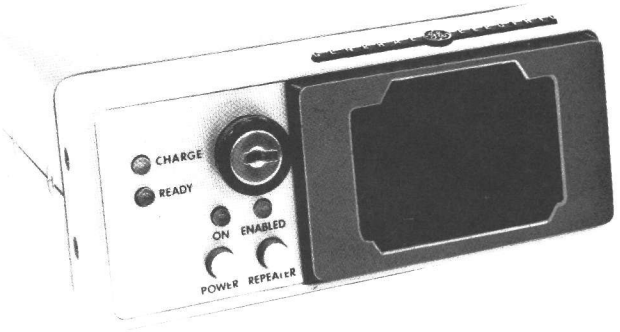
MOBILE RADIO

MASTR® Personal Series

PROGRESS LINE

PE VEHICULAR CHARGERS



SPECIFICATIONS *

USED WITH	PE Model Two-Way Radios in Vehicular Repeater Systems
INPUT VOLTAGE	11 VDC - 16.6 VDC
INPUT CURRENTS (@ 13.8 VDC)	
Standby	120 mA
CHARGE CURRENTS	
Rapid Charge	400 mA
Trickle Charge	45 mA
CHARGE TIME	3 Hours (100% Capacity)

CHARGE CAPACITY & TIME VS TEMPERATURE

Temperature	Time	Capacity
+5°C (41°F)	3.3 Hours	100%
+25°C (77°F)	3.0 Hours	100%
+45°C (113°F)	2.7 Hours	80%

INDICATORS		
	Amber	CHARGE
	Green	READY
	Amber	ENABLED
	Green	ON

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

PE VEHICULAR CHARGERS

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

This General Electric Vehicular charger provides a charger for the MASTR® Personal PE for two way radio and an automatic repeater control as part of a vehicular repeater system. The vehicular charger will recharge the nickel-cadmium 700 mAh battery pack 100% in 3 hours.

Charger

When a PE radio with battery pack is placed in the charging insert the charging contacts are automatically connected. Power Switch S801 is turned on by a compression spring in the charging insert. A yellow LED indicator labeled CHARGE will light, indicating the battery pack is being charged. When the battery pack is fully charged a green LED indicator labeled READY will light and the charger will automatically switch from a rapid charge rate to a safe trickle charge. The charger is not affected by any of the switches on the front panel.

The vehicular charger uses heat sensors to constantly monitor the temperature of both the battery pack and the charging insert. When a cold battery pack is inserted into the charging insert, the charger will wait until the battery pack has warmed up to within approximately 10^0C of ambient. The charger will then, automatically, apply the high charging rate. When the battery pack overcharges enough to heat the cells 10^0C above ambient, the charger will switch from fast charge to trickle charge. The charger also has a memory, set when the charger switches from the high charging rate to trickle charge and reset by removing the battery pack from the charging insert.

If a hot battery is in the charging insert and the memory has not been reset, the charger will remain at the trickle charge rate. If the memory has been reset the charger will wait until the battery pack has cooled before automatically switching to fast charge. If a fully charged battery pack is removed from the charging insert and then re-inserted, it will charge for approximately 1/2 hour until the cells reheat.

Repeater Control

The vehicular charger is supplied with a Repeater Enable/Disable switching circuit A808. When a PE radio with battery pack is placed in the charging insert, switch S801 is activated. Power switch S1 and Repeater Enable switch S2 should be placed in the "on" position. With the PE inserted in the vehicular charger, vehicular repeater function is disabled. By removing the PE radio from the vehicular charger, switch S801 is switched such that A+ voltage is present at J802-5, activating the Repeater Enable lead.

Holder

A PE Holder is provided in those vehicles used in a Vehicular Repeater communications system that are not equipped with a vehicular charger. The function of the Holder is not only to provide a receptacle for the PE radio, but also to allow the operator to "power up" and to "enable" the Vehicular Repeater in his vehicle. A POWER-ON and REPEATER-ENABLED switch on the front panel control repeater operation. The Enable/Disable switching circuit in the Holder is identical to the Enable/Disable circuit in the charger. Refer to the paragraph titled "Repeater Enable" under Circuit Analysis for the Circuit Description.

OPERATION

Temperature characteristics of nickel-cadmium batteries, prevent a full charge at temperature extremes. For a maximum charge, recharge the battery pack at temperatures of from 65^0 to 85^0 Fahrenheit whenever possible.

WARNING

General Electric Vehicular Charger Combinations are designed for recharging GE 700 mAh battery pack 19D413522G4 only. Attempting to recharge any other battery pack or batteries may result in damage to equipment, leakage or explosion.

To use the vehicular charger, place the radio into the charging insert with the speaker facing down. Press the radio in against the bottom of the charging insert (see Figure 1). Lock the charger to help protect the radio against theft.

Power is automatically applied to the PE radio when the radio is in the charging insert. The yellow LED indicator labeled CHARGE will light when positive contact has been made and the green LED indicator labeled READY will light when the battery pack is fully recharged.

To remove the radio from the charger, unlock the charger, press in on the release button and remove the radio from the charging insert.

With the PE radio in the charger and switches Power (S1) and Repeater Enable (S2) in the "on" position (pushed in), the vehicular repeater will be turned off. The green LED indicator labeled ON will light.

When the PE radio is removed from the charger the vehicular repeater in the mobile will be enabled. The yellow LED indicator labeled ENABLED will light.

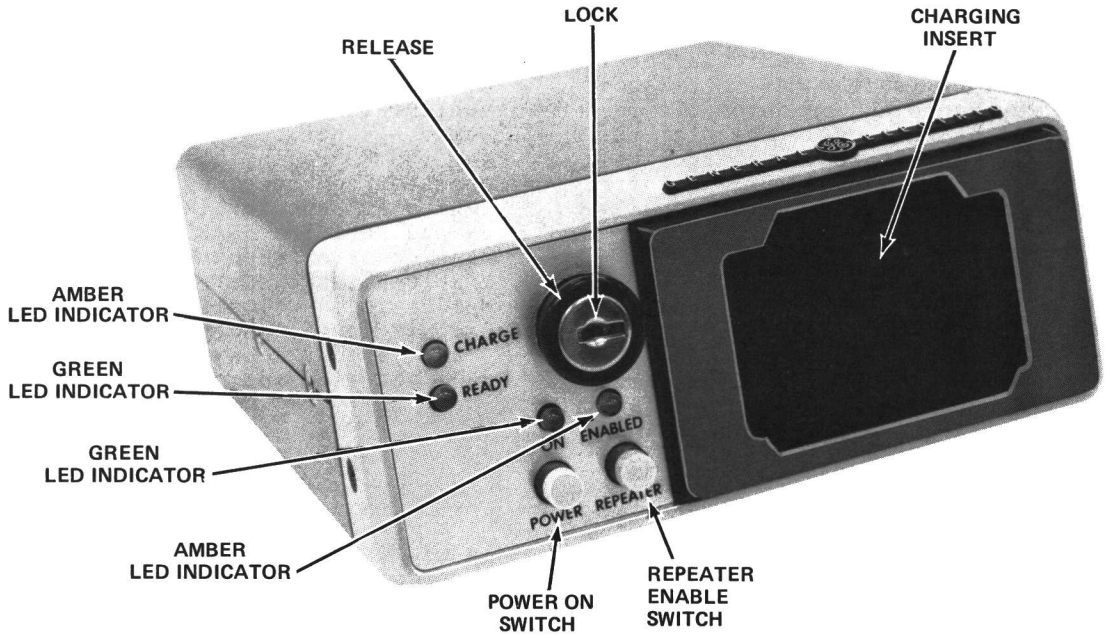


Figure 1 - Vehicular Charger

CIRCUIT ANALYSIS

Charger

The vehicular charger consists of a charging circuit with a temperature controlled cut-off circuit and a repeater enable/disable circuit. Charging current flows through series connected resistor R1, regulator transistor Q1 and diode CR4 to positive charging contact E804 on charging insert A810. A portion of the charging current is routed through resistor R3 and transistor Q4 to light LED indicator CR1 and provide a trickle charge. The series connected charge circuit determines the high charge rate and is controlled by the temperature controlled cut-off circuit. The temperature controlled cut-off circuit is contained in thick film hybrid integrated circuit (IC) U1.

Temperature cut-off IC U1 monitors the temperature of both the charging insert, through termistor RT1, and the battery pack through a termistor inside the battery pack. It also controls transistor Q1, through transistor Q2, turns the READY indicator on when the battery pack is fully charged and provides memory to prevent the same battery pack from being recharged at the high rate.

Thermistors RT1 and RT Battery are connected with R7 and R8 to form a bridge circuit (see Figure 2). The outputs of the bridge circuit are connected to terminals 2 and 14 of U1. When a battery pack is in the charging insert and U1 senses the bridge to be in a nearly balanced condition, the high rate of charge is enabled. When the battery pack is removed from the charging insert RT Battery is removed from the bridge circuit causing the bridge to be unbalanced. U1 senses the bridge to be unbalanced, the voltage on U1-14 being much larger than the voltage on U1-2, and the charger memory is reset.

When the battery pack temperature is more than 10°C below ambient, thermistor RT Battery is a high resistance and the voltage on U1-14 is larger than the voltage on U1-2 just as though no battery pack were present. There is no output from U1-6 or U1-5. Transistor Q1 and LED READY indicator CR2 remain off. The battery pack charges at a trickle charge rate, determined by series resistance R3 and diode CR4, until the temperature is less than 10°C below ambient. At less than 10°C below ambient, the voltage at U1-14 and U1-2 are nearly equal and the output at U1-6 goes high causing transistor Q2 to conduct turning Q1 on beginning the high charge rate. As the battery pack temperature increases 10°C above ambient during overcharge, the voltage at U1-2 becomes larger than the voltage at U1-14 causing U1-6 to go low. U1-6 going low causes Q2 to stop conducting. Q1 cuts off and the charge rate switches from the high charge rate to the trickle charge rate. The larger voltage on U1-2 also causes U1-5 to go high. The high output on U1-5 causes transistor Q3 to conduct and CR2 to light. A memory circuit inside of U1 is set so that the same battery pack cannot be

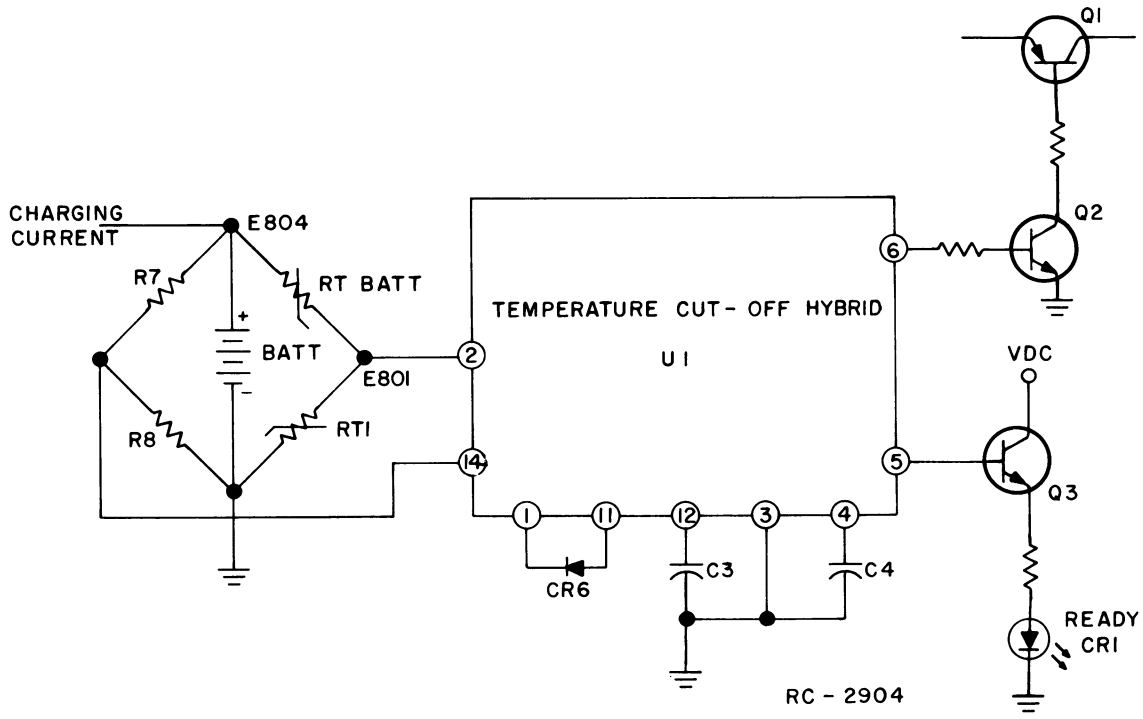


Figure 2 - Simplified Temperature Cut-off Circuit

recharged at the high charge rate unless it is first removed from the charging insert to reset the memory.

Repeater Enable

The Repeater Enable circuit adds two push-push switches and two LED indicators to the front assembly of the vehicular charger. The green LED indicator labeled ON will light when the POWER switch S1 is pushed into the "on" position and the LED indicator labeled ENABLED will light when the vehicular repeater is enabled. Push-push POWER switch S1 controls the A+ voltage to the associated vehicular repeater by way of J802-4 and the Repeater Enable circuit. Push-push REPEATER switch S2 controls the Repeater Enable path.

When the PE radio is removed from the charging insert, switch S801 switches to the normally closed position turning transistor Q2 on and causing the ENABLE LED CR2 to light. At the same time the A+ voltage is removed from the base of transistor Q1, thus turning Q1 "off". This removes the ground from J802-5 thus enabling the vehicular repeater.

Diode CR1 is a protective device to prevent possible damage to the PE charger/radio should the input supply voltage be reversed.

System

The vehicular charger is used in a negative ground system only.

INSTALLATION

CHARGER

When installing the charger in a vehicle, select mounting locations that will prevent injury to the occupants in case of an accident.

Install the charger where it will be within convenient reach of the operator, and where it will not interfere with the safe operation of the vehicle. The charger is normally mounted on the underside of the instrument panel.

To mount the charger:

1. Use the mounting bracket as a template and drill the two pilot holes with a #29 (9/64-inch) drill.
2. Attach the bracket to the mounting surface with the #10 x 5/8-inch self-tapping screws and lockwashers provided.
3. Mount the charger in the mounting bracket with the four machine screws and lockwashers provided.
4. Connect the Red fused lead to battery plus, and the Black lead to battery negative. Leave sufficient slack so that the charger may be pulled out of its case for servicing with the power applied.

MAINTENANCE

Disassembly

To gain access to the charger circuitry for servicing, remove the four Phillips-head screws in the rear of the housing and slide the charger from the housing.

To remove printed circuit board A809 for servicing, remove the six Phillips-head screws holding A809 and carefully lift A809 out, disconnecting from LED indicator board A806.

To remove LED indicator board A806 without first removing A809, remove the two screws in each side of the front assembly and remove the assembly unplugging A809 from A806. Remove the two Phillips-head screws holding A806 in the front assembly and lift A806 out.

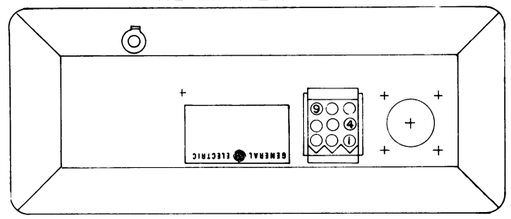
Troubleshooting

Should a difficult service problem arise, the Troubleshooting Procedure listed in the Table of Contents is provided to assist the service technician.

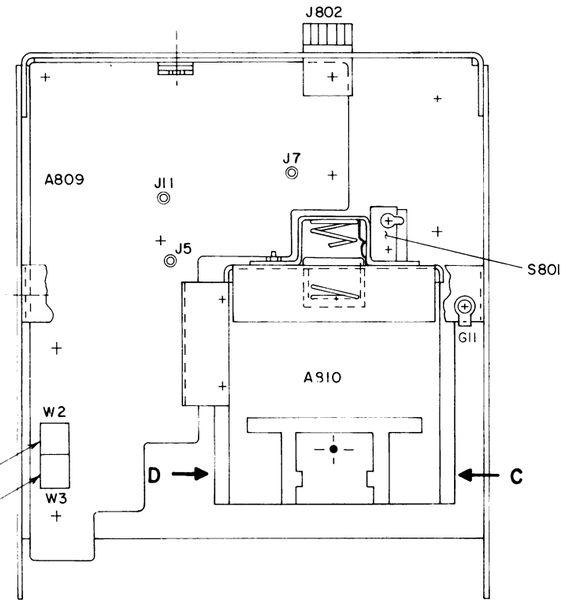
GENERAL ELECTRIC COMPANY • MOBILE COMMUNICATIONS DIVISION
WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.

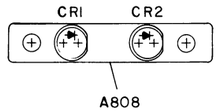
GENERAL ELECTRIC* U.S.A.

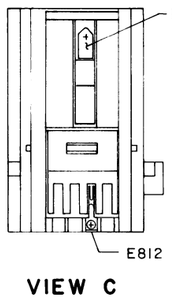
REAR ASSEMBLY
REAR VIEW



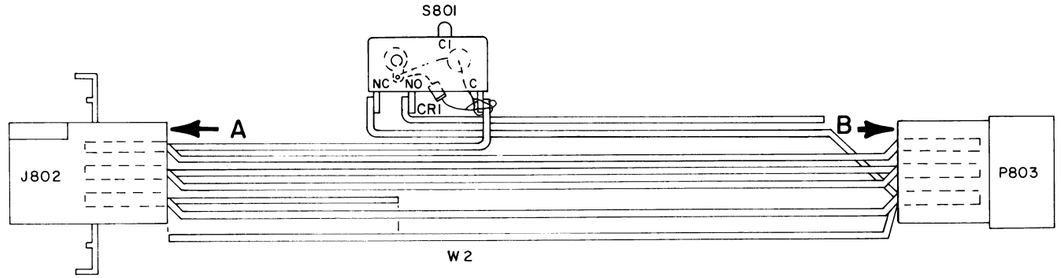
TOP VIEW

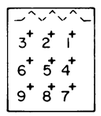




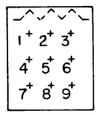


VIEW C



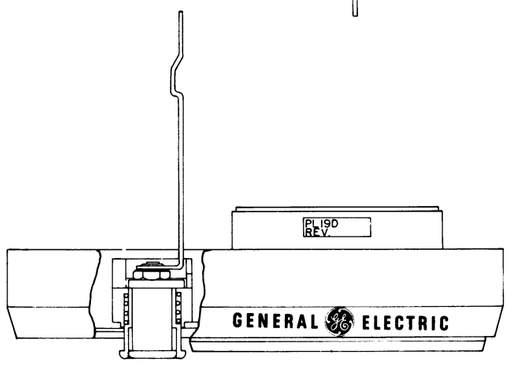


VIEW A



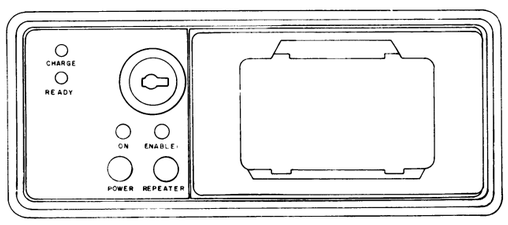
VIEW B

VIEW D

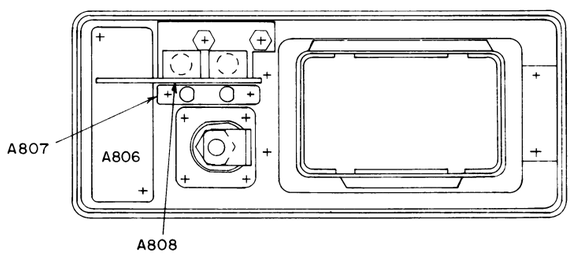


TOP VIEW

FRONT ASSEMBLY
FRONT VIEW



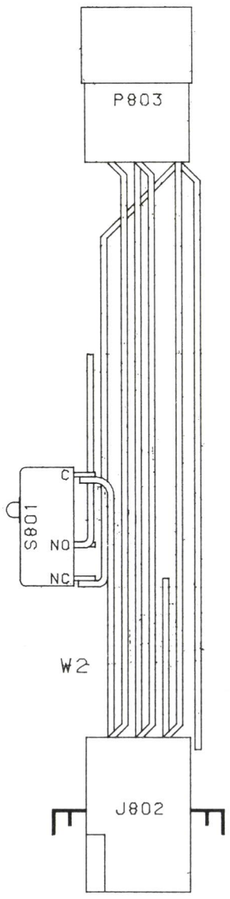
REAR VIEW

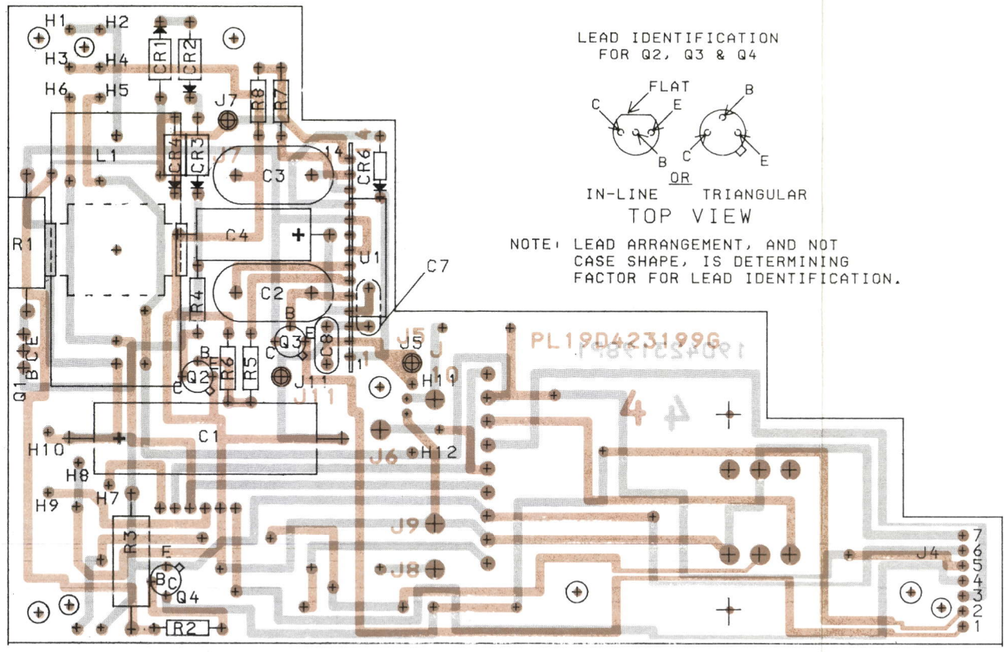


RC-3877A

OUTLINE DIAGRAM

VEHICULAR CHARGER





LEAD IDENTIFICATION
FOR Q2, Q3 & Q4

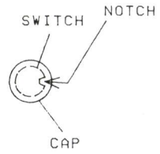
OR

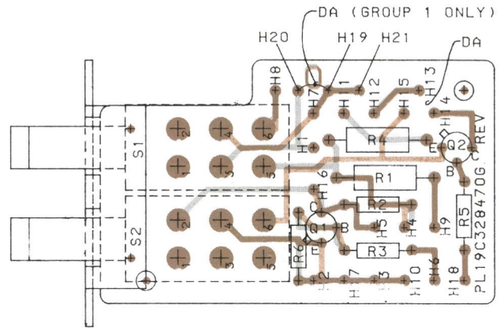
IN-LINE TRIANGULAR

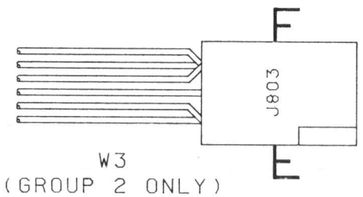
TOP VIEW

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

(19D430820, Rev. 0)
(19C321512, Sh. 1, Rev. 4)
(19C321512, Sh. 2, Rev. 4)

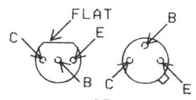






W3
(GROUP 2 ONLY)

LEAD IDENTIFICATION
FOR Q1



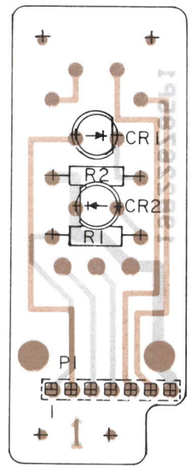
OR

IN-LINE TRIANGULAR

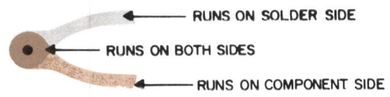
TOP VIEW

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

(19C330532, Rev. 0)
(19B232739, Sh. 1, Rev. 0)
(19B232739, Sh. 2, Rev. 0)

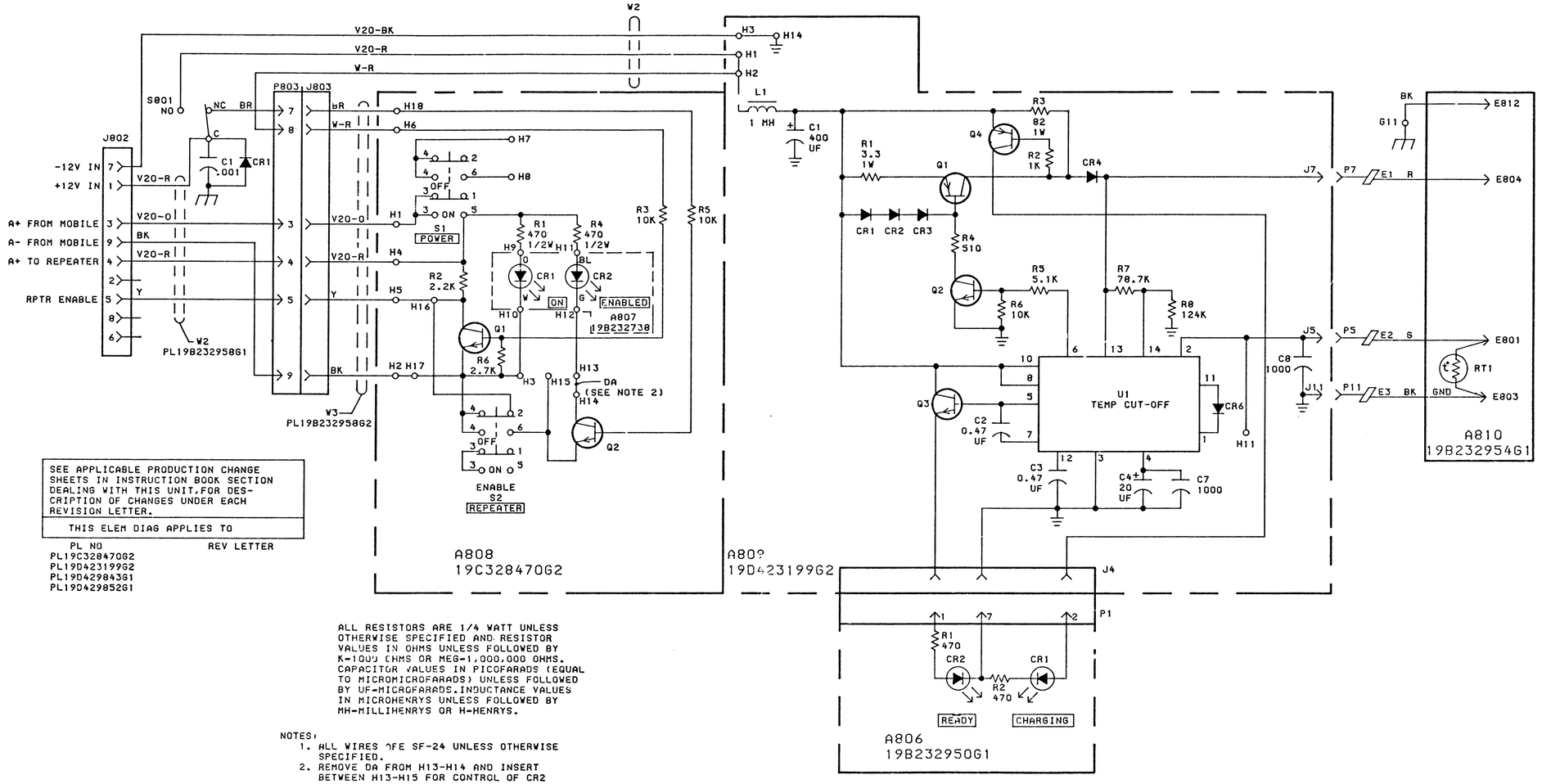


(19A142969, Rev. 0)
(19B226784, Sh. 1, Rev. 1)
(19B226784, Sh. 2, Rev. 1)



OUTLINE DIAGRAM

VEHICULAR CHARGER



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
PL19C328470G2	
PL19D42319962	
PL19D429843G1	
PL19D429852G1	

ALL RESISTORS ARE 1/4 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.

NOTES:
1. ALL WIRES ARE SF-24 UNLESS OTHERWISE SPECIFIED.
2. REMOVE DA FROM H13-H14 AND INSERT BETWEEN H13-H15 FOR CONTROL OF CR2 FROM S1 ONLY
3. ⏚ DESIGNATES CIRCUIT COMMON (GROUND).
   ⏚ DESIGNATES CHASSIS GROUND.

(19D429813, Rev. 3)

SCHEMATIC DIAGRAM

VEHICULAR CHARGER

PARTS LIST

SYMBOL	GE PART NO.	DESCRIPTION
		CHARGER FRONT ASSEMBLY 19D429843G1 HOLDER FRONT ASSEMBLY 19D429843G2 ISSUE 1
A806		LED BOARD 19B232950G1
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	19A134354P2	Diode, optoelectronic: yellow; sim to Hew. Packard 5082-4555.
CR2	19A134354P3	Diode, optoelectronic: green; sim to Hew. Packard 5082-4955.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1	19A134152P25	Connector, printed wiring: sim to Molex 22-03-2071.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1 and R2	3R152P471J	Composition: 470 ohms ±5%, 1/4 w.
A807		LED BOARD 19B232738G1
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	19A134354P3	Diode, optoelectronic: green; sim to Hew. Packard 5082-4955.
CR2	19A134354P2	Diode, optoelectronic: yellow; sim to Hew. Packard 5082-4555.
A808		MOBILE REPEATER CONTROL BOARD 19C328470G2
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	19A115910P1	Silicon, NPN; sim to Type 2N3904.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P471J	Composition: 470 ohms ±5%, 1/2 w.
R2	3R152P222J	Composition: 2.2K ohms ±5%, 1/4 w.
R3	3R152P103J	Composition: 10K ohms ±5%, 1/4 w.
R4	3R77P471J	Composition: 470 ohms ±5%, 1/2 w.
R5	3R152P103J	Composition: 10K ohms ±5%, 1/4 w.
R6	3R152P272J	Composition: 2.7K ohms ±5%, 1/4 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1 and S2	19B209575P2	Push: DPDT, alternate action, 1.1 amp at 14 VDC; sim to Switchcraft 14S-7099.
		- - - - - - - - - - - CABLES - - - - - - - - - -
#3		CABLE ASSEMBLY 19B232958G2
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J803		Connector. Includes:
	19B209288P3	Shell.
	5496809P17	Contact, electrical: female; sim to Molex 1381-T. (Quantity 6).

SYMBOL	GE PART NO.	DESCRIPTION
		MECHANICAL PARTS (SEE RC3882)
1	7142162P65	Spacer. (Used with A806).
2	N80P9004C6	Machine screw, Phillips head: No. 4-40 x 1/4.
3	N136AP905C6	Tap screw, phillips POZIDRIV: No. 4-24 x 5/16. (Secures sleeve assembly).
34	NP380563	Front casting faceplate. (CHARGER).
	NP280695	Front casting faceplate. (HOLDER).
35	19B209575P102	Pushbutton. (Used with S1 on A808).
36	19B209575P101	Pushbutton. (Used with S2 on A808).
37	19A134424P1	Tap screw, Phillips POZIDRIV®: No. 5-20 x 3/4.
38	19A130622P1	Spring. (Used with lock assembly).
39	19B226889P1	Screw, hex head: No. 1/4-28 x 2-5/8 with 6-32 tap. (Secures cam bar on lock assembly).
40	5491682P25	Lock assembly.
	5491682P4	Key.
41	19C321643P1	Pushbutton. (Used with lock assembly).
42	19B226880P1	Sleeve. (Used with lock assembly).
43	19B209572P1	Nameplate. (GE Monogram).
44	19D413783P1	Sleeve.
45	19B226911P1	Lock cam. (Used with lock assembly).
46	19B226840P1	Lock cam bar. (Used with lock assembly).
47	N910P18C6	Retaining ring. (Used with lock assembly).
48	5493361P5	Washer, spring tension. (Used with lock assembly).
49	19B226886P1	End cap. (Used with lock assembly).
50	19A137842G1	Front casting.
51	19B209209P706	Tap screw, Phillips Pozidriv®: No. 6-32 x 3/8. (Secures front cap).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

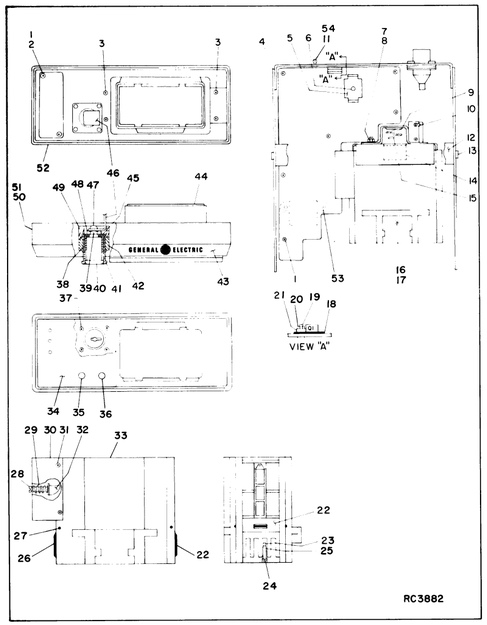
PARTS LIST

SYMBOL	GE PART NO.	DESCRIPTION
		CHARGER REAR ASSEMBLY 19D429852G1 HOLDER REAR ASSEMBLY 19D429852G2 ISSUE 1
A809		COMPONENT BOARD 19D423199G2
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A115680P24	Electrolytic: 400 µf +150% -10%, 18 VDCW; sim to Mallory Type TTX.
C2 and C3	19A116080P111	Polyester: 0.47 µf ±10%, 50 VDCW.
C4	19A115680P3	Electrolytic: 50 µf +150% -10%, 25 VDCW; sim to Mallory Type TTX.
C7 and C8	5494481P11	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 thru CR4	4037822P1	Silicon, 1000 mA, 400 PIV.
CR6	19A115100P1	Silicon; sim to Type 1N458A.
		- - - - - - - JACKS AND RECEPTACLES - - - - - -
J4	19A134152P34	Connector, printing wiring; sim to Molex 22-15-2071.
J5	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
J7	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
J11	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	19A115894P1	Audio freq: 1.0 mh ind., 0.35 ohms DC res.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A116375P1	Silicon, PNP.
Q2 and Q3	19A115910P1	Silicon, NPN; sim to Type 2N3904.
Q4	19A115852P1	Silicon, PNP; sim to Type 2N3906.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	5490205P4	Composition: 3.3 ohms ±5%, 1 w.
R2	3R152P102J	Composition: 1K ohms ±5%, 1/4 w.
R3	3R78P820J	Composition: 82 ohms ±5%, 1 w.
R4	3R152P511J	Composition: 510 ohms ±5%, 1/4 w.
R5	3R152P512J	Composition: 5.1K ohms ±5%, 1/4 w.
R6	3R152P103J	Composition: 10K ohms ±5%, 1/4 w.
R7	19C314256P27872	Metal film: 78.7K ohms ±1%, 1/4 w.
R8	19C314256P21243	Metal film: 124K ohms ±1%, 1/4 w.
		- - - - - - - INTEGRATED CIRCUITS - - - - - - -
U1	19D423164G1	Temp Cut Off Hybrid.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CABLES - - - - - - - - - -
W2		CABLE ASSEMBLY 19B232958G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5494481P11	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	4037822P1	Silicon, 1000 mA, 400 PIV.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J802		Connector. Includes:
	19B209288P3	Shell.
	5496809P17	Contact, electrical: female; sim to Molex 1381-T. (Quantity 6).
		- - - - - - - - - - PLUGS - - - - - - - - - -
P803		Connector. Includes:
	19B209288P4	Shell.
	5496809P18	Contact, electrical: male; sim to Molex 1380-T. (Quantity 6).
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	19A116676P1	Sensitive: SPDT, 5 amp at 24 VDC or 5 amp at 250 VRMS; sim to Microswitch 11SM1-T2.
A810		SLEEVE ASSEMBLY 19B232954G1
		- - - - - - - - - TERMINALS - - - - - - - - -
E1 thru E3	19A126140P3	Core, toroidal, ferrite: sim to Stackpole 88-31959.
G11	4036835P4	Solderless terminal.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P5	4029840P2	Contact, electrical: sim to Amp 42827-2.
P7	4029840P2	Contact, electrical: sim to Amp 42827-2.
P11	4029840P2	Contact, electrical: sim to Amp 42827-2.
		- - - - - - - - - THERMISTORS - - - - - - - - -
RT1	19C300048P6	Disc: 50K ohms ±10%; sim to NL Ind. 4D103.
		MECHANICAL PARTS (SEE RC3882)
4	19B226932G1	Support.
5	7118719P10	Clip, spring tension. (Secures L1 on A809).
6	19B200525P153	Rivet, tubular. (Secures L1 clip on A809).
7	7141225P2	Hex nut: No. 4-40.
8	N404P11C6	Lockwasher, internal tooth: No. 4.
9	19B226870G1	Rear Cap.
10	N84P5007C6	Machine screw, Phillips head: No. 2-56 x 7/16.
11	7135118P2	Solderless terminal. (Located on back of Charger).
12	19A130732G1	Support.
13	19B209209P304	Tap screw, Phillips POZIDRIV®: No. 6-32 x 1/4.
14	19B226873P1	Radio ejector.
15	19A130623P1	Ejector spring.
16	19A116773P105	Tap screw, Phillips POZIDRIV®: No. 7-19 x 5/16.
17	N404P13C6	Lockwasher, internal tooth: No. 6.
18	19A116023P3	Insulator, plate. (Used with Q1 on A809).

SYMBOL	GE PART NO.	DESCRIPTION
19	N80P9006C6	Machine screw, Phillips head: No. 4-40 x 3/8.
20	4029846P1	Nut, self-locking, steel: thd. size No. 4-40. (Used with Q1 on A809).
21	19A134016P1	Insulator, bushing. (Used with Q1 on A809).
22	19D424593P2	Lever. (Located on E804 side).
23	19B227847P1	Spring. (Located at E812).
24	N136AP503C	Tap screw, phillips Pozidriv: No. 2-32 x 3/16. (Located at E812).
25	19C327632P1	Contact.
26	19D424593P1	Lever. (Located on E801 side).
27	19A127849P1	Pin. (Secures levers 19D424593P1 & 19D424593P2).
28	19B226891P1	Screw: No. 4-40. (Located in sleeve guide assembly).
29	19A130625P1	Spring. (Located in sleeve guide assembly).
30	19B226895P1	Guide, sleeve.
31	N136P904C6	Tap screw: No. 4-24 x 1/4. (Secures 19B226895P1 guide).
32	19A137319P1	Latch. (Located in sleeve guide assembly).
33	19C317465G3	Sleeve assembly.
52	19A121891G7	Cover.
53	N330P1906P22	Metallic eyelet. (Secures J1 on A809).
54	19B201074P304	Tap screw, Phillips POZIDRIV®: No. 6-32 x 1/4. (Secures cover to rear of Charger).

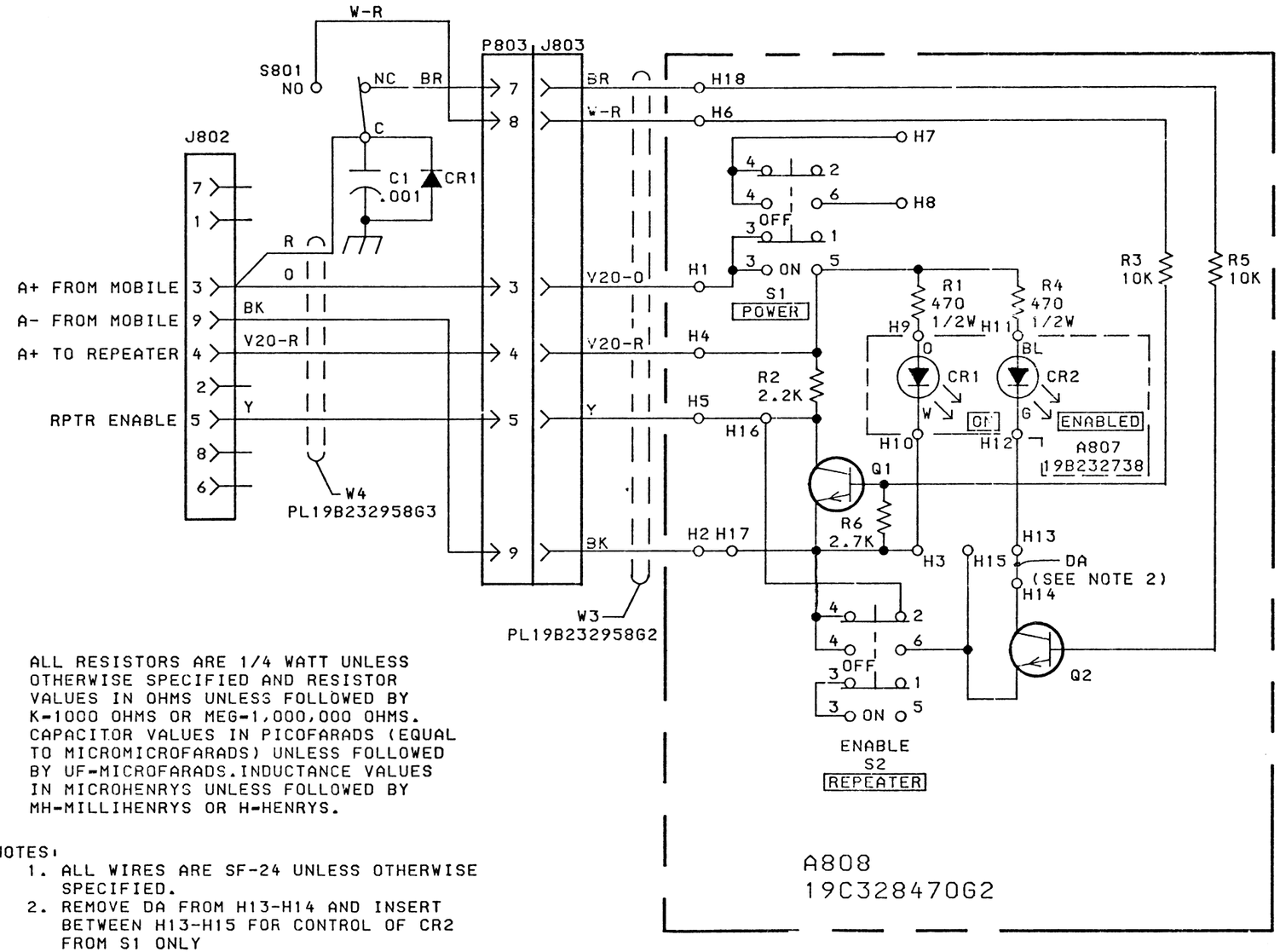


PARTS LIST

HUMP MOUNT BRACKET KIT
19A137302G1
ISSUE 1

SYMBOL	GE PART NO.	DESCRIPTION
	19B227124G2	Hump mount support.
	19B232354P1	Charger mounting bracket.
	19B209103P506	Tap screw, hex head: No. 10-32 x 3/8. (Secures charger mounting bracket to hump support).
	N403P19C6	Lockwasher, external: No. 10. (Secures charger mounting bracket to hump support).
	N402P9C6	Flatwasher: No. 10. (Secures charger mounting bracket to hump support).
	N130P1610C6	Tap screw, thd. forming: No. 10-16 x 5/8. (Secures hump mount support to vehicle).
	N130P1624C6	Tap screw, thd. forming: No. 10-16 x 1-1/2. (Secures hump mount support to vehicle- Used where spacers, carpets are present).
	19A115495P2	Machine screw, hex: No. 1/4-20 x 5/16. (Secures charger to charger mounting bracket).
	N403P25C6	Lockwasher, external tooth: No. 1/4 inch. (Secures charger to charger mounting bracket).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



ALL RESISTORS ARE 1/4 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.

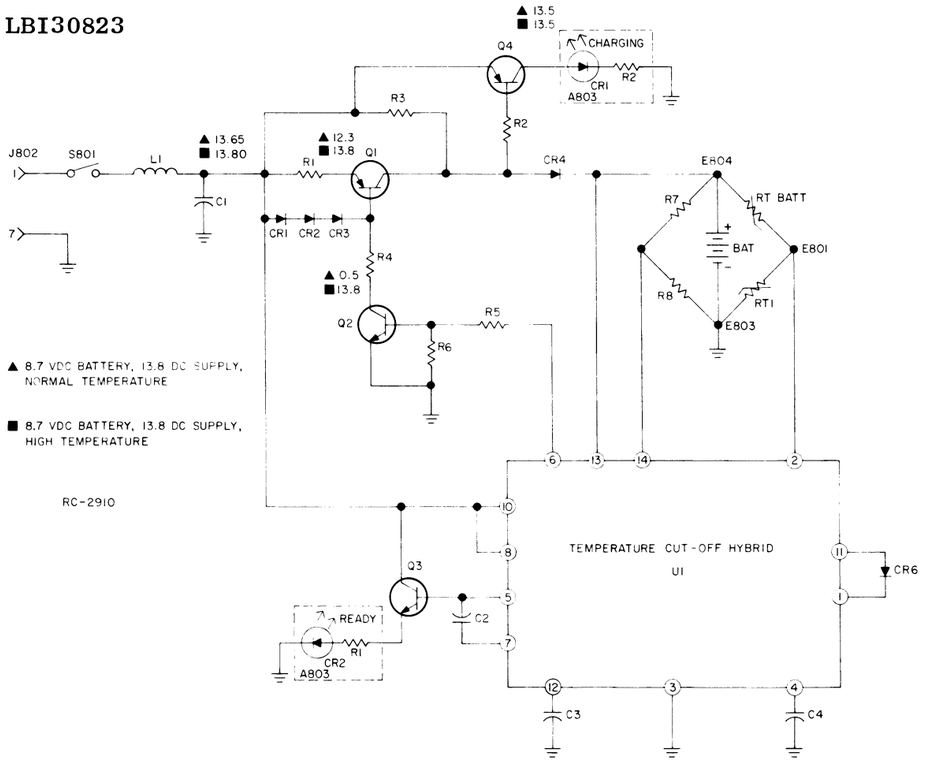
NOTES:
1. ALL WIRES ARE SF-24 UNLESS OTHERWISE SPECIFIED.
2. REMOVE DA FROM H13-H14 AND INSERT BETWEEN H13-H15 FOR CONTROL OF CR2 FROM S1 ONLY
3. ⏚ DESIGNATES CIRCUIT COMMON (GROUND).
   ⏚ DESIGNATES CHASSIS GROUND.

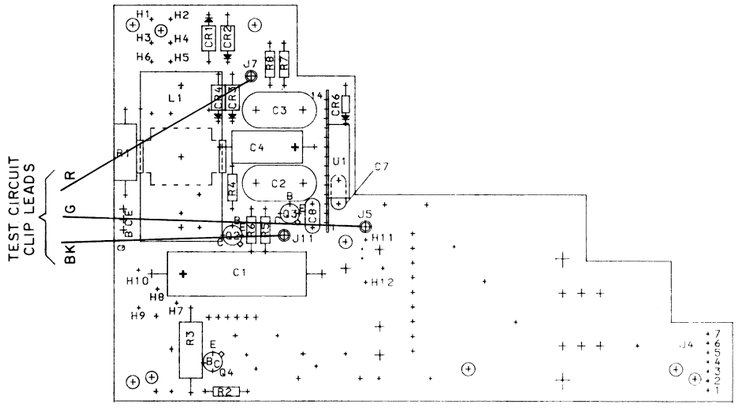
SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.	
THIS ELEM DIAG APPLIES TO	
PL NO	REV LETTER
PL19C328470G2	
PL19D429843G2	
PL19D429852G2	

(19C330213, Rev. 1)

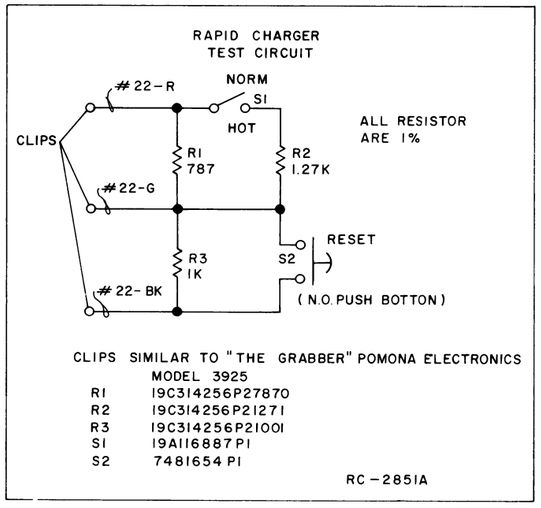
SCHEMATIC DIAGRAM

VEHICULAR CHARGER





(19D430820, Rev. 0)
(RC-2918)



TROUBLESHOOTING PROCEDURE

VEHICULAR CHARGER

TROUBLESHOOTING PROCEDURE

The test circuit shown can be used to simulate battery pack conditions and determine if the charger is working properly. Switch S1 simulates battery pack temperature (open-room temperature, closed-hot battery pack). Switch S2 resets charger logic, the same as removing the battery pack from the charging insert.

Connect the test circuit as shown on the diagram. Insert a battery pack into the charging insert. Use the logic chart and voltage readings on the diagram to determine the working condition of the charger.

If the charger works properly with the test circuit, but not with the battery pack, check thermistors RT1 and RT Battery. Each should measure approximately 50 K ohms at room temperature (25°C).

NOTE:

Insure the battery pack is fully inserted into the charging insert and all contacts are made before troubleshooting.

Other Checks:

1. Amber LED does not light, check fuse, Q4 and CR1.
2. If a known good battery pack has been charging and the charger fails to shut-off (READY light does not come on) at the end of the charge time, check Q1, Q2, Q3 and CR2.
3. U1-11 always high, logic will not reset, check C2.
4. U1-6 always low, no high rate of charge, check C3.
5. U1-5 always low, logic will not reset, check C4.
6. No high rate of charge, check for open CR4.
7. No Repeater Enable, check for shorted S2 or bad contact on S801.
8. Repeater Enable always on, check for open Q1.

TEST BATTERY CONDITION	U1 PIN				TEST CKT SWITCH POSITION	
	11	4	6	5	S1	S2
No Battery	High	Low	Low	Low	Norm	Closed
Cold Battery	High	Low	Low	Low	Norm	Closed
Normal Battery Charging	Low	High	High	Low	Norm	Open
Charged Battery	Low	Low	Low	High	Hot	Open
Hot Battery Just Inserted	Low	Low	Low	Low	Hot	Open

LOW - PIN VOLTAGE <1.0 VOLTS
HIGH - PIN VOLTAGE >3.0 VOLTS