

Sparkle the Seahorse

A badge in the shape of a seahorse with sparkling LED animations.

Construction

This is a kit with surface-mount components which makes it harder than one with through-hole components, but it uses components which are sized at the easier end of surface-mount soldering (1206). A magnifying lens is helpful for construction and fine solder and a fine-tipped iron are essential.

First solder the LEDs to the front of the board. The individual LEDs are not numbered but they are all the same (a couple of extra are included in case of mistakes). The polarity of the LEDs is important - see the diagram below for the correct orientation. Try to align them neatly between the solder pads and lying flat on the board. Note that if you solder an LED backwards it is not a complete disaster. It will still work but will light up at the wrong point in the sequences.

Next solder the chip (IC1) to the back of the board. The symbol on the board has a small dot which marks pin #1 and on the chip itself there is a small recessed circle. Make sure the pins of the chip are not bridged by too much solder.

Solder the resistors (R1, R2, R3, R4 and R5) to the board. The resistors are all the same and their orientation is not important.

Solder the capacitors (C1 and C2) either way around. C2 is slightly larger than C1 but if you mix them up it's not too important.

Add a small blob of solder to the middle of the larger metal square on the back side of the board to help make a better connection with the coin cell. Spread the solder around a little with the soldering iron so it is not too high then fit the coin cell retainer to this side of the board matching the marked outline. Solder the two tabs to the board using plenty of solder to make the joints physically strong. See picture below.

Insert a 3V CR2032 coin cell fully into the retainer with the positive (+) side uppermost. All the LEDs should flash twice if the board is functioning correctly.

Optionally fit the pin through the hole at the top of the board and then through your clothing. Use the butterfly clip to hold your badge securely in place. The pin can be soldered in place if you wish.

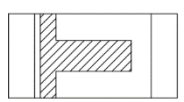
Note the ICSP holes are used in development for re-programming the microcontroller.

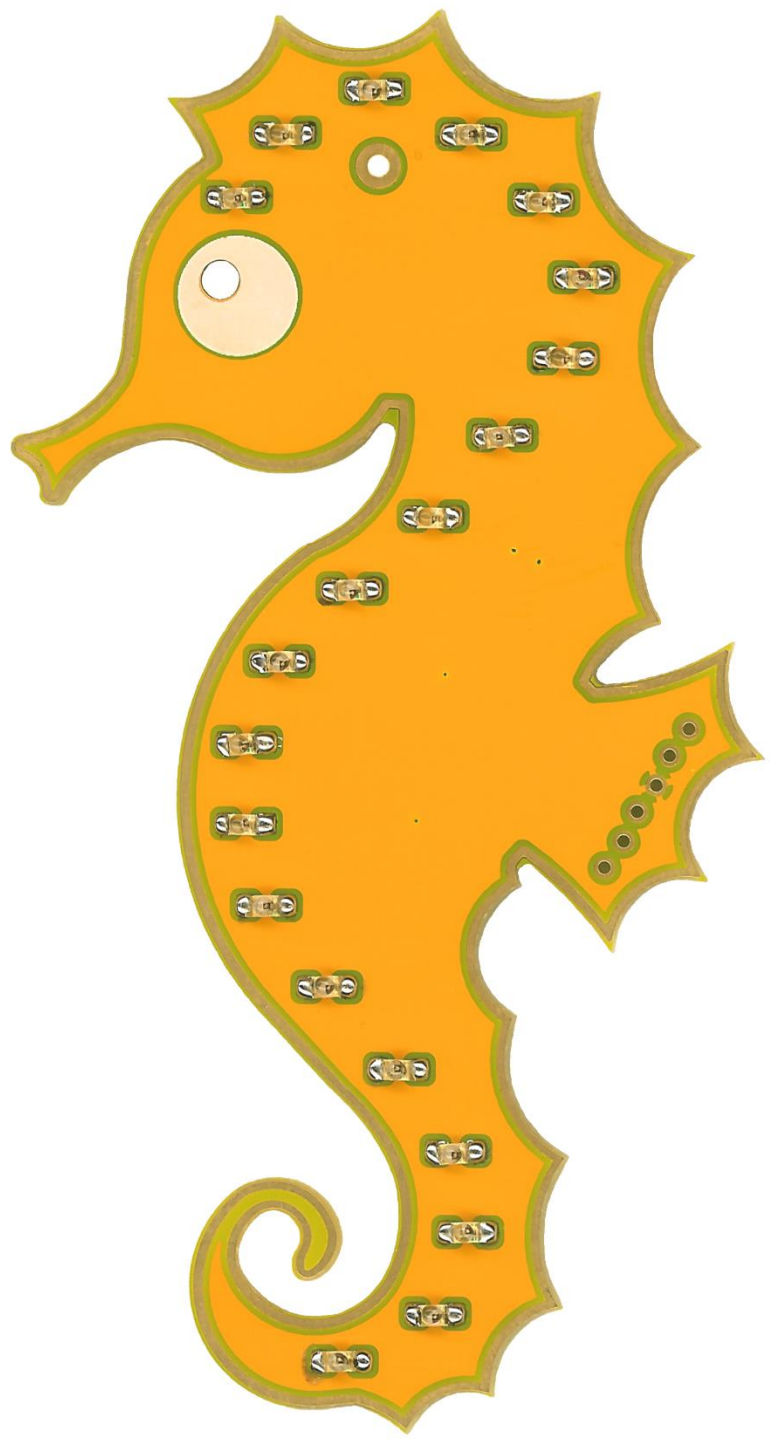
How to use

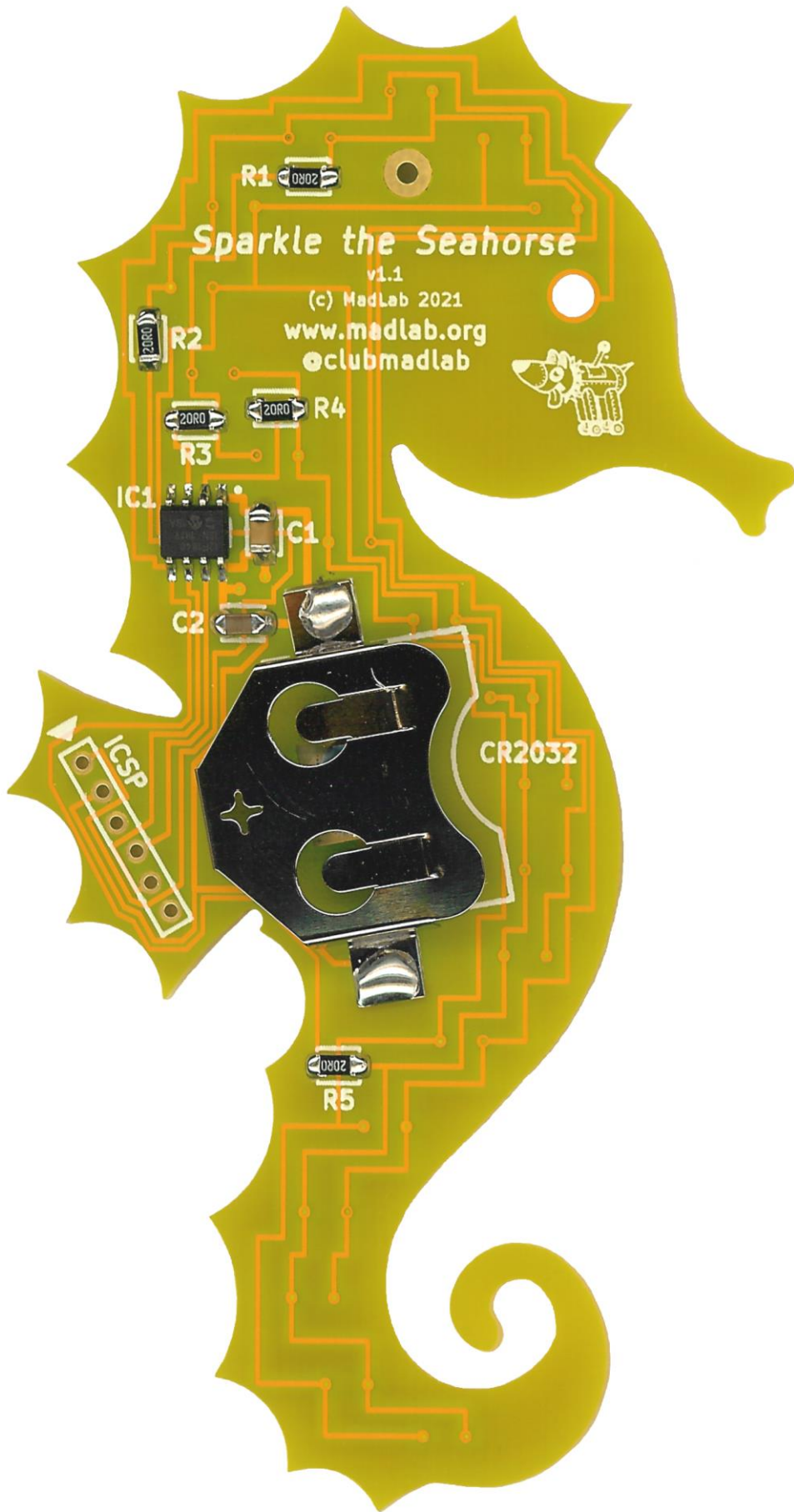
The seahorse's eye is a touch switch. Touch it to start the LED animations then touch it again to stop them. The badge will cycle through the animations in turn.

Remove the coin cell when not using the badge for any length of time.

symbol on PCB 1  2

underside of LED 1  2





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v1.1

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R1 20K

R2 20K

R3 20K

R4 20K

IC1

C1

C2

CR2032

R5 20K

ICSP

Component list

Resistors

R1 - R5 20R (black, marked '20R0') + 1 spare

Capacitors

C1 100nF MLCC (brown)

C2 10uF MLCC (brown)

Semiconductors

LED1 - LED20 hyperbright red LEDs + 2 spares

IC1 PIC12F1840-I/SN microcontroller

Miscellaneous

CR2032 coin cell retainer

Butterfly clasp + pin

PCB

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