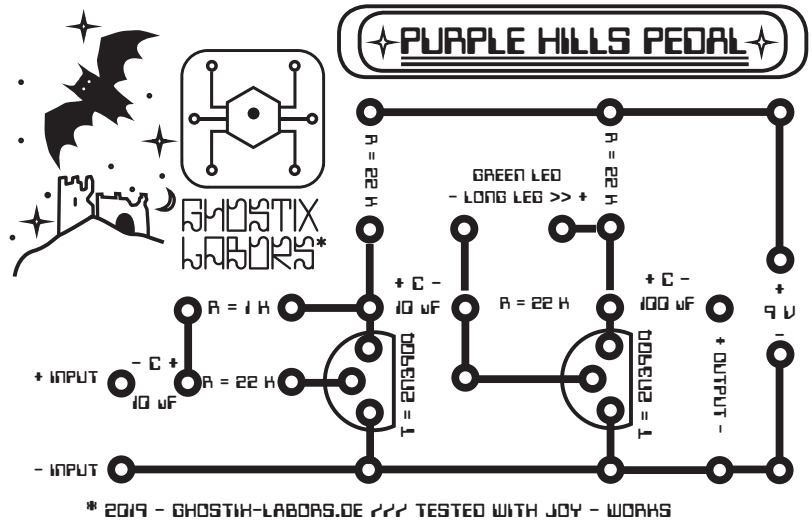
THE LITTE GUIDE TO BUILD "THE CARDBOARD CIRCUIT"



ISSUE 05 /// EFFECT PEDAL & LFO & CV - INPUTS FOR THE ATARI PUNK CONSOLE

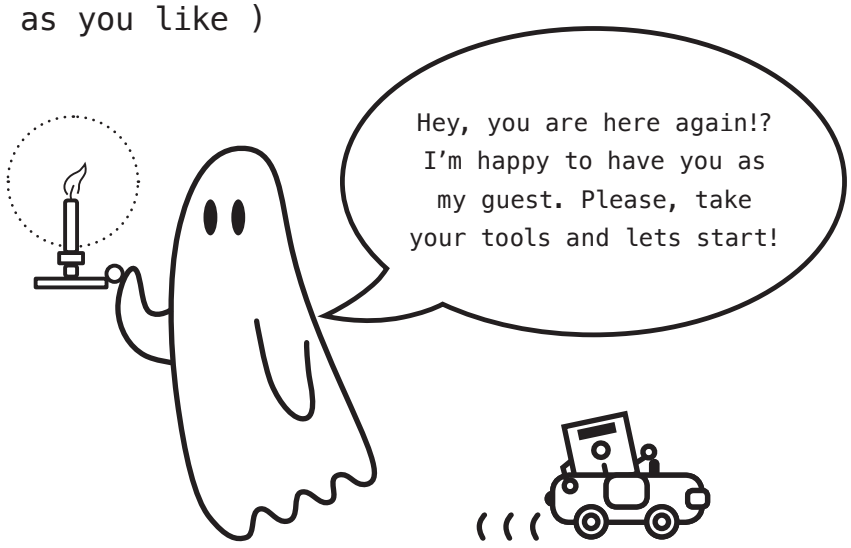
And the nights flew by .... like a dust devil on the surface of Mars.

You know these situations **....** you are gazing at the full moon at night**.** All the streets of your town are empty**.** You are standing at the bus stop and you realize**,** that you have to complain about something**.** Not because of the fact**,** that you are too late and the last bus is already gone**,** but something around may feel strange all the time **....** maybe**,** it's time to start a Punk Band!?

In the last issue**,** we had a look at the construction of an 8 Step Sequencer**.** This time**,** we'll construct a simple guitar pedal**,** which is great**.** No**,** you don't have to be a good guitar player! The only thing you'll need is our well known Atari Punk Console or a Casio keyboard of your choice**.** I found a Casio SA 20 in the basement**,** last week and resurrected it from the dead with a few simple fixes**.** After the test construction**,** I had fun with the pedal in line and I hope it will be a fun factor for you and your friends!

This is the list of parts, **which are needed**, **today**!

2 x audio jacks 6,5 mm (or 3,5 mm for small keyboards)
1 x enclosure metal, plastic or wood
1 x switch 2 x on/on or a normal switch 1 x on/on x 2
1 x LED – Green or Red (as you like)
1 x 1 K Resistor
4 x 22 K Resistor
2 x 2N3904 Transistor
2 x 10 uf capacitor + –
1 x 100 uf capacitor + –
1 x 9 Volt Battery
1 x Battery Holder

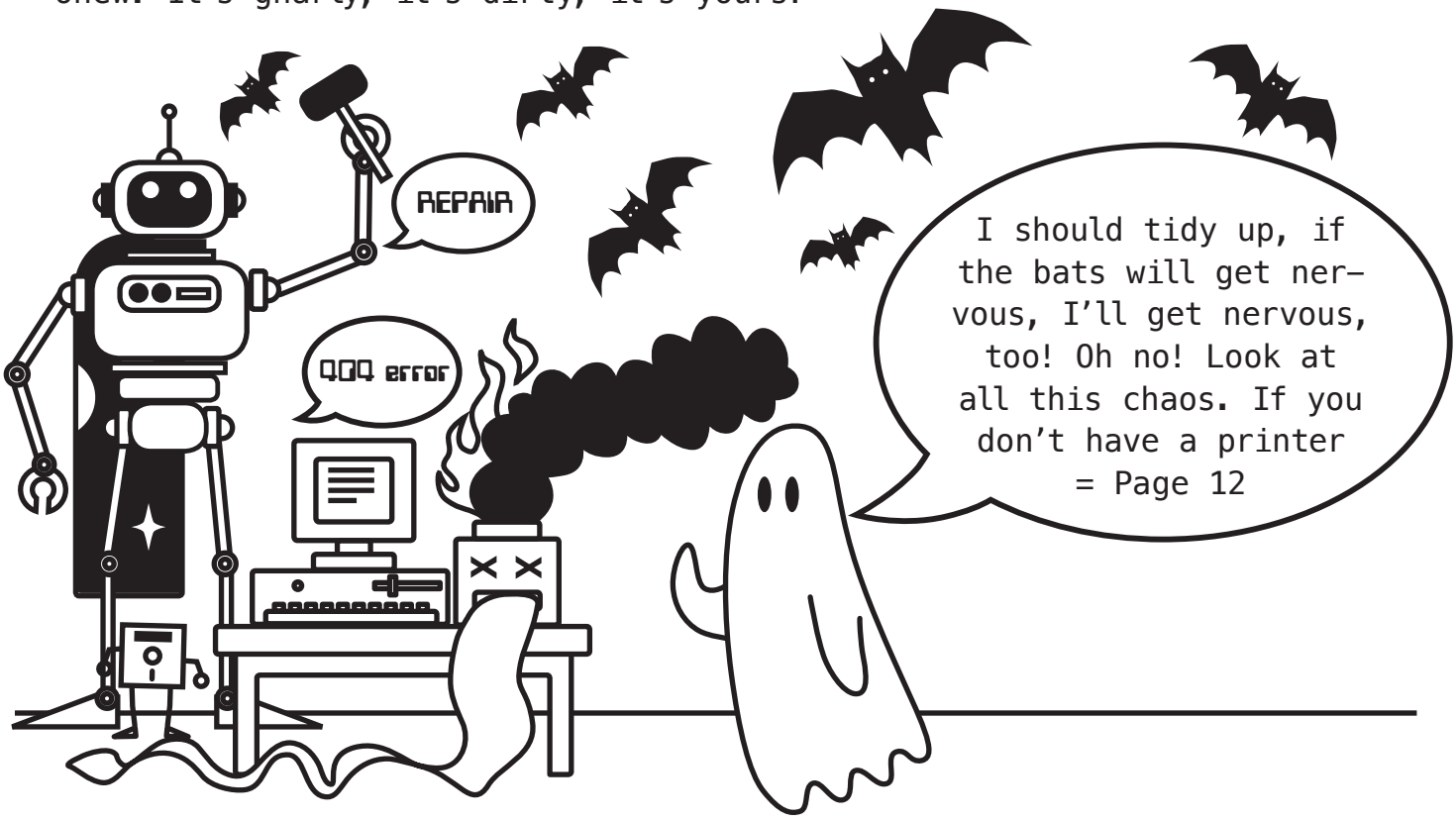


Grab Your basic tools:

1 x Soldering Iron
1 x Solder (Stannol 1 mm Flowtin TSC would be the best choice)
1 x Wire Cutter (scissors if you don't have one)
1 x pliers
1 x printer
1 x one piece of cardboard from the back of your college–block
1 x compasses (or another spiky tool, to poke the holes)
1 x open window /// a well ventilated room
1 x wire (much wire) solid core ///

If you want to build this little circuit, please have a look at issue one, of this small magazine. I did a whole description, how you can build your own cardboard circuits. It’s cheap, good for practise and a good alternative, to test things out, when you have nothing, to etch a circuit.

This circuit was also layouted and tested by me and the prototype was a joy, for several friends, which wanted to test it. So I think everything should go well, again. Just build it together with your friends, because there are four boards on the next page. Or build it as a gift, for a loved onew. It’s gnarly, it’s dirty, it’s yours!



The Start >>>

On the next page, you'll find your circuit. But make sure that your printer settings are correct, before you print this file. Don't stretch the file to 100 % of the A4 format. This is a common option, but these pages are already prepared, and should have the right measurements. There is a small, black cube on the left side, of the following page. This is your control mark and if this cube is 1 cm x 1 cm tall, the diameters of your circuit boards are correct. Your Printer Settings will allow you to print the circuit board only. Feel free to set the preferences to the relevant range. So, if you want only the circuit board, just print out page 4.

>> FOLD

>> FOLD

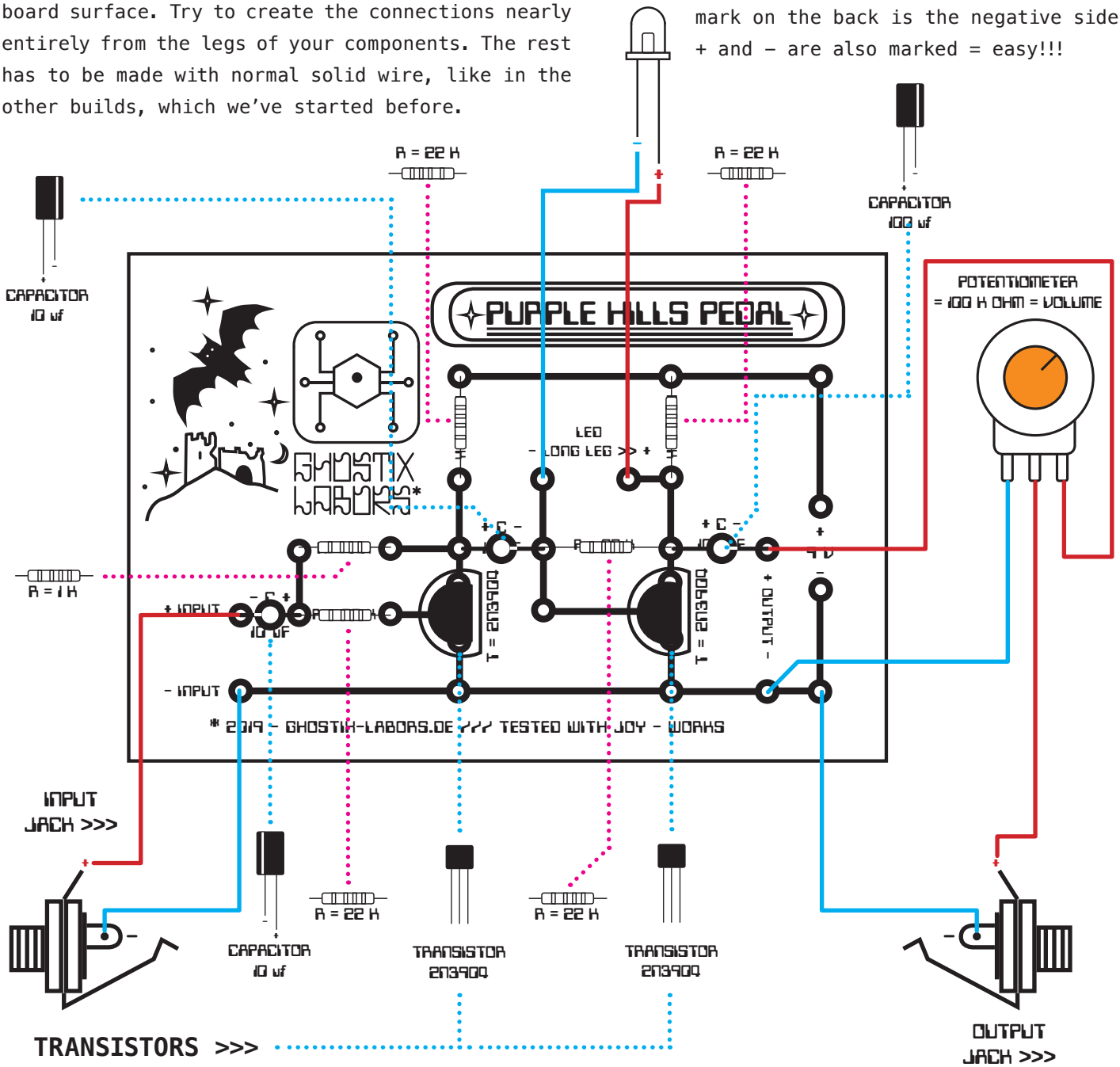
This Black Box has to be 1 cm x 1 cm then you should have the right measurements - to go forward with this print! >>>>>>>

THE PURPLE HILLS BOARD >>>

Let there be Punk and place your parts on the cardboard surface. Try to create the connections nearly entirely from the legs of your components. The rest has to be made with normal solid wire, like in the other builds, which we've started before.

CAPACITORS >>>

Please, have a really close look and mind their orientation. This is very important! The short leg, with the white mark on the back is the negative side. + and – are also marked = easy!!!

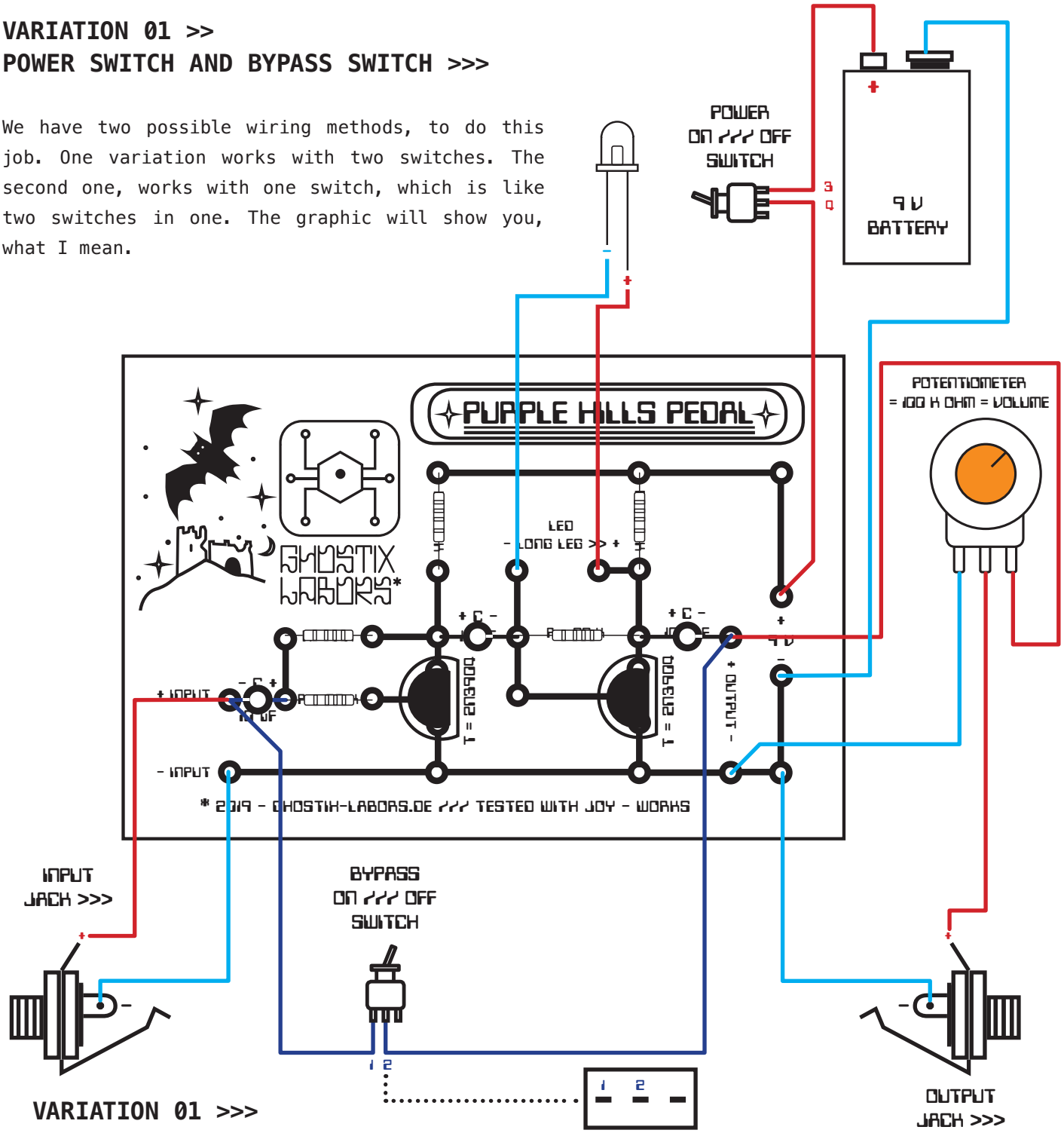


TRANSISTORS >>>

The orientation of the two transistors is directly shown on the surface of our board. The flat side faces to the right. If they are placed in the wrong direction, your project will not work.

VARIATION 01 >>
POWER SWITCH AND BYPASS SWITCH >>>

We have two possible wiring methods, to do this job. One variation works with two switches. The second one, works with one switch, which is like two switches in one. The graphic will show you, what I mean.

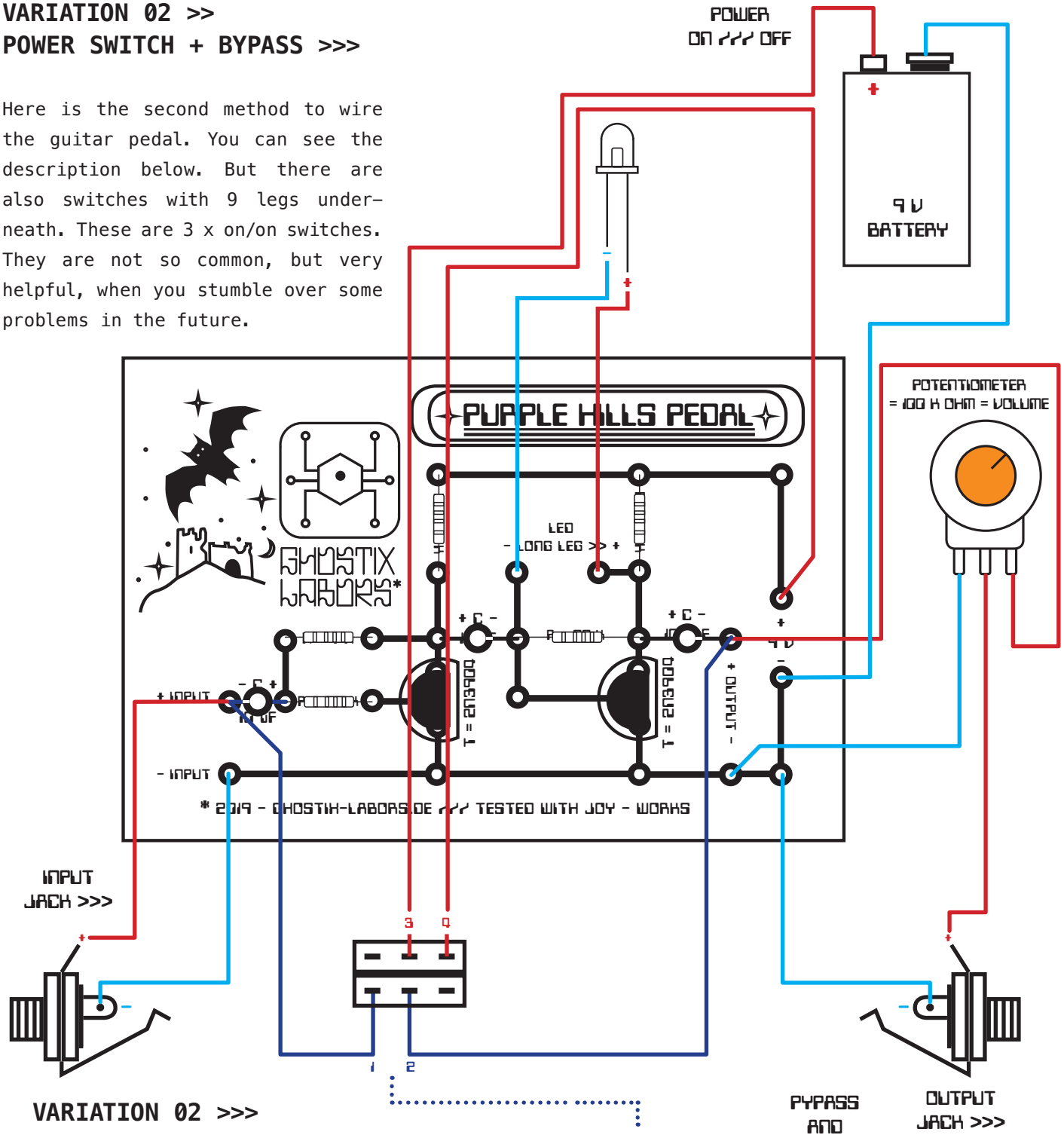


VARIATION 01 >>>

The orientation of the two transistors is directly shown on the surface of our board. The flat side faces to the right. If they are placed in the wrong direction, your project will not work.

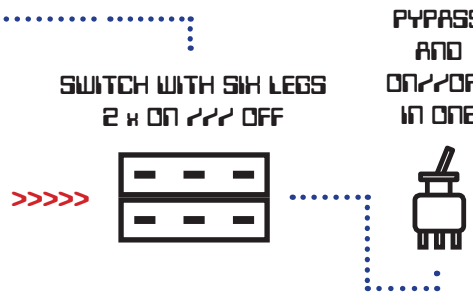
VARIATION 02 >>
POWER SWITCH + BYPASS >>>

Here is the second method to wire the guitar pedal. You can see the description below. But there are also switches with 9 legs underneath. These are 3 x on/on switches. They are not so common, but very helpful, when you stumble over some problems in the future.



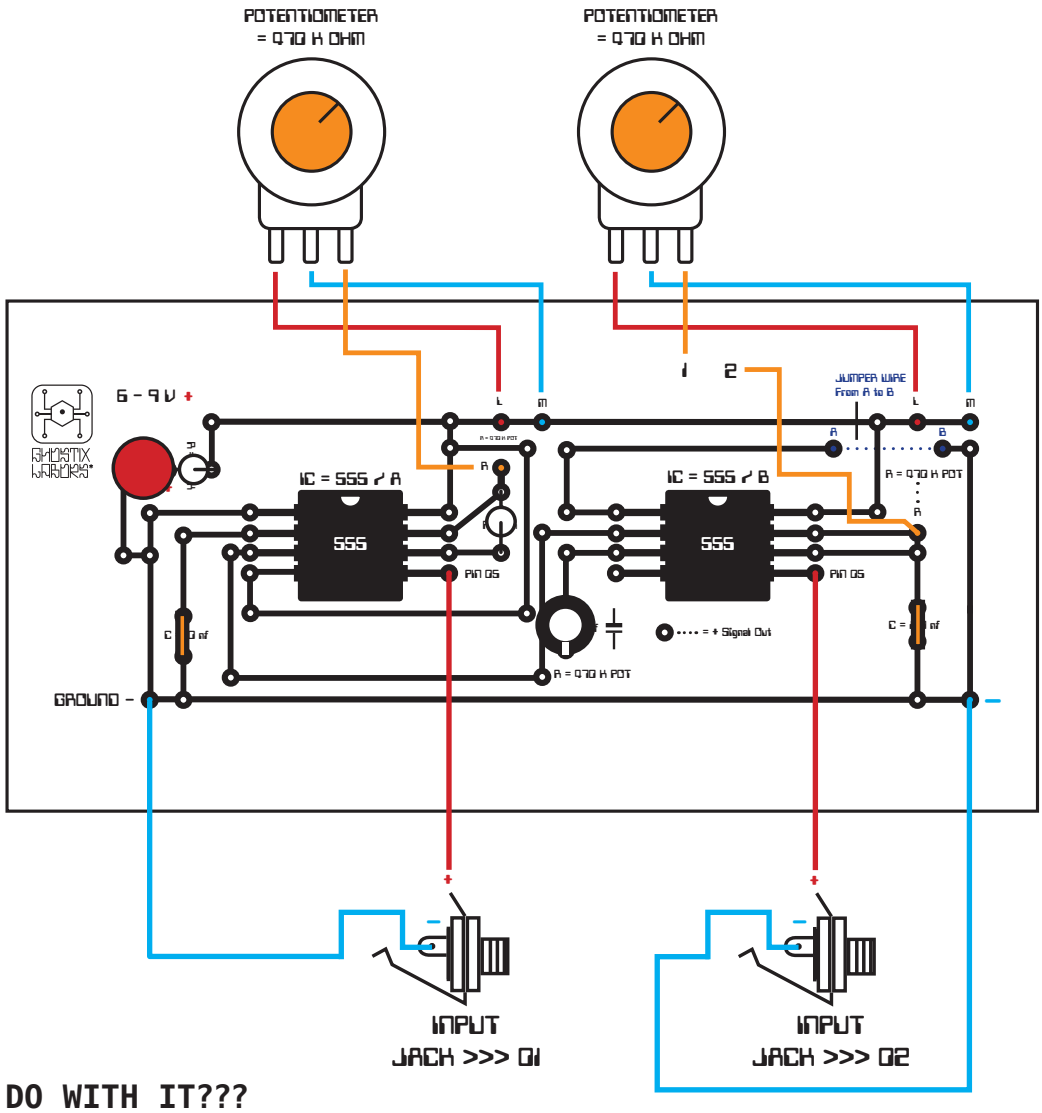
VARIATION 02 >>>

- Controling both functions with only one switch. See the graphic with the switch, seen from underneath. These 6 lines, with the numbers resemble the six legs of the 2 x on/on switch. This is also a method to switch between two functions. If you understand this, you can do more with it!



CONNECTING EXTERNAL CV SIGNALS >>> TO OUR MUTANT ATARI PUNK CONSOLE

This path was long, but we have updated our Punk Console to the maximum. No, there are quite some things, which we didn't implemented, yet. We didn't talk about CV–Signals (Control Voltage Signals), which are common in old analog gear and modern eurorack synthesizers. If we want to use this in case of our Punk Console, we have to add two little extras. Pin 05 of the 555 Timer Chip is marked as "CONTROL" in the data sheet. So lets start with it!



WHAT CAN WE DO WITH IT???

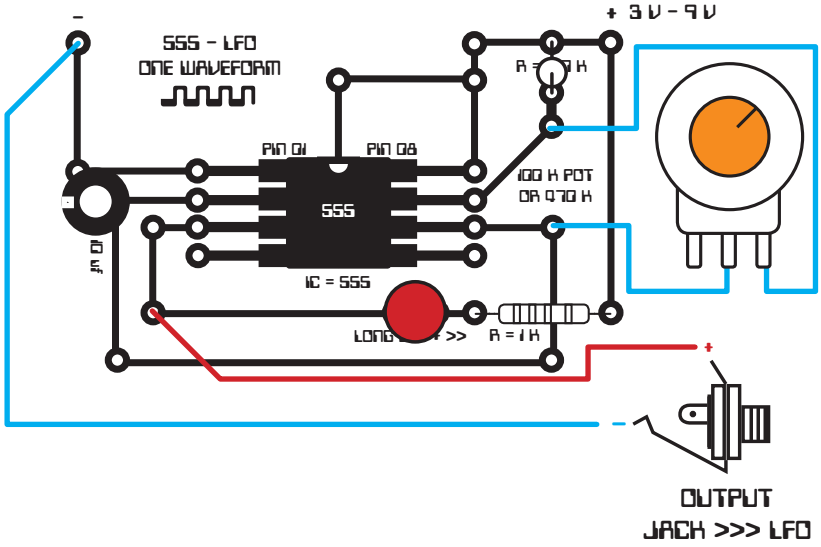
Now, we can use these signal inputs for pitch modulation. You can use one input for another sequencer, from an Eurorack System or you can modulate the pitch, with our little LFO. But there are two IC's on the board, so you can control both at the same time, with different control voltages. But I couldn't test the effect on this machine .... I'll mark the output from this little circuit board on the next page >>>

THE FINISHED MACHINES >>>

I think I'll close this issue for now, because this was enough witchcraft for several days. When you ask me, why our pedal wasn't mentioned at all. I would like to say that you can pair it with anything, which produces sound. The interesting thing about this, and why I included this build in our project, was the side effect, that the pedal makes the sequences of the Atari Punk Console a little bit more grainy, than before. Almost 303 like, but if you want this, then you have to pair the machine with an updated version of our LFO from the first issue. I've marked the trigger out variation in the graphic below!

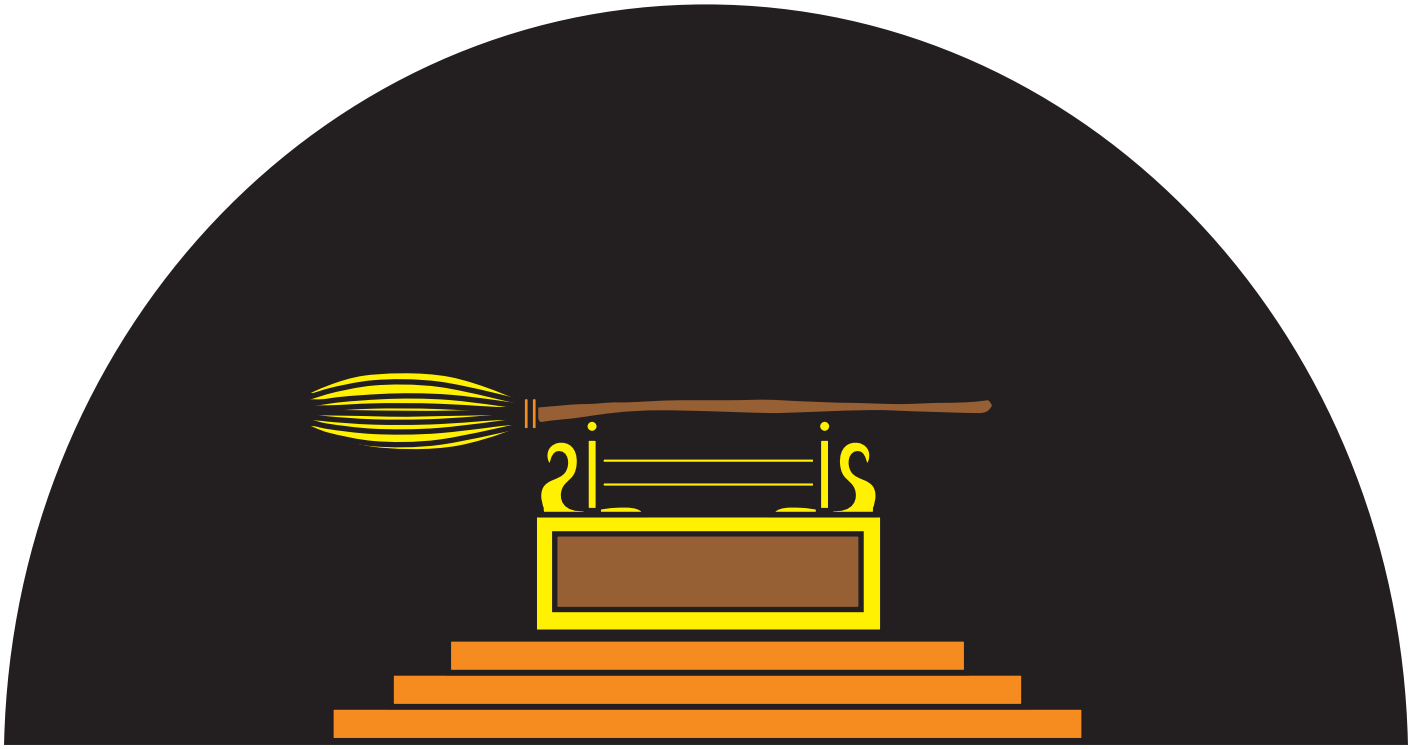
WIRE IT LIKE THIS >>>

If your wiring is done, you can connect the output jack from your LFO to the Pin 05 of our Atari Punk Console, to modulate the oscillator pitch!



THE CASE OF OUR PURPLE HILLS PEDAL >>>

When you are done with your building process of the circuit board. Then it's time to fit everything in a nice enclosure, to keep the circuit safe. May it look cool or awful. All what matters is, that the device is working properly. What counts is, what you want it to look like. Use your fantasy and try to find a proper metal can, a cigar box, a plastic housing or build it yourself. This is up to you. The housing has to be big enough, to provide the necessary room for your components. My tip is, to hold them behind your front panel. This should give you an idea, if your enclosure is the correct one for this purpose. Before you start to drill your holes, you can do the following trick. Take your front panel. Lay it down, on a piece of paper and cut it to the size of the front panel. Now you can create a sketch of your layout in the exact size. The whole design will also work with a foot switch.



What Lotta didn't know .... Somewhere down in the basement ....

"you're always too late ??? Here is the answer – everybody should have one, but there is only one in the entire world!
Here we have the "STORM RIDER" (Trademark) – His tail is made of gold and this broom is also faster than the speed of sound!

Our little ghost didn't only forget which room it was, but he also lost the key over time. (436 years ago)

THE FUNCTIONALITY >>>

The circuit board of the pedal can be placed directly into a synthesizer, as an effect unit. Why not, it is simple and it works. I wanted to talk about the switches again. This is also the reason, why I try to build one, fully functional prototype. If there would be only the power switch, for the pedal, which is also possible, you would have one elementary problem. If you would switch the unit on, everything is fine. But if you would switch it back to off, the sound will go trough the pedal, anyway. The electricity has to pass the two capacitors in line, and this will act as a filter. So the signal will be relatively quiet, in relation to the full signal, when it is switched on. So I can only recommend the bypass variation with one switch. But I would prefer a real metal enclosure and a real foot switch for our pedal .... if this should be one, according to plan.

I hope, everything came out well and works as hell. This was a long trip through our cable jungle. This project needs less components and is a really good thing, to start with. If you would hear a humming in the background of your amplifier, then there is something wrong. I've tested it in many situations, but only one HiFi-System produced this problem. On all the other constellations, everything was very clean. Please mark your input and your output on the front panel. If you would confuse the input with the output, then there would only be a small signal flow. Maybe you'll hear nothing and the LED won't work. So, please make shure to plug it in the right way. I'm tired and I have to sleep, before the sun comes up. Maybe, we'll see us in the next issue!?

/// THE CIRCUIT >>> DRAWN BY HAND

It's no problem, if you don't have a printer. You can draw the circuit on a piece of paper and start from this point. The only problem with this variation is, that your measurements of the IC -Socket has to be correct. Just take a ruler and take the measurements. Draw the part for the IC-Socket and see, if it would fit in. Continue with the connections. The measurements of these are not so important, as long as they don't touch each other or get to close. The rest of the process, is similar, to the printed version. If your first side is drawn, just fold the piece of paper and you can copy the other side through the paper, by holding it to your window.

!!! WARNINGS !!!

If you don't know, what you're doing, just ask your parents, they'll help you out. Otherwise, ask a friend or your science teacher, what to do, at first.

I'm not responsible for any harm, due to the use of the Cardboard Circuits. And I'm not responsible for any machine you'll fry. Make sure, you do the right thing and read my warnings. If you are not familiar with Circuit Bending or soldering , just find out more about it. There are pretty much online resources and diy-guides, in form of Video-Tutorials and books!

Voltages from Battery Powered devices up to 12 Volts are OK. If you aren't sure about an electrical device, please, ask your parents, first! Don't open expensive machines, which aren't yours and think twice about it. Because there is a difference between cheap toy keyboards and things you can't replace. If you touch a power transformer, which is plugged directly into the wall, it will kill you.