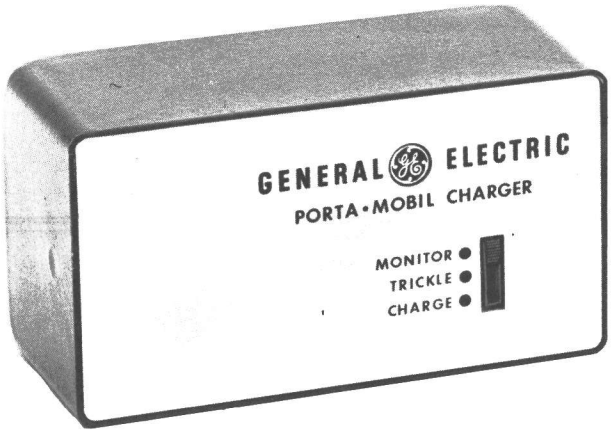
MOBILE RADIO

Porta-Mobile II™

DESK CHARGER COMBINATIONS 371L1A2X AND 371M1A1X



SPECIFICATIONS *

Dimensions (H X W X D)	3.04" x 5.64" x 2.80"
Input Voltage	
371L	121 VAC ±10% at 50/60 Hz
371M	220 VAC ±10% at 50/60 Hz
Charge Current	
Trickle	65 mA ±10% Trickle
Monitor	110 mA ±10% Monitor
Charge	400 mA ±10% Charge
Temperature Range	Charger will operate at -30°C to +65°C. However, a nickel-cadmium battery should be charged in the temperature range of +5°C to +45°C.

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

TABLE OF CONTENTS

ILLUSTRATIONS

WARNING

Under no circumstances should any person 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

Porta•Mobile II™ Desk Charger Combinations 371L1A2X and 371M1A1X are designed for use with Porta•Mobile II rechargeable battery pack and are capable of delivering a full charge to the battery pack in 16 hours. The charger use constant-current charging, thus preventing "thermal runaway. An indicator lamp on the front of the charger (located behind the GE Monogram) lights while the battery pack is being charged.

The charger combinations are three-rate chargers. Charging rates of 65, 110 and 400 milliamps are selected by a 3-position slide switch on the front of the chargers. This permits selection of a charging rate which is related to the duty cycle of the Porta• Mobile II Two-Way Radio.

OPERATION

Proper charging techniques greatly increase the operating efficiency and life of the Porta•Mobile II Rechargeable battery pack. It is especially important to avoid habitual overcharge, for the surplus energy is converted to heat and may result in premature battery failure. For best results, charge the battery within the temperature range of +5° to +45°C (41° to 113°F).

Battery capacity is specified in ampere-hours (Ah). Load in Amperes x Discharge period in hours = Capacity delivered in ampere-hours. (For example, a 4 Ah battery will deliver 1 ampere to a load for 4 hours). To maximize battery life, the charge cycle should be adapted to the discharge cycle. Charge the battery 1.4 ampere-hours for each ampere-hour taken from the battery.

Charging Procedure

1. Connect AC power to the charger (121 VAC or 220 VAC, 50/60 Hz. Refer to the Specifications).
2. Plug P3 of the charger into the charging jack on the Porta•Mobile II battery pack.
3. Select charger operation as follows:
   - TRICKLE - 65 milliamps
   - MONITOR - 110 milliamps
   - CHARGE - 400 milliamps
4. The indicator lamp on the front of the charger glows while the battery is charging.

CAUTION

Do not charge the battery pack at 400 milliamperes for longer than the recommended 16 hours. Beyond 16 hours, the charge current will only create heat within the battery pack and ultimately reduce battery life.

CIRCUIT ANALYSIS

The charger circuits consist of a full-wave rectifier, current limiter, charge selector switch and charge indicator light. The different charge rates are set by changing the resistance in the emitter circuit of the current limiter transistor.

Since battery cells tend to warm up during charge with resultant decrease in battery voltate, a constant current source is required to prevent thermal run-away during the charge cycle. The current limiting circuit consists of Q1, R1, VR1 and the "charge rate" resistors selected by S1 (Refer to Figure 1).

Initially, when the battery pack is connected, current limiter transistor Q1 is turned on by resistor R1. As the charge current through Q1 increases, the voltage drop across the "charge rate" resistors increases. When the selected charge current is reached, the voltage drop across the "charge rate" resistors causes diodes CR5 and VR1 to conduct. CR5 and VR1 conducting provides a bypass for the base current of Q1 through R1 causing Q1 to conduct less. Transistor Q1 will conduct less until a

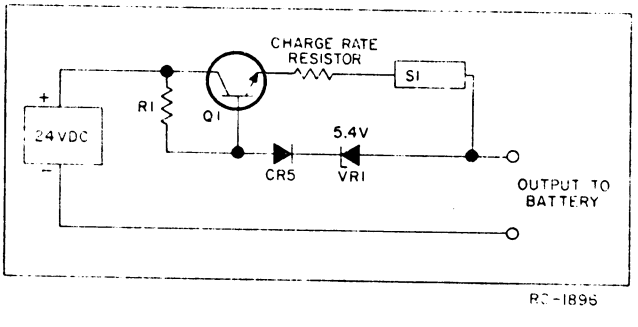


Figure 1 - Simplified Diagram of Current Limiter

stable condition results and the base current to Q1 is reduced to the value required to produce the desired charge current.

The stable condition occurs when the voltage drop across the "charge rate" resistors is approximately equal to the Zener voltage of VR1 (5.4 V).

Due to Feedback, the charge current is relatively independent of the battery pack voltage or the line voltage supplying the charger.

MAINTENANCE

DISASSEMBLY

To gain access to the inside of the charger, use the following procedure:

1. Disconnect the AC power.
2. Remove the two upper rubber feet on the back of the charger and lift chassis from the housing.

TROUBLESHOOTING

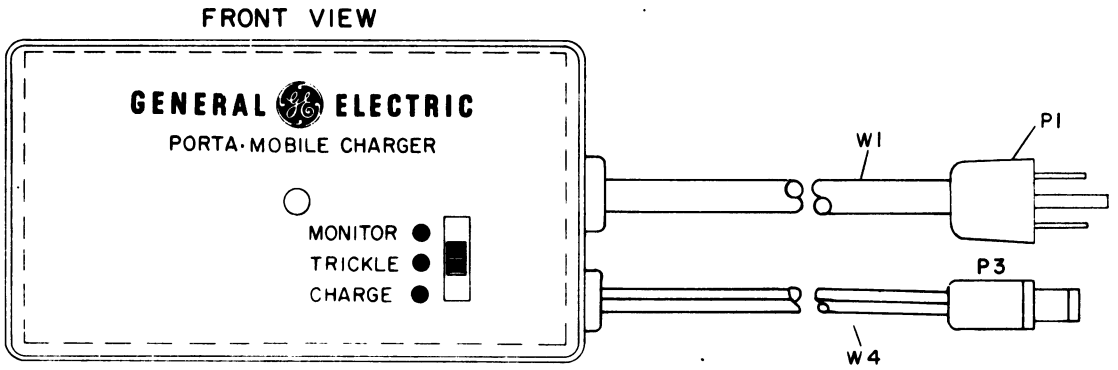
Troubleshooting and servicing procedures are outlined on the following chart. Also refer to the appropriate Outline and Schematic Diagram.

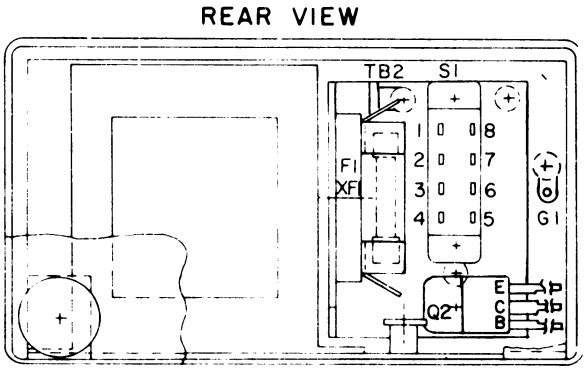
TROUBLESHOOTING PROCEDURES

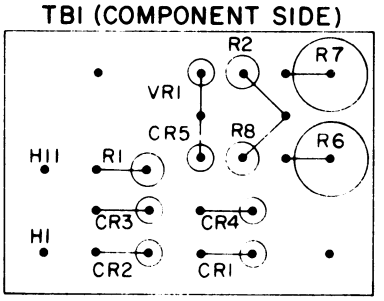
SYMPTOM	PROCEDURE
Charge light does not come on.	Check the following: 1. Connection to external charge circuit. 2. Lamp bulb. 3. Fuse 4. Q1 for open junction
Charge rates too high or low.	Check the following: 1. Q1 for collector-to-emitter short. 2. VR1 for short or open 3. Diode CR1-5 for shorts or opens. 4. Transformer primary and secondary windings.

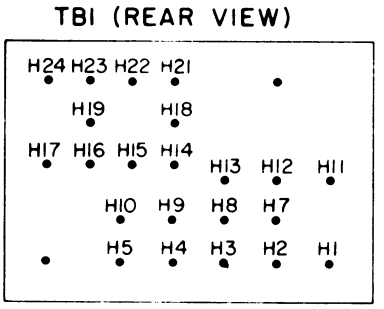
GENERAL ELECTRIC COMPANY • MOBILE COMMUNICATIONS DIVISION
WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.

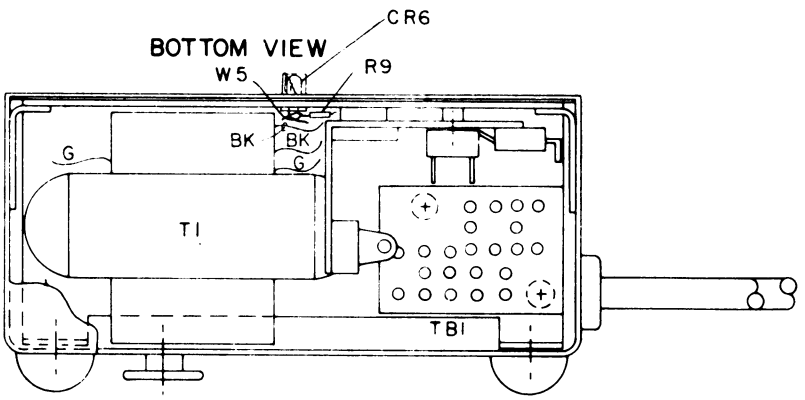
GENERAL ELECTRIC* U.S.A.







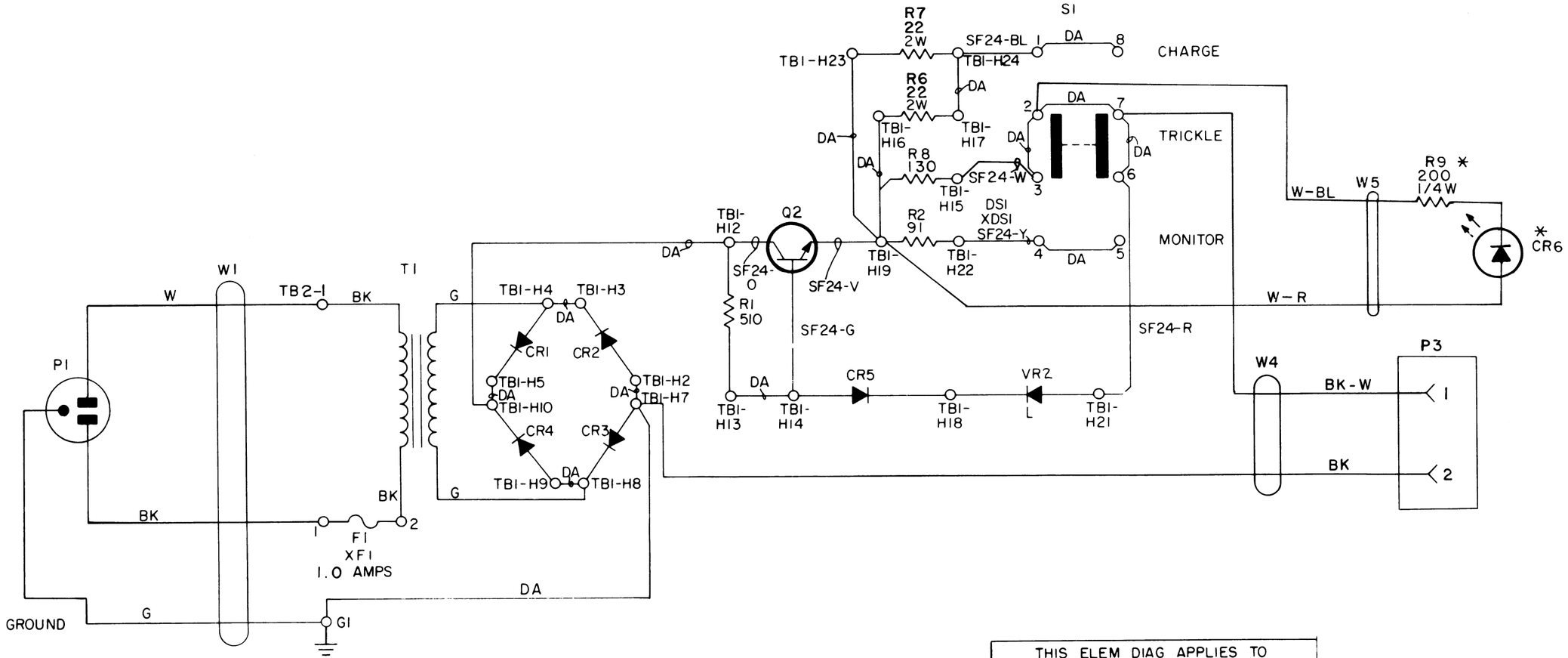




(19C328383, Rev. 2)

OUTLINE DIAGRAM

Porta●Mobile II DESK CHARGER
COMBINATION 371L1A2X



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.

* PART OF W5

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
4EP50A15	C

(19C328381, Rev. 4)

SCHEMATIC DIAGRAM

Porta•Mobile II DESK CHARGER
COMBINATION 371L1A2X

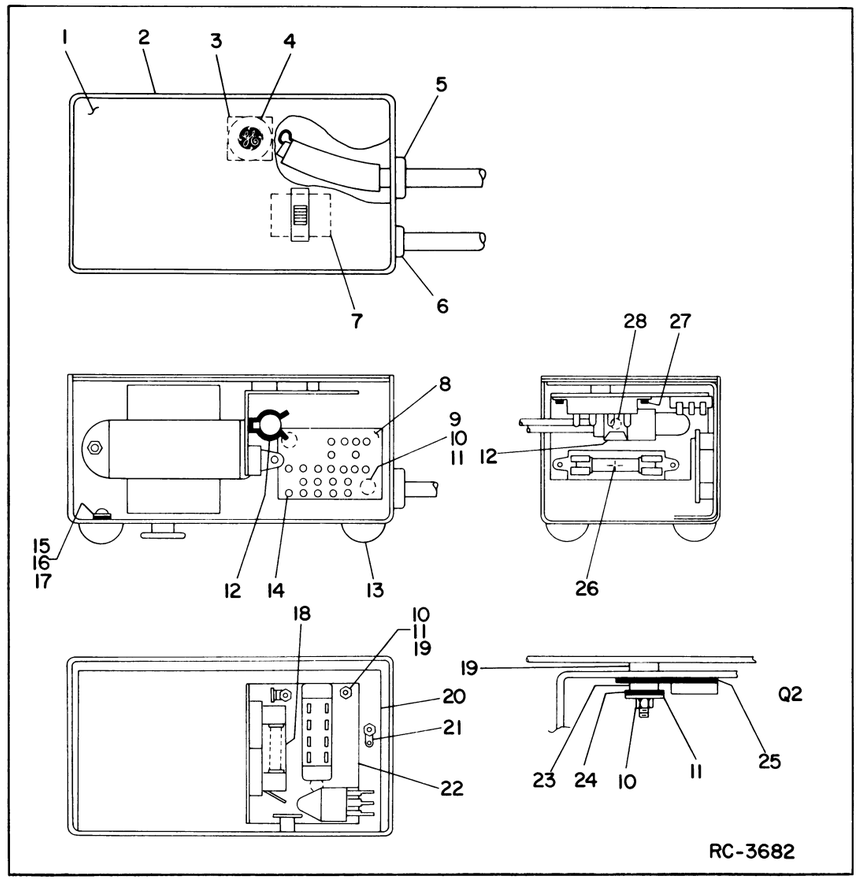
Issue 3

PARTS LIST

121 VAC DESK CHARGER
4EP60A15 - REV C
COMBINATION 371L1A2X
ISSUE 3

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR1 thru CR4	4037822P1	Silicon, 1000 mA, 400 PIV.
CR5	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
		- - - - - - - - - - INDICATORS - - - - - - - - - -
DS1*	19C307037P13	Lamp, incandescent: 2 v; sim to GE Lamp Dept. 49. Deleted by REV B.
		- - - - - - - - - - FUSES - - - - - - - - - -
F1	1R16P3	Quick blowing: 1 amp 250 v; sim to Littelfuse 312001 or Bussmann AGC-1.
		- - - - - - - - - - TERMINALS - - - - - - - - - -
G1	4035200P1	Terminal, solder; sim to Zierick No. 523.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q2	19A116118P2	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P511J	Composition: 510 ohms ±5%, 1/2 w.
R2	3R77P910J	Composition: 910 ohms ±5%, 1/2 w.
R3*	3R77P560J	Composition: 56 ohms ±5%, 1/2 w. Deleted by REV B.
R6 and R7	19A700111P23	Composition: 22 ohms ±5%, 2 w.
R8*	3R77P131J	Composition: 130 ohms ±5%, 1/2 w. Added by REV B.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	19B209261P5	Slide: DPTT, 2 poles, 3 positions, .5 amp VDC or 3 amp VAC at 125 v; sim to Switchcraft 11D1033B.
		- - - - - - - - - - TRANSFORMERS - - - - - - - - - -
T1	19B209188P1	Transformer, power, step-down, 117 v, 50/60 Hz.
		- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1	19B216379P1	Terminal board: 24 contacts.
TB2	19B800558P6	Miniature, phen: 1 terminal.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - - -
VR2	19A700025P7	Zener: 400 mW; sim to BZX55-C5V6.
		- - - - - - - - - - CABLES - - - - - - - - - -
W1	19A134567P1	Power: 2 poles, 3 wire grounding; approx 6 feet long.
W4	19A134262P2	Power: 2 conductors, wire size No. 20 AWG; sim to D & B Power 2011-0067.
W5*		HARNESS 19B233441G1 (Added by REV B)
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	19A134354P1	Diode, optoelectronic: red; sim to Hew. Packard 5082-4655.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - RESISTORS - - - - - - - - - -
R1	19A700106P46	Composition: 200 ohms ±5%, 1/4 w.
		- - - - - - - - - - - SOCKETS - - - - - - - - - - -
XDS1*	4032220P1	Lampholder, miniature: sim to Drake N517. Deleted by REV B.
XF1	7141008P1	Fuse holder; sim to Bussman No. 2663.
		MECHANICAL PARTS (SEE RC3682)
1	NP280757	Nameplate. (MONITOR-TRICKLE-CHARGE).
2	19B216377G2	Housing.
3	19A702380P1	Lens. (Not Used).
4	4036436P1	Nut, push-on; sim to Fastex 8063-43-02-0541.
5	19A116768P16	Bushing, strain relief, cable: approx wire size: 0.330; sim to Heyco SR-6N3-4.
6	19A116768P14	Bushing, strain relief, cable: approx wire size: 0.125 x 0.187; sim to Heyco SR-2M-4.
7	19A700136P9	Electrical, insulated sleeving: black.
8	19B216379P1	Terminal board, 24 contacts. (TB1)
9	7142162P18	Spacer: approx 3/16 x 1/4.
10	7141225P2	Hex nut: No. 4-40.
11	N404P11C6	Lockwasher, internal tooth. No. 4.
12	4032248P1	Clip, spring tension: steel; sim to Tinnerman C40495-014-551. (Not Used).
13	4037559P5	Bumper, rubber.
14	19A115438P1	Eyelet, metallic.
15	N84P15004C6	Machine screw, Phillips head. No. 8-32 x 1/4.
16	N403P16C6	Lockwasher, external tooth. No. 8.
17	N402P38C6	Flatwasher, No. 8.
18	19A130456G1	Cover. (F1).
19	7142162P96	Spacer, approx 1/16 x 3/16.
20	19B216380G1	Chassis.
21	4035200P1	Solderless terminal. (G1).
22	19B216383P1	Support.
23	19A115222P3	Insulator, bushing.
24	N402P5C6	Flatwasher, narrow. No. 4.
25	19A116023P2	Insulator, plate.
26	19B800608P156	Rivet, tubular.
27	19B800608P153	Rivet. tubular. (Secures S1).
28	19B200525P102	Rivet, tubular. (Not Used).



*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

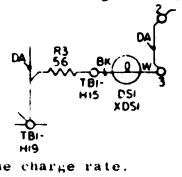
PRODUCTION CHANGES

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.

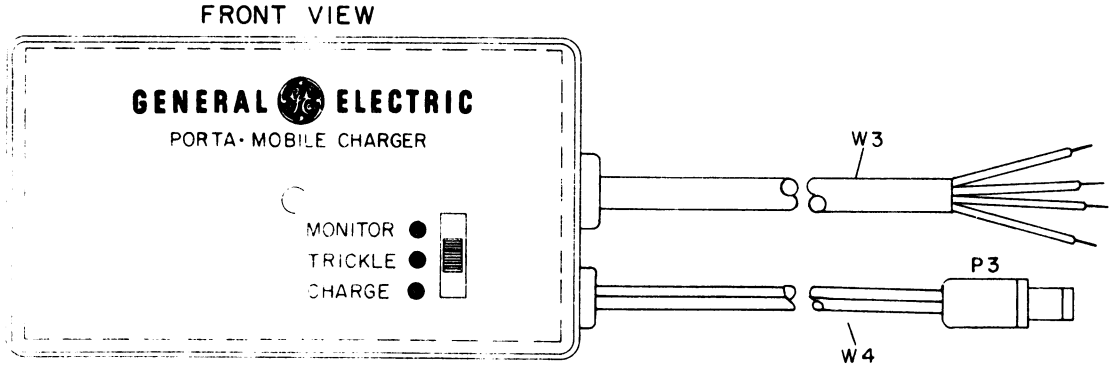
REV. A - 19C?11893G6 (4P60A15)
To make revision letter of units shipped agree with revision letter recorded in revision letter index and wiring diagram.

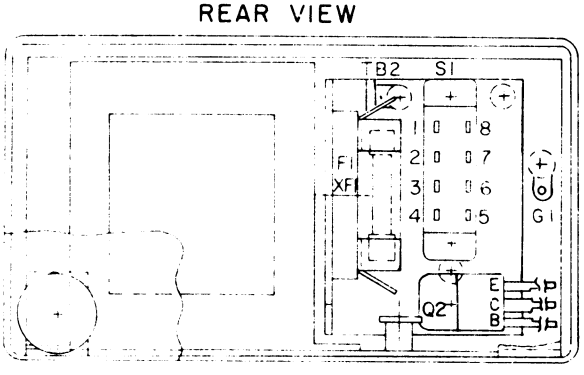
REV. B - To change lamp from incandescent design to opto-electronic.
Deleted DS1, R3 and XDS1.
Added R8 and W1.

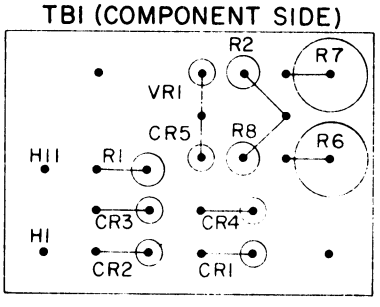
Schematic Diagram was:

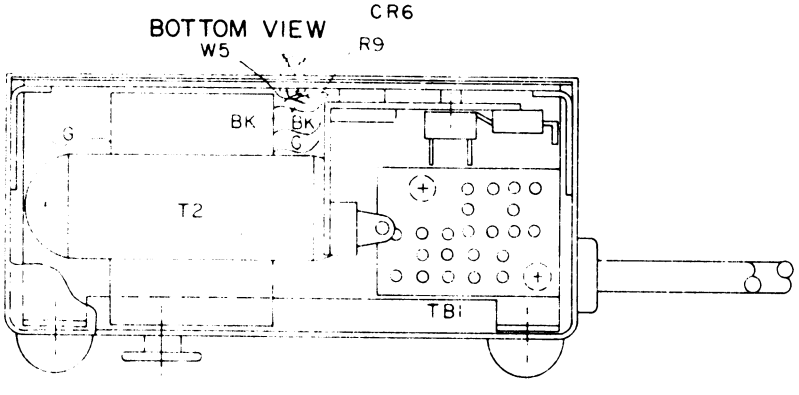


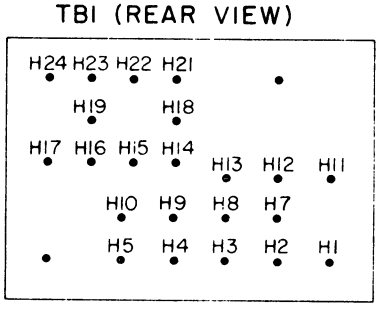
REV. C - To increase the charge rate.
Deleted VR1.
Added VR2.
VR1 was 4036877P5, Zener 500 m.w. 5.4 V. nominal.







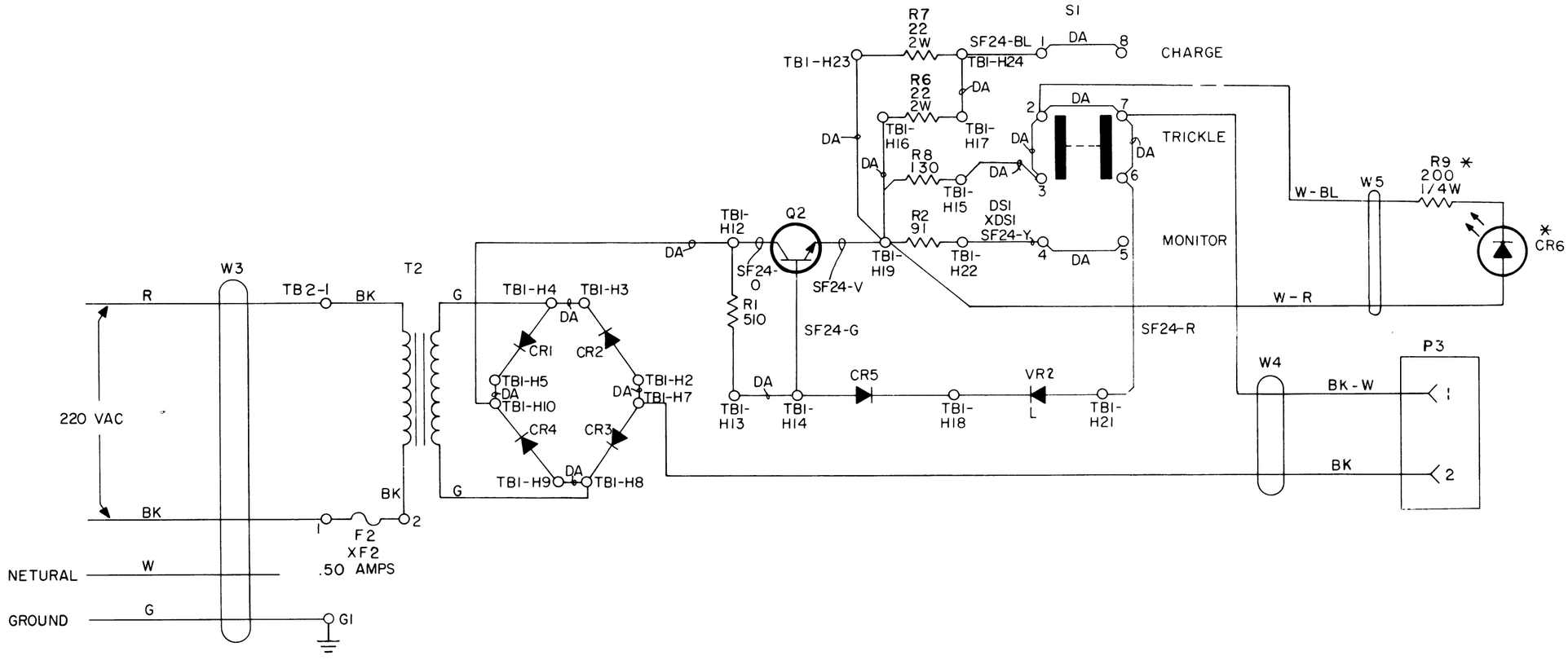




(19C327688, Rev. 3)

OUTLINE DIAGRAM

Porta•Mobile II DESK CHARGER
COMBINATION 371M1A1X



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.

* PART OF W5

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.

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
4EP60A14	C

(19C327505, Rev. 5)

SCHEMATIC DIAGRAM

Porta•Mobile II DESK CHARGER COMBINATION 371M1A1X

PARTS LIST

LBI30385C

220/240 VAC DESK CHARGER
4EP60A14 - REV C
COMBINATION 371M1A1X

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1 thru CR4	4037822P1	Silicon, 1000 mA, 400 PIV.
CR5	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
		- - - - - - - - INDICATING DEVICES - - - - - - -
DS1*	19C307037P13	Lamp, incandescent: 2 v; sim to GE 49. Deleted by REV B.
		- - - - - - - - - - FUSES - - - - - - - - - -
F2	1R16P1	Quick blowing: 1/2 amp at 250 v; sim to Littelfuse 312.250 or Bussmann AGC-1/2.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P3		(Part of W4).
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q2	19A116118P2	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P511J	Composition: 510 ohms ±5%, 1/2 w.
R2	3R77P910J	Composition: 91 ohms ±5%, 1/2 w.
R3*	3R77P560J	Composition: 56 ohms ±5%, 1/2 w. Deleted by REV B.
R6 and R7	19A700111P23	Composition: 22 ohms ±5%, 2 w.
R8*	3R77P131J	Composition: 130 ohms ±5%, 1/2 w. Added by REV B.
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S1	19B209261P5	Slide: DPTT, 2 poles, 3 positions, .5 amp VDC, 3 amp VAC at 125 v; sim to Switchcraft 11D1033D.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T2	19B209188P2	Power, step-down: Pri: 220 v, 50/60 Hz, Sec: 25.2 v, 1 amp.
		- - - - - - - - TERMINAL BOARDS - - - - - - - - -
TB1	19B216379P1	Terminal board. 24 contacts.
TB2*	19B800558P6	Miniature, phen: 1 terminal. Added by REV A.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - -
VR1	19A700025P7	Zener: 400 mw, sim to BZX55-C5V6.
		- - - - - - - - - - CABLES - - - - - - - - - -
W3	19B216544G1	Cable: 4 conductor; approx 6 feet long.
W4	19A134262P2	Cable: 2 conductor; approx 6 feet long. (Includes P3).
W5*		HARNESS ASSEMBLY 19B233441G1 (Added by REV B)
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	19A134354P1	Diode, optoelectronic: red; sim to Hew. Packard 5082-4655.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	19A700106P46	Composition: 200 ohms ±5%, 1/4 w.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XDS1*	4032220P1	Lampholder, miniature: sim to Drake N517. Deleted by REV B.
XF2	7141008P1	Fuseholder: 5 amps at 125 v; sim to Littelfuse E-357001.
		MECHANICAL PARTS (SEE RC3682)
1	NP280757	Nameplate. (MONITOR-TRICKLE-CHARGE).
2	19B216377G2	Housing.
3	19A702380P1	Lens. (Not Used).
4	4036436P1	Nut, push-on; sim to Fastex 8063-43-02-0541.
5	19A116768P16	Bushing, strain relief, cable: approx wire size: 0.330; sim to Heyco SR-6N3-4.
6	19A116768P14	Bushing, strain relief, cable: approx wire size: 0.125 x 0.187; sim to Heyco SR-2M-4.
7	19A700136P9	Electrical, insulated sleeving: black.
8	19B216379P1	Terminal board; 24 contacts. (TB1)
9	7142162P18	Spacer: approx 3/16 x 1/4.
10	7141225P2	Hex nut: No. 4-40.
11	N404P11C6	Lockwasher, internal tooth. No. 4.
12	4032248P1	Clip, spring tension: steel; sim to Tinnerman C40495-014-551. (Not Used).
13	4037559P5	Bumper, rubber.
14	19A115438P1	Eyelet, metallic.
15	N84P15004C6	Machine screw, Phillips head. No. 8-32 x 1/4.
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17	N402P38C6	Flatwasher, No. 8.
18	19A130456G1	Cover. (F1).
19	7142162P96	Spacer, approx 1/16 x 3/16.
20	19B216380G1	Chassis.
21	4035200P1	Solderless terminal. (G1).
22	19B216383P1	Support.
23	19A115222P3	Insulator, bushing.
24	N402P5C6	Flatwasher, narrow. No. 4.
25	19A116023P2	Insulator, plate.
26	19B800608P156	Rivet, tubular.
27	19B800608P153	Rivet. tubular. (Secures S1).
28	19B200525P102	Rivet, tubular. (Not Used).

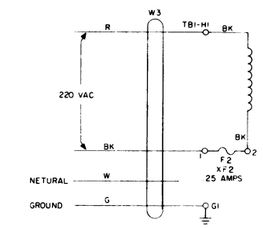
*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

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 - 19C311893G5 (4EP60A14)
To eliminate potential short circuit.
Changed wiring.

Schematic Diagram was:



REV. B - To change lamp design from incandescent to opto-electronic.
Deleted DS1, XDS1 and R3.
Added R8 and W1.

REV. C - To increase the charge rate.
Deleted VR1
Added VR2
VR1 was 403688P5 Zener: 500mw, 5.4v. nominal.