



INSTRUCTION MANUAL

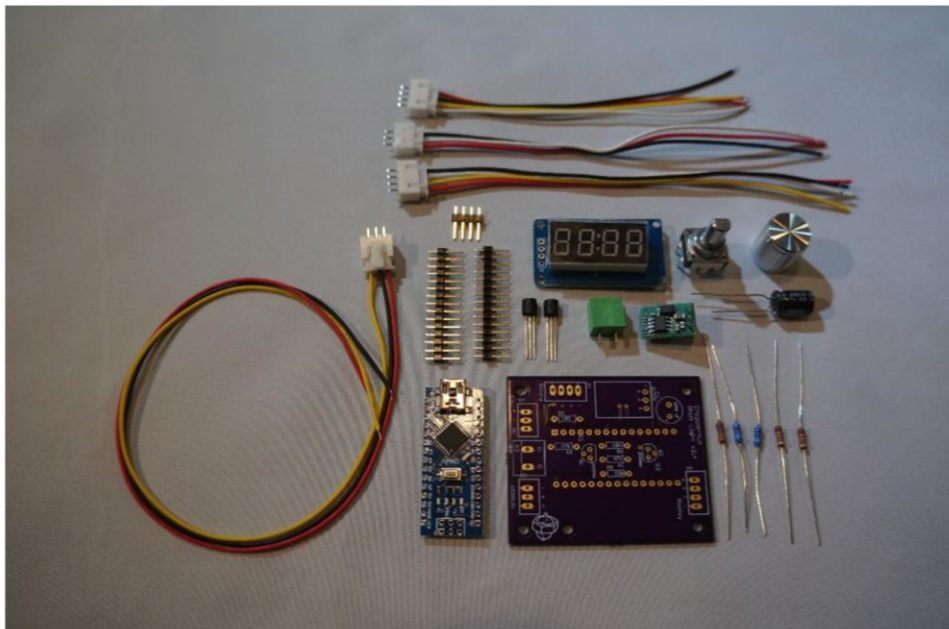
Shift Light V2.4
03/24/2016
Rev4

DISCLAIMER

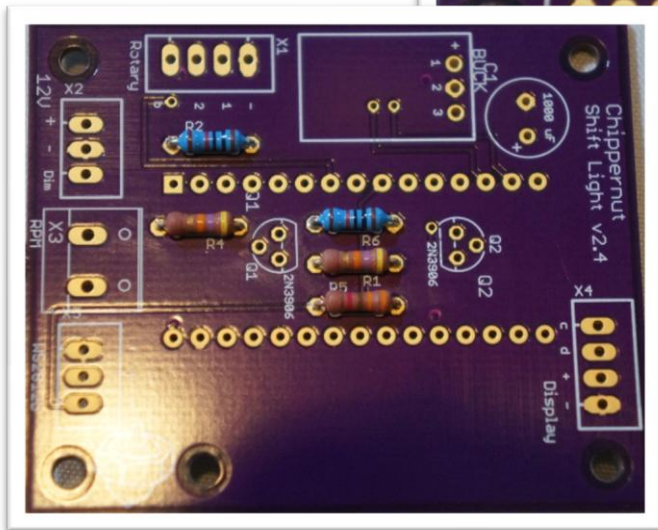
Install at your own risk. By purchasing and assembling this kit, you agree to hold Chippernut, LLC, it's owners, affiliates, members, and users harmless from any and all damages or harm that may result from the purchase, use, and/or installation of this product in any capacity. Please do research for the specific installation on your vehicle, engine, car, or motorcycle. Chippernut, LLC does not guarantee this product will work with all makes and/or models. We make no claims as to the legal use of this device - please check with your local regulations and laws.

Parts List

Part #	QTY	Description
0001	1	Circuit Board
2001	2	Transistor 2n3906
2101	1	Resistor, 330 Ohm
2102	2	Resistor, 10K Ohm
2103	2	Resistor, 47K Ohm
2201	1	Capacitor, 1000uf 6.3v
3101	1	Power Regulator, Buck, 5v, 1.5A
3001	1	LED Display, 7 Segment, 4 Digit, TM1637
1001	1	Arduino Nano
4001	1	Rotary encoder with switch
5001	16	Black, flexible, 144/M
7101	1	2 pin 5mm screw
7002	1	Black, White, Yellow, Red 4 Pin
7004	1	Grey, Blue, Purple, White, 4 Pin
7005	2	Black, White, Red, 3 Pin
7006	1	Red, Black, Yellow, 3 pin
7301	4	Pin Header Terminals
7103	1	Wire, 26 AWG, Green
7102	1	Wire, 26 AWG, Black
8001	4	Black nylon Phillips screw
8005	4	Aluminum male-female hex stand-off screw
8003	2	White nylon stand-off screw
8006	1	Steel hex nuts
8004	2	Stainless steel finish phillips screw
6001	1	Project Box
7201	1	4.8mm Shrink Tube
7202	1	2.4mm Strink Tube
4101	1	Chrome, aluminum knob
9301	1	Zip Tie

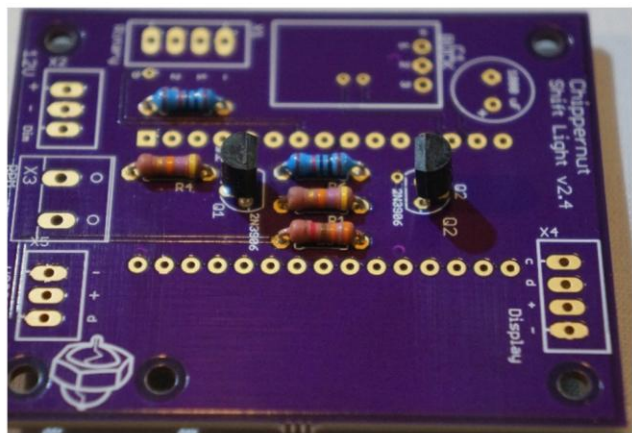
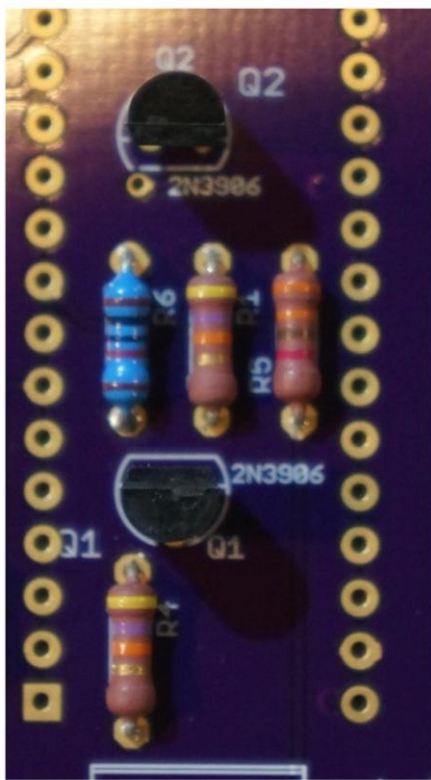
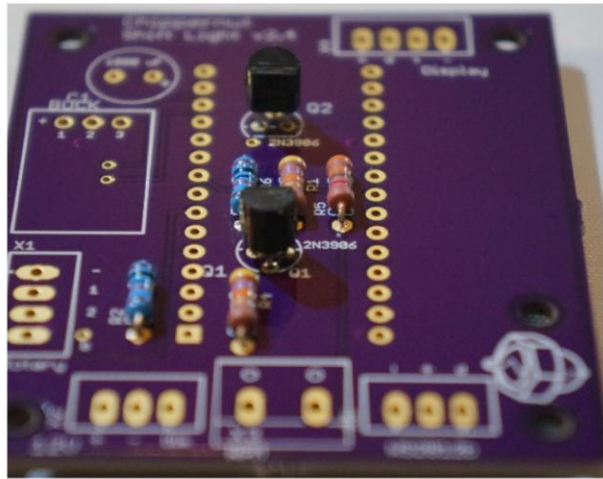


Match the value to the number printed on the circuit board.



Install the 2N3906 Transistors.

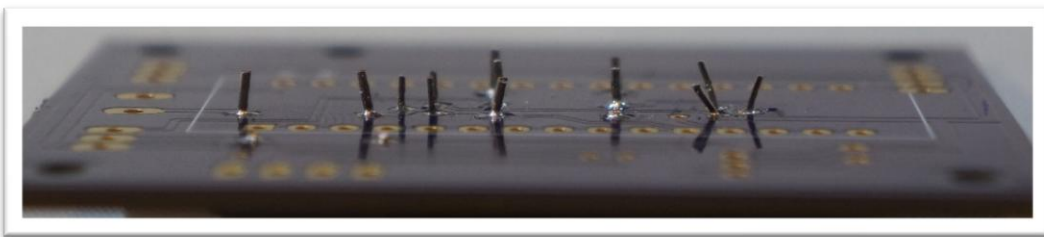
Match the profile of the transistor to the shape indicated on the circuit board



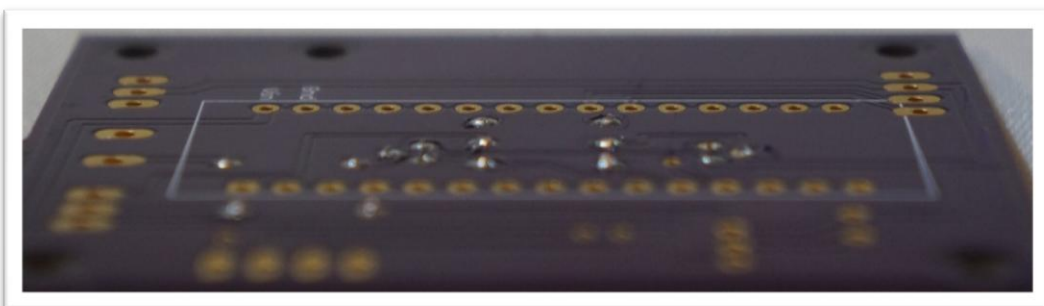
Trim the pins on the underside of the board when you are finished soldering.

This is very important.

Trim the pins as close to the board as possible. The Nano will mount to the bottom of the board, and we don't want any pins hitting the Nano board which may cause a short-circuit.



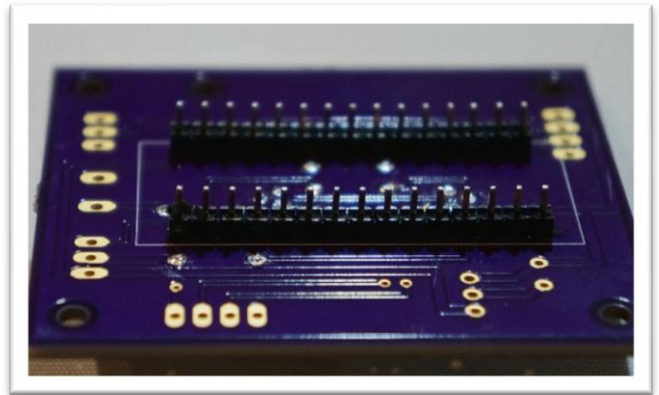
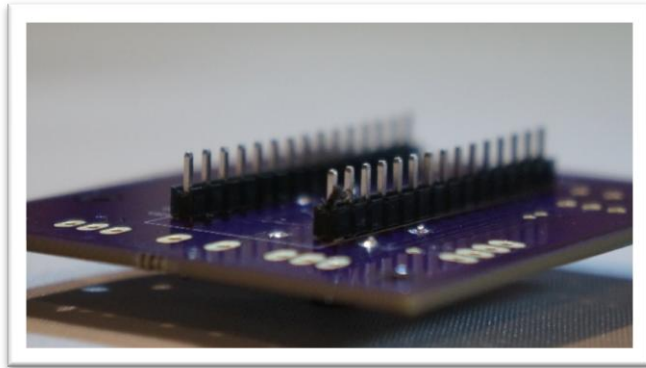
BAD



GOOD

Install the long Nano header pins into the bottom of the shift-light circuit board. The long side should go into the board, and come out the top side of the shift-light board.

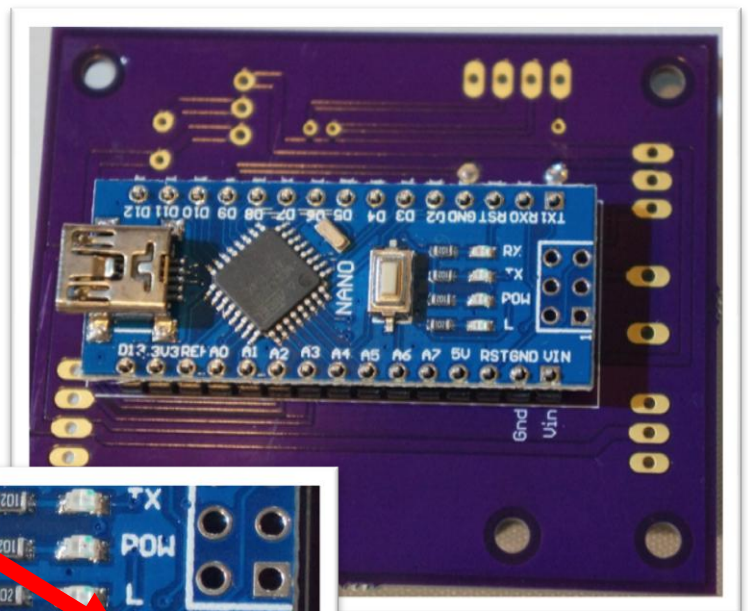
DO NOT SOLDER YET!



Now place the Nano on the header pins.

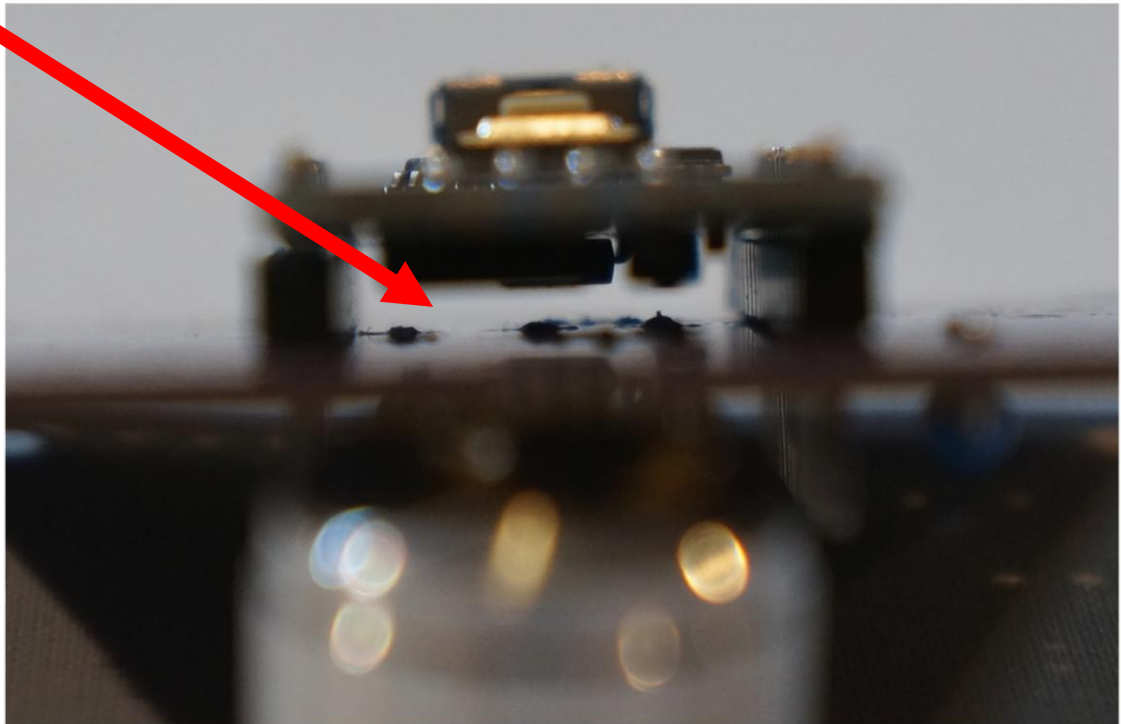
Match the GND and VIN pins on the Nano to the labels on the circuit board.

DO NOT SOLDER YET!



Holding the Nano to the shift-light circuit board snugly, turn the assembly on end and look down the space between the Nano and the shift-light circuit board.

Verify none of the pins from the circuit board (resistors and transistors) are contacting the Nano. **If there are any touching, remove the Nano and snip the pins shorter.**

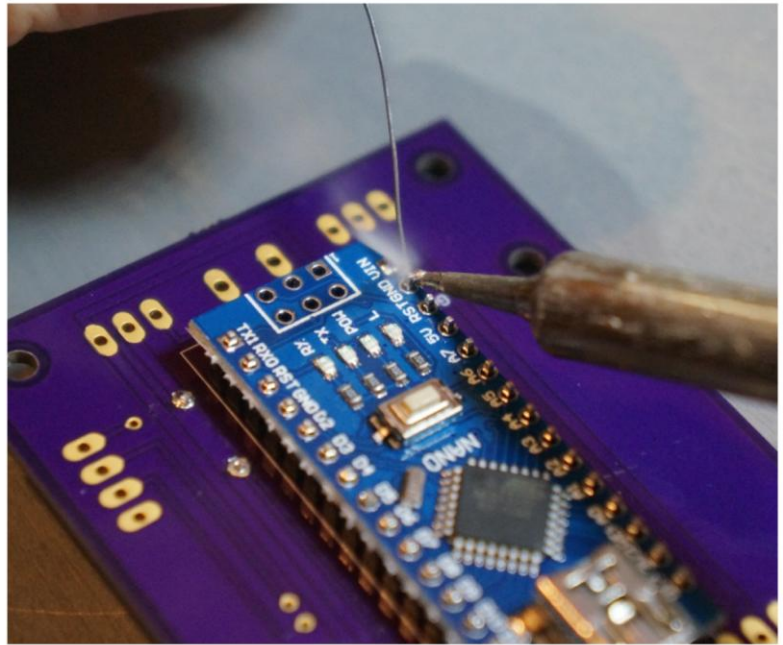


Now you can begin to solder the Nano.

Start on the bottom of the assembly, and solder the terminal pins to the Nano.

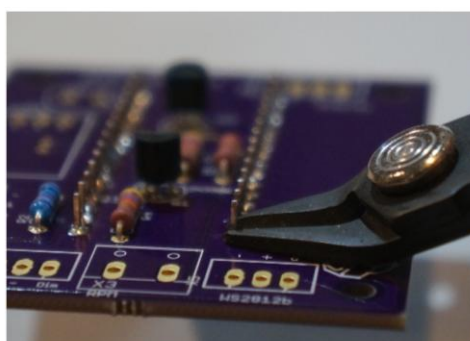
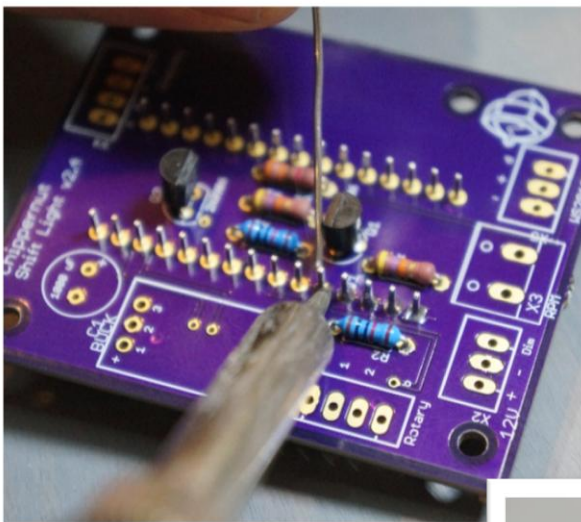
Hole the Nano snugly against the shift-light circuit board to ensure a good fit.

It may be helpful to solder the corners first, then solder the remaining pins.



Then flip the assembly over, and solder the terminal pins on the top-side of the Shift-light circuit board.

When complete, snip the remaining pins on the top-side of the board.



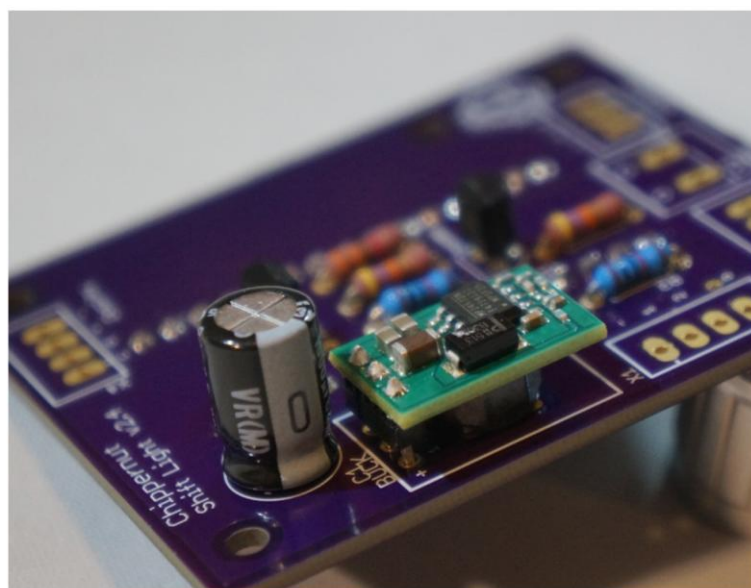
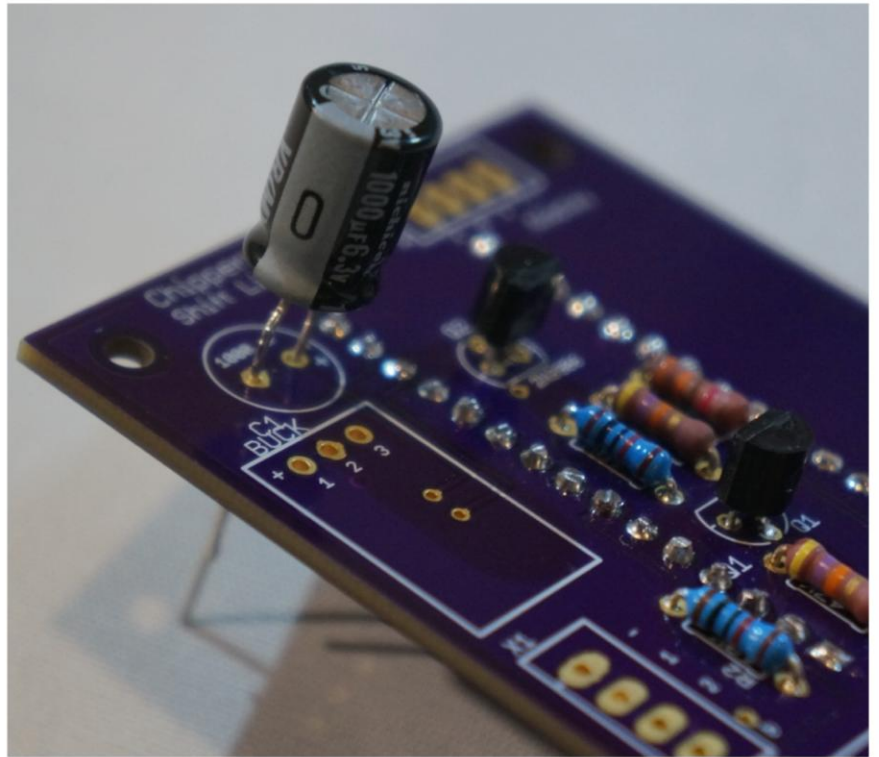
Install the 1000uF Capacitor in the designated spot.

BE CAREFUL!

This part is polarized. The White Band with the hyphen (--) indicates negative. The black side of the capacitor indicates positive.

Match the black side with the positive symbol (+) on the shift-light circuit board.

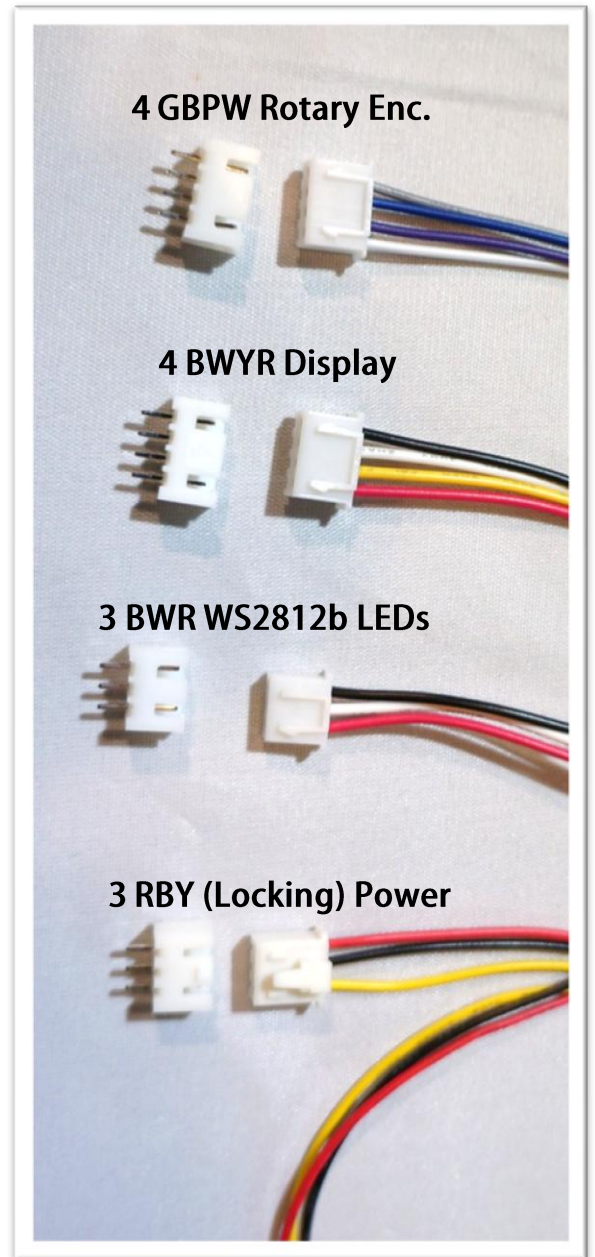
You may have to wiggle the capacitor to get it seated all the way down against the circuit board.



Next, install the Buck Convertor. This part only goes in one way.

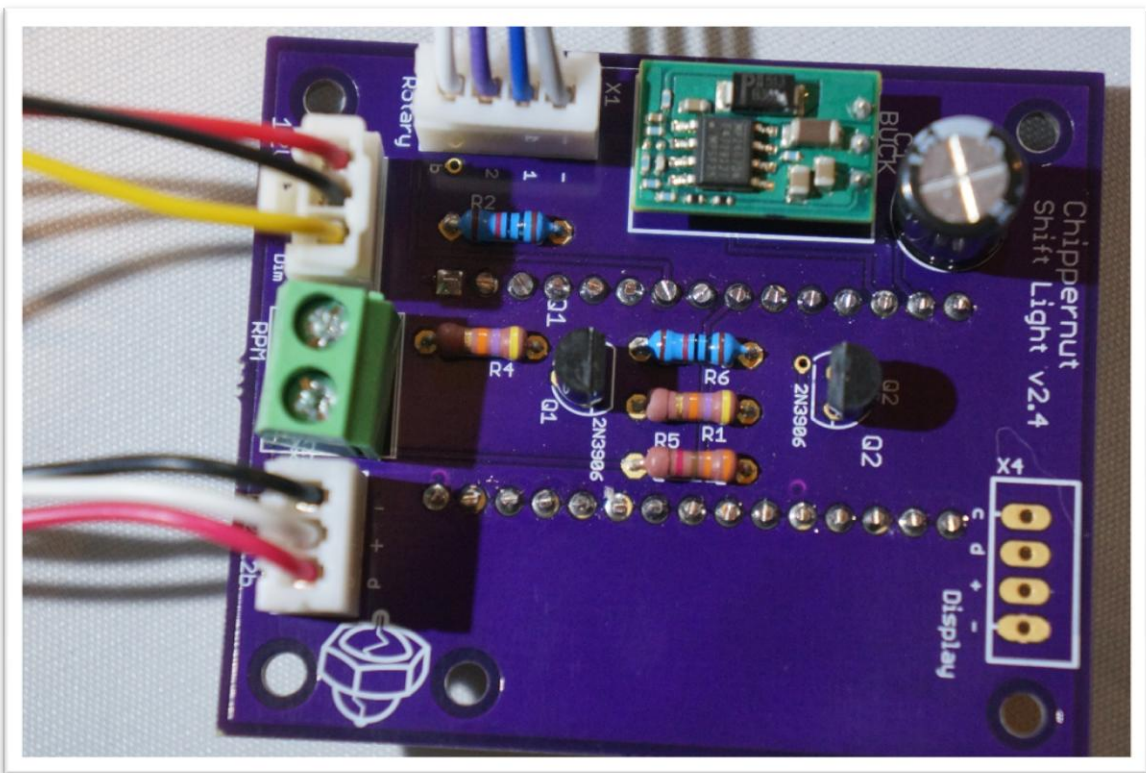
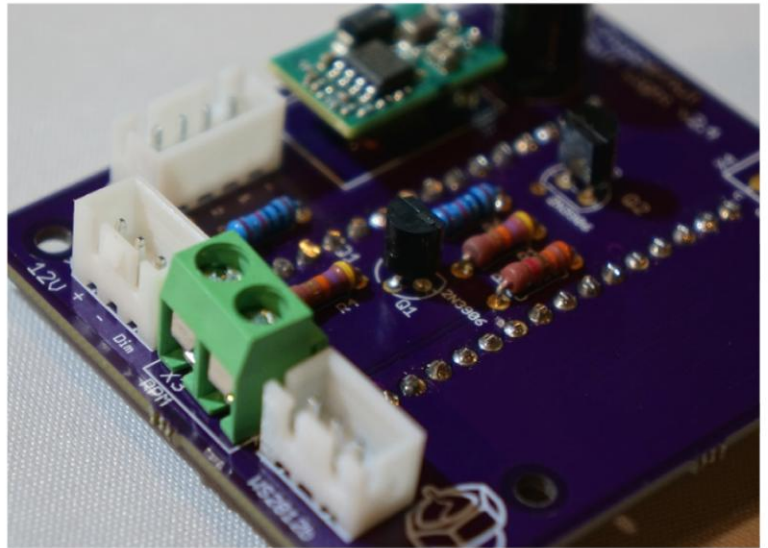
Now prepare the connectors. **Each connector has a unique color combination and a specific place on the board.** See images and chart below.

Connector Name	Pin/Color	Purpose
4 GBPW	1 (Grey)	Rotary ---
	2 (Blue)	Rotary 1
	3 (Purple)	Rotary 2
	4 (White)	Button Input
4 BWYR	1 (Black)	Display ---
	2 (White)	Display +5 VCC
	3 (Yellow)	Display Date
	4 (Red)	Display Clock
3 BWR	1 (Black)	WS2812B LED -
	2 (White)	Led +5 VCC
	3 (Red)	LED Data
3 RBY Lock	1 (Red)	+12 Volts Input
	2 (Black)	Ground Input
	3 (Yellow)	Dimmer Input



Place the connectors on the board in their respective positions.

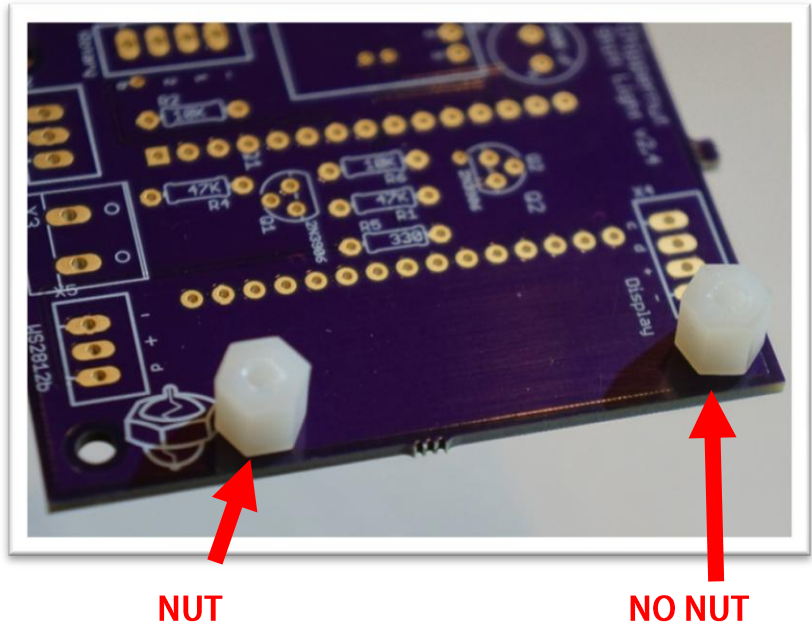
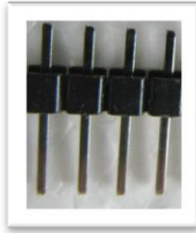
NOTE: If you want to install the 7-Segment LED display within the enclosure, DO NOT INSTALL A WIRE CONNECTOR HERE.



If you want to install the 7-segment LED display in the enclosure, first solder the 4-pin terminal headers to the display.

Insert (2) White Nylon stand-offs as indicated.

Install the (1) metal nut on the White Nylon stand-off closest to the Chippernut Logo.



Place the display on top of the Stand-Offs and align the holes – while simultaneously placing the terminal pins through the shift-light circuit board.

Fasten the display to the stand-offs using the (2) metal screws provided.

Then solder the terminal pins on the bottom side of the shift-light board.

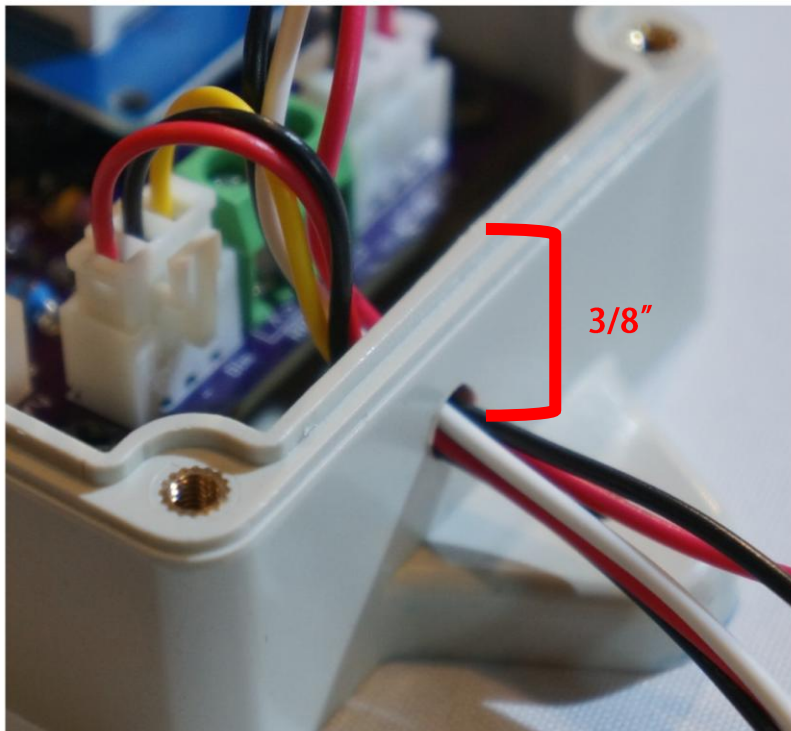
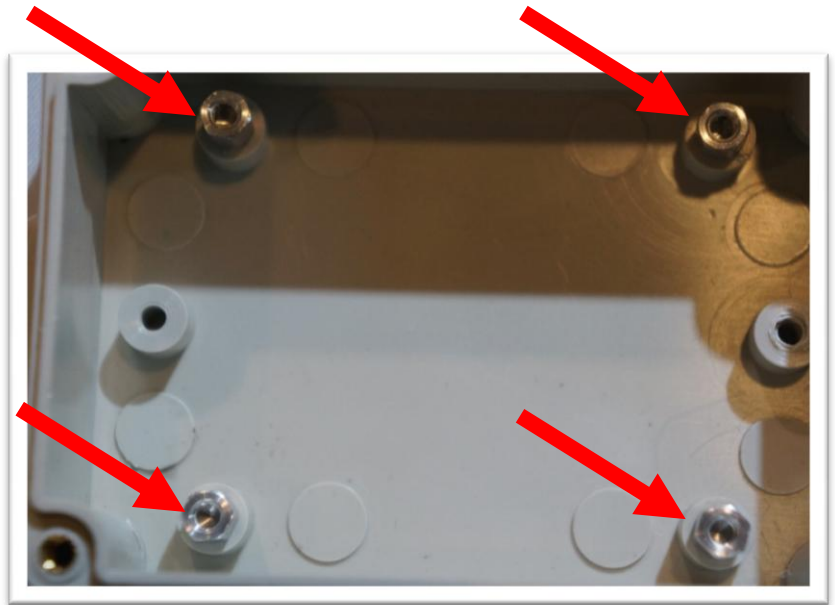


Install the (4) metal stand-offs into the base of the enclosure.

Use a socket driver or a pair of pliers to grip the outside of the stand-off.

DO NOT use the plastic screws to drive the stand-offs.

DO NOT force the pliers inside the stand-off hole, thread damage will occur.



Next, we will drill a wire passage hole.

Drill a 1/16" pilot hole on the short side of the enclosure base, roughly in the middle, about 3/8" down from the top edge.

Then drill a 3/16" hole in this pilot hole.

Do not drill holes with circuit board inside enclosure.
Pictures are reference only.

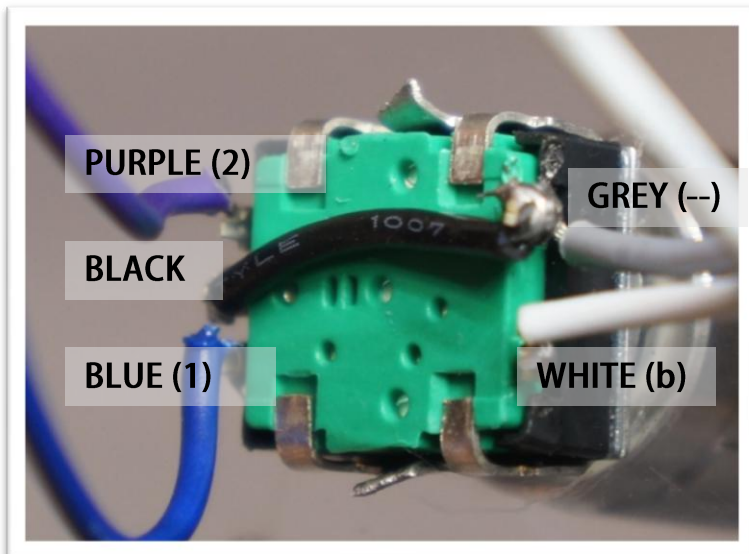
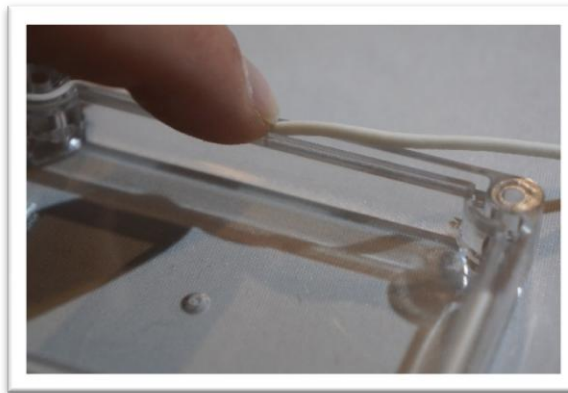
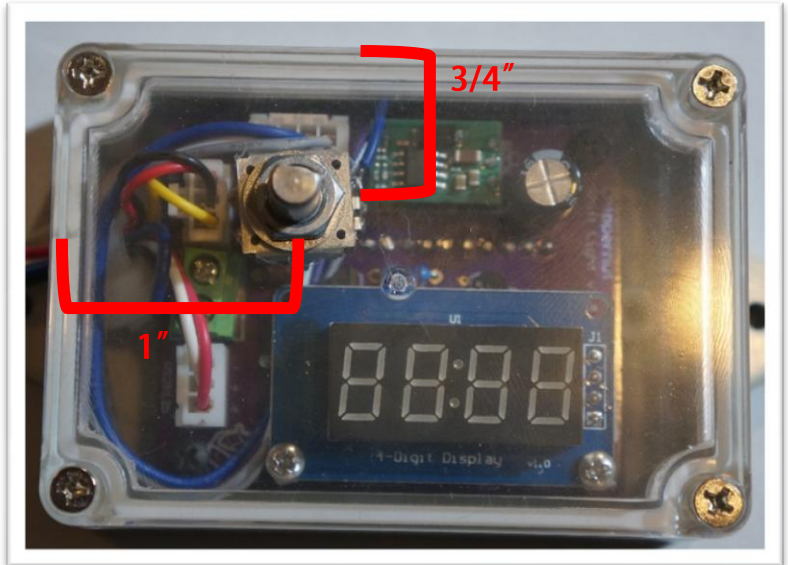
If you want the rotary encoder installed in the clear top of the enclosure, drill a 1/16" pilot hole at 3/4" from the top, and 1" from the side.

Then enlarge this hole with a 9/32" drill bit.

DO NOT drill these holes with the circuit board inside the enclosure.

Picture is for reference only.

Press the white gasket into the groove in the clear top.

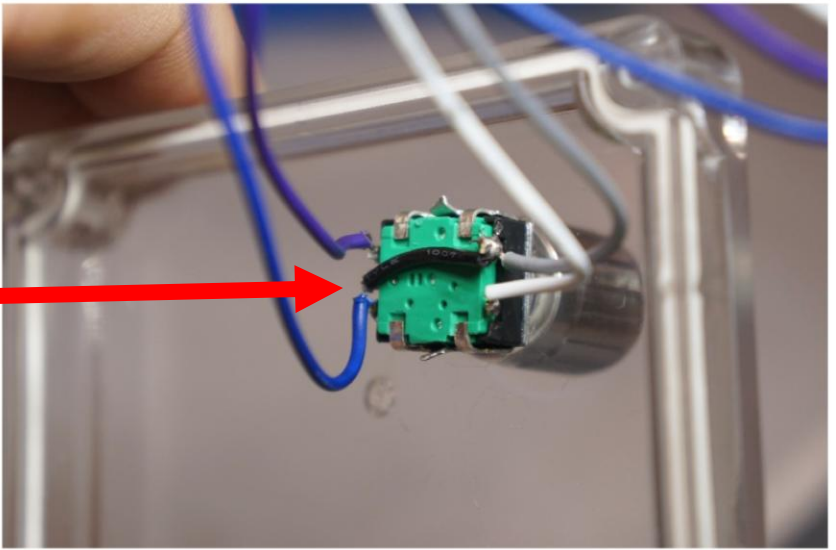


Prepare the rotary encoder by wiring a bridge: a small piece of wire between the middle pin (on the side with 3 pins) to either pin on the other side (side with 2 pins).

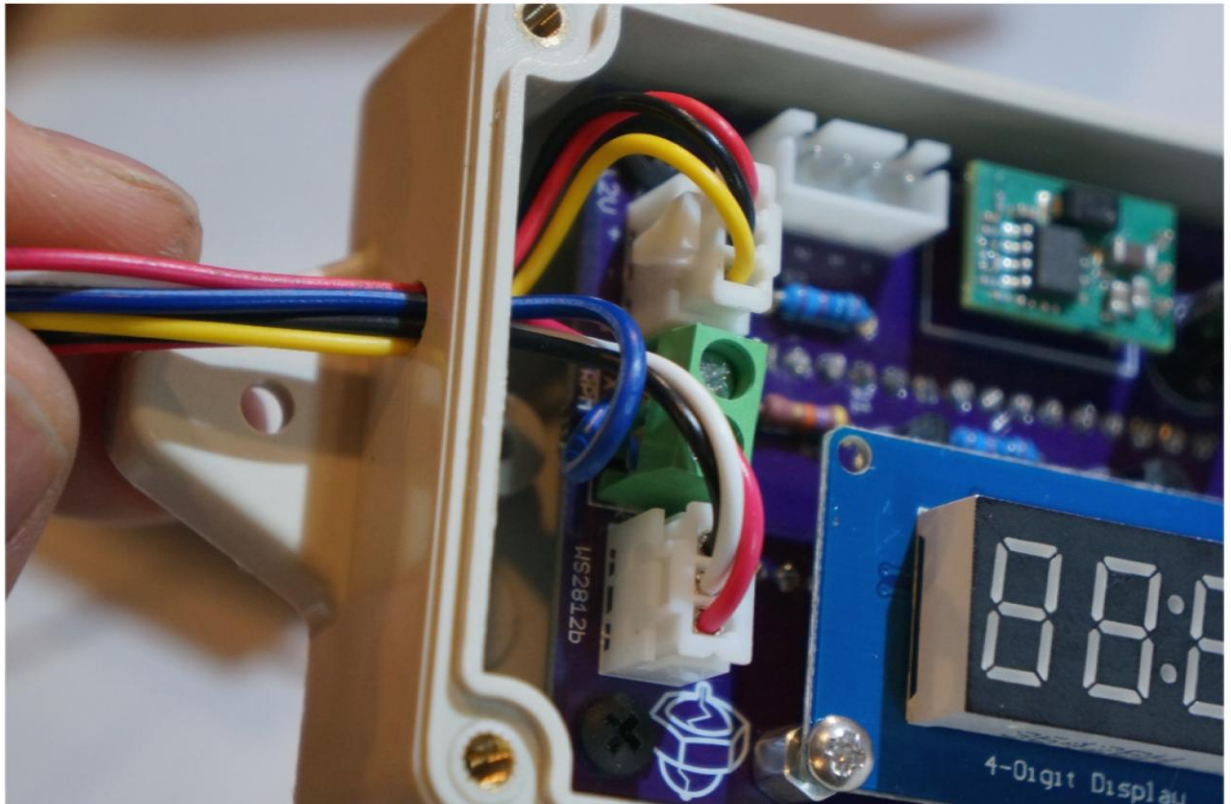
Wire the 4GBPW connector as diagrammed in the image. If installing the rotary inside the enclosure, feel free to cut these wires to about 1-1/2" total length from the end of the connector.

Install the rotary encoder and place the knob on the shaft.

Break off the tabs



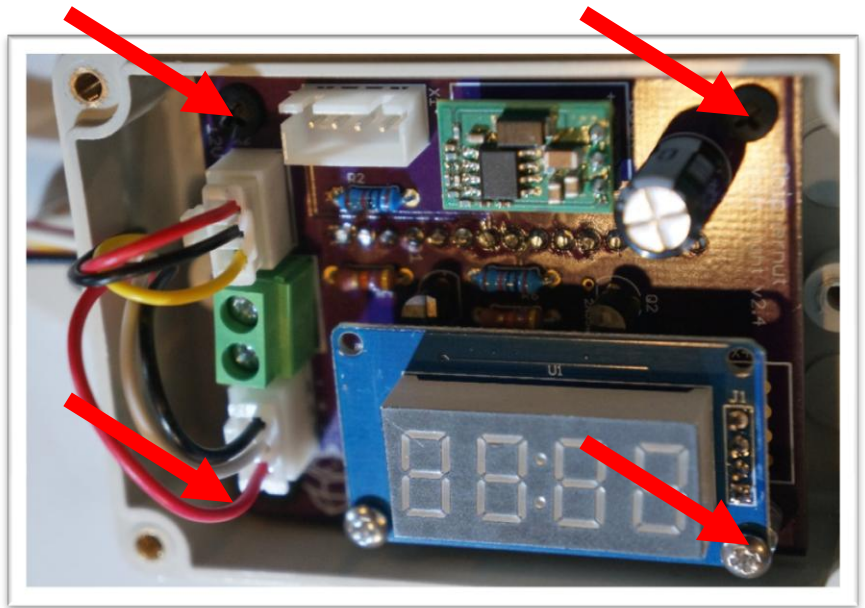
Install the wires in the connectors on the circuit board. Using the wire provided, strip an end of the wire and insert into the 2-pin screw terminal on the circuit board. Make sure the wire leads to the pin labeled "RPM"



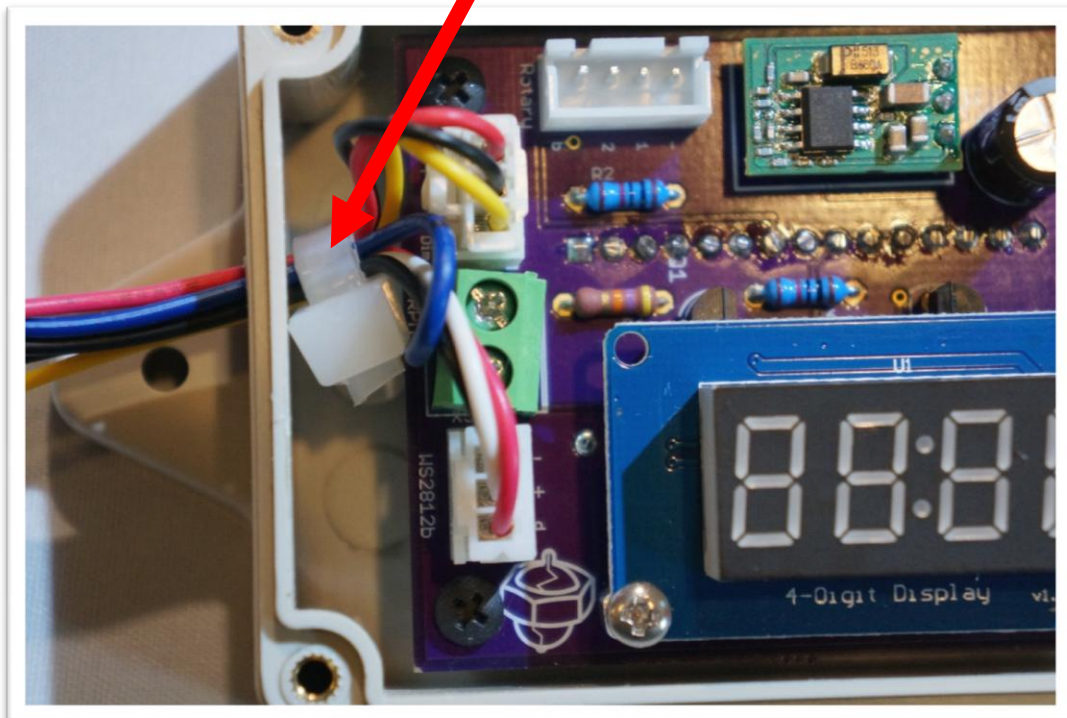
Feed the wires through the wire hole you drilled.

Seat the circuit board on the metal stand-offs.

Secure the board using the (3) Black nylon screws, and turn the Display screw to engage the last metal stand-off.

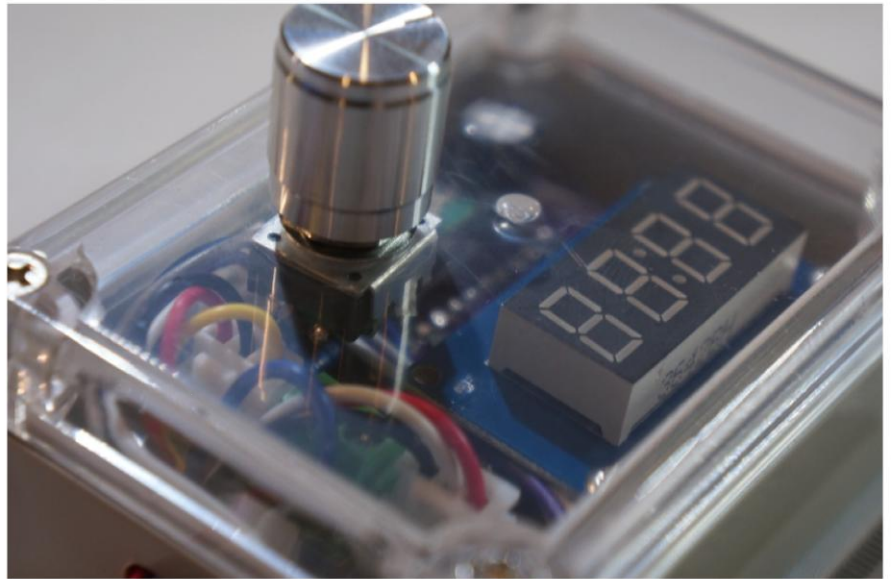


Use the provided Zip-Tie as a strain relief on the wires.



Plug in the rotary encoder and route the wires as needed to avoid interference.

Fasten the clear top to the base of the enclosure.

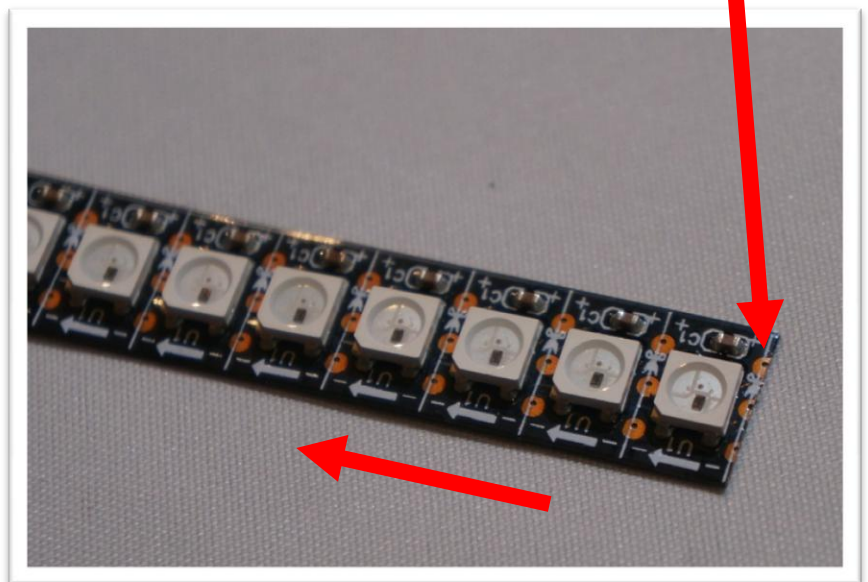


Prepare the WS2812B LED strip for wiring.

The LED strip has very small pads located on the very end of the flexible black strip.

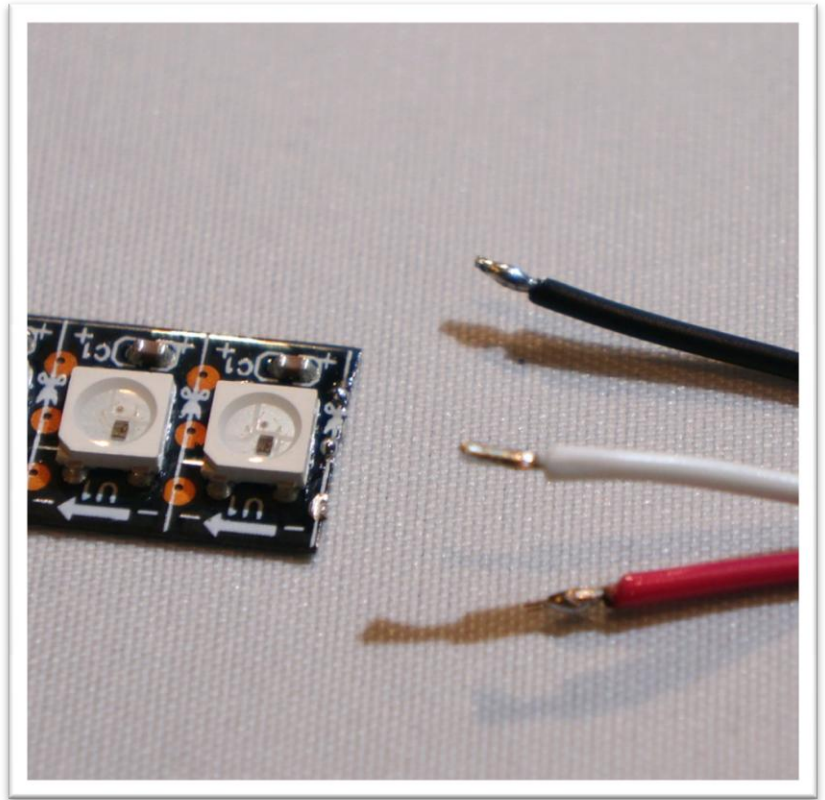
First, orientate the strip correctly. The power and data should flow in the same direction as the arrow.

It will not work if you wire this backwards.



Using a small amount of solder, "tin" the small copper pads on the LED strip.

Strip the wire on the 3 BWR wire connector. Trim the leads very short, and tin the ends.

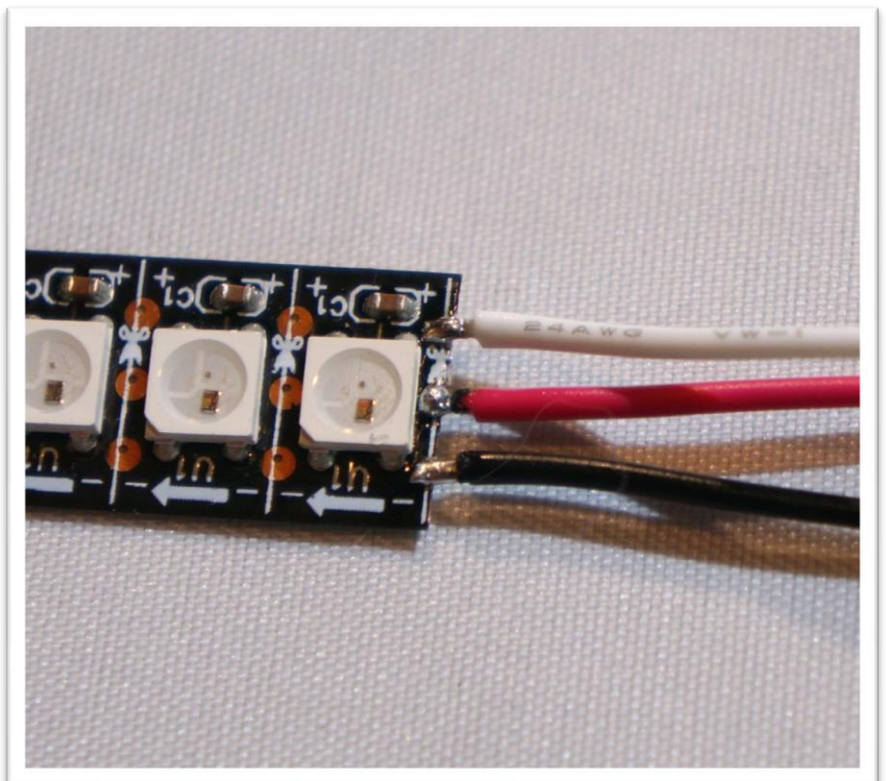


Match the colors exactly. Using just the soldering iron and the solder already applied, gently solder the wires to the LED strip.

+ → WHITE

Middle → RED

-- → BLACK

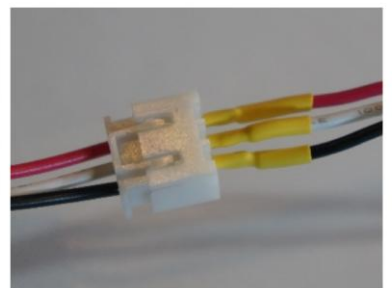
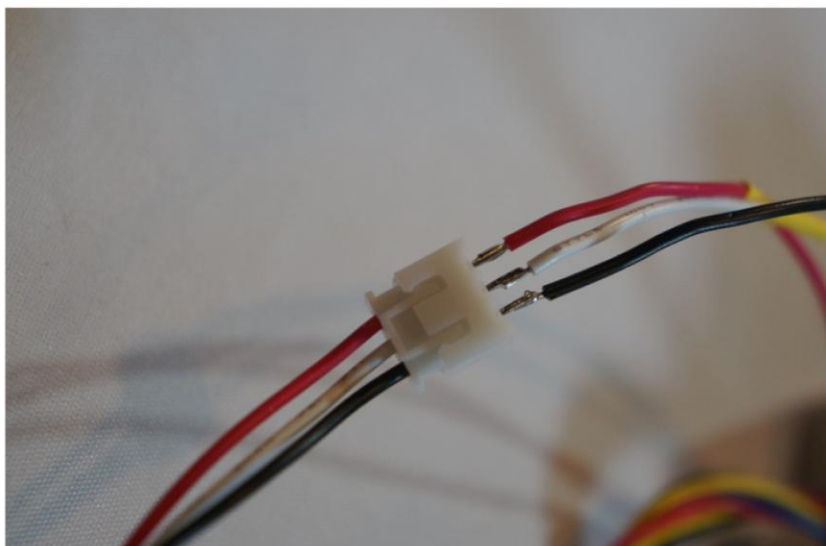
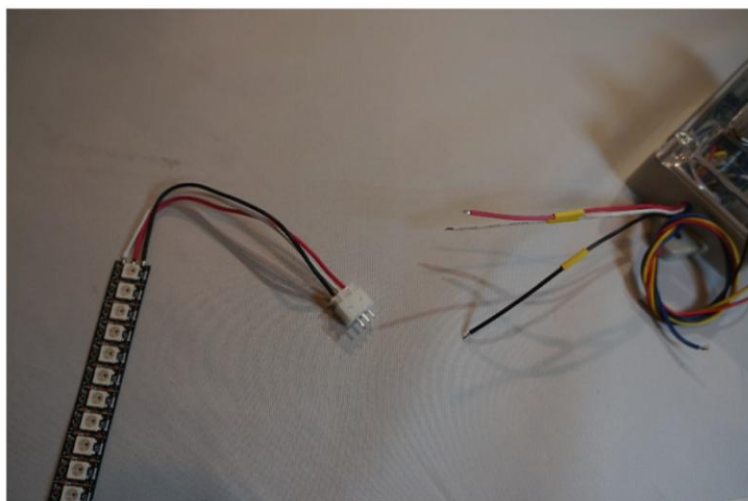
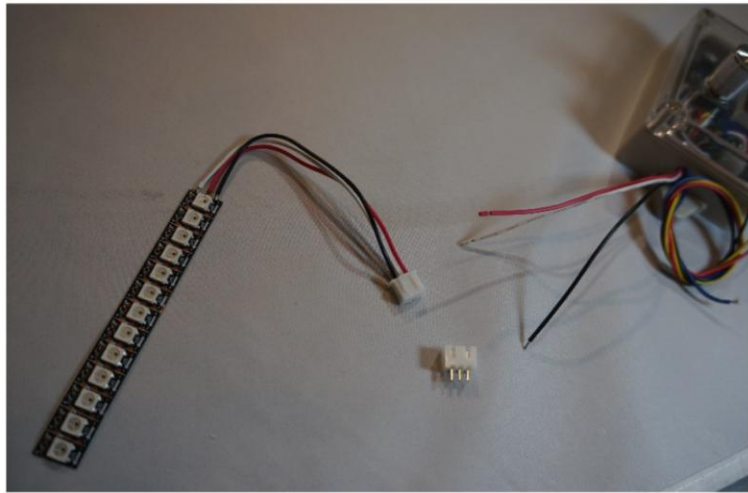


Now we need to add the extra receptacle to the LED wire coming from the enclosure.

Get the same 3 BWR connector and plug it into the WS2812B connector you just wired on the previous page.

Cut three equal lengths of small diameter shrink tube. Place the shrink tube over the wires. **Make sure you have the correct wires!**

Then carefully match the wire colors and solder in place.



Overall Wiring Diagram

