2-WAY MOBILE RADIO

MAINTENANCE MANUAL

FOR
TRANSISTORIZED PROGRESS LINE
REAR MOUNT CONTROL UNIT

SPECIFICATIONS

Model	4EC45A10 (Single-frequency) 4EC45A11 (Two-frequency)
Description	Control Unit for Transistorized PROGRESS LINE Two-Way Mobile Radios
Used With	Transistorized PROGRESS LINE Transmitters and Receivers
Controls	VOLUME-OFF Switch SQUELCH/STBY PUSH Switch
Indicators	Transmitter Filaments On Light (green) Transmit Light (red)

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CONTENTS

ILLUSTRATIONS

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 the installation, operation, or maintenance.

Should further information be desired, or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the nearest General Electric Company District Sales Office.

GENERAL ELECTRIC
TRANSISTORIZED PROGRESS LINE
REAR MOUNT CONTROL UNIT
MODEL 4EC45A10,11

Control Unit Model 4EC45A10,11 is designed for use with Rear Mount TPL Two-Way Radio Combinations. The Control Unit contains the operating controls and is mounted within convenient reach of the operator; generally on the top or underside of the instrument panel. Cable connections to the Speaker-Amplifier, Solenoid Assembly, Microphone, and Rear Mount Two-Way Radio are made to jacks on the back of the Control Unit.

Cable connections from the Control Unit to the Two-Way Radio are made by an extension cable that terminates in a 21 pin connector on the Front Panel of the Two-Way Radio. All connections to units in the front section of the Two-Way Radio are made by quick-disconnect plugs on wires running from the back of the Front Panel.

Instructions for adjusting the SQUELCH/STBY PUSH and VOLUME-OFF controls are included in the OPERATOR'S MANUAL for the Radio.

CIRCUIT DESCRIPTION

When the VOLUME-OFF switch is in the OFF position, all power is removed from the Two-Way Radio. Turning the VOLUME-OFF switch to the right applies power to the set. With the SQUELCH/STBY PUSH switch pushed in, power is applied only to the receiver.

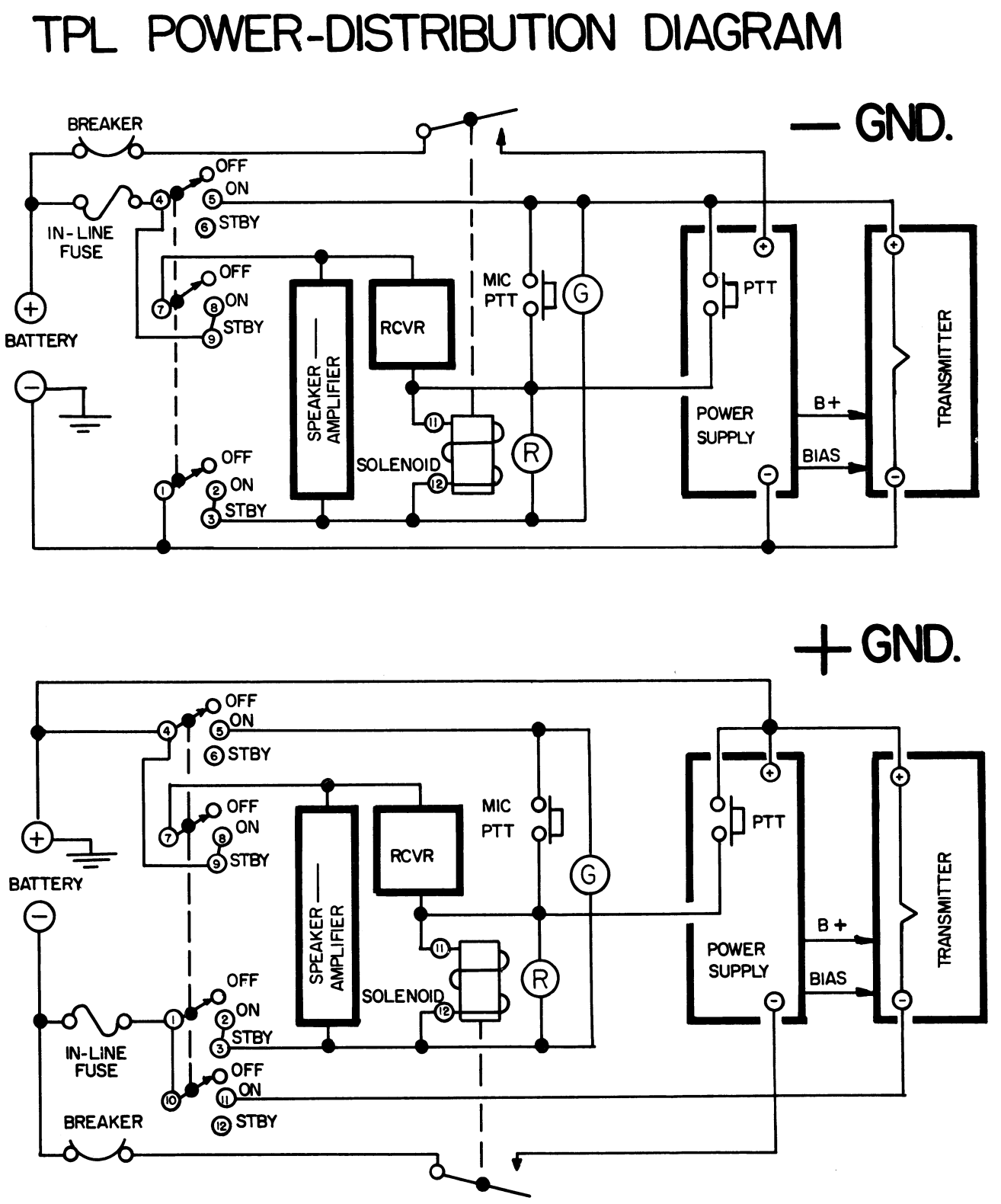
NOTE

Note that the receiver draws current through the solenoid. Due to the small current, however, and the low resistance of the solenoid, the relay does not pull in while the receiver is operating.

In vehicles in average commercial use, it is entirely feasible to leave the receiver operating continuously on STBY due to the extremely low battery drain. Ignition switch control can therefore be eliminated, if the STBY PUSH switch is pushed in whenever the engine is turned off.

Pulling the STBY PUSH switch out applies filament voltage to the tubes in the transmitter, activates the push-to-talk (PTT) circuit, and lights the green pilot light. After a short warm-up time, the PTT button on the microphone may be pressed to key the

Figure 1


TPL POWER-DISTRIBUTION DIAGRAM
— GND.
BREAKER
OFF
ON
STBY
IN-LINE FUSE
BATTERY
SPEAKER — AMPLIFIER
RCVR
MIC
PTT
G
PTT
SOLENOID
R
POWER SUPPLY
B+
BIAS
TRANSMITTER
+ GND.
RC-538B

transmitter. Notice that pressing the PTT switch shorts the voltage across the receiver, muting the receiver, energizing the solenoid, and lighting the red pilot light. As the solenoid contactors close, they apply power to the power supply, which, in turn, supplies B-plus and bias voltages to the transmitter, placing the transmitter on the air.

For two-frequency operation, an additional switch is mounted on the Control Unit. This two-frequency switch connects the emitter of the selected transmitter or receiver oscillator to ground so that the unit will operate on the frequency determined by that oscillator.

MAINTENANCE

Access to the inside of the Control Unit can be easily obtained by removing the two Phillips-head screws in the top or bottom of the Control Unit (depending on mounting position), and sliding the chassis out of the Control housing. Then remove the screws holding the lid on the chassis.

If it becomes necessary to move the two-way radio and Control Unit to another vehicle, the 21-pin plastic plug on the Extension Cable may need to be disassembled before the Extension Cable can be removed. To remove the pins from the plug, use the extraction tool (part of Control Unit Mounting Hardware Kit) as shown in Figure 2 to compress the pin flanges so that the pins can be pulled out of the plug. For reassembling the plug, refer to Figure 3.

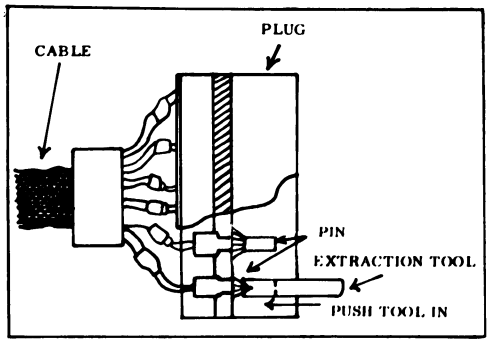
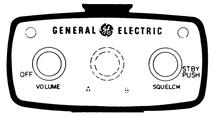


Figure 2 - Plug Disassembly

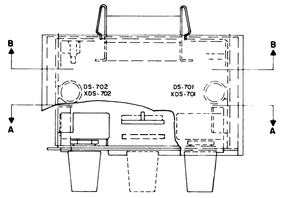
CONNECTIONS					
PIN NO. ON P705	WIRE COLOR	HOLE ON P704	PIN NO. ON P705	WIRE COLOR	HOLE ON P704
1	WHITE	A-1	12	ORANGE - RED	G-2
2	BLACK	A-2	13	BROWN	C-3
3	SHIELD OF WHITE & BLACK WIRES ABOVE	A-3	14	RED - BLACK	F-1
4	BLUE - WHITE	B-3	15	BLUE	G-3
5	RED - WHITE	C-1	15	SHIELD FROM BROWN WIRE ABOVE	G-3
6	BLACK - WHITE	F-3	16	BLACK - RED	F-2
7	GREEN - WHITE	G-1	17	WHITE - BLACK	D-1
8	ORANGE	C-2	18	BLUE - BLACK	D-2
9	WHITE - RED	C-2	19	SHIELD OF RED AND GREEN WIRES BELOW	D-3
10	GREEN - BLACK	B-1	20	RED	E-1
11	ORANGE - BLACK	B-2	21	GREEN	E-2

Figure 3 - Plug Connections

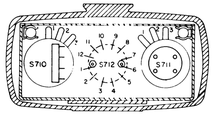
CONTROL UNIT
MODEL 4EC45A10



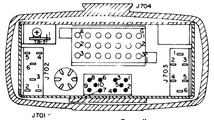
FRONT VIEW



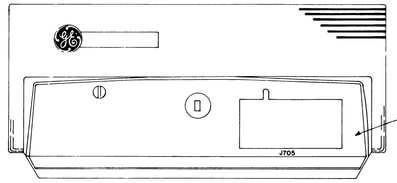
TOP VIEW



VIEW AT "A-A"

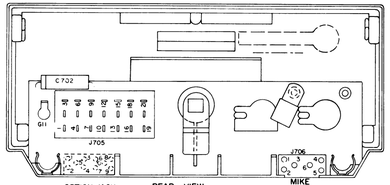


VIEW AT "B-B"



FRONT VIEW

FRONT PANEL
PL 5493770



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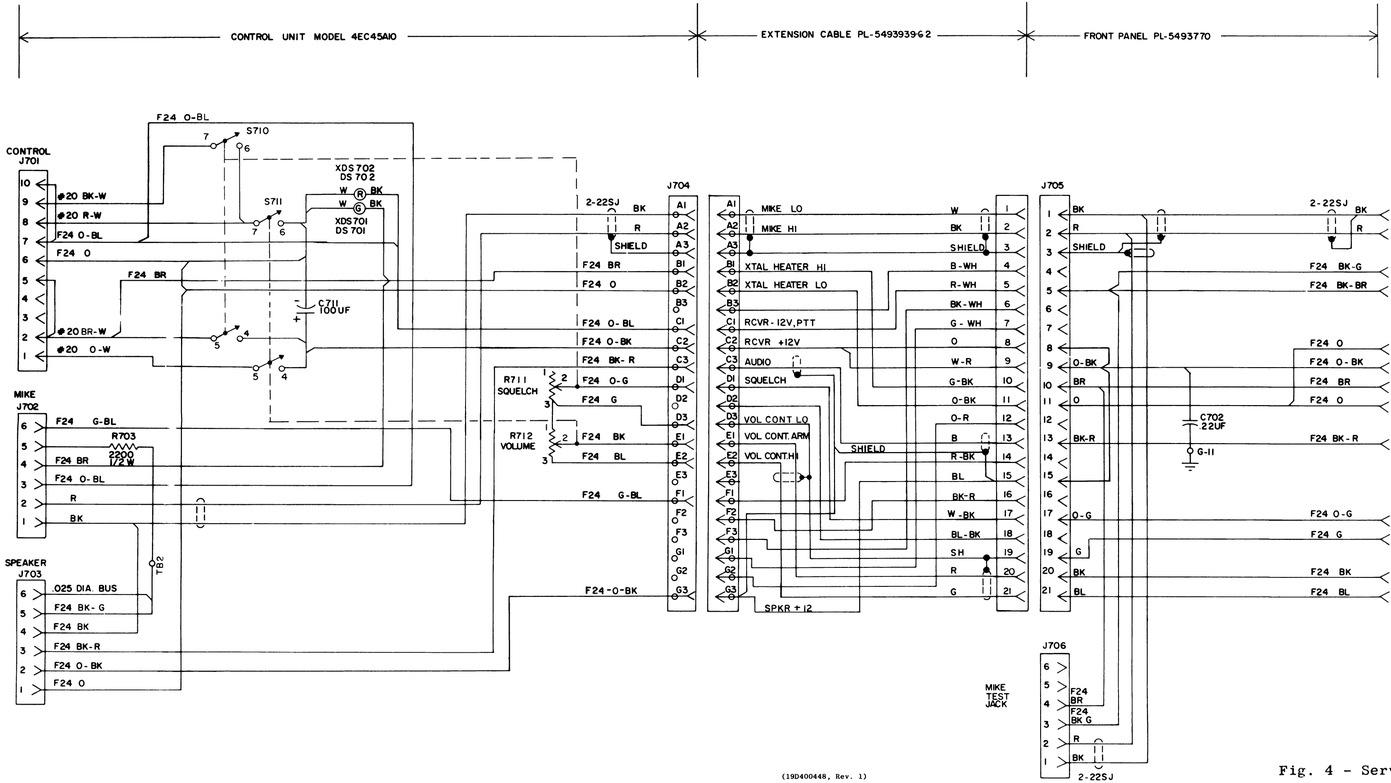

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Fig. 4 - Service Sheet

TPL REAR MOUNT CONTROL UNIT
MODEL 4EC45A10, REV. C: AND
FRONT PANEL PL-5493770-G1

(RC-707D)

10092

PARTS LIST

CONTROL UNIT MODEL 4EC45A10, REV. C
FRONT PANEL PL - 5493770-G1

SYMBOL	G-E PART NO.	DESCRIPTION
		CAPACITORS
C711*	7489483-P18	Electrolytic; 85°C operation; 100 mf +100% -10%, 25 VDCW; Sim to Sprague 30D188A1. Added by Rev. B.
		INDICATING DEVICES
DS701 and DS702	G.E. #53	Lamp, incandescent: (Min bayonet base); design volts 14.50, design current 0.12 amps. (Uses G-3-1/2 size bulb). Sim to G.E. 53
		JACKS AND RECEPTACLES
J701	5493545-P2	Connector, plug: Black phenolic insulation 10-male contacts (brass), max rating 1,000 VDC (contact to contact), max current 5 amps Sim to Component Mfg. Service Inc. 6601-CM10
J702	5493545-P3	Connector, socket: black phenolic insulation; 6-female contacts (brass), max rating 1,000 VDC (contact to contact), max current 5 amps Sim to Component Mfg. Service 6601-CF6
J703	5493545-P4	Connector, socket: Black phenolic insulation 6-female contacts (brass), max rating 1,000 VDC (contact to contact), max current 5 amps Sim to Component Mfg. Service 6601-CF6A
J704	5496809-P114	Connector, receptacle: phenolic, 21 circuits. Sim to Molex Products Co. 1055M21
		INDUCTOR
L701*	7488079-P67	R.F. Choke: Inductance 33 uh ±10%, Jeffers Catalog 10404-24. Deleted by Rev. B.
		RESISTORS
R701*	5491971-P2	Potentiometer, composition: (For push-on knob); mod log taper, 2,500 ohms ±20%. Sim to Allen Bradley Co. J. Deleted by Rev. C.
R702*	5491971-P1	Potentiometer, composition: (For push-on knob); linear taper, 15,000 ohms ±20%. Sim to Allen Bradley Co. J. Deleted by Rev. C.
R703	3R77-P222K	Fixed composition; 2,200 ohms ±10%, 1/2 w.
		SWITCHES
S701*	5495227-P4	Rotary: High grade phenolic insulation; shorting type contacts, 1-section, 4-pole, 3-position, contact rating = make and break 4 amps at 12 vdc. Sim to Oak Mfg. Co. F. Deleted by Rev. C.
S712	5495454-P1	Switch, rotary: Non-shorting contacts, 2-section, 2 pole, 2-position; contact rating 2 amps at 25 VDC. Used in Model 4EC45A11 only.
		SOCKETS
XDS701 and XDS702	4032220-P1	Socket, lamp; Min bayonet base; plastic insulating sleeve, 6-inch leads. Sim to Drake Mfg. Co., h317.
		MISCELLANEOUS MECHANICAL PARTS
	19B200008-P1	Control housing, steel, 2.428 x 2.75 inches dia.
	5492651-P1	Chassis, weld assembly.
	4035752-P1	Plate, cover; steel, 2.56 x 4.05 inches.
	19B200400-P1	Plate, aluminum
	4032248-P1	Clip, mounting; spring steel; annealed carbon.
	4035746-P1	Jewel, red, #2444 plexiglass, 0.250 dia. x 1.05lg.
	4035746-P2	Jewel, green, #2092 Plexiglass.
	5493256-P1	Knob, Butyrate (Tenite 11); red-orange color, for use with flatted shaft. Sim to Eastman Chemical Co. 32599.
	7143206-P2	Terminal, standoff: Brass, molded (asbestos filled melamine) insulation, 0.781 inches long.

SYMBOL	G-E PART NO	DESCRIPTION
		FRONT PANEL PL - 5493770-G1
C702, C703 and C704	7491930-P10	Capacitor, Mylar®, dielectric: 0.22 mf ±20% 100 VDCW. Sim to Good-All Electric Mfg. Co. 663-UW
J705	7773143-P3	Receptacle, 21 pin male, H.B. Jones P-315-SB
J706	5493545-P3	Connector, socket; black phenolic insulation; 6-female contacts; max rating 1,000 VDC (contact to contact), max current 5 amps. Sim to Component Mfg. Service 6601-CF6.
P701 thru P713	4029840-P1	Terminal: (Plug receptacle for 0.093 inch long pin); brass, 1 contact. Sim to Amp Mfg. Co. 41854. Sim to Hand Tool Amp Mfg. Co. 47745
	5496771-P1	Control Panel
	5493765-P1	Plate
	4032574-P1	Gasket
	5491682-P2	Lock
	7878455-P2	Lug, terminal, copper, bent at 90° angle, 0.688 in. lg., 0.25 in. wide, 0.025 in. thick.
	7143206-P4	Terminal, standoff: brass, molded insulation, 0.625 inches long.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

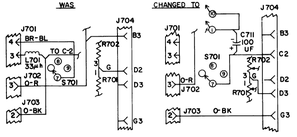
PRODUCTION CHANGES

(Refer to Parts List for description of parts affected by these revisions).

REV. A - To increase reliability of control connector by paralleling contacts. Removed wires from Pins 10 and 5. Added jumper from Pin 10 to Pin 7, and from Pin 5 to Pin 2.

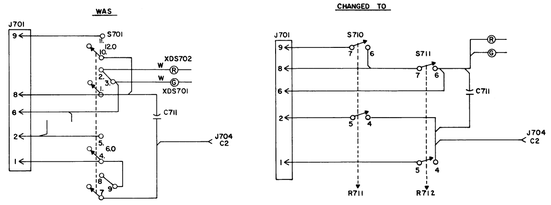
REV. B - To prevent noise pickup and improve option operation. Deleted L701 and added C711.

Elementary Diagram Changes



REV. C - To provide mounting space for 2-frequency on dual front end option switch on Control Unit. Deleted R701 (Volume), S701 (STBY-ON-OFF), and R702 (SQUELCH), Added R711/S710 (SQUELCH/STBY PUSH) and R712/S711 (VOLUME-OFF) Control.

Elementary Diagram Changes



Text Changes

Circuit Description of Control Unit, LBI-3256, pages 1 and 2, 4th through 8th paragraphs were:

The position of the STBY-ON-OFF switch (S701) determines whether or not the transmitter and receiver are operative. In the OFF position, all power is removed from the Two-Way Radio. Turning the switch to STBY (standby) applies power only to the receiver.

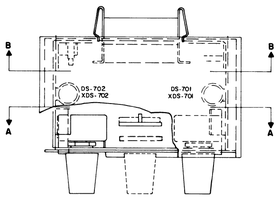
In vehicles in average commercial use, it is entirely feasible to leave the receiver operating continuously on STBY due to the extremely low battery drain. Ignition switch control can therefore be eliminated, if the switch is turned to STBY whenever the engine is turned off.

Turning the STBY-ON-OFF switch to ON applies filament voltage to the tubes in the transmitter, activates the push-to-talk (PTT) circuit, and lights the green pilot light. After a short warm-up time, the PTT button on the microphone may be pressed to key the transmitter. Notice that pressing the PTT switch shorts the voltage across the receiver, muting the receiver, energizing the solenoid, and lighting the red pilot light. As the solenoid contactors close, they apply power to the power supply, which, in turn, supplies B-plus and bias voltages to the transmitter, placing the transmitter on the air.

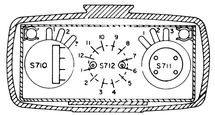
For options such as a two-frequency transmitter or receiver, an additional housing may be attached to the under side of the Control Unit, or mounted adjacent to the Control Unit on the under side of the instrument panel. This housing includes a two-frequency switch for selecting the proper channel for transmitting or receiving. The two-frequency switch connects the emitter of the selected transmitter oscillator and/or receiver first oscillator to ground so that the unit will operate on the frequency determined by that oscillator.

CONTROL UNIT
MODEL 4EC45A10

FRONT VIEW



TOP VIEW



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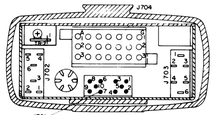

VIEW AT "B-B"

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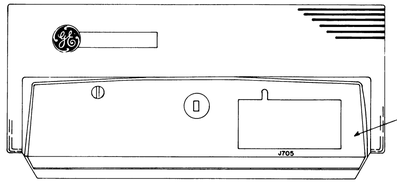
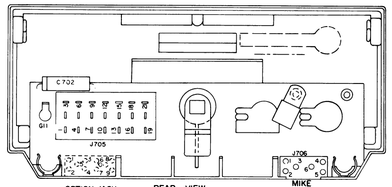


FRONT PANEL
PL 5493770

FRONT VIEW



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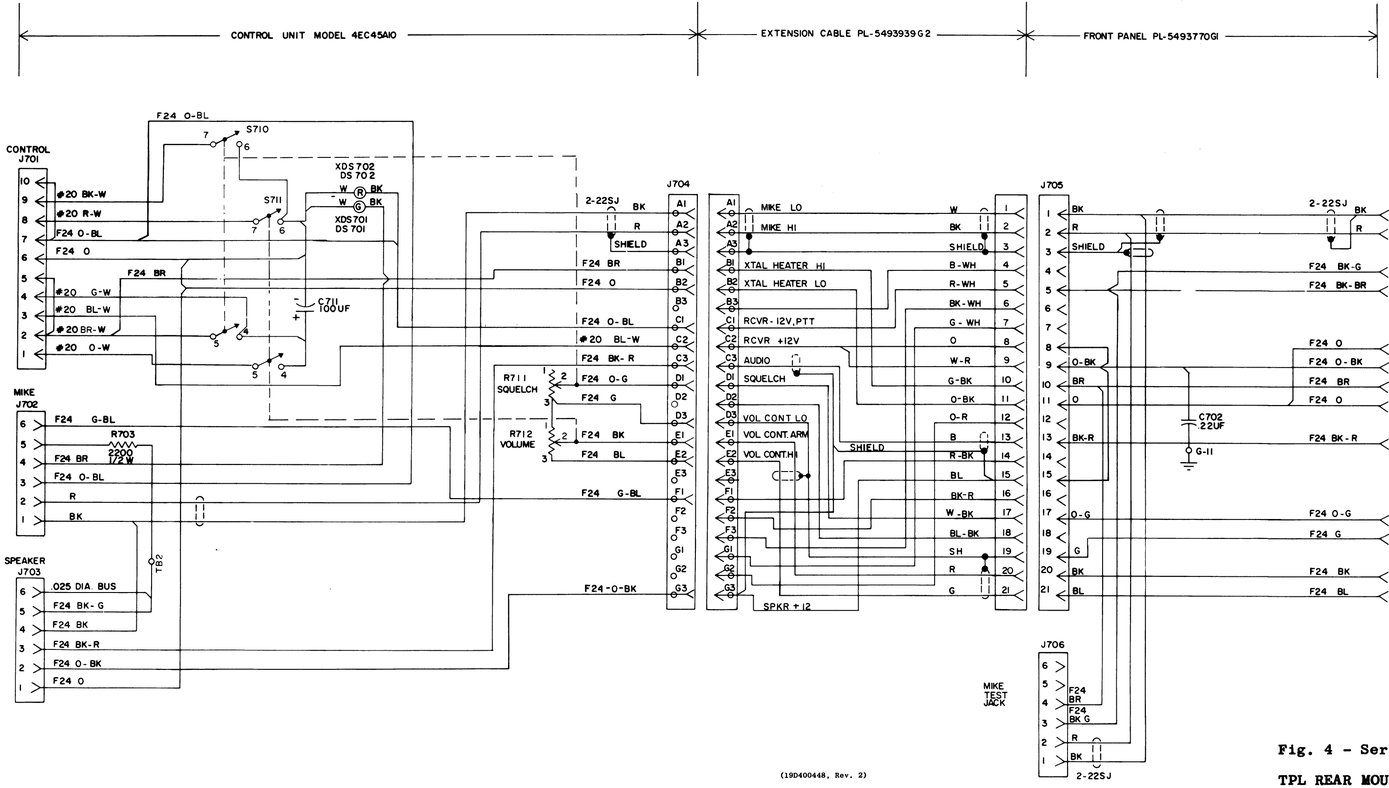


(19D400448, Rev. 2)

Fig. 4 - Service Sheet

TPL REAR MOUNT CONTROL UNIT
MODEL 4EC45A10; REV. E
MODEL 4EC45A11; REV. B
FRONT PANEL PL-5493770-G1

(RC-707F)

PARTS LIST

CONTROL UNIT MODEL 4EC45A10, REV. E
MODEL 4EC45A11, REV. B
FRONT PANEL PL - 5493770-G1

SYMBOL	G-E PART NO.	DESCRIPTION
		CAPACITORS
C711*	7489483-P18	Electrolytic: 85°C operation; 100 mf +100% -10%, 25 VDCW; Sim to Sprague 30D188A1.
		INDICATING DEVICES
DS701 and DS702		Lamp, incandescent: (Min bayonet base); design volts 14.50, design current 0.12 amps. (Uses G-3-1/2 size bulb). Sim to G.E. 53.
		JACKS AND RECEPTACLES
J701	5495345-P2	Connector, plug: Black phenolic insulation 10-male contacts (brass), max rating 1,000 VDC (contact to contact), max current 5 amps. Sim to Component Mfg. Service Inc. 6601-CM10.
J702	5495345-P3	Connector, socket: black phenolic insulation; 6-female contacts (brass), max rating 1,000 VDC (contact to contact), max current 5 amps; Sim to Component Mfg. Service 6601-CF6.
J703	5495345-P4	Connector, socket: Black phenolic insulation, 6-female contacts (brass), max rating 1,000 VDC (contact to contact), max current 5 amps; Sim to Component Mfg. Service 6601-CF6A.
J704	5496809-P114	Connector, receptacle: phenolic, 21 circuits. Sim to Molex Products Co. 1055R21.
		INDUCTOR
L701*	7488079-P67	R.F. Choke: Inductance 33 uh ±10%. Sim to Jeffers Catalog 10404-24. Deleted by Rev. B.
		RESISTORS
R701*	5496870-P4	Potentiometer, composition: (For push-on knob); mod log taper, 2,500 ohms ±20%, Sim to Allen Bradley Co. J. Deleted by Rev. C.
R702*	5496870-P3	Potentiometer, composition: (For push-on knob); linear taper, 15,000 ohms ±20%. Sim to Allen Bradley Co. J. Deleted by Rev. C.
R703	3R77-P222X	Fixed composition; 2,200 ohms ±10%, 1/2 w
R711*	5496870-P6	Potentiometer, carbon film: (for push-on knob); linear taper, 15,000 ohms ±20%; (include S710, a DPST push-pull switch, 6 amp, 125 VAC); Sim to Mallory LC15KPPCAC2.
R712*	5496870-P5	Potentiometer, carbon film: (for push-on knob); mod log taper, 2,500 ohms ±20%, (includes S711, a DPST rotary switch, 6 amps, 125 VAC); Sim to Mallory LC15MP.
		SWITCHES
S701*	5495227-P4	Rotary: high grade phenolic insulation; shorting type contacts, 1-section, 4-pole, 3-position, contact rating - make and break 4 amps at 12 VDC. Sim to Oak Mfg. Co. F. Deleted by Rev. C.
S710*		Part of R711.
S711*		Part of R712.
S712	5495454-P1	Switch, rotary: Non-shorting contacts, 2-section, 2-pole, 2-position; contact rating 2 amps at 25 VDC. Used in Model 4EC45A11 only.
		SOCKETS
XDS701 and XDS702	4032220-P1	Socket, lamp; Min bayonet base; plastic insulating sleeve, 6-inch leads. Sim to Drake Mfg. Co. N517.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES.

SYMBOL	G-E PART NO	DESCRIPTION
		MISCELLANEOUS MECHANICAL PARTS
	19B200008-P1	Control housing, steel, 2.428 x 2.75 inches dia.
	19B201630-G1	Chassis, weld assembly.
	4038132-G1	Plate, cover; steel, 2.56 x 4.05 inches.
	19B200400-P1	Plate, aluminum.
	4032248-P1	Clip, mounting; spring steel; annealed carbon.
	4035746-P1	Jewel, red, #2444 plexiglass, 0.250 dia. x 1.05lg.
	4035746-P2	Jewel, green, #2092 Plexiglass.
	5495256-P1	Knob, Butyrate (Tenite 11); red-orange color, for use with flatted shaft. Sim to Eastman Chemical Co. 32099.
	7143206-P2	Terminal, standoff: Brass, molded (asbestos filled melamine) insulation, 0.781 inches long.
		FRONT PANEL PL - 5493770-G1
C702	7491930-P10	Capacitor, Mylar®, dielectric; 0.22 mf ±20%, 100 VDCW. Sim to Good-All Electric Mfg. Co. 663-UW.
J705	4039092-P1	Receptacle, 21 pin male, Sim to H.B. Jones P-315-SB.
J706	5495345-P3	Connector, socket; black phenolic insulation; 6-female contacts; max rating 1,000 VDC (contact to contact), max current 5 amps. Sim to Component Mfg. Service 6601-CF6.
P701 thru P713	4029840-P1	Terminal: (Plug receptacle for 0.093 inch long pin); brass, 1 contact. Sim to Amp Mfg. Co. 41854. Sim to Hand Tool Amp Mfg. Co. 47745.
	5496771-P1	Control Panel.
	5493765-P1	Plate.
	4032574-P1	Gasket.
	5491682-P2	Lock.
	7878455-P2	Lug, terminal, copper, bent at 90° angle, 0.688 in. lg., 0.25 in. wide, 0.025 in. thick.
	7143206-P4	Terminal, standoff: brass, molded insulation, 0.625 inches long.

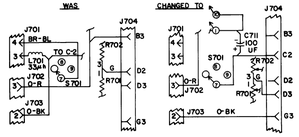
PRODUCTION CHANGES

(Refer to Parts List for description of parts affected by these revisions).

REV. A (Model 4EC45A10)
To increase reliability of control connector by paralleling contacts. Removed wires from Pins 10 and 5. Added jumper from Pin 10 to Pin 7, and from Pin 5 to Pin 2.

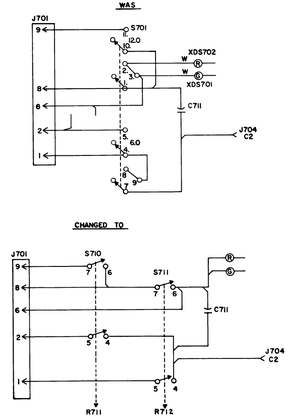
REV. B (Model 4EC45A10)
To prevent noise pickup and improve option operation. Deleted L701 and added C711.

Elementary Diagram Changes



REV. C (Model 4EC45A10)
To provide mounting space for 2-frequency on dual front end option switch on Control Unit. Deleted R701 (Volume), S701 (STBY-ON-OFF), and R702 (SQUELCH). Added R711/S710 (SQUELCH/STBY PUSH) and R712/S711 (VOLUME-OFF) Control.

Elementary Diagram Changes



Text Changes

Circuit Description of Control Unit, LBI-3256, pages 1 and 2, 4th through 8th paragraphs were:

The position of the STBY-ON-OFF switch (S701) determines whether or not the transmitter and receiver are operative. In the OFF position, all power is removed from the Two-Way Radio. Turning the switch to STBY (standby) applies power only to the receiver.

In vehicles in average commercial use, it is entirely feasible to leave the receiver operating continuously on STBY due to the extremely low battery drain. Ignition switch control can therefore be eliminated, if the switch is turned to STBY whenever the engine is turned off.

Turning the STBY-ON-OFF switch to ON applies filament voltage to the tubes in the transmitter, activates the push-to-talk (PTT) circuit, and lights the green pilot light. After a short warm-up time, the PTT button on the microphone may be pressed to key the transmitter. Notice that pressing the PTT switch shorts the voltage across the receiver, muting the receiver, energizing the solenoid, and lighting the red pilot light. As the solenoid contactors close, they apply power to the power supply, which, in turn, supplies B-plus and bias voltages to the transmitter, placing the transmitter on the air.

For options such as a two-frequency transmitter or receiver, an additional housing may be attached to the under side of the Control Unit, or mounted adjacent to the Control Unit on the under side of the instrument panel. This housing includes a two-frequency switch for selecting the proper channel for transmitting or receiving. The two-frequency switch connects the emitter of the selected transmitter oscillator and/or receiver first oscillator to ground so that the unit will operate on the frequency determined by that oscillator.

REV. D (Model 4EC45A10)

REV. A (Model 4EC45A11)
To permit control of filaments by OFF-ON Switch in positive-ground installations. The connection from S710-6 to S711-7 was moved to connect between S710-6 and S711-6.

REV. E (Model 4EC45A10)
To make unit compatible with the 12/24-volt Converter (Model 4EP20A10). Deleted O-BK wire from J704-C2 to S711-4. Added BL-W wire from J704-C2 to J701-3; and added G-W wire from S710-4 to J701-4.

REV. B (Model 4EC45A11)
To make unit compatible with the 12/24-volt Converter (Model 4EP20A10). Deleted O-BK wire from J704-C2 to S711-4. Added BL-W wire from J704-C2 to J701-3, BL wire from S712-2 to J704-C2, and G-W wire from S710-4 to J701-4.