Model Railroader
SPECIAL ISSUE

Expert advice on track and scenery

Plans for 12 great layouts N to G scale!

HOW TO BUILD A MODEL RAILROAD

WINTER 2013

Get started on your own layout today! p.26

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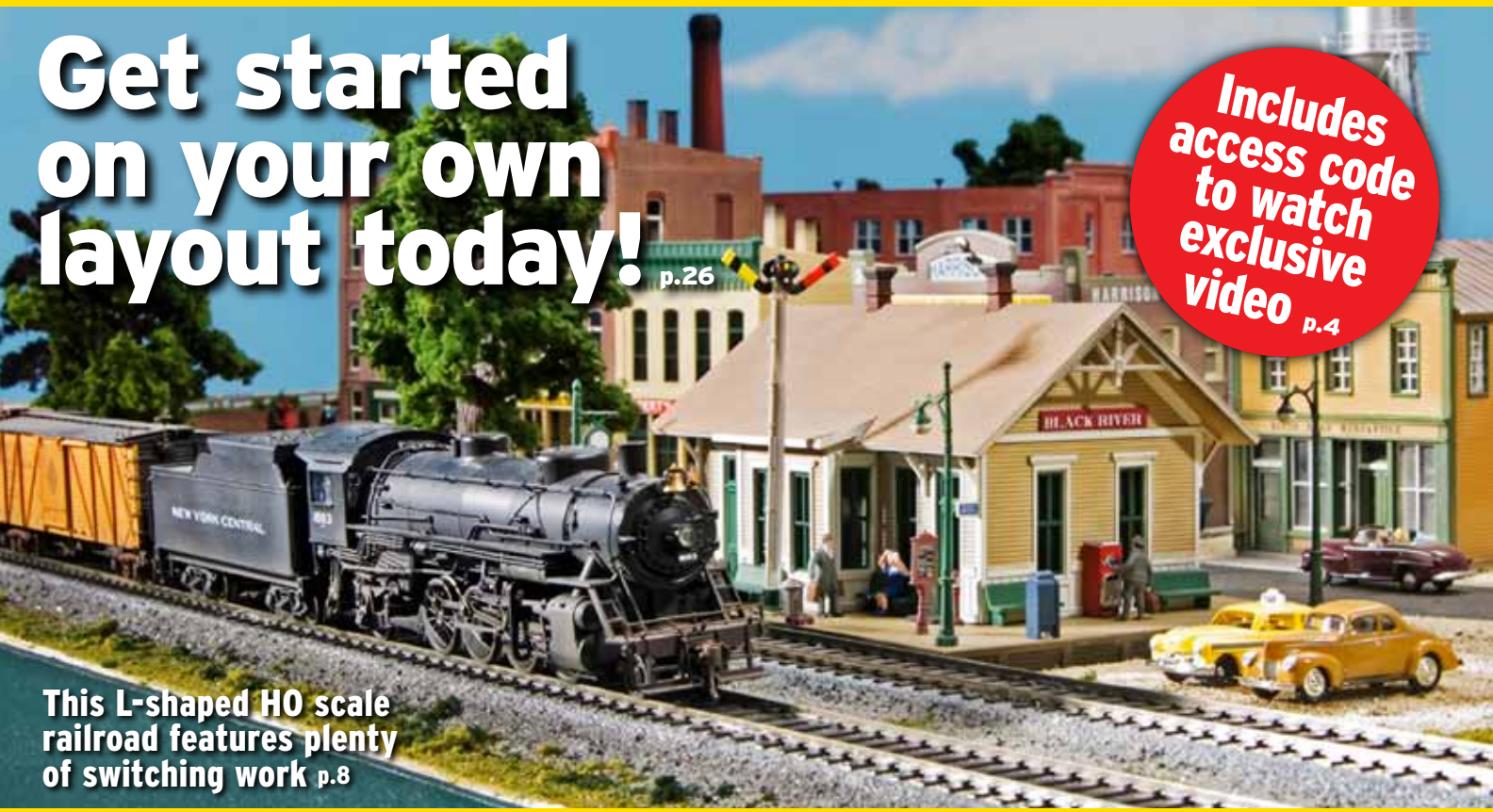
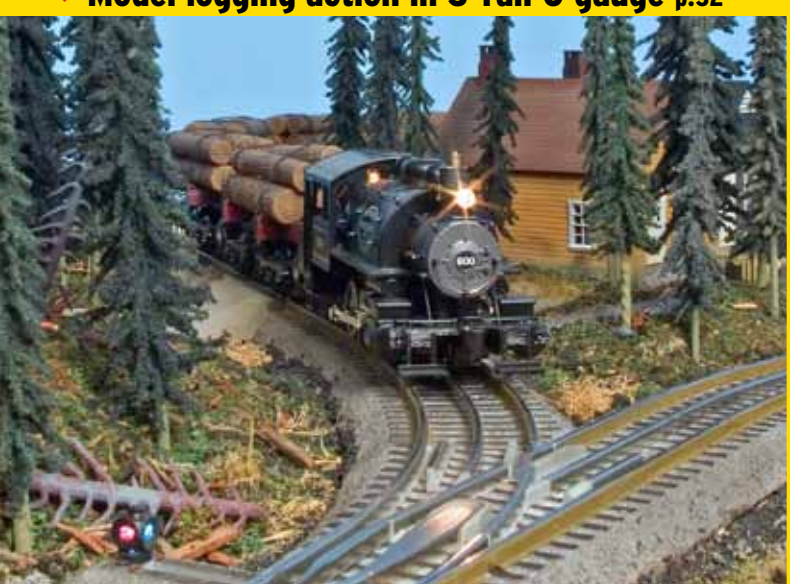
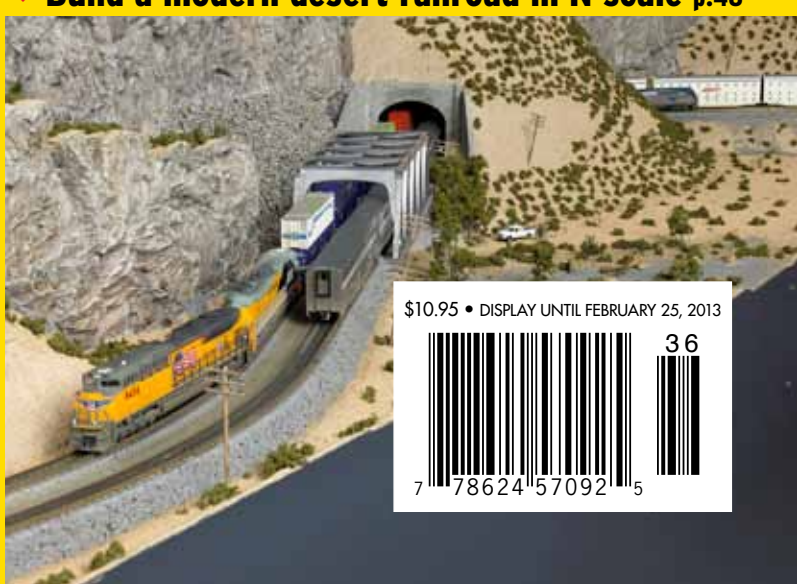


This L-shaped HO scale railroad features plenty of switching work p.8





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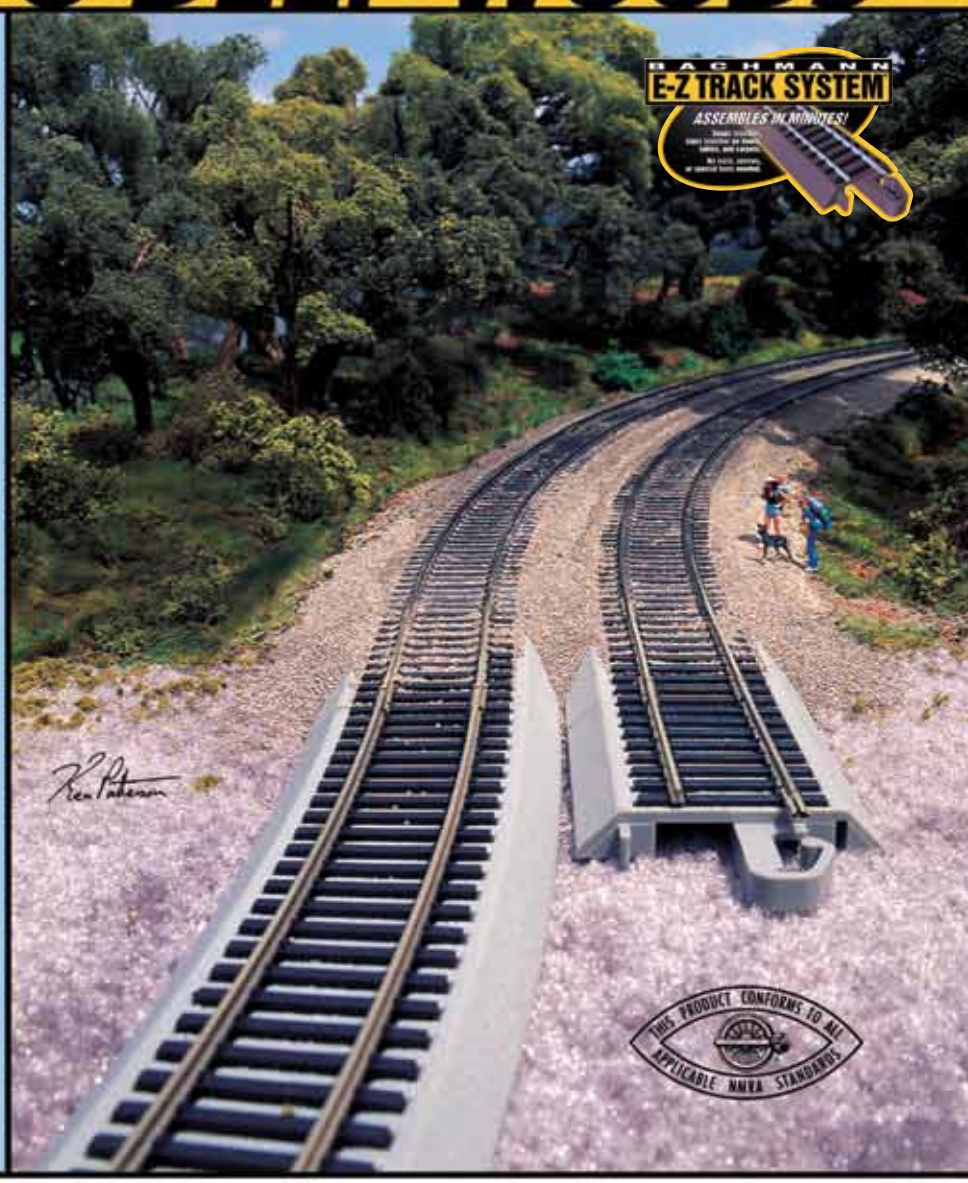

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KALMBACH PUBLISHING CO.

KEEP MOVING FORWARD

You'll have that first layout finished in no time if you keep moving forward.

SINCE YOU'RE READING THIS, chances are good that you've got some inkling to build a model railroad. Great!

For me, and thousands of others around the world, model railroading is a wonderful endeavor. It's filled with creativity, history, artistry, and excitement. You can enjoy it alone or with family and friends. And you don't really need to know anything about modeling to get started in the hobby. Model railroads are works in progress, and part of the enjoyment in building one is learning new skills and techniques as you go.

In a nutshell, model railroading is just plain fun.

PEOPLE BUILD MODEL RAILROADS for just about as many reasons as there are model railroaders in the world. Some enjoy the idea of building their own version of the world in miniature. With a vision of trains working their way through rugged mountains, tall forests, and open prairies, these modelers set to work organizing the world on their layouts the way they would like it to be – and they have a great time doing it, too.

Others are attracted to model railroading because like the idea of re-creating a specific time and place. They find that after researching a particular railroad in a given locale, building this bit of history piece by piece on a model railroad is heaven. For many, it's a way to remember something that they find significant, and often these modelers focus on towns they've grown up in, lived in, or visited.

Still other modelers simply enjoy running trains. Some gather together with friends and run their railroads following real railroading practices, but perhaps the vast majority just find it soothing to watch the trains run round and round.

Years ago when I was a high school teacher, I would often head down to the layout room in the evening with a cup of tea, turn on the railroad, and simply unwind as I watched a train or two work its way through the hills and towns of my layout. It was a peaceful way to end a long day.

HOW DO YOU GET STARTED? All model railroads, big or small, begin essentially the same way. One day, the builder makes a commitment and starts. It's that simple.

It doesn't matter whether that starting point is nailing two boards together, laying that first foot of track, choosing a real railroad to model, or turning over the ceremonial first shovel of dirt in the back yard for the shed that will house the layout. The important part is that the modeler has made a commitment to begin. It's the first step forward.

In assembling *How to Build a Model Railroad*, the *Model Railroader* staff and I wanted to provide a guide that would offer just about anyone getting started in the hobby a good chance for success on their first layout. With that in mind, this magazine includes an in-depth look at three model railroads in three of the most popular scales.

Although these layouts are different from each other, the topics featured in their construction articles are meant to be viewed as a whole. Each piece is its own step forward, and when combined, those steps provide a complete picture of what is needed to build a model railroad.

In the HO scale Black River Junction layout (page 8), we show techniques for constructing a 4 x 8 foot train table, wiring a layout for Digital Command Control, making easy river scenes, and building plastic structure kits. In the Cascade & Timber Trail article (page 32), we provide steps for transferring a plan to the benchwork, building scenery with foam, making a model forest, and wiring a layout for three-rail O gauge trains. And in the N scale Salt Lake Route story (page 48), we share tips for building a more flexible kind of benchwork, laying track, modeling mountain scenery, and adding a photo backdrop to make a layout seem much bigger than it is.

Along the way, we've included some helpful tips for you. There are six Basic Training sections in the magazine to help answer many of the questions asked by new model railroaders about things like modeling scales, track, and control systems. We've also included plans for 8 more layouts at the back of the book as inspiration for other model railroads you could build. They can be constructed as is, or you can mix and match features you like from each to make your own unique layout.

WATCH IT HAPPEN. On page 26 you'll find plans for the HO scale Madison Central, and you can watch a multi-part video at www.ModelRailroader.com/how showing you how we built that layout from start to finish. Even if you don't want to build the Madison Central, the layout uses most of the same techniques we used on the other layouts featured here. Look for the yellow video boxes throughout the magazine, telling you which chapters to watch for more information.

KEEP MOVING FORWARD. So if you dream of having your own model railroad, my best advice is to keep moving forward. Once you've got a tabletop, choose a track plan. After you've got the plan, lay some track. Next try adding some hills and buildings. Don't like how something looks? Take it out and try again. After you start, if you simply keep moving forward a little at a time, even when it involves doing something over, you'll be running trains on your own layout in no time at all. Enjoy the experience!

David Popp, Editor

GUIDE TO MODEL RAILROAD SCALES AND GAUGES

Essential information on the most common modeling scales used by model railroaders

BY JIM HEDIGER

IT ONLY TAKES a few minutes for newcomers to realize that model trains come in many sizes and scales. These differences are part of the fun of the hobby because with so many scales to choose from, you can fit a model railroad into almost any available space. Let's take a closer look at them so you can select the best size for you.

COMPARISONS. Model and toy trains are classified according to scale and gauge. "Scale" describes the model's size in relation to its full-sized prototype. "Gauge" refers to the spacing of the rails in the track.

The largest model trains are collectively referred to as "large scale." These big trains can operate outdoors on what modelers call garden railroads, and they also run on indoor layouts as well. Each large scale model is about the size of a loaf of bread, and they're made in a variety of scales including 1:32, 1:22.5 (called "G scale"), and 1:20.3. What groups all large scale trains together is that they operate on the same track. Called gauge 1, the track measures 45mm between the rails.

The next smaller popular scale is O (1:48 scale), with a track gauge of 1¼" between the rails. This gauge is used in both toy trains, which have non-scale proportions, and scale models. Lionel O gauge three-rail toy trains have been produced for more than a century and introduced millions of children to model railroading in the late 1940s and 1950s.

Slightly smaller than O is S scale (1:64 proportion, ⅞" track gauge). These trains were popularized by the A.C. Gilbert Co., which marketed them as American Flyer trains. Gilbert was a major competitor of Lionel, and there are still a few manufacturers of S scale models today.

HO scale trains are about half the size of O scale trains, which is why they're called HO (pronounced "aitch-oh.") These models are 1:87th the size of a real train, and they run on track that has a 16.5mm gauge. HO scale trains are the most popular of all the scales, with more than two thirds of all model railroaders using this size.

SCALE	MINIMUM RADIUS	CIRCLE*
G	48"	100"
O	30"	66"
S	22.5"	50"
HO	18"	39"
N	9"	20"
Z	5.75"	14"

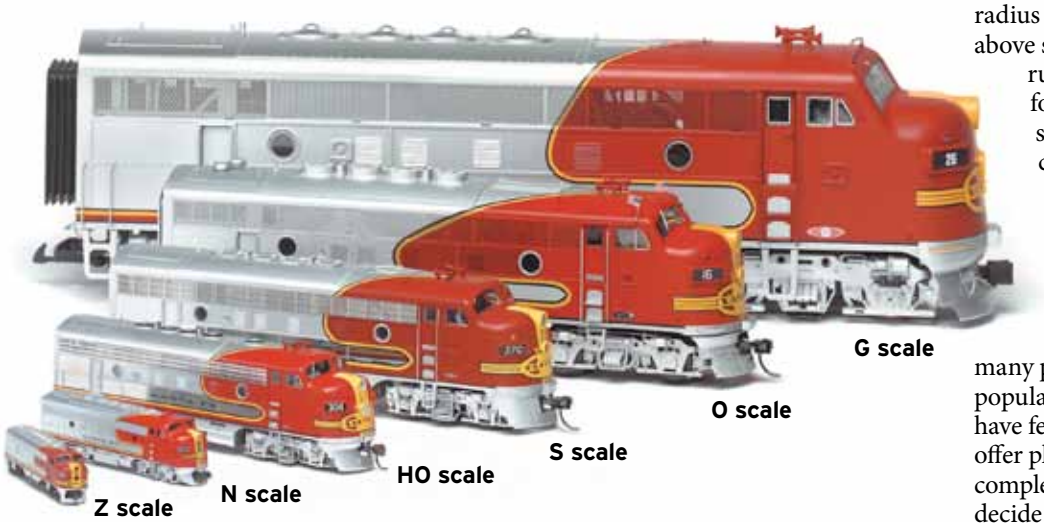
Curves listed above will need to be larger if you plan to operate longer locomotives and rolling stock.
* Includes the track width across the ties.

N scale trains are made to 1:160 proportion and operate on 9mm gauge track. The models are well detailed, and a fairly complex layout can be built in a compact space. However, some modelers use N scale to make much larger layouts, which allows them to run trains that are more realistic in length.

Of all the scales, Z is the smallest, with a 1:220 proportion. These tiny trains operate on 6.5mm gauge track, and a 50-foot boxcar is only 2¾" long.

A train's size dictates the minimum radius curve it can negotiate. The chart above shows the curve radius required to run a four axle diesel and short cars for all of the popular scales. It also shows the space required for a full circle of track.

AVAILABILITY. HO scale has a huge following, with many manufacturers making kits and ready-to-use items. N scale is next in popularity, so it also has many products to work with. Less popular scales, such as G, O, S, and Z, have fewer choices available, but still offer plenty of options for building a complete layout. Whichever scale you decide upon, model railroading offers plenty of variety, making it easy to build a great layout that's right for you. MR



This lineup of Electro-Motive Division F7 locomotive models illustrates the relationship of the various scales. HO models are the most popular size.

A New York Central freight passes the depot at the town of Black River, Ohio. This 1950s HO scale layout depicts a junction where the NYC crosses the Baltimore & Ohio. The layout can be built quickly using handy off-the-shelf products.

BUILDING THE BLACK RIVER JUNCTION

The *Model Railroader* staff built this 4 x 8 layout plus staging extension in a week

BY DAVID POPP
PHOTOS BY BILL ZUBACK AND THE *MODEL RAILROADER* STAFF

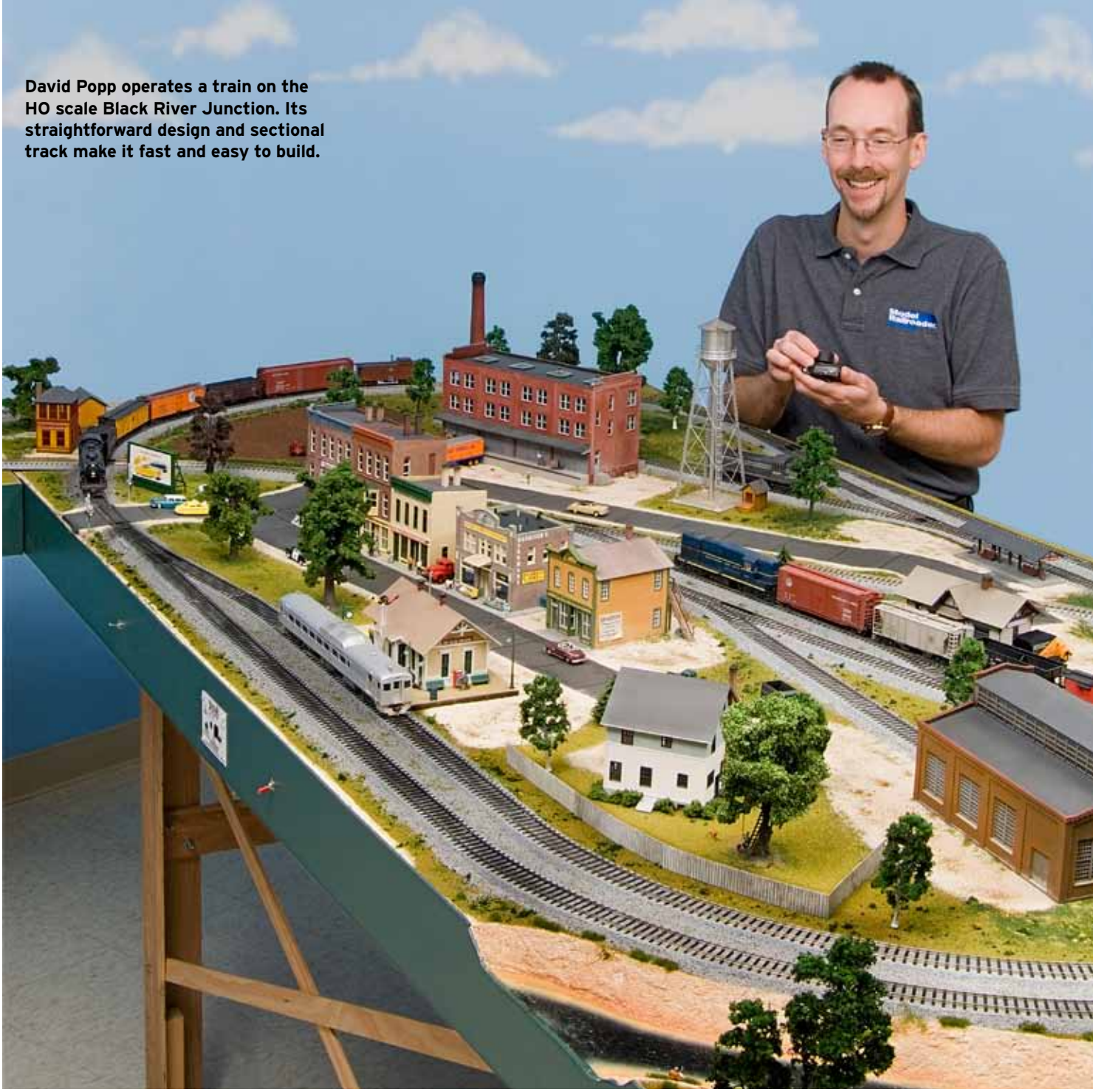
BUILDING AND OPERATING a model railroad, whether it's big, small, or somewhere in between, can be a lot of fun. And, with the wealth of easy-to-use track and scenery components and ready-to-run locomotives and cars available, building a good-looking layout has never been simpler or faster.

Our HO scale Black River Junction project railroad is an example of what you can do with modern modeling products and techniques. It's also an example of how fast you can build a layout – we assembled this one in under a week.

In building the 4 x 8-foot layout with staging extension, we used materials that would get things up and running quickly and give good results. Our list included items such as Kato Unitrack with built-in roadbed, Woodland Scenics vinyl grass mats, assembled and partly assembled structures from various manufacturers, and a Digitrax plug-and-play Digital Command Control system. We built the benchwork using Jim Hediger's lightweight all-plywood design (the details of which are on page 10), making the layout easy to transport and store.

As with any project, we experienced a few trial-and-error moments along the way. Still, we think the Black River Junction RR was a great success. And with each member of the staff tackling a different part of the construction, we finished the railroad in about 4½ days.

If you've been waiting to get started on that first layout, this may be your opportunity. In the rest of this section, MR staff members explain how they helped build the Black River Junction. Who knows? One day you may be running trains on your own version.



David Popp operates a train on the HO scale Black River Junction. Its straightforward design and sectional track make it fast and easy to build.

LAYOUT CONCEPT

THE BLACK RIVER JUNCTION depicts a fictional 1950s Ohio railroad town. It features a crossing and interchange point between the New York Central and Baltimore & Ohio railroads. The layout's NYC main line includes the town of Black River and the East Switch station, and it sees both passenger and freight trains. Black River is also the terminus for the B&O's branch line.

As you can see in the photo above and the track plan on page 13, the layout is designed for both mainline running and switching. It also features an interchange track, a connection between the two railroads that lets them transfer cars to each other. It's a universal industry, since any type of car can be transferred between railroads.

In addition to switching, the layout offers some passenger traffic. There are passenger platforms at East Switch and Black River on the NYC, as well as the B&O's depot by the interchange. We've chosen to represent passenger services on the NYC with a Budd RDC (Rail Diesel Car). On the B&O, a single heavyweight combine and diesel engine suffice for branchline service.

To have a place for the trains to come on and off the main portion of the railroad, we've included an 18" x 72" removable staging table that stores underneath the main table when not in use. The staging yard has two tracks for each railroad, but you could add more.

WATCH CHAPTER 2 AT
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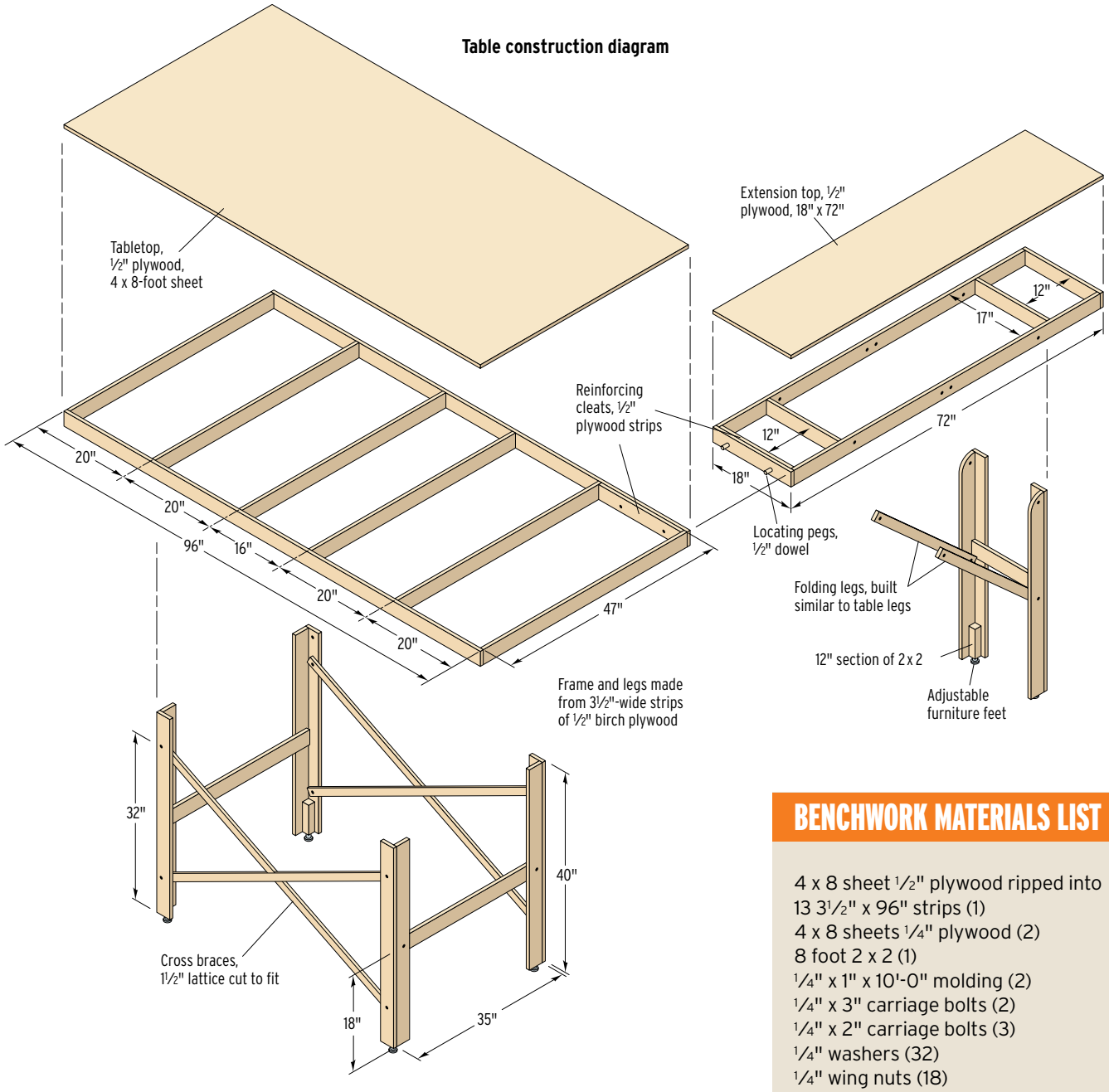
Table construction diagram



BENCHWORK MATERIALS LIST

4 x 8 sheet ½" plywood ripped into 13 3½" x 96" strips (1)
4 x 8 sheets ¼" plywood (2)
8 foot 2 x 2 (1)
¼" x 1" x 10'-0" molding (2)
¼" x 3" carriage bolts (2)
¼" x 2" carriage bolts (3)
¼" washers (32)
¼" wing nuts (18)
¼" stop nuts (14)
Small box 4d 1½" bright finishing nails (1)
Small box 1" panel board nails (1)
4 x 8 sheet 1" foam insulation board (2)
4 x 8 sheet ⅛" tempered hardboard ripped into 4¾" x 96" strips (1)
Adjustable furniture feet (6)
PL300 construction adhesive (4)
Carpenter's wood glue (Titebond)

I BUILT THE BENCHWORK for the Black River Junction using strips of ½" birch plywood. Ordinary ½" fir plywood has three or five layers of veneer, while the more costly birch plywood has seven layers, so it's stronger. I used a table saw to cut the plywood into 3½" x 96" strips that took the place of dimensional lumber. If you're careful, one 4 x 8-foot sheet yields 13 8-foot strips, which is just enough for both tables and their legs. Smooth the edges of the cut strips with medium sandpaper to remove slivers.

Since we designed this layout for portability, I secured the joints with Titebond wood glue and 4d 1½" finishing nails. Ultimately, the glue provides the most strength; the nails secure the joints until the glue cures.

The main table consists of two long side rails and six 47" crosspieces. Once attached, the side rails produce a frame width of 48" to match the size of the plywood top. I used a square and marked the center lines for the cross-pieces across both, spaced as shown in the drawing. I clamped one crosspiece vertically in a Black & Decker Workmate to help stabilize the piece while my "assistant" (David Popp) held the opposite end of a side rail. I applied a bead of glue, set the side rail in place, and drove two nails to hold the joint together. I then repeated this step at the opposite

end and then for the remaining intermediate crosspieces.

David and I let the assembly dry for about a half-hour or so, and then we gently turned it over so the side rail was now flat on the floor with all the crosspieces sticking up. I added the second side rail, starting at one end with David holding the opposite end in alignment. I did the first end joint as before, but I then glued and nailed the crosspieces in order, finishing up with the opposite end.

The last step was to mark the crosspiece center lines on the sheet of 1/4" fir plywood that would become the tabletop. We laid out the framework on the floor and used the tile pattern to make sure the corners were square. I applied glue to the top edges of the frame, and then David and I carefully set the sheet of plywood on top with its edges aligned with the framework. I put a few nails in one long edge and squared up the framework to match the plywood. Once the frame was square, we finished nailing the top in place, spacing the nails at 8" to 10" intervals along the frame.

LEG ASSEMBLY. Each L-shaped leg is made from two 40" plywood strips that I glued and nailed together. Next, I added a 35"-wide cross brace between each pair of legs. I turned the legs so the two legs' wide sides faced inward, and then I glued and bolted the cross brace squarely between them to add stability.

To mount the legs, I drilled a 1/4"-diameter hole into the tops of one set of legs. Then I clamped together both sets and drilled a matching set of holes in the second set. This makes them interchangeable for moves. I also added 8" blocks of 2 x 2 to the bottom of each leg. After center-drilling these blocks, I added a leveling foot to each leg.

With the tabletop upside down on the floor, I clamped a set of legs to the first cross brace on each end, centered it, drilled the mounting holes, and bolted the legs in place. Then I drilled a 1/4"-diameter hole through the side of each leg 32" from the bottom.

I cut four side braces from strips of 1/4" x 1" wood molding, as shown in the drawing on page 10. I clamped and drilled all four of them at once for interchangeability. Then I rounded the ends so the braces fit inside the legs.

YARD EXTENSION. I used a similar construction technique for the extension, but I spaced its cross braces so the 17"-wide leg set could fold up underneath. To accomplish this, I mounted the legs with a single bolt through each side rail and rounded the leg tops for clearance. I also added a reinforcing block underneath the main table where the extension would be attached. The two table sections bolt together with a pair of 1/4" x 3" carriage bolts. – *Jim Hediger*

To make the leg sections interchangeable, Jim clamped them back to back and then drilled the holes for the bolts that will mount them to the tabletop. This way both legs will fit on either end of the table.

With David's help, Jim assembled the tabletop frame. He used carpenter's glue and trim nails to secure each joint. Before the glue set, Jim squared up the frame and added the 1/4" birch-plywood top.

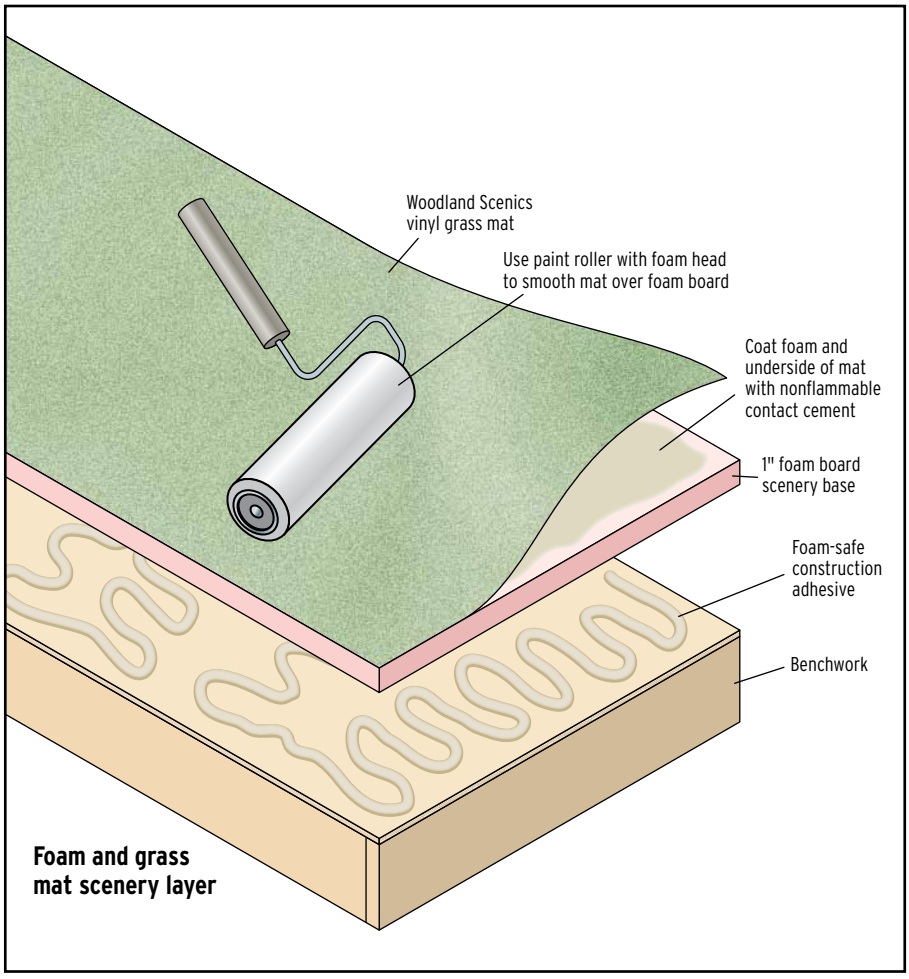
Jim cut a radius into the top of the staging yard legs. They fold into the yard's frame for storage.

FOAM AND GRASS MAT BASE

WE USED A LAYER OF 1" FOAM insulation board to make the layout's scenery base. Insulation board is a dense, extruded foam that's available in many lumber yards and home improvement centers; the color varies depending on the manufacturer. We covered the foam with a Woodland Scenics vinyl grass mat to jump start scenery construction. Later, after we had laid the track, we added hills, roads, the river, grasses, and other scenic details to break up the uniformity of the vinyl mat.

We attached the vinyl mat to the foam first, and then we cemented the foam to the layout's benchwork, as shown in the illustration. We used Weldwood nonflammable contact cement to attach the vinyl mat to the scenery (Woodland Scenics also offers an adhesive). When you use the cement, make sure you're in an area with plenty of ventilation – its fumes are toxic. Simply brush or roll the contact cement on the back of the vinyl mat and on one side of the foam insulation board. Wait until the adhesive is dry to the touch but still tacky, and then join the two pieces.

Contact cement isn't very forgiving – once you touch the halves, it grabs and holds tightly. Because the vinyl mat is flexible, we found it was easiest to lay the mat flat on the benchwork tabletop and then lay the foam onto the mat. We started at one end and laid the foam onto the mat in a rolling motion. We then flipped over the mat-and-foam sandwich and, using small paint rollers with foam roller heads, we rolled out as many air bubbles as we could.



Foam and grass mat scenery layer

To cement the foam to the plywood tabletop, we used PL300 construction adhesive from Ohio Sealants. We then stacked heavy books on top to hold the foam in place overnight while the adhesive set.

The final piece of benchwork construction was to add the fascia. After I'd cut the riverbeds (see page 20), Jim and I cut 4¾"-wide strips of ⅛" tempered hardboard to match the scenery contours of the layout. – *D.P.*


Contact cement will grip on the slightest contact, so to avoid mistakes, Jim and David laid the grass mat upside down on the benchwork and carefully laid the foam board on top of it. You get just one chance!


After cutting strips of ⅛" tempered hardboard fascia to follow the layout's scenery contours, we cemented them to the sides of the benchwork with PL300. Jim clamped the pieces in place until the glue cured.

WATCH CHAPTER 3 AT
www.ModelRailroader.com/how

WE USED SECTIONAL TRACK to speed tracklaying. The newer all-in-one-style sectional track snaps together quickly and includes plastic roadbed. The molded roadbed resembles the crushed rock ballast used to hold ties in place on real railroad track. Unlike flextrack or traditional sectional track, no ballasting is necessary – although we found that adding a layer of appropriately colored ballast to the shoulders adds realism and takes little effort. Several companies make all-in-one track, including Atlas, Bachmann, Life-Like, Trix, and Märklin (though the latter isn't compatible with two-rail operation).

After considering our options, we decided to use Kato Unitrack. This track features good-looking roadbed and robust joiners for solid mechanical and electrical connections between track pieces. Unitrack turnouts are made in no. 4 and 6 sizes and feature hidden built-in switch machines. These machines have a design that's unique to Kato and requires a constant-voltage DC power supply. Kato also makes a DC converter that connects to the AC terminals of a power pack. In either case, you'll need only one to power all the turnouts on your layout.

Hiding the switch machine under the turnout is clever, but the machines can be damaged by water or liquid glue when making scenery. We made sure to keep our turnouts dry and had no problems.

Opening the packages and organizing the pieces took more time than laying the track. To make sure everything would fit properly, I snapped all the track together and, according to David's plan, set it in place temporarily.

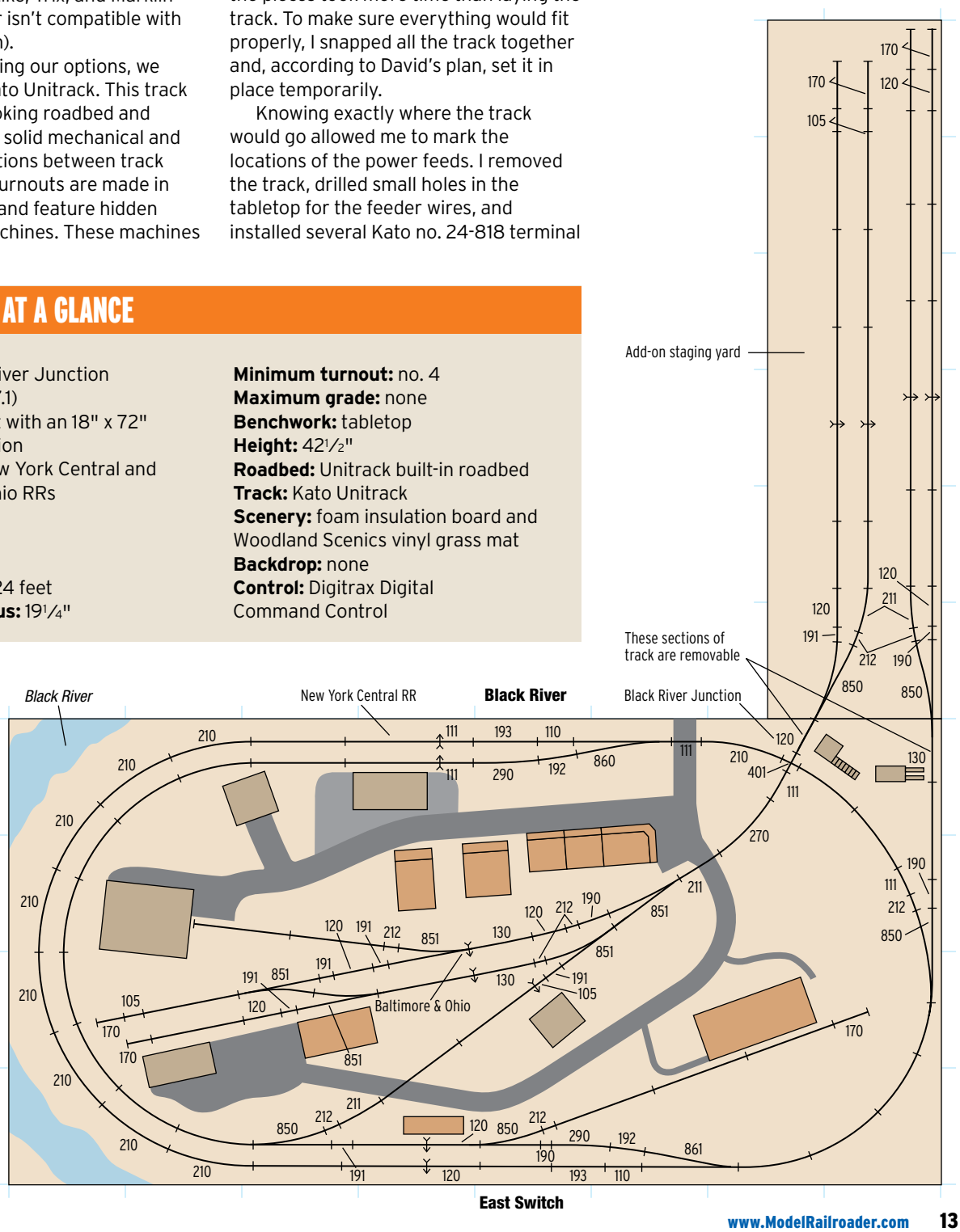
Knowing exactly where the track would go allowed me to mark the locations of the power feeds. I removed the track, drilled small holes in the tabletop for the feeder wires, and installed several Kato no. 24-818 terminal

THE LAYOUT AT A GLANCE

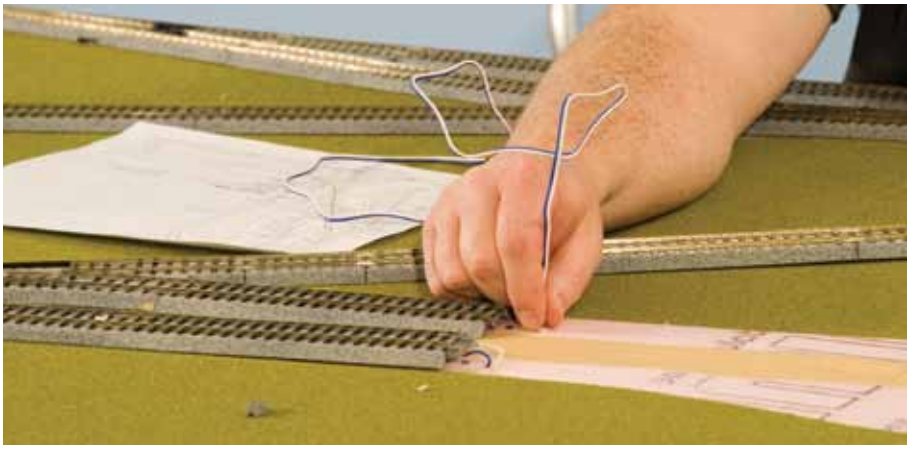
Name: Black River Junction
Scale: HO (1:87.1)
Size: 4 x 8 feet with an 18" x 72" staging extension
Prototype: New York Central and Baltimore & Ohio RRs
Locale: Ohio
Era: 1950s
Style: island
Mainline run: 24 feet
Minimum radius: 19¼"
Minimum turnout: no. 4
Maximum grade: none
Benchwork: tabletop
Height: 42½"
Roadbed: Unitrack built-in roadbed
Track: Kato Unitrack
Scenery: foam insulation board and Woodland Scenics vinyl grass mat
Backdrop: none
Control: Digitrax Digital Command Control

Black River Junction

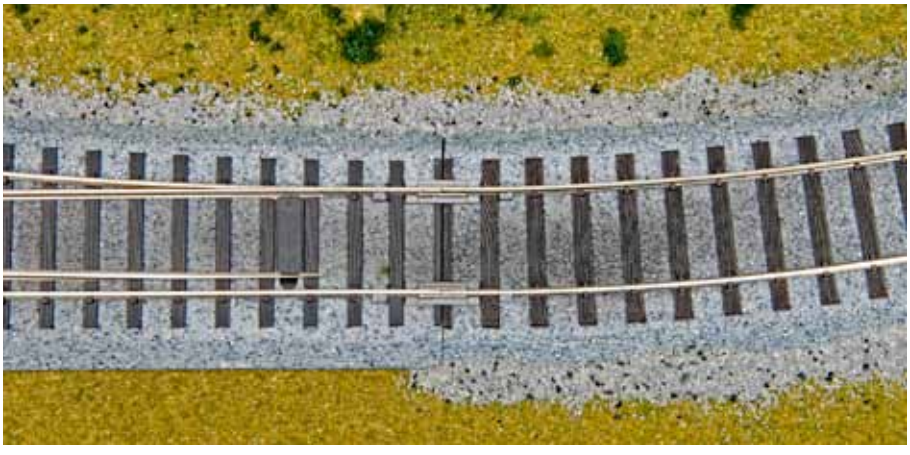
HO scale (1:87.1)
Layout size: 4'-0" x 8'-0" plus 1'-6" x 6'-0" removable staging yard
Scale of plan: ¾" = 1'-0", 12" grid
Minimum radius: 19¼"
Turnout minimum: no. 4
Track: Kato Unitrack
Unnumbered straight sections are no. 150
Unnumbered curve sections are no. 270
Feeder connections



Be extra careful that the rails are properly seated in the rail joiners when connecting track sections. This photo shows a rail that has ridden up on top of a joiner, which would be difficult to fix once the track has been secured.



To make the wire connections nearly invisible, we used Unitrack terminal joiners with the feeders already attached. Carl drilled holes through the layout surface, fed the wires through the holes, clipped the feeder joiners to the track, then glued the track in place.



We softened the sharp edge of the Unitrack's roadbed profile by adding Kato's matching ballast. As shown in the photo, the ballast gives the roadbed a more natural appearance, blending it into the surrounding scenery by removing the sharp, straight edge.

UniJoiners. Terminal joiners take the place of standard joiners and are easy to use, since they come with feeder wires already attached.

The standard joiners attached to the track can be removed with a plastic tool that Kato packages with terminal joiners. The track sections have a molded plastic ridge in the roadbed behind the joiners. To make room for the wires, I broke away the ridge with needle-nose pliers before clicking the new joiners in place.

Kato's terminal joiners have a blue wire and a white wire, and I was careful to be consistent in keeping the same color wire going to the same rail all around the layout. This makes connecting the rails to power easier later on.

It's possible for the end of a rail to ride over a joiner when connecting track pieces (see the top photo), so I checked each joint by sliding a finger along the rails – the joint is correct if it feels smooth. Finally, using dabs of PL300 construction adhesive, I glued the track in place.

We thought the assembled track looked a little too manicured to be realistic, so Cody Grivno, Terry Thompson, and I applied Kato's no. 24-039 ballast to soften the shoulders of the roadbed (bottom photo). Working on a few inches of track at a time, we poured on the ballast and arranged it using a soft brush. Then, using a spray bottle, we misted the ballast with a 50:50 mix of rubbing alcohol and water. The alcohol breaks the surface tension of the water, so the glue can more easily penetrate. When the ballast was wet, we used an eyedropper to flow on Woodland Scenics Scenery Cement. This both secured the ballast and made the track a bit more secure, as well. – *Carl Swanson*

TRACK MATERIALS LIST

105 2 3/8" straight (4)
111 3 11/16" straight (5)
120 4 1/2" straight (10)
130 6 7/8" straight (3)
150 9 3/4" straight (36)
170 track bumper (7)
210 21 5/8"-radius curve (9)
270 19 1/4"-radius curve (14)
401 90-degree crossing
818 terminal rail joiners (11)
850 left-hand turnout* (4)
851 right-hand turnout* (5)
860 left-hand no. 6 turnout*
861 right-hand no. 6 turnout*

* Make-up pieces 110, 190, 191, 192, 193, 211, 212, and 290 come with their respective turnouts

BECAUSE WE PLANNED to use Digital Command Control (DCC), we wired the Black River Junction as one electrical circuit with no blocks. We nevertheless used several sets of feeders to avoid voltage drop and loss of the control signal. There are many rail joints in any kind of sectional track, and they're all potential trouble spots. The multiple feeders minimize the effects of loose rail joiners and bad connections. The feeder locations are shown in the diagram on page 13.

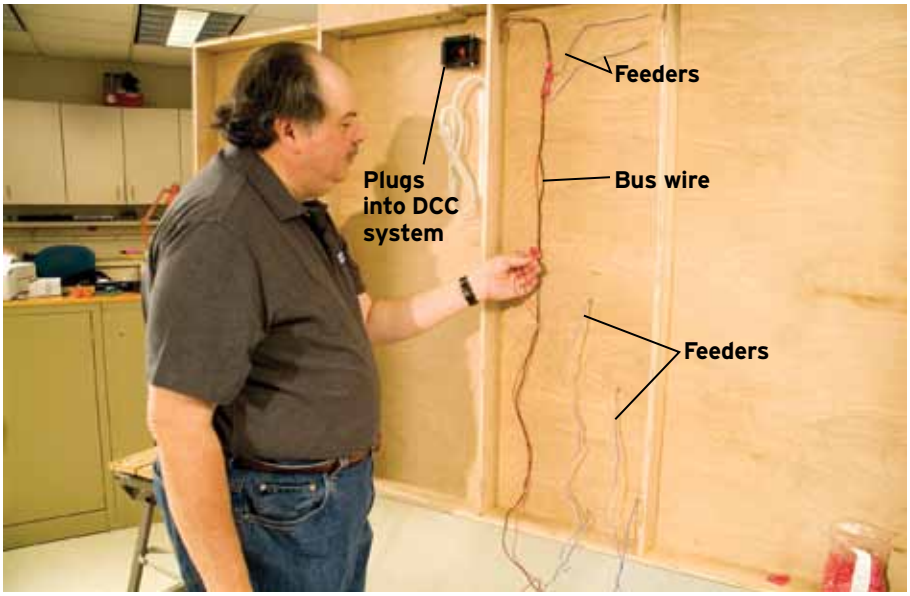
Under the table, the track feeders connect to a power bus formed by a pair of stranded 16-gauge wires, one red and one black to be consistent with the color coding of DCC systems. However, as Carl noted, the terminal joiners come with blue and white wires. I didn't bother to change them, but simply made sure to connect all the blue feeders to the black bus wire and all the white feeders to the red bus wire.

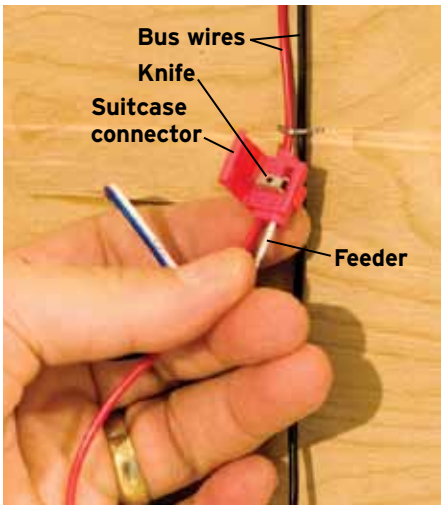
To make fast, secure, and insulated connections to the power bus, I relied on 3M's Scotchlok insulation-displacement connectors (IDCs), popularly called "suitcase connectors" because of their hinged lids. With IDCs there's no need to strip, solder, and tape splices, so the work goes quickly and the results are neat.

The "run" or through side of the red no. 558 IDC fits around the 16-gauge bus wire. The 22-gauge feeder wire goes into the "tap" or single-ended side. Then you squeeze the metal "knife" flush with the open top of the IDC, so the knife cuts through the insulation of both wires and bridges them together.

Robo-Grip cam-action pliers do a good job of squeezing the knife into place; Channellock pliers also work. When you snap the suitcase lid closed, it covers and insulates the knife. In the time you've now spent reading about IDCs you could have made at least two or three connections on your layout.

The two bus wires connect to the track terminals of the DCC command station. I made this connection through stereo-speaker banana plugs so we can quickly disconnect the command station, but you may not need to bother with that. I also used another set of banana plugs to connect the bus wires to the removable staging yard. – *Andy Sperandeo*

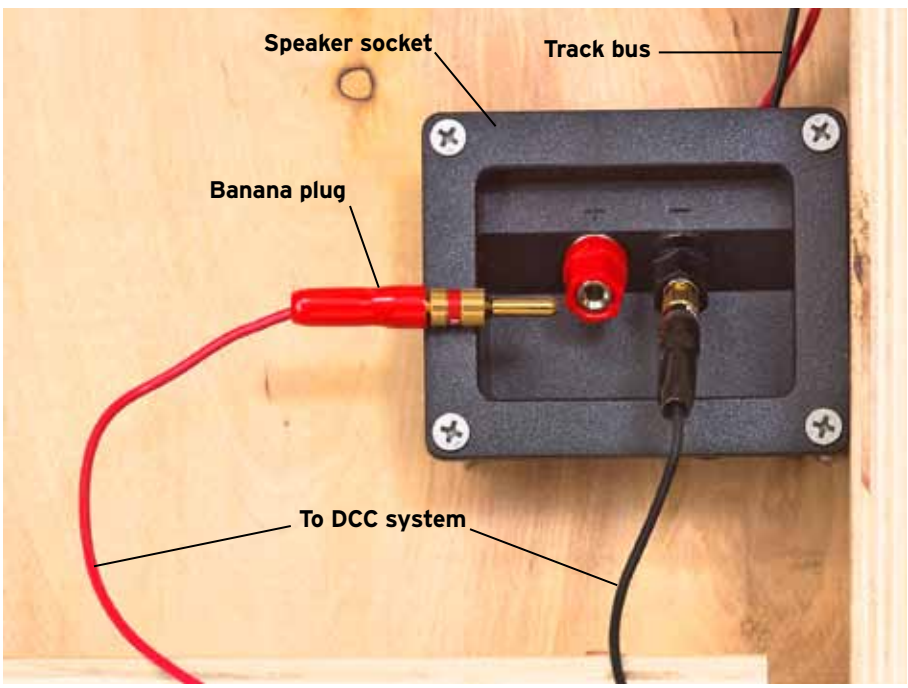




Andy kept the wiring simple by routing all the feeders on the main layout section to a bus made with two stranded 16AWG wires.

To attach the feeders to the bus wires, Andy used Scotchlok "suitcase connectors." Simply slip the wires into the appropriate holes in the connector, use pliers to squeeze the metal "knife" down flush, and snap the plastic cover shut to protect the connection.

Because the staging yard is removable, we needed an easy yet temporary way to connect it to the main bus. Banana-type plugs and sockets are perfect.



A DCC SYSTEM GIVES the Black River Junction easy-to-use multiple-train control, along with the capability to use wireless walkaround throttles and sound-equipped locomotives. We selected the Digitrax Zephyr DCS51 as our DCC system. This is a good starter set that's easy to expand.

The DCS51 command station includes a keypad with a digital readout that you use to select locomotives, program decoders, and control decoder functions. It has one set of speed, direction, and "brake" controls, and a "jump" feature that lets you use one or two conventional power packs as additional DCC cabs.

Instead of the jump option, we added a couple of Digitrax handheld cabs, a UT4 tethered cab and a UT4R wireless walkaround cab with a radio link. Using 6-conductor data cable and RJ-style connectors, we installed a Loconet cab bus to tie these components together. We ran a 4-foot cable from the command station to a Digitrax UR91 receiver module we installed nearby in the front fascia (one cable). We then connected the receiver module to a UP5 plug panel installed on the opposite side of the layout using a 6-foot cable.

The UT4's tether can plug into either the radio panel or the plug panel, so it can be used on either side of the layout. The UT4R wireless cab can also be plugged into either panel to assign or de-assign a locomotive (more on that in a bit), then unplugged for walkaround tether-free operation.

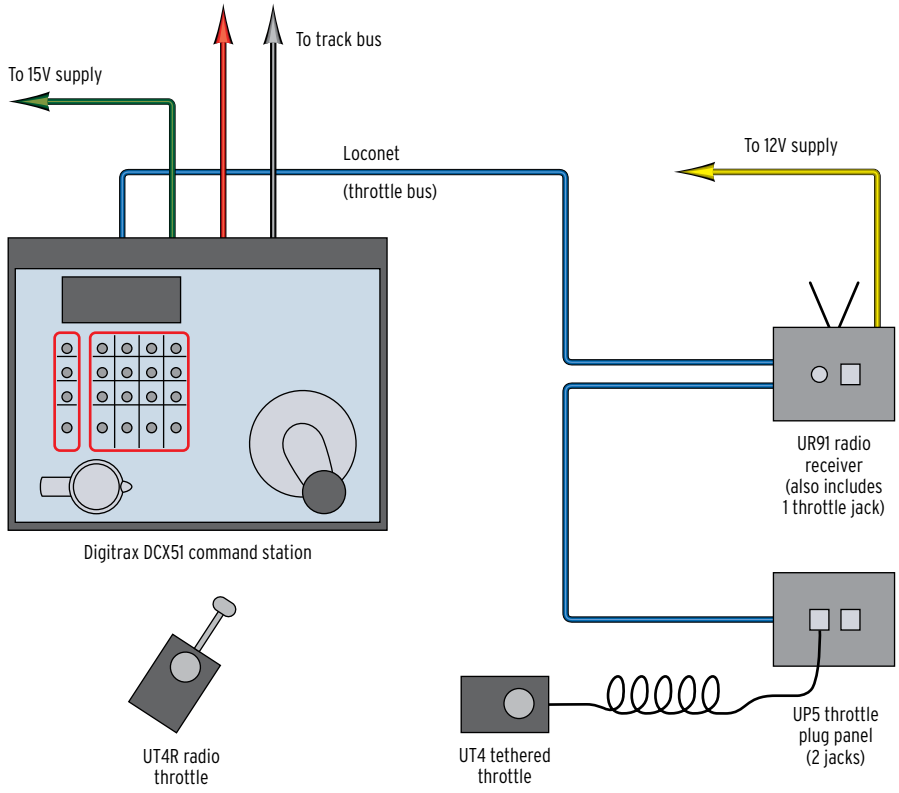
We mounted a power strip under the layout and then used plastic cable ties to hold the power supplies for the command station and the radio receiver in place. For the sake of portability, we didn't let any of these components extend below the framing. The cables run directly from the power supplies to their respective devices.

OPERATING THE SYSTEM. Once you have the components set up, it's time to run some trains. The Digitrax instruction manual provides information on how to get the most out of your DCC system, but to get you up and running quickly, I'll explain a few of the key elements.

When you turn on the power to the Zephyr, it doesn't immediately supply power to the rails. You need to turn on the track power from the Zephyr's panel. You do this by pushing the "power" key, located in the left-hand row of buttons. The base station's track status light will come on when the track power is on.

The next thing you'll want to do is try running a locomotive. To acquire a locomotive's address from the Zephyr, begin by pressing the "loco" key on the panel. Then, enter the address number of the locomotive and press the loco key again. You should now have control of that engine. If you want to run a different locomotive, repeat the process.

If you're using either the UT4 or UT4R walkaround throttles, these have a slightly different procedure for acquiring a locomotive. Before plugging the throttle into one of the layout's plug ports, set the four number dials to the address of the locomotive you wish to acquire. If the number has fewer than four digits, such as engine 480, use zeroes in place of the missing digits (0480). Next, plug the throttle's cable into the Loconet cab bus, and you should have control of the locomotive. When you want to switch trains, bring the engine to a stop, disconnect the throttle, and then set the dials to the next address. – *A.S.*



MATERIALS LIST

Digitrax
ZEPX Zephyr Xtra DCC starter set
UP5 universal Loconet panel
UR91 radio receiver panel
UT4 utility throttle
UT4R radio utility throttle
4-foot Loconet cable
6-foot Loconet cable

RadioShack
278-307 banana plugs (2)
274-630 banana speaker jack (2)

Miscellaneous
Stranded 16 AWG wire (2 colors)
22-16 gauge IDC connectors

OUR INITIAL LAYER OF SCENERY was formed by cementing a 1" sheet of foam insulation board on top of our benchwork. We then covered it with a Woodland Scenics vinyl grass mat before laying the track (see page 12). While this gave us 32 square feet of instant green, the layout was much too flat to be realistic – even for central Ohio.

To break things up a bit, I decided to add some small hills to the staging-yard end of the layout. Using a sharp utility knife, I cut two crescent-shaped pieces of 1" foam board, fitting them around the mainline track to form a cut. I then used the knife and a coarse sanding block to soften those cuts and round the edges to give the hills a natural shape. After vacuuming up the foam dust, I cemented the hills to the layout with PL300 construction adhesive. This is the same foam-safe adhesive made by Ohio Sealants Inc. that we've used for many other projects on the layout.

To speed up the process, I pinned the hills in place while the adhesive dried. Then I moved on to the next step – Sculptamold. This is a plaster-based papier-mache material that's ideal for scenery work on layouts because it's easy to use and makes little mess. I used the Sculptamold to blend the edges where the hills joined the layout, as shown in the top photo. I then let the hills dry overnight.

In the next step, I painted the hills with tan latex flat house paint. I then applied white glue directly on top of the wet paint (shown in the middle photo) and mixed the glue and paint together on the surface with my paintbrush. Next, I sifted Woodland Scenics green blended turf over the top, as shown in the lower photo. I also used several colors of coarse turf to represent weeds.

With the ground foam in place, I misted the hill with 70 percent rubbing alcohol and then used a pipette to dribble on some Woodland Scenics Scenic Cement. I let everything dry overnight. Later, Cody Grivno came back and added some patches of static grass while Carl installed the trees. With that, the hills outside Black River were finished. – *D.P.*

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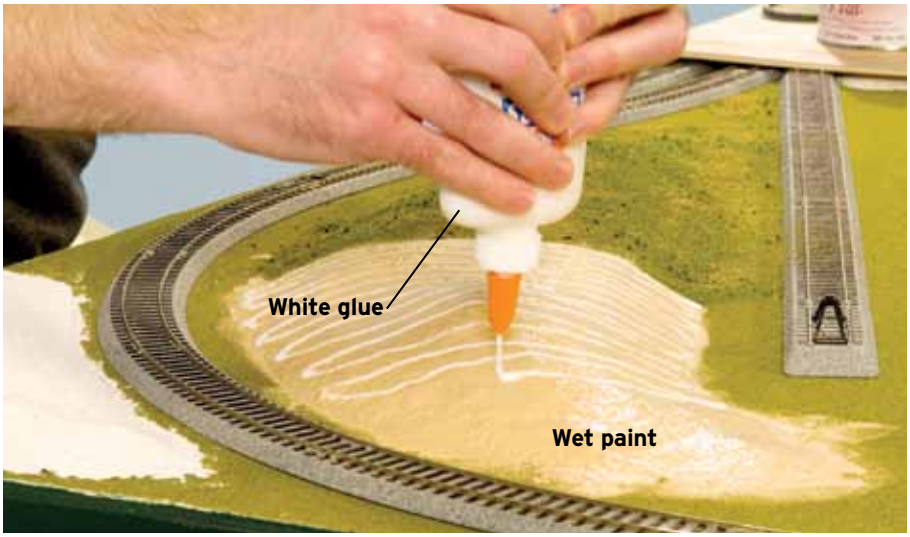
Once David cemented the hills to the layout, he filled in the gaps and smoothed out the edges using Sculptamold. He then let the material dry overnight.



David then painted the Sculptamold surface with latex paint and applied white glue, mixing the still wet paint with the glue using a wet paintbrush.

At this point, the back half of the hill is already finished. David worked in small sections to complete the scenery in each area before the glue dried too much and lost its tackiness.

Where the road needed to cross the railroad, David first built up the ground on either side of the tracks with sheet cork. He then formed the transition slopes with Sculptamold, sanding the surface once it had dried.

Cody used three rolls of self-adhesive foam road sections made by Vollmer. The adhesive is very sticky, so for the best results, be sure to peel away the backing in small sections at a time.

BEFORE WE COULD DO much else with the scenery, we needed to install the roads and grade crossings. We began by test-fitting the buildings for our town and major industries so we'd know where to put the roads. We then lightly marked these locations on the layout with a black felt-tip marker.

David's next project was the grade crossings. First, he used PL300 adhesive to attach pieces of cork sheet on both sides of the layout's three grade crossings. While the construction adhesive was drying, David used Sculptamold to blend the cork into the rest of the layout.

Once the Sculptamold had dried, David used a medium-grit sanding block to sand the surface smooth. Because the road material we planned to use is thin, any lumps or imperfections in the base scenery would be visible. Finally, David painted the Sculptamold with flat tan latex paint to blend it in with the base color of the grass mat.

ROAD MATERIALS LIST

Blair Line
165 grade crossings (2)

Highball Products
220 limestone ballast

Vollmer
6020 road sections (3)

Miscellaneous
HO sheet cork
Sculptamold
PL300 construction adhesive
Pins

As David finished up the grade crossings, I started the roads. I sprayed the grass mat with 70 percent isopropyl alcohol following my pen marks for the roads. With the ground foam saturated, I used a putty knife to scrape away the scenery material for a smooth base.

I then attached Vollmer 6020 self-adhesive road material. This product was easy to work with, and by pulling it carefully, I could bend it to follow curves in the road. A word of caution, however – the material is very sticky, so once you attach the road to the layout, you can't reposition it.

I found it easier to have help with the road project. David attached the road material to the layout as I followed along with a wallpaper roller to smooth it out. We continued in this fashion all the way around the layout.

We finished up this portion of the project by detailing the road. First, we used black felt-tip permanent markers to add expansion lines and cracks to the road material. Next, we used Highball Products limestone ballast to add shoulders to the road. Any scenery work done near the foam road material must be done with care, as we soon discovered that matte medium will stain the road surface. We were able to hide most of the stained foam by airbrushing the road with Polly Scale Union Pacific Dark Gray.

Finally, I used medium-viscosity cyanoacrylate adhesive (CA) to attach Blair Line wood grade crossings to the Unitrack. It's good practice to test fit the grade crossings first to make sure wheel flanges will roll through freely. As a final touch, I applied a wash of Polly Scale Steam Power Black to the planks.

With that, the motorists in Black River will be able to get around town with no problem at all. – *Cody Grivno*

THERE'S A LOT TO BE SAID for taking the time to make your own trees. It's fairly easy to get good results, it saves money, and you can vary each tree's appearance.

That being said, there are also some darn nice ready-to-plant trees on the market. Most of the trees we used on the Black River Junction are 4" and 6" Scenic Express Ready-Made Trees. We also purchased one very large Noch oak tree and two sizes of Faller oaks.

The Scenic Express trees came with a short plastic pin cast on the base. I cut those off with sprue cutter. The Noch and Faller trees already have flat bases.

I then clamped several 1" paneling nails points downward in the jaws of a vise and trimmed off the nail heads using a motor tool. Paneling nails are thin but made of hard steel, so I wore eye protection and did my cutting slowly and carefully, holding the tool so that the sparks would travel away from me. In the process, the nails get extremely hot, so let them cool before handling.

Next I used a .073" drill bit to bore a 3/8"-deep hole in the base of each trunk. I used a pin vise to drill the first hole, which worked fine but was a little too slow for my tastes. For the rest of the holes I used a variable-speed electric drill at its lowest setting, holding the tree trunks with pliers.

I applied a big drop of thick gel CA (cyanoacrylate adhesive) to the cut end of the nails and placed the nails in the holes in the trunks. After we finished the basic scenery work, I planted the trees by simply stabbing the nail-equipped trunks through the ground cover and into the foam insulation scenery base.

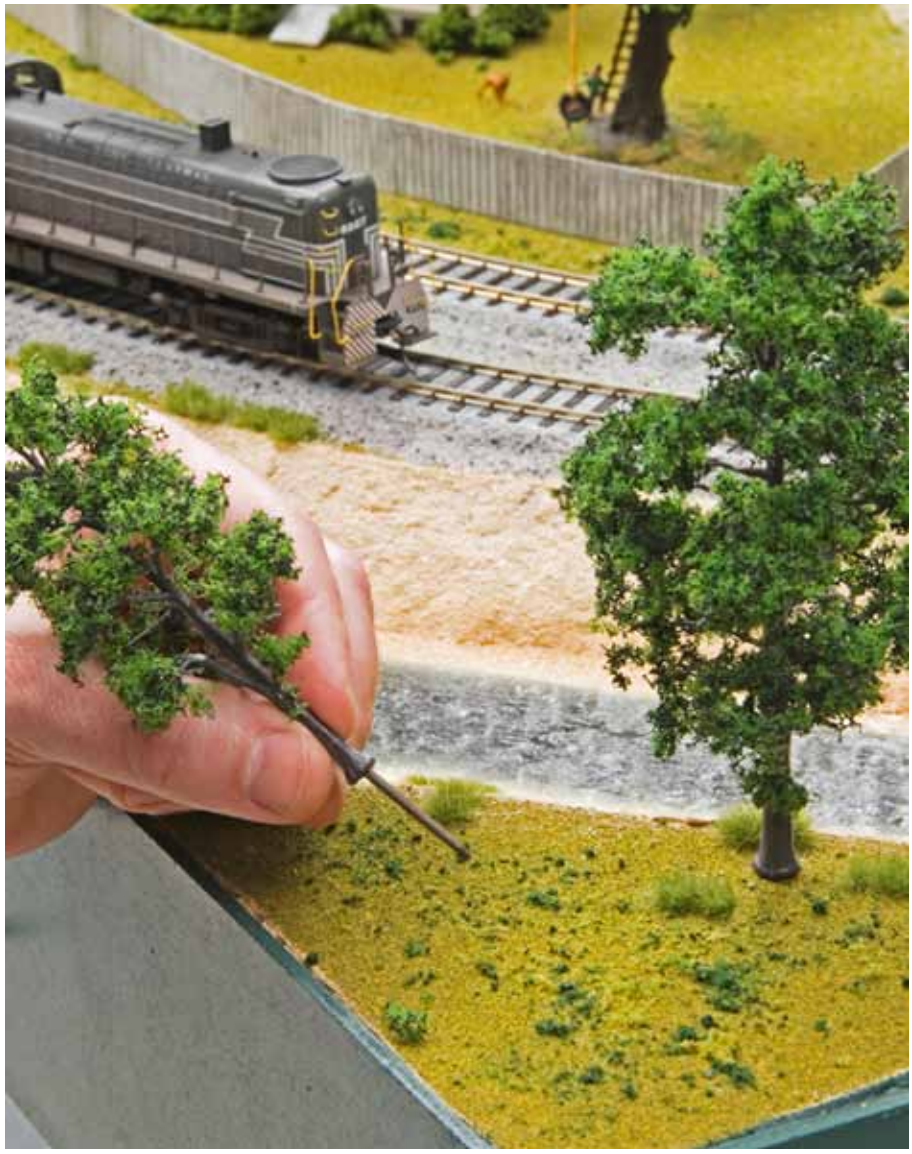
As a finishing touch, I placed a pinch or two of ground cover material around the base of each tree and dribbled on a little diluted while glue to hold everything in place. – *C.S.*

TREE MATERIALS LIST

Faller
181450 large oak (2)
181483 small oak

Noch
21768 large tree with swing

Scenic Express
528 spruce trees
1204 green 4" trees
1206 green 6" trees (2)
1216 maple trees
1224 birch trees

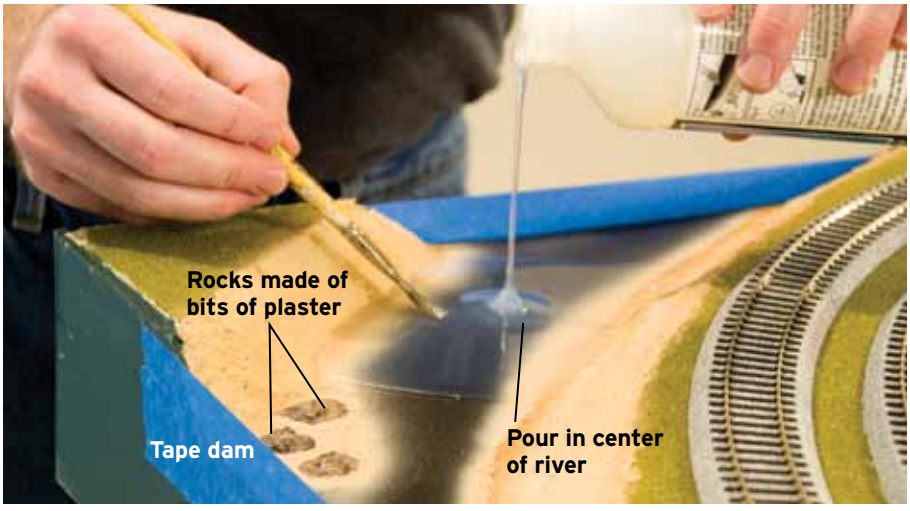


Adding mounting pins to your trees makes them easy to plant, especially in foam scenery. And, if you don't cement them in place, you can move the trees when you need to clean the track or work on the layout.

Some of the bigger trees we used, such as those from Noch and Faller, had molded bases. To blend them into the scenery, Carl and Cody painted the bases with white glue and then sprinkled on ground foam.

David cut the foam scenery down to the plywood to make the riverbed. He then coated the banks with Sculptamold, painted them, and covered them with ballast.

To give the river some depth, David painted the plywood flat black and then airbrushed Polly Scale Sand on the banks. By feathering the tan paint into the black, David made the river look deeper than it is.



Resin products like to creep up out of the riverbed, leaving unsightly high-water marks. To avoid this, pour the resin in the center of the river and then use a paintbrush to work it out toward the edges.

OF ALL THE SCENERY PROJECTS, modeling the Black River took the longest – four days, to be exact. To stay on our five-day building schedule, beginning on Tuesday that week, I started each day working on the river's next step. I'd then move on to something else while that layer of the river dried. But don't let that daunt you. Despite the fact that model railroad water features look impressive, they're very easy to make.

I started by cutting out the foam scenery where the Black River would run, cutting all the way down to the plywood top. Then, using a sharp utility knife, I made angled cuts to form the banks. Next, I smoothed the rough edges with a medium-grit sanding block. I then covered the banks with Sculptamold to give them the look of eroded soil.

Once the Sculptamold had dried, I painted the banks with tan latex house paint. Much like building the hills on page 17, I coated the wet paint with white glue, as shown in the top photo. I mixed the two together on the surface with a wet paintbrush. I then sifted some Highball limestone ballast into the paint-and-glue mixture to represent sand and clay. Once the ballast had a few hours to dry, I vacuumed off any loose material.

I painted the bottom of the riverbed with flat black latex paint. (It's the Black River, after all.) The black paint allows the resin layers to reflect light. Next, I airbrushed the banks with Polly Scale Sand, which was a close color match to the limestone ballast used on the banks. I feathered the tan paint into the black riverbed to create the illusion of depth.

Once the paint had dried, I dammed both ends of the river with masking tape and poured the first layer of resin water. As shown in the bottom photo, I used Woodland Scenics Realistic Water. This is no-odor, no-mixing resin. You can pour the material in 1/8" layers, and it sets up in about 24 hours. To give the Black River a little extra depth, I poured two layers.

After the resin had a full day to dry, the next step was to add the waves. For this, I used Woodland Scenics Wave Effects paste. The material goes on white, but dries clear. I used a paintbrush to form the paste into ripples. To finish things up, I added some Scenic Express Prairie Tufts to the banks, and Dana Kawala placed a few people fishing along the shore. – *D.P.*

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WATER MATERIALS LIST

Polly Scale
414302 Sand

Scenic Express
MN72732 Prairie Tufts

Woodland Scenics
1211 Realistic Water
1212 Water Effects
1878 people fishing

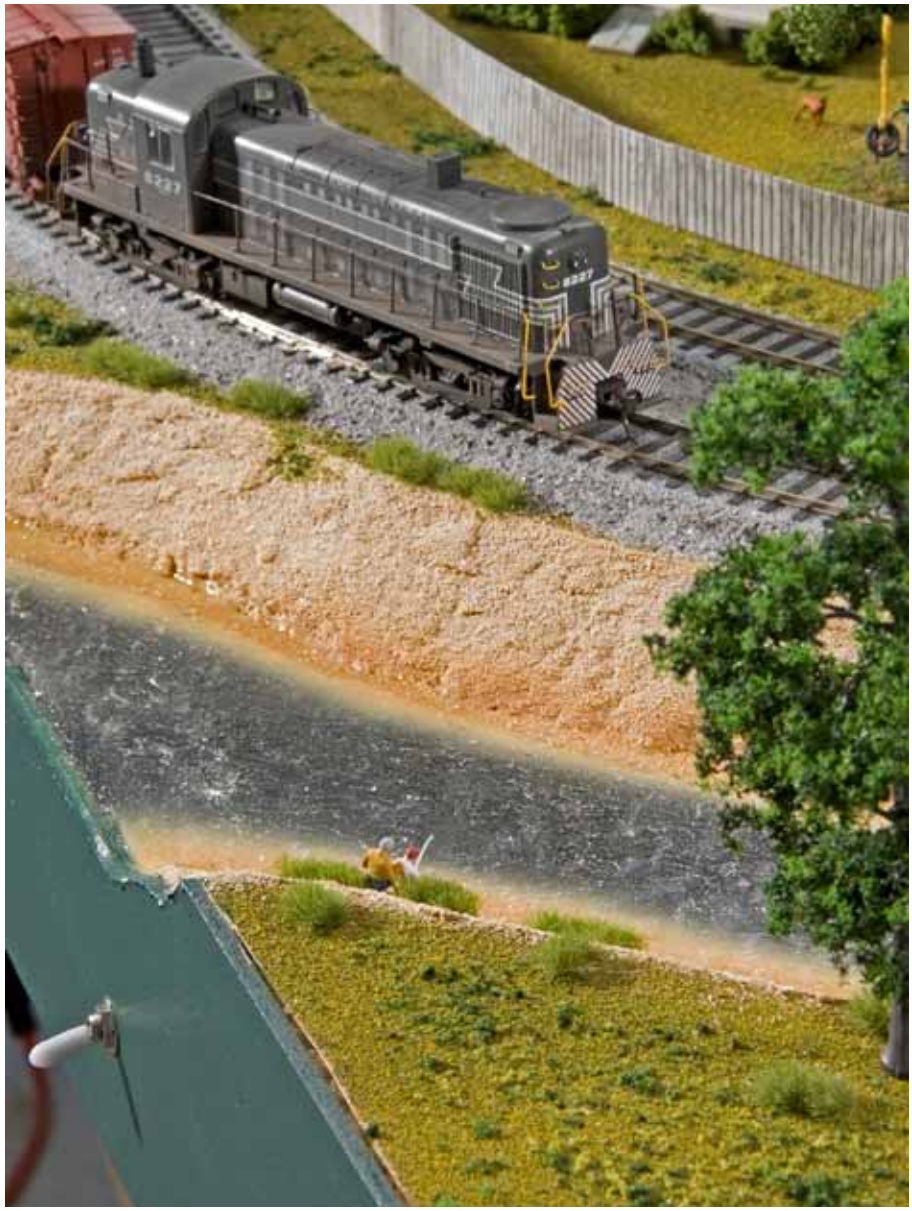
Miscellaneous
Tan latex house paint
Flat black latex paint
White glue

THOUGH THE WOODLAND SCENICS vinyl grass mat looked fine, we wanted to give the scenery some additional texture. One technique I used was to apply static grass with a Noch Gras-Master.

Static grass is a synthetic grass-colored fiber product that's usually applied with an electrical device like the Gras-Master. The applicator gives the fibers a static charge that makes them repel each other. This makes the fibers stand on end as you sprinkle them onto the charged terrain surface, resulting in a realistic tall grass effect.

First, I attached the alligator clip on the Gras-Master to a metal pin stuck in the scenery near where I was going to apply the grass. This serves to ground the work area. Then I used a pipette to randomly apply matte medium on the hillside. With the cement still wet, I applied the static grass (I used Noch no. 7370 Wildgras). To ensure the fibers would stand upright, I held the Gras-Master about ¼" above the terrain and gently shook the tool to dispense the grass fibers.

It's important that you use only rayon-based static grass, or the fibers won't receive the static charge they need to stand on end. – *C.G.*



David used Woodland Scenics Water Effects paste to make the surface ripples. He also added some Scenic Express Prairie Tufts to the shore.

Cody added some patches of static grass to give the scenery more definition, especially in the areas where the vegetation is left wild.

WE USED A VARIETY of injection-molded plastic structures on the layout, including a traditional kit, snap-together buildings, and several factory-assembled models.

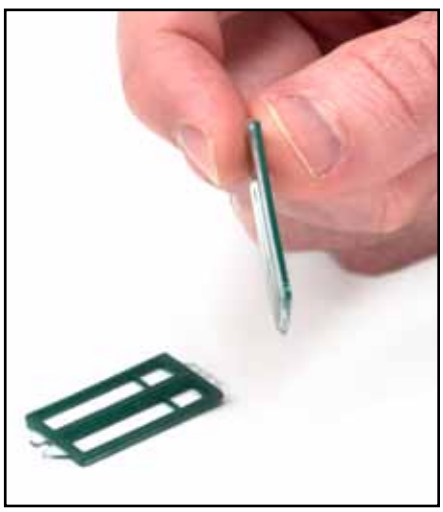
The transfer building was the only traditional (box full of parts) structure kit we used on the layout. After assembling the structure with liquid plastic cement, we airbrushed the building with Polly Scale Boxcar Red and painted the window mullions and freight doors Undercoat Light Gray.

The snap-together buildings (Daily Examiner and River Road Mercantile, among others) are Gold Ribbon Series kits from Wm. K. Walthers, Inc. These structures feature interlocking tabs that make assembly, well, a snap. However, we brushed liquid plastic cement over the joints so the wall panels wouldn't come apart with transport and handling. (We put the layout on display at train shows, so the buildings had to be durable.)

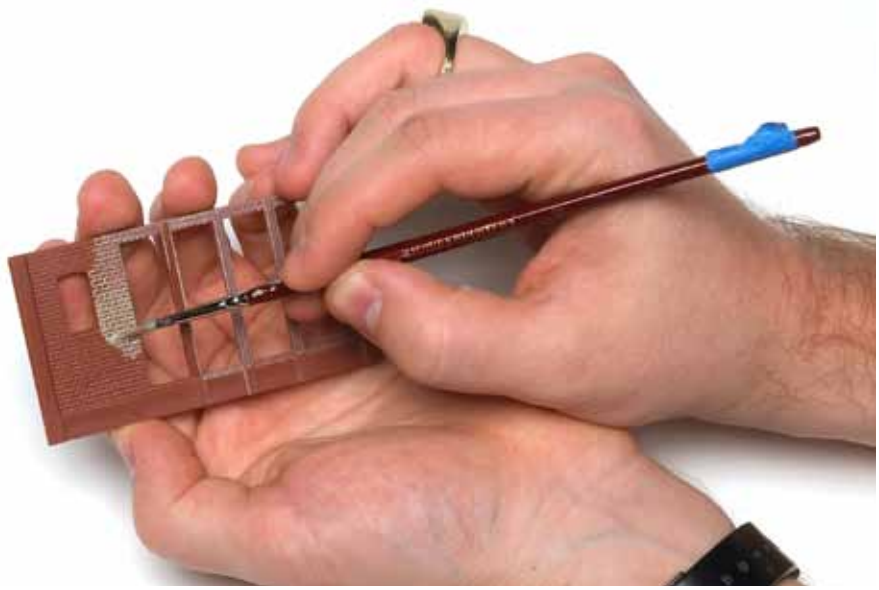
The Gold Ribbon kits also have parts with multi-color molding. For example, the windows have clear glazing with opaque mullions, which speeds up the assembly process.

We also used factory-assembled models, including the Golden Valley Depot and Freight House from Walthers and Harrison's Hardware from Woodland Scenics. The Walthers structures are molded in typical building colors, while the Woodland Scenics models are fully factory painted. Though most of the structures were molded or painted in appropriate colors, many were shiny, so the staff weathered them using a variety of techniques. Terry Thompson used thinned Polly Scale acrylic paints and an airbrush to weather the interlocking tower, transfer building, Danbury Depot, and others. I used thinned Polly Scale Aged Concrete (10 percent paint, 90 percent distilled water with a few drops of Liquitex flow enhancer added) to highlight the mortar lines on the Daily Examiner and All Needs Insurance buildings. Erik Bergstrom sprayed the River Road Mercantile with Testor's Dullcote, then weathered the building with powdered pastels.

As you can see, a variety of structures is available. You can easily add them to your layout in a short amount of time. – *C.G.*



Many of the structure kits we used had parts with multi-color molding. In those, windows and doors or trim were molded together in layers of different-colored plastic, making assembly easier and requiring no painting beyond weathering.



To make the mortar lines in the brick wall sections stand out, Cody used a wash of thinned Polly Scale Aged Concrete on the plastic parts.

STRUCTURE LIST

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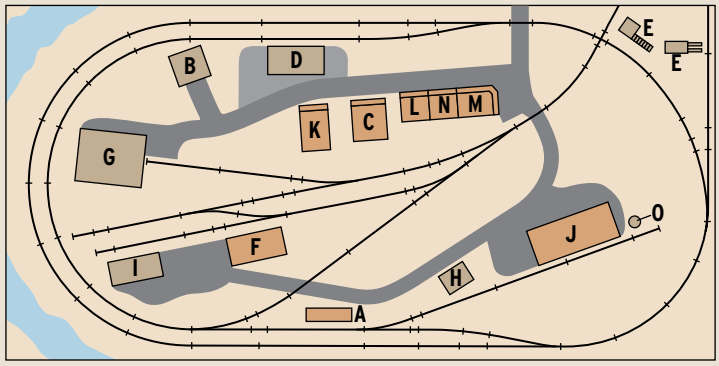
Atlas
A 607 platform
B 611 Kate's house

Design Preservation Models (Woodland Scenics)
C 5022 Harrison's Hardware
D 5023 Danbury Depot

Walthers
E 2800 interlocking tower set
F 2808 Golden Valley depot
G 2823 Dayton Machine Co.
H 2826 water tower
I 2828 Golden Valley freight house
J 3095 transfer building
K 3600 River Road Mercantile
L 3615 Robert's Books
M 3616 Daily Examiner
N 3617 All-Needs Insurance
O 3728 one-piece smokestack



AS WITH ANY STEP in the layout building process, a little planning goes a long way, and that includes adding figures, vehicles, and other scenic details. There's a multitude of details available, so I first had to find those that fit the setting of the Black River Junction layout.

Figures should have clothing appropriate for both the era and the season of a layout's setting. During the 1950s, the era represented on our layout, many men wore suits and hats around town. And since the Black River Junction is set in the summer, you won't see Santa Claus, ice skaters, townspeople in heavy overcoats, or anyone shoveling snow.

Just as in real life, all the vehicles I placed on the road had drivers in them. Unmanned cars and trucks stayed in parking lots or driveways.

Era-appropriate vehicles are important, but don't try to make all your vehicles from the same decade. I used automobiles and trucks from the 1940s and 1950s. There's always bound to be some older cars on the road, especially in a working-class town like ours.

Vintage advertising can also help date your layout. I built a wood billboard kit that advertises Nash automobiles, a nameplate that was phased out by American Motors at the end of 1957.

Once I'd found details to reinforce the Black River Junction's setting, it was time to plan the scenes for each location. I laid out all the details on a board, grouping them according to where I thought they'd work best on the layout. I chose some figures to convey movement for each scene, such as workers unloading a crate at the freight house or a man stooping to pick up a coin on the sidewalk in front of the hardware store. I also added skids, garbage cans, and assorted junk to give industries a worked-in look.

Woodland Scenics products provide a good starting point for detailing a layout. Its AutoScenes figure and vehicle sets, such as the Lubeners loading up their sedan for a vacation, have nice detail.

I installed many of the details by hand, but found a pair of Gentle Grips tweezers helpful for hard-to-reach areas. The tips of these tweezers are padded so they won't damage the paint on the figures.

Before placing figures and other details, I gently sanded the surface that I'd be gluing to the scenery. This step is especially important for standing figures, since the bottoms of a figure's feet might not be flat; otherwise, you'll eventually have sidewalks full of fallen pedestrians.

I used Scenic Accents cement for most of the figures. This adhesive remains tacky for hours, so I could reposition the figures if needed. For vehicles and other details, I used thick-viscosity CA, which gave me about 30 seconds of positioning time.

Figures and vehicles turned our empty streets into interesting scenes and added the final touches needed for a realistic layout. – *Dana Kawala*

Dana combined a number of different figures with Woodland Scenics and Classic Metal Works vehicles for this Main Street scene. Other details, like those in front of the hardware store, came with the structures.

DETAILS LIST

Blair Line
2431 lattice billboard kit

Central Valley Model Works
1601 fence assortment

Classic Metal Works
30157 International Harvester R-190 flatbed truck
30174 U.S. Mail R-190 express van
30175 B&O International Harvester R-190 express van (2)
31102 Roadway International Harvester 1954 R-190 semi-tractor/trailer

Life-Like Products
1626 disk and wagon
1627 tractors
1699 taxi

International Hobby Corp.
4550 crossbuck signals

Woodland Scenics
1823 dock workers
1824 ordinary people
1837 general public
1852 assorted junk
1854 assorted skids
1855 assorted crates
1859 train mechanics
1873 passengers
1878 gone fishing
1906 newsstand
5521 Hall and Duke
5522 Billy Brown's coupe
5526 Lubeners loading
5528 Willie's warning
5532 Thompson's travelin' trailer
5535 Sunday drive
5536 Cruisin' coupes

Different rail sizes are used to represent prototype track in spurs, branch lines, and main lines.

ALL ABOUT TRACK

A look at the many types of track and how to cut and install it

BY JIM HEDIGER

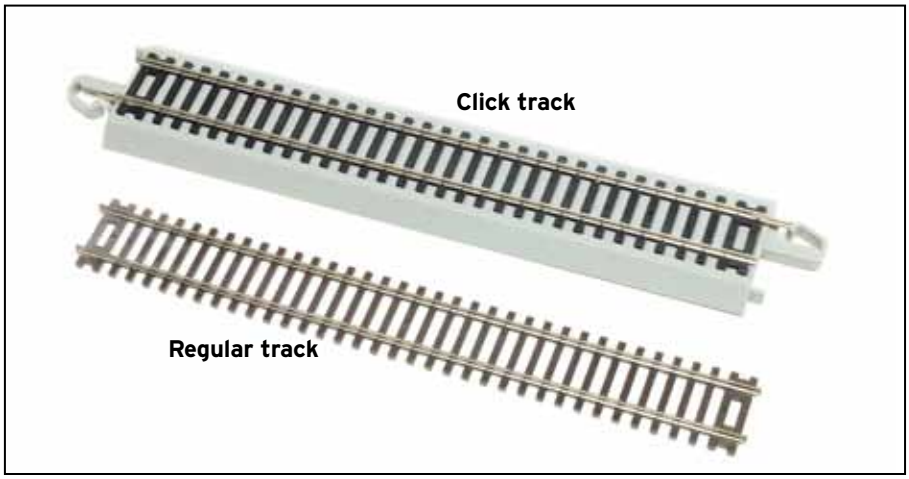
NEW MODELERS generally start out with the loop of sectional track that comes in their first train set, but it doesn't take long for the expansion bug to bite. It only takes a few minutes in the hobby shop to discover there's a wide range of track products available and a new vocabulary to go with it. Lets take a closer look at today's track so you can make the best choice for your railroad.

SECTIONAL TRACK

Today's model train sectional track is made with solid metal rails and plastic roadbed, while scale model track has solid metal rails and plastic ties.

Track is made in a variety of sizes called "codes" which refer to the height of the rail in thousandths of an inch. These codes are related to the scale of the track to simulate the different rail sizes used in real-life track. In HO scale, track is commonly made with code 70 (.070"), code 83 (.083"), and code 100 (.100") rails. The smallest size represents old-time or branchline rails, while the larger ones are for mainline track.

There are two types of sectional track available. Regular track consists of just the rails mounted on the ties, while "click" track is inset into a molded roadbed that locks together (hence the name). Some brands allow you to separate the track from the cast roadbed, but others don't. The big advantage of click track is it eliminates the need for roadbed.



Regular track normally requires roadbed, while "click" track already has a molded base that's shaped and textured to simulate the prototype's rock ballast.

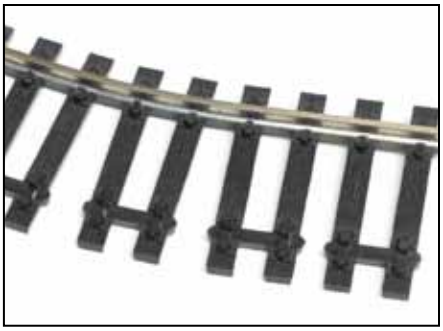
The basic track geometry refers to the shapes of the track sections, and it varies between brands and scales. However, all sectional track components are based on the brand's initial straight and curved sections. A full circle of curved track is commonly divided into either 12 or 16 pieces depending upon the curve radius, and most brands offer several different size curves. Straights are usually made in 9" or 12" lengths. Partial sections, such as two-thirds, half, one-third, and shorter pieces, match the basic curves and straights, serving as "fitter" pieces to fill gaps when a layout is assembled. These fitter sections eliminate the need to cut track pieces to fit.

You can easily expand a starter loop with more of the same brand of track, but you don't have to. There are plenty of track manufacturers who make a variety of components that all work together.

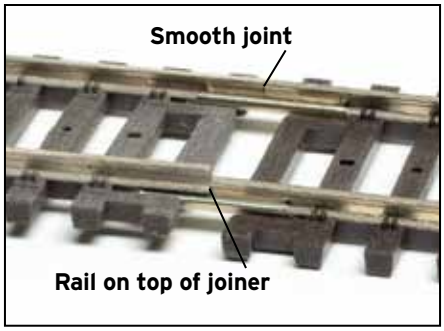
FLEXTRACK AND JOINERS

Flextrack is similar in appearance to sectional track, except it's longer and flexible so it can be bent to any desired radius. It's sold in either 3-foot or meter-length pieces depending upon where it's manufactured. It also comes in many rail codes for layout use.

The key to this track's flexibility can be seen in its plastic ties, which are molded with small alternating gaps. As the track is bent, the gaps open to allow the ties to spread a little along the outside rail and compensate for the curve.

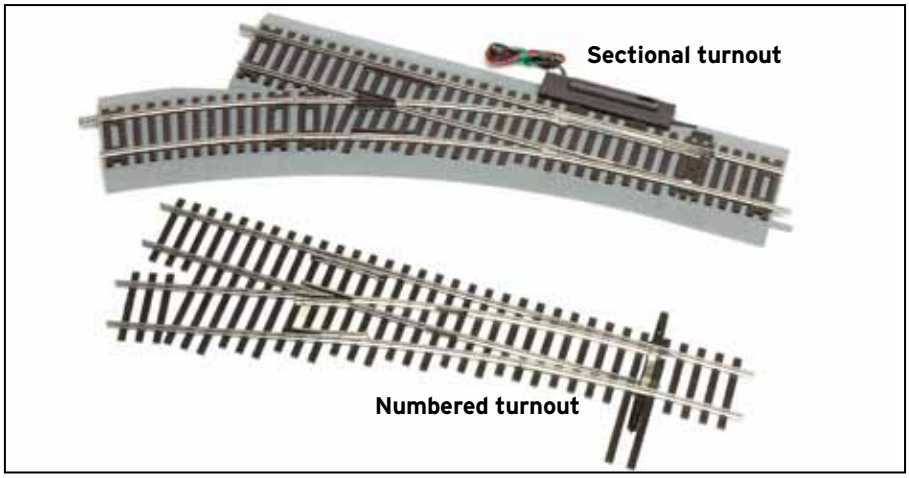


The small open gaps between the ties are the secret to flextrack's ability to bend into any desired curve.

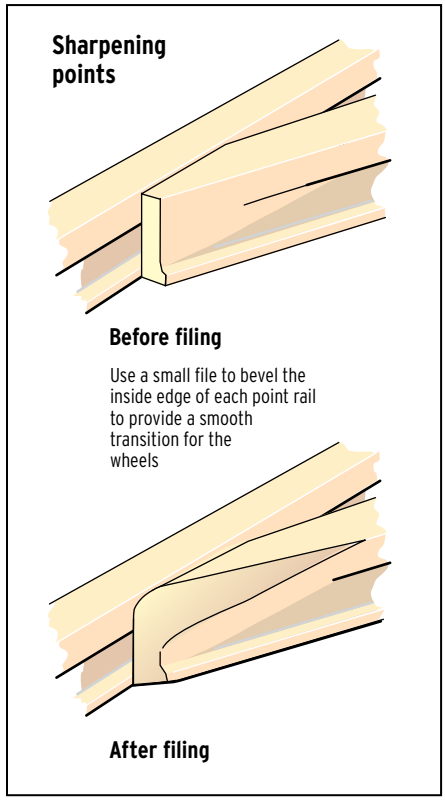


Rail joiners need careful attention to make sure the rail ends fit together properly to make a smooth joint.

Rail-cutting pliers are used to trim flextrack to fit. Use vertical cuts to avoid crushing the rail ends.



Sectional turnouts can replace a section of either curved or straight track, but numbered turnouts require careful blending of their approaches.



Using flextrack isn't difficult, but you'll need to learn how to cut and fit the rail joints. Special rail cutting pliers are available. Always make vertical cuts to keep from crushing the rail. Then smooth the cut ends with a small file.

Scale track is assembled with small rail joiners made of the same sheet metal as the rail. Each rail joiner is shaped to slide tightly over the base of both rail ends to obtain proper alignment.

TURNOUTS

A turnout (often called a switch by prototype railroaders) provides a way to route trains from one track to another. Turnouts are made in dozens of sizes and rail codes.

Sectional track turnouts are designed to replace single straight or curved track sections in a track plan. This makes them very sharp compared to the scale numbered turnouts.

Prototype and scale turnouts are identified by a number which indicates their diverging angles. These numbers are a shorthand expression of the turnout's length-to-width ratio. For example, a no. 4 turnout takes four units of length to spread one unit, while a no. 6 turnout requires six units of length to spread one unit. Thus, the higher the number, the gentler the diverging angle.

Modelers traditionally use no. 4 or no. 6 turnouts in their layouts. Recently, no. 5 turnouts have been introduced and are becoming increasingly popular. By railroad standards, the no. 4, 5, and 6 turnouts are all extremely sharp.

Before you install a turnout, it's a good idea to check the points for burrs. Many commercial switchpoints have a blunt end that will snag a wheel flange. An easy inspection technique is to slide your fingernail along the rail and over the switchpoint. If it snags, use a flat needle file to sharpen the moveable point into a smoothly tapered transition so the wheels will glide over the point. See the drawing above.

While you're choosing a brand of track at the hobby shop, you may want to check out the other specialty items that are part of the line. You may find that many angles of level crossings are available, along with three-way turnouts, single and double crossovers, and even slip switches. You may not need these specialty items now, but sooner or later they may come in handy.

TUNE UP FOR OPTIMUM RESULTS

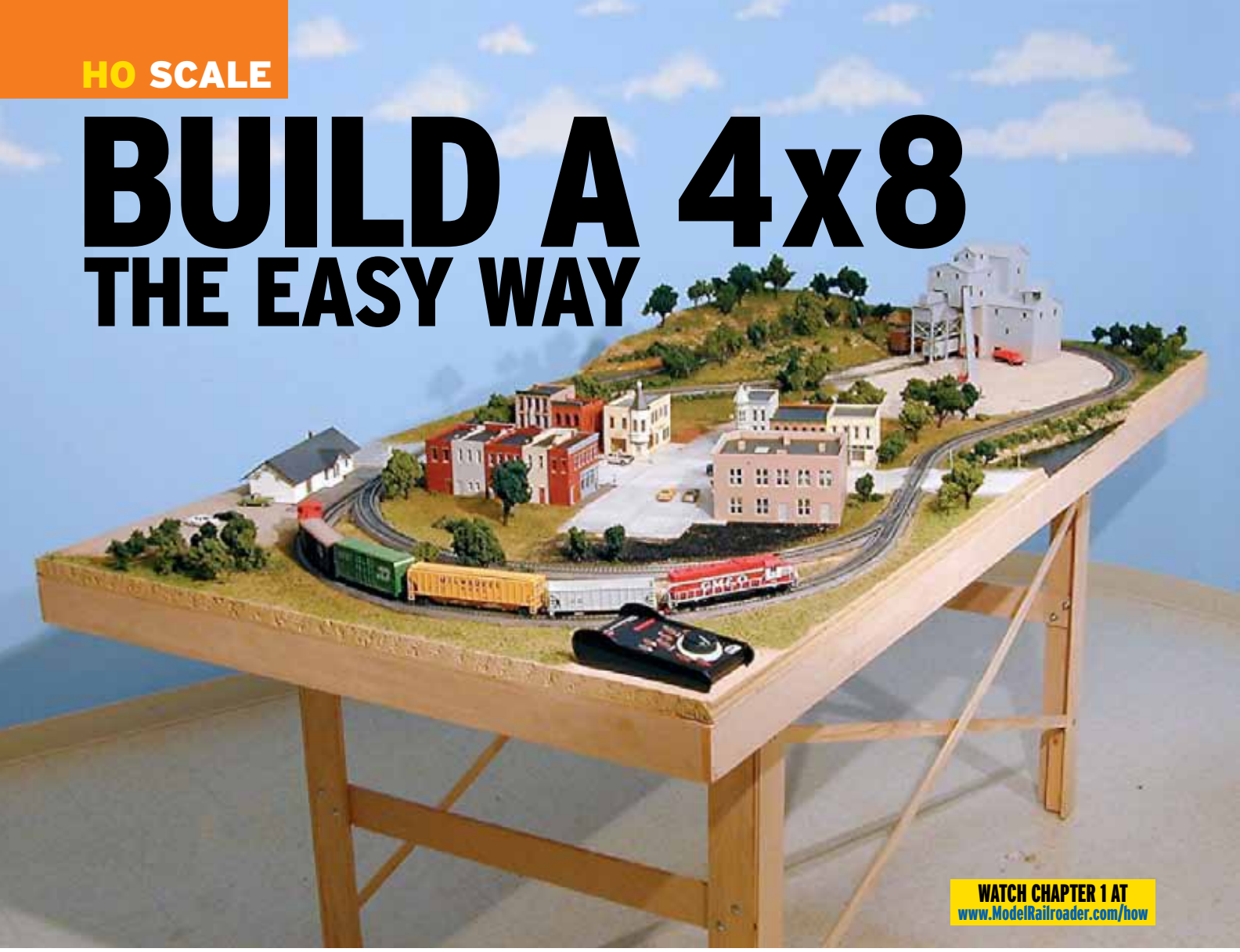
The quality of today's track components has made smooth operation an achievable goal for most modelers. All it takes is some care and patience.

Rail joints must be level and smooth so the wheels glide over them. Make sure both rail ends are inside the rail joiner and smooth any rough edges with a file.

With sectional track, make sure you have the right number of sections in each curve, and sight along the straightaways to make sure the rails are properly aligned and free of kinks. If you have to force the track into place, chances are there's a similar problem elsewhere.

Initially, you'll find that tracklaying can be a little fussy, but it's worth putting in the extra care to do it right. The payoff comes in the smooth performance when you start running trains. MR

BUILD A 4x8 THE EASY WAY



The 4 x 8 foot HO scale Madison Central is the star in a series of videos created for the World's Greatest Hobby program. Go to www.ModelRailroader.com/how, enter the code found on page 4 of this magazine, and watch the construction.

Learn how to build this HO layout from start to finish by watching the videos at www.ModelRailroader.com/how

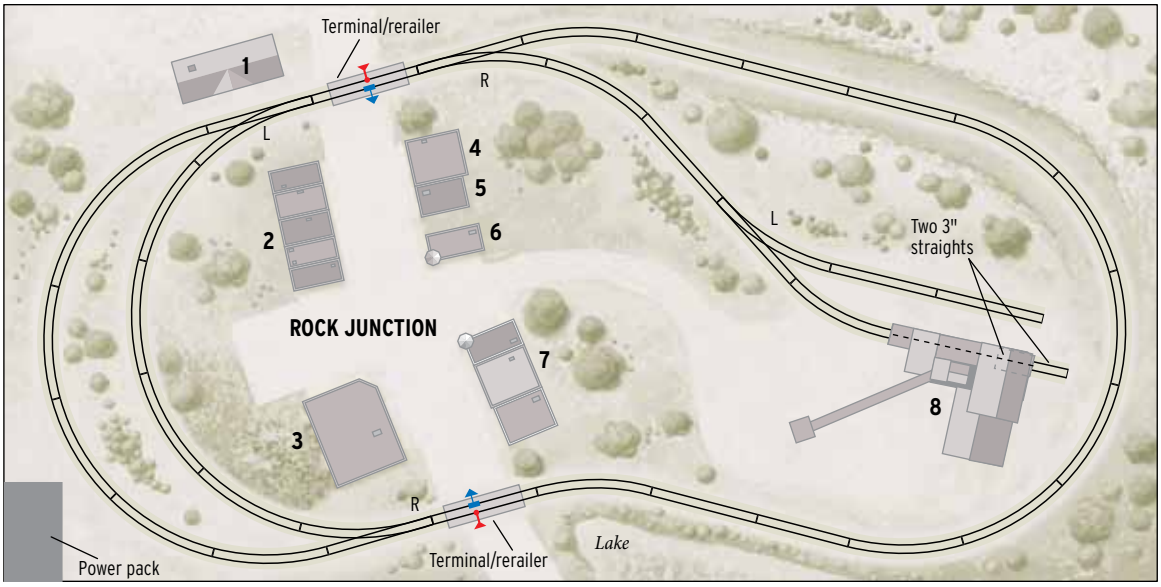
BY CARL SWANSON AND DAVID POPP
PHOTOS BY WILLIAM ZUBACK • ILLUSTRATIONS BY RICK JOHNSON

NEVER BUILT A LAYOUT? Have we got a deal for you. The 4 x 8 HO scale Madison Central may be the perfect candidate for your first model railroad. Its track plan is simple, its benchwork is basic, its wiring is plain vanilla, and its scenery is easy enough to get it right on the first try. And the best part is that the finished layout looks great. The Madison Central is a fun way to get started in the hobby.

Watching others show you how to build a model railroad can be a good confidence booster. If you go to www.ModelRailroader.com/how and enter the code found on page 4 of this magazine, you can watch us build the Madison Central from start to finish. The best part about the videos is that you can watch each step as many times as you need to learn the techniques.

Even if you don't want to build the Madison Central, the video series is a great modeling tool. Many of the layout construction techniques shown in the videos are the same that we used on the other layouts in this magazine. For example, the benchwork used on the Madison Central is the same that we used on the O gauge Cascade & Timber Trail (page 32), the HO scale Black River Junction (page 8), the Rock Ridge (page 70), and the Turtle Creek (page 78) layouts – don't miss out.

So, watch the videos, then roll up your sleeves and get started on your first layout. It's just that easy!



HO Scale
Scale: 3/4" = 1'-0"

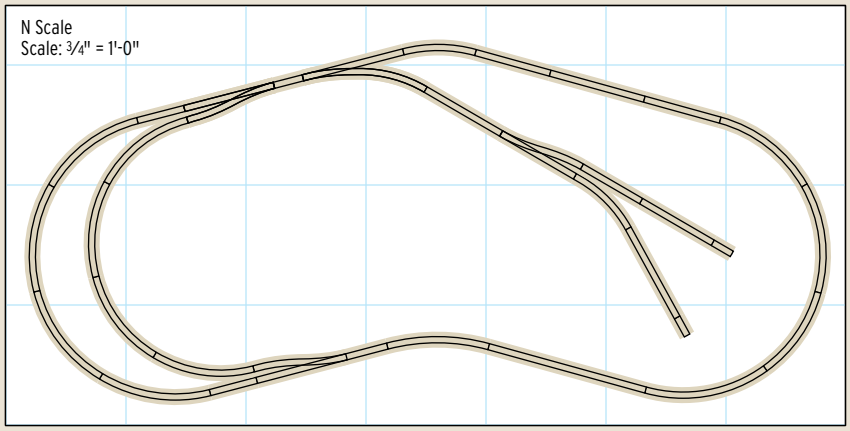
THE LAYOUT AT A GLANCE

Name: The Madison Central
Scale: HO (1:87.1)
Size: 4 x 8 feet
Prototype: any
Locale: Midwestern United States
Era: 1980s to the present

Style: island
Minimum radius: 18"
Minimum turnout: set track
Maximum grade: level
Benchwork: tabletop
Height: 40"

Roadbed: molded styrene
Track: Bachmann E-Z Track
Scenery: Sculptamold and plaster over extruded-foam insulation board
Control: Any starter Digital Command Control system

N SCALE VERSION



HERE'S AN N SCALE version of the Madison Central layout. Why N scale? There are plenty of excellent reasons to choose this scale, including the ability to pack more railroad action into less space.

N scale track and trains are roughly half the size of HO – 54.5 percent the size of HO, to be precise – and just 1/160 the size of real railroad equipment. This means the same 4 x 8-foot HO track plan can be built in N scale in a bit over 2 x 4 feet. If you have a little more space, you can reap the visual and operational benefits of wider curves and longer sidings and still be comfortably under 4 x 8 feet. Longer cars and locomotives operate much better on broader curves, and they look better too.

The N scale plan shown here needs a 3'-6" x 7'-0" space. Although the track arrangement is the similar to the HO version, this railroad makes extensive use of more realistic, sweeping 13 3/4"curves.

MATERIALS FOR N SCALE PLAN

Kato Unitrack
20-000 248mm straight track (4)
20-010 186mm straight track (4)
20-020 124mm straight track (4)
20-041 feeder track (1)
20-048 bumper track (2)
20-120 R315-45 curved track (4)
20-130 R348-30 curved track (4)
20-132 R348-45 curved track (8)
24-843 adapter cord (1) R315-45 curved track (4)
20-220 electric turnout no. 4, left (2)
20-221 electric turnout no. 4, right (2)

This plan uses sectional N scale Kato Unitrack, which includes ballast and subroadbed detail for a neat, finished appearance right out of the package. (Bachmann also offers an N scale track pack for the WGH Madison Central plan. It's item no. 44896.) For more on working with N scale Kato Unitrack, see the Salt Lake Route layout, shown on page 48 of this magazine.

BENCHWORK

THE MOST IMPORTANT requirement of benchwork is stability. The benchwork shown in the Madison Central video is the same type that is illustrated on page 10 in this magazine. Since the benchwork table is made from plywood, it's lightweight, relatively inexpensive, easy to build, portable (you can disassemble it, move it, and reuse it), and stable. The table is topped with a layer of 1" foam insulation board, so you can easily build scenery below the track grade, such as the lake, by cutting away some of the foam.

WATCH CHAPTER 2 AT
www.ModelRailroader.com/how

We used the same plywood benchwork construction for the Madison Central, as shown on page 10 of this magazine.

MATERIALS FOR 4 X 8 TABLE

Table
4 x 8-foot sheet ½" birch plywood, ripped into 3" strips (1)
4 x 8-foot sheet ½" plywood (1)
8" lengths of 2 x 2 (4)
8-foot lengths ¼" x 1¼" wood molding (2)
T nuts, ¼" (4)
Carriage bolts, ¼" x 2" (20)
Washers, ¼" (20)
Lock nuts, ¼" (8)
Wing nuts, ¼" (12)
Carpenter's glue

TRACK AND WIRING

WATCH CHAPTERS 3 AND 4 AT
www.ModelRailroader.com/how

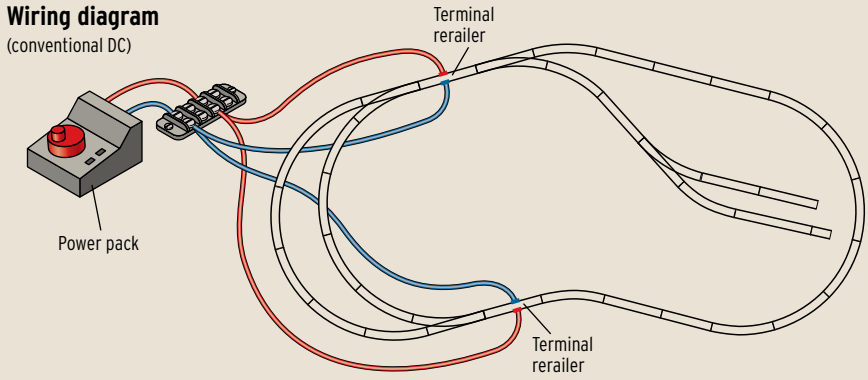
FOR THIS LAYOUT, we used Bachmann E-Z Track. This track comes with its own plastic roadbed, and the pieces lock together tightly. The track requirements are listed in the materials box below. Bachmann, Atlas, and Kato make track with plastic roadbed, and all three sell complete track sets for this particular model railroad. They are called World's Greatest Hobby (WGH) track packs, and their item numbers are also listed below.

To lay the track we started by snapping the sections together in the configuration shown in the plan. As shown in the video, after marking where the track goes on the tabletop, we glued the track to the layout with foam-safe construction adhesive.

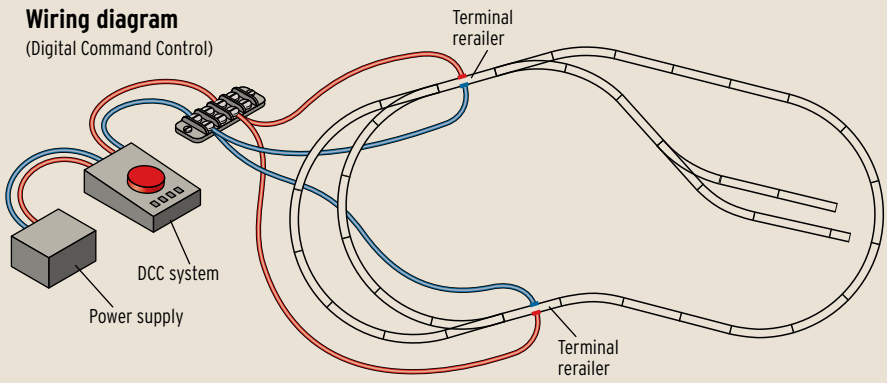
Although we wired this layout to run on Digital Command Control (DCC), we've also included a diagram for wiring the track for use with a convention direct current power pack. In the video, we used a simple starter set from Atlas (no longer available), but there are a number of other entry-level DCC systems available from other manufacturers, such as Bachmann, Digitrax, Lenz, NCE Corp., Electronic Solutions Ulm, and CVP USA. For more information on types of model railroad control systems, see page 30.

Whether you choose DC or DCC, with a simple layout like this, wiring is a snap. The Bachmann E-Z Track system includes plug-in wiring connections at the rerailer sections. All you need to do is follow the accompanying diagram wire-for-wire, and you'll be running trains in no time at all.

Wiring diagram
(conventional DC)



Wiring diagram
(Digital Command Control)



MATERIALS FOR HO SCALE PLAN

Track
9" straights (11)
18"-radius curves (20)
3" straights (2)
Left-hand switches (2)
Right-hand switches (2)

Or ready-to-use World's Greatest Hobby track packs
489 Atlas WGH track pack
44596 Bachmann WGH track pack
3103 Kato WGH track pack

SCENERY

WATCH CHAPTER 6 AT
www.ModelRailroader.com/how

WHAT MAKES A LAYOUT UNIQUE is the scenery. The Madison Central is a great learning layout because it has a little of everything: flat terrain, depressions, water, hills, grass, trees, and pavement.

The landforms and rock formations on the layout are basic and easy to build. As shown in the videos, we layered more of the same foam insulation board we used on the tabletop to make the hills. We shaped the foam layers with a knife and then made some simple rocks using plaster. We also cut away some of the foam to form the lake. To make the water for the lake, we used the technique shown on page 20.

Scenery work leaves a lot up to the modeler. You can put the trees where you think they look good, move the lake and hills to another place, or run the roads to other parts of the layout. And don't worry about making mistakes. With scenery, no mistake is permanent – if you don't like it, try again until you do. The video series shows a variety of scenery techniques to get you started.

Grass, trees, and gravel roads are just a few of the scenery techniques you'll learn while watching the Madison Central video series.

STRUCTURES AND DETAILS

WATCH CHAPTER 5 AT
www.ModelRailroader.com/how

OTHER ELEMENTS OF layout building that will make your model railroad unique are structures and details. This includes all of the buildings, vehicles, and figures.

The structures you include on your layout don't need to be exactly the same as on the layout pictured here. Instead of a gravel operation, how about a grain elevator or factory? You can also go your own direction, using vehicles to set the layout in the 1950s or '70s. And, to make your layout unique, try painting your buildings, like those shown in the photo.

As for figures, visit your local hobby shop or check out a hobby catalog. There are many different kinds of figures available, including railroad workers, families, passengers, sitting people, and animals. The choices are many and fun.

And don't forget the details. You can get trash cans, mailboxes, street lights, fences, and more, just like the real world. Signs are everywhere we look, and you can make your layout more realistic by including them. MR

Buildings, vehicles, people, and signs are all part of the finishing details that add that "lived in" look to a model railroad.

MATERIALS FOR HO SCALE PLAN

Walthers buildings
1.* 3063 Clarkesville Depot
2. 3028 Merchant's Row I
3. 3064 Merchant's Row III
4. 3002 Bill's Glass Shop
5. 3000 Don's Shoe Store
6. 3034 Adam's Ribs Restaurant
7. 3029 Merchant's Row II
8. 3062 Glacier Gravel Co.

*Corresponds to numbers on track plan on page 27

INTRODUCTION TO DIGITAL COMMAND CONTROL

Digital Command Control allows the independent operation of multiple trains on the same stretch of track. Sound-equipped locomotives and programming options are other reasons to choose DCC to run trains.

Use DCC to easily run multiple trains and add realism to a model railroad

BY DANA KAWALA

MANY SCALE MODEL RAILROADERS get started with a basic train set. Running a single train around a loop of track is as simple as connecting two wires from the rails to a direct-current (DC) power pack. But what's a modeler to do when he or she wishes to move beyond a loop and run more than one train at the same time? The answer used to involve a lot more wiring than it does today. For multiple train operation and other reasons, the *Model Railroader* staff recommends Digital Command Control, or DCC.

As a control system, DCC allows modelers to run multiple trains independent of each other on the same track with little or no special wiring. Setting up a layout for DCC also makes it easy to have walkaround control, where a modeler can follow a train around the railroad using a handheld controller.

Another advantage of DCC is the ability to fine-tune motor performance and add realistic operating effects. For example, most DCC-equipped engines can be programmed with a momentum effect to simulate the time it takes for a locomotive to accelerate or decelerate with a train behind it. Other realistic features found on many DCC-equipped

locomotives include steam or diesel engine sounds, whistles, horns, bells, and lights. It's also possible to control turnouts and other accessories with DCC.

DC VS. DCC

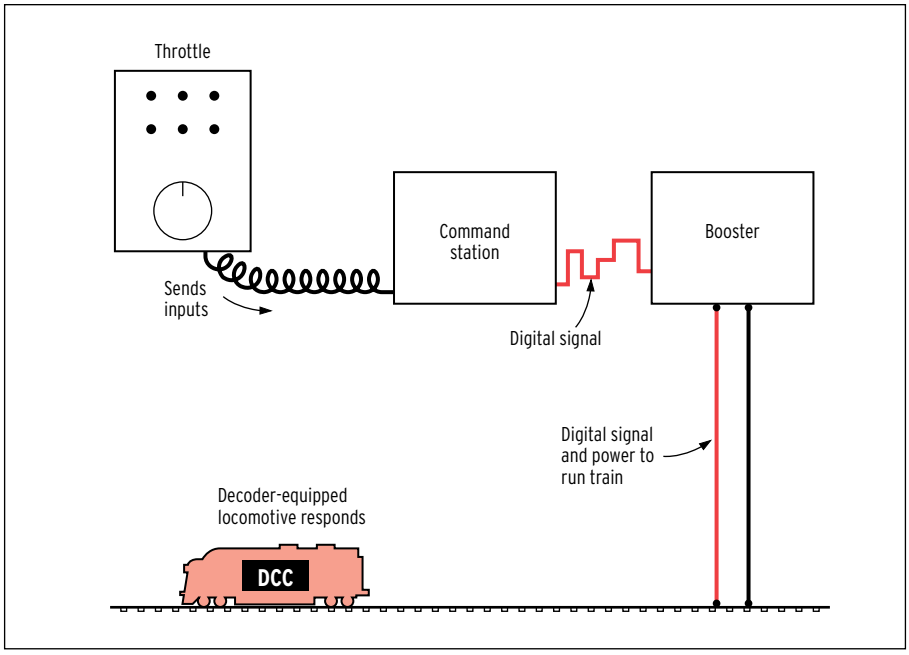
On a DC layout, a modeler controls a locomotive by varying the voltage that a power pack outputs to the track. The track power goes directly to the locomotive's motor. If you increase the voltage, the locomotive goes faster. However, varying the track voltage will affect every locomotive that's on the section of track connected to the power pack.

This means that you can operate two or more engines on a one-power-pack model railroad, but not independently. Running multiple trains (called cab control) requires special wiring so that multiple power packs can be used. The layout must be divided into separate electrical blocks. Then a system of electrical switches needs to be installed to transfer control of the blocks from one power pack to the other.

On a DCC layout, the rails still supply power for the locomotive, but they also act as conduits for digital signals (called packets). A typical DCC system consists of four main parts: the cab or throttle (the controller that an operator uses to issue commands), the command station (the computer brain of the system that turns the command from the cab into packets), the booster (the part that broadcasts the packets over the rails), and decoders (the components inside locomotives and accessories that receive and act on the packets).

A key feature of DCC is that each packet is preceded by an address that corresponds to a specific decoder, and only that decoder will respond to the command. Instead of going directly to the motor, the track power and digital signals first go through the decoder of a DCC-equipped locomotive. The decoder then regulates the amount of voltage that goes to that specific locomotive's motor. Therefore, although your DCC system may be outputting a constant 14 volts to the rails, you can make switcher no. 1 move ahead at half throttle, while road diesel no. 2 behind it remains still.

Some DCC systems allow operation of a single DC locomotive amid DCC engines. This isn't the best option, though, since DCC systems send alternating current (AC) to the rails that can potentially damage DC motors. Conversely, most DCC-equipped locomotives are dual-mode and can safely run on DC layouts (with limited functionality).



The throttle, command station, booster, and decoder are the four basic parts in every DCC system. The rails are conduits for the system's digital signal.

LIST OF DCC STARTER SET SUPPLIERS

Bachmann Trains
1400 E. Erie Ave.
Philadelphia, PA 19124
www.bachmanntrains.com

CVP Products
P.O. Box 835772
Richardson, TX 75083
www.cvpusa.com

Digitrax
2443 Transmitter Rd.
Panama City, FL 32404
www.digitrax.com

ESU LLC
477 Knopp Dr.
Muncy, PA 17756
www.loksound.com

Lenz Agency of North America
57 River Rd.
Suite 1023
Essex Junction, VT 05452
www.lenzusa.com

Model Rectifier Corp.
80 Newfield Ave.
Edison, NJ 08837
www.modelrectifier.com

NCE Corp.
82 E. Main St.
Webster, NY 14580
www.ncedcc.com

Zimo Elektronik, distributed by Model Railroad Solutions
1195 Velrose Dr.
Kelowna, B.C., Canada
V1X 6R7
www.mrsonline.net

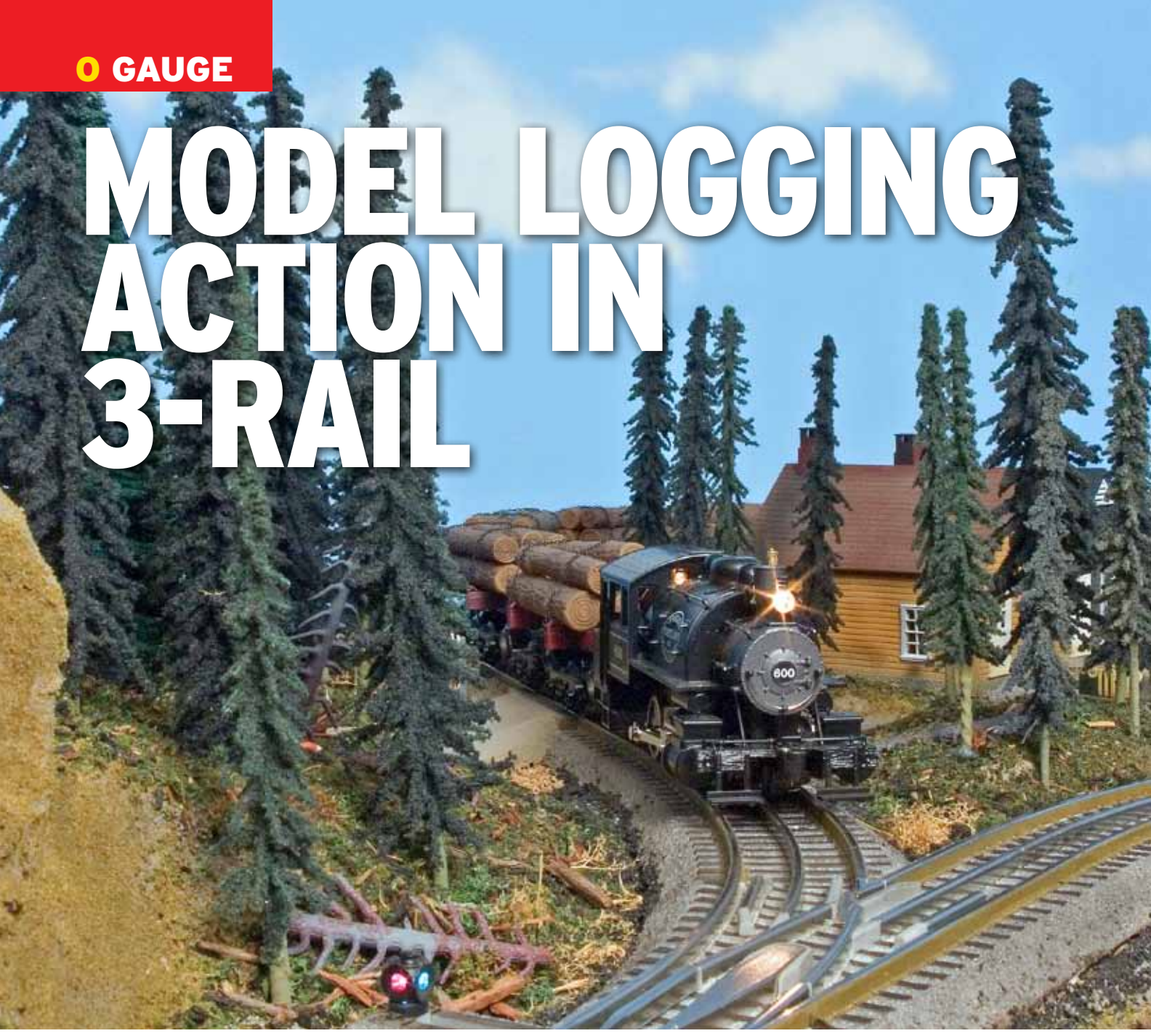
DCC STANDARDS

The National Model Railroad Association (NMRA) has developed standards for DCC that most manufacturers follow, especially for decoder wiring and functionality. These are available on the NMRA website at www.nmra.org. This means that one manufacturer's NMRA-compliant decoder will work with another manufacturer's NMRA-compliant DCC system, opening up a lot of options for purchasing DCC-equipped models.

However, the components within a DCC system, such as cabs and command stations, aren't compatible between manufacturers. When choosing a DCC system, it's a good idea to find one that will suit your particular operating needs – now as well as in the future as your layout expands. Many firms sell additional boosters, decoders (including those with downloadable sound effects), and extra cabs. Above you'll find a guide that lists several manufacturers who make DCC starter sets and other components.

Ready to give DCC a try? More extensive information can be found in *Basic DCC Wiring for Your Model Railroad* from Kalmbach Books. Better yet, pick up a throttle and run trains. Many local hobby shops and model railroad clubs use DCC and hold open houses that welcome newcomers. Digital Command Control is an exciting and fun way to make a model railroad run more like the real thing. MR

MODEL LOGGING ACTION IN 3-RAIL



The sights, sounds, and action of a logging railroad can all be found on the Cascade & Timber Trail Ry. project layout. Here, a Lionel Spokane, Portland & Seattle O-6-OT switcher hauls a string of Atlas skeleton log cars through the cutoff route.

A 4 x 8-foot O gauge railroad with starter set origins

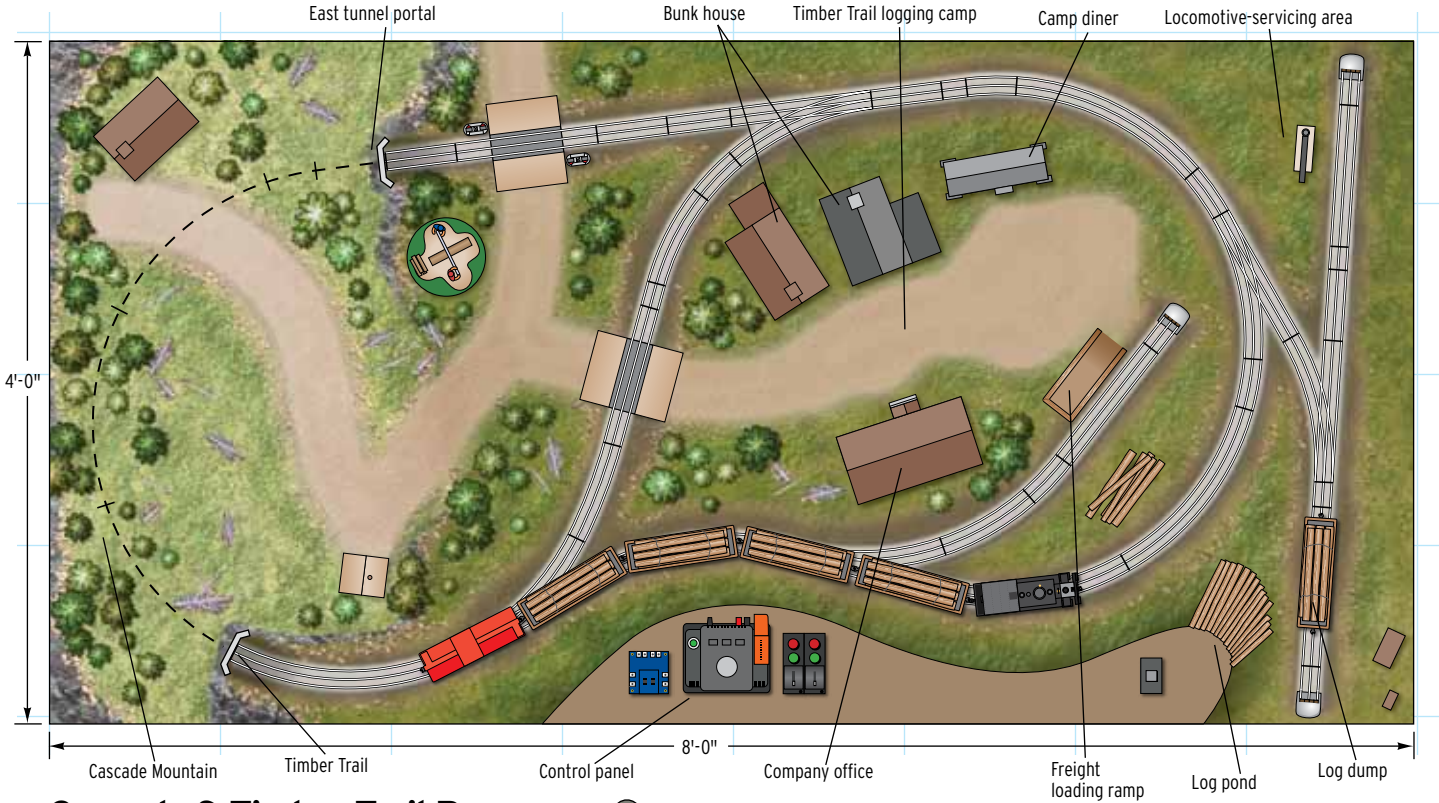
BY KENT JOHNSON
PHOTOS BY THE AUTHOR, BILL ZUBACK, AND JIM FORBES

THE MENTAL CHALLENGE of developing a suitable track plan is often cited as an obstacle to building a permanent train layout. Another common reason for avoiding the construction of a fun-filled railroad is the false notion that it requires an inordinate amount of time to develop, specialized construction skills, and hard-to-find products.

"Nonsense" is what we think you'll say to that – especially after examining our scheme for a logging-themed 4 x 8-foot O gauge layout named the Cascade & Timber Trail Ry., or simply, the C&TT.

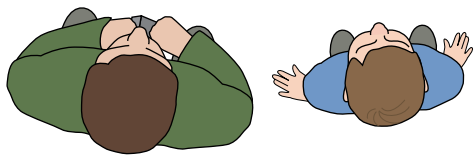
With the creation of this track plan, the *Classic Toy Trains* magazine staff set out to dispel most of the myths about designing and building an enjoyable train layout of any size. Regarding the size of the layout, we used a popular, compact layout dimension – 4 x 8 feet. Here we sought to prove that you can easily fit plenty of railroad and realistic scenery atop a single sheet of uncut plywood or foam insulation board.

Speaking of construction materials, we also thought it was important that the plan feature readily available materials and commercial products. If it wasn't likely



Cascade & Timber Trail Ry.

O scale (1:48)
Layout size: 4 x 8 feet
Scale of plan: ¾" = 1'-0"
Illustration by Kellie Jaeger



that you could find a particular item at your local hobby shop or home improvement center, we simply didn't include it in the plan. Additionally, these products needed to be safe and easy to use, without the need for expensive power tools.

Of all toy train products, perhaps the easiest to use is a train set that comes complete with reliable trains, track, and a transformer. That's why we elected to shape this plan around the Lionel no. 30021 Cascade Range Logging Train. Other train manufacturers, including Atlas, Bachmann, and MTH, offer comparable starter sets.

THE LAYOUT AT A GLANCE

Name: Cascade & Timber Trail Ry.
Scale: O (3-rail)
Size: 4 x 8 feet
Prototype: freelanced
Locale: Pacific Northwest
Era: steam-diesel transition
Style: tabletop
Mainline run: 20 feet
Minimum curve: O-36 (36" diameter)
Minimum turnout: O-36
Maximum grade: 4 percent
Benchwork: open-grid
Height: 40"
Roadbed: flexible foam
Track: Lionel FasTrack
Scenery: plaster cloth over extruded-foam insulation board
Control: Lionel CW-80

BENCHWORK

THE BASIC GOAL OF BUILDING a permanent layout is to move your track from a temporary position on the floor to a more secure, accessible, and comfortable location above it. Building wood framework (also called benchwork) is often the first choice for elevating a layout, as was ours. We used the same benchwork shown on page 10 of this magazine, but you can also use sawhorses or card tables to support a small layout. Other options for layout framework are detailed in the Kalmbach book, *Basic Model Railroad Benchwork, Second Edition* (12469).

1 FOAM LAYOUT SURFACE

After assembling the layout benchwork, you'll need a flat, sturdy, yet easily penetrated surface for trackwork and scenery. Although a 4 x 8-foot sheet of ½" plywood is a common choice, we elected to use 2" foam insulation board for our working surface. Despite appearances, handling this lightweight material does not require three magazine staffers!

2 FOAM BOARD OPTIONS

Various thicknesses of pink or blue foam insulation board are lightweight and fairly rigid, yet proved to be easy to cut and drill using hand or power tools. In addition to the foam board for our tabletop, we used factory-cut foam products from Woodland Scenics to help form our mountainous terrain and foundations for the layout structures.

3 INSTALL MDF FASCIA

On our Cascade & Timber Trail Ry. (C&TT), we installed a ½" x 6" medium-density fiberboard (MDF) border around the layout edges. This border (also called a fascia) keeps the foam in place, but you can also use foam-compatible adhesive to permanently attach the board. Additionally, the MDF border protects the soft foam edges from damage.

TRANSFER THE PLAN

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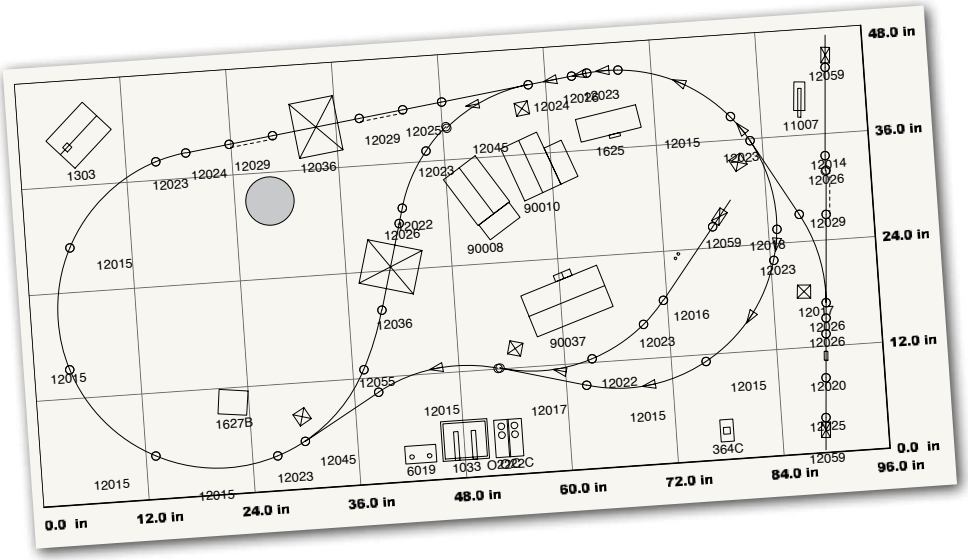


TEST-FIT

With the foam tabletop in place, you're ready to test-fit the track plan. At this point, many layout builders gather up and loosely assemble all the required track, switches, and accessories. Instead, we used our computer-generated track plan to perform a virtual test-fit of these layout components. By printing out a full-scale (1" equals 1") version of our plan, we could easily identify and modify issues regarding placement – without having all the layout components on hand.

TRAIN SET ORIGIN

A TRAIN SET has been a practical entry point into our hobby since the early 1900s. That's largely because these sets include the trains, track, and transformers required to get the action started quickly and easily.

Today, Atlas, Lionel, and MTH offer numerous 3-rail train sets with a wide variety of intriguing themes. However, a single Lionel set provided the ideal contents for developing the C&TT Ry.

Our Lionel no. 6-30021 Cascade Range O gauge logging-theme set include all of the toy train essentials, but it also featured three operating log dump cars that contribute to the action on the layout.

1 PLACE THE TEMPLATE

Place the first of multiple layout template pages in the upper left corner of the foam board. Using the printed grid lines to aid alignment, add subsequent pages by overlapping the right edge of a previously placed page. As you work (left to right) across an entire row, use cellophane tape to attach the pages to each other. Repeat the process, row by row, until all pages are in place.

2 TEST AND TWEAK

Once arranged on the foam board, the layout template reveals the precise placement of track and accessories. It was in this stage that we discovered that our initial plan didn't leave enough room to include a control panel. Based on other observations, we made a few changes in the track and structure placement to enhance operation.

3 TRANSFER THE PLAN

After updating the computer-generated track plan and removing the old template pages, we attached a revised template to the foam. Next, we used a pizza cutter to trace the plan onto the foam. Running the wheel along the track centerline marked a groove in the foam. Be sure to trace all track pieces and outline the structures before you remove the template.

FOAM ON FOAM

IN ADDITION TO RAISING YOUR TRACK and trains off the floor, a permanent layout provides a place to create a realistic setting for your railroad. Since the theme for our C&TT Ry. layout is a fictitious logging operation in the Pacific Northwest, our layout must include mountainous terrain. To help establish an appropriate terrain base, we used various Woodland Scenics SubTerrain system foam products, including ½" to 4" risers, 4 percent inclines and incline starters, and 8" x 24" profile boards.

MATERIALS LIST

Foam insulation board – you'll find 2" boards at home centers and lumberyards.

Foam packing peanuts – save and recycle these from shipped parcels or purchase them in bulk from a package delivery firm.

Woodland Scenics foam products – the essentials include ½" risers (2), ¾" risers (2), 1" risers (5), 4" risers (3), 4 percent inclines (1), 4 percent starters (4), profile boards (4), and plaster cloth (6). You might want to purchase extra foam materials and keep plenty of foam nails and foam tack glue handy.

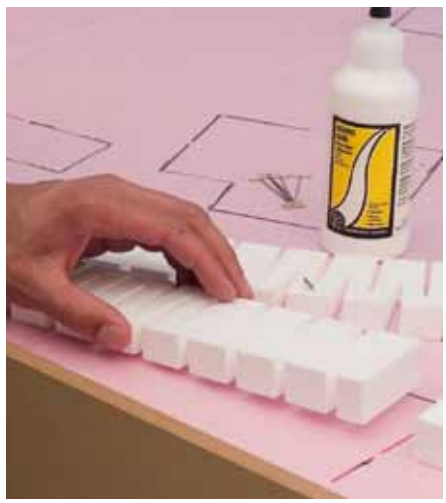
Tools – you'll need black and red markers; cellophane and masking tape; a pizza cutter; a yardstick and tape measure; a steak knife, electric knife, or hot wire cutter; and a small plastic storage bin.

1 TRACE TRACK CENTERLINE

With the template removed, use a black permanent marker to trace along the centerline groove in the foam. Next, measure 48" in from either end of the layout. Now use a red marker and long straight-edge to draw a line across the midpoint of the tabletop. To help form our mountainous, timber-filled terrain, we'll raise the track on one side of this line 1".

2 INSTALL FOAM RISERS

Begin installing 1", flexible foam risers (Woodland Scenics no. ST1407) at the midpoint of the tabletop. Use foam-compatible adhesive to attach risers along both sides of the track centerline. Continue adding these risers to raise the entire route on the mountainous half, but don't extend them beyond the red line you marked at the midpoint.



3 INSTALL FOAM INCLINES

Flexible foam inclines (Woodland Scenics no. ST1413) help transition the track from tabletop height to the 1" risers. For a gradual change, we added 4 percent grade (1" rise over a 24" run) inclines at the start and end points (on the opposite side of the red line) of the riser sections. Install the inclines in the same manner used to add risers.

4 INSTALL PROFILE BOARDS

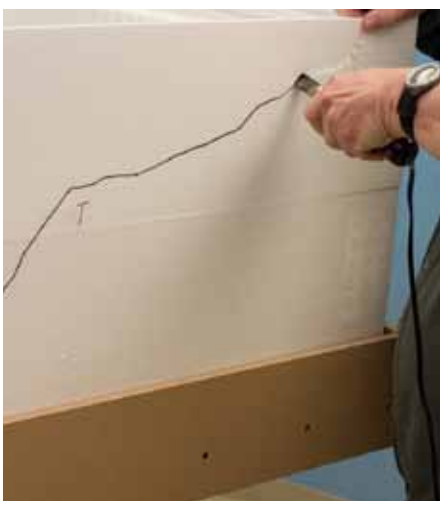
We used 8" x 24" foam profile boards (Woodland Scenics no. ST1419) to establish the perimeter and height of our mountain. First, interlock two boards at each corner of the mountainous area. Before gluing the boards to the tabletop, trim any parts that interfere with the risers. Finally, use connectors to attach a second row of profile boards.

5 ADDITIONAL ELEVATION

This is where we began transforming the flat tabletop into a three-dimensional mountain setting. We combined a variety of foam risers and inclines to raise roadways, structures, accessories, and other scenic areas various heights above the tabletop. Our goal was to simply rough in the elevations and work to refine and contour the terrain later.

6 CARVE CONTROL PANEL

Our modifications to the original track plan resulted in more space for a layout control panel. After outlining the panel area on the tabletop, we cut the foam from this area using a steak knife. You can also use an electric or hot wire knife to carve thick foam. We were left with a recessed, flat, and sturdy surface that's ideal for keeping controls out of the way.



7 TRIM PROFILE BOARDS

After determining the highest elevation for our mountain, we inserted foam nails through the 16" high profile boards to mark the critical heights (track, tunnel, and portal). With the nails to guide us, we sketched out a rough slope and then used a hot knife to contour the boards. We repeated the process to trim the boards on the opposite side of the layout.

8 BACKFILL WITH FOAM

To give our terrain a natural-looking contour, we mounded foam packing peanuts in low spots and other voids. After shaping the mounds to our satisfaction, we used strips of masking tape to hold the peanuts in place. As an alternative to foam peanuts, you can use newspaper wads or expanding polyurethane foam.

9 PLASTER OVER TERRAIN

After shaping the terrain to our satisfaction, we covered the mounds and elevated areas with overlapping, 6" wide strips of wet plaster cloth (Woodland Scenics no. C1203). There's no need to cover entire areas that will be hidden within tunnels, beneath structures, or under track, but be sure to transition between covered and uncovered areas.

TRACK AND WIRING

ALTHOUGH LIONEL FASTRACK FEATURES hard plastic roadbed, we installed Woodland Scenics no. ST1476 Track-Bed under all our sections, including switches. This flexible, soft foam material quiets track noise and smoothes irregularities along the risers. Once the roadbed is in place, use the track plan to identify each required track section. Assemble the sections on a flat surface and firmly push them together.

MATERIALS LIST

Roadbed – the essentials from Woodland Scenics (woodlandscenics.com) include no. ST1476 Track-Bed roll (2); no. ST1444 foam tack glue; and no. ST1432 foam nails. Also purchase no. 4 x 1" Phillips flat head screws (100).

Wiring – key items come from Atlas, including a no. 6927 heavy-duty connector; no. 6940 16-gauge layout wire (black); no. 6941 16-gauge layout wire (red); and no. 201 spade connectors. You'll also want to purchase RadioShack (radioshack.com) nos. 274-658 and 274-670 dual-row terminal blocks; a no. 274-650 8-position jumper (2); along with no. 364-3035 spade connectors.

Miscellaneous – the list includes Krylon H2O no. 2611 Gulf Gray latex spray paint and paintable latex caulk.

Tools – you'll need markers; a Phillips-head screwdriver; a hobby knife; a drill; wire cutters/strippers; a wire crimping tool; and needlenose pliers.

1 PREPARE THE ROADBED

To prepare the roll of Woodland Scenics no. ST1476 roadbed for installation, we separated the flexible foam material at the center seam. Although it isn't necessary to split the roadbed when adding it under straight track sections, doing so makes it easier to install the roadbed under curved track and switches.

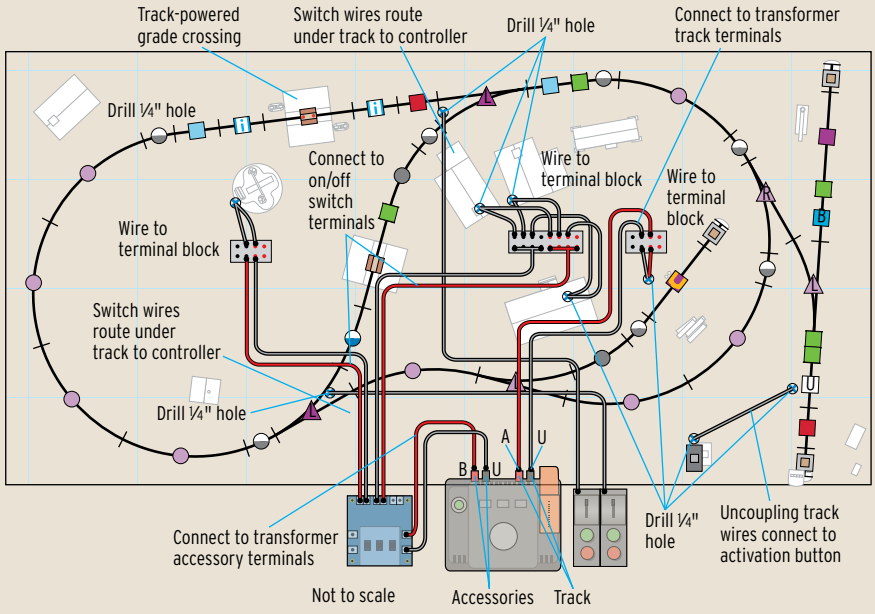
2 GLUE AND TACK ROADBED

After marking the track centerline, we spread a layer of Woodland Scenics no. ST1444 glue along one side of the line. We installed a three-foot length of the separated roadbed by aligning it along the line. Pins held the foam in place while we repeated this process to add a piece along the opposite side of the line.

3 UNDER SWITCHES

Install roadbed under track switches (also called turnouts) by first laying pieces on the outside of the straight and diverging routes. Next, install pieces on the inside of the straight and diverging routes. The resulting gap will be hidden under the track switch, plus it provides an ideal place to route wires connecting to the switch controller.

ASSEMBLE TRACK AND INSTALL WIRING



LIONEL FASTRACK COMPONENTS

Quantity Description/Number

5	1.75" straight (12026)
2	4.5" straight (12025)
2	5" straight (12024)
1	10" straight (12014)
7	0-36 curve, 11.25-degree (12023)
2	0-36 curve, 22.5-degree (12022)
8	0-36 curve, 45-degree (12015)
1	0-72 curve, 11.25-degree (12055)
2	0-36 manual left-hand turnout (12017)
1	0-36 manual right-hand turnout (12018)
2	0-36 remote left-hand turnout (12045)
1	5" uncoupler (12020)
2	5" isolator (12029)
1	5" block section (12060)
1	10" terminal straight (12016)
1	grade crossing (12036)
1	grade crossing with flashers (12062)
3	track bumper (12059)

TO DEVELOP THE WIRING SCHEME for our C&TT Ry., we referenced published magazine articles and Kalmbach books such as *Wiring Your Toy Train Layout, Second Edition* (10-8405). While the resulting wiring scheme is relatively simple, we also made it easy to install by using several handy electrical parts, products, and tools.

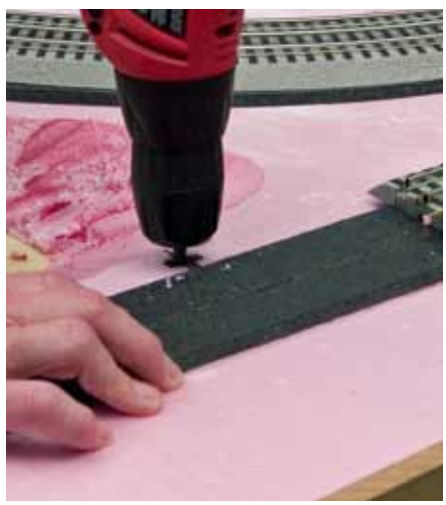
Some of the most useful products include Atlas O heavy-duty connectors, Atlas 16-gauge layout wire, Atlas spade connectors, and RadioShack terminal blocks and jumpers. When used together these products eliminate the need to solder connections on the layout. Even better, these connections can be disconnected should you want to make changes.

4 TRACK ASSEMBLY

First, we identified each track section in the plan. Then, starting in a corner of the layout, we laid two straight sections on a flat surface and pushed them firmly together. Curved sections and track switches fit together the same way to form a complete loop of track around the entire layout.

5 INSTALL UNCOUPLING SECTION

We marked the location for drilling a hole to be used to route wires between the track and activation button. After separating the Lionel no. 12020 FasTrack uncoupling track from the rest of the layout, we used needlenose pliers to disconnect the two wires attached to the underside of the section.



6 DRILL HOLES FOR WIRES

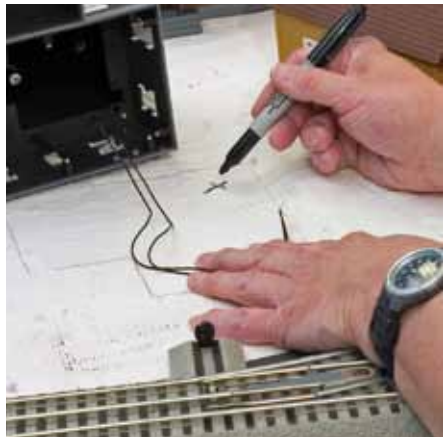
Next we used a power drill to make a ¼" hole through the foam at the location marked adjacent to the track and in the recessed control panel area. We routed the wires down the hole in the control panel and back up through the hole drilled adjacent to the uncoupling track section.

7 REASSEMBLE TRACK

After reattaching the wires, we reconnected the track and secured it to the layout using no. 4 x 1" Phillips flathead screws. We used the same technique to install wires from the Lionel no. 12016 FasTrack terminal straight track section located along the logging camp spur.

8 INSTALL TRACK SWITCHES

With one exception, we installed the Lionel no. 12045 FasTrack remote-control track switches using the technique described above. Here, we routed the wires up through a hole we drilled directly under the switch. Be sure to mark the proper terminal connections on the switches before disconnecting the wires.

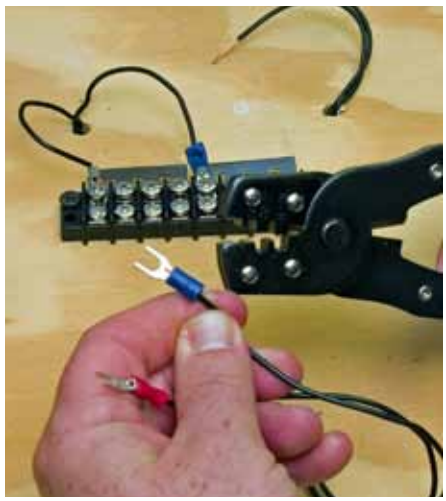


9 WIRE STRUCTURES

We marked the perimeter of each illuminated structure before removing it to drill ¼" holes for the wires. The wires attached to these structures are very thin, so use care when routing them down through the hole. Attaching the wires to a hook end of a straightened wire hanger makes this process easier.

10 WIRE ACCESSORIES

Like the illuminated structures, the wires for the Lionel no. 34192 operating lumberjacks accessory are hidden under the plastic base. At this elevated location, we needed a ¼" drill bit with at least a 5" long shaft to bore a hole through the plaster-covered, stacked foam risers and foam base.



11 WIRES TO TERMINALS

Under the layout, we attached spade connectors to the stripped ends of the structure wires. Then we secured the connectors to a terminal block and routed two 16-gauge wires to the control panel. We repeated this step to wire the lumberjack accessory and again to wire the terminal track section.

12 ASSEMBLE CONTROL PANEL

First, we drilled a hole large enough to accommodate the track switch, accessory, structure, and terminal track wires. After installing the set transformer and heavy-duty connector (on/off switch), we added spade connectors to the stripped ends of the wires and connected them to the appropriate terminals.

MAKE A MOUNTAIN

AFTER INSTALLING THE LIONEL FASTRACK and testing a few trains through the tunnel walls erected in the first phase of construction, we started to build up the mountainside scenery. Our first step was to add a top to the tunnel using Woodland Scenics no. ST1423 1/2" foam sheets. When trimmed to fit the area defined by the profile boards, they provided the level surface needed to install Woodland Scenics nos. ST1406 1/2" risers and ST1411 incline sets.

TUNNEL ENTRANCES

AS IN REAL LIFE, tunnels on a layout add to the drama of mountain railroading. The trains on our C&TT Ry. enter and leave the curved tunnel through a pair of portals. In keeping with the logging theme of the layout, we installed no. FL6195 timber frame portals from Scenic Express. Like many other products used to build the mountain, these portals are made of dense foam that's easily trimmed with a hobby knife.

To help integrate these tunnel entrances into the terrain, we used hot glue to secure nos. FL6110 (low) and FL6111 (high) timber retaining walls at the outer edges of the portals. After installing these components, we applied additional foam materials to blend the tunnel entrance into the scene.

1 INSTALL TUNNEL TOP

We began by loosely placing two Woodland Scenics no. ST1423 foam sheets over the tunnel area we wanted covered. Next, we used a marker to trace the outline of the curved tunnel walls on the underside of the sheets. Upon removing the sheets, we used a hobby knife to cut them along the line. We secured the cut sheets to the risers and profile boards using foam tack glue.

2 ADD RISERS AND INCLINES

Here we used hot glue to install additional Woodland Scenics no. ST1413 incline starters that continue the Timber Trail up the mountain. At the upper end of the trail, we installed Woodland Scenics no. ST1406 1/2" risers to raise the cabin to the height of the trail. We also added Woodland Scenics no. ST1411 incline sections to create the sloping terrain along the back profile board.

3 MASK THE MOUNTAIN

With the rough scenery forms in place, we created a natural contour to the mountain by adding foam packing peanuts held in place by a lattice of masking tape. We also protected the rails of the track by covering them with blue painter's tape. Lastly, we blanketed the entire area with wet strips of Woodland Scenics no. C1203 plaster cloth and then allowed the scene to dry thoroughly.

BLAZE A TRAIL

JUDGING BY THE STEEP INCLINE of Timber Trail, viewers can tell that it's one rough road to traverse! But to make matters more treacherous for hardworking trucks, we wanted to give the trail a muddy and rut-filled texture that would make each trip an adventure. Although a road made by painting plaster brown will do, we opted to use lightweight spackle that could be molded with ruts and potholes as it cured.

MAKE ROOM FOR ROADS

MANY TRAIN COLLECTORS and layout builders claim die-cast car and truck collecting as their second favorite hobby. We tend to agree, especially considering how much the selection, detail, and cost of O scale (1:43 to 1:53) vehicles have improved in recent years. That's one of the reasons we decided to cover a fair portion of the layout with roads we can use to showcase well-detailed equipment common to the logging industry. SpecCast's nos. 38000 White WC22 cab with lowboy trailer and ZJD1575 International TD-24 forestry crawler are two great examples of work vehicles suitable for use along the Timber Trail.

1 ADD SPACKLE

After allowing the plaster to dry, we began covering the Timber Trail with Red Devil no. 0544 lightweight spackle. Starting at the upper end of the trail, we used a 3" wide putty knife to apply a 1/4" thick covering of spackle to the entire length of the road. Following this application, we used a clean knife to smooth the spackle in a manner comparable to frosting a cake.

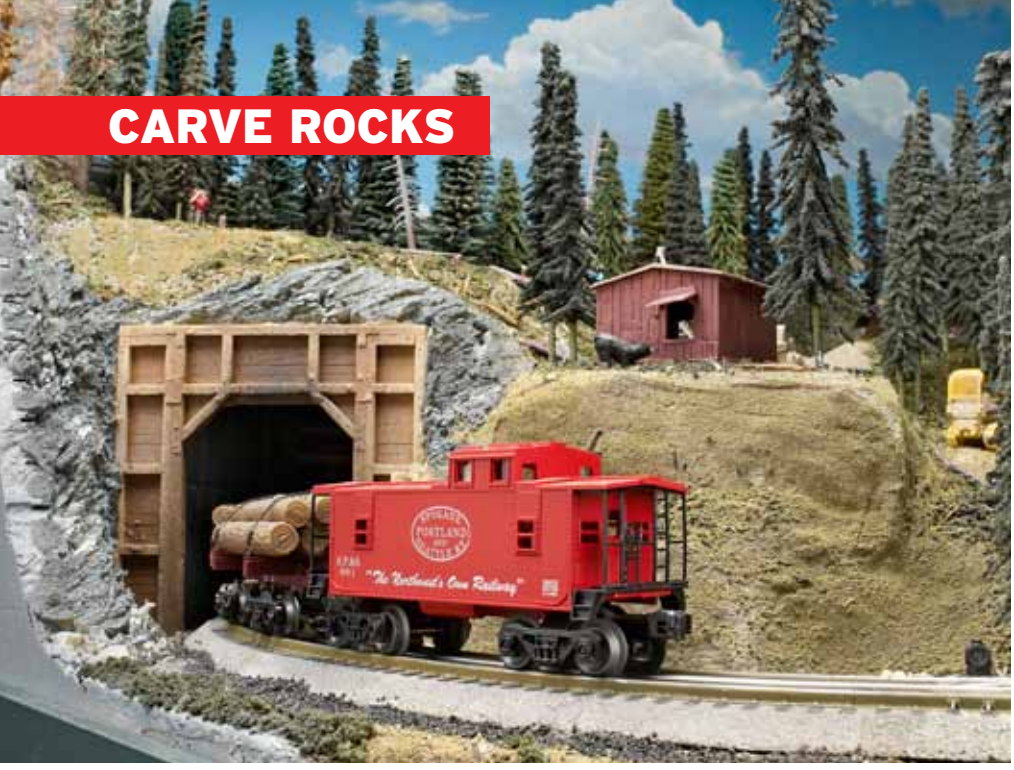
2 TEXTURE THE SURFACE

Within 20 minutes of application, the spackle will begin to set. At this point, we used a clean, damp sponge to add a coarse texture to the road surface. We started at the upper end of the trail and used a light touch to drag the sponge down the length of the road. Repeat this process using a heavier touch to produce ruts and potholes characteristic of a well-worn mountain road.

3 APPLY MUD COLORING

We allowed the spackle to harden completely before using fine-grit sandpaper on the textured road surface. Next, we used a vacuum to clean the road and surrounding area of loose debris. Finally, to give the trail its muddy coloring, we used Krylon H2O no. 2613 Panama Canal Beige latex spray paint to cover the road and adjacent areas. Never use solvent-based paint on foam.

CARVE ROCKS



ONE OF THE EASIEST WAYS to portray rugged terrain is to include a mountain face with exposed rock. There are several locations suitable for adding a rocky area to the Cascade & Timber Trail Ry., but we decided to highlight the two tunnel entrances by simulating rocks exposed after the railway blasted a route through the mountain. To form the rocks along this location, we used a household insulation product, a steak knife, and two shades of gray latex spray paint.

ROCKS FROM A SPRAY CAN

IT'S HARD TO IMAGINE that anyone at Dow Chemical would've anticipated using Great Stuff foam sealant to make model railroad scenery. Nevertheless, the product nicely fills gaps and cracks in layout scenery, too.

When dispensed from its spray can, the foam sealant has characteristics similar to shaving cream. Unlike shaving cream, it sticks to nearly everything it touches and shouldn't contact exposed skin.

Shortly after the foam is dispensed, it expands to approximately double its initial volume. When allowed to cure, the hardened foam can be carved with a knife and painted with a foam-compatible paint, such as Krylon H20 no. 2611 Gulf Gray latex spray paint or Rust-Oleum Aqua no. 223637 Gray Primer, to make intricate rock faces.

1 DISPENSE FOAM SEALANT

We first used Great Stuff foam sealant to fill gaps in the scenery, specifically those along the tunnel portals and retaining walls. Here we applied a minimal amount of foam to keep the walls from shifting under the pressure of the expanding material. After gauging the expansion, we applied sealant to areas surrounding the tunnel openings and let the material cure.

2 CARVE HARDENED FOAM

After determining the foam had cured completely, we used the sharp tip of a steak knife to lightly chisel away portions of the material. Our natural-looking rock strata is the result of making numerous, angled cuts into the foam. Once satisfied with the appearance of the rough cuts, we used a wire brush to scratch additional texture onto the rock face.

3 PAINTED ROCKS

Using a shop vac, we cleared the mountain and tunnel of any foam debris. Next, we prepared the area for painting by masking the adjacent track, timber portals, and retaining walls with blue painter's tape. To enhance the illusion of depth and detail, we first painted the rock face with dark gray latex spray paint, followed by light gray latex primer.

FILL THE FOREST FLOOR

WATCH CHAPTER 6 AT
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STRUCTURES AS SCENERY

DON'T FORGET that structures may require modifications to blend them into a realistic setting. On the C&TT Ry., we used Bachmann's Plasticville USA no. 45983 hobo jungle set, which includes structures made from plastic with a glossy sheen.

By applying a few light brushstrokes of Tamiya no. XF-52 Flat Earth paint to the roof and sides, we were able to give this structure a more appropriate aged appearance.

THERE WAS ONCE A TIME when layout scenery was limited by the availability of a scant few offerings. Today, numerous manufacturers provide a broad variety of realistic products for nearly every toy train setting imaginable, including the deep woods of the C&TT Ry. Some of the most useful scenery products for our project layout included Scenic Express nos. EX896C dead fall forest debris and EX887C swampy bog blend; Bachmann no. 32203 Scenescapes conifer trees; and Woodland Scenics no. TR1125 tree armatures (pine).

1 PAINTED SCENERY

Our scenery began by using a foam brush to apply brown latex paint to any bare area. We started along the control panel and restricted our work to a single 2 x 2-foot section at a time. Before the paint had dried, we poured enough Woodland Scenics no. B1390 cinders to cover the caulked edges of the track. We repeated this process over the entire layout.

2 APPLY DILUTED GLUE

We added an authentic forest floor texture to the C&TT Ry. using ground foam. After the paint had dried, we used a foam brush to apply diluted white glue (mix 1/2 ounce of water to 1 cup of glue) to a 2 x 2-foot area that would include trees. During this process, we kept a rag handy to clear the glue away from roads and locations for structures.

3 PILE ON THE COVERING

In one step, we created a realistic forest floor by sprinkling a handful of Scenic Express Flock & Turf no. EX896C dead fall forest debris over the glue-covered area. This blend of debris includes ground foam scenery and natural materials that you'd expect to see on a forest floor. In areas without trees, we applied Scenic Express Flock & Turf no. EX887C swampy bog blend instead.

4 ADD AN EXTRA HELPING

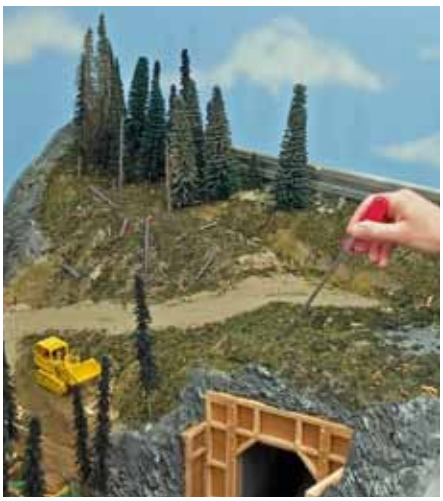
After seeing the results of adding dead fall forest debris and swampy bog blend, we decided that all the other areas of the layout would look better with more texture added to the base coat of brown paint. We applied blends of Woodland Scenics ground covering and ballast, along with natural materials, including real dirt, rocks, and twigs.

5 BLEND THE TEXTURES

We knew that glue alone wouldn't hold all the texture in place. Our effort to secure the texture to the layout required a two-step process that began by spraying a mist of isopropyl alcohol over the scenery. This mist of alcohol acts as a wetting agent that breaks the surface tension and makes the following step much more effective.

6 CEMENT THE SCENERY

While the scenery was still damp from the alcohol, we used a bottle with a small opening to drizzle Woodland Scenics no. S191 scenic cement over the scenery area. In areas where the cement rested on top of the scenery, we reapplied a mist of alcohol to break the surface tension. Allow the wet scene to dry before attempting to reapply cement.



7 A CONCENTRATED FOREST

The key element of the C&TT Ry. is its seemingly dense forest. We could've used scores of commercial trees to create this effect. Instead, we arranged our trees by size and shape to give viewers the impression that the forest gets thicker and taller as the Timber Trail ascends the mountain. To test our plan, we first used a screwdriver blade and an awl to bore holes into the scenery.

8 TEMPORARY TREES

While good-looking trees are becoming more economical, the cost of populating a forest can add up quickly. With that in mind, we tested our forestation plan by first installing various sizes of drinking straws and stir sticks to represent trees. Once we were satisfied with the arrangement of our forest, we counted the straws and ordered the appropriate number of trees.

9 TREES APLENTY

Bachmann Scenescapes no. 32203 conifer trees filled most of the forest, but we also used other bulky trees to disguise open areas. In addition to these mature trees, we painted and trimmed tree armatures to represent dead timber. We installed each tree by dropping a bead of foam tack glue into the bored holes. Lastly, we used binder clips to hold the trees until the glue set. MR

SCENERY SUPPORT

Get started building landforms with these tried-and-true methods

BY CODY GRIVNO AND JIM KELLY

ONCE THE TRACK is laid and wired and the trains are running, the next step is to add scenery. This may sound like a daunting task, but it's easier than ever thanks to the quality scenery products now available. You can get the supplies you need at any well-stocked hobby shop.

Though there are many different techniques for building scenery support systems, we'll look at three common approaches. Each has its advantages and disadvantages, but they all work well.

FOAM BOARD METHOD. The first approach is using extruded-foam insulation board, shown in **fig. 1**. This is the same stuff used to insulate homes. You will find it commonly in pink or blue, but the color doesn't matter. For scenery projects, 1"- and 2"-thick sheets work the best. Just cut the foam to the size you need and stack it into layers. The base layer will be supported by the benchwork. The foam can be bonded with Liquid Nails for Projects or any latex (foam-safe) caulk.

At this point, the foam will look like a wedding cake. To give the foam realistic contours, shape it with a serrated knife, Surform rasp, or hot-wire tool (a wire that's electrically heated to slice through foam). No matter which option you choose, make sure the room is adequately ventilated, and if you're sanding the foam, wear appropriate safety gear.

The advantages of foam are that it's easy to shape, it's lightweight and durable (good for portable layouts and modules), and no wood "skeleton" of landscape contours is needed.

On the downside, foam is slow to work with, especially you're building a large model railroad. Foam sheets are also expensive and difficult to find in warmer climates. The foam can also be messy, especially if you sand it or use a Surform tool.

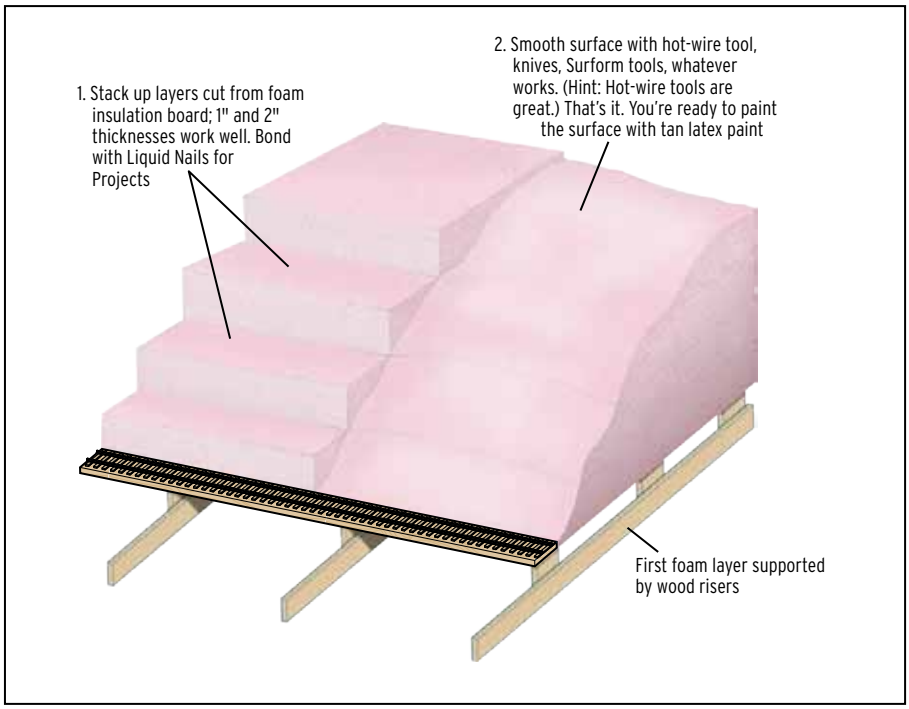


FIG. 1 FOAM BOARD METHOD. Extruded-foam insulation board can be easily cut and shaped to achieve the contour you want. Any cutting or sanding should be done in a well-ventilated area. Illustrations by Kellie Jaeger

CARDBOARD STRIPS. The second approach uses cardboard strips, as seen in **fig. 2**. Micro-Mark sells pre-cut strips, or you can cut your own from cardboard boxes. It's important to cut the strips across the corrugations. You can increase the flexibility of the cardboard by bending it while pulling the strip across the edge of a hard surface.

Start by using hot glue to attach 1" strips of corrugated cardboard to the subroadbed and benchwork. After the glue has set, weave in horizontal strips and staple or hot glue where the strips cross. Stapling is a quicker approach, but requires a pliers-type stapler.

Once the cardboard web is complete, cover the surface with hand-sized paper towels dipped in soupy plaster (messy) or plaster-impregnated gauze strips (neater). You can purchase the gauze, similar to that used by doctors for making casts, at most hobby shops.

Let the plaster dry thoroughly (at least 24 hours, or until there are no cold, damp spots). Then apply a finish coat of plaster (messy) or Sculptamold (neater) with a putty knife. The latter is a papier-mache-like material that's sold in hobby and craft shops. With the finish coat still wet, smooth the surface with a paintbrush soaked in water.

The advantages of the cardboard strip method are that it's inexpensive, fast, lightweight, and easy to modify. The drawbacks are that you need a finish coat

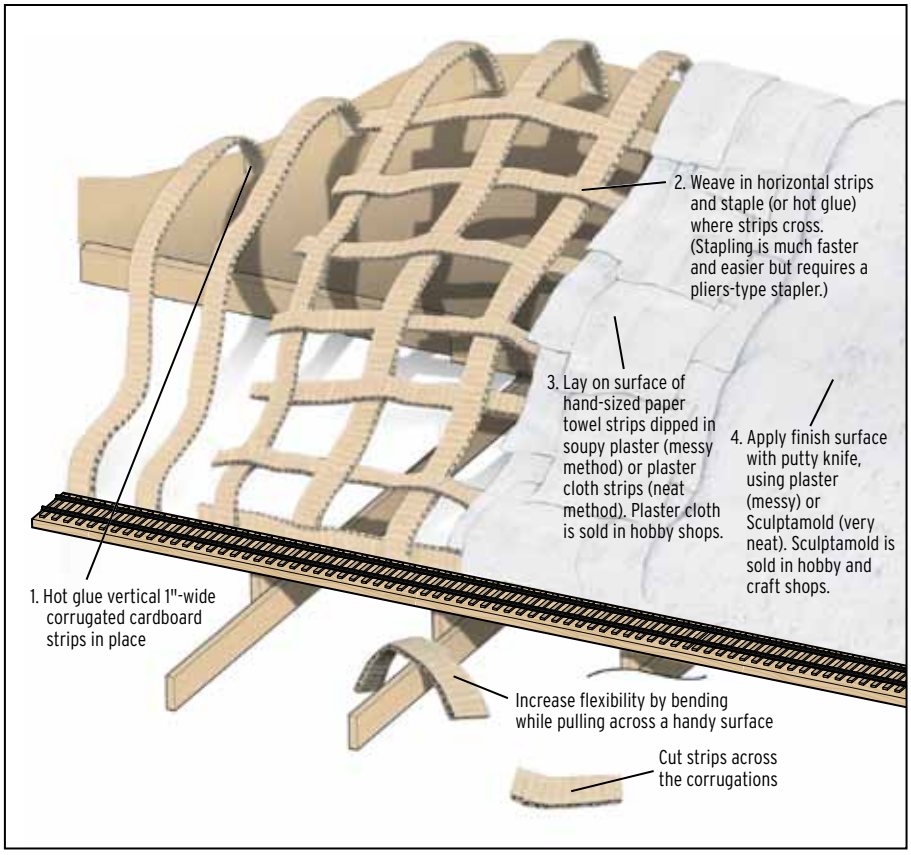


FIG. 2 CARDBOARD STRIP METHOD. A web of 1"-wide cardboard strips provides a strong scenery support system. You can buy pre-cut strips or cut your own from a cardboard boxes. The photo below shows how it looks on a layout.

FIG. 3 POPCORN SCENERY. Foam packing peanuts make a quick scenery base. The tape holds the peanuts in place when the plaster-impregnated gauze strips are added. Kent Johnson photo

to hide the outline of the strips and you may need to modify the cardboard web to obtain the final shape you desire. Unless you use plaster cloth and Sculptamold this technique can also be messy.

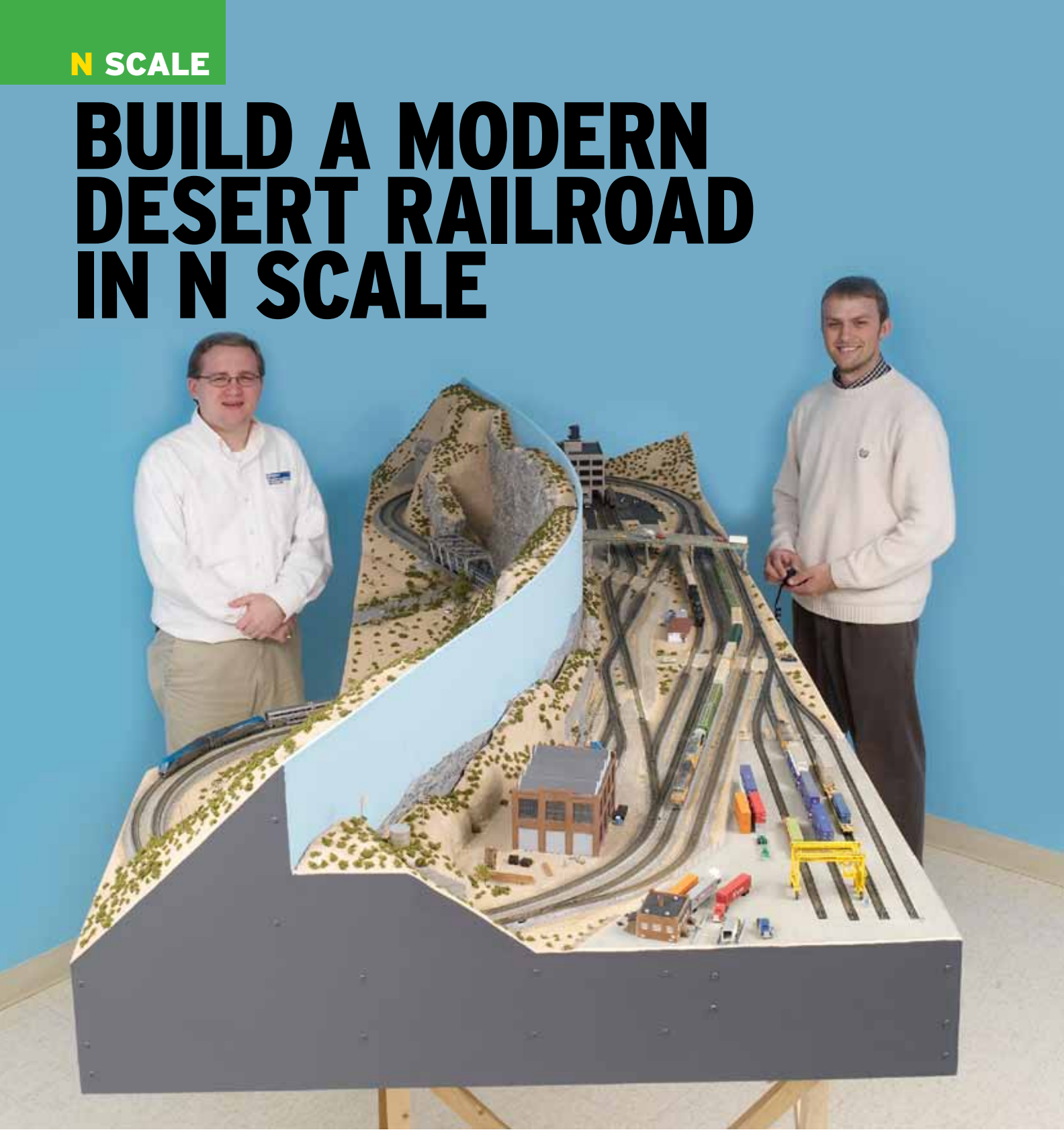
POPCORN SCENERY is the third approach, and is shown in **fig. 3**. Start by spreading foam packing peanuts into the shape of a hill. Once you achieve the look you're after, apply a web of masking tape over packing peanuts to hold them in place. Then cover the peanuts with plaster-impregnated gauze strips and let the plaster dry. Apply a finish coat of plaster or Sculptamold to hide the seams.

Popcorn scenery has many of the same advantages as cardboard strips. The drawback is that the foam peanuts can be a bit unwieldy. The masking tape helps contain the peanuts, but you may have to do a bit of final shaping while the gauze strips are still wet.

The key thing to remember with scenery is that it isn't permanent. If you try one of these techniques and don't like it, just tear the scenery out and try again. Many veteran modelers have done that more than once. Sure, you're out a few dollars in materials, but you've gained valuable modeling experience. MR

This hillside was built using the cardboard strip method. After the plaster-impregnated gauze strips had cured, the Hydrocal rock castings were attached with latex caulk. The gaps around the rock castings can be filled with more Hydrocal plaster or Sculptamold, a papier-mache-like product. Jim Forbes photo

BUILD A MODERN DESERT RAILROAD IN N SCALE



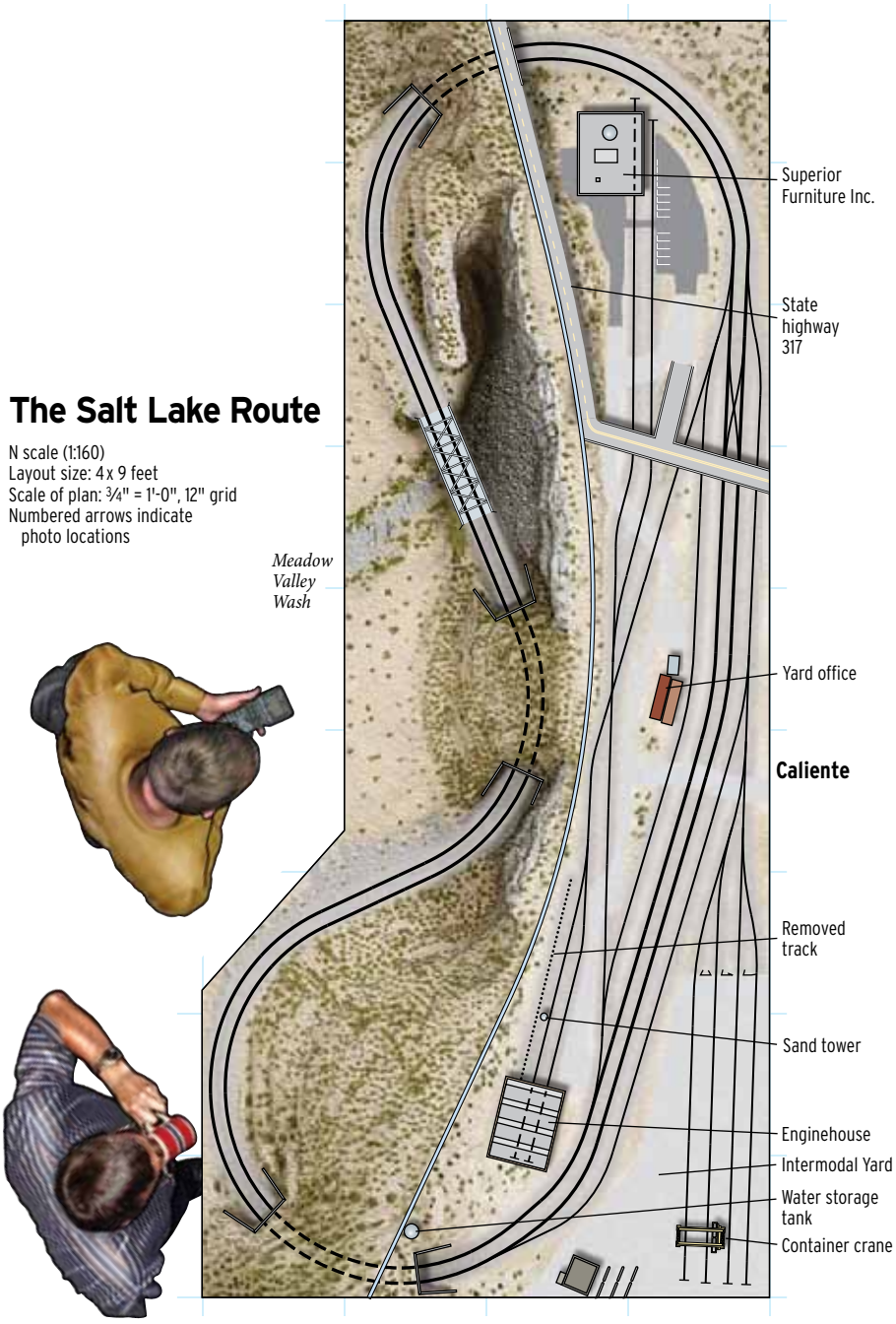
Associate editor Cody Grivno (left) and graphic designer Drew Halverson stand next to the N scale Salt Lake Route. This model railroad depicts modern railroading in the American west. Bill Zuback photo

This 4 x 9-foot N scale layout features modern railroading in Nevada

BY DICK CHRISTIANSON
PHOTOS BY THE AUTHOR UNLESS NOTED

The Salt Lake Route

N scale (1:160)
Layout size: 4 x 9 feet
Scale of plan: ¾" = 1'-0", 12" grid
Numbered arrows indicate photo locations



IF YOU'RE LOOKING FOR a compact layout that features modern railroading in the American West, the N scale Salt Lake Route is right up your alley. The 4 x 9 foot model railroad re-creates the Union Pacific in Nevada and features a mix of desert and industrial scenery. In addition, the layout uses Kato's Unitrack with superelevated curves and Noch foam rocks, both of which speed up the construction process.

The inspiration for the desert scenery came from two photos in Mark Hemphill's book *Union Pacific Salt Lake Route* (Boston Mills Press, 1995). One photo showed a train passing over silver steel truss bridges that spanned a small stream known as Meadow Valley Wash. The other image showed a UP train emerging from a tunnel in a landscape dominated by sand, rock, and bushes.

On the opposite side of the backdrop is Caliente, Nev. Though real in name, the track plan and industries were designed to fit the space. The intermodal yard provides a location for containers to be loaded and unloaded from well cars. The furniture factory receives inbound lumber and ships finished goods.

If you enjoy watching trains run through eye-catching scenery while still having the ability to do some switching, take a look at the Salt Lake Route. This layout provides the best of both worlds.

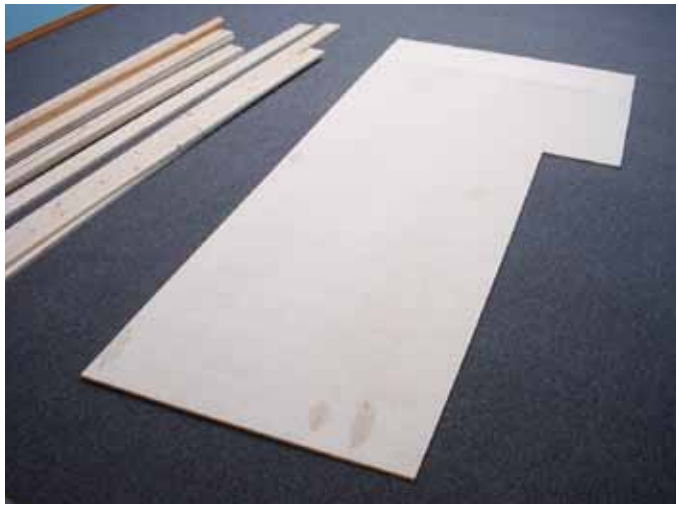
MATERIALS LIST

Kato Unitrack
20-000 9¾" straight (22)
20-010 7⁵⁄₁₆" straight (13)
20-020 4⅞" straight (7)
20-030 2½" straight (6)
20-041 2⁷⁄₁₆" straight feeder (7)*
20-048 2" straight with bumping post (6)
20-050 3"-4¼" expansion section (16)
20-101 9¾"-radius curve (4)
20-110 11"-radius curve (1)
20-111 11"-radius curve (2)
20-121 12⅜"-radius curve (1)
20-140 15"-radius curve (2)
20-150 28¼"-radius curve (4)
20-160 19"-radius curve (5)
20-202 no. 6 left-hand turnout (6)
20-203 no. 6 right-hand turnout (6)
20-210 12¾" double crossover
20-300 15-degree crossing
20-437 double-track bridge, silver
20-8701 V11 track set
20-004 (2), 20-023 (1), 20-042 (1), 20-043 (1), 20-181 (7), 20-182R (3), 20-182L (3)

*Dick used seven of these short feeder sections. In seven other instances, he used Kato factory-wired terminal joiners as feeders. The other two feeders were in section 20-043 from the V11 track set. Read more about this on page 54.

THE LAYOUT AT A GLANCE

Name: The Salt Lake Route
Scale: N (1:160)
Size: 4 x 9 feet
Prototype: Union Pacific
Locale: Meadow Valley Wash in southern Nevada
Era: present day
Style: island
Mainline run: 15 feet
Minimum radius: 10"
Minimum turnout: no. 6
Maximum grade: level
Benchwork: L-girder
Height: 50"
Roadbed: molded styrene on cork
Track: Kato Unitrack
Scenery: Sculptamold over extruded-foam insulation board
Backdrop: ⅛" tempered hardboard
Control: Digitrax Digital Command Control



Dick cut a 12" x 69" strip out of the length of the plywood, trimmed it to 48", turned it 90 degrees, and put it at the far end to make a tabletop 9 feet long by 4 feet wide.

Dick and his friend, Stener Harildstad, cut the joists to fit the curve of the layout on the wash side. The joists at the near end are 3 feet long; at the far end they're 4 feet. The fourth one in from the end is about 42".

Where the additional 12" of plywood was added to the end of the layout, another joist was needed for support. It's the same length as its mate, and Dick and Stener secured it with glue and screws to the L girder.

Meadow Valley Creek runs out from between a pair of canyon walls, flows beneath a bridge, and then spreads out into a wide wash. Stener marked this on the plywood and then cut it out, saving the cut piece for the floor of the wash.

I STARTED OUT WITH A BOX of Kato's new N scale superelevated track, set V11, on a piece of 4 x 8 plywood on the floor. The basic curve diameter of the outside track (to the outside edge of the molded ballast) is approximately 3 feet. That left almost a foot of unused plywood along most of one side. It occurred to me that I might be able to cut off at least a foot of that edge and add it to the other end, extending the layout to 9 feet in length.

Unable to wait for legs and L girders and all other preliminary materials, I took one of Kato's three-unit articulated well cars out of its box and put it on the track. In my mind's eye was beginning to see Meadow Valley Wash come alive in N scale.

What came next is definitely not a recommended practice. Without a detailed track plan, I took a leap of faith and declared the impromptu plan "good enough."

What? Only half the plan is done! The easy half! Are you crazy?

Maybe, but I figured there had to be – at least I hoped there would be – a way to fit an intermodal yard, passing sidings, industrial spurs, and locomotive service tracks on the other side. Talk about a leap of faith!

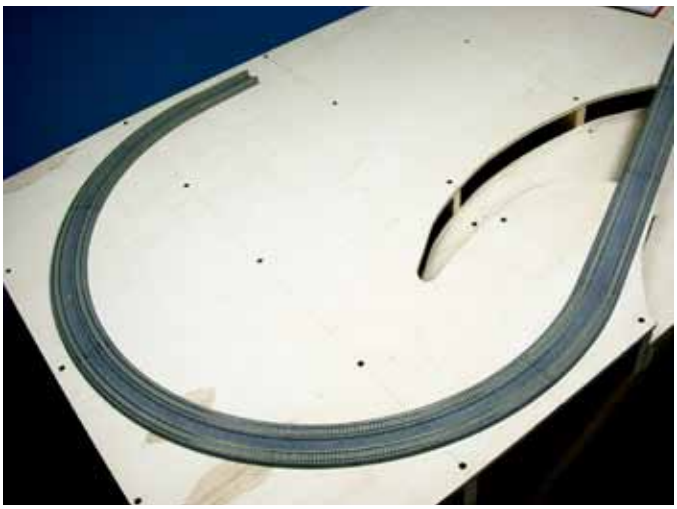
MY FRIEND FROM NORWAY, Stener Harildstad, and I spent a lot of time building benchwork. And I'm very grateful to have had his help. Not only were his talents and ideas helpful, it's just good to have companionship while you're working.

Our first step was to position the Meadow Valley Wash track on the 3/8" plywood, using that to figure out where to cut the 12" length of plywood – 5'-9" gave us enough room for the final curve. When we turned that cut-off plywood 90 degrees, placed it at the wide end of the layout, and cut it off at 4 feet, we had 21" of plywood left over (part of which I used later for the 7" x 11" control panel drawer). Now it was time to focus on the benchwork.

L-GIRDER BENCHWORK is ideal for railroads with grades. There are no grades

After marking the edge of the creek bed and wash on the joists, Stener measured down 2" and then used a saber saw to cut the joists. These slimmer, cut-down joists support the base for the plywood creek.

Here the grade-level plywood has been removed and the wash bed plywood put in place. A few additional supports were needed to keep the plywood from sagging between joists.



Dick and Stener used a pencil to mark the location of the joists, applied glue to the tops of the joists, and then drove drywall screws through the plywood into the joists. The joists were now tied together by the girders and plywood.

Dick and Stener used glue and screws to attach vertical 7" lengths of 1 x 2 to the side of the joists to support the layout's tempered hardboard fascia. They secured the fascia with screws.

on this layout, and only Meadow Valley Wash would be below grade. However, one of the other advantages of L-girder benchwork is that it provides plenty of strength using a minimum amount of wood. One of my requirements was that the layout needed to be portable, and anything I could do to keep the weight down would be a good thing.

Step one is to build two L girders. We used 10-foot lengths of 1 x 4, with a 10-foot 1 x 2 for the flange. [A 1 x 3 is even better for a flange. – *Ed.*] We glued and nailed the two girders, rather than screwing them together.

With the girders assembled, we cut the joists and screwed them into the girder flanges. The 1 x 4s are the width of the plywood to which they'll be attached. We doubled the joist under the plywood splice at the wide end so that both edges would have a firm support.

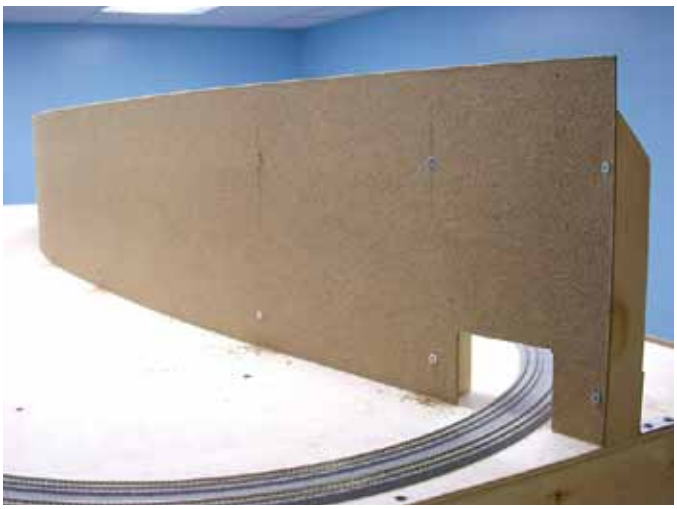
WITH THE PLYWOOD SHEET resting on the joists, Stener and I marked on the plywood where the track would be, where the wash at the end of the canyon would be, and where the creek would disappear between the canyon walls. Then we used a saber saw to cut out the base for the creek. Next, Stener measured down 2" from the tops of each of the appropriate joists and cut them with a saber saw. After adding a couple of supports here and there, we placed the plywood creek on the now-slimmer joists.

With the plywood in place, we drew pencil lines across the plywood directly over each joist. We then drove 1" drywall screws through the plywood into the joists.

FASCIA, THE FLAT EDGE TRIM attached to the side of most model railroads, is a beautiful thing. In addition to providing a place to attach bill boxes, town names, cup holders, and plug panels for walkaround control, fascia finishes a layout. The fascia has to be firmly mounted. Stener and I cut 7" lengths of 1 x 2 and screwed them into the sides of each of the joists. The fascia itself is ⅛"-thick tempered hardboard. We cut three 8¼"-wide lengths 8 feet long for

Here's the layout with the hardboard fascia attached to the sides. The ends will come later once the scenery contour has been determined. It's amazing how adding the fascia gives the layout a finished look.

Because the layout's design calls for two different types of terrain, a backdrop down the middle of the layout makes a good scene divider. The 1 x 2s and 2 x 2 are attached to the plywood with metal L-brackets.



Even though only a few inches of sky shows above the hills on the Meadow Valley side of the layout, that hardboard surface had to be smooth.

Since the laminated backdrop couldn't be screwed together, Stener applied a liberal amount of carpenter's wood glue to the mating faces.

the sides. We'd cut the ends later to roughly match the shape of the terrain. We used ¾"-long Phillips roundhead screws to attach the fascia to the vertical supports previously attached to the joists, allowing about ¼" of the hardboard to extend above the top of the plywood. Two screws per joist sufficed. I considered using flathead screws that could be countersunk flush with the fascia. They would be less obtrusive, perhaps, but I was concerned that they might pull through the thin hardboard.

THERE ARE A COUPLE OF WAYS to visually divide a layout, and Stener and I chose to run a double-sided, curved backdrop roughly down the center. On the Meadow Valley Wash side, the hills and steep bluffs could have pretty well divided the two sides of the layout by themselves, but I needed to hide the backs of the mountains.

We made the backdrop from tempered hardboard. L-girder benchwork lends itself well to adding a backdrop by allowing you to attach vertical supports to the joists. At this point on our layout, however, the joists were covered by plywood.

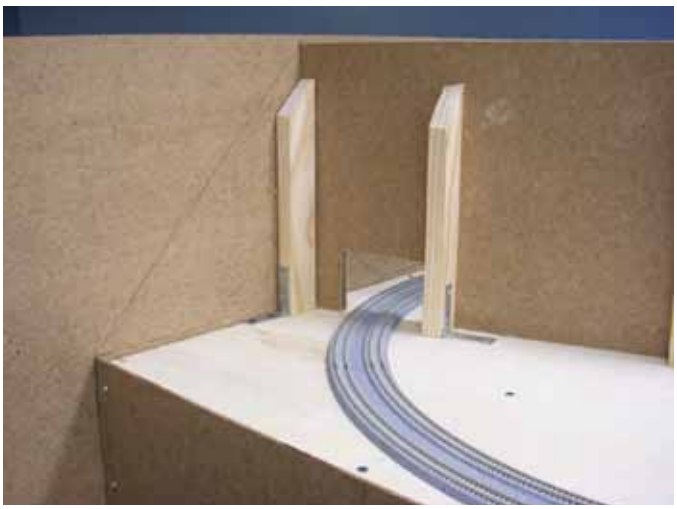
We used lengths of 10"-high 1 x 2 attached to the plywood with L-brackets at appropriate locations to support the backdrop. We beveled the tops of the supports, angling them down toward the Meadow Valley Wash side, making it easier to cover them with scenery. The backdrop itself is attached to the yard side of the vertical supports.

We cut three 1 x 8-foot strips of hardboard for the backdrop. The material we used is smooth only on one side, so we positioned one piece with the smooth side facing the supports. This provides a smooth surface for the couple of inches of sky that would show above the mountains on the Meadow Valley Wash side.

Next, we marked the backdrop to show where each of the supports would be, applied glue to the back of the supports, and then attached the hardboard using flathead screws carefully drawn down flush with the surface.

C-clamps at the top of the backdrop and drywall screws at the bottom force the back-to-back pieces (rough side to rough side) of tempered hardboard together until the carpenter's glue dries.

Stener attached large hardboard pieces to the ends of the layout with screws. He used clamps to hold the hardboard in place during this step. The scrap pieces of hardboard prevent the clamps from damaging the surface.



Dick used a pencil to mark where the mountains would meet the fascia. He used a variable-speed jigsaw to cut the tempered hardboard. You can also see where he cut the opening for the double-track main line.

When the layout was further along, Dick felt like there needed to be a reason for the tracks to change direction, so he added a hill. The fascia extensions help hide the extruded foam insulation board.

Then we cut openings for the tracks to pass between the scenes.

And since the entire backdrop needed to be more than 9 feet long, we ended up splicing another 18" or so at the other end. We used additional supports at the splice point and at both edges of the tunnel openings at both ends.

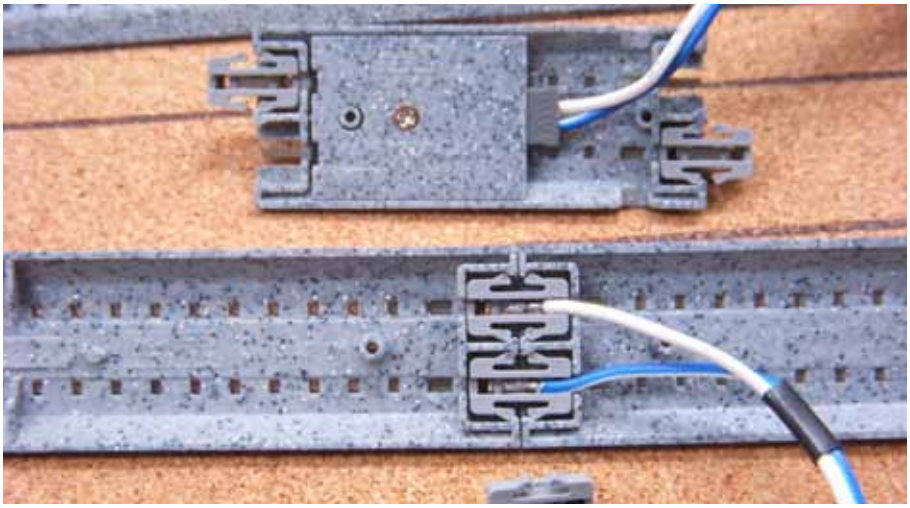
With one side of the backdrop firmly glued and screwed in place, we applied carpenter's glue on the rough side of another length (having cut matching tunnel openings) and placed it against the backside of the hardboard already in place. Note that we alternated ends for the splice.

We used 1 x 4 scraps clamped at the top and screwed on an angle at the bottom, to apply pressure as evenly as we could while the carpenter's glue dried.

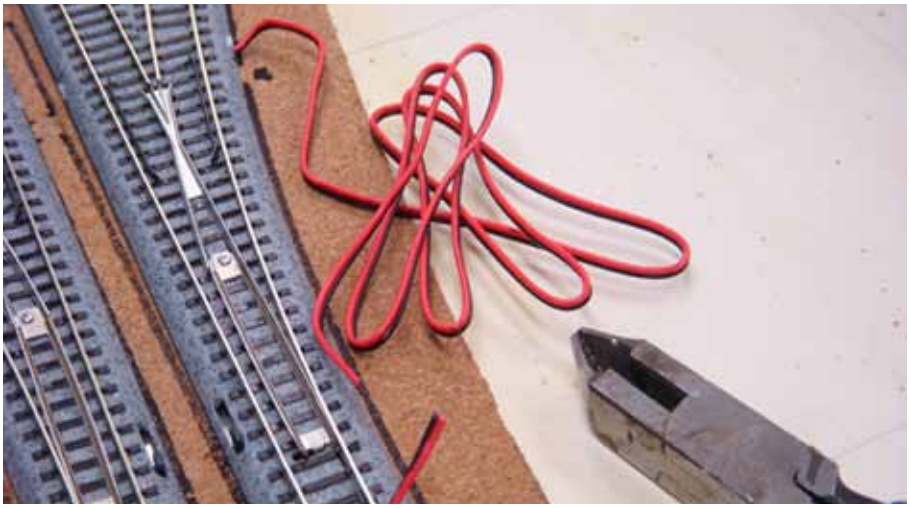
Once the glue dried, we removed the clamps. I sanded the joints on both sides of the backdrop and applied spackling compound. When that dried, I sanded the joint and it was ready for paint.

BY THIS TIME, STENER had sketched our joint vision of how the layout would look. The Meadow Valley Wash side took only one version; it was pretty well set in stone (so to speak). The Caliente side – well, like the track plan, that was still in a state of flux. Nevertheless, we had general ideas of where elements would go and what the slopes at the ends of the layout would look like.

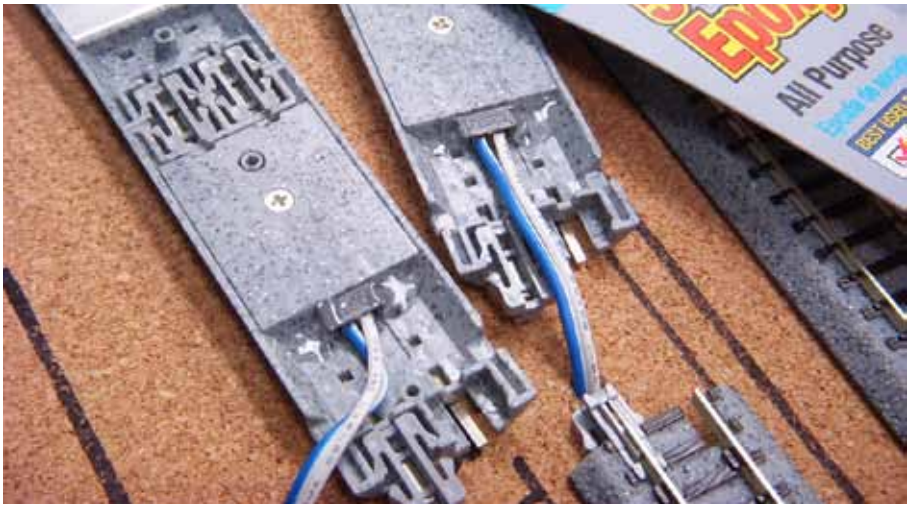
The first step was simply to screw some large hardboard pieces to the ends, lining up the bottom with the bottom of the side fascia and the top with the top of the backdrop. Then we marked the back of the hardboard where we thought the mountains might fall. It would be possible to trim them later to match the actual mountain contour or, as in one corner of the yard, to add more hardboard to match the ground contour.



You can attach feeder wires to Kato Unitrack with the firm's short track sections (no. 041) that have small sockets built in for the feeder wire plug (top) or with track clips/rail joiners (no. 24-818) with the feeder wires attached.



Kato turnouts use control wires with a plug at one end. Dick removed these plugs so he could slip the wires through holes drilled in the plywood subroadbed. The turnouts operate manually.



Dick used five-minute epoxy to cement the miniature plug to the Unitrack. This prevents the plug from falling out when the feeder wires are pulled through the holes he drilled in the layout surface.

I USED KATO'S superelevated sectional track (set V11), at least for part of the railroad. What I knew of traditional Kato Unitrack, with its molded roadbed, was positive. The firm's superelevated double track looks terrific, with molded gray and black ballast. The crossties are gray, representing concrete. Interestingly, the Union Pacific has concrete ties on the grade through Meadow Valley Wash and Clover Creek Canyon, so the track was prototypical for the area modeled.

Set V11 included half-sections that transition from a left-hand curve directly into a right-hand curve (or vice versa). At the end of each curve I installed the appropriate half-section to keep the track geometry intact.

The half-section transition brought the curve at the left end toward the center of the layout, instead of parallel to the edge. It functioned the same way at the other end. With the proper placement of straight sections between the curves, the track fit perfectly along the Meadow Valley Wash side of the layout at both ends.

Those half sections came into play on the yard side as well, determining where the molded double-track sections would end and the single-track straights and curves would begin. It was just a matter of which sections to use. I knew it could be done.

I BEGAN BY TRACING along the edges of the roadbed of the track on the Meadow Valley Wash side. Then I cemented N scale cork roadbed along the outsides so that the beveled edge of the cork aligned with the slope of the molded roadbed to absorb sound. I attached two strips of cork down the middle to provide support and a surface to apply Liquid Nails.

Kato has two options when it comes to feeder wires, and I used both on the Salt Lake Route. First, Kato offers short track sections with sockets built in under the roadbed for the feeder-wire plug. A miniature plug on one end of the two wires (blue and white) snaps into the socket. A larger plug, part of Kato's plug-and-play direct-current system, is attached to the other end of the wires. Since I used DCC on the layout, I clipped the plug off.

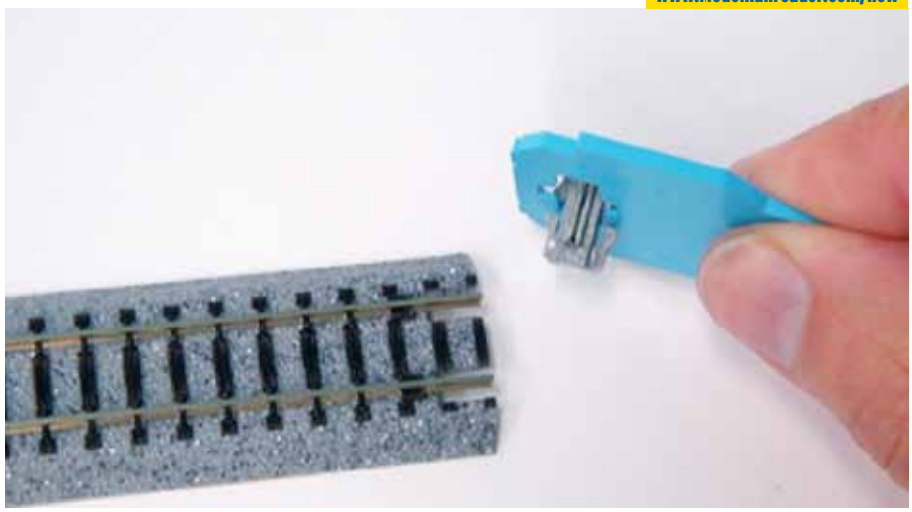
It's important to orient the blue and the white wires the same throughout the layout so the polarity isn't reversed. That way blue is always the same rail, and white is always the other rail.

After connecting the miniature plug to the track, I cemented it with five-minute epoxy. Only after I had glued and nailed down some of the track did I realize that one of these sections was without power. Apparently, as I pulled the wires down through the holes in the plywood beneath them, I must have tugged hard enough to pull the plug from its socket. Fortunately, I tested the connection before I had laid much track. Now the epoxy keeps the plug from pulling out.

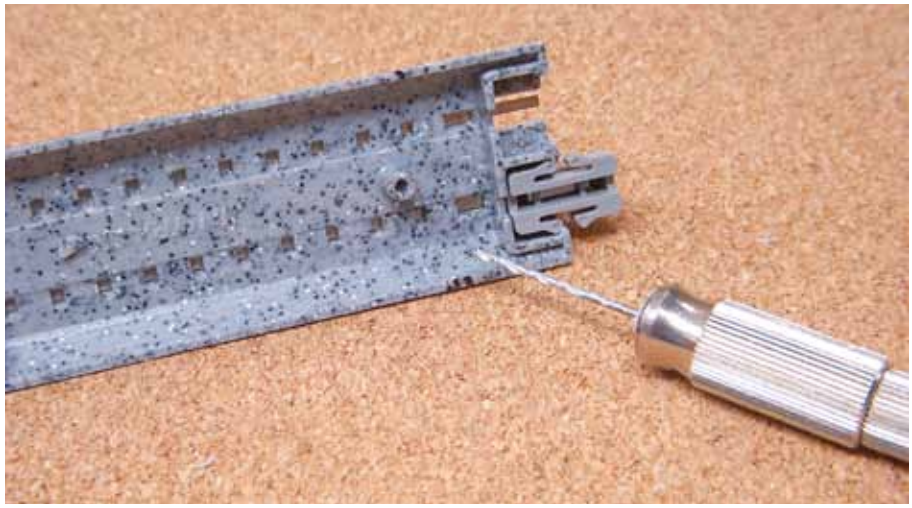
Second, Kato produces combination track clips/rail joiners to which blue and white wires have been attached (soldered to the metal rail joiners). Since the track plan doesn't always call for a short section of track where power is needed, I needed to use a few of these. Kato offers a tool with the joiners for removing the original clips.

To join Kato Unitrack, I slid the rail ends into the joiners of the adjoining section (molded into plastic spring clips that hold the plastic subroadbed sections together) and pushed until I could hear and feel a snap. This system results in a positive mechanical and reliable electrical connection.

To take sections apart, I held one in each hand and with my thumbs, pushed the joint away from me. The clip farther away released first. As I continued pushing on the track, the near clip released. I experimented on the yard for hours with various curve diameters and straight-section lengths. Despite snapping sections together and pushing them apart dozens of times, they continued to hold well and provide a positive electrical connection.



The blue plastic tool included with Kato Unitrack is for removing the track clip/rail joiner. The tool levers the clip/joiner out of its socket.

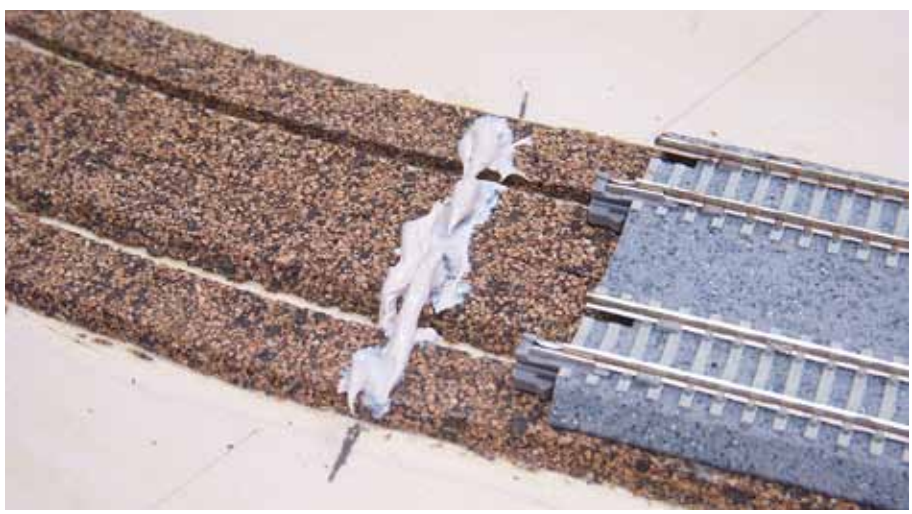


From above, it appears the Kato Unitrack doesn't have holes for track nails. Underneath the track are hollow tubes that Dick opened with a no. 60 bit.

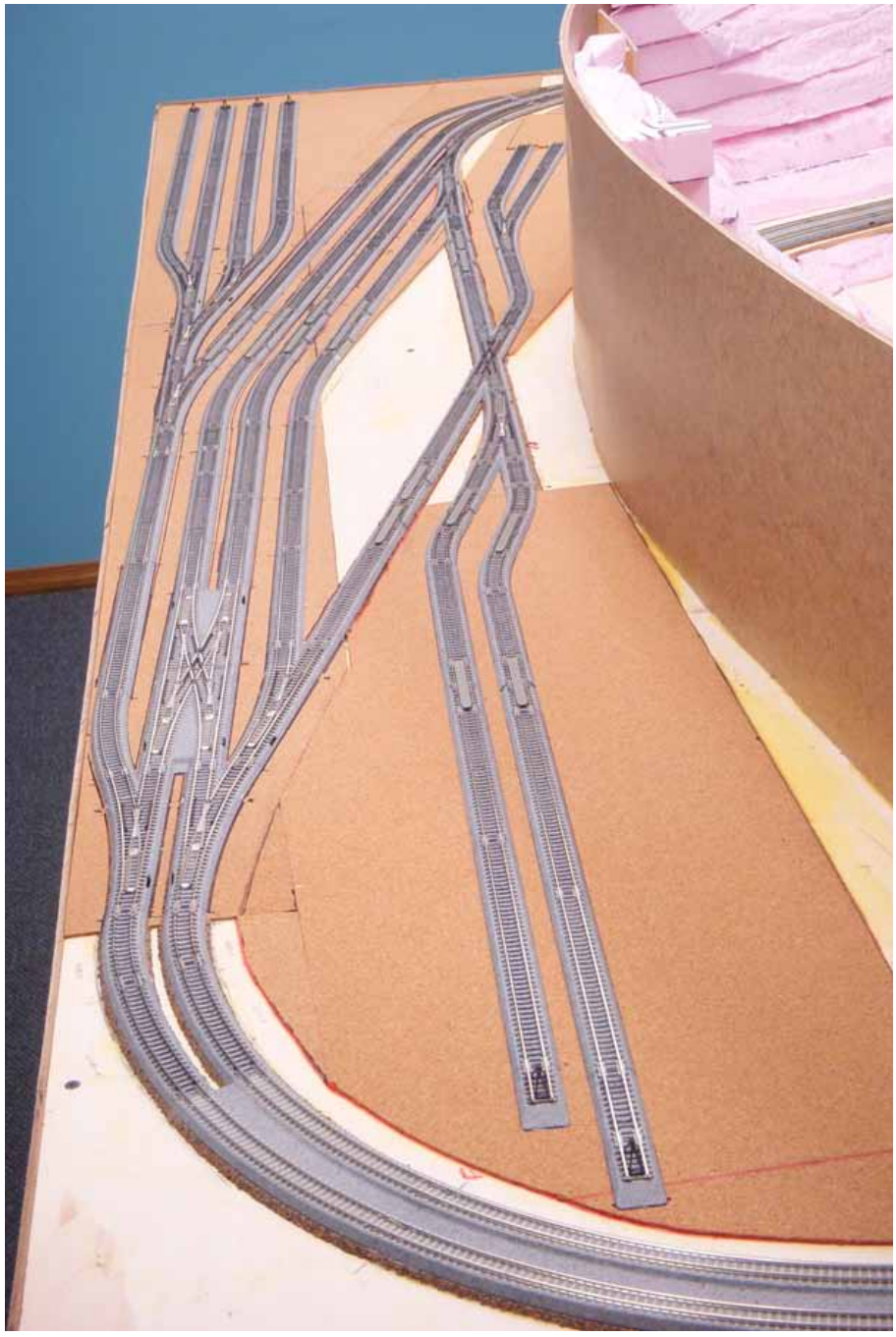
KATO PROVIDES DRILLING GUIDES that make it easy for you to nail down its track. From the top, no nail holes are visible through the ties. If you flip the track over, however, you'll see hollow tubes. Insert a no. 60 bit (in a pin vise) into the "tube" and give it a couple twists. Now you have a nail hole from above.

I nailed down the track all the way around the layout. I also used Liquid Nails for Projects, sparingly, at rail joints and in the middle of each section.

Before I began this project, MR contributing editor Andy Sperandeo mentioned that I should pay attention to how the rails meet from section to section. He had observed that sometimes Kato HO track seems to have a slight upward curvature at the ends of each



Dick knew the Salt Lake Route would be transported to train shows, so he wanted the track to be secure. In addition to the track nails, he applied beads of Liquid Nails for Projects to the cork before pressing the track down.



Dick laid out the Kato Unitrack on the Caliente yard side of the layout. He positioned the track as far away from the backdrop as possible to make room for the enginehouse and furniture factory. The four-track yard for the intermodal terminal is visible in the upper left corner.

Dick used a note card to maintain proper track spacing on the layout. The red marks of the main line match up with the superelevated double track from the Unitrack V11 set.

Dick placed a metal yardstick along the edge of the molded plastic roadbed to make sure the parallel tracks would be straight as an arrow.

section, making a peak where the rails meet. I laid the track with this in mind, adjusting the heights of the rail ends by driving the nails a little deeper. I also filed a few joints for smoother transitions. Running your fingernails along the heads of the rail will tell you which joints could stand some filing.

ALL OF THE TURNOUTS are on the Caliente Yard side of the layout. I used no. 6s throughout, including the double crossover at the right end of the yard. This section of track (four turnouts molded into one section) provides a way for locomotives to get from one side of the yard to the other. A crossover at both ends would have been ideal, but that would have meant shortening the sidings. Since long unit trains would be common on this layout, I wanted the passing sidings to be as long as possible.

As I installed each turnout, I drilled a small hole through the roadbed directly under the position of the wires attached to the turnouts. I fed the red and black turnout wires (minus the plug) through the hole and, like the power leads, left them dangling.

I've always liked the look and sound of crossings, and it was Stener who suggested the configuration that put the diamond between the engine terminal

These clever 3" lengths of track can be expanded to 4¼". The plastic in the middle has molded wood plank detail, allowing the track to double as a grade crossing. Dick used the expansion tracks as "fitters" to provide the needed, but unavailable, track lengths. There are more than a dozen fitter pieces on the Salt Lake Route.

To finish the intermodal yard and industrial sidings, Dick installed 2" track sections with bumping posts. He secured each section to the layout with track nails and construction adhesive.

and furniture factory. Getting those sidings far enough away from the backdrop to make reasonable-looking scenery possible was a bit of a challenge. The jog in the tracks going to the furniture factory and enginehouse is there to move them away from the backdrop.

The passing siding is a little closer to the edge of the layout than I would have preferred, but the curve diameters of the superelevated tracks on the Meadow Valley Wash side determined where everything – track, turnouts, and structures – would be on the Caliente side.

Speaking of consistent track spacing, here's a simple little tip. On a note card I marked the spacing I wanted between tracks (main line in red, passing tracks and yards in black). The mainline spacing through the yard simply continues the spacing between the rails on the super-elevated sections. Then, when I eventually came to spiking down the tracks, I used the marks as an alignment guide. I also used a long straightedge to keep the track arrow-straight.

Since the track spacing for the Walthers enginehouse is different than the geometry of Kato's no. 6 turnout, the tracks aren't parallel. The difference is only visible from the far end of the layout.

DURING A VISIT TO THE HOBBY SHOP, I saw a short section of track on the Kato rack. It looked like a grade crossing, with simulated wood planks running parallel to and between the rails. Closer examination revealed that it was an expansion section, meaning that it was a flexible length – anywhere between 3" to 4¼". This track section changed everything.

In addition to using the expansion tracks as "fitters" to provide the needed, but unavailable, track lengths, I used them as grade crossings. So, I ended up using more than a dozen.

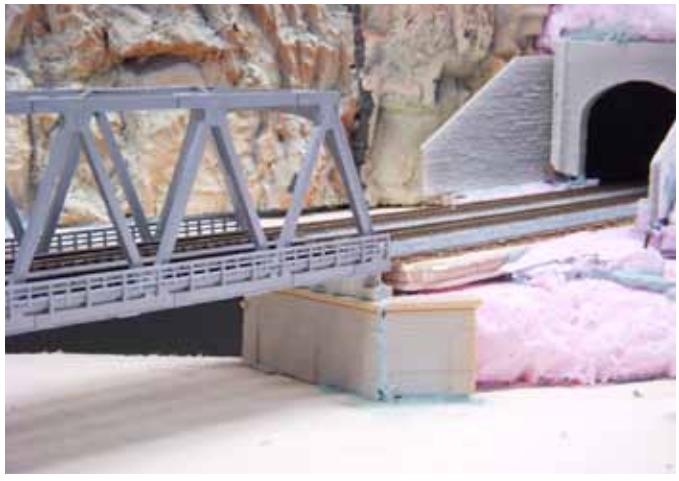
I used Kato track section 20-048 (with bumping post) at the end of each of the intermodal yard tracks and furniture factory sidings. I used the bases of the enginehouse and furniture factory kits to assure there would be room for these buildings. I even cut the enginehouse floor to accommodate the track clips.

You'll notice that the tracks going into the enginehouse aren't parallel. That's because the turnout angle didn't match the spacing of the track grooves in the enginehouse floor.

Stener used a serrated kitchen knife to cut the extruded-foam insulation board. The sloping contour of the foam roughly matches the railroad right-of-way.

This is how the Meadow Valley Wash side looked in its early stages. Though the hills were in place, the layers were still removable so Dick could add the tunnel liners and ballast.

Before enclosing the tunnel, Dick lined the walls with Woodland Scenics Track-Bed.



Dick trimmed the Chooch bridge abutments to fit under the Kato bridge and secured them with latex caulk.

SOME MODEL RAILROADERS enjoy laying track. Others get a kick out of wiring. I'm happiest when I'm building scenery. The desert landscape of the Meadow Valley Wash would be the signature scene of this layout, and I couldn't wait to get started.

Stener and I looked closely at the photos of the Meadow Valley Wash in Mark Hemphill's book *Union Pacific Salt Lake Route*, which provided inspiration for this layout. Then Stener sat down with paper and pencil and sketched the Wash as he thought it might look on our N scale layout.

ON THE LAST DAY OR TWO before Stener was to return to his home in Norway, we began cutting 1½"-thick extruded-foam insulation board. I used a sharp, serrated kitchen knife (bought specifically for this purpose – not borrowed from the kitchen). I'd tried a knife blade in a saber saw, and that worked fine for cutting the general shapes. But for cutting the slope into the edges, the serrated knife worked better.

The idea is to cut the first piece to the shape of the base of the hill – pretty much following a curved line an inch or so in from the edge of the track. Then we used the serrated knife to cut the edge to about a 45-degree angle, roughly matching the slope we had cut on the end fascia.

Next, we flipped that first layer of foam on its top and used it as a template for the next smaller layer of the hill. We did this until we got all the way to the top. The hill needed to reach its summit about one inch (at the ends) below the top of the backdrop.

At this point we had a rough form for the first hill (right end). We made cutouts in the back edge of the foam to allow for the vertical backdrop supports, allowing the foam to seat flush. We also had to cut the tunnel through the first and second layers.

With the first hill in shape, we next cut the foam for the hill in the center of the layout, again providing a tunnel through the foam for the double-track main.

I DREW A LIGHT PENCIL LINE on the backdrop along the tops of the hills. Where there were no hills (eventually to be rock cliffs), I drew a wavy line, suggesting that the tops of the hills and cliffs wouldn't be a straight line. Not having glued any of the mountains in place yet, I lifted off the stacks of foam and set them out of harm's way.

With a brush, I applied two coats of blue paint on the backdrop above and a little below my pencil line. When the paint had dried, I placed the first layer of the hills onto the layout, traced their location, and removed them. Then

To give the Noch rock walls added depth, Dick attached scrap foam to the backdrop. The gap between the backdrop and rock walls can be filled with Sculptamold.

Dick rotated some of the Noch rock walls so the patterns wouldn't be repeated. He also shortened some dense-foam rock castings to vary the height.

The creek needed to disappear into a canyon, so Dick made a two-sided rock wall by gluing rock sections back-to-back.

Dick attached 1/8" tempered hardboard to the top of the plywood to give the creekbed some profile.

I applied beads of PL300 Foamboard Adhesive onto the plywood and set the first layer of foam in place. I next coated the top of the first layer of foam with adhesive and attached the second layer. I stuck pins through the foam so it wouldn't shift.

Next, I added the tunnel liner, which I made using 3"-wide strips of Woodland Scenics Track-Bed Sheets. I attached them to the foam with the PL300. I used pins to hold the roadbed material in place while the adhesive dried.

Before attaching the third layer of foam, forever precluding access to the tunnel interior, I added ballast along the edges of the plastic roadbed. I painted a band of Elmer's white glue along the edge of the roadbed and poured Kato's matching ballast onto it. When the glue had dried, I dribbled Woodland Scenics Scenic Cement onto the ballast with a small turkey baster.

With the tunnel liners in place and the edges of the track ballasted, I continued assembling the foam hills, layer by layer.

THE NOCH ROCKS come in 8" x 13" factory-painted sheets, are lightweight, and are made of a very dense and easy-to-cut foam.

I needed to build three sections of canyon wall: a short one, a long one, and a double-sided one to hide the innermost part of the creek. In the case of the short and long walls, I varied the height and width of the slabs, and I tipped a couple end for end to make sure that the rock pattern didn't repeat itself. I used a serrated knife to make a clean, straight cut through the foam so I could butt the edges together neatly.

I didn't want to cement the rock outcroppings directly to the backdrop, so I used PL300 to first cement scraps of foam behind them to give the bluffs a little more depth. Then I used PL300 to attach the rocks to the foam scraps. I also cemented scraps to the backdrop at the very tops of the cliffs to hide the gap and to form the tops of the bluffs.

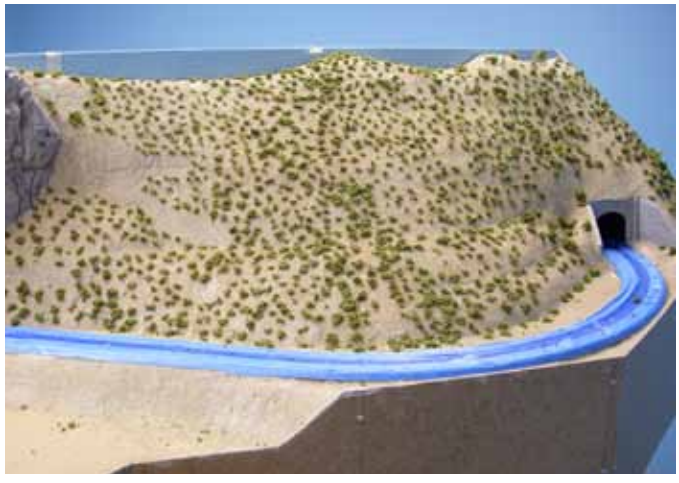
WHILE CUTTING THE EXTRUDED-FOAM insulation board for the hills, I hadn't spent a lot of time or effort shaping them precisely. With all of the chunks glued together and in place, I got out my Stanley Surform and started shaving away the mismatches. Then, as the seams became smoother, I switched over to sanding the entire surface of the hills with flexible 3M SandBlaster sanding sponges.

The horizontal seams between the layers of foam need to be hidden or they'll show through the ground cover and make the hills look like a layered wedding cake. Sculptamold troweled onto the seams is a good start. I also

Dick used Sculptamold to hide horizontal gaps and imperfections in the foam. He later went back with a sponge and smoothed the seams and other rough spots.

After Dick painted the rock castings, he applied a wash of black acrylic paint. The wash makes the details in the rock castings pop.

Woodland Scenics buff ballast captured the look of desert sand quite well.



Where the terrain would be too steep for vegetation growth, Dick left the hillside bare.

applied a thinner coat of Sculptamold over blemishes in the foam. When this dried, I went back with the sponges and smoothed the seams and other rough spots.

THE NOCH ROCKS aren't necessarily made to be pieced together side by side. Where there are outcroppings on one piece, there may very well be indentations on the adjacent piece when you butt them together. Where this occurred, I used a hobby knife to carve away the outcroppings to more or less match the indentations.

My next step was to mix a batch of Sculptamold to a consistency similar to oatmeal. Then, using a small palette knife, I worked the Sculptamold into the gaps along the vertical seams. In some areas, I had to build up the Sculptamold so the two edges matched. I did the same with the seam along the top of the rock wall that hides the disappearing creek, as well as along the banks of Meadow Valley Creek itself.

THOUGH THE NOCH FOAM ROCKS come painted, the cutting and carving didn't do much for their finish. I painted the two rock walls and outcroppings with gray latex paint.

Next, I put a squirt of Mars Black acrylic artist's paint into a food container and thinned it with water to make a wash. I dipped a paintbrush in the wash and flowed the liquid on top of the rock castings, letting it run down as rainwater would. I coaxed the wash down the cliff here and there so it would catch in the crevices.

In looking more closely at the photos and reading the text and captions in Hemphill's book, I noticed that he comments on the orange color of some of the rocks. To suggest just a hint of this, I mixed a little Titanium White and Burnt Umber acrylic paint, adding white until I got an orange tint. Then I drybrushed the paint on the rock castings with a flat-end brush.

If the low areas in the rock face are in shadow, then the high areas should be in light. To simulate the effect of sun on surfaces, I drybrushed the high points of the rocks with Titanium White. Just a hint of white is all you need.

ONCE I FINISHED PAINTING the rock faces, I worked on the talus pile. Woodland Scenics talus was the right color (gray) and about the right size, though pretty uniform. I painted on full-strength white glue at the base of the outcroppings and then poured on some of the talus. To my chagrin, more of it rolled into the creek bed than stayed on the talus pile.

To fix this, I curved a piece of thin cardstock to generally match the

curvature of the talus pile. Holding it near the bottom of the hill, I carefully poured on some talus. The card kept the excess from falling to the bottom. I carefully moved it up the slope as I continued pouring the talus out of the bag.

When that dried, there were still too many gaps. I applied more white glue to the gaps and sprinkled on pieces of talus. There are still some holes in the pile, but the overall effect is good.

THE PREDOMINANT LOOK of the Meadow Valley Wash is tan sand and gray/green brush. I'd already decided to use Woodland Scenics underbrush for the brush, but I hadn't figured out how I'd capture the look of millions of plants.

But first things first. I went to my local home center and picked out a paint color I thought would look right for the hills and brought it home. When I compared the color against the Woodland Scenics ballast I'd chosen to use as the desert sand, I realized once again that I can't trust my memory when it comes to colors. Back to the home center, but this time with the ballast in hand.

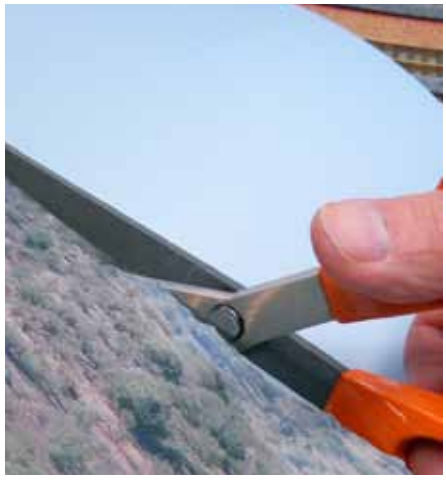
Starting at track level and working up until I had covered maybe a square foot of hill, I slathered on a thick coat of tan paint. While the paint was still wet, I sprinkled a thin layer of ballast onto the paint, staying an inch or so away from the edges of the painted area. That way when you apply more paint, you can overlap the paint without painting into a "sandy" area. I continued this process until the hills were covered with paint and sand.

The paint held most of the ballast, but some was loose on the surface. I soaked the sandy areas with Woodland Scenics Scenic Cement so the granules would stay in place.

As you can see in the bottom two photos on the left page, I covered the track with Scotch Blue painter's tape. This low-adhesive tape protects the track from scenery materials without leaving residue on the railheads.

I USED LIQUID NAILS to attach the Woodland Scenics ground foam I used for desert brush. After plopping about 30 or 40 dots on the side of the hill, I broke off little shrubs and stuck them into the adhesive. Yes, this took a while, but the finished results were worth the effort.

I left a few of the steeper parts of the hillside bare, rationalizing that nothing would grow on a hill that steep! The hills look more natural with a few bare areas.



Lacking enough sky to cover the tempered hardboard, Dick cut the sky and clouds from the photo and let the blue backdrop suffice.

Dick covered the backdrop with plastic wrap. This prevents paint, glue, and other scenery materials from damaging the photo and painted hardboard.

IN EACH PHASE OF THIS PROJECT, at least one aspect gave me indigestion through anticipation. On the Caliente, Nev., side of the layout, it was how to make the backdrop. I puzzled and agonized over this for weeks. I had no issues like this on the other side of the layout, where the mountains and rock cliffs climbed up the backdrop. But no such luck on the Caliente side. I needed a realistic backdrop for this side of the layout. However, I did find an appropriate photo backdrop from BackDrop Warehouse (www.backdropwarehouse.com).

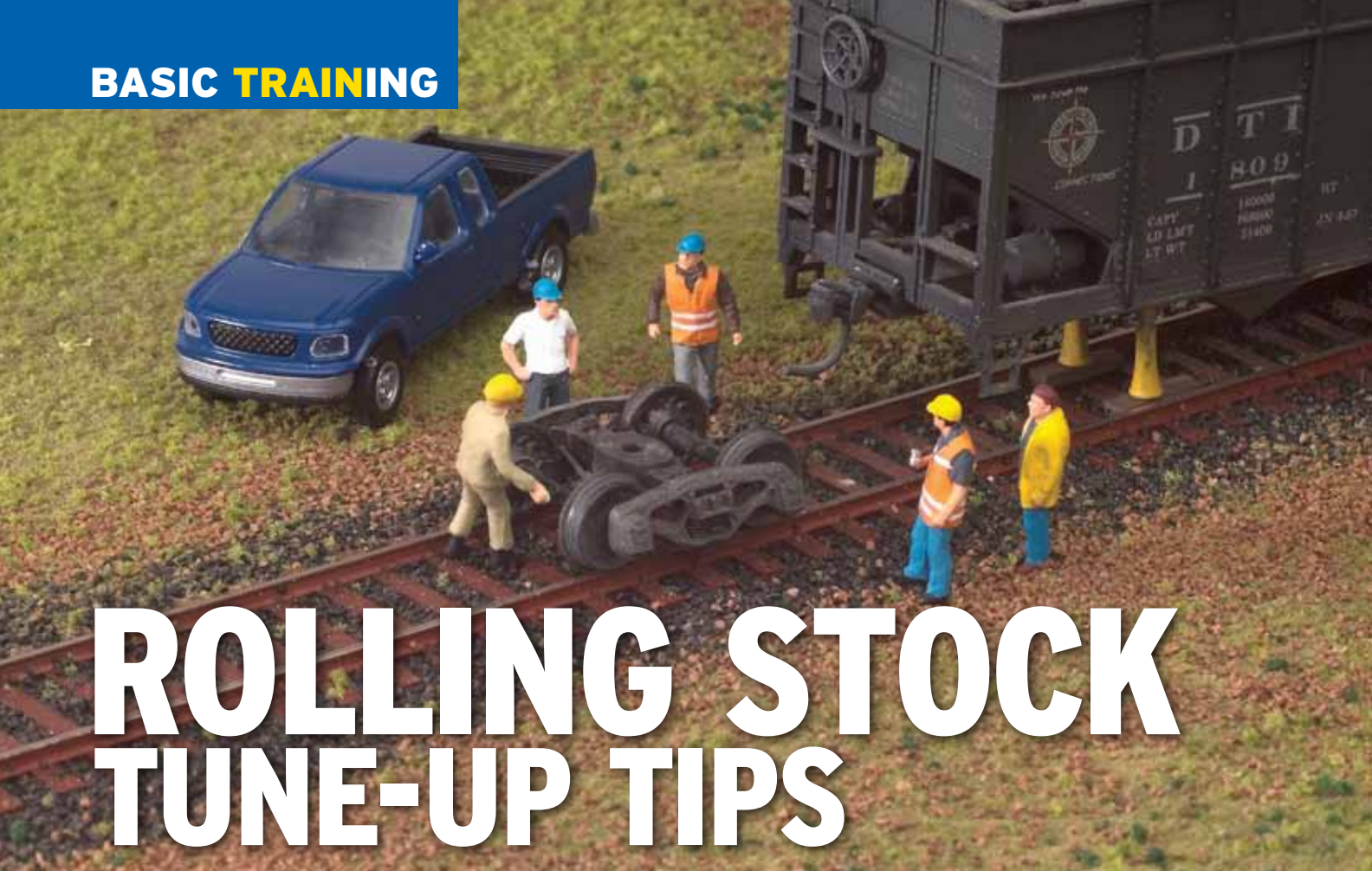
When the heavy-paper backdrop arrived, I rolled it out and held it against the tempered hardboard. Not enough sky and too much hill; the horizon would be above my eye level. I'd hoped to be able to just roll out the backdrop and attach it to the painted tempered hardboard.

So, I got out the scissors and cut a couple inches off the bottom of the roll to lower the horizon. That fixed the horizon problem, but now there wasn't enough printed sky to reach the top of the tempered hardboard. The only solution was to cut away the printed sky. But that's why I painted the hardboard blue.

I attached the photo backdrop with spray adhesive applied to the non-printed side. I placed the backdrop against the hardboard and smoothed it with a paint roller.

If you're into the modern railroad scene, consider the N scale Salt Lake Route. It provides a perfect blend of switching and scenery. MR

Here is the photo backdrop on the finished layout. Pieces of clump foliage hide the seam between the backdrop and the hillside. Bill Zuback photo



ROLLING STOCK TUNE-UP TIPS

Track, wheels, and couplers must all work together, so the proper installation and maintenance of all three items is important. The National Model Railroad Association has standards for all of these items that modelers need to follow.

10 proven methods to make your railroad run better

BY JIM HEDIGER

DERAILMENTS are a problem that modelers can eliminate by fine-tuning their layouts and rolling stock. Smooth operation depends upon the interaction of track, wheelsets, and couplers that must all match the appropriate National Model Railroad Association measurement standards (see www.nmra.org).

Metal gauges designed to quickly check standard dimensions for track and wheels in most of the popular scales are sold by the NMRA. These gauges are inexpensive and available at most hobby shops. The NMRA gauge is one of the hobby's few "must have" tools, and all modelers need to know how to use it.

The methods covered here come from more than 40 years of following a successful "zero derailments" policy on my own HO scale Ohio Southern model railroad. Each of the tips are easy adjustments and can be done in a few minutes. And this small investment in time pays off with better performance.

1. CHECK THE TRACK GAUGE

OBTAIN AN NMRA GAUGE, read the instructions, and learn how to check critical dimensions. When checking the dimension between the rails, the measuring pins should fit inside the rails without forcing them, and the notched pin should sit on the inside corner of its rail without dropping completely down (an indication the rails are spaced too wide).

2. ALIGN EVERY JOINT

EVERY RAIL JOINT should be carefully aligned, have tight, properly fitted rail joiners, and be level. Lean down and sight along the rails to check the alignment and smooth off any rough joints with a flat needle file. Sliding a fingernail along the inside of each railhead will reveal any irregularities that can snag a passing wheel flange and cause a derailment.

3. ADJUST THE TURNOUTS

TURNOUTS, or track switches, are the most common source of derailments, so it pays to check them carefully with an NMRA gauge. Use the proper pins on the gauge and adjust the turnout parts accordingly. A flat needle file works well to sharpen the tapered switch points and smooth any rough spots that may catch a wheel.

4. INSTALL COUPLERS PROPERLY

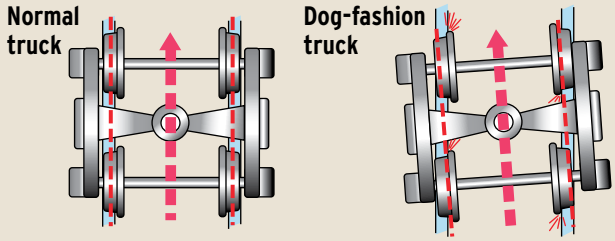
COUPLER RELIABILITY depends upon proper installation and maintenance. Most modelers use knuckle couplers, so take the time to read and follow the instructions. Use a coupler height gauge to adjust the vertical height and the correct trip pin clearance above the railheads. The couplers should also have minimal vertical play and center reliably.

5. WEIGHT APPROPRIATELY

MANY FREIGHT CARS need additional weight to obtain the best performance. The NMRA's Recommended Practice 20.1 (www.nmra.org) includes formulas to determine the optimum weight based on different car lengths (in inches). Any weight added to a model should be secured so it doesn't move out of position.

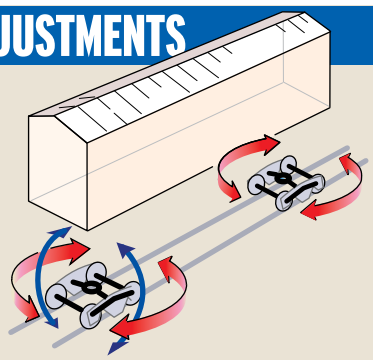
Peel-and-stick weights

6. CHECK AND ADJUST THE TRUCKS



TRUCKS should be square, with the wheels centered on the axles, and all of the wheels should contact the rails evenly.

7. TRUCK ADJUSTMENTS



Create a three-point suspension by adjusting one truck to swivel without rocking, while the other truck is free to swivel and rock

THE TRUCKS must swivel freely under the car, as any stiffness tends to magnify the potential for derailments.

8. USE MINIMAL LUBRICATION

COUPLERS should only be lubricated with an occasional small puff of powdered graphite or Teflon. These dry lubricants don't attract dirt, and a little lasts a long time.

Needlepoint wheelsets running in acetal plastic sideframes seldom need any lubricant. If a journal bearing makes noise, apply a small puff of graphite or Teflon. Avoid using oil on the trucks, as oil attracts dirt. Then as the oil evaporates, it turns into a gummy mess that adds a lot of drag. In addition, some petroleum-based oils may soften and damage the acetal plastic sideframes. If a metal truck makes noise, add a tiny drop of oil in the sideframe journal.

9. MAINTAIN THE FLEET

EVERYTHING I've covered so far can be done on the workbench as you build your equipment. But what about cars already on the layout? A hard-nosed annual inspection of every car will reveal all sorts of little problems due to wear and tear. The last time I did this major inspection, nearly 90 percent of my veteran car fleet failed.

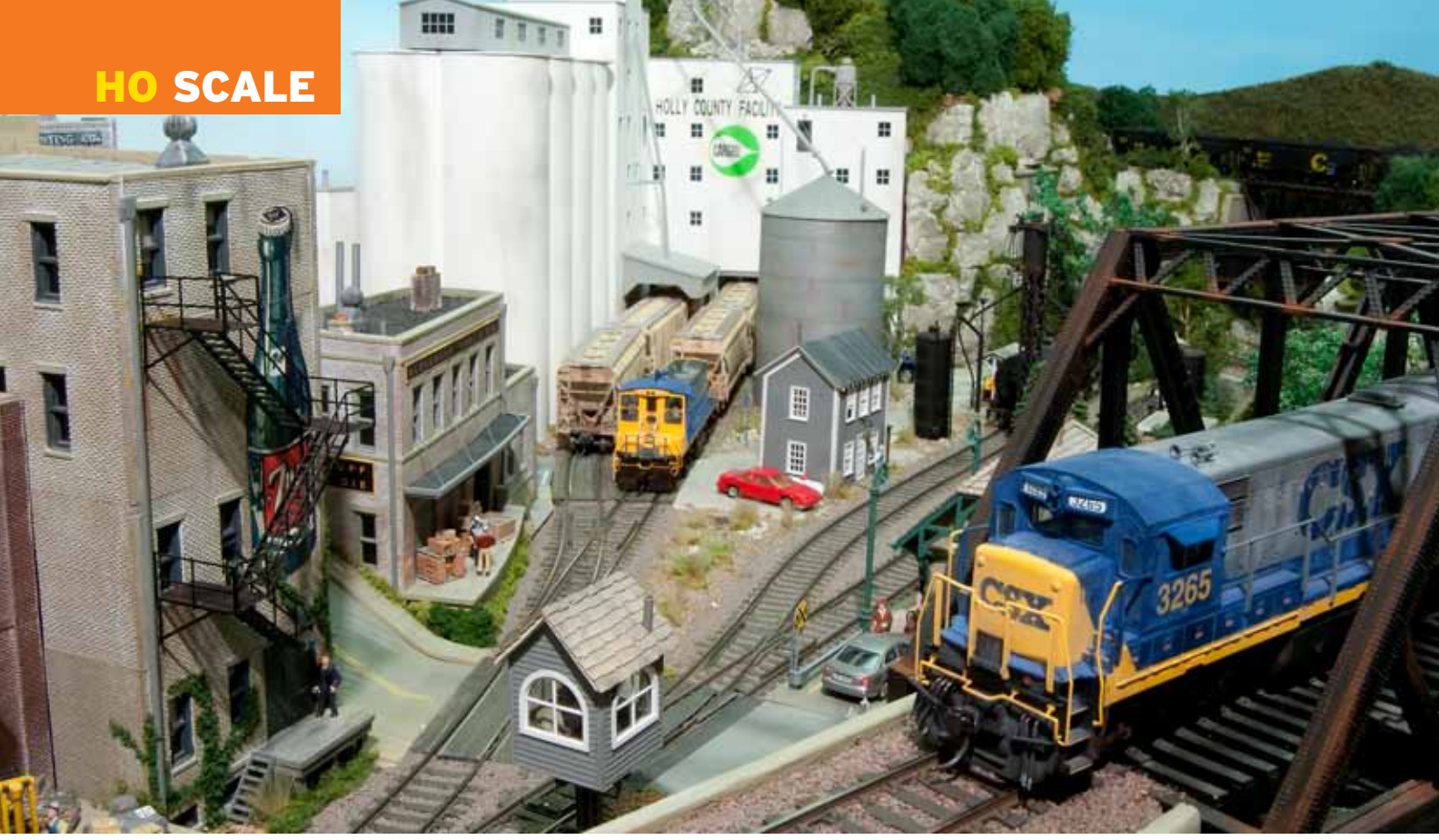
Another approach is to inspect one car type each month, make the repairs, and move on to checking another group of cars the following month.

To fix the numerous bad order cars (a prototype term for equipment needing repairs), I sort them by the type of work required and then group the repairs for efficiency.

10. STAY HARD-NOSED

MANY EXPERIENCED modelers are willing to put up with derailments as the price of running trains, but that's a rationalization to avoid investing the time it takes to make the necessary adjustments. Observe what's happening as your trains run and be hard-nosed about fixing problems as soon as they're identified. After a while, you'll find fewer problems need attention.

With the quality of the equipment we have today, there's no reason to put up with derailments. Putting in the five or 10 minutes required to eliminate specific track problems, change out a bad wheelset, and adjust each car makes an amazing difference – even when visitors are present.



Rick Van Laar's HO scale Rosston, Joelberg & Holly captures modern coal-hauling action in just 4 x 8 feet. Here, a coal train crosses the bridge over Joelberg on its way to the power plant.

CSX IN COAL COUNTRY

This double-sided layout packs a lot of railroading into a 4 x 8

BY STEVEN OTTE

RICK VAN LAAR'S HO SCALE Rosston, Joelberg & Holly was influenced by CSX's West Virginia lines and by his own three children. Though the railroad didn't have the desired effect of getting his kids interested in model trains, at modeling coal-country railroading in a small space it was a success.

By angling a backdrop down the middle of the 4 x 8-foot space, Rick was able to create two scenes – one urban, one rural. The distinct scenery of the two and the visual separation between them make the railroad seem larger.

A few more tricks also helped expand the appearance and feel of the layout. Rick modeled the town of Joelberg by stacking narrow structures up the side of a hill, creating the illusion of depth. (The hilly town also helps reinforce the railroad's West Virginia setting.) And small mirrors, carefully placed, visually extend

THE TRACK PLAN AT A GLANCE

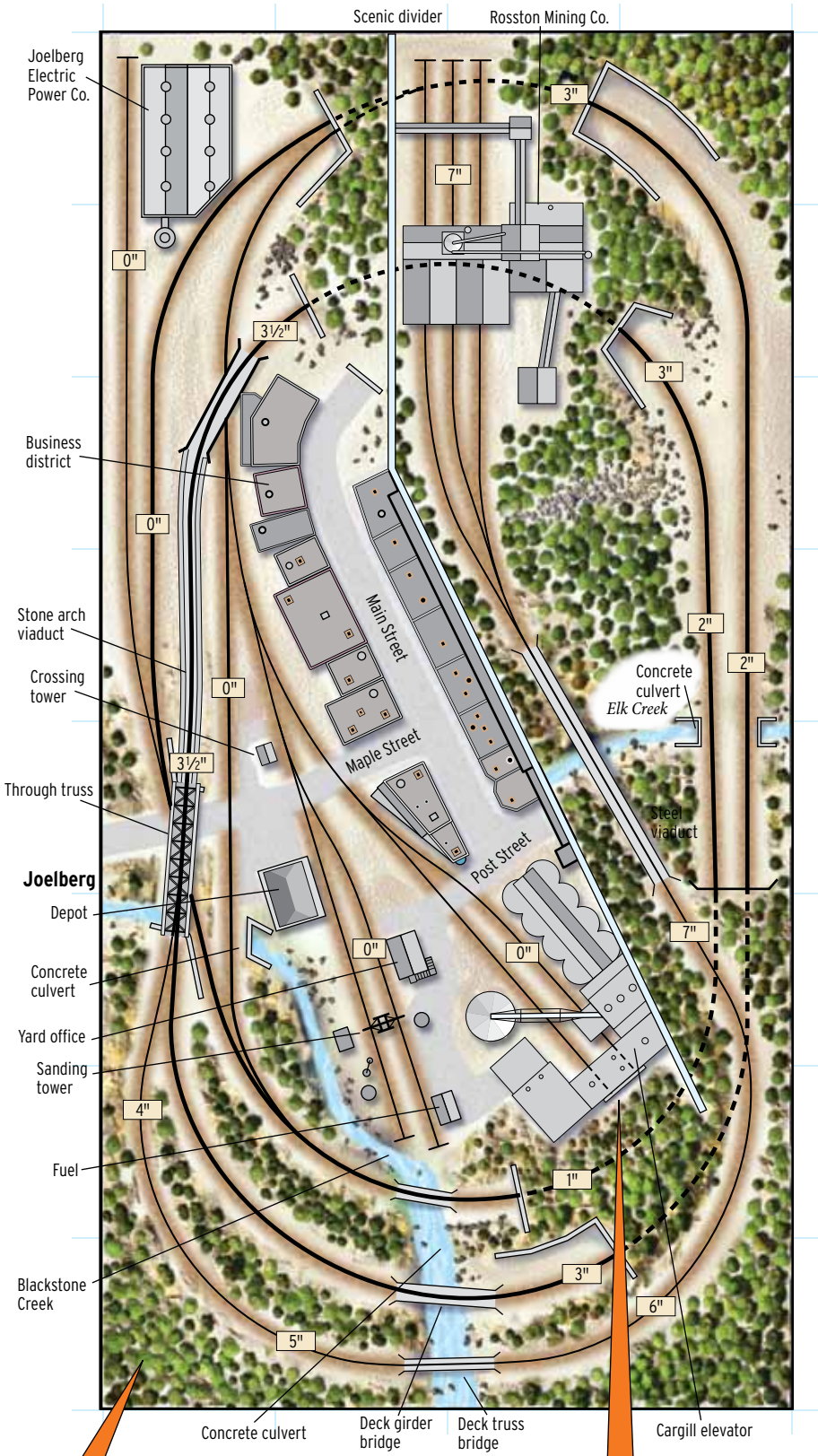
Name: Rosston, Joelberg & Holly
Scale: HO (1:87.1)
Size: 4 x 8 feet
Prototype: CSX, freelanced
Locale: West Virginia coal country
Era: 1990
Style: island
Mainline run: 32 feet
Minimum radius: 17"
Minimum turnout: no. 6 (main), no. 4 (yard and branch)
Maximum grade: 3.5 percent

Detailed scenes like this lighted diner make the layout seem much bigger.

Rick framed his layout in finished pine and added a black skirt to make it fit in with his rec room decor.

Joelberg's main street and the loading tracks at the town's grain elevator.

A railroad this small presents great opportunities for superdetailing scenes and structures, both in rural and urban settings, since every part of the railroad will be close enough to the viewers to be appreciated. MR



"Puffball" trees made from poly fiber cover Appalachian hills quickly, easily

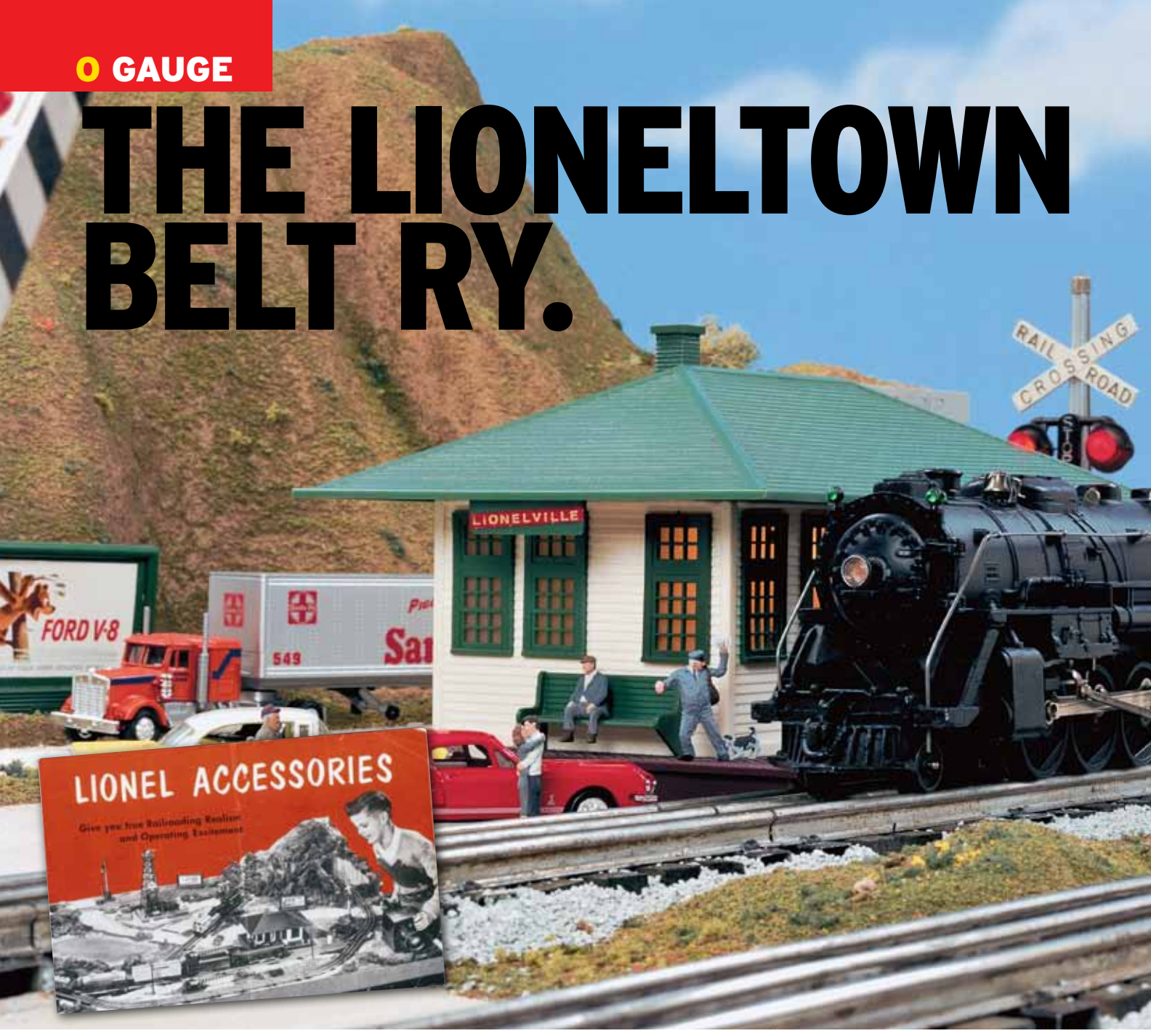
Grain elevator loading tracks are visually extended by a mirror placed under building

CSX in West Virginia

HO scale (1:87.1)
Layout size: 4 x 8 feet
Scale of plan: 1" = 1'-0", 12" grid
Illustration by Jay Smith

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

THE LIONELTOWN BELT RY.



Lionel dealer displays allowed customers (and their parents) to see what could be done with its wonderful array of toy trains and accessories. Relive the 1950s with this easy-to-build display layout. Chris Becker photo

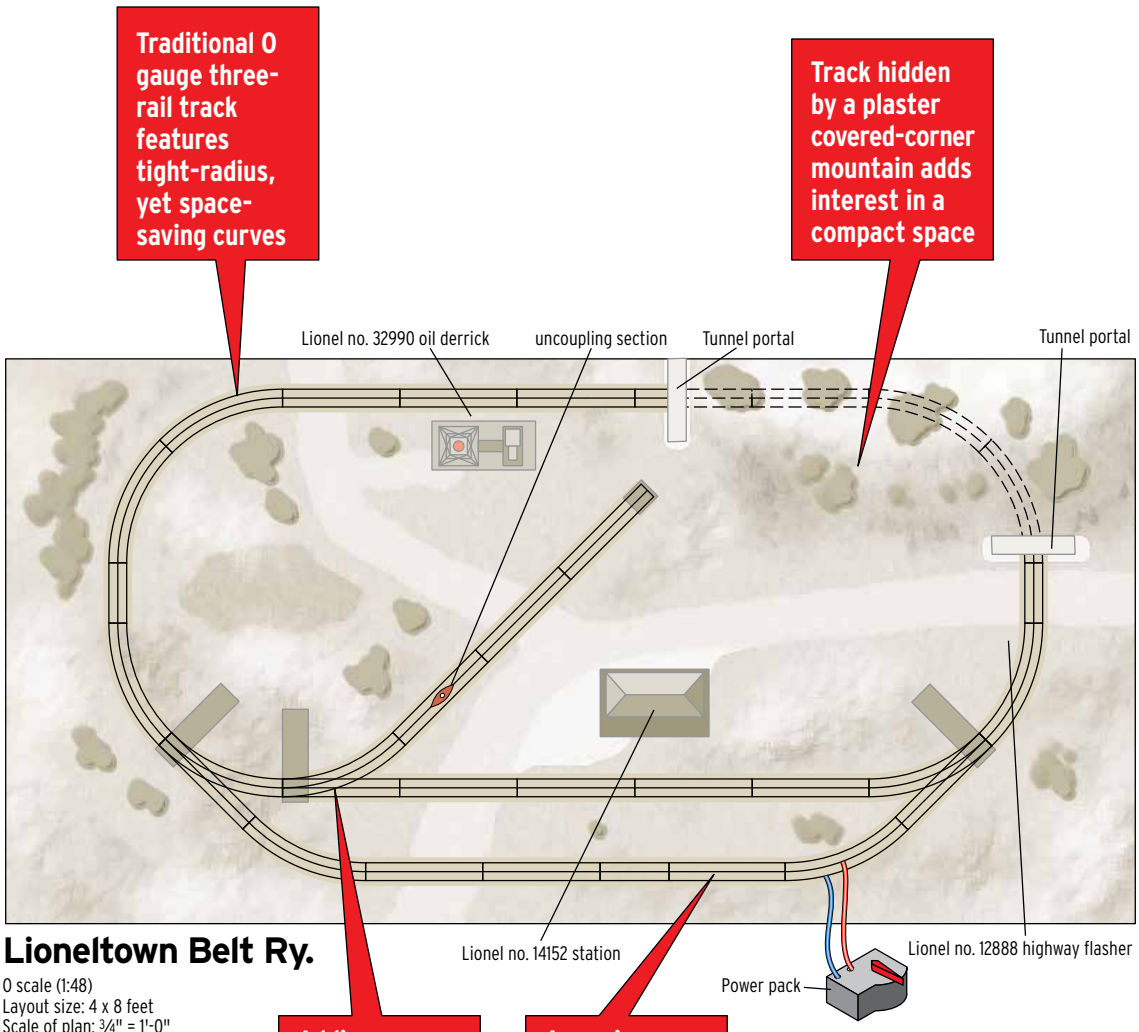
Build an O gauge layout with a 1950s store display look

BY KENT JOHNSON

FOR MANY HOBBYISTS, exploration into the exciting world of model railroading began at the sight of a simple, yet scintillating toy train layout commonly found on display in large retail stores during the 1950s. Although the footprint of these O gauge display layouts provided by Lionel Corp., the premier toy train manufacturer of the period, ranged from only 4 x 8 to 8 x 8 feet, they were loaded with accessories and packed with enough action to inspire multiple generations of hobbyists.

This 4 x 8-foot scheme seeks to capture the spirit of those display-style toy train layouts by curbing the track plan, one based on a classic Lionel design, to a few remote-controlled track switches for varied operation. Of course, this leaves plenty of room to add modern reproductions of classic postwar accessories from Lionel Trains and other contemporary manufacturers. Even better, there's also space to include finished scenery.

The sectional track arrangement for this plan is a basic oval with a passing siding and single spur to help introduce options for operation. Trains looping around the perimeter free up space at the center of the layout to add landscape,



Lioneltown Belt Ry.

O scale (1:48)
Layout size: 4 x 8 feet
Scale of plan: ¾" = 1'-0"
Illustration by Rick Johnson

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

including a small pond, rolling terrain, and a mountain rising from the flat plywood tabletop. To further enhance the toy train experience, you'll want to include operating accessories, ranging from trackside signals to an automated pumping oil derrick.

By including a passing siding, this layout also makes room for action provided by two trains sharing the rails.

Upon completion of construction, wiring, and scenery, this layout promises to rekindle the youthful exuberance so many of us first experienced from watching toy train displays in action. MR

THE TRACK PLAN AT A GLANCE

Name: Lioneltown Belt Ry.
Scale: O (1:48)
Size: 4 x 8 feet
Theme: display-style
Locale: Midwest
Era: 1950s-60s
Style: island
Mainline run: 16 feet
Minimum radius: 31" (O-31)
Minimum turnout: O-31
Maximum grade: none

MATERIALS LIST

Lionel track
14062 O-31 switch, left (2)
14063 O-31 switch, right (1)
65500 10" straight (12)
65501 O-31 curve (8)
65505 5½" half-straight (3)
65530 uncoupling section (1)

Other material
22AWG wire
Ground foam
Gloss medium
Glue and hot-glue gun
Plaster cloth (20 rolls)
Sculptamold (10 pounds)

SWITCHING WORK ON THE SOUTHERN RY.

Rolling hills covered with trees are the scenic hallmark of the Spartanburg Subdivision's rural South Carolina setting. The compact layout is built without legs so it can be operated on a dining-room table and stored under a bed when not in use.

Easy, low-profile benchwork lets this N scale layout store under a single bed

BY STEVEN OTTE
PHOTOS BY THE *MODEL RAILROADER* STAFF

A DILEMMA that keeps many potential model railroaders in the armchair is lack of space. Though there are many good small track plans out there, sometimes there simply isn't any room for a permanent layout, however compact.

The Southern Ry.'s Spartanburg Subdivision layout is designed to answer that challenge. This N scale layout is about the same square footage as a pair of Ntrak modules, but is a complete, self-contained railroad. Built in low-profile, legless tray benchwork, it can be placed on a dining room table for operating sessions and stored under a single bed when not in use. And it also has potential for expansion or integration into a larger permanent layout later.

The key to the layout's versatility is tray benchwork. Similar to upside-down open grid, tray benchwork is a frame of 1 x 4 lumber surrounding a sandwich of ¼" plywood and 2" extruded-foam insulation board. The result is light but rigid. This allows the layout to be carried from storage to tabletop without worry, and even stored on end (as long as scenery and structures are secured).

The track plan, representing a free-lanced Southern Ry. branch in South Carolina, packs a lot of operation into a small space. On one side of the central oval, yard switching can keep one operator busy. Meanwhile, in town, a textile mill, packing plant, team track, interchange, and lumber mill provide work for the local freight. The passing track hidden in the tunnel can be used to stage a through train for more challenge.

If you don't have room to build a permanent layout, this portable plan might be for you. MR

THE TRACK PLAN AT A GLANCE

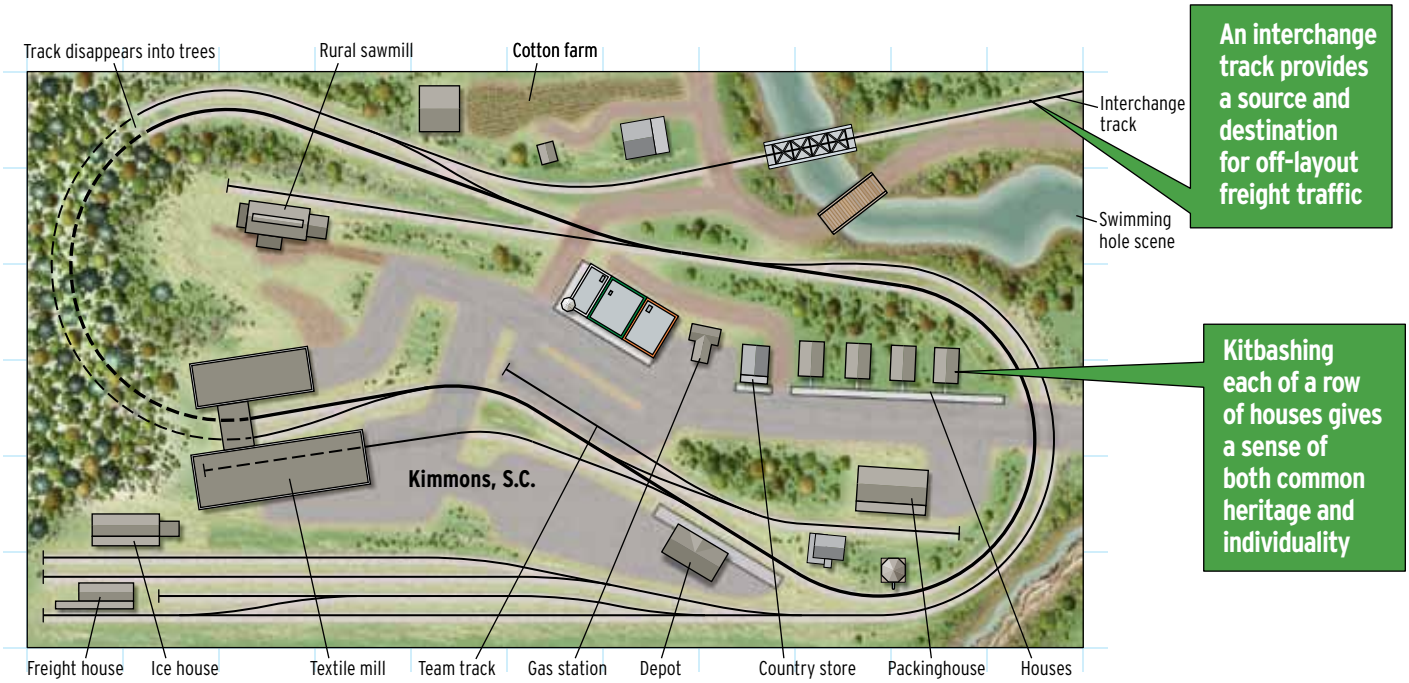
Name: Southern Ry. Spartanburg Subdivision
Scale: N (1:160)
Size: 36" x 66"
Theme: rural branch line
Locale: upstate South Carolina
Era: early 1940s
Style: island
Mainline run: 11 feet
Minimum radius: 9¾"
Minimum turnout: no. 5
Maximum grade: flat

Southern Ry.'s Spartanburg Subdivision

N scale (1:160)
Layout size: 36" x 66"
Scale of plan: 1" = 1'-0", 6" grid
Illustration by Rick Johnson and Kellie Jaeger

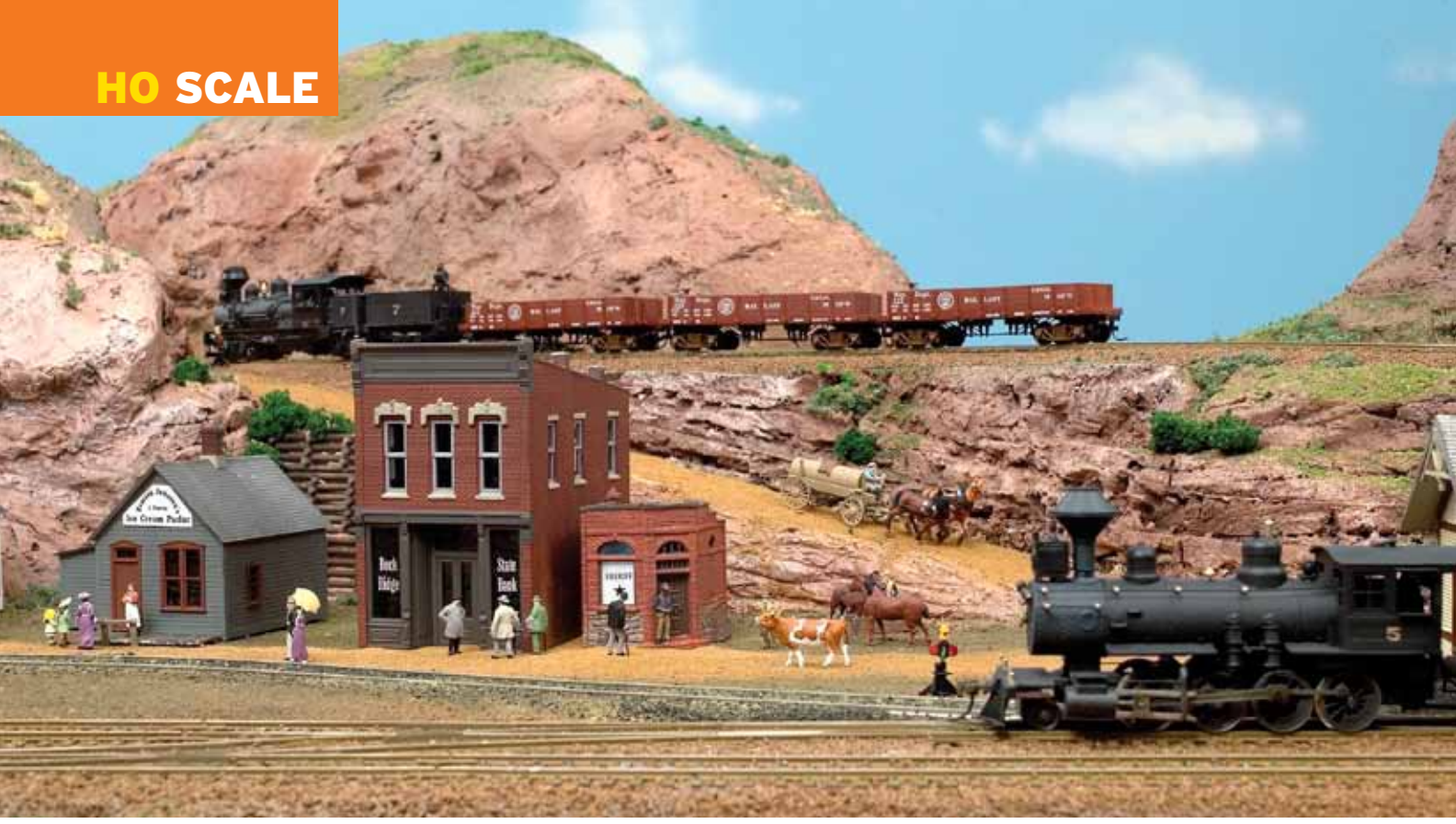
Find more plans online in the ModelRailroader.com Track Plan Database.

Model cotton rows with thread coated with green and white ground foam.



A frame of 1 x 4 lumber around a plywood panel provides a sturdy support for the foam board base of the layout.

Sculptamold on carved foam makes a small hill for the corner of the layout and breaks up the otherwise flat terrain.



Elevation changes, short trains, and high view-blocking ridges make the HO scale Rock Ridge Central seem larger than its 4 x 8-foot footprint. The railroad is set in the Old West, but could easily be moved elsewhere with a change of scenery.

THE ROCK RIDGE CENTRAL

Foam scenery on a plywood table makes an easy-to-assemble HO scale 4 x 8 layout

BY STEVEN OTTE

ONE OF THE DRAWBACKS of a tabletop layout is that it's too easy to take in the entire railroad in one glance. Watching a train chase its tail around in a circle can get old, fast. But the Rock Ridge Central avoids that problem. The layout is divided by rocky hills and a pair of tunnels. Scenes are further separated by elevation, and setting the railroad in the steam era means trains are short enough to occupy only one scene at a time.

The layout is set in the American West and takes advantage of the colorful terrain. But if you would rather model the East, simply paint your rocks gray and add and a lot of extra foliage.

We made the benchwork from two sheets of cabinet-grade birch plywood, one used as a solid tabletop, the other ripped into structural strips. (See the benchwork portion of the Black River Junction layout on page 8.) We glued a 2" sheet of extruded foam insulation to the tabletop using foam-safe Liquid Nails for Projects, and we used the same materials to make the mountains.

To build the grade to the mines, we used Woodland Scenics flexible foam 4 percent inclines. (See page 36 for more on foam inclines.) Since foam won't hold track nails, we used adhesive caulk to affix the cork roadbed to the foam, then we glued the track to the roadbed. This technique made building the grade easy.

Once the foam mountains were stacked, secured, and shaped, we covered them with plaster-impregnated gauze. This smoothed out irregularities, gave the surface a natural texture, and made it easier to apply plaster rock castings.

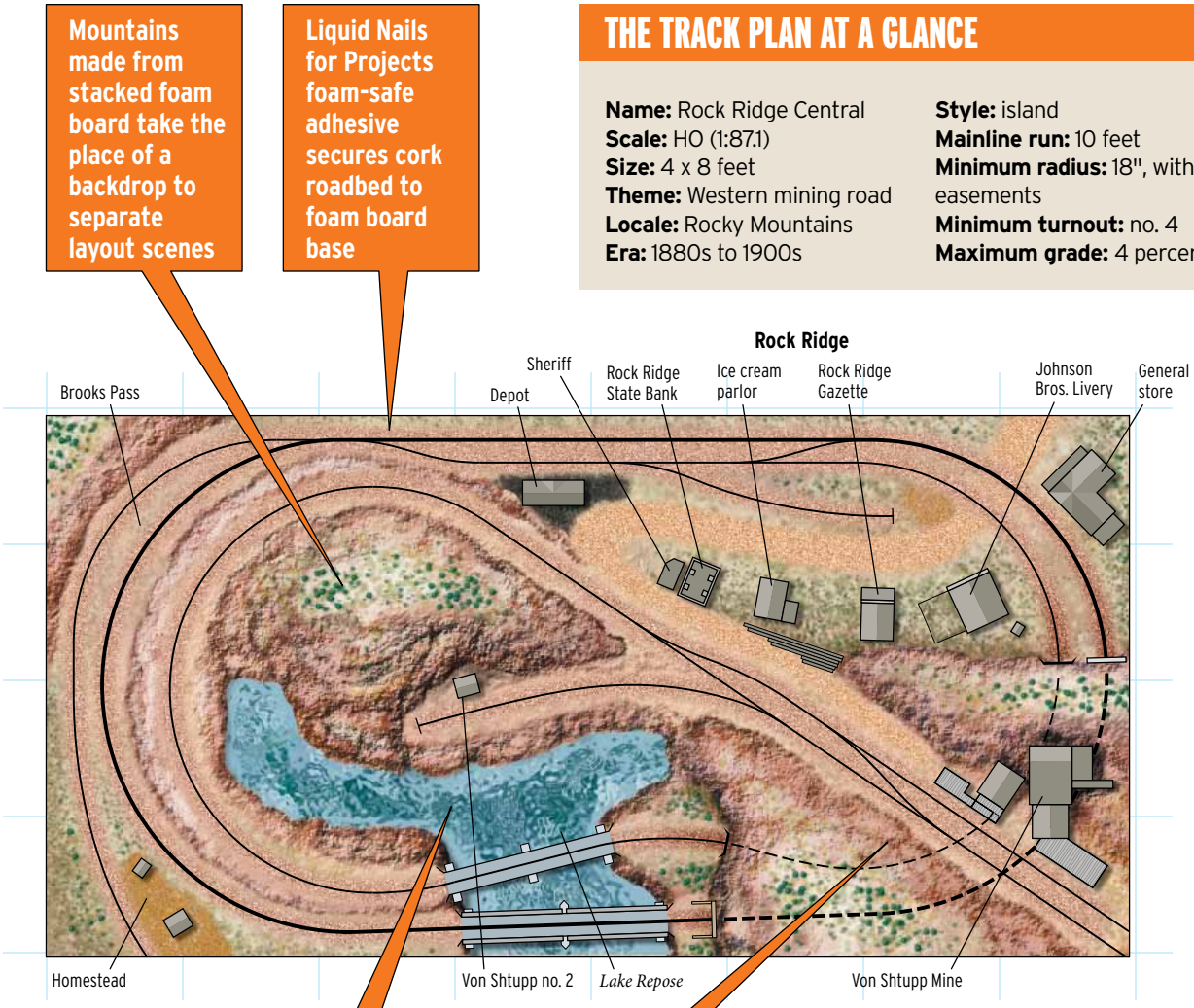
To model the lake, cut away the foam terrain down to the plywood base, then paint the plywood. Once the paint dried we poured the "water" using Woodland Scenics Realistic Water, an easy-to-use resin product. See page 20 of this magazine for more detail on modeling water.

A handful of easy-to-assemble structures for the town, bridges from Atlas and Micro Engineering, and a Grandt Line mine complete the layout. MR

THE TRACK PLAN AT A GLANCE

Name: Rock Ridge Central
Scale: HO (1:87.1)
Size: 4 x 8 feet
Theme: Western mining road
Locale: Rocky Mountains
Era: 1880s to 1900s

Style: island
Mainline run: 10 feet
Minimum radius: 18", with easements
Minimum turnout: no. 4
Maximum grade: 4 percent



Rock Ridge Central

HO scale (1:87.1)
Layout size: 4 x 8 feet
Scale of plan:
¾" = 1'-0", 12" grid
Illustration by Rick Johnson

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

We poured the tunnel liners in place (over the track) using thick plaster and foil-lined, removable foam forms.

A removable section of terrain on the elevated mine area allows access to the tunnel below for maintenance.

BIG TRAINS, BIG FUN

Large scale trains, commonly called G scale, aren't just for gardens and back yards. You can build the indoor layout shown here on a large tabletop.

G scale trains make a great 5 x 10 foot indoor layout the entire family can enjoy

BY DAVID POPP
PHOTOS BY JIM FORBES

ONE OF THE MAIN ATTRACTIONS of large scale (also called G scale) trains is that the models are so big that you need two hands to carry them! These trains are rugged, and most are designed to be run either indoors or out. (If you do run your G scale trains outdoors, be sure that any devices that use house current, including power supplies, stay indoors.)

Several manufacturers make large scale trains, including Aristo-Craft, Bachmann, LGB, Märklin, MTH, Piko, and USA Trains. The models are available in a wide variety of prototypes, including both American and European.

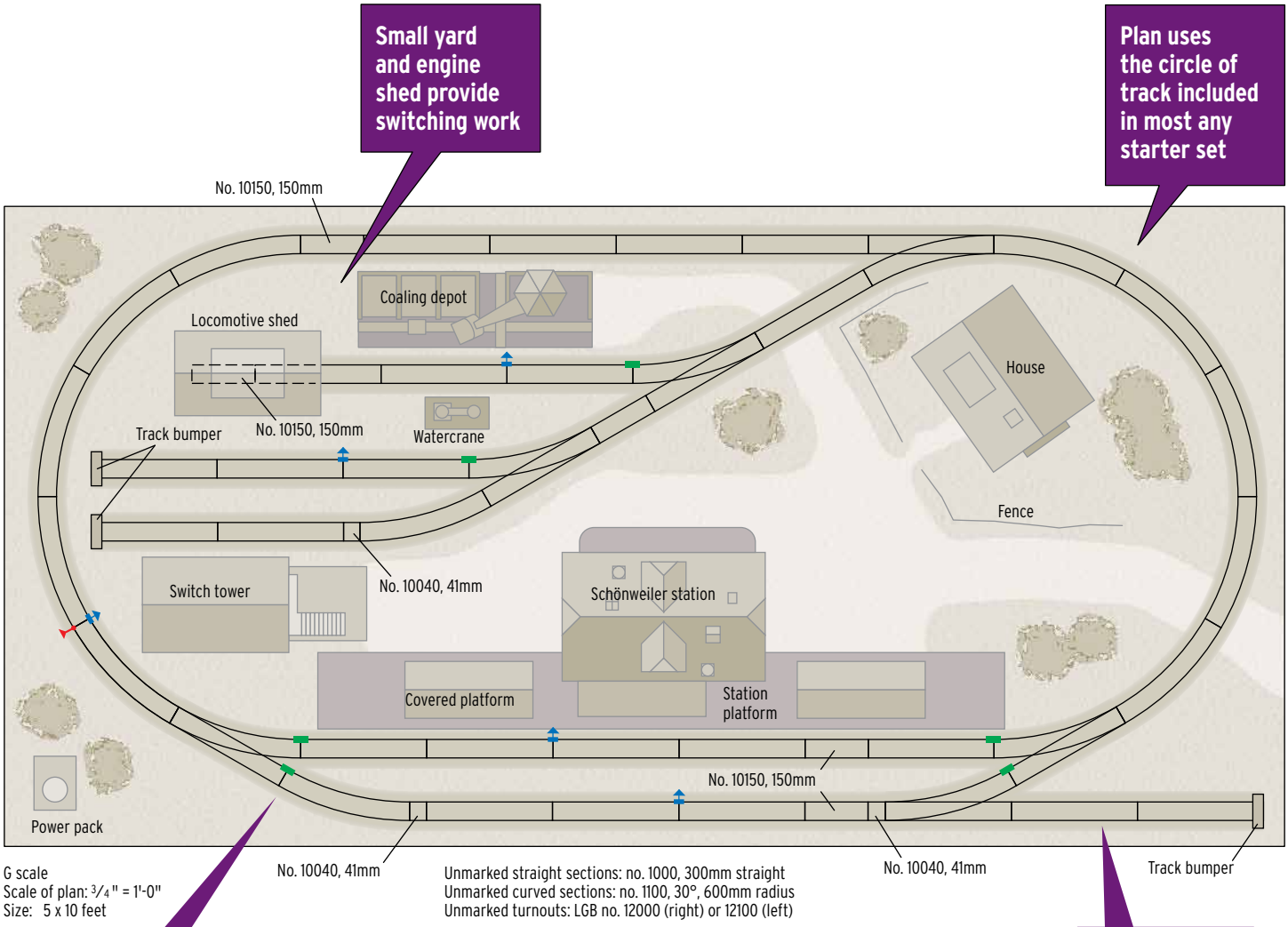
Space is the biggest issue with large scale trains, but if you work with smaller locomotives and cars, you can assemble a fun layout in about 5 x 10 feet. Many beginner sets include a loop of track, which could be the starting point for this layout's oval right-of-way. On the plan we used LGB track sections, though Piko and others also offer suitable track.

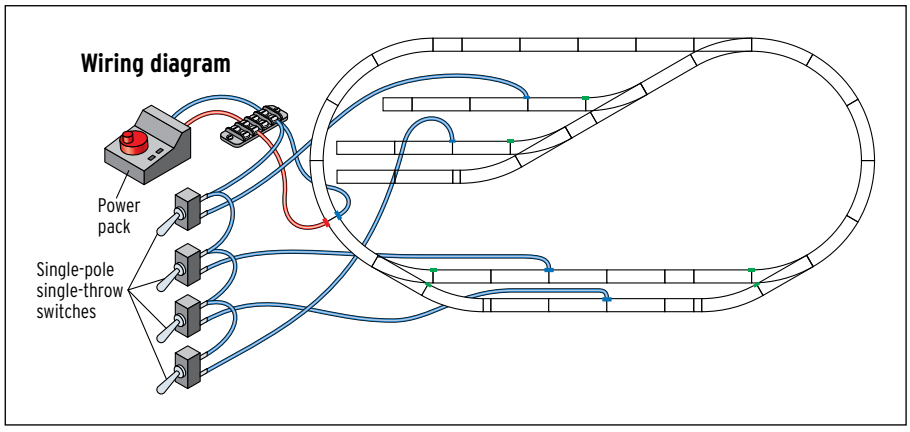
Because the railroad is essentially a loop, you can run just one train at a time, so we've shown it wired for DC train control. As shown in the wiring diagram, there are four insulated track blocks on the layout. These are wired to toggle switches to allow you to park an extra train or several locomotives, giving your railroad some operating variety.

The size of the trains and accessories, such as buildings and people, is all part of the attraction of modeling in G scale, and the scale is ideal for families with younger model railroaders.

If you're interested in getting into large scale trains, perhaps a small indoor layout like this is just what you need to keep you busy while you plan that future outdoor garden railroad empire! MR

We built our layout as a temporary winter scene, using polyfiber quilt batting for snow. As a permanent layout, you could easily add summer scenery.





THE TRACK PLAN AT A GLANCE

Name: Waterford Loop
Scale: G (1:22.5)
Size: 5 x 10 feet
Theme: narrow gauge steam railroad
Locale: United States or Europe
Era: 1930s
Style: island
Mainline run: 30 feet
Minimum radius: 24"
Minimum turnout: LGB small

MATERIALS LIST

LGB track
10000 straight (23)
10040 filler section (3)
10150 short straight (5)
10260 insulated rail joiners (6)
10310 track bumper (3)
11000 curve (12)
12000 right-hand turnout (3)
12100 left-hand turnout (3)

Pola G scale structures
901 Schönweiler station
904 station platform
908 covered platform
910 locomotive shed
914 switch tower
920 coaling depot
923 water crane
930 house
954 fence

A German Federal Railways class 218 diesel pulls a passenger train through town on the 4 x 8 foot Märklin layout. Scenic mats, ready-made trees, and easy-to-build structures complete the setting of this HO scale model railroad.

A QUICK AND EASY 4 x 8

This HO scale Märklin layout features lightweight benchwork and sectional track

BY DANA KAWALA

DESIGNED AND BUILT by the *Model Railroader* staff, this HO scale model railroad is an ideal "next step" for someone who's ready to move beyond a simple train set. The scenicked 4 x 8-foot layout requires few tools and can be built in a couple evenings.

The layout's theme is the German Federal Railways, and the track plan is designed for Märklin type C sectional track. This all-in-one, or "click," track system features built-in roadbed and is included in the firm's HO scale train sets, as well as for sale separately.

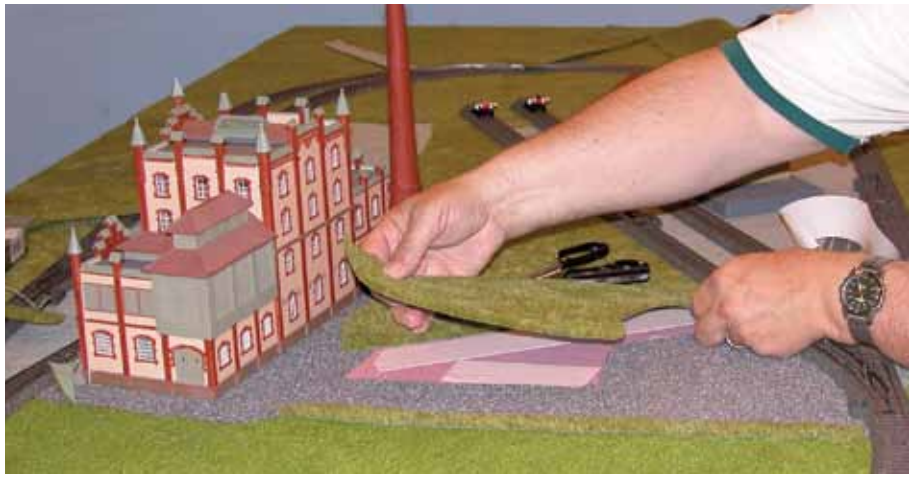
The plan can be easily modified to use other brands of sectional track and will work just as well for modeling North American railroads.

Built on lightweight extruded foam benchwork, the layout is portable. This model railroad can be placed on a pair of sawhorses, a table, or even on the floor for an operating session. Afterwards, the layout can be stored in a closet or under a bed. Just make sure to remove the locomotives, cars, and structure models so they're not damaged.

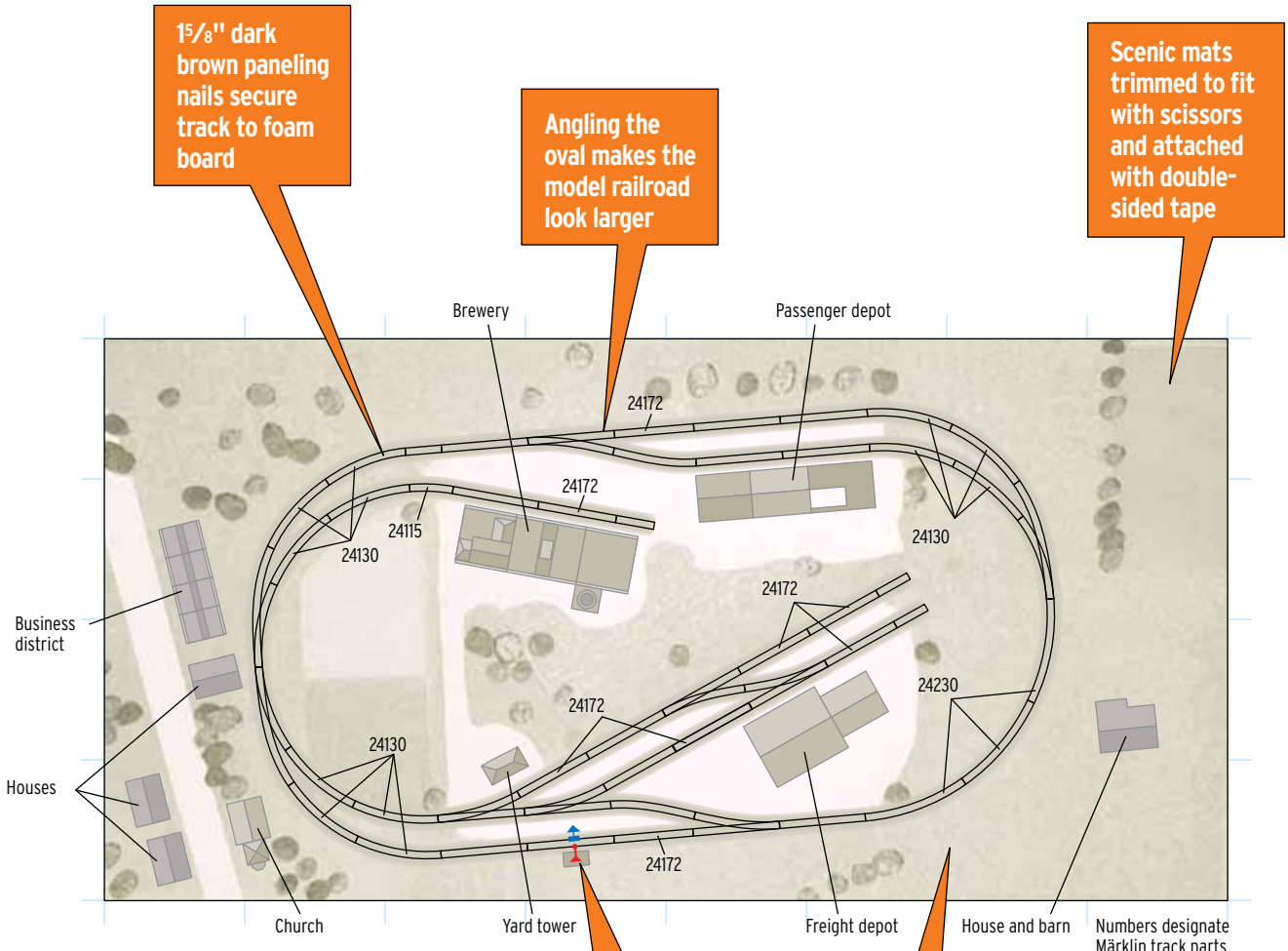
Cut-to-fit scenic mats, easy-to-build kits, and factory-assembled trees make it a snap to finish this model railroad in little time. A couple of industry spurs and sidings give trains a place to venture beyond the train set oval. MR

THE TRACK PLAN AT A GLANCE

Name: German Federal Railways
Scale: HO (1:87.1)
Size: 4 x 8 feet
Prototype: freelanced
Locale: Germany
Era: 1990s to present
Style: island
Mainline run: 14 feet
Minimum radius: 14 3/16"
Minimum turnout: no. 4
Maximum grade: none
Benchwork: Extruded-foam insulation board
Track: Märklin type C track



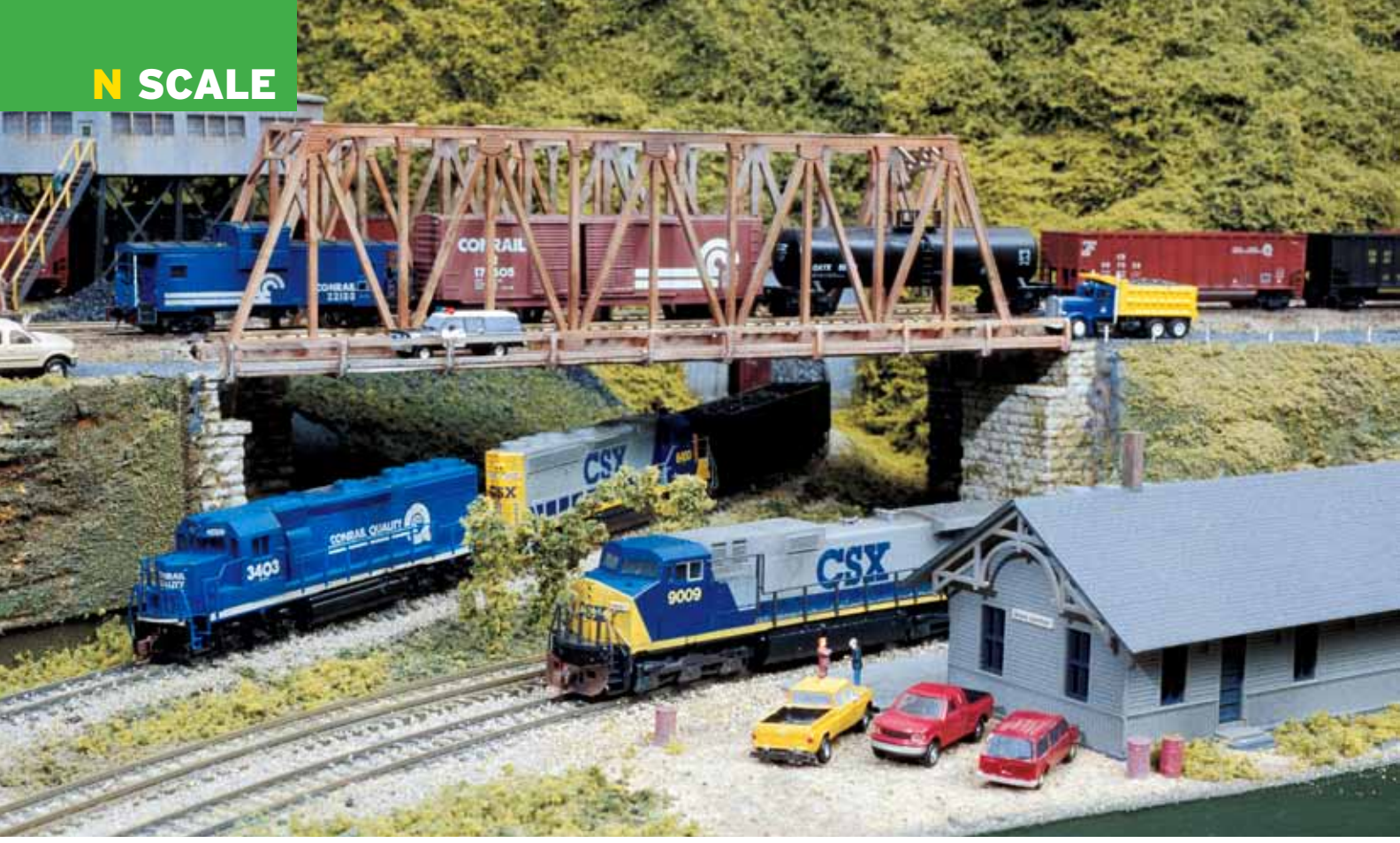
The ground cover on the layout is scenic mats of various textures cut to fit and attached with tape. Here a scrap of a field grass mat is used to fill in a bare spot.



German Federal Rys.

HO scale (1:87.1)
Layout size: 4 x 8 feet
Scale of plan: ¾" = 1'-0", 12" grid
Illustration by Rick Johnson

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



Trains pass across and beneath a truss bridge on the N scale Appalachian Central. The layout features plenty of realistic operation and mountain scenery in 5'-7½" x 7'-0".

BUILD AN N SCALE MOUNTAIN LAYOUT

A backdrop and staging enhance operations on the Appalachian Central

BY DANA KAWALA

YOU DON'T NEED TO FILL a basement to build a layout for operation. The N scale Appalachian Central, designed and built by Lionel Strang, is a case in point. Inspired by West Virginia coal country, the AC packs the action of a modern-era main line in 28½ square feet.

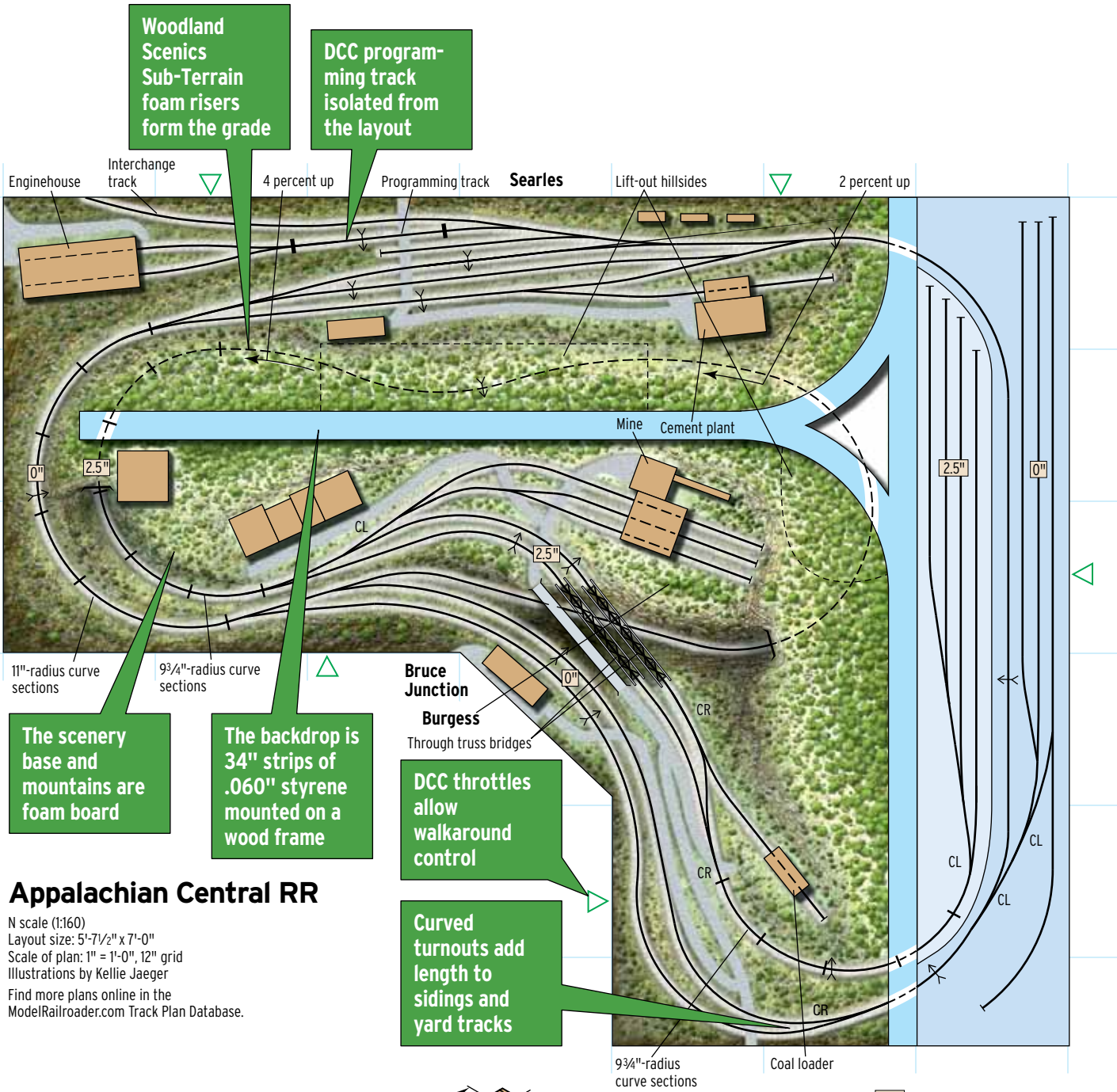
A backdrop divides the two main scenes and separates the scenicked part of the layout from the staging tracks. By providing off-layout destination and origination points for trains, the pair of four-track staging yards add to the illusion that the layout is part of a much larger railroad.

Lionel also used changes in elevation to help add distance between scenes. Trains enter a tunnel at Bruce Junction, then climb a stretch of hidden track to reappear 2½" above the main line at Burgess. Since Lionel built the scenery using lightweight foam insulation board, he could make lift-out mountains providing easy access to the hidden track.

A mine, coal loader, cement plant, and interchange track ensure plenty of switching. And the continuous-run main line lets railfans sit back and watch trains roll through the mountains. MR

THE TRACK PLAN AT A GLANCE

Name: Appalachian Central
Scale: N (1:160)
Size: 5'-7½" x 7'-0"
Mainline run: 22 feet
Prototype: freelanced
Locale: Appalachian Mountains of West Virginia
Era: 2000
Style: Island
Minimum radius: 9¾"
Minimum turnout: Peco medium radius (no. 4 frog)
Maximum grade: 2 percent
Benchwork: L-girder (see diagram)
Track: Atlas code 80 flextrack and sectional track

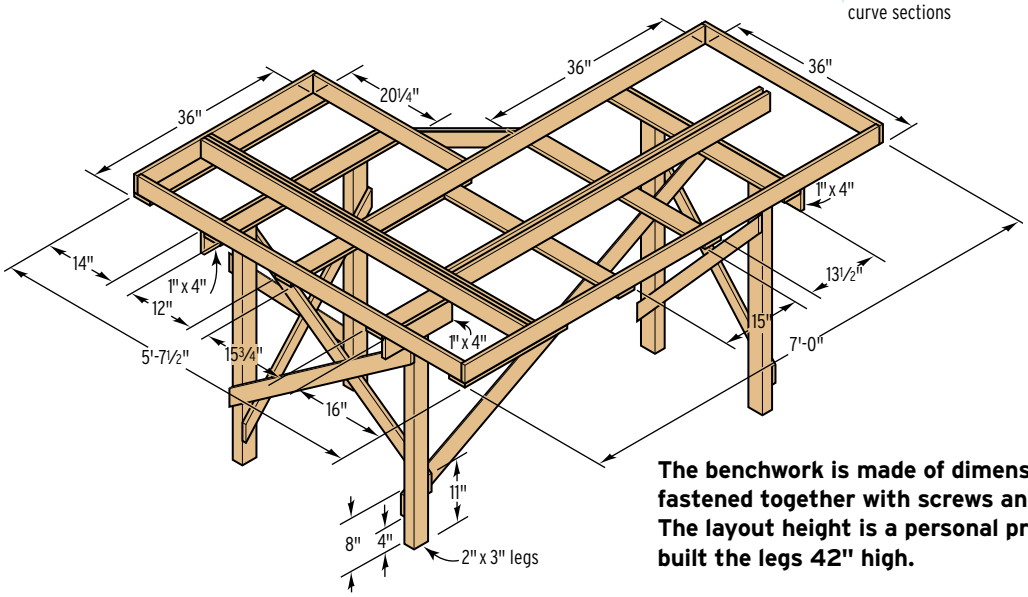


Appalachian Central RR

N scale (1:160)
Layout size: 5'-7½" x 7'-0"
Scale of plan: 1" = 1'-0", 12" grid
Illustrations by Kellie Jaeger

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

2.5" Elevations
Feeders
CL: Curved left turnout
CR: Curved right turnout
Handheld controller jacks



The benchwork is made of dimensional lumber fastened together with screws and wood glue. The layout height is a personal preference. Lionel built the legs 42" high.

Turtle Creek Central Baldwin switcher no. 4 pulls hoppers past the warehouse as workers break for lunch. Photo by Bill Zuback

BUILD A BRANCHLINE IN HO SCALE

This 4 x 8-foot layout provides plenty of operating potential

BY CODY GRIVNO
PHOTOS BY BILL ZUBACK

IF YOU DON'T THINK REALISTIC operation is possible on a small model railroad, take a look at the HO scale Turtle Creek Central. The 4 x 8-foot layout has five rail-served industries, interchange tracks to connect the railroad with the rest of the world, and the potential for expansion.

Because so much is packed into this layout, small steam locomotives and four-axle diesels are the order of the day. Freight cars have to be 40 feet or shorter, which is appropriate for the model railroad's 1950s era.

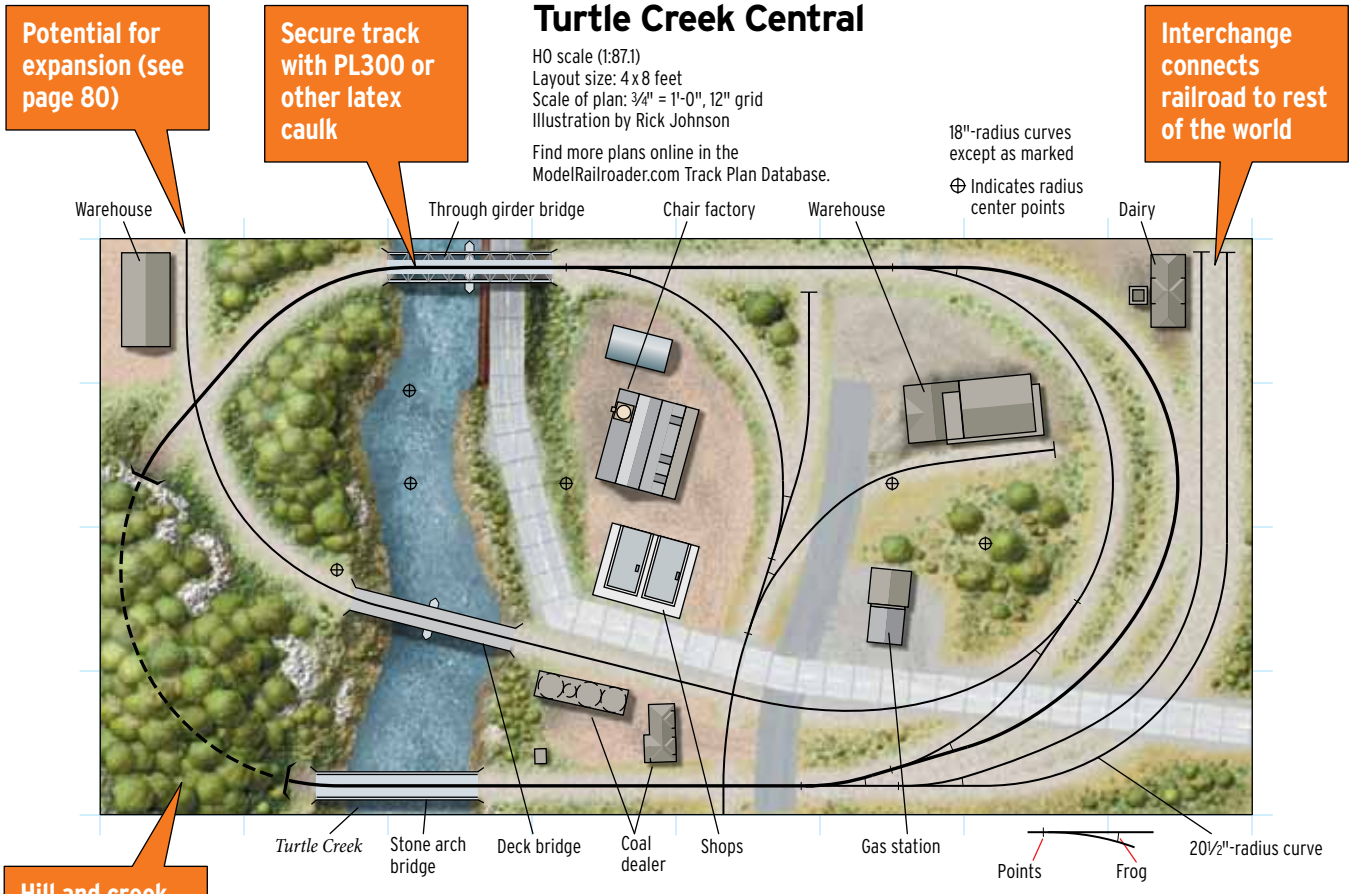
What sets this layout apart from most 4 x 8s is the effective use of scenery. The creek breaks up the tabletop, and the tree-covered hill provides vertical elevation change without introducing a grade to the track. You can learn more about building this type of scenery on page 46.

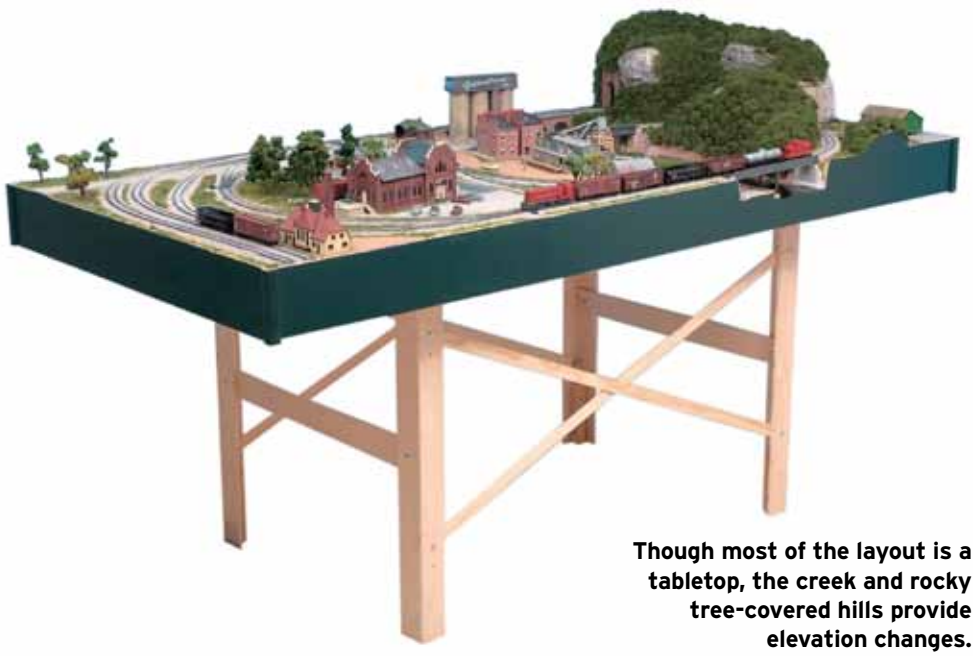
The Turtle Creek Central provides enough operating potential to satisfy a veteran hobbyist and scenic features that appeal to modelers of all skill levels. This combination of elements will lead to hours of enjoyment. To make this layout even more fun, see page 80. MR

Turtle Creek Central

HO scale (1:87.1)
Layout size: 4 x 8 feet
Scale of plan: ¾" = 1'-0", 12" grid
Illustration by Rick Johnson

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





Though most of the layout is a tabletop, the creek and rocky tree-covered hills provide elevation changes.

THE TRACK PLAN AT A GLANCE

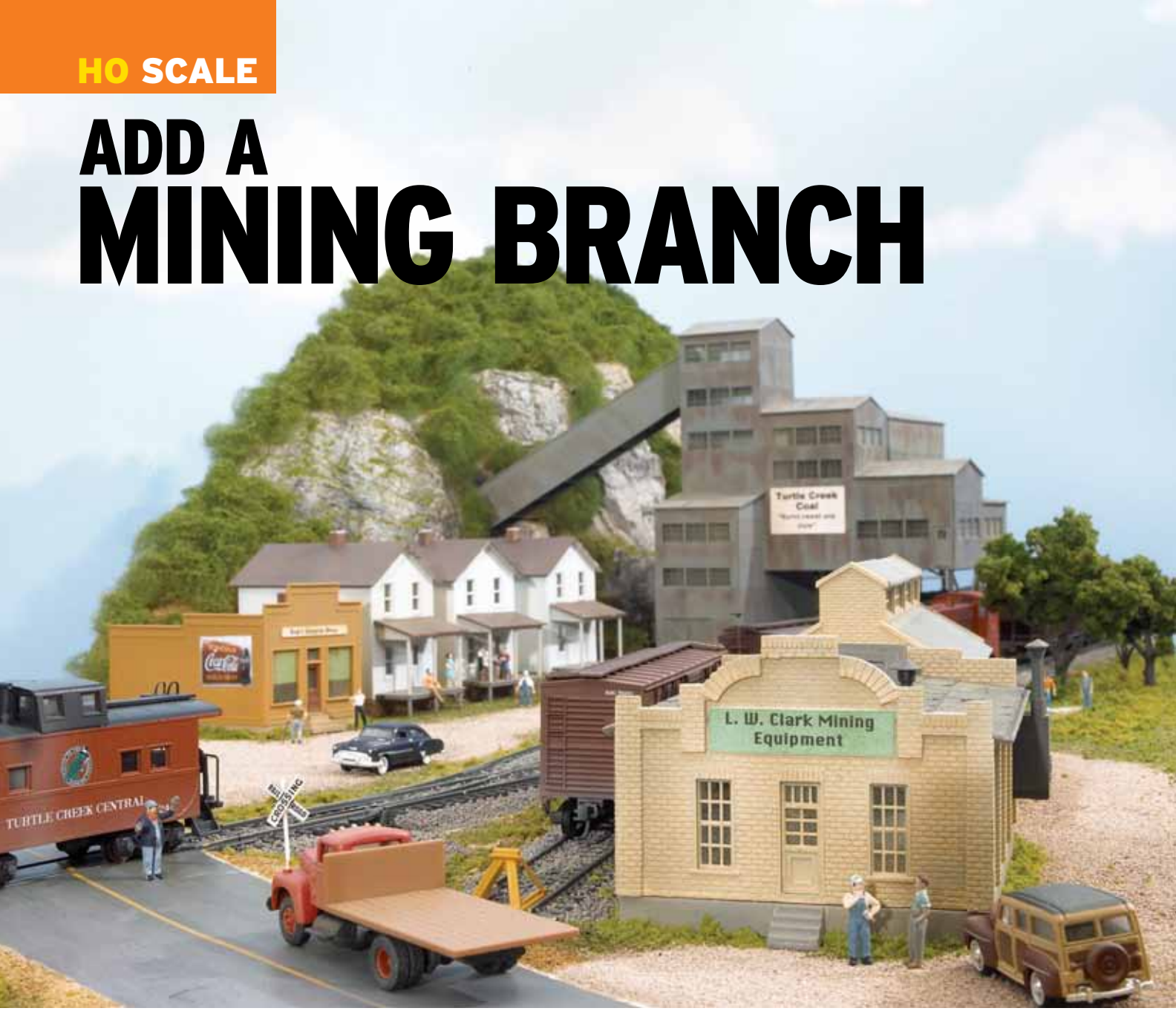
Name: Turtle Creek Central
Scale: HO (1:87.1)
Size: 4 x 8 feet
Prototype: freelanced
Locale: Pennsylvania
Era: summer 1952
Style: walkaround
Mainline run: 19 feet
Minimum radius: 18"
Minimum turnout: no. 4
Maximum grade: none

MATERIALS LIST

Atlas code 83
170 rail joiners, 2
500 flextrack, 15
542 Snap Switches, left-hand, 4
543 Snap Switches, right-hand, 4
575 45-degree crossing
577 90-degree crossing, 2

Caboose Industries
218 sprung ground throws, 3
5218 sprung ground throws, 5-pack

ADD A MINING BRANCH



The brakeman flags traffic as "The Snapper," the Turtle Creek branch line local, departs town. Building the HO scale Turtle Creek mine branch extension is a great way to expand an existing railroad, practice different modeling techniques, or begin a new sectional layout.

This 2 x 6-foot branch can be added to a layout or be the start of something new

BY STEVEN OTTE
PHOTOS BY THE *MODEL RAILROADER* STAFF

LIKE MANY TRACK PLANS presented in this magazine, the Turtle Creek Central (see page 78) includes opportunities for expansion – tracks that lead to the edge of the layout, where more railroad can be added on. Here's an expansion we built for the Turtle Creek, adding a coal mine and a mining supply business. A compact layout section like this can increase the operating fun of any layout, or even be the start of a larger system.

The branch is built on simple open-frame benchwork, topped with plywood and two sheets of extruded-foam insulation board, totaling 3" thick. The foam is cut away on one end to model a creek and stacked behind the mine to form a hill. Though the track is level, this vertical terrain adds visual interest and identifies the layout's Appalachian locale.

The coal mine is the center of operationing interest, justifying the line's construction. But if you're modeling another part of the country, it's simple to replace the mine with a grain elevator, cannery, sawmill, or some other industry better suited to your locale.

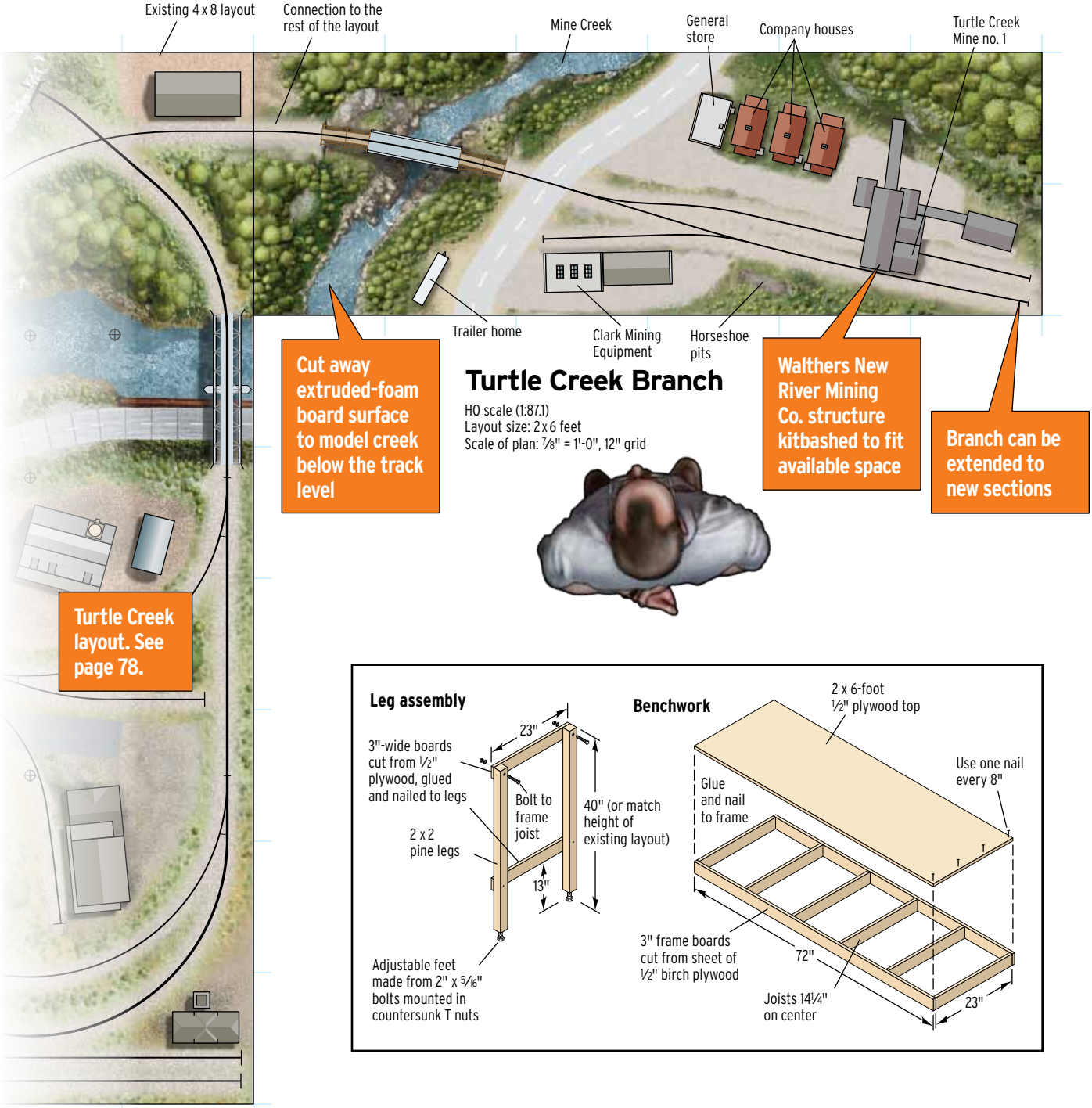
What's more, this layout expansion has its own potential for further growth. Extend the track running past the mine off the end of the layout and add another section. The railroading fun doesn't have to end here! MR

THE TRACK PLAN AT A GLANCE

Name: Turtle Creek Branch
Scale: HO (1:87.1)
Size: 2 x 6 feet
Theme: coal mining branch
Locale: Appalachian mountains
Era: 1950s
Style: sectional
Mainline run: 6 feet
Minimum radius: freehand curves (approx. 48")
Minimum turnout: no. 4
Maximum grade: none

Layers of foam insulation board, stacked and glued with foam-safe adhesive, form the rough hills.

Carve the foam to shape and trowel on Sculptamold to fill in gaps between foam layers and smooth the surface.



MODEL RAILROAD GLOSSARY

ALL-IN-ONE TRACK P.24
Model track that includes simulated roadbed or ballast. Also called combination track or "click" track.

BACKDROP P.61
A painting or scenic photograph on the wall behind a layout. It can be a simple cloudless blue sky, or it can echo the scenery of the layout and create an illusion of great distance.

BALLAST P.14
On real railroads, a layer of material, usually crushed rock, cinders, or gravel, on top of the roadbed that holds the ties in position and facilitates drainage. On a model railroad ballast is simulated by fine gravel spread between the ties and alongside the track.

BENCHWORK P.10 AND P.50
Supporting framework for a model railroad layout, usually made of lumber.

BLOCK
On a real railroad, a section of track defined for the purpose of controlling trains. On a model railroad, a block is an electrically isolated section of track.

COMMAND CONTROL P.30 AND P.15
A way of controlling model trains by sending electronic signals through the rails (such as Digital Command Control, or DCC) or by wireless link, either radio or infrared. Locomotives can be controlled independently anywhere on a model railroad.

COUPLER P.63
The device that fastens cars and locomotives together.

DIGITAL COMMAND CONTROL (DCC)
See Command Control.

FLEXIBLE TRACK P.25
Track in long sections (usually 3 feet or 1 meter) that can be bent to any desired curve. Also called flextrack.

FREELANCE
Modeling that doesn't follow a specific real-world prototype.

GAUGE
The distance between the inside of the railheads. Most railroads in North America and Europe are built to a standard gauge of 4'-8½".

GRADE P.36
The vertical rise of a track per 100 units of distance, expressed as a percentage. A 2" rise in 100" is a 2 percent grade.

HANDLAYING
Installing model railroad track using individual ties, rails, and track spikes.

HELIX
A rising curve that turns around an axis like a corkscrew. Used on some multilevel layouts to allow trains to go from one level to another.

JUNCTION P.9
A location on a railroad where main and/or branch lines diverge or cross each other.

KITBASHING
Taking one or more model railroad kits (often structure kits) and changing the construction process or combining parts to make a customized model.

LAYOUT
A model railroad.

MAIN LINE
The track serving as the main route for trains. Some heavy-use main lines have two or more tracks.

OPERATION
Running trains on a model railroad to simulate moving freight or passengers over a real railroad.

POWER PACK (OR SUPPLY)
A model railroad control device containing a transformer and rectifier to reduce 120-volt alternating current (AC) house current to a lower direct-current (DC) voltage for running model trains.

PROTOTYPE
The full-sized object after which a scale model is made. Also refers to the 1:1 railroad on which a model railroad is based.

RADIUS P.7
The size of a curve measured from its center point to the center line of a curved track.

RAIL CODE P.24
Height of model rail measured in thousandths of an inch: code 100 measures .100" tall, code 83 is .083" tall, code 70 is .070", and code 55 is .055".

RAIL JOINER P.25
A formed sheet metal mechanical connector used to join model rails end to end. Plastic, insulated rail joiners that don't pass electricity are also available.

ROADBED P.38
On real railroads, the foundation layer of earth on which the track is built. On a model railroad, cork, foam, or other material that simulates the ballast profile.

ROLLING STOCK P.62
Nonpowered railroad cars; freight and passenger cars.

SCALE P.7
The size of things on a model railroad relative to things on a real railroad. For example, an O or 1:48 scale model is 1/48th the size of its prototype.

SCRATCHBUILDING
Making a model from raw materials and parts, not using kits.

SECTIONAL TRACK P.24
Track in short, rigid pieces (fixed lengths and curve radii) that are easily joined to each other. Also called set track.

SIDING
A parallel track connected to another by a turnout at each end.

SPUR OR SPUR TRACK
A dead-end track, one with a turnout at only one end.

SUBROADBED
The bottom or foundation layer of model track, usually made from plywood.

TRACK PLAN
A diagram showing the arrangement of track and other details on a layout.

TRUCK P.63
The wheel, axle, and frame assembly under each end of a car or locomotive.

TURNOUT P.24
A section of track with movable rails to divert a train from one track to another. The term "switch" correctly refers to only the moving parts of the turnout.

WEATHERING P.22
Making new models look more realistic by simulating the effects of age, grime, and general evidence of use.

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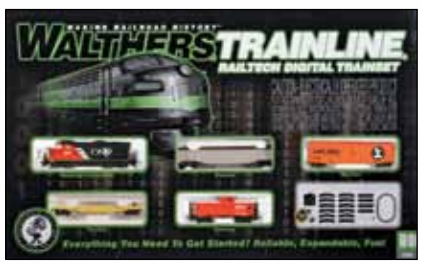

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