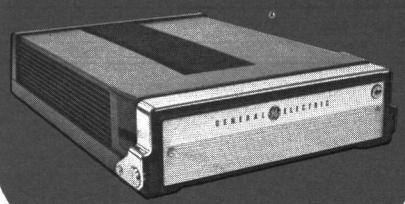
MOBILE RADIO

MASTR *Imperial*

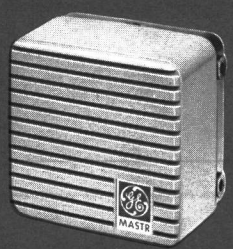
MAINTENANCE MANUAL



MOBILE RADIO

CONTROL UNIT

450-470 MHz; 30-WATT
TWO-WAY
FM
MOBILE
COMBINATIONS
LBI-4378



SPEAKER

DF-9030

GENERAL ELECTRIC

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WARNING

No one should be permitted to handle any portion of the equipment that is supplied with voltage or RF power; or to connect any external apparatus to the units while the units are supplied with power. KEEP AWAY FROM LIVE CIRCUITS.

EQUIPMENT INDEX

EQUIPMENT	MODEL OR TYPE NUMBER
Transmitter	KT-16-A, B
Receiver	ER-42-E
Control Unit	EC-59-A
Power Regulator	EP-77-A
Five-Watt Speaker	4EZ16A23
Microphone	4EM25M10
450-470 MHz Antenna	4EY12A13
Fuse Assembly 15-Amp Fuse	19B216021G4 1R11 P4
Mounting Frame	19C303430G1
Mounting Hardware Trunk Mount Front Mount	 19A121626G2 19A121626G1
Battery Cables	7147499G6
Power Cable Trunk Mount Front Mount	 19C303601G2 19C303601G1
Trunk-Mount Control Cable (18-Foot) One-Frequency Multi-Frequency	 19C303626G1 19C303626G3
Ignition Switch Cable	19A121454G1
Microphone Bracket	7141414G2
Key	5491682P8
Alignment Tools Hex Slug Type Slotted Screw Type	 4038831P2 4033530G2

OPTIONAL EQUIPMENT

EQUIPMENT	MODEL OR TYPE NUMBER
Carrier Control Timer, Option 7348	19A127875G2
Trunk-Mount Spacer Kit, Option 7082	19A121884G1
23-Foot, 12-Volt Power Cable, Option 7083	19C303601G3
23-Foot Control Cable One-Frequency, Option 7084 Multi-Frequency, Option 7085	 19C303626G2 19C303626G4

SPECIFICATIONS*

DIMENSIONS (H X W X D)	
Trunk-Mount	3-7/8" x 13-1/2" x 19"
Front-Mount	3-7/8" x 13-1/2" x 19-7/8"
WEIGHT	51 pounds
BATTERY DRAIN	
Receiver (at 13.8 VDC)	
Standby (Squelched)	200 milliamperes
Standby (Unsquelched)	1.2 amperes
Transmit (at 13.6 VDC)	9.5 amperes
DUTY CYCLE	Receiver, 100% - Transmitter, 20% EIA
OPERABLE TEMPERATURE RANGE	-30°C to +60°C (-22°F to +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	Mounting	Number of Freq.	Options	Frequency Range
M Mobile Unit	**K** 12-VDC Unit	**5** 16-38 Watts	**5** 25 kHz	**T** Trunk-Mount Mobile	**A** 1-Freq.T 1-Freq.R	**S** Standard	**88** 450-470 MHz
				F Front-Mount Mobile	**B** 2-Freq.T 1-Freq.R	**U** Channel Guard	
					C 2-Freq.T 2-Freq.R	**P** UHS Receiver	
					D 1-Freq.T 2-Freq.R	**G** UHS Receiver & Channel Guard	
					E 3-Freq.T 3-Freq.R		
					F 4-Freq.T 4-Freq.R		

DESCRIPTION

MASTR Imperial mobile radio combinations are highly reliable, ruggedly constructed units that are designed to meet the most stringent requirements in the field of two-way radio. The radios are fully transistorized - using silicon transistors for added reliability. Since no tubes are used, the MASTR Imperial is ready to transmit at full power the instant the radio is turned on.

No high-voltage power supply is required as the highest voltage in the radio is supplied by the vehicle battery. A power regulator assembly provides regulated voltages for the transmitter exciter and receiver, and contains sensing and control circuitry for protection of the transmitter output transistors.

Centralized metering jacks in the transmitter and receiver permit simplified alignment and troubleshooting. A module layout of the radio is shown in Figure 1.

TRANSMITTER

The transmitter assembly consists of a transistorized exciter and power amplifier assembly. The standard transmitter may be equipped with:

- One through four frequencies
- Channel Guard (tone squelch)
- Carrier Control Timer Option

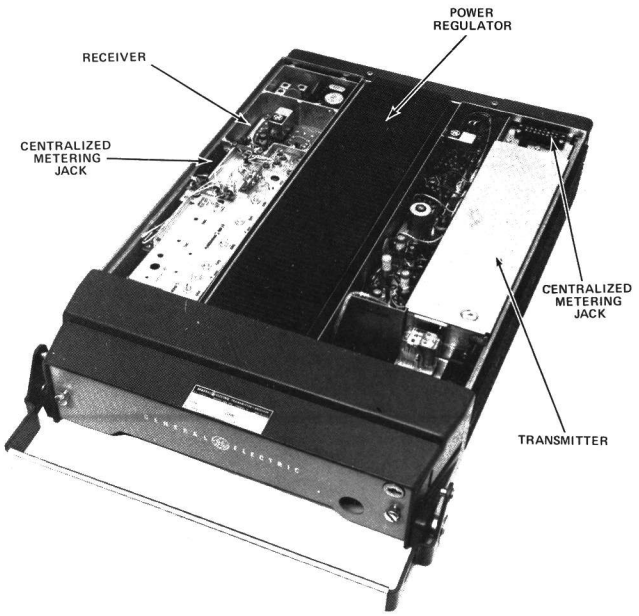

Figure 1 - Module Layout

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)

POWER REGULATOR

The transistorized mobile power regulator was designed for operation in a 12-Volt, negative-ground vehicle system only and provides regulated supply voltages for the transmitter exciter and receiver. The power regulator also contains circuitry to protect the transmitter PA stages against sudden increases in battery voltages, and a shorted or open antenna.

CONTROL UNITS

The Control Unit is used for both Front-Mount and Trunk-Mount installations. In Front-Mount applications, the Control Unit is attached to the front panel of the two-way radio. In Trunk-Mount applications, the Control Unit is mounted on the underside of the instrument panel near the operator.

INITIAL ADJUSTMENT

After the MASTR Two-Way Radio has been installed (as described in the INSTALLATION Manual), the following adjustments should be made by an electronics technician who holds a 1st or 2nd Class FCC Radio-telephone license. Alignment tools are provided with the radio.

Make sure that a RADIO TRANSMITTER IDENTIFICATION form (FCC Form 452-C or General Electric Form NP270303) has been filled out and attached to the transmitter.

TRANSMITTER ADJUSTMENT

The adjustment for the transmitter includes loading the power amplifier into the antenna, and checking the frequency and modulation. For the complete transmitter adjustment, refer to the ALIGNMENT PROCEDURE in the MAINTENANCE MANUAL for the transmitter.

NOTE

The MASTR Imperial Two-Way radio was designed for operation in 12-Volt, negative ground vehicle systems only. Failure to observe battery polarity when connecting power cables will cause a fuse to blow.

RECEIVER ADJUSTMENT

The initial adjustment for the receiver includes zeroing the receiver to the system operating frequency, and matching the antenna transformer to the antenna. For the Receiver Initial Adjustment Procedure, refer to the FRONT END ALIGNMENT PROCEDURES in the MAINTENANCE MANUAL for the receiver.

OPERATION

Complete operating instructions for the Two-Way Radio are provided in the separate OPERATOR'S MANUAL. The basic procedures for receiving and transmitting messages follows:

TO RECEIVE A MESSAGE

1. Turn the radio on by turning the STBY-ON-OFF switch to the STBY (Standby) position if you are not expecting any calls but wish to monitor other calls, or to the ON position if you expect to have to answer calls. The green light stays off in the STBY position to save battery power.
2. Turn the SQUELCH control clockwise (to the right) as far as possible.
3. Adjust the VOLUME control until the "hissing" sound is easily heard, but is not annoyingly loud.
4. Now, slowly turn the SQUELCH control counterclockwise (to the left) until the "hissing" sound just fades out.

The radio is now ready to receive messages from other radios in the system.

TRANSMIT A MESSAGE

1. Apply power to the transmitter by turning the STBY-ON-OFF switch to the ON position.
2. Press the push-to-talk button on the microphone and speak across the face of the microphone in a normal (or softer) voice. Release the button as soon as the message has been given. The red signal light on the control panel will glow each time the microphone button is pressed, indicating that the transmitter is on the air. The receiver is muted whenever the transmitter is keyed.

MAINTENANCE

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 at regular intervals. This preventive maintenance should include the checks as listed in the table of Maintenance Checks.

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 regulator.

For best results in servicing the Two-Way Radio, 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.

RE-INSTALLATION

The MASTR Imperial mobile combination operates in 12-Volt, negative ground vehicle systems only! If the radio is ever moved to a different vehicle, always check the battery polarity and voltage of the new system before using the radio.

CAUTION

Do not install the MASTR Imperial in a vehicle system using a circuit breaker. The radio must be operated in a system protected by a 15-amp quick blow fuse (similar to GE Fuse Assembly 19B216021G4 and fuse 1R11-P4).

MAINTENANCE CHECKS	INTERVAL	
	6 Months	As Required
CONNECTIONS - Ground connections and connections to the voltage source should be periodically checked for tightness. Loose or poor connections to the power source will cause excessive voltage drops and faulty operation.	X	
GENERATOR AND REGULATOR - The generator and voltage regulator should be maintained periodically to keep the generating system within safe and economical operating limits. If generator voltage is excessive, lights, etc., may burn out prematurely. This condition is indicated when the battery loses water rapidly. Usage of 1 or 2 ounces of water per cell per week is acceptable for batteries in continuous operation.		X
MECHANICAL INSPECTION - Since mobile units are subject to constant shock and vibration, check for loose plugs, nuts, screws, and parts to make sure that nothing is working loose.	X	
ANTENNA - The antenna, antenna base and all contacts should be kept clean and free from dirt or corrosion. If the antenna or its base should become coated or poorly grounded, loss of radiation and a weak signal will result.	X	
ALIGNMENT - The transmitter and receiver meter readings should be checked periodically, and the alignment "touched up" when necessary. Refer to the applicable ALIGNMENT PROCEDURE and Troubleshooting Sheet for typical voltage readings.		X
FREQUENCY CHECK - Check transmitter frequency and deviation as required by FCC. Normally, these checks are made when the unit is first put into operation, after the first six months, and once a year thereafter.		X

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-4378

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY, LYNCHBURG, VIRGINIA 24502

GENERAL ELECTRIC