Soldering Basics Part II

1. Part one of this series on soldering basics discussed safety, solder composition, types of fluxes, soldering irons and guns and a very briefly touched on actual soldering techniques. Here in part two we will briefly review these and will then concentrate on actual techniques. Soldering coax connectors require good soldering skills and techniques and will be discussed in separate sessions.

2. Safety should always be your first consideration. Soldering irons, melted solder and flux can reach temperatures from 500 to 1000 degrees Fahrenheit. Heat is very easily transferred thru component leads, wire, solder pads on PC boards and other electronic components. Do not hold components, connectors and etc. during soldering. Allow 20-30 seconds or more with large items for them to cool before touching them. Wear eye protection and avoid breathing fumes from soldering. Wash your hands after completing the soldering process. Know the location of your first aid kit. Before starting assure it has provision to treat burns.

3. Small diameter solder about 0.020 inches or smaller is ideal for small components. 0.030 to 0.040 inch is better for large components such as coax connectors. Solder with 60 parts tin to 40 parts lead is considered standard. See part one for additional details on solder and flux.

4. No lead solders should not be used on electronic equipment unless specifically authorized by the manufacturer. At this time electronic components sold in the USA are prepared with lead based solder. This includes pretinned component leads, PC boards, some wires and similar items. Most connectors are not pretinned. Using no lead solders with components prepared for leaded solder will result in corrosion within a few weeks or months. The corrosion can result in component failures. European and several other countries are in the process of changing to no lead solders. Some will be converted in about two years or less. Be watchful in the coming years as manufacturers change to no lead solder and their products begin to arrive in the USA.

5. Your soldering equipment should be the best you can afford. It should be capable of producing at least 700 degrees Fahrenheit at it's tip. Changeable tips are recommended. This enables you to use various sizes and perhaps various temperatures if the tip is capable of controlling the temperature. In addition to your soldering iron and solder you should have good lighting, hand tools, solder wick, solder extractor and good ventilation. Flush cutting diagonal cutters are a must. Needle nose pliers are useful for forming component leads. Soldering aids with picks, brushes and probes are very useful. Solder along with a good solder extractor is used to remove solder should you need to remove components. Solder wick is available in several sizes. One sixteenth inch is a good size to start with. Solder wick should have flux embedded in it. The flux helps draw in the solder while leaving the surface better prepared for resoldering. A two or three power hand magnifying glass can be helpful when checking your work or when identifying value markings on

components. Holder for components will provide that third hand to hold components while soldering.

6. Quality wire strippers are essential to stripping wires or preparing coax for soldering. A sharp knife or other blade can be used. A good ruler or tape measure should be used for measuring. In all instances use extreme caution when cutting with a knife or other blade. Do not nick braid or wire strands. Tools are available to strip coax. Again, use a quality stripper. Assure it is built for the coax you are going to use.

7. Prior to beginning think your way thru your process. Layout your equipment and components. Be sure you have everything needed. Consider how you will clean the tip of your hot soldering iron. If your soldering station has a sponge pad be sure it is saturated with water. If a sponge is not available on your soldering station use a saturated paper towel folded at least four times. Test your cleaning technique before turning on you iron. After turning on the iron carefully test again making sure you do not burn yourself or the paper towel, if you are using one.

8. Where practical a good mechanical connection should be made prior to soldering a component. Leads thru a PC board should be bent at an angle on the opposite side of the board from the component. There are exceptions such as when another component is to be mounted immediately on the opposite side of the PC board.

9. Position the components to be soldered in the same configuration as you expect them to be when you finish soldering. Assure your iron is hot and clean. Clean the tip within the 10-20 seconds prior to actually touching the tip to the components to be soldered. Immediately prior to touching the tip to the components touch the end of your solder to the tip. Assure 1/3 to ½ of it's diameter is wet with freshly melted solder. The solder should extend from the very end of the tip to about 3/16" from the tip. Enough solder should be applied to make a slightly oval convex layer of solder in this area.

10. Fast heat transfer is essential to assure a good solder connection while not over heating components. The before mentioned convex oval of melted solder should form itself to the local contour of the components leads and pads. Small additional amounts of solder may need to be added to assure the contouring occurs. This contouring will assure more surface area is available to transfer heat. The liquid solder forms itself to the leads and pads being soldered and increases the contact surface area thereby assuring more heat is transferred than would be in a simple iron to lead or pad contact.

11. That concludes this part on soldering basics. Part III continues our discussion of soldering basics.