

Soldering and Troubleshooting Tips

Soldering

Safety Precautions

Safety should be your first priority when soldering. A soldering iron tip can reach temperatures that exceed 600 degrees Fahrenheit, so it is very important to avoid contact with any metal part of the iron. Unless the iron is in use it should always be positioned in the stand. Also keep the soldering iron electrical cord from contacting the iron while in the stand and during use, which could damage the cord and more importantly create an electrical shock hazard. Never leave the irons unattended and allow them to cool off properly before storing.

Tinning

An important step to good soldering is to prepare the soldering iron tip by a process called tinning. This should be done periodically with older iron tips and prior to using a new tip. While the iron is warming up, hold the solder against the tip and wait until the solder will begin to melt. As soon as the solder begins to melt, coat the tip surface completely and wipe the tip off with a wet sponge. The end result should be a thin layer of solder coating the tip.

Soldering

The soldering iron tip must be pressed against the circuit board joint and the component lead or wire to allow heating of both at the same time. Try to keep the iron at an angle of 30 to 40 degrees to the work. As the joint heats up, typically about 5 seconds or less, apply the solder at the point where the iron tip meets the work. Once the solder flows around the joint, remove the iron and let it cool. It is a good habit to check all solder joints after they have cooled. A good solder joint should be smooth and shiny. Also the component should be rigidly attached at the joint to the board.

The most common problems with soldering are adding too much or not enough solder. Using too much can cause a solder bridge. This simply means that two adjacent joints are contacting which results in a short circuit and the circuit not functioning properly. If not enough solder is used, the joint may not provide electrical continuity between the board and component. A desoldering iron, "Solder Sucker", can be used to correct improper connections and also remove circuit components that are positioned incorrectly on the board.

Troubleshooting Tips

This is an overview of the most frequently occurring problems encountered when assembling the printed circuit board (pcb) projects. It is important to carefully read the **General Instructions** included with the projects that point out essential information related to soldering and each electrical component. One simple rule that can save time is to double check that the component is in the correct position on the board before soldering. If the circuit is not functioning, the following should be examined.

- **Inspect all solder joints.** Adjacent components may be bridged together or the joint may need additional solder for good electrical continuity.
- **Resistors installed in the wrong position on the board.** Each resistor has a specific value and therefore must be installed in the correct location. Resistors out of place can limit the circuit from functioning correctly to not functioning at all.
- **Components with polarity (+/-) are installed incorrectly.** It is critical to install the correct lead in the correct hole to establish electrical continuity.
- **IC-Chip installation or orientation incorrect on board.** Refer to the General Instructions.