

DCC CURRENTS **THE ELECTRONIC BASICS** p.56



Bachmann
HO scale Hudson
tested p.12

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From pink foam to snowy splendor p.50

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p.38

Gary Hoover shares
scenery tips from his
Norfolk & Western
layout. p. 50

PLUS

Sneak peek at *Great Model Railroads 2024* p.60

Portable steel mill packs a punch p.46

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Features



30 Light up the night

Add light-emitting diodes to bring your layout to life
by *Thomas Klimoski*

36 How to use heat shrink tubing

One of the best ways to insulate wire connections
by *Eric White*



38 A railroad that gives back

Once a private layout, the Pacific Southern Ry. grew into a club to benefit local emergency services
by *Lou Sassi*

46 A steel mill layout with a twist

This small, portable N scale layout is designed to create a big impression
by *Greg Albert*



50 Scenery from start to finish

Veteran modeler Gary Hoover shows how he modeled a scene on his HO scale layout
by *Gary Hoover*

In every issue

6 On Trains.com

The latest features on our website

8 From the Editor

Creating a model railroad that lives on



10 News & Reviews

HO scale NYC class J3a 4-6-4 Hudson by Bachmann Trains reviewed, plus the latest new products

18 Ask MR

How do I model a coal-gas plant?



24 Step By Step

Resurrection of a reefer

56 DCC Currents

DCC electrical basics

58 On Operation

The Crew Caller

60 Trackside Photos

Great Model Railroads 2024 preview

73 Index of Advertisers and Cartoon

74 Trains of Thought

Being sufficiently talented

12

56

50

38

60

46

30



On the cover: Gary Hoover lays out the steps to modeling realistic scenery in the Appalachian autumn on page 50. Gary Hoover photo



Next issue

In **December**, visit a huge HO scale museum model railroad and a big city layout with scratchbuilt skyscrapers. Plus, build a camera car, protect a lift gate, and more!

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All about ballast on the prototype and how to use it on your layout

What's one thing you can find on just about every model railroad layout? Ballast! In this article Cody Grivno explores types of ballast, how different kinds of ballast are used, roadbed construction, and ballast maintenance on full-size railroads. Then, Cody translates this real-world information to your model railroad layout, with tips to improve realism with era-specific ballasting techniques!



Bachmann HO scale New York Central J-3A Hudson review video

A **Bachmann HO scale J-3A Hudson** visits the Milwaukee, Racine & Troy layout! *Model Railroader* Editor Eric White and Senior Editor Cody Grivno discuss the features on this New York Central model, demonstrating light and sound features before running the engine on the layout. Scan the attached QR code with the camera on a smartphone or tablet to watch the video!



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Creating a model railroad that lives on

At some level, we all know our layouts are temporary things. Most likely, when we're gone, or no longer able to work on them, our layouts will follow us out the door.

But what if they didn't? What if we were able to find someone who wanted to keep it going, maybe even expand it?

This month, we're featuring a story about the Pacific Southern Ry., a private layout that grew into a club and raises money for the local volunteer fire company and ambulance service in Rocky Hill, N.J.

Jim Kelly and Andy Sperandeo first visited the layout for *Model Railroader* in 1982, and I recall reading the story in the November 1983 issue and being excited that a layout I had visited was in the pages of MR.

In fact, the Pacific Southern was the first model

railroad open house that I attended. On a blustery late fall day, my dad and one of his buddies took me and my childhood best friend on a ride from our homes in Pennsylvania across the Delaware River to Rocky Hill.

We had to wait our turn to board vans for the trip to the layout, as Bob and Anne Latham's home wasn't intended to have dozens of cars parked around it.

I visited the layout again in fall 2022 after the club e-mailed us about its upcoming anniversary. I had a great visit with the members during a Wednesday evening meeting where we discussed doing the article you see in this issue.

The Pacific Southern is still in the same basement it was built in back in the early 1960s. The house and layout has been sold twice, and added onto once, with the

club continuing the whole time.

That's not something that happens very often. Even Bill McClelland's famous Virginian & Ohio couldn't find a buyer interested in both the house and the layout.

Usually, when a house with a layout goes up for sale, the first thing the real estate agent does, after recovering from the shock of finding a miniature world in the basement, is to tell the seller everything has to be removed before the house can be listed.

Perhaps because Bob Latham's layout had become a club (it's even a chartered railroad in New Jersey, authorized to run in Mercer and Somerset counties), it had a built-in pool of folks interested in preserving the layout. Having a mission to help the community probably helps, too.



Some layouts still exist in pieces, such as sections of John Armstrong's Canandaigua Southern in David Vaughn's Nickel Plate Road/Canandaigua Southern O scale layout. But a whole layout existing for six decades in the same home under three owners? That's unusual. Find out more about this feat beginning on page 38.

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HO scale



Electro-Motive Division GP9 and SW9 diesel locomotives.

Grand Trunk Western is among the paint schemes on these Walther's Proto models. Additional schemes on the GP9 include Chicago, Burlington & Quincy; Nickel Plate Road; and Southern Pacific. The SW9 is also available lettered for Chesapeake & Ohio and Toronto, Hamilton & Buffalo.

Both locomotives are offered in four road numbers per scheme (two each in DC and DCC) and have railroad-specific details. Direct-current models are priced at **\$199.98** (SW9) and **\$219.98** (GP9). Versions with an ESU LokSound V5 sound decoder sell for **\$299.98** (SW9) and **\$319.98** (GP9). Wm. K. Walther's Inc., 414-527-0770, walther's.com

HO scale locomotives



• **Early Challenger 4-6-6-4 steam locomotive.** Union Pacific. Six road numbers available. Prototype-specific details such as feedwater heater, side rods, walkways, and handrails. Light-emitting diode firebox with flicker effect and see-through firebox door. Improved locomotive-to-tender connection harness for increased durability and serviceability. Minimum recommended radius is 22". Genesis series. Athearn Trains, 800-338-4639, athearn.com



• **Electro-Motive Division SD70ACe diesel locomotive.** Montana Rail Link, BNSF Ry., Canadian National, CSX, Kansas City Southern, Norfolk Southern, and Union Pacific. One to seven road numbers per scheme; also available undecorated. Die-cast metal chassis, fuel tank, and body. Factory-applied wire handrails with etched-metal stanchions and cast brass horn. Direct-current model, \$349.99; with DCC and sound, \$449.99. Broadway Limited Imports, 386-673-8900, broadway-limited.com

HO scale freight cars



• **FMC 5077 double-door boxcar.** Seattle & North Coast; Camino, Placerville & Lake Tahoe; Union Pacific; and Union RR of Oregon. Four road numbers per scheme; also available undecorated in two versions. Road-specific body style, wire grab irons, etched-metal parts, and X-panel roof. \$42.95. Atlas Model Railroad Co., 908-678-0880, shop.atlasrr.com



• **Samuel Rea Shops 4600 three-bay covered hopper.** Conrail, Lehigh Valley, and Penn Central. Multiple road numbers per scheme; also available as undecorated kit. Road-specific details, see-through Apex running board and crossover platforms, and upper and lower flange roof edge fastener detail. \$56.95. Tangent Scale Models, 828-412-3886, tangentscalemodels.com



• **Trinity 4750 57-foot 3-bay covered hopper.** Illinois Central Gulf, BNSF Ry., Burlington Northern, CSX, Kansas City Southern, Louisville & Nashville, and Missouri-Kansas-Texas. Four road numbers per scheme; also available undecorated. Clerestory-style roof, late Trinity-style jacking pads and pulling tabs, 1990s-era square-cornered roof hatches, and detailed hopper gates. \$34.98. Walther's Mainline. Wm. K. Walther's Inc., 414-527-0770, walther's.com

N scale freight cars



• **American Car & Foundry Flexi Flo hopper.** New York Central, Conrail, FMC Chemicals, Lafarge, Merchants Despatch Transportation, and Penn Central. Multiple road numbers per scheme; also available undecorated. Early or late body style as appropriate. Etched-metal running boards and factory-installed air pipes and uncoupling levers. Detailed underbody with



full discharge piping and brake equipment. Single car, \$44.95; two-pack, \$89.90; three-pack, \$134.85; six-pack, \$269.70. Rapido Trains Inc., 905-474-3314, rapidotrains.com

N scale structures



• **Dale's Tires.** Laser-cut wood kit with MDF base, bracing, sign, Tichy Train Group windows and doors, and 13

exclusive 3-D printed details. Includes photo-illustrated color instructions. Measures 2 1/8" x 2 5/8" x 2 1/4". \$55. Piper Craftsman Kits, pipercraftsmankits.com

O scale freight cars



• **General American 1928-design 6,000-gallon, 3-compartment tank car.** Codsens & Co., Celanese, General American Transportation, Magnolia Petroleum Co., and Protex Industries. Multiple road numbers per scheme; also available painted black but unlettered. Factory-painted and lettered brass model. Freestanding tank handrail, grab irons, and ladders. Wood grain detail on walkways. Heater line and outlet drain details, including correct side profile between tank and underframe. Available in O scale two-rail and Proto-48 versions. \$524.95. Tangent Scale Models, 828-412-3886, tangentscalemodels.com

S scale freight cars



• **International Car Company wide-vision caboose.** Missouri-Kansas-Texas;

Atchison, Topeka & Santa Fe; Burlington Northern; Chesapeake & Ohio; Chicago, Burlington & Quincy; Chicago & North Western; CSX; Great Northern; and Reading Co. One to three road numbers per scheme; also available undecorated. Plastic body with metal handrails. See-through running boards. Sprung, die-cast metal trucks. Light-emitting-diode illuminated interior and marker lights. Equipped with American Flyer-compatible wheels and operating couplers. Scale code 110 wheels and Kadee-compatible scale couplers included. \$59.99 S-Helper line. ScaleTrains, 844-987-2467, scaletrains.com

Club offerings



• **Chicago & North Western 40-foot double-door boxcars.** Accurail HO scale kits produced for the Chicago & North Western Historical Society. "Route of the 400 Streamliners" slogan on the left side and "The Overland Route" slogan on the right side of the car. Single car, \$32; three-pack, \$85. Illinois residents add 9.5% sales tax. 2024 all-color calendar also available (\$14 members, \$16 non-members). Chicago & North Western Historical Society, cnwhs.org



• **Great Northern Pullman-Standard 64-seat lightweight coach Mount Rainier.** RailSmith Models N scale car produced for Mount Rainier N-Scale. Injection-molded body with sprung diaphragms, plastic interior, and clear window glazing. \$50 plus \$12 shipping. Mount Rainier N-Scale, c/o John Benny, 8703 45th St. W., University Place, WA 98466.

HO scale



Southern Pacific postwar Pullman-Standard 40'-6" boxcar. This newly tooled model from Tangent Scale Models is decorated for St. Louis Southwestern (1951 as delivered scheme) and Southern Pacific (1950 as delivered, 1953 as delivered with Texas & New Orleans reporting marks, 1960 repaint). The HO scale car (\$52.95) is offered in six to 12 numbers per scheme and features prototype-specific details, 33" metal wheelsets, and Kadee scale couplers. Tangent Scale Models, 828-412-3886, tangentscalemodels.com

Bachmann HO scale NYC Hudson



An icon of steam is now available from Bachmann Trains. The new HO scale New York Central Class J-3a 4-6-4 Hudson features a die-cast metal boiler and frame and a Train Control Systems WOWSound dual-mode decoder.

The 50 Class J-3a Hudsons were built in 1937 and '38, the last of the type on the NYC. Known as Super Hudsons, they were destined for the cream of the crop in passenger trains, including the famous *20th Century Limited*.

The locomotives were built by Alco in Schenectady, N.Y. Major spotting differences were in driver type and cab material. Half of the Hudsons had General Steel Castings Boxpok drivers; the other half had Scullin Double Disc drivers. Alcoa supplied aluminum for the cabs of 30 locomotives, and 10 locomotives had cabs of Cor-Ten steel. The last 10 locomotives were built with streamlining applied and had aluminum cabs. The last J-3a was retired in March 1956.

The Bachmann J-3a Hudson has plastic and metal parts. In addition to the boiler, the frame, a weight that fills most of the inside of the boiler, and the tender frame are also die-cast metal.

The cab and tender shell are injection-molded plastic, and details are metal (grab irons and handrails) and plastic (headlight, steps and ladders, piping and smokebox front). There's also a plastic dummy drop coupler molded in a rusty-brown color for the pilot for modelers who want to add that look.

The paint is smooth and evenly applied, and the lettering is sharp and opaque. Our sample has the post-1940 sans serif Gothic lettering. The model is also offered in the as-delivered scheme with Roman lettering.

A can motor with a flywheel is mounted just behind the smokebox and drives the third axle with a worm gear mechanism. The siderods transfer power to the center and front drivers. The TCS WOWSound decoder and motherboard are mounted in the tender, along with a downward-facing speaker positioned over perforated openings between the six-wheel trucks.

The tender wheels and drivers all pick up current from the track, the front tender truck from the left (fireman's side), the rear from the right (engineer's side). The tender truck sideframes are plastic, but the leading and trailing trucks on the locomotive have metal frames, which helps with tracking.

The model is equipped with Bachmann's plastic E-Z Mate II couplers. The front coupler, with its long shank to clear the pilot, hangs about .040" low.

I tested the ready-to-run steam locomotive on our Milwaukee, Racine & Troy staff layout where the Bachmann J-3a Hudson pulled seven passenger cars up a 3% grade. Going the opposite direction, the 1 pound, 4.4 ounce locomotive pulled a dozen cars up the 1.5% ruling grade from Marquette Yard over the summit at Skyridge.

It was interesting to hear the engine working as it climbed, with loud chuffs, then turning much quieter as the locomotive brought its train back downgrade into Williams Bay. I measured a top speed of 65 scale mph. That's a bit shy of what the prototype could do, but likely sufficient for most model railroads.

Even if you don't model the New York Central, Bachmann's J-3a Hudson would be a fine addition to any steam fan's roster. – *Eric White, editor*

Facts & features

Price: \$479

Manufacturer

Bachmann Industries Inc.
1400 East Erie Ave.
Philadelphia, PA 19124
bachmanntrains.com

Era: 1940-1956 (as decorated)

Road name: New York Central: Gothic lettering (post-1940) and Roman lettering (as-delivered). Two numbers each.

Features

- Blackened metal side rods
- Blackened metal wheels with RP-25 contours, in gauge
- Can motor
- Die-cast metal chassis and boiler
- Directional headlight and reverse light
- Dual-mode TCS WOWSound sound decoder with Audio Assist
- E-Z Mate Mark II couplers on the front (.040" low) and rear (correct height)
- Weight: 1 pound, 4.4 ounces (locomotive); 1 pound, 9.6 ounces (locomotive and tender)



Atlas O PS 4427 high-side three-bay covered hopper



A Pullman-Standard 4427 high-side three-bay covered hopper is making its debut in the Atlas O Premier line. The model was acquired when Atlas O purchased select MTH tooling in 2021.

The PS 4,427-cubic-foot capacity three-bay covered hopper was unveiled in 1964. The original design had low sides. In 1966 PS redesigned the car with high sides, which made it easier to reach the outlet gates and shaker brackets. When production ended in 1971, more than 12,000 covered hoppers were built to the high-side design.

The Atlas O Premier line covered hopper features a multi-piece ABS body. The roof, sides, and ends are molded as a single piece. The slope sheets are separate.

The roof has a freestanding hatch cover casting and see-through plastic running boards. Painted wire grab irons are attached to the corners of the running board near the full-height ladders.

The end cages have painted wire grab irons and handrails. The brake wheel and housing are factory-applied parts.

The sills between the bolsters and outer hopper bays are molded and slightly shorter, lacking flange detail. The A and B end brake lever detail is molded.

Our sample is neatly decorated in Red River Valley & Western's Oxide Red scheme. The lettering and FRA-224 striping placement follows a prototype photo I found online. Smaller stencils on the sides, slope sheets, and hopper bays were omitted.

The car rides on sprung, die-cast metal trucks with correctly gauged 33"

insulated metal wheelsets (they should be 36"). The metal couplers are factory-installed in plastic draft-gear boxes attached to a mounting pad with two screws. The couplers are .040" low on both ends.

I found prototype drawings in the March 1995 *Mainline Modeler*. The truck wheelbase is a scale 4" short and the distance between the truck centers is a scale 3" short.

It has been fun to watch Atlas O incorporate former MTH freight cars into its product line. To see a additional photos and learn more about this covered hopper, check out my long-format review under the "News & Reviews" section of Trains.com – *Cody Grivno, senior editor*

Facts & features

Price: \$89.95

Manufacturer

Atlas O
378 Florence Ave.
Hillside, NJ 07205
shop.atlasrr.com

Era: Approximately 2009 to present (as decorated)

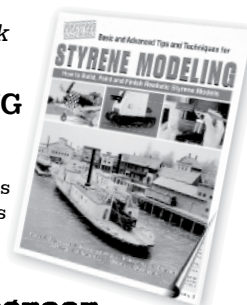
Road names: Red River Valley & Western, Burlington Northern, Chicago & Eastern Illinois, Equity Grain, J.W. Flammer, Montana Rail Link, and Stetson Grain.

Features

- Sprung, die-cast metal trucks
- Weight: 17.1 ounces (.3 ounce too light per National Model Railroad Association Recommended Practice 20.1)

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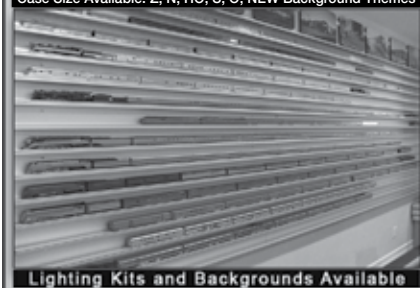
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Athearn HO scale EMD F59PHI



Athearn has released a new run of its HO scale Electro-Motive Division F59PHI diesel locomotive. The model, part of the Athearn lineup since 2000, features a dual-mode SoundTraxx Econami decoder, light-emitting-diode lighting, and smooth or corrugated body panels as appropriate.

Electro-Motive Division debuted the F59PHI (Passenger, Head-end power, Isolated cab) in August 1994. By the time production ended in 2001, 83 F59PHI diesels were built.

Our sample is decorated as Metra No. 90 in the commuter agency's Chicago & North Western heritage scheme. The full-size diesel was built by EMD as Amtrak 465 in September 1998. The unit was one of 21 F59PHIs acquired by Metra in 2018. The prototype was repainted in C&NW colors in 2020.

The Athearn model has a one-piece injection-molded plastic shell. The front pilot, also plastic, is attached to the die-cast metal underframe. A freestanding snow plow is attached to the pilot.

The shell features a mix of molded and factory-applied parts. Among the freestanding items are a Sinclair antenna, horn shroud, air horn, and rear vent. The radiator and dynamic brake fans are three-piece assemblies with see-through grills and separate fan blades.

The grab irons and vertical handrails are formed metal parts. Celcon was used for the rear handrails and stanchions.

To separate the shell from the die-cast metal chassis, I removed the front and rear draft-gear boxes and gently spread the shell.

Much of the model's weight comes from the chassis. A five-pole skew-wound motor with flywheels is mounted in the center of the chassis. The motherboard and SoundTraxx Econami sound decoder are on top of the motor. Dual cube-style speakers are located above the rear truck.

The dimensions on the Athearn model match prototype drawings in the November 1997 issue of *Model Railroader*. The paint and lettering placement closely follow the many prototype photos online. The road number below the black stripe on the rear of the carbody is missing. This would be easy to add with decal numbers.

There were a few detail discrepancies between the model and the prototype. The model shouldn't have the skirting over the fuel tank. The access door with louvers below the cab on the brakeman's side should have two knuckle-buster latches, not three. The bolt detail where the nose meets the carbody was omitted.

Athearn offers the F59PHI in direct current with a 21-pin NEM connector or with a dual-mode SoundTraxx Econami sound decoder. I tested our sound-equipped sample using an NCE PowerCab. At step 1 the model moved at 5 scale mph. It achieved a top speed of 73 scale mph. When delivered, the prototype F59PHI had a maximum speed of 110 mph. The speed range can be adjusted using configuration variables.

Then I took the four-axle locomotive over to our Milwaukee, Racine & Troy staff layout for further testing. The model pushed and pulled bi-level

commuter cars across the model railroad without incident. The F59PHI was able to pull six bi-level cars up the 3% grade between Williams Bay and Skyridge.

Heritage units have generated a lot of excitement on full-size railroads in recent years. Thanks to Athearn, you can enjoy running Metra's C&NW unit on your HO scale model railroad. – *Cody Grivno, senior editor*

Facts & features

Price: Direct current with 21-pin NEM connector, \$174.99; with dual-mode SoundTraxx Econami sound decoder, \$244.99 (add \$5 for Amtrak models)

Manufacturer

Athearn Trains
2904 Research Rd.
Champaign, IL 61822
athearn.com

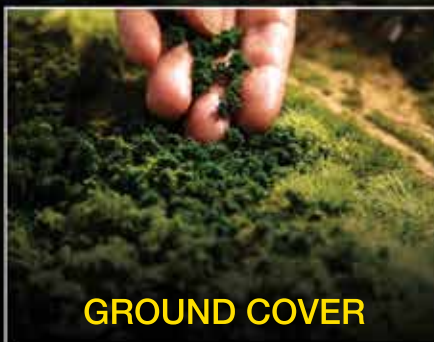
Era: August 2020 to present (as decorated)

Road names: Metra (Chicago & North Western, Milwaukee Road, and Rock Island heritage), Amtrak (as-delivered, "Be Track Smart," and Amtrak California schemes), Metrolink, and North Carolina Department of Transportation. One or two road numbers per scheme.

Features

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- Body-mounted McHenry scale couplers; front .020" too high, rear .040" too high
- Minimum radius: 18"
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Rapido HO baggage-lounge cars



Rapido Trains has been a great friend to New Haven passenger train modelers. The most recent additions are the Pullman-Standard (PS) *County*-series baggage-lounge and baggage-parlor-lounge cars. The injection-molded plastic and metal passenger cars feature extensive detail and come configured to match specific car interiors.

In 1948, the New Haven took delivery of 20 streamlined baggage-lounge cars as part of its postwar passenger modernization program. The cars were delivered in several configurations, each tailored to the needs of particular NH trains.

The New Haven evenly split the 20 *County*-series cars into two groups, baggage-lounge cars and baggage-parlor-lounge cars. Like New Haven's other postwar streamlined cars, these were built with Cor-Ten steel frames and stainless steel sides and ends with painted window panels.

As delivered, the cars had stainless-steel skirts. However, the New Haven removed this feature on most of its streamlined cars in the late 1950s to simplify maintenance.

Our samples are the *Dukes County* (standard baggage-lounge floor plan) and *Kings County* (former telephone-equipped baggage-lounge modified with two additional drawing rooms).

The New Haven Railroad Historical & Technical Association's publication

Shoreliner, vol. 43, issue 1, features an article by Wayne D. Drummond on the *County*-series cars, complete with builder's diagrams and floor plans. Both models matched the major dimensions.

The Rapido cars have multi-color interiors, including separate chairs, ashtrays, and compartments. The *Dukes County* has the as-built baggage section and doors and included the 1952 interior update to the lounge section. In that update, the New Haven replaced two of the chairs for tables, reducing lounge seating from 31 to 29, which is appropriate for a car from 1957.

Kings County reflects the 1953 conversion by PS of the baggage area into additional drawing rooms. This program removed the baggage doors, replacing them with two windows on the drawing room side and one window on the corridor side of the car.

The metal wheels in each General Steel Castings' 41-BNO-11 truck collect track power for the light-emitting diode interior lighting. The lighting system has a capacitor for flicker-free operation. You can turn the lights on and off in the car by using the supplied magnetic wand.

The baggage-lounge cars will negotiate 22" or greater curves when coupled to other similar cars. I also ran one of the cars on an 18" radius curve on the Beer Line. While it made it through the curve fine, according to the manufacturer's directions, for use on this radius one or both couplers should be replaced with a long-shank coupler.

Rapido has done an excellent job capturing the look and character of these uniquely New Haven passenger cars. I'm blown away by the floor plan configurations available for these cars and the matching color schemes.

If you are New Haven, Penn Central, or even early Amtrak fan, you'll enjoy having one of these cars on your railroad. – David Popp, director, *Trains.com*

Facts & features

Price: \$129.95

Manufacturer

Rapido Trains Inc.
500 Alden Rd., Unit 21
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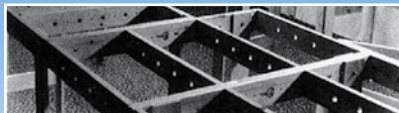
Era: 1957 to 1969 (as decorated)

Road names: New Haven as-delivered (1948-1955 Hunter Green, with skirts), New Haven McGinnis scheme (1957 to 1969, without skirts), Penn Central, and Amtrak (phase 1); assorted car names per scheme.

Features

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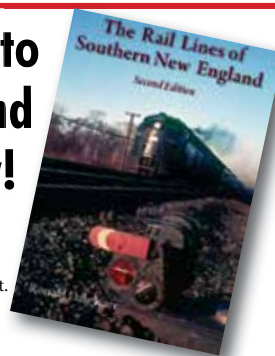
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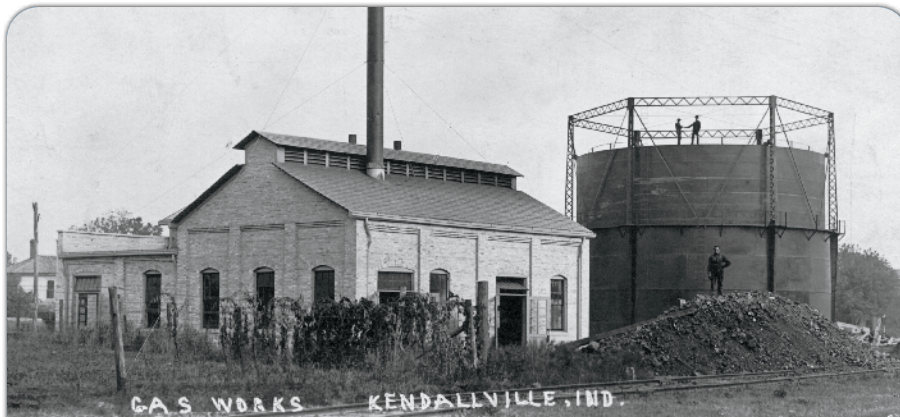
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A brick industrial building with a smokestack, a coal pile outside, and a telescoping tank called a gas holder or gasometer characterize a typical coal-gas plant. This fairly small plant served Kendallville, Ind., a town of about 5,000 people. Jeff Wilson collection

How do I model a coal-gas plant?

Q I have a Walthers gas plant kit (item 933-3104) and gas storage tank kit (item 933-2907). I want to model a coal-gas plant. Do you have any drawings or pictures of such a plant that I can model using these kits?

Thomas Lauritsen

A I can do you better than a few photos and drawings. Jeff Wilson's book *Industries Along The Tracks 4* (available from the Kalmbach Hobby Store) devotes an entire chapter to modeling the industry.

The coal gasification process dates from the late 1700s in France and started to spread across the United States in the early 1800s. By the 1860s, most towns of notable size had a gas plant of their own to supply gaslights on the streets and in homes and businesses. At the industry's peak, more than 50,000 coal-gas plants were in operation across the country.

The conventional coal-gas process involves heating bituminous (soft) coal in an oxygen-free retort so it would not burn. The heated coal would release flammable hydrocarbon gases that were collected and purified, then delivered to streetlights and homes via pipeline.

The electric light started to make gaslights obsolete around 1900, but since the production process was more efficient by then, the industry easily shifted to supplying gas for cooking and heating. This lasted until World War II, when new pipelines were laid from the oil fields of the Southwest to big cities and the coasts. Natural gas, once a waste product burned off at the wells, became cheaper to supply to the cities than coal gas, and coal-gas plants started to close. The last coal-gas plant closed in 1966.

Typical coal-gas plants were made up of one or more buildings housing the processing and cleaning equipment; at least one smokestack; a coal pile and conveyors for moving it to the retort or processing building; and the gasholder. Also known as a gasometer, the gasholder was a large, cylindrical tank made of several telescoping sections, enclosed by a structural steel framework. Gasholders are the most easily recognizable feature of a coal gas plant, and a tank painted with the name or logo of the gas company would be an eye-catching scenic landmark on your layout.

The Walthers storage tank you have is a perfect model of a gas holder. However, Walthers item no. 3104 is a tank car loading platform, as would be found at an oil refinery. To model the buildings of a coal-gas plant, I would recommend something like Walthers' Brickworks (item 933-4102), their Brick Millworks (item 933-3907), or something custom-built from Design Preservation Models' Modular Building System (such as item 35100).

Q I'm planning to model the Hoboken, N.J., and Brick Church, N.J., stations on the Delaware, Lackawanna & Western, the railroad I rode as a child and as an adult. I rode in the Lackawanna M.U. cars, but I can't find them anywhere. I'm thinking I'll buy the MuMP54 cars from Con-Cor and airbrush them the proper color. What is the proper color, Pullman Green or Brunswick Green? What is a good source for the paint? Or do you know where I might find HO DL&W MU cars?

Jim Ross

A The Delaware, Lackawanna & Western electrified its Morristown Line from Dover, N.J., to Manhattan's Pennsylvania Station, and the attached Montclair and Gladstone Branches in 1930. The railroad then purchased 141 M.U. (multiple unit) motor cars from Pullman to handle commuter traffic on the line. Numbered 2500 to 2640, they were paired with 141 trailers converted from various kinds of passenger cars, including high- and low-roof coaches, combines, and club cars. The cars became the property of Erie Lackawanna after that 1960 merger, then passed to Conrail in 1976 and NJ Transit in 1983. They were finally retired in 1984.

Since the M.U. cars were built by Pullman, it should come as no surprise that they were painted Pullman Green. The color photos I've seen vary in their exact shade; since over the years the colors faded in both the vintage photos and on the vintage cars, that's no surprise, either. So if you don't have a jar of Pullman Green paint (like Tru-Color 826) in your stash, or you want a slightly sun-faded shade, a military olive drab (like Vallejo US Olive Drab 70.887) will come close enough.

For comparison, Brunswick Green is a term hobbyists often apply to what the Pennsylvania RR called Dark Green Locomotive Enamel (DGLE). This is an extremely dark color that looks black under all but direct sunlight.

The Con-Cor cars you're thinking about using are modeled after Pennsylvania RR prototypes that had distinctive "owl eye" round end windows, which would look quite different from the rectangular windows on the Lackawanna M.U. cars. While you could

Send questions to senior associate editor Steven Otte at AskTrains@Trains.com.

cut and file new window openings in the Con-Cor cars, you could also save yourself the trouble. Island Modelworks makes the D&LW cars in HO scale. Go to islandmodelworks.com/DLW.html.

Q I'm planning a small layout based on the Bay Line (BAYL), a north Florida short line, focusing on the Cottondale diamond crossing and CSX interchange. I found a fascinating picture of the diamond near the interchange in 1989, which shows a grade crossing-type gate across the railroad track just before the diamond. What would the rules have been to operate this? Would CSX trains have gone straight over the diamond, but BAYL would have had to call for permission?

Christian Summers

A That kind of gate is called a "smashboard." It's a kind of interlocking signal that provides an unmistakable indication that it's been overrun.

Smashboards were used to protect lightly used grade crossings between two



Six Erie Lackawanna M.U. cars roll under wire near Orange, N.J., in October 1978. Originally built for the Delaware, Lackawanna & Western in 1930 by Pullman, the cars were painted Pullman Green. Roger Puta photo

railroads. Not all crossings were used often enough to warrant an interlocking tower and towerman. Smashboards are less in use in these modern days of GPS locomotive tracking and Positive Train Control (PTC), but they were a lot more common in the eras many of us model.

The way they work is as simple as their construction. A smashboard is

normally set against the "junior" route, which is the railroad to lay track through the crossing second. While trains on the senior line need to keep an eye out for trains on the other route, in general they can proceed through the diamond without stopping. Trains on the junior route, on the other hand, must stop at the diamond. A member of the train crew must



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look both ways and listen to determine if there's a train coming on the senior route. Only after the senior route is determined to be clear can the engineer blow the horn, order the gate opened (thus blocking the senior route), and cross the diamond. The gate is then closed behind the train, which can then proceed on its way.

It's the responsibility of the junior railroad's engineer to make way for traffic on the other route. Trains on the junior route will usually be scheduled to take the other railroad's schedule into account. Depending on the era, this traffic check might also include a radio call to a dispatcher.

Older smashboards were made of wood (hence the name). Later gates across the railroad track were made of cheaper, but more durable, welded steel pipe. If you'd like to model such a smashboard on your layout, Mike Tylick wrote about how he scratchbuilt one to protect a diamond on his On30 Marshfield & Old Colony layout in our September 2022 issue.



A pipe gate with a stop sign attached protects a crossing between the Ashley, Drew & Northern and Missouri Pacific in Monticello, Ark. Trains on the AD&N had to stop, check for oncoming MP trains, and open the gate before crossing the diamond. Terry

A. Holley photo

Q I've been given several HO scale locomotives that unfortunately came without boxes or information about whether they were DCC equipped or not. Most are very nice, higher end models, not entry-level. Is there any way to safely find out if each locomotive is DC or DCC without taking off the shells? Even if I do remove the shells, I know some DC models have

circuit boards that to a layman like me might look like a DCC decoder. How do I know for sure so I don't damage them by mistake?

Rusty Hamblin

A There's a simple way to tell if a locomotive is DC or DCC. Put it on a track powered with direct current and turn on the power. If the motor starts humming



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and the locomotive starts moving at a low voltage, it's likely a DC model. If it takes a fairly high throttle setting before the locomotive starts to move, it's probably DCC. And if you hear locomotive sound effects, there's about a 99% chance it's DCC. (Sound is possible in DC engines, but rare.)

If you have access to a DCC system, you can put the model on the track and set the system to "programming mode." On an NCE PowerCab, for example, the throttle will send a signal to the locomotive, and if there's a decoder, it will respond with its manufacturer's code, which will display on the throttle. Following the prompts on the throttle will reveal the decoder version, and which address is programmed into the decoder.

Follow the instruction manuals for direct programming for other DCC systems to see how they provide the same information. The low current of the programming track mode shouldn't cause damage to a DC motor, although it will likely make a buzzing sound, and the system will return a message saying no decoder was found if it's a DC model.

If these tests are inconclusive, you might want to double-check your findings by biting the bullet and taking off the locomotive's shell.

Many direct-current locomotives have built-in printed circuit boards (PCBs) that control the lights. There are a few ways to tell them apart from DCC decoders. First, if there are no electrical connections to the motor, it's a lighting-only board. A decoder will have either orange and gray wires or brass "ears" connecting the board to the motor. There's an exception to this, as well. If the lighting board has a socket to plug a decoder into, it will have electrical connections to the motor.

Second, lighting-only PCBs tend to look simpler than a DCC decoder. There will be both fewer components on the board and fewer circuit traces. This is also not a foolproof criterion.

Next, a lighting board will often be the only PCB under the shell. While there are single-board decoders that replace a lighting board, if you see two boards – stacked and plugged into each

other – odds are one of them is a decoder. But yes, you guessed it, there is an exception. A board with a decoder socket will have a jumper board plugged into the socket. But this will be much smaller and simpler than a decoder.

Finally, unless it's a low-cost generic one, a Digital Command Control decoder may have the manufacturer's logo on it somewhere. Such a logo is the definitive sign your locomotive is equipped with a DCC decoder. But just because a board doesn't have a logo on it doesn't mean it isn't a decoder. Clear?

The most definitive way to test if a locomotive is DC or DCC is to put it onto a DCC programming track and try to perform a factory reset, programming Configuration Variable 8 to the value 8. If it's a DCC model, this will usually reset all decoder settings to original settings, with the decoder responding to address 3. If that doesn't work, use the decoder ID number and look up the manufacturer on the list at nmra.org, then check the maker's website for the reset instructions. **MR**



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Mike Hauri shares how he replaced the draft gear on an Athearn “blue box” reefer. Photos by the author

Resurrection of a reefer

Don't throw the reefer out with the bathwater! Many HO scale modelers are still fans of the famous Athearn “blue box” car kits. Many of the kit boxes have original prices of \$3.50 to \$3.75, which today, is humorous in itself. Whether bought from swap meets or online purchases, these kits still provide modelers with excellent versions of HO scale rolling stock to run on model railroads.

The particular car that this article focuses on is the 57-foot mechanical reefer. Regardless of what railroad is modeled, this car serves as a fine example of a functional means of refrigerated freight transportation.

A design decision to mold the coupler pocket as a part of the frame is the main issue at hand with this car. The molded connection is a thin ribbed attachment

that can, over time, become weak or even break off if the model is dropped. Breaking the coupler pocket renders the car unserviceable. This fix can quickly get the car back into revenue service.

Mike Hauri is from Tuscon, Ariz., this is his first Model Railroader byline. He was featured in Drews's Trackage Adventures episode 40 on Trains.com

STEP 1 PREPARATION

The **WalthersProto Cushion Car Coupler Pocket Kit** is designed to represent the ACF Freight Saver, commonly installed on boxcars, flatcars, auto racks and cabooses of the 1970s and 1980s. In the instructions, it describes how to install this coupler pocket extension to an appropriate car and accomplish the “cushion car” look. [The Walthers kit provides enough pockets to convert four cars to cushion car coupler pockets – Ed.]

Photo 1 shows the new coupler pocket on the sprue. After removing the pocket from the sprue, I used the Bulls Eye Jig and No. 50 drill bit to drill and tap a hole for a 2-56 screw prior to gluing the pocket to the frame. I also trimmed the pocket prongs using a file and hobby knife, allowing the pocket to fit in the frame.



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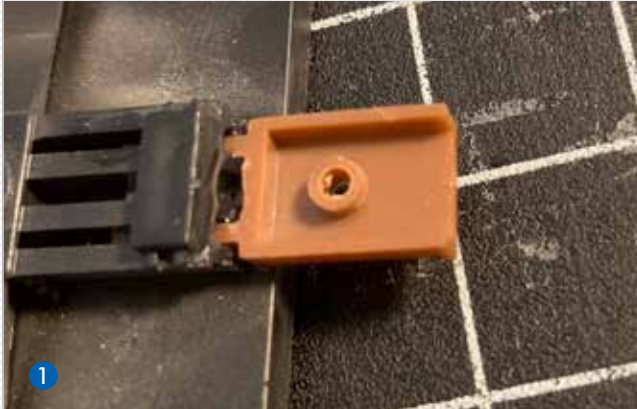
Photo: A scene on The Rockville Branch, modelled by the Rock Springs Group.

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For further details of both of these lines, see the latest PECO Catalog.

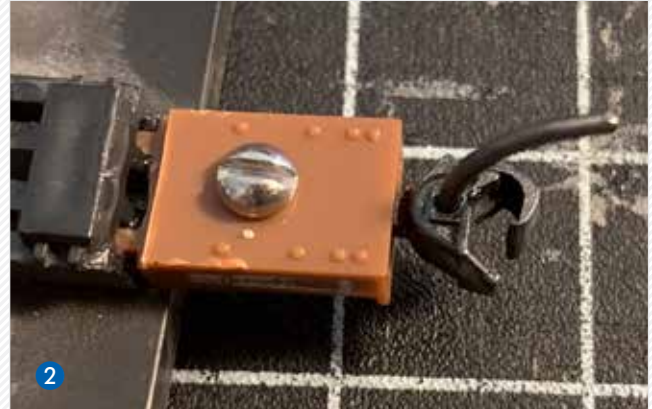
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STEP 2 INSTALLATION



After the pocket prongs were trimmed, I glued the pocket to the car frame ①. I allowed time for the glue to dry and firmly secure the pocket to the frame [let the glue dry for 24 hours to be sure it dries completely –Ed.]

Once the pocket was glued to the frame of the car, it was time to install the pocket cover, screw, and coupler.



I had to trim the coupler pocket cover to fit. For the screw, I used a 2-56 x 1/8" machine screw. Any screw longer than 1/8" will poke through the top of the coupler pocket. When those fit, I unscrewed the pocket cover, installed a Kadee No. 148 [a Kadee No. 5 coupler will also work – Ed.], and buttoned it all up ②.

STEP 3 FINISHING TOUCHES



After everything fit well and was installed, I painted the coupler pocket and screw flat black to match the rest of the reefer's frame ①. I then removed the coupler trip pin by preference, but this is not required. This reefer car now has many years of operations ahead of it with new couplers and pockets ②.



This fix so far has proven its worth and restored many cars to the fleet. I may even consider this method in other repair projects to return more HO scale cars to the rails. Don't forget to dig for those bargain cars at swap meets, hobby shops, and online auction websites too, and you may find a diamond in the rough. [MR](#)

Materials list

WalthersProto

920-2311 Cushion Car Coupler Pocket Kit

Bulls Eye

11000 drill jig

Kadee

5 universal metal couplers or
148 whisker metal couplers
1703 stainless steel screws 2-56 x 1/8"

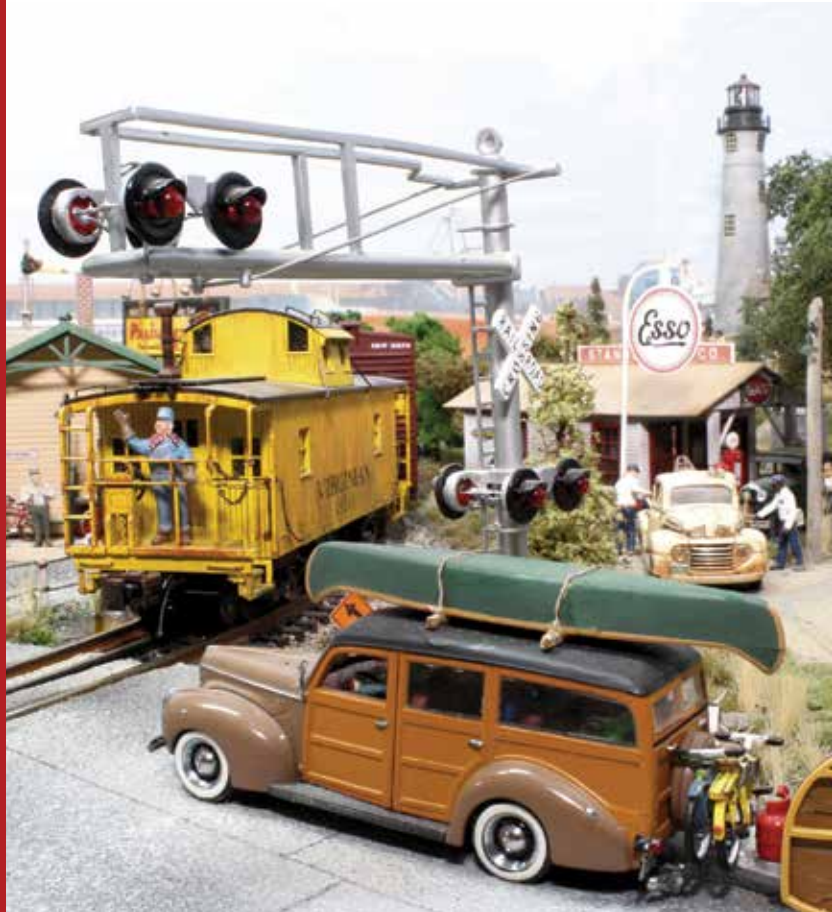
Miscellaneous

pin vise
no. 50 drill bit
hobby knife with no. 11 blade
liquid cement



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LIGHT UP THE NIGHT



As the sun sets and the lights come on at Capitol Materials, the employees wrap up their day on the Georgia Northeastern. Thomas Klimoski's lighting techniques can greatly improve your model railroad's night appearance.

Railroads are 24-hour operations, with lots of trains running through the night. Modelers who only set and operate their layouts during daylight hours are missing the dramatic looks and interesting operational opportunities when the street and building lights come on.

With the advent of recent technology and light-emitting diode (LED) lights, it's easier than ever to add lighting effects to your layout. Follow along as I describe how I lit up my layout.

Scene controller

I began my project by researching products to control LEDs. Model Train Technology (modeltraintechnology.com) offers a 16-port DCC LED Scene Controller that can control up to 64 LEDs (16 ports with a maximum of four lights assigned to each port) with different lighting effects for each port ①. One of its many benefits is that it comes equipped with resistors for the LEDs on each port and the light intensity can be adjusted as desired.

The controller includes a power supply and can be connected to your Digital Command Control (DCC) system to program the lights. For those who would like to power their lights from their DCC bus, Model Train Technology offers a LED Micro Scene Controller that can be placed inside a structure to power lights from your track power or an external power supply.

The LED Scene Controller has a couple of options for connecting the wires for each port. The standard connection for the lights is a JST plug, which is

Add light-emitting diodes to bring your layout to life

By Thomas Klimoski

Photos by the author

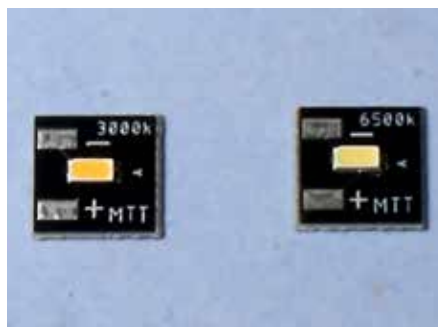


common for pre-wired lights like those available from Woodland Scenics. I opted for a screw terminal connector because I was wiring all my own lights. A JST-to-terminal-screw connector kit is available from Model Train Technology, if you want that option.

I wanted to illuminate several buildings from the inside and add exterior lights. I also wanted to simulate a TV in a house and have lights fade on and off in other structures. The LED Scene Controller can accomplish all those effects and more. I made a chart to decide which structures would be assigned to each controller port.



❶ The Model Train Technology LED Scene Controller can control 16 light ports with numerous lighting effects. Photo courtesy Model Train Technology

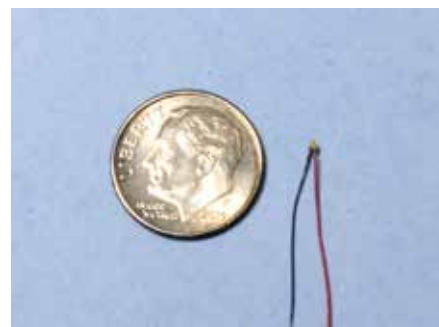


❷ Light-emitting diode “chip” lights from Model Train Technology come in four different color temperatures, including 3000K (left) and 6500K (right). Each light includes two solder pads.

I mounted the LED Scene Controller under the layout where it was centrally located and easy to access. To power the light controller I purchased an 18V 2A 36W AC/DC power adapter that was recommended by Model Train Technology, since I have an older version of the LED Scene Controller that wasn't sold with an adapter.

My controller has screw terminal connections for power input instead of a barrel socket. The light controller has a power switch on the device, but I wanted a more convenient location for the power switch. I removed the barrel plug from the power adapter and routed the wires to a toggle switch I installed on the fascia. Then I wired the switch to the controller power input. Next, I tapped into the layout's DCC power bus with suitcase connectors, and finally connected each wire to the DCC IN connection on the controller.

The LED Scene Controller has a built-in decoder that comes pre-set to address 3. The manufacturer recommends reprogramming the default address to one



❸ Pre-wired 0402 surface mount LED lights are tiny in comparison to a dime. These SMDs are easy to install in exterior light fixtures, such as porch and security lights.

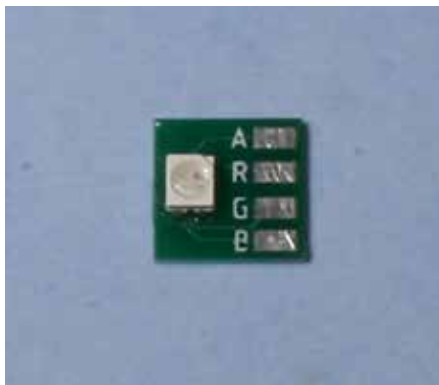
that's not used for a locomotive number or other stationary decoder. I chose 88 for my light controller because it's easy for me to remember, but you can select any two- or four-digit address.

LED light options

With the controller installed and wired, it was time to move on to the lights themselves.

Light-emitting diode technology has evolved rapidly in the past few years. It's now possible to add small LED lights that generate negligible heat into some very tight spaces. The LEDs come in many shapes and sizes that are perfect for model railroad projects.

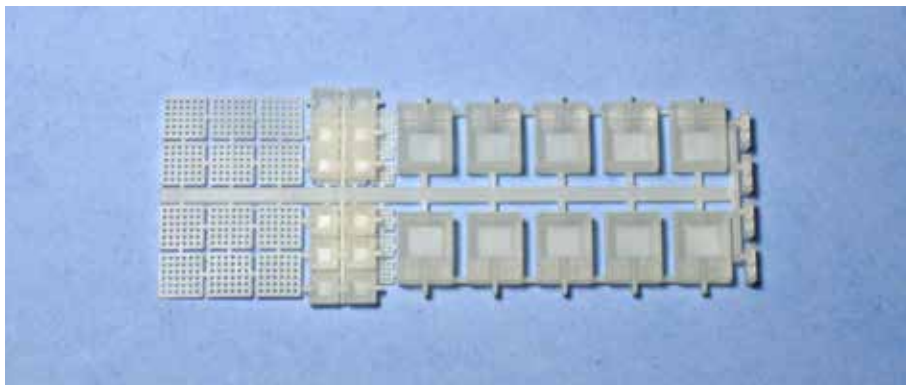
One important aspect to consider when selecting LEDs is the color temperature of the light. Color temperature is measured in degrees of Kelvin (K) from 1,000 to 10,000, with the lower numbers being perceived as warmer and the higher numbers being cooler. Most lighting applications are in the 2,000 to 6,500K range.



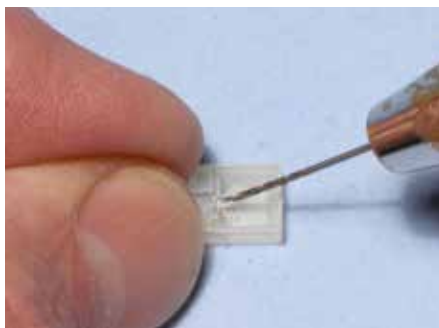
4 The Model Train Technology TV simulation chip light replicates a flickering multi-color light that comes from a TV.



5 HO scale security lights by SteveS3D on Shapeways can be used as porch lights on a house or as a security light in an industry.



6 The HO scale exterior light fixtures and cameras 3-D print contains ten 26" x 32" exterior light fixtures with diffusers, a dozen 15" x 15" exterior light fixtures with diffusers, and eight surveillance cameras.



7 Using a No. 68 drill bit, Thomas drilled a hole at a steep angle for the wires of the LED to pass through. This assured it would finish in the right spot.



8 Using a toothpick to securely hold the round light allowed Thomas to be able to drill a hole in the casting near the mounting post.

Model Train Technology offers "chip" lights in the following colors: 2000K Yellowish (candle), 3000K White (standard white), 5000K White (bright white), and 6500K White (fluorescent). I selected 3000K for the residential structures and 6500K for industries and commercial applications on my layout.

The LEDs are soldered to a $\frac{5}{16}$ " square board and have solder pads that are labeled positive and negative **2**. This makes attaching wires much easier than trying to solder directly to the LED.

For the exterior lighting fixtures I selected pre-wired warm white 0402 surface-mount LEDs. I purchased them from an online retailer and paid less than \$1 per light, not including shipping. The LEDs are approximately the size of a pencil tip and were perfect for adding lights to my fixtures **3**. I highly recommend purchasing pre-wired lights, as it saves a lot of delicate and precise soldering. The LEDs I purchased came with 0.28mm Teflon-coated wires, which allowed me to insert them into

small-diameter holes when installing them in the light fixtures.

One special light I ordered from Model Train Technology was an RGB LED (red, green, blue) that's used to simulate a TV **4**. When the LED receives random flickering light impulses from a Scene Controller unit, it mimics the light from a TV as seen from outside a structure [See page 36. – Ed.]

Exterior light fixtures

Now with all of the LEDs I needed for the project in hand, I began working on the exterior light fixtures.

A few years ago I was visiting my friend John Farrington's RSSX RailServe layout and noticed the lights he had mounted to the exterior of his structures. I thought they looked fantastic and asked where he got them. John said he purchased them from Shapeways and was really pleased with them. I searched the Shapeways website (shapeways.com/marketplace/miniatures) and found the fixtures that John had ordered.

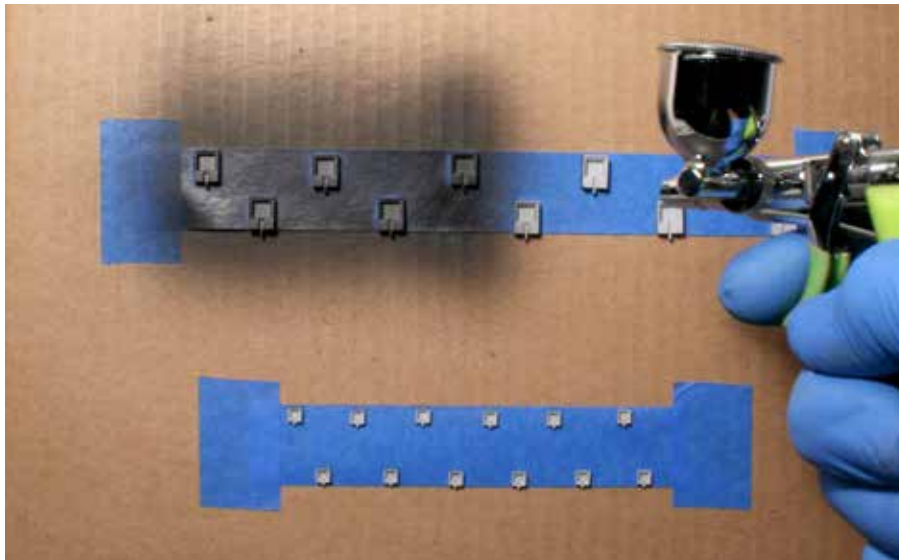
The first type I purchased was the HO scale (1:87.1) security lights six-pack made by SteveS3D **5**. I selected the smoothest fine detail plastic to get the highest quality print. These lights can be used as porch lights or as a security light on an arm if you add a wire between the fixture and the wall mounting plate, which comes separately in the package.

The second fixtures I ordered were the HO exterior light fixtures and cameras from Seth Neumann's Shapeways account. The print contains ten 32 x 26-inch exterior light fixtures with diffusers, a dozen 15 x 15-inch exterior light fixtures with diffusers, and eight surveillance cameras **6**. The parts were designed by Jason Hill of Owl Mountain Models. Both light fixtures can be used to represent security lights on the outside of structures, and the larger ones can represent parking lot lights attached to a pole.

Preparing the fixtures

Once I received the light fixtures from Shapeways, I carefully cut them from the sprues, then cleaned the residue from the printing process with isopropyl alcohol. It's important to clean the 3-D prints so paint will adhere to the fixture.

Next, I used a No. 68 drill bit in a pin vise to drill a hole for the wires to pass through. The inside of the large rectangular light fixture has a small angled portion on the side with the mounting



9 Thomas used an airbrush to paint the square and rectangular light fixtures with several light coats of black paint.

post. This is where I began to drill. I held the drill bit at a steep angle so that the hole would finish to the rear of the fixture just above the mounting post **7**.

The smaller square lights were prepared in a similar manner. However, I used a shallower angle for the drill bit so the hole for the diode and wiring would finish near the mounting post.

The round security lights were next. I found it difficult to hold the fixture while I tried to drill it. The solution was to place it on a wooden toothpick with the point cut off. This allowed me to place the light fixture on the toothpick, then drill the hole just below the mounting post and into the center of the fixture where the LED would go **8**.

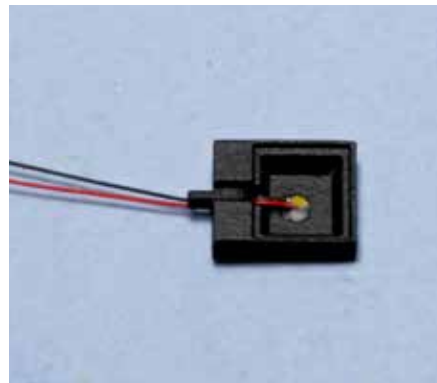
Priming and painting was the next step. I attached the rectangular and square light fixtures to painter's tape stuck to a piece of cardboard. It's important to prime and then get a good coat of paint on the fixtures so the light won't show through when illuminated. I used Tamiya light gray fine surface primer to prime the fixtures.

Once the primer was dry, I used my airbrush to apply several light coats of Tru-Color (TCP-805) flat black. Use appropriate cautions and spray in a well ventilated area **9**. After the paint was dry, I applied a coat of Dullcote. The diffusers for the lights also received a coat of Dullcote, but not painted.

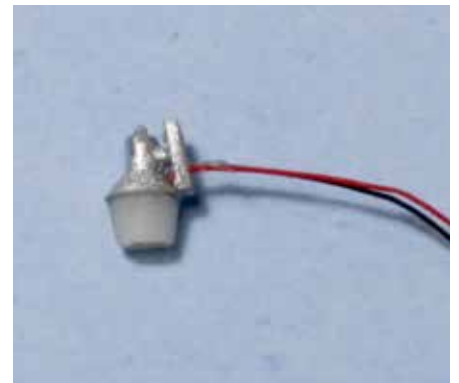
I brush-painted the round security lights, as masking off the clear lens would have been difficult. After I primed them, I painted them in three different colors – white, silver, and black – depending on what structure they were going to be installed on **10**.



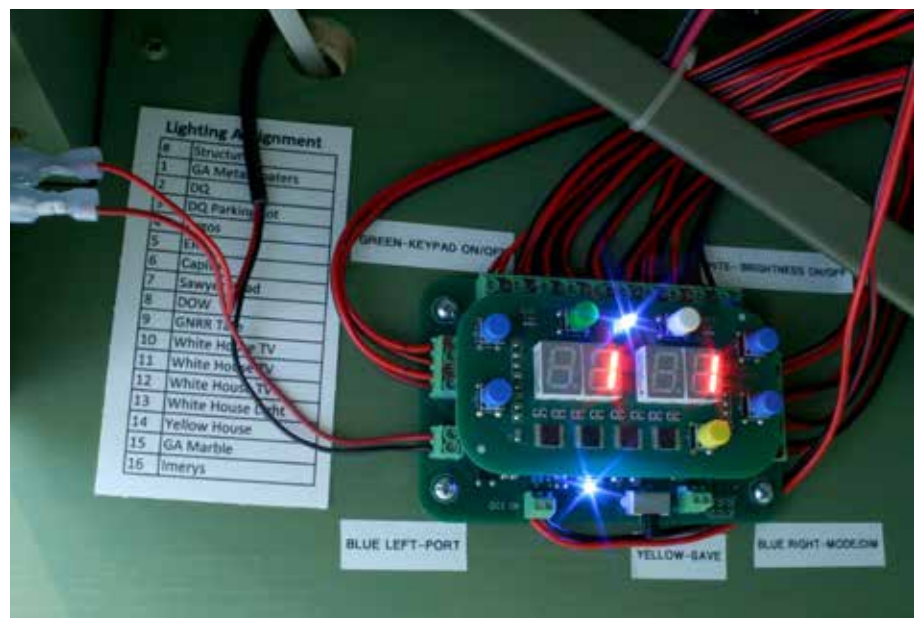
10 The round security lights were brush painted with either white, silver, or black paint.



11 After the wires were threaded through the hole, Thomas used canopy glue to hold the 0402 LED light in place in the light fixture.



12 With the wall mounting plate glued in position, the porch light assembly is ready to be installed on the structure.



13 The Model Train Technology Scene Controller is shown with all the wires connected to it under the layout. Labels identify the controller buttons, and a chart to the left is a handy reference for each lighting port connection.



With the TV simulation chip installed on the back wall, Thomas is ready attach the chip light to the bottom of the second floor and reinstall it in the house. The wires for the lights will be concealed behind the partition when viewed through the right side windows.



Adding lights and TV to a house

One building I installed lights in is an American Model Builders No. 140 Two-Story Farm House, a laser-cut wood kit. I'd previously built and finished the kit, so some disassembly was required to put lights inside. Fortunately, I had not glued the roof in place, so I only had to remove the second floor and an attached partition dividing wall.

With access to the interior of the first floor, I now could drill two $\frac{7}{32}$ " holes in the floor, one for the wires to the TV and another for the interior lights and porch lights. I drilled the hole for the TV wires next to the wall where I was planning to mount the TV simulator LED. The second was located behind a first-floor wall partition to hide the wires from view.

Next, I soldered wires to the LED RGB chip that simulates a flickering TV. The chip requires four wires, one positive and three black negative wires from the Scene Controller. I made sure to mark the wires so I wouldn't get them mixed up. I soldered the wires from the TV simulation chip to the Micro JST plugs and then covered the connection with heat-shrink tubing.

The TV simulation chip was attached to the wall with Gorilla double-sided mounting tape. I added a photo interior to the inside partition wall of the structure to give the room a little character and a lived-in look.

For the exterior of the structure, I added a porch light. I selected a location near the front door and drilled a hole for the wires. After pulling the wires through the hole, I added a spot of canopy glue to secure the light.

Model Train Technology recommends that you install a light in the same room as the TV simulation light to help it look more realistic. I used a 3000K white LED chip light that gives a warm white light common to residential household lighting.

I prepared the chip light by tinning the soldering pads, stripped and tinned the wires, and then soldered the wires for the porch light and the wires for chip light to the board. The chip light was attached to the underside of the second floor and the wires routed behind the partition when the floor was placed back inside the model.

With the wires connected to the Scene Controller, I adjusted the light levels of the TV simulation and the interior lights. Later I plan to add a sound module that will play the sounds of a TV show or sports broadcast, which will really enhance the TV simulation. – *Thomas Klimoski*

To install the LEDs, I threaded the wires of the 0402 SMDs through the hole and used canopy glue to secure the light in position in the center of the light fixture **11**. Canopy glue dries clear, so you don't have to worry about damaging the LED if you get some glue on it. Canopy glue also allows some time to position the LED before it dries. I also added a small spot of canopy glue where the wires went through the light fixture to help secure them in place.

The LEDs for the round security lights were installed in a similar manner, threading the wires through the center of the globe and out the hole on the mounting pin side. Just before I pulled the LED inside the globe, I added a small amount of canopy glue to the top of the LED. As before, I added a small spot of glue where the wires exited the fixture.

I drilled a hole in the wall mounting plate just below where the light attaches using a No. 68 drill bit. The 3-D print is delicate, so I went slowly and carefully with the drill bit. Next, I threaded the wire through the hole in the mounting plate and used canopy glue to secure it to the fixture **12**.

Once the glue dried, I tested all the LEDs using a 9V battery and a 1K resistor. It's important to test the LEDs frequently to make sure they still work before you go on to the next step. After they're installed in a structure, they're much more difficult to fix or replace.

After confirming that all of the lights were working, I installed the diffusers on the rectangular and square fixtures using a small amount of canopy glue.

Light it up

With all of the lights connected to the Scene Controller, it was time to light up the layout **13**. The new lights really gave a nice ambiance to the model railroad. After making some final adjustments to the light levels, I was pleased with how the project turned out.

Building your own exterior lights and adding interior lighting doesn't have to be that complicated, and I think the results were well worth it. I hope you'll try lighting up a few of your structures. Once you see how nice they look, you'll most likely want to add lighting to all of your buildings. **MR**

Thomas Klimoski and his wife, Diane, live in the Northeast Georgia Mountains. Tom's HO scale Georgia Northeastern layout was featured in Model Railroad Planning 2016.

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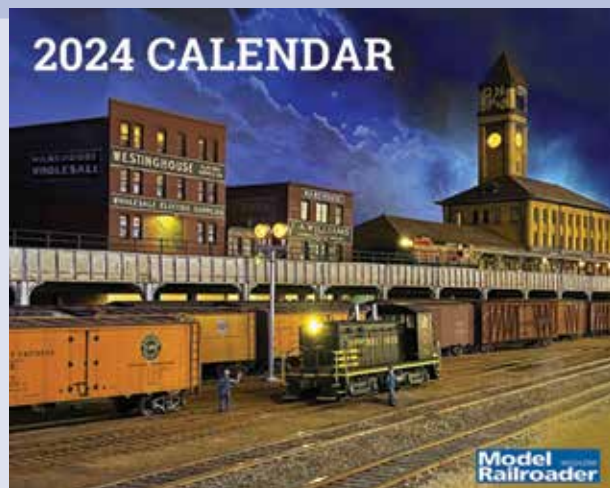
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How to use Heat shrink tubing



Eric has used the package of small-diameter heat-shrink tubing, left, for Digital Command Control and other electronics installations for years. Needing larger-diameter tubing, he found the assortment in the box at a big-box store. Be sure to choose an appropriate diameter of tubing for your project.

One of the best ways to insulate wire connections

By Eric White • Photos by the author

Heat-shrink tubing is something you need to have in your wiring toolkit. This material makes insulating soldered joints neat, simple, and fast.

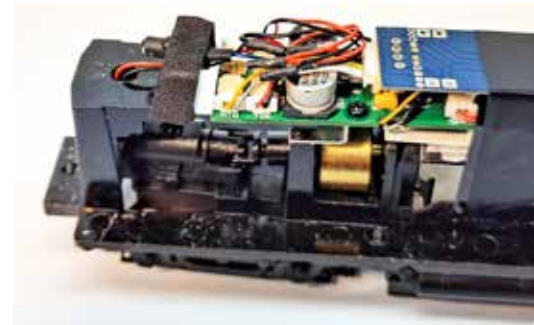
As the name implies, the material shrinks when it's heated. It comes in multiple sizes, some of which are somewhat specialized and are most likely to be found in a hobby shop.

I also have a package of larger tubing I picked up at a big-box store. It came in multiple colors and is useful for layout wiring. It's designed to be used on lower voltage projects – it's not something you'd use on 115/120V home wiring.

Preparation

The first tip to using the tubing is to put it on one of the wires you're connecting before you solder the joint. Since it's a tube, there's no way to place it after the fact, unless one end of the wire is free.

You'll want to find a size that will slide over the joint easily. Usually, the tubing is flexible enough that it can expand a bit, but if it starts to tear, it won't be able to do its job correctly. Make sure you can slide the tubing away from the area you're soldering, as the heat from soldering can shrink the



Eric needed to connect several wires together in this BlueRail decoder installation. After making a pigtail joint and soldering it together, he placed a length of heat-shrink tubing over the end of the joint and shrunk it in place.

tubing early. Then you'll have to start over. With that in mind, cut a piece of tubing that's slightly longer than your finished joint.


Applying heat

There are three popular ways to shrink the tubing. If it's a small diameter connection, such as for a Digital Command Control decoder installation, the heat from the soldering iron is usually enough. Move the tip close to the tubing, and you can see it start to shrink.

Many people will use a lighter to shrink the tubing. This works faster than the soldering iron, and is more useful on larger connections, such as layout wiring. Be sure to keep the flame moving so you don't ignite the tubing.

Finally, there's a heat gun. There's no flame here, and it will handle larger connections with ease. It might be too bulky for delicate projects, though.

Other uses

Heat-shrink tubing also has uses beyond insulation. I've used it to bundle wires in a decoder installation. You only need a short segment. You can also use black tubing to camouflage colored wires between a steam locomotive and its tender. It also works well as a light shield for light-emitting diodes to keep light from leaking out the sides of the diode. 

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A railroad that gives back



1 Pennsylvania RR No. 8959, a Baldwin RT-624 transfer locomotive, pauses at Wilson City, awaiting clearance to head to Green Mountain. The locomotive is a Custom Brass model. The towering Nassau Regency Hotel disguises a wall support pillar.



2 Multiple inbound and outbound passenger trains are making it a busy afternoon at Southport Station on the HO scale Pacific Southern Ry., a charitable club based in Rocky Hill, N.J. The station and its passenger platforms are the result of the efforts of club members Geoff Green, Mark Rosen, Bob White, and Jeff Bernardis.

Once a private layout, the Pacific Southern Ry. grew into a club to benefit local emergency services

By Lou Sassi • Photos by the author

The HO scale Pacific Southern Railway was conceived, designed, and built in the 1960s in the basement of Bob Latham's house in Rocky Hill, N.J. Wanting to give back to their community, the Lathams came up with the idea of holding a train show to raise money for the local volunteer fire department and first aid squad. Bob contacted some local model railroaders and asked them to help.

Bob's personal model railroad has since evolved into a club with more than 30 members. Over the past 60 years, the club has raised more than \$750,000 for local community services.

The HO scale Pacific Southern Railway is a generic layout representing multiple railroads of the steam-to-diesel transition era. The original track plan followed the perimeter of Bob's basement. The railroad was expanded in the 1970s by digging out under the kitchen of the house and adding an outside entrance to help with people exiting the layout after the shows.

After Bob passed away in 1988, club member Geoff Green purchased the home and decided to expand the

railroad to its current size. With this expansion in 1990, the exterior walls were sealed, insulation and emergency lighting added, and air handling upgraded. The expansion also included a 32-foot square deck, under which the basement expansion was built. The outside staircase was removed, commercial dehumidifiers were installed to control moisture, lights were changed to LEDs, and new stairs were built.

The original layout was moved in 2 to 4 inches on all sides to add wallboard for a backdrop. The wallboard backdrop was painted varying shades of blue, darker at the horizon with increasingly lighter hues toward the ceiling. In 2016, a variety of printed commercial scenes were added, with the most distant glued directly to the wallboard. Closer-to-scale scenes and images of buildings were added between them and the viewer. There are up to three layers of photos stacked to get the desired depth effect.

In some locations, foliage and fences were placed against the backdrop to hide where it meets the 3-D scenery. Clouds were hand-painted on the wallboard using sponges, brushes, and mixes of white, gray, and black paint.

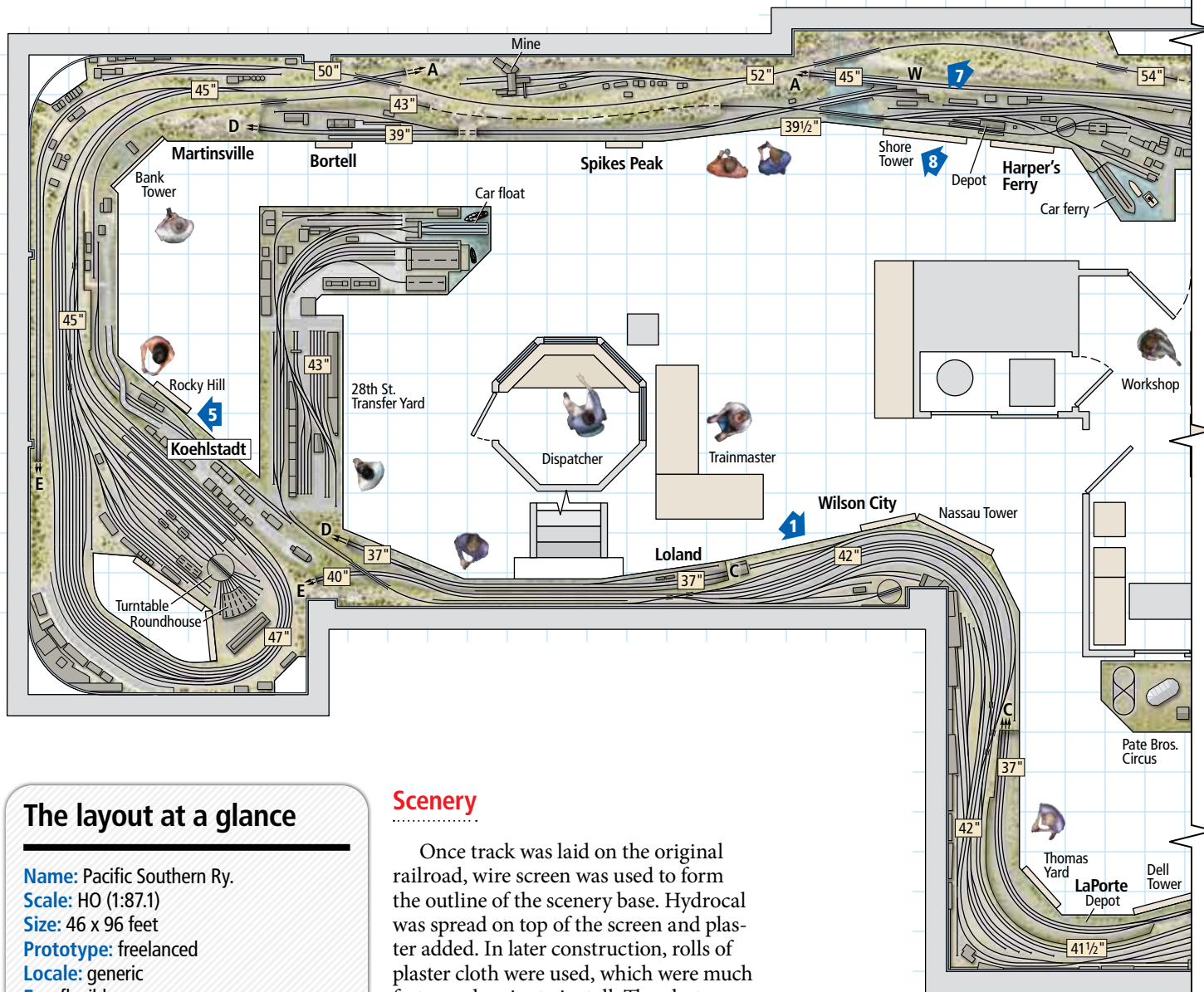
A look at the layout

The original 96 x 46-foot layout, built on a base of L-girders, has a mainline run of 1,000 feet. Roadbed consists of either Homasote or cork glued to a 3/4" plywood base.

Except for three new sections constructed by club members during the recent pandemic, visible mainline track is code 100 rail, freight yards code 83, and branch line is code 70, all hand-laid. Code 83 flextrack was used on those new sections, which contain the 28th and 29th Street Erie freight yard from the 1940s and a "wharf terminal" that was built to increase the waybill operation. Hidden track is commercial flextrack.

Turnouts are also hand-laid. The minimum turnout frog angle is No. 4, and the maximum is No. 16. They're controlled by solenoid switch machines, Tortoise by Circuitron switch motors, or ground throws.

The minimum mainline radius is 48" with superelevation and easements. On branch lines, the minimum radius is 36". The maximum grade on the mainline is 1.3%, while the grade on the branch is 3.1%. Rail height varies from 36" to 62".



The layout at a glance

Name: Pacific Southern Ry.

Scale: HO (1:87.1)

Size: 46 x 96 feet

Prototype: freelanced

Locale: generic

Era: flexible

Style: walkaround

Mainline run: 1,000 feet

Minimum radius: 48" (main), 36" (branch)

Minimum turnout: no. 4, some hand-laid

Maximum grade: 1.3% (main), 3.1% (branch)

Benchmark: L-girder

Height: 36" to 60"

Roadbed: cork on 1/2" plywood

Track: Visible track: handlaid code 100 (main), code 83 (yards), code 70 (branch-line). Hidden track: code 100 flextrack

Scenery: plaster hardshell or plaster cloth over screen or cardboard lattice

Backdrop: multiple layers of building flats in front of printed photos

Control: NCE Digital Command Control

Scenery

Once track was laid on the original railroad, wire screen was used to form the outline of the scenery base. Hydrocal was spread on top of the screen and plaster added. In later construction, rolls of plaster cloth were used, which were much faster and easier to install. The plaster was carved and molded to obtain the desired final ground contours. Ground cover and foliage are a mix of lichen, sticks, and wood debris all glued in place.

Once the ground cover was complete, trees of varying colors were planted. Holes for trees were drilled, then marked with toothpicks.

Rock formations were cast and carved and stained with dyes, which gradually faded with time. The scenery is now colored with a blend of latex paint colors.

The circus tent and surrounding ground was covered with real dirt from a local baseball field, sifted three times to obtain the finest texture.

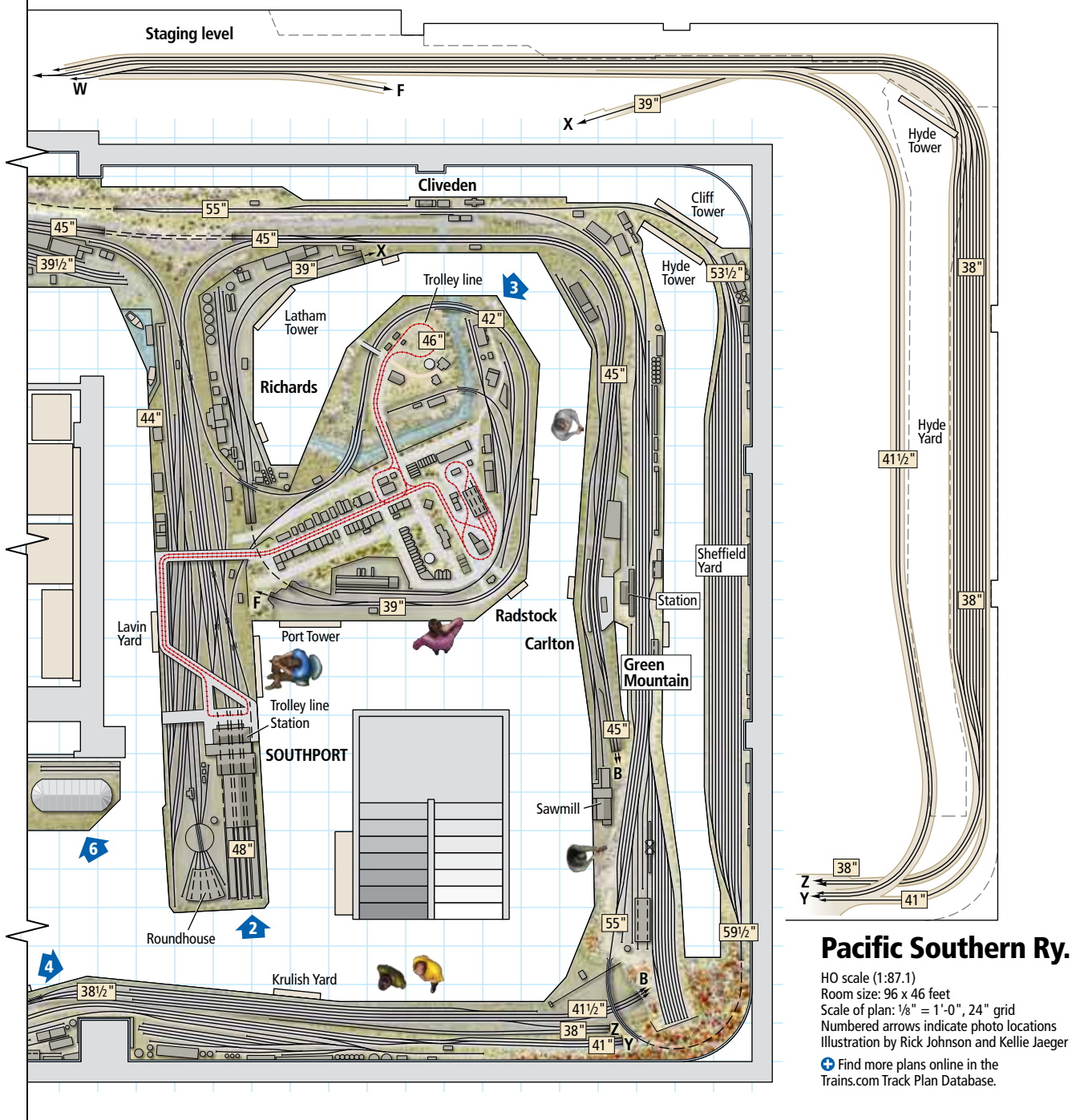
To represent water, the base was painted to give the illusion of depth. Epoxy was then added in thin layers.

Lighting consists of valance mounted LEDs. In selected spaces shades were added to direct the light. The hidden yard is lit by LED strips.

Structures

The many structures on the PSRY are a mix of kit-built, kitbashed, and scratchbuilt. Those with special operational interest include the entirely scratchbuilt Southport Station, with its old and new styled covered platforms. The engine shed roof and platform roof poles are 3-D printed.

The circus big top is constructed with five types of fabric and two spools of



3 This wide-angle view shows the city of Southport in the foreground, with Lavin Yard behind. The city is a collection of kit-built, kitbashed, and scratchbuilt structures. The station tracks were originally built by a member in his former home state of North Carolina and then moved to be joined to the layout.



④ Behind Union Pacific Big Boy No. 4023, the Pate Bros. Circus Train is headed toward Nassau. The circus wagons were custom built by Carl Pate. On the lower level, the first third of a 70-car coal drag heads toward Carlton after passing through the Dell interlocking.

⑤ Loaner power from the Chicago & North Western, 2-8-2 Mikado No. 427, brings its passenger local to a stop at Rocky Hill depot. The station, scratchbuilt with full interior by Bob Latham in 1967, models the prototype depot as it appeared in 1915.





thread. There are 400 chairs in the big top, along with bleachers for the public. (See “The circus that grew” at right.)

The Carlton Sawmill, made from a single piece of basswood, is a combination of three prototype mills. Harpers Ferry Station was originally a small cardboard kit. The window castings from the rear added to one front side to make the station larger.

The warehouse in the new Erie yard is a combination of four kits with freight doors relocated to line up with both 40- and 50-foot boxcars.

Construction techniques and the materials used for each structure vary based on the builder’s preferences and the structure. To help visitors appreciate the details of each location, information cards are secured to the lower railroad



6 In addition to the bleachers for the circus’ audience, the big top has a reserve seating area with 400 individually assembled wooden chairs.

The circus that grew

The circus started as a snowflake and grew to a storm.

In early 1970s, I had a small number of freight cars on the railroad, but they were hard to spot in the crowd. I asked if I could build a circus train and was given the OK. I joined a circus club which issued a bi-monthly magazine and ordered 10 flatcars and a number of circus wagons. I had assumed that each flatcar would hold two wagons, but was surprised to learn that each would hold three or four wagons, so I had to add more. I ordered any circus wagon I could find and even used drawings of wagons to scratchbuild and kitbash others. At one point I had every circus wagon sold on the market.

Over the years, I added stock cars, a maintenance car, an elephant car, and other animal cars. I spliced together two stockcars to create a long stockcar.

More wagons and new, more detailed flatcars were created. The circus train grew from 20 to 37 cars. With the expanded train, the name of the circus was changed to the “Pate Bros. Circus and Combined Shows.” The train is used as the final train in the PSRY train show schedule.

But the question remained: where would the train go to? In 1973, I started building a circus tent. One night while talking with Anne and Bob Latham, I said, “It would be great, besides the bleachers, to have a reserve section of chairs.” Anne asked, “Can you do that?” Before the end of the night, I made one chair to start the project. This reserve seating area ended up growing to 400 chairs!

Over the next six years, I worked on the construction of the three-ring circus, based on the Clyde Beatty Cole Bros. Circus as it appeared in Riverside, Conn., in 1973. Due to various layout expansions and improvements, the circus has occupied four different locations on the Pacific Southern. – *Carl Pate*

facia. The information is available for visitors to read if they want more detail.

Since the railroad is so large, reference numbers are placed on the upper valances to help engineers follow their schedule. The numbers also help visitors find locations that appear on remote track displays. To further help in the monitoring of train movement, we installed 16 closed-circuit cameras.

Special effects include flickering LED lights representing a forest fire, a string

of hot air balloons with their LED “burners” illuminated to mimic flames, and water sounds at the Bernardis Wharf area on module “C.” At several locations there are working crossing lights synchronized with train movements, while at Bortell there is a road crossing with working gates, lights, and bell sounds.

A popular location on the layout is the Shore Tower area with four different types of bridges. The scene was created

7 While fire crews battle a forest fire that threatens the Pacific Southern main line, Pennsylvania RR Class T1 No. 5533 leads a passenger train express upgrade to Green Mountain.



in the late 1960s to replace one bridge and multiple tracks. This is the only location on the railroad where you can see the different track elevations. Trains on the lower main line cross a girder bridge over the Back Bay inlet as they head into a tunnel (the interior of which is visible on video). In front of the main line is a branch line that crosses over a wooden pile bridge to Harpers Ferry. Trains on the middle level cross a steel arch bridge as they come from the west headed to eastern towers. The uppermost track heads to the eastern end of the layout on a high trestle.

Rolling stock and control

The motive power and cars on the railroad belong to the individual members. The detail, weathering, and quality of equipment is governed by each

member's abilities and preference. At any given time, most of what's on the layout is from the steam-to-diesel transition era.

Significant trains include the Pate Brothers Circus train, consisting of 25 to 37 scratchbuilt cars. These include a maintenance car, open and closed stock cars, up to 20 flatcars with three or four circus wagons per flat, and performers' coaches.

There is a 1940s-era Santa Fe passenger train with all 8 cars featuring fully detailed interiors. A Reading coal train has six powered engines pulling more than 80 cars and an unpowered "end of train" helper with sound. Passenger trains can consist of from 1 to 14 cars while most mixed freights have 25 to 30 cars. A double-headed B&O drag

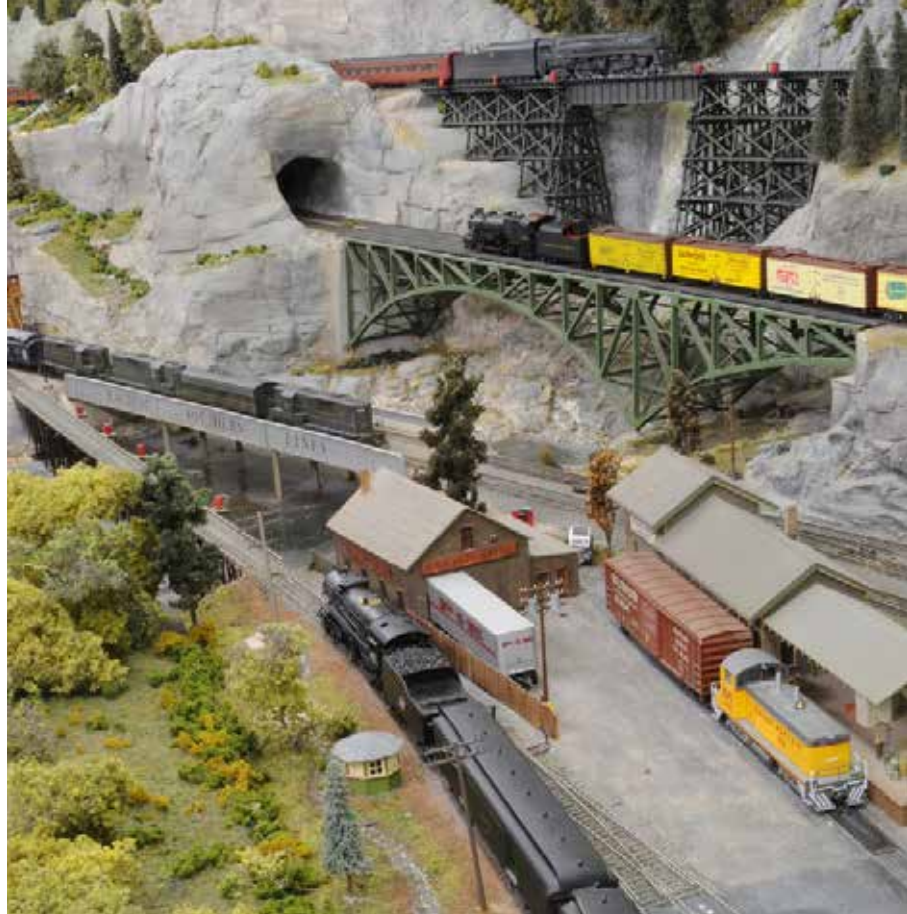
freight can be frequently found pulling 75 empty coal cars.

The PSRY uses NCE Digital Command Control (DCC) with four boosters around the layout. There are 12 NCE Pro Cabs, 7 Power Pro Cabs, and a remote throttle application for use with operators' phones over Wi-Fi. The club also features a member-designed throttle on the dispatcher panel and remote displays panels that "talk" to the railroad and govern signals and train speed.

Mainline turnouts are controlled by either the local tower operators or the club-designed Dispatcher software. In remote areas, some turnouts are controlled manually by movement of levers in the fascia. On the three new areas, all switches are hand-lined. All signals are integrated with



Trains.com members can see video of the Pacific Southern using this QR code.



8 Shore is the only location on the layout where all four levels of track are visible. Each bridge is a different type and all are scratchbuilt.

Operating sessions

Operations on the PSRY are controlled by a dispatcher, a train master, three to four tower operators, two to 10 engineers, and one or two brakemen. Originally, the club used a phone system that linked each tower operator to the dispatcher. Now club members use walkie-talkies, along with internet conferencing via Zoom. Full operation takes a minimum of 10 members.

Sessions are held every Wednesday night. On the third Saturday of each month, a session is held for those who can't make it to the Wednesday sessions. The length of a typical session depends on the schedule chosen.

- Standard schedule involves 25 to 30 trains operating over a 3-hour period.
- Extended schedule has up to 50 trains over multiple sessions that lasts around 4 hours.
- The Waybill schedule (350 cars) involves the movement of freight trains and local switching.
- A "Show schedule" is designed to run as many trains as possible within a 45-minute period by releasing a train every three minutes. During public shows, two professional recordings can be used to help visitors learn about the PSRY. Waybill operations along with

work sessions take place on selected Tuesdays and Wednesdays.

The PSRY is a family of friends. There are many different aspects involved with the creation and operation of such a large railroad. Each member has unique skills that, when shared, help both their fellow individual members and often the entire club. [MR](#)

Meet the club

The Pacific Southern Railway Club

is a 501(c)(3) nonprofit that raises money for the Rocky Hill Rescue Squad & Volunteer Fire Company. Over the past 60 years, more than 150 members have taught others about the club, the hobby, and the importance of the railroads to society. The club's layout has also inspired many members to build their own model railroads over the past 60 years. The club opens its doors to the public for its annual train show once a year; for details on the show, go to rockyhilltrains.org. For more, including photos and videos, go to pacificsouthern.org or visit the club on Facebook at facebook.com/RockyHillTrains.

the turnouts to prevent accidental switching mid-train.

The Dispatcher software controls switches and signals on the main line, along with the east and west ends of the railroad if there is no tower operator. The program includes automatic train routing, which sets switches and signals for a train route based on the train ID. Automatic train control can control the movement of multiple trains based on operation, switch settings, location of trains, and signals. It adjusts locomotive speeds and stops trains in the sidings based on the predetermined settings.

Another program designed by the club is a Train Tracker, which interfaces with the Dispatcher software. The program is used to assign engineers to trains, monitor train speed and movement, and identify delays so assistance can be taken to keep trains moving.



A steel mill layout with a twist

This small, portable N scale layout is designed to create a big impression

By Greg Albert • Photos by Lou Sassi

1 N&W GP18 No. 934 drags a hot metal car full of molten iron bound for the open hearth furnaces to be made into steel. The blast furnace itself was designed to resemble a soaring Gothic cathedral.



Since I turned 50, I've built four layouts, all in N scale and all on standard hollow-core doors. They were made to be portable so I could show them off at the National Model Railroad Association Division 7 annual train show. I consider my latest effort, an N scale steel mill, to be my most successful layout yet.

A major goal in designing and building my N scale steel mill was to make something creative and unique. I wanted it to be a crowd pleaser. The model railroad at its heart is a compact, portable display that I hope catches the interest of folks at train shows and entertains them.

I wanted my layout to go beyond the expected, beyond the usual conventions, beyond the predictable. That's why I call it a model of a steel mill with a twist.



2 After crossing the lift bridge, N&W No. 920 passes the coke gas by-products plant. The refining towers are up-ended HO scale three-dome tank cars. Fractionating towers from an HO scale Vollmer oil refinery kit complete the scene.

The twist is that almost everything on the layout is more than what it seems at first glance. I like to say that "everything is something else." I did that by using recycled materials, odds and ends from different stores, some kitbashing, and a little inspiration from famous architecture. I was looking to create an unusual, perhaps even playful, interpretation of an early 20th steel mill that would entertain even the non-model railroader.

Because this is a portable layout, I used components that are rigid, lightweight, and sturdy. The model railroad is built on a 3 x 7-foot hollow-core door covered by a sheet of 1½" extruded-foam insulation board. A layout of this size fits perfectly in my minivan and on the standard folding banquet table found at train shows, making set up quick and easy.

Maximizing viewer interest

I followed several basic principles to maximize viewer interest and entertainment. One of these principles is to have lots of train action going on. The track plan is simple. It's a double-track loop around the perimeter, with two point-to-point tracks. These are equipped with Bachmann Auto-Reversing Systems that shuttle two trains back and forth among the structures. This allows me to have four trains running simultaneously.

The outer loops are Kato Unitrack, an excellent choice for a portable layout that requires reliable performance. There are no turnouts, eliminating almost all derailments. If the rare derailment occurs it's not the fault of the track, but of the wheels, trucks, or couplers.

Four separate direct-current power packs are used, one for each of the loops and reversing tracks. I installed feeders every three feet to ensure there's consistent power throughout the layout.

More than meets the eye

Another principle was to make many things on the layout to be more than what they seem at first glance. To show what I mean, let's start with the blast furnace and casting house, the centerpiece of the layout. At first glance, it appears to be a typical early- to mid-20th-century structure. However, upon a second look, it resembles a Gothic cathedral. The front facade is reminiscent of Notre Dame in Paris, with its two matching towers. From above, the building can be seen to have the same plan as a cathedral, with a nave, transept, and crossing. But here's the twist: the crossing is the base for the shaft of the blast furnace itself, with the top works typical of an early to mid-century furnace.



The layout at a glance

Name: Steel mill with a twist
Scale: N (1:160)
Size: 3'-0" x 6'-8"
Prototype: freelanced
Locale: upper Midwest
Era: mid-20th century
Style: island
Mainline run: 17 feet
Minimum radius: 11.25"
Minimum turnout: none
Maximum grade: none
Benchwork: hollow-core door
Height: varies by venue
Roadbed: none
Track: Kato Unitrack and Bachmann E-Z Track
Scenery: extruded-foam insulation board
Backdrop: none
Control: direct-current cab control with Bachmann Auto-Reversing Systems

3 Greg's steel mill layout is built on a 3 x 7-foot hollow-core door covered by a sheet of 1½" extruded-foam insulation board. For portability, he chose components that were rigid, lightweight, and sturdy. The layout was built to capture the monumental complexity of a complete mill in a compact space.

There's more: the blast furnace is made from a yogurt cup sitting atop a peanut butter jar lid. Upon closer examination, you can also see that the vents and uptakes above are hardware store PVC connectors. The buttresses are PVC plumbing pieces. The hot-air stoves are plastic shampoo bottles and the stacks are more PVC connectors. So that's why I say "everything is something else."

By the way, there's a sign atop the "nave" of the building reading "Cathedral Iron And Steel" to help identify the building. So the viewer may do a double-double-take when looking at this structure. First you see a blast furnace, then you see a cathedral, and then you see that it's made with PVC plumbing pieces, and tubing connectors.

Is the result realistic? Not exactly. Although I consulted the many highly accurate scale drawings available from the Historic American Engineering Record website, I was very selective about which features of a blast furnace I wanted to re-create. One of my goals was to build a model of a steel mill that captured the complexity and massive monumentality of the real thing without a clutter of small, distracting details.



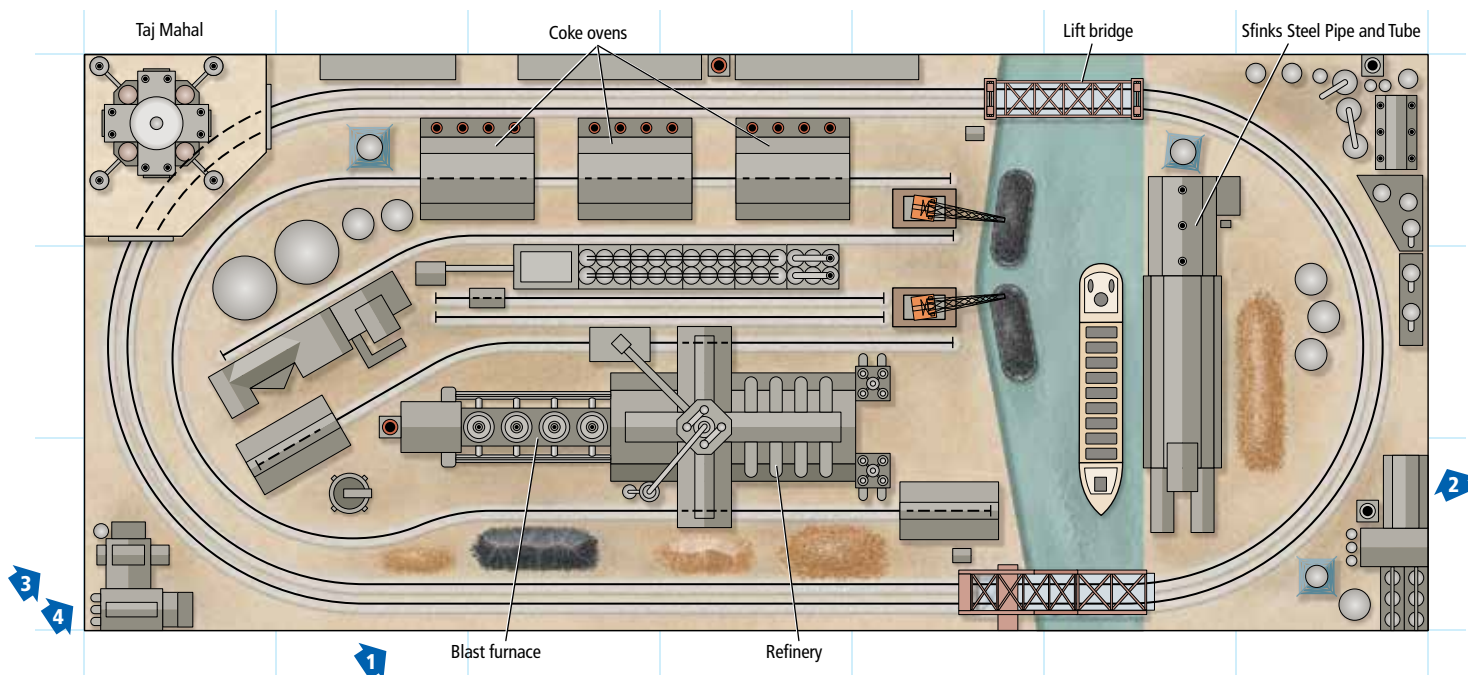
4 At center, a bright red MDT Plymouth diesel industrial switcher can be seen tugging a slag car into the blast furnace. On the center left are the coke ovens, which present several visual puns on the word "coke."

Architectural quotes

Other key structures on this layout are designed similarly. At first glance, they look like industrial buildings related to steel mills, but on closer examination they turn out to be disguised copies of other famous buildings.

The blast furnace is just one of several architectural quotes included on my

layout. The most clearly identifiable structure is what I call Dodge-McCall Byproducts, rather closely based on the Taj Mahal. Again, on close examination, you can see that most components are either re-purposed or recycled PVC pieces. The dome is a 2-inch end cap. The piping and stacks are PVC plumbing parts or connectors, including ⅛" vacuum line connectors. Once I point out



Portable steel mill

N scale (1:160)
Plan size: 3 by 7 feet
Scale of plan: 1" = 1'-0", 12" grid
Numbered arrows indicate photo locations
Illustration by Rick Johnson and Kellie Jaeger

Find more plans online in the Trains.com Track Plan Database.

the reference to viewers, I invite them to find other references on the layout.

The most playful are the coke ovens, where I resort to some visual puns on the word "coke." The combustion chambers are a row of Christmas tree ornaments in the shape of six-packs of cola cans, lightly weathered so the "Coke" labeling is still legible. But wait, there's more. The coal bunker is modeled after a foam picnic cooler; what I call the gas recovery unit is modeled after a cardboard carton of cola bottles, also Christmas ornaments. Prototypical? Hardly. A crowd pleaser? Most definitely.

Another architectural reference is the rolling mill, vaguely shaped like the Sphinx in Egypt. I used the profile of the Walthers Vulcan Manufacturing kit for the basic dimensions, but doubled its length. Maybe a bit obscure, but the signage is a powerful clue since it reads "Sfinck's Steel Pipe And Tube." When I point this out to viewers, the response is almost always a smile of recognition.

Consistency and continuity

A word about consistency and continuity. I made a conscious effort to use as many of the same materials and building techniques, even paint colors, to give most of my structures a familial resemblance. Much of the roofing is the same, most of the windows are made from plastic canvas used to make hooked

rugs, and a lot of the siding is Evergreen corrugated styrene.

I employed the same colors and weathering to unify the structures, drawing attention for their shape and form instead. I really want the viewer to see the layout as a whole, not as a lot of separate pieces. I used simple weathering and scenic techniques to give the entire layout a consistent look that lets the important centers of attention, such as the architectural visual puns, stand out.

I reinforced this impression by using restraint with the amount of detail I included; everything has about the same degree of detailing. There are no figures, vehicles, or clutter that would distract the viewer from seeing the larger forms of the buildings. I didn't want the focus to be on surface minutiae. I'm not a detail freak and didn't want to devote resources to fragile refinements that wouldn't hold up to the stresses of transporting the layout to shows.

An often overlooked concept in model railroading, in my opinion, is that of spectacle. This especially matters for layouts that are meant to be showcased

for the public at train shows and conventions, as mine was intended to be. There are some themes that are natural show stoppers, such as steel mills, waterfronts, and circuses, that will always be popular at public events.

Building and exhibiting my steel mill has been a very satisfying experience. My

layout has evolved over the years as I learned what worked for me and what didn't, and I continue to develop new ideas that will be incorporated in the future. I had fun trying new things, and I certainly have fun telling viewers about my discoveries. To me, that's what this hobby is all about. **MR**



Meet Greg Albert

Greg spent 30 years in publishing before retirement. He was trained as an artist, and continues to exhibit his work as well as teach art classes. When he's not working on his layout, he works in his studio. He enjoys "playing trains" with two of his brothers, also model railroaders. He has three grandchildren and lives in Cincinnati, Ohio.





SCENERY FROM START TO FINISH

Norfolk & Western's eastbound *Powhatan Arrow* meets a freight led by Alco RS11 309 at Tug, W.Va. Gary Hoover shares how he modeled this scene from start to finish.

Veteran modeler Gary Hoover shares how he modeled a scene on his HO scale layout

By Gary Hoover

Photos by the author

Constructing scenery has always been my favorite part of model railroading. The moderate messiness encountered in the early stages is quickly forgotten when rock painting, ground textures, and myriad details are being incorporated. I believe scenery is where one's creative juices begin to flow.

The amount of scenery on a layout is a matter of choice. To some extent, it's dependent on the type of geography one is trying to model. My Atchison, Topeka & Santa Fe layout was set in the Cajon Pass area and contained scenery with relatively few trees and basic rolling terrain. In contrast, my last two Norfolk & Western layouts had more involved

scenery due the numerous rock outcroppings, cuts, trees, and vegetation.

The type of scenery and associated details may also be limited by your operating scheme. Having crew members reach into a scene full of delicate trees to uncouple a car is asking for trouble. I use Rapido's Railcrew magnetic uncouplers to avoid that issue.

Any scenery is better than none, regardless the type or amount. Follow along as I share how I scenicked the free-lanced town of Tug, W.Va.

Gary Hoover lives in Florissant, Mo. His 24 x 49 foot HO scale Norfolk & Western of the 1950s layout was featured in the April 2020 Model Railroader.

STEP 1: IN FAVOR OF FOAM



My first several layouts used the time-honored hardshell and rock casting method for scenery. Crumpled paper grocery bags soaked in Hydrocal were draped over either chicken wire or a paper-ball and masking tape base. The rock castings, made from molding plaster, were then applied to the hardshell and blended into the scenery.

I used extruded-foam insulation board for the scenery base and rock formations on my last two layouts. The foam lets me precisely shape any contour desired, and each rock formation or outcropping is unique.

The downside to extruded-foam insulation board is cost. The price for 50 pounds each of Hydrocal and molding plaster is about the same as three 4 x 8-foot sheets of 2"-thick foam. Because of this, I try to minimize the amount of foam I use as much as possible.

First, I build a support structure from 1 x 2 lumber and mount it to the benchwork **1**. I then use construction

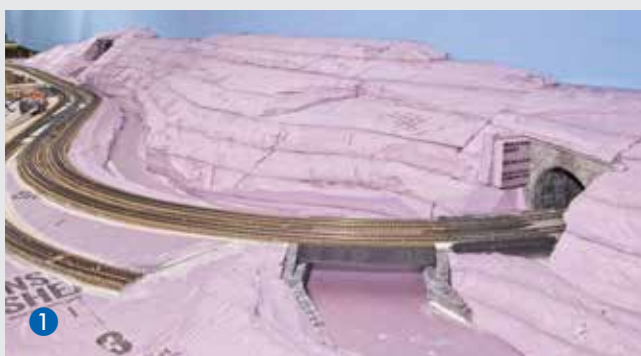
adhesive to attach insulation material to the supports. This method allows the foam to be layered only where needed, as opposed to building up layer after layer to reach the desired contour **2**.

Obviously, you need to have an idea of how high or how low the final terrain profile will be. I allow at least a 2" excess from the highest or lowest anticipated profile.

This is also the time to decide if a scenic divider is necessary. Tall hills and cuts along with gentle track curvatures can be used to make each scene stand alone from the rest of the layout. This provides the illusion of the trains traveling through a longer distance.

I glue the layered sheets of foam together using a general-purpose construction adhesive, such as Loctite PL 375 **3**. I've learned the more expensive adhesives made specifically for foam provides no appreciable added strength or reduced drying time.

STEP 2: LET THE CARVING BEGIN



I generally wait at least a week from the time I glue the foam until I start carving it. I start by rough-cutting the layered foam using a reciprocating saw, such as a Sawzall, with a 12" blade **1**. It's important to go slowly to avoid carving away too much foam.

I regularly stand back from the scene to see how the general contour is taking shape. For the terrain, I use 2" foam. I switch to 1/2" or 1" material for towns and stream beds. I save the scraps to make tunnel portals, bridge abutments, and retaining walls **2**.

Once the rough carving is fairly complete, I start work on the rock outcroppings using a small razor saw and a hobby knife with a No. 16 blade.

If rock strata are needed, I carve the layers in multiple steps. First, I use a hobby knife with a No. 11 blade to lightly carve the initial layers. Then I add undercuts, followed by various details in the rock face.

Rather than trying to be overly precise during rock carving, I've found controlled hacking works better and avoids repetition of the rock form.

STEP 3: ADDING THE MUD

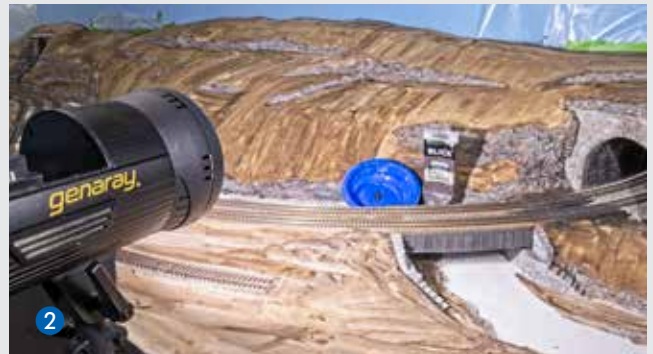
Once the contour of the terrain is shaped and the rock formations are carved, I apply a thin layer of drywall mud over everything but the rock faces. Lightly spraying the foam with “wet” water (water with a few drops of detergent added) makes it easier to spread the mud.

The thin coat of drywall mud serves a few purposes. First, it yields a better surface for painting prior to the ground cover being applied. Second, it provides a firm base for planting trees.

I lightly sand the dried, mud-covered areas with 150-grit sandpaper to remove any irregularities. A quick pass with a shop vacuum removes the dust.



STEP 4: PAINT AND GROUND COVER



I use Liquitex Basics acrylic paints (or equivalent) to color the terrain and rock formations ①. For the terrain I apply a thin wash of Raw Umber. I paint the rock formations using lightly thinned Neutral Gray, followed by Raw Umber, Mars Black, and Raw Sienna.

I apply Mars Black under the rock cuts to enhance the shadow effect and Unbleached Titanium White on the rock edges to highlight the raised surfaces. Each color is allowed to dry prior to going to the next.

Color photos of the rocks help immensely during this process. If I'm in doubt about the colors I need for a specific area or outcropping, I practice on a scrap piece of foam first. When I believe I'm finished painting the terrain and rocks, I use one of my photo lights to check for any spots I may have missed ②.

Once the terrain and rock carvings have been painted, I apply a thinned layer of white glue and then sprinkle on real dirt using a fine sieve ③. The dirt around my house in Missouri is a bit too red/orange for modeling West Virginia. Instead, I use Scenic Express medium dirt (SE0413). A finer version (SE0403) is also available, but I've yet to give it a try.

The dirt provides a natural base for the terrain and looks good in areas where ground cover won't be applied. It also makes great dirt roads. After the glue is dry, I lightly sand the roads with 150-grit sandpaper to make them look smoother and drier.

After the dirt over the terrain is dry, I apply another coat of thinned white glue, followed by a dusting of Scenic Express Soil (EX845E) and Woodland Scenics Soil (T1341)

STEP 4: PAINT AND GROUND COVER (CONT'D)



and Earth (T1342) ④. The ground foam doesn't need to cover all of the terrain; sporadic patches usually look better. Let your eye be your guide.

Once the ground foam layer is dry, I randomly apply another coat of undiluted white glue over the terrain. Then I add Noch 6mm wild grass (50256), Heki 2mm winter grass (3363), and Scenic Express forest green (EX8917). The



Heki Grass Hopper applicator works well for applying the 6mm fibers ⑤.

Once dry, I add clumps of Heki 1680 and 1682 pull-apart grass mats to the scene, along with Accurail Brown Bramble Brush (1414). Then I sprinkle residue from the Heki mats over the bramble brush and fix everything with unscented hairspray ⑥.

STEP 5: AUTUMN TREES



Trees are everywhere in West Virginia. That means I need hundreds of them on my layout. I use Scenic Express SuperTrees to fill this need. I straighten the trees by gently bending the trunk to the point where I hear a snap.

Next, while holding the trunk in a straighter form, I apply a small dab of cyanoacrylate adhesive (CA) to the spot that snapped. I follow that with a drop of accelerator to speed up the CA's cure time. Depending on how curved the trunk is on a SuperTree, I may repeat the process in multiple places on the trunk.

Once the trees are reasonably straight and I've removed the small leaves, I spray the natural material with

Rust-Oleum Earth Brown Camouflage spray paint (1918830), followed by a very light spray of Rust-Oleum Flat Gray Primer (249088). These paints can be found at hardware stores and home-improvement centers.

Since I'm modeling late fall/early winter, my final step is to spray a few trees with unscented hairspray and sprinkle on some dried ground leaf material.

Planting the trees into the foam is easy. I use a sharp, pointed tool or small finishing nail to make the holes. I don't glue the trees into the terrain, as it's not necessary. Also, I sometimes need to remove them temporarily while I'm taking photos.

STEP 6: WATER FEATURES



Rivers and lakes add a great sense of realism to most any scene. I start with a flat, level base of drywall mud. Once that's dry, I apply a coat of slightly thinned Liquitex Mars Black followed by a light wash of Raw Umber near the banks **1**.

By painting the base lighter or darker to represent water depth, I don't need to tint the epoxy. Tinting adds an element of unnecessary risk, because once the resin is down, taking it back up is next to impossible.

When the paint is dry, I apply a thin coat of Enviro-Tex two-part epoxy and allow it to fully cure **2**. I create ripples on the surface by applying a thin coat of clear latex caulk **3**. When the caulk is cured and turns clear, I put on another thin coat of Enviro-Tex. This brings the wet look back to the surface and seals the caulk.



STEP 7: TIES, RAILS, AND BALLAST

I airbrush the ties with an equal-part mix of Tamiya Flat Brown (XF10), Flat Dark Gray (XF24), and Flat Black (XF1). Select siding ties or ties that need to look old are given a random drybrushing of Tamiya Flat Deck Tan (XF55) and Flat Earth (XF52). [Use all hobby paints in a well-ventilated area and wear nitrile gloves, a respirator, and eye protection. – Ed.]

Next, I brush-paint the sides of the rail with Floquil Rail Brown, now out of production. I find solvent-based paints hold up better than acrylics when exposed to track cleaning fluids such as mineral spirits and isopropyl alcohol. I'll have to look for a new line of solvent-based paint when my stash of Floquil runs out.

I use Arizona Rock & Mineral ballast for all of my track. The ballast is made from real rock and doesn't float excessively when adding the wet water, alcohol, and diluted white glue. For the main line, HO scale Pennsylvania RR Gray (1052) closely matches the N&W prototype.

For the yards, I use the company's N scale Steam Era Yard Mix (1221). The N scale ballast seems to give a more realistic appearance in the yard, plus it's easier to work around turnouts.



STEP 8: LET IT SNOW

My two N&W layouts have been set in the late fall/early winter, so select scenes have a light snow covering. You can learn more about my techniques in the December 2020 *Model Railroader*.

In general, I lightly dust Woodland Scenics snow (SN140) onto the scene and fix it with unscented hairspray. I keep the snow off the tracks and away from turnouts as much as possible to prevent it from getting into the wheels of the locomotives and rolling stock.

To simulate frozen water, I first apply a coat of full-strength white glue along the banks. Next, I sprinkle Woodland Scenics snow into the glue. I apply Vintage Reproductions "wet snow" (now out of production) close to where the ice meets the water. A light application of diluted wet white glue from an eyedropper holds everything in place **1**.

As a final touch, I add Busch icicles (1143) to gutters, bridges, and any place when water can drip and freeze. Keep in mind that once snow has been applied to a scene, it's nearly impossible to remove entirely. I usually photograph the scene prior to adding snow and then again afterward **2**.



Hopefully you can use some of the ideas I've demonstrated here. Like many techniques in model railroading, what works for one person doesn't work for another. Experiment with different scenery techniques and find what works for you and your railroad. Whether you need simple or complex scenery, you'll be happy with the results. **MR**



DCC electrical basics



① This month, Allan Gartner will cover electrical basics. These skills will come in handy when wiring your layout and locomotives for Digital Command Control. Photos by the author

Over the course of this monthly column, I have given you some bits of basic electrical knowledge to get you through each individual project. Now, I would like to take some time to give you more information on how to handle other situations you might face as you equip your layout with Digital Command Control (DCC) ①.

A basic circuit consists of a power source, some wiring, and a load. A power source can be a battery, a power supply, or a booster. The load can be a light bulb, a light-emitting diode (LED), a motor, a speaker, or a decoder with any of the above attached ②.

A power source usually puts out voltage, or electrical pressure. Think of it like water pressure that squirts water out of a hose. The more voltage, the farther your hose can squirt. Note that sometimes in equations you will see the letter “E” used to represent voltage. E stands for electromotive force.

The hose is like wiring that gets the water from your spigot to the nozzle so you can wash your car. If your hose is small and lightweight, you’ll notice less water comes

out. This is the concept of resistance. Small wires have high resistance and can limit the amount of power that can get to your decoder. Resistance is usually represented by “R” in equations and is measured in ohms. The Greek letter “Ω” (omega) is used to represent ohms.

Although not a perfect analogy, the amount of water that comes out of the hose to fill your car wash pail is the concept of current. The unit of current is the ampere, usually just called amps. Amperage is like gallons per minute. The higher the amperage, the faster your bucket fills. In equations, the letter “I,” which stands for intensity, represents current.

Note that if a power source can put out 5 amps, for example, it will not put that out all the time. If the 5A supply is driving a slow-motion switch machine load, it will only be put out about 10 milliamps (.01 amps). So a power source will only put out what a load draws up to its maximum.

Most people understand polarity for a direct-current (DC) source like a battery. There is a positive (+) and a negative (-) terminal.

Polarity for an alternating-current (AC) source like a DCC booster is a bit harder to grasp, but it doesn’t need to be. At any moment in time, one wire is positive and the other is negative. One moment later, they are reversed – the wire that was positive is now negative and the wire that was negative is now positive. Then they reverse again and are back the way they started.

When wiring your layout, it’s OK to think of your DCC wiring like DC, because at any moment in time, your polarity has to be right. If you have a loop of track, you may decide that the outside rail is red and the inside rail is black. You have to keep this going all the way around. If at any point, you attach a red wire to the inside rail, you will violate the polarity and your system will short circuit, tripping your booster.

For the most part, wiring a layout is straightforward. Basically, it consists of two wires from your booster to your track’s two rails. Your wiring must be big (heavy) enough to be able to handle all the current that the booster can put out. That includes your feeders and track, as well as your buses.

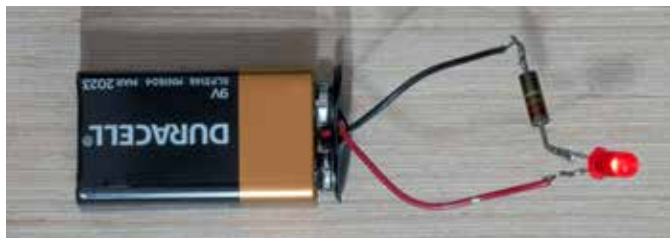
There are two generally available meters: a digital multimeter (DMM) and a RRampMeter. The DMM is available from electronics

stores and home improvement stores. The RRampMeter is made by DCC Specialties.

Digital multimeters can usually read AC and DC voltages, resistance in ohms, milliamperes, and sometimes continuity. Some make you set the range while others will auto-range. Either is fine. If you have your meter on the wrong range, it will usually display “OL” (overload). Go up in incremental ranges until you get a reading.

When measuring voltages, just place your meter on the range above what you expect to measure and either AC or DC. Be aware that if you try to measure AC and have the meter set on DC, it will read very close to zero. You won’t have better luck trying to read DC with the meter set to AC, so be sure to get this setting right. Some meters have a range of voltages for AC on one portion of the dial and DC on another, making it a little easier to get right.

For DCC voltages, set the multimeter to AC. Place the meter leads across what you’re measuring, like the booster output voltage. A DMM can’t make accurate DCC measurements. For example, your booster output voltage might be 14.25V, but the DMM may only read 10V, maybe even less. Note that value. As long as your other track voltage values are close to your booster reading, you’re



② All circuits can be boiled down to a power source (battery), a load (LED), and wiring. The circuit can be modified by devices as simple as the resistor shown here.

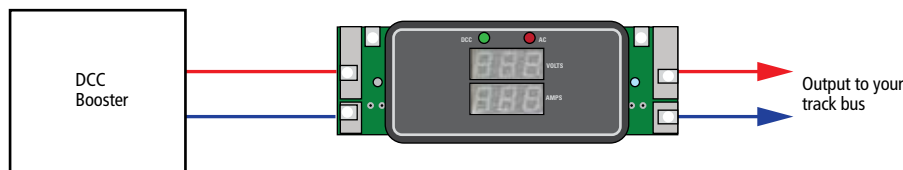
usually OK with a relative reading. If you want more accurate DCC voltage readings, buy an RRampMeter.

When measuring resistance, make sure the resistor you're measuring isn't in a circuit and power is not applied. If you have to set a range, the range should be just above the value you are measuring.

Continuity mode is intended to beep when an electrical connection is made. You can put one lead on your booster output and the other on the track. Make sure power isn't applied. If you want to follow this example, I recommend you pull the quick disconnect connector with your track connections off your booster. Also, ensure you don't have any locomotives or electronics across the tracks, or you may read them. If the meter beeps, you're set.

Measuring current, usually milliamps, is inconvenient, so you will rarely do it. Most inexpensive meters are limited to low milliamp readings, and most locomotives will draw more than that. Additionally, you have to break the circuit and put the meter in series to make a reading. Never put an amp meter across a circuit to be measured. You'll blow its fuse or more likely damage the amp meter.

To measure motor stall current, use an old DC power pack with an amp meter. Set the power pack at about 1.5V less than you expect the DCC track voltage to be. For HO, that will be about 13V. Put your locomotive to test on the track and prevent the motor from rotating. Be quick



3 The DCC Specialties RRampMeter can measure DCC voltage and current (amperage). If inserted in-line as shown, you can measure both. If you touch the left two terminals to your track, you can measure track voltage, but not current. Illustration by Kellie Jaeger

about it; you don't want to damage your motor. Your measurement doesn't need to be exact, but you want to buy a decoder that has a rating higher than your motor stall current.

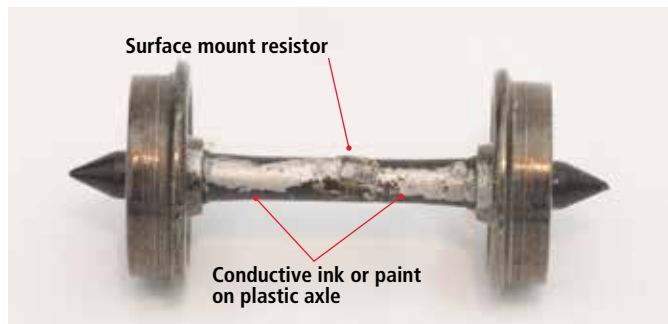
If you want more accurate DCC voltage and current readings, buy the DCC Specialties RRampMeter. You can use it several ways. If you want to measure track voltages, just hold its inputs touching your track. If you want to measure current with your RRampMeter, you will have to put it in series with both wires coming from your booster to its inputs and connect its outputs going to your track **3**. Note that the RRampMeter does not measure DC volts or amps.

Finally, let's talk about resistors. Next to LEDs, you'll use them a lot.

Resistors have many uses. The primary use of resistors by modelers is to limit current flow through LEDs, dimming them. I covered light-

emitting diodes in my January 2023 column. Resistors are also used to trigger block detectors when placed across axles of cars and cabooses.

Resistors are simple and only cost a few pennies each. They can be hooked up in your circuit in either direction; they're not polarity sensitive. The



4 This resistor wheelset was made with conductive paint. Be careful not to get ink or paint completely across the resistor, or you will short it out. When complete, an ohm meter should read the value of your resistor.

only two things that matter are their resistance value, measured in ohms (Ω), and their power rating, in watts (W). Resistors are available from Jameco (jameco.com) and other electronic distributors.

They're not made in every conceivable value. You can buy a 1k Ω resistor, but not a 1,234 Ω one. If you choose to calculate a value, just use the next higher commercially available one. Most resistors today are sold with a 5% tolerance. For most modeler uses, precision isn't essential.

Your circuit will generate a small amount of heat. When using resistors above 680 Ω with LEDs, a 1/4W resistor will be fine for HO scale and smaller. For scales greater than HO with higher track voltages, or values below 680 Ω , use a 1/2W resistor. If you're placing 4.7k Ω or higher resistors across wheel sets for block detection, a 1/16W resistor is fine.

It's always OK to use a higher wattage resistor; it just takes up more space. How much heat it dissipates is

determined by the circuit it is used in, not by its size. So if you have a circuit that generates 1/10W of heat, that's all any resistor in that application will dissipate, no matter how big it is. If size is important to you, here is the equation for determining the amount of heat:

$$W=(V^2)/R$$

Where V is the voltage across the resistor and R is its resistance.

If you want to use resistors for block detection on your rolling stock axles, use surface-mount device (SMD) resistors **4**. Glue them to plastic axles with metal wheels.

Then connect the resistor ends to the metal wheels with a conductive ink pen (COM-13254) available from Mouser (mouser.com). Surface-mount devices (SMDs) do not have leads on them and are particularly hard to solder to unless you are equipped to do so. Surface-mount device resistors come in sizes of hundredths of an inch. A 10k Ω 0603 resistor from Mouser is 755-ESR03EZPJ103. **MR**



IF YOU WANT TO USE RESISTORS FOR BLOCK DETECTION ON YOUR ROLLING STOCK AXLES, USE SURFACE-MOUNT DEVICE (SMD) RESISTORS. —ALLAN

The Crew Caller

Sharp knocking and rattling doors woke us long before dawn began streaking the sky. We had taken a bare bones room, desperate for showers and mattresses after roughing it through Boston & Maine territory in Vermont for days. The brusque desk clerk checked us in without looking up from the can of Moxie he nursed. Rustic would be a kind way to describe the Hotel Coolidge in the early 1980s, but its location overlooking the station at White River Junction was ideal.

Knock! Knock! Loudly, “You’re called for the *Montrealer*.” Footsteps sounded and we heard the call repeated at another door. Knock! Knock! Could having sleep interrupted this way please anyone but railfans?

Railroading involves around-the-clock work and odd hours hound railroaders today as much as ever. Federal hours of service requirements make it a challenge to staff train crews. Normal variation in rail traffic and schedules complicates this, as do seniority and personal time off. Years of service give railroaders seniority that they’ll use to bid on highly desirable jobs with regular start times like local freights and yard jobs. A crew caller pieces all this together.



Hang tags like these can help a layout’s crew caller know who’s on duty and not during an operating session.



Shining in the spotlight, this call board inside the Western Pacific depot at Keddie, Calif., displayed the work status of railroaders there. Photos by the author

The photo above shows the Western Pacific call board for conductors and brakemen at Keddie, Calif., in early 1973. The board didn’t necessarily list railroaders in the order they’d be called to work, but studying it helped them determine their standing. Someone who is “first out” receives the next call. Another railroader might say “I’m four times out,” meaning that three call times were ahead. Chalking the entries made it easy to update them.

Today, computer screens and cell phones display call boards, and railroaders no longer mark up because they’re always assumed to be available. However, they still “mark off” when they’re not. “Sharpshooters,” not a complimentary term, refers to those who manipulate the board to position themselves for desirable jobs.

Operating sessions also depend on crew calling, and

many hosts use call boards like Keddie’s. It’s easy to lay out jobs and call times on a whiteboard and make entries on it with erasable markers. A similar approach uses a grid on a magnetic board that holds job and name tags.

There are plenty of ways to assign crews at the start of an operating session. People usually sort themselves into road crews and yard jobs so calling these jobs can be as simple as raising hands. Often, a host preassigns a crew when a job needs an experienced individual. Some rely on a seniority list dated by a person’s first operating session on the model railroad.

Others allow participants to accumulate seniority by taking demanding jobs. For example, sitting in as a dispatcher might earn enough points to go to the top of the list at the next session. Lotteries are also popular. I

have crews draw a number, which determines their spot on the board. Sometimes, I blind number my jobs and the person drawing the number gets the job. For variety, I’ll reverse the lottery order to award first choice to the person drawing the highest number. All of these systems use “first in, first out” after crews complete their initial assignments. This sends the first crew available to the top of the board.

Recently, I ran across an arrangement new to me. The photo at bottom left shows the hang tags that Bob Willer adapted from his Spokane, Portland & Seattle prototype to help his crew caller. Each tag displays its person’s name and seniority date. The authentic typewriter font suits the mid-’60s era Bob models. Crews move their tags to the off-duty section of the board when they’re ready to mark up again. **MIR**

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Nov 11-12 Springfield, IL - Illinois State Fair
Nov 18-19 Wilmington, MA - Shriners Auditorium
Nov 18-19 Xenia, OH - Greene County Fairgrounds
Nov 25-26 Edison, NJ - New Jersey Expo Center
Nov 25-26 Collinsville, IL - Gateway Center
Dec 2-3 Timonium, MD - Maryland State Fair
Dec 3 Wheaton, IL - DuPage County Fair
Dec 9-10 Hampton, VA - Hampton Roads Conv. Ctr.
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Quincy & Torch Lake 2-6-0 Mogul

No. 3 crosses the Pewabic Trestle with a loaded rock train headed to the stamp mills at Mason on Pat Thomey's On30 layout. Pat tore down his former HO scale layout to build the slower-paced Q&TL. Dave Rickaby photo



Great Model Railroads 2024 is packed with articles, photos, tips, tricks, and track plans from nine spectacular layouts in HO, N, and O scales.

This month, Trackside Photos features images from six of those layouts. *Great Model Railroads 2024* goes on sale in October at your local hobby store. You can also order directly from our Customer Service hotline at 877-246-4879 or online from KalmbachHobbyStore.com.





Stoney Creek & Romeo No. 3 rolls through farm country on the outskirts of Stoney Creek with a cut of cars bound for the New York Central interchange track. The action takes place on Richard Cooke's O scale Pontiac Belt Line. Dave Rickaby photo





The eastbound *Olympian Hiawatha* streaks past the depot at Sturtevant, Wis., in the summer of 1954 on the traveling Modutrak modular N scale layout. The depot is a modified GC Laser wood kit. The *Hiawatha* is a Kato train set. The coal tower and passenger shelter are scratchbuilt from styrene.

Keith Kohlmann photo

Electro-Motive Division E7As 761 and 758 pull the *Hummingbird* passenger train past the car shop into the South Louisville yard on John Bowling's HO scale Louisville & Nashville layout. The locomotives are both Life-Like Proto 2000 models, and the cars are from Athearn. The car shop is kitbashed from two Walthers kits. Lou Sassi photo

As the sun sets, Milwaukee Road No. 2378, an Electro-Motive Division GP9, leads a mixed train around a curve near Dill on Gregg Condon's HO scale Mineral Point & Northern. Gregg thinks of his layout as a time machine; this scene takes viewers home to 1954. Todd Condon photo





Deep in a canyon in the Rocky Mountains, Union Pacific No. 2639 – a patched-out former Denver & Rio Grande Western SD45 – crosses Bear Creek. Rolf Malmberg's seventh layout is a freelanced, modern-day HO scale railroad set in the mountains of Colorado. Rolf Malmberg photo

Send us your photos

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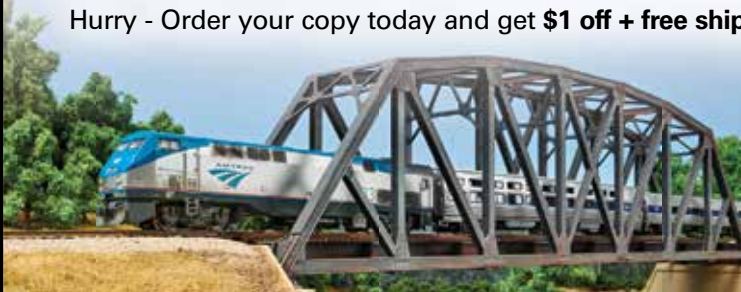
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Schedule of Events Rate: \$45 per issue (55 word maximum). Ads will contain the following information about the event: state, city, sponsoring organization and name of event, meet, auction or show, dates, location, times, admission fee, name and/or telephone number and/or email of person to contact for information. Name, daytime telephone number and street address of the person providing the information is also required but need not be included in the ad. Unless otherwise requested, ads will be published in the issue month that the event occurs in. Please specify issue date(s). **Word Ad Rates;** per issue: 1 insertion — \$2.03 per word, 6 insertions — \$1.89 per word, 12 insertions — \$1.77 per word. \$40.00 MINIMUM per ad. To receive the discount you must order and prepay for all ads at one time. Count all initials, single numbers, groups of numbers (i.e. 4-6-0 or K-27), names, address number, street number, street name, city, state, zip, phone numbers each as one word. Example: John A. Jones, 2102 South Post St., Waukesha, WI 53187 would count as 10 words. For MR's private records, please furnish: a telephone number and, when using a P.O. Box in your ad, a street address. **Model Railroad** reserves the right to refuse listing. **All Copy:** Set in standard 6 point type. First several words only set in bold face. If possible, ads should be sent typewritten and categorized to ensure accuracy.

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All ads must be prepaid and pertain to the subject of model railroading.

Schedule of Events

AL, HELENA: Smokey City Rails Show & Sale. October 27-28, 2023. Helena Sports Complex, 110 Sports Complex Dr., Helena, AL 35080. Friday 4pm-8pm, Saturday 9am-3pm. Admission: Adults \$6, Children 8-12 \$2, Under 8 Free. \$10 Two-Day available. For additional information, contact: 205-864-7769 or email: scrmc029@gmail.com

AZ, GLENDALE: ARHS Model Train Swap Meet. Glendale Christian Church, 9661 North 59th Ave., Glendale, AZ 85302. Saturday, November 11, 2023, 9:00am-1:00pm. Everything Trains — Food — Fun. Admission \$5.00. Tables \$25.00 - to sign up send check or money order to: ARHS, PO Box 5816, Glendale, AZ 85312-5816. Contact: Craig Faris, 623-340-3529

CA, ANAHEIM: 2023 TTOS-SP Super Meet. December 15-16, 2023. Friday, 5-8pm; Saturday, Noon-6pm. Brookhurst Community Center, 2271 Crescent Ave. Buy-Sell-Trade Trains, Toys, and Railroad Memorabilia. Train races, auction, and more! FREE kids train set raffle Saturday. 2-day admission: \$5/person, \$10/family. FREE parking. Vendors: 8-ft tables, \$25, \$30 after 12/01. Visit: TTOS-SP.ORG/THE-SUPERMEET/ to register. Questions: info@ttos-sp.org

CA, SACRAMENTO: 45th International Railfair. November 11-12, 2023. Cal Expo, Building C, 1600 Exposition Blvd., Sacramento, CA 95815. Saturday 10am-5pm and Sunday 10am-4pm. Layouts, Vendors, Clinics. Admission: \$12 on Saturday, \$10 on Sunday. Under 12 free. Info: tom.c.irf@gmail.com or internationalrailfair.com

CA, TULARE: TRAIN, TOY, & MODEL KIT SHOW. November 18-19, 2023, 10am-4pm. International Agri-Center, 4500 S. Laspinia St., Tulare, CA 93274 (off Route 99). Admission: \$10/person; \$15/family. FREE parking. Up to 400 vendor tables plus operating train layouts, live steam displays, a parts dealer. Vendor information: send SASE to TTOS-Tulare Show, PO Box 6710, Fullerton, CA 92834

CO, LOVELAND: Rocky Mountain Train Show. November 25 & 26, 2023. The Ranch Complex, 5280 Arena Circle, Loveland, CO 80538. Saturday, 10am-5pm, Sunday 9am-3pm. 200+ sales tables, 50+ vendors, operating layouts, model trains of all scales. Admission \$10.00, 12 and under free. Free parking. 303-364-0274 www.RockyMountainTrainShow.com Information@RockyMountainTrainShow.com

CO, PUEBLO: Rail Fair Model Train Show, sponsored by the Pueblo Model Railroad Association and TECO. October 14-15, 2023, Saturday 9am-4:30pm & Sunday 10am-3pm. Livestock Pavilion-Coloredado State Fairgrounds, 1001 Beulah Ave., Zip: 81004. Admission: \$10, 12 and under free. All scales, operating model railroad layouts, vendor tables, instructional clinics. Free parking. More info: www.pueblomodelrailroadassoc.org or www.tecoshow.org

CT, ANSONIA: Classic Shows, LLC will hold a Train and Toy Show on Sunday, November 5, 2023, from 9:00am-2:00pm at Warsaw Park, 125 Pulaski Hwy (Route 243), Ansonia, CT 06401. Admission \$6.00, children 15 and under are free with an adult. For information, please call 203-926-1327 or go to: www.ClassicShowsLLC.com

CT, VERNON: Model Train Show, October 29, 2023, 10:00am-4:00pm. Vernon Center Middle School, 777 Hartford Turnpike, Vernon CT 06066. Adults - \$8, children 12 and under - free, family max - \$20. Operating model railroads, vendors. Proceeds benefit the Rockville High School band and choir programs. Sponsored by the Amherst Railway Society - amherstrail.org

FL, NEW PORT RICHEY: Regal Railways presents a Toy Train, Collectible and Hobby Show/Sale. Elks Lodge, 7201 Congress Street, New Port Richey, FL 34653. Saturday, November 18, 2023. 9:00am-2:00pm. Admission: \$6.00 adults, children under 12 free. Early Bird: \$8.00 (8am-8:45am). Vendors and model train layouts. Contact: Joe at 727-244-1341 or visit: www.regalrailways.com for more information.

FL, OCALA: Lions Tri-Annual Train Show. First Christian Church, 1908 E. Fort King St., Ocala, FL 34471. Saturday, November 4, 2023, 9:00am-2:00pm. Model trains, accessories, detail parts and toys. Admission \$5.00, children 12 and under free w/paid adult. Bring two canned goods and receive \$1.00 off admission. Food/snacks available. Information: Bob 352-694-6381 or cell 813-203-3216

FL, PINELLAS PARK: HR Trains & Toys, Inc., presents the 75th (original) Train Show. October 14 & 15, 2023. Both days, 10am-5pm. 7900 49th St. N., Zip: 33781. Pinellas Park Performing Arts Center, free parking next to our store. Bachmann-Marklin-LGB, more! 5 seminars/day. For kids—wood box car painting, race and take. Best layout prizes! 727-526-4682, www.HRTrains.com

GA, SAVANNAH: Coastal Rail Buffs 34th Annual Model Railroad and Train Show at Cottonwood Suites, 301 Governor Treutlen Dr, Pooler, GA 31322. November 11-12, 2023, Saturday 10:00am-5:00pm, Sunday 10:00am-4:00pm. Adults 2-day admission \$7.00; Students/Seniors \$5.00, Active-Duty Military/under 12 FREE. Dealer tables, operating layouts in O, HO, N. Visit: www.coastalrailbuffs.com

IA, DAVENPORT: Model Train Show. October 27-28, 2023. Friday 10am-6pm and Saturday 10am-4pm. N, HO, O27, O & American Flyer...NEW & USED. Buying trains, pay in cash. FREE admission & parking! Cash and credit cards only. American Legion, 702 West 35th Street, Davenport, IA 52806. Questions, call John at 563-349-0134 or email: JohnsTrainsHobby@aol.com

IA, HAMPTON: NCIMRRC Train Show. Franklin County Convention Center, 1008 Central Avenue W., Hampton, IA 50441. Sunday, October 29, 2023. 9:00am-3:00pm. Admission \$5.00. 10 and under free with paid adult. Trains (all scales), memorabilia and collectibles to buy, sell and trade. Individual tables welcome. For information or table reservations contact, Eastside Trains, 641-456-1998, email: eastsidetrains@gmail.com

IL, LENA: MARK YOUR CALENDARS! Depot Stove Gang 34th Annual Model Railroad Show and Swap Meet. March 23 & 24, 2024, 10am-4pm both days. Lena-Winslow Elementary, Junior & Senior High Schools. 401 Fremont Street, Lena, IL 61048. Over 26,000 sq.ft. Operating exhibits, vendors, and food. Free parking. Info: Roger Schamberger 815-238-7888 or email: depotstovegang@gmail.com

IL, ORLAND PARK: Fall S-Fest 2023. November 3-5, 2023. CASG, Inc. Be part of the greatest S, 1/64 event! Registration \$35. Georgios Quality Inn & Suites, 8800 W. 159th St., Orland Park, IL, 60462. 110 tables! Clinics! S-Fest cars! www.trainweb.org/CASG or call Joel at 847-212-3541

IL, ST. CHARLES: 32nd Annual Chicago Railroadiana and Model Train Show. Kane County Fairgrounds, (Front Building), 525 South Randall Rd., St. Charles, IL 60174. Sunday, October 15, 2023, 10:00am-3:00pm. Admission: \$6.00 (includes tax). Children under 12 FREE. Tables starting at \$65.00. For information: 847-358-1185, RussFierce@aol.com or www.RRShows.com

IN, DANVILLE: Central Indiana Division-NMRA 16th annual Danville Train Show. Saturday, November 18, 2023, 10:00am-3:00pm. Hendricks County Fair Grounds, 1900 E. Main St., Danville, IN. Operating layouts, displays, door prizes, vendors, food. Free parking. Admission: \$3.00/adult, 16 and under free. Dealer Tables \$16.00 each. Contact: Dave Mashino at danvilletrainshow@gmail.com or 765-860-1560. More info at <http://cidnmra.org>

IN, LA PORTE: Duneland Model RR Club Train Show and Swap Meet. La Porte County Fairgrounds Community Building, 2581 In-2, La Porte, IN 46350. Sunday, November 19, 2023, 9:30am-2:00pm (Chicago time). Adults \$5.00, youths 6-12 \$1.00, 5 and under free. Contact: Dave Novak at trains86@myyahoo.com or 219-778-3195. (Masks are optional.)

IN, TIPTON: Antique Toy & Train Show. Tipton 4-H Fairgrounds, 1200 S. Main St., (State Rd 19), Tipton, IN 46072. Saturday, October 14, 2023, 11:00am-3:00pm. Adults \$4.00, 13-18 \$1.00, 12 and under free. 100+ tables, all gauges, kits, free-parking, food/drink available, handicap accessible. Contact: David Moree, 4402 East 100 South, Kokomo, IN 46902, 765-457-1044 or 765-860-8062

MA, MARLBOROUGH: Hub Division NER/NMRA. Royal Plaza Trade Center, 181 Boston Post Road West (Rte. 20 West), Marlborough, MA. Saturday December 2, 2023, 10am-4pm and Sunday December 3, 2023, 10am-4pm. Admission: \$15.00; Children under 12 and Scouts in Uniform FREE. Admission good both days. Information: Mark 508-528-8587; E-mail: TE.info@hubdiv.org; website: www.hubdiv.org

MI, EAST LANSING: Lansing Model Railroad Club Show and Sale. Michigan State University Pavilion, Sunday, November 5, 2023, 10:00am-4:00pm. Admission \$8.00, under 12 free. Michigan's largest train show: layouts, demonstrations, and 500+ tables. Free parking. Flyer, table forms and map, visit: www.lmrc.org or call Ron St-Laurent 517-256-3588

MI, KALAMAZOO: Southwest Michigan Train Show & Sale. Kalamazoo County Expo Center, 2900 Lake Street, Sunday, October 29, 2023, 10am-3pm. Admission \$6.00; Children 12 and under free. Operating layouts, vendors, railroad memorabilia, model trains, accessories, door prizes. Free parking, concessions and more! Presented by Kalamazoo Model Railroad Historical Society. Contact: David Hayes-Moats, 269-344-0906, www.kmrhs.org

MN, WOODBURY: Newport Model RR Club Train Flea Market. All scales, model railroad equipment, collectibles, antique toys, books/magazines, and much more! Woodbury High School, 2665 Woodlane Drive, Woodbury, MN 55125. Saturday, October 14, 2023, 9:00am-2:00pm. Admission \$5.00. Club Address: Greater East Area Model RR Club, PO Box 0061, St. Paul Park, MN 55071. Contact: Don, 763-257-5443

MO, ST. LOUIS: 32nd Annual Greater St. Louis Metro Area Train Show by Mississippi Valley N Scales. NEW LOCATION and DATE! Meramec Community College Gym, 11333 Big Bend Rd., Kirkwood, MO 63122. October 14-15, 2023, Saturday 10am-4pm; Sunday 10am-3pm. Admission: \$10, kids 12 and under FREE! All scales-swap tables-layouts-grand prize drawing! Free parking. David Johnson, 636-225-2405, www.seetrains.com

NC, RALEIGH: Neuse River Valley Model Railroad Club Annual Show: Jim Graham Building, NC Fairgrounds, 4825 Trinity Road; November 4th-5th, 9am-5pm; admission: \$10, children 12 and under free w/adult, \$1 off coupon on club website. The largest, oldest train show in NC, 95,000 SF with 300+ tables, multiple layouts. Contact George Lasley, email: gwasley52@gmail.com, visit www.nrvclub.net

NH, DOVER: The Great Northern New England Train Show. Dover Lodge of Elks #184, 282 Durham Road, Dover, NH 03820. Saturday, October 28, 2023, 10:00am-3:00pm. Admission: \$5.00 per person, children under 12 free. Exhibitor tables \$35.00, includes entrance fee. All scales, operating layout, railroadiana items, and food on premises. Contact Ed Martin, efmenter@aol.com or 603-362-4300

NJ, BRICK: ECTP and Collectibles LLC presents The Brick Train Show, Elks Lodge, 2491 Hooper Avenue, Brick, NJ 08723. Sunday, November 5, 2023, 9:00am-2:00pm. Admission: \$7.00; under 12 free with adult. John LaLima 732-845-5966. Go to www.eastcoasttrainparts.com and click on The Brick Show.

NJ, WAYNE: ECTP and Collectibles LLC presents The Wayne Train Show. P.A.L. Hall, 1 Pal Drive, Wayne, NJ 07470. Sunday, October 29, 2023, 9:00am-2:00pm. Admission: \$7.00; under 12 free with adult. John LaLima 732-845-5966. Go to www.eastcoasttrainparts.com and click on The Wayne Show.

NY, ALBANY: December 3, 2023, "Great Train Extravaganza". Largest model train show in Capital Region. Empire State Convention Center, underneath The Egg. 10am-4pm. \$10 adults, children free. Operating layouts, all scales, plus Lego. 300+ tables: model trains, train sets, craftsman kits, buildings/scenery, accessories/parts, books/DVDs, railroad memorabilia/prints, switching puzzle, test tracks, educational/NMRA displays. Door prizes. Refreshments. www.gtealbany.com, 518-668-9892, trains@gtealbany.com

NY, ONTARIO/BUFFALO/HAMBURG: WNYRHS Train & Toy Show. November 18-19, 2023 & February 17-18, 2024. Fair Grounds Event Center. 5820 South Park Ave., Hamburg, NY. Saturday 10:00am-5:00pm, Sunday 10:00am-4:00pm. 350+ tables. Adults: \$8.00, 12 and under FREE. NMRA (WNY-Div) meeting Saturday 10:30. NMRA-Modeling clinics/demos, layouts (N-HO-S-O), LEGO, children's area. Family fun! Stroller friendly! Contact: Art Toale, 716-837-1791, feebeelovr@yahoo.com

NY, POUGHKEEPSIE: Train & Hobby Show of the Hudson Valley. November 5, 2023. 10am-3pm. MJN Convention Center, 14 Civic Center Plaza, Zip: 12601. Model train vendors, operating layouts, raffles, kids ride-on railroad, free parking. Vendor Tables \$35 each, Public & Family Discount Tickets all online at: www.midhudsonciviccenter.org/event/hv-train-hobby-show/ Visit the preeminent fall show in the NY/NJ/CT Metro area!

OH, DAYTON: Dayton Train Show. The New Montgomery County Fairgrounds, 645 Infirmary Road, Dayton, OH 45417. November 4-5, 2023. Saturday 11am-5pm and Sunday 11am-4pm. Admission: \$8.00 per adult, children 12 and under with paid adult. Gail Yarnall, PO Box 341233, Beavercreek, OH 45434, 937-424-6413. Email: NMRA.Dv.3@gmail.com or visit: www.DaytonTrainShow.com for updates.

OH, MASSILLON: CJ Trains Winter Train and Toy Show. Massillon Knights of Columbus Hall, 988 Cherry Road NW, 44647. Sunday, December 10, 2023, 10:00am-3:00pm. Admission: \$5.00, 12 and under FREE. \$25/dealer table, 152 - 8' dealer tables. Jon Ulbricht, PO Box 446, Wooster, OH 44691, 330-262-7488, cathijon@ssnnet.com www.cjtrains.com

OH, MT. HOPE: UPDATE - CANCELED. CJ Trains Fall Train and Toy Show. Mt. Hope Event Center, 8076 St. Rt. 241, Zip 44660. Saturday, November 4, 2023, 10:00am-4:00pm; Admission: \$5.00, under 12/FREE. \$30/dealer table, 600+ 8' dealer tables. Contact: Jon Ulbricht, PO Box 446, Wooster, OH 44691. 330-262-7488, cathijon@ssnnet.com www.cjtrains.com

PA, ALLENTOWN: ATMA First Frost Train Meet. Allentown Fairgrounds Agri-Plex, 1925 W. Chew Street, Allentown, PA 18104. November 11 & 12, 2023. Saturday 9am-4pm, Sunday 9am-3pm. Advance tickets \$15, admitted at 8am. At the door, admitted 9am: \$10 adults, 12 and under FREE with adult ticket purchase. For more info, visit: www.allentowntrainmeet.com or call 610-442-2859

PA, BEAVER FALLS: BLRHS Fall Train Show. Saturday, October 14, 2023, 10:00am-3:00pm. Chippewa Township VFD Social Hall, 2568 Darlington Rd., Beaver Falls, PA 15010. Admission: \$5.00 (\$4.00 if you mention Model Railroader ad). Children 12 and under FREE. Tables \$25 each. For show info: www.blrhsinc.org. For table reservations: Tom Bianculli, tbian64@gmail.com or 412-585-3614

SC, EASLEY: CRMHA MODEL TRAIN EXPO 2024. February 16-17, 2024. Friday, noon-6pm. Saturday, 9am-3pm. Impact Center at Rock Springs Church, 207 Rock Springs Road, Easley, SC 29642. Admission: \$8.00 Adult, good for both days. Children under 10 are FREE. Trains of all sizes, operating layouts, model train vendors, a Kids Zone and more! Visit: www.crmha.org

TX, HOUSTON: Houston Area Model Train Show, November 18-19, 2023. Saturday 10am-5pm, Sunday 10am-4pm. Adults \$7, 17 and under free. All scales, operating layouts, club/museum displays, table sales and more. Pearland Knights of Columbus Hall, 2320 Hatfield Rd., Pearland TX 77581. More information at <http://houstontrak.org> or by email info@houstontrak.org. Sponsored by Houston Area T-TRAK Association, Inc.

WA, KENT: Boeing Employees Model Railroad Club Annual Swap Meet. Saturday, November 11, 2023, 9:30am-4:00pm. Kent Commons Community Center, 525 4th Avenue North, Kent, WA 98030. Admission: \$10.00, under 16 free. Ed Sherry, 550 SW Colewood Lane, Normandy Park, WA 98166; 206-244-3884; swapmeet@bemrrc.com

WA, SPOKANE: River City Modelers Fall Model Train Show. Spokane Fairgrounds, 404 N. Havana. Sunday, October 15, 2023, 9:30am-3:30pm. Admission: adults \$6, 12 & under free. 200+ tables of Railroad related items for sale, operating layouts, Free-MO, Operation Lifesaver & more. Free Parking. For table rental or general info, contact: Shirley Sample, 509-991-2317 or shirleysample13@gmail.com

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2B In Trains	35	Loco-Boose Hobbies	66
2024 Railroading Calendars	35	Mainline Hobby Supply	35
Allentown Train Meet	25	Menard, Inc.	7
American Cruise Lines Inc.	9	Mianne Benchworks	35
Atlas Model Railroad Co., Inc.	5	Micro-Mark	23
Axian Technology	13	Modelers Marketplace	68-69
Azatrax	35	Model Railroad Planning 2024	66
Bachmann Industries, Inc.	76	Model Rectifier Corp.	3
Blair Line	35	Modeling Small Layouts Special Issue	67
BPL	35	Model Train Stuff	59
Branch Line Press	17	NCE Corp.	22
Broadway Limited Imports	19	Nicholas Smith Trains	17
Central & Western Homaroad Supply	35	PECO Products	25
Chi-Town Union Station	17	PIKO America	23
Circuitron	23	Pola G.	6
Custom Model Railroads	25	Rapido Trains	2
Digitrax	20	Pre-Size Model Specialties	35
Downtown Deco	35	Showcase Express	13
Entertainment, Inc.	67	Sievers Benchwork	17
EngineHouse Services, LLC	35	ScaleTrains.com	21
Evan Designs	35	SoundTraxx	59
Evergreen Scale Models	13	Spring Creek Model Trains	66
General Store of Middlebury	17	Train Sets Only	35
Great Midwest Train Show	59	Train World	25
Great Train Expo	59	Trains.com	27
Greenburg Show	59	Trainz.com	59
Halfpricehobby.com	13	Wm. K. Walther's	28-29
JB Wheel Sets	35	Woodland Scenics	15
Kato USA, Inc.	75	Yankee Dabbler	23
LGB	37		

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Being sufficiently talented



Poor lighting under the benchwork during an upgrade of the wiring for the Frankfort engine terminal on Tony Koester's HO scale layout led to the need to replace power supplies and circuit breakers for the track and switch motors. Tony Koester photo

Supposedly, there are more than one of Murphy's Laws. Among them is this gem: Nothing is foolproof to a sufficiently talented fool. Which brings me to the red insulation escape.

I spent the last quarter of 2022 on railroad improvement projects I have studiously ignored for at least a decade, probably closer to two. They were projects that should have been completed when the railroad was just being built, but for whatever reason – probably because I was hurrying to get it ready for an inaugural operating session involving some good friends from out of town – I took some shortcuts.

Among these hasty decisions was grouping the feeders from two busy switching areas on adjacent decks onto a common bus. I should have run two sets of bus wires, each powered through its own circuit breaker. Finding the feeders from one switching area and moving them to a new bus now proved to be a

real challenge, as things like backdrops and staging tracks often got in the way.

I had also ignored the need to add switch motors to several turnouts to or near the west ladder of Charleston Yard. The reason was simple: Major support beams were directly under the places where the Tortoises would need to be mounted. I finally solved the problem with two surface-mounted motors hidden in buildings. I used ground throws when the switches were within reach of the yardmaster. I don't like mixing two methods of switch-point control in one area, but at least the west end is now fully functional.

After I had completed the wiring, I discovered all of the Tortoises quit working. So I went on a hunt for a loose wire. I finally remembered I had installed a new power strip for the power supplies to plug into. Sure enough, Bill Darnaby's troubleshooting tip about "What did you do last?" applied: I had failed to plug in the power supply!

Which brings us to the really expensive part of my dissertation. Noting my success at separating the two switching areas into two power districts, the west-bound yardmaster at Frankfort, Ind., strongly suggested that I now electrically separate the busy engine terminal from his equally busy yard tracks.

I therefore ordered another PSXX electronic circuit breaker (ECB) from DCC Specialties and ran a second pair of red and black no. 10 stranded bus wires alongside the original pair, albeit somewhat separated. I rolled out containers of scenery materials stored under the layout, grabbed a work light and the required tools and materials, and got to work moving the engine terminal feeders to the new bus wires.

I started with the roundhouse

wiring. This was simple, as all of the black wires are grouped together, as is the power to the red wires that go to push-buttons for each radial track on a control panel. I could use these isolated tracks as a test. I first found the red lead to the old red bus, snipped it off, and slid it into a 3M insulation-displacement connector (IDC) I had already snapped onto the new red bus wire. Or so I thought.

Actually, in the shadowy light provided by the work light shining up from the floor, I had inadvertently snapped the IDC onto an adjacent red-insulated, three-wire switch-motor cable. When I clamped down on the connector and turned the power on, ZAP! I instantly burned out a DCC booster, the switch-motor power supply, two ECBs, and probably two sound decoders!

Better under-layout lighting in the form of a \$20 head-band-mounted LED light, which I now own, would have saved me the cost of two new DCC Specialties PSXX electronic circuit breakers, a new Tortoise switch-motor power supply (by good fortune, MR's On Operation columnist Jerry Dziedzic had a spare one), and a new NCE 5-amp DCC booster. (I had

an operating session scheduled for the next weekend and didn't have time to wait to find out whether the damaged one could be economically repaired; I should have a spare booster on hand, anyway).

I am definitely sufficiently talented for Mr. Murphy. **MR**



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