Pass Laboratories

Aleph L Service Manual

The Aleph L is a simple Mosfet stereo preamplifier having four single-ended inputs and two outputs. Its controls consist of an input selector and a level control. Maximum gain is internally adjustable via a dip switch.

The gain stage of the preamp is a single Mosfet operated common source and biased by a Mosfet constant current source.

Figure 1 shows the schematic of the preamp, indicating the component designations and values and various voltages.

The power supply and the left channel are shown. Power supply and components common to both channels have reference designators less than 100. The left channel is 100 to 199, and the right channel is 200 to 299.

The power supply transformer delivers approximately 84 volts (for 120 or 240 VAC operation) unregulated DC into C1, which is then passively filtered and then actively regulated down to about 60 volts at the output of Q1. Q1 is driven by a stack of Zener diodes in parallel with C3 and the regulated output is additionally filtered by C4.

The output muting relay is controlled by the circuits of Q2 and Q3. For the relay to activate, both Q2 and Q3 must be conducting. Q3 turns on slowly via the charge on C5, while Q2 will only conduct when there is at least 8 volts difference between regulated and unregulated supplies. Thus Q3 delays relay turn on, and Q2 shuts it off quickly.

The audio gain stage consists of Q101. The input goes to the gate, and the output appears at the drain. The circuit is inverting.

The circuit of Q102 provides a constant current source of about 40 ma for the gain stage. It is controlled by the circuit of Q103, which works to keep a .7 volt value across R111.

The output of the gain stage goes to the level control which is a 23 position stepped attenuator whose wiper is attached to the preamp output.

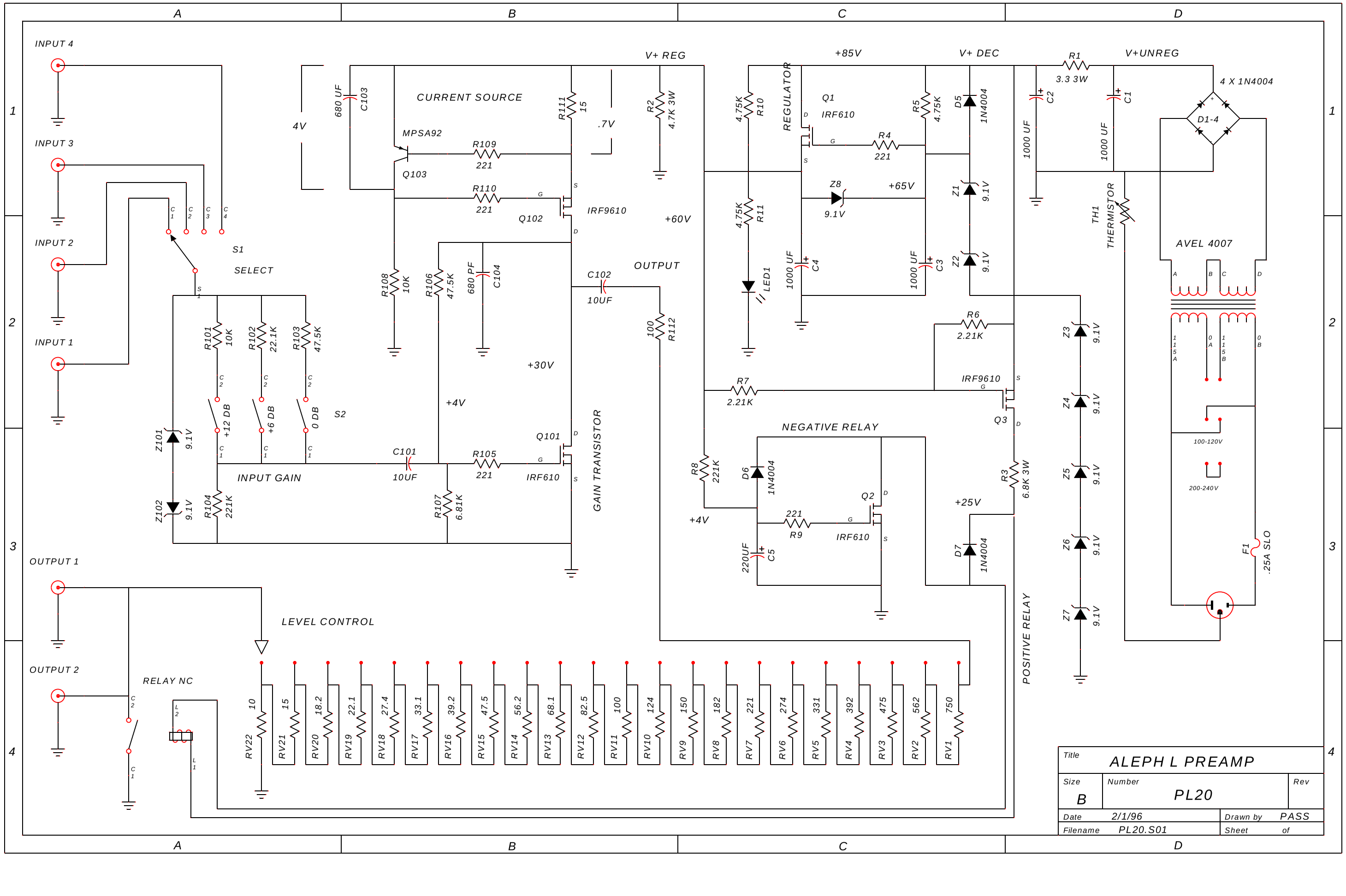
Fig 2 shows the circuit board layout, with the components identified by designators.

Fig 3 shows the circuit board layout, with the components identified by values.

Fig 4 shows the circuit board layout of the volume control.

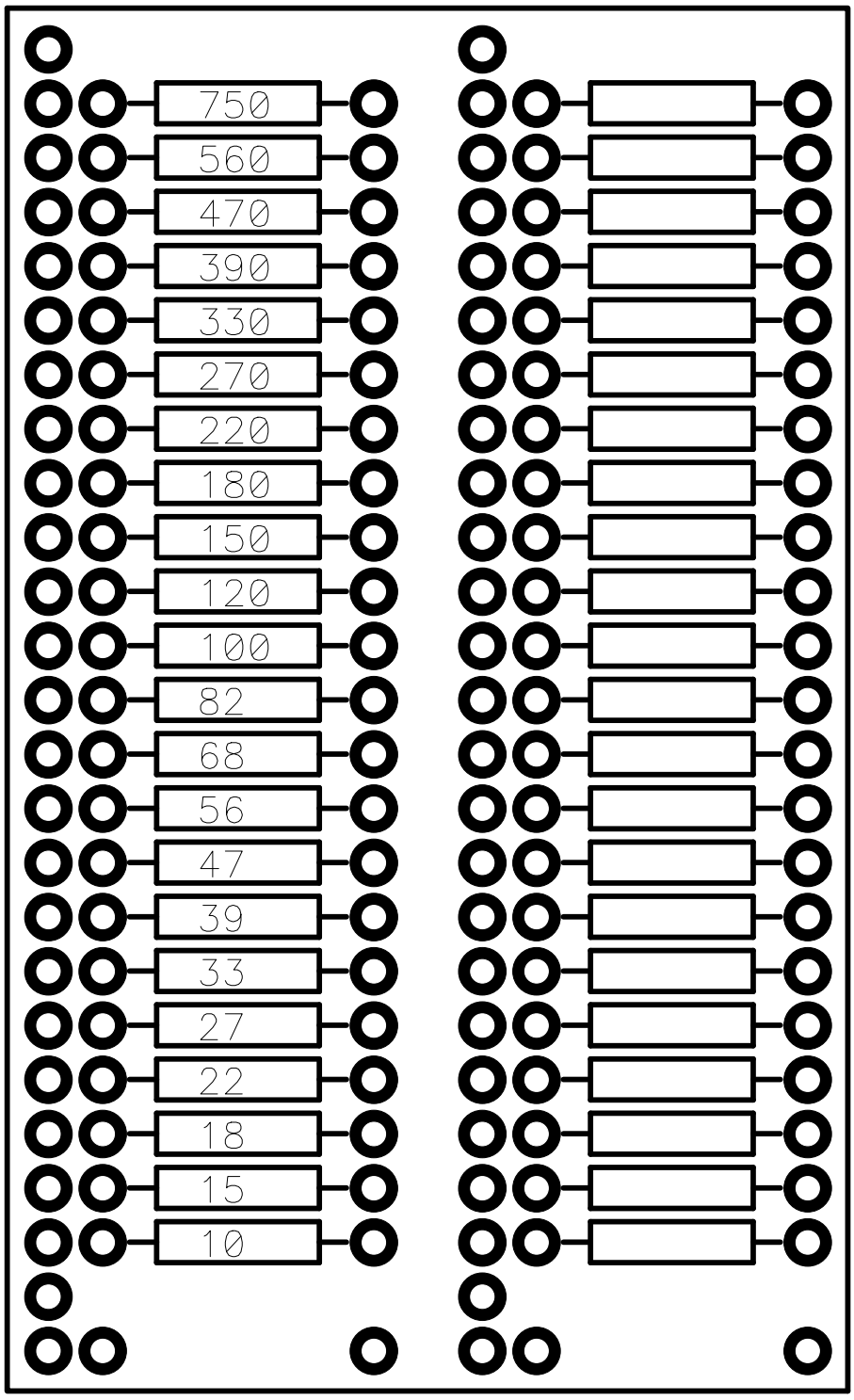
The maximum gain of the preamp is controlled by the input resistor values in conjunction with the 6 position dip switch on the main board.

0 dB	switches 1, 6 = On	
6 dB	switches 2, 5 = On	(default)
12 dB	switches 3, 4 = On	
18 dB	all internal switches = 0n	


A
B
C
D
INPUT 4
INPUT 3
INPUT 2
INPUT 1
S1
SELECT
S2
4V
680 UF
C103
CURRENT SOURCE
MPSA92
Q103
R109
221
R110
221
Q102
IRF9610
R111
15
.7V
V+ REG
R2
4.7K 3W
+60V
R108
10K
R106
47.5K
680 PF
C104
+30V
+4V
C102
10UF
OUTPUT
R112
100
Z101
9.1V
Z102
9.1V
R101
10K
R102
22.1K
R103
47.5K
+12 DB
+6 DB
0 DB
INPUT GAIN
C101
10UF
R105
221
Q101
IRF610
R104
221K
R107
6.81K
GAIN TRANSISTOR
REGULATOR
Q1
IRF610
+85V
4.75K
R10
4.75K
R11
LED1
1000 UF
C4
R4
221
Z8
9.1V
+65V
V+ DEC
R5
4.75K
D5
1N4004
Z1
9.1V
1000 UF
C3
Z2
9.1V
R1
3.3 3W
V+UNREG
4 X 1N4004
D1-4
1000 UF
C2
1000 UF
C1
TH1
THERMISTOR
AVEL 4007
100-120V
200-240V
F1
.25A SLO
R6
2.21K
R7
2.21K
IRF9610
Q3
Z3
9.1V
Z4
9.1V
NEGATIVE RELAY
R8
221K
D6
1N4004
+4V
221
R9
IRF610
Q2
220UF
C5
+25V
D7
1N4004
R3
6.8K 3W
POSITIVE RELAY
Z5
9.1V
Z6
9.1V
Z7
9.1V
OUTPUT 1
OUTPUT 2
RELAY NC
LEVEL CONTROL
RV22 10
RV21 15
RV20 18.2
RV19 22.1
RV18 27.4
RV17 33.1
RV16 39.2
RV15 47.5
RV14 56.2
RV13 68.1
RV12 82.5
RV11 100
RV10 124
RV9 150
RV8 182
RV7 221
RV6 274
RV5 331
RV4 392
RV3 475
RV2 562
RV1 750
Title
ALEPH L PREAMP
Size
B
Number
PL20
Rev
Date
2/1/96
Drawn by
PASS
Filename
PL20.S01
Sheet
of

L
R
1
2
3
4
LEFT
RIGHT
Q103
C103
R109
R111
R110
C101
C102
C104
R108
R106
R107
R104
R105
R112
Q101
Q102
Q203
C203
R209
R211
R210
C201
C202
C204
R208
R206
R207
R204
R205
R212
Q201
Q202
S2
R201
R202
R203
Z201
Z202
R101
R102
R103
Z101
Z102
W
LED
R11
R10
OUT
RELAY
D7
TH1
R3
EARTH
D1~4
AC
Q2
R2
Q3
R9
R8
D6
R7
R6
C5
Q1
R4
Z8
D5
R1
C1
C2
C3
C4
R5
Z1
Z2
Z3
Z4
Z5
Z6
Z7
GND

1
R
L
2
3
4
LEFT
RIGHT
A92
680PF
2210
15R0
1000
10UF
9610
610
1002
10 UF
4752
6811
2213
W
0 DB
6 DB
12 DB
9.1
2212
4751
LED
OUT
RELAY
1N4004
4.7K
220UF
2211
THERMISTOR
6.8K
EARTH
AC
GND
1000 UF
3.3


750
560
470
390
330
270
220
180
150
120
100
82
68
56
47
39
33
27
22
18
15
10

SPECIFICATIONS

Gain	17 dB (all internal switches = 0n)
	12 dB (switches 3, 4 = On)
	6 dB (switches 2, 5 = On)
	0 dB (switches 1, 6 = On)
Freq. Response	+0, -3 dB @ 10 Hz and 100 kHz
Distortion	< .2 % THD typically .02% @ 1 volt @ 1KHZ
Maximum Output	10 volts rms.
Output Impedance	0 - 750 ohms
Input Impedance	20 Kohm, 6.5 dB gain setting (default)
	10 Kohm, 13.4 dB gain setting
Output Noise	less than 10 microvolts, unweighted 20-20khz
Power Consumption	15 watts
Dimensions	12 " W x 11.5 " D x 4" H
Shipping Weight	22 lb.

Pass Laboratories

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Aleph L Service Manual

Rev 1.2 9/26/96

The Aleph L is a simple Mosfet stereo preamplifier having four single-ended inputs and two outputs. Its controls consist of an input selector and a level control. The volume control is passive up to the 3:00 o'clock position where the gain is unity. At 3:00 o'clock, the connection from input to output is direct, with no components in the signal path, and past the 3:00 o'clock position the unit becomes an active preamp.

The gain stage of the preamp is a single Mosfet operated common source and biased by a Mosfet constant current source.

Figure 1 shows the schematic of the preamp, indicating the component designations and values and various voltages.

The power supply and the left channel are shown. Power supply and components common to both channels have reference designators less than 100. The left channel is 100 to 199, and the right channel is 200 to 299.

The power supply transformer delivers approximately 84 volts (for 120 or 240 VAC operation) unregulated DC into C1, which is then passively filtered and then actively regulated down to about 60 volts at the output of Q1. Q1 is driven by a stack of Zener diodes and the regulated output is additionally filtered by C3 and C4 to form the left and right supplies.

The output muting relay is controlled by the circuits of Q2 and Q3. For the relay to activate, both Q2 and Q3 must be conducting. Q3 turns on slowly via the charge on C5, while Q2 will only conduct when there is at least 8 volts difference between regulated and unregulated supplies. Thus Q3 delays relay turn on, and Q2 shuts it off quickly.

The audio gain stage consists of Q101. The input goes to the gate, and the output appears at the drain. Q102 inverts the signal, so the circuit as a whole is non inverting.

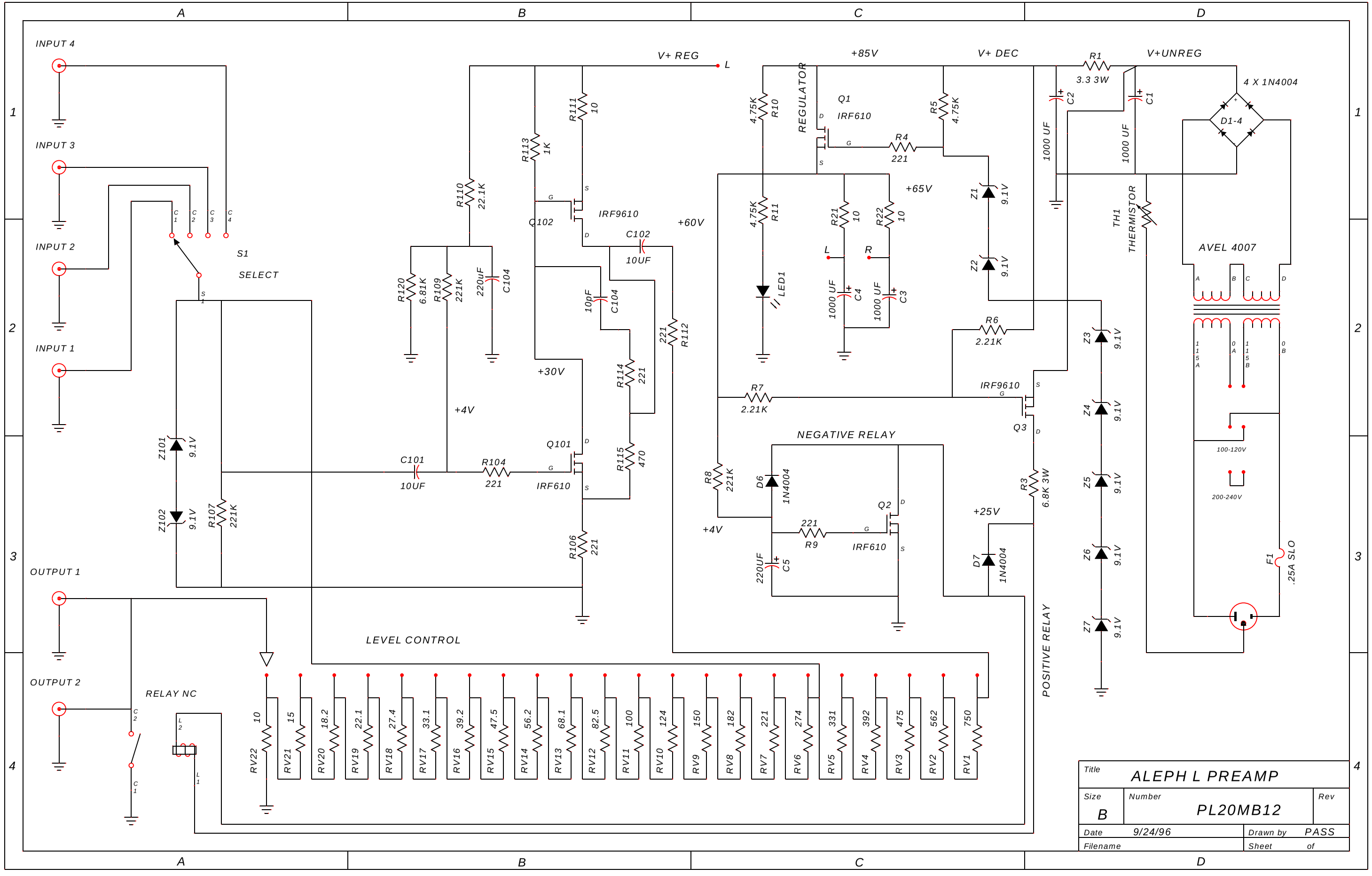
The output of the gain stage goes to the level control which is a 23 position stepped attenuator whose wiper is attached to the preamp output.

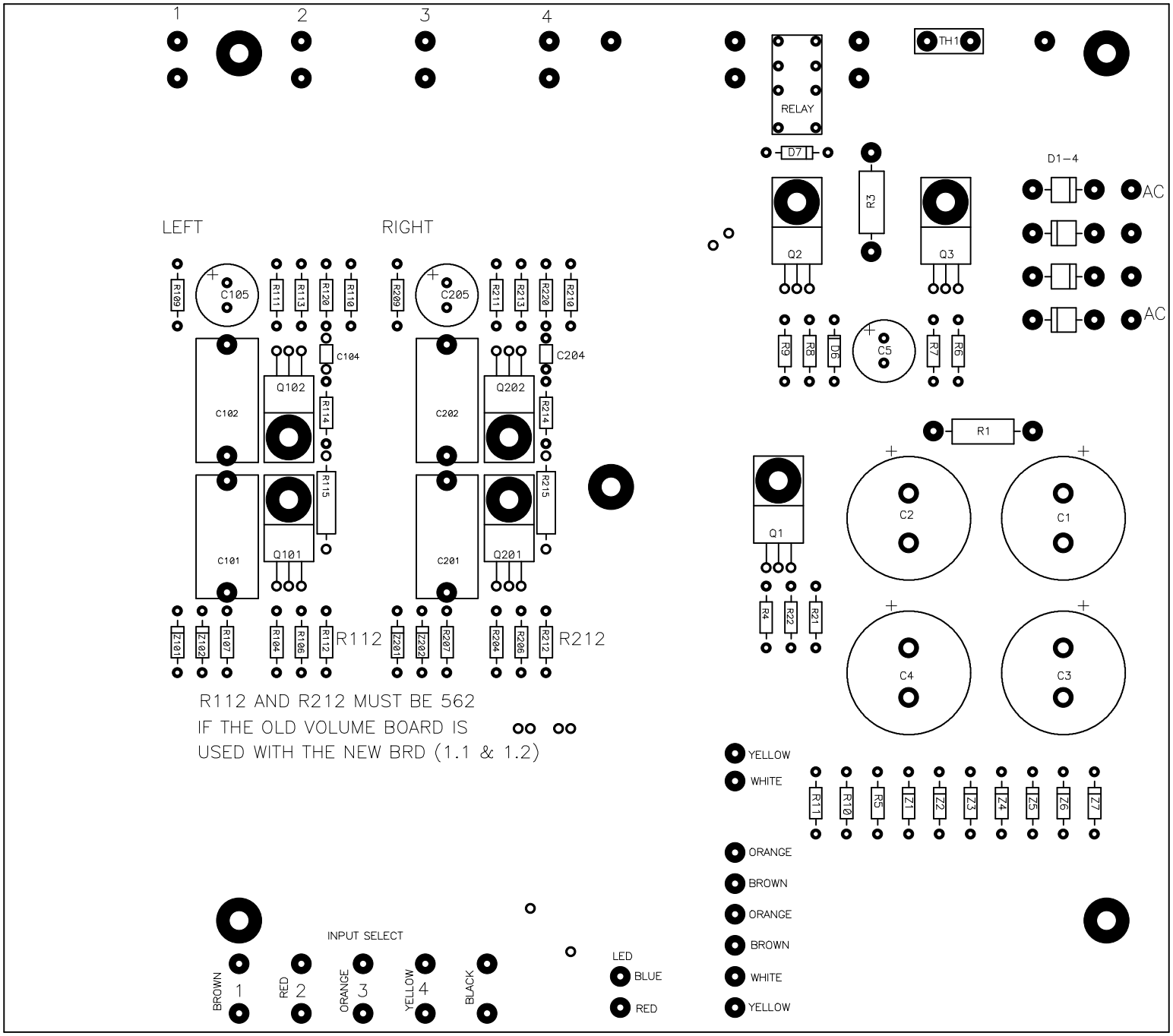
Fig 2 shows the circuit board layout, with the components identified by designators.

Fig 3 shows the circuit board layout, with the components identified by values.

Fig 4 shows the circuit board layout of the volume control.

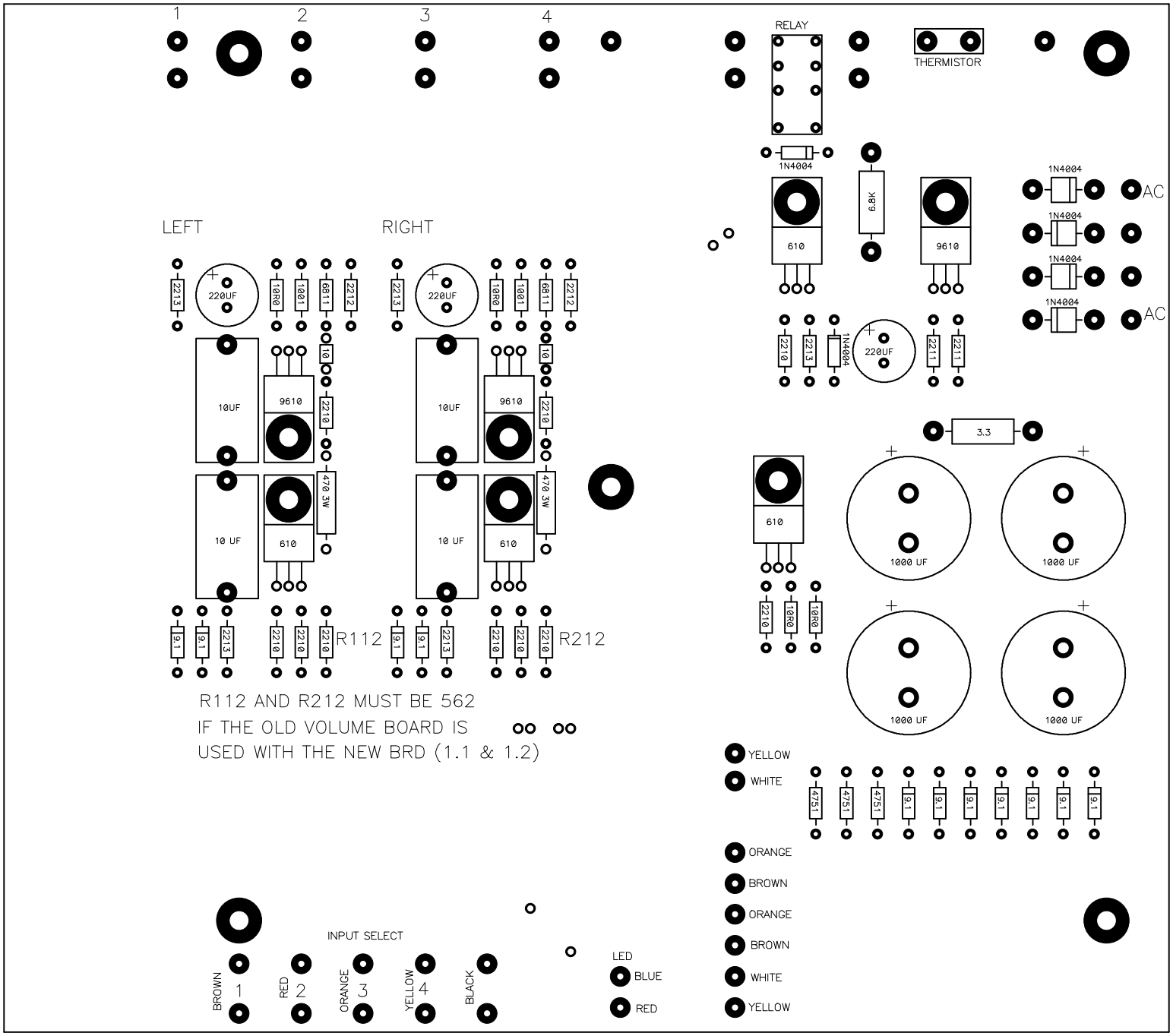
Fig 5 shows the Aleph L upgrade.


A
B
C
D
INPUT 4
INPUT 3
INPUT 2
INPUT 1
C 1
C 2
C 3
C 4
S1
SELECT
S 1
Z101 9.1V
Z102 9.1V
R107 221K
V+ REG
L
R110 22.1K
R111 10
R113 1K
G
S
IRF9610
Q102
D
C102
10UF
+60V
R120 6.81K
R109 221K
220uF C104
10pF C104
+30V
R114 221
221 R112
+4V
C101 10UF
R104 221
Q101
IRF610
R115 470
R106 221
REGULATOR
+85V
V+ DEC
R1 3.3 3W
V+UNREG
4 X 1N4004
Q1 IRF610
4.75K R10
R4 221
R5 4.75K
1000 UF
C2
C1
D1-4
4.75K R11
R21 10
R22 10
+65V
Z1 9.1V
Z2 9.1V
TH1 THERMISTOR
AVEL 4007
L
R
1000 UF C4
1000 UF C3
LED1
R6 2.21K
R7 2.21K
IRF9610
Q3
Z3 9.1V
Z4 9.1V
NEGATIVE RELAY
R8 221K
D6 1N4004
Q2
221 R9
IRF610
220UF C5
+4V
+25V
D7 1N4004
R3 6.8K 3W
Z5 9.1V
Z6 9.1V
Z7 9.1V
100-120V
200-240V
F1 .25A SLO
OUTPUT 1
OUTPUT 2
RELAY NC
LEVEL CONTROL
RV22 10
RV21 15
RV20 18.2
RV19 22.1
RV18 27.4
RV17 33.1
RV16 39.2
RV15 47.5
RV14 56.2
RV13 68.1
RV12 82.5
RV11 100
RV10 124
RV9 150
RV8 182
RV7 221
RV6 274
RV5 331
RV4 392
RV3 475
RV2 562
RV1 750
POSITIVE RELAY
Title
ALEPH L PREAMP
Size
B
Number
PL20MB12
Rev
Date
9/24/96
Drawn by
PASS
Filename
Sheet
of



ALEPH L UPGRADE (1.0 TO 1.1 OR 1.2)

THE UPGRADE TO THE "L" IS A SIMPLE BOARD SWAP.
NOTE THE RESISTOR CHANGE INDICATED IN THE DRAWING ABOVE.
WHEN SWAPPING THE BOARDS PAY ATTENTION TO THE WIRE LOCATIONS
USE THE DIAGRAM ABOVE AS A GUIDE FOR WIRE PLACEMENT.



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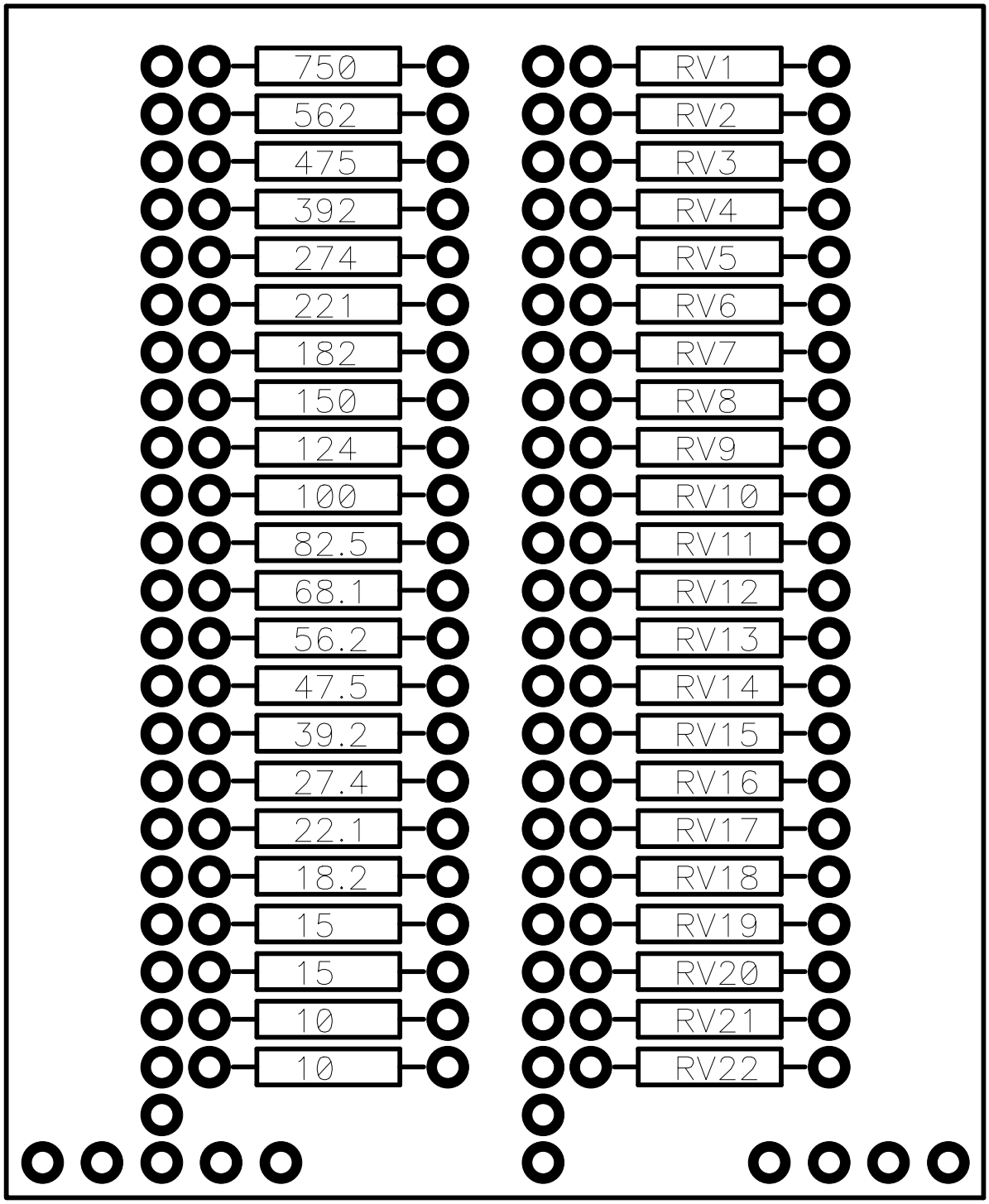
750
562
475
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182
150
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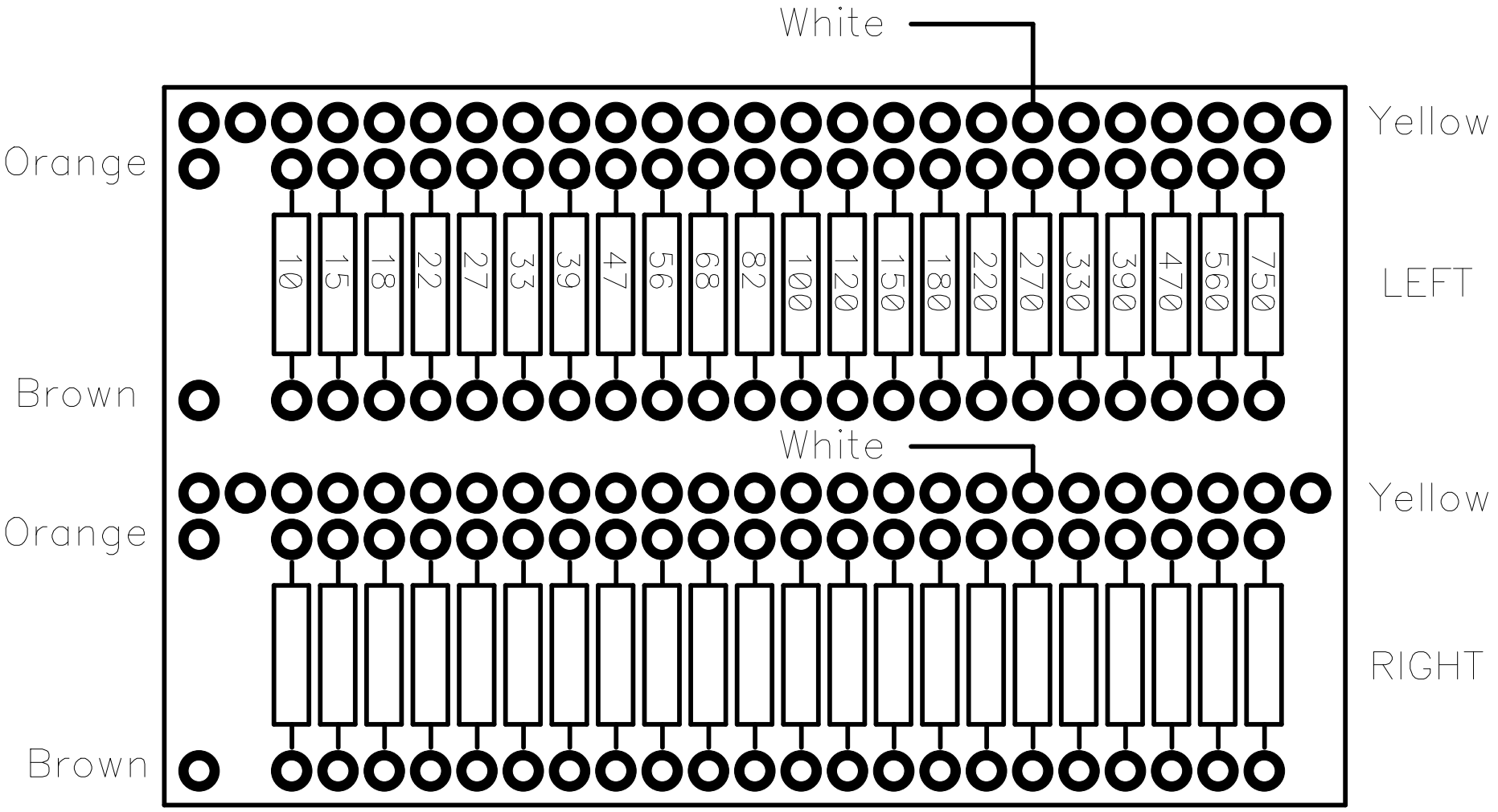
100
82.5
68.1
56.2
47.5
39.2
27.4
22.1
18.2
15
15
10
10
RV1
RV2
RV3
RV4
RV5
RV6
RV7
RV8
RV9
RV10
RV11
RV12
RV13
RV14
RV15
RV16
RV17
RV18
RV19
RV20
RV21
RV22

ALEPH L update with
old Volume Control Brd.

NOTE: LOCATION OF WHITE WIRE



ALEPH L Update

Rev 1.0 to 1.1

The kit contains one new main board with the correct value for R212, but please verify before doing the conversion.

To update the Aleph L from rev 1.0 to either rev 1.1 is a simple matter of replacing the main board, with two minor exceptions.

1. R212 **must** be 562 (see attached drawing for location).

2. When keeping the old volume control board the white wire **must** be attached as shown in the drawing of the old volume board.

SPECIFICATIONS

Gain	17 dB
Freq. Response	+0, -3 dB @ 10 Hz and 100 kHz
Distortion	< .2 % THD typically .02% @ 1 volt @ 1KHZ
Maximum Output	10 volts rms.
Output Impedance	0 - 750 ohms
Input Impedance	20 Kohm
Output Noise	less than 10 microvolts, unweighted 20-20khz
Power Consumption	15 watts
Dimensions	12 " W x 11.5 " D x 4" H
Shipping Weight	22 lb.

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