

Northern Virginia NTRAK "How-To" Article

DCC FOR OLDER "NON-DCC READY" LOCOMOTIVES
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NVNTrak has adopted and pioneered many significant aspects of operating complex and large layouts with DCC systems. With DCC as the primary means of control, come many advantages that are critical to prototypical operations. DCC allows easy operation of large numbers of trains simultaneously without a plethora of isolation blocks, consisting of multiple units with real speed matching, precise control of engines, and effects such as lighting and sound which are typically unavailable or unreliable in analog control. Many of us have adopted the use of DCC and its advantages in our locomotives precisely for these reasons.

Now with all that cheerleading for DCC done, let me explore the darker side of DCC vs. DC decisions. We have all experienced that sinking feeling when contemplating the prospect of trying to convert the whole of our power rosters to DCC. Many of us have suffered sticker shock at the thought of what it would cost to outfit all those good old engines we started collecting back in the day as we started into this journey of N-scale railroading.

Even if cost were no object, there is still the prospect of trying to find space inside the typical N-scale locomotive to fit the decoder electronics. Not all is bleak, however, as the advances in decoder construction have enabled small enough units to find their way into the smallest of spaces. I have found a lot of success with Digitrax DZ-123 and similar sized units, but other manufacturers also have good options.

So how does one decide which locomotives will be good candidates for DCC conversion? While certainly not every old engine is a good candidate for DCC conversion, some better ones can be. Here are a few considerations to weigh before you take your Exacto knife and soldering iron to your prized diesel articulated steam engine.

First, the engine should be in excellent mechanical condition, meaning smooth, quiet running motor and drive train (no pun intended), no hesitation or drop outs through switches, clean contacts, and electrical path, and no blinking or flickering of the headlights.

While DCC allows engines to perform at their best, it is not a fix for poor mechanical or electrical operation seen in DC analog mode. In fact, DCC demands great electrical performance to maintain good signal path into the decoder. While flywheels improve and mask some momentary electrical drops from a mechanical standpoint, those same drops will only aggravate a poor electrical signal path when a DCC decoder is involved.

Second, the engine should be of enough value to warrant the time and effort to convert it. Now value is a rather subjective thing, and what is valuable to one may not be to another, so let me illustrate with some examples. Many smaller engines may be easier to buy new in factory DCC option rather than convert an old one that is difficult and nearly as expensive to find a suitable (small enough) decoder.

While I have a number of older Plymouth switchers and SW 1500s, and some in road names that are nearly impossible to get today, the issues of how to get them apart, electrically isolate the motor, carve out room for the decoder and get them all back together again are simply too hard to overcome to make it worth the effort. A couple of modern units with factory DCC fills in the operational need while the other DC units can be assigned duties on isolated parts of the layout where a separate DC operation can extend their usefulness.

Similarly, I have a number of older F3 diesels that while of sentimental value as first engines, they just don't run well enough or have solid enough assemblies to warrant a DCC conversion. I am sure you can all guess the manufacturer of many such engines. Then there are the really prized older engines that may have been the big articulated steam engines of yesteryear like the Atlas (imported Rivarossi) Challengers and Big

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Boys, which may or may not hold enough value to you to attempt a DCC conversion. Most of those still fall short when evaluating reliability of the motor or electrical pick-ups to make them worthy candidates, but some of the better ones can overcome the obstacles to make them worthwhile to consider.

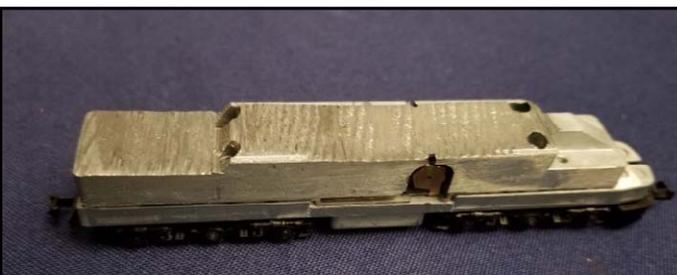
Finally, there must be enough room or potential room to fit a decoder, and an easy enough path to electrically isolate the motor and lights from the frame or at least the electrical pick up path from all the wheels. This is somewhat of a learning curve as some locomotives I have attempted, thinking it would be fairly straightforward, had some hidden (OK, less obvious) electrical paths from wheels to motor leads. This point is a strong one though, as it is simply a great way to destroy a decoder by allowing a DCC installation to still feed some part of track power to one of the motor leads. It is also preferable for light leads to be entirely free of electrical path shared with wheel pickups, although some decoders will allow for it. This practice will greatly reduce the lighting effects and control you can have over light operation should you allow one of the light leads to be common with a wheel pickup. It is best to avoid it altogether by running a new light bulb on leads from the decoder outputs designed for the function.

Now that you have decided that your really excellent and prized locomotive meets all the criteria above, what do you need to be aware of to ensure a successful DCC conversion? I am including two examples, one diesel and the second a steam engine.

The first is a old Concor PA unit. The internals were actually manufactured by Kato and have been very reliable, if a little noisy.

With the frame removed you find that the frame is in three pieces. Note the split at the right end of the photograph. Electrically, the two bottom pieces pick up power from the left and right rails. The top piece with the motor mechanism is electrically isolated from one side. You will also find there is no room for a decoder.

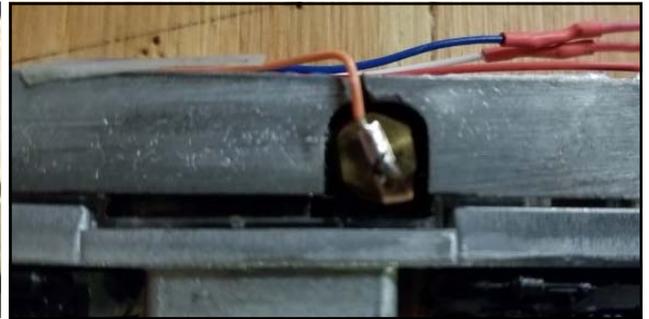
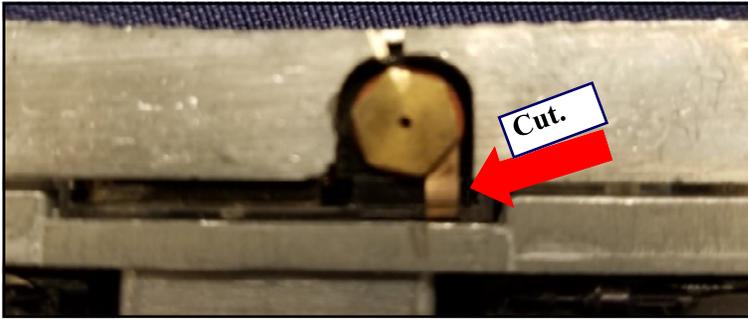
The top frame needs to be cut or milled down to make room for the decoder and wires. I saved all the scraps to use as weights in box cars.



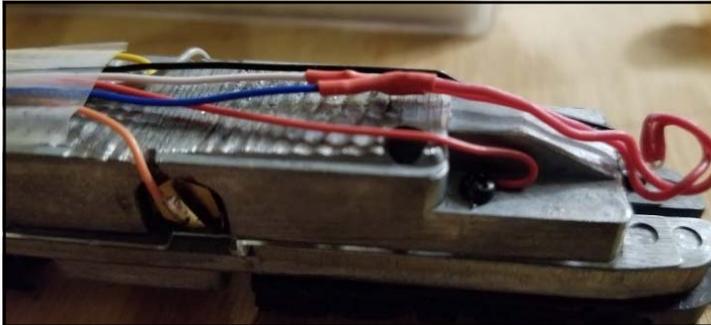
You must ensure electrical isolation of the motor by removing all electrical contact from the wheels to the motor including any through the frame connections. Replace them with the appropriate feed direct from decoder to the motor connections. Remember, the wheels to decoder paths must be isolated from the decoder to motor paths! It is also a good idea to ensure both positive and negative lamp leads go directly from decoder to the lamps. Ensure all electrical connections are soldered cleanly with properly flowed solder for a solid connection. See the next page

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Ensure any joints that may expose wires or conducting elements are adequately protected. Shrink wrap is an excellent method.



There is a lot more viability in steam engines. There is normally a lot of space in the tender, which is an easy place for the decoder if the power pickup will



support that.

In a few cases you will find that only the tender has no electrical contacts. In that case it may be easier to find room in the locomotive itself. In my case I placed the decoder in the tender as shown.

Finally, test the decoder functions thoroughly and program as desired. This should provide the best chance for a successful DCC conversion and allow you to enjoy the enhanced benefits of digital control of some of your best motive power regardless of age.

Happy Railroading!

