MOBILE RADIO

MAINTENANCE MANUAL

FOR

BATTERY STANDBY/CHARGER

OPTION 9502 & 9563

(FOR MASTR®II STATIONS)

CONTENTS

DESCRIPTION

The Battery Standby/Charger (Option 9502) consists of a voltage regulator and relay switching circuit mounted on a printed board to provide a charging current for the storage battery when the station power supply is operating normally. The relay switching circuit switches to battery power and switches the power supply bleeder resistor from the circuit in the event of a power failure.

Option 9563 is the same as Option 9502 with the addition of an RF Relay and connecting cables. The operation is the same as Option 9502 in addition the RF Relay automatically switches the driver RF output directly to the antenna Relay, thereby by-passing the High Power RF Power Amplifier. The charger board mounts on the inside of the rear panel of the driver power supply and all necessary leads for connection to the power suppy and battery are hanging from the board. The RF Relay mounts on the power panel of the High Power Station.

ADJUSTMENT AND TEST

Adjustment

R4 is set at the factory and normally doesn't need adjustment but if the voltage at the black and red battery leads (with the battery disconnected) exceeds 14.5 Volts DC, adjust R4 for 14 Volts with the battery disconnected.

Test

To test the operation of the Relay switching circuit, turn off the station power supply. The relay K1 should drop out and the station should now be operating on the battery supply.

CIRCUIT ANALYSIS

When the station power supply is operating normally, approximately +15 Volts appears at P1-2. This voltage provides the input voltage through CR1 for the voltage and current regulator consisting of Q1 (the pass transistor) and Q2 (the driver transistor). R2 is the current sensing resistor to limit the battery charge current to a maximum of 4.5 amps. A voltage divider network made up of R3, R4 and R5, provides a variable voltage adjusted with R4 to set the bias on the base of Q2 which in turn controls the conduction of Q1 (the pass transistor). C1 provides filtering of the input voltage. The output of the regulator is fused through F1 to provide overload protection. The +15 Volts at P1-2 also provides the voltage through CR4 to energize the K1 relay. When the station power supply is off for any reason the regulator is off because no input voltage is fed to it. With no voltage applied K1 de-energizes and the battery is switched in as the power source and the power supply bleeder resistor is switched out of the circuit. Refer to Figure 1 and Figure 2 for curves of RF Power output of the transmitter against time for intermittent and continuous duty stations.

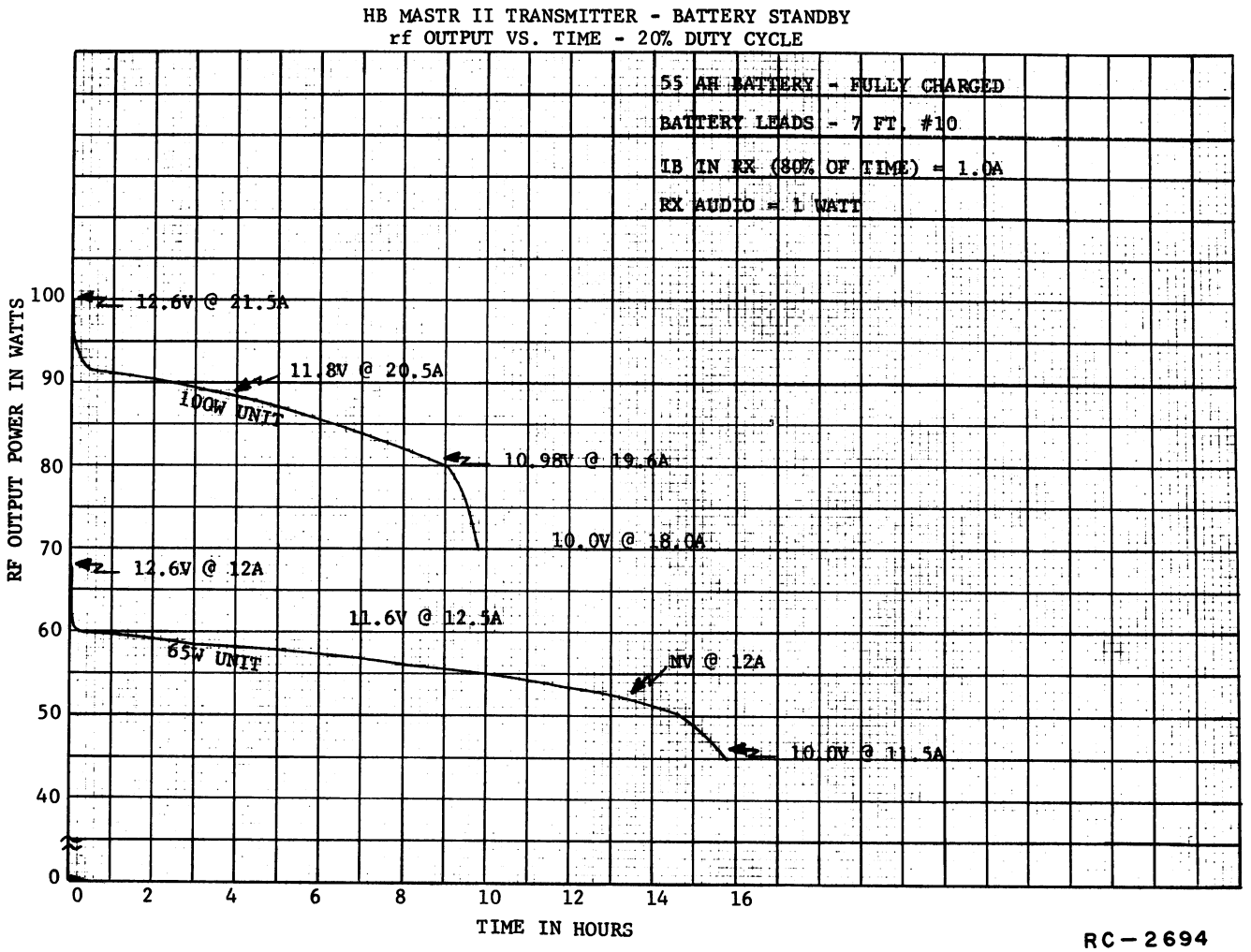


Figure 1 - RF Power Output Versus Time Intermittent Duty

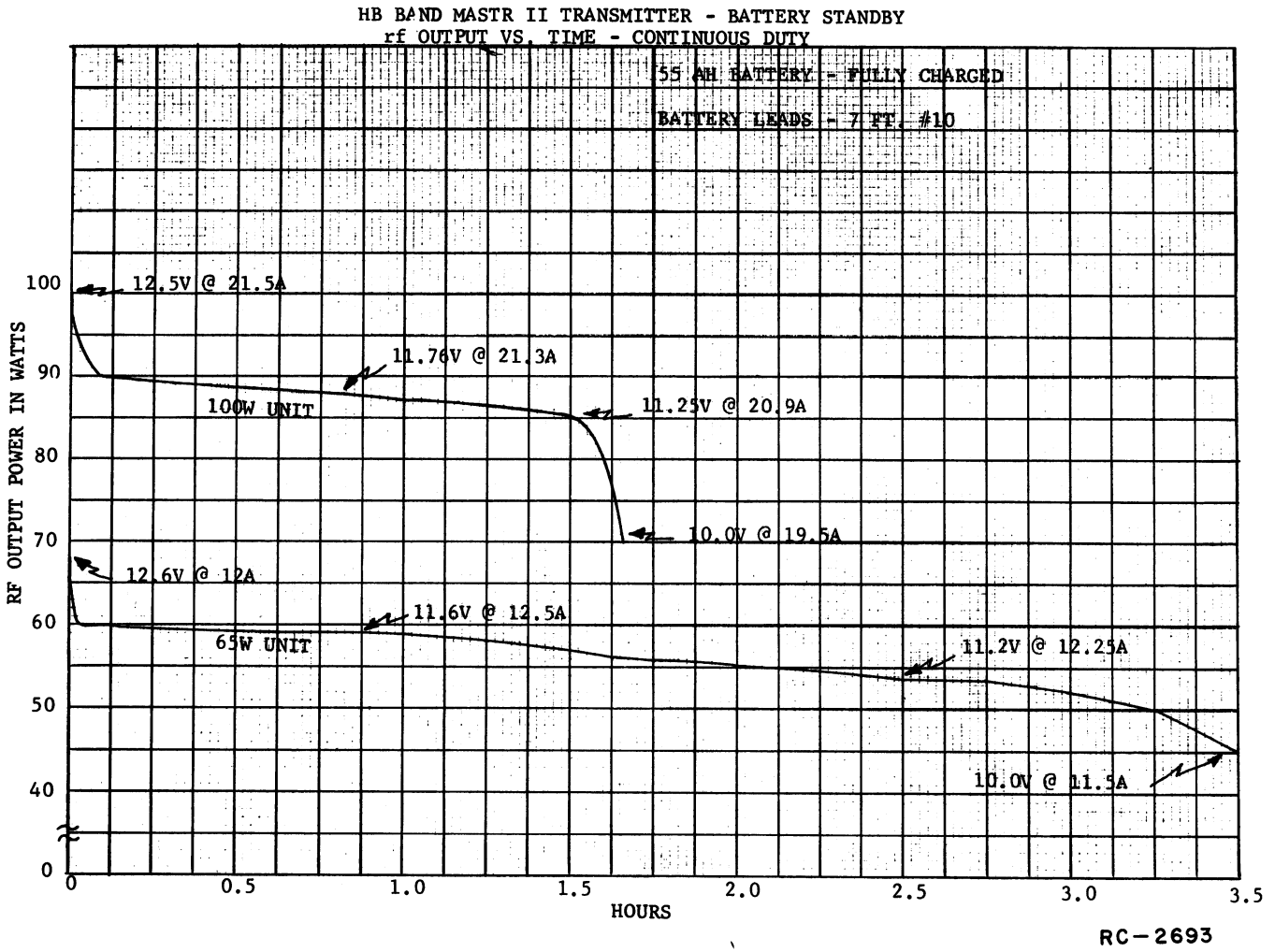
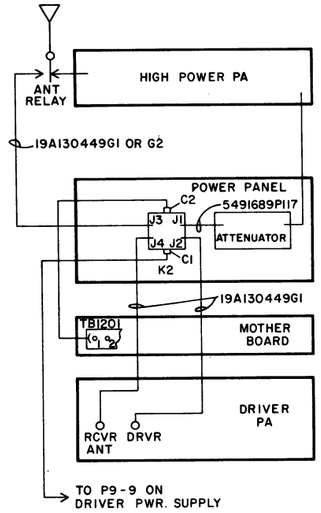


Figure 2 - RF Power Output Versus Time Continuous Duty

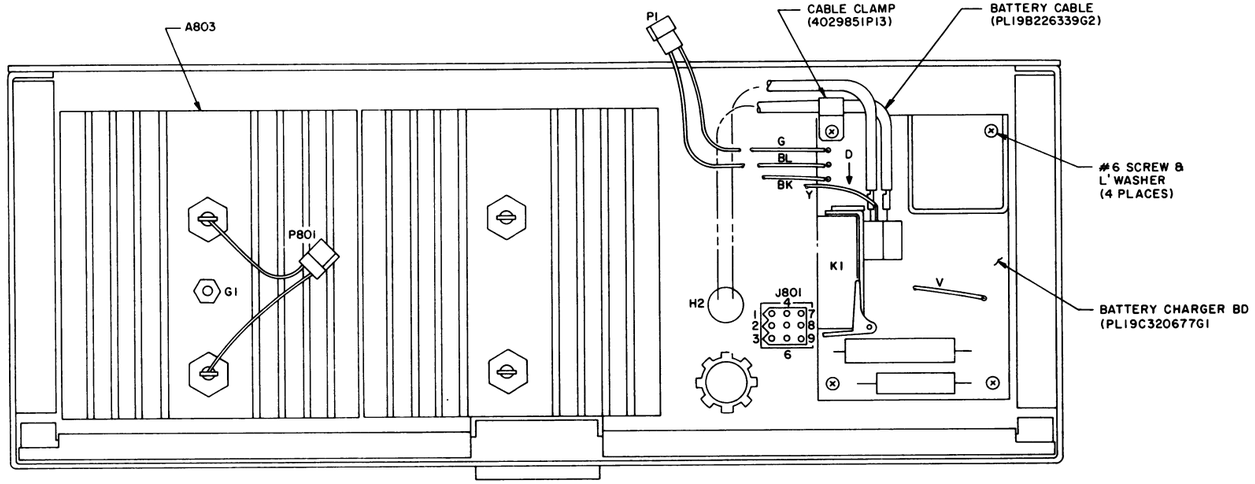


THESE INSTRUCTIONS COVER THE INSTALLATION OF THE BATTERY STANDBY/CHARGER OPTION (NO. 9563) FOR THE MASTR II HIGH POWER BASE STATION.

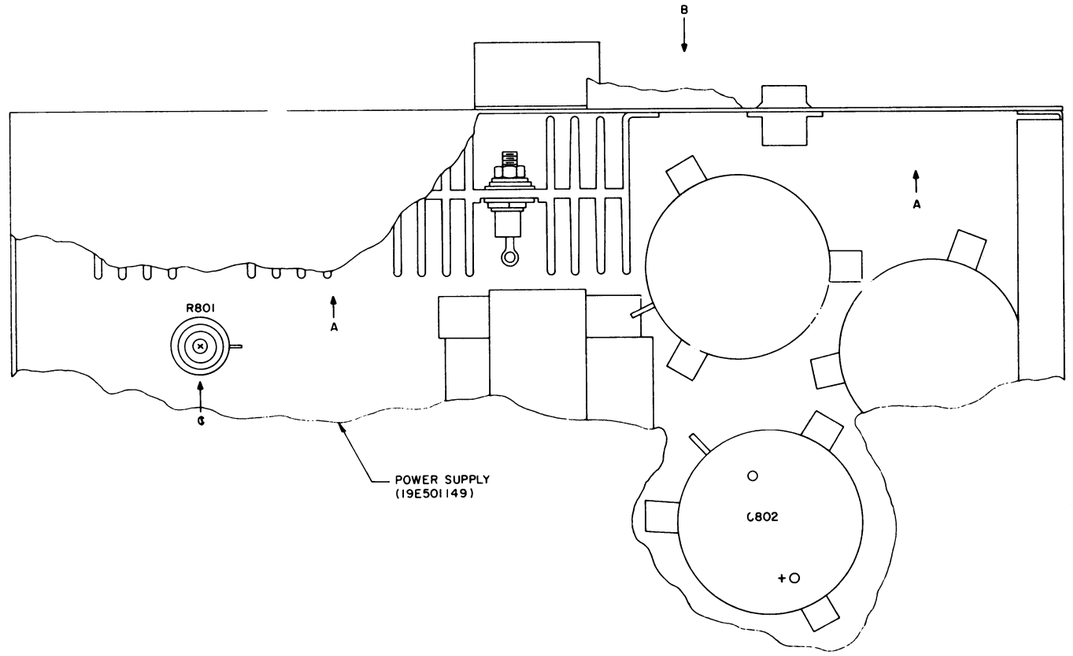
1. INSTALL THE BATTERY STANDBY/CHARGER OPTION (NO. 9502) PER INSTALLATION INSTRUCTION 19D417640.
2. DISCONNECT ALL rf CABLES FROM THE BACK OF THE RADIO EXCEPT THE CABLE FROM THE HIGH POWER PA TO THE ATTENUATOR.
3. MOUNT THE rf RELAY ASM. K2 (19C321398) ON THE POWER PANEL, USING THE HARDWARE PROVIDED.
4. CONNECT THE SF22 BK WIRE FROM C2 TO TB1201-1 ON THE MOTHER BOARD.
5. INSERT CONTACT ON END OF SF-22 R WIRE FROM C1 INTO P9-9 ON THE DRIVER POWER SUPPLY CHASSIS.
6. INSERT CONTACT ON 30 INCH LENGTH OF SF22 R WIRE INTO J801-9 ON THE DRIVER POWER SUPPLY CHASSIS AND CONNECT OTHER END TO R801-1.
7. CONNECT THE 8" rf CABLE (5491689P117) BETWEEN J1 ON THE rf RELAY AND THE ATTENUATOR PAD (IN-LINE CONNECTOR ON UHF UNITS).
8. CONNECT THE 19A130449G1 CABLES AS FOLLOWS:
   A. J2 ON rf RELAY TO DRIVER rf OUTPUT.
   B. J4 ON rf RELAY TO RECEIVER ANTENNA CONNECTOR.
   C. J3 ON rf RELAY TO ANTENNA SWITCHING RELAY ON THE HIGH POWER PA. (ON UHF BAND, THIS CABLE IS 19A130449G2).

WHEN TWO ANTENNAS ARE USED OMIT B ABOVE AND CONNECT RCVR ANTENNA DIRECTLY TO RCVR ANTENNA CONNECTOR.

(19B226736, Rev. 3)



VIEW A-A

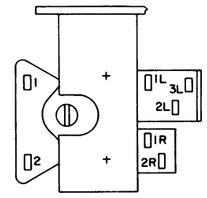


(19D417640, Rev. 2)

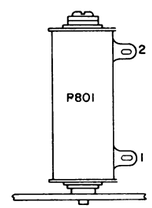
THESE INSTRUCTIONS COVER THE INSTALLATION OF THE BATTERY CHARGER (19C320677) IN THE POWER SUPPLY (19E501149)

(1) INSTRUCTIONS FOR INSTALLING BATTERY CHARGER

1. TURN OFF POWER TO STATION POWER SUPPLY.
2. ASM BATTERY CHARGER BOARD AND CABLE CLAMP AS SHOWN, USING HARDWARE FURNISHED.
3. DISCONNECT BLACK WIRE ON POWER SUPPLY BETWEEN R801-1 AND C802(-) AND DISCARD. TIGHTEN SCREW TERMINAL AT C802(-).
4. SOLDER THE #20 YELLOW WIRE EXTENDING FROM THE BATTERY CHARGER TO R801-1.
5. PULG P1 INTO P801.
6. CONNECT THE #20 BLACK WIRE EXTENDING FROM THE BATTERY CHARGER TO A803-G1 AND #20 VIOLET WIRE TO J801-7.
7. ROUTE ORANGE CABLE THRU H2 AND CONNECT TO XF801-1.
8. CONNECT RED CABLE (PL19B226339G2) TO (+) TERMINAL ON CUSTOMER BATTERY AND BLACK CABLE TO (-) TERMINAL. CONNECT OTHER END OF BLACK CABLE TO XF801-3. ROUTE RED CABLE THRU H2 & CABLE CLAMP AND CONNECT TO K1-2L ON BATTERY CHARGER.



VIEW D (ENLARGED) K1-XK1



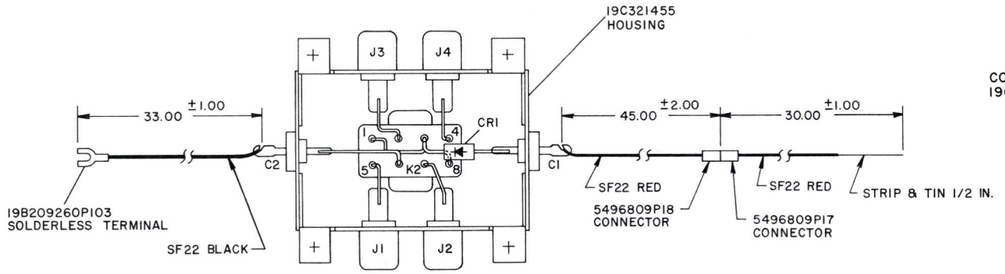
VIEW C

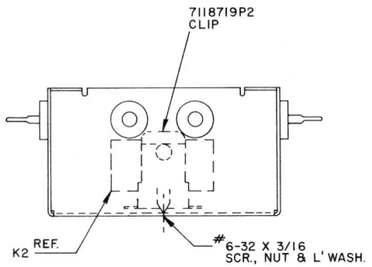
VIEW B

INSTALLATION INSTRUCTIONS

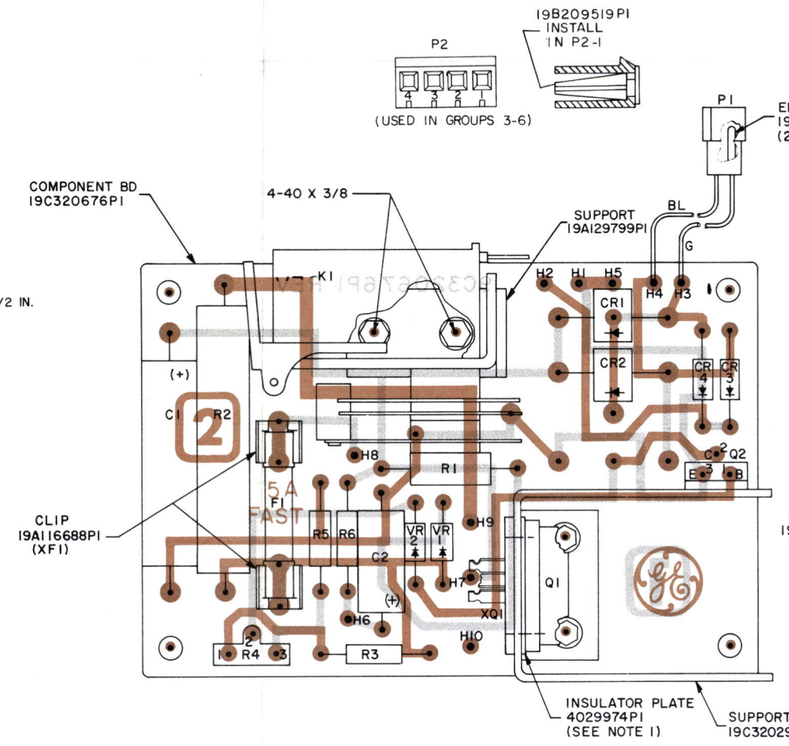
BATTERY STANDBY/CHARGER

Issue 3

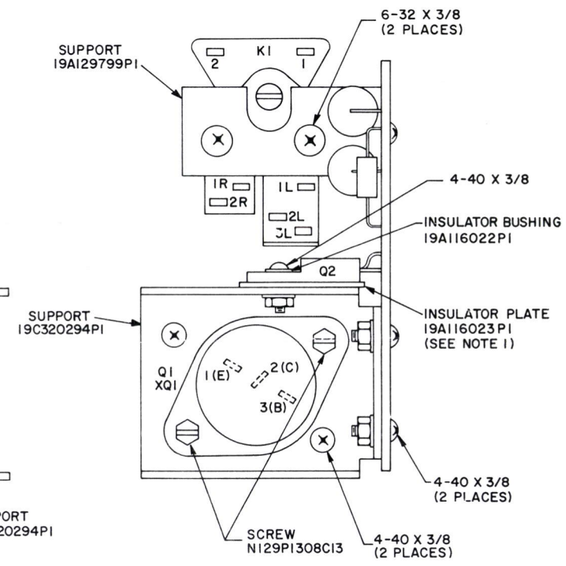




(19C321634, Rev. 0)



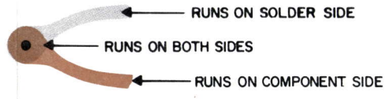
(19C321445, Rev. 2)
(19C320676, Sh. 2, Rev. 2)
(19C320676, Sh. 3, Rev. 1)

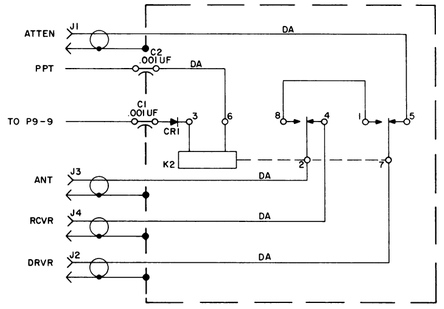


NOTE:
1. APPLY SILICON GREASE TO BOTH SIDES OF INSULATOR FOR Q1 AND Q2.

OUTLINE DIAGRAM

BATTERY STANDBY/CHARGER





(19B226680, Rev. 1)

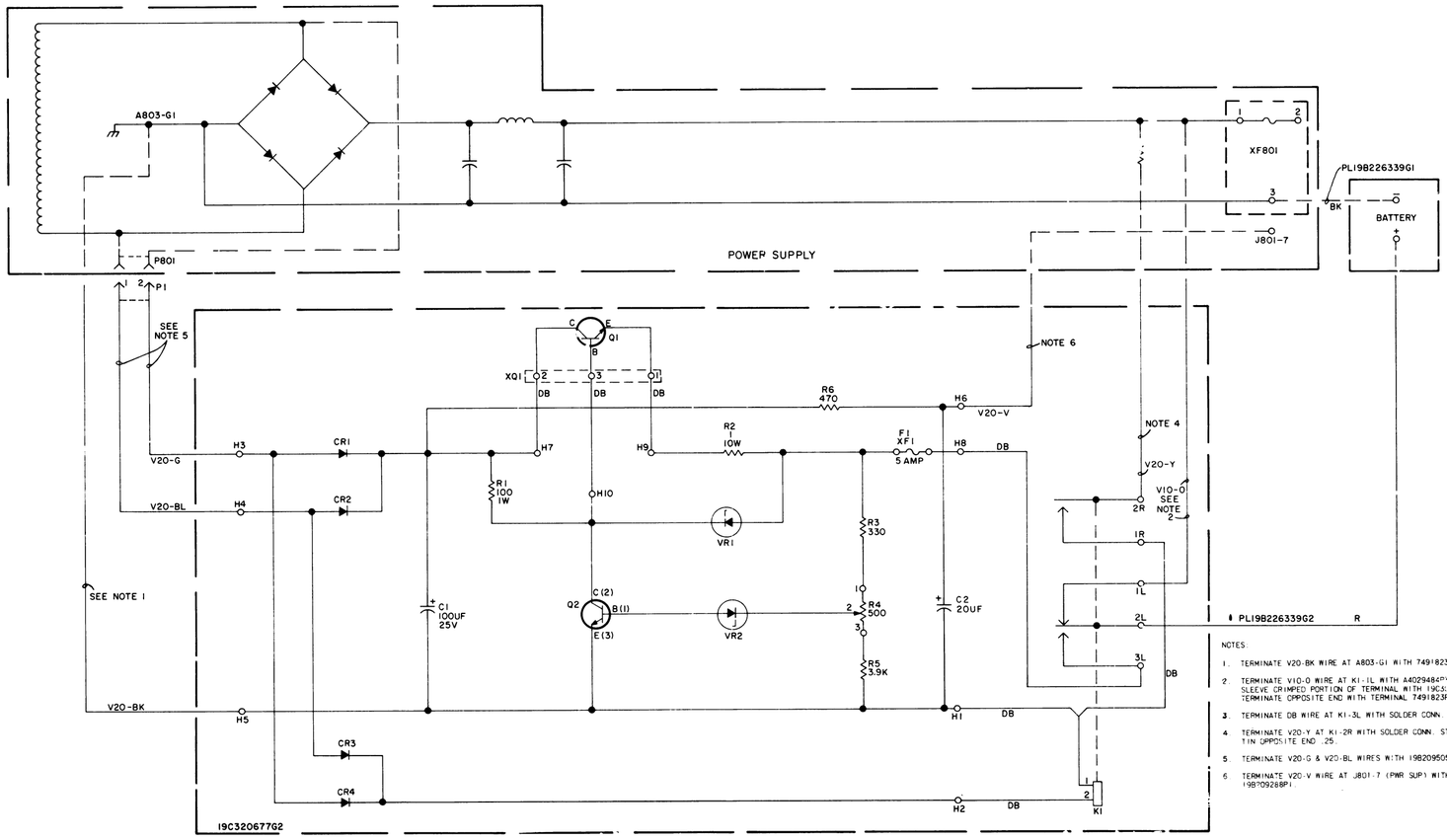
SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO

MODEL NO	REV LETTER
PL19C321398G1	

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.

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.



NOTES:

1. TERMINATE V20-BK WIRE AT A803-G1 WITH 7491823P2.
2. TERMINATE V10-O WIRE AT K1-1L WITH A4029484P1 AND SLEEVE CRIMPED PORTION OF TERMINAL WITH 19C531208P7. TERMINATE OPPOSITE END WITH TERMINAL 7491823P9.
3. TERMINATE DB WIRE AT K1-3L WITH SOLDER CONN.
4. TERMINATE V20-Y AT K1-2R WITH SOLDER CONN. STRIP & TIN OPPOSITE END .25.
5. TERMINATE V20-G & V20-BL WIRES WITH 19B209505P20.
6. TERMINATE V20-V WIRE AT J801-7 (PWR SUP) WITH TERM 19B709288P1.

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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

MODEL NO	REV LETTER
PL19C320677G2	A

(19D417267, Rev. 5)

SCHEMATIC DIAGRAM

BATTERY STANDBY/CHARGER

PARTS LIST

LBI4819B

BATTERY STANDBY CHARGER
19C320677G1

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - PLUGS - - - - - - - -
P1		Includes:
	19B209505P102	Shell.
	19B209505P20	Contact, electrical: male; wire range No. 18-24.
		COMPONENT BOARD 19C320677G2
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	19A115680P5	Electrolytic: 100 µf +150% -10%, 25 VDCW; sim to Mallory Type TT.
C2*	19A115680P3	Electrolytic: 20 µf +150% -10%, 25 VDCW; sim to Mallory Type TTX. Added by REV A.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1 and CR2	19A116783P1	Silicon.
CR3 and CR4	4037822P1	Silicon, 1000 mA, 400 PIV.
		- - - - - - - - - - FUSES - - - - - - - - -
F1	1R16P8	Quick blowing: 5 amps at 250 v; sim to Littelfuse 312005 or Bussmann MTH-5.
		- - - - - - - - - - RELAYS - - - - - - - - - -
K1	19B209492P1	Relay, open: 12.6 VDC nominal, 80 ohms ±10% coil res, 1 form A, 1 form C contact; sim to Magnecraft 22AX134A.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A116753P1	Silicon, NPN; sim to Type 2N5302.
Q2	19A116118P1	Silicon, NPN.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1	3R78P101J	Composition: 100 ohms ±5%, 1 w.
R2	5493035P28	Wirewound: 1 ohms ±10%, 10 w; sim to Hamilton Hall Type HR.
R3	3R77P331K	Composition: 330 ohms ±10%, 1/2 w.
R4	19B209358P102	Variable, carbon film: approx 25 to 500 ohms ±10%, 0.2 w; sim to CTS Type X-201.
R5	3R77P392K	Composition: 3.9K ohms ±10%, 1/2 w.
R6	3R77P471J	Composition: 470 ohms ±5%, 1/2 w.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - -
VR1	4036887P3	Zener: 500 mW, 3.8 v. nominal.
VR2	4036887P8	Zener: 500 mW, 11.0 v. nominal.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XF1	19A116688P1	Clip, electrical. (Quantity 2).
XQ1	5491888P1	Transistor, power, phen: sim to Cinch 133-92-10-034.
		- - - - - - - - - MISCELLANEOUS - - - - - - - -
	19A116022P1	Insulator, bushing. (Used with Q2).
	19A116023P1	Insulator, plate. (Used with Q2).
	4029974P1	Insulator, plate. (Used with Q1).

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

PARTS LIST

LBI4906A

COAXIAL RELAY AND CABLE 19C321398G1
AND
RF CABLE 19A130449G1, G2

SYMBOL	GE PART NO.	DESCRIPTION
		RELAY ASSEMBLY 19C321398G1
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	4037822P2	Silicon, 1000 mA, 600 PIV.
		- - - - - - - - - - RELAYS - - - - - - - - - -
K2	19B209558P1	Hermetic sealed: 180 to 330 ohms coil res, 2 form C contacts, 8.0 to 16.3 VDC; sim to GE 35AY1760A2.
		- - - - - - - - - - MISCELLANEOUS - - - - - - -
	7118719P2	Clip, spring tension. (Used with K2).
	19B209260P103	Spade terminal.
	5496809P17	Connector, electrical: female, wire size No. 18-28 AWG; sim to Molex Products 1381-T.
	5496809P18	Connector, electrical: male, wire size No. 18-28 AWG; sim to Molex Products 1380-T.
		RF CABLE ASSEMBLY 19A130449G1
	19A116979P1	Plug, coaxial: sim to Amphenol 83-822.
	7105381P2	Adapter: sim to UG-176/U.
	5491689P116	RF cable: approx 43 inches long.
		RF CABLE ASSEMBLY 19A130449G2
	19B209018P5	Receptacle: sim to Automatic Metal Products Corp. 100-N1000A or UG-536B/U.
	5491689P116	RF cable: approx 43 inches long.

*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 - Battery Standby Charger Component Board 19C320677G2
To remove hum from the phone line when battery charger is operating. Added C2.