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Soldering Class

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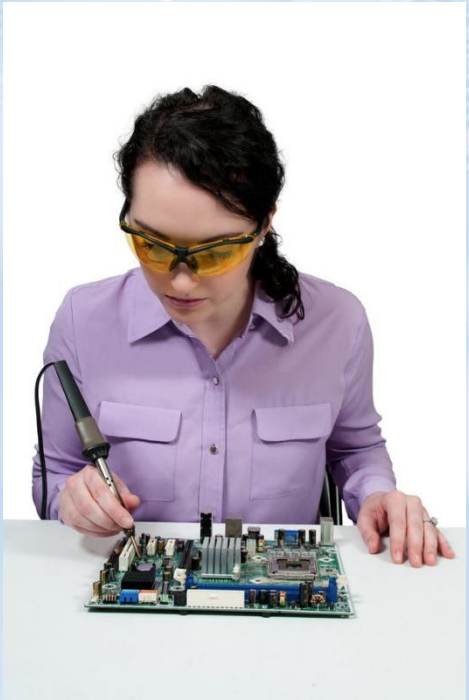
Soldering Electronics

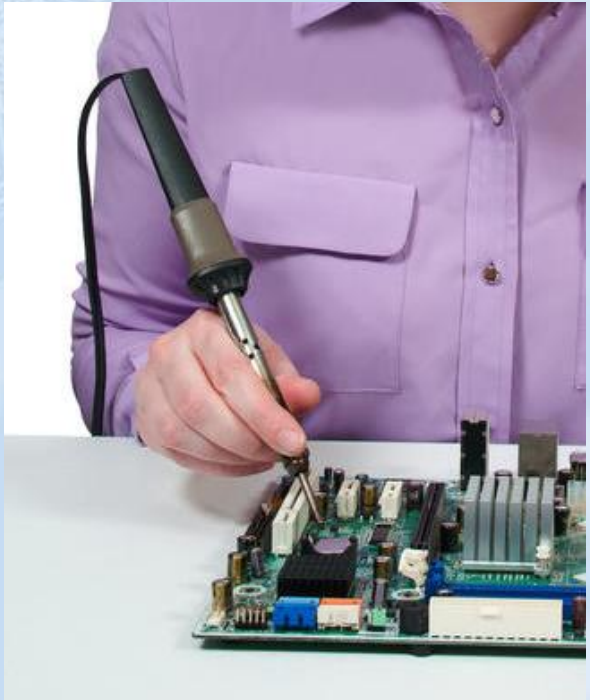
- PTH – Plated Through Hole
- Wire to Wire
- Wires to RGB strips
- SMD - Surface Mounted Devices

Safety First

- Solder irons are HOT 600-700 degrees
  - Work on stable level surface
- Solder contains LEAD Dangerous for children
  - Wash your hands afterwards
- Soldering generates nasty fumes
  - Work in a well ventilated area
- Wear safety glasses and adequate clothing
- Work in a well lit area

Safety First





Supplies / Tools

- Solder iron – good quality (Weller WLC100 $38)
- Solder – Kester 44 – ROSIN CORE 60 tin/40 lead
- Flux Pen – Tip Cleaner – Tinning Block
- Desoldering Iron – Solder Wick
- Flush Cutters – Tweezers – Needle Nose Pliers
- Magnifier – Light
- Fume Extractor / Fan
- PCB Vise – Helping Hands – Blue Tape
- Multimeter

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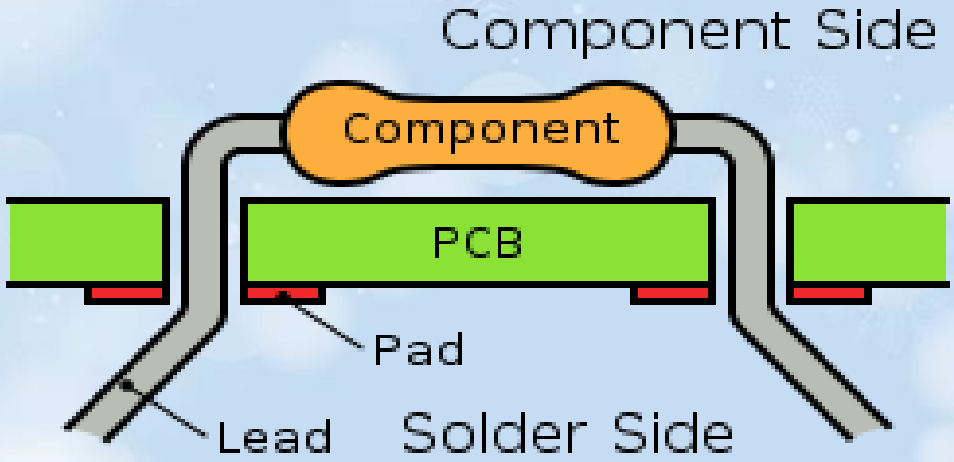
Getting Started

- Layout PCB and all Parts
- Start with the smallest and shortest components
- Some components have polarity
  - LEDs & Capacitors & Diodes (longer lead is +)
- Get comfortable with all tools and components within easy reach
- Heat up your soldering iron
- Get ready for fun!

Get Ready

- Bend component leads to fit holes
- Insert and bend slightly outward



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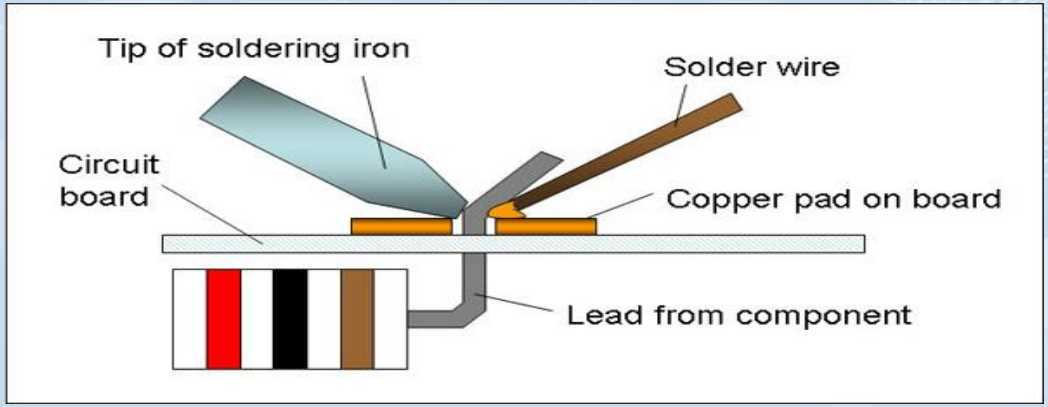
Get Set

- Solder needs a clean surface
  - Isopropyl alcohol and soft brush if needed
  - Flux (pen, paste or liquid) will help solder flow
- Heat the connection for a second, then apply the solder
- Too much heat will damage the pad/trace



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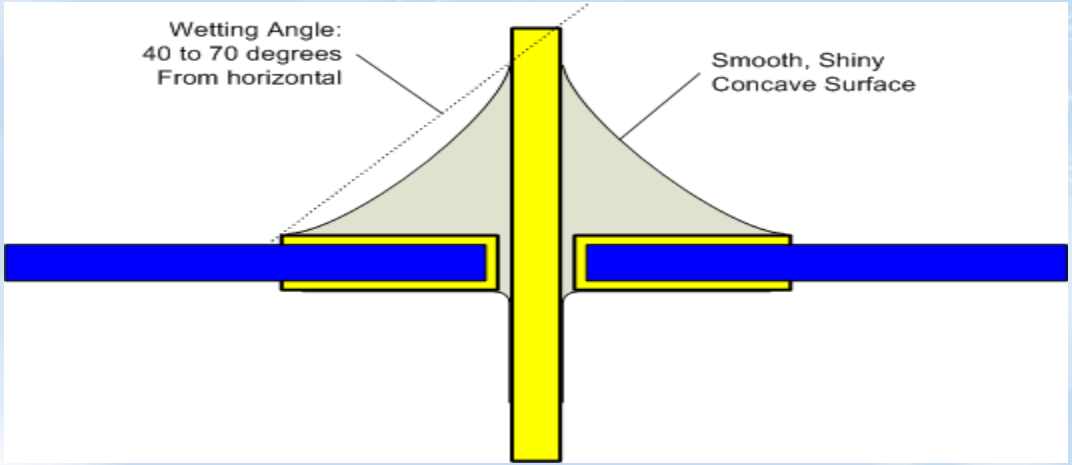
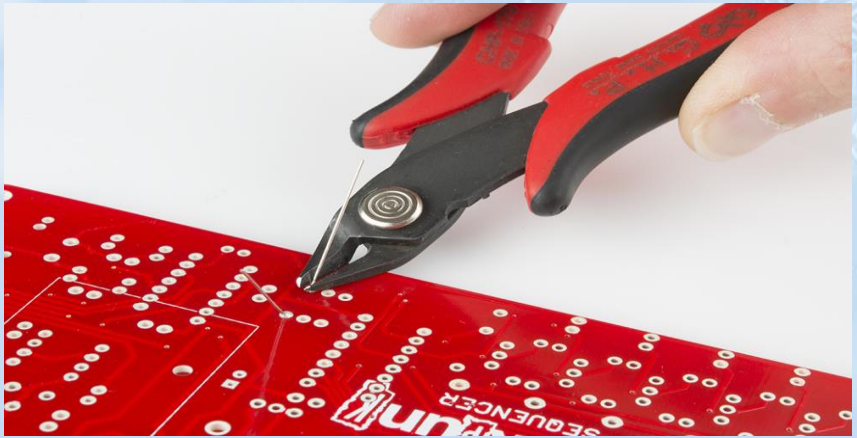
GO!

- Apply enough solder to flow through the hole to the back side and create a cone on the component side



Inspect and Trim

- Check your solder connections on both sides.
- Trim with flush cutters right above the solder cone placing your other hand above the wire to catch the flying wire.



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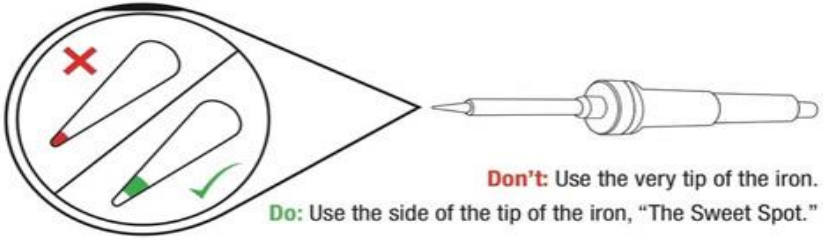
Common Problems

- Solder will not flow
  - Iron, component or trace may be dirty
  - Be sure tip is clean and tinned
  - Clean with Isopropyl Alcohol or apply flux
- Connection not shiny
  - Parts may have moved before solder cooled
  - Reheat or apply flux and reheat
  - Some parts may require more heat for good flow

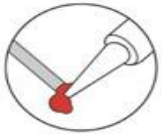


Don't: Use the very tip of the iron.

Do: Use the side of the tip of the iron, "The Sweet Spot."

Do: Touch the iron to the component leg and metal ring at the same time.

Do: While continuing to hold the iron in contact with the leg and metal ring, feed solder into the joint.



Don't: Glob the solder straight onto the iron and try to apply the solder with the iron.

Do: Use a sponge to clean your iron whenever black oxidization builds up on the tip.

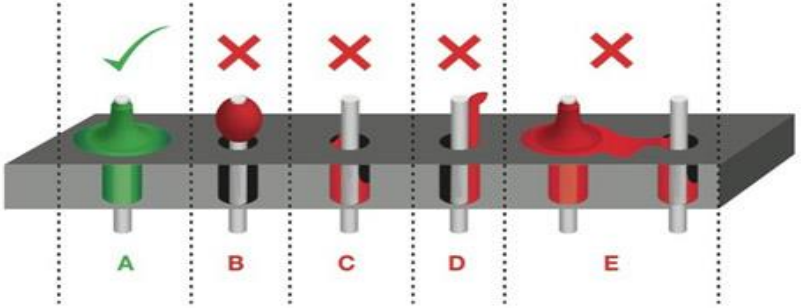
A Solder flows around the leg and fills the hole - forming a volcano-shaped mound of solder.

B Error: Solder balls up on the leg, not connecting the leg to the metal ring.
Solution: Add flux, then touch up with iron.

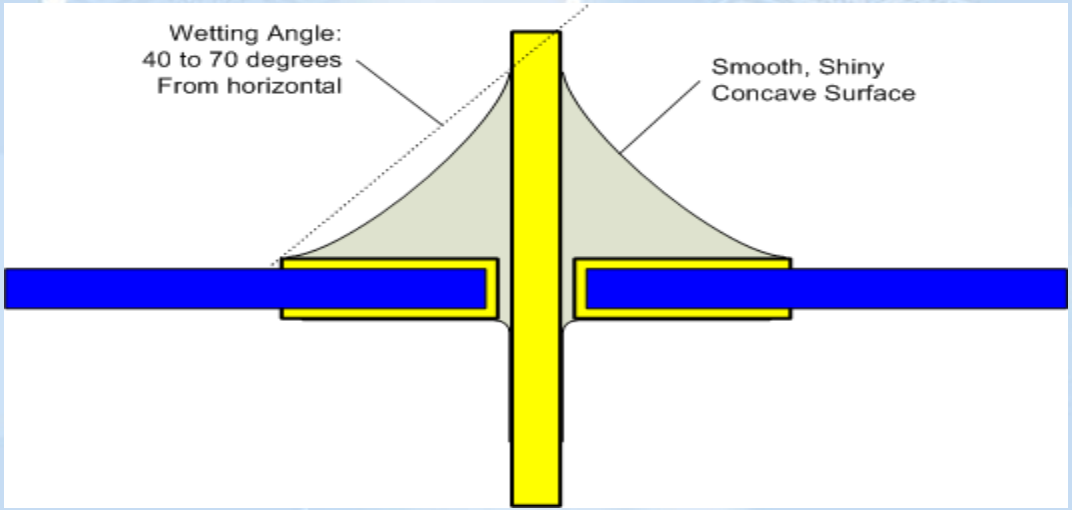
C Error: Bad Connection (i.e. it doesn't look like a volcano)
Solution: Flux then add solder.

D Error: Bad Connection...and ugly...oh so ugly.
Solution: Flux then add solder.

E Error: Too much solder connecting adjacent legs (aka a solder jumper).
Solution: Wick off excess solder.



Good Soldering



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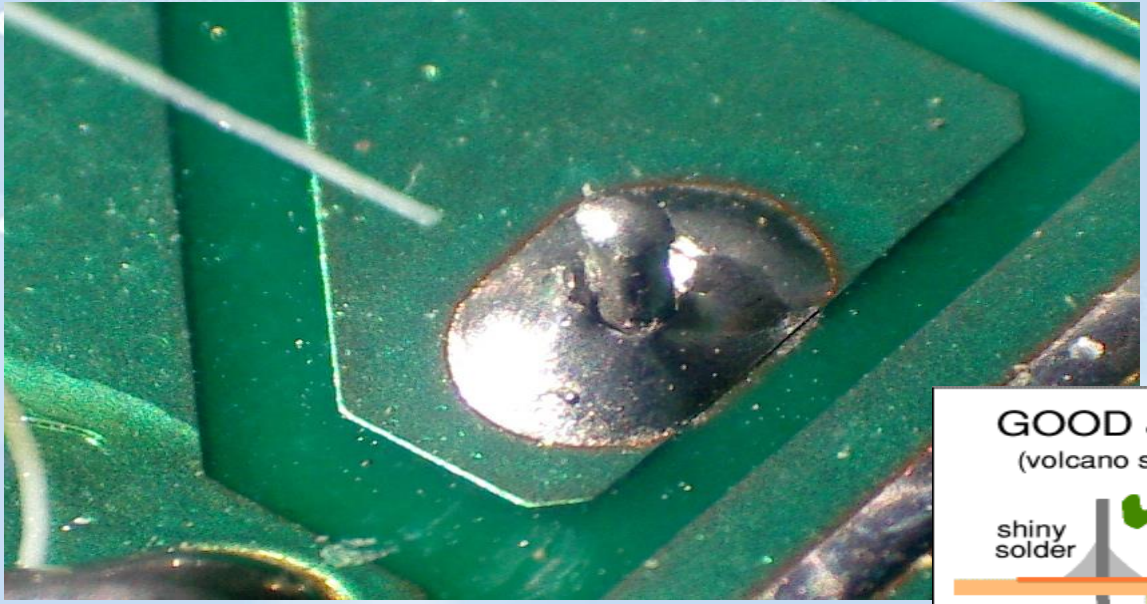
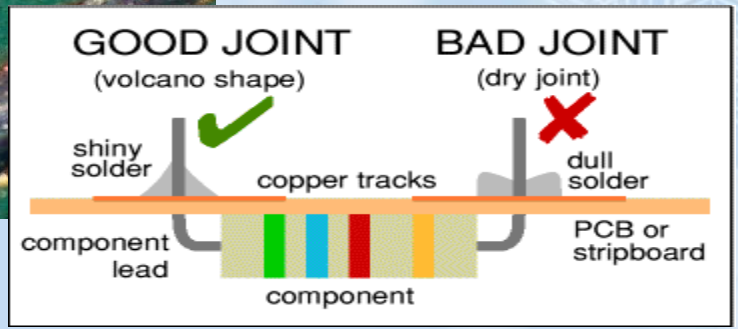
Poor Soldering





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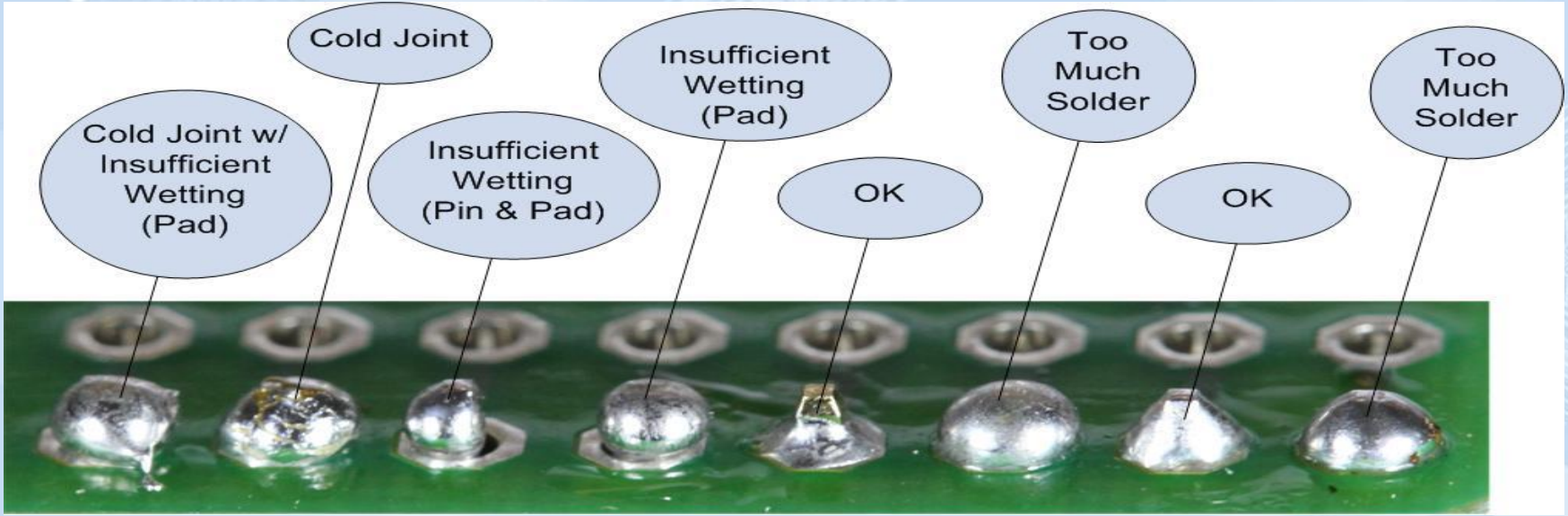

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De-Soldering

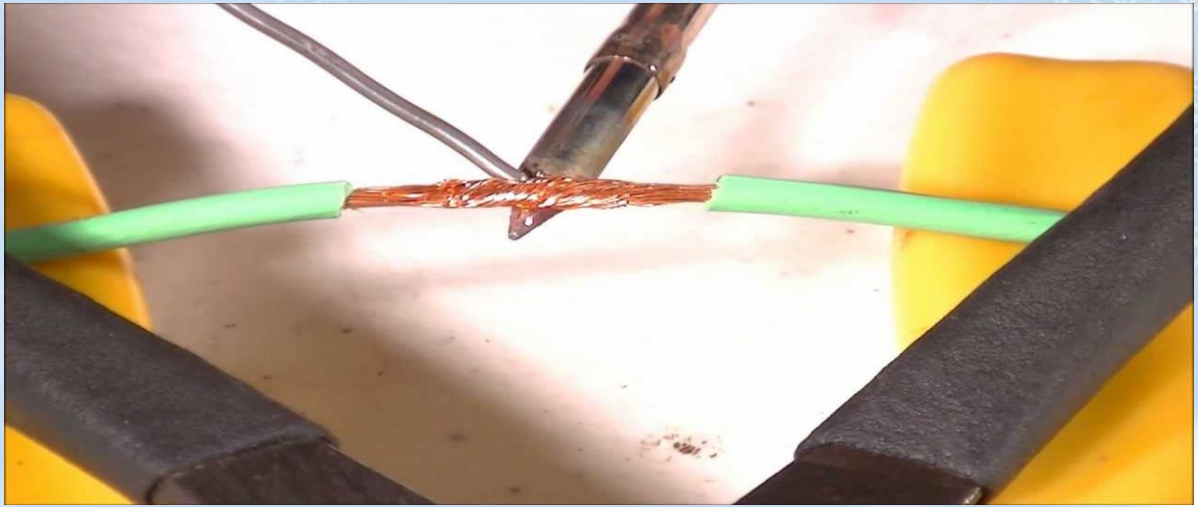
- Not just for poor connections but for Replacement & Salvage
  - Solder Wick
  - Solder Sucker
  - Solder Iron w/ sucker

Soldering Wire

- Helping Hands – No - Not your kids hands

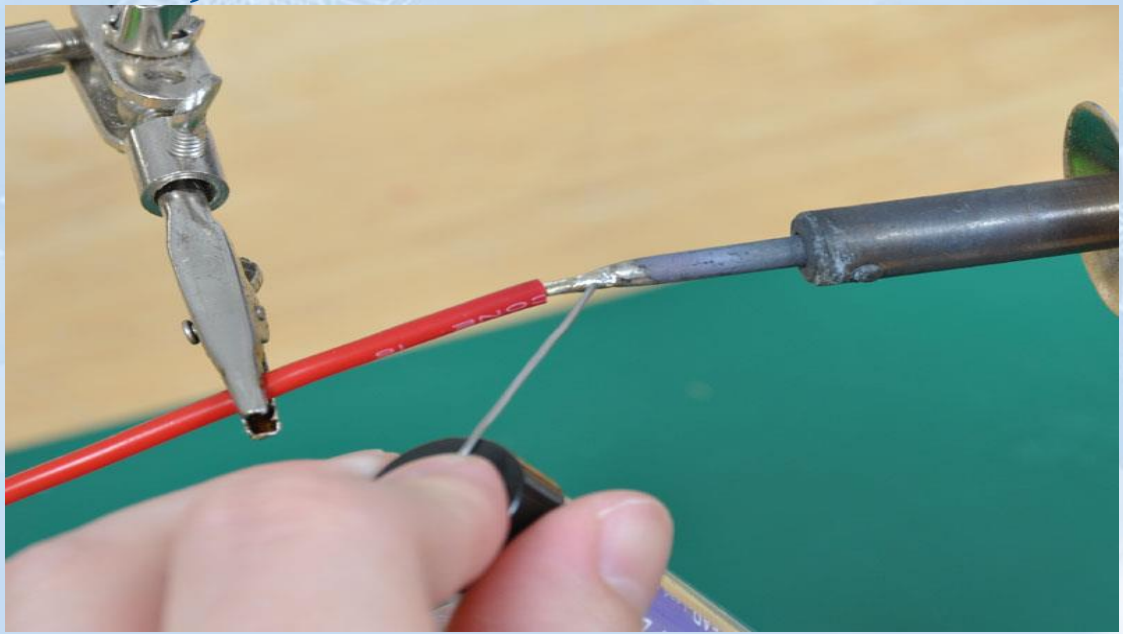
Prepare Wires

- Strip and twist wires OR…



Prepare Wires

- For smaller gauge wires - Just twist and tin
- Leave a bit more solder on each
- Flux will help



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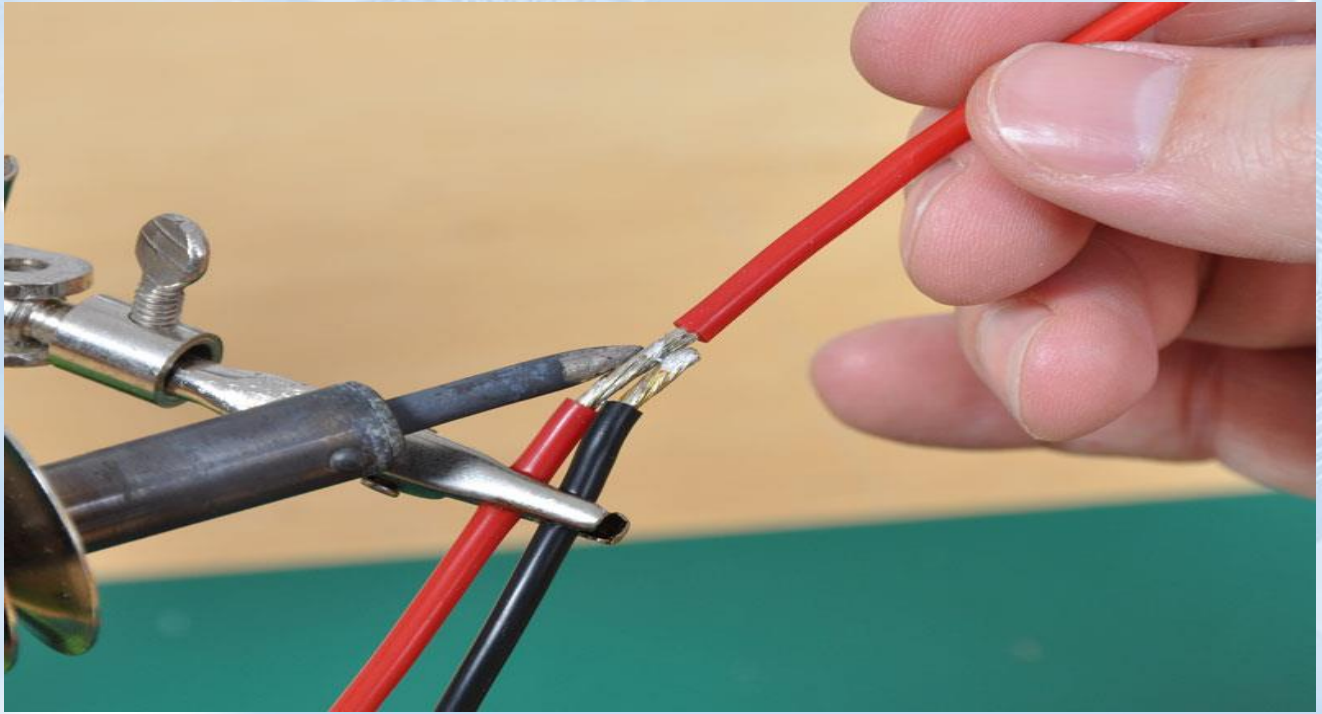
Reheat & Join



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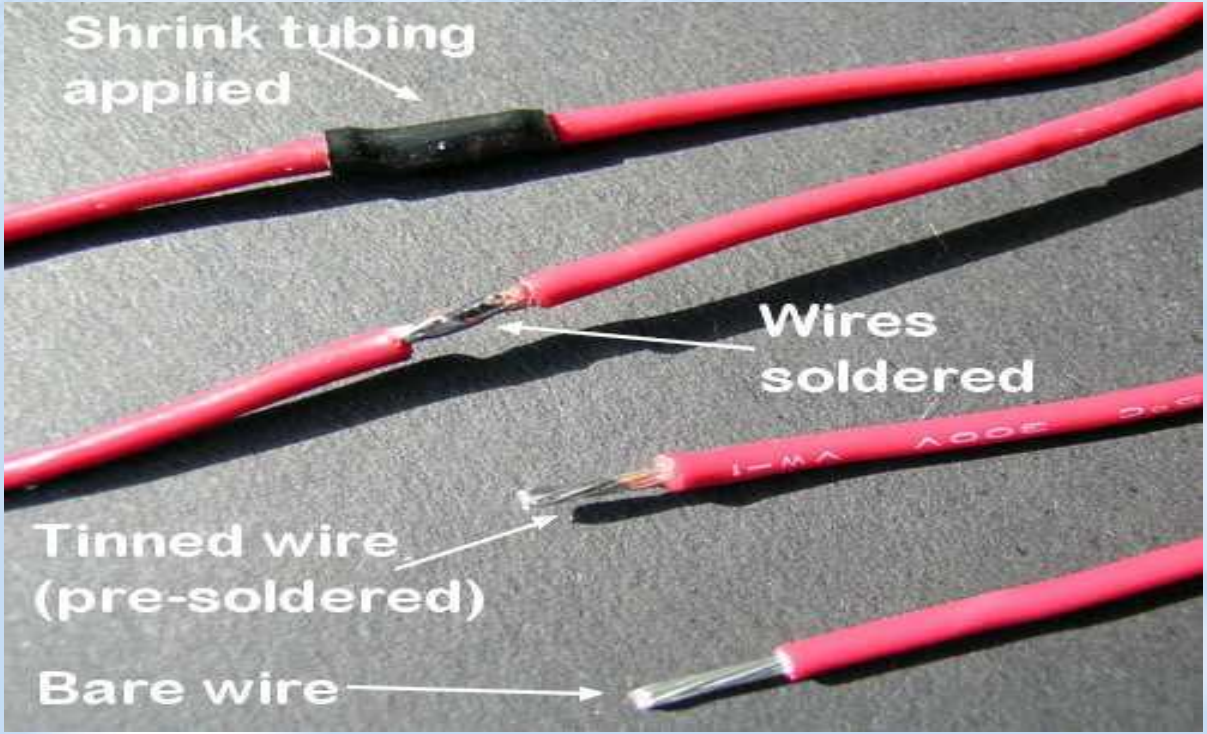
Solder & Shrink



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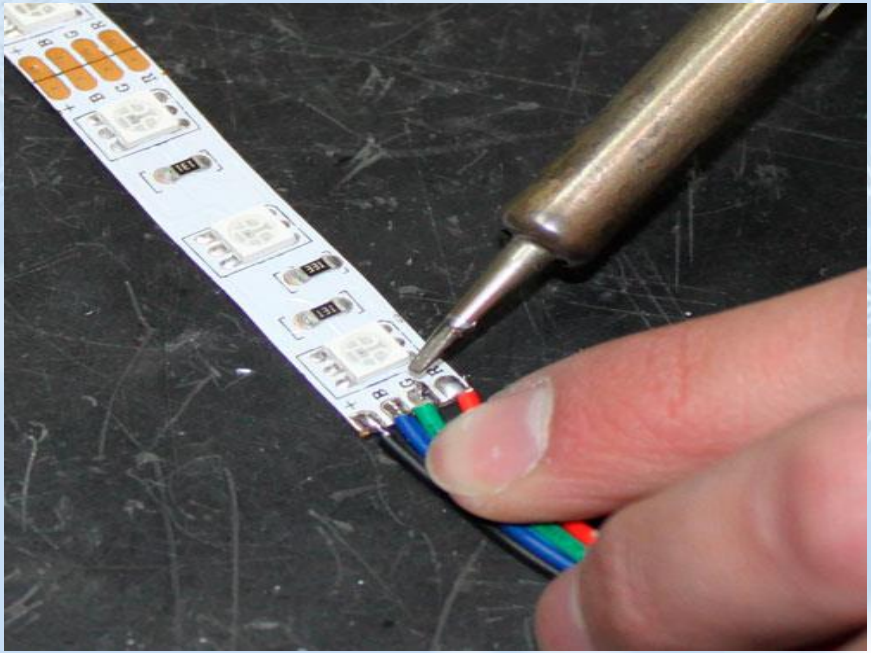
Wires to Strips

- Pull back the silicon sleeve
- Tin both the wire and the strip pads
- Pads are delicate
- Hold until set
- Cover with hot glue or silicon glue for strain relief



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Velleman MK100

Electronic Christmas Tree with 16 Blinking LEDs

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It's Soldering Time!

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Thank you for being a part of the Christmas Expo family!