

HUB Headlight

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

Volume 40, Number 5, May - June, 2024

RAILFUN TIMETABLE

Build a Low-Cost Static Grass Applicator

By Manny Escobar and other HUB members

1 PM TO 3 PM Saturday, May 11, 2024

Chelmsford Public Library, 25 Boston Road, Chelmsford, MA

Manny will once again attempt to present his clinic on making a static grass applicator. The November attempt got short-circuited (pun intended) when the Library decided at the last minute to be closed on Veteran's Day. So this will be a continuation of that program.

For those who were at the Library in November, bring your kits with you. If you missed that one, we still have kits available, just contact Manny at president@hubdiv.org to reserve your kit. The cost is \$5.00.

In this clinic you will learn how to convert an inexpensive electronic fly swatter into a device to apply static grass. There are a number of static grass applicators on the market but they are relatively expensive. Using static grass yields some very effective and realistic-looking grass for your scenery. Using this low-cost applicator will give you the chance to try it without the cost of a more expensive unit.

Joint RAILFUN Session with the Seacoast Division

10 AM Saturday, June 15, 2024

Marion Gerrish Community Center,

39 West Broadway (RT. 102, exit 4 off I93), Derry, NH

For our final meeting before the summer break, we will be doing a combined RAILFUN meeting with members of the Seacoast Division. This will be a great opportunity to meet folks from our sister division and make some new friends. In addition to two clinics, there will be some very nice layouts to visit. So head up to New Hampshire for great day of model railroading.

Clinic 1: Two Years, Two Weeks- Building the Stratton Valley RR: Jim Falls, from Salem, NH, wanted to build his dream railroad and decided that Bruce Robinson was going to be the one to make that happen. The SVRR took two years and two weeks from benchwork to completion of this HO scale model railroad based in southwestern Vermont during 1940. Included within the mountains and water features are doses of Jim's sense of humor. The layout is 100% complete, runs small moguls and diesel switchers and a lot of short cars in order to handle the small radius curves and short sidings, and is powered by a NCE DCC system.

Clinic 2: Building Scenery for AP scenery certificate: John McHugh is working on the requirements to complete his Achievement Program certificate for Scenery. This PowerPoint presentation will describe the goal and process John uses to complete this work. Following the meeting John's layout will be open to visit to see first-hand the work undertaken.

Model Showcase: Bring along whatever you are working on for some bring-and-brag time. Modelers bring in their latest efforts get a chance to "Share the fun of model railroading" by talking about what they are working on. Dig out your precious modeling effort and bring it along to the meeting.

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Introduction to Filament-Based 3D Printing: Part II

By Robert Manna

Welcome back! In this issue we'll continue our discussion on 3D printing by diving into consumables and maintenance. You might be surprised at the number of choices in terms of filament you can print with and the implications of what you can do with it.

Consumables

3D printers do not just consume filament (the material used to build your printed model). By virtue of being machines that move, and deal with high temperatures, there are parts that need care and maintenance and can ultimately wear out. There are also different options to be considered depending upon the material you're printing with; not all filaments are equal.

Maintenance supplies

Like any sophisticated tool or any tool with moving parts, care and maintenance is required to keep a printer operational, they are not yet equivalent to your desktop inkjet or laser printer in terms of load ink cartridge and print (until it dies, and you replace it).

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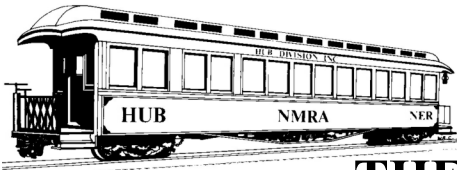
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THE PRESIDENT'S CAR

By Manny Escobar

Spring is almost over; just a couple more months with RAILFUN events in May and June. The first is on Saturday, May 11, 2024 and will be held at Chelmsford Public Library at 1:00 PM (not 10:00 AM.) I will continue the DIY static grass applicator build and demonstrate how to use it on your layout. The second is on Saturday, June 15, 2024 and will be held at Marion Gerrish Community Center, Derry, NH, starting at 10:00 AM. See details in this *Headlight*, the website and via emails. Pete Watson has a great program set up. Finally, we will once again meet at the Waushakum Live Steamers on Sunday, July 21, for the annual summer cookout. There will be an announcement as we get closer to the event.

I want to thank our members for voting on our three Board of Directors (BoD) for the next three years. Peter Higgins, Erich Whitney and myself were re-elected. I also want to thank the Board for reappointing and having the confidence in me for the next year. I promise to do my best to maintain the HUB's legacy in the coming

year as your president and Board member. The key to our organization is our ability to muster outstanding volunteer talent to keep fresh new faces in leadership positions within our organization. In the next month, I will be reaching out to find leadership recruits. If you believe you would like to volunteer, please reach out to me and let's talk.

We have openings to be filled; RAILFUN coordinator, Public Relation Director, (BoD) Recording Secretary (is a good way to be part of the board and know how BoD works), NEMTE Show Manager, Assistant Treasurer (new position) and *Headlight* Editor (Bill Barry would like to step down, but is willing to train and shadow a new volunteer).

The HUB Division, Inc. has adopted the NMRA Code of Conduct, revised Division Policies and New Modular Group Operation Handbook. You all have received from our Office Manager an email on this matter and you can download these from our website at www.hubdiv.org. Please get familiar with these policies.

I'm extremely honored to be able to say I have served as your President. I'm in the company of some remarkable people across our history of this organization.

Please stay safe and healthy during the off season and enjoy the summer months and see you all in the Fall.

"Keep 'Em Rolling"

2024 Election Results

The following members were elected to three-year terms on the HUB Division Board of Directors:

Peter Higgins

Erich Whitney

Manny Escobar

HUB Summer Picnic

July 21, 2023

The Summer Picnic is tentatively scheduled to take place at Waushakum Live Steamers in Holliston, MA, on Sunday, July 21 (rain or shine) from 11AM to 2PM. Visit www.waushakumlivesteamers.org More information will be emailed, or look for further details on the HUB website and Facebook page.



RAILFUN TIMETABLE:

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Joint RAILFUN Session with the Seacoast Division

Lunch Break: 12PM - 2PM

Layout tours: 2PM (directions available at the meeting. All layouts are within 45 minutes from the hall):

- Tom Oxnard
- John McHugh
- James Van Bokkelen
- Bruce Robinson
- Jim Falls

Fall RAILFUN

10 AM Saturday,
September 28, 2024

Save the date. More info will be provided in the September-October *Headlight* Issue

(Refer to Page 11 for information about RAILFUN updates and cancellations)

New Members

The HUB Division welcomes the following new members

- Daniel Santos, Plymouth
- Leonard Singer, Boston
- Paul Marotta, Arlington
- Matthew Castle, Chelmsford
- James Lee, Needham
- Mario Signore, Needham
- Kenneth Fields, Medford
- Patrick McManus, N Reading



Shanty Talk:

By Rudy Slovacsek

Spring

Here I am writing this column while my daughter and grandchildren play a board game called "Ticket to Ride" in which you connect railroads between cities with freight car pieces. Any way you can get them involved with trains is a plus in my book. I myself was fascinated with the first computerized game for the PC called RailRoad Tycoon by Sid Meyer.

Well, it's that time of year again when the earth begins to warm-up and trees sprout green leaves. Now is the first trip over the road to assess the damage that the winter storms and spring floods have caused along the railroad right-of-way. It reminds me of many years ago when I had the opportunity to visit Lyle Sorensen's summer home, up in Vermont, just north of Bellows Falls. It was on a side road, off Rockingham Road, named Parker Hill Road, and it crossed the Williams River, went under the tracks of the old and abandoned "Rutland" and on up the hill. The tracks were then part of the revived Green Mountain. What intrigued me was that those tracks paralleled the Williams River up on the embankment and had evidently experienced a washout at one time as some quarried limestone pieces and some old railroad freight car trucks littered the embankment at the water's edge. It was a great place to go fishing. Sometime when I find my slides (Yes, remember those from before digital cam-

eras?) I'll try and send some pictures. Since the Rutland went belly up early in the sixties, this wreck must have been at least 20 to 30 years old at the time. I mention it because such mishaps were not uncommon at the time on the Rutland. The terrain of new England is such that rapidly running streams, creeks and rivers carved V shaped grooves in the landscape. This is unlike the Midwest where overflowing rivers just spread out over the flatlands and flow at a slower pace. In New England and places such as the Rockies, the faster-flowing waters can cause severe erosion and the damage can be quite extensive. So, spring trips were usually a common occurrence for the maintenance crews.

While we're discussing it, by the sixties, when it was abandoned, the Rutland was all dieselized with Alco RS-1s, RS-3s and a lone GE 70 tonner. An extensive series of books on the Rutland's history in

pictures, written by R.W. Nimke, makes plain the struggles of the Rutland with flooding. I have several models of Rutland equipment (See Photo 1) as the D&H connected with the Rutland in the city of Rutland with a branch of the D&H from Whitehall, and to the NYC with another branch to Chatham called the "Corkscrew" division. I met Mr. Nimke himself at a HUB show in Marlborough at the time he was selling his book on the Green Mountain Railroad describing the revival of the southern part of the old Rutland by a group of former employees. Today the "Green Mountain" and the "Vermont" have merged both the northern and southern half of the old Rutland to essentially restore it to a successful regional carrier.

Well, I hope your spring is a beautiful green without the flooding problems. Bye for now.



Photo 1: Water stop for 73

Could "You" be the next Headlight Editor?

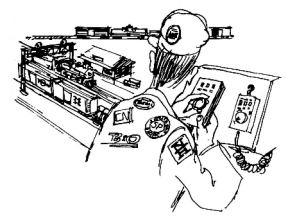
By Bill Barry

I have now been editor of this publication for the past 12 years, and it's time for me to pass the torch. So we need a HUB member willing to take on the responsibility of putting together five issues of the newsletter each year. This involves gathering info from the members and online resources, putting it all together in an electronic format, sending that along

to the printer and webmaster, and finally preparing and mailing the printed copies to the membership. The editor position is a behind-the-scenes job, but it will keep you involved in the goings-on of the Division. Thankfully, we have a very active Division with many members that are willing to contribute articles and photos to the newsletter.

So if you have computer skills and some familiarity with page layout software, would you be interested in becoming the *Headlight* editor? You will need to have

your own computer, but the division will purchase the software you need to do your work along with providing the necessary supplies, like postage, labels, wafer seals, etc.



If you want to discuss this or are looking for more info about the position, please email me at editor@hubdiv.org.

Intro to 3D Printing: Part II

(Continued from Page 1)

First a simple one, while not required when printing, you frequently do want to use glue sticks on the printing bed before sending a job to print. The glue stick aids with adhesion of the filament to the bed, while making it easier to remove the print later. For prints without much surface area in contact with the build plate, using glue stick is less critical. But for prints with a large amount of surface area, using a glue stick can help ensure that removal does not also damage the print itself. An alternative to glue sticks is a spray adhesive (hairspray is popular), but those can be messy to work with. Tape, such as Kapton or Masking, can also be used though these surfaces are more about making it easier to remove the print than providing extra adhesion to help avoid warping. Printer manufacturers will offer recommendations for their own products, or you can do research to find third-party products. However, make sure that the selected product is tolerant of the expected temperature levels of the print bed and filament. When using adhesives, clean the Build Plate(s) reasonably frequently to avoid any residue build-up which can degrade the quality of your print(s).

As discussed in the last article the printer has several moving parts of various types and kinds. The printer manuals should address general care and upkeep, but you can expect that lubrication will be required, and eventually things like belts or even motors can wear out if they see enough use. Additionally, printers contain items like wiper pads for the nozzle or cutters in the automatic material systems. Gears and sprockets within things like the feeders for the filament can also wear over time. All these pieces have some level of life expectancy before they need to be replaced to ensure consistent good output from the printer.

For lubricants, you can expect to need something like silicon grease, which you may already have on hand as a model railroader. Part wear, be it wipers, cutters or moving parts simply need to be replaced on an as-needed basis.

Nozzles (print heads)

The nozzle or print head assembly is the key component to any printer as it is the part that extrudes the filament onto the bed. Nozzles do not last forever though; they eventually will wear out or become unusable.

The two biggest impacts to nozzles are:

- Clogs – nozzles can become clogged when the temperature is not set correctly for the filament that is in use, or there is a problem with the filament. Often heating the nozzle to its highest setting can help clear a clog, however there are times where nothing works, resulting in a nozzle that is no longer usable.
- Abrasive wear – there are different types of filaments that are not 100% plastic, and the other materials can be abrasive on the nozzle material depending on what it is made of. Too much abrasion will damage the nozzle to the point where it no longer extrudes properly, or easily becomes clogged due to the rough surface.

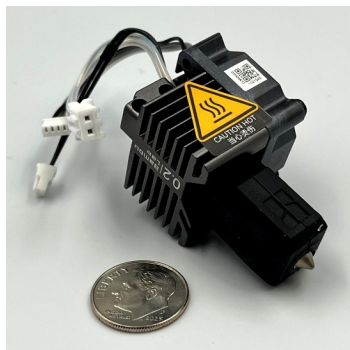


Figure 1: A 0.2 mm nozzle assembly (Bambu)

Using the right nozzle with the right filaments can reduce the likelihood of these problems, but regardless nozzles will eventually wear out. Nozzles can come in multiple materials, brass, stainless steel, coated metals, hardened steel, and ruby tipped.

As noted in the first article many 3D Printers come with a 0.4 mm nozzle standard. This size offers a nice balance between resolution, printing speed and overall precision. Smaller-sized nozzles will be slower to print but offer a higher degree of resolution and printing. Larger nozzles will print much faster, but sacrifice overall detail quality of the part. In any case most nozzle sizes can be purchased in multiple materials.

- Brass – very popular due to its thermal conductivity properties and price point, but also very soft which means using it with any abrasive filaments with any frequency is a bad idea.
- Stainless Steel and Hardened Steel – both handle abrasive materials better (nothing lasts forever) but sacrifice some thermal performance. Hardened steel has particularly good abrasive material performance. They carry the same max temperature rating as brass but will require more time to heat and more energy to meet the target. Steel nozzles will also be more expensive.
- Coated – several material options, but particularly brass, can be coated. Coatings offer more protection from abrasive materials, allowing you to print abrasive materials more frequently. Brass with a coating is particularly popular as it retains brass's thermal performance while offering peace-of-mind when doing some prints with abrasive materials.
- Ruby Tipped – still a metal nozzle body of some kind, but with the tip and associated hole made from a ruby stone offering significant protection from abrasive materials.

Many printers will allow you to swap print heads/tips to some degree or another. The most popular printers typically make this process tool-less or require only an allen wrench and/or screwdrivers. This means if you so choose you can purchase multiple heads to begin with or add to your collection as you go. If you are using 'basic' materials, then you can expect a fairly long life from your print-head unless you run into temperature issues. If you want to work with more 'exotic' filaments, then investing in higher-end print heads is likely worth the price.

Build Plates (print bed)

The build plate attaches to the actual base via mechanical, magnetic or adherence mechanisms (depending on the material of the build plate). Most build plates should last quite a long time (unless you're using something like Kapton tape) particularly if cared for. The biggest risks to build plates are damage to the surface, breaking, or residue build-up from adhesives used to ensure the quality of the first layer and removal.

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Intro to 3D Printing: Part II

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Build plates come in a variety of materials, the most popular are those made with spring coil steel and coated. The inner steel layer allows for magnetically attaching to the actual print base while the coating provides for an ideal printing surface. Printing surfaces should either be uniformly smooth with no defects or textured. Smooth plates will result in a smooth bottom layer



Figure 2: Build plate(s) (Bambu).

whereas a textured surface cannot help but have the texture imprinted to a degree on the first layer. Smooth surfaces in conjunction with adhesives make for easy part removal, whereas a textured surface makes for easy removal by virtue of less surface area in direct contact with the part. Other popular base plate materials are tempered and treated glass, or various types of plastics. The drawback to these alternatives is that they required some type of mechanical feature to attach them to the base as opposed to being able to use magnets with the steel spring plates.

Filament

Not surprisingly filament is by far the consumable you'll purchase the most of since it's the material you use to build your parts. What you may not realize is that you may consume far more (or far less) filament than you might expect. How much filament used on a given print is an outcome of your printing settings.



Figure 3: PLA Filament Rolls

A variety of types are available from a variety of manufacturers, including third parties. Nearly all of the major printer brands offer their own 'branded' filaments that they will claim stringently meet their tolerances, but the fact is many of the third-party products will work just as well.

When you're printing objects with a large, enclosed volume, by default printers will not fill that volume. Printing is not like casting an object since printed objects are not solid throughout unless you specify them to be. Rather, objects are typically in-filled with enough material to help ensure structural stability. Increasing the ratio of fill will make an object stronger, but of course consumes more filament. The place where you may experience unexpected consumption is supports. Supports are throw-away material that aids the printer in the printing of the part. Supports come into play when you have overhanging conditions. While the final product may be strong enough to support an overhang, temporary scaffolding is required during the process.

Printing supports will also require a secondary support material. With that, let's discuss the types of filaments further:

- PLA (PolyLactic Acid) – the most popular filament by far; why? Low heating temperature, heated bed not required (but handy), does not warp as easily as other materials, low odor thanks to being derived from corn starch and sugar, low relative cost. Why not use it? Not good for where the part will be repeatedly subject to torsional forces (bending/twisting), brittle material overall, also susceptible to heat, will degrade after extended exposure to UV (sunlight) and will absorb moisture that in the long term will degrade the part. Other benefits: it comes in a variety of flavors where the PLA is mixed with other materials like carbon fiber, silk, wood, metals (conductivity), glitter and more.
- ABS (Acrylonitrile Butadiene Styrene) – the go-to material for most injection molding globally. ABS is a well understood material, that is relatively stable in UV and heat exposure while being quite strong, including under repeated torsion. The major drawbacks to ABS is that it is highly prone to warping when 3D printing and releases VOC's during printing due to the (relatively) high heating point. Other benefits, ABS is more friendly to 'post' processing unlike PLA, including an acetone bath to help smooth out 'print surfaces. ABS is also hydro-phobic (unlike PLA).
- PET(G) (Polyethylene Terephthalate, Glycol-modified) – a good alternative to ABS as it is a bit easier to print with less susceptibility to warping, while not being as brittle as PLA. All three have various translucent options, PET can provide better translucency. PET can also be food safe, but always double-check. PET however does not 'bridge' well due to its consistency and nature, those same properties though help to ensure good adhesion between each layer. PET comes in various flavors too, including metals and such, the most popular is the 'Glycol-modified' versions.
- TPEs (ThermoPlastic Elastomers), TPU, TPC – its in the name elasto-, these materials flex and bend and are intended to. Often popular for printing things like phone cases or model tires that should have a 'rubber' feel and performance, TPUs are durable in terms of physical, chemical and temperature. Printing requires ideal / closely monitored / managed conditions for a good result. In some cases, TPE's cannot be used with Automatic Material Systems as the filament itself is prone to easily breaking.

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Intro to 3D Printing: Part II

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- PA (PolyAmide, aka Nylon) – another well known, tried and true material. Overall good strength (tensile, mechanical and impact) as well as less susceptible to high temperatures. Printing requires high temperatures (300c nozzle) that are well controlled. Storage is also critical as nylon is hygroscopic and the presence of moisture while printing will degrade the print quality. PA comes in multiple varieties that helps improve its strength.
- ASA (Acrylonitrile Styrene Acrylate) – related to ABS, but slightly easier to print, though higher temperatures are required, and enclosures are a must to avoid warping and cracking (due to shrinking). Its biggest advantage is being highly UV and chemical stable as well as high impact strength. So particularly good for outdoors (ie: garden model railroad-ing).
- PVB (PolyVinyl Butyral) – its biggest two benefits are transparency and smoothness (after post processing with Isopropyl Alcohol). Otherwise it's very similar to PLA, but not nearly as strong. If, however, you need a custom-shaped window (e.g., a dome glass insert for a passenger car model) this may fit the bill.
- Support Materials – many of the most popular filaments (PLA, ABS, PET) have matching support materials that have similar thermal properties so that they can be easily printed together. Support materials are generally much weaker than the primary material, thus allowing for easy removal. Some support materials will dissolve in water or some other chemical solution.

There are a number of other filament types available, that generally have special advantages in certain areas; for example, strength (just like the variations of support material). These other specialty materials often will cost more per weight and may have special handling requirements (high heat, low moisture, etc). Often, these advanced materials are more popular in industrial-grade printing operations.

As noted, filament can be purchased from a number of vendors. When purchasing filament, beyond checking reviews and hobbyist sites in terms of performance in your 3D printer you also need to be aware of the filament diameter relative to your printer and its nozzle(s). Also know the size of the spool itself and if it will work with your printer or AMS.

Storage

Many of the filament materials are prone to absorbing moisture to some degree, and some of them can absorb a great deal of moisture. Therefore, it's important to consider long-term storage. Moisture is a particular enemy during the printing process due to the heating temperature. The moisture will be boiled off and during that process can negatively impact the quality of the print. Using either desiccant packs or ensuring you store the material in a dry environment (low relative humidity) is important. Note: This doesn't mean storing the filament in your basement where you have a dehumidifier. Rather it should be stored in a room where you may not typically

Learning Points:

- There are a variety of filament types available, all with different properties that affect the performance of the final part.
- Choosing the right filament is important and you need to be aware of your printer's capabilities.
- Printers consume other supplies, including adhesives, to help ensure print quality.
- There are other printer parts that can wear out over time, or you may want different options available to expand your printing palette.

have a dehumidifier (and then add one). If guaranteeing a particularly dry room is not possible, you can purchase zip-lock bags that include a port that can be used with the popular brands of food vacuum sealers. Storing a roll of filament with desiccant packs in a vacuum sealed bag will help ensure longevity of the material. Filament rolls can also be dried prior to use with high food dehydrators, or purpose-built filament dryers. You do not want to leave filament out on your printer unless you know that it will be quickly used again.

Conclusion

Hopefully this follow-up to the first article in the March issue of the *Headlight* was helpful. Like any hobby there are a number of attributes to consider, and as also noted in Part I, 3D printing can easily become a hobby within a hobby. The variety of filaments available make 3D printing a great way to fill several gaps you might encounter in the hobby, whether its printing parts for a model itself, making tools for modeling, printing replacement parts for something that has broken or printing parts for building supporting infrastructure for your model railroad. It is also important to remember that your printer consumes more than just the raw material (filament) and it requires care and feeding to ensure successful printing results.

In Part III we will take a closer look at what it takes to get started, how you get a model, what your choices are for creating your own models and some simple starting projects.

If you'd like to see this material presented as a RAILFUN session or a clinic or if you have questions, please feel free to reach out to me: robert.manna@gmail.com.

Submissions Requested

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.



**Support Your
Division!**

HUB VJRR Op Session April 13, 2024 By Bruce Robinson

The latest HUB operating session was held on the Valley Junction RR April 13, starting with meeting up at the Ober Easy diner for lunch and then moving on to the basement housing the railroad. After orientation and crew assignments the crew moved out to their positions. Peter Watson drew the dispatcher's job with Doug Schall and Chris Shannon taking on the two yard master positions. Matt Castle moved to the Valley Branch Lines to handle the interchange traffic with the parent VJRR. Main-line crew assignments were held by Peter Higgins, Peter Meyer and Johann Meyer. The planned 1-4 op session wrapped up at 6:00pm! It seems everyone enjoyed their time on the VJRR.



*Peter Watson, MRR looks on as Peter Higgins stands in front of the fast clock. Several others are working an issue while new HUB Member Matt Castle operates the branchline.
Photo by Bruce Robinson*

The Neponset Ridge Shortline by Ray Schofield

Ray's HO Scale Neponset Ridge Shortline and his HON3 Wild River are in two rooms with dual gauge staging in another part of the basement. The main room is 12 by 25 feet and the second room about 12 by 11 feet. The second room houses the HON3 trackage and also acts as the crew lounge. A photo of the layout room appeared in February 2015 *Model Railroader* "Trains of Thought" by Tony Koester. The layout is open during the annual April Southern New England layout tour that Ray organizes.



The branch line headed to Neponset Ridge and a divergent route to my interchange with Bill Robertson's New England and Western. (Unfortunately Bill passed away late last year and the layout is gone.)



The main yard (Neponset Valley) is pictured near the engine facility with my latest power, all Alcos of course.



Right: The town of Neponset Ridge with a Woodland Scenics gas station.

Erich's Electronics Notebook

By Erich Whitney

A DCC DC Power Supply

I apologize if you were expecting to read about the next chapter in the LCC Module Panel saga. That will have to wait until we pick up the column again in September when, hopefully, we've had a chance to give that project a proper wrap-up. As of the Shriner's show, we were making great progress with Hoosac and Upton yard when it saw traffic for the first time after the complete power relay replacement project.

Instead, I'm going to revisit the DCC power supply subject to complete that topic. The idea for this came up while I was performing a major DCC system upgrade for the HUB Module Group. Upon reflection about how I addressed this topic in my column, "A DCC Supply", HUB *Headlight*, Volume 40, Number 1, Sep-Aug 2023", I realized that I focused on the use of an AC power supply to power a DCC system and I didn't address the choice of AC versus DC power supplies. There is a choice and there are trade-offs. When you have the option of using either a DC or AC supply with your DCC system, an AC supply is the simplest and can be the least expensive because it's essentially just a transformer. The downside of using an AC supply is that these supplies don't provide any voltage or current regulation to the DCC system, which leaves that functionality up to the DCC system's design. If the transformer's specification is adequate and the DCC system is operated within its proper design limits, this shouldn't be a problem.

Another consideration is scalability. If you want to power a command station and multiple power stations from a common source, using a single large AC source will keep all the DCC components in sync with each other. However, the AC transformer must scale to the maximum amount of current for the entire system. But, if you use DC supplies, each command station

and power station can have its own separate power supply.

The HUB Module Group uses a group of DC power supplies to power the layout. There are a total of ten DC supplies in the HUB modular layout system, each connected to a command station or power station (DCC devices). The reason for multiple DC supplies in this application is the scalability issue I mentioned above. Selecting a single AC transformer with a capacity of up to 50Amps is challenging not to mention expensive. Ten low-cost DC supplies capable of supplying 5Amps each is very economical and modular.

It is important that all the DC power supplies connected to a group of DCC devices share a common DC ground from their DC power supplies. This ensures that the voltage inputs to the DCC devices stay referenced to one another. Also, each DC supply should be adjusted to the same voltage so that each DCC device is operating from the same value. The next question is what value do you select? A rule of thumb is to choose a voltage 2 volts higher than the track voltage you want. Why do you want to do this? The idea is to provide enough voltage for the DCC device to operate without overdoing it. Providing too much voltage can lead to excess heat being dissipated in the DCC device and this is undesirable for long-term reliability. Not providing enough voltage is also a problem, because this can cause more current draw and that may also increase heat dissipation as well as low output voltage. It is best to check the installation manual for your specific DCC device for specifications and guidance. Also, some DCC systems allow you to adjust the DCC output voltage value and current limit (i.e. Lenz LZV200 and LV103).

Figure 1 is an example of a low-cost DC supply that is a good candidate for a DCC system supply. It's 0-24VDC adjustable and can supply up to 6.5Amps, or a total of 150W. The supply shown in Figure 1 is a generic model from MPJA.com, referenced in Table 1. Note that all of these supplies are clones of the TDK-Lambda LS150-24 supply at about half the price. The TDK-Lambda version runs about \$45 each and the clones are about \$23 each. I have tested this supply at full load, and it works as advertised.



Figure 1: Variable DC Power Supply
Photo by Digikey.com

You do have to connect the AC line voltage input to the screw terminals to this supply, it doesn't come with a power cord or power jack. For this I highly recommend a PEM (Power Entry Module) (Figure 2). These PEMs also need a cable (Figure 3). Additionally, there is an AC ground input on the power supply, and this MUST be connected to the PEM. There's an uninsulated terminal for this purpose (Figure 4).



Figure 2: Power Entry Module
Photo from TE.com



Figure 3: PEM Cable Assembly
Photo from TE.com



Figure 4: PEM Ground Terminal
Photo from TE.com

(Continued on Page 9)

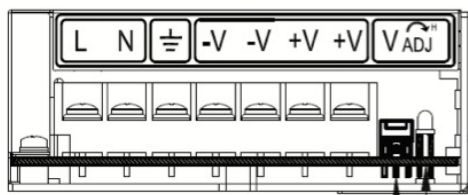
Erich's Electronic Notebook

(Continued from Page 8)

Table 1 Component Source List


Component	Source	Part Number	Figure
DC Power Supply	MPJA.com Digikey.com Digikey.com Digikey.com	33471 PS (generic Asian brand) 285-1813-ND (TDK-Lambda) 102-VGS-150C-24-ND (CUI) 1866-3321-ND (Mean Well)	1
Power Entry Module	Digikey.com	PS0SXDBX0-ND (TE Connectivity)	2
PEM Cable Assembly	Digikey.com	CCM1664-ND (TE Connectivity)	3
PEM Ground Terminal	Digikey.com	A27702CT-ND (TE Connectivity)	4

The power supply has the following interface:



L: AC Line (Hot) input. This goes to the two hot wires of the PEM Cable Assembly (black and yellow as shown in Figure 3).

N: AC Line (Neutral) input. This goes to the two neutral wires of the PEM Cable Assembly (white and blue as shown in Figure 3).

GND : This is the AC Line Ground input. This goes to the bare terminal on the PEM using the PEM Ground Terminal as shown in Figure 4).

Notice that there are two -V and two +V terminals. These are the DC outputs of the power supply, and ALL these outputs MUST be connected. Also, it is important that you run these wires in pairs from these terminals to the DC inputs of the DCC system. The reason for this is that the power supply uses these wires to sense the voltage AT the load which improves its voltage regulation. This also allows the two wires to share the current so you can use smaller wire. I recommend 16AWG stranded wire for these connections.

Finally, there is an adjustment potentiometer next to the VADJ label that you use to set the output voltage. The procedure for setting the output voltage is to wire up the AC input and power up the supply with no load. Using a voltmeter, adjust VADJ until the voltmeter reads the desired voltage. Once the systems are all wired up, power up and check the power supply voltage under load and carefully adjust the voltage if necessary. Repeat this for each power supply to make sure each of them is reading the same output voltage.

I hope this fills in the gap I left back in September. As always, I welcome questions, comments, inputs, and suggestions. Have a great summer!



LAKESHORES

NMRA Northeastern Region Annual Convention

NER Convention, Lakeshores '24
Rochester, NY

Thursday, Sept. 19 to Sunday, Sept. 22

By Bill Barry

The next NER convention will be held in Rochester, NY, for the first time since the Lakeshores Division joined the NER. The convention committee has been hard at work putting together an excellent convention program. The convention website has plenty of details about the convention, hotel and all the activities that are planned, including a large slate of clinics, layout tours, contest room, etc.

The planned prototype outing will be a rail excursion on a Genesee Valley Transportation train from SUNY Brockport to the Medina Railroad Museum and back. The Rochester & Genesee Valley RR Museum will be open exclusively to NMRA members on Friday afternoon and NCE will be hosting an open house at their headquarters on Friday morning.



The Danby, Ludlow & Springfield "Marble Train" nears the quarry in Danby on MMR Ned Spiller's freelance HO scale layout in Hammondsport, NY. The DL&S depicts railroading in 1954 Vermont and will be open for op sessions and tours.

It would be great if we could have a good showing of HUB members attending the convention in this newly expanded part of the NER. So check out the website and get signed up. <https://conventions.nernmra.org/home/home-2024/>

HUB High Green 2024

Bruce Robinson

The first of the annual op-til-you-drop weekend sponsored by HUB Division kicked off May 3 -5. Six host layouts accepted more than twenty guest operators to participate on layouts modeling in N-scale, HO-scale and Fn3-scale.

James Van Bokkelen started off Friday evening with a crew made up of experienced operators and two new operators experiencing an operating session for the first time. Saturday morning sessions were hosted by Dave Sias and Matt Keiser. Each layout hosted a half dozen operators. Saturday afternoon sessions were hosted by John Newick and Butch Taggart with another dozen operating slots filled with old hands and newbies alike. The final session of the weekend was hosted by Debbie and Stan Ames with another dozen operators arriving in the Ames' back yard to try their hand at operating large scale trains in a back yard setting.

Many thanks go to HUB member Rand Hoven for all his work pulling this event together for all to enjoy. The chance to do something a little different and enjoy some real hobby camaraderie with fellow modelers was quite evident through out the weekend.

I am all ready looking forward to next year's "bigger and better!" HUB High Green event!



James Van Bokkelen's B&M Eastern Route - Friday Night
Photo by Bruce Robinson



Matt Keiser's CSX RFP Sub - Saturday Morning
Photo by Bruce Robinson



John Newick's Central Maine and Aroostook - Saturday Afternoon
Photo by Bruce Robinson



Dave Sias' White Mountain Route - Saturday Morning
Photo by Bill Barry



Butch Taggart's Red Oak Railroad - Saturday Afternoon
Photo by Bill Barry



Stan and Debbie's SJR&P - Sunday Morning/Afternoon
Photo by Matt Castle

HUB Headlight

Volume 40, Number 5, May - June, 2024

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Headlight Printers

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From the Modular Superintendent's Desk

By Bob Collins



With the return of warm weather and outside activities such as fun events like going for a hike or going to the beach or bad like mowing the lawn, our module group takes a long-deserved break from the hectic model train show season. Beginning in September with Hopedale, we finish seven months later in the nearby town of Holliston. These two nearby communities not only bookend the show season but have another feature in common. Both shows are local community events that help spread model railroading to communities that might otherwise never step foot into a train show. Spreading model railroading to the general public is one of the primary missions of the National Model Railroad Association.

It is events like this that do more to ensure future generations of model railroaders will continue to fill the ranks of the HUB Division than the average train show. Often the people joining us are families and individuals who happen to be looking for something to do on a weekend. The show in Hopedale is intended to be one small part of a broader town fair. This is truly an event for the uninitiated in the hobby.

Just like last year's Spring TRAINing event in Manchester by the Sea, many of our attendees expressed surprise at the level of detail on modules and equipment alike. So many of our module group members also do a fantastic job of spending time with our viewing public. Answering questions, mentoring an aspiring model railroader, or letting a small child operate their equipment goes a long way towards growing the hobby.

We will be gathering at Dick Ball's house again this summer for another work day(s). This is a great opportunity for a veteran or new members of the division to gather in solidarity and practice the skills that we all continue to hone on our journey to Master Model Railroaders. Maybe we will see you there.

With that, okay to mark off HUB Division for some well-deserved rest.

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

Please see the [March-April 2024 Headlight](#) for all order forms and module kit information along with information about the online HUB Branded Merchandise store.

RAILFUN Updates or Cancellations

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.

HUB Division Calendar of Events

(Subject to Change)

2024

- May 11 (Sat) HUB RAILFUN Meeting, 1 PM, Chelmsford Public Library, Chelmsford, MA
- Jun 15 (Sat) HUB RAILFUN Meeting, 10 AM, Marrion Gerrish Community Center, 39 West Broadway (RT. 102, exit 4 off I-93), Derry, NH
- Jul 15 (Mon) Submissions deadline for the HUB *Headlight* Sep-Oct issue
- Jul 21 (Sun) HUB Summer Picnic, Waushakum Live Steamers, Holliston, MA
- Aug 4-11 (Sun-Sun) 2024 NMRA National Convention, 2024 SurfLiner, Long Beach, CA, www.2023texasexpress.com
- Sep 19-22 (Thu-Sun) 2024 NER Convention, Lakeshore '24, Rochester, NY <https://conventions.nernmra.org/home/home-2024/>
- Sep 28 (Sat) HUB RAILFUN Meeting, 10 AM
- Oct 1 (Tue) Submissions deadline for the HUB *Headlight* Nov-Dec issue
- Oct 18 (Fri) HUB RAILFUN Meeting, 8 PM, Online

RAILFUN.....



NO MOTIONS.....

NO SECONDS.....

NO BUSINESS.....

NO YAWNS.....

HUB Division Headlight
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