Amplifier Gain

Voltage gain of the Model 312 Preamplifier may be conveniently and accurately adjusted by means of an external resistor or potentiometer attached to the mating connector. Resistor values to achieve various gain settings are shown in the External Gain Resistor Table. To achieve gain settings other than those indicated, the proper resistance value may be extrapolated from the table, or the following equation may be used:

Gain Resistance

$$R = \frac{20{,}000}{\frac{At}{(Ai)\ (Ao)} - 1} - 200$$

Where:

R = External gain resistor in Ohms

At = $\frac{V\ out}{V\ in}$ = Total input to output voltage gain ratio

Ai = Input transformer gain

Ai = 8 for 150Ω input connection

Ai = 4 for 600Ω input connection

Ao = Output transformer gain

Ao = 1.86, Output 1

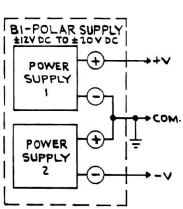
Ao = 0.98, Output 2

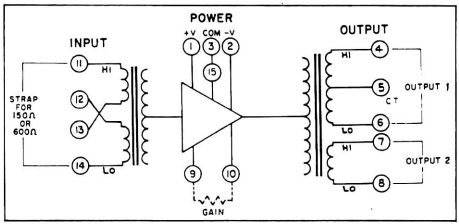
Ao = 2.60, Output 1 & 2 in series

Note: Output Load = 600Ω in all cases.

Connector

The connector furnished with the Model 312 contains 30 terminals in a "double readout" configuration such that only 15 terminals make contact with the printed circuit, and the second row of 15 contacts is available for external connections as desired. A plastic keying pin is provided to prevent improper insertion. This keying pin is located between terminals 2 and 3.





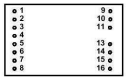
EXTERNAL GAIN RESISTOR TABLE

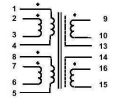
(600 Ohm Load)

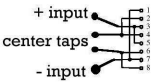
Voltage Gain (dB)		Gain Resistor, Terminals 9 - 10		
600 Ohm Input	150 Ohm Input	Output 1 Terminals 4 - 6	Output 2 Terminals 7 - 8	Output 1 & 2 Terminals 4 - 8
12	18	--	Open	--
18	24	270k	18k	--
24	30	18k	6.2k	36k
30	36	6.2k	2.7k	9.1k
36	42	2.4k	1.1k	3.6k
42	48	1.0k	430	1.6k
48	54	390	120	680
54	60	100	--	220
60	66	--	--	short

Note: All resistor values in Ohms

PAT's CUSTOM DESIGNED MM990 PREAMP







gain control can be a 25k reverse audio pot
gain control can be a 10k linear pot, with 10k fixed resistor
gain control can be a custom ladder, made with individual fixed resistors, and a switch

USE STAR GROUNDING!
each ground goes INDIVIDUALLY
to ONE POINT on the chassis

Millennia Music and Media Systems
***MM-990* Pure Class-A, All Discrete, All J-FET Operational Amplifier.**
Fully Compatible with Jensen 990™ and API 2510 / 2520™ Modules

Millennia Media®

MM-990 Typical Performance Specifications

Max output Level (1% THD+N)…
10k load = +26.5 dBu
600 ohm = +25.5 dBu

Noise Floor (22-22k bandwidth @ +20dB Gain)…
25 Zs = -105.5 dBu (4 microvolts RMS)
600 Zs = -101 dBu (6 microvolts RMS)

THD+N (10-22K bandwidth @ +20dB Gain)…
10k ohm Load
0 dBu = 0.001%
+10 dBu = 0.002%
+20 dBu = 0.009%
+24 dBu = 0.01%

600 ohm Load
0 dBu = 0.0018%
+10 dBu = 0.003%
+20 dBu = 0.009%
+24 dBu = 0.01%

Frequency Response.
10k||0.001mfd or 600 ohm Load…
-1 dB @ 355 KHz and 0.3 Hz
-3 dB @ 450 KHz and 0.15 Hz

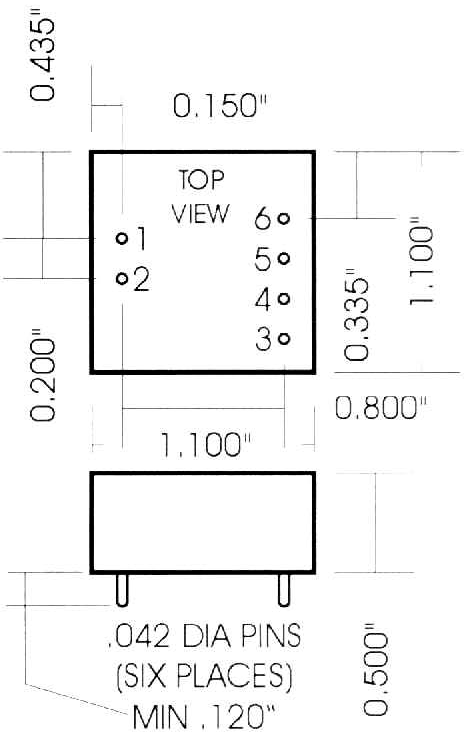
Open Loop Gain…
73 dB typical

Input Impedance…
1 megohm

Input Capacitance…
Appox 20 pf

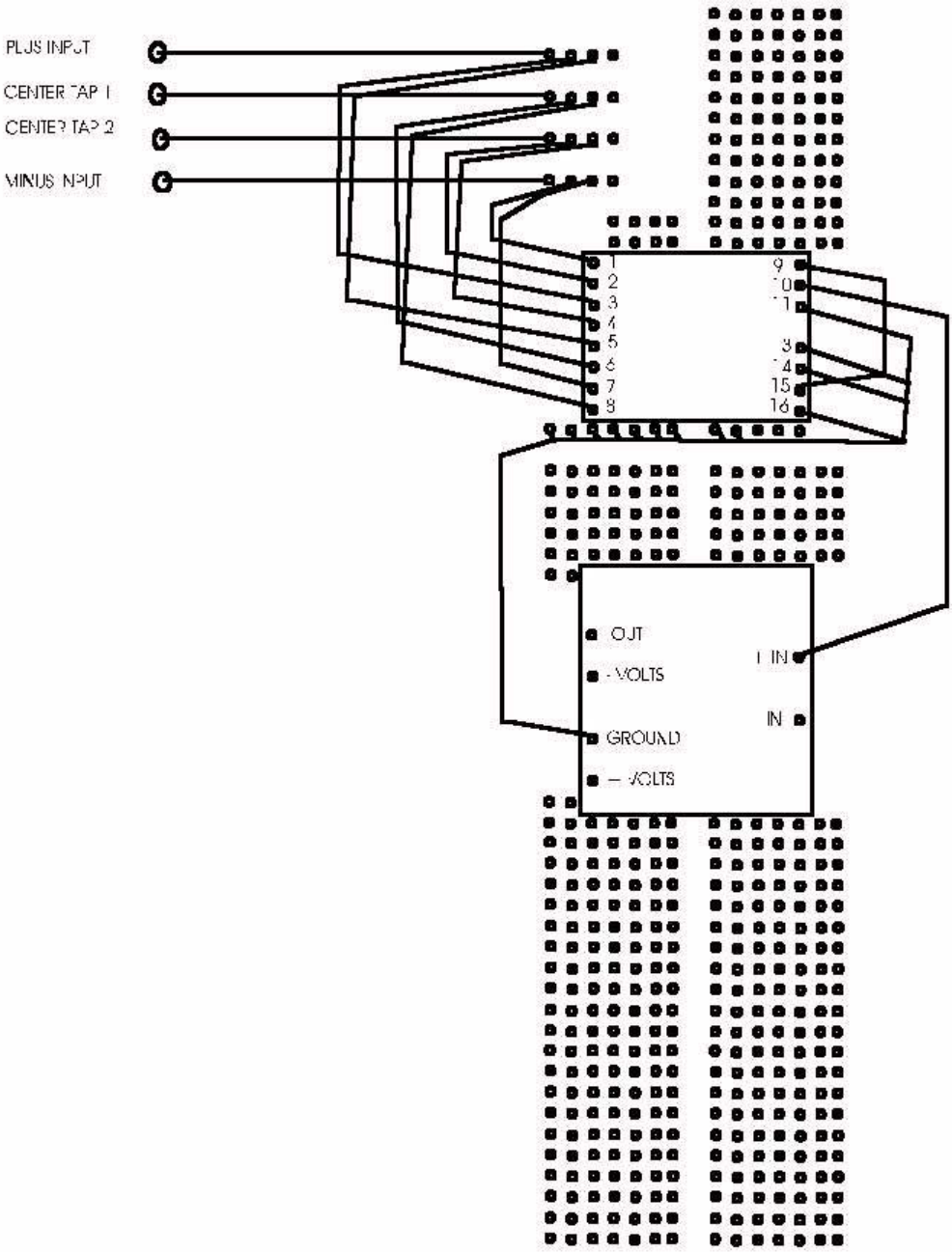
Power Supply Voltage Range…
Bipolar 12 VDC to Bipolar 28 VDC
(Bipolar 15 to Bipolar 25 Max Recommended)

Power Supply Current Draw…
20-25 milliamps (each polarity)

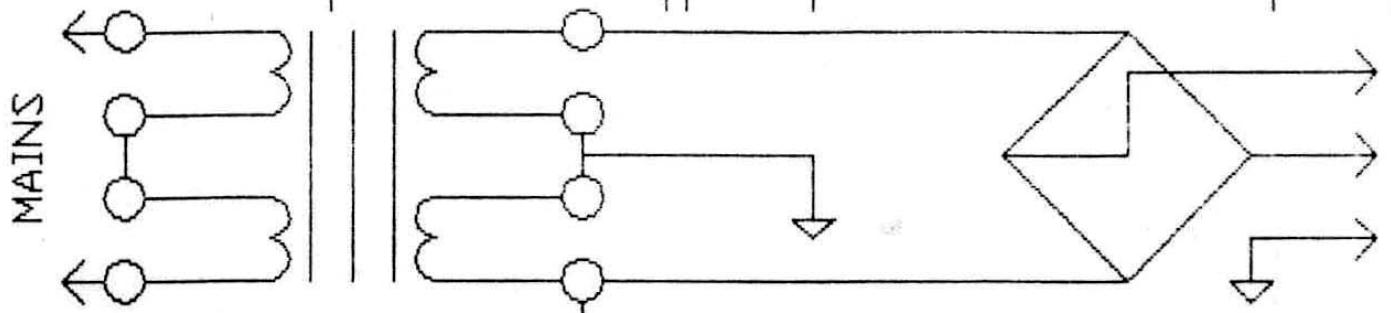


1 + IN
2 − IN
3 + V
4 GND
5 − V
6 OUT

Millennia Media, Inc.
4200-B Day Spring Ct.
Placerville, CA 95667 USA
Tel 530-647-0750 Fax 530-647-9921
WEB http://www.mil-media.com
EMAIL info@mil-media.com

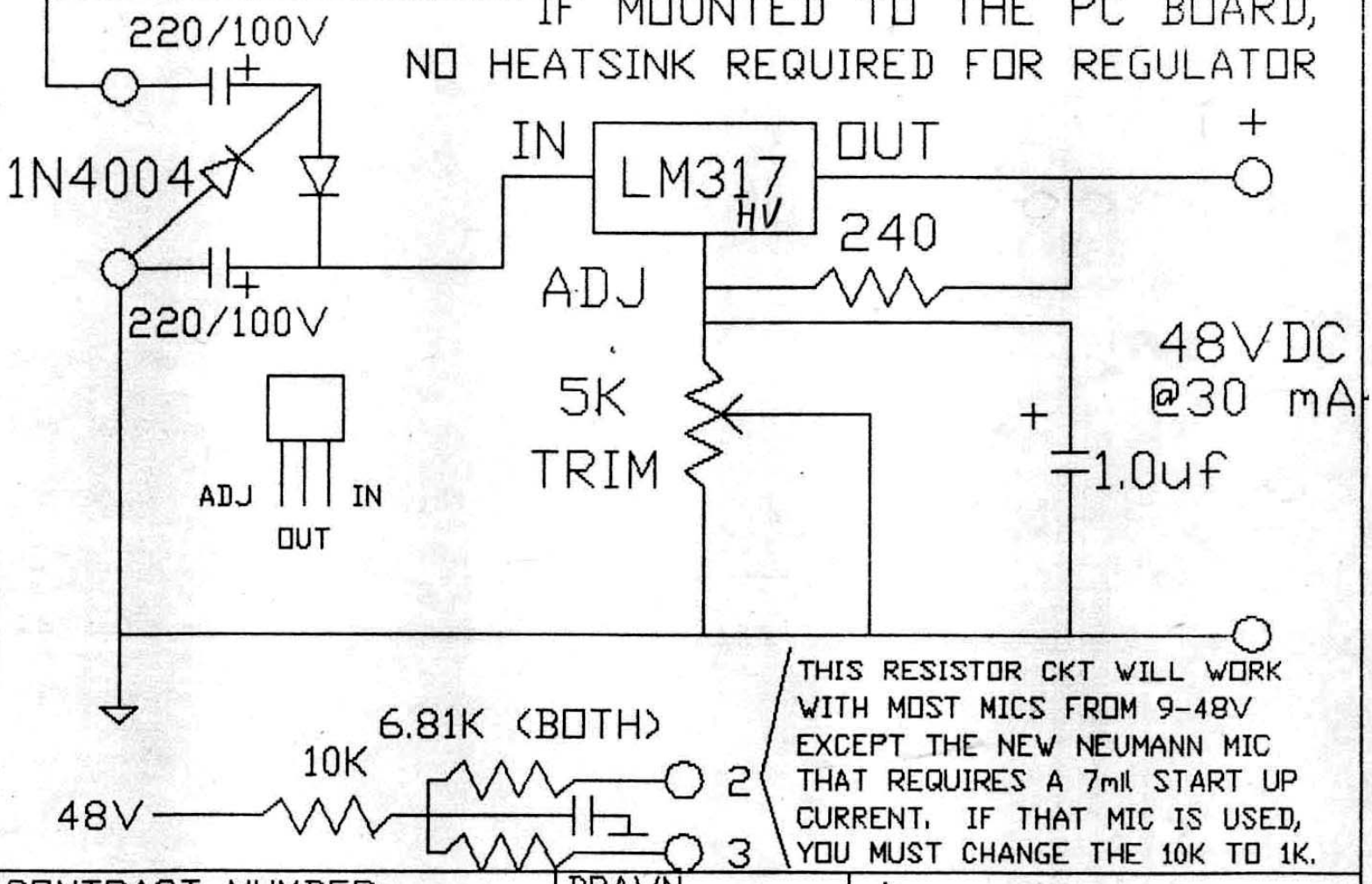

PLUS INPUT
CENTER TAP 1
CENTER TAP 2
MINUS INPUT
1
2
3
4
5
6
7
8
9
10
11
13
14
15
16
OUT
- VOLTS
GROUND
— VOLTS
IN
IN

APPLICATION		REVISIONS			
NEXT ASSY	USED ON	REV	DESCRIPTION	DATE	APRVD
EXISTING TRX					



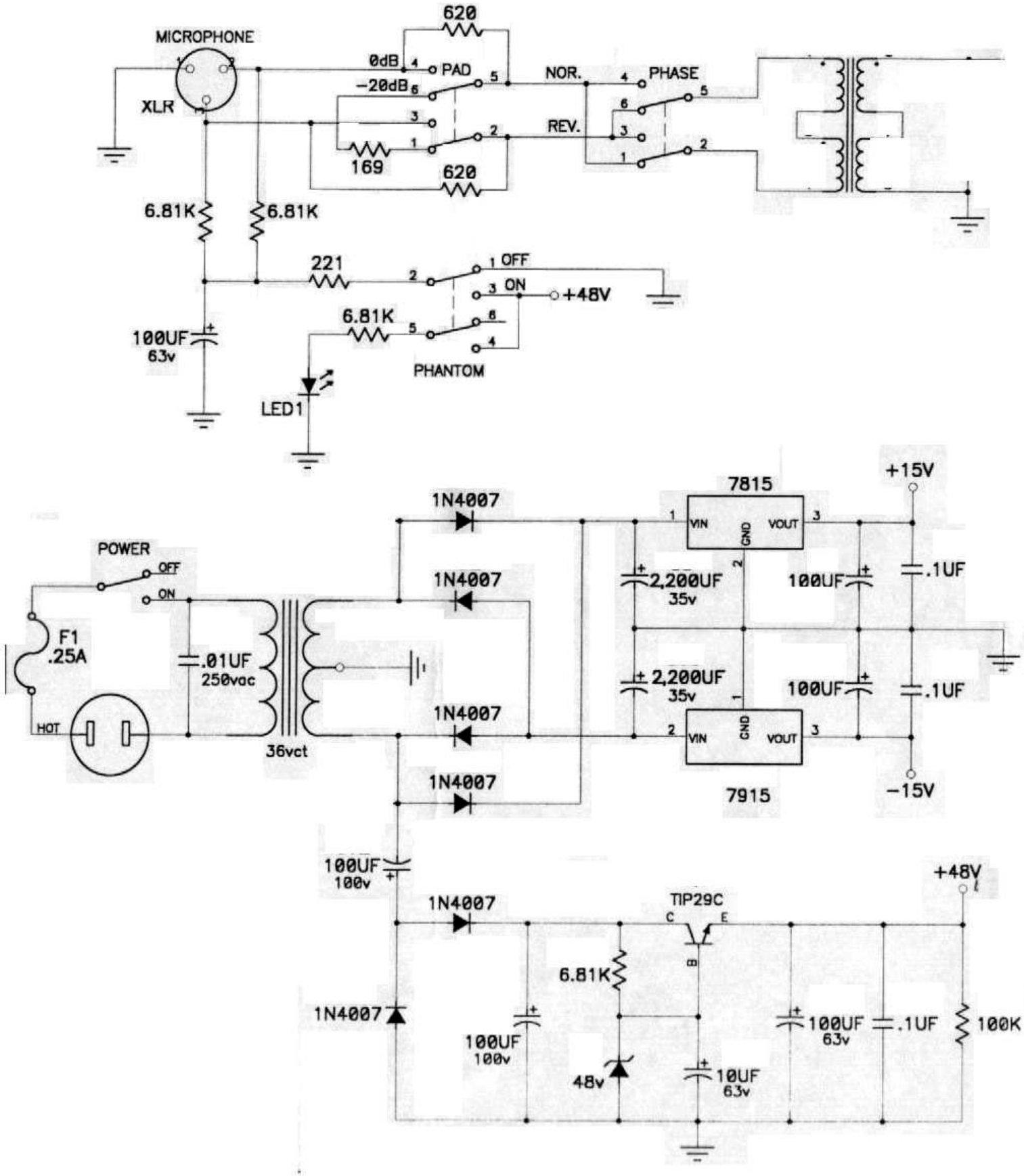
AC ONLY!

IF MOUNTED TO THE PC BOARD,
NO HEATSINK REQUIRED FOR REGULATOR



THIS RESISTOR CKT WILL WORK WITH MOST MICS FROM 9-48V EXCEPT THE NEW NEUMANN MIC THAT REQUIRES A 7mA START UP CURRENT. IF THAT MIC IS USED, YOU MUST CHANGE THE 10K TO 1K.

CONTRACT NUMBER SHOWN WITH 230V MAINS	DRAWN WOLFF DATE 11-5-87	api audio products, inc. MADE IN USA
FINISH	APPRVD	VOLTAGE DOUBLER for 3124/3124m
MATERIAL	ENGR PAW	TITLE


MICROPHONE
XLR
620
0dB
PAD
-20dB
NOR.
PHASE
REV.
169
620
6.81K
6.81K
221
OFF
ON
+48V
6.81K
100UF
63v
PHANTOM
LED1
+15V
7815
1N4007
1N4007
1N4007
1N4007
1N4007
POWER
OFF
ON
F1
.25A
.01UF
250vac
HOT
36vct
VIN
GND
VOUT
2,200UF
35v
100UF
.1UF
2,200UF
35v
100UF
.1UF
7915
-15V
100UF
100v
+48V
TIP29C
C
E
B
6.81K
1N4007
100UF
100v
48v
10UF
63v
100UF
63v
.1UF
100K

PARTS LIST AUDIO SECTION

A: 4 pieces 1n40007 silicon DIODE (get a couple of spares, they are cheap)
B: 4 pieces 50 UF 35 volt ELECTROLITIC CAPS (this isn't critical..the exact value has to be OVER your supply voltage, and anywhere between 12 uf and 100uf will do…)
C: 4 pieces 3 UF POLYPROPALINE CAPS (for power supply bypass, in parallel with the electrolics above… once again, this isn't critical, anything between 1uf and 5 uf will do…the BEST CASE scenario is 12+ uf POLYPROPALINE, all by itself, with NO electrolitics…if you can afford it, and can afford the SPACE, going ALL polypropaline after the diodes is KILLER...
D: 2 pieces 100-120PF polystyrene caps..any voltage over the supply voltage is fine.
E: 2 pieces 20k 1/2watt metal film resistor
F: YOUR choice of output coupling caps…I use **40uf polypropaline**, (can be 4 x 5uf, for example).. *you* might want more low end, in which case 2 computer grade 150uf caps back to back (making a bipolar cap) with a 5 UF polypropaline cap in PARALLEL will work…or you could have a bank of TANTELUM, with a polypropaline bypass, as above. In my own unit, I use 40 UF of polypropaline, and ALSO have a 1:1 output transformer (in PARALLEL, not series with the CAP)…this gives me BALANCED transformer coupled out, as well as UNBALANCED capacitor coupled out… remember , whatever you choose, to get enough for both channels.
G: 2 pieces 250-350 UF ELECTROLITICS, 60v or more…these are for the GAIN CONTROL cap..
H: GAIN CONTROL….here there is some CHOICES as well. I personally don't find I use that WIDE a range of gain in a mic preamp..so I am happy with 35db to 75db of range…..i don't find I need less, so far…so I use a 10k linear pot, in series with a 10k resistor…you might want to go ALL OUT and have a ladder network for yours…or you might want a pot with more range, in which case a reverse log 25k pot works very well. I will include a table of ladder resistor values, in case you want them. If you go that route, I suggest wiring your ladder so that instead of ADDING resistances together,(each switch position adding resistance in series to the last position) you switch ONE resistor only per switch position,so there is only ever one resistor in the gain control path.
I have tried all of these methods, and actually , in use, prefer the POT…I spray my pots with CRAMOLIN, and also tend to use conductive plastic attenuators. I DON'T think its worth the money they charge for fancy ladders made with surface mount resistors, etc..you might disagree….i would rather spend my $$ on MICS.
I: lastly, if you want to switch in PHANTOM power, you need to have ONE MORE **20UF polypropaline** CAP between the TWO CENTER TAPS on the primary of the INPUT TRANSFORMER. I use a Double pole double throw switch…ONE SIDE switches the 48v DC phantom voltage off and on, the OTHER side bypasses the CAPACITOR that couples the TRANSFORMER CENTER TAPS. This way, the cap is fully out of circuit when the phantom is DISENGAGED…this gives the best fidelity.

If NOT using phantom at all, you can simply JOIN THE CENTER TAPS PERMENANTLY.

POWER SUPPLY

For my OWN power supply, I use a VERY simple setup.
It consists of a transformer with 36volt center tapped secondary...I simply connect ONE diode to each leg and put a cap from the leg to the grounded center tap. I use LARGE filters (20,000uf PER LEG), and I find that I prefer the sound of SIMPLE UNREGULATED supplies (properly bypassed AT the gain block with the 3uf or larger polypropalines) to the regulated units.
The Millennia 990 can run up to +/- 24vdc..i run mine at around 17 volts..you can feel free to go higher, if you want to....i seem to have plenty of gain for my needs, even for the lowest output ribbons, in my studio.
There are lots of simple 3 pin regulator supply circuits out there...(I will have one in the kit, as an example of THAT way of doing it as well....) basically, they work by taking a higher than target raw voltage and dumping the extra to bring it down to your regulated supply voltage...they are simple little things, and they work ok..they DO tend to keep things a bit more constant in a bad power environment..
(I try to use a regulated, filtered power source for my entire studio, however, something that keeps the mains constant...)
Have a look at the enclosed power supply ideas, and see what you think. There are lots of kits for power supplies out in the world as well, but they SURE ARE SIMPLE.
HAVE FUN...and let me know how you like it.