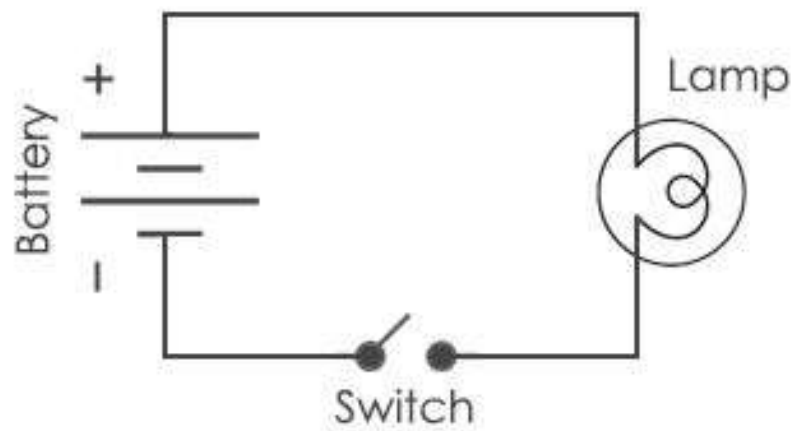
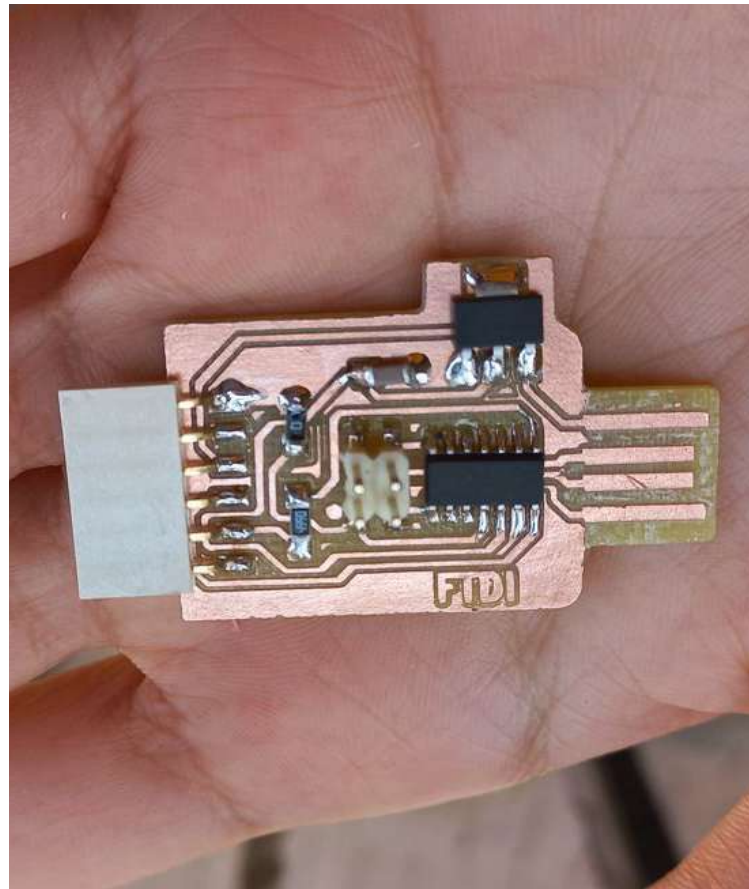
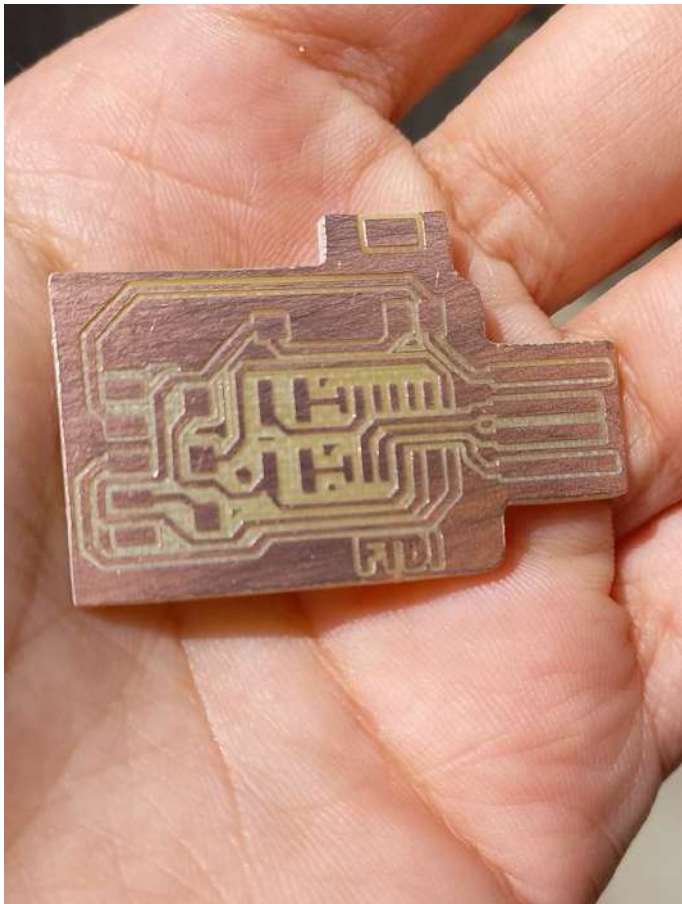

Soldering basics

Duaa Alaali - Fab Lab Bahrain

What is soldering





By Amany Ayman: <http://fabacademy.org/2022/labs/egypt/students/amany-ayman/pcbp.html>

The Fab Academy

2024 Schedule

Jan 8-12: [instructor boot camp](#)
Jan 15-19: [student boot camp](#)
Jan 24: [principles and practices](#) ([video](#)), [presentations](#) ([video](#)), [project management](#) ([video](#), [review](#))
 Jan 29 *recitation*: [version control](#) ([video](#))
Jan 31: [computer-aided design](#) ([video](#), [review](#))
Feb 07: [computer-controlled cutting](#) ([video](#), [review](#))
 Feb 12 *recitation*: [AI](#) ([video](#))
Feb 14: [embedded programming](#) ([video](#), [review](#))
Feb 21: [3D scanning and printing](#) ([video](#), [review](#))
 Feb 26 *recitation*: [programming and debugging](#) ([video](#))
Feb 28: [electronics design](#) ([video](#), [review](#))
Mar 06: [molding and casting](#) ([video](#), [review](#))
 Mar 11 *recitation*: [sustainable materials](#) ([video](#))
Mar 13: [electronics production](#) ([video](#), [review](#)) ←
Mar 20: [output devices](#) ([video](#), [review](#)) ←
 Mar 25 *recitation*: [machine building](#) ([video](#))
Mar 27: [mechanical design](#), [machine design](#) ([video](#), [review](#))
Apr 03: [break](#), [midterm review](#)
Apr 10: [input devices](#) ([video](#), [review](#)) ←
 Apr 15 *recitation*: [fab ecosystem](#) ([video](#))
Apr 17: [computer-controlled machining](#) ([video](#), [review](#))
Apr 24: [networking and communications](#) ([video](#), [review](#)) ←
 Apr 29 *recitation*: [education](#) ([video](#))
May 01: [interface and application programming](#) ([video](#), [review](#)) ←
May 08: [wildcard week](#) ([video](#), [review](#))
 May 13 *recitation*: [Fab All-In](#) ([video](#))
May 15: [applications and implications](#) ([video](#), [review](#))
May 22: [invention, intellectual property, and income](#) ([video](#), [review](#))
 May 27 *recitation*: [start-ups](#) ([video](#))
May 29: [project development](#) ([video](#), [review](#)) ←
Jun 05-: [project presentations](#) (5, 7, 10, 12)
Aug 04-11: FAB24

By Fab Academy: <https://fabacademy.org/2024/schedule.html>

Manual Soldering

—
Solder wire



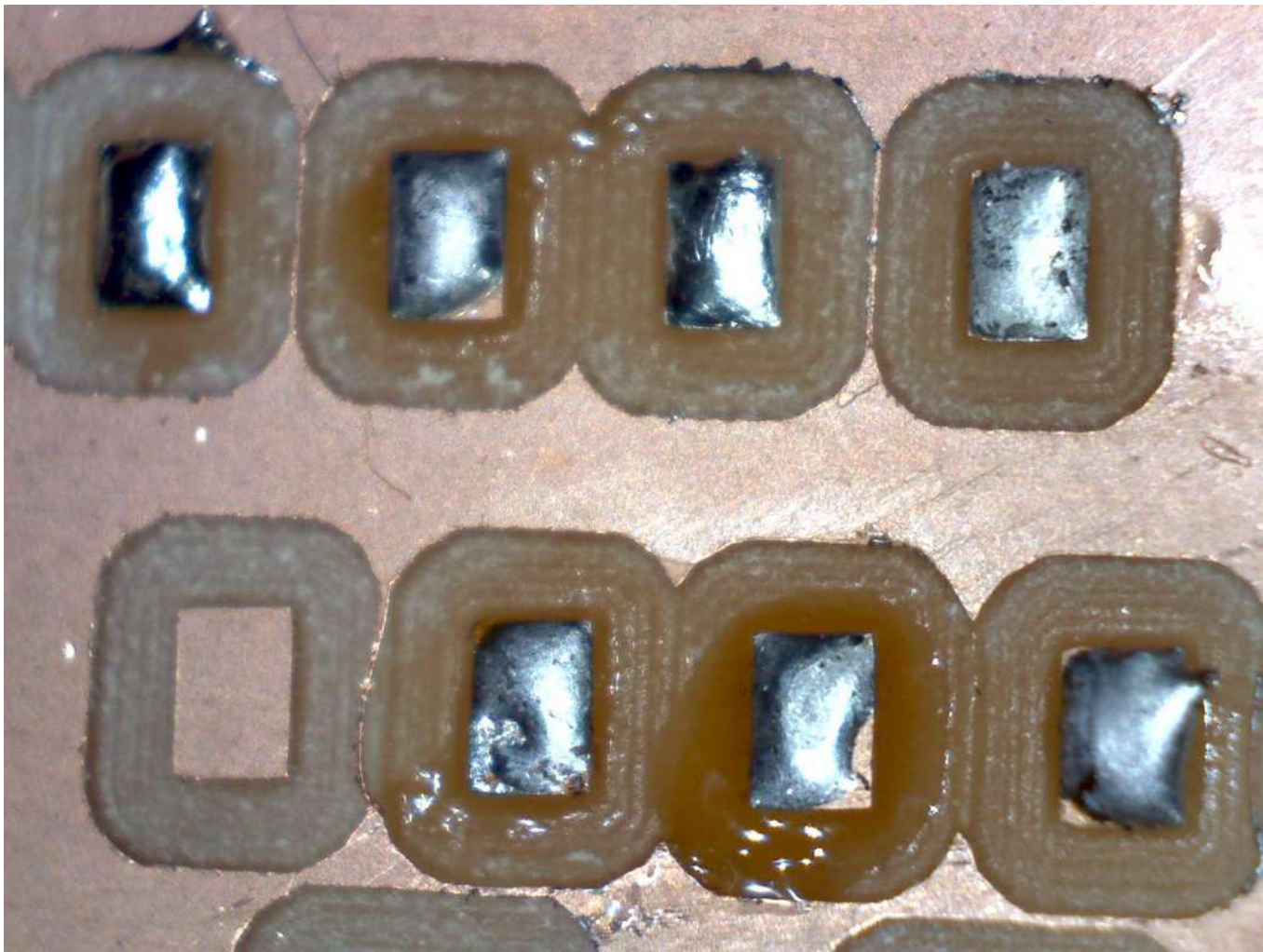
—

Sn96.5/Ag3.0/Cu0.5
Tin/Silver/Copper

Product Attributes

TYPE	DESCRIPTION
Category	Soldering, Desoldering, Rework Products Solder
Mfr	Chip Quik Inc.
Series	-
Package	Spool
Part Status	Active
Type	Wire Solder
Composition	Sn96.5Ag3Cu0.5 (96.5/3/0.5)
Diameter	0.020" (0.51mm)
Melting Point	423 ~ 428°F (217 ~ 220°C)
Flux Type	No-Clean, Water Soluble
Wire Gauge	24 AWG, 25 SWG
Process	Lead Free

-



Soldering iron

The most important part.
An iron will heat up to
melt the solder. You need
to have temperature
control. 25 watt iron
minimum is recommended



By Weller® - Apex Tool Group

Solder tip

The point of contact with the solder. There are different types for different purposes. Generally you need a fine tip for accurate soldering.



Stand

a safe place to rest the hot iron between uses. It will keep your iron from rolling around and protect both you and your work surface from burns.



Flux pen (optional)

The flux is the substance that prevents beading of the solder and helps the solder flow cleanly onto the parts you are soldering





BAKUU[®]
PROFESSIONAL TOOLS FOR TELECOMMUNICATIONS

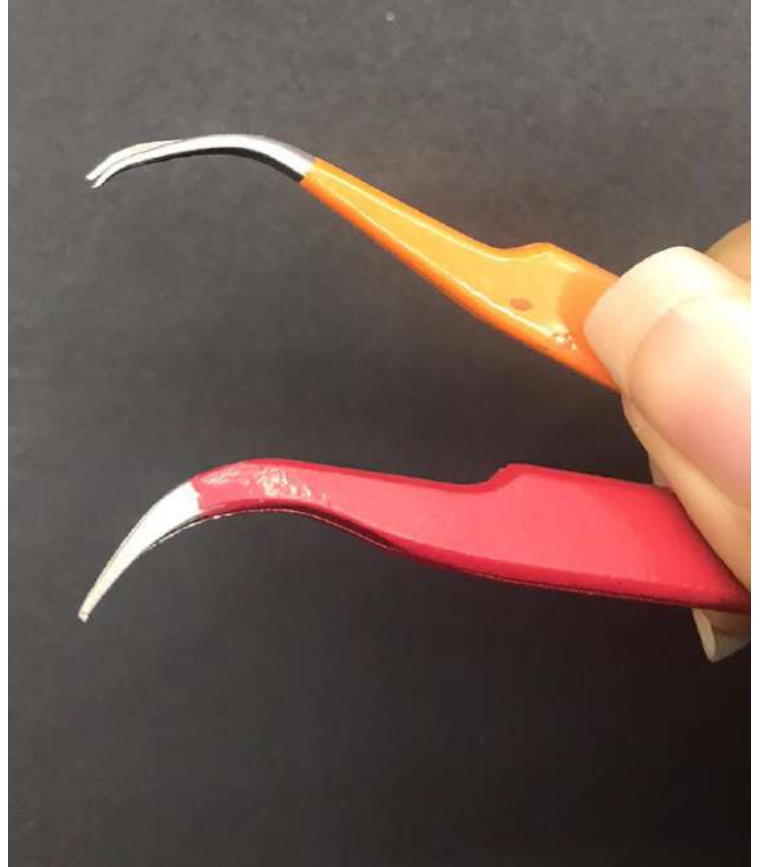
Tweezers Set

tweezers

Necessary for holding
small components without
burning your hands



—



Vise (optional)

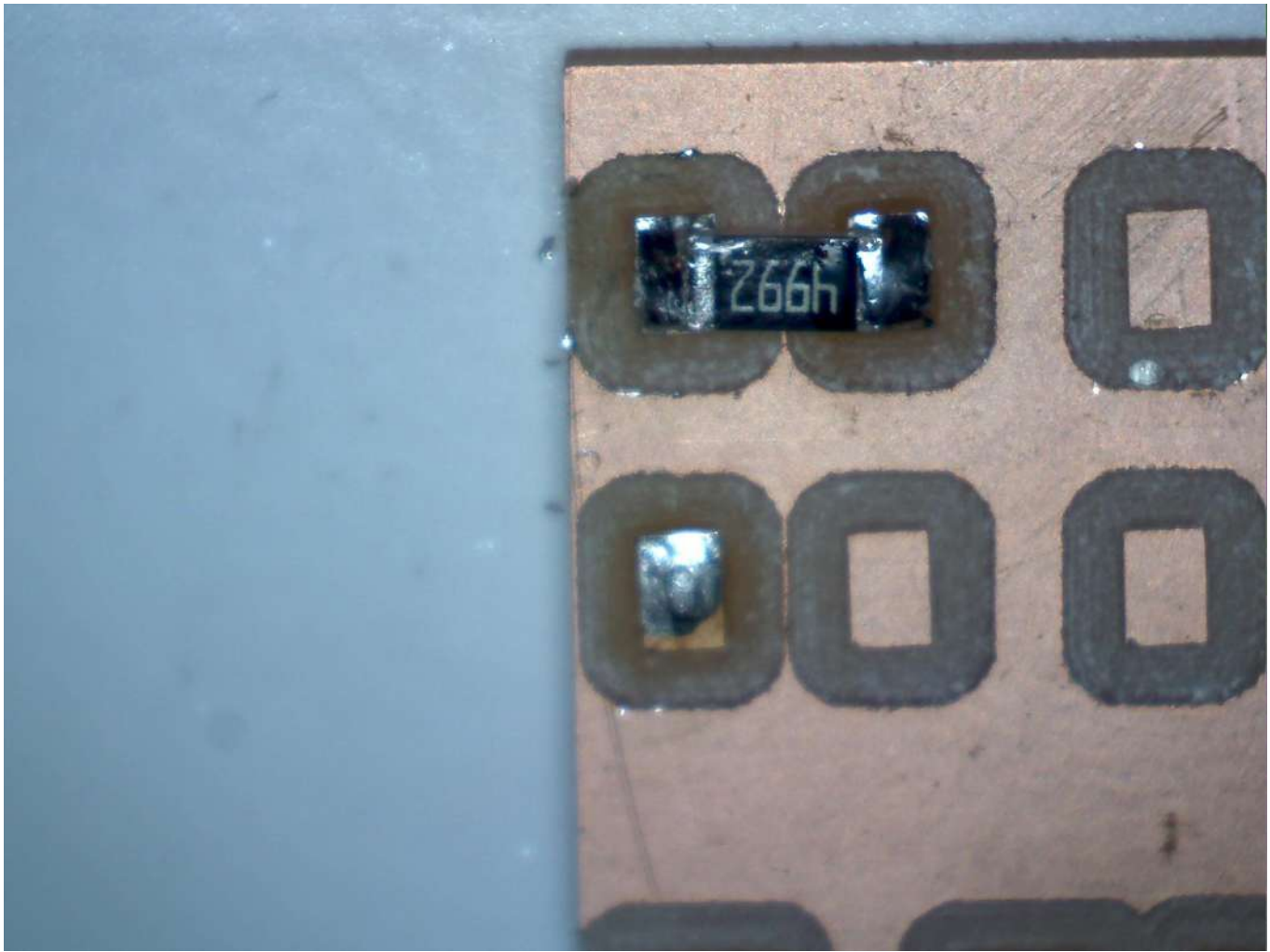
keeps your electronic board in place while you solder

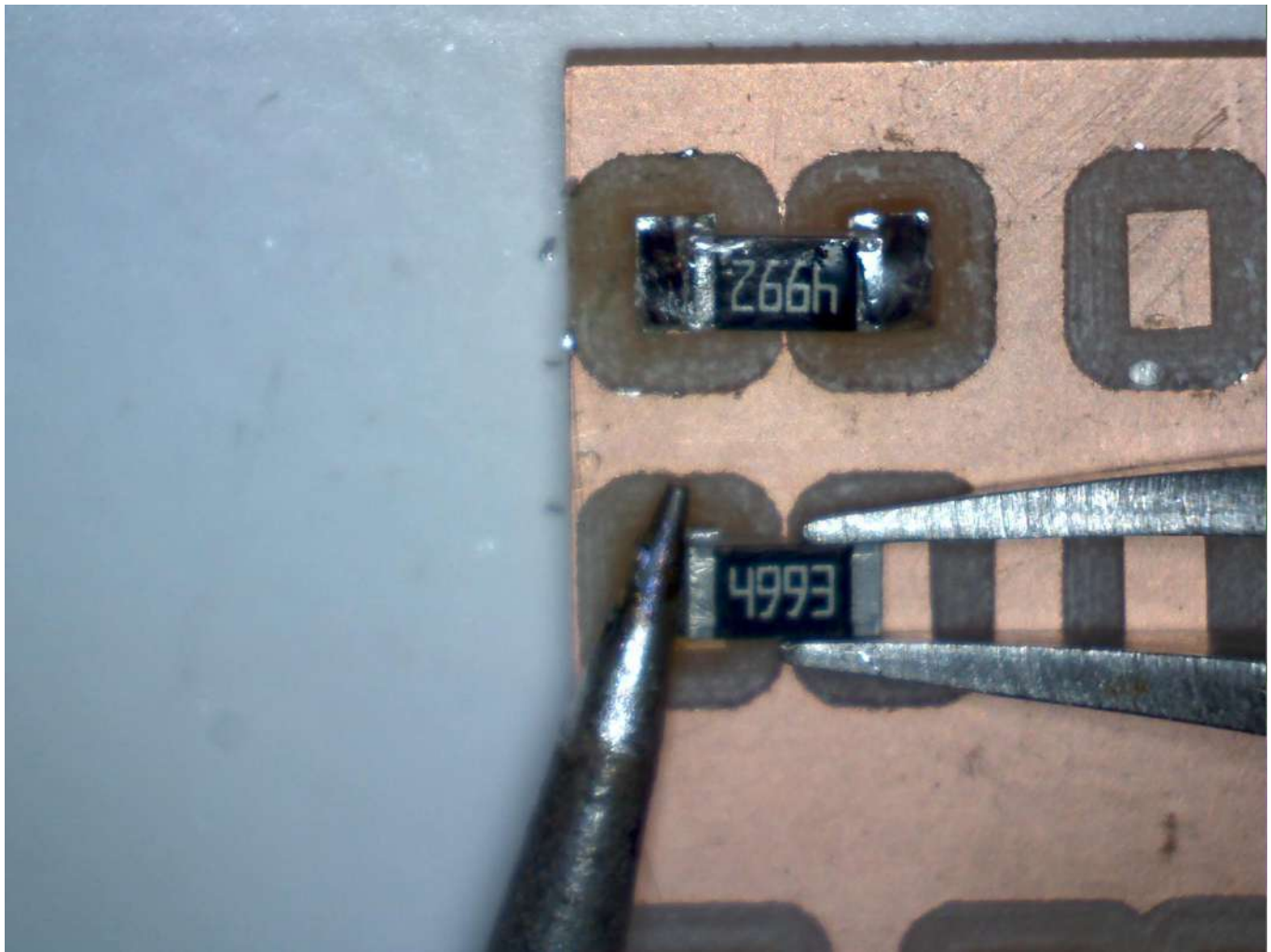


Third Hand (optional)

keeps your electronic board in place while you solder and helps you see your solder joints better



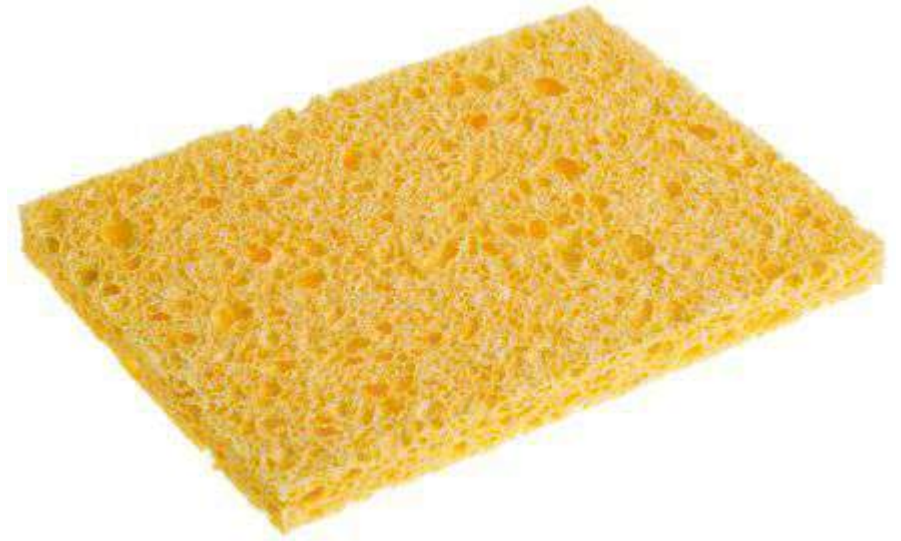


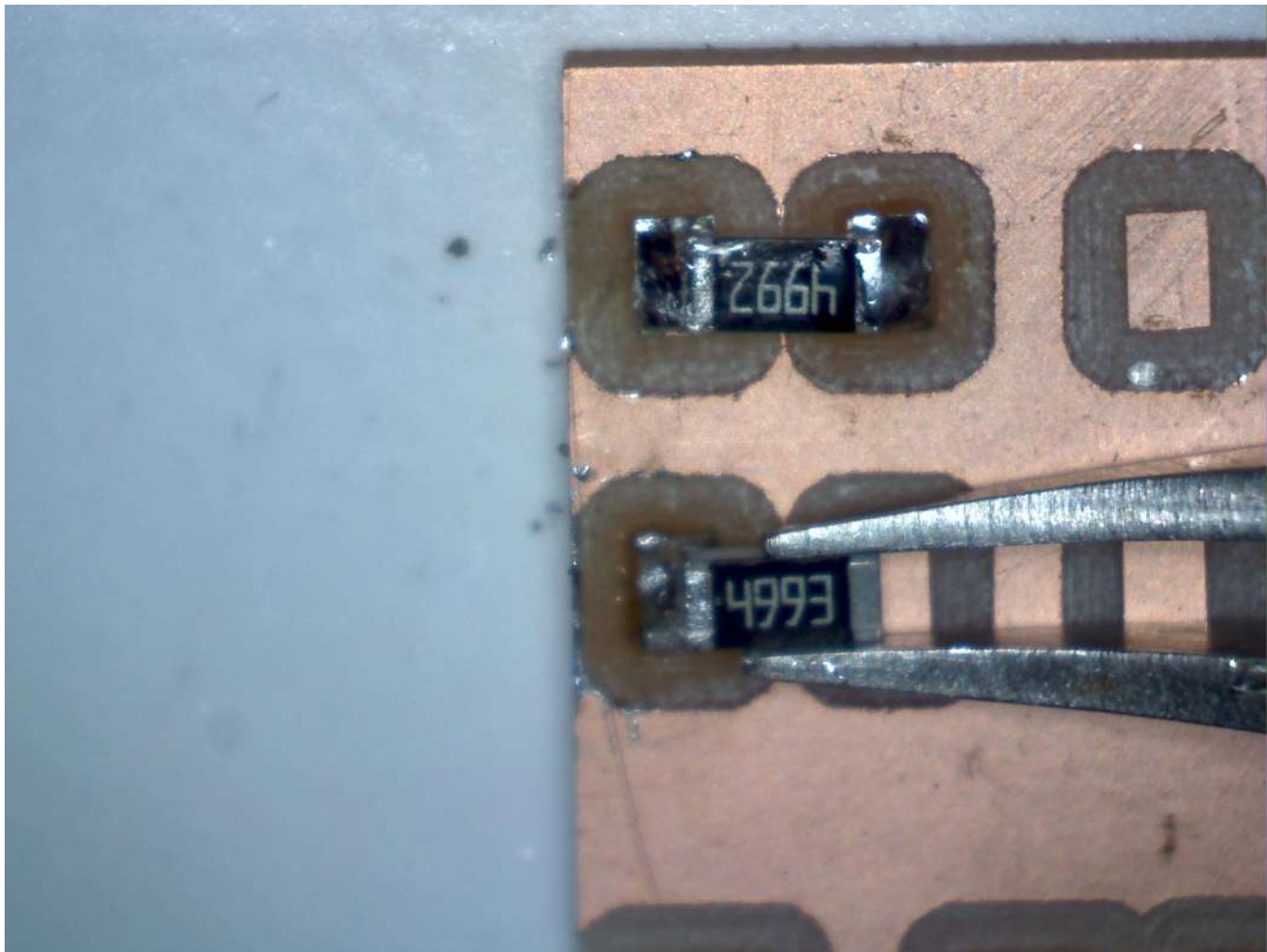


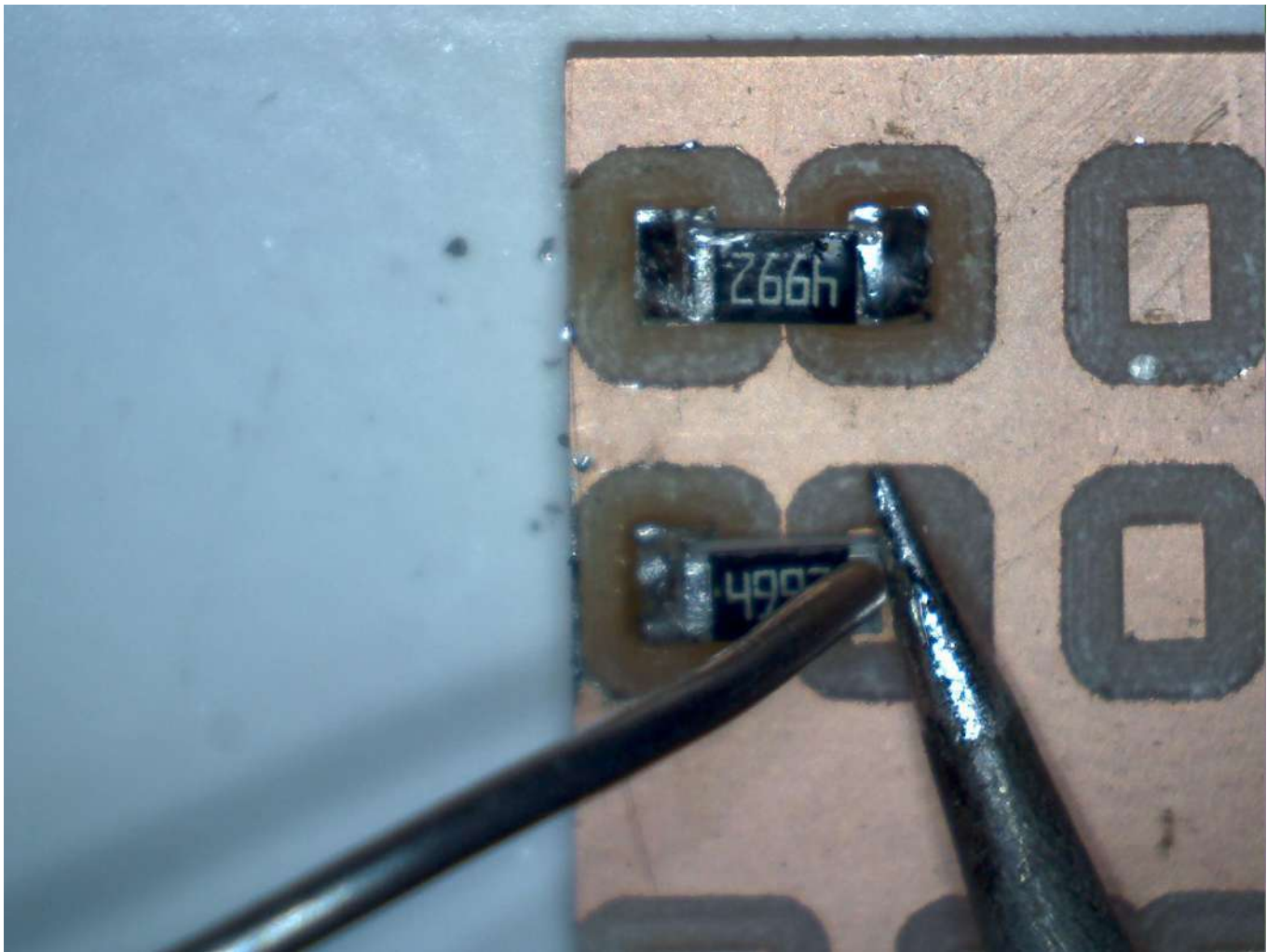
Tip cleaners

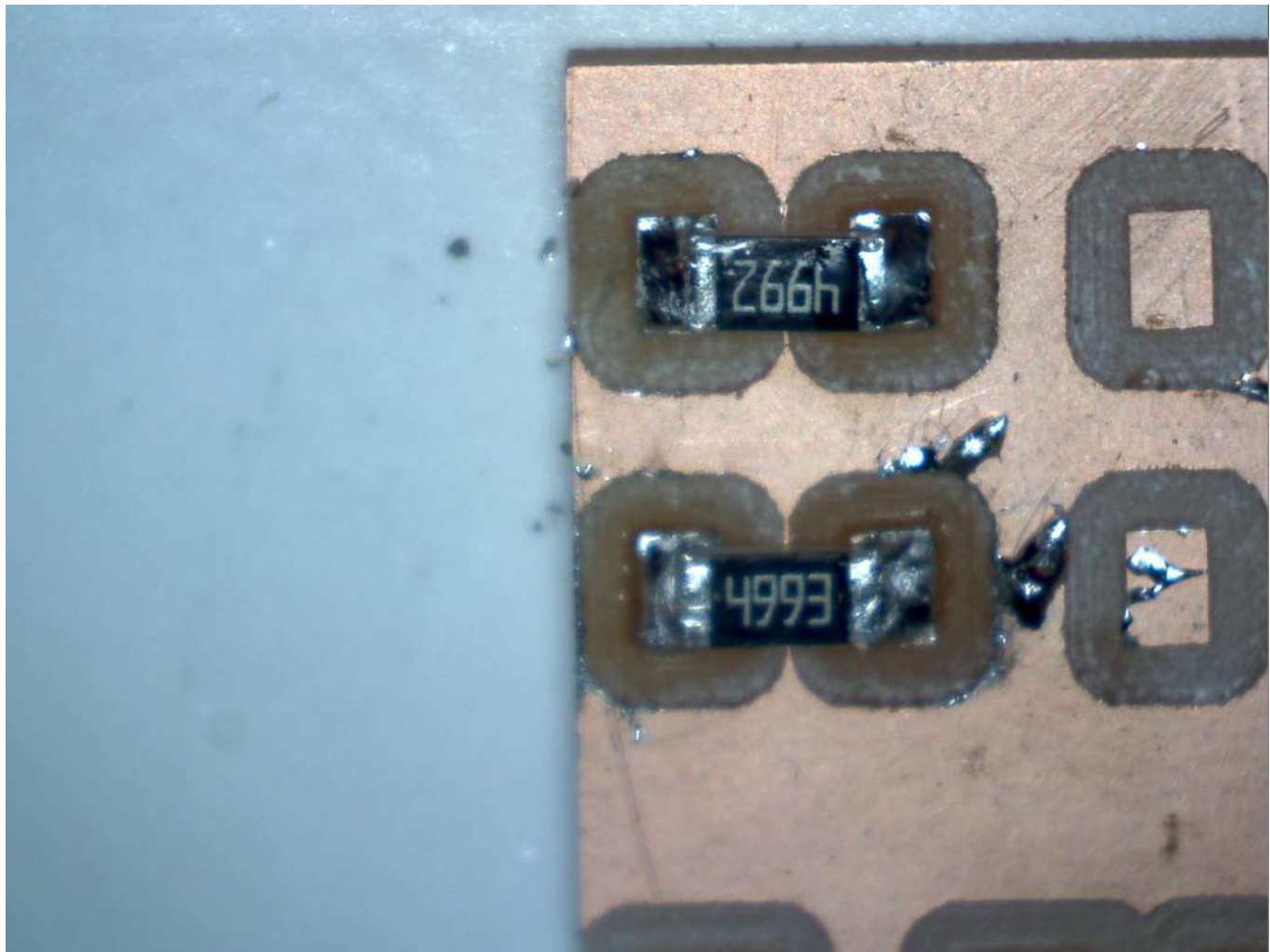
To keep the soldering tip clean while soldering.

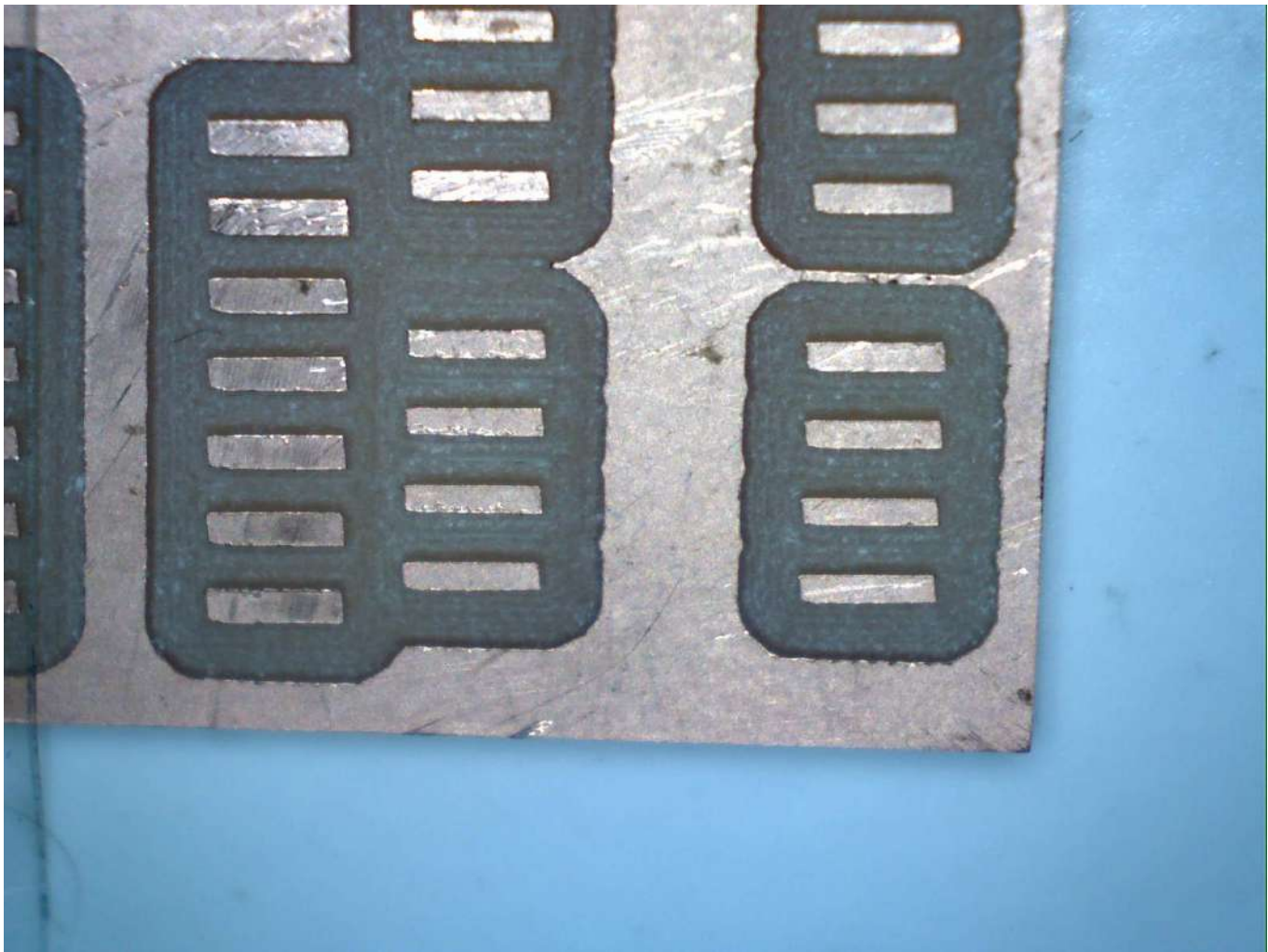
Use it after every use

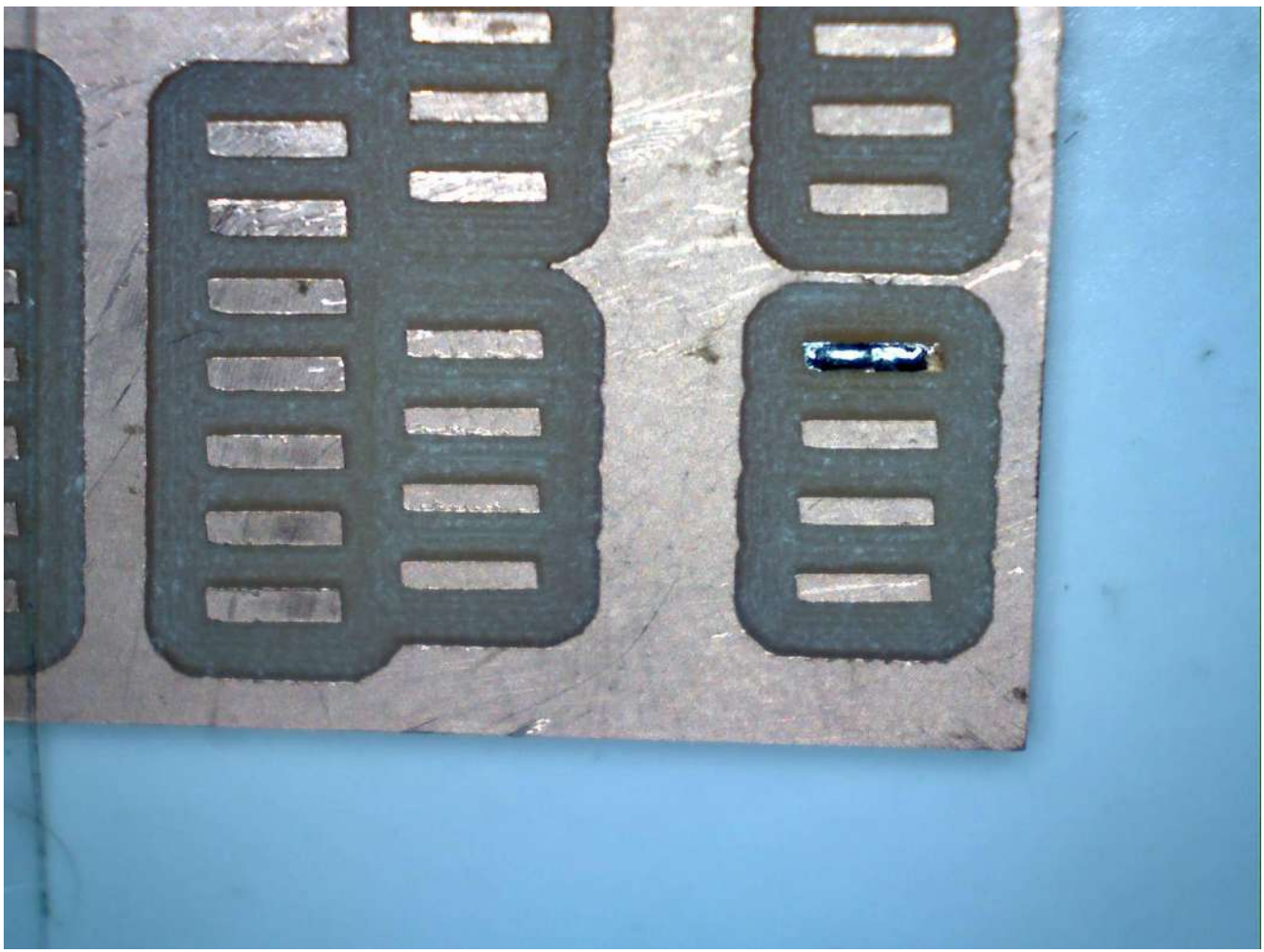


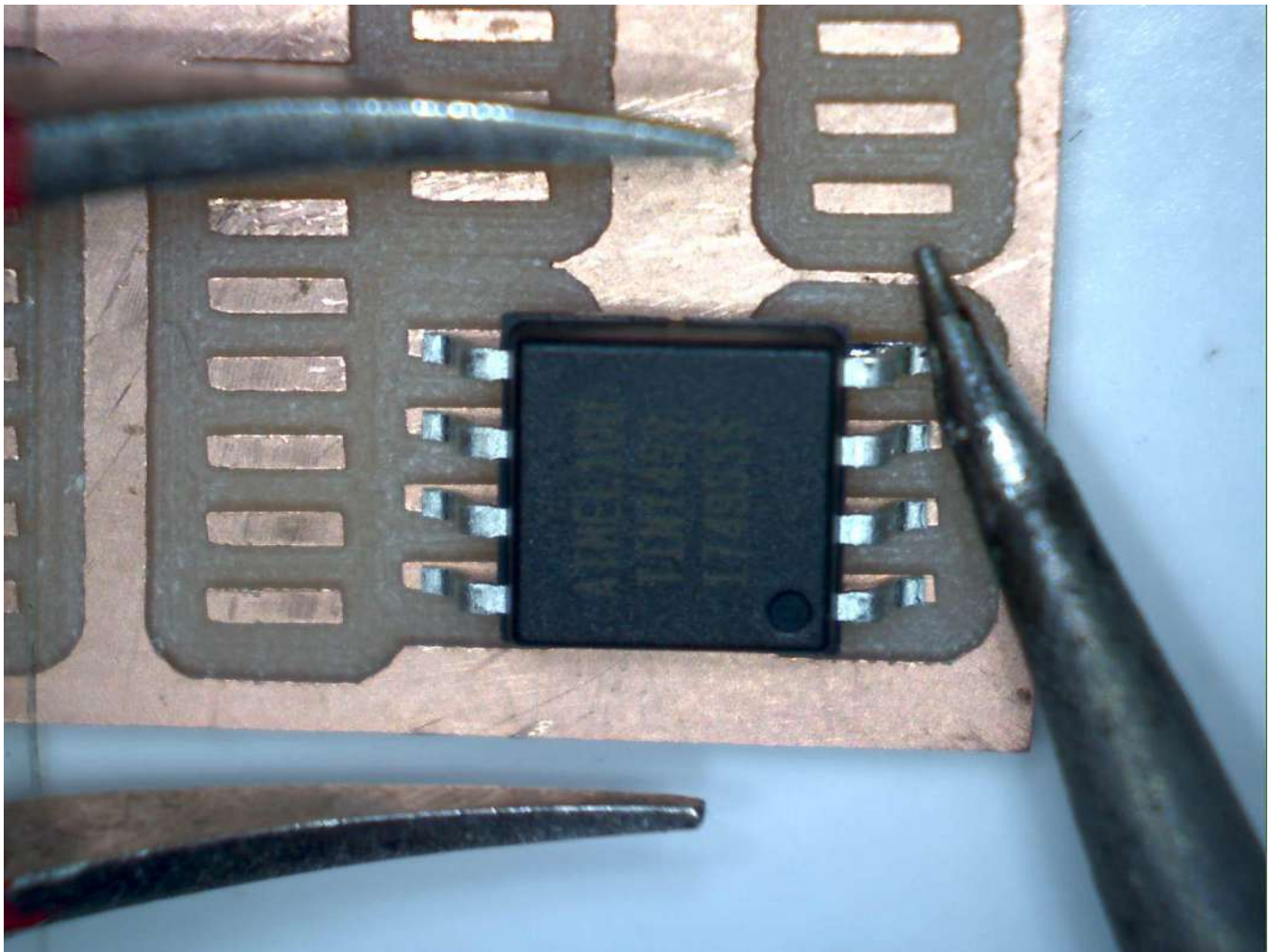


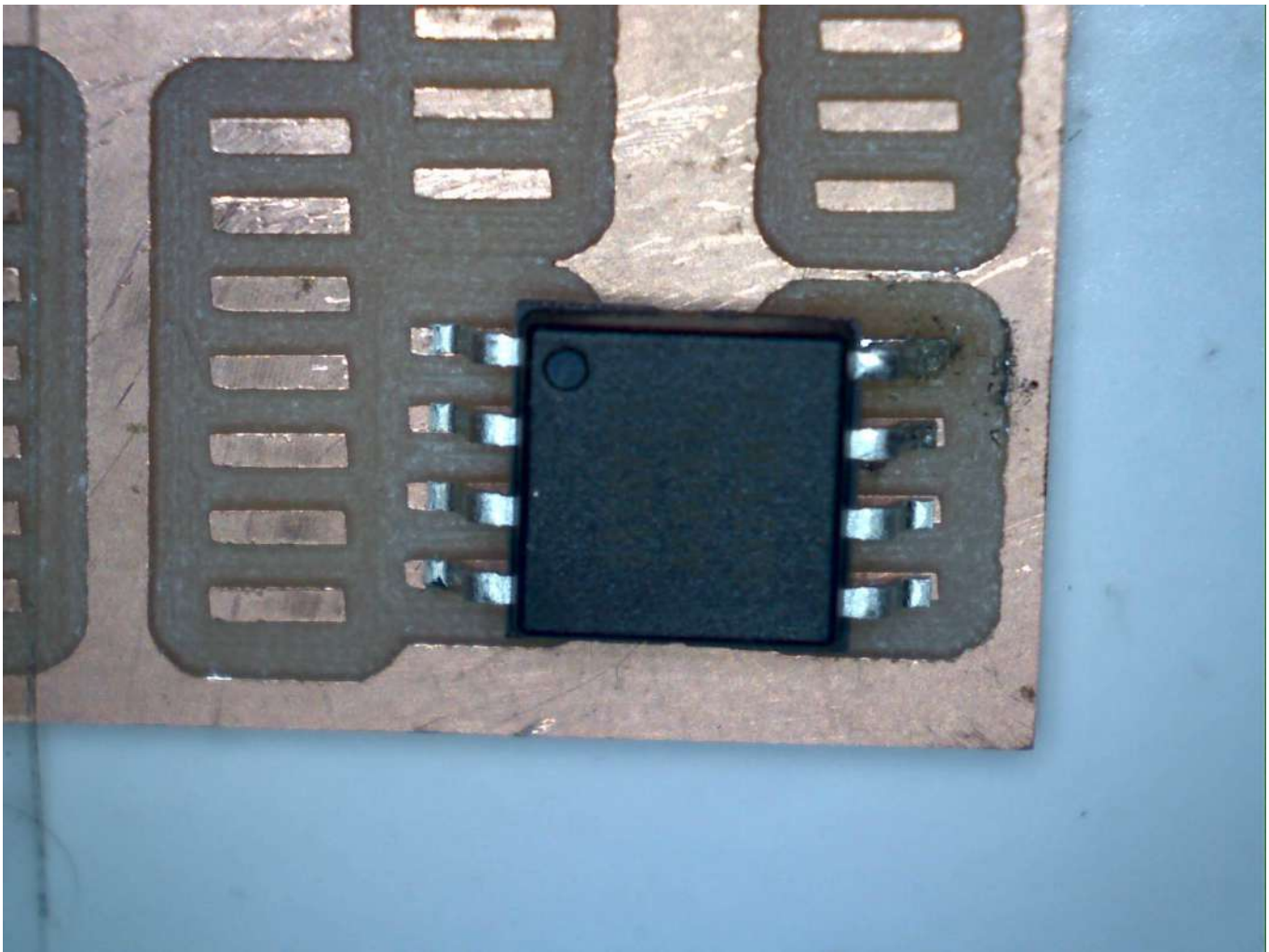


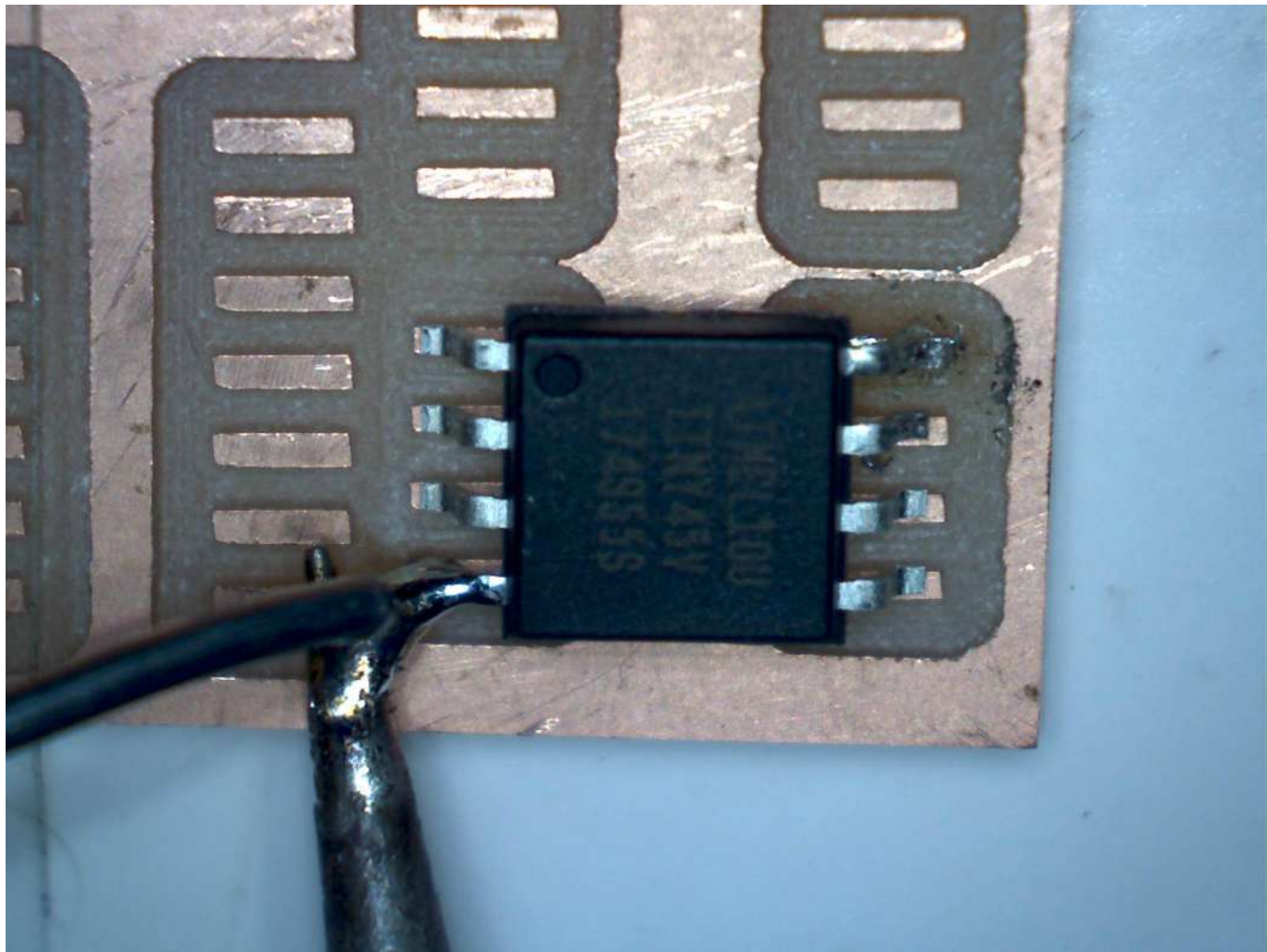


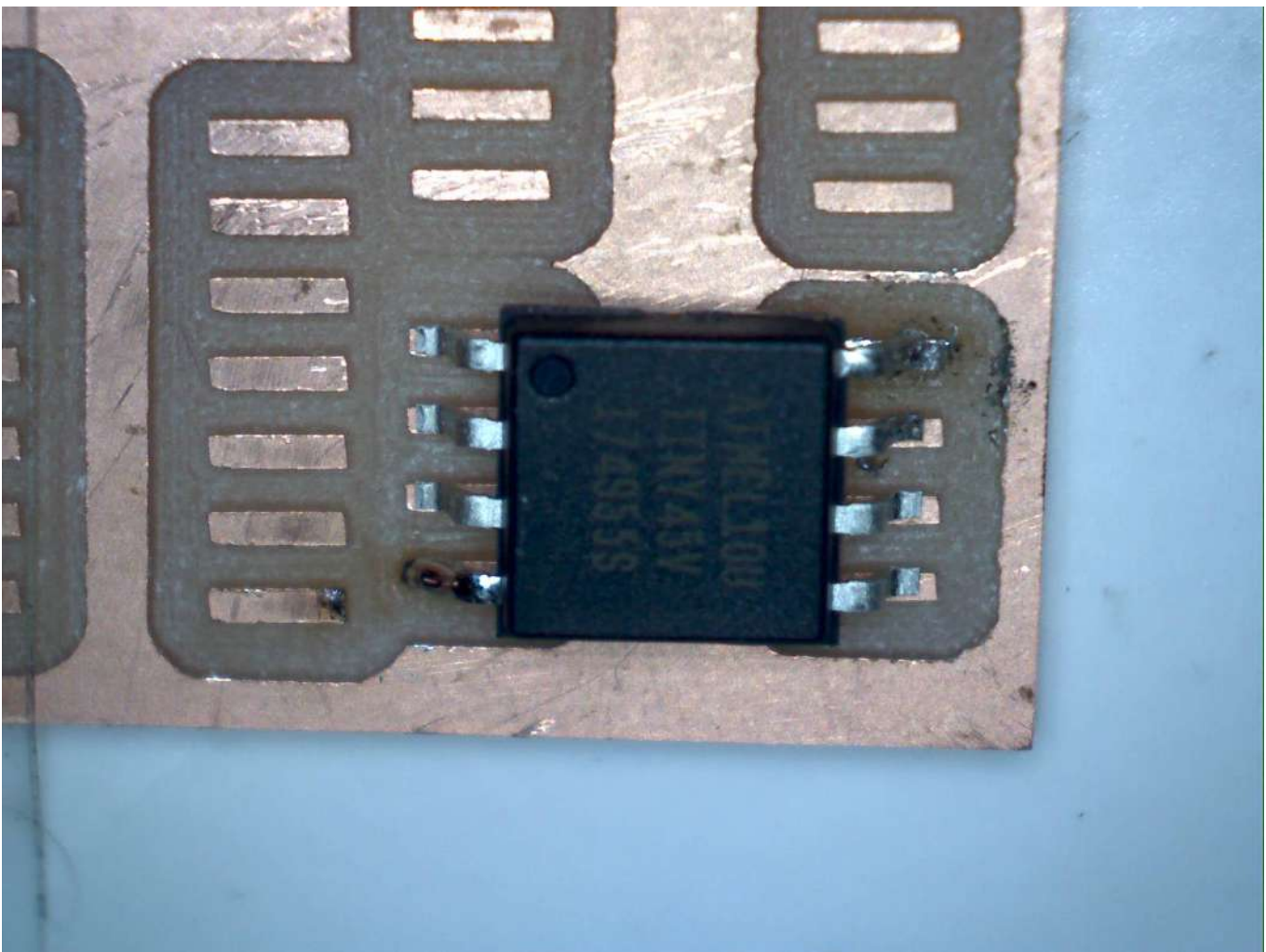


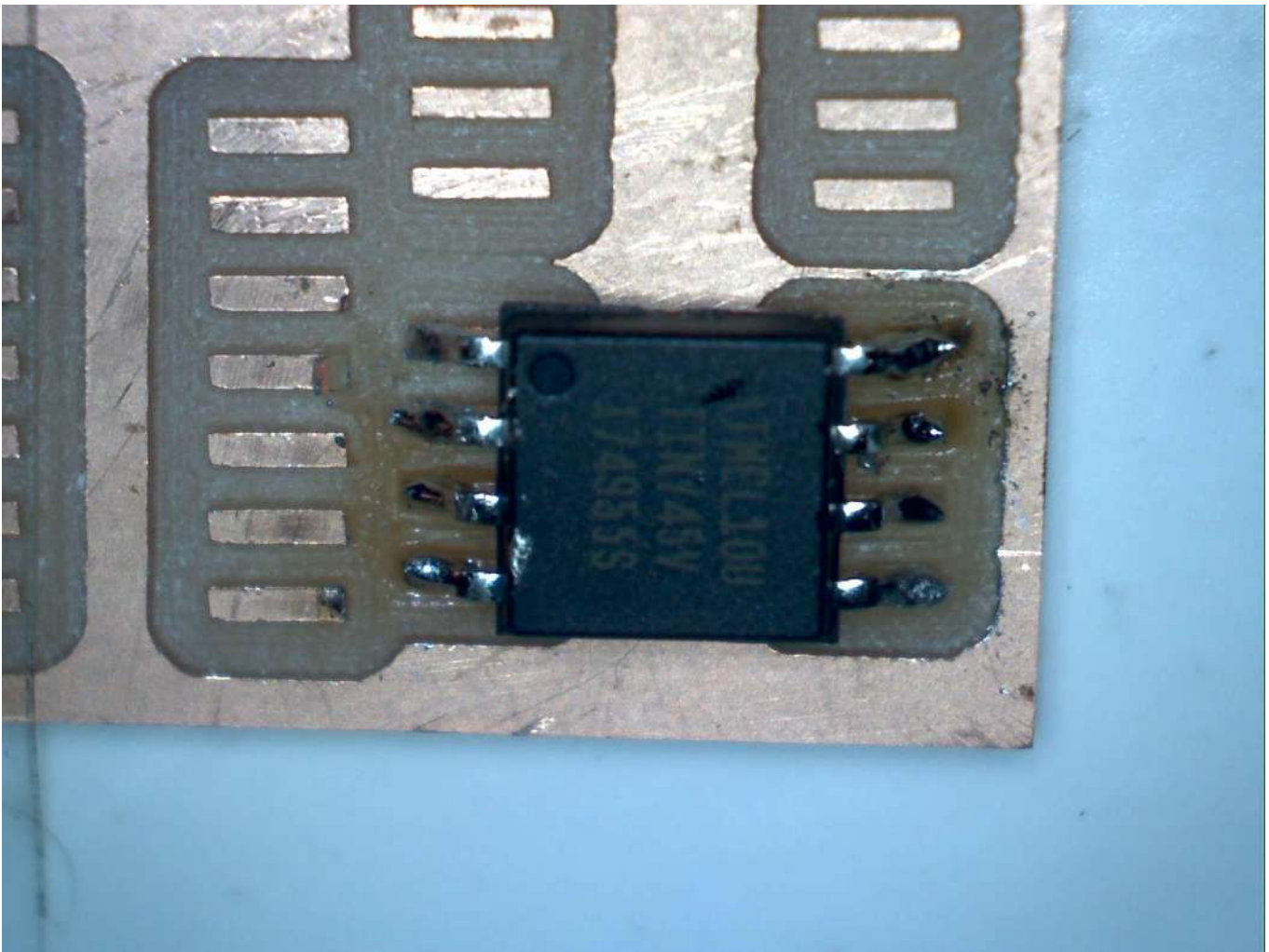


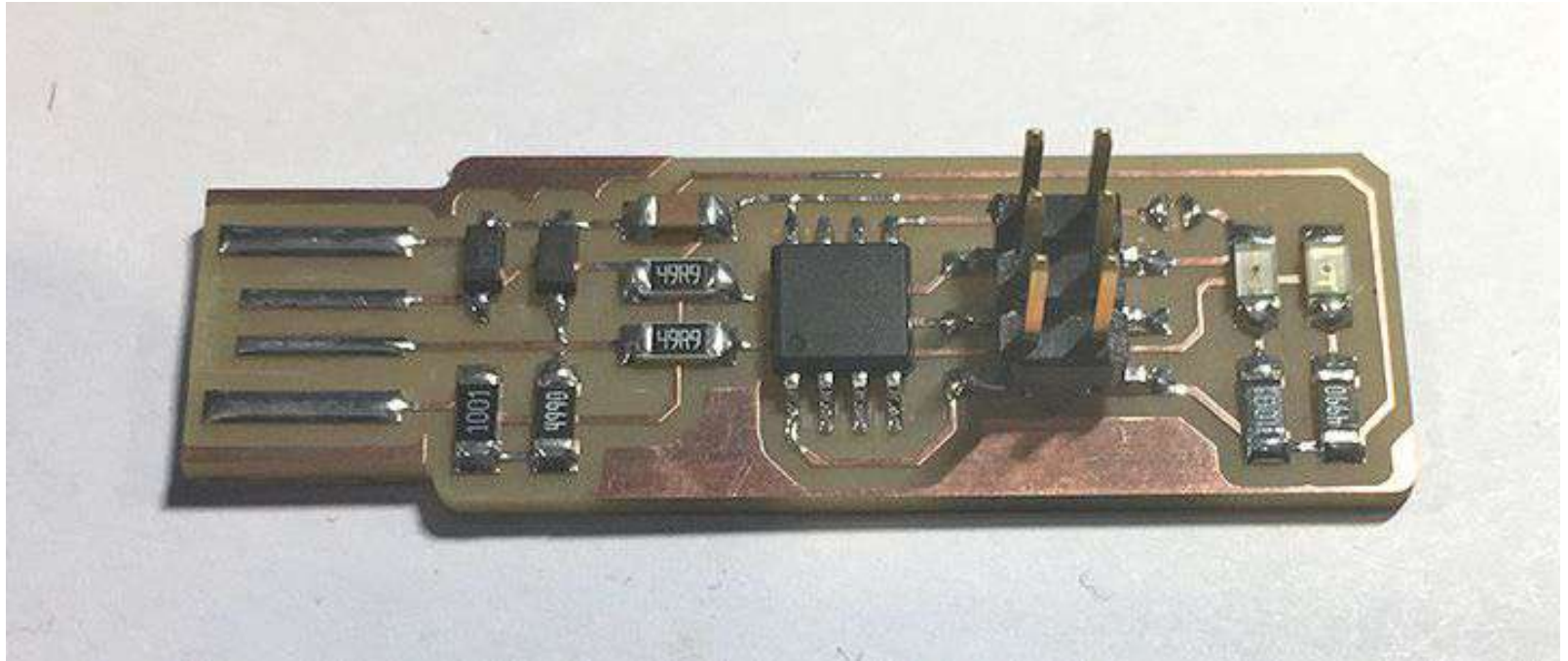






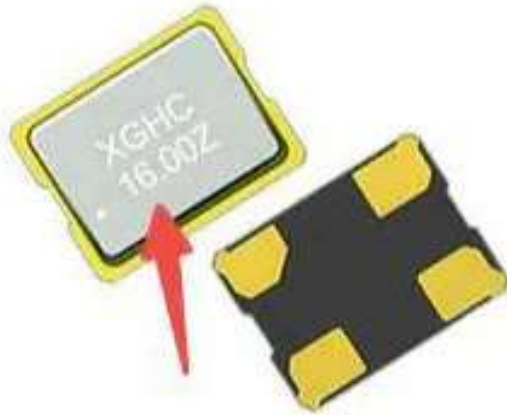






By Brian: <http://fab.cba.mit.edu/classes/863.16/doc/projects/ftsmin/index.html>

Reflow soldering



By: <https://leadsintec.com/how-to-identify-smd-components-fast-and-easy-from-appearances/>



Image shown is a representation only. Exact specifications should be obtained from the product data sheet.

TS391SNL

Digi-Key Part Number	TS391SNL-ND
Manufacturer	Chip Quik Inc.
Manufacturer Product Number	TS391SNL
Supplier	Chip Quik Inc.
Description	THERMALLY STABLE SOLDER PASTE NO
Manufacturer Standard Lead Time	3 Weeks
Detailed Description	Lead Free No-Clean Solder Paste Sn96.5Ag3Cu0.5 (96.5/3/0.5) - Syringe, 0.53 oz (15g), 5cc
Customer Reference	Customer Reference

Composition	Sn96.5Ag3Cu0.5 (96.5/3/0.5)
Diameter	-
Melting Point	423 ~ 428°F (217 ~ 220°C)
Flux Type	No-Clean
Wire Gauge	-
Mesh Type	4
Process	Lead Free
Form	Syringe, 0.53 oz (15g), 5cc
Shelf Life	12 Months
Shelf Life Start	Date of Manufacture
Storage/Refrigeration Temperature	68°F ~ 77°F (20°C ~ 25°C)

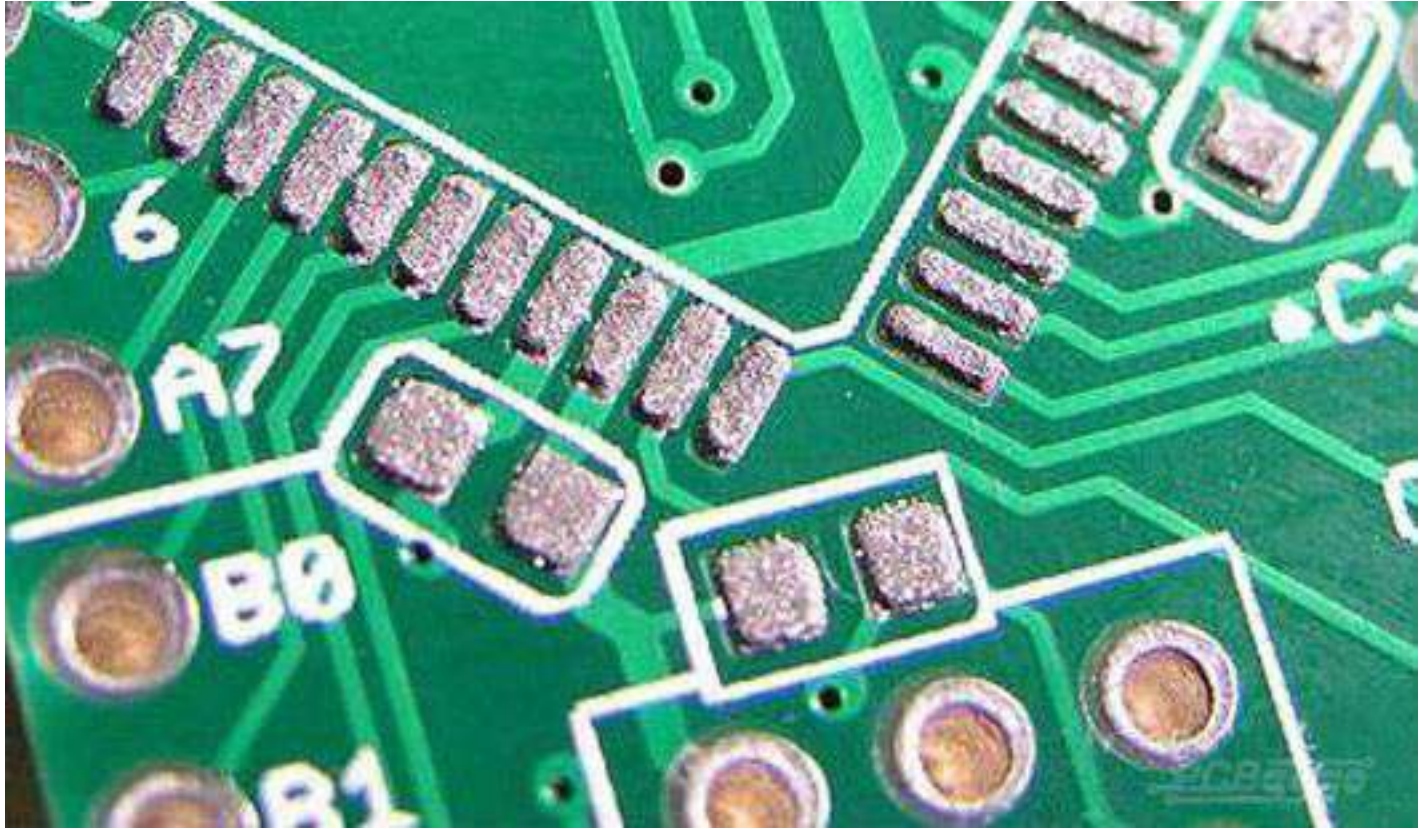
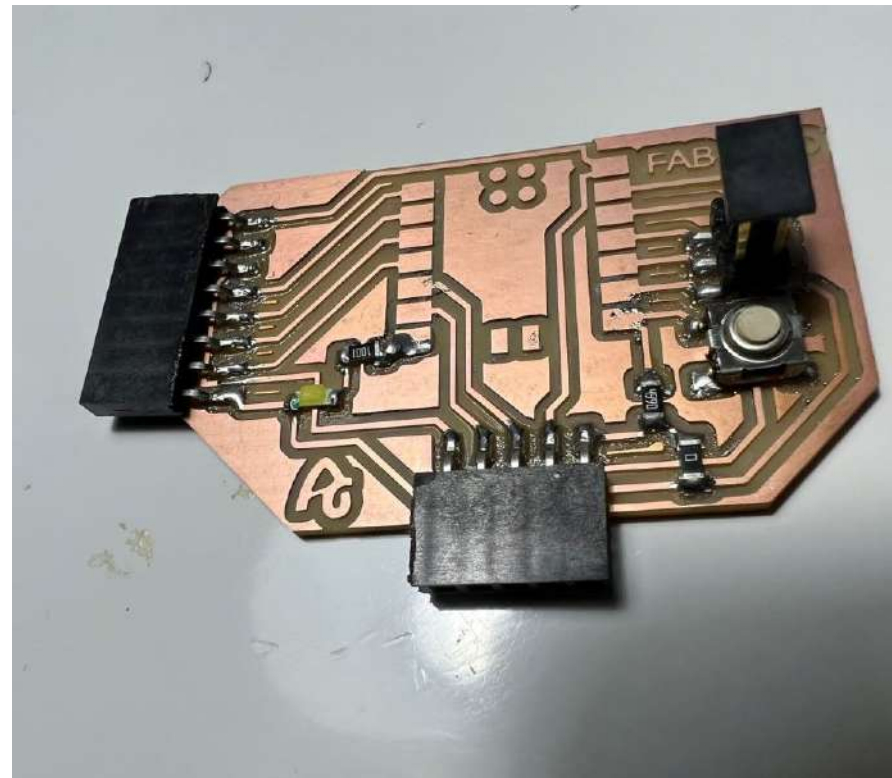
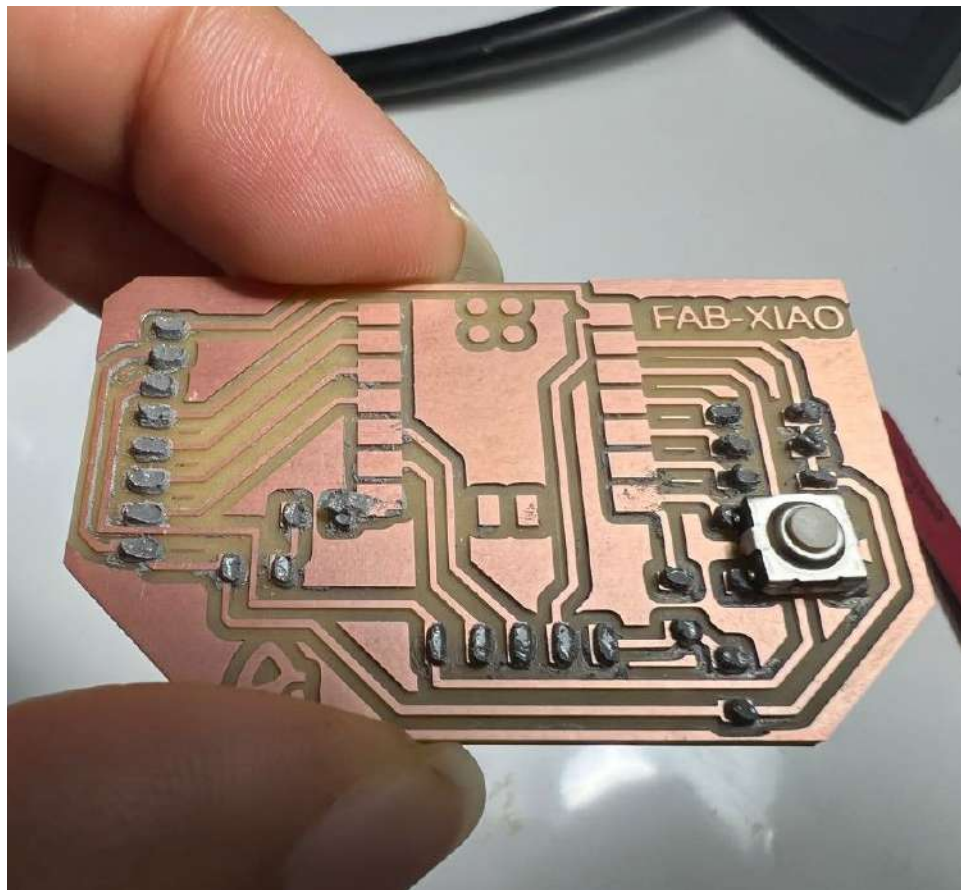
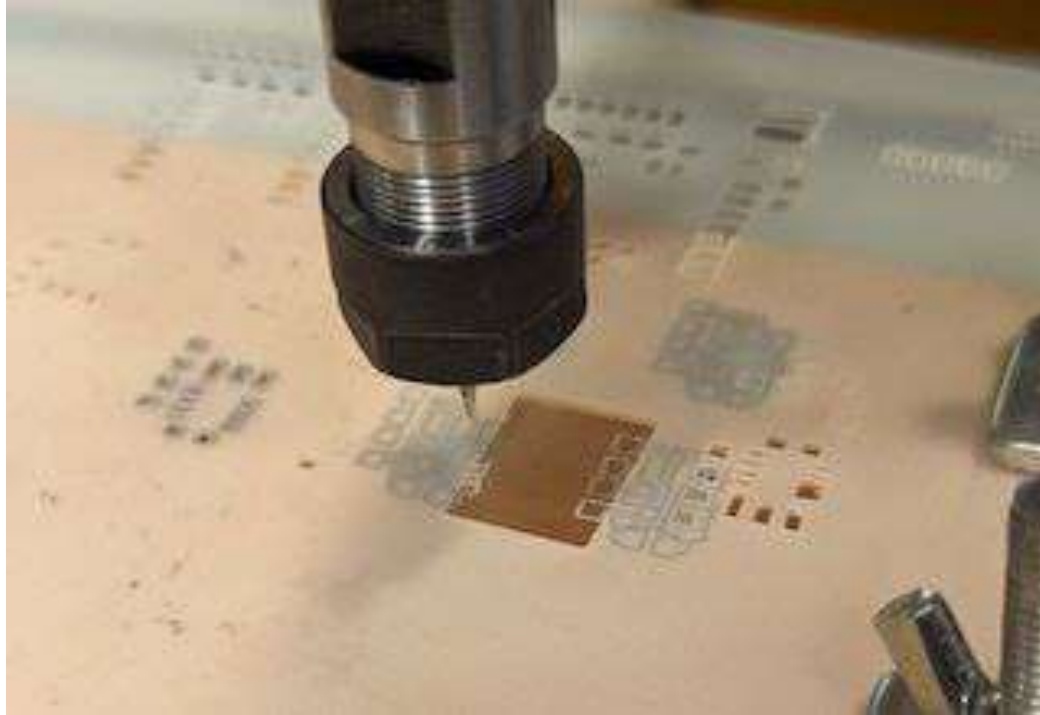


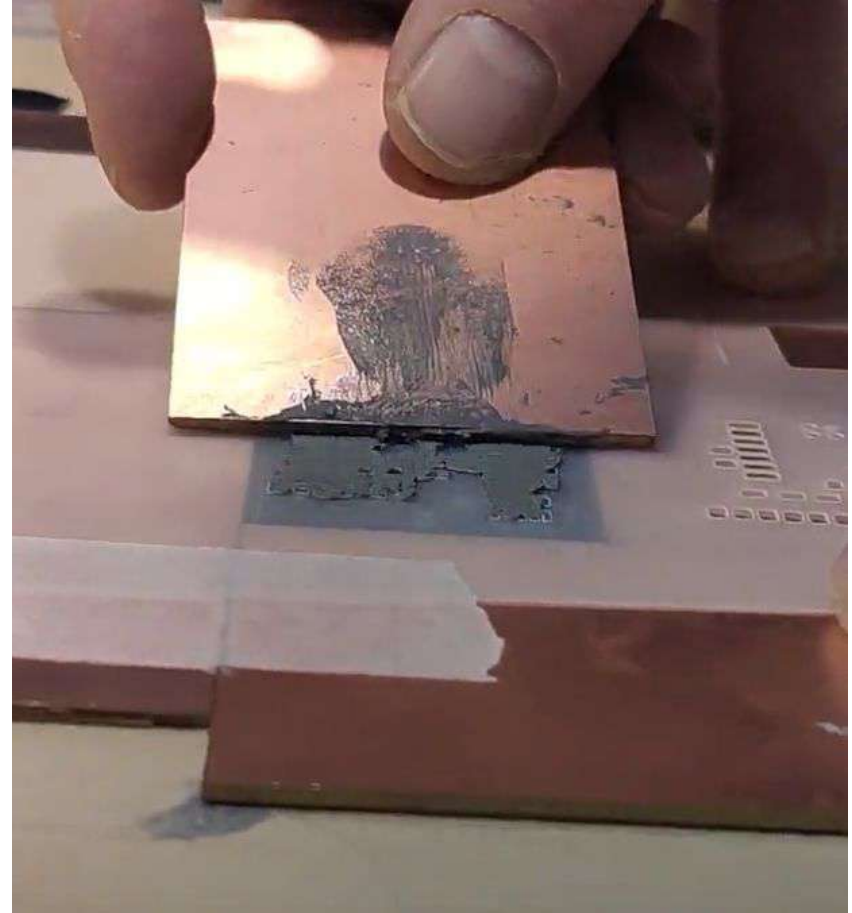
Image by: <https://manage.pcbgogo.com/img/js/ueditor/ueditor1.4.3.3/net/upload/image/20190806/6370071249309100003429824.png>



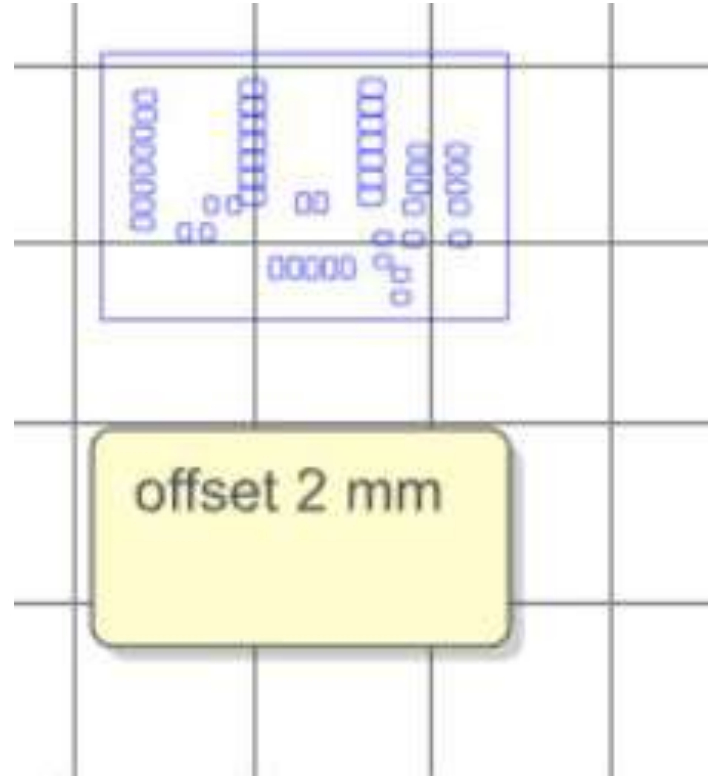
Method 1: Milling



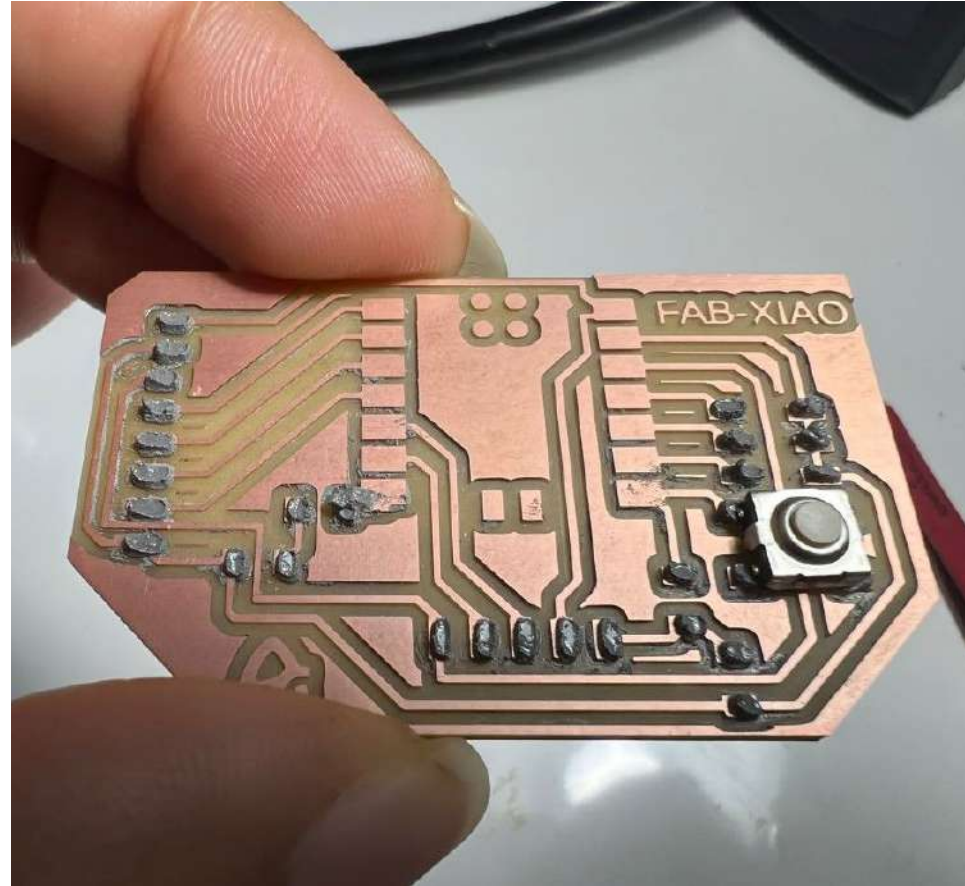
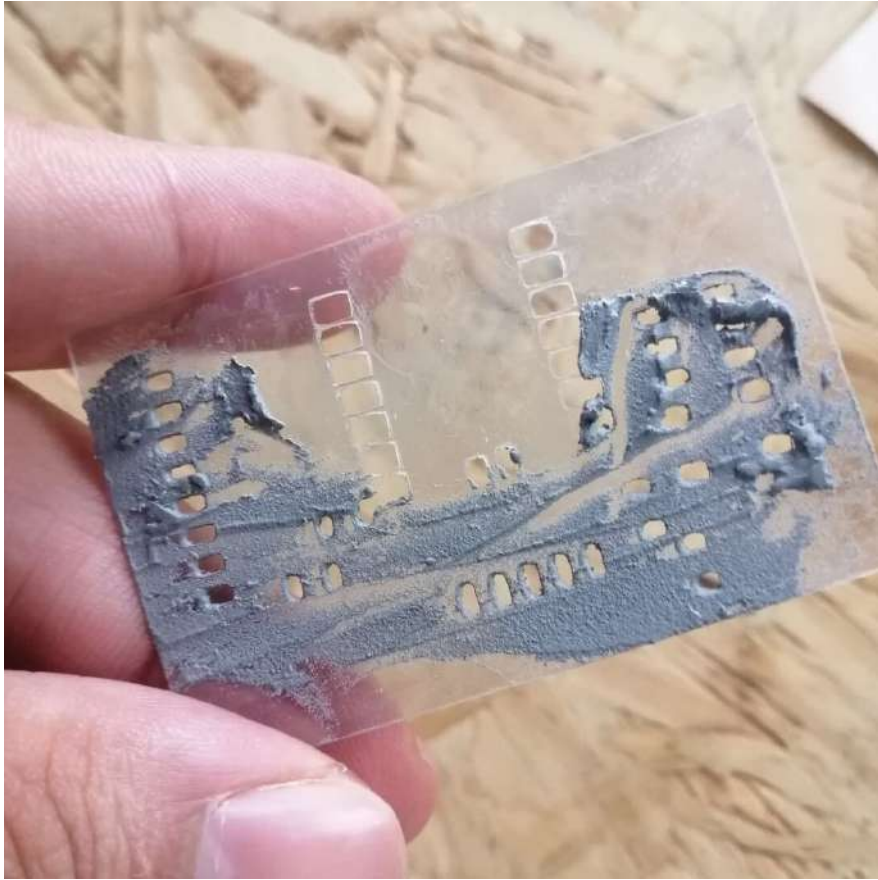
0.01" thick polycarbonate milled with V shape bit



Method 2: Vinyl cutting



3 PVC sheets vinyl cut and glued together



By: <http://fablabbh.fabcloud.io/asterisk/2022/students/haider.albasri/projects/pcb-stencil-project/>

Reflow options for FR1

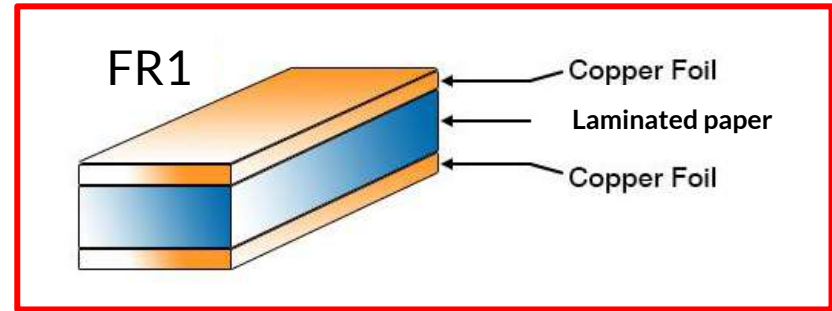
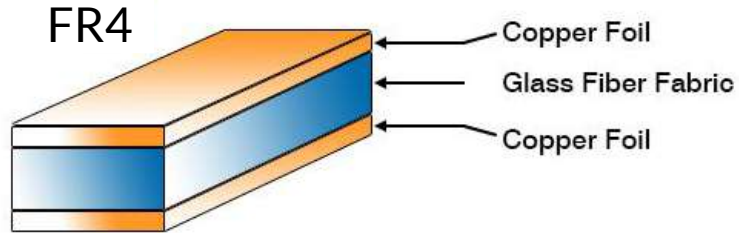
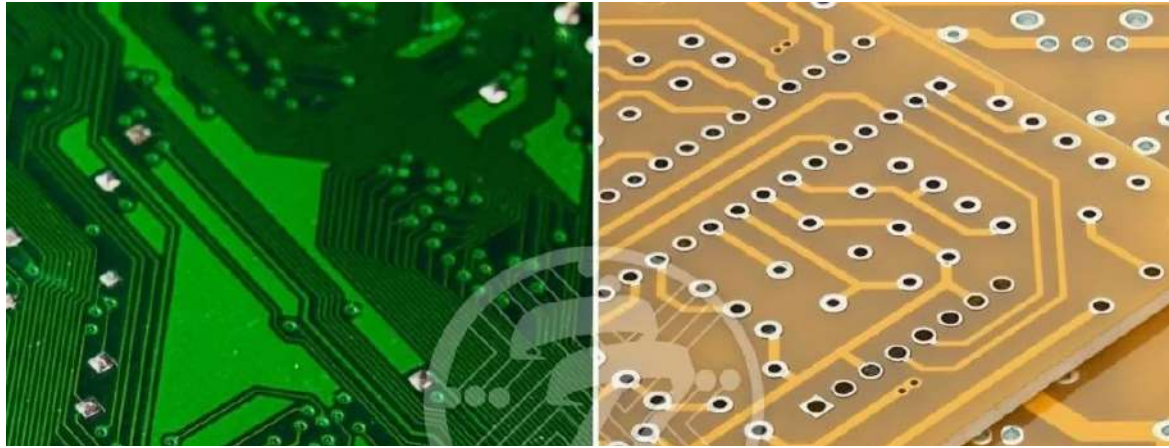


Illustration by: https://www.pcbgogo.com/Article/Choosing_the_Correct_Thickness_for_PCB_Prototype.html

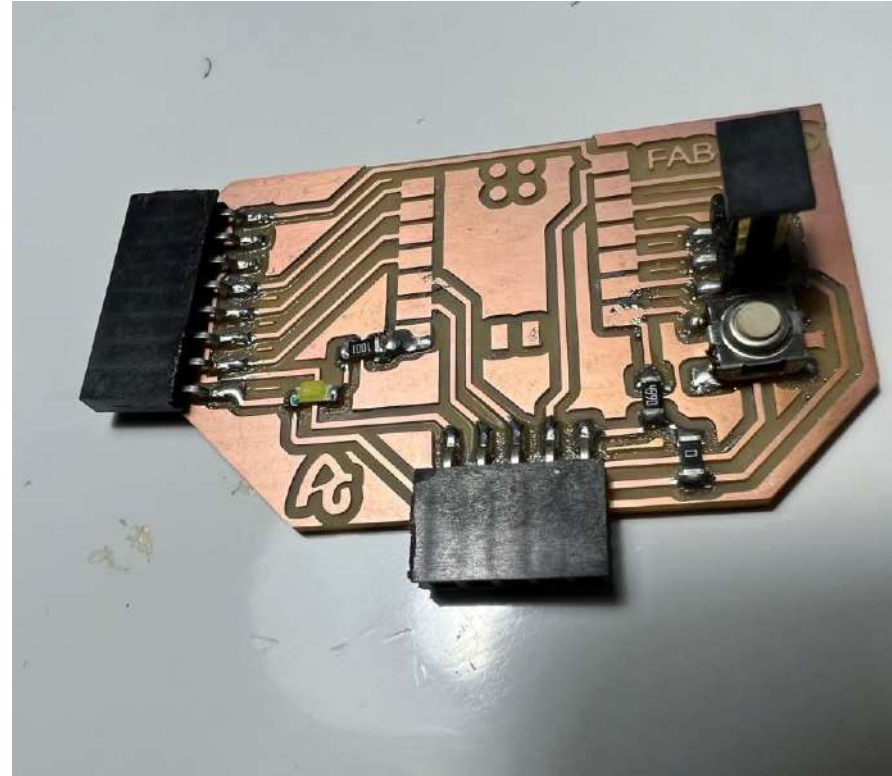
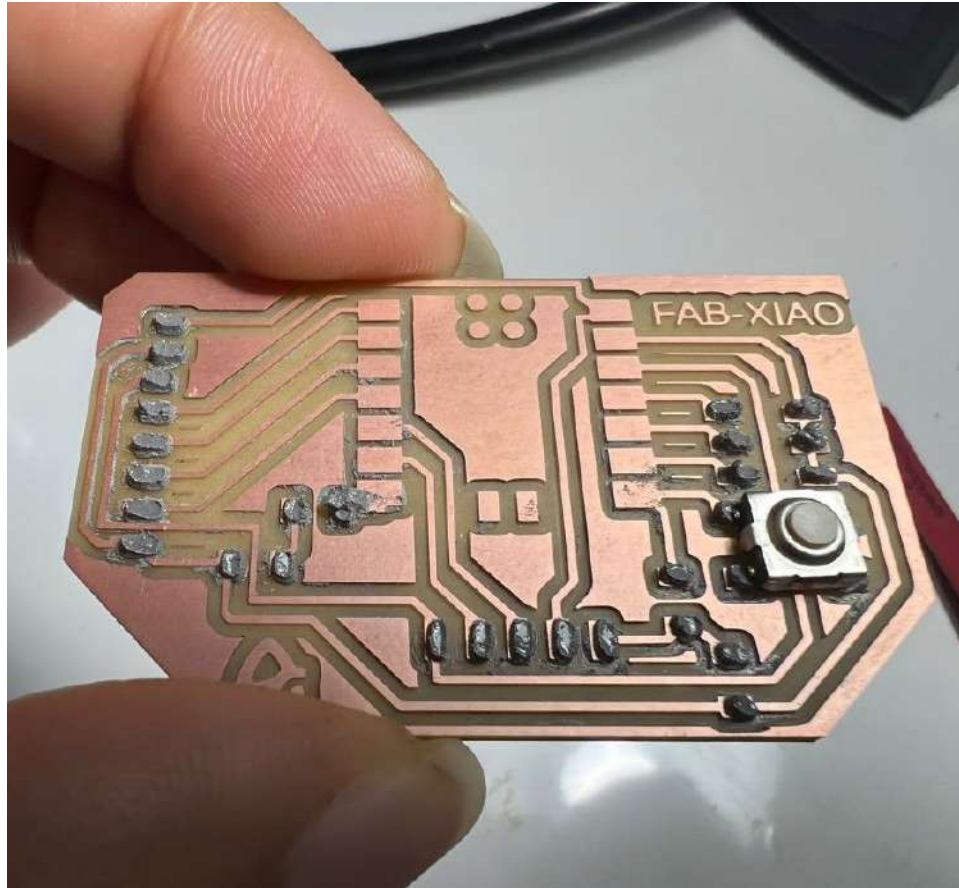
Picture by: <https://www.technotronix.us/pcbblog/rogers-pcb-vs-fr4-pcb-what-is-the-difference/>

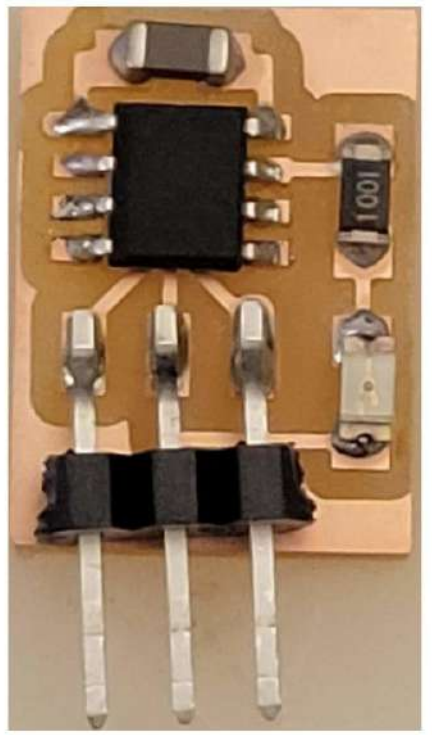
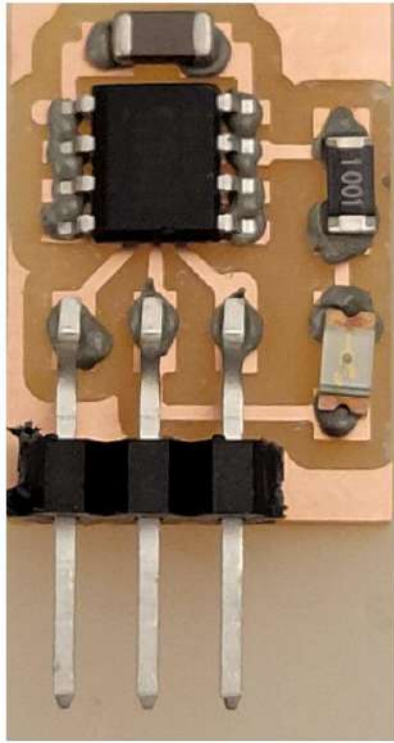
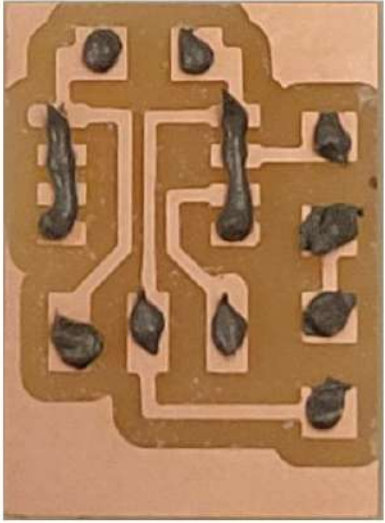
Oven



Ideally: Hot air gun







Reflow options for FR4

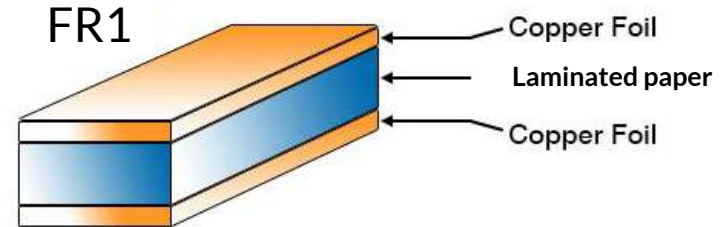
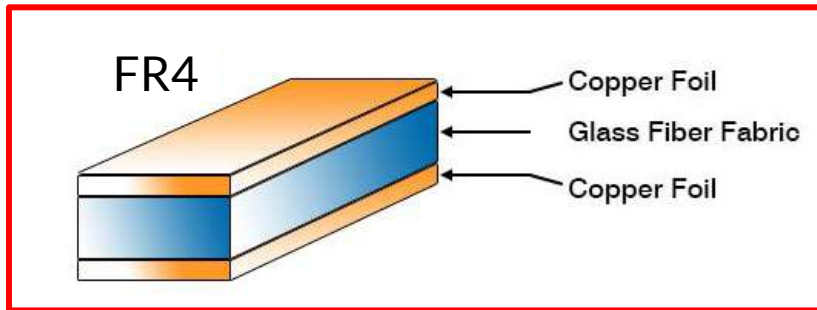
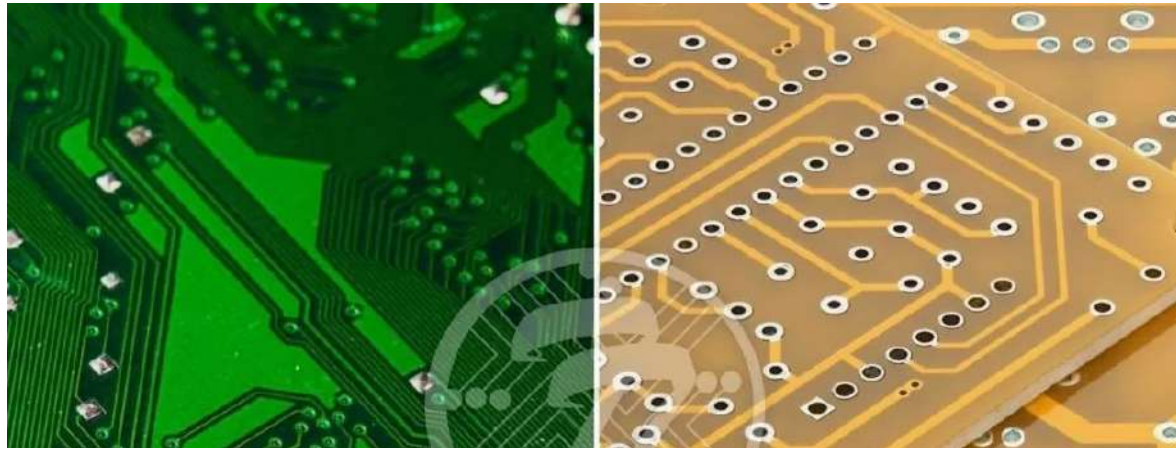


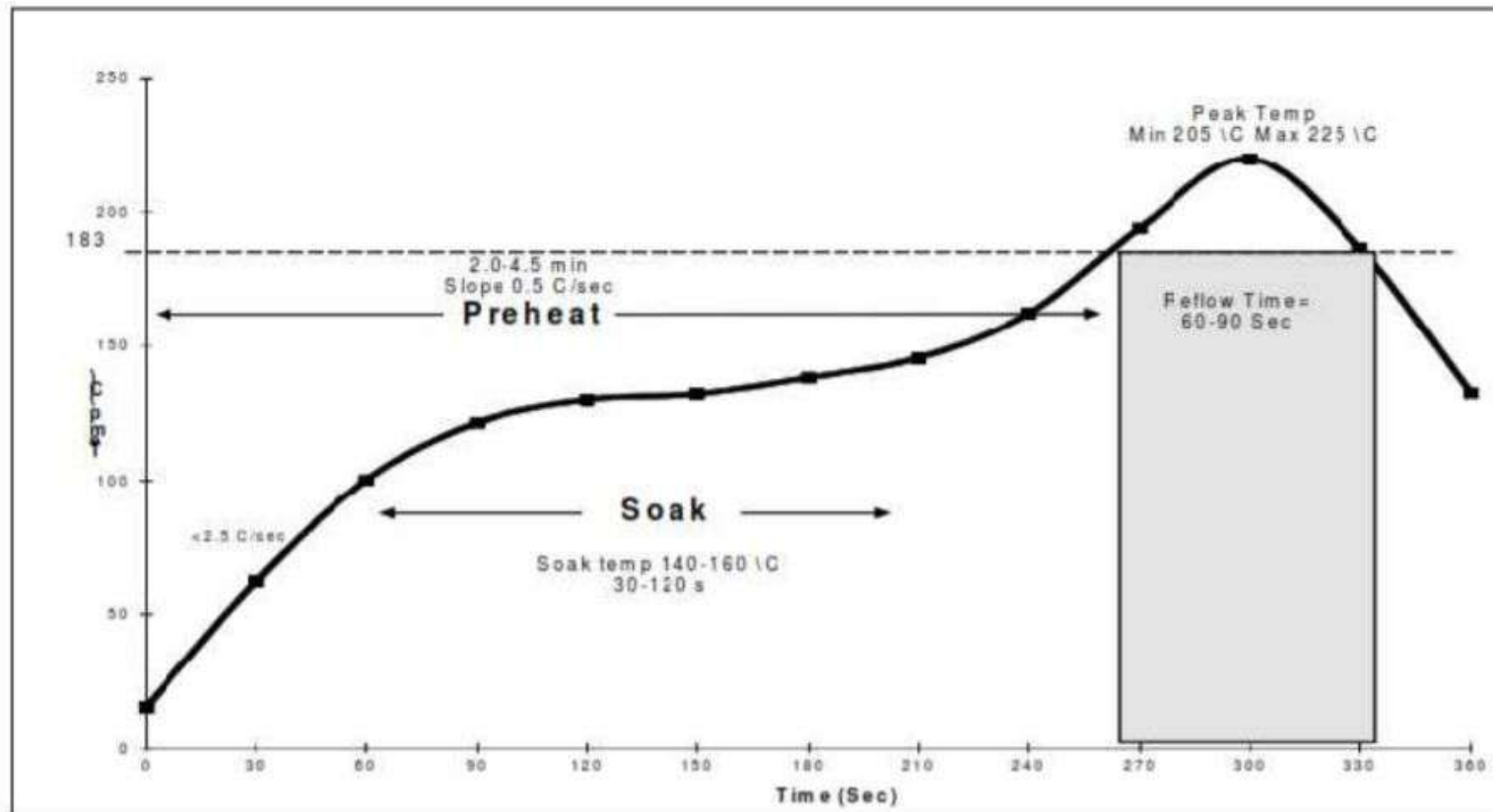
Illustration by: https://www.pcbgogo.com/Article/Choosing_the_Correct_Thickness_for_PCB_Prototype.html

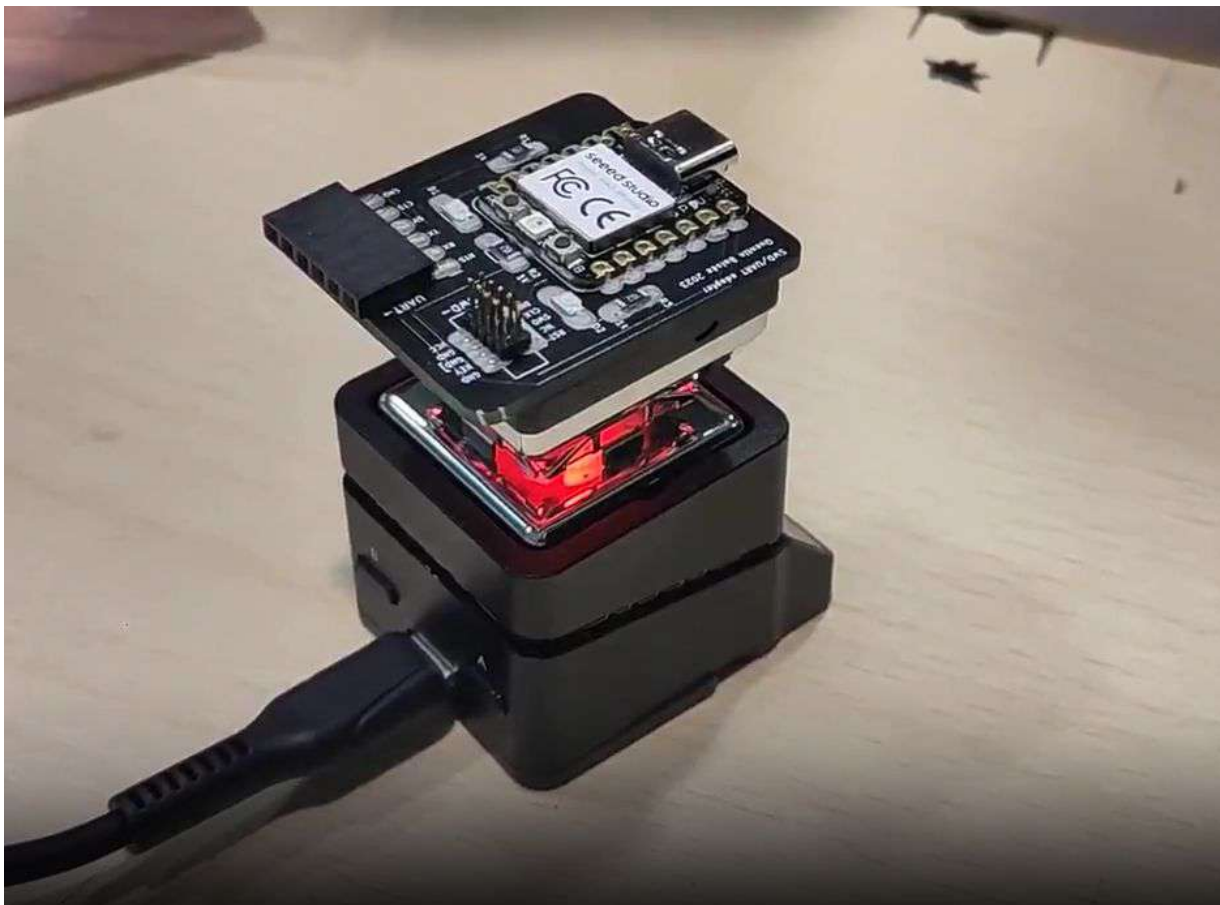
Picture by: <https://www.technotronix.us/pcbblog/rogers-pcb-vs-fr4-pcb-what-is-the-difference/>

Hot Plate



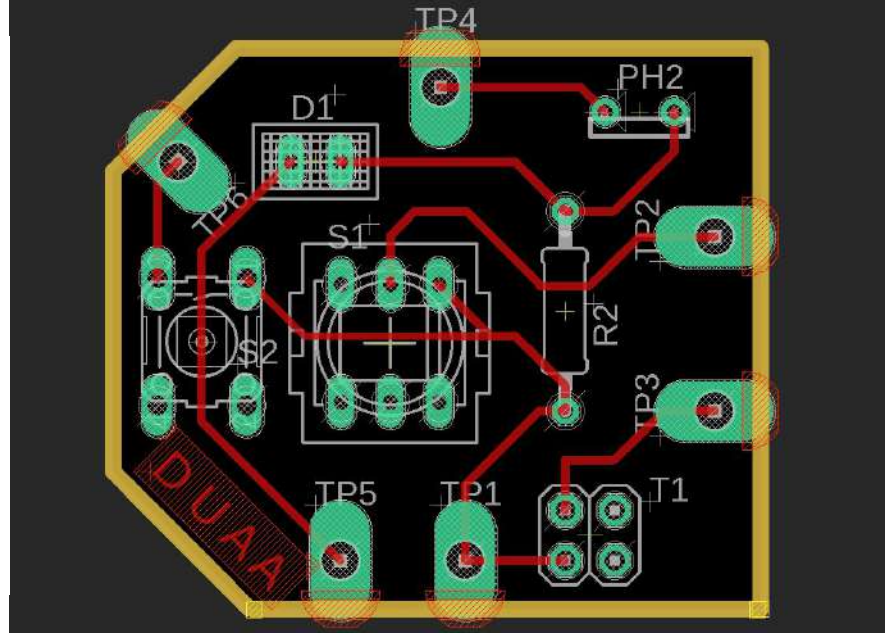
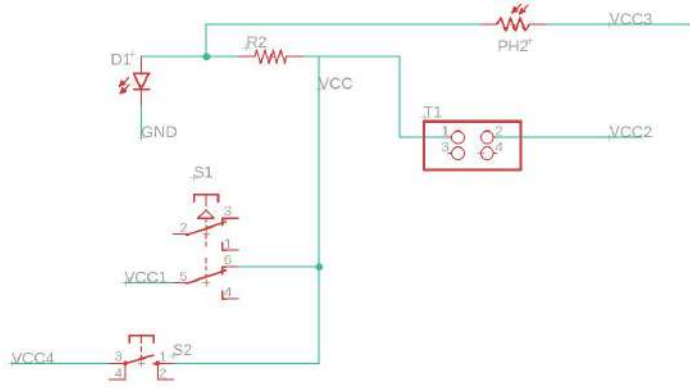
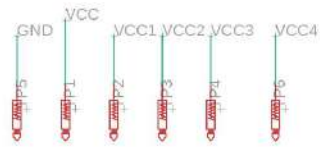
Picture from: <https://www.amazon.com/SainSmart-Soldering-Preheating-Preheater-Intelligent/dp/B08R6XFPKR?th=1>

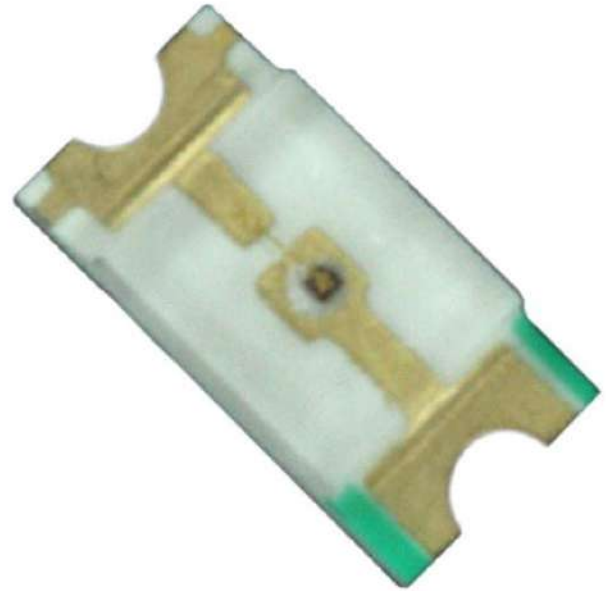
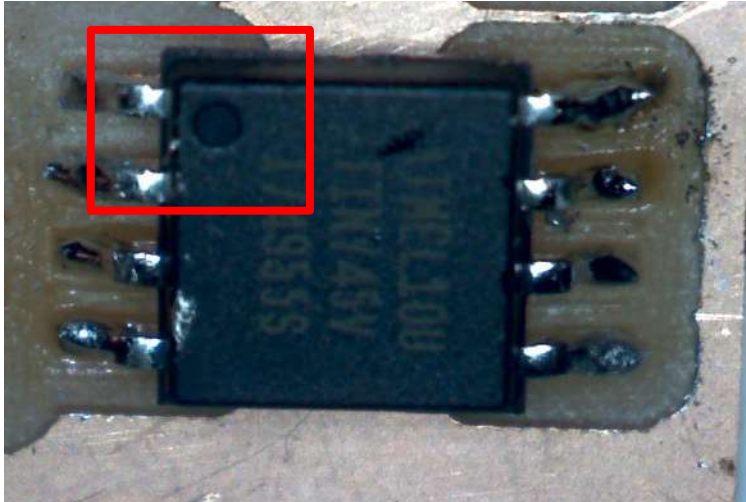




By: <https://academany.fabcloud.io/fabacademy/2024/bootcamp-instructors/workshops/Soldermask/>

What to solder where?



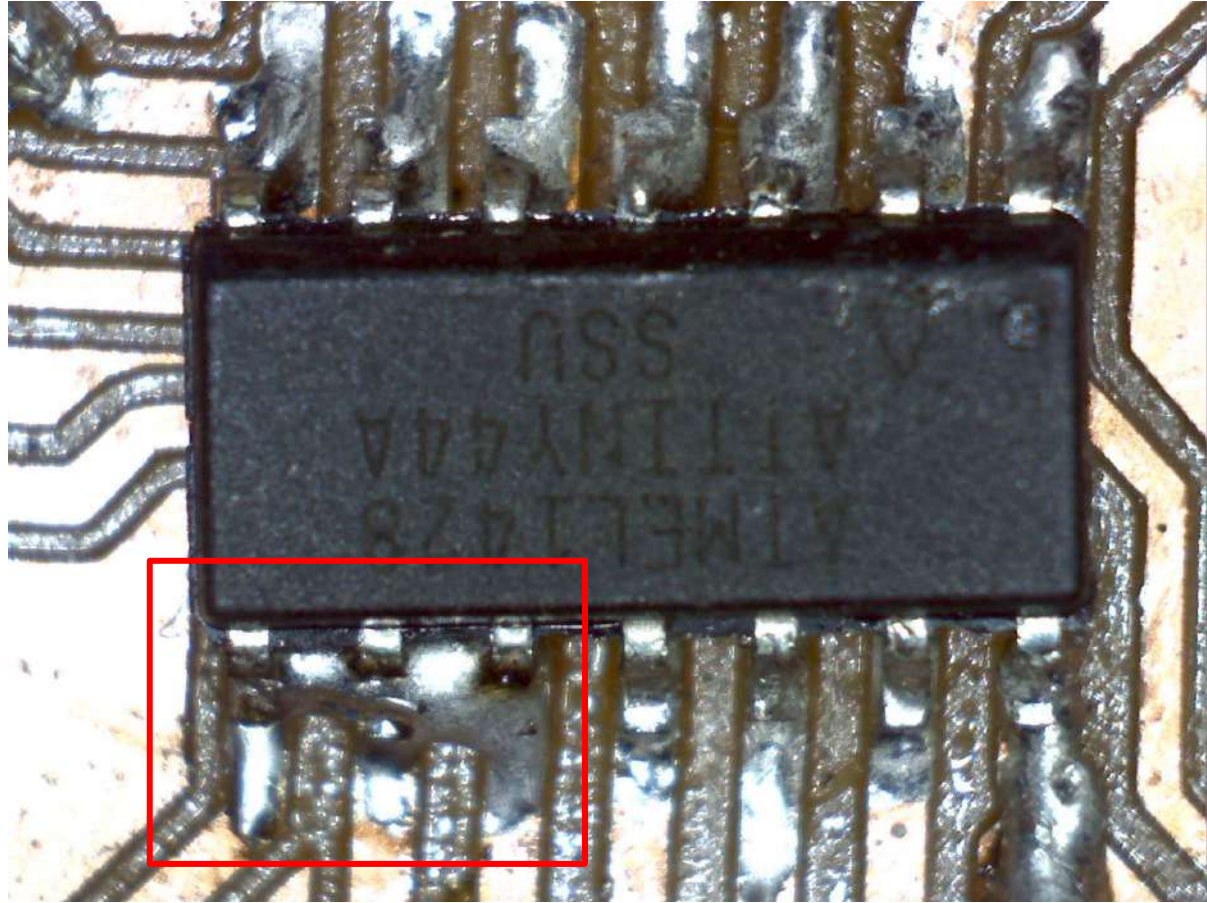


<https://www.digikey.com/en/products/detail/di-align/5990230007F/9385417>

Desoldering

—
**Digital
microscope
(optional)**





Solder Sucker

Great for desoldering.
Sucks the solder out from
the joint

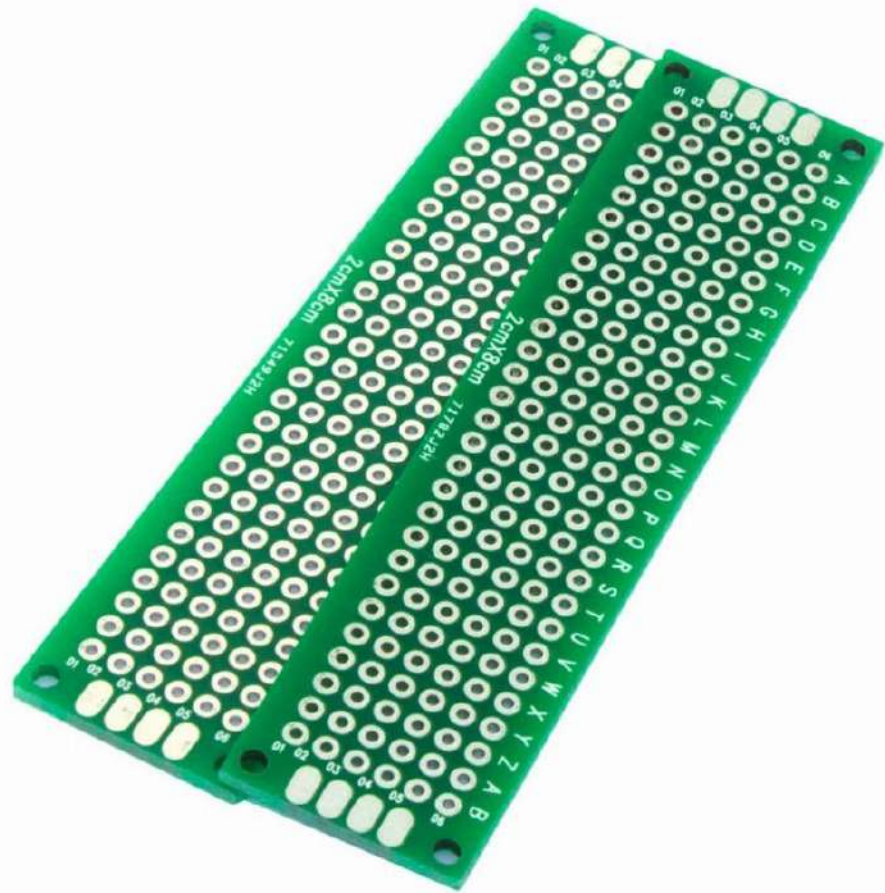


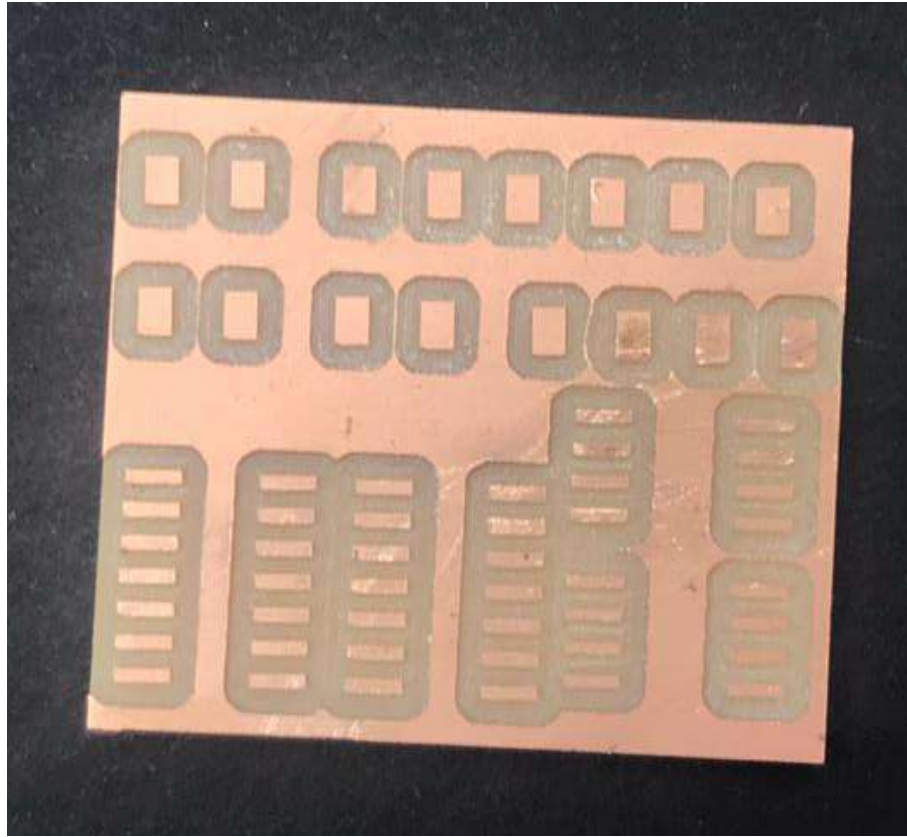
Solder wick

Great for desoldering.
Absorbs the solder out
from the joint



How to get better







... OWN SAFETY
DON'T TOUCH MY D...
... ON THE EXHAUST FAN
... GET ME BACK IN THE MOLD!!

Where ideas become reality

... BOARDS
FOR SOLDERING
ON CIRCUIT BOARDS

