Summer 2026

# The Relay

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

NMRA

CHESAPEAKE DIVISION

## View from the Cupola

Summer is in full swing, and what a wonderful summer for railroading fans it has been. The most high-profile item in recent railroading news has been the travels of Union Pacific's Big Boy locomotive in our neck of the woods. Communications with fellow model railroaders, including email and Facebook posts, confirm that many of you were able to see it at one location or another while it visited here in the East. I regret not seeing it myself, but I have enjoyed the many YouTube videos that folks have made available as they documented their sightings of and experiences with the Big Boy. These videos stir excitement and inspire an appreciation of trains and the role they have played in American history.

Fortunately, I did recently get to experience some prototype railroading that I do not typically see. In April my wife, Laura, and I traveled to London, where we spent a day visiting the British National Railway Museum in York. British rail had not been a particular interest of mine – not until the day of our visit to the museum. The National Railway Museum certainly sparked an interest in and an appreciation for it. The museum highlights a fascinating and interesting history and displays a terrific collection of locomotives, cars, and thousands of artifacts from British rail. To top it off, a beautifully executed computer-controlled model railroad is on display. It is lovingly cared for by volunteers who are obviously proud of the work they do to maintain and operate it.

Now, back to local news. As many of you already know, the Division has a new webmaster, Scott Wooddell, who has done a terrific job of updating and improving the Division's website. If you haven't visited it recently, please do. You will find it well worth your time.

Among the wealth of information, you will find notice of many upcoming model railroading activities on the calendar. In particular, I will call your attention to the 2026 MER convention, *Tracks to Tidewater*, scheduled for October 15-18, in Virginia Beach, Virginia. If you have not attended a model railroading convention, the regional

convention is a great place to start. It provides a readily accessible opportunity to meet and be among other like-minded hobbyists, learn what they are doing, learn something you may not already know, and perhaps gain inspiration or provide inspiration to others. I invite you to join me and your fellow model railroaders there. You'll find the link to the convention website on the Division calendar, so check it out.

Finally, as of this writing, the NMRA National Convention is just a couple of weeks away. If you attend, please share your experiences via either an article in our newsletter or a post to our website. For guidance on the former, contact our Division newsletter editor at newsletter@chesdiv-nmra.org. Regarding the latter, contact our Division webmaster at web@chesdiv-nmra.org. I would enjoy hearing about your experience at the National convention, and I expect other members of the Chesapeake Division, and beyond, will as well.

Until next time, enjoy this wonderful hobby of model railroading.

Kirk Bateman, Superintendent, Chesapeake Division

# From the Editor

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

The summer has struck and we've spent a hot and humid 4th of July. The train room is calling while the heat is making yard work untenable.

After retiring at the end of 2025, I'm just now getting into the train room. My retired friends warned me that it would be busier in retirement. How right they are; how wrong was I to doubt them.

If this issue seems a little light in content, I will reiterate my remarks (you may get tired of hearing/reading them). Write up something about what you're working on. Share it with your fellow division members. Include a couple pictures. You don't have to be Shakespeare; I'll help with the wordsmithing. You know more than you think you do and have plenty to share with others. Here's your venue.

I will be reaching out to each of you in the Division by email directly. Please respond with a small write up and couple pictures of what project you are working on on your workbench or your layout.

Kurt Thompson, MMR, Editor

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# Chesapeake Division Meets at Perryville Station

Scott Wooddell

On the last Saturday in March, the Hartford Associates for Railroad Modeling (HARM) hosted the Chesapeake Division at the Perryville Railroad Museum and Station. From start to finish, the event showcased everything that makes our organization strong: engaged members, quality presentations, a welcoming venue, and a shared enthusiasm for the hobby. It was one of those days that reminded everyone in attendance why these gatherings matter—not just for learning, but for building community.

The choice of venue proved to be an inspired one. The Perryville Railroad Museum and Station provided a setting that was both historically rich and visually engaging. Surrounded by real railroad infrastructure and active rail lines, attendees were immersed in the sights and sounds that inspire our modeling efforts. Adding to the atmosphere, the trains on the adjacent lines seemed to "cooperate" throughout the day, passing by at just the right moments to punctuate conversations and presentations. For many, this added a dynamic and authentic backdrop that simply can't be replicated in a more conventional meeting space.

The meeting began with a warm welcome and an informative presentation by Rich Hafer of the Perryville Railroad Historical Society. Rich provided attendees with an overview of the society's mission, its ongoing preservation efforts, and the development of the museum itself. His presentation highlighted not only the importance of preserving local railroad history but also the dedication of volunteers who make such efforts possible. Members gained a deeper appreciation for the work being done in Perryville and were encouraged to support the museum—whether through visits, donations, or simply spreading the word.

Immediately following Rich's introduction, the division paused to recognize a significant achievement within our ranks. Scott Wooddell was awarded two Achievement Certificates—Master Builder: Scenery and Chief Dispatcher—by Kurt Thompson, MER AP Manager. These certifications represent meaningful milestones within the NMRA Achievement Program, requiring both technical proficiency and sustained dedication to the craft of model railroading. In addition to these certificates, Scott had earned the Golden Spike Award earlier in the month, marking another important step in his progress through the program. Moments like this serve not only to honor individual accomplishment but also to inspire others to pursue their own goals within the Achievement Program.

Following this recognition, Scott Wooddell transitioned into his presentation, offering a detailed and engaging look at the history of railroads in Cecil County. His talk traced the development of rail lines in the region, emphasizing their impact on local industry, commerce, and community growth. By connecting historical events with modern-day railroading, Scott helped attendees see how the past continues to shape the present. His presentation resonated with both history enthusiasts and modelers, providing valuable context that can inform layout design, operations, and storytelling.



The third presentation of the day came from Bill McAleese, who shared his expertise on building Metcalfe Models cardboard structures. Although delivered via recorded video, Bill's presentation was clear, practical, and highly informative. He walked viewers through techniques for assembling these kits, offering tips on improving realism and durability. For many attendees, this session provided actionable ideas they could immediately apply to their own modeling projects. It also served as a reminder that even relatively simple materials can yield impressive results when handled with care and creativity.

After the formal meeting concluded, the day transitioned into one of the most anticipated aspects of any division event: layout tours. Members had the opportunity to visit several local layouts hosted by Bill Freeland, Ken Poznaniak, Dave DiCarlo, and Scott Wooddell. Each layout offered something unique, reflecting the individual interests and skills of its owner. From detailed scenery and thoughtful track planning to engaging operations, these visits provided inspiration and sparked plenty of discussion. Layout tours remain one of the most effective ways to share ideas within the hobby, and this event was no exception.

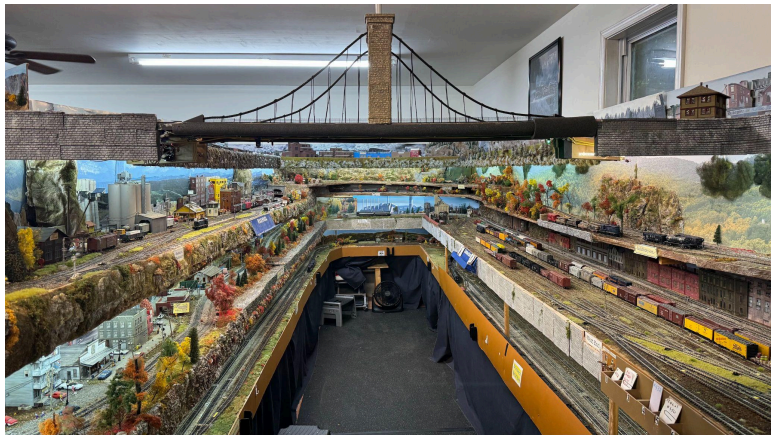
Events like this do not happen without considerable effort behind the scenes. It is important to acknowledge the many individuals who contributed to its success. From those who coordinated the venue and scheduled presentations to the hosts who opened their layouts for tours, the day was truly a team effort. Their dedication ensured that everything ran smoothly and that attendees had a positive and memorable experience.

Perhaps one of the most encouraging outcomes of the event is the momentum it creates for future activities in this part of the Division. The strong turnout, high level of engagement, and

overall success demonstrate that there is both interest and capacity for more division events in the region. By continuing to explore new venues and collaborate with local organizations like the Perryville Railroad Historical Society, the division can expand its reach and provide even more opportunities for members to connect and learn.

In reflecting on the day, it is clear that this meeting embodied the best aspects of the NMRA: education, fellowship, and a shared passion for railroading. Whether attendees came for the presentations, the layouts, or simply the chance to spend time with fellow modelers, they left with new ideas and renewed enthusiasm. As we look ahead, events like this set a high standard and offer a roadmap for future success.


A big coal mine on Bill's layout.



One segment of Bill Freehold's layout.


McAllese Metal Works on Scott's layout.


Woods Furniture is well served by rail at Scott's.


Big and modern on Ken's.


Modern equipment rules on Ken Poznaniak's layout.


A sea of freight in Dave DiCarlo's yards.

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."

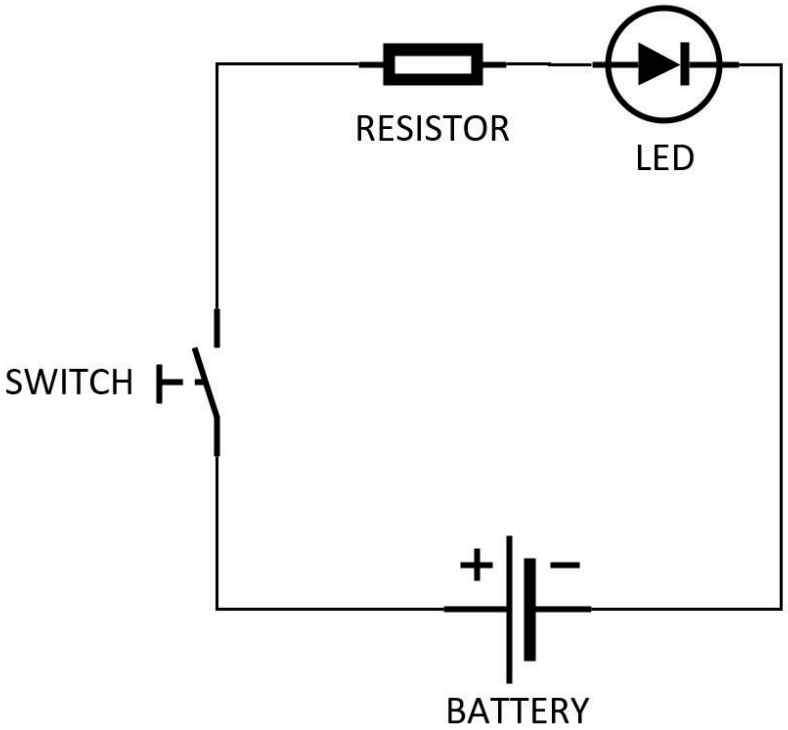

The cow doesn't mind CSX passing on Dave's layout.

The Perryville Station seems a little askew.

# LET'S FIGURE IT OUT!

Randy Smith

What better way to add realism to your layout than adding lights? Let's have an Ops session at night? But wait… unless you have night-vision goggles, that could be difficult. I need to add some lights. Maybe some platform lights at the passenger station, lighted buildings, streetlights, yard lights, lighted billboards, or just a simple crossing signal. All these things seem easy and well within your talents… right? How hard can it be? I take a light, add some wires, a simple switch, and a wall wart to power it. Voila… let there be light! As illustrated below, we have a simple circuit.




OK, how about a series of streetlights down the street. I'll do six streetlights. I have some old grain of wheat bulbs I can mount on some dowels I fashioned into street light poles or maybe I can 3D print some! I glue on the lights, mount them on the layout, and daisy chain them down the street. I plug in my wall wart and the lights are very dim or don't come on at all. What happened? It worked with one light just a minute ago? Before I get all excited, let's figure this out. Simple math and a few rules to assist. I can do this.

Don't get too anxious, I have been doing this all my life. There is no difference between this and the flashlight I use when the lights go out. What do I check first… if it was a flashlight, I would bet the batteries are dead. Let's start with the power supply, the wall wart.

The label on the housing reads:

INPUT: 120 VAC

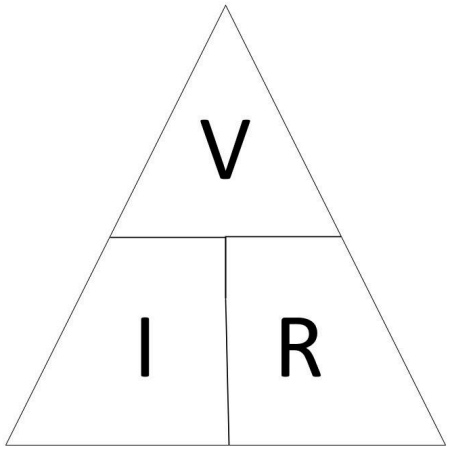
OUTPUT: 12VDC; 500mA

Seems like it should work. I put my multimeter on it and got 12VDC. That isn't it. It worked with one light, but why not with six?

I read the light package and the specifications for the lights say:

INPUT: 12VDC (Check) 400mA (Check)

Sounds good!... for one light, but I have six. What do six lights need? In this example, let's treat each light as a resistor that produces light and heat. I have a system of six lights (or resistors) wired in a series, each one needs 12VDC and 400mA to function. I wired them in a series, so what does the overall system with six lights need? How can I determine the total current in the system? First, I need to find the total resistance of the system. In this case, six resistors in a series.

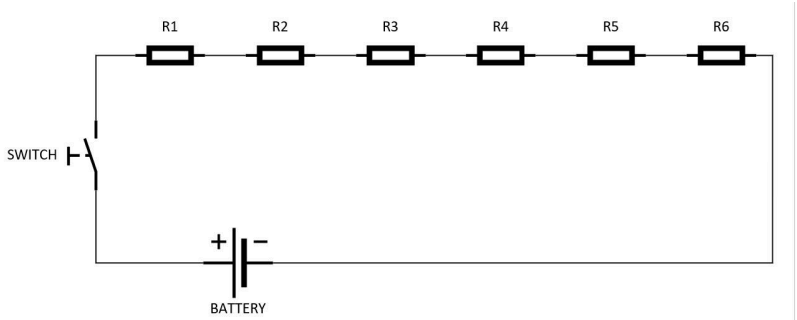



V=IxR

I=V/R

R=V/I

Ohm has the answer. Ohm's Law is the relationship between voltage(V), current(I), and resistance(R). Stated as V=I*R Using this basic relationship (equation) and knowing two of the values allows me to calculate the third. In this case, I can use my multimeter to verify the wall wart is operating at 12 VDC. Then I can measure the current and verify the light is pulling 400 mA. Solving Ohm's Law for resistance (R), I get R=V/I or 12 VDC/0.4 A to find a resistance of R=30 ohms. Now that we know the resistance of one, I can add them up to get six like the picture below.




The first rule, with resistors (lights) wired in a series, the resistances are additive. This gives the equation:

$R_{Total} = R_1 + R_2 + R_3 \ldots. + R_6$

Substituting values,

$R_{Total}$ = 30 ohms + 30 ohms + 30 ohms + 30 ohms +30 ohms + 30 ohms = **180 ohms for the system.**

Because all the current must go through all the lights wired in a series, I can mathematically combine them into one 180ohm resistor to determine the circuit characteristics. Substituting back into ohms law, knowing the given voltage and the total resistance, I can calculate the amount of current the system will allow to flow.

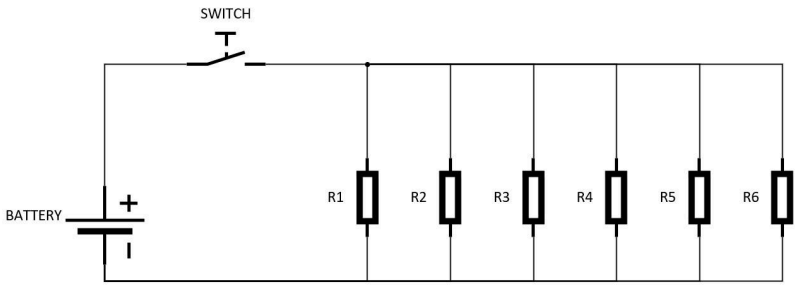
Think of it like your faucet. The water pressure is the voltage. The water moving is the current. The faucet is the resistor only allowing a certain amount to flow.

With this in mind, I'll do the math.

$$I = V / R = 12VDC / 180 \text{ ohms} = 0.067 \text{ A or } 67mA$$

With all these resistors, 67mA is all that will flow and is way less than the 400 mA needed to properly illuminate the lights, if it lights at all!

What if I take a different approach and run a bus with each light in parallel? As shown below, each light gets full voltage and the reduced resistance in each light will allow more current. Right? Instead of 6 resistors in series, I can reduce the resistance of one light back to the 30 ohms six times.




That brings us to another rule. When combining resisters in parallel the relationship is inversely proportional, giving the following equation:

$1/R_{Total} = 1/R_1 + 1/R_2 + 1/R_3 + \ldots 1/R_6$

Substituting…

$1/R_{Total}$ = 1/30 ohms + 1/30 ohms + 1/30 ohms + 1/30 ohms + 1/30 ohms + 1/30 ohms

$R_{Total}$ = 5 ohms for the system.

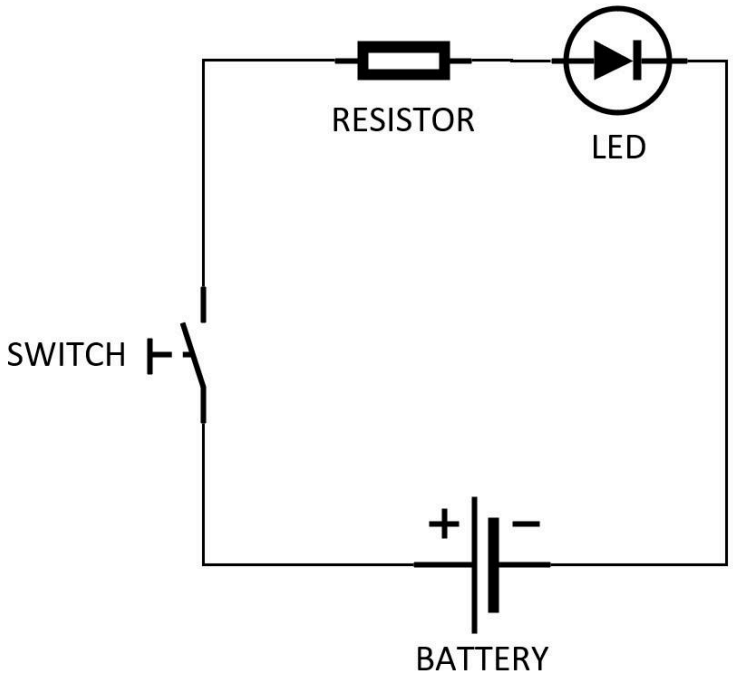
With the system wired in a parallel, the voltage is constant across each light, but the current is additive for each light. In this case, the overall system resistance is 5 ohms. Plugging this into ohms law again for the system:

I = V / R or 12VDC / 5 ohm = 2.4A for all 6 lights combined.

I need 2.4A to power the 6 lights in parallel. The wall wart can only provide 0.5 A. Why do I now need 2.4A? Look at the circuit, every branch of the circuit needs 400 mA. That introduces another rule. Kirchoff's Law says that all current going into a junction must go out. To properly illuminate our lights, each one needs 400mA. Six lights would need 2.4A as I calculated. I need a bigger power supply or a better solution…

I know! How about Light Emitting Diodes or LEDs? They draw less power, right? This is true; however, they need less power and I need to regulate that power. If I don't, the LED will act more like a single use flashbulb. LEDs are delicate that way, but I can do this. Again, simple math and applying rules or guidelines. As shown below, we have a simple LED circuit.

Let's start with one LED in the circuit like the original simple lightbulb circuit, with an exception. I must add a resistor in front of the LED to regulate the voltage and current going through the LED. Let's call it a Current Limiting resistor ($R_c$). For LEDs, I need two more pieces of information. Looking at the package of the LED, it should list at least 2 characteristics




of the LED: Operating Voltage ($V_d$) and Operating Current ($I_o$). For this example, the supplied voltage ($V_S$) will be 12 VDC. The package for the LED says:

$V_d$ = 1.8VDC

$I_O$ = 20mA

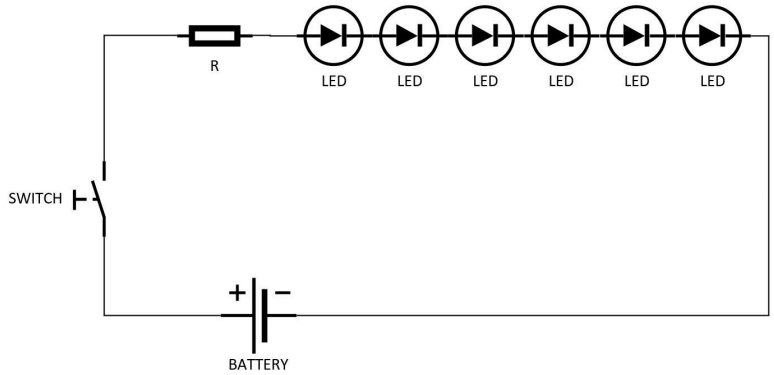
Another concept here is that the resistors in a series have a voltage drop across each. In this case, I have two components. The LED must not have more than a 1.8VDC difference to operate properly. That means the remainder of the voltage drop must occur with the resistor. To choose the correct resistor I need to determine the voltage the resistor needs to drop also allowing the required current to pass to the LED. Subtracting the LED Operating Voltage ($V_d$) from the Supply Voltage ($V_s$) gives the remaining voltage drop the resistor must control. Using a slight variation of ohm's law:

$(V_S – V_d)/ I_O = R_C$

(12VDC – 1.8VDC)/0.020A = 510 ohm

I wire it up and I have light!

The simple LED circuit with a 510 ohm resistor will draw 20 mA . This is far less than the 500mA provided by the wall wart! I'll just add 5 more and I am good to go… right? I got caught here before, I better do some math to see if it will work.




If I take the LEDs and put them in a series as shown above with our 510 ohm resistor, it should be good…not so fast. The LEDs I am putting in a series must all have the same operating characteristics ($V_d$ and $I_O$). Remember too that I need to subtract the operating voltages and each one needs a drop of

1.8VDC. Using 1.8VDC X 6 gives 10.6 VDC. The wall wart is 12 VDC, so good to go!...Right?

Wait, there is another guideline to consider. When using LEDs in a series, you cannot use more than 90% of the supply voltage. 90% of 12VDC is 10.8VDC. So far, so good. I energize our circuit and…nothing.

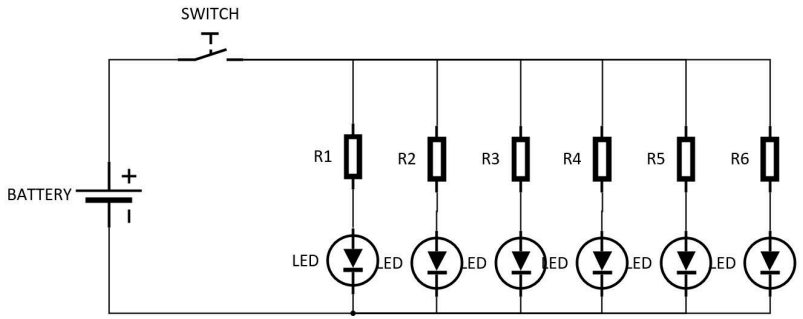
Hold on a minute. I sized my resistor in the first example so it will drop 10.2 VDC. Now I only want to drop (12-10.6) = 1.4VDC. Recalculating for that Current Limiting Resistor:

R=V/I or 1.4VDC/0.020A = 70 ohm

Swap out the resistor, energize, and I have light! It may be dim or flicker. What is going on?

This is all within the parameters of our wall wart, but the system is close to the 90% operating voltage with very little margin. Slight variations in the resistor value or LED characteristics may give less than optimal performance. I'll try a different approach and run a bus with the 6 LEDs in parallel similar to the picture below to see if that helps.

Going back to the simple LED circuit, a 510 ohm current limiting resistor for 12 volts and a 20mA forward current gave a strong illumination well within the capacity of our wall wart. I'll just add 5 more rungs ln the circuit like a ladder. Each LED has 12 VDC across it and its own current limiting resistor, but each one draws 20mA of current. As I start at the top and work my way down, I add 20 mA for each LED 'rung' junction as Kirchoff says. Adding it up I get 20 mA X 6 or 120 mA, well within the capacity of our wall wart! SUCCESS! I have six brightly lit streetlights with no flickering!



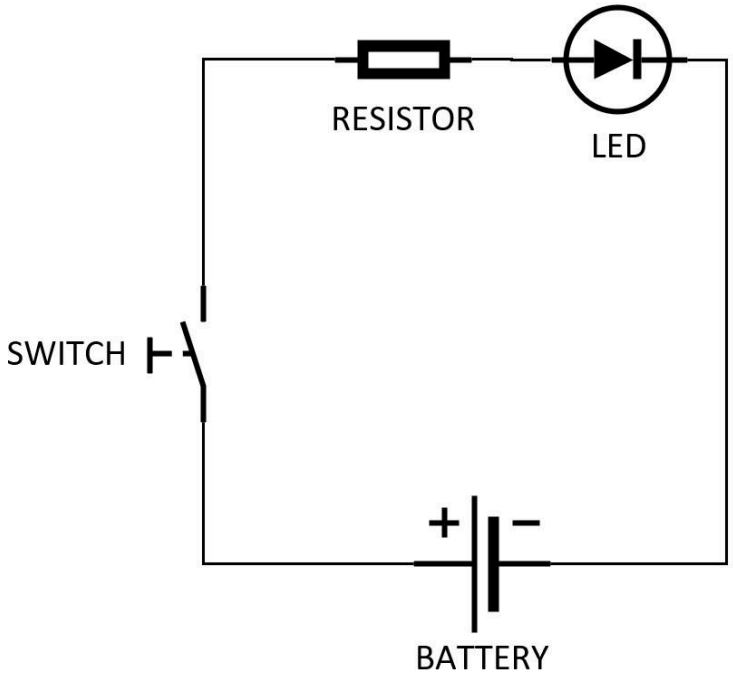

Don't take my word for all of this! Take a box of components and set it up. Set up each circuit and see what happens. Are the lights dim? Maybe you want them to be dim and can use this. Did they not light at all? Use your multimeter at different points to prove all the current is going through each component or that there is a voltage drop across each component. Seeing is believing.

Let's recap our rules and guidelines.

- ✔ Ohm's Law: V = I x R
- ✔ Kirchoff's Law: All current going into a junction must go out.
- ✔ All current goes through all components when in a series.
- ✔ Adding resistors in series: $R_{Total} = R_1 + R_2 + R_3 \ldots + R_n$
- ✔ In a series, there is a voltage drop across each resistor. If the resistances are all the same, then so are the voltage drops for each component.

- ✔ The combined voltage drop for LEDs in series must not exceed 90% of the supplied voltage.
- ✔ LEDs in series must all have the same forward current and voltage drop characteristics.
- ✔ Adding resistors in Parallel: $1/R_{Total} = 1/R_1 + 1/R_2 + 1/R_3 + \ldots 1/R_n$

I wire this together with one LED or more and it still doesn't work. There is one more important point. **LEDs only work in one direction.** They only allow current to flow one way. They are polarized like the plugs in your home.

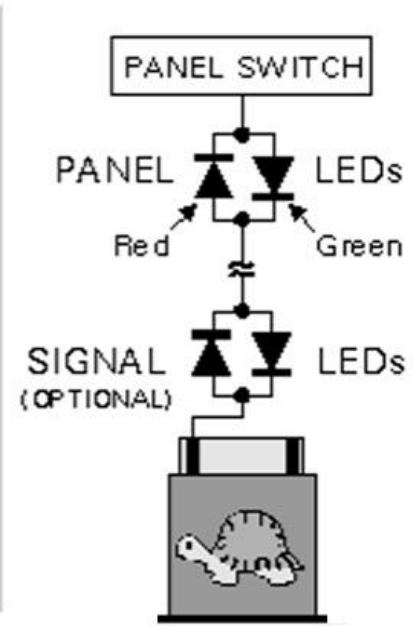



[File: LED_ILLUSTRATION]

As shown above, there is an Anode(+) and a Cathode (-). The cathode is the lead that is shorter or (on round LEDs) the side with a flat on the circular base. When putting them in a series, daisy chain them Anode to Cathode and things should work fine. LEDs also must have DC power. AC power alternates direction of current flow; consequently, LEDs only work with current flow in one direction and will not work on AC power. They can be made to work on an AC system but need an additional component. A rectifier. That is a conversation for another article.

Circuitron suggests using this one-way current flow characteristic as shown below for signaling and indication when using their Tortoise stall motors. See their literature for more information.

Keep in mind that each LED requires a voltage drop and putting too many in a series will diminish your stall motors performance. Circuitron says you can put unlimited LEDs in a series. Their solution is to just increase the voltage if you experience any performance issues. This is great if you have different power supplies for each switch motor and unlimited voltages available. Another thing to note is that they do not use current limiting resistors. In this



application, the stall motor provides the current limiting resistance. One idiosyncrasy of this application is that when the turnout motor is in motion, the LEDs will flicker and go dim till the motor reaches its stall position.

I think that wraps up this session. I hope this enlightened you on the finer points of some basic circuitry and increased your confidence in tackling some electronics projects on your railroad. We took a quick look under the layout to demystify LEDs and the current limiting resistor as well as the nuances of series and parallel circuits.

Lighting and electronics are just one more aspect of this hobby that allow you to keep learning and increasing your skill set! You can be successful with a little knowledge and following the “rules.” Feel confident in your abilities to explore and learn! Send in your pictures of your lighting projects.

You never know, adding that detail in your structure may give you that extra boost in getting that NMRA MMR recognition! Your imagination is your only limit. If you don’t know how to do something, step back, ask some questions, do a little research and LET’S FIGURE IT OUT!