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Twinkle star



The Twinkle star building kit will provide almost endless light effects, generated by 10 very bright LEDs. The building kit comes with all the needed parts including 10 bright LEDs.

You can set the light effects by adjusting two potentiometers. You could also place more Twinkle star PCB's besides or below/above each other to make bigger light effect panels

The light effects are pseudo random and will always be different. With the two potentiometers you can adjust the effects in a lot of ways.

This building kit is easy to assemble even for the beginner. All that is needed is a soldering iron and solder. Everything else is provided for. In the building kit.

A great Budgetronics building kit for endless pleasure and fun!

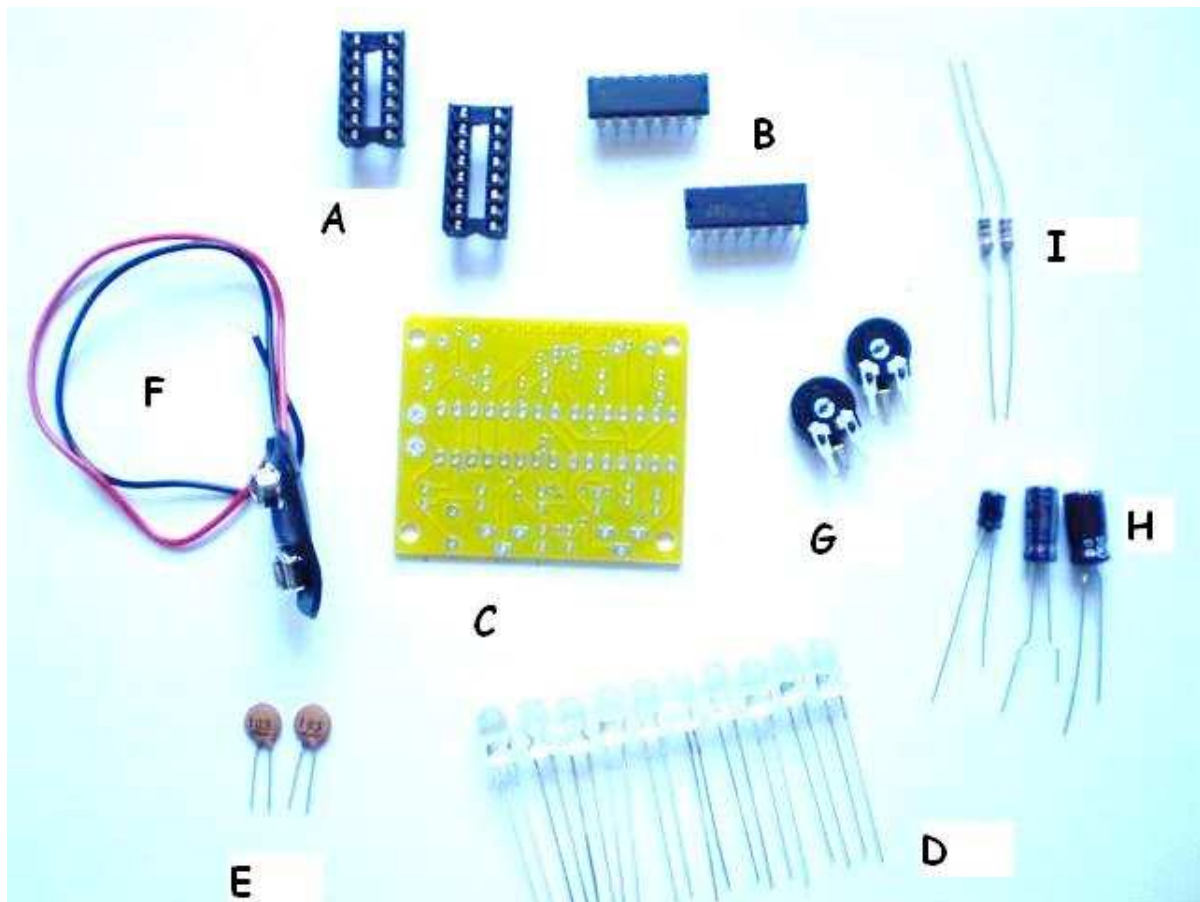
Introduction

The Twinkle Star

The heart of the Twinkle star is formed by the NE555 and a 4017 CMOS IC. This circuit provides an almost endless variation of electronic pulses which will light up 10 LEDs in different lighting patterns. With two adjustable potentiometers the light effects can be changed from slow flashing to a very chaotic light pattern.

Partslist of your building kit

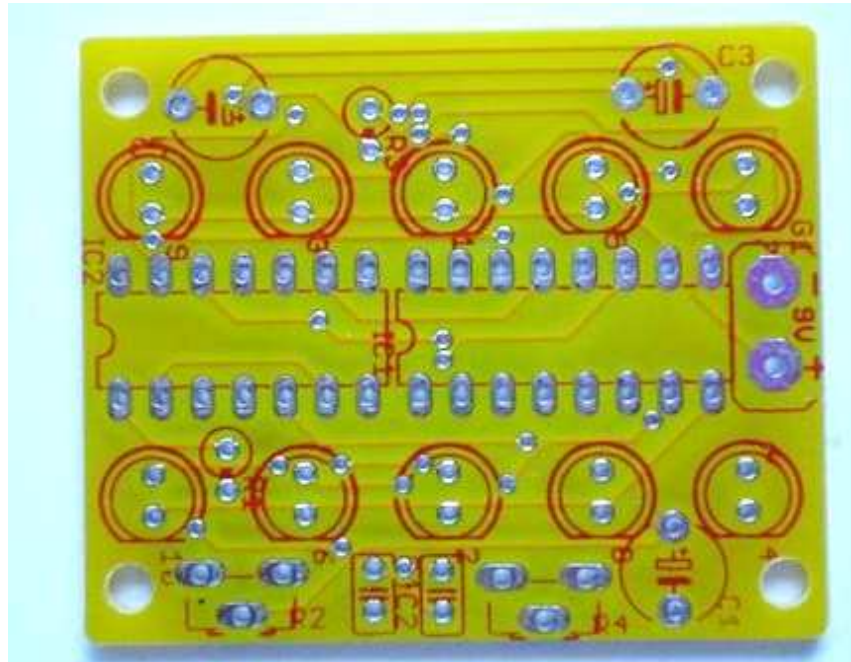
Before you begin identify and check all the parts in your building kit.



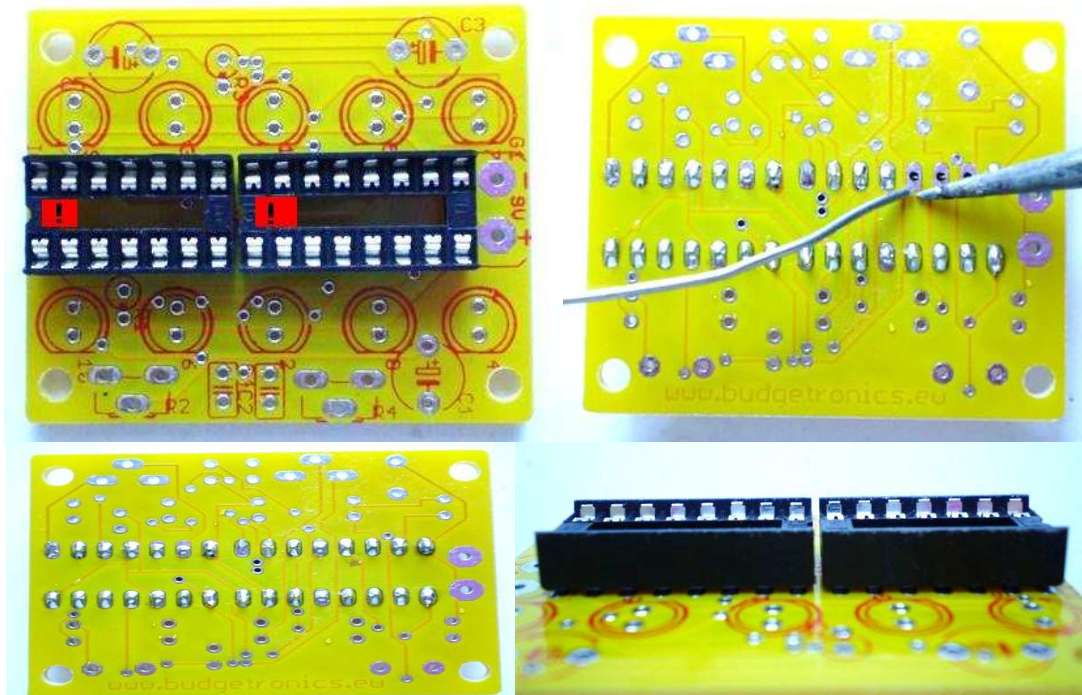
- A: 1 x 14 pin IC socket
- A: 1 x 16 pins IC socket
- B: 1 x IC NE555
- B: 1 x IC CMOS IC 4017
- C: 1 x Twinkle star PCB
- D: 10 x bright LED
- E: 2 x ceramic capacitor 10 nf
- F: 1 x 9 volts battery clip
- G: 2 x potentiometer 100K
- H: 1 x electrolytic capacitor 1 uf
- H: 1 x electrolytic capacitor 2,2 uf
- H: 1 x electrolytic capacitor 47 uf
- I: 1 x resistor 270 Ohms (colour code red, violet, brown)
- I: 1 x resistor 1k5 Ohms (colour code brown, green, red)

Construction

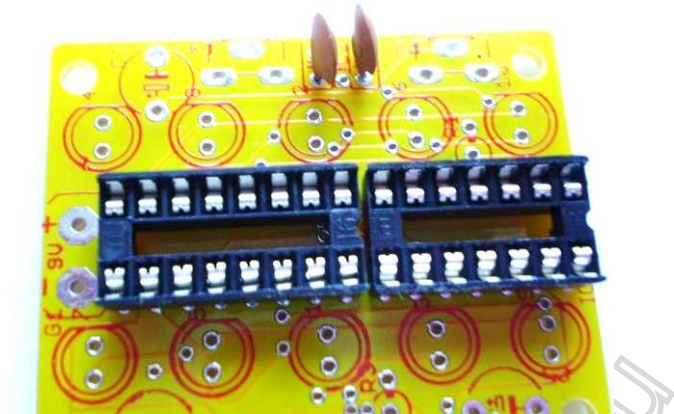
Before you begin look closely at the Twinkle star PCB. Notice that there are more holes in the PCB than you can fill with all the parts. Some holes are not used to connect parts but serve only to connect the upper and bottom side of the contacts with each other. These holes are a little bit smaller and are called via's. Always look closely at the photos to be sure in which holes you connect the different parts.



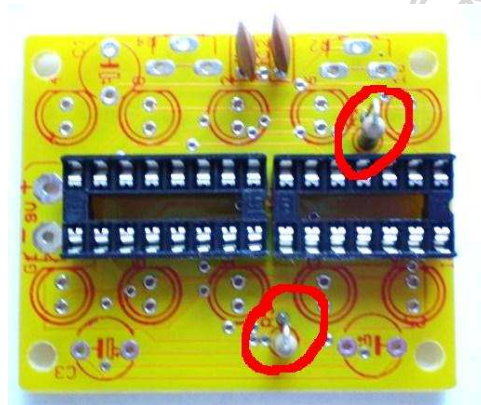
Begin by placing the two IC sockets. Take care to connect them as shown in the photos. That is with the side with the little bit out to the left. Place them tight on the PCB and solder them in position. Don't put the IC's in yet we will do this later. In this way the IC's will not get broken by heat.



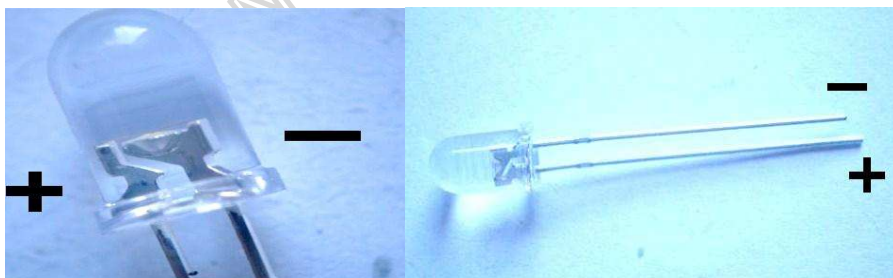
Now put the two ceramic capacitors in their spot. It does not matter how you connect them. Both sides are the same.



Solder the resistors in place. R1 = 270 Ohms (colour code red, violet, brown), R3 = 1K5 Ohms (colour code brown, green, red). R1 and R3 are marked on the PCB. In the photo below R3 is in the red circkel at the bottom.

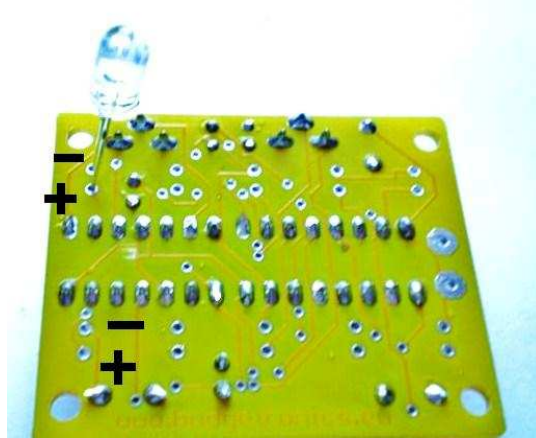
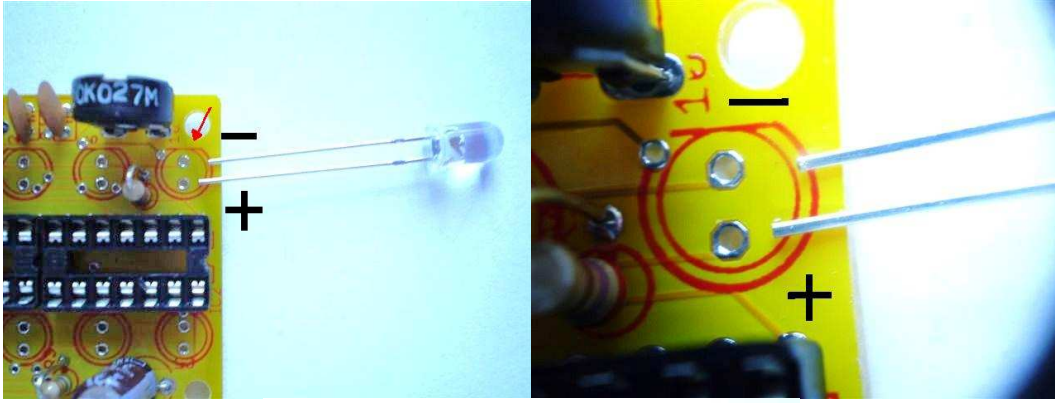


Now solder the 10 LEDs in place **AT THE BACKSIDE** of the PCB. Watch the right polarity. The short leg is the negative (-). The flat side of the LED drawings on the PCB's are the negative sides. This side is where you put the short LED leg in.

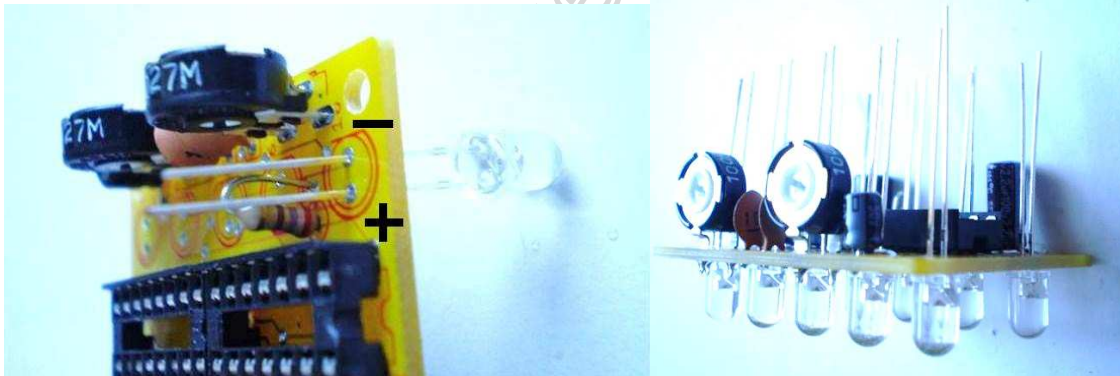


Look closely at the pictures. You could also choose to place the LEDs on the front side of the PCB if you find this better or nicer. Just always watch the polarity.

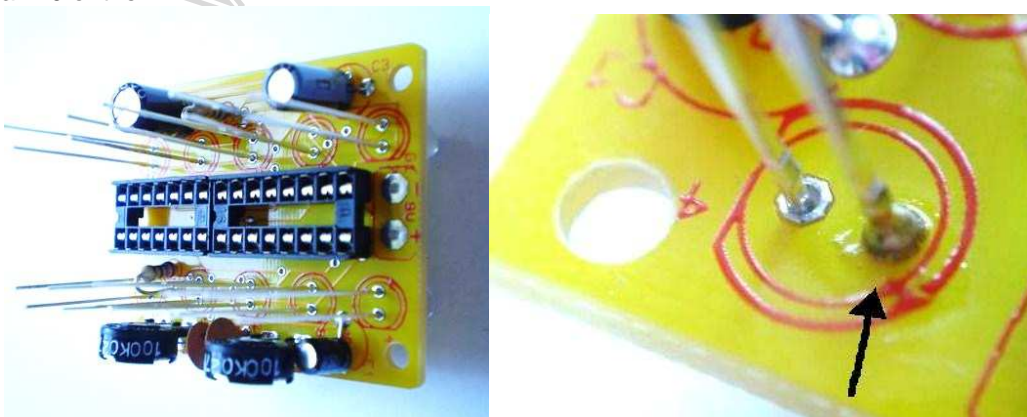
On the pictures you will see some parts that we have not yet placed on the PCB. This is correct, We will place them later on. It is better to place the LEDs now because its much easier to solder them at this stage and cut of the wires. Just follow the order which we show you in this text!



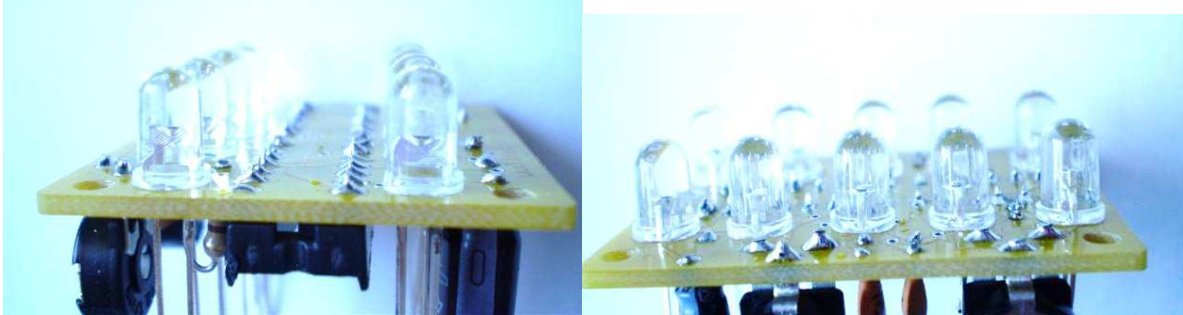
At the back of the PCB there are NO + and - marks. Just watch out that you connect them in the right way. Look at the front if in doubt. Short leg on the - side.



Solder the LEDs with one leg flat on the PCB. In this way you can line them out a bit after you have placed all 10 of them.

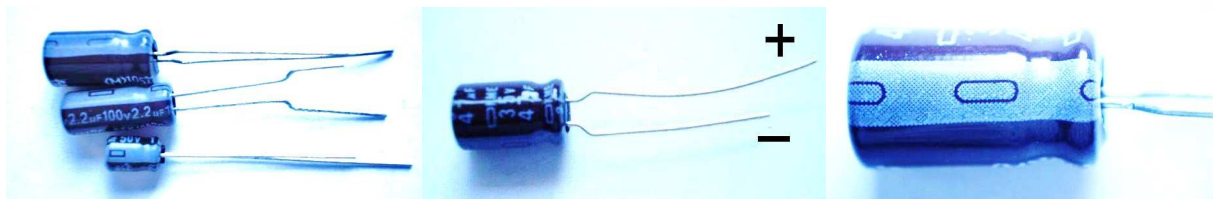


Align the LEDs as shown in the photos. When you are satisfied you can solder all the other legs.



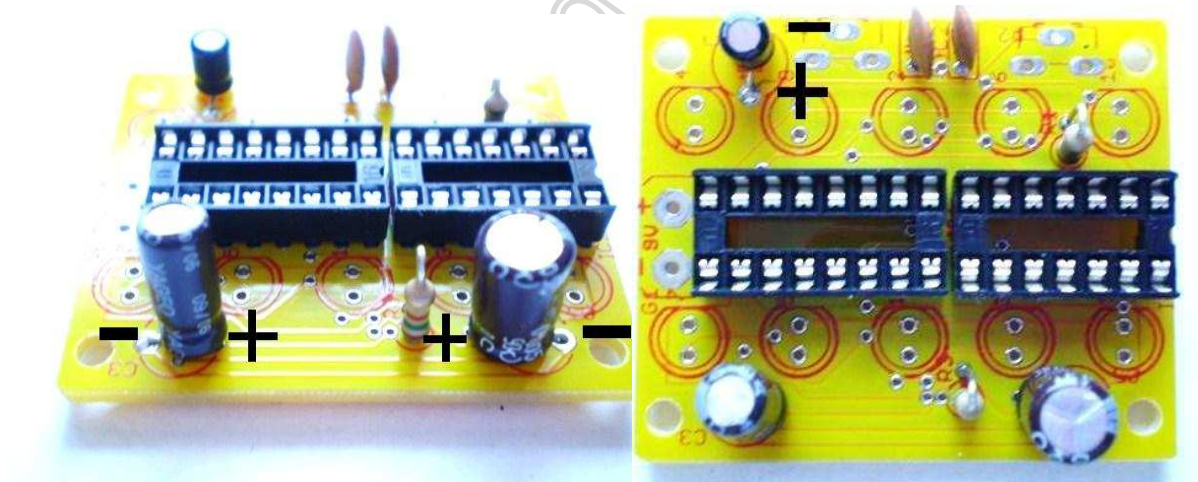
Cut off all the led wires.

Place the three electrolytes and also watch the polarity. On one side of the electrolytes you will see a clear - mark to indicate the negative side. The leg is also shorter on the negative side.



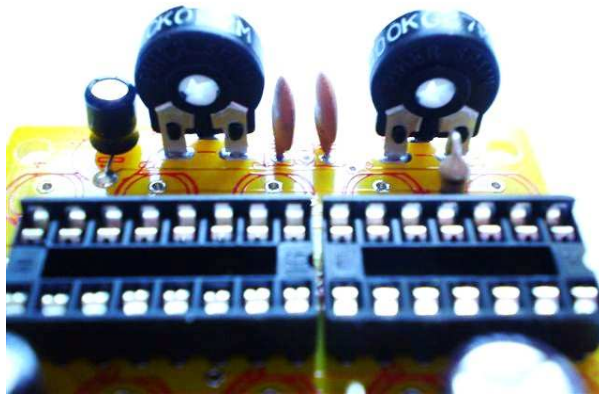
The electrolytes in your building kit have 3 different values 1 uF, 2.2 uF and 47 uF.

The electrolyte with the value of 47 uF is the biggest of the lot. You can find the values clearly printed on the electrolytes. On the PCB you must place the smallest electrolyte of 1 uF. You can see this electrolyte on the photo at the top. C3 is 2.2 uF and you see this on the photo below on the bottom left. On the bottom right you place the 47 uF electrolyte. Watch the polarity!

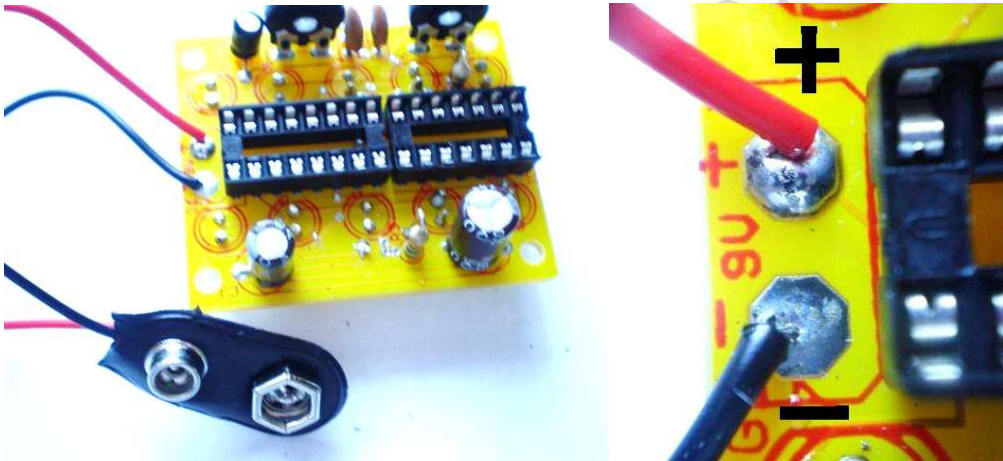


Bottom left 2.2uf and bottom right 47 uF. Top left 1uF. Watch + en - .

Now place the two potentiometers. You can only place them in one way on the PCB.

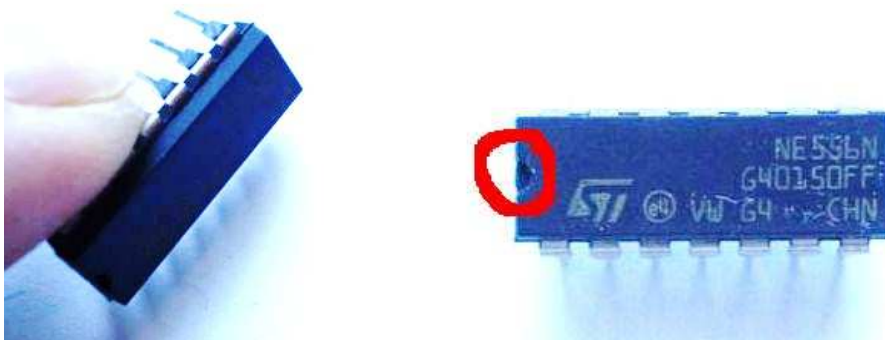


Solder the battery clip on the PCB. **Watch polarity!** The black wire is negative (-) and the red wire positive (+). Look at the photos.



Now that you have placed all the parts on the PCB you can put the IC's in their sockets. One IC has 14 legs and one has 16 legs so they only fit in one of the sockets.

Before you put the IC's in their sockets you have to bend the legs a little bit. You can do this by placing the IC on a hard underground and press the legs, with care, a little bit more inwards. See photo. Take notice of the little dent the IC's have on one side. The red circle in the photo below. You must install the IC's in the right way otherwise they will not work.





In the photo above the NE556 is fitted on the left and the 4017 to the right. Watch the red circles!

Powering up!

If you are finished and have checked your PCB for loose wires, shorts and everything you can think of, you can connect the 9 volts battery to the battery clip. You can only do this in one way but take care not to touch the wrong sides of the battery with the battery clip. It could hurt your circuit!

Budgetronics wishes you lot of fun with your Twinkle star kit. If you want to change the circuit read on otherwise stop reading from here.

Changing the circuit

If you want different light effects you can try to change the electrolytes of 1 uF , 2.2 uF and 47uF. Try values like 10 uF, 220 uF or 100 uf. It cannot hurt the circuit just try it out and see what it does for the light effects.

The standard building kit comes with two potentiometers to adjust the light effects. You could also replace one or both of these with a LDR (light depending resistor) or a NTSC (temperature depending resistor). With this the light effects that are shown depend on light intensity from the surroundings and/or the temperature.

The potentiometers have 3 connections and a LDR or NTSC just two. If you look closely at the PCB you will see the potentiometers are only connected with two legs to the circuit. Use these connections to connect your LDR or NTSC.

Have fun experimenting!