



Stealth 60i
Integrated Stereo/Mono Power Amplifier

Users' Manual (Beta)

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Introduction

The Mapletree Audio Design *Stealth 60i* vacuum tube power amplifier combines the functions of a 30 W/ch stereo power amplifier and a preamplifier with volume control for use as a single input integrated amplifier. It can also be configured as a 60 W mono power amplifier suitable for driving a subwoofer.

The output stage for each channel employs a low distortion class AB₁ ultra-linear configuration using easily obtained EL34 pentode tubes. The driver circuit is of the Mullard type with a long-tail phase inverter (6SL7GT) and a pentode voltage amplifier input stage (6SJ7). The preamplifier stage employs a 6SN7GT tube in a common cathode topology.

A conservatively rated power supply allows the two stereo channels to operate as two monoblocs with full power output achieved with both channels. Soft startup is facilitated by separate AC and DC power switches. The Main (AC) switch applies power to the tube heaters and the fixed bias supply for the output tubes. Once the tubes have reached operating temperature, the DC switch is used to activate the high voltage supply. The pre-heated tubes immediately conduct plate current without over-voltage transients that can damage capacitors and tubes.

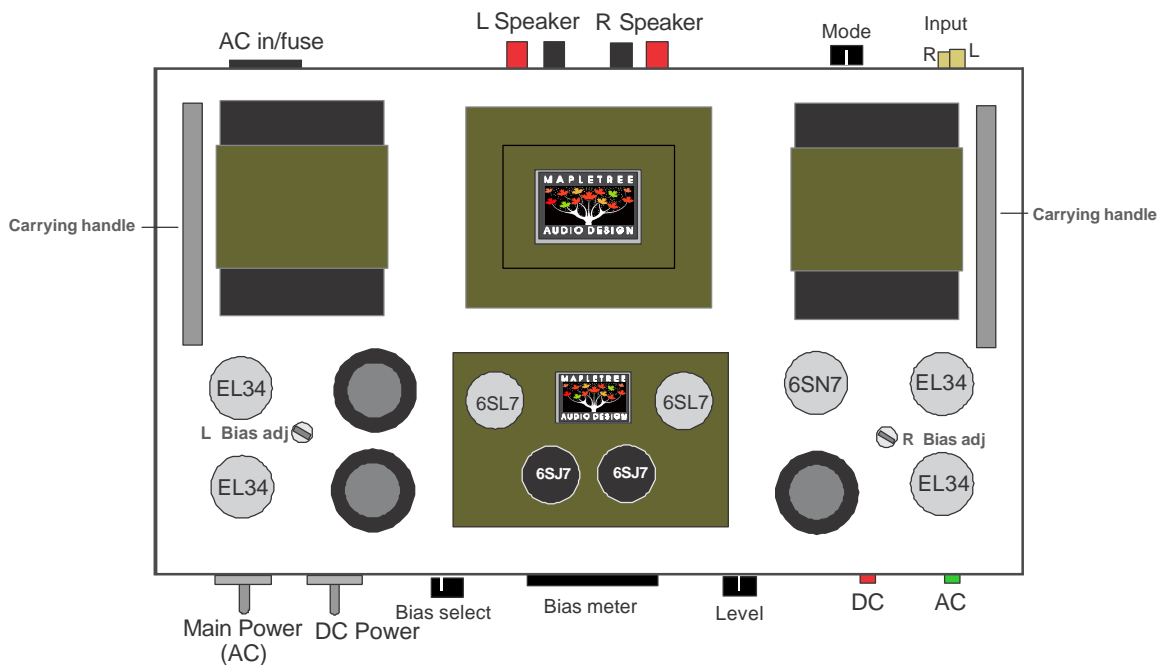
Adjustment of fixed bias for the output tubes is facilitated by a built-in bias meter with a selector switch for right and left channels. Bias current is adjusted by controls located near the output tubes for each channel.

Please read this instruction manual thoroughly before powering up your Stealth 60i for the first time.

Powering up

The layout of the *Stealth 60i* chassis is shown below.

Inserting or removing tubes is easiest if you use a slight rocking motion as you push or lift the tubes (grasp at the base rather than the glass bottle if possible). Don't over-do the rocking as it can cause damage to the central spigot. The EL34 output tubes are installed as matched pairs. Matched quads are not required as individual bias controls are used for each channel.

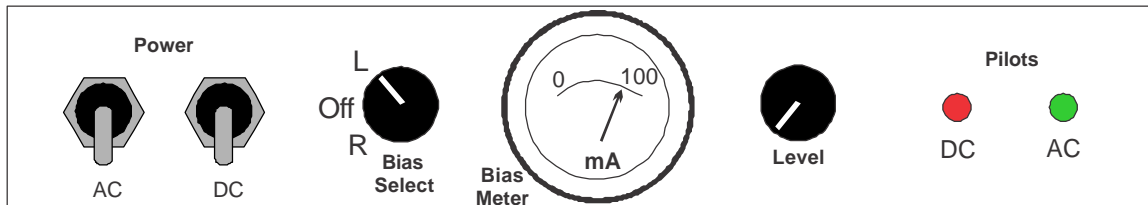


Leave the bias selector switch in the OFF position during the power-on procedure. With the tubes installed, connect the IEC power cord to the fused AC input receptacle on the rear of the chassis. Plug the cord into an ac outlet rated for at least 200 W (110-125 VAC, 60 Hz). The power switches are on the front panel. The Main Power (AC) switch is used to apply power to the tube heaters and EL34 bias supply. The green pilot light will be illuminated and you will see the heaters light up, particularly those of the EL34 tubes. It takes approximately 30 sec for the tubes to reach operating conditions at which point the DC Power switch is used to activate the plate voltage supply. The red pilot light will be illuminated. The bias current for the output tubes can then be monitored for the left and right channels as desired using the bias selector switch. The “soft start”, facilitated by the separate AC and DC power switches, maximizes the lifetime of the tubes and capacitors in your amplifier. You can use the DC switch to put the amplifier in a “standby” condition where the high voltage supply is temporarily disabled but the tubes kept in a ready state once the DC switch is turned on again. This also extends the lifetime of tubes and components as long as the “down time” is reasonable (an hour or less). When the DC switch is turned off, the red pilot light will continue to be illuminated until the charge on the filter capacitors is drained off. When permanently powering down, switch off the DC switch, then the AC switch.

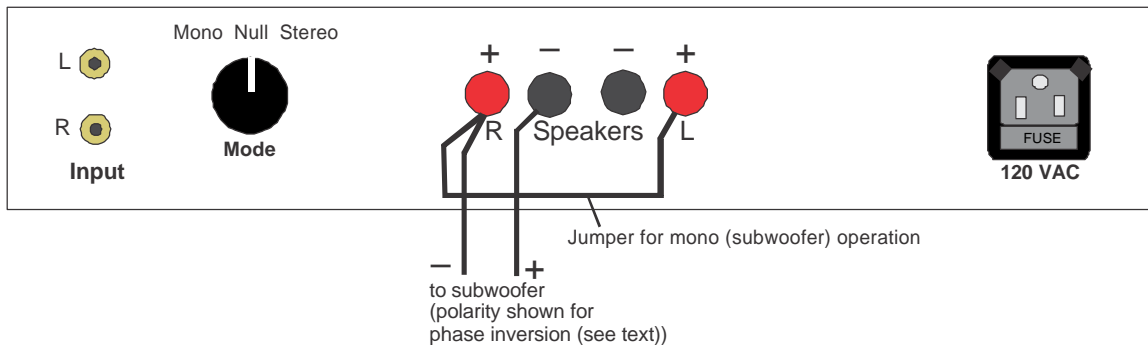
Bias adjustment

The *Stealth 60i* is designed to run the EL34 output tubes at a cathode (combined plate and screen grid) current of 100 mA per pair. With a plate voltage of 470 V, the plate dissipation for each EL34 is close to 22 W. The grid bias voltage to achieve this condition is factory set for the tubes supplied but will require adjustment if the tubes are replaced. Matched pairs of EL34s are recommended for lowest distortion. The procedure for adjusting the grid bias is as follows.

The bias adjustment potentiometers are located on the top of the chassis next to the EL34 output tubes. A slot screwdriver is recommended for adjusting the controls. When installing a new pair of output tubes in one or both channels, start with both potentiometers at the position they were for the previous tubes or slightly less (counter-clockwise). With the amplifier operating normally, the left and right bias current can be set to 100 mA as indicated by the bias meter. Bias current increases when the bias adjustment control is rotated clockwise. Only small adjustments are normally required. The bias selector switch is used to monitor the desired pair of tubes. You may have to fine-tune the bias adjustments for each channel a couple of times to ensure both meter readings are the same. The amplifier can be operated with the bias selector switch in any position as desired.



Input/Output connections



The input RCA jacks are located on the rear apron of the chassis. The input resistance is approximately 430 kOhms. An input voltage of 0.7 V is required to drive the amplifier to full output.

Binding posts for connection to stereo speakers are also located on the rear apron of the chassis. The outputs are wired for 8 Ohm speakers. If other impedances are required to

match your speakers, the wiring will need to be changed under the chassis. The connection diagram at the end of this manual shows the connections to be made.

Bridging for mono or subwoofer operation

The mode switch on the rear apron is set to “Stereo” position for normal operation as a stereo power amplifier. The amplifier is put into mono or “subwoofer mode” by moving the mode switch to the “Mono” position. The two channel outputs can now be bridged (connected in parallel). The “Null” switch position mutes the outputs of both channels.

In mono mode, the red speaker binding posts for the left and right channels are wired together with a short jumper and the subwoofer connected between one of the red binding posts and one of the black binding posts. The black binding posts are internally connected, so it is not necessary to jumper the two black binding posts. A 4 Ohm subwoofer is ideal for maximum power output. Although no damage will occur with any speaker impedance connected to any output, an 8 Ohm subwoofer will benefit from the re-configuration of each stereo output impedance to 16 Ohms (see below).

The *Stealth 60i* inverts the phase of the input signal. If your amplifier being used for the stereo channels is non-inverting (most common) and is fed from the same signal source as the *Stealth 60i*, you should reverse the connections to the subwoofer so all speakers operate in phase.

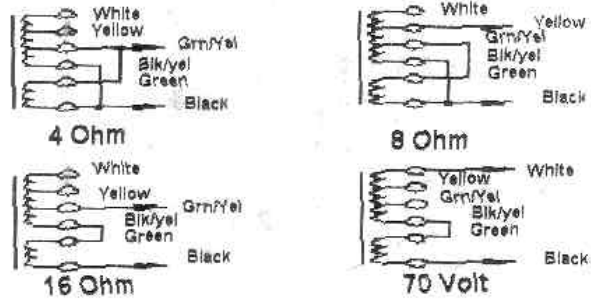
The front apron “Level” control sets the initial subwoofer output level and may have to be adjusted for different volume levels of the amplifier being used for the left and right channels.

Note: The Stealth 60i cannot be used with a powered subwoofer.

Tube substitution

Any vintage or currently manufactured pairs of EL34 pentode power tubes can be used in the *Stealth 60i*. Optimum performance is obtained using matched pairs 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 type 5693 can also be substituted. It offers the potential for very long life (10,000+ hrs). No currently manufactured versions of the 6SJ7 are available but NOS tubes are readily available from large tube suppliers and on ebay. The 6SL7GT is a dual high mu triode. It is currently manufactured in Russia and available under several brand names. NOS versions are not hard to find but the supply is limited. The special red equivalent is the 5691. The 6SN7GT is similarly available in new and NOS versions. The special red version is the 5692.

1645 Connection Diagram

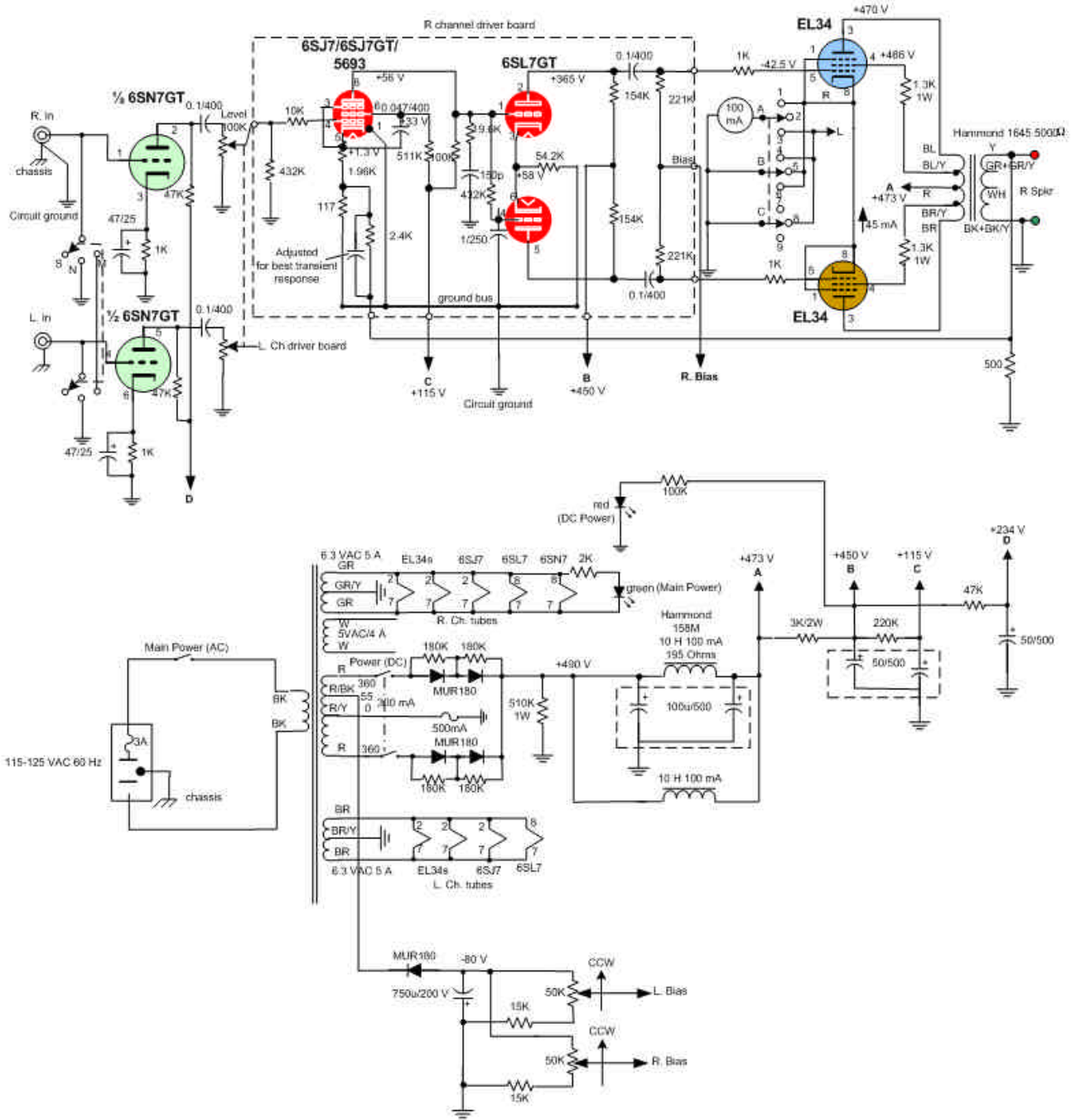


Hammond 1645 output transformer wiring for different speaker impedances.

Mapletree Audio Design *Stealth 60i* Stereo Integrated Amplifier

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Right channel and power supply shown
L. channel voltages are within 5% of R. channel



Specifications

Tube complement: 1 x 6SN7GT, 2 x 6SJ7, 2 x 6SL7GT, 4 x EL34 (matched pairs)

Rectifier: full-wave rectification with high speed silicon diodes

Output configuration: Class AB₁ ultra-linear push-pull with fixed bias (EL34 matched pairs recommended)

Phase inverter: cathode-coupled

Rated power output (8?): 30 W/channel (60 W in bridged configuration)

Frequency response at 1 W output: 15 Hz–75 kHz –1 dB

Frequency response at 30 W output: 20 Hz–20 kHz –1 dB

Gain: 26 dB (20 V/V) or 0.7 V input for 30 W output

Input resistance: 430 k?

Phase: Inverting

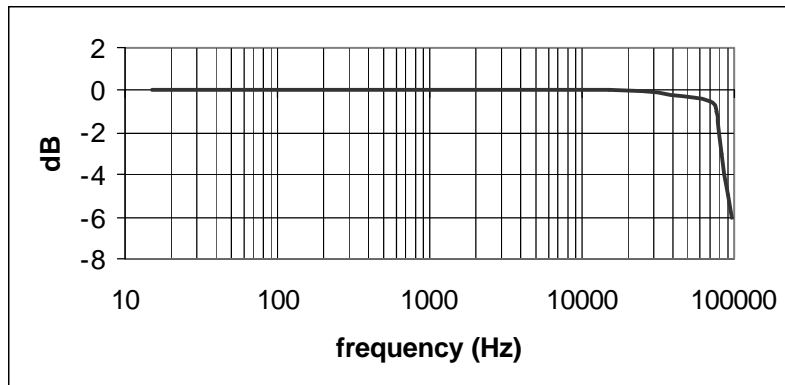
Noise: less than 1 mV (84 dB below rated output)

Dimensions: 17" W x 14" D x 8" H overall

Weight: 25 lb

Power consumption: 200 W, 115–125 VAC 60 Hz

Fuse: 4 A fast blow type rated at 250 V or 3 A slow blow



Frequency response at 1 W output