MOBILE RADIO

MPR/MPX *Personal Series*
VEHICULAR CHARGER

SPECIFICATIONS *

Used With	MPR & MPX MODEL Two-Way Radios
Input Voltage	11 VDC - 16.6 VDC
Polarity	Neg (-) grd only
Input Currents (@13.8 VDC)	
Standby	100 mA
2 Watts Audio-Trickle Charge	400 mA
2 Watts Audio-Rapid Charge	800 mA
CHARGE CURRENTS	
Rapid Charge	450 mA
Trickle Charge	50 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	70%

INDICATORS	Amber	CHARGING
	Green	READY
RATED AUDIO POWER	2 Watts	
DISTORTION (@ Rated Audio Power)	10%	
SPEAKER IMPEDANCE	8 ohms	

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

VEHICULAR CHARGER

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!

EQUIPMENT INDEX

EQUIPMENT	PART NUMBER OR MODEL NUMBER
Charger	19D429957G3,4
Bottom Cover	19C328676G1
Top Cover	19D429684P1
2 Watt Audio Amplifier	19B232505G1
Speaker	19C320302G6
Microphone	19C320270G1
Cables	19B226198G2
Antenna: 138-512 MHz 800 MHz	 19B209568P1 19B209568P4
Key	5491682P4

OPTIONS

15 Watt Audio Amplifier	19C328216G1
External Speaker	19B232770G1
Ignition Lock	19A138074G1
Internal/External Switch	19B232790G1

COMBINATION NOMENCLATURE

1st Digit	2nd Digit	3rd Digit	4th Digit	5th Digit	6th Digit	7th Digit	8 Digit
Product Line	Application	Package	Input Voltage	Charge Time	Version	Vintage	Frequency Range
3 Charger	**5** (750 mAh and 1200 mAh Battery Packs)	**4** Mobile System	**C** -12 VDC Neg Grd	**3** 3 Hour	**A** 1 Charge Socket	**3** 138-512 MHz	**H** 138-150.8 MHz
		5 Mobile Charger				**4** 800 MHz	**J** 150.8-162 MHz
							K 162-174 MHz
							N 406-435 MHz
							R 435-470 MHz
							S 470-494 MHz
							T 494-512 MHz
							W 851-870 MHz
							X Not Frequency Sensitive

DESCRIPTION

General Electric Vehicular Charger combinations provide a system for using an MPR and MPX Personal Series two-way radios as a mobile unit while recharging the radio's battery pack. The vehicular charger will recharge the nickel-cadmium 1200 mAh battery pack 100% in 3 hours and a 750 mAh battery pack in less than 3 hours.

When a radio with battery pack is placed in the charging insert the external antenna, microphone, Push-to-Talk, speaker and charging contacts are automatically connected. Power Switch S801 is activated by inserting the radio into the charging insert. An amber LED indicator labeled CHARGING 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 trickly charge.

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°C of ambient. The charger will then, automatically, apply the high charging rate. When the battery pack overcharges enough to heat the cells 10°C 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 reinserted, it will charge for approximately 1/2 hour until the cells reheat.

The vehicular charger also uses a voltage controlled cut-off circuit to constantly monitor battery pack voltage. If the battery pack voltage exceeds 9.0 volts, the high rate of charge will be held off and the LED RDY indicator will light. This prevents overcharging and "gassing".

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° to 85° Farenheit whenever possible.

WARNING

General Electric Vehicular Charger Combinations are designed for recharging GE 750 mAh battery pack 19D429763G1 and GE 1200 mAh battery pack 19D429777G1. 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, with audio adjusted for a normal listening level, into the charging insert with the speaker facing down. Press the radio into the charging insert (see Figure 1). A connector inside the charger will mate with the UDC connector on the side of the radio.

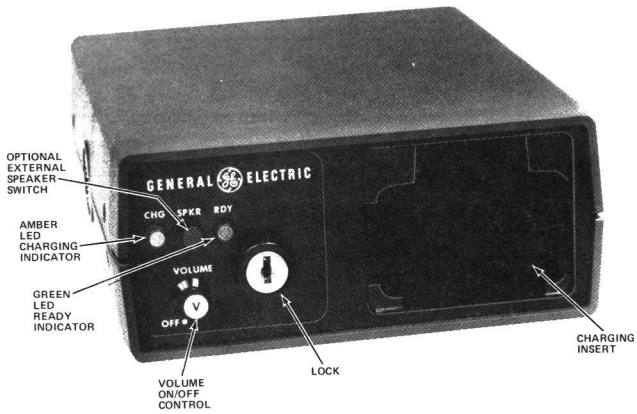


Figure 1 - Vehicular Charger

Power is automatically applied to the radio through the UDC connector and ON/OFF Switch S801 when the radio is in the charging insert. The amber LED indicator labeled CHARGING will light when positive contact has been made and the green LED indicator labeled READY will light when the battery pack is fully recharged. Turn the radio on with the VOLUME/ON/OFF control and adjust the volume control on the charger for a normal listening level.

The vehicular charger is equipped with an external antenna for sending and receiving messages. A 7.5 Volt regulator circuit provides power for operating the radio while the radio's battery pack is being re-charged. This allows continuous operation of the radio while maintaining the battery pack charge.

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

CIRCUIT ANALYSIS

Charger

The vehicular charger consists of a charging circuit, a temperature controlled cut-off circuit and a 7.5 VDC regulator circuit. Charging current flows through series connected resistor R12 and regulator transistor Q3 to positive charging contacts E3 and E4 for the "A" size radio combination. The charging current connects to positive contacts E7 and E8 for the "B" and "C" size radio combination. A portion of the charging current is routed through resistor R19 and transistor Q2 to light LED indicator DS2 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 thermistor RT1, and the battery pack through a thermistor inside the battery pack. It also controls transistors Q3 and Q4, 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; unless the battery pack is first removed from the charging insert, then reinserted.

Thermistors RT1 and RT Battery are connected with R17 and R18 to form a bridge circuit (see Figure 2). The outputs of the bridge circuit are connected to terminals 2 and 14 of U1.

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 Q3 and LED "READY" indicator DS1 remain off. The battery pack charges at a trickle charge rate, determined by series resistance R19, until the temperature is less than

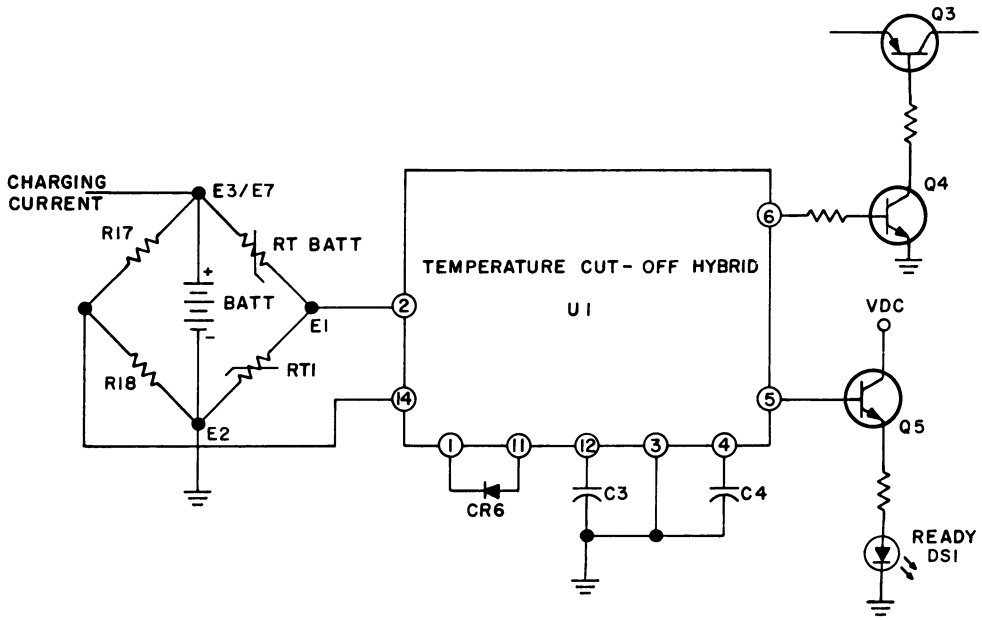


Figure 2 - Simplified Temperature Cut-off Circuit

10°C below ambient. At less than 10°C below ambient,the voltage at U1-14 still larger than the voltage on U1-2, the output at U1-6 goes high causing transistor Q4 to conduct turning Q3 on beginning the high charge rate. As the battery pack temperature increases 10°C above ambient during overcharge, the voltages at U1-14 and U1-2 become equal indicating the bridge circuit is balanced and the battery pack is fully charged. U1-6 goes low causing Q4 to stop conducting. Q3 cuts off and the charge rate switches from the high charge rate to the trickle charge rate. The equal voltages on U1-14 and U1-2 also causes U1-5 to go high. The high output on U1-5 causes transistor Q5 to conduct and DS1 to light. A memory circuit inside of U1 is set so that the same battery pack cannot be recharged at the high charge rate. When the battery pack is removed from the charging insert, RT Battery is removed from the bridge circuit causing the bridge to again be unbalanced. U1 senses the bridge in an unbalanced state, the voltage on U1-14 being larger than the voltage on U1-2, and resets the charger memory.

When power is first applied to the charger, the voltage at pin 6 of op-amp U2-B is higher than at U2B-5 due to the charging time of C14. The higher voltage causes the output at U2B-7 to go low, keeping U1 turned off to allow the battery to start charging.

Voltage regulator module VR1 controls the base of NPN transistor Q1 to provide a regulated 7.5 VDC on the emitter. The 7.5 VDC is used to power the circuits of the radio while the battery pack is being charged.

Voltage Controlled Cut-Off

The voltage controlled cut-off circuit monitors the battery voltage and cuts off regulator Q3 when the battery voltage exceeds 9.0 VDC.

A reference voltage is applied to Pin 3 of amplifier U2A. Resistor R24 is adjusted so that when the battery pack voltage is 9.0 volts, a voltage equal to the reference voltage on Pin 3 is applied to Pin 2 of U2A. This causes Pin 6 of U2A to go low impressing a smaller voltage on Pin 14 of U1 than is on Pin 2 of U1. This causes U1 to cut off Q3 and light LED RDY indicator DS1.

2 Watt Audio Amplifier

Receive audio is coupled through connectors P801-10, P7, J7 and J13-6 to the input of the audio amplifier circuit. P13 of audio amplifier 19B232505G1 plugs into J13, mounting the amplifier inside of the charger.

Receiver audio at P13-6 of the audio amplifier is coupled to Pin 8 of operational amplifier AR1. AR1 produces 2 watts of audio at J1-3.

The audio at P13-3 is coupled through J13-3 to J14-1. Audio at J14-1 is connected through P14-1 to J804-1 to an external speaker.

15 Watt Audio Amplifier (Optional)

P13 of 15 watt audio amplifier plugs into J13 mounting inside the charge the same as the 2 watt audio amplifier. Receiver audio is connected to J13-6.

The receiver audio at P13-6 is coupled through audio transformer T1 to push-pull, Darlington connected, power amplifier circuit Q1 and Q2. 15 Watts of audio is applied from audio output transformer T2 to P13-3.

Transistor Q3 and Q4 disable the audio when the receive circuit is squelched.

External Speaker (Optional)

The external speaker option adds a push-push switch on the charger front panel and an external speaker connection to the rear of the charger. Any 8 ohm speaker may be used.

INSTALLATION

CHARGER

When installing the charger, speaker and microphone 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 two 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.

SPEAKER

Mount the speaker where it will direct sound to the operator but not interfere with his vision, and the safe operation of the vehicle. In exposed locations or areas of high humidity, mount the speaker so that moisture will not accumulate in the speaker cone.

The universal mounting bracket enables the speaker to be mounted on the top or bottom of the instrument panel, on the firewall above the windshield in trucks, or behind the speaker grille in some vehicles.

To mount the speaker:

1. Use the mounting bracket as a template and drill three mounting 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 supplied with the unit.
3. Attach the speaker to the mounting bracket and connect the speaker plug to the speaker jack on the back of the charger.

MICROPHONE

Mount the microphone where it will be within easy reach of the operator but will not interfere with the safe operation of the vehicle.

To mount the microphone:

1. Use the microphone bracket as a template and drill two mounting holes with a #32 (1/8-inch) drill.
2. Attach the bracket to the mounting surface with the two #8 x 1/2" screws provided.
3. Connect the microphone plug to the jack on the bottom of the charger.

ANTENNA

Installation instructions for the antenna are packaged with the antenna. The antenna must be installed in accordance with good engineering practice for optimum results.

MAINTENANCE

Disassembly

To gain access to the charger circuitry for servicing, remove the top and bottom of the housing by removing the four Phillips-head screws in the sides of the housing.

To remove printed circuit board A801 for servicing, remove the six Phillips-head screws holding A801 and carefully lift A801 out, disconnecting speaker connector P14 or the external speaker option.

The 2 watt audio amplifier board A807 or the optional 15 watt audio amplifier board A806 may be removed for servicing by removing one or two screws and unplugging the boards from J13 of printed circuit board A801.

Troubleshooting

Should a difficult service problem arise, the Troubleshooting Procedure listed in the Table of Contents is provided to assist the service technician. Also, voltages are provided on the Schematic Diagram to further assist the service technician in isolating any problem.

ADJUSTMENT PROCEDURES

VOLTAGE CUT-OFF

Equipment Needed: 4EX20A10 TEST CALIBRATOR

1. Adjust R24 on the charger board fully clockwise.
2. Set the 4EX20A10 test calibrator to voltage range "2". Set the temperature range to NORMAL. Connect the calibrator to the charger sleeve and set the VOLTAGE ADJUST to read +9.0 V +.05 V at the external meter jacks.
3. Slowly adjust R24 counterclockwise until the RDY indicator turns on.

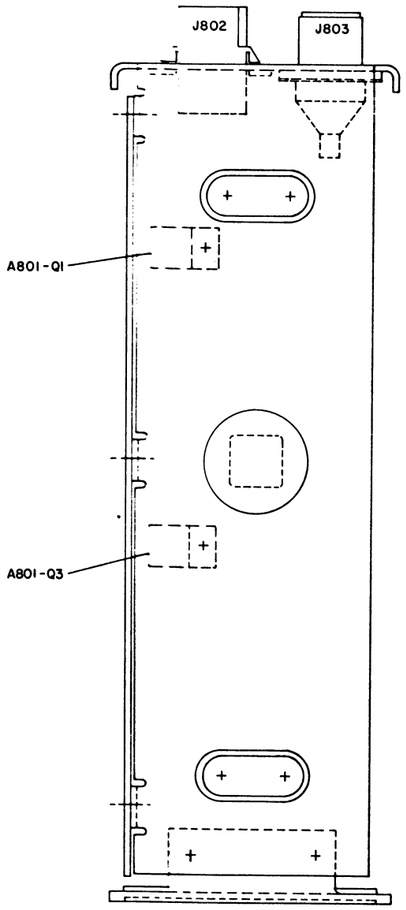
15 WATT AMPLIFIER 19C328216G1

Equipment Needed: DC Ammeter (0 to 3 Amps.) connected in the +13.8 volt supply lead.

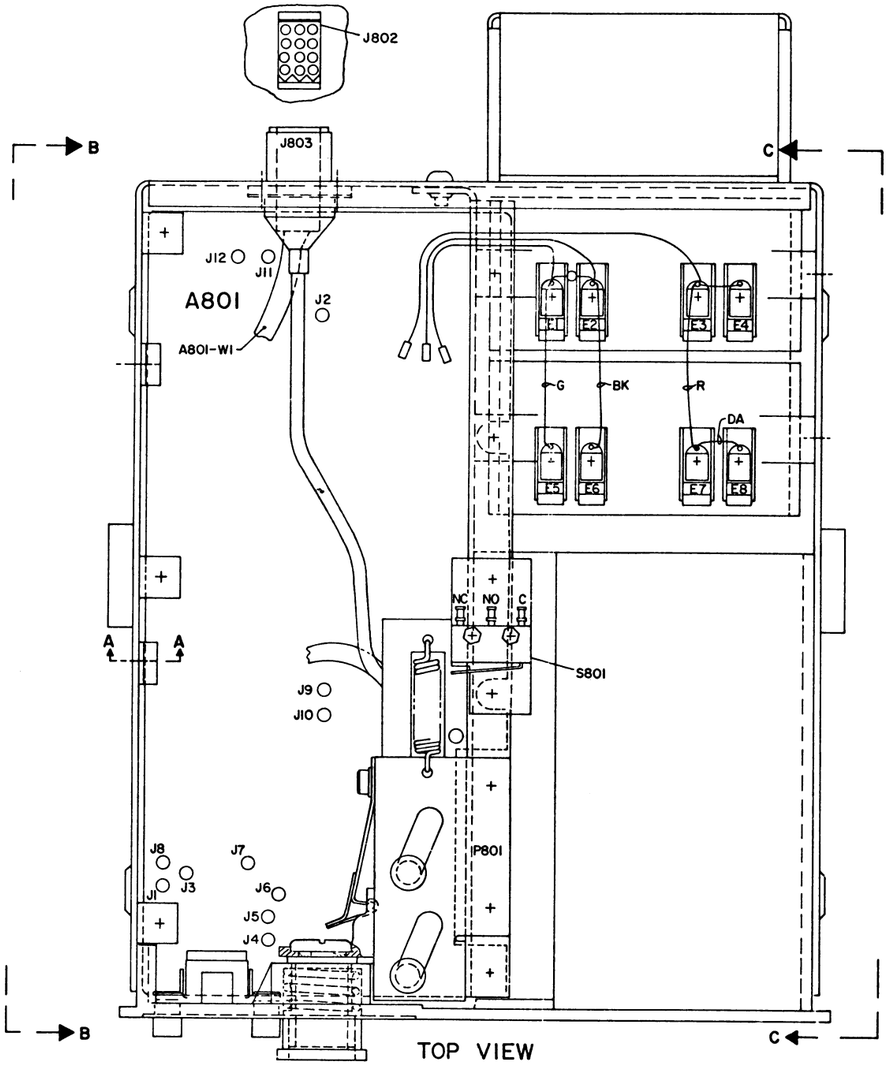
1. Adjust R3 fully counterclockwise.
2. Apply 13.8 VDC.
3. Without audio applied, adjust R3 for 120 ±2 milliamps.

NOTE: This may vary until PA thermistor reaches a stable value.

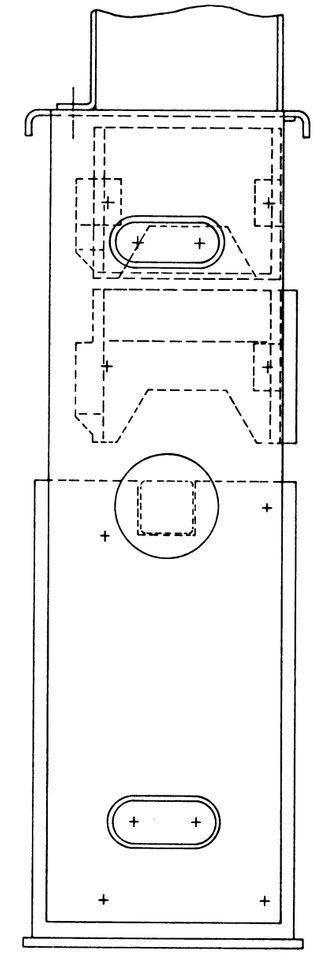
GENERAL ELECTRIC COMPANY • MOBILE COMMUNICATIONS DIVISION
WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.



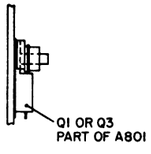
VIEW IN DIRECTION OF ARROW 'B'



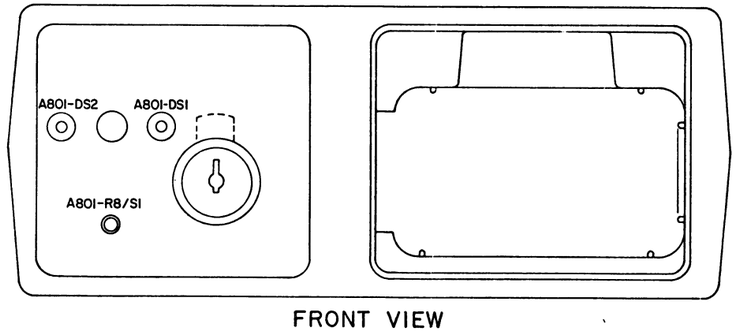
TOP VIEW



VIEW IN DIRECTION OF ARROW 'C'



SECTION IN DIRECTION
OF ARROW A-A



FRONT VIEW

(19D430402, Rev. 3)

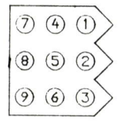
OUTLINE DIAGRAM

MPR/MPX VEHICULAR CHARGER

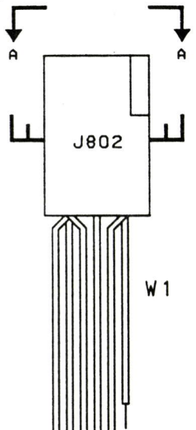
LBI31218

CONNECTIONS CHART		
FROM	TO	DESCP.
H1	LET HANG	V20-R
J802-1	LET HANG	V20-R
H2	J802-3	SF24-R
H3	J802-7	V20-BK
H4	J802-9	SF24-BK
H5	J802-4	SF24-WO
H6	J802-8	SF24-WBL
H7	J802-6	SF24-WG
H8	R8/S1-5	V20-R
H9	R8/S1-4	V20-R
DS1-BK	H10	
DS1-BK	H11	
DS2-BK	H12	
DS2-BL	H13	

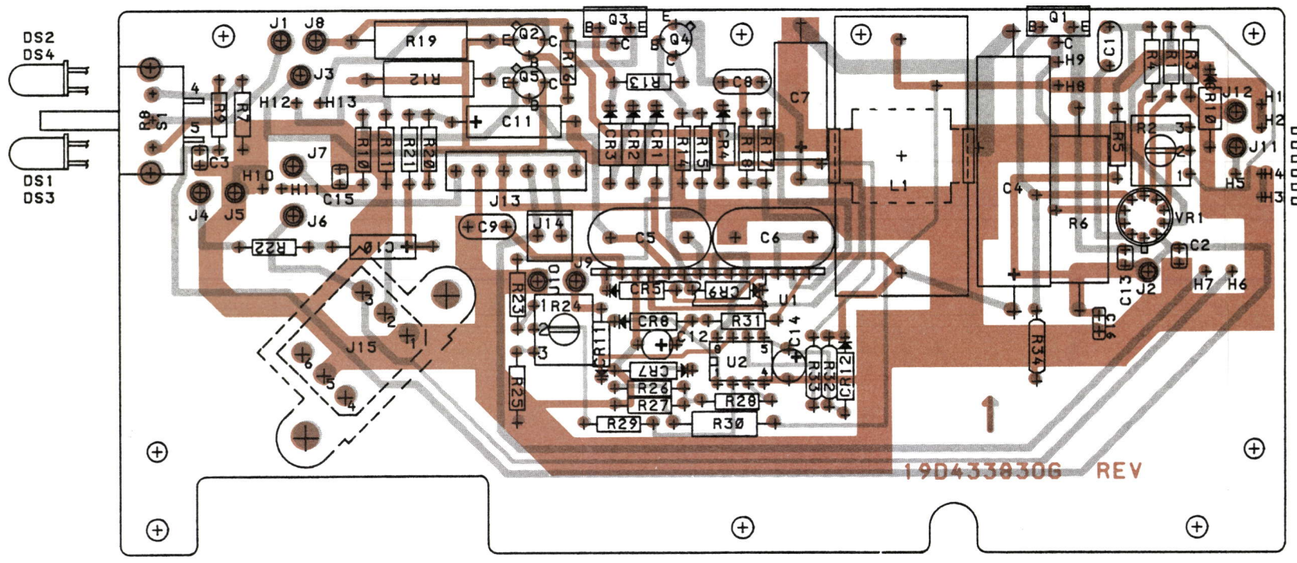
PART OF W1



VIEW IN DIRECTION OF ARROW "A"



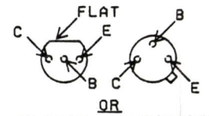
A801



(19D433832, Rev. 1)
(19A144805, Sh. 1, Rev. 1)
(19A144805, Sh. 2, Rev. 1)

RUNS ON SOLDER SIDE
RUNS ON BOTH SIDES
RUNS ON COMPONENT SIDE

LEAD IDENTIFICATION FOR Q2, Q4, & Q5



OR

IN-LINE TRIANGULAR

TOP VIEW

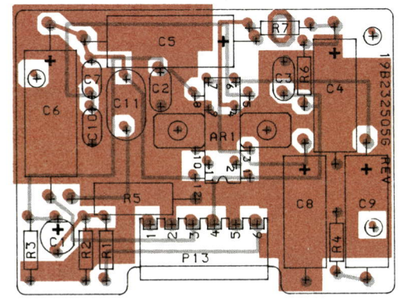
NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.

OUTLINE DIAGRAM

MPR VEHICULAR CHARGER

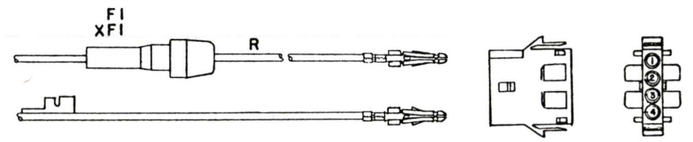
6 Issue 2

2 WATT AMPLIFIER
19B232505G1



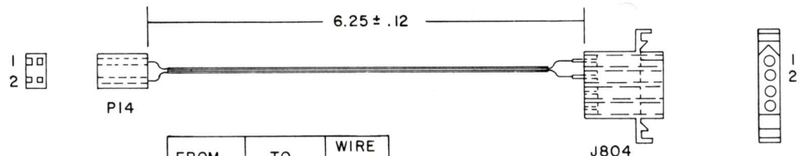
(19B233026, Rev. 0)
(19B233507, Sh. 1, Rev. 0)
(19B233507, Sh. 2, Rev. 0)

POWER CABLE
19B226198G2



RC4039

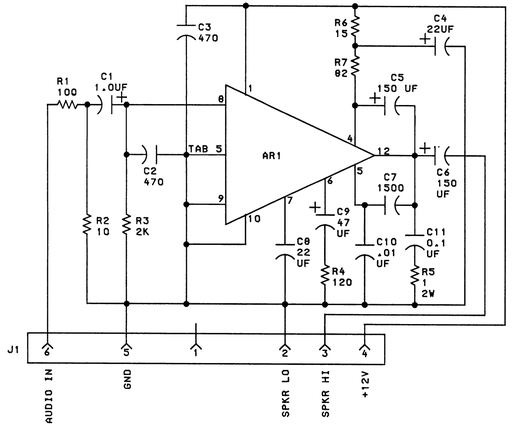
SPEAKER CABLE
19B232791G1



FROM	TO	WIRE SF-22
P14-1	J804-1	BR
P14-2	J804-2	BL

(19B233453, Rev. 0)

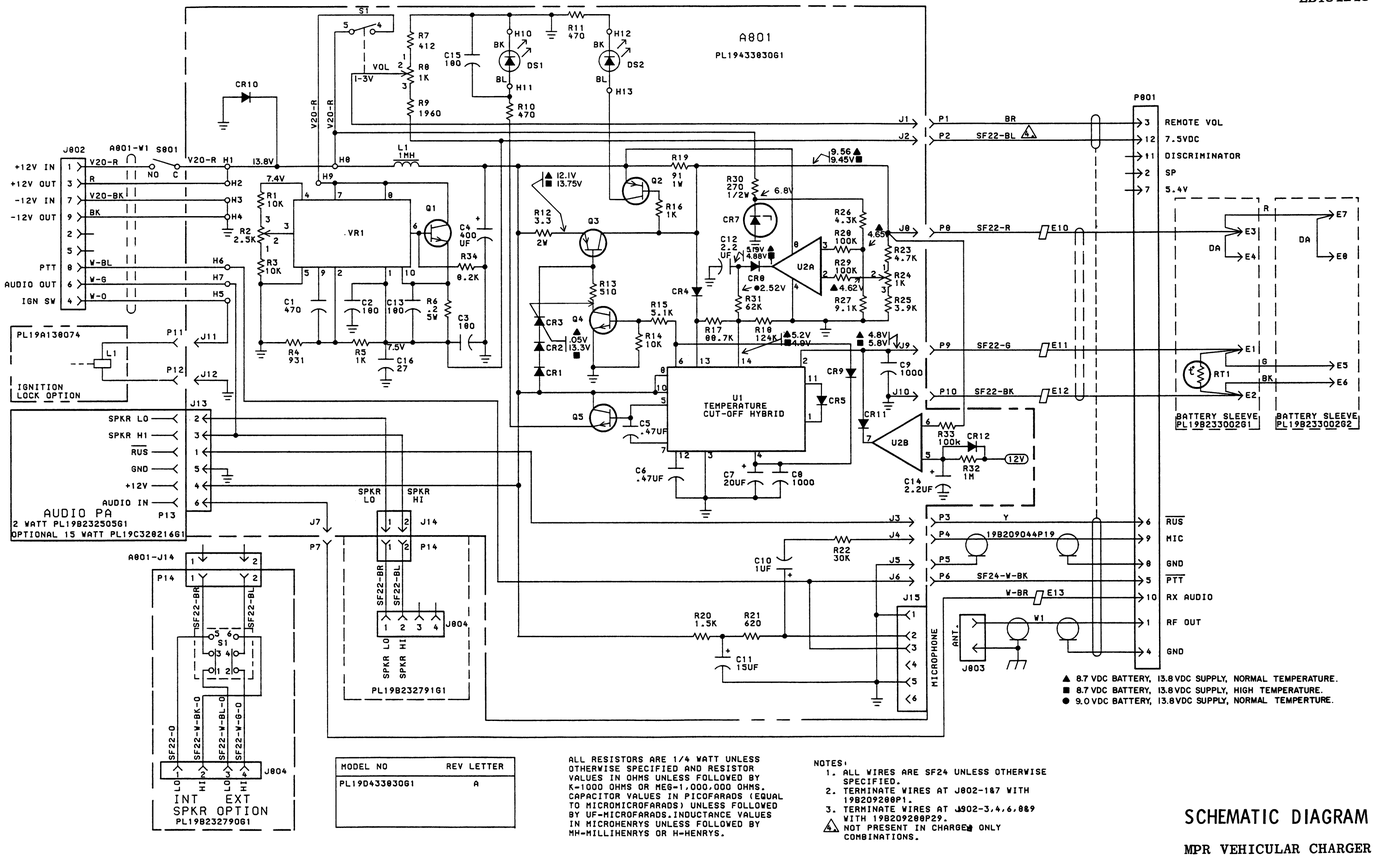
2 - WATT AMPLIFIER



THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
PL19B232505G1	A

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.

(19B232516, Rev. 3)



MODEL NO	REV LETTER
PL19D433030G1	A

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 SF24 UNLESS OTHERWISE SPECIFIED.
2. TERMINATE WIRES AT J802-1&7 WITH 19B209288P1.
3. TERMINATE WIRES AT J802-3,4,6,8&9 WITH 19B209288P29.

⚠ NOT PRESENT IN CHARGER ONLY COMBINATIONS.

(RC-3886A)
(19D437017, Rev. 3)

SCHEMATIC DIAGRAM

MPR VEHICULAR CHARGER

Issue 2

PARTS LIST

MPR/MFX VEHICULAR CHARGER
19D429957G3 136-512 MHz
19D429957G4 800 MHz
ISSUE 2

SYMBOL	GE PART NO.	DESCRIPTION
A801		COMPONENT BOARD 19D433830G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	5494481P107	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C2 and C3	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM.
C4	19A115680P24	Electrolytic: 400 uF +150% -10%, 18 VDCW; sim to Mallory Type TTX.
C5 and C6	19A116080P111	Polyester: 0.47 uF ±10%, 50 VDCW.
C7	19A115680P3	Electrolytic: 20 uF +150-10%, 25 VDCW; sim to Mallory Type TTX.
C8 and C9	5494481P111	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C10	5496267P17	Tantalum: 1.0 uF ±20%, 35 VDCW; sim to Sprague Type 150D.
C11	5496267P14	Tantalum: 15 uF ±20%, 20 VDCW; sim to Sprague Type 150D.
C12	19A134202P7	Tantalum: 2.2 uF ±20%, 20 VDCW.
C13	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM.
C14	19A700003P5	Tantalum: 2.2 uF ±20%, 35 VDCW.
C15	19A700229P73	Ceramic: 180 pF ±10%, 100 VDCW, temp coef -3300 PPM.
C16	19A700219P44	Ceramic: 27 pF ±5%, 100 VDCW.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 thru CR4	4037822P1	Silicon, 1000 mA, 400 PIV.
CR5	19A115100P1	Silicon: sim to Type 1N458A.
CR7	4036887P6	Zener: 500 mW, 6.5 v. nominal.
CR8	5494922P1	Silicon: sim to Hughes 1N456.
CR9	19A115100P1	Silicon: sim to Type 1N458A.
CR10	4037822P1	Silicon, 1000 mA, 400 PIV.
CR11 and CR12	19A115100P1	Silicon: sim to Type 1N458A.
		- - - - - - - - INDICATING DEVICES - - - - - - - -
DS1	19B219800G11	Diode, optoelectronic: green light emitting.
DS2	19B219800G12	Diode, optoelectronic: yellow light emitting.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J1 thru J12	4033513P4	Contact, electrical: sim to Bead Chain L93-3.
J13	19A116659P12	Connector, printed wiring: 6 contacts rated @ 5 amps; sim to Molex 09-64-1061.
J14	19A116659P100	Connector, printed wiring: 2 contacts rated @ 5 amps; sim to Molex 09-60-1021.
J15	19B219627G1	Connector: 6 contacts.
J802		Connector. Includes:
	19B209288P3	Shell.
	19B209288P1	Contact, electric: wire size No. 14-20 AWG; sim to Molex 02-09-1101. (J802-1, 7).
	19B209288P29	Contact, electrical: wire size No. 22-30 AWG; sim to Molex 02-09-1141. (J802-3, 4, 6, 8, & 9).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

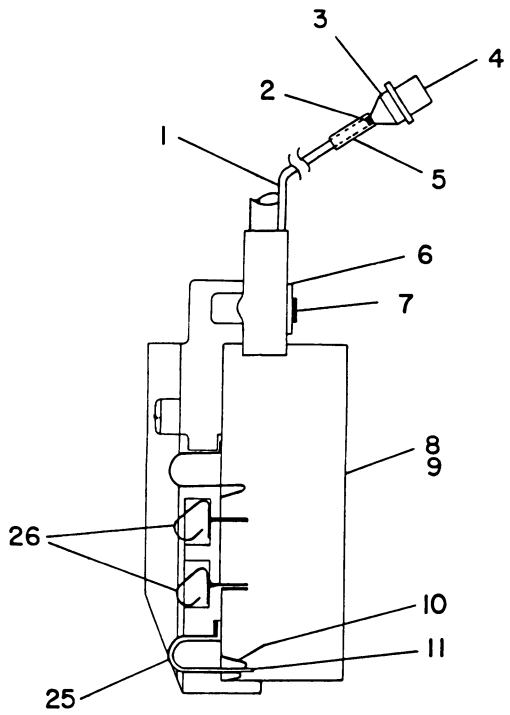
SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L1	19A115894P1	Audio freq: 1.0 mh inductance, 0.35 ohms DC res.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q1	19A116742P2	Silicon, NPN.
Q2	19A115852P1	Silicon, PNP; sim to Type 2N3906.
Q3	19A116375P1	Silicon, PNP.
Q4 and Q5	19A115910P1	Silicon, NPN; sim to Type 2N3904.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	19A701250P301	Metal film: 10K ohms ±1%, 1/4 w.
R2	19A1165589P104	Variable cermet: 2500 ohms ±20%, 1/2 w; sim to CTS Series 360.
R3	19A1170250P301	Metal film: 10K ohms ±1%, 1/4 w.
R4	19A701250P194	Metal film: 931 ohms ±1%, 1/4 w.
R5	19A701250P201	Metal film: 1K ohms ±1%, 1/4 w.
R6	5493035P16	Wirewound: 0.2 ohms ±10%, 5 w; sim toton Hall Type HR.
R7	19A701250P160	Metall film: 412 ohms ±1%, 1/4 w.
R8	19A1346089P1	Resistor/switch: Resistor 1-25 ohms ±20%; switch SPST, rated 3 amps at 125 VRMS; sim to CTS T057-XBE270.
R9	19A701250P229	Metal film: 1960 ohms ±1%, 1/4 w.
R10 and R11	19A700106P55	Composition: 470 ohms ±5%, 1/4 w.
R12	19A700050P19	Wirewound: 3.3 ohms ±10%, 2 w.
R13	3R152P511J	Composition: 510 ohms ±5%, 1/4 w.
R14	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R15	3R152P512J	Composition: 5.1K ohms ±5%, 1/4 w.
R16	19A700106P63	Composition: 1K ohms ±5%, 1/4 w.
R17	19A701250P392	Metal film: 88.7K ohms ±1%, 1/4 w.
R18	19A701250P410	Metal film: 124K ohms ±1%, 1/4 w.
R19	3R78P910J	Composition: 91 ohms ±5%, 1 w.
R20	19A700106P67	Composition: 1.5K ohms ±5%, 1/4 w.
R21	3R152P621J	Composition: 620 ohms ±5%, 1/4 w.
R22	3R152P303J	Composition: 30K ohms ±5%, 1/4 w.
R23	19A700106P79	Composition: 4.7K ohms ±5%, 1/4 w.
R24	19A700109P1	Variable, cermet: 1K ohms ±20%, 1/4 w.
R25	19A700106P77	Composition: 3.9K ohms ±5%, 1/4 w.
R26	3R152P433J	Composition: 4.3K ohms ±5%, 1/4 w.
R27	3R152P912J	Composition: 9.1K ohms ±5%, 1/4 w.
R28 and R29	19A700106P111	Composition: 100K ohms ±5%, 1/4 w.
R30	19A700113P49	Composition: 270 ohms ±5%, 1/2 w.
R31	3R152P623J	Composition: 62K ohms ±5%, 1/4 w.
R32	19A700109P73	Deposited carbon: 1W ohms ±5%, 1/4 w.
R33	19A700019P61	Deposited carbon: 0.1W ohms ±5%, 1/4 w.
R34	19A700019P48	Deposited carbon: 8.2K ohms ±5%, 1/4 w.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1		(Part of R8).
		- - - - - - - - INTEGRATED CIRCUITS - - - - - - - -
U1	19D423164G1	Hybrid, temperature, cut off.
U2	19A116297P4	Linear: DUAL OP AMP; sim to MC1458P.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - - -
VR1	19A116841P1	Linear: voltage regulator; sim to Fairchild uA723C.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CABLES - - - - - - - - - -
W1	19D429343G2	Component board. (Includes J802).
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S801	19A116676P1	Sensitive: SPDT, 5 amps at 24 VDC or 5 amps at 250 VRMS; sim to Microswitch 11SM1-T2.
		REAR SLEEVE ASSEMBLY 19B233002G1 & G2
		- - - - - - - CORE TOROIDAL, FERRITE - - - - - - -
E10 thru E12	19A700122P1	Torridal core, ferrite: sim to Stackpole 88-31959.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P8 thru P10	19A702402P2	Contact, electrical; sim to AMP 42827-2.
		- - - - - - - - - - THERMISTORS - - - - - - - - - -
RT1	19C300048P6	Disc: 50K ohms ±10%; sim to NL Ind. 4D 103.
		CONNECTOR SUPPORT 19C328718G4 W/O UDC 136-512 MHz 19C328718G6 UDC 800 MHz
		CABLE ASSEMBLY 19D429935G1 136-512 MHz 19D429935G2 800 MHz
		- - - - - - - - TOROIDAL CORES - - - - - - - -
E13	19A700122P1	Torridal core, ferrite: sim to Stackpole 88-31959.
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J803		Connector. Includes:
	19A700067P1	Receptacle, coax; sim to Amphenol 83-79B.
	4029082P2	Cover.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1 thru P4	19A702402P2	Contact, electrical; sim to AMP 42827-2.
P5	19A702402P1	Contact, electrical: sim to AMP 41854.
P6 and P7	19A702402P2	Contact, electrical; sim to AMP 42827-2.
P801		Connector. Includes:
	19B233000G1	Shell, connector block.
	19B232652G1	Contact. (P801-1, 10, 12).
	19A13757BG1	Contact. (P801-3, 5, 6, 8,9).
		- - - - - - - - - - CABLES - - - - - - - - - -
W1	19A127521G9	RF Cable. Includes: 19A700067P1 receptacle and 19A130322P1 shield. (Includes J803 - 136-512 Mhz)
W1	19A127521G10	RF Cable. Includes: 19A701423P2 connector. (Includes J803 - 800 MHz).
		MECHANICAL PARTS (See RC3873)
1	19D429684P1	Top cover.
2	19C328676G1	Botton cover.
3	19A700031P310	Machine screw, metric: 2.5-.45 x 10MM.
4	19A700032P3	Lockwasher, tooth, steel, metric: 2.5.
5	19A700034P3	Hex nut, metric: M2.5 x 0.45.
6	N136AP905C	Tap screw, phillips POZIDRIV®: No. 4-24 x 5/16.
7	19A134589P3006	Tap screw, metric: 3-0.5 x 6MM. (Secures P801, S801, rear cap, rear housing to frame).

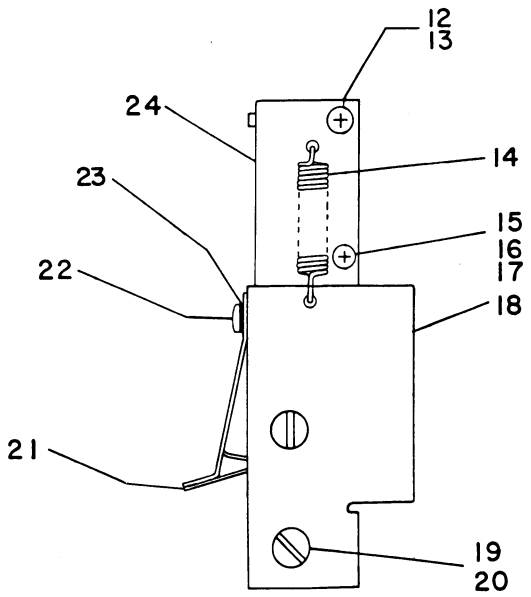
SYMBOL	GE PART NO.	DESCRIPTION
8	19C328689P1	Cap.
9	N190AP905C6	Flat head, phillips POZIDRIV®: No. 4-24 x 5/16.
10	19B233002G1	Sleeve.
11	19B233002G2	Sleeve.
12	N136P503C	Tap screw, phillips head: No. 2-32 x 3/16.
13	19C327044P1	Spring contact. (E1-E4).
14	19A137881G1	Plate.
15	19B233001G1	Frame.
16	19A134521P3	Lens.
17	19C328108P5	Knob.
18	19A143453P1	Set screw, self locking: 3-48 x 1/8.
19	19C328193P2	Knob, scaled.
20	19A134521P2	Lens: green.
21	5491682P25	Lock Assembly. (Key is not included - order key 5491682P4).
22	19C321643P1	Push button.
23	NP280586	Faceplate.
24	19A700115P3	Insulator, plate.
25	19A700068P1	Insulator, bushing.
26	19A701312P3	Flatwasher, metric: No. 2.5MM.
27	19A134586P2510C6	Machine screw, flathead, metric: 2.5-0.45 x 10MM.
28	19D429665P1	Front cap.
29	19A130622P1	Spring.
30	19A148209P1	Spacer.
31	19C328718G6	Connector support. (800 MHz).
	19C328718G4	Connector support. (136-512 MHz).
32	19C328679P1	Channel.
33	19A134586P3508C6	Machine screw: No. M3.5 x 8MM.
34	19B234399P1	Cam.
		MECHANICAL PARTS (See RC4122)
1	19B80056OP2	RF Cable.
2	7489477P8	Ferrule.
3	4029082P2	Cover.
4	19A700067P1	Receptacle, coax; sim to Amphenol 83-79B.
5	19A700136P6	Insulated sleeving.
6	19B232106P1	Strain relief.
7	19A700031P310	Machine screw, metric: 2.5-.45 x 10MM.
8	19D429935G1	Cable/connector assembly. (P801 - 136-512 MHz).
9	19D429935G2	Cable/connector assembly. (P801 - 800 MHz).
10	19B232656P1	Contact.
11	19A137593P1	Insulator.
12	N80P13024C6	Machine screw, phillips head: No. 6-32 x 1-1/2.
13	19A148086P1	Stop.
14	19A137862P1	Spring.
15	19A700031P310	Machine screw, metric: 2.5-.45 x 10MM.
16	19A700032P3	Lockwasher, tooth, steel, metric: 2.5.
17	19A138061P1	Spacer.
18	19B233012G1	Support.
19	19A134647P1	Shield screw, pan head metric: M2.5 x .45 thd.
20	19A137927P1	Spacer.
21	19B233091G3	Spring.
22	N170P13008C6	Cap screw, hex socket head: No. 6-32 x 3/8.
23	19A115409P2	Lockwasher: No. 6.
24	19B232971P1	Channel.

SYMBOL	GE PART NO.	DESCRIPTION
25	19B232652G1	Contact.
26	19A137578G1	Contact.
		ASSOCIATED PARTS 2 WATT AUDIO BOARD 19B232550G1
AR1	19A134339P2	Linear, audio amplifier; sim to SGS-ATES TBA810-ACB.
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19A134202P14	Tantalum: 1 uF ±20%, 35 VDCW.
C2 and C3	5494481P7	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim. to RMC Type JF Discap.
C4	5496267P19	Tantalum: 22 uF ±20%, 35 VDCW; sim to Sprague Type 150D.
C5 and C6	5496267P12	Tantalum: 150 uF ±20%, 15 VDCW; sim to Sprague Type 150D.
C7	19A700005P2	Polyester: 1500 pF ±10%, 50 VDCW.
C8	5496267P19	Tantalum: 22 uF ±20%, 35 VDCW; sim to Sprague Type 150D.
C9	5496267P15	Tantalum: 47 uF ±20%, 20 VDCW; sim to Sprague Type 150D.
C10	19A116080P101	Polyester: 0.01 uF ±10%, 50 VDCW.
C11	19A116080P107	Polyester: 0.1 uF ±10%, 50 VDCW.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P13	19A116659P6	Connector, printed wiring: 6 contacts rated @ 5 amps; sim to Molex 09-52-3061.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	19A700106P39	Composition: 100 ohms ±5%, 1/4 w.
R2	19A700106P15	Composition: 10 ohms ±5%, 1/4 w.
R3	3R152P202J	Composition: 2K ohms ±5%, 1/4 w.
R4	19A700106P41	Composition: 120 ohms ±5%, 1/4 w.
R5	19A700050P13	Wirewound: 1 ohms ±10%, 2 w.
R6	10A700106P19	Composition: 15 ohms ±5%, 1/4 w.
R7	19A700106P37	Composition: 82 ohms ±5%, 1/4 w.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19A143578P56	Spacer, threaded. (Secures AR10.
	19A137924P1	Spacer. (Secures 2 Watt Audio Board).
	19A700031P406	Machine screw, metric: 3-0.5 x 6MM. (Secures 2 Watt Audio Board to spacer).
	19A134586P2506E	Machine screw, metric: 2.5-0.45 x 6MM. (Secures Audio Board spacer to mounting surface).
		MICROPHONE KIT 7141414G2
	4031457P1	Support.
	4031458P1	Spring.
	N193P1408C6	Tap screw, phillips head: No. 8-18 x 1/2.
	19A116773P105	Tap screw, phillips POZIDRIV®: No. 7-19 x 5/16.
		CHARGER MOUNTING KIT 19A137939G1
	19B227124G2	Support. (Mounts on hump).
	19B233043G1	Support. (Located between charger and hump support).
	19B209103P506	Tap screw, hex head: No. 10-32 x 3/8. (Secures charger support to hump support).

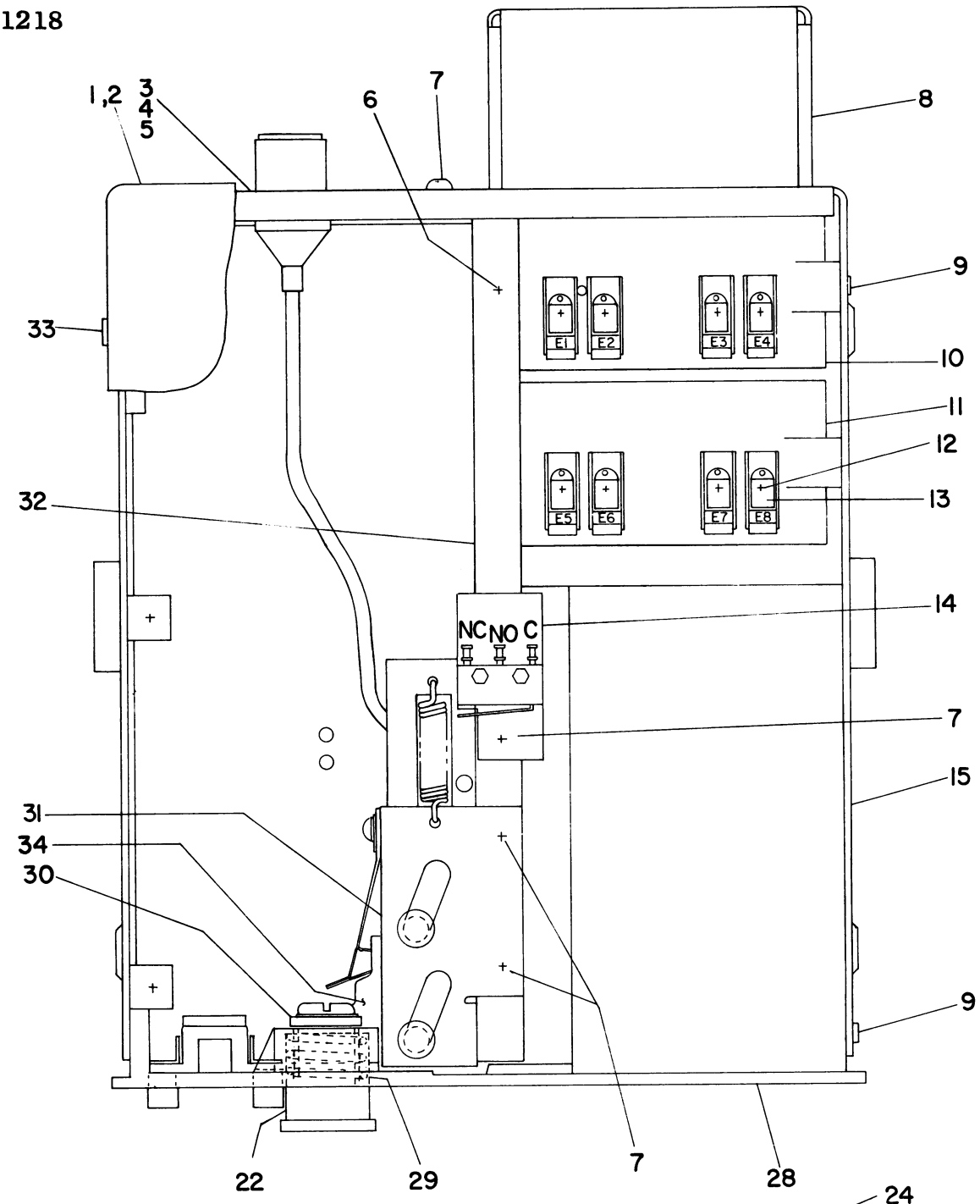
SYMBOL	GE PART NO.	DESCRIPTION
	N403P19C6	Lockwasher: No. 10. (Secures charger support to hump support).
	N402PPC6	Washer, steel: No. 10. (Secures charger support to hump support).
	N130P1610C6	Screw, thread forming: No. 10-16 x 5/8. (Secures hump mount support to vehicle - thin mounting surface).
	N130P1624C6	Screw, thread forming: No. 10-16 x 1-1/2. (Secures hump mount support to vehicle - used with thick carpets or spacers).
	19A134653P6020	Bolt, machine. (Secures charger to charger support).
	19A134297P1	Lockwasher, external tooth: No. 6.0W. (Secures charger to charger support).
	19B232982P1	Cover.
		SPEAKER CABLE 19B232779G1
		- - - - - - - JACKS AND RECEPTACLES - - - - - - -
J804		Connector. Includes:
	19B209288P17	Shell.
	5496809P17	Contact, pin: female, brass; sim to Molex Products 1381-T.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P14		Connector. Includes:
	19A1166659P138	Shell.
	19A116781P6	Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0106.
		POWER CABLE 19B232819G2
		- - - - - - - - - - FUSES - - - - - - - - - -
	1R16PR	Cartridge, quick blowing: 5 amps at 250 v; sim to Littelfuse 312005 or Bussmann WTH-5.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P1		Connector. Includes:
	19B209288P4	Shell.
	19B209288P2	Contact, electrical: sim to Molex 02-09-2101.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XF1	19A122111G1	Lead, fuse: approx 8 feet long.
	7491823P7	Solderless terminal. (As required).
	7491823P8	Solderless terminal. (As required).
	4029484P2	Contact, electrical. (As required).

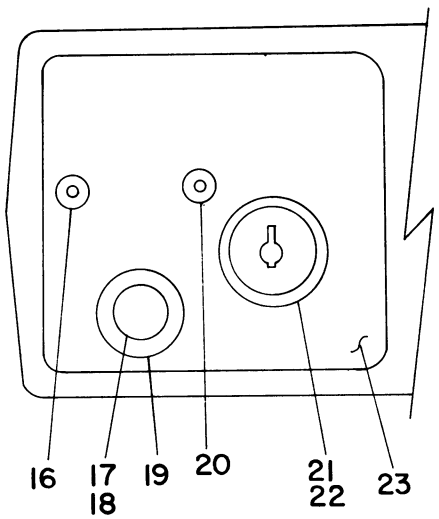


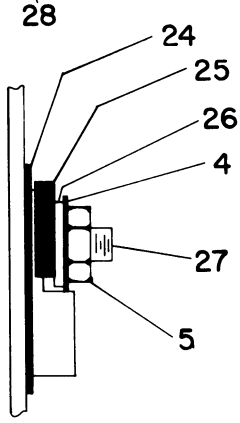
P801
CROSS SECTION VIEW



RC 4401







Q1 & Q3 ON A801

RC-3873A

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.

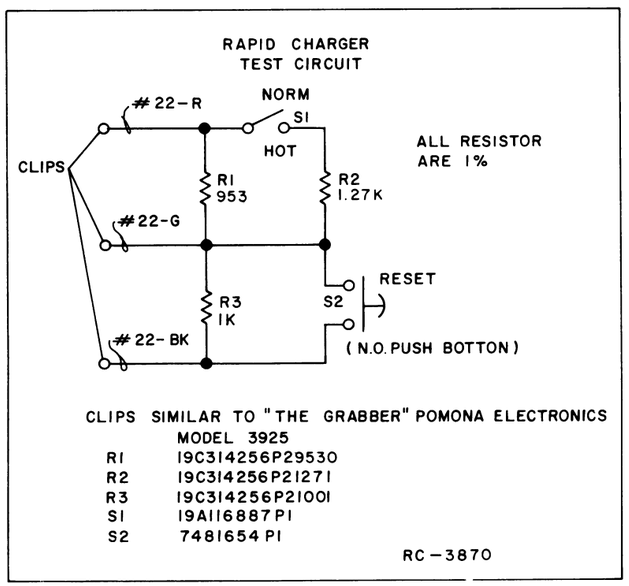
If the charger works properly with the test circuit, but not with the battery pack, check thermistors RT1 and RT Battery. Each should measure approximately 50K ohms at room temperature (25°C).

NOTE:

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

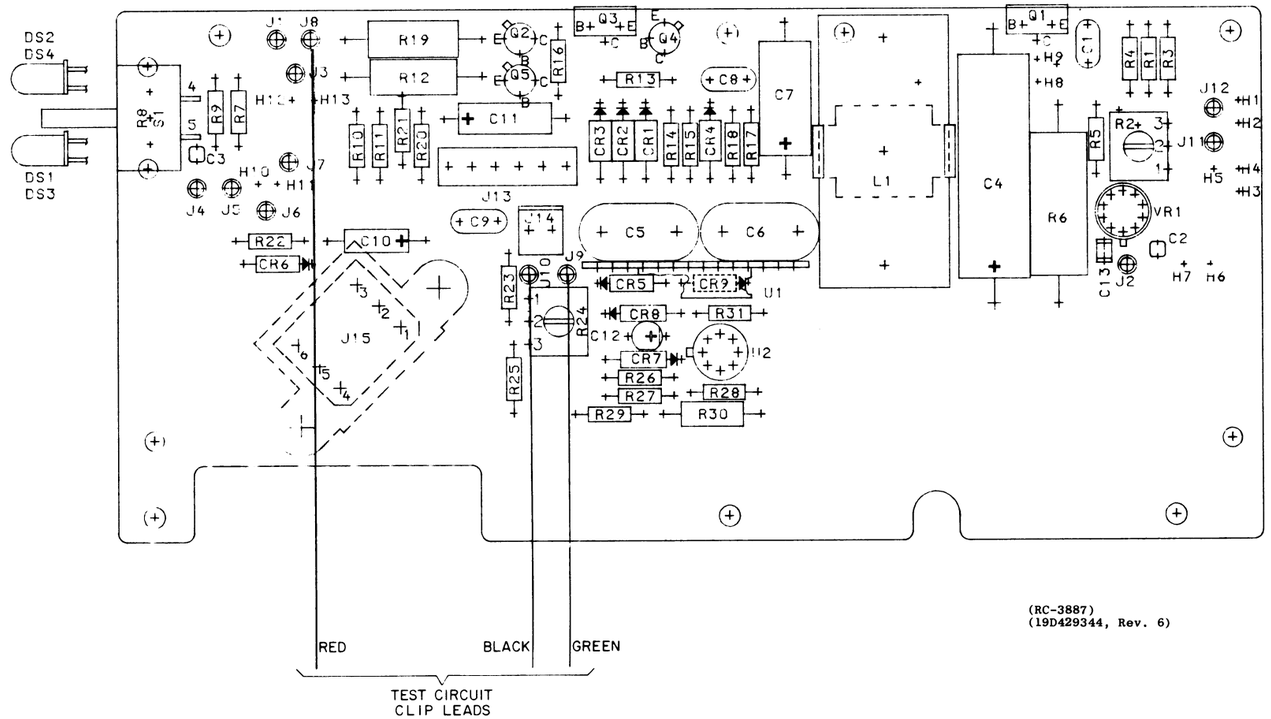
Other Checks:

1. Amber LED does not light, check fuse, Q2 and DS2.
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 Q3, Q4, Q5 and DS1.
3. U1-11 always high, logic will not reset, check C5.
4. U1-6 always low, no high rate of charge, check C6.
5. U1-5 always low, logic will not reset, check C7 and C8.
6. No high rate of charge, check for open CR4 or Q3.



TEST BATTERY CONDITION	U1 PIN				TEST CRT 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



(RC-3887)
(19D429344, Rev. 6)

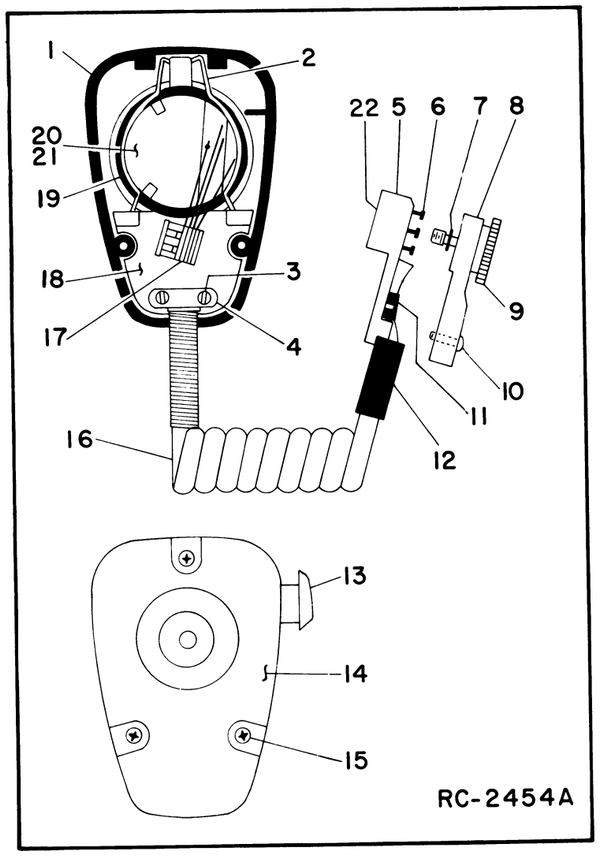
PARTS LIST

LBI-4481B

TRANSISTORIZED DYNAMIC MICROPHONE
19C320270G1, G2
(SEE RC-2454)

SYMBOL	GE PART NO.	DESCRIPTION
1		Front Case Assembly. RP127. (includes items 14, 15).
2		Retaining spring. (Part of item 18).
3		Tap screw, phillips. (Part of item 16).
4		Retaining bar. (Part of item 16).
5	19D416766P1	Connector base.
6	19A129435P1	Contact.
7	7109043P1	Retaining ring.
8	19D416767P1	Connector cover.
9	19B219723G1	Screw.
10	N136AP905C	Tap screw, phillips: No. 4 x 5/16.
11	19A116937P1	Cable clip.
12	19B219749P1	Strain relief.
13		Switch button kit. RP126.
14		Rear Case Assembly. (Part of item 1).
15		Tap screw, phillips. (Part of item 1).
16	19C321016G1	Cable assembly: Includes items 3-12 and cable RP129.
17		Switch Assembly. RP128.
18		Grille Assembly. RP130. (includes items 2, 19, 21).
19		"O" Ring. (Part of item 18).
20		Transistorized Cartridge. RP117.
21		Washer. (Located under cartridge- part of item 18).
22	19C321016G3	Connector assembly: Includes items 5-12.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter," which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - Charger Board 19D433830G1

To prevent RF from causing the regulators to chop the 7.5-Volt output. Added C16 in parallel with C3.

SERVICE SHEET

MICROPHONE 19C320270G1 & G2
(Sheet 1)

12 Issue 1

The following is an adjustment procedure for the spring latch and power switch S801.

If any difficulties occur with intermittant or bad UDC contact the following adjustments should be made to assure that the charger UDC connector mates securely to the radio contacts.

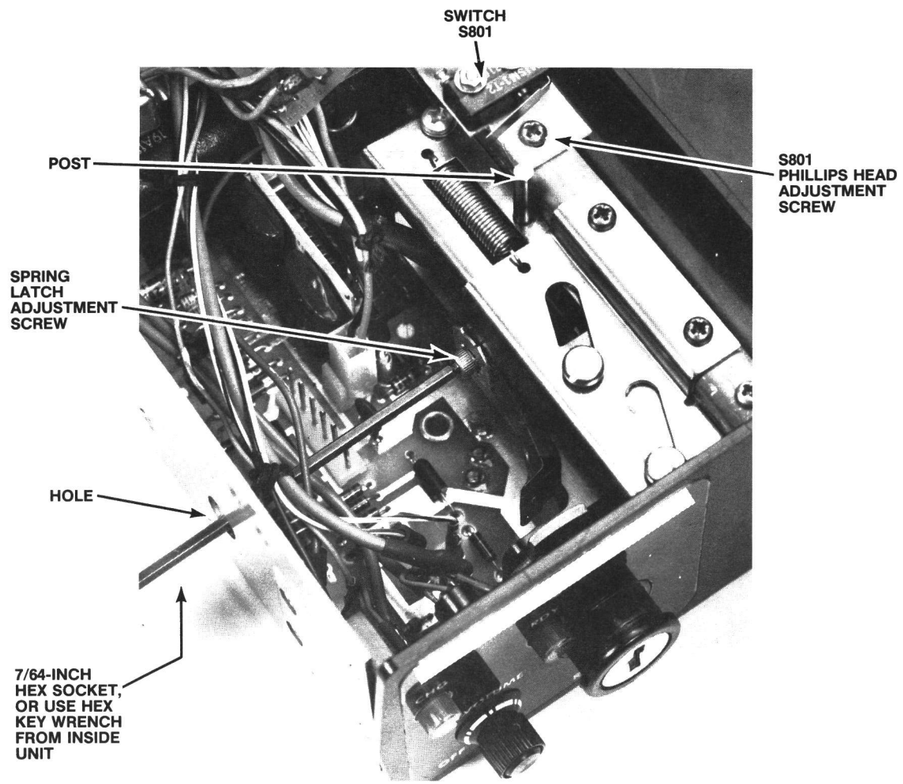
To adjust the spring latch and power switch S801:

1. Loosen spring latch adjustment screw and two mounting screws holding both the latch and the switch.

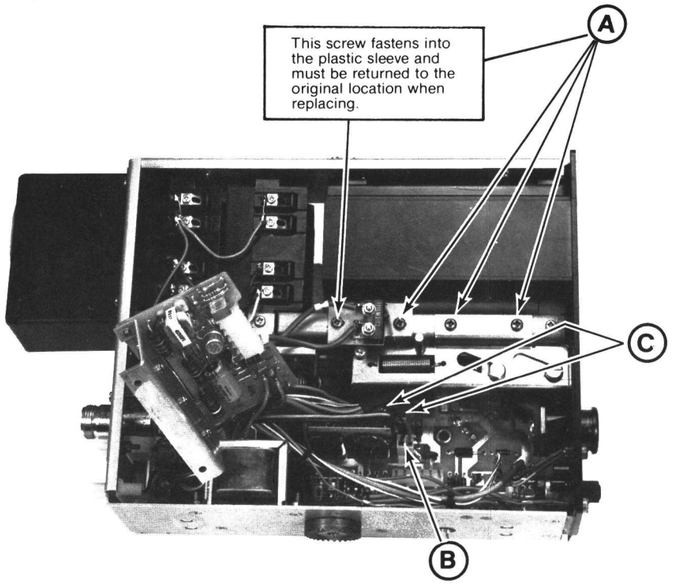
2. Slide S801 toward the back of the charger.

3. Press the radio into the charging insert as far as it will go. Hold the radio in this position and pull the spring latch back as far as it will go. Tighten the spring latch adjustment screw to 14-16 inch pounds. The radio is now latched in the charging insert.

4. Slide S801 forward against the post until S801 is activated. The post should not be hitting the switch housing when the radio is pushed in as far as it will go. Tighten the two screws holding S801 in place.

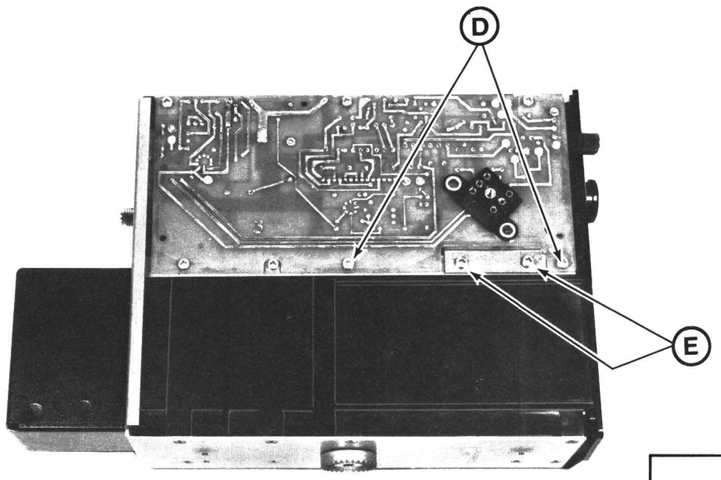


SPRING LATCH AND POWER SWITCH ADJUSTMENT PROCEDURE



To remove cable assembly:

1. Remove Phillips Head screws at (A).
2. Remove P14 at (B).
3. Remove P9 and P10 at (C).

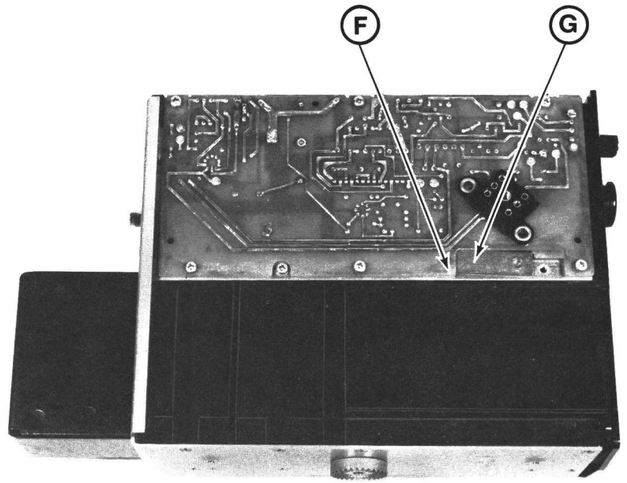


4. Loosen Phillips Head screws at (D).
5. Remove Phillips Head screws at (E).

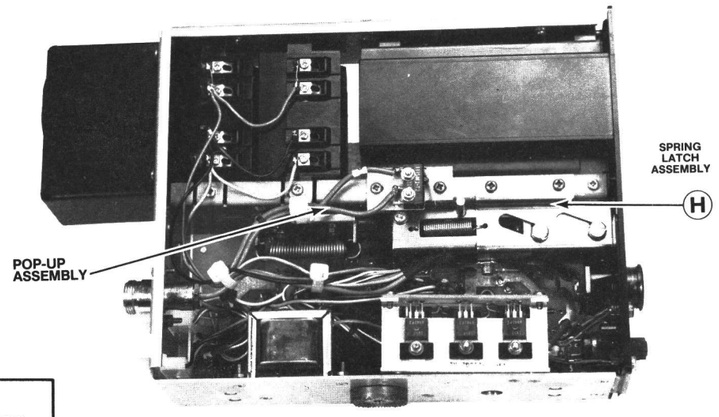
PROCEDURE FOR REMOVING CONNECTOR SUPPORT AND CABLE ASSEMBLY

NOTE

The Charger is shipped with one spring for horizontal mounting (up to 30° from horizontal). Install second spring for vertical mount.



6. Lift up on edge of printed wire board at (F).
7. Push cable assembly under printed wire board (G).



8. Lift the cable assembly up and out as shown at (H).

PARTS LIST

SPEAKER ASSEMBLY
19C320302G6
ISSUE 1

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - LOUDSPEAKERS - - - - - - - - -
LS1	19A116694P1	Permanent magnet: 5 inch, 8 ohms ±10% imp, 20 w. max operating; sim to Oaktron SEU2189-2.
		- - - - - - - - - - - CABLES - - - - - - - - - - -
W4		CABLE ASSEMBLY 19A130648G1
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P1		Connector. Includes:
	19B209288P16	Shell.
	5496809P18	Contact, pin: male, sim to Molex Products 1380-T.
		MECHANICAL PARTS (SEE RC 3073)
7	19C320016P2	Mounting bracket.
8	N187P16010C6	Machine screw: No. 10-32 x 5/8.
9	19B227593G2	Housing.
10	19A116986P108	Screw, thread forming, assembled washer: Phillips POZIDRIV, HI-LO thread, No. 7-19 x 1/2. (Secures speaker LS2 to housing).
11	19A116986P112	Screw, thread forming, assembled washer: Phillips POZIDRIV, HI-LO thread, No. 7-19 x 3/4. (Secures grille to housing).
12	19B219692G2	Grille.

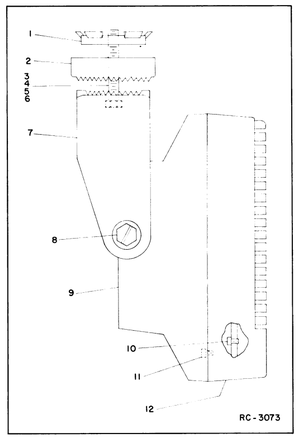
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

BREAK-AWAY DEVICE KIT
19A129461G1
(SEE RC3073)
ISSUE 1

SYMBOL	GE PART NO.	DESCRIPTION
1	19B219578G1	Safety Release Disc.
2	19C320022P1	Retaining bracket.
3	N187P16010C6	Screw, hex head, slotted: No. 10-32 x 5/8. (Quantity 1- used with safety release disc & retaining bracket).
4	N130P16012C6	Tap screw, hex head, slotted: No. 10-16 x 3/4. (Quantity 3- used without safety release disc & retaining bracket).
5	N130P16024C6	Tap screw, hex head, slotted: No. 10-16 x 1-1/2. (Quantity 3- used with thick carpet mounting).
6	N402AP9C	Flatwasher: No. 10. (Used with items 4 & 5).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

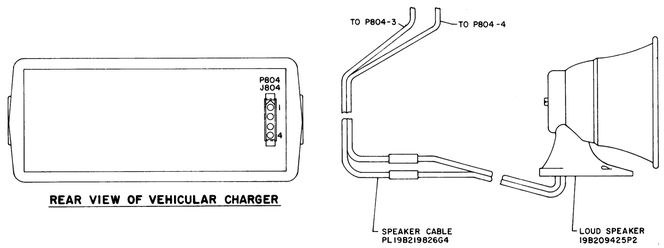


PARTS LIST

SPEAKER OPTION CABLE
19B232790G1
ISSUE 2

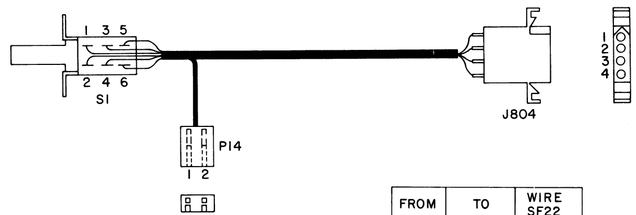
SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - JACKS AND RECEPTACLES - - - - - - - -
J804		Connector. Includes:
	19B209288P17	Shell.
	5496809P17	Contact, electrical, female: sim to Molex 1381-T. (Quantity 4).
		- - - - - - - - - - - PLUGS - - - - - - - - - - -
P14		Connector. Includes:
	19A116659P138	Shell.
	19A116781P6	Contact, electrical: wire range No. 22-26 AWG; sim to Molex 08-50-0108. (Quantity 2).
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	19A134426P2	Push: DPDT, alternate action, 14.0 VDC at 1.1 amp; sim to Switchcraft 348-1025A.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - -
	N136AP905C6	Tap screw, phillips POZIDRIV: 4-24 x 5/16. (Secures S1).
	N402P5C6	Washer, steel: No. 4. (Secures S1).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES



REAR VIEW OF VEHICULAR CHARGER

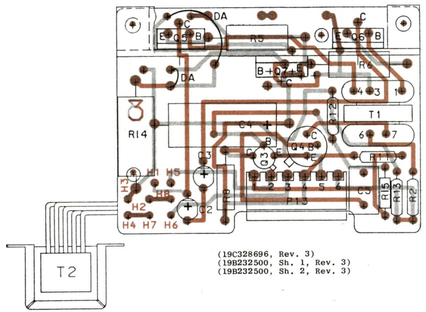
(19C328819, Rev. 1)



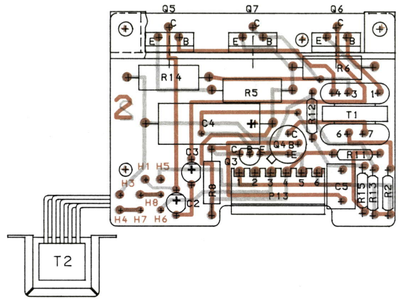
FROM	TO	WIRE SF22
S1-1	J804-3	W-BL-O
S1-2	J804-4	W-G-O
S1-3	P14-1	BR
S1-4	P14-2	BL
S1-5	J804-1	O
S1-6	J804-2	W-BK-O

(19B233504, Rev. 0)

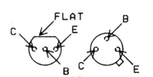
SPEAKER ASSEMBLY 19C320302G6
SPEAKER OPTION CABLE 19B232790G2
(Sheet 2)



(19C328696, Rev. 3)
(19B232500, Sh. 1, Rev. 3)
(19B232500, Sh. 2, Rev. 3)



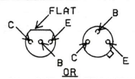
LEAD IDENTIFICATION
FOR Q3 & Q4



IN-LINE TRIANGULAR
TOP VIEW

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

LEAD IDENTIFICATION
FOR Q4



IN-LINE TRIANGULAR
TOP VIEW

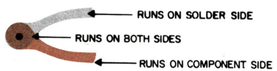
NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.

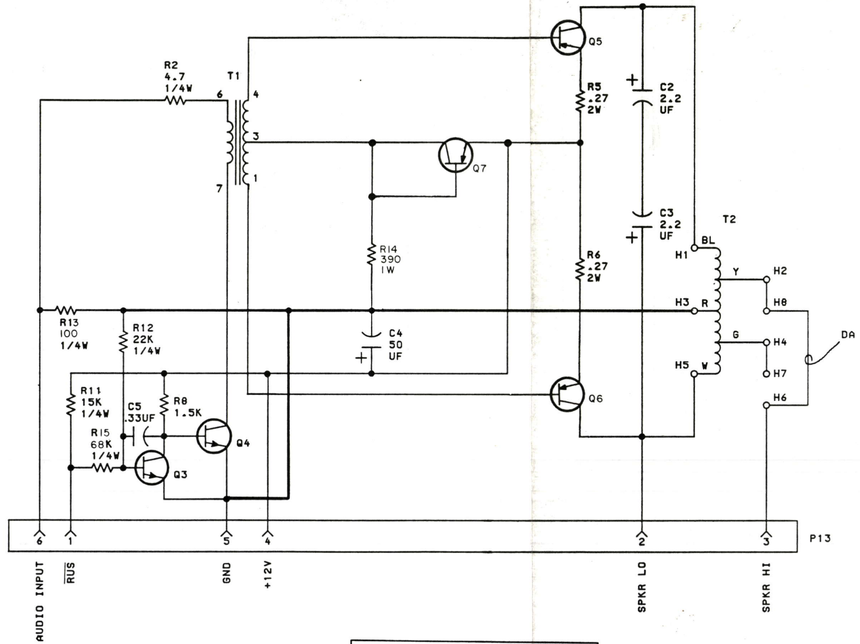
LEAD IDENTIFICATION
FOR Q3

IN-LINE
TOP VIEW

NOTE: CASE SHAPE IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.

(19C331745, Rev. 1)
(19A144534, Sh. 1, Rev. 2)
(19A144534, Sh. 2, Rev. 2)





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.

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
PL19C328216G1 PL19C328216G2	B

(19C331746, Rev. 1)

PARTS LIST

OPTIONAL 15 WATT AUDIO AMPLIFIER BOARD
19C328216G1 - REV B
19C328216G2
ISSUE 4

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C2* and C3*	19A134202P7	Tantalum: 2.2 pF ±20%, 20 VDCW.
		Earlier than REV A:
	5496267P13	Tantalum: 2.2 uF ±20%, 20 VDCW; sim to Sprague Type 150D.
C4	19A115680P4	Electrolytic: 50 uF +150% -10%, 25 VDCW; sim to Mallory Type TTX.
C5*	19A700004P5	Metallized polyester: 0.33 uF ±10%, 63 VDCW. Added by REV A.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P13	19A116659P6	Connector, printed wiring: 6 contacts rated @ 5 amps; sim to Molex 09-52-3061.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q3	19A115774P1	Silicon, NPN.
Q4	19A115300P4	Silicon, NPN.
Q5 thru Q7	19A116942P1	Silicon, PNP.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R2*	19A700019P9	Deposited carbon: 4.7 ohms ±5%, 1/4 w.
		Earlier than REV A:
	19A700113P7	Composition: 4.7 ohms ±5%, 1/2 w.
R5 and R6	19A700050P6	Wirewound: 0.27 ohms ±10%, 2 w.
R8	19A700113P67	Composition: 1.5K ohms ±5%, 1/2 w.
R11*	19A700019P51	Deposited carbon: 15K ohms ±5%, 1/4 w. Added by REV A.
R12*	19A700019P53	Deposited carbon: 22K ohms ±5%, 1/4 w. Added by REV A.
R13	19A700019P25	Deposited carbon: 100 ohms ±5%, 1/4 w.
R14	19A700112P53	Composition: 390 ohms ±1 w.
R15	19A700019P59	Deposited carbon: 68K ohms ±5%, 1/4 w.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T1	19A134159P1	Audio freq: 300-4000 Hz, ±1.0 dB max; Pri: 40 ohms ±10%; Sec: 60 ohms 2.5 MADC.
T2	19A134167P1	Audio freq: 300-4000 Hz, ±1 dB, 1.6 amp max; Input 2.0 watt at 8.0 ohms; 50 MADC, 1000 Hz.
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	19B233014P1	Heat sink. (Q5 & Q6).
	19A700115P3	Insulator, plate. (Used with Q5 - Q7).
	19A700068P1	Insulator, bushing. (Used with Q5 - Q7).
	19A700034P3	Hex nut, metric: M2.5 x 0.45. (Secures Q5 - Q7 and PA Board).
	19A700031P310	Machine screw, metric: 2.5-.45 x 10MM. (Secures Q5 - Q7).
	19A700032P3	Lockwasher, tooth, steel, metric: 2.5. (Secures Q5 - Q7 and PA Board).
	19A701312P3	Flatwasher, metric: No. 2.5MM. (Secures Q5 - Q7 and PA Board).
	19A701332P4	Insulator, washer: nylon. (Used with Q4).
	19A134589P3006	Tap screw, metric: 3-0.5 x 6MM. (Secures heat sink to component board).
	19A134586P2510C6	Machine screw, flathead, metric: 2.5-0.45 x 10MM. (Secures PA Board).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

SERVICE SHEET

15 WATT AMPLIFIER 19C328216G1
(Sheet 3)