

# **12AU7 Balance Pre-Amplifier**

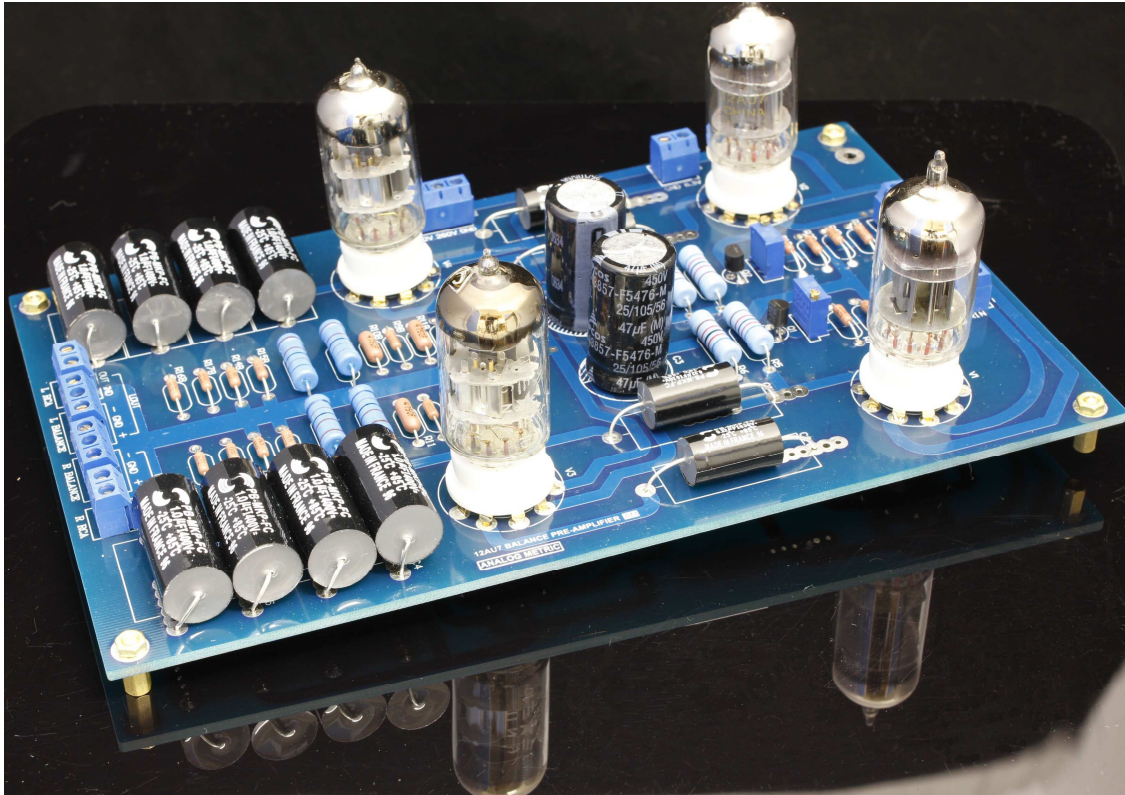
## **User Manual**

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## INTRODUCTION

The circuit design is referenced to Audio Research preamplifier. It supports both single-end and balance input and output (RCA and XLR). Basically, the circuit is differential amplifier with two cascade stages. The input stage uses 12AU7 with moderate voltage gain, whereas the output stage uses 6DJ8 (6N11). The differential amplifier provides high PSRR and capability to noise rejection. The signal paths of this PCB layout are designed in symmetry for both channels. Dedicated power rails, ground, and signal paths, altogether are taken into design considerations so that all are to minimize the parasitic, cross interference, and influence of RFI.

## FEATURES

- Two 12AU7 and two 6N11 (6DJ8) vacuum tubes.
- Voltage gain: 16dB (single-ended) and 22dB (balanced)
- Bandwidth: 20-100KHz
- Frequency Flatness: 40-20KHz (+/-0.1dB)
- S/N Ratio: >94dB
- THD: 0.147% @Vin = 0dBV and 1KHz  
0.243% @Vin=10dBV and 1KHz
- Input impedance 500K  $\Omega$
- Output impedance 400  $\Omega$
- Two single-ended and balanced inputs.
- Two single-ended and balanced outputs.
- Symmetric layout design and signal paths with minimum parasitic.
- Dedicated ground and power rails layout design.
- Two large reservoir decoupling capacitors for power rails.
- Power requirements: one 260V (80mA) DC, one 12.6V (0.5A) DC and one 6.3V (0.8A) DC.
- PCB dimension: 21.8mm (W) x 13.5mm (L)
- PCB thickness: 2.4mm, double layer, 2oz copper.

## PRECAUTIONS

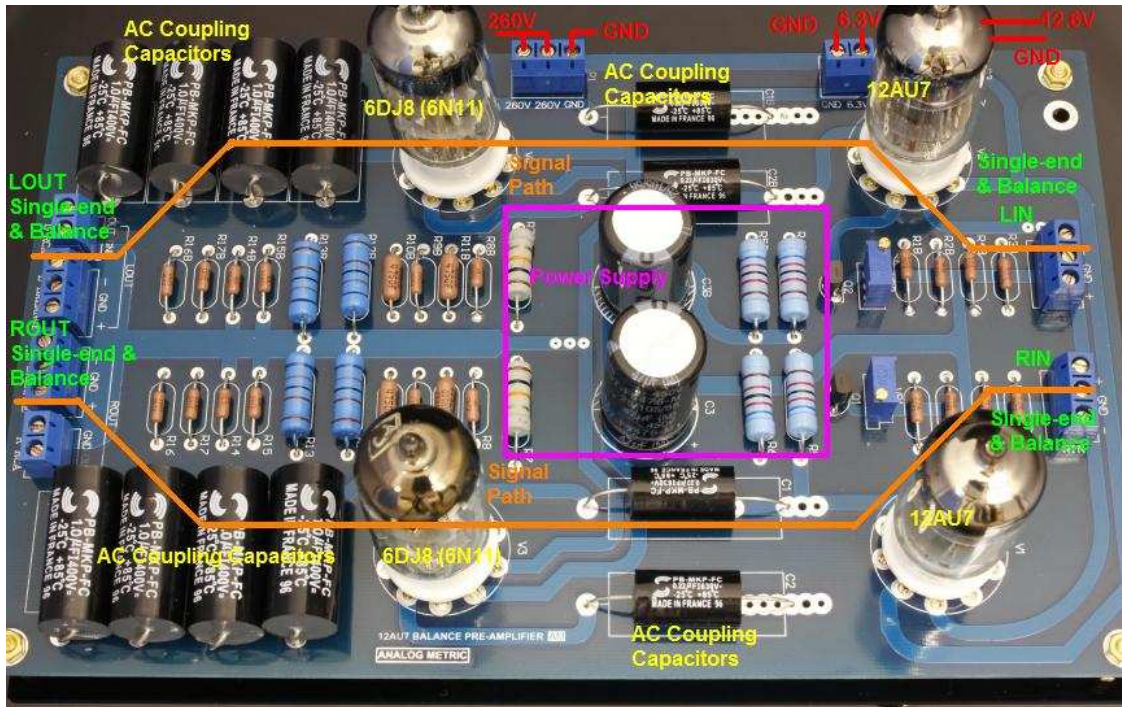
- Do not use any body parts to touch the metal parts of the kit after power up or power off, since the high voltage capacitors may not fully discharge. It may cause serious electric shock.
- Use a power transformer with fuse (1-3A) socket to limit the supply current in case of short circuit or incorrect assembly.
- Double check the assembled components with the schematics.

- Do not attempt to measure the voltage by multi-meter with hand after power up. The probes of the multi-meter should be mounted by some stands to the points of the measurement before switching on the power supply.
- Turn off the power supply if you observe any smokes or hear strange sound coming out from the transformer or board. If there is short circuit, the transformer will be getting very hot shortly.

## PROCEDURES

1. Hook up all the components according to the schematic, part list, and photos. Notice to the polarity of the high voltage electrolytic capacitors (C3 and C3B). There are no polarities of the thin film capacitors.
2. Apply either one or two 260V DC to P1, one 6.3V DC to P2, and one 12.6V DC to P3. If you only have one 260V DC supply, connect the two '260V DC' pins together.
3. Adjust R18 and R18B so that the voltage at PIN #3 and PIN #8 are 7V DC.
4. Apply input signals (single-end signals: V+, and ground V- and GND; balance signals: V+, V-, and GND)
5. Obtain output signals (single-end signals: V+ and GND; balance signals: V+, V-, and GND)
6. Enjoy it.

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## CHECKLIST

1. The polarity of the high voltage C3 and C3B.
2. The supply voltages at connectors (P1, P2, and P3). Check whether has 260V DC to two pins of P1.

If you have any problem in assembly, please contact us by email to [tech@analogmetric.com](mailto:tech@analogmetric.com)