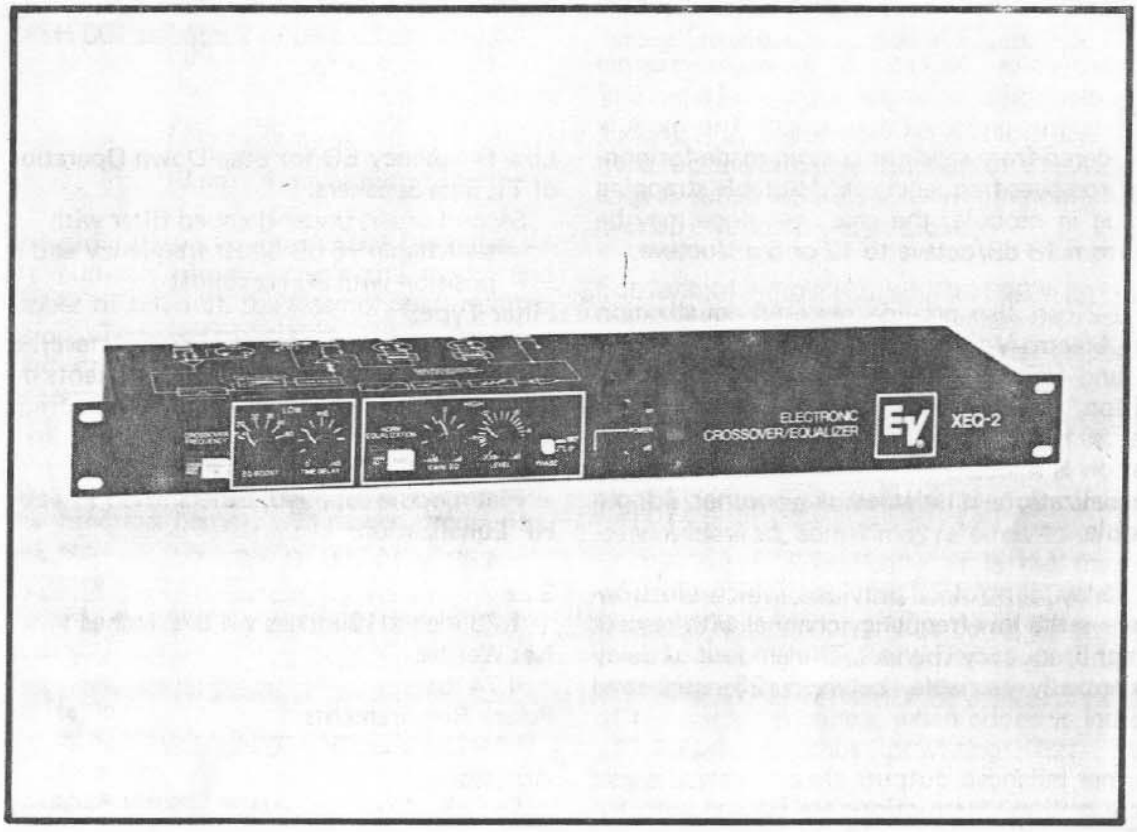
Electro-Voice®

XEQ-2

ELECTRONIC CROSSOVER

SERVICE MANUAL



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XEQ-2 EQUALIZED ELECTRONIC CROSSOVER

1.0 GENERAL INFORMATION

The Electro-Voice XEQ-2 is a single channel equalized, electronic crossover. A plug-in 16 pin DIP module sets the crossover frequency. The module may be ordered from stock or custom made for non-standard crossover frequencies. By suitable strapping in the plug in module, the crossover slope may be changed from 18 dB/octave to 12 or 6 dB/octave.

The XEQ-2 can also provide required equalization for the Electro-Voice TL series low frequency systems and HR series Constant Directivity horns. In addition, a third-order (18 dB/oct.) subsonic rolloff at 30 Hz is provided. TL series low frequency equalization is selected with a rotary switch and HR series equalization is selected via another 16 pin DIP module.

A time delay control is provided which electronically delays the low-frequency channel with respect to the high frequency channel. The amount of delay is continuously variable between 25 usec and 2 msec.

Transformer balanced outputs are available as a user installable option. Instructions are packed with the transformer accessory (EV Model TRB-1).

1.1 SPECIFICATIONS

Type:
Equalized, electronic crossover

Frequency Response:
30-20 kHz, ± 0.5 dB, −3 dB at 30 Hz sum of outputs, controls flat

Noise Output:
−90 dB V maximum re 1 V, 20 kHz noise bandwidth

Total Harmonic Distortion:
0.02% typical, 0.1% max @ 20 kHz, †20 dBm

Overall Gain:
0 dB into high-Z load

Minimum Load Z:
600 ohms

Output Source Z:
47 ohms

Input Configuration:
Balanced or Unbalanced

Input Z:
30 k balanced bridging, 15 k unbalanced

Input CMR:
55 dB typical, 60−1 kHz

Connectors:
1/4 inch tip-ring-sleeve phone jacks and XLR-3 RCA for low frequency summing

Delay:
Adjustable, 25 usec to 2 msec at 100 Hz low frequency output

High Pass Filter:
−3 dB at 30 Hz, 12 dB/octave

Low Frequency EQ for Step-Down Operation of TL Bass Speakers:
Second order, under-damped filter with switchable +6 dB boost frequency and flat position with 30 Hz rolloff

Filter Type:
Third-order Butterworth (18 dB/octave). See Table 1. Other orders and alignments by custom construction, high and low frequency crossover points independently chosen

Plug-In Horn/Driver Equalization:
Flat module supplied, others listed in Table 1

HF Equalization:
± 4 dB at 10 kHz, Q = 3

Size:
1.73 inch x 19 inches x 4.875 inches

Net Weight:
4.74 lbs

Power Requirements:
90−120 V ac, 50−60 Hz, 8 W

Accessories:
Security Cover (supplied), TRB-1 balanced output transformers, BMK blank module kit

1.2 GENERAL SERVICING INFORMATION

Most Electro-Voice circuitry is built around commonly available IC operational amplifiers. A certain amount of familiarity with operational amplifier theory and operation will facilitate servicing this unit. Throughout this manual, the following convention will be used when discussing the various amplifier stages: U1 (1). This is to be interpreted as follows: Chip designation U1, output pin = 1.

The op-amp's output pin is particularly significant because all of the unit's stages are referenced to ground. Thus, the normal quiescent voltage at any op-amp output is 0 volts dc, give or take a few millivolts. Any op-amp output that is not at 0 volts dc is suspect, especially if it is at or near one of the power supply rails. Beware: much of the circuitry is direct coupled. It is important to look backward towards the input to localize the exact cause of trouble.

1.3 REPAIR PARTS

Service parts are available from the EV factory. Contact us by phone or mail.

Our address:

Electro-Voice, Inc.
600 Cecil Street
Buchanan, MI 49107–0186

(616) 695-6831
(8 am - 4 pm eastern time zone)

If you are ordering parts and do not have the six digit part number, please include the model and serial number of the unit, the assembly part number and revision. The assembly part number/revision is a six digit, one letter code beginning with 800 that is rubber stamped on the parts side of the PCB assembly. In lieu of this information, the two digit, one letter code etched into the foil side of the PCB is helpful. If you are ordering a control or switch, tell us the function name . . . power, frequency, input level, etc.

In any event, be sure to include the following information:

Your Name
Shipping address (no post office boxes, please)
City, State, Zip
Daytime phone number
Method of shipment
(UPS ground if not specified)

If you call us for assistance on/with a problem, please have the EXACT model number, serial and assembly part numbers handy.

2.0 DISASSEMBLY INSTRUCTIONS

All circuitry is contained on one printed circuit assembly. Access the interior of the unit via the sheet metal screws securing the top cover.

2.1 Main Board Removal

A. Remove top cover screws and top cover.
B. Remove all pot knobs and control nuts underneath.
C. Disconnect the red power transformer connector.
D. Remove screws from main PCB.
E. Slide board toward rear of chassis until pots clear fron panel, lift up and out.
F. Reverse this procedure to reassemble.

2.2 CUSTOM CROSSOVER FREQUENCY CALCULATION

The XEQ-2 has maximally flat third-order Butterworth filter characteristics when used with the supplied crossover frequency modules (800 Hz and 500 Hz). Other frequencies and characteristics are possible, with suitable choice of component values within the module. The component values for the "stock" modules are listed in Figure 2.3.

The module supplies the tuning resistors (RH1, 2, 3, and RL1, 2, 3) for the high and low pass filters that make up the crossover portion of the XEQ-2. Since each is tuned separately, any combination of slope, overlap or underlap is possible.

For sake of simplicity, information is given only for the case of the third-order Butterworth filters. This configuration gives a maximally flat response shape near the crossover frequency with 18 dB per octave slopes. This gives the best all around performance for the vast majority of applications.

In the following formulas, f3 is the crossover frequency desired, sometimes referred to as the 'knee' of the curve. Specifically, it is the frequency at which the response has been attenuated by 3 dB from the flat portion of the curve. When the f3's of the low and high pass sections are made to coincide in frequency, as is usually the case, the total energy of the output channels, when added is independent of frequency, thus providing 'flat' frequency response.

Resistors RL1, RL2 and RL3 determine the filter characteristic of the low pass filter section. Similarly, RH1, RH2, and RH3 determine the high-pass section filter characteristics. One-quarter watt film resistors having a resistance tolerance of 1% or

2% are recommended. In less critical applications, 5% resistors may suffice. MIL type RN55D resistors are easiest to use, however, conformally coated resistors may also be used.

In the following formulas, R is given in ohms and f3 in Hertz. M stands for meg (as in megohm).

LOW PASS SECTION

RL1 = 16.39 M / (f3+6)
RL2 = 116.97 M / (f3+6)
RL3 = 21.03 M / (f3+6)

HIGH PASS SECTION

RH1 = 24.32 M / f3
RH2 = 9.55 M / f3
RH3 = 167.3 M / (f3–7.6)

After calculating the exact values, select the nearest standard value. For specialized applications (other slopes, and/or filter characteristics) consult the factory engineering department.

2.3 MODULE CONSTRUCTION

Construct the module as shown in Figure 2.3. If you use other than molded case resistors (MIL type RN55D) make sure that the leads are free from coating material where they emerge from the body of the resistor. Use a low wattage iron, preferably with a small chisel tip. Flush cutting diagonal cutters will make installing the module cover easier. Temporarily installing the module in a spare dip socket helps keep the pins in alignment during soldering. Remember the jumper from pin 2 to pin 15. When finished, glue the cover on using 'super glue' or other suitable adhesive.

2.4 SERVICE NOTE

Early XEQ-2 units may experience intermittent outputs, for no apparent reason. Typically, this is caused by low line voltage, particularly when the sound system is stressed (asked to deliver large outputs). The culprit is the anti-thump relay, K1, intermittently dropping out, at the trough of the AC line voltage.

To cure this problem, zener diode D7 was changed from a 15 V, 1N5245B to a 12 V, 1N5242B. This lowers the drop-out threshold of the anti-thump relay.

NOTES

CROSSOVER MODULES

DESCR	P/N	POS.1	POS.2	RL1 POS.3	RL2 POS.4	RL3 POS.5	RH2 POS.6	RH3 POS.7	RH1 POS.8
125HZ	801076	BLANK	JMPR	124K	887K	162K	76.8K	1.43M	196K
500HZ	801068	BLANK	JMPR	32.4K	232K	41.2K	19.1K	340K	48.7K
900HZ	801069	BLANK	JMPR	20.5K	147K	26.1K	11.8K	210K	30.1K
1.5KHZ	801077	BLANK	JMPR	11.0K	76.8K	14.0K	6.34K	113K	16.2K
3.5KHZ	801078	BLANK	JMPR	4.64K	33.2K	6.04K	2.74K	47.5K	6.98K
7.0KHZ	801079	BLANK	JMPR	2.32K	16.9K	3.01K	1.37K	23.7K	3.48K

EQUALIZER MODULES

DESCR	P/N	POS.1	RE7 POS.2	RE4 POS.3	RE5 POS.4	RE6 POS.5	POS.6	RE1 POS.7	RE2 POS.8
HR-90	801071	BLANK	BLANK	68.1K	48.7K	4.75K	BLANK	56.2K	26.1K
HR-40 HR-60	801073	BLANK	BLANK	100K	48.7K	4.75K	BLANK	100K	22.1K
FLAT	801075	BLANK	JMPR	BLANK	BLANK	BLANK	BLANK	JMPR	BLANK
HR-4020A HR-9040A	801070	BLANK	BLANK	100K	39.2K	3.92K	BLANK	100K	48.7K
HR-120 SM-120	801072	BLANK	BLANK	100K	48.7K	4.75K	BLANK	68.1K	19.1K
HR-6040A	801074	BLANK	BLANK	100K	39.2K	3.92K	BLANK	147K	48.7K

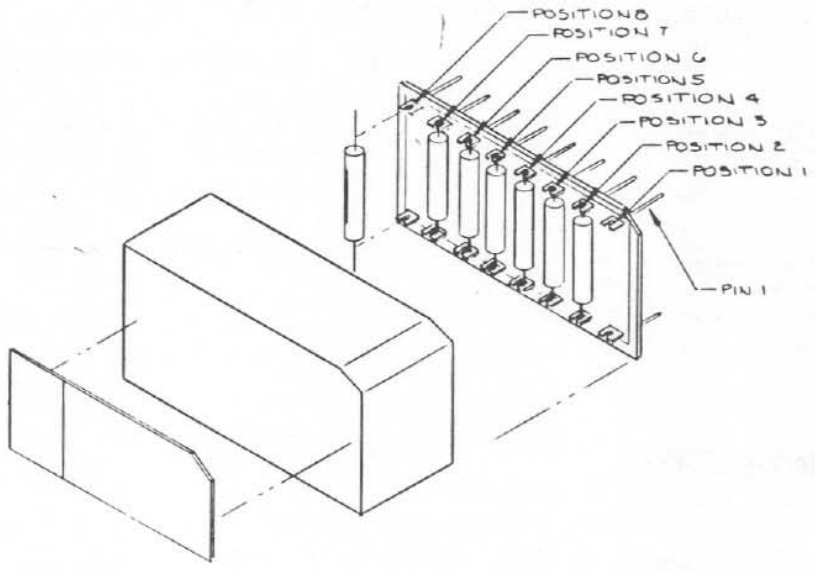

Figure 2–3

3.0 CIRCUIT DESCRIPTION

3.1 INPUT DIFFERENTIAL AMPLIFIER

Input signals (balanced or unbalanced) are applied to unit gain differential amplifier U1 (2). U1 (2) buffers the input signal and presents a low source impedance to the active crossover filters.

3.2 ACTIVE CROSSOVER FILTERS

Voltage follower U1 (7), C3, C4, C5, RH1, RH2, RH3 and R6 make up an active their order high pass filter. Resistors RH1, RH2 and RH3 control the corner frequency. Their values are computed as described in Section 2.2 of this manual. R6 ensures that U1 (7) has a ground reference in the event that a crossover module is not plugged in to the front panel socket.

Similarly, U2 (1), RL1, RL2, RL3, C15, C16, C17 make up an active third order low pass filter. RL1, RI2, and RL3 control the tuning.

3.3 HORN EQ

When a constant directivity horn is used with a conventional compression driver, equalization is necessary to restore flat frequency response. This is because of the falling high frequency response of the compression driver and the constant directivity horn's lack of high frequency beaming.

RE1, RE2, C6 and C7 make up a bridged tee notch filter. R10 ensures that U5 has a ground reference (through R8 and R9) if there is no equalization module plugged in.

A similar network (RE4, RE5, RE6, RE7, C8 and C9) is placed in the feedback loop of U5 (6)s. This results in a frequency response curve having a slight notch (caused by the C6/C7 network) followed by high frequency boost (C8/C9 network). Since all the resistors are plugged in via the equalization module, the overall curve may be optimized for many horn/driver combinations.

3.4 10 kHz EQ

Both sections of U6 are used to provide a limited amount of high frequency EQ centered around 10 kHz. This allows modification of the high frequency curve provided by U5 and associated components for variations in individual drivers and personal taste.

U6 (1) is a simulated inductor. C10 series resonates with the simulated inductance at approximately 10 kHz.

U6 (7) is the boost cut amplifier. When the wiper of the boost/cut pot R15 moves toward R14, the decreasing impedance of the series resonant circuit connected to R14's wiper causes a dip in the overall frequency response. When the wiper moves towards R17, the feedback is shunted away at resonance, causing a peak in the frequency response.

3.5 HF OUTPUT AMPLIFIER

U7 (7) is the high frequency output amplifier. It uses a NE5534 as either a unity gain inverter or as a voltage follower. C13 compensates U7 for unity gain. S1, the phase switch, determines which of the opamp's differential inputs the input signal is applied to.

3.6 LOW FREQUENCY EQ

U2 (1) is an active high pass filter. S2, the LF EQ switch, controls the cutoff frequency. In the FLAT position, U2 (1) becomes a second order (12 dB/oct.) Butterworth high pass filter. At other positions, U2 (1) becomes an underdamped high pass filter. In an underdamped second order filter, a peak occurs in the frequency response just before the curve breaks away from flat response. Once past the peak frequency, the curve falls at 12 dB/octave. The peak frequency is noted in the switch markings on the front panel. The peak amplitude is approximately 6 dB.

3.7 LOW FREQUENCY DELAY CIRCUIT

U3 and U4 make up an allpass filter. This has the characteristic of frequency independent constant time delay up to a frequency defined as $f = 1/t$, where t = delay time in seconds and f = frequency in Hz. The frequency response is flat.

U3 (7) is an inverting amplifier. Its input resistor is split in two to allow common bass mixing. By paralleling the junction of R35 and R36 with the identical point in another XEQ-2, the low frequency outputs are summed, for common (mono) bass applications.

The output of U3 (7) is fed to U4 (6), which is also the low frequency output stage. U4 (6) is connected as an active phase shifter, with R39 controlling the phase shift. Overall positive feedback is applied via voltage follower U3 (1) and the associated RC networks.

3.8 OUTPUT RELAY

Both low and high frequency output amplifiers feed K1, a DPST reed relay. K1 is delayed on at turn-on, but turns off instantly at turn-off.

K1 is powered from the raw dc power from the bridge rectifier. Darlington transistor Q1 operates as a switch to energize K1's coil. When power is applied, C41 charges through R56 until D7's zener voltage is reached. Q1 is turned on by the current through D7, closing the relay. On turn-off, C41 discharges quickly through D6 and the relay opens.

3.9 BALANCED OUTPUT TRANSFORMERS

When the balanced output accessory is installed, transformers T1 and T2 area connected to K1's outputs. They then feed the XLR output connectors. Both T1 and T2 are 1:1 ratio, 600 ohm transformers. The installation instructions are packed with the transformers.

3.10 POWER SUPPLY

The XEQ-2 requires ± 15 volts dc for operation. This is supplied by a regulated supply consisting of a full wave rectifier and two three-terminal regulator ICs.

NOTES

XEQ-2 MISCELLANEOUS PARTS

Part Number	Description
804209	XFMR assy, export
804208	XFMR assy, domestic
804037	Linecord
800132	PCB assy, XEQ-2
500704	Lckwshr, outside, CR, 7 mm
500703	Washer, appearance, 7 mm
500702	Nut, hex, 7MMX 0.75 mm
500299	Screw, SM, SQSKTFH, 8X1/2
500200	Screw, SM, blk PHP 8X1/2
500112	Screw, SM, PHP, blk, 6X3/8
500107	Screw, SM, PHP, blk 6X1/2
500103	Screw, PHP, blk, 6-32X1/4
500102	SCRU, blk, PHP, 6-32X3/8
500070	SCRU, blk, PHP, 4-40X3/8
500050	SCRU, PHP, blk, 4-40X3/16
460181	Panel, Center, XEQ-2
450238	Decal, crossover, 7 kHz
450237	Decal, crossover, 3.5 kHz
450236	Decal, crossover, 1.5 kHz
450235	Decal, crossover, 125 Hz
450234	Decal, crossover, blank
450232	Decal, horn EQ, blank
450231	Decal, EQ, flat
450230	Decal, EQ, HR6040
450229	Decal, EQ, HR40/HR60
450228	Decal, EQ, SM120/HR120
450227	Decal, EQ, HR90
450226	Decal, EQ, HR4020/HR9040
450225	Decal, crossover, 800 Hz
450224	Decal, crossover, 500 Hz
450208	Cover, XEQ-2, screened
450207	Front panel, screened
440138	End panel, painted
440136	Chassis, XEQ-2 painted
440134	Bracket, Power, XEQ-2
440125	Plate, adapter, ac pwr
400065	Knob, SM blk, w/line
400064	Cover, security, XEQ-2
400051	Knob, pushbutton, grey
303308	Fuse, 32MA, slo blo Xprt
303121	Fuse, 1/16 A, slo blo
303120	Fuseholder, panel MT, dom
303107	Carrier, fuse, export
303103	Fuseholder, chass MT xprt
303030	Rubber feet
301025	Switch, RCKR, blk SPST
300103	Cover, dip plug, .40 high
300102	Dip plug, 16 pin
300084	Receptacle, ac pwr

Part Number	Description
007153	IC, volt reg, −15 V, 7915
007103	IC, volt reg, +15 V, 7815
007011	IC, single opamp, LF351
007010	IC, dual opamp, LF353
007009	IC, single opamp, NE5534N
006021	Transistor, Darl, 2N6427
005791	RES, MF, RN55D, 1.43M
005790	RES, MF, RN55D, 887 k
005789	RES, MF, RN55D, 196 k
005788	RES, MF, RN55D, 162 k
005787	RES, MF, RN55D, 124 k
005786	RES, MF, RN55D, 113 k
005785	RES, MF, RN55D, 76.8 k
005784	RES, MF, RN55D, 47.5 k
005783	RES, MF, RN55D, 33.2 k
005782	RES, MF, RN55D, 23.7 k
005781	RES, MF, RN55D, 16.9 k
005780	RES, MF, RN55D, 16.2 k
005779	RES, MF, RN55D, 14.0 k
005778	RES, MF, RN55D, 11.0 k
005777	RES, MF, RN55D, 6.98 k
005776	RES, MF, RN55D, 6.34 k
005775	RES, MF, RN55D, 6.04 k
005774	RES, MF, RN55D, 4.64 k
005773	RES, MF, RN55D, 3.48 k
005772	RES, MF, RN55D, 3.01 k
005771	RES, MF, RN55D, 2.74 k
005770	RES, MF, RN55D, 2.32 k
005769	RES, MF, RN55D, 1.37 k
005768	RES, MF, RN55D, 340 k
005767	RES, MF, RN55D, 232 k
005766	RES, MF, RN55D, 210 k
005765	RES, MF, RN55D, 147 k
005764	RES, MF, RN55D, 100 k
005763	RES, MF, RN55D, 68.1 k
005762	RES, MF, RN55D, 56.2 k
005761	RES, MF, RN55D, 48.7 k
005760	RES, MF, RN55D, 41.2 k
005759	RES, MF, RN55D, 39.2 k
005758	RES, MF, RN55D, 32.4 k
005757	RES, MF, RN55D, 30.1 k
005756	RES, MF, RN55D, 26.1 k
005755	RES, MF, RN55D, 22.1 k
005754	RES, MF, RN55D, 20.5 k
005753	RES, MF, RN55D, 19.1 k
005752	RES, MF, RN55D, 11.8 k
005751	RES, MF, RN55D, 4.75 k
005750	RES, MF, RN55D, 3.92 k
005456	POT, PCB, Vert 5 k LIN (B)
005432	POT, Dual, vert PCB 2X50 k
005420	POT, vert PCB 10 k LIN

						120	
						119	
						118	
						117	
						116	
						115	
	1	795011	25109	OUTPUT CONN ASSY XEQ-2		114	
						113	
						112	
	2	500801	—	RIVET, POP BLK		111	
	3	500683	—	WASHER, FIBER FLAT 3/8 ID		110	
	3	500391	—	NUT, HEX ST BR NKL PLAT UNEF-2B 3/8-32		109	
	2	500079	—	SCREW, MACH BLK 4-40 X 1/4		108	
						107	
						106	
	3	460130	24709	BRACKET, SUPPORT 7000 SERIES		105	
						104	
	26	452503	—	JUMPER, ZERO OHM .6	7	103	
						102	
	1	451092	86E	PCB XEQ-2		101	B
						100	
						99	
						98	
						97	
	1	301033	—	SW, 2PDT ROT, NOBLE SR303-26B2AK	S2	96	
	1	301028	—	RELAY, 1.5A 24VDC DPST	K1	95	
	1	301013	—	SW, PUSH ON-OFF VERT PCB DPDT .093	S1	94	
	1	300109	—	CONN, RTANG PCB MT PHONE JACK, RA11AB2C	J3	93	
	2	300101	—	DIP SOCKET, 16 PIN RTANG PC MOUNT	J9, 10	92	
	1	300097	—	HDR, .025 SQ PST STR, 3 PIN, MICRO-MATE AMP	J1	91	
	2	300093	—	CONN, RTANG PCB MT PHONE JACK, RA11AB2C	J4, 6	90	
	1	300087	—	CONN, RTANG PCB MOUNT MIC JACK	J2	89	
	1	300020	—	CONN, PCB 90 DEG JACK, PHONO SMLS0-3081	J5	88	
						87	
	2	144025	—	WIRE, 22 AWG YEL, .12 STRIP BOTH ENDS 2.5		86	
	2	133025	—	WIRE, 22 AWG ORN, .12 STRIP BOTH ENDS 2.5		85	
	2	100025	—	WIRE, 22 AWG BLK, .12 STRIP BOTH ENDS 2.5		84	
			—			83	
	1	008069	—	DIODE LED ROUND RED T1	DS1	82	
	1	008071	—	DIODE ZENER 12V 5% IN5242B	D7	81	7
	6	008022	—	DIODE PWR 1A/100V OR 200V IN4002	6	80	
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	1	005609	—	RES MF .25W 1% 13.0K	R25	37	
	1	005608	—	12.1K	R26	36	
	1	005607	—	9.09K	R27	35	
	1	005606	—	RES MF .25W 1% 6.98K	R28	34	
						33	
	1	005436	—	POT 16MM VERT PCB 5K LINEAR (B)	R15	32	
	1	005432	—	DUAL POT 16MM VERT PCB 50K LIN 20%	R39	31	
	1	005420	—	POT 16MM VERT PCB LINEAR 20% 10K	R7	30	
						29	
	2	005087	—	RES CF .5W 5% 6.2K	R46, 47	28	
						27	
						26	
						25	
	6	004087	—	CAP CERAMIC 20% .01uF	3	24	
	1	004042	—	10% 220PF/50	C11	23	
	4	004022	—	10% 39PF/50	C20, 14, 1, 2	22	
	2	004013	—	CAP CERAMIC 10% 20PF/50	C29, 13	21	
						20	
	3	003747	—	CAP POLYPROPYLENE 2.5% .0100uF/100	C3, 4, 5	19	
	2	003710	—	CAP POLYPROPYLENE 2.5% .01uF	C15, 17	18	
	1	003610	—	CAP POLYPROPYLENE 2.5% .001uF	C16	17	
						16	
	2	003275	—	CAP MYLAR 5% .1/50	C18, 19	15	
	2	003240	—	.02/50	C22, 25	14	
	1	003225	—	.009/50	C9	13	A
	3	003201	—	CAP MYLAR 5% .001/50	C6, 7, 8	12	
						11	
	1	003013	—	CAP MYLAR 10% .0022/50	C10	10	
						9	
	1	002005	—	CAP TANT 20% 10/25	C28	8	
	1	001208	—	CAP ELECT AL AX 22/10	C12	7	
	2	001519	—	CAP ELECT AL RAD 330/35	C26, 27	6	
	1	001505	—	10/35	C41	5	
	4	001413	—	100/25	2	4	
	2	001351	—	100/16	C21, 40	3	
	2	001209	—	CAP ELECT AL RAD 22/10	C23, 37	2	
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	1	007153	—	IC +15V REG TO-220 1AMP 7915	U9	77	
	1	007103	—	IC +15V REG TO-220 1AMP 7815	U8	76	
	1	007011	—	IC SINGLE OP-AMP(8 PIN D.I.P) LF351N	U5	75	
	4	007010	—	IC DUAL OP-AMP(8 PIN D.I.P) LF353N	U6, 1, 2, 3	74	
	2	007009	—	IC SINGLE OP-AMP(8 PIN DIP) NE5534N	U7, 4	73	
						72	
						71	
	1	006021	—	X'ISTOR NPN DARLINGTON 2N6427	Q1	70	
						69	
						68	
						67	
	3	005983	—	RES CF .25W 5% 22MEG	R6, 21, 22	66	
	2	005931	—	1MEG	R12, 10	65	
	1	005935	—	240K	R13	64	
	1	005930	—	150K	R36	63	
	5	005923	—	75K	5	62	
	1	005920	—	56K	R43	61	
	1	005915	—	36K	R23	60	
	1	005912	—	27K	R44	59	
	1	005909	—	20K	R37	58	
	1	005905	—	18K	R34	57	
	2	005906	—	15K	R38, 18	56	
	1	005902	—	10K	R45	55	
	2	005850	—	3.0K	R35, 51	54	
	3	005885	—	2.2K	R17, 16, 14	53	
	1	005884	—	2.0K	R35	52	
	1	005862	—	1.6K	R9	51	
	1	005879	—	1.2K	R11	50	
	1	005878	—	1.1K	R8	49	
	2	005872	—	620	R42, 40	48	
	2	005849	—	68	R41, 59	47	
	2	005845	—	47	R48, 32	46	
	3	005813	—	RES CF .25W 5% 2.2	R54, 50, 1	45	
						44	
	1	005615	—	RES MF .25W 1% 243K	R30	43	
	1	005614	—	221K	R31	42	
	1	005613	—	200K	R32	41	
	1	005612	—	150K	R33	40	
	1	005611	—	121K	R24	39	
	7	005610	—	RES MF .25W 1% 150K	4	38	
	NO.	PART NO.	DWG NO.	DESCRIPTION	REF DESIG	ITEM NO.	REV
	25003	PARTS LIST					

NOTES:

1. FOR SCHEMATIC DIAGRAM SEE DWG. 25131 B

2> C35, 36, 38, 39

3> C29, 30, 31, 32, 33, 34

4> R29, 20, 19, 5, 4, 3, 2

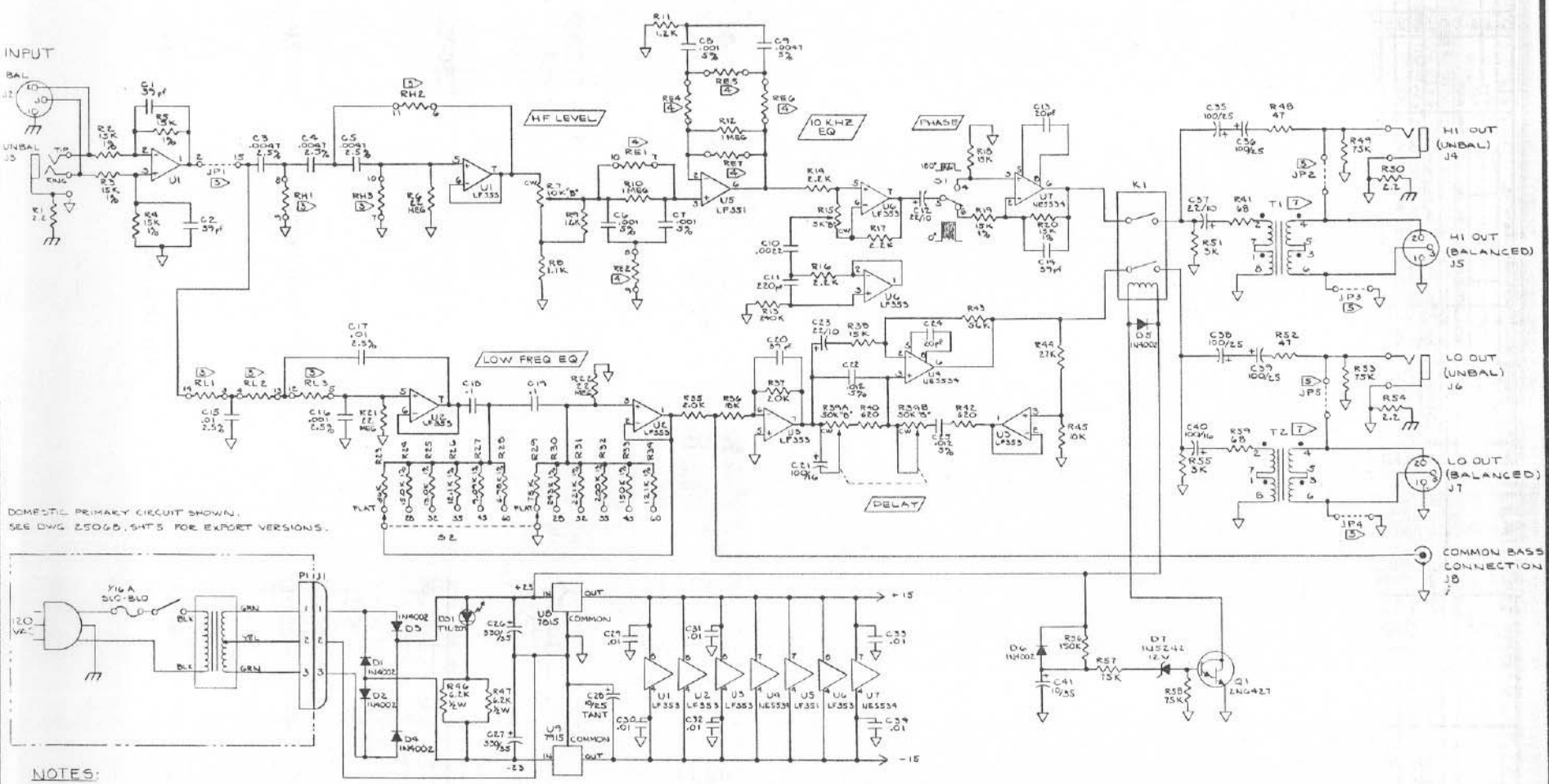
5> R49, 57, 58, 33, 29

6> D1, 2, 3, 4, 5, 6

7> JP2, 3, 4, 5

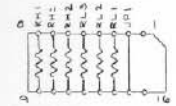
FOR REFERENCE USE ONLY

EV XEQ-2 ELECTRONIC CROSSOVER



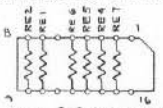
NOTES:

1. ALL RESISTORS ARE IN OHMS, ¼ W, 5% UNLESS NOTED.
2. ALL 1% RESISTORS ARE ¼ W. METAL FILM.
3. CROSSOVER PLUG-IN: J9



ALL RESISTORS USED IN CROSSOVER PLUG IN MODULE ARE ¼ W, 1%, RNS5D.

4. HORN EQ. PLUG IN: J10



ALL RESISTORS USED IN HORN EQ PLUG IN MODULE ARE ¼ W, 1%, RNS5D.

5. J2 - J5 CUT OUT WHEN TRANSFORMERS T1 & T2 ARE INSTALLED.
6. LAST REF. DESIG. USED: R39, C41, D7, DS1, J10, JP5, U9, S2, T2, K1, Q1.
7. TRANSFORMERS T1 & T2 ARE OPTIONAL USER INSTALLED ACCESSORIES.

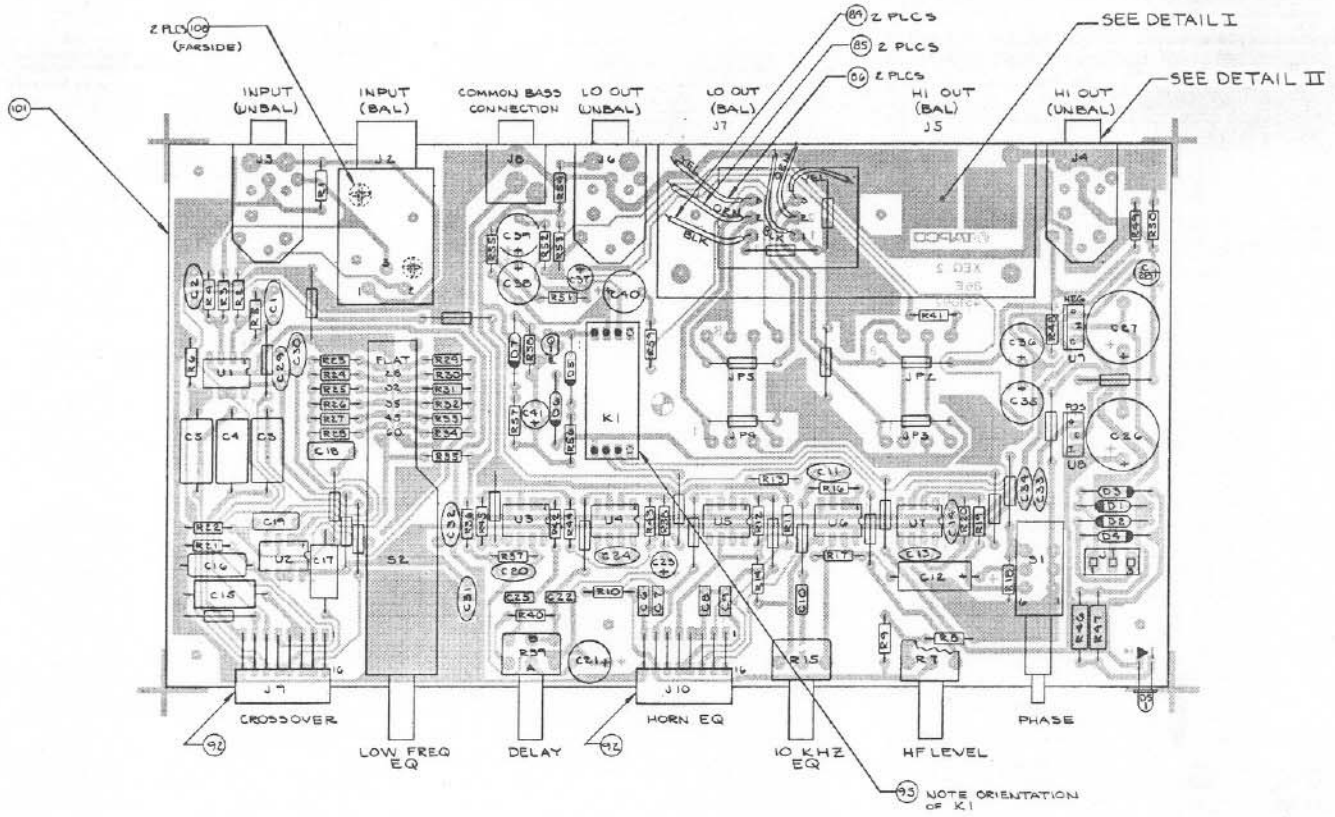
CROSSOVER PLUG IN VALUE CHART

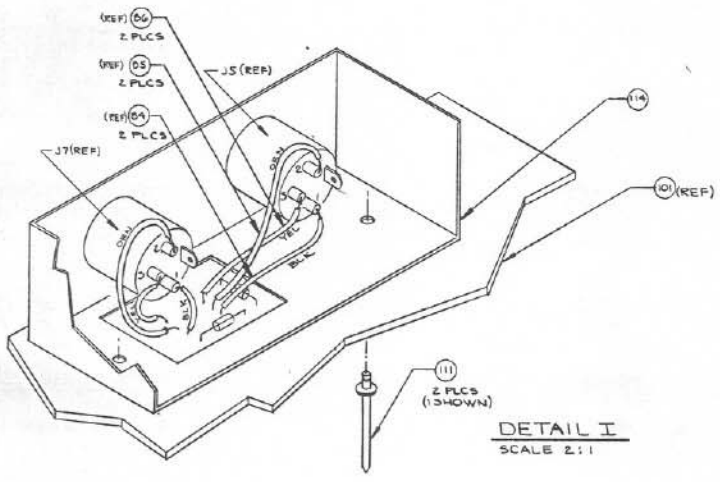
FREQ	RL1	RL2	RL3	RH1	RH2	RH3
125	124K	80.7K	162K	196K	768K	1.43M
500	32.4K	232K	41.2K	48.7K	19.1K	340K
800	20.5K	147K	26.1K	30.1K	11.0K	210K
1500	11.0K	76.8K	14.0K	16.2K	6.34K	113K
3500	4.64K	33.2K	6.04K	6.98K	2.74K	47.5K
7000	2.32K	16.4K	3.01K	3.48K	1.37K	23.7K

HORN EQ PLUG IN VALUE CHART

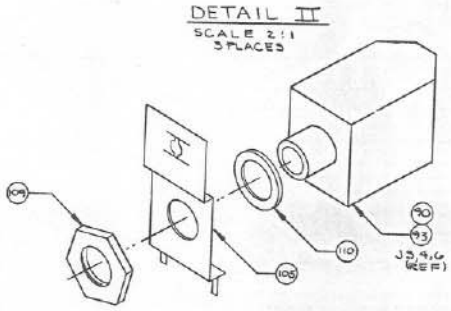
TYPE	RE1	RE2	RE4	RE5	RE6	RE7
HR-90	56.2K	20.1K	68.1K	48.7K	4.75K	—
SM-120 HR-120	68.1K	19.1K	100K	48.7K	4.75K	—
HR-40 HR-60	100K	22.1K	100K	48.7K	4.75K	—
HR-4020A HR-9040A	100K	48.7K	100K	39.2K	3.92K	—
HR-6040A	147K	48.7K	100K	39.2K	3.92K	—
FLAT	JUMPER	—	—	—	—	JUMPER

FOR REFERENCE USE ONLY





DETAIL I
SCALE 2:1



DETAIL II
SCALE 2:1
3 PLACES

FOR REFERENCE USE ONLY

Plug-In EQ Modules for XEQ-3 Electronic Crossover

8/13/93

Module	R1	R2	R3	R4	R5	R6	R7	R8	Used With	
									Drivers	Horns
EQ "A"	---	---	68.1k	48.7k	4.75k	---	56.2k	26.1k	DH1012 &DH1506	HR90
EQ "B"	---	---	100k	48.7k	4.75k	---	68.1k	19.1k	DH1012 &DH1506	HR120
EQ "C"	---	---	100k	48.7k	4.75k	---	100k	22.1k	DH1012 &DH1506	HR40 & HR60
EQ "D"	---	---	100k	39.2k	3.92k	---	100k	48.7k	DH1012 &DH1506	HR9040A & HR4020A
EQ "E"	---	---	100k	39.2k	3.92k	---	147k	48.7k	DH1012 &DH1506	HR6040A
EQ "F"	---	Short	---	---	---	---	Short	---	Flat Response	Flat Response
EQ "G"	---	1.00M	100k	9.53k	.825k	---	140k	47.5k	DH2012	HR90
EQ "H"	---	1.00M	100k	15.0k	2.32k	---	68.1k	30.1k	DH2012	HR120
EQ "J"	---	1.00M	100k	22.1k	2.32k	---	100k	23.7k	DH2012	HR40 & HR60
EQ "K"	---	1.00M	100k	7.50k	5.62k	---	110k	51.1k	DH2012	HR9040A & HR4020A
EQ "L"	---	1.00M	100k	7.50k	5.62k	---	110k	51.1k	DH2012	HR6040A
EQ "M"	---	---	140k	.392k	12.7k	---	158k	20.5k	DH1 & DH2	HP940
EQ "N"	---	---	41.2k	8.45k	1.37k	---	169k	41.2k	DH1 & DH2	HP1240
EQ "O"	---	---	Short	28.7k	2.00k	---	78.7k	78.7k	DH1 & DH2	HP420 & HP640
EQ "P"	---	---	53.6k	41.2k	3.01k	---	53.6k	28.7k	DH1 & DH2	HP9040 & HP 4020
EQ "Q"	---	---	41.2k	37.4k	4.75k	---	47.5k	41.2k	DH1 & DH2	HP6040
EQ "R"	---	---	100k	16.9k	Short	---	107k	40.2k	DH1A, DH2A & N/Dym1	HP940
EQ "S"	---	---	100k	3.57k	1.82k	---	107k	40.2k	DH1A, DH2A & N/Dym1	HP1240
EQ "T"	---	---	84.5k	13.3k	1.43k	---	86.6k	66.5k	DH1A, DH2A & N/Dym1	HP640
EQ "U"	---	---	35.7	14.3k	5.62k	---	14.7k	Short	DH1A, DH2A & N/Dym1	HP4020, HP6040 & HP9040
EQ "V"	---	---	84.5k	13.3k	3.16k	---	86.6k	28.0k	DH1A, DH2A & N/Dym1	HP420
EQ "W"	To be defined.								DH1A, DH2A & N/Dym1	HP64,HP94,HP64S & HP94S
HP 16/32	73.2k	36.5k	---	---	---	---	75k	150k	Misc. LF Systems	
EB 29/35	205k	12.4k	---	---	---	---	15k	243k	Misc. LF Systems	
EB 45/60	113k	7.15k	---	---	---	---	9.58k	154k	Misc. LF Systems	
EQMT2 HF	---	1.00M	127k	12.7k	10.5k	---	86.6k	16.2k	MTH-2/64, MTH-2/94 & MTH-2/94A HF Section	
EQMT2 MB	---	---	53.6k	Short	Short	---	825k	274k	MTH-2/64, MTH-2/94 & MTH-2/94A MB Section	
EQMT2 LF	113k	15.0k	---	---	---	---	15.0k	113k	MTL-2 LF System	
MTX-4A HF	---	1.00M*	154k	14.0k	6.34k	---	80.6k*	7.87k	MTH-4A HF Section	
MTX-4A MF	---	1.00M*	127k	30.1k	3.65k	---	88.7k*	15.8k	MTH-4A MF Section	
MTX-4A MB	---	Short	---	---	---	---	Short	---	MTH-4A MB Section (Flat Response)	
MTX-4A LF	---	---	---	---	---	---	---	---	Not Applicable - Different EQ Topology Employed	
FS-212A HF	---	---	82.5k	14.3k	Short	---	84.5k	28.0k	FS-212A HF Section	
FS-212A LF	---	---	---	---	---	---	30.1k	60.4k	FS-212A LF Section (40 Hz HP)	
Stage Systems HF	---	---	95.3k	24.9k	1.00k	---	52.3k	24.9k	Stage System HF (DH3 or DH2010A on HT94)	
Stage Systems 12" LF	---	---	---	---	---	---	21.5k	43.4k	Stage Systems with 12 " Woofers (55 Hz HP)	
Stage Systems 15" LF	---	---	---	---	---	---	30.1k	60.4k	Stage Systems with 15 " Woofers (40 Hz HP)	

* Notes: MTX-4A HF & MF topology is slightly different --- Indicated values give equivalent results with XEQ-3 topology.
MTX-4A LF topology is sufficiently different from the XEQ-3 that equivalent values don't exist. Use EQMT2 LF above.

CROSSOVER MODULES

DESCR	P/N	POS.1	POS.2	RL1 POS.3	RL2 POS.4	RL3 POS.5	RH2 POS.6	RH3 POS.7	RH1 POS.8
125HZ	801076	BLANK	JMPR	124K	887K	162K	76.8K	1.43M	196K
500HZ	801068	BLANK	JMPR	32.4K	232K	41.2K	19.1K	340K	48.7K
900HZ	801069	BLANK	JMPR	20.5K	147K	26.1K	11.8K	210K	30.1K
1.5KHZ	801077	BLANK	JMPR	11.0K	76.8K	14.0K	6.34K	113K	16.2K
3.5KHZ	801078	BLANK	JMPR	4.64K	33.2K	6.04K	2.74K	47.5K	6.98K
7.0KHZ	801079	BLANK	JMPR	2.32K	16.9K	3.01K	1.37K	23.7K	3.48K

EQUALIZER MODULES

DESCR	P/N	POS.1	RE7 POS.2	RE4 POS.3	RE5 POS.4	RE6 POS.5	POS.6	RE1 POS.7	RE2 POS.8
HR-90	801071	BLANK	BLANK	68.1K	48.7K	4.75K	BLANK	56.2K	26.1K
HR-40 HR-60	801073	BLANK	BLANK	100K	48.7K	4.75K	BLANK	100K	22.1K
FLAT	801075	BLANK	JMPR	BLANK	BLANK	BLANK	BLANK	JMPR	BLANK
HR-4020A HR-9040A	801070	BLANK	BLANK	100K	39.2K	3.92K	BLANK	100K	48.7K
HR-120 SM-120	801072	BLANK	BLANK	100K	48.7K	4.75K	BLANK	68.1K	19.1K
HR-6040A	801074	BLANK	BLANK	100K	39.2K	3.92K	BLANK	147K	48.7K

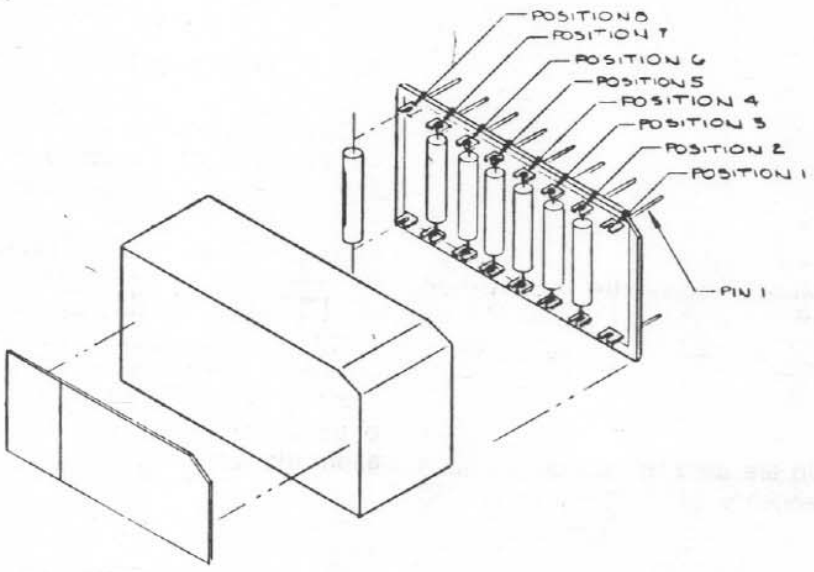


Figure 2–3