



## ***Viper 4+ Magic Eye Stereo Monitor/Line Router***



### **User's Manual**

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Mapletree Audio Design  
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## **Introduction**

The Mapletree Audio Design *Viper 4+* is a development of the original *Viper Magic Eye Monitor* that includes separate cathode ray indicator tubes for average and peak signal levels in combination with a 3-input/3-output line router. It can be used with a wide range of sources, preamps, and power amps, tube or solid state. It offers the following features:

- ◆ Display of instantaneous (peak) and average signal levels in both left and right channels using four 1629 cathode ray indicator ("magic eye") tubes.
- ◆ A voltage amplifier stage utilizing a 12SC7 dual triode to provide sufficient gain to operate directly from most analog and digital sources.
- ◆ Separate sensitivity controls for peak and average displays to ensure optimum indication on all tubes.
- ◆ A high (2 M $\Omega$ ) input resistance.
- ◆ Input source and output selector switches for three inputs and three outputs. The selected input signal is monitored, or the line router function can be used with power switch off.

## Operating Suggestions

The *Viper 4+* can be installed on top or under the chassis of most preamps and source units. The heat produced is modest if normal open-air ventilation is provided. Up to three line-level sources can be connected to the RCA jacks on the rear of the *Viper 4+* and selected using the input source switch. The selected source signal is monitored by the indicator tubes, two for each channel. One of up to three output destinations, connected to the output RCA jacks on the rear panel, can be selected. For example, two separate stereo power amplifiers, a headphone amplifier, etc. can be connected. The peak indication allows the L and R indicator tube shadow sectors to open and close instantaneously with the incoming signal. Response is flat from 20-20 kHz. The average indication provides a smoothing filter to show a time-averaged signal display which is easier to visualize. The sensitivity controls can be used to set the optimum display for each type of indication. They operate on both channels at the same time.



## Tube Replacement

The 12SC7 voltage amplifier tube should exhibit long life in this application. Degradation in its performance will be evidenced by a loss of sensitivity to input signals. It can be replaced by removing the chassis bottom plate (**make sure the power cord is removed and the unit has been off for at least 1 minute**) and unplugging it from its socket. Replacements are available from any of the large tube suppliers.

The 1629 cathode ray indicator (magic eye) tubes will eventually exhibit a reduced intensity as the phosphorescent coating becomes contaminated. They are replaced by first removing the bottom chassis cover (**make sure the power cord is removed and the unit has been off for at least 1 minute**). Carefully detach the tube socket from the tube being replaced. Each eye tube is held in place by an aluminum clamp held in place by a screw into the wood mounting strip. The tubes can be slipped out of their clamps by loosening the clamp screw, sliding the old tube out and the new tube in. The screw can then be tightened and the socket re-attached. The tubes are correctly oriented when the spigot key is aligned toward the bottom of the chassis (upward you as you view the open chassis).

The 1629 eye tubes are not plentiful as they have not been manufactured for many years. It is possible to convert operation to the more plentiful Russian 6E5C tubes. Contact Mapletree Audio Design for more information. *Do not use the 6E5Cs without modification or damage will result.*

### **Specifications**

**Connections:** Three inputs and three outputs through RCA phono jacks

**Input resistance:** 2 M Ohms at 1 kHz.

**Sensitivity (peak indicator):** 80 mV at 1 kHz.

**Time constant (average indicator):** approx. 5 ms

**Dimensions:** 14" x 10" x 2.5" overall

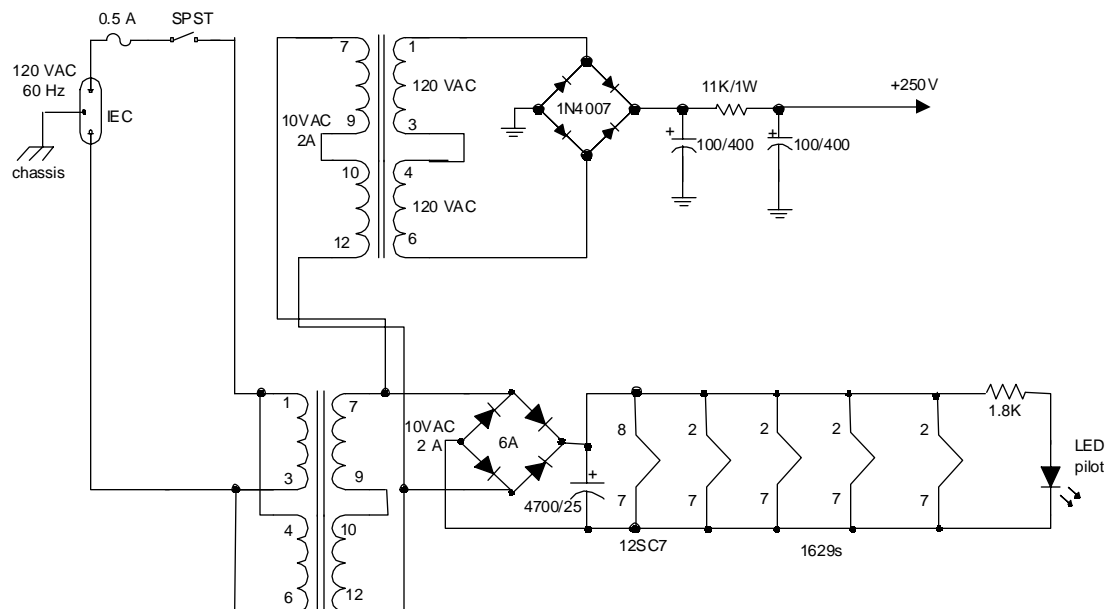
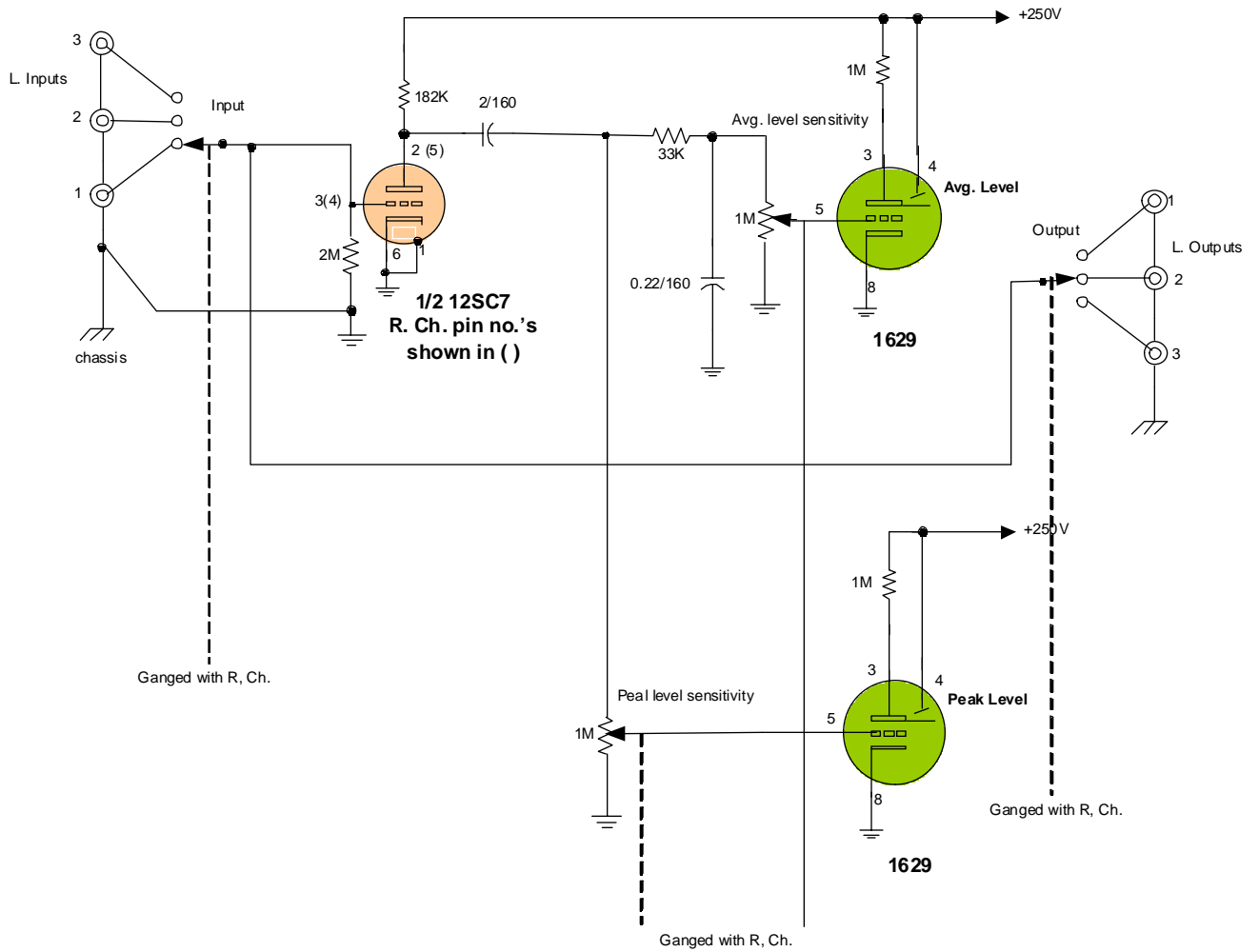
**Power requirements:** 120 VAC 50-60 Hz 10 W



# Mapletree Audio Design *Viper 4+* Stereo Magic Eye Monitor/Line Router

Left channel shown

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## **Circuit Description**

The signals to be monitored from the *Viper 4+* are connected to the input jacks. The following describes the left channel operation; the right channel is identical. The input signal is directly coupled to the grid of the 12SC7 dual triode tube. The 12SC7 is a dual high-mu triode with a cathode common to both sections. It is used as a common-cathode voltage amplifier with the output taken from the plate and capacitor-coupled to the sensitivity control potentiometers for the indicator tubes. A low-pass filter with an effective time constant of about 5 ms feeds the average sensitivity potentiometer while the peak sensitivity potentiometer is fed directly. The output signals from the potentiometers are applied to the triode section of the 1629 tubes to provide further voltage amplification before it is internally coupled to the eye control electrode. The high voltage applied to the target electrode of the 1629 creates a flow of electrons from the cathode and illuminates the phosphor coating on the target (the visible portion of the eye). With zero signal voltage applied to the input grid, the control electrode blocks the electron flow to the target in a 90-degree “shadow sector”. As the grid voltage amplitude increases (in a negative direction), the positive voltage on the control electrode produces a reduced shadow sector angle visible on the target. At high signal levels, the shadow sector disappears and the “eye” appears to close. Further increases in signal produce a slight “overlapping” of the shadow sector edges producing increased target illumination over a small angle.

The power supply provides a B+ voltage of about +250 V through a full-wave rectifier bridge and CRC filter. The tube heaters are supplied with 12 VDC.