GHOSTIX
LABORS*

THE LITTE GUIDE TO BUILD
"THE CARDBOARD CIRCUIT"

−

+ 3 V

555 - LFO
ONE WAVEFORM

R = 0,7 K

PIN 01   PIN 08

100 K POT
OR 0,70 K

C = 10 uF

IC = 555

LED

LONG LEG + >>   R = 1 K

ISSUE 01 /// THE SIMPLE LFO

You know these days **....** nothing happens and you find yourself bored in your own room? You think: "Hey, I want to build a circuit and I have nothing to make one."

No, you don't have to etch a circuit, to see it in action. You can build it out of the backside of your collegeblock. All you need, are some tools, solid wire (simple solid core) , a little bit of solder and some electronic parts. "What???" Yes, It's true and this little tutorial will show you how It's done.

This is the list of parts, which are needed!

1 x   555 Timer IC
1 x   8 pin IC—socket
1 x   1 K Ohm Resistor
1 x   4,7 K Ohm Resistor
1 x   100 K Ohm Potentiometer
1 x   Led
1 x   10 uf polarized Capacitor
1 x   Wire (simple solid core)
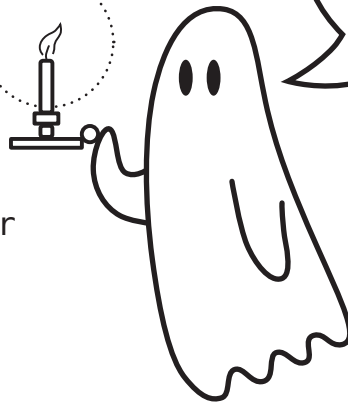
Hey, I'm the Ghost of this Castle and I'll guide you through the whole process!

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

What is a LFO ???

The LFO is a so called "Low Frequency Oscillator". It operates at a lower frequency than a regular audio oscillator. But If you would connect the positive pole of a small speaker to the waveform output of the circuit = pin 3 of the 555 timer IC (+) and the negative pole to – = ground .... you would hear clicks from it or a humming, if the circuit would operate at fast speed. But what can we do with it??? Some people would use it as an audio source, which is not common, but possible. In most cases, this small circuit is used to control differ-ent circuits or their effects. It has the ability to trigger a sound, inside of a toy or to control a potentiometer (a variable resistor). But we will turn our eyes on it, when the circuit is completed, because, it is better to see the effect in action. if you are new to this, don't panic, everything will make sense after a while and some experimentation.
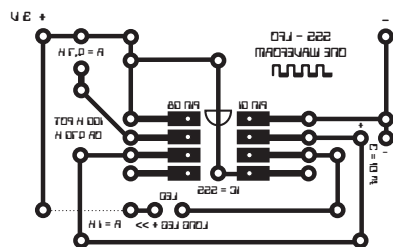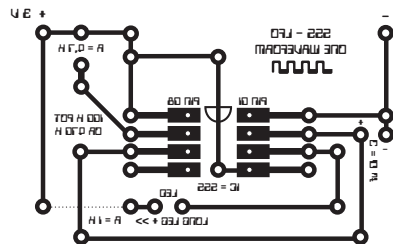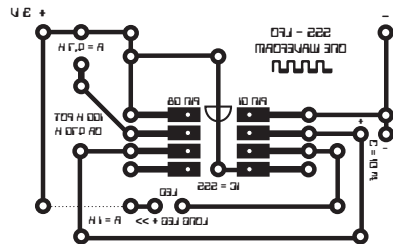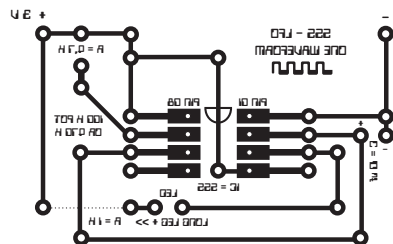

Now, we need a printer. But you can also draw the circuit on a sheet of paper. (Page 9)
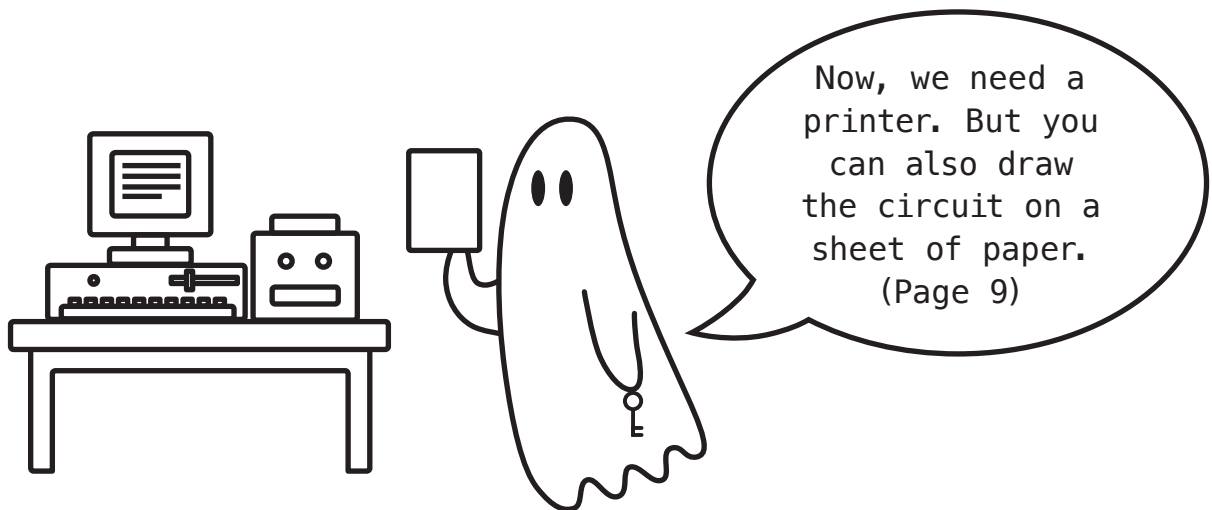
The Start >>>

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 stret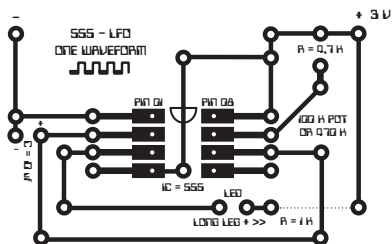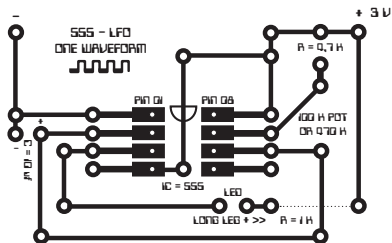ch the file to 100 % of the A4 format. This is a common option, but these pages are already prepared, and should have the right measurements. There is a small, black cube on the left side, of the following page. This is your control mark and if this cube is 1 cm x 1 cm tall, the diam-eters of your circuit boards are correct.

6 x Simple LFO ??? DIAMETER 555 TIMER = 0,9 x 1,0 cm   FOLD

555 - LFO
ONE WAVEFORM
+ 3V
PIN 01 PIN 08
R = 0,7 K
100 K POT OR 0,10 K
C = 10 µ
IC = 555
LED
LONG LEG + >>   R = 1K
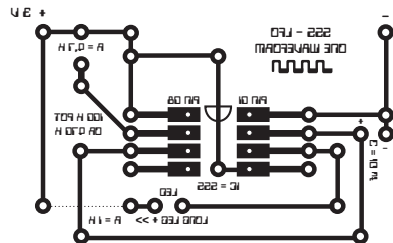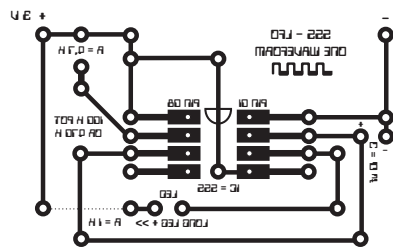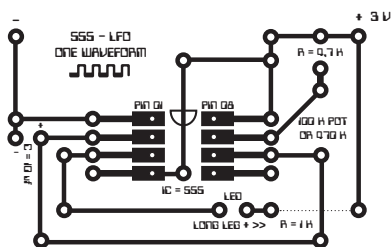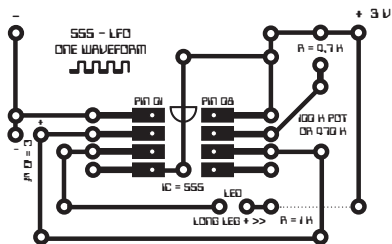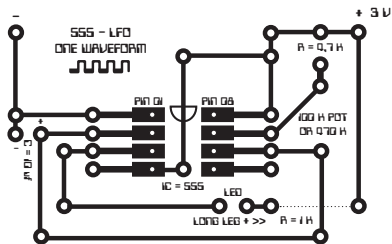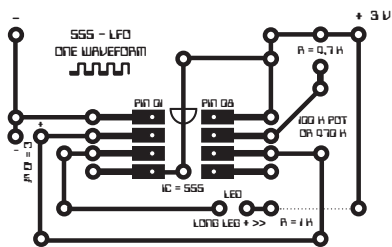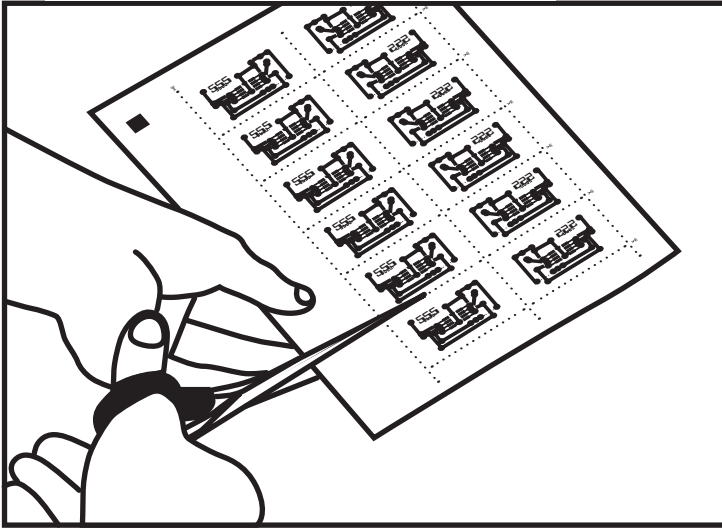
01 /// The Start >>>

Cut out, one of the circuits.
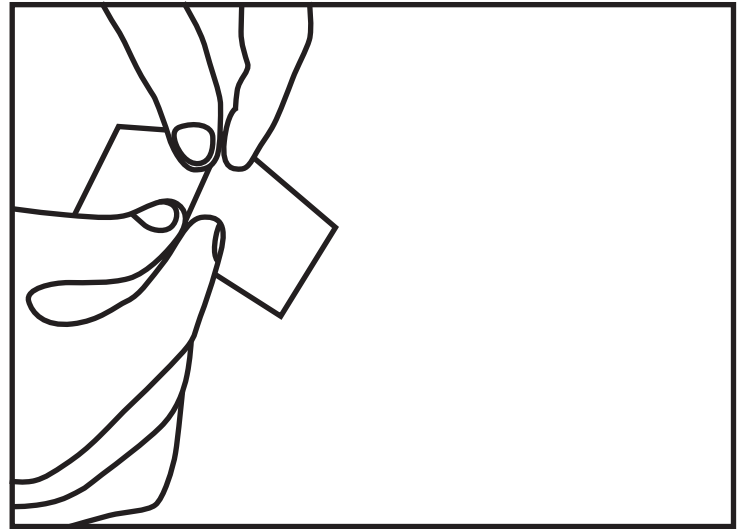
02 ///

Fold the piece of paper in the middle (at the "FOLD" mark) >> The fold has to be as exact as possible!
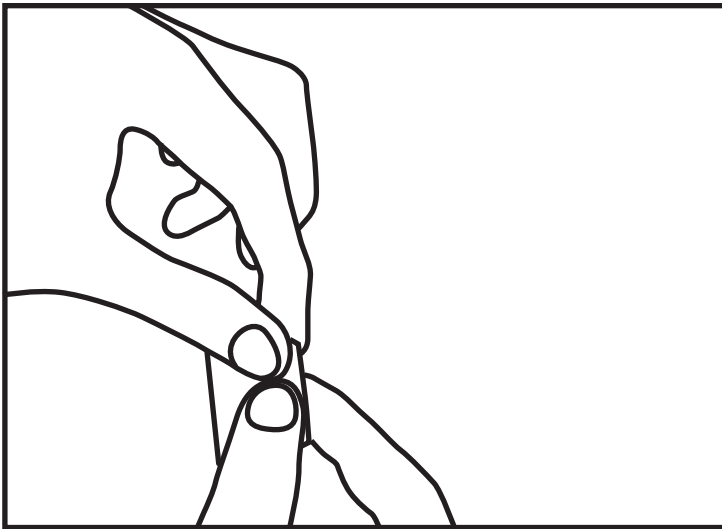
03 ///

The two sides, of the circuit have to be congruent (you can check it, by hold-ing it to a window or a lamp). Cut out a piece of cardboard and put it between the two sides.
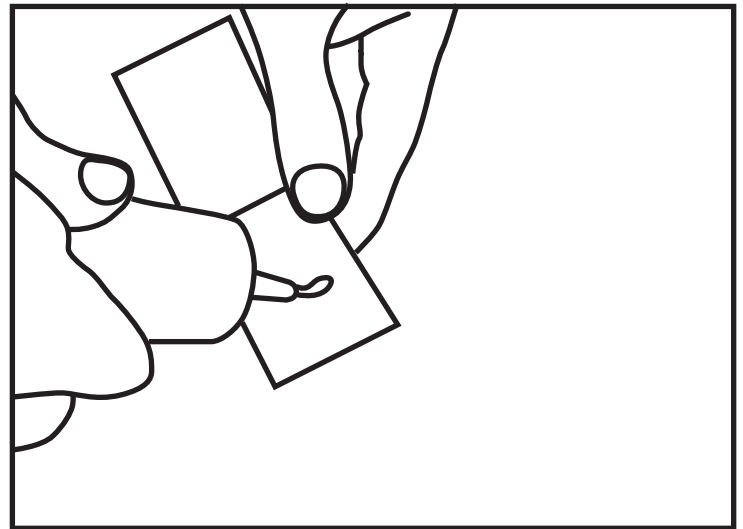
04 ///

Now, it is time, to glue the two sides, to the cardboard. The best way to do it, is to wait a little bit, after each side is done. Please make shure, that the fold mark touches the border.

05 ///

Take your compasses and poke holes in every round marking, on the paper bread-board, after everything is dry! You can also use another needle, to make your holes. But they shouldn't be too big.

06 ///

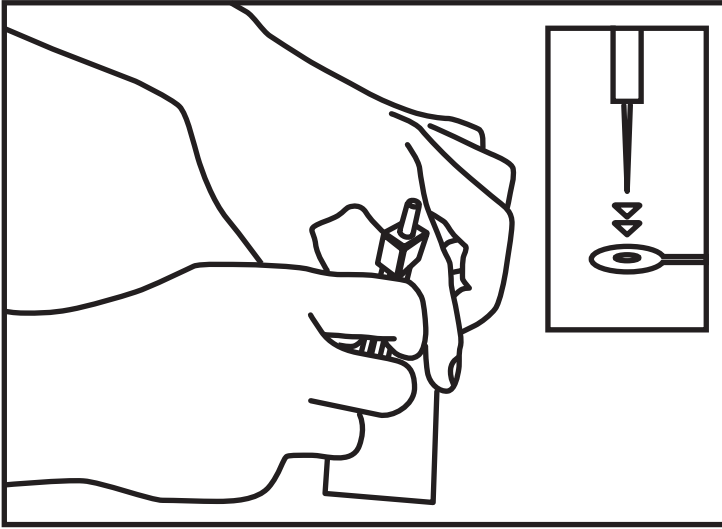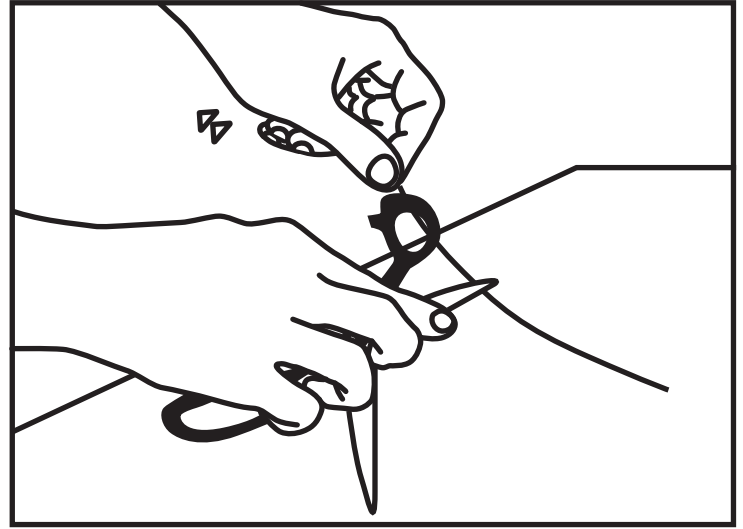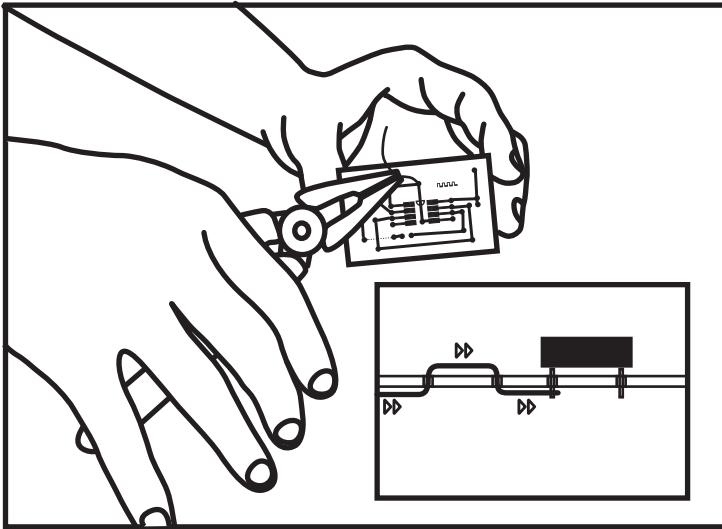Take your scissors, hold it to the wire and strip the insulation off. Just pull your hand to the body, like in the picture. Don't use too much force and be careful!

07 ///

Take your bare wire and weave it through the holes. The mirrored side, is the backside. Start from there and work your way through the whole circuit. Just one, after another cable bridge. Make shure, the wire bridges are stiff and woven close to the board, on both sides!
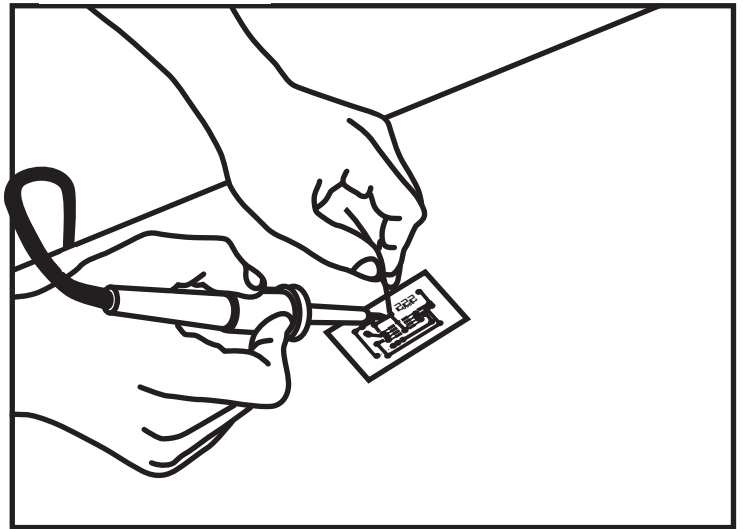
08 ///

Place your parts on the board and sol-der them in, when you are done with a solid wire connection. You can also use the legs of your components, to com-plete the circuit here and there. Take your wire cutter and snip off the ends, which are too long, after you've sol-dered them together.

BATTERY CASE

Q1
Q2
Q3
Q4
555
Q8
Q7
Q6
Q5

555 IC

8 PIN - IC SOCKET

POTENTIOMETER = 100 K OHM

+ 3 V

555 - LFO
ONE WAVEFORM

R = 7 K

PIN 01   PIN 08

555

100 K POT
OR Q70 K

IC = 555

LONG + >>

R = 1 K

10 uf

RESISTOR = Q,7 K OHM

RESISTOR = 1 K OHM

CAPACITOR
10 uf

LED
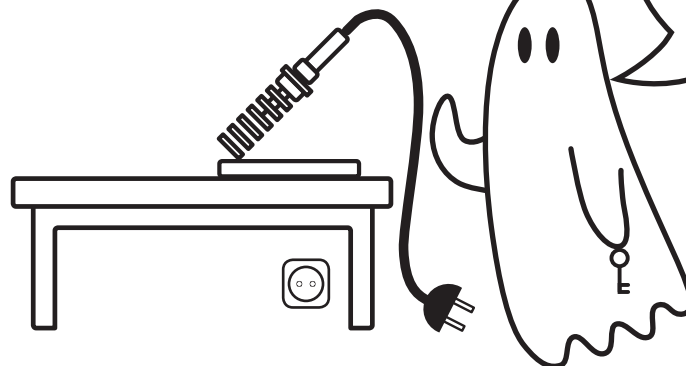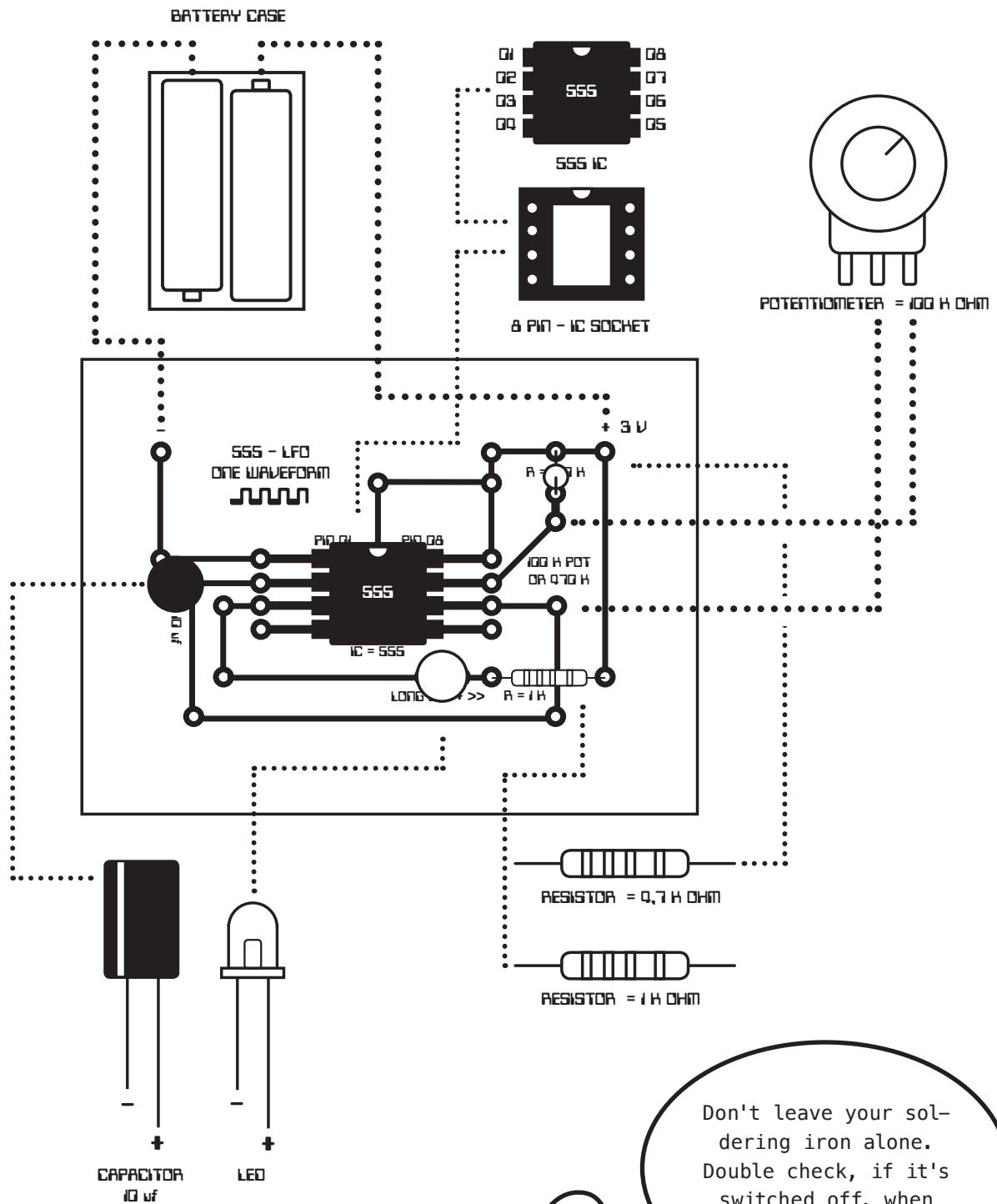
Don't leave your sol-
dering iron alone.
Double check, if it's
switched off, when
you go!.

/// THE FINISHED CIRCUIT >>>

Yeah, and congratulations, you've build your first
>>>>>>>>>>>> Cardboard LFO! ///

This was magic and look at the effect! We will use this little device for another circuit in the next issue!
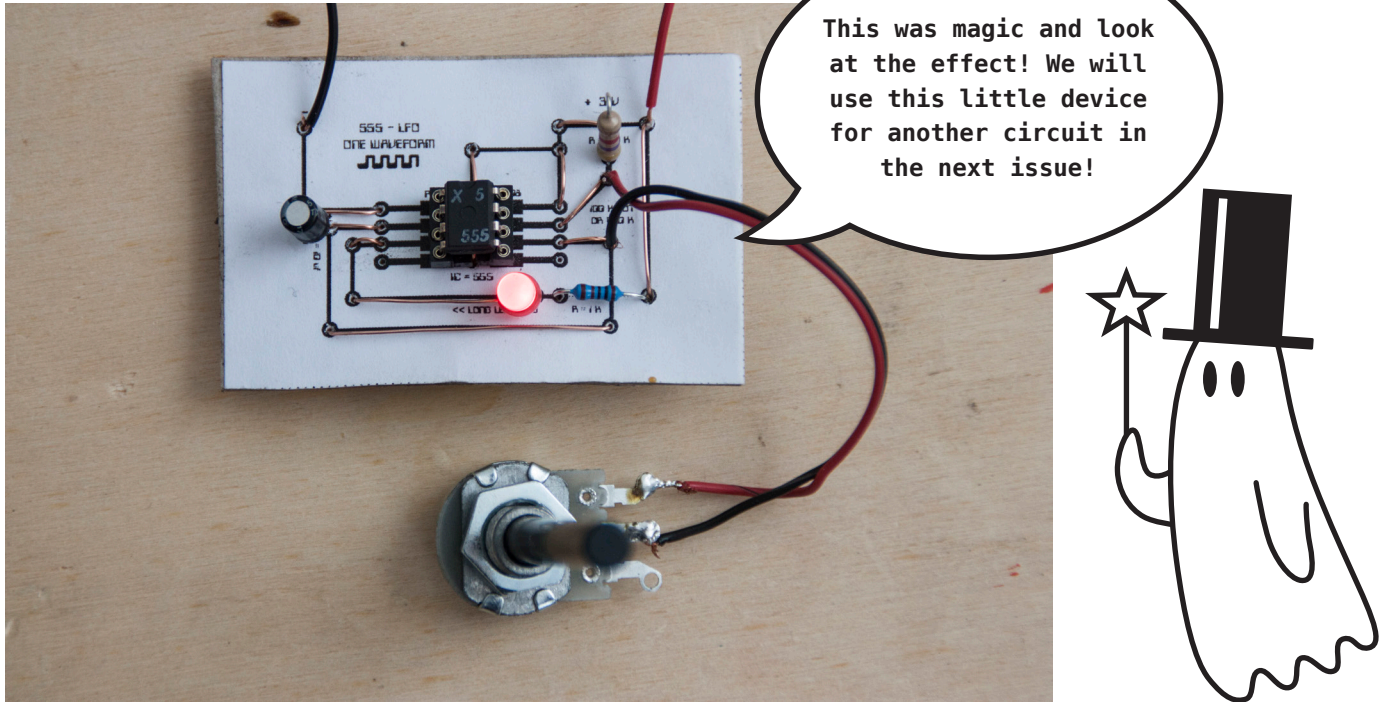
There are some things to say. The IC—Socket has to be placed first. The last component, which has to be placed on the board, is the 555 Timer IC. Make shure, that your parts will have the right polarity. If your LED won't light up, then you have to check your connections.

Did you forget one??? Is there a short circuit???

Note, that the polarity of your batteries has to be correct, too. Because this could be also an issue. If this polarity is wrong, the 555 Timer Chip, will get very hot and the LED won't light up. Mind the little notch on the 555 Chip and the IC Socket. There is a mark on the board, you couldn't miss it. All the notches must head in the same direction.

You don't have to place the LED directly to the circuit, you can also use wires, like I did it on the potentiometer.

Your LED should blink, if everything is correct. Now you can adjust the frequency of the LED, by turning the potentiometer in both directions.

And what can we do with it??? My answer is: "A lot of things!" But this is a story for the next issue and then we will do some experiments on another simple circuit, to make some noise!

/// THE CIRCUIT >>> DRAWN BY HAND

It's no problem, if you don't have no 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 sci-
ence teacher, what to do, at first.

I'm not responsible for any harm, due to the use of the Card-
board LFO. And I'm not responsible for any machine you'll
fry. Make shure, you do the right thing and read my warn-
ings. If you are not familiar with Circuit Bending, 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.