

Decoder Installation: Rivarossi E444

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Background

Having done DCC decoder installations on American prototype N scale engines, I was happy to discover that it was a pretty easy job on a wide-body Italian electric.

Considerations

My layout (in constructions) includes a Swiss section and an Italian section. I'm sold on the idea of DCC and have already purchased a Digitrax system. I plan on operating the Italian section of the layout in a "hands-on" way, but hope to use a computer to run the Swiss section (which consists of a mainline 'race track' representing part of the Domodossola to Simplon Tunnel double track line.

One of the recent additions to the Digitrax product line is transponding. This feature allows the engine (or transponder-equipped rolling stock) to be sensed by the system and identified as to which piece of equipment it is. While this will be of limited use on the "hands-on" section of the layout, it becomes very handy on the computer-controlled portion.

Rivarossi E444

I chose as my first candidate one of my Rivarossi E444 electric engines. The choice was influenced by a question from an ASN member on how to install a decoder in this engine (and the recognition that I needed to get started converting my fleet to DCC).

I will admit that from the outset I forgot the first rule of DCC: "Make sure the loco is running well on DC before you begin!" In my case, I knew that the engine had run well in the past, but did not consider that sitting in its storage box for a couple of years did nothing to enhance its functioning. I did verify the decoder.

Step by Step

Begin by disassembling the locomotive:

1. Remove the ventilation cover from the roof;
2. Remove the two screws holding the body; set the body parts and the screws aside;
3. Unsolder the wires from the two truck pick-ups;

4. Remove the two screws near the light bulbs; lift the plastic circuit holder and the metal plate off to expose the motor;
5. Remove the motor; depending on the type of universal joints used, you may have to remove the motor and the gears as a unit; be careful not to lose the bronze bearings at the end of the worm shafts.



Figure 1: Motor with underside contact removed

Mark the bottom side of the motor. Carefully remove the bottom brush holder and slip the flat contact strip off of it. Carefully reinstall the holder making sure that the carbon brush and the spring are properly seated within the holder. At this point, it is probably a good idea to test the motor and give each shaft a single drop of light, plastic-compatible oil.

Reinstall the motor with the marking facing the bottom of the mechanism. Set the metal top plate in place. Test the mechanism using jumper wires to make sure everything moves as expected.

Decision Time

To install the Digitrax DZ-121 decoder, some minor modifications will have to be made. Essentially, you have two choices:

1. Modify the plastic circuit holder. This allows retention of the switch that selects between track and overhead pickup. It also allows for the use of the stock light bulbs if this configuration is supported by your decoder.
2. Discard the plastic circuit holder. This eliminates the overhead pickup and requires a different approach to lighting.

I initially chose the first method, but soon realized that for my purposes the second method was better. Why?

- I am installing catenary but have no intention of using it as a power pick-up because it requires that the loco always be oriented in the same direction; no traversing reverse loops or wyes, no 180-degree trips on a turntable. I also didn't have full faith in the switch remaining in the correct position.
- Transponder operation requires that the lights be hooked up per the instructions using the white, yellow, and blue wires. The stock bulbs use a common return through the frame.

Prepping the Mechanism

With the decision made to eliminate the plastic circuit holder, I found that I had to shorten the two screws that hold the top and bottom portions of the mechanism together. I also removed the wire connecting the two pantographs. I did keep all removed parts just in case I ever needed to restore the engine to its as-built configuration.



Figure 2: Modified frame piece (lower)

Though not absolutely necessary, I decided to grind away a bit of metal to make more room for the decoder. Notice that of the two screws that hold the body to the mechanism, one is right on the locomotive center line and one is not. Adjacent to the one that is not, there is an additional mounting boss of some sort that evidently serves no purpose. With a milling bit in a Dremel motor tool, I ground this boss down so that I could install the decoder further from the end (and leave more room for the wires and light). I also removed a small amount of metal from the top of the truck pick-up nearest the decoder.

Installation and Wiring



Figure 3: Location of the decoder atop the mechanism

I affixed the decoder in the desired location with a bit of silicon adhesive. I determined that the end opposite the decoder was the anterior end and so made the pick-up and motor connections accordingly:

- Black wire to the two truck pick-ups on the left side (the insulated side);
- Red wire to one of the truck pick-ups on the right side (the uninsulated side);
- Grey wire soldered directly to the top motor brush holder (don't apply too much heat when soldering to the brush holders);
- Orange wire soldered directly to the bottom motor brush holder; route this wire down through the hole in the top of the mechanism and alongside the motor end cap.

Of course, trim each wire to the necessary length before making the connection.

At this point, test the locomotive to make sure that it works.

Lights

For lighting, I chose white LEDs. Since these operate at a maximum voltage of about 3.5 volts, each LED needs a resistor at the cathode end. I used the usual 680 Ohm resistors.

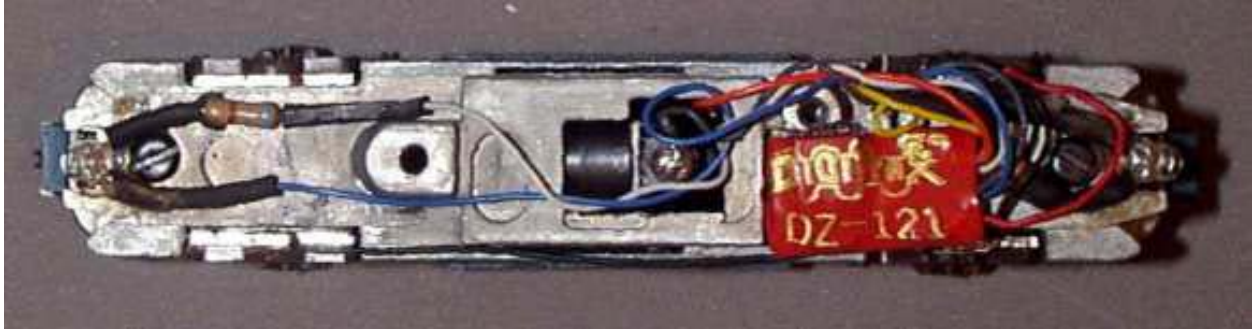


Figure 4: Top view, wired and LEDs installed

Solder all of the light connections and insulate the connections and bare wires with shrink-wrap tube.

With the work finished, test and program the locomotive. Reassemble the body, ensuring that the wires are routed safely away from anything that might pinch them (and cause a short circuit).