

LINE AND TRUNK CIRCUIT TESTS
 USING TEST CIRCUIT SD-15174-01
 NO. 12 SWITCHBOARD

1. GENERAL

1.01 This section describes methods of testing line and trunk circuits using test circuit SD-15174-01. The tests are as follows:

- (A) Busy Test of Multiple Jacks
- (B) Test of Local Contacts of Multiple Jacks
- (C) Test of Subscriber Line Circuit Equipped With a Series Line Lamp
- (D) Test of Subscriber Line Circuit Equipped With a Line Relay
- (E) Test of Toll and Rural Line or Trunk Equipped With Drop Only and No. 141 Jacks
- (F) Test of Toll and Rural Line or Trunk Equipped With Drop and Busy Lamps or With Line Lamps

2. APPARATUS

2.01 The apparatus required for the tests is shown in the following table:

Apparatus	Tests					
	(A)	(B)	(C)	(D)	(E)	(F)
Operator's Tel.Set	1	1	1	1	1	1
P3E Cord	-	*1	1	1	-	1
W2C Cord	-	-	1	1	-	1
W2AS Cord	-	-	-	1	1	1
P2B Cord	-	-	-	-	1	-
No. 110 Plug (T & R Strapped)	-	-	1	-	-	-
No. 184 Plug or No. 110 Plug (R & S Strapped)	-	-	-	1	-	-

* See the Note in 2.02.

2.02 The cords should be equipped as follows:

Cord	At One End	At Other End
P3E	No. 110 Plug	No. 110 Plug
W2C	No. 110 Plug	No. 59 Cord Tips
W2AS	No. 110 Plug	No. 522A Key
P2B	No. 110 Plug	No. 257A Plug

Note: The P3E cord used for test (B) should have a No. 123A gauge at one end instead of a No. 110 plug.

3. METHOD

(A) Busy Test of Multiple Jacks

3.01 At the first position of the switchboard connect an operator's telephone set. Check that the grouping key is normal. Make a busy test of the circuit to be tested at the first appearance in the multiple, using the calling (front) cord plug of an idle cord circuit. When testing a line equipped with lamp busy signals, note whether the lamp is lighted.

3.02 If the jack tests busy or if the busy lamp is lighted, check to see if a connection is made at some other appearance in the multiple. If there is no connection at another position it is an indication of a false busy condition.

3.03 If the circuit is not busy, restore the talking key and insert the calling (front) cord plug into the first multiple jack of the circuit under test. The cord supervisory lamp will light if the connection is made to a common battery line jack. This cord should remain connected to the jack until the test is completed.

Note: If a call should be originated while the test is being made on a common battery line, the cord supervisory lamp will be extinguished; on a rural or toll line and on interoffice trunks the cord circuit recall lamp will light while the calling party rings.

3.04 If the circuit is equipped with lamp busy signals, check that all the lamps are lighted.

3.05 At the last position of the switchboard, make a busy test of the last multiple jack of the circuit under test. The jack should test busy as an indication that the sleeve wiring is continuous through the multiple.

3.06 When testing a rural or toll line or an interoffice trunk equipped with lamp line and busy signals, insert the plug of an idle cord at the last position of the switchboard into the last line jack. Then disconnect the cord at the first position. The busy lamps should remain lighted as an indication that the wiring controlling the lamps is continuous throughout the multiple.

3.07 If necessary to check each multiple appearance, connect the operator's telephone set at each intermediate position where a multiple jack of the circuit under test appears, restore the grouping key to normal, if operated, and make the tests at that position. When the test is completed, restore the grouping key to the operated position, if necessary and disconnect the telephone set.

(B) Test of Local Contacts of Multiple Jacks

3.08 With an operator's telephone set connected to the position at which the jack to be tested appears note that the grouping key is normal. Connect an idle answering (back) cord to test jack F and operate the talking key.

3.09 Insert the No. 110 plug of the P3E cord into test jack G.

3.10 If the circuit to be tested is not equipped with busy lamps, make a busy test on the jack with an idle front cord. If it is not busy, insert the No. 123A gauge of the P3E cord (or the other No. 110 plug) into the jack to be tested.

3.11 Common Battery Line: The supervisory lamp of the cord connected to jack F should light. Listen in the receiver for any clicks and observe the cord supervisory lamp for any flickers during the operations covered in 3.13 to 3.15. If the supervisory lamp flickers or is extinguished, it is an indication that one of the contacts of the jack is not in proper adjustment. If clicks are heard, it is an indication that either one or both of the break contacts of the jack are not in proper adjustment.

Note: No attempt should be made to adjust the springs of a jack mounted in the switchboard.

3.12 Rural or Toll Line or Interoffice Trunk: Listen in the receiver for any clicks and observe the busy lamps, if equipped, during the operations covered in 3.13 to 3.15. If clicks are heard it is an indication that the break contacts of the jack are not in proper adjustment. The busy lamps should be lighted and if they flicker or are extinguished, it is an indication that the make contact of the jack is not in proper adjustment. Refer to the Note in 3.11.

3.13 Push the gauge (or plug) to the right and to the left with just sufficient pressure to take up the play in the sleeve.

3.14 Rotate the gauge (or plug) in the jack one complete revolution without exerting any sidewise or up and down pressure.

3.15 While holding the gauge (or plug) firmly in the jack, tap the jack strip lightly with the handle of a small screwdriver.

(C) Test of Subscriber Line Circuit Equipped With a Series Line Lamp

Test of Ring Side of Line Circuit

3.16 Insert one No. 110 plug of the P3E cord into the C jack of the test circuit and a No. 110 plug with tip and ring short-circuited into the D jack of the test circuit.

3.17 Connect the operator's telephone set to the position to be used for the test.

3.18 With the position grouping key normal, make a busy test of the line under test, using the calling (front) cord of an idle cord circuit.

3.19 If the line does not test busy, partially insert the free No. 110 plug of the P3E cord into a jack of the line under test so that the tip of the plug just makes contact with the ring spring of the jack. The line lamp, or lamps, should light while the tip of the plug is in contact with the ring spring of the jack. Although the line lamp will probably light dimly under this test, it should light sufficiently to indicate continuity of the filament.

Note: If the line lamp lights to full brilliancy, it indicates that the line is equipped with a line relay and test (D) should be applied.

3.20 If the lamp does not seem to be sufficiently bright, check that it is adjusted for maximum illumination by the following method: Remove the lamp from its socket and partially reinsert it. Place the lamp cap over the lamp and push back until the lamp cap seats in its mounting.

3.21 Remove the plug from the line jack. The lamp should be extinguished.

Test of Tip Side of Line Circuit

3.22 At the M.D.F. select a spare line (one not equipped with a line relay). Connect the No. 59 cord tip of the white (tip) conductor of the W2C cord to the ring terminal of the spare line. Touch the tip of the plug to ground and observe that the line lamp lights properly.

3.23 At the switchboard, make a busy test of the jack of the line to be tested.

3.24 If the line is not busy, partially insert the plug of the W2C cord into the jack so that tip of the plug just makes

contact with the tip spring of the jack. The lamp of the spare line should light to the normal brilliancy.

3.25 Failure of the lamp to light indicates the absence of the normal ground on the tip side of the line circuit. A dimly lighted lamp probably indicates resistance in a jack contact.

(D) Test of Subscriber Line Circuit Equipped With a Line Relay

3.26 Insert a No. 184 plug (or equivalent) into the B jack of the test circuit. Insert one plug of the P3E cord into the D jack. Insert the plug of the W2AS cord into the H jack.

3.27 Connect the operator's telephone set at the position to be used for the test.

3.28 With the position grouping key normal, make a busy test of the line under test, using the calling (front) cord of an idle cord circuit.

Non-Operate Test of Line Relay

3.29 If the line does not test busy, partially insert the free plug of the P3E cord into a jack of the line under test, preferably the jack associated with the line lamp, so that the tip of the plug just makes contact with the ring spring of the jack. The line lamp should not light.

3.30 If the line lamp lights, the line relay has operated on the non-operate test. In this case, remove the heat coil from the ring side of the line and repeat 3.29. If the line lights under this condition, the relay is out of adjustment and should be readjusted while the heat coil is removed.

Note: If the test is satisfactory when the heat coil is removed, the failure was probably due to low insulation resistance of the line. Restore the heat coil and disconnect the P3E cord from the line. Make a voltmeter test of the line to determine whether the insulation resistance is within the prescribed limits.

3.31 Remove the plug of the P3E cord from the line jack.

Operate Test of Line Relay

3.32 Operate and hold the No. 522A key of the W2AS cord.

3.33 Partially insert the free plug of the P3E cord into a jack of the line under test so that the tip of the plug just makes contact with the ring spring of the jack.

The line lamp should light. Failure of the lamp to light indicates failure of the line relay to operate on the operate test.

Note: If it was necessary to remove the heat coil due to line leakage, to make the non-operate test, the operate test should be made with the heat coil removed. Any adjustments required on the relay should be made with the heat coil removed.

Test of Tip Side of Line Circuit

3.34 At the M.D.F. select a spare line not equipped with a line relay. Connect the No. 59 cord tip of the white (tip) conductor of the W2C cord to the ring terminal of the spare line. Touch the tip of the plug to ground and observe that the line lamp lights properly.

3.35 At the switchboard, make a busy test of the jack of the line to be tested.

3.36 If the line is not busy, partially insert the plug of the W2C cord into the jack so that the tip of the plug just makes contact with the tip spring of the jack. The lamp of the spare line should light either dimly or to full brilliancy.

3.37 A dimly lighted lamp ordinarily indicates that the line relay winding is connected in the circuit. Failure of the lamp to light indicates that the circuit is open.

(E) Test of Toll and Rural Line or Trunk Equipped With Drop Only and No. 141 Jacks

3.38 Insert the No. 110 plug of the P2B cord into the E jack and the plug of the W2AS cord into the D jack of the test circuit.

3.39 Connect the operator's telephone set to the position to be used for the test and check that the position grouping key is normal. Make a busy test of the line to be tested, using the calling (front) cord of an idle cord circuit.

3.40 If the line does not test busy, disconnect the line from the jack by one of the following methods:

(a) Where the line has more than one multiple appearance, insert an idle answering (back) cord into the first multiple jack.

(b) Where the line has only one multiple appearance and does not have a repeating coil, remove the heat coils at the M.D.F.

(c) Where the line has only one multiple appearance and is equipped with a repeating coil it will be necessary to unsolder one of the cross-connec-

tions to the jack while the test is being made or to transfer the line to another jack by shifting the cross-connection.

3.41 Insert the No. 257A plug of the P2B cord into the multiple jack at which the drop appears.

Note: The white line on the No. 257A plug should be toward the top as the plug is inserted into the jack.

3.42 Operate the No. 522A key associated with the W2AS cord. The line drop should operate. Restore the drop and repeat the test.

(F) Test of Toll and Rural Line or Trunk Equipped With Drop and Busy Lamps or With Line Lamps

3.43 Observe the busy lamp (or if the busy lamps are not equipped, make a busy test) of the line to be tested.

3.44 If the line is not busy, disconnect the line by one of the following methods:

(a) Where the line is not equipped with a repeating coil, remove the heat coils at the M.D.F.

(b) Where the line is equipped with a repeating coil, it will be necessary to unsolder one of the cross-connection wires to the jack while the test is being made or to transfer the line to another jack by shifting the cross-connection.

3.45 At the M.D.F. connect the white (tip) and blue (ring) conductors of the W2C cord to the tip and ring terminals, respectively, of the line to be tested.

3.46 At the switchboard, insert the plug of the W2C cord into the E jack and the plug of the W2AS cord into the D jack of the test circuit.

Line Equipped With Drop

3.47 Operate and release the No. 522A key associated with the W2AS cord. The line drop should operate when the key is operated. Restore the drop and repeat the test.

3.48 Insert the plug of an idle cord into the line jack. Check that all the busy lamps are lighted to the normal brilliancy. Refer to 3.20.

Line Equipped With Line Lamp

3.49 Operate the No. 522A key associated with the W2AS cord. The busy lamps should light.

Note: If the line is arranged for busy lamps but not equipped with them disregard all reference to the busy lamps in this test.

3.50 Release the No. 522A key. The line lamp should be lighted to normal brilliancy. Refer to 3.20.

3.51 Again operate and release the No. 522A key. The line lamp should be extinguished when the key is operated and lighted when the key is released.

3.52 Check that all the busy lamps are lighted to the normal brilliancy. Refer to 3.20.

3.53 Insert the plug of an idle cord into the line jack. The line lamp should be extinguished.

3.54 Disconnect the cord from the line jack. The line lamp and the busy lamps should be extinguished.

4. REPORTS

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