

# Hatto

**Based on:**  
PCB Guitar Mania's  
original design

**Effect type:**  
Tap tempo tremolo

**Build difficult:**  
Advanced

**Amount of parts:**  
High, 84 components

**Technology:**  
8 waveform tap tempo LFO with  
multiplier and wave distortion  
features

**Power consumption:**  
9V

**Enclosure type:**  
1590bb

**Get your board at:**

[Hatto](#)

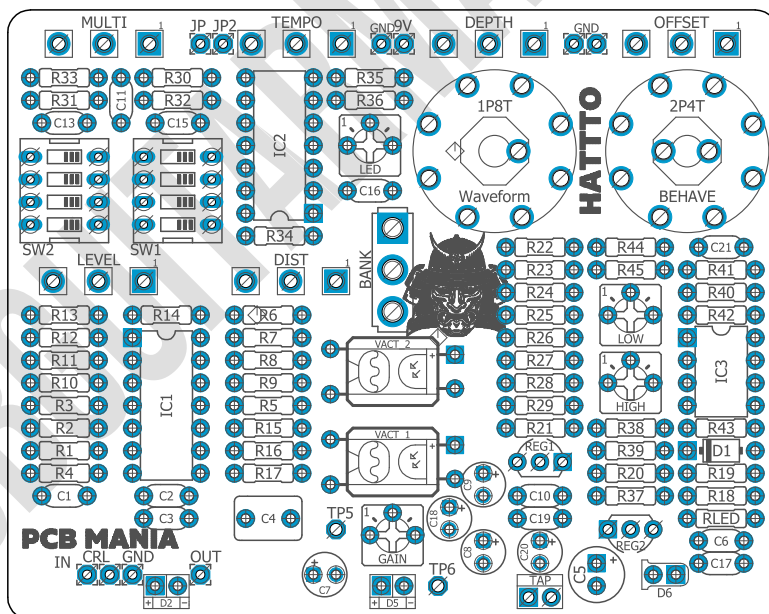
**Get your kit at:**

[Das Musikding \(Europe\)](#)

## Project overview:

HATTO (harmonic tap tempo tremolo) is an original design by PCB Guitar Mania.

We wanted to create the ultimate tremolo, and let me tell you, we are proud of how this circuit turned out!



# Index

---

- |                                   |                         |
|-----------------------------------|-------------------------|
| 1. Project overview               | 6. Build Notes          |
| 2. Index, Introduction & Controls | 7. Schematic            |
| 3. Bills of Materials, BOM        | 8. Wiring Diagram       |
| 4. Shopping Lists                 | 9. Drill Template       |
| 5. Components Recommendations     | 10. Licensing and Usage |

## Introduction

---

We studied all the most common tremolos on the market and selected the best fragments of each one to make our version. We also added the tap tempo function and the ability to choose different types of waveforms to ensure tons of versatility and tonal control.

HATTO is the most versatile and ambitious tremolo of all, and we can't wait for you to give it a try.

## Controls

---

### *Potentiometers*

- Depth
- Dist
- Level Multi
- Offset
- Tempo

### *Switches*

- SW1
- Waveform
- Behave
- Bank

# Bill of materials

| Resistors |       |
|-----------|-------|
| Part      | Value |
| R1        | 1M    |
| R2        | 10K   |
| R3        | 1M    |
| R4        | 1K    |
| R5        | 5.1K  |
| R6        | 9.1K  |
| R7        | 13K   |
| R8        | 20K   |
| R9        | 30K   |
| R10       | 9.1K  |
| R11       | 13K   |
| R12       | 20K   |
| R13       | 30K   |
| R14       | 5.1K  |
| R15       | 1K    |
| R16       | 1K    |
| R17       | 1K    |
| R18       | 100k  |
| R19       | 100k  |
| R20       | 100R  |
| R21       | 4K7   |
| R22       | 4K7   |
| R23       | 10K   |
| R24       | 10K   |
| R25       | 10K   |
| R26       | 10K   |
| R27       | 10K   |
| R28       | 10K   |
| R29       | 10K   |
| R30       | 1K    |
| R31       | 1K    |
| R32       | 1K    |
| R33       | 4K7   |
| R34       | 1K    |
| R35****   | 1K    |
| R36       | 10K   |
| R37       | 100R  |
| R38       | 100K  |
| R39       | 100K  |
| R40       | 10K   |

|      |      |
|------|------|
| R41  | 10K  |
| R42  | 10K  |
| R43  | 10K  |
| R44  | 100R |
| R45  | 100R |
| RLED | 4K7  |

| Capacitors |       |
|------------|-------|
| Part       | Value |
| C1         | 100n  |
| C2         | 22n   |
| C3         | 22n   |
| C4         | 1u    |
| C6         | 100n  |
| C10        | 100n  |
| C11        | 100n  |
| C13        | 100n  |
| C15        | 100n  |
| C16        | 100n  |
| C17        | 100n  |
| C19        | 100n  |
| C21        | 100n  |

| Electrolytic Capacitors |       |
|-------------------------|-------|
| Part                    | Value |
| C5                      | 100u  |
| C7                      | 10u   |
| C8                      | 10u   |
| C9                      | 10u   |
| C18                     | 100u  |
| C20                     | 47u   |

| Potentiometers |       |
|----------------|-------|
| Part           | Value |
| DEPTH          | B10K  |
| DIST           | B10K  |
| LEVEL          | A500K |
| MULTI          | B10K  |
| OFFSET         | B25K  |
| TEMPO          | B10K  |

| Trim pots |       |
|-----------|-------|
| Part      | Value |
| GAIN      | 100K  |
| HIGH      | 5K    |
| LED       | 10K   |
| LOW       | 5K    |

| IC   |                          |
|------|--------------------------|
| Part | Value                    |
| IC1  | TL074                    |
| IC2  | <a href="#">TAPLFO3*</a> |
| IC3  | TL072                    |

| Switches   |                   |
|------------|-------------------|
| Part       | Value             |
| SW1        | DIP<br>4PDT***    |
| SW2        | DIP<br>4PDT***    |
| Footswitch | SPDT<br>momentary |
| Waveform   | Rotary<br>1P8T    |

|        |                |
|--------|----------------|
| Behave | Rotary<br>2P4T |
| Bank   | On-On          |

| Regulators |        |
|------------|--------|
| Part       | Value  |
| Reg1       | L78L05 |
| Reg2       | L78L05 |

| Photocoupler |          |
|--------------|----------|
| Part         | Value    |
| VACT_1       | VTL5C2** |
| VACT_2       | VTL5C2** |

| Diods |             |
|-------|-------------|
| Part  | Value       |
| D1    | 1N5817      |
| D2    | 3mm red LED |
| D5    | 3mm red LED |
| D6    | 3mm red LED |

# Shopping list

| Resistors |       |  |
|-----------|-------|--|
| Qty       | Value | Parts  |
| 2         | 100K  | R38, R39   |
| 4         | 100R  | R20, R37, R44, R45   |
| 2         | 100k  | R18, R19   |
| 13        | 10K   | R2, R23, R24, R25, R26, R27, R28, R29, R36, R40, R41, R42, R43 |
| 2         | 13K   | R7, R11  |
| 9         | 1K    | R4, R15, R16, R17, R30, R31, R32, R34, R35****                 |
| 2         | 1M    | R1, R3   |
| 2         | 20K   | R8, R12  |
| 2         | 30K   | R9, R13  |
| 4         | 4K7   | R21, R22, R33, RLED  |
| 2         | 5.1K  | R5, R14  |
| 2         | 9.1K  | R6, R10  |

| Capacitors |       |  |
|------------|-------|--|
| Qty        | Value | Parts  |
| 10         | 100n  | C1, C6, C10, C11, C13, C15, C16, C17, C19, C21 |
| 1          | 1u    | C4   |
| 2          | 22n   | C2, C3   |

| Electrolytics Capacitors |       |            |
|--------------------------|-------|------------|
| Qty                      | Value | Parts      |
| 1                        | 100u  | C18        |
| 1                        | 100u  | C5         |
| 3                        | 10u   | C7, C8, C9 |
| 1                        | 47u   | C20        |

| Potentiometers |       |                           |
|----------------|-------|---------------------------|
| Qty            | Value | Parts                     |
| 1              | A500K | LEVEL                     |
| 4              | B10K  | DEPTH, DIST, MULTI, TEMPO |
| 1              | B25K  | OFFSET                    |

| Trim pots |       |           |
|-----------|-------|-----------|
| Qty       | Value | Parts     |
| 1         | 100K  | GAIN      |
| 1         | 10K   | LED       |
| 2         | 5K    | HIGH, LOW |

| IC  |          |       |
|-----|----------|-------|
| Qty | Value    | Parts |
| 1   | TAPLFO3* | IC2   |
| 1   | TL072    | IC3   |
| 1   | TL074    | IC1   |

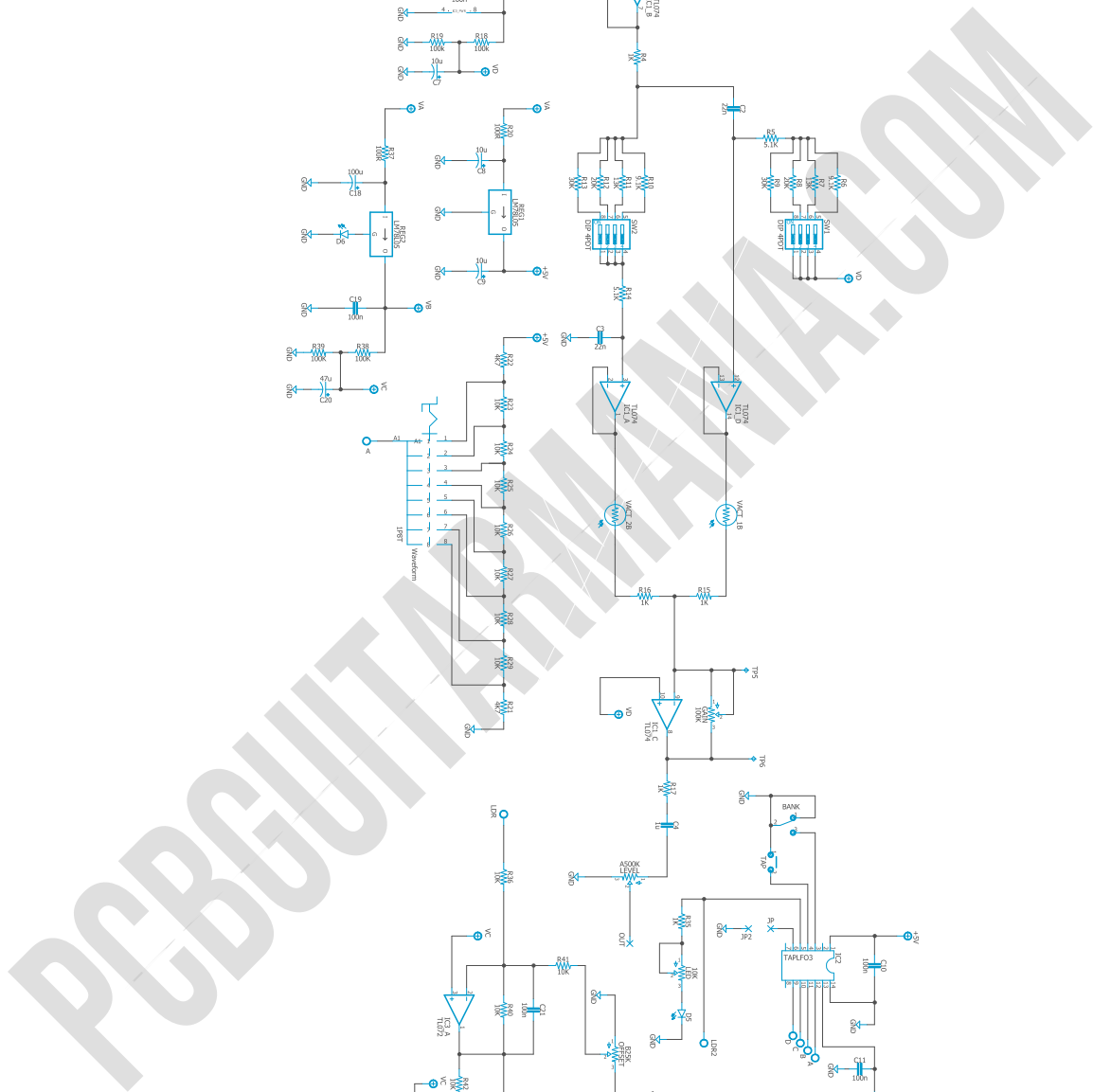
| Switches |                |            |
|----------|----------------|------------|
| Qty      | Value          | Parts      |
| 2        | DIP 4PDT***    | SW1, SW2   |
| 1        | SPDT momentary | Footswitch |
| 1        | Rotary 1P8T    | Waveform   |
| 1        | Rotary 2P4T    | Behave     |
| 1        | On-On          | Bank       |

| Regulators |        |            |
|------------|--------|------------|
| Qty        | Value  | Parts      |
| 2          | L78L05 | Reg1, Reg2 |

| Diodes |             |            |
|--------|-------------|------------|
| Qty    | Value       | Parts      |
| 1      | 1N5817      | D1         |
| 3      | 3mm red LED | D2, D5, D6 |

| Photocoupler |          |                |
|--------------|----------|----------------|
| Qty          | Value    | Parts          |
| 2            | VTL5C2** | VACT_1, VACT_2 |

## Schematic



# Components Recommendations

---

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

This board has been tested using Film box capacitors for most of the values over 1nf and ceramics discs for those 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 exclusive regarding this project. It doesn't include all the hardware like the 3PDT bypass switch, audio/dc jacks, enclosure, etc.

## Build Notes

---

If this is one of your first projects, I recommend you to take a look at 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

### TAPLFO3\*

You can find this IC in [Electric Druid components](#).

### VTL5C2\*\*

Instead of the vactrol, you can place a photoresist + 5mm yellow LED diffused.

### DIP 4PDT\*\*\*



#### R35\*\*\*\*

A 90-100ohm resistor is better suited for diffused LEDs.

## 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 the control slug of your 3PDT.

This board has been designed to match our EZ 3PDT PCB; check it [here](#) to access 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 on an A4 page.

## Licensing and Usage

---

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

We try to reply to every question we receive on our email or our social media. Still, we try to encourage all our customers to join our [PCB Guitar Mania – Builders Group](#) on Facebook to post all your doubts, issues, suggestions, or requests, share your builds, and have some feedback from other fellow builders and us!

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

These boards may be used for commercial endeavors in any quantity unless expressly noted. No attribution is necessary, though accreditation or a link back is always much 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 to 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 silkscreen 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 designs with your brand and logo, we could undoubtedly reach an agreement.

Follow us on [Instagram](#) and [Facebook](#) to stay in tune with the latest projects!

PCBGUITARMANIA.COM