BELL SYSTEM MAINTENANCE PRACTICES

TRANSMISSION

SECTION 6-C

METHODS FOR MAKING TRANSMISSION TESTS ON EXCHANGE AREA CIRCUITS AND EQUIPMENT ASSOCIATED WITH LOCAL AND TOLL PANEL OFFICES

AMERICAN TELEPHONE AND TELEGRAPH COMPANY

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METHODS FOR MAKING TRANSMISSION TESTS ON EXCHANGE AREA CIRCUITS AND EQUIPMENT ASSOCIATED WITH PANEL LOCAL AND TOLL CENTRAL OFFICES

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METHODS FOR MAKING TRANSMISSION TESTS ON EXCHANGE AREA CIRCUITS AND EQUIPMENT ASSOCIATED WITH LOCAL AND TOLL PANEL OFFICES

1. GENERAL

1. This section covers the methods for making transmission tests on the exchange area circuits and equipment associated with local and toll panel offices.

2. The tests specified are to be made on the circuits in the normal talking condition.

3. On circuits designed for more than one arrangement of the apparatus in the talking condition, tests are specified for each arrangement.

4. Tests should be made on a clean-up basis, that is, as troubles are found steps should be taken to clear them and any replacements which are necessary should be made.

5. The testers should be familiar with any arrangements which should be made with the Wire Chief in regard to the clearing of trouble.

6. After making repairs or replacements the tests should be repeated to be sure that the circuits contain no other troubles which would manifest themselves only after certain troubles have been cleared.

7. Testers should be familiar with any arrangements which should be made with the traffic people as to the light load periods of certain circuits which should only be tested at these times.

8. The testers should be thoroughly familiar with the operation of the central office circuits and also the testing apparatus, which should always be kept in good condition.

9. Testers should be familiar with the transmission loss information for the circuits being tested and also the procedure for making triangulation measurements in connection with loop tests. The circuit with which other circuits are looped for test will be referred to as the standard circuit.

10. Where loops are established for trunk testing, it will facilitate the computation work if trunks of similar makeup are used wherever this is practicable otherwise proper allowance should be made for the reflection losses or gains as the case may be.

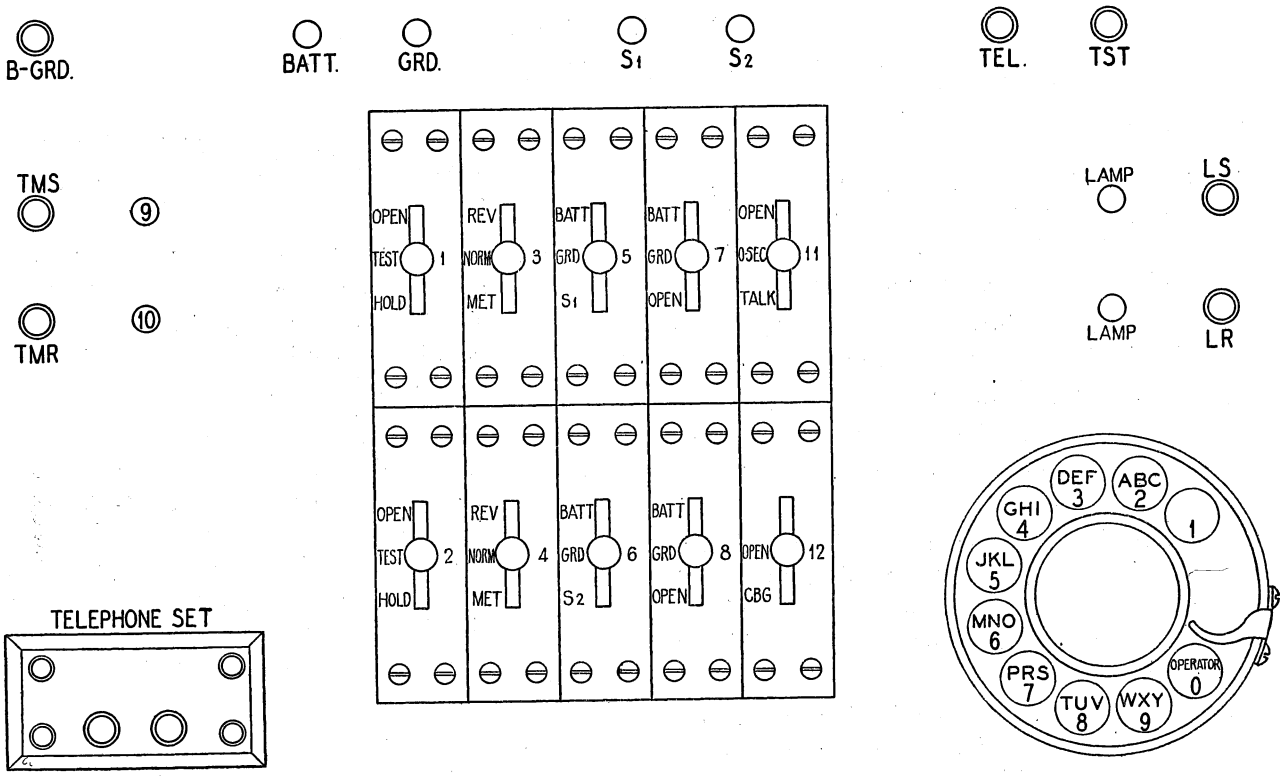
11. When circuits are looped with the standard circuit at the distant end, the looping should be done at a position of the switchboard that will include any multiple of the circuit under test.

12. The looping of circuits may be done with either a double-ended (patching) cord, the sleeves of which should be equipped in the same manner as the sleeves of the cord circuits normally used with the circuits under test, or a regular switchboard cord circuit which should be known to be in good condition and proper allowance made for its loss.

13. It is more convenient to hold the standard circuit after making a loop test so that succeeding circuits to be tested may be readily looped with the standard circuit. In some cases, it is not practicable to hold the standard circuit due to the design of the particular circuit under test or the testing method. In these cases it will be necessary to release the standard circuit after each test and re-establish it for succeeding tests. This matter is covered in detail throughout the practices.

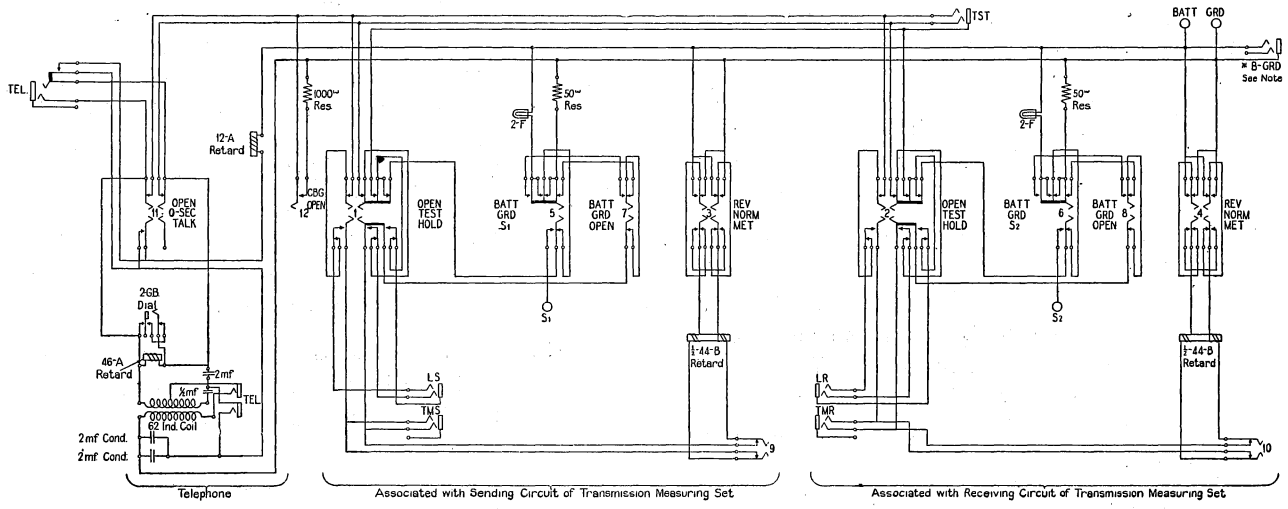
14. In order to facilitate the testing work, an arrangement of keys, jacks and coils is necessary and referred to throughout this section as an auxiliary test unit. The holding coils of this unit often remain connected to the transmission measuring set while the circuit is being tested and as the transmission loss of the coils is very small, it may be disregarded.

15. To facilitate the work when testing circuits both ends of which are not available at the testing point, such as interoffice trunks, it will be necessary to establish a talking circuit between the tester and his assistant at the distant end. This may be done by using nearby telephones or, where facilities are available, a trunk connection to the (TEL jack) auxiliary test unit.



AUXILIARY TEST UNIT

Face View.



* NOTE:-Battery and ground should not be obtained from leads used to supply Transmission Measuring Set.

AUXILIARY TEST UNIT
Schematic Wiring Diagram.

2. TESTING APPARATUS REQUIREMENTS

1. No. 3 type transmission measuring set and associated oscillator.
2. No. 220 plug.
3. Miscellaneous switchboard cords and patching cords which are covered in detail as required.
4. Auxiliary test unit, face view of which is shown on Drawing No. 608-335 and schematic wiring diagram on Drawing No. 608-336. This unit consists of an arrangement of jacks and keys which are wired for conveniently obtaining holding bridges across the tip and ring conductors of the circuits under test, and the necessary sleeve conditions to place the circuits in the normal talking condition.

3. METHODS

A. DISTRICT SELECTOR CIRCUITS

(a) Line Switch District Selector Circuits

1. These circuits should be tested at the district elector frame and the connections to the transmission measuring set completed over the district selector test line.
2. Figure 1 shows schematically the connections for the test.

Preliminary Connections

3. Connect the LR jack of the auxiliary test unit to the B jack (district selector test line) at the district selector frame.

   Note: When making tests at other than the front of district frame No. 1, place a dummy plug in the B jack on the front of No. 1 frame. This procedure will remove the reversed battery and ground from the district test line, which otherwise would interfere with the tests.

4. Connect the B-GRD jack of the auxiliary test unit to the A jack of the district selector frame.
5. Connect the TMS and TMR jacks of the auxiliary test unit respectively to the sending and receiving jacks of the transmission measuring set.
6. Plug an operator's telephone set into the telephone set jacks of the auxiliary test unit.

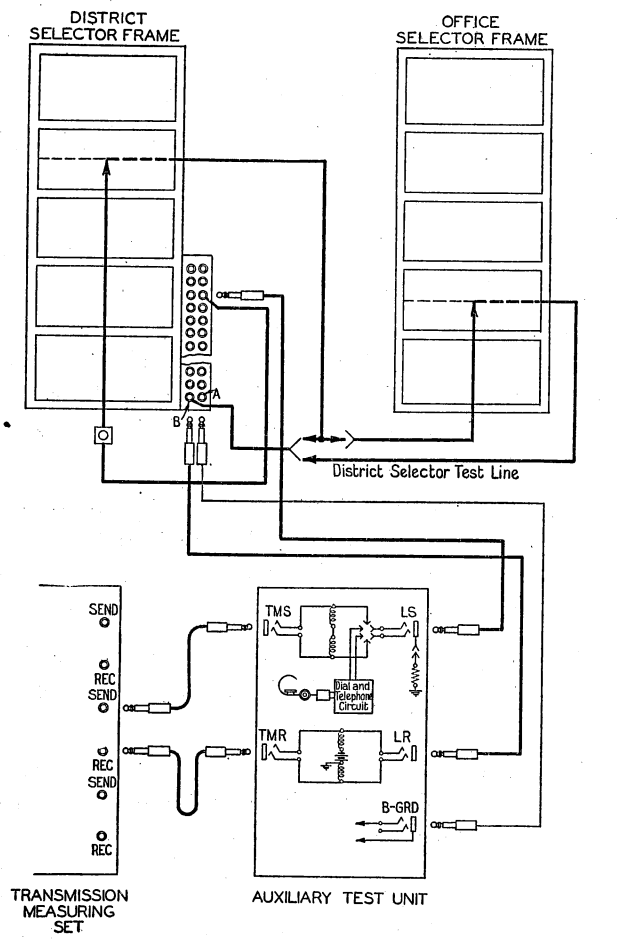


Figure 1

Testing Procedure

7. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to OPEN	Key 5 to GRD
Key 2 to HOLD	Key 7 to GRD
Key 3 to MET	Key 8 to OPEN
Key 4 to REV	Key 11 to O-SEC
	Key 12 to OPEN

8. Connect the LS jack of the auxiliary test unit to the T-MB (test make-busy) jack of an idle selector to be tested.
9. Operate key 1 of the auxiliary test unit to TEST and listen for dial tone.

   Note: When testing coin district selectors, operate key 12 of the auxiliary test unit to CBG before operating key 1 to TEST.

10. When dial tone is received, dial the code for the district selector test line for the "Repeating Coil In" condition.

11. When selections are completed operate key 1 of the auxiliary test unit to HOLD.

12. Measure the transmission loss.

    Note: This is the loss of the district selector circuit for the "Repeating Coil In" condition.

13. Operate the transmission measuring set keys to the position for measuring current supply on the sending terminals.

14. Measure the current supply while depressing key 9 of the auxiliary test unit to remove the holding bridge across the sending terminals of the transmission measuring set.

15. Release the district selector by removing the plug from the T-MB jack and operating key 1 of the auxiliary test unit to OPEN.

16. Repeat the above testing procedure for the remaining district selector circuits to be tested.

17. **Where a district selector circuit appears to be defective,** it may be desirable to measure the transmission loss of the circuit for the "Repeating Coil Out" condition. With the preliminary connections as outlined above, proceed as follows:

18. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to OPEN	Key 6 to OPEN
Key 2 to OPEN	Key 7 to GRD
Key 3 to MET	Key 8 to GRD
Key 4 to NORM	Key 11 to O-SEC
Key 5 to GRD	Key 12 to OPEN

19. Connect the LS jack of the auxiliary test unit to the T-MB jack of the defective district selector circuit.

20. Operate key 1 of the auxiliary test unit to TEST and listen for dial tone.

    Note: When testing coin district selectors, operate key 12 of the auxiliary test unit to CBG before operating key 1 to TEST.

21. When dial tone is received, dial the code for the district selector test line for the "Repeating Coil Out" condition.

22. When selections are completed operate key 1 and then key 2 of the auxiliary test unit to HOLD.

23. Measure the transmission loss.

    Note: This is the loss of the district selector circuit for the "Repeating Coil Out" condition.

24. Release the district selector circuit by operating keys 1 and 2 of the auxiliary test unit to OPEN and removing the plug from the T-MB jack.

(b) **Line Finder District Selector Circuits (Non-Link)**

1. These circuits should be tested at the line finder frame and the connections to the transmission measuring set completed over the district selector test line.

2. Figure 2 shows schematically the connections for the test.

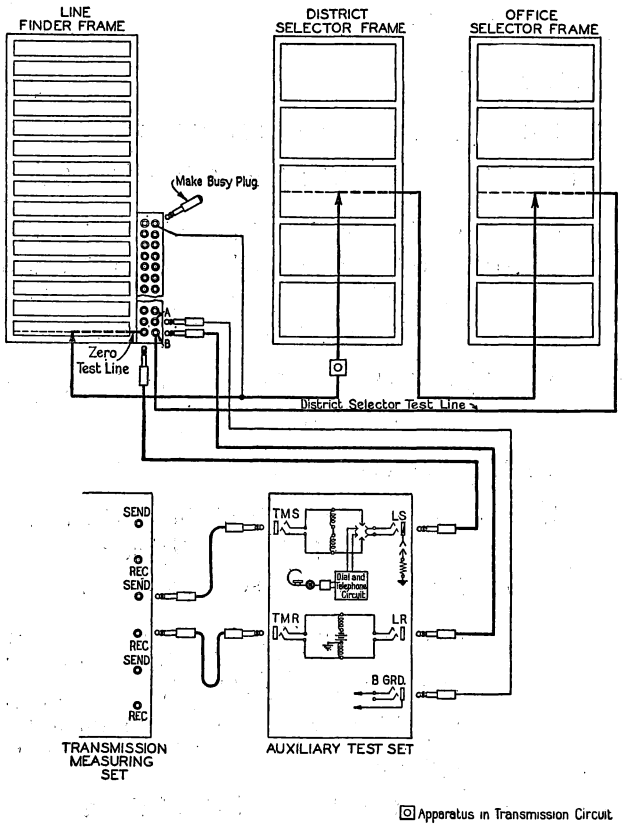


Figure 2

Preliminary Connections

3. Connect the LS jack of the auxiliary test unit to the ZERO test line jack (C or E jack) at the line finder frame.

4. Connect the LR jack of the auxiliary test unit to the B jack (district selector test line) at the line finder frame.

Note: When making tests at other than the front of line finder frame No. 1 place a dummy plug in the B jack on the front of line finder frame No. 1. This procedure will remove the reversed battery and ground from the district test line, which otherwise would interfere with the tests.

5. Connect the B-GRD jack of the auxiliary test unit to the A jack of the line finder frame.

6. Connect the TMS and TMR jacks of the auxiliary test unit respectively to the sending and receiving jacks of the transmission measuring set.

7. Plug an operator's telephone set into the telephone set jacks of the auxiliary test unit.

Testing Procedure

8. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to OPEN	Key 5 to GRD
Key 2 to HOLD	Key 7 to GRD
Key 3 to MET	Key 8 to OPEN
Key 4 to REV	Key 11 to O-SEC
	Key 12 to OPEN

9. Place a make-busy plug in the test jack of an idle line finder to be tested,

Note: This will prevent it from being seized by subscribers and will bring it under control of the tester by means of the Zero Test Line.

10. Operate key 1 of the auxiliary test unit to TEST and listen for dial tone.

Note: When testing coin district selectors, operate key 12 of the auxiliary test unit to CBG before operating key 1 to TEST.

11. When dial tone is received, dial the code for the district selector test line for the "Repeating Coil In" condition.

12. When selections are completed operate key 1 of the auxiliary test unit to HOLD.

13. Measure the transmission loss.

Note: This is the loss of the line finder district selector circuit for the "Repeating Coil In" condition.

14. Operate the transmission measuring set keys to the position for measuring current supply on the sending terminals.

15. Measure the current supply while depressing key 9 of the auxiliary test unit to remove the holding bridge across the sending terminals of the transmission measuring set.

16. Release the line finder district selector by removing the make-busy plug from the test jack of the line finder and operating key 1 of the auxiliary test unit to OPEN.

17. Repeat the above testing procedure for the remaining line finder district selector circuits to be tested.

18. **Where a line finder district selector circuit appears to be defective** it may be desirable to measure the transmission loss for the "Repeating Coil Out" condition. With the preliminary connections as outlined above proceed as follows:

19. Operate the keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to OPEN	Key 6 to OPEN
Key 2 to OPEN	Key 7 to GRD
Key 3 to MET	Key 8 to GRD
Key 4 to NORM	Key 11 to O-SEC
Key 5 to GRD	Key 12 to OPEN

20. Place a make-busy plug in the test jack of the defective line finder district selector.

21. Operate key 1 of the auxiliary test unit to TEST and listen for dial tone.

Note: When testing coin district selectors, operate key 12 of the auxiliary test unit to CBG before operating key 1 to TEST.

22. When dial tone is received, dial the code for the district selector test line for the "Repeating Coil Out" condition.

23. When selections are completed, operate key 1 and then key 2 of the auxiliary test unit to HOLD.

24. Measure the transmission loss.

Note: This is the loss of the line finder district selector circuit for the "Repeating Coil Out" condition.

25. Release the line finder district selector circuit by operating keys 1 and 2 of the auxiliary test unit to OPEN and removing the make-busy plug from the test jack.

(c) **Line Finder District Selector Circuits (Panel Link)**

1. These circuits should be tested during a period of light traffic load at the district

selector frame and the connections completed to the transmission measuring set over the district selector test line and a test-jack circuit to the test selector of the line finder frame.

2. Figure 3 shows schematically the connections for the test.

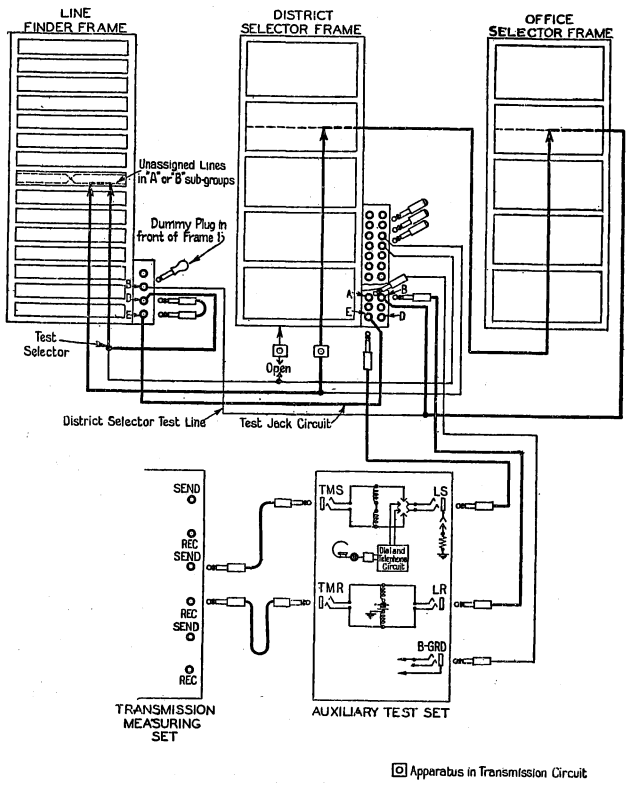


Figure 3

Preliminary Connections

3. At the district selector frame, insert a make-busy plug in the MB jack associated with the test selector on the front of the line finder frame.

4. At the vertical side of the I.D.F. select a spare subscriber's line circuit in the "A" sub-group of the line finder district selector circuits to be tested.

5. At the line finder frame manually raise the the test selector to the spare line circuit in the "A" sub-group and trip the multiple brush.

6. At the front of the line finder frame connect the D jack associated with the test selector to the E jack (test jack circuit).

7. At the district selector frame, connect the E jack (test jack circuit) to the LS jack of the auxiliary test unit.

8. Connect the TMS and TMR jacks of the auxiliary test unit respectively to the sending and receiving jacks of the transmission measuring set.

9. Connect the LR jack of the auxiliary test unit to the B jack (district selector test line) at the district selector frame.

   Note: When making tests at other than the front of district frame No. 1, place a dummy plug in the B jack on the front of No. 1 frame. This procedure will remove the reversed battery and ground from the district test line, which otherwise would interfere with the tests.

10. Connect the A jack of the district selector frame to the B-GRD jack of the auxiliary test unit.

11. Plug an operator's telephone set into the telephone set jacks of the auxiliary test unit.

Testing Procedure

12. At the district selector frame insert make-busy plugs in the MB jacks associated with the line finder district selectors of the "A" sub-group.

13. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to OPEN	Key 5 to GRD
Key 2 to HOLD	Key 7 to GRD
Key 3 to MET	Key 8 to OPEN
Key 4 to REV	Key 11 to O-SEC
	Key 12 to OPEN

14. Remove the make-busy plug from a line finder district select circuit to be tested and immediately thereafter operate key 1 of the auxiliary test unit to TEST and listen for dial tone.

    Note: When testing coin district selectors operate key 12 of the auxiliary test unit to CBG before operating key 1 to TEST.

15. When dial tone is received dial the code for the district selector test line "Repeating Coil In" condition.

16. When selections are completed operate key 1 of the auxiliary test unit to HOLD.

Note: The tester should note that the desired district selector selects the test terminal. If a subscriber should originate a call in the same line finder sub-group, it is possible that the subscriber will be served by the line finder district which was to be tested and a line finder in the other sub-group will will select the test terminal.

17. Measure the transmission loss.

Note: This is the loss of the line finder district selector circuit for the "Repeating Coil In" condition.

18. Operate the transmission measuring set keys to the position for measuring current supply on the sending terminals.

19. Measure the current supply while depressing key 9 of the auxiliary test unit to remove the holding bridge across the sending terminals of the transmission measuring set.

20. Release the line finder district selector circuit from test by replacing the make-busy plug in the MB jack and operating key 1 of the auxiliary test unit to OPEN.

Note: Observe that the district selector returns to normal before proceeding with the tests.

21. Repeat the above testing procedure items 13 to 20 inclusive for the remaining line finder district selector circuits in the sub-group.

22. Release the line finder district selectors of the "A" sub-group except the test selector by removing the make-busy plugs from the MB jacks at the district selector frame.

23. Insert make-busy plugs in the MB jacks associated with the district selectors of the "B" sub-group.

24. At the I.D.F. select a spare subscriber's line circuit in the "B" sub-group of the line finder district selector circuits to be tested.

25. At the line finder frame manually raise the test selector to the terminals of the spare subscriber's line circuit and trip the multiple brush.

Note: Restore the terminal brush tripped for the testing of the "A" sub-group.

26. Proceed as outlined in items 13 to 21 inclusive, for the line finder district selector circuits in the "B" sub-group.

27. Release the line finder district selector circuits of the "B" sub-group by removing the make-busy plugs from the MB jacks at the district selector frame.

28. Transmission measurements of the line finder district selector circuit which was used as a test selector should be made in conjunction with the test selector at the rear of the line finder frame. Connections for this test are as follows:

29. At the district selector frame remove the make-busy plug from the MB jack associated with the test selector on the front of the line finder frame and insert a make-busy plug in the MB jack associated with the test selector on the rear of the line finder frame.

30. Restore the test selector on the front of the line finder frame by manually operating the down drive.

31. Remove the connection between the D and E jacks at the front of the line finder frame and connect together the D and E jacks at the rear of this frame.

32. At the rear of the line finder frame manually raise the test selector to the terminals of the spare subscriber's line of item 4 and trip the terminal brush.

33. Proceed as outlined in items 12 to 19 inclusive to test the test selector on the front of the line finder frame.

34. Release the line finder district selector circuits by removing the make-busy plugs from the MB jacks at the district selector frame and operating key 1 of the auxiliary test unit to OPEN.

35. Restore the test selector by manually operating the down drive and removing the connection between the D and E jacks.

36. **Where a line finder district selector circuit appears to be defective,** it may be desirable to measure the transmission loss for the "Repeating Coil Out" condition. With the preliminary connections as outlined above proceed as follows:

Note: Raise the test selector to the terminals of the spare subscriber's line circuit in the same sub-group as the defective line finder district selector circuit and make busy all of the district selectors of this sub-group, by inserting make-busy plugs in the respective MB jacks.

37. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to OPEN	Key 6 to OPEN
Key 2 to OPEN	Key 7 to GRD
Key 3 to MET	Key 8 to GRD
Key 4 to NORM	Key 11 to O-SEC
Key 5 to GRD	Key 12 to OPEN

38. Remove the make-busy plug from the defective line finder district selector circuit and immediately thereafter operate key 1 of the auxiliary test unit to TEST and listen for dial tone.

Note: When testing coin district selector circuits operate key 12 of the auxiliary test unit to CBG before operating key 1 to TEST.

39. When dial tone is received, dial the code for the district selector test line "Repeating Coil Out" condition.

40. When selections are completed operate key 1 and then key 2 of the auxiliary test unit to HOLD.

41. Measure the transmission loss.

Note: This is the loss of the line finder district selector circuit for the "Repeating Coil Out" condition.

42. Release the line finder district selector circuit from test by operating keys 1 and 2 of the auxiliary test unit to OPEN.

43. Release the line finder district selector circuits of the sub-group by removing the make-busy plugs from the MB jacks at the district selector frame.

44. Restore the test selector by manually operating the down drive and removing the connection between the D and E jacks.

(d) **Line Finder District Selector Circuits (Rotary Link)**

These circuits are similar to the panel link type and should be tested as outlined under A (c), "Line Finder District Selector Circuits (Panel Link)."

(e) **Operators' Dialing District Selector Circuits**

These circuits have no equipment in the transmission circuit and require no transmission tests.

(f) **Panel "A" Switchboard Semi-Mechanical Cord and District Selector Circuits**

The testing procedure for these circuits is outlined under D, "Panel 'A' Switchboard Cord Circuits."

(g) **Full Selector Tandem District Selector Circuits**

These circuits are tested in conjunction with the associated trunks as outlined under C (h), "Full Selector Tandem Trunks Incoming from Panel Offices."

(h) **Operator Tandem District Selector Circuits**

These circuits are tested in conjunction with the associated trunks as outlined under C (i), "Operator Tandem Trunks Incoming from Manual Offices."

B. **OFFICE SELECTOR CIRCUITS**

(a) **Panel Office Selector Circuits**

These circuits have no equipment in the transmission circuit and require no transmission tests.

(b) **Distant Office Selector Circuits**

These circuits are tested in conjunction with the associated trunks as outlined under C (j), "Outgoing Trunks to Distant Office Selectors at Switching Center."

C. **TRUNK CIRCUITS**

(a) **Incoming Trunks from Panel Offices**

1. These circuits should be tested at the horizontal side of the M.D.F. of the incoming office by the loop method, the loops being established at the outgoing trunk test board of the outgoing panel office.

2. The trunks are completed for test to the transmission measuring set through spare final multiple circuits.

3. Figure 4 shows schematically the connections for the test.

Preliminary Connections

4. At the horizontal side of the incoming office M.D.F. connect the sending and receiving terminals of the transmission measuring set respectively to two spare final multiple circuits.

Note: At the I.D.F. remove the intercepting lines from the two spare final multiple circuits for the duration of the tests.

5. Provide two cords (tip and ring) each of which is equipped on one end with clips and on the other end with plugs suited to the jacks of the auxiliary test unit.

6. Insert the plugs of these cords in the LR and LS jacks of the auxiliary test unit.

Testing Procedure

7. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to OPEN	Key 3 to MET
Key 2 to OPEN	Key 4 to MET

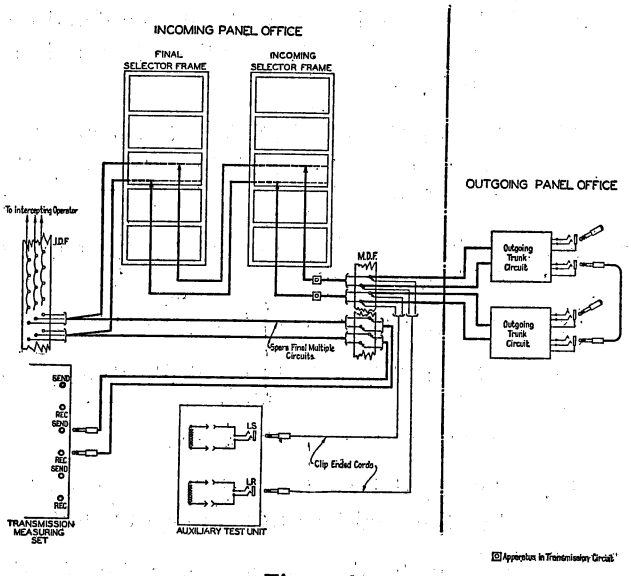


Figure 4

8. At the outgoing trunk test board select an idle trunk to be tested and insert a make-busy plug in the MB jack.

9. At the horizontal side of the M.D.F. of the incoming office connect the clips of the cord connected to the LS jack of the auxiliary test unit to the tip and ring of the trunk selected in item 8.

10. At the outgoing trunk test board by means of the test cord circuit select one of the spare final multiple circuits over the trunk to be tested.

11. When selections are completed operate key 1 of the auxiliary test unit to HOLD.

12. At the outgoing trunk test board select another idle trunk to be tested and insert a make-busy plug in the MB jack.

13. At the horizontal side of the M.D.F. of the incoming office connect the clips of the cord connected to the LR jack of the auxiliary test unit to the tip and ring of the trunk selected in item 12.

14. At the outgoing trunk test board remove the test cord from the trunk of item 10, insert it in the trunk of item 12 and select the second spare final multiple circuit.

15. When selections are completed operate key 2 of the auxiliary test unit to HOLD.

16. Remove the test cord from the second trunk.

17. At the outgoing trunk test board loop the two trunks by means of a double ended (patching) cord.

18. At the transmission measuring set trip the ringing.

19. Measure the transmission loss.

Note: This is the loss of two trunk circuits.

20. Measure the current supply.

21. Disconnect one trunk by operating key 2 of the auxiliary test unit to OPEN and at the outgoing trunk board remove the make-busy plug and the double ended (patching) cord.

22. Disconnect the other trunk by operating key 1 of the auxiliary test unit to OPEN and at the outgoing trunk test board remove the make-busy plug and the double ended (patching cord).

23. Repeat the above testing procedure to determine the transmission loss of a trunk to be used as a standard and set it up as outlined in items 7 to 11 inclusive.

24. Proceed with the tests as outlined in items 12 to 21 inclusive for the remaining trunks of the group.

25. When all of the trunks in the group have been tested the standard trunk should be released as in item 22.

(b) **Local Three-Wire Incoming Trunks**

1. These circuits should be tested at the incoming selector frame and the connections to the transmission measuring set completed over the bell ringing test line.

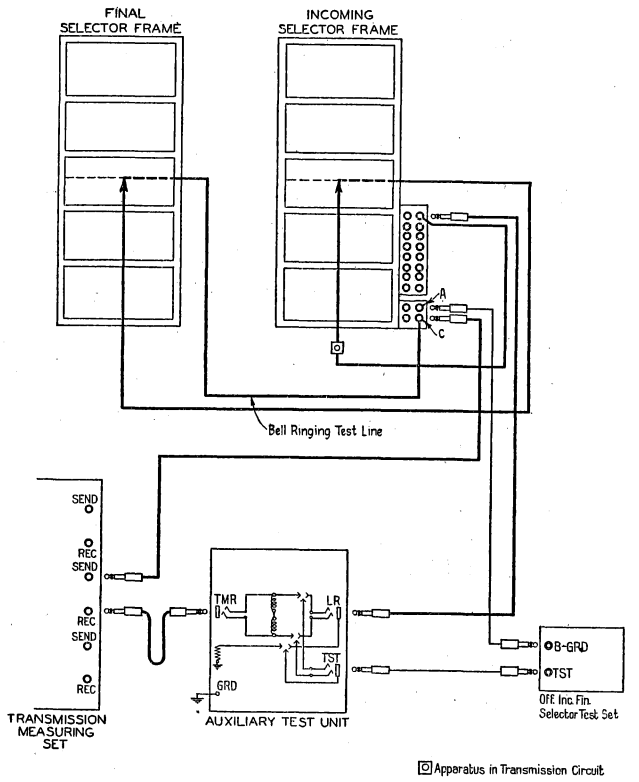


Figure 5

2. Figure 5 shows schematically the connections for the test.

Preliminary Connections

3. Connect the "C" jack (bell ringing test line jack) at the incoming selector frame to the sending jack of the transmission measuring set.

4. Connect the TST jack of the OFF-INC-FIN selector test set to the TST jack of the auxiliary test unit.

5. Connect the B-GRD jack of the OFF-INC-FIN selector test set to the A jack at the incoming selector frame.

6. Connect the TMR jack of the auxiliary test unit to the receiving jack of the transmission measuring set.

7. Connect the GRD terminal of the auxiliary test unit to ground.

Testing Procedure

8. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to OPEN	Key 6 to S_2
Key 2 to OPEN	Key 8 to GRD
Key 4 to MET	Key 11 to OPEN
	Key 12 to OPEN

9. Connect the LR jack of the auxiliary test unit to the test jack of an idle incoming selector circuit to be tested.

   Note: If separate test and make-busy jacks are provided insert an MB plug in the make-busy jack.

10. Operate Key 2 of the auxiliary test unit to TEST.

11. Operate the proper keys of the OFF-INC-FIN selector test set to select the bell ringing test line.

12. When selections have been completed operate key 2 of the auxiliary test unit to HOLD.

13. Restore the OFF-INC-FIN selector test set circuit to normal by operating the DISC key.

14. At the transmission measuring set trip the ringing.

15. Measure the transmission loss.

    Note: This is the loss of the local three wire incoming trunk circuit.

16. Measure the current supply.

17. Release the trunk circuit by operating key 2 of the auxiliary test unit to OPEN.

18. Repeat the above testing procedure for the remaining circuits of the group.

(c) **Direct Dialing Trunks Incoming from Manual Office Switchboards**

1. These circuits should be tested at the horizontal side of the M.D.F. of the incoming office by the loop method, the loops being established at the manual switchboard.

2. The trunk circuits are completed for test to the transmission measuring set through two spare final multiple circuits.

3. Figure 6 shows schematically the connections for the test.

Preliminary Connections

4. At the horizontal side of the incoming office M.D.F. connect the sending and receiving terminals of the transmission

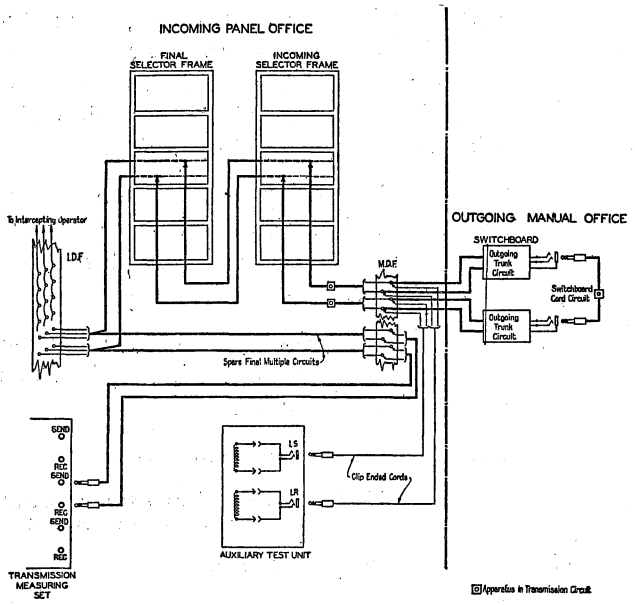


Figure 6

measuring set respectively to two spare final multiple circuits.

Note: At the I.D.F. remove the intercepting lines from the two spare final multiple circuits for the duration of the test.

5. Provide two cords (tip and ring) each of which is equipped on one end with clips and the other end with plugs suited to the jacks of the auxiliary test unit.

6. Insert the plug of these cords in the LR and LS jacks of the auxiliary test unit.

Testing Procedure

7. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to OPEN	Key 3 to MET
Key 2 to OPEN	Key 4 to MET

8. At the manual switchboard by means of a dialing "A" cord circuit which is known to be in good condition, select one of the spare final multiple circuits over an idle trunk to be tested.

9. When selections are completed (at the horizontal side of the M.D.F. of the incoming office) connect the clips of the cord connected to the LS jack of the auxiliary test unit to the tip and ring of the trunk of item 8.

10. Operate key 1 of the auxiliary test unit to HOLD.

11. Remove the dialing cord from this trunk, insert it in another idle trunk to be tested and select the other final multiple circuit.

12. When selections are completed (at the horizontal side of the M.D.F. of the incoming office) connect the clips of the cord connected to the LR jack of the auxiliary test unit to the tip and ring of the trunk of item 11.

13. Operate key 2 of the auxiliary test unit to HOLD.

14. At the manual office switchboard loop the two trunks under test by means of the switchboard cord circuit used for dialing.

15. At the transmission measuring set trip the ringing.

16. Measure the transmission loss.

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

17. Measure the current supply.

18. Disconnect one trunk by operating key 2 of the auxiliary test unit to OPEN and at the manual office switchboard remove the looping cord.

19. Disconnect the other trunk by operating key 1 of the auxiliary test unit to OPEN and at the manual office switchboard remove the looping cord.

20. Repeat the above testing procedure to determine the transmission loss of a trunk to be used as a standard and set it up as outlined in items 7 to 10 inclusive.

21. Proceed with the tests as outlined in items 11 to 18 inclusive.

22. When all of the trunks in the group have been tested the standard trunk should be released as in item 19.

(d) **Direct Dialing Trunks Incoming from Panel "A" Switchboards**

These circuits are similar to "Direct Dialing Trunks Incoming from Manual Office Switchboards" and should be tested as outlined under C (c).

(e) **Direct Dialing Trunks Incoming From Step-by-Step Offices**

These circuits should be tested at the step-by-step office. The testing procedure is

outlined in Bell System Maintenance Practices—Transmission, Section 6-B.

(f) **Panel "B" Switchboard Trunks from Manual Local and Toll Offices, Arranged for Straightforward or Call Circuit Operation**

1. These circuits are tested at the Panel "A" switchboard of the incoming office by the loop method.

2. The loops are established at the manual office switchboard by means of a switchboard cord circuit.

3. At the incoming office the circuits are completed to the Panel "A" switchboard through two final terminal cord circuits.

4. Figure 7 shows schematically the connections for the test.

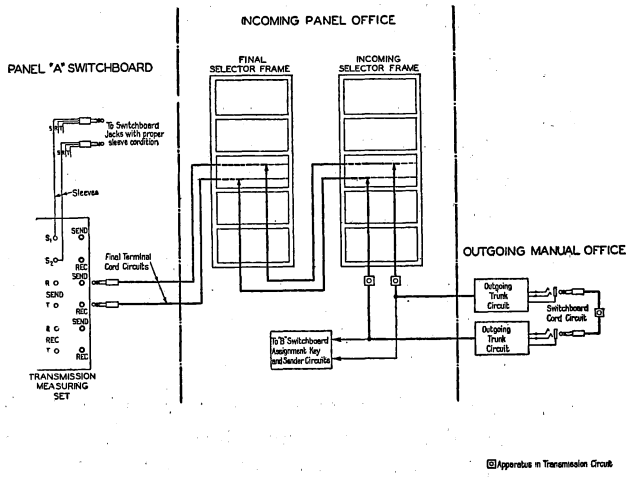


Figure 7

Preliminary Connections

5. Connect the sleeve conductors of two switchboard cords to the S_1 and S_2 terminals of the transmission measuring set and insert the plugs of these cords in switchboard jacks having the proper sleeve condition.

6. At the Panel "A" Switchboard insert the plugs of two final terminal cords which are known to be in good condition in the sending and receiving jacks of the transmission measuring set.

Testing Procedure

7. **Where the trunks are arranged for straightforward operation** call one of the final terminal cord numbers from the manual office switchboard over one of the trunks to be tested, using the answering cord of a switchboard cord circuit which is known to be in good condition.

8. Connect the calling cord of the switchboard cord circuit to another trunk to be tested and call the other final terminal cord number.

9. Where the trunks are equipped for machine ringing trip the ringing at the transmission measuring set.

10. Measure the transmission loss.

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

11. Measure the current supply.

12. Disconnect one trunk by removing the cord at the manual office switchboard.

13. Repeat the above testing procedure to determine the transmission loss of a trunk to be used as a standard and set it up as outlined in item 7.

14. Proceed with the tests as outlined in items 8 to 12 inclusive for the remaining trunks of the group.

15. When all of the trunks in the group have been tested, the standard trunk should be released by removing the cord at the manual office switchboard.

16. **Where the trunks are arranged for call circuit operation** pass the final terminal cord number and the trunk number desired to the trunk operator over the call circuit.

17. Insert in a multiple jack of this trunk one end of a switchboard cord circuit.

18. Pass the other final terminal cord number and the trunk number desired to the trunk operator over the call circuit.

19. Insert the other end of the switchboard cord circuit in a multiple jack of this trunk.

20. At the transmission measuring set trip the ringing.

21. Measure the transmission loss.

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

22. Measure the current supply.

23. Disconnect one trunk by removing the switchboard cord from the multiple trunk jack at the Manual Office Switchboard.

24. Repeat the above testing procedure to determine the transmission loss of a trunk to be used as a standard and set it up as outlined in items 16 and 17.

25. Proceed with the tests as outlined in items 18 to 23 inclusive for the remaining trunks of the group.

26. When all of the trunks in the group have been tested the standard trunk should be released by removing the cord from the multiple trunk jack at the manual office switchboard.

(g) **Panel "B" Switchboard Trunks From Manual Tandem Offices Arranged for Straightforward or Call Circuit Operation**

1. These circuits are tested at the panel "A" switchboard of the incoming office by the loop method, the loops being established at the manual tandem switchboard by means of a patching cord as described below.

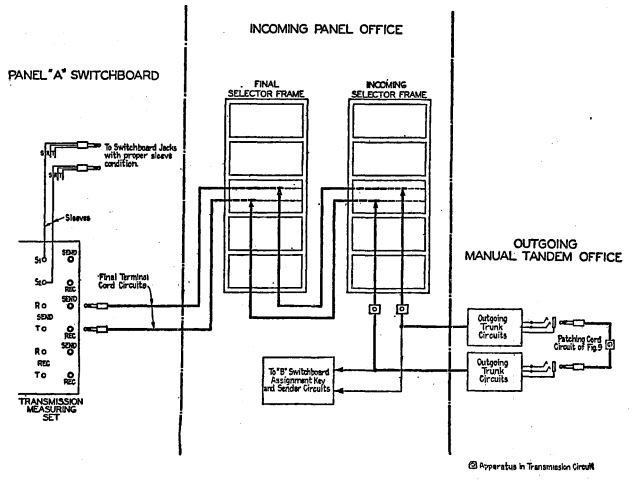


Figure 8

2. At the incoming office the circuits are completed to the transmission measuring set through two final terminal cord circuits.

3. Figure 8 shows schematically the connections for the test.

Preliminary Connections

4. The loops are established at the tandem switchboard by means of a double-ended patching cord across the tip and ring conductors of which is connected a ½ 44B retardation coil. The sleeves of the patching cord should be connected to the sleeves of two trunk cords regularly used with the trunks under test.

Note: When testing trunks of the type where battery and ground is normally supplied from the tandem switchboard for the operation of the panel "B" supervisory signals it will be necessary to supply normal battery and ground to the retardation coil of the patching cord.

5. Figure 9 shows schematically the connections of the retardation coil.

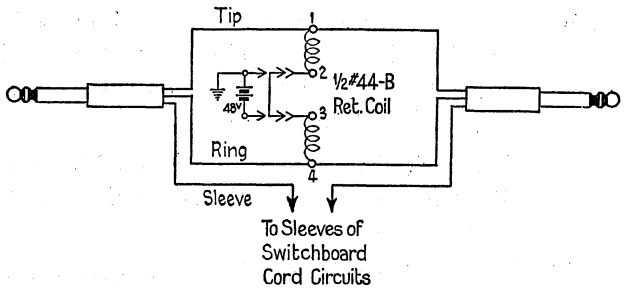


Figure 9

6. Connect the sleeve conductors of two switchboard cords to the S_1 and S_2 terminals of the transmission measuring set and insert the plugs of these cords in switchboard jacks having the proper sleeve condition.

7. At the Panel "A" switchboard insert the plugs of two final terminal cords which are known to be in good condition in the sending and receiving jacks of the transmission measuring set.

Testing Procedure

8. **Where the trunks are arranged for straightforward operation** call one of the final terminal cord numbers from the manual tandem office switchboard over one of the trunks to be tested using a supervisor's telephone circuit calling cord.

9. Insert in a multiple jack of this trunk one end of the patching cord and remove the supervisor's telephone circuit calling cord.

10. Call the other final terminal cord number over another trunk to be tested using the supervisor's telephone circuit calling cord.
11. Insert in a multiple jack of this trunk the other end of the patching cord and remove the supervisor's telephone circuit calling cord.
12. At the transmission measuring set trip the ringing.
13. Measure the transmission loss.

    Note: This is the loss of two trunk circuits and the looping circuit.
14. Measure the current supply.
15. Disconnect one trunk by removing the cord from the multiple trunk jack at the manual tandem switchboard.
16. Repeat the above testing procedure to determine the transmission loss of a trunk to be used as a standard and set it up as outlined in items 8 and 9.
17. Proceed with the tests as outlined in items 10 to 15 inclusive for the remaining trunks of the group.
18. When all of the trunks in the group have been tested the standard trunk should be released by removing the cord from the multiple trunk jack at the manual tandem office switchboard.
19. **Where the trunks are arranged for call circuit operation** pass the final terminal cord number and the trunk number desired to the trunk operator over the call circuit.
20. Insert in a multiple jack of this trunk one end of the patching cord.
21. Pass the other final terminal cord number and the trunk number desired to the trunk operator over the call circuit.
22. Insert in a multiple jack of this trunk the other end of the patching cord.
23. At the transmission measuring set trip the ringing.
24. Measure the transmission loss.

    Note: This is the loss of two trunk circuits and the looping circuit.
25. Measure the current supply.
26. Disconnect one trunk by removing the cord from the multiple trunk jack at the manual tandem switchboard.
27. Repeat the above testing procedure to determine the transmission loss of a trunk to be used as a standard and set it up as outlined in items 19 and 20.
28. Proceed with the tests as outlined in items 21 to 26 inclusive for the remaining trunks of the group.
29. When all of the trunks in the group have been tested the standard trunk should be released by removing the cord from the multiple trunk jack at the manual tandem switchboard.

(h) **Full Selector Tandem Trunks Incoming from Panel Offices**

1. These circuits are tested at the horizontal side of the M.D.F. at the tandem office by the loop method, the loops being established at the outgoing trunk test board of the outgoing panel office.

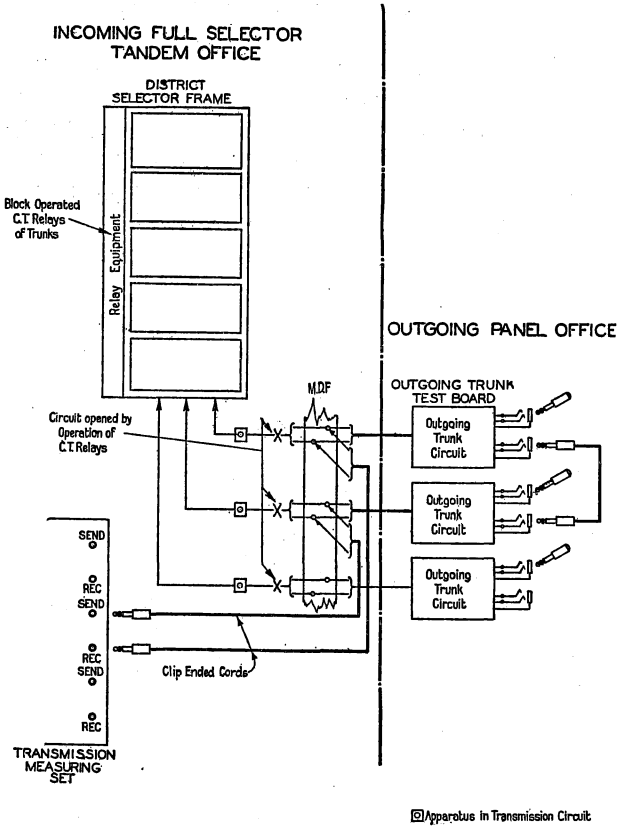


Figure 10

2. At the tandem office the circuits are completed to the transmission measuring set over the district selector test line from which the relay equipment has been disconnected.

Preliminary Tests and Connections

3. Determine the loss of a test or standard trunk as outlined below.

4. Figure 10 shows schematically the connections for this test.

5. Select three idle trunks and insert make-busy plugs in the MB jacks at the outgoing trunk test board.

6. At the district frame of the tandem office remove the equipment from these trunks by blocking the CT relays in the operated position by means of relay armature blocking tools (136-B tools).

7. Provide two cords (tip and ring) each of which is equipped on one end with clips and on the other end with a plug.

8. Insert the plugs of these cords in the sending and receiving jacks of the transmission measuring set.

9. At the horizontal side of the M.D.F. at the tandem office connect the clips of the cords of item 7, to two of the trunks of item 5.

10. At the outgoing trunk test-board of the originating office loop these trunks with a double ended (patching) cord.

11. Measure the transmission loss.

    Note: This is the loss of two trunk circuits less equipment.

12. Make triangulation measurements to determine the loss of each of the three trunks less equipment as outlined in the above items 9 to 11 inclusive.

13. Select one of these trunks to be used as a standard trunk and restore the other two trunks to normal by removing the blocking tools from the CT relays at the district frame and the make-busy plugs at the outgoing trunk test board.

14. Connect the standard trunk to the receiving jack of the transmission measuring set by means of a clip ended cord.

15. At the connecting block on the horizontal side of the M.D.F. at the tandem office disconnect the district test line and to these terminals connect the LS jack of the auxiliary test unit.

    Note: Where more than one district test line exists in the test group it will be necessary to make-busy the other test lines by inserting make-busy plugs in the MB jacks of the test circuits at the outgoing trunk test board of the tandem office.

16. Remove the plug of the clip ended cord from the sending jack of the transmission measuring set and insert it in the LR jack of the auxiliary test unit.

17. Connect the TMS jack of the auxiliary test unit to the sending jack of the transmission measuring set.

18. Connect battery (24 volts) and ground respectively to the BATT and GRD terminals of the auxiliary test unit.

Testing Procedure

19. Figure 11 shows schematically the connections for the test.

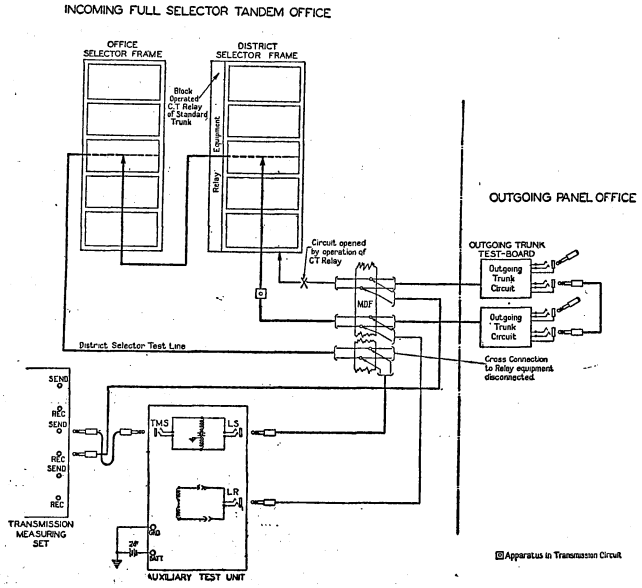


Figure 11

20. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to HOLD	Key 7 to OPEN
Key 2 to OPEN	Key 11 to OPEN
Key 3 to REV	Key 12 to OPEN
Key 4 to MET	

21. Select an idle trunk to be tested and insert a make-busy plug in the MB jack at the outgoing trunk test board of the originating office.

22. At the horizontal side of the M.D.F. of the incoming office connect the clips of the cord connected to the LR jack of the auxiliary test unit to the tip and ring of the trunk selected in item 21.

23. At the outgoing trunk test board by means of the test cord circuit select over the trunk to be tested the district test line to which the LS jack of the auxiliary test unit is connected.

24. When selections are completed operate key 2 of the auxiliary test unit to HOLD.

25. At the outgoing trunk test board remove the test cord and connect the trunk under test and the standard trunk by means of a double ended (patching) cord.

26. Measure the transmission loss.

    Note: This is the loss of the trunk under test and the standard trunk.

27. Retain the standard trunk for further tests.

28. Release the tested trunk by operating key 2 of the auxiliary test unit to OPEN.

29. At the outgoing trunk test board remove the patching cord and the make-busy plug from the tested trunk.

30. Repeat the above testing procedure for the remaining trunk circuits of the group.

31. Proceed as follows to test the standard trunk with its equipment connected in the circuit.

32. Remove the cord from the LR jack of the auxiliary test unit and also the cord connected to the receiving jack of the transmission measuring set which should be inserted in the LR jack of the auxiliary test unit.

33. Restore the standard trunk to normal by removing the blocking tool from the CT relay at the district frame.

34. Select one of the other trunks used in the triangulation measurements inserting a make-busy plug in the MB jack at the outgoing trunk test board of the originating office and removing the equipment by blocking the CT relay in the operated position at the district frame of the tandem office.

35. The trunk of item 34 should now be used as a standard trunk and connected to the receiving jack of the transmission measuring set by means of a clip ended cord.

36. Proceed with the tests as outlined in items 20 to 26 inclusive omitting items 21 and 22.

37. Restore the standard trunk to normal by removing the blocking tool from the CT relay at the district frame and release both trunks by removing the patching cord and make-busy plugs at the outgoing trunk test board.

(i) Operator Tandem Trunks Incoming From Manual Offices

1. These circuits should be tested at the operator tandem office by the loop method, the loops being established at the manual switchboard.

2. The trunks are completed for test to the transmission measuring set through two spare final multiple circuits.

3. Figure 12 shows schematically the connections for the test.

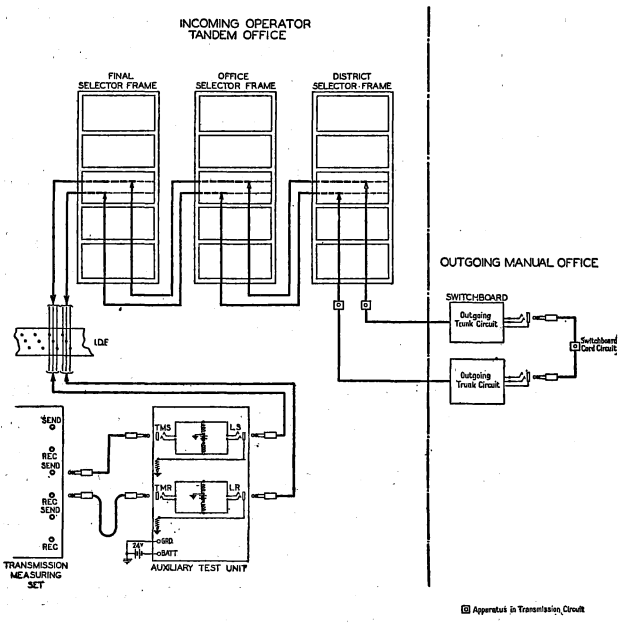


Figure 12

Preliminary Connections

4. At the distributing frame of the tandem office connect the LS and LR jacks of the auxiliary test unit to two spare final multiple circuits (tip, ring and sleeve).

5. Connect the TMS and TMR jacks of the auxiliary test unit respectively to the sending and receiving jacks of the transmission measuring set.

6. Connect battery (24 volts) and ground respectively to the BATT and GRD terminals of the auxiliary test unit.

7. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to HOLD	Key 4 to NORM
Key 2 to HOLD	Key 7 to GRD
Key 3 to NORM	Key 8 to GRD

Testing Procedure

8. At the manual office switchboard select an idle trunk to be tested and call one of the spare final multiple circuits using the answering cord of a switchboard cord circuit which is known to be in good condition.

9. Select another idle trunk to be tested and with the calling cord of the switchboard cord circuit call the other spare final multiple circuit.

10. Measure the transmission loss.

    Note: This is the loss of two trunks and the switchboard cord circuit.

11. Disconnect one trunk by removing the cord at the manual office switchboard.

12. Repeat the above testing procedure to determine the transmission loss of a trunk to be used as a standard and set it up as outlined in item 8.

13. Proceed with the tests as outlined in items 9 to 11 inclusive for the remaining trunks of the group.

14. When all of the trunks in the group have been tested, the standard trunk should be released by removing the cord at the manual office switchboard.

(j) **Outgoing Trunks to Distant Office Selectors at Switching Center**

1. These circuits are tested at the horizontal side of the M.D.F. of the switching center by the loop method, the loops being established at the outgoing trunk test board of the outgoing panel office.

2. The circuits are completed for test to the transmission measuring set over one of the trunk circuits from which the equipment has been disconnected.

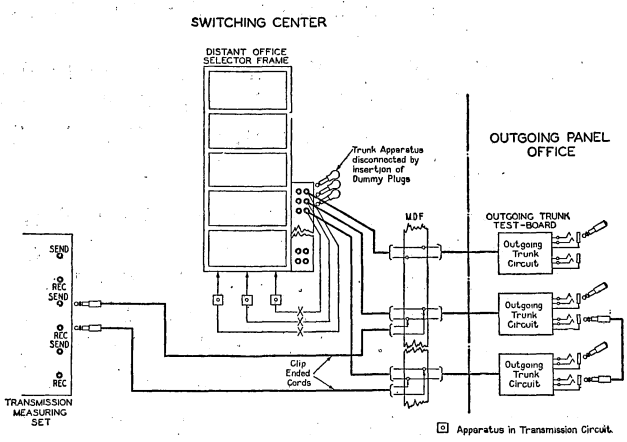


Figure 13

3. In order that selections of the circuits to be tested may be properly completed to the transmission measuring set it will be necessary to use the distant office test line interrupter circuit at the switching center.

Preliminary Tests and Connections

4. Determine the loss of a standard trunk as outlined below.

5. Figure 13 shows schematically the connections for the test.

6. Select three idle trunks and insert make-busy plugs in the MB jacks at the outgoing trunk test board.

7. At the distant office selector frame remove the equipment from these trunks by inserting dummy plugs in the test jacks associated with the trunks.

8. Provide two cords (tip and ring) each of which is equipped on one end with clips and on the other end with a plug.

9. Insert the plugs of these cords in the sending and receiving jacks of the transmission measuring set.

10. At the horizontal side of the M.D.F. of the switching center connect the clips of the cords of item 8, to two of the trunks of item 6.

11. At the outgoing trunk test-board of the originating office loop these trunks with a double ended (patching) cord.

12. Measure the transmission loss.

Note: This is the loss of two trunks less equipment.

13. Make triangulation measurements to determine the loss of each of the three trunks less equipment, as outlined in the above items 10 to 12 inclusive.

14. Select one of these trunks to be used as a standard trunk and restore the other two trunks to normal by removing the dummy plugs from the test jacks at the distant office selector frame and the make-busy plugs at the ougoing trunk test board.

15. Connect the standard trunk to the receiving jack of the transmission measuring set by means of a clip ended cord.

16. At the connecting block of the distant office test line interrupter circuits connect one of these circuits (tip, ring and sleeve) to the TST jack of the auxiliary test unit.

17. At the switching center select a set of terminals (tip, ring and sleeve) in each of the office frame multiple groups as shown in figure 14.

Note: These terminals should be chosen in unassigned trunk groups.

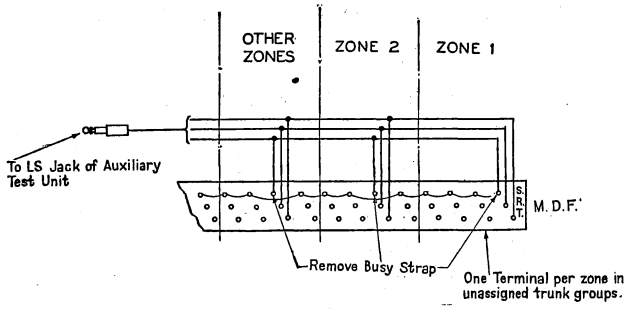


Figure 14

18. Remove the sleeve busy straps of these terminals at the distributing frame for the duration of the tests.

19. Multiple the tips, rings and sleeves of these terminals respectively and connect them by means of a plug-ended cord to the LS jack of the auxiliary test unit.

20. Remove the plug of the clip ended cord from the sending jack of the transmission measuring set and insert it in the LR jack of the auxiliary test unit.

21. Connect the TMS jack of the auxiliary test unit to the sending jack of the transmission measuring set.

22. Connect battery (24 volts) and ground respectively to the BATT and GRD terminals of the auxiliary test unit.

Testing Procedure

23. Figure 15 shows schematically the connections for the test.

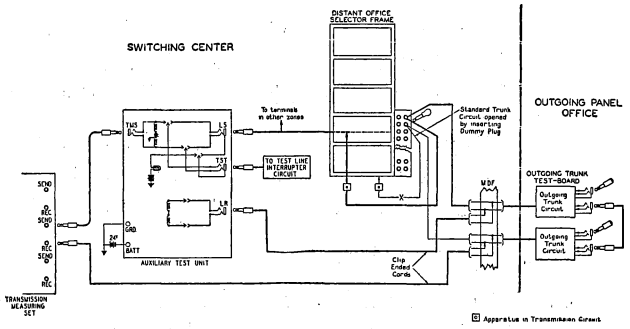


Figure 15

24. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to TEST	Key 6 to S_2
Key 2 to OPEN	Key 7 to BATT
Key 3 to REV	Key 8 to OPEN
Key 4 to MET	Key 11 to OPEN
Key 5 to S_1	Key 12 to OPEN

25. Select an idle trunk to be tested and insert a make-busy plug in the MB jack at the outgoing trunk test board of the originating office.

26. At the horizontal side of the M.D.F. of the incoming office connect the clips of the cord connected to the LR jack of the auxiliary test unit to the tip and ring of the trunk selected in item 25.

27. At the outgoing trunk test board by means of the test cord circuit select over the trunk to be tested the terminal (of items 17 to 19 inclusive) to which the LS jack of the auxiliary test unit is connected.

28. When selections are completed operate keys 1 and 2 of the auxiliary test unit to HOLD.

Note: If a selector circuit has terminated on the terminal associated with the LS jack the sleeve lamp of the LS jack will light.

29. At the outgoing trunk test board remove the test cord and connect the trunk under test and the standard trunk by means of a double ended (patching) cord.

30. Measure the transmission loss.

    Note: This is the loss of the trunk under test and the standard trunk.

31. Retain the standard trunk for further tests.

32. Release the tested trunk by operating keys 1 and 2 of the auxiliary test unit to TEST and OPEN respectively.

33. At the outgoing trunk test board remove the patching cord and the make-busy plug from the tested trunk.

34. Repeat the above testing procedure for the remaining trunk circuits of the group.

35. Proceed as follows to test the standard trunk with its equipment connected in the circuit.

36. Remove the cord from the LR jack of the auxiliary test unit and also the cord connected to the receiving jack of the transmission measuring set which should be inserted in the LR jack of the auxiliary test unit.

37. Restore the standard trunk to normal by removing the dummy plug from the test jack at the distant office selector frame at the switching center.

38. Select one of the other trunks used in the triangulation measurements, inserting a make-busy plug in the MB jack at the outgoing trunk test board of the originating office and removing its equipment by inserting a dummy plug in the test jack at the distant office selector frame.

39. The trunk of item 38 should now be used as a standard trunk and connected to the receiving jack of the transmission measuring set by means of a clip ended cord.

40. Proceed with the tests of items 24 to 30 inclusive omitting items 25 and 26.

41. Restore the standard trunk to normal by removing the dummy plug from the test jack at the distant office selector frame and release both trunks by removing the patching cord and make-busy plugs at the outgoing trunk test board.

(k) Outgoing Trunks to Recording Switchboards

1. These circuits should be tested at the panel office by the loop method from a location convenient to the district distributing frame during a period of light traffic load.

2. The loops are established at the recording switchboard.

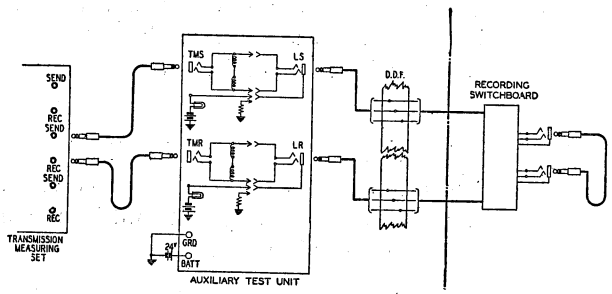


Figure 16

3. Figure 16 shows schematically the connections for the test.

Preliminary Connections

4. Connect battery (24 volts) and ground respectively to the BATT and GRD terminals of the auxiliary test unit.

5. Connect the TMS and TMR jacks of the auxiliary test unit respectively to the sending and receiving jacks of the transmission measuring set.

6. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to OPEN	Key 5 to BATT
Key 2 to OPEN	Key 6 to BATT
Key 3 to MET	Key 7 to GRD
Key 4 to MET	Key 8 to GRD
	Key 12 to OPEN

7. Provide two cords (tip, ring and sleeve) each of which is equipped on one end with a 234 plug or its equivalent and on the other end with a plug of a type suited to the jacks of the auxiliary test unit.

Testing Procedure

8. At the recording switchboard select an idle trunk and insert the plug of a cord circuit in the trunk jack.

9. At the horizontal side of the district distributing frame connect this trunk to the LS jack of the auxiliary test unit by means of one of the cords of item 7.

10. Operate key 1 of the auxiliary test unit to TEST.

Note: If the lamp associated with the LS jack does not light (indicating that the trunk circuit is still idle) operate key 5 of the auxiliary test unit to GRD and key 1 to HOLD.

11. At the recording switchboard select another idle trunk and insert the other plug of the cord circuit of item 8 in the trunk jack.

12. At the horizontal side of the district distributing frame connect this trunk to the LR jack of the auxiliary test unit by means of the other cord of item 7.

13. Operate key 2 of the auxiliary test unit to TEST.

Note: If the lamp associated with the LR jack does not light (indicating that the trunk circuit is still idle) operate key 6 of the auxiliary test unit to GRD and key 2 to HOLD.

14. Measure the transmission loss with the keys of the looping cord circuit in the normal position.

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

15. Disconnect both trunks by removing the cords from the trunk jacks at the recording switchboard and the 234 plugs from the terminals at the district distributing frame and also restore keys 1 and 2 of the auxiliary test unit to OPEN and keys 5 and 6 to BATT.

16. Repeat the above testing procedure to determine the transmission loss of a trunk to be used as a standard and set it up as outlined in the above items 8 to 10 inclusive.

17. Proceed with the tests as outlined in the above items 11 to 14 inclusive for the remaining trunks of the group, disconnecting the tested trunk by removing the cord from the trunk jack at the recording switchboard and the 234 plug from the terminals at the district distributing frame and also restoring key 2 of the auxiliary test unit to OPEN and key 6 to BATT.

18. When all of the trunks in the group have been tested the standard trunk should be released by removing the cord from the trunk jack at the recording switchboard and the 234 plug from the terminals at the district distributing frame.

(1) Outgoing Trunks to Information Desks

1. These circuits should be tested at the panel office by the loop method from a location convenient to the district distributing frame during a period of light traffic load.

2. The loops are established at an idle position of the information desk by means of cord circuits or by the operation of trunk keys depending upon whether the circuits terminate in jacks or keys.

3. Figure 17 shows schematically the connections for the test.

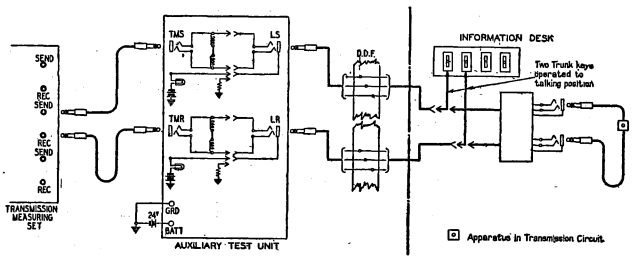


Figure 17

Preliminary Connections

4. Connect battery (24 volts) and ground respectively to the BATT and GRD terminals of the auxiliary test unit.

5. Connect the TMS and TMR jacks of the auxiliary test unit respectively to the sending and receiving jacks of the transmission measuring set.

6. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to OPEN	Key 5 to BATT
Key 2 to OPEN	Key 6 to BATT
Key 3 to MET	Key 7 to GRD
Key 4 to MET	Key 8 to GRD
	Key 12 to OPEN

7. Provide two cords (tip, ring and sleeve) each of which is equipped on one end with a 234 plug or its equivalent and on the

other end with a plug of a type suited to the jacks of the auxiliary test unit.

Testing Procedure

8. At the information desk select an idle trunk and insert the plug of a cord circuit in the trunk jack for the case of jack ended trunks, and for the case of key ended trunks, operate the trunk key to the talking position.

9. At the horizontal side of the district distributing frame connect this trunk to the LS jack of the auxiliary test unit by means of one of the cords of item 7.

10. Operate key 1 of the auxiliary test unit to TEST.

    Note: If the lamp associated with the LS jack does not light (indicating that the trunk circuit is still idle) operate key 5 of the auxiliary test unit to GRD and key 1 to HOLD.

11. At the information desk select another idle trunk and insert the other plug of the cord circuit of item 8 in the trunk jack for the case of jack ended trunks, and for the case of key ended trunks operate the trunk key to the talking position.

12. At the horizontal side of the district distributing frame connect this trunk to the LR jack of the auxiliary test unit by means of the other cord of item 7.

13. Operate key 2 of the auxiliary test unit to TEST.

    Note: If the lamp associated with the LR jack does not light (indicating that the trunk circuit is still idle) operate key 6 of the auxiliary test unit to GRD and key 2 to HOLD.

14. With the transmission measuring set in the measuring condition, have an attendant test the keys of key ended trunks for cut-outs by tapping the key tops lightly and moving the levers slightly forward and backward while exerting a reasonable pressure to the left and right to take up any play or side lash.

15. Measure the transmission loss.

    Note: This is a loss of two trunk circuits and the looping circuit. For the case of key ended trunks it includes any apparatus of the telephone circuit which may be bridged.

    Where the trunks are jack ended, the keys of the looping cord circuit should be in the normal position. Where the trunks are key ended, the keys of these trunks at multipled positions should be normal and the telephone set should be disconnected from the position under test.

16. Disconnect both trunks by removing the cords from the trunk jacks or restoring the trunk keys to normal as the case may be at the information desk, removing the 234 plugs from the terminals of the district distributing frame, and restoring keys 1 and 2 of the auxiliary test unit to OPEN and keys 5 and 6 to BATT.

17. Repeat the above testing procedure to determine the transmission loss of a trunk to be used as a standard and set it up as outlined in the above items 8 to 10 inclusive.

18. Proceed with the tests as outlined in the above items 11 to 15 inclusive for the remaining trunks of the group, disconnecting the tested trunk by removing the cord from the trunk jack or restoring to normal the trunk key as the case may be at the information desk, removing the 234 plug from the terminals at the district distributing frame and also restoring key 2 of the auxiliary test unit to OPEN and key 6 to BATT.

19. When all of the trunks in the group have been tested the standard trunk should be released by removing the cord from the trunk jack or restoring to normal the trunk key as the case may be at the information desk and also removing the 234 plug from the terminals at the district distributing frame.

(m) **Outgoing Trunks to Intercepting Operators**

These circuits have no equipment in the transmission circuit and require no transmission tests.

(n) **Outgoing Trunks to Manual Local, Tandem and Toll Switchboards**

These circuits should be tested at the manual office. The testing procedure is outlined in Bell System Maintenance Practices—Transmission—Section 6-A.

(o) **Ringdown Trunks**

1. These circuits terminate in jacks at both ends and may be tested by the loop method from either end at a position that will include all of the trunk multiple.

2. The trunks are looped for test by means of a double ended patching cord or switchboard cord circuit.

3. Figure 18 shows schematically the connections for the test.

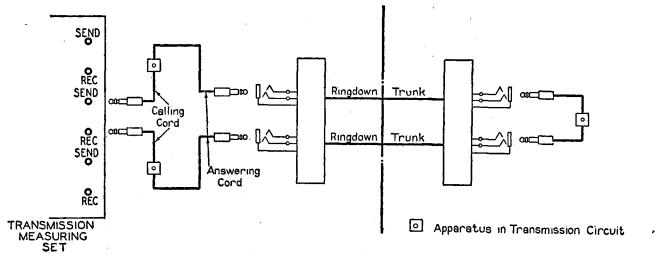


Figure 18

Testing Procedure

4. Connect the trunks to the transmission measuring set by means of double ended patching cords or switchboard cord circuits which are regularly used with the trunk circuits.

   Note: Where double ended patching cords are used the sleeves should be equipped in the same manner as sleeves of the cord circuits normally used with the trunks.

   Where switchboard cord circuits equipped with the busy test feature are used for connection between the trunks and the transmission measuring set, the calling cord should always be connected to the trunk jack.

5. At the distant office loop the trunks to be tested.

   Note: Where switchboard cord circuits are used and equipped with non-interfering answering and busy test features, the answering cord should always be inserted in a trunk jack before the calling cord. The trunk TRK key of the position should be operated to trip the ringing.

6. Measure the transmission loss.

   Note: This will be the loss of two looped trunks and the connecting cord circuits.

7. Release the trunks by removing the connecting cords from the trunk jacks at the testing end and the looping circuit at the distant end.

8. Repeat the above testing procedure to determine the transmission loss of a trunk to be used as a standard.

9. Set up the standard trunk and proceed with the tests as outlined in items 4 to 7 inclusive for the remaining trunks of the group.

(p) Local and Long Distance Key Indicator Trunks

These circuits are tested at the manual office. The procedure is outlined in Bell System Maintenance Practices—Transmission—Section 6-A.

D. PANEL "A" SWITCHBOARD CORD CIRCUITS

(a) Intercepting and Special Service Operators' Cord Circuits, and Associated Operators' Telephone Circuits

Cord Circuits

Preliminary Connections

1. Insert the 220 plug in the telephone set jack associated with the position under test with the key of the plug in the normal position.

2. Connect the sleeve conductors of two switchboard cords to the S_1 and S_2 terminals of the transmission measuring set, and insert the plugs of these cords in spare switchboard jacks having the proper sleeve conditions.

Testing Procedure

3. Insert the calling and answering cords of the cord circuit respectively in the sending and receiving jacks of the transmission measuring set.

4. With the transmission measuring set in the measuring condition, perform the operations outlined in items 5, 6 and 7 below:

5. Rotate the plugs of the cord circuit slowly in the test jacks to detect cut-outs due to defective or dirty plugs.

6. Test the cords for cut-outs by holding the plugs firmly in the jacks and rotating the cords slowly with a cranking motion.

7. Test all keys associated with the cord circuit for cut-outs in the normal and operated position (except ringing and flashing keys in the operated position) by tapping the key tops lightly.

   For lever type keys, move the levers slightly forward and backward while exerting a reasonable pressure to the left and right to take up any play or side lash.

For plunger type keys, connected in the transmission circuit move the plungers with a circular motion and test for plunger-spring clearance by depressing the plungers slightly.

8. Measure the transmission loss with the keys of the cord circuit normal.

9. Measure the current supply of each cord that provides talking battery.

10. Repeat the above testing procedure for the remaining cord circuits of the position.

Operators' Telephone Circuits

11. 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 the test.

12. 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 operator's telephone circuit:

13. Insert the plug of the calling cord in the receiving jack of the transmission measuring set.

14. Measure the transmission loss with the keys of the cord circuit normal.

15. Operate the listening key associated with the cord circuit so that the operator's telephone circuit is connected across the cord circuit in the talking condition.

16. Measure the transmission loss.

Note: The difference between items 14 and 16 will be the loss of the operator's telephone circuit in the bridged talking condition.

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

18. Insert the 202 plug associated with the 220 plug in the sending jack of the transmission measuring set.

19. Operate the key of the 220 plug to the T position.

20. Measure the transmission loss.

Note: The difference between items 14 and 20 will be the loss of the operator's telephone circuit in the transmitting condition.

(b) **Toll and Assisting Operators' Cord Circuits and Associated Operators' Telephone Circuits**

These circuits are similar to "Intercepting and Special Service Operators' Cord Circuits and Associated Operators' Telephone Circuits" and should be tested as outlined in D(a).

(c) **Final Terminal Cord Circuits**

These circuits have no equipment in the transmission circuit and require no transmission tests.

(d) **Semi-Mechanical Cord and District Selector Circuits and Associated Operators' Telephone Circuits**

Semi-Mechanical Cord and District Selector Circuits

1. These circuits consist of single ended cords each of which is associated with a district selector.

2. Transmission tests on these circuits should be made at the panel "A" switchboard, at a time when the position in which the circuits appear can be released from service.

3. The circuits are set up for test by means of the position key set and the connections to the transmission measuring set completed over a test line which appears in a test jack at the switchboard.

4. Figure 19 shows schematically the connections for the test.

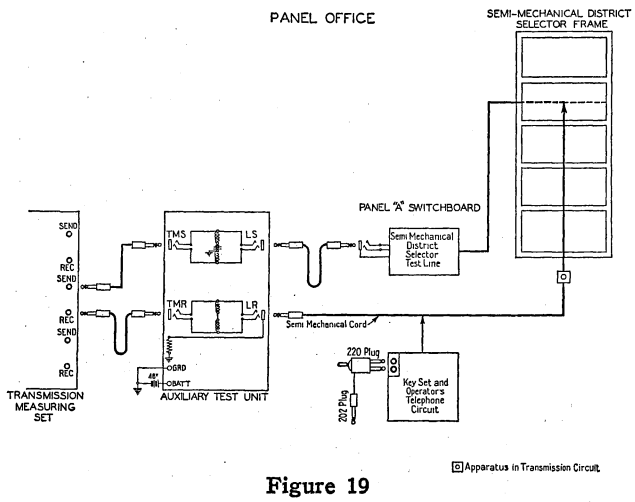


Figure 19

Preliminary Connections

5. Connect the test line jack of the switchboard to the LS jack of the auxiliary test unit.

6. Connect battery (48 volts) and ground from the B-GRD jack of the switchboard respectively, to the BATT and GRD terminals of the auxiliary test unit.

   Note: It may be necessary to ground the sleeve conductor of the cord which is inserted in the B-GRD jack of the switchboard, to close through the battery lead.

7. Connect the TMS and TMR jacks of the auxiliary test unit respectively to the sending and receiving jacks of the transmission measuring set.

8. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to HOLD	Key 4 to MET
Key 2 to HOLD	Key 7 to OPEN
Key 3 to REV	Key 8 to GRD

9. Insert the 220 plug in the telephone set jacks associated with the position, with the key of the plug in the normal position.

Testing Procedure

10. Insert the plug of the semi-mechanical cord and district selector circuit under test in the LR jack of the auxiliary test unit.

11. Operate the DST district selector test and ST start keys of the position. This will cause the selection of the test line by the semi-mechanical cord and district selector circuit.

12. When selections are completed and with the transmission measuring set in the measuring condition, perform the operations outlined in items 13 and 14 below.

13. Rotate the plug of the cord circuit slowly in the test jack to detect cutouts due to a defective or dirty plug.

14. Test the cord for cutouts by holding the plug firmly in the jack and rotating the cord slowly with a cranking motion.

15. Operate the LO listening out key of the position, to disconnect the operator's telephone circuit from the cord circuit.

16. Measure the transmission loss.

    Note: This is the loss of the semi-mechanical cord and district selector circuit.

17. Operate the transmission measuring set keys to the position for measuring current supply on the receiving terminals.

18. Measure the current supply while depressing key 10 of the auxiliary test unit to remove the holding bridge across the receiving terminals of the transmission measuring set.

19. Release the circuit under test by removing the plug from the LR jack of the auxiliary test unit.

20. Repeat the above testing procedure for the remaining circuits of the position.

Operators' Telephone Circuits

21. From the results of tests on the semi-mechanical cords of the position, choose a cord which shows no transmission troubles and use it to make the following tests of the operator's telephone circuit:

22. Remove the cord connecting the TMS jack of the auxiliary test unit and the sending jack of the transmission measuring set.

23. Figure 20 shows schematically the connections for the test.

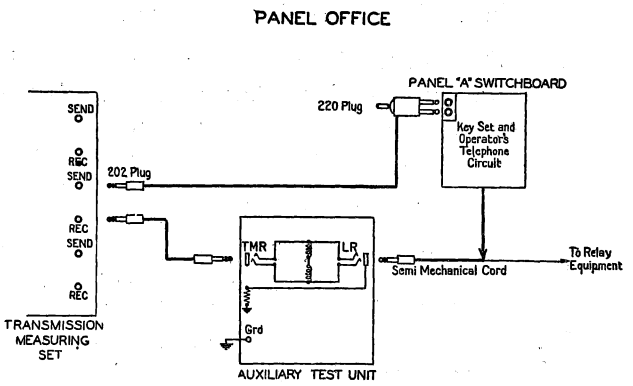


Figure 20

24. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 2 to HOLD
Key 4 to MET
Key 8 to GRD

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

    Note: Where 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.

26. Insert the plug of the semi-mechanical cord circuit of item 21 in the LR jack of the auxiliary test unit.

27. Measure the transmission loss.

    Note: This will be the loss of the operator's telephone circuit in the bridged talking condition.

28. Measure the transmission loss with the monitoring key of the cord depressed.

    Note: This will be the loss of the telephone circuit in the bridged monitoring condition.

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

30. Insert the 202 plug associated with the 220 plug in sending jack of the transmission measuring set.

31. Operate the key of the 220 plug to the T position.

32. Operate the "Listening In" key of the cord circuit.

33. Measure the transmission loss.

    Note: This will be the loss of the operator's telephone circuit in the transmitting condition.

34. Operate the key of the 220 plug to the R position.

35. Measure the transmission loss with the monitoring key of the cord depressed.

    Note: This will be the loss of the operator's telephone circuit in the receiving monitoring condition.

E. PANEL SWITCHBOARD TELEPHONE CIRCUITS

(a) Panel "A" Switchboard Operators' Telephone Circuits

These circuits are tested in conjunction with the associated cord circuits as outlined under D, "Panel "A" Switchboard Cord Circuits."

(b) Panel "A" Switchboard Supervisors' Telephone Circuits

1. Connections to the line side of the "A" switchboard supervisors' telephone circuits should be made at the switchboard jacks.

2. Figure 21 shows schematically the connections for the test.

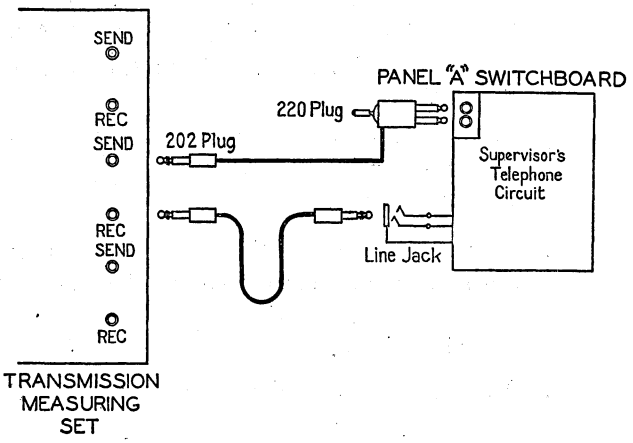


Figure 21

3. At a position of the supervisor's section which will include all of the multiple wiring, insert the 220 plug, with the key normal, in the supervisor's telephone set jack.

4. Connect the receiving jack of the transmission measuring set to a line jack of the supervisor's telephone circuit at a location which will include all of the multiple.

5. 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 when a dummy plug is removed from a jack other than the one to be used in this test.

6. Measure the transmission loss.

    Note: This will be the loss of the supervisor's telephone circuit in the bridged talking condition.

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

8. Insert the 202 plug associated with the 220 plug in the proper type sending jack of the transmission measuring set.

9. Operate the key of the 220 plug to the T position.

10. Measure the transmission loss.

    Note: This will be the loss of the supervisor's telephone circuit in the transmitting condition.

    Precaution: Should the transmission circuit appear to be open for this measurement, an inspection should be made of the relay in the transmitter battery supply circuit. An improper adjustment of this relay will result in a failure of the line contacts to close.

(c) **Panel "B" Switchboard Operators' Telephone Circuits Arranged for Call Circuit Operation**

1. These circuits should be tested at the Panel "B" switchboard during a period of light traffic load.
2. Connections to the line side of the operator's telephone circuit should be made at the punchings in the rear of the switchboard position.
3. Figure 22 shows schematically the connections for the test.

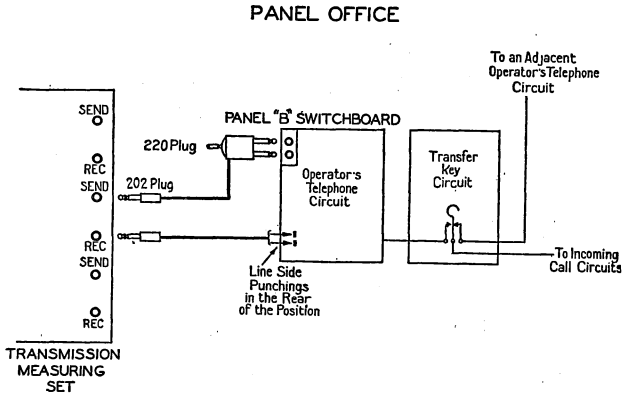


Figure 22

Preliminary Connections

4. Operate the position grouping or transfer key to transfer the call circuits during test to an adjacent position.
5. Connect the receiving jack of the transmission measuring set to the line side of the operator's telephone circuit at the punchings in the rear of the position.

Testing Procedure

6. Insert the 220 plug in the telephone set jack associated with the operator's telephone circuit under test with the key of the plug in the normal position.
7. 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.

8. Measure the transmission loss.

    Note: This is the loss of the operator's telephone circuit in the bridged talking condition.

9. Remove the strapping between the sending and receiving T and R terminals of the transmission measuring set.
10. Insert the 202 plug associated with the 220 plug in the sending jack of the transmission measuring set.
11. Operate the key of the 220 plug to the T position.
12. Measure the transmission loss.

    Note: This is the loss of the operator's telephone circuit in the transmitting condition.

(d) **Panel "B" Switchboard Operators' Telephone Circuits Arranged for Straightforward Operation**

1. These circuits should be tested at the Panel "B" switchboard during a period of light traffic load.
2. Connections to the line side of the operator's telephone circuit should be made through a spare incoming selector circuit in order to include all of the apparatus associated with the telephone circuit.

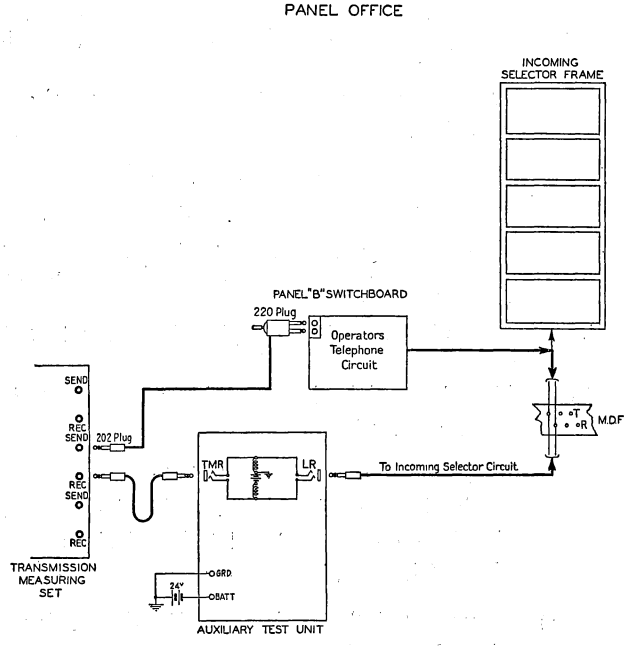


Figure 23

3. Figure 23 shows schematically the connections for the test.

Preliminary Connections

4. Connect a pair of wires to the LR jack of the auxiliary test unit and extend these wires to the distributing frame terminals of a spare incoming selector circuit associated with the position of which the operator's telephone circuit is to be tested.

5. Connect the TMR jack of the auxiliary test unit to the receiving jack of the transmission measuring set.

6. Connect battery (24 volts) and ground respectively to the BATT and GRD terminals of the auxiliary test unit.

7. Operate keys 2 and 4 of the auxiliary test unit respectively to HOLD and NORM (other keys do not affect the test).

Testing Procedure

8. Insert the 220 plug in the telephone set jack associated with the operator's telephone circuit under test with the key of the plug in the normal position.

9. Operate the assignment key of the spare incoming selector circuit.

10. 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.

11. Measure the transmission loss.

    Note: This is the loss of the operator's telephone circuit in the bridged talking condition including the apparatus of the spare incoming selector circuit.

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

13. Insert the 202 plug associated with the 220 plug in the sending jack of the transmission measuring set.

14. Operate the key of the 220 plug to the T position.

15. Measure the transmission loss.

    Note: This is the loss of the operator's telephone circuit in the transmitting condition including the apparatus of the spare incoming selector circuit.

(e) **Panel "B" Switchboard Supervisors' Telephone Circuits**

1. These circuits are tested from the Panel "B" switchboard in conjunction with the associated line circuit to the Panel "A" switchboard as shown in Figure 24.

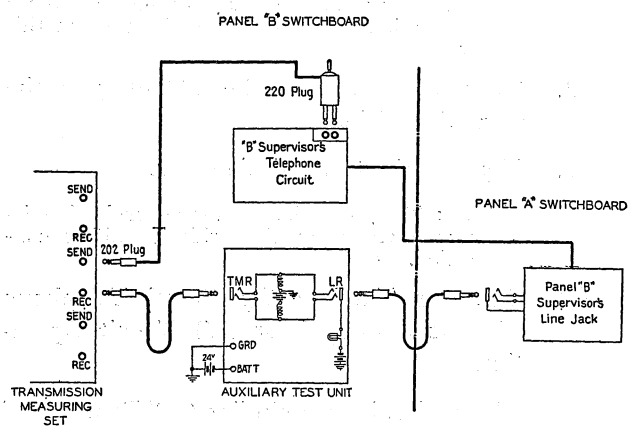


Figure 24

Preliminary Connections

2. Connect the TMR jack of the auxiliary test unit to the receiving jack of the transmission measuring set.

3. Operate the following keys of the auxiliary test unit to the positions specified Keys not mentioned do not affect the test.

   Key 2 to HOLD
   Key 4 to NORM
   Key 8 to BATT

Testing Procedure

4. At the panel "B" switchboard insert the 220 plug in the supervisor's telephone set jack with the key of the plug in the T position.

5. Insert the 202 plug associated with the 220 plug in the sending jack of the transmission measuring set.

6. Operate the OPR key associated with the supervisor's telephone circuit.

7. At the panel "A" switchboard connect the LR jack of the auxiliary test unit to the panel "B" supervisor's line circuit jack.

8. Measure the transmission loss.

   Note: This is the loss of the supervisor's telephone circuit in the transmitting condition.

9. 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.

10. Operate the key of the 220 plug to the normal position.

11. Measure the transmission loss.

    Note: This is the loss of the supervisor's telephone circuit in the bridged talking condition.

(f) **Operator Tandem Operators' Telephone Circuits Arranged for Call Circuit Operation**

These circuits are similar to "Panel "B" Switchboard Operators' Telephone Circuits Arranged for Call Circuit Operation" and should be tested as outlined in E(c).

(g) **Operator Tandem Operator's Telephone Circuits Arranged for Straightforward Operation**

1. These circuits should be tested at the tandem switchboard during a period of light traffic load.

2. Connections to the line side of the operator's telephone circuit should be made through a spare district selector circuit in order to include all of the apparatus associated with the telephone circuit.

3. Figure 25 shows schematically the connections for the test.

Preliminary Connections

4. Connect a pair of wires to the LR jack of the auxiliary test unit and extend these wires to the distributing frame terminals of a spare district selector circuit associated with the position of which the operator's telephone circuit is to be tested.

5. Connect the TMR jack of the auxiliary test unit to the receiving jack of the transmission measuring set.

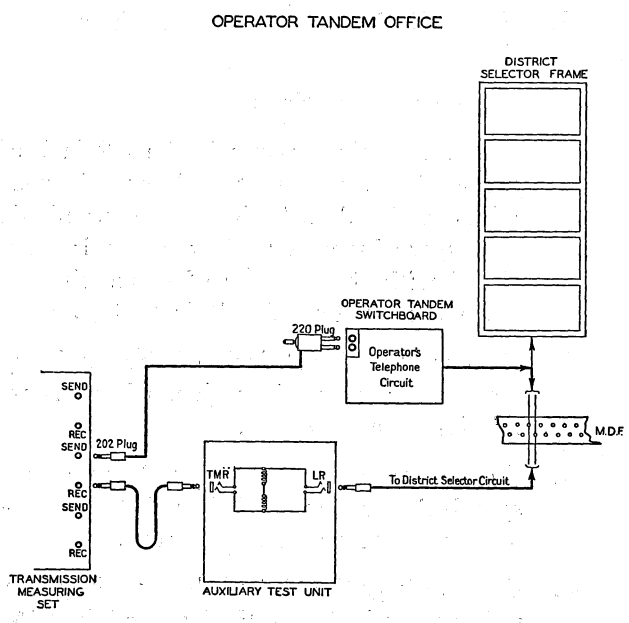


Figure 25

6. Operate keys 2 and 4 of the auxiliary test unit respectively to HOLD and MET. (Other keys do not affect the test.)

Testing Procedure

7. Insert the 220 plug in the telephone set jack associated with the operator's telephone circuit under test with the key of the plug in the normal position.

8. Operate the assignment key of the spare district selector circuit.

9. 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.

10. Measure the transmission loss.

    Note: This is the loss of the operator's telephone circuit in the bridged talking condition including the apparatus of the spare district selector circuit.

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

12. Insert the 202 plug associated with the 220 plug in the sending jack of the transmission measuring set.

13. Operate the key of the 220 plug to the T position.

14. Measure the transmission loss.

Note: This is the loss of the operator's telephone circuit in the transmitting condition including the apparatus of the spare district selector circuit.

(h) Operator Tandem Supervisor's Telephone Circuits

1. These circuits are tested at the operator tandem switchboard in conjunction with the associated district selector circuit and the connections to the transmission measuring set are completed over a spare local final multiple circuit.

2. Figure 26 shows schematically the connections for the test.

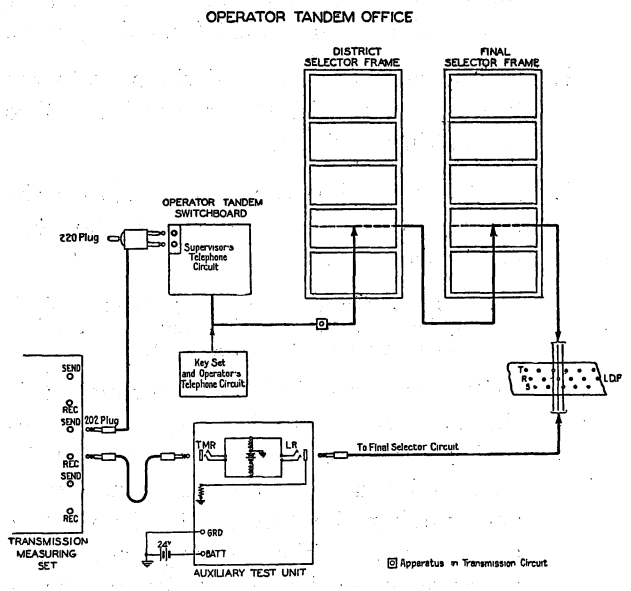


Figure 26

Preliminary Connections

3. At the operator tandem office select a spare local final multiple circuit.

4. At the distributing frame connect a pair of wires to the spare local final multiple circuit (tip, ring and sleeve) and extend these wires to the LR jack of the auxiliary test unit.

5. Connect battery (24 volts) and ground respectively to the BATT and GRD terminals of the auxiliary test unit.

6. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 2 to HOLD
Key 4 to NORM
Key 8 to GRD

7. Connect the TMR jack of the auxiliary test unit to the receiving jack of the transmission measuring set.

Testing Procedure

8. At the operator tandem switchboard insert the 220 plug in the supervisors' telephone set jack with the key of the plug in the normal position.

9. 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.

10. Operate the OPR key of the supervisors' telephone circuit.

11. At the tandem switchboard operator's position operate the assignment key of the district selector circuit associated with the supervisor's telephone circuit.

12. Operate the necessary keys of the switchboard position to select the spare local final multiple circuit.

13. Measure the transmission loss.

Note: This is the loss of the supervisor's telephone circuit in the bridged talking condition including the associated district selector circuit.

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

15. Insert the 202 plug associated with the 220 plug in the sending jack of the transmission measuring set.

16. Operate the key of the 220 plug to the T position.

17. Measure the transmission loss.

Note: This is the loss of the supervisor's telephone circuit in the transmitting condition including the associated district selector circuit.

F. OPERATING ROOM DESK CIRCUITS

(a) Trunk Circuits

1. These circuits terminate at the operating room desks in keys, and are tested from the Panel "A" switchboard by the loop method, the loops being completed over "Special Service Operator" trunks.

2. Figure 27 shows schematically the connections for the test.

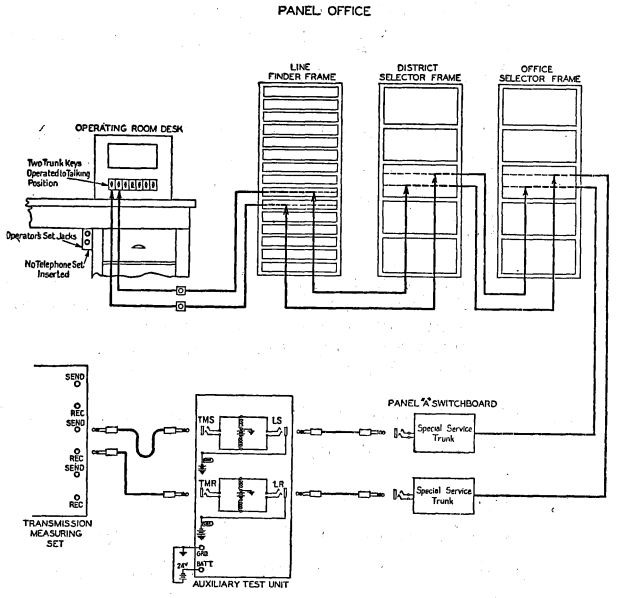


Figure 27

Preliminary Connections

3. Connect the TMS and TMR jacks of the auxiliary test unit respectively to the sending and receiving jacks of the transmission measuring set.

4. Connect battery (24 volts) and ground respectively to the BATT and GRD terminals of the auxiliary test unit.

5. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to HOLD	Key 4 to NORM
Key 2 to HOLD	Key 7 to BATT
Key 3 to NORM	Key 8 to BATT

Testing Procedure

6. At the operating room desk insert an operator's set in the telephone set jacks.

   Note: Where the operating room desk is equipped with a desk stand remove the receiver from the switch-hook.

7. At the operating room desk operate the key associated with one of the trunks to be tested to the talking position.

8. Dial "Special Service Operator" and at the panel "A" switchboard connect the special service operator trunk selected, to the LS jack of the auxiliary test unit by means of a double ended (patching) cord.

9. At the operating room desk, operate the key associated with the trunk of item 7 to the holding position.

10. Operate the key associated with another trunk to be tested to the talking position.

11. Dial "Special Service Operator" and at the panel "A" switchboard connect the special service operator trunk selected to the LR jack of the auxiliary test unit by means of a double ended (patching) cord.

12. At the operating room desk, operate the key associated with the trunk of item 7 to the talking position.

13. At the operating room desk remove the operator's telephone set from the telephone set jacks.

    Note: Where the operating room desk is equipped with a desk stand the receiver should be placed on the switch-hook.

14. With the transmission measuring set in the measuring condition test the keys associated with the trunks under test for cutouts by tapping the key tops lightly and moving the levers slightly forward and backward while exerting a reasonable pressure to the left and right to take up any play or side lash.

15. Measure the transmission loss.

    Note: This is the loss of two looped trunk circuits and includes any apparatus of the telephone circuit which may be bridged.

16. Disconnect one trunk by restoring to normal the associated trunk key at the operating room desk and remove the patching cord from the special service operator trunk at the panel "A" switchboard.

17. At the operating room desk operate the key associated with the remaining trunk to the holding position.

18. Determine the transmission loss of the trunk to be used as a standard by repeat-

ing the testing procedure of items 10 to 16, inclusive, omitting item 12 and in its place operating the key associated with the trunk of item 17 to the talking position.

19. Set up the standard trunk as outlined in items 7 to 9, inclusive.

20. Proceed with the tests as outlined in items 10 to 16, inclusive for the remaining trunks to be tested.

21. When all of the trunks in the group have been tested the standard trunk should be released by restoring to normal the associated trunk key at the operating room desk and removing the patching cords from the special service operator trunks at the panel "A" switchboard.

(b) **Telephone Circuits**

1. These circuits are tested at the operating room desk.

2. **Where desks are arranged for monitoring,** the monitoring cord may be used in testing the telephone circuit.

3. Figure 28 shows schematically the connections for the test.

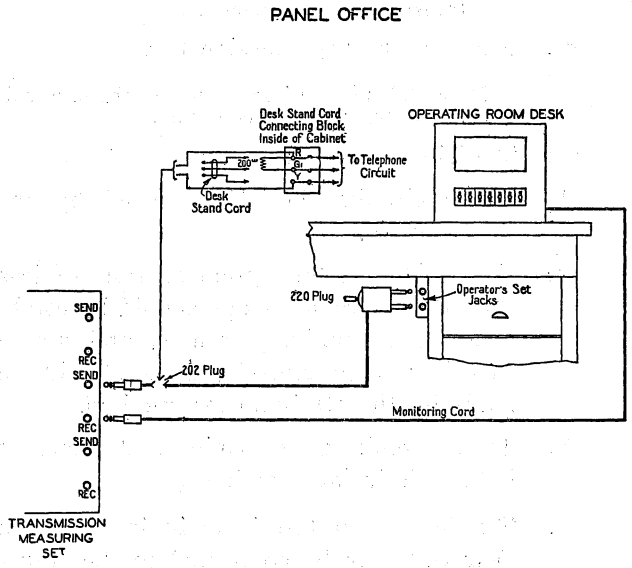


Figure 28

4. Insert the monitoring cord in the receiving jack of the transmission measuring set.

5. Operate the key associated with the cord to the talking position.

6. Insert the 220 plug in the telephone set jack of the operating room desk with the key of the plug in the normal position.

   Note: Where the desk is equipped with only a desk stand instrument replace the transmitter and receiver respectively with 40 and 200 ohm resistances at the desk stand cord connecting block.

7. 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.

8. Measure the transmission loss.

   Note: This is the loss of the telephone circuit in the bridged talking condition.

9. Restore the key associated with the monitoring cord to the normal (monitoring) position.

10. Measure the transmission loss.

    Note: This is the loss of the telephone circuit in the bridged monitoring condition.

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

12. Insert the 202 plug associated with the 220 plug in the sending jack of the transmission measuring set with the key of plug operated to the R position.

    Note: Where the desk is equipped with only a desk stand instrument and a 200 ohm resistance has been substituted for the receiver remove the resistance and in its place connect a pair of wires which should be extended to the sending terminals of the transmission measuring set.

13. Measure the transmission loss.

    Note: This is the loss of the telephone circuit in the receiving monitoring condition.

14. Operate the key associated with the monitoring cord to the talking position.

15. Operate the key of the 220 plug to the T position.

    Note: Where the desk is equipped with only a desk stand instrument remove the connections from the receiver circuit terminals at the connecting block and connect to these terminals a 200 ohm resistance. At the transmitter circuit terminals of the connecting block disconnect the 40 ohm resistance and connect these terminals to the sending terminals of the transmission measuring set.

16. Measure the transmission loss.

    Note: This is the loss of the telephone circuit in the transmitting condition.

17. **Where desks are not arranged for monitoring** the operator's telephone circuit should be tested in conjunction with a special service trunk at the panel "A" switchboard.

18. Figure 29 shows schematically the connections for the test.

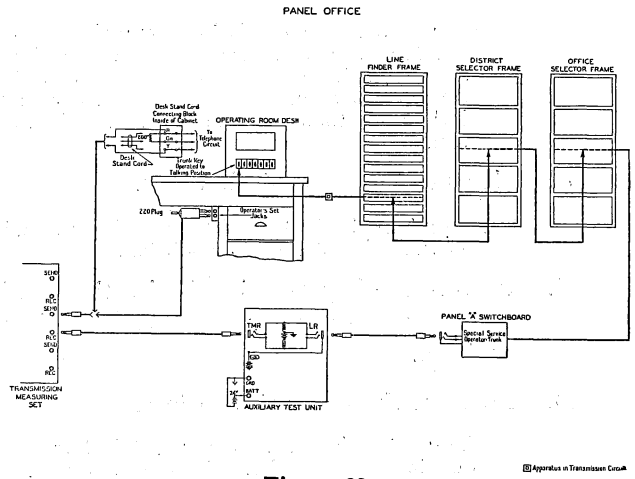


Figure 29

Preliminary Connections

19. Connect the TMR jack of the auxiliary test unit to the receiving jack of the transmission measuring set.

20. Connect battery (24 volts) and ground respectively to the BATT and GRD terminals of the auxiliary test unit.

21. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

    Key 2 to HOLD Key 8 to BATT
    Key 4 to NORM

Testing Procedure

22. At the operating room desk insert the 220 plug in the telephone set jack with the key of the plug in the normal position.

    Note: Where the desk is equipped with only a desk stand instrument replace the transmitter and receiver respectively with 40 and 200 ohm resistances at the desk stand cord connecting block.

23. Operate the key associated with one of the trunks to be used in this test to the talking position.

24. Dial "Special Service Operator" and at the Panel "A" switchboard connect the special service operator trunk selected to the LR jack of the auxiliary test unit.

25. 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.

26. Measure the transmission loss.

    Note: This is the loss of the telephone circuit in the bridged talking condition.

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

28. Insert the 202 plug associated with the 220 plug in the sending jack of the transmission measuring set with the key of plug operated to the T position.

    Note: Where the desk is equipped with only a desk stand instrument and a 40 ohm resistance has been substituted for the transmitter, remove the resistance and in its place connect a pair of wires which should be extended to the sending terminals of the transmission measuring set.

29. Measure the transmission loss.

    Note: This is the loss of the telephone circuit in the transmitting condition.

(c) **Tie Lines**

1. These circuits should be tested by the loop method.

2. Where the tie line group consists of less than three circuits, loops should be established over auxiliary routes, and where this is not practicable, tests should be made by the straightaway method.

3. These circuits may terminate at either or both ends in jacks or keys.

4. **Tie Lines that terminate in jacks at the near end** may be connected to the transmission measuring set by means of either double-ended (patching) cords or one of the cord circuits regularly used with the tie lines.

    Note: Where double-ended (patching) cords are used, the sleeves should be connected in a manner similar to the sleeves of the cords regularly used with the tie lines.

5. **Tie lines that terminate in keys at the near end** may be connected to the transmission measuring set at the punchings either in the rear of the switchboard or in the equipment box of the desk.

6. **Tie lines that terminate in jacks at the distant end** may be looped by means of double-ended (patching) cords or one of the cord circuits regularly used with the tie lines.

   Note: Where double-ended (patching) cords are used, the sleeves should be connected in a manner similar to the sleeves of the cords regularly used with the tie lines.

7. **Tie lines that terminate in keys at the distant end** may be looped by operating the keys to the talking position.

   Note: Where a desk stand instrument is provided, the receiver should remain on the hook. Where telephone set jacks are provided, no apparatus should be inserted in these jacks. Allowances should be made in the measurement of the loop for any apparatus of the telephone circuit that may be bridged.

8. Connect two tie lines to be tested to the transmission measuring set in accordance with the procedure as outlined above for the particular type terminations involved.

9. With the transmission measuring set in the measuring condition, test any keys which are connected in the circuit during measurement for cut-outs by tapping the key tops lightly and moving the levers slightly forward and backward while exerting a reasonable pressure to the left and right to take up any play or side lash.

10. Where tie lines are arranged to supply talking battery, measure the current supply.

11. Measure the transmission loss.

    Note: This is the loss of two tie lines and for the case of key terminated tie lines any apparatus in the telephone circuit that may be bridged.

G. TEST BOARD CIRCUITS

(a) Local Test Desks

Test Cord Circuits and Associated Telephone Circuits

1. Insert the primary test cord in the receiving jack of the transmission measuring set.

   Note: If the test cord requires the operation of sleeve equipment to close through the talking circuit, connect to the S_2 terminal of the transmission measuring set the sleeve of a cord, the plug end of which is inserted in a test desk jack having the proper sleeve condition.

2. Operate the proper keys of the test desk to bridge the telephone circuit across the primary test cord circuit without the current supply equipment.

3. Insert the 220 plug in the test desk telephone set jack with the key of the plug in the normal position.

4. **Where the test desk is arranged for the use of a breast type transmitter** insert the 202 plug associated with the 220 plug in the sending jack of the transmission measuring set.

5. Operate the key of the 220 plug to the T position.

6. Proceed as outlined in the following items 8 to 30 inclusive.

7. **Where the test desk is arranged for the use of a suspended transmitter** remove the cords from the transmitter cord fasteners and connect to these fasteners, the sending terminals of the transmission measuring set.

   Note: Where the transmitter circuit is normally closed by the insertion of a telephone set plug the tips of which are connected together, the connections for the test should be made in the same manner as in the above items 4 to 6 inclusive after short circuiting the suspended transmitter terminals.

8. With the transmission measuring set in the measuring condition perform the operations as outlined in items 9, 10 and 11 below.

9. Rotate the plug of the cord slowly in the test set jacks to detect cutouts due to defective and dirty plugs.

10. Test the cord for cutouts by holding the plug firmly in the jack and rotating the cord slowly with a cranking motion.

11. Test the keys associated with the test circuit for cutouts in the normal and operated position (except the ringing keys in the operated position) by tapping the key tops lightly.

For lever type keys, move the lever slightly forward and backward, while exerting a reasonable pressure to the left and right to take up any play or side lash.

For plunger type keys, connected in the transmission circuit move the plungers with a circular motion and test for plunger-spring clearance by depressing the plungers slightly.

12. Where the test circuit is equipped to transfer the testing equipment from one test cord circuit to another, test the cord and transfer key for cutouts before proceeding with the remaining tests.

13. Replace the test cord connected to the transmission measuring set with one of the other test cords and operate the transfer key and proceed with the cutout tests as outlined in items 9 to 11, inclusive.

14. Restore the transfer key and replace the cord removed in item 13 and proceed with the tests as follows:

15. Measure the transmission loss.

    Note: This is the loss of the telephone circuit in the transmitting condition.

16. Operate the proper keys of the test desk to connect the current supply equipment across the test cord circuit.

17. Measure the transmission loss.

    Note: This is the bridged loss of the current supply equipment and the telephone circuit in the transmitting condition.

18. Measure the current supply.

19. **When a transmission test pad (artificial network)** is provided in the test desk operate the proper keys to connect it in the test cord circuit.

20. Measure the transmission loss.

    Note: This is the loss of the transmission test pad (artificial network) and associated apparatus as measured through the telephone circuit in the transmitting condition.

21. Operate the proper keys of the test desk so that the telephone circuit is bridged across the test circuit without the current supply equipment.

22. Operate the key of the 220 plug to the normal position.

    Note: Where the test desk is equipped with a suspended transmitter, remove the connections of item 7 from the sending terminals of the transmission measuring set and connect to the transmitter cord fasteners a 40 ohm resistance.

23. 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.

24. Measure the transmission loss.

    Note: This is the loss of the telephone circuit for the bridged talking condition.

25. Operate the proper keys of the test desk to bridge the telephone circuit in the monitoring condition across the test cord circuit.

26. Measure the transmission loss.

    Note: This is the loss of the telephone circuit for the bridged monitoring condition.

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

28. Operate the key of the 220 plug to the R position.

29. Measure the transmission loss.

    Note: This is the loss of the operator's telephone circuit for the receiving monitoring condition.

30. Where the test desk is equipped with more than one testing circuit, test the features of the other circuits in the same manner as outlined in the above items 1 to 29 inclusive.

Call Circuits

31. These circuits should be tested at the incoming switchboard by the loop method during a period of light traffic load.

32. Figure 30 shows schematically the connections for the test.

33. The tests should be made by looping the call circuit at the test desk with a test trunk to the sender monitor or outgoing trunk testboard as the case may be, using a primary test cord circuit to complete the loop.

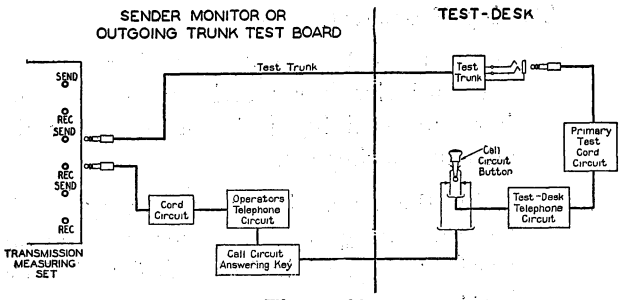


Figure 30

Testing Procedure

34. **At a position on the sender monitor or outgoing trunk testboard** as the case may be, insert a cord in the receiving jack of the transmission measuring set.

    Note: Where necessary operate the keys of the position to connect the telephone circuit to the call circuit. A telephone set should not be connected to the position used for this test.

35. Operate the talking key to bridge the telephone circuit across the cord circuit of item 34.

36. Insert the cord of a test trunk to the test desk, in the sending jack of the transmission measuring set.

37. At the test desk insert a primary test cord in the jack of the test trunk of item 36 and operate the proper keys of the test desk to connect the telephone circuit across the cord in the bridged talking condition.

38. Operate the call circuit button at the test desk.

39. Measure the transmission loss.

    Note: This is the loss of the call circuit and the test trunk and also includes the bridged loss of the telephone circuits at the test desk and the sender monitor or outgoing trunk testboard as the case may be.

Trunk Circuits

40. These circuits are similar to tie lines of operating room desks. The testing procedure is outlined in F(c), "Tie Lines."

Tie Lines

41. These circuits are similar to tie lines of operating room desks. The testing procedure is outlined in F(c), "Tie Lines."

(b) Outgoing Trunk Test Board

Test and Talking Cord Circuits and Associated Telephone Circuits

1. Testing and talking cord circuits are tested in conjunction with the test board telephone circuits.

Test Cord Circuits

2. Insert the test cord in the receiving jack of the transmission measuring set.

    Note: If the test cord requires the operation of sleeve equipment to close through the talking circuit, connect to the S_2 terminal of the transmission measuring set the sleeve of a cord, the plug end of which is inserted in a test desk jack having the proper sleeve condition.

3. Operate the proper key of the test cord circuit to bridge the telephone circuit across the test cord circuit.

4. Insert the 220 plug in the test board telephone set jack with the key of the plug in the normal position.

5. **Where the test board is arranged for the use of a breast type transmitter** insert the 202 plug associated with the 220 plug in the sending jack of the transmission measuring set.

6. Operate the key of the 220 plug to the T position.

7. Proceed as outlined in the following items 9 to 16, inclusive.

8. **Where the test board is arranged for the use of a suspended type transmitter** remove the cords from the transmitter cord fasteners and connect to these fasteners the sending terminals of the transmission measuring set.

9. With the transmission measuring set in the measuring condition perform the operations as outlined in items 10, 11 and 12 below.

10. Rotate the plug of the cord slowly in the test set jacks to detect cut-outs due to defective and dirty plugs.

11. Test the cord for cut-outs by holding the plug firmly in the jack and rotating the cord slowly with a cranking motion.

12. Test the keys associated with the test cord circuit for cut-outs in the normal and operated position (except the ringing keys

in the operated position) by tapping the key tops lightly, moving the lever slightly forward and backward while exerting a reasonable pressure to the left and right to take up any play or side lash.

13. Measure the transmission loss.

    Note: This is the loss of the telephone circuit in the transmitting condition.

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.

15. Restore the key of the 220 plug to the normal position.

    Note: Where the testboard is arranged for the use of a suspended type transmitter remove the leads from the sending terminals of the transmission measuring set and connect to them a 40 ohm resistance.

16. Measure the transmission loss.

    Note: This is the loss of the telephone circuit in the bridged talking condition.

17. Repeat the above testing procedure for the other test cords to be tested.

Talking Cord Circuits

18. Proceed with the tests as outlined in the above items 2 to 17, inclusive.

H. SENDER MONITOR CIRCUITS

(a) Double ended Intercepting Cord Circuits and Associated Telephone Circuits

Cord Circuits

Preliminary Connections

1. Insert the 220 plug in the telephone set jacks associated with the sender monitor position under test, with the key of the plug in the normal position.

   Note: Where a suspended type transmitter is used, replace the transmitter with a 40 ohm resistance.

2. Connect the sleeve conductors of two switchboard cords to the S_1 and S_2 terminals of the transmission measuring set and insert the plugs of these cords in spare switchboard jacks having the proper sleeve conditions.

Testing Procedure

3. Insert the calling and answering cords of the cord circuit respectively in the sending and receiving jacks of the transmission measuring set.

4. With the transmission measuring set in the measuring condition, perform the operations outlined in items 5, 6 and 7 below:

5. Rotate the plugs of the cord circuit slowly in the test jacks to detect cut-outs due to defective or dirty plugs.

6. Test the cords for cut-outs by holding the plugs firmly in the jacks and rotating the cords slowly with a cranking motion.

7. Test all keys associated with the cord circuit for cut-outs in the normal and operated position (except ringing and flashing keys in the operated position).

   For lever type keys, move the lever slightly forward and backward, and exert a reasonable pressure to the left and right to take up any play or side lash.

   For plunger type keys, connected in the transmission circuit move the plungers with a circular motion and test for plunger-spring clearance by depressing the plungers slightly.

8. Measure the transmission loss with the keys of the cord circuit normal.

9. Measure the current supply of each cord that provides talking battery.

10. Repeat the above testing procedure for the remaining cord circuits of the position.

Telephone Circuits

11. On the transmisson 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.

12. 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 telephone circuit:

13. Insert the calling cord of the intercepting cord circuit in the receiving jack of the transmission measuring set.

14. Measure the transmission loss with the keys of the cord circuit normal.

15. Operate the proper key of the sender monitor position to connect the telephone circuit across the cord circuit in the talking condition.

16. Measure the transmission loss.

    Note: The difference between items 14 and 16 is the loss of the telephone circuit in the bridged talking condition.

17. Remove the strapping between the sending and receiving terminals of the transmission measuring set.

18. Insert the 202 plug associated with the 220 plug in the sending jack of the transmission measuring set with the key of the plug operated to the T position.

    Note: Where a suspended type transmitter is used and a 40 ohm resistance has been substituted for the transmitter, remove the resistance and in its place connect a pair of wires which should be extended to the sending terminals of the transmission measuring set.

19. Measure the transmission loss.

    Note: The difference between items 14 and 19 is the loss of the telephone circuit in the transmitting condition.

(b) Single Ended Sender Monitor Cord Circuits and Associated Telephone Circuits

Cord Circuits

1. These circuits are tested in conjunction with the associated telephone circuits.

Telephone Circuits

2. Figure 31 shows schematically the connections for the test.

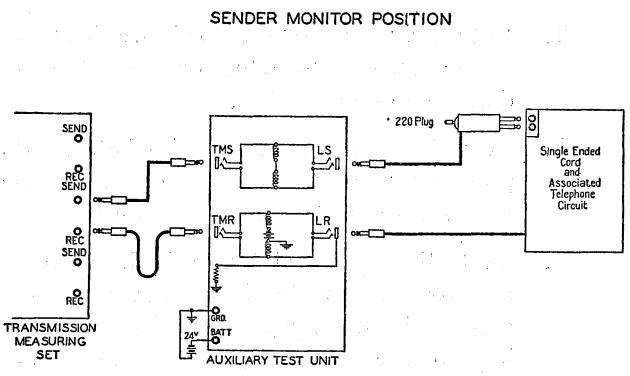


Figure 31

Preliminary Connections

3. Connect battery (24 volts) and ground respectively to the BATT and GRD terminals of the auxiliary test unit.

4. Connect the TMS and TMR jacks of the auxiliary test unit respectively to the sending and receiving jacks of the transmission measuring set.

5. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to HOLD	Key 4 to REV
Key 2 to HOLD	Key 7 to OPEN
Key 3 to MET	Key 8 to GRD

Testing Procedure

6. Insert the 220 plug in the telephone set jacks associated with the sender monitor position under test, with the key of the plug in the T position.

    Note: Where a suspended type transmitter is used remove it and in its place connect a pair of wires extending them to the LS jack (tip and ring) of the auxiliary test unit.

7. Insert the 202 plug associated with the 220 plug in the LS jack of the auxiliary test unit.

8. Insert the sender monitor cord in the LR jack of the auxiliary test unit.

9. Operate the key associated with the sender monitor cord under test to the talking position.

10. With the measuring set in the measuring condition perform the operations outlined in items 11, 12 and 13 below.

11. Rotate the plug of the cord circuit slowly in the test jack to detect cut-outs due to a defective or dirty plug.

12. Test the cord for cut-outs by holding the plug firmly in the jack and rotating the cord slowly with a cranking motion.

13. Test all keys associated with the cord circuit for cut-outs in the normal and operated position (except ringing and flashing keys in the operated position) by tapping the key tops lightly and moving the lever slightly forward and backward while exerting a reasonable pressure to the left and right to take up any play or side lash.

14. Measure the transmission loss.

    Note: This is the loss of the telephone circuit in the transmitting condition and the sender monitor cord circuit.

15. Operate the key of the 220 plug to the normal position.

    Note: Where a suspended type transmitter is used the connection between the LS jack of the auxiliary test unit and the transmitter circuit terminals should be removed and a 40 ohm resistance connected to these latter terminals.

16. 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.

17. Measure the transmission loss.

    Note: This is the loss of the telephone circuit in the bridged talking condition and the sender monitor cord circuit.

(c) **Emergency Cord Circuits and Associated Telephone Circuits**

Cord Circuit

1. This circuit is tested at the sender monitor position in conjunction with a "Special Service Operator" trunk to the Panel "A" switchboard, connection to which is obtained from a nearby telephone.

2. Figure 32 shows schematically the connections for the test.

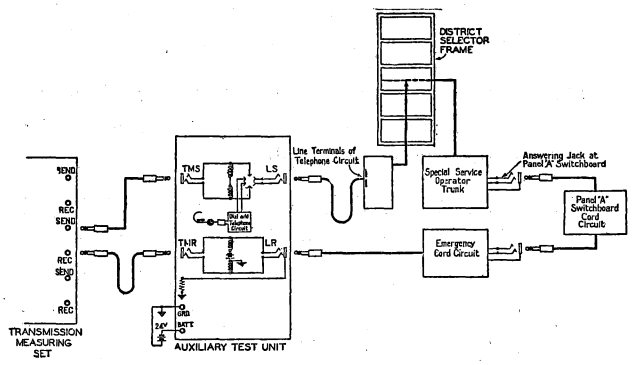


Figure 32

Preliminary Connections

3. Connect battery (24 volts) and ground respectively to the BATT and GRD terminals of the auxiliary test unit.

4. Connect the TMS and TMR jacks of the auxiliary test unit respectively to the sending and receiving jacks of the transmission measuring set.

5. Plug an operator's telephone set into the telephone set jacks of the auxiliary test unit.

6. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to OPEN	Key 5 to S_1
Key 2 to HOLD	Key 7 to OPEN
Key 3 to MET	Key 8 to GRD
Key 4 to REV	Key 11 to O-SEC
	Key 12 to OPEN

Testing Procedure

7. Connect to the LS (tip and ring) jack of the auxiliary test unit the line terminals of a nearby telephone circuit.

8. Operate Key 1 of the auxiliary test unit to TEST and listen for dial tone.

9. When dial tone is received dial the code for "Special Service Operator."

10. Insert the emergency cord in the LR jack of the auxiliary test unit.

11. At the Panel "A" switchboard connect the "Special Service Operator" trunk answering jack selected in item 9 and the emergency cord circuit jack by means of a cord circuit regularly used with these circuits.

12. Operate Key 1 of the auxiliary test unit to HOLD.

13. With the measuring set in the measuring condition perform the operations outlined in items 14, 15 and 16 below.

14. Rotate the plug of the cord circuit slowly in the test jack to detect cut-outs due to a defective or dirty plug.

15. Test the cord for cut-outs by holding the plug firmly in the jack and rotating the cord slowly with a cranking motion.

16. Test all keys associated with the cord circuit for cut-outs in the normal and operated position (except ringing and flashing keys in the operated position) by tapping the key tops lightly and moving the lever

slightly forward and backward while exerting a reasonable pressure to the left and right to take up any play or side lash.

17. Measure the transmission loss.

Note: This is the loss of the emergency cord circuit, and the switchboard cord circuit.

Telephone Circuits

18. Figure 33 shows schematically the connections for the test.

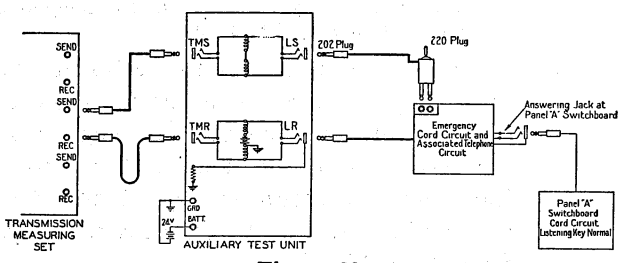


Figure 33

Preliminary Connections

19. Connect battery (24 volts) and ground respectively to the BATT and GRD terminals of the auxiliary test unit.

20. Connect the TMS and TMR jacks of the auxiliary test unit respectively to the sending and receiving jacks of the transmission measuring set.

21. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to HOLD	Key 4 to REV
Key 2 to HOLD	Key 7 to OPEN
Key 3 to MET	Key 8 to GRD

22. At the panel "A" switchboard insert the plug of a cord circuit regularly used with the emergency cord circuit into the answering jack of the latter circuit.

Note: The listening key of the Panel "A" switchboard cord circuit should be normal.

Testing Procedure

23. Insert the emergency cord in the LR jack of the auxiliary test unit.

24. Insert the 220 plug in the telephone set jacks associated with the sender monitor position with the key of the plug in the normal position.

Note: Where the suspended type transmitter is used remove it and in its place connect a 40 ohm resistance.

25. 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.

26. Measure the transmission loss with the key of the emergency cord circuit normal.

27. Operate the talking key of the emergency cord circuit.

28. Measure the transmission loss.

Note: The difference between items 26 and 28 is the loss of the telephone circuit in the bridged talking condition.

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

30. Insert the 202 plug associated with the 220 plug in the LS jack of the auxiliary test unit with the key of the plug in the T position.

Note: Where a suspended type transmitter is used and a 40 ohm resistance has been substituted for the transmitter remove the resistance and in its place connect the LS jack (tip and ring) of the auxiliary test unit.

31. Measure the transmission loss.

Note: The difference between items 26 and 31 is the loss of the operator's telephone circuit in the transmitting condition.

I. REPAIR CLERK'S DESKS

(a) Trunk Circuits

1. These circuits should be tested from the district distributing frame of the outgoing panel office by the loop method, the loops being established at the repair clerk's desk by the operation of the associated trunk keys.

2. Figure 34 shows schematically the connections for the test.

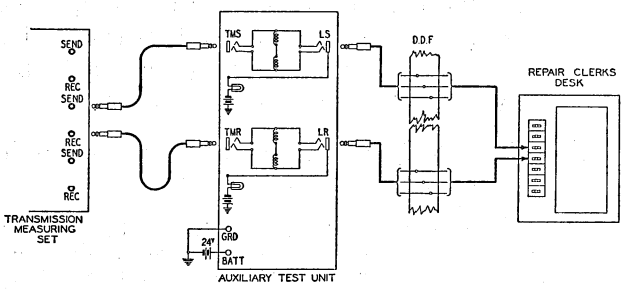


Figure 34

Preliminary Connections

3. Connect the TMS and TMR jacks of the auxiliary test unit respectively to the sending and receiving jacks of the transmission measuring set.

4. Connect battery (24 volts) and ground respectively to the BATT and GRD terminals of the auxiliary test unit.

5. Operate the following keys of the auxiliary test unit to the positions specified. Keys not mentioned do not affect the test.

Key 1 to OPEN	Key 5 to BATT
Key 2 to OPEN	Key 6 to BATT
Key 3 to MET	Key 7 to GRD
Key 4 to MET	Key 8 to GRD
	Key 12 to OPEN

6. Provide two cords (tip, ring and sleeve) each of which is equipped on one end with a 234 plug or its equivalent and on the other end with a plug of a type suited to the jacks of the auxiliary test unit.

Testing Procedure

7. At the repair clerk's desk select an idle trunk and operate the associated trunk key to the talking position.

8. At the horizontal side of the district distributing frame connect this trunk to the LS jack of the auxiliary test unit by means of one of the cords of item 6.

9. Operate Key 1 of the auxiliary test unit to TEST.

   Note: If the lamp associated with the LS jack does not light (indicating that the trunk circuit is still idle) operate key 5 of the auxiliary test unit to GRD and Key 1 to HOLD.

10. At the repair clerk's desk select another idle trunk and operate the associated trunk key to the talking position.

11. At the horizontal side of the district distributing frame, connect this trunk to the LR jack of the auxiliary test unit by means of the other cord of item 6.

12. Operate Key 2 of the auxiliary test unit to TEST.

    Note: If the lamp associated with the LR jack does not light (indicating that the trunk circuit is still idle) operate key 6 of the auxiliary test unit to GRD and key 2 to HOLD.

13. With the transmission measuring set in the measuring condition have an attendant test the trunk keys for cut-outs by tapping the key tops lightly and moving the levers slightly forward and backward while exerting a reasonable pressure to the left and right to take up any play or side lash.

14. Measure the transmission loss.

    Note: This is the loss of two trunk circuits and includes any apparatus of the telephone circuit that may be bridged.

15. Disconnect both trunks by restoring the trunk keys at the repair clerk's desk to normal and removing the 234 plugs from the terminals of the district distributing frame and by restoring keys 1 and 2 of the auxiliary test unit to OPEN and keys 5 and 6 to BATT.

16. Repeat the above testing procedure to determine the transmission loss of a trunk to be used as a standard and set it up as outlined in the above items 7 to 9, inclusive.

17. Proceed with the tests as outlined in the above items 10 to 14, inclusive, for the remaining trunks of the group disconnecting the tested trunk by restoring the trunk key at the repair clerk's desk to normal and by removing the 234 plug from the terminals at the district distributing frame and also restoring key 2 of the auxiliary test unit to OPEN and key 6 to BATT.

18. When all of the trunks in the group have been tested, the standard trunk should be released by restoring the trunk key at the repair clerk's desk to normal and by removing the 234 plug from the terminals at the district distributing frame.

(b) **Telephone Circuits**

1. These circuits should be tested at the repair clerk's desk and connections to the line side of the telephone circuit being made at the punchings in the desk.

2. Connect the receiving T and R terminals of the transmission measuring set to the line side punchings of the telephone circuit.

   Note: The punchings to be used for this connection should be those on which the leads from the ringing key terminate.

3. Insert the 220 plug in the telephone set jack with the key of the plug in the T position.

4. Insert the 202 plug associated with the 220 plug in the sending jack of the transmission measuring set.

5. Measure the transmission loss.

   Note: This is the loss of the telephone circuit in the transmitting condition.

6. Restore the key of the 220 plug to the normal position.

7. 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.

8. Measure the transmission loss.

   Note: This is the loss of the telephone circuit in the bridged talking condition.