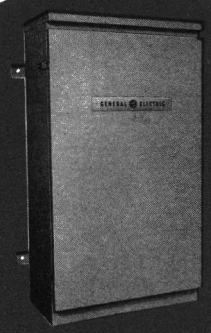
MOBILE RADIO

MASTR
PROGRESS LINE

MAINTENANCE MANUAL



POLE MOUNT STATION

TWO-WAY FM
POLE MOUNT
STATION
COMBINATION

REPEATER CONTROL

LBI-3605J

MICROPHONE

DF-9014

GENERAL ELECTRIC

TABLE OF CONTENTS

WARNING

No one should be permitted to handle any portion of the equipment that is supplied with high voltage; or to connect any external apparatus to the units while the units are supplied with power.

KEEP AWAY FROM LIVE CIRCUITS.

EQUIPMENT INDEX

EQUIPMENT	TYPE OR MODEL NUMBER
Transmitter	ET-55-A through ET-60-H
Receiver	ER-39-A through ER-42-L
Pole Mount Cabinet	7132483G6
Station Power Supply	4EP38A10-12
Control Panel	4KC19A10
Microphone	4EM25A10
Microphone Mounting Kit	7141414G2
Speaker Assembly	19B219618G1
Handle	7145676P2
Alignment Tools (hex slug type) (slotted screw type)	4038831P2 4033530G2

EQUIPMENT	OPTION NO.	TYPE OR MODEL NO.
Station Test Metering Panel: Meter Panel Assembly Meter Switching Panel Assembly	7609	 19A121953G1 19A121460G1
Transmitter Metering Cover	7648	19C303676G3
Receiver Metering Cover	7649	19C303676G2
Heater Kit	3551	4KZ3A1
220/110 volt Stepdown Transformer Kit	7608	19A121971G1

SPECIFICATIONS *

DIMENSIONS (H x W x D)	42" x 23" x 12-1/4"
WEIGHT	Approximately 170 pounds
DUTY CYCLE (Transmit & Receive)	Continuous
INPUT VOLTAGE	117 VAC, ±10%, 50/60 Hz
INPUT POWER	Transmit: 2.9 amps max, 340 watts Receive: 0.8 amps max, 95 watts
OPERABLE TEMPERATURE RANGE	-30°C (-22°F) to +60°C (+140°F)

* These specifications are intended primarily for use by the serviceman. Refer to the appropriate Specification Sheet for complete specifications.

COMBINATION NOMENCLATURE

1st Digit	2nd Digit	3rd Digit	4th Digit	5th Digit	6th Digit	7th Digit	8th & 9th Digits
Mechanical Package	Operating Voltage	RF Power Output Range	Channel Spacing	Control	Number of Freq.	Options	Frequency Range
P Pole-Mount Station	**M** 117 VAC	**5** 16—38 watts	**4** 20 KHz	**Y** Repeater Station	**A** 1-Freq.T 1-Freq.R	**S** Standard	**11** 25—33 MHz
		6 38—64 watts	**6** 30 KHz			**U** Channel Guard	**22** 33—42 MHz
		7 64—128 watts	**7** 40 KHz				**33** 42—50 MHz
			8 50 KHz				**44** 66—77 MHz
			9 60 KHz				**45** 77—88 MHz
							55 132—150.8 MHz
							66 150.8—174 MHz
							77 406—420 MHz
							88 450—470 MHz
							89 470—494 MHz
							91 494—512 MHz

DESCRIPTION

The General Electric MASTR Progress Line Pole Mount Station is a ruggedly built two-way repeater radio station. The station can be mounted outdoors regardless of weather conditions. Both the transmitter exciter and the receiver are fully transistorized. Silicon transistors are used throughout for added reliability. An optional heater kit is available for installations where the climate is such that the cabinet temperature drops below 5°F.

SERVICING

The transmitter, receiver, power supply, control panel, and options are mounted to a "swing-out" rack to provide ease in servicing either side of the component rack. The transmitter and receiver modules are equipped with centralized metering jacks, and are mounted on swing-out chassis for simplified alignment and troubleshooting.

The transmitter and receiver modules may be used interchangeably in mobile and station installations. No modifications are required when transferring the units from one type of operation to another.

The station may also be equipped with an optional built-in Station Test Metering Panel to facilitate servicing.

TRANSMITTER

The transmitter assembly consists of the transistorized exciter board and the power amplifier section. The standard transmitter may be equipped with Channel Guard (tone squelch).

RECEIVER

The fully transistorized receiver is completely contained in an aluminum casting, which provides excellent electrical shielding and reduces the effects of vibration. The standard receiver may be equipped with:

- Channel Guard (tone Squelch)
- Noise Blanker (25-50 MHz & 132-174 MHz

POWER SUPPLY

Station Power supply Model 4EP38A11 provides operating voltages for both the transmitter and receiver. In addition to plate, screen and bias voltages for the transmitter, the power supply provides:

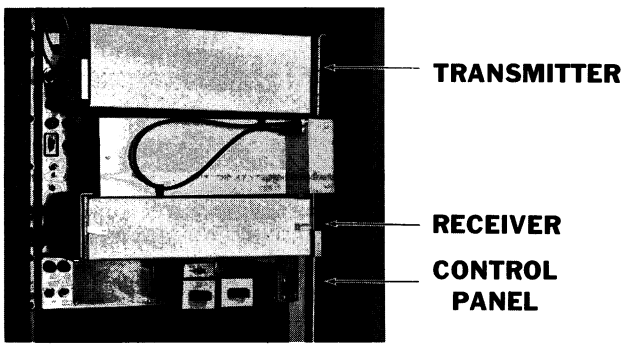
- Regulated -20 volts for the transistorized transmitter exciter-board.
- Regulated +10 volts for the receiver and for transmitter Channel Guard.
- Regulated +12.6 volts transmitter filaments, receiver audio, relay and pilot lights.

Antenna Circuits

The receive antenna is connected to the left socket and the transmit antenna to the right socket on the antenna mounting bracket. From the antenna mounting bracket, the receive antenna is connected to receiver jack J441 and the transmit antenna to transmitter jack J103.

Heater (Optional) (4KZ3A1)

The Heater is an option used where the climate is such that an auxiliary cabinet heater is required. The heater consists of a 250-watt heater strip and a temperature-operated switch. When the temperature of the cabinet drops below 5°F, the switch closes, thereby applying power to the heater strip. When the temperature rises above 5°F, the heater will be turned off by the opening of the switch. The heater strip is usually mounted on the bottom of the cabinet on the inside in a convenient location. Splice one lead from the temperature switch to a lead from the heater strip. Connect other lead from the temperature switch to Power Supply EP-38-A, TB502-14 and other lead from heater strip to TB502-15. For complete Installation Instructions of Heater Kit refer to EBI-4353.



Front View

CONTROL PANEL

The Control Panel contains the AC input circuit, audio coupler, carrier operated switch, 3-minute limit timer, drop-out delay timer and the Channel Guard filter (if used). The panel is mounted on the chassis mounting frame below the Transmitter-Receiver Power Supply.

AC Input

The 117-volt AC input is connected directly to TB706-1 and 2. All power to the station is controlled by switch S701 on the Control Panel.

An optional 220/110 volt AC Stepdown Transformer Kit is available for use when the input line voltage is 220 volts AC (nominal).

WARNING

117-volts AC is always present at TB706-1 and 2, even when S701 is in the OFF position. Always use care when servicing the Control Panel.

MICROPHONE (MODEL 4EM25A10)

A microphone is mounted inside the station for use during service and maintenance work by the serviceman. The Microphone is connected to mike jack J902 located on the front side of the power supply.

SPEAKERS

Speaker Assembly

Speaker Assembly 19B219618G1 is used in later station combinations, and provides an audio output of 1.5 Watts. The speaker assembly mounts on the chassis of Transmitter-Receiver power supply Model 4EP38A12.

NOTE

When a speaker is not used, a 3.5-ohm, 10-Watt resistor must be connected from TB501-11 to TB502-5 as a substitute for the speaker load impedance.

Speaker 4EZ16A20

Speaker Model 4EZ16A20 is used in earlier station combinations, and provides an audio output of 5 Watts, an attenuator is located on the speaker case for adjustment of audio output level by the serviceman.

The 4EZ16A20 is available as an external speaker option.

INITIAL ADJUSTMENT

After the MASTR Pole Mount Station has been installed as described in the Installation Manual, the transmitter, receiver, power supply, and control panel must be adjusted by an electronics technician who holds a 1st or 2nd Class FCC Radiotelephone or Radiotelegraph license before the station can be placed in operation.

TEST EQUIPMENT REQUIRED

The following test equipment is required for the adjustment of both transmitter and receiver:

1. A tuning tool and a screwdriver.
2. GE Test Meter Model 4EX3A10, 4EX8K11, Station Test Metering Panel (Optional), or a 20,000 ohms-per-volt multimeter.
3. A signal source operating at the system frequency (preferably the transmitter which will normally be monitored by the receiver).

TRANSMITTER ADJUSTMENT

The initial adjustment for the transmitter includes:

- Loading the power amplifier into the antenna.
- Checking the frequency and modulation.

For the Initial Adjustment procedure, refer to the ALIGNMENT PROCEDURE in the MAINTENANCE MANUAL for the transmitter.

RECEIVER ADJUSTMENT

The initial adjustment for the receiver includes:

- Zeroing the receiver to the system operating frequency.
- Matching the antenna transformer to the antenna.

For the Receiver Initial Adjustment Procedure, refer to the FRONT END ALIGNMENT PROCEDURE in the MAINTENANCE MANUAL for the receiver.

POWER SUPPLY ADJUSTMENT

The initial adjustment for the power supply includes:

- Turning switch S501 ON.
- Adjusting VOLUME (R511) and SQUELCH (R512) controls as follows: Set the SQUELCH Control to the point at which the noise disappears, then set VOLUME Control to optimum listening level.

CONTROL PANEL ADJUSTMENT

The initial adjustment for the control panel includes:

- Turning power switch S701 ON.
- Adjusting AUDIO COUPLER LEVEL Control (R2) on Audio Coupler Circuit Board.

For the complete adjustment procedure, refer to the control panel MAINTENANCE MANUAL.

MAINTENANCE

The Pole Mount Station is designed for ease in servicing and minimum of maintenance. The chassis units are mounted on a "swing-out" frame for quick servicing of both sides of each component chassis. Swing the chassis frame out as follows:

1. Remove bolt holding top of left mounting frame to cabinet back.
2. Remove screw or bolt and nut from bottom of left mounting frame holding frame to cabinet back bracket.
3. Grasp handle located on upper portion of left mounting frame and pull carefully to swing out the entire chassis assembly.

TEST AND TROUBLESHOOTING PROCEDURES

The individual Maintenance Manual for the transmitter and receiver describe standard test procedures which the serviceman can use to compare the actual performance of the transmitter or receiver against the specifications of the unit when shipped from the factory.

In addition, specific troubleshooting procedures are available to assist the serviceman in troubleshooting the transmitter, receiver and power supply.

For best results in servicing the station, the TEST PROCEDURES should be used in conjunction with the TROUBLESHOOTING PROCEDURES. Both sheets are listed in the Table of Contents of the applicable Maintenance Manual.

PREVENTIVE MAINTENANCE

To insure high operating efficiency and to prevent mechanical and electrical failures from interrupting system operations, routine checks should be made of all mechanical and electrical parts. This preventive maintenance should include the maintenance checks listed on the following page:

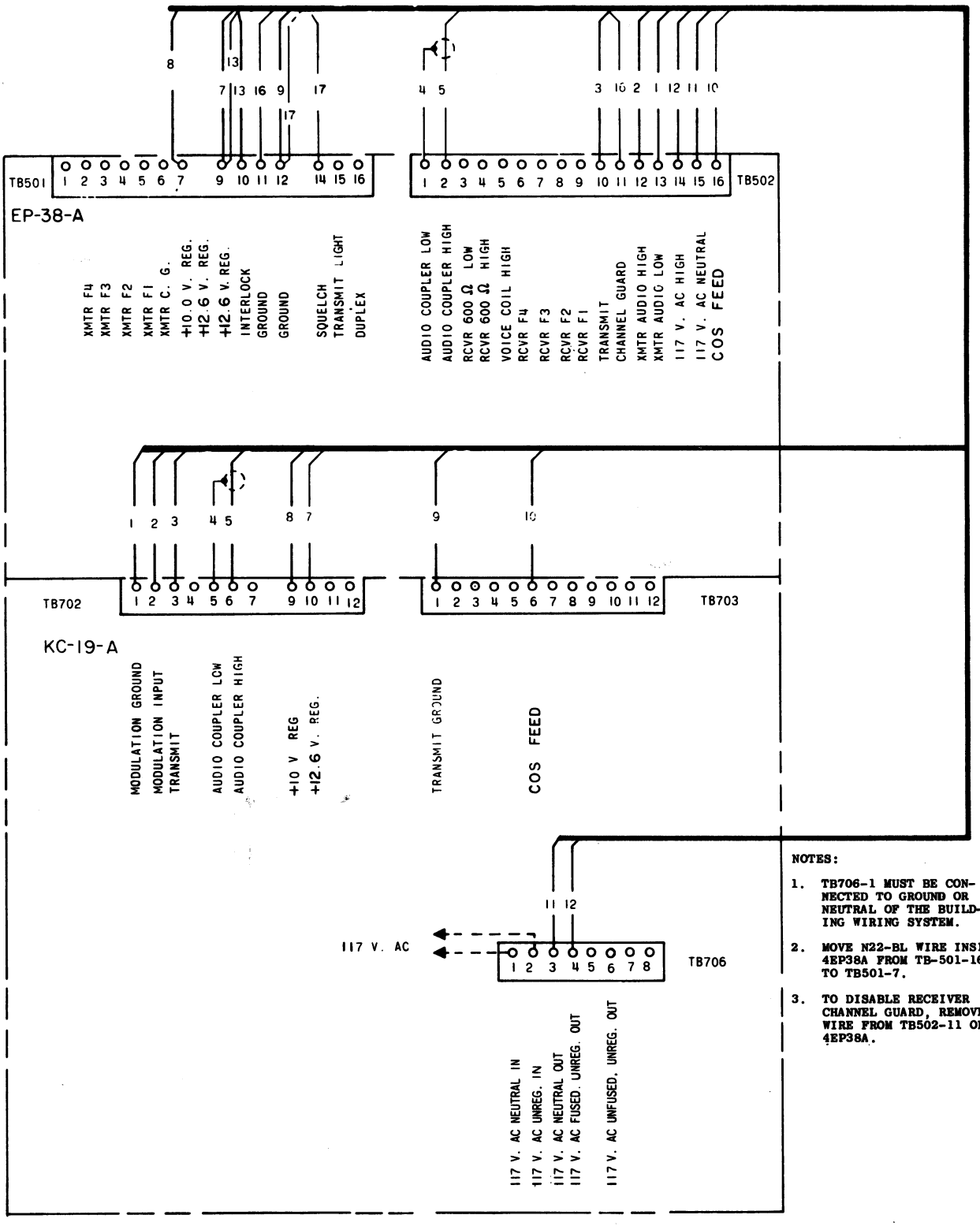
PREVENTIVE MAINTENANCE PROGRAM

CHECK THE FOLLOWING ONCE A YEAR:

1. Transmitter frequency and deviation (FCC requires this check-up ONCE a year). ☐
2. Measure and record the antenna system V.S.W.R. ☐
3. Check input voltage at TB706-1-2 on control panel. Reading should be within 10% of 117 VAC. (Also check during routine service calls). ☐
4. Compare and record transmitter meter readings with voltages taken during initial tune-up. Retune, if necessary. ☐
5. Compare and record receiver meter readings with voltages taken during initial tune-up. Retune, if necessary. ☐
6. Check for positive indication of pressure on transmission line pressure gauge (if pressurized line is used). ☐
7. Clean dust from fan blades and lubricate bearings. ☐
8. Burnish pitted or coated relay contacts to smooth out metallic deposits or remove the coating. ☐

MAKE THE FOLLOWING MAINTENANCE CHECKS DURING ROUTINE SERVICE CALLS:

1. Check antenna lines and mast for mechanical stability. ☐
2. Visually check: ☐
   - External cables ☐
   - Internal cables ☐
   - plugs ☐
   - sockets ☐
   - terminal boards ☐
3. Check for tightness of nuts, bolts, and screws to make sure nothing is working loose from its mounting. ☐
4. Replace tubes as necessary. (It may be convenient to replace all station tubes during the yearly check-up). ☐



NOTES:

1. **TB706-1 MUST BE CONNECTED TO GROUND OR NEUTRAL OF THE BUILDING WIRING SYSTEM.**
2. **MOVE N22-BL WIRE INSIDE 4EP38A FROM TB-501-16 TO TB501-7.**
3. **TO DISABLE RECEIVER CHANNEL GUARD, REMOVE WIRE FROM TB502-11 ON 4EP38A.**

(19D402349, Rev, 8)

INTERCONNECTION DIAGRAM

MASTR POLE MOUNT STATION COMBINATION
REPEATER CONTROL PANEL

PARTS LIST

LBI-3562A

POLE MOUNT STATION CABINET
7132483-G6

SYMBOL	GE PART NO.	DESCRIPTION
	7353495-P5, 18 19, 20	Door Assembly: Weather seal: rubber, Manhatten Division of Raybestos Manhatten Inc.; Passiac, N.J. 1/2 " OD x 1/4" ID x 9'7". A12A2A.
	7769652-G1	Hinge Assembly: (for swing out mounting bracket)
		Hinge, door: Stanley, cat No. 195 with leaves assembled reversed, no swage, without mounting holes. (give all above information when reordering).
		Pull-Latch: Corbin Cab Lock Co. No. 015642SD.
	7769631-G1	Mounting bracket: (mounts on swing away hinge assembly).
	NP148724	Nameplate (GENERAL ELECTRIC).
	N107P9004-C13	Tap screw: No. 4-40 x 1/4. (Used to secure nameplate).
	7763541-P7	Cable clip: (Lower).
	7763541-P6	Cable clip: (Upper).
	N80P15007C13	Screw, phillips: 8-32- x 7/16. (Used with cable clips).
	N210P15C14	Nut: 8-32. (Used with cable clips).
	N403P16C13	Lockwasher: external tooth, No. 8. (Used with cable clips).
	N80P19008C13	Screw, phillips: 12-24 x 1/2. (Used to secure rack panel assemblies).
	N403P21C13	Lockwasher: external tooth, No. 12. (Used to secure rack panel assemblies).
	19A121317-G2	Interconnection Harness.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PARTS LIST

HEATER
MODEL 4KZ3A1

SYMBOL	G-E PART NO.	DESCRIPTION
HR901		Heater Strip: sim to General Electric 51-344.
S901		Thermo-switch: adjusted to +5°F, sim to Fenwall Inc. A-7300.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

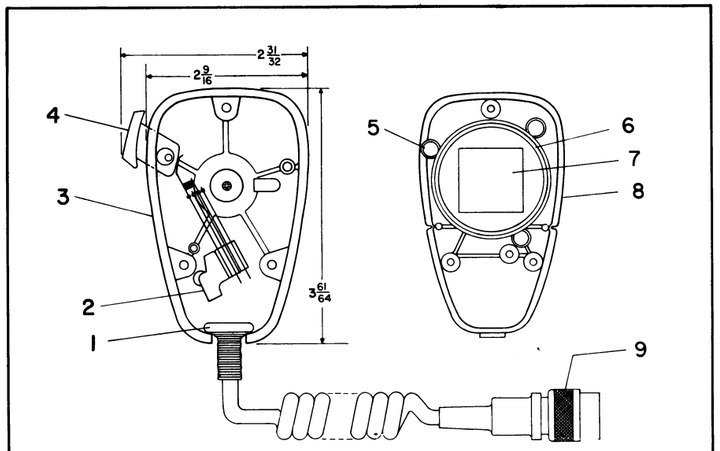
PARTS LIST

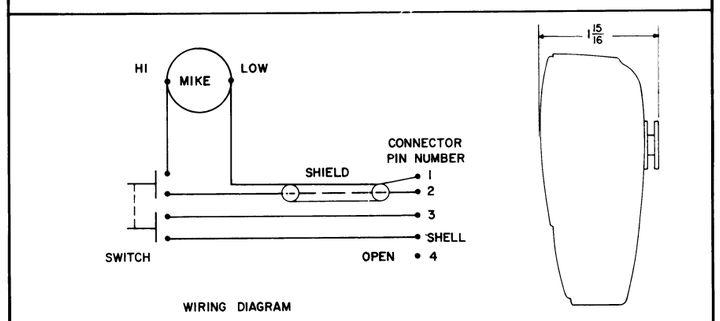
LBI-3558B

MILITARY MICROPHONE
MODEL 4EM25A10
(PL-19B209102-P1)
(SEE RC-1163)

SYMBOL	G-E PART NO.	DESCRIPTION
		MECHANICAL PARTS
		MODEL 4EM25A10
1		Cable clamp. Shure Brothers RP-16.
2		Switch. Shure Brothers RP26.
3		Case (back) and mounting button: plastic. Shure Brothers RP-67.
4		Switch button: red plastic. Shure Brothers RP-25.
5		Spring. Shure Brothers RP-1.
6		Shield. Shure Brothers RP-23.
7		Magnetic controlled cartridge. Shure Brothers RP-13.
8		Case (front) plastic. (Part of item 3).
9		Cable and plug: approx 6 feet long. Shure Brothers RP-14.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.





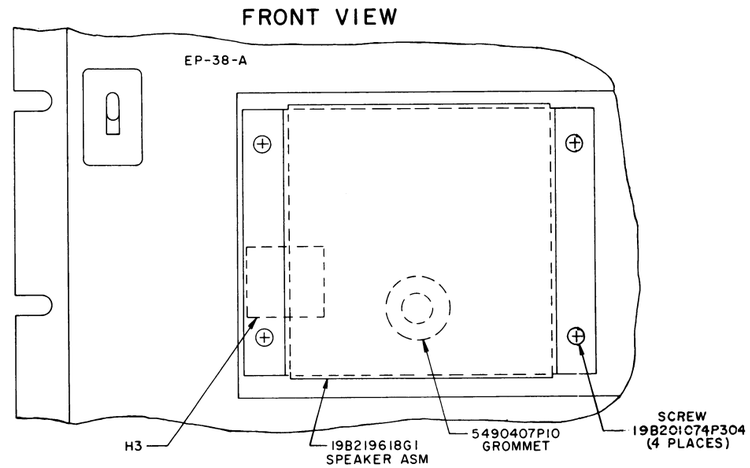
PARTS LIST

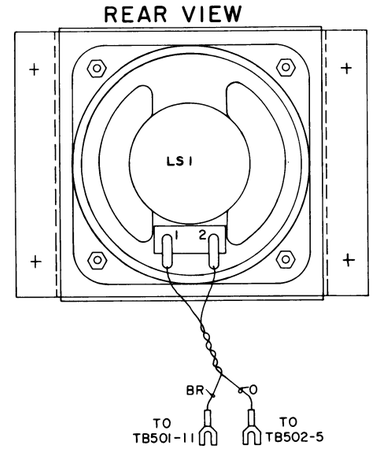
LBI-4427

STATION SPEAKER
19B219618G1

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - LOUDSPEAKERS - - - - - - - - -
LS1	19A115964P1	Weatherproof, Permanent Magnet: 3-1/2 inch, 18 ohm ±10% imp at 1000 Hz, 15-19 ohms DC; sim to Oaktron S-9847.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	19B219615P1	Cover.
	19B209260P103	Terminal, solderless: sim to AMP 60495-1.
	5490407P10	Grommet.
	19B201074P304	Tap screw: No. 6-32 x 1/4.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.





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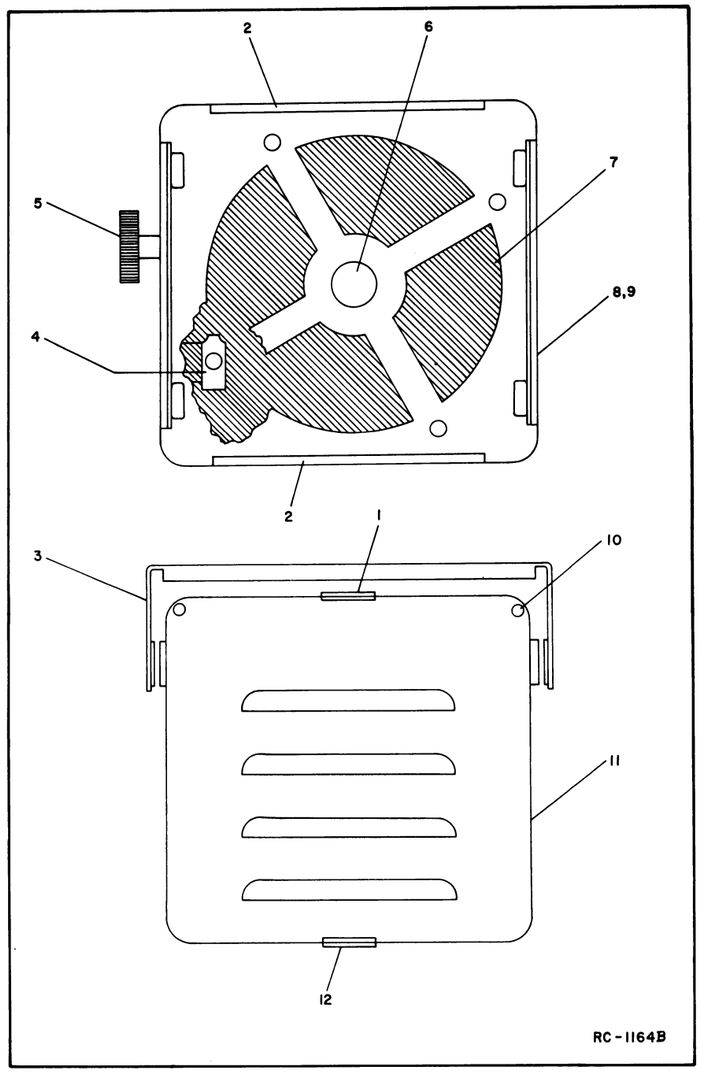

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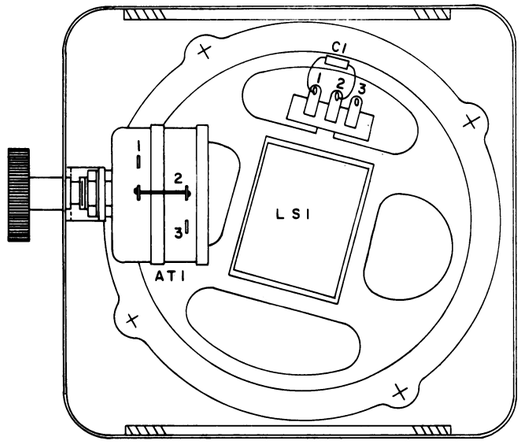
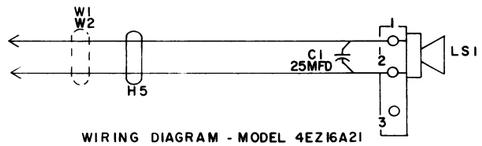


NOTE: ATTENUATOR (ATI) USED ON MODEL 4EZ16A20 ONLY

RC-1363 B



WIRING DIAGRAM - MODEL 4EZ16A21

RC-1118 B

The speaker leads connect to TB501-11 and TB502-5 on the Transmitter-Receiver Power Supply.

SPECIFICATIONS

Audio Power Input:	5-watts
Frequency Range:	300-3000 Hz
Input Impedance:	3.2 ohms
Attenuator:	3.5 ohms

PARTS LIST

LBI-4081

FIVE-WATT STATION SPEAKER

MODEL 4EZ16A20 19D402449-G13
MODEL 4EZ16A21 19D402449-G14

SYMBOL	G-E PART NO.	DESCRIPTION
		- - - - - - - - - - ATTENUATORS - - - - - - - - - -
AT1	7478301-P48	L-pad, variable, audio: 3.5 ohms res, 4 w, 40 db min attenuation max, 294° rotation.
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19B209233-P1	Electrolytic, non-polorized: 25 µf ±20%, 25 VDCW; sim to Sprague 41D.
		- - - - - - - - - - LOUDSPEAKERS - - - - - - - - - -
LS3	19B209422-P1	Permanent magnet: 5 inch, 3.2 ohms ±10% imp, 2.98 ohms ±15% DC res, 7.5 w max operating.
		- - - - - - - - - - - - CABLES - - - - - - - - - - -
W2	7484521-G7	Speaker: 2 conductor with 2 spade tongue terminals, approx 4 feet long.
		MECHANICAL PARTS (SEE RC-1164)
1	5490407-P3	Neoprene grommet.
2	19A121623-P1	(Not used).
3	19A121521-G1	Mounting support.
4	7160861-P20	(Not used).
5	19A115837-P1	Plastic knob. (Used in Model 4EZ16A20).
6	19A12467-P1	(Not used).
7	19C303500-P1	(Not used).
8	19B216269-G3	Can. (Used in Model 4EZ16A20).
9	19B216269-G2	Can. (Used in Model 4EZ16A21).
10	4037072-P10	(Not used).
11	19A121550-G3	Speaker cover.
12	19A115470-P1	Rubber grommet: approx 3/4 inch dia; sim to Atlantic Rubber 2279 (without hole).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

ORDERING SERVICE PARTS

Each component appearing on the schematic diagram is identified by a symbol number, to simplify locating it in the parts list. Each component is listed by symbol number, followed by its description and GE Part Number.

Service Parts may be obtained from Authorized GE Communication Equipment Service Stations or through any GE Radio Communication Equipment Sales Office. When ordering a part, be sure to give:

1. GE Part Number for component
2. Description of part
3. Model number of equipment
4. Revision letter stamped on unit

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired, or should particular problems arise which are not covered sufficiently for the purchaser's purposes, contact the nearest Radio Communication Equipment Sales Office of the General Electric Company.

MAINTENANCE MANUAL

LBI-3605

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

GENERAL ELECTRIC

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