

BELL SYSTEM PRACTICES
Outside Plant Construction
and Maintenance

SECTION G50.240.1
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CABLE TESTING—GENERAL

IDENTIFYING PAIRS IN WET CABLE

Contents	Page
1. General	1
2. Connections	2
3. Identifying Pairs	3
4. Testing with Auxiliary Set	5

1. GENERAL

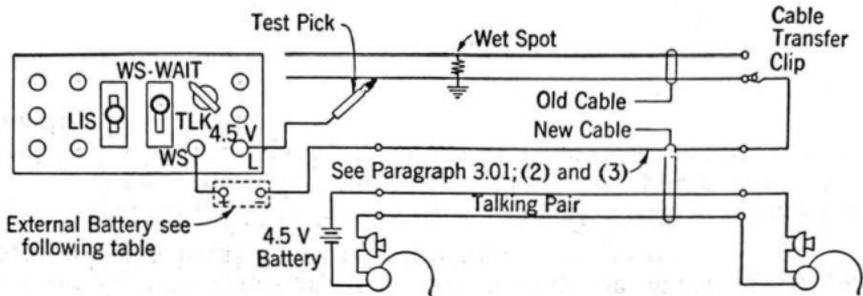
1.01 This section covers the methods of identifying pairs using a 76-type test set in making a section transfer of a wet cable when it is impracticable to identify the pairs using tone or to manually trace the pairs through the core.

1.02 This section has been rewritten. In addition to the information covered in Issue 1, it now includes a method of identifying pairs when the relay circuit will not operate properly, thus resulting in the transposition of pairs. In the new method, an auxiliary set employing a varistor is used. A description of the set and the method of using it is covered in Part 4. The auxiliary set can readily be made from parts obtained at a local radio repair shop.

1.03 **Caution: This is a direct current testing method and should only be employed when the pairs can not be identified with tone or by tracing, as interference will result on working lines.**

2. CONNECTIONS

2.01 The circuit arrangement for identifying pairs through a wet section of cable is shown below.



2.02 The circuit will operate through the following lengths of cable of various gauges where the wire used as the return conductor in the new cable is the same gauge as that being identified in the old cable. Somewhat greater range can be obtained if the return wire is of larger gauge. It is advisable to operate without external battery when practicable. When external battery is employed, connect the + POST to WS and the - POST to the cable, as shown by the dotted lines in the diagram.

TESTING RANGE OF CIRCUIT

<u>Gauge of Conductor</u>	<u>No External Battery</u>	<u>4-1/2-Volt External Battery</u>	<u>9-Volt External Battery</u>
13	2500 ft.	—	—
16	1200 ft.	—	—
19	600 ft.	3000 ft.	—
22	300 ft.	1500 ft.	—
24	200 ft.	1000 ft.	1700 ft.
26	100 ft.	600 ft.	1100 ft.

2.03 Before proceeding with the section transfer be sure that the batteries are in good condition. It is advisable to use fresh batteries, if practicable.

3. IDENTIFYING PAIRS

3.01 The procedure to be employed in making a section transfer in a wet cable is as follows:

- (1) Identify a pair in the new cable with direct current as outlined in Section G50.213.2, and set up a talking pair using a separate 4-1/2-volt battery as illustrated above.
- (2) Identify a wire in the new cable for use as the return part of the loop in the above circuit. If it is necessary to obtain more testing range than this will provide, use several wires in parallel for the return part of the loop.
- (3) Connect the wire selected to the WS post as illustrated above and connect the test pick to the L post.
- (4) With the keys in the LIS and WS-WAIT positions, connect the cable transfer clip and test pick to a known wire in the new cable of the same gauge as those to be identified in the old cable. If there are no wires in the new cable of the same gauge as those to be identified, smaller gauge wires may be paralleled in accordance with TABLE A to give the equivalent resistance of the larger

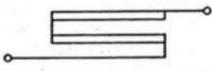
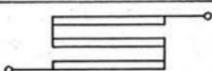
TABLE A

<u>Large Gauge Wire</u>	<u>Equivalent to Smaller Wires in Parallel</u>
13 ga.	Two 16 ga.
13 ga.	Four 19 ga.
16 ga.	Two 19 ga.
16 ga.	Four 22 ga.
19 ga.	Two 22 ga.
19 ga.	Three 24 ga.
22 ga.	Two 24 ga. approx.*
22 ga.	Three 26 ga. approx.*
24 ga.	Two 26 ga. approx.*

*In adjusting the rheostat when one of these combinations is involved, turn the dial one scale division beyond the position where the buzzer operates instead of one-half division.

gauge wire in the old cable. If only larger gauge wires are available in the new cable, the equivalent resistance of the wire in the old cable should be obtained by connecting the larger gauge wires in series—parallel as indicated in Table B. Turn the rheostat clockwise to its extreme position

TABLE B

Small Gauge Wire	Large Gauge Equivalent
22 Ga.	19 Ga. 
24 Ga.	22 Ga. 
26 Ga.	24 Ga. 

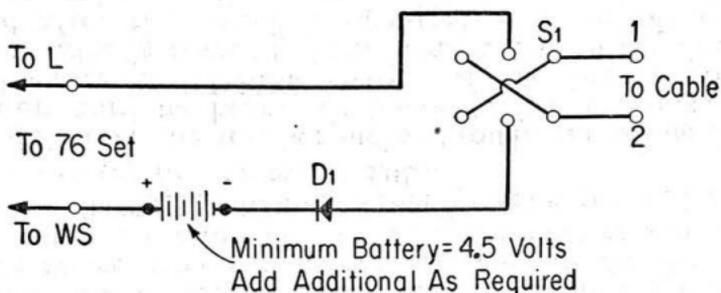
or until the buzzer ceases to operate. Turn the rheostat back carefully until the buzzer just operates. Then turn one-half scale division beyond this point. With this setting the buzzer will operate only when the test leads are connected to both ends of a conductor of the same resistance in the faulty cable.

(5) To identify pairs in the faulty cable, the splicer at the end away from the test set connects the transfer clip to one wire of a pair (preferably on the ground side first and in the outer layer to facilitate identification) and advises the other splicer what color group it is in and on which side of the pair.

(6) The splicer at the test set picks through the group in question until he hears the buzzer. Then the two men verify both sides of the pair and board it or splice it to a pair previously identified in the new cable.

4. TESTING WITH AUXILIARY SET

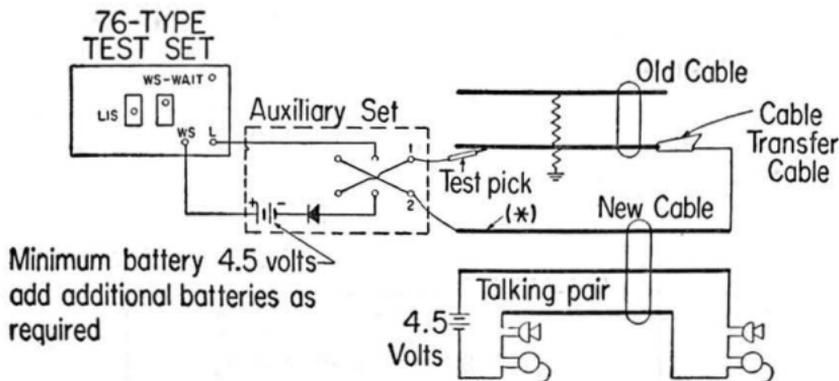
4.01 The auxiliary set, which consists of dry batteries, a double-pole, double-throw switch and a varistor is illustrated in the following sketch. The set can readily be made from parts obtained at a radio repair shop.



Parts

S1	DPDT Toggle Switch 81027-F Arrow-Hart & Hegeman Or Equivalent
D1	Federal Selenium Rectifier Type 1004 A Rated 100 milliams Peak Inverse Volts 380 Or Equivalent

4.02 The circuit connections of the 76-type and auxiliary test set are shown in the following diagram.



* See Paragraph 3.01 (2)

4.03 At least one 4.5-volt external battery is required. Add additional as required.

4.04 The procedure to be employed in making a section transfer is the same as described in Paragraph 3.01 of this section with a few exceptions.

- (1) Proceed as in (1) and (2) of Paragraph 3.01.
- (2) Connect the auxiliary test to the 76-type test set as shown above. Connect the wire selected to the No. 2 Post and connect the test pick to the No. 1 Post as shown.
- (3) With the DPDT switch in either position proceed as in (4) and (5) of Paragraph 3.01.
- (4) The splicer at the test set picks through the group in question until he hears the buzzer. After the buzzer sounds, operate the DPDT switch. If the buzzer still sounds, the wire is correctly identified. If the buzzer does not sound after the switch is operated, continue picking through the wires until a wire is found with which the buzzer operates in both positions of the DPDT switch. Then the two men verify both sides of the pair and board it or splice it to a pair previously identified.