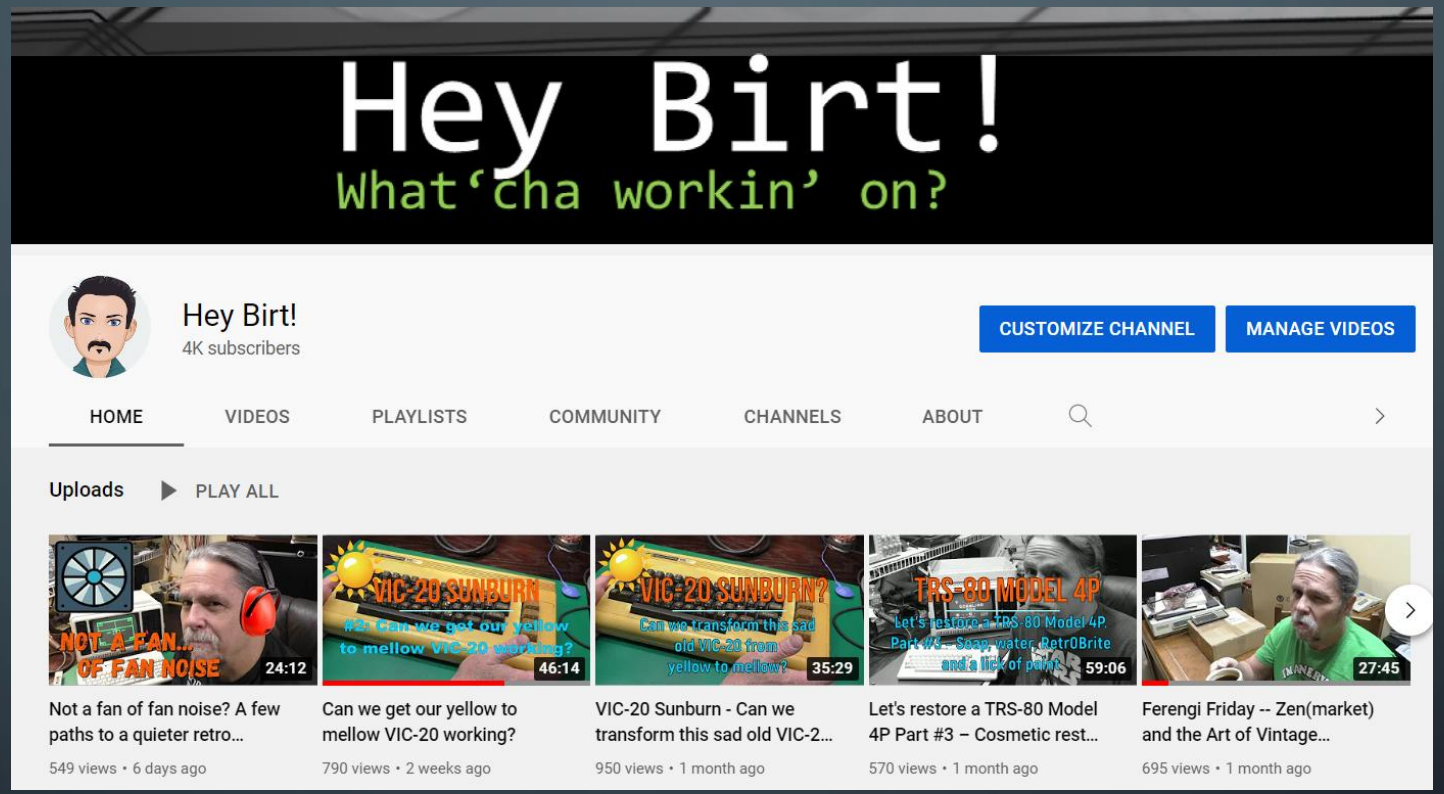
SOLDERING, WELDING & GLUING ELECTRONICS



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SOLDERING, WELDING & GLUING ELECTRONICS

1. Define soldering, welding and glueing
2. How are PCBs commercially made?
3. Repairing, building PCBs at home

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SOLDERING, WELDING & GLUING ELECTRONICS

1. Define soldering, welding and glueing
2. How are PCBs commercially made?
3. Repairing, building PCBs at home
4. *Correct pronunciation: ‘soddering’

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SOLDERING, WELDING & GLUING ELECTRONICS

Definitions

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Soldering, Welding & Gluing Electronics

Soldering -

- Glueing with liquid metal
- Temp of ~240c melts lead/tin solder
- Solder creates a mechanical bond.
- Little/no metallurgical reaction
- Quick, good conductivity, weak joints

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SOLDERING, WELDING & GLUING ELECTRONICS

Welding -

- Base metal heated to melting temp
- Filler material may be added
- Base and filler are fused
- Metallurgical reaction
- Strong joint, good conductivity

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Glueing -

- Scope limited to electronics usages
- Very fine metal powder or carbon added to glue
- OK conductivity, weak bond

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Production Soldering

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Methods of production soldering -

1. Wave soldering
2. Reflow soldering
3. Selective soldering
4. Hand soldering

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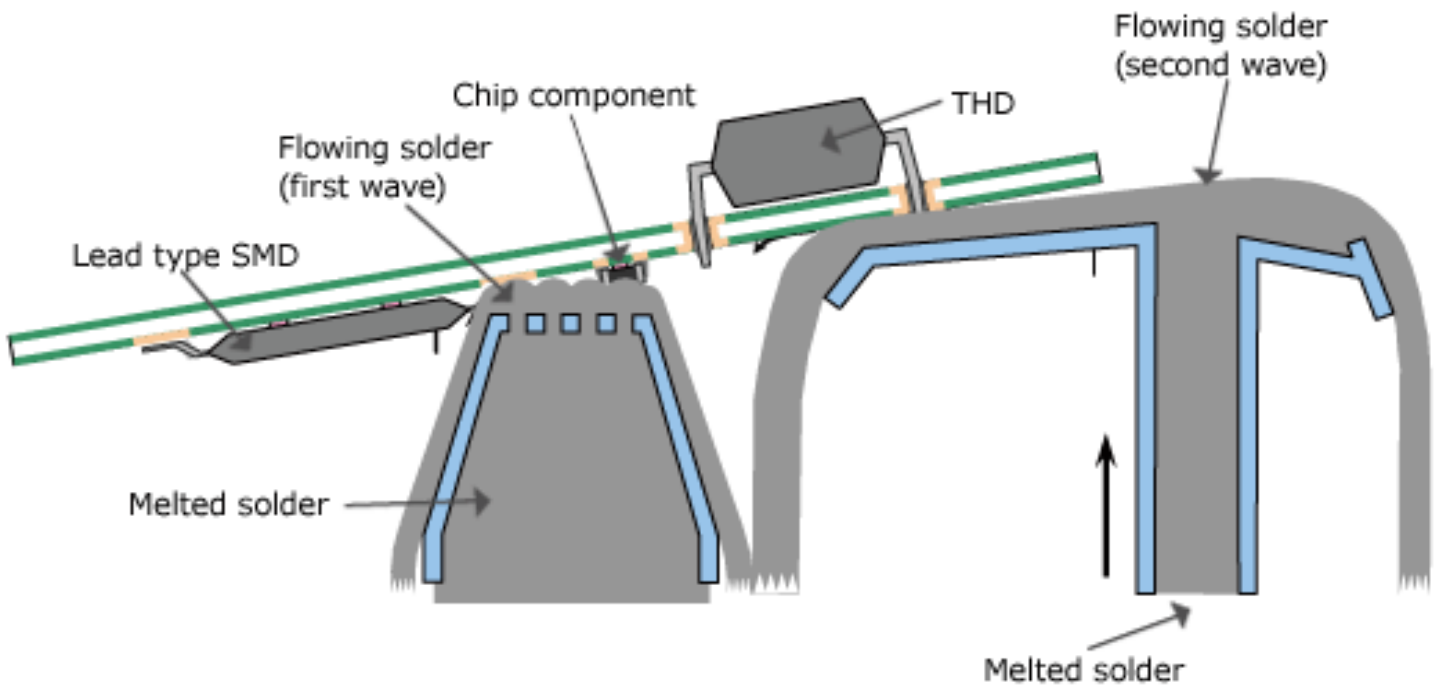
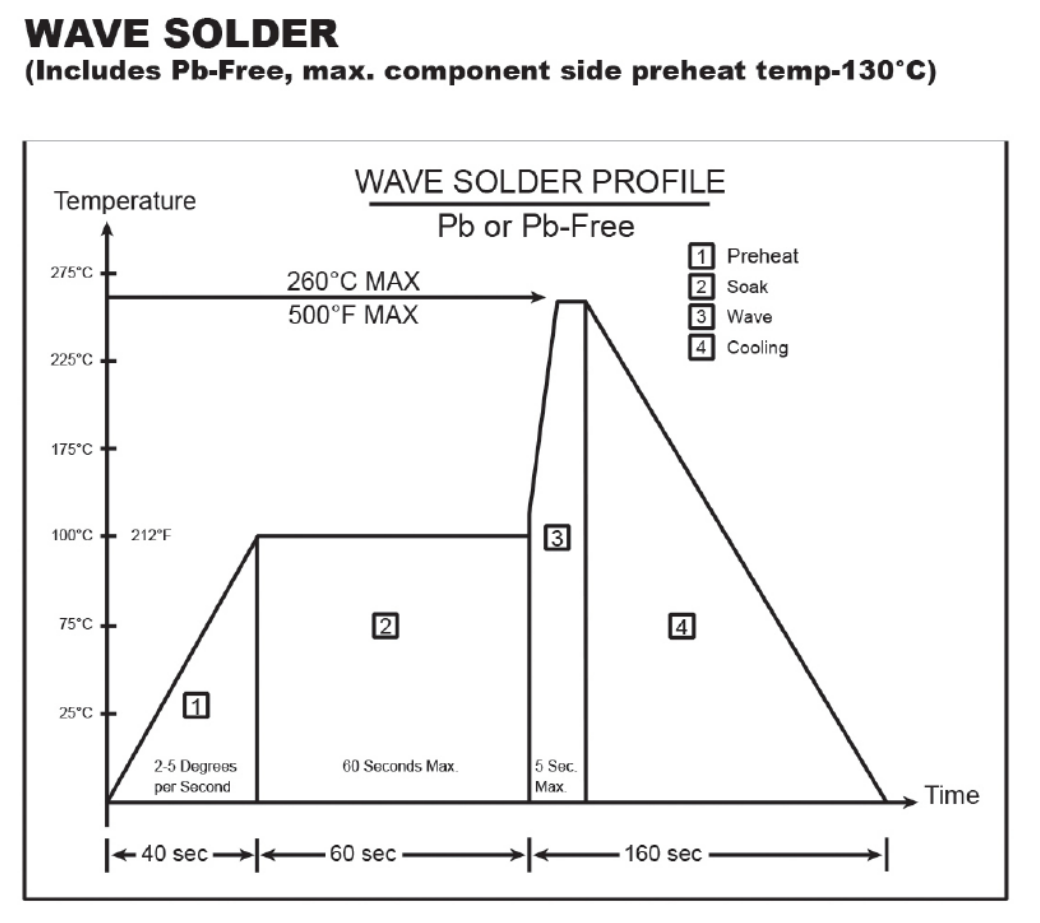


Figure 1.12 Flow (Wave Soldering) Method (Example)

Wave soldering 4-5 min process. Soldering is not a race

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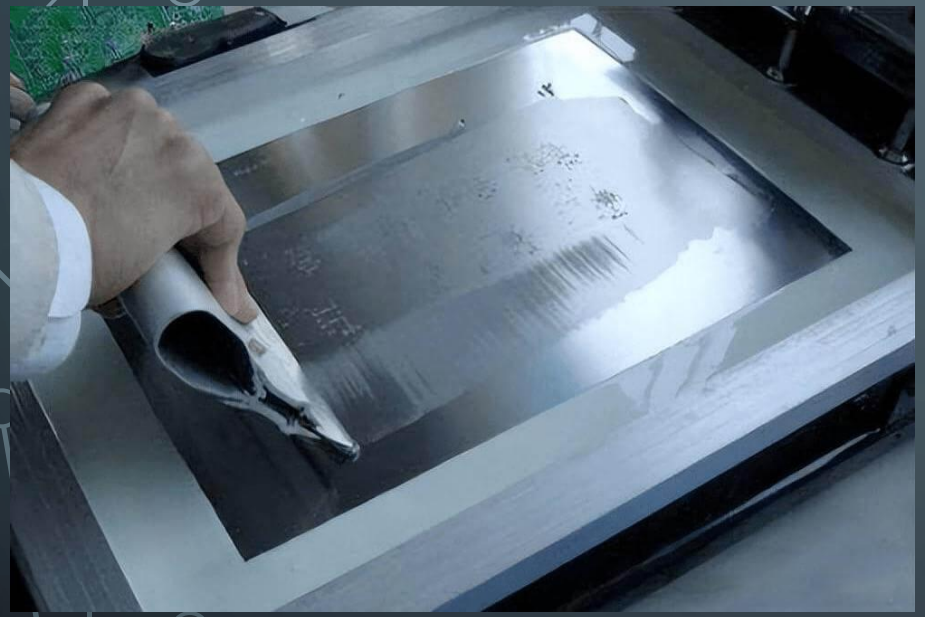
SOLDERING, WELDING & GLUING ELECTRONICS

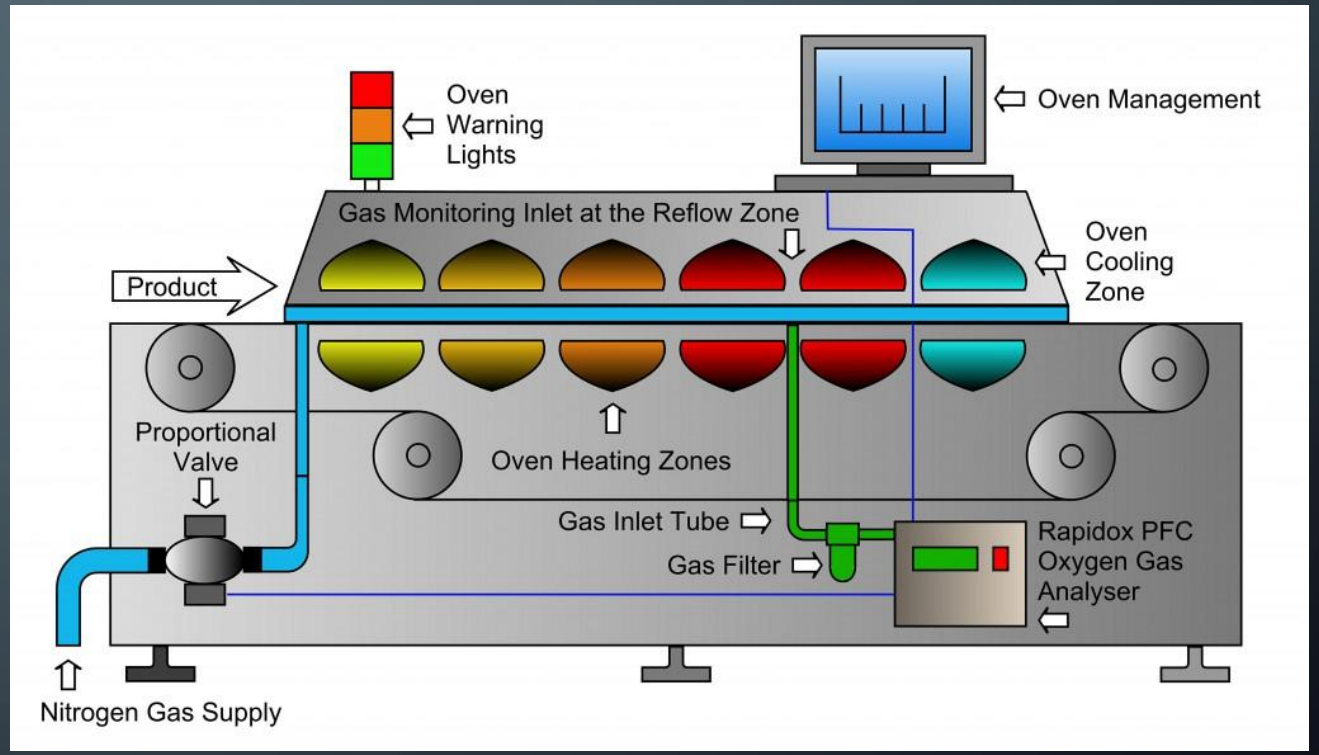


Wave soldering 4-5 min process.
Soldering is not a race

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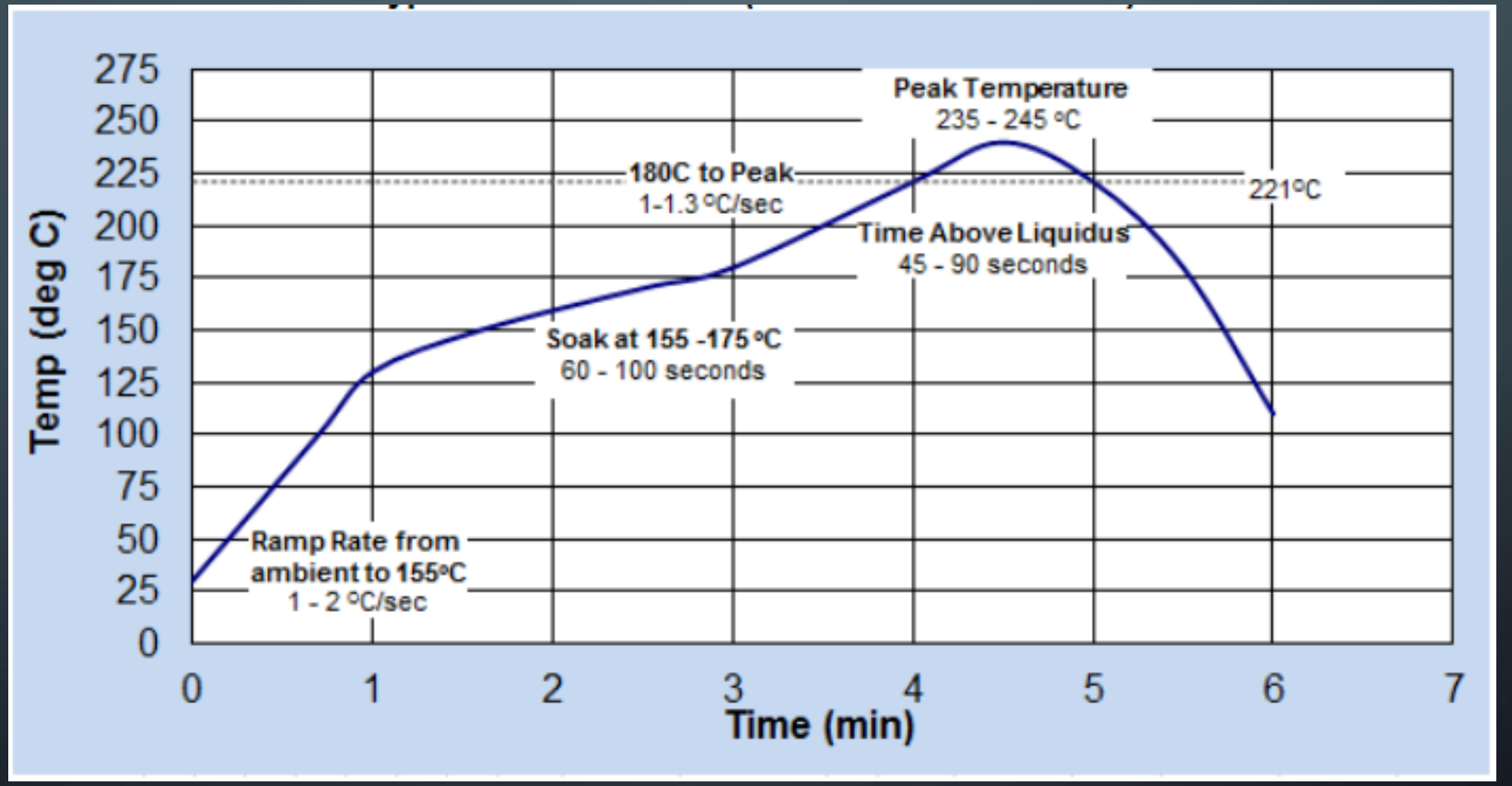




Reflow soldering 5-6 min process.
Soldering is not a race

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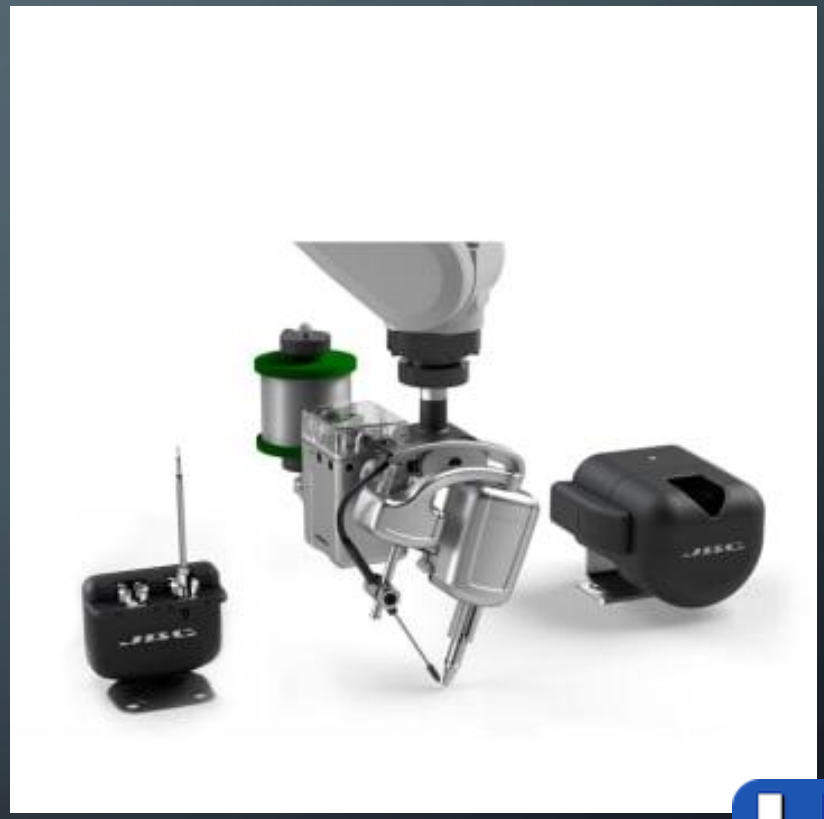
Reflow soldering 5-6 min process.
Soldering is not a race

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SOLDERING, WELDING & GLUING ELECTRONICS



Mini-Wave

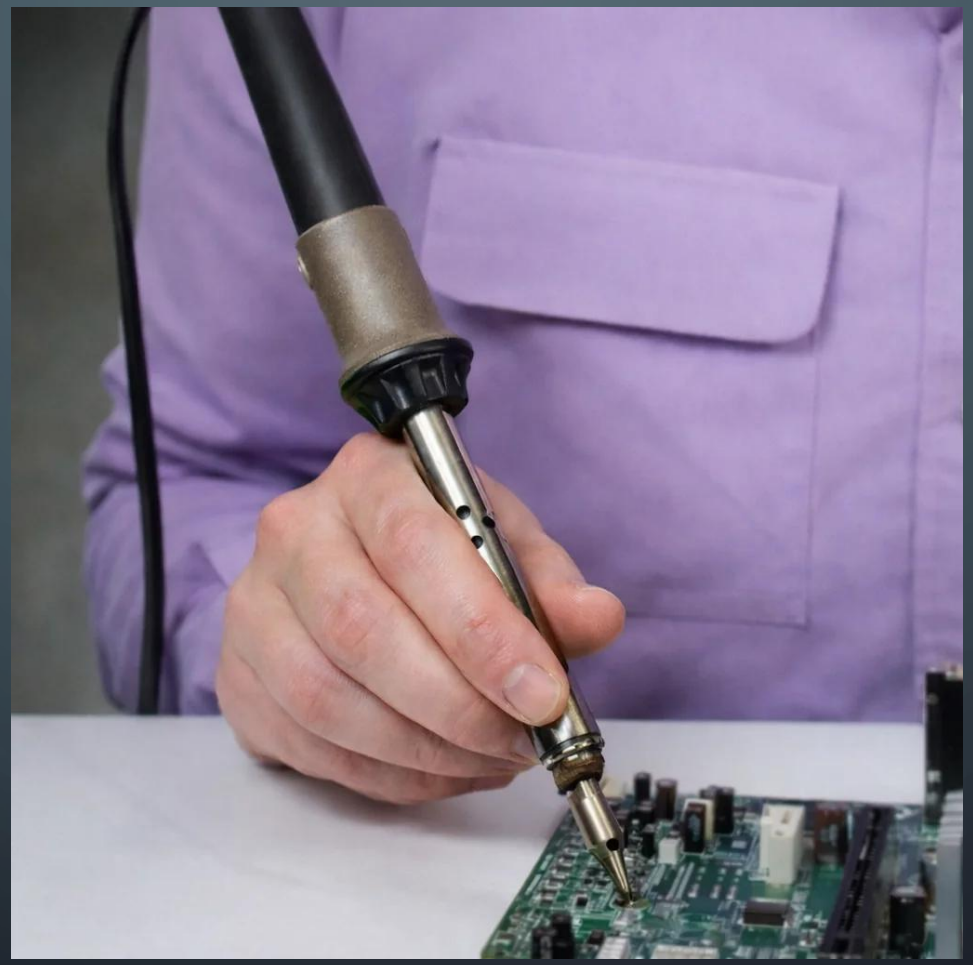


Robot

Selective Soldering. Soldering is not a race

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Hand soldering: ** This ain't it!**

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DIY Soldering & Desoldering

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DIY Soldering with iron –

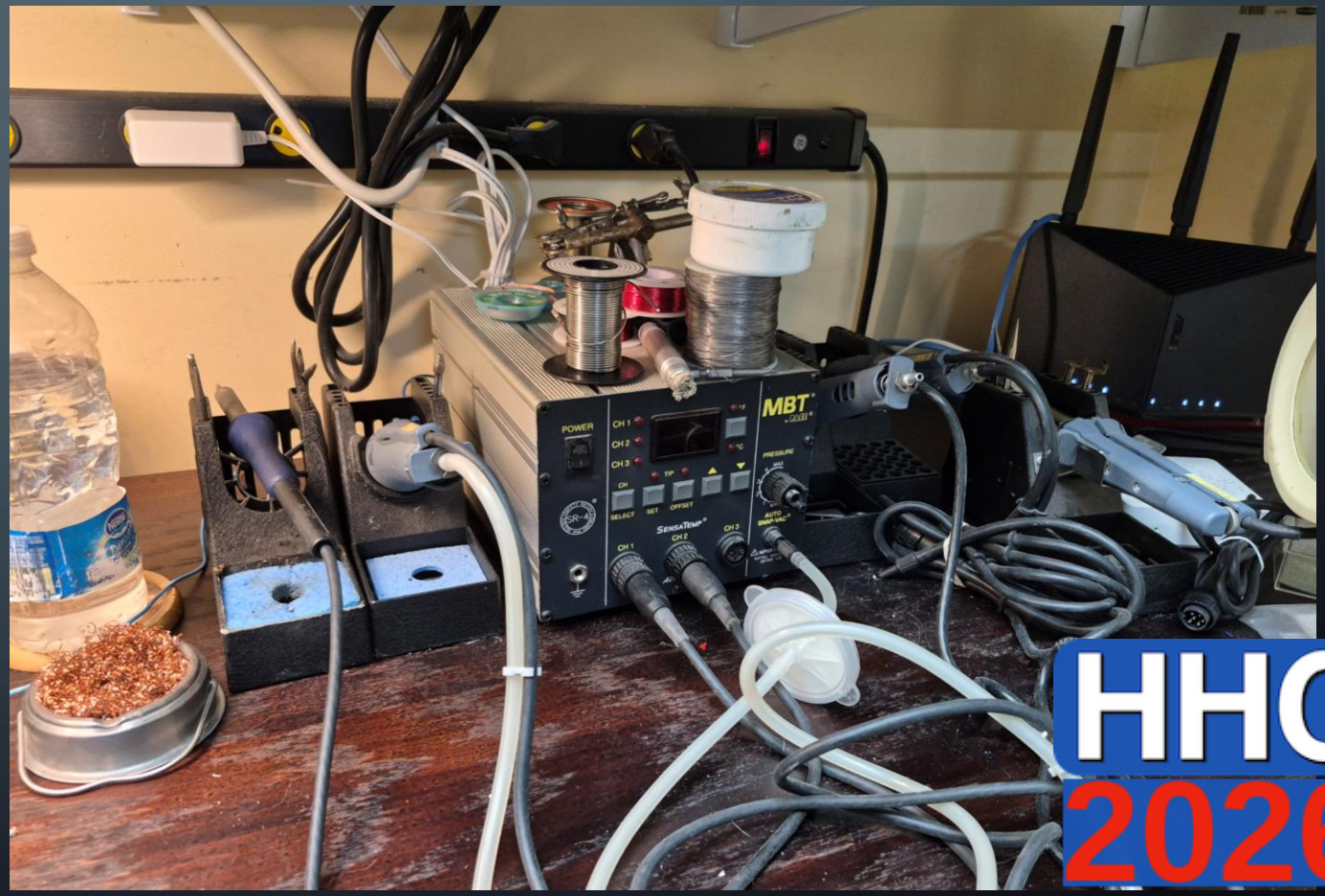
- Soldering is about heat transfer
- Heat transfer is about surface area & ΔT
- Size of tip in iron matters
- More heat != more better

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My set up





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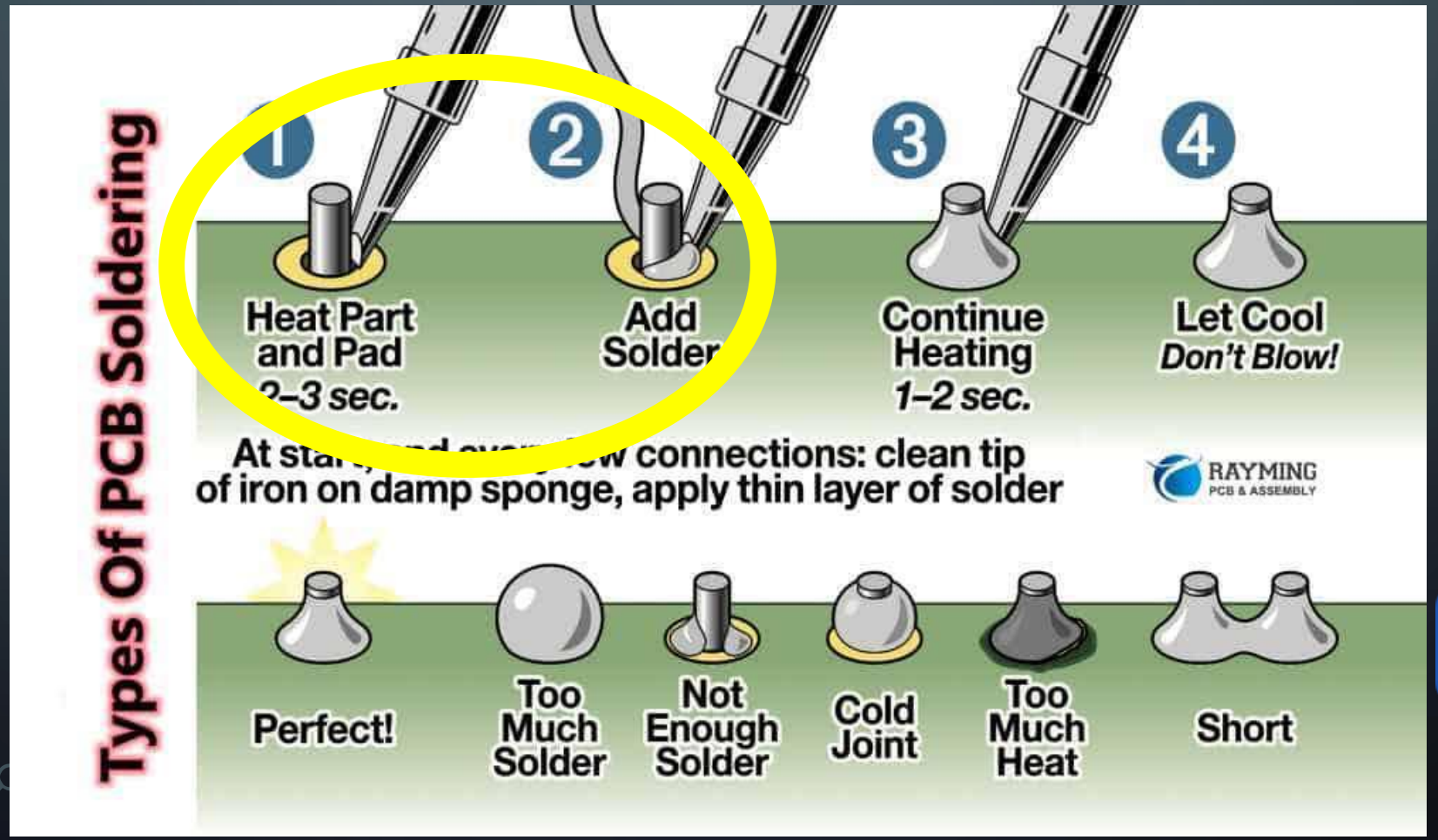
Soldering iron tips –



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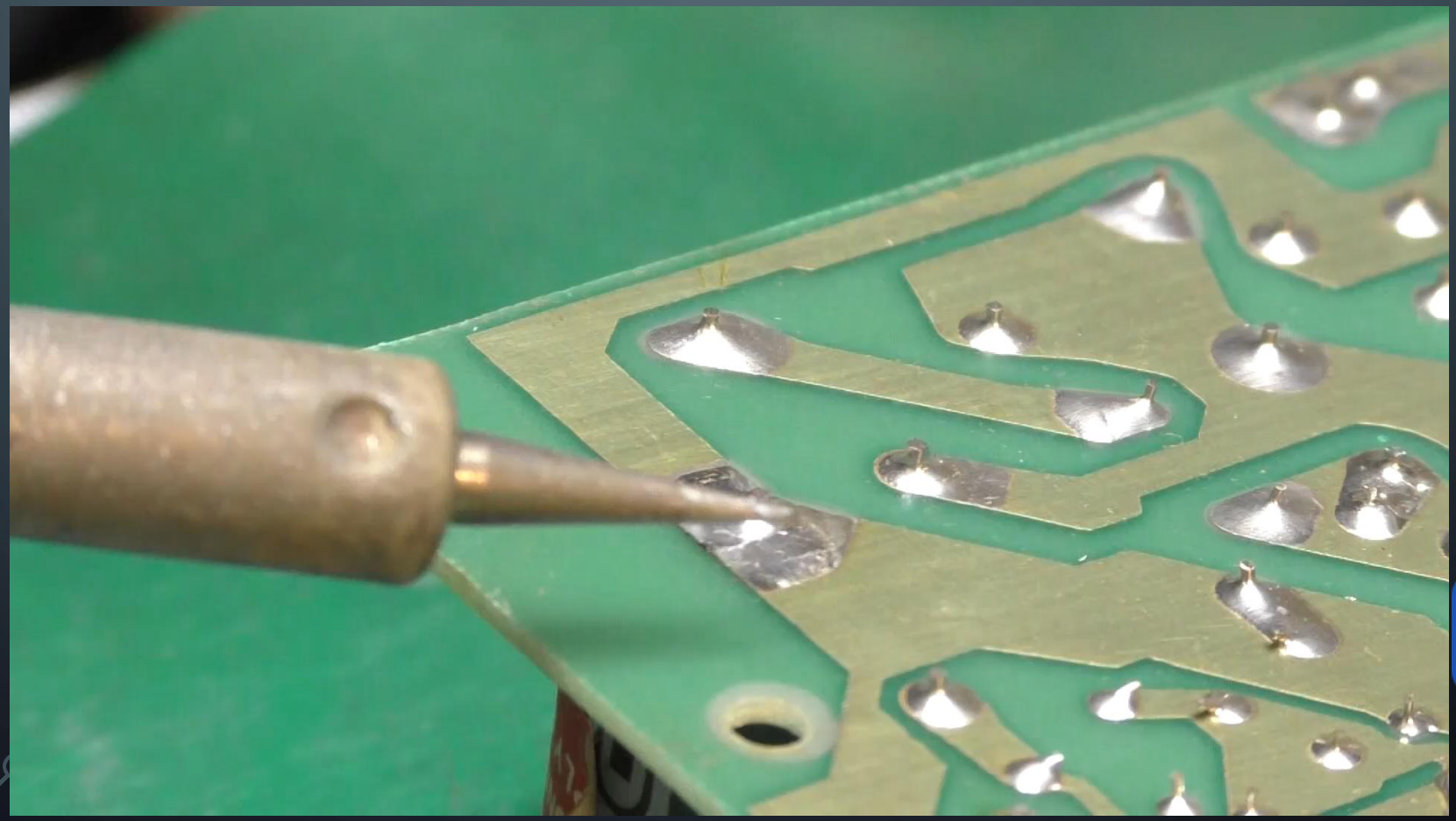
Tips: Effective surface area



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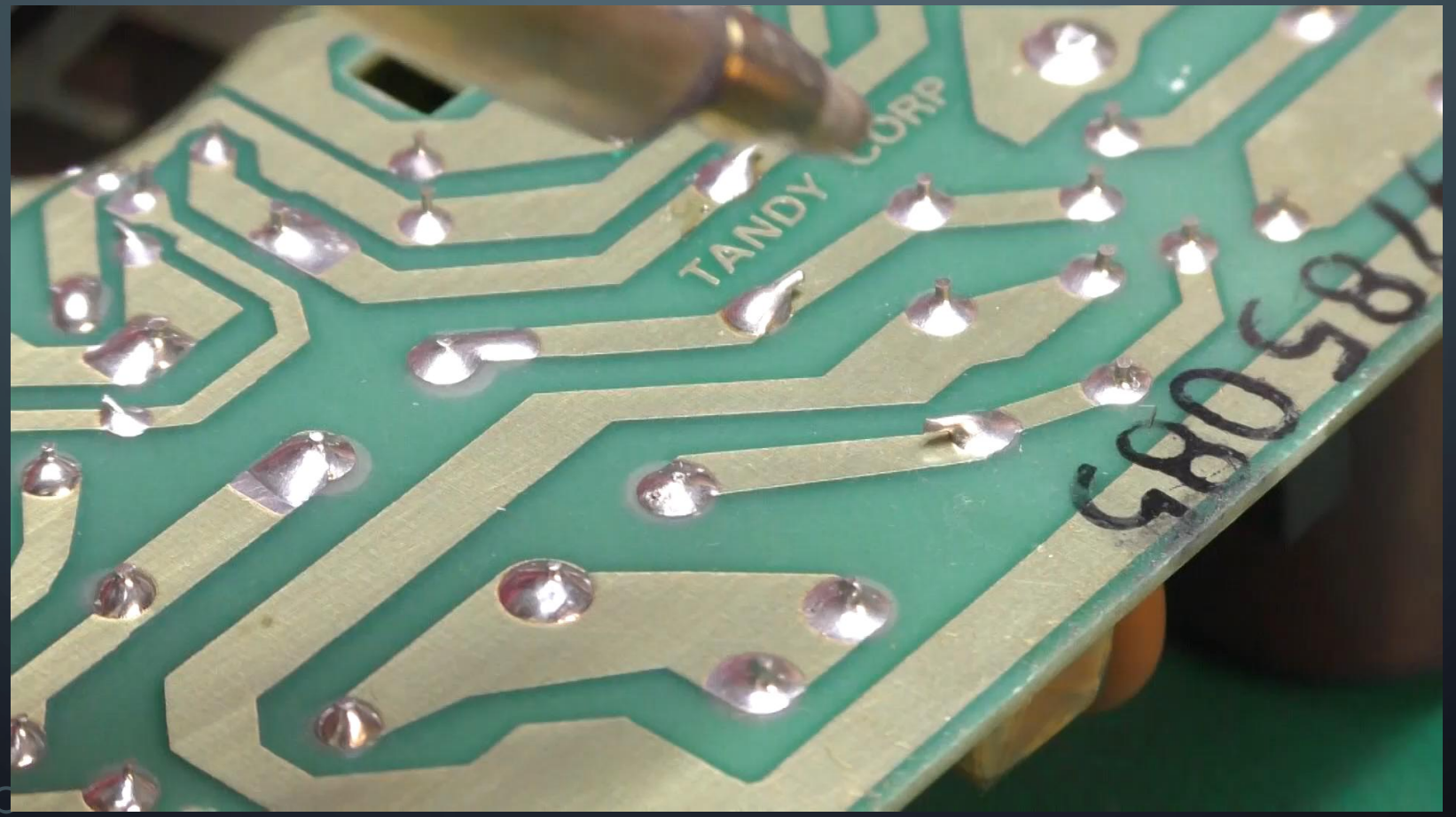
Tips: Through hole soldering



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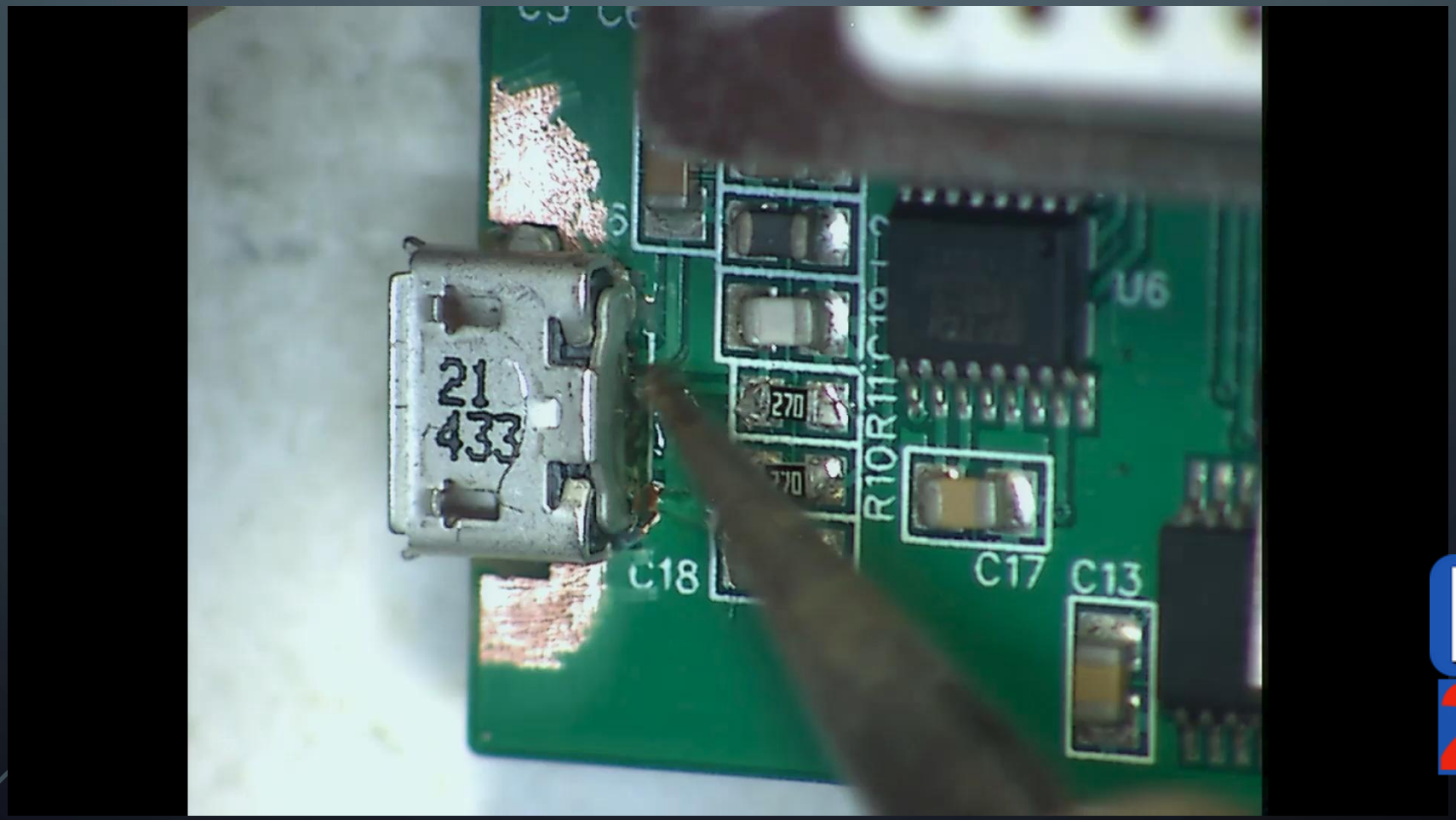
Tips: Through hole soldering



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Tips: Real world use cases



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SOLDERING, WELDING & GLUING ELECTRONICS

Tips: Surface mount soldering

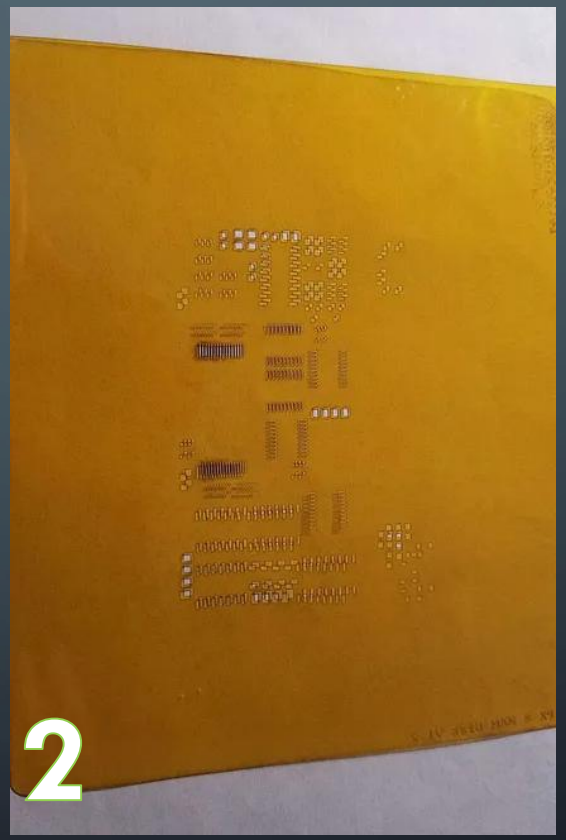


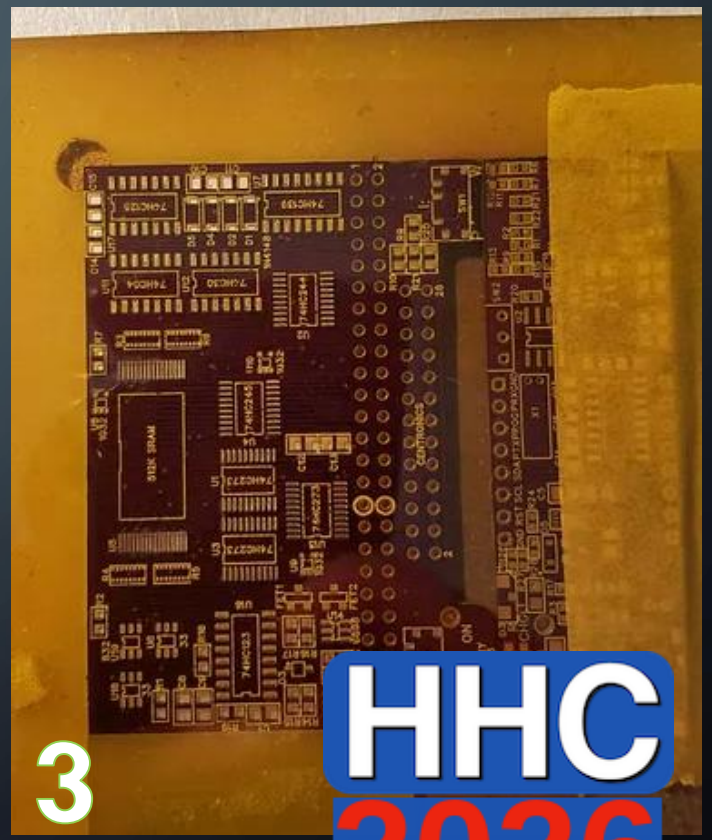
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Tips: Surface mount soldering

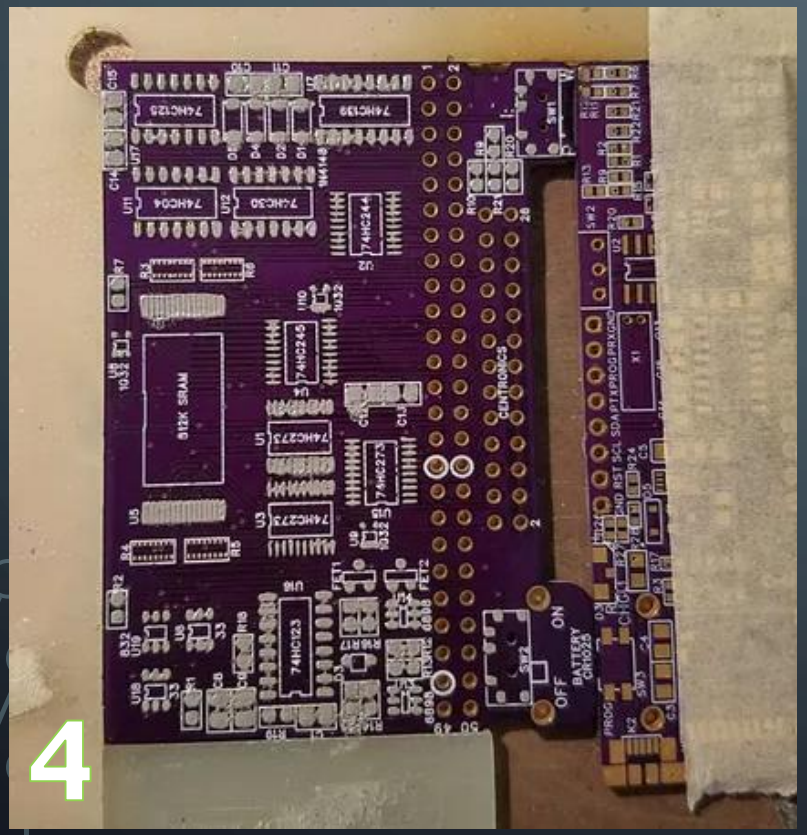


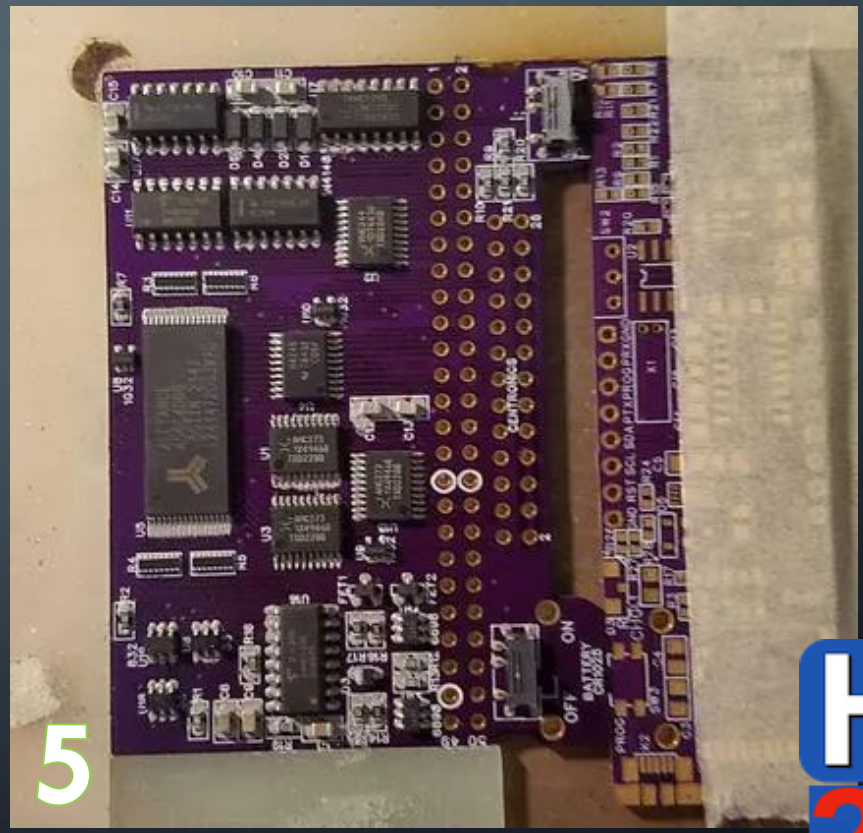




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Tips: Surface mount soldering





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Tips: Surface mount soldering

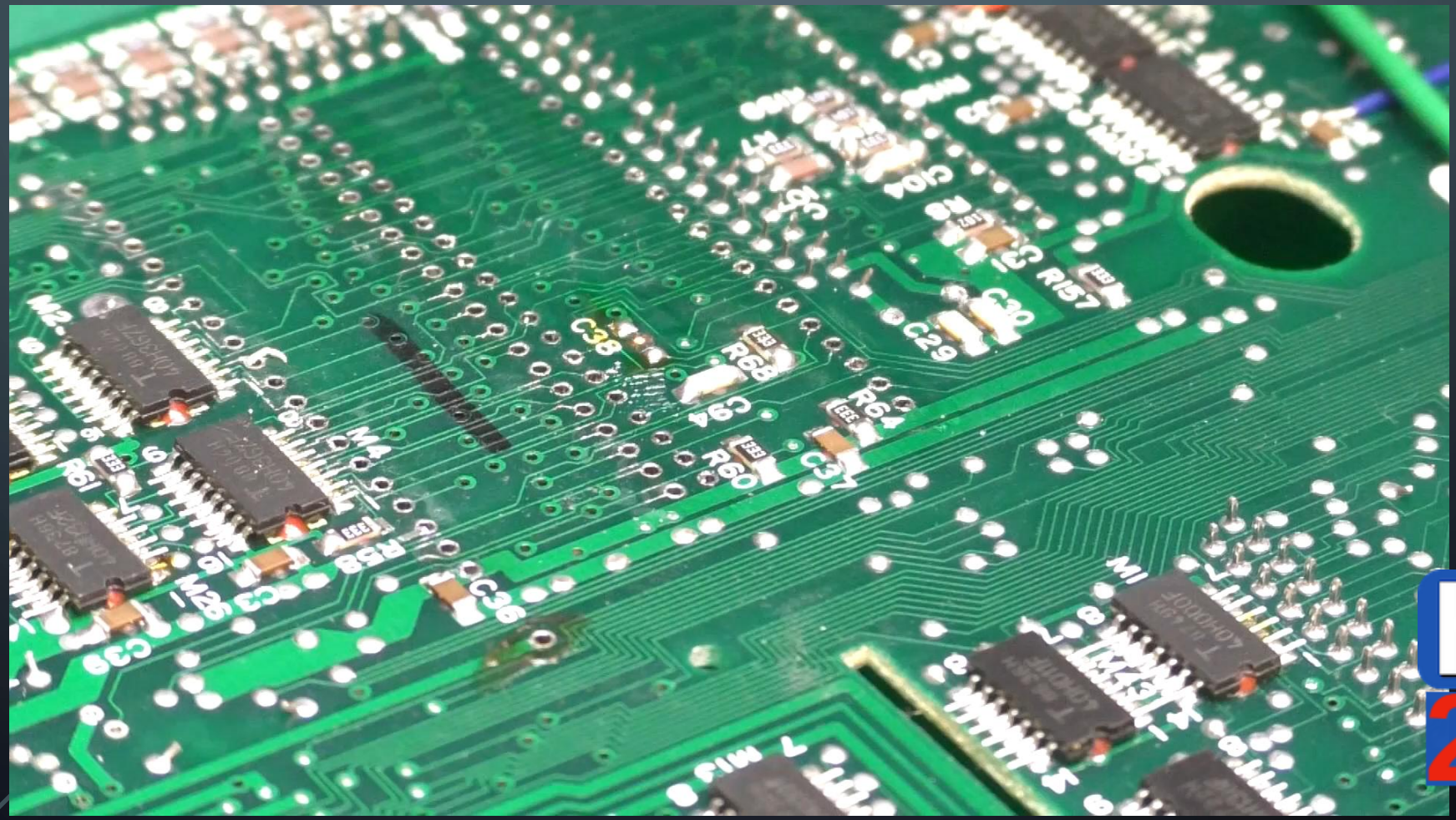




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Tips: Special irons and tips



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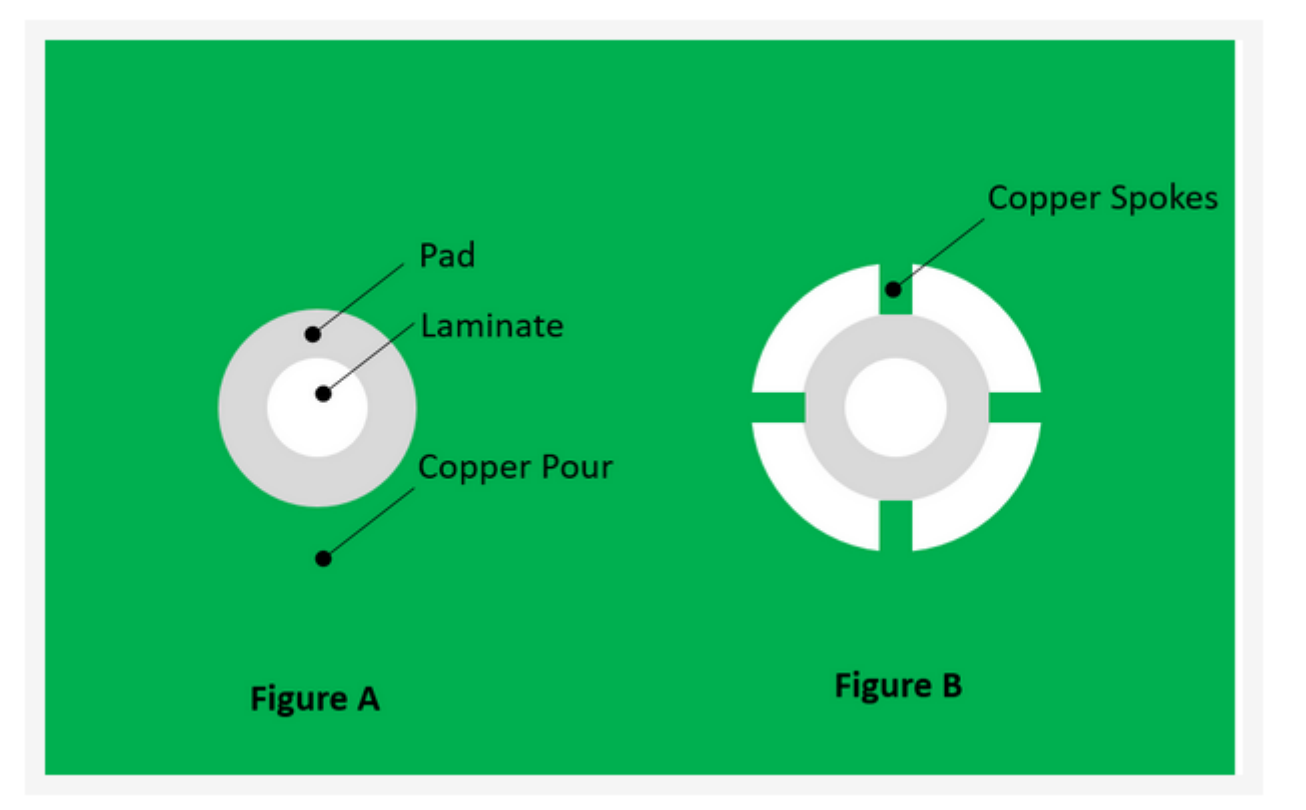
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Things to look out for

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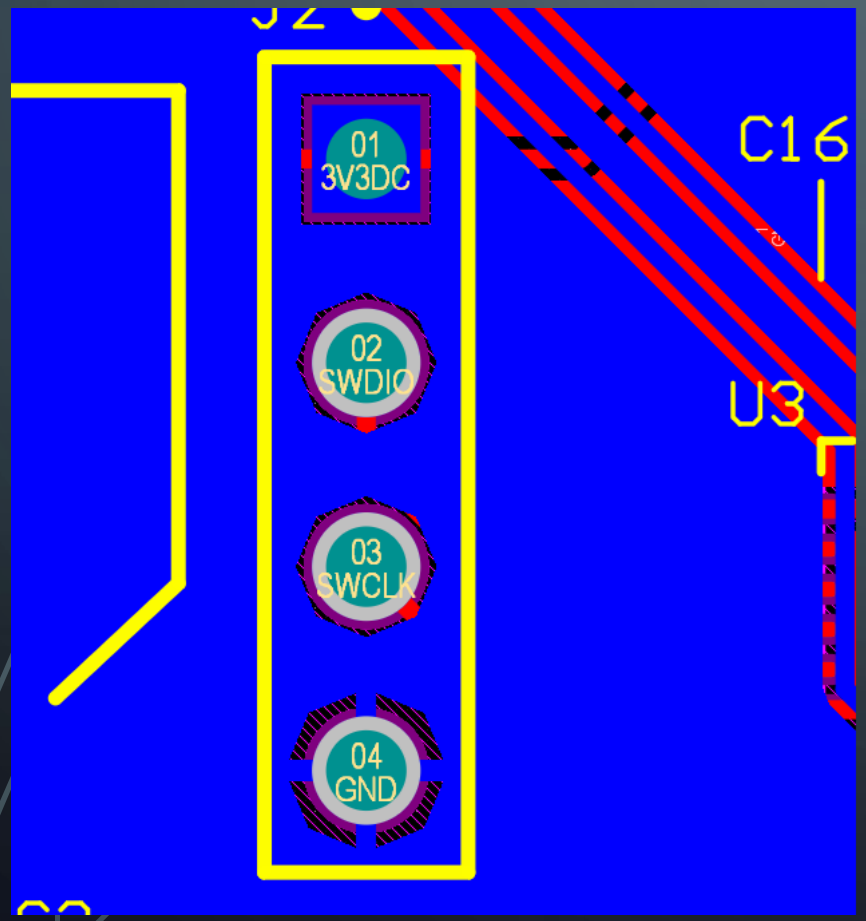
Tips: Thermal relief – Through hole

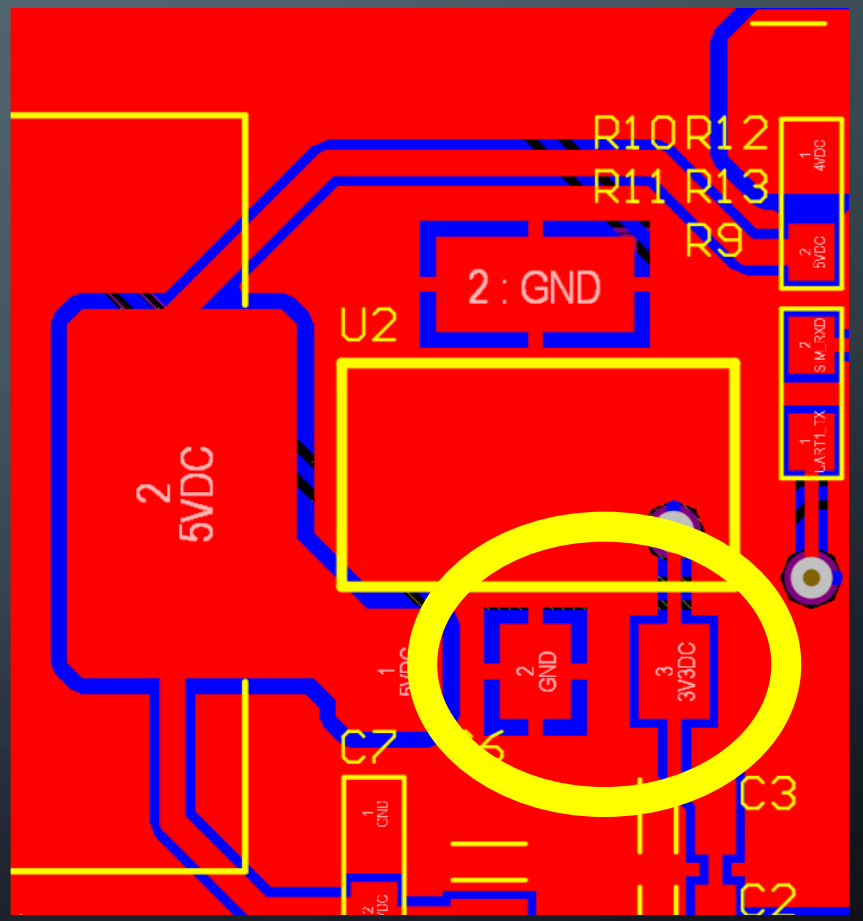


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Tips: Thermal relief – SMD

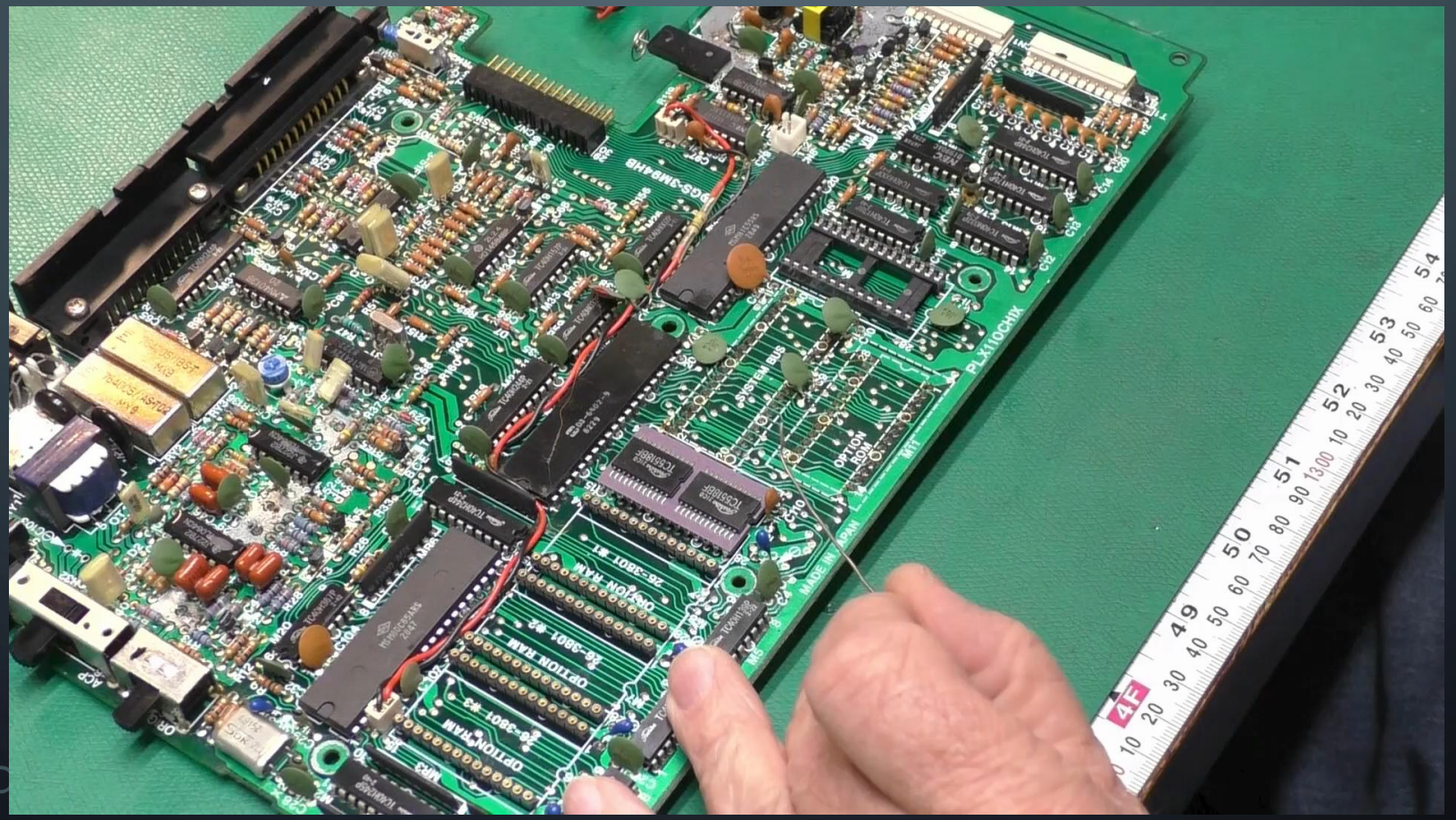




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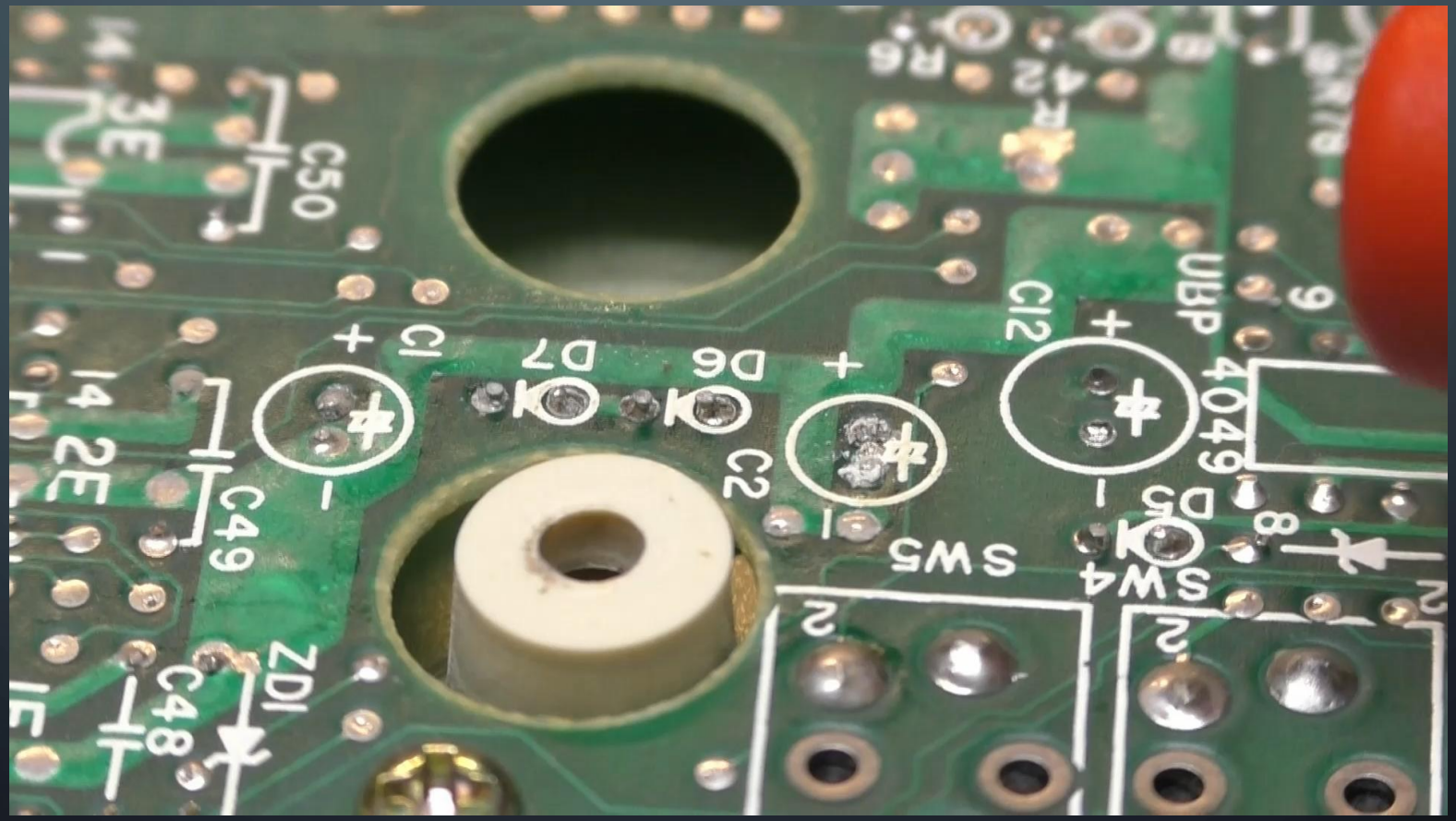
Tips: Rework with no thermal reliefs



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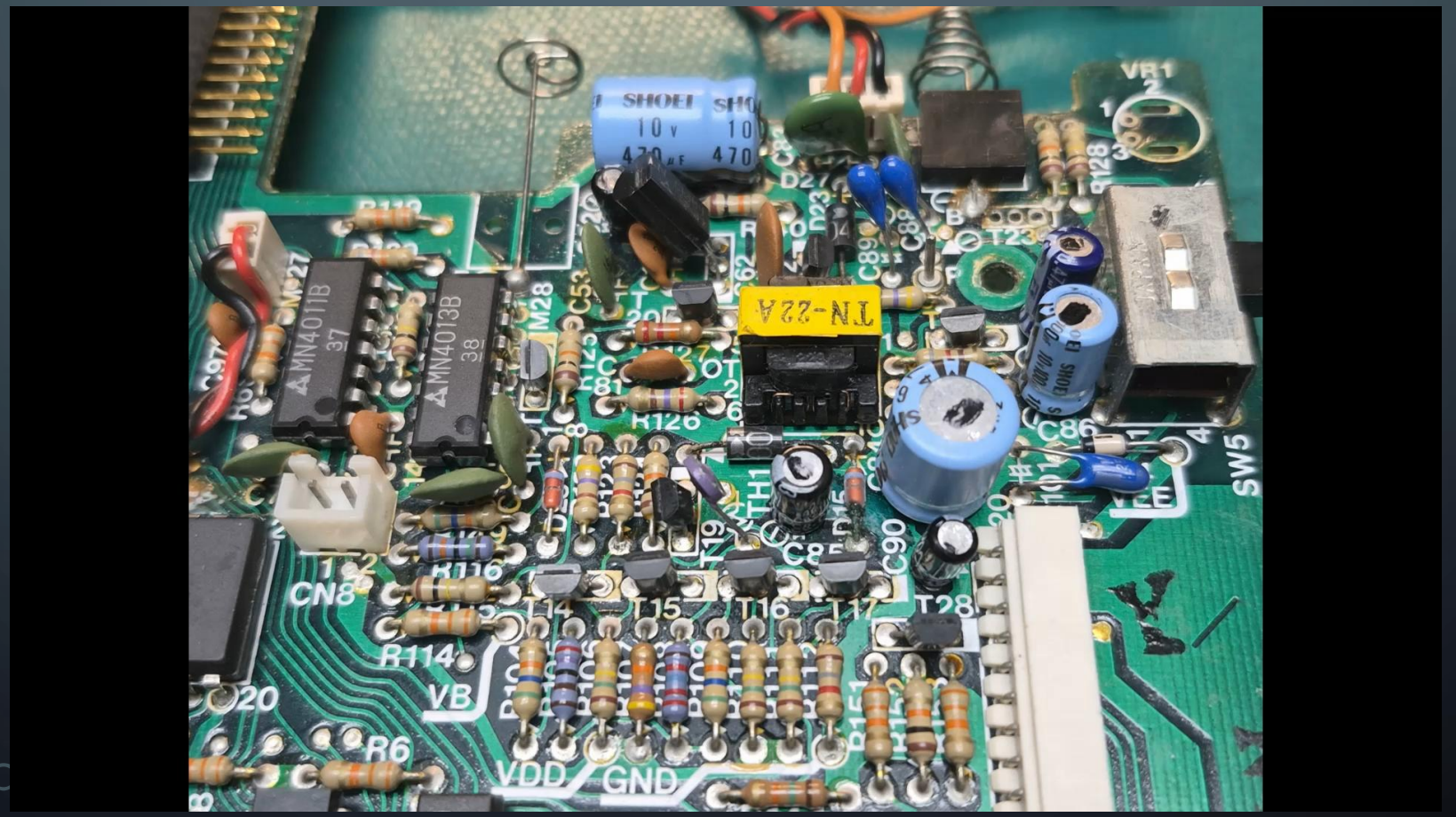
Tips: Oxidized lead/tin has higher melting temp



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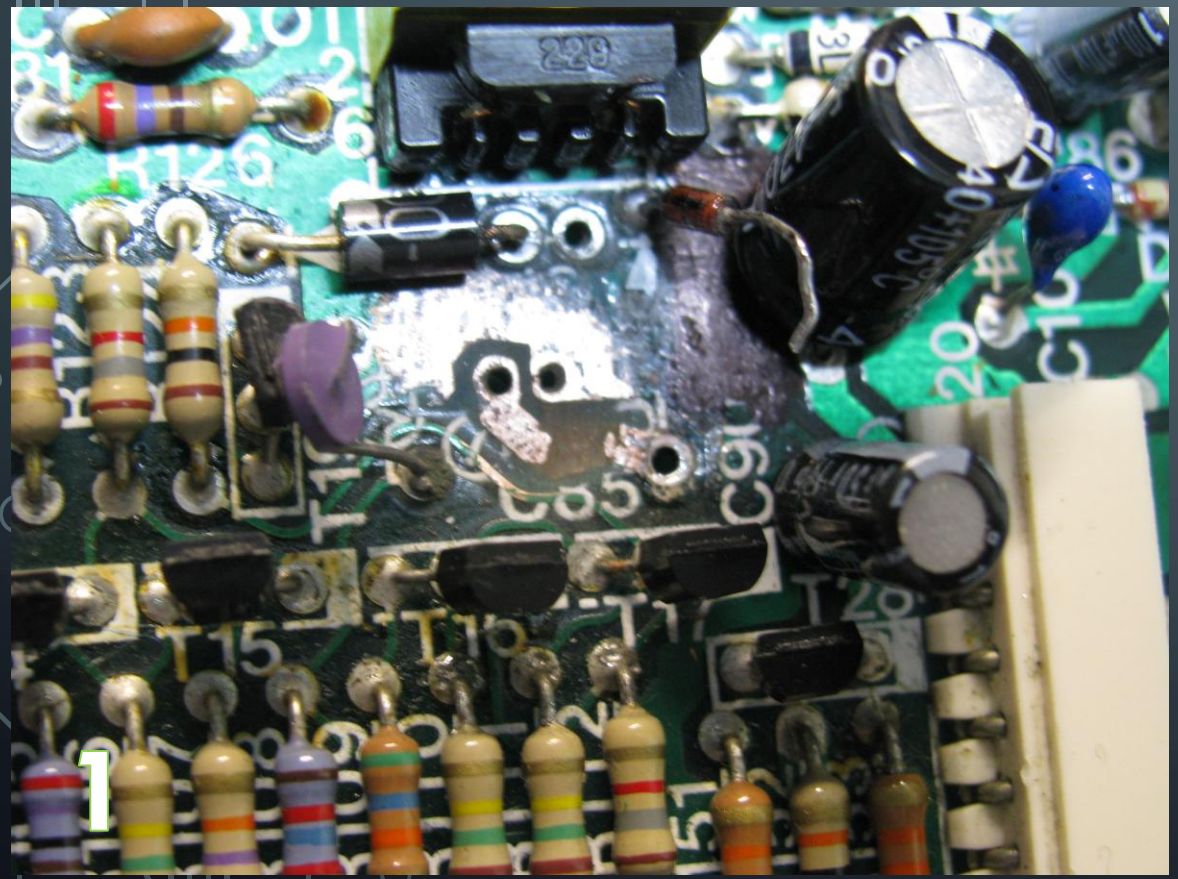
Tips: Walking out difficult to remove parts

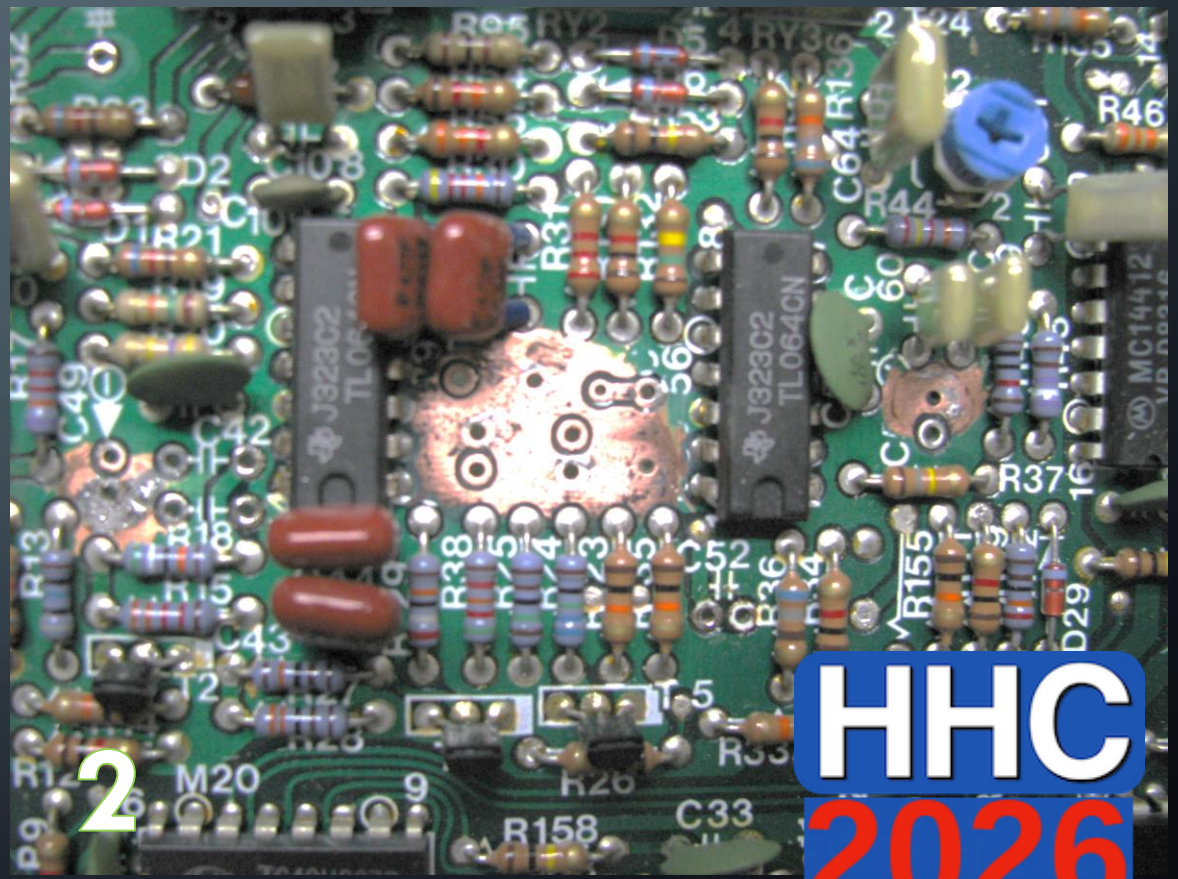


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Tips: Walking out difficult to remove parts





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Nasty Flux -



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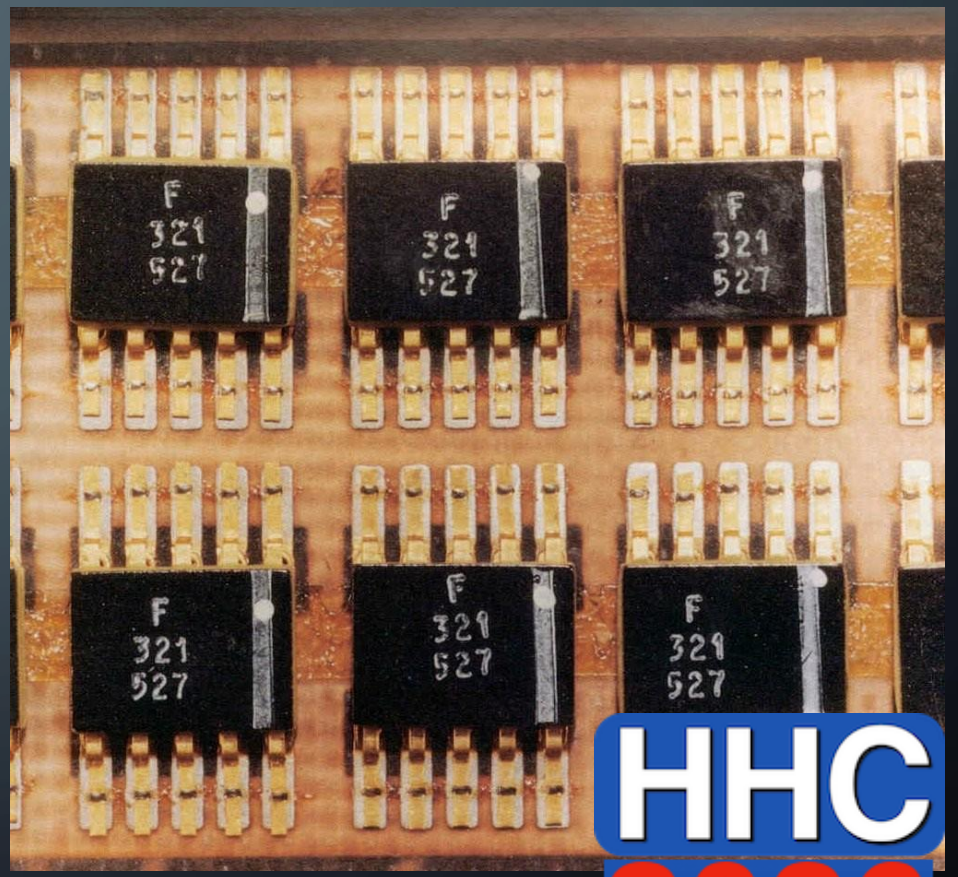
Welding Electronics

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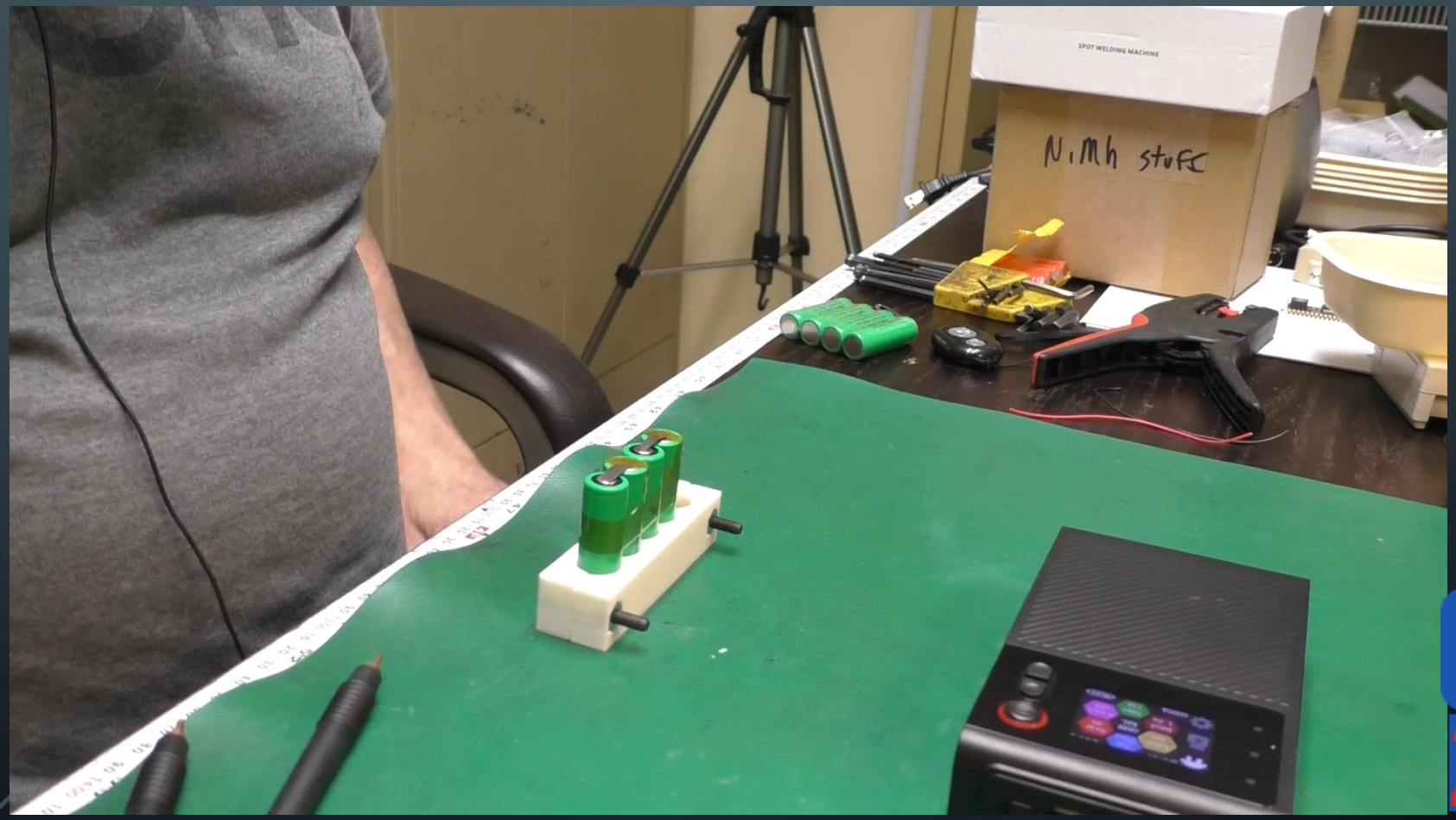
Welding electronics –

- Most obvious use in battery pack construction
- Apollo program used welding for improved reliability over soldering.



SOLDERING, WELDING & GLUING ELECTRONICS

Example battery pack welding -



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Glueing Electronics



Soldering, Welding & Gluing Electronics

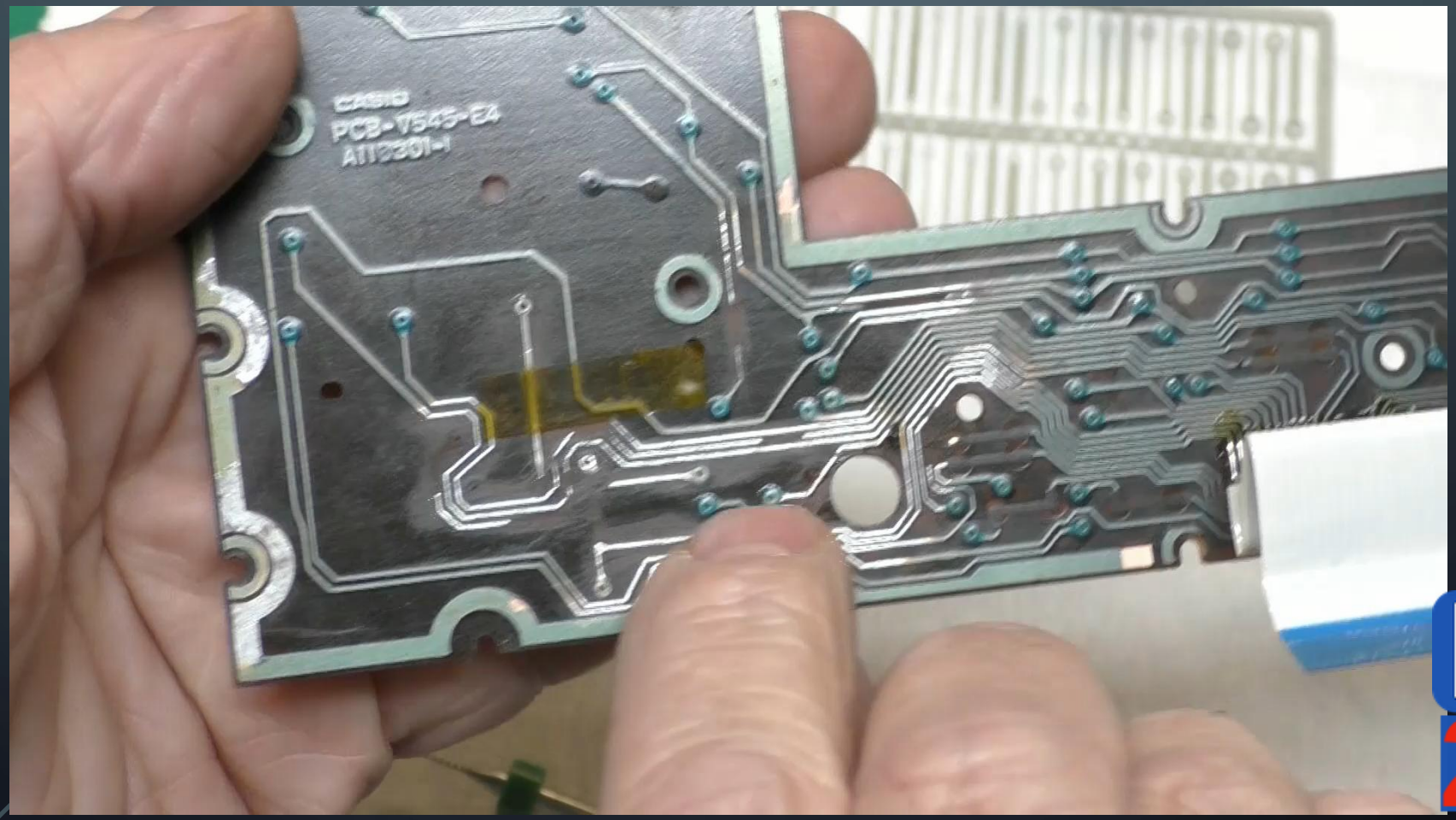
Glueing electronics –

- Vias from copper to carbon
- Fixing rubber keypads
- FFCs for LCDs, etc.

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Example glueing PCB-



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Example glueing keypad-



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Questions?

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