BUILD THIS RETRO RAILROAD

Complete instructions for creating this 4 x 8-foot postwar-style layout

RETRO RAILROAD YOU CAN BUILD

THIS 4 X 8-FOOT O GAUGE PLAN DRAWS IDEAS FROM TRADITIONAL LIONEL DISPLAYS

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Photos by Jim Forbes • Illustrations by Kellie Jaeger and Kent Johnson

A Lionel no. 213 Alco diesel combination has the inside track on this O gauge project layout featuring traditional toy trains and classic operating accessories.

A big and scenic layout with many trains is a lifelong dream for many of us, but those layouts can get complicated (and costly). If that's what you want, great, but if not, don't worry – you can have a lot of fun with a basic layout.

Over the years John and I have worked on large layouts. They're cool, no doubt, but we thought that something smaller that combined postwar trains with modern materials also sounded like fun.

We told CTT Editor Carl Swanson what we were thinking, and he challenged us to actually follow through. Uh-oh.

We started by taking a quick tally of what we did and didn't want for our O gauge railroad. I wanted to run two trains using conventional power, so that basically meant the classic "two loops and a transformer" configuration on a 4 x 8-foot table.

Getting our thoughts on track

Choosing the track brought about one of our longer discussions, but in the end we stayed pretty close to home, so to speak. We had plenty of O-27 track, so that's what we used, but you could build a basic layout just as easily using tubular O or new click track. You can use our plan if you use O gauge, but you'll need to make a few adjustments if you use any brand of click track.

Most of our track switches are no. 1022 manual versions because we didn't see a need for electric switches along the front of the layout. However, we did use two no. 1122 switches in places where we wanted to have the non-derailing feature.
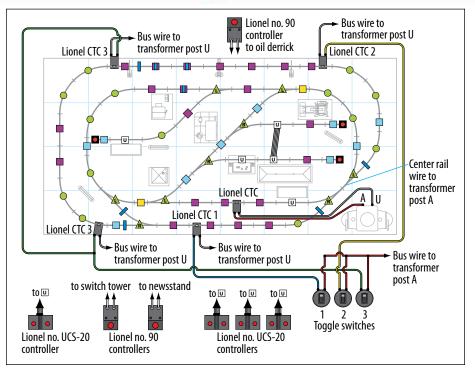
Using the O-27 means that we're limited to mid-sized and smaller equipment, but hey, it's a modest 4 x 8-foot table. Once we decided to use O-27, we figured we might as well stay with the postwar theme. We made a few exceptions, as you'll see, but for the most part the track and accessories are all postwar vintage selections.

Track plan preparations

The plan we built makes room for a transformer and adds some operating interest thanks to a junction at one end of the layout. It fits on a 4 x 8-foot table comfortably, and we added a spur track in the spot where we had originally planned for a tunnel.

There aren't any S curves, and the plan has space for several operating accessories that we arranged to resemble what you would have seen on a postwar Lionel display layout.

The final version of the track plan, shown on the facing page will work in O-27 or O gauge as is, though it's too wide for a 4 x 8-foot table in O gauge unless you slightly modify the outer loop of track.

Operation on this railroad is pretty straightforward, basically the mainline train (outer track) picks up or drops off cars in front of the depot and then either runs a few more laps or goes to the other side of the layout and waits. The switch engine on the inner track
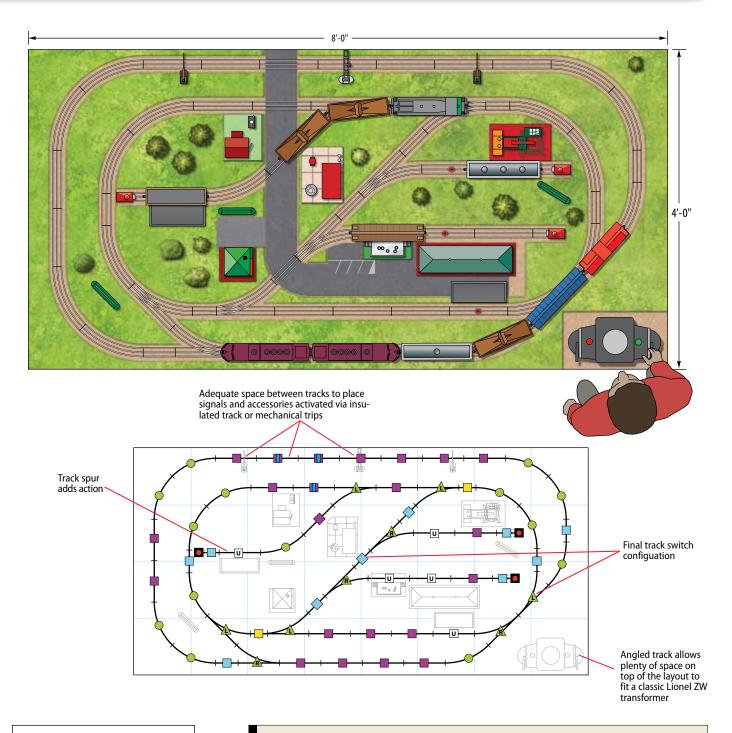
then positions the cars at the various industries. If you want to vary the operation, exchange a few cars for others when the mainline train is stopped on the backside of the layout – or even exchange the entire train.

Operating accessories, ranging from a postwar Lionel no. 452 signal to a modern reproduction of a no. 455 oil derrick, provide layout action on and away from the track

Control buttons mounted along wood framework provides additional room for track

Classic O gauge trains and simple scenery are reminiscent of postwar Lionel display layouts

Lionel CTC 3

Bus wire to transformer post U

Lionel no. 90 controller to oil derrick

Bus wire to transformer post U

Lionel CTC 2

Center rail wire to transformer post A

Lionel CTC

Lionel CTC 1

Lionel CTC 3

Bus wire to transformer post U

Bus wire to transformer post U

Bus wire to transformer post A

to switch tower   to newsstand

to u

to u   to u   to u

1   2   3
Toggle switches

Lionel no. UCS-20 controller

Lionel no. 90 controllers

Lionel no. UCS-20 controllers

8'-0"

4'-0"

Adequate space between tracks to place signals and accessories activated via insulated track or mechanical trips

Track spur adds action

Final track switch configuation

Angled track allows plenty of space on top of the layout to fit a classic Lionel ZW transformer

LIONEL O-27 TRACK COMPONENTS

Quantity		Description/Number
10		5-inch half-straight
19		10-inch straight
2		custom-cut straight
3		insulated straight
5	U	uncoupling track
14		0-27 curve, 45-degree
5	L	0-27 left-hand switch
4	R	0-27 right-hand switch
3		track bumpers (260)

SUGGESTED LIONEL POSTWAR ACCESSORIES

Quantity/Description/Number
1 animated newsstand (128)
1 automatic gateman (145)
1 illuminated freight station (256)
3 billboard set (310)
1 switch tower (445)

1 overhead gantry signal (452)
1 operating oil derrick (455)
1 milk car platform (3462P)
1 ZW transformer

Layout framework

The primary goal of building any permanent layout is to raise the track from a temporary position on the floor to a more accessible, comfortable, and secure location above it. Building a wood framework (also called "benchwork") is often the first choice for elevating a layout, but not always.
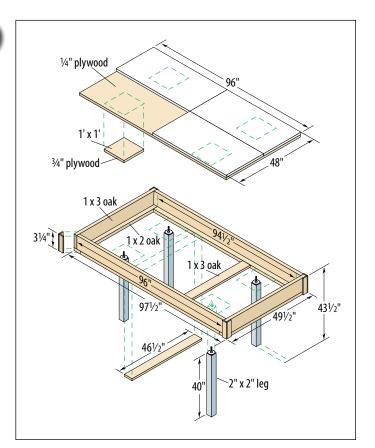
As John and Terry initially considered, you can use a table, desk, or other furniture item to support a small layout. Other more conventional options for layout framework are detailed in the Kalmbach book, *Basic Model Railroad Benchwork* (no. 12241), available at KalmbachBooks.com.

If you want to build your layout framework similar to how John and Terry did, simply review the construction diagram shown here, gather your materials, and follow along with the photographs, text, and helpful tips presented in the next pages. – *Editor*

¼" plywood
96"
1' x 1'
¾" plywood
48"

1 x 3 oak
3¼"
1 x 2 oak
94½"
1 x 3 oak
96"
97½"
49½"
43½"
46½"
40"
2" x 2" leg

ON THE WEB

CTT+

Registered users can view several videos of the Retro Railroad by going to ClassicToyTrains.com and clicking on "Operating". And then clicking on "How-to."
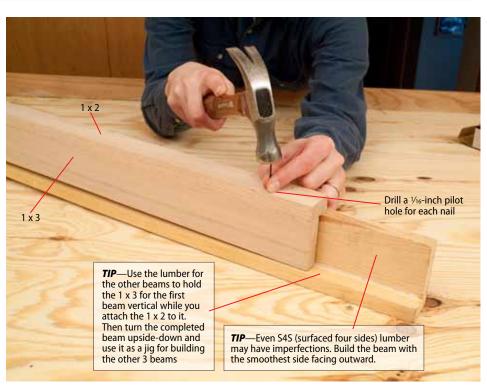
Build a solid frame

We assembled the top portion of our table using ¼-inch plywood framed with furniture-quality oak. The oak frame helps support the plywood and gives the layout finished edges. Yes, we splurged on the oak, but it sure looks great. You could use maple, birch, or even clear pine if you prefer to match the frame to other furniture or wood trim in the room.

If you're feeling really thrifty, cut all the pieces for the frame from a piece of ¾-inch oak plywood and then cover the edges with iron-on veneer. You'll be surprised how good that looks once you sand and stain it.

To construct the sturdy wood frame, we used 1 x 3 and 1 x 2 boards (rather than 2 x 4s) to reduce the overall weight of the assembly. Even so, moving the layout is still a two-person job. If you plan to move the layout through any doors, you may even need to recruit a third person to assist.

After cutting the boards, we used carpenter's wood glue and small screws to join the oak trim with the plywood. Remember to drill pilot holes before driving the screws so that you don't split the lumber.

1 x 2

1 x 3

Drill a ¹⁄₁₆-inch pilot hole for each nail

TIP—Use the lumber for the other beams to hold the 1 x 3 for the first beam vertical while you attach the 1 x 2 to it. Then turn the completed beam upside-down and use it as a jig for building the other 3 beams

TIP—Even S4S (surfaced four sides) lumber may have imperfections. Build the beam with the smoothest side facing outward.
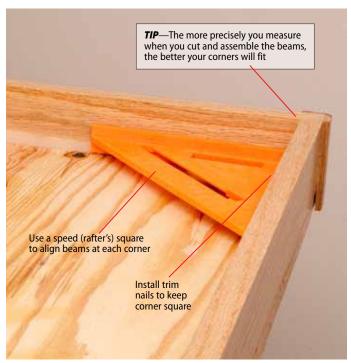
To start construction, we temporarily placed the plywood on top of two sawhorses for a stable work surface. Next, we built four L-shaped beams according to the dimensions shown in the framework diagram. We used a combination of carpenter's wood glue and 1½-inch trim nails to fasten the boards.

Build a solid frame (continued)

Use C-clamps to hold L-shaped beam

Apply glue and drive 1¼-inch drywall screws into 1 x 2

Check 90-degree angle

Plywood tabletop rests on lip of 1 x 2

After allowing the glue to dry, we installed the L-shaped beams along the plywood edges. We used clamps to temporarily secure the 1 x 2 lip of an 8-foot beam to the underside of the plywood. We confirmed that the 1 x 3 fit at a right angle to the tabletop and then used wood glue and drywall screws to attach the beam.

TIP—The more precisely you measure when you cut and assemble the beams, the better your corners will fit

Use a speed (rafter's) square to align beams at each corner

Install trim nails to keep corner square

As previously described, we attached the remaining L-shaped beams to the plywood. In addition to checking the vertical alignment of the beams, we used a speed square tool to align the four corners as precisely as possible. If necessary, insert trim nails to hold each corner in alignment while the glue dries.

Finishing the corners and framework

At this point we had a plywood tabletop with a swell frame, but we didn't stop there. The choice of oak wood certainly enhanced the look of our tabletop, but we accented the finish by installing trim pieces at each corner and then applying an oil finish to the outward sides of the frame.

In an additional step to make the framework as rigid and stable as possible, we installed wood cross-members under the plywood tabletop. Finally, we added legs to our framework and removed the sawhorses we had used for temporary support.
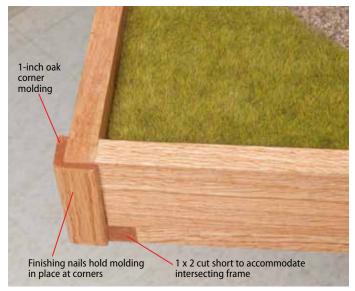
LONG ON LEGS

The set of legs John and Terry used for the Retro Railroad is just one of many simple and economical options available to support a train table. On a visit to a home improvement store, you'll likely find several helpful products, including:
• sawhorses
• PVC tubing
• steel poles and feet
• metal workbench legs
• dock or pier supports

1-inch oak corner molding

Finishing nails hold molding in place at corners

1 x 2 cut short to accommodate intersecting frame

After allowing the glue application along the framework and corners to dry, we decided to add finishing trim to each corner. We cut four 3¼-inch lengths of outside corner molding for the corners and attached them with carpenter's wood glue. You can use small finishing nails to hold them in place if you wish, but be sure to drill pilot holes first and fill the nail holes afterward.
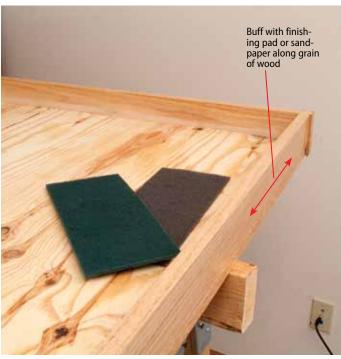
TIP—Make sure your room is well ventilated when applying the wood finish

TIP—Wear inexpensive clear plastic food service gloves while working with the wood finish. They're cheap enough that you can use a new pair for each coat

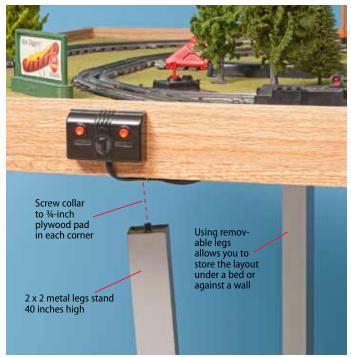Use clean and soft cotton cloth to apply oil finish to exposed oak surfaces

Next, we sanded the wood in preparation for finishing. We used Minwax (minwax.com) Antique Oil Finish, but you could easily use other stains and finishes or even simply paint the wood. If you use a finish like we used, simply rub it onto the wood using a piece of clean, white cotton cloth.

Buff with finishing pad or sandpaper along grain of wood

We let each coat of finish dry for approximately 5 to 10 minutes before buffing it with a Scotch-Brite no. 7447 general-purpose finishing pad. Re-apply coats until you're happy with the finish. If you want an especially smooth finish, switch from the Scotch-Brite pad to 220- and then 400-grit sandpaper as you add coats.

Angle brackets help secure cross braces to framework

Plywood pads provide a solid base for mounting the legs

Even in a controlled room environment, thin plywood will flex and eventually warp. That's why we used 1 x 2 framework remnants to add two oak cross braces to the underside of the plywood tabletop. Next we used carpenter's wood glue and wood screws to attach 1-foot-square pads (offset 12 inches from the ends) of ¾-inch plywood in each of the underside corners.

Screw collar to ¾-inch plywood pad in each corner

Using removable legs allows you to store the layout under a bed or against a wall

2 x 2 metal legs stand 40 inches high

The permanent legs we selected for our layout are 2-inch-square table legs with an aluminum finish. They screw into metal collars that are themselves screwed to the plywood pads. We purchased these 40-inches-high legs from Table Legs Online (tablelegsonline.com or 800-220-3800), where you can find legs of varying sizes, styles, and heights.

A stone and foam top

Although numerous classic toy trains and accessories top off our retro railroad, we looked to use as many modern construction conveniences as possible below the rails. For one such departure from the norm, we elected to use stone-coated foam insulation board on top of the plywood. This board is intended for insulating outside walls and foundations, but you can use it indoors just as easily.

After installing the foam top, we took a break for lunch and debated which classic Lionel locomotive is best, the no. 226E 2-6-4 or the 726 Berkshire. (We settled on the 1946 no. 726 Berk, but that's just a matter of opinion.) The friendly discourse inspired us to make plans for assembling track and wiring the layout for operation in our next work session.

1-inch-thick sheets of stone-textured foam insulation board can be purchased from major home improvement stores

TIP—measure the insulation pieces carefully before starting your framework. Ours were about ⅛-inch oversize on each side because of paint and stone that overlapped the sides. If that's the case, either make your wood frame slightly larger or use a circular saw with an abrasive blade to shave a little from the sides of three of the panels

On our project layout, the 2 x 4-foot sheets of stone-covered insulating material add strength to the plywood. Plus, in our application, it saved a lot of time because it allowed us to skip ballasting completely—something we really didn't miss!

We used Liquid Nails For Projects brand latex adhesive (www.liquidnails.com) to bond the foam to the plywood. Bonding the foam to the plywood gives the plywood a little more strength. If you find that the foam wants to lift off of the plywood, use drywall screws to hold it in place while the Liquid Nails dries. You may remove the screws later.

TIP—If you want the ballasted look but don't want to use the stone-coated board, purchase a few rolls of ballast mat, such as that made by Faller, and use that instead. You can also use a faux painting technique, but remember to use latex paint, not oil, if you paint over foam

After the Liquid Nails dried, we used brown acrylic caulk to hide any seams and fill any gaps between the foam boards. Once our foam-covered framework was done, we had a tabletop that already looked realistic, if a bit barren. At this point, the surface was ready for us to install track, which we'll cover next in our Build a Retro Railroad instructions.

Cutting the mats

In parts of the layout, we added scenery mats (from Scenic Express) on top of the stone-coated foam insulation board that we put over the plywood base. You can cut the mats now or later.

Busch, Heki, and Noch make mats in the color we liked (spring green). Be aware: the flocking installed on these mats differs in length and texture.

The simplest and most effective way to decide how to cut the mats is to place some large sheets of paper on the stone before assembling the track. Next, put the track together and mark its location on the paper. Then remove the paper from under the track so that you can use it as a pattern for cutting the mats later.

You can also unroll the mats on the plywood tabletop before adding the stone-coated foam insulation board. Assemble the track temporarily, and go ahead and cut the mats before doing the final assembly of your track. Be sure to use a sharp hobby knife (you'll go through several blades). Then set the mats aside.

TIP—Don't cut the mats directly on the stone-coated insulation board. The blade of your hobby knife will become dull almost instantly, and you'll end up tearing the mats. Instead, slide a piece of cardboard under the mat before cutting.

John and Terry used a hobby knife and a good stock of sharp blades to cut the scenery mat that added greenery to parts of the Retro Railroad. They made sure to put heavy cardboard between the mat and the stone-coated foam insulation board.

Assembling the track

Even newcomers to the toy train side of model railroading find that it's easy to assemble commercial sections of track. The only challenge comes when, as shown in the list of O-27 components on the previous page, you need two custom-cut straights.

Here's our advice: Whenever you're cutting steel track to fit, be certain you have a sharp blade for your hacksaw. And because the blade won't stay sharp for very long, we recommend that you buy plenty of blades before starting.

We cut the steel track by clamping it between two pieces of wood in a bench vise and cutting along the edge of the wood. We used a metal file – specifically, a Craftsman file made for sharpening lawn mower blades – to remove burrs and even out the ends of the rails.

Next, we replaced any bent pins with new solid pins and tightened any loose connections. Track pliers work well for these tasks, but we managed by using a pair of standard pliers and a pair of heavy-duty needlenose pliers.

We put insulating pins at the correct points. We looked over each section of track as we added it to ensure that the center-rail insulators were in place.

TIP—For high-speed cuts, use either a motor tool with a cutoff wheel or a saber saw with a metal-cutting blade. Always wear safety goggles and heavy gloves.

A pair of needlenose pliers works very well for removing any bent track pins and tightening loose connections. John and Terry suggest examining each piece of track before securing it to ensure that the center-rail insulators are in place.

Adding ties under the rails

We wanted to add ties to our track. There are several sources of commercial, ready-to-use ties. However, you can make your own from wood, rubber, or foam-core. We used rubber ties left from an earlier layout.
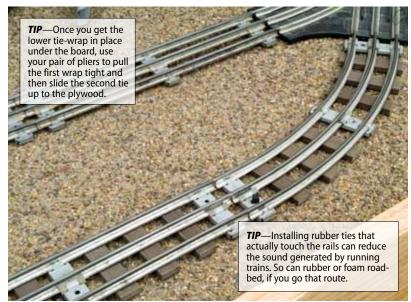
To hold the ties in place, we used brown acrylic caulk made for outdoor use as a sealant around windows. You can apply the caulk to the ballast or the ties. Then lift the track and slide the ties in place. Push them down against the stone board so the caulk gets a good grip.

The layer of foam covering the plywood tabletop makes it impossible for screws to adequately hold the track in place. Consequently, we used tie-wraps.

We relied on a hardened trim nail to make a hole in the stone. We then used a ⅛-inch bit to drill through the hole and into the tie, foam, and wood. An extra long bit proved to be essential in spots where we had to drill through the plywood pads. Even if you're careful, the bit will be dull when you're done.

The small black electrical ties that we bought had a thin section at the end, and it was too flexible to go through the holes well. They worked better after we cut the ends off at an angle using side cutters.

To secure the track, place a black tie-wrap through the hole with the larger end facing up. Use a second wrap under the board to hold it in place. Cut off whatever length remains unused, and you're done.

TIP—Once you get the lower tie-wrap in place under the board, use your pair of pliers to pull the first wrap tight and then slide the second tie up to the plywood.

TIP—Installing rubber ties that actually touch the rails can reduce the sound generated by running trains. So can rubber or foam roadbed, if you go that route.

The rubber ties that John and Terry carefully placed under the rails on the Retro Railroad enhance the realism of their layout. They relied on brown acrylic caulk to secure the ties. You can see the black electrical tie-wraps that they used to hold the track in place. The authors first had to drill holes through the ties and the stone-coated board and plywood.
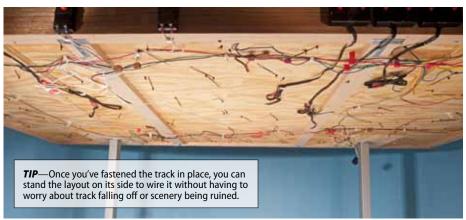
Wiring the layout

Even on a layout as compact as ours, we thought adding feeder wires made sense. But first we had to drill holes for those wires. We used several bits because of the stone-coated insulation board on top.

Beginning with a masonry bit to drill through the stone, we then switched to a standard bit to go through the foam and the plywood. Last, we used a larger bit to clean away splinters from the hole on the bottom of the plywood.

The wire we used for our feeders – 16-gauge solid copper – is heavier than we needed for a 4 x 8-foot layout. Of course, our voltage drop from one end of the railroad to the other is virtually nothing. However, we discovered that getting wire as thick as 16-gauge into the lockons could be quite a challenge.

For that reason, we suggest that you use 18-gauge solid wire, although it can be tough to find. Also, crimp-on spade connectors are useful for wires that must connect to screw terminals.

Be sure to color-code all your wiring. We did so according to our usual system – black for ground, red for the main power wire, white for accessory voltage, and blue, green, and yellow for the three blocks on the Retro Railroad.

TIP—Once you've fastened the track in place, you can stand the layout on its side to wire it without having to worry about track falling off or scenery being ruined.

This view of the underside of the layout should help you see just where Terry and John secured the 16-gauge feeder wires and 3M Scotchlok self-stripping electrical tap connectors. White plastic wire clips hold all the wires in place. The authors used different colors of wire to help them troubleshoot any electrical problems.
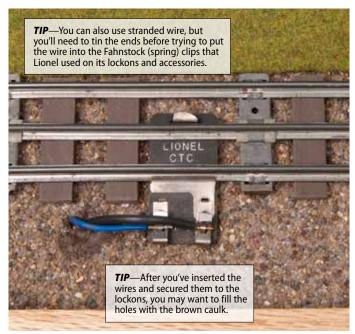
Under the layout, we decided to install 3M Scotchlok no. 558 self-stripping electrical tap connectors, purchased through Mouser Electronics (mouser.com). They have a plastic housing and a small metal clip that you squeeze onto the wires using a large pair of pliers or the crimping tool that 3M sells for handling this job.

The clip cuts through the insulation and connects the wires electrically. Then you snap the lid closed, and the connection is complete.

Common white plastic wire clips hold the wires to the underside of the layout, but we replaced the nails with small pan-head screws. To bundle the wires together into cables, we used the same electrical tie-wraps that we chose for the track – perhaps the first time we've actually used them for their intended purpose!

Completing the wiring

TIP—You can also use stranded wire, but you'll need to tin the ends before trying to put the wire into the Fahnstock (spring) clips that Lionel used on its lockons and accessories.

TIP—After you've inserted the wires and secured them to the lockons, you may want to fill the holes with the brown caulk.

To ensure that the voltage did not drop on the layout, John and Terry added feeder wires. After drilling holes through the tabletop, they secured 16-gauge solid copper wire to Lionel lockons.

TIP—Install lighted bumpers so the light can tell you whether a spur track is live.

For this uncoupling/unloading section, as with the others on the layout, John and Terry cut the cable, installed the track, and then reattached the cable. This leaves a neat look.

Installing the five sections of uncoupling/unloading track presented a challenge on our O-27 layout. That's because the control box and cable come already soldered to the track section.

You have four ways to solve this problem: Run the cable on top of the layout and cover it later, unsolder the cable from the track section and reattach it later, drill a huge hole in the plywood tabletop, or cut the cable and reattach it later.

We picked the fourth option. Before cutting the cable, we marked one side of it with white paint so we knew which way to reattach it. We could have soldered the wires back in place, but decided instead to go with crimp-on connectors.

Another issue related to our wish to operate two trains at once. Rather than wire the layout for two cabs, we decided to use one side of the ZW transformer to run the trains. The inner loop and reversing track are always on. The outer main has three blocks that can be turned off with Leviton no. 1210 surface-mount switches. Track switches control the power to the spurs.

We can run two trains easily, but not simultaneously. It didn't seem worth the trouble to wire a 4 x 8-foot layout for simultaneous operation, but it could be done with ease if you choose a track plan that features a pair of complete loops.

We have only one accessory bus because all of our accessories seem to perform well at the same level (12 volts). If you use several types of accessories, though, you may want to have two or even three buses, each at a different voltage.

On our previous layouts, we've used as many as four accessory bus lines, including independent lighting circuits. These days, however, we tend to keep things simpler so we don't need to spend much time working under the layout.

From one loop to another

If you have two trains on the layout and want to switch the train on the outer loop to the inner loop (and vice-versa), you'll need to use the electrical blocks that we created on the outer loop. Let's go ahead and tell you how we did it.

Start by turning the outer-loop block switches to off and then putting your inner-loop locomotive (which is pulling what we'll designate as "Train 1") onto one of the spurs. Follow this step by throwing the switch to turn its power off. If your locomotive has a three-position reversing unit, you can lock it in neutral.

Next, you'll need to restore power to the outer loop and run that train (we'll refer to it as "Train 2") to one of the two blocks on the backside of the layout. Turn the power off to that block only.

Now get ready to restore the power to Train 1 and then run it onto the other backside block. Finish by turning off the power to that block.

Turn the power back on for Train 2 so you can proceed to run it onto the inner loop. That's all there is to it.

When we run trains on the Retro Railroad, we usually keep a mainline locomotive on the outer track and a switch engine on the inner track.

Dividing the outer loop into three blocks lets anyone shut off the power to the outer train when we want. The three spurs enable us to do the same for the inner train.

ON THE WEB

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Install scenery mats

To complete our scenery we used White Lightning all-purpose adhesive caulk to install the grass mats we had previously cut.

Previously, we showed how we temporarily placed grass scenery mats from Busch, Heki, and Noch on the layout before trimming them to fit specific areas. Now it's time to install those mats.

To hold the mats to the irregular stone surface we used White Lightning (wlcaulk.com) no. WL01010 3006 all-purpose acrylic caulk (almond-colored). You could also use the same brown caulk that we used on the rubber ties placed under the sections of O-27 track.

In either case, apply the caulk to the layout and then use a putty knife to smooth it before applying the mats. You may need to weight some of the pieces to prevent them from curling away from the surface while the caulk dries.

If you prefer, you can apply the caulk to the mats, but that makes getting the mats in place a bit more challenging.

Laying roads

We made our roads from preformed rubber material with printed lane markings. Here, too, we used adhesive caulk to secure roads to the stone tabletop surface. For additional realism, add dirt or gravel along the shoulders of the roads and around accessories.

To make a place for O gauge vehicles, we used Scenic Express (sceneryexpress.com) rubber road material: nos. EX8558 (roadway), EX8511 (turns), and EX8556 (parking lot) components.

Some components of this asphalt roadway system have been discontinued. Fortunately, the Mini Highways roadway pieces from Wm. K. Walthers (walthers.com) look similar, specifically, the nos. 406-401 straight, 406-403 curved, and 406-405 intersection.

Mark your cut lines with chalk or a white crayon, and note that the material is easier to cut with scissors than with a knife. As with the mats, use the acrylic caulk to hold the road to the table top.

Although we didn't attempt to do anything special around our accessories, you could put dirt or gravel around their foundations to add realism.

Scenery details

TIP—Cut steel wire only with cutters made for that purpose. Ordinary side cutters won't last.

TIP—Use two billboards in each frame, so you can see one from each side, or place two billboards back to back.

Trees, billboards displaying vintage ads, and O scale automobiles and trucks are a few of the details that help set the scene on this postwar display-style layout.

EVEN SIMPLER SCENERY

We used the stone-covered foam (styro.net) and grass mats on our layout because we wanted to try some new materials and techniques, but traditional scenery methods work just as well.

For your roadbed, paint the area that will be under the track gray and then add a second (darker) color using a drywall texture roller to give the appearance of stones with different colors.

For the grassy area, paint the section with a medium brown latex and then sprinkle on green ground foam "grass." Hold the grass in place by misting it with water that has a little dishwashing detergent added and then spray it with commercial scenic cement.

To make the layout look a little more complete (and add to the vintage vibe), we positioned billboards around the layout. We primarily used Lionel no. 310 billboards, but we couldn't resist adding one with a slightly more contemporary flair.

All of our trees are ready-made items made by Noch (noch.de/en). Although most of them are pine trees (no. NH26320), we've also included a few deciduous varieties (no. NH261765) that stand more than 7 inches tall.

To install the trees, we first drilled small holes into the trunks. Next, we used pliers to insert short pieces of steel wire into the holes, leaving about ½ inch of the wire extending beneath the tree trunk.

After determining where to plant a tree, we drilled a hole into the stone-covered foam base and inserted the wire extending from the trunk.

Assemble the control panel

Some layout builders like big control panels, but for this simple layout we mounted the block and accessory switches on the side of the layout. Use a pencil to mark the placement of the controls and then use screws to secure them. Be sure to drill pilot holes before driving screws into hardwood.

We used Lionel no. 90 push buttons for the nos. 445 automatic switch tower and 128 newsstand, and a Lionel no. 364C to control the no. 455 oil derrick.

For the no. 145 automatic gateman, we made four track sections that have one outer rail insulated. To make these, we used a screwdriver to pry up the tabs on one outer rail of a straight section and then insulated that rail with paper insulators from the center rail of a scrap section of track. Use pliers to squeeze the tabs back into place, and make sure to use insulated pins on both ends of that rail.

When a train is on one of those sections, the wheels and axle complete the

TIP—Step-by-step photos for insulating a track section appeared in the November 2006 CTT feature, "Make insulated O gauge track sections."

For easy access, John and Terry installed traditional Lionel controllers on the face of the solid oak framework.

circuit and the gateman exits his shack. You can use a no. 145C contactor to control the gateman.

We had already installed the controls for the no. 3424 operating brakeman car when we realized that our brakeman had

Although the Lionel no. 452 signal was a late addition to our plan, it gives the brakeman a very good reason to duck.

no reason to duck. The Lionel no. 452 signal gives him a reason, plus it makes the outer track look like a main line. Rather than wire it using a relay, we just wired the green bulb to the accessory bus. It's always high green on the Retro Railroad! **CTT**