Soldering 101

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with
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In this clinic I will discuss and practice:

- How to make a good solder joint
- How to solder feed wires to rail
- How to make connections to the small wire used with decoders.
- We will not discuss resistance or torch soldering in this clinic
Tools and Supplies

- Soldering Iron
- Solder
- Tip Cleaner and Sponge
- Flux
- Needle Nose Pliers
- Wire Cutter
- Wire Stripper
Soldering Irons

There are many types and styles ranging in price from a few dollars to several hundreds of dollars.

15 - 60 Watt irons are suitable for general purpose electrical – electronic work associated with model railroading. A 15 Watt iron with a very small tip is suitable for decoder installation.

60 Watt irons are suitable for soldering feed wires to rail.

Choose the iron(s) that best suit your application and budget. You may need more than one iron.
More on Soldering Irons

The following are my personal preferences for soldering irons. I prefer to pay more money to get professional temperature controlled soldering irons. My brand of preference is *Weller*.

I have one iron and one soldering station that I use most of the time.

- *Weller* 60 Watt Model W60P with assorted 700° f. tips
- *Weller* WTCPT Soldering Station with assorted 700° f. tips
More Soldering Irons

Weller Marksman 40 Watt Soldering Iron Kit SP40LK shown with Radio Shack 64-2078 Holder/Cleaner
More Soldering Irons

Weller Marksman 40 Watt Soldering Iron Kit SP40LK shown with Radio Shack 64-2078 Holder/Cleaner

Weller 40 Watt Soldering Station WLC100
Variable control only controls wattage, controlling wattage indirectly controls temperature.
Supplied with 1/8 in Screwdriver tip
8 different tips available
More Soldering Irons

Weller Marksman 40 Watt Soldering Iron Kit SP40LK shown with Radio Shack 64-2078 Holder/Cleaner

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Variable control only controls wattage, controlling wattage indirectly controls temperature.
Supplied with 1/8 in Screwdriver tip
8 different tips available

Weller WESD51 – 50 Watt Soldering Station
Adjustable from 350F to 850F
Supplied with 1/16 in Screwdriver tip.
20 different tips available
WELLER WESD51
Solder

There are many types of solder, but for our purposes and for all hobby electronics and model railroads, use ONLY rosin core solder.

The common formulations of lead based solder is 60/40 and 67/37. 1/32” and 1/16” diameter wire solder is common. No Lead solder is also available.

I use Kester “44” solder, 67/37, 1/32” dia.
Flux

Although the solder contains flux, there are times when additional flux is needed. The most common need for extra flux is soldering feed wire to rail and soldering rail joiners.

No-clean fluxes are preferred for ease of use. Kester offers a no-clean flux in a handy pen applicator. Catalog number 951.

Other fluxes that are useful include liquid rosin flux and non-corrosive paste flux.
Tools

One or two good needle nose pliers
One or two diagonal cutting pliers
Wire strippers
Small Wire Brush
Cleaner
Micro-Mark 82466A Scratch Brush
ISOPROPYL ALCOHOL AND TOOTHBRUSH
Elements of a good solder joint

The surfaces to be soldered **MUST** be **CLEAN!!**

Clean dirty surfaces with fine sandpaper, wire brush, steel wool, or scrape with knife.

When making a connection using stranded wire to a terminal strip or other terminal, twist and tin the stripped end of the stranded wire.

Make sure iron is tinned, an iron not tinned will not conduct heat to the connection to be soldered!

Touch the iron to the connection, wait a few seconds. Apply the solder to the connection.

Flow just enough solder to make the connection.
Elements of a good solder joint

Remove the iron and let the connection cool.

You can tell the connection is set when the solder changes texture.

Soldering Track Feeds

Make sure the point at which you want to solder the feed wire is clean. If you are using stranded wire, make sure the wire is tinned. You also might want to apply extra flux to the connection to insure good solder flow.

Using a tinned iron that will supply adequate heat in a short time, touch the iron tip to the connection, apply the solder and let the solder flow.
Elements of a good solder joint

An alternative method for soldering feed wires is to use activated solder paste.

Apply an adequate amount of paste to the rail and feed wire, then apply heat until the solder flows.

Always, when applying heat to the feed wire connection, do not leave the heat on any longer than it takes to flow the solder. This will help to prevent plastic ties from melting.
Elements of a good solder joint

Soldering Very Small Wires

To produce good connections with very small wires, i.e. 26, 28, 30 AWG as used for connections to decoders, a small iron, 15 – 25 Watts, or a small tip should be used.

The easiest way to splice two small wires, is to first strip the ends of the wires, twist them together and solder.

After the wires are soldered, trim, fold the wire over and insulate with a small piece of heat shrink tubing.
Helpful Information

Suppliers

All Electronics
14928 Oxnard Ave
Van Nuys, CA
1-888-826-5432
http://www.allelectronics.com

Mouser Electronics
1000 N Main St
Mansfield, TX 76063
1-800-346-6873
http://www.mouser.com

Digi-Key Corp
701 Brooks Ave. S.
Thief River Falls, MN 56701
1-800-344-4539
http://www.digikey.com

Allied Electronics
7151 Jack Newell Blvd. S
Fort Worth, TX 76118
1-866-433-5722
http://www.alliedelec.com
Helpful Information

More Suppliers

McMaster-Carr
200 Aurora Industrial Pkwy.
Aurora, OH 44202-8087
330-342-6100
http://www.mcmaster.com

Electronic Surplus
8755 Munson Road #6
Mentor, OH 44060
440-205-8388
http://www.electronicsurplus.com

Micro-Mark
340 Snyder Ave
Berkeley Heights, NJ 07922
1-800-225-1066
http://www.micromark.com
And now,

It's your turn!