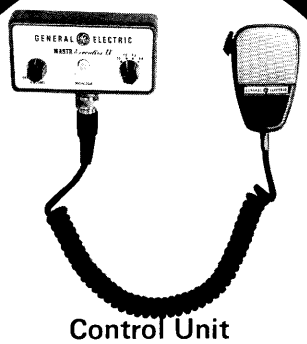
MOBILE RADIO

MASTR® *Executive II*

MAINTENANCE MANUAL LBI30058D

DATAFILE FOLDER – DF9040

Mobile Radio



Control Unit

406 – 512 MHz

TWO-WAY FM RADIO MOBILE COMBINATIONS

Speaker

GENERAL ELECTRIC

TABLE OF CONTENTS

ILLUSTRATIONS

FCC FILING NUMBER

Transmitter	Power Output
KT-122-A	40-Watt
KT-140-A	75-Watt
KT-141-A	100-Watt

WARNING

Although the highest DC voltage in MASTR Executive II Mobile Equipment is supplied by the vehicle 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!

SYSTEM SPECIFICATIONS*

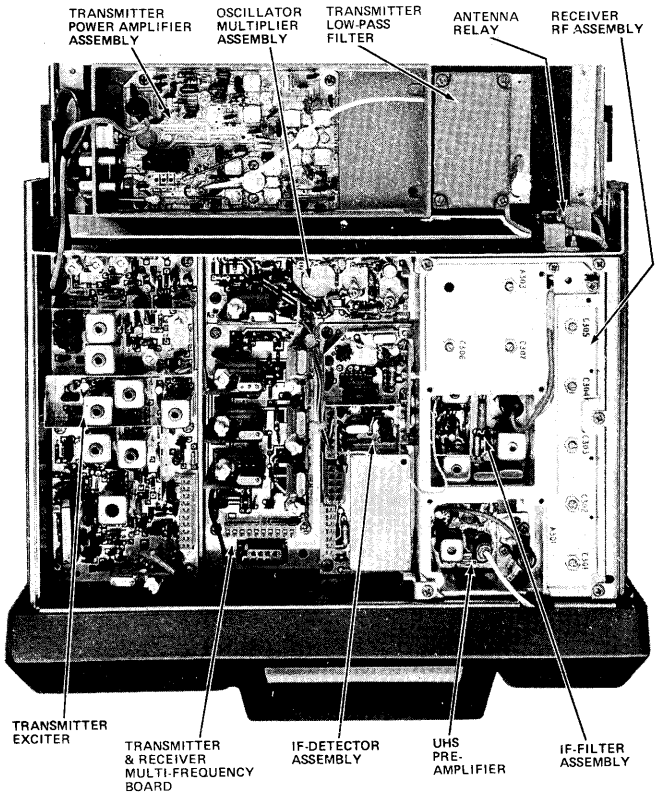
FREQUENCY RANGE	406-512 MHz
BATTERY DRAIN	
Receiver	
Squelched	0.30 Amperes
Unsquelched	1.40 Amperes
Transmitter	
40 Watt	12 Amperes at 13.6 VDC
75 Watt	17.5 Amperes at 13.4 VDC
100 Watt	28 Amperes at 13.4 VDC
DIMENSIONS (H X W X D)	
Two-Way Radio	3.9" x 13.5" x 13.4"
Control Unit (less bracket)	5.3" x 3.1" x2.9"
Speaker (less bracket)	5.1" x 5.1" x 2.8"
WEIGHT	
Two-Way Radio (includes mounting plate)	20 pounds
Control Unit	1 pound, 10 ounces
Speaker	1 pound, 8 ounces
TEMPERATURE RANGE	-30°C to +60°C (-22°F to +140°F)
DUTY CAPABILITY	
Intermittent	20% transmit, 100% Receive
Continuous	100% transmit at reduced power

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

COMBINATION NOMENCLATURE

1st Digit	2nd Digit	3rd Digit	4th Digit	5th Digit	6th Digit	7th Digit	8th & 9th Digits	10th Digit	11th Digit
Mechanical Package	System Voltage	Power Output	Channel Spacing	Freq. Capacity	Number of Freq.	Options	Frequency Range	Oscillator Stability	PA Type
R Executive II Standard Control	**T** +12 Volts with Accessories	**5** 21-40 Watts	**5** 25 kHz	**A** 1 Freq.	**A** 1-Freq TX 1-Freq RX	**S** Standard	**77** 406-420 MHz	**A** ±5 PPM	**H** High Power
S Executive II Optional Control	**X** +12 Volts less Accessories	**6** 41-80 Watts		**F** 4 Freq.	**B** 2-Freq TX 1-Freq RX	**G** Channel Guard & UHS Receiver	**78** 420-450 MHz		
		7 81-128 Watts			**C** 2-Freq TX 2-Freq RX	**P** UHS Receiver	**88** 450-470 MHz		
					D 1-Freq TX 2-Freq RX	**U** Channel Guard	**89** 470-494 MHz		
					E 3-Freq TX 3-Freq RX		**91** 494-512 MHz		
					F 4-Freq TX 4-Freq RX				
					G 5-Freq TX 5-Freq RX				
					H 6-Freq TX 6-Freq RX				
					J 7-Freq TX 7-Freq RX				
					K 8-Freq TX 8-Freq RX				

TOP VIEW



BOTTOM VIEW

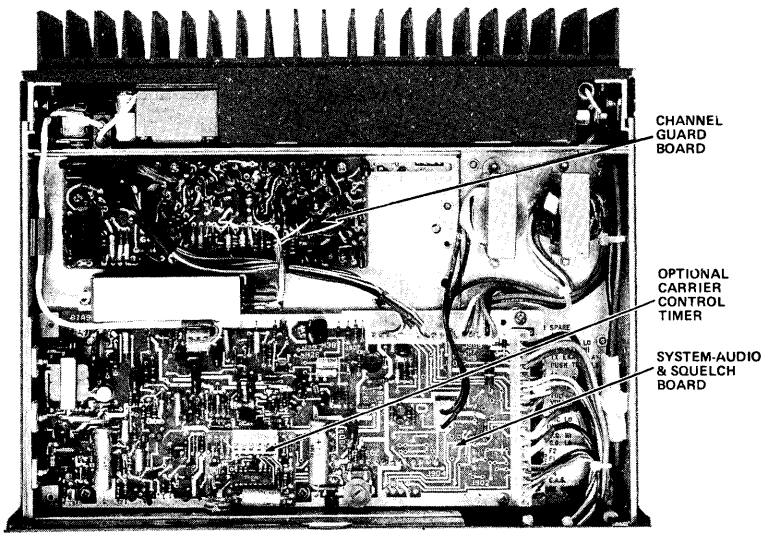


Figure 1 - MASTR Executive II Module Layout

DESCRIPTION

MASTR® Executive II mobile radio combinations are compact, highly reliable and ruggedly-constructed units that are designed to meet the most stringent requirements in the two-way radio field.

The radios are fully transistorized -- utilizing both discrete components and integrated circuits (IC's) for highest reliability. Since no tubes are used, the radio is ready to use the instant it is turned on. The standard combination may be equipped with the following:

- One through eight frequencies
- Plug-in oscillator modules for ±0.0005% oscillator stability
- Channel Guard (tone squelch)
- Ultra High Sensitivity (UHS) pre-amplifier

The combination is contained in a "slide-rail" mounting frame and is designed for trunk-mount installations. The radio is tamperproof when locked in the mounting frame. When unlocked, the unit can be easily pulled out of its frame for servicing.

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

No power supply is required since the highest supply voltage used in the radio is supplied by the vehicle battery. The radio is shipped for operation in 12-Volt, negative ground vehicle systems. An optional polarity converter is available for operating the radio in 12-Volt, positive ground systems.

The radio is of modular construction. All major modules and tuning adjustments except for the system board, Channel Guard and Carrier Control Timer option are easily accessible from the top of the radio (see Figure 1).

Centralized metering jacks for the transmitter, receiver and system board are provided for simplified alignment and troubleshooting.

TRANSMITTER

The transmitter consists of an exciter board and a power amplifier assembly. The PA assembly mounts on a hinged heatsink casting that swings down for easy access. A low-pass filter mounts on the heatsink next to the PA assembly.

RECEIVER

The receiver consists of an oscillator/multiplier assembly (Osc/Mult), RF assembly, IF Filter assembly, and IF-detector assembly (IFD). The audio and squelch circuitry for the receiver is located on the system board. In UHS receivers, the pre-amplifier mounts in the area near the antenna input board.

SYSTEM-AUDIO & SQUELCH BOARD

The system-audio and squelch board is mounted on the underside of the radio chassis. The board contains the 10-Volt regulator, transmitter and receiver system control circuits, and the receiver audio and squelch circuitry. The system board contains jacks to provide plug-in interface for the transmitter and receiver modules. The board also has jacks for Channel Guard, multi-frequency board and Carrier Control Timer option.

CONTROL UNITS

In "R" Series Combinations, the control unit contains the OFF-ON Volume control, pushbutton MONITOR switch, a frequency selector switch in multi-frequency models, and a red transmit indicator light.

In "S" Series Combinations, other types of control units can be used with the radio. For these applications, refer to the appropriate control unit Maintenance and Operator's Manual.

INITIAL ADJUSTMENT

After the MASTR Executive II 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.

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.

CAUTION

Before bench testing the MASTR Executive II Mobile Radio, be sure of the output voltage characteristics of your bench power supply.

To protect the transmitter power output transistors from possible instant destruction, the following input voltages must not be exceeded:

Transmitter unkeyed: 20 Volts

Transmitter keyed
(50 ohm resistive load): 18 Volts

Transmitter keyed
(no load or non-resistive load):
15.5 Volts

These voltages are specified at the normal vehicle battery terminals of the radio and take the voltage drop of standard cables into account. The voltage limit shown for a non-optimum load is for "worst case" conditions. For antenna mismatches likely to be encountered in practice, the actual limit will approach the 18 Volt figure.

Routine transmitter tests should be performed at EIA Standard Test Voltages (13.6 VDC for loads of 6 to 16 amperes; 13.4 VDC for loads of 16 to 36 amperes). Input voltages must not exceed the limits shown, even for transient peaks of short duration.

Many commonly used bench power supplies cannot meet these requirements for load regulation and transient voltage suppression. Bench supplies which employ "brute force" regulation and filtering (such as Lapp Model 73) may be usable when operated in parallel with a 12-Volt automotive storage battery.

TRANSMITTER ADJUSTMENT

The adjustment for the transmitter includes measuring the forward and reflected power and adjusting the antenna length for optimum ratio, then setting the transmitter to rated power output (or to the specific output or input which may be required by the FCC station authorization). Next, measuring the frequency and modulation and entering these measurements on the FCC-required station records. For the complete transmitter adjustment, refer to the ALIGNMENT PROCEDURE in the MAINTENANCE MANUAL for the transmitter.

RECEIVER ADJUSTMENT

The initial adjustment for the receiver includes tuning the input circuit to match 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 in "R" Series combinations is as follows:

TO RECEIVE A MESSAGE

1. Turn the radio on by turning the OFF-VOLUME control halfway to the right.

2. Press in the MONITOR button and adjust the VOLUME control for a comfortable listening level.

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

TO TRANSMIT A MESSAGE

1. Turn the radio on as directed in the "To Receive a Message" section.

2. Press the push-to-talk button on the microphone and speak across the face of the microphone in a normal voice. Release the button as soon as the message has been given. The red GE indicator light on the control unit 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

REMOVING IC's (and all other soldered-in components) can be easily accomplished by using a de-soldering tool such as a SOLDA-PULLT® or equivalent. To remove an IC, heat each lead separately on the solder side and remove the old solder with the de-soldering tool.

An alternate method is to use a special soldering tip that heats all of the pins simultaneously.

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 and receiver.

NOTE

In positive ground operation only, A- is "hot" with respect to vehicle ground. Shorting the transmitter PA printed wiring board ground pattern to the radio case may cause one of the in-line fuses to blow.

DISASSEMBLY

To gain access to the unit for servicing:

1. Unlock the radio (see Figure 2).
2. Loosen the two captive screws shown in Figure 2.
3. Pull the radio forward about two inches out of the mounting frame, and lift off top cover.
4. To gain access to the bottom side, pull the radio all the way out of mounting frame.

MECHANICAL PARTS BREAKDOWN

A mechanical parts breakdown diagram of the two-way radio is provided in this manual. The diagram shows the placement and GE Part Number of mechanical items on the two-way radio set (see Table of Contents).

RE-INSTALLATION

If the mobile combination is ever moved to a different vehicle, always check the battery polarity of the new system. If necessary, install the optional polarity converter in positive ground vehicles to maintain current polarity.

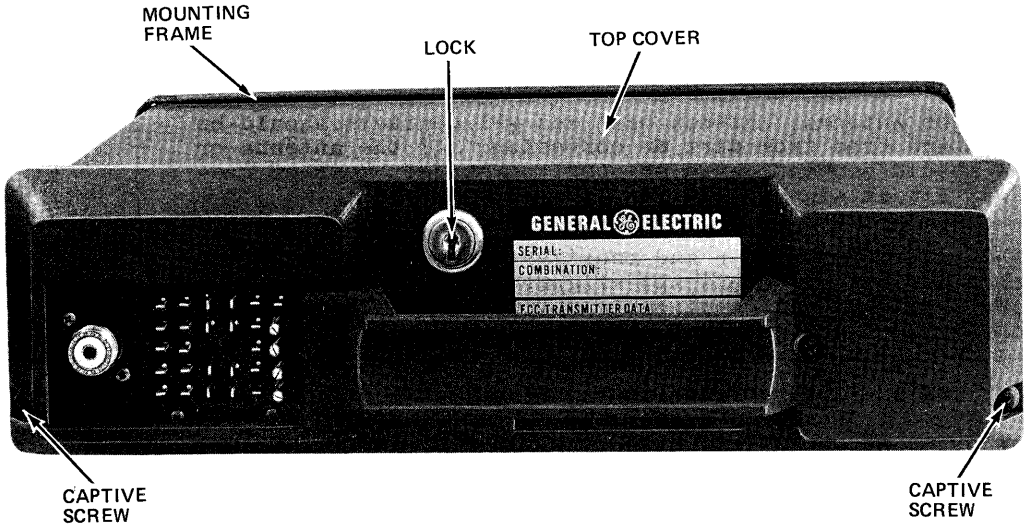


Figure 2 - Disassembly

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. When ground connections are not made directly to the battery, the connection from the battery to vehicle chassis must be checked for low impedance. A high impedance may cause excessive voltage drops and alternator noise problems.	X	
ELECTRICAL SYSTEM - Check the voltage regulator and alternator or generator periodically to keep the electrical system within safe and economical operating limits. Over-voltage 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. A weak battery will often cause excessive noise or faulty 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

GENERAL ELECTRIC COMPANY • MOBILE COMMUNICATIONS DIVISION
WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.

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