

Echo Base PCB

The Echo Base is a digital delay based on the PT2399 chip, which is designed to offer sounds somewhat like analog and tape delays. The circuit was designed by Ian Maltby. The circuit has a modulation feature, which varies the delay time using a low frequency oscillator (LFO). This allows for some wobbly tape delay sounds, vibrato, chorus, and at high speeds, a pseudo-ring-modulator. The “tails” function, when switched on, allows you to bypass the effect while letting the last few echoes ring out, rather than cutting them abruptly. The optional LFO killswitch (marked “LFO SW” on the board) stops the modulation when switched on.

The controls are:

Delay time (from 30ms to around 700ms)

Feedback (Repeats)

Level (varies the volume of the delayed signal)

Modulation speed

Modulation depth

Tails on/off switch

Echo Base PCB
Bill of Materials

Part type

quantity - part (additional info, Mouser part number where available)

ICs

- 2 - TL072 (dual opamp)
- 1 - 4066 or 4016 (quad bilateral switch)
- 1 - PT2399 (delay chip)
- 1 - 7805 (5 volt regulator - 78L05 works as well and has the same pinout)

- 1 - 14pin IC socket
- 2 - 8pin IC socket
- 1 - 16pin IC socket

Transistors

- 1 - 2N5089
- 1 - BC560

Potentiometers

- 3 - A100K
- 1 - B50K
- 1 - B1M

Resistors

	Color code
1 - 3K3 (3.3K)	Orange Orange Red Silver
1 - 47R	Yellow Purple black Silver
2 - 1M	Brown Black Green Silver
1 - 100K	Brown Black Yellow Silver
9 - 10K	Brown Black Orange Silver
5 - 1M5 (1.5M)	Brown Green Green Silver
1 - 10M	Brown Black Blue Silver
3 - 220K	Red Red Yellow Silver
2 - 20K	Red Black Orange Silver
1 - 50K	Green Black Orange Silver
1 - 39K	Orange White Orange Silver
3 - 220R	Red Red Brown Silver
2 - 47K	Yellow Purple Orange Silver
1 - 240K	Red Yellow Yellow Silver
1 - 680K	Blue Grey Yellow Silver
1 - 27K	Red Purple Orange Silver
2 - 22K	Red Red Orange

Capacitors

- 2 - 220nf film
- 12 - 100nf film
- 2 - 47nf film
- 2 - 1nf film
- 2 - 15nf film
- 1 - 4N7 (4.7nf) film
- 1 - 1uf film (Mouser part# 80-R82DC4100DQ60J)

NOTE: all film caps are intended to be boxed metal film caps. Other cap types might not fit.

- 1 - 470pf ceramic
- 1 - 100uf electrolytic
- 1 - 10uf electrolytic
- 1 - 2uf2 (2.2uf) electrolytic
- 4 - 47uf electrolytic

Diodes

- 1 - 1N4001
- 2 - 1n4148 (1n914 is equivalent)
- 1 - LED (blue superbright is ideal here)

Switches

- 1 - SPDT toggle
- 1 - SPST latching stomp (bypass. Any latching stomp switch will work here, DPDT, 3PDT, etc. but only one pole and one throw is used)
- Optional: 1 - SPST toggle (LFO kill switch - if you don't want this switch just leave the pads labeled "LFO SW" empty)

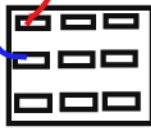
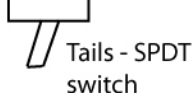
IC orientation: square pads indicate pin 1.

This resistor, marked 50k, is the current limiter for the LED. Different LEDs may require a different value.

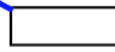
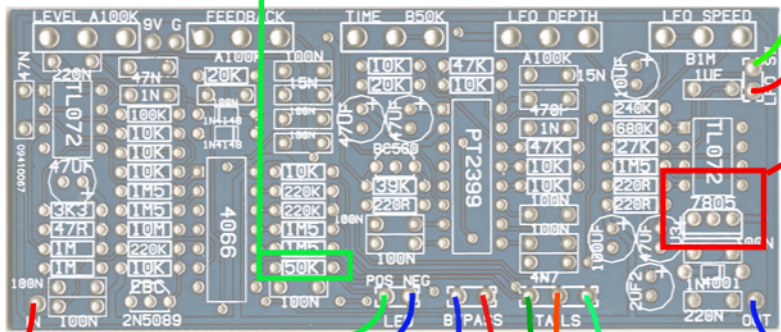
LFO SW: optional. Turns off modulation (LFO) when the pads are connected together. If you don't want this, just leave the pads empty.

7805 is oriented with its metal tab facing the Out jack. 78L05 also works - orient its flat side toward the Out jack.

input jack

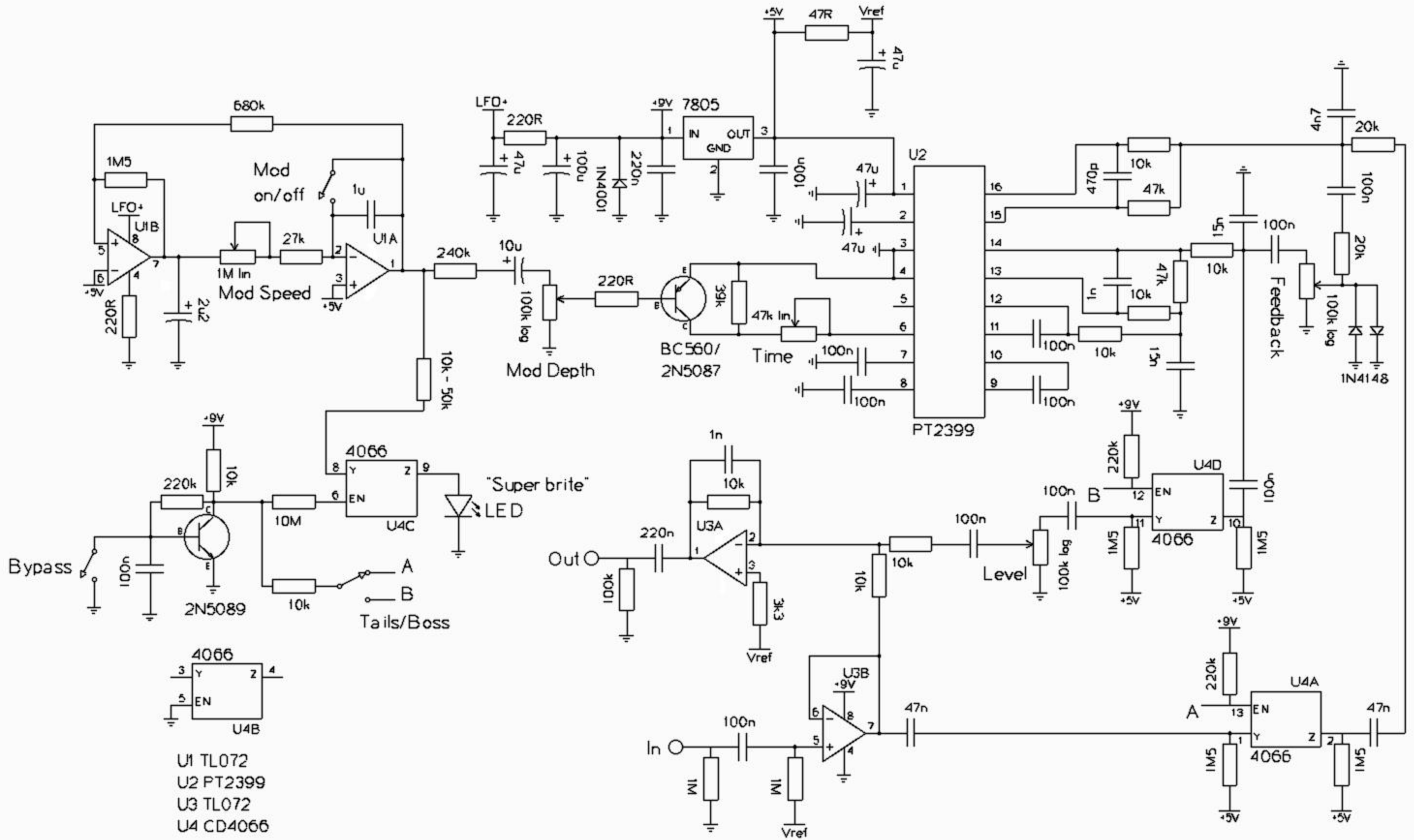


Bypass switch can be any latching switch, only one pole and one throw are used.



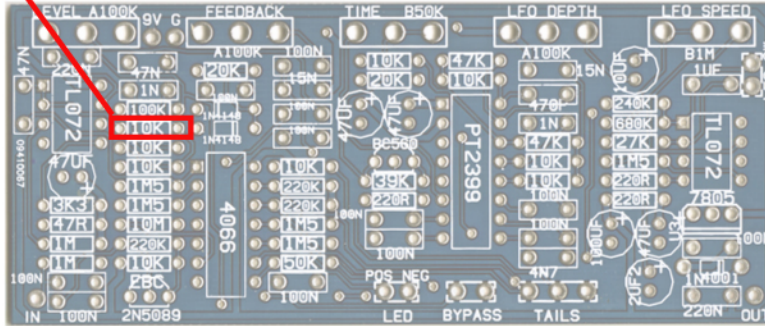
ECHO BASE

Version 2 30/03/2010

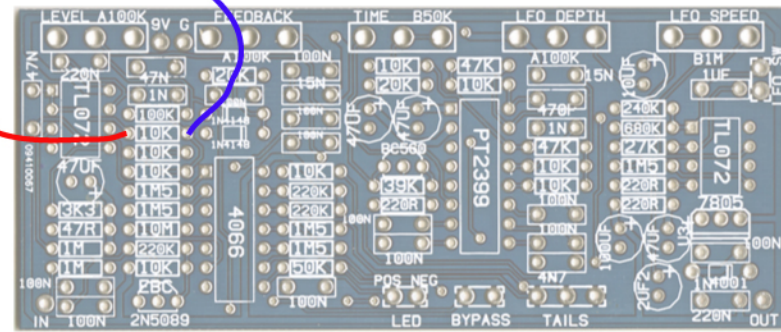
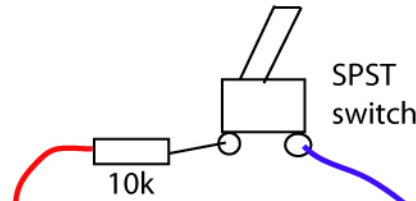


Clean signal kill mod:
This mod adds a switch to mute the clean signal. This allows you to get vibrato tones and ring modulator sounds, without the clean signal being heard.

Step one: don't fill in this 10k resistor, or take it out if you've already put it in.

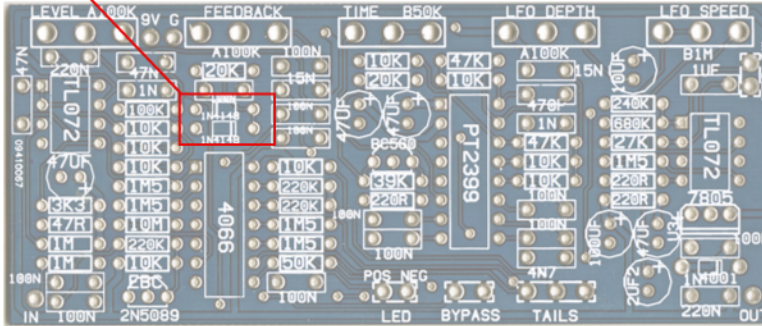


Step two: wire this switch along with the 10k to switch out the clean signal

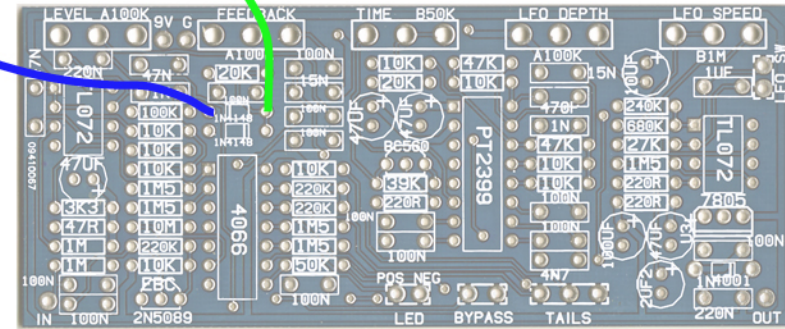
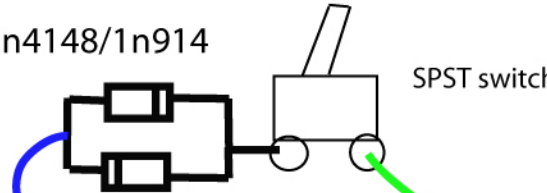


Step one: don't put these diodes in the board/remove them if you already put them in.

Diode lift mod: some people find they get distortion when using humbuckers. Removing the diodes can fix this. Putting them on a switch allows you to change the sound of the feedback/oscillation.



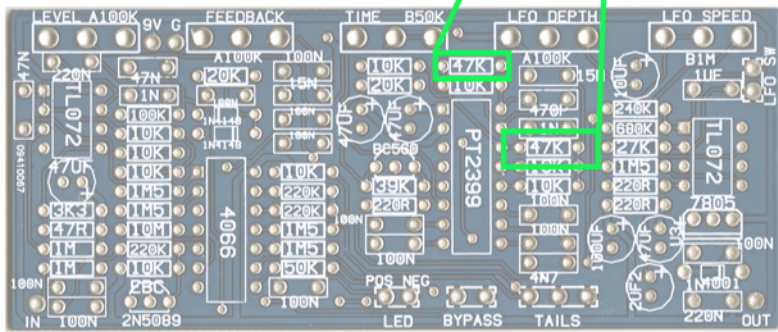
Step two: 1n4148/1n914



Humbucker-friendly mod:

Some builders found that the EB was distorting when using guitars with humbuckers or other hot signals. Replacing these 47k resistors with 22k should fix the problem.

Replace these two 47k resistors with 22k resistors.



LFO Waveshape mod:

This lets you morph the LFO from the stock triangle (smooth and vibrato-y) to a square wave (hard and pitch-shifty).

Step one:
remove/don't fill this
240k resistor.

