About our DCC columnist

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

Click here to learn more about Bruce.

DCC Impulses: Enhancing Your System

Going Beyond the Basics

Reader Feedback (click here)

Computer interfaces and programming track boosters ...

On the web blog after an earlier column, one of the writers suggested that it would be a good idea to discuss computer interfacing and programming sound decoders.

So let's talk about some of the ways to make your system more fun and easier to use.

The SMP (Standard Maintenance Procedure) for this month involves those times that you just have to have two decoders in your loco. See page 28.

Computer Interface for Your DCC System

Several times I have recommended the JMRI suite of computer programs. It includes PanelPro, for making control panels. DecoderPro is valuable for speed matching or speed tables or sound programming. One of the features of the JMRI suite is support for "WiThrottles" - apps that turn your Android or iPhone or iPod Touch or iPad into a throttle.

I mentioned in an earlier column that the JMRI suite of programs is free to the user. Yes, volunteers do do the work. But there are costs involved in the assembly and distribution of this software, plus some lingering legal expenses resulting from a lawsuit with KAM Industries. I highly recommend that users contribute to the ongoing cost of JMRI. You may do so at their website (jmri.sourceforge.net). Even $10 per year for each user would be significant. Thank you for your help.

Installation of JMRI and the Java software to support it are covered on the JMRI web site referenced above. There is a Yahoo group for some hands-on help, if you need it (jmriusers-subscribe@yahoogroups.com).

I frequently hear folks report that they cannot do such-and-such with their system and DecoderPro. Remember this: DecoderPro only electronically pushes buttons on your throttle. If you cannot do something with your throttle, you won't be able to do it with DecoderPro.

Some folks think DecoderPro will allow them to program sound decoders that they cannot program with their throttles. Won't happen. This is probably a case where a programming track booster will be required. See the discussion about these later in this column.

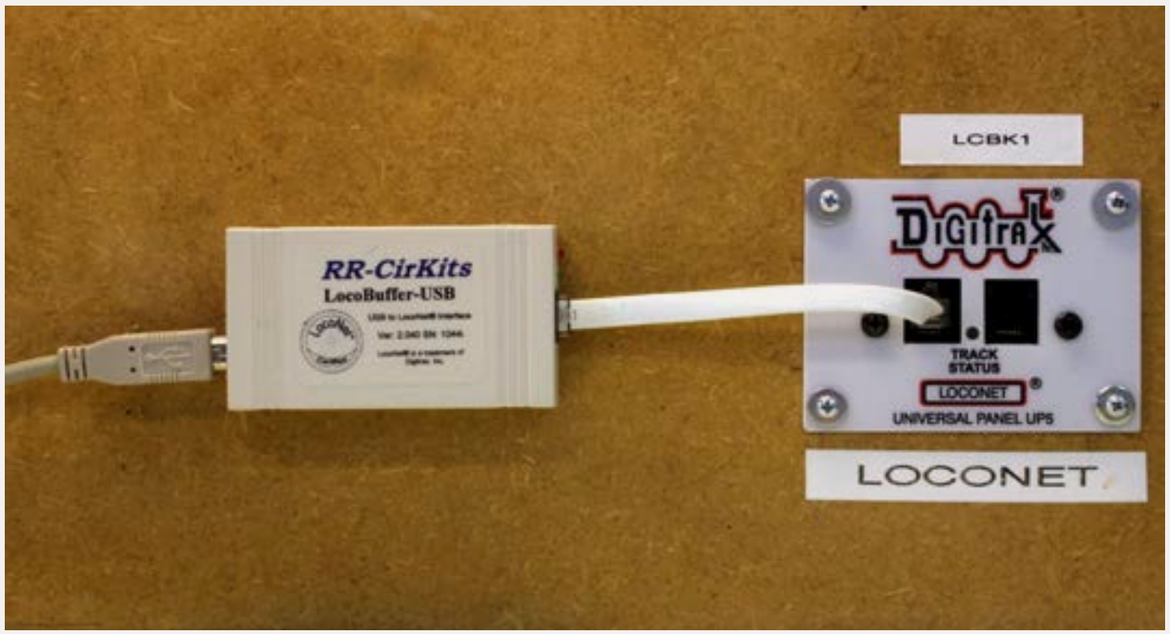

Figure 1: LocoBuffer-USB at PebbleCreek Club.

Another frequent complaint is that folks can't read back CVs with their Digitrax DB150 (Super Empire Builder system box). The DB100 does not have a programming track connection. A programming track is necessary to be able to read CVs, short of complicated bi-directional communication – beyond the scope of this column. In short, you cannot read CVs with a DB100 and a throttle. DecoderPro won't change that.

Interconnection Hardware

What good is a computer program unless you can connect your computer to your DCC system? So let's look at interconnection hardware.

How you will connect your computer to your DCC system is a function of the specific DCC system that you have. Let's take a look at a few of the more popular DCC systems and their computer interfaces.

CVP

The Easy DCC system from CVP has an RS232 port built in. However, this port uses a non-standard RJ style connector, so you will probably need to make your own cable.

Later in this column, I'll discuss the RS232-to-USB adapter to get CVP and other systems talking to modern computers.

Digitrax

There are two major ways of connecting your computer to your Digitrax system. The Digitrax-manufactured PR-3 (street price about $68) and the LocoBuffer-USB (street price about $58), manufactured by RR-CirKits.

Personally I prefer the LocoBuffer-USB, as shown on my club layout (pcmrc.org) in figure 1. I like its lower price and simple operation. You can see how easily it connects. Since I am not a Digitrax sound user, I do not need the sound-loading capabilities of the PR-3 (figure 2).

So what are the advantages of the PR-3 programmer over the LocoBuffer-USB? As previously mentioned, the PR-3 allows you to install Digitrax sound projects into Digitrax sound decoders. It can also function as a stand-alone programming track driver. You can connect your computer to the PR-3 with a USB cable and then connect a programming track to the PR-3. No command station is needed.

Earlier Digitrax computer interfaces are not recommended these days. If you have one and it is working, fine. If you have any problems, change to either the PR-3 or the LocoBuffer-USB.

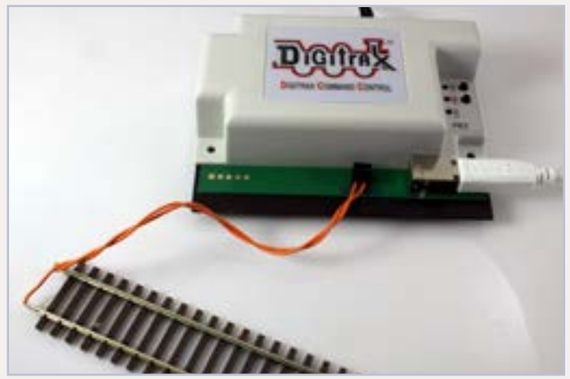

Figure 2: Digitrax PR-3 connected to USB and programming track.

Lenz

Lenz currently offers only a "full service" interface for its system. The LI-101-USB (street price about $180) connects to your computer via a USB connection and to a network router via an Ethernet connection. As shown in figure 3, this configuration allows use of WiThrottles without the need for a computer and intranet WiFi setup.

MRC

MRC offers a computer interface for its Prodigy series of sets. However, it is only compatible with MRC's own software. MRC has made it clear that they won't share the interface

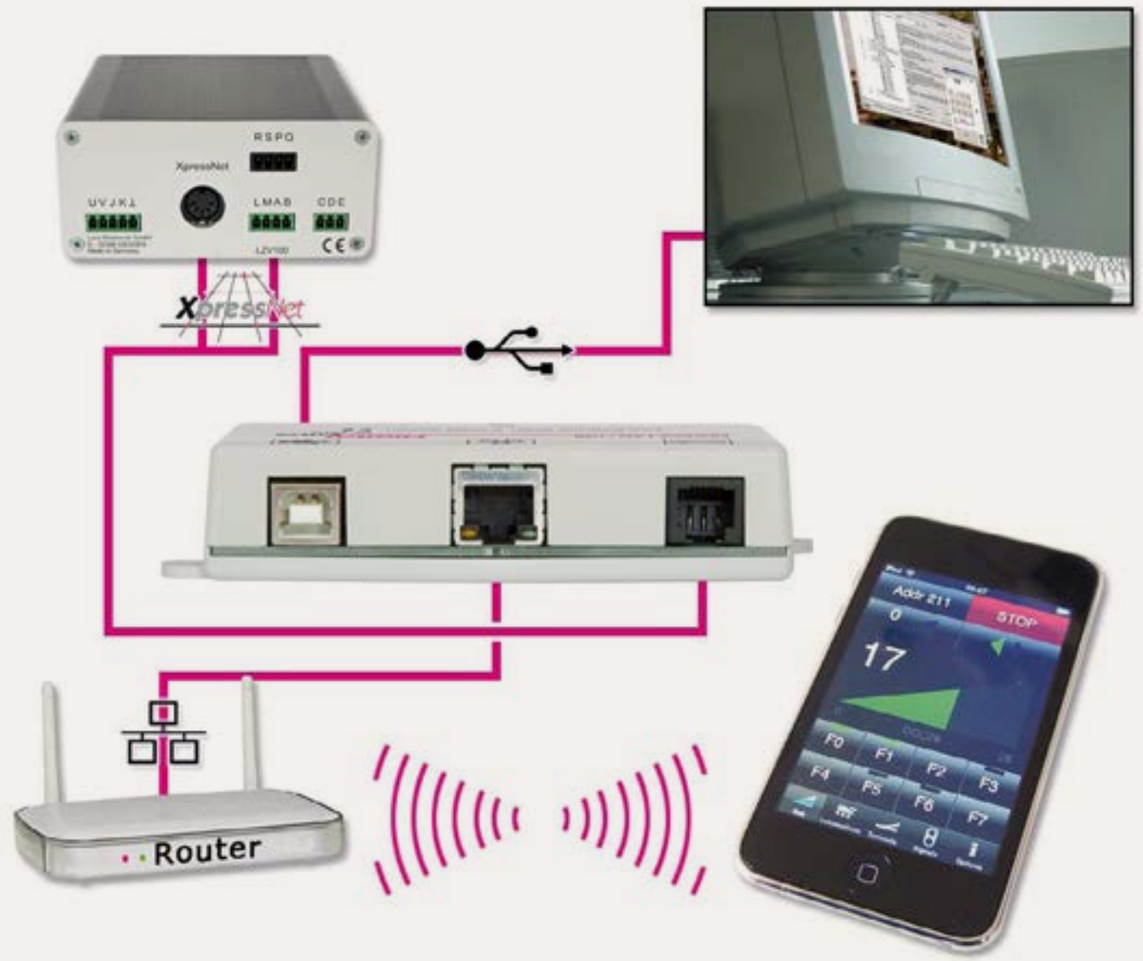

Figure 3: LI-101-USB connecting computer, Lenz DCC system and wireless router – drawing courtesy American Hobby Distributors.

specifications. This means that programs like JMRI cannot interface with them. So, if you are looking at an MRC system, you might want to review their software to make certain that it meets your needs before you finalize your decision.

NCE

There are two ways of connecting a computer to your NCE set, depending upon which type you own.

The PowerCab and the NCE USB adapter (about $40 street price) were designed for each other. Working together with DecoderPro, they allow you to program any present decoder.

The PowerCab even has the programming-track-booster functionality built in, so you don't need that extra hassle or expense. Thus, you can have a complete programming solution for a street price under $200.

Figure 4: The NCE USB adapter in use with the PowerCab on my layout.

Figure 4 shows the PowerCab and USB adapter connection on my switching layout.

I know many folks who have one brand of DCC on their layout, but have a PowerCab and NCE USB adapter for their programming track.

A nice side benefit, you can use the JMRI throttles, either WiThrottles, or the basic throttles available in DecoderPro, to run more trains than the two-cab limit currently supported by NCE for the PowerCab.

The Power Pro (5 amp) and Power House (10 amp) NCE systems use the same command station board, whether it is bundled with a booster in a system box or the separate CS-02 box. This command station has a RS232 serial interface as part of the board as shown in figure 5. This interface can be connected to a computer with a serial port using a straight through RS232 cable. This cable will be a male-female.

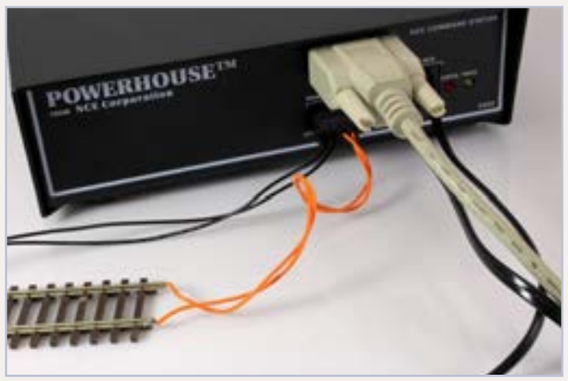

Figure 5: NCE command station with RS232 cable interface.

I'll discuss RS232 to USB adapters later in this column.

Yes, the NCE USB adapter can be plugged into a cab-bus port with the Power House or Power Pro systems. However, due to the NCE system architecture, this connection will only allow you to run trains and throw turnouts. You cannot program decoders from the computer with this setup.

SPROG

SPROG-II is a stand-alone interface that comes from the UK (sprog-dcc.co.uk). It allows you to connect your computer USB port to a programming track. It is independent of your DCC system.

SPROG-II is fully supported by JMRI.

Figure 6: SPROG stand-alone programmer – photo courtesy Andrew Crosland.

North American SPROG distribution is by Bill Chown (sprog.us.com). The SPROG models are available at many stores and websites.

The SPROG II, shown in figure 6, connects with two sets of wires (power and track) and costs about $100.

Zimo

The Zimo MX-1 system has a USB interface built in.

RS232 to USB Adapter

Several systems have RS232 ports on them. Easy DCC, NCE and Wangrow are the most common.

Finding a new computer these days with an RS232 port is like seeing a pterodactyl flying around. What is needed is an adapter that speaks RS232 on one side and USB on the other. This way, your computer can talk to your RS232 equipped DCC system.

Many RS232 to USB adapters only partially emulate the standards and may not work.

The Tripp-Lite (Keyspan) USA-19HS has been proven over the years to work with the NCE system and others. It is on the high end, price-wise, over $30, but it comes with really good diagnostic software and seems to work just fine with all computer operating systems, both Windows and Mac.

I use an adapter that I took a chance on and purchased from EasySYNC, their EX-U-1001-B10. In the two years

that I've owned this unit, it has given me flawless performance with my NCE system and several computers, all running Windows XP.

The EasySYNC low price (below $20) is a reason to buy. It doesn't have the support and proven long-term consistency that the Keyspan unit does.

Figure 7: RS232 to USB adapter – ES-U-1001-B10 from EasySYNC.

Figure 7 shows what comes with the EasySYNC unit. It may be purchased directly from the manufacturer's website (easysync-ltd.com/product/528/es-u-1001-b10.html). They have a 30-day refund policy, as long as you return the unit and packaging – shipping's not refunded in either direction.

So, you have your choice of two directions to go. The Keyspan is well respected and includes lots of diagnostic software for a higher price. The EasySYNC doesn't have the reputation or diagnostic support, but provides an inexpensive solution.

Verify Communication

Once you have your computer (with JMRI and Java installed) connected to your DCC system, let's make sure that the computer is talking to the DCC system.

Open DecoderPro. There you will find a menu bar with an entry that varies in name depending upon what DCC system you selected in the preferences. I'm going to press forward with the Digitrax LocoNet selected.

When you pull down the menu, select Monitor LocoNet, as shown in figure 8. A new window will open and you will see the network commands being sent on the DCC system.

Grab a throttle and run a loco; watch it go and stop. You should see the system commands necessary for this motion in the window that you just opened. If not, your computer is not talking to your command station and you need to do some troubleshooting. If you need help with this troubleshooting, see the Yahoo group for some hands-on help: (jmriusers-subscribe@yahoogroups.com).

Figure 8: DecoderPro Screen shot with Monitor LocoNet selected.

While I used Digitrax in this example, the same selection exists for other DCC systems. It will be named differently, but it will be in the same place on the DecoderPro window menu bar.

Once you know that the computer is talking to the system, you can use DecoderPro, PanelPro, Railroad & Company or any other software to run trains, build panels, automate your layout or program decoders.

Programming Sound Decoders

There are two needs with sound decoders: 1) programming CVs and 2) loading sound files into those decoders that are user-loadable. In this column, I'm going to deal with programming, not sound loading.

Programming Track Boosters

As sound decoders evolved, manufacturers were left with an issue: a brief interruption of track power could result in a complete restart of the sound – a diesel going through a prime mover start up sequence as it was going down the track at 40 scale miles per hour, for example.

The solution was to add power storage (in the form of larger power supply capacitors) to the decoder, making the sound decoders less susceptible to the power dropouts. Many even allow the user to add more capacitors, if desired and if space will allow.

The result of this advance in decoder design is a very large inrush of current when power is applied to the decoder – energy filling up the added storage.

One of the side effects of this inrush is that, when viewed from the standpoint of the original NMRA DCC recommended practices (RP), it looks like a short-circuit.

In 2006 the NMRA RP was adjusted to cover these new decoders. Many command stations on the market today were designed before the new RP. Thus, they see what they have been told is a short when trying to program many of today's sound decoders. So they do what they were trained to do - shut off the power before something gets hurt.

A programming track booster (PTB) can interface with these older command stations and allow programming of all decoders. I talk about them in detail on my web page (mrdccu.com/curriculum/ptb.htm).

On that page, I have installation diagrams for connecting a PTB to

Figure 9: SoundTraxx' PTB100 Programming Track Booster.

Digitrax, Lenz and NCE systems. Also, there is a bit of their theory.

What systems do not need a PTB? As of this writing:

- Lenz with version 3.6 command station software or later
- NCE PowerCab
- Zimo

As more systems comply with the 2006 RP, I'll update my website at the address above.

There are two PTBs on the market today. The first came from American Hobby Distributors, called the PowerPax. Then SoundTraxx introduced their PTB-100 when they began shipping their Tsunami decoders.

While these two units are similarly priced, about $50 street price, there are some differences.

The PowerPax is enclosed in a box and includes a power supply for 110-volt power mains. It is simple in operation and has one red LED to tell you what is happening. Generally, I find that the LED either says the PowerPax is working or not, without providing much diagnostic assistance.

I find the PowerPax useful when connecting to a Digitrax Zephyr system, as you don't have easy access to the command station power. In figure 10, you can see the black PowerPax supply cable coming in from the left and the black Zephyr power cable coming in from the right.

Figure 10: Digitrax' Zephyr connected to a PowerPax PTB.

The SoundTraxx PTB-100 is a circuit board wrapped in clear shrink tubing, allowing the three LEDs to shine through. See figure 9. It is designed to connect to the same power that is running your command station - helpful if you don't have 110-volt power mains. The multiple LEDs show you lots of what is happening in the PTB-100, helpful in diagnosing issues.

Figure 11 shows the PTB100 connected to a Digitrax DCS100 command station. It is an easy six-wire connection – black (power); yellow (programming track output); orange (programming track itself).

"Okay, I understand that I need a PTB for my system to fully interact with my sound decoders. But it is a hassle connecting it and removing it," I hear you say.

Leave it in the line. It won't damage any decoder and it will make your system as compatible as possible with all decoders.

DecoderPro

I'm going to be redundant here. If you are programming sound decoders, you need DecoderPro. It will significantly reduce the hassle and make setting up your locos fun.

I have almost forgotten which CVs do what since I've been using DecoderPro for about 8 years. I just tell DecoderPro what I want – for example, the sound level of the coupler clank to 25% – and it sets the

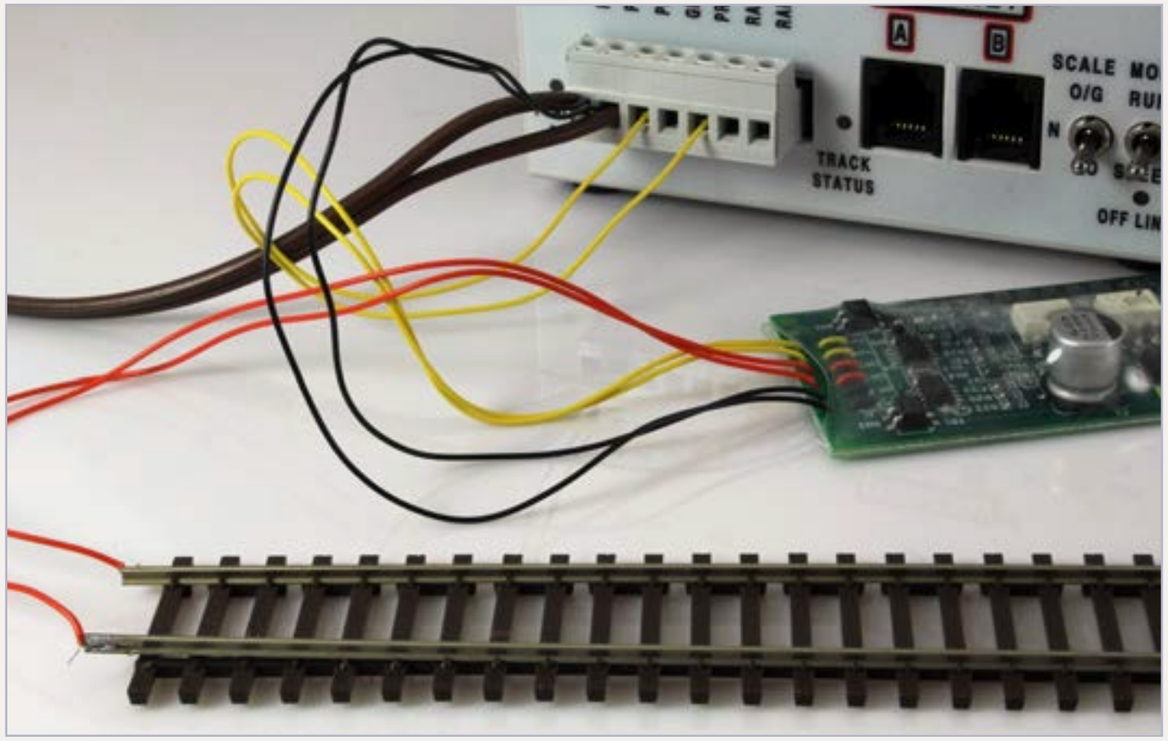

Figure 11: Digitrax DCS100 connected to a PTB100.

necessary CVs. With over 100 CVs in many sound decoders, any automation is very welcome.

Figure 12 shows the "sound mixing board" page in DecoderPro for SoundTraxx' steam Tsunami.

QSI decoders use indexed CVs. This means that two or three CV values must be entered to write or read one value. DecoderPro does this automatically!

Hint, with QSI decoders, turn off the audible CV reporting on the QSI page of DecoderPro. Why? DecoderPro sends commands as quickly as it can.

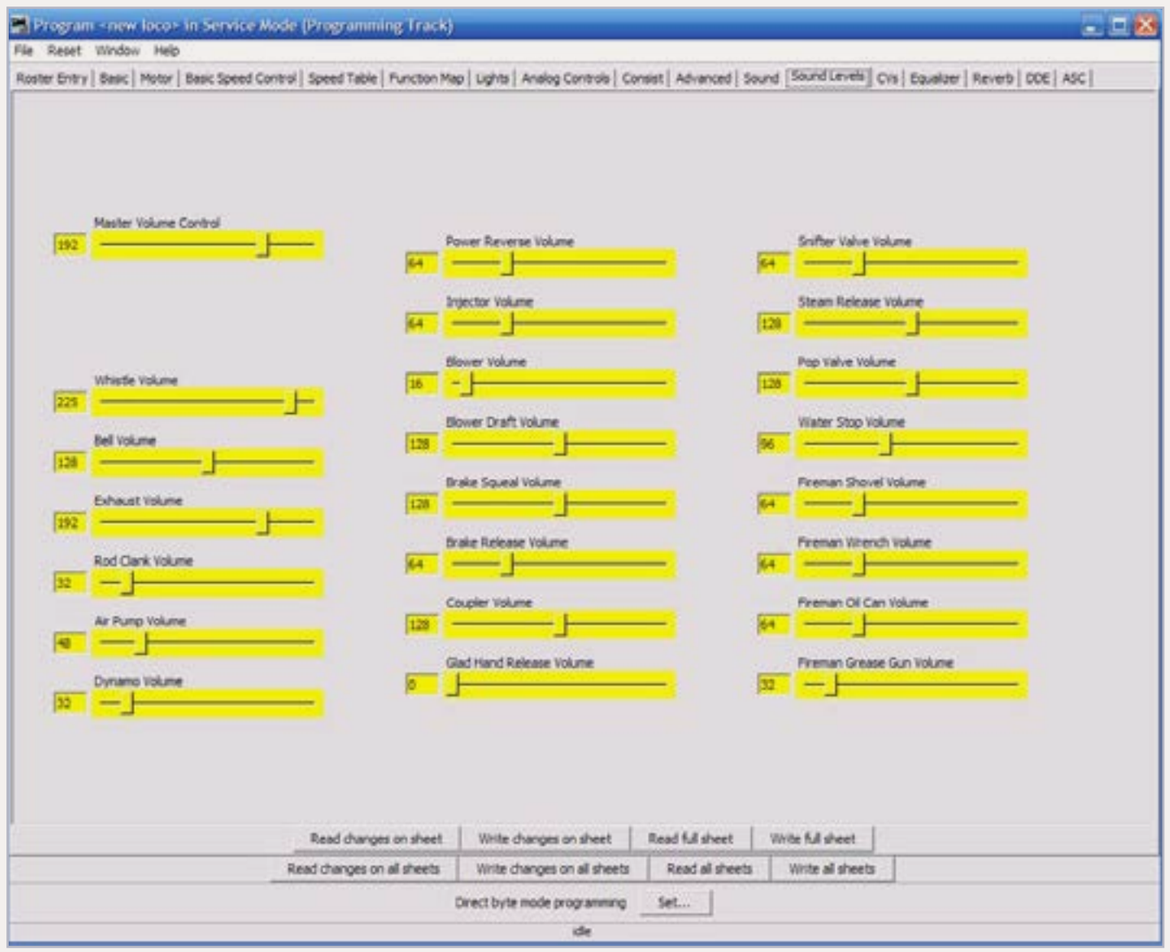

Figure 12: Tsunami Sound level page in DecoderPro.

If the decoder is reading back a CV value, it isn't listening. Any incoming CV values will be ignored while it is talking to you.

One more reason to use DecoderPro: you can keep a copy of every CV for every loco.

I've had customers come back to me years later, having issues with their locos. I could put the loco on the programming track and use the compare feature to find what CVs had changed. Frequently, the ones that have changed relate to the customer's complaint.

If you have a copy on your computer, you can restore the loco any time you wish. Just put the loco on the programming track and hit WRITE ALL SHEETS.

So there you have the icing for your DCC cake: a computer interface, DecoderPro and a programming track booster (if your DCC system needs one).

Thanks to Jack at Litchfield Station (litchfieldstation.com) for the loan of many of the products that were photographed for this column.

Thanks to you readers whose votes have kept the first eight of my columns in the top five. That makes me feel really great.

Click on the link here to vote for this column and make any comments or suggestions or to share your experiences. ☑

Reader Feedback (click here)

A Sidebar continues on the next page.

SMP* from Mr. DCC – Dual Decoder Installations

There are times that you put two decoders into a single locomotive. For example, you want more lighting or control functions than the motor decoder has and you add a function-only decoder. Or you add a sound-only decoder to a loco that already has a motor and light decoder.

It seems easy enough, just wire both to the track pickup, give them the same address and then set them up for the operations you want. Oh, NO! That won't work; frequently some of the CVs are common between the two decoders. If you do it this way, you may think you are setting the headlight functions and you are adjusting some of the sounds, too, or some such.

Here is how I get around this:

I use clip leads to connect the secondary decoder to the programming track. Then I do the basic set up. I give both decoders the same long address. I give them distinct two-digit addresses. For Example, with loco 1234, I'd set the primary (motor) decoder to address 34 and the secondary decoder (sound) to 12. I then set CV29 so that both decoders respond to the short address.

After I wire the secondary decoder into the loco, I'm ready to tweak the decoders independently. I select SHORT addresses and consist the two addresses.

Then I program on-the-main either decoder without affecting the other. All I do is select the two-digit address of the decoder I want to tweak.

After I have all of it running as I desire, I clear the consist and set CV29 for both decoders to long addressing and run the loco on the long address.

If I want to fiddle later, I just change CV29 back to short addresses, put them back into a consist and tweak some more.

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

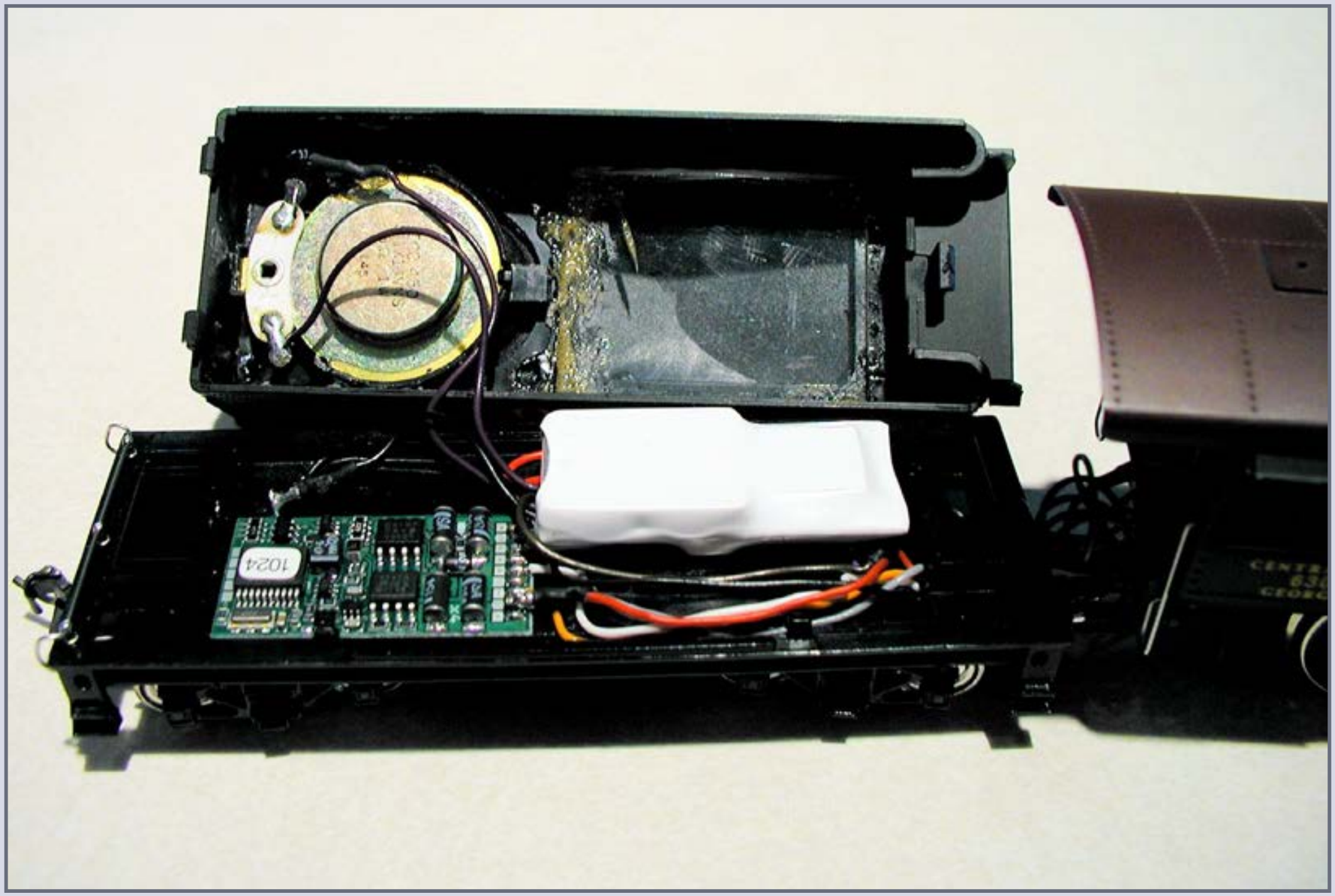

Figure 13: HO steam loco with two decoders – open board is motor & lights, white wrapped unit is sound.