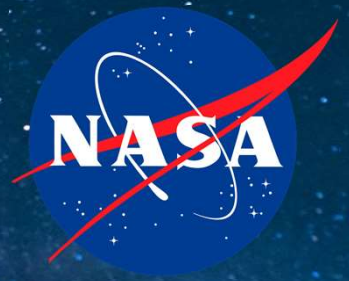
Balloon Payload Workshop

Soldering 101



Partner

Soldering:

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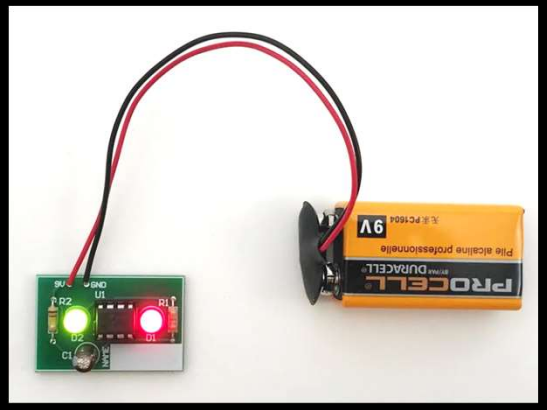
What am I about to do?

Advice for success

- ✓Follow steps
- ✓Be patient with yourself
- ✓Safety!



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Supplies:

- ✓Soldering 101 Kit
- ✓Soldering Iron
- ✓Solder
- ✓Wire “Sponge”
- ✓Safety Glasses
- ✓Wire Snippers
- ✓Solder Sucker
- ✓9V Battery
- ✓Helping Hands
- ✓Secure Power Source

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Soldering:

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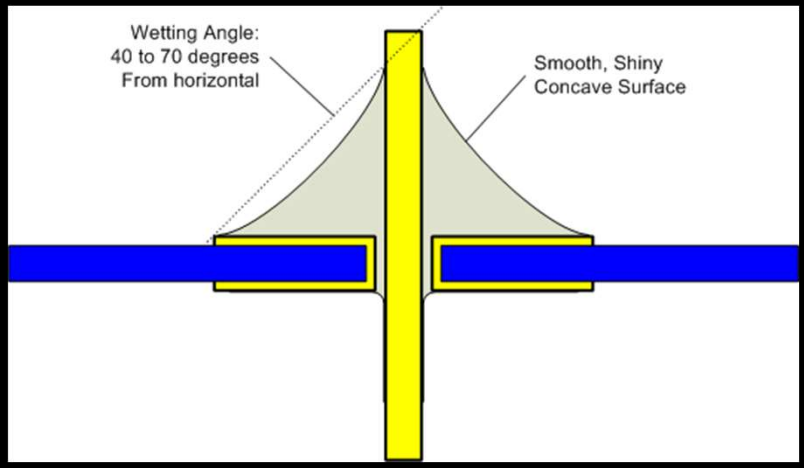
- How much solder?

- Cold Solder Joints



Soldering

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- **Use caution when clipping leads to avoid flinging metal across the room**
- **Please put clipped leads in the trash not the floor**

Soldering

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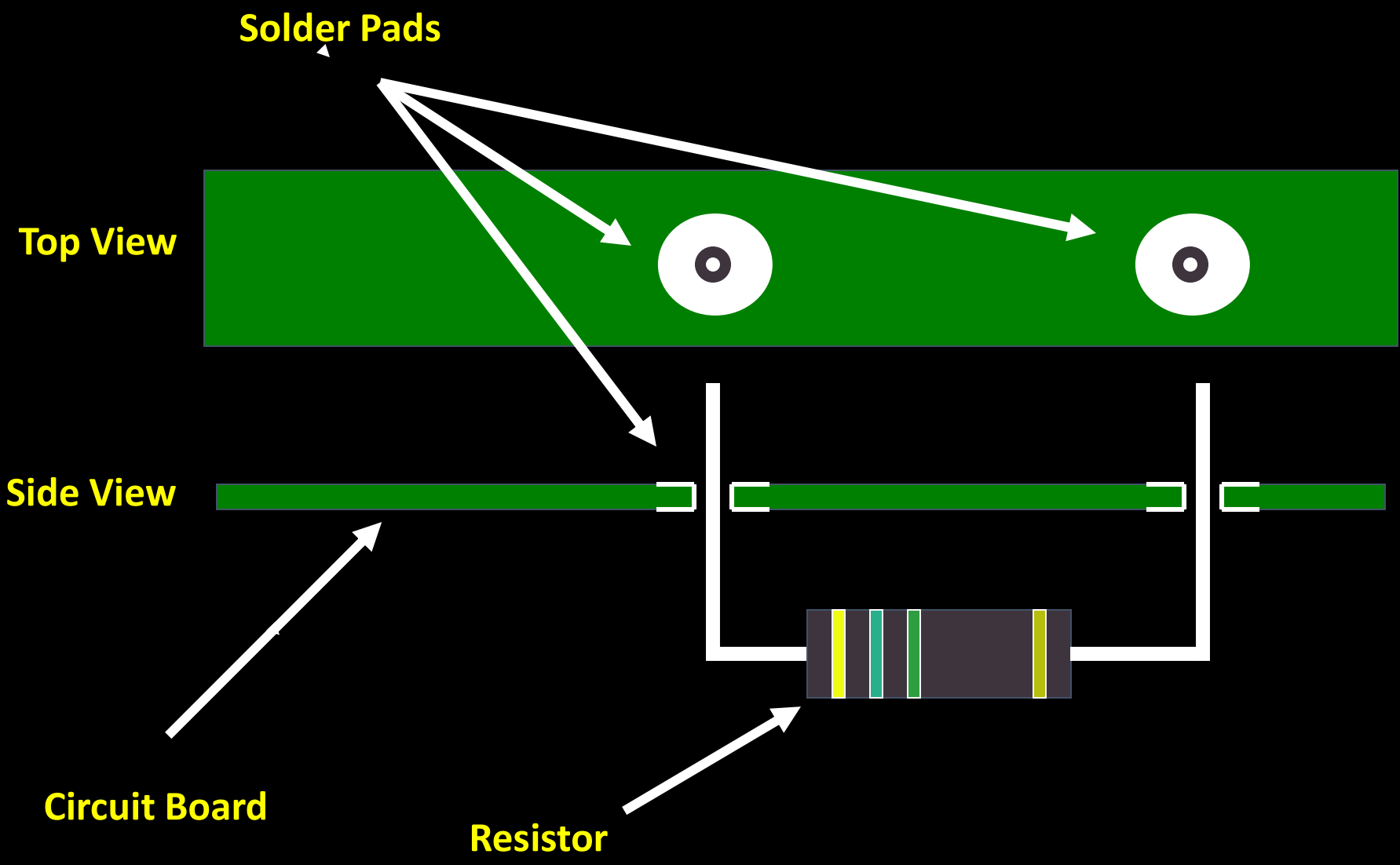

Soldering

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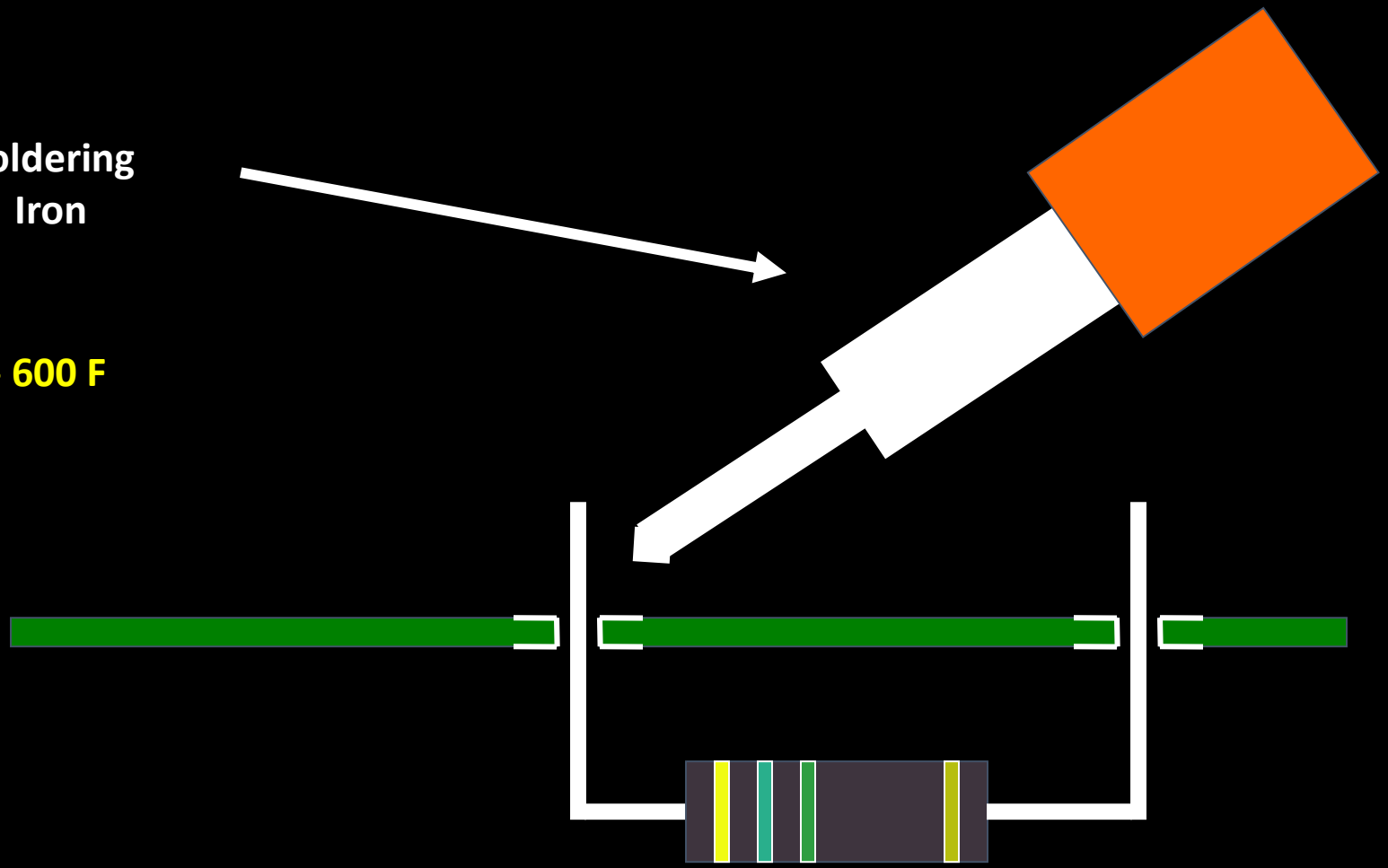

Soldering iron is to heat the pad on the board

Soldering

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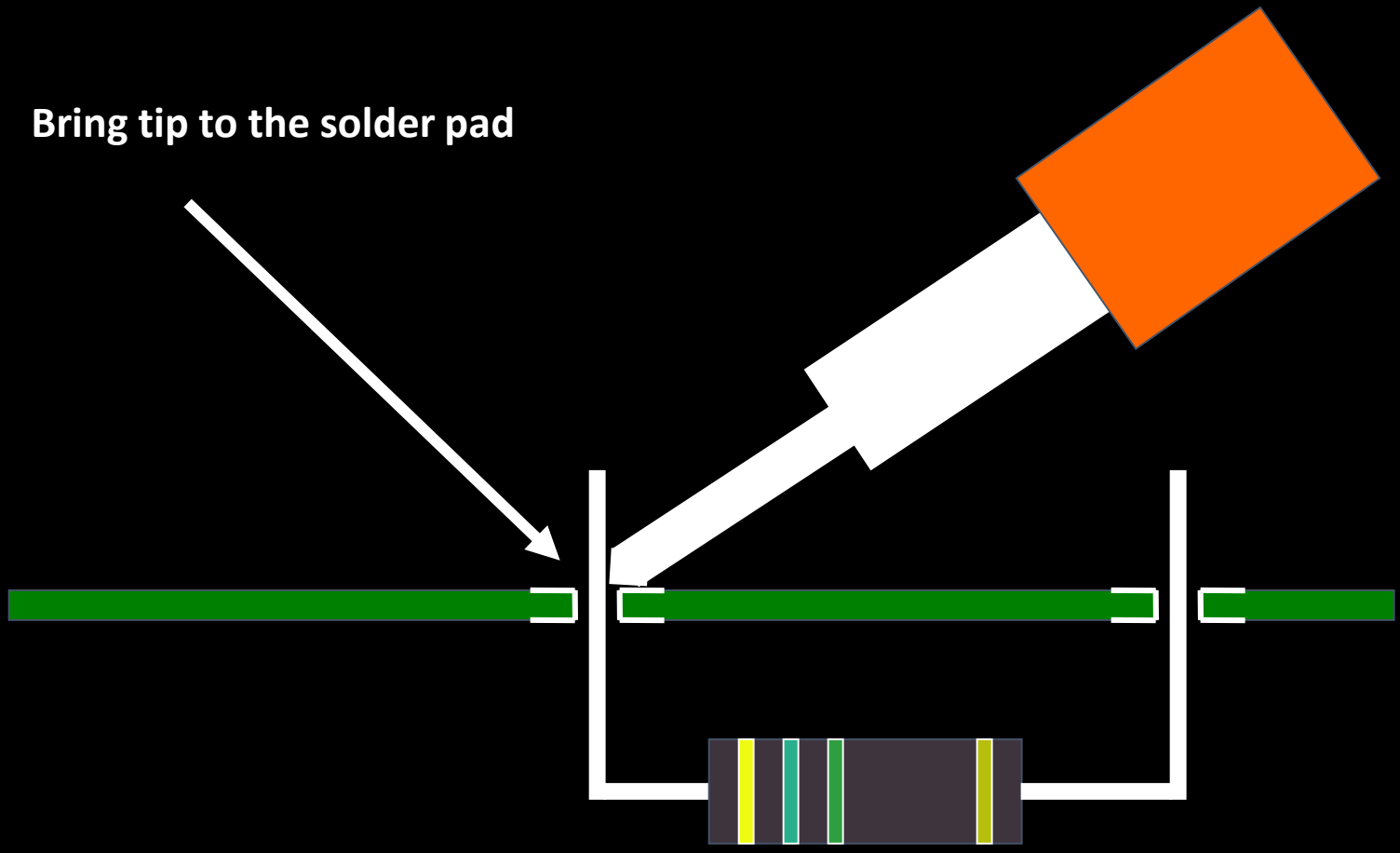
Bring tip to the solder pad



Soldering

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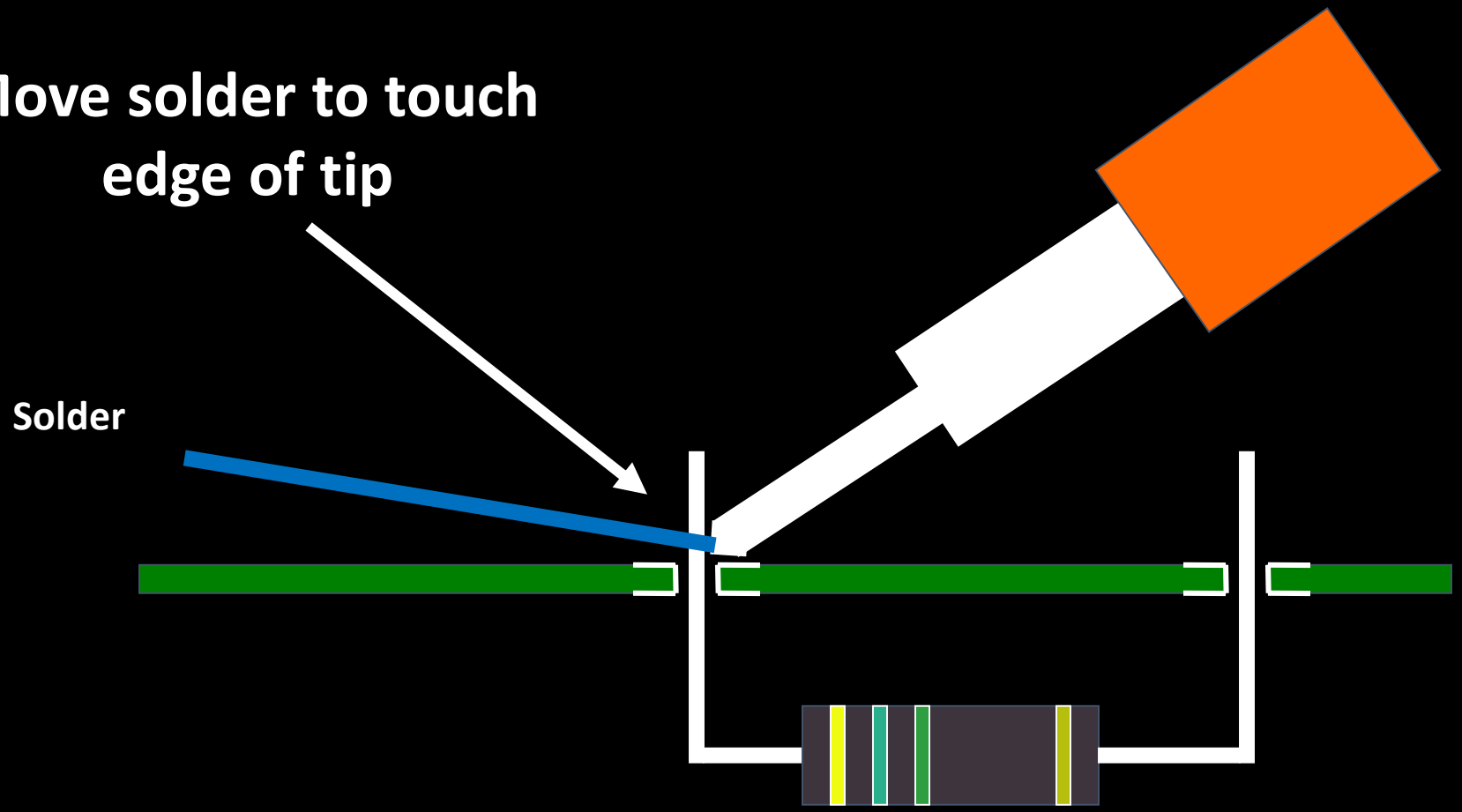
Move solder to touch edge of tip



Solder will flow toward heat

Soldering

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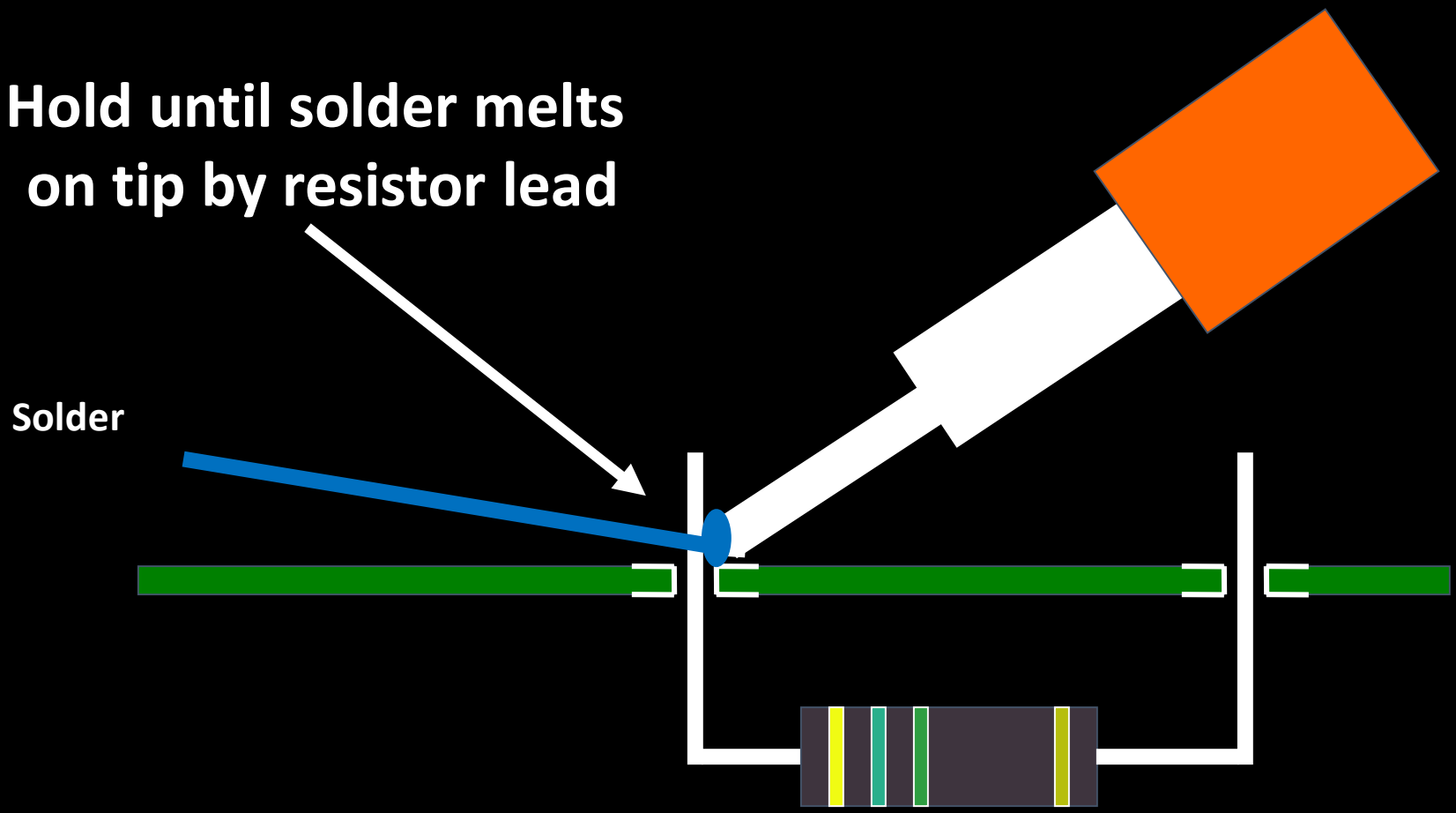
Hold until solder melts on tip by resistor lead



Iron is still on the board/pad

Soldering

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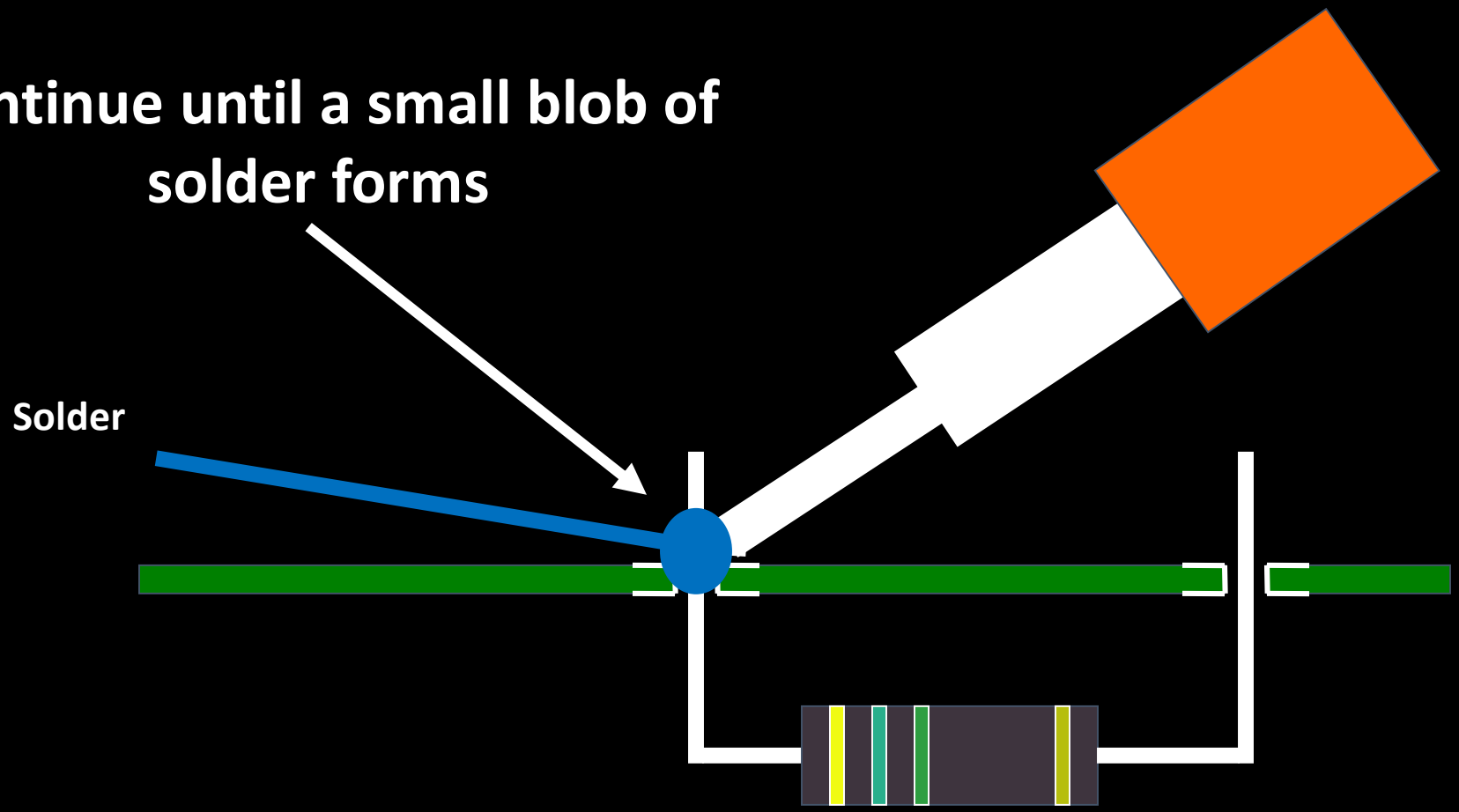
Continue until a small blob of solder forms



Maintain contact with pad the whole time

Soldering

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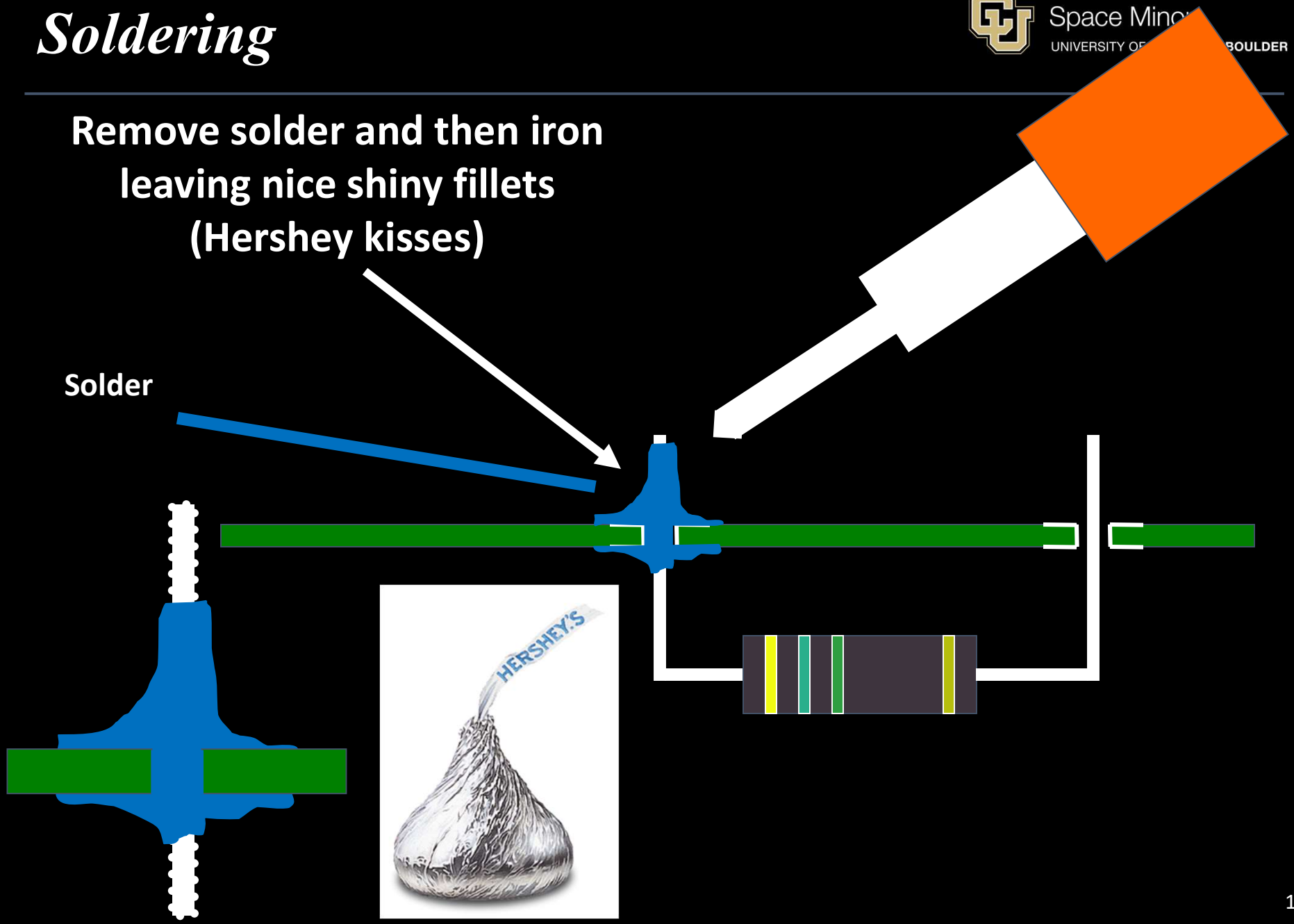
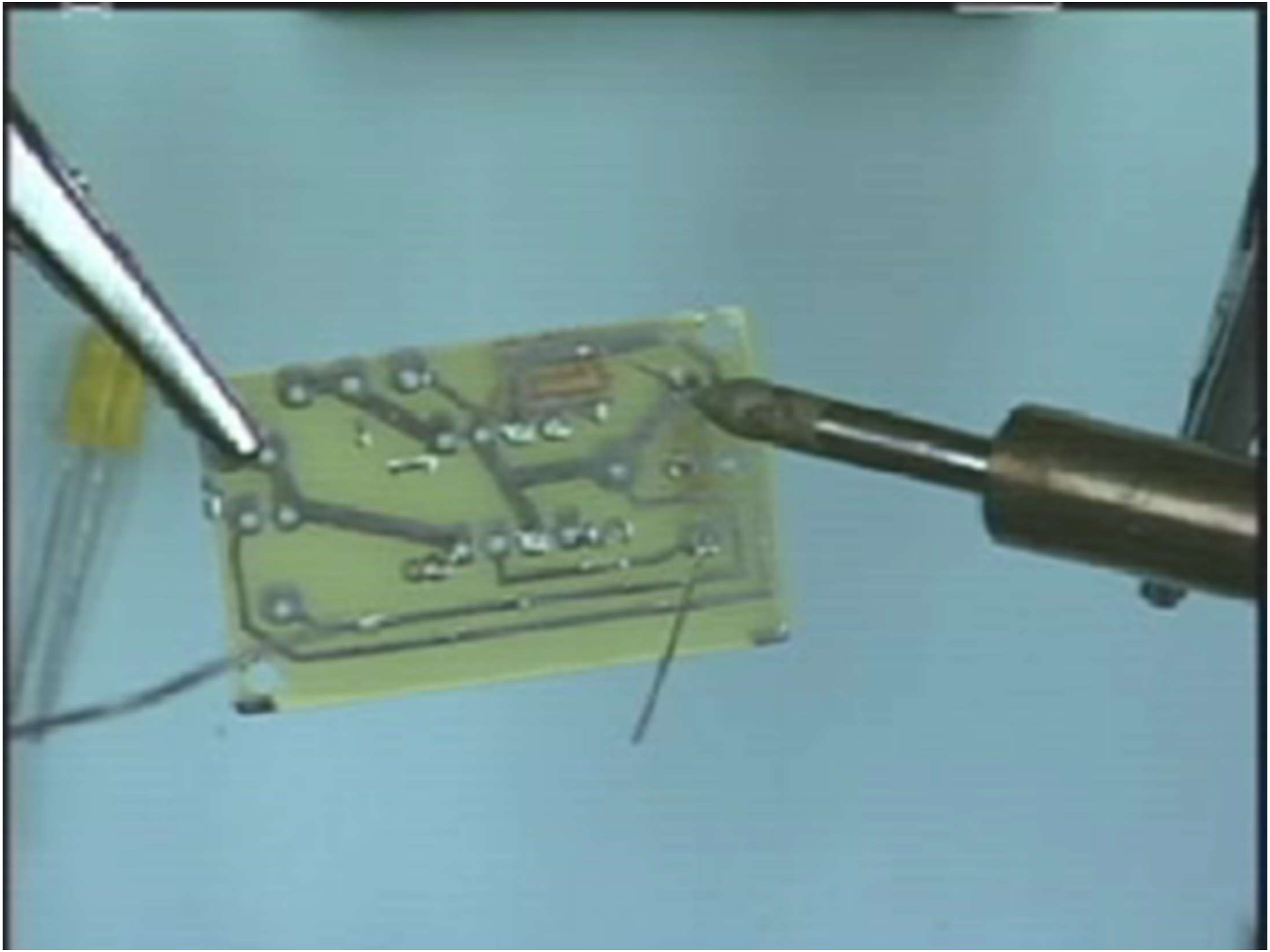
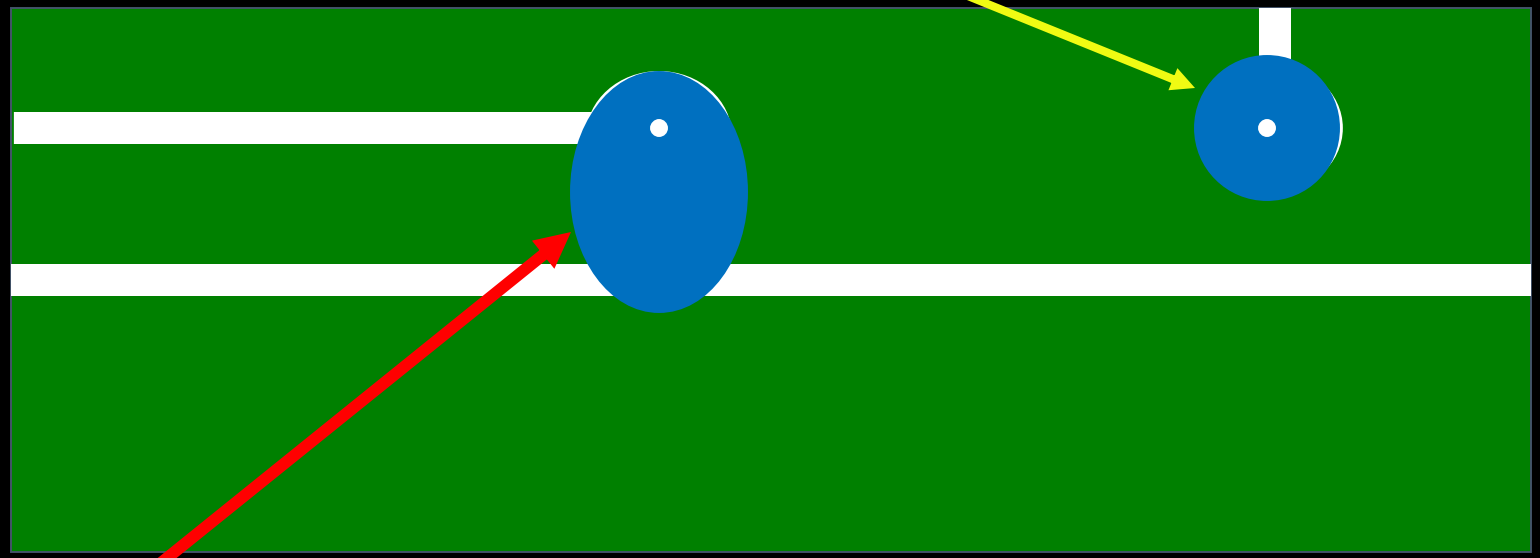
Remove solder and then iron leaving nice shiny fillets (Hershey kisses)





Soldered

Top View



Solder bridge shorting two traces or pads

But, can be fixed by reheating or using solder sucker

Soldering:

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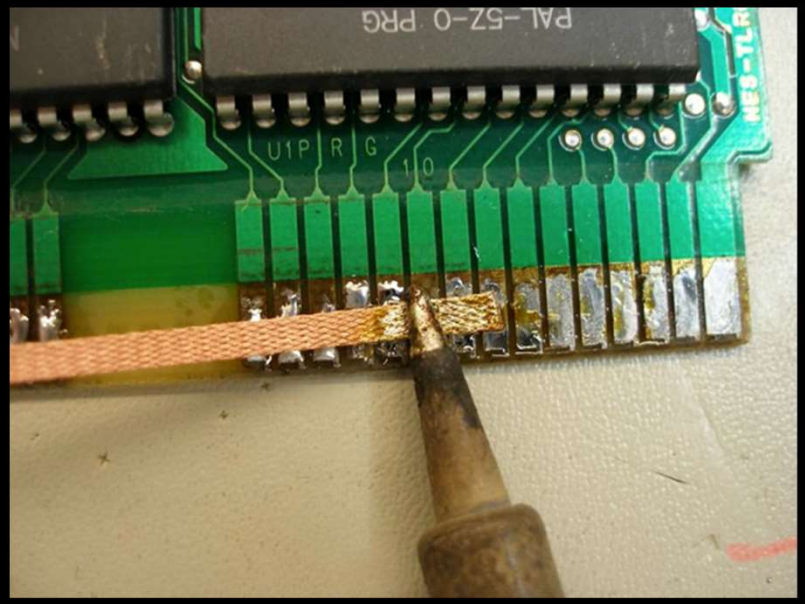
- Easy to add solder or re-melt vs. remove it



Little Quiz!!

Soldering Test:

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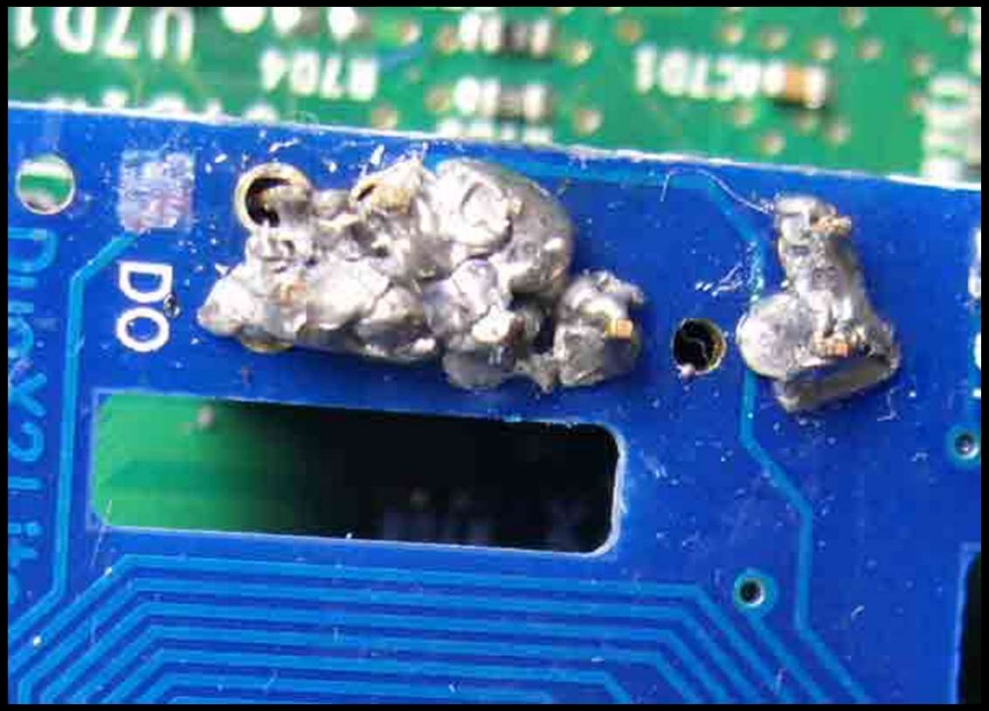

Safety

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- ***- Soldering is dangerous so follow my instructions***
- ***- Be mindful of where you are and where the soldering iron is***
- ***- Eyes and liquid solder – everyone shall wear safety glasses***
- ***- Hair (get it out of the way)***
- ***- If you get burned…***
- ***- LEAD – Wash Hands***

Hands-On Soldering:

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- **I will guide you and the rest of the video through the 20 steps**

- **Turn your soldering irons on now!**

Step 1: Retrieve Kit

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Step 2: Layout Kit

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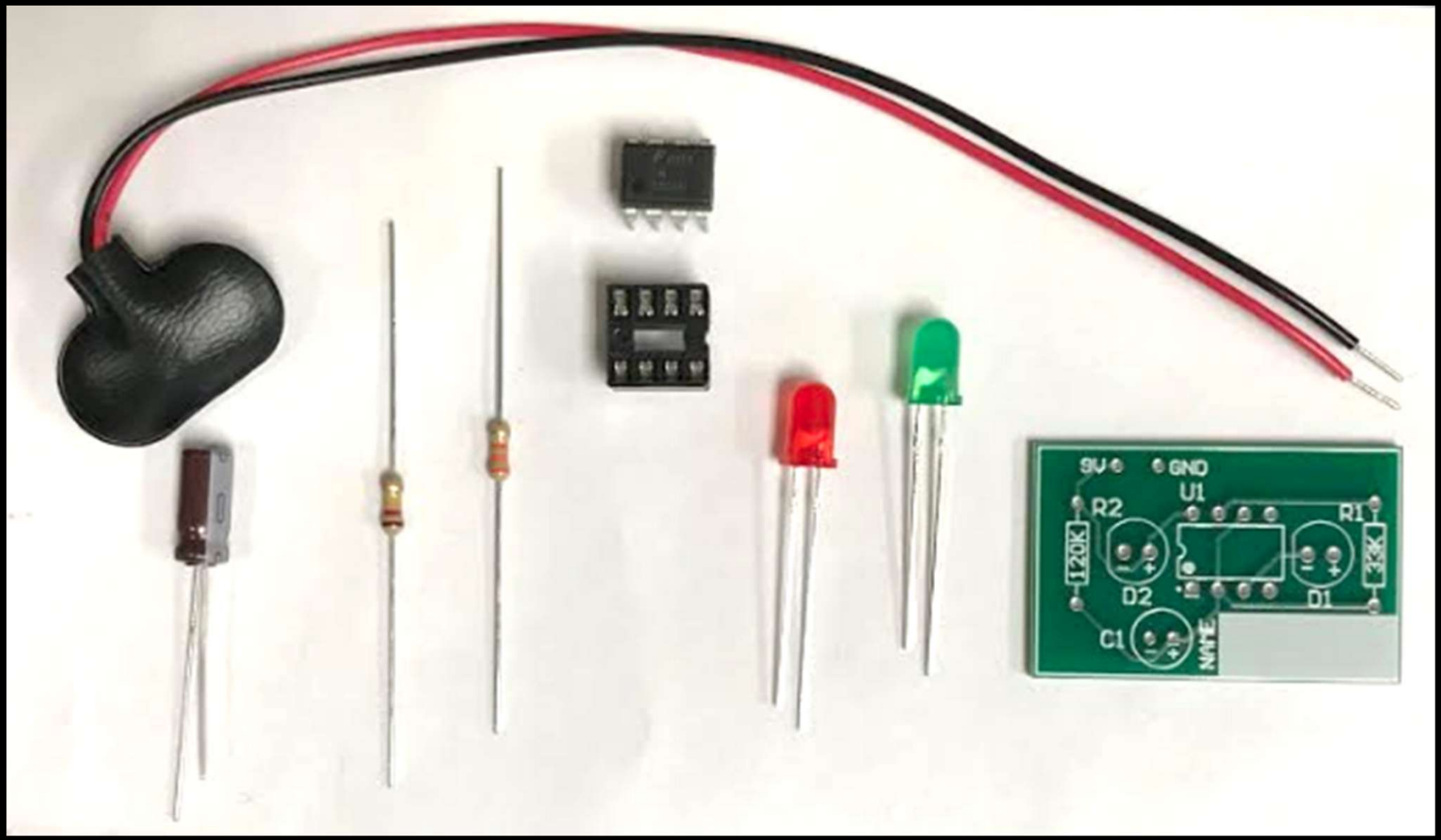

Step 3: Orient board, find reference point

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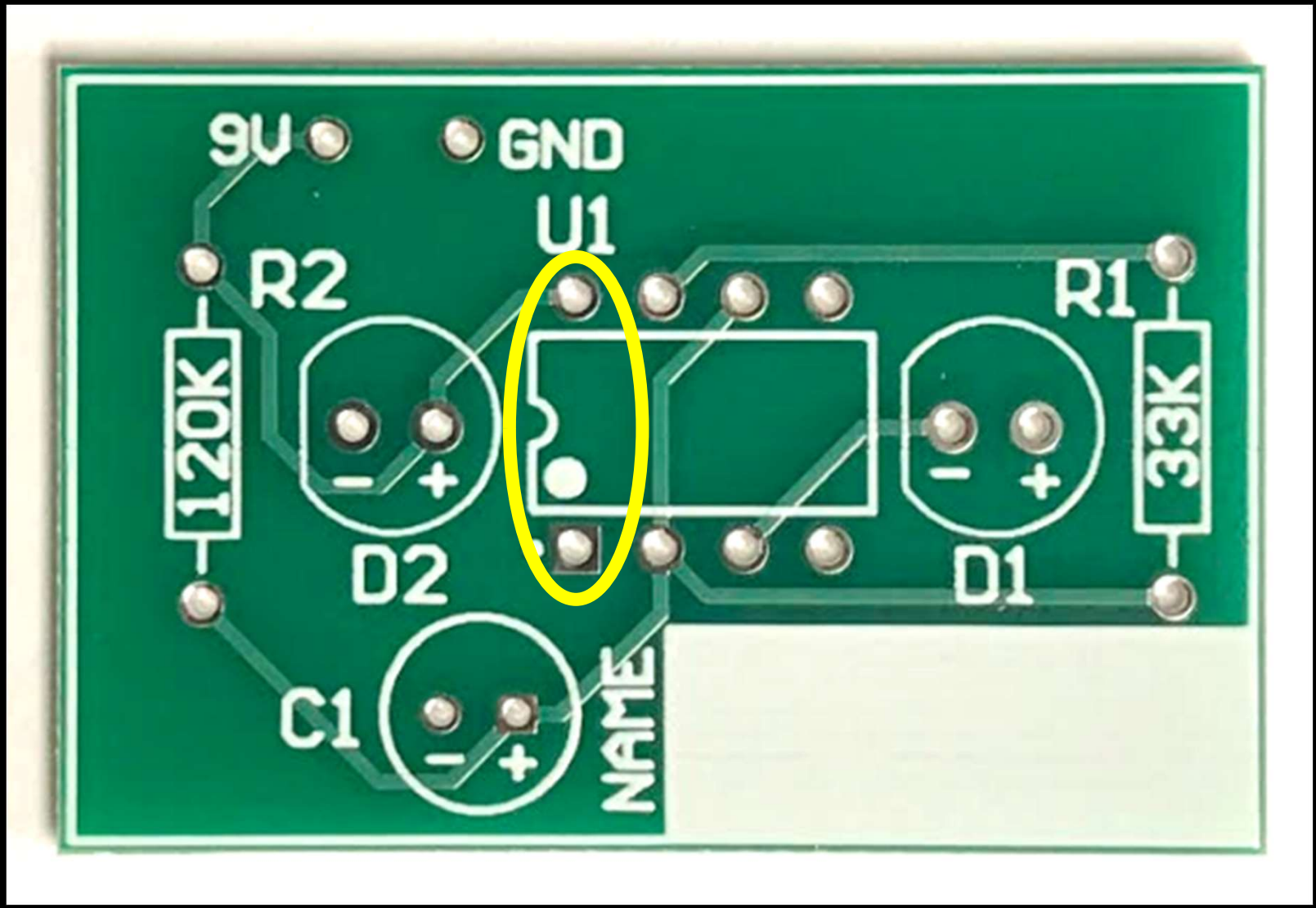

Install Side

Step 3: Orient board, find reference point

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Solder Side

Step 4: Install 8 pin socket

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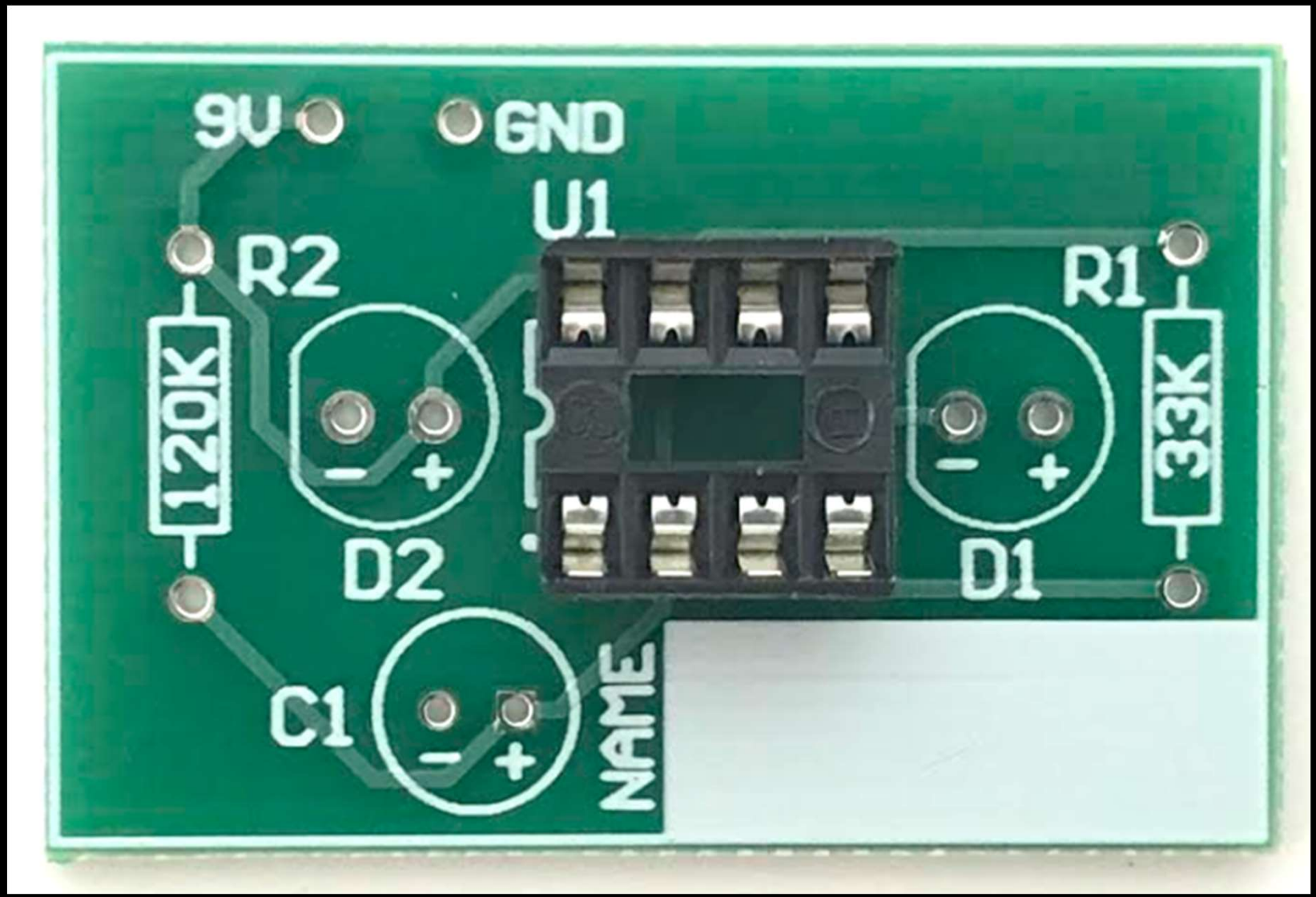

Step 4: Install 8 pin socket

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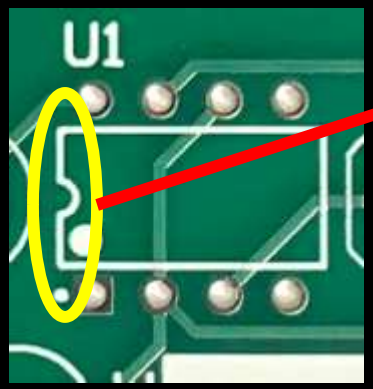
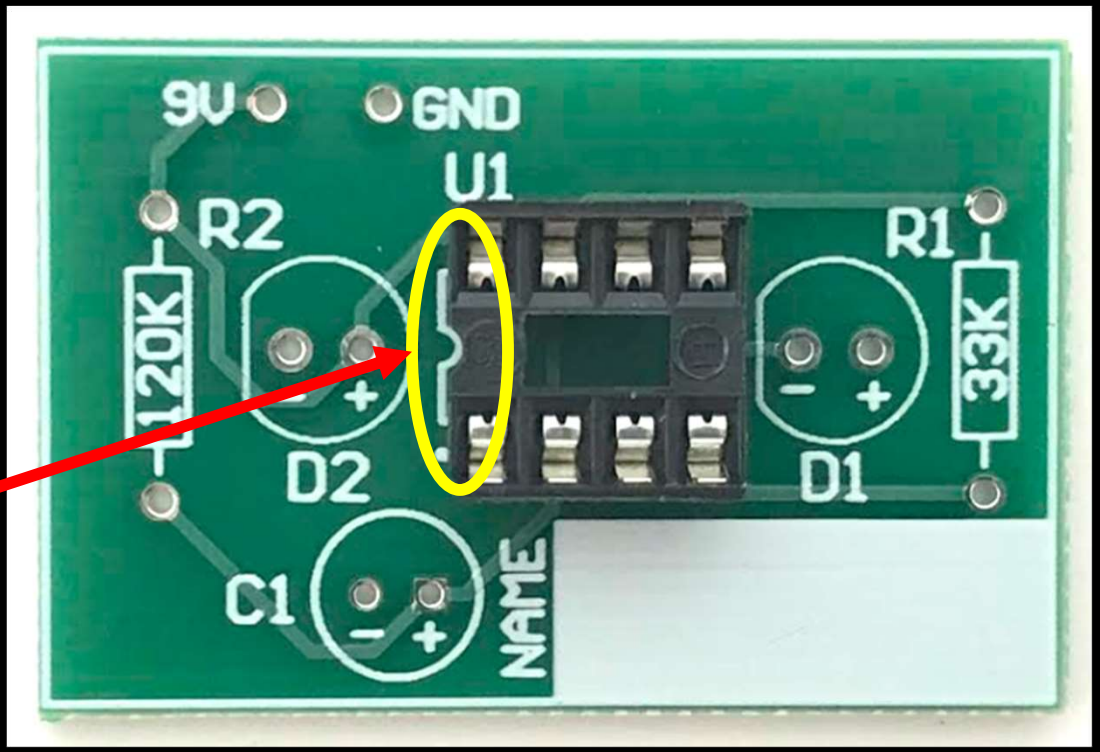
Make sure the notch on the socket matches the notch on the board





Step 5: Socket Lead Bending

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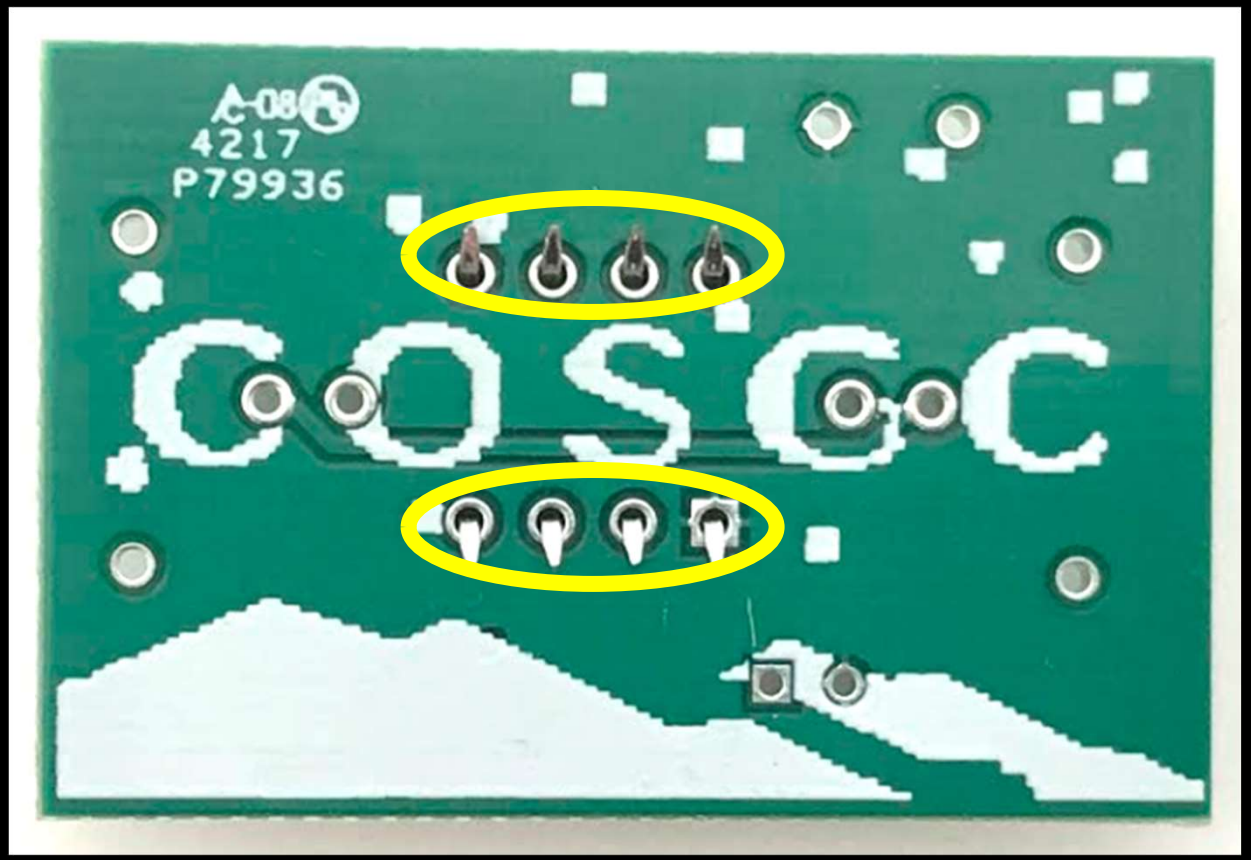
DO NOT SOLDER AT THIS TIME



Soldering:

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- **Tin the tip of the soldering iron by melting an inch or so of solder on the tip**
- **The iron will now look shiny on the tip**
- **Then wipe any excess solder on the golden “sponge”.**

Soldering

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Step 6: Install 33 resistor (Orange, Orange, Orange)

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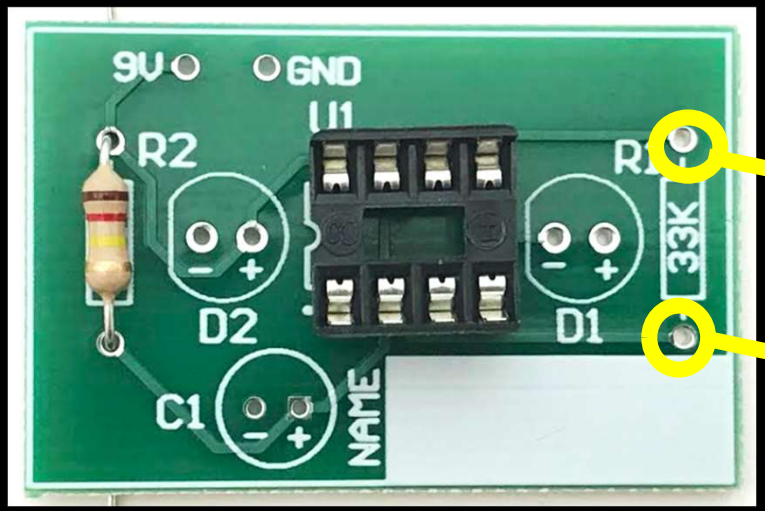
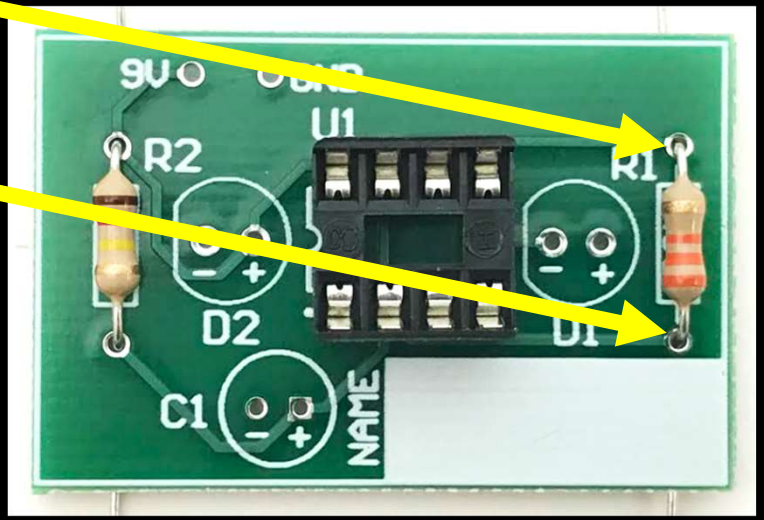
DO NOT SOLDER THE LEADS AT THIS TIME





Step 7: Install 120 kΩ resistor (Brown, Red, Yellow)

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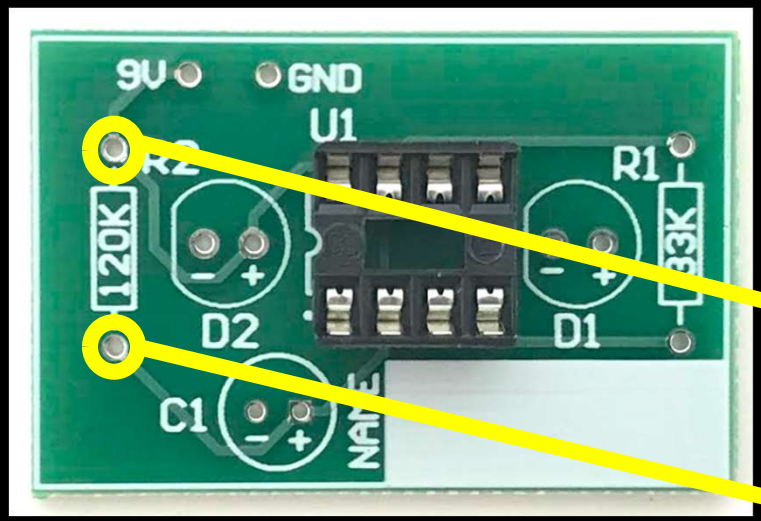
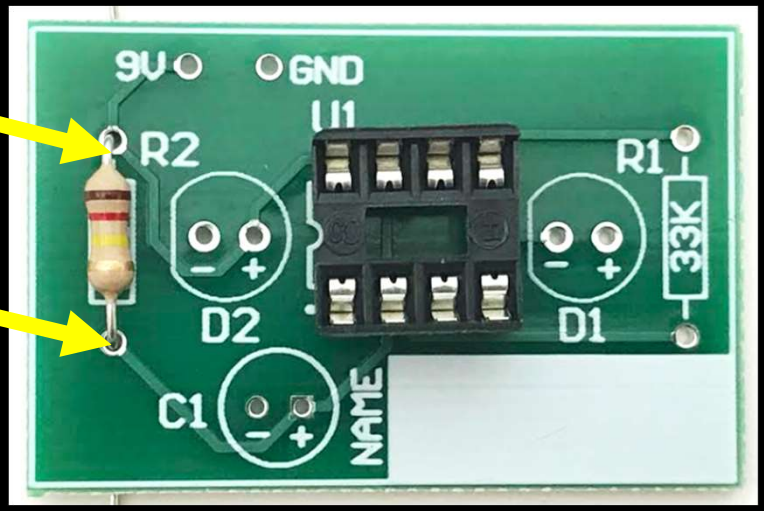
DO NOT SOLDER THE LEADS AT THIS TIME





Step 8: Verify Resistors

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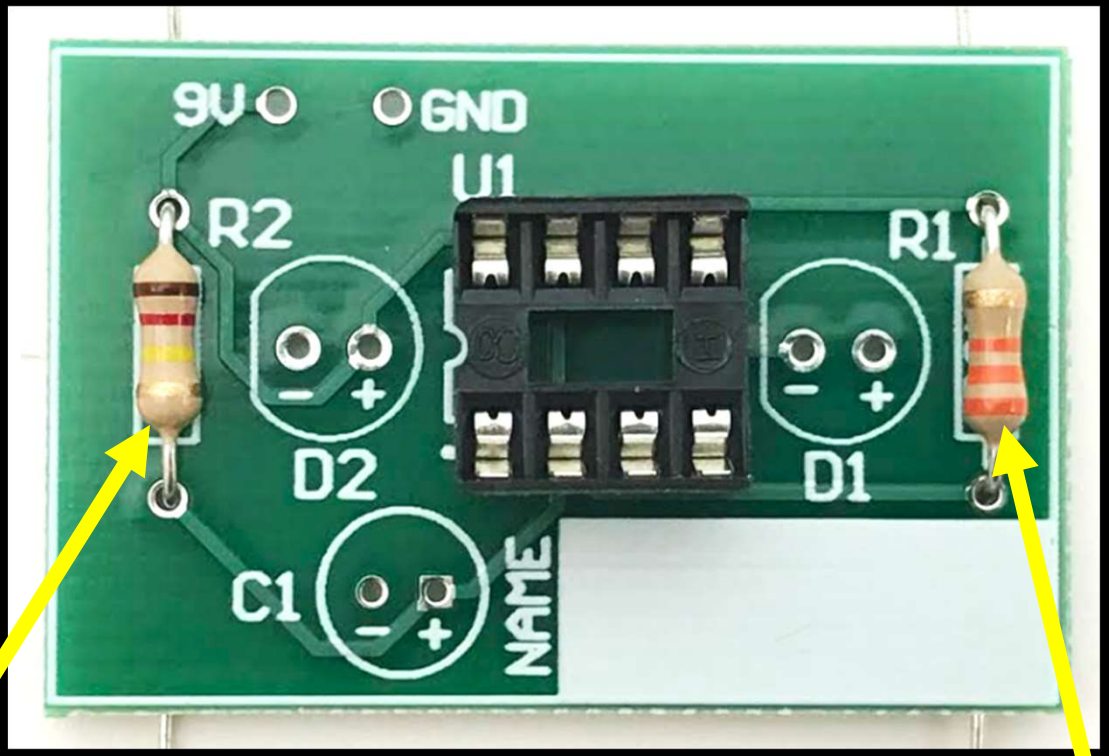

120 kΩ
Brown, Red, Yellow

33 kΩ
Orange, Orange, Orange

Step 9: Solder Resistors

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33 kΩ
Orange, Orange, Orange

120 kΩ
Brown, Red, Yellow

Step 10: Inspect solder joints and trim leads

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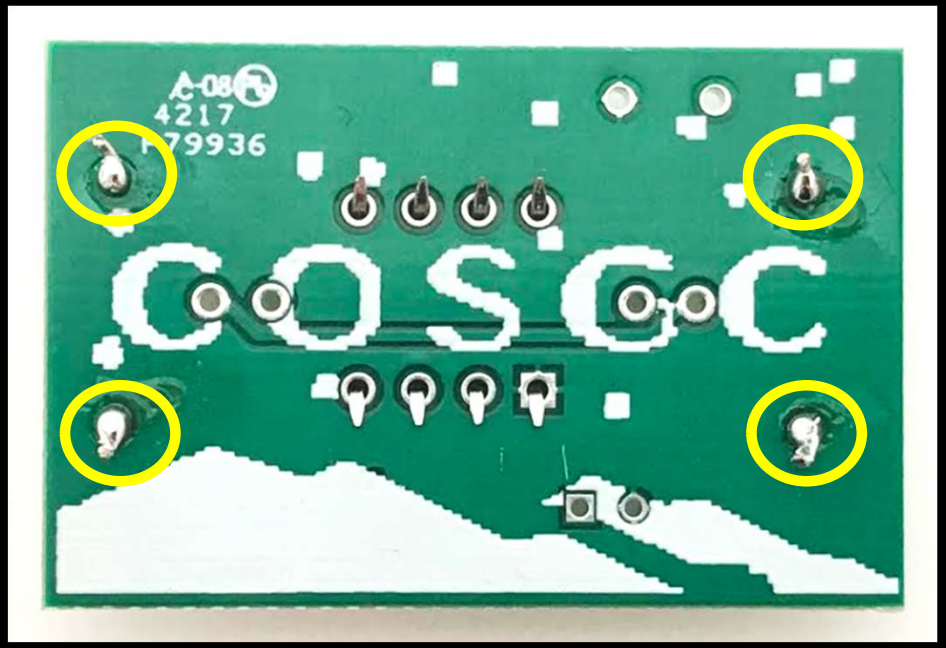
Ok to NOT clip leeds, if you want to wait until the end to ease troubleshooting.



Step 11: Install Capacitor

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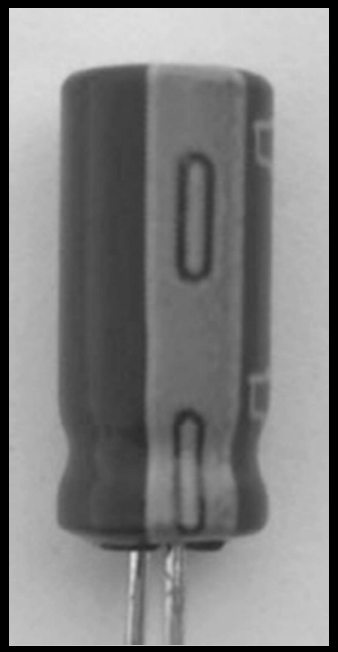
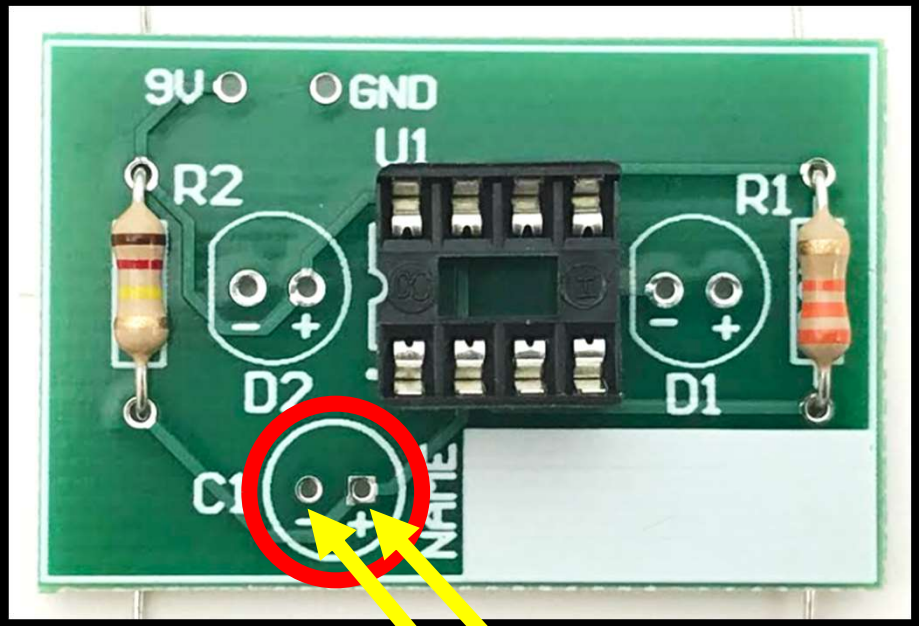
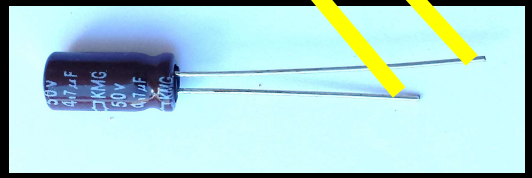
Gray strip indicates "negative" lead





"-" Lead
Shorter Lead



Step 12: Verify capacitor install and solder

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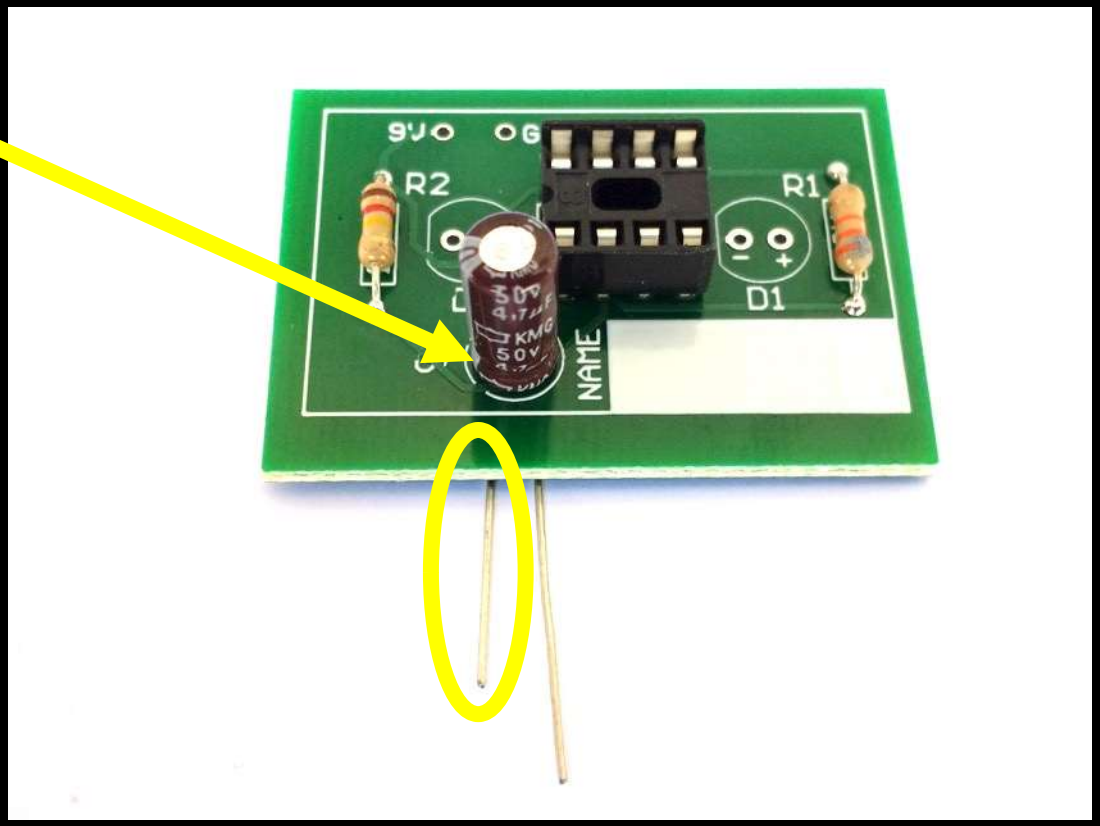
"-" Lead



Step 12: Verify capacitor install and solder

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Also trim leads when finished

Step 13: Install GREEN LED

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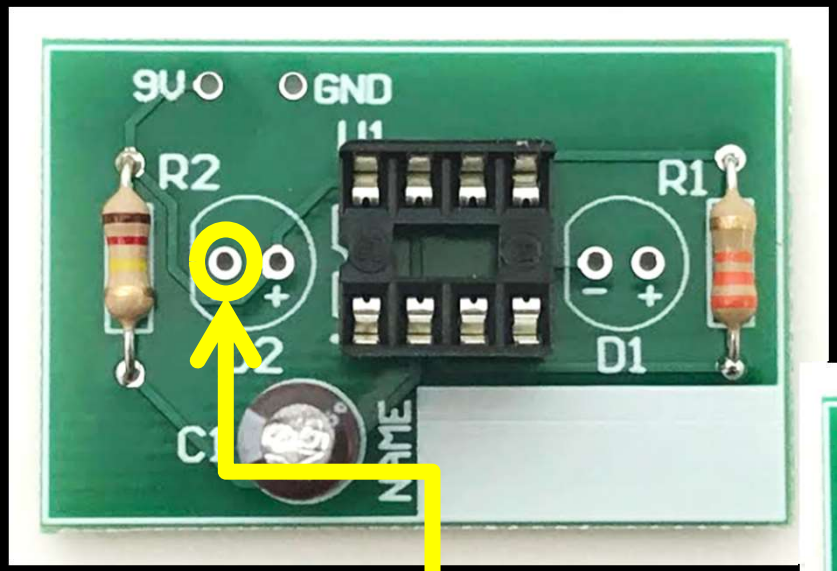
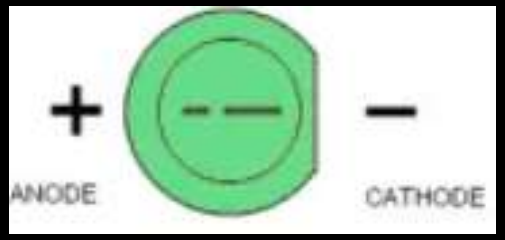
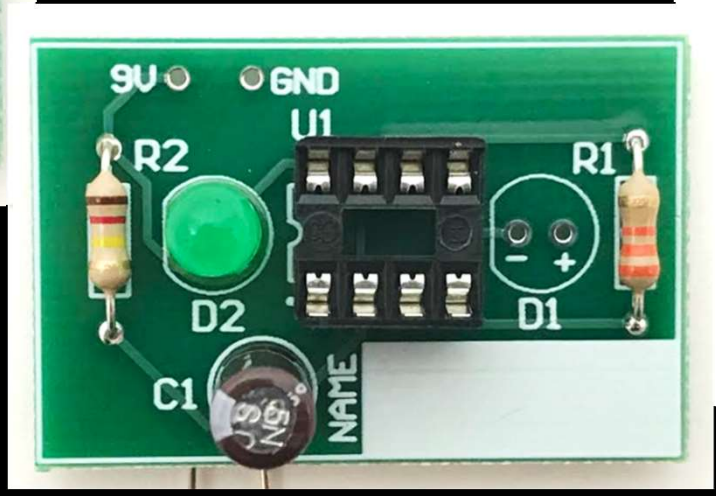
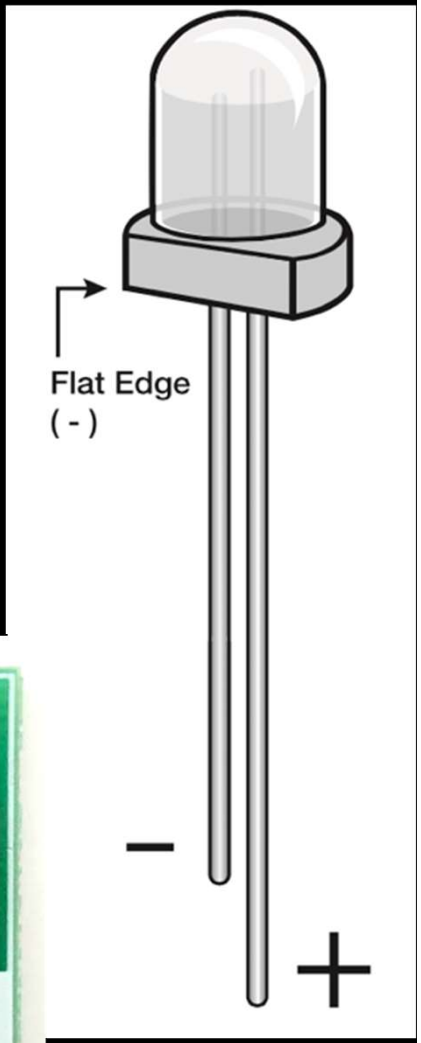
DO NOT SOLDER THE LEADS AT THIS TIME









Step 14: Install RED LED

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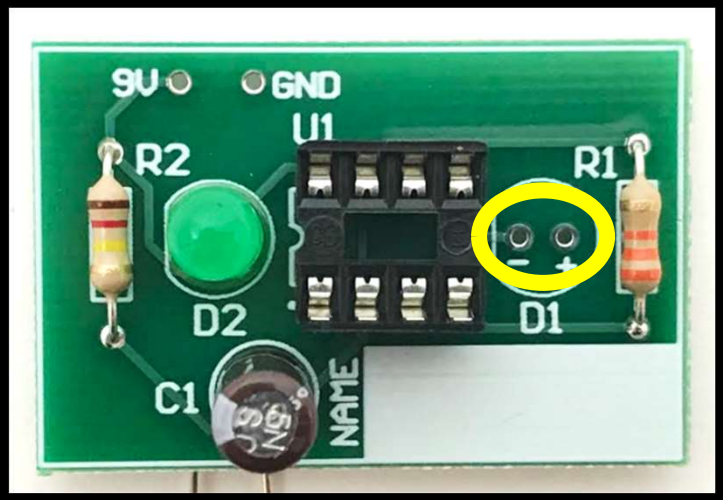
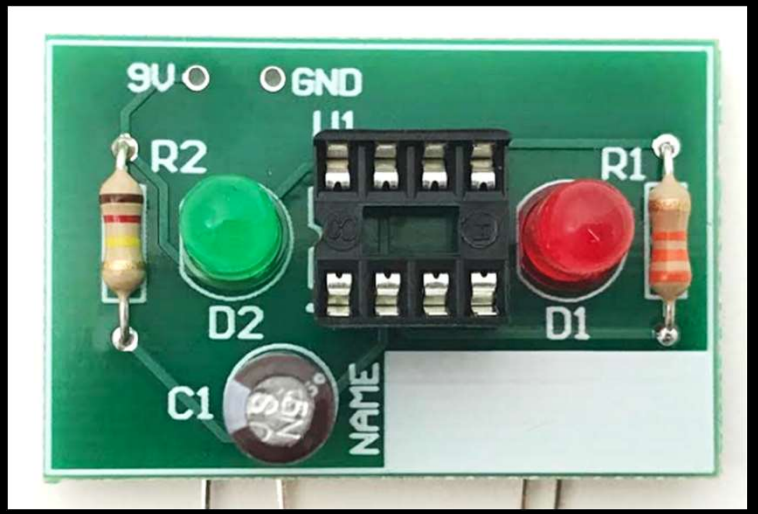
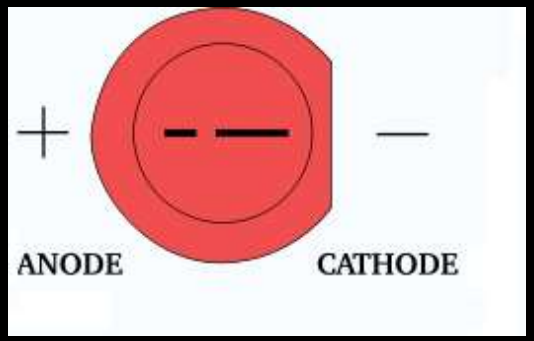
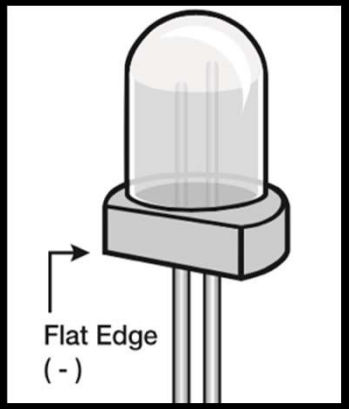
DO NOT SOLDER THE LEADS AT THIS TIME









Step 15: Verify and solder LED leads

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Also trim leads when finished

Step 16: Solder socket to board. Go Slow

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Verify solder joints and check for solder bridges

Step 17: Install the chip

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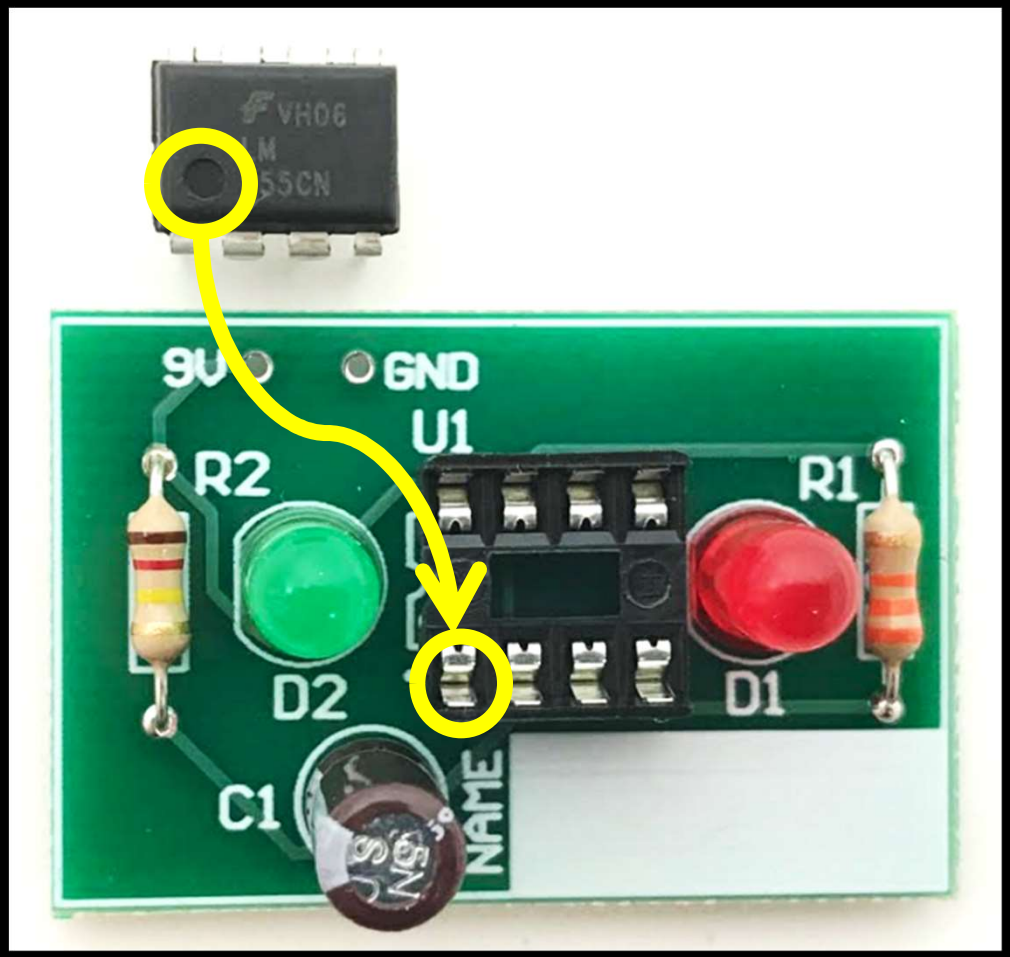
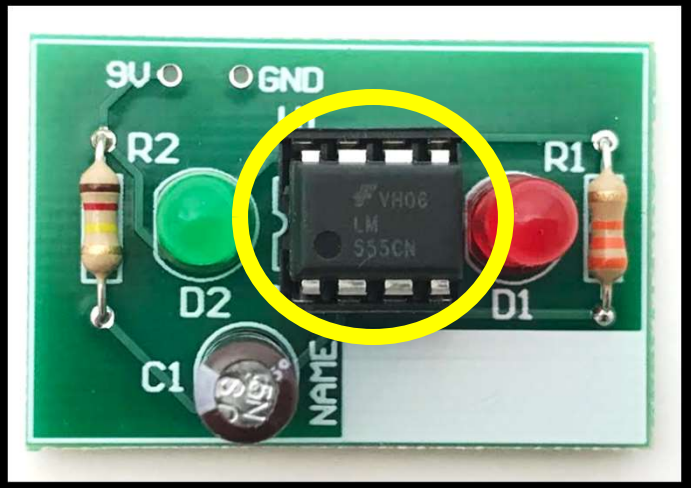


Small circle on chip placed over pin hole "1" on socket



Step 18: Install 9V battery clip to board

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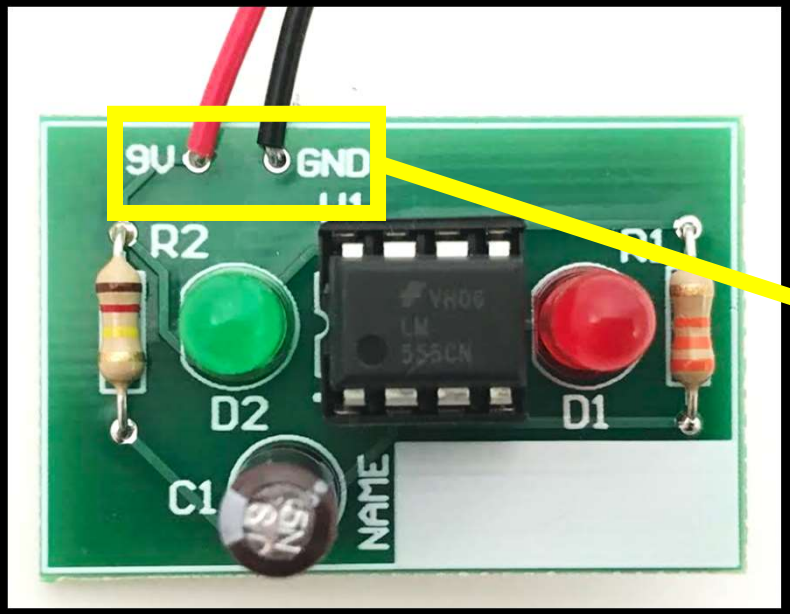
Install 9V battery clip to board



9V = Red
GND = Black

Step 19: Solder battery leads

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Step 20: Attach test battery

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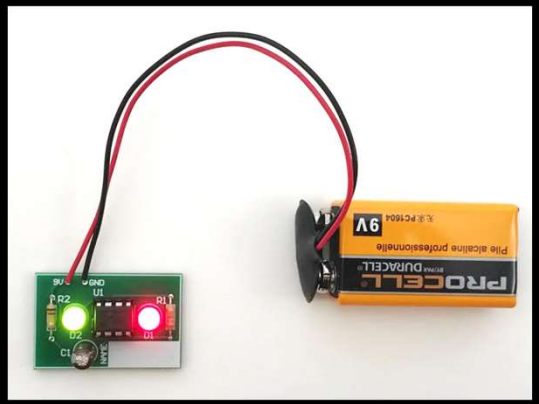
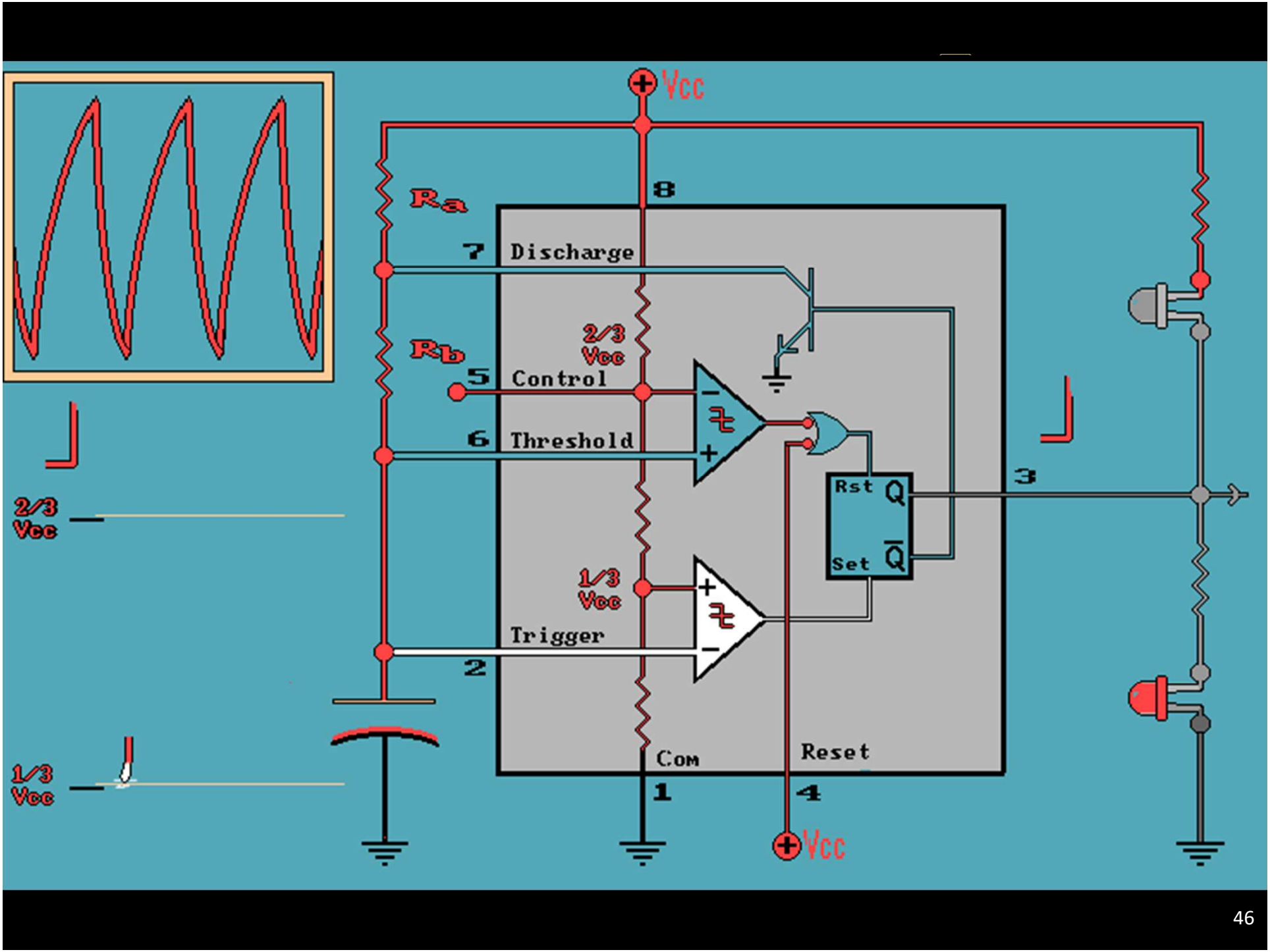
If LEDs don't blink, detach battery <u>immediately</u>.

- **Go through steps and see if you find any mistakes.**
- **Do any component need to be desoldered/resoldered?**
- **Check polarity!**
- **Use the multimeter to make sure all connections have been made.**




Vcc
Ra
8
7
Discharge
Rb
2/3
Vcc
5
Control
6
Threshold
2/3
Vcc
Rst
Q
3
Set
Q
1/3
Vcc
Trigger
2
1/3
Vcc
Com
Reset
1
4
Vcc