

# Amplifier Bias Board

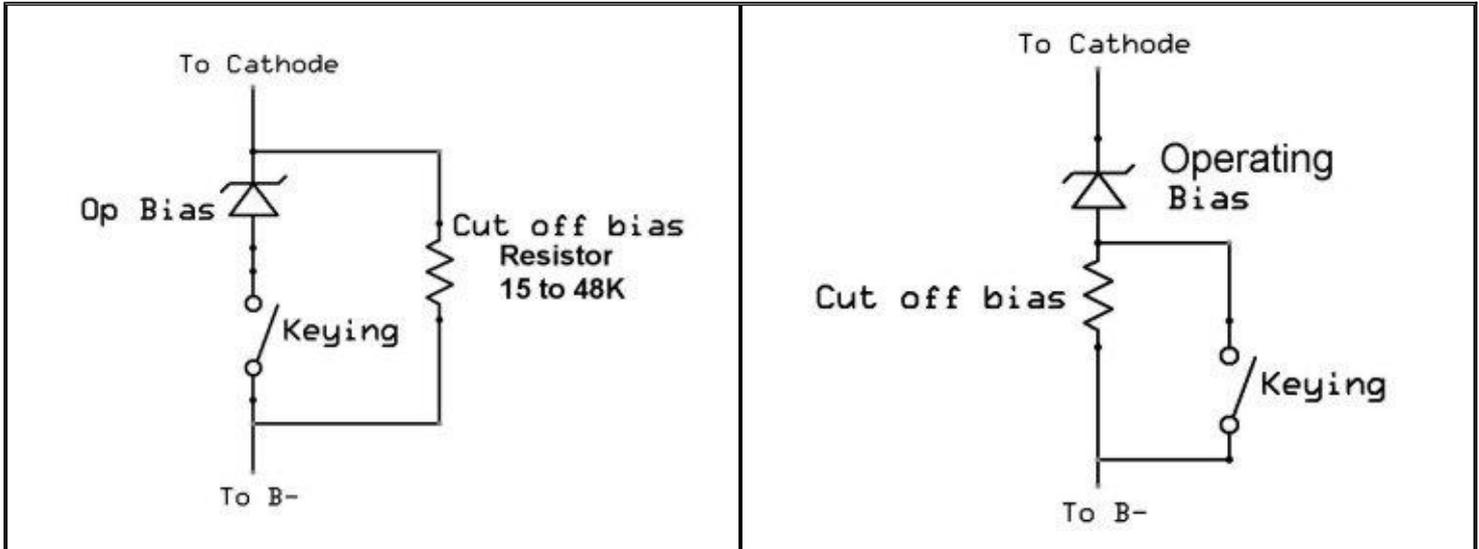
by Tony King, W4ZT

Direct replacement for Zener Diode fixed bias in Grounded Grid Amplifiers  
Adjustable over the range of about 3.5 Volts to 39 Volts

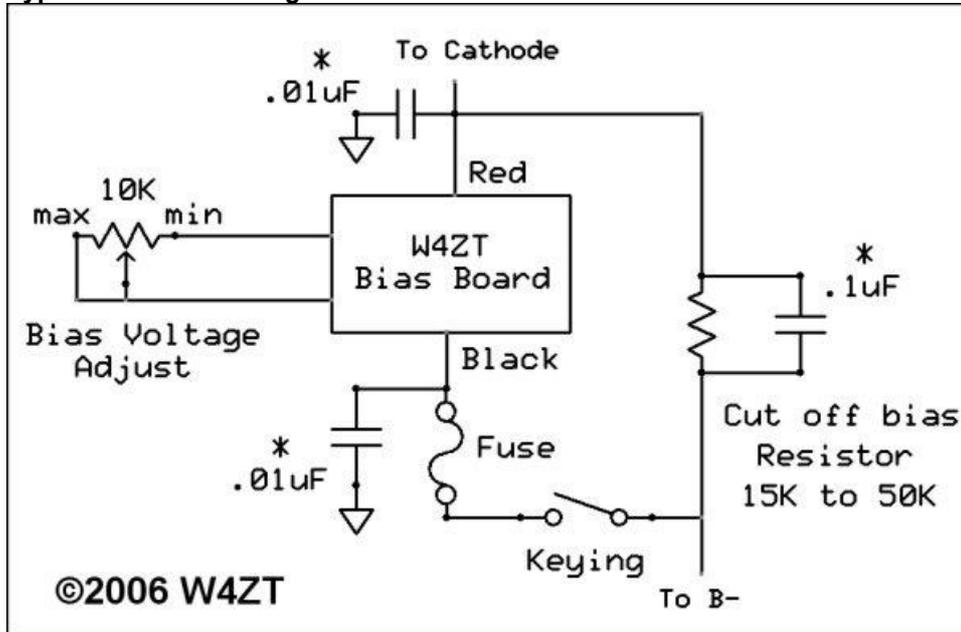
This bias board is an easy two wire replacement for the zener diode used in many Grounded Grid amplifiers as well as the ideal bias board to use for Grounded Grid amplifier retrofits. The circuit is a very common one using the TL-431 precision variable voltage reference with a TIP147 PNP power darlington transistor as the active element that is used to regulate the bias voltage.

You have the option of adjusting your bias over the range of approximately 3.5 to 39 Volts. The advantage of adjustable bias is being able to adjust the idling current on your tube(s).

Typical bias circuits using a power Zener diode to bias the cathode of a triode



Typical connection diagram for the bias board

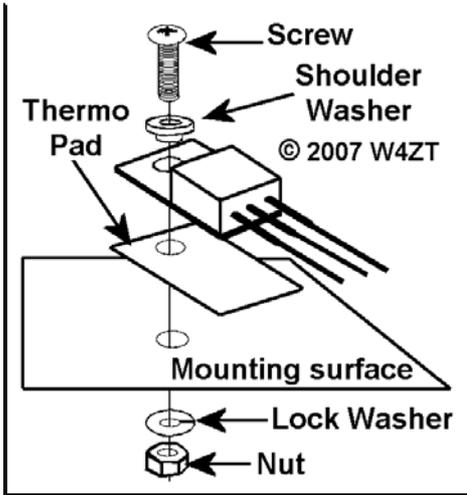


The 10K potentiometer, R1, provides a bias adjustment range of approximately 3.5 to 39 volts. For initial installation the potentiometer should be set for maximum bias to insure you start your adjustment at the lowest plate current. Fuse the circuit just above the maximum expected plate current.

The TIP-147 tab mount transistor, Q1, **MUST** be securely mounted to a heat sink or aluminum chassis with the thermo pad, shoulder washer and screw provided. Improper mounting **WILL** cause failure of the TIP-147 due to lack of heat removal.

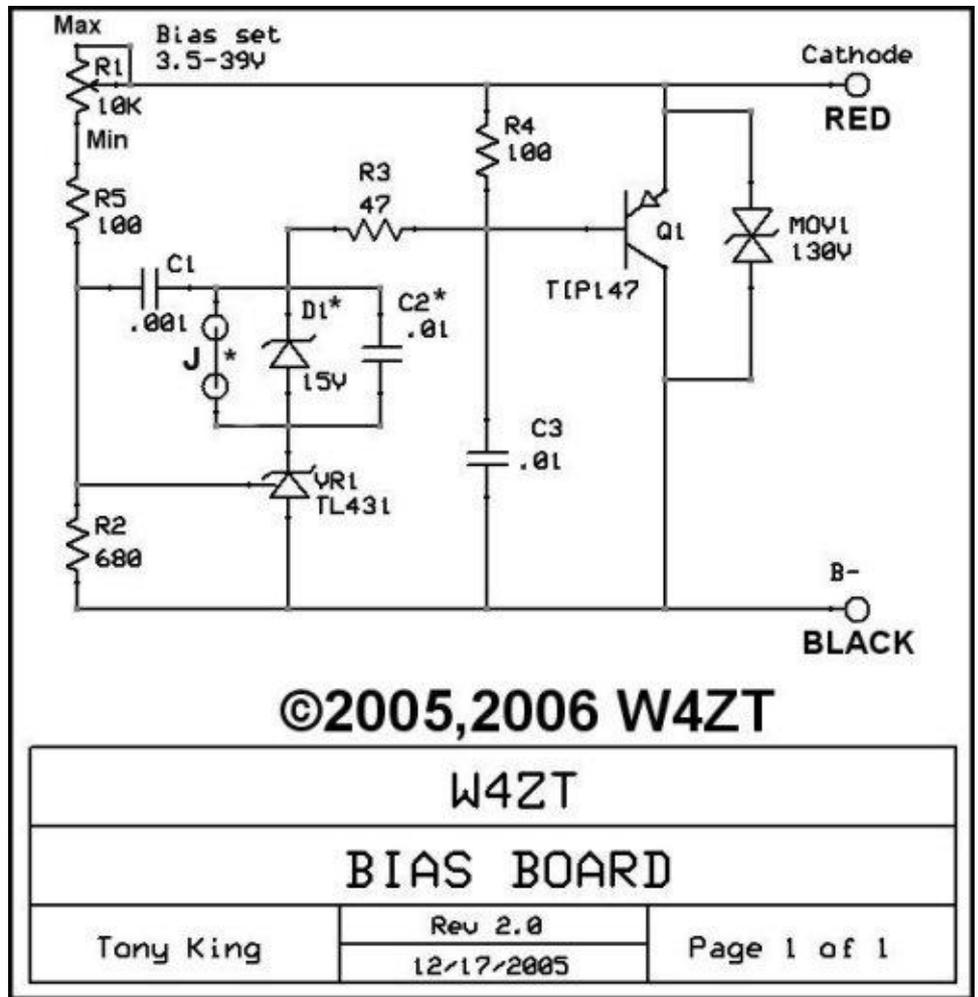
\* The capacitors marked with \* should be added to your amp if they are not currently in your amp.

Mount the bias board as shown here. The screw, nut and lock washer may be reversed. The thermo pad and shoulder washer must remain as shown.



**Schematic Diagram**

Maximum Bias (minimum plate current) occurs with this board when the multi turn potentiometer, R1, is set to the full ClockWise position for boards with a GRAY pot, or full Counter ClockWise position for boards with a BLUE pot.



**Parts layout**

The jumper (J) on the board should be cut only if you need to increase the bias voltage over 39 Volts. Cutting this jumper and adding 15V 1/2 Watt Zener diode, D1, and the .01uf capacitor, C2, will increase the top end Voltage to approximately 54 Volts at the expense of the lower end. Be sure you do not cut the jumper unless you need the increased bias Voltage.

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