

Auto-Bias (quad) module option for M125 mono-blocks

This module automatically optimizes bias settings to maintain a strict symmetry of currents through both tube branches in the output stage, and to completely avoid the flow of DC current through the output transformer, all with minimum requirements on anode current in the tubes.

DC current can saturate the output transformer which results in increased distortion of low-frequency sounds.

Bias control is realized by maintaining a constant bias on output tube grids, independently on the level of the driving signal.

The module is powered by the 6.3V voltage for tube filaments in the amplifier.

Benefits:

- No need to constantly re-adjust tube operating points
- Significantly extended tube life
- Current regulation not influenced by music signal
- Undistorted sound for a great listening experience
- Increase in signal clarity – reduction of hum and noise level of the amplifier
- Improved bass transmission
- No maintenance or additional setup needed
- Optimum utilization of tube life
- Safe operation due to minimized danger of runaway tube current – even when the amplifier is left unattended

This module is recommended in existing amplifiers with fixed bias of output tube control grids, as aging of the tubes causes the need for a constant re-adjustment of their operating points.

The connection secures an absolute symmetry of anode currents through both branches of primary winding of the output transformer. This way, saturation of the the output transformer core with DC current with subsequent signal distortion and decrease in available power is reliably avoided.

Furthermore, tube operating points need no additional re-adjustments. The module constantly creates optimum conditions for the output stage, independently of tube aging and consequent changes in their parameters.

Initial Setup

The module is not connected in the amplifier. Apply the AC voltage taken from the filament supply of the tubes (6.3...vac). Wait for the red LED (indicating the ramp up of the reference voltage) to light up. P2 trimmer is used to set the reference voltage which determines the quiescent current through the tubes. S2 jumper is connected.

Use the following formula: $V_{ref} = 0.5V$, then $I_o = 0.5/10 = 0.05 = 50mA$ per tube. V_{ref} is measured between the “Ref” point and the ground.

The S2 jumper on the module connects the driver board bias for generating the reference voltage.

Connecting the module to the output stage circuits of the amplifier

Remove the 10 ohm resistors on the output tube cathodes.

Remove the existing bias pots on the driver board.

Remove the connecting links from V1 to V3 (pin1) and from V2 to V4 (pin1).

Remove the connecting links from V1 to V3 (pin6) and from V2 to V4 (pin6).

Add R30, R32, C6B and C8B to AB board

Connect AB BIAS to the – end of C17 on driver board

Connect AB GND to the + end of C17 on driver board

Connect 6.3 vac from the V2 output tube (pins 2 & 7)

Connect a wire from the input side of C6 on driver to C6A on AB (R20-C6)

Connect a wire from the input side of C8 on driver to C8A on AB (R22-C8)

Connect V1 out on AB to V1-pin6

Connect V2 out on AB to V2-pin6

Connect V3-GRID on AB to output tube V3 pin 6

Connect V4-GRID on AB to output tube V4 pin 6

Connect V1-CATH on AB to output tube V1 pin 1

Connect V2-CATH on AB to output tube V2 pin 1

Connect V3-CATH on AB to the center point of the old bias pot next to R30

Connect V4-CATH on AB to the center point of the old bias pot next to R32

After the module has been connected and the AC supply voltage of 6.3 V applied, the “Soft Start” function will be initiated. The red LED located in the reference part of the module (Soft start) will be on for about 20 sec.

After this time, the LED will go off. The operational amplifiers of the automatic system will start to simultaneously sample the voltage of cathode resistors and set the bias for the grid bias. This process is indicated by blue LEDs (bias active).

Depending on the voltage supplied by the local source of grid bias in the amplifier, the values will stabilize after some time (about 60 sec.) and the tube bias will be permanently set to unify all flows through all the four tubes.