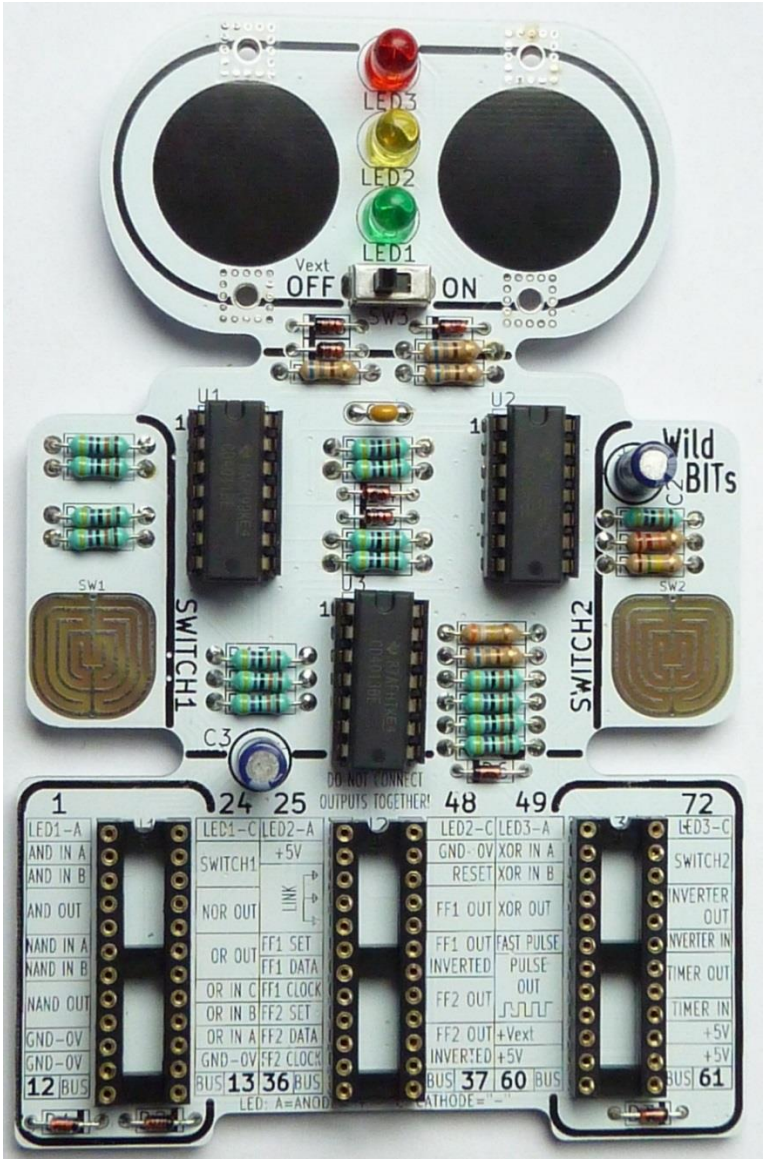
Wild-BITS

Manual Wild-BITS kit.



A project from the Service Kring JOTA-JOTI.

Do you like the Wild-BITS, do you have nice ideas?
Let us know, read on the last page how.

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Remarks:

We would like to advise soldering during soldering to read this entire document carefully beforehand. All you need to do is print pages 5 and 6 for the construction itself.

Since this is a kit with many options, not everything is in one document. The manual with an explanation of how it works, examples and the diagram can be downloaded separately from our website.

TIP: Putting a copy together for the building activity itself is also very useful.

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Preface:

It appears, and we can only applaud this, that soldering activities are not only limited to JOTA-JOTI but that, for example, group weekends, international camps and schools are also soldered. Due to the continuing demand for electronics projects, we have released something different this time. We have called this kit "Wild-BITS" and it is intended for the more advanced builders. With this kit you can really experiment with electronics!
Have fun with the construction and use of the Wild-BITS!

Content of the kit:

The table below can be used to check the contents of the kit. Solder tin and 2 CR2032 batteries must be supplied by yourself, for example these batteries are available cheaply at the Action..

Component	Value	Qty	Pos. on board	Remarks
Battery holder	CR2032	2	BT1, BT2	
Capacitor	100 nF	1	C1	
Capacitor	10 µF	1	C2	beware proper placement
Capacitor	100 µF	1	C3	beware proper placement
Diode	1N4148	9	D1 - D9	beware proper placement
IC-socket	14 pins	3	U1, U2, U3	beware proper placement
IC-socket	24 pins	3	J1, J2, J3	beware proper placement
IC	CD4011BE	1	U1	beware proper placement
IC	CD40106BE	1	U2	beware proper placement
IC	CD4013BE	1	U3	beware proper placement
LED	Green, 5 mm	1	LED1	beware proper placement
LED	yellowl, 5 mm	1	LED2	beware proper placement
LED	red, 5 mm	1	LED3	beware proper placement
Switch	Slide	1	SW3	
resistor	680 Ω	4	R17 t/m R20	blue, grey, braun, gold
resistor	22 KΩ	1	R23	red, red, orange, gold
resistor	150 KΩ	1	R22	braun, green, yellow, gold
resistor	390 KΩ	1	R21	orange, white, yellow, gold
resistor	470 KΩ	16	R1 t/m R16	yellow purple, black, orange, braun
PCB		1		
Wire	rood	1,1m		

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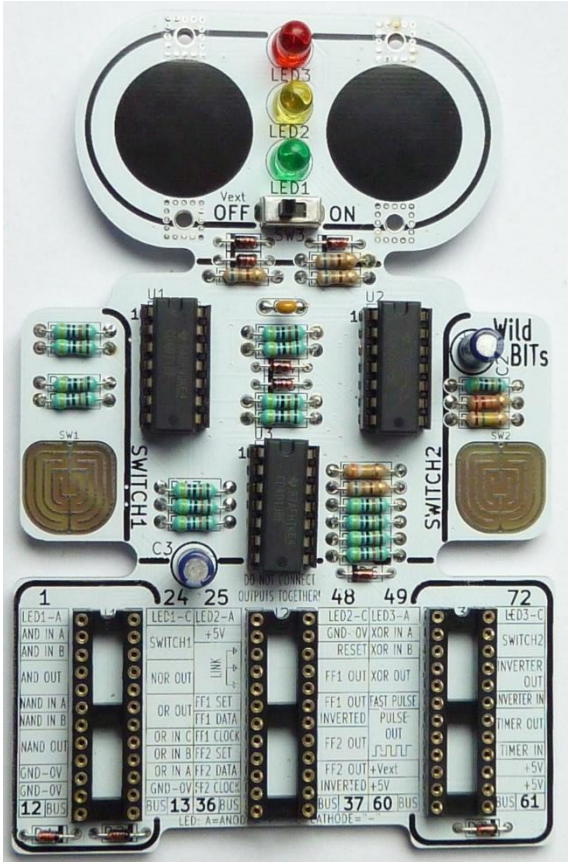
Component numbering and component values:

Board txt	Component	Board txt	Component
BT1, BT2	Battery holder	LED1	LED green
C1	100 nF	LED2	LED yellow
C2	10 µF	LED3	LED Red
C3	100 µF	SW3	Switch
		R1 t/m	
D1 t/m D9	1N4148	R16	470 KΩ
		R17 t/m	
U1, U2, U3	IC-socket 14 pins	R20	680 Ω
J1, J2, J3	IC-socket 24 pins	R21	390 KΩ
U1	CD4011BE	R22	150 KΩ
U2	CD40106BE		
U3	CD4013BE		



It is easy to immediately cut and strip some wires during construction that you will need later for your experiments. See the table for the lengths and numbers. The length is the total length. Half of this length of insulation will be removed on each side later on from this length. For this it is best to use a (self-adjusting) stripper.

Draadlengte	Aantal
75 mm	4
50 mm	6
40 mm	6
30 mm	6
20 mm	4

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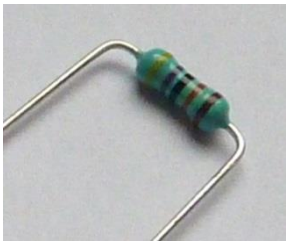
Building description of the Wild-BITS:



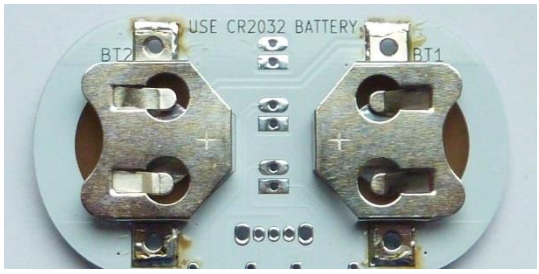
It is easiest to assemble the parts from low to high. All resistors and diodes are mounted horizontally. To do this, bend both wires at a 90-degree angle, taking into account the distance between the holes on the print. Insert the resistor or diode through the PCB and carefully bend the wires at the bottom of the PCB slightly apart. The board can now be turned over to solder without the resistor or diode falling out of the board. After soldering, cut off the legs just above the soldering, also do this for all other components with longer legs such as, for example, the LEDs and the capacitors.

Tip 1: The balls at the beginning of the line can be coloured to indicate which parts have already been assembled.

Tip 2: When in doubt about the mounting of a component, look at the photo of the assembled print, once soldered incorrectly, repair can sometimes be very difficult.

Tip 3: For the resistors, a component bending jig can prove useful.

Assembmy sequence:



Mount the battery holder BT1 and BT2.
That is easiest because the print is now flat. To keep it in place while soldering you can put a wooden skewer through the holes..

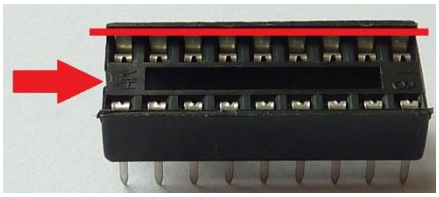
- Mount diodes D1 to D9.
  ATTENTION: look carefully at the drawing on the print how these should be mounted. The line on the diode must match the line on the printed circuit board.

Install the following resistors one after the other:

- R1 t/m R16: 470 KΩ (yellow purple, black, orange, braun)
- R17 t/m R20: 680 Ω (blue, grey, braun, gold)
- R21: 390 KΩ (orange, white, yellow, gold)
- R22: 150 KΩ (braun, green, yellow, gold)
- R23: 22 KΩ (red, red, orange, gold)

- Mount IC-socket J1, J2 en J3.
  PLEASE NOTE: there is a notch in the IC socket on one of the short sides. This must match the drawing on the print.

- **Mount IC-socket U1, U2 en U3.**
- **PLEASE NOTE**: there is a notch in the IC socket on one of the short sides. This must match the drawing on the print.
- When placing these feet, make sure that all pins protrude properly through the PCB before you start soldering, at the top all connections must be flat and aligned. On the photo this is indicated with a similar IC socket.



- Mount capacitor C1 (100nF).
- Mount slide switch SW3.

Assemble successively LED 1 t/m LED3:

- LED1 (green).
- LED2 (yellow).
- LED3 (red).

  NOTE: these may only be mounted in one way. The long leg is at the top of the print. So in the solder box with the round corners. You can also look at the flat side, which is also indicated on the print.

Mount capacitors C2 en C3:

- C2 (10 µF).
- C3 (100 µF).

  NOTE: these may only be mounted in one way. The long leg must be in the hole on the print with + on it. As an extra help the pole is also indicated on the housing on the capacitor.

Place U1 t/m U3:

- U1 (4011).
- U2 (40106).
- U3 (4013).

  NOTE: There is a notch (slot) in one of the ends of the ICs, this must match the drawing on the print and the notch in the previously mounted IC socket. The legs of the IC stand out a little, first bend it in before the IC is inserted into the socket. This is easiest by placing the IC on the table with the legs from one side and tilting the IC a little. Do the same for the other side of the IC. If the IC is inserted in the socket, check that no legs are bent double. You can do this by looking through the IC from the front.

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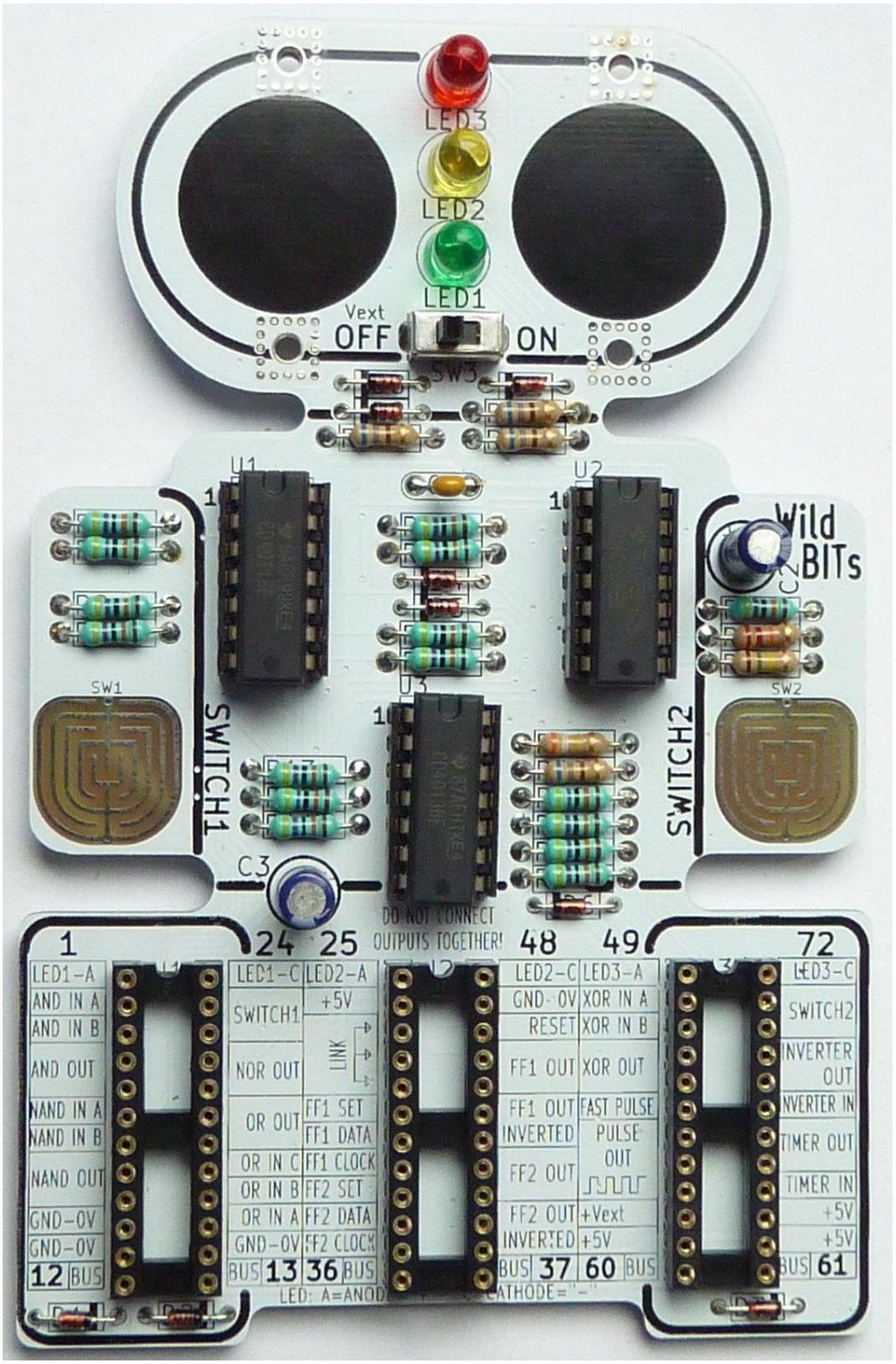
Built-up board:



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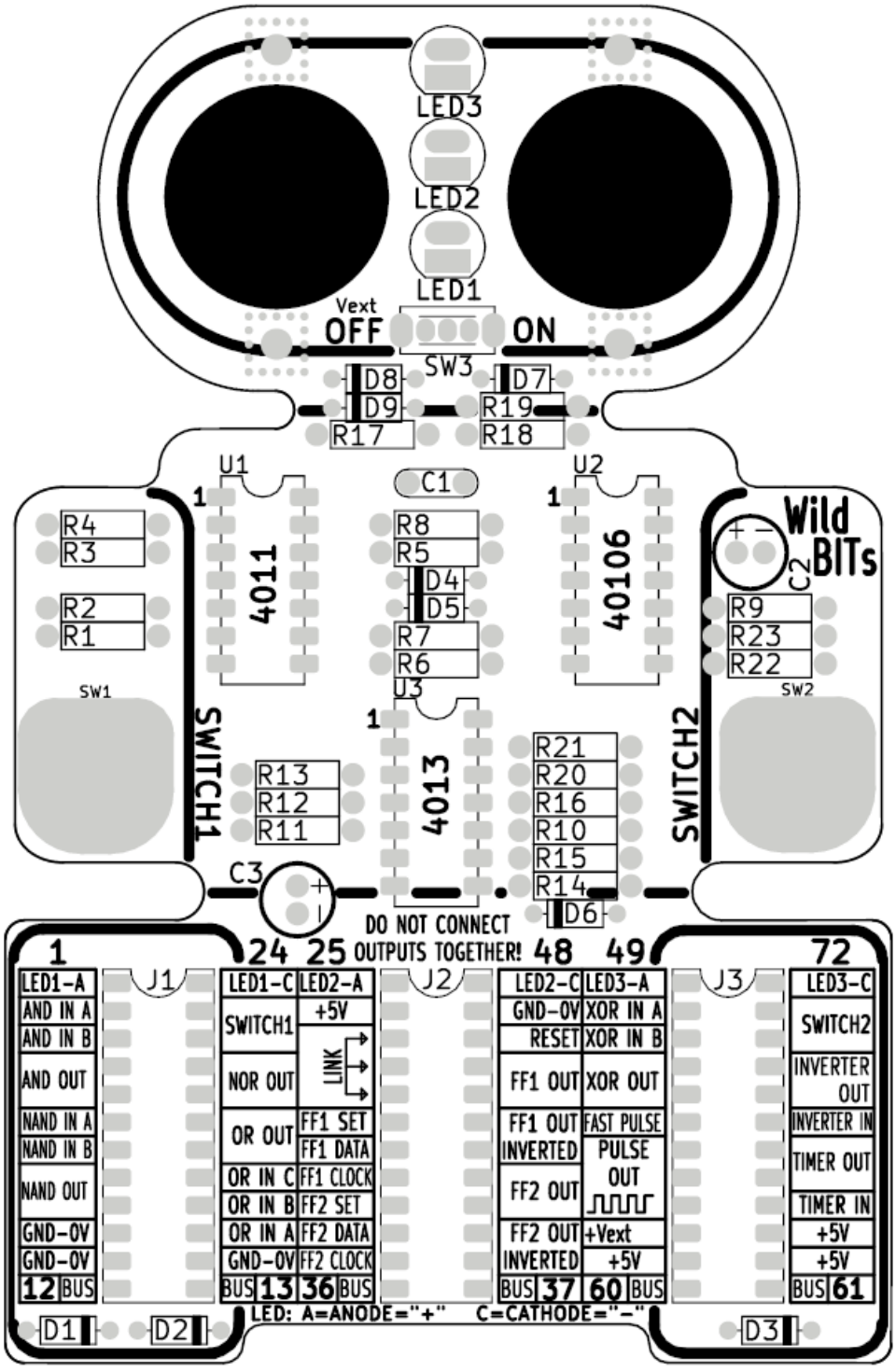
Components setup:



The diagram has been added separately to this document due to its dimensions.

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Soldering with children:

There are at soldering with children some pitfalls imaginable, by avoiding this, it is likely that the new little project is successfully completed. The following items we see in the field: • The making of the soldered connection takes (much) too long, a good soldered connection is made in about 3 seconds. Approximately 1.5 seconds for pre-heat (with a little solder to the tip for good heat conduction), attach solder, solder and remove the soldering iron. Children do not have this skill yet and the materials are heated for too long and thus too hot. • Children often tend to put solder on the soldering iron and then "stick" the solder on the board, the flux is already burning and poor soldering is the result. In an attempt to get it right, the solder connection heats up too long, causing component failures etc.. • Temperature-controlled soldering irons are set at too high a temperature, for leaded solder around 320° C is a good temperature for soldering. • NON-controlled soldering irons often have to high power, and the pin temperature can reach 450 - 500 °C. A iron with a power of about 15 to 20 W is for this purpose the most suitable. • The assistant has previously not read the manual and do not know exactly what to do. • There is too little guidance in relation to the number of participants. Certainly the youngest children, many need much guidance. A directive is to go aim for one attendant on one beaver, with cubs / gnomes one supervisor per soldering (2 scout members per soldering station). With older Scouts go for one supervisor on four members. As the members are more experienced this can be adjusted of course. • It is advisable to have besides the solder guidance, one supervisor who controls the PCB with components build on it and (if applicable) places the IC's ect. This trouble-shooter can also look at mail functional PCB that do not work right away.

Feedback:

Do you have comments or would like to give you feedback about the E-Badge? Do you have comments or questions about the Service Kring JOTA-JOTI? Please contact us via the contact form on the site www.kitbuilding.org

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On behalf of the Service Kring JOTA-JOTI, we wish everyone a lot of fun building but also enjoy the Wild-BITS!