

DCC Impulses - Is DCC Dead?



Model Railroad Hobbyist |

DCC IMPULSES

column

BRUCE PETRARCA



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No, this is not going to be a doom and gloom nightmare. I'm just going to push some paradigms a bit.

It is very easy to ignore things that are out of your mainstream of thought. For example, Texas Instruments almost bankrupted Timex in the 1970s. TI came out with a LED watch [1] and Timex ignored it because it didn't have wheels and hands and was from an electronics company. The digital watch caught on and Timex was struggling for a few years to compete.

1. Circa 1975 Texas Instrument digital watch



I have seen advertisements over the last few months (maybe a year or so, I don't remember) for the MRH advertiser Bachmann and their E-Z App™ locomotives and train sets. They have a catchy logo [2]. At a quick glance, I dismissed them as something for the "toy train" folks and not for real "hobbyists."

While I maintain my position on the quality of the product that Bachmann has installed the technology into, I have discovered that this technology might be the camel nose under the tent flap of DCC.

How can that be? Well, hang on, let's check this out.

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How would you like to run your trains without a DCC system, but still have the motor and function control that we have come to love? Oh, yes, that would be wirelessly, without expensive radio cabs and a base station. In addition, how about:

2. Bachmann's E-Z App™ logo

- Adding sound for less than \$20, even after the fact?
- Using DCC, DC or battery to power your locomotive?
- Controlling your loco from as much as 150 feet away?
- Updating your decoder in a couple of minutes without removing it from the loco?



I was introduced to David Rees, the CEO of BlueRail Trains (bluerailtrains.com) by Pete Steinmetz. Pete is a member of the Dead Rail Society (deadrailsociety.com) and owner of Dead Rail Installs (deadrailinstall.com). I respect Pete's knowledge of lithium batteries and his influence in the on-board power world. Recently, Pete was getting together with David to do some tweaking on the product that BlueRail Trains is getting ready to release. It may be available by the time you see this in print.

Here is what I learned by talking with David.

BP: What are you folks preparing to sell this spring?

DR: We are offering a board [3] that is small enough (58 x 28 x 7 mm or 2.28 x 1.1 x 0.28 inches) to fit in some HO or larger locomotives. It will use the 9-pin JST connector commonly used in DCC as its interface and is plug compatible with DCC-ready locos having that plug. It has 4 functions for lights and will provide up to 2 amps stall current for the motor(s). If it is plugged into an unmodified DCC loco, it will take power from the track and control the loco completely by Bluetooth from your smartphone at distances up to 150 feet away.

There is a video from our web site with more information (youtu.be/Hrokc9KQOHA) about this initial direct offering.

The motive power from the track can be DC or DCC. If you are running the loco on a DCC track, you will only be taking power from the DCC system. The control will not come from the DCC data. Control will come over the air with your smartphone talking directly to the loco.

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3. BlueRail Trains' first board - plug compatible with DCC locomotives, using a 9-pin JST connector



BP: Wow, this is blowing my mind. What about battery operation?

DR: There is a place to connect a battery in the 12 to 24 volt range to the board. With this, you can be totally self contained. The loco could sit on your wood desk and run until the battery goes dead. Or you can use a smaller capacity battery as an energy support device to help the loco over areas of less-than-perfect contact with the rail power.

For smoothest operation in the energy support mode you will want to select a battery voltage about $\frac{1}{2}$ volt to 2 volts higher than your track voltage. This will have the transition from track power to battery power not affect the loco speed noticeably, even as the battery discharges a bit. This also allows for convenient battery selection. Battery voltage more than 5 volts above the track power will cause a change in speed with the loss of track power.

BP: So, let me see if I get this right. If I plug one of your boards into my loco, I can put it on a track that is powered by an inexpensive DC power supply and run it with my cell phone? No cost for a DCC system or for a lot of other hardware. None of the set-up hassles of other forms of software control. No expensive radio throttles or base stations.

DR: Yes, that is correct.

BP: Many of us have been in the situation where we install a DCC decoder and need to update it. So, we take it out and send it back to the manufacturer. We are out the cost of postage to send it back, plus the loss of use, plus the time to remove and reinstall it. How do BlueRail Trains boards get updated?

DR: When you launch the app, the app checks your train's firmware version. If there is a newer version available, the app offers you a chance to upgrade the firmware. Upgrading

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firmware is accomplished with one click. It is about a 2 minute process. Of course, you will need an active internet connection and the loco must be powered up for the update process to go forward.

BP: Let's back up and talk about how BlueRail Trains got started.

DR: About 6 years ago, I was working on a 3-rail O scale layout and looking for better ways to control it. I discussed a concept with two friends (Pete Skeggs and Eric Laun) and we came up with the original prototype board [4]. This board was called "Box Car Willie Version 1", as it was our first attempt to control the motor on a locomotive using the new Bluetooth Smart (V 4) communications standard. It was so big that it needed to be installed in a trailing box car. The three of us formed BlueRail Trains to continue developing this concept.

4. Box Car Willie Version 1 - BlueRail Trains' first prototype board connected to a Lionel 3-rail locomotive



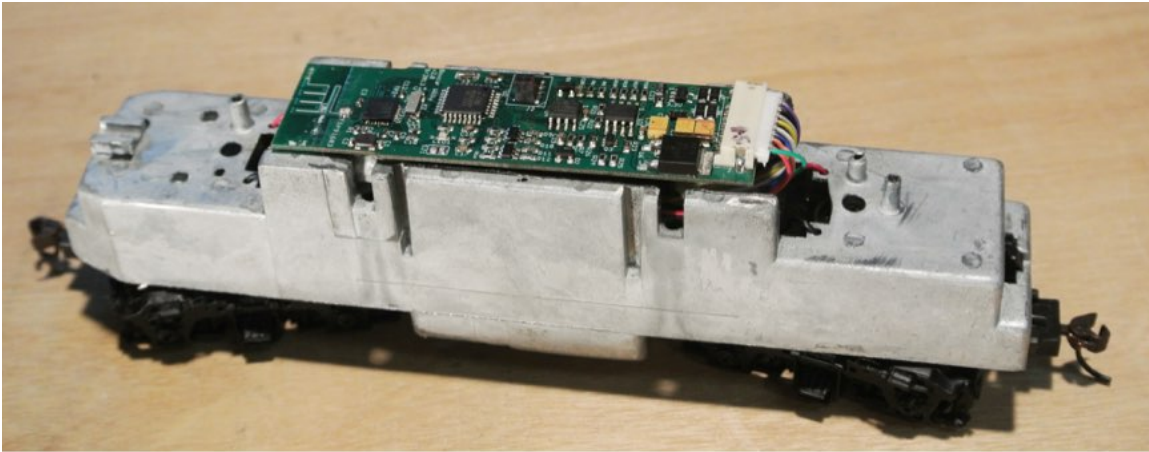
What this "concept" board allowed us to do is to control the speed and direction of our locomotive with our iPhones. The power came from the track, through our board to the motor. The iPhone provided the throttle mechanism via Bluetooth radio.

BP: What came next?

DR: Within a few months, we were able to shrink the module until we could install it into an HO-scale F unit. We called this Box Car Willie Version 2, even though it was installed inside an HO locomotive [5].

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5. BoxCar Willie Version 2 - miniaturization allowed an installation into a Stewart HO F unit.



After we had the smaller board and our iPhone app working, we partnered with Bachmann. They licensed our technology and put it in some locos, calling it E-Z App™.

All of our Bluetooth products (BlueRail Trains plugin boards or Bachmann E-Z App™ trains) can be controlled the BlueRail Trains free app. The Bachmann E-Z App™ assumes you have a standard headlight configuration (like most out-of-the-box trains).

The BlueRail Trains app is more adjustable. It allows you to configure lights and accessories. You can performance tune your specific loco. The iOS app is available in the Apple App store (supports iPhone 4s or later, or iPad 3 or later, or iPod Touch 5 or later). The Android version is expected late Q1 2016.

BP: Do you have a price range for your plug-in board?

DR: We are working with our suppliers just now to firm up pricing. Our goal is well below \$100.

BP: How do you do sounds?

DR: Our BlueRail plugin boards have an expansion port designed to accommodate a future sound module. The control app also contains in-app sounds which can be played either on the smart device or through bluetooth speakers (either on your layout or in a train).

For a single loco solution, a small Groove Cube speaker can be purchased in the \$15 range and housed in a loco or trailing car [6]. This is detailed on a video from our web site (youtu.be/lB4HT-_9jFQ).

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6. Bluetooth (Groove Cube) speaker installed in a stock car to be pulled behind the loco. Sound added for under \$20.



BP: I found the Groove Cube speaker on Amazon.

DR: This package includes the speaker, Bluetooth receiver and battery. It only needs to be installed so that the sound has a path from the grill to your ear. The stock car, with the holes in the sides, is perfect for this. You also need access to the jack on the speaker to charge the internal battery.

BP: I cannot get my iPhone to talk to more than one Bluetooth device at a time. How do we get multiple sounds on the layout at once?

DR: You are right. The protocol in smartphones only allows you to connect to one set of bluetooth speakers at a time. We have a solution in mind that will allow you to expand this in increments of 7 locos (7,14,28 etc). We will be pursuing support for both a sound decoder-type module as well as more extensive use of bluetooth speakers.

BP: How do you performance tune your loco with the BlueRail Trains board and app?

DR: The board drives the motors with high frequency (16 kHz) Pulse Width Modulation (PWM). We have carefully tuned the PID (motor control circuitry) to a setting that gives very good slow speed operation (newer DCC decoders have CV variables that allow for this).

Because these boards can be installed in anything that has an electric motor, the BlueRail app will give users access to tweak these variables if they desire. The "out-of-the-box"

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settings work great for 90% of engines. The "start voltage" and the "update period" are the only variables I have needed to adjust to tune slow speed on certain locos.

To tune the PID, you run your train at a slow speed, open the tuning panel, and adjust a few options in real-time as you watch your train move. Users will have a simple tuning panel to make easy tweaks, as well as a more in-depth panel that lets you play with all the variables.

Outside of the PID tuning, users are able to set minimum speed-step, acceleration, deceleration, and calibrate chuff-rate. The ease of using these interfaces is one of the nicer advantages of this system.

BP: What are your plans going forward?

DR: We will be making BlueRail Trains boards in several sizes for various scales in the next little while. See some of the ideas are shown at the end of the video about our first board. That video and others about our product, including a demo of our operating range, can be found on our web site (bluerailtrains.com/videos).

BP: Thank you David Rees, from BlueRail Trains. I look forward to running my Fn3 garden trains with a future board from your company.

So, folks, that's it.

Think about this in the foreseeable future. A bedroom sized HO layout with a two trains running simultaneously would need two BlueRail Trains boards (under \$200) and a 1.5 amp, 12 to 15 volt power supply (under \$10 on allelectronics.com) and two Groove Cube speakers (\$15 each) plus two smartphones, that you probably already have. That's under \$250, perhaps near \$200. The least expensive way to do the same with DCC is with a Sprog3 (\$135) plus two Econami decoders (\$160) for a total of \$295 plus the two smartphones.

Yes, two smartphones. I'm an operations oriented guy. That means one throttle per operator per train. You can easily jump from one train to another with the app. If you want to watch trains go around in circle, you only need one smartphone.

In the garden, I can see a much greater cost savings. In many ways, the larger and more complex the layout, the more cost advantageous BlueRail Train's solution becomes: no multiple boosters and circuit breakers; no layout wiring; no reversing loop controllers. If you want rail power, hook up a power supply to the track, making sure that it is designed to tolerate shorts without damage or fire.

I'm looking forward to getting my hands on some hardware (and the app).

Well, let's talk about this on the MRH blog for this column. 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.