

THE B16GY 'Biggy'

Complete build guide

spikenzielabs.com

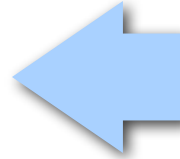
Version 0001

Certain steps must precede other steps. For the best outcome, follow each step in order.
We recommend reading this guide entirely before you get started.

Note these symbols. They call attention to certain elements of the build that require additional care & attention.



Caution



Look here...



Info

Unpack the electronics parts :

Clear 1/8"
Acrylic

Acrylic parts shown with protective blue film

Black 3/16"
Acrylic

Black 1/8"
Acrylic

2x Screws

ATmega Chip

Resistors
10 x 470 ohm
6 x 1k ohm
4 x 10k ohm
1 x 2.2k ohm

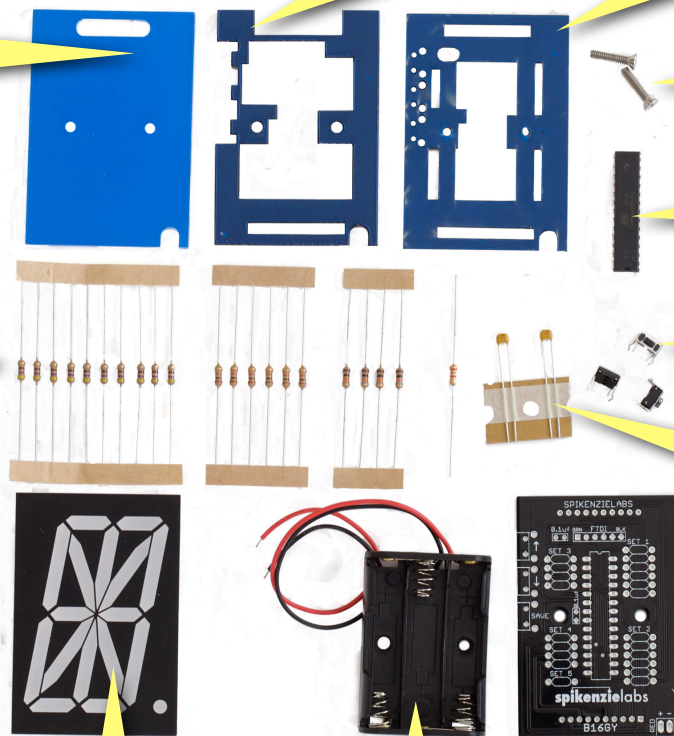
3x Buttons

2x 0.1uf Caps

16 Segment
LED Module

Battery Holder
For 3x 'AAA'

B16GY
PCB



Safety + Fun = Fun Safely



Some of the steps in the build of this kit require the snipping component legs. If you're building this kit on your own, or with someone else, we **STRONGLY** recommend whoever is present is wearing safety glasses. When the legs are snipped, the can fly off in unpredictable directions, at a high speed. Also, be sure to follow the safety instructions that came along with your soldering iron.

Note : A word about solder. For people new to soldering, we recommend using leaded solder. It is much easier to solder. Lead free solder requires a much higher temperature. In all cases, **wash your hands** after handling solder. Especially before eating.

Be safe, and enjoy.

Identification & resistor placement :

The B16GY comes with four different resistor values.



470 ohm [yellow/violet/brown]



2.2k ohm [red/red/red]



1k ohm [brown/black/red]



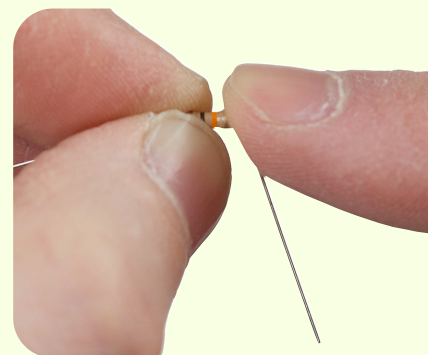
10k ohm [brown/black/orange]

Resistor graphics by samstechlib.com

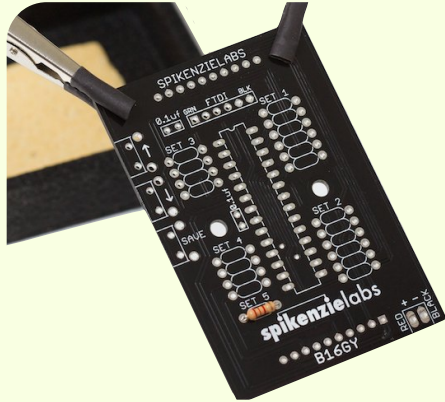
Resistor Bending:

Cut the resistors from the tape, and bend each of the resistors like in this photo:

You want to have the bend both legs as **close as possible to the body of the resistor**.



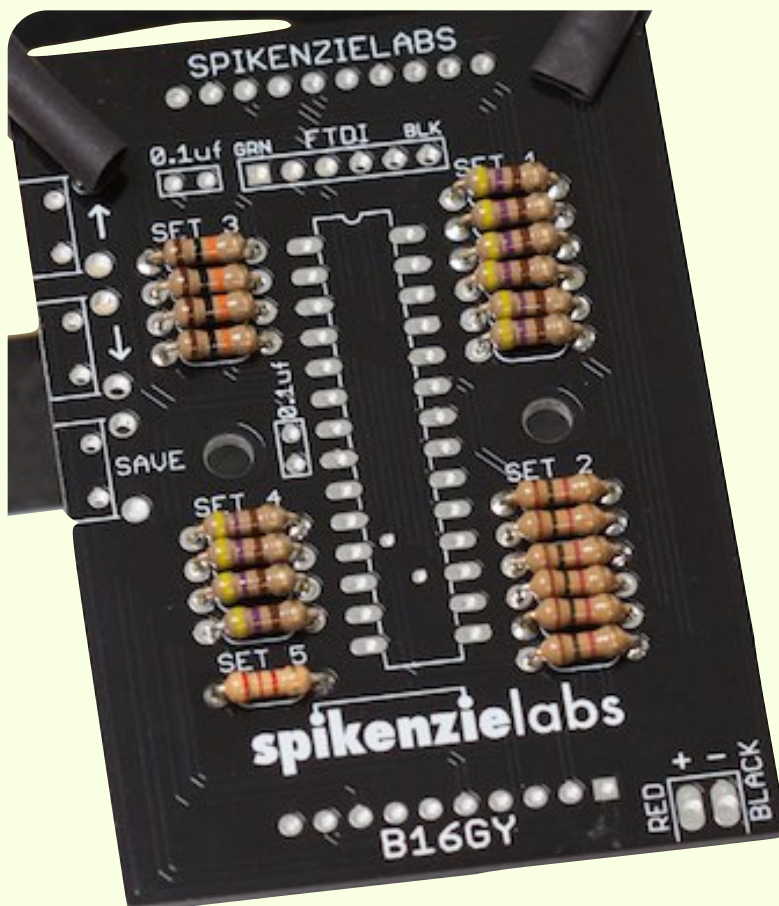
It is important to place each resistor in the appropriate area on the B16GY PCB. Prepare one type of resistor at a time, and insert them into the appropriate area on the PCB. Be sure to install the resistors on this side of the PCB. Note the set numbering, and rounded white spaces.



Start with the single 2.2k ohm resistor, and install it like in this photo, in 'SET 5'. Flare the legs out on the bottom side of the PCB, to hold it in place until it is soldered.



Continue in this same manner, and place the rest of the resistors in place.



Set 1 and Set 4 : 470 ohm resistors
(Yellow - Violet - Brown - Gold)

Set 2 : 1k ohm resistors
(Brown - Black - Red - Gold)

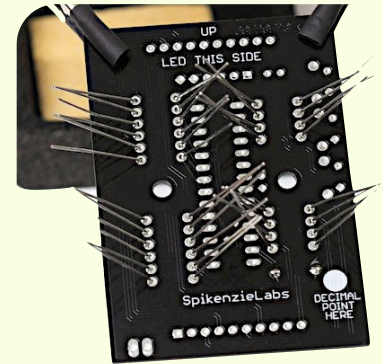
Set 3 : 10k resistors
(Brown - Black - Orange - Gold)

Set 5 : 2.2k ohm single resistor
(Red - Red - Red - Gold)

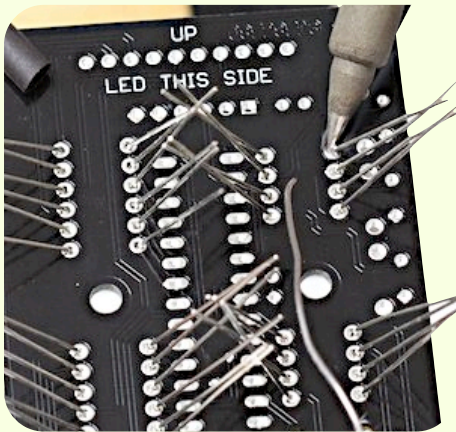
Soldering the resistors :

Double check to make sure that all of the resistors are in the proper place. Their orientation doesn't matter, although it looks nicer to have the color bands lined up. Make sure they are all laying flat against the PCB.

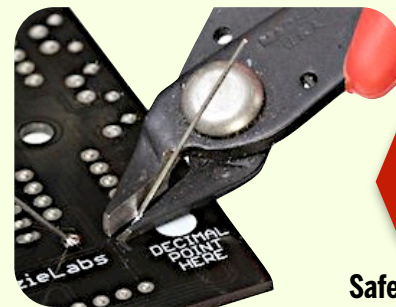
Flip the PCB over, and flare out the legs of each resistor, as in this photo:



Solder the resistors in place. Make sure you don't forget to solder any of the legs.



Snip off the ends of the legs. Be sure not to scratch the surface of the PCB. Keep your safety glasses on!



Safety Glasses On!

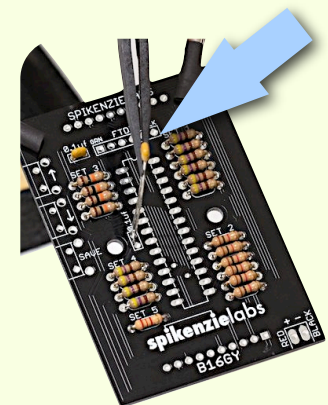
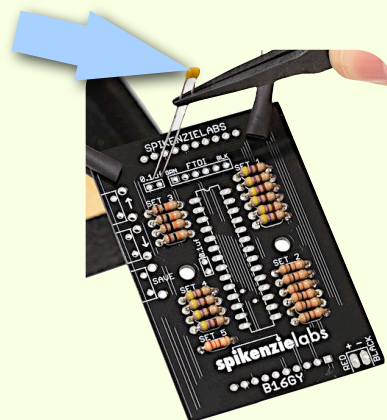
Do this for each resistor leg.

Placing the capacitors :

Place the capacitors in the two locations as seen in these photos. Marked as 0.1uF on the PCB.

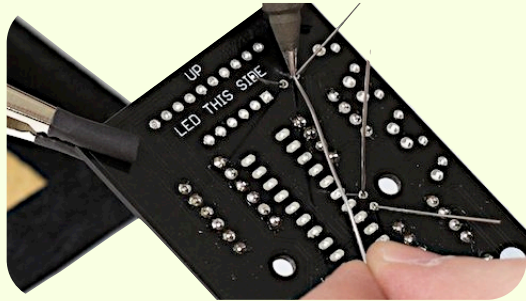
Polarity does not matter for these.

Flare the legs out as you did for the resistors.

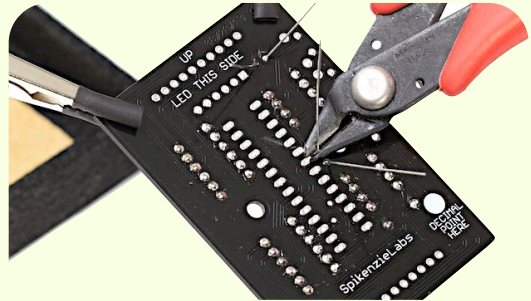


Soldering the capacitors :

Solder both capacitors in place.

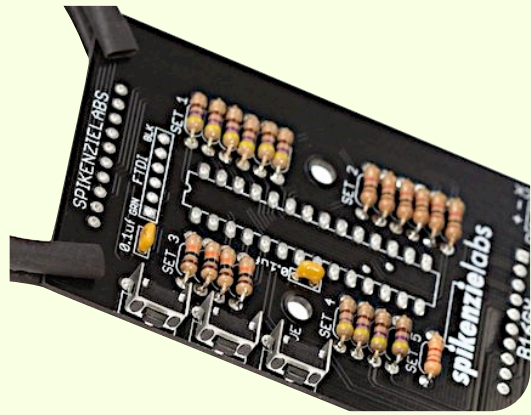
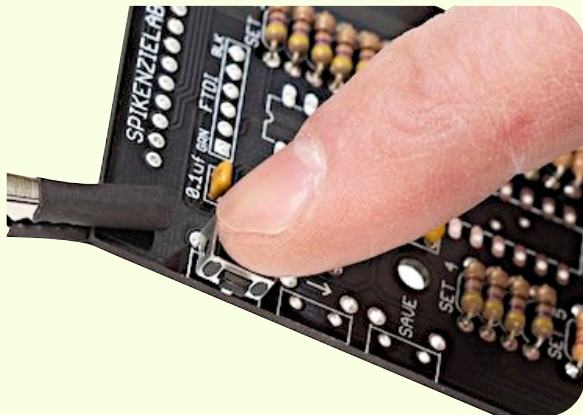


Trim the legs.

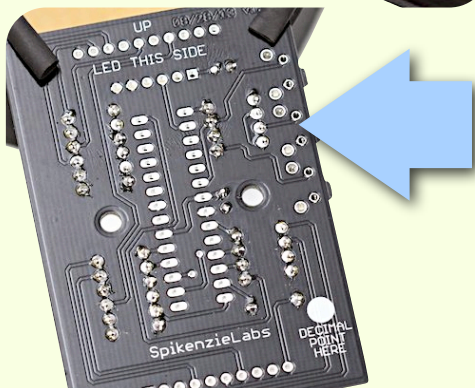


Mounting and soldering the buttons :

Mount the three right angle buttons to the PCB. They have 4 legs each.



Make sure they are flat against the PCB.



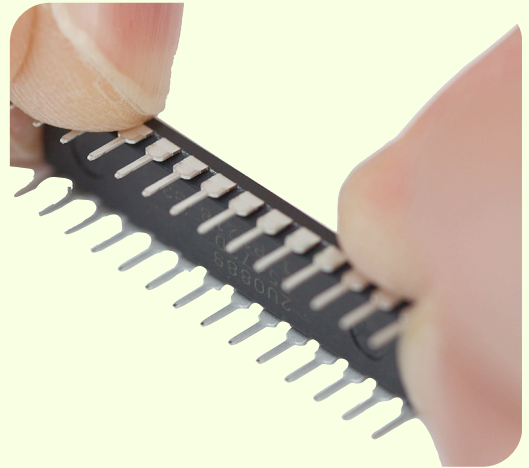
Solder the 4 points for each of the three buttons.
(12 solder points in total)

Preparing the IC

Remove the IC from the antistatic foam. Hold it firmly on either end, and press the legs down on a flat hard surface.

You can test fit it on the PCB if you think you have them straight enough.

*When manufactured, the legs are flared out slightly. To be mounted to the PCB, the legs need to be closer to the body of the IC.

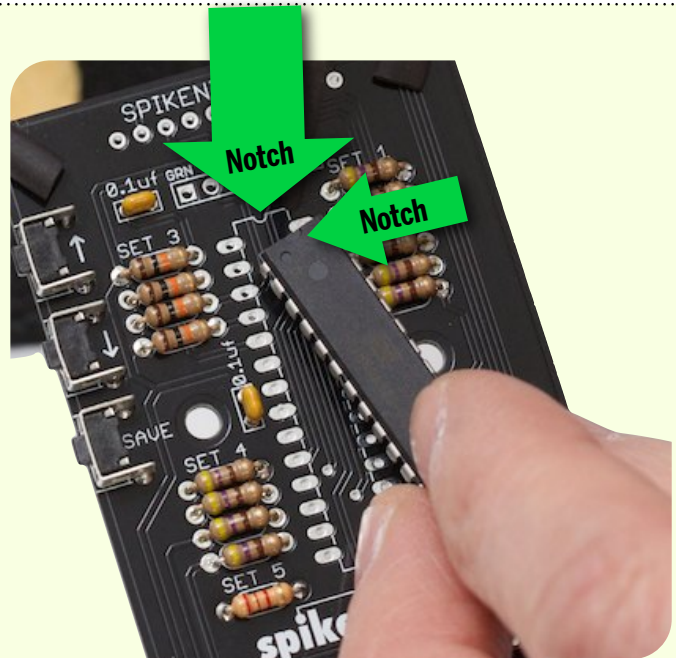


The IC has a notch on one side. The PCB has a printed notch. When you are mounting the IC to the PCB, make sure the notches are lined up.

If you install the IC in the opposite orientation, it will not work.

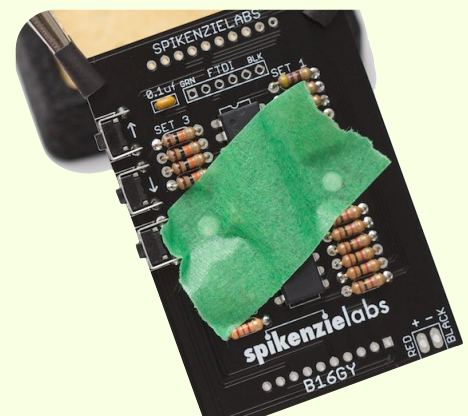


Mind the notch!



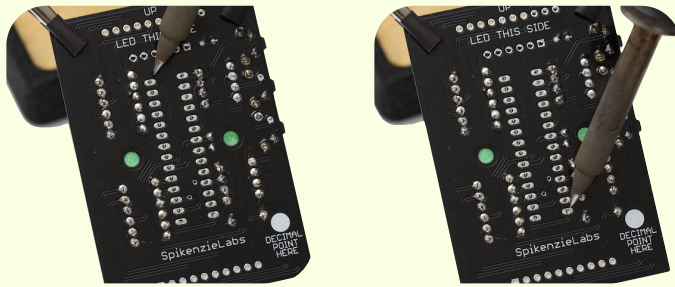
With the IC sitting on the board in the correct orientation, secure it temporarily with a piece of painter's tape.

This will help hold it in place when you flip the board over to solder all 28 legs.



Soldering the IC :

Solder the first pin in, and then the pin diagonally across, as in the photos below. If the IC has shifted while handling it, this will give you a chance to quickly re-heat both legs, while pressing on the body of the IC. It needs to be flush with the surface of the PCB.

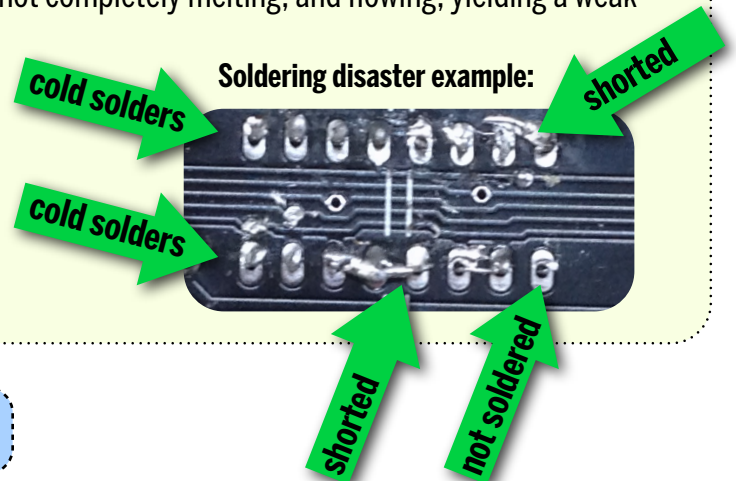


Check to be sure the IC looks like this photo below:



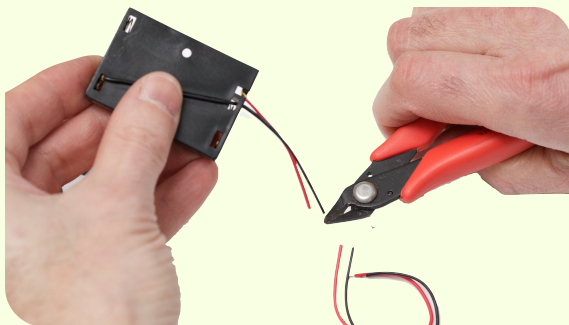
When you are satisfied, continue to solder the rest of the IC legs. At this point, **take some time to examine your solder points**. Make sure there is no debris shorting between two pins, and be sure that there are no cold-solder joints. 'Cold solder' refers to the solder not completely melting, and flowing, yielding a weak connection, and a kit that may not work perfectly.

Once the LED module is soldered, you will no longer be able to fix any soldering mistakes. Even though it looks 'good' examine each. The B16GY will only work perfectly if soldered properly.

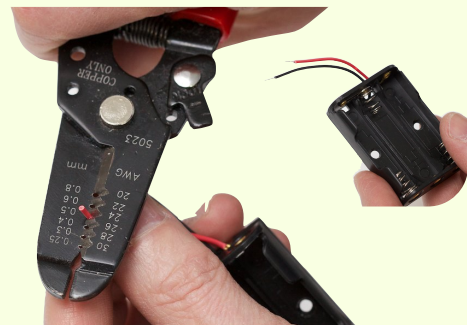


Preparing the battery holder :

Measure off about 2" from the battery holder, and snip the excess wire.

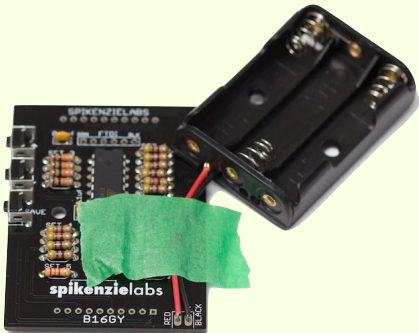


Strip the end of the red and black wires, exposing about 1/8" of the bare wire.

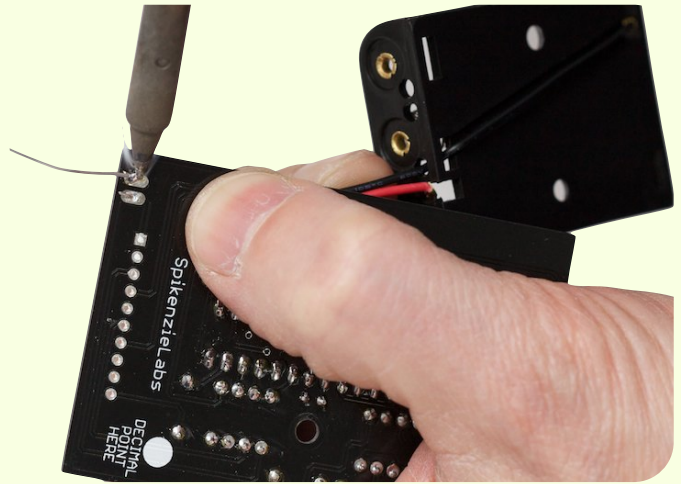


Soldering the battery holder :

Feed the red and the black wires to the marked pads on the PCB as in the photo below.



Hold them in place with a piece of painter's tape.
Solder both wires on the other side of the PCB

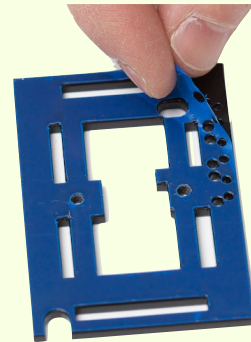


Preparing the 1/8" Black Acrylic :

Take the 1/8" piece of black laser cut acrylic.
(The thinner black piece)

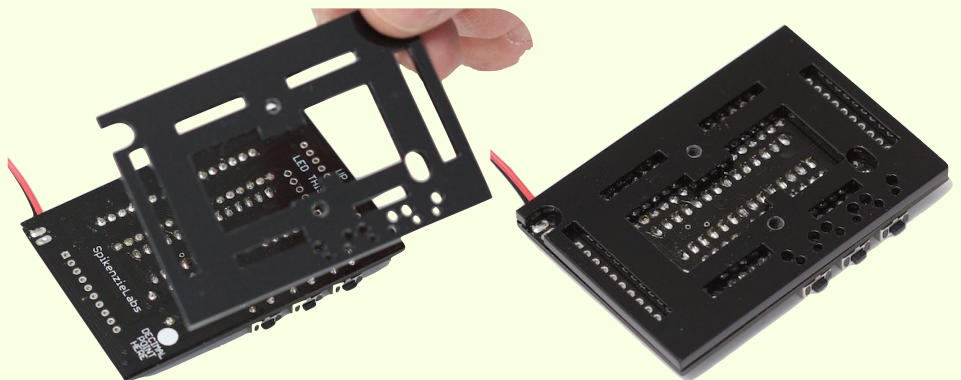
Remove the protective blue sheeting by starting in one corner, and peeling the rest off.

Do this on both sides.



Place the peeled piece of 1/8" black acrylic on top of the PCB soldered side up as in these two photos (right) This is for placement.

Set aside, and proceed to the next step.



Straighten the LED pins :

Examine the LED legs closely. If any of the legs appear to be bent, very gently straighten them.

The LED module will not fit unless all of the legs are perfectly straight.

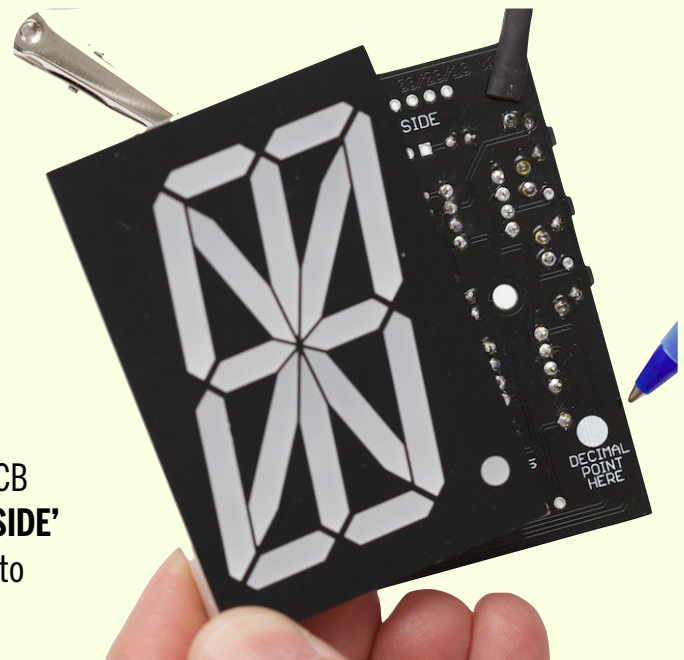
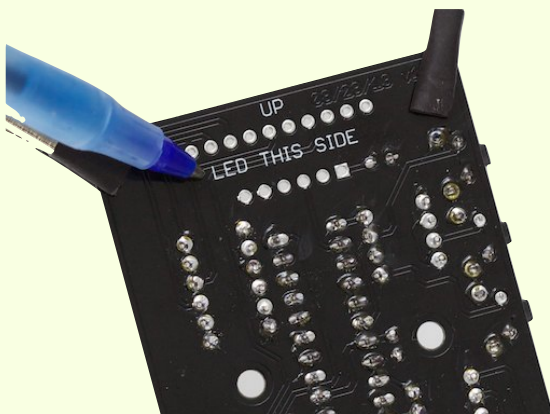


Double check the LED placement :



Remove the 1/8" black acrylic piece and note the orientation of the LED module in the photos below. It will only work if it is installed in the orientation below.

Replace the 1/8" black acrylic piece.



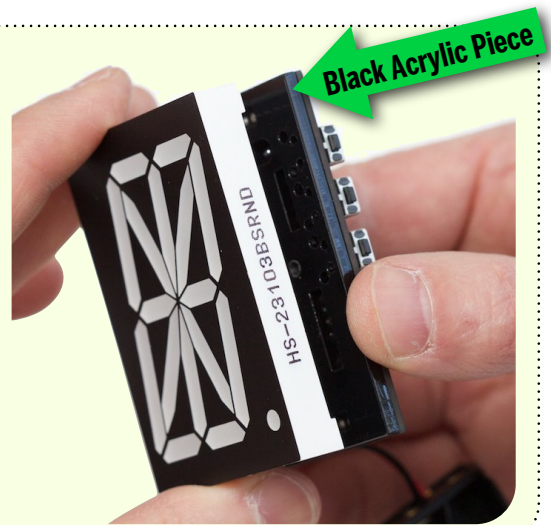
The 16 segment LED gets mounted to the side of the PCB that you have been soldering on. Note the '**LED THIS SIDE**' As well as '**DECIMAL POINT HERE**' This indicates how to mount the LED module to the PCB.

Mount The LED Module :

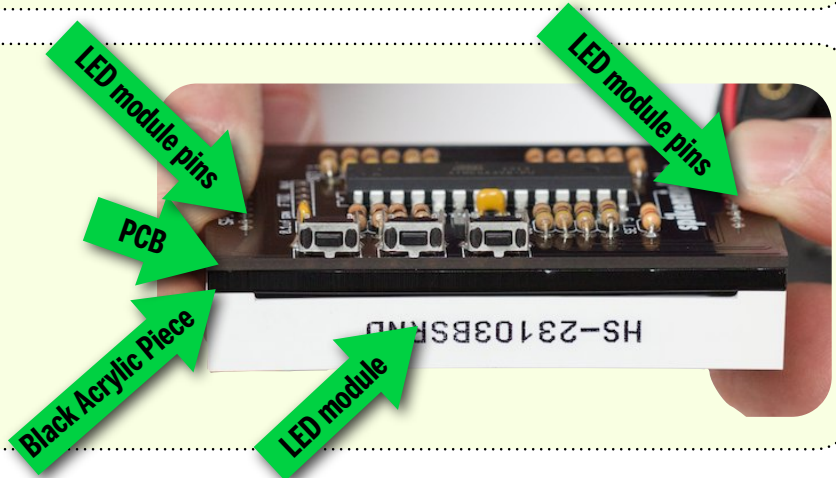
With the 1/8" black acrylic back in place, it should be laying flush against the PCB.

Line up the LED module pins, so that all of the pins go through the corresponding holes on the PCB. Once they are all through, the LED module will be flush with the acrylic.

You don't need to apply pressure, when the pins are lined up, they will slide right through the holes. If it's not going, straighten the pins on the LED some more, and it will mount perfectly



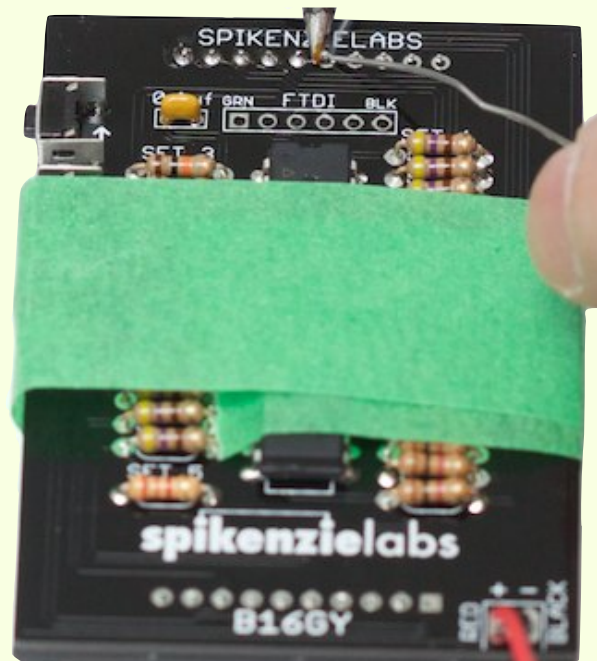
Note all of the pins fitting through the holes, and how the LED is laying flush against the acrylic.



To hold the LED module tight to the PCB and acrylic, wrap with painter's tape. Make sure that none of the pins have come out and that each layer (PCB, acrylic, and LED) remain flat against each other.

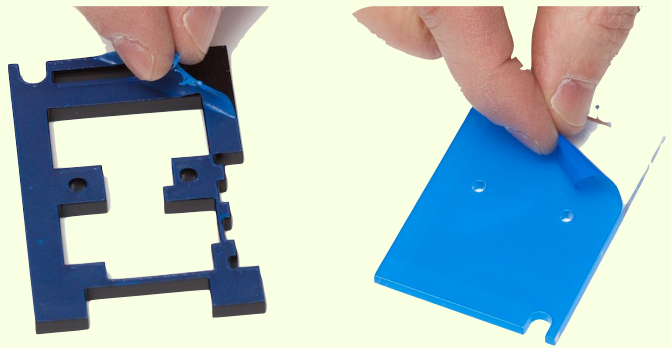
Solder all 20 pins.

In this photo, the top pins are being soldered. Repeat for the other 10 pins.

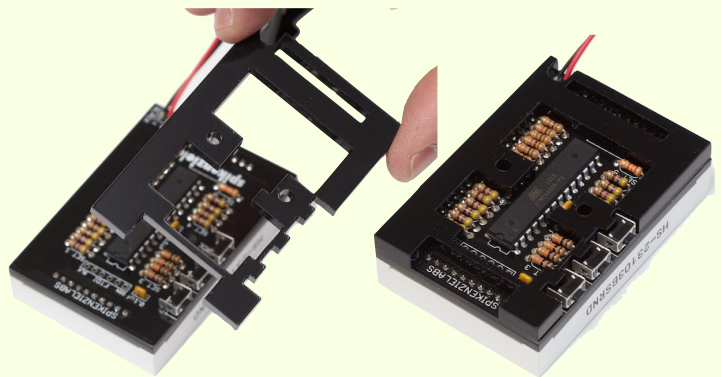


Remaining acrylic, battery, and screws :

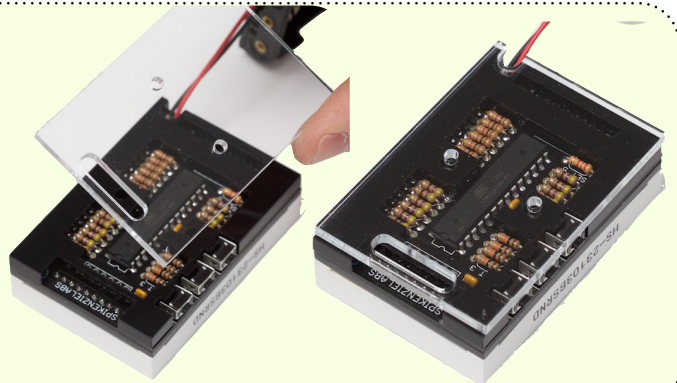
Peel the protective sheeting from the two remaining acrylic pieces.



Place the 3/16" black acrylic piece over the PCB. Note the notches that are cut out, they fit behind the buttons.

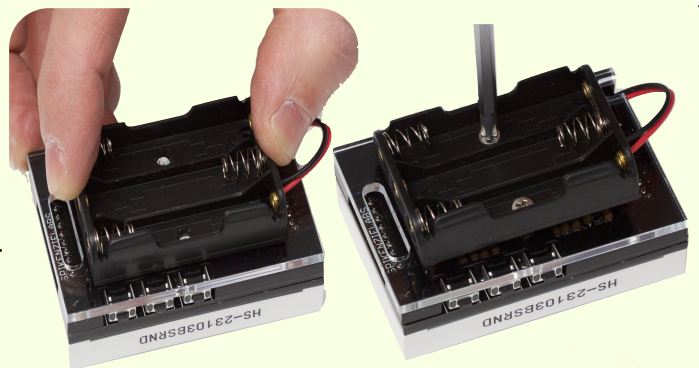


Place the 1/8" clear acrylic piece over the black one. The loop fits over the notch in the black, and the semi circular cut-out allows the battery wires clearance.



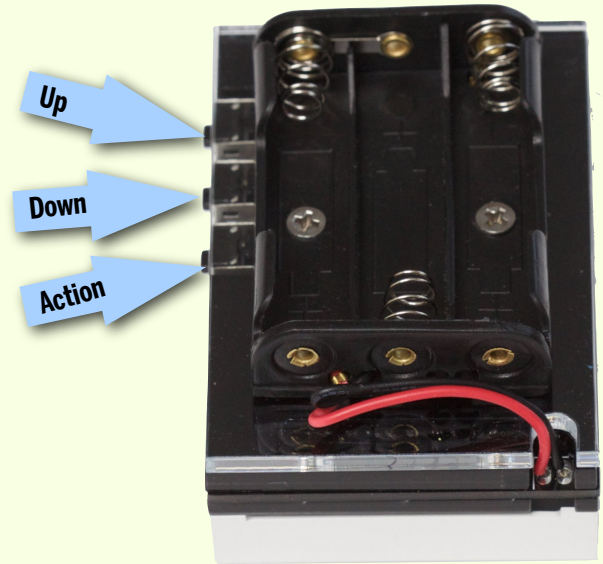
Line up the battery holder, and make sure it is laying flush against the clear acrylic. You may need to adjust the wire underneath, if it has come loose from the space provided for it on the battery holder.

Screw the battery holder **finger tight only**. If you over tighten, you may crack the tapped holes under the LED module.



Assembly complete!

Tuck the remaining wires against the clear acrylic, so they don't get caught up on anything. Load in 3 x AAA batteries, and enjoy.



When the B16GY first gets powered up, it flashes the 'B 1 6 G Y' which is the default programmed phrase.

To change the message, hold down the action button. When you see the spinning animation, you are in programming mode.

Press "Up" or "Down", to select from the alpha numeric characters. The space is shown as an underscore. Add the character displayed to your message by pressing 'Action'.

When you are finished entering your message, do nothing for a few seconds. Your message will start to play back.

While it is playing, you can press "Up" or "Down" to speed up / slow down the playback speed.

After about 30 seconds, your B16GY will go to sleep. (There is no power switch). To wake up the B16GY, press the "Action" button. Playback of the last message will start.

To change the message, (or erase the characters just entered) press and hold the "Action" button, until you see the spinning animation.