

CABLE TESTING—GENERAL

IDENTIFYING CONDUCTORS

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1. GENERAL

1.01 This section describes the methods of identifying conductors in long loaded cables and identifying dead conductors in short lengths of cable.

1.02 This section is being reissued to include the information formerly provided in Section 634-200-512. Since this is a general revision, arrows normally used to indicate changes have been omitted.

2. IDENTIFYING CONDUCTORS IN LONG CABLES

2.01 In long cables, particularly if they are loaded, it is not always possible to identify the individual conductors of a pair or quad by tone methods because the tone may be heard with equal volume on each of the conductors. If individual conductors must be identified, it can be done using

the tone method to find the pair or quad and then identifying the individual conductors by one of the direct current methods described in this section.

CAUTION: *Since direct current tests may cause interference on working circuits, these methods should not be used on working pairs or quads unless permission is obtained to momentarily open them, or unless arrangements are made to turn down or reroute the circuits involved.*

Relay Test With 76-Type Test Set

2.02 The 76-type test set is equipped with a relay operated buzzer that can be used to identify the individual wires. This circuit will operate over a length of approximately 20 miles of 19-gauge, 10 miles of 22-gauge, 6 miles of 24-gauge, and 3 miles of 26-gauge cable.

2.03 To use the relay circuit for identifying individual wires, the talking circuit must be set up as shown in Fig. 1.

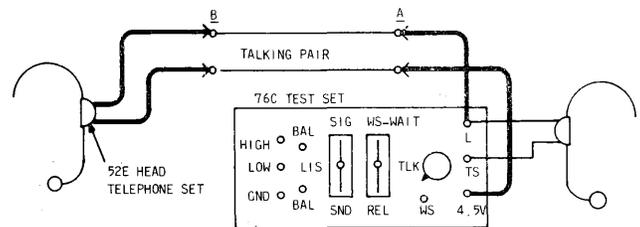


Fig. 1—Establishing Talk Circuit

Grounded Tone and 52E Headset

2.04 The relay test can be combined with the grounded tone method of identifying pairs in exchange distribution and trunk plant. The connections are made as shown in Fig. 2.

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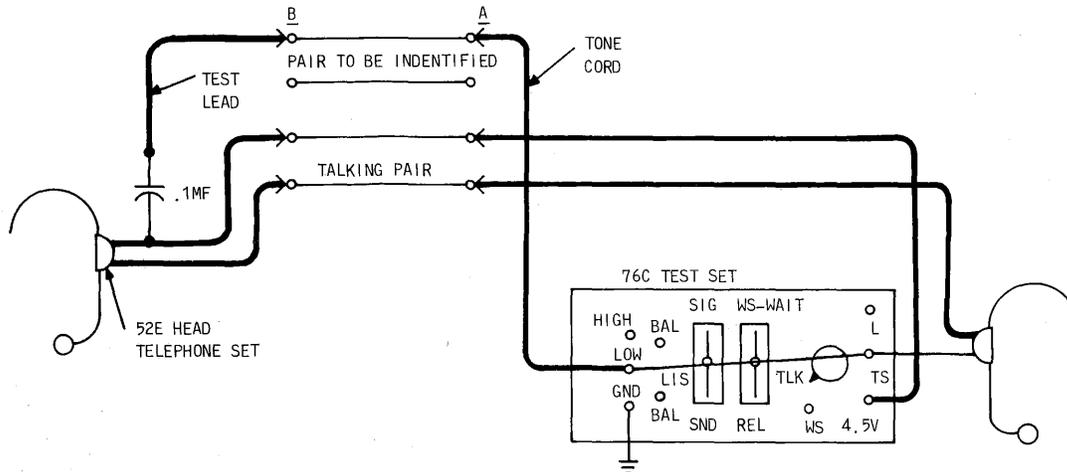


Fig. 2—Grounded Tone Method of Identifying Pairs

2.05 The identifying procedure is as follows:

- (1) At A, with the keys in the LIS and TLK positions, connect the sending cord to one side of a pair and listen for one that is not busy; then operate the key from LIS to SIG and then to SND position.
- (2) At B, using the test lead from the 0.1 μ F condenser, probe the pairs until the one with tone is found (Fig. 3).
- (3) After the pair has been located, move the key at A from SND to LIS. At B, attach

test lead from the talk pair to ring side of unidentified pair, and hold the test lead to the ring side of the pair (as shown above); at A, make the relay test.

- (4) At A, operate the key from TLK to WAIT and test each conductor of the pair with the tone sending cord.

This procedure on one of the conductors should cause the relay circuit to close and operate the buzzer. At A, restore the key to TLK which signals B to shift the test lead to the tip side of the pair and to repeat the relay test.

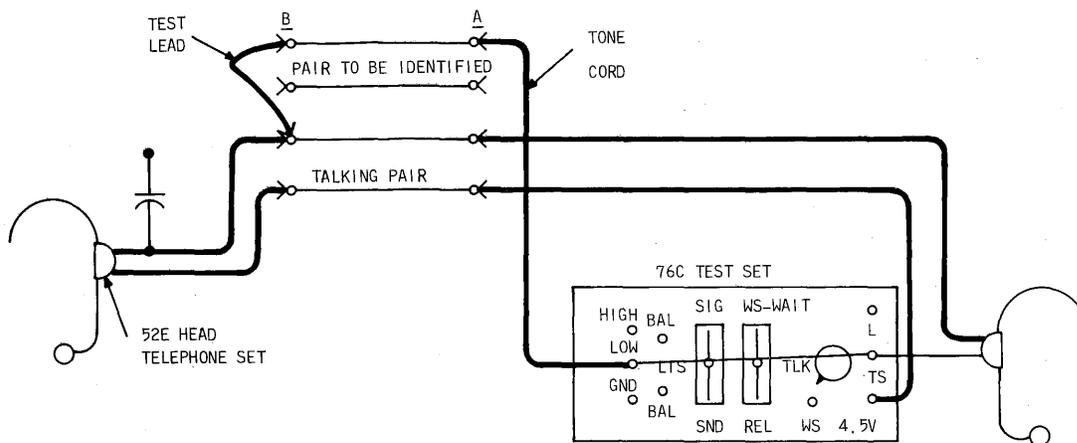


Fig. 3—Probing the Pairs Until One With Tone Is Found

2.06 The presence of terminating equipment on the pair that is being identified may lead to false tests. A connection of less than 2500 ohms resistance between individual conductors may cause the relay and buzzer to respond to both conductors. Therefore, it is always necessary to check all conductors of a quad or pair when making a relay test. If the relay operates on more than one conductor of a pair or quad without changing the position of the test lead at the identifying end, the presence of terminating equipment should be checked. If the identification is being done at a main frame and if permission is obtained to momentarily open the circuits, the relay test can be made rapidly after removing the heat coils from the pair.

Grounded Tone and 147-Type Amplifier

2.07 A 147-type amplifier may be combined with the talk circuit as shown in Fig. 4. However, if this arrangement is inconvenient, the amplifier may be used with a separate receiver.

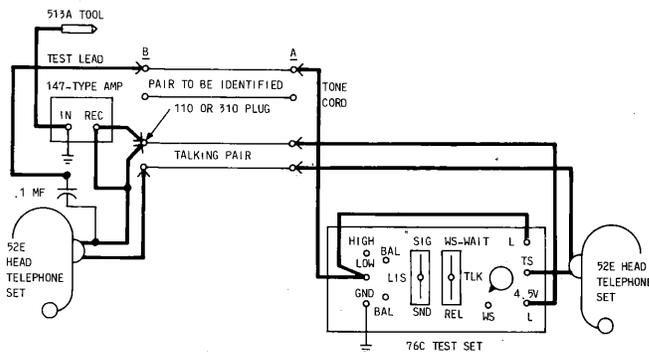


Fig. 4—Grounded Tone and 147-Type Amplifier

The procedure is essentially the same as that outlined in paragraph 2.05.

2.08 If the identification is being done in a dead cable, the 0.1 μF condenser may be omitted (see Part 3).

Nongrounded Tone and 147-Type Amplifier

2.09 The relay test for identifying individual wires can be combined with the nongrounded HIGH tone and a 147-type amplifier to identify quads or pairs in a toll cable. The circuit arrangement shown in Fig. 5 illustrates standard headsets used for the talk circuit in long cables.

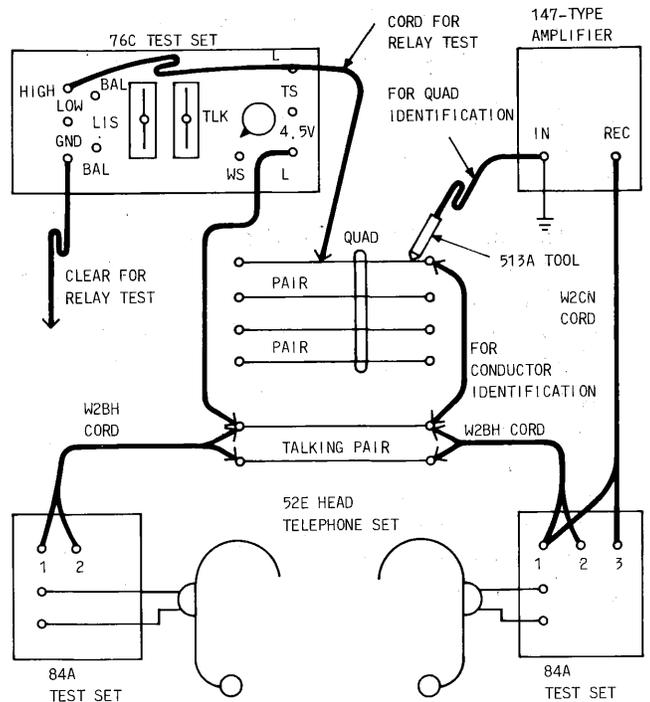


Fig. 5—Nongrounded Tone and 147-Type Amplifier

Voltmeter Method

2.10 A dc current ohmmeter such as provided with the KS-8455 (or 145A) test sets, may be used to identify the individual conductors in a long cable. Figure 6 shows a typical connection using a KS-8455 test set and a 76C test set.

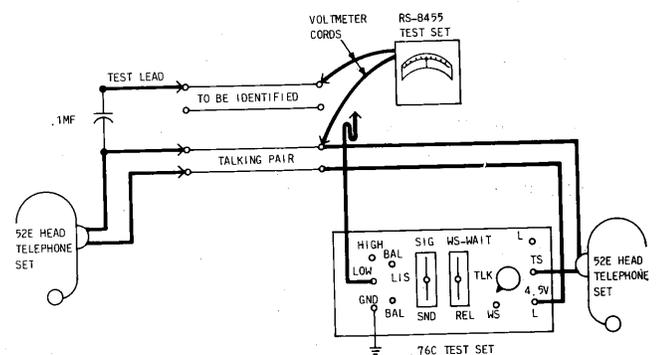


Fig. 6—Identifying Individual Conductors Using Voltmeter Method

2.11 The general procedure when using the above circuit arrangement follows:

- (1) Identify the pair or quad by the tone method.
- (2) Disconnect the tone-sending cord and identify the individual conductors with the KS-8455 test set using a transfer cord to short-circuit the condenser of the 52E headset. When using the KS-8455 set, the OFF-ON key should be in the ON position. Test each conductor in the pair or quad to make sure that a reading on the voltmeter can be obtained on only one conductor at a time. If a reading is obtained on more than one conductor, it generally indicates the presence of terminating equipment that must be disconnected before the test can be made.

2.12 If one of the above mentioned sets is not available, any high resistance ohmmeter (1000 ohms per volt) may be substituted.

3. IDENTIFYING CONDUCTORS IN SHORT DEAD CABLE

3.01 The methods described can be used to advantage in such operations as the following:

- (a) Identifying pairs at the end of a terminal stub cable from the binding posts in the terminal
- (b) Identifying pairs at the end of the terminating stub cable from the terminations on the central office main frame
- (c) Identifying the IN and OUT conductors in the stub of a loading coil case
- (d) Identifying pairs through a short length of cable that is used to replace a length of damaged cable.

Using 76-Type Test Set

3.02 Two typical uses of this method are illustrated in Fig. 7.

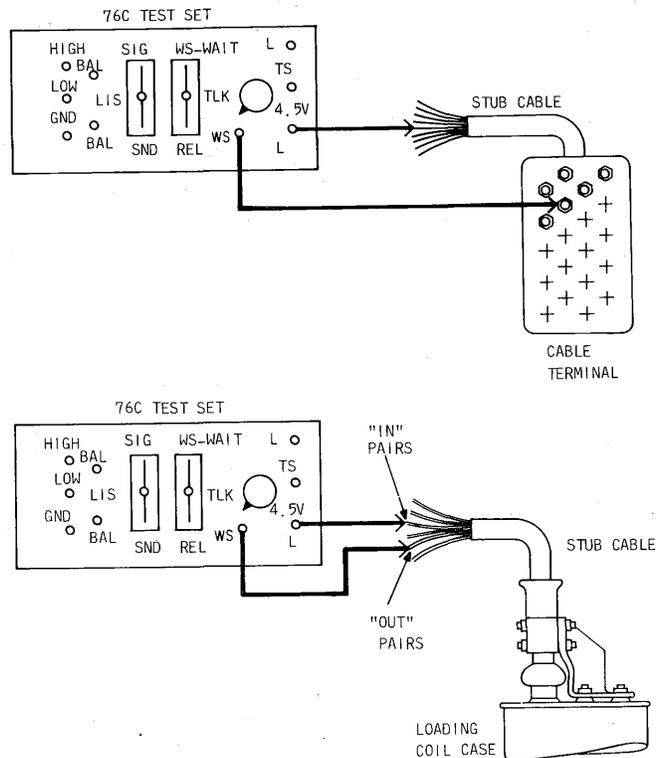


Fig. 7—Identifying Conductors in Short Dead Cable Using 76-Type Test Set

Connect the test cords to the WS and the lower L binding posts. Set the buzzer rheostat at the zero position and throw the keys to LIS and WS-WAIT. If the battery is in good condition, any metallic connection with less than 40 ohms resistance from the WS post to the lower L post should operate the buzzer. The operation of the circuit can be checked by connecting the ends of the test cords together. The buzzer should operate in this test.

3.03 The typical method of operation is to connect one of the test cords to a wire in the cable and use the other test cord to identify the other end of the wire as shown above. At the main frame or a terminal, the simplest method of identification is to probe slowly over the springs or binding posts with a test point.