



Model Railroad Hobbyist |

DCC IMPULSES

column

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I'm retiring!

**“Raindrops on roses,
whiskers on kittens,
bright copper kettles
and warm woolen mittens.”**

I think we all know the song about favorite things.

Well, this column is about not-so-favorite things.

1. Brass HO locomotive. *Bruce Petrarca photo*



When we procrastinate, there is a reason. I'm just finishing two brass HO steam locomotive installations. These have been in my workshop for way too long. Why haven't I gotten them done sooner?

I just realized that I don't really like working on brass locomotives, especially steamers. Why? Many reasons. Here are a few:

- I don't like chasing 43 different-sized microscopic metric screws, half of which have unique flats, shafts or shanks, along with a couple of unique springs, around the workshop.
- I don't like doing major surgery on a metal shell that has what seems like a hundred tiny detail parts and a perfect paint job.
- I don't like the finesse of eye-hand coordination necessary to take them apart and put them together. I seem to need to do so many times to get things the way I really want them.

Working on them is not fun for me. It is hectic work. Similar to how NASCAR drivers talk about racing at Talladega Super Speedway: hours of tension and stress. And, at least for me, it is truly hours, requiring several days of time, to allow glues to set up, etc.

I'm not quitting my **MRH** column or my website or my consulting business. I'm just quitting doing something that I don't like: DCC installations into brass locomotives.

So, I'm going out with a bang. In lieu of a **Mr. DCC's Workshop** section this month, I'm devoting the entire column to hints and tips and ideas from these last two installations for you.

You might want to look back at my June 2013 "tips" column: **17 DCC Tips**, too.

So, here are photos from two different installations with their own hints and kinks.

These are presented in the vein of my January 2013 column: **HO Kato NW2 Sound Installation**. There are a lot of ideas to take away regardless of your era or scale.

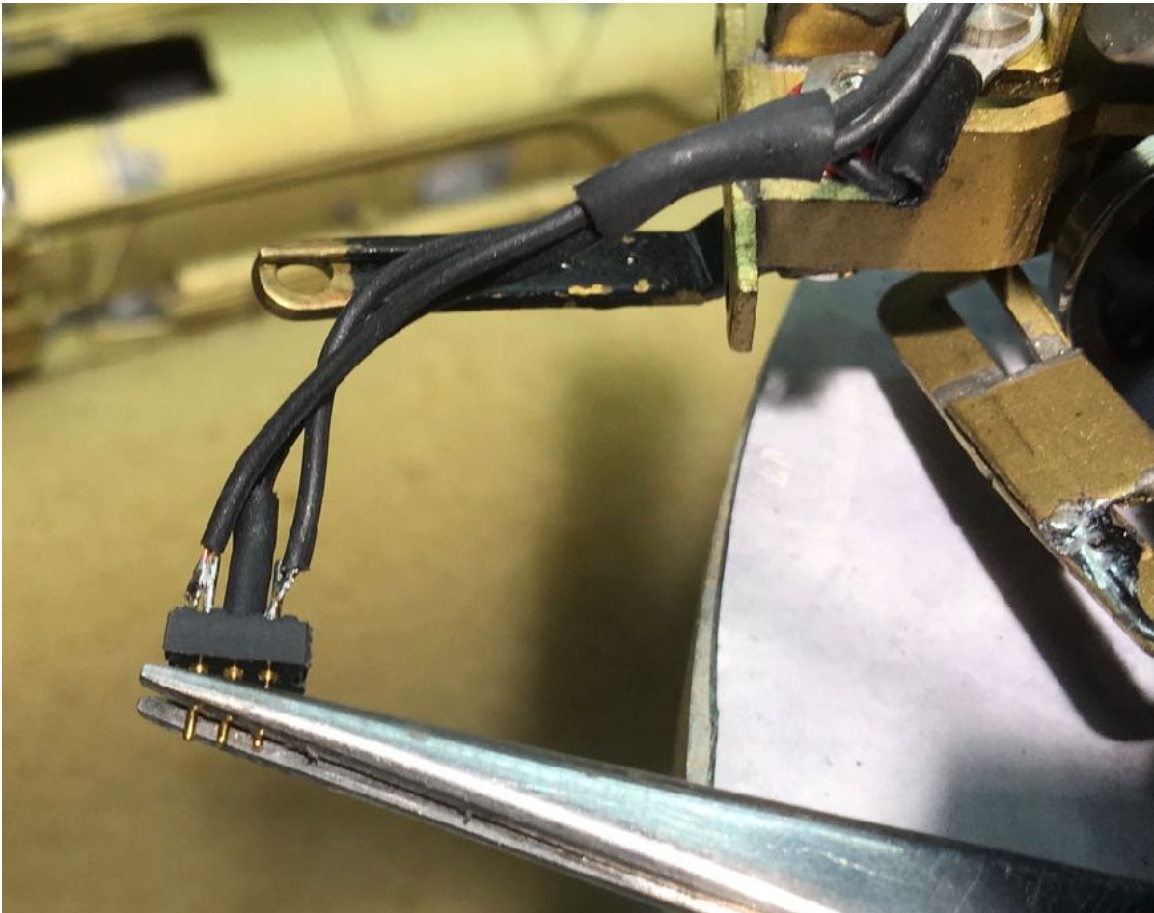
Wiring do-it-yourself connectors

I've talked about these before. I usually need several for a brass steam installation. I purchase 50-pin long strips of male and female connectors and slice off what I need.

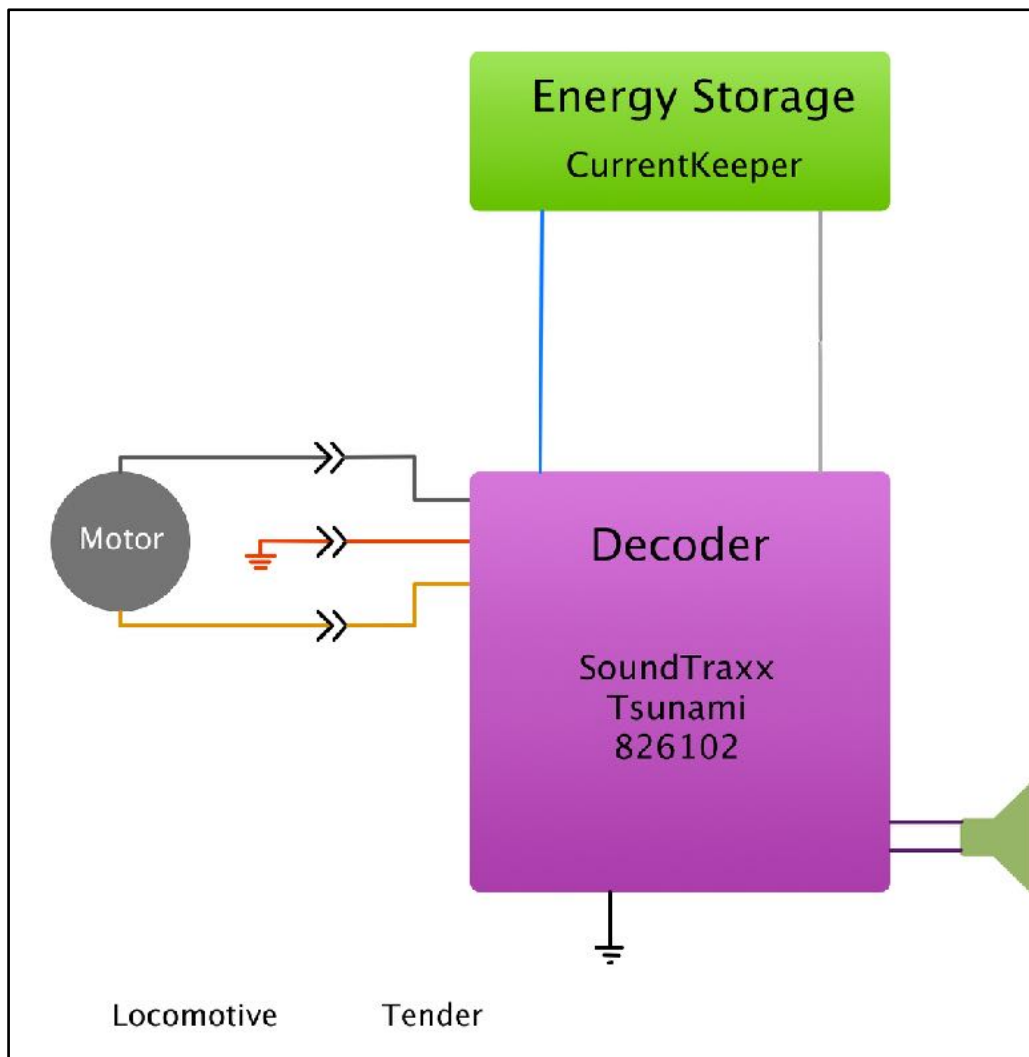
If I need three pins, I cut through the fourth pin from the end with small wire cutters. That leaves me with two things: a single loose pin (which I save for those times that I only need one pin); and a three-pin header with a slightly concave surface on one or both sides. I use an emery board to sand the sides flat.

Then I wire them. Here's how.

2. Three-pin male connector being wired to the loco. *Bruce Petrarca photo*



3. Wiring diagram of a simple installation. Not shown in this diagram is the connector between the decoder and the speaker which will allow the shell to be removed from the tender. *Bruce Petrarca diagram*



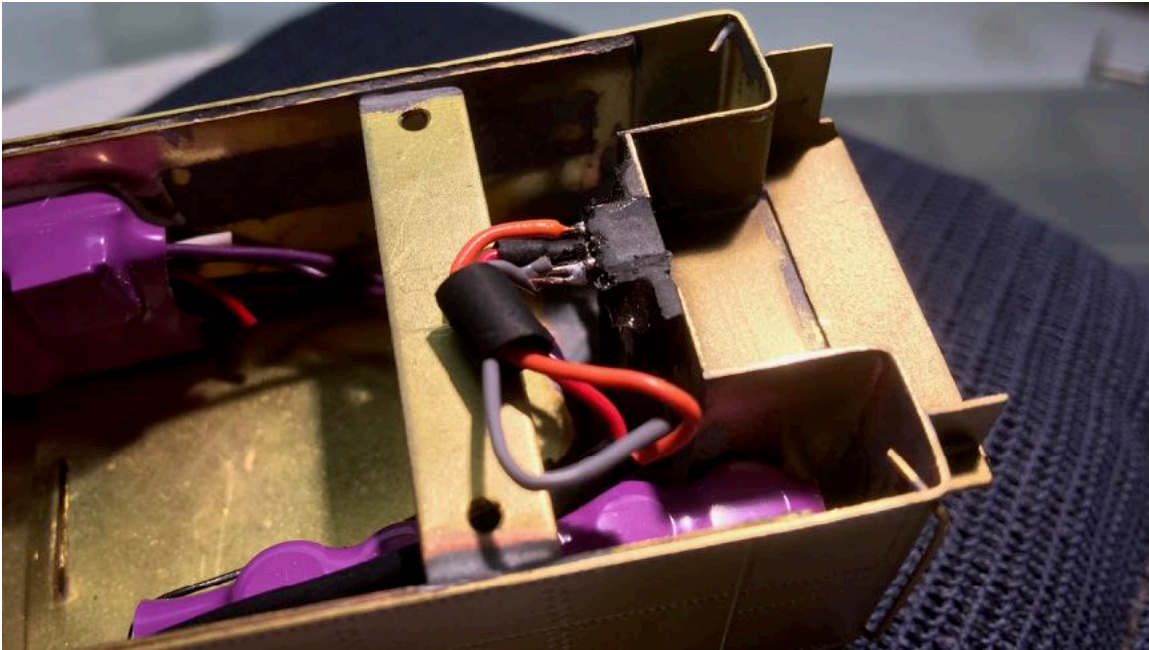
The wiring diagram [3] shows a three-pin connector between the loco and the tender. The loco shell (red) is wired to the center pin. The outside pins have the motor. Wiring this connector this way means that there is no wrong way to plug it in. If the connection is reversed right to left, the loco runs backwards, that's all.

Photo [2] shows a three-pin header being wired. The wires are super-flexible rubber wire, such as NorthWest Short Line used to sell.

The header is held in a pair of spring-loaded tweezers in the photo [2]. The center pin is connected to the loco frame (right rail) and has a piece of 3/32 inch heat-shrink in place to insulate it from the other two pins. A piece of 3/8

inch heat-shrink will later be slipped over the pin end of the connector and shrunk in place to insulate the outside two pins and provide a respectable looking cover. Note: At the top of the photo is a piece of 1/4-inch tubing which is positioned to keep the rubber-insulated wire from chafing on the brass loco parts here and at various points throughout the installation.

4. Three-pin female connector wired to tender side. *Bruce Petrarca photo*

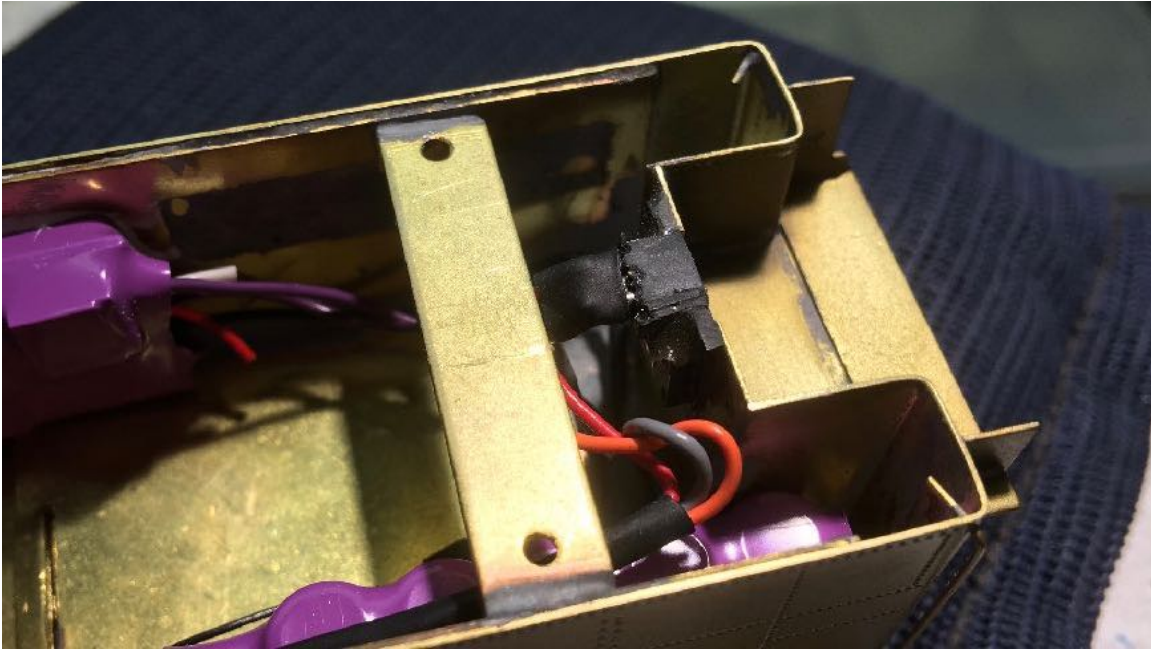


The female side was wired similarly. A small opening was cut in the tender shell with my rotary tool and a cutoff wheel. Final work was done with a jewelers file and hobby knife. The header was mounted to a bit of plastic that was cut and glued [8] in such a way as to be able to mount behind the opening. I used MEK and JB Kwik Weld to get the header mounted to the plastic and JB Kwik Weld to hold the assembly to the shell.

JB Kwik Weld is a black five-minute two-part epoxy that is available at hardware and home improvement stores and, of course, Amazon. I like to let it set up about an hour before I put any real stress on it, even though the parts are pretty well adhered in the stated five minutes.

In photo [4], the right rail (red) wire is connected to the center pin and has 3/32-inch diameter heat-shrink in position over the connection. The 3/8-inch diameter heat-shrink is ready to slide over the entire assembly and be shrunk in position. After shrinking [5], the wires are dressed so that they will not be pinched when the shell is screwed onto the frame.

5. Three-pin female connector on the tender side after tubing has been shrunk. *Bruce Petrarca photo*



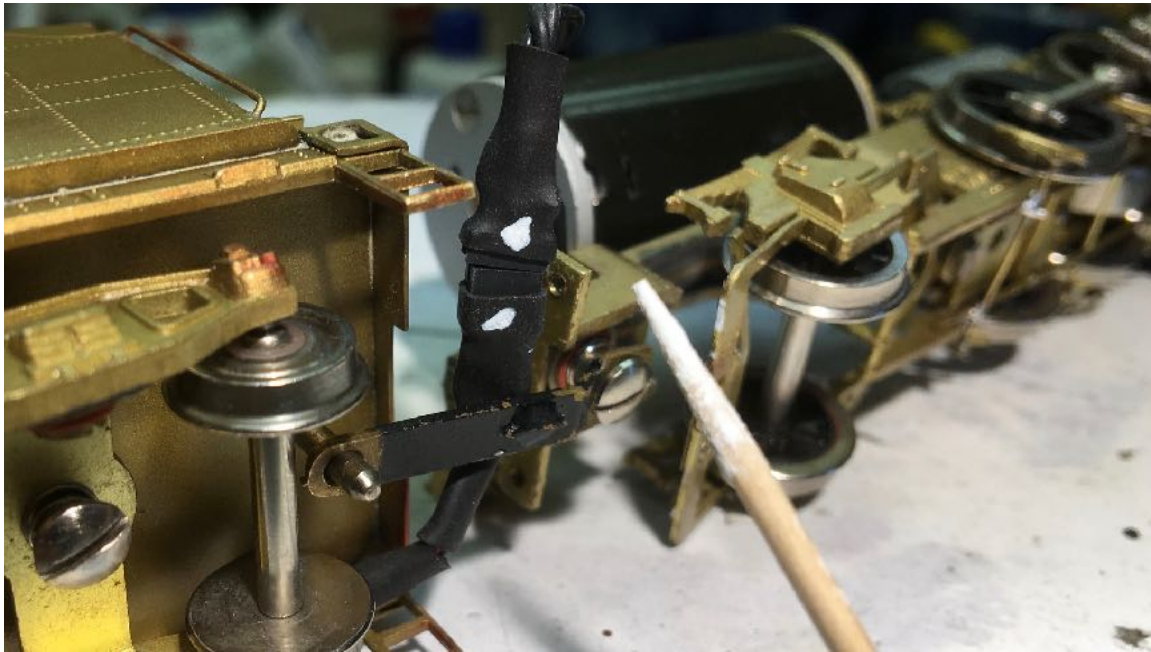
Marking connectors for polarity

I hate to guess which way connectors plug into each other. In some cases [3] it won't hurt if they get put together incorrectly. The loco will run backwards from the selected direction. In other cases, they just won't mate backwards, but knowing the correct direction ahead of time makes assembly easier.

Here is how I designate polarity on connectors that I build.

Once I have the plug and the socket connected properly, I use some white acrylic paint (Plaid's discontinued "Paint for Plastics," in this case) and a toothpick to put a white dot on the same side of the plug and socket. If, as shown in [6], you paint the bottom side, the marks will be less obvious when the loco is running.

6. Marking the correct polarity on a plug and socket with a toothpick and white paint. *Bruce Petrarca photo*



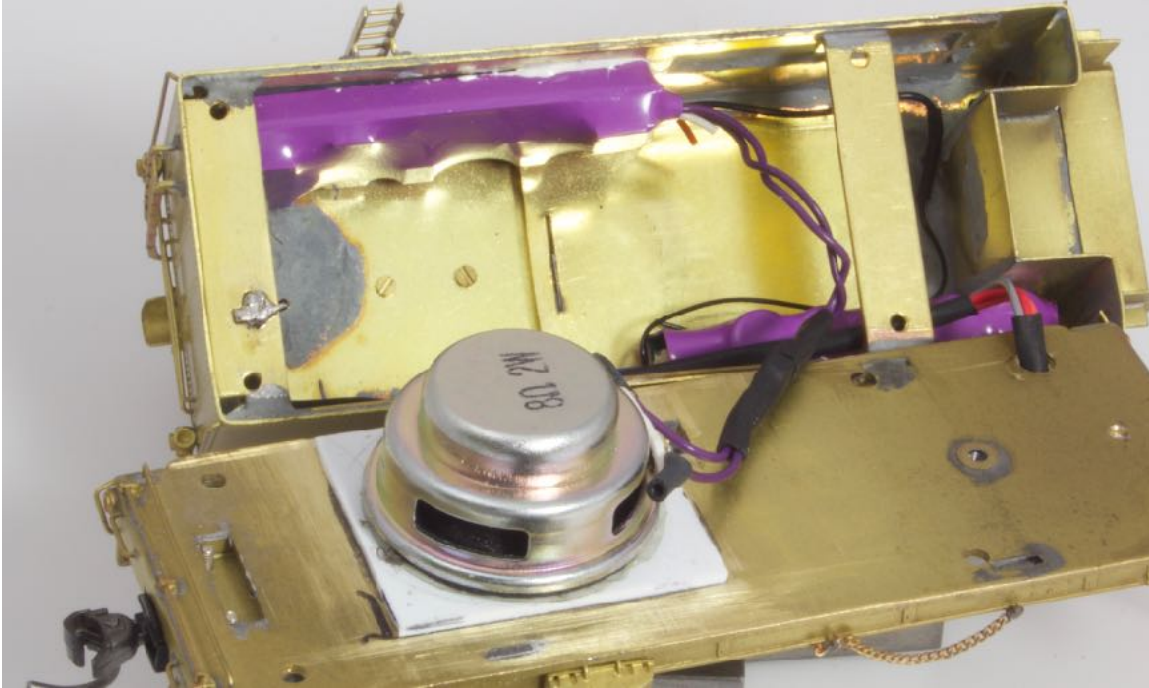
Getting it all in the tender

To get good sound out of this installation requires a lot of attention to detail inside the tender.

When I started sizing this loco, I wanted to put a big speaker and the Tsunami and a CurrentKeeper into the tender. It initially seemed like 4½ pounds of stuff in a 5-pound bag. But when I started parsing the task, things became clearer. The result is shown in photo [7].

The Tsunami was attached to the right side of the tender shell (upper part of the photo) with Arctic Alumina Thermal Adhesive ([amazon.com/gp/product/B0009IQ1BU](https://www.amazon.com/gp/product/B0009IQ1BU)). Sharp eyed readers will notice the slight section of white adhesive near the center of the tender. This adhesive is thermally conductive but electrically insulating, making it excellent for mounting decoders to metal sheets. They stick well; the adhesive sets up similarly to most 5-minute epoxies; if needed, the decoder can be removed from the epoxy with the twist of a screwdriver.

7. Tsunami decoder and CurrentKeeper mounted in tender shell. *Bruce Pe-*



trarca photo

The CurrentKeeper was mounted partially into the protrusion at the front of the left side of the shell. This kept all of the wiring in the shell, except the feed to the speaker. Note: the left rail (black) wire soldered to the cross brace just above the left rear mounting screw boss.

A 27mm high bass speaker (DHB27-8 from RailMaster Hobbies) was mounted offset on the floor of the tender. The reason for the offset was to allow clearance for the Tsunami decoder on the side of the speaker facing the camera.

Once the speaker location was determined, holes were drilled in the tender floor (coming from the bottom to assure that they didn't interfere with the truck mounting boss) to let the sound out.

The high bass speaker needs 0.04 inches (1mm) of space between the speaker face and the surface to which it is mounted. This allows the cone to move in front of the speaker mounting surface on loud sounds without hitting the mounting surface. To achieve this spacing, a speaker mounting board was made out of 0.04-inch thick white styrene, with a cutout in front of the speaker about 0.9 inches (23mm) in diameter.

The speaker is held to the board with a SoundTraxx 28mm speaker gasket (part number 810054) and the board is held to the floor with JB Kwik Weld [8].

The connection between the Tsunami decoder and the speaker is made with a two-pin connector to allow the shell to be removed from the base.

Some things that make this easier

Tools are the things that make our lives easier. Here are a few of my favorites.

8. Applying JB Kwik Weld to hold heat-shrink tubing in place on a loco tender. *Bruce Petrarca photo*



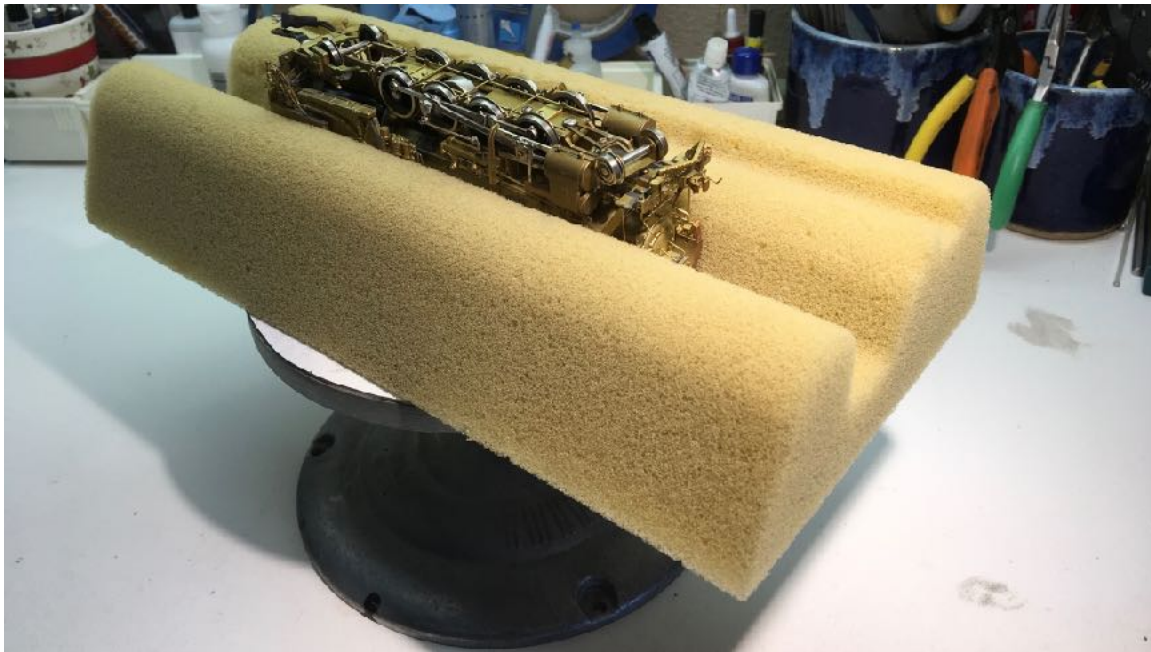
While photo [8] was designed to show my way of mixing epoxy, it details many tools and ideas.

Epoxy: I use old business cards, the stiffer the better, as a mixing board. Mix with toothpicks and apply. When the job is done, the card, toothpick and left-over epoxy goes in the trash.

Lead shot bags: I use old scuba diving weight bags (blue mesh in the photo - in 1 and 2 pound sizes) for holding things and supporting things like this tender with a doghouse, as shown in [4], [5] and [8]. They are great for holding items together while glue sets up, too.

Also in [8] are the bottom of my decorating wheel and spring tweezers. The decorating wheel is better seen in [9], the tweezers in [10].

9. Decorating wheel holding up a foam cradle and a loco.
Bruce Petrarca photo



There are several other things at work in [9].

I like foam cradles to hold rolling stock while working on them. I have them in HO and O sizes. I use the O size or shot bags for work with garden locos and cars.

The decorating wheel has been hailed as one of the best suggestions that folks have taken from my column and videos.

Officially known as an Amaco No. 5 Decorating Wheel, they are available from Dick Blick (dickblick.com/products/amaco-no-5-decorating-wheel). They are pricey, about \$40 currently. They are designed to spin a pot and allow the decorator to apply paint or glaze at a constant level around it. They spin very freely and smoothly. The base and wheel seem to be made of aluminum, while the rounded post that the wheel spins on seems to be steel. I use a bit of 85 weight Nano-Oil on the pivot.

The white sheet that you can see in [9] is a bit of a foam place mat that I've cut to fit the top and held down with a bit of caulk. This keeps the surface cushioned and not electrically conductive. The height of the wheel makes working on things on it more comfortable for me, elevating them about 6 inches above the workbench. I've tried less expensive versions and found them seriously lacking.

With a locomotive that I'm working on positioned on this wheel, I can move it around and access every side without picking it up and damaging something. Everybody who has popped for the bucks has told me how much they like owning a wheel.

10. I use a bunch of tweezers, both regular and clamping styles. I prefer non-magnetic stainless steel whenever I can get it -- most of the clamping ones are magnetic, alas. My favorite is the curved version in front. *Bruce Petrarca photo*



Also in [9], you can see the lighting I use on my workbench. The background and left edge of the foam cradle is lit by a fluorescent shop light (bluish light). This fades to a brighter light with better color rendition toward the right edge of the cradle. This warmer light is provided by a 3000°K color temperature LED floodlight in a swing-arm style drafting light. I can move this around to point where I need it. A few years back, I replaced the 50W halogen bulb with the 8W LED. The reduction in heat on the bench is amazing.

Tweezers [10] are the fine fingers I need to work with small wires and connectors. As you can see, I have a bunch and use them all.

11. Clamping tweezers holding a multi-pin header. The tweezers are positioned on the decorating wheel by a shot bag. *Bruce Petrarca photo*



How to corral those small screws and other hardware parts?

I use a plastic sorting tray that I bought on Amazon for about \$5 ([amazon.com/gp/product/B000CRB3V6](https://www.amazon.com/gp/product/B000CRB3V6)). I pour parts from a small bag (00 washers in the case shown in [12]) into the tray. It is easy to pick them out of the tray. Once I'm done with them, the funnel spout built into the tray makes it easy to get them back into the bag.

On the subject of small parts, most of mine come from Micro Fasteners (microfasteners.com). They sell many of the sizes of screws, machine screws, nuts, washers and lock washers that we need in our hobby for a very competitive price. Their (USA, at least) shipping charges are reasonable and their service unparalleled. For example, the 00 brass washers shown in [12] were \$3.25 for 100 pieces.

12. Small parts can be poured into a sorting tray, used and the remainder poured back into the bag. Bruce Petrarca photo



Getting the sound out of the boiler

Some folks feel that having the speaker in the boiler makes for a more realistic sound image. Sometimes it is possible, sometimes not. Here is a loco where it is possible [13]. I did a similar 2-10-2 for a customer several years ago. He was so impressed that he asked me to do another.

I cut about $\frac{1}{3}$ of an inch off the weight at an angle so that the top of the speaker is closer to the rear of the loco than the bottom. This minimizes the amount of weight lost for the speaker to clear the gear tower. In this case a 28mm speaker fit the internal diameter of the boiler. It did require hand-filing the nubs off several of the detail parts that were preventing the speaker from just sliding into the shell.

The magnet of the speaker was held onto the weight with double-sided tape. A small bead of caulk was applied around the edge of the speaker before it

was inserted into the boiler. Note: Be careful not get the caulk on the speaker cone.

In this configuration, the positive sound pressure (off the cone side of the speaker) is routed out through the rear of the loco. The negative sound pressure (magnet side of the speaker) is vented out the stack.

**[13]. A 28mm speaker installed into the boiler of an HO 2-10-2.
*Bruce Petrarca photo***

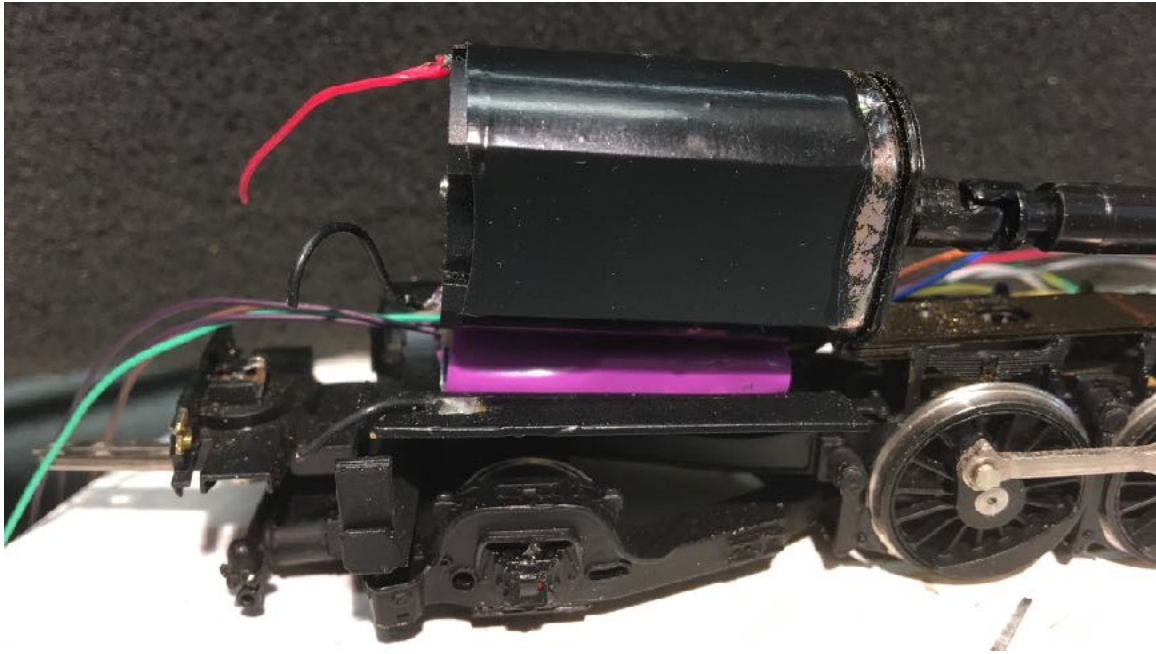


I installed a Tsunami2 (TSU-1100) under the motor where the lighting board had previously been. A stall current test of the loco showed that the TSU-1100 would not be overtaxed by the motor.

The photo [14] was taken during the test-fit process and does not reflect the final installation.

This loco has a Vanderbilt tender. Working inside these tenders is a major pain. With the installation centered inside the loco, very little work needs to be done in the tender. In fact, only one wire needs to run between the loco and the tender. It connects to the rear light.

14. A Tsunami2 (TSU-1100) being installed under the motor in the 2-10-2 HO locomotive. *Bruce Petrarca photo*



Hopefully these tips and comments will give you some ideas on how to better install your decoders. The tools that I like are not necessarily what you would prefer. Share what works for you. Just click on the Reader Feedback icon at the beginning or the end of the column. While you are there, I encourage you to rate the column. “Awesome” is always appreciated. Thanks.

Until next month, I wish you green boards in all your endeavors.