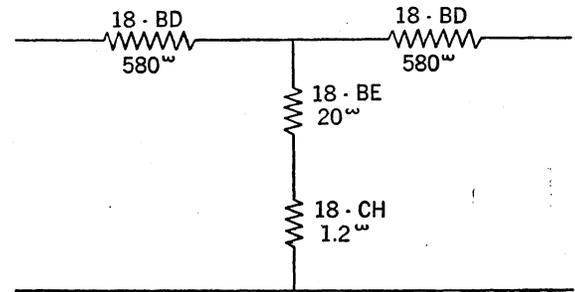


Figure 4

2.34 Operate the EM key to the OFF position.

Note: The filament of the vacuum tube should light.

2.35 Connect the 1-A attenuator set for 35 db or the 35 db resistance network to the input terminals of the click reduction circuit (terminals 1 and 2 of the 213-D input transformer).

2.36 Connect the other side of the 1-A attenuator or the 35 db resistance network to the sending jack of the transmission measuring set, using a patching cord equipped on one end with a No. 110 plug and with clips or suitable terminals on the other end.

2.37 Connect the receiving jack of the transmission measuring set to the output of the click reduction circuit, using a patching cord equipped on one end with a No. 110 plug and with clips or suitable terminals on the other end. This is done, as shown in Figure 3, by connecting the tip and ring terminals, respectively, of the patching cord to terminal 4 of the 116-A output transformer and to the upper transfer contact of the EM key.

2.38 Measure the transmission loss.

2.39 Remove the ground from the lower transfer contact of the EM key, remove the other testing connections from the click reduction equipment, and operate the EM key to the ON position.

#### (C) Central Office Trunk Circuits

##### Trunk Circuits to Manual Offices

2.40 These circuits may be tested by either the loop or straightaway methods. The loop method can be used only if there are three or more circuits in the group. Where the group consists of less than three circuits, the tests are made by the straightaway method.

##### Loop Method

2.41 Under this method the circuits are tested at the P.B.X. switchboard during a period of light traffic load.

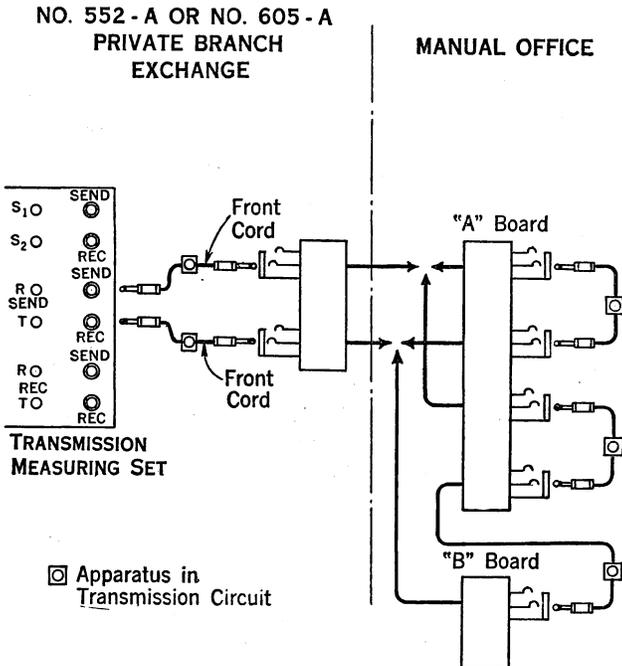
2.42 The loop is established at the "A" board of the manual office by means of a switchboard cord circuit or where required a trunked connection to the "B" board.

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2.43 The circuits are completed to the transmission measuring set at the P.B.X. switchboard through two cord circuits.

Note: Cord circuits should be used which have been tested and found to be in good condition.

2.44 Figure 5 shows schematically the connections for the test.



2.45 Establish a connection with the central office in the regular way from P.B.X. switchboard over one of the trunks to be tested. Have the "A" board operator complete the connection in the regular way to another trunk to be tested.

2.46 At the P.B.X. connect the back cord of the cord pair used to pass the call to the manual office, to the sending jack of the transmission measuring set.

2.47 Connect the receiving jack of the transmission measuring set to the other trunk by means of an idle cord pair. The front cord of the idle cord pair should be inserted in the trunk jack, and the back cord in the transmission measuring set.

2.48 Measure the transmission loss.

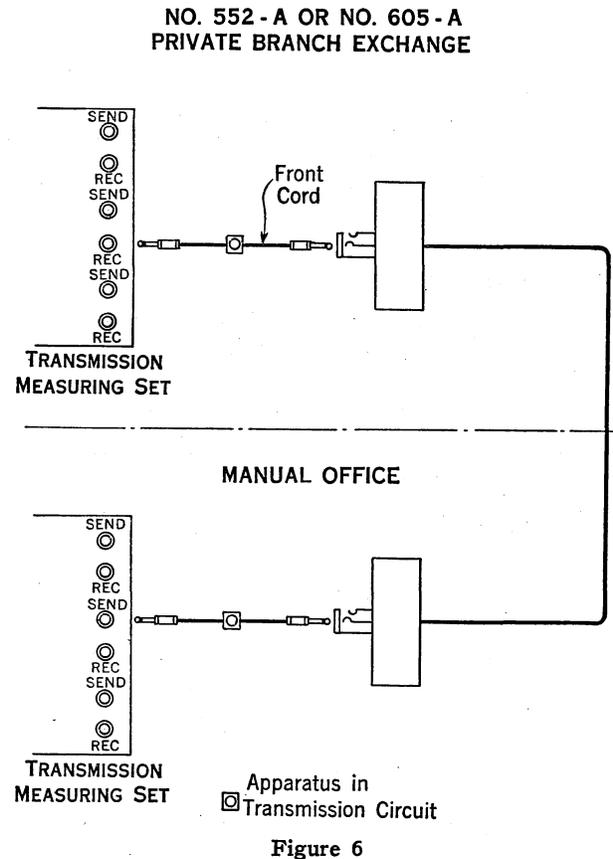
Note: This will be the loss of two trunk circuits and three cord circuits and where the looping includes the "B" board the loss of the circuit between the "A" and "B" boards.

### Straightaway Method

2.49 Under this method the circuit is tested at the P.B.X. switchboard during a period of light traffic load.

2.50 The circuit is completed for test to the sending transmission measuring set at the manual office switchboard by means of a switchboard cord circuit.

2.51 Figure 6 shows schematically the connections for the test.



2.52 Establish communication with the tester at the manual office and have the sending jack of the transmission measuring set connected to the trunk to be tested using a switchboard cord circuit.

2.53 At the P.B.X. connect the receiving jack of the transmission measuring set to the trunk to be tested using an idle cord pair, inserting the front cord of the cord pair in the trunk jack.

2.54 Measure the transmission loss.

Note: This is the loss of the trunk circuit and two cord circuits.

2.55 Upon completion of the test the trunk should be released at the P.B.X and the connection to the measuring apparatus at the manual office removed.

### Trunk Circuits to Step-by-Step Offices

2.56 These circuits are tested at the P.B.X. switchboard by the straightaway method.

- 2.57 The circuit is completed for test to the sending transmission measuring set at the step-by-step office from a test line jack.
- 2.58 Figure 7 shows schematically the connections for the test.

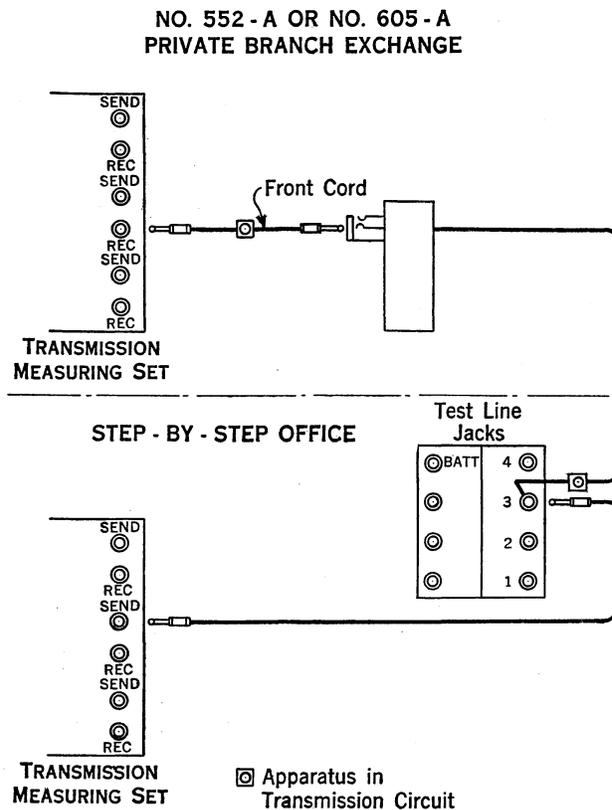


Figure 7

- 2.59 At the step-by-step office provide a regular double-ended patching cord equipped with No. 110 plugs.
- 2.60 Establish communication with the tester at the step-by-step office and arrange for the connections of paragraph 2.61.
- 2.61 At the step-by-step office select a test line associated with a connector group and connect the sending jack of the transmission measuring set to the test line circuit (jack No. 3 of the test line group) using the patching cord of paragraph 2.59.
- 2.62 When the connections of paragraph 2.61 have been completed the tester at the step-by-step office should advise the tester at the P.B.X. which group has been selected.
- 2.63 At the P.B.X. select an idle cord pair, insert the rear cord in the receiving jack of the transmission measuring set and the front cord in the trunk jack and dial the number of the test line to which the sending transmission measuring set is connected.

Note: It will be necessary for the tester at the step-by-step office to trip the ringing.

- 2.64 Measure the transmission loss.

Note: This is the loss of the trunk circuit and a cord circuit.

- 2.65 When the testing has been completed have the patching cord removed at the step-by-step office.

#### Trunk Circuits to Panel Offices

- 2.66 Trunk circuits to panel offices should be tested in the same manner as those to step-by-step offices, the methods for which are outlined in paragraphs 2.56 to 2.65 inclusive, except that the sending transmission measuring set should be connected at the I.D.F. to a spare final multiple circuit from which the intercepting line has been removed.

#### (D) Tie Line Circuits

##### Manual Ringdown Tie Line Circuits

- 2.67 These circuits may be tested by either the loop or straightaway methods. The loop method can be used only if there are three or more circuits in the group. Where the group consists of less than three circuits the tests are made by the straightaway method.

##### Loop Method

- 2.68 Under this method the circuits are tested at the P.B.X. switchboard during a period of light traffic load.
- 2.69 The loop is established at the connecting manual P.B.X. switchboard by means of a cord circuit.
- 2.70 Figure 8 shows schematically the connections for the test.

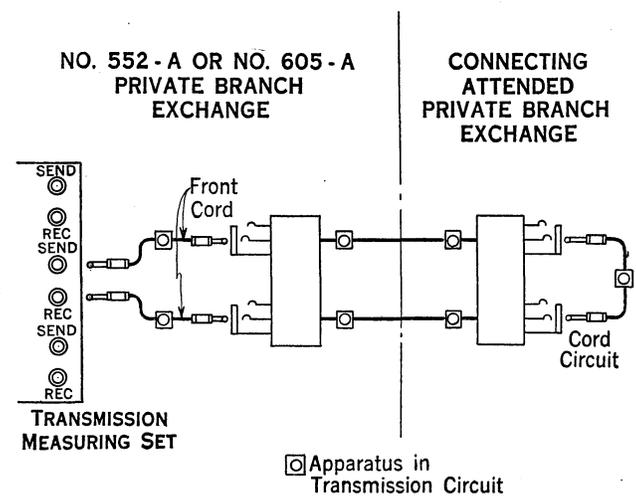


Figure 8

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2.71 Establish a connection with the attendant at the connecting P.B.X. and request her to loop the two tie lines under test with a cord circuit.

2.72 At the No. 552-A or No. 605-A P.B.X. insert the front cords of two idle cord pairs in the jacks of the tie lines to be tested.

2.73 Connect the back cords of the cord pairs used in paragraph 2.72 to the sending and receiving jacks respectively of the transmission measuring set.

2.74 Measure the transmission loss.

Note: This is the loss of the two tie lines and three cord circuits.

2.75 At the completion of the test have the attendant at the connecting P.B.X. remove the looping cord circuit.

**Straightaway Method**

2.76 Under this method the circuit is tested at the No. 552-A or No. 605-A P.B.X. switchboard during a period of light traffic load.

2.77 The circuit is completed for test to the sending transmission measuring set at the connecting P.B.X. switchboard by means of a cord circuit.

2.78 Figure 9 shows schematically the connections for the test.

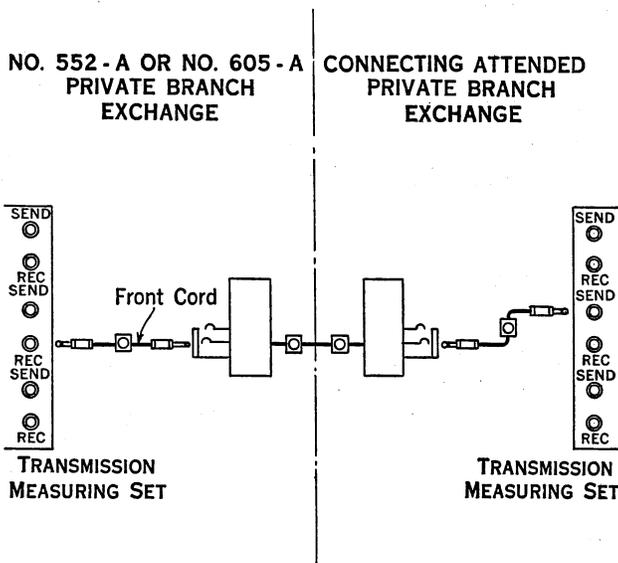


Figure 9

2.79 Establish a connection with the assistant tester at the connecting P.B.X. and have the sending transmission measuring set connected to the tie link jack by means of an idle cord pair.

2.80 At the No. 552-A or No. 605-A P.B.X. insert the front cord of an idle cord pair in the jack of the tie line to be tested and insert the back cord in the receiving jack of the transmission measuring set.

2.81 Measure the transmission loss.

Note: This is the loss of the tie line and two cord circuits.

**One-Way Dialing Two-Way Manual Tie Line Circuits**

2.82 This circuit is tested in the same manner as the manual ringdown tie line circuit, the methods for which are outlined in paragraphs 2.67 to 2.81, inclusive.

**Two-Way Dialing Two-Way Manual Tie Line Circuits**

2.83 This circuit is the same circuit used for one-way dialing two-way manual service and is tested in the same manner following the methods outlined in paragraphs 2.67 to 2.81, inclusive.

**One-Way Repeating One-Way Dialing One-Way Manual Tie Line Circuits**

2.84 This circuit is tested by the straightaway method in the same manner as the manual ringdown tie line circuit following the method outlined in paragraphs 2.76 to 2.81, inclusive.

**"Terminating" and "Through and Terminating" Tie Line Circuits**

2.85 These circuits are used for terminating long manual tie lines at the No. 552-A or No. 605-A P.B.X. and are arranged to provide high-grade transmission battery from the tie line circuit. These circuits are tested with the tie line circuit with which they are associated, following the methods which are given in paragraphs 2.67 to 2.81 inclusive.

**(E) Long Station Line Circuits**

2.86 The long line circuit provides a means for extending the range of a station line circuit, and the apparatus is located at the No. 552-A or No. 605-A P.B.X.

2.87 It will be necessary to disconnect the long line circuit from the P.B.X. station line in order to make the test. This is accomplished at the distributing frame or at the line relay rack.

2.88 Connect the sending jack of the transmission measuring set to the station line circuit terminals, and the receiving jack of the transmission measuring set to the trunk circuit terminals using patching cords equipped on one end with No. 110 plugs and on the other with suitable clips.

2.89 Measure the transmission loss.

2.90 Reconnect the long line circuit to the P.B.X. station line.

2.91 Where this circuit is used with central office trunk circuits to extend their range, it is tested in connection with the trunk circuit.