

2016 Blackfeet Camp Les: 6.0 SOLAR USB

INTRODUCTION



2016 Blackfeet Camp Les Joy: INTRO & OVERVIEW

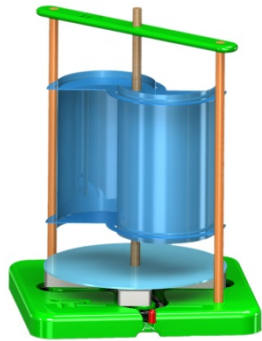
- 1.0 JOY** Thanks You BCC & NSF
Introduction Names
Students, Kits Helper
- 1.1 Les Overview: Assemble Experiment Kits
- Sonica **2.0** Meter,
Jasper **3.0** Turbo Wind Generator,
Sonica **4.0** Tear apart (de-engineer) solar garden light
Boyi/Jonas **5.0** Solar Lantern or
Boyi/Jonas 6.0 Solar USB (iPhone charger)
Jonas/Boyi **7.0** Breadboard (free play):
Jonas **8.0** Bear Trap



2016 Blackfeet Camp Les Joy: Parts Order List OVERALL



30 Midschool and 30 Highschool								Total		
	Units	Ordered	Vendor	Location	Time	Status	Agent	Cost	Payer	
2.0 Meter	60									
1.5 Battery										
Solar Cell										
Light Source										
Magnet & Coil (Stripped)										
3.0 Turbine Wind	40									
Wood Base 12"x12"x1"	40		Lowes				Les			4'x8'=32
extra magnets	120						Zichao			
screw Handel	80									
screw Feet	160									
screw Plastic Base										
screw electric terminal										
terminal	200									
4.0 De-engineer solar garden light	60									
5.0 Solar Lantern Browndog	30									
mid-school, solderable										
6.0 Solar USB (iPhone charger)	30									
Basic Kit										
Battery										
Solar Cell										
Demo Unit Commercial	3									
	1				#####	#####	Les	\$29	Les-cc	
7.0 Breadboard (free play):	5									
8.0 Bear Trap	1									
UHAUL										



Turbo Parts list

Turbo Parts List and spare							
Status	Quant	Location	Parts/Instrument				
			Description	Type	Details		
			Instruments	Dremel			X20 long dowels (w
							X20 plastic discs
							X20 magnets
??	10	Shop	Instruments	Dremel-battery op			X10 coils (I think I l
??	10	Shop	Instruments	Dremel Charger			
OK	2	Shop/Lab	Instruments	Wind Machine			A list of extra stuff v
							X20 wood boards
Need	20		xtra parts	long dowels (we have short dowels)			X80 wood board sta
Need	20			plastic discs			X40 handles
Need	20			magnets			X80 wire connector
Need	10			coils (I think I had one group last year v			X120 screws and X
							X20 LEDs
							X10 dremels
							tape (for fixing the c
							glue gun

2016 Blackfeet Camp Les: ASSEMBLY 6.0 SOLAR USB

6.1 Check Tools Needed to assemble Solar USB

6.1.1 Soldering Iron

6.1.2 Solder

6.1.3 Wire Stripper

6.1.4 Helping Hand Vice

6.1.5 Connecting wires (22 GA, stranded, tinned)

6.1.6 Double sided foam tape

6.1.7 Glue gun

6.1.8 Screw driver + (Philips #1)

2016 Blackfeet Camp Les: ASSEMBLY 6.0 SOLAR USB

6.2 Check Parts List to ensure you have all parts in your ziplock

6.2.1 Switch



6.2.2 Blue USB Lithium IC Circuit Board: **CONTROLLER**



6.2.3 Green Dual **USB** Charging Board



6.2.4 Lithium Battery w Two Wires Attached



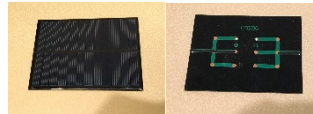
6.2.5 A Bag of Nuts and Bolts



6.2.6 Six Wooden Box Parts

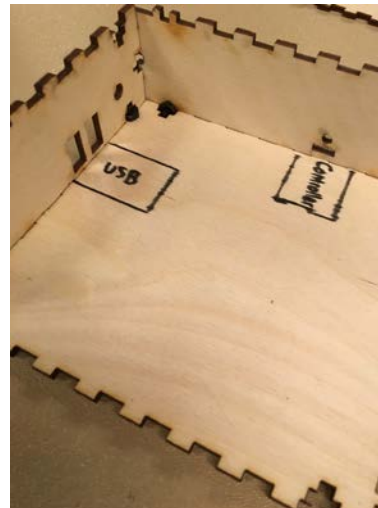
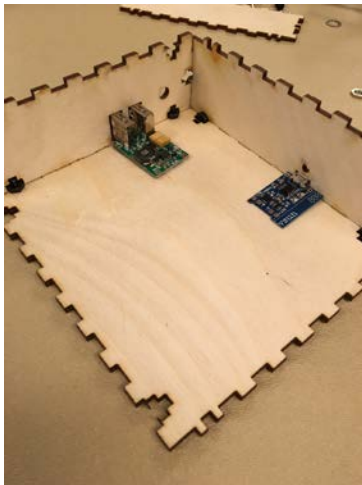
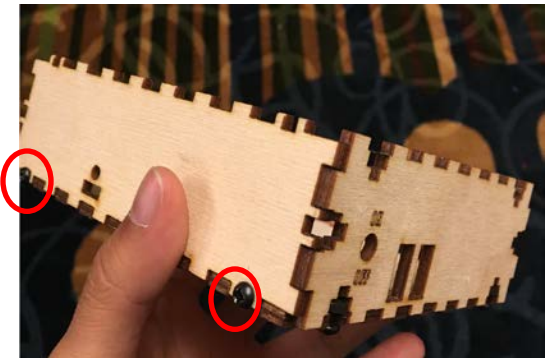


6.2.7 Solar Cell



2016 Blackfeet Camp Les: ASSEMBLY 6.0 SOLAR USB

6.3 Assemble wood box Bottom + Side(USB)+Side(Controller) using screws and label the locations of the components using a pen/pencil/sharpie (outline)

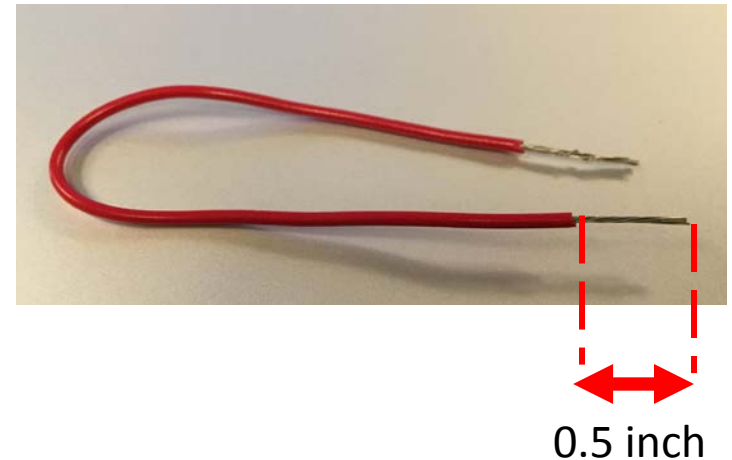
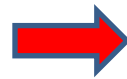


2016 Blackfeet Camp Les: ASSEMBLY 6.0 SOLAR USB

6.4.1 Make your own wires that are 6" long

- 3 red
- 3 black

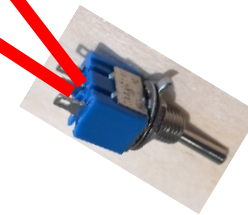
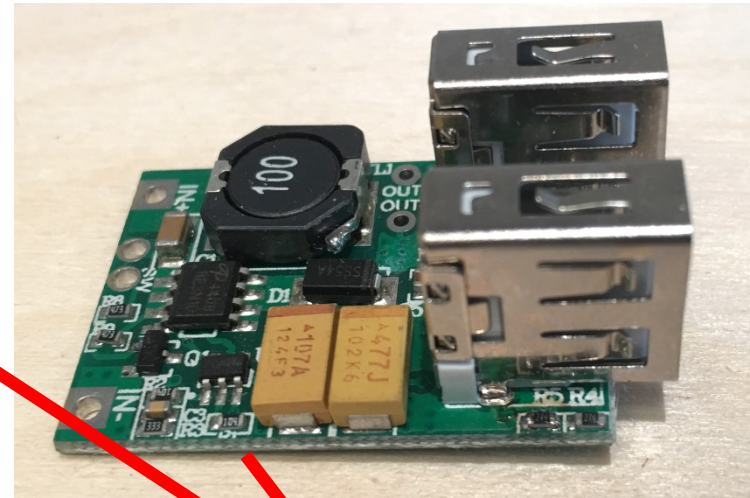
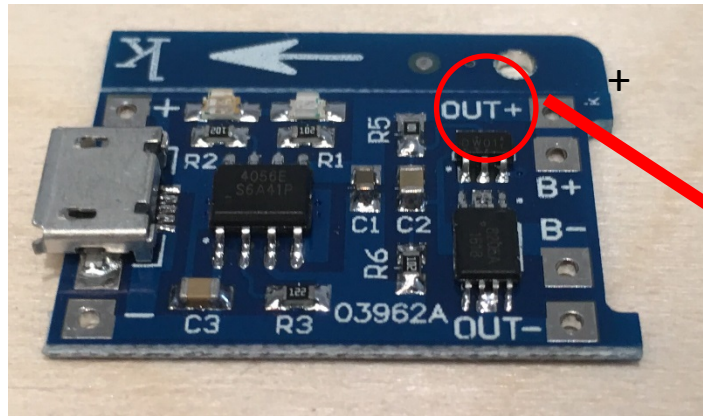
6.4.2 Strip both end of the wires you just made (~0.5") with your wire cutter and twist the striped ends until they are not stranded.



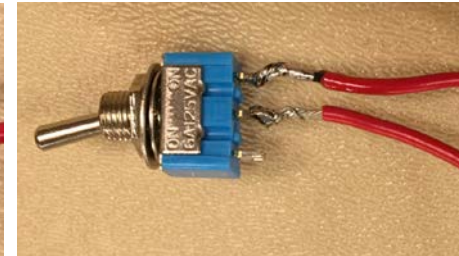
2016 Blackfeet Camp Les: ASSEMBLY 6.0 SOLAR USB

Always solder any wires from the top of any board and snip excess wires as close as possible to the board.

6.5.1 Solder a red wire to an OUT + and the middle pole of the switch. Solder another red wire to either the top or bottom of the switch.

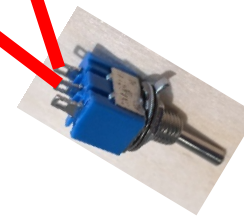
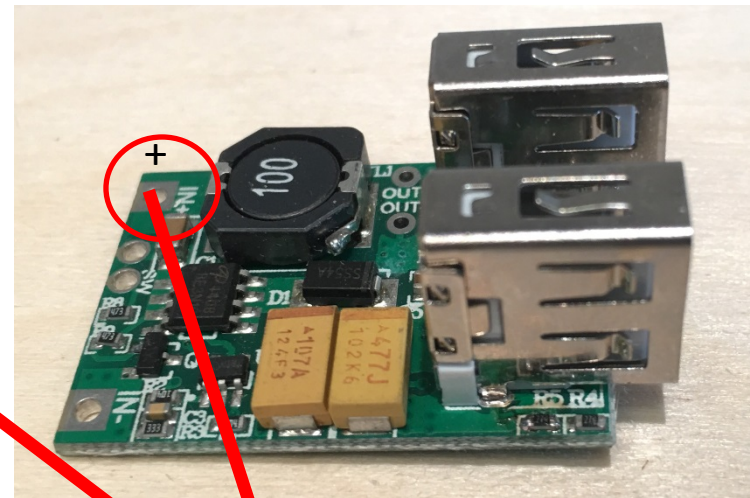
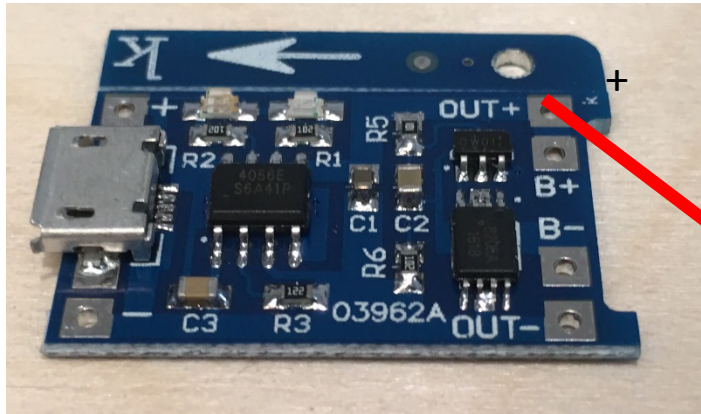


How to solder a switch tutorial:



2016 Blackfeet Camp Les: ASSEMBLY 6.0 SOLAR USB

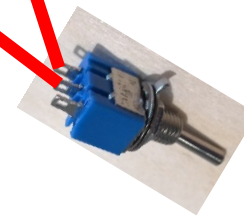
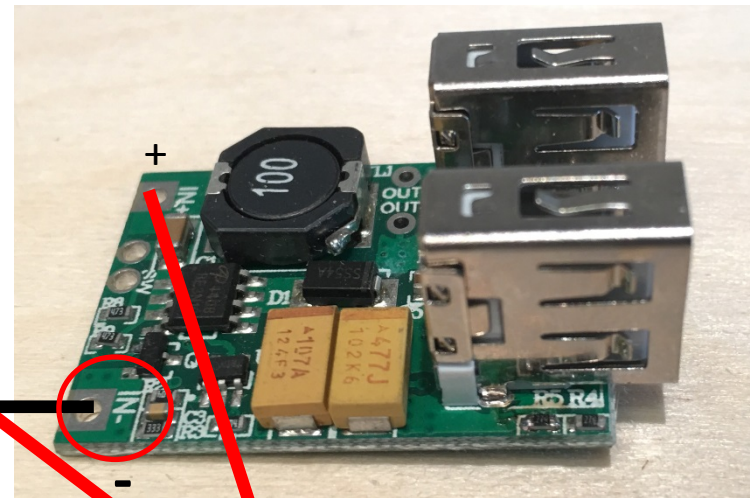
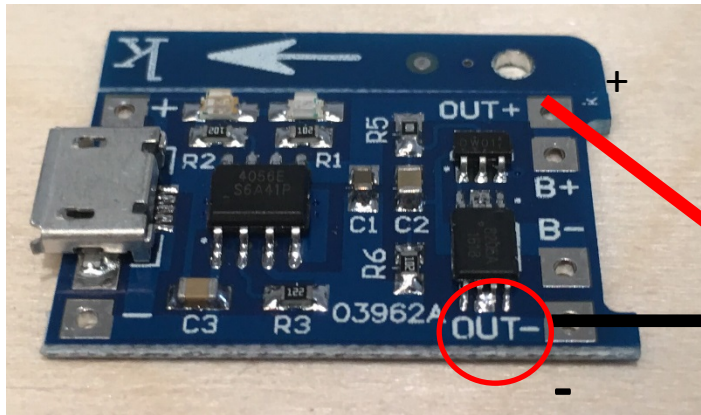
6.5.1 Solder the other end of red wire that is connected to the top/bottom of the switch to the IN + of the green USB board.



Always solder any wires from the top of any board and snip excess wires as close as possible to the board.

2016 Blackfeet Camp Les: ASSEMBLY 6.0 SOLAR USB

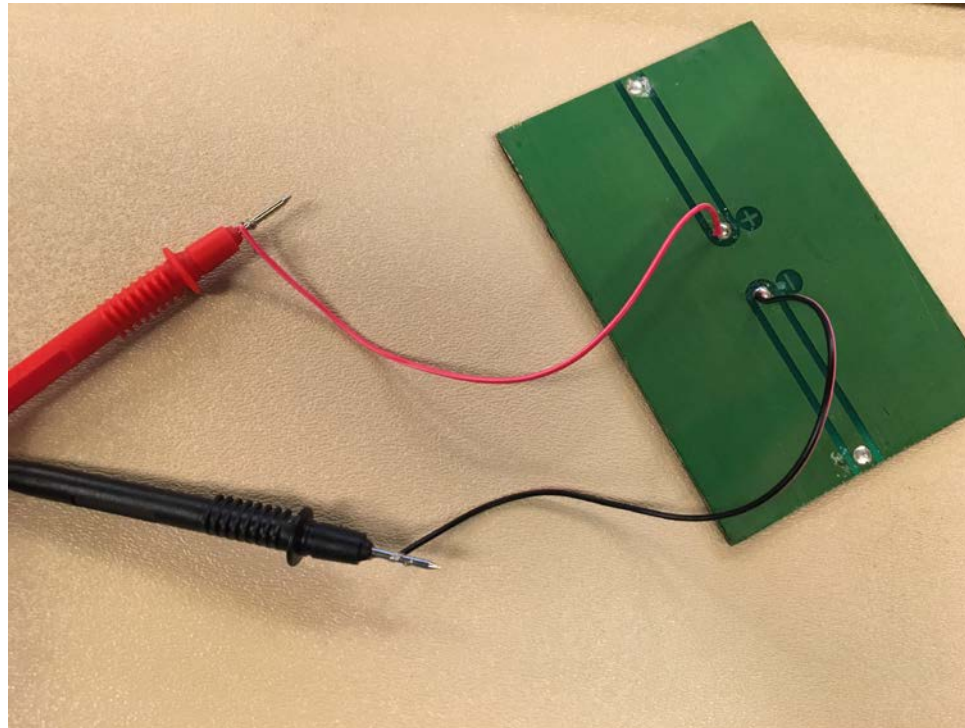
6.5.2 Solder a black wire to OUT – of the blue controller board and IN – of the green USB board.



2016 Blackfeet Camp Les: ASSEMBLY 6.0 SOLAR USB

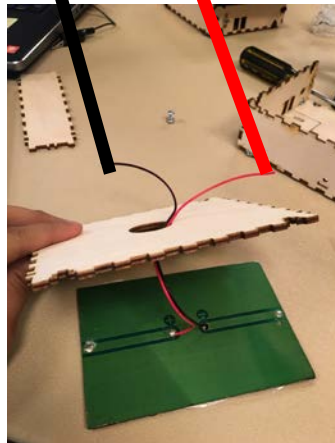
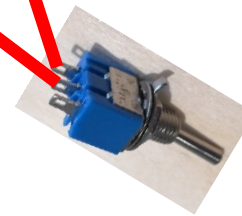
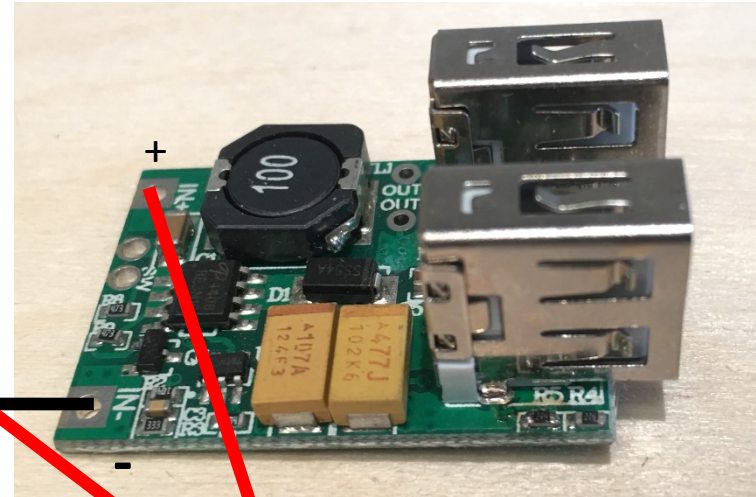
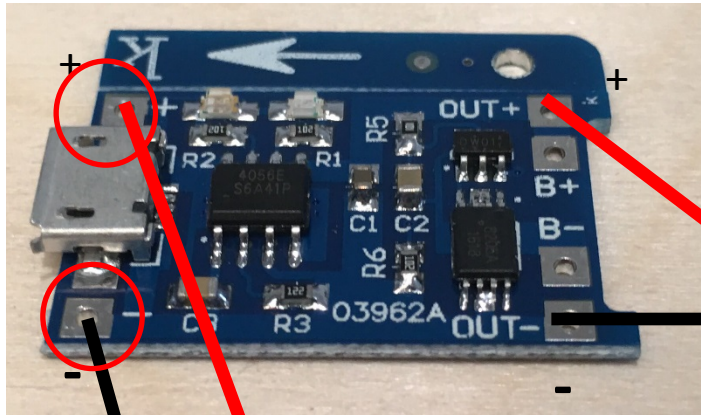
6.5.3 Solder red wire to the (+) of your solar cell's back and black wire to the (-) of your solar cell's back

Test your solar cell after you finish soldering them by using your multimeter and put it on a 10V setting. Connect the red wire to the red pole of the multimeter and black wire to the black pole of the multimeter. It should display 5-6V when you let light shine on the top of your solar cell.



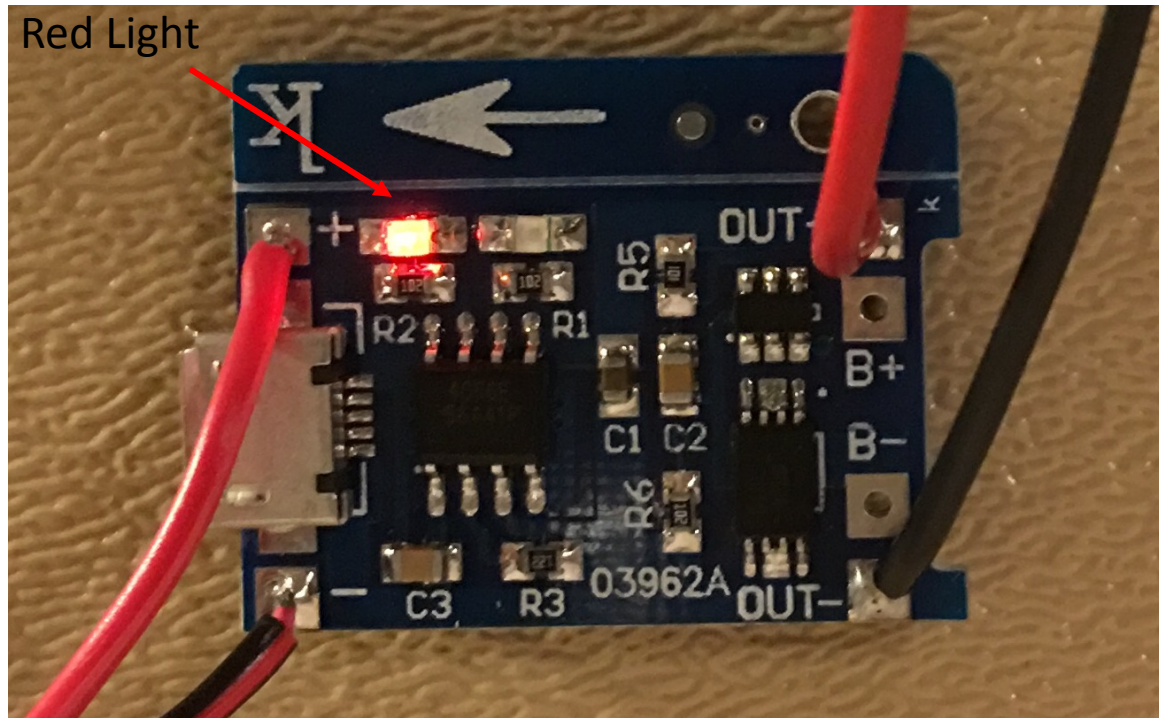
2016 Blackfeet Camp Les: ASSEMBLY 6.0 SOLAR USB

6.5.4 Put your soldered solar cell through the top of the wood with a hole and solder them to the controller as shown below, red to (+) and black to (-).



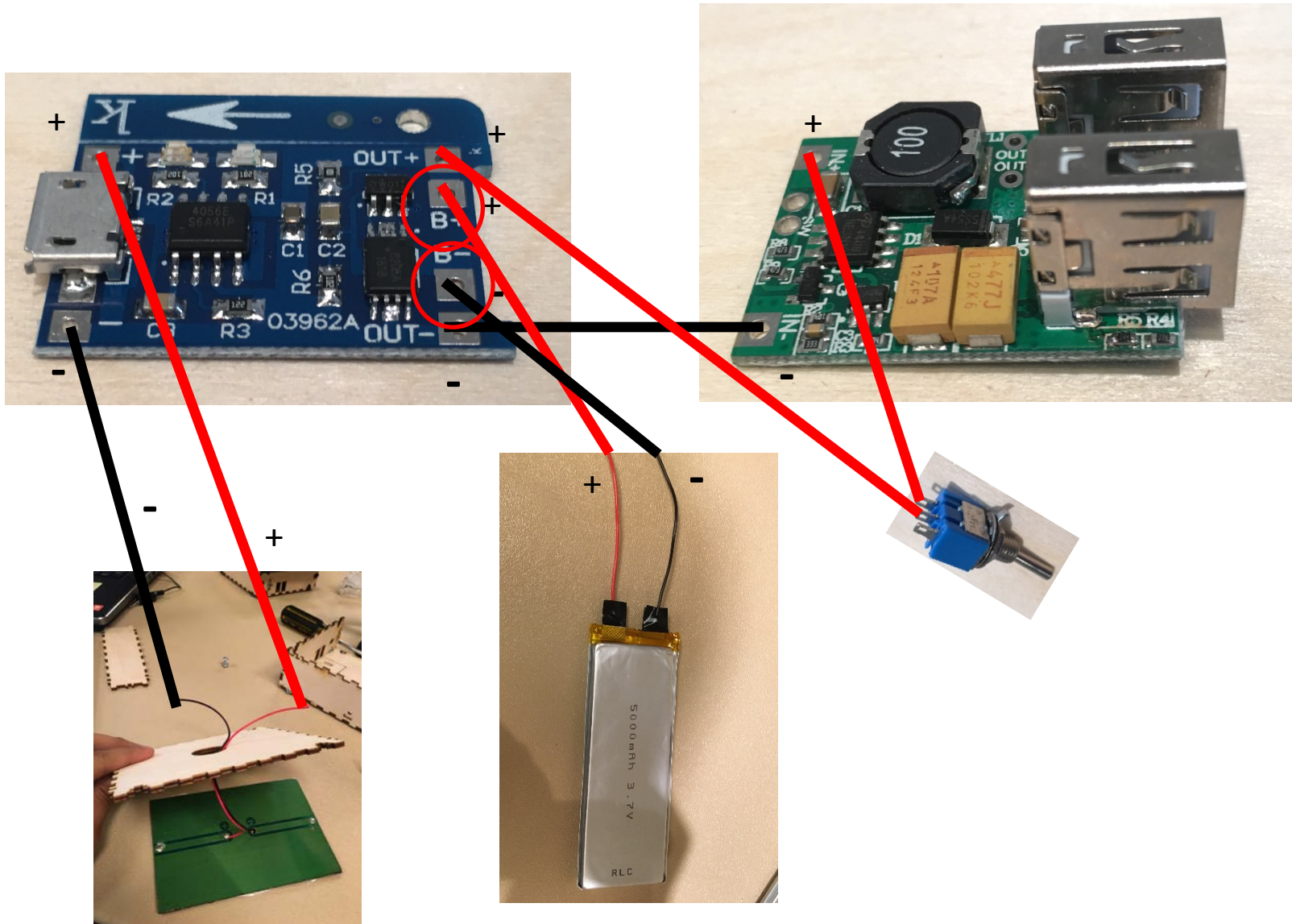
2016 Blackfeet Camp Les: ASSEMBLY 6.0 SOLAR USB

6.5.5 To test the blue controller, remove the plastic cover of your solar cell, shine light on your solar cell and a red light should light up on the blue controller.



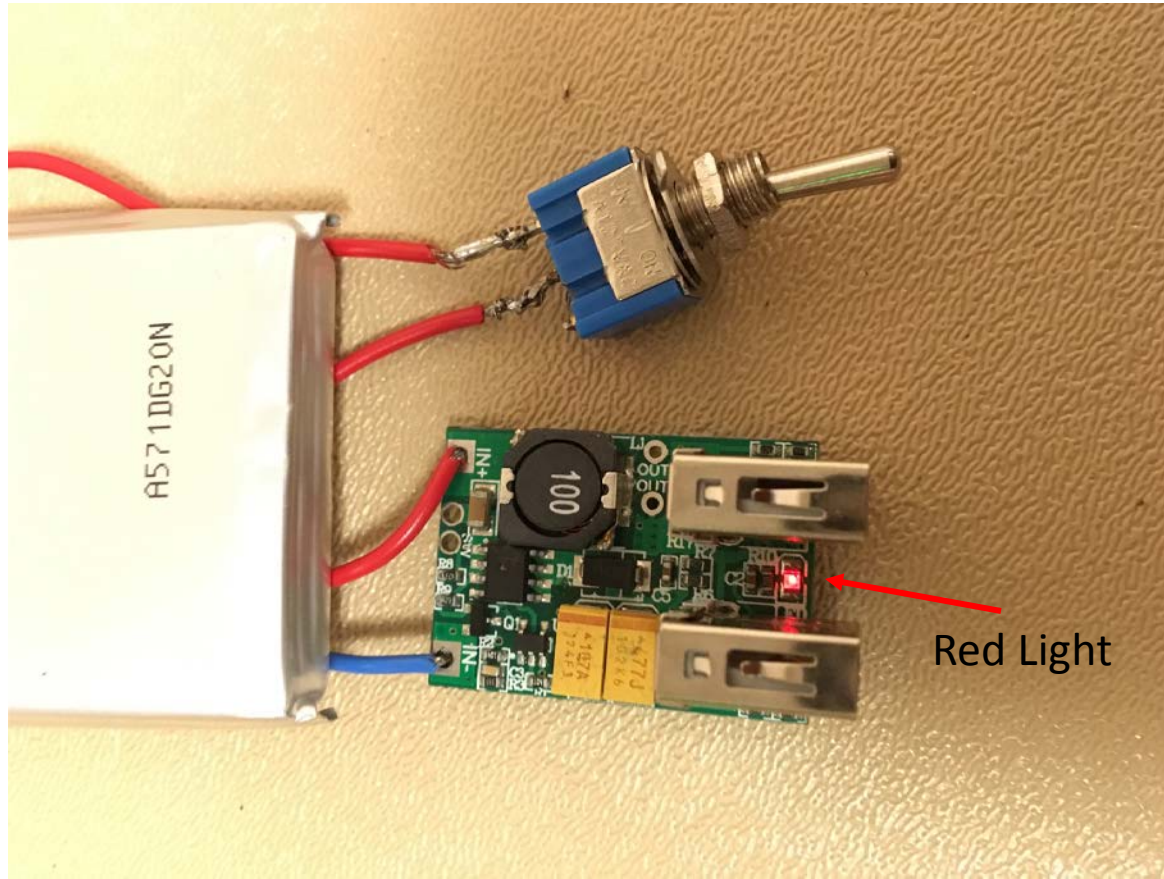
2016 Blackfeet Camp Les: ASSEMBLY 6.0 SOLAR USB

6.5.6 Strip the battery's wires and solder the red (+) and black (-) wires of the battery to B+ (red) and B- (black).



2016 Blackfeet Camp Les: ASSEMBLY 6.0 SOLAR USB

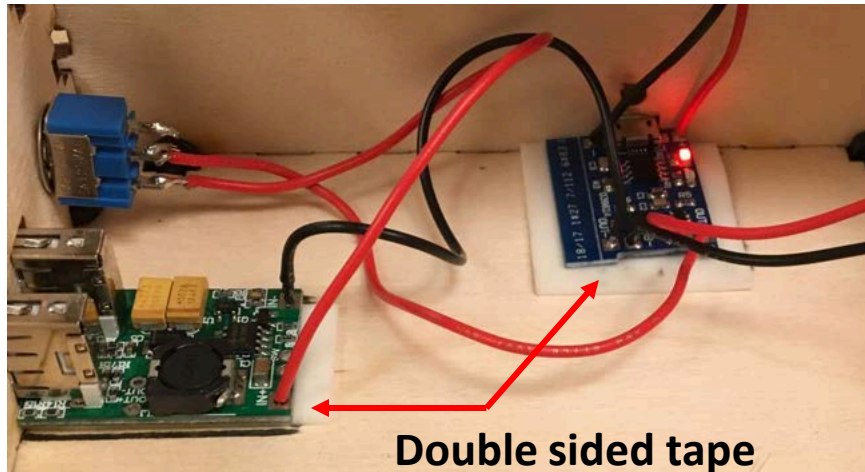
6.5.5 To test your battery, turn the switch on, and a red light should turn on your green board.



2016 Blackfeet Camp Les: ASSEMBLY 6.0 SOLAR USB

6.6.1 Put these assembled components on the designated spaces on the base of the box using double sided tape that you get from the instructor, trim them to match the component's size:

1. Green board goes to "USB"
2. Blue board goes to "controller"
3. Screw the switch on the switch hole



6.6.2 Glue the USB and controller in place with glue gun -> go to the glue gun station

6.6.3 Use double sided tape to mount your battery as shown in the picture above.

6.6.4 Screw the the remaining 2 sides of the box and the top that has a solar cell attached on it.