

HUB Headlight

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ONLINE RAILFUN TIMETABLE

Editor: Due to the Covid-19 pandemic, the HUB is using the Zoom online meeting software. Meeting info will be sent out in advance of each RAILFUN via the Google email list and Constant Contact. Contact Online Activities Coordinator Erich Whitney, onlinecoordinator@hubdiv.org, with questions.

How I Decided to Go for My MMR

By Russ Norris, MMR

8PM Friday, January 15, 2021

Russ Norris is the HUB's most recent Master Model Railroader (MMR #638). He will explain how his modeling adventures were jump-started by rejoining the NMRA at the Amherst Model Train Show back in 2012. Russ will give the audience a retrospective on the process of achieving one's MMR, and convince them that it can be a fun and educational experience.

If you haven't visited Russ's layout on one of our Saturday Cape RAILFUNs or seen his prototype structures at the Cambridge School, you are in for a treat.

Conklin Limestone Quarry, Lincoln, RI and My NMRA Achievement Award for Prototype Modeling

By George Landow (Little Rhody)

8PM Friday, February 19, 2021

George will explain the history of the limestone quarry from 1636 to the current date. He has been observing this quarry over the past 45 years with many photographs cataloging its history. In the 1970s he published an article for Railroad Modeler magazine.

After making basic drawings, he created a cardboard mockup to test the accuracy of his measurements, after which he began to create his miniature version from styrene. George's version is set in the 1950s. The presentation will document his procedures to construct the quarry, then document the prototype aspects from photographs of the original and the finished model.

Presentation: Designing and Manufacturing Model Trains in China - the "Rapido Way"

By Bill Schneider and/or John Sheridan

8 PM Friday, March 19, 2021, Cambridge School of Weston

Bill Schneider and John Sheridan are the project managers at Rapido, and one of them will show us a presentation of their manufacturing plants in China and their operations in Markham, Ontario, Canada. We'll get a rundown of the design phase, first-tooling, pre-production to the production phase, and the delivery of their inventory. While Rapido is based in Canada, they focus on a variety of Canadian and American prototype models, and have an impressive line of New Haven products.

Feature Module: Clark's Falls

By Jeff Gerow

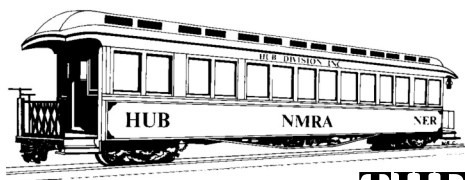
Clark's Falls, named for my wife's family, made its first appearance at Springfield in 2001 with the ballast still wet. Having gone to NMRA National Conventions for many years, I felt that my local activities should begin by joining the HUB's Module Group. I had visited their shows, especially at Marlborough High School, and was impressed by the quality of the scenery on the HUB modules, so a scenery module was my plan. In fact, I used the HUB Module Kit – Mark Harlow cuts all the pieces and the kit makes the wiring easy.

I've always liked bridges as a great excuse to have a train suspended in midair – especially a big steam engine – so that became the central theme and an excuse to model the water under it. The Kibri bridge was 16" long and required separating the tracks a bit, so the bridge became the focus of the 4' module. And then you think, "Oh it's a kit, so easy..." Not so much – yes, all the parts were cast, but they all had flash to remove, and some filing here and there. Girders were made of individual flat strips, with three pieces per girder (and there are a lot of girders). The bridge took quite a while to build, and

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THE PRESIDENT'S CAR

By James VanBokkelen

Hello, members of the HUB Division and readers outside our group. I'm writing this during a bit of unseasonably warm weather, and I am hoping it lasts a bit longer because my track project at Seashore really needs another few work days before it's buried in snow or the ground freezes under it.

With the increase in Covid-19 cases in New England, in-person public events are unlikely even in early Spring. Train shows or events we might have attended are postponed to 2021 or 2022: Greenberg, Tour de Chooch, the ARS show at the Big E, Nashua Valley, Hooksett, etc. Our own June Murder Mystery Dinner Train, our October Northeastern Region Convention in Westford, MA and our December New England Model Train Expo are all awaiting a change for the better.

By the time you read this, most area museums and tourist railroads will be down to whatever winter activities they offer. Seashore is done until May, having canceled its Christmas Prelude event. You may find holiday events if you look, but be careful: the virus is around. Some of my family (who don't live in my house) got infected just before Thanksgiving.

On the remote front, the HUB's RAILFUN continues using the Zoom online platform for our regular monthly event. Watch for notices on our hubdiv@googlegroups.com mailing list. If you are not on it, email the HUB Office Manager (Officemanager@hubdiv.org) to be added. Notices about Nutmeg Division's events appear on the HUB list as well. The Seacoast Division posts their notices on seacoastnmra.org; and the Hudson-Berkshire Division is at hudson-berkshire.org. Occupying the NEMTE's usual pre-holiday spot, our region's NERx online convention was a success, drawing more than a hundred viewers on each of its four evenings.

Our one big in-person event this winter is the displays at the Museum of Science. Our volunteers have been keeping the trains running. There has even been some discussion of continuing the event beyond last year's closing date. *[Editor: As of publication, the MOS was closed per City of Boston order for three weeks, hopefully re-opening January 7th.]*

Erich Whitney's job title has changed to Online Activities Coordinator. This includes organizing a calendar listing when our Zoom account is being used. If you have a HUB-related activity you'd like to conduct using our account, let Erich know and he'll see about scheduling it.

NMRA Achievement Program activity is working its way around the virus: It's straightforward to earn Author, Volunteer or Association Official, and I'm starting to see some new Certificates come through. Chief Dispatcher can even be earned in self-isolation, but you'll need some technology to participate in operating sessions remotely; one of our members has acted as Dispatcher over an Internet link. The NMRA thinks it can do remote evaluation for Civil and Electrical, but Cars, Locomotives, Structures and Prototype Modeling still rely heavily on in-person evaluation. Regardless of how the NMRA's efforts to adapt to Covid-19 play out, many of us are building models or working on layouts in this unexpected free time. Keep the necessary paperwork on the To-Do list as well. I hope we'll see a lot of new AP certificates in 2021.

Mill City 2021 will be October 8-11, 2021 (still Columbus Day Weekend). It's at the Westford Regency Hotel in Westford, MA. We'll carry over many of the 2020 arrangements, including schedule, layouts, and clinics. Inevitably there will be a few changes. Our focus will remain on model railroad operations. If you have a new presentation, or a layout that would make a nice tour or operating session, get in touch. We also need volunteers for the Convention site and activities, so consider getting involved as things come into focus.

Speaking of Volunteers, the HUB is looking: We have five candidates for Board Members in the upcoming election, but we still need help in member outreach. As the crisis tapers off, we'll also need show

management, RAILFUN events for members who can't get to Weston on a Friday evening, and model railroad operations for members. Talk to me or another Board Member/Officer to get involved!

Personally, since my last column, almost all my spare time has gone to track work at Seashore Trolley Museum. We still have a few days' work remaining in our long-term project to re-lay much of the yard in front of our Shop. Panel-track turnouts were built from kits in 2017 and 2019; now we've torn out the worn-out originals and their sand ballast. By mid-December, we must have everything connected again.

If there's something on your mind about the HUB or its activities, email me at president@hubdiv.org, call me at (603) 394-7832 or catch me at a HUB online event.



The Custom House, built by museum staff, makes a great addition to the Museum of Science layout. Photo by James VanBokkelen

New Members

The HUB Division welcomes the following new members:

- Paul St. Martin, Marshfield, MA
Formerly of Seacoast Division:
- Bruce Robinson, Sandown, NH
- Brenna Whitney, Derry, NH
- Erich Whitney, Derry, NH
- Holly Whitney, Derry, NH



Shanty Talk: Get Out the Plows

By Rudy Slovacek

As I write this, there is a lasting snow on the ground with a temperature of 10 degrees below freezing. Winter is finally upon us so call out the plow! A few years back (I guess it's many years before the beautiful Jordan spreaders by Walthers), I had the shop forces of the Coastal Mountain Railroad (CMR) build up a snowplow. It was a crude affair composed of a short frame from rail stock, some old trucks and wooden bunkers filled with railyard scrap to give it weight. The plow was welded steel and could be manually lifted for clearance through switches and crossings if needed (See Figure 1). It was often seen at the head of my trains in late January in Springfield. I shall be resurrecting it now that I have a maintenance track in the back of Saratoga yard and I have time to add more detail.

The yard itself has undergone an upgrade in which the hidden track, behind the backboard, has now come forward to the rear of the yard itself. It will serve for maintenance and storage purposes. The engine house now has a bonafide, structurally sound roof instead of the flimsy

cardboard original. When the exhaust fans from Scale Structures Ltd arrive, I'll be able to complete the roof and put it into operation. At the opposite end of the maintenance track the crew has finished building the bottling plant for Saratoga Spring Water Co. With a little modelers license, a platform was built to serve boxcars brought in to supply the plant with bottles and ship out the bubbly spring Vichy water. A perusal of the Internet at www.saratogaspringwater.com shows a history of the plant and some great photos.

Much has changed from 1872, such as a track rearrangement that no longer runs through downtown Saratoga Springs. Rather, it crosses under Route 50, just before the Park entrance, and leads to the beginning of the yard proper under Spring Road. Inside the park entrance, about a quarter-mile from the bottling plant, is what appears to be an old-style freight station kept up for possibly golf club maintenance purposes. If I had to guess, the Vichy water from the plant was carted first by wagons and then by trucks to the station for shipment by rail. Now all shipment of the bright blue bottles is done by trucking. The signature square smokestack with the "SARATOGA" lettering denotes the location of the plant off of Spring Road.

Indoor winter months have been spent on some rolling stock additions. Three of the Accurail 30-ft. double-sheathed boxcars have now been completed and may complement my WWII trains. The cars are from the P&LE, NYC proper and the D&H. On my first P&LE car, I did not

follow the instructions and messed up the brake gear. However, if you carefully read first and then follow the Accurail directions, you'll be rewarded with a fine-looking car. Now all mine need is some weathering. I've also completed the D&H depressed center flat I mentioned in my last column. In Figure 2, the car appears as it looked in the 80's when modeled from the picture in the "D&H Color Guide to Freight and Passenger Equipment" by Morning Sun books. I'm planning to make a second car with a bit more accurate detail and a paint scheme from the earlier era when it was constructed. I have some people searching their data bases for more color scheme information now. Do any of you out there perhaps have an earlier picture?

Lastly, to give my modeling an overall plausibility, I'm attempting to incorporate vehicle signage for businesses from the era in which I model. For example, the Hicks family off Schaubert Hill Road ran the trash pick-up service and Ashdown delivered heating oil to my childhood home. The recent 1957 Chevrolet garbage truck from Mini Metals is an excellent starting point for my rubbish removal service. I've printed a few signs on Testors white decal paper and will let you know how they turn out.

Until then, remember to follow the CDC guidelines. We are so close to getting the vaccine distributed that now is not the time to relax or drop our guard. Stay safe over the holidays and perhaps we'll meet again on the other side of this year.



Figure 1: The Plow.



Figure 2: D&H 16159 depressed center flat car.

My Rutland Layout

By Ernie Johansen

Here are photos of my finished railroad. It's a 30" x 60" N-scale layout of a fictitious village in Vermont. It's set in the fall of the late 50s before the Rutland went out of business. Scenery is 99% complete. I have a collection of Rutland rolling stock as well. Whenever this virus clears up, it will all be donated to the Rutland Railway Association, a non-profit club in Rutland, VT. I'm a member of the Association, and they have room for it in their clubhouse.



Wintry Scene at the MOS



A wintry village scene with trolley on the Museum of Science layout.
Photo by James VanBokkelen

On30 NERX Reefer

By Mike Tylick, MMR

As part of our recent NERx online regional NER convention, a virtual car kit was offered to attendees. No physical cars were manufactured, but instructions and the artwork for printing decals on your own were offered on the www.millcity2020.org website. This will also be available on the 2021 "in-person" regional convention's webpage, www.millcity21.org. Plans are also being made to include special contest categories for these cars at the 2021 convention.

I designed the artwork to allow for many variations by different modelers (see Bruce Robinson's version below). I tried my hand at a simple On30 version. I purchased a Bachmann On30 data only yellow reefer (#27495) and printed the artwork on clear Microscale Thinfilm decal paper (#100). The decals were printed on a laser printer, so no sealing over-sprays were necessary. I did apply several coats of Testor's Decal Bond spray as a precaution. The car was sprayed with Testor's Glosscote to make both the car sides and the decals glossy. After the decals were applied, they were softened with three coats of Walther's Solvaset. The shiny car was then dulled with Rustoleum Matte Clear Enamel followed by Testor's Dullcote. Rattle cans were used throughout. When everything was dry, the car was weathered in a surprisingly short time with pan pastels.

The finished reefer will be quite useful hauling fresh seafood on my Marshfield and Old Colony Railroad.



HO NERX Reefer

By Bruce Robinson

Reefer NERX 2020 is being delivered to the Swift plant at Valley Junction on the VJRR. Just like the Mill City convention, the VJRR has the motto "WE DELIVER!" Joining several other layouts at the convention, the VJRR will be open for operating sessions and layout tours at Mill City 2021.



Feature Module: Clark's Falls

(Continued from Page 1)

then I had to surround it with appropriate scenery – mountains and water to justify such an expensive steel bridge – and it should be autumn for the colors!



Joel Bragdon, supplier of Geodesic Foam Scenery™ materials, gave clinics at several NMRA National Conventions and convinced me to try his system. Geodesic foam uses two-part polyurethane foam and plastic to make strong, super lightweight scenery. Since this is for a module that will be carried from my basement to my car and back, it needed to be both tough and light-weight. There are two different, related products in use here – the first, a foam, is used to create a hard-shell base and also back the second, a hard plastic. The hard plastic becomes the detailed surface of the rocks.

The “hard-shell” forming the surface of Clark's Falls is made using Bragdon's two-part polyurethane foam spread over Fiberglass window screen contained within layers of plastic wrap. This hardens to a solid surface able to support all manner of scenery. The rocks, added on top of this hard shell, are made from another Bragdon two-part urethane, Cast Satin™, a white hard plastic able to maintain the fine rock detail.

Styrene foam insulation panel pieces support the Bragdon hard shell to create the mountains and a stream bed.

On a work area covered in newspaper (it's messy); I put down a layer of plastic wrap, then a section of Fiberglass window screen cut for the area I was covering. The foam is a two-part mixture that once mixed and stirred quickly, must then be spread immediately. I used a throwaway brush that I made from corrugated cardboard to do the spreading. To finish the hard-shell, I then covered the foam with another layer of plastic wrap. The foam does get warm and expand – within the plastic wrap thankfully – and starts to get stiff. While it's warm and still flexible, I hot-glued it to the edges that I had provided and shaped it to final contours. Pretty soon it's hard-shell – but very lightweight – and it's held up for 20 years. The shell is also water-tight as a piece does form the bottom of the stream (and we know how water materials like to find a hole...).

The rock faces start with latex rock molds, also conveniently available from Bragdon. I used two molds, one with larger rocks for the foreground and one with smaller rocks for the background. It's easy to break up the molded rocks and mount them at various angles to cover a big area without seeing repeats from only two molds.

These rock molds are quite detailed, so a thin coat of Bragdon's Cast Satin™ – their other two-part urethane that hardens but doesn't expand – is used to maintain that detail. Bragdon's hard-shell foam product is used to back the Cast Satin™ to give it enough strength to deal with errant jabs.

Casting rocks starts by rubbing the mold with petroleum jelly and spraying white lacquer spray paint onto it. Somehow the paint with petroleum jelly helps to maintain the detail while allowing the plastic to release from the latex mold. Once the mold is ready, the Cast Satin™ A and B parts are mixed, quickly stirred and poured onto the prepared mold – and again spread with a disposable cardboard “brush.” The molds are suspended in wooden frames to allow me to pick up the sticky rock mold without grabbing it with gloved fingers. By tilting and holding it upside down(!), the plastic spreads more or less uniformly over the mold – covering the peaks between rocks and the valleys of the rocks themselves. When the plastic starts to get stiff and stops flowing, a layer of the hard-shell urethane foam is mixed, poured and then brushed onto the back of that first layer of white plastic. This foam layer will protect the thin plastic molded rocks. When the foam layer is no longer sticky, I peel the mold away from the plastic rocks. At this point the molded rock is warm and flexible so I push and pull – and, in some cases, tear – the molded rock to create different natural forms. I can shape the rocks while I hot-glue them in place on the hard-shell.

The first step in coloring the rocks is to paint on a coat of gesso, which is an ultra-white undercoat that painter's use to seal their canvas. Here it provides a consistent white undercoat that “grabs” the washes of color that I use to color rocks and covers irregularities in the surface. Since I purchased a Bragdon Kit, I also had some of their black powdered tempera paint to “pre-paint” the shadows, by brushing on the powder and wetting.



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Feature Module: Clark's Falls

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Then the exposed rocks are wiped “clean,” leaving tempera in the shadows – to later interact with washes of color. Many thin washes of various colors followed (Payne's Gray, Burnt Umber, Raw Umber, etc.), and were finally sealed with Dullcoat.

The water was poured with two-part resin after preparing the lake and stream beds with both plastic and real rocks. I live at the beach so was able to find natural scale, weathered stone for a New England stream bed. I caulked a piece of plexiglass to the front edge to form a dam and hold the water in while pouring. After the resin had set and I removed the front dam, I used gloss medium to create ripples and waves in the flowing water. I also embedded a fish being caught with a splash of monofilament strands – sadly my first plastic fish dissolved in the “water” so I had to drill a hole for the second jumping fish.

Once the rocks and water were done, several layers of scenic details were added – ground foam in several colors, small rocks, pieces of twigs (now HO logs), small bushes, etc. For the distant mountains, Woodland Scenics “Bushes” become distant, small “puff-ball” trees – with small twig trunks added at the front edge. A light overspray by airbrush with diluted light blue lets the background recede a bit into haze.

Finally, I made several full-size trees that live off the module and are added when setting up on-site. For construction details of the trees, I refer you to the clinic (“Foreground Trees with Leaves”) that I presented for NERx on December 1st (available on my YouTube page – www.youtube.com/watch?v=GNJK-nzReKs).

A few years into displaying Clark's Falls, as I considered getting the module judged, I realized that there were many points

available for electrical accessories (and I didn't have any) – so I decided to add a signal tower. While making the signal tower from a NJ International kit for the bridge and Oregon Rail Supply signal targets, I also decided to add a relay cabinet – and for a bit more viewer interest, why not have a technician dealing with a big problem including sparks! Using fiber optic strands and a welding LED set, I made big problems for the signal crewman – and added a service vehicle with flashing lights to get him there. This plastic signal bridge lasted a few years but didn't survive a loading failure, so I made a brass replacement that has been much more robust.

As I mentioned, Clark's Falls was first shown at Springfield, but has had many appearances since then, including our wonderful setup at Dortmund, Germany. Clark's Falls and I are anticipating future train shows where we can visit with other train enthusiasts while having our trains travel the HUB layout.



Online Activities (Zoom) Coordinator

By Erich Whitney

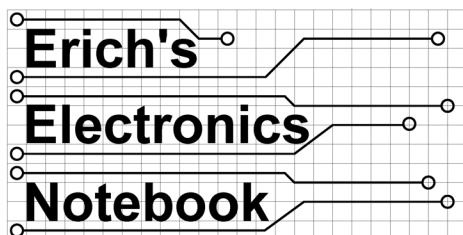
As James mentioned in his recent column, I have volunteered to take on a new role in the division to help with our online Zoom meetings. There's a couple of things about this role that I wanted to bring to your attention.

Our division's Zoom account only allows for one online meeting at a time, however, there is no restriction on the number of meetings we can host in a given month. So, if you are interested in getting together with a group of friends online to work on model railroading activities, please reach out to me and I can schedule a Zoom meeting for you. Please note that if you want to host a Zoom meeting, you will need to register with Zoom (it's free). Once you've done this, send me an email with the details of the meeting and I will schedule it for you. You will need to provide me with the email address you used to sign up with Zoom. I will then send you the meeting information that you can share. If there's a meeting conflict I can work with you to adjust the schedule accordingly. You don't need to use the HUB Zoom account to host a meeting unless you need more than the 40-minutes that the free version gives you.

In addition to hosting Zoom meetings, we also have a YouTube Channel for the HUB Division. Currently, we are using this channel to post any RAILFUN meetings that we record, but if you have model railroading videos that you would like to share, please let me know and I can work with you to post them. All of our HUB Division YouTube videos are public so you need to be careful not to include copyrighted material such as commercial music. YouTube does scan the material and will completely remove videos containing anything that is not allowed.

This should go without saying, but please be sensible about your requests. I want to help to share relevant model railroading activities online, but I do not want to have to police it. Please don't request Zoom calls to meet with your friends just for the heck of it – use the free version for that. Please send requests a few days in advance to give me time to respond. I have a full-time job and cannot guarantee last-minute requests. When we focus on sharing model railroading in the spirit of education and outreach then adding these online activities should be rewarding for everyone.

You can reach me at: onlinecoordinator@hubdiv.org



By Erich Whitney

Turnout Control

After reading Dave Insley's article, "My First LCC Network," and watching Jeff Gerow's NMRx LCC Clinic (see HUB Headlight Volume 37, Number 2), I got thinking about the various turnout control issues. In this column I'm going to do a little bit of a deep dive into the subject, and hopefully provide some information for you to consider for your home layout or module. I'm going to cover some basic information in this article and follow-up with a more in-depth look at turnout control with LCC in a subsequent column.

Terminology

Technically speaking, a turnout is the piece of track that allows a train to change its route. The part of the turnout that moves is called the switch. We tend to use the terms "turnout" and "switch" interchangeably but if we're trying to be true to the prototype, we "throw-a-switch" to change route. If we "throw-a-turnout" it's probably because it has caused its last derailment and we've torn it from the layout and sent it flying into the trash. Unfortunately, this subtlety has been lost in part because the term "switch" is also used for the electrical device used to switch the switch. I'm going to try to be consistent with the use of the word "switch" – it should be obviously disambiguated from context (hopefully).

Turnouts are either "normal" or "closed" meaning that they are aligned for the straight or normal route. When a turnout is "reverse" or "thrown," it is aligned for the divergent route. When we speak about the turnout we tend to use "normal" or "reverse." The turnout switch is either "closed" or "thrown" respectively. This difference trips me up all the time when working with JMRI CATS files because I think in terms of "normal" and "reverse" but it (correctly) uses "closed" and "thrown." The piece of the switch that

actually moves the rails (points) is called the "throw bar."

Frogs are the pieces of trackwork in the middle of turnouts that are part of both the normal and divergent routes. If the turnout has an insulated frog, then power is applied to all of the rails and it is assumed that a locomotive passing through the turnout will be able to pick up enough power such that the wheels passing over the insulated frog won't cause the locomotive to lose power. If the turnout has an un-insulated (active) frog, then the frog must be wired such that it can get the correct power based on which way the switch is thrown. An active frog MUST change polarity when the switch is thrown or it will cause a short circuit. For some good pictures and more detailed explanations about the difference, visit dccwiki.com/Wiring_Turnouts.

Manual Throws

The simplest and least expensive solution for controlling your turnouts is a manual ground throw or you could even throw the switch with your finger (some commercial turnouts have integrated springs that allow you to do this). However, even with manual control you must make sure that you address the frog power issue mentioned above. Some commercial turnouts do this for you as part of the switch mechanism while others require you to wire the frog externally.

Switch Machines

A switch machine is an electro-mechanical device that moves the turnout switch for you. It can be operated from a toggle or pushbutton switch on the fascia or panel, operated remotely under dispatcher control from a dispatcher's panel, or even operated remotely by a computer or some other type of layout automation. There are way too many options for me to properly cover the subject. I can generalize the types of switch machines into a few basic types.

1) A stall motor, which is a DC motor that you apply power with one polarity to make the motor go one way and the opposite polarity to go the other way. The term "stall" comes from the motor stalling when it hits its limit but it's designed to stay powered with very low current – this

keeps the points tight. The motor typically moves a stiff piece of wire at the end of a lever-arm attached to the throw bar under the layout.

2) A servo motor, which is a DC motor that moves by pulsing the power to it through a servo motor controller. Each pulse moves the motor a little bit and you need to stop the pulses when the switch is in the desired position. These are very common in the model airplane hobby because they move precisely and will stay at whatever position you leave them in. They are also incredibly inexpensive, and the servo motor controller can be implemented with very inexpensive Arduino devices. Servo motors typically have a small gearbox with a lever arm attached to a stiff wire that moves the throw bar.

3) A twin-coil switch machine has two coils of wire through which the armature (a metal rod) is placed in a tube. Applying DC or AC to one coil pulls the armature one way, and powering the other coil pulls the coil the other way. Less common single-coil switch machines use a spring in place of one coil. For either type, the armature is attached directly to the throw bar or to a lever attached to the throw bar. This type of device is known as a solenoid.

Layout Considerations

When a turnout is installed in your layout, there may be wiring and other components that can make the task a bit daunting depending on how you want that switch to operate. Here are some things to consider.

1) Local Control: Do you want your train crews to be able to operate the switch themselves or do you want to only control the switch remotely?

2) Remote Lockout: Do you want the ability to give the train crews "permission" to control the switch during specific times (i.e. grant them track authority for local switching)?

3) Positive Switch Position Indicators: Do you want to have some type of positive switch position indication for either the train crews, the dispatcher, or both? This might be an LED on a panel located near the switch or on a dispatcher's panel.

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Erich's Electronic Notebook

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4) Computer Control: Do you want to connect your turnout switch machines to a computer? If so, do you want the computer to have some type of feedback indication of the switch position?

The Integrated Turnout Controller

A little while ago I came across a product on the Model Railroad Control Systems (MRCS) website called the Integrated Turnout Controller (www.modelrailroadcontrolsystems.com/integrated-turnout-controller). This is a clever little device that is designed to be quite versatile and provides some interesting features. It's also very inexpensive, especially if you build it yourself. The design uses a very small (8-pin) ATtiny85 microprocessor that's programmed using the free Arduino tools and MRCS provides the source code if you want to modify it. The ITC can be plugged directly onto the back of a Tortoise switch machine, but it can be configured to work with other switch machines as well. It is designed to work with the C/MRINet (cpNode, SMINI, etc), but it uses logic-level inputs and output so it will work with LCC or any other type of digital device that's connected to your layout. It does not have (or need) a DCC control interface.

The ITC has the following features (from the MRCS ITC User Guide):

- Standalone or computer turnout motor control
- Local Throw input
- Remote Throw input
- Switch Lock input
- Turnout position feedback output
- Route LED ports, Normal/Reverse (Common Anode, Sinking)
- Open Source sketch software
- Motor power input, 9-12 Vdc
- Onboard 5v regulator for logic power
- Turnout motor driver (TC4428 MOS-FET), up to 500 ma drive
- Frog power routing using external switch contacts (TortoiseTM, Switch-masterTM, MP1/MP5)
- 8 position motor pads for a .156" Molex connector, .156" edge connector, or .100" (2.54mm)
- Separate motor pads for connection to additional crossover turnout motors

You can purchase these ITC boards built-up in whatever configuration you like, but you can also buy just the bare boards and build your own. MRCS sells the two chips as a set with the ATtiny85 already programmed if you don't want to deal with that. I chose to buy just the bare boards and I ordered the parts myself. I purchased the Tiny AVR Programmer for the ATtiny85 from SparkFun

Electronics (www.sparkfun.com/products/11801) so that I could download and program the chip myself. If you are interested in how to build one of these, please let me know and I could cover this in a future article. I would like to point out that as of the time I wrote this, MRCS was undergoing a major revision of the ITC User Guide and I am working with them to update and correct some of the information about the design. This was a product that Chuck Catania was working on shortly before his passing two years ago. His business partner, Seth Neumann, has been working through the product line with help from friends.

In the next issue, I'll take a look at how to implement this functionality in an LCC-based layout control system. As always, please keep your questions and suggestions coming!

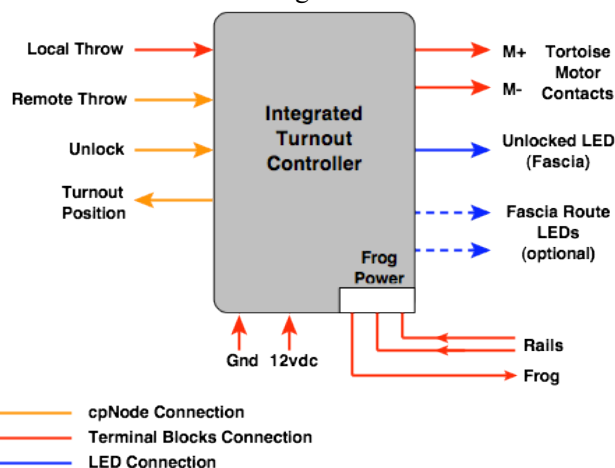


Figure 1 The MRCS ITC Block Diagram (image from the MRCS ITC User Guide)

Switch Position Feedback

By Erich Whitney

For the purposes of train movement, a turnout switch can be in one of three possible states; closed, thrown, or somewhere in between, either in the process of moving between closed and thrown or stuck. The only foolproof way of giving accurate switch position feedback is to have sensors on the actual throw bar that verify the switch is either completely closed or completely thrown and not in an in-between state. The most common way to sense the switch position in model railroads is to somehow infer the position of the switch from the position of the switch machine. This is NOT fool-

proof. A simple case in point is what happens when a piece of ballast or scenery gets stuck in the points. The switch machine happily comes to a stop, but rails are not properly aligned, and you have a derailment just waiting to happen. In the real world, there are things such as ice, snow, mud, ballast, critters, or any number of things that can foul the points and so switch feedback is way more important to get right than with our model railroads. I have given this specific issue quite a bit of thought and I have never seen anything on the market that implements this type of feedback. The Tortoise switch machine has two single-pole, double-throw switches built into the stall motor mechanism. These switches emulate most of the prototypical switch position indication in that the switch will transition from the

center contact connected to one side when the switch machine is in one state, then when the motor starts to move the center contact is not touching either side, then when the motor stops at the other side, the center contact is connected to the other side. If the motor gets stuck halfway in between the two sides, the switch would be completely open, and you could detect this condition. A switch that works this way is called a "break-before-make" type of switch, which means that the contacts of the switch will mechanically disconnect from one side before they connect to the other side. The other type of mechanism is a "make-before-break" type and that is something you don't want to use unless you know what you're doing because it has the potential to cause short circuits.

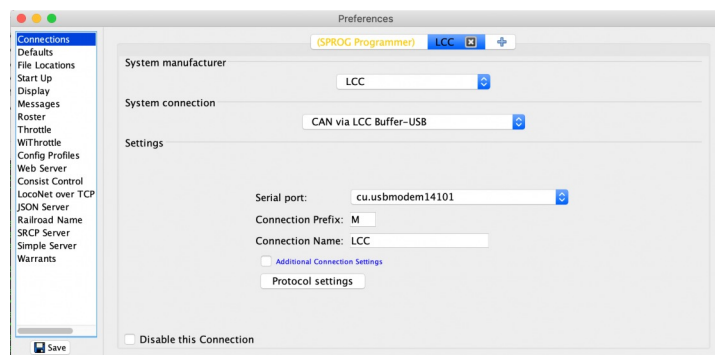
Configuring JMRI for LCC Turnouts

By Dave Insley

In the last edition of the *Headlight*, I shared by first LCC network that I created to control Tortoise switch machines in my staging yard. You do not really need a computer to use LCC, but you do need one to configure your nodes, and JMRI (Java Model Railroad Interface) is the simplest way to do that. I also chose to use the JMRI Panel Pro to create my control panel, just to get things running. Let's dive into how I did that.

Creating a Connection:

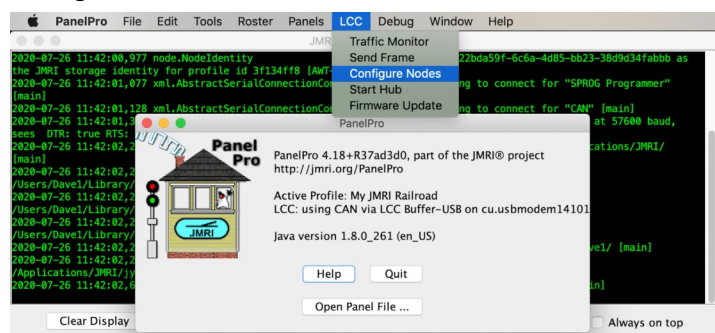
The first step you need to take is install JMRI. You can download the program from the JMRI website at www.jmri.org/download. Pick the version for your computer, either Windows or Mac, typically. You also need Java on your machine, but most come with that already installed. JMRI has several different programs included. The one we will use is called Panel Pro. I mentioned in the last article that nodes on an LCC network are self-identifying. So all you need to do is plug in the LCC Buffer-USB device and start Panel Pro. You should see a connection screen when you first start JMRI.



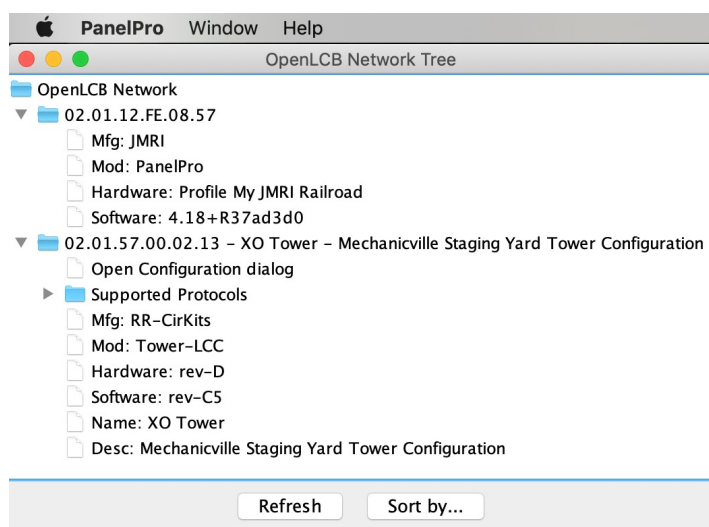
All you need to do is select LCC as the System Manufacturer and CAN via LCC Buffer-USB as the system connection. The Serial Port should have your USB port already selected, if not, the choice should be relatively obvious. I had previously connected JMRI Decoder Pro to a SPROG, so that connection was also active for me and caused a conflict on the LCC connection, so I simply disabled the SPROG using the checkbox at the bottom of the screen.

Configuring Nodes:

Once connected, the fun can begin – configuring the nodes in my network so they know they are connected to a Tortoise switch machine. From the Panel Pro main window, click on LCC, then Configure nodes.

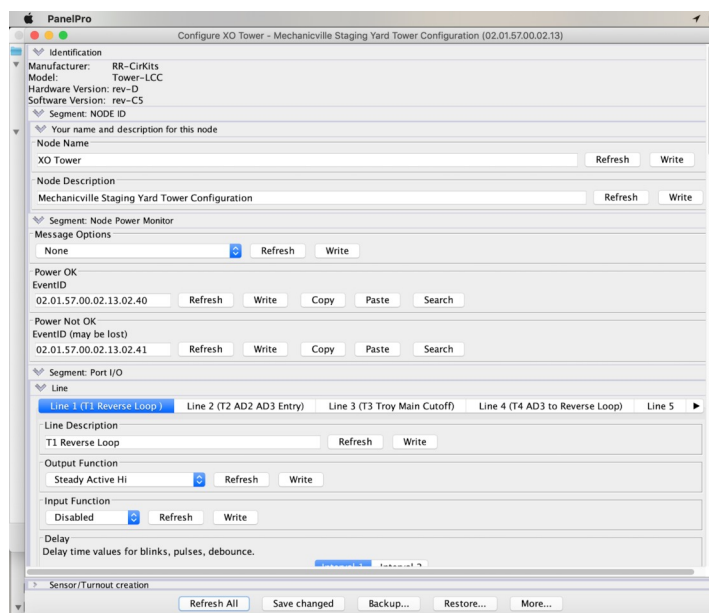


This opens up another window where you should see all of the LCC nodes connected to your network. In my case, it is my laptop running JMRI and a Tower LCC board.



Each node in the network is represented by a blue file folder with a 6-byte hexadecimal address that is unique to that node. Check out Jeff Gerow's LCC Clinic from NMRAX if you want to dive a little deeper into this, or check out the RR-CirKits website. For this article we will dive right into configuring our Tortoises.

Expand the blue folder and double-click on the "Open Configuration Dialog" option. This will bring up a configuration screen for the TowerLCC. I gave mine a meaningful Node Name, XO Tower, as my staging yard represents Mechanicville, New York, and I put information in the Node Description to help with my overall documentation. Not a big deal with only two nodes in my network, but I will be adding more down the road, so might as well develop good habits now.



(Continued on Page 10)

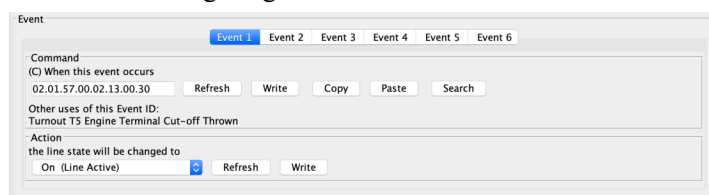
Configuring JMRI for LCC Turnouts

(Continued from Page 9)

The real fun begins in the section with the heading “Line.” Each Tower LCC has a total of 16 lines that can be configured to take an input from a Producer, or it can send output to a Consumer. In my case, the Tortoises will be Consumers of an event sent from JMRI. I decided to put two SMD-8 boards into my Tower LCC so I could control 16 Tortoise switch machines. I will experiment with pushbuttons and signaling in the future.

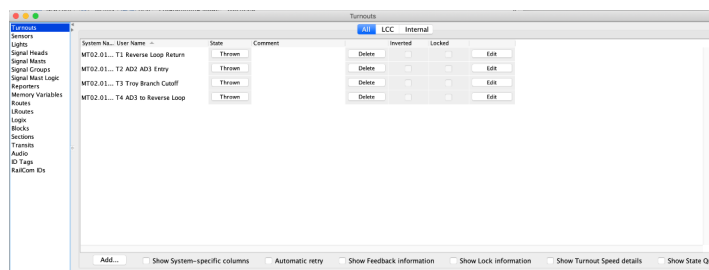
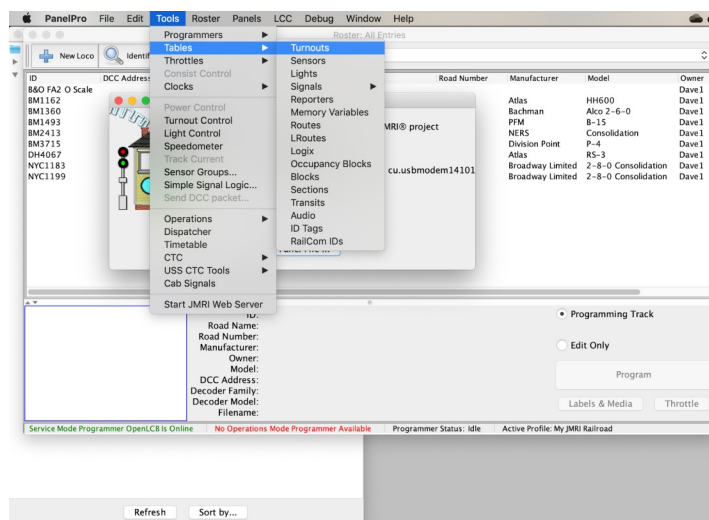
Each line will therefore represent one turnout in my staging yard. To complete the configuration, I make three changes. First, I give each line a meaningful Line Description so I know which switch will be thrown. The second step is to change the Output Function to Steady Active Hi since Tortoises accept a steady current from the DC power supply we attached to our SMD-8. Tortoises are consumers and there is no input function on the line, so change the Input Function to Disabled.

The final step is under the Events section of the screen. The events will be sent from our panel to control the switch machine. When Event 1 is sent, we want the Tortoise to throw, so we set the Action to “On (Line Active).” Event 2 will cause our Tortoise to normal, so we set that to “Off (Line Inactive).” And that is it for configuring the Tower LCC lines.

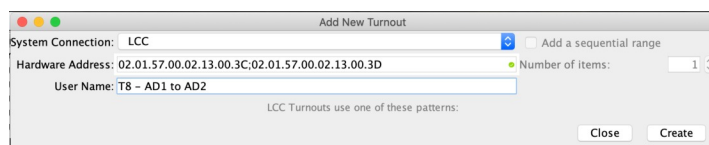


Creating Turnouts on a Panel

Now that we have the Tower LCC configured so our Tortoises can consume events, we need something to send those events. In my case, I chose to build a panel in JMRI Panel Pro. First thing I needed to do was to define my turnouts. You can find a detailed tutorial on the JMRI website (www.jmri.org/help/en/html/tools/Turnouts.shtml). From the main Panel Pro window, select Tools->Tables->Turnouts.



This will open a window for adding turnouts. In my case, I already have four defined, so you see them in the table. To add a new turnout, click on the Add button.



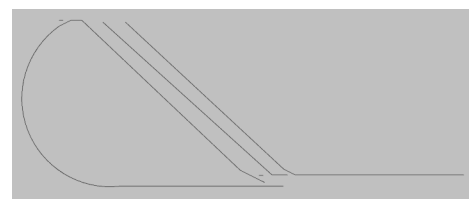
Select LCC as the System Connection. There is a little tool tip if you hover over that little yellow triangle. It tells you that LCC turnouts use a pair of 8-byte events, the events that were configured on the line of the Tower LCC above. The first 8-byte number is from Event 1 (the event to throw the turnout) and the second number is from Event 2 (the event to close the turnout) separated by a semi-colon. If you are like me, there is a 50-50 chance that the ‘Thrown’ position is actually in the reverse position (diverging route on the turnout). If this happens, you have several options to correct it. One is to switch the order of events in the Hardware Address, this is not recommended as it would confuse someone looking at the configurations later. The second option is to Edit the turnout in the Turnout Table, select the Inverted checkbox or you can switch the wires on the turnout motor. I chose the latter as I did not want to confuse myself later if came back and wondered why the configuration was reversed and I would know everything was consistent.

Make sure to define all of your turnouts in the table before going to create your panel. If you have manual throw turnouts you can create those as well, you just set the System Connection to Internal.

Creating a Panel

Panel Pro, as its name suggests, was designed to create panels. There are two general types of panel editors in Panel Pro, the Layout Editor and the Panel Editor. The Panel Editor is designed to make a panel that looks like a CTC machine. It superimposes selectors on top of an image. I wanted something basic that I could use to represent my staging yard as I saw it, so I used the Layout Editor.

I created the world’s lamest panel, but it showed my turnouts and indicated the position of the turnout, so it met the requirements for my electrical certificate.



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HUB Headlight

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Configuring JMRI for LCC Turnouts

(Continued from Page 10)

I will not try to do a tutorial on the Layout Editor as there are several good tutorials on the JMRI website. There is a link there to a tutorial by Bob Bucklew that I found quite helpful. See www.quaker-valley.com/CTC/JMRI_Panel_Tutorial.html.

It is pretty easy to place a turnout on your panel, you simply select the type of turnout and then click on the panel in the area you want it. Simple, right? It was, until I added a cross-over and a slip switch. I had defined the cross-over as two turnouts in my turnout table, but there was only one place to select a turnout when I first added the cross-over. It was only after I closed that screen and chose to edit the turnout that the edit screen changed and gave me the option of adding the second turnout configuration. My final tip, other than reading Bob Bucklew's tutorial? Make sure you save your turnout table and save your panel. There is no auto-save in JMRI and no warning when you close the editor. Don't ask me how many times I had to redraw my panel before I figured that out. Try your hand at LCC and JMRI. It made this project fairly easy and I now have turnout control directly from my laptop. My next project will be to build a real panel and control the turnouts using pushbuttons. Maybe this is something to write about in a future edition of the *Headlight*?

Working on the Railroad



Former HUB Vice President David "Shack" Haralambou makes a repair to the Museum of Science layout. Fenway park is to his left and Kenmore Square, with the ever-present Citgo sign is to his right.

Photo by Jeff Gerow

HUB Division Nametag, Headlight Subscription and Donation Forms, Module Kit and Branded Merchandise Store Information

Please see the September - October 2020 Headlight for all order forms and module kit information along with details about the online HUB Branded Merchandise store.

HUB Division Calendar of Events (Subject to Change)

2021

Jan 15 (Fri)	HUB RAILFUN Zoom Meeting, 8 PM
Jan 30-31 (Sat-Sun)	CANCELED Amherst Railway Society's Railroad Hobby Show, Big-E Fairgrounds, West Springfield, MA.
Feb 1 (Mon)	Submissions deadline for the HUB <i>Headlight</i> Mar-Apr issue
Feb 19 (Fri)	HUB RAILFUN Zoom Meeting, 8 PM
Mar 19 (Fri)	HUB RAILFUN Zoom Meeting, 8 PM
Apr 1 (Thu)	Submissions deadline for the HUB <i>Headlight</i> May-Jun issue
Apr 16 (Fri)	HUB Annual Meeting and Election Zoom Meeting, 7:30 PM
Apr 16 (Fri)	HUB RAILFUN Zoom Meeting, 8 PM
May 21 (Fri)	HUB RAILFUN Zoom Meeting, 8 PM
Jun 18 (Fri)	HUB RAILFUN Zoom Meeting, 8 PM
Jul 4-11 (Sun-Sun)	Rails By the Bay NMRA Convention, Santa Clara, CA, www.nmra2021.com
Oct 8-11 (Fri-Mon)	HUB-Sponsored NER Convention, Mill City 21, Westford, MA, www.millcity21.org

RAILFUN.....



NO MOTIONS.....

NO SECONDS.....

NO BUSINESS.....

NO YAWNS.....