

HUB Headlight

HUB Division Inc., Northeastern Region, National Model Railroad Association - www.hubdiv.org
Volume 39, Number 2, November - December, 2022

RAILFUN TIMETABLE

Presentation: Lighting the way with LED's

By David "Shack" Haralambou

**8 PM Friday, November 18, 2022, Motherbrook Arts
and Community Center, 123 High St, Dedham, MA 02026**

This month we will cover LED's. What are they? Why are they different from normal bulbs? How do I use them? At the end of the night you will be experts on how to use LED's in many different applications from streetlights to lighted houses, locomotives and rolling stock applications. Let's get ready to be enlightened!

Hands-On: Rolling Stock Tune-Up

By Mike Tylick, MMR; and Peter Watson, MMR

**8 PM Friday, January 20, 2023, Motherbrook Arts
and Community Center, 123 High St, Dedham, MA 02026**

This meeting falls one week before our HUB Modular Display in Amherst on Saturday, January 28th to Sunday, January 29th. In an effort to hop onboard and make the Big E Show a trouble-free exhibition, we are encouraging our members to bring their rolling stock in for our annual tune-up event. We will be on-hand to demonstrate the proper way to fix dragging coupler pins, re-gauge rolling stock, and top the cars off with a little weight. There will be an ample supply of weights so that your rolling stock will meet the NMRA standards. So, bring along your rolling stock, tool kits, standard gauges, new wheel sets and a portable post office scale if you have one. We will also explain when and why the modular group uses wheel resistors for our signaling system and will have them for sale at the meeting.

Presentation: How I Got My MMR

By Malcolm Houck, MMR

**8 PM Friday, February 17, 2023, Motherbrook Arts
and Community Center, 123 High St, Dedham, MA 02026**

My efforts to obtain my Master Model Railroader (MMR) began at the RAILFUN "What I did last summer" when I decided to show off two NYO&W scratch-built HO-scale locomotives that I'd finished over the warm months. After the meeting, Pete Watson, MMR, and Andy Reynolds suggested that my demonstrated skills were of high accomplishment, and since I had been model building for so many years it was likely that many MMR AP category requirements were already completed. It was then a matter of sorting out models and completing some submissions.

For this RAILFUN session, I will explain the process to achieving my MMR including tips on completing the necessary paperwork. My modeling has received high marks at many of the conventions that I have attended since that clinic at the Cambridge School of Weston, and I just won the Best-In-Show Baldwin Trophy Award at the September 2022 NER Convention. I look forward to sharing my experience.

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.

Gateway 2022 - Part 1

By Jeff Gerow

I was excited that this year's National was to be in St. Louis, as it's such a great city to visit and I'd had a wonderful time at the last St. Louis convention (in 2001). There's a lot of railroading in and around St. Louis. My wife, Susan [recently more-or-less retired], was able to join me – so I was looking forward to the convention as well as the road trip there and back. I try to find something interesting to do each day we're on the road – and I don't like to spend too much time in the car each day, so the trip looked to be just under three weeks with six days in St. Louis.

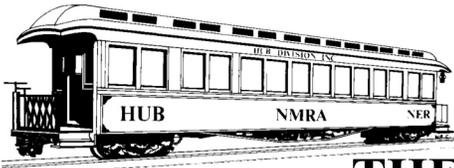


Our first stop was in southern New York near Binghamton, as we planned to visit the Corning Glass Museum the next day. What a wonderful museum with great displays of glass ranging from historical to artistic, including demonstrations of glass-work – in our case, glass blowing and shaping a vase.

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THE PRESIDENT'S CAR

By Manny Escobar

We have had a busy start to the model railroading year. This installment of President's Car will be focused on our coming events and volunteering efforts in support of our organization.

The September and October RAILFUN sessions got us off to a good start and **Andy Reynolds**, our RAILFUN Coordinator, has a great schedule coming up. Please check the *Headlight* and website calendar of events for the particulars. Please join us at the November RAILFUN to get inspired to do projects at home over the upcoming winter days. Also, if you have an idea or can recommend a topic / lecture, please contact Andy Reynolds at railfun.coordinator@hubdiv.org.

We have also done several modular events in Norwood and Boxborough. **Robert Collins**, our new Modular Coordinator, has done a great job. We have additional modular events coming up, so please check our website www.hubdiv.org and *Headlight* calendar for upcoming shows.

The Boston Museum of Science and the HUB Division will again present a seasonal train display at the museum, as we have done for the past several holiday seasons. The display will be in the same space as the past couple of years and updated with scenery changes. Check your email on how to volunteer and enjoy the holidays with trains.

Do not forget about our "New England Model Train Expo," December 3-4, 2022, at the Best Western Royal Plaza Trade Center, Marlborough, MA. We need support from our members, so please contact **John Russo**, the show chair, for details about volunteering. Remember, this is our "Show" and fundraiser, so please help.

Another event is the Tour de Chooch self-guided tour of home and club layouts, November 25-27, 2022, (Fri-Sun), check our website calendar for further information. Also, **Bruce Robinson** will be planning an operation weekend in 2023. The tentative name of the event is *HUB High Green* and the target date is May 5-7, 2023.

A couple more events being planned include: Spring TRAINing, April 22, 2023, in Manchester by the Sea, MA, with our annual meeting and finally, in June 2023, the Conway Scenic Dinner Excursion.

The month of November is "Model Railroad Month" where we promote our hobby that we love and show off to co-workers, friends and family. Bring a train to work or bring a friend to see a show, display, a club or your own layout. I have not seen any word or promotional on this in the past 5-6 years, but I still believe in it, so go spread the word about what a great hobby we have for all. Please introduce these new trains enthusiasts to our membership chairperson, **Peter Higgins**, for that special deal when joining NMRA-NER in the HUB Division.

Our Holiday Dinner event will be Saturday, January 7th, 2023. Once again, it will be held at the Common Market Restaurant, 97 Willard Street, Quincy, MA 02169. Check inside this *Headlight* for reservation details and menu. Remember to bring a gift for our traditional "Yankee Swap" after dinner.

Don't forget to explore the HUB Division's "Facebook" and "Twitter" pages. But more important is our own two-way communication via the Google mailing list. It's a great way to stay in touch with our members. Please contact our Office Manager, **Pete Watson, MMR**, at officemanager@hubdiv.org to be activated on the mailing list.

By the time you get this edition of *Headlight*, you will have received an email from me conducting a survey to collect information about what you are interested in and what you are willing to do to help with important job positions needing volunteers. Your thoughts on the matter will be invaluable to us and your volunteer help is needed.

If you are interested in running for the Board of Director position in the upcoming election in Spring 2023, please contact Pete Watson, Malcolm Houck or Bruce Robinson for details on placing your name on the slate for the election. The deadline is December 1, 2022.

Have a wonderful holiday season and New Year! Stay safe and healthy.

"Keep 'Em Rolling"

New Members

The HUB Division welcomes the following new members

- Christen Amenta, Shrewsbury
- Sabastian Amenta, Shrewsbury
- Dana Brown, Waban
- Joseph Comuzzi, Groton
- James Gray, Middleboro

HUB HIGH GREEN! An operations themed weekend! May 5 - 7, 2023



You have a clear track ahead for a weekend of model railroad operations on multiple layouts, joining operators from near and far.

Operating sessions Friday, Saturday and Sunday.

Operate on N-scale, HO-scale, O-scale and Fn3-scale layouts.

Diner/breakfast gathering.

Visit www.hubdiv.org for information



Shanty Talk: Guest Columnist

By Rudy Slovacek

Rudy has generated this column in nearly every *Headlight* issue since about 2005. He is enjoying a well deserved break and Malcolm Houck is taking the reins for this issue.

Through a Magnifying Glass

By Malcolm Houck

All railroads have certain “Yankee” thrift... “Use it up, wear it out, make do or do without...” and that often governs the decisions what must be done with equipment that no longer has revenue producing value. As recyclers from the very beginning of the industry, worn out materials and equipment of iron and steel easily went to scrap and “back-to-the-furnaces.” Worn out wrought iron rail went to scrap and returned as 60# steel rail. Heavier equipment and traffic demanded that 60# rail be replaced with 80#, then 120# rail and so on.

The frenzy to change motive power from steam to diesel resulted in massive scraping campaigns everywhere; and, by-the-way, it takes some steel to make new steel. Liquid iron from a blast furnace to, first a Bessemer Converter, then an Open hearth Furnace, and now in current practice, a Basic Oxygen Furnace is only about 60% of the loaded “burden.” The rest being scrap (from various sources).

Iron and steel recycling is easy, especially today. About one-half of the steel produced in this country now comes from so-called “Mini-Mills” using electric melt furnaces that are charged primarily with scrap. Other ingredients are largely used to regulate and cool the temperature of the “melt” as needed, or to provide a desired alloy.



The NYO&W used its Hand Derrick No. HD 5 primarily for moving about freight-truck parts and wheelsets at a derailment site. Trailing is a flat car with completely assembled trucks and wheelsets. On an adjacent track is an Industrial Brownhoist heavy steam derrick and a Harlan & Hollingsworth wood coach now used as a crew car for the wreck crews.

Other former revenue-producing equipment is a different story. Short-line railroads were a traditional source of purchasers of superannated equipment, but not all older equipment could be so disposed. Immediate local needs were another assignment for such surplus -- wooden-bodied passenger cars in particular. Coaches were often assigned to wreck outfits when clean-up equipment was rail borne and was primarily the duty of the line on which a wreck accident occurred. Such wreck equipment is usually now largely over-the-road equipment provide by independent contractors.

Baggage cars, railway postal cars and any number of flat cars traditionally made up wreck outfits. Rail-borne derricks, ditchers and excavators usually have their own frame-truck-coupler-air brake suite, but other equipment and supplies were often re-purposed former revenue equipment. For modelers, company service and wreck outfits are a perfect place to make use of old flat cars or wooden-bodied passenger cars. Recognizing that layout space is often at a premium for stored equipment not regularly engaged in operation, Wreck train outfits are largely 3-D scenic or backdrop enhancements. They can be an interesting “Special” movement during an operating session (without the need to actually damage or destroy operating models).

While many aspects of railroad operation can only be suggested or implied, the modeling of company service or wreck equipment can be a pleasant diversion from other model building efforts. Some of this equipment, such as derricks, ditchers and excavators need not be fully operational, but only suitable for that occasional run-about during operations. Try this out... a small wrecker outfit or M.O.W. outfit may only need a siding, and even a siding to be shared on a layout with the caboose track.



NYO&W Ditcher at Roscoe, New York. Behind flat car FR-1 is a re-purposed tender cistern from a retired steam engine on another flat car and now serving as the water cistern for the steam ditcher. Ahead is another flat car with the boom and clamshell bucket for installation at a work site.

Gateway 2022 - Part 1

(Continued from Page 1)



Corning Glass

That night we slept in a caboose! Titusville, PA is not only the home of the Caboose Motel, but also the site of the first oil well in the US. We visited the reconstructed well site earlier than it was officially open – but the operator was starting up the steam engine and loved to have people to talk with [not to mention being able to see him start it up]. We found out that the real boon that Edwin Drake achieved with that well was the first use of casing for the well shaft – which led to many wells in the area in just a few years.



Starting up the steam engine for Drake's well

On our way through Ohio, we stopped by Coshocton and took an Ohio and Erie Canal ride on the *Monticello III*. The horse team, Tim and Deisel, pulled us down the canal while the Captain related “tall tales and history” about the canal and the area.



Our Caboose at the Caboose Motel



The Monticello III canal boat

That night we stayed in Dayton, OH, to be near the National Museum for the Air Force the next day. That museum is a must see if you're ever in the area. It is huge – multiple galleries ranging from Early Flight to Space. We had a docent-led tour of “Space, Research & Development, Global Reach and Presidential Galleries,” which I'd highly recommend. We saw and heard about several “X” aircraft, including the well-known X-15; as well as an Apollo Capsule that had returned from space (with Air Force personnel on board – it is the Air Force Museum, after all); and three planes that had served as “Air Force 1.” I was astounded how large the Reaper Drone is and how small Sputnik is.



Sputnik at the National Museum for the Air Force

Our last driving day took us across Illinois, where we had one “large” stop. A guy in the town of Casey decided to give his hometown a new lease on life after manufacturing left by creating “giant” things to entice tourists off I 70. He has a drilling business with access to a lot of used (and new) pipe so he started by building the world's largest wind chime (really, a Guinness official



World's largest wind chime

record). He didn't stop there, or use just pipe, in creating many very large and some record-breaking works, including the World's Largest Post Box, Golf Tee, Wooden Shoes, Rocking Chair, Barber Pole, Pencil and several others.

We arrived in downtown St. Louis on Sunday, staying in the convention hotel, the Marriott St. Louis Grand. I can't emphasize enough the value of being in the center of a city for a convention. It's so nice to be able to walk around downtown – especially St. Louis where there's an Arch! Plus, the city architecture is so wonderfully varied to reward the walker around every corner.



City view from a restaurant where we ate

We were off on our first bus trip on Monday morning to The National Museum of Transportation with its more than 70 locomotives, the “most complete collection of American rail power in the world.” We were led around the train yard to hear stories about the locomotives parked there and then into the large pavilion with the more protected exhibits, like the General Motors FT demonstrator 103 from 1939. On our own, we wandered around the yards to visit a Zephyr, Big Boy 4006, a Boston & Providence Railroad 1830's coach, and even the Aerotrain, as well as cars, trucks and even steamrollers! It is a quite a Museum of Transportation!

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Rock Island Aerotrain

Gateway 2022 - Part 1

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GM 1939 FT demonstrator number 103



Boston & Providence Rail Road 1830's coach

That afternoon we did our first self-driving layout tour. I have to say, it is a lot more fun to be almost alone in a layout with the owner than with 20-40 other model railroaders from the bus, but it does mean driving in a strange city – thank goodness for GPS. The layouts were grouped by area/day but not in any order, so I entered them into Google Maps and figured an order for easy rides to the next layout. We only made it to four of the six layouts available since we started a bit late, but we saw wonderful layouts and had great discussions with the builders.



Jim Knight's N-Scale "My Dream Layout Continues"

Tuesday we went to Amsted Rail. I had no idea who they were before this visit but now I look for their trademark octagon on railroad trucks (and found a few on the trip). It turns out that they make every-



Amsted Rail's main sign and truck on display

thing that exists under a freight car as well as for many passenger cars. They didn't want any pictures taken but the huge facility was very impressive as well as the products that we could see.

Afterwards, we walked downtown from the hotel and found a great rooftop restaurant with views of downtown and the Arch. Then we visited the series of parks coming out from the Arch, starting with the Old Court House, closed while being renovated. In front of the Court House is



The "Big Suit" sculpture in Citygarden Park

a park with fountains and a statue "The Runner." Then comes Citygarden and Serra, both sculpture parks with very interesting art. But really, the greatest part is just walking around St. Louis as the architecture is fabulous.

Wednesday, we went on our second driving layout tour, and since we started on time, we were able to visit all five layouts. We're really glad we did as the last one, Richard Rands' Mineral & Southfork Railway, was really stunning. Not that the other four were slackers, we saw five really great layouts and were able to chat with the owners and some other visitors.

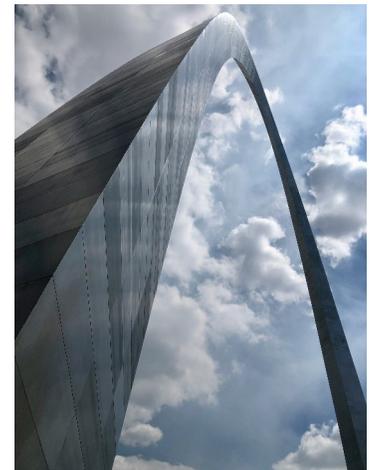


Richard Rands' stunning HO-scale layout



"The Runner" sculpture in Kiener Plaza Park

That afternoon we walked down to the Arch and its Museum. We weren't too excited about being in the tiny elevator capsules that go to the top of the Arch but there is a stern-wheeled paddleboat that does a tour of the Mississippi from the Arch. So, after taking the necessary Arch pictures, we traveled on the river under those bridges – especially the Eads Bridge from 1857 – and alongside the barges and other river going vessels. The museum under the Arch has recently been renovated (since my last visit) and is a great introduction to America's western expansion and St. Louis, as well as telling the story of the Arch.



Looking up at the arch from its museum



Eads Bridge over the mighty Mississippi

In Part 2, I'll cover the rest of the convention, national train show and our trip home.

Kit bashing Swift & Company; Replacing a thirty-year-old mockup

By Bruce Robinson

The city of Portsmouth on the Valley Junction Railroad has been “graced” by several foam core mockups (see Photo 1) over its 30 year existence. Three buildings remained in the quest to replace them with permanent structures: C.H. Moore, A.C. Leather and Swift & Company. Several years ago Walthers introduced their Champion Packing Company kit and one was purchased and set aside until now. The idea was to use the Walter’s kit to kit-bash the Swift & Company building.



Photo 1: This mock up has been in place in Portsmouth for 30 years. It is time for a permanent structure.

The Walthers kit has a two-story boiler plant, a tall chimney with a breaching base and a three-story main plant. Both structures have a multitude of roof additions and an elaborate incline used to walk beef stock from ground level to the top floor of the main plant. Champion Packing is designed to be a slaughter house and Swift & Company is to be a wholesale meat distribution business that would fit into a stepped space on the layout, so some modification was needed. Photo 2 shows the space available with a stepped profile to deal with. Also, Swift & Company was to have a recessed loading area under the upper floors of the structure.



Photo 2: The stepped space was a challenge to the kit-bash process.

Main Plant

Using the four walls of the main plant and some tape, the walls were set in place to see how everything would fit (see Photo 3). As it turned out the boiler plant would fit in the available space with the same cut-out modification.



Photo 3: The kit walls were taped together to see how things would fit.

The next step in the process was to make two templates (see Photo 4), one for each end using the kit walls traced onto thin cardboard. The rear cutout is to fit the stepped space and the left cutout is sized for the loading dock to allow spotting of refrigerator cars under the building.

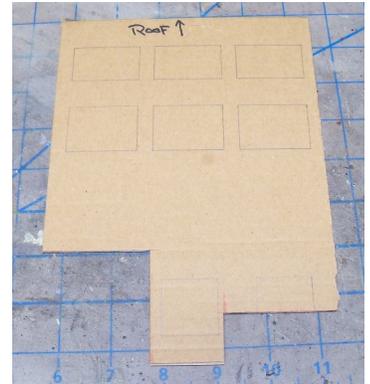


Photo 4: Right end wall template traced from kit wall. Left end template was similar.

Walther’s structure kits use a hard plastic, making the tried-and-true method of score and snap difficult to use. The saw and course file came to be a better method of making the cuts. In this kit-bash most of the cut wall sections are not visible in the finished building. Unused door and wall openings were covered with scraps of .040” styrene.



Photo 5: The wall parts were cut out using the scraps of .040” styrene templates



Photo 6: The wall sections for the main plant were cut out and ready for painting and assembly.

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Kit bashing Swift & Company; Replacing a thirty-year-old mockup

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The front wall was cut in two pieces to form the recessed loading door section and the upper two-floor section as shown in Photo 7. The four walls of the main plant were assembled and the vertical supports for the overhanging upper floors were built (see Photo 8). Note how the support columns were spaced to fall in line with the building wall pilasters. A shadow box was constructed behind the left loading door to add depth and animation to the structure. Hanging meat included in the Walther's kit was painted and hung from the included overhead track.



Photo 7



Photo 8

The main plant roof was assembled, the roof top components spray-painted gray and a wood walkway was added between the roof access door and the base of the water tank ladder. A ballasted roof would be added after final assembly as shown in Photo 9.

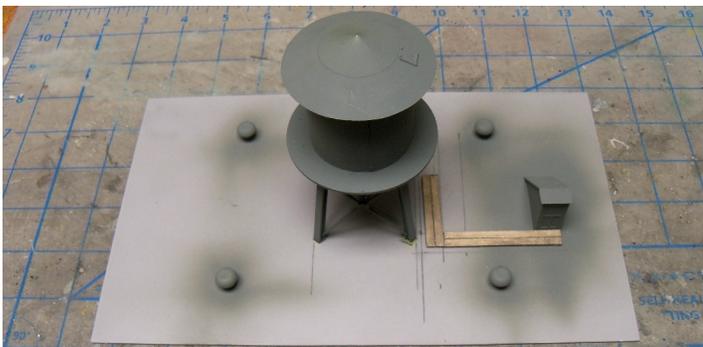


Photo 9 Main plant roof

Boiler Plant

The boiler plant end walls were notched to fit the stepped space, spray-painted a brick red color, the trim cornices were painted a concrete color and the roof was assembled. The cooling tower supplied in the kit does not include the cooling fan or grating showing only a large gaping hole. A piece of screen wire was cut to fit and glued into place as a covering to hide the hole (see Photo 10). A roof access hatch and wood walkway were added. Like the main plant roof, a ballasted roof was added after final assembly. The chimney included in the kit was assembled and positioned against the left wall of the boiler plant as shown in Photo 11.



Photo 10

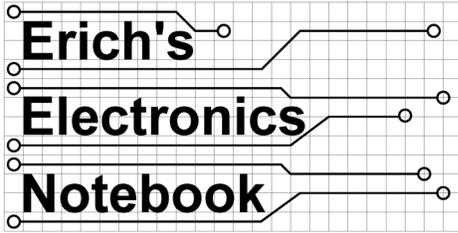


Photo 11

The Swift & Company building is completed and installed

Final assembly included ballasting the roofs, lighting the interiors, adding the sign and weathering using powered chalks. Some touch-up scenery around the base of the structure with ground foam "anchored" the structure into the existing scenery. Just after the last photo was taken the next operating session took place. The Portsmouth yard master pulled the out-going empty Swift reefer and spotted the new inbound loaded reefers as if the building had been in place for 30 years.





By Erich Whitney

Crossing Gate Project - Part 4

Introduction

In this issue, we're going to look at the software used to operate my crossing gate controller. Instead of trying to include the actual code in this article, the code is available on the HUB Division website and you can download it if you want to see it (https://hubdiv.org/docs/code/railroad_crossing_nano_pcb_r6.ino). The source file is over 1300 lines of code and contains many comments. The reason the source file is so long, aside from comments, is because I have made this design flexible with many configuration options that depend on how you want to install the crossing gate controller and exactly which features you need. The crossing logic itself is a very small piece of the overall project.

Arduino Programs

All of the code for this project was written in the C programming language. I used the free Arduino IDE (Integrated Design Environment) which is a program that allows you to write, edit, compile, download, and debug software onto your Arduino. There is a wealth of information on the internet that can teach you how to write Arduino software so I'm not going to repeat that information here. But I will give you an overview of the code and how I designed the software for this project.

If you've ever done any C programming on a general-purpose computer, you would start with a program template that looks something like this:

```
int main(int argc, char *argv[]) {
// You put your code here
}
```

This example defines a function called "main" which is where your program will start executing when you run the program. The following link does a decent job of going over the basic C program structure: <https://opensource.com/article/19/5/how-write-good-c-main-function>.

One of the quirks with writing Arduino programs is the Arduino compiler hides this "main" function from you and instead insists that you provide these two function definitions:

```
void setup() {
// You put your setup code here.
// This code is only executed once when the Arduino
// is powered on or you press the reset button.
}

void loop() {
// You put your loop code here.
// This code is executed in an infinite loop unless
// the Arduino is reset or turned off.
}
```

NOTE: If you are an experienced programmer and you want to have all the flexibility of designing your own programs from scratch, you can use a standard C compiler along with the Arduino libraries and there are several options for this, however, I'm going to just stick with the Arduino IDE here.

The way I structured my crossing gate controller code looks more like this:

```
// Define a set of constants for each of the pins on the
// Arduino that I'm using

// Define a set of handy functions for interacting with
// the hardware (i.e. lights, sensors, servo motors)

void setup() {
// This is code I use to initialize the hardware
}

void loop() {
// Here's the list of steps

// Read the sensors to see if a train is coming

// If a train is coming, activate the crossing logic

// If the train was here and has left, deactivate the crossing
// logic

// wait a few milliseconds before going back to the top of
// the loop.
}
```

This code, as described, doesn't do anything — it's just a bunch of comments, but it gives you a sense of how the code is structured. Since the "loop" function repeats over and over, you need some way to keep track of what's going on in time. I do this with something called a "state machine." To explain this, think about how the crossing gate behaves. It starts out in the inactive state, the lights are off, and the gates are up. When a train enters the approach block from either end, a sequence of events begins. The crossing lights start blinking and after some delay, the gates start to come down. The train enters the island section, the gates stay down, and the lights continue to blink. Once the train exits the island section, the gates can go up and

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Erich's Electronic Notebook

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once clear, the lights can stop blinking. Each of these steps is called a “state”. The crossing gate logic dictates when the crossing gate system transitions from one state to the next. If you look back to part 2 of this series (HUB *Headlight*, Volume 38, Number 5, May-Jun 2022, pages 9-11, https://www.hubdiv.org/docs/Headlight2022_38.5.1.pdf), you will see this logic implemented with relays. Instead of using relays, I put the same logic into the Arduino C program. These are just two different ways of building a state machine.

The key thing to remember about the Arduino C version of the state machine is that you need to keep track of what state the system is in. This is done by using a global variable I called “run_mode”. This must be a global variable because its value needs to remain intact from one iteration of the loop to the next. This variable is an integer to which I used eight values to represent each of the eight states. Here are the states I used:

| Value | Name | Meaning |
|-------|-----------------|--|
| 0 | CALIBRATION | Used to calibrate the photo sensors for ambient room light levels |
| 1 | PROTECTION | Waiting for a train to come |
| 2 | GATE_WAIT | Waiting to lower the gates (the lights are flashing) |
| 3 | GATE_LOWER | The gates are moving down, waiting for them to go all the way down |
| 4 | GATE_DOWN | The gates are down, the lights are still flashing |
| 5 | PROTECTION_HOLD | Waiting for the train to leave |
| 6 | GATE_RAISE | The gates are moving up, waiting for them to go all the way up |
| 7 | GATE_UP | The gates are up, turn lights off |

The crossing gate system is only in the CALIBRATION state right after power-on or reset. After that it goes into PROTECTION. Then when activated by the sensors, it transitions through the states GATE_WAIT through GATE_UP, one step at a time until the track circuit is clear and it returns to the PROTECTION state. The actual code is slightly more complicated by the fact that this is a double-track crossing so there are two track circuits and they both have to work together to properly protect the crossing.

Controlling Hardware

One of the nice things about the Arduino IDE and its accompanying library is that it provides all of the code necessary to interact with the hardware in the Arduino chip itself as well as the many thousands of pieces of hardware you can connect to the Arduino. The C language is wonderfully flexible but it knows absolutely nothing about hardware. The basic Arduino library includes functions like, “digitalWrite()” and “digitalRead()” that let you either set or read the value of a digital pin on the Arduino chip, respectively. Since the photo cells I used for block detection provide a voltage level reading, I use the Arduino “analogRead()” function that returns an integer value proportional to how much light that sensor can “see.”

The gate arms are controlled by a small servo motor. Fortunately, there is an Arduino servo library that provides a “servo.write()” function. Servo motors are controlled by sending digital pulses to them. These pulses move the servo motor in steps, either forward or reverse. To keep the servo motors from making noise when they’re not moving, the servo circuit has a provision to turn the servo motors on and off using a digital pin.

The crossing gate controller circuitry just needs a digital pin for each LED you want. The flashing of the LEDs is done in software by toggling the digital control pin on and off at a fixed rate. There are also some auxiliary pins I provided in the hardware that can be controlled by a digital pin. I’m going to use one of these in the future to add a sound module to Bruce’s crossing gate that will replay a digital recording of an actual crossing gate bell when the lights are flashing. This will be an optional feature that can be turned off when it gets annoying.

One final note on connecting hardware. While the crossing gate controller board can use either photocells or traditional block detectors (i.e. NCE BD20, MRCS cpOD/Chubb DCCOD, r-cirkits BOD4/BOD4-CP/BOD-8-SM, and others), I have not added the software to accommodate this configuration. It’s fairly easy to do so, but since I didn’t have a way to easily test it, I decided to leave it out until I had an installation that used block detectors. If you are curious about how to do this, refer to part 2 referenced above — this is exactly how the prototypes do it.

Conclusion

I hope this has given you a basic understanding about how the Arduino is used in this project to implement the core logic of the crossing gate. The wonderful thing about using software in this way is if you don’t like the way it’s working you can change it relatively easily. I like to say that my first, and favorite, programming language is solder. But programming in C is a close second. I also like writing Python code for my scripting adventures, and I can, and do, write Arduino using C++ (yes, it supports that). Let me know if you enjoyed this article and if you’d like to see other software-based articles otherwise we’ll call this “one and done.” I keep writing about things that I enjoy building but I’m a bit disappointed in the lack of fresh ideas and questions I (don’t) get in response to this column. I have received feedback that some people enjoy reading the column, but their eyes glaze over and they fall asleep before the end — maybe that’s why they never make it to this part where I beg for more topic ideas.

The next installment of the crossing gate project will be the last in this series. I’m going to be covering how I installed this crossing gate on Bruce’s layout and what it took to do that. I’m tentatively planning on following up that column with an article about my NeoPixel project that I introduced at the Gateway 2020 NMRA National Convention, and I gave an update to that at the Connecticut Yankee 2020 NER NMRA Convention in September. Please send me any questions, comments, suggestions, or other feedback to hubboard2@hubdiv.org. At least let me know if you made it this far without drifting off.

HUB Holiday Party

Saturday, January 7, 2023

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: \$50 per person.
 Reservations only, no walk-ins.
 Dress appropriately (no denims)
 Ugly Holiday Sweaters a Plus!
 No reservations after January 5.

Bring a gift worth at least \$15 to participate in the Yankee Swap.

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:

Tossed 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.

HUB Holiday Party Registration Form

Name: _____

Food allergies: _____

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 \$50.00 = _____

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.

New England Model Train Expo, December 3rd and 4th

By John Russo

The Division needs your help to make the 2022 NEMTE show a success. Please volunteer and sign up for one of the open assignments preferably on both Saturday and Sunday. We are using SignUpGenius to track the work schedule. I will send out

an email with the link and instruction for accessing SignUpGenius. Volunteers are allowed free show access. The HUB website has a link under "Our Shows" tab with the dates, time and location. Looking forward to seeing you at the show.

The HUB Division at the Boston Museum of Science

By Boris Maznek & Gerry Covino

Back in the summer of 2018, the Division received an email request from the Boston Museum of Science. They were looking for a group that would design, build, and operate an Exhibit for the 2018 Holiday Season, and for the subsequent two holiday seasons. After some discussion and reservation by the Board of Directors, the HUB signed the three-year contract with the museum.

Under the direction of David "Shack" Haralambou, and with the help of many HUB Division volunteers, the layout was constructed. In the first Holiday season over 150,000 visitors viewed the Exhibit and we have never turned back.

The HUB Division's association with the Boston Museum of Science has been a tremendous success. It has given us and the hobby a lot of exposure as well as provided a nice financial return. This return has helped fund the division's other activities.

This November will mark our fifth year at the museum. As has been the case for the past three seasons, the Exhibit consists of four separate layouts: a G-scale trolley; HO-scale trolley; a Boston-themed HO-scale; and two-level O-scale.

As always, we need volunteers to get these layouts built and running through the Holiday Season. If you have any free time from November 9 through January 16, please take a look at the HUB Division Museum of Science schedule on SignUpGenius. If you can, please sign-up. In order to meet our contractual commitment to the Museum we really need all member's assistance. When you volunteer, you will have free parking and full access to the Museum's other exhibits. Please help to make this project a continuing success with our Museum partner.



**Support
 Your
 Division!**

HUB Headlight

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November - December, 2022

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Headlight Printers

Versatile Printing Services, LLC, Burlington, MA

From the Modular Superintendent's Desk

By Bob Collins



Change is in the air. Leaves are changing, mornings are crisp, and soon enough the warmth of summer days will be a fond memory. Speaking of change, if you haven't been to a show recently then you've missed the amazing work of Rodney Feak, one of our modular group members. He has put countless hours into rehabbing the Meat Packing Plant HUB-owned corner module as well as putting the finishing touches on our soon-to-debut Clean Energy corner module that will make its first public appearance in Wilmington at the Greenberg show.

This module has working solar panels that power the lights of the power company building located on the module. Pretty amazing what modern technology and a little hard work can accomplish. Special thanks to Mark Harlow, Dick Ball and Gerry Covino for helping to get the module built and wired.

We've had two exciting shows for the modular division. It was great to be back at our full-size display in Boxboro after having to cut it short last year. Sign up's are currently under way for both Greenberg and HUB's own show, the New England Model Train expo in Marlborough. Look on the website for details! If you are interested in helping out please sign up using the sign up genius platform.

Well that's all for now HUB Division... "okay to go."

Layout Tour & Open Houses

November 19-20, 2022 (Sat-Sun): Bay State Model Railroad Museum Open House, Roslindale, MA, www.bsrmr.org

November 25-27, 2022 (Fri-Sun): Annual "Tour de Chooch" layout tour, Southern NH, Northeastern MA, www.tourdechooch.org

December 2022 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

Submissions Wanted

The *Headlight* is always accepting photos and articles relating to model and prototype railroading. Articles about model building or home layouts would be much appreciated. Earn credit towards your Author AP certificate. Please email editor@hubdiv.org.

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

Please see the [September-October 2022 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)

2022

- Nov 18 (Fri) HUB RAILFUN Meeting, 8 PM, Motherbrook Arts & Community Center, Dedham, MA
- Nov 18 (Fri) Submissions deadline for the HUB *Headlight* Jan-Feb issue
- Nov 19-20 (Sat-Sun) HUB Modular Railroad display at the Greenberg's Toy & Train Show, Shriner's Auditorium, Wilmington, MA
- Dec 3-4 (Sat-Sun) The HUB-sponsored New England Model Train EXPO at the Best Western Royal Plaza Trade Center, Marlborough, MA

2023

- Jan 7 (Sat) HUB Holiday Party at the Common Market, Quincy, MA
- Jan 14-16 (Sat-Mon) HUB Modular Railroad display at the Wenham Museum, Wenham, MA
- Jan 20 (Fri) HUB RAILFUN Meeting, 8 PM, Motherbrook Arts & Community Center, Dedham, MA
- Jan 28-29 (Sat-Sun) HUB Modular Railroad display at the Amherst Railway Society's Railroad Hobby Show, Big-E Fairgrounds, West Springfield, MA
- Feb 1 (Wed) Submissions deadline for the HUB *Headlight* Mar-Apr issue
- Feb 17 (Fri) HUB RAILFUN Meeting, 8 PM, Motherbrook Arts & Community Center, Dedham, MA

RAILFUN.....



NO MOTIONS.....

NO SECONDS.....

NO BUSINESS.....

NO YAWNS.....

HUB Division Headlight
65 Branch Road
East Bridgewater, MA 02333-1601