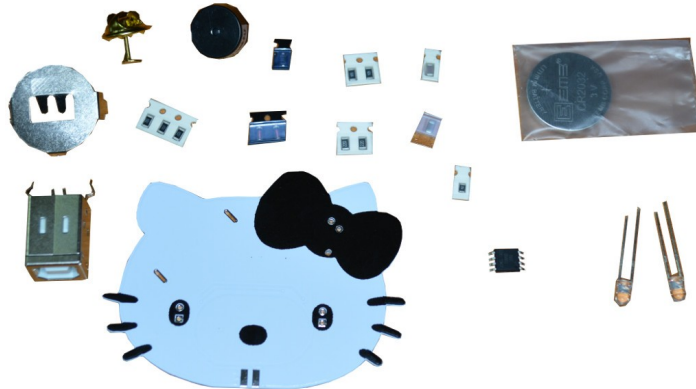


TuxCon Kitty



[TuxCon](#) is annual Open Source Hardware and Software conference held in [Plovdiv, Bulgaria](#).

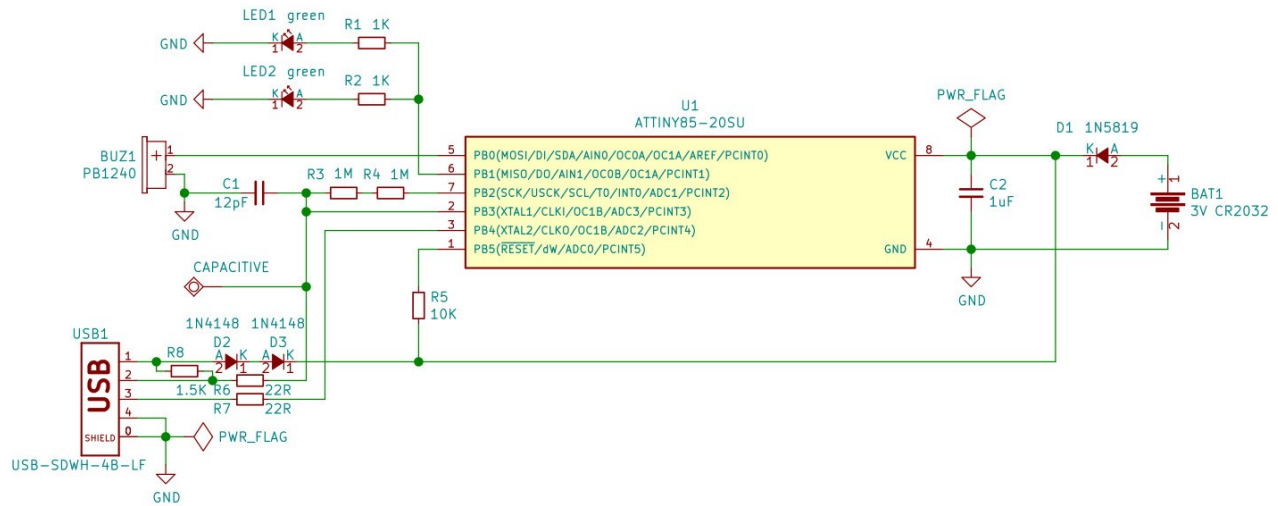
TuxCon-Kitty board was specially designed for the TuxCon 2017 issue. It's badge in the form of Cat head with capacitive sensor in nose and two LEDs as eyes. The board has small piezzo speaker which allow it to play sounds. Main processor is ATmega85 which allow it to be programmed with Arduino sketches without need of anything else.



This board is perfect to teach kids to solder and to program them. They will make their own Arduino compatible board and learn how to program it.

Hardware Build

This is the board schematic:



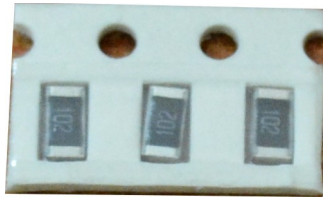
Bill of materials:

R1,R2,R5	1 K ohm 1206 5%
R3,R4	1 M ohm 1206 5%
R6,R7	22 ohm 1206 5%
R8	1.5 K ohm 0805 5%
C1	22 PF 1206 5% NP0
C2	1 UF 1206 10% X7R
D1	1N5819 SOD-123
D2,D3	LL1N4148 SOD-80
U1	ATTINY85-20SU
BUZ1	PB1240
USB1	USB-SDWH-4B-LF
LED1, LED2	3mm round GREEN LEDs

What tools you will need?

1. Soldering iron with regulated temperature like [SLD936B-45W](#) or [CHN-SLD907](#) and thin soldering tip like: [T-1](#) which is good for SMT components soldering
2. Magnify glass as SMT components are really small
3. [Twizzers](#) to hold the components while soldering.
4. Solder wire with flux like [SAC0307-0.6](#)
5. Colophony which you can buy from music shop

We will start the assembly by R1, R2, R5 components with value 1K ohm. You can easily recognize them they are on paper tape and there is number 102 written on their body.



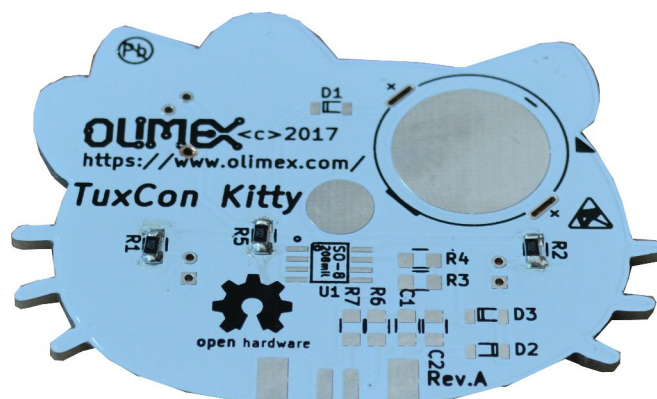
The three digit number is common to mark resistors. The value is composed by the two first digits to which you had to add as many zeroes as third digit.

In our case number is 102 and we should add two zeros to 10 i.e. 1000 ohm for short 1000 is marked in schematics like K, so 1000 ohm = 1K ohm.

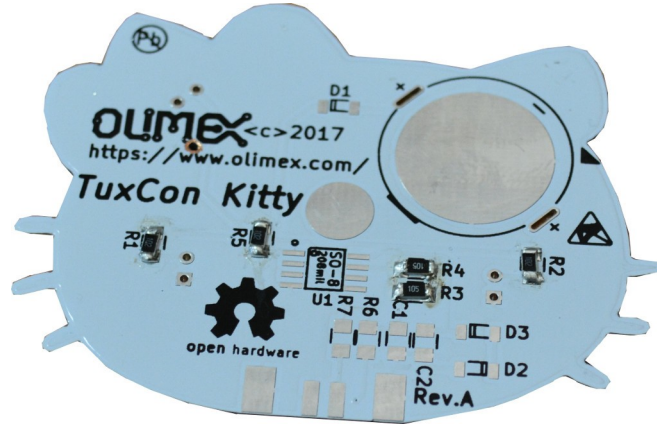
How to assembly the resistors? Our advice is to hold the part with the twizzers and with the tip of the soldering iron to put some solder to the one pad of the resistor just to hold it. No need to make it perfect, just fix. Then when the resistor is fixed use your left hand to feed some solder wire while heat the other pad with the soldering iron, you will make perfect shiny soldering joint, then you return back to the first pad which was just fixed and using again soldering iron and feeding the solder wire do the joint perfect.

If the solder joint do not look bright and shiny just use some colophony flux, it will remove the oxidation which makes solder joint dull and not reliable. Note that if you apply too much colophony it may look a bit messy on the PCB but you can use alcohol based solvent to clean it.

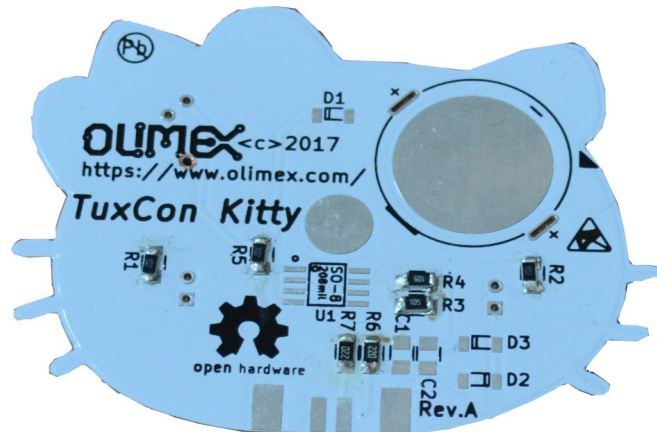
Here are the R1, R2, R5 soldered with 1K resistors.



Now let's solder R3 and R4 they are with 1M ohm value, 1M ohm is 1000 000 ohms, so the marking should be 105 i.e. 10 with 00000 after them.



The next are R6 and R7 they are with 22 ohm and their code is 220:



After them is time to solder C1, it's brown color and in paper tape



The next capacitor C2 is also brown and same size but in plastic tape:



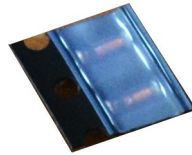
D1 is in plastic tape with black rectangular body and one white stripe for the polarity.



On the PCB there is marking how to place the diode, make sure you place it correctly as otherwise the board will not work.



D2 and D3 are in rounded glass package with black stripe on one end, on the PCB there is mark where this stripe to be, please place it correctly.



Next solder the battery holder, make sure you solder it this way that the battery can slip from outside board!

Next solder the processor U1, the IC has dot which marks pin.1 on the Pcb also has black dot which show how to solder it. Make sure there are no shorts between the legs!

Now is time to solder the badge pin. First tin the pin head and PCB pad, then holding the badge pin with tweezers put the pin to PCB and heat it with the soldering iron for 10 seconds until the solder melts and pin is soldered to the PCB

Next solder Buzzer, it has no polarity so doesn't matter how you solder it to PCB.

Then solder the LEDs, they have short and long legs, put the short leg in the square pad, long in the round pad.

Then solder the USB connector, it's important to solder it with correct orientation, 4 legs are in same line and must be solder on back side of PCB, two are soldered on top side of PCB.

Finally solder R8 1.5 K ohm with marking 152 between the USB connector top pins.

Finally you will have completely assembled board like this:



The brow-yellow colophony leftovers do not look nice, but can be cleaned easily with soft cotton wipes and isopropyle alcohol.

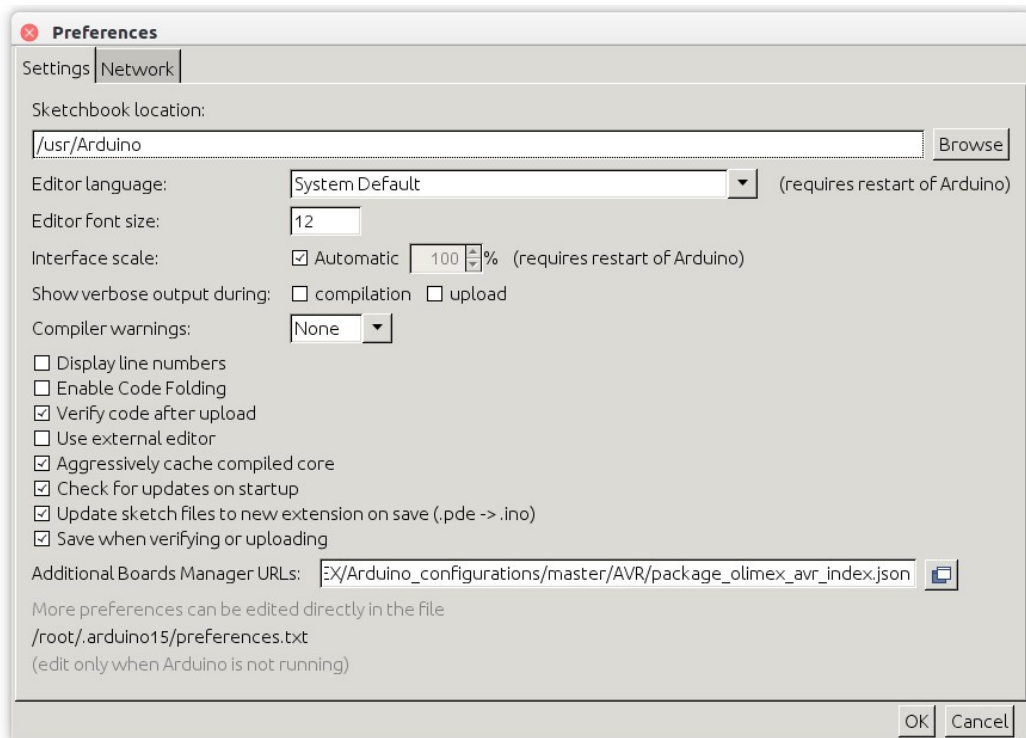
Software Setup

Now to learn how to program it. All instructions below are for Ubuntu, but Windows installation is similar:

1. Download latest Arduino from www.arduino.cc
2. Unarchive to your Home directory. Run terminal and go to arduino directory and execute arduino scrip as superuser

```
$ sudo ./arduino
```

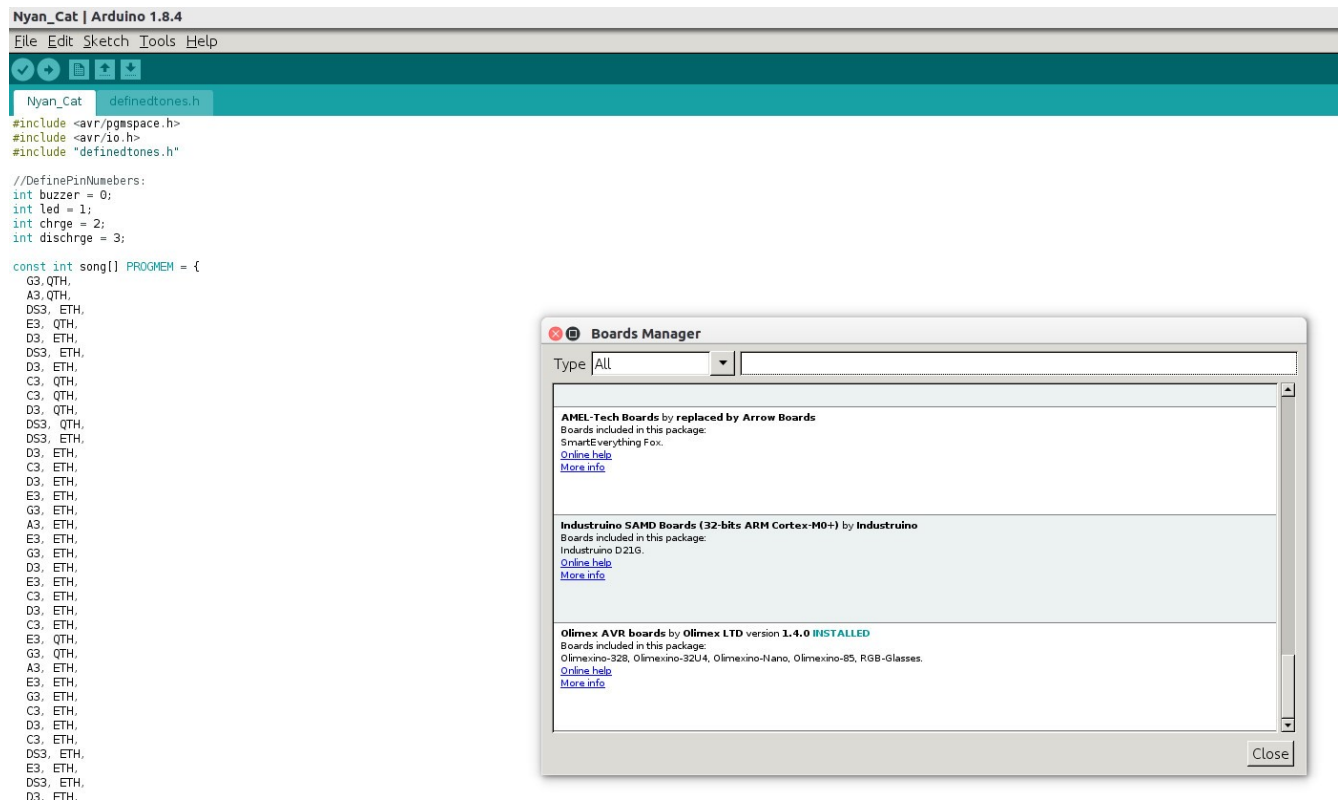
2. From File menu select Preferences:



In Additional Boards Manager URLs paste this:

https://raw.githubusercontent.com/OLIMEX/Arduino_configurations/master/AVR/package_olimex_avr_index.json

Then from menu Tools → Board → Boards Manager select OLIMEX AVR boards:



then select Olimexino-85 as Board.

Now you can test if everything works by Opening sketch from File → Examples → Basics → Blink Compile and Upload and check if kitty eyes start to blink, you can play a bit by changing delay time to make the blink faster or slower.

From GitHub you can download the software examples:
<https://github.com/OLIMEX/TuxCon-Kitty/tree/master/SOFTWARE>

Open Nyan_Cat.ino and try to compile, if it complains there are no definedtones.h use Sketch → Add file to add to the project.

When you compile and upload you will hear music and cat's eye will blink.

Then open hello_kitty.ino you may need to add the definedtones.h and some libraries which may missing like the capacitive button you can add library with Sketch → Include library → Library manager.