

Porta-Mobile IITM

MAINTENANCE MANUAL

138—150.8 MHz

150.8—174 MHz

MOTORCYCLE
TWO-WAY FM RADIO



LBI-30290A
(DF9042)

GENERAL  ELECTRIC

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ILLUSTRATIONS

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WARNING

Although the highest DC voltage in Porta • Mobile IITM Equipment is supplied by a portable or vehicular battery, high currents may be drawn under short circuit conditions. These currents can possibly heat metal objects such as tools, rings, watchbands, etc., enough to cause burns. Be careful when working near energized circuits! High-level RF energy in the transmitter Power Amplifier assembly can cause RF burns upon contact. Keep away from these circuits when the transmitter is energized!

EQUIPMENT INDEX

LBI-30290

| EQUIPMENT | TYPE OR PART NUMBER |
|-----------------------------------|---------------------|
| Transmitter | KT-132-B |
| Receivers: | |
| Two Frequency | |
| 138-150.8 MHz | ER-59-A |
| 150.8-174 MHz | ER-59-C |
| Dual Front Ends | |
| 150.8-174 & 42-50 MHz | ER-83-A |
| 150.8-174 & 150.8-174 MHz | ER-84-A |
| 150.8-174 & 450-470 MHz | ER-85-A |
| 150.8-174 & 470-512 MHz | ER-86-A |
| System Board & Case Assembly | 19D423076G3 |
| Front Cover & Audio Amplifier | 19C321258G4 |
| Antenna | |
| 138-150.8 MHz | 4EY19A10 |
| 150.8-174 MHz | 4EY19A12 |
| Power Cable & Microphone Assembly | 19C321929G1 |
| Ignition Noise Filter | 19C321889G1 |
| Right Angle Adapter | M2R22P2 |

INSTRUCTION BOOK INDEX
FOR
HIGH BAND PORTA•MOBILE 11

| PUBLICATION | LBI NUMBER | DATA FILE FOLDER NUMBER |
|--------------------------------|------------|-------------------------|
| Installation Manual | LBI-30292 | DF-9042 |
| Operator's Manual | LBI-30084 | ----- |
| Combination Manual | LBI-30290 | DF-9042 |
| Transmitter XT-132-R | LBI-30229 | DF-3167 |
| Receivers: | | |
| ER-59-A | LBI-4852 | DF-1102 |
| ER-59-C | LBI-30000 | DF-1102 |
| ER-83-A | LBI-4780 | DF-1102 |
| ER-84-A | LBI-4780 | DF-1102 |
| ER-85-A | LBI-4780 | DF-1102 |
| ER-86-A | LBI-4780 | DF-1102 |
| System Board and Case Assembly | | |
| 19D423076G3 | LBI-30285 | DF-4103 |
| Audio Power Amplifier | | |
| 19C321258G4 | LBI-30098 | DF-8377 |

SPECIFICATIONS*

GENERAL

| | |
|---|-------------------------------------|
| FREQUENCY RANGE | 138-150.8 MHz, 150.8 - 174 MHz |
| DIMENSIONS (HXWXD) | |
| Includes power plug and antenna connector | 5.25" X 9.0" X 5.4" |
| OPERABLE TEMPERATURE RANGE | -30°C to +60°C |
| BATTERY DRAIN (@ 13.8 Volts) | |
| Standby | 30 milliamps |
| Receive | 1.66 amperes (rated 10 watts audio) |
| Transmit | 6.2 amperes |
| MAXIMUM FREQUENCY SPACING | |

TRANSMITTER

| | | |
|-----------------|----------------|------------------------------|
| Frequency Range | No Degradation | 1 db Degradation (Power Out) |
| 138-174 MHz | +0.6% | +2.0% |

RECEIVER

| | | |
|-----------------|---------------------------|--------------------------------|
| Frequency Range | No Degradation | 1 db Degradation (Sensitivity) |
| 138-174 MHz | ±0.2% (highest frequency) | ±0.4% (center frequency) |

COMBINATION NOMENCLATURE

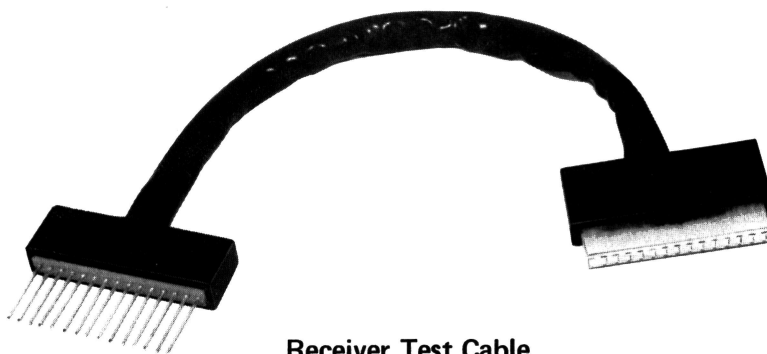
| 1st Digit | 2nd Digit | 3rd Digit | 4th Digit | 5th Digit | 6th Digit | 7th Digit | 8th Digit | 9th Digit | 10th Digit |
|------------------------|------------------------------|-------------------------|--------------------|----------------------|--------------------------|---|--------------------------|-----------------------------|---------------------------|
| Product Line | System Voltage | RF Power Output Range | Channel Spacing | System | Number of Xmit Freq. | Options | Number Rcvr Frequency | Frequency Range | Frequency Range DFE |
| J Motorcycle | G 12 VDC neg. Grd. | S 15-32 Watts | C 30 kHz | S Standard | A 1-Freq Xmit | S Standard | A 1-Freq Rcvr | G 138-150.8 MHz | G 42-50 MHz |
| | | | | | B 2-Freq Xmit | W Channel Guard Encode/Decode | B 2-Freq Rcvr | H 150.8 - 174 MHz | H 150.8-174 MHz |
| | | | | | C 3-Freq Xmit | R 2 Tone CG Encode | C 3-Freq Rcvr | | M 450-470 MHz |
| | | | | | D 4-Freq Xmit | B T90 Encode/Decode | D 4-Freq Rcvr | | N 470-494 MHz |
| | | | | | E 5-Freq Xmit | C T90 2-Tone Encode | E 5-Freq Rcvr | | P 494-512 MHz |
| | | | | | F 6-Freq Xmit | L T99 Ind. Call | F 6-Freq Rcvr | | X NO DFE |
| | | | | | G 7-Freq Xmit | M T99 Ind. & Group Call | G 7-Freq Rcvr | | |
| | | | | | H 8-Freq Xmit | | H 8-Freq Rcvr | | |
| | | | | | I 9-Freq Xmit | | I 9-Freq Rcvr | | |
| | | | | | J 10-Freq Xmit | | J 10-Freq Rcvr | | |
| | | | | | K 11-Freq Xmit | | K 11-Freq Rcvr | | |
| | | | | | L 12-Freq Xmit | | L 12-Freq Rcvr | | |

ACCESSORIES

LBI-30290



RF Test Connector
19B227389G1
(Option 2106)



Receiver Test Cable
19C327327G1
(Option 2118)



Transmitter Test Cable
19D424148G1
(Option 2118)

DESCRIPTION

General Electric Porta . Mobile II VHF Motorcycle combinations are compact, high performance two-way FM Radios designed for complete two-way communications in the 138-174 MHz frequency range. The radios utilize both discrete components and integrated circuit modules.

All Porta . Mobile II component boards are housed in a ruggedly constructed, weather-proof Lexan® case with aluminum front and back covers. The center of the case contains the system board with the receiver board and tone and control option boards. The front cover contains the 10 Watt audio amplifier, speaker and 7.5 Volt regulator module. The back cover contains the complete transmitter assembly: exciter board and RF power amplifier board.

Operating controls for the Porta . Mobile II are mounted along the top of the case assembly. The controls consist of an OFF-ON Volume control with a red LED transmit indicator, a Squelch control and a two-frequency toggle switch or a multi-frequency rotary selector switch. There is no frequency selector switch for single frequency radios. Control positions for multiple options are also along the top of the case assembly.

Porta . Mobile II Motorcycle combinations may be equipped with several options. The combination may have multiple Channel Guard Encoder/Decoder, Type 90 Encoder/Decoder or Type 99 Decoder Tone options.

Carrier Operated Relay, BUSY light, Automatic Monitor, SLM, AND GATE, CALL INDICATOR and Hailer are a few of the other options offered.

OPERATION

Before adjusting the receiver, disable any options by placing the option switch(es) in the OFF or M (Monitor) position. After adjusting the receiver, place the option switch(es) back in the ON or N (Normal) position to enable the option. Refer to LBI30084 for complete operating instructions.

TO RECEIVE A MESSAGE

1. Turn the OFF-VOLUME control about half-way to the right.
2. Turn the SQUELCH (SQ) control to the right as far as possible. A hissing sound will be heard from the speaker.
3. Adjust the VOLUME control until the hissing sound is easily heard but not annoyingly loud.
4. Turn the SQUELCH control slowly to the left until the hissing noise just fades out.

With the frequency selector switch, select the proper frequency. You are now ready to receive messages from other radios in your system.

TO SEND A MESSAGE

1. Turn the radio on as directed in the "To Receive A Message" section.
2. With the frequency selector switch, select the proper frequency. Then listen to make sure that no one is using the channel.
3. Press the Push-To-Talk (PTT) switch and speak directly into the microphone

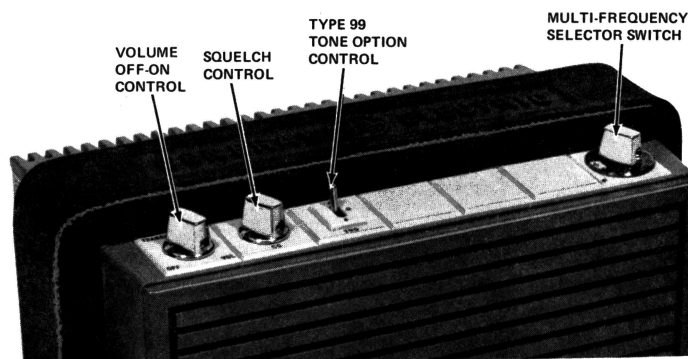


Figure 3 - Operating Controls

in a normal tone of voice. Release the PTT switch as soon as you stop talking. You cannot receive messages when the PTT switch is pressed.

OPERATING TIPS

The following conditions tend to reduce the effective range of Two-Way Radios, and should be avoided whenever possible.

- Operating the radio in low areas of the terrain, or while under power lines or bridges.
- Operating the radio inside of a vehicle, or in a metal or steel-framed building unless using an outside antenna.
- Obstructions such as mountains or buildings between the person sending and the person receiving the messages.

In areas where transmission or reception is poor. Some improvement may be obtained by insuring the antenna is fully extended and vertical. Moving a few yards in another direction or moving to a higher elevation may also improve communication.

MAINTENANCE

SERVICING THE RADIO

A complete procedure is provided in this manual for disassembling the radio for servicing. The procedure also contains instructions for replacing the different assemblies, Integrated Circuit modules and transmitter PA transistors. Refer to the Disassembly Procedure as listed in the Table of Contents

If the radio should begin to operate improperly, (i.e., transmitter messages start getting weak and hard to understand, or the receiver won't squelch properly), the first thing to suspect is run-down batteries. If a freshly recharged battery fails to restore the radio to its normal operating condition, refer to the appropriate Troubleshooting Procedure for help in isolating and correcting the problem.

TEST AND TROUBLESHOOTING PROCEDURES

Whenever difficult servicing problems occur, the Test Procedures for the transmitter and receiver can be used by the serviceman to compare the actual performance of the unit to the specifications met by the unit when shipped from the factory.

If addition, specific Troubleshooting Procedures are available for the transmitter, receiver and tone options. For best results, the Test Procedures should be used in conjunction with the Troubleshooting Procedures when servicing the radio. Refer to the applicable maintenance manual.

CHANGING FREQUENCIES

To change the operating frequency of the transmitter or receiver, it is necessary to replace the entire oscillator module as directed in the Disassembly Procedure. Always give the model number of the module and the exact operating frequency required when ordering new oscillator modules.

After replacing the oscillator module, re-align the transmitter or receiver as directed in the Alignment Procedure (refer to the applicable maintenance manual).

DISASSEMBLY PROCEDURE

Do not attempt to remove a module from the printed wiring board until troubleshooting indicates that the module is bad. Remove or replace the assemblies or modules as directed.

Caution: Always remove the power source before removing any component board to avoid blowing the fuse.

Equipment Required

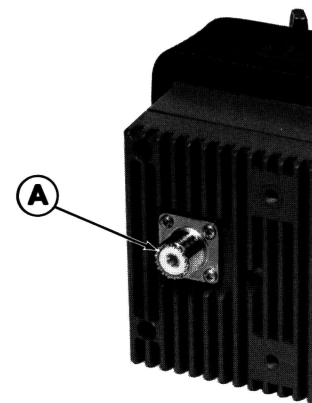
Small Phillips-head screwdriver.

Pencil-type soldering iron (40-60 watts) with a fine tip for unsoldering module leads and component leads, and a medium tip for unsoldering module mounting tabs.

Needlenose pliers for removing slotted nuts.

Tuning tool 19B219079-P1 for removing Allen-head set screws in the controls.

Allen-head #8, wrench 7150729P11 for removing bolts in the case assembly.

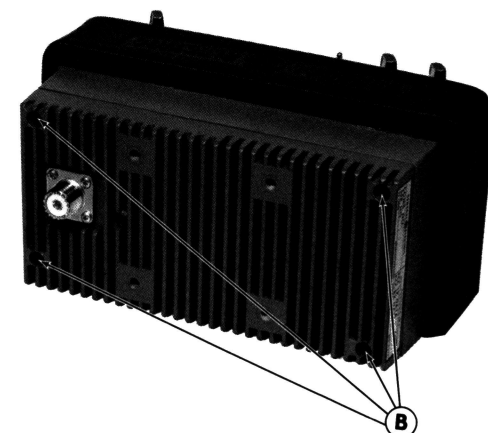


STEP 1

To remove the antenna, unscrew the antenna nut (A) and remove the antenna.

STEP 2

To gain access to the internal circuitry, loosen the four captive Allen-head bolts (B) with the Allen-head wrench and carefully remove the front or rear cover of the case assembly. The RF power cable must be disconnected by unplugging an in-line connector between the rear cover and the system board.



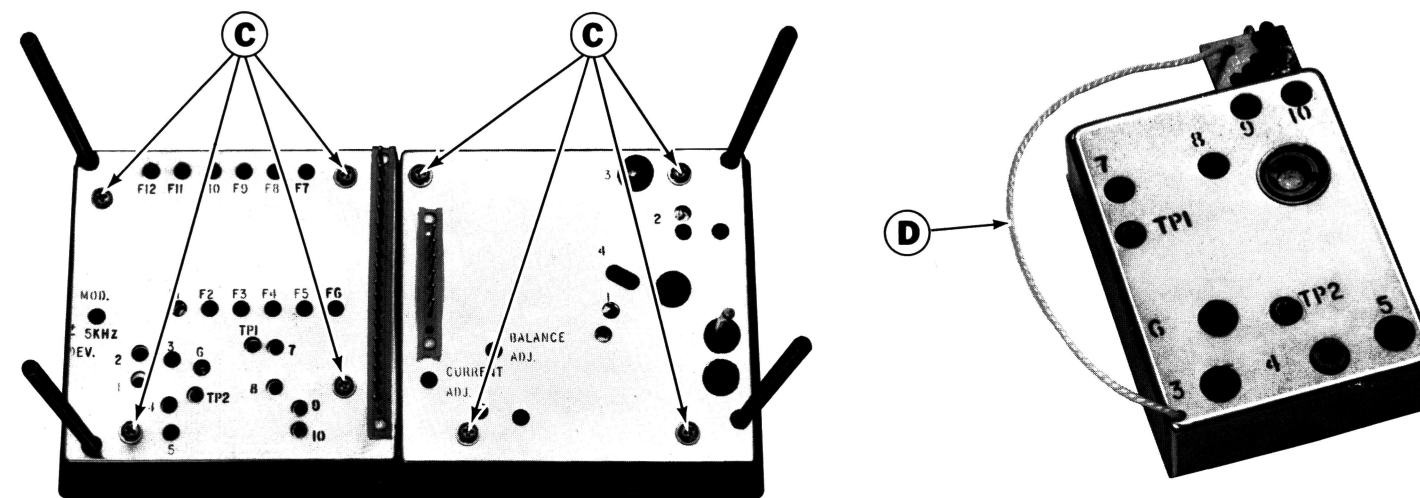
CAUTION

When replacing the front and rear assemblies a torque wrench should be used to tighten the captive Allen-head bolts (B). A torque of 20 inch-pounds should NOT be exceeded.

STEP 3

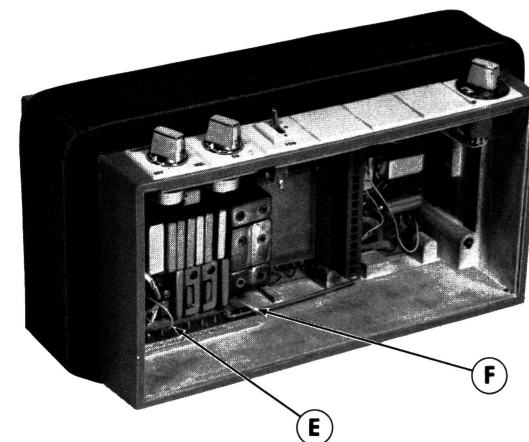
To gain access to the transmitter circuitry remove the four Phillips-head screws (C) holding the cover on the exciter or the PA.

The exciter module can be unplugged by pulling on lifting strap (D).



STEP 4

To gain access to the receiver unplug plugs (E) and lift the receiver board out of the case by lifting strap (F). Option boards can be removed from the case by the same method.



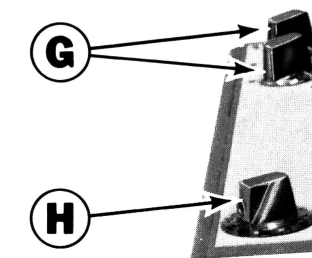
CAUTION

Do not place a circuit board on metal or other conductive surface with power applied. To do so will damage the Integrated Circuit modules. A small "pancake" of Duxseal® provides an excellent insulated work surface for the receiver or tone board.

STEP 5

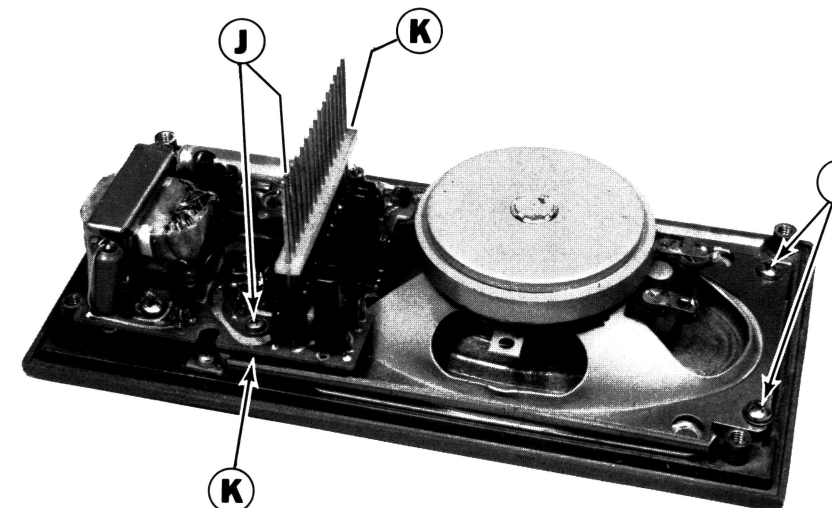
To remove the Volume or Squelch Control, remove the set screw (G) in the side of the control with the tuning tool. Then unscrew the slotted nut and remove the control.

To remove the Multi-Frequency switch, remove the set screw (H) as directed above. Then remove the washer, unscrew the slotted nut and remove the control.



STEP 6

To replace the speaker, remove the two Phillips-head screws (I) and loosen the two Phillips-head screws (J). With a pair of needlenose pliers loosen standoff (K). Remove speaker retaining plate and speaker.

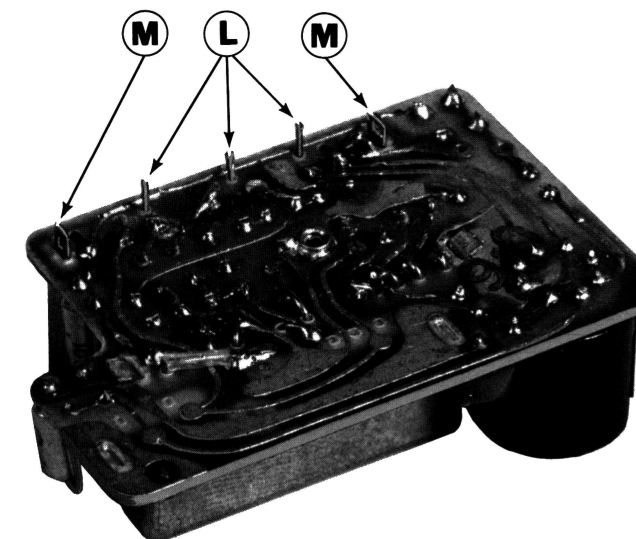


STEP 7

To replace one of the modules, unsolder and straighten up the module wire leads (L). Remove any solder accumulation from the leads.

Unsolder and straighten up the module mounting tabs (M) and remove any solder accumulation.

If replacing the receiver front end or mixer modules, also remove the small screws holding the helical resonators. Replace the module and solder down the mounting tabs and then the wire leads. Refer to the appropriate Outline Diagram (see Table of Contents) for the wire lead placement, if required.



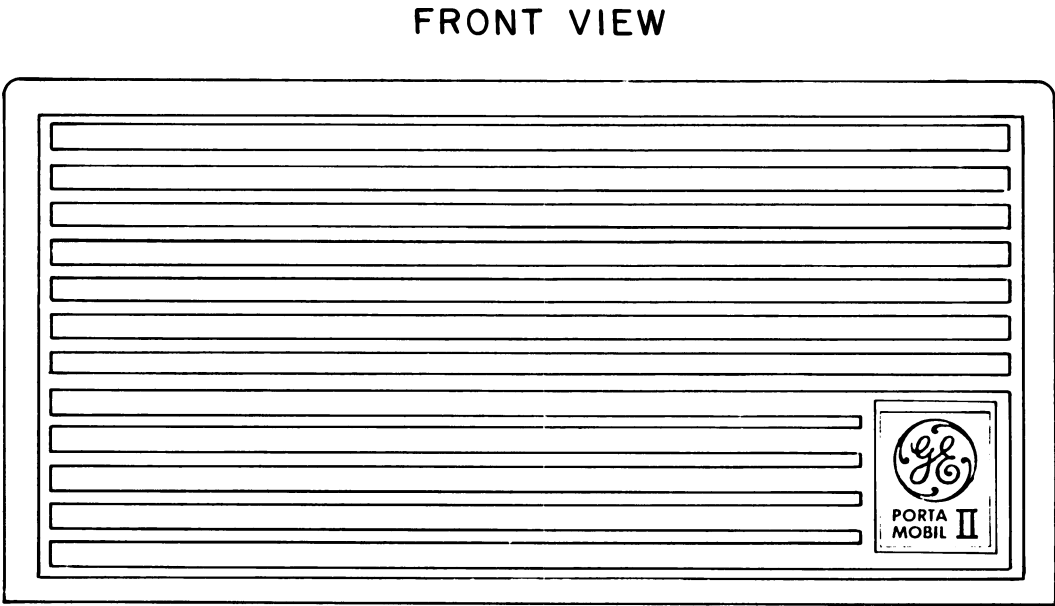
WARNING

The stud mounted RF Power Transistor used in the PA Module contain Beryllium Oxide, a TOXIC substance. If the ceramic or other encapsulation is opened, crushed, broken or abraded, the dust may be hazardous if inhaled. Use care in replacing transistors of this type.

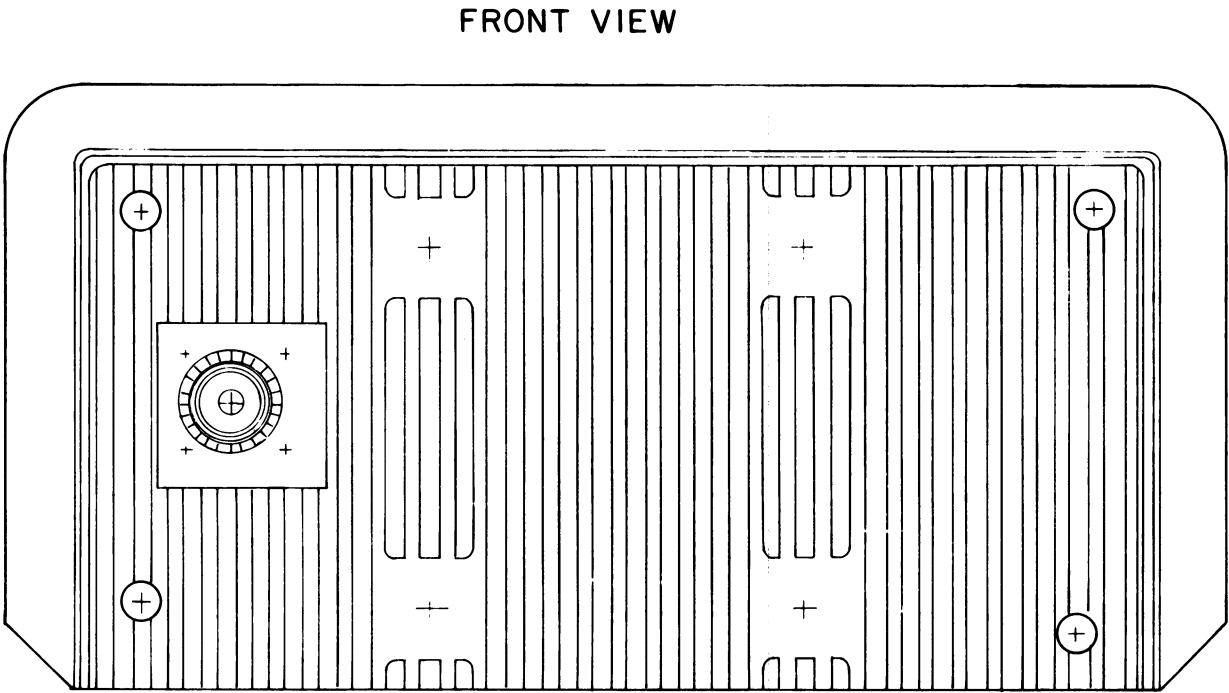
DISASSEMBLY PROCEDURE

138—150.8 MHz & 150.8—174 MHz
PORTA • MOBIL II™ MOTORCYCLE

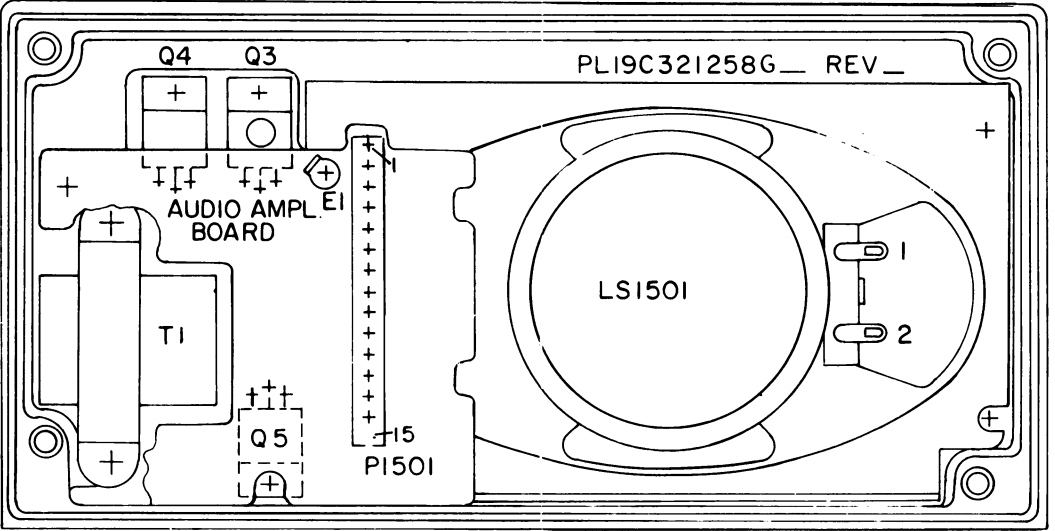
FRONT COVER



REAR COVER



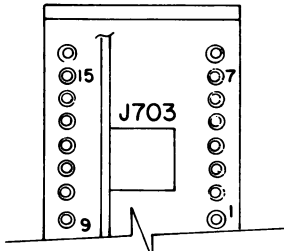
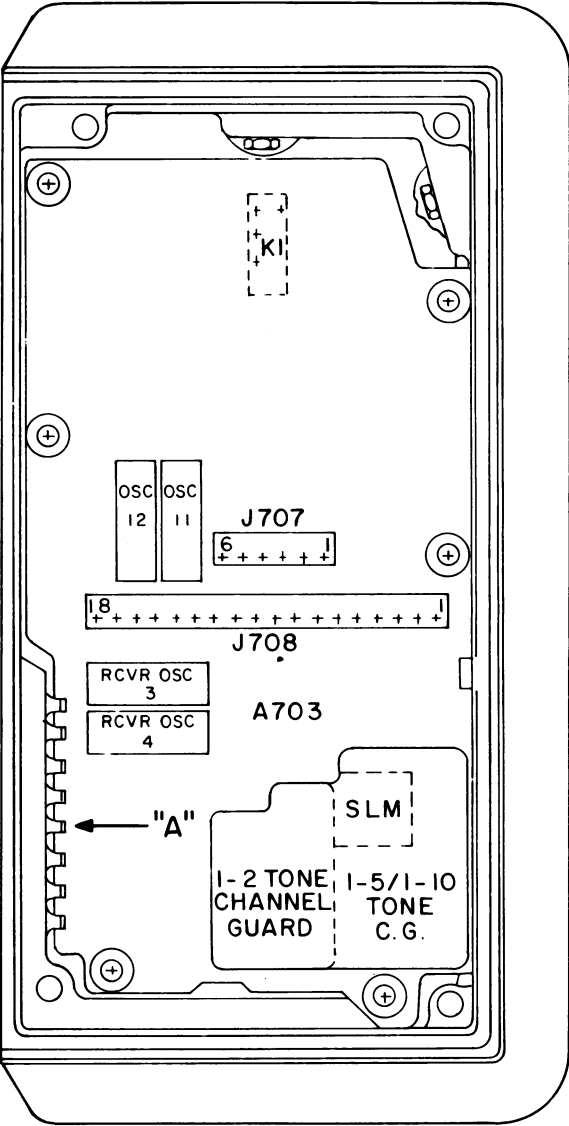
REAR VIEW



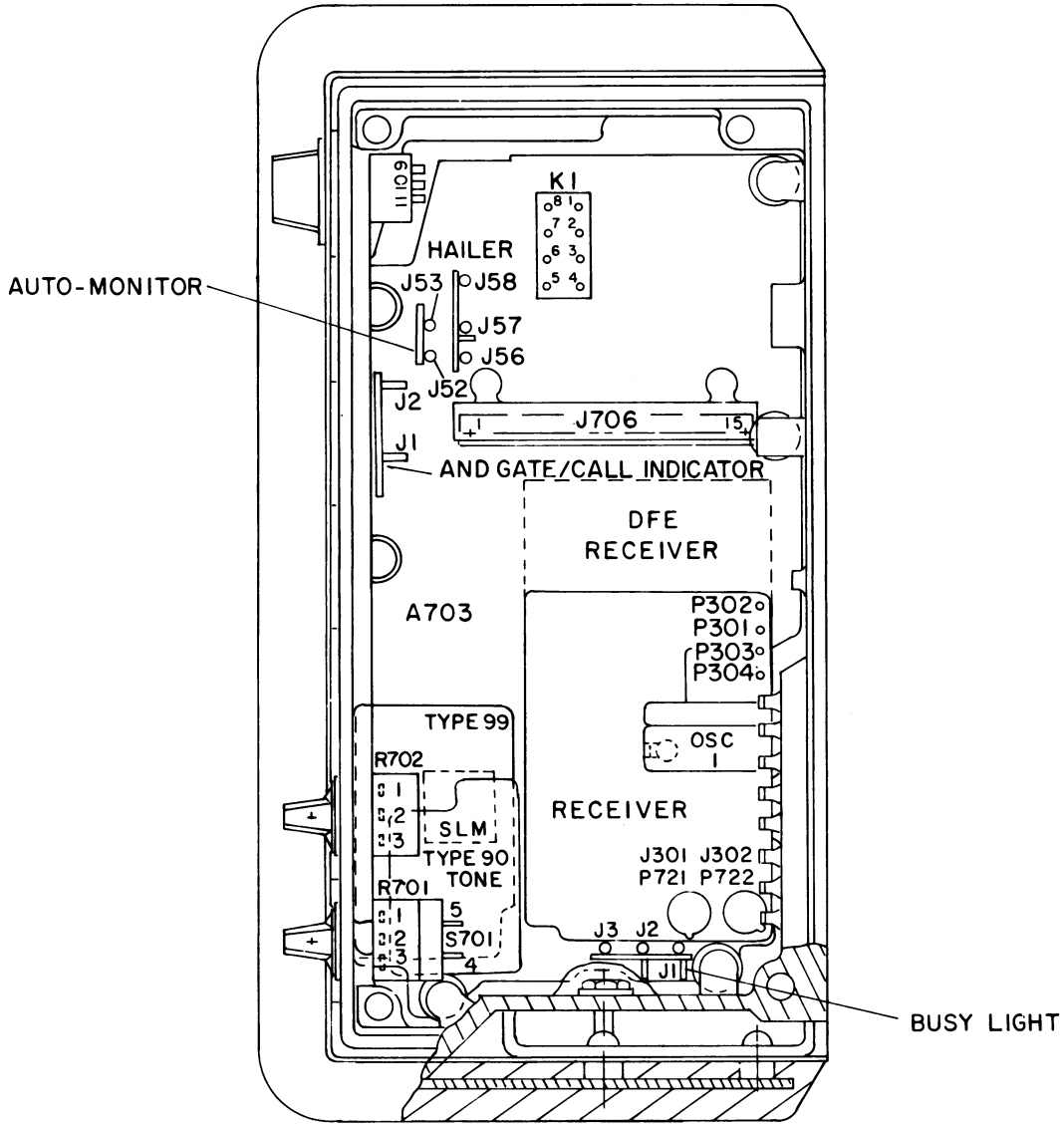
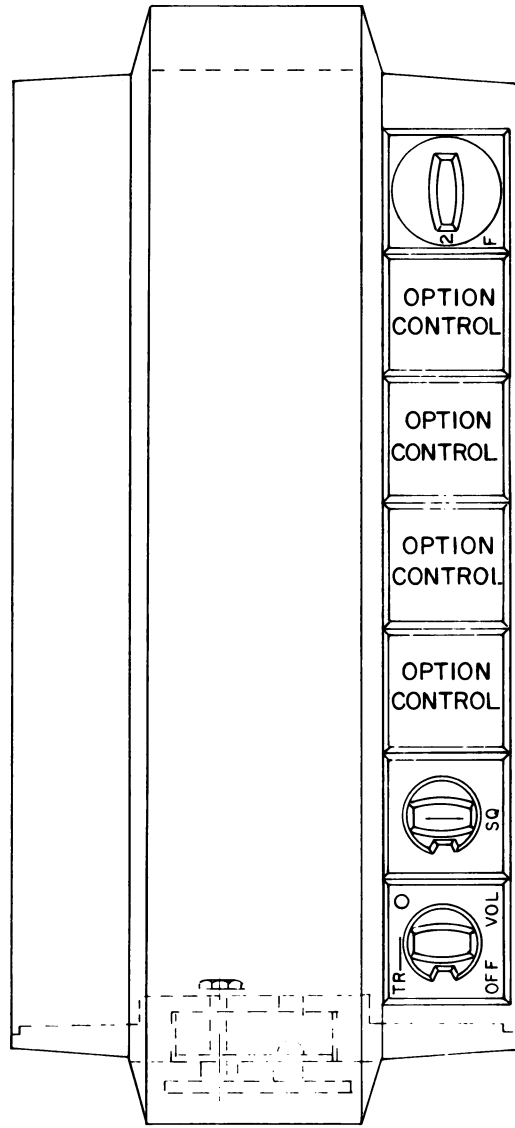
MODULE LAYOUT DIAGRAM

138—150.8 MHz & 150.8—174 MHz
MOTORCYCLE

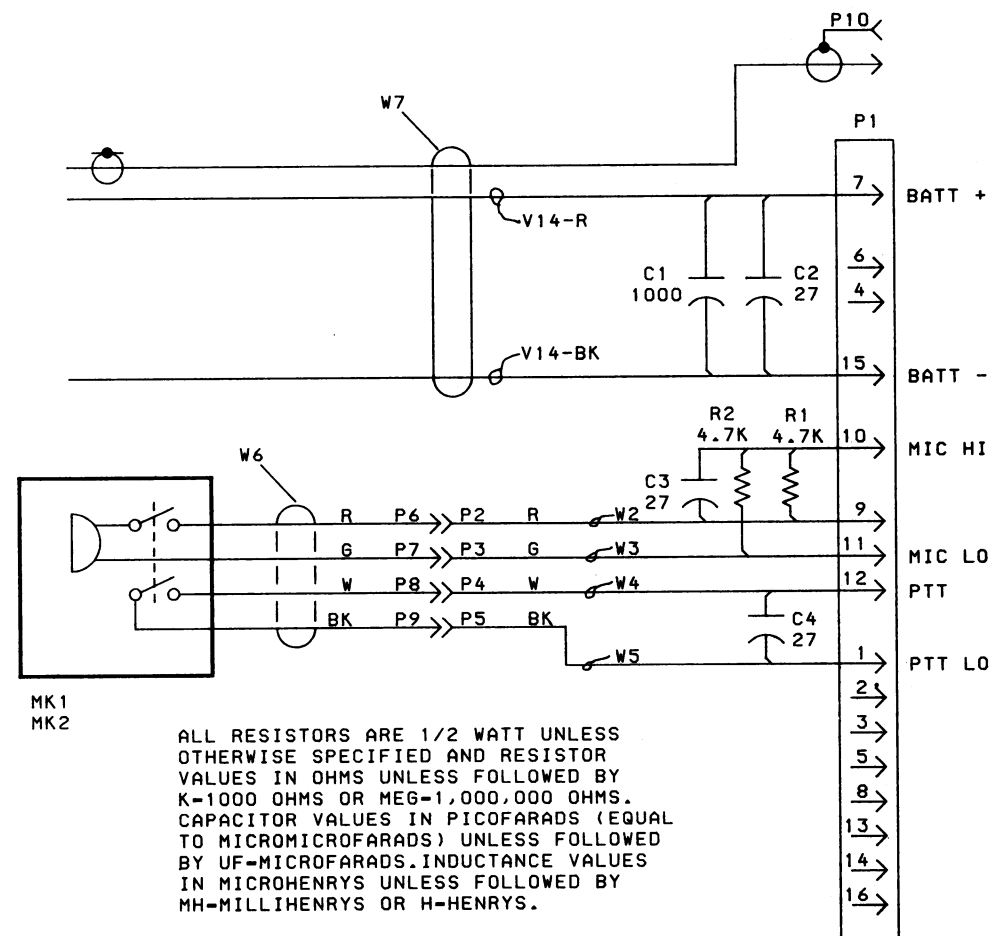
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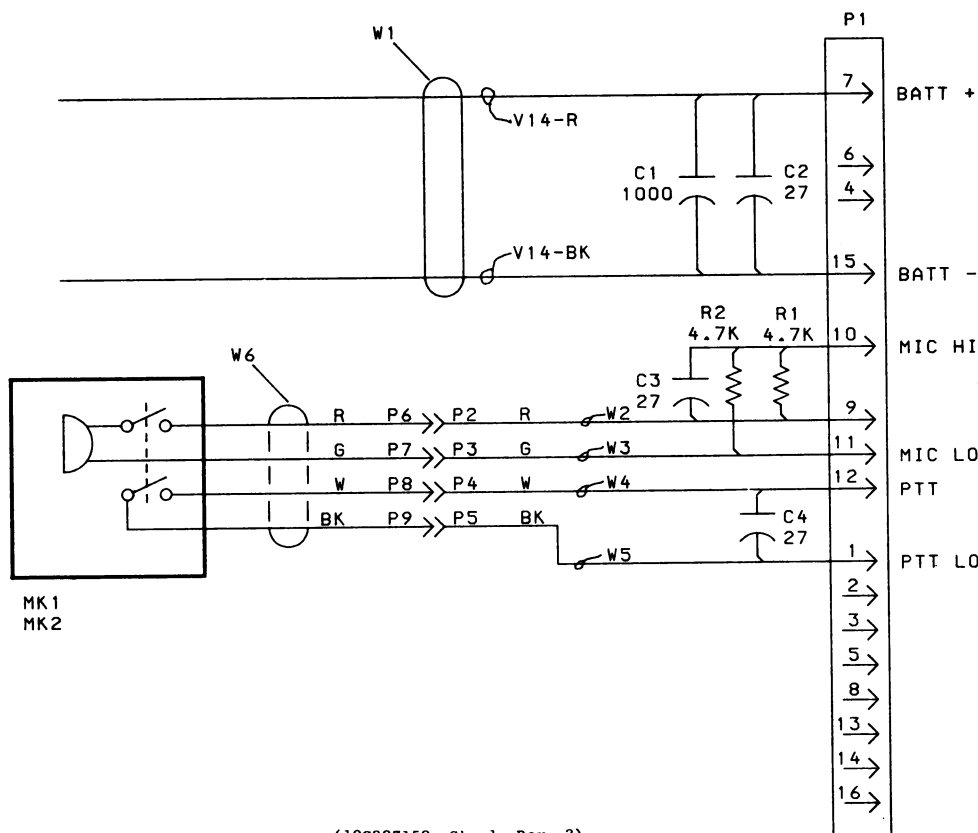
VIEW AT "A"



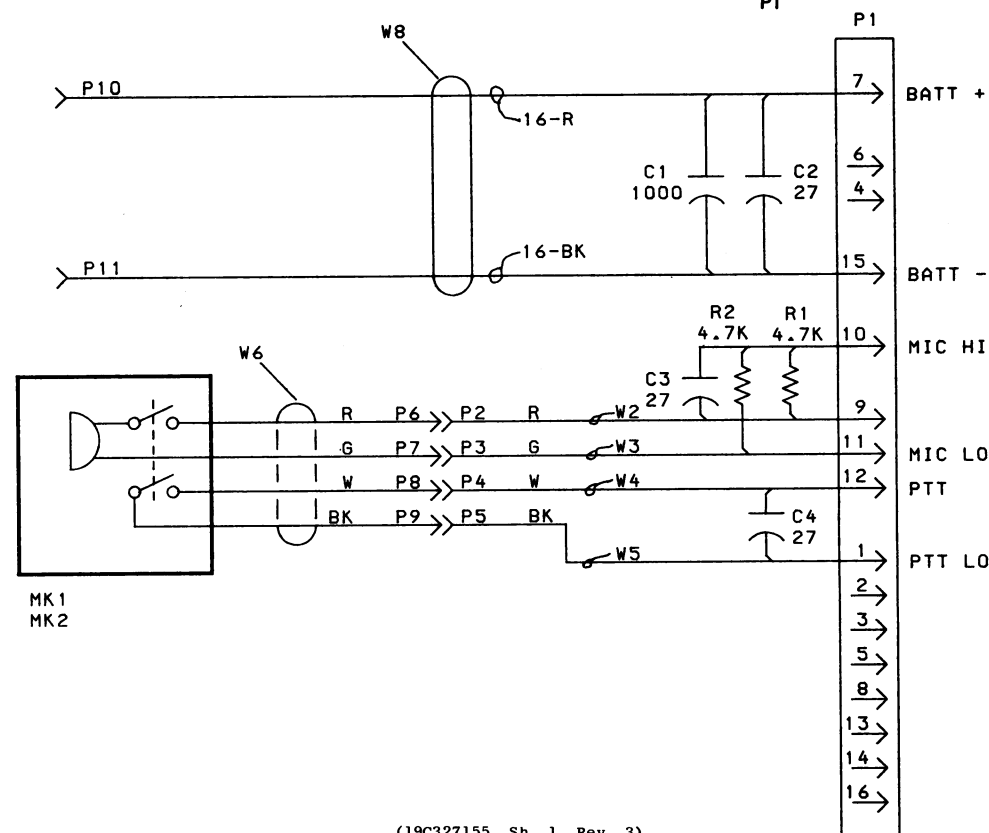
(19D424016, Sh. 3, Rev. 0)



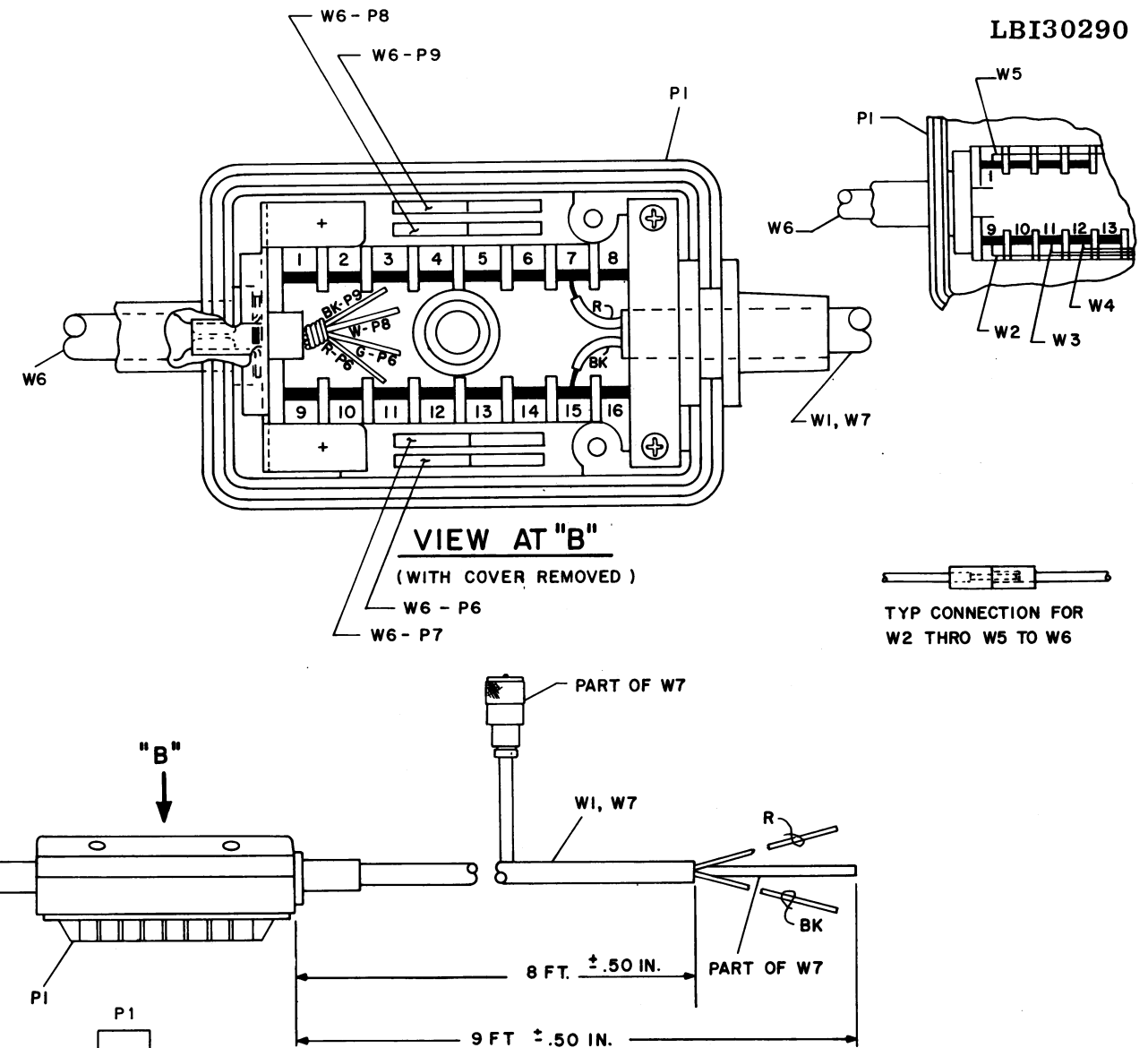
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(19C327152, Sh. 1, Rev. 3)



(19C327155, Sh. 1, Rev. 3)

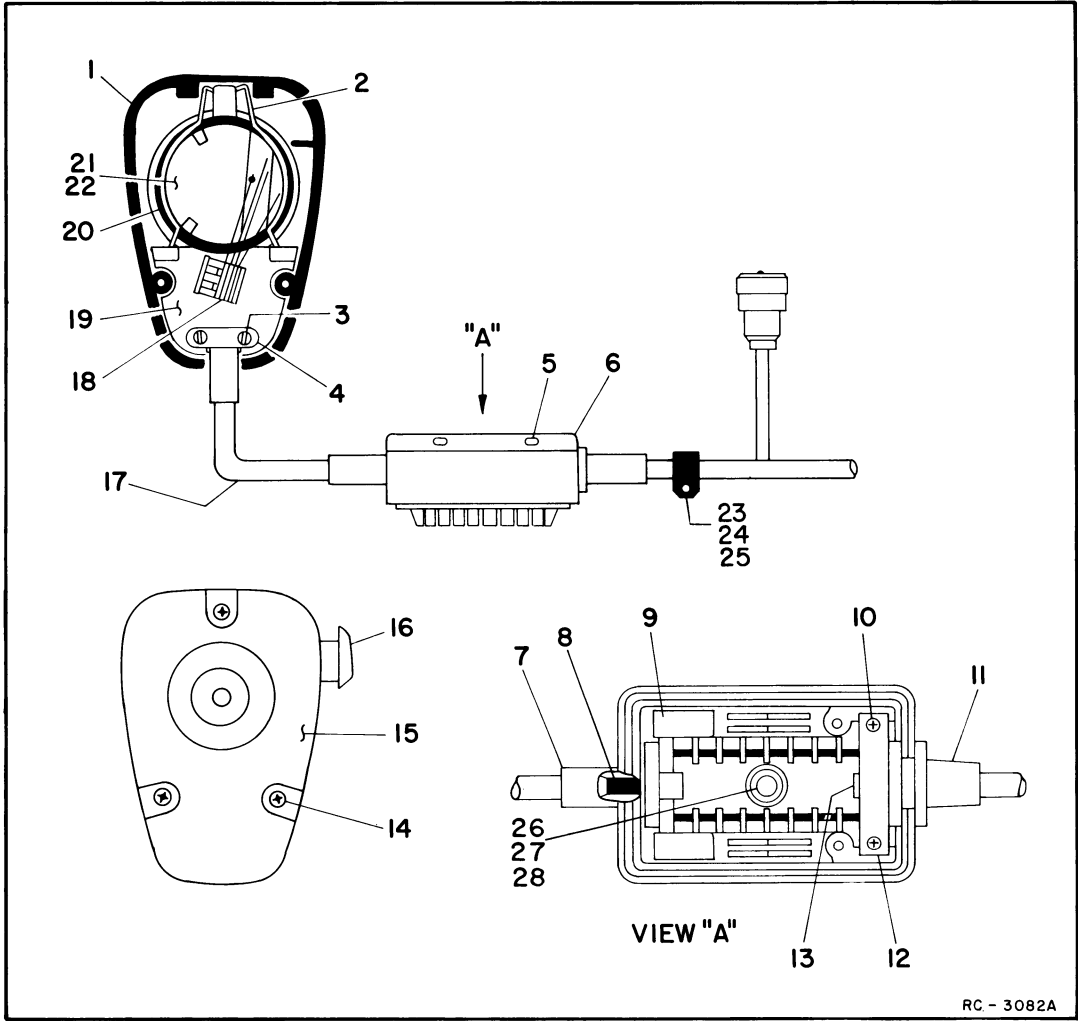


(19C328420, Rev. 0)

SERVICE SHEET

POWER CABLE & MICROPHONE

Issue 1



SERVICE SHEET

POWER CABLE & MICROPHONE

PARTS LIST

LBI30299A

POWER CABLE AND MICROPHONE ASSEMBLY
19C321929G1 STANDARD
19C321929G2 REAR MOUNT
19C321929G3 MOBILE

| SYMBOL | GE PART NO. | DESCRIPTION |
|----------------------------------|-----------------|---|
| ----- CAPACITORS ----- | | |
| C1* | 5494481P11 | Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap. Added by REV A. |
| C2* thru C4* | 19A116114P10044 | Ceramic: 27 pf ±5%, 100 VDCW; temp coef -3300 PPM. Added by REV A. |
| ----- MICROPHONES ----- | | |
| MK1 | 19C320270G10 | Microphone, dynamic. Includes P6-P9. |
| ----- PLUGS ----- | | |
| P1 | 19C321269G2 | Connector: 16 contacts. |
| P2 | 7147199P2 | Contact, electrical: female; sim to Winchester Electronics 21804. (Part of W2). |
| P3 | 7147199P2 | Contact, electrical: female; sim to Winchester Electronics 21804. (Part of W3). |
| P4 | 7147199P2 | Contact, electrical: female; sim to Winchester Electronics 21804. (Part of W4). |
| P5 | 7147199P2 | Contact, electrical: female; sim to Winchester Electronics 21804. (Part of W5). |
| P6 thru P9 | 7147199P1 | Contact, electrical: male; sim to Winchester Electronics 21737. |
| ----- RESISTORS ----- | | |
| R1 and R2 | 3R77P472K | Composition: 4.7K ohms ±10%, 1/2 w. |
| ----- CABLES ----- | | |
| W1 | 19A134268P1 | Conduit, nonmetallic: approx 8 feet long; sim to Co-Operative Ind. C-11000-18. |
| W2 | 19B227262G1 | Cable: approx 3 inches long. (Includes P2). |
| W3 | 19B227262G2 | Cable: approx 3 inches long. (Includes P3). |
| W4 | 19B227262G3 | Cable: approx 3 inches long. (Includes P4). |
| W5 | 19B227262G4 | Cable: approx 3 inches long. (Includes P5). |
| W6 | RP129 | (See item 17 on RC3082). |
| W7 | 19B227391G1 | Cable assembly. |
| W8 | 19A134268P1 | Conduit, nonmetallic: approx 8 feet long; sim to Co-Operative Ind. C-11000-18. |
| MECHANICAL PARTS (SEE RC3082) | | |
| 1 | RP127 | Front Case assembly. (Includes items 14 and 15). |
| 2 | | Retaining spring. (Part of item 19). |
| 3 | | Tap screw, phillips. (Part of item 17). |
| 4 | | Retaining bar. (Part of item 17). |
| 5 | 19A116773P106 | Tap screw, Phillips POZIDRIV®: No. 7-19 x 3/8. |
| 6 | 19D417745P1 | Cover. |
| 7 | 19B219749P1 | Flex relief. |
| 8 | 19A130080P1 | Cable clip. |
| 9 | 19A130903P1 | Support. |
| 10 | 19A116773P105 | Tap screw, Phillips POZIDRIV®: No. 7-19 x 5/16. |
| 11 | 19B226586P1 | Seal. |
| 12 | 19A130897P1 | Strain relief. |
| 13 | 19A134268P1 | Conduit, non-metallic, 8 feet long; sim to Co-Operative Industries Inc. C-11000-18. |

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

| SYMBOL | GE PART NO. | DESCRIPTION |
|--------|--------------|--|
| 14 | | Tap screw, phillips. (Part of item 1). |
| 15 | | Rear Case assembly. (Part of item 1). |
| 16 | RP126 | Switch button kit. |
| 17 | RP129 | Cable assembly. (Includes items 3 and 4). |
| 18 | RP128 | Switch assembly. |
| 19 | RP130 | Grille assembly. (Includes items 2, 20, and 21). |
| 20 | | "O" Ring. (Part of item 19). |
| 21 | | Washer. (Located under cartridge- Part of item 19). |
| 22 | | Dynamic cartridge, 200 ohms nominal imp: Shure Brothers 99A668. |
| 23 | 7488373P2 | Cable clamp, 5/16 inch loop; sim to Thomas Associates TA717-SS5. |
| 24 | N80P21006C6 | Machine screw: No. 1/4-20 x 3/8. |
| 25 | N405P41C15 | Lockwasher, spring type: 1/4 inch. |
| 26 | N22P21022C13 | Cap screw: size No. 1/4. |
| 27 | 19A134297P1 | Lockwasher, steel: sim to Shakeproof 3079-14-00. |
| 28 | 4037064P21 | Washer, non-metallic: .281 ID. |

ADDENDUM #1
TO
Porta●Mobile II™ MAINTENANCE MANUALS
LBI30083A, LBI30230B, LBI30233A, LBI30289
LBI30290A, LBI30382, LBI30383 and LBI30384

When a Porta●Mobile II™ is opened for maintenance or repair the weatherproof integrity is disturbed and water leak spots may occur. This addendum adds to the maintenance manuals listed above, the procedures for restoring a Porta●Mobile II™ back to its original weatherproof condition.

Possible water leak spots when PM II is opened and re-assembled:

- 1) Front cover gasket, back cover gasket, or around any of the 4 back cover mounting bolts. This can be prevented by:
 - a) Applying a light coat of silicone grease, 115205P4 (GE 623) in the groove on the cover gaskets.
 - b) Applying silicone grease under washer on the 4 cover mounting bolts.
 - c) Torque the screws to 19 in/lbs with torque tool.
Do not overtighten.
- 2) If on-off switch or squelch pot is removed from housing, apply silicone grease around base of shaft before installing black washer on shaft. Tighten nut to 2 to 3 in/lbs of torque.
- 3) When power transistor mounting nut is removed, apply white silicone grease, 115205P3 (Insulgrease G 640), to bottom of nut before re-installing. Torque to 6 in/lbs. Overtightening may break the transistor.
- 4) When option switches are added, RTV-162 or Dow RTV 3140 must be used to fill switch keyway slot and also the keyway holes in the housing. If an LED is added with the option RTV must be also applied in the LED hole before installing LED. Apply glyptal to slots in housing before installing option module.
- 5) When speaker is replaced, clean RTV-162 from cover that speaker is mounted on and apply new RTV around the mounting surface cone before mounting speaker.
- 6) If handle is removed, before replacing handle, remove all RTV that was originally applied inside the cavity in housing on the antenna end of the Handle. New RTV (RTV 162) must be re-applied in cavity and in the antenna stud hole before assembling gasket and handle. Also, the RTV or wax must be removed around the mic wires and after handle re-assembly apply Dow RTV-3140. RTV 162 may be used but care must be taken to assure that the RTV fills the hole and flows well around each wire. The handle mounting screw should have glyptal applied to the screw threads before nut is put on and also, nut should be staked with glyptal.