About our DCC columnist

Bruce Petrarca is a well-known expert on all things DCC.

Click here to learn more about Bruce.

DCC Impulses: More of the Basics

Getting to know DCC!

Reader Feedback (click here)

Here's what you need to do to get going with DCC!

Well, here we are in the second month of this column. Glad to have you back!

You may have seen a sound-equipped loco like the gorgeous Blackstone HOn3 C-19 shown in Figure 1 at a store or on someone's layout. You may have purchased one and brought it home and been disappointed in the operation or sound control with DC. So now, you are thinking of converting to DCC.

At this juncture it is easy to get overwhelmed by the choices out there.

I came to DCC with little model railroading background, but lots of electronics and computer experience. That may have been an advantage. I wasn't tied to the DC ideas like: track polarity dictates loco direction or the need for block switches, etc.

In this column, I'm going to hit on a few of the points to get you started. Future columns will elaborate on some of them!

Choose a dealer

Many folks start their DCC trek talking to lots of friends or posting questions on an Internet chat group. They ask about systems, locos, manufacturers, etc.

While these are good questions, I suggest folks work from the opposite direction and find a dealer knowledgeable in DCC who is easy to communicate with. Yes, this may very well be a real search. Have them show you what they have done in DCC (and which person actually did it). Yes, you can do this by phone and email for distant dealers!

Why do this? Several reasons.

Would you buy a new car based on the suggestion of a friend? How about a recommendation from someone you have never met but who told you about it over the Internet? Wouldn't you want to test drive the car first? Well, DCC isn't as large an investment, dollar-wise, but you still want to be happy with its performance in your hand!

Figure 1: Blackstone HOn3 C-19 is typical of current generation of sound-equipped locos designed to run on DC and DCC. Photo courtesy Blackstone.

You will be working on converting locos, or purchasing new locos. You may need some help along the way.

You may have questions about layout design or modification. Sometimes a small change in track plan will make the DCC system easier or more reliable!

Once you have a relationship established, stick with that dealer. A couple of dollars saved with another dealer may wind up costing you more in the long run!

Layout design

Starting from scratch with a new layout is nice. You can wire it for DCC from the get-go and not have to worry. I have some wiring suggestions on my website (www.mrdccu.com/curriculum/basics/wiring.htm).

If you are converting a DC layout to DCC, you may or may not need to rewire it. Check out the suggestions on my website above, as well.

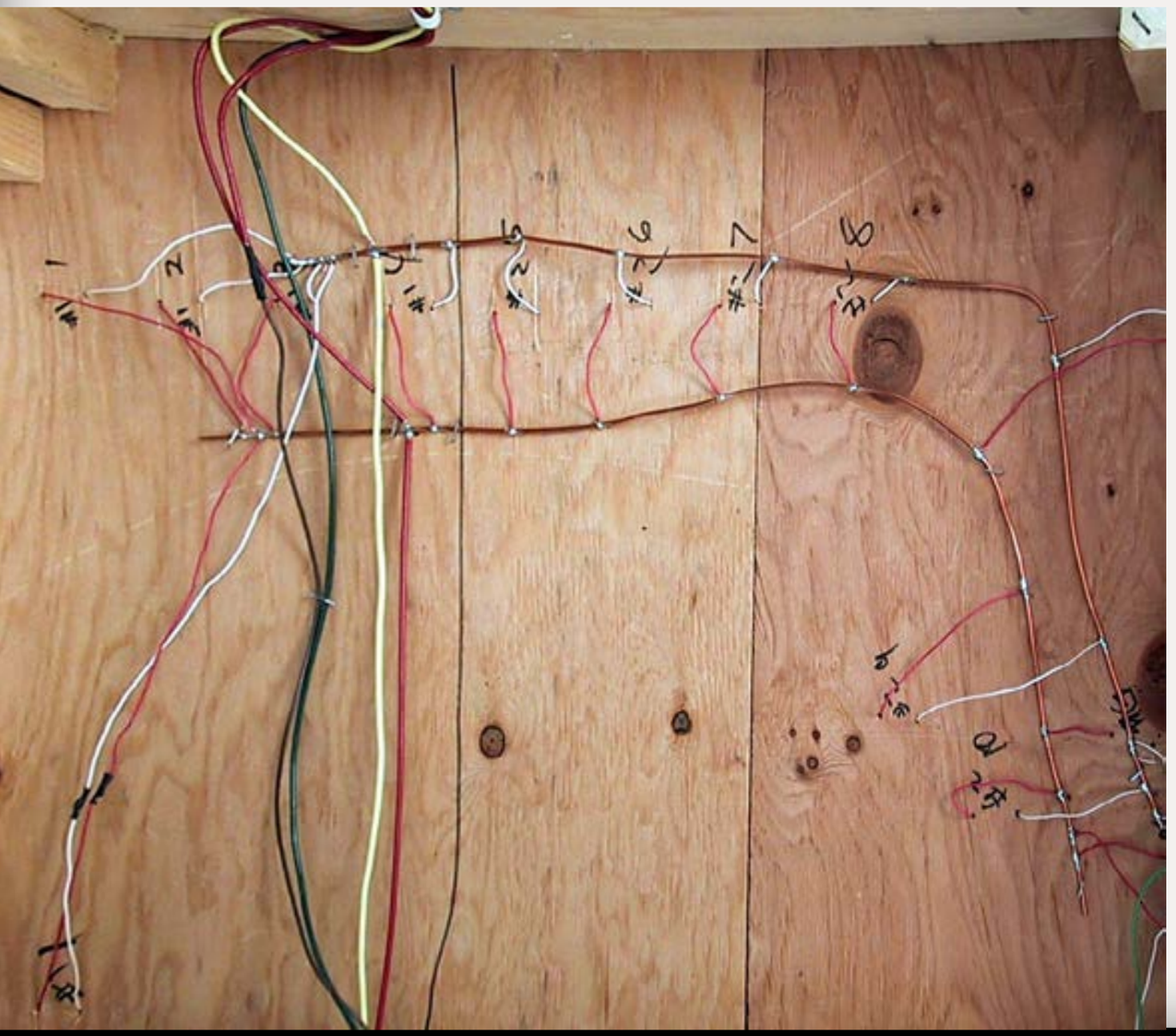

Figure 2: Underside of sectional club layout after DCC rewire. The DCC bus is the red and light colored (white or yellow).

Our sectional club designed and built our modules for DC and then tried to run them on DCC. The results were difficult, including the fact that we needed to mount the switch panel to the layout and interconnect all the blocks just to be able to run it. After several unsuccessful runs, we decided to rewire it.

Figure 2 shows one of the yard modules after the rewire. The track feeders are routed through the plywood and are wrapped and soldered to the bare sub-bus that was stapled to the plywood. The brown, black and green wires are an accessory bus, not related to DCC.

I present this as an example of DCC wiring practices. Above all, keep it simple and neat!

This wiring method worked here, because we were able to stand the modules up on their side and wire them that way with access to both sides. If this were a benchwork layout, I would have put some color codes on the bare bus wires.

System selection

One of the most common questions is “what system should I get?” I have repeatedly told folks that they need to answer that question for themselves.

DCC systems are like life partners: all have interesting features, but each has something you will have to “live with”.

One historical recommendation has been: find out what folks around you are using and buy that. Well, if you are in a club with DCC, there is some reason to select the same brand. You can then have a throttle to take to the club layout. However, as DCC matures, there are fewer and fewer “brand specific” issues. My personal layouts use a different brand than any of the clubs I’ve belonged to. That means that I have a throttle that I take with me to the clubs but cannot use it at home!

It might be tempting to purchase the least expensive set, “just to see.” However, I find that most folks who do that wind up frustrated. Spend a few more dollars up front!

A future column will delve into my views on different systems and their features and shortcomings. There are only two introductory level systems that I consistently recommend. They are similarly priced. They operate somewhat differently. I suggest you try both of them. Run trains and program some decoders before you decide. They are, alphabetically:

- Digitrax Zephyr – Figure 3
- NCE PowerCab – Figure 4

One obvious difference between the systems is that the Zephyr is a console and the PowerCab is a hand-held unit. Other systems are either significantly more expensive or have some serious limitations, to my thinking.

Figure 3: Digitrax Zephyr Xtra table mount starter system. Photo courtesy Digitrax.

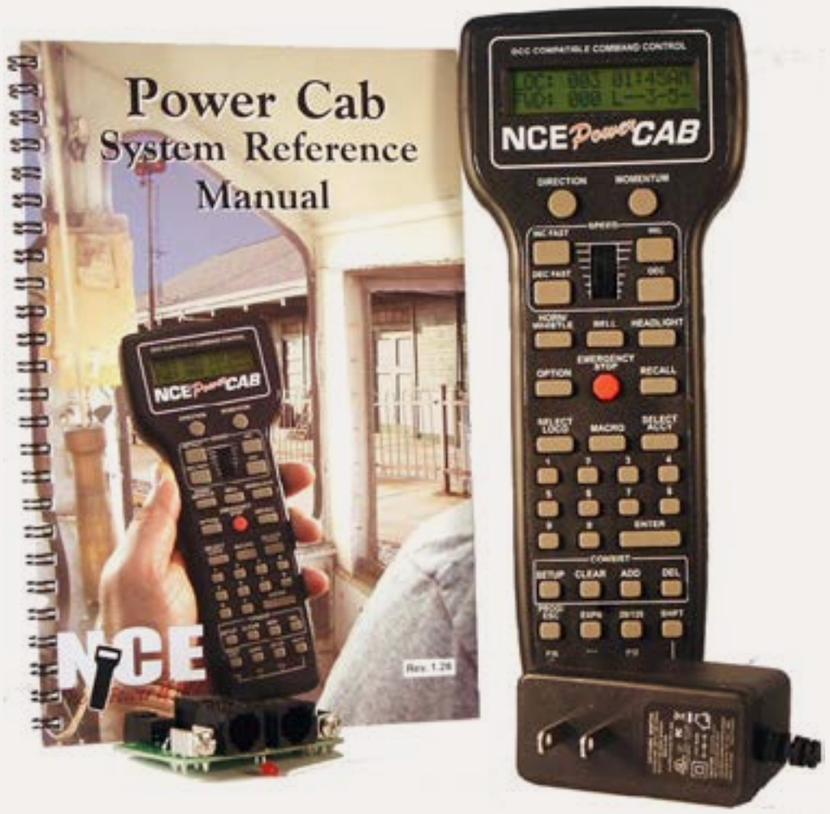

Figure 4: NCE PowerCab hand-held starter system. Photo courtesy NCE.

You need a loco to run

In college, they taught me the "scientific method". Part of that is to only change one variable at a time.

When folks buy their first DCC set and a decoder to take home and install in their favorite loco, they violate this. They don't have a proven system setup or a proven decoder installation.

I suggest you have a "known good" loco, whether it is yours or a friend's, new or used. Make sure you know its "name" (address).

This way, you can install your system and run and program the loco.

Once you have your system running on your layout, even if it is just a test track, then you can try your hand at decoder installation, if you wish!

First install

I know that you have that favorite loco that you are just itching to put sound into. Please DO NOT, at least for your first install. Let's walk a bit before we try to run a marathon!

There are many locos over the last decade that have been marketed as "DCC Ready". Some are. Many (especially early ones) are less so.

A good place to cut your teeth on installations is what I call:

Plug-n-run

These locos contain a socket to plug your decoder into. The socket may be either an 8-pin NMRA compliant socket (figure 5) or an industry-standard 9-pin socket, called a JST.

Some, like the Athearn shown in Figure 6, have BOTH plugs. In this case, there is a jumper plug on the JST to allow the loco to run on DC. In the photo, it is being removed – necessary before installing a decoder. In cases like this, I recommend that you plug in a JST decoder and be done. Here's why: the JST connection is more rigid (read reliable) than the 8-pin.

Locos that only have the 8-pin socket, like the Atlas shown in Figure 7, are easy to do, as well. You just remove the jumper plug from the 8-pin socket and plug the decoder in!

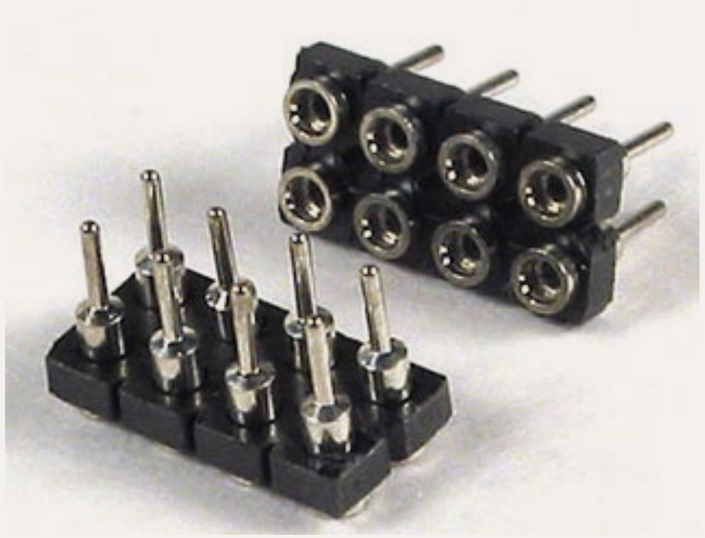

Figure 5: NMRA standard NEM-652 8-pin plugs, showing both male and female sides.

Be aware of the fact that many of the early boards from many manufacturers with either style of connectors had shorts in some of the boards. The jumper board masked these defects. When the decoder is installed in such boards, damage to the board or to the decoder may occur. To be safe, check for a lack of continuity (infinite resistance) between the motor wires (orange and gray) and any other

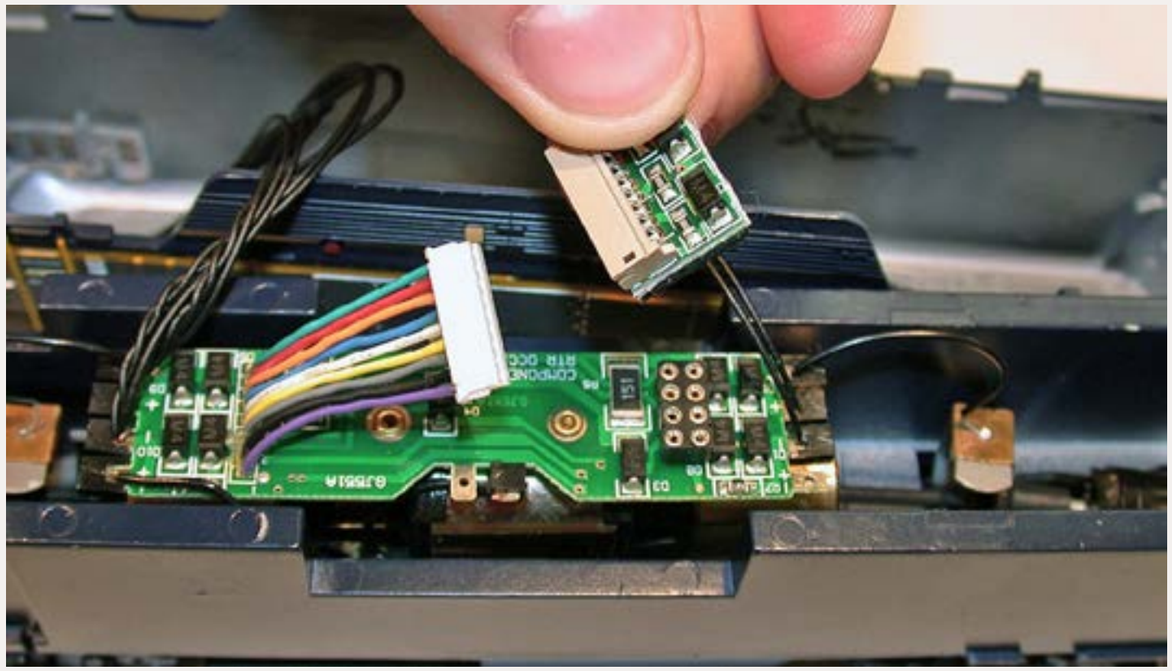

Figure 6: Athearn HO loco with both NEM-654 and JST connectors. Photo courtesy TCS.

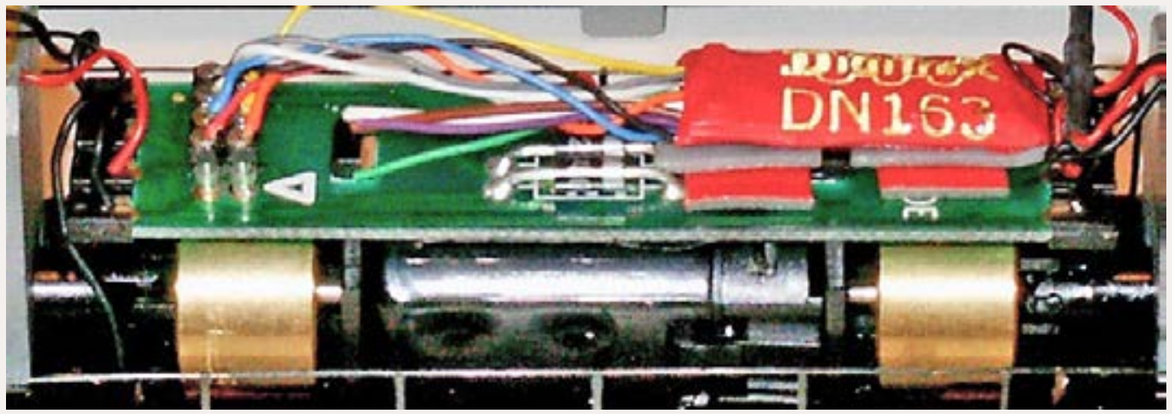

Figure 7: An Atlas HO diesel loco with a DN163PS decoder plugged into the board.

wires without the decoder or jumper installed. Of course the gray and orange wires will show continuity, as they have the motor connected between them.

I recommend a multi-meter for anybody working on the electrical portion of model railroading. You can pick one up for under $10 many places.

Selecting a decoder

Figure 7 shows an N-scale decoder plugged into an HO-scale loco. Is this okay? Absolutely!

The critical factor is the ability of the decoder to survive the current drawn by the motor and lights. Some decoders have strict limits. Others are a bit more forgiving.

You will always be safe if you measure the stall current of your loco and size your decoder accordingly. See my website: **www.mrdccu.com/curriculum/stall.htm**.

When you are sizing the decoder, remember to add up the current drawn by the motor and ALL the lights.

Other issues are:

- Does the decoder physically fit in the allotted space?
- Does the decoder have enough functions (light outputs) to fulfill my needs?
- Do the functions provide the desired special effects: strobe, Mars light, etc?

Installing in older locos

Okay, now you have cut your teeth on some plug-n-run locos. What about locos designed before DCC was so popular?

Some are unbelievably complex, such as the Kato NW-2, which requires complete disassembly and machining of the weight to install the decoder.

The venerable Blue Box Athearns that folks seem to have in abundance are rather straightforward. The installation requires good soldering skills and the willingness to disassemble the loco. That's a topic for a future column.

I find that getting the decoder installed such that we can run the motor is about half the job. The lighting takes up a lot of the time. Look to future columns about lighting concepts.

What about my brass?

Most older brass locos had minimal power pick-up. The most common design in old brass steam has the right rail picked up by the loco wheels

(frequently only the drivers) and the left rail picked up in the tender.

This results in very spotty DCC performance without adding pick-ups to the opposite rails. Not for the faint of heart. See what I installed in an O-scale loco in Figure 8.

Older locos also tend to have less efficient motors than the current crop, resulting in some with enormously large stall and running currents. Three pole motors are less responsive at low speed than the current five pole designs.

Add in the older gear towers and the result is a loco that needs a complete rebuild to run as it should on DCC.

Is it worth it? That is a question for you to decide.

If you have the background and tools to rebuild the loco, then the DCC install is fairly easy. If you are paying someone to do the work, expect to spend many hundreds of dollars.

Perhaps you may want to display your older treasures and run some newer locos on your DCC layout.

Early brass diesels have similar issues to the steamers.

Later brass diesels have more efficient motors and drive trains and frequently make good candidates for DCC.

I want sound!

I knew we would get back to that question, as that's where this column started.

The decoder part of a sound installation is not hard. It is basically the same as a motor and light install, except there is the added issue of the speaker.

Where it becomes tricky is the acoustic design necessary to get the sound out in an efficient and pleasing manner. Again, this will be covered in a future column or two.

You can't work through all that was presented here in a few weeks, so just be patient and I'll get to these topics soon.

Have fun on your pike (or someone else's) until next month! ☑

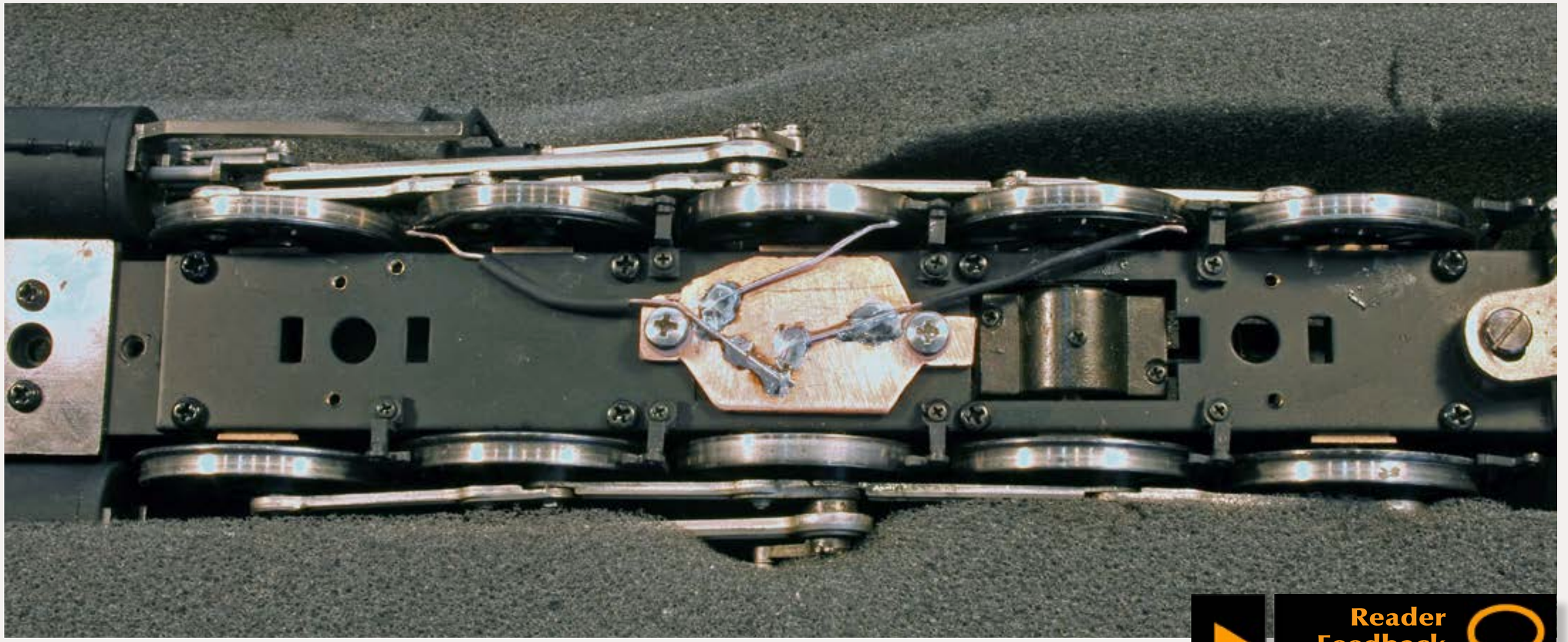

Figure 8: Opposite rail pick-up installed in an O-scale brass steam loco.

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