

EM80 Magic Eye Driver Board – Kit Build



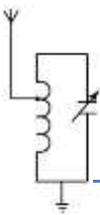
WARNING - HIGH VOLTAGE PRESENT ON PCB, CAPACITORS CAN HOLD CHARGE EVEN AFTER POWER IS REMOVED. TAKE CARE, EXERCISE CAUTION. THIS IS NOT A TOY!

Kit Build – Full & Bare Bones

This kit to make an EM80 driver board is available in two formats, a full kit where all parts are supplied, except the Magic Eye tube, and a bare bones kit which excludes the power supply parts D3/D4, C2/C3 and R3. Depending on which kit you have purchased will define the parts list. When the kit arrives, check the contents carefully against the tables below, and report any issues. We strive to ensure your kit arrives complete; this includes a double check on the contents against the order by 2 people, however, mistakes can still happen and we want you to be a satisfied customer.

Kit contents – Full Kit

Part Number/Name	Part Value	Function
Resistor R1	1.M Ω	Grid bias
Resistor R2	470K Ω	B+ Voltage Divider
Resistor R3	47K Ω	Part of B+ RC Network
Capacitor C1	0.1 μ F (104)	Grid/Cathode Bypass
Capacitor C2/C3	10 μ F 400VDC	B+ Smoothing
Diode D1/D2	1N4148	Fan control grid
Diode D3/D4	1N4004	B+ Rectifiers
9 Pin tube socket		
2 Pin 5mm Screw Terminals x 3		Easy connection of power
RCA Jack		Input for voltage control of fan
PCB		



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Kit Contents – Bare Bones

Part Number/Name	Part Value	Function
Resistor R1	1.M Ω	Grid bias
Resistor R2	470K Ω	B+ Voltage Divider
Capacitor C1	0.1 μ F (104)	Grid/Cathode Bypass
Diode D1/D2	1N4148	Fan control grid
9 Pin tube socket		
2 Pin 5mm Screw Terminals x 3		Easy connection of power
RCA Jack		Input for voltage control of fan
PCB		

After checking the kit contents, first decide on which configuration you intend to build, with the bare bones kit you have already decided that the board will be powered from a DC power supply, option 3 on the chart in Appendix A.

If you purchased the full kit, then refer to the chart in Appendix A to help decide which power configuration you are going to build, then move to the construction part.

The first step is to insert the resistors in their correct locations. All part locations are clearly marked on the PCB. Remember the bare bones kit does not have R3 supplied.

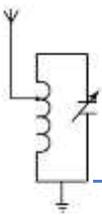
After installing the resistors, the diodes D1 – D4 (if supplied) are installed. Note that these are polarized; make sure the band on the diode matches the band printed on the PCB.

Next install capacitor C1 marked 104, the orientation of this capacitor is not important. Then if building the full version, and they are needed, install electrolytics C2 and C3. These are polarized so need to be installed correctly.

Now install the blue 5mm screw terminal connectors and the yellow RCA jack and finally the tube socket. You may need to bend the tube socket pins slightly to make them all line up with the PCB outline.

Initial Testing

After completing the board, it is important to check over the top side components to ensure all components are properly installed in their correct locations and the underside of the board to make sure all the solder connections are good and no splashes of solder are causing bridges or shorts. Finding and correcting mistakes at this stage saves a lot of potential work later.



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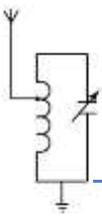
After completing the checks outlined above, insert the tube and carefully push it home in the socket. The socket pins may be tight as the socket is new, if used a few times the pin receptacles will loosen up a little. Power can now be applied to the board. With tubes it is always a good idea to apply the heater voltage before the B+ voltage, and have the heater glowing before application of the B+ but this is not essential. Refer to the chart in Appendix A for wiring details depending on your power supply configuration.

The tube should, after a warm up time, have a green glow that is vertical and centered in the tube, it should be a narrow glowing band, small side 'fans' should also be visible. This photo shows the typical glow that should be seen after warm up and with no control voltage applied.



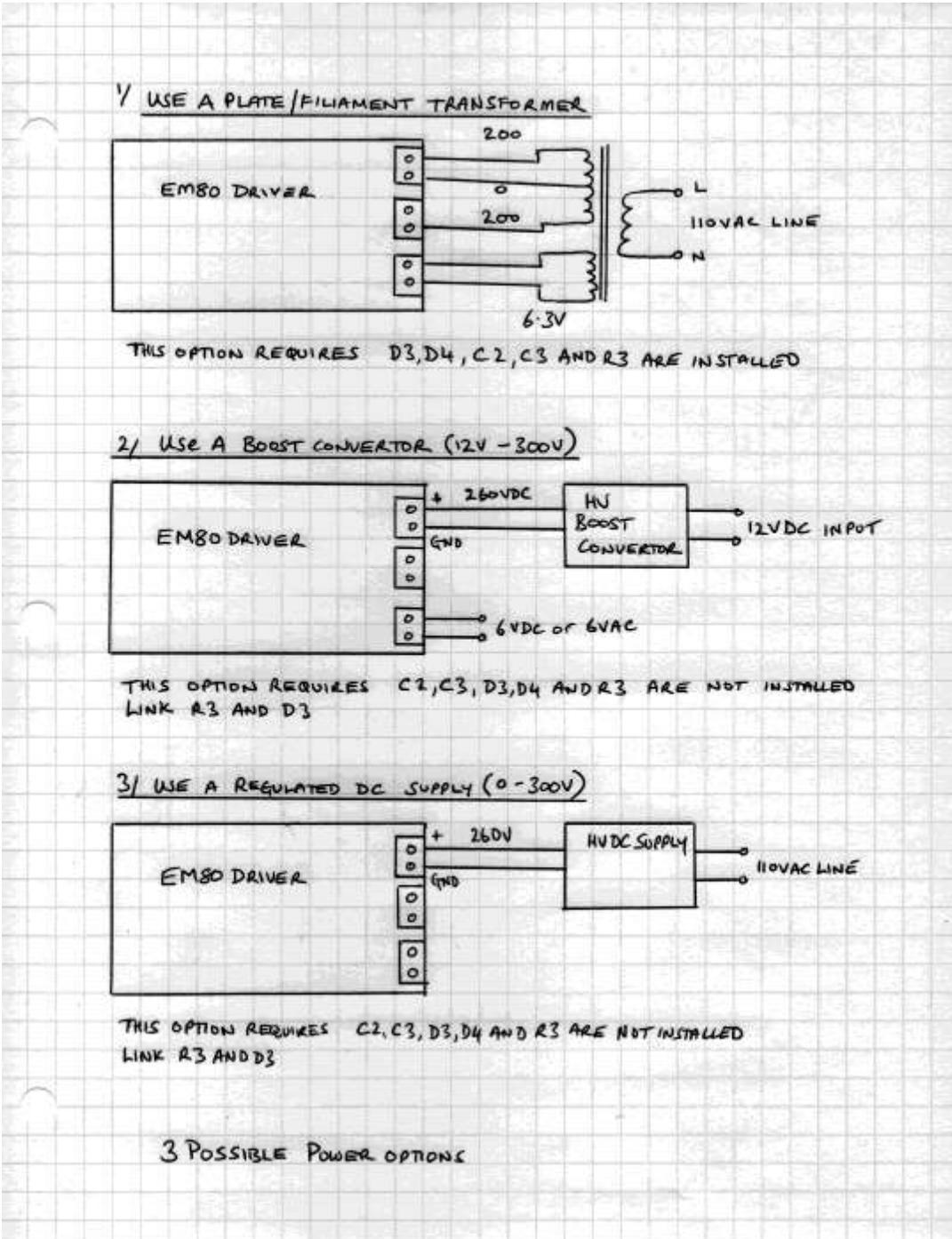
To make the 'fan' move or expand a modulating voltage is required at the input jack, this can be an audio signal from a small amplifier or a low frequency sine/square or triangle signal. We say low frequency as at frequencies above 50 – 100 Hz the fan will fully expand but not visibly contract. A slow 1Hz signal will cause a pleasing open/close of the fan, while music applied to the jack will cause the fan to open/close in beat to the input signal. Experiment, find what works best for you, just remember the board has high voltages present and these can remain after power is removed!

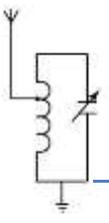
Also see the user guide for more information.



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Appendix A - Power options chart

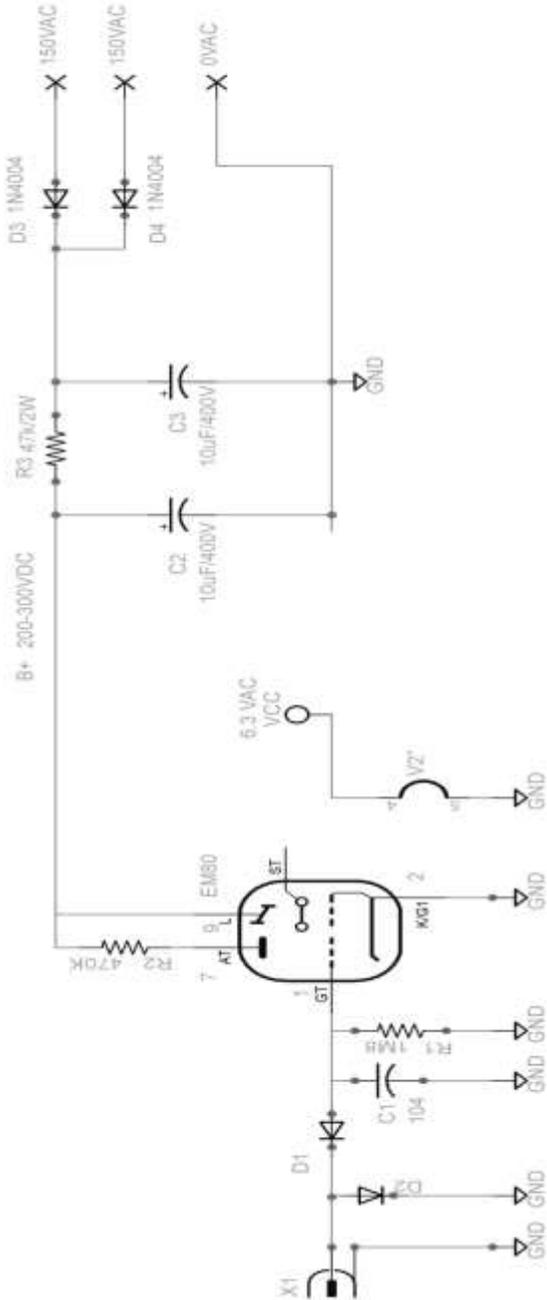




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Appendix B - Schematic

From Center tap Plate transformer



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