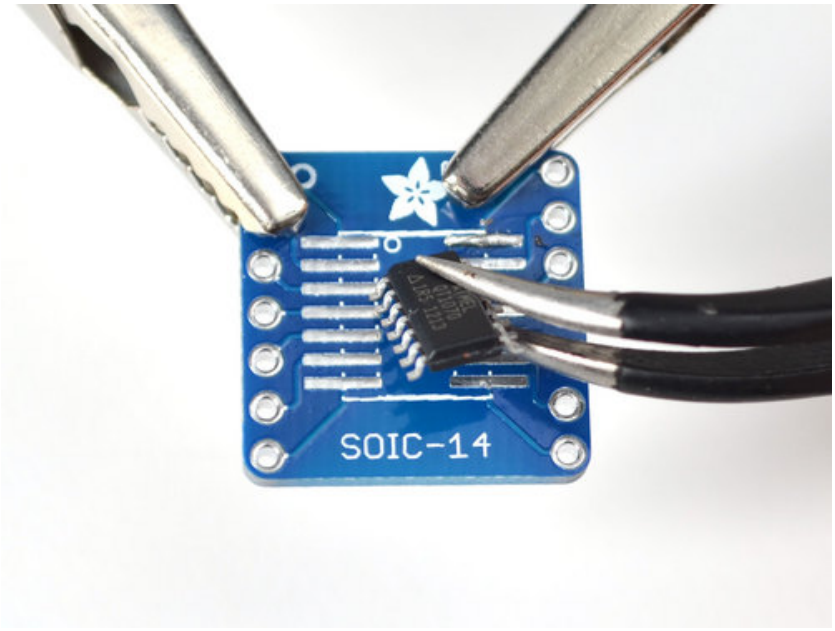
adafruit learning system

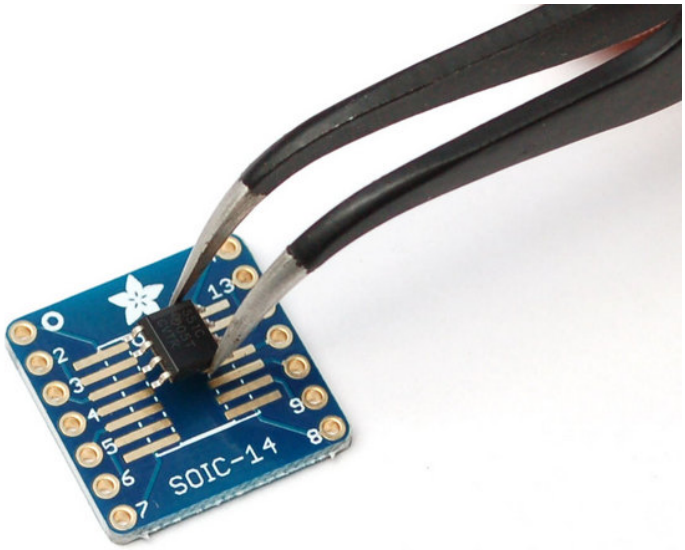
SMT Breadboard Prototyping Using Breakout PCBs

Created by Ladyada



Guide Contents

Overview



Nothing is as fast and fun as prototyping on a breadboard, but at some point you will find that the chips you want to work with are only available in non-breadboard-friendly SMT/SMD (Surface Mount Technology/Surface Mount Device). Unlike most DIP chips and resistors, SMT parts do not have the leads going through holes in the PCB. Instead, they 'float' on top, with often-rectangular solder pads.

Although you may one day decide to use CAD software for laying out a custom PCB for these parts, you can do yourself a favor and prototype with SMT breakout/adapter PCBs. In this mini tutorial we'll go over how to use these. It's not hard, once you have the experience!

Required Tools

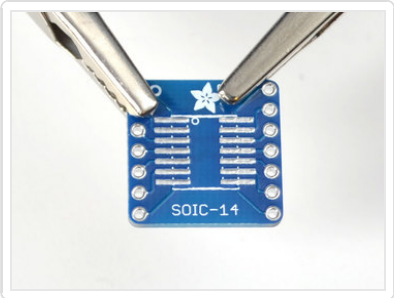
With ALL SMT work, having the right tools is *essential!* You will need tweezers. Either straight-tip style (available here) (http://adafru.it/421)

Or curved (available here) (http://adafru.it/422)

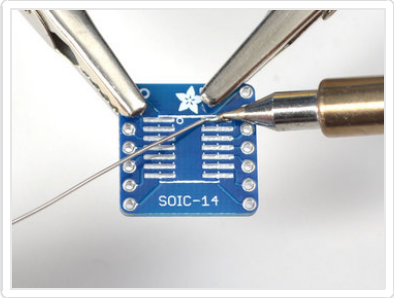
You'll also need a soldering iron with a fine tip. Although a good iron is a little expensive, its the most important tool and we suggest investing in a good one. Our favorite is the Hakko FX-888D (http://adafru.it/1204) with the fine SMT tip (http://adafru.it/1249)

Soldering an SOIC

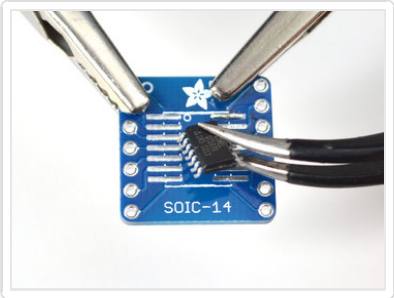
We'll start by showing how to solder an SOIC component. Although we have many different 'package' versions available (such as SOIC/TSSOP/QFP/QFN) SOIC is the easiest to start with and its the chip I needed to work with today so that's what we're going to do :)



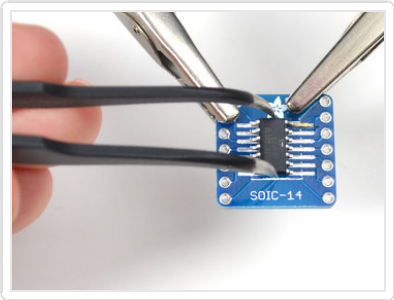
Begin by placing the breakout adapter into your vise/third hand to keep it steady.

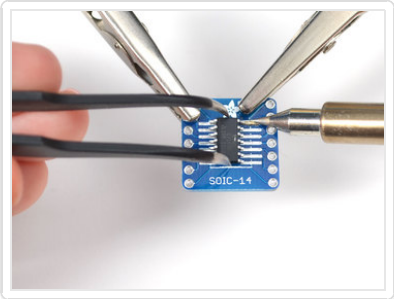


We'll start by melting a little solder on one corner pad. I like going with the top right corner. Melt just a tiny bit on, so its rounded but not blobby

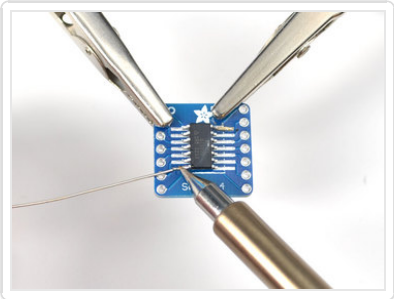


Next you need to place the part onto the pads, and you'll want to get the orientation right. You can look for a dot (indicating pin #1). In some cases, look for a flattened corner (on the left side here) which indicates which side is on the left

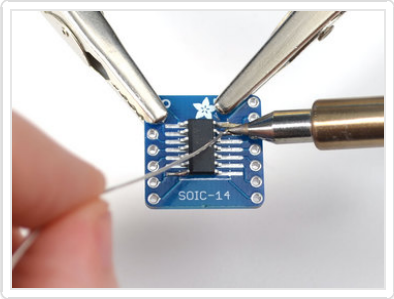


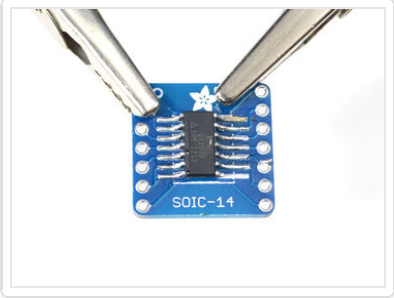


Once you've identified which is pin 1, hold the chip with the tweezers over the pads and then *re-heat* the corner pad you soldered onto a few steps ago.

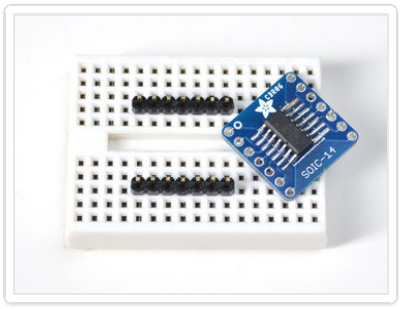


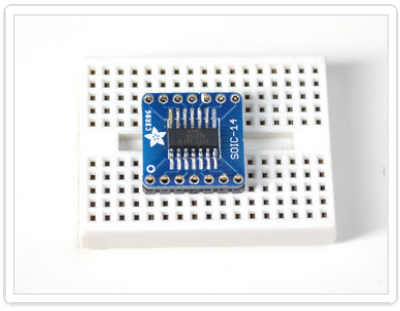
Now you can 'fix' the chip in place by soldering in the opposite corner. The one pin you soldered will keep the chip in place mostly, so you just have to solder the other pin a little to make the setup secure





Go ahead and solder the remaining pins now

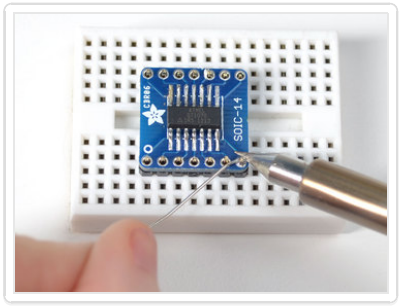


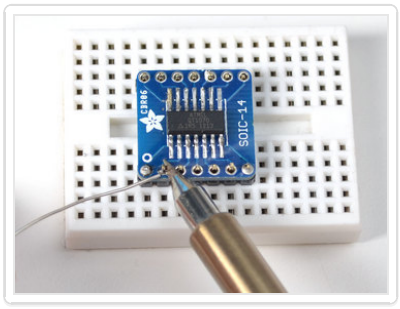


The hard part's done! Now we can solder on regular 0.1" spaced male header. We like the break-away kind so its easy to get just the right amount. (You can get some at the adafruit shop if you don't have any!) (http://adafru.it/392)

Break two pieces the same length as the pads on either side of the PCB and place them into a breadboard, long pins down. They should be parallel and the same distance as the PCB pads so that you can place the PCB on top with ease

---





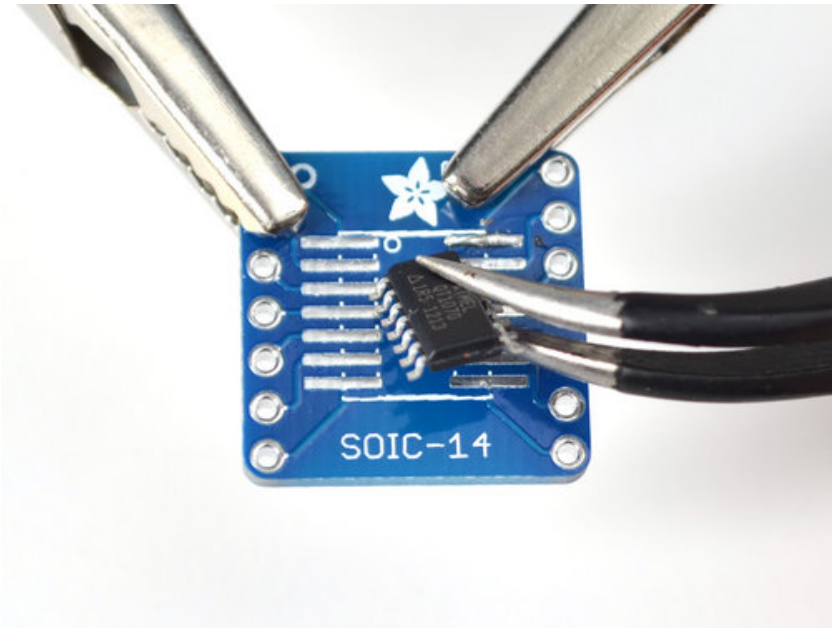
Almost done, now all you have to do is solder each header pin into the corresponding hole to make a secure connection

---

adafruit learning system

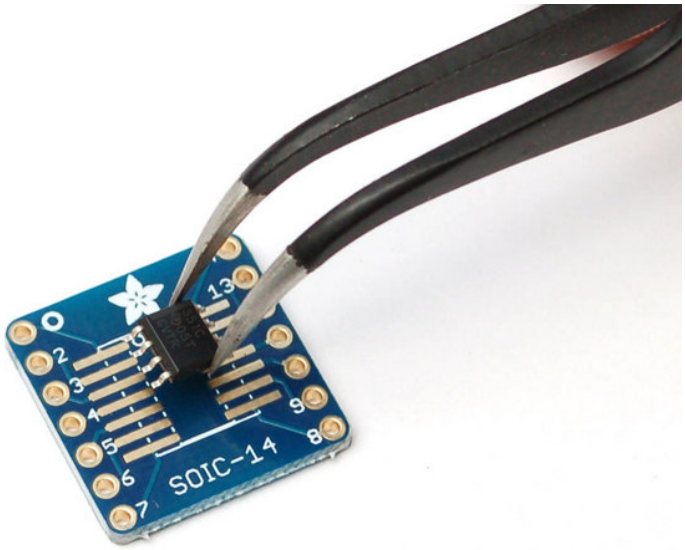
SMT Breadboard Prototyping Using Breakout PCBs

Created by Ladyada



Guide Contents

Overview



Nothing is as fast and fun as prototyping on a breadboard, but at some point you will find that the chips you want to work with are only available in non-breadboard-friendly SMT/SMD (Surface Mount Technology/Surface Mount Device). Unlike most DIP chips and resistors, SMT parts do not have the leads going through holes in the PCB. Instead, they 'float' on top, with often-rectangular solder pads.

Although you may one day decide to use CAD software for laying out a custom PCB for these parts, you can do yourself a favor and prototype with SMT breakout/adapter PCBs. In this mini tutorial we'll go over how to use these. It's not hard, once you have the experience!

Required Tools

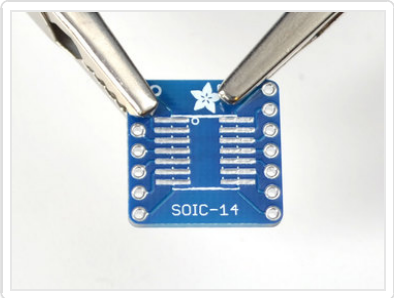
With ALL SMT work, having the right tools is *essential!* You will need tweezers. Either straight-tip style (available here) (http://adafru.it/421)

Or curved (available here) (http://adafru.it/422)

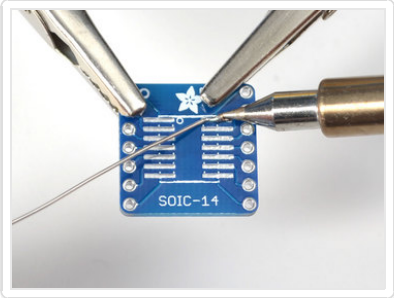
You'll also need a soldering iron with a fine tip. Although a good iron is a little expensive, its the most important tool and we suggest investing in a good one. Our favorite is the Hakko FX-888D (http://adafru.it/1204) with the fine SMT tip (http://adafru.it/1249)

Soldering an SOIC

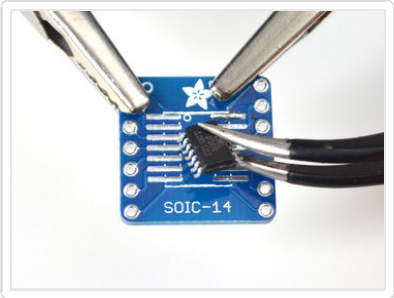
We'll start by showing how to solder an SOIC component. Although we have many different 'package' versions available (such as SOIC/TSSOP/QFP/QFN) SOIC is the easiest to start with and its the chip I needed to work with today so that's what we're going to do :)



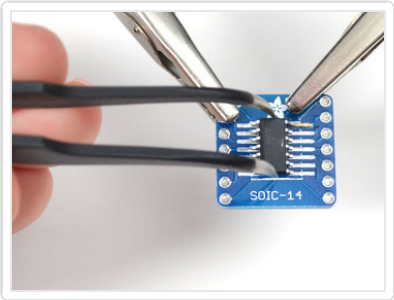
Begin by placing the breakout adapter into your vise/third hand to keep it steady.

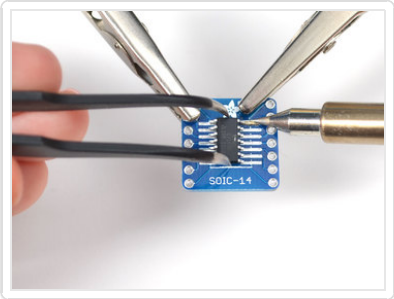


We'll start by melting a little solder on one corner pad. I like going with the top right corner. Melt just a tiny bit on, so its rounded but not blobby

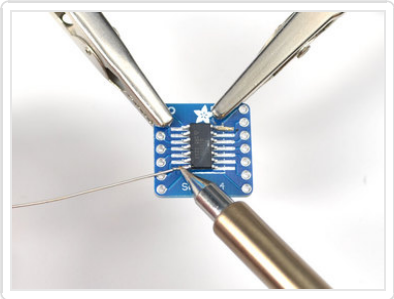


Next you need to place the part onto the pads, and you'll want to get the orientation right. You can look for a dot (indicating pin #1). In some cases, look for a flattened corner (on the left side here) which indicates which side is on the left

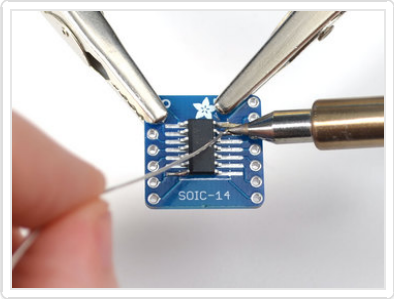


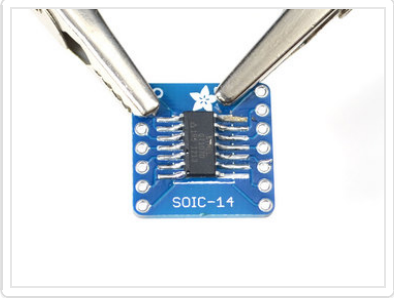


Once you've identified which is pin 1, hold the chip with the tweezers over the pads and then *re-heat* the corner pad you soldered onto a few steps ago.

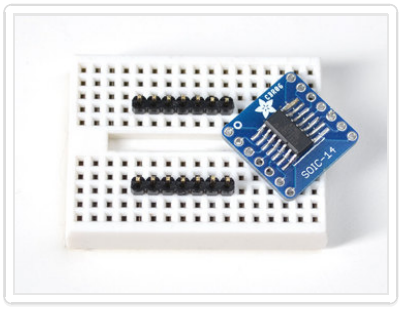


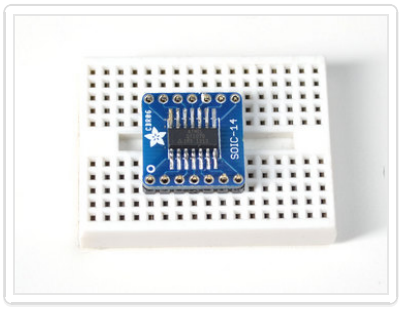
Now you can 'fix' the chip in place by soldering in the opposite corner. The one pin you soldered will keep the chip in place mostly, so you just have to solder the other pin a little to make the setup secure





Go ahead and solder the remaining pins now

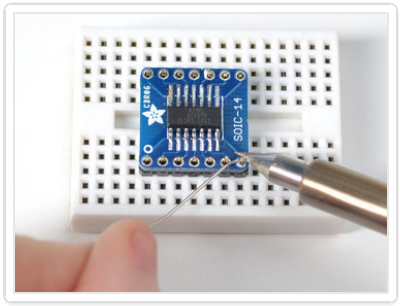


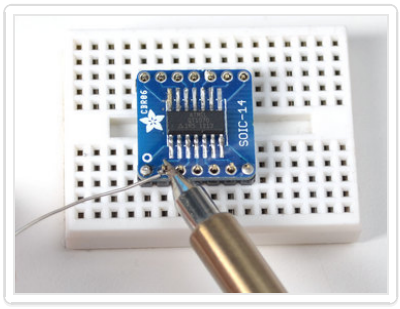


The hard part's done! Now we can solder on regular 0.1" spaced male header. We like the break-away kind so its easy to get just the right amount. (You can get some at the adafruit shop if you don't have any!) (http://adafru.it/392)

Break two pieces the same length as the pads on either side of the PCB and place them into a breadboard, long pins down. They should be parallel and the same distance as the PCB pads so that you can place the PCB on top with ease

---



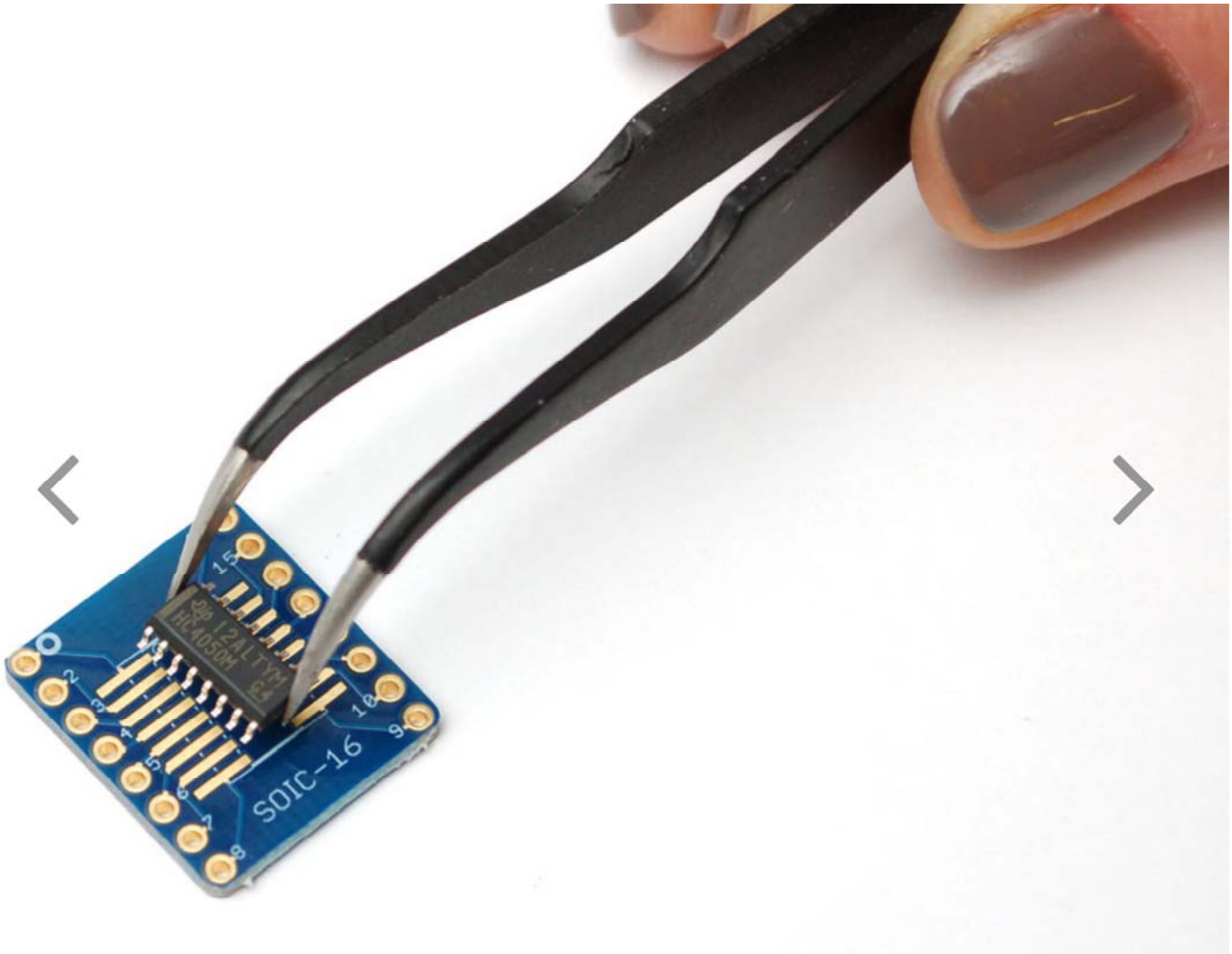


Almost done, now all you have to do is solder each header pin into the corresponding hole to make a secure connection

---

SMT Breakout PCB for SOIC-16 or TSSOP-16 - 3 Pack!

PRODUCT ID: 1207

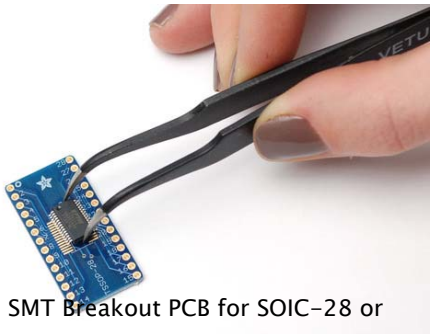


DESCRIPTION

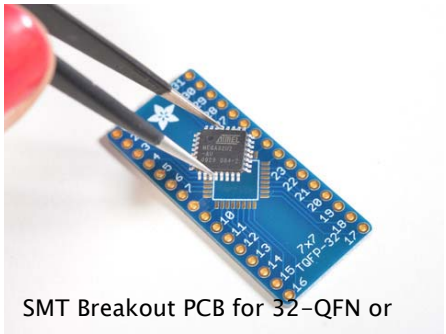
Beguiled by a fancy new chip that is only available in a SOIC or (T)SSOP pinout? This breakout PCB set will make your life much much easier and get you prototyping faster than ever. One side has a 16-TSSOP pin out with traces going to two rows of 0.1" spaced holes, the other has 16-SOIC. Solder your chip to either side and you're ready to rock on any solderless breadboard.

Each item comes with three PCBs, each PCB is identical and can support either a SOIC (narrow, medium or wide variety) or TSSOP. Standard thickness PCBs, with 0.6" spacing between the two rows. You can of course use a smaller chip but the pin numbering wont be right so use care.

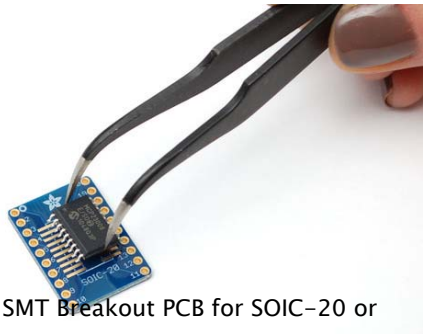
MAY WE ALSO SUGGEST...



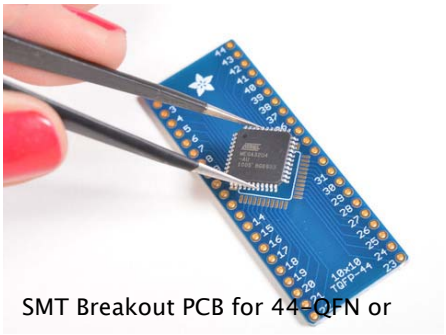
SMT Breakout PCB for SOIC-28 or (/products/1208)



SMT Breakout PCB for 32-QFN or (/products/1163)

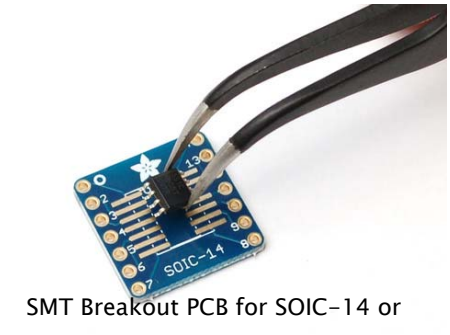


SMT Breakout PCB for SOIC-20 or (/products/1206)



SMT Breakout PCB for 44-QFN or
(/products/1162)

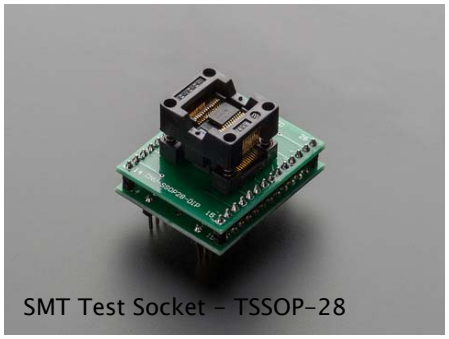
SMT Test Socket - SOIC-16 Narrow
(/products/1283)



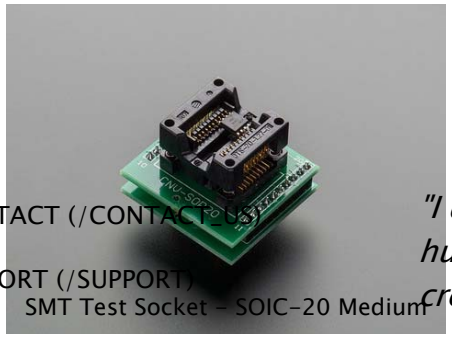
SMT Breakout PCB for SOIC-14 or
(/products/1210)

SMT Test Socket - TSSOP-16
(/products/1795)

SMT Breakout PCB for SOIC-8,
(/products/1212)

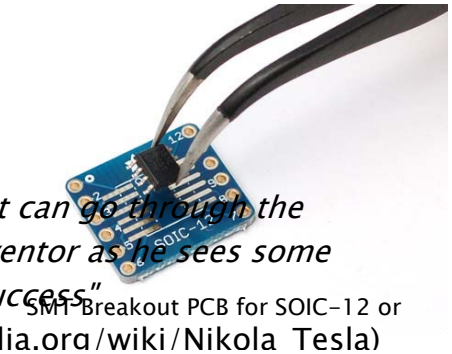


SMT Test Socket - TSSOP-28
(/products/1280)



SMT Test Socket - SOIC-20 Medium

SMT Breakout PCB for 48-QFN or



SMT Breakout PCB for SOIC-12 or

CONTACT (/CONTACT)

SUPPORT (/SUPPORT)

"I do not think there is any thrill that can go through the human heart like that felt by the inventor as he sees some creation of the brain unfolding to success."
– Nikola Tesla (http://en.wikipedia.org/wiki/Nikola_Tesla)