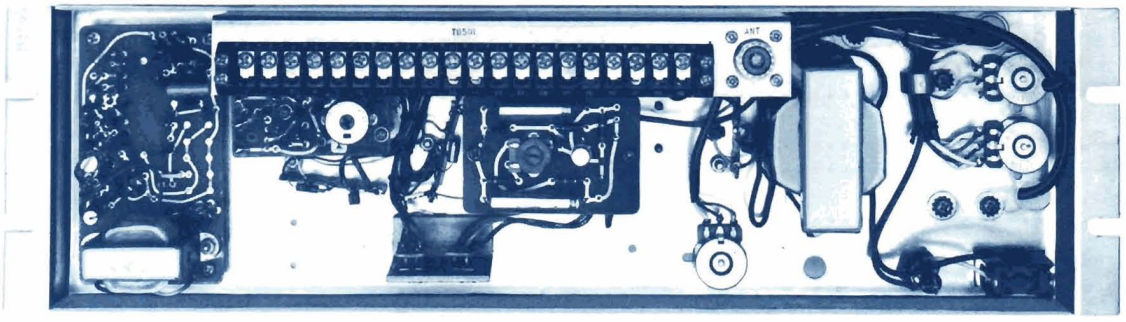
MOBILE RADIO

MASTR PROGRESS LINE

BASE STATION RECEIVER POWER SUPPLY MODELS 4EP39A11 & 12



SPECIFICATIONS *

Model Number	
Non-Channel Guard	4EP39A11
Channel Guard	4EP39A12
Output Impedance:	600 ohms
Audio Frequency Characteristics:	
4EP39A11	Within +1 dB to -3 dB of a 6-dB/octave de-emphasis from 300 to 3000 Hz
4EP39A12	Within +1 dB to -8 dB of a 6-dB/octave de-emphasis from 300 to 3000 Hz
Distortion:	Less than 5%
Dimensions (W x H):	19" x 5-1/4"
Input Voltage	117 VAC, ±20%, 50/60 Hz
Output Power:	12.6 volts @ 1.0 Amp 10 volts @200 mA
Fuses:	1 (F501, 1/4-amp, slow)
Duty Cycle:	Continuous
Ambient Temperature Range	-30°C to +60°C (+140°F to -22°F)
Humidity:	95% maximum relative humidity @50°C
Metering:	All voltages measured at terminal strips on wiring side of power supply board with a 20,000 ohms-per-volt multimeter.

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

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

General Electric Transistorized Power Supply Models 4EP39A11, 12 and Antenna Relay 19A121260-G2 are used when a second receiver is added to MASTR Progress Line Base Station Combinations. The power supply is modified for use in Satellite Receiver systems. A description of the modifications is contained in the Power Supply Modification Section as listed in the Table of Contents.

- +12.6 Volts regulated for the receiver audio
- +10 Volts regulated for the receiver RF stages and line amplifier board
- De-emphasis and amplification of receiver audio to drive the telephone pair

The power supply is mounted on the chassis frame below the control panel. The antenna relay mounts on Transmitter-Receiver Power Supply Type EP-38-A.

The receiver mounts on the front side of the power supply panel. Power supply voltages are connected to the receiver through power cable plug P443. All power supply components are located on the rear side of the power supply chassis.

CIRCUIT ANALYSIS

When power supply ON-OFF switch S501 is on, 117 Volts AC is connected across the primary (black leads) of power transformer T501. The secondary of T501 connects to a full-wave rectifier circuit consisting of CR501 and CR502. The output is taken from the transformer center-tap (red-yellow wire), and filtered by C501 and C502. Fuse F501 is in series with switch S501 to protect the power supply from overload.

12.6-VOLT REGULATOR (A502)

Voltage is applied from the center tap of T501 to the collector of regulator transistor Q503. When the voltage rises, Q503 conducts harder and the output voltage at the emitter of Q503 starts to rise. This increases the base voltage of Q2 (emitter of Q2 is kept constant by VR4) and Q2 conducts more. As Q2 conducts harder, the forward bias at the base of Q1 is decreased and Q1 conducts less. As a result, the forward bias at the base of Q503 is reduced and Q503 conducts less. This increases the voltage drop across Q503, keeping the output voltage constant.

When the voltage at the collector of regulator transistor Q503 drops, the output voltage starts to drop. Q2 conducts less, allowing Q1 to conduct more. This increases the forward bias on Q503 and Q503 conducts more. The reduced voltage drop across Q503 keeps the output voltage constant.

Potentiometer R1 is used to set the emitter-base voltage of Q2 for the desired 12.6-Volt output. R2 and R4 limit the maximum current through Q2 and R3 provides bias current for zener diode VR4. The 12.6-Volt regulated output is connected to TB501-10, to P443-11 for the receiver audio circuits, and to the input of the +10 Volt regulator.

+10-VOLT REGULATOR (A501)

When the supply voltage (or output) starts to increase, the voltage at the base of Q5 also increases. As the emitter voltage of Q5 is kept constant by VR4, the emitter-base voltage increases. This causes Q5 to conduct more which means less base current for Q501. The voltage drop across Q501 becomes larger and the output remains constant.

When the input voltage starts to drop, the output voltage also tends to drop and Q5 will conduct less. This increases the forward bias on Q501 and reduces the voltage drop across Q501 to keep the output constant.

Diode CR2 gives reverse polarity protection to the supply. Potentiometer R11 is used to set the emitter-base voltage of Q5 for the desired 10-Volt ±5% output. R8 and R10 limit maximum current through Q5. R9 provides bias current for zener diode VR4, and lamp DS1 provides bias for Q501. C4 and C5 prevent high frequency oscillation. The output voltage is metered at TB501-10 and -12.

RECEIVER MUTING

Transistor Q502 operates as a switch for the receiver muting +10 Volts. A continuous +10 Volts is applied to the emitter of Q502. When the transmitter is unkeyed, the base of the transistor is grounded, caus ing it to conduct. When conducting, the +10 Volts at the emitter of Q502 is coupled through P443-2 to the base of receiver DC amplifier Q9, turning it on. When Q9 conducts, DC amplifier Q10 is turned off, and the receiver operates normally.

Keying the transmitter applies 12.6 Volts to the base of Q502, turning it off. This removes the +10 Volts to receiver DC amplifier, turning it off. Turning off Q9

causes Q10 to turn on, which turns off the receiver audio amplifiers and mutes the receiver.

LINE AMPLIFIER (A503 & A504)

Line Amplifier Board A503 is used in the 4EP39A11 (non-Channel Guard stations), and A504 is used in the 4EP39A12 (Channel Guard stations). The line amplifiers are also used in Satellite Receiver combinations.

Supply voltage for the line amplifier is provided by the power supply 10-Volt regulator. Receiver audio applied to the line amplifier is taken from volume high (R502-3) on the station power supply (EP-38-A).

Line Amplifier A503

Audio from the receiver is applied to the base of 1st audio amplifier Q1. The output of Q1 is applied to de-emphasis network R5 and C2 which provides 6-dB per octave roll-off. Following the de-emphasis network is buffer-amplifier Q2. The output of the buffer stage is coupled through LINE LEVEL ADJUST potentiometer R509 to the base of 2nd amplifier Q3. For standard remote control stations, instructions for setting R509 are contained in the Adjustment Section (see Table of Contents). For satellite receiver combinations, instructions for setting R509 are contained in the Maintenance Manual for the satellite receiver (LBI-4293).

The output of the 2nd amplifier is applied to line driver transistors Q4 and Q5. Q4 operates as a current amplifier and Q5 as a voltage amplifier. The line driver output is coupled through line-matching transformer T1 to line output terminals TB501-14 and -15. In standard stations, the line output is connected as shown on the appropriate Interconnection Diagram (see Table of Contents). For satellite receiver combinations, the line output is connected to TB1-4 and TB1-5 on the Tone/Audio Panel.

The operation of line drivers Q4 and Q5 is controlled by squelch switch transistors Q6 and Q7. When the station receiver unsquelches, the COS feed voltage applied to the base of Q6 rises from zero to approximately 3 Volts DC. This voltage turns on Q6, which turns on Q7. Turning on Q7 completes the current path for the line drivers, turning them on and applying audio to the line output.

When the receiver squelches, the COS feed voltage drops to zero, turning off Q6 and Q7. The +5 Volts developed across divider network R20 and R21 is applied to the emitter of Q5. This reverse-biases Q5, turning the line drivers off.

The action of C6 and R18 provides a slight delay in turning Q7 on or off. This delay prevents a switching "pop" from being heard in the speaker.

Line Amplifier A504

Audio from the receiver is applied to the base of 1st audio amplifier Q1. The amplifier output is coupled through a de-emphasis network (R5 and C7) and applied to buffer amplifier Q2. Following the buffer is a 180 hertz notch filter for attenuating the Channel Guard tone. The filter consists of C8 through C14, L1 and R25.

The filter output is coupled through LINE LEVEL ADJUST potentiometer R509 to the base 2nd audio amplifier Q3. For standard remote control stations, instructions for setting R509 are contained in the Adjustment Section (see Table of Contents). For satellite receiver combinations, instructions for setting R509 are contained in the Maintenance Manual for the satellite receiver (LBI-4293).

The output of the 2nd amplifier is applied to line driver transistors Q4 and Q5. Q4 operates as a current amplifier and Q5 as a voltage amplifier. The line driver output is coupled through line matching transformer T1 to line output terminals TB501-14 and -15. In standard stations, the line output is connected to TB701-1 and -2 on remote control panel Model 4KC16A12. For satellite receiver combinations, the line output is connected to TB1-4 and TB1-5 on the Tone/Audio Panel.

The operation of line drivers Q4 and Q5 is controlled by squelch switch transistors Q6 and Q7.

When the station receiver unsquelches, the COS feed voltage applied to the base of Q6 rises from zero to approximately 3 Volts DC. This voltage turns on Q6, which turns on Q7. Turning on Q7 completes the current path for the line drivers, turning them on and applying audio to the line output.

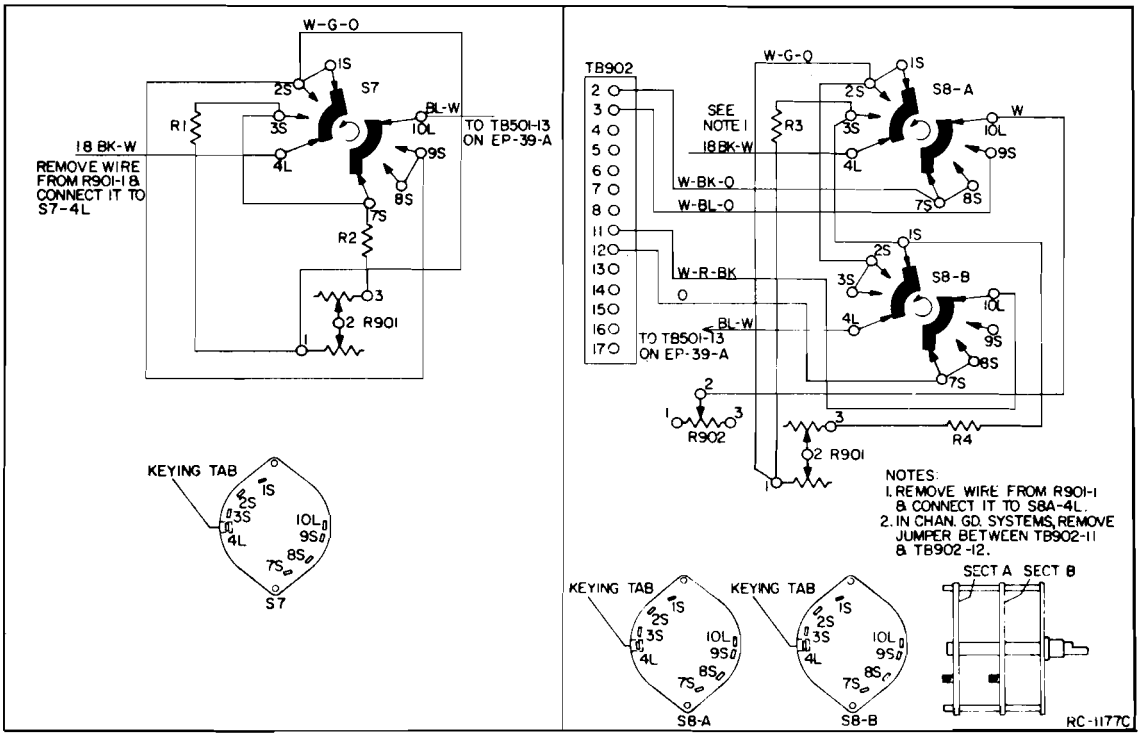
When the receiver squelches, the COS feed voltage drops to zero, turning off Q6 and Q7. The +5 Volts developed across divider network R20 and R21 is applied to the emitter of Q5. This reverse-biases Q5, turning the line drivers off.

The action of C6 and R18 provides a slight delay in turning Q7 on or off. This delay prevents a switching "pop" from being heard in the speaker.

OPTIONS

Two-Frequency Monitoring

A two-frequency monitoring switch is required in Local Control and Local/Remote



Single Frequency Switch Wiring Diagram 19A121629-G7

Two Frequency Switch Wiring Diagram 19A121629-G8

Figure 1

stations equipped with two receivers. In single-frequency transmit applications, Switch Kit 19A121629-G7 is used. In two-frequency transmit applications, Switch Kit 19A121629-G8 is used. The switch Mounts on the front control panel between the VOLUME control (R901) and the CG-ON switch (S902).

When the monitoring switch is in the "F1-F2" position, receiver 1 and receiver 2 audio will be heard simultaneously and at equal volume levels. The operator must switch to either the "F1" position or "F2" position to interpret one call at a time. When the monitoring switch is in position "F1" for example, receiver 1 will be heard at full volume. If a signal is received by receiver 2, the audio will be heard in the background at a low volume level with the receiver 1 volume remaining constant. When the switch is in the "F2" position, the reverse occurs, "F2" audio will be at full volume and "F1" audio will be low, but audible in the background. This will alert the operator to the presence of a second signal. Refer to the Figure 1 for -G7 and -G8 monitor circuit wiring.

Antenna Relay

When a second receiver is used in the station, antenna relay K502 on the Transmitter-Receiver Power Supply EP-38-A is removed and replaced by second receiver antenna relay K504 (19A121260-G2).

1. Remove relay K502 as follows:

   A. Disconnect wires from terminals 1 and 2 on K502.
   B. Disconnect plug J503 from chassis mounting bracket.
   C. Disconnect P103 from J103 on transmitter.
   D. Disconnect P441 from J441 on receiver.
   E. Unscrew relay and remove from chassis.

2. Mount Second Receiver Antenna Relay K504 as follows:

   A. Disconnect the R-O (W-BK-R*) wire and the BR-R wire from TB15 (TB504*) and remove TB15 (TB504*).
   B. Connect R-O (W-BK-R*) wire to terminal 1 and BR-R wire to terminal 2 on K504.
   C. Mount J503 into left hole on chassis mounting bracket as shown in Figure 2.
   D. Mount J504 into right hole on mounting bracket.
   E. Plug P103 into J103 on transmitter.

* For 4EP38A12 only

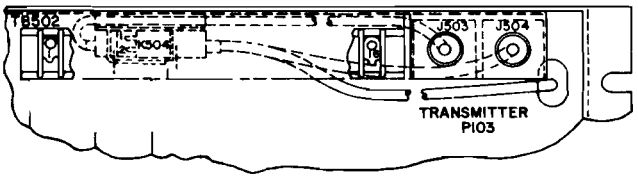


Figure 2 - Antenna Relay Wiring

The opposite end of the mounted J504 plug must be connected to the input of each receiver in the station either directly or by means of the appropriate Antenna Matching Unit.

INITIAL ADJUSTMENT

VOLUME AND SQUELCH CONTROLS

VOLUME (R502) and SQUELCH (R501) controls must be adjusted as follows:

1. Attach a speaker (3.5-ohm impedance) to TB501-9 and -13.
2. Turn on power to the receiver.
3. Turn the VOLUME and SQUELCH controls fully clockwise.
4. Adjust SQUELCH control R501 counterclockwise until the noise just disappears.
5. Adjust VOLUME control R502 to the desired listening level.

NOTE

A 3.5 ohm resistor or speaker (3.5 ohm impedance) must always be connected across TB501-9 and -13 for proper loading.

LINE LEVEL ADJUST

In MASTR base stations equipped with a second receiver, adjust the LINE LEVEL control (R509) as follows:

1. Make sure that TB501-14 and -15 on the power supply are properly terminated at the remote control panel or control shelf, to a 600-ohm telephone pair, or a 620-ohm, 1/2-Watt resistor.
2. Connect a signal generator to the receiver antenna jack and apply a 1000 microvolt, 1000 Hz signal with two-thirds rated system deviation.
3. Adjust R509 for an AC-VTVM reading of 2.7 Volts RMS (+11 dB) at TB501-14 and -15.

In satellite receiver combinations, adjust R509 as directed in the maintenance manual for the satellite Receiver (LBI-4293) or voting selector (LBI-4292).

MAINTENANCE

TROUBLESHOOTING HINTS

Refer to the troubleshooting steps listed and the "Quick-Checks" listed on the power supply troubleshooting procedure sheet:

1. Check fuse F501.
2. Make continuity and voltage checks listed on service outline diagram.
3. Check for shorts and opens in capacitors and resistors.
4. Check voltage readings on line amplifier Schematic Diagram.

POWER SUPPLY MODIFICATIONS

DC REMOTE CONTROL MODIFICATIONS

In DT, PT, and VT station combinations, power supply Model 4EP39A11 and the second receiver overlay harness is modified for DC remote control systems. The modifications are described below:

Modification Kit 19A130046G1

1. Clip out R17 on Line Amplifier board A503.
2. Remove wire 108 from overlay harness 19A129437G1 at TB502-11 (on EP-38-A) and TB501-16 (on 4EP39A11). Insulate leads and let hang.
3. Replace R10 (10K) on A503 with 4.7K resistor supplied in the kit.

Satellite Receiver Modifications

The power supply is modified as described below for use in Satellite Receiver Systems. Refer to the Battery Panel Wiring Diagram and Power Supply Modification Diagram in LBI-4293 for the location of components used in the modification.

Modification Kit 19A129012G1

Modification Kit 19A129012G1 is used in tone signaling applications. The Modification adds diode CR1, terminals TP1 and TP2, and jack J1 to 12.6 Volt regulator board A502. The modification also adds speaker jack J10 to the power supply chassis.

Modification Kit 19A129012G2

Modification Kit 19A129012G2 is used in E & M signaling applications. The modification adds diode CR1, terminals TP1 and TP2, and jack J1 to 12.6-Volt regulator board A502. The modification also adds speaker jack J10 and COR 19C303533G3 to the power supply chassis.

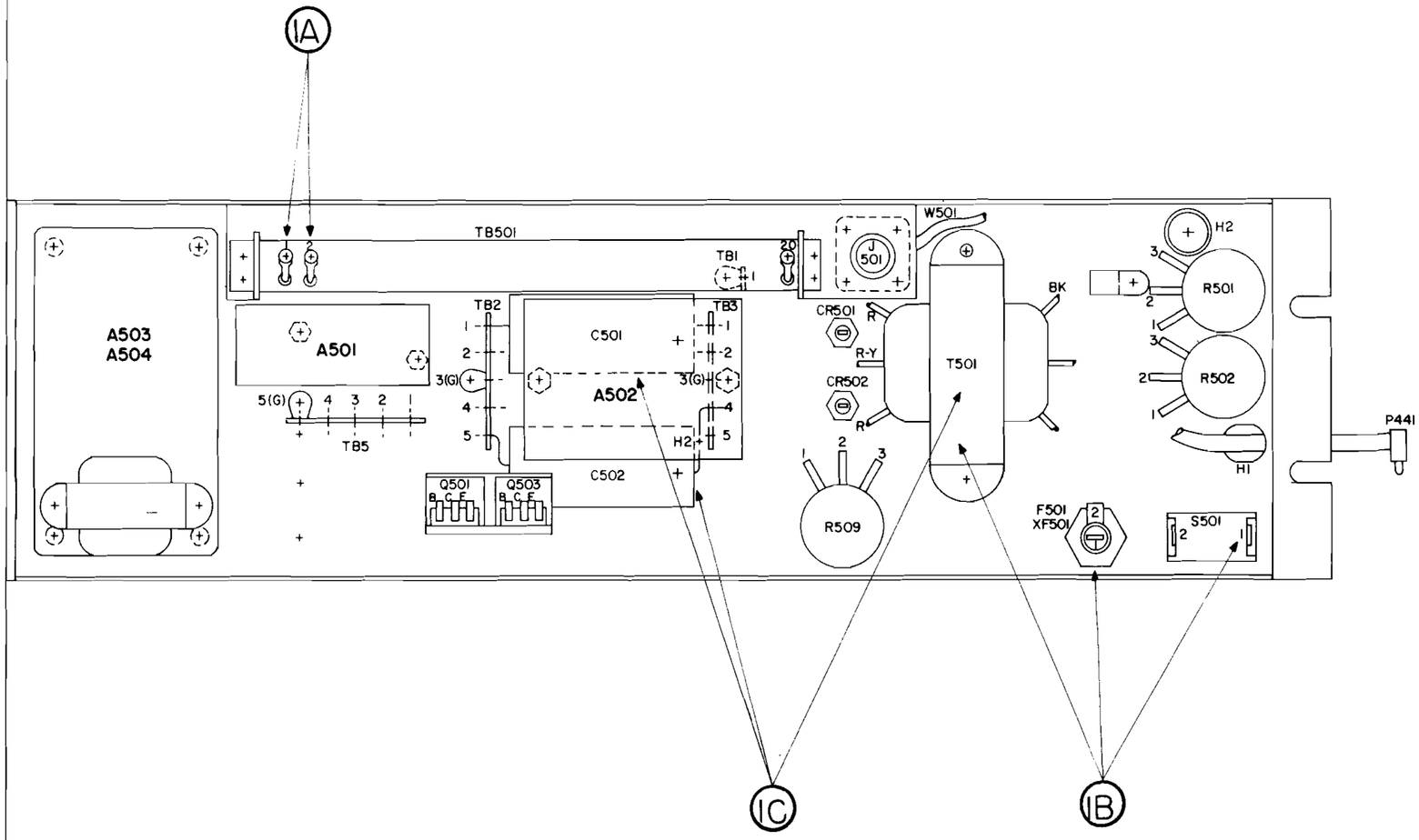
Heater Modification

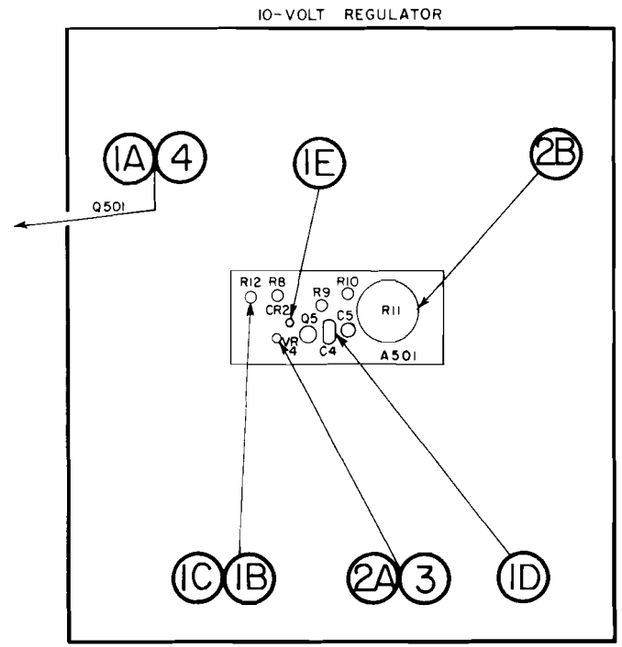
When optional battery heater 4034002P1 is used, thermostatic switch S1 is added to the power supply chassis.

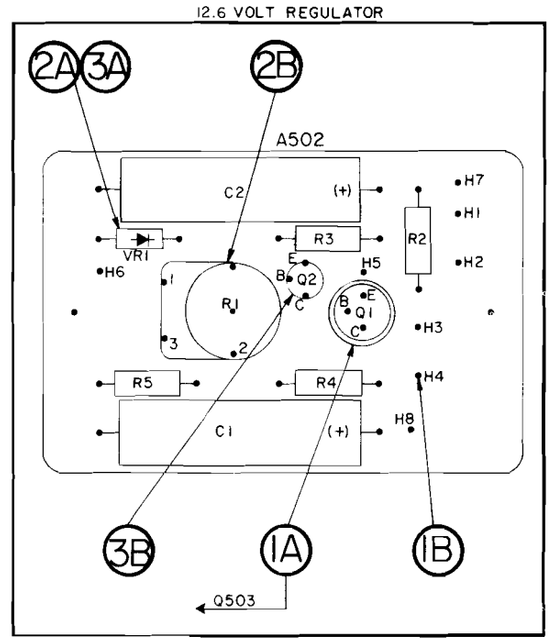
STEP I - QUICK CHECKS

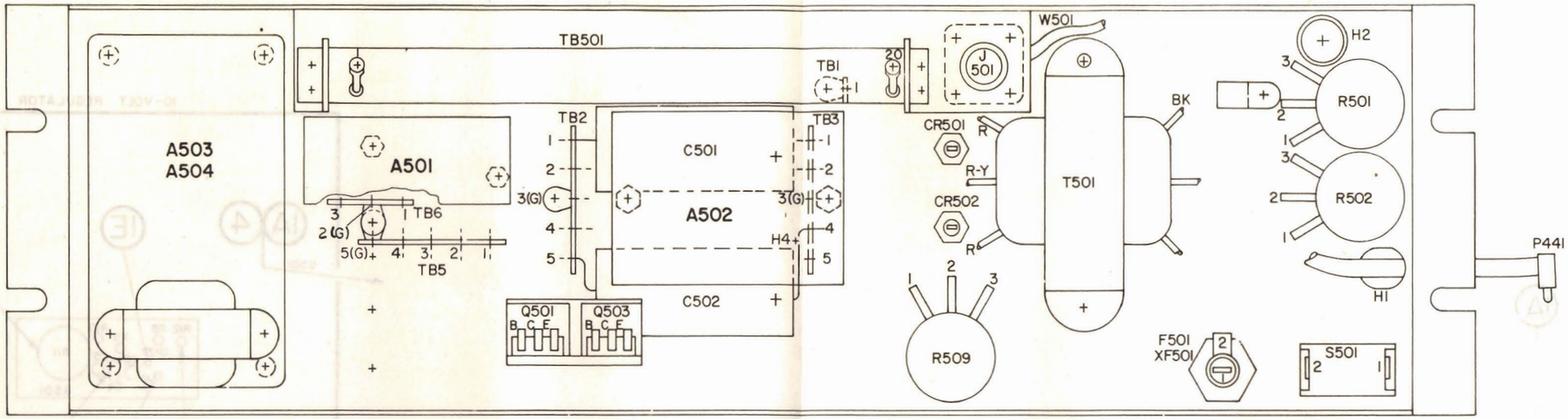
RECEIVER POWER SUPPLY
MODELS 4EP39A11 & 12

SYMPTOM	PROCEDURE
No output voltages at P443-11-12 and TB501-10-12	1. Check for the following: A. 117 VAC on TB501-1 and -2. B. Open F501, S501, T501, L501. C. Shorted T501, C501, C502.
12.6 VOLT REGULATOR	
No. 12.6-volt regulator output	1. Check the following: A. Open Q503 or Q1. B. 12.6 volts at H4.
Output voltage too high, cannot be adjusted by R1	2. A. Check for open VR1. B. Check for defective R1.
Very low output voltage	3. A. Check for shorted VR1. B. Check for shorted Q2.
10-VOLT REGULATOR	
No 10-volt regulated output	1. Check for the following: A. Open Q501. B. 12.6 volts. C. Open R7. D. Shorted C4. E. Open CR2.
Output voltage too high, cannot be adjusted by R6	2. A. Check for open VR4. B. Defective R11.
Very low output voltage	3. Check for shorted VR4.
Output voltage equals input voltage	4. Shorted Q501.


1A
A503
A504
TB501
TB1
A501
TB2
TB3
C501
A502
C502
5(G)
4
3
2
1
TB5
3(G)
H2
Q501
B C E
Q503
B C E
W501
J 501
CR501
R
R-Y
CR502
R
T501
BK
R509
F501
XF501
S501
R501
R502
H2
H1
P441
1C
1B

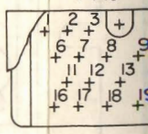

10-VOLT REGULATOR
1A
4
Q501
1E
2B
R12
R8
R10
R9
R11
CR2
Q5
C5
VR
4
C4
A501
1C
1B
2A
3
1D


12.6 VOLT REGULATOR
2A
3A
2B
A502
C2
(+)
H7
H1
R3
R2
VR1
H6
H5
H2
E
B
Q2
C
R1
B
E
Q1
C
H3
R5
R4
H4
C1
(+)
H8
3B
1A
1B
Q503

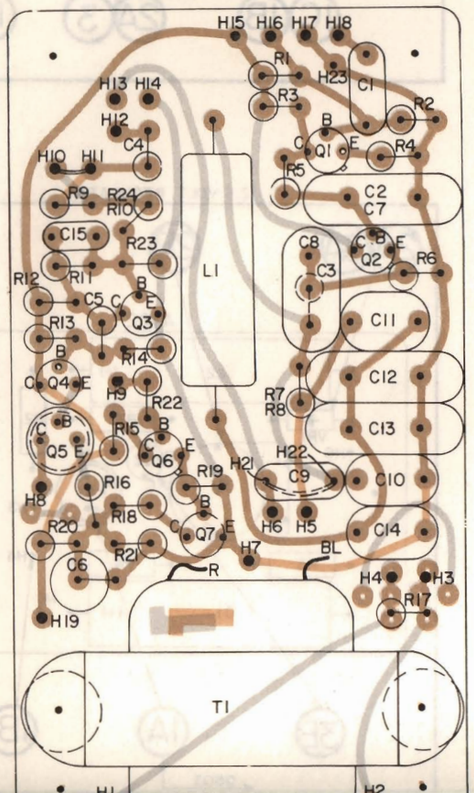


CONTINUITY AND VOLT	
CONTINUITY CHECKS THE FOLLOWING CONTINUITY CHE (S501) IN OFF POSITION AND P	
FROM	TO
TB501-3	P443-6
TB501-4	P443-7
TB501-5	P443-8
TB501-6	P443-9
TB501-7	P443-4
TB501-8	GRD.
TB501-13	GRD.
TB501-14	TB501-15
TB501-16	P443-18
P443-5	P443-10
TB501-13	P443-16
P443-1	GRD.
P443-13	GRD.
P443-14	GRD.
P443-17	GRD.
TB501-12	P443-12
TB501-9	GRD.
VOLTAGE CHECKS THE FOLLOWING VOLTAGE CHECKS RECEIVER AT FULL LOAD CONDIT	
TEST POINT	
TB501-10 TB3-5 TB501-12 TB501-1 / TB501-2 J1 & J2	

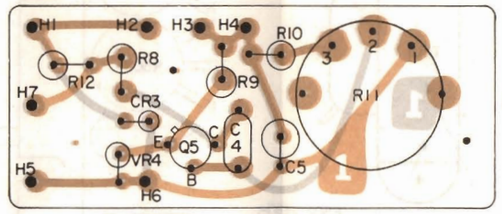
P443



LINE AMPLIFIER A503/A504



10-VOLT REGULATOR A501



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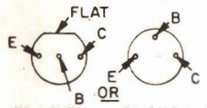
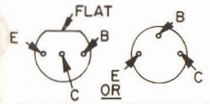
(19A122401, Sh. 2, Rev. 1)

LEAD IDENTIFICATION FOR Q3, Q4 & Q7



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

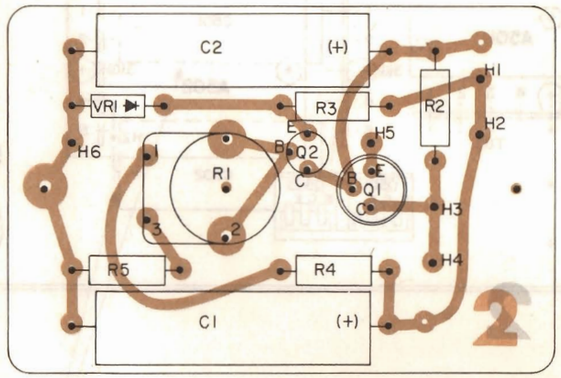
TRANSISTOR LEAD IDENTIFICATION



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

LEAD IDENTIFICATION FOR Q1, Q2, Q5 & Q6

12.6 VOLT REGULATOR A502



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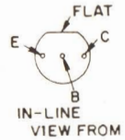
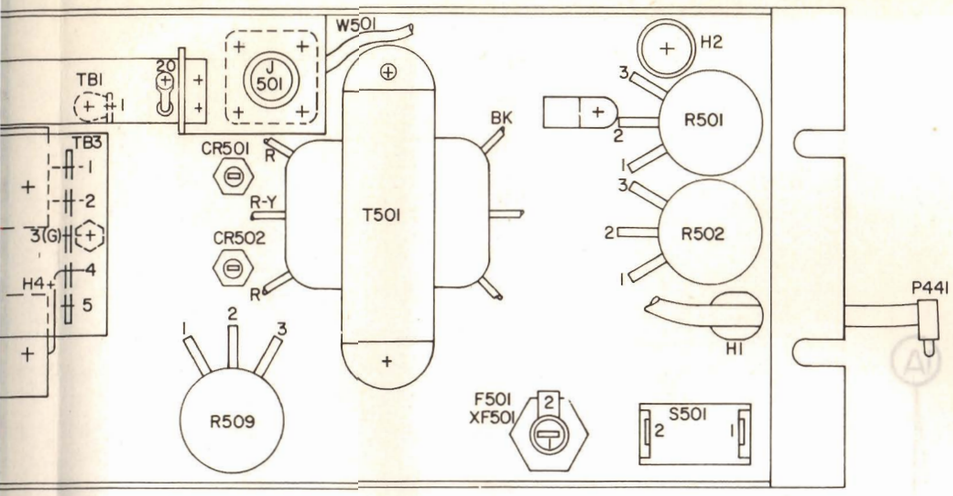
(19B219158, Sh. 2, Rev. 2)

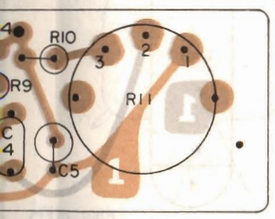
LEAD IDENTIFICATION FOR Q502 ONLY



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

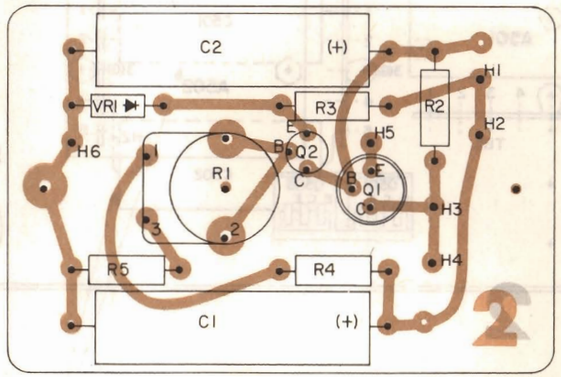


REGULATOR A501



Sh. 1, Rev. 1)
Sh. 2, Rev. 1)

12.6 VOLT REGULATOR A502



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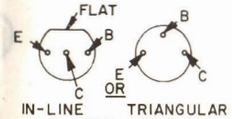
(19B219158, Sh. 2, Rev. 2)

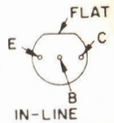
TRANSISTOR LEAD IDENTIFICATION



IN-LINE TRIANGULAR
VIEW FROM LEAD END

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

LEAD IDENTIFICATION FOR Q502 ONLY

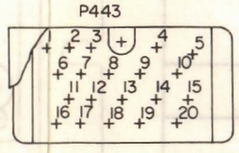


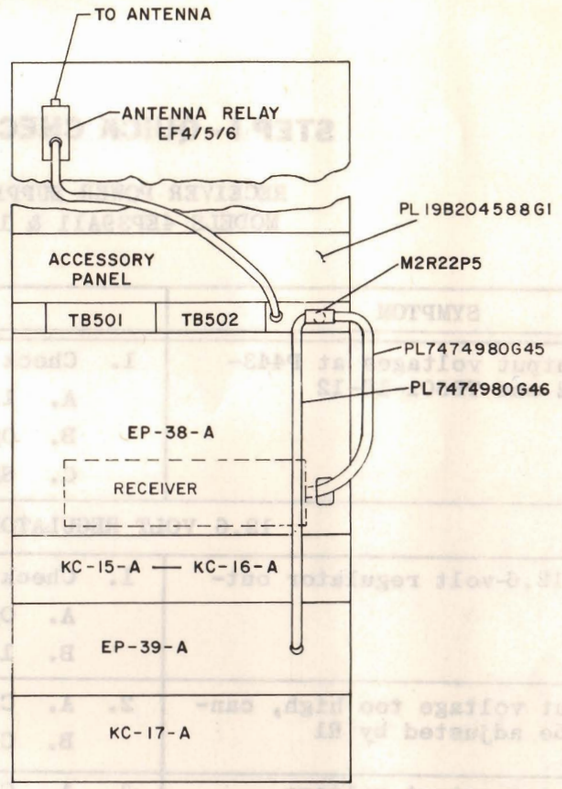
IN-LINE
VIEW FROM LEAD END

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

CONTINUITY AND VOLTAGE CHECKS		
CONTINUITY CHECKS THE FOLLOWING CONTINUITY CHECKS MUST BE MADE WITH SWITCH (S501) IN OFF POSITION AND PLUG P443 DISCONNECTED:		
FROM	TO	RESISTANCE
TB501-3	P443-6	0
TB501-4	P443-7	0
TB501-5	P443-8	0
TB501-6	P443-9	0
TB501-7	P443-4	2.5 K SQUELCH POT MAX
TB501-8	GRD.	0
TB501-13	GRD.	5
TB501-14	TB501-15	14
TB501-16	P443-18	0
P443-5	P443-10	5 K VOL. POT MAX
TB501-13	P443-16	0
P443-1	GRD.	0
P443-13	GRD.	0
P443-14	GRD.	0
P443-17	GRD.	0
TB501-12	P443-12	0
TB501-9	GRD.	0
VOLTAGE CHECKS THE FOLLOWING VOLTAGE CHECKS MUST BE MADE WITH RECEIVER AT FULL LOAD CONDITIONS.		
TEST POINT		READINGS
TB501-10		12.6 VOLTS DC
TB3-5		12.6 VOLTS DC
TB501-12		10 VOLTS REG. DC
TB501-1 / TB501-2		117 VOLTS AC
J1 & J2		10 VOLTS REG. DC

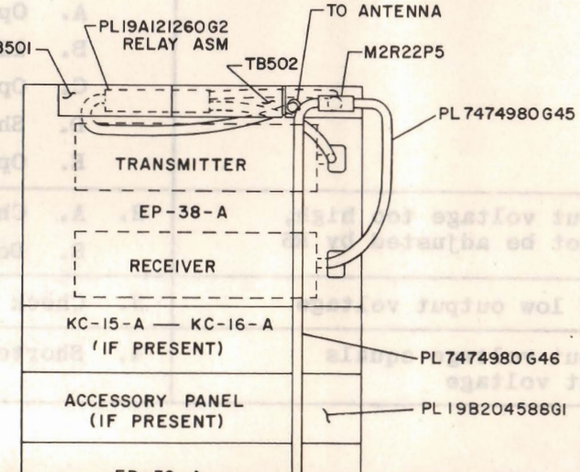
P443

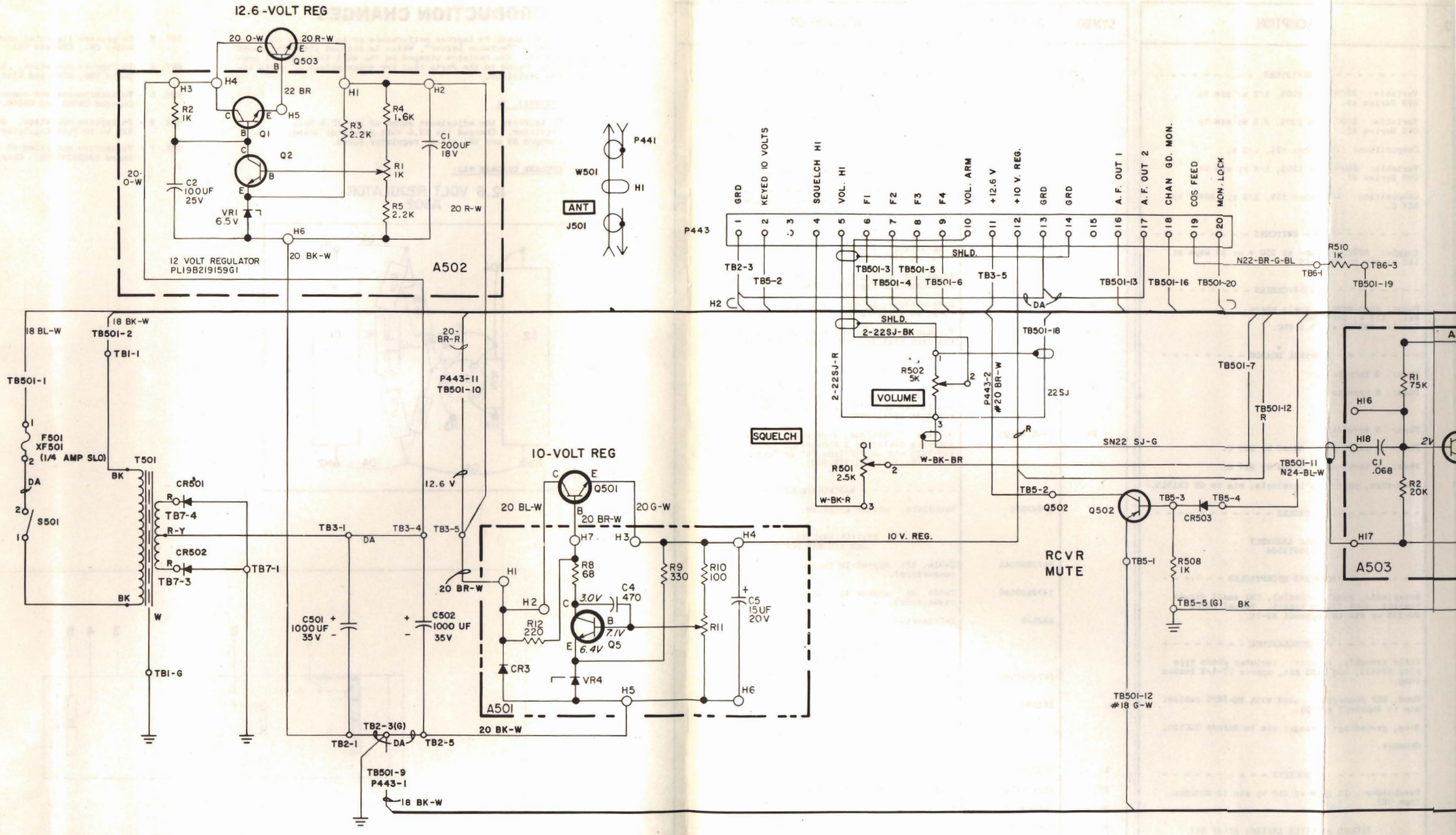




REAR VIEW

ANTENNA WIRING HIGH POWER





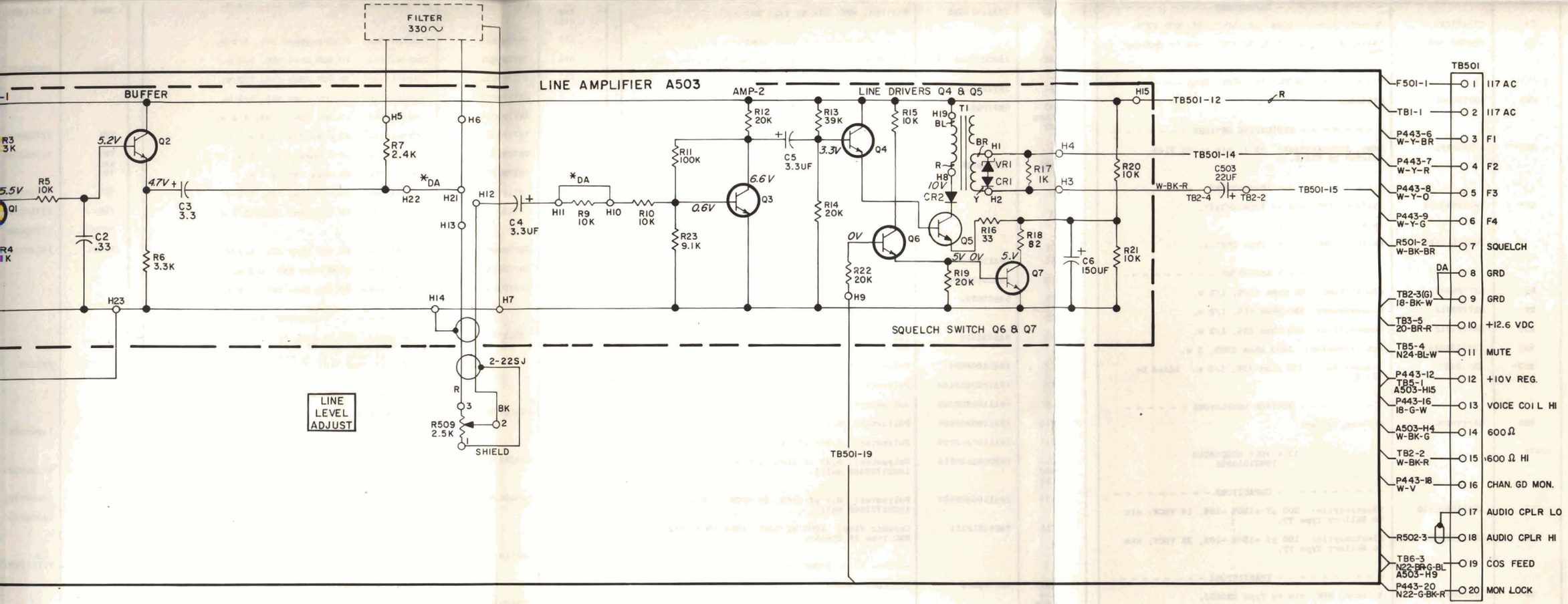
ALL RESISTORS ARE 1/2 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF=MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH=MILLIHENRYS OR H=HENRYS.

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.

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
4EP39A11	F



NOTES:

1. ALL WIRES SF24 UNLESS OTHERWISE SPECIFIED.
2. * JUMPERS REMOVED IN XCC APPLICATION.

VOLTAGE READINGS

THESE READINGS ARE TYPICAL DC READINGS MEASURED FROM TRANSISTOR PINS TO GROUND WITH A 20,000 OHM-PER-VOLT METER, AND WITH NO SIGNAL APPLIED (RECEIVER SQUELCHED).

(19R621330, Rev. 14)

SCHEMATIC DIAGRAM

BASE STATION RECEIVER POWER SUPPLY MODEL 4EP39A11

RT NO.	DESCRIPTION
	- - - - - - - - - - RESISTORS - - - - - - - - - -
	Variable: 2500 ohms ±20%, 1/2 w; sim to CTS Series 45.
	Variable: 5000 ohms ±20%, 3/8 w; sim to CTS Series 45.
J	Composition: 1000 ohms ±5%, 1/2 w.
	Variable: 2500 ohms ±20%, 1/2 w; sim to CTS Series 45.
J	Composition: 1000 ohms ±5%, 1/2 w. Added by REV C.
	- - - - - - - - - - - - SWITCHES - - - - - - - - - -
1	Toggle: SPST, 10 amps at 250 v or 15 amps at 115 v; sim to Hart 164.
	- - - - - - - - - - TRANSFORMERS - - - - - - - - -
4P1	Power, step-down: single phase, Pri: 117 v, 50/60 Hz, Sec 1: 850 ma at 13.8 VDC.
	- - - - - - - - - TERMINAL BOARDS - - - - - - - - -
46	Phen: 2 terminals.
11	Phen: 5 terminals.
55	Phen: 5 terminals.
7	Phen: 3 terminals. Added by REV C.
6	Phen: 4 terminals. Added by REV D.
6P12	Feed-thru, phen: 20 terminals; sim to GE CR151D.
	- - - - - - - - - - - CABLES - - - - - - - - - - -
	CABLE ASSEMBLY 7146725G4
	- - - - - - - - JACKS AND RECEPTACLES - - - - - -
	Receptacle, panel: coaxial, UHF small single contact, mica-filled insert. Signal Corps SO-239 or sim to Amphenol 83-1R.
	- - - - - - - - - - MISCELLANEOUS - - - - - - - - -
35	Cable assembly, coaxial: includes phono type plug (P441), 350 VRMS max, approx 17-1/2 inches long.
	Hood, UHF connector: used with RG-58/U cables; sim to Amphenol 83-765.
	Ring, grounding: orange; sim to Burndy YOC150.
	Grommet.
	- - - - - - - - - - SOCKETS - - - - - - - - - -
	Fuseholder: 15 amps at 250 v; sim to Bussman Type HKP.
	SECOND RECEIVER ANTENNA RELAY KIT 19A121260G2
G2	Relay assembly. Includes:
P1	Relay, armature, coaxial: 12 VDC nominal, 2 w max operating, 100 ohms ±15%, coil res, 1 form C contact rated at 100 w RF at 470 MHz; sim to FXR 300-10977.
P16	Antenna cable, RF: 1900 VRMS max, approx 10 inches long; sim to Amphenol 421-055. (Used with J503).
2	Receiver cable assembly, RF coaxial: includes panel receptacle (J504), 350 VRMS

SYMBOL	GE PART NO.	DESCRIPTION
J503 and J504	2R22P3	Receptacle, panel, coaxial: mica-filled insert, UHF contact. Signal Corps SO-239; sim to Amphenol 83-1R.
	4029082P1	Hood, UHF connector: used with RG-58A/U cables; sim to Amphenol 83-765. (Used with J503 and J504).
P103	7104941P17	Connector: phono type plug.
		FREQUENCY MONITORING KIT 19A121629G7 (1-FREQUENCY TRANSMITTER) 19A121629G8 (2-FREQUENCY TRANSMITTER)
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R1	3R77P180K	Composition: 18 ohms ±10%, 1/2 w. (Used in 19A121629G7).
R2	5493035P10	Wirewound, ceramic: 3.5 ohms ±5%, 5 w; sim to Hamilton Hall Type HR. (Used in 19A121629G7).
R3	3R77P180K	Composition: 18 ohms ±10%, 1/2 w. (Used in 19A121629G8).
R4	5493035P1	Wirewound, ceramic: 5 ohms ±5%, 5 w; sim to Hamilton Hall Type HR. (Used in 19A121629G8).
		- - - - - - - - - - SWITCHES - - - - - - - - - -
S7	5495454P21	Rotary: 2 poles, 3 positions, non-shorting contacts, 2 amps at 25 VDC or 1 amp at 110 VAC; sim to Oak Type "A" or Centralab Series 100. (Used in 19A121629G7).
S8	5495454P20	Rotary: 2 sections, 4 poles, 3 positions, non-shorting contacts, 2 amps at 25 VDC or 1 amp at 110 VAC; sim to Oak Type "A" or Centralab Series 100. (Used in 19A121629G8).
		- - - - - - - - - - MISCELLANEOUS - - - - - - - - - -
	NP243559	Nameplate: etched aluminum.
		STATION ANTENNA CABLE LOW AND MED POWER
	7474980G45	Cable, RF: approx 19 inches (Complete with connectors).
	7474980G46	Cable, RF: approx 40 inches (Complete with connectors).
	2R22P5	T-Connector.
		STATION ANTENNA CABLE HIGH POWER
	7474980G46	Cable, RF: approx 40 inches (Complete with connectors).
	2R22P5	T-Connector.
		MECHANICAL PARTS (SEE RC-1132)
1	19B204374G1	Hinged support. (Used with Receiver).
2	19A121131G2	Support. (Swivel latch for Receiver).
3	19B204619G1	Chassis.
4	5490195P102	Stud.
5	19A121788G1	Support. (Used with Receiver).
6	7142162P81	Hex spacer: No. 4-40. (Used with A501).
7	7142162P71	Hex spacer: No. 6-32. (Used with A502).
8	7878455P1	Lug terminal. (Used with S501).
9	19A127515G1	Terminal board, transistor.
10	N404P11C6	Lockwasher, internal tooth: No. 4.
11	7141225P2	Hexnut: No. 4-40.

PRODUCTION CHANGES

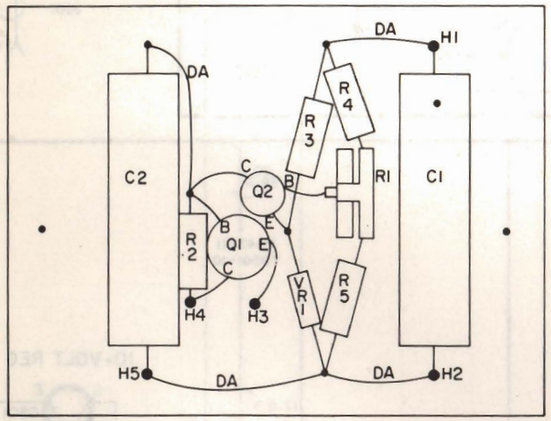
Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter", which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

REV. A - 4EP39A11, 12

To increase the adjustment range of the 12.6 Volt regulator. Changed the 12.6 Volt regulator board. Changed R4 and VR1 on the regulator board.

OUTLINE DIAGRAM WAS:

12.6 VOLT REGULATOR
A502



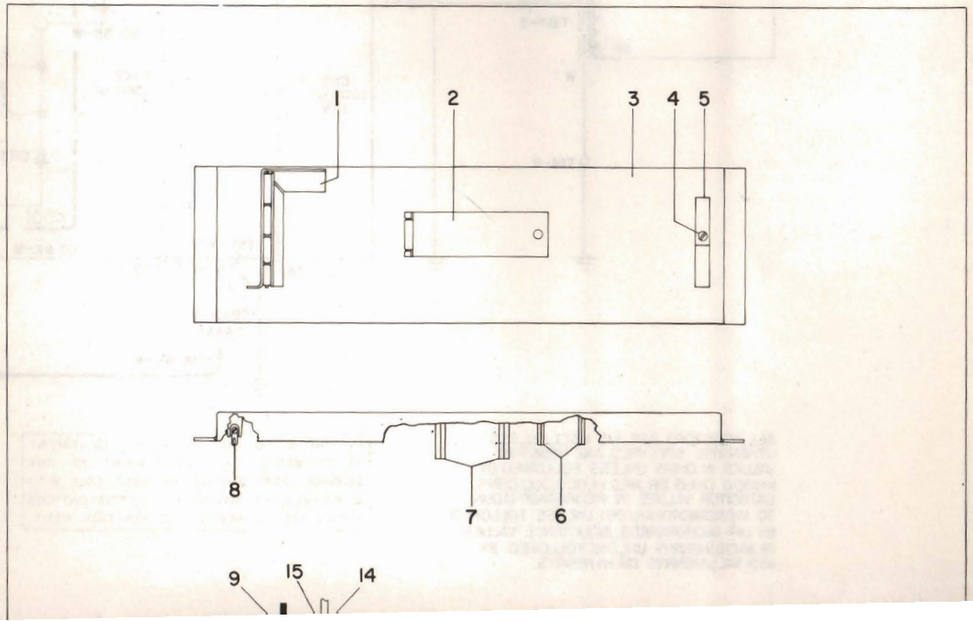
REV. B - To provide lightning protection. Added CR1, CR2 and VR1. Deleted CR504.

REV. C - To improve operation. Added terminal board TB6, C503 and R510.

REV. D - To incorporate new components. Changed CR501 and CR502.

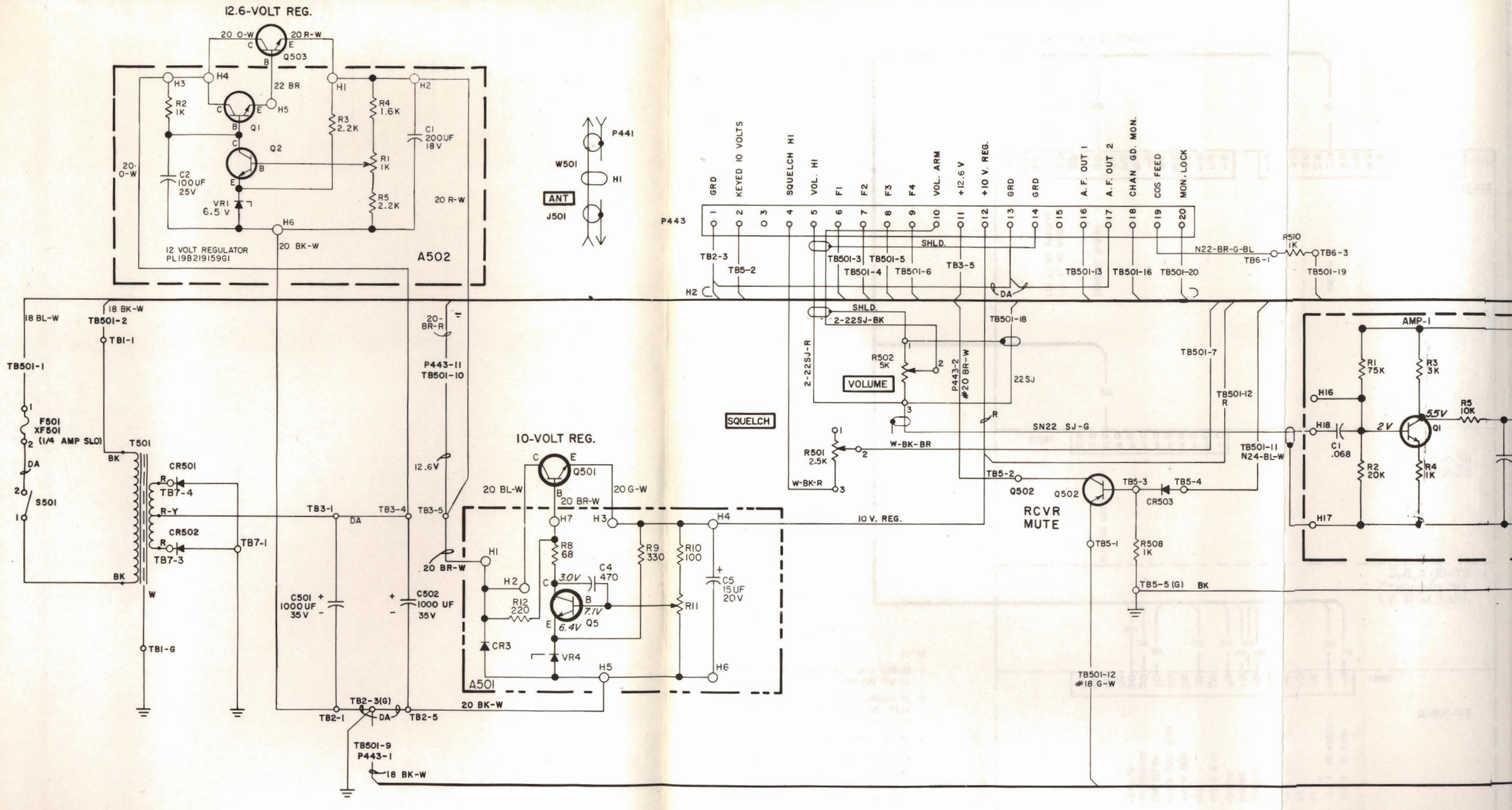
REV. E - To improve operation. Deleted DS1 and added R12 to 10-Volt Regulator Board 19C303420G6.

REV. F - To improve operation of 10-Volt Regulator Board 19C303420G6. Changed Q5.



RECEIVER POWER SUPPLY
MODEL 4EP39A11, 12

SYMBOL	GE PART NO.	DESCRIPTION
A501		10-VOLT REGULATOR 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 - - - - - - - -
CR3	4037822P1	Silicon.
		- - - - - - - - - INDICATING DEVICES - - - - - - - -
DS1*	4034664P1	Lamp, incandescent: 28 v; sim to GE 2148. Deleted by REV E.
		- - - - - - - - - - TRANSISTORS - - - - - - - - - -
Q5*	19A116755P1	Silicon, NPN; sim to Type 2N3947.
		In REV E and earlier:
	19A115123P1	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - -
R8	3R77P680K	Composition: 68 ohms ±10%, 1/2 w.
R9	3R77P331J	Composition: 330 ohms ±5%, 1/2 w.
R10	3R77P101J	Composition: 100 ohms ±5%, 1/2 w.
R11	19A115681P1	Potentiometer: 1000 ohms ±20%, 3 w.
R12*	3R77P221J	Composition: 220 ohms ±5%, 1/2 w. Added by REV E.
		- - - - - - - - VOLTAGE REGULATORS - - - - - -
VR4	4036887P6	Silicon, Zener.
A502*		12.6 VOLT REGULATOR 19B219159G1
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19A115680P10	Electrolytic: 200 µf +150% -10%, 18 VDCW; sim to Mallory Type TT.
C2	19A115680P5	Electrolytic: 100 µf +150% -10%, 25 VDCW; sim to Mallory Type TT.
		- - - - - - - - - - TRANSISTORS - - - - - - - - -
Q1	19A115300P4	Silicon, NPN; sim to Type 2N3053.
Q2	19A115123P2	Silicon, NPN; sim to Type 2N2712.
		- - - - - - - - - - RESISTORS - - - - - - - - -
R1	19B209358P3	Variable, carbon film: approx 25 to 1000 ohms ±20%, 0.2 w; sim to CTS Type U-201.
R2	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R3	3R77P222J	Composition: 2200 ohms ±5%, 1/2 w.
R4*	3R77P162J	Composition: 1600 ohms ±5%, 1/2 w.
		Earlier than REV A:
	3R77P222J	Composition: 2200 ohms ±5%, 1/2 w.
R5	3R77P222J	Composition: 2200 ohms ±5%, 1/2 w.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - - -
VR1	4037887P5	Silicon, Zener.
A503 and A504		LINE AMPLIFIER A503 19C317324G1 (WITHOUT CHANNEL GUARD) A504 19C317324G2 (WITH CHANNEL GUARD)
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C1	19A116080P6	Polyester: 0.068 µf ±20%, 50 VDCW.
C2	19B209243P14	Polyester: 0.33 µf ±20%, 250 VDCW.
C3 thru C5	5496267P9	Tantalum: 3.3 µf ±20%, 15 VDCW; sim to Sprague Type 150D.
C6	5496267P3	Tantalum: 150 µf ±20%, 6 VDCW; sim to Sprague Type 150D.
C7	19A116080P4	Polyester: 0.033 µf ±%, 50 VDCW.
C8	19A116080P108	Polyester: 0.15 µf ±10%, 50 VDCW.
C9	19A116080P106	Polyester: 0.068 µf ±10%, 50 VDCW.
C10	19A116080P107	Polyester: 0.1 µf ±10%, 50 VDCW.
C11	19A116080P106	Polyester: 0.068 µf ±10%, 50 VDCW.
C12 and C13	19B209243P114	Polyester: 0.33 µf ±10%, 250 VDCW. (Used in 19C317324G2 only).
C14	19A116080P107	Polyester: 0.1 µf ±10%, 50 VDCW. (Used in 19C317324G2 only).
C15	5494481P111	Ceramic disc: 1000 pf ±20%, 1000 VDCW; sim to RMC Type JF Discap.
		- - - - - - - DIODES AND RECTIFIERS - - - - - - -
CR1* and CR2*	4037822P2	Silicon. Added by REV B.
		- - - - - - - - - INDUCTORS - - - - - - - - -
L1	19A115690P3	Reactor: 880 mh ind, 120 amp ±15% DC res; sim to Artted AC5672. (Used in 19C317324G2 only).
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q1 and Q2	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q3 and Q4	19A115362P1	Silicon, NPN; sim to Type 2N2925.
Q5	19A115300P1	Silicon, NPN; sim to Type 2N3053.
Q6	19A115123P1	Silicon, NPN; sim to Type 2N2712.
Q7	19A115362P1	Silicon, NPN; sim to Type 2N2925.
R1	3R77P753J	Composition: 75,000 ohms ±5%, 1/2 w.
R2	3R77P203J	Composition: 20,000 ohms ±5%, 1/2 w.
R3	3R77P302J	Composition: 3000 ohms ±5%, 1/2 w.
R4	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R5	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R6	3R77P332K	Composition: 3300 ohms ±10%, 1/2 w.
R7 and R8	3R77P242J	Composition: 2400 ohms ±5%, 1/2 w.
R9 and R10	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R11	3R77P104J	Composition: 0.10 megohms ±5%, 1/2 w.
R12	3R77P103J	Composition: 10,000 ohms ±5%, 1/2 w.
R13	3R77P393J	Composition: 39,000 ohms ±5%, 1/2 w.
R14	3R77P203J	Composition: 20,000 ohms ±5%, 1/2 w.
R15	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R16	3R77P330J	Composition: 33 ohms ±5%, 1/2 w.
R17	3R77P102J	Composition: 1000 ohms ±5%, 1/2 w.
R18	3R77P820J	Composition: 82 ohms ±5%, 1/2 w.
R19	3R77P203J	Composition: 20,000 ohms ±5%, 1/2 w.
R20 and R21	3R77P103K	Composition: 10,000 ohms ±10%, 1/2 w.
R22	3R77P203J	Composition: 20,000 ohms ±5%, 1/2 w.
R23	3R77P912J	Composition: 9100 ohms ±5%, 1/2 w.
R24	3R77P203J	Composition: 20,000 ohms ±5%, 1/2 w.
		- - - - - - - - - TRANSFORMERS - - - - - - - - -
T1	19A115672P1	Audio freq: 300 to 6000 Hz, Pri: 9.0 ohms ±15% DC res, Sec 1: 15 ohms ±15% DC res, Sec 2: 15 ohms ±15% DC res.
		- - - - - - - - VOLTAGE REGULATORS - - - - - - - -
VR1*	19A116325P4	Diode, silicon, Zener: sim to 1N5349. Added by REV B.
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C501 and C502	5493132P1	Tubular: 1000 µf +250% -15%, 35 VDCW; sim to GE 43F2066AA1.
C503*	5496267P10	Tantalum: 22 µf ±20%, 15 VDCW; sim to Sprague Type 150D. Added by REV C.
		- - - - - - - - DIODES AND RECTIFIERS - - - - - - - -
CR501* and CR502*	19A116783P1	Silicon.
		In REV C and earlier:
	4037898P2	Silicon.
CR503	19A115250P1	Silicon.
CR504*	19A116062P3	Selenium. Deleted by REV B.
		- - - - - - - - - - FUSES - - - - - - - - - -
F501	7487942P1	Slow blowing: 1/4 amp at 250 v; sim to Bussman MDL-1/4.
		- - - - - - - - - - PLUGS - - - - - - - - - -
P443	19C303506P1	Connector, phen: 20 contacts rated at 5 amps max at 600 VDC.
	19A121589G1	Cover.
		- - - - - - - - - TRANSISTORS - - - - - - - - -
Q501	19A116118P1	Silicon, NPN.
Q502	19A116768P1	Silicon, PNP.
R501	2R75P10	Var CTS
R502	2R76P12	Var CTS
R508	3R77P102J	Comp
R509	2R75P10	Var CTS
R510*	3R77P102J	Comp REV
S501	7144140P1	Togg 115
T501	19B209074P1	Powe Pri Sec
TB1	7775500P46	Pher
TB2 and TB3	7775500P11	Pher
TB5	7775500P55	Pher
TB6*	7775500P7	Pher
TB7*	7775500P6	Pher
TB501	19C301086P12	Feed
W501		
J501	2R22P3	Rece cont SO-2
	7488600P135	Cabl plug long
	4029082P1	Hood sim
	7489477P8	Ring
	5490407P2	Grom
XF501	7115179P1	Fuse Type
K504	19B204628G2	Rela
	19C307103P1	Rela 2 w 1 fe sim
	19B209044P16	Ante 10 1 (Use
	5491689P52	Rece incl max
	19B209044P16	Tran appr 421-



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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.

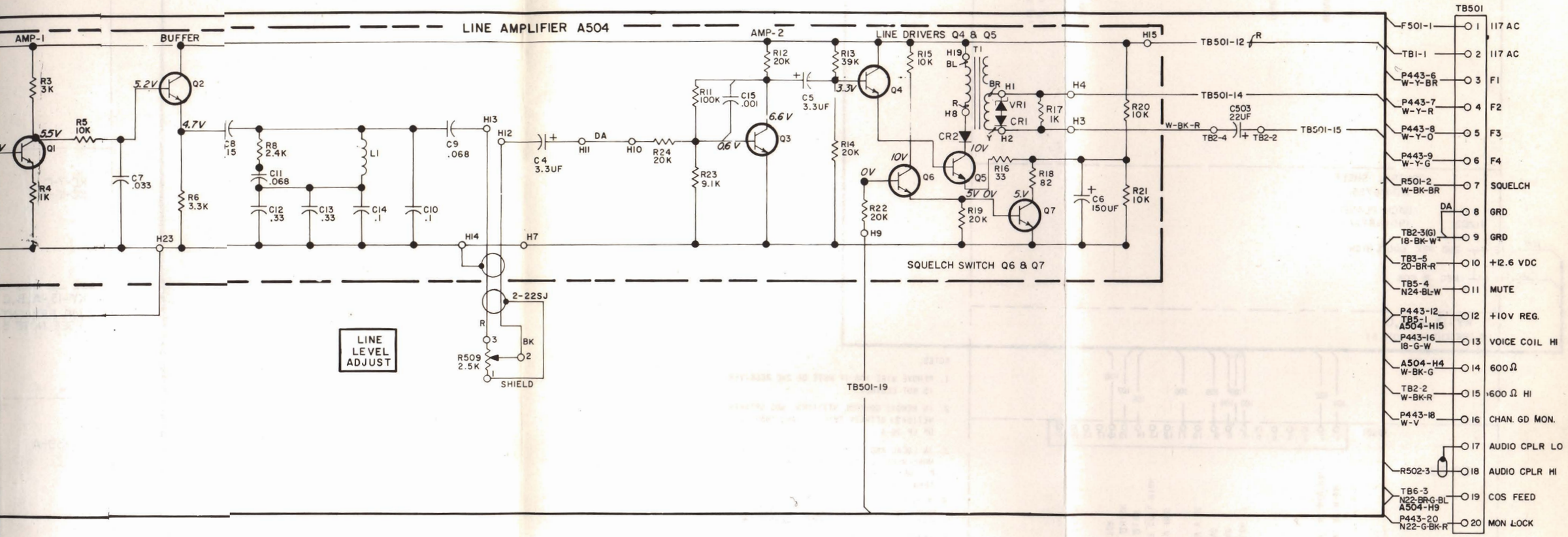
SEE APPLICABLE PRODUCTION CHANGE SHEETS IN INSTRUCTION BOOK SECTION DEALING WITH THIS UNIT, FOR DESCRIPTION OF CHANGES UNDER EACH REVISION LETTER.

THIS ELEM DIAG APPLIES TO	
MODEL NO	REV LETTER
4EP39A12	F

NOTE:
ALL WIRES SF24 UNLESS OTHERWISE SPECIFIED.

VOLTAGE READINGS

THESE READINGS ARE TYPICAL DC READINGS MEASURED FROM TRANSISTOR PINS TO GROUND WITH A 20,000 OHM-PER-VOLT METER, AND WITH NO SIGNAL APPLIED (RECEIVER SQUELCHED).



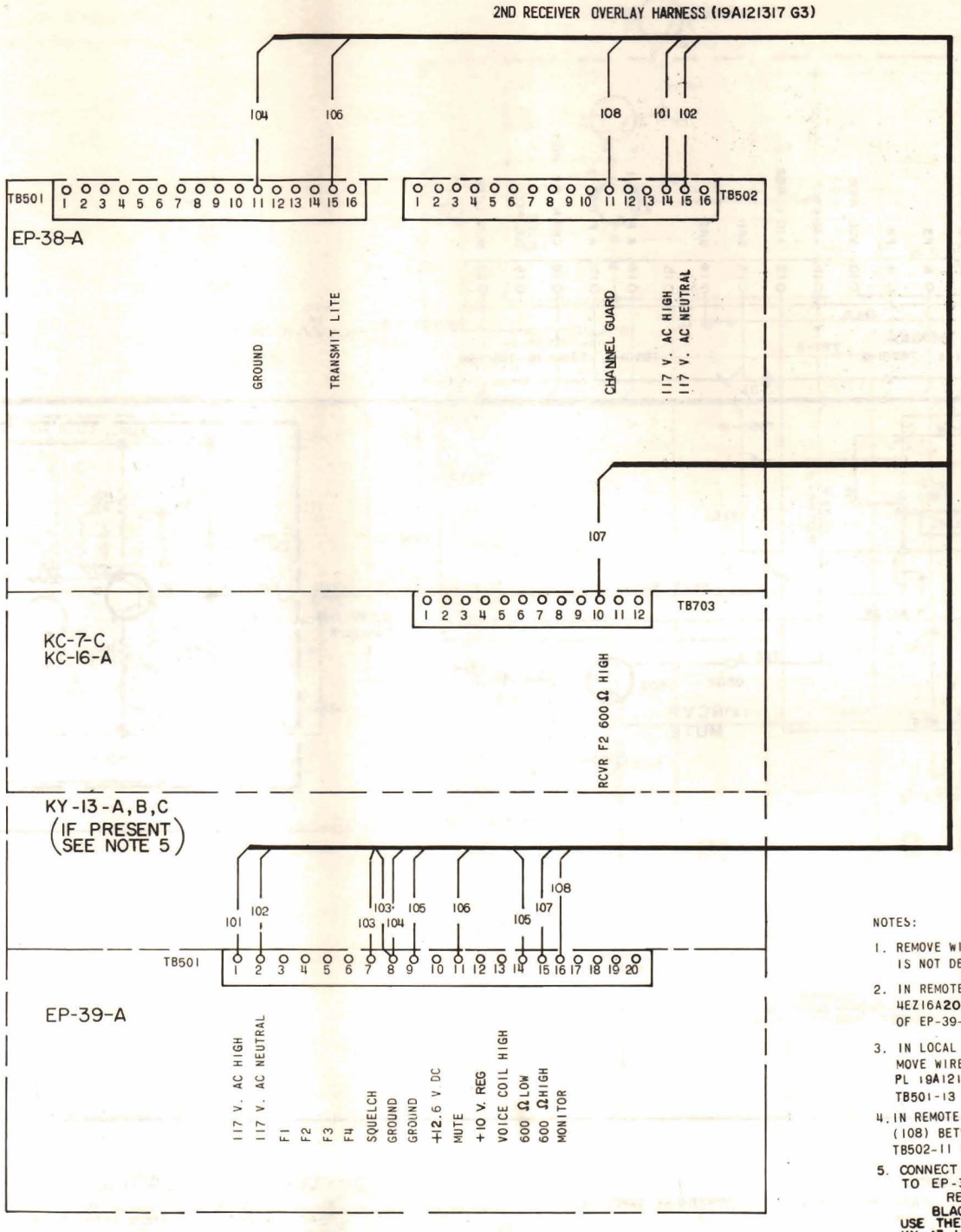
EADINGS

TYPICAL DC
FROM TRANSISTOR
A 20,000 OHM-
WITH NO
EIVER SQUELCHED).

(19R621329, Rev. 12)

SCHEMATIC DIAGRAM

BASE STATION RECEIVER POWER SUPPLY



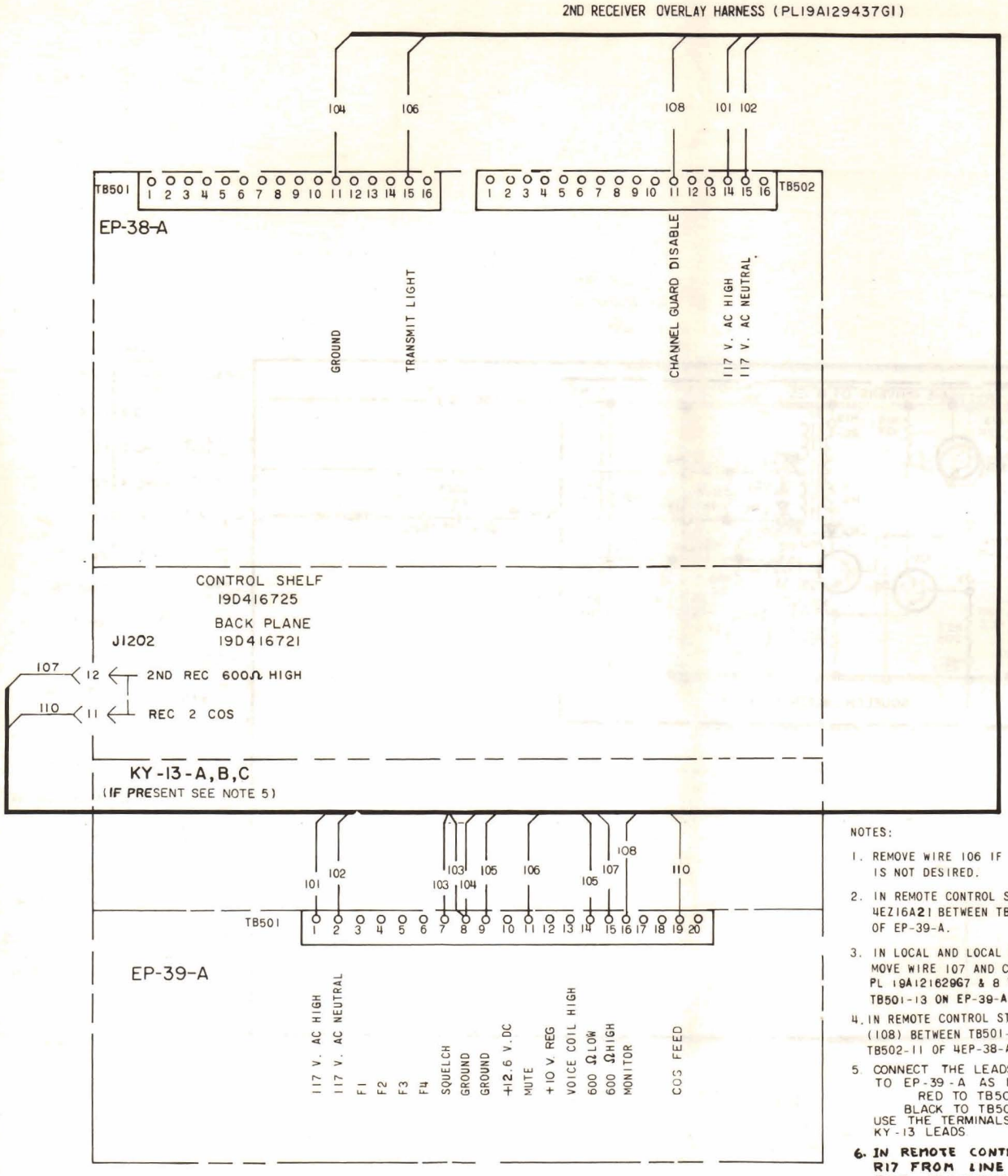
NOTES:

1. REMOVE WIRE 106 IF MUTE OF 2ND RECEIVER IS NOT DESIRED.
2. IN REMOTE CONTROL STATIONS, ADD SPEAKER 4EZ16A20 BETWEEN TB501-13 AND TB501-9 OF EP-39-A.
3. IN LOCAL AND LOCAL REMOTE STATIONS, REMOVE WIRE 107 AND CONNECT SWITCH KIT PL 19A121629G7 & 8 WIRE #18 BL-W TO TB501-13 ON EP-39-A.
4. IN REMOTE CONTROL STATIONS, REMOVE WIRE (108) BETWEEN TB501-16 OF 4EP-39-A TO TB502-11 OF 4EP-38-A.
5. CONNECT THE LEADS HANGING FROM KY-13 TO EP-39-A AS FOLLOWS:
   RED TO TB501-12
   BLACK TO TB501-9
   USE THE TERMINALS SUPPLIED WITH THE KY-13 LEADS.

(19D402362, Rev. 5)

INTERCONNECTION DIAGRAM

BASE STATION RECEIVER POWER SUPPLY
MODELS 4EP39A11 & 12
(FOR DM, PM & VM STATION COMBINATIONS)



NOTES:

1. REMOVE WIRE 106 IF MUTE OF 2ND RECEIVER IS NOT DESIRED.
2. IN REMOTE CONTROL STATIONS, ADD SPEAKER 4EZ16A21 BETWEEN TB501-13 AND TB501-9 OF EP-39-A.
3. IN LOCAL AND LOCAL REMOTE STATIONS, REMOVE WIRE 107 AND CONNECT SWITCH KIT PL 19A121629G7 & 8 WIRE #18 BL-W TO TB501-13 ON EP-39-A.
4. IN REMOTE CONTROL STATIONS, REMOVE WIRE. (108) BETWEEN TB501-16 OF 4EP-39-A AND TB502-11 OF 4EP-38-A, **PER 19A129529.**
5. CONNECT THE LEADS HANGING FROM KY-13 TO EP-39-A AS FOLLOWS:
   RED TO TB501-12
   BLACK TO TB501-9
   USE THE TERMINALS SUPPLIED WITH THE KY-13 LEADS
6. **IN REMOTE CONTROL STATIONS REMOVE R17 FROM LINE AMP OF EP-39-A PER 19A129529.**

(19D416817, Rev. 1)

INTERCONNECTION DIAGRAM

BASE STATION RECEIVER POWER SUPPLY
MODELS 4EP39A11 & 12
(FOR DT, PT & VT STATION COMBINATIONS)

ORDERING SERVICE PARTS

Each component appearing on the schematic diagram is identified by a symbol number, to simplify locating it in the parts list. Each component is listed by symbol number, followed by its description and GE Part Number.

Service parts may be obtained from Authorized GE Communication Equipment Service Stations or through any GE Radio Communication Equipment Sales Office. When ordering a part, be sure to give:

1. GE Part Number for component
2. Description of part
3. Model number of equipment
4. Revision letter stamped on unit

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance.

Should further information be desired, or should particular problems arise which are not covered sufficiently for the purchaser's purposes, contact the nearest Radio Communication Equipment Sales Office of the General Electric Company.

MAINTENANCE MANUAL

LBI-4172

DF-0060

MOBILE RADIO DEPARTMENT
GENERAL ELECTRIC COMPANY • LYNCHBURG, VIRGINIA 24502

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