MOBILE RADIO

MASTR *Imperial*

MOBILE CONTROL UNIT MODELS 4EC59A115

SPECIFICATIONS *

MODEL NUMBERS	4EC59A115
USED WITH	MASTR Imperial Mobile Combinations
CONTROLS	VOLUME Control
	OFF-ON-STBY Switch
	SQUELCH Control
	Search-Lock Monitor Switch
	Optional Controls
	CHANNEL GUARD Monitor Switch
	Dimmer Control for Pilot Lights
INDICATORS	On light: green
	Transmit light: red

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

GENERAL ELECTRIC

TABLE OF CONTENTS

ILLUSTRATIONS

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.

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.

SEARCH-LOCK MONITOR Switch (S705)

Search-Lock Monitor Switch S705 has three positions: F1, F1-F2 and F2. When the switch is in the F1-F2 position, no voltage is fed from S705 to either receiver crystal switching diode, and the Search-Lock Monitor operates. The Search-Lock Monitor (SLM) then provides two-channel sequential monitoring by alternately switching +10 Volts between the two receiver crystal switching diodes at a rate of approximately 10 times per second. When a signal is received on either channel, the SLM will "lock" on that frequency for the duration of the signal.

Turning S705 to the F1 or F2 position applies +10 Volts to the selected crystal switching diode in the receiver oscillator and over rides the SLM. Switching to the F1 or F2 position also connects the crystal switching diode of the transmitter oscillator to ground, so that the radio will operate on the frequency determined by the selected transmitter and receiver oscillator. With S705 in the F1-F2 position, the transmitter will operate on the F1 frequency only.

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

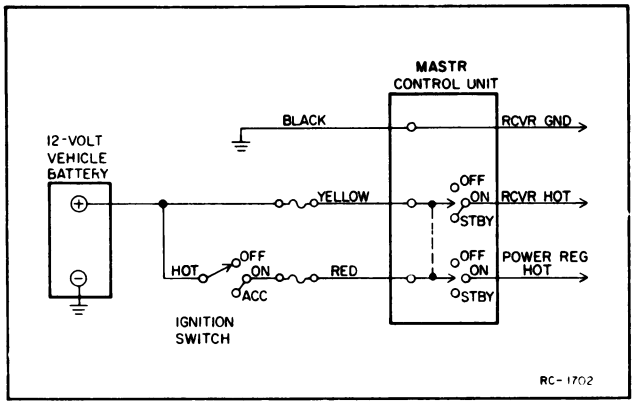


Figure 1 — 12-VDC Connections for Ignition Switch Standby

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.

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 system 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 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 plug, remove the remaining two screws and rotate the metal frame 180 degrees.

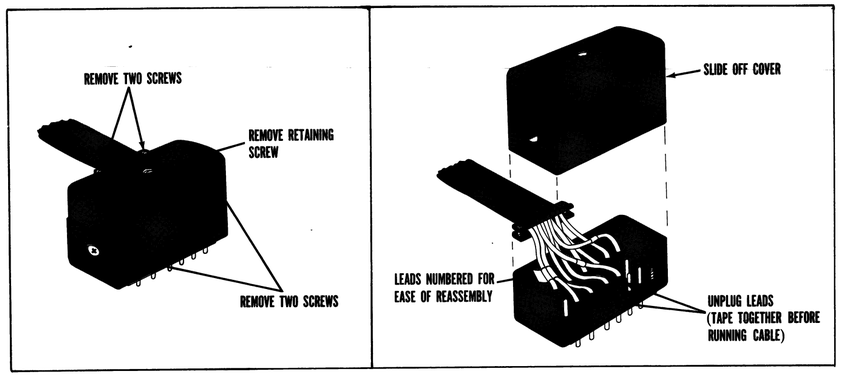
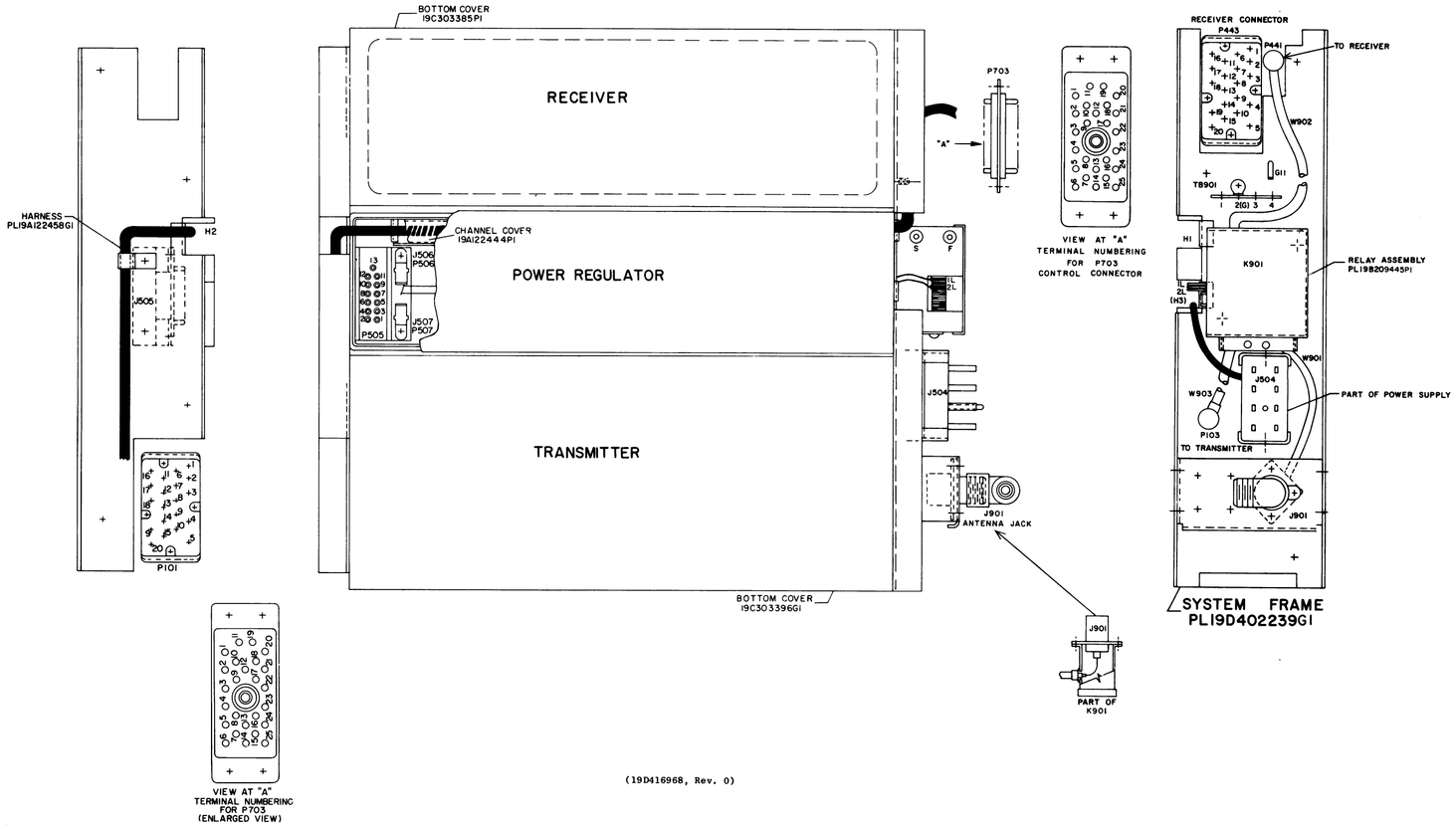


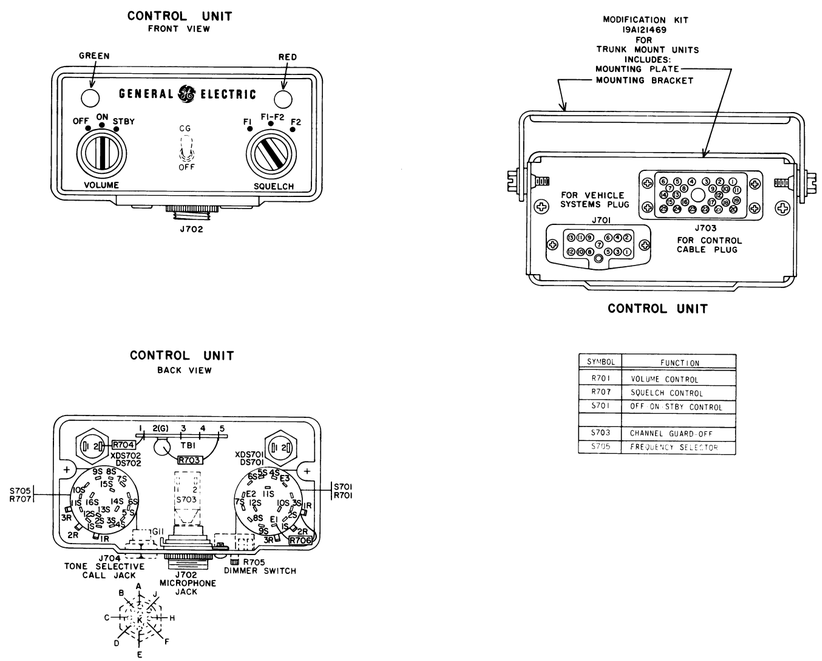
Figure 2 - Disassembly of Control Cable Plug

SYSTEM FRAME AND HARNESS



(19D416968, Rev. 0)

CONTROL UNIT



SYMBOL	FUNCTION
R701	VOLUME CONTROL
R707	SQUELCH CONTROL
S701	OFF-ON-STBY CONTROL
S703	CHANNEL GUARD OFF
S705	FREQUENCY SELECTOR

(19C303817, Rev. 2)

OUTLINE DIAGRAM

MASTR IMPERIAL CONTROL UNIT
MODEL 4EC59A115

MODEL NUMBER	REV. LETTER	NO. OF FREQ.	CHANNEL GUARD MONITOR SWITCH	TONE OPTION JACK
4EC59A34	F		SEARCH-LOCK MONITOR	
4EC59A35	F		SEARCH-LOCK MONITOR	
4EC59A36	J		SEARCH-LOCK MONITOR	X
4EC59A37	J		SEARCH-LOCK MONITOR	X
4EC59A38	F		SEARCH-LOCK MONITOR	X
4EC59A39	F		SEARCH-LOCK MONITOR	X
4EC59A40	J		SEARCH-LOCK MONITOR	X
4EC59A41	J		SEARCH-LOCK MONITOR	X
4EC58A115			SEARCH-LOCK MONITOR	

** TERMINALS 9 & 11 ARE USED ON 12 VOLT SYSTEMS FOR CONTROL OF 10-WATT SPEAKER.

▲ DIMMER CONTROL OPTION
ADD DOTTED CONNECTIONS & OMIT WIRE FROM TB1-5 TO X05701-1

■ TONE SELECTIVE CALLING
OMIT IN MODELS 4EC59A34, 35, 38 & 39

SPEAKER MUTE
OMIT DA WIRE WHEN R706 IS USED.

⊠ CHANNEL GUARD SWITCH
OMIT IN MODELS 4EC59A34, 35, 36 & 37

NOTES:
1. ALL WIRES N24 UNLESS OTHERWISE SPECIFIED.
2. OMIT DA WIRE WHEN R706 IS USED.
3. ADD W WIRE WHEN PL19B204970G1 HOOKSWITCH IS USED.
4. FOR CHANNEL GUARD ON F1 ONLY REMOVE DA WIRE FROM TS TO B5.

(19D402414, Rev. 19)

(RC-2361)

(19D416412, Rev. 2)

NOTES:
1. ALL WIRES ARE SPDN EXCEPT AS OTHERWISE SHOWN.
2. SEE 19D416414 FOR ORIENTATION AND LOCATION OF COMPONENTS AND ROUTING OF CABLE.
3. N22SJ-W-G WIRE IS A7134854P5
   N22SJ-W-BL WIRE IS A7134854P5
   18-G-BK WIRE IS A4035028P5
   18-BR-Y WIRE IS A4035028P11
4. TERMINATE WIRES AT J506 & J507 WITH A7117269P1.
5. PARTS OF HARDWARE KIT PL19A214566G6.

SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO	
PL NO	REV LETTER

SCHEMATIC & INTERCONNECTION DIAGRAM

MASTR IMPERIAL CONTROL UNIT MODEL 4EC59A115

Issue 1

PARTS LIST

LBI-4396

CONTROL UNIT - 19D413054G18
MODELS 4EC59A115
AND
ASSOCIATED ASSEMBLIES

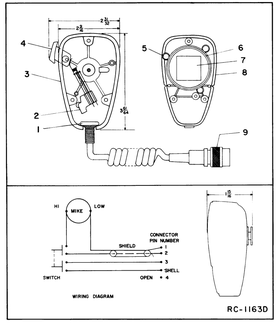
SYMBOL	GE PART NO.	DESCRIPTION
		CONTROL UNIT 19D413054G18
		- - - - - - - - INDICATING DEVICES - - - - - -
DS701 and DS702	19B209112P1	Light, indicator: miniature, 6 v; sim to GE Type 1768.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J701	19C303579P1	Socket, phen: 13 contacts rated at 5 amps max.
J702		Receptacle. Includes:
	19A116061P2	Receptacle: 4 contacts; sim to Amphenol 91-PC4F-1000.
	19A116061P4	Lockwasher, internal tooth.
	19A116061P5	Nut, knurled: No. 13/16-27N-2.
	19A116064P1	Solderless terminal.
J703	19D402408P1	Connector, phen: 25 contacts rated at 5 amps max.
		- - - - - - - - - RESISTORS - - - - - - - - -
R701		(Part of S701).
R703 and R704	5493035P19	Wirewound: 87 ohms ±5%, 5 w; sim to Hamilton Hall Type HH.
R707		(Part of S705).
		- - - - - - - - - SWITCHES - - - - - - - - -
S701	19C307089P19	Switch/Resistor: includes Switch, rotary, 3 poles, 3 positions, momentary shorting contacts, 250 ma at 500 VRMS; Resistor (R701), variable, 5000 ohms ±20%, 1/2 w max; sim to Mallory LC5E-3133.
S705	19C307089P20	Switch/Resistor: includes Switch, rotary, 4 poles, 3 positions, momentary shorting contacts, 250 ma at 500 VRMS; Resistor (R707), variable, 2500 ohms ±10%, 1 w max; sim to Mallory Type LC.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB1	7775500P12	Phen: 5 terminals.
		- - - - - - - - - SOCKETS - - - - - - - - -
XDS701 and XDS702	19B209112P2	Lamp, miniature: sim to Drake Series 121.
		MECHANICAL PARTS CONTROL UNIT MODELS 4EC59A115 (SEE EC-1170)
1	8529P19C13	Plug button: approx 21/32 inches dia.
2	8529P5C13	Plug button: approx 13/32 inches dia.
3	19A121521G1	Mounting bracket.
4	19B209112P3	Lens cap: green translucent nylon.
5	RP276158	Nameplate.
6		(Not Used).
7		(Not Used).
8		(Not Used).
9		(Not Used).
10		(Not Used).

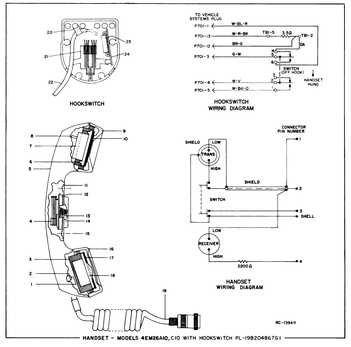
SYMBOL	GE PART NO.	DESCRIPTION
11		(Not Used).
12		(Not Used).
13	19B201122P4	Lens cap: red translucent nylon.
14	19B204443G3	Knob: brown.
15	19C303413P1	Knob: VOLUME/SQUELCH.
16	19B216271G3	Housing: brown.
17	19B204552P1	Mounting plate.
18	19A115495P1	Screw, hexhead: No. 1/4-20 x 5/8.
		ASSOCIATED ASSEMBLIES
	19A121469G1	Control unit modification kit (trunk mount).
	19D402239G1	12 volt vehicle frame.
	19A122444P1	Cover, wire channel (on systems frame).
	19C303452G1	Front casting (Front mount).
	19C303453G2	Front casting (Trunk mount).
	403426P3	Screw: 10-32 x 1-1/8 (Secures Front casting).
	5491682P2	Lock: Tale and Tower. (Part of Front casting).
	5491682P7	Cam. (Used with lock).
		DIMMER CONTROL MODIFICATION KIT 19A121353G3
		- - - - - - - - - RESISTORS - - - - - - - - -
R705	19B209114P1	Variable, wirewound: 75 ohms ±30%, 3 w; sim to CTS Series 112.
		POWER CABLE ASSEMBLY 19C303601G1 (12 VOLT FRONT MOUNT) 19C303601G2 (12 VOLT TRUNK MOUNT)
	19B209188P1	Connector, phen: 8 contacts rate at 15 amps at 1100 VRMS; sim to Benschaine and Sons S-5401-70.
	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 19C303629G2, G3 (1-FREQ) 19C303629G3, G4 (MULTI-FREQ)
		- - - - - - - - - PLUGS - - - - - - - - -
P1	19C303626G5	Plug, male: includes connector 19D402408P2, cap (HC303229G9P2 and connector retaining screw 19A121444P2.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1	19C303626G6	Plug, female: includes connector 19D402408P1, cap (HC303229G9P1 and connector retaining screw 19A121444P1.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	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.
	7139880P11	Cable: 23 conductors. (When ordering specify length). (Used in 19C303629G3 and G2).
	7139880P8	Cable: 13 conductors. (When ordering specify length). (Used in 19C303629G3 and G4).

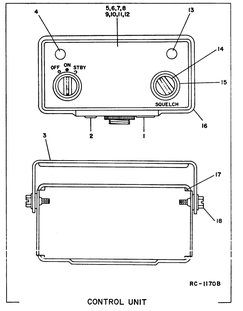
SYMBOL	GE PART NO.	DESCRIPTION
		VEHICLE SYSTEM CABLE KIT 19A121454G1 (12 VOLT VEHICLES)
	19A121423P1	Pin: 1/2 inch long.
	19A121441G1	Plug: 13 contacts.
	19C303574P1	Cover: approx 1-13/16 x 1 x 1/32 inches.
		FUSED LEAD ASSEMBLY 19A121314G1 (19A121454G1)
	1B16P8	Fuse, cartridge, quick blowing: 5 amps at 250 v; sim to Littelfuse 312005 or Bussmann MTH-5.
	7124109P3	Fuseholder: sim to Bussmann type MDJ-B.
	7112178P7	Cable: approx 8-3/4 feet long.
		INTERCONNECTION HARNESS ASSEMBLY 19A123245G1
		- - - - - - - 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 - - - - - - - -
TB901	7775500P11	Phen: 5 terminals.
	19A122444P1	Channel Cover.
		ANTENNA RELAY ASSEMBLY 19B209444P1
		Includes J901, KS01, P103, P441, W901-W903.
	1D341304501	Base.
	19D413046P1	Cover.
	19B203950P1	Fuse clip.
		- - - - - - - - - - FUSES - - - - - - - - - -
	1B11P4	Quick blowing: 15 amps, 250 v; sim to Bussman MDM15. (transmitters).
		130 - 470 MHz ANTENNA MODEL 4EY12A13 (5480969P23)
		Antenna: includes stainless steel whip approx 20 inches long; ball tip; whip socket with (2) No. 6-32 set screw; rubber mounting gasket; antenna cable; cable adapter; PL-259 coaxial plug; sim to Antenna Specialists ASP2001GE or Danbury-Knudsen Type PA-25.
	5480969P4	Whip: stainless steel, approx 20 inches long; ball tip.
	5480969P5	Socket, whip: with (2) No. 6-32 set screws.
	5480969P6	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).
	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).

SYMBOL	GE PART NO.	DESCRIPTION
		25 - 50 MHz ANTENNA
	749107 4P1	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 749107 4P1).
	4033101G1	Antenna package: includes base; adapter spring; cable and plug.
	7472880G5	Antenna base. (Used in 4033101G1).
	7474633G4	Adapter spring. (Used in 4033101G1).
	5492339P1	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 15A52. (Used in 4033101G1).
	2R22P1	Plug, coaxial: mica-filled insert, UHF contact. Signal Corps PL-259; sim to Amphenol 83-1SP. (Used with GE Dwg 5492339P1 in 4033101G1).
	4KY9A1	Coil, loading: 25 to 33 MHz; sim to Antenna Specialists ASP5A7.
	19A121577G1	Antenna hook kit.
	7134724P1	Antenna hook. (Used in 19A121577G1).
		HANDSET MODEL 4EM26A10 MODEL 4EM26C10 (SEE EC-1394)
1		Self tap screw, bind head: No. 4 x 5/16. Shure Brothers 30C54CC.
2		Cable clamp. Shure Brothers 53A532.
3		Shield. Shure Brothers RP19.
4		Switch. Shure Brothers RP81.
5		Case. Shure Brothers RP49. (Used in 4EM26A10).
		Case: Shure Brothers 21RP8099. (Used in 4EM26C10).
6		Adapter. Shure Brothers 65A230.
7		Magnetic controlled cartridge. Shure Brothers RP41.
8	3R77P22K	Resistor, composition: 2200 ohms ±10%, 1/2 w.
9		Receiver cap. (Part of item 5).
10		Washer. Shure Brothers 34A231.
11		Escutcheon. Shure Brothers 53A536A.
12		Actuator. Shure Brothers 53A556.
13		Spring. Shure Brothers 44A140.
14		Plunger bar. Shure Brothers RP62.
15		Flat head screw, socket cap: No. 4-40 x 1/4. Shure Brothers 30CS57B.
16		Transmitter cap. Shure Brothers 65A197A. (Part of item 5).
17		Washer. Shure Brothers 34A309.
18		Magnetic controlled cartridge. Shure Brothers RP13.
19		Cable and plug. Shure Brothers RP48. (Used in 4EM26A10).
		Cable and plug. Shure Brothers 21RP738F. (Used in 4EM26C10).
		HOOKSWITCH ASSEMBLY 19B204807G1 (SEE EC-1394)
20	402985 1P4	Cable clamp: sim to WEC Kessler 3/16-4.
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.

SYMBOL	GE PART NO.	DESCRIPTION
23	5493035P10	Resistor, wirewound, ceramic: 3.5 ohms ±5%, 5 w; sim to Hamilton Hall Type HH.
24	7775500P65	Terminal board, phen: 5 terminals.
		MILITARY MICROPHONE MODEL 4EM23A10 19B209102P6 (SEE EC-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 RP23.
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 4EZ16A23 19D402448G19
C1	19B209233P1	Electrolytic, non-polorized: 25 µf ±20%, 25 VDCW; sim to Sprague 44DC.
LS3	19B209422P1	Permanent magnet: 5 inch, 3.2 ohms ±10% imp, 2.98 ohms ±15% DC res, 7.5 w max operating.
W2	7484521G7	Speaker: 2 conductor with 2 spade tongue terminals, approx 4 feet long.
		MECHANICAL PARTS
	19B216269G4	Speaker housing.
	19A121550G3	Cover.
	19A121521G1	Mounting support.
	5490407P33	Neoprene grommet. (Upper)
	19A115470P1	Rubber grommet. (Lower)
	19A115469P1	Screw, hexhead: No. 1/4-20 x 5/8. (Secures housing to mounting bracket).







*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 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-4397

DF-4087

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

GENERAL ELECTRIC

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