

DCC Impulses - A Dozen More DCC Myths



Model Railroad Hobbyist |

DCC IMPULSES

column

BRUCE PETRARCA

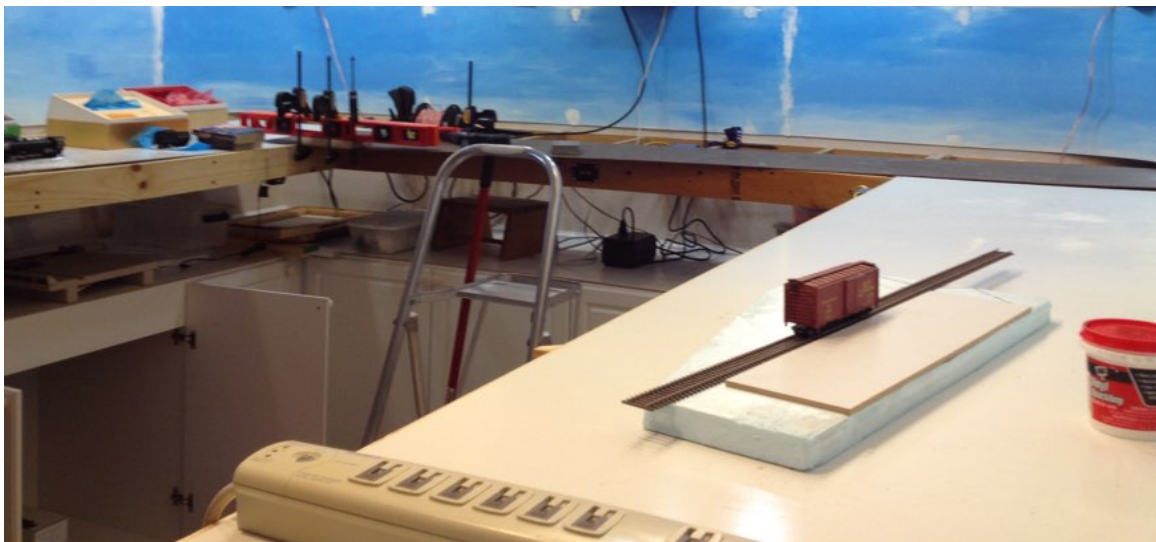


[Click here for reader comments](#)

A little while ago, ok, two years ago, I offered a dozen myths. Now it is time to visit the oracle again and see what myths are being propagated now.

1. Myth #1 Using DCC is difficult.

Yes, it can be. However, it doesn't need to be any more difficult than you want it to be.



A simple unit like (alphabetically) the Digitrax Zephyr Xtra or MRC Prodigy or NCE PowerCab will get you up and running in a few minutes.

1. My bedroom-sized HO layout under construction

► DCC TIPS, TRICKS, AND TECHNIQUES

DCC Impulses - A Dozen More DCC Myths

If you choose to go with an extremely sophisticated system and lots of bells and whistles, it will bring with it added complexity.

If you are designing a layout to run in a bedroom, you wouldn't be buying a dozen cases of track, and turnouts by the case. You might use a case of track, but certainly not a case of turnouts.

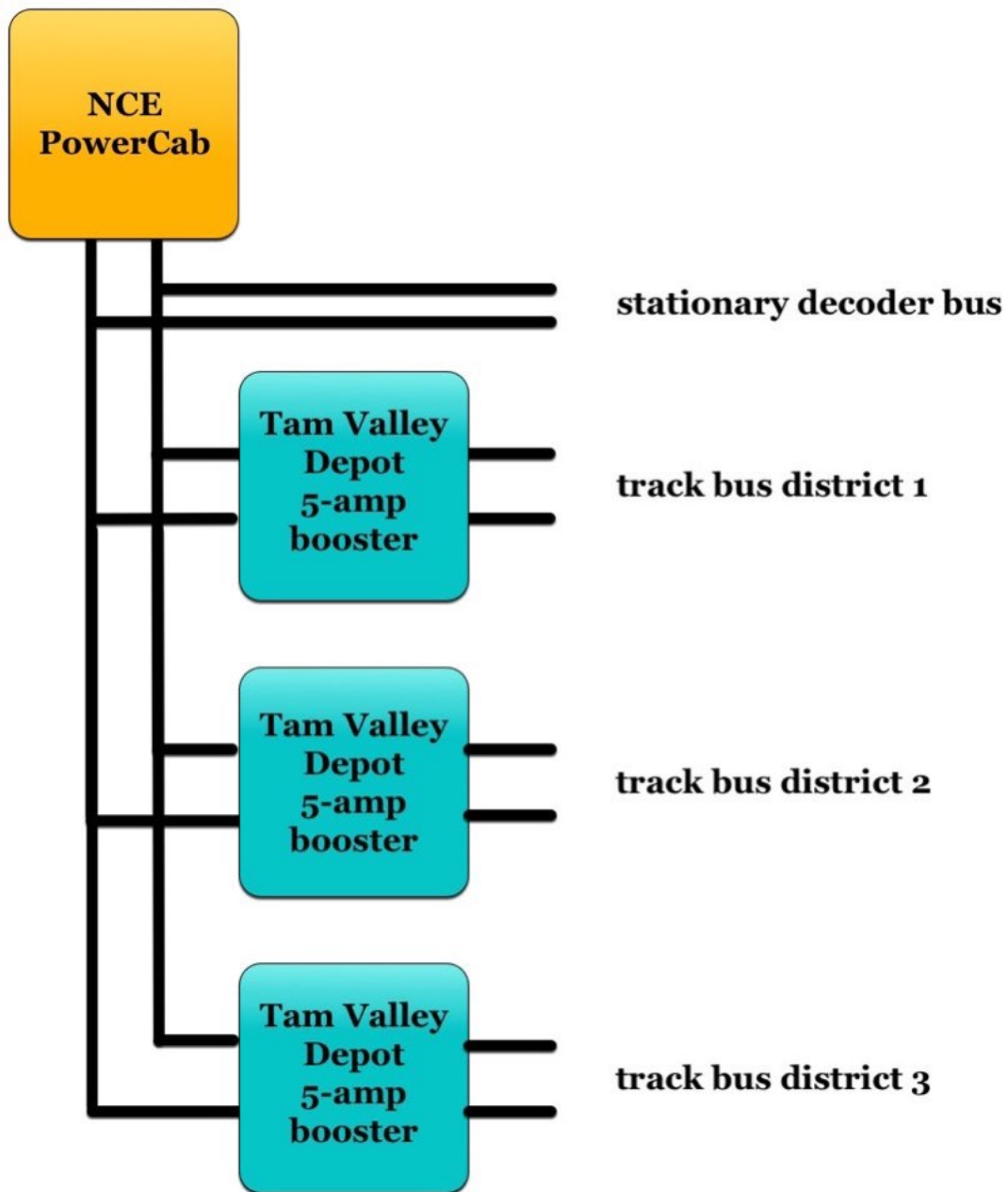
Similarly, size your DCC system to your needs. My HO layout under construction will be under 30 feet in total length (basically a U shape) and 2 feet deep [1]. I'll have, at most, three operators. Most of the turnouts will be controlled by Tortoise machines activated by fascia switches; a few will be in a small yard and controlled with push buttons and a NCE MiniPanel. I'm going to run it all with a NCE PowerCab and three Tam Valley Boosters [2]. The branch line I'm modeling, the Santa Maria Valley Railroad, is dark territory so no signals are needed.

I could spend a lot of money on a more sophisticated DCC system that would add nothing to the operation of the layout.

When you are working on your "givens and 'druthers" is a good time to consider what you will need for a DCC system, just as it is not a good idea to scratchbuild a structure and decide on size and location of windows half way through.

DCC Impulses - A Dozen More DCC Myths

2. System diagram of my PowerCab-driven HO layout



2. Myth #2 A reversing section shorter than longest train is ok.

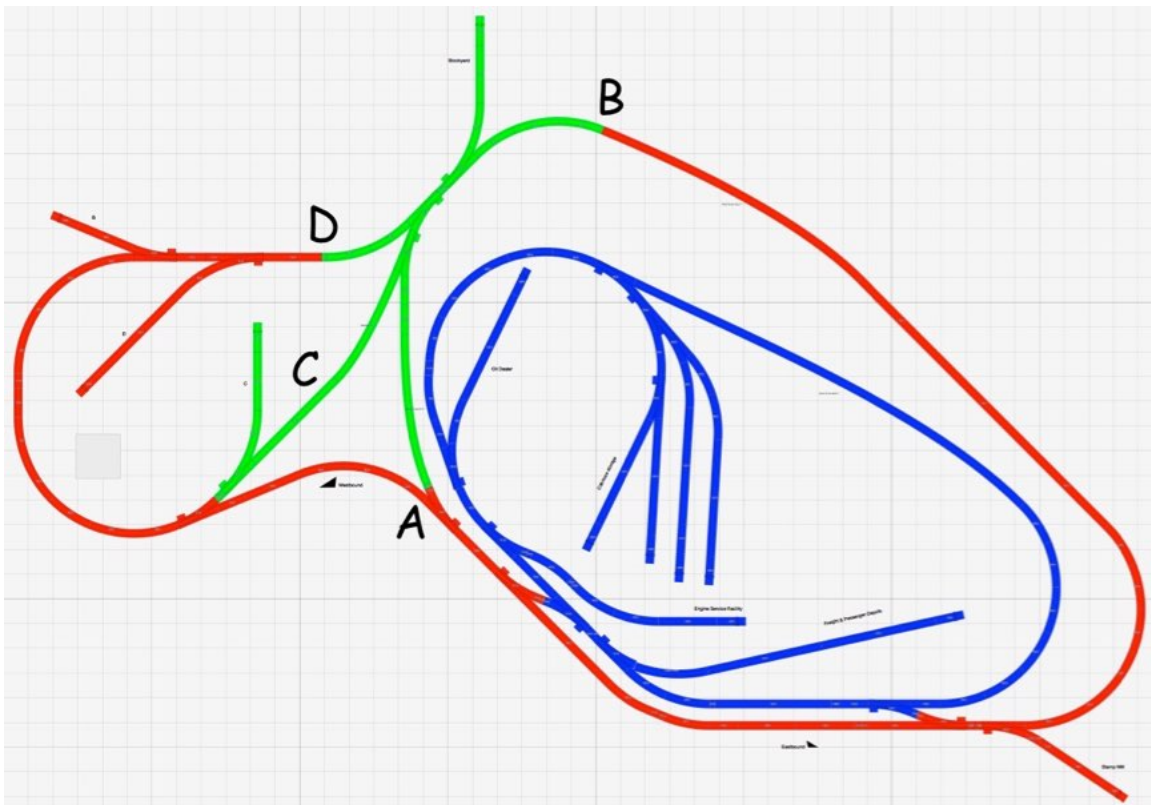
Just because you get away with it for a bit of time does not make it a good design practice.

DCC Impulses - A Dozen More DCC Myths

You want to be able to get your entire train inside the reversing section before any of it starts to leave.

The reversing section controller (auto-reverser) senses a short whenever a metal wheel bridges the gap between two sections of rail that are of opposite polarity. It reverses the polarity of the small section to match the rest of the layout. If you have rolling stock entering and leaving the district, you run a chance that you will short each end of the reversing section at the same time, confusing the controller. Note that this bridging occurs on one rail at a time, not across the rails. This is why I recommend staggering the gaps a bit ($\frac{1}{2}$ inch to several feet - there is really no maximum distance). As a matter of fact, the gaps at D in the track diagram [3] are on opposite ends of a section of LGB curved track, more than a foot long.

3. Track diagram of my garden layout. The reversing section is in green. The adjacent track is the red loop. See text for explanation of A, B, C and D.



The reversing section of my garden layout is shown in green on the track diagram [3]. The adjacent track is shown in red. Blue is the unrelated inner loop. The actual reversing occurs in the (inverted) wye in the middle of the district. The short side of the wye plus the tail on the top part of the outer loop (A to B) sets the longest train that I can operate through this reversing loop. The two spurs are wired as part of the loop, since they attach to track that is in the loop. When switching the upper spur, it is a good idea to use the long section of the wye (C) as the drill track. If one were to use the track that curves off

DCC Impulses - A Dozen More DCC Myths

to the left (D), it would be possible to have a wheel bridging the gap at B while another wheel was bridging the gap at D.

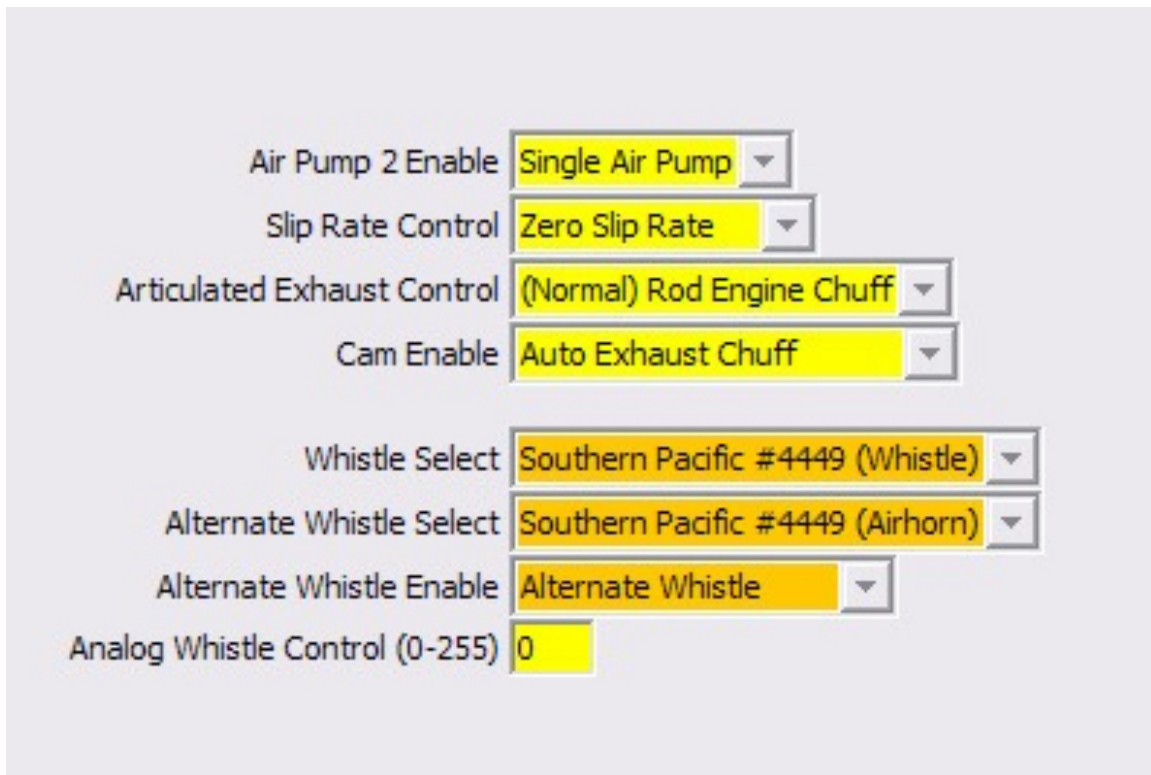
It doesn't matter if the offending wheels are on a loco or on a car, nor does it matter if the car is drawing power from the track, such as a resistor wheel set or lights. They will still trip the auto-reverser.

3. Myth #3 I can read decoder CVs "on the main".

When you write CVs "on the main," aka Programming On the Main (POM) or Ops Mode programming (Digitrax parlance), you cannot read back what you wrote. Folks get lured into believing this due to a couple of factors:

- A. DecoderPro changes the color of the window when it writes the value. That doesn't mean that it read back that value, just that it wrote it. In figure [4], the values that had been input from the computer file are yellow. A whistle sound setting has been changed and the resulting changed panes are orange. After writing the changes on the main, the orange windows will turn white. That doesn't mean that the new values have been read back, though.
- B. Some DCC systems will show what they wrote into a specific CV after they write it, as does DecoderPro. Again, this is not an indication of read-back, just remembering what it attempted to write.

4. DecoderPro window showing sound settings in a SoundTraxx Tsunami decoder



DCC Impulses - A Dozen More DCC Myths

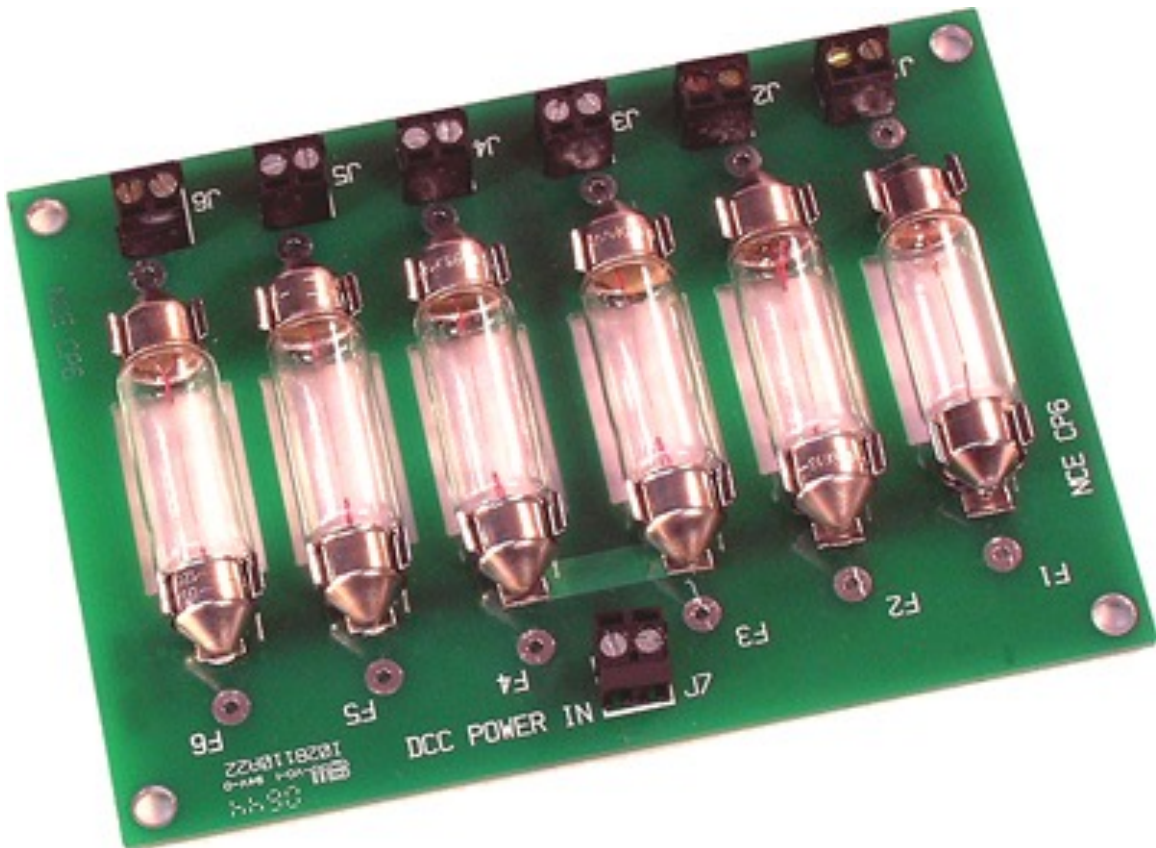
That said, there is a method available to read back settings on the main. It is called bi-directional communication. Digitrax calls it Transponding. Lenz developed it under the RailCom moniker and has assigned its patent to the NMRA. RailCom is the basis of the NMRA DCC Standard 9.3.2. Both of these methods allow various amounts of CV read-back from the main. However, you would know if you had implemented the hardware and software to do bi-directional communication. If you did, then you can read back. If you didn't, you can't.

If a DCC user has undergone the expense and time to install bi-directional communication, they will know it. See section Myth 1, above, kinda like Rule #1 - it's your railroad.

4. Myth #4 I must use light bulbs for circuit protection with my PowerCab.

The popular NCE PowerCab reacts to a short by shutting down the entire unit. It is very unsettling to have to wait for it to completely reboot. NCE has created a product specifically to provide six districts of circuit protection for the PowerCab, using automotive bulbs [5].

5. NCE CP6 circuit protection module utilizing automotive bulbs.



DCC Impulses - A Dozen More DCC Myths

Lots of folks have tried to use electronic circuit breakers and auto-reverse controllers with the PowerCab. Most have failed because most circuit breakers are slower than the PowerCab's circuit protection.

However, there is a solution that I have utilized. The PSx series of circuit breakers will work with the PowerCab, provided that they are wired for manual reset and the trip current is set to the minimum at about 1-¼ amps. If both of these settings are not utilized, the PowerCab will shut down instead of the PSx tripping.

What about an auto reverser? I have anecdotal evidence that two Tam Valley Depot Frog Juicers will work, with one driving each rail. In my experience with the TVD Frog Juicers, I expect this to be true, but I haven't used it myself.

While we are on the subject, take another look at figure [2]. I'm using the output of the PowerCab to drive the inputs of various electronic modules (TVD boosters and stationary decoders). This way, there is no need for a circuit breaker anywhere. The TVD boosters will protect their track districts. The PowerCab doesn't drive any track or exposed wiring.

5. Myth #5 MTH locos use DCC.

MTH (Mike's Train House) has chosen to build its own command system, called Digital Command System, DCS. MTH Proto-Sound 2.0 and Proto-Sound 3.0 equipped locomotives are designed to run and be programmed by the MTH DCS system.

The DCS system is not DCC. It is similar. MTH Proto-Sound locos may be able to be programmed on a DCC system, or they may not. The MTH web site ([TINY URL for mthtrains.com/product-line-pages](http://mthtrains.com/product-line-pages)), as of early 2016 says, "MTH HO Runs On DCC."

Runs, yes. They make no claim to programming.

So that's why I say they do not "use" DCC. They "use" DCS, which MTH claims can "run" on DCC.

6. Myth #6 The prime mover is the loudest sound on my loco.

My experience says differently. I've studied this from many vantage points: inside the cab, along the track, riding behind in an open car and in a closed car. My experiences include steam (narrow and standard gauge), diesel (vintage and modern).

Other than inside the cab, the horn is always louder than the motor ("prime mover" in modeler's terms). Depending upon sound insulation and horn location, the motor may be louder inside the cab. But we aren't modeling inside the cab but outside the cab.

I actually measured the decibel difference on the Skunk Train out of Willits CA this summer. Measuring their GP9 from an open-air gondola one car back of the locomotive, while pulling a grade, the horn showed 6 to 8 dB louder than the motor [6].

DCC Impulses - A Dozen More DCC Myths

6. Sound measured in open-air gondola one car behind GP9 locomotive on California Western Railroad in September 2015



How did I measure it? I used a neat little app for my iPhone. Called "Decibel 10th" [7], this app turns an iPhone or iPad into a sound level meter. They even have an Apple watch version. Not having a watch, I don't know how that version works. The app is free, but it has ads. However, if the advertising banner on the top of the page bothers you too much, you can remove with an in-app purchase for the princely price of 99¢.

The motor at full load will be louder than the bell or just about the same level. Other external sounds (dynamo, automatic water release valves, etc.) will be lower yet.

This is sort of a stair-step setup, in the order of decreasing loudness: horn, motor, dynamic brakes, bell, and other stuff.

DCC Impulses - A Dozen More DCC Myths

7. iPhone screen shot of Decibel 10th app. This shows a recent peak of 80 dB with a current level of 75 dB. This is approximately what I measured on the Skunk Train just after the horn was blown. This would be a 5 dB difference.



7. Myth #7 A speaker must have an enclosure.

Ok, is this a surprise to long-time readers? I eschew putting speakers in boxes.

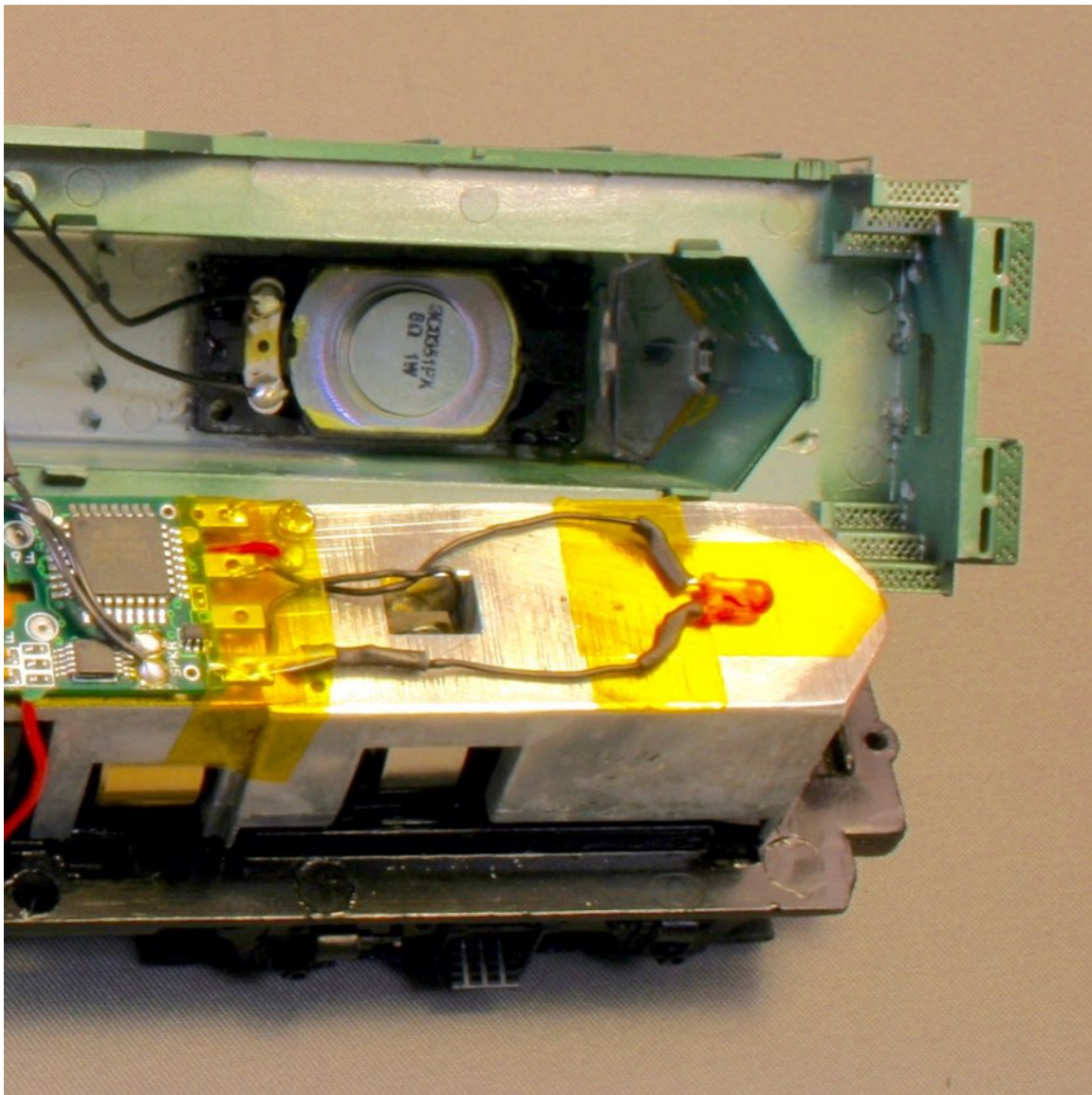
To my ear, a baffle style design, where the sound is allowed to come off both sides of the speaker and blend together such that the lower notes are reinforced, is preferable to putting the speaker in a box and nulling out all the sound off one side of the speaker.

DCC Impulses - A Dozen More DCC Myths

For detailed information on how this is accomplished, see my August 2012 column (model-railroad-hobbyist.com/magazine/mrh-2012-08-aug/dcc_impulses) or my web site (mrdccu.com/curriculum/soundout.htm).

However, folks say a picture is worth a thousand words. See [8]. As long as the path from the front of the speaker around to the rear (when the shell is in place) is about five inches or more, the sound is great. Of course, the speaker must face an opening, such as a fan grill or exhaust ports or smoke stack.

8. Here is a speaker installation below the fan grills in an HO scale Proto 2000 GP9. The sound off the front of the speaker goes out through the fan grills. That coming off the rear goes down through the mechanism and exits next to the rear truck.



DCC Impulses - A Dozen More DCC Myths

Speakers need baffling. This may be an enclosure or a horn or some other method. Yes, there are times that I use a box (enclosure), but they are only as a last resort.

8. Myth #8 One must carefully wire the speaker to the decoder with correct polarity.

This hogwash has been perpetrated by many folks, including at least one manufacturer who sells locomotives with decoders installed.

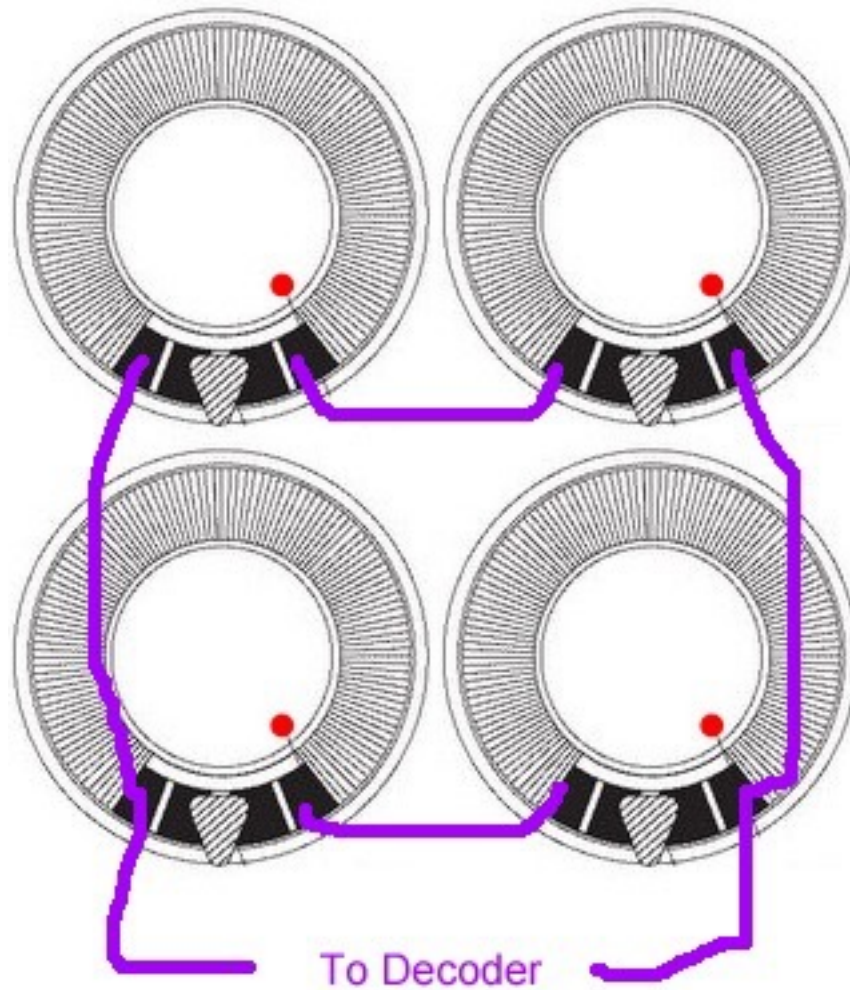
Some manufacturers label the speaker connections on their decoders with a plus (+) and minus (-) terminal. I do not know why. This means nothing relative to an installation. I really wish decoder manufacturers would just label both of the contacts SPK, or some such, and ignore the polarity there.

Speakers themselves have a mark near the positive terminal. This mark has real, physical meaning. When a voltage is applied to the speaker with the marked terminal positive relative to the other terminal, the cone moves away from the magnet.

In the process of designing multiple-speaker arrays, it is important to get the speakers going in the same direction, so those little marks are very important [9].

DCC Impulses - A Dozen More DCC Myths

9. A four speaker array showing positive wired to negative in the series leg and the positive and negative sides connected in parallel.



Once the array is designed, it doesn't matter which side of the array is connected to which side of the decoder. Similarly, it doesn't matter which side of a single speaker is connected to which side of the decoder.

A poster on one of the Yahoo Groups that I read said that he was told by the loco manufacturer that connecting the decoder positive to the speaker negative "will cause the speaker to work in the opposite direction and you will get a bit of distortion." Reality is that the speaker must move equally in both directions to function properly. Period.

Riddle me this: what is the polarity on a SoundTraxx Tsunami decoder with two purple wires for the speaker connection? Point made.

DCC Impulses - A Dozen More DCC Myths

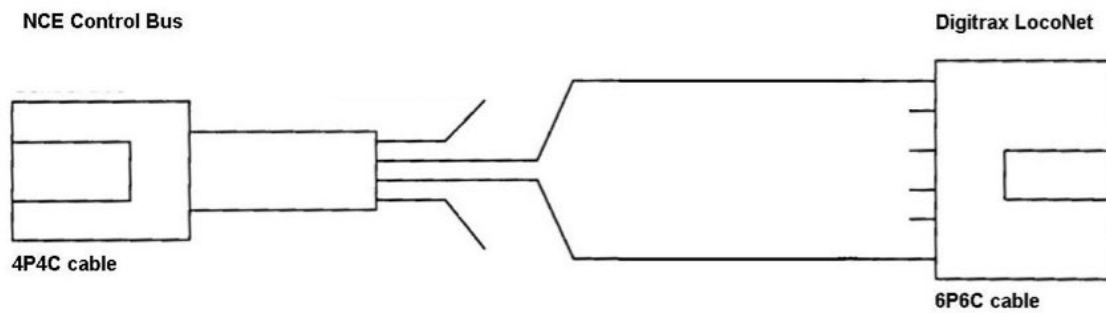
9. Myth #9 Boosters are brand-specific.

One of the few places where one can cross brand lines in DCC is with the boosters.

Most boosters use a low voltage bus signal as their input. This allows them to be interconnected with a minimum of fuss. One of the simplest is connecting between Digitrax and NCE [10]. Here it is simply a matter of interconnecting two different plugs with the proper two wires. Other brands may require a few resistors, as well.

10. NCE's diagram of how to connect between their Cab Bus and Digitrax' LocoNet. This allows NCE or Digitrax boosters to be used on the other's command station.

Some boosters use the track level signal as their input, sort of like the old car stereo amps



that connected between the in-dash radio and the speakers. The Tam Valley Depot units that I'm using for my HO layout are an example of this [2].

10. Myth #10 Wireless operation is very expensive.

Do you have your layout connected to a computer running JMRI (DecoderPro)? Is that computer connected to a WiFi hub? Okay, you can use your smart phone for a wireless throttle. So can all your guest operators.

Our club (pcmrc.org) fits this category exactly. We have a Digitrax system connected with a LocoBuffer-USB to a computer. The computer connects to the internet via WiFi. One of our members also joined to a club that encourages smart phones. He came back and asked why we weren't doing the same. Never occurred to us. We adjusted JMRI to advertise on the WiFi network and now folks can use their smart phones.

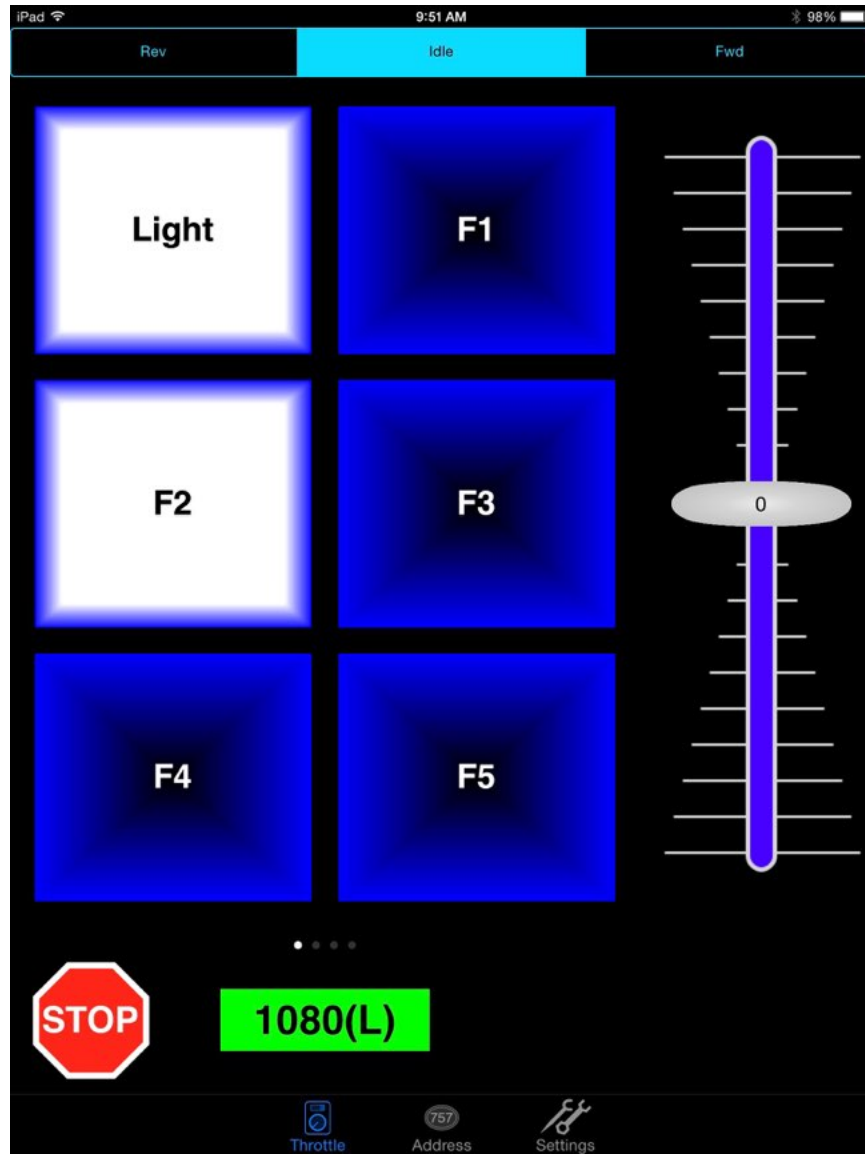
You will need an app on your phone.

WiThrottle (withrottle.com) is for Apple devices (iPhone, iPad or iPod Touch). The WiThrottle Lite version is free through the Apple Store. There is an in-app upgrade (\$10) to the full version, allowing dual throttles and consisting. You can buy the full version on at the Apple Store, too.

DCC Impulses - A Dozen More DCC Myths

Engine Driver (enginedriver.rriclubs.org) is for Android devices. It can be downloaded from the Google Play store. That is the recommended way to start. If your device is unable to access the Google Play store, you can download the software from the site above and install it. Engine Driver is an open source part of JMRI and is free.

11. Screen shot of WiThrottle Lite from my iPhone.



Some folks buy an old device for a few bucks, do not activate it as a phone, and use it as a throttle only. I've seen folks mentioning sales at various stores for \$20 to \$30.

One final note. For systems like the NCE PowerCab that have limited throttle slots, all the smartphones connected via JMRI utilize only one slot.

DCC Impulses - A Dozen More DCC Myths

11. Myth #11 Energy storage circuits cure all ills.

Energy storage modules (CurrentKeeper, Keep-Alive, No Halt, Power Xtender, etc.) are all the rage just now. They help with marginal contact issues: dead frogs, track discontinuities, marginal pick-up in the loco. But they are not a fix-all.

Nothing beats clean track and wheels and good trackwork and running stock.

The down side of these modules is that they keep the loco moving absent any DCC signal. That movement can be off the track or off the layout, even. Even if the loco stays on the track, the absence of a DCC signal can result in an uncontrollable loco. Remember that same contact that brings the power also brings the control signal to the loco.

12. Myth #12 DecoderPro will read something my system won't.

I wish I had a buck for every post I've seen, "My system won't read a sound decoder, even with DecoderPro." The second half of that sentence is meaningless. If your system won't do something like read a decoder by itself, adding JMRI's DecoderPro won't change a thing.

DecoderPro only sends commands to your command station. If they are things that the command station can understand, it will try to execute them. However, if you are asking for something that the command station cannot do, it won't because it can't.

For example, if you wish to read back from a QSI sound decoder, most command stations need a programming track booster (mrdccu.com/curriculum/ptb.htm) to read that decoder. If your command station is one that does, it doesn't matter if you used your throttle or DecoderPro, it still needs a PTB.

For troubleshooting, get your system to read a non-sound decoder with the throttle. Then, get it to work with the same decoder via DecoderPro. Now, try reading a sound decoder with the throttle. Add a PTB, if necessary. When you have communication between the throttle and the decoder, then use DecoderPro.

Well, I've had fun popping bubbles with this column, I hope you got an idea or two by reading it. Perhaps it will jog your memory about a myth that you've disproven. Share it with us.

Folks always seem to have additional ideas to share. 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.