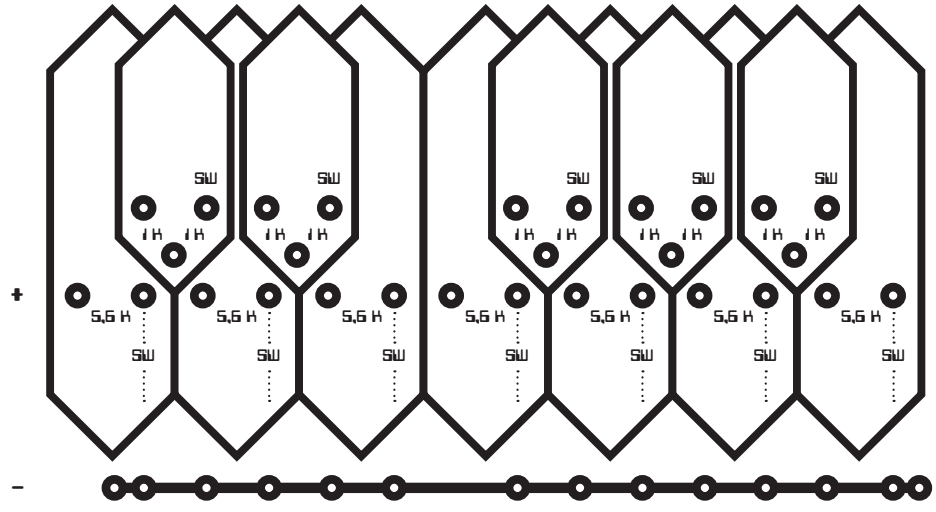
GHOSTIX LABORS*

THE LITTE GUIDE TO BUILD "THE CARDBOARD CIRCUIT"



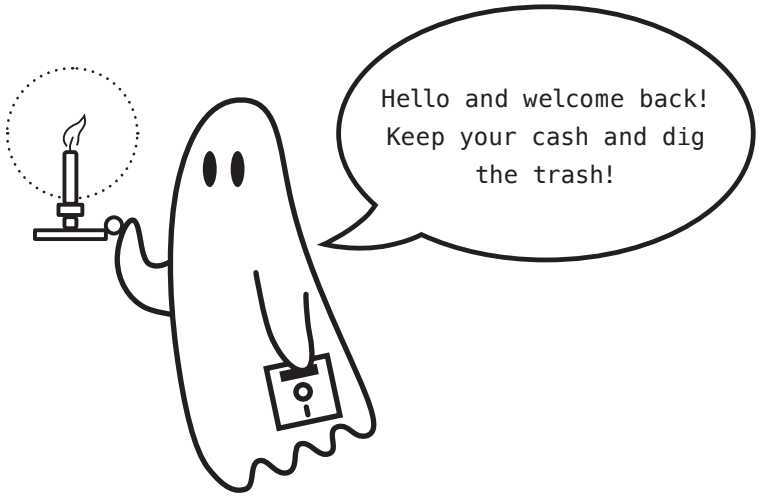
ISSUE 03 /// KEYBOARD & LFO
FOR THE ATARI PUNK CONSOLE

And the days flew by .... like bats in a stormy night ....

You know these nights **....** you end up bored, in your room, watching the candles which are slowly burning down. But this is over, now. Tonight, we'll build a keyboard for the Atari Punk Console! This circuit is a popular sound machine which uses two 555 Timers in this version. I've chosen this schematic, for several reasons. Some versions using the 556 IC, which is one integrated circuit which resembles two 555 timers, in one housing. But for a better understanding in relation to the signal flow and some tricks, we'll implement later. Another reason for this is the fact, that I had found several houndreds, of 555 timer chips in my basement, which slept there for almost 30 years. And they are very reliable, I had not a simgle one, which didn't work. My question at this point was **...** could I build a synthesizer, just, with these chips and some other types, but mainly out of 555 timer chips? Yes and it's fun!

This is the list of parts, which are needed!

10 x 1 K Resistor (or >>> 5 x 2 K or 2,2 K Resistors)
8 x 5,6 K Resistor (for the white keys & a possible ghost key)
2 x Light Dependant Resistors
2 x switches (or more)
12 x momentary switches or
12 x big flat washers and
12 x machine screws +
12 x Screw nuts
one crocodile clip, nail or
banana plug
100 nf capacitor
10 K potentiometer



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 circuit. It is cheap, good for practise and a good alternative, to test things out, when you have nothing, to etch a circuit.

This circuit was tested by me and the prototype works until this day. So I think everything should go well. I'll build it again. Just to make shure, everything is correct.

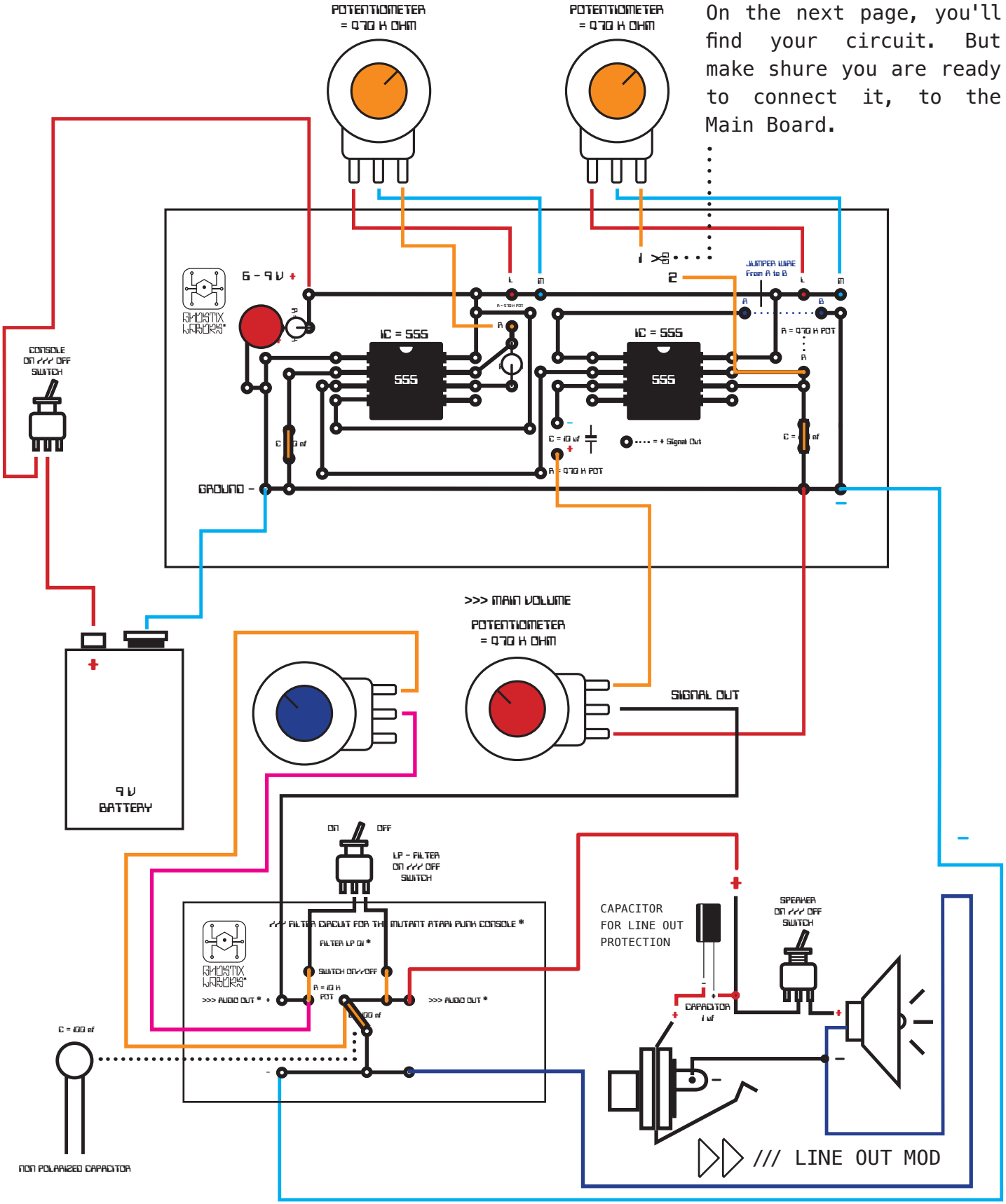
The Start >>>

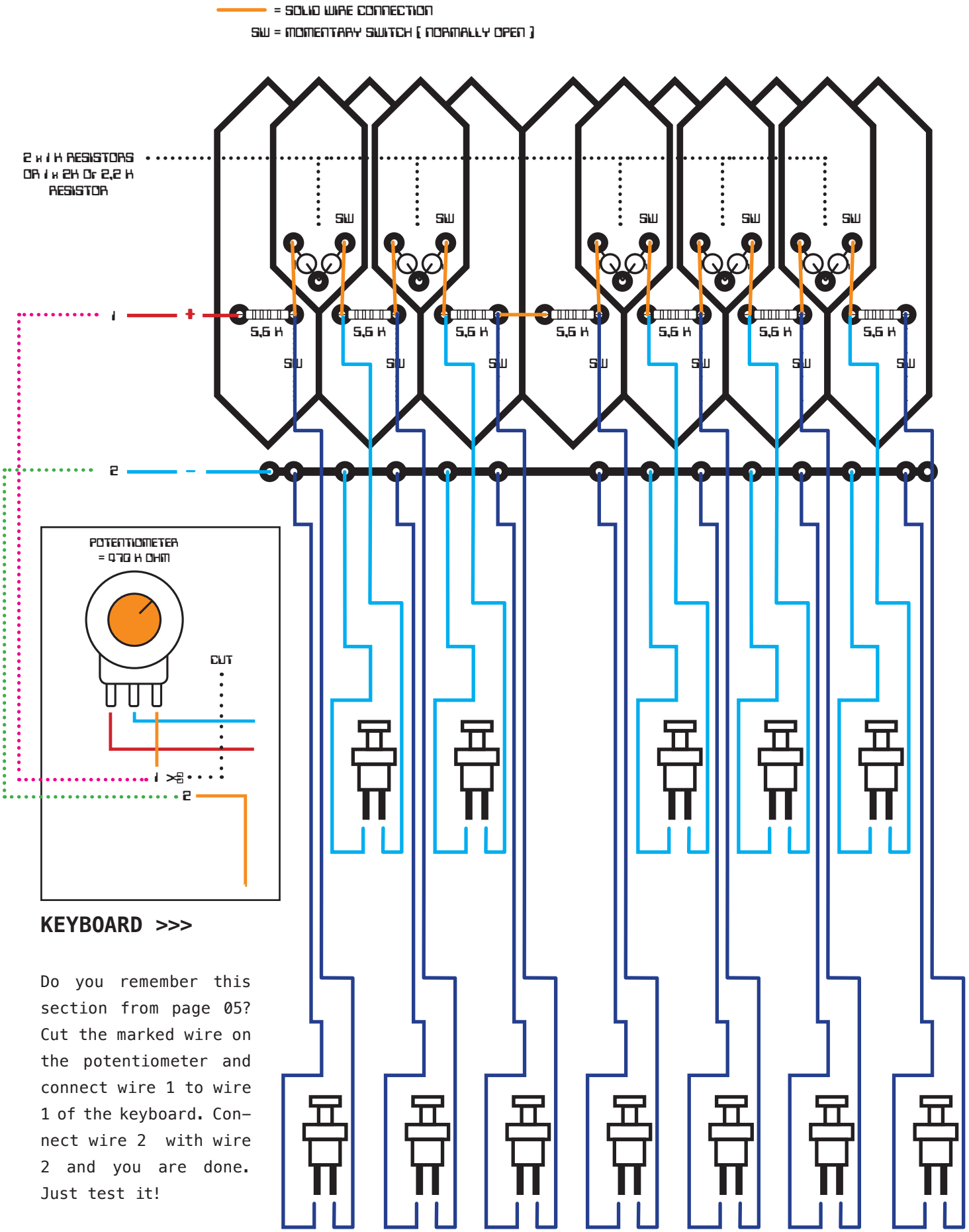
On the next page, you'll find your circuit. But make shure that your printer settings are correct, before you print this file. Don't stretch the file to 100 % of the A4 format. This is a common option, but these pages are already prepared, and should have the right measurements. There is a small, black 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.

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

KEYBOARD >>>

On the next page, you'll find your circuit. But make shure you are ready to connect it, to the Main Board.





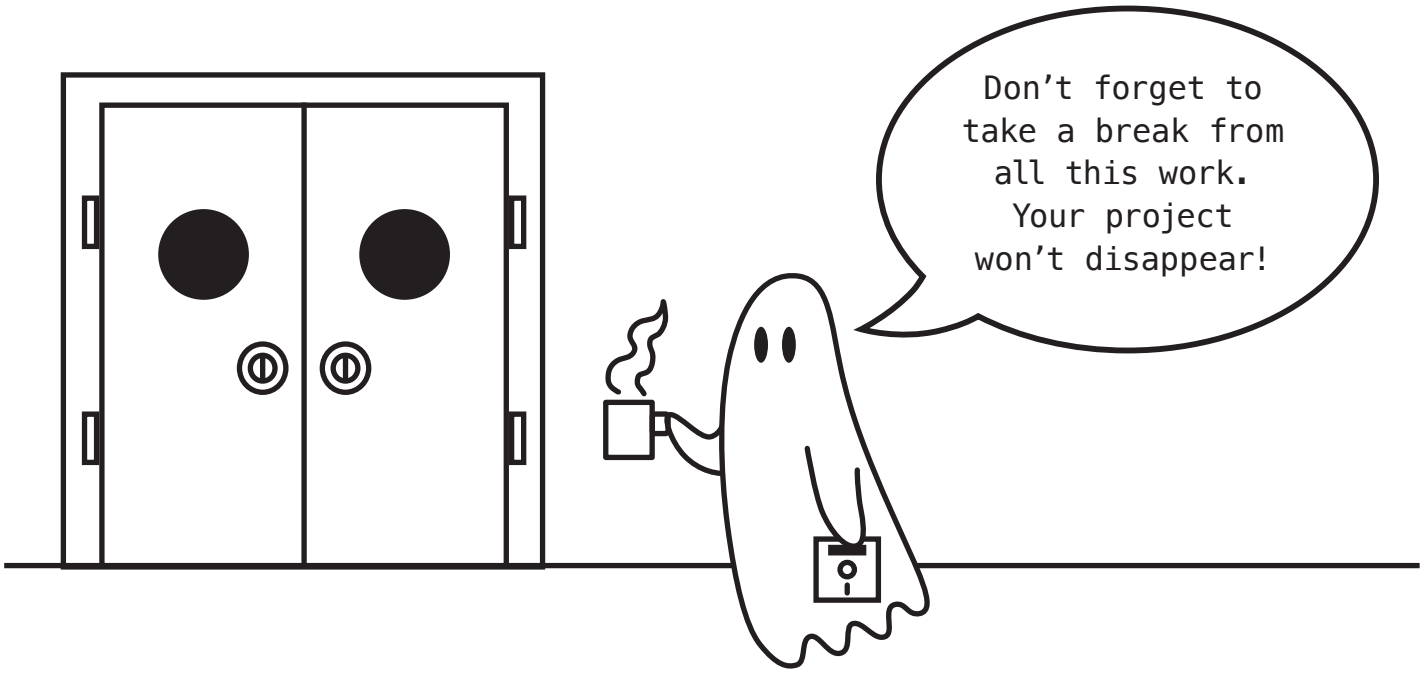
KEYBOARD >>>

Do you remember this section from page 05? Cut the marked wire on the potentiometer and connect wire 1 to wire 1 of the keyboard. Connect wire 2 with wire 2 and you are done. Just test it!

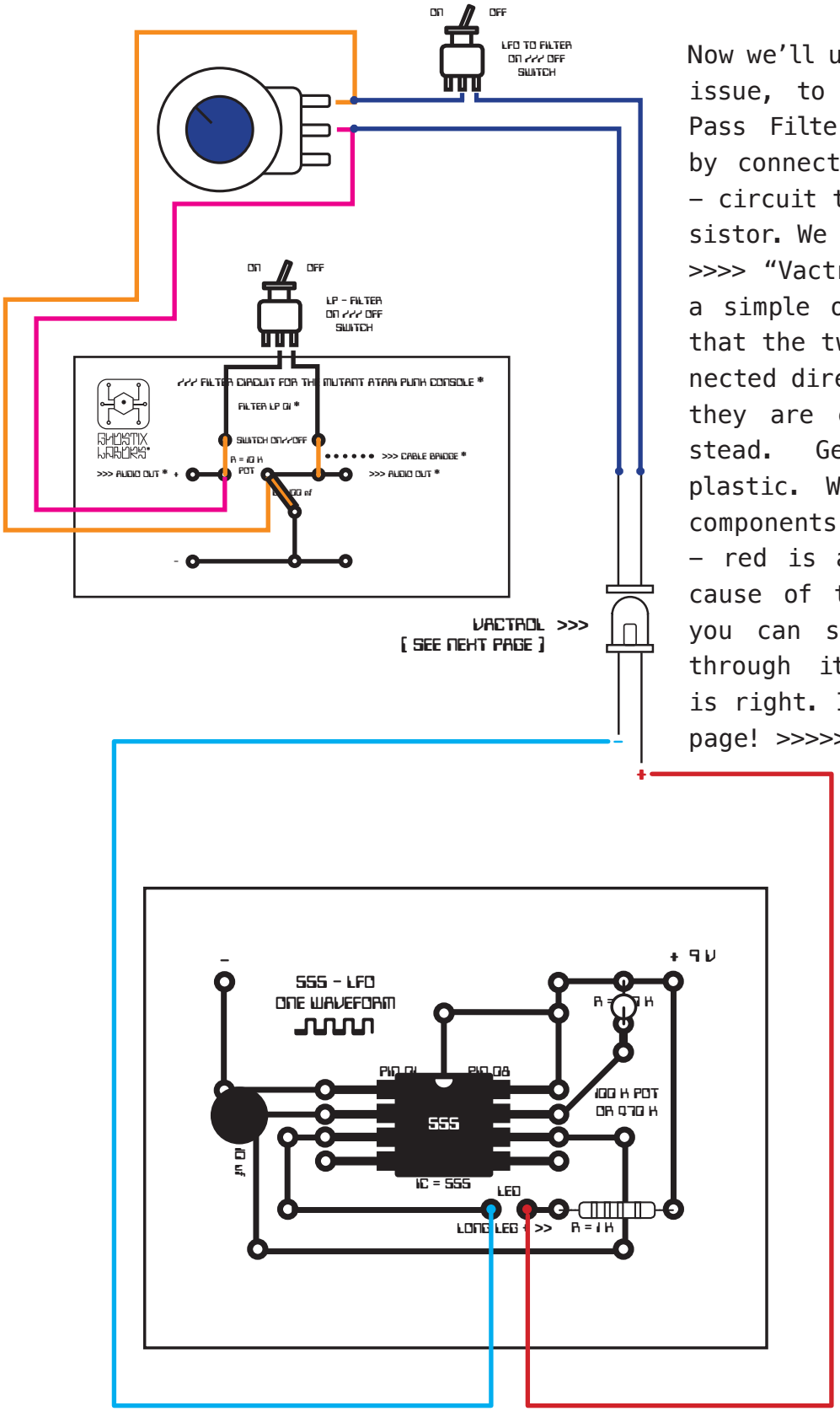
Keep your head up and carry on >>>

I hope all these wire connections are not too complicated. My main tip for this problem is, to pick one wire at the time and connect it to it's destination. A switch for example, has two wires, in this case. Just connect one part, after another and there shouldn't be so many problems. You will end up, with a lot of wires. Don't make them too short. If we have a look at the switch section of the keyboard, for example. Just cut all the wires to the same lenght. Then connect it to all the switches, which are needed and afterwards, to the circuit board. I have to write all this, because if you are new to this. There will be so much questions, which have to be answered at first. I don't do this, for myself, but for you, because, I wanted such a magazine, from the web, and I didn't find it. When there was a resource, it was for pro electricions and not really for beginners. Or you have to open up, an existing device, but you didn't build your own circuit. And for some modifications, you should have the knowledge, to build your own circuits out of a schematic. But this is a problem for the future and another issue of this little magazine.

There are so many possibilities, how you could build this into a housing. An old plastic suitcase, for example. Cigar boxes are great, but too small for this project, I think. Please, if you want to know more about this and how you can push this project further than the normal 100 %, please leave your circuit boards on your desk, or in a project box. We'll build another space mod in the next issue and then, we'll go on with the planning, of the case.



LFO FROM ISSUE 01 + FILTER >>>

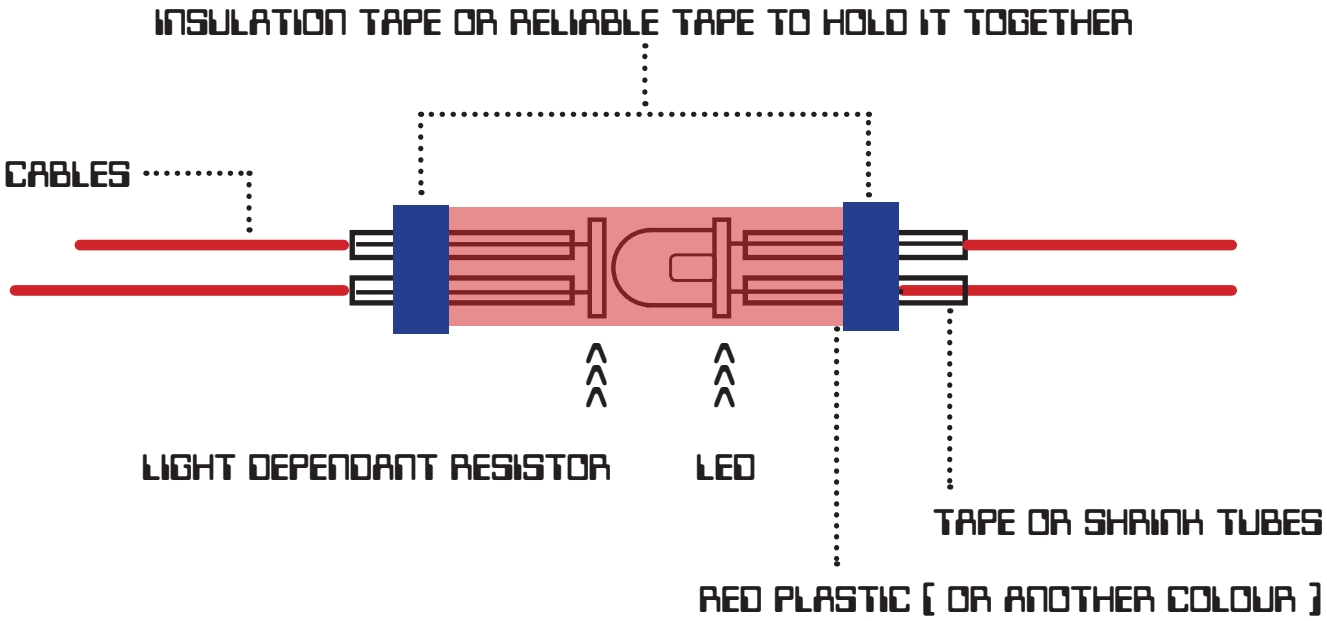


Now we'll use the LFO from out first issue, to control the simple Low Pass Filter. We can achieve this by connecting the LED of our LFO - circuit to a light dependant resistor. We call this little helper a >>>> "Vactrol" and it is basically a simple optocoupler. This means, that the two circuits are not connected directly, to each other, but they are connected by light instead. Get a red tin sheet of plastic. Wrap it around the two components. It can be any colour - red is a little bit better because of the light shielding. If you can see your LED, blinking, through it's surface. Everything is right. I'll show it on the next page! >>>>>>>>>>>>>>>>>>> *

PUNK VACTROL >>> +

Now we have to talk about insolation Tape and shrink tubes. Shrink tubes are a little more expensive. It depends on what you want and it is your way and your machine. You have to find out, what suits you and how you want to work. But I think you know, what a short circuit is. So you have to make shure, that your components, which are not directly installed on the circuit board itself, are well shielded, with tape or shrinking tubes. >>>>>>>>>>>>>>>>>>>

At one point, this can ruin your whole work. You are wondering, why something doesn't work. Maybe, there is a short circuit, between two switches or potentiometers on your desk. In case of this machine, this isn't so bad at all, because the Atari Punk Console is a very reliable and simple circuit. I didn't fry it, so there is not so much possibility, that this would happen to you. To avoid this, you can also tape your external switches and potentiometers to your desk. So they can't touch each other at all.

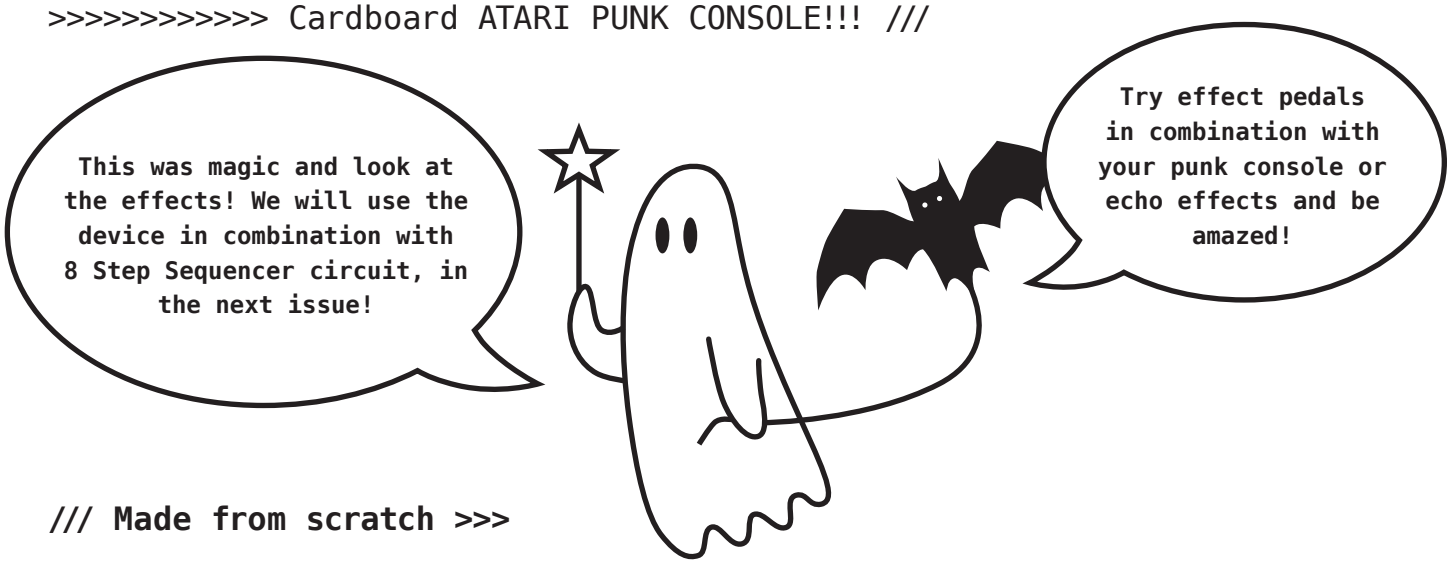


USING THE PUNK VACTROL >>>

The positive thing about this version, of a vactrol is, that you are able to see your light signal and you can control all your potentiometers with it, if you want. (Even the Vactrol from outside - use a flashlight and have fun) Just glue it behind a hole in the front panel of your machine, but make shure, that you can see the flashing led. Now it depends on you. What do you want, to control on your Punk Console. Just build a second one and try it on different potentiometers. You can build as much LFO's and Vactrols as you want. Just print your circuits and go for it!

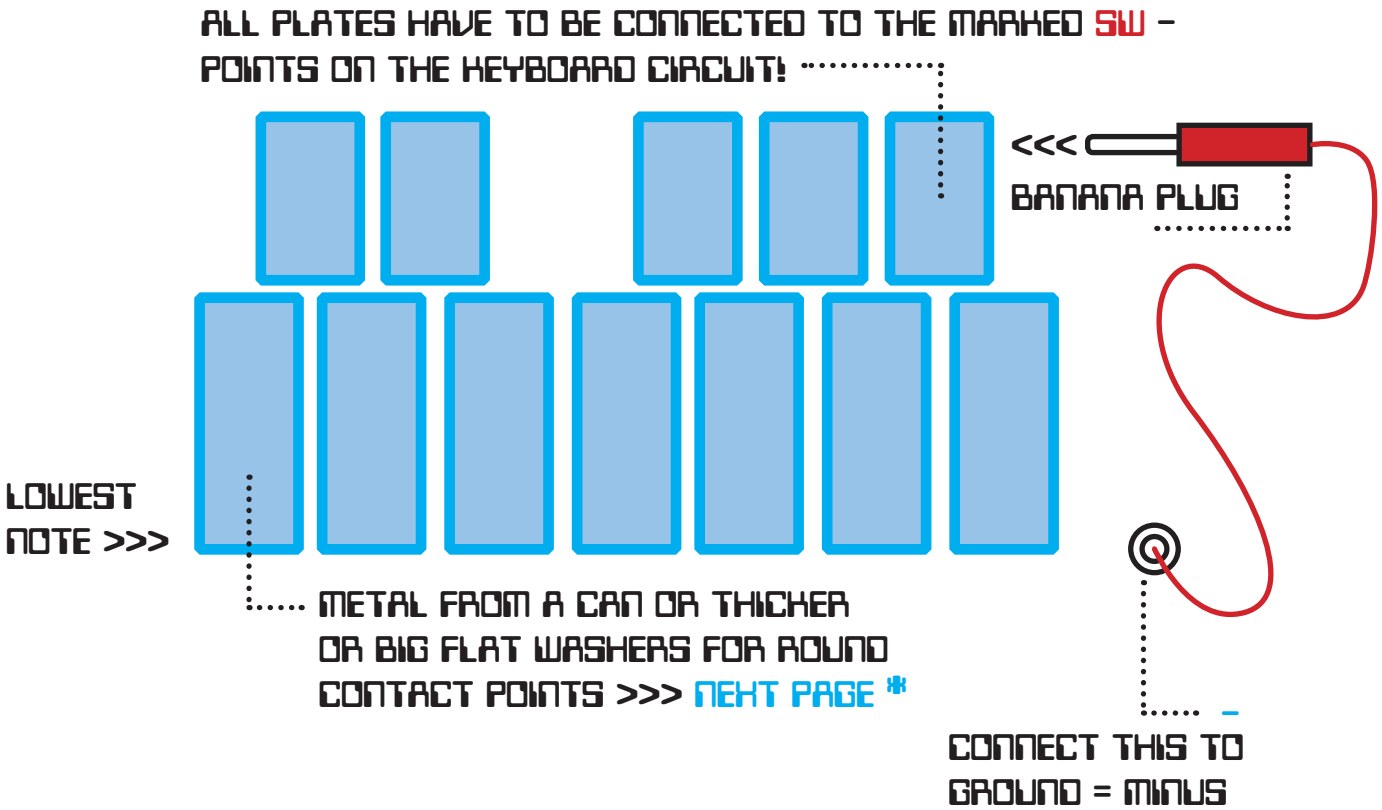
/// THE FINISHED MODIFICATIONS >>>

Yeah, and congratulations, you've build your modifications for your >>>>>>>>>>>> Cardboard ATARI PUNK CONSOLE!!! ///



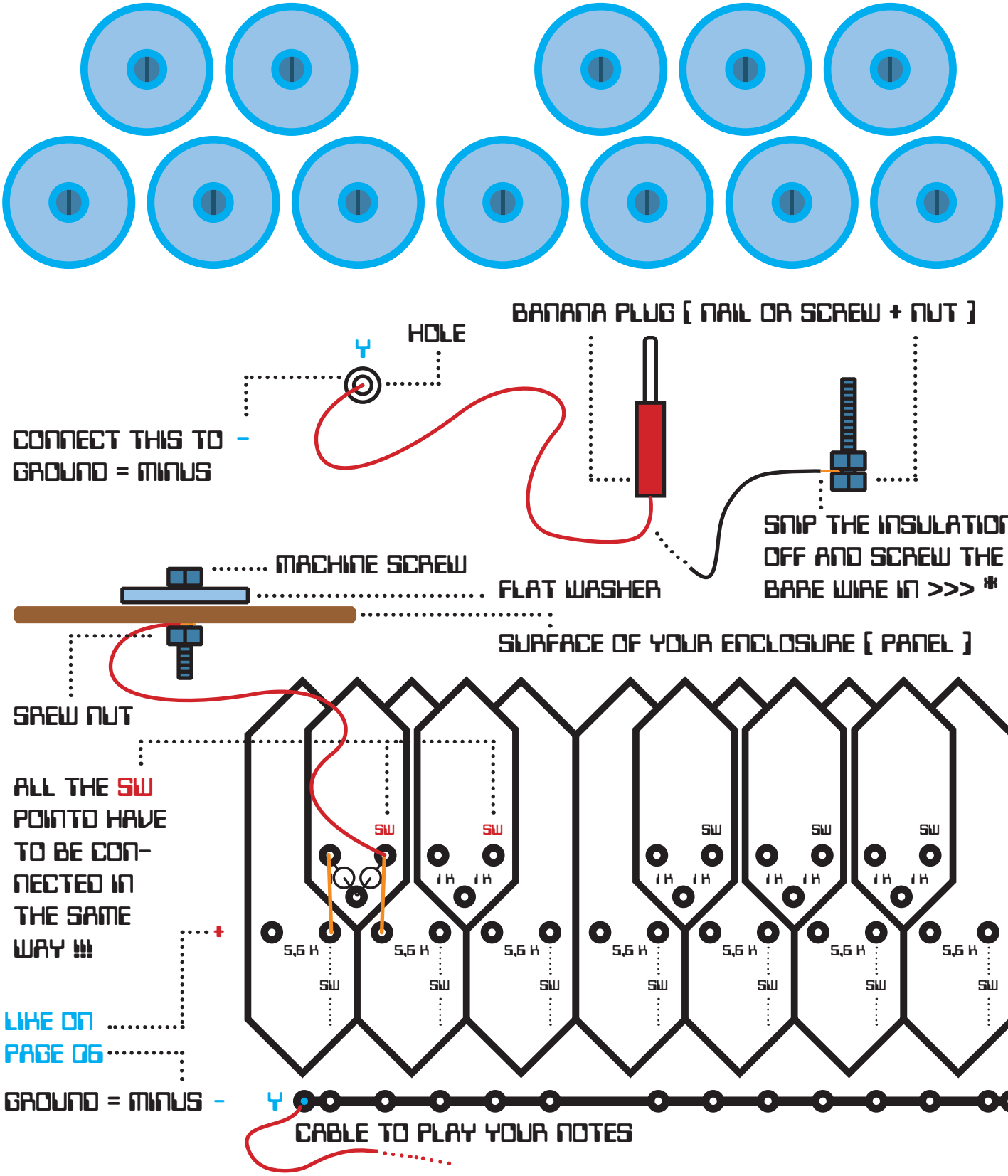
/// Made from scratch >>>

There are some things to say. The Keyboard is just a row of divided re-sistors. In this case, you can also check your connections with the “Ghost Probe”, in series with a 9 Volt battery. You don’t have to use my concept with the normal push buttons. There are more possibilities. You can take the keys from a broken one or you could build it inside of another toy, which has 12 keys. There are really cool “reed switches” – Reed Ghazala describesd how to build them, out of old cans. Just be creative and have fun. If you don’t have push buttons – just use the next variations, if you want! >>> Just find 12 metal plates which are the equal to each other!



/// THE WASHER KEYBOARD >>>

If you have no switches – this is the alternative version for you >>>
You can play the notes, by touching the flat washers, with the banana plug or the machine screw, which is connected to the ground, via one cable.



/// 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 shure, 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 shure 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.