

Germanium Percolator

Based on:
Harmonic Percolator

Effect type:
Germanium Fuzz

Build difficult:
Beginner

Amount of parts:
Low, total 23 components

Technology:
NOS 2N404 Germanium
2N3565 Silicon

Power consumption:
23mA (9v)

Enclosure type:
1590b

Get your board at:
[Germanium Percolator](#)

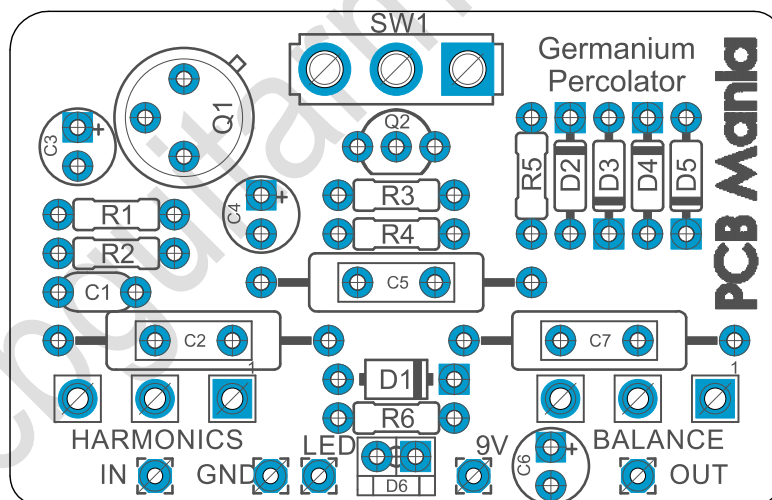
Get your kit at:
[Das Musikding \(Europe\)](#)

Project overview:

The Germanium Percolator is our take on one of the most famous and mysterious fuzzes, the InterFax HP-1 Harmonic Percolator.

The Percolator does not have one “stock” design, an original version. There are reports of people tracing different units and finding slightly different values in between each other.

With this board you will be able to build two different versions of this project, “The Stock” version based on the analysis of many different schematics of the original Percolator, and the “Albini” version, popularized by the famous guitarist/producer, Steve Albini.



Real measures are:

50.70mm width x 32.30mm height

2.00" width x 1.27" height

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Introduction

The original Percolator was designed in Milwaukee Wisconsin in the 1970's as an original circuit not based on anything previously available on that era.

With silicon NPN transistor and a germanium PNP transistor, the circuit passes even order harmonics while suppressing odd order harmonics. These even order harmonics are more pleasing to the ear than odd order harmonics.

This board allows you to build two different versions of the same pedal:

- The Stock version is much more wild, raw, and hard to control. It delivers an over-compressed sound. Also is more prominent to be noisy than the Albin version.
- The Albin version is smoother and more controlled, reminds to an aggressive Fuzz Face with unique characteristics. When the Harmonic knob is all the way up, it can get really compressed as well

This version features an additional toggle switch to select in between the stock diodes and some extra of your choice. You can play around with some 3mm Red leds for a louder sound and less compressed drive, or with some other germanium diodes for a compressed and creamy tone.

There's no definitive ideal hFE for the Germanium 2N404 in the circuit, but based on our experience with the circuit, anything between 40-60 sounds great - nice and crunchy with plenty of focus. As the gain gets higher it gets a little unruly and gets some noise, at this point it also starts to get the microphonic behavior that can be a real interesting tool.

As the 2N404 is almost unobtainable we are currently testing with some other germanium alternatives. The results will be published on the next update of the docs.

Controls

- **Balance:** This controls the output level of the pedal. It works just like the volume knob on your guitar or your amp.
- **Harmonics:** Is the input gain or distortion control, at the same time controls the Harmonics response.
- **Diode Switch:** Select between the stock 1n695 and your choice of clipping diodes

Bill of materials

Resistors		
Part	Value	
	Albini	Stock
R1	51k	220k
R2	91k	20k
R3	3m9	750k
R4	91k	91k
R5	4k7	4k7
R6	4k7	4k7

Diodes		
Part	Value	
	Albini	Stock
D1	1n4001	1n4001
D2	1n695	1n695
D3	1n695	1n695
D4	your choice	your choice
D5	your choice	your choice
D6	3mm led	3mm led

Potentiometers		
Part	Value	
	BALANCE	50k A
HARMONICS	100k A	100k A

Capacitors		
Part	Value	
	Albini	Stock
C1	100pf	100pf
C2	50nf	50nf
C3	47uf	47uf
C4	2.2uf	1uf
C5	1n5	1n
C6	47uf	47uf
C7	100n	100n

Transistors		
Part	Value	
	Q1	2N404a
Q2	2N3965	2N3965

Switches	
Part	Value
SW	SPDT ON-OFF-ON

Shopping list

Resistors		
Qty	Value	Device
1	3m9	R3
2	4k7	R5, R6
1	51k	R1
2	91k	R2, R4
1	220k	R1
1	20k	R2
1	750k	R3

Potentiometers		
Qty	Value	Device
1	100k A	HARMONICS
1	50k A	BALANCE

Transistors		
Qty	Value	Device
1	2N3965	Q2
1	2N404a	Q1

Capacitors		
Qty	Value	Device
1	100n	C7
1	100pf	C1
1	1n5	C5
1	2.2uf	C4
2	47uf	C3, C6
1	50nf	C2
1	1nf	C5
1	1uf	C4

Diodes		
Qty	Value	Device
1	3mm led	D6
1	1n4001	D1
2	your choice	D4, D5
2	1n695	D2, D3

This Shopping list includes all the parts to do any of the possible versions of this pedal.

Switches		
Qty	Value	Device
1	SPDT ON-OFF-ON	

Components Recommendations

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.

For the capacitors we have place extra large pads so you can fit some vintage axial caps on those places

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

All the pots are Alpha 16mm.

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.

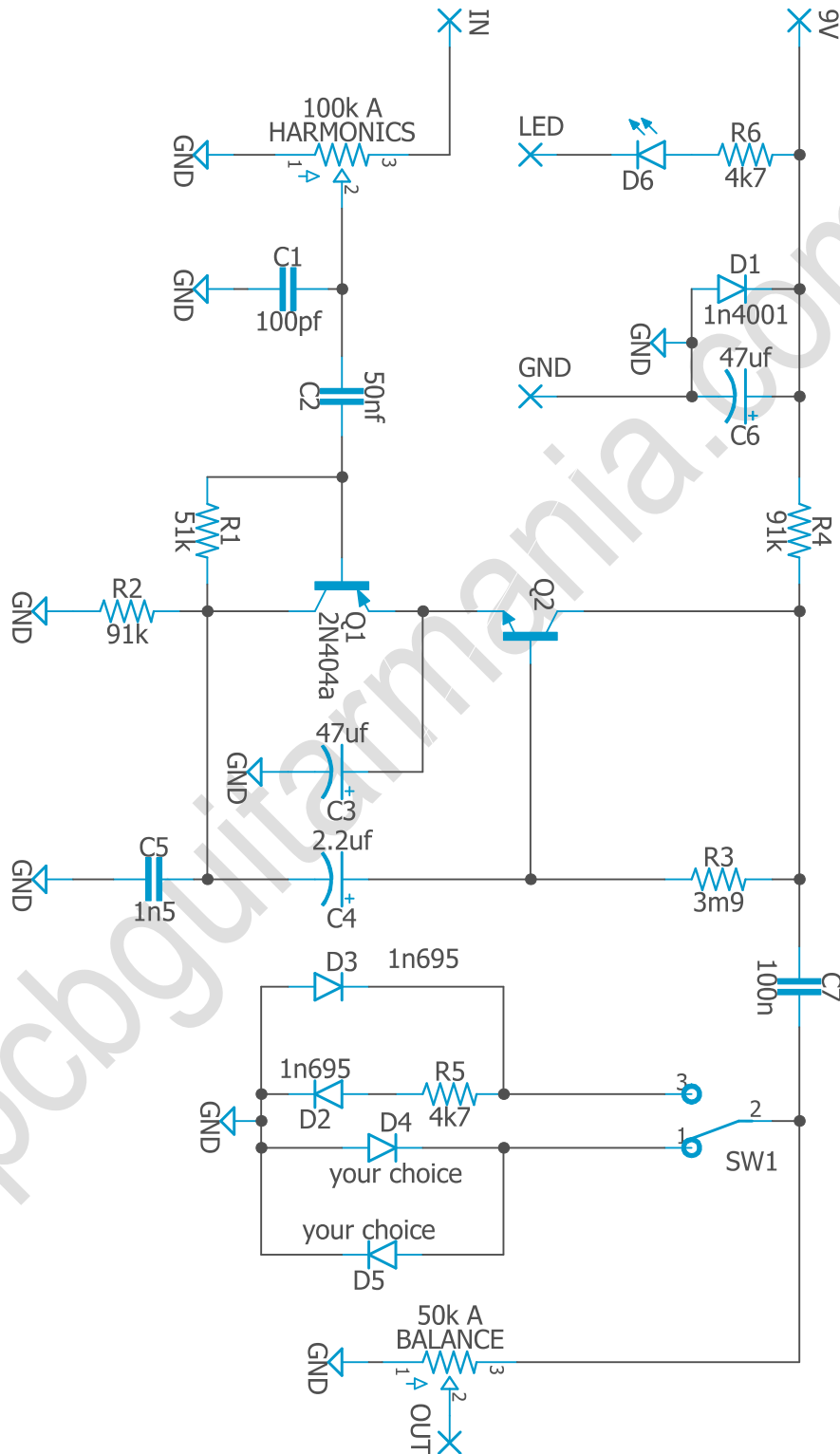
Build Notes

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

Schematic

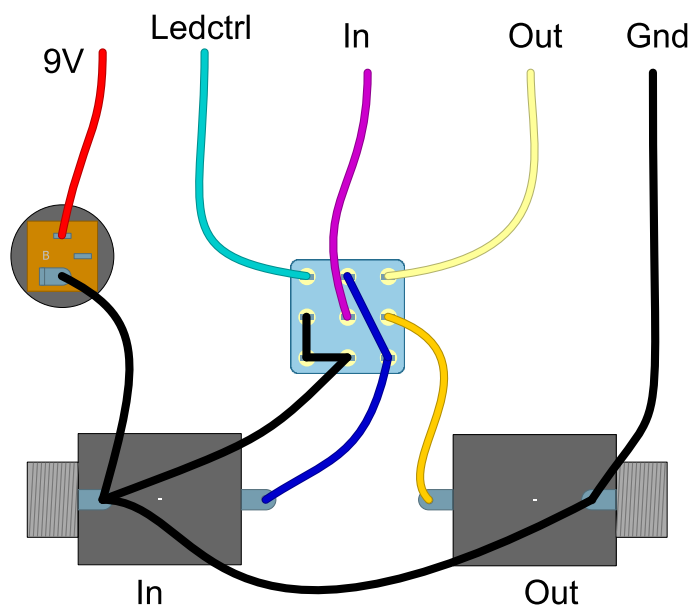


Wiring Diagram

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.

You can take a look on the following diagram to understand the general connections. For further information check our [Pedal Wiring guide](#).



Drill Template

This Project has been planned to fit into a1590b enclosure type

Check the Attached “Drilling templates” to drill the box properly. The files are on Scale 1:1, ready to print in a 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 Grup](#) 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 our 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 its written above, if you want to have your own designs, with your brand and logo we could certainly reach an agreement.

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