GENERAL DESCRIPTION

The Westrex RA-1713 Auxiliary Electronics is designed for use with Westrex RA-1712 Photographic Sound Recording Electronics. The two units form the electronics portion of the Westrex 9000 Series Photographic Recording System. The RA-1713 cannot be used independently of the RA-1712, except for the record lamp supply. The RA-1713 interfaces with the RA-1712 at a standard level and after the preliminary band limiting of the RA-1712. The RA-1713 can inject a cross-modulation signal at a desired level, independent of the input level adjustment set on the RA-1712.

The RA-1713 comprises five subsystems: a function/cross-modulation signal generator, a signal compressor/limiter, a cross-modulation correction circuit, a monitor system for direct and photoelectric monitoring of the recorded signal, and a current regulated record lamp supply.

FUNCTION/CROSS-MODULATION GENERATOR

The RA-1713 input signal is fed from the RA-1712 at a reference level of 1.8V peak-to-peak (P-P) at 1 kHz corresponding to 100% optical track modulation. The ON/OFF toggle switch at the right side selects either the input signal from the RA-1712 or the output of the function/cross-modulation generator. In the OFF position, the X-MOD generator circuit is disconnected from the system and is not powered, thus removing any possibility of its output interfering with program material. The RA-1713 provides cross-modulation signals at 4, 6, 8 and 10 kHz. The level of the signals is controlled by the LEVEL control. Their relative levels are internally set.

MONITOR CIRCUIT

The RA-1713 provides monitoring of either the input signal or the photocell monitored recorded signal. The levels of these signals are adjusted independently by two front panel controls labeled REC. LEVEL and DIR. LEVEL. A front panel monitor REC. EQ. switch is provided to cancel pre-emphasis in the RA-1712; it should be set to the same setting as the RA-1712 EQUALIZATION switch. A MODE switch allows either direct or record monitoring. The photocell input for record monitoring comes from a silicon photocell in the Westrex film recorder connected to a terminal strip on the RA-1713. The monitor provides up to =20 dBm output at 600 Ω.

COMPRESSOR/LIMITER

The RA-1713 compressor/limiter provides up to 12-dB compression in 4 steps of 3 dB each. In the OFF position, the circuit is switched completely out of the system. The limiter is designed specifically for use in photographic sound

recording, and allows a significant increase in average program level while preventing valve clash on occasional peaks. For example, operation in position 2 will allow raising average program level 3 to 4dB without valve clash distortion.

The RA-1713 compressor circuit may be internally reset to provide more or less compression than the 3-dB step provided from the factory. To reset requires adjustment of two internal trimpots, R1 and R2. Trimpot R1 adjusts the amount of compression provided, while trimpot R2 adjusts the compressor output so that before compression begins, the input and output of the compressor are the same.

To make the adjustments, the RA-1713 must be connected to a RA-1712. A 1 kHz signal source capable of delivering +14 dBm should be connected to the RA-1712 input. For the adjustments, the RA-1712 polarity switch should be in the STANDBY position. All other circuits should be in their normal record position with the RA-1712 meter in the IN position. With the compressor in the OFF position, the input signal level should be adjusted to 100 on the IN meter. Turn the compressor switch on the RA-1713 to position 4; the RA-1712 meter level will drop. The input level may now be increased until the meter again reads 100 on the RA-1712 meter. The dB increase is the amount of added level provided in position 4 of the compressor. If more compression is desired, turn trimpot R1 to decrease the meter reading. Turn the compression off and reduce the input signal level to 50% modulation, then turn the compressor to setting 4 and adjust trimpot R2 so that the RA-1712 reads 50% with the same input. This process may be repeated until the desired compression is achieved.

CROSS-MODULATION CORRECTION CIRCUIT

The cross-modulation correction circuit provides up to 20% cross-modulation distortion correction in 4 steps of 5% each. The circuit is designed for use primarily in making direct positive sound tracks, although it may be used in some circumstances in making conventional negative sound tracks.

LAMP SUPPLY

The RA-1713 incorporates a 10-amp current regulated lamp supply. A digital readout displays the lamp current directly in amperes, calibrated in hundredths of amperes. The current level is controlled by a 10-turn LAMP control. The peak output current is normally limited to 7.5 amps, but can be increased to 10 amps. This modification is detailed in the INSTALLATION section.

INSTALLATION

Refer to "Electronics Interconnection Diagram". The RA 1713 is connected to the RA-1712 via single conductor shielded cables. Before connecting the RA-1713 to the RA-1712, remove the capacitor that is between the two outside

terminals of the center, three-terminal block on the back of the RA-1712. The right terminal of this terminal block on the RA-1712 should be connected to the left terminal of the RA-1713 using one of the shielded cables. The shield of the cable should be connected to the center terminals of both the RA-1712 and RA-1713 terminal blocks. The left terminal of the RA-1712 should be connected to the right terminal of the RA-1713 using the other shielded cable; the shield connects only to the RA-1713.The RA-1713 is connected

The RA-1713 is connected to the silicon photocell monitor in the Westrex recorder via a similar 22 Ga. shielded cable. The shield should be connected to the black photocell lead as close to the photocell as possible and the center conductor to the red lead. The shield is connected to the PC -terminal on the back of the RA-1713 and the red lead to the PC +terminal. All leads should be as short as possible!

The monitor output of the RA-1713 is unbalanced. The output may be connected to a power amplifier or to any 600 Ω or higher input load. If a power amplifier is used and is grounded, the monitor GND of the RA-1713 should be connected to the power amplifier ground and the amplifier ground isolated from line ground. The monitor circuit can supply up to +20 dBm into a 600 Ω load. The other six-terminal connector on the back of the RA-1713 is connected to the eight-terminal connector on the lamp supply, using the cable supplied with the unit.

The lamp supply must be cooled by a fan drawing air over the supply if it is mounted in an enclosure that does not provide free airflow. The supply will dissipate up to 70m watts of heat, and the 2" x 14" area must not rise more that 50˚C above 20˚C.

The RA-1713 is fused by a 3AG 4-amp slow blow fuse for operation at 110 VAC, 60 Hz. The RA-1713 is normally supplied for operation on 110 VAC. For 220 VAC operation the jumpers between terminals 1 to 3, and 2 to 4 on the transformers of both power supplies of the RA-1713, must be removed and single jumpers installed between transformer terminals 2 and 3 on both supplies. The other wires connected to the transformer primary should not be moved, as they provide power to the pilot light. For 220 VAC operation, a 2-amp slow blow fuse should be used.

The RA-1713 lamp supply is connected to the record lamp using 14 Ga. or larger wires from the lamp supply terminal strip. It is very important that neither side of the circuit is grounded. Improper operation and possible damage may result if either side is grounded.

LAMP CURRENT INCREASE MODIFICATION

Refer to the Power-One, Model HE1210.2 power supply. This supply is about 14 inches (355 mm) long. At one end (the opposite end from the transformer) are

located three power resistors. Two of them are 1 Ω, 50 watt, and the other is .1 Ω, 10 watt. Enclosed with the system is a .1 Ω, 10 watt power resistor. Remove the two power resistors (1Ω, 50 watt) and install the .1 Ω 10 watt resistor in their place. New holes will probably have to be drilled in order to mount the resistor. The resistor must be mounted to the chassis to absorb the heat. This new resistor is electrically connected in place of the two resistors.

With reference to the schematic "RA-1713 Auxiliary Electronics, Record Lamp Supply Circuit", R103 and R104 are removed and replaced with the new resistor.

On the PC board will be seen an IC, type 723. Two white wires run from this IC to the terminal strip. One wire connects to terminal #4 and the other to terminal #5. Locate the wire where it connects to terminal #4; a short length of black tubing covers a resistor. Remove the lug and resistor from the terminal. The resistor will be 4.7 KΩ, ¼ watt. Replace this resistor with the resistor found with the system. The new resistor is 20 KΩ, ¼ watt.

With reference to the schematic, R101 is removed and replaced with the new resistor.

The modification is now complete. Before turning power on, be sure the LAMP control is turned fully ccw, or all the way down, to avoid burning out the enclosure lamp. Then check operation and finally close up the system.

OPERATION

Before turning the RA-1713 on for the first time, turn the LAMP control fully ccw. Turn power on, lamp current should be just under 3 amps.

It is possible that the interconnections between the RA-1713 and RA-1712 are reversed. No damage will result, but no signal will be processed through the RA-1713. If this is the case, merely interchange the left and right wires at the interconnect strip at the RA-1712.

The lamp current digital meter has greater accuracy than analog meters. For this reason, density tests should be performed to arrive at proper lamp currents. Cross-modulation tests may also be made at this time.

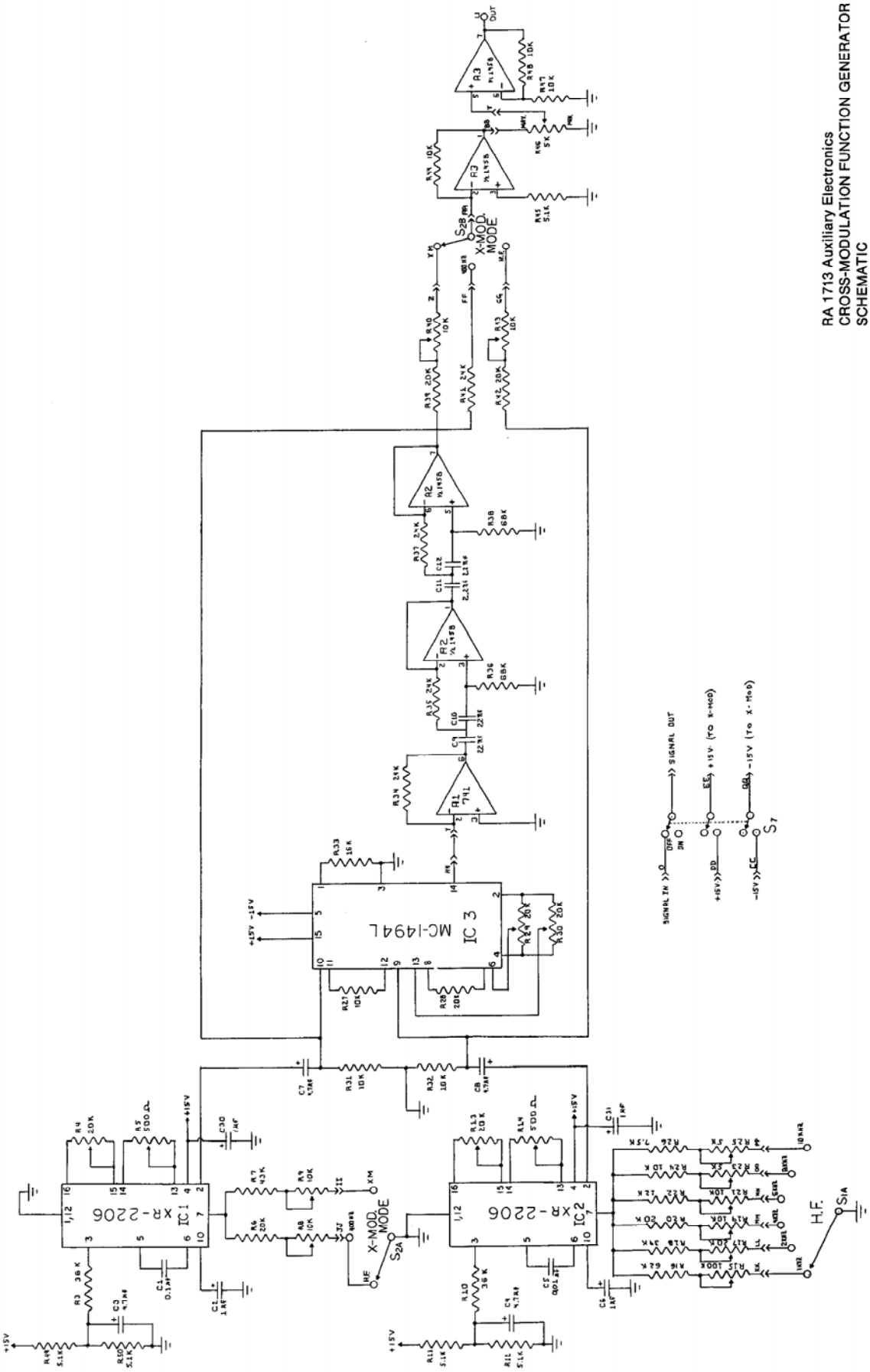
For normal system operation, the following switches should be set to OFF: RECORD EQ, COMPRESSOR, X-MOD, CORR., and X-ModGenerator switch.

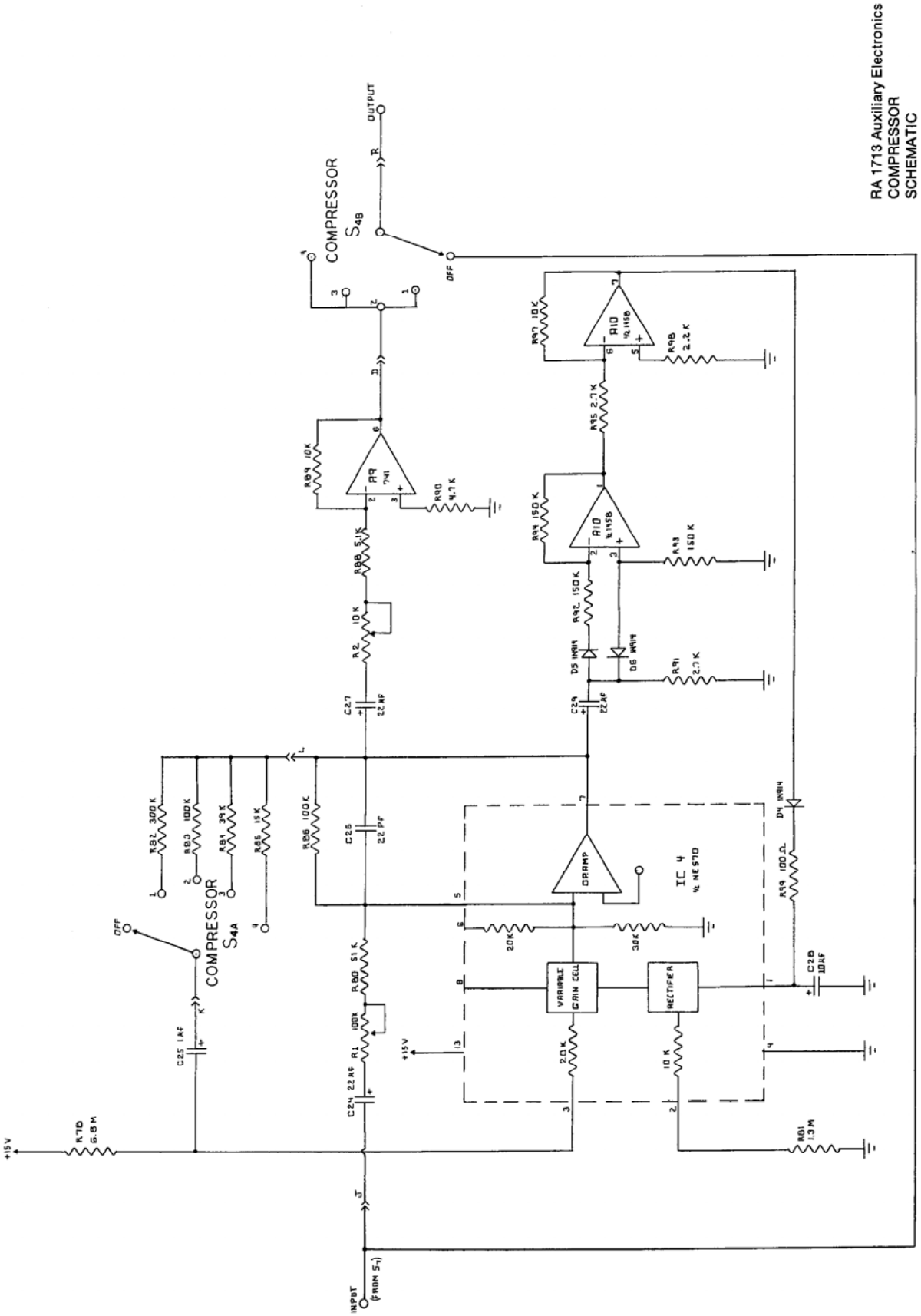
For cross-modulation or level tests, turning the generator ON interrupts the normal signal flow and inserts the cross-modulation generator. The generator may be used to set levels "400 Hz", check HF response "H.F." and as a cross-mod. Generator "XM". The output level is set as required by "LEVEL".

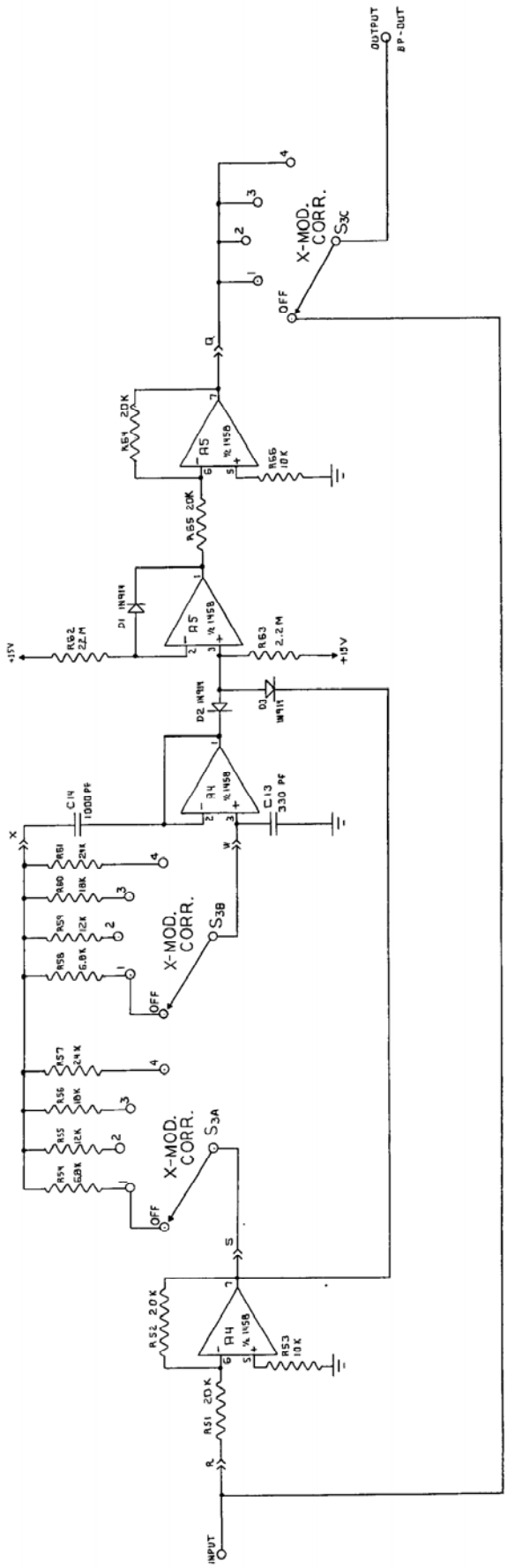
The compressor is expressly designed for photographic sound recording and should be used according to the program material. Listening to different types of program material with various settings of the COMPRESSOR switch will show the effects of the compressor circuit.

For normal recording, the X-MOD CORR. is not used. The primary use is during recording of electro-prints or direct positives. Proper settings can only be determined by trial and experimentation. The correction circuit provides up to 20% distortion correction, or "pre-distortion" of the signal.

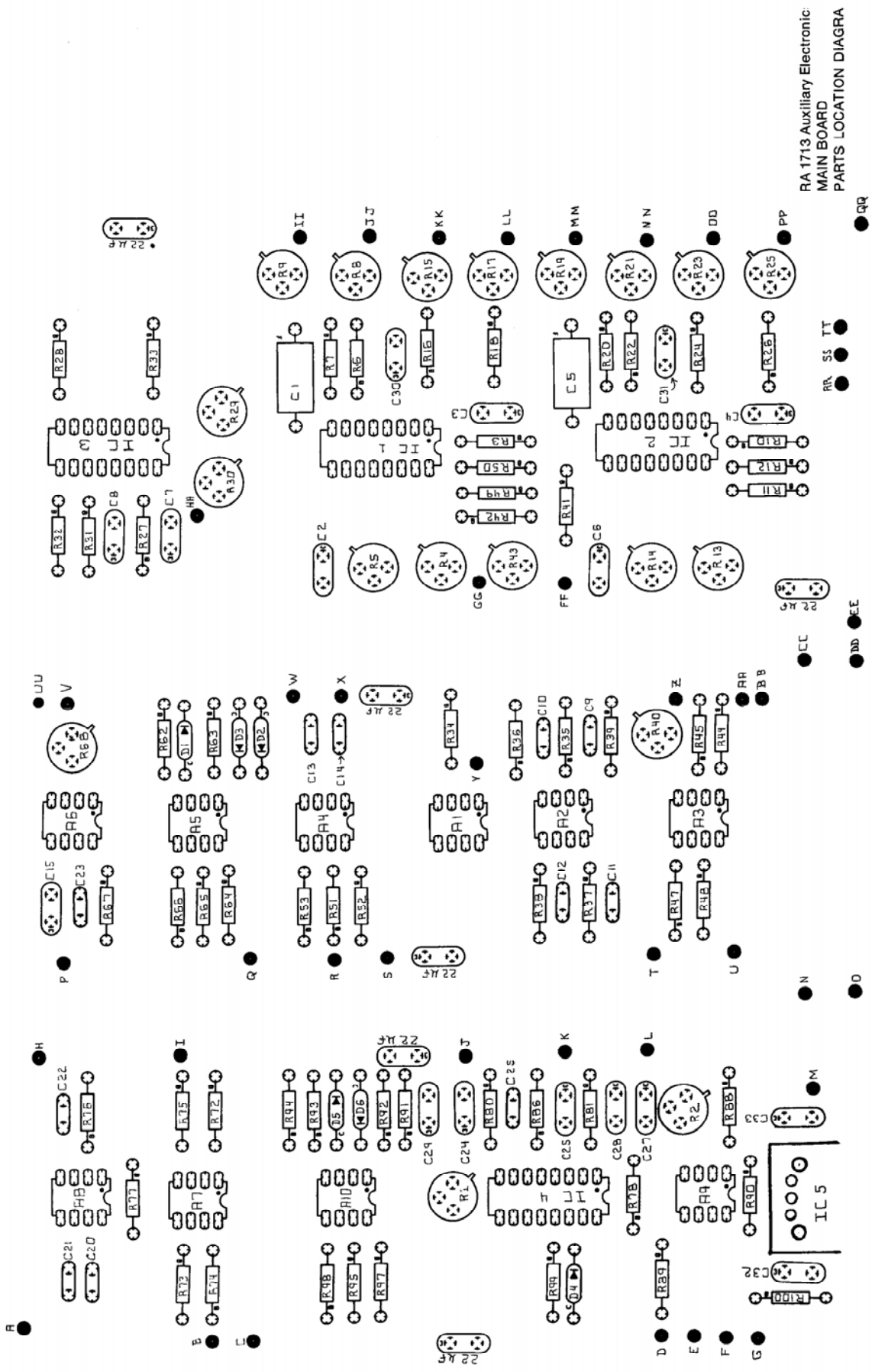
The monitor system in DIR position monitors the input signal before processing by the RA-1713. In the REC position the PEC signal is monitored. This is, of course, derived from the optical beam directed to the film and is most useful during recording or tests. The REC. EQ should be set to the same dial position as the EQUALIZATION switch on the RA-1712. The film loss equalization will be compensated, and a flat monitor will then be heard.

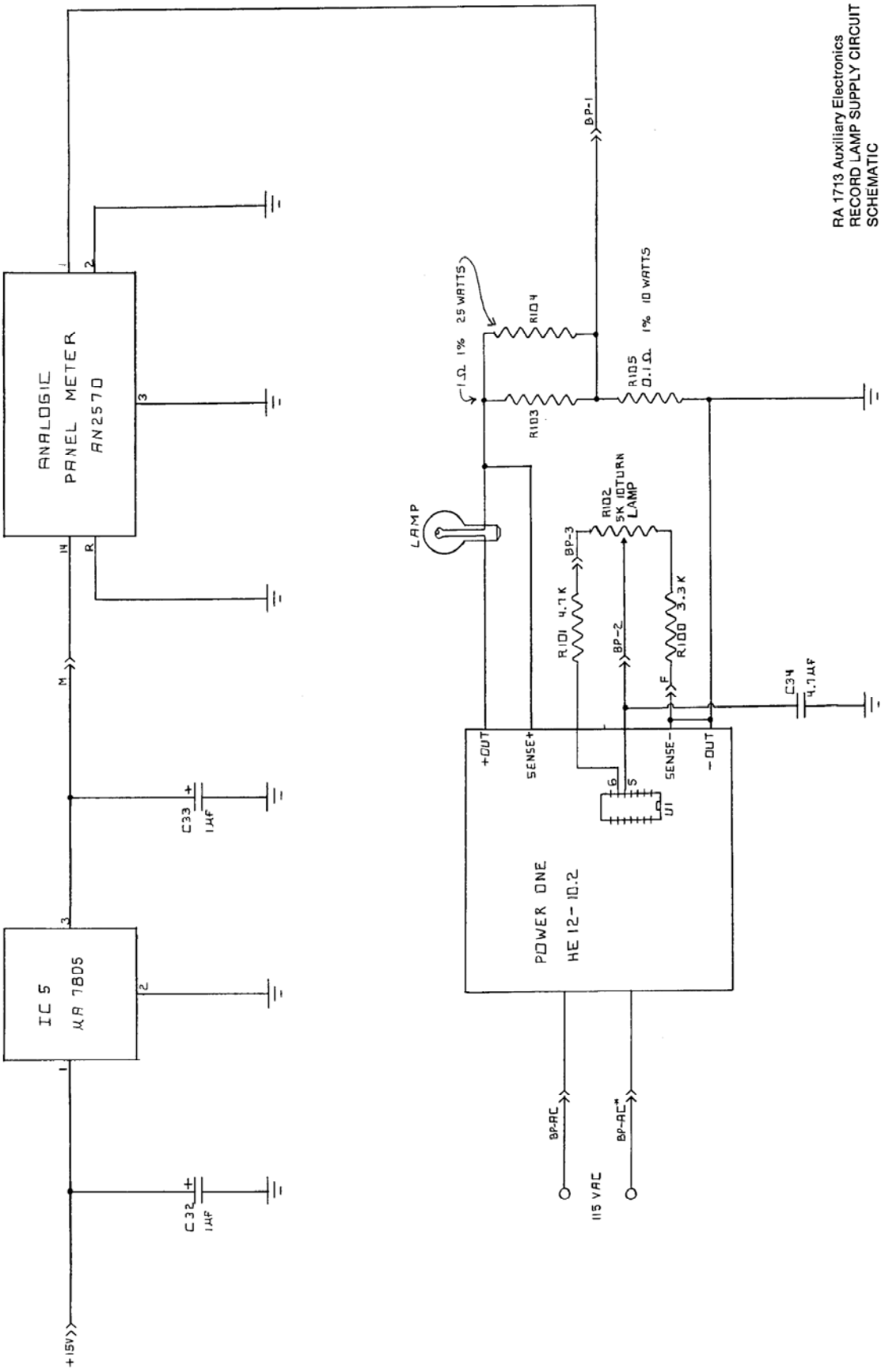

RA 1713 Auxiliary Electronics
CROSS-MODULATION FUNCTION GENERATOR
SCHEMATIC
IC 3
MC-1494L
IC 1
XR-2206
IC 2
XR-2206
X-MOD. MODE
H.F.
SIGNAL OUT
+15V (TO X-MOD)
-15V (TO X-MOD)
SIGNAL IN
+15V
-15V


RA 1713 Auxiliary Electronics
COMPRESSOR
SCHEMATIC
COMPRESSOR
S4B
COMPRESSOR
S4A
OUTPUT
INPUT
(FROM S4)
OFF
VARIABLE
GAIN CELL
RECTIFIER
OPAMP
IC 4
NE570
+15V



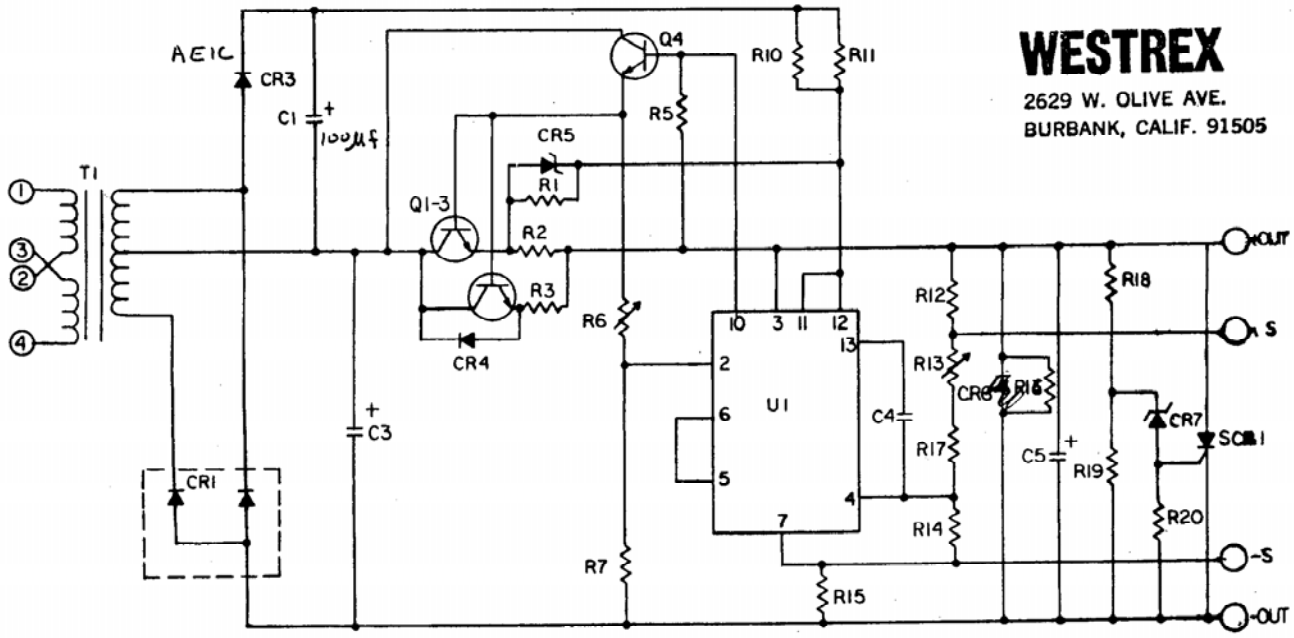
RA 1713 Auxiliary Electronics
CROSS-MODULATION CORRECTION CIRCUIT
SCHEMATIC


RA 1713 Auxiliary Electronic
MAIN BOARD
PARTS LOCATION DIAGRA
IC 5


RA 1713 Auxiliary Electronics
RECORD LAMP SUPPLY CIRCUIT
SCHEMATIC
ANALOGIC
PANEL METER
AN2570
IC 5
μA 7805
+15V
C32
1μF
C33
1μF
POWER ONE
HE 12-10.2
+OUT
SENSE+
SENSE-
-OUT
U1
LAMP
R104
1Ω 1% 25 WATTS
R103
R105
0.1Ω 1% 10 WATTS
R102
5K IOTURN
LAMP
R101 4.7K
R100 3.3K
C34
4.7μF
BP-1
BP-2
BP-3
BP-AC
BP-AC'
115 VAC

WESTREX RA-1713 LAMP SUPPLY

REF DES	HE12-10.2	HE15-9	HE24-7.2	HE28-6	DESCRIPTION
C4	.001/100	.001/100	.001/100	.001/50	CAPACITOR, MYLAR
C1	100/35	100/35	47/50	47/50	ELECT
C5	330/35	330/35	330/35	330/35	ELECT
C3	23000/30	23000/30	9500/50	9500/50	CAPACITOR ELECT
CR1	R711A	R711A	R711A	R711A	DIODE BRIDGE
CR3,4	AEIC	AEIC	AEIC	AEIC	1A 200V
CR5	—	—	IN752A	IN752A	ZENER
CR6	—	—	—	—	3A 100V
CR7	—	—	—	—	DIODE ZENER
SCR1	—	—	—	—	SCR
Q1,2,3,	12505-2	12505-2	12505-2	12505-2	TRANSISTOR 2N3055
Q4	12500-5	12500-5	12500-5	12500-5	TRANSISTOR
U1	Ua723	Ua723	Ua723	Ua723	I.C. VOLTAGE REGULATOR
R1	2.2K	2.2K	2.2K	2.2K	RESISTOR 1/2W 5% CF
R5,16	2.2K	2.2K	2.2K	2.2K	
R7	10K	10K	22K	22K	
R10	1K	1K	7.5K	10K	
R11	—	—	7.5K	10K	
R12,15	6.8Ω	6.8Ω	6.8Ω	6.8Ω	
R20	—	—	—	—	
R18,19	220Ω	220Ω	470Ω	470Ω	1/2W 5% CF
R17	750Ω	750Ω	1.18K	2K	1/4W 2% MF
R14	1.62K	1.62K	1K	1K	1/4W 2% MF
R2,3,4	.12Ω	.12Ω	.22	.39Ω	RESISTOR 2W WW
R6,13	1.5K	1.5K	1.5K	1.5K	POTENTIOMETER 2W WW
T1	12256	12257	12258	12259	TRANSFORMER
PCB	11080	11080	11080	11080	P.C. BOARD
CHASSIS	11071	11071	11071	11071	CHASSIS, ALUM



SEE RECORD LAMP SUPPLY SCHEMATIC FOR MODS TO THIS P.S.

Power-One INC.
DC POWER SUPPLIES
Power One Drive, Camarillo, California 93010 • Phone (805) 484-9806 • TWX 910-336-1297

APPLICATION DATA
Including:
1. Schematic
2. Parts Lists
3. Specification
4. Outline & Mounting Dwg.
5. General User Information

MODEL
HAA15-.8

SPECIFICATIONS

AC Input: 115/230 VAC ±10% 47-440 Hz (Derate Current 10% for 50 Hz operation)

Input Fusing: See Table

DC Output: See Table

Line Regulation: ±.05% for a 10% input change

Load Regulation: ±.05% for a 50% load change

Output Ripple: 3 mv Pk-Pk +.02% V. out

Transient Response: 30μ sec for 50% load change

Overload & Short Circuit Protection: Automatic current limit/foldback

Temperature Coefficient: ±.03%/°C maximum

Cooling: Units are full rated to 50°C, full rated, derate linearly to 40% at 70°C

Efficiency: 55% at nominal input, full load on output

Weight: 2 lb.

Vibration: Per Mil-Std-810B, method 514, proc. I, curve AB (to 50Hz)

Shock: Per Mil-Std-810B, method 516, procedure V

AC CONNECTION & FUSE TABLE			
For Use At	Primary Fuse at	Connect	Apply Power To
115	.5	1-3,2-4	1 & 4
230	.25	2-3	1 & 4

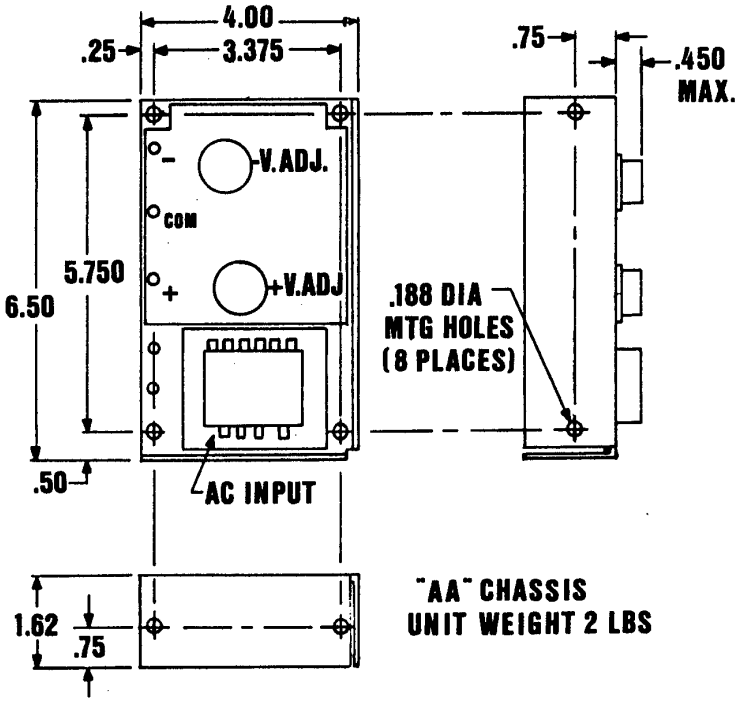
OUTPUT RATING HAA15-.8
15V @ .8A (Adj. range: 9-15V) -15V @ .8A (Adj. range: 9-15V) -or- - 5V @ .4A*
OUTPUT HAA 24-.6
18,20V @ 0.4A -or- 24V @ 0.6A
-18,20V @ 0.4A -or- -24V @ 0.6A

*This may be accomplished by jumpering, E_1 to E_2 and readjusting the output voltage pot.

2 YEAR GUARANTEE

POWER-ONE, INC. will repair or replace any power supply of its manufacture that does not perform to published specifications as a result of defective materials or workmanship for a period of 2 years from date of original purchase. No other obligations or liabilities are implied or expressed. Returns must be freight prepaid.

WESTREX
2629 W. OLIVE AVE.
BURBANK, CALIF. 91505



"AA" CHASSIS
UNIT WEIGHT 2 LBS

POWER-ONE Inc.
531 DAWSON DR.
CAMARILLO, CALIF. 93010
(805) 484-2806

APPLICATION DATA
Including:
1. Schematic
2. Parts Lists
3. Specification
4. Outline & Mounting Dwg.
5. General User Information

MODEL
HE12-10.2

WESTREX

2629 W. OLIVE AVE.
BURBANK, CALIF. 91505

SPECIFICATIONS

AC Input: 115/230 VAC ± 10% 47-440 HZ (Derate Current 10% for 50 HZ operation)

Input Fusing: See Table

Line Regulation: ± .05% for a 10% input change

Load Regulation: ± .05% for a 50% load change

Output Ripple: 1.5 mv Pk-Pk, 0.4 mv RMS

Transient Response: 30μ sec for 50% load change

Overload & Short Circuit Protection: Automatic current limit/foldback

Temperature Coefficient: ± .03%/°C maximum

Cooling: Units are full rated to 50°C in free air, must be derated or fan cooled when mounted in confined area

Temperature Rating: 0 - 50°C, full rated, derate linearly to 40% at 70°C

Efficiency: 55% at nominal input, full load on output

Weight: 10 lbs.

Vibration: Per Mil-Std-810B, method 514, proc. I, curve AB (to 50 HZ)

Shock: Per Mil-Std-810B, method 516, procedure V

Remote Sensing: Provided, open-lead protection built in

AC Connection & Fuse Table			
For Use At	Primary Fuse At	Connect	Apply Power To
115	3A	1-3, 2-4	1 & 4
230	1.5A	2-3	1 & 4

MODEL	OUTPUT POWER
HE12-10.2	12V, 10.2A
HE15-9	15V, 9A
HE24-7.2	24V, 7.2A
HE28-6	28V, 6A

2 YEAR GUARANTEE

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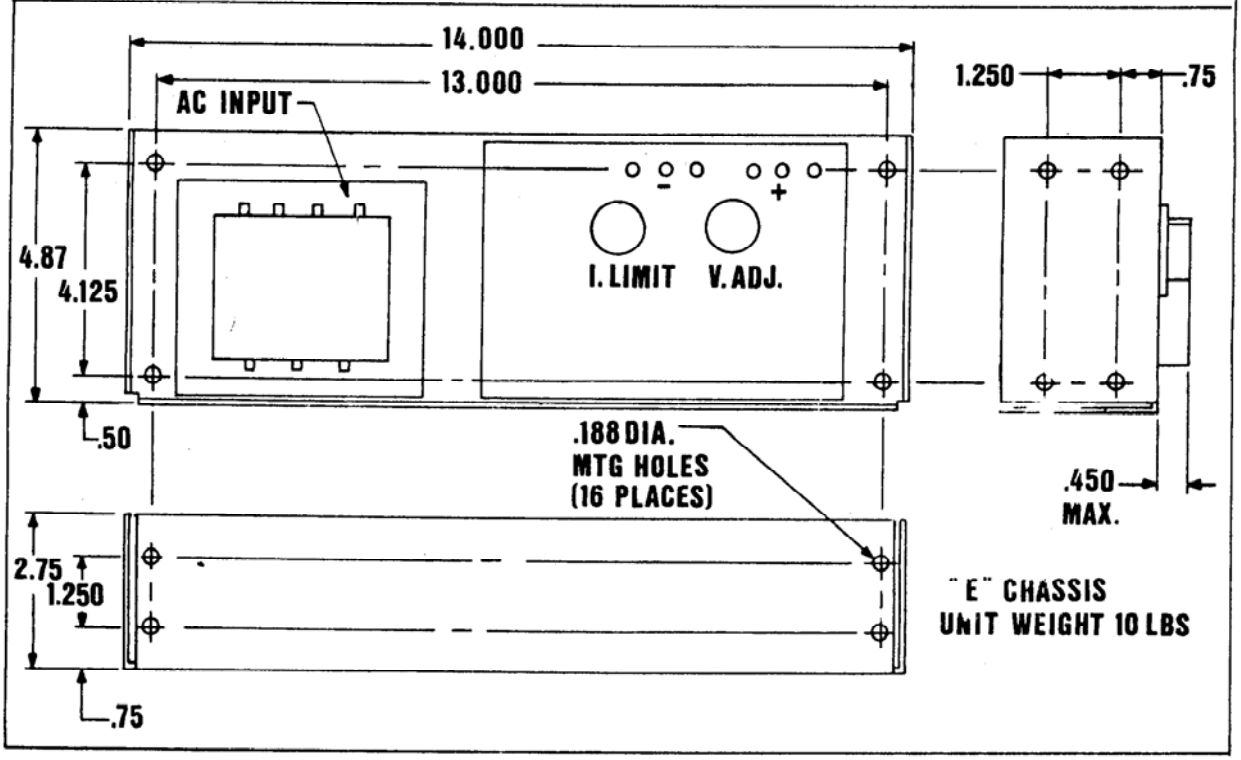
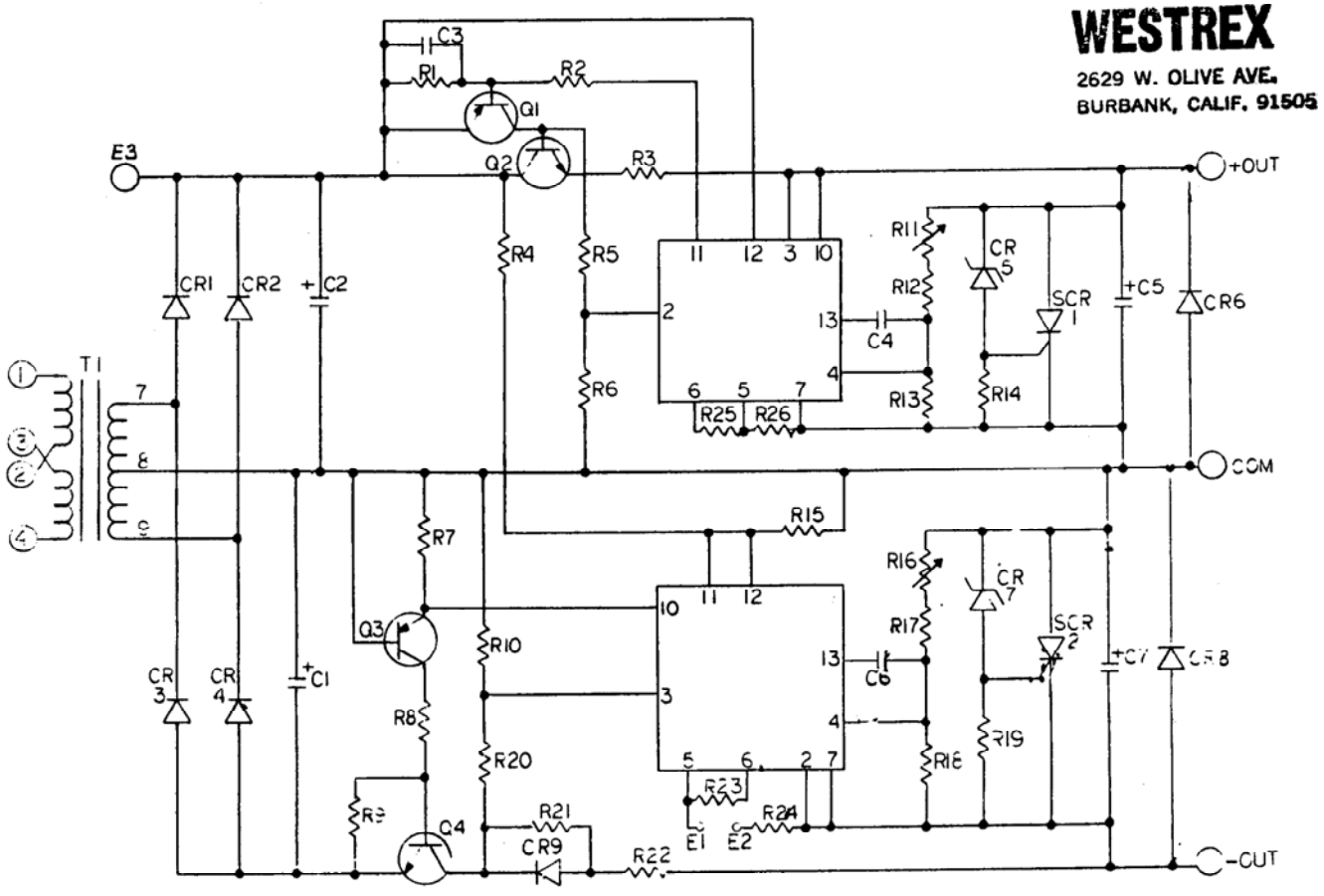


REF DES	HAA15	POWER-ONE P/N	HAA24	POWER-ONE P/N	DESCRIPTION
C1, 2	2200/35	102-10100	1000/50	102-10617	CAPACITOR ALUM ELEC
C5, 7	100/35	101-10110	100/35	101-10110	" ALUM ELEC
C4, 6	.01/100	104-10095	.01/100	104-10095	CAPACITOR MYLAR
C3	——	——	——	——	CAPACITOR MYLAR
CR1,2,3,4,9	AEIC	111-10251	AEIC	111-10251	DIODE 1A 200V
CR5	——	——	BUSS	——	" ZENER
CR7	——	——	BUSS	——	" ZENER
CR6,8	——	——	——	——	DIODE
Q2, 4	12500-3	171-10261	12500-3	171-10261	TRANSISTOR
Q1, 3	2N2907	172-10248	2N2907	172-10248	TRANSISTOR
SCR1, 2	——	——	——	——	SCR 3A
U1, 2	μA723	130-10287	μA723	130-10287	I.C. VOLTAGE REGULATOR
R2, 8, 7, 5	330Ω	151-10353	270Ω	151-10351	RESISTOR ½W ± 5% CF
R3, 22	.56Ω	158-10082	.56Ω	158-10082	2W 8WH
R20	470Ω	151-10357	270Ω	151-10351	½W ± 5% CF
R6, 9, 10	4.7K	151-10381	10K	151-10389	
R21	3.9Ω	151-10307	6.8Ω	151-10313	
R12, 17	150Ω	152-10345	1.6KΩ	152-10510	RESISTOR ½W 2% MF
R19, 14, 15	——	——	1.6K	151-10370	½W 5% CF
R23, 1, 25	1.6K	151-10370	1.6K	151-10370	½W ± 5% CF
R26	——	——	——	——	
R24	2.2K	152-10513	——	——	½W ± 2% MF
R13, 18	1.2K	152-10507	1.2K	152-10507	RESISTOR ½W ± 2% MF
R11, 16	1.5K	155-10085	1.5K	155-10085	POTENTIOMETER 2W WW
R4	330Ω	151-10353	1.6K	151-10370	RESISTOR ½W ± 5% CF
T1	12244	082-12244	13375	082-13375	TRANSFORMER
P C B	12222	505-12222	12222	505-12222	PRINTED CIRCUIT BOARD
CHASSIS	11091	412-11091	11091	412-11091	CHASSIS ALUM



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