About our DCC columnist

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

Click here to learn more about Bruce.

DCC Impulses: HO Scale Diesel Installation Examples

How to Get Your Diesel Running on DCC

Reader Feedback *(click here)*

Non-sound installations ...

Are you a PowerCab user or are you thinking of buying one? Check out this month's SMP sidebar for tips on connecting your PowerCab (see page 39).

In the April 2012 column (model-railroad-hobbyist.com/magazine/mrh-2012-04-apr/dcc_impulses), I did an extravaganza of N scale installation examples. The response was heartwarming.

So, in the same vein, let's look at the most popular scale, HO.

These will not be step-by-step installation guides, but rather, an example of how things have been done successfully. Once you know your final target, you can frequently find step-by-step guides on the web.

I will refer to tools and supplies previously discussed in my columns, mostly in January 2012 (model-railroad-hobbyist.com/magazine/mrh-2012-01-jan/dcc_impulses).

Some HO scale loco installations require so much work that I will not cover them here. They may get a column of their own in the future. HO locos such as:

- Kato NW2
- Life-Like Proto 2000 PA units
- Life-Like Proto 2000 S-1 series

I covered the general concepts to install DCC in Athearn blue-box locos in the February 2012 column (issuu.com/mr-hobbyist/docs/mrh12-02-feb2012-ol?viewMode=presentation&mode=embed%pageNumber=49).

Here we go – this time in HO, again in alphabetical order:

Athearn CF7

Installing a decoder into the Athearn RTR locos seems to be pretty straightforward: a simple JST style 9-pin plug-in swap.

Not so fast.

Some of the boards for these locos were not properly etched. In the highlighted section of figure 1, there is a place where the motor trace touches the rail trace.

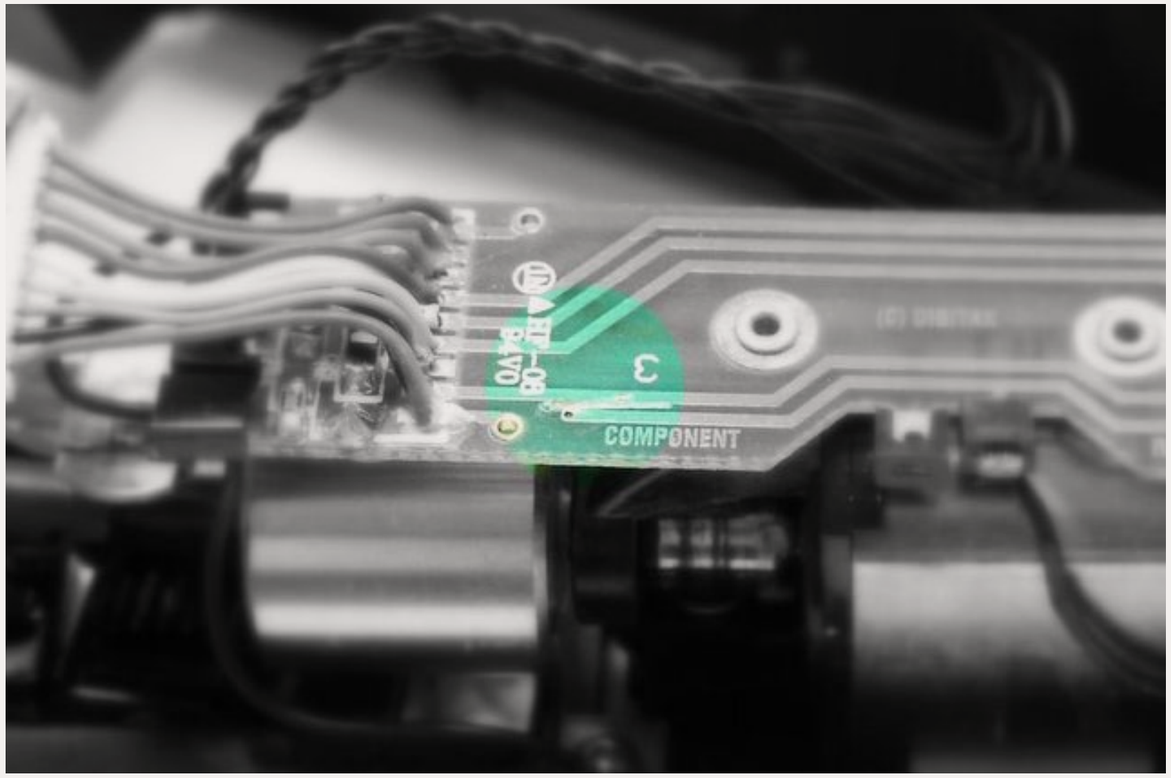

Figure 1: Athearn CF7.

If you simply plug a decoder into this loco, you will have a motor to rail short. Such shorts are frequently fatal to decoders.

I carefully inspected the board for visually obvious shorts. When I found one, I used my hobby knife with a #11 blade (I prefer Excel to X-acto – sharper blades) to carefully slice between the traces as shown in figure 1. Once my buzzer showed no rail to motor continuity without the decoder or jumper board installed, I could continue the installation. Had I been able to see the shorts, I would have tested with my buzzer, as discussed later in this column, before plugging in a decoder.

I plugged in the 9-pin JST style decoder.

If I were to do this installation today, I would do it exactly the same way.

Athearn RTR GP60M

The GP-60M shown in figure 2 has no such issues.

After opening the loco, I removed the JST jumper. As a precaution, I used my buzzer to verify that the rails (red and black) were not connected to the motor (orange and gray); and plugged in a Lenz LE-1024 decoder.

If I were to do these installations today, I would do it exactly the same way. Any 9-pin JST style decoder will just plug in this way – check for clearance between board and shell

Atlas S2

The S1 to S4 locos are popular switchers and Atlas makes a workhorse model.

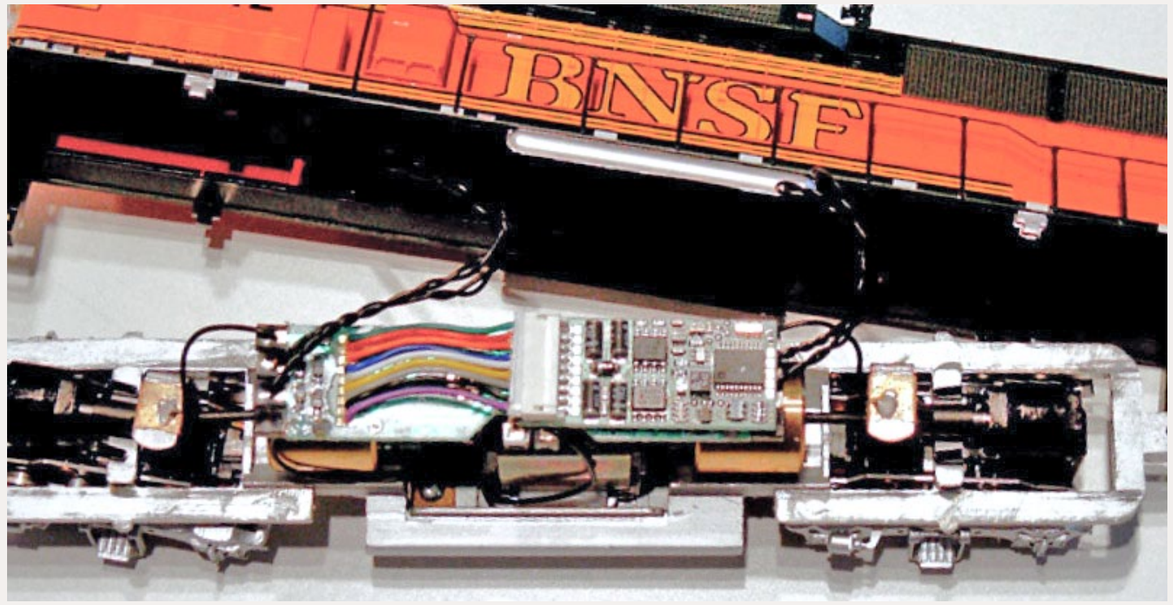

Figure 2: Athearn RTR GP-60M.

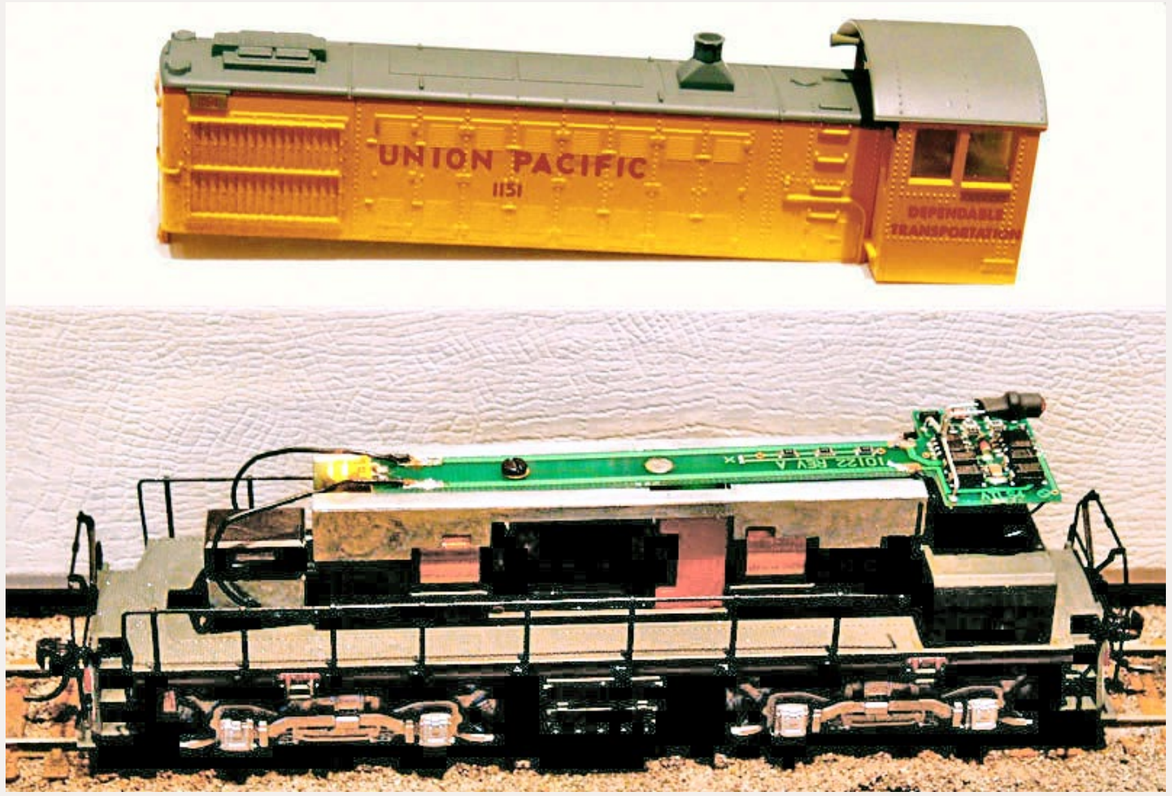

Figure 3: Atlas S2.

The Atlas S series switchers are much more DCC friendly than the Life-Like Proto 2000 units. However, they still need to have the motor isolated from the frame.

The NCE ATL-S4 decoder was designed to work into these locos with a minimum of fuss. But it is a full-wired installation.

I just followed the NCE directions for this installation. These instructions included the steps necessary to isolate the motor from the frame. NCE's kit even includes a plastic motor-mount screw.

Be very careful to follow the directions exactly, especially when is playing the motor.

While there may be less expensive ways to get a decoder into this loco, I recommend one of the decoders specifically designed for it.

If I were to do this installation today, I would use the NCE ATLS4 or the new TCS AS6.

Bachmann GP30

This split-frame loco comes from Bachmann with a light board spanning the length of the loco.

I removed and discarded the light board and lights. I then disassembled the loco and installed motor wires that were insulated from the frame – orange for the tab that contacted the

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right frame half and gray for the one that contacted the left. The goal here is to isolate the motor connections from the frame.

I used a Dremel cutoff wheel to cut small channels in the frame to provide clearance for the wires coming from the motor. You can see them on the side of the frame in figure 4. The wires are held in place with Kapton tape.

I prepared two LEDs, as detailed in the March column and video (model-railroad-hobbyist.com/magazine/mrh-2012-03-mar/dcc_impulses).

Then I wired a Lenz LE1024W decoder to the motor leads, the frame halves and the LEDs. I selected the (now discontinued) LE1024W, as it was one of the thinnest HO-scale decoders on the market at the time.

If I were to do this installation today, I would do it very similarly. My current choice of decoder would be the TCS A4X. It provides very good motor control and is as thin as the Bachmann light board. Check for clearance between frame and shell.

Kato RS-2

At last, here is a fairly simple, drop-in decoder installation.

All the major decoder folks make the "integrated plug" style decoder, used here: Digitrax, Lenz, NCE, SoundTraxx and Train Control Systems.

I have not seen the quality problems with this Kato board that have plagued some of the locos mentioned earlier in this column.

This installation was as simple as removing the shell, pulling out the 8-pin jumper plug and plugging in a Digitrax DH163IP decoder.

If I were to do this installation today, I would do it exactly the same way. Note: There are both standard and UK version decoders available. There is a 90-degree difference in the plug orientation between them. Do not use the UK oriented decoders for this installation.

Life-Like Proto 1000 (early)

The Life-Like Proto 1000 locos were one of the earliest "DCC aware" locos available.

Figure 7 (next page) shows a top view of the original board. A white X is silk-screened at three places on the board. Cutting the printed circuit trace (wire) at these locations will isolate the motor and lights.

The installation was one of the most straightforward of the early "DCC aware" locos.

I removed the shell and then cut the traces on the board with an Excel knife equipped with a #11 blade at the marked spots. For safety, I used my buzzer to verify that I had cut through the trace.

Then I wired a JST (9-pin) harness to the six eyelets on the rear of the board with the following color code:

- P1 – Orange
- P4 – Black
- P5 – Gray
- P6 – White
- P7 – Blue
- P8 – Red

Now, you have a "DCC ready" loco. Any 9-pin JST style decoder will plug right in. Figure 6 (next page) shows a Digitrax DH163 decoder installed.

Newer Proto 1000 units seem to be "DCC Ready" – just plug your decoder in.

If I were to do this installation today, I would do it exactly the same way.

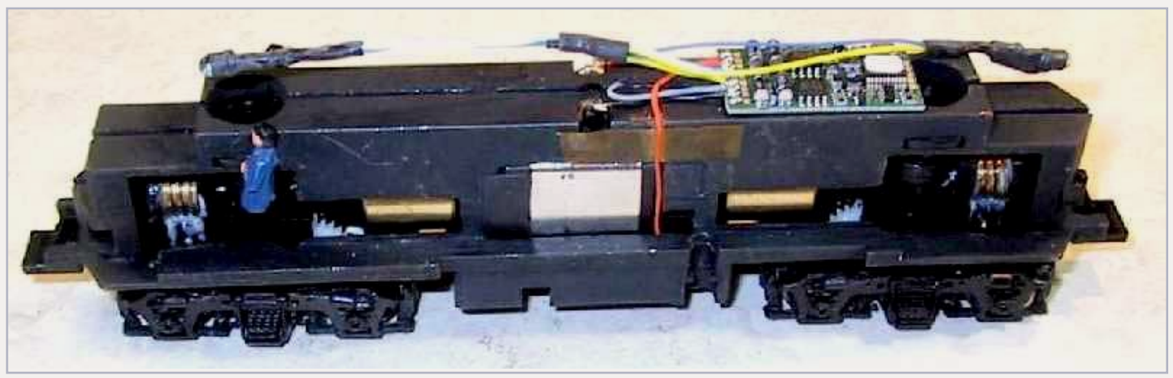


Figure 4: Bachmann GP-30

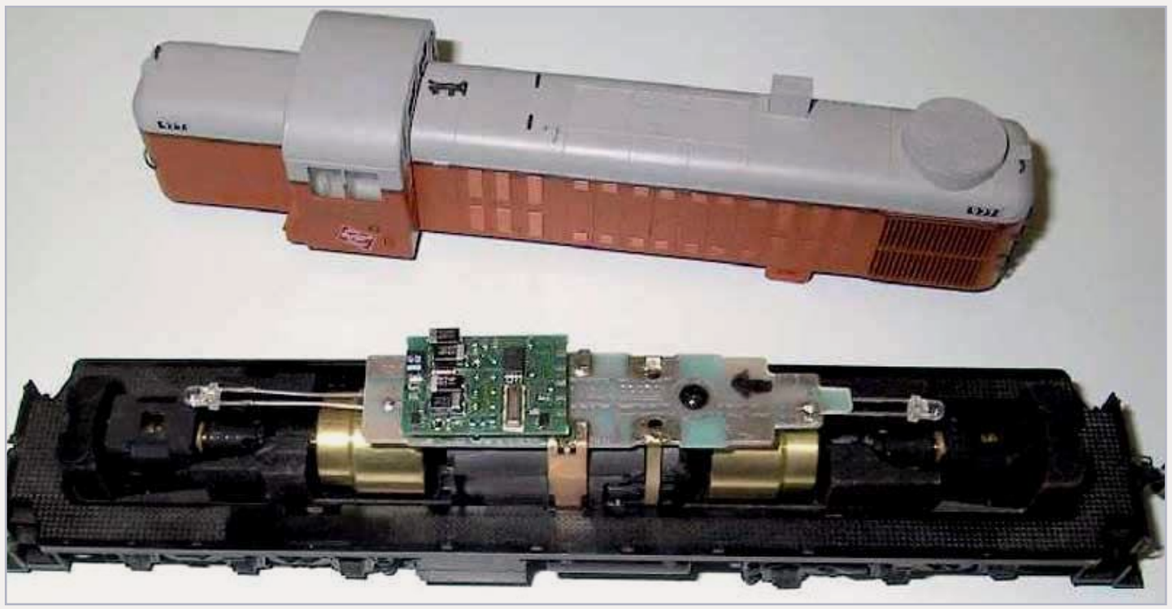


Figure 5: Kato RS-2

Life-Like Proto 2000 Cab Units

Whether they are E8/9 A units, or E7 A units these are nice running locos: strong, heavy and smooth. My major complaint is the "flick-flick" attempt to emulate a Mars-light on the appropriate models. Sorry, it just doesn't look like what I want on my railroad.

The 1990s vintage PA units are a DCC installation challenge unto themselves due to excessive motor current. This

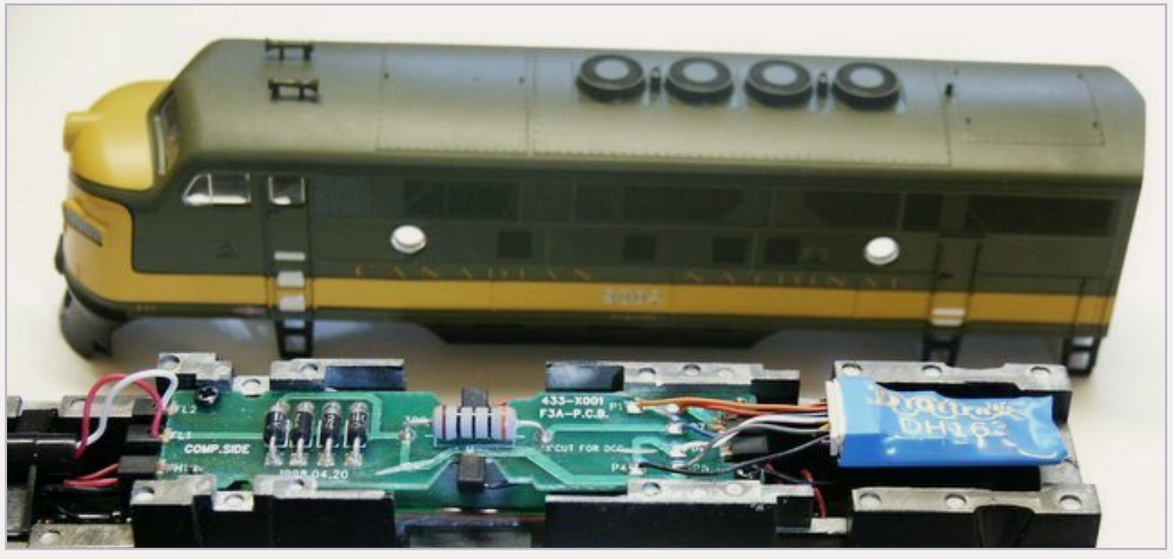


Figure 6: Life-Like Proto 1000 (early) – overview.

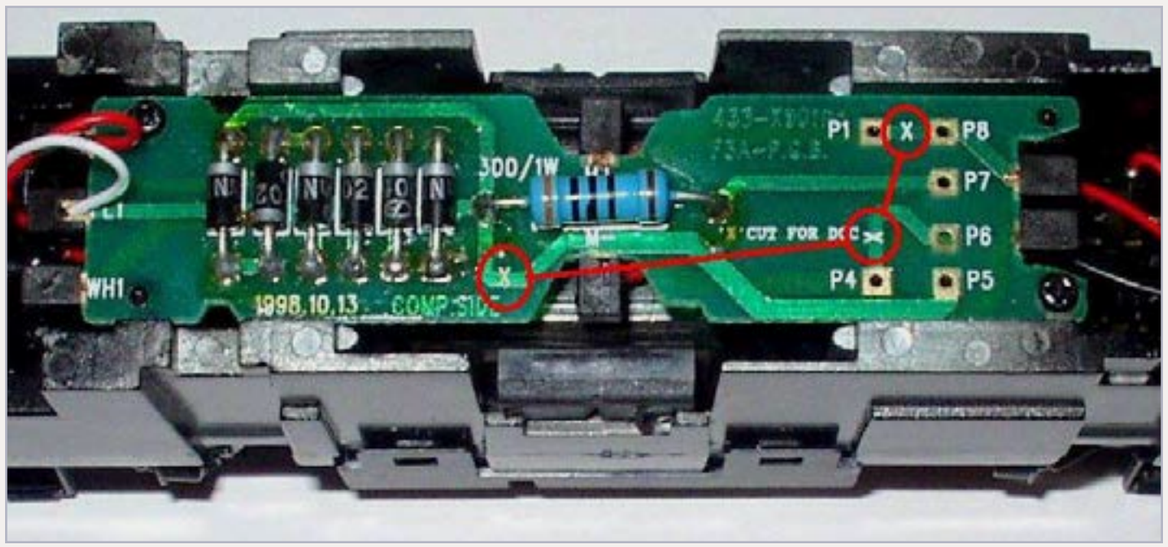


Figure 7: HO scale Life-Like Proto 1000 (early) – board detail with X's.

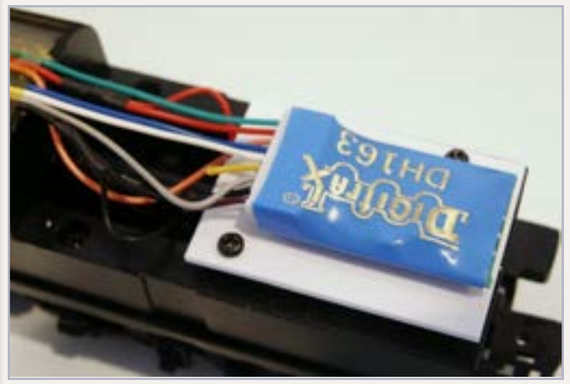


Figure 8: Life-Like Proto 2000 Cab Units – decoder mount.

installation won't work for them without a motor replacement.

Let your DCC decoder generate the Mars-light effect for you. I showed a LED equipped loco with the Mars-light effect enabled in a video with a prior column here in MRH (youtube.com/watch?v=HvyyttLXagE).

Here's how I did a circa 1995 model.

First I removed all the Life-Like lighting and electronics. When I was done with this, all the wiring left in the loco was connected to either the motor or to the trucks.

I made a mount out of styrene over the rear truck, as shown in figure 8. It is held down by the screws that held down Life-Like's PC board. White styrene was used for the photo, as it shows up easier – I would use black for a customer's installation. I installed a Digitrax DH163 decoder on that shelf with carpet tape.

Then I built an assembly of two Sunny White LEDs, with the anode (long) leads connected to a blue wire, as shown in figure 9. A white wire was connected to the cathode (short) lead of the LED that will be in the lower position (a bit toward the rear of the loco, too). The upper LED got a yellow wire on its cathode (short) lead.

The LED assembly was mounted in place of the Life-Like bulbs, as shown in figure 10 (next page). The upper LED is shrouded with shrink tubing to reduce the bleed over between lights as seen from outside the shell.

The final wiring is straightforward. I connected the red and black decoder wires to the red and black truck wires. The orange decoder wire got connected to the red or orange motor wire (the color scheme varies between runs). The gray decoder wire was connected to the other motor wire.

The LEDs were connected to the decoder – matching colors as I went – and I added 750-ohm resistors in series with the white and yellow leads.

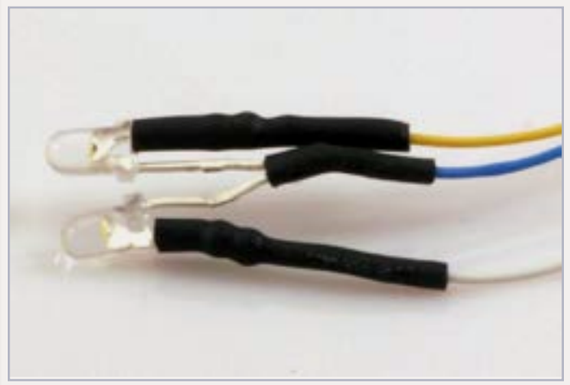


Figure 9: Life-Like Proto 2000 Cab Units – LED assembly.

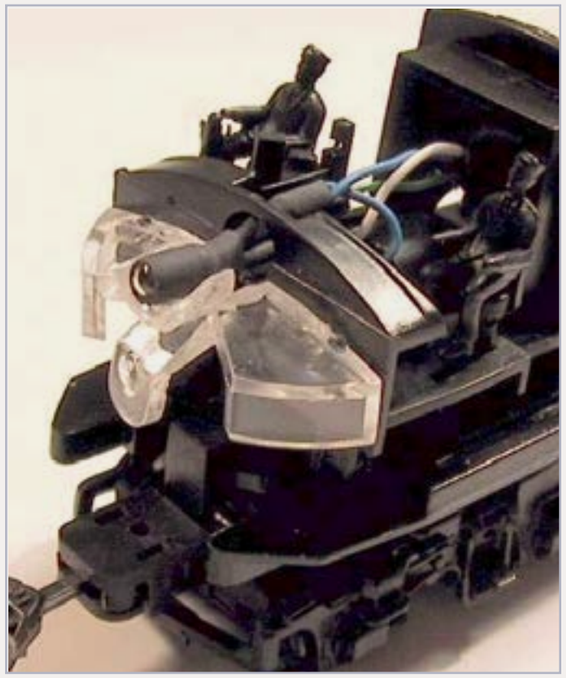


Figure 10: Life-Like Proto 2000 Cab Units – Mars light mount.

All that was left was for me to program the yellow wire to light up going forward and have a LED Mars-light function emulated. This programming varies among decoder manufacturers. I recommend DecoderPro for the task. All you have to do is tell it what you want and it figures out which CVs need to be changed.

If I were to do this installation today, I would do it exactly the same way.

Life-Like Proto 2000 GP's and SD's

Life-Like sold several versions of these popular locos in the 1990s. They had numerous designs for the light boards. The good news is that, if they are still in the original box, it is easy to see which version of the light board you have, as the shell is not installed.

While there are external differences between the GP7, GP9, SD7 and SD9, the interior of the model is virtually identical for a given production run.

The SD7 in figure 11 is typical of one run, which included the 8-pin NMRA compliant socket.

This was truly a "plug-n-play" installation. The Life-Like board even took care of the conversion to 1.5 volts for their bulbs.

These locos are notorious for cracking the gears on the driven axles. It seems as if the molded plastic gears are not strong enough to take the expansion of the metal axles imbedded in them.

So, I plan on (and price into my installation budget) replacing the gears with the machined Delrin gears from Northwest Short Line (53-21946). Yes, they are pricey.

There are lots of stories about other options, but I like to fix things once and have them stay that way. I've never seen a NWSL gear crack. And they are smoother and quieter running than the Life-Like or Athearn plastic gears.

If I were to do this installation today, I would use an Atlas-style light board decoder and replace the Life-Like

bulbs with LEDs. The bulbs seem to have a fairly short life and changing them out for LEDs makes for a long-lived loco. This total-replacement installation will work with any of the various "versions" of these locos, not just the version shown here.

Motor Isolation

Sharp-eyed readers will notice that I rarely talked this time about "motor isolation." Why? Most of these locos have the motor isolated from the frame or the trucks, as they come.

If you have any questions about whether the motor is isolated on the specific unit you are working with, I recommend that you prepare the loco for the installation. Just before you wire the decoder, or plug it in, test between a motor lead and each set of wheels. There should be no continuity – the buzzer won't buzz or the ohm-meter reads infinity. Any other out-come is your signal to dig deeper and find out what is happening, before you smoke a decoder.

We'll start on sound installations in a column in the near future.

Meanwhile, keep having fun and post any questions or observations on the blog by clicking on the READER FEEDBACK link below. While you are there, please vote for this column. Your votes have kept my column in the top five for every one of the first seven months that I have been writing the column. Thanks. ☑

Reader Feedback *(click here)*

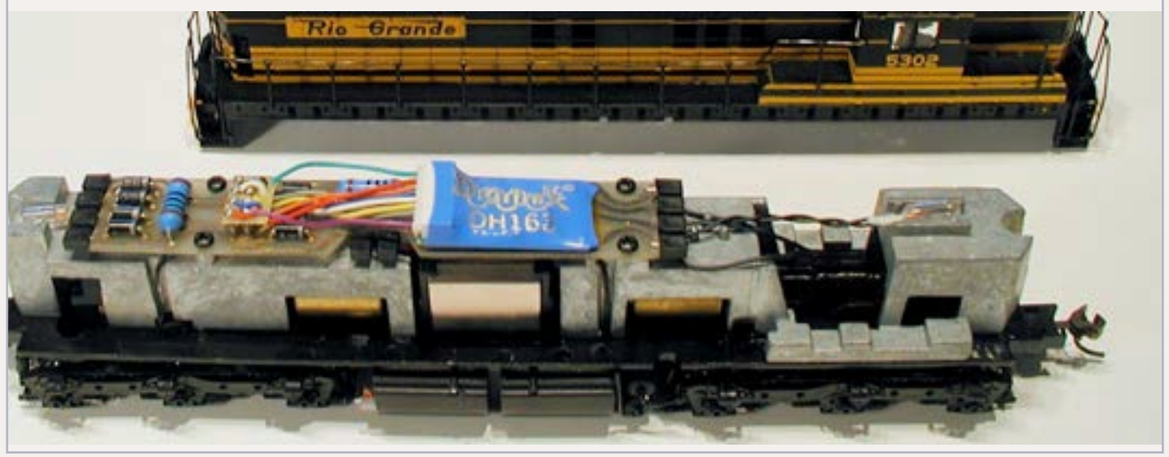
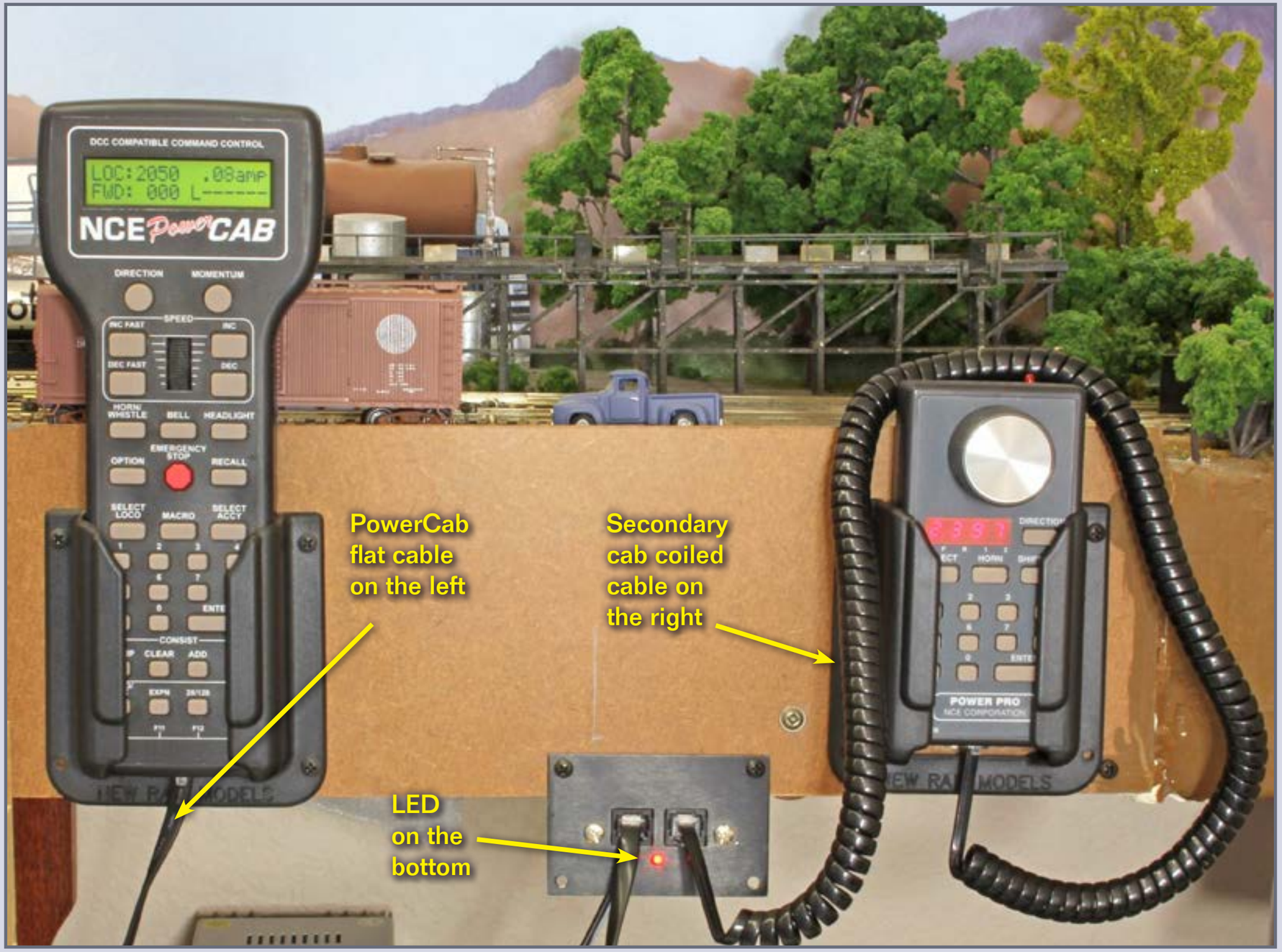


Figure 11: HO scale Life-Like Proto 1000 (early) – board detail.

SMP* from Mr. DCC – NCE PowerCab Connection

One of the most popular DCC "starter sets" is the NCE PowerCab. Inside the front cover of the NCE manual is a drawing that shows how to connect the hand unit to NCE's Power Control Panel (PCP). However, sometimes folks seem to have a hard time making sense of the drawing. Here is a more graphic representation.

A 6-foot flat cord is supplied with the PowerCab. NCE offers an optional 12-foot cord. To avoid problems with your system always use a genuine NCE flat cord, either the 6-foot or the 12-foot version. The system was designed to balance the PowerCab, the supplied power supply and either of the NCE cords into a safe and easy-to-use unit.



Orient the Power Control Panel on your layout with the LED on the bottom and plug the flat cord into the left socket and leave it there. This is the connection between your PowerCab system and the track. If you unplug the PowerCab, everything will stop. There will be a delay while the system comes back up when you plug the PowerCab back in.

A secondary cab or radio base unit can be plugged into the right socket or the rear socket of the PCP. Universal Throttle Panels (UTP) can be daisy-chained off the rear socket so you have a place to plug in with the secondary throttle as you move around the layout. I recommend only genuine NCE UTPs.

The photo shows the PowerCab on my layout plugged into the PCP with the flat cord on the left. A Cab-06 with the coiled cord is plugged in on the right. The cabs are resting in a pair of New Rail Models (501-40020) throttle pockets. I especially like the throttle pocket for the PowerCab, as it keeps folks from setting the PowerCab on the layout or dropping it when they are using the other cab to run a train.

** SMP comes from the Amtrak world and is short for Standard Maintenance Procedure.* ■

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