

Fall 2026

The Relay



A publication of the Chesapeake Division of the Mid-Eastern
Region of the NMRA



CHESAPEAKE DIVISION

View from the Cupola



Summer is over and fall has officially begun.

We had an exciting summer of railroading! Two highlights of the summer come to mind: the travels of the Union Pacific Big Boy locomotive in the East and the NMRA National Convention in Chattanooga, TN. If you were able to experience either, or both, of these activities, please share it with your fellow model

railroaders, within these pages, by contacting Kurt Thompson, the editor of this publication, at newsletter@chesdiv-nmra.org, or on the Division website, by contacting Scott Wooddell, the Division Webmaster, at web@chesdiv-nmra.org.

The Division kicked off fall with our annual *Modelers Day-In* September 26th in Columbia, Maryland. We had a great turnout, with fourteen of you attending and contributing to the conversation, collaboration, and model building.

Looking ahead, this seems to be the time when model railroading gets serious, with model railroaders returning to their train rooms and their workbenches to operate trains; build, maintain, expand, and improve their layouts; build locomotives, rolling stock, structures, and scenes; and restore, repair, and create.

There are a seemingly endless number of prototype and model railroading activities to enjoy this time of year. For example, scenic railroad excursions nearby include the Western Maryland Scenic Railroad, the Potomac Eagle Scenic Railroad, and the Walkersville Southern Railroad. I have enjoyed visits to all three over the years. Upcoming model railroading events include the Mid-Atlantic Railroad Prototype Modelers Meet (MARPM) in Linthicum, MD, October 1-4; the NMRA Mid-Eastern Region convention, *Tracks to Tidewater*, October 15-18 in Virginia Beach (registration is still open); and, rounding out the month of October (October 31 – November 1), the Great Scale Model Train Show at the Timonium Fairgrounds. The Division will have a table there, so be on the

lookout for a call for volunteers in the upcoming eBlast and on our website. If you attend the show, please stop by to say hello.

Looking forward to November, many of our fellow model railroaders (likely including at least a few of the readership of this publication) are opening their homes for guests to visit their layouts during the Model Railroad Open House Month in November.

You'll find further information about many of the activities in our area on the Chesapeake Division website.

I hope you have a pleasant and productive fall as you enjoy this wonderful hobby. I look forward to seeing you November 14th at our Division annual meeting.

Kirk Bateman, Superintendent, Chesapeake Division

From the Editor

Well, here we are again. The third issue of the new *The Relay*.

I'm grateful for the many Division members who responded favorably to my email asking (or begging) for articles. Several of the articles are in this issue; many others will be in future issues.

If this issue seems larger than the Summer 2026 issue, that is because it is. There's more content because more members have shared about their particular spot in the hobby.

In upcoming issues, we'll hear about building an O Scale two rail test track and switching layout; CSX's Howard St. Tunnel enlargement project; a humorous article (so I'm told by the author) about

PRR hopper cars; the reconfiguring of a modeler's N-scale Cumberland Yard to improve operations; and many others.

This time around, Randy Smith's column is on Resistors and Rectifiers. There is another new column on caps and hats and the stories they tell. I hope the hat and cap column will spark others to write up their own short story about a hat they acquired. Photos of that hat on the head of the author would be appropriate.

And as the AP guy for the Division, I'll be highlighting the various achievements earned by our members.

Kurt Thompson, MMR, Editor

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How I Spent My Winter Vacation: The Scale Rails N Scale Expansion in Florida Pat Flash

After a few winters of attending free Saturday clinics at Scale Rails of Southwest Florida, I finally ponied up and joined. Since I was working on a small N scale layout in our condo, I spent most of my time at the club with the small N scale group and our N-Trak layout. We even added a couple of new six-foot modules over the years until we'd filled the length of the room.



We had disassemble the layout and take it out to the train show in Fort Myers each February. That was an immense undertaking. Then Covid came along; the venue for our show was torn down; and many electronics and lighting features were added to the layout. It would have been

impossible to move it anyway. So, we watched trains go round and round.



The new support module support brackets installed.

Then the HO guys, whose layout was rapidly approaching completion, began to think of something to keep all of us busy. How about getting rid of the N-Trak and starting over? The N scale powers-that-be resisted greatly but finally gave in after much gentle persuasion and presentation of a potential track plan.

The first plan called for keeping all the modules and placing them on the wall on a set of two-level brackets. The levels would have been

joined by a helix and other bench work at the end of the room. Then someone pointed out that the helix was very long and that a break-in-two train could result in a catastrophic disaster. Rethink.

Ultimately, we decided to keep our best modules and sell the corners and a couple of interior ones as a complete layout. We placed our saved modules along the outside wall and added to that base with a standard L girder type expansion.

We filled in windows, painted walls, did some 120 volt rewiring, prepped the walls for a LED dropped ceiling, and got a sky backdrop up. Subsequent pictures will document the area directly connected to the end of the N-Trak modules, our version of Horseshoe Curve.

Our guru of trees insists that puffballs have no place on our layouts so we make all our trees. Between Super Trees and Woodland Scenics tree armatures, we'll probably make a couple thousand. Most of the club members have been gently coerced into making at least a few trees for the new layout and I'm sure next winter when all the snowbirds return, we'll all be making trees again.

Further updates to follow as the work progresses and the mood inspires.



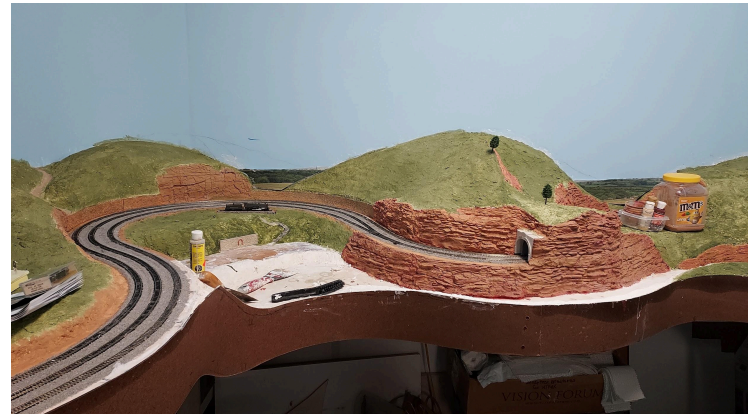
The saved modules to the left; “layout” sold to the right.



Extensive prep work was done before and during the rebuild.



The roughed in base of Horseshoe Curve.



My B&O Railroad

Bill Freeland

Let's go back to the mid 40's to mid 50's when steam and diesel were still alive. It is an autumn setting to early sprinkles of snow starting to appear. The layout is a 4 level construction with no helix. My layout runs from Baltimore west through Maryland, West Virginia, Pennsylvania, New York and Illinois.



On the layout, you will see freight and passenger service throughout the towns from Baltimore to Buffalo and Chicago and everything in between. The room is 28ft by 40ft. There is approximately 1,100 feet of mainline, very little hidden track so operators must be watching their trains all the time. Trains can run from level 1 to level 4 which gives me the option of continuous running.



Running trains vary from straight through to multiple freight switching. There are unit trains, manifests, priority trains, RDC's, even the famous Capitol Limited. You name it, I probably have it running somewhere.

I do run operating sessions, which I really enjoy. The crews vary from 5 to 8 depending on the session, whether it is an occasional Tuesday or Wednesday to the once a month session on the second Saturday. We will run anywhere between 10 to 20 trains a session.

The layout is open grid with ½ inch plywood and ½ inch foam. I have crafted many rock carvings out of plaster and molds, then covered with joint compound before adding all the scenic materials. There are over 5000 trees, many laser kit buildings, a steel mill, lights in buildings, lights along the streets, and traffic lights as well. There are rivers, lakes and water falls throughout the layout.



Why the B&O? My Dad worked for the B&O for 49 years, so how could I do any other railroad?

It doesn't seem possible that I started this whole adventure back in the winter of 2005. It is still thriving and so am I. Here's to another 20 plus years and more.



Submission Guidelines to *The Relay*

When you submit an article for publication, please submit it as a Word document (DOC, DOCX), Rich Text Format (RTF), or Google doc. Do not imbed the photos in the document as I may have to move them around the page during the layout of the newsletter. At the end of your article, please put your desired captions in separate lines and put the image number corresponding to the JPEG file name in parentheses after the caption.

Some simple DON'Ts:

1. Don't send your article in PDF format. I can't edit it or do the pagination I need to publish the newsletter.
2. Don't send multiple articles in the email. Send one article and its photos in one email.
3. Please address the email with "Article for The Relay."

LET'S FIGURE IT OUT!

Randy Smith



The other night I was going to wire my LED lights and did some quick math to determine the value of the current limiting resistor I needed (Summer 20-26 issue). So I pull out this box of electrical components from under my workbench and dig around for some resistors. They generally seem to be of different sizes, colors and shapes. No matter how you are using a resistor, limiting current for a Light Emitting Diode (LED) or setting up a voltage divider, you need to be able to select and identify a resistor. Looking at them, they have these little color bands that I am sure mean something. I need a secret decoder ring. Reading the color-coding bands on the resistor or selecting the correct wattage is a skill and can better ensure success.

For a little background, resistors are a fundamental component in electronic circuits. They are comprised of 2 wires connected by a poor conductor to prevent current flow and create a voltage drop. Resistance is measured in ohms represented by the Greek symbol omega (Ω). Resistors impede the flow of current and reduce voltage by absorbing energy and dissipating it as heat. This is expressed in Watts.

Let's not get too far ahead of ourselves. First, we need to know how to identify the correct resistor. As always, a quick search of the internet reveals a multitude of information. Figure 1 shown below is one such page courtesy of the International Fluid Power Society (www.IFPS.org). *[I had to get a plug in here for the IFPS. I have*

been a member for years and on the Board of Directors. Posters are available from the website.]

International Fluid Power™ Society
www.ifps.org

Resistor Sizing & Color Chart

COLOR	1st BAND	2nd BAND	3rd BAND	MULTIPLIER	TOLERANCE	TEMPERATURE COEFFICIENT
Black	0	0	0	x 1 Ω		250 ppm/°K
Brown	1	1	1	x 10 Ω	±1%	100 ppm/°K
Red	2	2	2	x 100 Ω	±2%	50 ppm/°K
Orange	3	3	3	x 1k Ω		15 ppm/°K
Yellow	4	4	4	x 10k Ω		25 ppm/°K
Green	5	5	5	x 100k Ω	± 0.5%	20 ppm/°K
Blue	6	6	6	x 1M Ω	± 0.25%	10 ppm/°K
Violet	7	7	7	x 10M Ω	± 0.1%	5 ppm/°K
Gray	8	8	8	x 100M Ω	± 0.05%	1 ppm/°K
White	9	9	9	x 1G Ω		
Gold				x 0.1 Ω	±5%	
Silver				x 0.01 Ω	±10%	
None					±20%	

6 Band		$350 \cdot 1 = 350 \Omega \pm 5\% 50 \text{ ppm}/^\circ\text{K}$
5 Band		$268 \cdot 100 = 26.8 \text{ k}\Omega \pm 10\%$
4 Band		$47 \cdot 1\text{k} = 47 \text{ k}\Omega \pm 1\%$
3 Band		$29 \cdot 10\text{k} = 290 \text{ k}\Omega \pm 20\%$

Typical resistors have a $\pm 5\%$ band. Tighter tolerances can be found. The tighter the tolerance, the more expensive the resistor. What is this tolerance?

If I have a 1000Ω resistor with a 5% tolerance, that means the actual resistance value can vary between 950Ω to 1050Ω . For most appli-

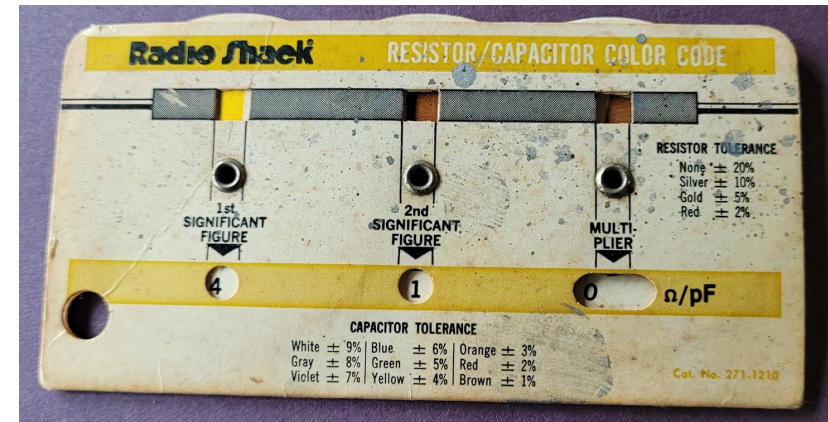
**FIGURE 1:
RESISTOR COLOR
CODE**

For those of you who remember the good ole' days of Radio Shack you may have one of the wheel decoders shown in Figure 2 or something similar.

Either way, the result is the same. Most resistors have 3-4 bands. Looking at our decoder, we see that the first two bands reveal numbers (0-9), the third reveals a multiplier (0.1, X100, X 10000, etc.) to reveal the value

of the resistor. The final band gives a tolerance.

cations we deal with, this is 'good enough'. This variance is a result of the materials and processes used to manufacture the resistor.



I look at the resistor and all I see are some color bands. You just need the secret decoder ring! Resistors typically have 3-5 color bands which each give an additional piece of information. In modern schemes, the 3-4 bands (close together and held to the left) represent the value of the resistor while the one separate band (usually after a small gap and to the right) represent the value of the tolerance.



Using the color coding in the chart, our 1000Ω resistor would be BROWN, BLACK, RED, GOLD.

Now that we have determined the resistance value we need, what about choosing the correct power rating?

As you can see above, I have three 1000000Ω or 1MΩ resistors, all with the same color-coding bands (BROWN, BLACK, GREEN, GOLD). What is the difference other than they are different sizes? The resistors shown are ½ Watt, ¼ Watt, and 1/8 Watt. That is great, but what is a Watt (Who's on first)?

A Watt (W) is a measure of power. In this case, it is the amount of energy dissipated by the resistor and is observed as heat. A standard light bulb or your computer gets hot, because they are just big resistors (25-150 Watts). In this case we are not talking about that magnitude of heat, but the concept is the same. Remember the Easy Bake Oven baking a cake with a 100W light bulb?

You may be asking yourself, why do I care about wattage? Under-sizing your resistor could cause premature failure, poor performance, or worse. For a demonstration and further explanation, a YOUTUBE search for 'How to calculate resistor wattage' will yield a video by "TechStudyCell" which shows an improperly sized resistor melting down.

Let's look at a Watt and how we would size the proper resistor.

Power, expressed in Watts, is defined mathematically as:

$$\text{Power}(P) = \text{Voltage}(V) * \text{Current}(I) \text{ or } P = V * I$$

Using Ohm's Law or $V=I*R$ and substituting we also get

$$P = V^2 / R \text{ or } P = I^2 * R$$

In this example, I determined the resistor I need is 1KΩ (1000 ohms). I will have 0.012 A (amperes) passing through at 12 V (Volts).

Using the known values and substituting into the equation:

$$P = (0.012A)^2 * 1000\Omega \text{ so } P = 0.144 \text{ W.}$$

In this case, a 1/4 W (0.25 W) resistor would get the job done with plenty to spare.

For a larger current of 0.048A:

$$P=12VDC * 0.048A \text{ yields } P=0.576 \text{ W}$$

In this case, using the next higher size, a 1W resistor would be needed. Personally, I would always try to have some cushion in the sizing of your resistors due to the tolerances (variances) previously discussed. I have seen a rule of thumb that says a resistor should be sized such that it is not required to dissipate more than 75% of the rated load for continuous use.

As you can see, none of this requires an exceptional amount of math skills. Simple multiplication, division, and substitutions. Nothing new from the 2nd grade. Remember these problems?

$$2 + \square = 4$$

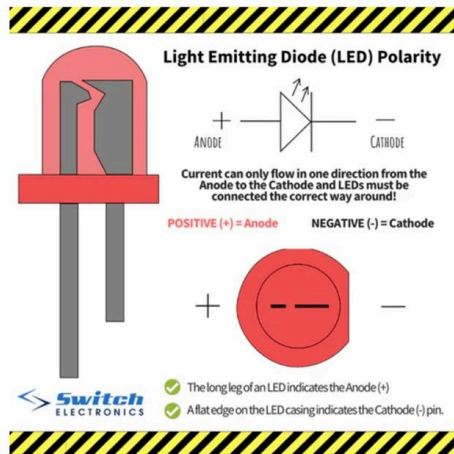
You can do this. Current, Voltage, and Resistance can be measured using a multimeter and resistors can generally be determined by reading the color bands. I recommend selecting a resistor using the bands; however, measure using the multimeter for a more accurate value. It is also a good check as the bands are small and my eyes are not getting better with age.

We have now selected a proper resistor based on the resistor value and power dissipation requirements. This fundamental skill is a basis

for other projects such as LED lighting, pull-up or pull-down resistor for inputs to a microcontroller, or voltage dividers. We will cover these things in future articles.

Recalling the last issue's article on lighting, I would like to put this to use to place some marker lights on a caboose. I have two lights with a given Forward Current at a given voltage. I can size the resistor and attach to my track pick-ups. All is good...so why doesn't it work?

Unless you are running this on a DC system, this will not work. Recall that LEDs only allow current flow in one direction. DCC provides an AC voltage thus it is constantly alternating the direction of current flow and will only work half the time. Compound that with the forward voltage requirement to get the LED to light, and it is only on for a small fraction of the time. See the figure below for a review of LEDs and the anode/cathode (Courtesy Switch Electronics).



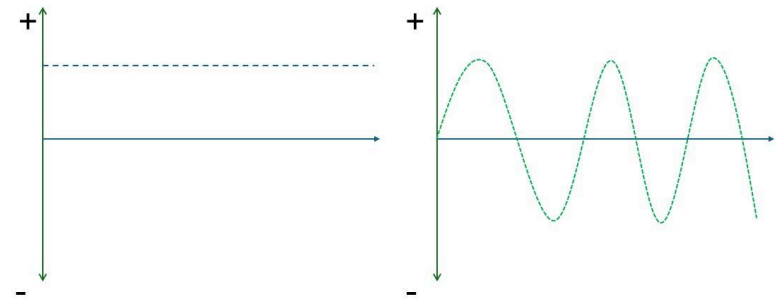
So how do I get this to work? I can buy passenger cars with LED lighting, so it is possible. What makes it work?

The answer is a rectifier. A rectifier takes the Alternating Current (AC) provided to the track and 'rectifies' it into a pseudo DC... or at least a modified AC that only

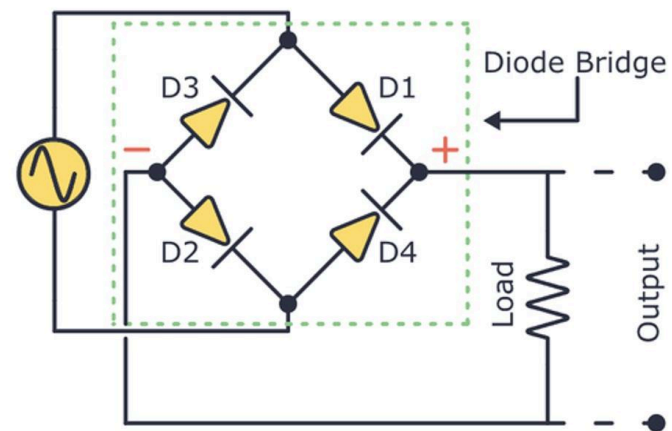
allows current to flow in one direction. When comparing AC to DC we can see in Figure 5 below that Direct Current creates a steady voltage whereas the alternating current creates a sine wave with a

varying direction that causes the current to reverse direction on the lower portion of the wave.

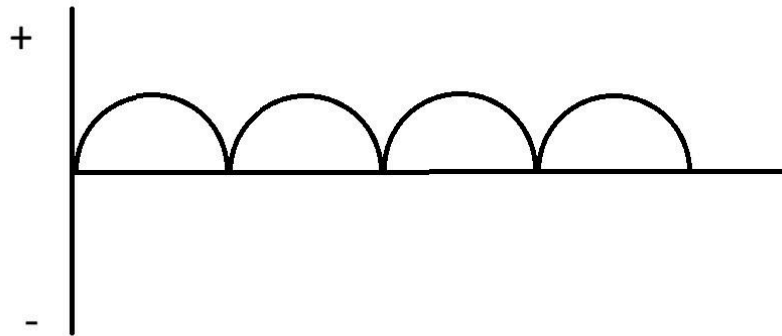
Direct Current - DC vs. Alternating Current - AC



To solve this dilemma, we use diodes. Remember, a diode (D) only allows current flow in one direction. Imagine a check valve in a piping system except in electrical terms. To keep our current flowing in the same direction, we essentially put in a bridge circuit with diodes that route the current differently depending on which side of the sine wave is coming to your load. Figure 6 shows a bridge rectifier.



As the current proceeds through the bridge on the top side of the sine wave, it passes through D1, the load, then D2. It is blocked in one direction so only the forward voltage side gets through. When current reverses through the bottom side of the sine wave, it passes through D4, the load, and D3. The reversed current flows through the other side of the bridge only providing current in one direction to the load. This essentially modifies the AC Sine wave seen by the load as in Figure 7 below.



For most applications, this will provide adequate performance. It may flicker a bit as the voltage drops below the LED forward voltage; however, this can be addressed with a capacitor to smooth out the output to be more linear like a DC voltage. Providing power during the valleys in the wave form. Think like a keep alive circuit to buffer the rectifier output.

There are electronics kits out there to provide the components and most provide an IC circuit instead of 4 diodes wired in a bridge configuration. Figure 8 below shows the rectifier kit I purchased.



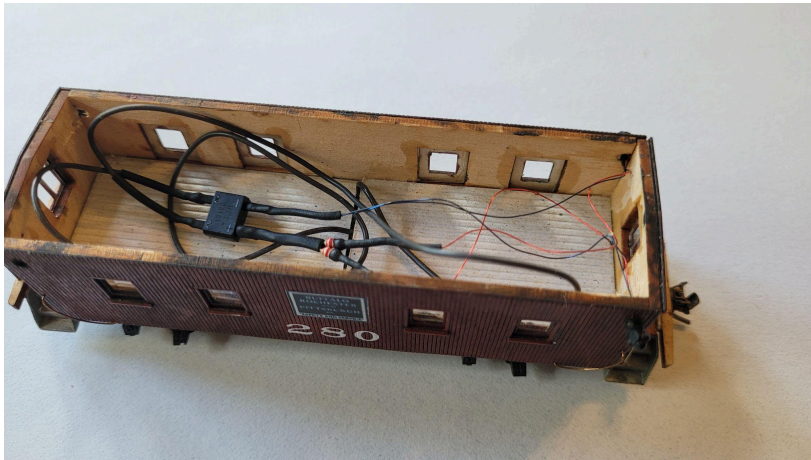
The key is identifying and connecting your wires to the correct pins. In this example, the pins on the rectifier are marked on the top of the component. The markings can be seen better in Figure 10. Looking at Figure 10, the AC connections are labeled with (~) on the left and a (+) and (-) marking the DC pins on the right. You can also see the LED current limiting resistors also provided in the kit. For other rectifier IC components, a diagram typically identifies the pins with numbers. The number one pin is marked with a dot on the top or there is a semicircular indentation on one side when viewed from the



top to give proper orientation to a diagram and insertion into the

socket. Figure 9 shows an example of an IC socket and chip. The indent is on the left.

Now that we have an understanding of what needs to be done, a few quick connections with the soldering iron of the AC leads from the truck pick-ups and the DC connections to the LED Light Anode to Positive (+) and Cathode to Negative (-). Figure 10 shows the completed project. We are in business.



As a general rule, if using IC pin components, I recommend using an appropriate sized socket as shown in Figure 9. Soldering to that instead of soldering directly to the IC component is a better practice. Sometimes the heat of soldering can damage IC components. By soldering to the socket and then putting the component into the socket, this can be avoided. Just pay particular attention to the orientation of the pins when you flip over the socket to solder the leads and when inserting the chip into the socket.

With the circuit all soldered together, we can put the caboose on the track and we have lights! Depending on the components and connections to the track through the wheel pick-ups, there may be some issues that cause flickering of the lights as the car rolls down the



track. These issues can be solved with a capacitor on the load side of the rectifier. We'll talk more about capacitors in a future article. If your lights do not light, check your pick-ups to be sure you are pulling power from both sides of the track. Look at Figure 11 and notice the red dots on the trucks. These must align to opposite sides of the track.

Hopefully all of that is successful and you properly sized a resistor, installed a rectifier, and have lights in your caboose!

CONGRATULATIONS! YOU DID IT!

In the next issue, together we can tackle another perplexing electrical project. In the meantime, never let a little knowledge stand between you and realizing your vision. Just step back, exercise your curiosity, and Let's Figure It Out!

Every Cap (Not Picture) Tells A Story

Kurt Thompson, MMR

Welcome to a new column for *The Relay*.

An old Rod Stewart song is entitled “Every Picture Tells A Story.” The same can be said about most of the caps in my closet. Each one is a reminder of a certain event from my model railroading or railfan adventures (or misadventures) and from my life. So I’ll begin this new column by looking at the first hat I bought.



Yes, it is the venerable railfan/model railroader standard - the steam engineer's cap. It is festooned with buttons and patches. I purchased this hat on the weekend following my 16th birthday in October of 1976.

My father had purchased a ticket for me on a steam excursion behind Southern 4501. The cost of the round trip ticket from Morristown, TN to Asheville, NC was \$16.00.

The full excursion was from Knoxville, TN to Asheville, NC via Morristown, Newport, and many small hamlets up through the French Broad river valley over the hills to Asheville. I had a cheap camera back then and it took square pictures. I still have a couple of the pictures.

I spent more on the hat, buttons, patches, and a cheap set of cinder goggles than the ticket cost my father. A few months later, my mother kindly sewed on the patches for me after she and I arranged them and the buttons.

As I look at the hat now, I feel the PRR and “I Rode Behind..” buttons should have been and need to be switched.

The hat brings back many fun memories of a long day riding the excursion. I enjoyed the steam whistle echoing in the valleys and gorge of the French Broad River.

In the future, I would like others of you to share a hat story or two.

Division Book Bash (or Sale)

In late August, Viki Lackey contacted me (Kurt) and said she would like to dispose of her deceased husband's collection of over 1000 railroad and transit books. With the help of fellow Division member, Don Marvel, we removed 16 cartons and 14 reusable grocery bags worth of books from her residence. These are being offered on a first come, first go basis. The list can be accessed via the link below or through our Division website.

https://docs.google.com/spreadsheets/d/1ldlJbpmipimjEaFyn5KkJvZlZGXPE7Jzd9bqsc3-s_RM/edit?usp=sharing

This Book Bash/Sale is a fundraiser for the Division. Unless noted with a special price, all books are \$10/each. Noted exceptions are any Morning Sun “In Color” books are \$15/each. There are also some Pennsylvania RR books, notably the entire nine volume set of PRR Triumphs. These are \$40/each or \$220/full set.



Books will not be shipped or mailed. You will need to contact me through my personal email (kurtthompson@gmail.com) to make arrangements. I'm willing to meet you somewhere in the middle or arrange a time for you to pick up your books at my house. Several people took the option of picking their books up at the recent Modelers Day In.



Division Achievement Program Update

Kurt Thompson, MMR

Since the beginning of the year, I've made a couple of trips up to Harford County. The first one was to Scott Wooddell's after he asked me to arrange a Golden Spike evaluation on his layout. Along with the Golden Spike, my evaluation team and I went ahead and did a check of the layout to confirm his Scenery award.

With the presentation of his awards at the Perryville Station meeting, Scott has started a progression of new work for me in Harford County. On Tuesday, July 28th, Jim Fisher and I performed a Golden Spike evaluation at John Zdanis' layout. John and I discussed where he stands with work already done that will lead to him earning two or three certificates - mainly scenery, electrical, and civil.

That was followed up two weeks later in mid-August with another Golden Spike evaluation at Ken Poznianiak's layout. As part of that I went over the requirements for many of the AP certificates that Ken is currently partially done with. Scott Wooddell, Dave DiCarlo and I completed the evaluation for Ken's Scenery certificate. Ken's close on completing his AP Civil and Electrical, along with Motive Power, Structures, and Scenery. With this start, Ken's well on his way to completing his Master Model Railroader, if he chooses. Ken's got the work done; now it's time for paperwork.

On the same day, the evaluators and I stopped by Dave DiCarlo's layout. Dave and I also did a review of the certificates he's on the way to completing.

Growing Through Operations: My Journey with the OPSIG Achievement Program

Alan Feldman

Model railroad operations have a way of pulling us deeper into the hobby. What starts as "running a train around the layout" quickly becomes something richer: teamwork, problem-solving, communication, and the satisfaction of making a miniature railroad function like the real thing. Over the past year, I decided to lean into that side of the hobby by participating in the **Operations Special Interest Group Achievement Program (OPSIG-AP)** and the experience has been both rewarding and eye-opening.



Recently, I received an email from the OPSIG-AP Board of Trustees confirming that my latest submission had been approved. The note read:

“I am happy to inform you on behalf of the Board of Trustees that your submissions for the following OPSIG Achievement Awards have been approved. Thank you for providing the documentation we needed to approve this submission with confidence.

ALAN FELDMAN - C&E”

The **C&E (Conductor & Engineer)** award represents dozens of sessions spent learning the rhythm of prototype-inspired operations: blocking cars, handling paperwork, coordinating with dispatch, and working as part of a crew. Unlike some of the other categories, the C&E award **does include a written test**, but all study materials are included, and **free to download**. The test isn’t meant to intimidate - it’s designed to reinforce good operating practices and help operators understand the “why” behind the work we do on the layout.

Beyond C&E, I also completed achievements in several other categories:

- **Dispatcher** — managing traffic, issuing authority, and keeping the railroad fluid
- **YardMaster** — sorting, blocking, and keeping the yard running efficiently
- **Mentor** — teaching new operators and helping others grow their skills
- **Volunteer** — contributing time and energy to the ops community

One award you won’t see on my list *yet* is **Key Helper**. That one is absolutely within reach, but it does require a layout host to give me the gentle nudge needed to complete the application—*nudge nudge*. It’s on my radar, and I’m looking forward to checking that box soon.

I’m also exploring a few additional categories that look both fun and challenging, including **Office Crew**, **Author**, **Traffic Manager**, and

Clinician. And who knows—maybe someday I’ll even earn the **OPSIG Host** award and eventually be welcomed into the coveted, sought-after, and somewhat tongue-in-cheek **secret society of the Operations Ninja**. A model railroader can dream.

[EDITOR’S NOTE: The OPSIG-AP program is not associated with the NMRA’s Achievement Program. There is no relation between the two achievement programs.]

Insights from Our Division’s Zoom Meeting with OPSIG President Paul Weiss

On February 6, 2025, the Chesapeake Division had the opportunity to meet over Zoom on with OPSIG Chairman of the Board of Trustees, Paul Weiss, who gave us a guided look into his layout and shared a deeper understanding of what the OPSIG offers. He discussed what makes an operations session work best for all involved. His presentation highlighted how the organization supports operators at every level, from beginners to seasoned dispatchers.

Paul walked us through several features and benefits of OPSIG membership, including:

- **The Membership Directory** — a powerful tool for connecting with operators, layout owners, and regional groups.
- **The Calendar of Events** — a centralized listing of operating sessions, regional meets, and special events.
- **Invite-Only Operating Weekends** — curated multi-day events on some of the best layouts in the country.
- **The Dispatcher's Office** — OPSIG’s quarterly newsletter, widely regarded as one of the most polished and informative publications in the hobby.

But the moment that resonated most with the group was when Paul said:

“We don’t take ourselves too seriously — this is fun.”

That comment alone was the kick in the pants I needed to finish my studying and finally commit to taking the C&E test. Luckily, I passed on the first try. Paul had warned me months earlier to take the study materials seriously - some operators have attempted the test without preparation and didn’t pass. It’s open-book, but it’s also timed and completed from your computer at home, so being familiar with the material makes all the difference.

The recognition that comes afterward is genuinely satisfying. The OPSIG certificates are beautifully produced, printed on high quality paper with a gold border that gives them a professional, almost railroad office feel. Each certificate also comes with an accompanying pin - about an inch in diameter, solidly made, and surprisingly high quality. They make the accomplishments feel tangible and worth proudly showing off. They’re the kind of pins you’d proudly wear on a lanyard at an op session or display on a bulletin board next to your timetable and train orders. The pins were a surprising and nice touch included with the certificates.

What the OPSIG-AP Offers

The OPSIG Achievement Program is designed to encourage participation, learning, and community involvement. It’s not a competition, and it’s not an exam (except for the C&E test, which is more educational than challenging).

Instead, it’s a structured way to: build new skills; explore different roles; support the layouts and clubs you already enjoy; celebrate the work you’re already doing; and have fun

Whether you’re a seasoned dispatcher or someone who has never tried a yard job, the program gives you a path to grow at your own pace.

And if you know any younger operators, there is a **Ninja In Training** award that can be given out. Perhaps this is something we can have on hand in our Division booth for upcoming shows as an encouragement to younger operators?

Why You Might Want to Join

One of the best parts of the OPSIG-AP is how accessible it is. Membership is only **\$10 per year**, and **NMRA membership is not required**. The program is welcoming, flexible, and designed for operators of all experience levels.

Two helpful links for anyone interested:

- **OPSIG-AP Program Website:** <https://www.opsig-ap.org/>
- **Main OPSIG Website:** <https://www.opsig.org/>

Both sites offer resources, study materials, event listings, and ways to get involved.

A Personal Invitation

As someone who has benefited from the program, I’d love to see more members of our Division get involved. We already have a strong operations community, and the OPSIG-AP is a natural extension of what many of us are doing at sessions every month. It’s fun, it’s motivating, and it helps strengthen the broader network of operators across the region.

If you’ve ever thought about leveling up your ops experience - or simply want a new way to engage with the hobby - this is a great place to start.

Switchman's Nightmare Or Switching It Up

Russ Sampson

Part 1
Building the Test Bed

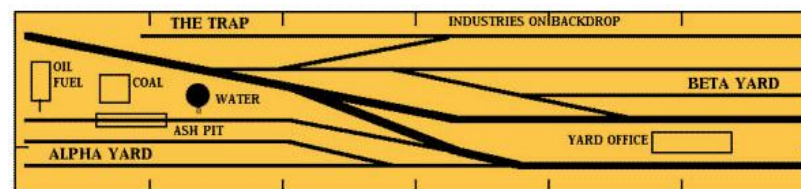


Everyone in model railroading has strengths and weaknesses. I'm certainly no exception. While I really enjoy building models, scenery is a struggle. I also have difficulty with operations, especially yard switching. I model in HO and my home railroad is under construction, but it's not operational enough to practice switching on.

While reading one of the hobby publications, I saw an article comparing John Allen's 'Time Saver' to Linn Westcott's 'Switchman's Nightmare.' It got me thinking. What if I built a small shelf style switching layout to use for practice? Sure, I could practice switching, but I could also practice some scenery techniques on a smaller scale before committing to my larger home railroad. I could also use it as a test bed for railroad electronics and any other crazy ideas I might come upon. So, I started doing a little research to see what would suit me best. The 'Time Saver' was designed to be a game to play against the clock. Since I already liken switching to a slide puzzle, and didn't want to solve a slide puzzle against the clock, I wasn't particularly drawn to that choice.

But I still liked the idea of a small layout that could pose serious challenges for learning switching moves. I reviewed several great track plans with industries, mainline interchanges and other features. I finally circled back to Westcott's 'Switchman's Nightmare.' At sixteen inches wide and extending it to seven feet long (9.3 sq. ft), it's the perfect size to be easily portable and still manageable by one person. Almost as an afterthought, I realized that it would still be

large enough to qualify for an NMRA Golden Spike Award. The requirement to qualify is 8 sq. ft. minimum.



Switchman's Nightmare

by Linn Westcott, c. 1958

HO, 16x72in, #6 switches

I first drew up the track plan in XTrack CAD (free, open-source software) to prove it would all work with the track and turnouts I had on hand. And, yes, I built this mostly with leftovers and extra stuff that wasn't going to be part of the larger home railroad. So, once the plan was proven, I built the benchwork. Again, just leftover 1" x 3" lumber and 5/16" plywood, nothing special. Since most of the tracks are parallel, I laid them out with a chalk line. I like to use cork roadbed, and I've found that cork squares from the craft stores are the same thickness as the precut roadbed. The squares are great for yards because they are all one piece. I just use white glue to stick the cork to the plywood making sure to transfer my track centerlines as I go.

On my home layout, I only used code 100 flex-track in the hidden staging. All the exposed track is code 83, so all the leftover code 100 track was fair game for this new railroad. I was fortunate enough that it also included all the necessary turnouts. Since my choice of leftover turnouts required electrical isolation gaps for the frogs, I determined where the gaps should be and then started laying track. Code 100 track is really easy to work with. You can stick it down with construction adhesive, double stick tape or track nails. Once all the track was in, I ran my fingers over the track to feel for rough spots. Then I rolled my test car (clear acrylic car) through all of the track to be certain there's no bad spots. Proper roadbed, track and ballast all count toward the NMRA Golden Spike certificate. Follow-

ing a successful test, I drilled holes and installed feeder wires from the rails through the plywood.



I took the entire railroad outside and spray painted the track and roadbed with Rust-Oleum Camouflage Brown to cover up the shiny sides of the rails and mute the glossy black plastic ties. If you are quick, you can wipe the paint from the railheads before it has a chance to dry. Otherwise, like me, you may need some paint thinner and elbow grease to clean it off.

After the paint dried, I turned the railroad over and installed terminal blocks where the feeder wires came through the plywood. I prefer the European style terminal blocks as opposed to screw terminals or barrier strips. The reason being that the wires are less prone to slip out from under the screws as they are tightened and there is no large exposed metal screw head that may contribute to a short circuit. Since the railroad is small and not expected to have more than two engines on it at a time, I used ordinary thermostat wire (18 gauge) for the feeders and the power bus. The thermostat wire is another leftover that I had on hand.



I made a decision to wire the entire railroad as one power block. All of the feeders would be fed from the same common power bus. I could run the railroad with DC and a single switcher, or, if I used DCC I could run multiple engines. Having used terminal blocks, I could easily convert it to block control if I chose to do so. Being able to run two trains simultaneously is another requirement of the Golden Spike certificate.

The next step was to check my work. I got my trusty multimeter and tested all of the wires and track for continuity and short circuits. Having passed that test, I connected an old DC power pack to the power bus. I still have several old Athearn 'Blue Box' engines that haven't been converted to DCC, so I chose one to be the guinea pig. It was immediately obvious that I hadn't gotten all of the paint off of the rails. The good news was that all tracks functioned, so I could run a train over the entire railroad.

At this point, I'd invested about a week of hobby time into this little railroad. Most of the materials were leftovers from other projects. I could stop here and have a basic switching railroad.

Or, I could try out that Arduino servo controlled turnout project I've been reading about!

Part 2 Controlling Turnouts

Having completed the benchwork, sub roadbed, trackwork and track wiring, it was time to focus on the turnouts. My home layout has all the turnouts operated by Tortoise switch machines. I just don't like the idea of people reaching their large hands into my scenery in a panic as their train approaches the next turnout, so I've made it easy to move the points from the aisle. For this little railroad, I wanted to do something different (and less expensive). There have been several articles written describing servo control of turnouts. Joe Fugate wrote a great series in his publication, *Model Railroad Hobbyist* between April and June 2024, that really inspired me to try adding this to my new little railroad.

Now, two of my best friends are Google and Amazon. They are my constant companions when I want to try something new and different. Google is always ready to teach me new stuff, and his helper, YouTube can even show you how. Google has another helper, AI that gathers information from different sources and summarizes it for you. Be cautious of AI though, because he's been known to make mistakes. My other friend, Amazon, sends me almost anything I need for these little electronic projects and doesn't usually charge too much.

So, Google helped me find more information on servo-controlled turnouts. I was able to find drawings for servo mounts that I could make from styrene and information about controlling servos with an Arduino microcontroller. There were several example sketches for

controlling servos. AI can even generate a sketch for you. Arduino calls the program that runs on their board a "sketch." One of the concepts that I've been contemplating for my larger home railroad is "route control." Since you can tell an Arduino to do whatever you want, why not try adding route control into the mix as well.

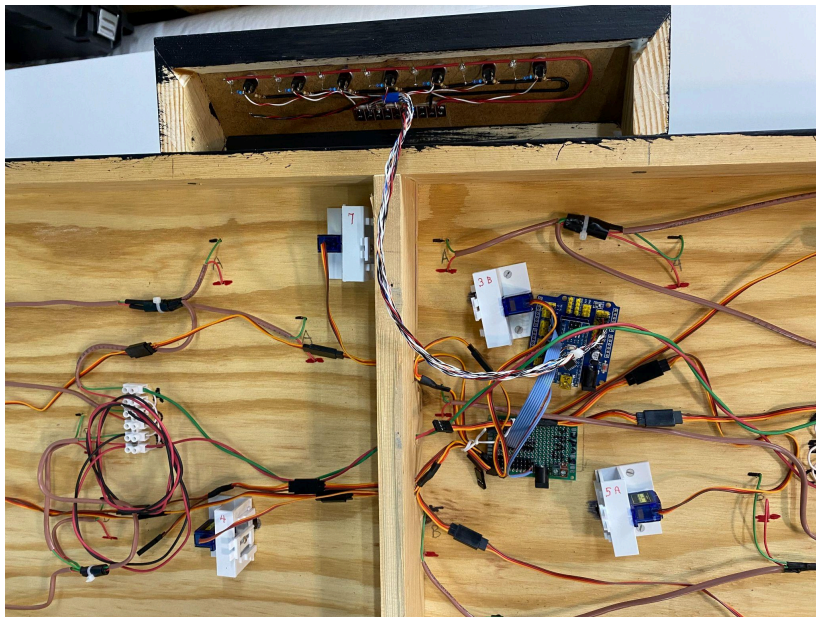
I got my shopping list together and went to my old friend Amazon. I bought an Arduino Nano clone, an in/out board to make wiring easier, a buck/boost power converter to feed it the right voltage, some pushbutton switches so I can communicate with the Arduino and a bunch of cheap servos. Total damage was around \$50 to control ten turnouts. I already had a 12-volt DC power brick so I didn't need to buy a power source. Ready to get to work.

When my package of goodies arrived, I laid everything out on the workbench and started connecting wires per one of the many examples I'd seen on the internet. As I reread the accompanying text, I learned that the servo motors draw a lot more current than the Arduino can provide. I had to go back to Amazon and buy something called a PCA9685 servo driver board that can handle the current. Oh well. I can still use that in/out board I purchased to connect the pushbutton switches to.

Wiring an Arduino is actually pretty simple. Almost everything has little plugs or sockets on it, so there's nothing to solder. It's just a matter of plugging the wires on the right pins. Since this wasn't installed on the railroad yet, I was considering it to be more of a learning experience at this point. I returned to my examples and wired everything up. OK, it's all wired up, but nothing is happening. That's because the Arduino needs instructions.

To get an Arduino to do anything, you have to give it instructions, and the way to do that is by connecting it to your computer. You'll need to download and install a small piece of software called an Integrated Development Environment (IDE). This is where you write and/or edit the instructions (sketch) and upload it to the Arduino. I

started out by copying one of the many examples from the internet and loading it into my Arduino. I continued to edit the sketch and observe the results until the servos started to act like switch motors. I found I could control the start and stop point for each servo and the speed the motor moves. That's all good for controlling one turnout at a time, but what about route control. For that, Arduino uses a function called an Array. This time I went to Google and AI to create a sketch that would control servos with the Array command. After a little more editing (several hours), I had something that could operate my turnouts to route a train across my little layout from any track to



any other track with the touch of a single button. Success! I had previously found a plan for a servo mount made from styrene on the internet that looked like it would work, so I went ahead and built ten of them. I mounted them under the turnouts and moved all of the Arduino stuff from the work bench to the railroad connecting wires as I went. I built a little control panel by printing out the track plan on my trusty inkjet and covering it with clear laminating plastic. I stuck that to a piece of Masonite with spray adhesive and then drill-

led holes for the pushbuttons and some LEDs to show which route was in use. I have some woodworking equipment at home so I was able to make a frame for the control panel and mount it to the railroad.

Having power operated turnouts counts toward the Golden Spike certificate and LEDs to indicate their position can be an added bonus.



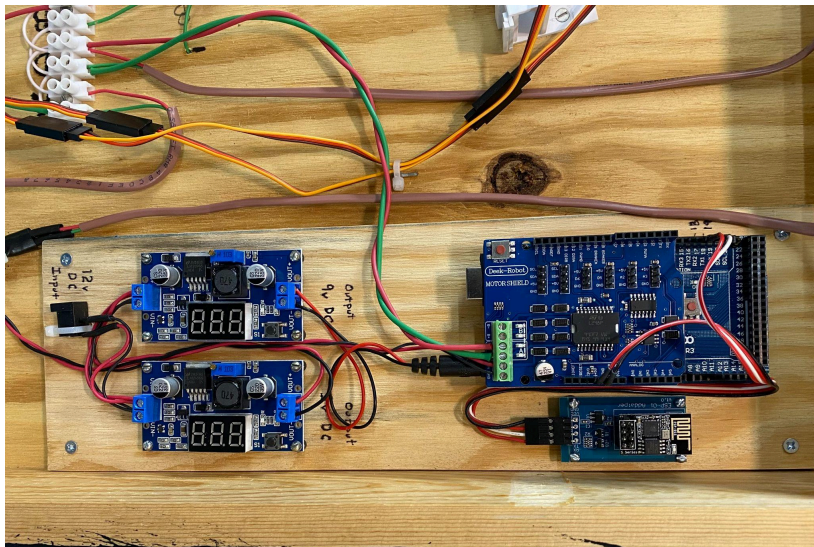
This Arduino stuff has a lot of possibilities. I wonder what else I can incorporate into this little railroad? Maybe a built in DCC system with WIFI.

Part 3 Adding a DCC System

One of the great things about this hobby is that every time you think you're done, you realize that you've only just begun. Such is the case with electronics and microcontrollers. You can automate as little or

as much as you want to and since I enjoy playing with electronics, of course, I would keep adding more.

I was intrigued when I learned about DCC-EX, a do it yourself, homemade DCC system. They have a great web site and everything is open source. The system uses an Arduino Mega, which has a more powerful processor and more memory than the Arduino Nano I used for the servos. You can operate the system through JMRI (open source) and connect via USB or WiFi. Or operate it with a cell phone app (Engine Driver for Android or Wi Throttle for iOS) via WiFi. There are many other throttle options listed on their website. Another great thing about the system is that anyone visiting can download the phone app and run a train. It is standalone WiFi so you're not tied to your home WiFi. It seemed to me that adding this DCC capability would make my little railroad very self-contained and easily transportable.



I navigated to the DCC-EX website and read the 'Getting Started' page. There are options to purchase a Ready-To-Run command station/booster or Do-It-Yourself. Of course, I chose the Do-It-Your-

self option. There's a guide for purchasing parts and a download page to access the open-source software that runs the system. Because this system is open source, it is constantly evolving and has changed since I built my system. It is still a very inexpensive way to add DCC to your railroad. I purchased all the compatible hardware



(Arduino Mega clone, motor shield, and WiFi shield) from Amazon for around \$75. I planned to share the same power brick I was already using with the turnouts so I didn't need to buy another. Assembly was just a matter of aligning pins from one circuit board to the next. The software download and install were also very straightforward. I had a working DCC system in less than an hour.

Wrapping It Up

My little railroad can now run trains and switch cars, but it looks a little bare on the surface. Time to start thinking about scenery. As of this writing, I've ordered a few background building flats through

one of the brick-and-mortar hobby stores. Once they're built and weathered, and I'm satisfied with the placement, I'll ballast the track and add some foreground details. With any luck I'll end up with a nice-looking switching railroad.

This little railroad started out as a testbed to practice switching and scenery techniques. Even though it has yet to fulfill those goals, it has already given me a lot more. I'm looking forward to completing the Switchman's Nightmare Railroad in the coming months where I plan to practice switching while I continue work on my primary home railroad. And, who knows. I may even earn my first NMRA Achievement Certificate along the way.