

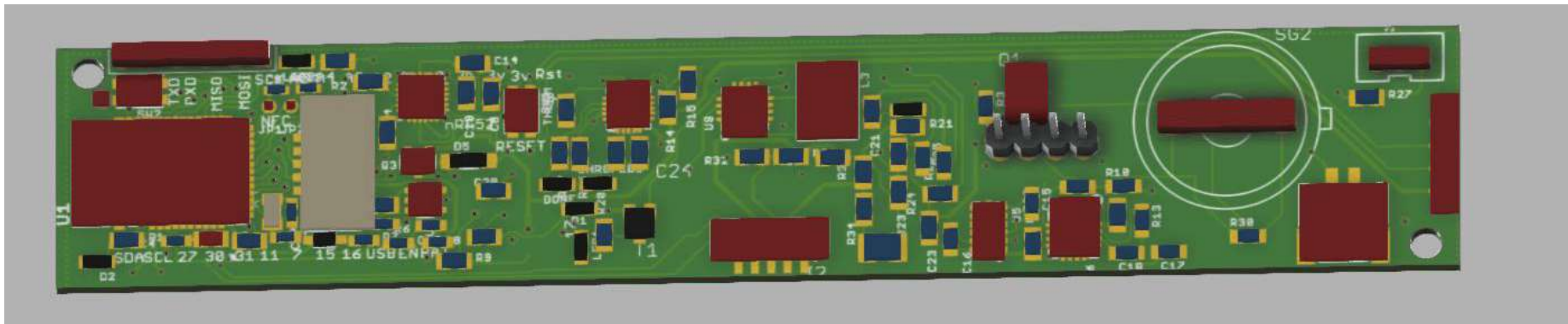
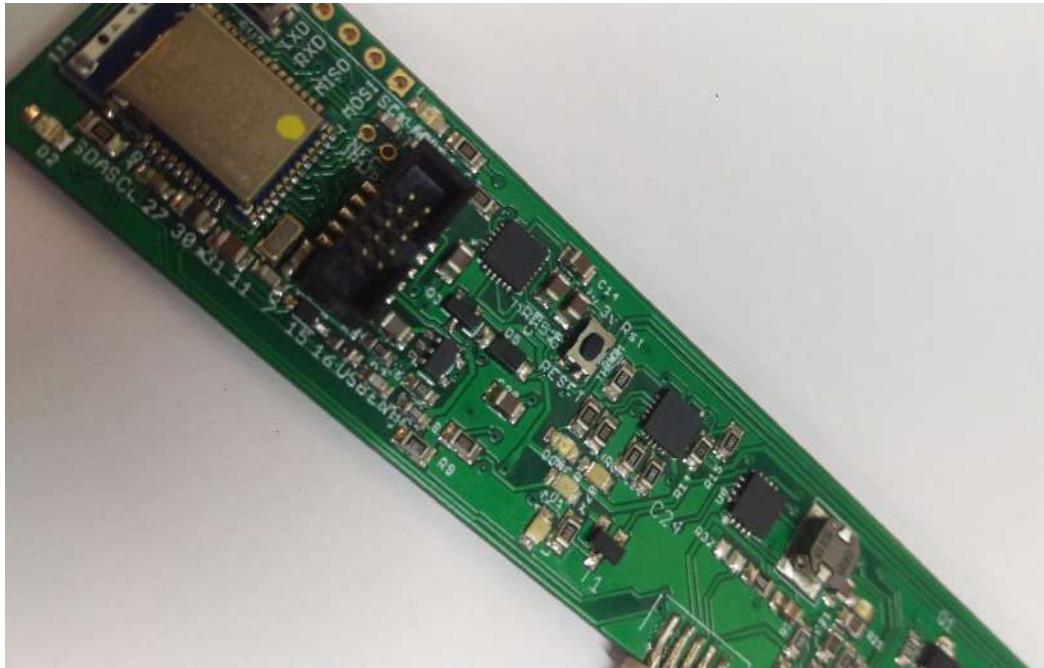
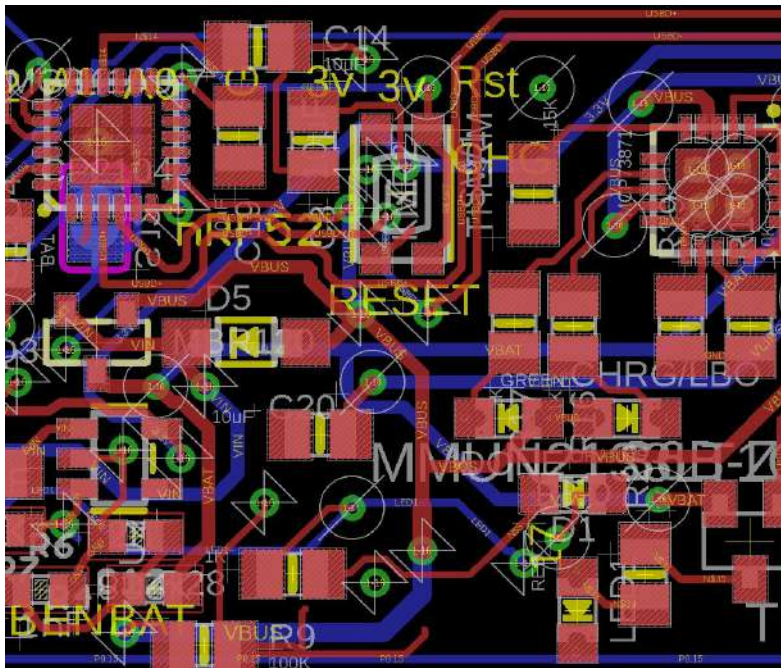
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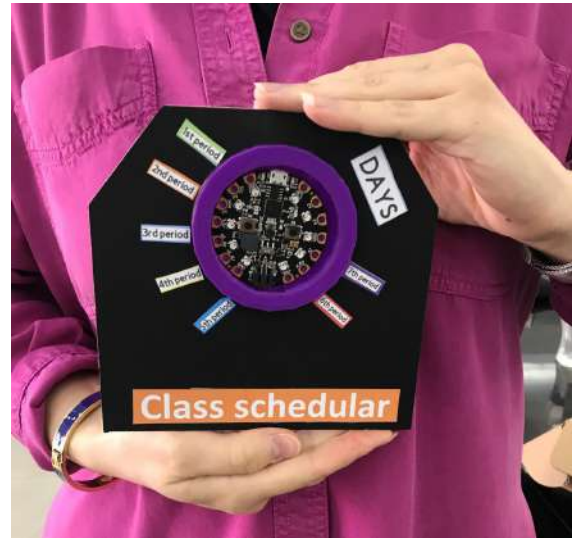
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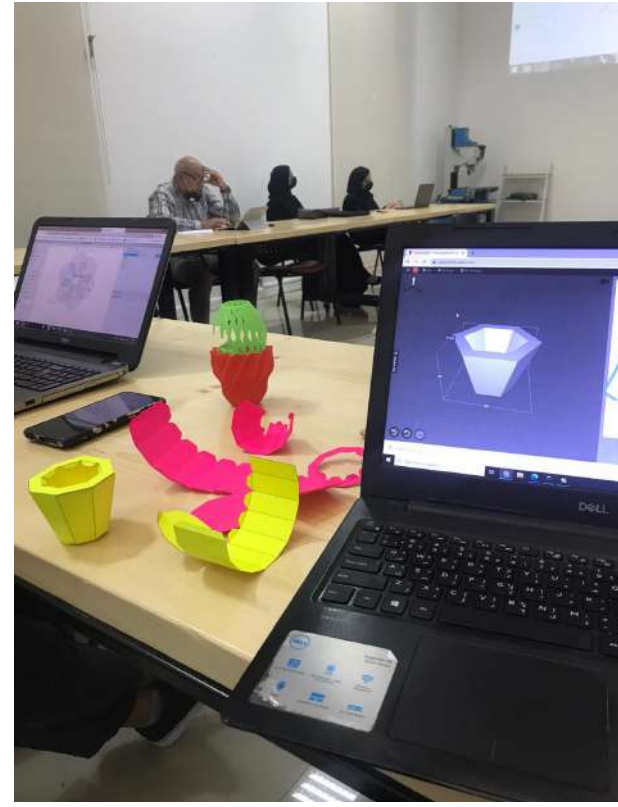
# Soldering basics

Duaa Alaali - Fab Lab Bahrain

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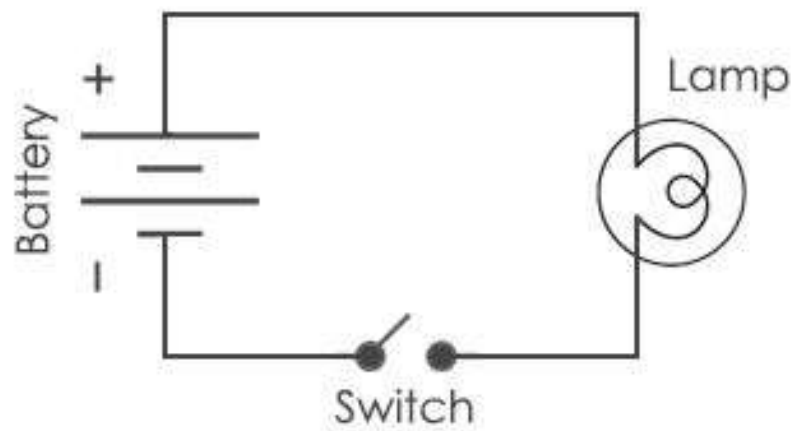


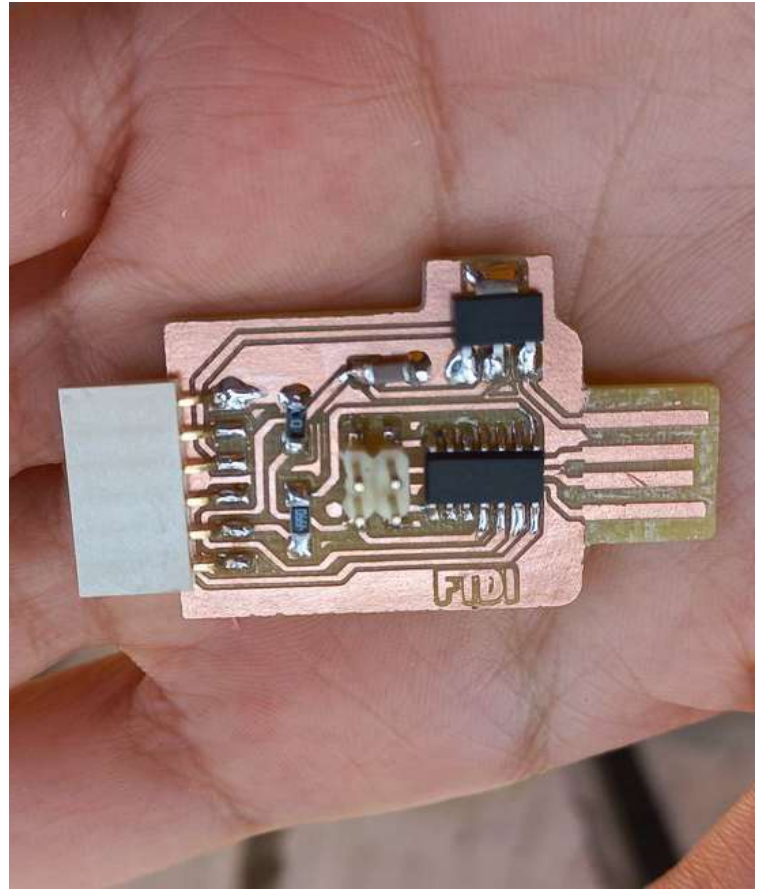
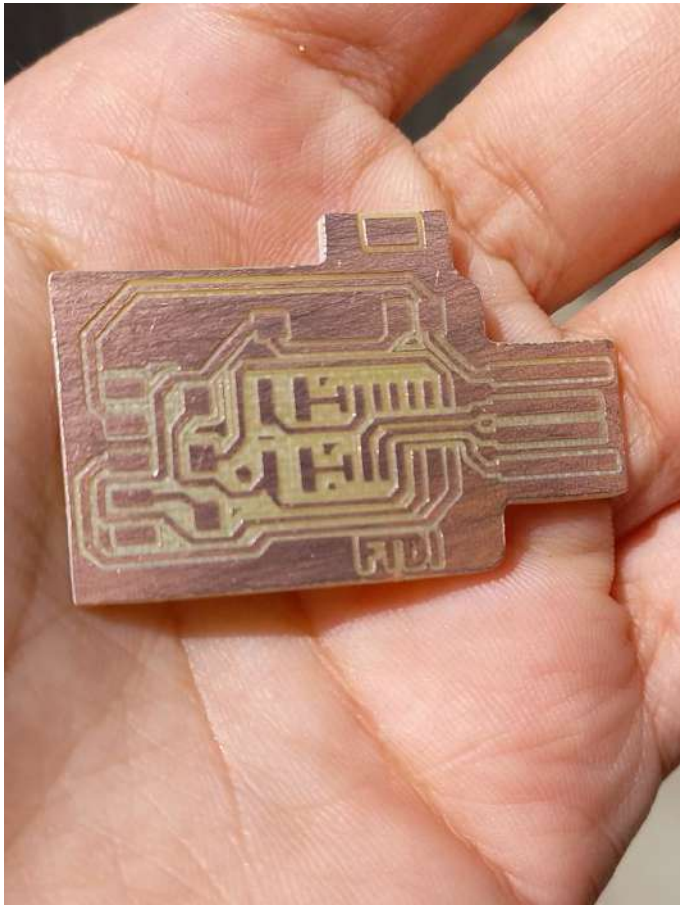


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# What is soldering

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



The Fab Academy.  
2023

Schedule

Labs

Students

Presentations

Documents

Projects

Prior Years

Search:

By Fab foundation: <http://fabacademy.org/2023/>





**The Fab Academy**  
2023 Schedule (tentative)

- Jan 12-16: instructor boot camp
- Jan 19-24: student boot camp, project presentations
- Jan 25: principles and practices ([video](#)), project management ([video](#), [review](#))
- Jan 30 *recitation*: version control ([video](#))
- Feb 01: computer-aided design ([video](#), [review](#))
- Feb 08: computer-controlled cutting ([video](#), [review](#))
- Feb 13 *recitation*: parametric, algorithmic, generative design ([video](#))
- Feb 15: embedded programming ([video](#), [review](#))
- Feb 22: 3D scanning and printing ([video](#), [review](#))
- Feb 27 *recitation*: debugging ([video](#))
- Mar 01: electronics design ([video](#), [review](#))
- Mar 08: computer-controlled machining ([video](#), [review](#))
- Mar 13 *recitation*: programming ([video](#))
- Mar 15: electronics production ([video](#), [review](#))
- Mar 22: molding and casting ([video](#), [review](#))
- Mar 27 *recitation*: machine building ([video](#))
- Mar 30: output devices ([video](#), [review](#))
- Apr 05: mechanical design, machine design ([video](#), [review](#))

---

# The tools

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—  
**Solder wire**





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

## SMDSWLF.020 4OZ

<b>Digi-Key Part Number</b>	SMDSWLF.0204OZ-ND
<b>Manufacturer</b>	Chip Quik Inc.
<b>Manufacturer Product Number</b>	SMDSWLF.020 4OZ
<b>Supplier</b>	<a href="#">Chip Quik Inc.</a>
<b>Description</b>	SLD WIRE NO-CLEAN 96.5/3/.5 4OZ.
<b>Manufacturer Standard Lead Time</b>	3 Weeks
<b>Detailed Description</b>	Lead Free No-Clean, Water Soluble Wire Solder Sn96.5Ag3Cu0.5 (96.5/3/0.5) 24 AWG, 25 SWG Spool, 4 oz (113.40g)
<b>Customer Reference</b>	<input type="text" value="Customer Reference"/>
<b>Datasheet</b>	 <a href="#">Datasheet</a>

—

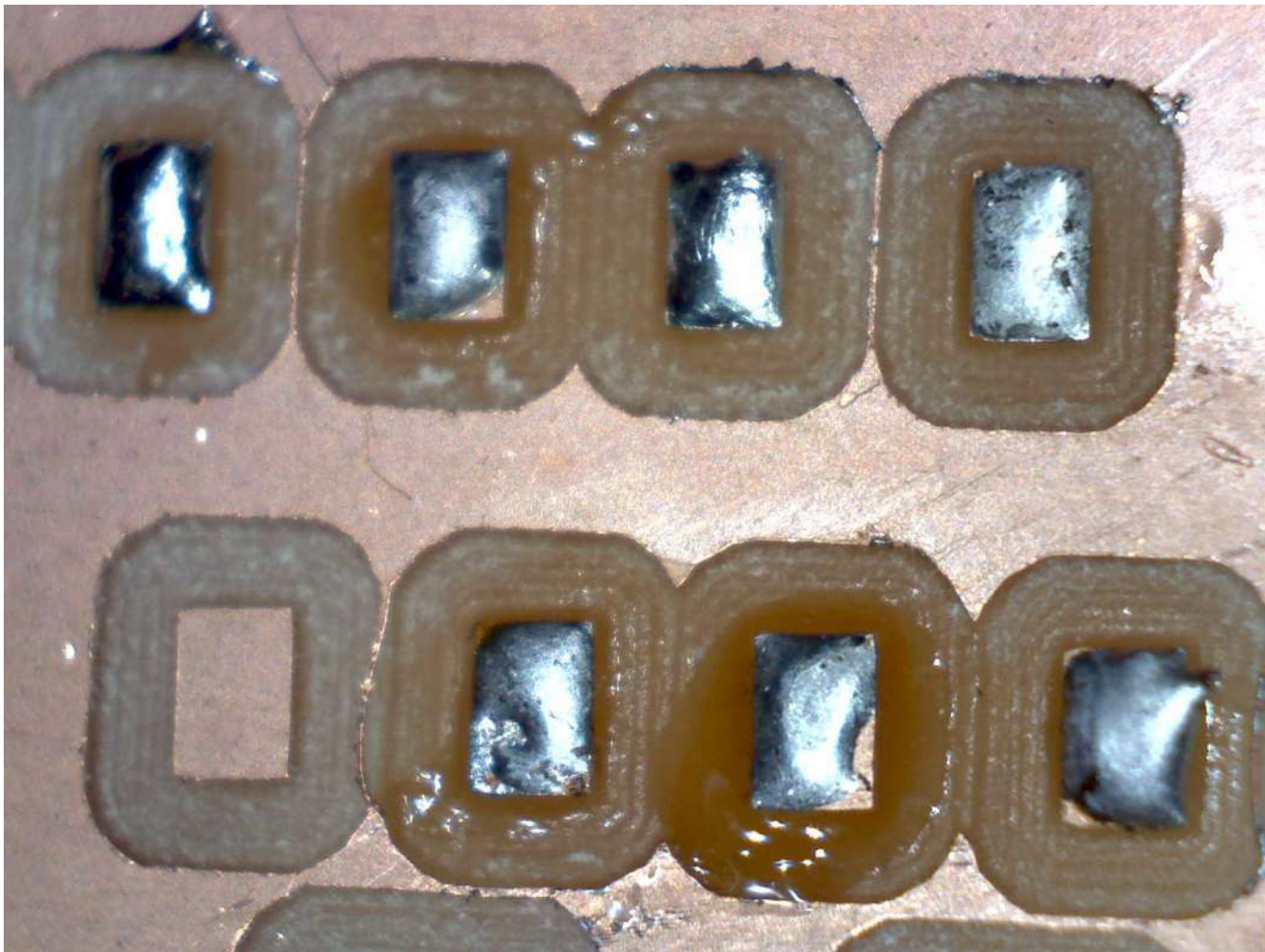
Sn96.5/Ag3.0/Cu0.5  
Tin/Silver/Copper

## 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. Some  
have temperature control  
and some don't. 25 watt  
iron minimum is  
recommended



By Weller® - Apex Tool Group



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## 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.



---

## Tip cleaners

To keep the soldering tip clean while soldering.

Use it after every use



---

## 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**<sup>®</sup>  
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)

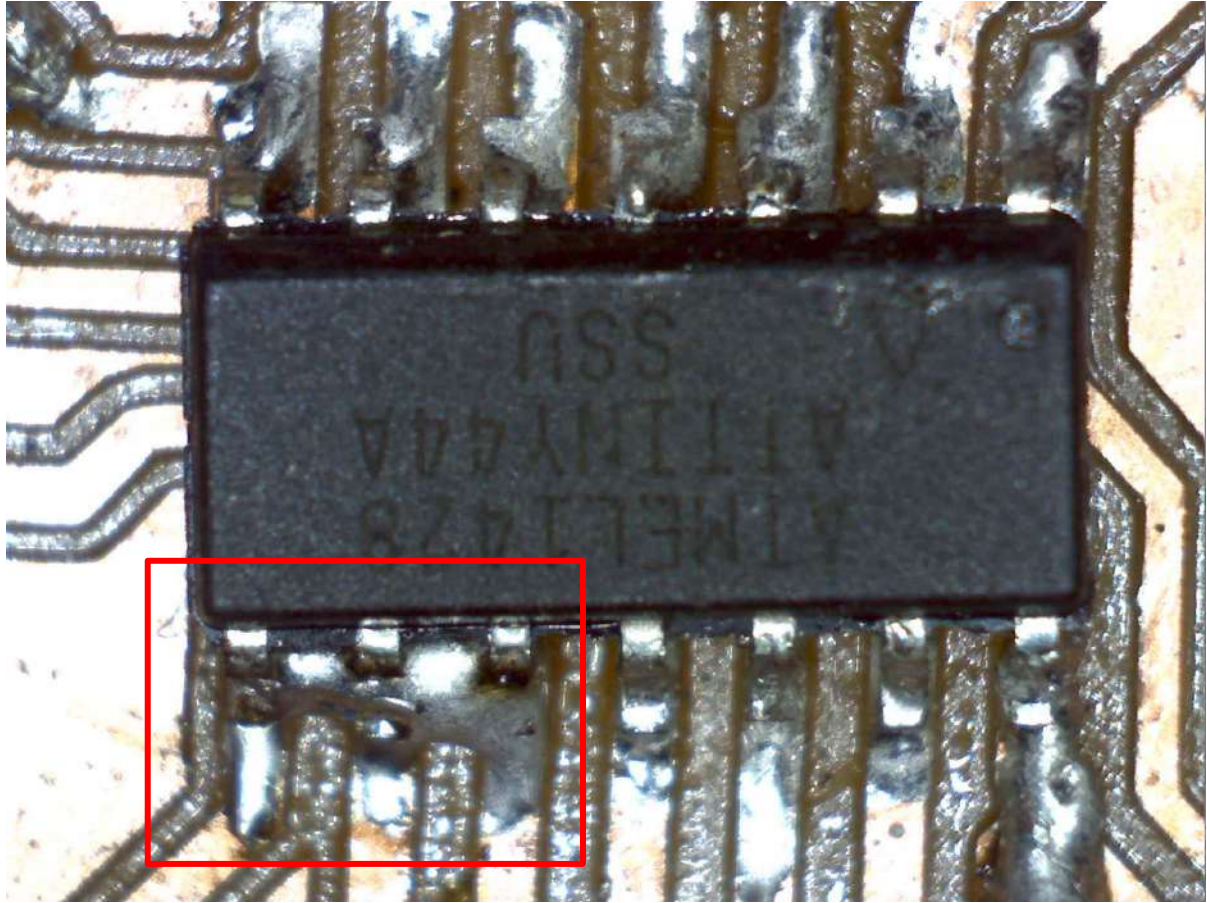
keeps your electronic board in place while you solder and helps you see your solder joints better





—  
**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





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

... BOARDS  
FOR SOLDERING  
ON CIRCUIT BOARDS  
... TRAM

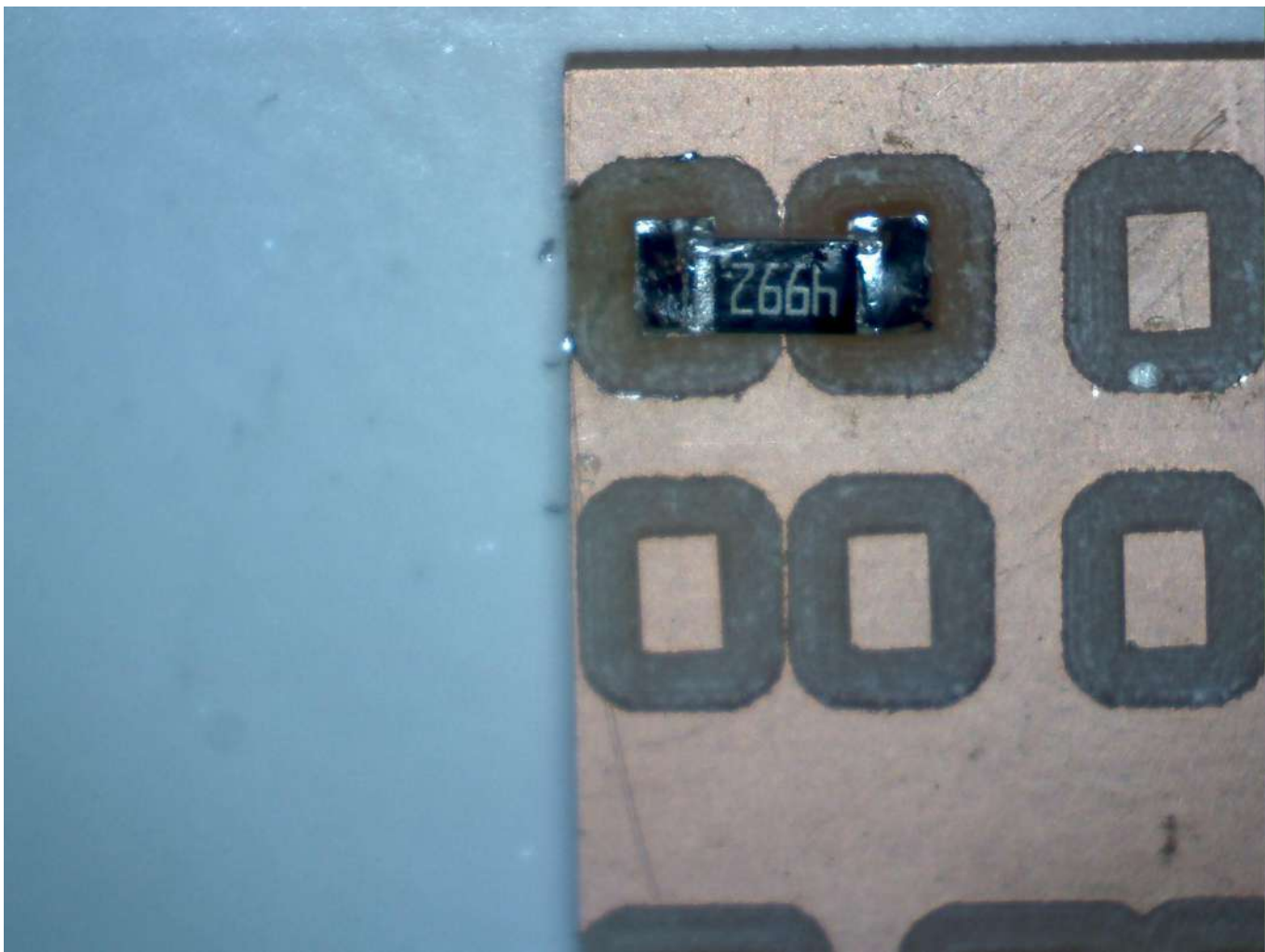
Where ideas become reality

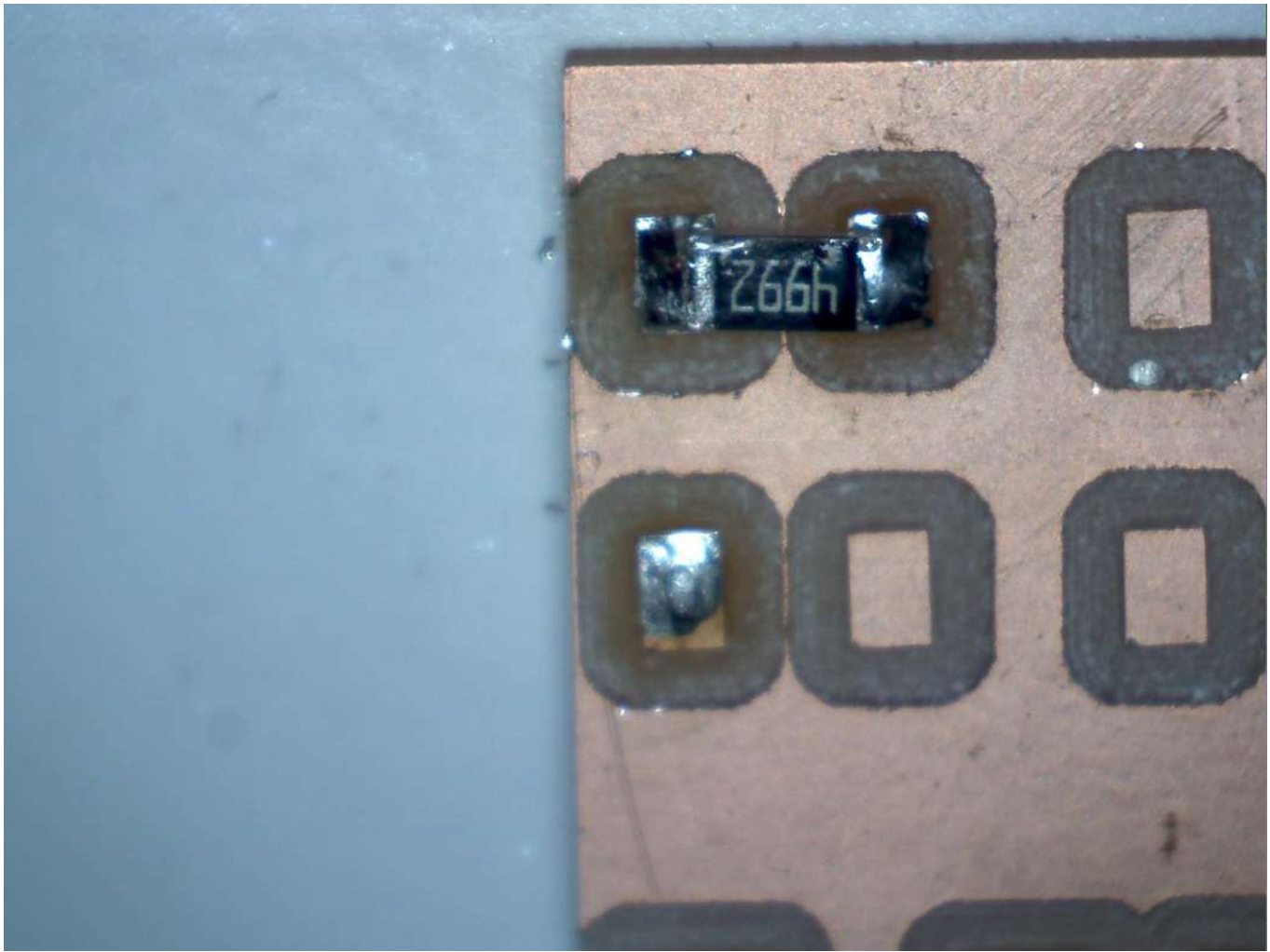


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# Soldering

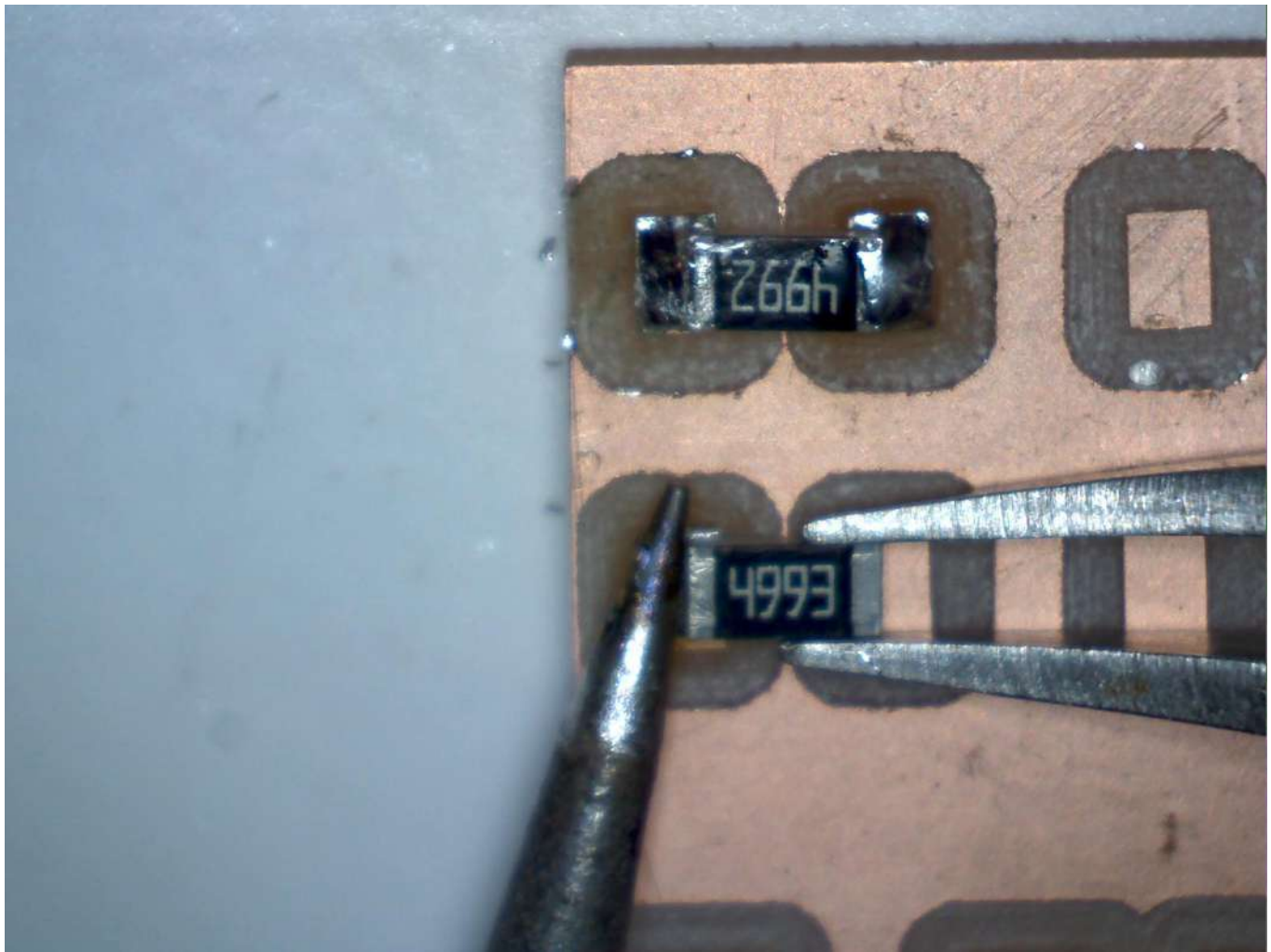
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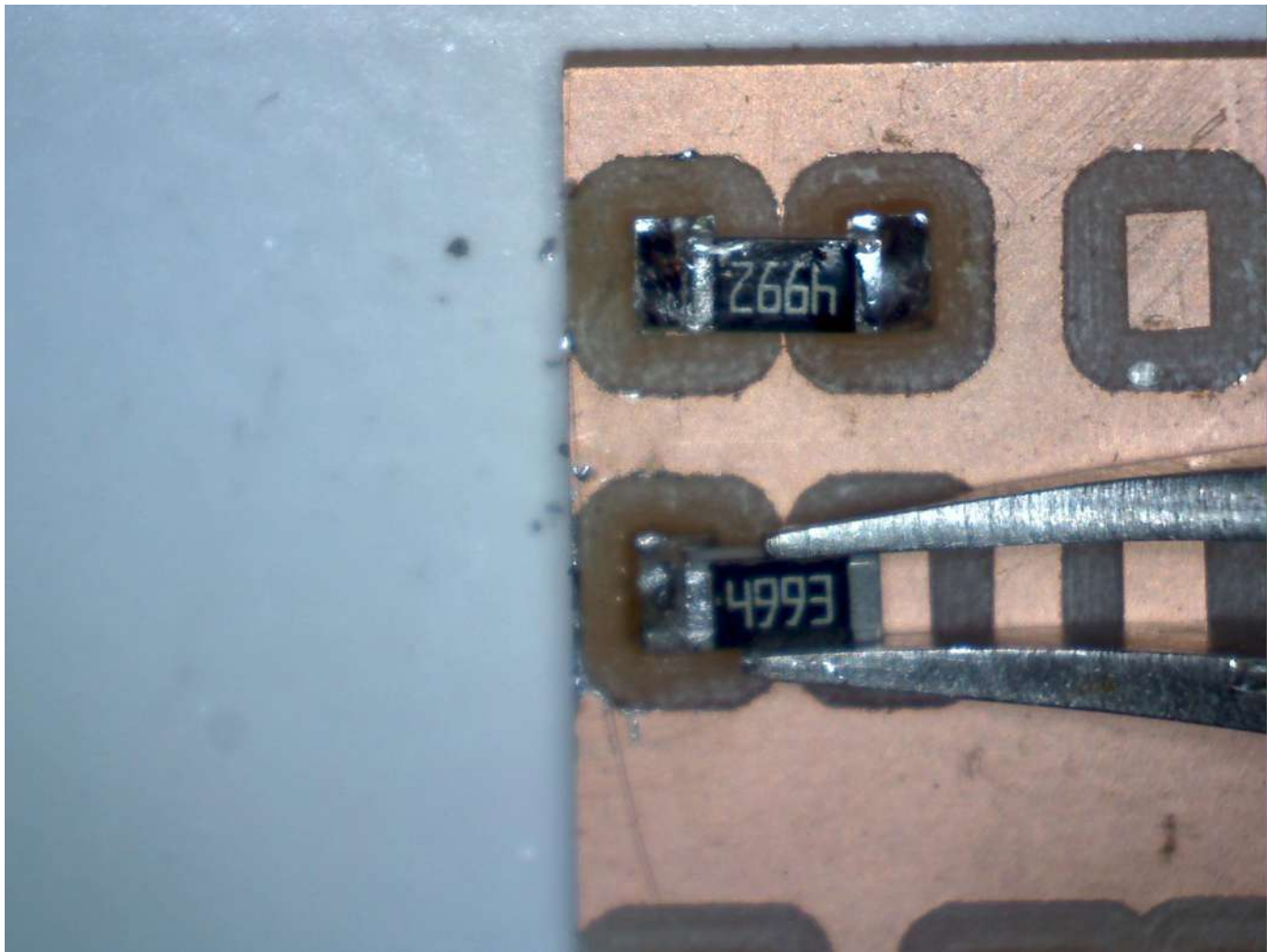


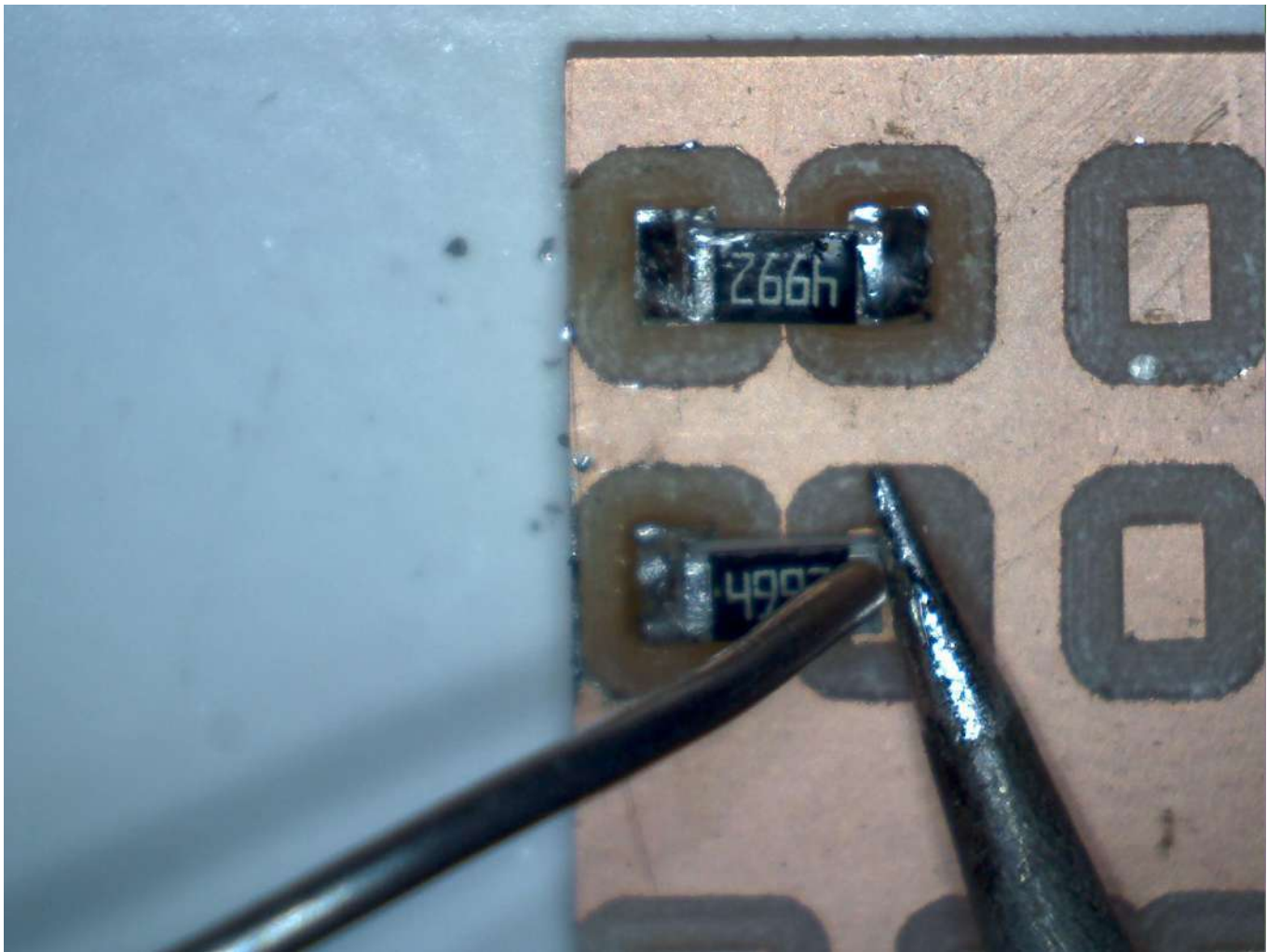


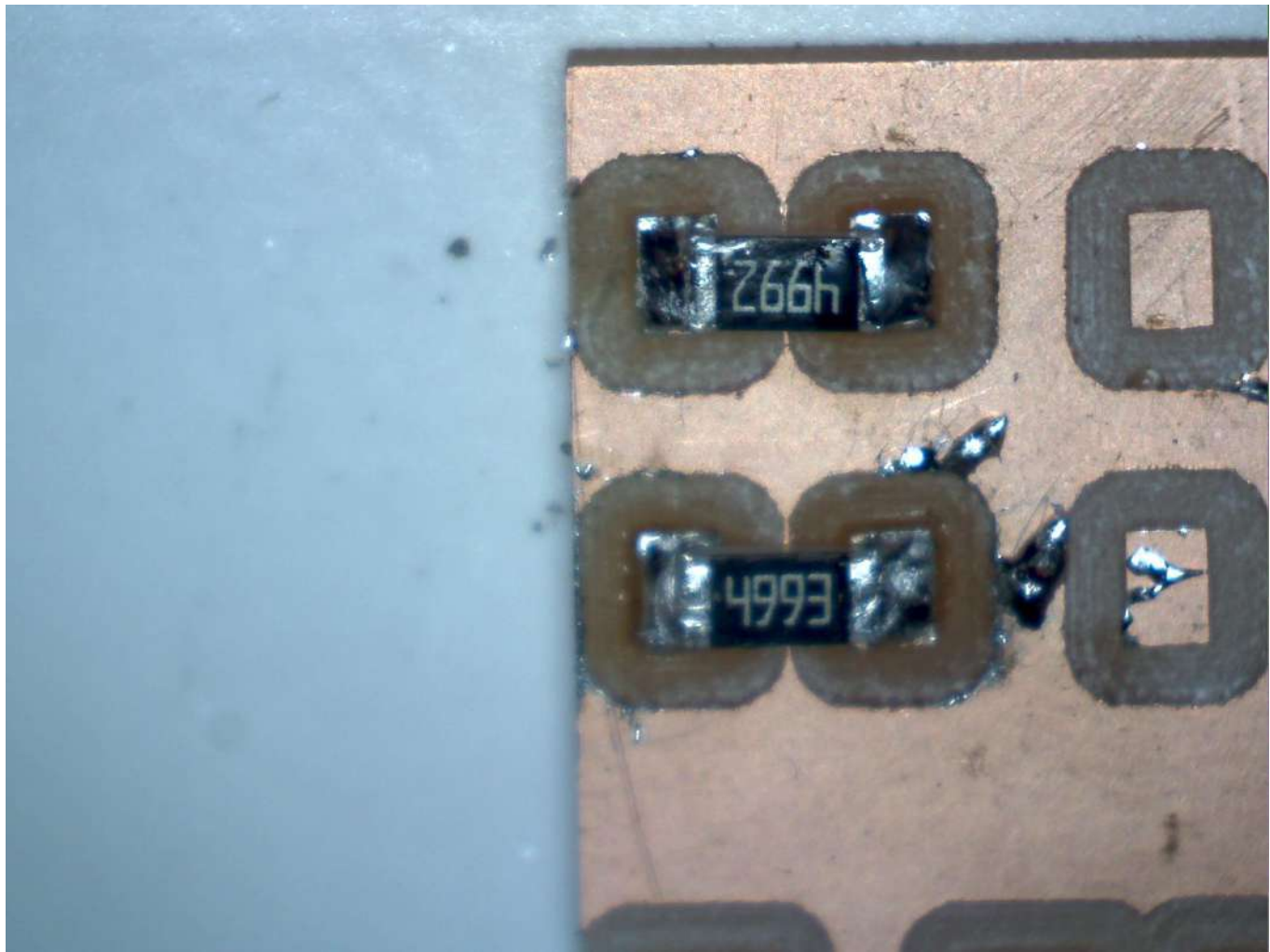
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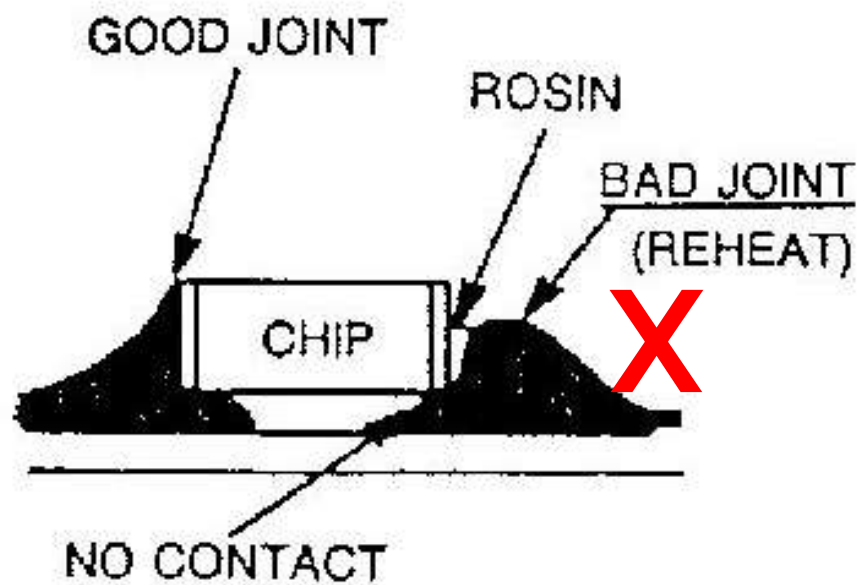


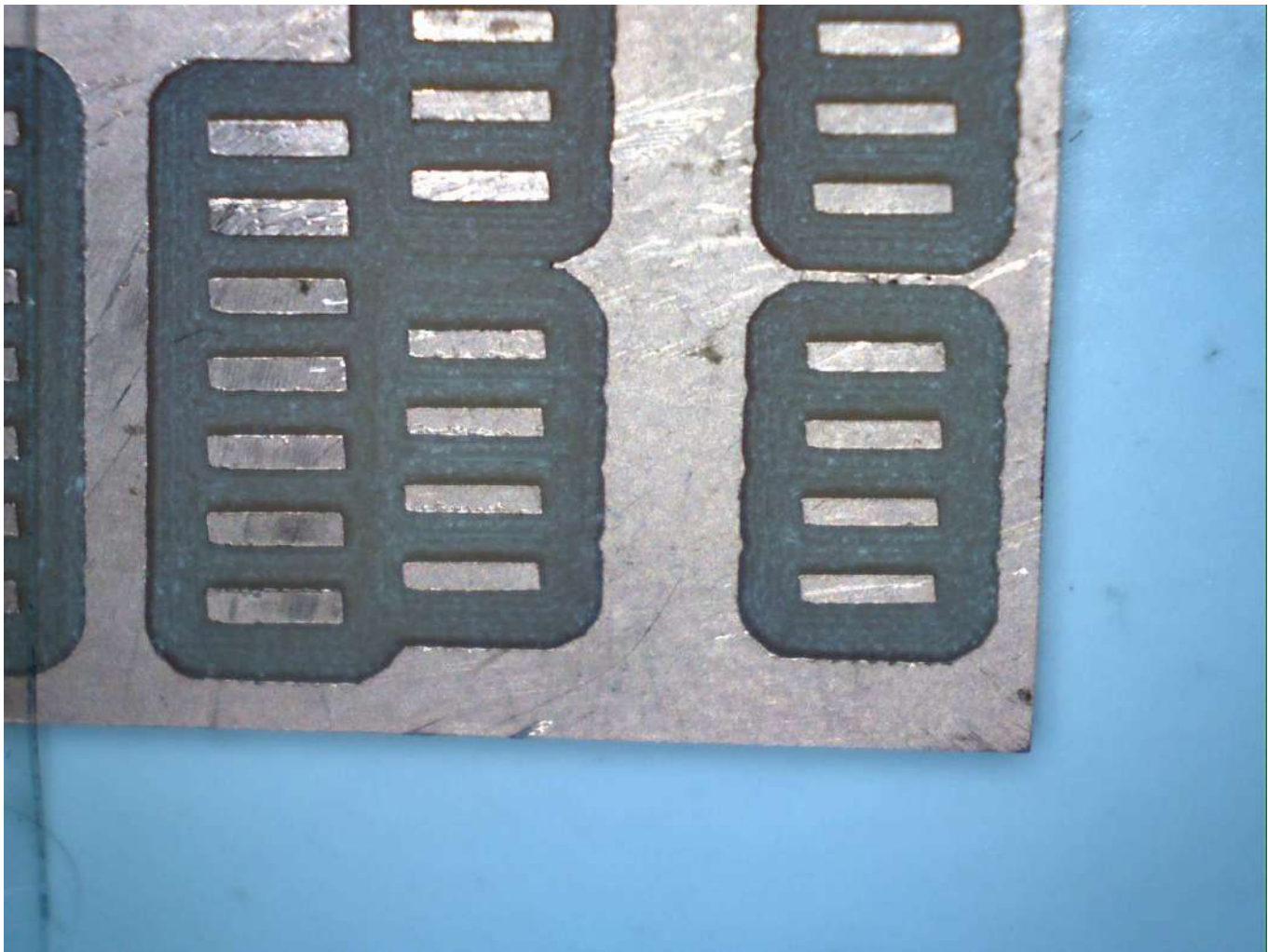


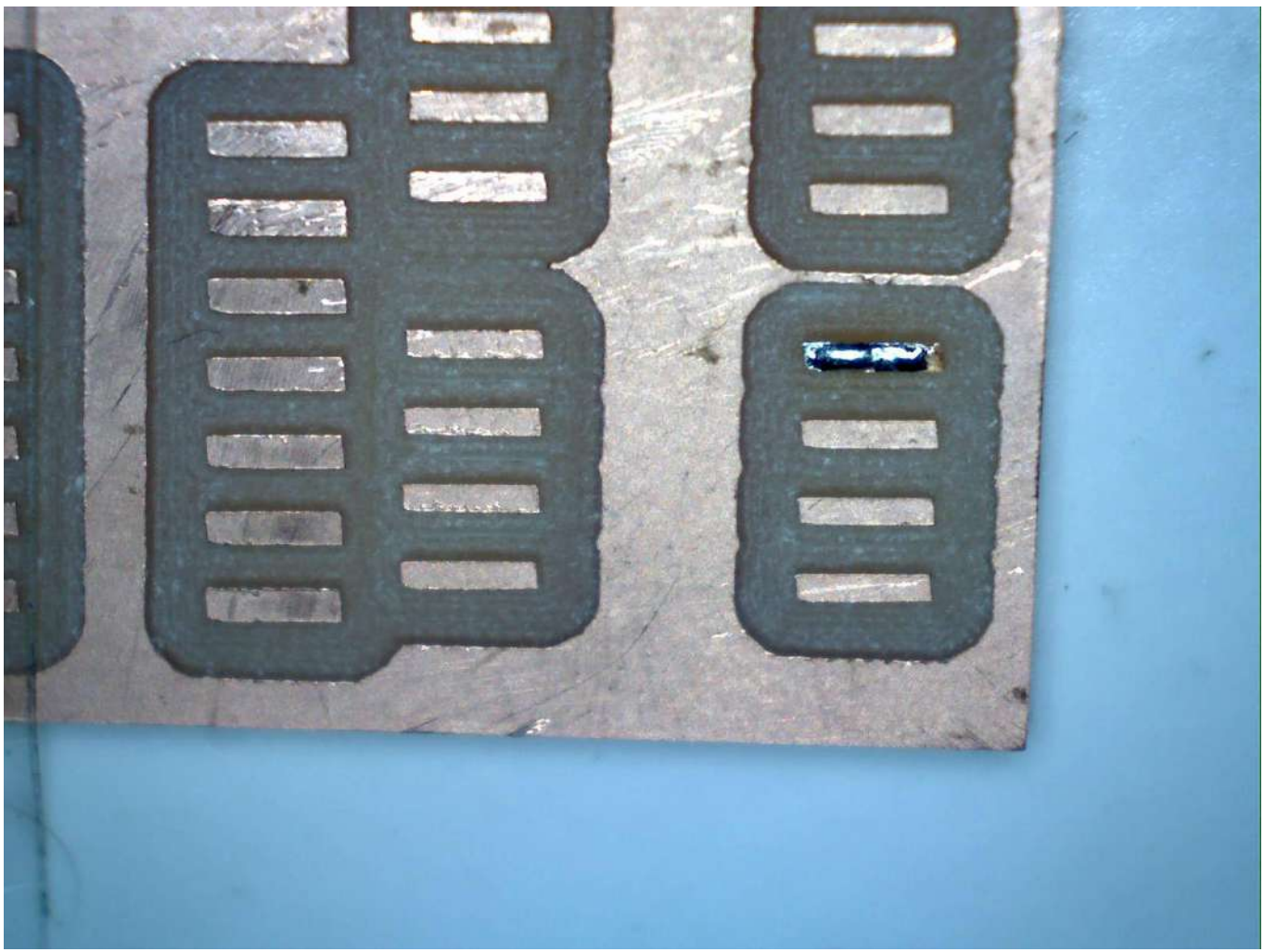


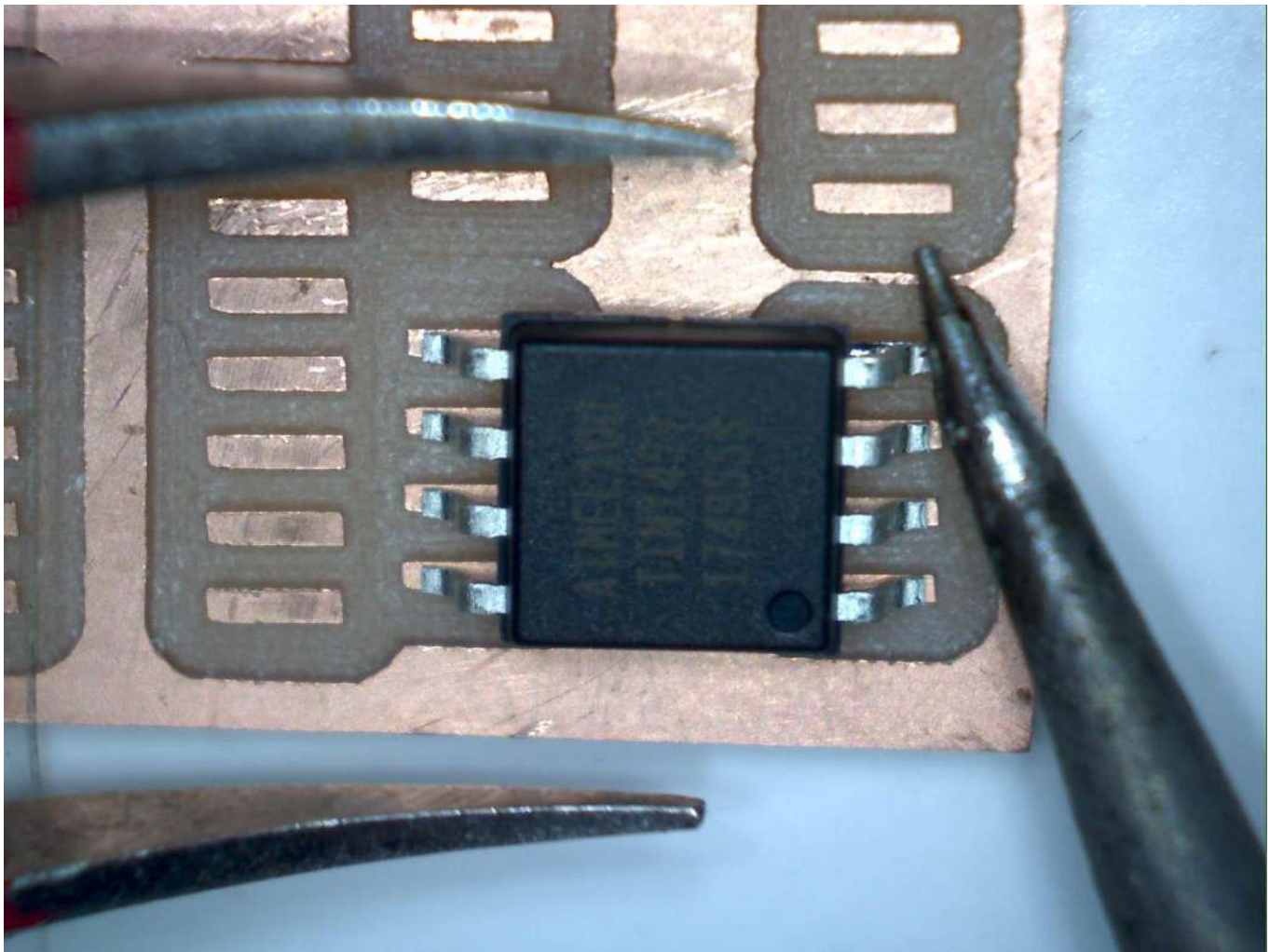




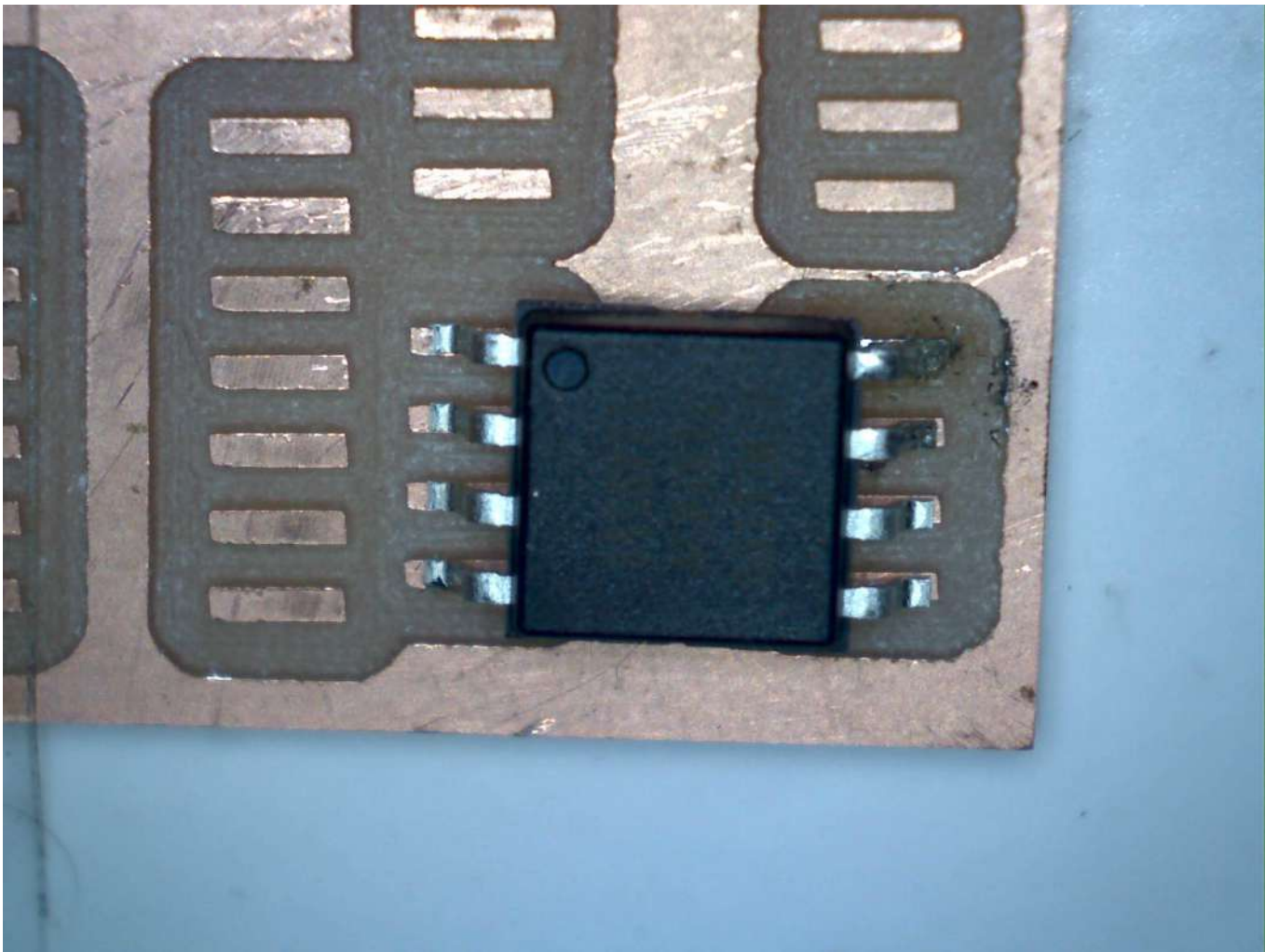


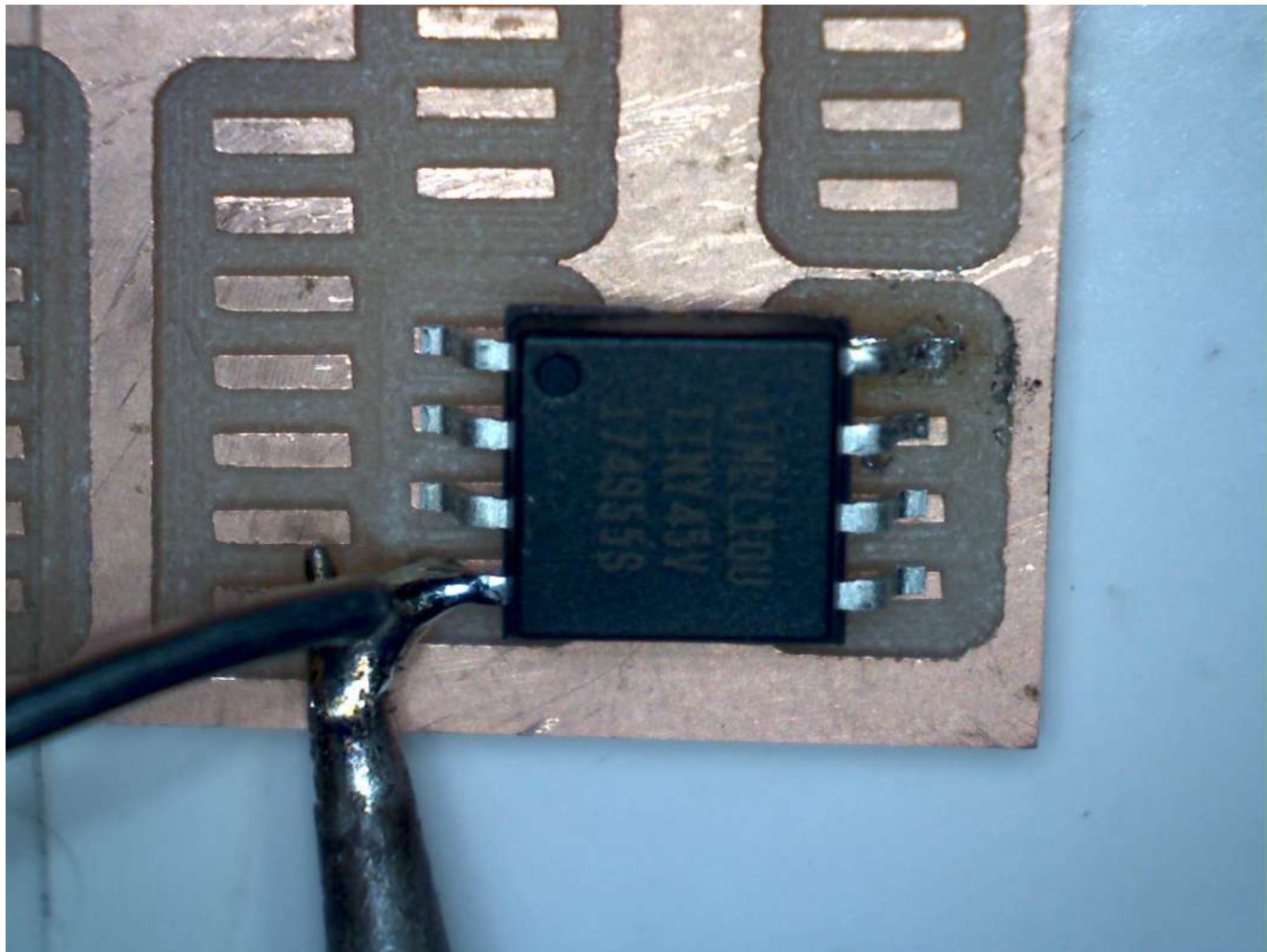


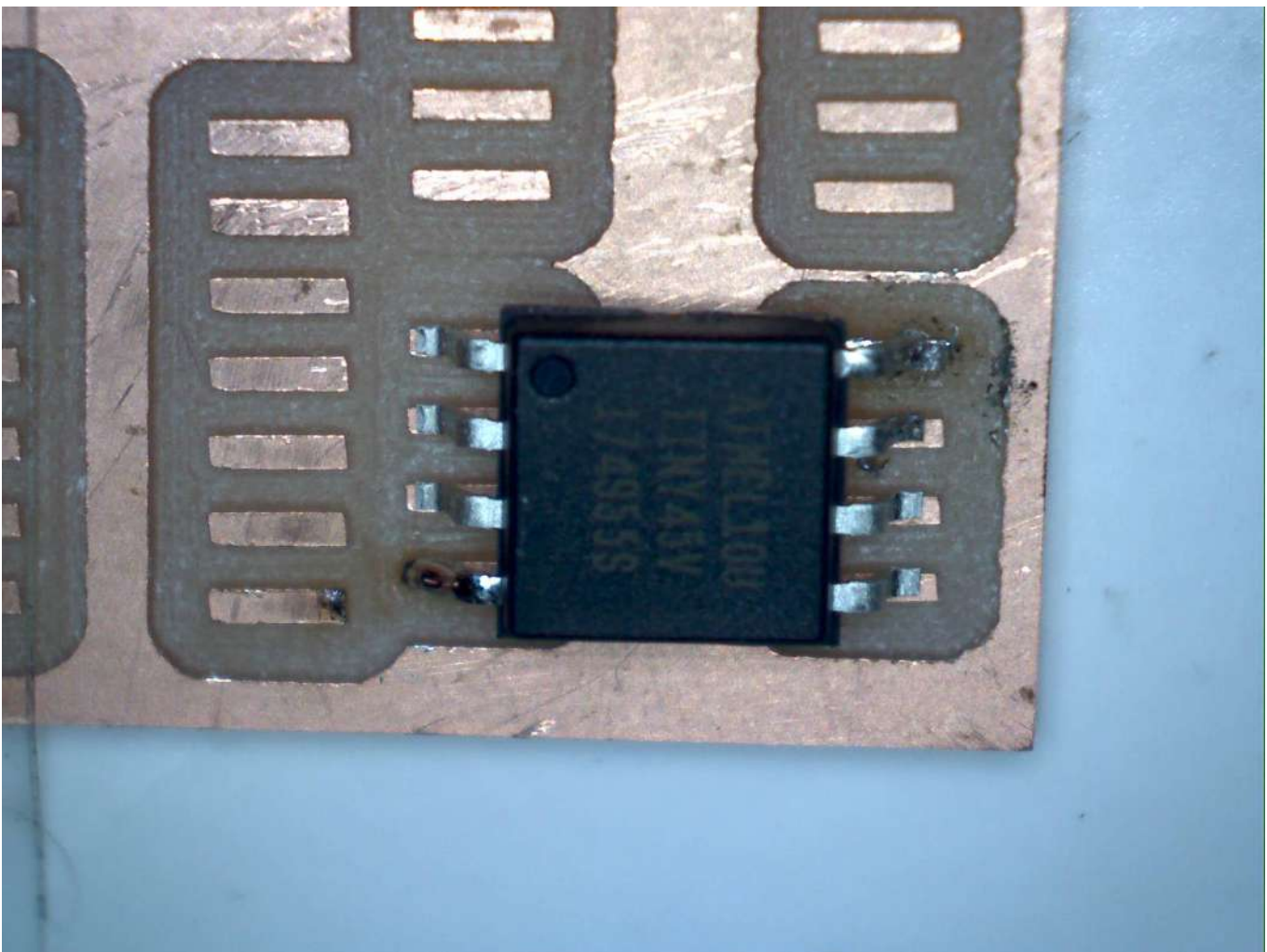


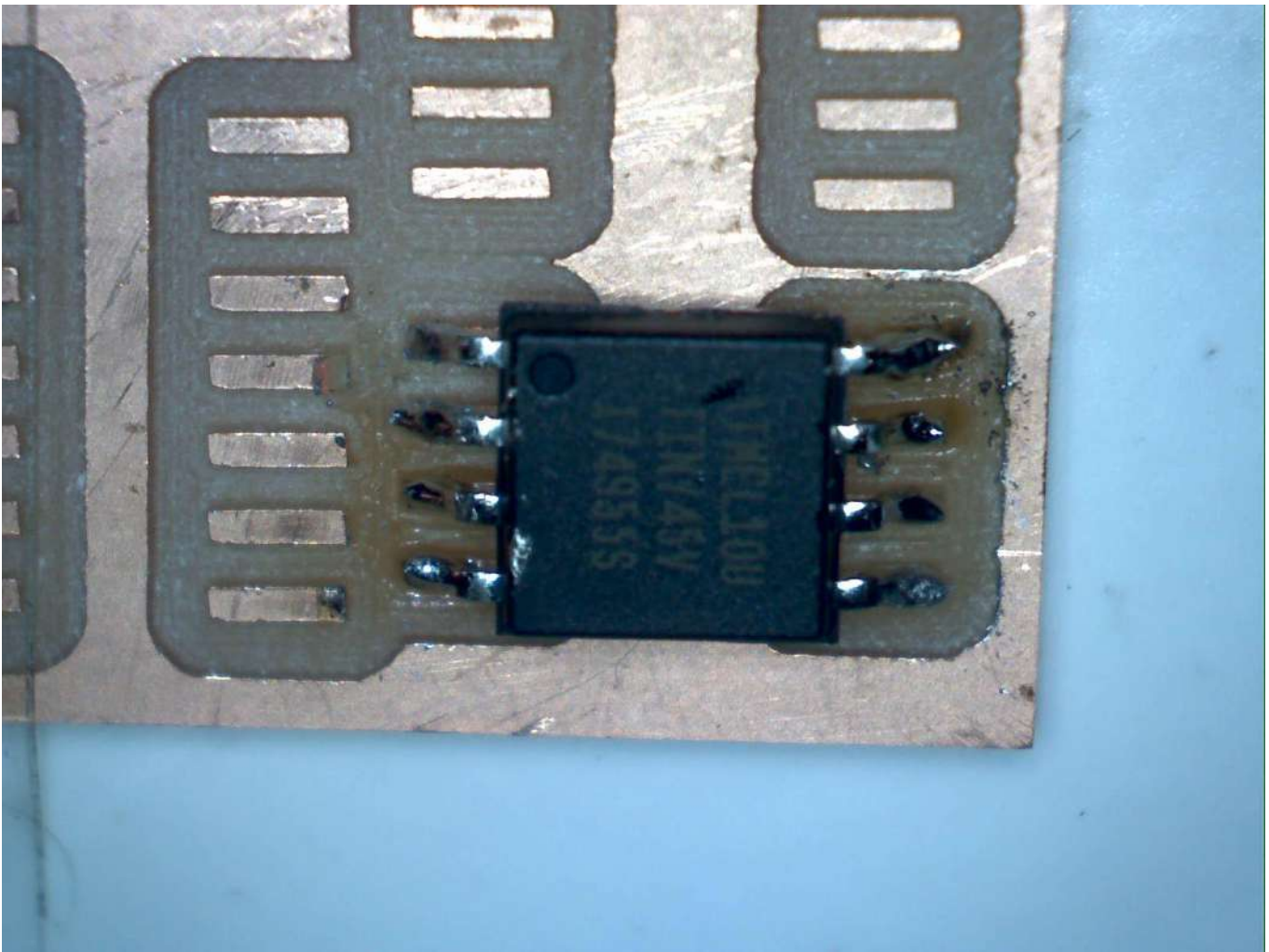


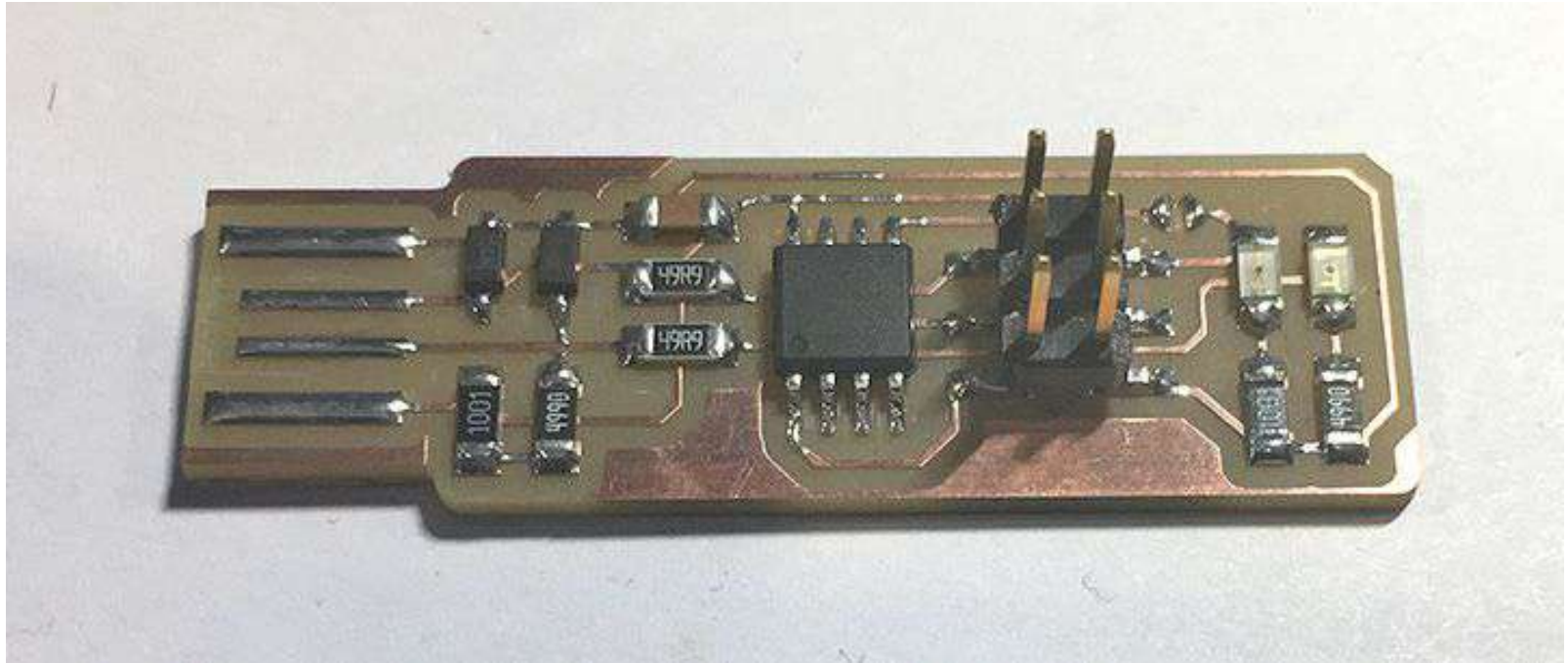










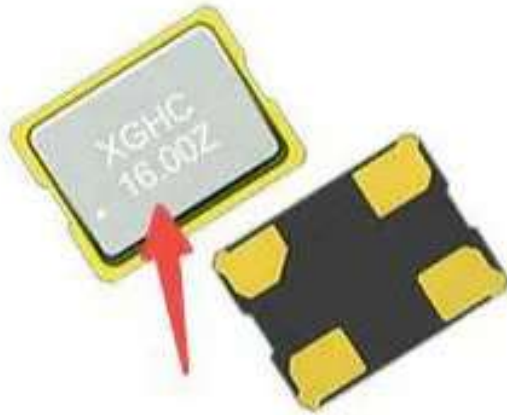


By Brian: <http://fab.cba.mit.edu/classes/863.16/doc/projects/ftsmin/index.html>

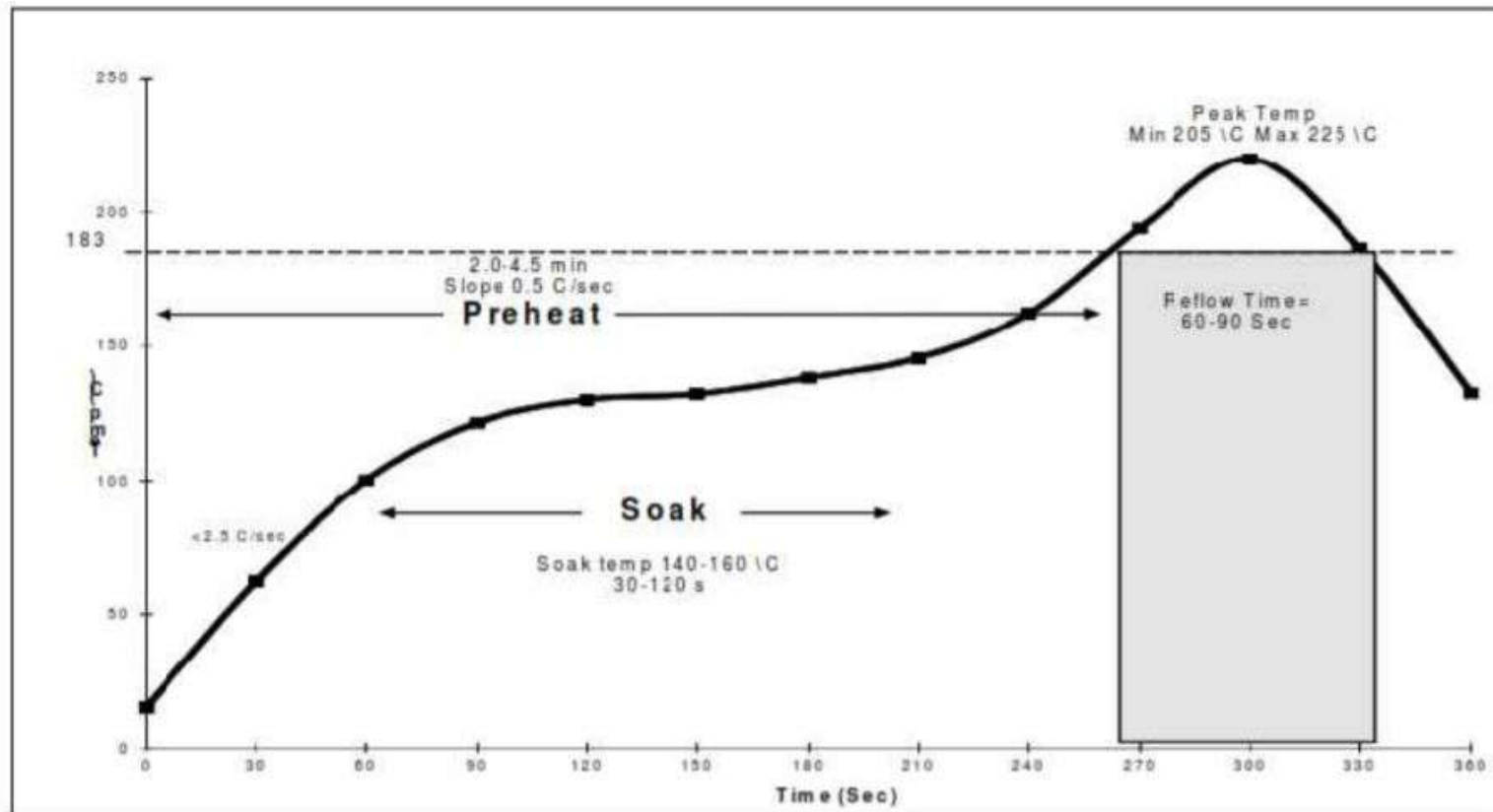
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# Reflow soldering

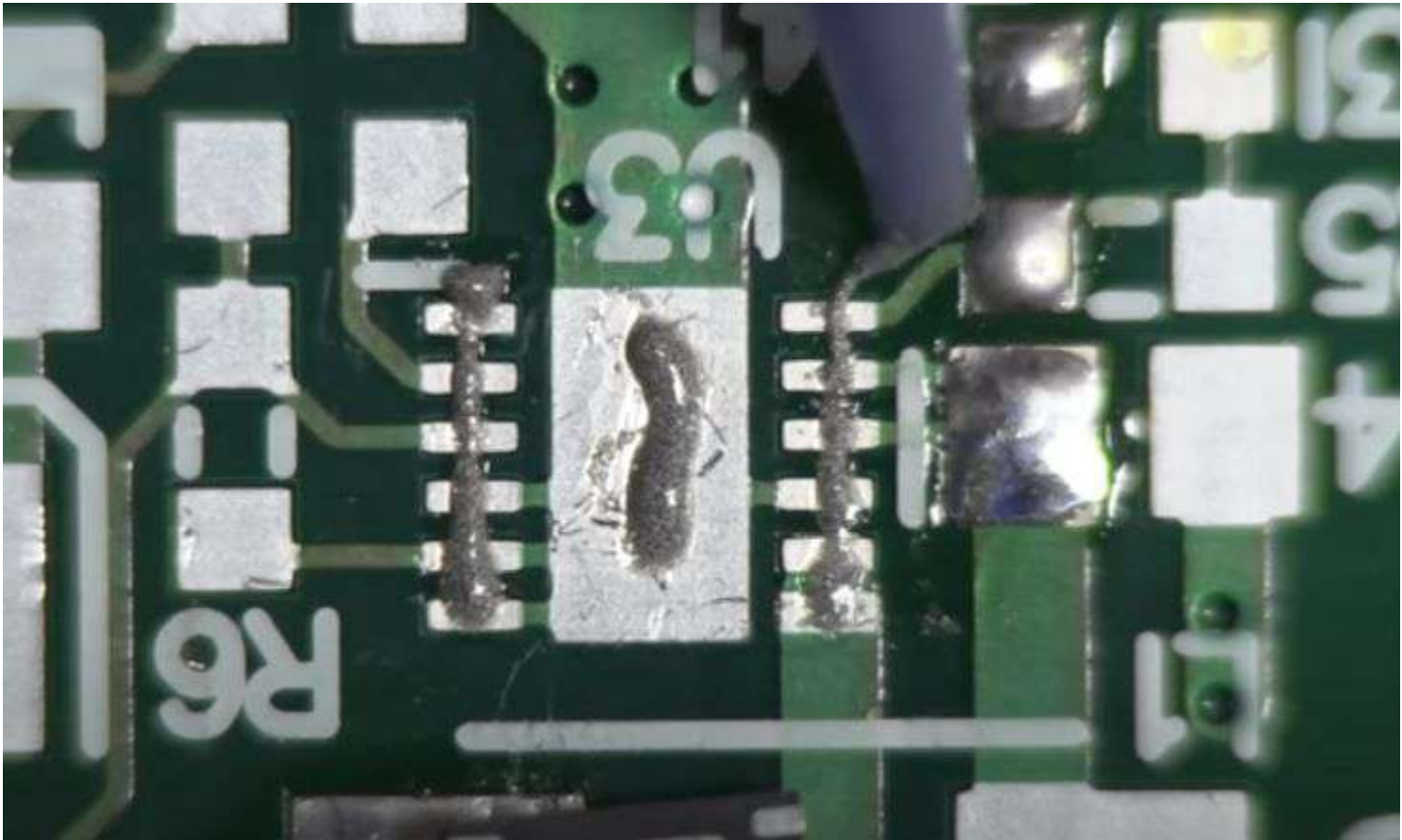
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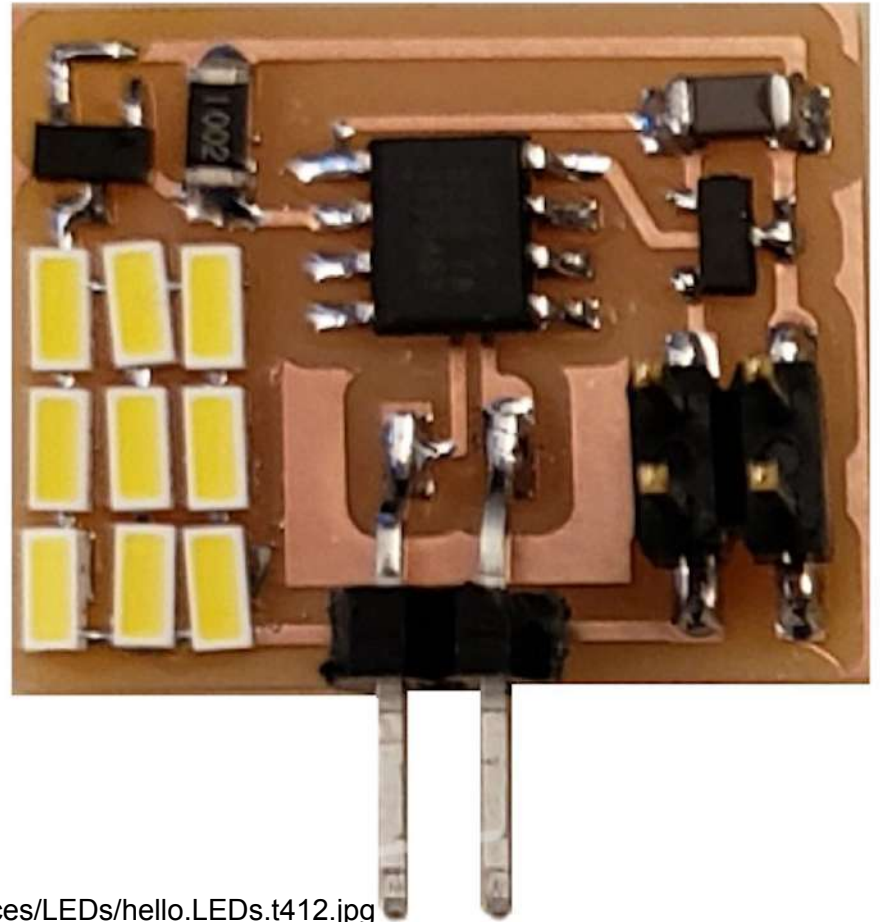
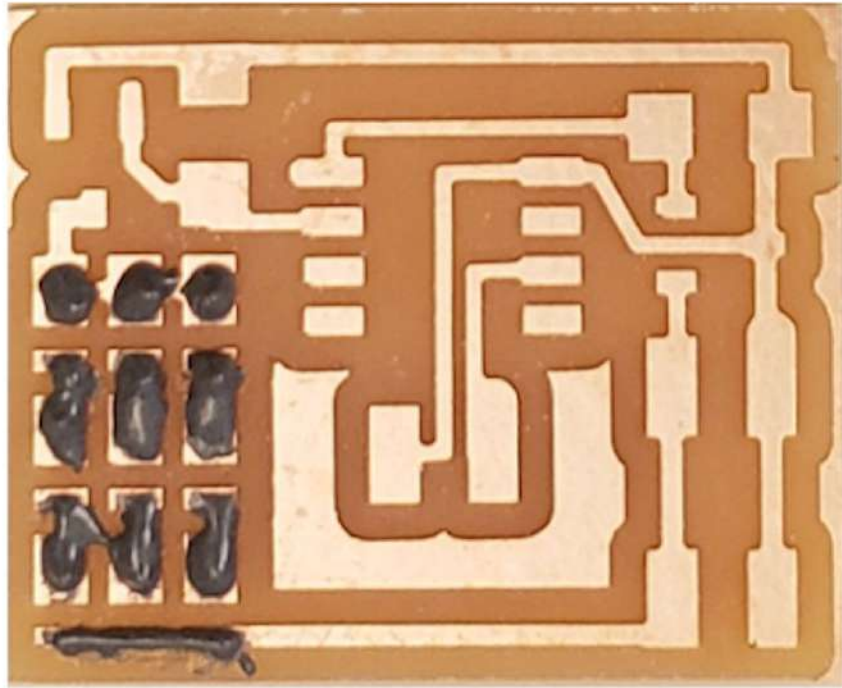


By: <https://leadsintec.com/how-to-identify-smd-components-fast-and-easy-from-appearances/>









By Neil Gershenfeld: [http://academy.cba.mit.edu/classes/output\\_devices/LEDs/hello.LEDs.t412.jpg](http://academy.cba.mit.edu/classes/output_devices/LEDs/hello.LEDs.t412.jpg)







Picture from: <https://www.amazon.com/TOAUTO-Soldering-Conversion-Temperature-Correction/dp/B08L8YGYQZ?th=1>

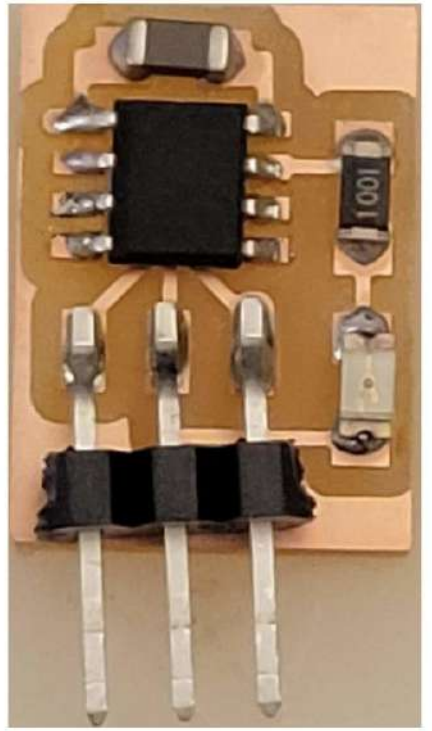
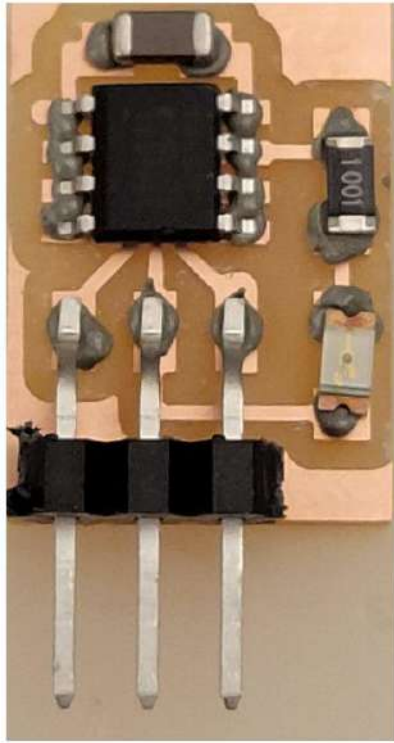
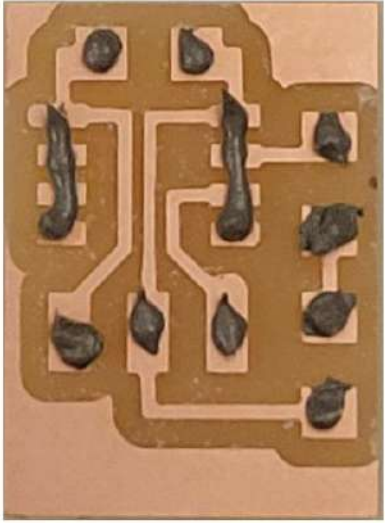


*Image shown is a representation only. Exact specifications should be obtained from the product data sheet.*

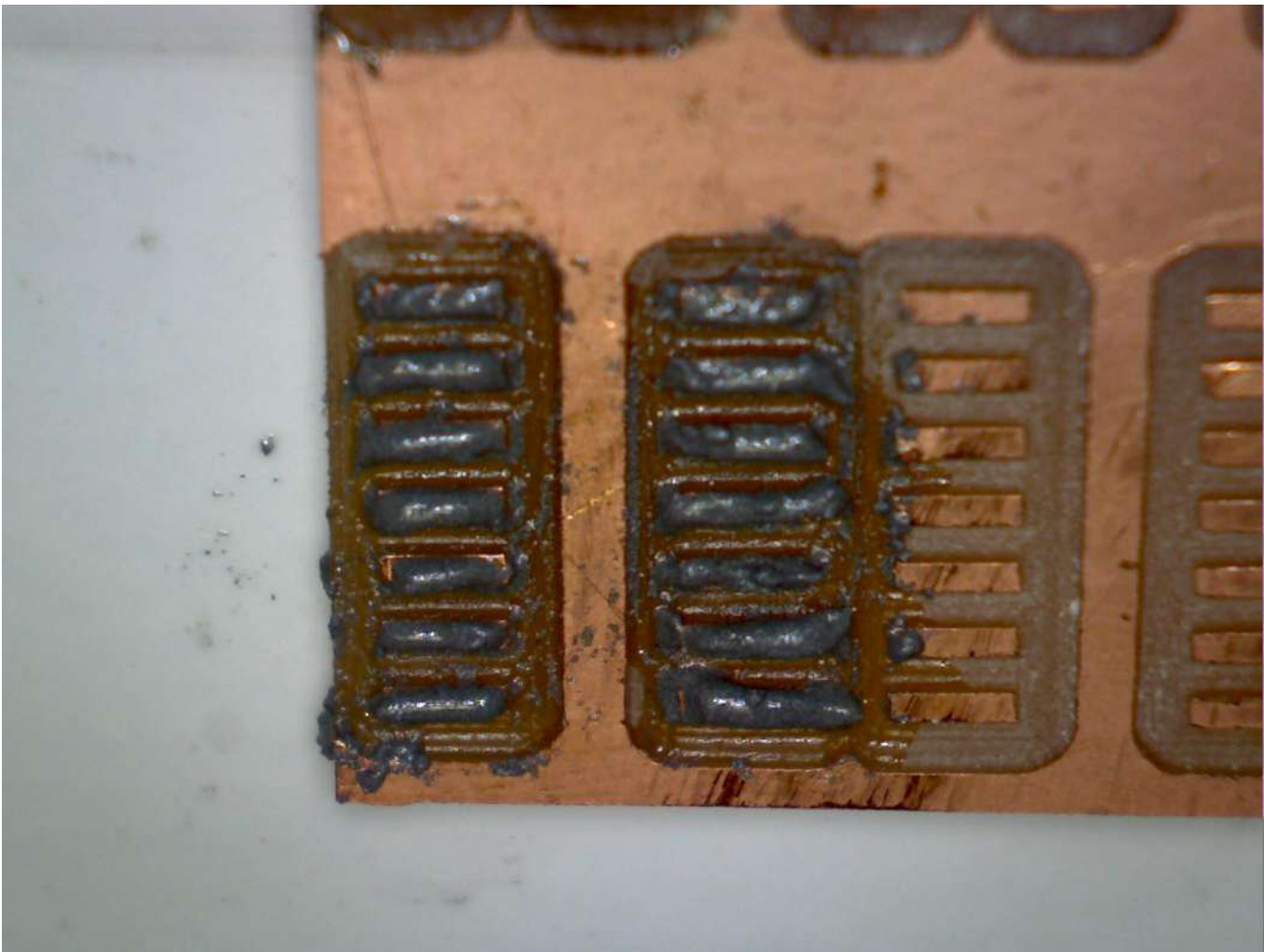
## TS391SNL

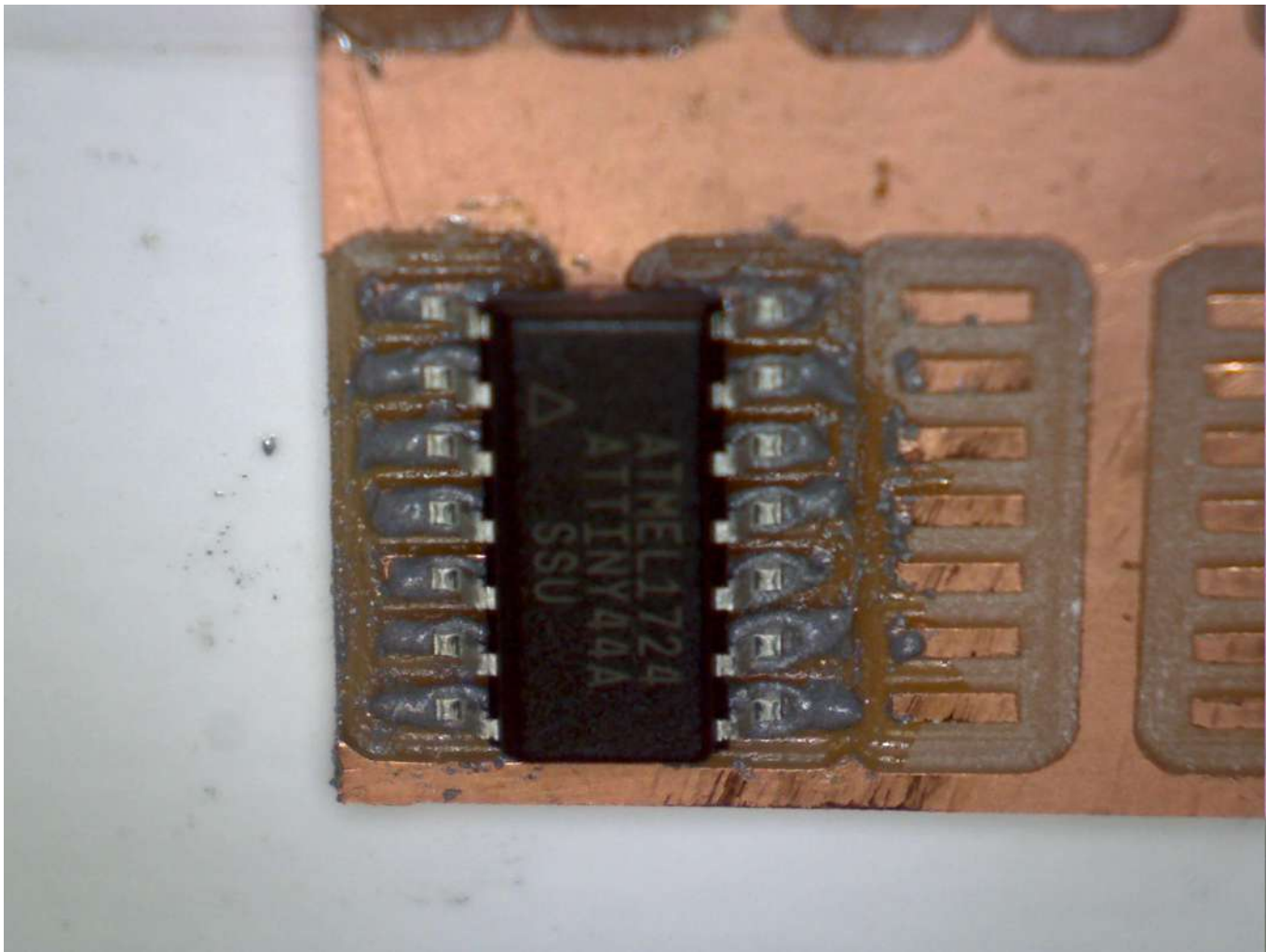
<b>Digi-Key Part Number</b>	TS391SNL-ND
<b>Manufacturer</b>	Chip Quik Inc.
<b>Manufacturer Product Number</b>	TS391SNL
<b>Supplier</b>	<a href="#">Chip Quik Inc.</a>
<b>Description</b>	THERMALLY STABLE SOLDER PASTE NO
<b>Manufacturer Standard Lead Time</b>	3 Weeks
<b>Detailed Description</b>	Lead Free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

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

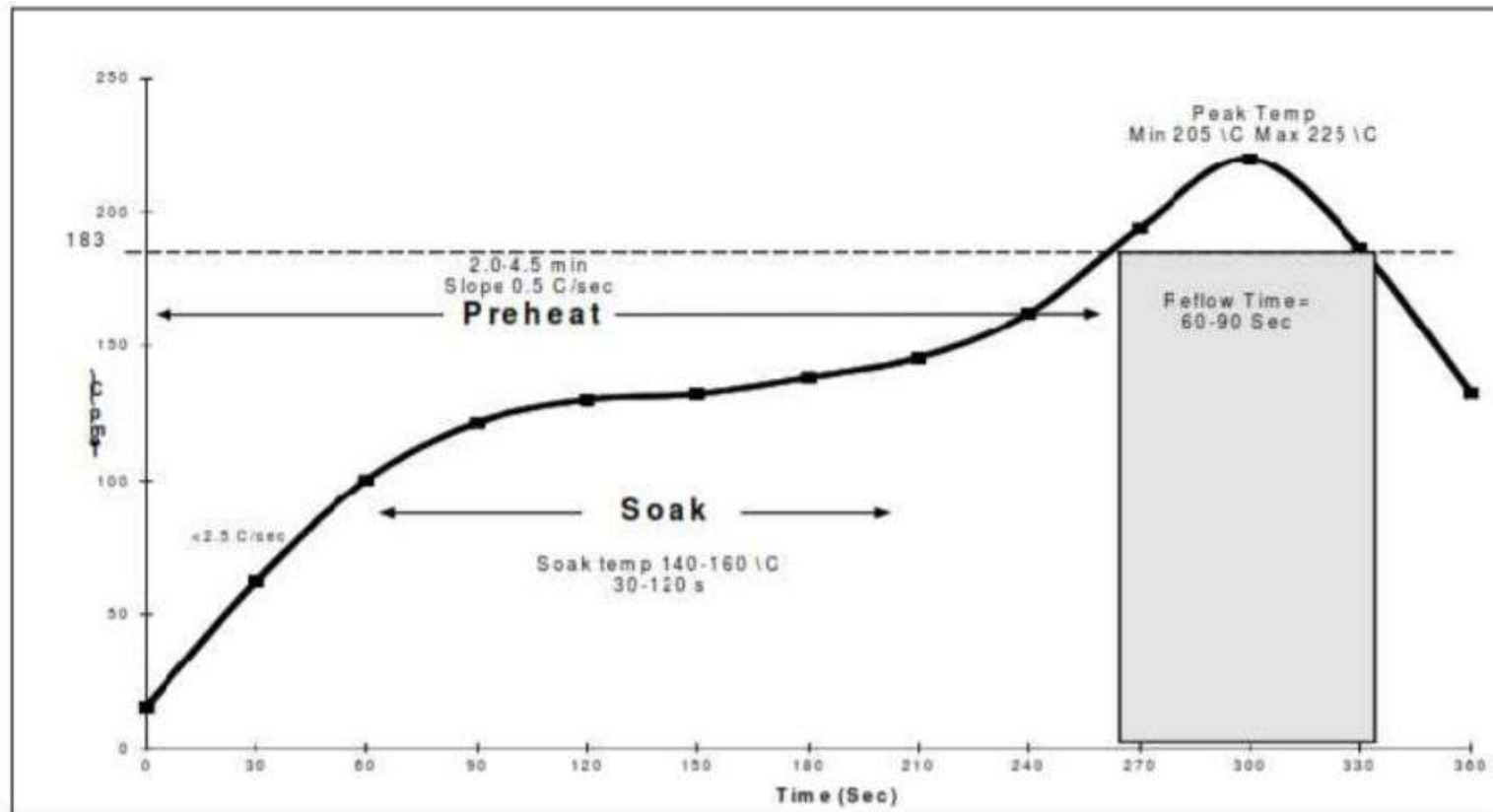




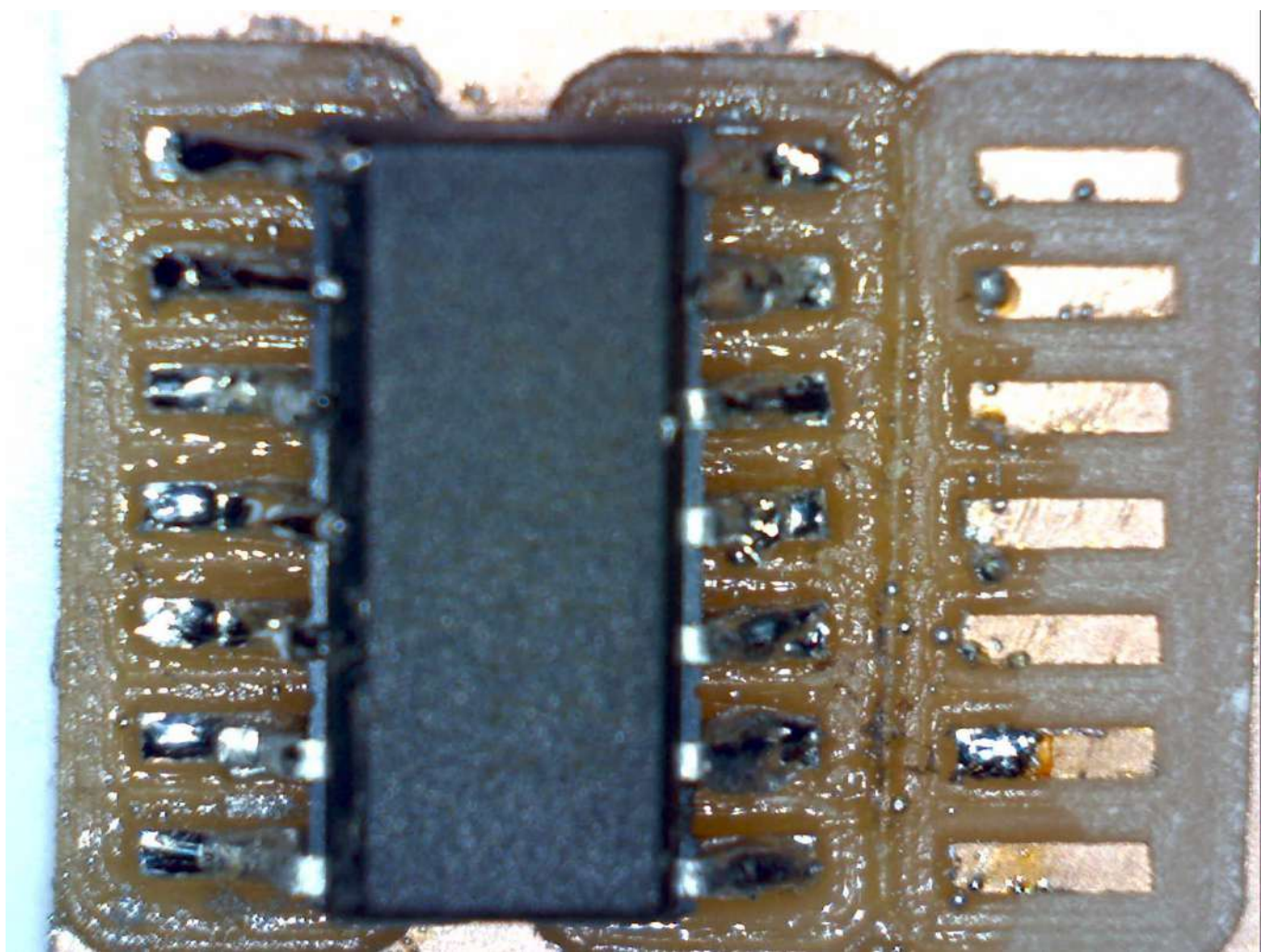




ATMEL1724  
ATTINY44A  
SSU

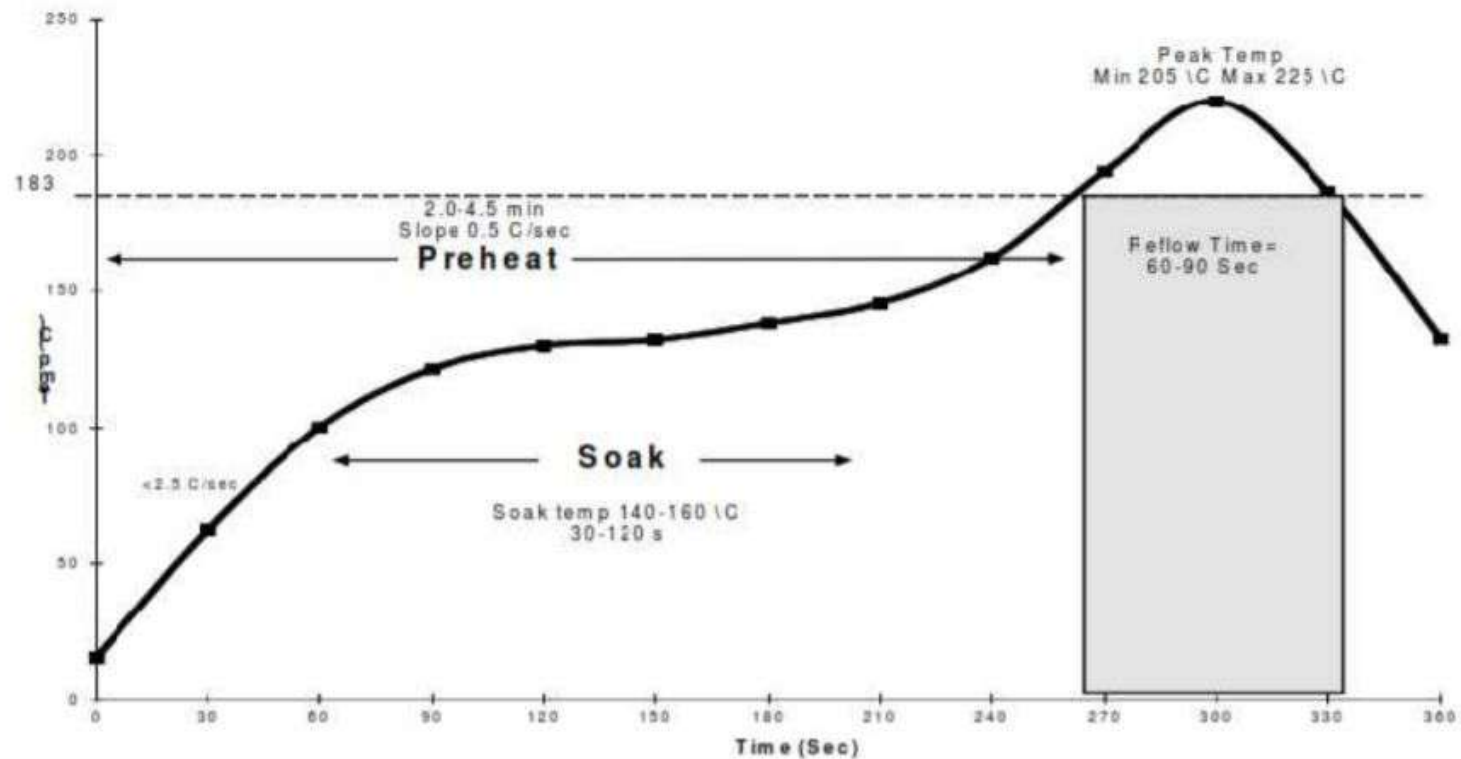


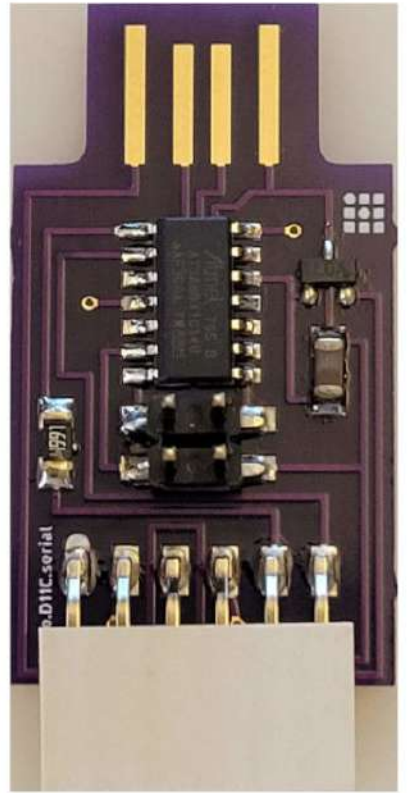
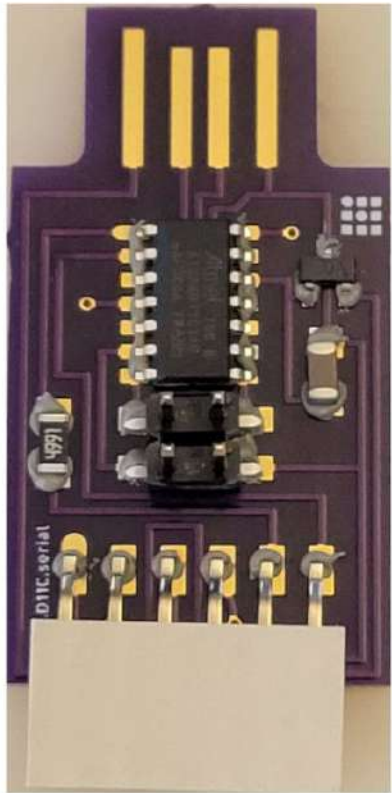
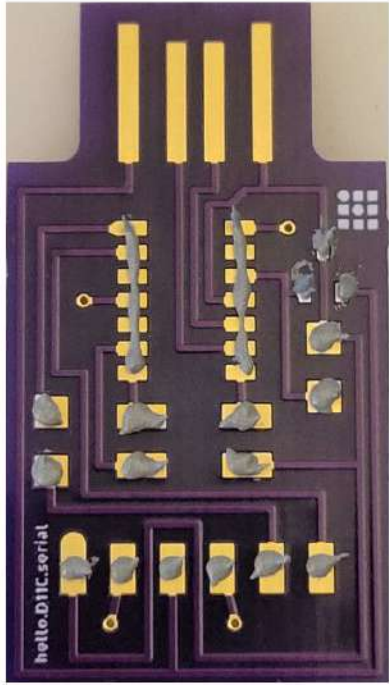






Picture from: <https://www.amazon.com/SainSmart-Soldering-Preheating-Preheater-Intelligent/dp/B08R6XFPKR?th=1>





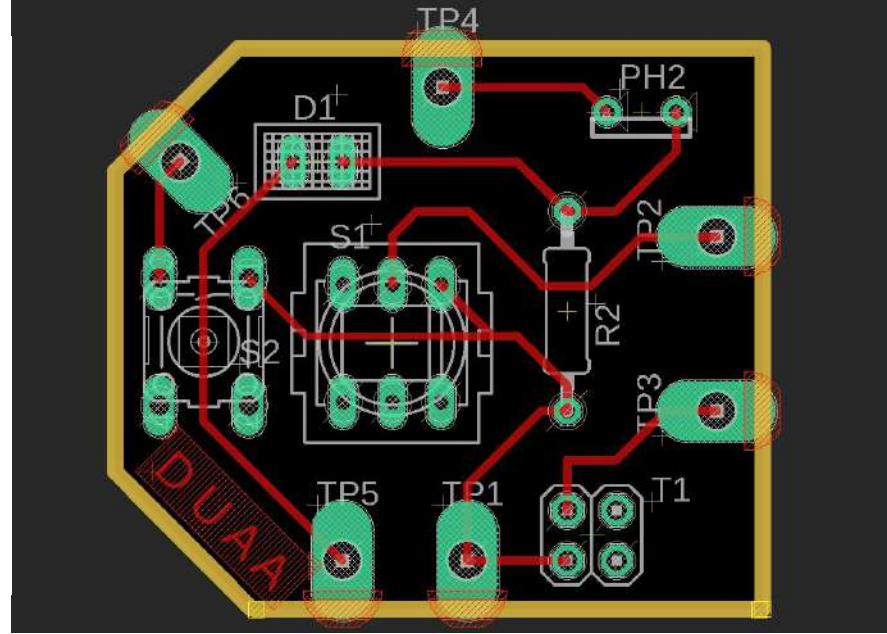
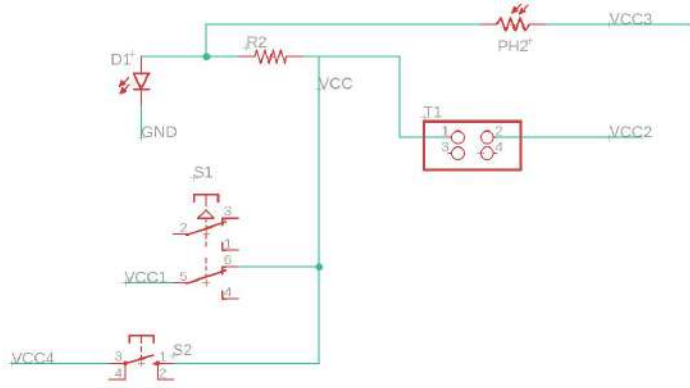
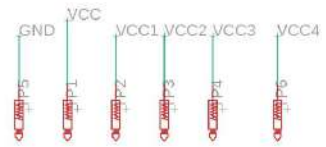
By Neil Gershenfeld: [http://academy.cba.mit.edu/classes/electronics\\_production/hotplate.jpg](http://academy.cba.mit.edu/classes/electronics_production/hotplate.jpg)



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**What to solder where?**

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Diode



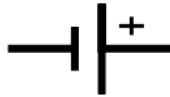
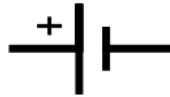
Capacitor



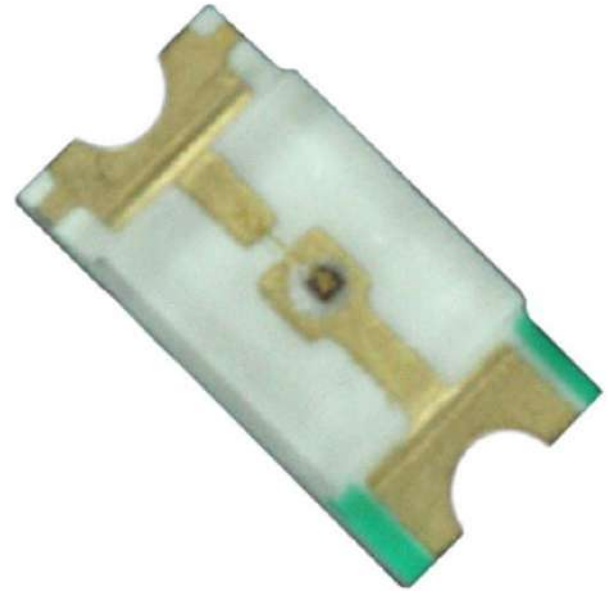
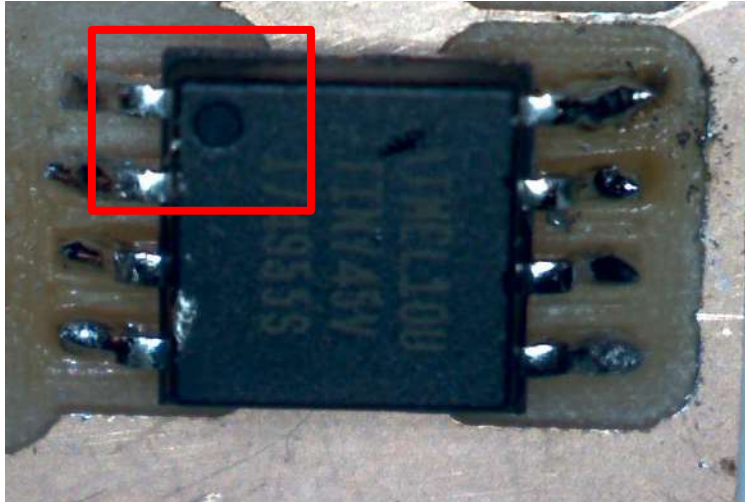
Inductor



Resistor



DC voltage  
source

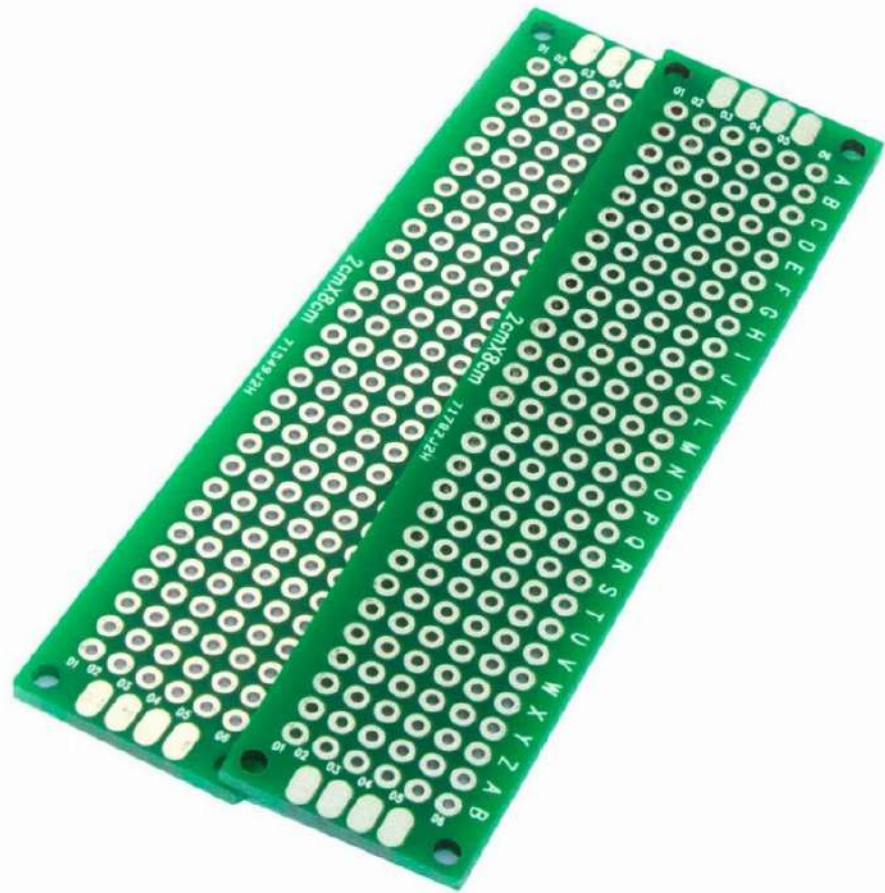


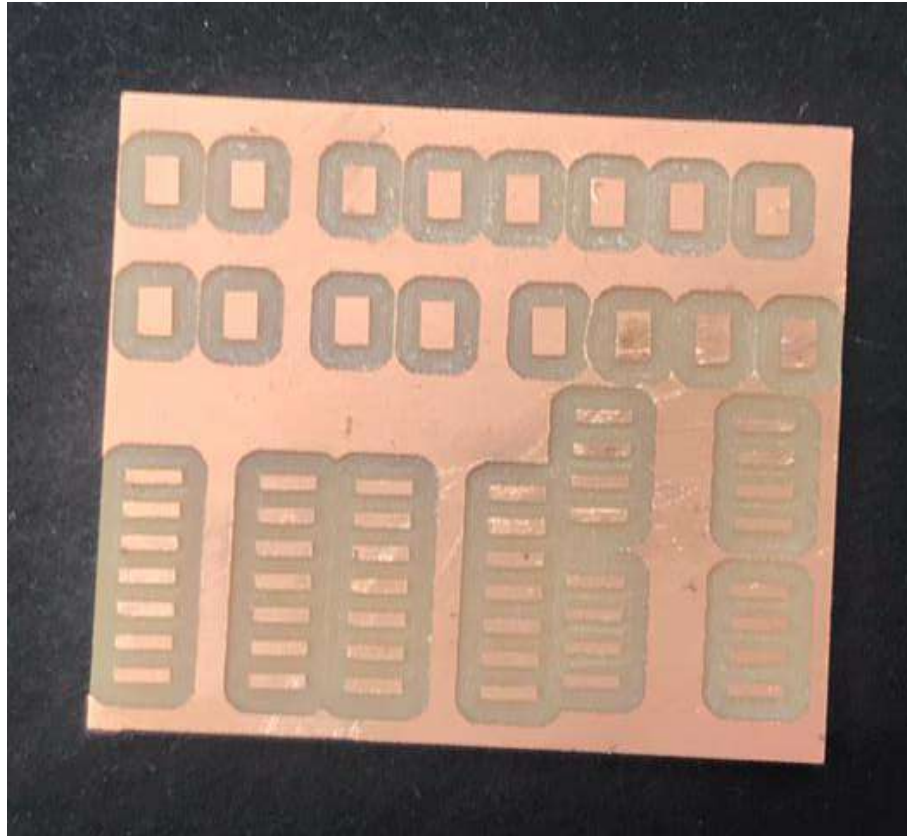
<https://www.digikey.com/en/products/detail/dialight/5990230007F/9385417>

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**How to get better**

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

T-BOARDS  
FOR SOLDERING  
ON CIRCUIT BOARDS  
GRAM

Where ideas become reality

Orange card with a white arrow pointing right.