

SMD Soldering Practice Kit

(Surface Mount Devices) #ci687

curiousinventor.com/smd-soldering-practice-kit.html





SMD Video Instructions

curiousinventor.com/guides/Surface_Mount_Soldering/101

over 500k YouTube views

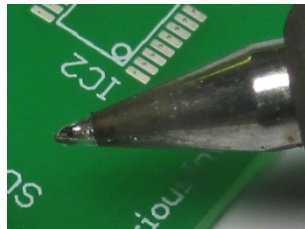
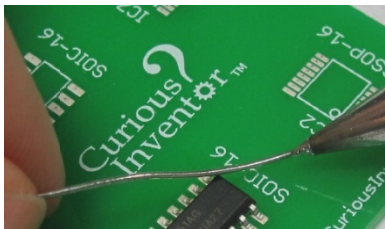
Recommended Tools

 © 2007 CuriousInventor.com		 © 2007 CuriousInventor.com	
Tweezers Recommended: EROP7SA	Wick Recommended: Chemtronics 80-4-5	Loupe Recommended: a 10x loupe just to check your work. You can actually solder SMDs WITHOUT any magnification!	Iron and Solder Iron Tip: A chisel or screwdriver is recommended over a small point iron tip. This helps transfer heat and carry solder. Solder: .02" solder is recommend.
 © 2007 CuriousInventor.com	Flux Recommended part: Kester #186 rosin, RMA (mildly activated). Or GC electronics 10-4202. Note: these recommendations do not require cleaning, but if you buy a water soluble kind, it will corrode your board if you do not clean it.		
Optional: Masking tape to hold down the pcb. IPA (Isopropyl Alcohol) and acid brush to clean flux residues, (not necessary with rosin flux).			

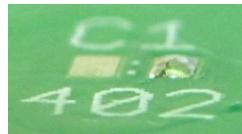
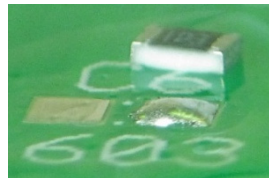
Resistor and Capacitor Instructions

Note: more pictures on page 2.

- 1) Add flux to the pads. (view A)
- 2) Add a small ball of solder to your iron tip. Having a tip in good condition that's also not too small will help here.



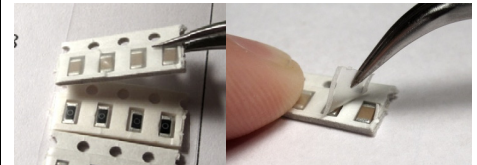
- 3) Touch the pad with the iron tip to add a small pillow of solder to **ONE** pad (the chip won't lie flat otherwise). Very little is needed for the 603 and 402 parts!



- 4) Add more flux to the side with solder.
- 5) Hold the component on top of the pillow, and touch the joint with the iron (view C on page 2). The component should fall flat. Reheat while pushing down on the component to get it flat if your first attempt didn't work. **Note:** a) resistors should be black side up—to better dissipate heat.
- 4) Add solder to the other side. For smaller components (402 and 603), adding solder with the wire will add too much. Put a small ball on the iron tip and then touch the component.
- 5) The final joint should smoothly ramp to all surfaces. A little excess solder is OK, and is hard to prevent with the 402 components (see page 2 for an **ideal joint picture**).

Parts

Note: there are 2 extra of all capacitors and resistors.



- 1) Remove carrier from double-sided tape.
- 2) Peel off plastic cover with tweezers.

(4) 1206 Capacitors: C4, C8

(4) 1206 Resistors: R8, R4

(4) 805 Capacitors: C3, C7

(4) 805 Resistors: R3, R7

(4) 603 Capacitors: C2, C6

(4) 603 Resistors: R6, R2

(4) 402 Capacitors: C1, C5

(4) 402 Resistors: R5, R1

(2) SOICs: IC4, IC3
16 pins, 1.27mm pitch

(2) TSSOPs: IC2, IC7
16 pins, .65mm pitch

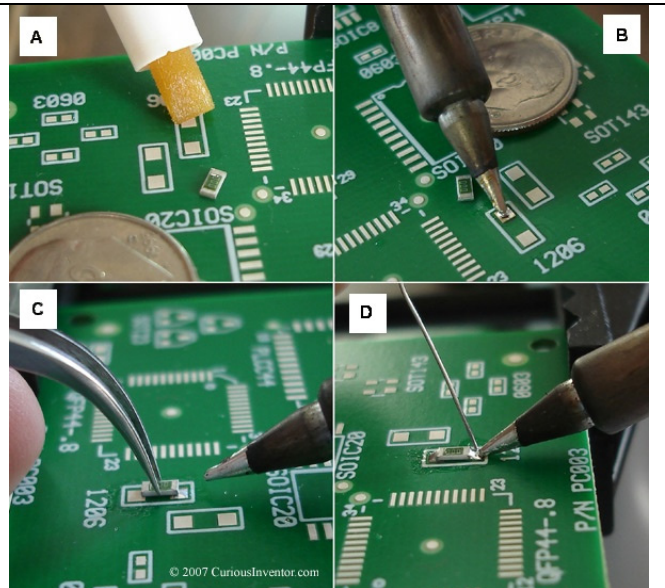
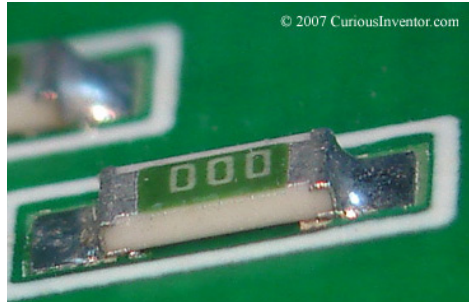
Resistor and Capacitor Instructions (continued)

Main Steps for a 1206 capacitor (shown on right)

- A) Add flux to pads
- B) Add pillow of solder to ONE pad only.
- C) Holding chip over pad, heat joint so component falls flat against board.
- D) Add solder to other side. For 603 and 402 parts, put small ball of solder on the tip, and then touch the joint. Do not add directly from wire.

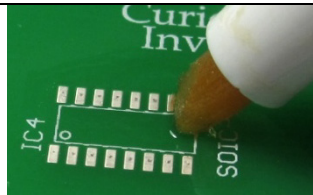
Ideal Joint

The solder should form a smooth, concave ramp.

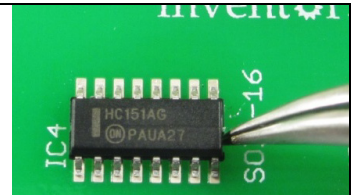


SOIC and TSSOP IC Instructions - Pin-by-pin method

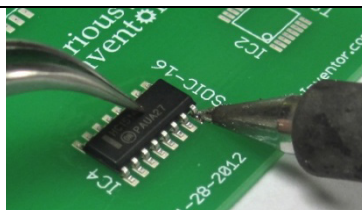
- 1) Add flux to all the pads.



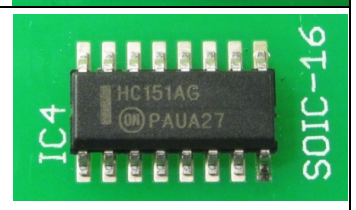
- 2) Position the IC over the pads, making sure the bar or dot line up with the dot on the silk screen.



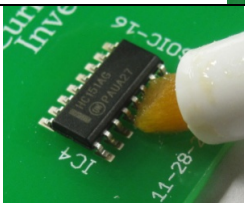
- 3) Add a small ball of solder to the iron tip (as shown in step 2 from the resistor instructions). Holding the IC in place, touch a corner pin with the ball of solder on the end of the tip.



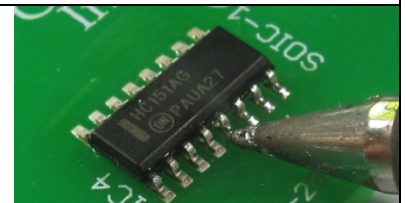
- 4) **CHECK alignment!** Once you solder more than one pin, you won't be able to adjust the position anymore. Reheat the first pin and nudge the IC to make adjustments.



- 5) Add more flux to all the pins

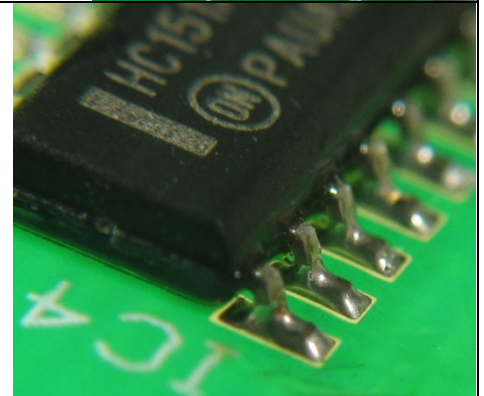


- 6) Pin by pin, add a little solder to the end of the iron tip, and touch the "toe" of each pin. Make sure to hold the iron on the pin long enough for solder to wick around to the back of the pin.

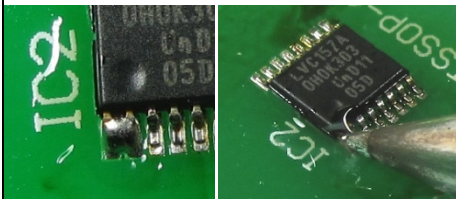


- 7) After soldering all the pins, inspect the IC with a loupe to make sure there isn't any solder "bridging" two pins, and that sufficient solder is on each joint.

Ideal joint: the solder should look like a sheet draped over the pin, smoothly ramping down to the pad. Look for a ramp on the front ("toe") and back ("heel") of the pin.



Bridges? Add more flux, and try touching / swiping the bridge with a clean iron tip. Often-times this will be enough to draw the solder bridge off on to the iron. If this doesn't work, use solder wick to remove the bridge (see below).

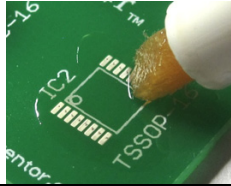


SOIC and TSSOP IC Instructions – Flood and Wick Method

This method can be used when you don't have access to flux, or are dealing with extremely small pitches. The downside of this method is that it leaves less than an ideal amount of solder on the joint, and you risk damaging the board and IC with the wick.

1) Add flux to the pads.

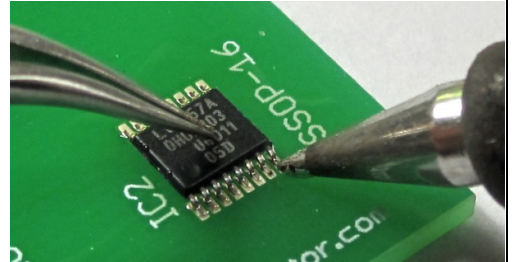
The first steps are the same as above. We're going to align the IC and solder one IC down.



2) Position the IC.

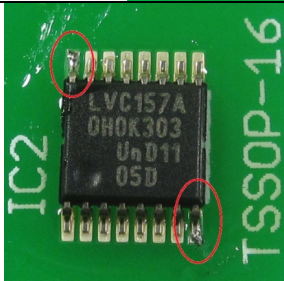


3) Apply solder to a corner pin as shown previously in the instructions. First put a small ball of solder on the iron tip, and then present the solder to the joint while holding the IC in place with tweezers.

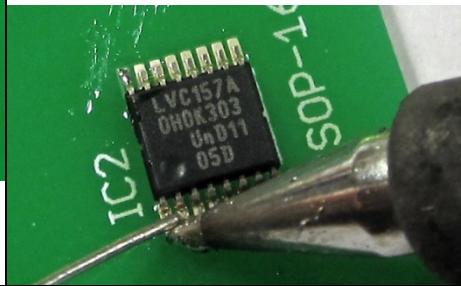


4) Check alignment! Once you solder more than one pin, it will be impossible to realign the IC. Reheat the corner pin and nudge the IC into position if it moved off the pads.

5) Now repeat the above procedure to add solder to the opposite corner. You want the IC to be held securely in place before the next step.



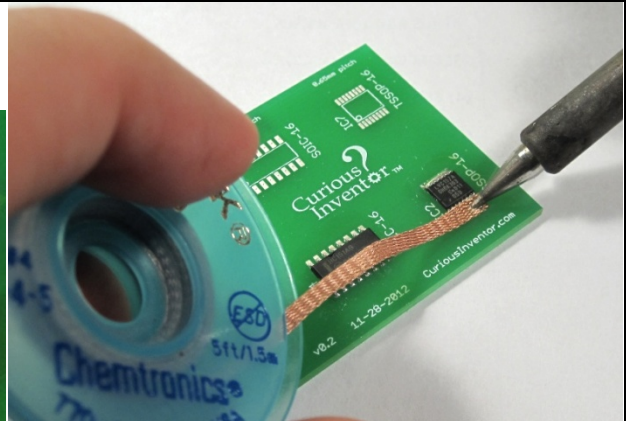
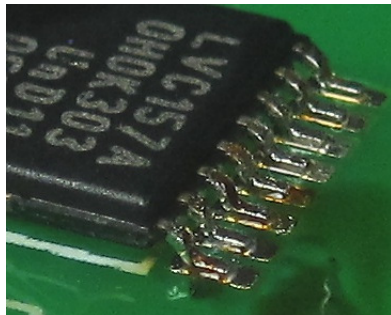
6) "Flood" all the pins by applying a generous amount of solder. Make sure to thoroughly cover all the pins. Also, be sure to spend enough time heating every pin so that the solder can wick all the way behind all the pins.



7) Use the wick to remove the excess solder. Hold the wick over the pins, and pressure down lightly with the iron. Surface tension will prevent all the solder from wicking off leaving just enough to form a connection.

Tip: Even though we're trying to remove solder, it helps to **add** solder to the iron before pressing it on the wick to aid heat transfer. It may take a few seconds before the solder starts getting sucked up into the wick—be patient!

Be careful! Hold the wick with the plastic wheel. Heat transfers very quickly up the metal wick.



Be careful #2! It's very easy to pull pads and pins off with the wick. If a portion of the wick cools while you're moving the wick, it will tear off whatever is frozen to it. Avoid dragging the wick side-to-side to prevent this.

Tips and More Resources

Keeping Your Iron Tip In Good Condition: Always cover the iron tip with solder before setting it down. Exposure to oxygen causes the tip to oxide (form rust), which will repel solder and make it harder to transfer heat to joints.

More Videos: See our **YouTube** channel: **CuriousInventor**

Including: How to Remove SMD Components, Soldering QFN chips, Toaster Oven Soldering, and more.

Help! For any questions or feedback, just email support@CuriousInventor.com