MSH MODEL-1 Preamp

This schematic was presented by **Fred Nachbaur.**

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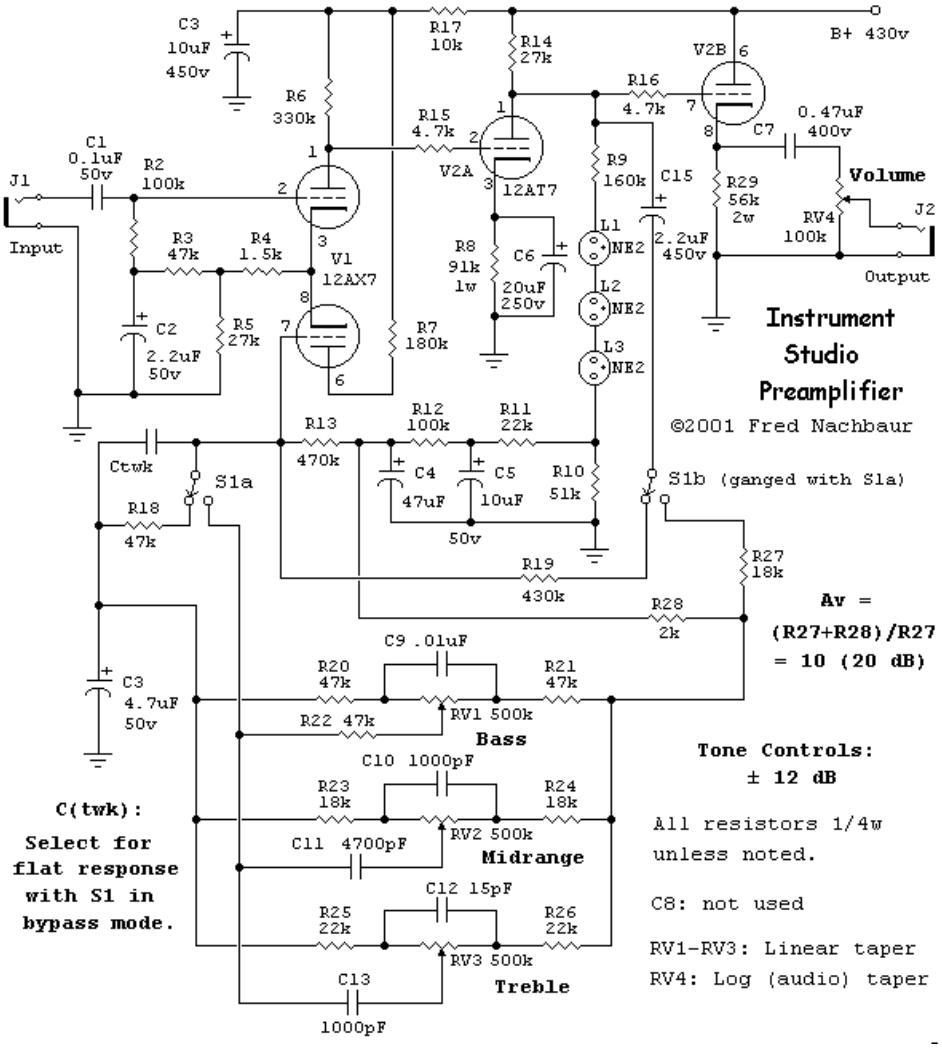
http://www.dogstar.dantimax.dk/tubestuf/index.htm
http://www.dogstar.dantimax.dk/tubestuf/instpre.htm

This is the schematic I used for my preamp. I did make a few modifications and I am glad that Fred Nachbaur offered this for non-commercial use. Please visit the two links above for a much better description.



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DISCLAIMER

While this document describes a plan to build an electronic device that has about 180 volts DC under the chassis caution must be followed. I will not be held responsible for any injuries incurred from some one following this document. Nor will I

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PREAMP POWER SUPPLY

The circuit draws somewhat more current than the original (about 8 milliamps) due to the presence of the cathode follower. For a monaural circuit, the simple power supply detailed as part of the Standalone phono preamp and reproduced below should be entirely adequate. (Click on image to view a larger version of the schematic.) T1 and T2 are both 12-volt, 0.5-ampere units. For stereo use (two units) however, the increased demand would probably cause the B+ to sag excessively. One workaround would be to use a 12 volt, 1 ampere transformer for T1, a 9 volt, 0.5 ampere transformer for T2, and doubling all B+ supply filter capacitor values.

By now it may be obvious that we are using the INVERTING mode for the tone preamps. The non- inverting input is effectively grounded for AC using a capacitor (making the schematic look strange indeed!), and both signal and feedback are applied to the inverting input. This greatly simplifies the design of the feedback networks. To ensure that our system phase is consistent from input to output, the inverting mode is also used in the driver/PA section that follows.

The feedback network for the tone control stages is an outboard card that also contains the linear 500K gain control pots. This also includes the gain bypass switch, which essentially reduces the tone control amplifier to a simple line amp with a pre-set gain of 10 (20 dB).

There is an important component marked Ctweak on the schematic. The purpose of this capacitor is to cancel out the effective parallel capacitance of your input cabling. The proper value is best determined experimentally. Connect a decent signal generator to the CD input, and measure the output signal at C307 with an oscilloscope or AC voltmeter. Set the scope or meter for a full-scale reading at 1000 Hz, then increase the input frequency until the output reaches 71% of full-scale. Note the frequency in kilohertz (we'll call it F0); the desired capacitance in Pico farads can be found using the formula:

159000/(F0 * 47)

In the prototype, the F0 frequency was about 7.5 kHz, and the simple addition of a 470-pF capacitor leveled it out to well beyond 30 kHz. This tweak capacitor is best installed directly on the tone control card.

Again, we have the op-amp design model of the preamplifier to thank for this simple fix to a problem that plagues many a tube design, often without any simple recourse.

Also on the topic of frequency response: the low-frequency response of this stage is a bit of overkill, with a 3 dB corner well below the audible range. This can actually be a drawback, since subsonic such as turntable rumble can result in power wastage, reducing the power available for audible frequencies. A simple fix is to put a 0.1 uF capacitor into the "FX loop" instead of the usual jumper cables. This rolls off the subsonic below about 30 Hertz (dependent somewhat on volume control setting; the roll off frequency is somewhat higher at high volume control settings, acting almost like a simple "loudness contour").

FREQUENCY RESPONSE

On the print there is a note about a tweak capacitor, which will move the frequency response so that you may fit it between both ends of the frequency range. My final choice was a 100PF cap. And the over all frequency response is 20HZ at a +1.13db loss and -2.06db gain at 20khz. The overall frequency response is +-2.06 db.

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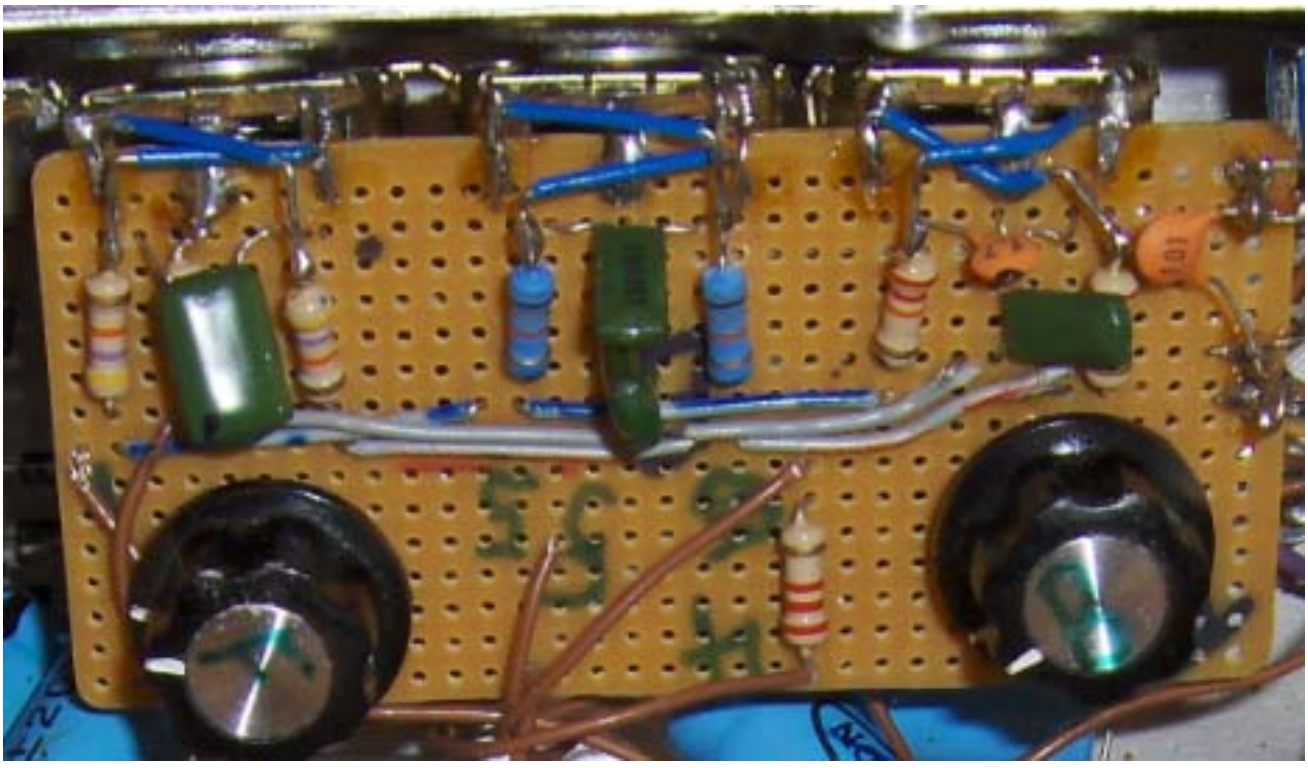
TONE CONTROLS

The tone controls were fun to build and the components were placed on the pots and terminal strips. I found that this was messy and hard to work on. I decided to build separate board for the tone controls. I used a Bread Board and set up the tone controls and experimented with the filters. I had a problem with the tone controls output matching the flat when the tone controls were in flat position (all three tone controls pots strait up) I want the sound to be the same when the 12DB boost switch is on and the tone controls in the flat position in comparison to in the flat position.

This preamp is designed with the tone controls working with the circuit partly configured as an op amp. That makes the tone controls active filters which means we have feedback, which was determined by a fixed resistor. There is also a feed back circuit for the flat position with fixed resistor. I found it easier to change the gain resistors with variable resistors in both feedback circuits. This adds the ability to control the amount of gain separately for both the tone control switch in flat and in the boost positions. This will enable you to control the amount of overdrive in the output of the amp separate from the flat position and the 12db gain. Clipping may or may not be desired and this is a nice way for both worlds.

The performance of the tone controls changes as the gains is changed. With these two gain controls accessible from the bottom side of the preamp and with knobs on them for better adjusting.



As this is a one-time project for me I chose to use a perforated board and point-to-point wiring. This is not very professional but I got in hurry.

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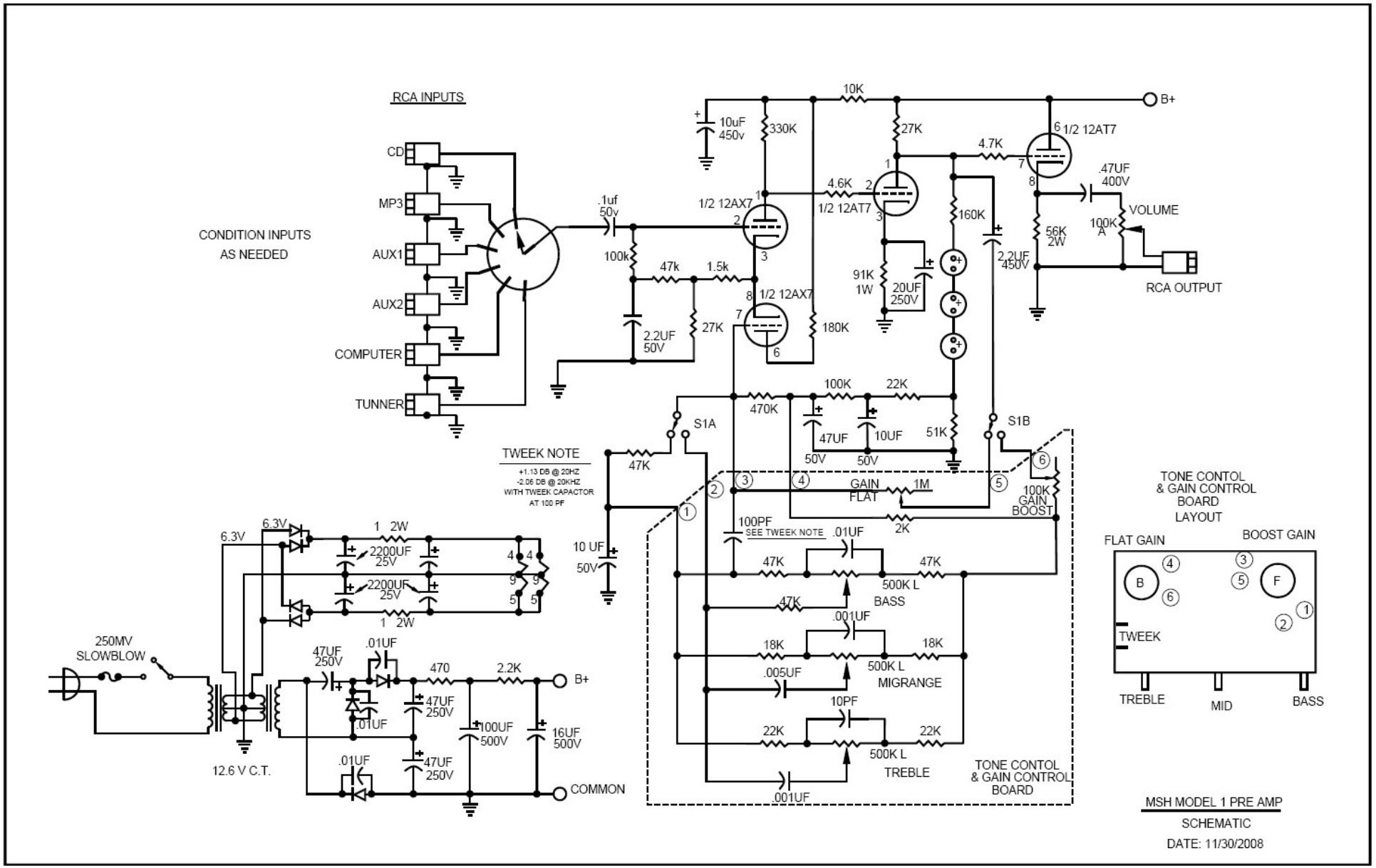
SCHEMATIC



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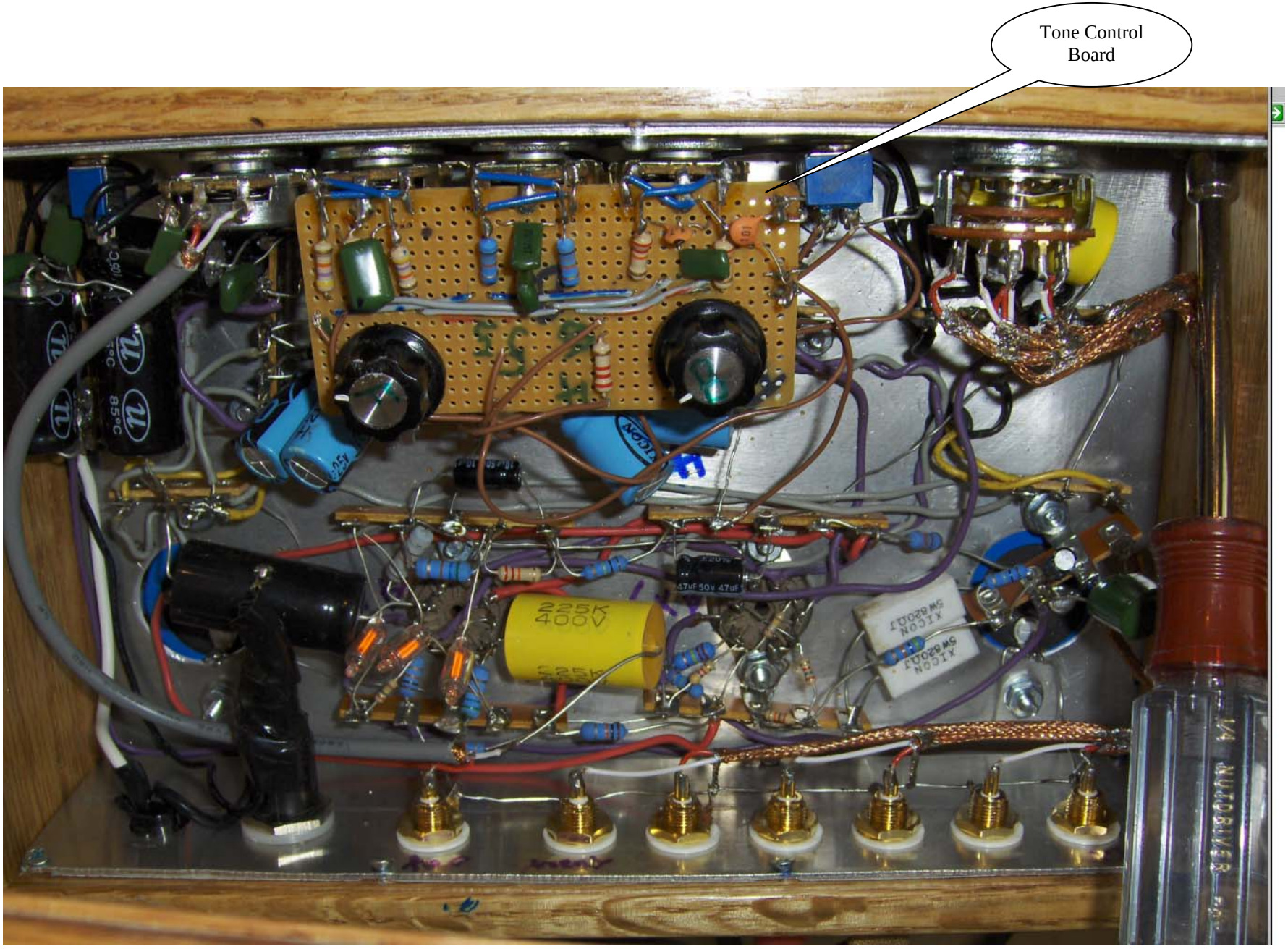

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UNIT DESCRIPTION

On the rear of the preamp there are six inputs labeled as, CD, MP3, AUX1, Aux2, Computer, and Tuner. I have not conditioned any of the inputs as of yet they can be added as needed for specific equipment. For a magnetic input other components may be needed. There is a fuse holder accessible from the rear panel. It is one of the square kinds with a catch on the left side that must be pushed before you can gain access to the fuse.

Please note that there is a warning message by the 120vac cord where it enters the chassis at the rear.
"WARNING
High Voltage
Open at own risk"

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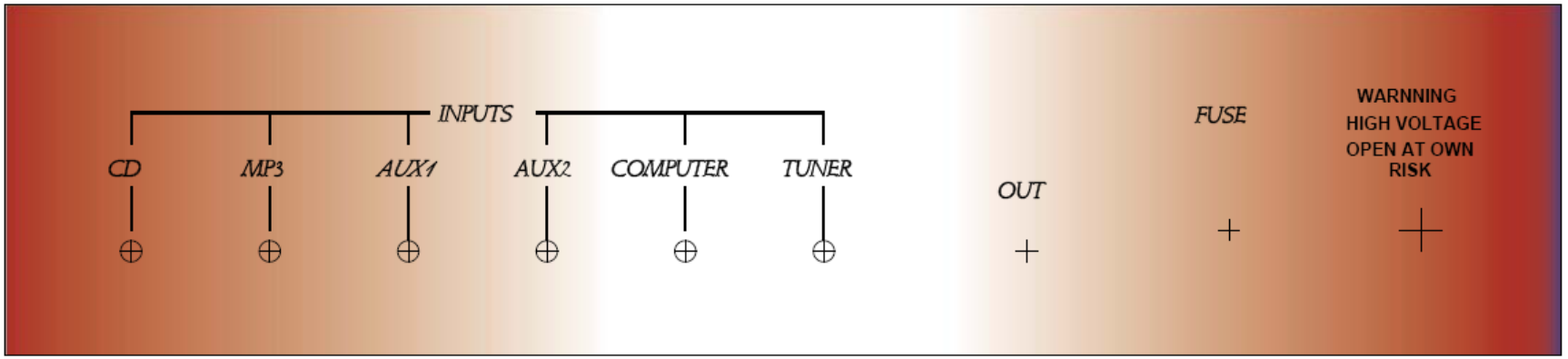
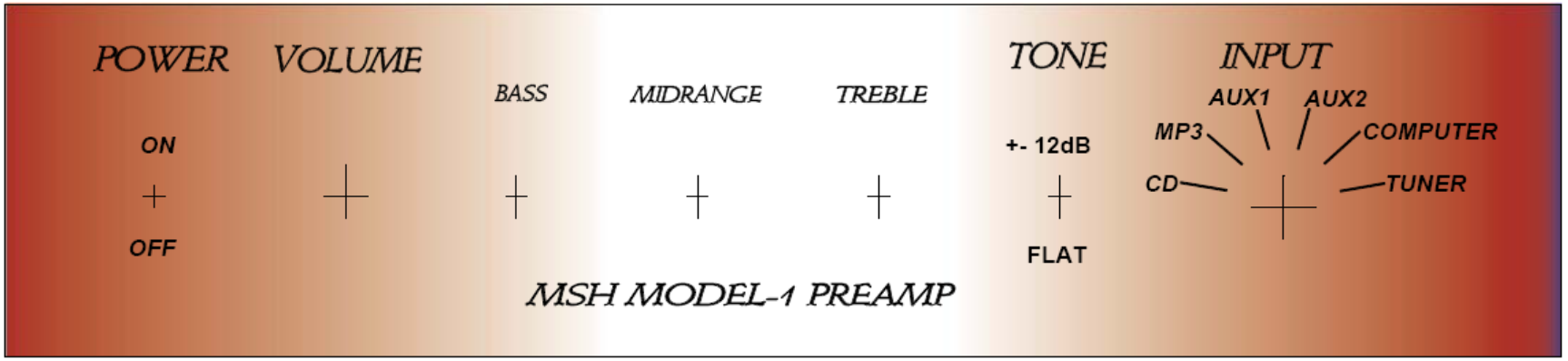
FRONT & BACK DRILLING TEMPLATES

ALSO FRONT & BACK FACE PLATES



9 1/8"



2 1/16"

2"

DATE: 11/17/2008

LETTER SIZED PAPER