

Useful Soldering Tools, Tips And Information For Small Scales (*and large too*)

Using the correct tools and soldering techniques are very important when working with and installing AirWire900 components. Not using proper tools and technique can lead to expensive repairs and poor operation. The suggested soldering iron will last a lifetime.

Solder Iron and Solder - Bigger Is Not Better

This miniature soldering iron is manufactured by Antex. This is the one we use when working on AirWire circuit boards. it is not expensive and will last a long time. Ours have been in continuous use for at least the last 15 years.

We pair up this iron with an **unplated pure copper tip**. This tip is very small at only 0.020 inches diameter. The small size helps prevent pad damage from excessive heat. The tip is easily bent so treat it gently. During use, the tip does wear down. It is a good idea to purchase 4 or 5 tips so you have plenty.

The copper tip must be tinned before use. To do this, first slip the tip onto the iron. Slide the tip all the way down the shaft. Adjust the collar clip to keep the tip tight against the shaft. Plug in the iron. Place the solder on the tip. As it gets hot enough to melt the solder, rotate the tip and tin the entire tip. Apply solder around the entire tip, extending upwards from the tip about a quarter inch. Wipe the newly tinned tip on a damp rag and repeat the procedure one more time.

A **solder iron holder** with cleaning sponge is a great addition to your work bench. The hold protects the iron and the sponge is perfect for tinning and cleaning the tip.

Before soldering, wipe the tip on a damp cloth or cleaning sponge. A brass shaving tip cleaner is even better. Do not wipe the tip after use. The extra solder will slow down tip wear between uses. Before unplugging the iron for the day, wipe the tip on the cleaning sponge then coat the tip with solder.

Unplug the iron when no longer needed. The tips will last much longer. Tips deteriorate quickly when the iron is allowed to remain on all day.

Both the tip and the iron are available from a mail order tool supplier called MM Newman. We've been buying tools from this supplier for many years and we highly recommend them.

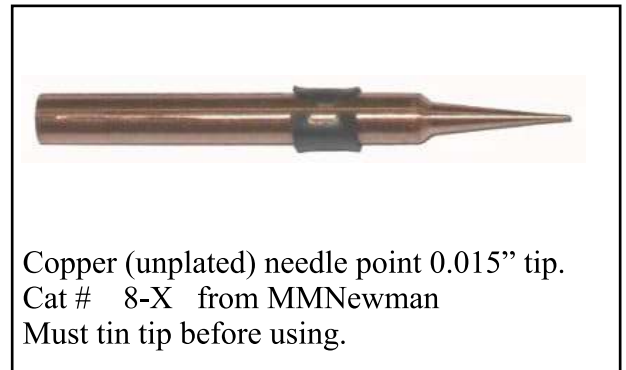
No-clean flux solder is ideal for small soldering jobs. Solder joints are clean and shiny without any brown or burned rosin flux residues. The tiny diameter helps prevent solder bridges.

Heat Shrink Tubing Kit is very useful. Spliced wires need to be protected from short circuits. Heat shrink tubing is much easier to use than plastic tape. The suggested kit costs only \$8.29 and has a variety of diameters. Cut off a small length, slip it on the wire, then make the connection. Shrink the tubing with a heat gun, lighter or the shaft of your soldering iron.

From Eventronic Cat # ET1002 via Amazon.



Antex 15 watt grounded miniature soldering iron. Tips are sold separately.
Cat # C/3U from MMNewman



Copper (unplated) needle point 0.015" tip.
Cat # 8-X from MMNewman
Must tin tip before using.



Soldering Iron Stand for Antex Irons
Cat # ST-6
From MMNewman



No-Clean Flux Solder 63/37 0.020" dia.
Cat # 2260-WBNCC633720-4OZ-ND
From Digikey



Useful Soldering Tools, Tips And Information *continued*

Twist and Tin All Stranded Wires

Nearly all AirWire900 components use stranded wire for connections. Stranded wire needs to be tinned to insure stray strands do not touch adjacent pads or components. Tinning is a simple task and should be automatic when working with stranded wire.

First, strip a small length of the insulation off. Twist the individual strands together to form a tight bundle that is straight.

Heat the wire with your soldering iron starting at the end of the bare wire. Don't heat next to the insulation; it will melt and possibly draw back exposing more bare wire.

As the wire heats, touch the solder to it and observe if it melts. If not, keep heating the wire. Don't put solder on the iron. When the wire is hot enough, the solder will melt.

A well tinned wire only has a small amount of solder on it. It will be just enough to hold the twisted strands together. You will be able to see the twisted strands through the solder.

The bottom image shows a properly twisted and tinned wire and one that has some problems. Note the bulge at the end. This is caused by some strands that were not included when the twisting was done. The user attempted to fix this by blobbing more solder on the end of the wire. Sometimes, trimming the ends can fix this. But it is better to perform the twist and tin correctly the first time.

Trim the wires to the desired length before soldering them to the board.

Soldering Wires To Circuit Board Pads

Rather than stick the wire into the hole, lay the wire flat on the pad and solder. This will eliminate the sharp bend in the wire which usually leads to breakage.

Be sure to first tin the wire and then inspect for loose strands. Next, trim the wire so its length is no longer than the width of the pad. It is OK to place a small pool of solder on the pad first. Then, heat the wire and when the solder is molten, touch the wire to the pad. The heat will quickly transfer to the pad and melt the solder. Take away the iron and let the joint cool. You do not need a lot of solder.

Use a Magnifying Glass or 10X magnifier Loupe to Check Your Work

A large magnifying glass on an articulated stand is easiest to use. But they could be expensive and not provide sufficient magnification. The old fashioned Luxo lamp with the circular magnifying lens is also good. It too may be insufficient for close inspection. Listed on Amazon was an inexpensive lamp with a 2.25X lens and an LED light. Use the title below to locate the Amazon listing.

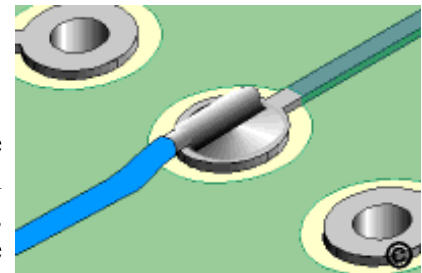
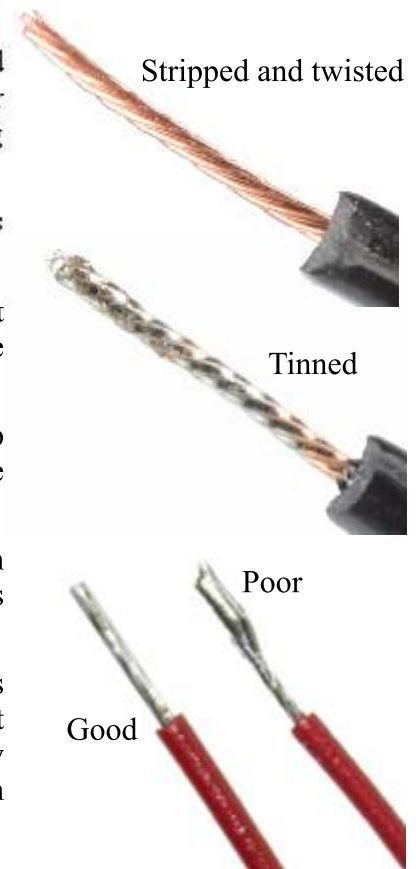
Brightech LightView PRO - LED Magnifying Desk Lamp - 2.25x Magnification

A 10X jewelers loup or magnifier is small, inexpensive and superb for inspecting very small areas. We use these when checking boards for solder bridges. Use the title below to locate the Amazon listing.

Bausch & Lomb Coddington Magnifier, 10x

Suppliers Mentioned

MM Newman	800-777-6309	www.mmnewman.com
Digikey Corp	800-344-4539	www.digikey.com
Eventronics		www.amazon.com



Magnifying Desk Light



10X Loupe Magnifier

Useful Soldering Tools, Tips And Information *continued*

Hookup Wire Recommendation

Remington Industries offers a wire hookup kit consisting of small 25' reels of of different colors and can be purchased as either stranded or solid. It comes in a handy cardboard box designed as a wire dispenser. We purchase a box of both solid and stranded, #26 AWG. The box costs about \$16 and is well worth it. The kit can be ordered directly from their website.

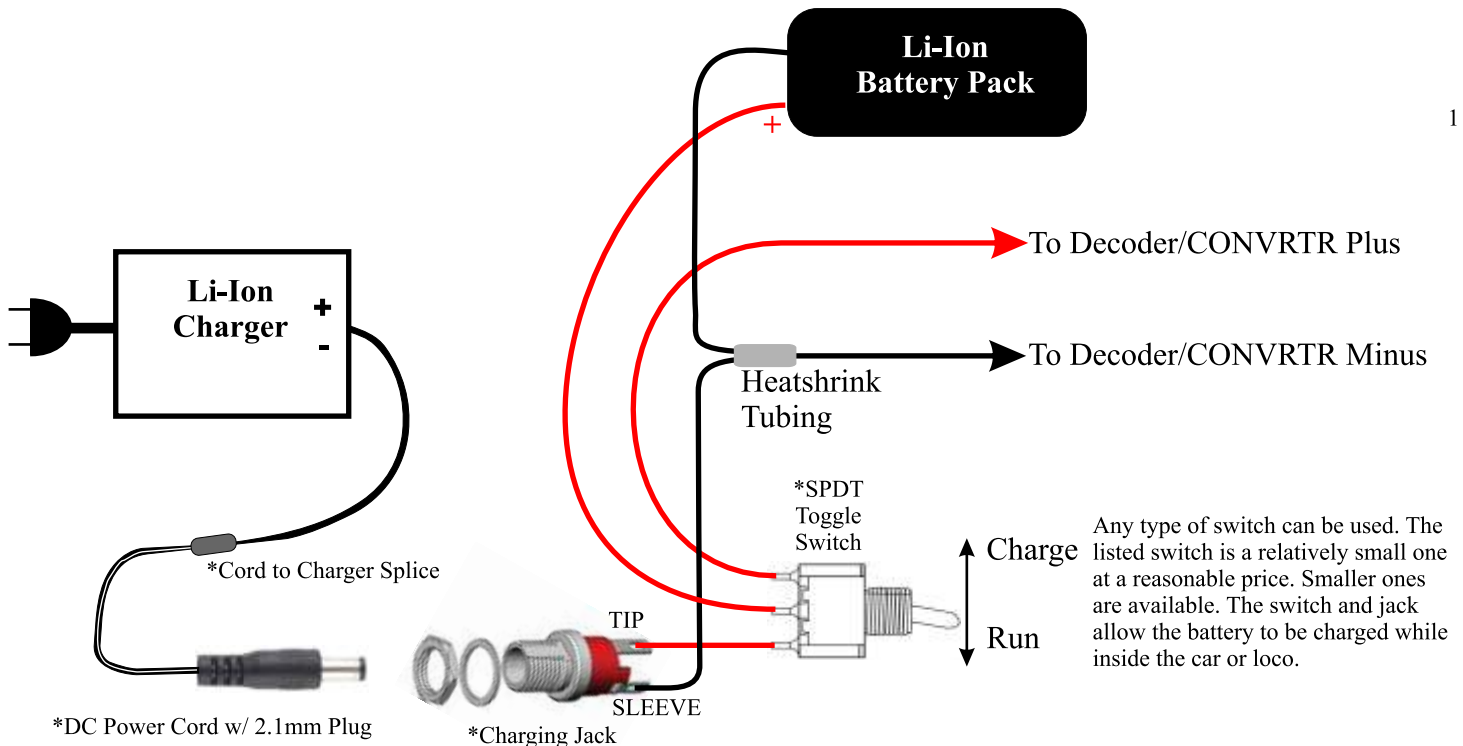


Remington also offers other sizes of wire kits all the way down to AWG30 wire. However, this wire is only recommended for use in HO scale. It is too small for the high current of larger scale locomotives.

<https://www.remingtonindustries.com>

Search for item: 26UL1007STRKIT

Hookup Diagram For Plug-In Charger For Any Locomotive



This diagram shows a generic hookup for locomotives that use a toggle switch and a charging jack to connect the battery to the battery charger. The parts list has the supplier and the part number for the various parts. However, any brand of jack, cable or toggle switch can be used. Regardless of the component brand, the hookup diagram is the same. Be sure to verify polarity at all the critical locations before connecting up a batter, a charger or a decoder/CONVRTR. Polarity reversal will damage the decoder and charger.

Threaded Jack for Battery Charger and Matching Cord

Mouseer	DC Power Cords 2.1mm 24" R/A Plug	Cat #: 172-4207	\$3.65
Mouseer	DC Jack Panel Mnt 2.1mm Long Bushing	Cat #: 502-L721A	\$4.72 (1)

Toggle Switch SPDT

Mouser	SWITCH TOGGLE SPDT	Cat #: 108-1MS1T2B3M1QE-EVX	\$2.36
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Mouser Electronics www.mouser.com

Customer service: 1 (800) 346-6873

Visa/MC accepted

1000 North Main Street

Mansfield, TX 76063

Pricing and availability subject to change. Verify stock with the supplier before ordering.