Tremolo Device

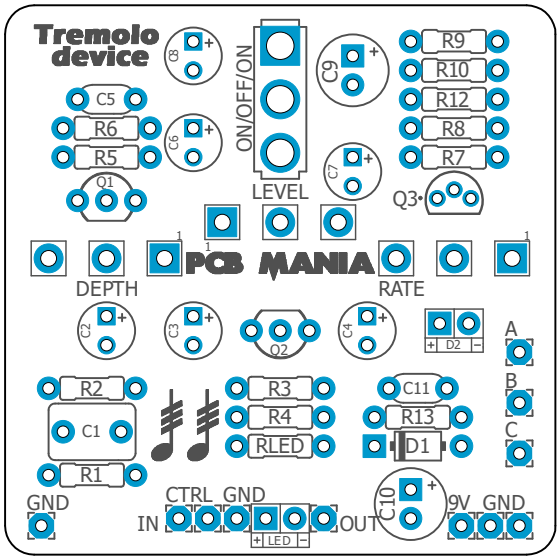
Based on:
EQD Hummingbird
Effect type:
Vintage voiced reverb
Build difficult:
Average

Amount of parts:
Low, total 26 components
Technology:
Jfet Buffer + pickup simulator in front of a fuzz Silicon Fuzz face
Power consumption:
9V(9mA)

Enclosure type:
1590b
Get your board at:
Tremolo Device
Get your kit at:
Das Musikding (Europe)

Project overview:

Based on EQD Hummingbird is a choppy, sawtooth tremolo modeled on the vintage “repeat percussion” capable of producing everything from classic “50’s style” shimmering tremolo to a synthy, delay-like chop that turns your signal into a burst of short pings and on through to near ring modulation.
Features the possibly of plug it to an expression pedal, and an optional Rate LED-diode that can turn this EQD based pedal into the DBA territory!



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Introduction

The people from EQD revisted another classic forgotten pedal as is the Vox Repeat Percussion Tremolo, adding volume and depth control, plus the rate mod toggle that switch in between capacitors altering the behavior of the tremolo.

They also included the possibility of controlling the Rate with an external pedal.

For this layout we have made a deep analysis on both circuits, the Vox and EQD version in order to deliver the best possible version of it.
Both version features originally a **2N2646** transistor for the tremolo section, however as this part is often hard to source we made a little adaptation to work with the modern **2N6027.**
We have also included an external LED that follows the Rate speed, bellow on the section of components recommendation we explain further the proper functionality of this.
We also took in consideration the reports of many pedal builders about this project on different forums across the web where they were reporting a constant issue, the ticking of the LFO louder than the tremolo effect itself. To deal with this we included a power filtering resistor, and also replaced the low gain wn3904 for a high gain 2n5089 transistors.

Controls

- Depth
- Level
- Rate
- Rate mode Switch

Bill of materials

Resistors	
Part	**Value**
R1	2M2
R2	47K
R3	12K
R4	22K
R5	47K
R6	220K
R7	27K
R8	100R
R9	470R
R10	2K2
R12	**2K2***
R13	470R
RLED	4K7

Capacitors	
Part	**Value**
C1	1u
C5	220n
C11	100n

Electrolytics Capacitors	
Part	**Value**
C2	1u
C3	4u7
C4	2u2
C6	1u
C7	2u2
C8	10u
C9	100u
C10	100u

Potentiometers	
Part	**Value**
DEPTH	B50K
LEVEL	B100K
RATE	B100K

Switches	
Switch	Spdt on off on

Transistors	
Part	**Value**
Q1	2N5089
Q2	**PF5102*** **
Q3	**2N6027***

Diodes	
Part	**Value**
D1	1n5817
D2	**3mm LED****
LED	3mm LED

Shopping list

Resistors		
Qty	**Value**	**Parts**
1	100R	R8
1	12K	R3
1	220K	R6
1	22K	R4
1	27K	R7
2	2K2	R10, R12
1	2M2	R1
2	470R	R9, R13
2	47K	R2, R5
1	4K7	RLED

Capacitors		
Qty	**Value**	**Parts**
1	100n	C11
1	1u	C1
1	220n	C5

Electrolytics Capacitors		
Qty	**Value**	**Parts**
2	100u	C9, C10
1	10u	C8
2	1u	C2, C6
2	2u2	C4, C7
1	4u7	C3

Potentiometers		
Qty	**Value**	**Parts**
2	B100K	LEVEL, RATE
1	B50K	DEPTH

Transistors		
Qty	**Value**	**Parts**
1	2N5089	Q1
1	**2N6027***	**Q3**
1	**PF5102*****	**Q2**

Switches		
1	SPDT ON-OFF-ON	

Diods		
Qty	**Value**	**Parts**
1	1n5817	D1
1	3mm LED	LED (Status)
1	**3mm LED****	**D2 (Rate)**

Components Recommendations

As many people like to experiment some pedals with higher voltage, always ensure the max tolerance of your **electrolytic capacitors** is over 25v.

This board has been tested using Film box capacitors for most of the values over 1nf, and ceramics discs for the ones under 1nf. However, high quality components such as Wima's Capacitors and Panasonic's electrolytics can deliver a better performance.

All the resistors used for testing this project are 1/4W Metal Film.

The BOM and Shopping list are exclusively regarding this project. It doesn't include all the hardware like the 3PDT bypass switch, audio/dc jacks, enclosure, etc.

2N6027-R12* 2N6027 is a uni-junction transistor in charge of controlling the tremolo effect. On the original unit this transistor is actually an old discontinued **2N2646**, if you want to try it out on this circuit you must leave **R12 unpopulated.**

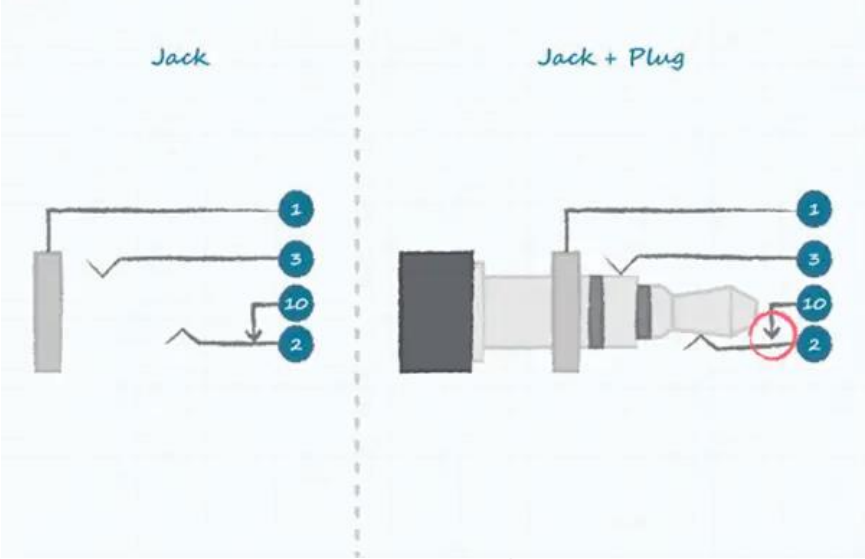
D2- RATE LED** We have included a rate led indicator to have a visual perspective on how the LFO is affecting the tremolo, however this LED can not only add color to the tone but also totally change the behavior of tremolo rate. A nice experiment will be to set a switch to select in between different diodes and compare their behavior. Also you can try other diodes, like the classic 1N4148 or a germanium one.

PF5102*** is a JFET that shares the same pinout and functionality as a 2n5457 or J201. Either of them could work for as a replacement.

A-B-C Pads This pads have been included in this desisgn with the idea of adding the possibility of controlling the rate with an external expression pedal. In order to have this pedal working properly without the expression jack **you MUST place a jumper connecting the pads B and C.**

External Expression Control

To make this mod as it's present on the original EQD you'll need a three-conductor audio jack with tip switch. Basically a stereo switch with an additional tip as we can see on this diagram to the right.



This jack allow us to have the pedal fully working with or without the expression pedal plugged in

Match the Pads A, B and C from the pcb with the tips of the jacks as is number on the diagram

- Terminal 1 to GND
- Terminal 2 to PAD C
- Terminal 3 to PAD A
- Terminal 10 to PAD B

As you can see on the Diagram the key its to have PAD B and PAD C closed, whether this is by a jumper or by the tip touching the connectors (10 and 2). When the Jack is connected this will be bypassed and the expression would be in control of the external pedal.
Remember you must use an stereo jack for the cable, and its up to the expression pedal you are using and it's own internal wiring, if you should split the stereo jack into two mono cables or to keep it as a stereo one. If the expression pedal uses just one stereo connector make sure which tip represents the 'IN' and 'Out' of it.

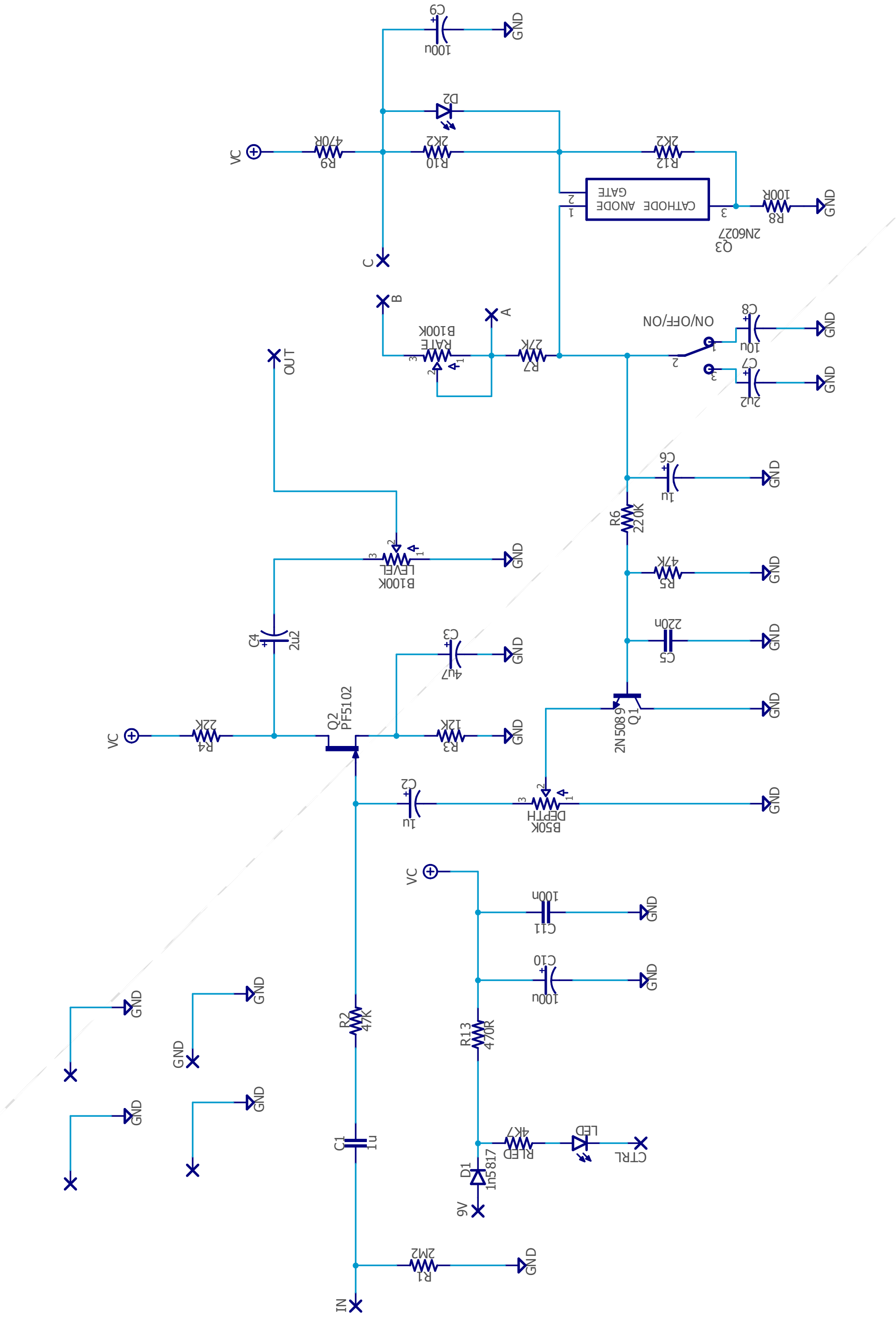
Build Notes

If this is one of your first projects I recommend you to take a look on our Pedal Building Guide

For a successful and tidy build it's recommended the following order:

1. Resistors & diodes
2. Capacitors, starting with the smaller ones and the ceramic ones.
3. Electrolytic capacitors (always check the polarity)
4. Transistors
5. Wires
6. Potentiometers and switches
7. Off board wiring

Schematic


VC
GND
IN
OUT
9V
CTRL
LED
A
B
C
ON/OFF/ON
RATE
B100K
LEVEL
B100K
DEPTH
B50K
CATHODE ANODE
GATE
2N6027
Q3
2N5089
Q1
PF5102
Q2
1n5817
D1

Wiring Diagram

All our projects include a free 3PDT Board to make the wiring easier and tidier. Also all of our PCBs feature the status LED on board.

The pad named “Ctrl” or “LED” is the one that controls the status of the led, wire it to the “LED”pad on the 3PDT board, or in control slug of your 3PDT.

This board has been designed to match our EZ 3PDT PCB check it here to access to our Pedal Wiring Guide

Drill Template

This Project has been planned to fit into a 1590bb enclosure type.

Check the Attached “Drilling templates” to drill the box properly. The files are on Scale 1:1, ready to print in an A4 page.

Licensing and Usage

We really appreciate your trust and support buying this PCB, as well as your will to dive into the DIY electronics world. That’s why for us is really important that you can make this project work properly and to enjoy not only the building process, but also to experiment and play with it on your rig.

We try to reply to every question we receive on our email or in our social media, but we try to encourage all our customers to join our PCB Guitar Mania – Builders Group on Facebook, in order to post all your doubts, issues, suggestions or request, as well to share your builds and have some feedback from us and other fellow builders!

All of our projects have been tested following this same guide on their standard configurations. Although, not all of the variations and mods have necessarily been tested. These are suggestions based on the schematic analysis, and on the experiences and opinions of others. Feel free to share with us your opinions and suggestions regarding the mods your own personal experimentation.

These boards may be used for commercial endeavors in any quantity unless specifically noted. No attribution is necessary, though accreditation or a link back is always greatly appreciated.

If you are a builder planning to make your own run of pedals we also offer the service of custom made boards with your brand and logo, design according your specifications.

The only usage restrictions are that, first, you cannot resell the PCB as part of a kit without prior arrangement with us, and second, you cannot scratch off the silk screen, or other way of trying to hide our logos and the source of the PCBs. Like it’s written above, if you want to have your own designs, with your brand and logo we could certainly reach an agreement.

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