

EQUINOX II V1.1

Reverb based on delay chips
based on Merlin Blencowe's circuit

OVERVIEW

Merlin is famous for his knowledge about valve circuits. But from time to time he releases stompbox circuits after his own ideas. His site: <http://www.valvewizard.co.uk/>

GENERAL

Everyone looking at DIY reverb knows the "Belton brick" which is often used by pedal builders (including the 'booteek' guys). Did you ever wonder what's inside? Look here.

But this is not only for study purposes. Merlins reverb also sounds really good!

This is what Merlin says about his project:

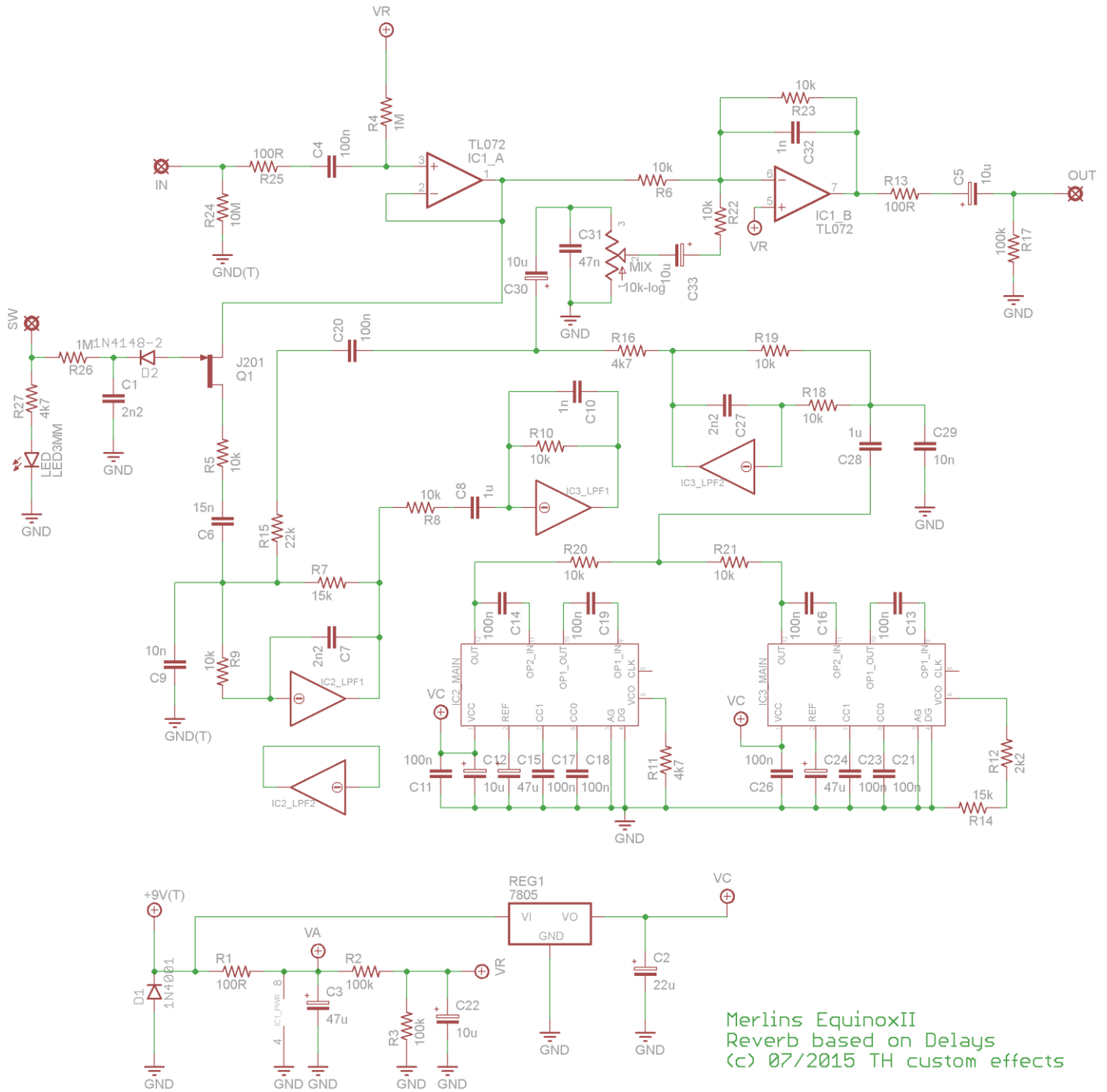
"This project came about because I wanted to roll my own reverb. A common way to do this is to use a tapped delay line, but no such chips exist any more. No matter; the result is the same as using multiple delay lines in series and/or parallel. Several DIY reverb effects use the excellent accutronics Belton Digi-Log reverb module, and the associated patent, [US8204240](http://www.uspto.gov/patft/US8204240), shows that it uses three PT2399 delay chips, one of which is modulated at a slow rate to give a more realistic spring reverb sound. The Accutronics module is not commonly available in Britain (also it's cheating to use a ready made effect module!), but I did have a tube full of PT2399s (I absolutely love these chips). I also wondered whether just two could do the job, and it turns out that for guitar use you can indeed get a primitive but usable effect this way. I think this makes the Equinox II the simplest DIY reverb project on the net at the moment!

In the Equinox II the reverb effect is achieved by passing the audio through two delay lines in parallel. One is arranged for a short delay (about 80ms), and the other a long delay (about 250ms). The outputs from each are summed and fed back to the input of the delay lines, and also mixed with the original audio via a mix pot- that's it. (I have an affection for one-knob effects.)"

Here is Merlins project page: <http://www.valvewizard.co.uk/equinox.html>

This is a reverb with tails – the wet signal is trailing out when the effect is switched off. See the wiring instructions on the end of the document.

SCHEMATIC



BILL OF MATERIALS

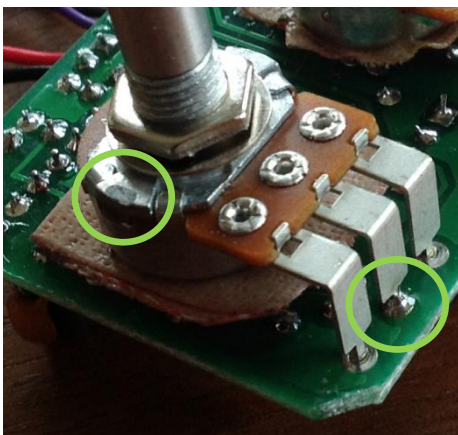
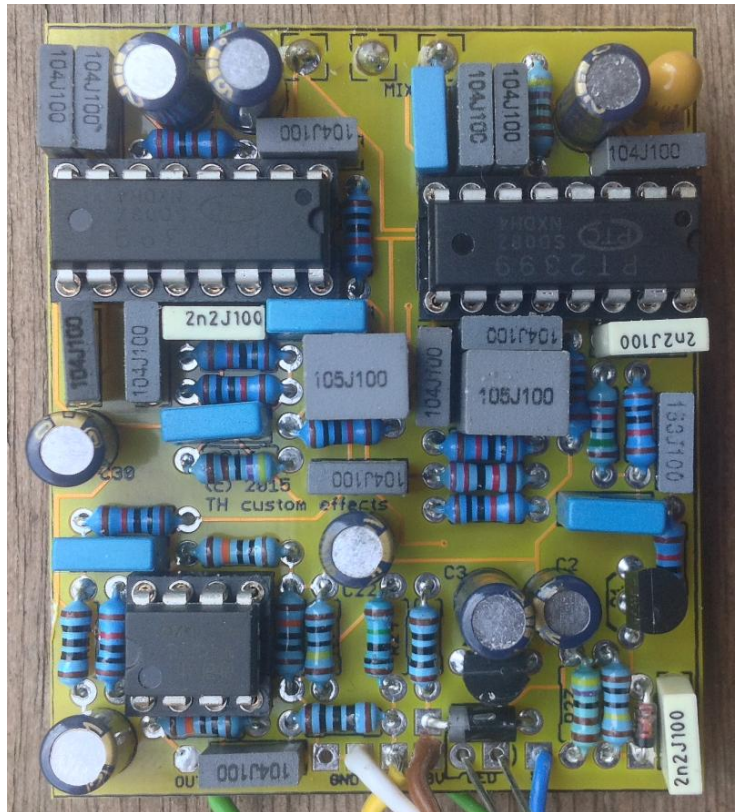
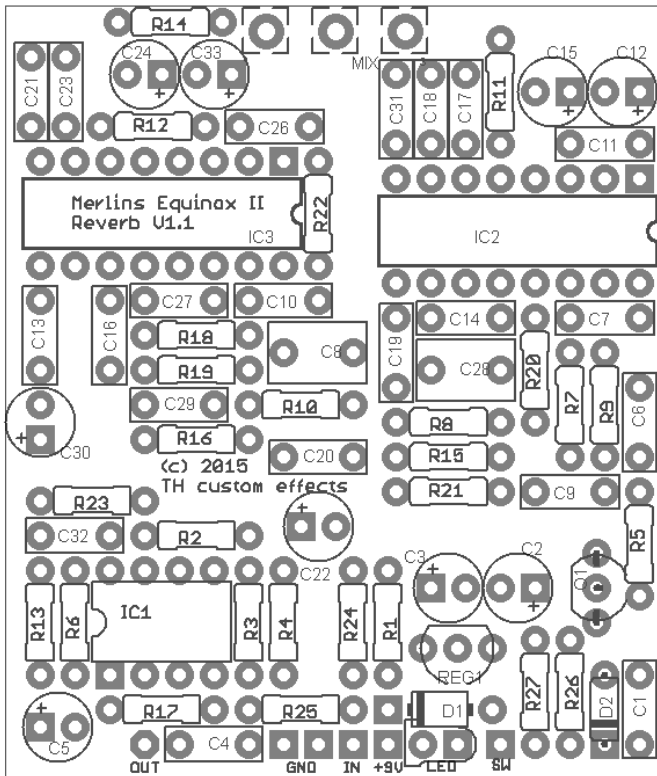
	Device#	Qty	Value	Comment	
Resistors	R1, R13, R25	3	100R		
	R2, R3, R17	3	100k		
	R4, R26	2	1M		
	R5, R6, R8, R9, R10, R18, R19, R20, R21, R22, R23	11	10k		
	R7, R14	2	15k		
	R11, R16	2	4k7		
	R12	1	2k2		
	R15	1	22k		
	R24	1	10M		
	R27	1	4k7	try together with LED for brightness	
	Capacitors	C1, C7, C27	3	2n2	box film
		C2	1	22u	polarized electro
C3, C15, C24		3	47u	polarized electro	
C4, C11, C13, C14, C16, C17, C18, C19, C20, C21, C23, C26		12	100n	box film	
C5, C22, C30, C33		4	10u	polarized electro	
C6		1	15n	box film	
C8, C28		1	1u	box film	
C9, C29		1	10n	box film	
C10, C32		2	1n	box film	
C12		1	10u	tantalum	
C31		1	47n	box film	
Pots		MIX	1	10k-log	
Diodes	D1	1	1N4001		
	D2	1	1N4148		
	LED	1		LED of your choice	
Transistors	Q1	1	J201		
ICs	IC1	1	TL072		
	IC2, IC3	2	PT2399		
	REG1	1	78L05		

BUILDING

There are a lot of parts on relatively small space, so take your time and everything will work out well.

Start populating resistors and diodes first, then IC sockets. If you want to socket the transistors you put the sockets in now. Next do the capacitors, starting ceramic, box film and last 1u box film and pol. electros.

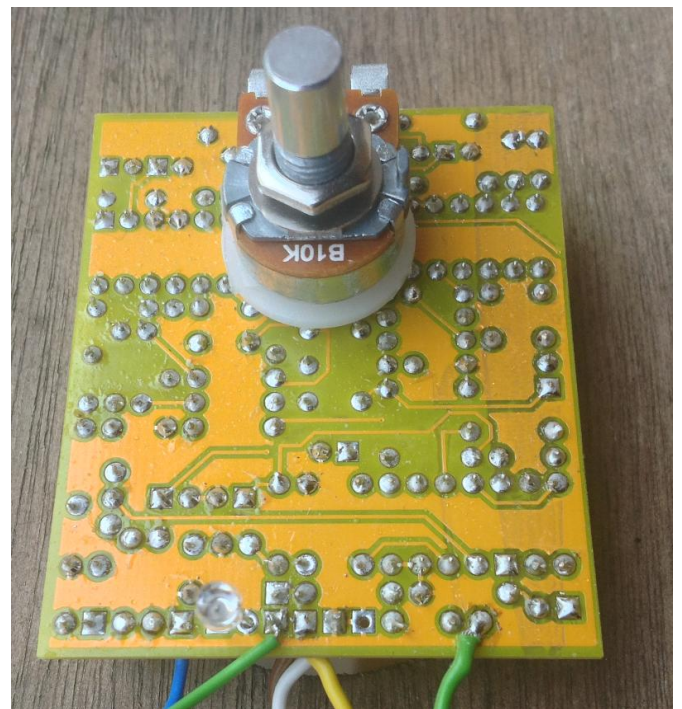
The LED is needed for the bypass to function correctly.



The board mounted pots need to go onto the other side of the board. Use some (double-sided) tape to make sure the pot cases do not shorten any pins that come through the board. As you solder them it is good practice to

apply some solder to the middle pin first, then pull it back approx. 1mm and let it harden. Then solder the other pins. This will align the pot horizontally in a better way and avoid shortcuts of the wide pot pins and the board.

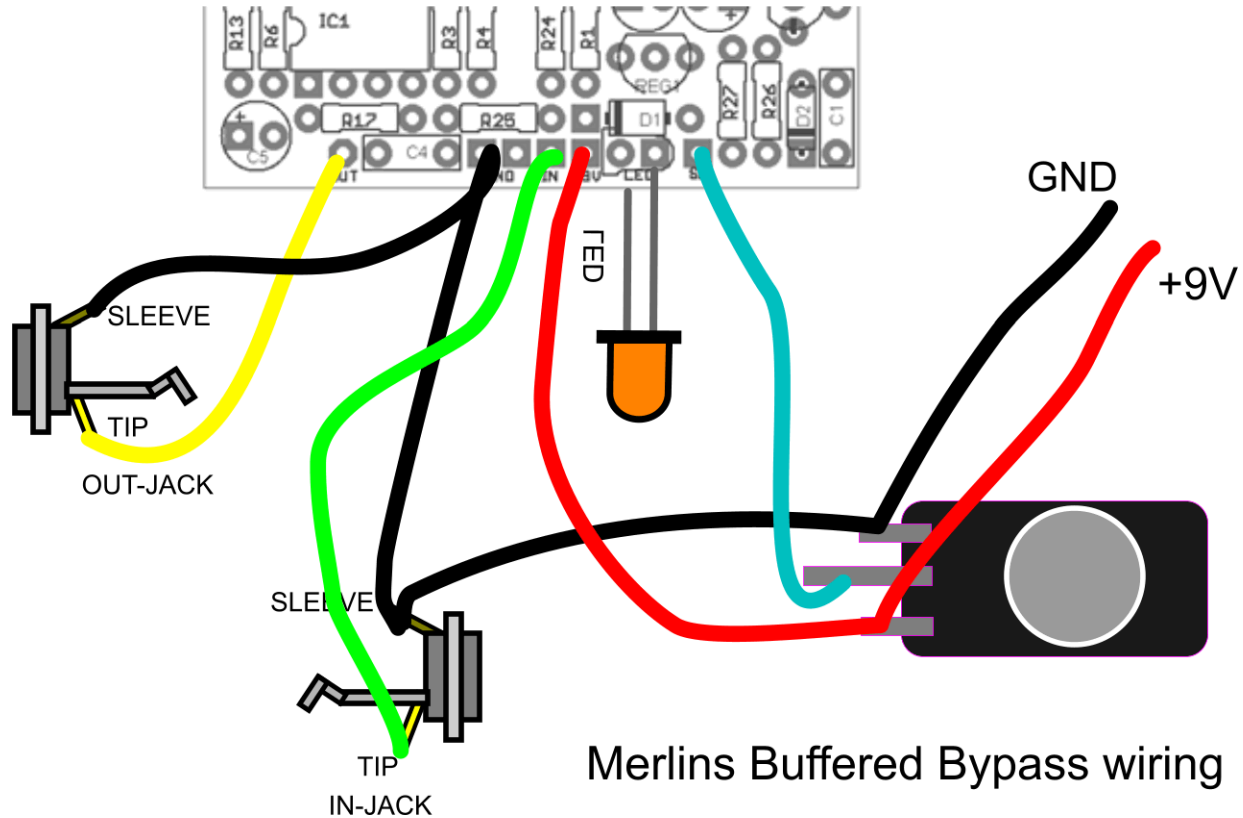
Don't forget to clip of the small bracket before you mount the circuit.



WIRING

This is a buffered bypass circuit.

You only need a Single pole latching footswitch (SPST/SPDT) to turn it on and off.



Merlins Buffered Bypass wiring

FINALLY

This is not only a proof of concept – instead it is the cheapest to build and good sounding reverb!

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