

Simon Assembly Instructions

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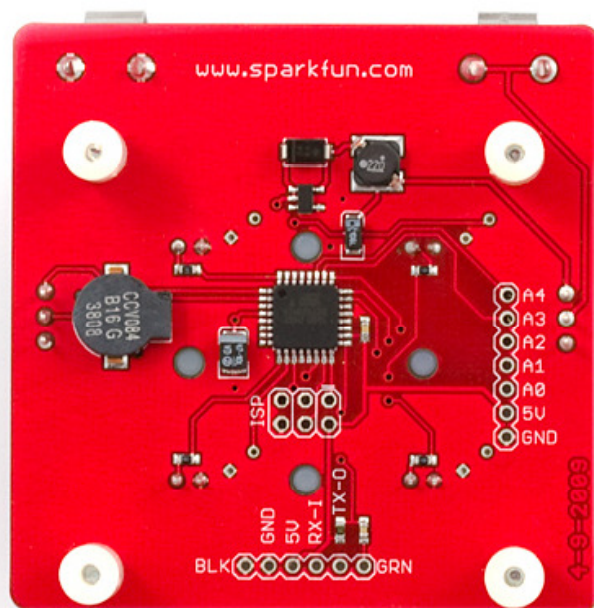
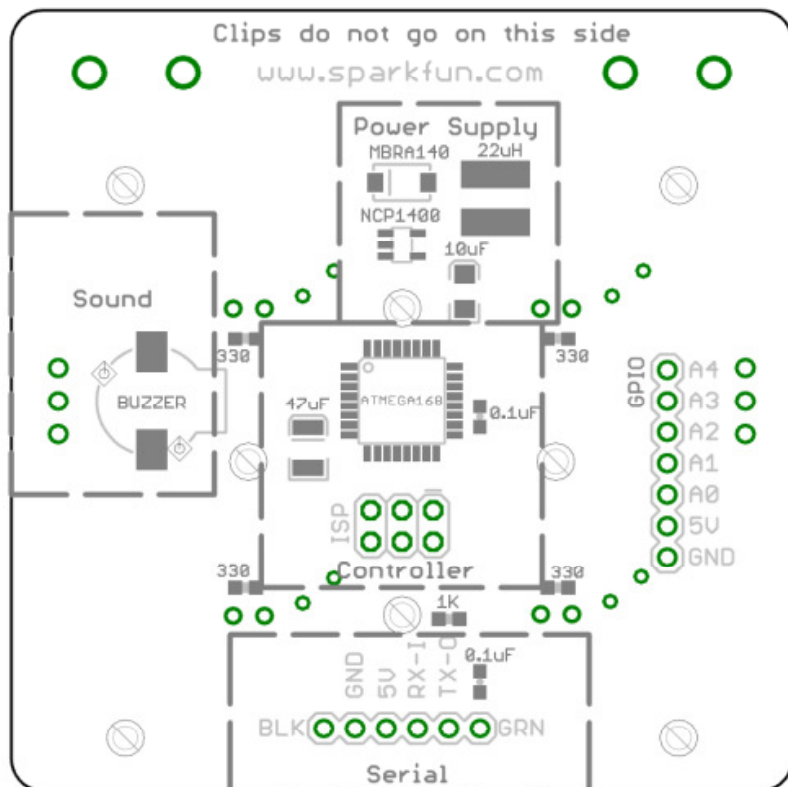
Matt Bolton : matt@sparkfun.com

Step	Name	Purpose	Side	Polarized?	Marking
Power Supply					
1	NCP1400	DC to DC Step up	Bottom	No	Make sure to line it up with pads on board
2	22uH	Inductor	Bottom	No	Make sure the pads on the inductor line up with pads on board
3	MBRA140	Diode	Bottom	Yes	Line on diode matches line on silkscreen
4	47uF	Tantalum Cap	Bottom	Yes	Line on capacitor goes on rounded end of silkscreen
5	10uF	Tantalum Cap	Bottom	Yes	Line on capacitor goes on rounded end of silkscreen
6	Power Switch		Top	No	Keep iron tip away! Plastic melts easy
7	Clip x 2	Battery Holder	Top	Yes	Push hard! Make sure the clips are pushed flat against the PCB. Make sure clips point towards each other to accept AA battery.
Before proceeding – insert AA battery and test output voltage. Should be 5V. Remove battery before proceeding					
Controller					
8	ATmega168	Microcontroller	Bottom	Yes	Corner of IC has small circle on top side – matches silkscreen circle
9	0.1uF x 2	IC decoupling	Bottom	No	In general, ceramic caps are not polarized and do not have an up/down
10	1K Resistor	Reset pull-up	Bottom	No	In general, resistors are not polarized but have a label on the top side
LEDs					
10	330 x 4	LED limiter	Bottom	No	In general, resistors are not polarized but have a label on the top side
	Red – Green –				LED housing *may not* match the silkscreen. Make sure the long leg of the
11	Blue – Yellow	LED	Top	Yes	LED goes into the hole next to the round side of the silkscreen indicator.
Sound					
12	Sound Switch		Top	No	Keep iron tip away! Plastic melts easy
13	Buzzer	Sound	Bottom	Yes	+ on buzzer matches silkscreen
Mechanical					
14	Button pad	Buttons	Top	No	Lay rubber pad over LEDs. Lay black frame on top rubber pad.
15	Stand offs	Stand offs		No	Insert 4 screws through frame. Attach 4 stand offs to screws. Hold screw in place and twist stand off onto screw.

Once assembled – Test that there is **not** continuity between pins labeled 5V and GND.

Once assembled – bring to Matt or Nathan for programming

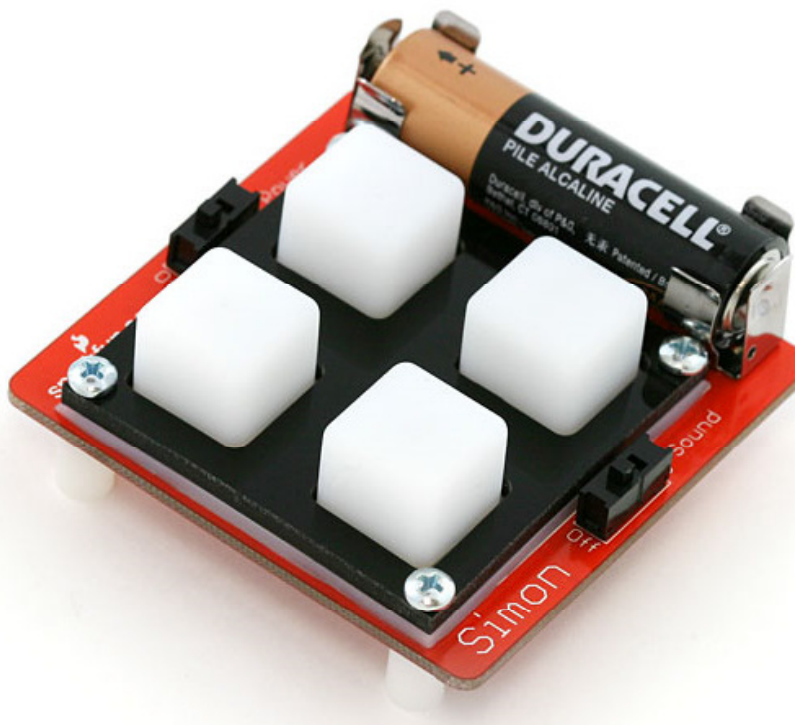
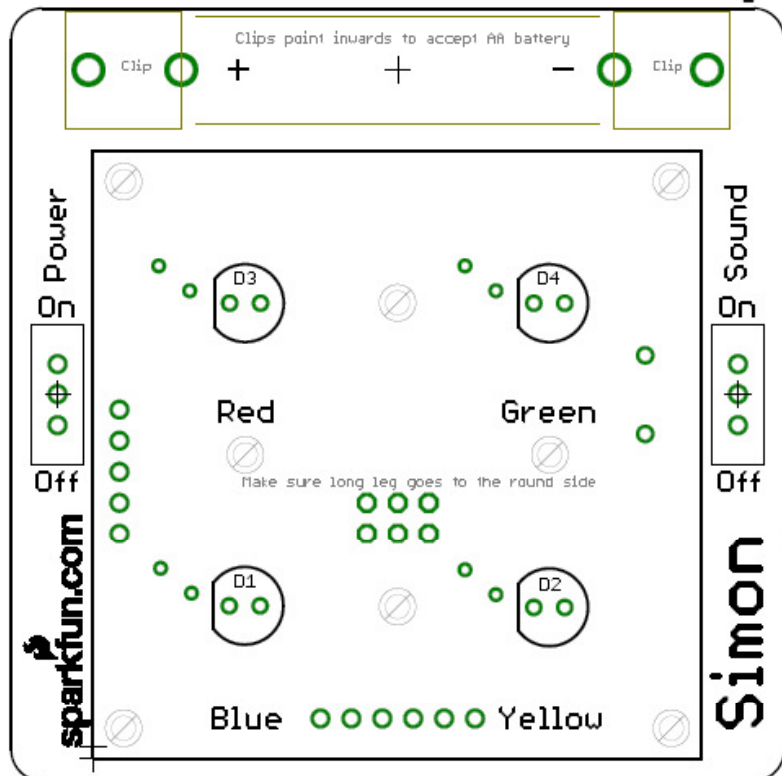
Bottom Side



Bottom Side Components

All thru hole components make joint on top side

Top Side



Top Side Components

All thru hole components make joint on bottom

Soldering Workshop Review

Date of workshop:

Rating:

1 (bad) 2 3 4 5 6 7 8 9 10 (great)

How long did it take you to complete the kit?

What did you like best?

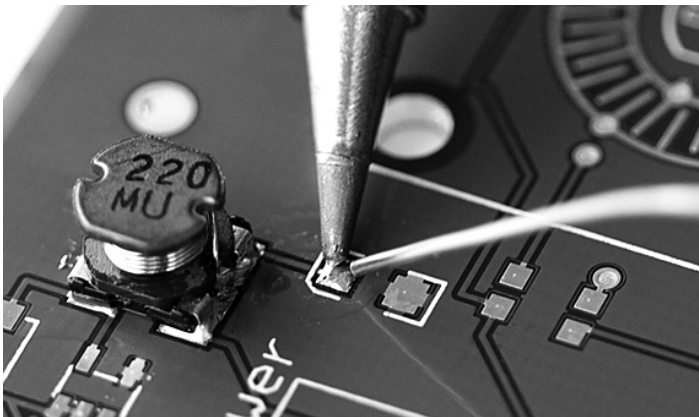
What did you like least?

What other instructional workshops would you like to see (PCB layout, microcontrollers, etc)?

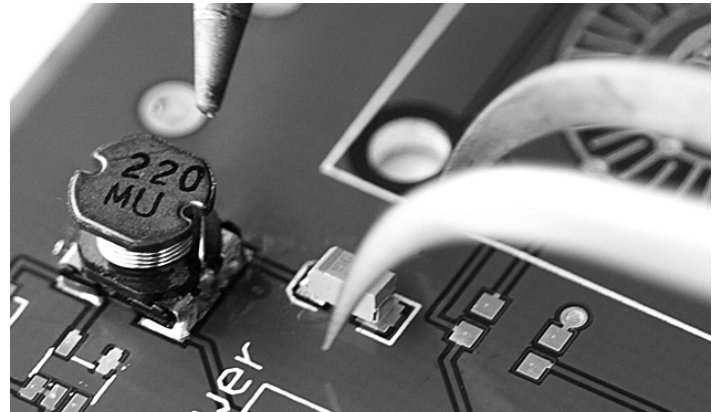
Comments:

SMD Soldering

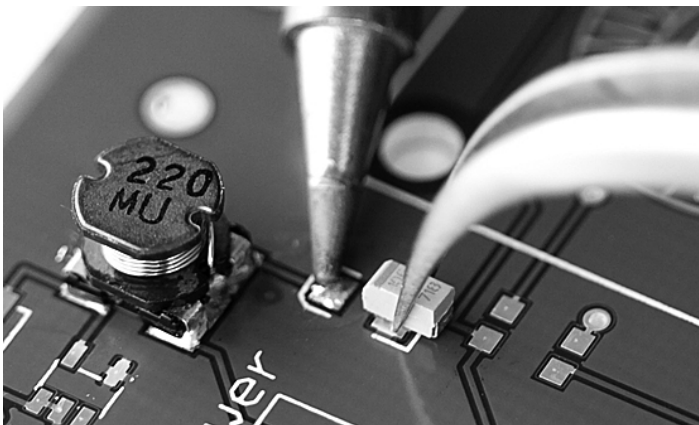
A simple method for soldering SMD components.



Add solder to one pad.



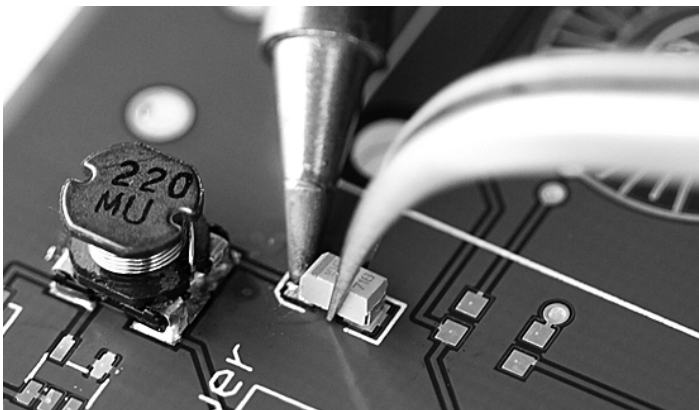
Once you have good alignment, *continue* to hold the component in place, and remove your iron. *Continue* to hold component for 1-2 seconds while the pad solidifies.



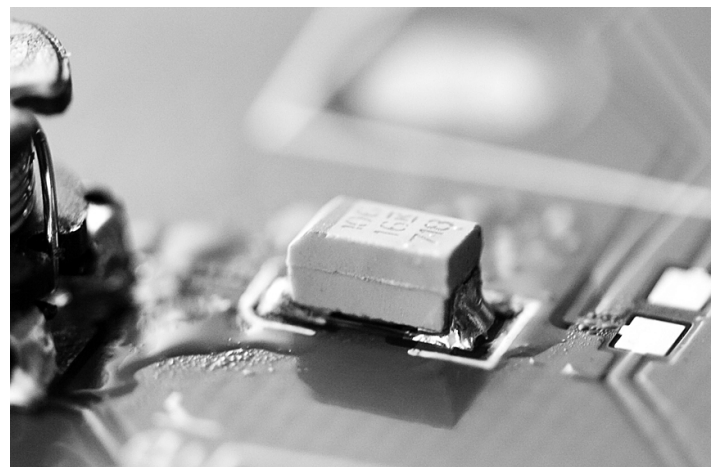
While that pad is molten, *slide* the component into place. Do not push down from the top - slide the component into the blob of solder horizontally.



From above, the alignment looked good. From the side, you can see the rear pad is hovering slightly above the PCB. This can lead to problems on multi-pin components (open connections). Be sure the component is flush up against the PCB before soldering more connections. Re-grip the component, re-heat pad 1 and push the component flush against the PCB.



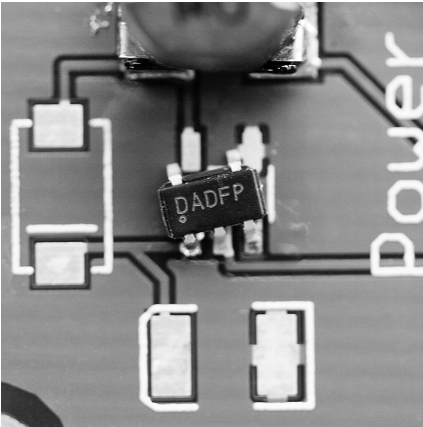
Align the component while connection is molten.



A soldered tantalum capacitor

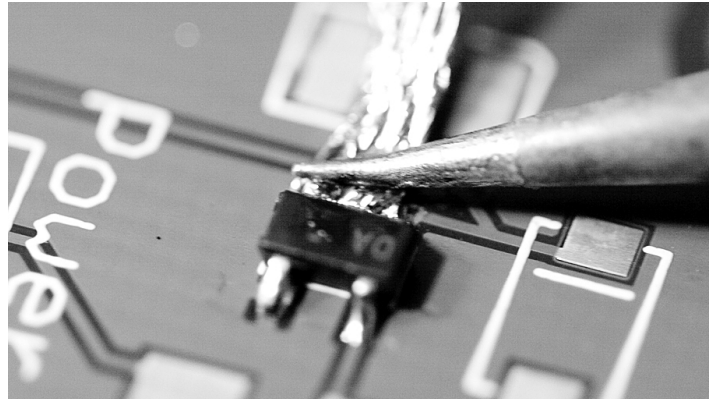
SMD Soldering Workshop

Soldering Multi-pin Devices

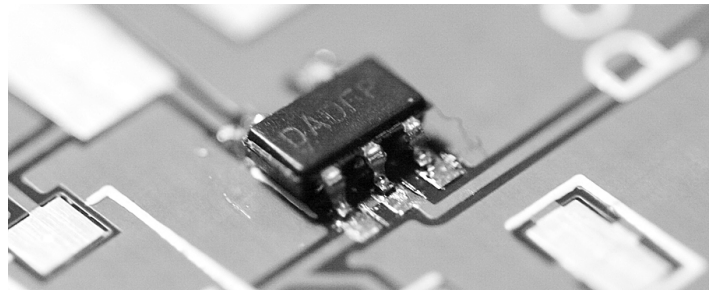


If alignment is not good, do not solder more than 1 pad! Re-heat the pad, re-adjust component until aligned correctly, then move on to soldering other connections.

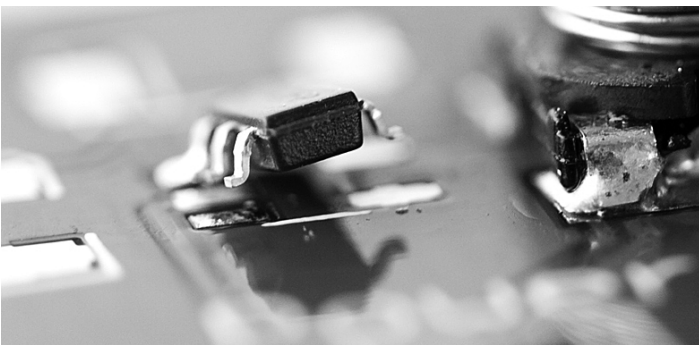
Pull out some solder wick. Put a small amount of solder on the end of your iron (this will transfer heat from iron to wick to the jumper). Sandwich the wick in between the iron and the solder bridge.



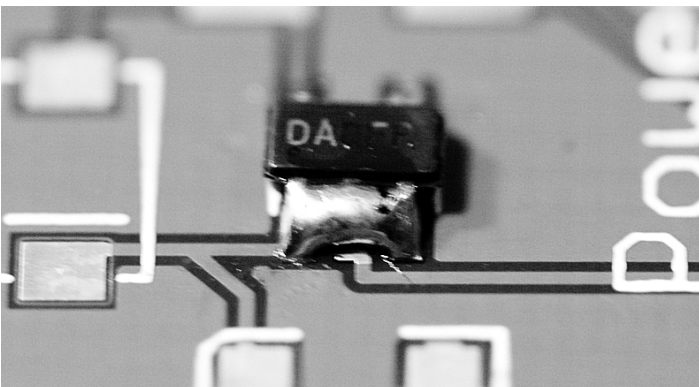
Hold still for 2-3 seconds. You will see solder start to flow up the wick. Holding the iron against the wick and PCB, slide the sandwich sideways away from the jumper.



Nice and clean!



This is bad. It would be nearly impossible to finish the connections on this part. Make sure you have the component flush against the PCB.



Do not worry about jumpers! There are actually three pins under that blob.



Bad bad bad. There was not enough solder for the connection on the left. Middle pin is lacking solder and should have been heated for longer. Right pin has had solder applied by an iron rather than applied to two heat parts (the board and the pin).

