

# MASTR *Imperial*

MOBILE CONTROL UNIT MODELS 4EC59A116-119 & 4EC59A122-125



Maintenance Manual LBI-4393B  
\*\*\*\*\*  
DF-4087

## SPECIFICATIONS \*

|               |   |
|---------------|---|
| MODEL NUMBERS | 4EC59A116 through 4EC59A119, and<br>4EC59A122 through 4EC59A125   |
| USED WITH     | MASTR Imperial Mobile Combinations  |
| CONTROLS      | VOLUME Control<br>OFF-ON-STBY Switch<br>SQUELCH Control<br>Three and Four-Frequency Selector Switch<br>Optional Controls<br>CHANNEL GUARD Monitor Switch<br>Dimmer Control for Pilot Lights |
| INDICATORS    | On light: green<br>Transmit light: red  |

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

## TABLE OF CONTENTS

|   |       |
|---|-------|
| SPECIFICATIONS .....  | Cover |
| DESCRIPTION .....   | 1     |
| CIRCUIT ANALYSIS .....  | 1     |
| Controls .....  | 1     |
| Three and Four-Frequency Switch .....                         | 1     |
| CHANNEL GUARD-OFF Switch .....                                | 1     |
| Dimmer Control (Optional) .....                               | 1     |
| Ignition Switch Connections .....                             | 1     |
| MAINTENANCE .....   | 2     |
| Disassembly .....   | 2     |
| Pilot Light Replacement .....                                 | 2     |
| Reinstallation .....  | 2     |
| OUTLINE DIAGRAM .....   | 4     |
| CONTROL UNIT SCHEMATIC & INTERCONNECTION DIAGRAM .....        | 5     |
| PARTS LIST .....  | 6     |
| Control Unit Models 4EC59A116-119 & 4EC59A122-125             |       |
| Power Cables 19C303601G1 & G2                                 |       |
| Trunk-Mount Control Cables 19C303626G1 - G4                   |       |
| Vehicle System Cables 19A121454G1 & G2                        |       |
| Interconnection Harness 19A122458G1                           |       |
| Microphone Model 4EM25M10                                     |       |
| Handset Model 4EM26A10, C10                                   |       |
| Dimmer Control Option 19A121293G1                             |       |
| Fuse Assembly 19B216021G4 and Fuse 1R11-P4                    |       |
| Five-Watt Speaker 4EZ20A12                                    |       |
| PRODUCTION CHANGES .....                                      | 8     |
| ILLUSTRATIONS   |       |
| Figure 1 12-VDC Connections for Ignition Switch Standby ..... | 2     |
| Figure 2 Disassembly of Control Cable Plug .....              | 3     |

### WARNING

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

## DESCRIPTION

MASTR Imperial Control Units are compact, highly functional control units that are designed for either Trunk-Mount or Front-Mount MASTR mobile combinations.

In Trunk-Mount installations, a plate is installed on the back of the Control Unit to hold the connectors. A mounting bracket is provided for mounting the Control Unit within convenient reach of the operator. In Front-Mount installations, the Control Unit is attached to the front of the MASTR Two-Way Radio.

Cable connections are secured to the Control Unit by means of captive locking screws.

## CIRCUIT ANALYSIS

The OFF-ON-STBY (standby) switch determines whether or not the transmitter and receiver are operative. With the switch in the OFF position, all power is removed from the Two-Way Radio. Turning the switch to STBY applies power to the receiver only, and the green light does not light.

Turning the switch to the ON position enables the push-to-talk (PTT) circuit, lights the green pilot light, and applies +12 Volts to the receiver and power regulator.

Pushing the PTT button on the microphone lights the red pilot light, energizes the antenna changeover relay, and applies a keyed voltage to the transmitter and power regulator. The keyed voltage also mutes the receiver audio stages.

## CONTROLS

All models of the Control Unit have VOLUME and SQUELCH controls, and an OFF-ON-STBY switch. Depending on the model number, some of the Control Units may have one or more of the controls described in the following paragraphs. A chart showing which controls are present on each Control Unit Model is provided on the Control Unit Wiring Diagram.

Instructions for adjusting the controls are in the Operator's Manual for the Two-Way Radio.

### Three and Four-Frequency Switch (S706)

For three or four-frequency operation, a frequency selector switch selects the channel desired (F1 thru F4) for both transmitting and receiving. For three-frequency operation, the F3 and F4 channels on S706 are jumpered together. The switch connects +10 Volts to the selected receiver oscillator

switching diode, and connects the transmitter oscillator switching diode to ground, so that the unit operates on the frequency determined by each of the crystal-controlled oscillators.

### CHANNEL GUARD-OFF Switch (S703)

Placing this switch in the OFF position disables the receiver Channel Guard so that the receiver operates on noise squelch only.

### Dimmer Control (R705 - Optional)

The dimmer control is a rheostat in series with the green pilot light. Turning the control adjusts the amount of light given off by the green pilot light.

## VEHICLE IGNITION SWITCH CONNECTIONS

The Control Unit may be connected for three different modes of operation, depending on the way the three ignition switch cables are connected in the vehicle system. The black ignition switch cable provides the receiver ground connection. The yellow fused lead provides the receiver hot connections, and the red fused lead provides the +12 Volts for the power regulator. The three types of operation are:

### 1. Ignition Switch Standby

For this type of operation, the red fused lead (power regulator voltage) is connected to the ACCESSORY or ON terminal of the ignition switch. The yellow fused lead (receiver hot) is connected to the hot side of the ignition switch, and the black lead connects to vehicle ground.

With the ignition switch OFF, the receiver automatically reverts to STBY, ready to receive messages. Turning the ignition switch to the ON or ACCESSORY position turns on the green pilot light and supplies power regulator voltage. Turning the OFF-ON-STBY switch to OFF removes all power to the Two-Way Radio.

### 2. Ignition Switch Control

For ignition switch control, the yellow and red fused leads are connected to the ACCESSORY or ON terminal of the ignition switch. The transmitter and receiver will operate only when the ignition switch is in the ACCESSORY or ON position. Turning the ignition switch OFF removes all power to the radio.

### 3. Ignition Switch Bypass

For ignition switch bypass, the yellow and red fused leads connect to the "hot" side of the ignition switch or the vehicle fuse block assembly. Both the transmitter and receiver operate independently of the ignition switch and can be turned on the off only by the OFF-ON-STBY switch on the MASTR Control Unit.

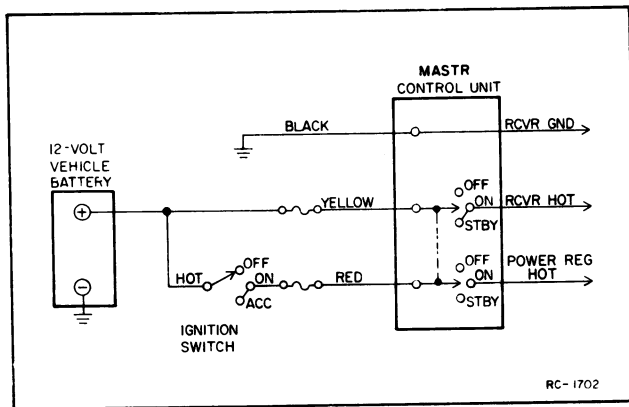


Figure 1 — 12-VDC Connections for Ignition Switch Standby

## MAINTENANCE

### DISASSEMBLY

In Trunk-Mount installations, access to the inside of the Control Unit is obtained by removing the two Phillips-head screws in the back of the unit and pulling the back panel away from the housing.

In Front-Mount installations, remove the two Phillips-head screws holding the front casting to the frame and move the casting away from the frame. Next, remove the two screws securing the control cable plug to the inside of the front casting. Then remove the two flat-head screws holding the Control Unit to the front casting.

### PILOT LIGHT REPLACEMENT

The pilot lights can be easily replaced without disassembling the Control Unit.

First, unscrew the colored lens. Then wrap a small piece of masking tape around the bulb, to give the fingers a firm grip, and unscrew the bulb.

### REINSTALLATION

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 installing 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 19B216021-G4 and fuse 1R11-P4).

If it becomes necessary to move the Two-Way Radio and Control Unit to another vehicle, the 25-pin control cable plug may need to be disassembled. Refer to Figure 2 for disassembly of the plug.

### NOTE

The plug is assembled so that the cable comes out of the top of the plug when connected to the Control Unit. To have the cable come out of the bottom of the plug, remove the remaining two screws and rotate the metal frame 180 degrees.

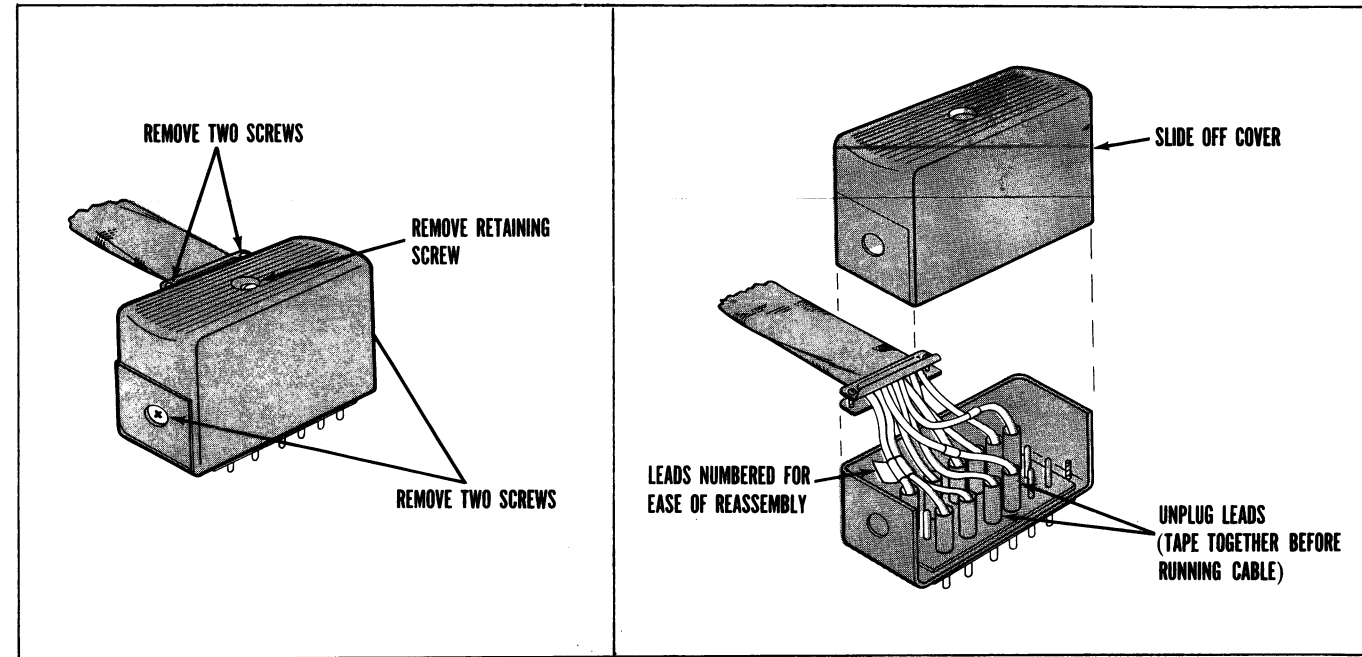
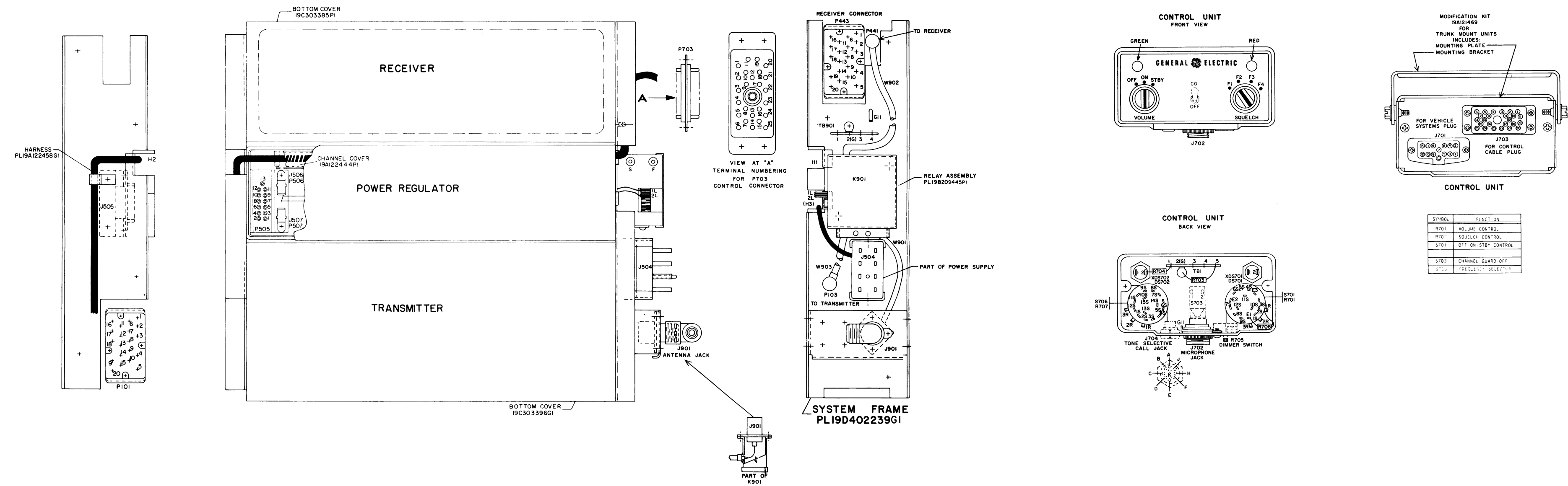


Figure 2 - Disassembly of Control Cable Plug



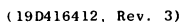
(19D416968, Rev. 1)

(19C303819, Rev. 2)

OUTLINE DIAGRAM

MASTR IMPERIAL CONTROL UNIT  
MODELS 4EC59A116-119 & 4EC59A122-125

## SYSTEM FRAME AND HARNESS



MASTR IMPERIAL CONTROL UNIT  
MODELS 4EC59A116-119 & 4EC59A122-125

| SYMBOL                  | GE PART NO.  | DESCRIPTION   |
|-------------------------|--------------|---|
|                         |              | CONTROL UNIT<br>19D413054G19  |
| DS701<br>and<br>DS702   | 19B201122P1  | Light, indicator: miniature, 6 v; sim to GE Type 1768.  |
| J701                    | 19C303576P1  | Socket, phen: 13 contacts rated at 5 amps max.  |
| J702                    | 19A116061P2  | Receptacle. Includes: Receptacle: 4 contacts; sim to Amphenol 91-7047-1000.   |
|                         | 19A116061P4  | Lockwasher, internal tooth.   |
|                         | 19A116061P5  | Nut, knurled: No. 13/16-27N-2.  |
|                         | 19A116049P1  | Solderless terminal.  |
| J703                    | 19D402408P1  | Connector, phen: 25 contacts rated at 5 amps max.   |
| J704                    | 19B216279G1  | Jack assembly: 9 female contacts rated at 5 amps at 500 VMS; sim to Winchester WSS-LRM.   |
| R701                    |              | RESISTORS   |
| R703<br>and<br>R704     | 5493035P19   | (Part of S701). Wirewound: 67 ohms ±5%, 5 w; sim to Hamilton Hall Type HR.  |
| R706                    | 3R77P100K    | Composition: 10 ohms ±10%, 1/2 w.   |
| R707                    |              | (Part of S706).   |
| S701                    | 19C307089P19 | SWITCHES  |
|                         |              | Switch/Resistor: includes Switch, rotary, 3 poles, 3 positions, momentary shorting contacts, 250 ma at 500 VMS; Resistor (R701), variable, 5000 ohms ±20%, 1/2 w max; sim to Mallory LC5K-3133. |
| S703                    | 5491899P5    | Toggle: SPST, 3 amps at 250 VAC or 250 VDC; sim to Cutler-Hammer S280K13.   |
| S706                    | 19C307089P21 | Switch/Resistor: includes Switch, rotary, 3 poles, 4 positions, momentary shorting contacts, 250 ma at 500 VMS; Resistor (R707), variable, 2500 ohms ±10%, 1 w max; sim to Mallory Type LC.     |
| TB1                     | 7775500P12   | TERMINAL BOARDS   |
|                         |              | Phen: 5 terminals.  |
|                         |              | SOCKETS   |
| XD8701<br>and<br>XD8702 | 19B201122P2  | Lamp, miniature: sim to Drake Series 121.   |
|                         |              | MECHANICAL PARTS  |
|                         |              | CONTROL UNIT<br>MODELS 4EC59A116-119, 122-125<br>(SEE RC-1170)  |
| 1                       | N529P19C13   | Plug button: approx 21/32 inches dia.   |
| 2                       | N529P5C13    | Plug button: approx 13/32 inches dia.   |
| 3                       | 19A121521G1  | Mounting bracket.   |
| 4                       | 19B201122P3  | Lens cap: green translucent nylon.  |
| 5                       | NP276163     | Nameplate. (Used in Models 4EC59A116, A117, A122, and A123).  |
| 6                       | NP276160     | Nameplate. (Used in Models 4EC59A118, A119, A124, and A125).  |

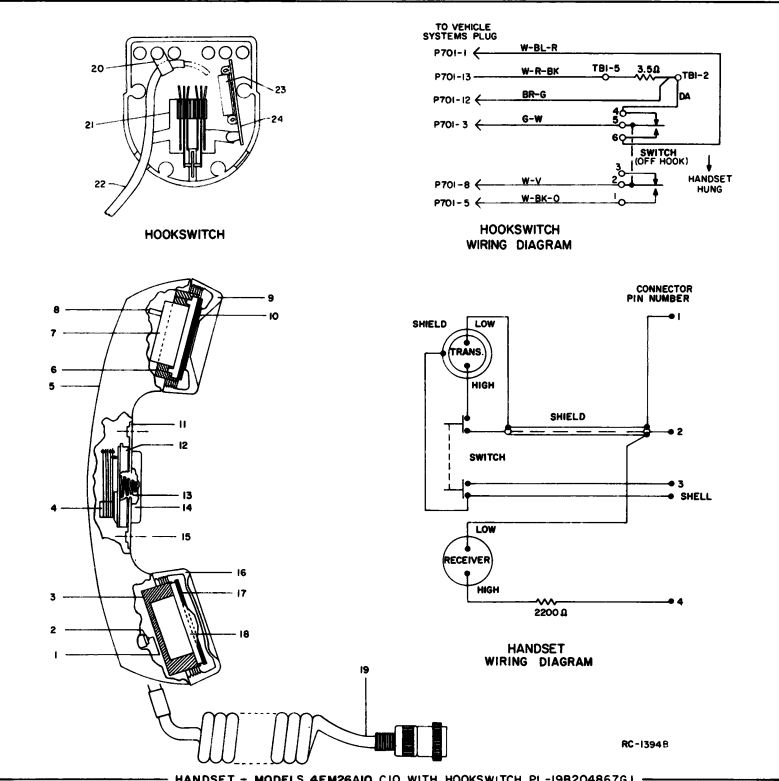
\*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

| SYMBOL | GE PART NO. | DESCRIPTION  |
|--------|-------------|--|
| 7      |             | (Not Used).  |
| 8      |             | (Not Used).  |
| 9      |             | (Not Used).  |
| 10     |             | (Not Used).  |
| 11     |             | (Not Used).  |
| 12     |             | (Not Used).  |
| 13     | 19B201122P4 | Lens cap: red translucent nylon.   |
| 14     | 19B204443G3 | Knob: brown.   |
| 15     | 19C303413P1 | Knob: VOLUME/SQUELCH.  |
| 16     | 19B216271G3 | Housing: brown.  |
| 17     | 19B204522P1 | Mounting plate.  |
| 18     | 19A115495P1 | Screw, hexhead: No. 1/4-20 x 5/8.  |
|        |             | ASSOCIATED ASSEMBLIES  |
|        | 19A121469G1 | Control unit modification kit (trunk mount).   |
|        | 19D402239G1 | 12 volt vehicle frame.   |
|        | 19A122444P1 | Cover, wire channel (on systems frame).  |
|        | 19C303452G1 | Front casting (Front mount).   |
|        | 19C303452G2 | Front casting (Trunk mount).   |
|        | 4034260P3   | Screw: 10-32 x 1-1/8 (Secures Front casting).  |
|        | 5491682P2   | Lock: Yale and Towne. (Part of Front casting).   |
|        | 5491682P7   | Cam. (Used with lock).   |
|        |             | DIMMER CONTROL MODIFICATION KIT<br>19A121293G1   |
|        |             | RESISTORS  |
| R705   | 19B209114P1 | Variable, wirewound: 75 ohms ±20%, 3 w; sim to CTS Series 112.   |
|        |             | POWER CABLE ASSEMBLY<br>19C303601G1 (12 VOLT FRONT MOUNT)<br>19C303601G2 (12 VOLT TRUNK MOUNT)           |
|        | 19B209189P1 | Connector, phen: 8 contacts rate at 15 amps at 1100 VMS; sim to Beauchaine and Sons S-3401-76.           |
|        | 19D402438P1 | Cap, connector.  |
|        | 19A121444P2 | Connector retaining screw.   |
|        | 19A115313P1 | Cable: 3 conductor, approx 9 feet long. (Used in 19C303601G1).   |
|        | 19A115314P1 | Cable: 3 conductor, approx 18 feet long. (Used in 19C303601G2).  |
|        |             | CONTROL CABLE ASSEMBLY<br>19C303626G1, G2 (1-FREQ)<br>19C303626G3, G4 (MULTI-FREQ)                       |
|        |             | PLUGS  |
| P1     | 19C303626G5 | Plug, male: includes connector 19D402408P3, cap 19C303290P2 and connector retaining screw 19A121444P2.   |
| J1     | 19C303626G6 | Plug, female: includes connector 19D402408P1, cap 19C303280P1 and connector retaining screw 19A121444P1. |
|        | 19D402408P1 | Connector, female phen: 25 contacts rated at 5 amps max.   |
|        | 19D402408P3 | Connector, male phen: 25 contacts rated at 5 amps max.   |
|        | 19C303290P1 | Cap, connector.  |
|        | 19C303290P2 | Cap, connector.  |
|        |             | MISCELLANEOUS  |

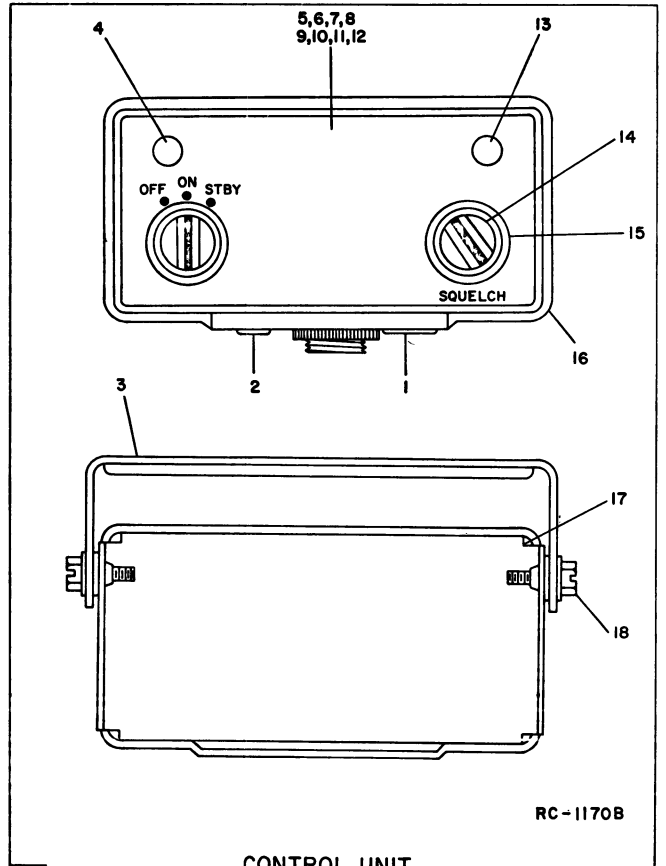
| SYMBOL | GE PART NO. | DESCRIPTION  |
|--------|-------------|--|
|        | 7139880P11  | Cable: 23 conductors. (When ordering specify length). (Used in 19C303626G1 and G2).  |
|        | 7139880P8   | Cable: 13 conductors. (When ordering specify length). (Used in 19C303626G3 and G4).  |
|        |             | VEHICLE SYSTEM CABLE KIT<br>19A121454G1 (12 VOLT VEHICLES)   |
|        | 19A121429P1 | Pin: 1/2 inch long.  |
|        | 19A121441G1 | Plug: 13 contacts.   |
|        | 19C303574P1 | Cover: approx 1-13/16 x 1 x 1/32 inches.   |
|        |             | FUSED LEAD ASSEMBLY<br>19A121314G1 (19A121454G1)   |
|        | 1R16P8      | Fuse, cartridge, quick blowing: 5 amps at 250 v; sim to Littelfuse 312003 or Bussmann WH-5.  |
|        | 7124109P3   | Fuseholder: sim to Bussmann Type HDJ-B.  |
|        | 7112178P7   | Cable: approx 8-3/4 feet long.   |
|        |             | INTERCONNECTION HARNESS ASSEMBLY<br>19A122458G1  |
|        |             | JACKS AND RECEPTACLES  |
| J505   | 19B204409G1 | Plug, male: 13 pin contacts.   |
|        |             | PLUGS  |
| P101   | 19C303506P1 | Connector, phen: 20 contacts rated at 5 amps max at 600 VDC.   |
| P443   | 19C303506P1 | Connector, phen: 20 contacts rated at 5 amps max at 600 VDC.   |
| P703   | 19D402408P2 | Connector, phen: 25 contacts rated at 5 amps max.  |
|        |             | TERMINAL BOARDS  |
| TB801  | 7775500P11  | Phen: 5 terminals.   |
|        | 19A122444P1 | Channel Cover.   |
|        |             | ANTENNA RELAY ASSEMBLY<br>19B209445P1  |
|        |             | Includes J901, K901, P103, P441, W901-W903.  |
|        |             | 12 VOLT FUSEHOLDER<br>19B216021G4<br>(Fuses must be ordered separately)  |
|        |             | FUSES  |
| 1R11P4 |             | Quick blowing: 15 amps, 250 v; sim to Bussman NON15. (transmitters).   |
|        |             | 130 - 512 MHz ANTENNA<br>MODEL 4B121A13<br>(5490969P13)  |
|        |             | Antenna: includes stainless steel whip approx. 20 inches long; ball tip; whip socket: No. 6-32 set screw; rubber mounting gasket; antenna cable: cable adapter; PL-259 coaxial plug; sim to Antenna Specialists ASPD201GE or Danbury-Knudsen Type PA-25. |
|        | 5490969P4   | Whip: stainless steel, approx 20 inches long; ball tip.  |
|        | 5490969P5   | Socket, whip: with (2) No. 6-32 set screws.  |
|        | 5490969P6   | Whip and whip socket: stainless steel whip approx 20 inches long with ball tip; whip socket with (2) No. 6-32 set screws.  |
|        |             | Cable, antenna: approx 15 feet long. Type RG-58/U. (Used with GE Dwg 2R22P1 and GE Dwg 7105381P1).   |

| SYMBOL | GE PART NO. | DESCRIPTION   |
|--------|-------------|---|
|        | 7105381P1   | Adapter, cable: approx 1 x 7/16 inches dia. Type UG-175/U. (Used with GE Dwg 2R22P1 and Type RG-58/U cable).  |
|        | 2R22P1      | Plug, coaxial: mica-filled insert, UHF contact. Signal Corps PL-259; sim to Amphenol 83-1SP. (Used with GE Dwg 7105381P1 and Type RG-58/U cable).                                 |
|        |             | 25 - 50 MHz ANTENNA   |
|        | 7491074P1   | Antenna: includes stainless steel rod approx 96-1/2 inches long; ball tip; lockwasher; No. 10-32 hex socket set screw; sim to Antenna Specialists ASPA3BGE.                       |
|        | 7102930P3   | Adapter, antenna: approx 2-5/16 inches long. (Used with GE Dwg 7491074P1).  |
|        | 4033101G1   | Antenna package: includes base; adapter spring; cable and plug.   |
|        | 7472880G5   | Antenna base. (Used in 4033101G1).  |
|        | 7476639G4   | Adapter spring. (Used in 4033101G1).  |
|        | 5492239P1   | Cable, antenna: includes Type RG-58/U cable approx 15 feet long; PL-259 coaxial plug; mounting clip; ring tongue terminal; sim to Antenna Specialists 15A43. (Used in 4033101G1). |
|        | 2R22P1      | Plug, coaxial: mica-filled insert, UHF contact. Signal Corps PL-259; sim to Amphenol 83-1SP. (Used with GE Dwg 5492239P1 in 4033101G1).   |
|        | 4KY9A1      | Coil, loading: 25 to 33 MHz; sim to Antenna Specialists ASPA87.   |
|        | 19A121577G1 | Antenna hook kit.   |
|        | 7134724P1   | Antenna hook. (Used in 19A121577G1).  |
|        |             | HANDSET<br>MODEL 4EM26A10<br>MODEL 4EM26C10<br>(SEE RC-1394)  |
| 1      |             | Self tap screw, bind head: No. 4 x 5/16. Shure Brothers 30C640C.  |
| 2      |             | Cable clamp. Shure Brothers 53A532.   |
| 3      |             | Shield. Shure Brothers RP19.  |
| 4      |             | Switch. Shure Brothers RP81.  |
| 5      |             | Case. Shure Brothers RP49. (Used in 4EM26A10).  |
| 6      |             | Case. Shure Brothers 21RP899P. (Used in 4EM26C10).  |
| 7      |             | Adapter. Shure Brothers 65A230.   |
| 8      |             | Magnetic controlled cartridge. Shure Brothers RP41.   |
| 9      | 3R77P222K   | Resistor, composition: 2200 ohms ±10%, 1/2 w.   |
| 10     |             | Receiver cap. (Part of item 5).   |
| 11     |             | Washer. Shure Brothers 34A321.  |
| 12     |             | Escutcheon. Shure Brothers 53A536A.   |
| 13     |             | Actuator. Shure Brothers 53A556.  |
| 14     |             | Spring. Shure Brothers 44A140.  |
| 15     |             | Plunger bar. Shure Brothers RP82.   |
| 16     |             | Flat head screw, socket cap: No. 4-40 x 1/4. Shure Brothers 30C57B.   |
| 17     |             | Transmitter cap. Shure Brothers 65A197A. (Part of item 5).  |
| 18     |             | Washer. Shure Brothers 34A309.  |
| 19     |             | Magnetic controlled cartridge. Shure Brothers RP13.   |
|        |             | Cable and plug. Shure Brothers RP48. (Used in 4EM26A10).  |
|        |             | Cable and plug. Shure Brothers 21RP738P. (Used in 4EM26C10).  |
|        |             | HOOKSWITCH ASSEMBLY<br>19B204867G1<br>(SEE RC-1394)   |
| 20     | 4029851P4   | Cable clamp: sim to WEC Kesser 3/16-4.  |

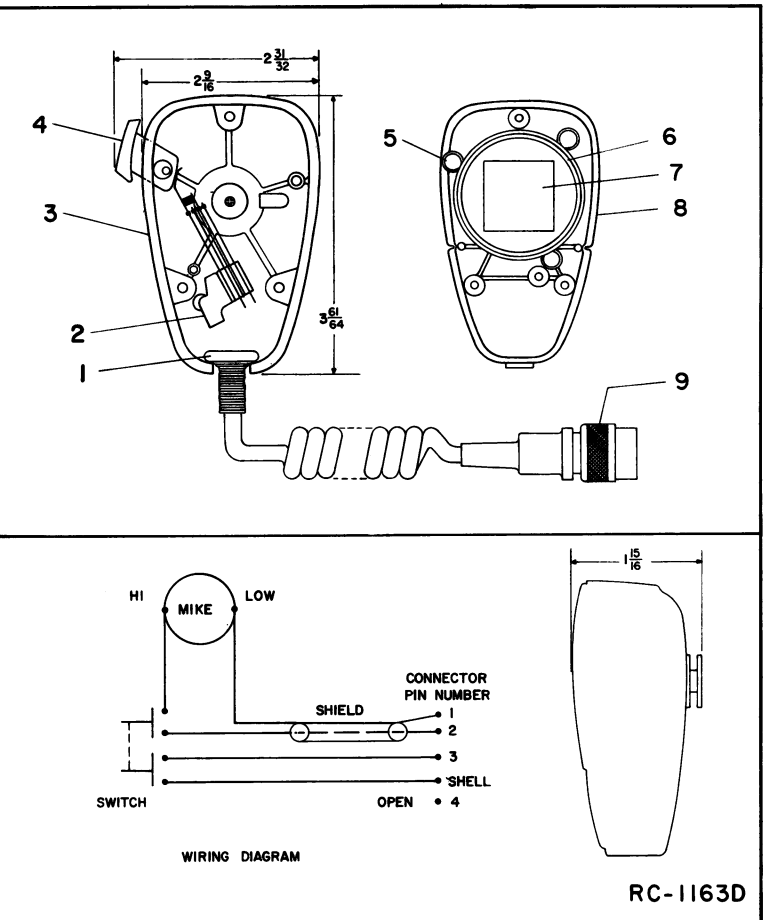
| SYMBOL | GE PART NO. | DESCRIPTION  |
|--------|-------------|--|
| 21     | 19A121612P1 | Holder and switch: thermoplastic case, contact rating 1 amp at 125 v.  |
| 22     | 19A121581G1 | Cable: approx 8-1/2 feet long, includes five 19A121429P1 pins.   |
| 23     | 5493035P10  | Resistor, wirewound, ceramic: 3.5 ohms ±5%, 5 w; sim to Hamilton Hall Type HR.   |
| 24     | 7775500P55  | Terminal board, phen: 5 terminals.   |
|        |             | MILITARY MICROPHONE<br>MODEL 4EM258A10<br>19B209102P6<br>(SEE RC-1163)   |
| 1      |             | Cable clamp. Shure Brothers 53A532.  |
| 2      |             | Switch. Shure Brothers RP26.   |
| 3      |             | Case (back) and mounting button: plastic. Shure Brothers RP100.  |
| 4      |             | Switch button: red plastic. Shure Brothers RP25.   |
| 5      |             | Spring. Shure Brothers RP16.   |
| 6      |             | Shield. Shure Brothers RP23.   |
| 7      |             | Magnetic controlled cartridge. Shure Brothers RP13.  |
| 8      |             | Case (front): plastic. Shure Brothers RP100.   |
| 9      |             | Cable and plug: approx 6 feet long. Shure Brothers RP14.   |
|        |             | 5 WATT SPEAKER<br>4EZ20A12 19D402449G19  |
| LS2    | 19A116910P1 | Permanent magnet: 5 inch, 3.2 ohms ±15% imp, 5 w max operating; sim to Pioneer 002009.   |
| W3     | 19A121546G1 | Cable assembly: approx 48 inches long, includes (2) 19A121429P1 pins.  |
|        |             | MECHANICAL PARTS   |
|        | 19D416396P1 | Speaker housing.   |
|        | 19C320016P2 | Mounting support.  |
|        | 19A116985P1 | Screw, hex head-slotted: double lead thread, with internal tooth washer, No. 13-16 x 3/4. (Secures housing to mounting bracket). |
|        | 19B219692G1 | Grille.  |



HANDSET - MODELS 4EM26A10, C10 WITH HOOKSWITCH PL-19B204867G1



CONTROL UNIT



## PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - Models 4EC59A117, 119, 123 and 125  
To add Mike Hi, PTT, earphone and ground to Tone Option Jack J704.



## 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

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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.

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# **MAINTENANCE MANUAL**

**LBI-4393**

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**MOBILE RADIO DEPARTMENT  
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502**

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