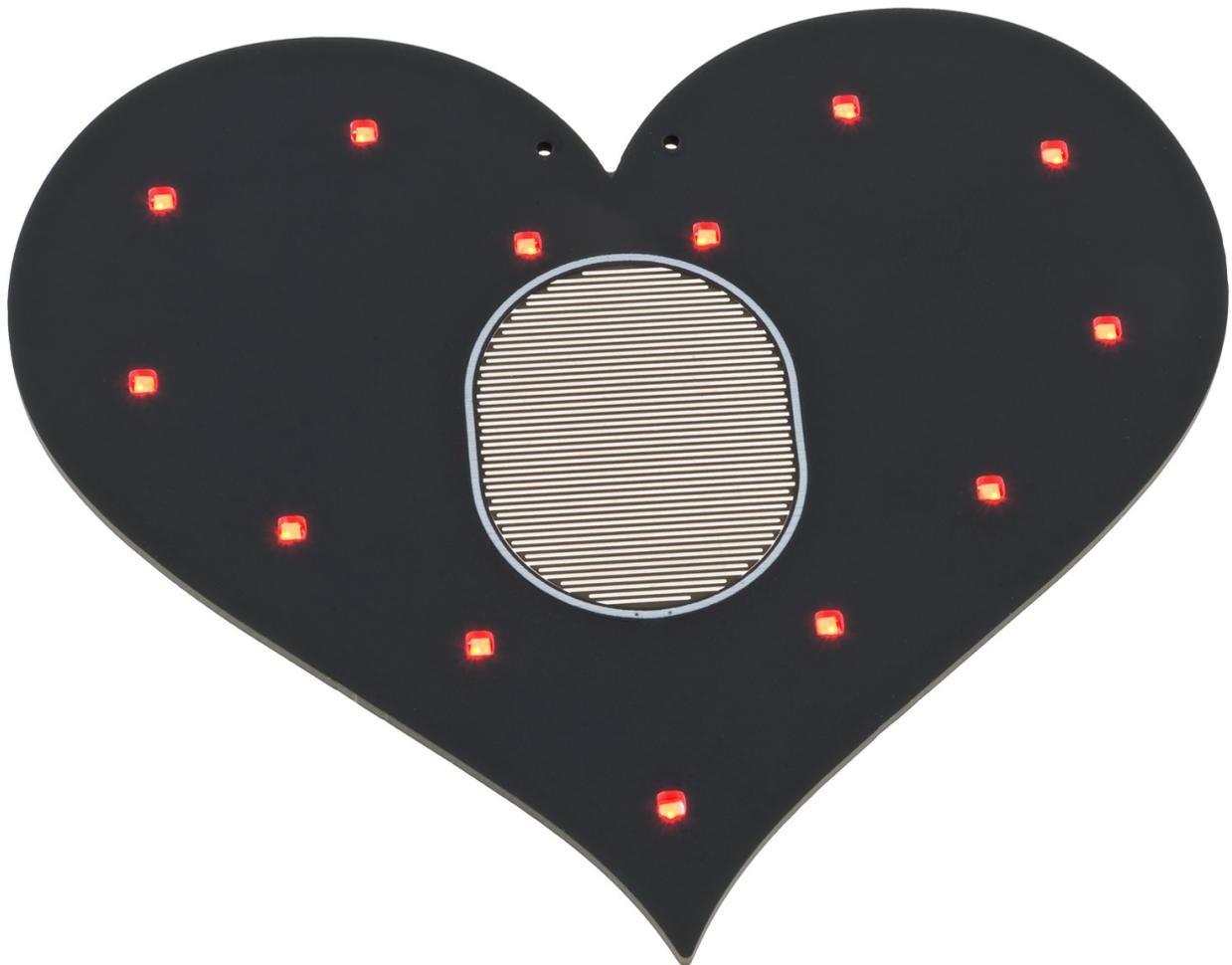


EK037 Flashing Heart 13LED

Part.no: [41035972](#) ↗



Description

Solder kit with 13 red LEDs and a touch sensor. The kit contains exclusively surface-mounted (SMD) components. Good practice kit with easy-to-solder components.

The circuit consists of an OP amplifier, configured as a triangle-wave oscillator, a transistor to drive all the LEDs, and a simple resistive touch sensor. The oscillator speed can be increased by partially short-circuiting the touch sensor when it is touched. When a larger area of the sensor is touched, the resistance becomes lower and the LEDs pulse faster.

Please read the entire assembly guide first. Correct tools are required in order to be able to solder the small components.

Required tools:

- Solder iron with ~40-60W power and a small solder tip
- Solder wire (thin diameter)
- Tweezers to pick and place the small components

In addition to the tools listed, you will need a flat working surface and good lighting- Some magnifying tool, microscope or loupe makes the assembly much easier.

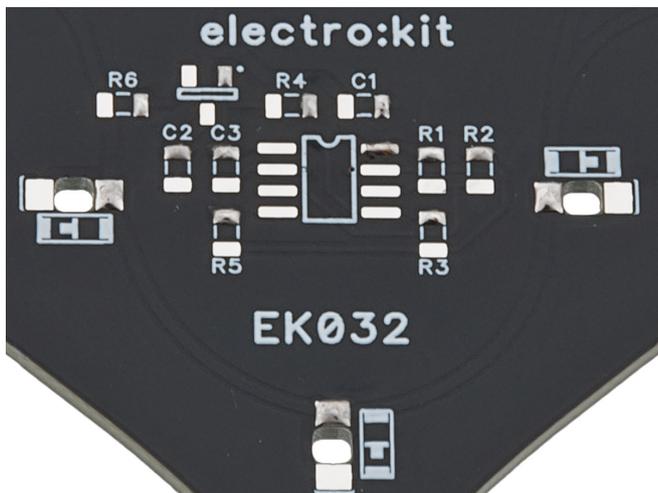
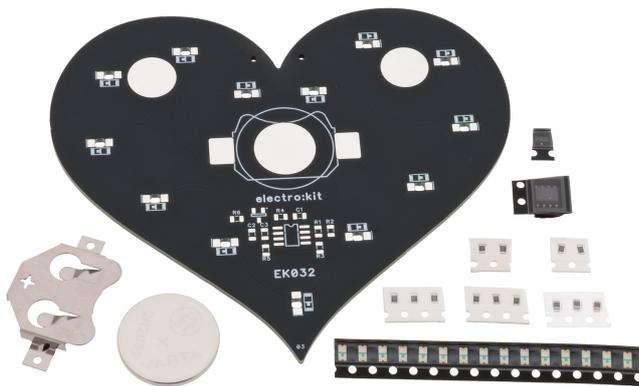
Please note that some extra resistors are included as they are easy to loose.

Component list

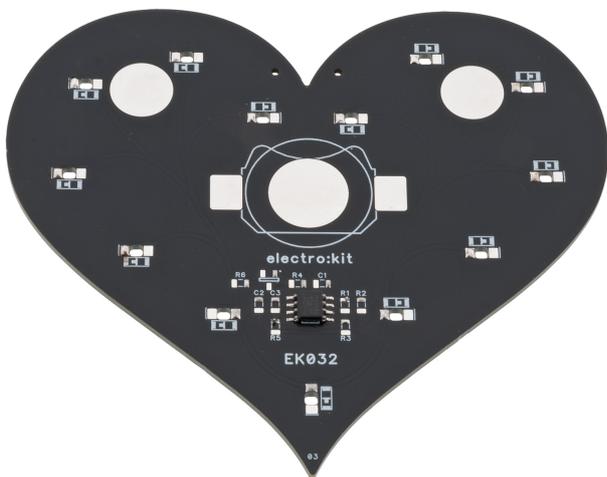
RefDes	Description	Marking	Value	Qty.
BT1	Battery holder		CR2032	1
C1, C2, C3	Capacitor 0805	Brown	10uF	3
D1 - D13	LED 1206		Red	13
R1, R5	Resistor 0805	1003	100kohm	2
R2, R3	Resistor 0805	224	220kohm	2
R4	Resistor 0805	8202	82kohm	1
R6	Resistor 0805	100	10ohm	1
T1	Transistor NPN SOT-23		BC847	1
U1	OP amplifier SOIC-8	MV358I	LMV358	1

Assembly guide

Start by checking that all components are included. Check the component list. Do a visual inspection of the PCB and make sure it's free from damage. If necessary, clean the PCB with isopropanol to remove grease and dirt.

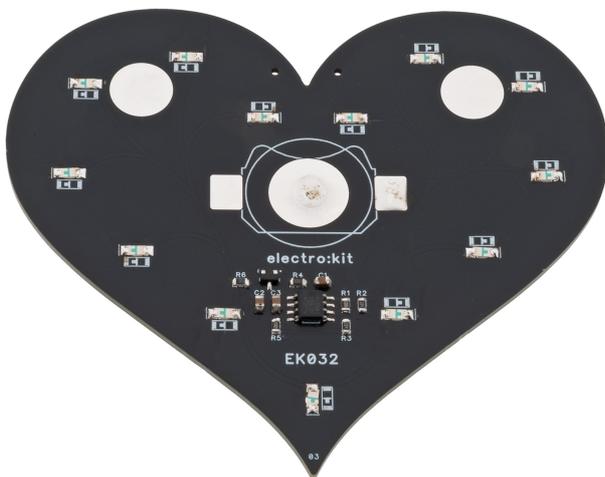
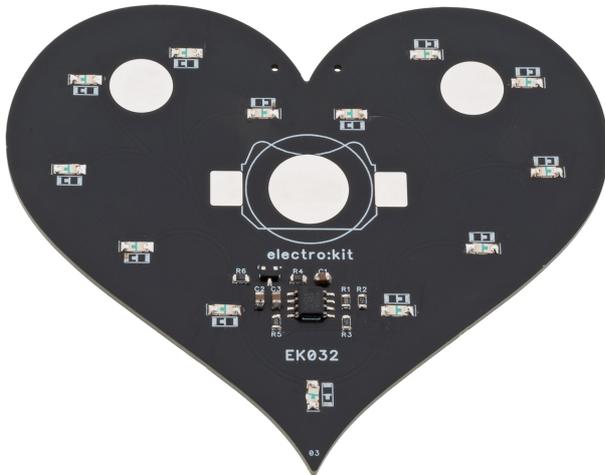
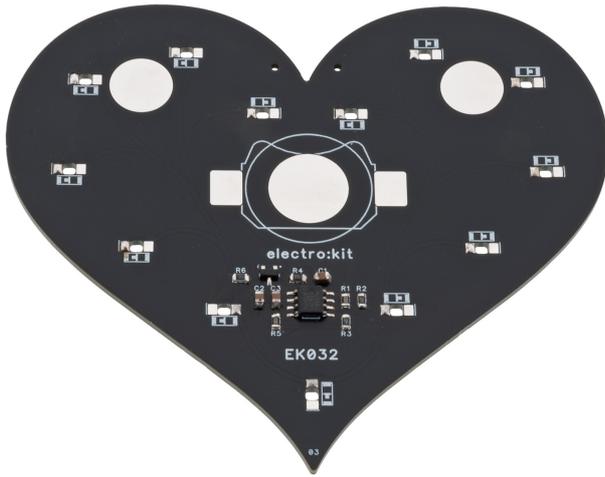


First step is to tin one pad for each component, except the battery holder.



First component to mount is the IC in the center. Continue working outwards with the rest of the components. Melt the solder on the pre-tinned pad and slide the component in place using tweezers. When the component is centered, solder the other pins. Make sure the solder joints are smooth and no residual solder is left on the board.

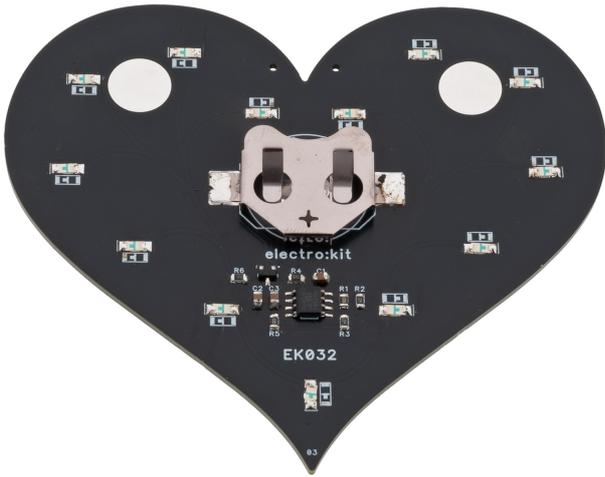
Continue mounting the rest of the components. Check the component list to see where each component should be placed.



Next step is to mount the 13 LEDs. Please note the markings on the PCB and the LEDs. LEDs must be correctly oriented. The LEDs should be mounted with the transparent side faced down and will fit in the hole between the pads.

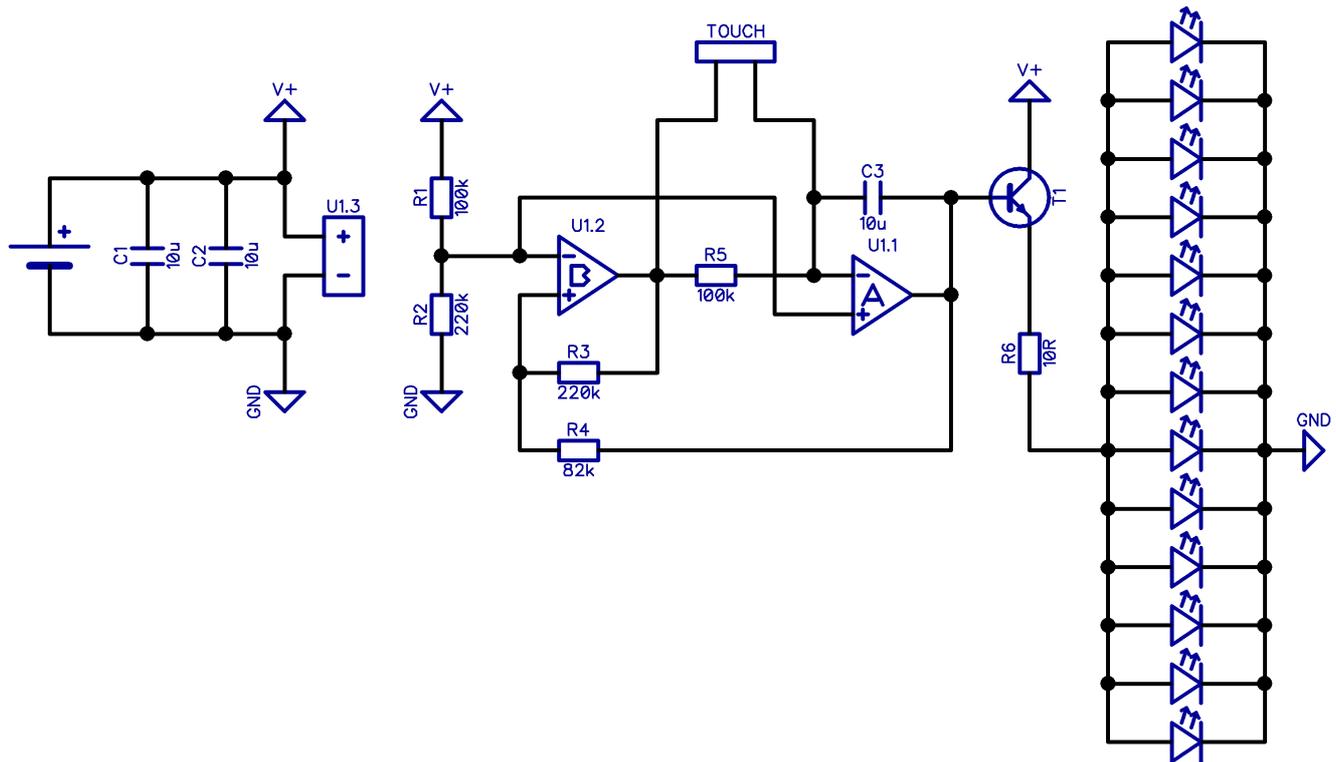
The battery holder is a bit more difficult to solder than the small components as the pads are larger and will require some time to heat up. Don't make the mistake of increasing the temperature too much! Just keep the tip on the pad until the solder melts. Start by melting some solder to the round pad in the center. Nothing will mount to this pad, but the additional solder will create better contact with the battery. Pre-tin one of the square pads.

Solder one side of the battery holder, just like the other components. Keep in mind that the holder is large and it can take a while to heat all the material before the solder melts. When the holder is soldered on one side, finish the assembly by soldering the other pad.



Make a last check before power-up. Make sure all components are in the correct place, all LEDs are in the correct orientation, and that no pad has been left unsoldered. If everything looks good, place the battery in the holder (+ sign facing up) and the LEDs should start flashing slowly. When the large oval pad on the other side of the PCB is touched, the LEDs will increase in speed.

Schematic



Troubleshooting

If you run in to any problems when the board is assembled, please follow the guide below.

- Nothing happens. The LEDs neither lights up or flashes!
 - Check that all components are in the correct location.
 - Check that all LEDs and the IC is oriented correctly. Compare with the last image in the assembly guide.
 - Check that all pads are soldered and no residual solder is left on the board that could cause shorts.
 - Check that the battery is installed correctly. The plus side should face upwards ad the negative side facing the PCB.

- The LEDs light up, but doesn't flash or pulsate at all!
 - Check that all resistors are in the correct location. Compare "marking" from the component list with the markings on the resistors.

- All the small components can be soldered, but the battery holder will not stick!

- It can be very difficult to heat both the pads on the PCB and the battery holder at the same time. It takes time to heat all the metal that wicks away the heat from the solder tip. Let it take time. It can take several minutes to heat, especially if the solder tip is very small and/or the solder station output power is low.