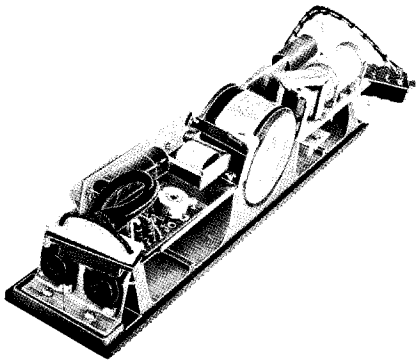
MOBILE RADIO

MASTR Progress Line

12-VOLT, 70/90/100-WATT POWER SUPPLY MODEL 4EP37A10



SPECIFICATIONS *

Type Number	EP-37-A	
Output	Voltage	Current
Regulated Receiver	10 volts	150 mA
Regulated Transmitter		
25 — 88 MHz	-20 volts	45 mA
132 — 470 MHz	-20 volts	90 mA
Bias	-45 volts	
Low B-Plus		
25 — 88 MHz	300 volts	70 mA
132 — 174 MHz	300 volts	110 mA
406 — 470 MHz	300 volts	95 mA
High B-Plus		
25 — 88 MHz	660 volts	280 mA
132 — 174 MHz	680 volts	220 mA
406 — 470 MHz	660 volts	270 mA
Battery Drain		
Transmit		
25 — 88 MHz	13.4 volts	25 amps
132 — 174 MHz	13.4 volts	26 amps
406 — 470 MHz	13.4 volts	26 amps
Receive		
Standby - Squelched	13.8 volts	150 mA
Standby - Unsquelched	13.8 volts	1.1 amps
Squelched - Transmitter Filaments On	13.8 volts	1.75 amps (25 — 88 MHz) 1.9 amps (132 — 174 MHz) 2.2 amps (406 — 470 MHz)
Transistors		
Multivibrator Circuit	4	
10-Volt Regulator Circuit	3	
-20 Volt Regulator Circuit	2	
Rectifiers	10	
Zener Diodes	2	
Battery Voltage	13.4 volts ±20% (positive or negative ground, 12-volt system)	
Duty Cycle	Transmit: 20% (one minute transmit, four minutes off)	
Ambient Temperature Range	-30°C (-22°F) to +60°C (+140°F)	

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

EP-37-A

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

Transistorized Power Supply Model 4EP37A10 is used with 12-volt, 70-Watt, 90-watt and 100-watt MASTR mobile combinations. The power supply provides:

- Plate, screen and bias voltages for the tubed transmitter multiplier and power-amplifier stages.
- Regulated -20 volts for the transistorized transmitter exciter board.
- Regulated +10 volts for the receiver and for the transmitter Channel Guard board.

Low voltage for the transmitter filaments and receiver audio amplifier is taken directly from the vehicle battery.

The fully transistorized power supply uses highly efficient silicon rectifiers for reliable operation. The use of Mylar® capacitors provides additional reliability, with good performance at low temperatures. Regulation of critical transmitter and receiver supply voltages provides improved operation over the wide range of input voltages encountered in mobile communications.

CIRCUIT ANALYSIS

The power supply may be used in vehicles having either positive or negative ground systems. The power cable, fused leads and ground wire must be connected for the proper polarity when the Two-Way Radio is installed.

All connections to the transmitter, receiver and power cables are made through two plug connectors. Two clip-on connectors (P501 and P502) connect the power supply to the push-to-talk relay on the system frame. Figure 2 is a simplified power distribution and switching diagram.

MULTIVIBRATOR CIRCUIT (Figure 1)

Power Supply Model 4EP37A10 uses transistors as switches in two identical inductively coupled multivibrator circuits. These switches connect the battery voltage across alternate halves of the transformer primary-resulting in alternating square waves. The output of each multivibrator circuit (square wave generator) is stepped up by the power transformer; then rectified and filtered to supply B-plus and bias voltages for the transmitter.

The two identical multivibrator circuits operate in parallel pairs (Q501-Q503 and Q502-Q504). Separate bias parallel windings are used to provide equal load sharing between the paired transistors. Since both multivibrators operate in the same manner, a description of the operation of Q501 and Q502 only will be given.

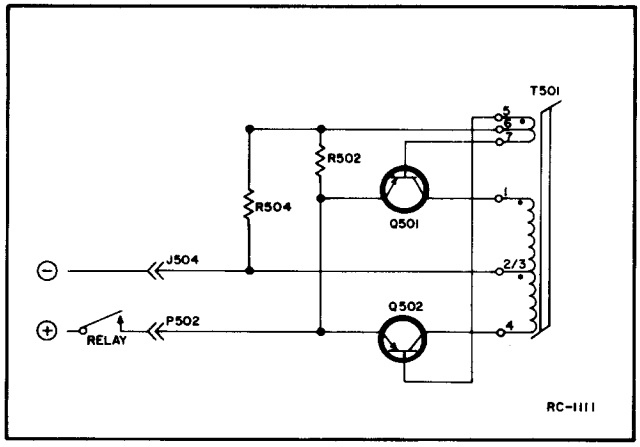


Figure 1 - Simplified Multivibrator Circuit

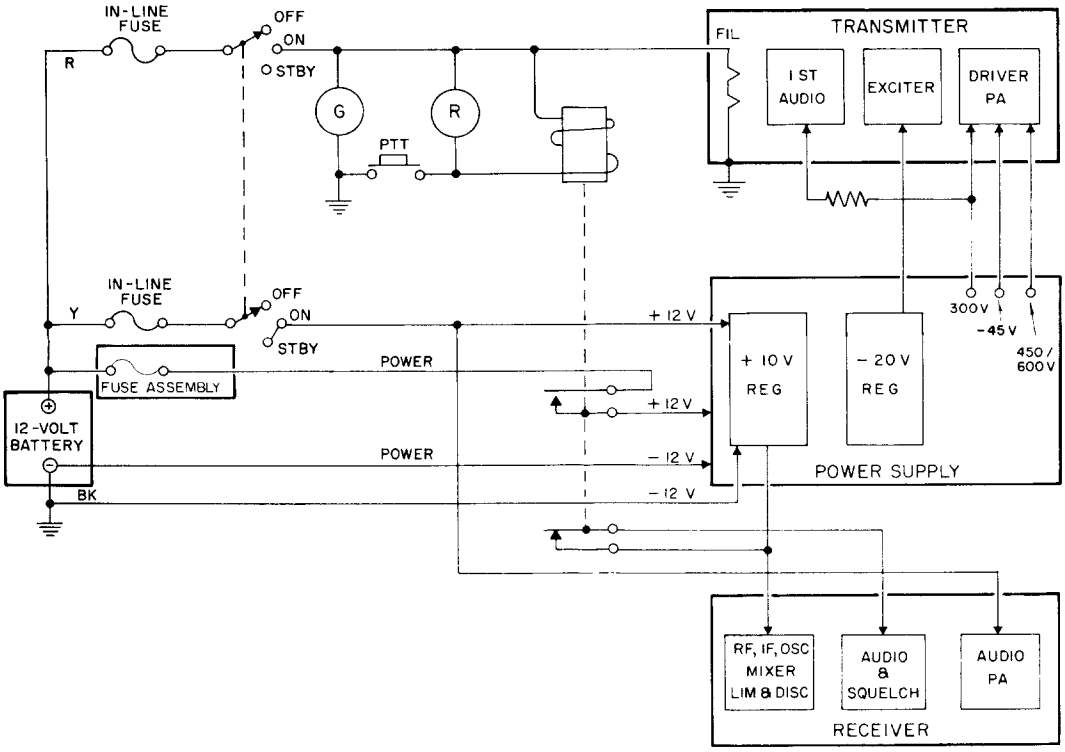
Keying the transmitter closes the relay contacts and applies power to transistors Q501 and Q502. The bases of the transistors are biased negatively (with respect to their emitters) through resistor R504, and all transistors start to conduct. Due to inherently different characteristics, one transistor will conduct slightly more than the others.

Assuming that Q501 will initially conduct more than Q502, Q501 will draw more current through winding 1-2/3 than Q502 will draw through winding 2/3-4, making terminal 1 of T501 more positive than terminal 4.

The increasing magnetic field in the core of T501 induces a voltage in the windings 5-6-7, causing terminal 7 to become negative with respect to the emitter of Q501. This increased bias causes Q501 to conduct even harder. At the same time, terminal 5 becomes positive with respect to the emitter Q502, stopping current flow through Q502 and winding 2/3-4. Current through winding 1-2/3 rapidly saturates the core of the transformer, and the magnetic field ceases to increase.

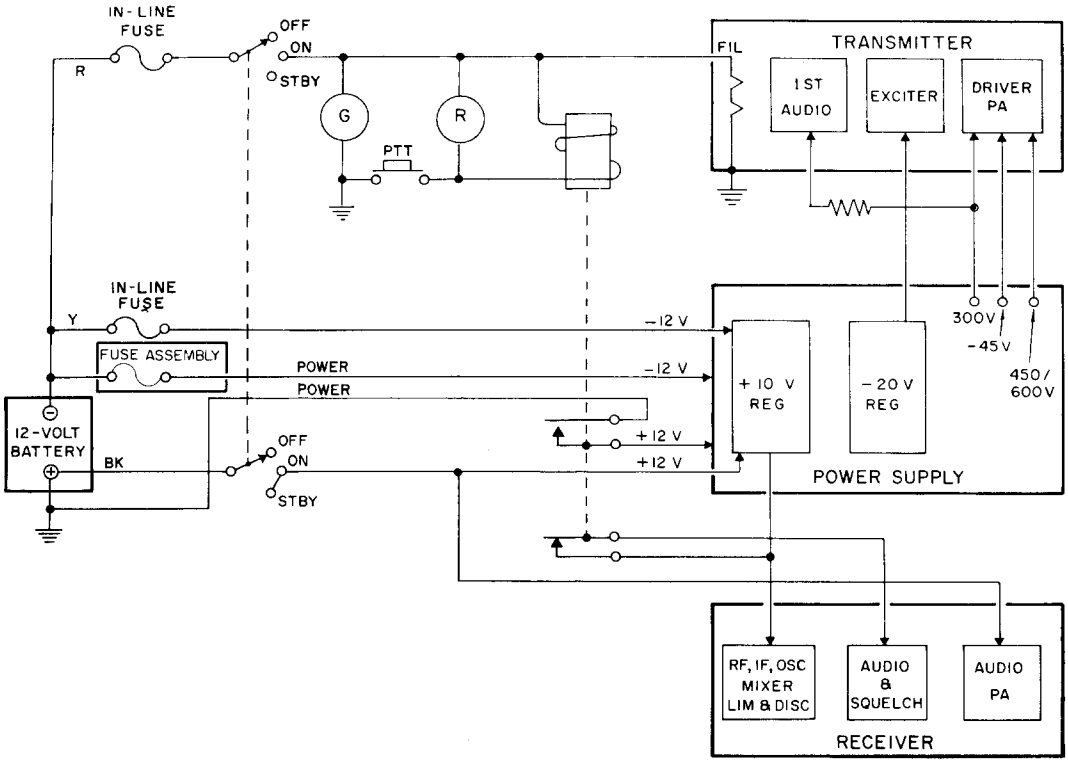
The voltage induced in winding 5-6-7 therefore falls to zero, reducing the bias on Q501 to that obtained through R504. This reduced bias tends to cut off Q501 and

12 VOLT NEGATIVE GROUND



RC-1168A

12 VOLT POSITIVE GROUND



RC-1169A

Figure 2 - 12-Volt Power Distribution Diagram

reduce the current through winding 1-2/3.

The collapsing magnetic field in T501 induces a reverse biasing voltage across winding 5-6-7, biasing Q501 off and biasing Q502 on. Q502 now conducts in a similar manner until T501 is again saturated. Resistor R502 limits the base current which can flow through Q501 and Q502.

The two transistor pairs continue to conduct alternately at a frequency of approximately 1330 hertz. The resulting waveform approaches that of a perfect square wave.

RECTIFIER AND FILTER CIRCUITS

Negative Bias and -20 Volt Regulator (Figure 3) - The AC voltage developed across secondary windings 12-8-14 of transformer T501 is rectified by full-wave rectifiers CR501 and CR502, and is filtered by C501, L502 and C502. The negative 45 volts is the bias voltage for the control grids of the transmitter driver and power amplifier. This circuit also supplies -45 volts to input of the 20-Volt Regulator. The bias voltage is present as a protective measure to limit cathode current in the PA tube while the PA is untuned, or in case of loss of drive to the PA.

Transmitter Multiplier B-Plus (Figure 4) - The AC voltage developed across high voltage secondary windings 18-21 of T501 is rectified by using a bridge rectifier circuit consisting of CR503, CR504, CR505 and CR506. Filtering is provided by filter C505, L501 and C506. Relatively small values of L and C are required because of the high frequency and the square wave characteristics of the AC voltage.

Power Amplifier B-Plus (Figure 4) - The AC voltage developed across the high voltage secondary windings 15-17 of T501 is rectified by the bridge rectifier circuit, CR507, CR508, CR509 and CR510. The output of this bridge rectifier circuit is connected in series with the multiplier B-plus bridge circuit to provide the high B-plus output. Filtering is provided by C507. R510 and R511 are bleeder resistors for discharging C507 when the keying relay is opened. R505 prevents ringing in the oscillator circuit formed by C505, L501 and C506.

-20 VOLT REGULATOR (Figure 5)

The -20 Volt Regulator provides a closely controlled supply voltage for the transistorized exciter section of the transmitter. Input power is taken from the -45 volt bias output at TB1-3. Dropping resistor R507 provides the negative bias to turn on Q506. Zener diode VR501 provides a voltage reference for the regulator.

When the input voltage at TB1-3 rises, the output voltage at the emitter of Q506 also tends to rise. This causes a change in the base-emitter bias on Q507, making it conduct more heavily. When Q507 conducts, there is less base bias on Q506, and less base current. With less current, the voltage drop across Q506 is larger; and the output voltage remains constant.

When the input voltage starts to drop, the output voltage also tends to drop; and Q507 will conduct less. This increases the forward bias on Q506 and reduces the voltage drop across the transistor so that the output voltage remains constant.

Capacitor C511 prevents high frequency oscillation.

R506, R508 and R512 form an adjustable voltage divider so that potentiometer R508 can be adjusted for a -20 volt output. R509 provides bias current for VR501. The output is metered at the transmitter centralized metering jack J102-12.

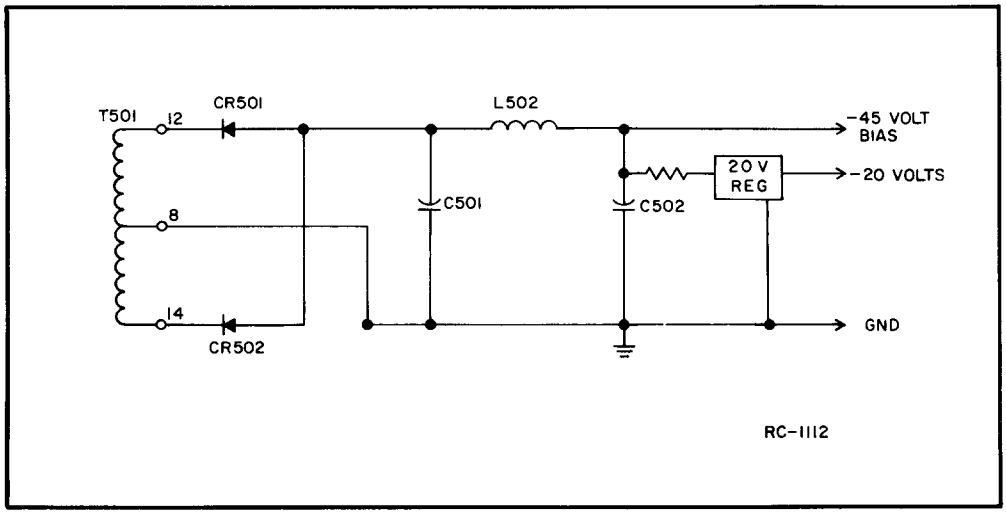


Figure 3 - Simplified Bias and -20 Volt Regulator Supply Circuit

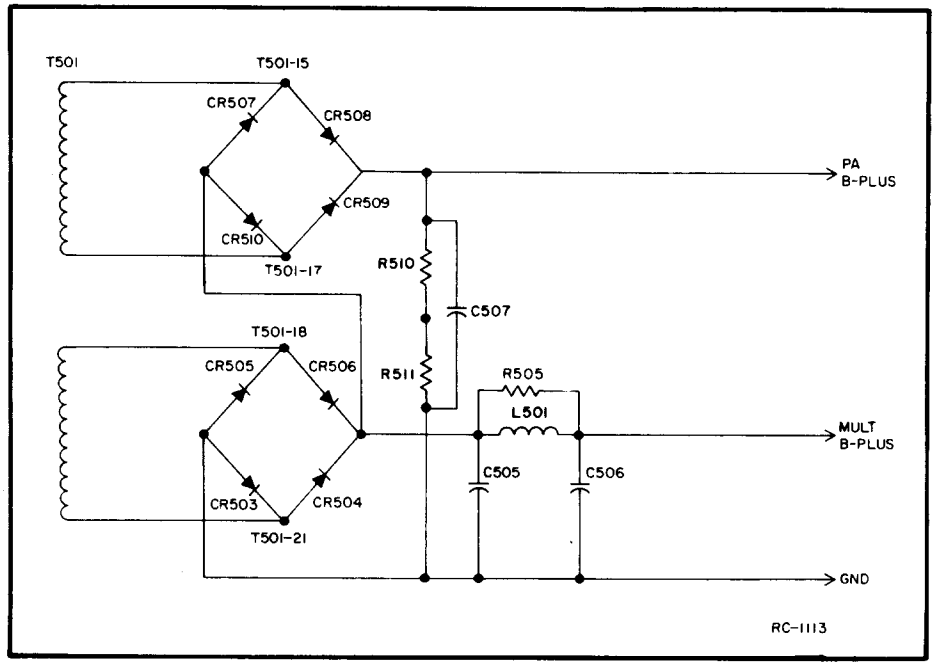


Figure 4 - Simplified Transmitter Multiplier and Power Amplifier B-Plus Circuits

10-VOLT REGULATOR A501

The 10-Volt Regulator Circuit provides a closely controlled supply voltage for the receiver (except for the audio amplifier), and a supply voltage for the transmitter Channel Guard option, when present. Input voltage is supplied from the Control Unit on P505-5.

When the supply voltage (or output) starts to increase, the voltage at the base of Q1 also increases. As the emitter voltage of Q1 is kept constant by VR1, the emitter-base voltage increases. This causes Q1 to conduct more which means less base current for Q505. The voltage drop across Q505 becomes larger and the output remains constant.

When the input voltage starts to drop, the output voltage also tends to drop and Q1 will conduct less. This increases the forward bias on Q505 and reduces the voltage

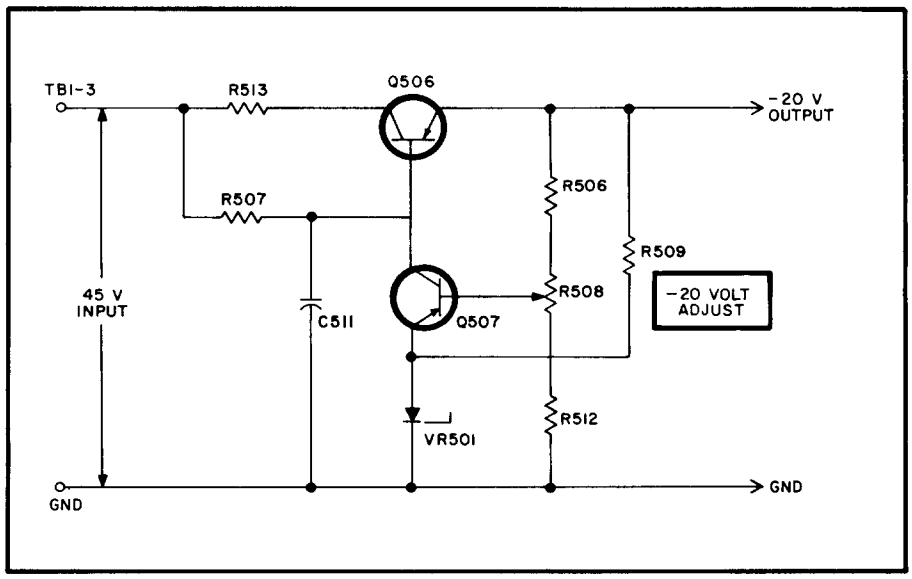


Figure 5 - -20 Volt Regulator Circuit

drop across Q505 to keep the output constant.

Diode CR1 gives reverse polarity protection to the supply. Potentiometer R4 is used to set the emitter-base voltage of Q1 for the desired 10-Volt ±5% output. R1 and R3 limit maximum current through Q1. R2 provides bias current for Zener diode VR1, and R7 provides bias for Q505, C1 and C3 prevent high frequency oscillation. The output voltage is metered at P505-7.

RECEIVER MUTING

Transistor Q2 on the 10-volt regulator board operates as a switch for the receiver muting +10 volts. When the transmitter is not keyed, the base of Q2 is connected to ground, causing Q2 to conduct. When conducting, the +10 volts at the collector of Q2 is coupled from P505 to the base of receiver DC amplifier Q9, turning it on. With Q9 conducting, Q10 is turned off, allowing the receiver to operate normally.

Keying the transmitter applies +12 volts to the base of the PNP muting switch (Q2), turning it off. This removes the +10 volts to receiver DC amplifier Q9, turning it off. Turning off Q9 causes DC amplifier Q10 to turn on, which turns off the receiver audio stages and mutes the receiver.

MAINTENANCE

HEAT SINK SERVICING

Since the metal envelopes of the transistors are at collector potential, they must be electrically isolated from ground. However, there must be a good path for heat from the transistors to reach the cast aluminum radiator (heat sink) in which they are mounted, so that the heat will be dissipated by the heat sink. The anodized aluminum spacers used between the transistors and their mounting plate not only isolate the transistors electrically, but also provide a good conductor to conduct heat away from them.

Silicone grease is used between the metal parts in the heat sink to improve contact between them and allow the heat to be transferred more readily.

NOTE

Whenever the transistor mounting plate is removed from the heat sink, be sure that there is sufficient silicone grease on the plate to make good contact with the heat sink before it is replaced. There should also be a coating of grease beneath the transistors and beneath the anodized aluminum spacers.

REINSTALLATION

If the mobile combination is ever moved to a different vehicle, be sure to check the battery polarity of the new system and, if necessary, change the power cable connections to the fuse assembly, as well as the ignition switch cable connections, to maintain current polarity.

DISASSEMBLY

To service the power supply --

1. Pull the locking handle down and pull radio out of mounting frame.
2. Remove the two screws in bottom cover and take off cover.

To remove the power supply from the system frame --

1. Complete Steps 1 and 2 above.
2. Remove the two Phillips-head retaining screws in the front casting, and pull casting away from system frame.
3. Pry power connector out of connector supporting bracket. Next, unplug the clip-on connectors to the system relay, and unplug systems connector at the back of the power supply.
4. Lift the Two-Way Radio away from power supply.

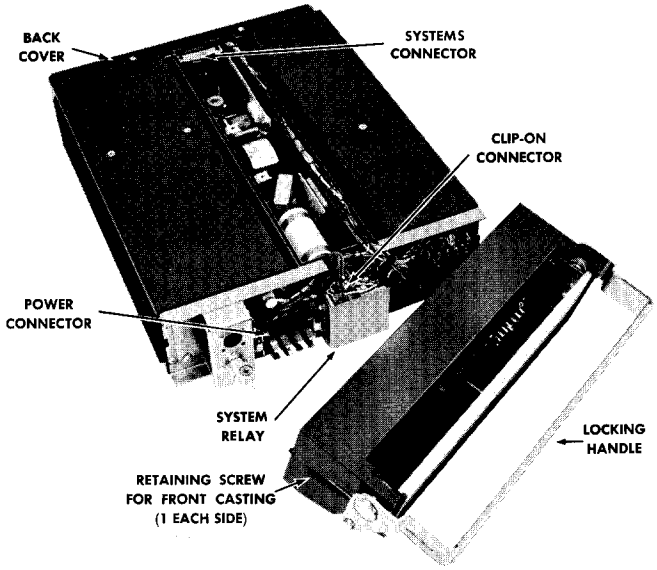
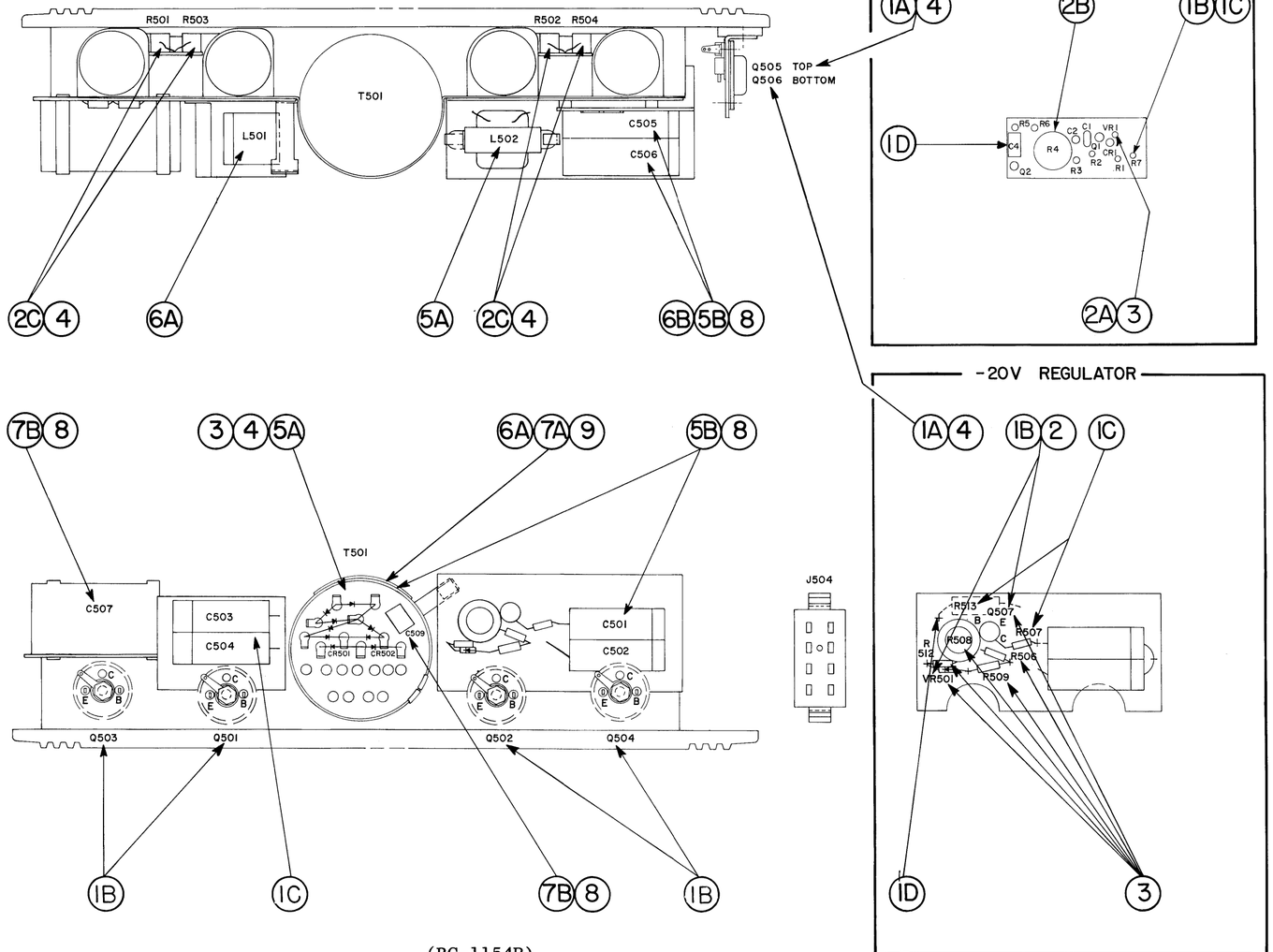


Figure 6 - Disassembly of Power Supply

(Page 6 is blank)

STEP 1 - QUICK CHECKS

SYMPTOM	PROCEDURE
No power supply output voltages at P505 when unit is keyed	Check for 12 Volts at J504-3-7. If O.K., go to Step 2; otherwise check: 1. A. Check fuse assembly for open circuit. If fuse is open check for: B. Collector-to-emitter short in Q501, Q502, Q503, Q504, primary wiring shorts. C. If an above transistor is shorted, check for shorted C504, C503.
	With 12 Volts at J504, check the following steps: 2. A. Open fuse in system cable. B. Keying relay in system should close when PTT switch is depressed. C. Open R501, R502, R503, R504.
	3. Check T501 for shorts and opens. Check for shorted winding turns by applying a 1/2-volt P-P from an audio signal generator to the primary winding T501. Check output of each secondary winding with a scope. No output indicates shorted turns.
Output voltages low	4. Open R501, R502, R503, R504, and diodes in affected circuit.
No -45 Volts at P505-2	5. A. Open CR501, CR502, L502, T501. B. Shorted C502, C501, T501.
No 300 Volts at P505-1	6. A. Open CR503, CR504, CR505, CR506, L501, T501. B. Shorted C505, C506.
No 650 Volts at P505-9	7. A. Open CR507 through CR510 (two or more), T501. B. Shorted C507, C509.
Excessive output ripple voltages	8. Open diodes, C501, C502, C505, C506, C507, C509.
Reverse or high output voltage on bias output	9. Check for shorts between bias output winding and B+ output winding of T501.
10 VOLT REGULATOR	
No 10-Volts regulated at P505-7	1. Check for the following: A. Open Q505. B. 12 Volts input. C. Open R7. D. Shorted C4. E. Open fuse in vehicle system.
Output voltage too high, cannot be adjusted by R6	2. A. Check for open VR1. B. Defective R4.
Very low output voltage	3. Check for a shorted VR1.
Output voltage equals input voltage	4. Shorted Q505.
-20 VOLT REGULATOR	
No -20 Volts regulated at P505-3	1. Check for the following: A. Open Q506. B. Shorted Q507 and/or VR501. C. Open R507, R513. D. -45 Volts at TB1-18.
Very low output voltage	2. Shorted Q507 or VR501.
Output voltage too high, cannot be adjusted by R508	3. Open VR501, Q507, R506, R508, R509, R512.
Output voltage equals input voltage	4. Shorted Q506.

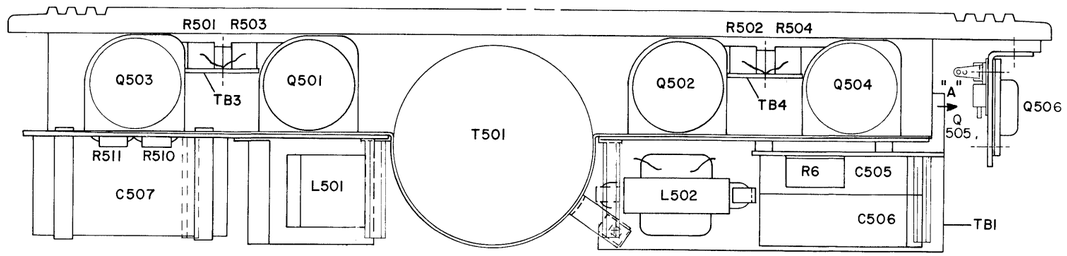


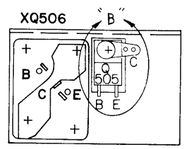
(RC-1154B)

LBI-3504

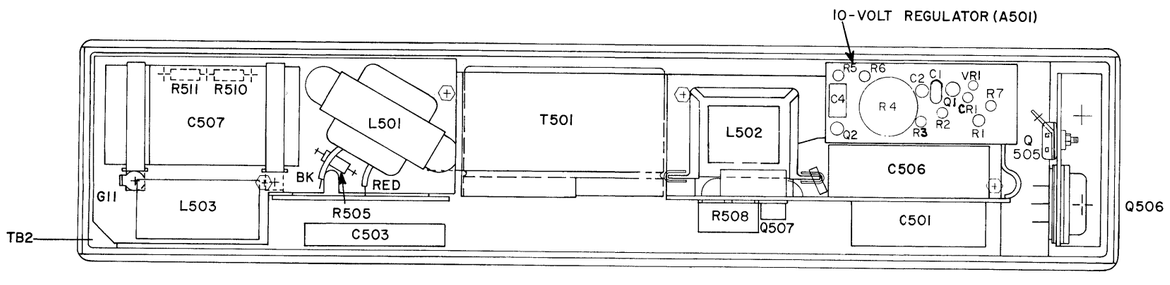
TROUBLESHOOTING PROCEDURE

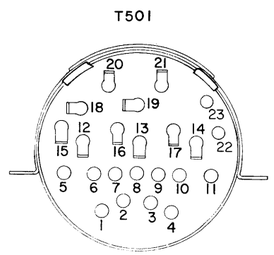
70/90/100-WATT POWER SUPPLY
MODEL 4EP37A10

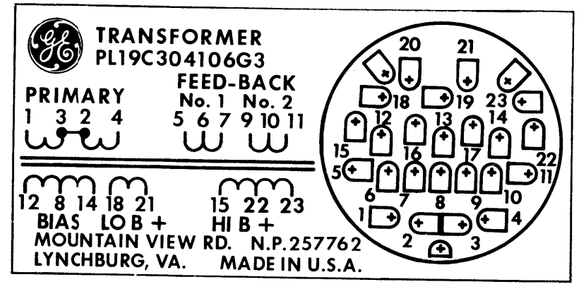


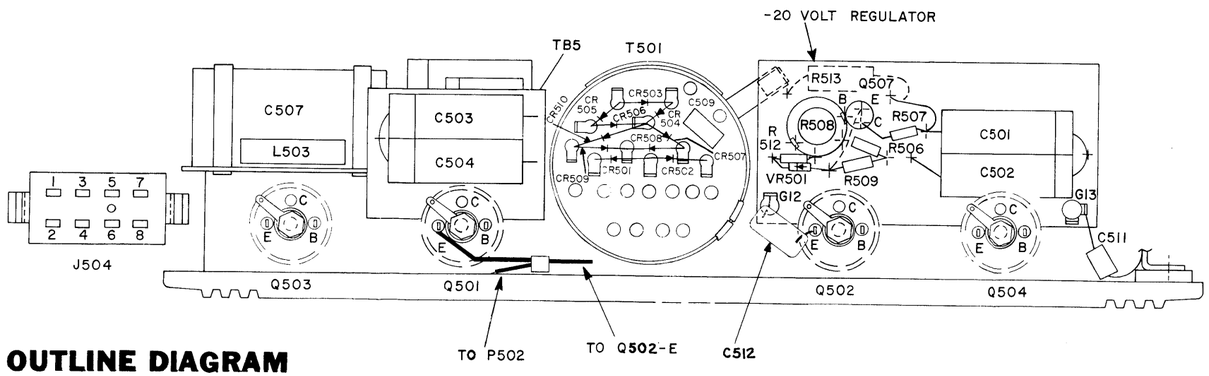


VIEW AT "A"



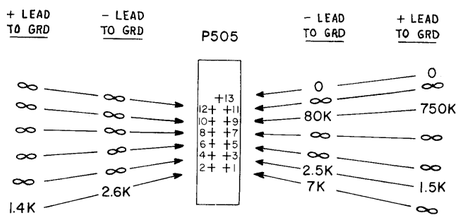






RESISTANCE READINGS

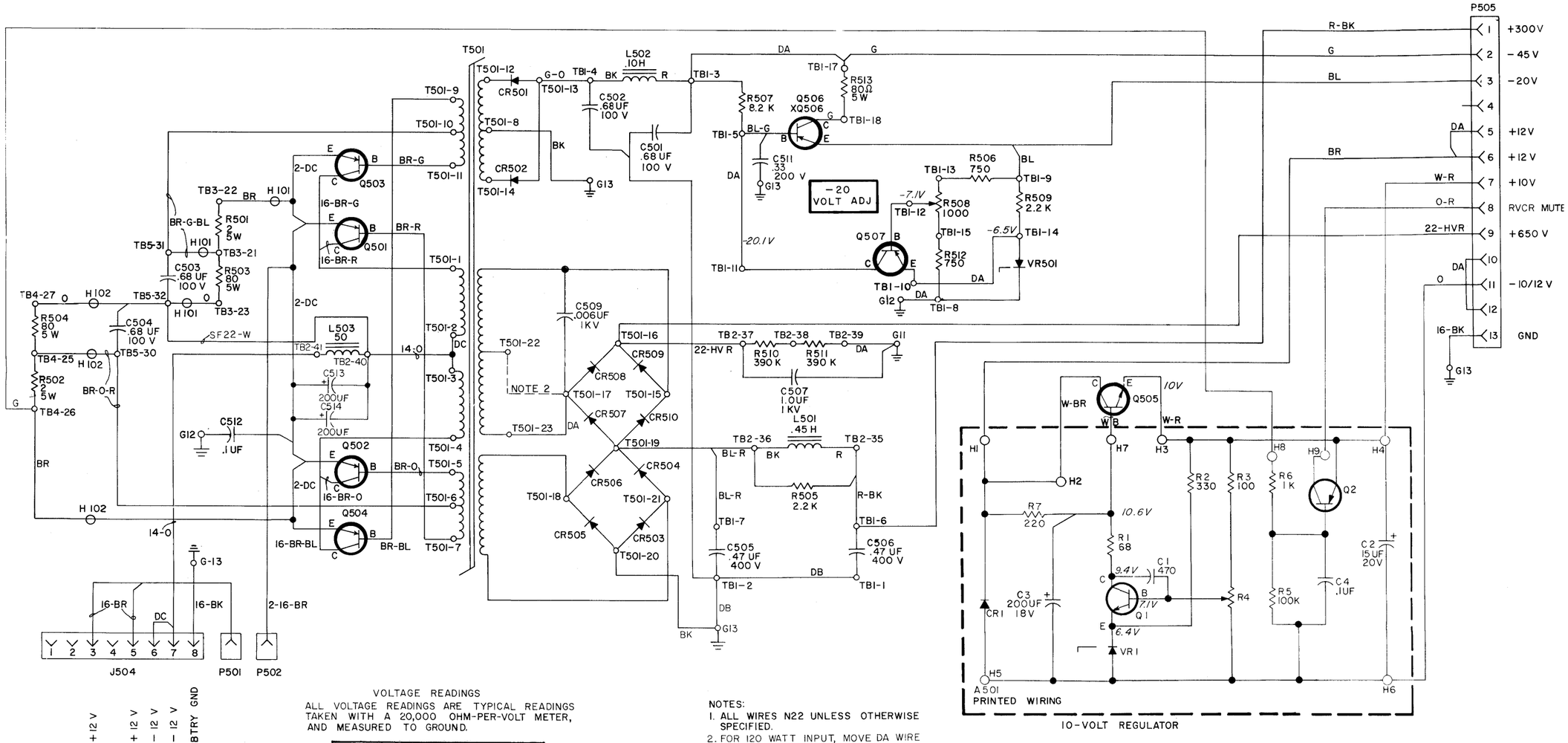
ALL RESISTANCE READINGS ARE TYPICAL READINGS
TAKEN WITH A 20,000 OHMS-PER-VOLT METER TO CHASSIS GROUND.



OUTLINE DIAGRAM

70/90/100-WATT POWER SUPPLY
MODEL 4EP37A10

19D402567, Rev. 10)



VOLTAGE READINGS

ALL VOLTAGE READINGS ARE TYPICAL READINGS TAKEN WITH A 20,000 OHM-PER-VOLT METER, AND MEASURED TO GROUND.

NOTES:
1. ALL WIRES N22 UNLESS OTHERWISE SPECIFIED.
2. FOR 120 WATT INPUT, MOVE DA WIRE FROM T501-23 TO T501-22.

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.

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
4EP37A10	T

(19D402304, Rev. 24)

SCHEMATIC DIAGRAM

70/90/100-WATT POWER SUPPLY
MODEL 4EP37A10

PARTS LIST

LBI-3582J

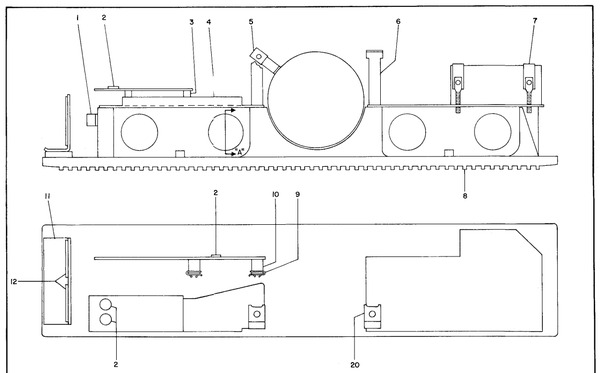
12 VOLT, 70/90/100 WATT POWER SUPPLY
MODEL 4EP37A10

SYMBOL	GE PART NO.	DESCRIPTION
A501*		10 VOLT REGULATOR BOARD 19C317751G1
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	7774750P1	Ceramic disc: .00047 µf +100 -0%, 500 VDCW.
C2	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW.
C3	19A115680P10	Electrolytic: 200 µf +150% -10%, 18 VDCW; sim to Mallory Type TT.
C4	19A116080P107	Polyester: 0.1 µf ±10%, 50 VDCW.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR1	4037822P1	Silicon.
		- - - - - - - - INDICATING DEVICES - - - - - -
DS1*	4034664P1	Lamp, incandescent: 28 v; sim to GE2148. Deleted by REV S.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q2	19A115768P1	Silicon, PNP; sim to Type 2N3702.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P680K	Composition: 68 ohms ±10%, 1/2 w.
R2	3R77P331J	Composition: 330 ohms ±5%, 1/2 w.
R3	3R77P101J	Composition: 100 ohms ±5%, 1/2 w.
R4	19A115681P1	Variable, wirewound: 1000 ohms ±20%, 3 w; sim to CTS Series 115.
R5	3R77P104K	Composition: 0.10 megohm ±10%, 1/2 w.
R6*	3R77P102K	Composition: 1000 ohms ±10%, 1/2 w.
		In REV M and earlier:
	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R7*	3R77P221J	Composition: 220 ohms ±5%, 1/2 w. Added by REV S.
		- - - - - - - - VOLTAGE REGULATORS - - - - - -
VR1	4036887P6	Silicon, Zener.
		IN REV H thru L:
A501*		10 VOLT REGULATOR BOARD 19C303420G7
		- - - - - - - - - CAPACITORS - - - - - - - - -
C4	7774750P1	Ceramic disc: .00047 µf +100 -0%, 500 VDCW.
C5	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW.
C6	19A115680P10	Electrolytic: 200 µf +150% -10%, 18 VDCW; sim to Mallory Type TT.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR3	4037822P1	Silicon.
		- - - - - - - - INDICATING DEVICES - - - - - -
DS1	4034664P1	Lamp, incandescent: 28 v; sim to GE2148.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q5	19A115123P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R8	3R77P680K	Composition: 68 ohms ±10%, 1/2 w.

SYMBOL	GE PART NO.	DESCRIPTION
R9	3R77P331J	Composition: 330 ohms ±5%, 1/2 w.
R10	3R77P101J	Composition: 100 ohms ±5%, 1/2 w.
R11	19A115681P1	Variable, wirewound: 1000 ohms ±20%, 3 w; sim to CTS Series 115.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - -
VR4	4036887P6	Silicon, Zener.
		IN REV D thru G:
A501*		10 VOLT REGULATOR BOARD 19C303420G6
		- - - - - - - - - CAPACITORS - - - - - - - - -
C4	7774750P1	Ceramic disc: .00047 µf +100 -0%, 500 VDCW.
C5	5496267P14	Tantalum: 15 µf ±20%, 20 VDCW; sim to Sprague Type 150D.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR2*	19A115250P1	Silicon. Deleted by REV J.
CR3*	4037822P1	Silicon. Added by REV J.
		- - - - - - - - INDICATING DEVICES - - - - - -
DS1	4034664P1	Lamp, incandescent: 28 v; sim to GE 1762D.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q5	19A115123P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R8*	3R77P680K	Composition: 68 ohms ±10%, 1/2 w.
		In REV D:
	3R77P161J	Composition: 160 ohms ±5%, 1/2 w.
R9	3R77P331J	Composition: 330 ohms ±5%, 1/2 w.
R10	3R77P101J	Composition: 100 ohms ±5%, 1/2 w.
R11	19A115681P1	Variable, wirewound: 1000 ohms ±20%, 2.2 w; sim to CTS Series 115.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - -
VR4	4036887P6	Silicon, Zener.
		IN REV C AND EARLIER
A501*		REGULATOR COMPONENT BOARD ASSEMBLY 19C303420G1
		- - - - - - - - - CAPACITORS - - - - - - - - -
C1	5496267P10	Tantlaum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1	4037822P1	Silicon.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1*	4037993P1	Germanium, PNP; sim to Type 2N1303. Deleted by REV C.
Q2	19C300073P2	Germanium, PNP; sim to Type 2N1414.
Q3	19A115123P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P680J	Composition: 68 ohms ±5%, 1/2 w.
R3	3R77P242J	Composition: 2400 ohms ±5%, 1/2 w.
R4	3R77P331J	Composition: 330 ohms ±5%, 1/2 w.
R5	3R77P681J	Composition: 680 ohms ±5%, 1/2 w.
R6	19B209113P1	Variable, wirewound: 250 ohms ±20%, 2.5 w.
R8*	3R77P680K	Composition: 68 ohms ±10%, 1/2 w. Added by REV C.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - VOLTAGE REGULATORS - - - - - - - -
VR1	4036887P9	Silicon, Zener.
		- - - - - - - - - CAPACITORS - - - - - - - - -
C501 thru C504	19B209004P11	Polyester: 0.68 µf ±10%, 100 VDCW; sim to Sprague 157P68491.
C505 and C506	5491656P42	Polyester: 0.47 µf ±20%, 400 VDCW; sim to GE Type 61F.
C507	5491656P40	Polyester: 1 µf +30% -10%, 1000 VDCW; sim to GE Type 61F.
C509	19C301693P20	Ceramic disc: .006 µf ±10%, 1000 VDCW; sim to RMC Type JF Discap.
C512*	19A115028P14	Polyester: 0.1 µf ±20%, 200 VDCW. Added by REV B.
C513* and C514*	19A11680P10	Electrolytic: 200 µf +150% -10%, 18 VDCW; sim to Mallory Type TT. Added by REV P.
		- - - - - - - DIODES AND RECTIFIERS - - - - - -
CR501 thru CR506	4037822P1	Silicon.
CR507 thru CR510	19A115845P4	Silicon.
		- - - - - - - - - - INDUCTORS - - - - - - - - - -
L501	19A121120P1	Reactor: 0.45 h +0.5 -.05 h min at 0.15 amp DC, 20 ohms ±10% DC res, 1000 v peak, 420 VDC operating.
L502	19B200777P1	Reactor: 0.1 h min at 0.15 amp DC, 12 ohms ±10% DC res, 720 v peak, 300 VDC operating.
L503	19A115391P1	Coil, RF: 50 µh ±10% ind at 1000 Hz, .02 ohm DC res max.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q501 thru Q504	5490810P1	Germanium, PNP.
Q506	19A115341P1	Germanium, PNP.
Q507	19A115768P1	Silicon, PNP; sim to Type 2N3702.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R501 and R502	5493035P3	Wirewound, ceramic: 2 ohms ±5%, 5 w; sim to Hamilton Hall Type HR.
R503 and R504	5493035P4	Wirewound, ceramic: 80 ohms ±5%, 5 w; sim to Hamilton Hall Type HR.
R505	3R77P222K	Composition: 2200 ohms ±10%, 1/2 w.
R506	3R77P751J	Composition: 750 ohms ±5%, 1/2 w.
R507	3R77P822K	Composition: 8200 ohms ±10%, 1/2 w.
R508	19B209113P3	Variable, wirewound: 1000 ohms ±20%, 2.5 w.
R509	3R77P222K	Composition: 2200 ohms ±10%, 1/2 w.
R510 and R511	3R77P394K	Composition: 0.39 megohm ±10%, 1/2 w.
R512	3R77P751J	Composition: 750 ohms ±5%, 1/2 w.
R513	5493035P4	Wirewound, ceramic: 80 ohms ±5%, 5 w; sim to Hamilton Hall Type HR.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T501*	19C304106G3	Transformer.
		In REV E and earlier:
	19C304106G1	Transformer.
		- - - - - - - - TERMINAL BOARDS - - - - - - - -
TB1	19C303431G1	Eyelet board.
TB2	19B204509G1	Eyelet board.

SYMBOL	GE PART NO.	DESCRIPTION
TB3	19B204463G1	Eyelet board.
TB4	19B204463G2	Eyelet board.
TB5	19C303422G1	Eyelet board.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - - -
VR501	4036887P6	Silicon, Zener.
		HARNESS ASSEMBLY 19D402277G3
		- - - - - - - - - CAPACITORS - - - - - - - - -
C511	19A115028P17	Polyester: 0.33 µf ±20%, 100 VDCW.
		- - - - - - - - JACKS AND RECEPTACLES - - - - -
J504	19A121524G1	Connector, phen: 8 contacts.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P501 and P502	19B209151P1	Terminal: solderless; sim to Amp 42284-5.
P505	19B204781P1	Female, phen: No. 1 thru 12 contacts rated at 2 amps at 850 VDC max, No. 13 contact rated at 4 amps at 450 VDC max.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q505*	19A116203P3	Silicon, NPN.
		In REV K:
	19A116118P1	Silicon, NPN.
		In REV G, H and J:
	19A115948P1	Silicon, NPN.
		In REV D, E and F:
	19A115527P1	Germanium, PNP.
		In REV C and earlier:
	19A115267P1	Germanium, PNP.
		- - - - - - - - - SOCKETS - - - - - - - - -
XQ506	5491888P1	Transistor, power, phen: sim to Cinch 133-92-10-034.
		- - - - - - - - MISCELLANEOUS - - - - - - - -
	19C30339G2	Power Supply cover.
		MECHANICAL PARTS (SEE RC-1173)
1	7763541P4	Cable clamp. (Used with P505 cable).
2	4036555P1	Insulator, washer: nylon. (Used with Q1, Q2).
3	7140624P6	Spacer. (Used with A501).
4	19C303429P1	Support. (Used with A501).
5	7160861P2	Speed nut: spring; sim to Tinnerman C880-632-157. (Used with T501).
6	19A121220P1	(Not Used).
7	19B204454G1	(Not Used).
8	19D402261P1	Heat sink.
9	7160861P10	(Not Used).
10	7142162P89	(Not Used).
11	19B204431P1	Support. (Used with Q505 and Q506).
12	4029974P1	Transistor insulator. (Used with Q505 and Q506).
13	4031291P1	Transistor insulator. (Used with Q501 and Q502).
14	4034215P1	Bushing. (Used with Q501 and Q502).
15	4024225P1	Flat washer. (Used with Q501 and Q502).
16	N405P9C13	Lockwasher. No. 10. (Used with Q501 and C502).
17	4032596P1	Nut. No. 10-32. (Used with Q501 and Q502).
18	4036835P1	Solder terminal: sim to Shakeproof 214-14-000. (Used with Q501 and Q502).
19	19A115221P3	Mica washer. (Used with Q501 and Q502).
20	7160861P4	(Not Used).



POWER SUPPLY 4EP37A10 & 4EP37B10

*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 - To protect the 10-volt regulator against reverse polarity. Added CR1 to the 10-volt regulator board A501.

REV. B - To suppress switching spikes in the power supply primary. Added C512.

REV. C - To improve operation of 10-volt regulator. Deleted Q1 and added R8 to the 10-volt regulator board A501.

REV. D - To improve reliability of 10-volt regulator. Changed Q505 and 10-volt regulator circuit (A501).

REV. E - To improve operation of 10-volt regulator A501. Changed R8.

REV. F - To provide tap for 120-watt input. Changed T501.

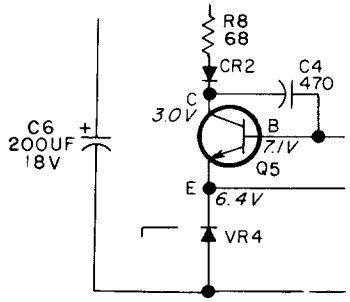
REV. G - To incorporate new transistor. Changed Q505.

REV. H - To reduce alternator noise. Changed A501.

REV. J - To provide reverse polarity protection. Deleted CR2 and added CR3 to 10-volt regulator A501

Schematic Diagram

Was



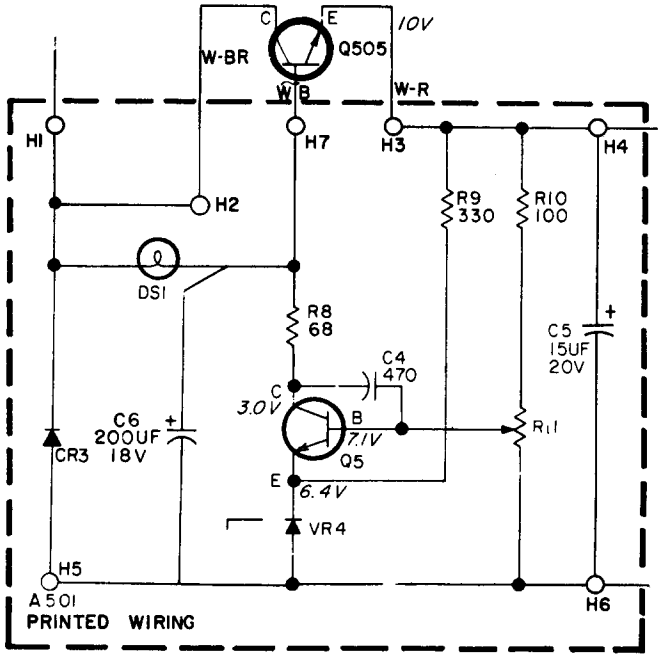
Rev. K - To incorporate a different transistor. Changed Q505.

Rev. L - To obtain a more reliable connection to the regulator transistor. Changed Q505.

Rev. M - To incorporate a transistor switch on the 10-volt regulator board for receiver muting. Added C4, R5, R6, Q2 and new regulator board.

Schematic Diagram

Was:

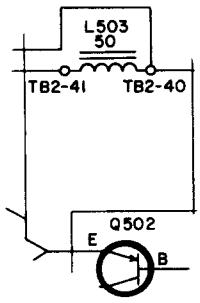


10-VOLT REGULATOR

REV. N - To insure muting of the receiver when operating below 20% of the battery voltage. Changed R6.

REV. P - To reduce residual spike deviation. Added C513 and C514.

Schematic Diagram
was



REV. R - To improve performance and mechanical construction. Added standoffs. Changed cover and DA wire between TB5-32 and TB2-40.

REV. S - To solve procurement problem.
10 Volt Regulator Board, 19C317751G1
Deleted DS1 and added R7.
10 Volt Regulator Board, 19C303420G6
Deleted DS1 and added R12.

REV. T - To improve filtering.
Changed connection of C513 and C514.