

HUB Headlight

HUB Division Inc., Northeastern Region, National Model Railroad Association - www.hubdiv.org

Volume 38, Number 2, November - December, 2021

RAILFUN TIMETABLE

Hands On: MOS Update and Wiring 101: Cables

By David "Shack" Haralambou

**8 PM Friday, November 19, 2021, Motherbrook Arts
and Community Center, 123 High St, Dedham, MA 02026**

This will be our second meeting in Dedham Center. Our Museum of Science (MOS) Coordinator, David "Shack" Haralambou, will give us new updates on our recently extended five-year Museum of Science project. He will then explain how electrical cables work and how to use them on our layouts including looking at all the different types of cable available, what the different specifications mean, and how to pick the right cable for the job. We will cover all the basic cable types used on our layout. Then we will look at connectors and use the hands-on portion of our clinic to learn how to put them on including: Cat6 connectors, Power poles, spade connectors and more.

Presentation: Lineside Signals

By James van Bokkelen

**8 PM Friday, January 21, 2022, Motherbrook Arts
and Community Center, 123 High St, Dedham, MA 02026**

James will present a computer slide show about engineering, designing and building automatic block and interlocking signals for his DC/DCC layout. The signals don't require a computer, can be installed location by location and are debugged with a voltmeter. The presentation covers the selection and use of commercial components, how to implement basic ABS and interlocking logic, communication between signal locations and discussion of modeling searchlight, mast and dwarf signals following B&M / MEC practice and rule books. James will then go into detail about construction and details of a searchlight signal. He will bring along examples of parts used to build the signals, and one or more signals with the plug-in mount.

RAILFUN Updates or cancellations will be posted on the division website (www.hubdiv.org) and issued via the HUB email list and via Constant Contact.

How I learned to stop worrying and love TrainTech (nee DCC) - "Phase 3"

By Jerry Grochow

I have officially changed the title of this series – it's not just about DCC, but about the broader topic of "Train-Tech!" I first wrote about my experience learning about DCC (my "Phase 0") in 2018 ([Headlight Vol. 35, Number 1](#)), and followed-up in 2019 ([Headlight Vol. 36, Number 1](#)) and 2020 ([Headlight Vol. 37, Number 1](#)) as I got my modest-sized (read: "very small") HO layout up and running. During "The Year of the Lockdown," I added some more functions and also experimented with new, faster microcontrollers communicating over WiFi – that is, I focused on more TrainTech!

To review: My layout uses a [SPROG3](#) DCC command station, connected to a PC running the open-source [JMRI](#) software. I use iPhones and iPads running the [WiThrottle](#) app as throttles, both locally and from a thousand miles away (the grandkids love controlling the trains!). I have five [arduinos](#) monitoring sensors and controlling turnouts and animations, emulating [C/MRI](#) nodes and connected to the PC using the RS-485 protocol. The RS-

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Summer '21

By Robert Manna

This summer my family and I decided to head out west for a month-long road-trip, visiting a number of national parks and monuments along the way and enjoying camping in the great outdoors! It's impossible to head west and not see and enjoy trains (some-what to my wife's chagrin).

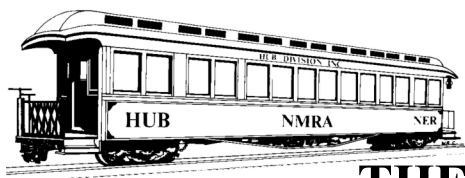
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*Far left: Georgetown Loop locomotive 111 approaches after passing under the trestle.
Left: Rob's children in front of D&SNGR Locomotive 480*



THE PRESIDENT'S CAR

By Manny Escobar

Fall is upon us and with Thanksgiving on its heels, we still have a lot to do to get things back to normal. This has been a hard year for many, many reasons, not the least of which is the loss of fellowship at in-person meets, layout tours, op sessions, and such. As I attended some of our most recent events (a modular display, Railfun and NER Convention), I realized that a lot of our members still question the in-person events and are not volunteering or participating. Despite it all the HUB Division has been active. I am proud that we have been able to maintain events throughout this time, and we are working on future events and exhibits for the upcoming months, so stay tuned. If you are a HUB member and have not yet volunteered or joined us for an in-person event, I encourage you to give it a try.

I want to give my special thanks to Pete Watson, his convention committee and volunteers for a great job on the Mill City 21 NER Convention that was held last month in Westford, Massachusetts. It was a great success and, in talking to the attendees, I found that they had great praises for the committee.

We have a new venue for RAILFUN in Dedham, Massachusetts. Andy Reynolds has negotiated with the Motherbrook Arts and Community Center for us to meet there on the third Friday of the month. Please check the calendar and *Headlight* for further information.

Volunteers Wanted: As I have mentioned in the past, without volunteers organizations will not survive. With that in mind, we are looking for prospective members interested in running for the Board of Directors (BoD). If you think you would like to run, please talk to one of these current BoD members: Erich Whitney, Pete Higgins or myself.

For upcoming events, please check the calendar and *Headlight* for specific events, meetings and any social gatherings.

On another note, I mentioned earlier in the season that we are planning a committee to create a Mentor Program. We would like to connect those who have knowledge or expertise with others in the hobby and organization who are looking for some help, guidance, and encouragement. To assist in this, please look for a survey in the near future.

So, as we enter winter and the approaching holiday season during these challenging times, I am thankful for the opportunities I have had to interact and share the hobby with fellow HUB members and friends. I'm asking all HUB members to consider the Division as part of their annual giving. There are so many worthy groups in need of support that it may seem hard to add us to that list. However, if at all possible, any contributions to the HUB Division will enhance what we're able to accomplish. If you choose to make a contribution, we are a registered 501(c)3 non-profit organization so your donation could be tax deductible. Check with your tax advisor. Please contact treasurer Gerry Covino with any questions you may have at treasurer@hubdiv.org.

"Keep 'Em Rolling"



Shanty Talk:

Old and New

By Rudy Slovacek

If you've been reading my column lately, you'll know that I've been building a few different models and not all of them are trains themselves. In some cases, they are trucks, the competitors of railroads, but in others they're local delivery vehicles carrying goods between the rails and customers in places the rails don't go. I've just completed a Jordan Products 1926 Essex Coach and gotten a new-found appreciation for those who model vehicles in HO scale. I found it one of the most challenging plastic kits I've ever put together with its tiny separate details. In fact, I'm beginning to question

my choice to begin a 1923 Mack Stake truck (another Jordan Product)!

As I was choosing paints from my inventory, I ran across some paint bottles with "My Dads Trains" price stickers and immediately thought of the late George Thompson. He started a model train shop in the town of Wrentham (just down the street from me) and built up quite an inventory before he passed on. While all traces of George and his shop are gone, my memories of him remain. He wasn't just a hobby shop owner, dealer and modeler belonging to the HUB Division, he was an early member of the Coastal Mountain Railroad. When he opened his shop in a two-car garage-barn like structure, he provided the space for a group of like-minded module owners to meet weekly and further their model railroading hobby. Members like Lyle Sorenson taught us all how to model rocks, water and trees in realistic scenery vignettes, and Mark Harlow helped bring our modules up to the latest wiring specifications for

HUB Division modules. Occasionally we'd work on repairs to HUB module stuff. George also bought a trailer so we could store and haul the group's modules and equipment to shows throughout New England.

I had a special modeling relationship with George and one of the things he liked to do was give me a new kit or item to build and see how it turned out. It gave me good practice and the impetus to experiment. In many cases I gave George the completed item back for use on his own Railroad. However, if I liked how the kit turned out, I would purchase one and duplicate the nifty little project for myself. A couple of examples for George included an awful dayglo pink pick-up truck and a white metal kit for a late-teens-early 20s Kleiber stake-truck body. Well, I spray painted that pick-up a dark green, added a rack and some welding equipment and gave it to George along with a small

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Shanty Talk

(Continued from Page 2)

homemade circuit for a flashing welder or cutting touch so he could park it alongside an old NP engine or passenger car being scraped outside the roundhouse on his loop module. I've subsequently made several such trucks with welding equipment for myself.

I returned the finished Kleiber truck to a place in front of an old AHM freight house missing the platform roof, but to which I added men working to build a new roof frame from raw lumber. These pieces helped to make it one fine looking and unique rural mountain module for George. Meanwhile, I bought one of those Kleiber kits for myself and a finished truck is now used to period-date my diorama for photography purposes. See Figure 1.



Figure 1: Kleiber kit truck helps period-date my diorama

Back in the late 80s, early 90s, Tim Byrne invited us up to run the Coastal modules at the Father's Day show held at the Narrow-Gauge Museum, then located in Portland. George called me early the morning of our trip and informed me he couldn't bring his module because in trying to load it himself he dropped it and chipped some plaster. He was mortified for he thought it would ruin our display. I assured him all was ok and brought a small film can of dilute India Ink that touched up the damage nicely. George's wife, Vira, was handy with a needle and thread and made teddy bear engineers. She had a sweet spot for my daughter Caitlyn, who was around six or seven at the time. When Caitlyn graduated high school, it was George who prepared the barbecue chicken. Whenever the Coastal went up to Vermont, railfanning the Green Mountain Railroad, we stayed at Lyle's

family summer home and George was our cook. His recipe for fall-off-the-bone Bar-B-Que chicken was to die for. We Coastal members used to say every trip was an adventure and we rode the rails on our stomachs. We always ate well, and the tradition continued when Bill Powers joined the group – but that is a story for another time. George's own daughter, Marsha, helped out at shows with his merchandise displays and even recruited local high school girls in business classes to help with sales to customers. Together, George and Marsha built a corner module with housing lots on swampland. It is one of the present-day modules anchoring the Coastal Mountain Railroad.

George had a unique sense of humor and he enjoyed shocking people with it. As I recall, it was our second invited trip to display at Boothbay Railway Village and we were to set up in the newly renovated old Chapel building. We had also invited Tim Byrne and Jerry Ross to bring their Rogers Yard to set up with us. We got there first, and Mark Harlow had brought some spare legs we could saw to length since a foot-high stage sat in part of the room. When Jerry and Tim walked in, George told them, quite matter-of-factly, that, we would simply cut their module legs down to size. After their mouths dropped open, we informed them George was kidding and, that we had actually brought materials for that purpose. One had to know George to understand his unconventional sense of humor. George was my friend and I miss him.

While at the Mill City 21 Convention, I met a few other old friends, still with us, who I hadn't seen since the pandemic began. I spoke with Gerry Covino and his lovely wife, Rosemary, who gave a clinic there. I also met Mark and Joannie Harlow for lunch and a chat. Malcolm Houck and I later traded stories of our early memories dealing with coal-fired furnaces for home heating (see Figure 2) before his clinic on O&W steam engines. Like the D&H, the O&W used the slower-

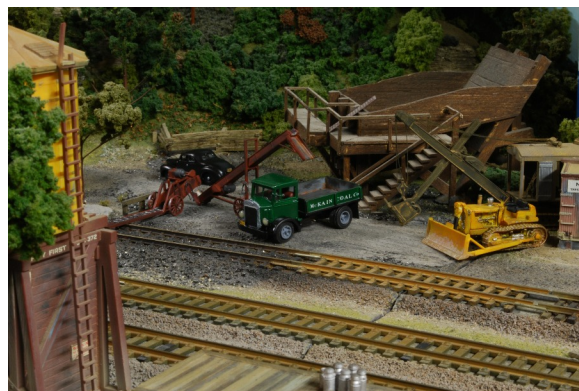


Figure 2: Coal dealer on my diorama

burning anthracite in wide Wooten firebox locomotives with a center cab. Chuck Diljak showed me how to make grab irons for scratch points and gave a clinic on Anthracite Mines in the Wyoming Valley of Pennsylvania. As a D&H fan, this was all near and dear to my heart. My friend Jim Heidt gave an interesting clinic on "Researching Consignees / Shippers for fun and Profit" to add to our operations based on some real-life data. Jim's family actually owned a small railroad serving the port of Ogdensburg after the Rutland shut down.

Also, I made a new acquaintance with Lewis White when I operated on his beautiful Bellows Falls layout at the Convention center itself. The modeling was superb and captured the feel of the steam-to-diesel transition of that location on the Rutland during the early 50s. After my operation session, we just sat and talked about our interests and how the modules came to be as part of an earlier convention effort by several people. Now he virtually sets up and runs the display himself. He also does custom DCC decoder installations with sound. His favorite decoders are the Sound Tracks Tsumani series. Imagine that, a man after my own heart. Anyhow, it was great to meet a kindred spirit in our interests. I'd say it was a successful Convention and I'm glad I went. I've had a little modeling camaraderie for the moment and will get back to my workspace in the basement. I think my next project will be one of those butter dish milk cars I picked up from Funaro and Camerlengo.

Bye for now and if this Covid pandemic settles down a bit perhaps you will see me at our New England Model Train Expo in December.

How I learned to stop worrying and love TrainTech "Phase 3"

(Continued from Page 1)

485 "layout control bus" is two wires connecting my arduinos, each of which have a \$2 TTL-to-RS485 module, to my PC with a \$5 RS485-to-USB converter module in a "daisy chain" configuration. Figure 1 shows my layout electronics diagram. The arduinos connect to the listed layout objects (turnout switch machines, crossing gates, signals, sensors, lights, other automations).

Having conquered the use of arduinos under C/MRI and JMRI (actually not that difficult), and wanting to expand sensor coverage and animations, this year I explored how to do this without running too many more wires, both the wires from objects on the layout to the arduinos (the "object controllers"), and the wires from the arduinos to the computer running JMRI (the RS-485 bus).

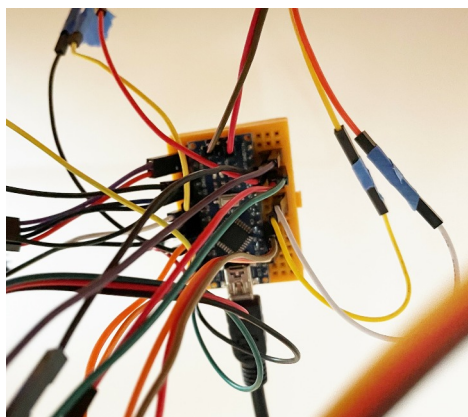


Figure 2: Arduino Connections to Objects on the Layout

I had already been dealing with the first issue by using many arduinos, each one located near the objects it was controlling, rather than having one or two centrally located devices controlling everything as some people do. While I could use a single arduino (\$5 plus the cost of occupancy sensors) to monitor 16 blocks (triple that using an arduino Mega for \$12), I choose instead to have each one monitor two or three and spread them around the layout – still at significantly lower total cost than commercial occupancy sensors (such as the popular Digitrax BDL-168 for \$150). Of course, the trade-off comes in the relative "plug and play" of commercial products versus programming the ardui-

nos. For me, and a growing group of other modelers, that's a trade-off we are willing to make (although there are suppliers, like [Model Railroad Control Systems](#), that provide the programming too).

Solving the second wiring issue, wires from the arduinos to the computer, would require going to some form of wireless communication, either Bluetooth or WiFi. Wireless modules are available for the arduino, along with software to talk to your PC (or Mac) so this was certainly a possibility. As you will see, I went a little further in coming up with a solution.

My Journey Beyond the Arduino

Arduino add-ons (called "shields") providing WiFi or Bluetooth capability are available for a few dollars so definitely within my budget and a viable approach for the next phase of my layout electronics. I also discovered microcontroller modules based on the ESP32 processor from [Expressif Systems](#), compatible with arduino programming, that already include WiFi and Bluetooth capabilities for about the same cost as an arduino+WiFi shield. The ESP32 has two CPUs (which means advanced programmers can program two tasks to run simultaneously), operates at processor speeds up to 10 times the arduino, has almost double the number of I/O pins as most

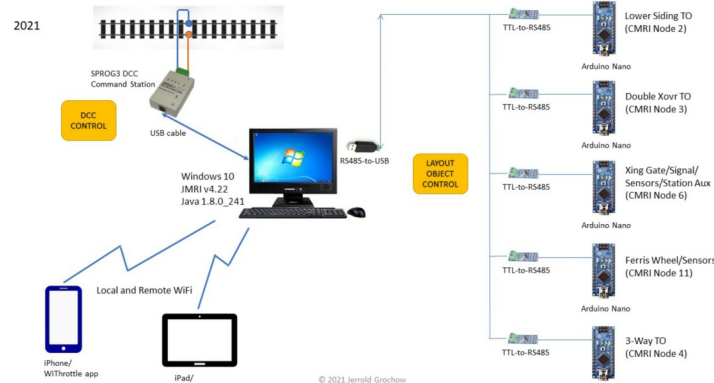


Figure 1: My Layout Electronics

arduinios (making it more flexible than the arduino), and a host of built-in sensors. A price of around \$6 (from China via eBay) made it an easy choice to order a couple.

The ESP32 can be programmed using the same integrated development environment (IDE) as the arduino and use many of the same libraries, as well as some that are specific to the ESP32. This made it relatively easy to convert programs (called "sketches") I'd already written for the arduino. About three-quarters of the code was "reused" by the time I was done.

A Technical Digression...

Since I already had the code for my arduinos to emulate C/MRI nodes over my RS-485 layout control bus, I first tried to port these to the ESP32 and convert them to use WiFi. Adding WiFi to the sketch was easy: just "include" the WiFi library and some initialization code. However, my attempts at using JMRI's C/MRI-over-TCP/IP capability (the protocol used for network connectivity over WiFi) were only partially successful.

JMRI allows you to specify whether you are using C/MRI over a USB port or over WiFi by changing the "System connection" parameter. When using RS-485, all your microcontrollers are connected via the same USB port so you only define a single connection to JMRI. Using the "Network Interface," you specify the IP address for each microcontroller with a separate JMRI connection, as shown in the screen shot in Figure 4.

Taking this approach also meant that the "system name" of each turnout, light, or sensor defined to JMRI would have a "connection prefix" based on which

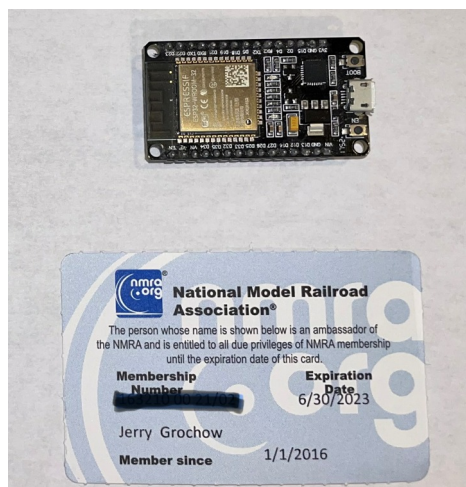


Figure 3: ESP32 Module vs NMRA Membership Card

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How I learned to stop worrying and love TrainTech "Phase 3"

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microcontroller it was connected to (all objects must have a system name but JMRI also allows you to set up more user-friendly "user names" and those can be anything you want). A sensor connected to a wired microcontroller emulating C/MRI Node #6 might have system name CS6001. Using WiFi with multiple C/MRI connections, it would be known as C6S6001. The process you go through to change a system name requires creating new JMRI sensor table entries under the new system names and "moving" the user names from the old ones. It's a little bit of work, but not insurmountable.

The bigger problem was that JMRI didn't want to poll my microcontroller the way it did when they were connected via wires. The C/MRI protocol uses a "leader-follower" approach where the leader (in this case, the computer running JMRI) polls the followers in turn to see if they have anything to report. Under normal operation, JMRI polls each C/MRI connected node multiple times a second starting as soon as sensors controlled by C/MRI are defined to JMRI. What I found, however, was that JMRI wasn't automatically polling until I specifically started it for each different connection. Again, this is not a huge problem, but it's still an annoyance (which is being analyzed by some of the many folks who contribute their skills to maintaining JMRI).

My next attempt was to use direct TCP/IP communications rather than using JMRI's built-in C/MRI capabilities. Rather than using the established C/MRI protocol, I would in effect be designing my own communication protocol to use between JMRI and my layout. This is not a task to be undertaken lightly. This approach required modifying one of the sample programs provided to extend the base JMRI. These programs, called "scripts," are written in Jython, a Java-based variant of Python, that comes with JMRI. While I was able to make this work (in the process designing my own, admittedly not very robust, communications protocol), there was an issue if the microcontroller lost connectivity for some reason, causing

JMRI to generate an error. On the advice of other members of the JMRI community, I abandoned this approach in favor of using another supported communication protocol called [MQTT](#). MQTT uses a "publish-subscribe" approach that is considered more flexible than the leader-follower approach of C/MRI as many devices can subscribe (receive) the same message. This makes it possible to design multiple control panels in large layouts that receive the same messages as the layout object controllers. MQTT support in JMRI is easy to implement and quite robust and is what I am using today.

My Current Layout Control System

So my TrainTech Phase 3 added ESP32s to monitor more block sensors and control lights and animations using the MQTT protocol. I haven't replaced any of the arduinos (yet) but I might in the future. Figure 5 is my layout electronics diagram for this year. It may not seem much different from my previous diagram (Figure 1), but it is miles ahead in terms of possibilities!

Conclusion

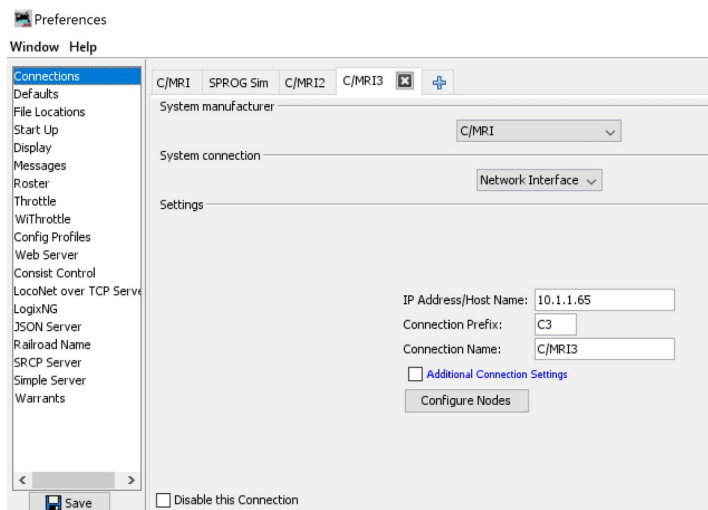


Figure 4: Multiple C/MRI with TCP/IP Connections to JMRI

Control of layout objects such as turnouts, signals, lights, and animations is a key component of many model railroads. Many approaches to developing a layout control system have been created over the past 20 years (C/MRI is over 20 years old and MQTT about the same) and most are still actively evolving. I implemented mine at the right price point (low) but it required some experimentation and programming. Others may find it more expedient to buy one or more of the many commercial layout control products on the market (with more coming every year). To me, getting "hands-on" with TrainTech is as much a part of model railroading as layout planning, scenery building, and a dozen other aspects of the world's greatest hobby. Whether this is your primary interest or just a necessary evil, TrainTech is driving our railroads into the future and I, for one, can't wait to see what that future brings.

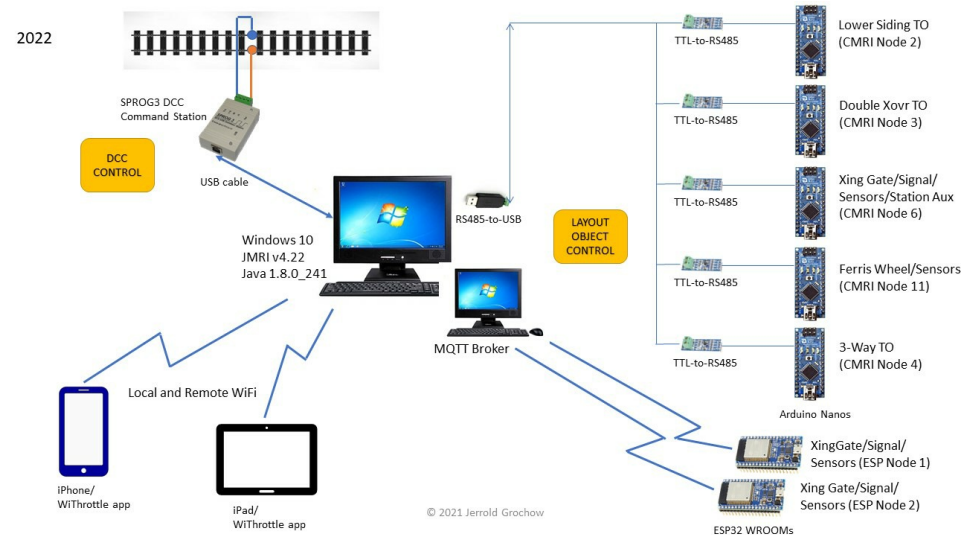


Figure 5: Phase 3 Expanded Layout Electronics

Summer '21

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Crossing Wyoming was the first real opportunity to encounter and see trains. We caught several BNSF drags, coal and mixed freight from the highway as we headed west out of the Black Hills, SD.



In Thermopolis, WY, we stopped to check out the hot springs that were also conveniently located to grab some shots of a mixed freight following the Bighorn River north towards Billings, MT.



After central Wyoming there wasn't much more to see, being in Yellowstone & Jackson Hole and headed south. When we hit Grand Junction, CO, we found what appeared to be a graveyard of UP Dash 9's, likely put out to pasture due to their carbon emission rates.



Heading further south, we swung through Silverton, on our way to Durango where, in addition to the narrow-gauge equipment, we spotted a house built from two standard-gauge cabooses! Of course, we proceeded to ride the Durango and Silverton as far as Cascade Station and back, which was still a five-hour trip. While narrow-gauge of course refers to the spacing of the track; if you've never been, you should not under-estimate how NARROW the D&SNGR right-of-way is; the phrase "keep your hands and head inside the train car" takes on new meaning on this ride!



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Summer '21

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Turning east, we saw a few random rail cars along the way before arriving in the greater Denver area. Since the Georgetown Loop Railroad was a mere hour from where we were staying, and not the 3/4 day investment of D&SNGR, we of course decided to hop the hour-long ride out and back from Georgetown. While it was a bit damp, we were only a few cars behind locomotive 111 (the only running steam that day) and really got to experience it working the grade! The Georgetown trestle is impressive, and it is a fun, short ride (at a mere 9,000'+).



Crossing Kansas, and even into the Midwest, we didn't see much more in the way of trains (I-70 as far as Columbus, OH). While biking in the Cuyahoga Valley National Park, OH, we did see the Cuyahoga Valley Scenic Railroad pass through with FPA-14 #6771 on the head. Unfortunately, the bike & ride schedule



didn't work in our favor so a quick pass in Boston Mills was all we got.

After that, crossing the southern tier of New York is a bit lacking in trains and then we were home again in eastern Mass.

Erich's Electronics Notebook

By Erich Whitney

Which Resistor Value?

As we begin to get more active, in what I hope is a slow but steady return to something resembling normal, I'm finding that I have so many projects I want to work on but there just never seems to be enough time. I am going to shift the focus of this column to a collection of topics that aren't large projects but hopefully answer questions that some of you may have. As always, I'd love it if you'd send me questions.

The other day, I fell victim to an email advertisement from one of my electronics suppliers. This email inspired two ideas for topics to write about, the first one being this column about a handy resistor substitution board and in my next column, I'm going to do a deep dive about how I buy electronics components, where I get them, and why.

The product I want to tell you about is the "36837 RS" Resistor Substitution Board from Marlin P. Jones (<https://www.mpja.com/Resistor-Subststution-Board-01-Ohm-99999999-Ohms/productinfo/36837+RS/>), \$6.95 at the time I am writing this, see Figure 1. This is a very simple board that has 72 surface-mount resistors, 80 jumper positions, and a screw terminal block. The jumpers let you select a resistor value from 0.1 ohms to 9,999,999.9 ohms. As shown in the picture, all the jumpers are set to zero so the resistance at the screw terminal would be a dead-short. This is probably not what you want. Think of each column of jumpers as a digit in the value of the resistance. Figure 2 shows a close-up of the jumpers. Each column has 10 jumpers, marked 0-9. At the top of each column is the resistor multiplier (0.1, 1, 10, 100, 10K, 100K, 1M). By placing the jumpers in the correct position, you can program any value in the range, 0.1 to 9,999,999.9 ohms, seven places to the left of the decimal point and one place to the right of the decimal point.

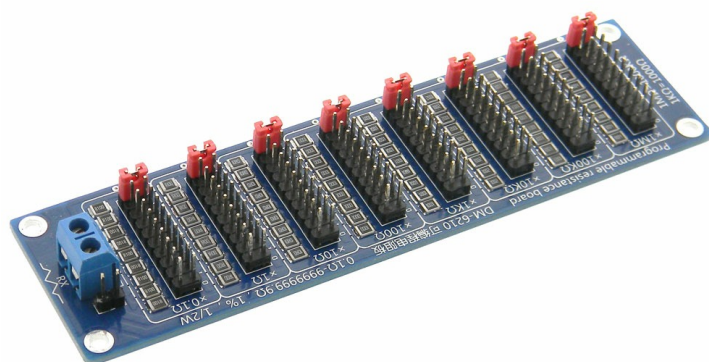


Figure 1: Marlin P. Jones Resistor Substitution Board (image from mpja.com)

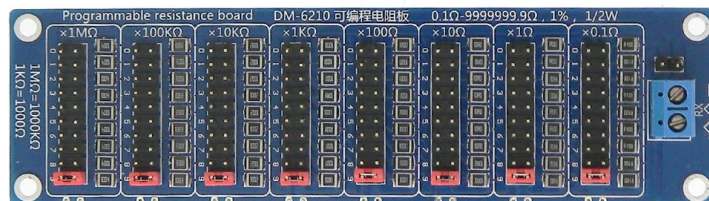


Figure 2: Close-up of jumpers (image from mpja.com)

At this point, you might be asking why you would use one of these. This board is a very small version of an old-time tool called a Decade Resistor Box (see Figure 3). The term decade comes from the fact that each control is a factor of ten. There are many different types of these boxes with different ranges of resistance and different power capacity for a variety of applications. Traditional decade boxes like the one shown are considerably more expensive than \$6.95.

The application relevant to model railroading that caught my eye when I saw the advertisement is for selecting a resistor value for an LED to get the brightness I want. In a previous column I talked about how to go about calculating the series current-limiting resistor for LEDs. What my resistor calculations don't tell you is how the LED will look with a given resistor.



Figure 3: A Traditional Decade Box (image from google.com)

LED brightness varies quite a bit for any two of the same color and even more between different colors. White and blue LEDs tend to be very bright at a modest amount of current while older red LEDs can be very dim at that same amount of current. You can certainly adjust the overall brightness of your LEDs by varying the power supply voltage but if you have many LEDs connected to the same power supply, you need to use the current-limiting resistor to adjust the brightness. I don't want to go off on a tangent about LEDs again, but just remember that these little devices are non-linear which means they turn on at some small amount of current and while increasing the current will make them brighter, don't assume that if you double the current you double the brightness (hence, non-linear).

You can certainly get a variety pack of resistors and try them until you get something that works. But that can be time consuming and a little frustrating. With this simple resistor substitution board, you can set the jumpers to a value close to what your LED calculations tell you it should be, then adjust the value up or down depending on how you like the brightness.

All you need to do this is:

- 1) A DC power supply, either variable or fixed.
- 2) The resistor substitution board
- 3) A collection of candidate LEDs for your application
- 4) A small amount of hook-up wire

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Erich's Electronic Notebook

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You can use a battery or a power pack or whatever you have. Just remember to use the same voltage for your test that the LED will be connected to in the application for which you're testing. For example, if you want to test an LED that you're planning on connecting to a decoder, either measure the LED output voltage on the decoder (usually about 12 volts) or you can simply bring out a pair of LED wires from the decoder and connect it up to your DCC system, turn on that LED function output and use that as your power supply. I prefer to use a variable output bench supply and set it to the voltage that I measured on the decoder. Figure 4 shows this simple test setup using a 12V bench supply, the resistor substitution board, and an LED. Figure 5 shows how to identify the leads of a discrete LED. There are a few clues used but at least one of the following features will help you identify which lead is which. The negative lead is on the side that's flat, it's shorter, and if you see inside the plastic, the inside metal is larger. If you're trying to use surface mount LEDs, my best advice is to get yourself a meter that has an LED test feature. Most digital meters have this, and the LED will light very dimly when connected correctly. The positive lead of the meter will be the positive side of the LED.

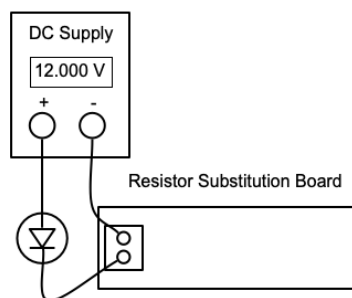


Figure 4: Test setup for LEDs

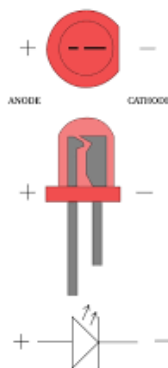


Figure 5 Discrete LED polarity
(image from google.com)

To review the calculation for a good starting value for the resistor, do the following. If you can get the specification for the LED, it should tell you two things, the forward voltage, and the forward current. Let's say these are 1 volt and 10 milliamps respectively. If using this LED with a 12-volt power supply, the resistor value would be:

$$R = \frac{V_{\text{supply}} - V_{\text{forward}}}{I_{\text{forward}}} = \frac{12 - 1}{0.01} = 1,100 \text{ ohms}$$

If you only know the forward current of the LED, you can just use the supply voltage:

$$R = \frac{V_{\text{supply}}}{I_{\text{forward}}} = \frac{12}{0.01} = 1,200 \text{ ohms}$$

And if you don't know either of these values, just use 10 milliamps as a guess and play with the resistor value. Here's an easy-to-use online calculator that Jeff Gerow pointed out to me:

<https://www.hobby-hour.com/electronics/ledcalc.php>. The nice thing about this calculator is that it finds the nearest standard resistor value available. That is one thing about using the resistor substitution board — you can select a resistor value but you may not be able to find one that's readily available. When you go to order your resistors, you can see which value is closest to the value you chose and then you can test that value to decide if you want to go up or down to the next available resistor.

One final comment on using the resistor substitution board that I want to mention again. By default, if you leave all the resistors in the default "0" position, the resistance will be zero! Do NOT start with this because your LED will burn out long before you've realized your mistake and it will be useless. You can also set the resistor value to 2,200 ohms to start and just about any LED will light at 12 volts with this value. I find that depending on the supply voltage and the LED color, typical resistor values between 100 ohms and 2,200 ohms are common.

I hope you found this interesting and maybe even useful. At the risk of sounding like a broken record, please send me questions you may have about electronics and model railroading and I'll do my best to answer them in a future column. Until next time, high green!



An In-Person NER Convention Actually Happened!

By Bill Barry

Well, we had an in-person convention with roughly 180 registrants and about 250 total attendees. After a year-and-a-half of dealing with the pandemic and adapting to Zoom calls and face masks, it was nice to see our fellow model railroaders in-person. It felt a little surreal to be sitting in a room full of people and enjoying a meal without a face mask. Something that was possible thanks to our fully-vaccinated attendees.

This year's contest room was filled with many models and photos showing everyone's handiwork while in lockdown. I'll put together some info for the next issue, but I'll give a hint that one person who did well has a last name that rhymes with "Hawk."

(Continued on Page 11)

HUB Holiday Party

Saturday, January 8, 2022

Happy Hour from 6:00 PM to 7:00 PM (Hors d'oeuvres and cash bar with waitress service)
 Dinner at 7:00 PM
 Yankee Swap at 8:00 PM (or shortly thereafter)

The Common Market Restaurants
 97 Willard Street
 Quincy, MA 02169
 (617) 773-9532

www.commonmarketrestaurants.com

Price: \$45 per person.
 Reservations only, no walk-ins.
 Dress appropriately (no denims).
 No reservations after January 6.

Bring a gift worth at least \$15 to participate in the Yankee Swap.
 Railroad hobby-related gift preferred.

Appetizers:

Scallops and bacon
 Spring rolls
 Coconut chicken
 Shrimp cocktail
 Cheese and crackers

Entrees:

Roast Sirloin with horseradish sauce
 Roast Turkey with cranberry relish
 Shrimp Scampi

Included:

Caesar Salad
 Seasonal Vegetables
 Rice of the Day
 Dinner Rolls
 Coffee and Tea station

Dessert:

Cookie and Brownie Tray
 Assorted French Pastries
 Coffee and Tea Station

Please let us know if you have any allergies or dietary restrictions.

Please Note: The *ad hoc* HUB Holiday Party Planning Committee is always looking for venues in new and different locations. Please contact Michael Tylick, MMR (michael@raildesignservices.com) if you have any suggestions for future parties.

HUB Holiday Party 2022 - Let's Get Together!

By Michael Tylick, MMR,
 HUB Holiday Planning Committee Chairman

Now that we are on our way back to a more normal life, the HUB Party Planning Committee is pleased to announce this season's HUB Holiday Party. As is our tradition, the party will be held on the first Saturday after New Year's – January 8, 2022. Once again, it will be held at the popular Common Market Restaurants. (97 Willard Street, Quincy, MA 02169, (617) 773-9532). There is ample parking at the rear of the building and across the street. The festivities will commence at 6:00 PM with hors d'oeuvres and cocktails, and dinner will begin at about 7:00 PM. In order to attend, you must register in advance.

We are planning to offer the carving station and French pastry buffet that were so well received at our last party two years ago. A ticket this year is \$45 a person, a reasonable price for a three-course meal and a fun-filled evening with friends. If you have any allergies or dietary restrictions please let us know on your ticket form. The Common Market will be happy to accommodate you if reasonably possible. The advance notice will help them do so.

While we are planning to keep Santa Pete's traditional Yankee Swap, we are trying something new this year. It has been suggested that we allow more casual dress requirements. In keeping with this more relaxed festive mood, we are encouraging partygoers to don their ugly holiday sweaters for us all to enjoy. If you would like to participate in our Yankee Swap, a suggested price for a gift is at least \$15.

We look forward to seeing you there!!!

The HUB Party Planning Committee

HUB Holiday Party Registration Form

Name: _____

In case of inclement weather, please provide your email and/or phone number where we will be best able to reach you.

Email: _____

Phone: _____

Number Attending: _____ x \$45.00 = _____

Please make check payable to: The HUB Division, Inc.

Mail to:
 The HUB Division, Inc.
 P.O. Box 672
 Hollis, NH 03049-0672

To purchase using your credit card, email Treasurer@hubdiv.org and an invoice will be sent to you.

Fall Layout Tour and Open Houses

November 6, 2021 (Sat): The North Shore Model Railroad Club's Flea Market (Sat), Taunton, MA, www.nsmrc.org

November 26-November 28, 2021 (Fri-Sun): Annual "Tour de Chooch" layout tour, Southern NH, Northeastern MA, www.tourdechooch.org

December 2021 TBD (Sat): The Providence Northern Model Railroad Club Open House, Warwick, RI (Club is also open most Saturdays 12-4.) www.providencenorthern.com

Note: These are presented here for the benefit of members. If you belong to a club and want to promote your open house or show, please email editor@hubdiv.org

HUB Headlight

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November - December, 2021

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Headlight Printers

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An In-Person NER Convention Actually Happened!

(Continued from Page 10)

HUB life member and silent action contribution manager Peter Higgins out-did himself with a huge spread of prizes including some pretty sweet ones from our model railroading industry friends. A listing of contributors can be found on the convention website.

Though I presented a clinic and helped judge the photo contest, I was still able to attend three operating sessions, each a different scale, N on Friday, On30 on Saturday and Fn3 (1:20.3) on Monday. I enjoyed meeting with old friends at



the Friday welcome reception, attended some interesting clinics and had some filling banquet meals at the Sunday evening banquet and Monday morning awards breakfast.

At the banquet, Dick Towle was the last-man-standing when John Doehring had everyone stand and then asked those that had been NMRA members for less than 15 years to sit down, then 20, 25, 30, 35, 40, 45, 50. At that point only Dick was standing and he then announced he'd been a member for 63 years. Far surpassing anyone else in the room. A past NER president and most recently Convention Chairman for the Palmer, MA convention, he was hosting large NER conventions decades before I was even born, but I'm just a youngster in the group at age 50.



Stan Ames accepts the Keith Shoneman award from Dave Insley during the Awards Breakfast.

I hope you were able to join us for the convention, but if not, it's less than a year until we can all meet again at The Connecticut Yankee convention in Windsor, CT, from September 15 to 18, 2022.

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

Please see the [September-October 2021 Headlight](#) for all order forms and module kit information along with information about the online HUB Branded Merchandise store.

HUB Division Calendar of Events

(Subject to Change)

2021

- Nov 19 (Fri) HUB RAILFUN Meeting, 8 PM, Motherbrook Arts and Community Center, 123 High St, Dedham, MA 02026
- Nov 19 (Fri) Submissions deadline for the HUB *Headlight* Jan-Feb issue
- Nov 20 (Sat) HUB's Museum of Science display opens for season - Open daily until January 17, 2022
- Nov 20-21 (Sat-Sun) HUB Modular Railroad display at the Greenberg's Toy & Train Show, Shriner's Auditorium, Wilmington, MA
- Dec 4-5 (Sat-Sun) The HUB-sponsored New England Model Train EXPO at the Best Western Royal Plaza Trade Center, Marlborough, MA

2022

- Jan 8 (Sat) HUB Holiday Party at the Common Market, Quincy, MA
- Jan 15-17 (Sat-Mon) HUB Modular Railroad display at the Wenham Museum, Wenham, MA
- Jan 21 (Fri) HUB RAILFUN Meeting, 8 PM, Refer to future *Headlight* and website for location
- Jan 29-30 (Sat-Sun) HUB Modular Railroad display at the Amherst Railway Society's Railroad Hobby Show, Big-E Fairgrounds, West Springfield, MA

RAILFUN.....



NO MOTIONS.....

NO SECONDS.....

NO BUSINESS.....

NO YAWNS.....