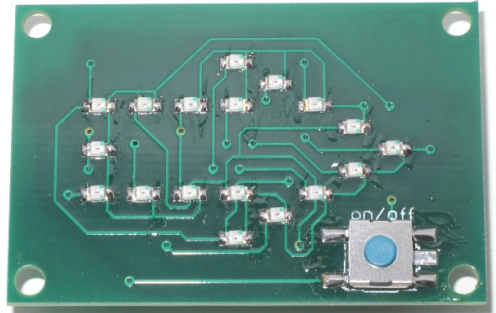# *LED ARROW – Construction Kit*

Contents:
- 1 Circuit board "LED Arrow v4.0"
- 1 Battery CR2032
- 1 Battery holder for CR2032 (SMD)
- 20 LEDs red (0805, 2 spare)
- 1 Push-button (SMD)
- 1 Microcontroller (programmed, SO8)
- 5 Resistors 68 Ω (0805)
- 1 Capacitor 100 nF (0805)

SMD Soldering Advice

To solder the SMD components, tin only one of the pads, then grab the component with tweezers, re-heat the tinned pad and slide the component in sideways. When the component is aligned properly, remove the soldering iron, let the solder joint cool and solder the remaining pins (starting with the diagonally opposite pin for ICs). Solder bridges between adjacent pins can be removed with desoldering wick or by heating up the solder joint, then very quickly knocking the board against the table (with the heated solder bridge facing down). For illustrated soldering instructions, see

http://talkingelectronics.com/projects/SurfaceMount/SurfaceMount-P1.html#table2

It is recommended to solder the components in the order listed below.

1. LEDs (top side):

The orientation is important for the LEDs. You can see two small green (or dark) dots inside the LED on one side (cathode). Some LEDs also have an arrow on the bottom pointing that way. This side must face in the direction the little arrow on the circuit board is pointing to, as shown in the image to the right. Don't solder too long on the LEDs, they will have reduced brightness if they become too hot during soldering.

CATHODE MARK
(DARK DOTS)

arrow
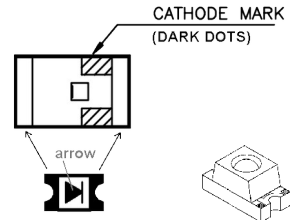
2. Resistors (R1~R5, bottom side):

The resistors are the small rectangular components (size 0805, for 0.08" × 0.05" ≈ 2 mm × 1.25 mm) marked with "680" ($68 \cdot 10^0$ Ω) or "68R0" (68.0 Ω). The orientation doesn't matter.

on/off
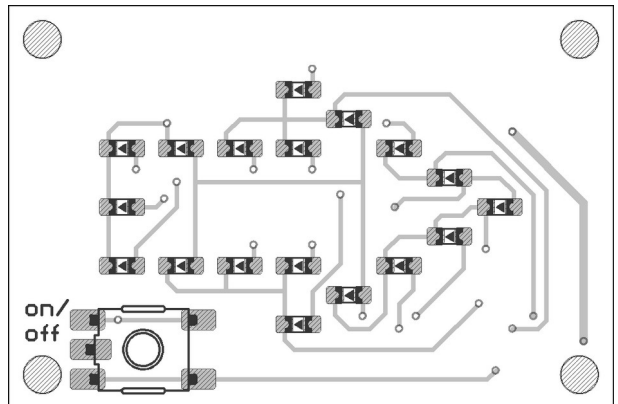
3. Microcontroller (IC1, bottom side):

The small round indent in one corner of the controller (indicating pin 1) must match the small circle on the silkscreen on the board.
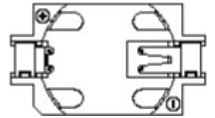
4. Capacitor (C1, bottom side):

The capacitor is the small (size 0805) brown component with no marking. The orientation doesn't matter.

5. Battery Holder (BAT1, bottom side):

You need a decently sized soldering tip for the battery holder – a long, thin tip for SMD soldering doesn't work very well. If your tip is pointy, hold the *side* of the tip against the battery holder's contact for better heat transfer. Make sure the chamfered corner as well as the ⊕ and ⊖ marks match the silkscreen outline on the board.

⊕ side contact *above* battery!

BAT1

CR2032

LED Arrow v4.0
http://blinkenarea.org/
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BlinkenArea

C1 IC1 R1 R2 R3 R4 R5

6. Push-button (top side):

Solder the push-button to the intended location on the board (on the LED side). Orientation is not important if your push-button has only 4 pins, the fifth pad remains unused. 5-pin push-buttons will only fit in one orientation.

7. Turn it on!

Insert the battery (text side facing away from the board) by sliding it sideways *under* the ⊕ **side contact** and then pushing it down. Press the push-button to switch the LED Arrow on.

The battery can be removed by inserting a small, flat screwdriver between it and the ⊖ side of the holder and carefully levering it up.

For fault finding, use the test mode: hold down the button when inserting the battery and keep holding for at least 5 seconds. The LEDs will light up in sequence.

● If an LED lights up at the wrong time, it is likely populated the wrong way around. Desolder it by heating the two pads in quick succession until you can push the LED away with the soldering iron's tip (or use 2 irons), remove any remaining solder with desoldering braid and solder the LED again (rotated 180°).

● If every 4th LED or 4 consecutive LEDs are not working, the cause is probably a bad solder joint on a controller pin or resistor.

● If nothing works, check controller pins 1 and 8 (bottom left and top left) and make sure the battery is inserted correctly (⊕ side contact above battery, as shown above).

Questions? Problems? Comments? Ideas? Please contact me.
E-mail: arne@blinkenarea.org
Project webpage: http://wiki.blinkenarea.org/index.php/LedShapesEnglish