MAINTENANCE MANUAL TH-35
DETECTING SET, MINE

AUDIO/VISUAL INDICATION; 6VDC OPERATING POWER
PORTABLE; TRANSISTORIZED; WITH CASE

WHITE'S ELECTRONICS
AF-108 NSN No. 6665-01-288-9997

DIAGRAMS

FIGURE 1 - SEARCH HEAD ASSEMBLY AND ROD ASSEMBLY

FIGURE 2 - INTERNAL VIEW OF CONTROL BOX

FIGURE 3 - WIRING DIAGRAM

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Chapter I

INTRODUCTION

1. Scope

These instructions are published to give information on preventative maintenance service, and general maintenance on the White's Electronics Mine Detector, AF 108.

It should be used in conjunction with the Operator's Manual (TH-12), and Parts List (TH-35E).

Chapter 2 provides information on organizational maintenance, Chapter 3 gives instructions for shipment and storage, and Chapter 4 provides information on direct and general support and depot maintenance.

The diagrams are displayed as Chapter 5.

Chapter 2

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I - Organizational Maintenance, Tools and Equipment

2. Special Tools and Equipment

No special tools or equipment are required by the organizational maintenance personnel for the maintenance of the mine detector set.

Section II - Preventive Maintenance Services

3. General

To ensure that the mine detector set is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventative maintenance services to be performed are described in paragraph 4.

4. Quarterly Preventative Maintenance Services

This paragraph contains a listing of preventative maintenance services which must be performed by organizational maintenance personnel at quarterly intervals. A quarterly interval is equal to 3 calendar months or 250 hours of operation, whichever occurs first.

1. Case - Clean a dirty case. Replace worn, damaged or defective case. ***(Ref: Paragraph 14)***

2. Detector Head Assembly - Clean a dirty detector head assembly. Replace worn, damaged or defective detector head, nut, bolt or washers, rod or spring clip. ***(Ref: Paragraph 14) (Figure 1, Diagram)***

3. Headset Assembly - Clean a dirty headset. Replace worn, damaged or defective headset assembly.

4. Battery Boxes - Clean a dirty battery box. Clean corroded batteries and terminals. Check each battery voltage is greater than 1.4 volts. Replace discharged, damaged or defective battery. Replace damaged battery box. ***(Ref: Paragraph 16)***

5. Control Box - Clean a dirty control box. Check that battery indicators and unit fault indicators operate correctly. Check for correct operation and sensitivity. Replace dam aged or defective control box. ***(Ref: Paragraph 15)***

6. Handle Assembly - Clean a dirty handle assembly. Replace worn, damaged or defective component parts.

7. Shoulder Bag - Replace worn, damaged or defective bag.

8. Carrying Satchel - Replace worn, damaged or defective satchel.

9. Extension Lead - Replace worn, damaged or defective extension lead.

Section III - Trouble Shooting

5. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the mine detector set and its components. The trouble shooting guide is divided into two parts; the first part corresponds to faults occuring when the warning indicators are on, and the second part corresponds to faults which occur with warning indicators off.

Warning Indicators On

6. Battery Alert Indicator On-

Probable Cause	**Possible Remedy**
Low Battery	Replace Battery **(Paragraph 16)**
Control Box Defective	Replace Control Box

7. Replace Battery Indicator On-

Probable Cause	**Possible Remedy**
Low Battery	Replace Battery **(Paragraph 16)**
Control Box Defective	Replace Control Box

8. Unit Fault Indicator On-

Probable Cause	**Possible Remedy**
Faulty Search Head	Replace Search Head **(Paragraph 17)**
Faulty Control Box	Replace Control Box

Warning Indicators Off

9. Mine Detector Set Inoperative with On/Off Switch On-

Probable Cause	Possible Remedy
Battery Weak or Dead	Replace Batteries **(Paragraph 16)**
Faulty Control Box	Replace Control Box
Faulty Battery Box	Replace Battery Box

10. Headset Signal Absent when Detector is Turned on and Tuned-

Probable Cause	Possible Remedy
Headset Faulty	Replace Headset
Faulty Control Box	Replace Control Box

11. No Increase in Output Frequency when Metal is Positioned Near the Detector-

Probable Cause	Possible Remedy
Faulty Control Box	Replace Control Box

12. Intermittent Signal Heard in Headset-

Probable Cause	Possible Remedy
Faulty Battery Connections	Replace Battery Box **(Paragraph 16)**
Faulty Control Box	Replace Control Box

Section IV - Mine Detector Set Components

13. General

The mine detector set components and attachments covered in this section are those which are within the scope of organizational maintenance. Specific details pertinent to each item appear in applicable paragraphs below.

14. Mine Detector Set Case

1. Remove components from the case.
2. Wipe all surfaces of the case with a clean cloth dampened slightly with an approved cleaning solvent, and dry thoroughly.
3. Inspect for breaks, cracks, dents or other defects.
4. Replace a damaged or defective carrying case as necessary.

15. Control Box

1. Wipe all surfaces of the box with a clean cloth dampened slightly with an approved cleaning solvent and dry thoroughly.

2. Inspect box for cracks or dents.
3. Inspect indicators, controls, sockets and plug for loose mounting and damage.
4. **Battery Indicators**

Note: Following test to be carried out using a variable output power supply (0.5 amp)

- **a.** Check that both battery indicators are off when the power supply is greater than 4.6v.
- **b.** Check that the battery alert indicator is on when the power supply voltage is 4.2v.
- **c.** Check that both battery indicators are on when the battery voltage is less than 3.6v, and that the unit cannot be tuned.

5. **Unit Fault Indicator**

Note: Test to be carried out with battery voltage/power supply voltage greater than 4.6v.

- **a.** Unplug the detector head, and check that the unit fault indicator is on and that the unit cannot be tuned.
- **b.** Connect the detector head plug and check that the unit fault indicator is off and that unit can be tuned.

6. Check for correct operation and sensitivity.
7. Replace a damaged or defective control box as necessary.

16. Battery Box

1. Wipe all surfaces of the box with a clean cloth dampened slightly with an approved cleaning solvent and dry thoroughly.
2. Inspect for cracks in the box and check for bent contact pins in the sockets.
3. Open battery box and remove batteries.
4. Wipe the batteries with a clean dry cloth.

Note: Discard cloth after wiping batteries clean. Traces of battery corrosion absorbed by the cloth may damage other parts of the set.

5. Inspect the batteries for corrosion or other damage.
6. Inspect and clean contacts on the battery holders and ensure that contacts are held firmly against the batteries when in position.
7. Replace a weak, damaged or defective battery.

Note: For a correct reading of battery voltage, battery must be tested under simulated load or while connected to operating unit.

8. Replace a damaged or defective box as necessary.
9. Close battery box lid and tighten screws.

17. Detector Head Assembly

1. Wipe all surfaces of the box with a clean cloth dampened slightly with an approved cleaning solvent and dry thoroughly.
2. Inspect for worn, damaged or defective detector head, detector head nut and bolt, rod, spring clip, cable and plug.
3. Replace any damaged component as necessary.

Note: When reassembling a rod onto the detector head make sure that a washer is placed on either side of the detector head rod. **(See figure 1)**

Chapter 3

SHIPMENT AND LIMITED STORAGE

Section I - Shipment Within Zone of Interior

18. Preparation of Equipment for Shipment

a. **General -** Detailed instructions for the preparation for domestic shipment are outlined within this paragraph.
b. **Inspection -** Equipment will be inspected for any unusual conditions such as damage, corrosion, accumulation of water and pilferage.
c. **Cleaning and Drying -** Remove dust and dirt from the mine detector set components; dry thoroughly. Clean and dry the interior of the mine detector set case. Clean and dry the battery connectors and the terminals of the batteries.
d. **Painting -** Paint all surfaces where the paint has been removed or damaged.
e. **Packing -** Refer to paragraph 7 in Operators Manual (TH-12) and pack the mine detector set.
f. **Marking -** Mark the shipping container as required.

19. Loading the Mine Detector Set for Shipment

a. **Loading -** Loading the mine detector set for shipment can be accomplished by one man.
b. **Shipment -** During shipment the cases must be tied down securely and provisions should be made against the possibility of the instrument case being struck by loose objects or shifting freight.

Section II - Limited Storage

20. Preparation of Mine Detector Set for Storage

a. **General -** Detailed instructions for preparation and maintenance of the mine detector set for limited storage are the same as those outlined in paragraph 18. Limited storage is defined as storage not to exceed six months.

b. **Storage -** Store the mine detector set, case and accessories in a dry, dust-free location where there is a minimum of vibration.

21. Inspection and Maintenance of Mine Detector Set in Storage

Frequent inspection must be made to ensure the equipment is ready for immediate use. Frequency of inspections will be prescribed by the unit commander, taking into consideration such factors as the physical condition of the storage area, weather-proofing, vibrations, security from tampering or pilferage, humidity and temperature conditions. The mine detector set components must be inspected frequently unless they are in hermetically sealed packages containing adequate desiccates.

Chapter 4

DIRECT AND GENERAL SUPPORT AND DEPOT MAINTENANCE INSTRUCTIONS

Section I - General

22. Scope

The following instructions are for direct and general support and depot maintenance personnel. They contain information on equipment maintenance that is beyond the scope of the tools, equipment, personnel or supplies available to organizational maintenance.

23. Section II - Description and Data

For a complete description of the mine detector set, see paragraph 2 of the Operator's Manual (TH-12).

24. Wiring Diagram

The wiring diagram is shown in Figure 3.

Section III - Special Tools and Equipment

25. Special Tools and Equipment

No special tools or equipment are required by direct and general support, and depot maintenance personnel for performing maintenance on the mine detector set.

26. Field and Depot Maintenance Repair Parts

Direct and general support and depot maintenance repair parts are illustrated in the Parts List (TH-35E).

Section IV - Troubleshooting

27. General

This section provides information useful in diagnosing and correcting unsatisfactory operation or failure of the mine detector set and its components. Each trouble symptom stated is followed by a list of probable causes of trouble. The possible remedy recommended is described opposite the probable cause.

28. **Mine Detector Set Fails to Start When Switch is Turned On-**

Probable Cause	Possible Remedy
Switch Defective	Replace Switch **(Paragraph 40)**
Circuit Board Faulty	Replace Circuit Board **(Paragraph 40)**
Faulty Cable Harness	Repair or Replace Cable Harness **(Paragraph 40)**
Battery Box Defective	Repair Battery Box **(Paragraph 41)**

29. **Headset Does Not Give Satisfactory Signal-**

Probable Cause	Possible Remedy
Headset Socket Defective	Replace Socket **(Paragraph 40)**
Cable Harness Defective	Repair or Replace Cable Harness **(Paragraph 40)**
Circuit Board Defective	Replace Circuit Board **(Paragraph 40)**
Volume Potentiometer Defective	Replace Potentiometer **(Paragraph 40)**

30. **Signal Does Not Increase as Detector Head Comes Close to Metal Object-**

Probable Cause	Possible Remedy
Circuit Board Defective	Replace Circuit Board **(Paragraph 40)**
Detector Head Defective	Replace Detector Head

31. **Unit will Not Tune When Auto Tune Button is Pressed-**

Probable Cause	Possible Remedy
Push Button Switch Defective	Replace Push Button Switch **(Paragraph 40)**
Circuit Board Defective	Replace Circuit Board
Cable Harness Defective	Repair Cable Harness **(Paragraph 40)**

32. **Set Cuts Off and On During Operation-**

Probable Cause	Possible Remedy
Battery Terminals Corroded	Clean Terminals **(Paragraph 41)**
On/Off Switch Defective	Replace On/Off Switch **(Paragraph 40)**
Circuit Board Defective	Replace Circuit Board **(Paragraph 40)**
Cable Harness Defective	Repair Cable Harness **(Paragraph 40)**

33. **Unit Fault Indicator Not Switching On When Detector Head Unplugged-**

Probable Cause	Possible Remedy
Unit Fault Indicator Defective	Replace Unit Fault Indicator **(Paragraph 40)**
Cable Harness Defective	Repair Cable Harness **(Paragraph 40)**
Circuit Board Defective	Replace Circuit Board **(Paragraph 40)**

34. **Unit Fault Indicator Remains On With Functioning Detector Head Connected-**

Probable Cause	Possible Remedy
Circuit Board Defective	Replace Circuit Board **(Paragraph 40)**

35. **Battery Alert Indicator On Continually (With New Batteries Attached)-**

Probable Cause	Possible Remedy
Circuit Board Defective	Replace Circuit Board

36. **Battery Alert Indicator Not On When Battery Voltage is Below 4.2 Volts-**

Probable Cause	Possible Remedy
Cable Harness Defective	Repair Cable Harness **(Paragraph 40)**
Indicator Defective	Replace Indicator **(Paragraph 40)**
Circuit Board Defective	Replace Circuit Board **(Paragraph 40)**

37. **Replace Battery Indicator On Continually (With New Batteries Attached)-**

Probable Cause	Possible Remedy
Circuit Board Defective	Replace Circuit Board **(Paragraph 40)**

38. **Replace Battery Indicator Not On When Battery Voltage is Below 3.6 Volts-**

Probable Cause	Possible Remedy
Indicator Defective	Replace Indicator **(Paragraph 40)**
Cable Harness Defective	Repair Cable Harness **(Paragraph 40)**
Circuit Board Defective	Replace Circuit Board **(Paragraph 40)**

39. **Output Indicator Does Not Flash When Unit is Tuned-**

Probable Cause	Possible Remedy
Indicator Defective	Replace Indicator **(Paragraph 40)**
Cable Harness Defective	Replace Cable Harness **(Paragraph 40)**

Section V - Control Box and Battery Box

40. Control Box

a. General - The control box consists of a waterproof aluminium housing which has mounted on it an on/off potentiometer switch, a push button switch, 4 indicator lights, a headphone and detector head socket and a battery lead/plug. Internally the box contains a printed circuit board, printed circuit board connectors and cable harness.

b. External Inspection and Cleaning

1. Wipe the control box with a clean cloth dampened with an approved cleaning solvent and dry thoroughly.
2. Inspect for breaks, cracks or damaged fittings and replace if necessary.

c. Internal Inspection

1. Undo the six lid screws and lay lid to one side of the control box, ensuring that no strain is put on the earthing link between the box base and lid.
2. Inspect for loose fittings and tighten as required.
3. Inspect for faulty or damaged component parts and replace as necessary.
4. Inspect condition of lid gasket and replace if damaged.

d. Fault Location on Defective Control Box

1. Unplug all three circuit board connectors and connect to a known working circuit board.
2. Use insulators to ensure that the board does not short out against control box housing.
3. Attach detector head, battery box and headset and carry out function test.
4. a. If unit functions correctly, replace the circuit board in unit. **(See figure 2, for correct orientation of circuit board)**

   Note: Ensure replaced board has the same operating frequency as that marked on the identification plate on the control box.

   b. If unit does not function correctly, fault lies on the internal wiring, plugs, controls, sockets or indicators. Inspect and repair or replace as necessary. **(See Paragraph 42)**

e. Reassembly and Function Check

1. Replace control box lid and secure with the six screws.

Note: Ensure that the earthing wire link between the control box base and lid is not caught on the sealing edge. **(Ref: Figure 2)**

2. Carry out function test **(Paragraph 15)** and check that the unit can detect the aluminum test piece at 20 cm.

41. Battery Box

(1) Unscrew the four thumb screws and lift off lid.
(2) Inspect the battery holders, wiring and socket.
(3) If the battery holders are damaged or defective replace the battery box lid.
(4) If the battery box socket is damaged or defective replace as necessary. **(See paragraph 42)**
(5) Clean the inside of the battery case thoroughly.
(6) Replace lid.

42. Replacement of Sockets

a. General - The two sockets on the control box and one socket on the battery box do not incorporate sealing gaskets; special precautions must therefore be taken to ensure that a waterproof seal is obtained when these are replaced.

b. Replacement Procedure

1. Unsolder connector wires and flag if required.
2. Undo the four nuts and withdraw the fixing bolts.
3. Lever off the socket
4. Clean the area thoroughly around the fixing holes, ensuring that all the gasket material has been removed.
5. Cover the back face of the connector (the part which will lie flat on the panel) with an approved gasket compound.
6. Position connector onto the panel and place screws in position.
7. Put gasket compound on thread of screws next to the back of the panel.
8. Put washers in place and tighten up locking screws.
9. Resolder connector wires.

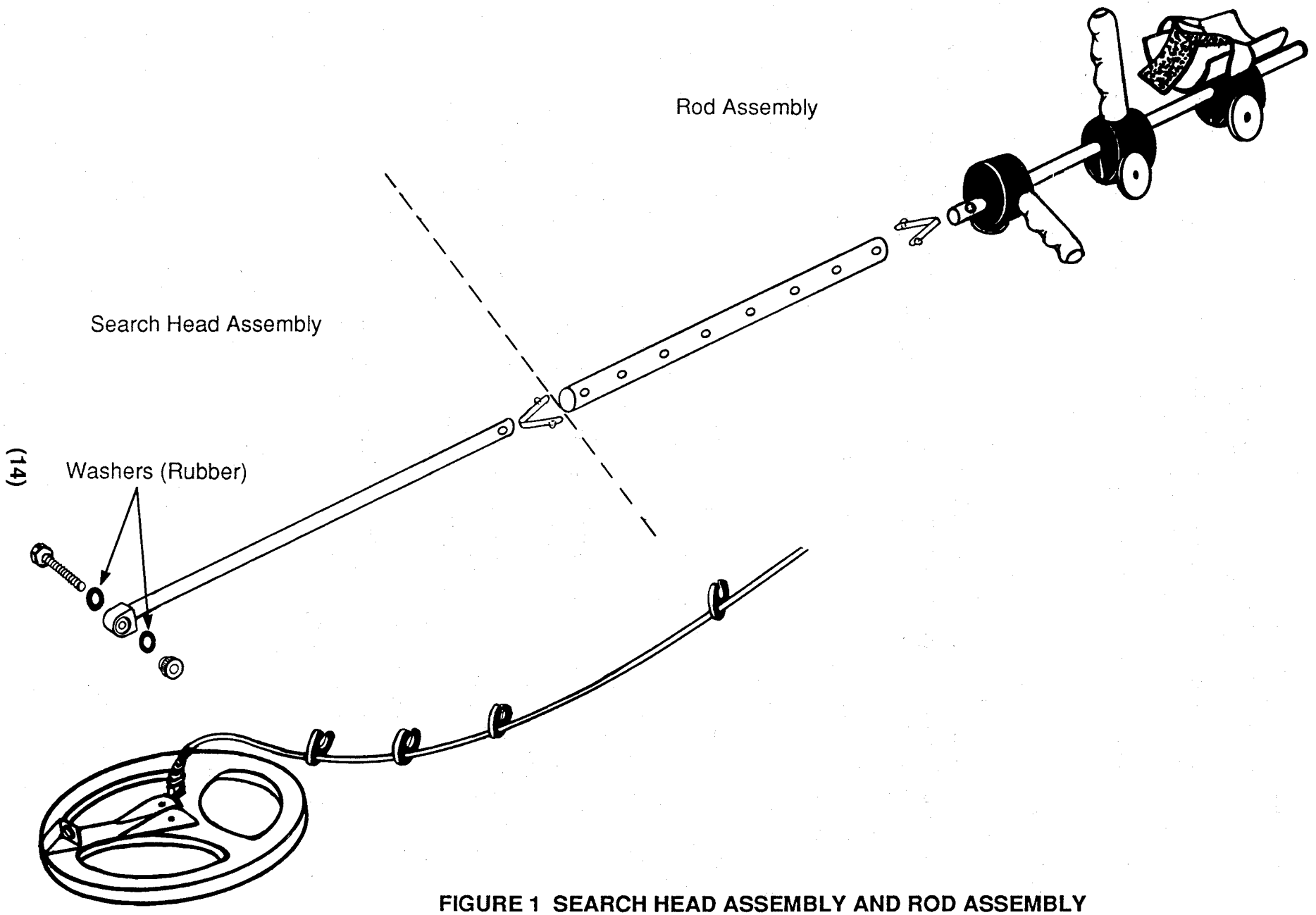

FIGURE 1 SEARCH HEAD ASSEMBLY AND ROD ASSEMBLY

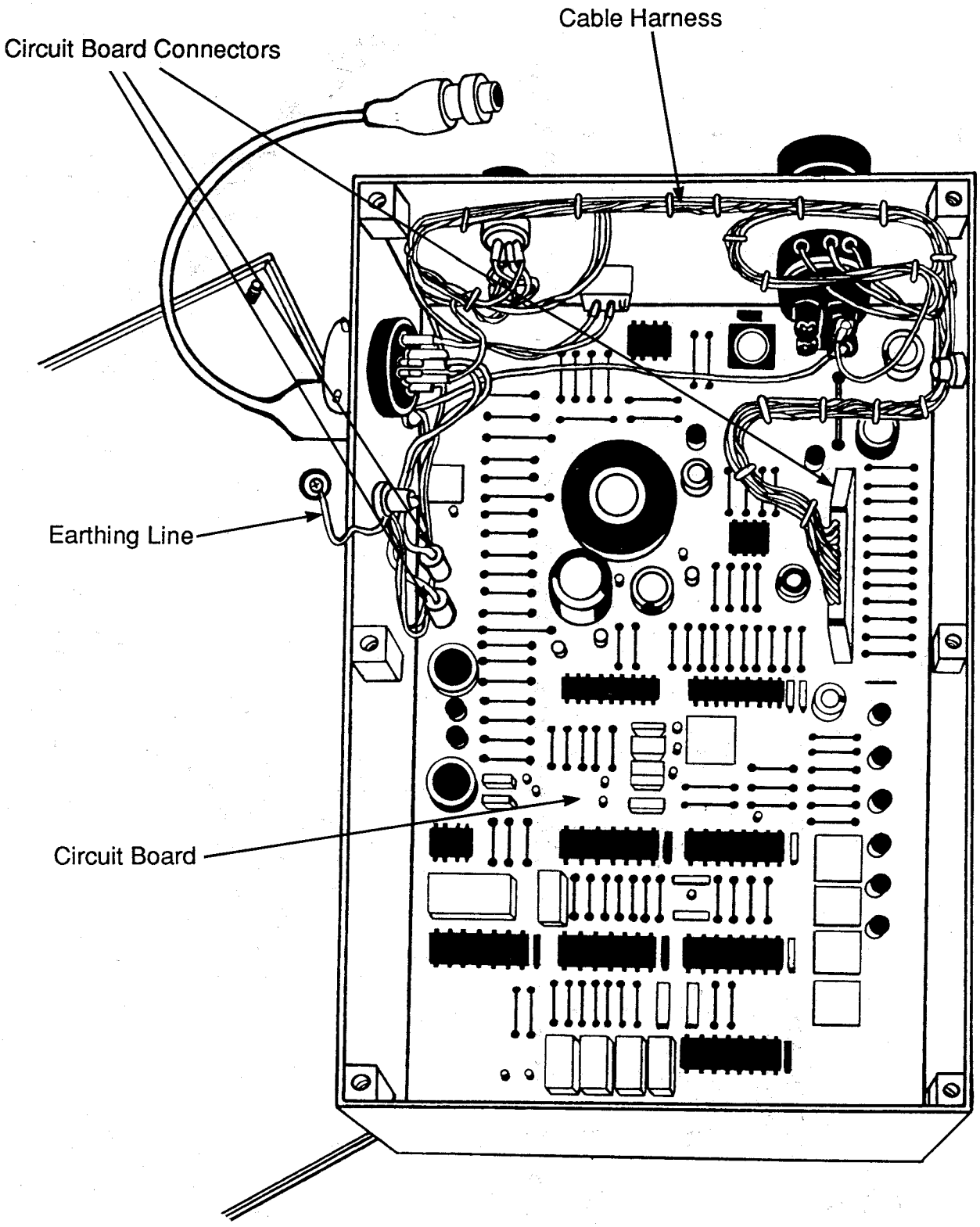

FIGURE 2 INTERNAL VIEW OF CONTROL BOX

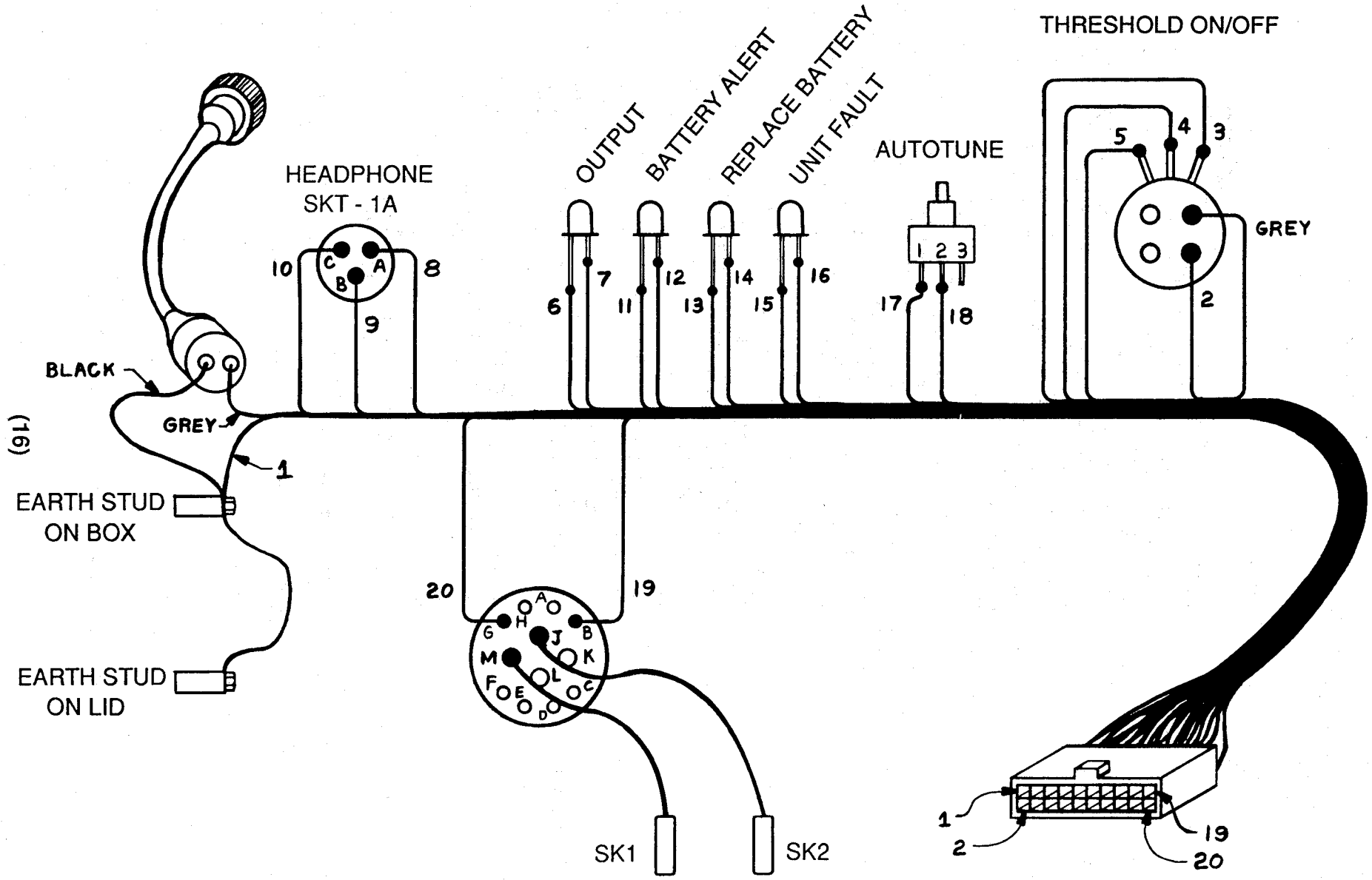
THRESHOLD ON/OFF
HEADPHONE
SKT - 1A
OUTPUT
BATTERY ALERT
REPLACE BATTERY
UNIT FAULT
AUTOTUNE
GREY
BLACK
GREY
(16)
EARTH STUD
ON BOX
EARTH STUD
ON LID
SK1
SK2

FIGURE 3

white's electronics, inc. 1011 Pleasant Valley Rd. Sweet Home, Oregon 97386

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