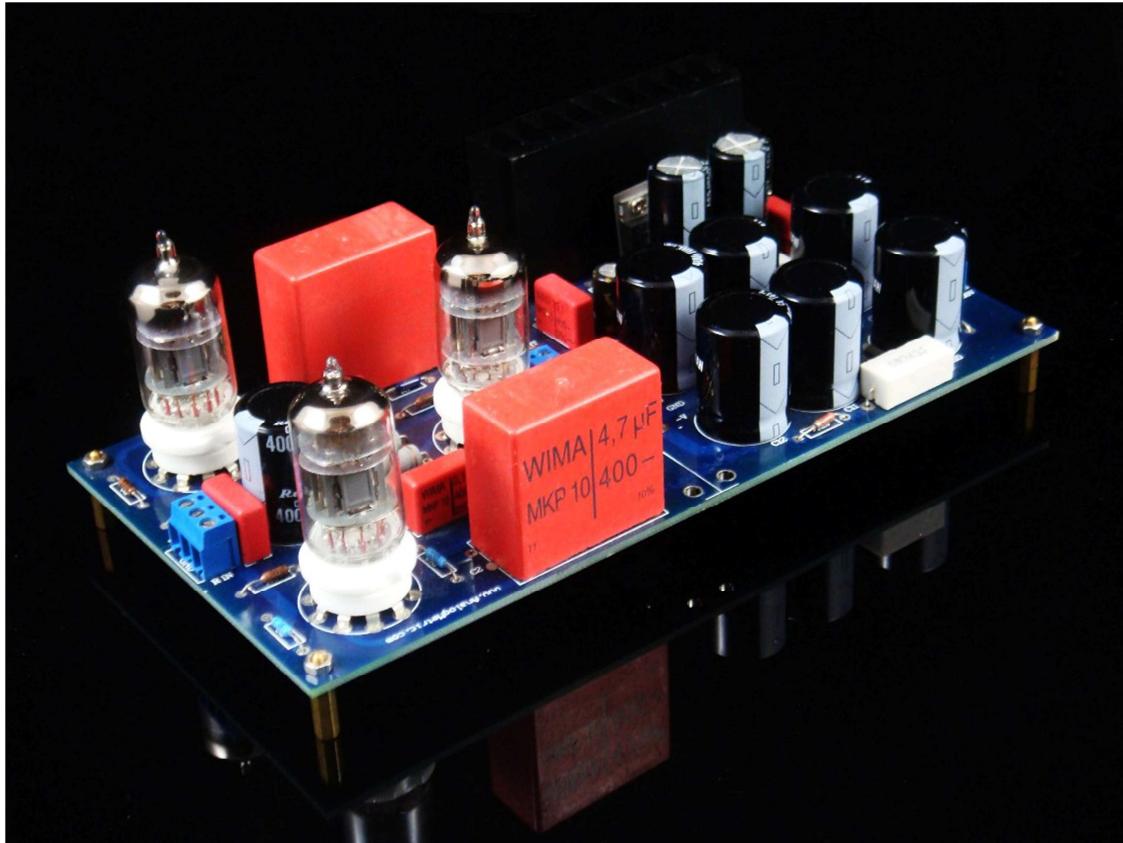


Grounded Grid Vacuum Tube Preamplifier User Manual

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INTRODUCTION

The circuit design is referenced to Grounded Grid preamplifier which can be found in earlier wireless radio application which requires high signal-to-noise ratio (SNR) and wide bandwidth. For audio application, it is capable of creating high dynamic responses and preserves the originality of the beauty of audio signals with neglectable distortion due to the simplicity of the circuits. Also, thanks to the differential pairs of the input stages, it rejects most of common-mode noise and has high PSRR. This grounded grid (GG) preamplifier will not make any artifacts to the sound and play 100% originally and naturally.

For many years, Grounded Grid tube preamp has been tested and verified by many worldwide DIYers. The simplicity of this circuit enables the beauty of circuit symmetry, and also simplifies its power supply circuitry. Therefore, this kit can be supplied only by using a toroidal power transformer T30.

The high voltage supply for the tube preamp is obtained from the secondary coil (200VAC) of T30. A RC lowpass filter simply employs to reduce the undesired voltage supply ripple.

The static current consumption of GG tube preamp (2 channels) is approximately 8mA. By including the power consumption of ZENER diode, the total current consumption is just about 13mA. The power supply of the filament is come from the secondary winding (12.6VAC) of T30, where the rectified voltage is regulated with the low voltage dropout LT1085CT. The heat is dissipated by relative large surface area of the heat sink, so the temperature of the heat sink is almost remain constant to produce a stable DC voltage source for filament.

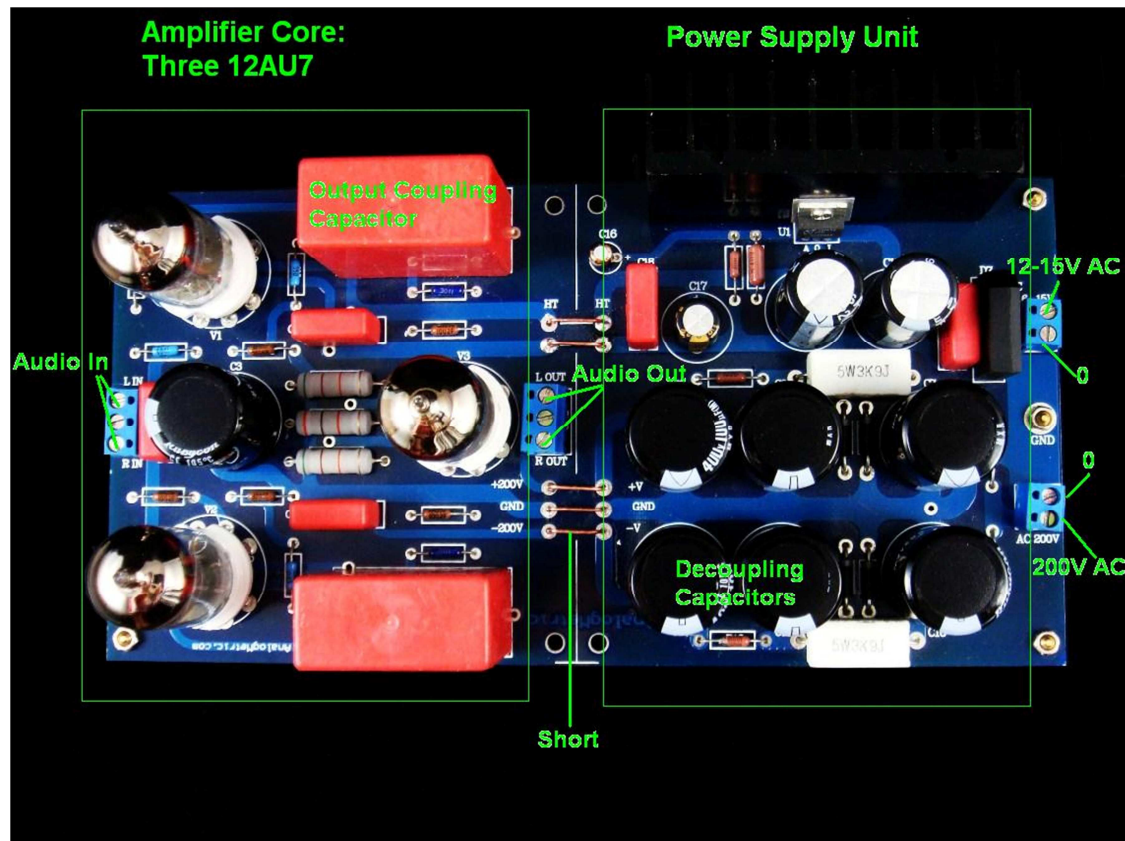
The voltage gain is 10-15dB. It can be set by adjusting the ratio of R10/R12 and R9/R11, respectively for right and left channels by the following equations.

$$\text{Voltage gain (dB)} = 20 \log \left(\frac{R10}{R12} \right) \text{ (for right channel)}$$

$$\text{Voltage gain (dB)} = 20 \log \left(\frac{R9}{R11} \right) \text{ (for left channel)}$$

In this kit, R9 and R10 use 100Kohm; whereas R11 and R12 use 20k, so the gain of the amplifier is about 14dB.

Since the signal grounding of this small signal preamp is very critical to determine the overall performance, there is a need to have good signal grounding which can reduce the noise distortion or addition to the original weak audio signal. In practical, one can use the method suggested by Bruce Rozenblit that is bypassing the GND of RCA input with a 10ohm (0.5W) resistor or the GND of filtering capacitor via copper strip to the metal chassis, it can greatly reduce the surrounding noise interference. For this purpose, w GND hole for copper strip is designed. A copper strip is used to connect the hole to metal chassis, good shielding and low noise will be resulted.



FEATURES

- Three vacuum tubes 12AU7.
- Two single-ended inputs and two single-ended outputs
- Voltage gain ~15dB
- High dynamic range, output voltage max. 20Vrms
- S/N ratio >90dB
- Built-in voltage regulator circuit.
- RC filters for ripple rejection and noise filtering.
- Independent amplifier core and power supply block which are connected by flying wires.
- GND hole for signal grounding.
- Power requirements one 200V AC (100mA) and one 12V AC (1A)
- PCB dimension: 111mm (W) x 220mm (L)
- PCB thickness: 2.5mm, double layer, 2oz copper.

PRECAUTIONS

- Do not use finger or any body parts to touch the components or board! It is hazardous, since the high voltage capacitors may not be fully discharged after switched off the power supply.
- Turn off the power supply if the transformer is getting hot or some smoke is observed or strange buzz sound is heard.
- Fuse should be used either in power transformer or main socket to avoid accidentally large current drawing.
- Always contact technicians or experts to seek help.

PROCEDURES

1. Hook up all the components according to the schematic, part list, and photos.
2. Apply and measure the output voltages of the power transformer by multimeter. The voltage should be around 200V AC and 12-15V AC. More or less the same if connected to the board via J1 and J2.
3. Connect the power rails HT, +200V, -200V and GND by flying wires on marked the board.
4. Apply power supply without plugging in the tubes. Check again the voltages HT (12.6V), +200V, and -200V, with reference to the GND, respectively.
7. If the voltages are correct, plug in the tubes and turn on the main power.
8. Good luck.

If you have any problems in assembly, please contact us by email tech@analogmetric.com