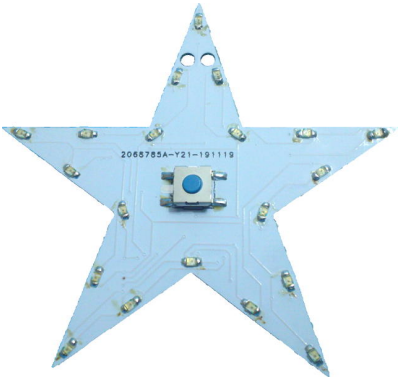
LED STAR – Construction Kit

Contents:

1	Circuit board “LED Star v3.0”
1	Battery CR2032
1	Battery holder for CR2032 (SMD)
20	LEDs KPT2012SECK (orange, 0805)
1	Push-button (SMD)
1	Microcontroller ATtiny13 (SO8)
5	Resistors 68 Ω (0805)
1	Capacitor 100 nF (0805)



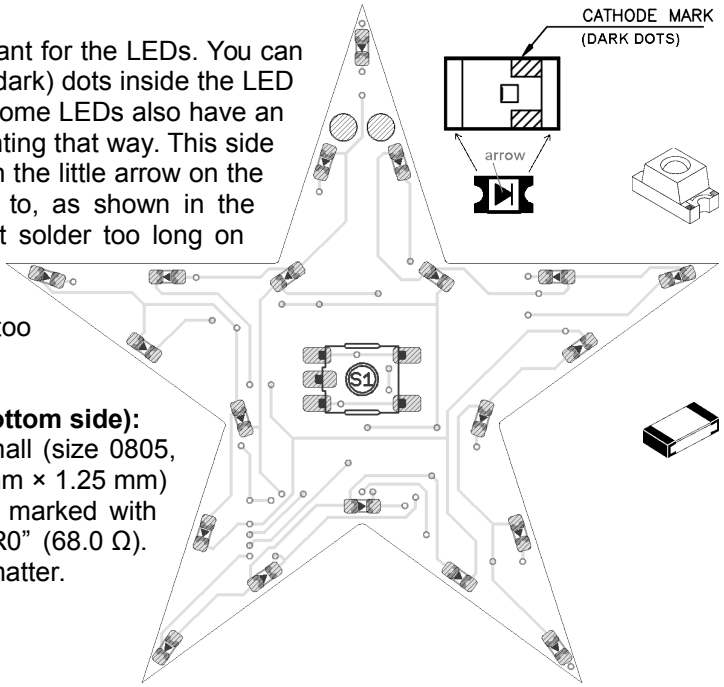
SMD Soldering Advice

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 some 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):

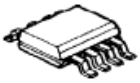
The orientation is important for the LEDs. You can see two small green (or dark) dots inside the LED on one side (cathode). Some LEDs also have an arrow on the bottom pointing that way. This side must face in the direction the little arrow on the circuit board is pointing to, as shown in the image to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



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

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

3. Microcontroller (IC1, bottom side):
The chamfered side must match the line in the silkscreen outline on the board. There is also a triangle in one corner of the controller (indicating pin 1), which must face towards the notch in the outline.



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):
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.

6. Push-button (S1, 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 ⊕ contact and then pushing it down. Press the push-button to switch the LED Star 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.

- If a LED lights up at the wrong time, it is likely that it's 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 5th LED or 4 consecutive LEDs are not working, the cause is probably a bad solder joint on a controller pin.
- If nothing works, check controller pins 4 and 8 (top right and bottom left) and make sure the battery is inserted correctly (⊕ side contact visible, as shown above).

Questions? Problems? Comments? Ideas? Please contact me.
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Project webpage: http://wiki.blinkenarea.org/index.php/LedStarEnglish