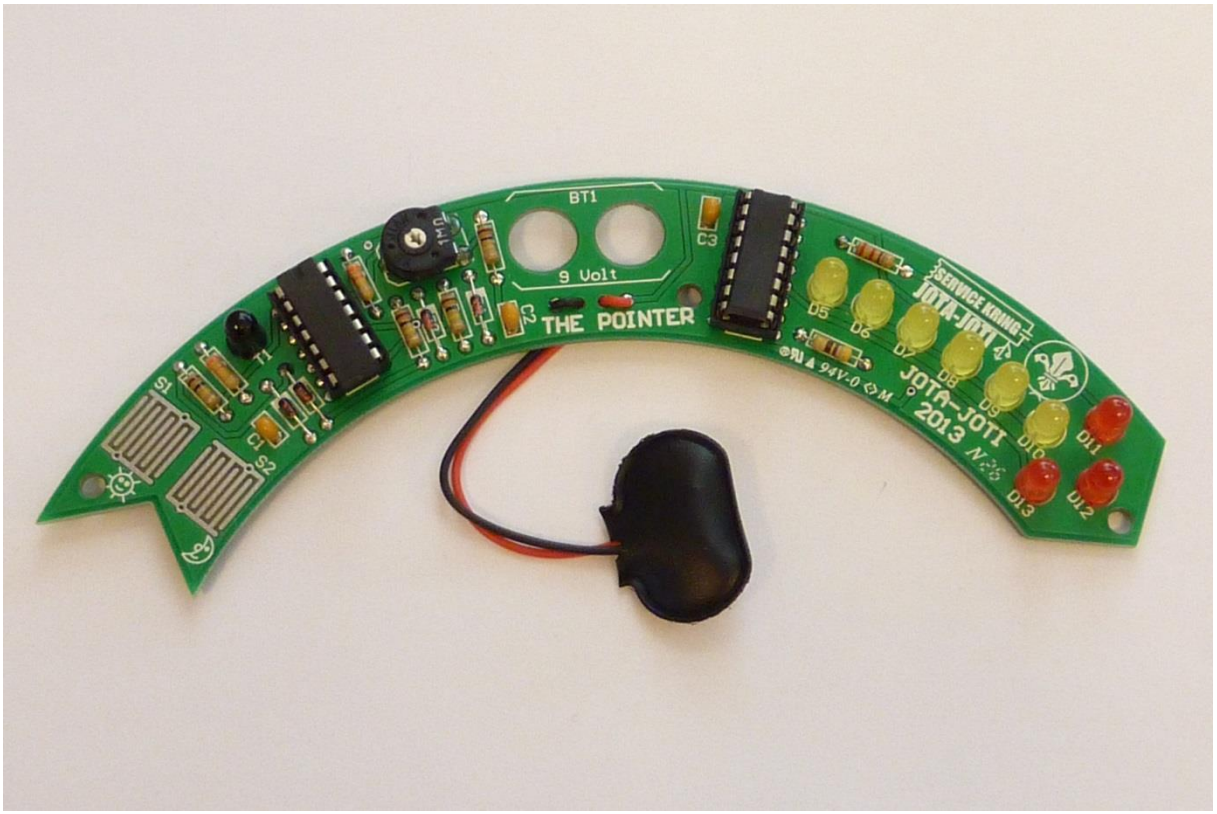
The Pointer 2013



The Pointer kit manual.

A project of the Service Kring JOTA-JOTI.

Like the The Pointer?
Do you have great ideas?
Want to show what you've done with your Pointer
Let us know!

Read how on the last page.

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Table Of Contents:

Note:

Unlike some previous years all the documentation around the kit is included in one big document. This is to ensure, except the building description, also all the background information and other things are combined here.

Before you start guidance the scouts with soldering, we want to recommend to read this entire document carefully. It is sufficient, For building your own is is sufficient to print only page 6 and 7. During construction it may be easy, as a reference, to keep page 9 and 10 also at hand. Having yourselves your sample kit build in advance is besides nice also educational.

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Introduction:

Also this year the Service Kring JOTA-JOTI did it again to put together a fun and educational building project what we have called The Pointer. As well as previous years also this kit is designed for use by children (under guidance) to be soldered together and so to expose them to technique and electronics.

The Pointer is an interactive walking light that turn on automatically in the light or in the dark. The speed of the light, in the shape of an arrow, is adjustable. With the arrow you can draw attention to an important message wherever required. You can also join a treasure hunt in the dark. Hang the Pointer in a conspicuous place, enlighten them there with the flashlight on and follow the arrow!

The Pointer fits well with the theme of 2013 because the theme of the JOTA-JOTI is this year:

"Share it! What to share?"

Short description of the theme:
By doing numerous tasks the children gonna look for clue's. Social media like Facebook, Hyves and Twitter play a role too. The participating Scouts and guidance are given the choice to share things with others. The consideration what part of info to share with the world and what you better keep to yourself herein is an important question.
(more info at: http://thema.jota-joti.nl/)

In the theme logo is to recognize clearly the arrow.
Did you know that the Service kring also badges can be ordered with this logo?
Happy soldering with the construction and the usage of the Pointer!

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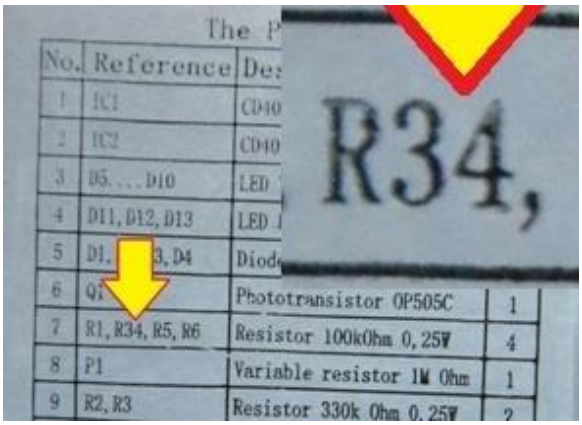
Contents of the Kit:

The table below can be used to check the contents of the Kit. Solder and a 9 Volt battery should be arranged..

Component	Value	Number Of	Place on print	Comments
IC	CD40106	1	IC1	
IC	CD4017	1	IC2	
LED	Yellow	6	D5-D10	5 mm diameter
LED	Red	3	D11, D12, D13	5 mm diameter
Diode	1N4148	4	D1, D2, D3, D4	
Transistor	OP505C	1	T1	fototransistor, kind Black LED
Potentiometer	1 MΩ	1	P1	
Resistance	100 kΩ	4	R1, R4, R5, R6	Brown, black, yellow, gold
Resistance	330 kΩ	2	R2, R3	Orange, Orange, yellow, gold
Resistance	220 Ω	1	R7	Red, red, Brown, gold
Resistance	470 Ω	1	R8	yellow, purple, Brown, gold
Capacitor	100 nF	3	C1, C2, C3	Yellow, inscription 104
9 Volt bat. Clip		1	BT1	
IC-foot	14 pin	1	IC1	
IC-foot	16 pin	1	IC2	
Print		1		

On (only) the packaging of the pointer is unfortunately a small mistake.
On line 7 is R34 mentioned, this should be R4, see also below image.



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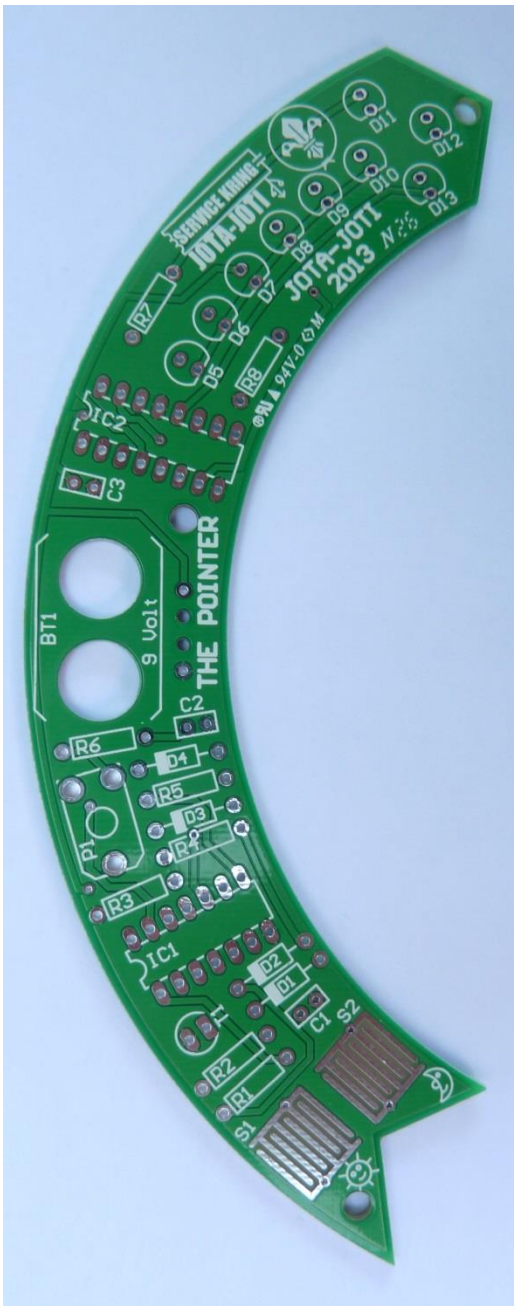
Component numbering and component values:

Print Imprint	Component
R1	100 kΩ
R2	330 kΩ
R3	330 kΩ
R4	100 kΩ
R5	100 kΩ
R6	100 kΩ
R7	220 Ω
R8	470 Ω
D1	1N4148
D2	1N4148
D3	1N4148
D4	1N4148
D5	LED yellow
D6	LED yellow
D7	LED yellow
D8	LED yellow
D9	LED yellow
D10	LED yellow
D11	LED Red
D12	LED Red
D13	LED Red
C1	100 nF
C2	100 nF
C3	100 nF
T1	OP505C
P1	1 MΩ
IC1	foot 14 p
IC2	foot 16 p
IC1	CD40106
IC2	CD4017
BT1	9 V clip



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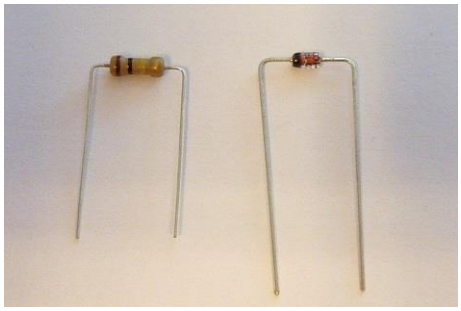
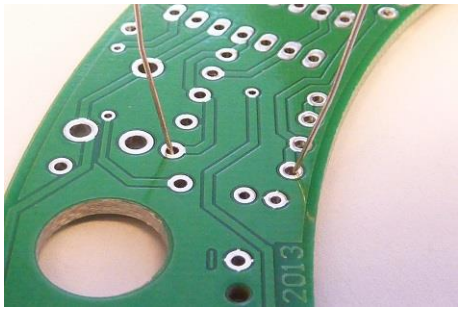
Building description of the Pointer:



The easiest is to build the parts from low to high. We start with the resistors so that we can practice before we fixed what more vulnerable parts go mount. All resistors and diodes are mounted lying, bend to both threads at a 90 degree angle taking into account the distance between the holes on the PCB. Insert the resistance (or diode) by the print back and bend the wires at the bottom of the print careful slightly apart. The print can now be turned around to soldering without resistance (or diode)

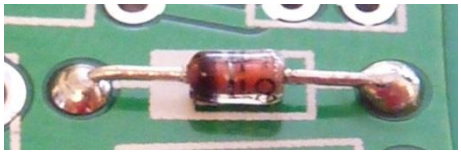
Tip: the polka dot at the beginning of the line can be coloured to indicate which parts are already mounted.



Mounting Order:

Mount the following resistances:

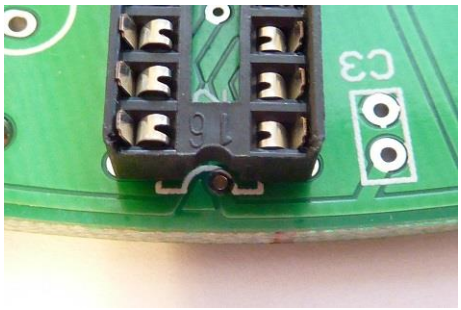
- R1, R4, R5, R6: 100 kΩ (Brown, black, yellow, gold)
- R2, R3: 330 kΩ (Orange, Orange, yellow, gold)
- R7: 220 Ω (red, red, Brown, gold)
- R8: 470 Ω (yellow, purple, Brown, gold)
- Mount diodes D1 to D4, 1N4148 (small reddish glass tube).



PLEASE NOTE: the stripe on the diode should match the thick stripe on the print.

Mount the capacitors:

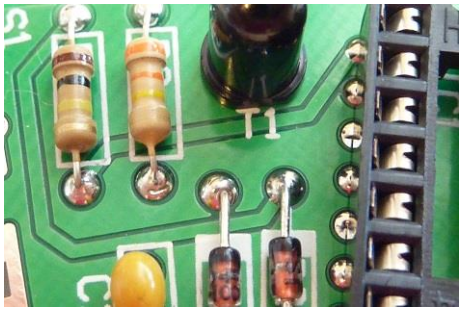
- C1, C2, C3: 100 nF (yellow, inscription 104)



- Mount IC-foot, IC1 (PIN 14).
- Mount IC-foot, IC1 (16 pin).

PLEASE NOTE: in one of the ends of the IC-feet is a notch, it must match the drawing on the PCB. (Make sure all pins are sticking true the print back well before you go soldering).

- Mount potentiometer P1, this can be mounted only one way.
- Mount phototransistor T1.



PLEASE NOTE: this looks like a black LED and as unlike a "regular" transistor this one has just 2 Sockets. To see how this is mounted on the PCB because the transistor has a flat spot. This is also the shortest side of the paw, this should be in the rectangular solder islet

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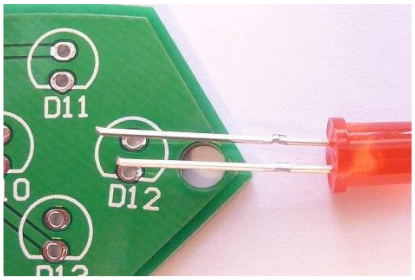
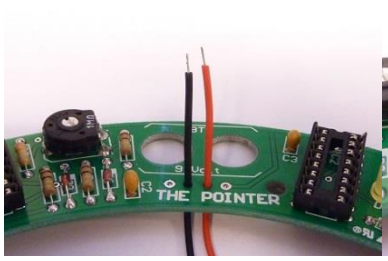
- Mount the yellow Leds, D5-D10.
- Mount the D12, D11, D13 and Red LEDs.

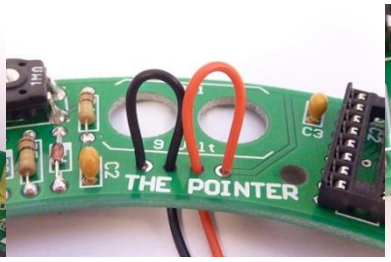
PLEASE NOTE: these must be mounted properly. Also to these Leds is a flat side, however, this is difficult to see. Easier to remember that the short leg to the flat side of the drawing on the print. So if we can read the text on the print, place the short connections in the lower holes.

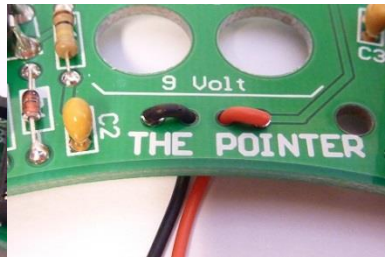


- Mount the battery connection.

Get the wires over from above by the print and insert them in the print. Then solder them and pull the threads tight. This prevents the threads quickly break down. The Red wire to the +, the black wire to-.

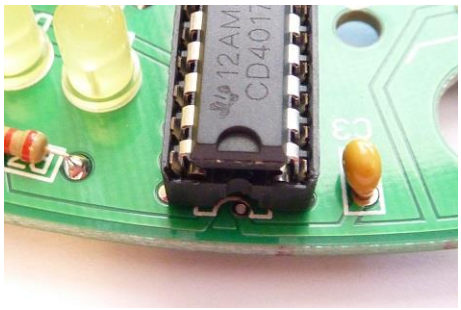






- Insert CD40106, IC1, gently into the IC-foot.
- Insert IC2, CD4017, gently into the IC-foot.

PLEASE NOTE: : in one of the ends of the IC is a notch (slit), it must match the drawing on the print and the previously mounted IC-foot. The legs of the IC are out, bend them to in for the IC in the foot. The easiest is this going by the IC with the legs of one side on the table and the IC to tilt a bit. Do the same for the other side of the IC. If the IC in the foot is put into it, check if there are any legs double curved. You can do this by starting from the front under the IC by watching.



Point of interest

The photo transistor is especially sensitive to light what lead right to the top, twilight or just some less light can soon be seen as dark.

The POINTER is assembled and is ready to be tested!

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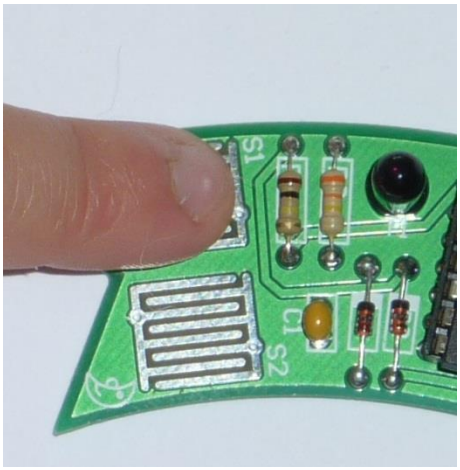
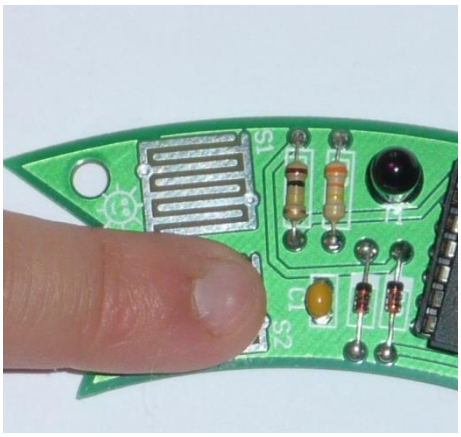
Usage:

Once the Pointer in each other is soldered and the ICS are posted we can go test if the Pointer works. If we connect a battery goes, if we all have done well, the running light walk in the dark, starting with the back towards the tip of the arrow. With P1, we can arrange the speed of this walking light..



With your, something moist, finger on the silver spot at the Sun will enter into the Pointer in the light.



By then, something moist, finger on the silver spot at the moon will enter into the Pointer again in the dark.

Tip:
The arrow points in the design shown to the right, if you want to point the arrow to the left and do not want to hang it "upside down"?
Then mount the LEDs (D5-D13) and the photo transistor (T1) just on the other side of the circuit board.
However, make sure that they are properly mounted (flat side/short leg).

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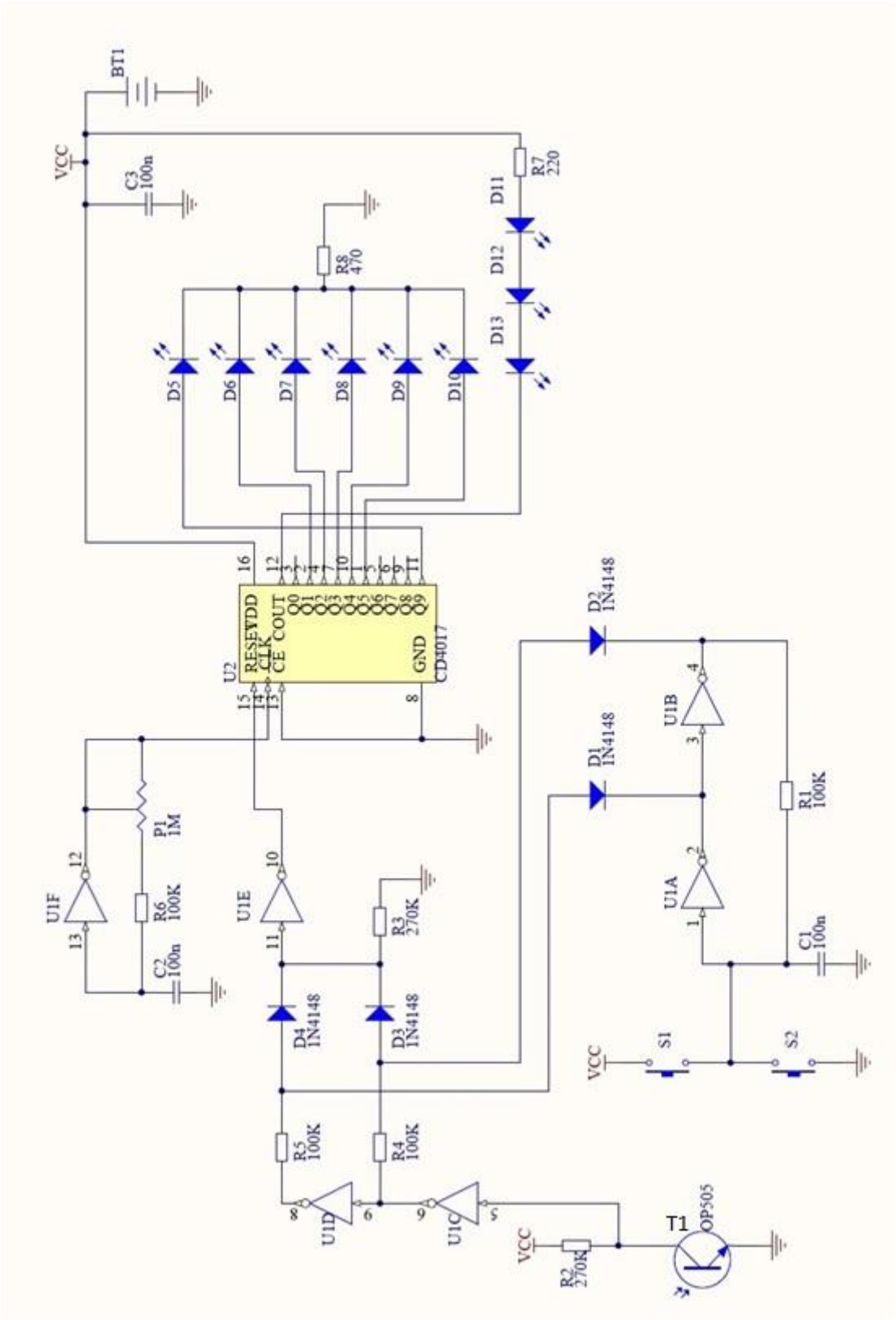
Schematic:



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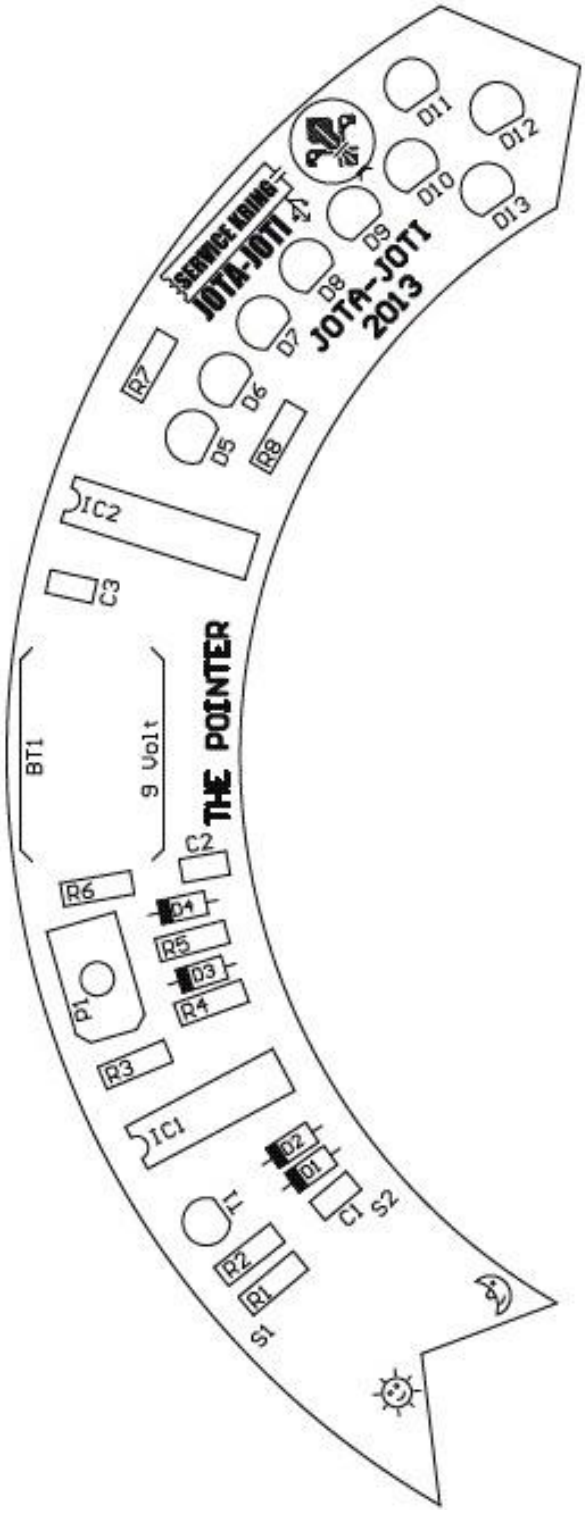
Component Layout:



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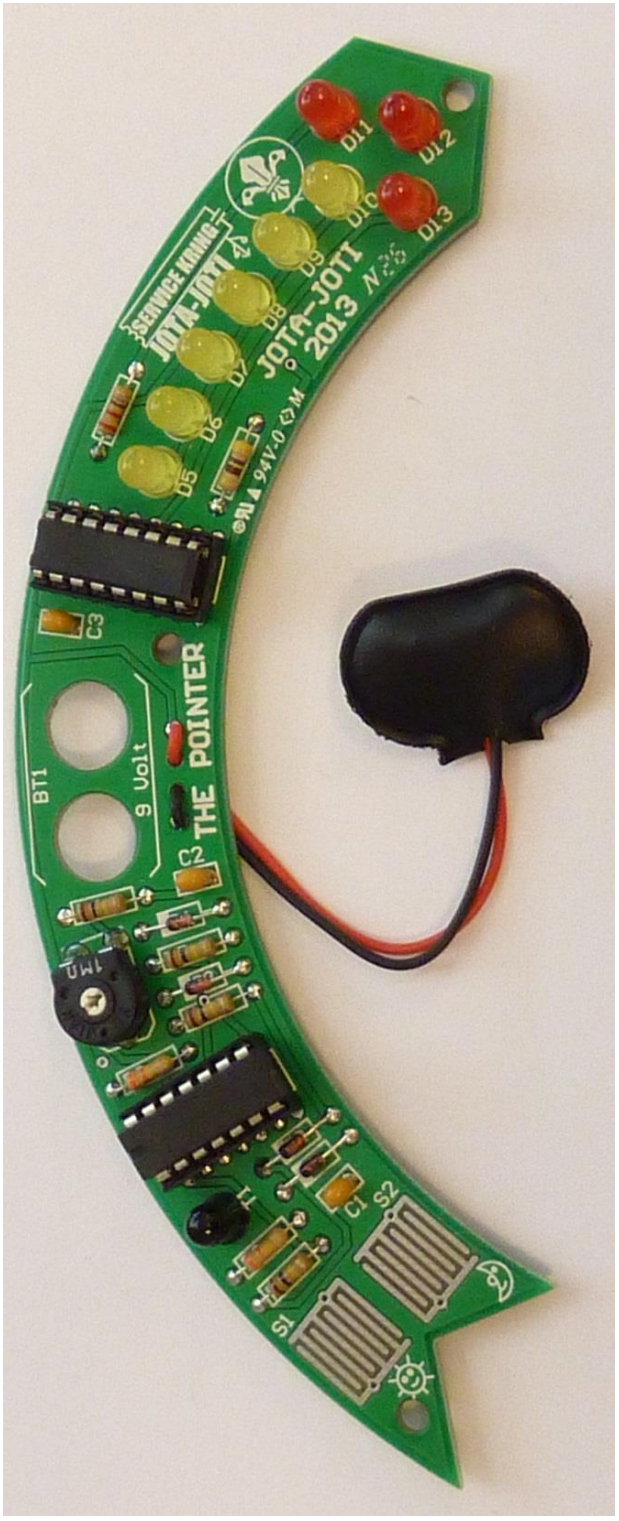
Complete PCB:



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Feedback:

Except that the Pointer is a fun and decorative structure, there are also countless fun playing games.
A search in the vicinity or in the Woods is fast.
Do you have any other cool ideas please tell us!

Do you have comments or do you want to give feedback on the Pointer?
Do you have comments or questions about the Service Kring JOTA-JOTI?
Please contact us using the contact form on the site www.kitbuilding.org.

On behalf of the Service Kring JOTA-JOTI, we wish everyone lots of fun building-, and playing with the Pointer!