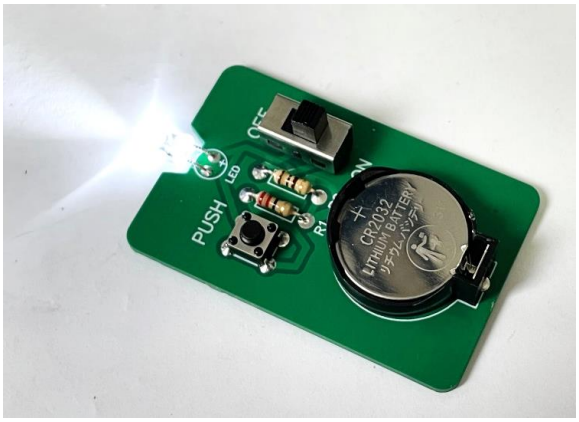
KANGA PRODUCTS

Signal Lamp / Torch

Build and user Instructions



The Kanga Signal Lamp is a great first soldering project, and if building as part of a group something that can be used to send secret messages between you!

Let's first check we have all the parts to build our Signal lamp.

Parts List

Signal Lamp PCB
CR2032 Battery Holder
ON-OFF Switch
Push Switch
100 Ohm Resistor
22 Ohm Resistor
5mm White LED
CR2032 battery

You will have a strip of parts, there should be a Printed Circuit Board (PCB) at one end of the strip, lets start there! And build our Lamp.

Stage 1: The Resistors

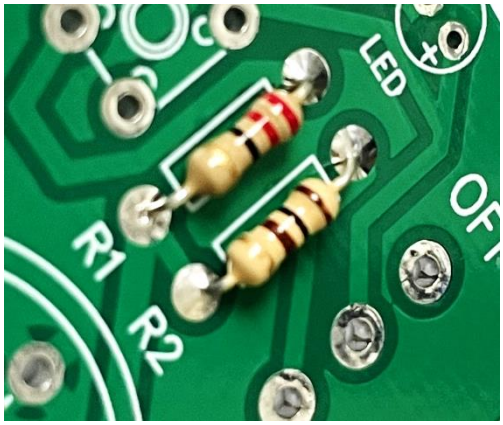
Our little lamp uses a Light Emitting Diode (LED) in place of the old fashion light bulb. A LED needs a resistor to control the amount of current it draws from the battery, the lower the value the more current (and Power) it uses and the brighter it is. We are using two resistors in our lamp. One works with the switch to act as a torch, the other resistor is used with the push button for signalling messages to someone else, the signalling function is brighter than the torch feature.

The brightness of the LED is controlled by the value of the resistor, a 22 ohm Resistor in our kit is used to provide just the right amount of current for our LED when used to send signals with the push button. This resistor is to be fitted in position marked R1 on the little PCB for the lamp.

The torch side uses a higher value resistor. This resistor is 100 ohms , this resistor allows less current to flow and so when we use the switch to turn on the torch the LED will not be as bright as the signal lamp feature but the battery will last much longer. This second resistor is fitted in position marked R2.

The coloured bands on the resistor tell us its value. You will have a handy resistor colour code card with the kit, see If you can use that to work out the values.

But do double check you have the right one in the right place



R1 will have bands Red, Red, Black, Gold

R2 will have coloured bands Brown, Black, Brown, Gold

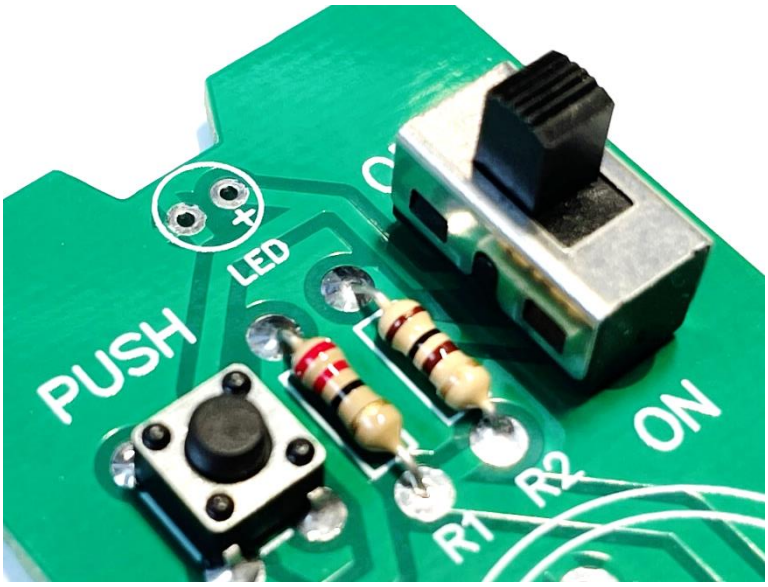
The resistors can be fitted either way round. Solder and then trim the leads flush with the back of the board

Stage Two : The Switch and push button

We have an ON/OFF switch for the torch function and a small push button for use to send signals

The switch can now be mounted to the PCB, push the switch down on the board as far as it will go.

Solder and then trim the 3 legs so they are flush to the board and no sharpe edges are left.



Next fit the small button, it will only fit to the board one way so you may have to rotate it so it fits. Solder one pin first and check its still sat down on the board correctly then solder the remaining pins. You can trim the legs after soldering.

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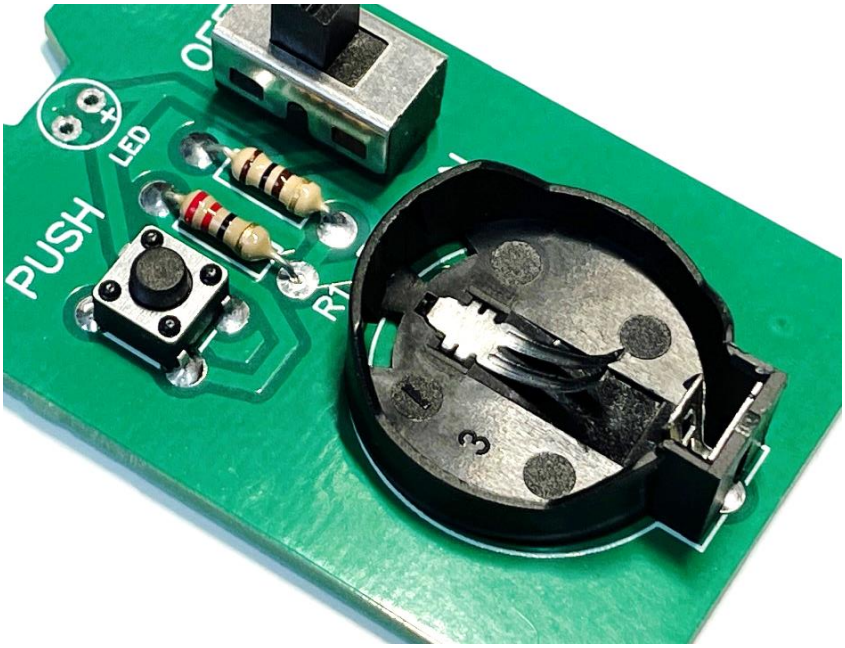
Stage Three: The battery holder

The battery holder

The holder is for the small CR2032 battery that this kit uses. Before we go further a word of warning!

The battery is small in size and thin, it would be possible for a child (or anyone for that matter) to swallow the battery which would be very dangerous. The use and building of this kit should be supervised by an adult. There is a chocking hazard so its important to take care with the supervision of young builders/users.

The battery holder must be fitted the right way round, the PCB shows the outline of the holder so make sure you fit it the way shown on the PCB and photos here.



Stage 4: The LED

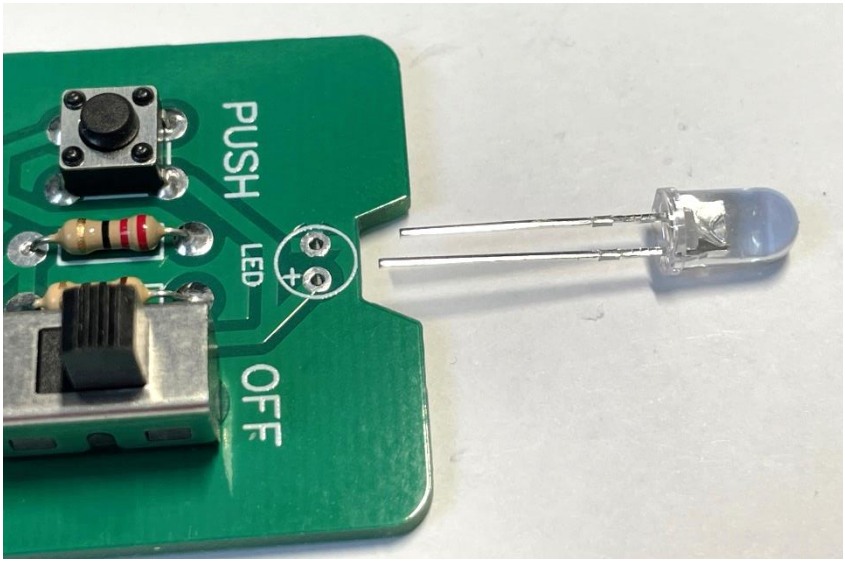
OK so now we will fit the LED

There are LED's of many different colours but for our torch we are using a bright white LED but if you wish, and you have one any other colour LED could be used.

LED have two leads and you will notice that one is longer than the other. This is probably the most likely place that you will make a mistake so take your time with this.

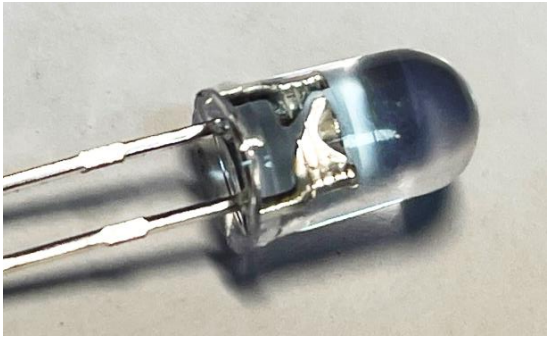
The top of the PCB has a notch cut out for the location of the LED. Below this notch you can see the outline of the LED and the two solder pads that the LED uses.

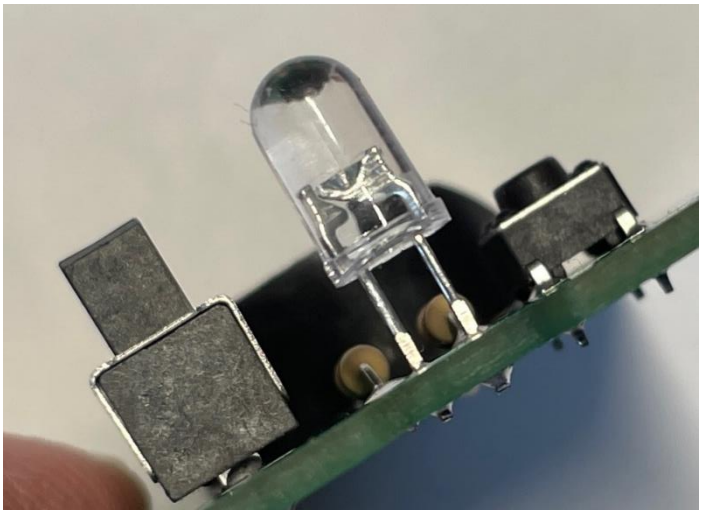
One of these holes has a '+' marked.



The LED as we have said before has two different length leads. The longest lead **MUST** pass through the hole with the '+' mark. Be 100% sure you do this right as the LED will not work if it's the wrong way round and it is hard to remove and re-fit later if you get it the wrong way round.

In addition to one leg being longer you will also notice (if you look carefully!) that about 5mm from the bottom of the LED's body both legs have a little flat section. This is helpful for us with this kit. Put the LED into place on the board (again make sure the long leg goes into the hole with the '+' mark), but don't solder it yet!.

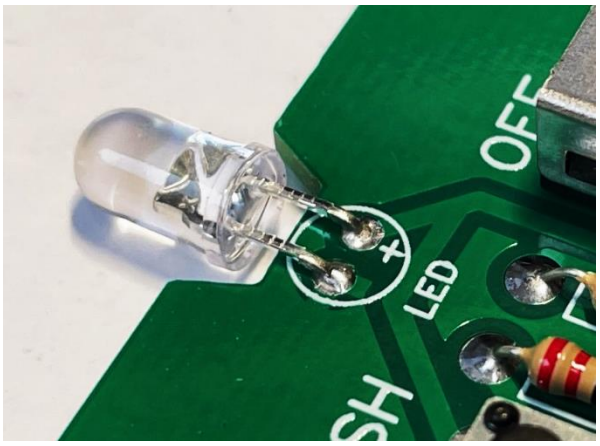




This is a little difficult I know but solder just one leg of the LED but do it with the LED positioned so the little flat section is just visible on top of the board, the LED should be about 5mm higher than the board.

Once happy the LED is in the right place solder the second leg and trim both flush with the board

Now fold the LED down so its aiming outwards not up.



Finial Steps : The battery CR2032

The battery used in the Signal Lamp is a very common low-cost battery and is ideal for our use. The battery must be fitted the correct way round. One side as a crisscross pattern and the other side will have markings including the battery type engraving saying ‘CR2032’

Clip the battery into the holder with the engraving side facing up so you can still read it when its fitted.

Testing stage

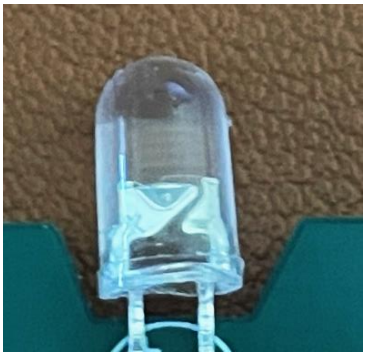
Well we are ready to test our signal lamp. For a quick test press the button, the LED should illuminate brightly. if not there are two common faults

1) Check the battery has been put in the right way, the engraving showing the make and battery type should be visible, the crisscross pattern should **NOT** be visible.

2) The LED may have been fitted the wrong way round

Even though we have trimmed the leads so they are now cut flush we can tell if the LED is the right way round.

Look carefully at the LED, you can see inside of it as it’s a very clear body.



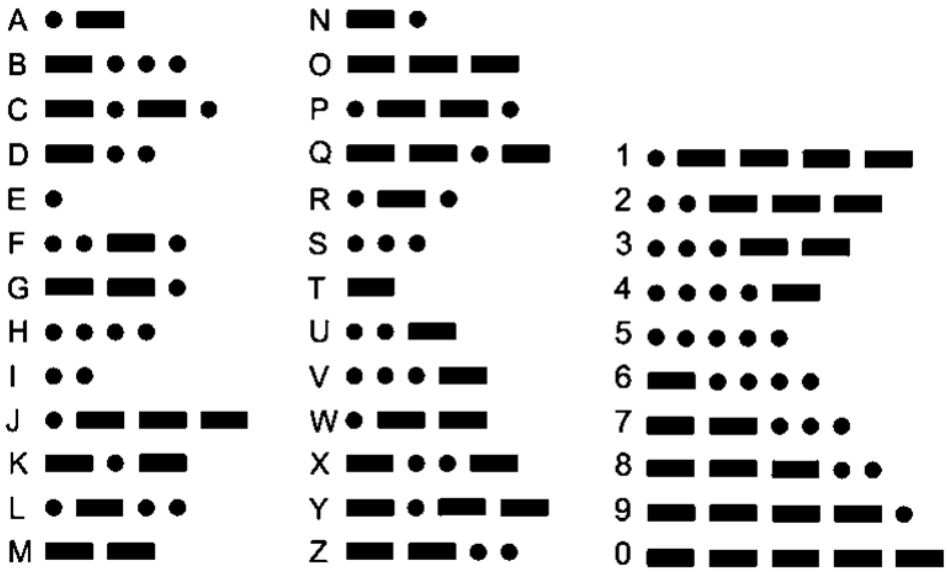
If the LED has been fitted correctly the inside of the LED will look like this. you can see two metal posts, one is much larger than the other and the larger post will be on the left hand side if fitted correctly.

Correct any mistakes and re-test.

Now try the switch, again the LED should come on. You will notice that the brightness is less than with the pushbutton pressed (if its brighter then double check that the right resistor has been fitted in the right place) this is because you may need the torch to left on for long periods and in this low power mode the battery life will be much longer, if you need a boost of brightness then you can press the button.

But the main reason for the button is so you can send messages to friends, the signal light can be seen for some distance at night. This method of silent signalling has been used for over a 100 years and Morse Code is normally used to send these messages.

The Morse Code is shown below



When sending Morse remember that the DASH is 3 times longer than the DOT

Don’t rush your sending, you will have to send slowly if the person at the other end doesn’t know Morse well. It’s harder to receive Morse than to send it!

I Hope you enjoyed building this project and that it gives you the encouragement you need to move onto more complex kit or homebrewing in the future.