



Octal 6A Stereo Preamplifier



Users' Manual

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Mapletree Audio Design
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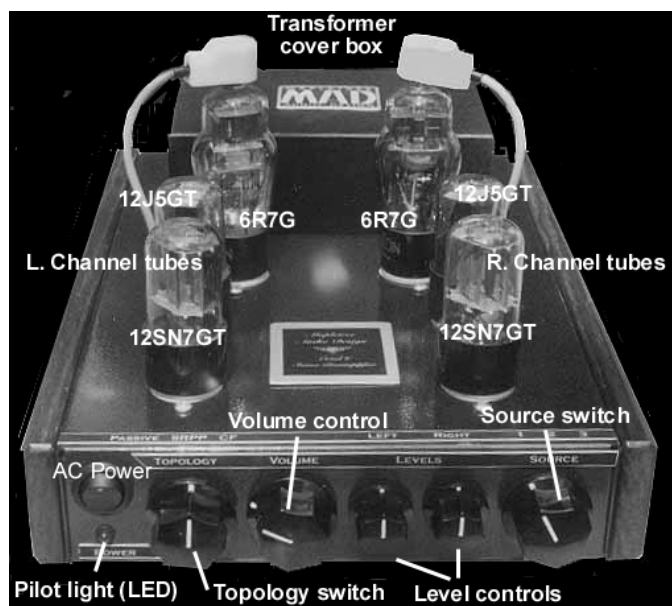
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Introduction

The Mapletree Audio Design Octal 6A Stereo Line Preamplifier offers the audiophile a number of unique features:

- ◆ Proven, low-distortion octal signal tubes are used throughout. Although the tube types are available only as new old stock (NOS), they can still be obtained at modest cost from several suppliers. The tubes provided are brand-name NOS types and should exhibit a very long life in this application.
- ◆ Three complete preamp circuits are incorporated: a classic common-cathode/cathode-follower cascade (CF), a shunt-regulated push-pull (SRPP) circuit, and a zero-loss passive path. Output and input switching permits any of the three input sources to be routed to either of these three preamp. A separate set of record outputs enables source switching directly to a tape recorder or CD burner. Alternatively, the record outputs can be wired as a second set of normal outputs for bi-amp applications, feeding a separate headphone amplifier, etc.
- ◆ All tube heaters are supplied with dc voltage for minimum hum induction.
- ◆ Silver-plated copper, Teflon-insulated wire is used for all signal paths.
- ◆ High quality components are used throughout: Xicon carbon film resistors, Solen polypropylene film coupling capacitors, Beyschlag-Centralab metal film resistors and electrolytic capacitors, Clarostat level control potentiometers, and Hammond and Tamura power transformers.

Controls



The front panel controls are arranged as shown above. The ac power switch is at the left end and the green LED pilot light just below.

Topology selection

The three-position topology selection switch is located next to the power switch. *The selectable circuit feature facilitates critical comparative listening evaluation using the same input source or matching different sources to the optimum circuit topology. With three input sources and three topologies (including the passive path), a total of 9 different combinations are possible.*

The two active topologies and the passive path have different voltage gains so that switching between topologies can cause a sudden increase in loudness. This can be avoided by reducing the volume before switching and then re-adjusting for the desired listening level. As you move the topology switch clockwise, the gain increases for each selection.

Volume and balance

The volume control affects the output level for both channels simultaneously. The left and right channel level controls can be used to compensate for unbalanced speaker outputs with different listening positions, or to compensate for other variables in your system. Normally these controls are operated in the full on position (fully clockwise with the indicator at 12 o'clock). The channel to be attenuated is adjusted as necessary by turning the appropriate level control counterclockwise.

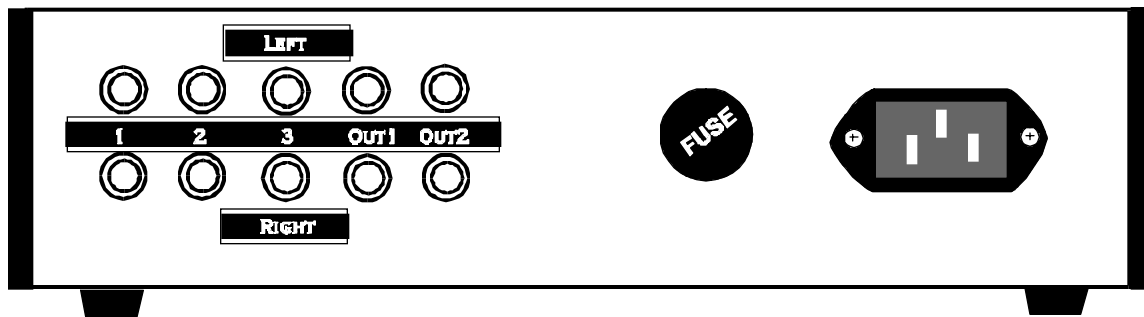
Overall gain

The level controls can also be used to set the overall gain of the signal path by attenuating both channels by the same amount. Depending on the output of the line source, the sensitivity of the power amplifiers and speakers, etc., you may find that the volume control is operated near its minimum position at normal listening levels. More precise tracking, and a greater measure of control can be obtained if the volume control is operated nearer its mid position. The level controls can be adjusted to facilitate this gain shift.

Source selection

The three position source selection switch is located at the far right. It facilitates selections of one of three line-level input sources such as a CD player, tape deck, phono preamp output, tuner, VCR/TV, computer sound card, etc.

Input/output



The input/output jacks are located on the rear apron of the preamp chassis as shown above. The left channel jacks are on the top row. The OUT jacks can feed the inputs of a tube or solid state power amplifier with an input resistance greater than or equal to 50,000 Ohms. The Record Output (REC) jacks (if equipped) bypass the volume and level controls and can be used without power applied to the preamp. The three input jacks are labeled 1, 2, and 3 corresponding to the source selector switch positions.

***Note:** To reduce the capacitive effects of the active circuits, which can affect high frequency response, when using the record output only, it is advantageous to turn the ac power off. The passive mode is not significantly affected by the active circuitry and can be used equally well with the ac power on or off.*

Servicing

CAUTION: Once the bottom panel is removed, and with power applied, potentially lethal voltages are exposed to human contact. Once the power is turned off (and the power cord unplugged), high voltages may persist for several minutes due to charge stored by the filter capacitors. Unless you

are experienced in working with tube circuits, do not remove the bottom panel. If you are having problems, an experienced electronics technician should be consulted or you should contact Mapletree Audio Design at the phone number or email address given on the cover of this manual.

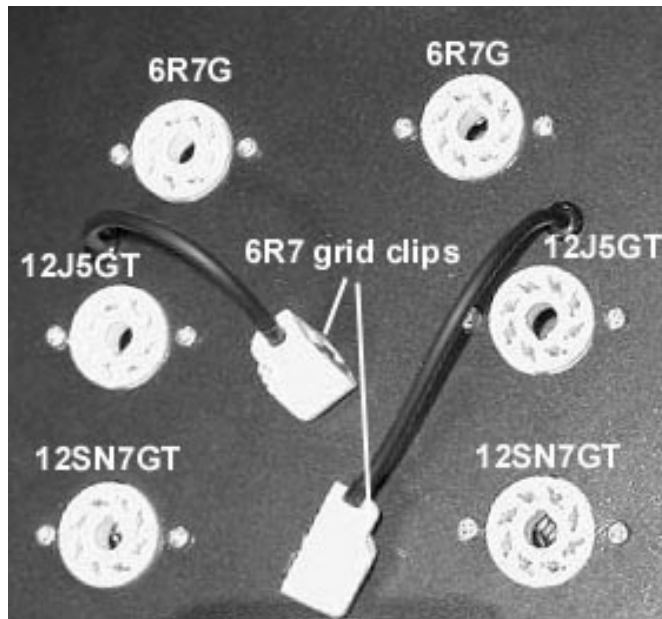
Fuse replacement

The main power fuse is accessible from the rear apron. Replace only with a 0.5A/250V fast action fuse. Since a blown fuse indicates the existence of a problem, use caution in replacing it. If the fuse blows a second time, consult a qualified technician and/or contact Mapletree Audio Design. *A spare fuse is supplied with your preamp.*

Vacuum Tube Locations

CAUTION: The 6R7G/GT grid caps have a potential of around 80V with respect to the chassis during operation. When changing tubes, wait at least 2 minutes after the power is turned off before removing the grid clips.

Left channel tubes are on the left of the chassis as viewed in the photograph below.



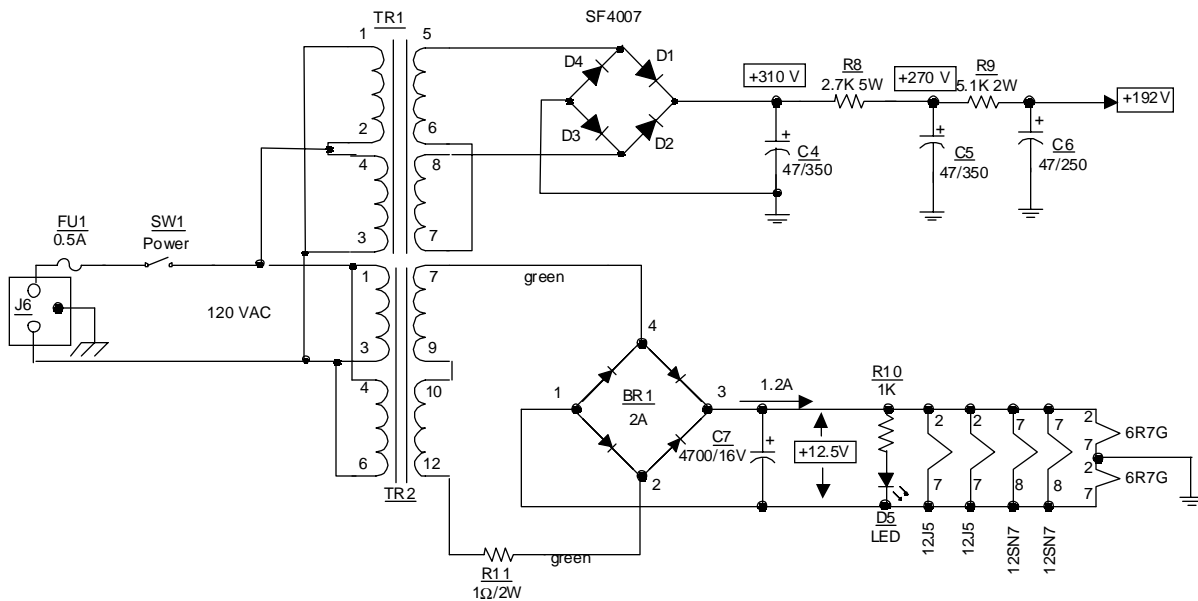
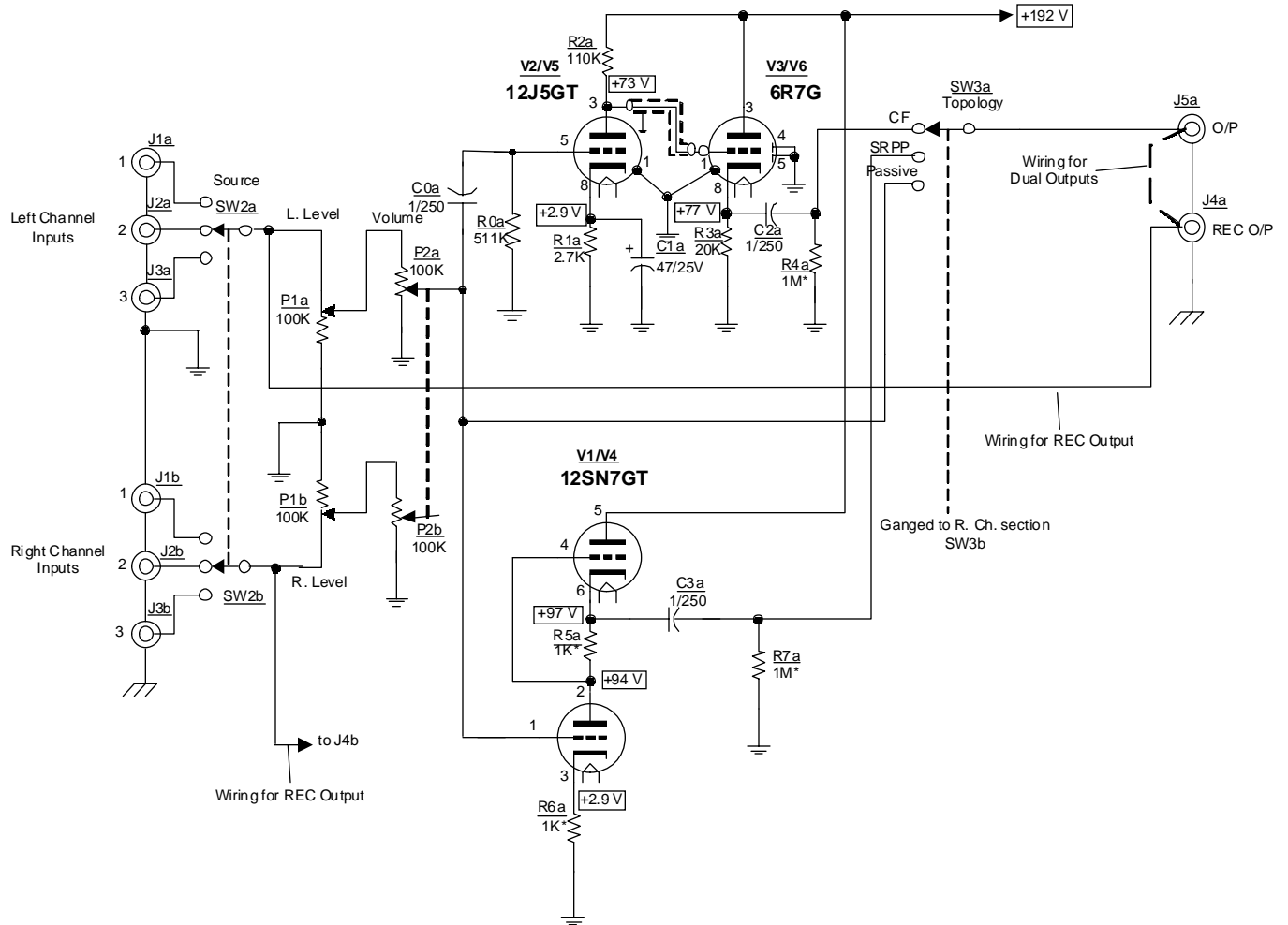
Replacement Parts List

Reference	Description
BR1	2A or greater bridge rectifier
C0a,b	1uF/250V polypropylene capacitor
C1a,b	47uF/25V electrolytic capacitor
C2a,b, C3a,b	0.56uF/630V polypropylene film capacitor
C4, C5	47uF/350V electrolytic capacitor
C6	47uF/250V electrolytic capacitor
C7	4700/16V electrolytic capacitor
D1, D2	SF4007 1000V/1A fast recovery diode
D5	Green LED pilot light with holder and retaining ring
FU1	0.5A/250V fuse
J1a,b–J5a,b	RCA gold plated phono jack
J6	IEC ac receptacle
P1a,b	100K dual audio potentiometer (volume)
P2a, P2b	100K linear potentiometers (levels)
R0a,b	511K 0.5W 1% metal film resistor
R1a,b	2.7K 1W 5% carbon film resistor
R2a,b	110K 1W 5% carbon film resistor
R3a,b	20K 1W 5% carbon film resistor
R4a,b, R7a,b	1M 0.6W 1% metal film resistor
R5a,b, R6a,b	1K 0.6W 1% metal film resistor
R8	2.7K 1W 5% wire wound resistor
R9	5.1K 2W 5% metal oxide resistor
R10	1K 1W 5% carbon film resistor
R11	1 Ohm 2W resistor
SW1	SPST switch (power)
SW2, SW3	3 position 2 pole rotary switch
TR1	Power transformer 230 V/50 mA
TR2	Filament transformer 12.6 V/1.6 A
V2, V5	12J5GT tube
V3, V6	6R7G/GT tube
V1, V3	12SN7GT tube

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Left channel shown. Right channel components have "b" suffix.
All resistors 1 W 5% carbon film except where noted.
Resistors marked (*) are 0.6W 1% metal film.



Circuit Description

For simplicity, the schematic diagram shows only the left channel and the power supply. Both channels are identical. The inputs for each channel are applied to the three input jacks J1, J2, and J3. Switch SW2 selects one of the three source signals and passes it on to the level control P1, which attenuates the signal when moved away from its maximum clockwise position. The signal is then routed to the volume control potentiometer P2.

The signal from the wiper of volume control potentiometer is applied to the inputs of two parallel preamp circuits through capacitor C0. The first (top circuit in schematic) consists of a common cathode gain stage followed by a cathode follower output buffer. For convenience, this circuit is simply referred to as a cathode follower (CF) topology. The common cathode gain stage employs a 12J5GT medium mu triode (V2) with self-bias and a cathode bypass capacitor to maximize the voltage gain. The output is taken from the plate of this tube and directly coupled to the grid of the 6R7G cathode follower stage (V3). This tube was designed as a detector/first audio tube in classic radios and includes two diode plates. These are grounded and only the medium mu triode section is used. The stage is self-biased by cathode resistor R3 while the plate is connected directly to the B+ supply. The signal is taken from the cathode and is capacitor coupled to the load. The 1M Ohm resistors R4 and R7 discharge the coupling capacitors C2 and C3 to prevent audible clicks when the outputs of the two circuits are switched. This stage offers high voltage gain and a very low output resistance, making it suitable for driving low impedance loads while maintaining wide bandwidth.

The second circuit (lower circuit in schematic) is a shunt regulated push-pull (SRPP) stage. The two halves of the 12SN7GT medium mu triode (V1) carry the same bias current which flowing through identical resistors R5 and R6 sets up equal grid bias for each triode. The output of the lower triode is directly coupled to the grid of the upper triode which operates 180 degrees out of phase with the lower triode (hence the term “push-pull”). The upper triode is configured as a cathode follower with the output taken from the cathode but it also serves as the load resistance for the lower triode. Since it presents a high load resistance, the voltage gain of the lower triode stage is maximized. The output resistance, while not as low as for the pure cathode follower, is much lower than if the output were taken from the plate of the lower triode. The SRPP stage offers high gain, relatively good drive capability, good linearity, and simplicity.

The outputs from the CF and SRPP circuits, plus a passive path from the volume control potentiometer, are selected by switch SW3 and the signal is then transferred to the output jack J5. Output jack J4 may be connected directly to the output of the source selector switch and used as a record output. Alternatively, J4 can be wired in parallel with J5 for use with bi-amplification systems or a separate headphone amplifier.

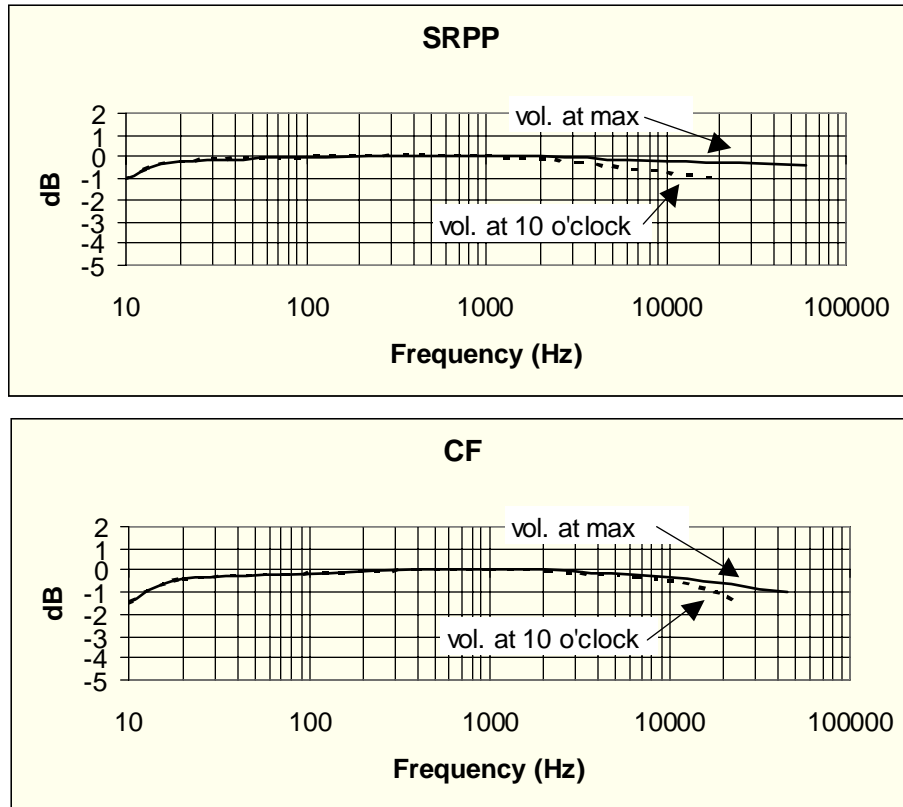
The B+ dc power supply uses a 230VAC transformer secondary together with a full-wave bridge rectifier (four fast recovery diodes D1–D4). A capacitor input filter is used comprised of C4, C5, C6 and R8 and R9, which provides a B+ supply voltage of approximately 210V for both channels. The heater voltage is derived from a 12.6 VAC transformer secondary voltage. This is full-wave rectified by bridge BR1 and filtered by capacitor C7. Resistor R11 sets the heater dc voltage to approximately 12.5 VDC. The heaters of V3 and V6 (6R7G) are connected in series across the 12.5 VDC with the mid-point grounded. All other heaters are connected in parallel.

MAD Octal 6A Specifications

Rev. May 10/03

Voltage gain (100K load, max volume): SRPP: 20 dB at 1 kHz
CF: 23.5 dB at 1 kHz
Passive: 0 dB at 1 kHz

Frequency response (2.4V out, 100K load, 3 ft. shielded cable, vol. at max): SRPP: 14 Hz–60 kHz (–0.5 dB)
CF: 17 Hz–20 kHz (–0.5 dB)
Passive: 0–110 kHz (–.5 dB)



Noise (100K load): SRPP: < 0.5 mV
CF: < 0.4 mV
Passive: < 0.1 mV (power on)

Maximum output voltage (100K load): SRPP: 15 V rms
CF: 24 V rms

Output impedance (1 kHz): SRPP: 5.4 k Ω
CF: 660 Ω
Passive: less than 25 k Ω at all volume settings. At full volume, it is governed by the source impedance.

Total harmonic distortion (1 V output, 1 kHz, 100K load): Less than 0.1 %

Power consumption: 20 W

Tube Replacement

The new old stock (NOS) tubes supplied with your Octal 6 should be good for many thousands of hours of listening. At some point, however, you may find it necessary to replace them. Some users like to experiment with different manufacturer's tubes to obtain subtle differences in audio quality. You may also wish to purchase a spare set for future needs. Note that the 12J5GT and 12SN7GT tubes may have a suffix, such as A or B, which is not important for this circuit. The British OM4 tube is electrically equivalent to the 6R7G/GT. Metal versions of both the 6R7 (no suffix) and 12J5 (no suffix) are also available. While these have not been evaluated for audio quality in this preamp, they are electrically compatible and a good subject for experimentation.

The following suppliers are three of many sources of NOS tubes of the types required. You may also purchase replacement tubes directly from Mapletree Audio Design.

Pacific T.V.
480 South Joffre St.
Victoria, B.C.
Canada V9A 6C8
Fax: (250) 920-3517 Phone: (250) 386-4283
www.pacifictv.ca

Antique Electronics Supply
6221 South Maple Avenue
Tempe, AZ 85283
Fax: (800) 706-6789 Phone: (480) 829-5411
www.tubesandmore.com

David Boardman Tubes
10 Lemaistre
Sainte-Foy, Québec
Canada G2G 1B4
Phone: (418) 877-1316
www.dbtubes.com