

M A P L E T R E E  
  
A U D I O   D E S I G N

***Stealth Max***  
**Monobloc Power Amplifier**



***Users' Manual***

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## **Introduction**

The Mapletree Audio Design *Stealth Max* vacuum tube monobloc power amplifier features:

- ? ? A low distortion Class AB<sub>1</sub> ultra-linear output stage employing easily obtained KT88 beam power tubes delivering a conservative 50 W continuous power. A triode/ultra-linear mode switch to permit experimentation with different sonic presentations. The triode power rating is about 20 W.
- ? ? An output transformer that is an exact replica of the Dynaco A431S used in the original Dynaco Mk III amplifier. The power transformer is conservatively rated and can deliver the current required for maximum power output. Soft startup is assured through use of a 5AR4/GZ34 rectifier tube.
- ? ? A driver module based on the Mapletree *Special Red SR-70* board developed for the Dynaco ST-70. It employs octal tubes in a Mullard-type circuit with 6SJ7 pentode voltage amplifier and a 6SN7 long-tail phase inverter.
- ? ? Wide frequency response: 20 Hz–20 kHz –1 dB at 50 W output.
- ? ? Adjustable fixed bias for optimum performance with any matched pair of output tubes.
- ? ? Stainless steel chassis and high quality components and hardware used throughout.

## **Powering up**

Please read this instruction manual thoroughly before powering up your *Stealth Max* for the first time. The location of the tubes on the driver board and chassis are shown below. When installing tubes, locate the key on the central spigot and make sure it matches with the indent on the tube socket. Push the tube into the socket with a slight rocking motion to ensure it seats properly. Removal is also easier if the tube is rocked slightly as it is pulled out. Don't over-do the rocking as it can cause the spigot to break off. The KT88 output tubes are installed as matched pairs as indicated on the boxes supplied with your amplifier. Matched quads are not required as individual bias controls are used for each channel.

With the tubes installed, connect the IEC power cord to the AC input receptacle on the rear of the chassis. A proper sized fuse (3 A/250 V) has been installed (a spare is provided). Plug the cord into an ac outlet rated for at least 200 W (110-125 VAC or 230-240 VAC for the export version, 50-60 Hz). The ac power switch is on the front panel. The red pilot light indicates the AC power is on. You will see the heaters light up, particularly in the KT88 tubes. It takes approximately 60 sec for the plate voltage to build up to the operational level and stabilize. This "soft start" maximizes the lifetime of the tubes and capacitors in your amplifier.



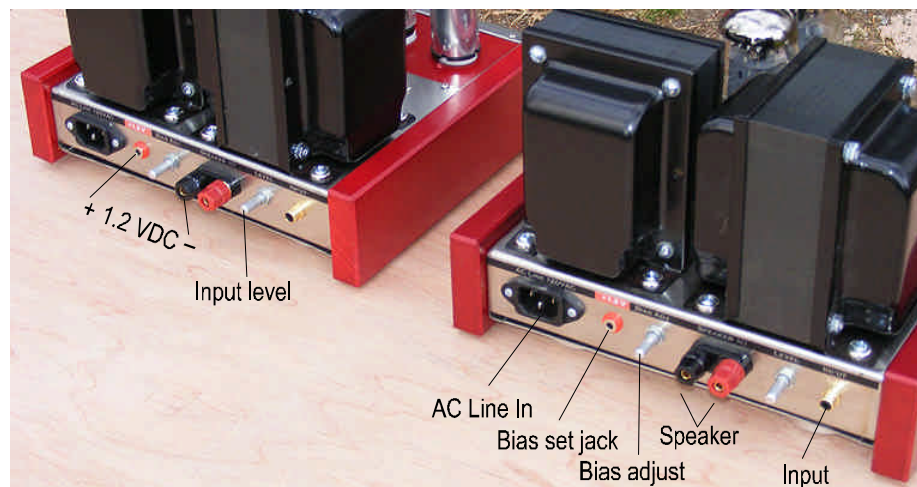
## **Biasing the output tubes**

The *Stealth Max* is designed to run the KT88 output tubes at a cathode (combined plate and screen grid) current of 60 mA per tube. With a plate voltage of 500 V, the plate dissipation is about 25 W for each tube (the KT88 is rated for 35 W). The correct bias condition is pre-set for the tubes supplied but will require adjustment if the tubes are replaced. It is a good idea to check the bias when first powering up as it may have shifted during shipping. A matched pair of KT88s is recommended for lowest distortion. The procedure for adjusting the grid bias is as follows.

The bias adjustment potentiometer is located on the rear apron next to the green bias measurement jacks. When installing a new pair of output tubes, start with the potentiometer at the position it was for the previous tubes. A multimeter capable of reading at least 2 VDC is required. Connect the red meter lead to the bias jack on the rear panel next to the ac power receptacle and the black meter lead to the black speaker binding post (the speaker can remain connected). Set the multimeter to read dc Volts (most meters have a 2 V scale which is ideal). Turn the ac power switch on. Once the tubes reach their operating conditions the meter reading should rise to around 1 Volt. Adjust the bias potentiometer, turning counterclockwise (CCW) if the voltage is greater than 1.2 V and clockwise (CW) if the voltage is below 1.2 V. Adjust to achieve a reading close to 1.2 V. The combined plate and screen current for both tubes is being sampled across a 10 Ohm resistor so 1.2 V corresponds to 120 mA for the pair of KT88s.

## **Input/Output connections**

The input RCA jack is located on the rear apron of the chassis. A level control is next to the input jack and should normally be set full on (full CW). If you have higher than normal preamp gain or if your speakers are very efficient, you may find that it is desirable to adjust the level control to allow use of the preamp volume control near its mid position. The input resistance is 100 k $\Omega$ . An input voltage of 1.2 V is required to drive the amplifier to full output.



Binding posts for connection to a speaker system are located on the rear apron of the chassis and are appropriately labeled. Speaker interconnect wires can be terminated as bare wire, spade lugs, or banana plugs. The latter are most convenient, especially if different speaker systems are to be connected from time to time. The output speaker impedance is wired for 8 Ohms but can be re-wired easily if required.



**Triode Mode** – The toggle switch located next to the KT88 tubes permits changing the output tube configuration from ultra-linear to triode mode. You can switch “on the fly” and determine which mode suits your sonic preferences. The maximum power output in triode mode is around 20 W. The gain (and hence input sensitivity) is unchanged.

### **Tube substitution**

Any vintage or currently manufactured pair of KT88 beam tetrode power tubes can be used in the *Stealth Max*. Lowest distortion is obtained using a matched pair to achieve identical bias currents in both tubes. The 6SJ7 metal small signal pentode was designed for audio use, offering low noise and high gain. The glass 6SJ7GT can be substituted without change in performance. The special red series 5693 can also be directly substituted and offers the potential for very long life (10,000+ hrs). No currently manufactured versions are available but NOS tubes are readily available from large tube suppliers and on ebay. The 6SN7GT is a dual high mu triode. It is currently manufactured in Russia and available under the Electro Harmonix brand and others. NOS versions are not hard to find but the supply is limited. The special red equivalent is the 5691. The rectifier tube can be any GZ34/5AR4 type. Substitution of a directly-heated rectifier tube such as the 5U4 is not recommended except in an emergency as the soft startup feature will be lost and capacitors and tubes subjected to high transient surge voltages until the tubes reach their operating temperature.

You may be told that the 6550 power tube can be substituted for the KT88. With its lower screen grid voltage rating, the 6550 is not recommended for the *Stealth Max* with its 500 V screen potential operating in either ultra-linear or triode mode.

## Specifications

**Tube complement:** 1 x GZ34/5AR4, 1 x 6SJ7, 1 x 6SN7GT, 2 x KT88 (matched pair).

**Rectifier:** tube full-wave rectification with 5AR4/GZ34 cathode-type rectifier tube for soft startup.

**Output configuration:** Class AB<sub>1</sub> ultra-linear push-pull with fixed bias or triode mode.

**Phase inverter:** cathode-coupled (long tail)

**Heater supply:** ac

**Rated power output (4/8? ):** 50 W

**Frequency response at 1 W output:** 15 Hz–44 kHz –1 dB

**Frequency response at 50 W output:** 20 Hz–20 kHz –1 dB

**Gain:** 24 dB (16 V/V) or 1.2 V input for 50 W output

**Input resistance:** 100 k $\Omega$

**Noise:** less than 1 mV ( greater than 86 dB below rated output)

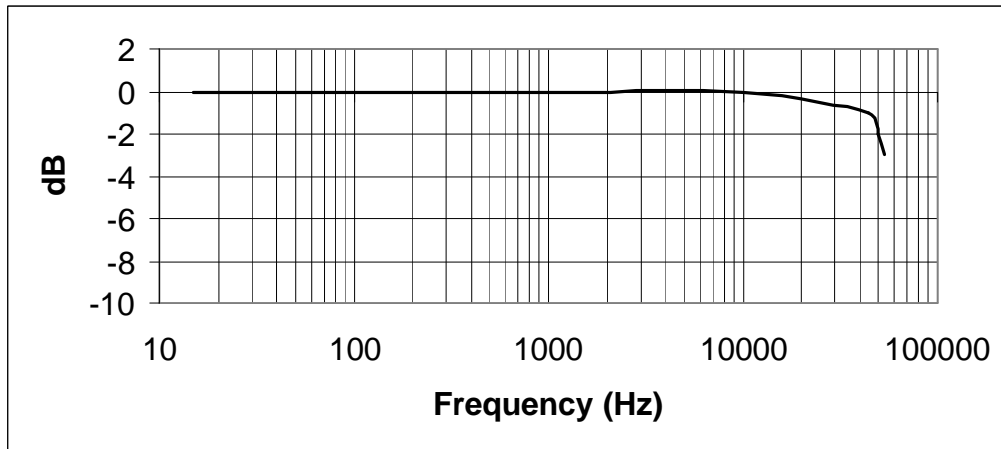
**Dimensions:** 10" W x 10" D x 8" H overall

**Weight:** 20 lb

**Power consumption:** 150 W, 115–125 VAC (230-240 VAC for the export version) 50-60 Hz

**Fuse:** 3 A fast blow type rated at 250 V

Frequency response at 1 W output



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5 HY1 RY

