TRACE ELLIOT LTD

SERVICE MANUAL : SM00037 **ISSUE : 1**

Date :	14th Feb 1997
Product Code :	T1300 / 1305 / 1310
Model No :	PPA X-OVER 2/3/4 WAY
Technical File No :	TE00037

CONTENTS

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TEST PROCEDURE
FOR PPA 2 WAY CROSOVERS

1. Connect the 15-0-15 volt supply to the PCB.

2. Measure the supply rails:
   +15 volts on IC1 pin 4, and -15 volts on IC1 pin 11.

3. Inject a 100Hz 3 volt p-p sine wave into XLR 1 wired ground to pin 1, signal live to pin 2, pin not connected.

4. Measure the output level between pins 2 and 3 of XLR 2.
   (pin 3 = signal negative, pin 2 = signal positive).
   The signal should measure 1.7 volts p-p approximately.

5. Measure the output level from XLR 3 (sub out).
   The signal should measure 2.5 volts p-p.

6. Transfer the input signal to XLR 4.

7. Measure the output at XLR 5 as in test 4.

8. Measure the output level from XLR 3 (sub out).
   The signal level should measure 2.5 volts p-p.

Rik Daniels
April 2, 1997

TEST PROCEDURE
FOR PPA 3 & 4 WAY CROSOVERS

1. Connect together the PCB's with connectors CA, CB and CC.

2. Connect the supply to connector CD.
   Zero volt to centre pin.

3. Measure the supply rails.
   +15 volts on IC5 pin 4 and -15 volts on IC5 pin 11.

4. Set the switches for both halves of the PCB as follows:
   SW1 OUT.
   SW2, SW3 and SW4 IN.
   Set all pots to maximum.

5. Inject a 100Hz 3 volt p-p signal into XLR 1 wired ground to pin 1, signal live to pin 2, pin 3 not connected.

6. Measure the output level on the scope connected between pins 2 & 3 of XLR 2 (pin 3 = signal negative, pin 2 = signal positive).
   The signal level should be 3 volts p-p.
   LED L1 should be lit to indicate the signal is present.
   Turn down pot V2, this should vary the signal level.
   Return V2 to its maximum position.
   Move switch SW 2 to its out position , L1 should go out and the signal should disappear from XLR 2.
   Return SW 2 to its in position.

7. Change the signal to 1kHz 3 volt p-p and monitor pins 2 & 3 on XLR 3.
   The signal level should measure 1.4 volts p-p.
   LED L2 should be lit to indicate the signal present.
   Turn down V3, this should vary the signal level.
   Return V3 to its maximum position.
   Move switch SW 3 to its out position, L2 should go out and the signal should disappear from XLR 3.
   Return SW 3 to its in position.

8. Change the signal to 10kHz 3 volts p-p, monitor XLR 4.
   The signal level should measure 2 volts p-p.
   LED L3 should be lit to indicate the signal is present.
   Turn down V4, this should vary the signal level.
   Return V4 to its maximum position.
   Move switch SW 4 to its out position.

L3 should go out and the signal should disappear from XLR 4.
Return SW 4 to its in position.

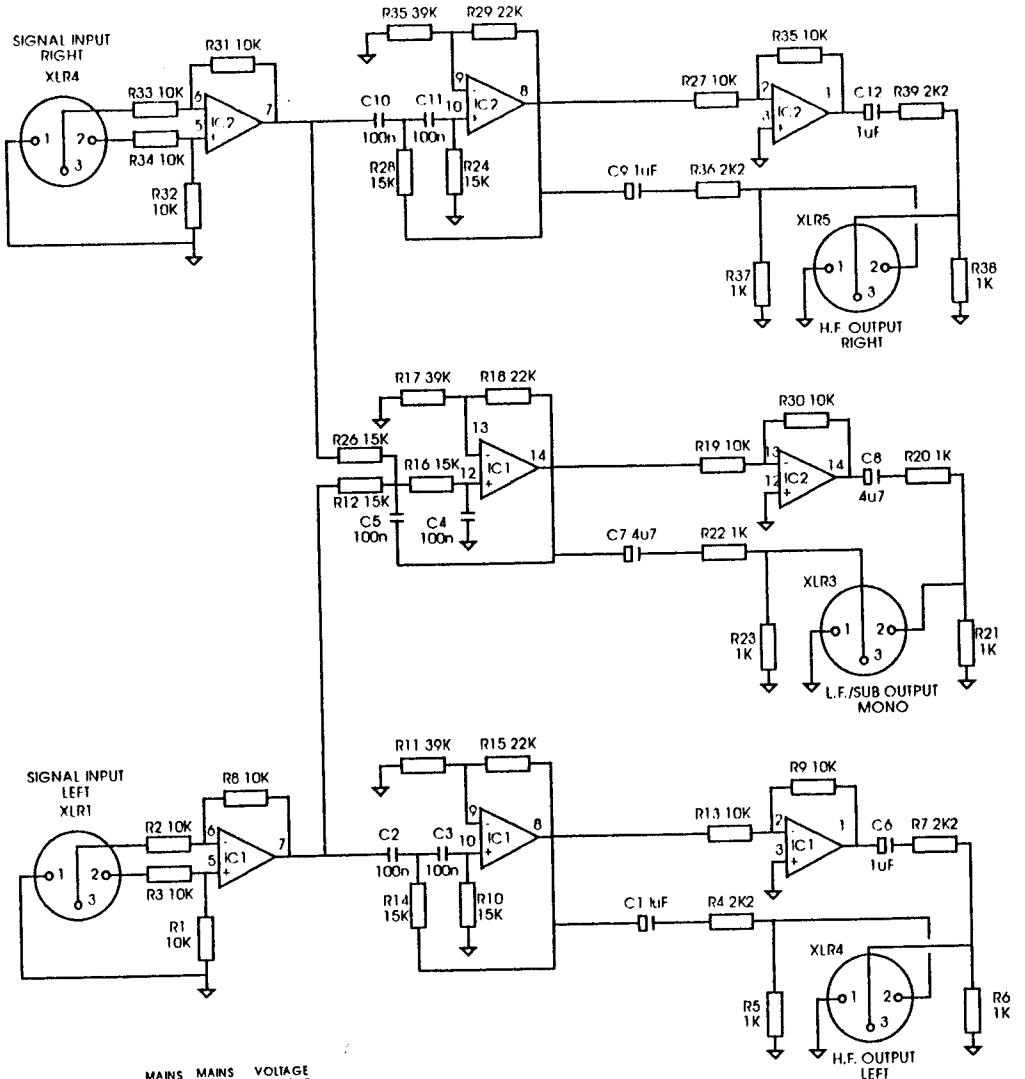
9. Change the signal to 50Hz 3 volts p-p and push in switch SW 1.
Measure with a probe on the junction of R72 / R73.
Turn down V1, this should vary the signal level.
Return V1 to its maximum position.
The signal should measure 240 mV p-p.
This checks that the sub-bass compression is working.

10. Low / Mid crossover check:-
With one channel of the scope monitoring XLR 2 and the other channel monitoring XLR 3 (both channels of the scope set to the same sensitivity), vary the input frequency between 200 and 400Hz.
Both output levels should be equal and in phase in between 285Hz and 315Hz.

11. Mid / High crossover check:-
With one channel of the scope monitoring XLR 3 and the other channel monitoring XLR 4 (both channels of the scope set to the same sensitivity), vary the input frequency between 2kHz and 3kHz. Both output levels should be equal and in phase in between 3135Hz and 3465Hz.

12. Repeat tests 5 to 11 for the second half of the PCB.

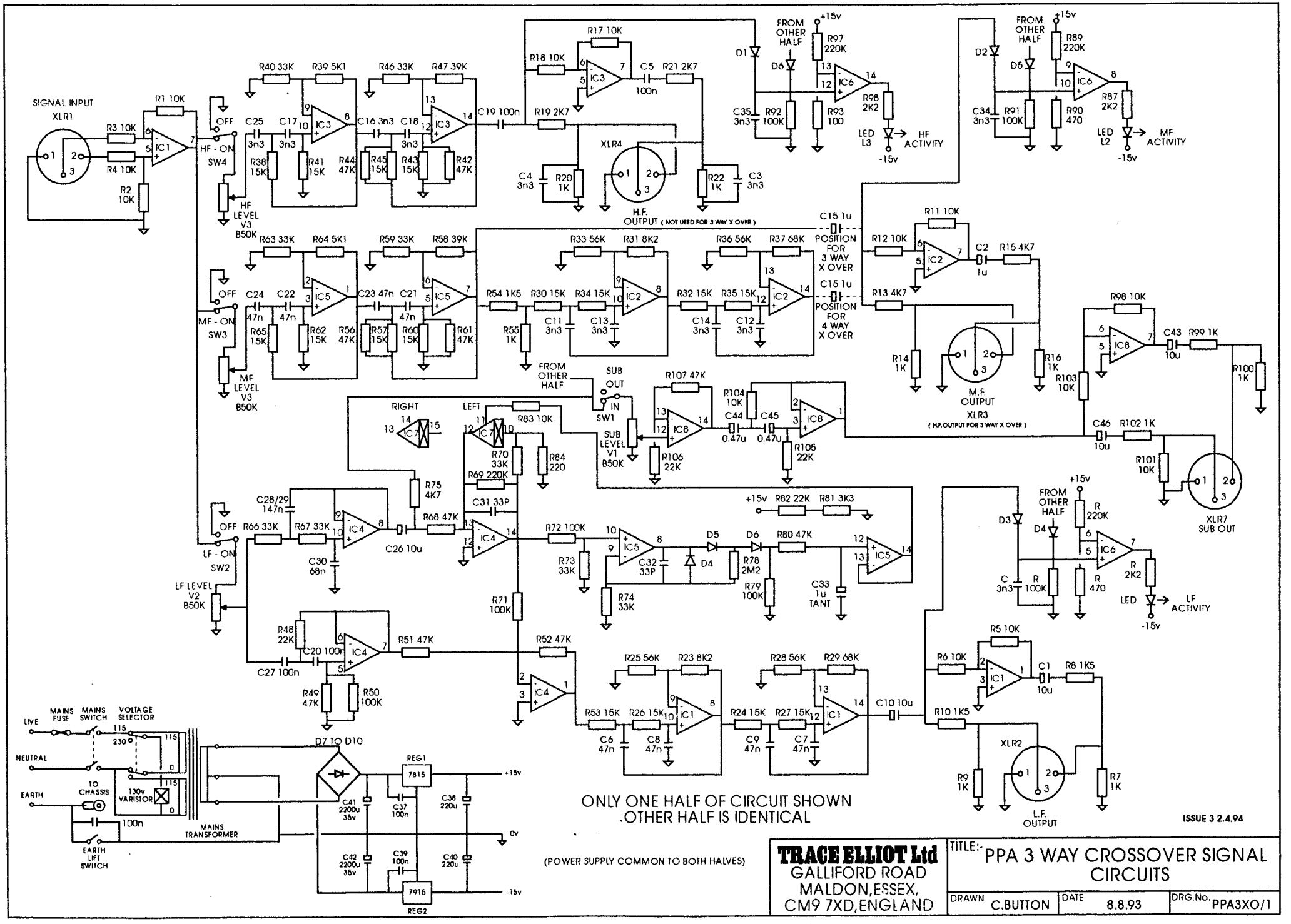
Rik Daniels
April 2, 1997



TRACE ELLIOT Ltd
GALLIFORD ROAD
MALDON, ESSEX,
CM9 7XD, ENGLAND

TITLE:- 2 WAY CROSSOVER PCB CIRCUIT DIAGRAM

DRAWN	DATE	DRG.No.
C.BUTTON	6.4.94	2WXO/1


SIGNAL INPUT XLR1
R1 10K
R3 10K
R4 10K
R2 10K
IC1
HF - ON SW4
OFF
HF LEVEL V3 B50K
R40 33K
R39 5K1
R46 33K
R47 39K
C25 3n3
C17 3n3
C16 3n3
C18 3n3
C19 100n
R38 15K
R41 15K
R44 47K
R45 15K
R43 15K
R42 47K
IC3
R17 10K
R18 10K
R19 2K7
C5 100n
R21 2K7
C4 3n3
R20 1K
XLR4
H.F. OUTPUT (NOT USED FOR 3 WAY X OVER)
R22 1K
C3 3n3
FROM OTHER HALF
+15v
D1
D6
R97 220K
C35 3n3
R92 100K
R93 100
IC6
R98 2K2
LED L3
HF ACTIVITY
-15v
D2
D5
R89 220K
C34 3n3
R91 100K
R90 470
R87 2K2
LED L2
MF ACTIVITY
MF - ON SW3
MF LEVEL V3 B50K
R63 33K
R64 5K1
R59 33K
R58 39K
C24 47n
C22 47n
C23 47n
C21 47n
R65 15K
R62 15K
R56 47K
R57 15K
R60 15K
R61 47K
IC5
R33 56K
R31 8K2
R36 56K
R37 68K
R54 1K5
R30 15K
R34 15K
R32 15K
R35 15K
C11 3n3
C13 3n3
C14 3n3
C12 3n3
IC2
R55 1K
C15 1u POSITION FOR 3 WAY X OVER
C15 1u POSITION FOR 4 WAY X OVER
R11 10K
R12 10K
R13 4K7
C2 1u
R15 4K7
R14 1K
M.F. OUTPUT XLR3
(H.F.OUTPUT FOR 3 WAY X OVER)
R16 1K
R98 10K
R103 10K
IC8
C43 10u
R99 1K
R100 1K
FROM OTHER HALF
SUB OUT
IN
SW1
SUB LEVEL V1 B50K
R107 47K
R104 10K
C44 0.47u
C45 0.47u
R106 22K
R105 22K
C46 10u
R102 1K
R101 10K
XLR7 SUB OUT
RIGHT
LEFT
IC7
R83 10K
R70 33K
R84 220
R69 220K
R75 4K7
C28/29 147n
R66 33K
R67 33K
IC4
C26 10u
C30 68n
C31 33P
R68 47K
R71 100K
R72 100K
R73 33K
C32 33P
D4
R78 2M2
R79 100K
+15v
R82 22K
R81 3K3
R80 47K
C33 1u TANT
R74 33K
LF - ON SW2
LF LEVEL V2 B50K
R48 22K
C20 100n
R51 47K
R52 47K
C27 100n
R49 47K
R50 100K
R25 56K
R23 8K2
R28 56K
R29 68K
R53 15K
R26 15K
R24 15K
R27 15K
C6 47n
C8 47n
C9 47n
C7 47n
C10 10u
R5 10K
R6 10K
C1 10u
R8 1K5
R10 1K5
R9 1K
R7 1K
XLR2
L.F. OUTPUT
D3
D4
R 220K
C 3n3
R 100K
R 470
R 2K2
LED
LF ACTIVITY
-15v
MAINS FUSE
MAINS SWITCH
VOLTAGE SELECTOR
LIVE
NEUTRAL
EARTH
TO CHASSIS
115
230
130v VARISTOR
100n
EARTH LIFT SWITCH
MAINS TRANSFORMER
D7 TO D10
REG1
7815
REG2
7915
C41 2200u 35v
C37 100n
C38 220u
C42 2200u 35v
C39 100n
C40 220u
+15v
0v
-15v
ONLY ONE HALF OF CIRCUIT SHOWN
.OTHER HALF IS IDENTICAL
(POWER SUPPLY COMMON TO BOTH HALVES)
ISSUE 3 2.4.94
TRACE ELLIOT Ltd
GALLIFORD ROAD
MALDON,ESSEX,
CM9 7XD,ENGLAND
TITLE:- PPA 3 WAY CROSSOVER SIGNAL CIRCUITS
DRAWN C.BUTTON
DATE 8.8.93
DRG.No. PPA3XO/1

PARTS LIST FOR 2 WAY CROSSOVER

Description	Part Code	Qty	Where Used
RESISTORS			
ZERO OHM LINK	72-RCZERO	2	
10K ¼ WATT	72-RM10K	14	R1-3 R8 R9 R13 R19 R27 R30-35
2K2 ¼ WATT	72-RM2K2	4	R4 R7 R36 R39
1K ¼ WATT	72-RM1K	8	R5 R6 R20-23 R37 R38
15K ¼ WATT	72-RM15K	7	R10 R12 R14 R16 R24 R26 R28
22K ¼ WATT	72-RM22K	3	R15 R18 R29
39K ¼ WATT	72-RM39K	3	R11 R17 R25
CAPACITORS			
1µF 35V TANT	72-C1-35VT	4	C1 C6 C9 C12
1000µF 35V RADIAL	72-C1000-35VER	2	C17 C18
100nF 100V POLY BOX	72-C100N-100VP	8	C2-5 C10 C11 C13 C16
220µF 35V RADIAL	72-C220-35VER	2	C14 C15
4.7µF 35V TANT	72-C4.7-35VT	2	C7-8
SEMI-CONDUCTORS			
IN4002 DIODE	72-D-IN4002	4	D1-4
15V REGULATOR	72-IC-7815-REG	1	REG 1
-15V REGULATOR	72-IC-7915-REG	1	REG 2
TL074 OP-AMP	72-IC-TL074	2	IC1 IC2
OTHERS			
3 WAY HEADER	72-HEAD-3W-2	1	CA
HEATSINK FOR REG 1	71-HS-TEG	2	REG 1 & 2
FEMALE XLR	73-XLR-PCB-F	2	XLR 1 XLR 4
MALE XLR	73-XLR-PCB-M	3	XLR 2 XLR 3 XLR 5

Rik Daniels
April 1, 1997

PARTS LIST FOR PPA 3 & 4 WAY CROSSOVER FRONT PCB

Description	Part Code	Qty	Where Used
RESISTORS			
ZERO OHM LINK	72-RCZERO	21	
100K ¼ WATT	72-RM100K	3	R91 R92 R96
100R ¼ WATT	72-RM100R	1	R93
220K ¼ WATT	72-RM220K	3	R89 R94 R97
2K2 ¼ WATT	72-RM2K2	3	***R86*** R87 R88
470R ¼ WATT	72-RM470R	2	R90 R95
CAPACITORS			
3N3 100V POLY BOX	72-C3N3-100VP	3	C34 C35 C36
SEMI-CONDUCTORS			
IN4148 DIODE	72-D-IN4148	6	D1-6
RED LED	72-LED-RED-TEG	3	L1 L2 ***L3***
TL074 OP-AMP	72-IC-TL074	1	IC6
OTHERS			
10 WAY 100MM LINK	72-LK-10W100TEG	2	CA CC
5 WAY 100MM LINK	72-LK-5W100MM	1	CB
50K POT	73-POT-50K	1	V1
50K DUAL GANG POT	73-POT-50K-DG	3	V2 V3 ***V4***
LATCHING SWITCH	73-SWT-F2UEE	4	SW1 SW2 SW3 ***SW4***

HIGHLIGHTED PARTS ARE NOT USED ON THE THREE WAY CROSSOVERS

Rik Daniels
April 1, 1997

PARTS LIST FOR PPA CROSSOVER
3 & 4 WAY BACK BOARDS

Description	Part Code	Qty	Where Used
RESISTORS			
ZERO OHM LINK	72-RCZERO	34	
100K ¼ WATT	72-RM100K	4	R50 R71 R72 R79
10 ¼ WATT	72-RM10K	15	R1-6 R11 R12 ***R17 R18*** R83 R98 R103 R104 R106
15K ¼ WATT	72-RM15K	16	R24 R26 R27 R30 R32 R34 R35 ***R38 R41 R43 R45*** R53 R57 R60 R62 R65
1K ¼ WATT	72-RM1K	11	R7 R9 R14 R16 ***R20 R22*** R55 R99-102
1K5 ¼ WATT	72-RM1K5	3	R8 R10 R54
220K ¼ WATT	72-RM220K	1	R69
220R ¼ WATT	72-RM220R	2	R84 R85
22K ¼ WATT	72-RM22K	3	R48 R82 R105
2K7 ¼ WATT	72-RM2K7	2	***R19 R21***
2M2 ¼ WATT	72-RM2M2	1	R78
33K ¼ WATT	72-RM33K	9	***R40 R46*** R59 R63 R66 R67 R70 R73 R74
39K ¼ WATT	72-RM39K	2	***R47*** R58
3K3 ¼ WATT	72-RM3K3	1	R81
47K ¼ WATT	72-RM47K	10	***R42 R44*** R49 R51 R52 R56 R61 R68 R80 R107
4K7 ¼ WATT	72-RM4K7	3	R13 R15 R75
56K ¼ WATT	72-RM56K	4	R25 R28 R33 R36
5K1 ¼ WATT	72-RM5K1	2	***R39*** R64
68K ¼ WATT	72-RM68K	2	R29 R37
8K2 ¼ WATT	72-RM8K2	2	R23 R31
FEMALE XLR	73-XLR-PCB-F	1	XLR 1
MALE XLR	73-XLR-PCB-M	3	XLR 2-4
CAPACITORS			
0.47µF 35V TANT	72-C0.47-35VT	2	C44 C45
1µF 35V TANT	72-C1-35VT	1	C33
1µF 63V RADIAL	72-C1-63VER	2	C2 C15
10µF 63V RADIAL	72-C10-63VER	5	C1 C10 C26 C43 C46
100N 100V POLY BOX	72-C100N-100VP	7	***C5 C19*** C20 C27 C28 C37 C39
220µF 35V RADIAL	72-C220-35VER	2	C38 C40

2200µF 25V RADIAL	72-C2200-25VER	2	C41 C42
33pF 100V CER DISC	72-C33P-100VCD	2	C31 C32
3N3 100V POLY BOX	72-C3N3-100VP	10	***C3 C4*** C11 C12 C13 C14 ***C16 C17 C25 C18***
47nF 100V POLY BOX	72-C47N-100VP	9	C6-9 C21-24 C29
68nF 100V POLY BOX	72-C68N-100VP	1	C30
SEMI-CONDUCTORS			
IN4002 DIODE	72-D-IN4002	4	D7-10
IN4148 DIODE	72-D-IN4148	3	D4-6
15V REGULATOR	72-IC-7815-REG	1	REG 1
-15V REGULATOR	72-IC-7915-REG	1	REG 2
SSM2024 IC	72-IC-SSM2024	1	IC7
TL074 OP-AMP	72-IC-TL074	6	IC1 IC2 ***IC3*** IC4 IC5 IC8
OTHERS			
10 WAY HEADER	72-HEAD-10W-TEG	2	CA CC
3 WAY HEADER	72-HEAD-3W-2	1	CD
5 WAY HEADER	72-HEAD-5W	1	CB
HEATSINK	71-HS-TEG	2	REG 1&2

PARTS HIGHLIGHTED ARE NOT USED ON THE THREE WAY CROSSOVERS

Rik Daniels
March 27, 1997