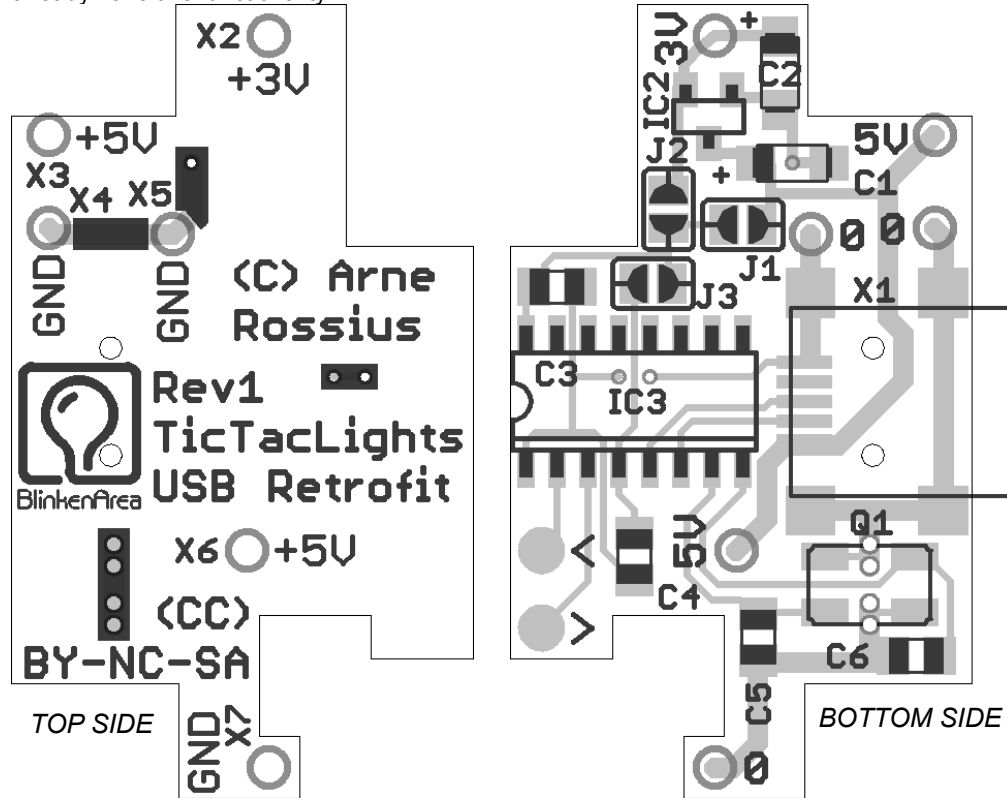


TicTacLights USB Retrofit Kit

Contents:

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| 1 PCB "TicTacLights USB Retrofit Rev. 1" | 2 Ceramic Capacitors 12 pF/15 pF (0805) |
| 1 USB/UART converter CH340G (SOIC16) | 2 Ceramic Capacitors 100 nF (0805) |
| 1 Voltage Reg. MCP170x-3302 (SOT23) | 2 Tantalum Capacitors, 1 μ F (size code A) |
| 1 Resistor 270 Ω (0805) | 1 Crystal, 12 MHz (SMD, 5x3.2 mm) |
| 1 Resistor 2.7 k Ω (0805) | 1 Piece of wire, 0.09 mm ² |
| | 1 Paper label, blank |

This kit can be used to add a USB connection for power and data to older revisions of the TicTacLights (Rev. 1.0, 2.0 or 3.0) and TicTacLights Colour (Rev. 1.0) projects. Newer versions already have this functionality.



1. Solder components in the order listed below

- X1 = USB connector (**cut plastic pins on bottom to approx. half length first**)
- IC2 = Voltage regulator (only fits in one orientation)
- IC3 = USB-UART converter (dent in one corner must face toward notch in outline)
- Q1 = Quartz crystal (orientation doesn't matter)
- C1, C2 = 1 μ F (tantalum, printed bar on capacitor must face to plus sign on PCB)
- C3 = 100 nF (ceramic, not polarised)
- C4 = 100 nF with 270 Ω resistor (marked "271" or "2700") on top (in parallel).
- C5, C6 = 12 pF (ceramic, not polarised)

2. Solder Jumpers

Solder bridges across the solder jumper pads as follows:

- TicTacLights (all revisions): Bridges on SJ2 and SJ3 (3.3 V logic level signals)
- TicTacLights Colour: Bridge on SJ1 (5 V logic level signals)

3. Prepare TicTacLights

Some components have to be removed from the TicTacLights board:

- TicTacLights Rev. 1.0: Remove battery holder
- TicTacLights Rev. 2.0: Remove battery holder, USB connector (X6), IC2, C5, and C6
- TicTacLights Rev. 3.0: Remove USB connector (X6)
- TicTacLights Colour Rev. 1.0: Remove USB connector (X2)

Clean solder pads with desoldering braid after desoldering components.

4. Determine used contact points

The contact points on the USB Retrofit board are used to connect power to the TicTacLights.

- TicTacLights Rev. 1.0: use X2 and X7
- TicTacLights Rev. 2.0: use X2 and X7
- TicTacLights Rev. 3.0: use X3 and X4
- TicTacLights Colour Rev. 1.0: use X5 and X6

Cover unused contact points as well as the white rectangles with small pieces of adhesive paper label, applied to the top side of the Retrofit board.

5. Mount to Retrofit Board to TicTacLights Board

Lay retrofit board on the TicTacLights board with the *top* side of the retrofit board touching the *bottom* side of the TicTacLights board. Align carefully, then solder the two contact points to the corresponding solder pads on the TicTacLights using plenty of solder. Leave the soldering iron on the solder joint for several seconds so the solder can flow between the boards.

TicTacLights Colour: the retrofit board will lie on top of some components, use cyanoacrylate glue ("superglue") to fix it to the components and use short pieces of solid wire to bridge the gap between the boards for the contact points.

6. Connect serial port pads

Cut two short pieces from the thin stranded wire to connect the "<" solder pad with the "Rx" solder pad on TicTacLights and the ">" solder pad with the "Tx" solder pad. The "Rx" connection requires a 2.7 k Ω resistor (marked "272" or "2701") in series with the wire. The easiest way to do this is to solder the resistor to the "<" pad vertically, then solder the wire to the top of the resistor (see picture). Be careful, the resistor cracks easily.

Questions? Problems? Comments? Ideas?

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Project Webpage

http://wiki.blinkenarea.org/index.php/TicTacLights_USB_RetrofitEnglish

