Soldering Instructions

1. Placement: Place the wire or component on the insulating side of the printed circuit board (PC board), and thread it through the appropriate conducting hole.

2. Temperature: If possible, set the temperature of the soldering iron to about 350° C or 650° F. A hotter temperature is used to solder larger wires, or if a very fast solder is required. A lower temperature is used if a component can be damaged by excessive heat.

3. 3-way junction: Make a 3-way junction between the printed circuit board metal pad, the component wire, and the soldering iron. All metal surfaces should look shiny and clean. You can clean the hot soldering tip with a wet sponge.

4.   Heat and melt: Allow a brief time (0.5 – 2 seconds … sometimes longer) for the everything to heat up, and then apply the solder to the 3-way junction. Generally, the solder must touch the soldering iron tip in order to melt. Generally, the faster you solder, the better the result.

5.   Wetting: Allow the molten solder to flow and "wet" all the metal contacts, and then remove soldering iron.

6. Inspection: A good solder joint should have a shiny finish. A matte or dull gray finish indicates that some oxidation has occurred (the yellow liquid that you see when the solder melts is called the flux, and it prevents oxidation … until it all turns to smoke, if you heat if for too long). If you see signs of oxidation, then you should redo the solder joint, since even if you do have a good electrical contact now, it may fail later.

   You can also use a soldering microscope to look for any unwanted contacts between two adjacent solder points.

Additional soldering tips:

a. Circuit layout: Plan the layout of most of your circuit components before soldering.

b. Direct soldering and testing: If you are careful, you can solder your components directly to the PC board with very little initial testing. Only do this if you know how all you subcircuits work. A good practice is to test each subcircuit individually before continuing on to the next subcircuit and attaching them all together.

c. IC sockets: Solder IC sockets without the ICs, and add the ICs to the sockets after you have finished all the soldering.

d. Color coding: Color code your wires for easy circuit construction, and debugging.

e. Trace cutting: If necessary, you can cut a PC board trace with a knife or razor to isolate a subcircuit.

f.   Heat shrink: You can cover bare wire with heat shrink. Heat shrink is an insulating "rubbery" tube that shrinks when you heat it with a heat gun or soldering iron.

g. Desoldering: If you need to desolder a connection you previously made, you can do so by vacuuming up molten solder with a vacuum pump desoldering tool or a copper braid wick (it acts like a sponge for molten solder).