QSE4A AND QSE4B TYPE HANDSETS

(DIAL HAND TEST SET)

DESCRIPTION, OPERATION AND MAINTENANCE

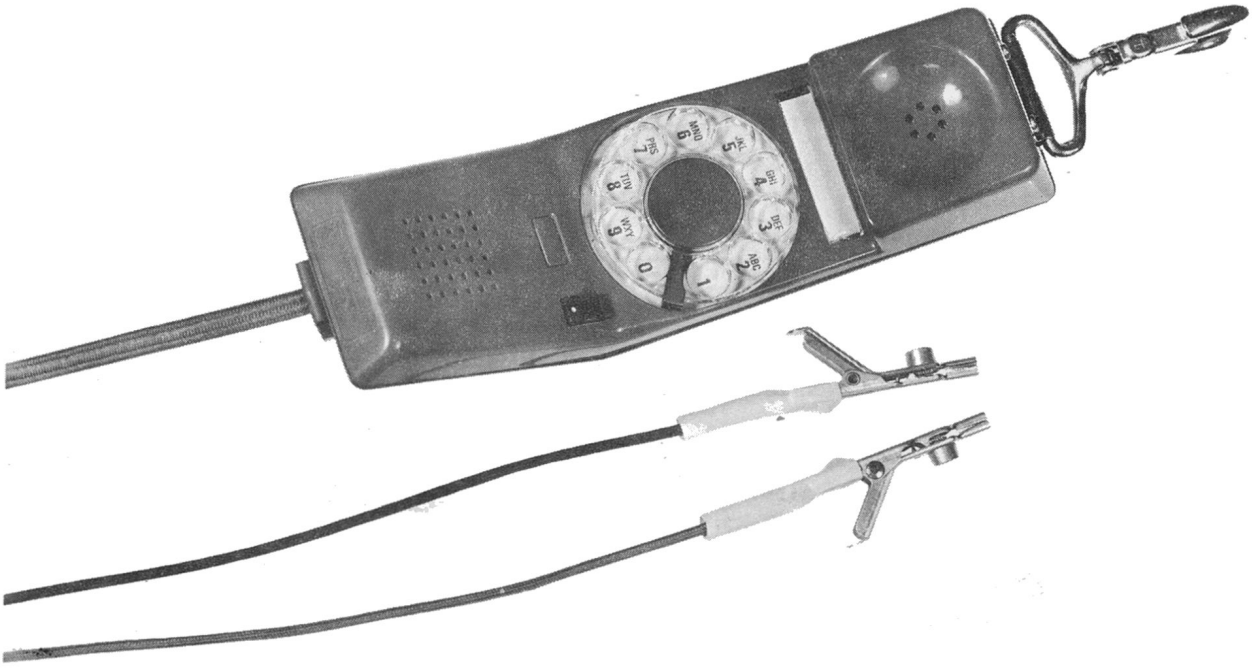

Fig. 1 — QSE4A1 Handset

1. GENERAL

1.01 This procedure covers the description, operation and maintenance of the QSE4A- and QSE4B-types of handset (dial hand test set).

1.02 The primary application of these handsets is to originate test calls on dial system apparatus to test switching, continuity, and talking features of the circuit. In the maintenance of equipment they may also be used to locate trouble in the various portions of the circuit. The types of equipment with which these handsets are used are shown in Table A.

1.03 These handsets are intended for both indoor and outdoor use, and are available in the standard green (-51) colour.

1.04 Each type of handset is provided with a "Monitor-Talk" switch to provide a means of monitoring the line under test to determine if it is in use.

1.05 The QSE4A and QSE4B type handsets are equipped with a pushbutton switch which, when depressed, will facilitate dialing over very long loops.

TABLE "A"

Handset Code	Identification Dial Center Insert	Features	Primary Application	Cord Code	Cord Termination	See Note
QSE4A1	Red	Medium Impedance Monitor	Outside Plant	NE-W2QK	Test Clips NSQ4100-L1	
QSE4B1	Yellow	High Impedance Data – Manual Return-to-Monitor				
QSE4A2	Red	Medium Impedance Monitor	General Use	NE-H2QB	NE-346A Plug	1
QSE4B2	Yellow	High Impdenace Data – Manual Return-to-Monitor				

NOTE 1: QSE4A2 and QSE4B2 handsets provide an arrangement whereby a basic coded handset can be adapted, by means of plug-in cords, to all Central Office tests requiring the use of a handset.

1.06 If these handsets are accidentally connected directly across 48 volts with the "Monitor-Talk" switch in the talk position, the circuit design is such that minimum damage results.

NOTE: When this condition occurs, the QHP99A inductor located on PC2 (P0500416 or P0500417) is subjected to excessive power dissipation for approximately 10 seconds, at which time the thermistor limits the current to a safe level.

1.07 Conversion Parts: Parts are available to modify QSE4A type handsets in service to QSE4B types, in order to provide the additional features shown in Table B. For installation of these conversion kits, refer to 4.10.

TABLE B

CONVERT FROM	CONVERT TO	PART NUMBER
QSE4A- Medium Impedance Monitor (Non-Data)	QSE4B- High Impedance Monitor Manual (Data-Manual)	P0500416

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1.08 Identification and assembly of parts is shown in Fig. 9 and Table C.

2. DESCRIPTION

2.01 The QSE4A1 and QSE4B1 type Handsets consist of a plastic handset equipped with an NE-10QA type Dial in the center of the housing, an NE-T1 Transmitter Unit, an NE-U1 Receiver Unit, and a cord provided with test clips (see Fig. 1).

2.02 The QSE4A1 and QSE4B1 handsets differ in their operational features and circuitry, as shown in Table A and Fig. 3 and 4.

2.03 The QSE4A2 and QSE4B2 Handsets are the same as the QSE4A1 and QSE4B1 types respectively, except that they use a cord equipped with an NE-346A plug. This plug-ended cord provides an arrangement whereby a basic coded handset can be adapted, by means of plug-in cords, to all Central Office tests requiring the use of a handset (Fig. 2).

2.04 The QSE4A type Handsets are for use where data transmission facilities are not provided, and it is only necessary to bridge the line under test with a medium impedance of 1000 ohms in the "Monitor" position, as indicated on the rocker switch when the red face is hidden. In the "Talk" position the red face on the switch is visible and the dc resistance is approximately 130 ohms. The use of the pushbutton is described in 3.01 (4).

2.05 The QSE4B Handsets are designed for use in areas where local plant involves data circuits, and it is essential to monitor lines before test with a high impedance bridging the line. This high impedance is approximately 100,000 ohms in the "Monitor" position and will not disrupt data transmission which may be underway. The change from "Monitor" to "Talk" is accomplished by a rocker switch, after ensuring that the line is not in use. This switch must be in the "Monitor" position before using the handset to test the line. The use of the pushbutton switch is described in 3.02 (4).

Fig. 2 – QSE4B2 Handset

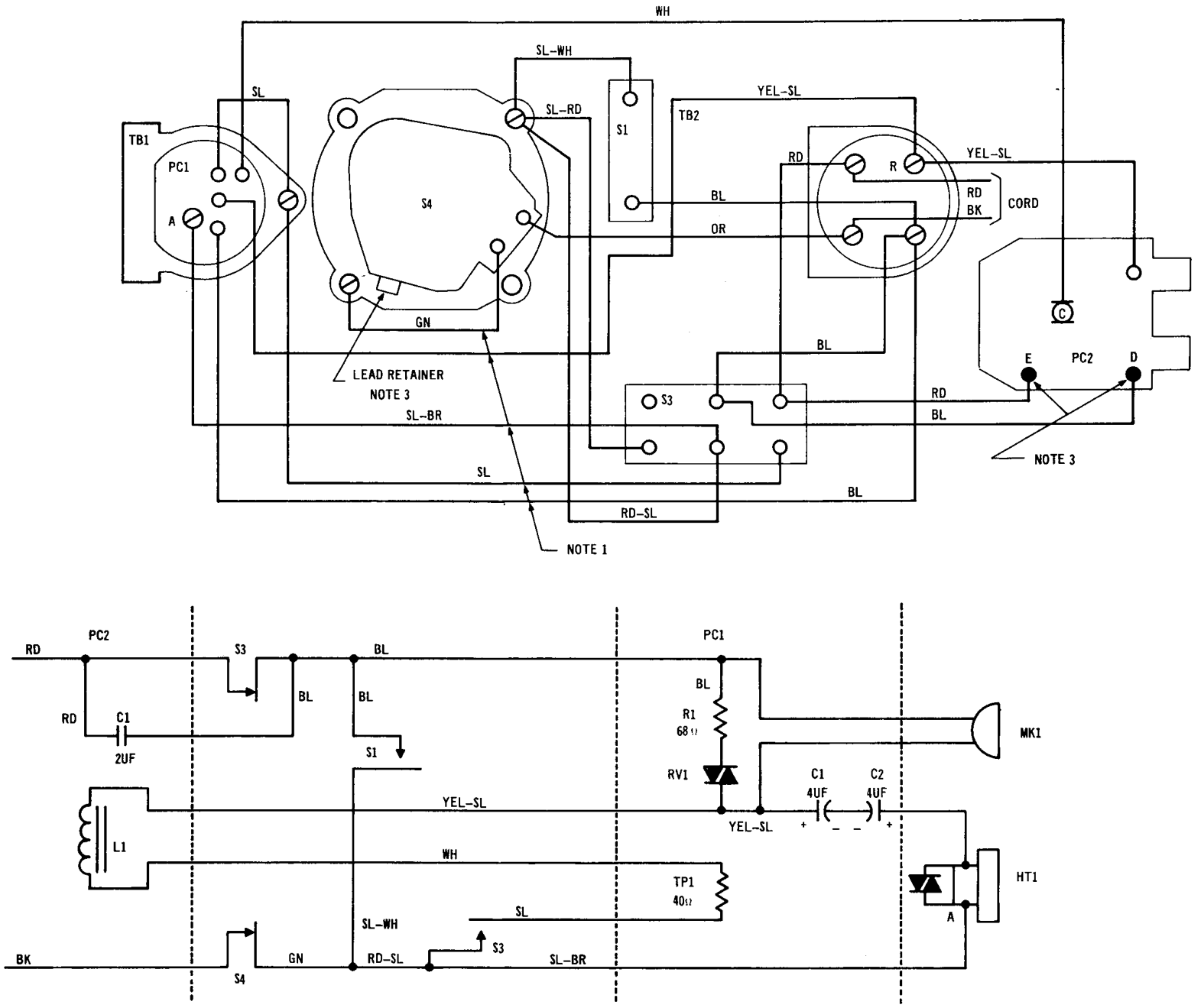

Fig. 3 QSE4A Handset Schematic and Wiring

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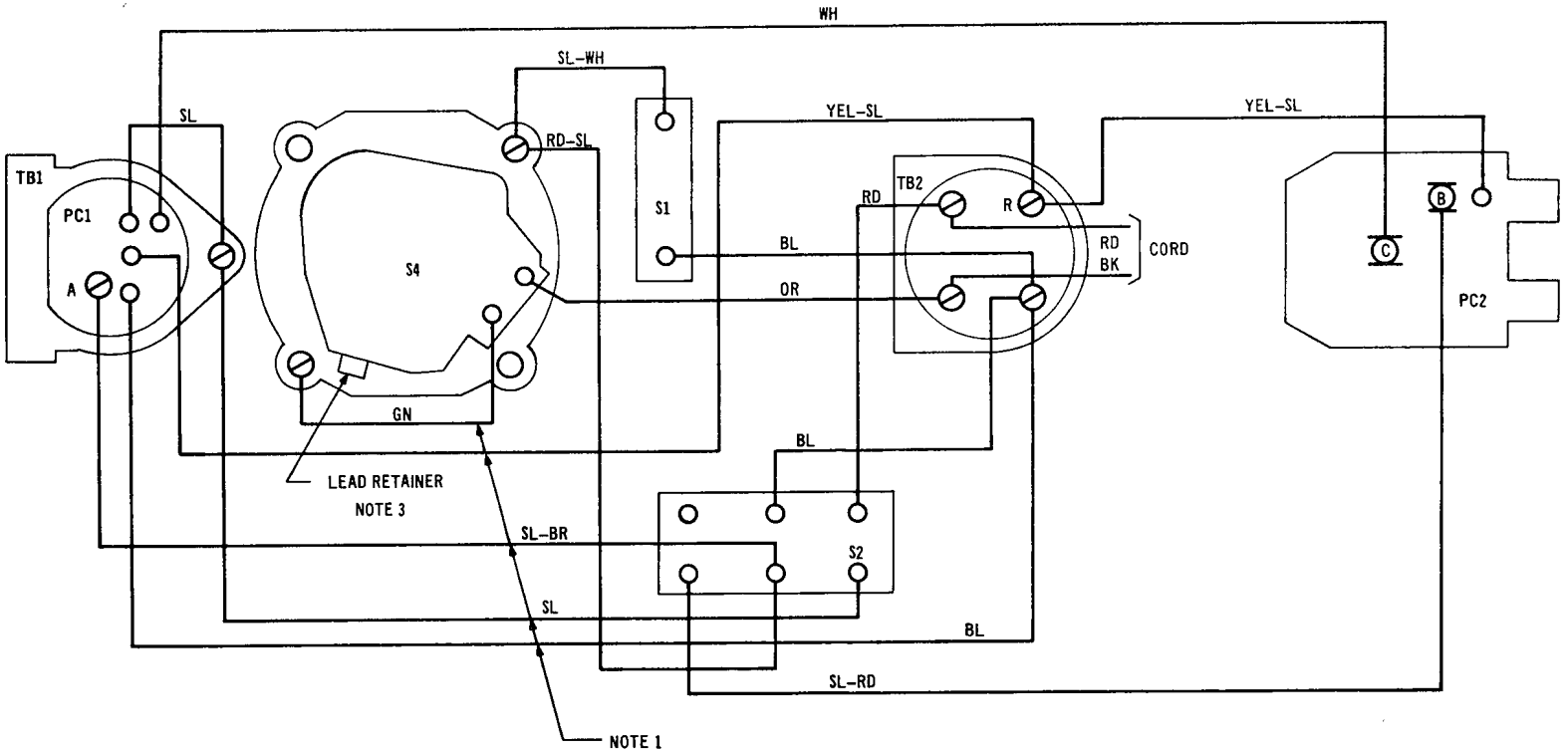

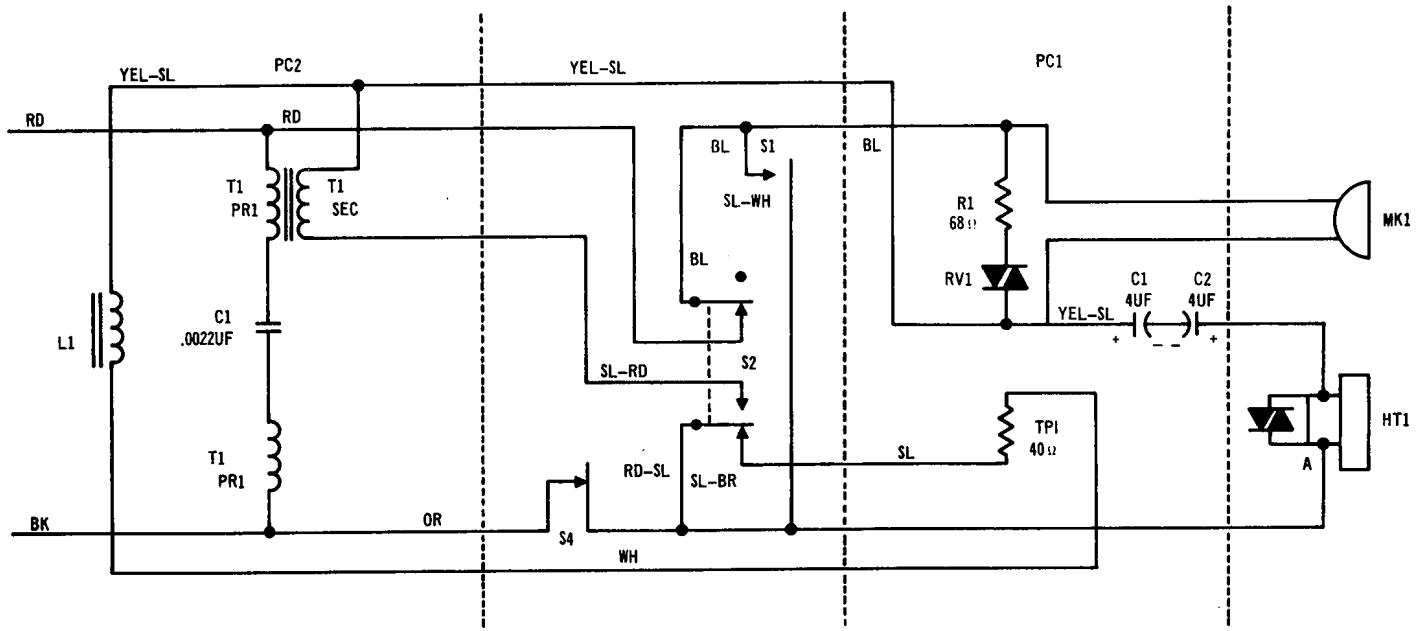

Fig. 4 QSE4B Handset Schematic and Wiring

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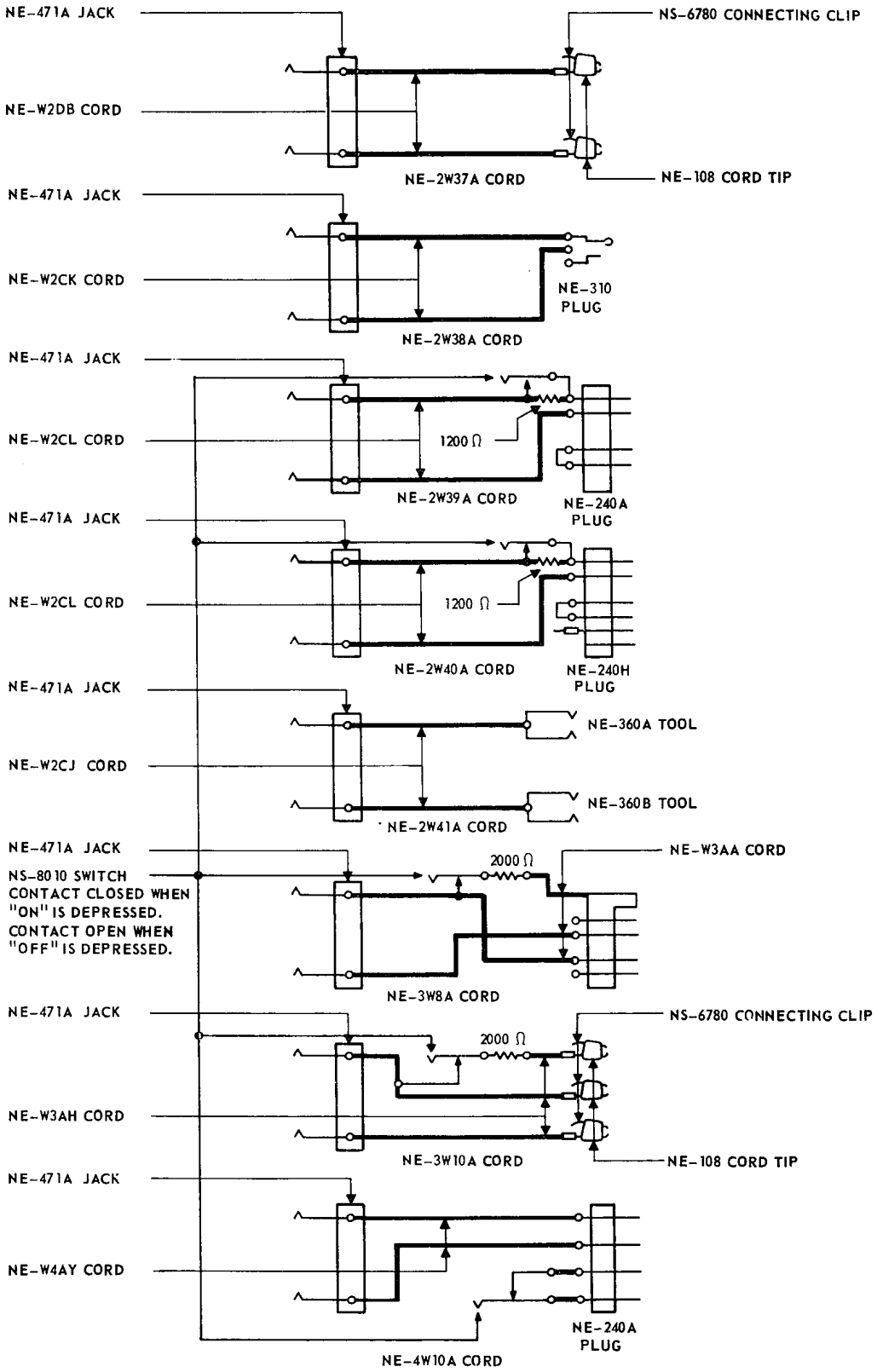

*TOOLS SUCH AS THE NE-411A TOOL MAY BE USED WITH THE NE-2W41A CORD BY INSERTING THEM IN THE NE-360-TYPE TOOLS

Fig. 5 – Schematics of Accessory Cords for QSE4A2 and QSE4B2 Handsets

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2.06 Equipment features of the different types of handsets are shown in Table A.

2.07 Schematic and wiring diagrams of the handsets are shown in Figs. 3 and 4.

2.08 Fig. 5 shows the schematic diagrams of the accessory cords available for use with the QSE4A2 and QSE4B2 Handsets.

2.09 All handsets are equipped with a snap hook to allow the handset to be carried on a tool belt. The hook is positioned in such a manner as to allow the handset to hang and follow the contour of the body, thus affording protection to the face of the handset as shown in Fig. 6.

2.10 When the handset is not in use, the cord should be wrapped as shown in Fig. 7.

3. OPERATIONAL PROCEDURE

3.01 QSE4A Type Handsets:

(1) Make certain that the test clips make electrical contact with only one circuit at a time.

(2) To bridge the line under test, the rocker switch should be in the "Monitor" position, which is indicated by the red face of the switch being hidden. In this mode, the handset has an impedance of approximately 1000 ohms.

(3) Dialing can be accomplished in the normal manner, however, since the handset resistance is slightly higher than the resistance of an NE-500 type Telephone Set, difficulty could be encountered when dialing over a very long line.

(4) If dialing difficulty is experienced, it can be overcome by keeping the pushbutton depressed while dialing. This procedure allows the handset to operate on any line which permits operation of an NE-500 type Telephone Set.

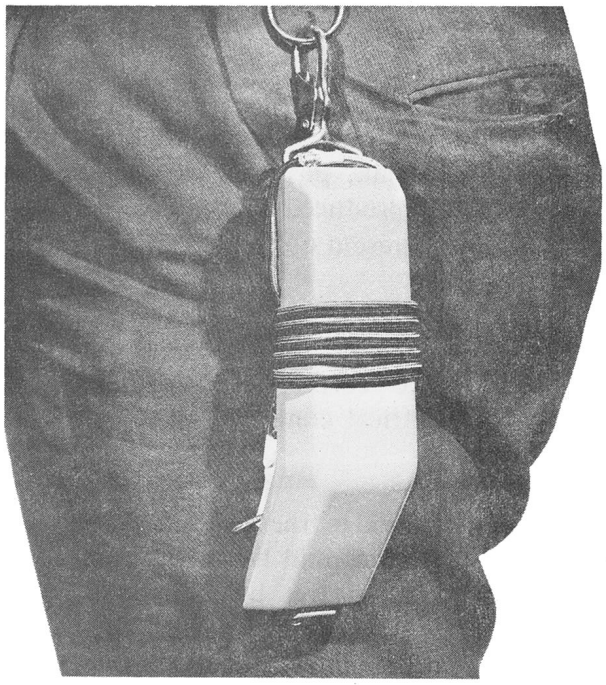

Fig. 6 – Wearing of Handset on Tool Belts

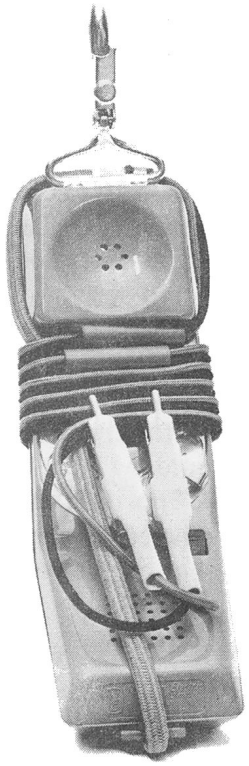

Fig. 7 – Method of Wrapping Cord When Handset is Not in Use

(5) If talking is necessary, the rocker switch must be placed in the "Talk" position, which is indicated by the red face of the switch being visible, to establish the talking circuit.

(6) Checking for the presence of 48 volts on the line should be done with the rocker switch in the "Talk" position (red face showing). Clicks will be produced in the receiver each time 48 volts is present on the test clips.

3.02 QSE4B Type Handsets:

(1) Make certain that the test clips make electrical contact with only one circuit at a time.

(2) To bridge the line under test, the rocker switch should be in the "Monitor" position, which is indicated by the red face of the switch being hidden. In this mode, the handset presents a very high impedance to the line, which ensures minimum loading of the line under test and thus can be used on circuits where data is present.

(3) If talking is necessary, the rocker switch must be placed in the "talk" position, which is indicated by the red face of the switch being visible, to establish the talking circuit.

(4) Dialing can be accomplished in the normal manner, however, since the handset resistance is slightly higher than the resistance of an NE-500 type Telephone Set, difficulty could be encountered when dialing over very long lines. This dialing difficulty can be overcome by keeping the pushbutton depressed while dialing.

(5) Checking for the presence of 48 volts on the line should be done with the rocker switch in the "Talk" position (red face showing). Clicks will be produced in the receiver each time 48 volts is present on the test clips.

4. MAINTENANCE

4.01 Normal maintenance may involve replacement of the dial, transmitter unit, receiver unit, or the cord.

NOTE: Dial maintenance consists only of determining if the dial is defective. Do not attempt adjustments of the dial in the field.

4.02 Disassembly of Handset (see Fig. 8 and 9) (item Nos. refer to Fig. 9).

(1) To remove the card retainer window (item 13), insert the tip of an NS-16750 L3 Releaser into the small slotted hole at the edge of the window. Ensure that the tip does not enter the hole by more than one-eighth of an inch, as an underlying screw may hinder the lateral motion of the releaser. Apply a slight lateral pressure to the handle of the releaser. The housing projection provides a fulcrum and this will bow the window upward so that its edges may be grasped with the fingertips of the other hand to spring it out.

(2) Remove the handset line cord grommet (items 27 and 28, Fig. 9) by turning the handset face down and pushing the cord into the grommet to release the pressure on the inside of the grommet, then exerting a lateral pressure, towards the rocker switch and an upward pressure (while retaining the latteral pressure), until the grommet comes out of the housing (see Fig. 8). This grommet is in two pieces.

(3) Once the grommet has been withdrawn, two screws (item 3) are exposed. Loosen these two screws by about three-sixteenths of an inch only, as it is not desirable or necessary to remove them.

(4) Free (do not remove) the two captive screws (item 2) in the card retainer well. Loosen the receiver end, then slide the smooth (back) half of the handset housing back to release this section from the slotted screw holes.

4.03 To Replace Dial

(1) See 4.02 for instructions on opening the handset.

(2) Remove the dial leads from the terminals

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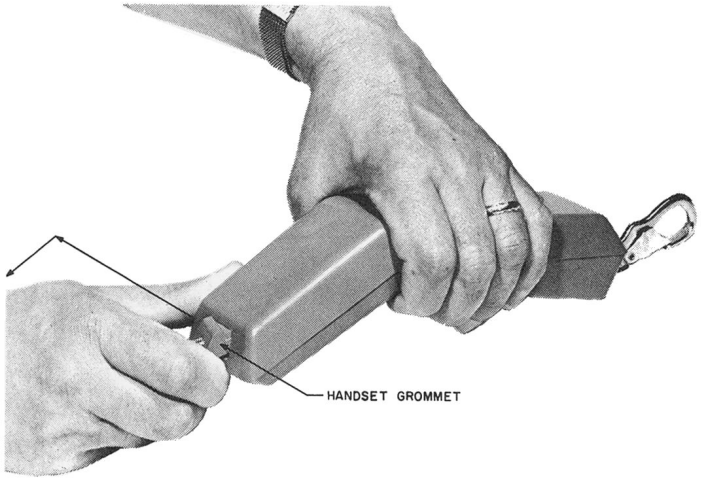

Fig. 8 – Removal of Handset Grommet

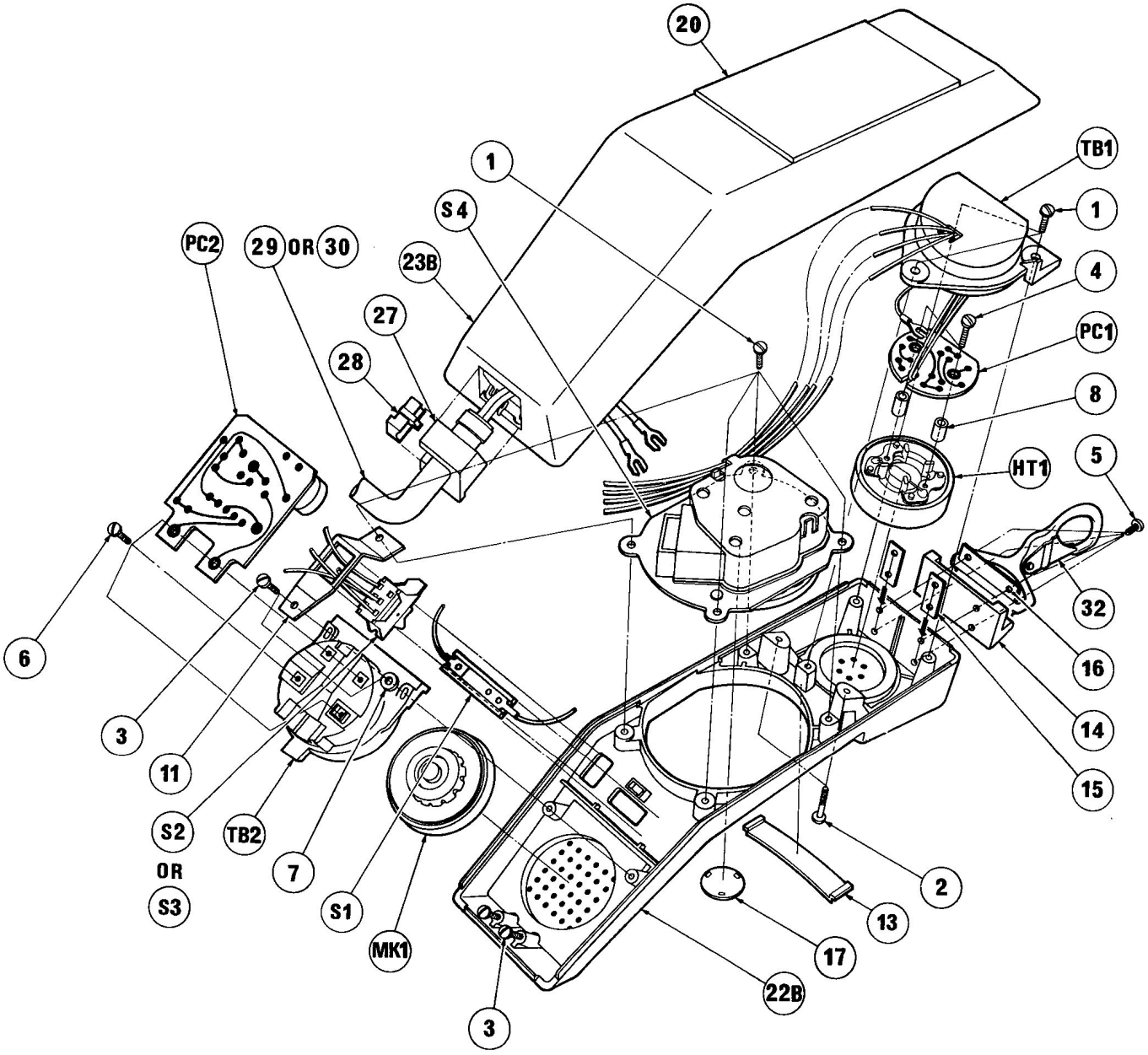

Fig. 9 – QSE4 Type Handsets – Assembly of Parts

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(3) Remove the four mounting screws (item 1) and loosen rocker switch.

(4) Replace dial.

(5) See 4.09 for instructions on re-assembly of handset.

4.04 To Replace Transmitter:

(1) See 4.02 for instructions on opening the handset.

(2) Remove the two screws (item 3) holding the transmitter cup (item TB2) and loosen the rocker switch retainer bracket (item 11).

(3) Lift out transmitter cup and replace transmitter (item MK1).

(4) See 4.09 for instructions on re-assembly of handset.

4.05 To Replace Receiver:

(1) See 4.02 for instructions on opening the handset.

(2) Remove the three screws (item 1) holding the receiver cup (TB1).

(3) Slide the cup along the leads.

(4) Disconnect and replace the receiver units.

(5) See 4.09 for instructions on re-assembly of handset.

4.06 Fingerwheel: Should the fingerwheel require replacement, replace the complete dial as fingerwheel replacement in the field may result in permanent damage to the dial.

4.07 To Replace Line Cord:

(1) See 4.02 for instructions on opening the handset.

(2) Disconnect and replace line cord, ensuring that the cord is properly dressed in the housing (see Fig. 10).

4.08 To Replace Hook:

(1) See 4.02 for instructions on opening the handset.

(2) Remove the four screws (item 5) and remove the two hook plate retainers (item 15) and the hookstop (item 14).

(3) Replace the hook, ensuring that the four mounting screws are properly positioned in the two hook plate retainers and that the hookstop is properly positioned between the hook and the cover.

(4) See 4.09 for instructions on re-assembly of handset.

4.09 Re-assembly of Handset:

(1) Align the jacketed portion of the handset line cord (item 29 or 30) into the handset so that it will fit into the channel in the transmitter cup (item TB2).

(2) Slide the two handset sections together so that the two slots at the grommet end slide over the two screws (item 3) in the instrument section (item 22B).

(3) Carefully align the two sections so that the two screws (item 2) in the card holder well, will engage the tapped post holes in the back cover (item 23B).

(4) Tighten the two screws (item 3) in the grommet cut-out and the two screws (item 2) in the card holder well.

CAUTION: Do not use undue force when tightening these screws.

(5) Slide the grommet (items 27 and 28) into the rectangular hole in the end of the handset housing, with the side ribs of the grommet sliding into place on the inside face of the cover. Then pull the line cord to ensure that the grommet is securely in place.

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(6) Insert the card and retainer window into the well in the handset.

4.10 To Convert QSE4A Type to QSE4B Type (see Fig. 9 and 10):

(1) Open handset as described in para. 4.02.

(2) Remove the two screws (item 6) which fasten the line cord leads and the red and orange leads to the transmitter cup terminals. Fold the red and orange leads to the sides of the handset.

(3) Remove slate-red lead from under dial plate screw (item 1), the white lead connected to terminal C of PC2, the yellow-slate lead from under terminal R on the transmitter cup (TB2) and the red and blue leads from TB2 to S3.

(4) Remove original PC2 (P0500417).

(5) Insert slate-red lead into terminal B and white lead into terminal C on the new PC2 (P0500416).

(6) Carefully place new PC2 (P0500416) into position and ensure that the yellow-slate lead is dressed between the transformer on PC2 and the transmitter cup (item TB2) and that the transformer bobbin rests on the raised portion of the instrument section housing between the dial and pushbutton (item S1). The bracket of the transformer should now be located over the pushbutton.

(7) Connect the yellow-slate lead from PC2 to terminal "R" of the transmitter cup with the existing yellow-slate lead on that terminal.

(8) Insert the two screws (item 6) through the mounting holes in PC2 and into the terminal screw holes in the transmitter cup.

(9) Ensure that the line cord is passed through the cord hole in the handset back cover (item 23B).

(10) Connect the red lead, which was moved to one side of the handset in sub-para. 2 above, and the red lead of the line cord, to the terminal immediately above terminal "R" on the transmitter cup (see Fig. 10). Tighten this connection.

(11) Connect the orange lead which was moved to one side of the handset in sub-para. 2 above, and the black line cord lead to the other PC2 mounting terminal (rocker switch side) and tighten the mounting screw (see Fig. 10).

(12) Dress leads and line cord as shown in Fig. 10.

(13) Replace handset back cover, line cord grommet and card retainer window as outlined in para. 4.09.

5. IDENTIFICATION OF PARTS

5.01 Table C lists the components of the QSE4 type Handset as shown in Fig. 9.

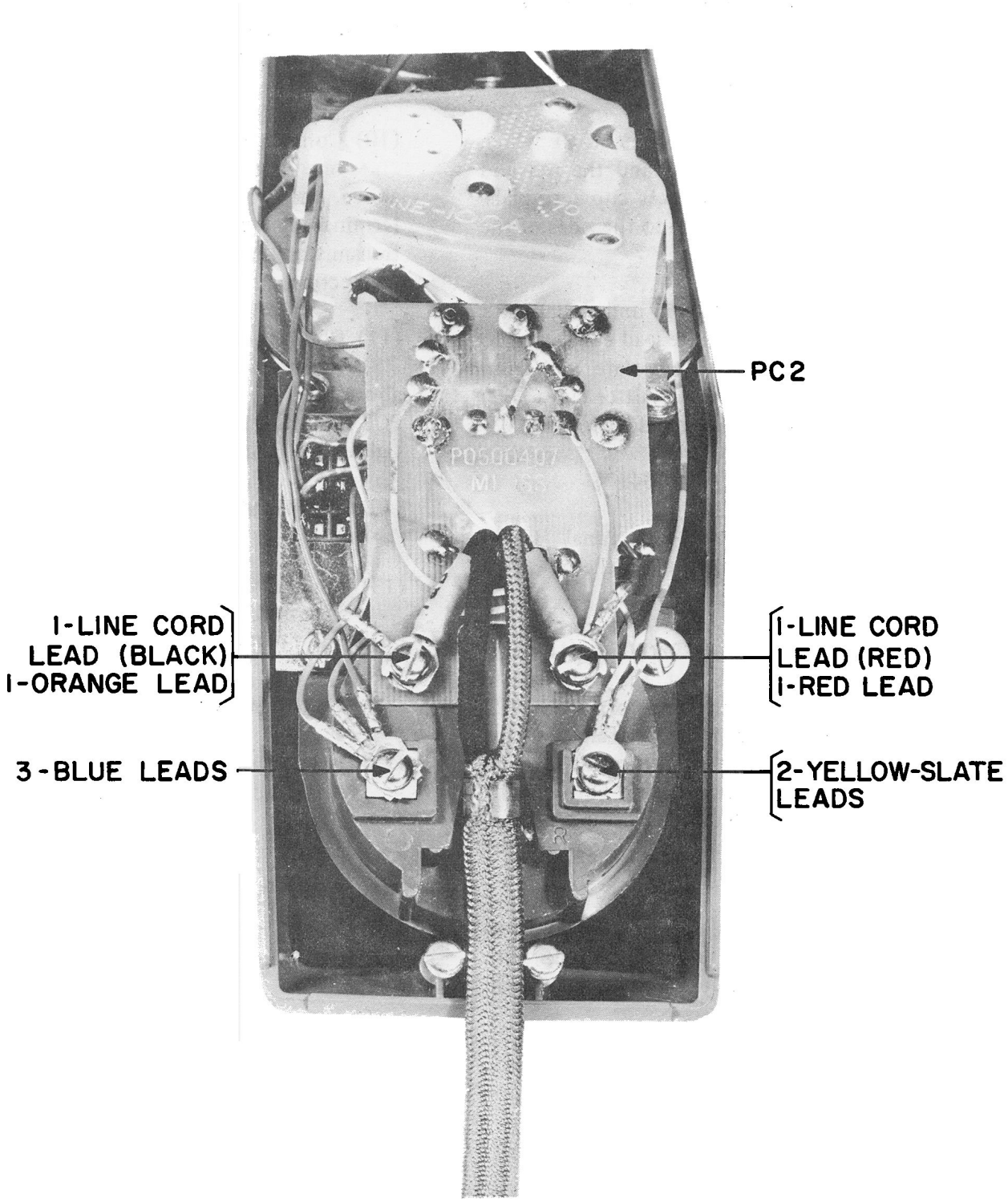

Fig. 10 – QSE4B Type Handset – Cover Removed – Showing Connection of Line Cord and Assembly of PC2 (P0500416) For Conversion Purposes

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TABLE C
QSE4 TYPE DIAL HAND TEST SET
IDENTIFICATION OF PARTS

ITEM	IDENTIFICATION	DESCRIPTION	QSE4A1	QSE4B1	QSE4A2	QSE4B2
1	–	.112 – 24 (# 4 – 24) x .375 long, Type B, Flat Fillister Head, Tapping Screw	7	7	7	7
2	P096D315	.138 – 20 (# 6 – 20) x .650 long, Type B, Flat Fillister, Captive Tapping Screw	2	2	2	2
3	–	.112 – 24 (# 4 – 24) x .500 long, Type B, Flat Fillister, Tapping Screw	4	4	4	4
4	–	.125 – 40 (# 5 – 40) x .500 long, Pan Head Machine Screw	2	2	2	2
5	–	.112 – 40 (# 4 – 40) x 3/16 long, Pan Head Machine Screw	4	4	4	4
6	–	.125 – 40 (# 5 – 40) x 5/16 long, Pan Head Machine Screw	4	4	4	4
7	–	Washer, Steel, .145 I.D. x .344 O.D. x .038 Thick	1	1	1	1
8	–	Spacer, Phenol Fibre, .141 I.D. x .219 O.D. x .250 long	2	2	2	2
11	P0500423	Bracket	1	1	1	1
13	P096D313	Card Holder	1	1	1	1
14	P0500419	Hookstop	1	1	1	1
15	P0500411	Hook Plate Retainer	2	2	2	2
16	P0500403	Hook Plate	1	1	1	1
17	P096E723	Disc	1		1	
17	P096E724	Disc		1		1
20	P0500420	Friction Pad	1	1	1	1
22B	P0500500*	Instrument Section Assembly	1	1	1	1
23B	P0892000*	Handset Cover Assembly	1	1	1	1
27	P0512100*	Grommet Female	1	1	1	1
28	P0512000*	Grommet Male	1	1	1	1
29	NE-W2QK	Cord E/W NSQ4100 L1 Clips	1	1		
30	NE-H2QB	Cord E/W NE-346A Plug			1	1
TB1	P096D305	Receiver Cup	1	1	1	1
TB2	P0500414	Cup Assembly	1	1	1	1
S1	P0501500*	Pushbutton Assembly	1	1	1	1
S2	P0500412	Pushbutton Assembly		1		1
S3	P0500413	Pushbutton Assembly	1		1	
S4	NE-10QA	Dial	1	1	1	1
PC1	P0500400	Printed Circuit Board Assembly	1	1	1	1
PC2	P0500417	Printed Circuit Board Assembly	1		1	
PC2	P0500416	Printed Circuit Board Assembly		1		1

*The last two digits of these part numbers are colour significant and should be replaced by the correct colour code for the colour desired. i.e., P0500551 – Instrument section assembly (green) (Sect. 1.03).