

EE133 Soldering Tips

Prepared by Alex Tung - January 2001

Getting Started:

1. **Turn on the soldering iron.** This may seem obvious, but you do have to pay attention to the temperature level. For the Weller irons we have at the lab benches, somewhere between 60 and 70 should be good enough. The hotter you make the soldering iron, the more you'll risk burning up your components.
2. **Wet the soldering sponge** – this is good for cleaning the tip of your soldering iron and wiping any excess soldering juice from your board (you'll see what this means). There's a big bottle of water in the lab for wetting sponges.
3. **Get your soldering board.** We're supplying solder boards with connected metal traces. Though this is not the best kind of board for RF circuits (can you guess why?), it will make your soldering job a whole lot easier.
4. **Plan your layout** – You have a limited amount of space, so use it wisely. You'll want to roughly follow the block diagrams we've given you for your transmitter and receiver boards. It's best to use the long connected traces for power and ground – you'll need to use an additional 4.5V reference, so it might be good to save one of the outer strips for that on each board.

The Dirty Work:

1. **Tinning** - First, you want to wipe the tip of your soldering iron on the wet sponge to clean off any gunk. Then, "tin" the tip by melting just a little bit of solder on the end of the soldering iron. This helps create better thermal conduction.
2. **Get physical first** – If you're soldering two elements together (say two wires), make sure they have a good mechanical connection (i.e. twist them together) before you solder them. This will ensure that you maintain a good overall connection. For soldering to a board this is less crucial.
3. **Heat the joint** - The basic idea for soldering is to heat the two elements you want to join enough so that the solder melts onto them. You shouldn't need to even touch the soldering iron with the solder. You only need enough solder to cover the joint.
4. **The three-second rule** - In general, ICs are designed to handle soldering heat, but not for a long amount of time. The three-second rule is usually a good one to follow (don't hold the soldering iron to your component for more than three seconds). For multiple pin ICs, you may want to solder two or three pins at a time, stop and blow on the chip, then solder a few more pins, etc.
5. **A good job** – When you're soldering onto a board, you should shoot for your solder joint to look more like a concave circus tent than a balloon – this reduces the chances that your solder joints will cause nasty short circuits.
6. **No soldering with your mouth!** – There is no other activity that calls for the convenience of a third hand more than soldering. You may be tempted to do "clever" things like hold the soldering iron between your teeth so your hands can be free to hold two components together. **DON'T DO THIS!** We don't like the emergency room any more than you do . . .
7. **Made a mistake? Well suck it up!** – Each lab bench is equipped with a "solder sucker." You can use this on those rare (yeah right!) occasions when you need to fix or modify a part of your circuit. Simply depress the plunger, heat up the joint you need to change, and press the button to suck your worries away. Note that when you're trying to desolder a chip, you should probably do a couple pins at a time, let it cool or blow on it, and then finish it up. This prevents unnecessary chip combustion.