BELL SYSTEM PRACTICES
Outside Plant Construction and Maintenance

SECTION G86.060.9
Issue 1, January, 1949
AT&T Co Standard

76-TYPE TEST SETS
DESCRIPTION AND MAINTENANCE

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1. GENERAL

1.01 This section describes the 76-Type Test Set used in exchange and toll cables for conductor identification, exploring coil tests, and Wheatstone bridge measurements.

1.02 The 76-Type set has a tone output of such character and magnitude that it may be used in exchange cables, voice frequency toll cables, and J or K carrier cables.

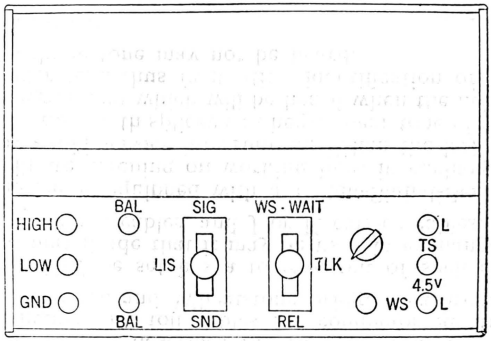
1.03 The set is equipped with a Listen-Signal-Send key to facilitate listening on working lines in exchange cables and thereby avoid service interruption. When the key is in the signaling position, both splicer and helper hear tone of about the same intensity as that which will be heard when the helper finds the pair under test, thus facilitating identification of wires on which full volume tone may not be heard.

2. DESCRIPTION

2.01 **The 76-Type Test Set** is a vacuum tube oscillator producing a tone having a frequency of about 500 cycles with a 7-cycle warble. The resulting tone is easily recognized over noise in cables and is not tiring to listen to in making large

cable transfers. The set is housed in a metal box with a removable hinged cover.

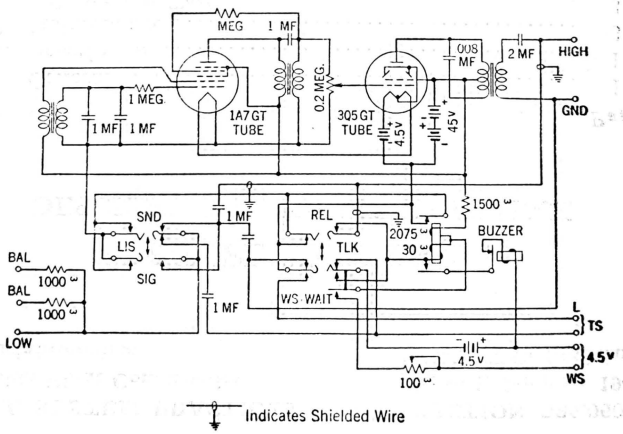
2.02 The position and markings of the keys and binding posts in the set are illustrated below.



Abbreviations:

GND—Ground	SND —Send	REL—Relay
BAL—Balance	WS —Wet Section	L —Line
SIG —Signal	WAIT—Wait	TS —Talking Set
LIS —Listen	TLK —Talk	

2.03 **Circuit Diagram:** The following is a schematic circuit diagram of the 76-Type test set.



2.04 **Vacuum Tubes:** The set is equipped with two commercial radio tubes, as indicated in the sketch. This provision has been made to simplify field replacement of tubes.

2.05 **Batteries:** The set is operated by two 4-1/2 volt, KS-6570 batteries and two 22-1/2 volt, KS-6571 batteries.

2.06 **Tone Output:** The set has both LOW and HIGH tone outputs. The LOW tone is used for identifying exchange cable pairs, in which operation the tone is applied from one conductor to ground. The HIGH tone is used in identifying conductors in toll or exchange cable when tone is applied between two wires of a pair or quad.

2.07 The HIGH tone is also used in exchange cables for running down faults by means of exploring coil tests. The current output of the set is much lower than that of the 20-C Test Set which has been used in exploring coil tests heretofore and consequently a 4-B, a 107-A Amplifier or a 91A Test Set is required with the 19-C, 75-A or 75-B Test Sets (exploring coils) to permit hearing the tone. LOW tone from the 76-Type Test Set should be used whenever practicable in fault locating work in order to avoid interference with working lines.

3. MAINTENANCE

3.01 The 76-Type Test Set is of sturdy construction and should require relatively little maintenance aside from battery and vacuum tube replacements and an occasional check to ensure that the control relay is operating satisfactorily.

3.02 **Operating Tests:** Since the 500 cycle tone delivered by the 76-Type Test Set is produced by a vacuum tube oscillator there is no sound audible when the set is in operation. However, the operation of the tone generator can be checked by connecting a talking set to the binding posts marked LOW and GND, the keys being set at LIS and TLK. Then turn the tone on and off by moving the tone key slowly from LIS to SND several times. Warble tone should be heard each time the key is at SND.

3.03 If the operation of the tone seems to be erratic, it indicates that the batteries are low or that one of the vacuum tubes is defective. If no tone is heard, either the batteries are low or connected incorrectly, or one of the tubes has failed.

3.04 If steady tone is heard instead of a warble tone, it is likely that the connections to the filament battery B1 (KS-6570) are reversed. This should be checked and corrected, if necessary.

3.05 **Batteries:** The set makes use of two 4-1/2 volt, KS-6570 batteries, and two 22-1/2 volt, KS-6571 batteries. For ordinary identification operations, the batteries should be discarded when their voltages (measured while the set is in operation) are found to be below the following values: KS-6570 battery, 3.5 volts; KS-6571 battery, 19 volts. However, when the set is used in running down faults with the exploring coil, the battery voltages should not be allowed to fall below 4 volts and 20 volts, respectively. The life of the batteries with intermittent use of the set as a source of tone is about 100 hours of operation, but when the relay or buzzer is being used, the life of the batteries is somewhat shorter.

3.06 If the batteries must be replaced on short notice and the above type standard batteries are not available, commercial batteries of corresponding voltage may be employed. Where obtainable, the Eveready No. 714, 4-1/2 volts and Eveready No. 763, 22-1/2 volts should be used as they will fit into the battery compartment.

3.07 **Vacuum Tubes:** If a vacuum tube is defective, it should be replaced using a tube having the same designation. These are commercially available and when replacements must be made on short notice in the field, they can be obtained from a local radio store. Normal replacements should be made in accordance with local routine.

3.08 Difficulty has been experienced in obtaining sufficient 1A7-GT and 3Q5-GT vacuum tubes for use in the 76-type test sets. As miniature type tubes are more readily available, the 76B Test Set was redesigned to provide sockets in which the miniature tubes can be used. The modified set has been coded the 76C Test Set.

3.09 The 76C set is electrically the same as the 76A and 76B sets and also mechanically, except for the sockets and the tubes. (The 76B set is similar to the 76A set except for the type of key employed.) The 76C set employs a 1R5 tube in place of the 1A7-GT tube, and a 3V4 tube in place of the 3Q5-GT tube.

3.10 Orders for tubes for replacement purposes in 76C sets should specify the 1R5 or 3V4 tube, depending on the type tube required.

3.11 Some 76B sets have been supplied equipped with a 1R5 tube and BA-259863 adapter in place of the 1A7-GT tube. When it becomes necessary to replace a 1R5 tube in one of these 76B sets, the 1A7-GT tube should be ordered. In this event the adapter will no longer be required.

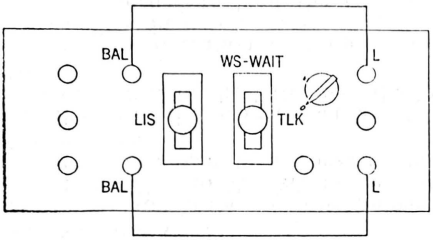
3.12 The Western Electric Company maintain a stock of 1A7-GT and 3Q5-GT tubes to take care of the replacement needs for tubes in 76A and 76B sets. These tubes, therefore, should be ordered for replacement purposes in the 76A and 76B sets.

3.13 **Relay Test:** The 76-Type set employs a U-6106 relay. The proper functioning of this relay can be ascertained as follows:

(1) Check the batteries and, if necessary, replace those that have subnormal potential.

(2) Set the keys at LIS and TLK.

(3) Connect a wire from each BAL post to one of the L posts as illustrated below. This will simulate connecting the set to a 2000 ohm line.



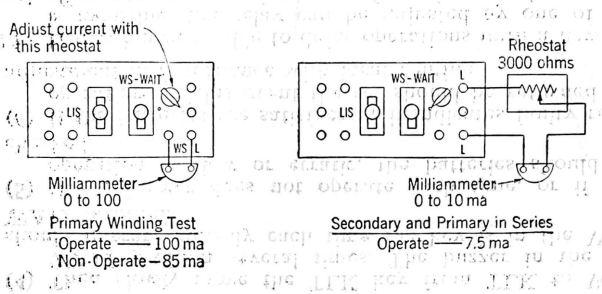
(4) Then slowly move the TLK key from TLK to WS-WAIT position several times. The buzzer in the set should operate steadily each time the key is in the WS-WAIT position.

(5) If the buzzer does not operate each time, or if the operation is slow or erratic, the batteries should be checked.

(6) If the batteries are satisfactory it indicates faulty relay operation. In this event the set should be returned for adjustment in accordance with local routine.

3.14 If it is impracticable to defer operations until a new set is available, the relay can be adjusted by one of the central office equipment maintenance force in accordance with

Section A461.011. The relay should be adjusted to operate at the current values indicated below, using the test circuits shown.



(1) In testing the operation with the primary winding of the relay, connect a 0-100 milliammeter where shown and set keys at LIS and WS-WAIT.

(2) Adjust the rheostat in the set to 100 milliamperes; move the key from TLK to WS-WAIT several times. The relay should close and operate the buzzer when the key is in the WS position.

(3) Repeat the test with current set at 85 milliamperes through the relay. In the latter test the buzzer should not operate.

(4) Then check the operation with the primary and secondary windings in series. An external rheostat of 2500 to 3000 ohms is needed to limit the current flow, and a milliammeter capable of reading 0 to 10 mils.

(5) Set the current at 7-1/2 mils and operate the keys as in the previous test. The buzzer should operate on each movement of the key to the WS-WAIT position.

3.15 **Cleaning and Oiling Strap:** The leather strap on the set requires cleaning and oiling about every 6 months to keep it in good condition.