30 LED Light Chaser Ring

Contents:

- 1 Circuit board “Light Chaser Ring 30ch v1.0”
- 1 IC 74HC132 (quad NAND gate with Schmitt-trigger inputs)
- 1 IC 74HC4017 (decimal counter)
- 1 14-pin IC socket
- 1 16-pin IC socket
- 30 LEDs 5mm, high efficiency
- 1 Slide switch
- 1 Resistor 180 Ω
- 1 Resistor 10 kΩ
- 3 Resistors 1 MΩ
- 4 Ceramic capacitors 100 nF
- 1 Battery Holder for CR2032
- 1 Button cell CR2032

General Soldering Advice

Insert the components one at a time and bend the leads outward slightly to prevent the component from falling out. Heat up the solder joint for a second before feeding some solder wire between the soldering iron's tip, the board and the component's lead. Wait for a few more seconds before removing the tip from the solder joint so the solder has time to flow. Don't move the board before the solder has solidified. After soldering, trim the leads with a wire cutter to about 1-2 mm length.

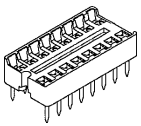
See http://mightyohm.com/files/soldercomic/FullSolderComic_EN.pdf for more detailed instructions.

I recommended soldering the components in the order listed below. Make sure the board is the right side up (component outlines visible) before starting.

1. Resistors (R1~R5): Gently bend the leads by 90°, then insert the resistors into the board and solder them. Orientation doesn't matter.

Resistor	Value	Colour Code
R1	180 Ω	brown, grey, brown, gold *or* brown, grey, black, black, brown
R2~R4	1 MΩ	brown, black, green, gold *or* brown, black, black, yellow, brown
R5	10 kΩ	brown, black, orange, gold *or* brown, black, black, red, brown

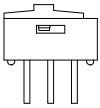
2. IC Sockets (IC1, IC2): Insert the IC sockets into the board, making sure the orientation of the small notch matches the silkscreen outline. You can bend two diagonally opposite pins of the socket if you like, but setting the board (with the socket inserted) upside-down on a flat surface works just as well.



3. Capacitors (C1~C4): Insert the capacitors and solder them.
The orientation doesn’t matter. There are two different values:

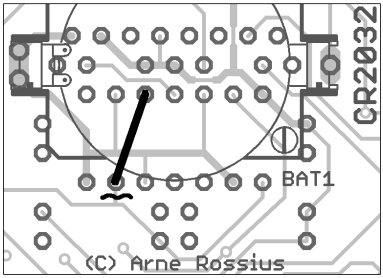
Capacitor	Value	Code
C1~C4	100 nF	“104” (**10**·10^4 pF = 100 000 pF = 100 nF)

4. Slide switch (S1): Insert the switch to the intended location on the board and solder it. Orientation doesn't matter. Be careful when trimming the leads, the ends tend to fly away quite forcefully.



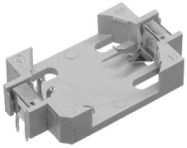
5. PCB rework: The PCB in this kit has a small error which must be fixed. If you skip this step, the LEDs will light up in the wrong order.

5.1: On the bottom of the board, cut the trace as shown (squiggly line under the battery outline, between the IC pad and the horizontal trace). You can use a small flat screwdriver, hobby knife or other sharp or abrasive tool. Make sure to remove any burrs to avoid a short-circuit across the cut.



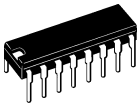
5.2: Now, solder a piece of wire (e.g. one of the cut-off resistor leads) between the two IC pads as shown in the image (thick straight line, IC pins 3 and 13).

6. Battery Holder (BAT1): Make sure all solder joints are good under the battery holder before inserting it to the bottom side of the board and soldering it (also from the bottom side). It will only fit in one orientation. Use plenty of solder and make sure the solder has flowed all the way into the holes before removing the soldering iron.



7. LEDs: The LEDs can be installed in 3 different ways: pointing up (inserted from IC side), pointing down (inserted from battery holder side), and pointing out (leads flat against the board from either side). To install the LEDs flat, cut the LEDs' leads to be slightly shorter than the pads around the edge of the board before soldering. Otherwise, cut the leads after soldering. Orientation is important, the flattened side indicates the *cathode* (–). On the board, the other side (*anode*) is marked with a "+" sign. Solder only one pin of each LED first, then carefully check alignment and polarity before soldering the other pin. Don't solder too long on the LEDs, they will have reduced brightness if they become too hot.

8. ICs (IC1, IC2): Insert the two ICs into their corresponding sockets. You may have to bend the pins inward slightly before they will fit into the socket. Make sure the IC's notches match those of the sockets and the silkscreen outlines. Sometimes, the notch is replaced by a tiny dot near pin one, which should also face towards the notch of the socket. **Please ignore the "74HC00" label on the board,** the correct IC to install in that location is 74HC132.



9. Battery: Insert the CR2032 button cell into the holder. With the marked side ("+" side) facing away from the board, slide the battery under the short metal tabs on the side of the holder marked "+", then press down until it clicks in. To remove the battery, insert a small flat screwdriver between the battery and the "–" contact of the holder, then carefully lever it out.

10. Turn it on! If your kit has a red switch, move it towards C3. If the switch is white, move it towards C4.

Questions? Problems? Comments? Ideas?
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