Add SMD Resistors to Decoder Terminals

Article and photos by James (Jim) Exler

Some decoders available today require a resistor to be added in series with one leg of an LED for current limiting. An SMD (surface mount device) is perfect for this project; 1,000 ohms is a commonly recommended size, but this can be varied to suit your needs.

I have used the standard axial wire lead resistor in the past, which works well but has some drawbacks. It is larger than an SMD, and you will want to insulate any portions of the bare leads to prevent contact with any other components. Photo 1 shows an example of this.

Installing an SMD resistor, as defined here, takes up hardly any extra room and requires no additional insulation.

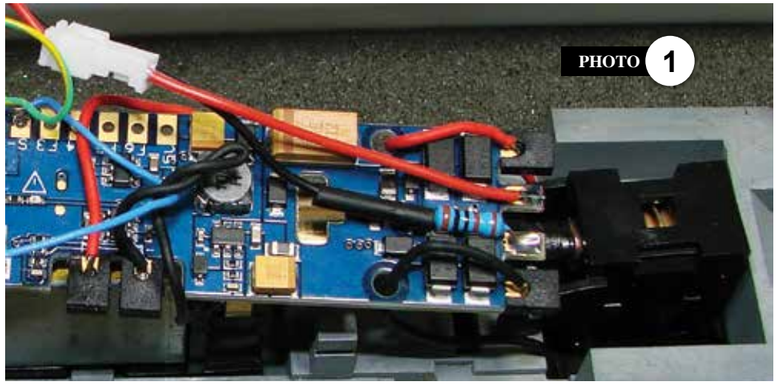

Photo 1: **When using axial resistors, one must cover the exposed leads to avoid short circuits. Axial lead resistors also take up more room.**

I purchased some 1k (102) 1206 SMD resistors for this procedure. They are about the same width as the decoder terminals. I found 100 pieces for less than $4 on eBay with free shipping.

Step-by-Step Description of My Method

Step one: Gently clamp the SMD in a bench vise with the terminals up so that about half the length is exposed.

Step two: Strip and tin a piece of wire to connect to the SMD.

Step three: Place a small drop of liquid flux on the SMD and, while holding the tinned wire over the SMD terminal, press a hot soldering iron with a small amount of solder on the tip to the joint. It should flow almost immediately. When cool, remove from the vise and trim the excess. (**Photo 2** shows the SMD in the vise with the wire attached.)

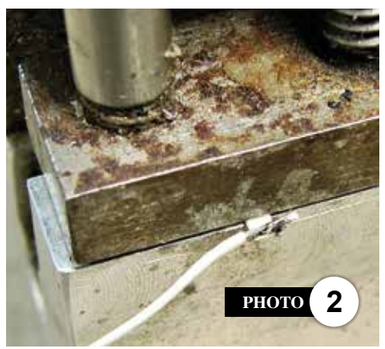

Photo 2: **Place the SMD resistor in a vise or other clamp to solder the tinned wire lead to the resistor.**

Step four: Identify the proper decoder terminal to receive the resistor. Put the resistors in the function leads, not the B+ (V+). Tin this decoder terminal; be careful to make a thin, even layer of solder.

Step five: Place the bare end of the SMD over the terminal, aligning it so the end of the SMD is about even with the outer edge of the hole in the terminal, and hold it in place with a clamp. I used a heat-sink clamp, as shown in **Photo 3**, but a test-lead alligator clip will also work.

Photo 3: **Clamp the other end of the SMD resistor to the decoder terminal and solder it in place. A heat sink clamp or an alligator clip from a test lead can be used to hold the resistor in place. It is best to solder this to the control terminal and not the V+ power source.**

Step six: Place a small drop of liquid flux on the terminal where it touches the SMD and press a hot soldering iron with some solder on the tip to the joint. Again, it should flow quickly.

Step seven: After it has cooled, remove the clamp and use your ohmmeter to check for the correct resistance to ensure you have not bridged the resistor with solder. (**Photo 4** is a close-up of the installed SMD with the wire attached as it is mounted on the model.)

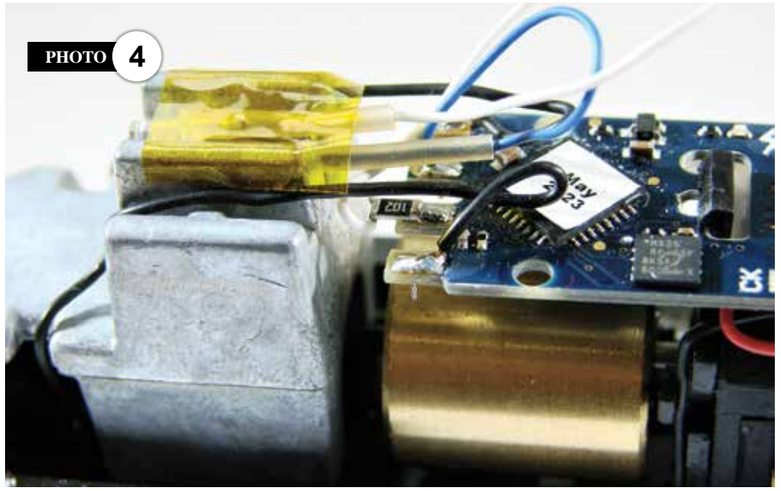

Photo 4: **The SMD resistor and wire are attached to the decoder, which is installed in the locomotive.**

Move to the other light(s), and you are good to go.

Note: The soldering involved here can also be done with soldering paste (solder balls mixed with paste flux). I didn't have any and used what I had. Either way, this makes a nice installation.

The wire colors are your choice, but I recommend staying with the NMRA standard colors for uniformity. See Standard S-9.1.1

This article is an excerpt from a page describing a SoundTraxx decoder install in an Atlas U23B on my website that can be found at [http://jexler.s3.amazonaws.com/railroad/jimrr1.html]. Follow the links to "DCC and Electrical."