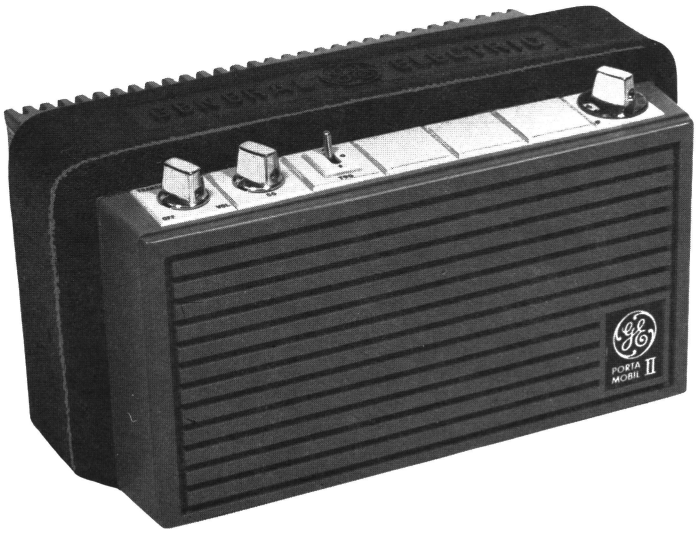
MOBILE RADIO

Porta·Mobile II™

MAINTENANCE MANUAL

406–420 MHz
450–512 MHz
MOTORCYCLE & MOBILE
TWO-WAY FM RADIO



LBI30289A
DATAFILE FOLDER (DF9042)

GENERAL ELECTRIC

Printed in U.S.A.

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WARNING

Although the highest DC voltage in Porta•Mobile II™ 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

EQUIPMENT	TYPE OR PART NUMBER
Transmitter	KT-131-B/C
Receivers:	
Two-Frequency	
406-470 MHz	ER-60-A
470-512 MHz	ER-62-A
Dual Front Ends	
450-470 & 150-174 MHz	ER-78-A, ER-85-A
450-470 & 450-470 MHz	ER-80-A
450-470 & 470-512 MHz	ER-81-A
470-512 & 470-512 MHz	ER-82-A
System Board & Case Assembly	19D423076G3
Front Cover & Audio Amplifier	19C321258G4
Antenna	19B227378G1
Power Cable & Microphone Assembly	19C321929G1
Ignition Noise Filter	19C321889G1

INSTRUCTION BOOK INDEX
FOR
UHF Porta●Mobile II™

PUBLICATION	LBI NUMBER	DATAFILE FOLDER NUMBER
Installation Manual	LBI-30292	DF-9042
Operator's Manual	LBI-30084	-------
Combination	LBI-30289	DF-9042
Transmitter KT-131-B/C	LBI-30085	DF-3167
Receivers:		
ER-60-A	LBI-4638	DF-1102
ER-62-A	LBI-4577	DF-1102
ER-78-A	LBI-4780	DF-1102
ER-80-A	LBI-4780	DF-1102
ER-81-A	LBI-4780	DF-1102
ER-82-A	LBI-4780	DF-1102
System Board and Case Assembly 19D423076G3	LBI-30285	DF-4103
Audio Power Amplifier 19C321258G4	LBI-30098	DF-8397

SPECIFICATIONS*

GENERAL

FREQUENCY RANGE	406-420 MHz, (KT-131-B) 450-512 MHz, (KT-131-C)
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	7.0 amperes (KT-131-B) 0.7 amperes (KT-131-C)

MAXIMUM FREQUENCY SPACING

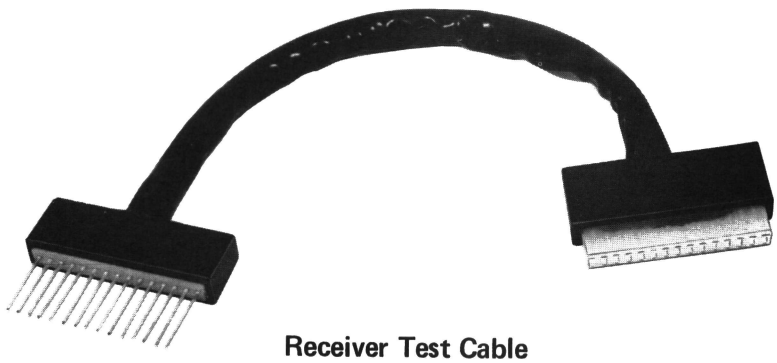
TRANSMITTER			RECEIVER		
Frequency Range	No Degradation	1 dB Degradation (Power Out)	Frequency Range	No Degradation	1 dB Degradation (Sensitivity)
406-420 MHz	+0.4%	5.5 MHz	406-420 MHz	-0.4% (Highest frequency)	-0.8% (center frequency)
450-470 MHz	+0.4%	5.5 MHz	450-470 MHz	-0.4% (Highest frequency)	-0.8% (center frequency)
470-512 MHz	+0.4%	3.5 MHz	470-512 MHz	+3.5 to -0.5 MHz (tuned 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. Freq.	Frequency Range	Frequency Range DFE
J Motorcycle	G 12 VDC Neg. Ground	1 1-2 Watt	5 25 kHz	S Standard	A 1-Freq.Xmit	S Standard	A 1-Freq. Rcvr.	K 406-420 MHz	H 150.8-174 MHz
L Mobile		5 15-32 Watts			B 2-Freq.Xmit	W Channel Guard Encode/Decode	B 2-Freq. Rcvr.	M 450-470 MHz	K 406-420 MHz
					C 3-Freq.Xmit	R 2 Tone CG Encoder	C 3-Freq. Rcvr.	N 470-494 MHz	M 450-470 MHz
					D 4-Freq.Xmit	B T90 Encode/Decode	D 4-Freq. Rcvr.	P 494-512 MHz	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

RF Test Connector
19B227389G1
(Option 2106)



Receiver Test Cable
19C327327G1
(Option 2118)

Transmitter Test Cable
19D424148G1
(Option 2118)

DESCRIPTION

General Electric Porta•Mobile II™ UHF Motorcycle and Mobile combinations are compact, high performance two-way FM radios designed for complete two-way communications in the 406-512 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.

PortaoM•bile 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.

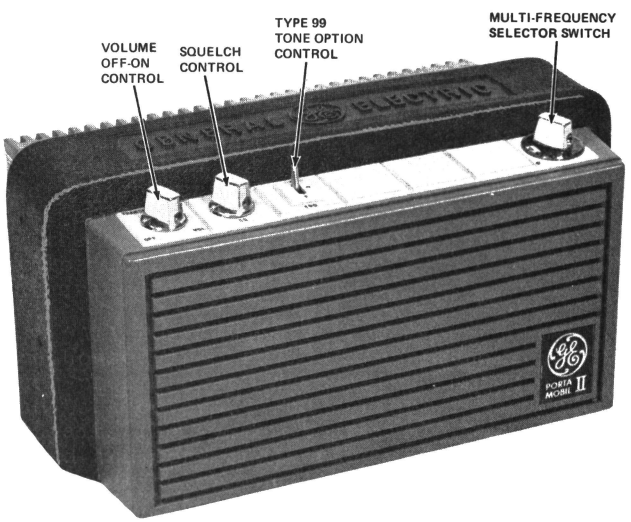


Figure 3 - Operating Controls

TO RECEIVE A MESSAGE

1. Turn the OFF-VOLUME control about halfway 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 sound 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 on the radio 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 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 steelframed 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.

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 hole 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 reapplied 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.

TEST AND TROUBLESHOOTING PROCEDURES

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

In 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.

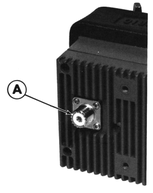
After replacing the oscillator module, re-align the transmitter or receiver as directed in the Alignment Procedure (refer to the applicable maintenance manual).

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.

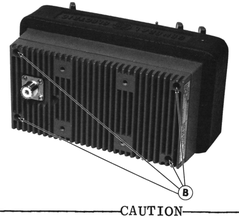
Allen-head #8, wrench 7150729P11 for removing bolts in the case assembly.

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.



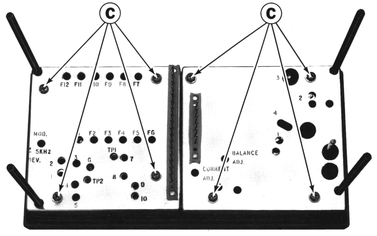
CAUTION

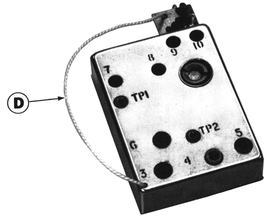
When replacing the front and rear assemblies a torque wrench should be used to tighten the captive Allen-head bolts (B). A torque of 20 inch-pounds should NOT be exceeded.

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.

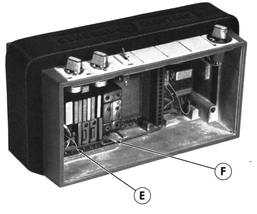
The exciter module can be unplugged by pulling on lifting strap (D).





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.



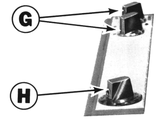
CAUTION

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

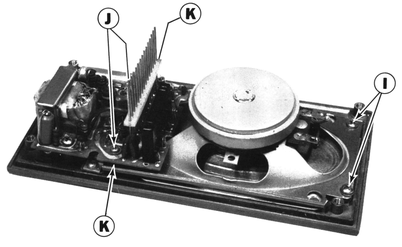
To remove the Volume or Squelch Control, remove the set screw (G) in the side of the control with the tuning tool. Then unscrew the slotted nut and remove the control.

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.

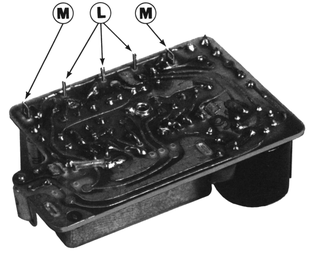


STEP 7

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.

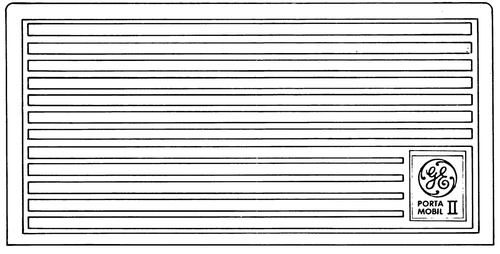


WARNING

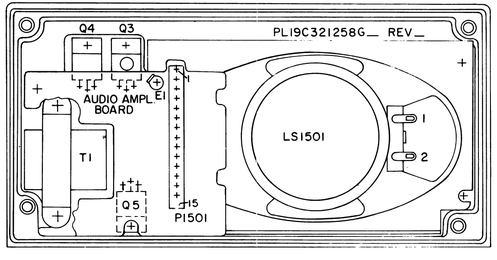
The stud mounted RF Power Transistor used in the PA Module contain Beryllium Oxide, a TOXIC substance. If the ceramic or other encapsulation is opened, crushed, broken or abraded, the dust may be hazardous if inhaled. Use care in replacing transistors of this type.

FRONT COVER

FRONT VIEW

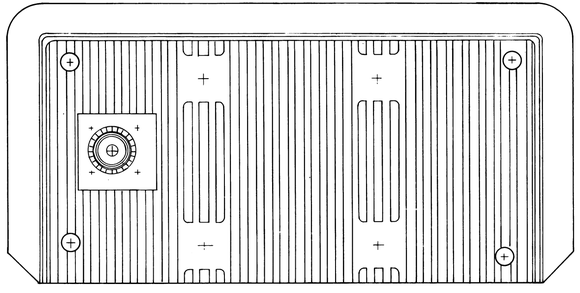


REAR VIEW

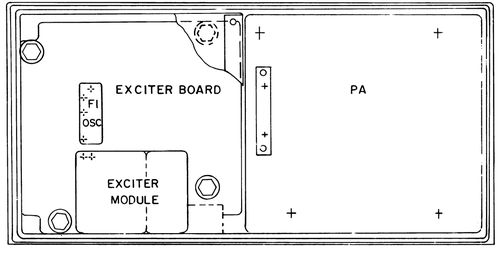


REAR COVER

FRONT VIEW



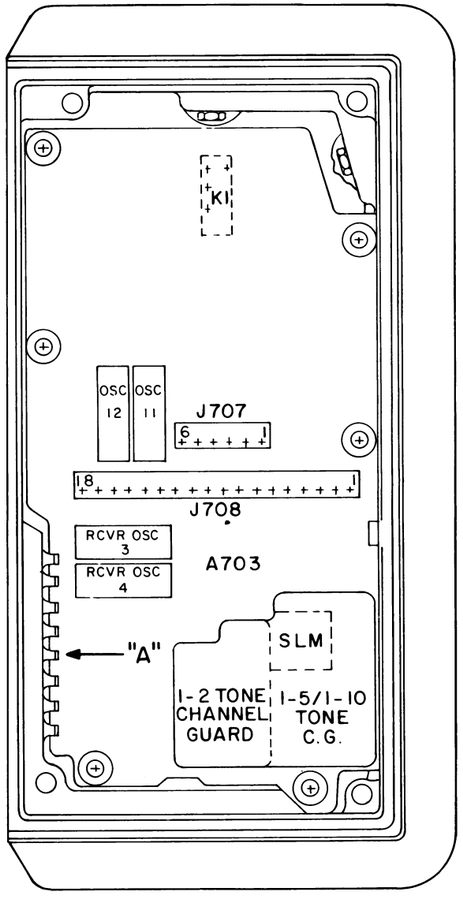
REAR VIEW

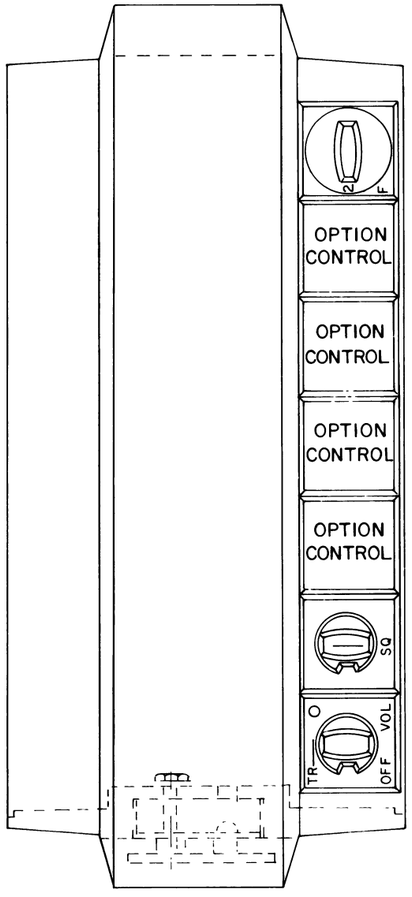


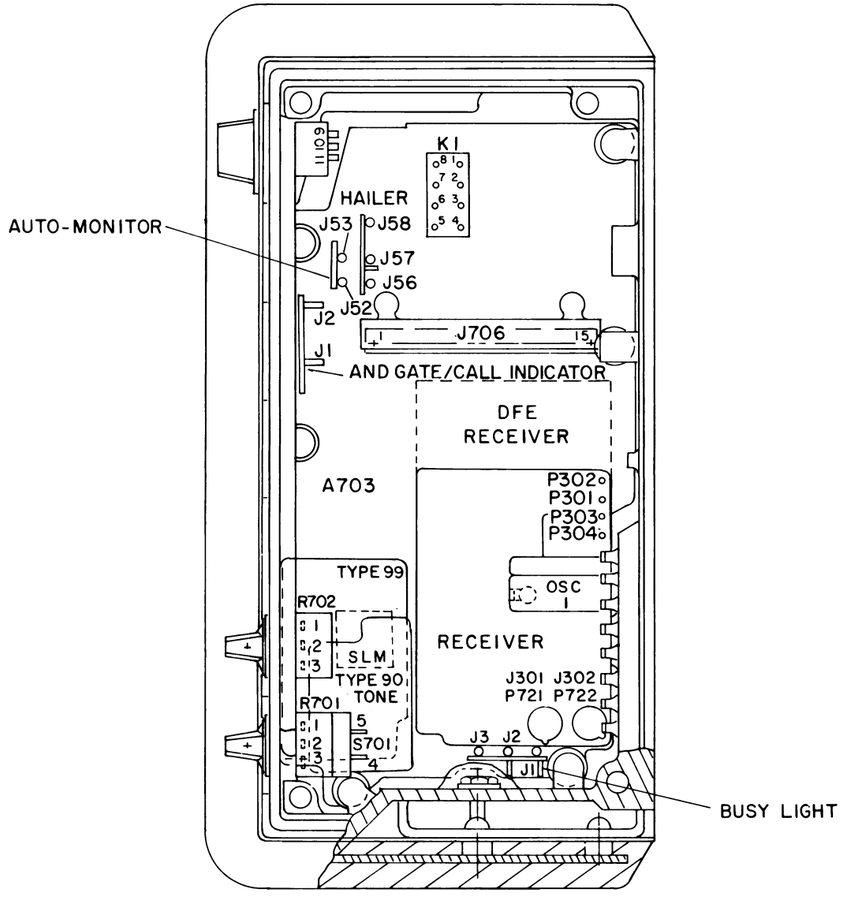
MODULE LAYOUT DIAGRAM

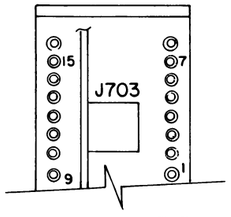
406—420 MHz & 450—512 MHz

(19D424016, Sh. 1, Rev. 2)







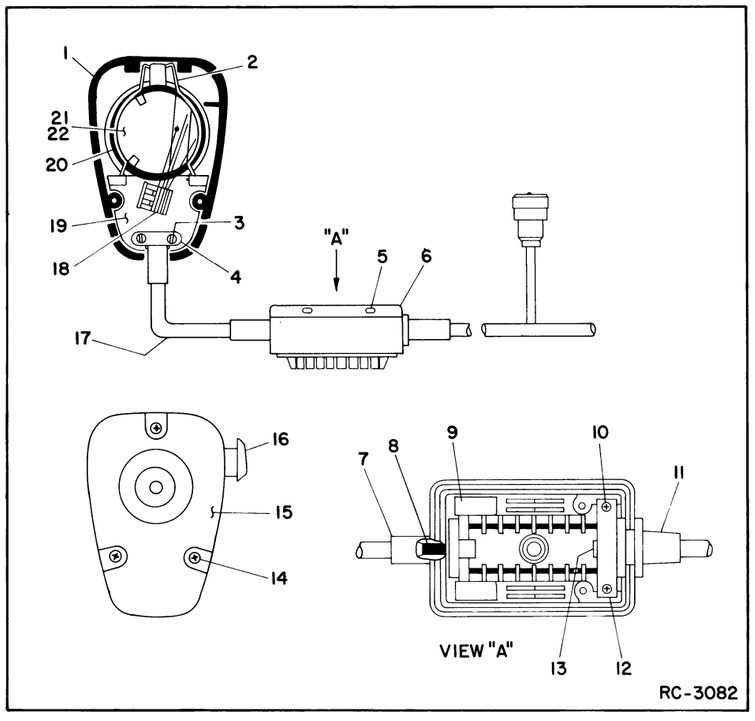


VIEW AT "A"

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

MODULE LAYOUT DIAGRAM

406—420 MHz & 450—512 MHz



PARTS LIST

LBI-30299

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

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - 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: 4700 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 RC-3082).
W7	19B227391G1	Cable assembly.
		MECHANICAL PARTS (SEE RC-3082)
1		Front Case assembly. RP127. (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.
14		Tap screw, phillips. (Part of item 1).
15		Rear Case assembly. (Part of item 1).
16		Switch button kit. RP126.
17		Cable assembly. RP129. (Includes items 3 and 4).
18		Switch assembly. RP128.
19		Grille assembly. RP130. (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.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PARTS LIST

MOUNTING HARDWARE KIT
19A137329G1

SYMBOL	GE PART NO.	DESCRIPTION
	4037064P21	Washer, non-metallic. (Secures Microphone/Power connector to bottom of radio).
	19A134297P1	Lockwasher: sim to Shakeproof 3079-14-00. (Secures Microphone/Power connector to bottom of radio).
	N22P21022C6	Cap screw. (Secures Microphone/Power connector to bottom of radio).
	N405P41C6	Lockwasher, spring type: No. 1/4. (Secures radio to mounting bracket, and Power cable to bottom of radio).
	N80P21006C6	Machine screw, phillips: No. 1/4-20 x 3/8. (Secures Power cable to bottom of radio).
	7488373P2	Clip loop. (Used with Power cable on front mount antenna).
	N22P21010C6	Cap screw. (Secures radio to mounting bracket).
	N402P41C6	Flatwasher: No. 1/4. (Secures radio to mounting bracket).
	7121139P13	Clip loop. (Secures filter to motorcycle frame).
	19A116890P2	Wire, stranded: red, No. 14 AWG. (Connects filter to radio and motorcycle battery).
	19A116890P10	Wire, stranded: black, No. 14 AWG. (Connects filter to radio and motorcycle battery).
	19A115185P2	Retainer strap. (Secures Power cable to frame).
	19A134089P2	Terminal, solderless: wire size No. 18-14; sim to AMP 42281-2. (Connect to filter- Quantity 4).
	19A134090P3	Terminal shell, black nylon. (Used with solderless terminal 19A134089P2).
	19B209260P28	Terminal, solderless: wire range No. 16-14; sim to AMP 33642 LOOSE PC. (Used on Power cable at battery- Quantity 2).
	19A134342P2	Retaining strap. (Secures high band antenna to windshield).
	19A137321P1	Support. (Mounts UHF antenna to rear of radio).
	N80P9006C6	Screw, phillips: panhead, No. 4-40 x 3/8. (Secures UHF antenna cable clip loop).
	N404P11C6	Lockwasher, internal tooth: No. 4. (Secures UHF antenna cable clip loop).
	4029851P3	Clip loop. (Secures UHF antenna cable).
	7488373P4	Clip loop. (Used with Power cable on rear mount antenna).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SERVICE SHEET

POWER CABLE & MICROPHONE