

### Tip of the month - Nov 2019

## Keep it clean!

Soldering is a technique that (usually) improves with practice.

However, there are a few things you can do to ensure more successful soldered connections. Many of the kit building failures are due to inadequate preparations.

Soldering techniques are covered in detail at our kit building workshops and there is a whole chapter in my book on it.

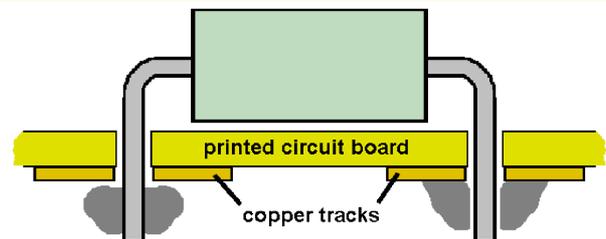
Looking at boards made up by various members has prompted a look at this one aspect only.

A previous Tip recommended using 60/40 solder (60% tin and 40% lead) instead of lead-free solder, as this is easier to use and produces more consistent results.

However, a successful soldered joint firstly requires that the surfaces to be soldered are perfectly clean, both before and during the soldering process.

Metals oxidise rapidly when exposed to air, moisture or heat. It forms a non-conductive surface on the material, making it difficult for the solder to adhere. This often results in a 'dry joint'.

Look at this illustration. The solder has adhered to the wire on the left, but not to the copper track. In the other case, the solder adhered to the copper track but not the wire. Often, these joints look OK at first glance.



Most solder has several cores of flux embedded in the solder. When heat is applied, the flux flows out over the surfaces to be soldered, thus removing any oxides and preventing re-oxidation during the soldering process.

If you find you are applying more and more solder to a joint to get it to 'take', it means that the joint needs cleaning. This often results in dry joints – and the excess solder creating unwanted bridges between tracks and pads.

Don't try to burn away excessive dirt or oxidation.

Here are some suggestions:

#### Clean the PCB or stripboard

While flux is great at removing oxides from the surfaces, it will not clean dirt, oil, grease, etch resist, etc.

The copper tracks and pads can be cleaned using a mild abrasive such as a cleaning block, a fibreglass pen or an ultra-fine abrasive pad.



### **Clean the wire/components**

The leads of the components should be cleaned before soldering.

Strip off a little of the insulation on any wires that are to connect to your board and tin their ends (especially with multi-stranded wire).

### **Clean your bit**

Your soldering iron can soon end up with a tip that is dry and is dirty.

Eventually, flux residue and oxidized lead from the solder coat the tip. This gunge is often referred to as 'clag' and can contaminate joints.

Since only a tip that is clean, shiny and wetted successfully transfers heat, it follows that the tip needs periodic cleaning during soldering.

### **Solder soon after**

Don't clean the board and components with the intention of using them later.

Oxidisation is a continuous process and starts again as soon as you have finished the cleaning.

### **Clean up afterwards**

Finally, examine the solder joints for any residual excess unactivated flux, as this could be corrosive and eventually damage the joints. Excess flux may also be covering up bad dry joints or solder blobs between tracks. Best to make sure by removing any excess flux you find, by scraping it away and finishing with an old toothbrush.

When I finish soldering, I first clean between tracks with the edge of a screwdriver (if there is obvious crusty residue). I then use IPA and an old toothbrush. I also have Servisol De-Flux 160, which comes in a spray can (from Rapid, CPC, etc.)

There are many other ways to improve your soldering, but that is for another day.

**Happy soldering!**