

Soldering Basics

Lee Dobyns 1/2020

1. Topics
2. Types of soldering
3. Types of solder
4. Equipment
5. Solder and Flux
6. Connection Methods
7. Do's and don't
8. Workshops – sharpen your skills

Types of Soldering

- Direct heat
 - Guns, pencil irons, stations
- Solder Bath
- Resistance

Types of Solder

- Lead/Tin 60/40
 - Different thicknesses
 - Most include one or more rosin cores
- Silver/Tin
 - Now used for water supply
 - Requires special flux
 - Circuit boards
- ROHS
 - Has greatly reduce the use of Lead based solder

Equipment

- 25-35 Watt pencil iron is the most common
 - Cheap, Long heat up, no temperature control
- Large pencil iron
 - Not used much anymore
 - Very long heat up, no temperature control
- Pencil iron – temperature controlled
 - Grounded – safe for electronics, reduce static
 - Adjustable temperature
 - Temperature held very stable
 - Can be used to solder large bus
 - Suggest Hakko 936 or 888D station. One on Amazon for \$85-99 with one tip.
 - http://www.amazon.com/Hakko-FX888D-23BY-Digital-Soldering-FX-888D/dp/B00ANZRT4M/ref=sr_1_1?ie=UTF8&qid=1453982664&sr=8-1&keywords=hakko+fx888+soldering+station
- Gun - 200 and 325 watt versions
 - Fast heat up
 - Tips have shorter life
 - Good for large bus wire
- Resistance
 - Good for bonding small-medium metals

Solder and Flux

- Solder needs flux to help it clean & bond to the metal
- The flux can be inside the solder in small cores
- Types of flux
 - Rosen – Used with electronics
 - Acid – Used with metals
- Solder has a wide range of sizes based on work being done and amount to be applied
- FastTrack turnouts require liquid acid flux to solder the nickel silver rail. Acid flux must be removed after soldering is complete. Use a water and baking soda bath to neutralize acid.

Connection Methods

- Joining two wires – loop and crimp, apply heat shrink to insulate
- Parallel wires – use tools to hold
- Terminal strip or connector – loop and crimp
- Large bus with small wires- wrap small wire around larger wire
- Circuit board – through hole
- Surface mount – Hard to repair
- Suitcase connectors – throw away

Do's and Don't

– DO

- Clean tip before and after each use
- Use moist sponge to clean tip
- Apply heat before solder. Not doing this can result in cold solder joint and loose connections
- Turn off Hakko station if not using for 5 minutes. Will increase tip life and save energy. Very fast warm-up.
- Use grounded tip for electronics.
- Consider using static strap on wrist to reduce static.

– DON'T

- Don't move wires until solder cools. Will result in cold solder joint.
- Don't carry solder to job on the tip. Always apply to heated work area.
- Don't set the tip temperature too high. 700-750 on the Hakko is good for small to medium wires. 800-850 for large wires.
- Remember to turnoff power on wires since tip will short to ground
- Don't use aluminum wire. Avoid solid wire.
- Flux is in the solder, no need to add any.

Workshops

- Tinning wires
- Solder crimped wires, apply heat shrink
- Solder feeder to track and turnouts
- Solder 12 gauge with wrapped wire