Ease of build	Advanced
-partscount	Medium
-density	High
Parts sourcing	Normal
Enclosure fitting	Normal
Debugging level	Advanced

Tube Driver V1.2

Famous tube sound in a user-friendly package (125B)

Overview

There is a well known circuit that runs a simple OpAmp-based distortion into a tube - generating great tones.

This is used by David Gilmore, Eric Johnson, Joe Satriani and many other well known guitarists.

If you ever wanted to own one or build one yourself – don't look any further.

General

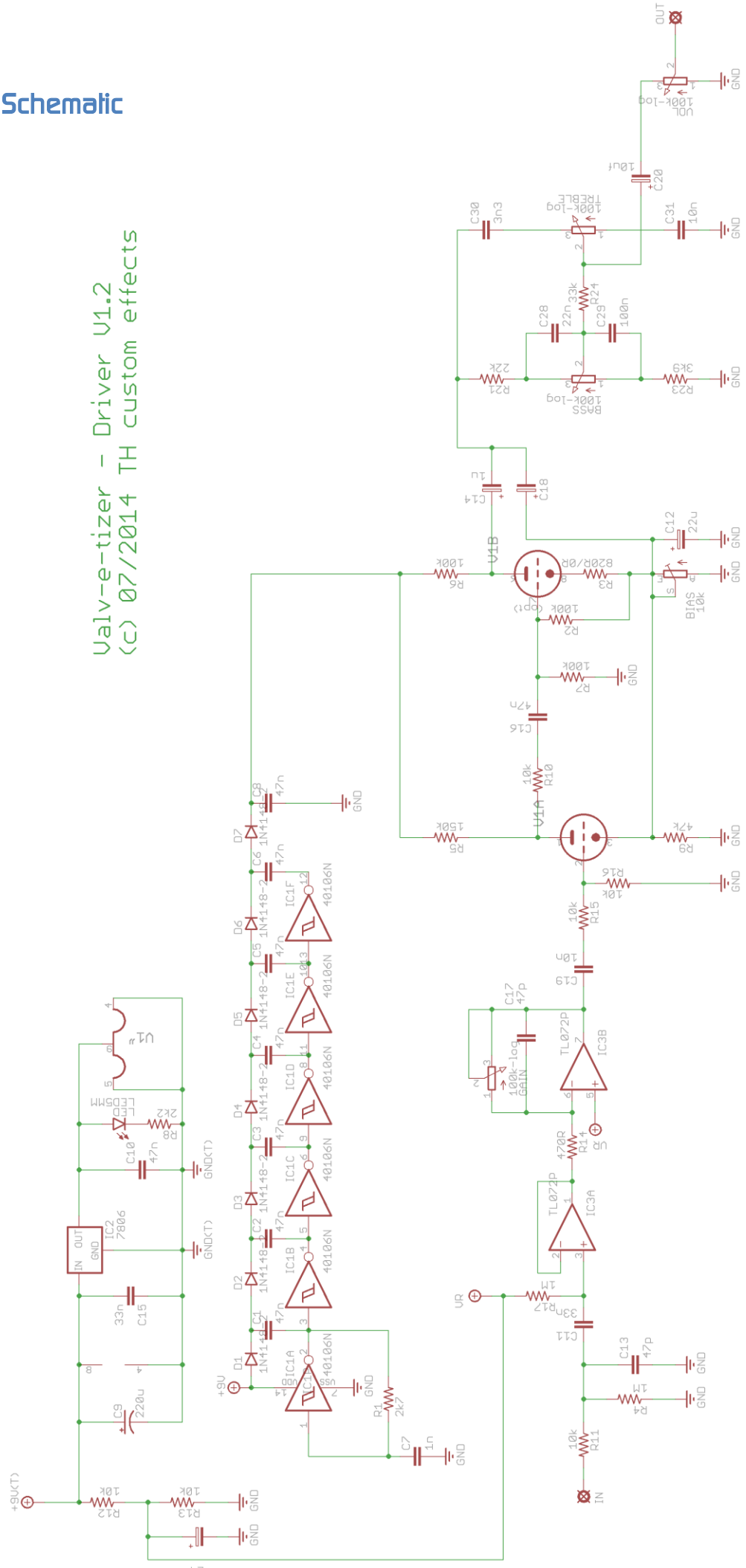
This circuit is intended to fit in a 125B enclosure with the tube outside.

The tube heaters run on 6V to allow 9V operation on any pedalboard. Internally the tube is powered with ~60V DC.

There are a lot of small changes to the original circuit to make I more versatile and fix a few insufficiencies. That starts with the higher voltage on the tube plates, a single power rail, a different tone control (Baxandall) and a well thought after optimized board and layout which makes boxing it very easy.

The unit will draw 300-500mA on 9V, so keep this in mind when connecting it to your pedal board supply. It is highly recommended to use a separate and isolated output.

Schematic



Bill of materials

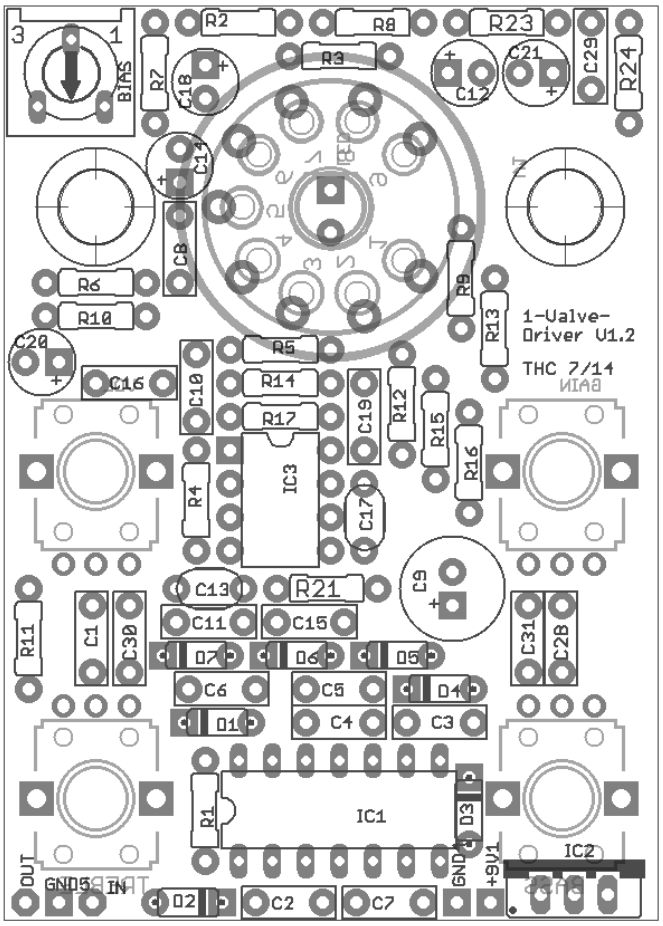
Please stick to the part values in the BOM. The values in the layout may be different.

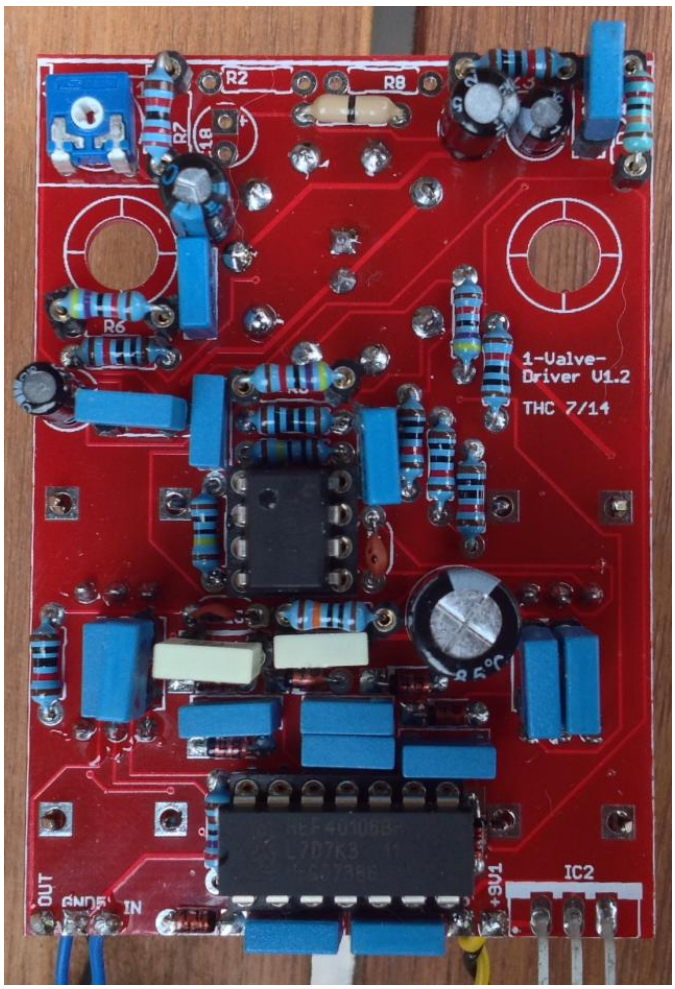
	Parts	Value			Qty	Description
		MyDriver	both	Driver		
Resistors	R1		2k7		1	
	R2	---		---	1	Do not populate
	R3	jumper		jumper	1	0R resistor or cut-off leg (wire)
	R4, R17		1M		2	
	R5	47k		47k	1	
	R6	47k		47k	1	
	R7	22k		22k		
	R8		1k5-3k3		1	LED series resistor. Test for brightness with your LED first.
	R9		47k		1	*Optional. Use with external BIAS pot
	R10, R11, R12, R13, R15, R16, R23		10k		7	
	R14		1k5		1	
	R21		100k		1	
	R24		22k		1	
Capacitors	C1, C2, C3, C4, C5, C6, C8, C10, C16		47n		9	box film ! 80-100V !
	C7, C28, C30		1n		3	box film
	C9		220u/16V		1	pol. electro
	C11	47n		33n	1	box film
	C12		22u/50V		1	pol. electro
	C13, C17		47p		2	ceram
	C14	1u/50V		1u/50V	1	pol. electro
	C15		33n		1	box film
	C18	---		---		pol. electro
	C19	33n		10n	1	box film
	C20, C21		10u/16V		2	pol. electro
	C29		6n8		1	box film
	C31		4n7		1	box film
Diodes	D1, D2, D3, D4, D5, D6, D7		1N4148		7	
	LED		LED3MM		1	super-bright
Trimpots	BIAS1*		10k		1	*6mm ACP6 or Piher
Pots	Gain, Volume, Treble, Bass		100k-log		4	Potentiometers 9mm Alpha (from Tayda)
Ics	IC1		40106N		1	
	IC2		uA7806		1	
	IC3		TL072		1	
Other	V1	12AT7		12AX7	1	
	S1		Socket Noval print		1	Noval Socket Print

*The bias pot can be used externally and be mounted to the enclosure if you want to make it tweakable from the outside. Usually it is set fixed once you found your sweet spot with the tube you are using.

Building

The BOM lists two different versions that can be built. One is very close to the original circuit and will definitely sound alike. The other one is tweaked to my liking.





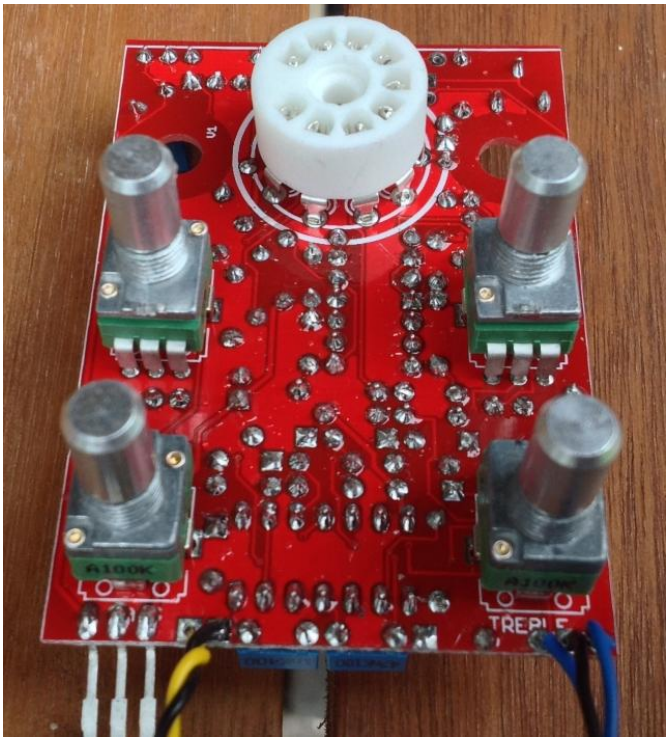
Start populating the small diodes first, then larger diodes, resistors, IC socket and capacitors. It is a good idea to mount the power regulator to the enclosure which will work as a heatsink.

Then mount the 3mm LED from the backside. Make sure it is the right orientation before you solder the NOVAL socket on top of it. The long pin goes into the round hole.

Of course this does only work if your tube socket has a hole in the middle. If not and it is a plastic socket, you can drill one. If it is a ceramic version you will be able to drill a hole into it.

Leave some space between tube socket and PCB so it is slightly raised (1-2mm) above the pots.

Don’t forget to clip off the small notches on the pots.



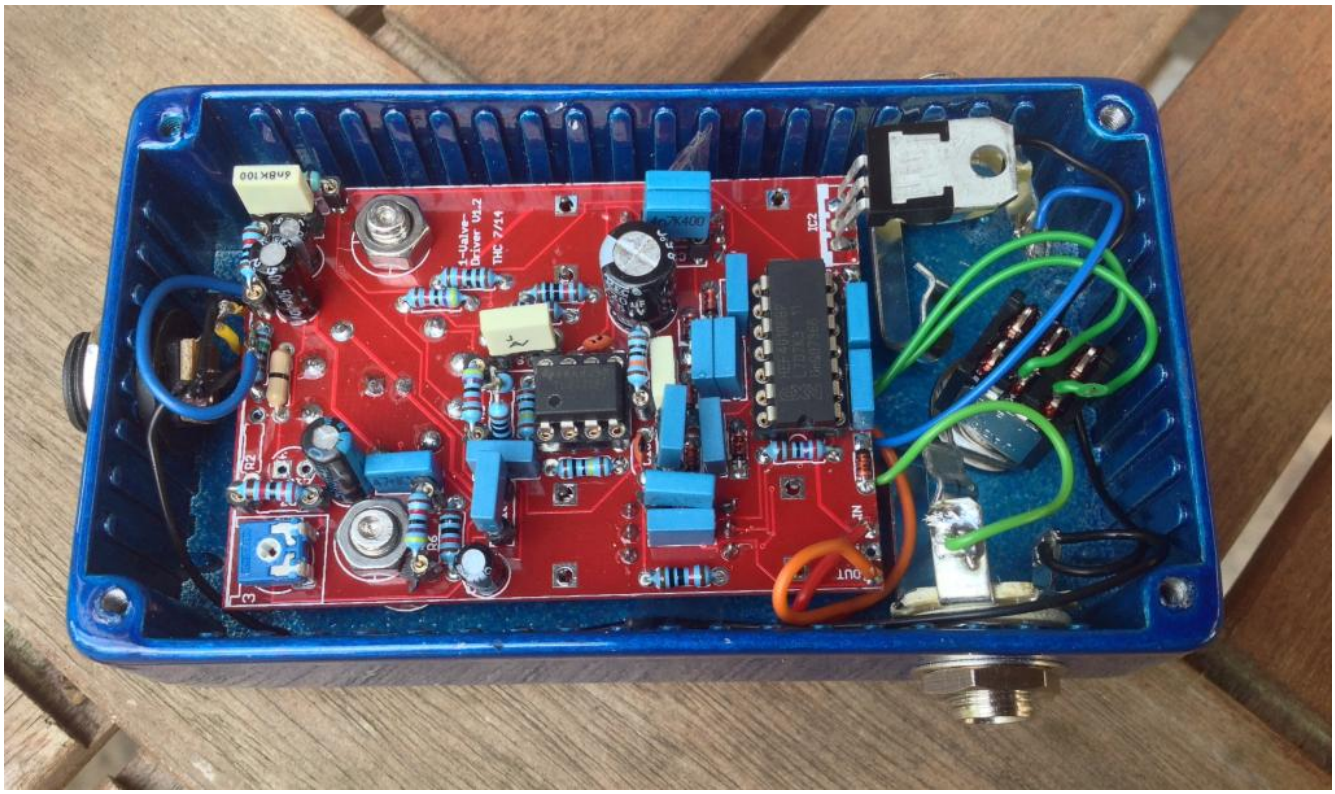
The pots will keep the board in place but it is highly recommended to use the holes in the board to mount it fixed to the enclosure!

Enclosure

This fits a 125B enclosure.

A decal that can be used as a drilling template is available here: http://diy.thcustom.com/drill-templates/

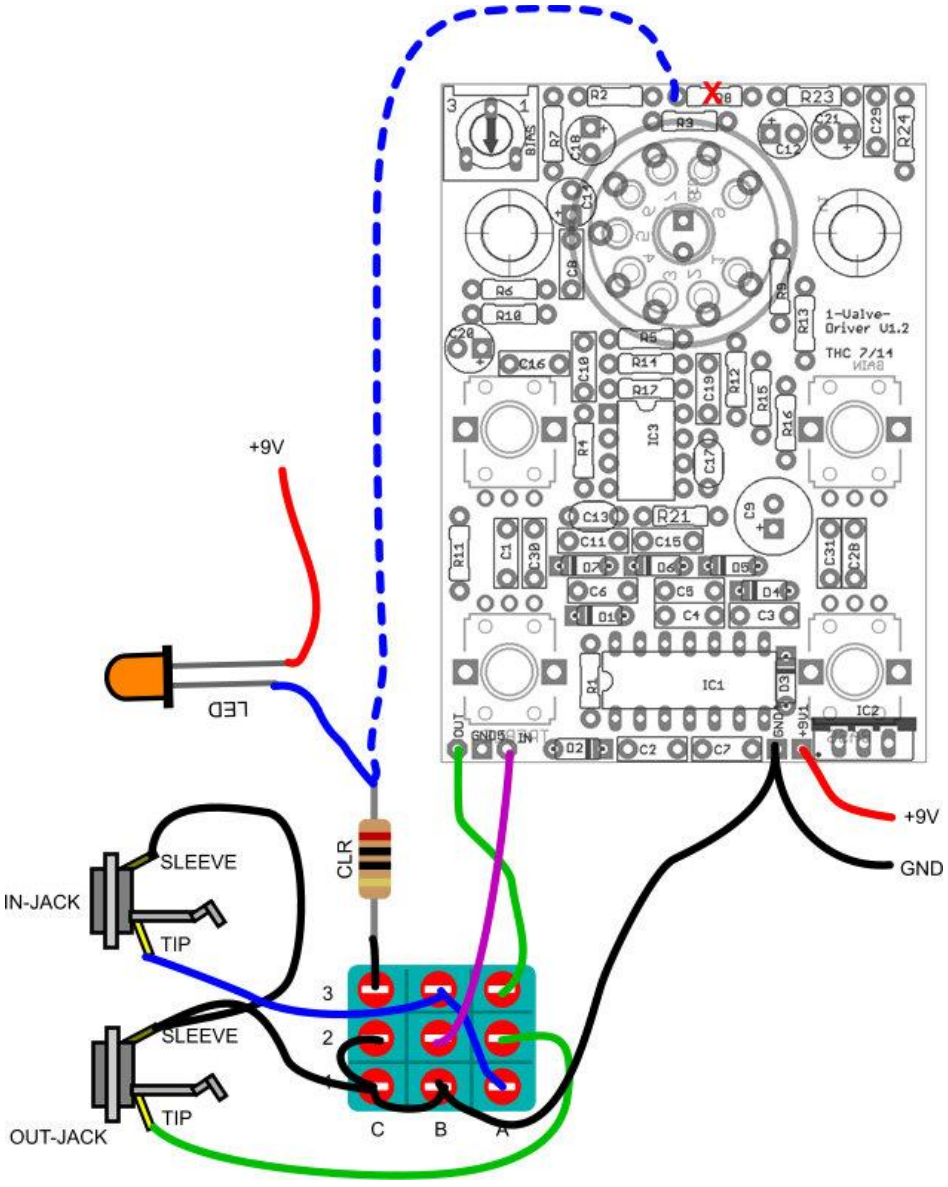
Example of a prototype in a 1590B enclosure- not recommended ☺



WIRING

Please note that in a standard-build R8 (the CLR of the socket-LED) is populated which will light the tube as long as the power is connected. To have an on/off indicator you will need another LED and CLR as seen in the wiring diagram below.

If you don't want the tube light always on you do not populate R8 but use a wire (dotted line below) and connect it to the 3PDT switch. In that case you do not populate the switch LED as shown below.



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