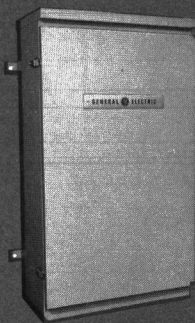


 **MOBILE RADIO**

MASTR

Progress Line

MAINTENANCE MANUAL



POLE MOUNT STATION

**TWO-WAY FM
POLE MOUNT
STATION
COMBINATION**

**REMOTE CONTROL
LBI-3604D**

DF-9014



MICROPHONE

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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-D
Receiver	ER-39-A through ER-42-H
Pole Mount Cabinet	7132483-G6
Station Power Supply	4EP38A10
Antenna Relay (mounts on 4EP38A10)	19A121260-G1
Remote Control Panel	4KC16A10
Microphone	4EM25A10
Microphone Mounting Kit	7141414-G2
Speaker	4EZ16A16
Handle	7145676-P2
Alignment Tools (hex slug type) (slotted screw type)	4038831-P2 4033530-G2

OPTIONAL EQUIPMENT

EQUIPMENT	OPTION NO.	TYPE OR MODEL NUMBER
Priority Search-Lock Monitor	7678 & 7679	19A127679-G1
Receiver Power Supply	7708, 7709, 7804 - 09	4EP39A10
Antenna Relay	7708, 7709, 7807 - 09	19A121260-G2
Antenna Matching Power Supply	7804 - 7809	4EP41A10
Antenna Matching Unit (30-40 MHz)	7804, 7807	4EY8A2
Antenna Matching Unit (40-50 MHz)	7805, 7808	4KY8A3
Antenna Matching Unit (152-174 MHz)	7806, 7809	4KY8C1
Heater Kit	3551	4KZ3A1
Test Meter Panel	7609	19A121953-G1
Meter Switching Panel	7609	19A121460-G1
Transmitter Metering Cover	7648	19C303676-G3
Receiver Metering Cover	7649	19C303676-G2
Intercom-Kit	7620	19A122231-G9
220/110 volt Stepdown Transformer Kit	7608	19A1212971-G1

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, $\pm 10\%$, 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	R Remote Control Station	A 1-Freq.T 1-Freq.R	S Standard	11 25—33 MHz
		6 38—64 watts	6 30 kHz		B 2-Freq.T 1-Freq.R	N Noise Blanker	22 33—42 MHz
		7 64—128 watts	7 40 kHz		C 2-Freq.T 2-Freq.R	U Channel Guard (71.9—156.7 Hz)	33 42—50 MHz
			8 50 kHz		D 1-Freq.T 2-Freq.R	V Channel Guard (162.2—203.5 Hz)	44 66—77 MHz
			9 60 kHz		E 3-Freq.T 3-Freq.R	W Noise Blanker & Channel Guard (71.9—156.7 Hz)	45 77—88 MHz
					F 4-Freq.T 4-Freq.R	X Noise Blanker & Channel Guard (162.2—203.5 Hz)	55 132—150.8 MHz
						P UHS Receiver	66 150.8—174 MHz
						G UHS Receiver & Channel Guard (71.9—156.7 Hz)	77 406—420 MHz
						H UHS Receiver & Channel Guard (162.2—203.5 Hz)	88 450—470 MHz

DESCRIPTION

The General Electric MASTR Progress Line Pole Mount Station is a ruggedly built two-way remote radio station. The station can be mounted outdoors in remote locations 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 Test Set 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:

- One through four frequencies
- 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:

- One through four frequencies
- Channel Guard (tone squelch)
- Noise Blanker (25-50 MHz and 132-174 MHz)

POWER SUPPLIES

Transmitter-Receiver Power Supply

Station Power Supply Model 4EP38A10 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 +13.4 volts for transmitter filaments, receiver audio, relays and pilot lights

Antenna Switching Relay

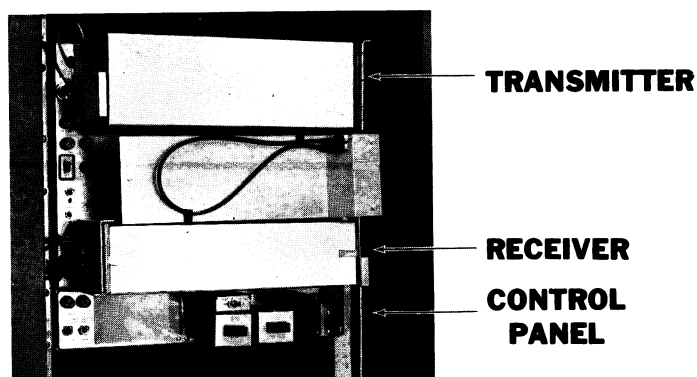
The antenna switching relay (K502) is mounted on the power supply. Keying the transmitter energizes the relay, which connects the transmitter output to the antenna. When the transmitter is unkeyed, K502 is de-energized and the receiver is connected to the antenna.

Receiver Power Supply (Optional)

Receiver power Supply Model 4EP39A10 is provided when the Pole Mount Station is equipped with a second receiver.

Antenna Matching Power Supply (Optional)

The Antenna Matching Power Supply provides the 200 VDC B-plus and filament voltage for the station antenna matching units.



Front View

ANTENNA MATCHING UNITS (Optional)

The Antenna Matching Unit is designed to provide the gain necessary to match two or three receivers to a single antenna where frequency separation requirements are 1.0 MHz or less. The unit consists of a highly selective, dual-tuned preselector circuit with individual cathode follower outputs to properly match the receiver inputs.

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 4EP38A10, TB502-14 and other lead from heater strip to TB502-15. For complete Installation Instructions of Heater Kit refer to EBI-4353.

REMOTE CONTROL PANEL

The Control Panel contains the AC input circuit, remote control kits, and telephone line connections. 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.

WARNING

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

Telephone Lines

The key link in a Remote Control installation is the telephone line from the Dispatcher Unit to the Remote Control Station. The telephone line is connected directly from the dispatcher's console to

the Remote Station wherever it may be located.

There are three methods of telephone line control:

1. Two telephone pair--one for audio and one for control.
2. One metallic pair for both audio and control, simplexing the control voltage from the center-tap of the output transformer to ground.
3. One metallic pair for both audio and control, simplexing the control voltage from one line to the other by splitting the output transformer with a capacitor.

Refer to the MAINTENANCE MANUAL for Remote Control Panel Model 4KC16A10 to obtain complete information on remote control telephone lines.

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.

SPEAKER (Model 4EZ16A16)

Speaker Model 4EZ16A16 is designed for an audio output of five watts. An attenuator is located on the right side of Speaker for adjustment of the audio output level by the serviceman.

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.

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 Portable Test Set Model 4EX3A10 which is especially designed for testing the MASTR Station transmitter and receiver--or a 20,000 ohms-per-volt multimeter--or an optional built-in Station Test Metering Panel.
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 on the power supply includes:

- Turning ON power switch S501.
- Adjusting VOLUME (R511) and SQUELCH (512) controls as follows:

Connect signal generator to receiver at maximum system deviation with 1000 Hz. Adjust VOLUME control R511 for approximately 6.0 VRMS across the 600-ohm telephone line terminals TB701-1 and -2. (Do not reset R511 after this adjustment). Set the SQUELCH control R512 to quieting.

CONTROL PANEL ADJUSTMENT

The initial adjustment for the control panel includes:

- Turning ON power switch S701.
- Adjusting AUDIO LEVEL CONTROL R701.

For the Initial Adjustment Procedure, refer to the MAINTENANCE MANUAL for the control panel.

ANTENNA MATCHING UNIT ADJUSTMENT

The initial antenna matching unit adjustment is peaking T671 and Z671.

For the ADJUSTMENT procedures, refer to the MAINTENANCE MANUAL for the Antenna Matching Unit.

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 the chassis assembly.

Swing the chassis frame out as follows:

1. Remove bolt holding top of left mounting frame to cabinet.
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:

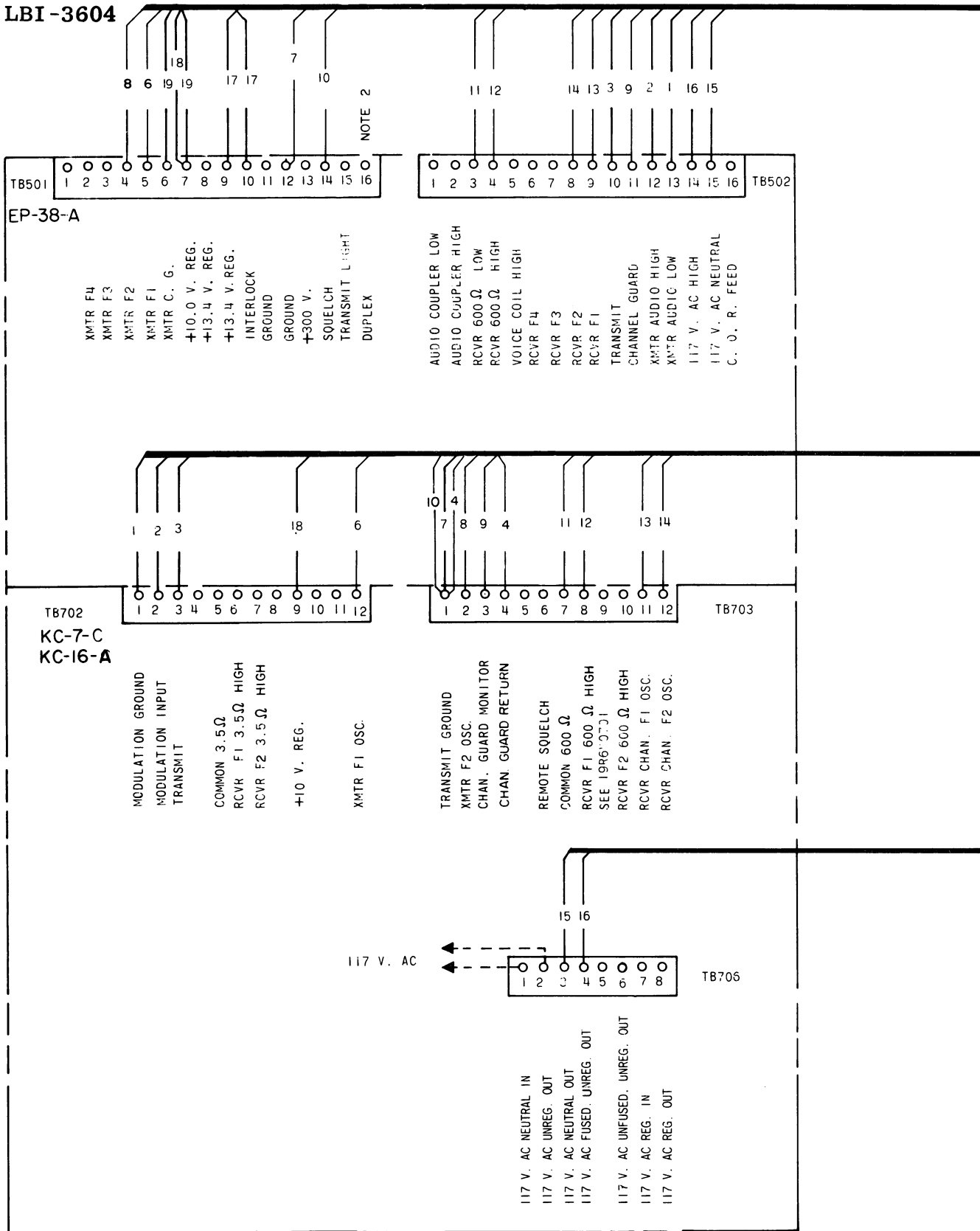
PREVENTIVE MAINTENANCE PROGRAM

CHECK THE FOLLOWING ONCE A YEAR:

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

MAKE THE FOLLOWING MAINTENANCE CHECKS DURING ROUTINE SERVICE CALLS:

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



(19D402348, Rev. 6)

INTERCONNECTION DIAGRAM

MASTR POLE MOUNT STATION COMBINATION REMOTE CONTROL PANEL

PARTS LIST
LBI-3562
POLE MOUNT STATION CABINET
PL-7132483-G6

SYMBOL	G-E PART NO.	DESCRIPTION
	7353495-P5, 18, 19, 20	Door Assembly: weather seal: rubber, Manhattan Div. of Raybestos Manhattan Inc., Passaic, N.J. $\frac{1}{2}$ " OD x $\frac{1}{4}$ " ID x 9"7". A12A2A
	7769652-G1	Hinge Assembly: (for swing out mounting bracket) Hinge, door: Stanley, cat #195 with leaves assembled reversed, no swage, without mounting holes. (give all above information when re-ordering)
	7769631-G1	Pull-Latch: Corbin Cab Lock Co. #015642SD. Mounting bracket: (mounts on swing away hinge assembly.)

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PARTS LIST

HEATER
MODEL 4KZ3A1

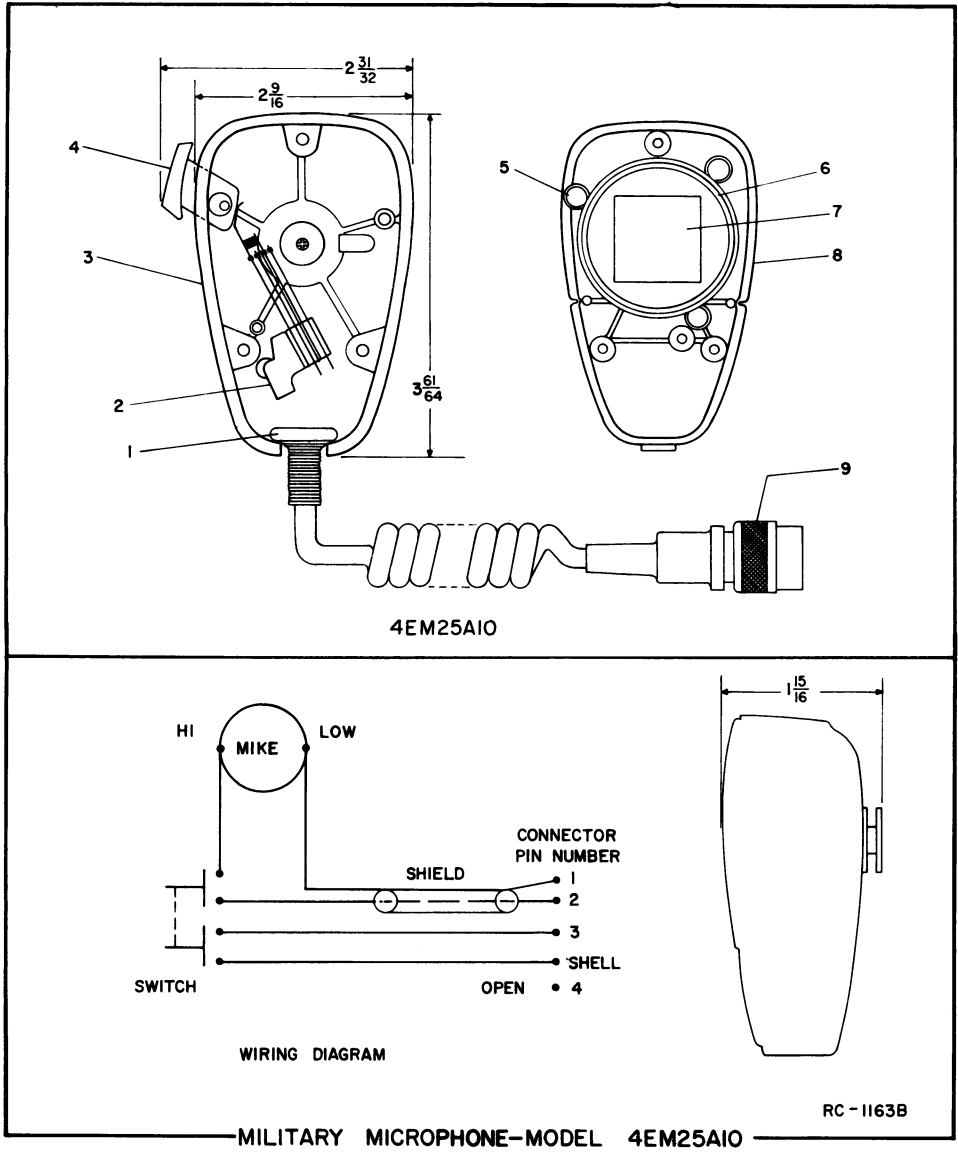
SYMBOL	G-E PART NO.	DESCRIPTION
HR901 S901		Heater Strip: sim to General Electric 51-344. Thermo-switch: adjusted to +5°F, sim to Fenwall Inc. A-7300.

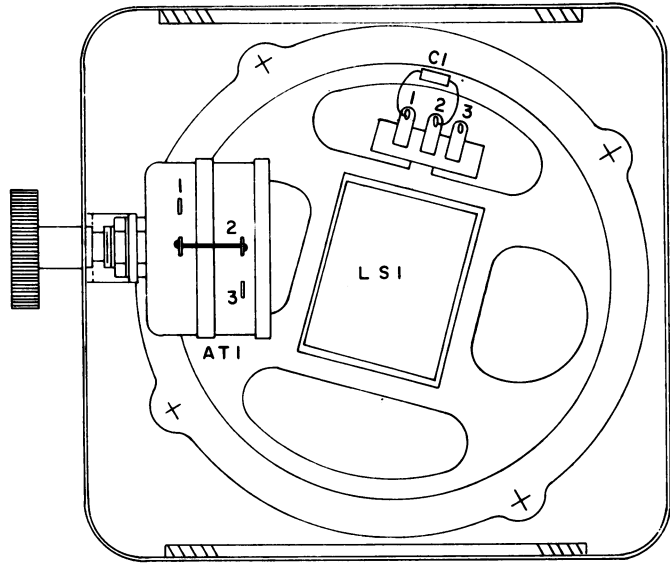
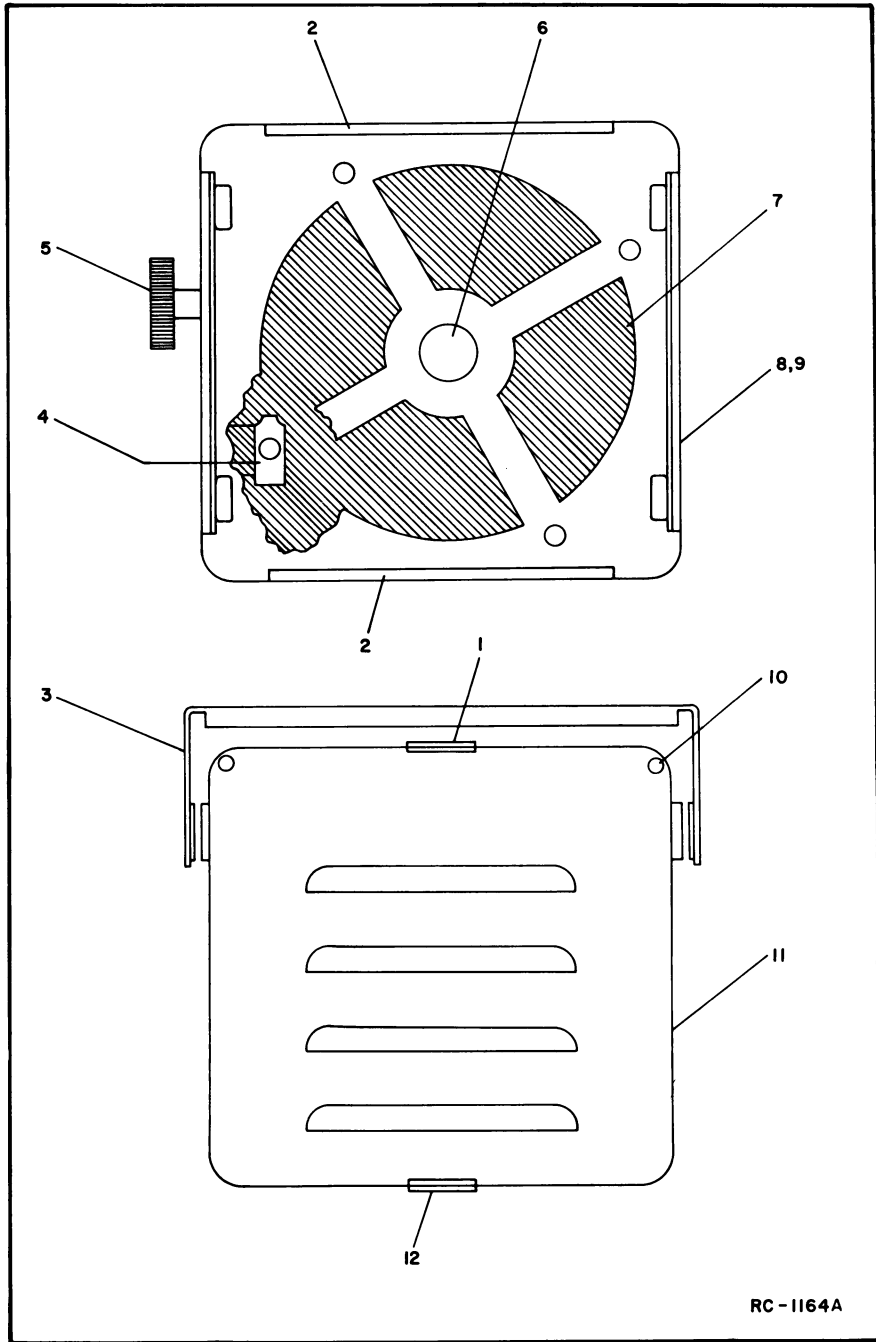
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

PARTS LIST
LBI-3558B
MILITARY MICROPHONE
MODEL 4EM25A10
(PL-19B209102-G1)
(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.

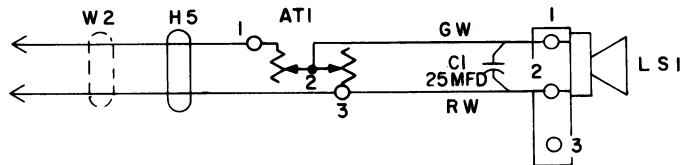
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.





NOTE: ATTENUATOR (AT1) USED ON
MODEL 4EZ16A20 ONLY

RC-1363 B



WIRING DIAGRAM - MODEL 4EZ16A20

RC - 1362 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 -----		
CI	19B209233-P1	Electrolytic, non-polarized: 25 μ f \pm 20%, 25 VDCW; sim to Sprague 41D.
----- LOUDSPEAKERS -----		
LS3	19B209422-P1	Permanent magnet: 5 inch, 3.2 ohms \pm 10% imp, 2.98 ohms \pm 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 - 3604C

Progress Is Our Most Important Product

GENERAL  ELECTRIC

MOBILE MAINT. DEPARTMENT, LYNCHBURG, VIRGINIA 24502, CABLE RECORDING

THE GENERAL ELECTRIC COMPANY, LTD., 100 KING ST. W., TORONTO 40, CANADA