MOBILE RADIO

MASTR *Executive II*
MAINTENANCE MANUAL
Polarity Converter MODEL 19C321845G1
(OPTIONS 1712 AND 1713)

SPECIFICATIONS *

Dimensions (H x W x D)	3" x 6" x 3"
Input (Positive Ground)	13.6 VDC ±20%
Output (Negative Ground)	13.6 VDC ±20%
Output Current	1.5 Amperes
Battery Drain (No Load)	Less than 5 milliamps
Duty Cycle	Continuous
Temp. Range	-30°C to +70°C

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

POLARITY CONVERTER 19C321845G1

GENERAL ELECTRIC

TABLE OF CONTENTS

ILLUSTRATIONS

WARNING

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

DESCRIPTION

General Electric Polarity Converter 19C321845G1 is a compact, fully transistorized polarity converter required for operating a MASTR Executive II mobile radio in a 12-Volt, positive-ground vehicle system. Silicon transistors and diodes are used for added reliability.

The converter provides a nominal +12 volt supply for the mobile receiver.

INSTALLATION

The converter can be mounted inside of the vehicle on the bottom of the instrument panel or on the firewall. The unit may also be mounted in a dry location in the engine compartment. Refer to the step-by-step instructions on the following pages.

To Mount the Converter:

1. Remove the two hex-head screws in the front panel and slide off the back cover (Figure 1).
2. Use the cover as a template and mark and drill three mounting holes with a #32 (1/8-inch) drill.
3. Mount the back cover with the three #8 sheet metal screws provided, and reassemble the converter.

CABLE CONNECTIONS

POWER/CONTROL CABLE (Figure 2)

Starting with the plug end of the Power/Control cable, run the black control cable to the control unit location. Tape the numbered leads before running the cable.

Run the red battery lead to the vicinity of the battery. Cut the red lead and connect the fuseholder in the red lead with ring terminals provided. Then mount the fuseholder near the battery, and connect the red lead to the negative (-) battery terminal. Connect the brown lead to a good vehicle ground in the trunk compartment.

BATTERY & IGNITION SWITCH CABLE CONNECTIONS

The battery and ignition switch cables may be connected for two different modes of operation, depending on the way the cables are connected in the system. The two types of operation are:

1. Ignition Switch Control

   The transmitter and receiver will operate only when the ignition switch is in the Accessory or ON position. Turning the OFF-VOLUME switch to OFF removes all power to the radio. See Figure 3.

2. Ignition Switch Bypass

   Both the transmitter and receiver operate independently of the ignition switch, and can be turned on and off only by the OFF-VOLUME switch on the control unit. See Figure 4.

NOTE

The black ignition switch wire may be connected to vehicle ground instead of terminal 5 on the converter.

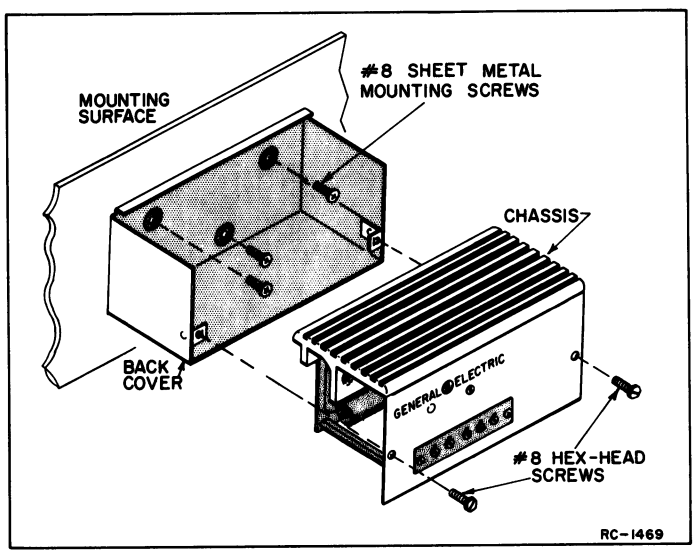
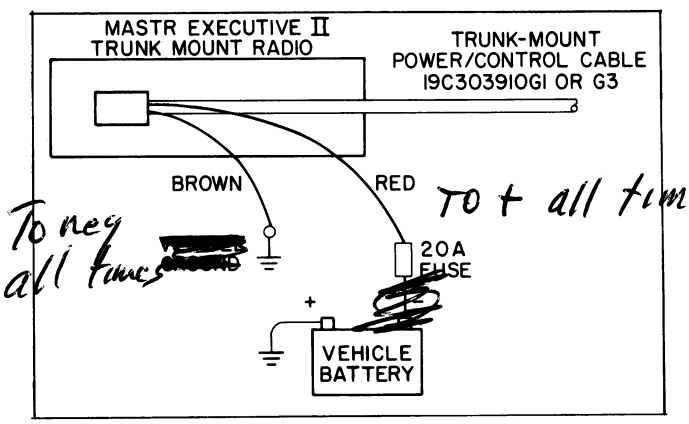


Figure 1 - Mounting the Converter



(19C321918, Rev. 0)

Figure 2 - Power/Control Cable Connections

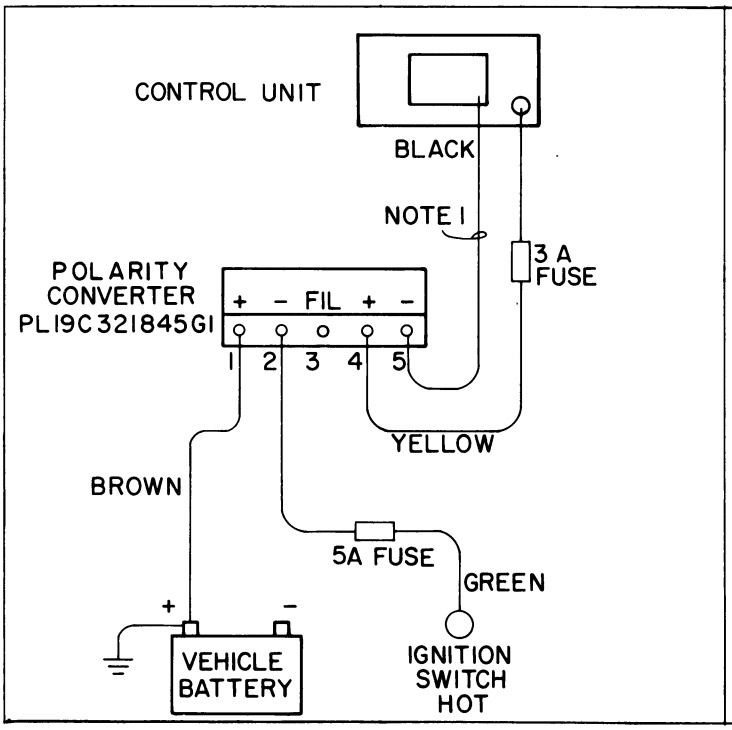


Figure 3 - Ignition Switch Control Connections

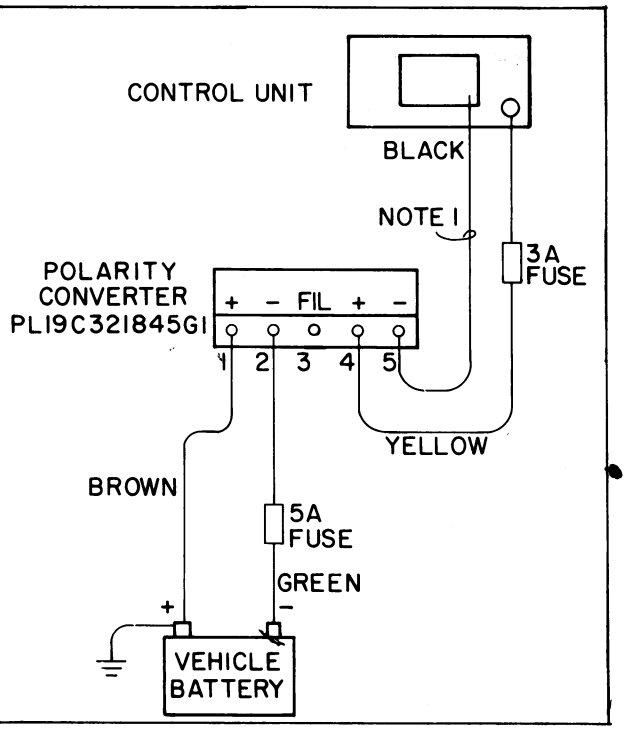


Figure 4 - Ignition Switch Bypass Connections

CIRCUIT ANALYSIS

The converter consists of a load-controlled switching circuit and a multivibrator circuit that supplies +12 Volts for the receiver and 10-volt regulator.

SWITCHING CIRCUIT

The switching circuit is designed to automatically start the multivibrator whenever a load is applied, and stop the multivibrator when the load is removed. This prevents a continuous drain on the vehicle battery by the converter when the Ignition Switch Bypass Control method is used. The load is applied or removed by the OFF-VOLUME control on the mobile control unit.

When the Ignition Switch Control method is used, the ignition switch controls the power input to the converter, and the load is applied to the mobile unit when the OFF-VOLUME control switch is turned on.

Turning the external switch ON causes current to flow in the secondary circuitry of T501. This causes Q2 to conduct, turning on Q3 and Q501. When Q501 conducts, a positive potential is applied to terminal 2 of transformer T501 which starts the multivibrator, Q503 and Q502.

With the multivibrator running, a voltage drop occurs across diodes CR7 and CR8 which turns on Q1 and turns off Q2. The output of Q1 keeps Q3 and Q501 conducting, and the multivibrator continues to operate until the load (or power) is removed.

Turning the external switch OFF, or removing the load from TB501-4 and TB501-5, stops the current flow through diodes CR7 and CR8. With no voltage drop across these diodes, Q1 stops conducting and the multivibrator stops operating. The converter draws less than 5 milliamps with no load applied.

Protective diode CR1 prevents damage to the converter in case the battery polarity is accidentally reversed.

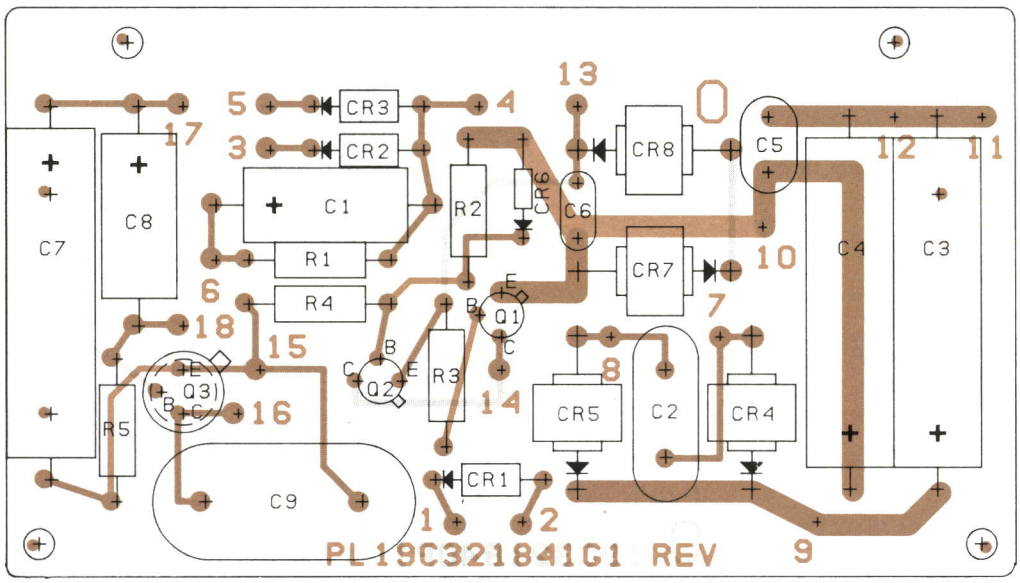
MULTIVIBRATOR CIRCUIT

Transistors Q503 and Q502 are used as switches in an inductively-coupled multivibrator circuit (square wave generator). When biased on by the switching circuit, the transistors connect the battery voltage across alternate halves of the primary of T501, resulting in alternating square waves. The output is rectified by full-wave rectifiers CR4 and CR5 and filtered by C3, C4 and L502. The two transistors conduct alternately at a frequency of approximately 3,000 Hertz.

TROUBLESHOOTING PROCEDURE

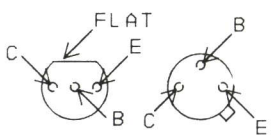
SYMPTOM	PROCEDURE
Converter won't start when load is connected	1. Check all fuses and power connections. 2. Connect a jumper from the collector to the emitter of Q501. If the converter starts, remove the jumper and proceed with Step 3. If the converter doesn't start, remove the jumper and proceed with Step 4. 3. Check transistors Q3, Q1, Q2, and Q501, and diodes CR4, CR5, and CR6. 4. A. Check Q502 and Q503. B. Make continuity check of transformer T501. C. Check for excessive load in the transformer secondary. The rated load is approximately 1.5 amperes.
Low output voltage	5. Check for excessive load in the transformer secondary. The rated load is 1.5 amperes.
Converter won't stop when load is removed	6. Check for an extraneous load (Meter, etc.) connected across output terminals. 7. Check transistors Q3, Q1, Q2, and Q501, and diode CR6.

A501



(19C327562, Rev. 0)
(19A130797, Sh. 2, Rev. 0)
(19A130797, Sh. 3, Rev. 0)

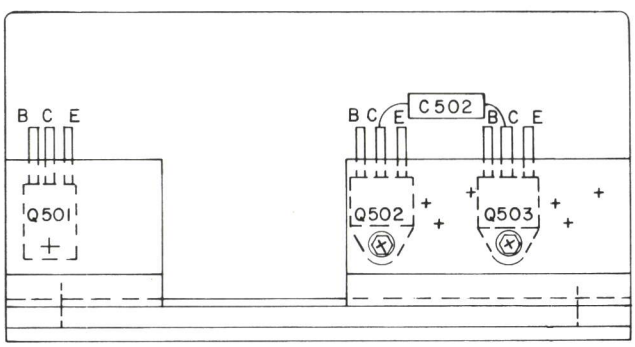
LEAD IDENTIFICATION
FOR Q1, Q2, &Q3

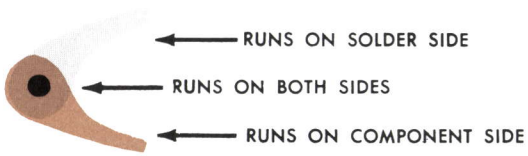


TOP VIEW

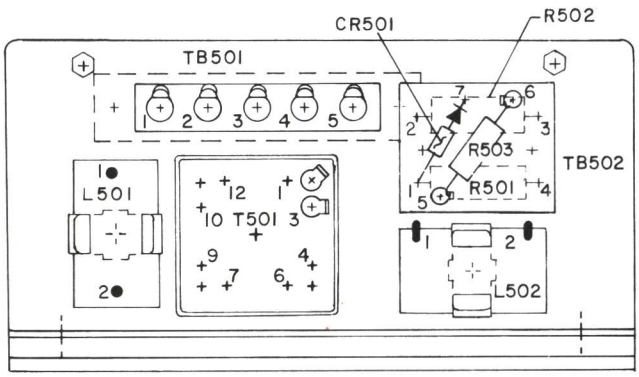
NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.

CHASSIS
(REAR VIEW)





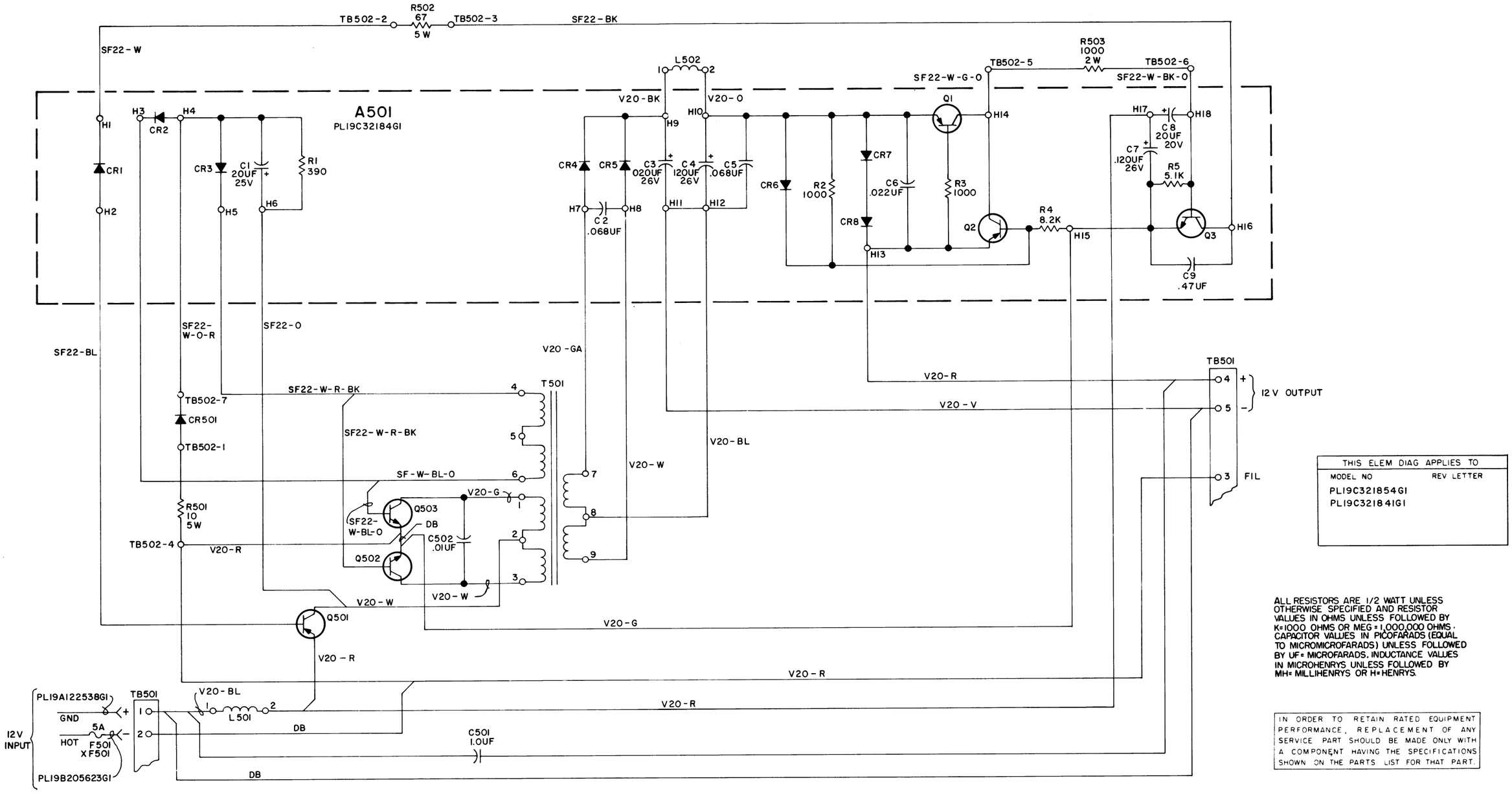
FRONT PANEL
(REAR VIEW)



(19C327563, Rev. 0)

OUTLINE DIAGRAM

POLARITY CONVERTER
MODEL 19C321845G1



THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
PLI9C321854G1	
PLI9C321841G1	

ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG = 1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H=HENRYS.

IN ORDER TO RETAIN RATED EQUIPMENT PERFORMANCE, REPLACEMENT OF ANY SERVICE PART SHOULD BE MADE ONLY WITH A COMPONENT HAVING THE SPECIFICATIONS SHOWN ON THE PARTS LIST FOR THAT PART.

(19D423579, Rev. 1)

SCHEMATIC DIAGRAM

POLARITY CONVERTER MODEL 19C321845G1

PARTS LIST

LBI-30288

POLARITY CONVERTER
19C321845G1

SYMBOL	GE PART NO.	DESCRIPTION
A501		COMPONENT BOARD 19C321841G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19A115680P3	Electrolytic: 20 µf +150% -10%, 25 VDCW; sim to Mallory Type TTX.
C2	19A115028P112	Polyester: 0.068 µf ±20%, 200 VDCW.
C3 and C4	19A115680P9	Electrolytic: 120 µf +150% -10%, 26 VDCW; sim to Mallory Type TTX.
C5	19A116080P6	Polyester: 0.068 µf ±20%, 50 VDCW.
C6	19A116080P3	Polyester: 0.022 µf ±20%, 50 VDCW.
C7	19A115680P9	Electrolytic: 120 µf +150% -10%, 26 VDCW; sim to Mallory Type TTX.
C8	19A115680P3	Electrolytic: 20 µf +150% -10%, 25 VDCW; sim to Mallory Type TTX.
C9	19A115028P119	Polyester: 0.47 µf ±20%, 100 VDCW.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 thru CR3	4037822P1	Silicon.
CR4 and CR5	19A116783P1	Silicon.
CR6	19A115250P1	Silicon.
CR7 and CR8	19A115783P1	Silicon.
		- - - - - - - - - - TRANSISTORS - - - - - - - -
Q1 and Q2	19A115852P1	Silicon, PNP; sim to Type 2N3906.
Q3	19A115300P2	Silicon, NPN; sim to Type 2N3053.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P391K	Composition: 390 ohms ±10%, 1/2 w.
R2 and R3	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
R4	3R77P822K	Composition: 8200 ohms ±10%, 1/2 w.
R5	3R77P512K	Composition: 5100 ohms ±10%, 1/2 w.
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C501	7491930P13	Polyester: 1.0 µf ±20%, 100 VDCW; sim to GE Type 61F.
C502	19A116080P7	Polyester: 0.1 µf ±20%, 50 VDCW.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR501	4037822P1	Silicon.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L501 and L502	7143944P2	Choke, RF: 120 µh ±10%, .064 ohm DC res max.
		- - - - - - - - - - TRANSISTORS - - - - - - - -
Q501	19A116942P1	Silicon, PNP.
Q502 and Q503	19A116203P2	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R501	5493035P27	Wirewound: 10 ohms ±5%, 5 w; sim to Hamilton Hall Type HR.
R502	5493035P19	Wirewound: 67 ohms ±5%, 5 w; sim to Hamilton Hall Type HR.
R503	3R79P102K	Composition: 1000 ohms ±10%, 2 w.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T501	19C303894G2	Coil.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB501	7117710P5	Phen: 5 terminals; sim to Cinch 1775.
TB502	19A122495G1	Eyelet board.
		CABLE ASSEMBLY 19B205623G1
		- - - - - - - - - - FUSES - - - - - - - - - -
F501	1R16P8	Quick blowing: 5 amps at 250 v; sim to Littelfuse 312005 or Bussmann MTH-5.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XF501	19A115776P2	Fuseholder: sim to Bussmann Type HHJ.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19A122492G1	Cover.
	19C311147G1	Heat sink.
	7118719P10	Clip, spring tension. (Mounts L501, L502).
	19B200525P153	Rivet. (Secures L501, L502 mounting clip).
	19B201074P304	Tap screw, Phillips POZIDRIV®: No. 6-32 x 1/4. (Secures TB501).
	NP118306A	Decal. (GE MONOGRAM).
	19A115730P1	Insulator, bushing. (Used with Q501-Q503).
	N402P35	Plain washer. (Used with Q501-Q503).
	19A116023P2	Insulator plate. (Used with Q502-Q503).
	4036555P1	Insulator, washer: nylon. (Used with Q3).
	19A122538G1	Cable, battery. (Brown).

*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 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.

MAINTENANCE MANUAL

LBI-30287

DF-0074

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

GENERAL ELECTRIC

PRINTED IN U.S.A.