

MASTR

Progress Line

MOBILE CONTROL UNIT MODELS 4EC59A34-41



Maintenance Manual
* * * * *
LBI-3943A
DF-4070

SPECIFICATIONS *

MODEL NUMBERS	4EC59A34 through 4EC59A41
USED WITH	MASTR Royal Professional Mobile Combinations
CONTROLS	VOLUME Control OFF-ON-STBY Switch SQUELCH Control Search-Lock Monitor Switch Optional Controls CHANNEL GUARD Monitor Switch SPEAKER-OFF Monitor Switch Dimmer Control for Pilot Lights
INDICATORS	Transmitter filament-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.

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Control Unit Model 4EC59A34-41	
Power Calbes 19C303601-G1 & G2	
Trunk-Mount Control Cables 19C303626-G1—G4	
Vehicle System Cables 19A121454-G1 & -G2	
Interconnection Harness 19A122458-G1	
Microphone Model 4EM25A10	
Handset Model 4EM25A10	
Dimmer Control Option 19A121293-G1	
Fuse Assembly 19B216021-G4 & Fuse 1R11-P4	
Five-Watt Speaker 4EZ16A19	
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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.

DESCRIPTION

MASTR Progress Line 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 overrides 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.

In radios equipped with Channel Guard, the receiver Channel Guard operates only in the F1 position. The transmitter Channel Guard operates in the F1 and F1-F2 position.

SPEAKER-OFF Switch (S702)

The SPEAKER-OFF switch is used whenever a telephone handset and hookswitch is used. The switch operates in parallel with the hookswitch and, in the SPEAKER position, overrides the speaker muting circuit in the handset hookswitch. Calls can then be heard from the speaker, regardless of whether the handset is on or off the hookswitch.

With the switch in the OFF position and the handset off the hookswitch, calls are heard only from the handset earpiece. The speaker still operates with the handset hung up.

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

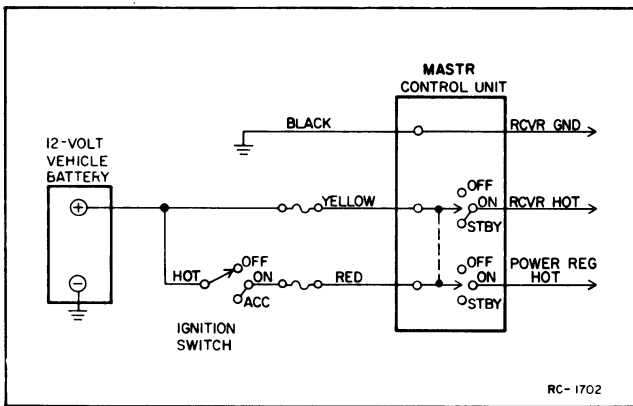


Figure 1 — 12-VDC Connections for Ignition Switch Standby

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.

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 Royal Professional 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 Royal Professional 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.

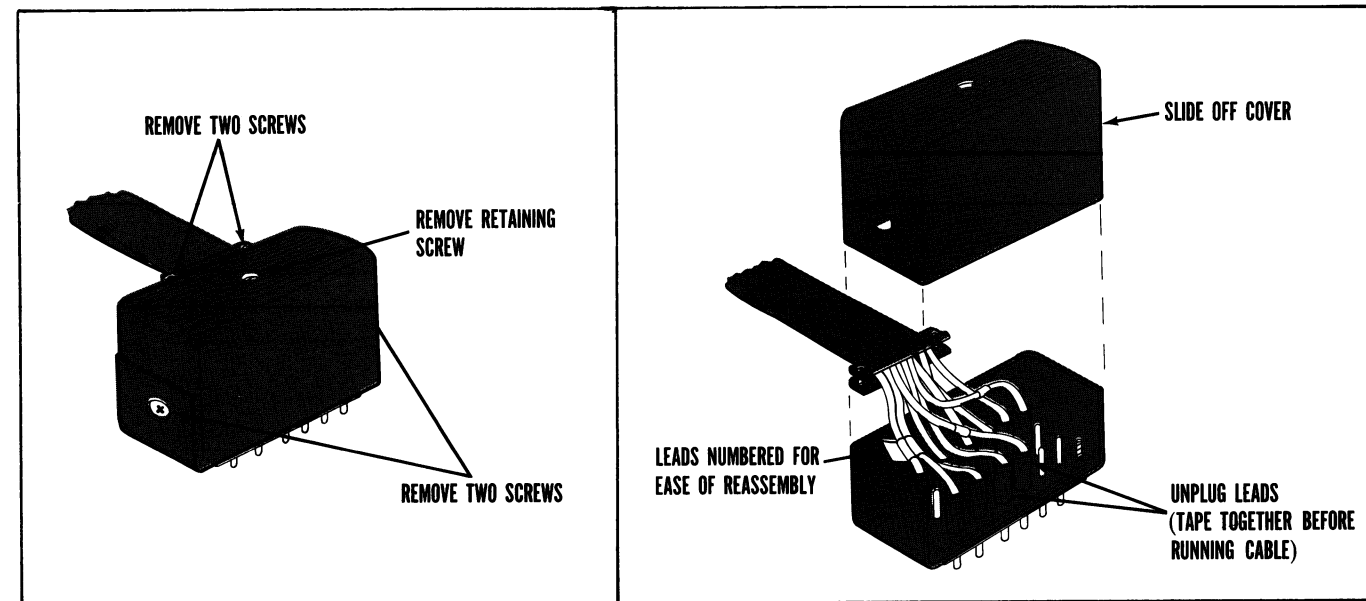
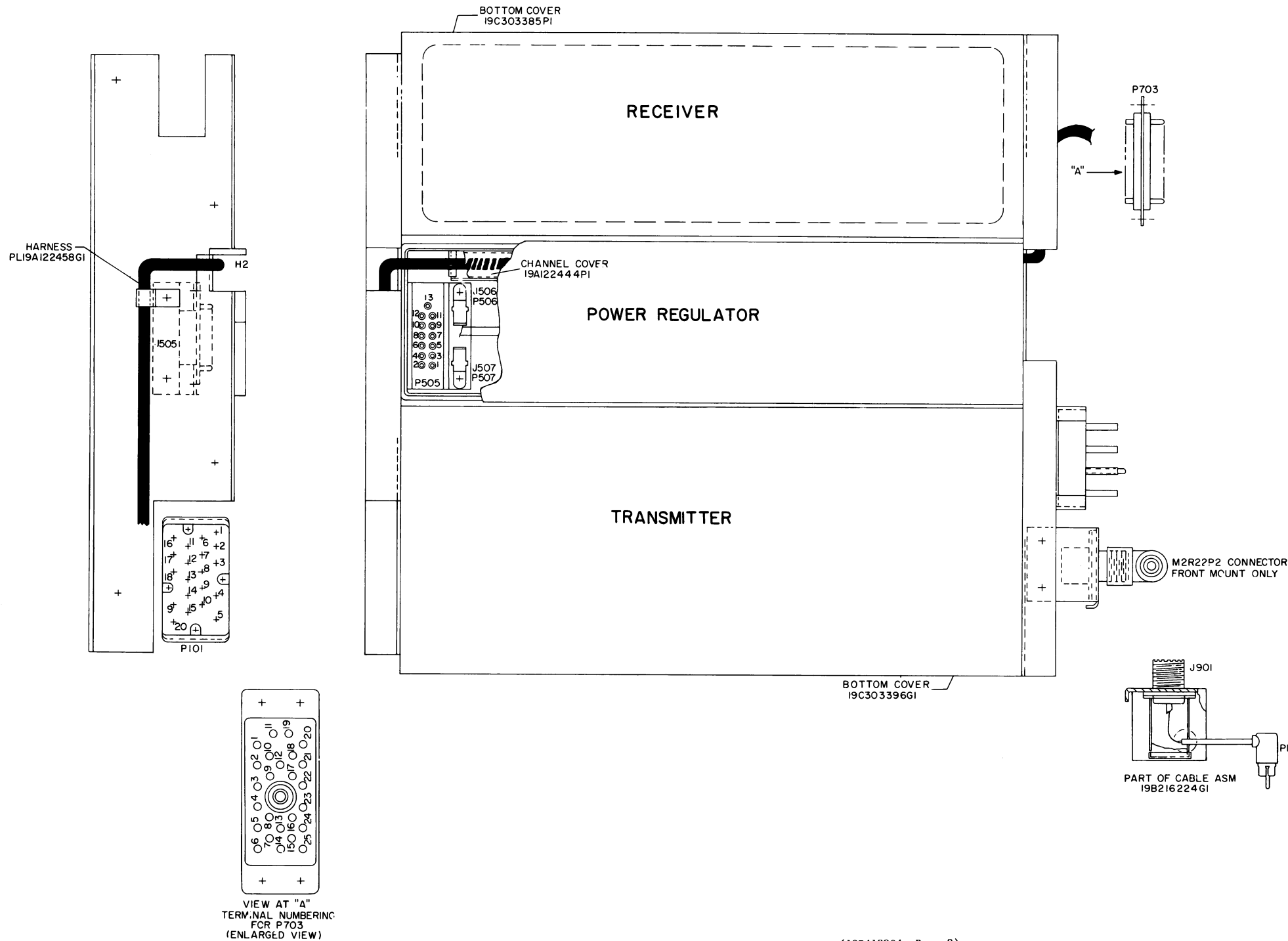


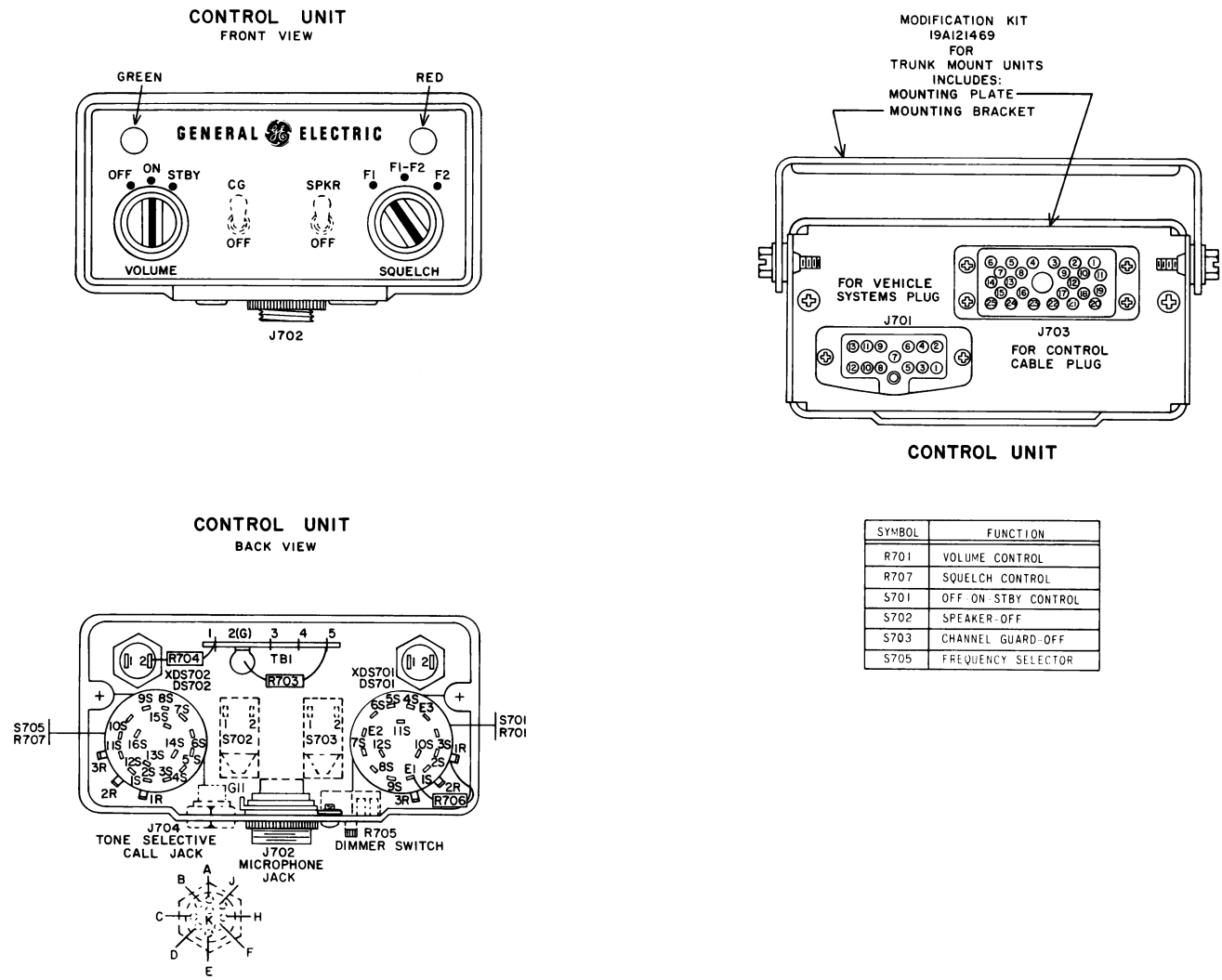
Figure 2 - Disassembly of Control Cable Plug

SYSTEM FRAME & HARNESS



(19D413204, Rev. 2)

CONTROL UNIT



(19C303817, Rev. 1)

OUTLINE DIAGRAM

MASTR CONTROL UNIT
MODELS 4EC59A34-41

SYSTEM FRAME AND HARNESS



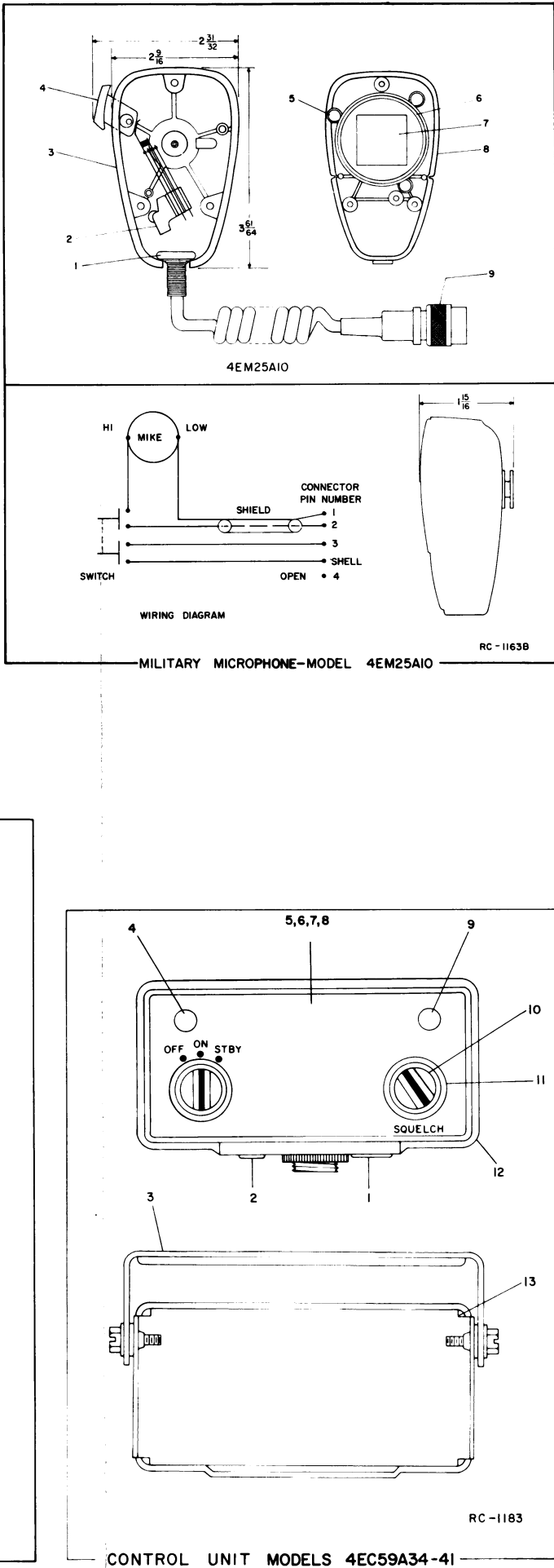
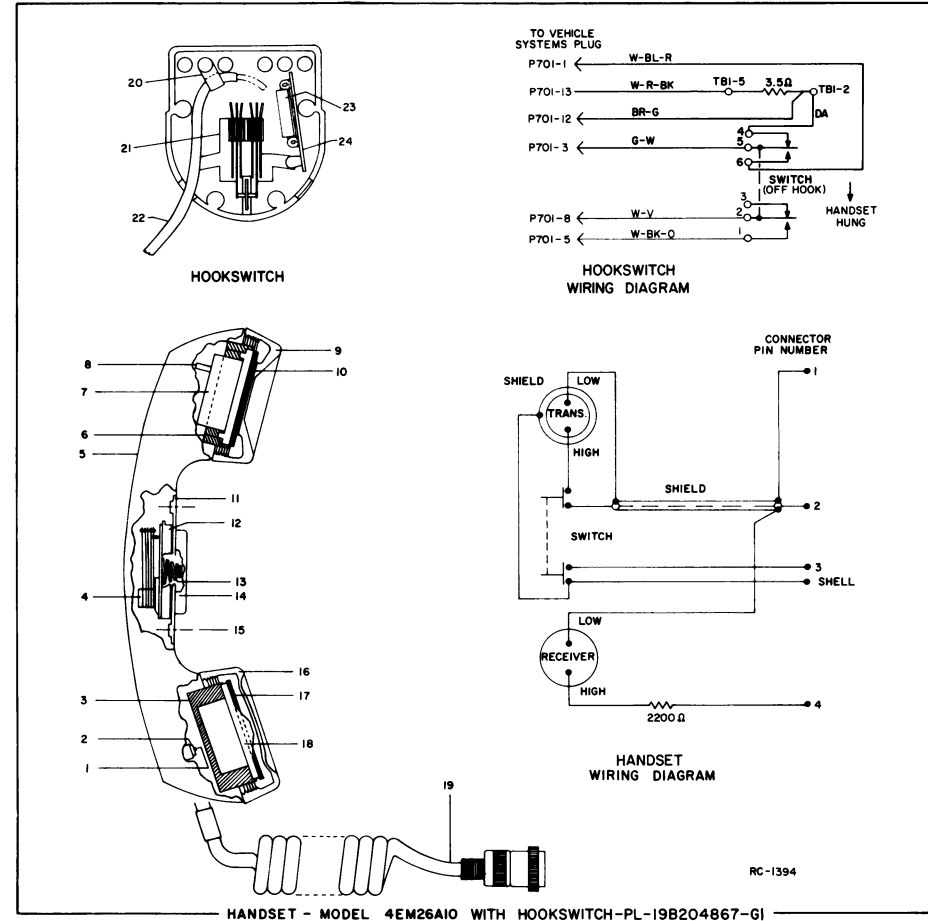
PARTS LIST		
LBI-3952A CONTROL UNIT MODELS 4EC59A34-41 AND ASSOCIATED ASSEMBLIES		
SYMBOL	GE PART NO.	DESCRIPTION
CONTROL UNIT 19d413054-G6		
----- INDICATING DEVICES -----		
D8701 and D8702	19B201122-P1	Light, indicator: miniature, 6 v; sim to GE Type 1768.
----- JACKS AND RECEPTACLES -----		
J701	19C303576-P1	Socket, phen: 13 contacts rated at 5 amps max.
J702	19A116061-P1	Connector, chassis: 4 female contacts; sim to Amphenol Type 91-PW4F-1000.
J703	19D402408-P1	Connector, phen: 25 contacts rated at 5 amps max.
J704	19B216279-G1	Jack assembly: 9 female contacts rated at 5 amps at 900 VRMS; sim to Winchester M95-LRN.
----- RESISTORS -----		
R701		(Part of R701).
R703 and R704	5493035-P19	Wirewound, ceramic: 67 ohms ±5%, 5 w; sim to Tru-Ohm Type X-60.
R706*	3R77-P100K	Composition: 10 ohms ±10%, 1/2 w.
	3R77-P560K	In Models 4EC59A36, 37, 40, 41 of REV G and earlier: Composition: 56 ohms ±10%, 1/2 w. (Part of R705).
R707		(Part of R705).
----- SWITCHES -----		
S701*	19C307089-P19	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, mod log taper; sim to Mallory LC5K-2233.
	19C307089-P1	In Models 4EC59A34, 35, 38 and 39 earlier than REV B: In Models 4EC59A36, 37, 40 and 41 earlier than REV D: Switch/Resistor: includes Switch, rotary, 3 poles, 3 positions, non-shorting contacts, 250 ma at 500 VRMS; Resistor (R701), variable, 5000 ohms ±20%, 1/2 w max; sim to Mallory LC.
S702 and S703	5491899-P5	Toggle: SPST, 3 amps at 250 VAC or 250 VDC; sim to Cutler-Hammer 8280K15.
S705	19C307089-P20	Switch/Resistor: includes Switch, rotary, 3 poles, 3 positions, momentary shorting contacts, 250 ma at 500 VRMS; Resistor (R707), variable, 2500 ohms ±10%, 1 w max; sim to Mallory LC.
----- TERMINAL BOARDS -----		
TB1	7775500-P12	Phen: 5 terminals.
----- SOCKETS -----		
XD8701 and XD8702	19B201122-P2	Lamp, miniature: sim to Drake Series 121.
MECHANICAL PARTS (SEE RC-1183)		
1	N529P19C13	Plug button.
2	N529P5C13	Plug button.
3	19A121521-G1	Mounting bracket.
4	19B201122-P3	Lens cap: green translucent nylon, approx 3/8 inch dia.

SYMBOL	GE PART NO.	DESCRIPTION
5	NP257619	Nameplate: (Used in Models 4EC59A34 and A36).
6	NP257838	Nameplate: (Used in Models 4EC59A35 and A37).
7	NP257827	Nameplate: (Used in Models 4EC59A38 and A40).
8	NP257840	Nameplate: (Used in Models 4EC59A39 and A41).
9	19B201122-P4	Lens cap: red translucent nylon, approx 5/8 inch dia.
10	19B204443-G1	Knob: gray.
11	19C303413-P1	Knob: VOLUME/SQUELCH.
12	19B216271-G1	Housing.
13	19B204522-P1	Mounting plate.
ASSOCIATED ASSEMBLIES		
19A121469-G1		Control unit modification kit (trunk mount).
19D402239-G1		12 volt vehicles frame.
19A122444-P1		Cover, wire channel (on systems frame).
19C303452-G1		Front casting (Front mount).
19C303452-G2		Front casting (Trunk mount).
5491682-P2		Lock: Yale and Towne. (Part of Front casting).
5491682-P7		Cam. (Used with lock).
POWER CABLE ASSEMBLY 19C303601-G1 (12 VOLT FRONT MOUNT) 19C303601-G2 (12 VOLT TRUNK MOUNT)		
19B209189-P1		Connector, phen: 8 contacts rated at 15 amps at 1100 VRMS; sim to Beauchaine and Sons S-5401-76.
19D402438-P1		Cap, connector.
19A115313-P1		Cable: 3 conductor, approx 9 feet long. (Used in 19C303601-G1).
19A115314-P1		Cable: 3 conductor, approx 18 feet long. (Used in 19C303601-G2).
CONTROL CABLE ASSEMBLY 19C303626-G1, G2 (SINGLE FREQ) 19C303626-G3, G4 (MULTI-FREQ)		
P1	19C303626-G5	Plug, male, includes: connector 19D402408-P3, cap 19C303290-P2.
J1	19C303626-G6	Plug, female, includes: connector 19D402408-P1, cap 19C303290-P1.
----- MISCELLANEOUS -----		
19D402408-P1		Connector, female phen: 25 contacts rated at 5 amps max.
19D402408-P3		Connector, male phen: 25 contacts rated at 5 amps max.
19C303290-P1		Cap, connector. (Used with 19D402408-P1 connector).
19C303290-P2		Cap, connector. (Used with 19D402408-P3 connector).
7139880-P8		Cable, single freq: 13 conductors, approx 18 feet long. (Specify length when ordering).
7139880-P8		Cable, single freq: 13 conductors, approx 23 feet long. (Specify length when ordering).
7139880-P11		Cable, multi freq: 23 conductors, approx 18 feet long. (Specify length when ordering).
7139880-P11		Cable, multi freq: 23 conductors, approx 23 feet long. (Specify length when ordering).
VEHICLE SYSTEM CABLE KIT 19A121454-G1 (12 VOLT VEHICLES)		
19A121429-P1		Pin: 1/2 inch long.

SYMBOL	GE PART NO.	DESCRIPTION
	19A121441-G1	Plug: 13 contacts.
	19C303574-P1	Cover.
		FUSED LEAD ASSEMBLY 19A121314-G1 (19A121454-G1)
1R16-P8		Fuse, cartridge, quick blowing: 5 amps at 250 v; sim to Littelfuse S1200S or Bussmann MTH-5.
19A115776-P2		Fuseholder: sim to Bussmann Type HM-B.
		INTERCONNECTION HARNESS ASSEMBLY 19A122458-G1
		----- JACKS AND RECEPTACLES -----
J505	19A122683-G1	Plug, male: 13 pin contacts.
		----- PLUGS -----
P101	19C303506-P1	Connector, phen: 20 contacts rated at 5 amps max at 600 VDC.
P443	19C303506-P1	Connector, phen: 20 contacts rated at 5 amps max at 600 VDC.
P703	19D402408-P2	Connector, phen: 25 contacts rated at 5 amps max.
		----- TERMINAL BOARDS -----
T8901	7775500-P10	Phen: 4 terminals.
CR5	5494922-P1	Diode, silicon: part of Mod Kit 19A121899-G1.
		ANTENNA CABLE ASSEMBLY 19B216224-G1
		----- JACKS AND RECEPTACLES -----
J901	2R22-P3	Receptacle, panel, coaxial: mica-filled insert, UHF contact. Signal Corps SO-239 or sim to Amphenol 83-1R.
P103		----- PLUGS -----
		(Part of W901).
		----- CABLES -----
W901	5491689-P56	Cable, RF: coaxial, approx 12 inches long. Includes phono type plug (P103).
2R22-P2		Adapter, right angle, coaxial: polystyrene, UHF contact. Signal Corps M-359; sim to Amphenol 83-1AP. (Front mount only) (Connect to J901).
		RECEIVER RF CABLE ASSEMBLY
		----- PLUGS -----
P104		(Part of W902).
P441		(Part of W902).
		----- CABLES -----
W902	5491689-P71	Cable, Receiver, RF: includes two phono type plugs (P104 and P441), 350 VRMS max, approx 12 inches long.
		12 VOLT FUSEHOLDER 19B216021-G4
19D413045-P1		Base.
19D413046-P1		Cover.
19B205950-P1		Fuse clip.
		----- FUSES -----
1R11-P4		Quick blowing: 15 amps, 250 v; sim to Bussmann NON15. (transmitter).
		130 - 470 MHz ANTENNA MODEL 4EY12A13 (5490969-P13)
		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.

SYMBOL	GE PART NO.	DESCRIPTION
	5490969-P4	Whip: stainless steel, approx 20 inches long; ball tip.
	5490969-P5	Socket, whip: with (2) No. 6-32 set screws.
	5490969-P6	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 2R22-P1 and GE Dwg 7105381-P1).
7105381-P1		Adapter, cable, Type UG-175/U. (Used with GE Dwg 2R22-P1 and Type RG-58/U cable).
2R22-P1		Plug, coaxial: mica-filled insert, UHF contact. Signal Corps PL-259; sim to Amphenol 83-1SP. (Used with GE Dwg 7105381-P1 and Type RG-58/U cable).
		25 - 50 MHz ANTENNA
7491074-P1		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.
7102930-P3		Adapter, antenna: approx 2-5/16 inches long. (Used with GE Dwg 7491074-P1).
4033101-G1		Antenna package: includes base; adapter spring; cable and plug.
7472880-G5		Antenna base. (Used in 4033101-G1).
7476632-G4		Adapter spring. (Used in 4033101-G1).
5492239-P1		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 4033101-G1).
2R22-P1		Plug, coaxial: mica-filled insert, UHF contact. Signal Corps PL-259; sim to Amphenol 83-1SP. (Used with GE Dwg 5492239-P1 in 4033101-G1).
4KY9A1		Coil, loading: 25 to 33 MHz; sim to Antenna Specialists ASPA87.
19A121577-G1		Antenna hook kit.
7134724-P1		Antenna hook. (Used in 19A121577-G1).
		HANDSET MODEL 4EM26A10 (19B209100-G1) (SEE RC-1394)
1		Self tap screw, blind head: No. 4 x 5/16. Shure Brothers 30C840C.
2		Cable clamp. Shure Brothers 53A532.
3		Shield. Shure Brothers RP19.
4		Switch. Shure Brothers RP81.
5		Handle. Shure Brothers RP49.
6		Adapter. Shure Brothers 65A230.
7		Magnetic controlled cartridge. Shure Brothers RP41.
8	3R77-P222K	Resistor, composition: 2200 ohms ±10%, 1/2 w.
9		Receiver cap. Shure Brothers 65A199A. (Part of RP49).
10		Washer. Shure Brothers 34A321.
11		Escutcheon. Shure Brothers 53A536A.
12		Actuator. Shure Brothers 53A556.
13		Spring. Shure Brothers 44A140.
14		Plunger bar. Shure Brothers RP82.
15		Flat head screw, socket cap: No. 4-40 x 1/4. Shure Brothers 30C557B.
16		Transmitter cap. Shure Brothers 65A197A. (Part of RP49).
17		Washer. Shure Brothers 34A309.
18		Magnetic controlled cartridge. Shure Brothers RP13.
19		Cable and plug. Shure Brothers RP48.

SYMBOL	GE PART NO.	DESCRIPTION
		HOOKSWITCH ASSEMBLY 19B204867-G1
		----- MISCELLANEOUS -----
20	4029851-P4	Cable clamp; sim to WEC Kesner 3/6-4.
21	19A121612-P1	Holder and switch: thermoplastic case, contact rating 1 amp at 125 v.
22	19A121581-G1	Cable: approx 8-1/2 feet long.
23	5493035-P10	Resistor, wirewound, ceramic: 3.5 ohms ±5%, 5 w; sim to Tru-Ohm Type X-60.
24	7775500-P55	Terminal board, phen: 5 terminals.
		MILITARY MICROPHONE MODEL 4EM25A10 19B209102-G1 (SEE RC-1163)
1		Cable clamp. Shure Brothers 53A532.
2		Switch. Shure Brothers RP-26.
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-16.
6		Shield. Shure Brothers RP-23.
7		Magnetic controlled cartridge. Shure Brothers RP-13.
8		Case (front): plastic. Shure Brothers RP-67.
9		Cable and plug: approx 6 feet long. Shure Brothers RP-14.
		5 WATT SPEAKER 4E216A19 19D402449-G12
Cl	19B209233-P1	Electrolytic, non-polarized: 25 µf ±20%, 25 VDCW; sim to Sprague 44DC.
LS3	19B209422-P1	Permanent magnet: 5 inch, 3.2 ohms ±10% imp, 2.98 ohms ±15% DC res, 7.5 w max operating.
W1	19A121546-G1	Cable assembly: approx 48 inches long, includes (2) 19A121429-P1 pins.
	19B216269-G2	Speaker housing.
	19A121550-G3	Cover.
	19A121521-G1	Mounting support.
	5490407-P3	Neoprene grommet. (Upper)
	19A115470-P1	Rubber grommet. (Lower)



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, 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-3943

Progress Is Our Most Important Product



MOBILE RADIO DEPARTMENT LYNCHBURG, VIRGINIA 24502 CABLE GEOMPROD
(In Canada, Canadian General Electric Company, Ltd., 100 Wingold Avenue, Toronto 19, Ontario)

PRINTED IN U.S.A.

DF-4080