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Product Reviews:

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- *3rd Rail 4-8-4*

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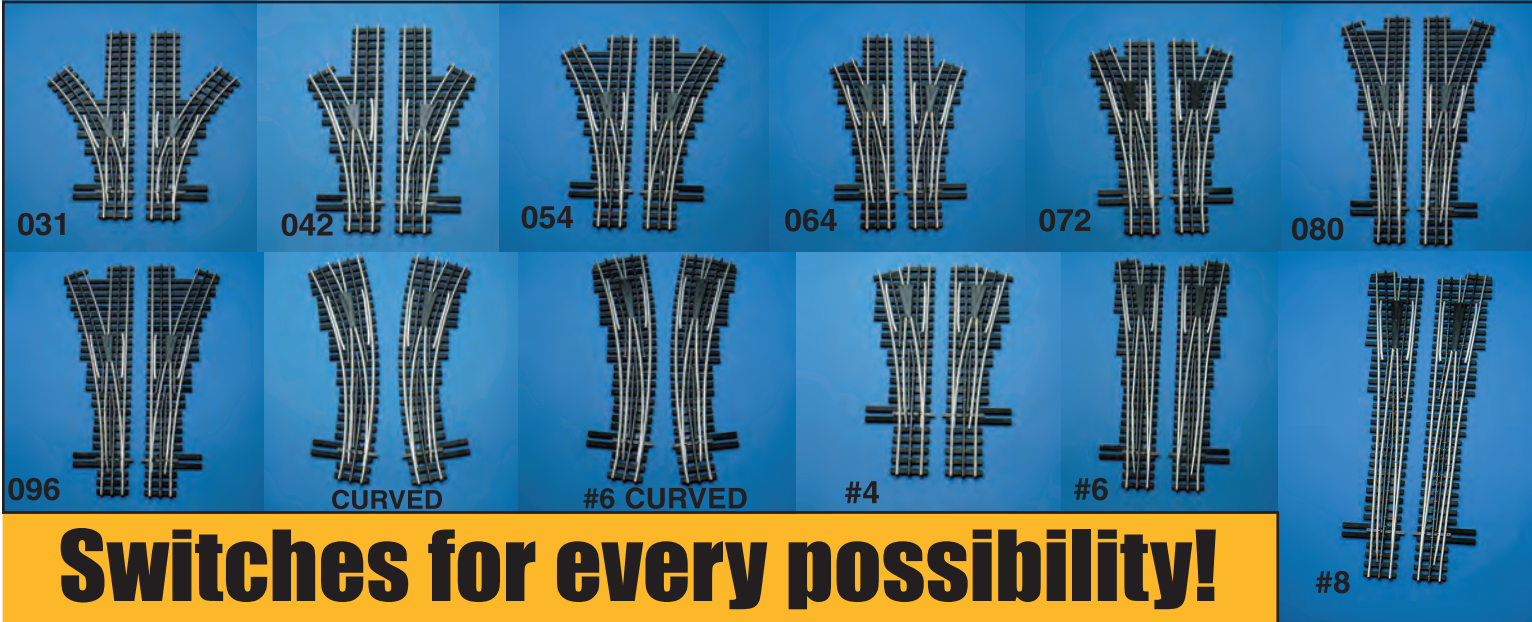
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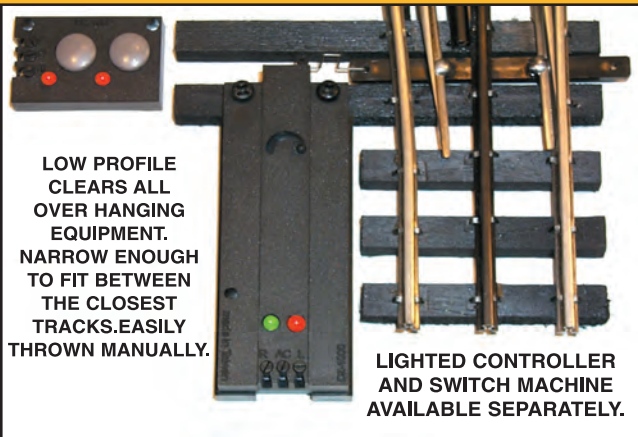


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ON THE COVER

Hugh Earnhart is a big fan of the Erie Railroad, which should come as no real surprise since he is a lifelong resident of the northeast Ohio area once served by that fallen flag. There's a personal connection as well because Hugh's father worked for the Erie. The 14' x 15' 3-rail layout Hugh has constructed is a lasting tribute to many fond childhood memories.

Photo by John Ciccarelli



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Painter of Light Visits Lionelville

I'm a genuine nostalgia buff. After all, nostalgia is what brought me back to Lionel trains in 1981 when I was given Ron Hollander's *All Aboard* book as a Christmas gift. A quick initial reading of Ron's book on Christmas Day that year was all it took to rekindle fond memories of my boyhood days when Lionel trains were an abiding passion. Beyond that, the book also inspired me to go out the very next day and invest a fairly hefty amount in some of the new Lionel trains and accessories available at that time.

Because I'm so fond of looking back at what for me were truly memorable growing-up years, I have also long been a fan of the work of the late Thomas Kinkade, the American artist perhaps best known as the "Painter of Light." During his all-too-short lifetime (he died at age 54 last year), Thomas Kinkade caused a considerable stir in the art world. Dismissed by some critics for what they regarded as his commercialization of art, he nevertheless reached the hearts and minds of millions with his paintings of idealistic and realistically portrayed subjects that stimulate memories, hopes, and dreams among us more common folk. Estimates are that examples of his work are displayed in some form in one out of every 20 American homes, which is quite an accomplishment for someone looked down upon by those so-called serious art experts.

Early this past December, a member of our OGR On-Line Forum started a discussion thread about a recently released *All Aboard for Christmas* painting by Thomas Kinkade. When I learned that this painting, one of the last completed by the artist, involved his conception of what a real-world Lionelville might look like at Christmas, I was totally hooked. I added a few supportive comments to that thread and noted that I intended to look around to see if I might be able to purchase a print for myself.

Imagine my great surprise and joy when the week after Christmas a very large box was delivered to my office. Inside was a beautifully matted and framed 36"x 24" serial number print of *All Aboard for Christmas*. But there's one big caveat: I had not ordered the painting and likely would not have even been able to afford one nearly so grand. The shipping document indicated it was a gift, and the gallery it shipped from subsequently confirmed that to be the case. Thanks *very* much, Kristen, for making this nostalgic editor's wish come true.

All Aboard for Christmas, coincidentally a title that is at least partially similar to that of the earlier Ron Hollander book, now occupies a place of honor in my living room on the wall above the fireplace mantle. You can view the painting and learn more about it at www.thomaskinkade.com. Click on New Releases at the top of the home page.

The scene depicts Pere Marquette No. 1225, the Polar Express Berkshire so familiar to O gauge hobbyists today, with Lionel Lines on the tender. The engine is pulling a string of Madison passenger cars into a station with the destination sign Lionelville. A young boy in the foreground even holds a small flag bearing a postwar-era version of the Lionel logo.

The Certificate of Authenticity accompanying the print includes comments from the artist on the origins of this work. Recalling how a Lionel train was his most favorite of all childhood Christmas gifts, the artist recounted, "As a boy, I received my first Lionel electric train set under a yuletide tree and still delight in the memory of its setup and of the imagined adventures I had on those scaled-down tracks. For a child, there is nothing as exciting as the dream of faraway places and the adventures in travel one might have to reach them."

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He closed with the invitation, "Join me in Lionelville, a place where adventures start and reunions are enjoyed throughout the holiday season."

I'm already on board, of course, and the Kinkade painting, much like the words of Ron Hollander in his earlier book, inspired me to place an order for yet another Lionel locomotive. You can probably guess which one I selected. But I imagine this particular Thomas Kinkade painting, which is currently available, may also entice a great many others to come along for the ride down Memory Lane, which just happens to lead straight to Lionelville Station. 

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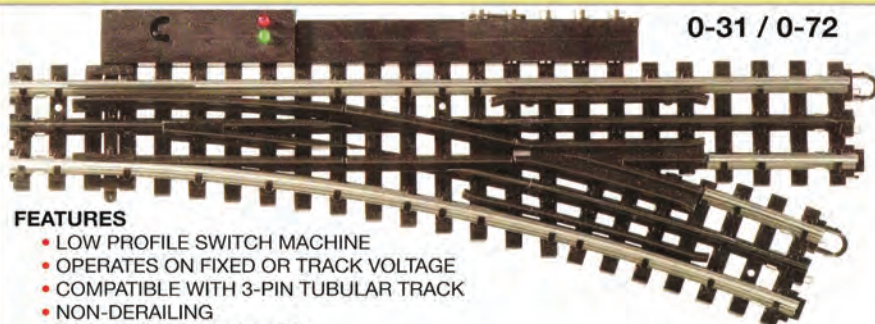
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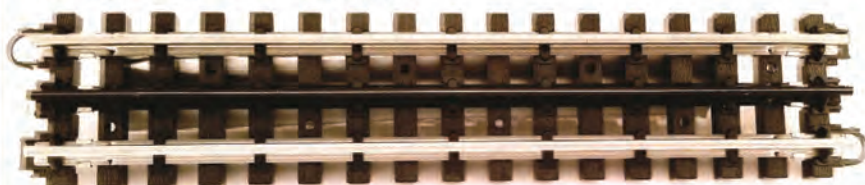


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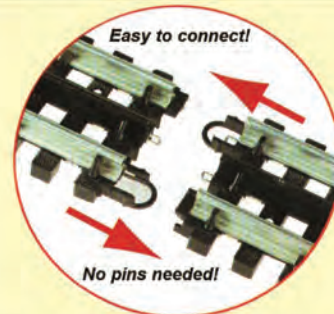
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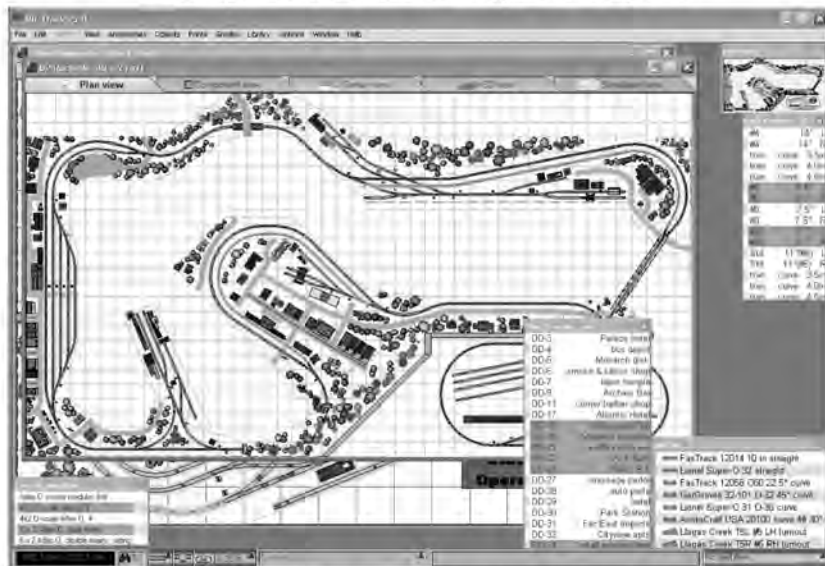


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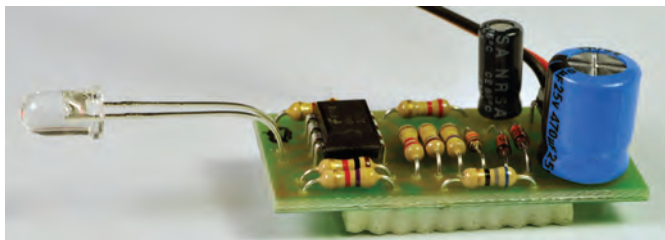
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Traction in Action

During the early part of the 20th century, the Hudson River Valley had its own great traction empires. Some of them, like the Albany and Hudson Railroad, even moved freight over their corridors using big interurban cars. So it comes as no surprise that even though the Lehigh Valley Transit Co. operated in eastern Pennsylvania, but not New York, this O scale model of one of its big freight motors still looks right at home on the Kingston Model Railroad Club's traction line. The scenery along this model empire replicates many scenes from the traction's past from beach stations and tunnels to street running and car barns, all the result of years of hard work. After all, when the club was founded in 1937, Lehigh Valley Transit Co. was still running these big cars to Philadelphia. This O scale trolley was built by Bill Brandt from a kit, and the photo was taken by Glenn David Fresch.



Lazy Summer Day

It's a hot summer day at Tennessee Pass on Mike Luczak's dual-gauge layout, but the stifling heat just bounces off those gleaming Burlington diesels as they pull into the depot for a crew change. Mike models both 2-rail 0 scale and On30 narrow gauge on his layout, and we promise to show you far more of his fine craftsmanship in the near future.

Putting Things in Perspective

That SP tank car in the background of this scene on Robert Hirning's 0 gauge Pine Island Railroad is actually an N scale model. The clouded overall look of this steel mill scene—these mills once emitted a lot of pollutants—is convincing, but the depth perspective provided by using a smaller scale model is excellent. Robert's 3-rail layout is located in his home in rural southwest Oregon.



Scrap Loads to Fuel Industry

Here's a photo from Ken Paynter of his Paynter Short Haul Lines layout in San Antonio, Texas. Those shredded metal loads may eventually end up being one of the raw materials that goes into the manufacture of new 0 gauge trains. Ken authored several how-to articles in the past for *OGR*, and his brother Michael, an accomplished photographer, took the photos published here and with Ken's articles. We'll see if we can entice Ken and Michael to do a whole series of shots and a full layout feature.

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1

Lionel ZW-L 620-Watt Transformer

Review and Photos by George Brown

It's big, it's powerful, and it's high-tech contemporary with a traditional appearance. Lionel states the dash-L in its new ZW-L stands for Legacy, the company's current generation of command control for 3-rail O gauge trains. To me, with the ZW-L as the most powerful transformer on today's 3-rail O gauge market, the dash-L stands for loaded with state-of-the-art power control technology. The sidebar on

these pages gives a thumbnail sketch of the transformer's features, and I'll be expanding on a number of them later in this review.

The Traditional and the New

Naturally, the ZW-L carries on with the traditional shape and power controls of the original ZW from the postwar Lionel Corporation. This tradition includes the

appearance of a phenolic resin case with a steel base, two handles on each end normally used for the train throttles, and two more levers for controlling power to accessories or tracks. Slider controls for reversing the locomotive and sounding the horn or whistle are inboard of the power controls as are lights that indicate power-on and any overload shutdown of an output channel. On the back of the case are the

Lionel ZW-L Features

Case

- Art deco case front with illuminated “Lionel”
- Power-on and overload indicator lights
- Die-cast throttle handles
- Two voltmeters
- Two ammeters
- Molded ABS case resembles postwar phenolic case
- Stamped steel base
- Overall dimensions 15-1/2" x 8" x 9-1/4"
- Weight 27 pounds (approximate)

Electric Input and Outputs

- 120 VAC 50/60 Hz input power
- Four 5–18 VAC, 0–10 A power output channels
- Up to 180 watts per individual output channel
- Total output electronically limited to 620 watts
- ETL listed

Controls

- Power on-off switch
- Control handle for each of four output channels
- One handle can control all four output channels
- Reverse, whistle or horn, and bell buttons for two output channels
- Conventional, TMCC, or Legacy control
- Up to 200 speed steps in command operation
- Circuit breaker for each output channel

Technology

- Nearly silent toroid transformer
- Electronic output regulation
- Three-level overload protection each output channel:
 - Dynamic power limiting
 - Fold-back current limiting
 - Circuit breakers
- Thermally controlled fan cooling

four sets of binder posts for the power outputs. But here is where tradition ends and a modern power supply for 3-rail O gauge AC trains takes over. Compared to the postwar ZW and also what I call the millennium ZW Controller released in 1998, the new ZW-L is a whole different animal...well, transformer.

I was particularly pleased that the ZW-L is completely self-contained and does not use external transformers, or bricks as they are called colloquially, that powered the millennium ZW. While I'm



briefly on the topic of the millennium ZW, Lionel Chief Technology Officer Jon Zahornaky explained that an important goal in the development of the new ZW-L was a problem-free unit without any of the type of glitches that users of the millennium ZW experienced plus several other bugs that were usually not seen by hobbyists.

Physical Features

As I unboxed the ZW-L, the most immediately noticeable difference was the significant increase in size over its postwar predecessor, which included the four analog meters on top of the case. Actually, my first introduction to the new ZW-L was when the UPS driver handed the shipment to me and warned it was heavy. And with the transformer's shipping weight of 29 pounds including its packing, he was not just saying a pleasant Christmastime greeting. Between this weight and the stamped steel base with no rubber feet under it, I put the transformer on a piece of corrugated cardboard to protect the finished top on my power bench for the editorial Carpet Central Railroad.

On the front of the art deco ribbed case is a much-welcomed power on-off switch and two buttons for sounding the bell on modern locomotives. In my phone conversation with Jon about the ZW-L, I learned

that the design of the case is mostly the result of Neil Young's artistic talent. On the case is the backlit Lionel, emblazoned actually in brilliant blue when the power is on, as is the blue power-on indicator on top of the case (Photo 1). All four meters are comfortably backlit when the transformer is running normally.

As on the postwar and millennium ZWs, the binding post for the four output channels AU through DU are on the back of the case along with a 12-amp circuit breaker for each channel and three operating mode control switches (Photo 2). I especially liked the additional binding post for connecting a Lionel command base to the transformer using a spade or eye terminal end or even a banana plug.

As I understand it, James Rohde of Lionel was the architect of what is now the ZW-L. He started with a clean sheet of paper, or computer file, plus the design specifications from Jon, and grew the project from a vision into a new and capable product.

Meters

Two sets of illuminated analog meters display the volts and amps from two output channels (Photo 3). The default channels are AU and DU, but the outputs of BU or CU can also be displayed. The control handles for BU and CU sense hand capacitance, so grasping either handle causes the lighting for the appropriate pair

of meters to go brighter with the pointers showing the output of that channel. Readings for channels AU and BU are on the right-hand pair of meters while DU and CU are on the left-hand pair.

At the risk of sounding old-fashioned, I prefer the analog meters over digital displays in this application. With analog meters, all I have to do is glance at them rather than read them to understand what's going on electrically with the train or accessory circuit. And if that glance tells me that the current draw is too high, I can react accordingly to reduce the load. Otherwise, I can just relax and watch my trains run.

Operating Modes and Switches

Three mode control switches select run or program modes, command or conventional operation, and individual 4-channel or ganged 1-channel power. As it is advertised, the ZW-L can be operated either conventionally using the throttle and accessory levers or by command using a Legacy system with a CAB-2 or even a TMCC setup with a CAB-1. I can confirm that it does on all accounts.

In command mode, each output of the ZW-L can be assigned as either an engine (ENG) ID or a track (TR) ID. Assigning track IDs is a simple process with both Legacy and TMCC systems. Additionally, assigning engine IDs to the ZW-L using a TMCC system is equally simple. But to assign engine IDs to the ZW-L with the Legacy system, the Command Base and CAB-2 must be running software version 1.4. Memory modules with Legacy version 1.4 for the Command Base and CAB-2 are shipped with the ZW-L along with complete instructions for installing the software and then setting up the transformer for command operation.

Software version 1.4 adds the device type of transformer (XFMR) to the Legacy system so the CAB-2 can correctly control all functions of the ZW-L. To illustrate, with the ZW-L properly defined as a transformer device type within the Legacy system, pressing and releasing the direction (DIR) key on the CAB-2 momentarily interrupts the selected track's voltage for changing direction of a conventional

locomotive. But if the ZW-L is defined as some type of device other than transformer, such as a diesel (DSL), pressing the direction key on the CAB-2 simply turns off the voltage to the selected track, and the engine stops. Whoops!

Regarding software versions, the owner's manual states: "Using TMCC or LEG control modes with Legacy version 1.3 or lower will result in unexpected operation." To me, that pretty much said it all, so I installed version 1.4 in my system before even plugging the transformer's power cord into my surge protector.

In 1-channel operation, the throttle handle for output channel AU controls the power output for all four channels: AU, BU, CU, and DU. The maximum voltage output from channels BU, CU, and DU can be set by the position of their individual handles. Again, full instructions are in the owner's manual.

Toroid Transformer

A toroid transformer provides the step-down bulk voltages for the ZW-L. This type of transformer is more expensive than an iron core unit, but it is also more efficient and is noticeably quieter in operation. The only time I heard any of the classic AC hum was during the first few seconds after power-up, and it was very faint before it faded off to quiet.

Toroid transformers are built around a round core of metal, which is similar in shape to a donut, with the primary and secondary coils concentrically wound around the entire surface. In the ZW-L the toroid is in the bottom of the case and underneath the printed circuit board (Photo 4).

Of course at the size required to power the ZW-L, the toroid is quite heavy.

Power Output

Each of the four output channels can deliver up to 18 volts AC with a current draw of up to 10 amps for a maximum 180 watts of pulse width modulated power, popularly known as chopped sine wave. Each of the four output channels begins to produce power at approximately 5 volts. With the ZW-L running in command mode, up to 200 speed steps for each output channel provides precision throttle control of locomotives or power to accessories.

A Microchip PIC microprocessor running sophisticated software handles all of the electrical functionality of the ZW-L. The vast majority of the software was written by Lou Kovach, who designed and coded several successful TMCC products that Lionel still catalogs at this writing on Christmas weekend of 2012.

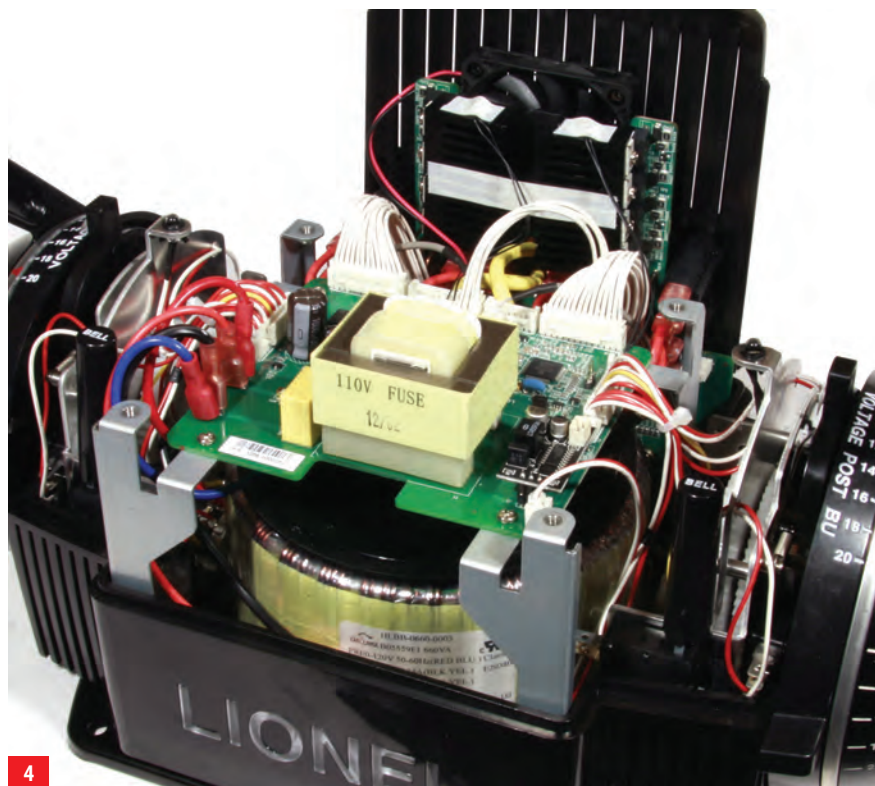
For conventional control, a potentiometer geared to each control handle senses the power setting in volts that the operator wants. With the unit set to 4-channel operation, any change to the operator's setting of a specific handle, throttle AU for example, is sensed within half a cycle, so the electrical output from the MOSFET semiconductor devices for that particular channel, AU in this case, is adjusted accordingly up or down. As a result, the voltage on the track or the accessory increases or decreases.

For command operation, a Legacy receiver and controller are implemented inside the ZW-L, as is an internal antenna



for the receiver. Commands from a Legacy or TMCC command system are received, decoded, and executed to increase or decrease voltage from the addressed power channel, again such as AU. Essentially and except for setting its power switch to on or off, the ZW-L can be run remotely for all functions including sounding the bell and whistle or horn via a CAB-2 or CAB-1 remote and the appropriate command base.

With the unit set to 1-channel operation, either the AU handle or the AU channel output addressed via the command remote controls the voltage of all four output channels. Whatever the voltage from output channel AU is, the voltages from the other three output channels are the same. For example, if AU outputs 14 volts, BU, CU, and DU also output 14 volts. Additionally, the maximum output of these subordinate channels can be controlled by the position of its respective lever. Case in point, say I want no more than 10 volts from channel CU. Setting the handle for CU to 10 volts establishes the maximum output at that level.



Overload Protection

As I mentioned earlier, the ZW-L has three levels of overload protection. One is dynamic load balancing between the output channels if all four of them are running at or close to their maximum of 180 watts, but no more than 620 watts total. Basically, the output for one or more channels is reduced dynamically to keep the total load at no more than the regulatory mandated 620 watts without completely inhibiting power from any particular channel. Because load conditions on each of the four output channels can be detected within half a power cycle, this dynamic reduction affects one or more of the channels according to momentary real-time current draw and a complex algorithm within the control software for the ZW-L. When the transformer is dynamically balancing loads between its output channels, the red light on the top left of the case blinks.

Another level of overload protection is what is technically called fold-back current limiting. Again, all four output channels are monitored for current draw. Should a short circuit occur, the voltage on the overloaded channel is reduced within a half cycle of the event to maintain a 10-amp current draw for up to three seconds, with

the red indicator light flashing during this time. This three-second delay before shutting the affected output channel down lets the ZW-L tolerate a momentary short circuit that can occur and then go away. If the short persists for more than three seconds, only the shorted channel is shut down while the other output channels continue to run normally. The red light is then lit solid, and the backlight on the meter that is positioned relative to the output channel is turned off. For instance, if BU, the second output and control handle from the right, is the output that is shut down, the second meter from the right goes dark. All the other meters remain lit. Setting the handle to off for the affected output channel, or resetting it with the command remote, resets the channel. Of course the cause of the short circuit has to be corrected first.

The last level is the 12-amp circuit breaker for each of the four output channels. These breakers are the fail-safe backups for the electronic overcurrent protection. As I understand it, normally the fold-back current limiting provides the necessary overcurrent shutdown; therefore, the circuit breakers should rarely trip. But if one does trip, again the red light will come on, and the backlight for the meter relative to the

faulted output channel will go out.

As a test, several actually, I put an old screwdriver blade across the binding posts for each of the four output channels. Every time, the fold-back current limiting worked as it was supposed to as did resetting the affected channel. Nope, this box is definitely not your granddad's iron core, carbon roller ZW.

Cooling Fan

A thermally controlled fan located at the back of the case runs only as necessary to cool the electronics inside the ZW-L. The MOSFET output drivers are mounted on a large heat sink, which is located immediately in front of the fan. Thermal sensors on this heat sink provide the trigger to turn the fan on or off.

Safety Listing

The ZW-L is ETL listed rather than UL, which means that it complies with all electrical safety standards for the North American market, including those from UL, CSA, NFPA, and others. If you're curious about ETL listing, information is available from several sources on the Internet by searching on ETL listing.

Although each output channel is capable of delivering 180 watts of power, that is 18 volts at 10 amps, the total capacity of the transformer is limited to 620 watts because of safety and regulatory requirements. In fact, Jon explained that the design and early prototype units were capable of delivering a full 720 watts with the only difference being a larger toroid transformer. But alas, even considering the electronic and fail-safe overload protection that the ZW-L has, the ETL folks balked at 720 watts of output power.

On the Power Bench

My first impression of the ZW-L was how smoothly the throttle handles moved, which was followed immediately with the realization that the handles were a lot more solid than the plastic handles on my postwar ZWs. In fact, the handles on the ZW-L are die-cast, and I like 'em! I instantly had a good feeling about the new power supply I was about to set up on my power bench for the editorial Carpet Central Railroad.

The transformer's initial trial by fire, electricity actually, was the Williams by Bachmann GP30 also reviewed in this issue. The ZW-L started the Geep much more smoothly than did my postwar ZWs, which by the way are now sitting quietly in my train room closet. The GP30's run was faultless using each one of the controls on the ZW-L. Setting any of the handles to the voltage printed on the case put that voltage on the track according to the built-in voltmeter.

Along with the GP30 pulling a train on the CCRR's outer loop, an Atlas conventional RS3 hauled a second train on the

inner loop. Neither locomotive loaded the ZW-L, so throughout the run the transformer's cooling fan never came on. After 30 minutes the case was barely warmer than room temperature.

Next at bat was Ed Boyle's Lionel Legacy GP35, which was also a treat to run and watch. In spite of the heavy train of 18 weighted 3-rail scale freight cars, the engine never came close to taxing the output of the AU channel. A pair of Atlas diesels with EOB speed control also performed as expected, as did Atlas and MTH diesels upgraded with Cruise Commander.


Best of all, a small sampling of my postwar, MPC, and LTI engines ran great on the power from the ZW-L. One extremely heavy freight train pulled by a consist of MPC F3s with four series-wound brush motors performed with panache at approximately 11 volts and 7.5 amps. After 15 minutes of powering the train, the ZW-L was still cool, and its internal fan hadn't started yet. Hey, that's one cool transformer!

Power for my string of Atlas switches and Lionel Accessory Switch Controllers came from the CU channel, which again proved completely capable for the task. Actually, the ZW-L powering the switches and ASCs was not unlike a Clydesdale pulling a child's toy wagon loaded with stuffed animals—lots of power with little load.

Throughout all the runs, the meters were really neat for observing what the trains and switches were doing electrically. If the needles on the ammeters weren't close to or in the red zone, I was happy. If they were, I backed off the affected throttle.

At the End of the Run

Unfortunately, the ZW-L arrived here at the OGR Southwest Office within days of this issue going into graphic design and production. As a result, I didn't get to spend the time needed to thoroughly explore the transformer's capabilities and any of its limitations. However, what I learned about the transformer and experienced with it has pleased me considerably. To be candid, I didn't think any modern transformer could come along that would unseat my venerable and reliable postwar ZWs. Well, it's possible the unthinkable has happened, and the old ZWs may be retired in the foreseeable future. The new ZW-L is really great—so far.

In a future issue, currently planned as the next one, I'll be reporting my observations after aggressively shaking out the ZW-L. And since I run my trains almost nightly for wind-down from the day's activities, a lot of operating hours will likely accumulate on the ZW-L over the next two months...and beyond. 

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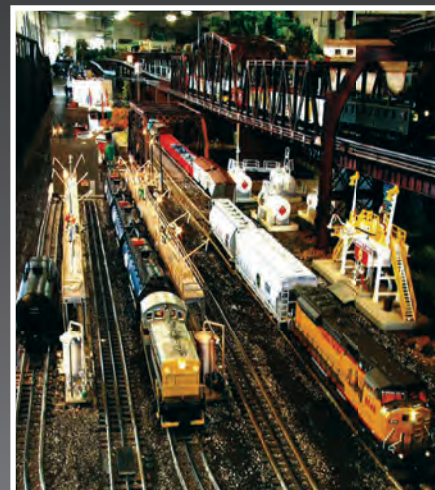
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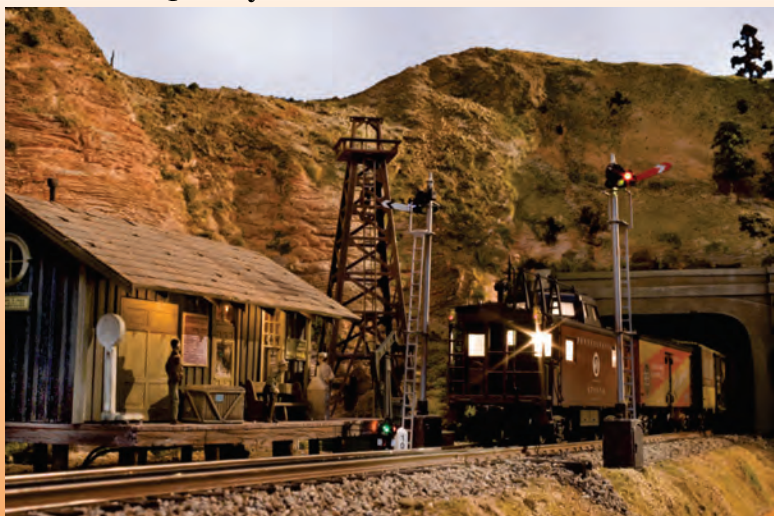
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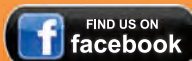
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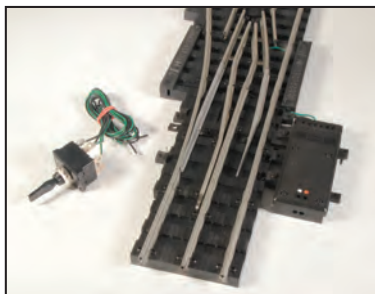
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Williams by Bachmann EMD GP30

Review and Photos by George Brown

Although the logo on the windowed box stated Williams by Bachmann, the box's distinctive red and blue decoration visually proclaimed a special content. The 1:48 scale model of the diesel engine visible through the window was definitely special. Finished in Union Pacific livery, my initial view of the scale-sized GP30 was truly spectacular. Gone was the visible hallmark of WbB road switcher diesels, namely the stamped steel frame with its handrails formed out of the same steel sheet. Instead, the UP Geep wore a realistic plastic body with wire handrails and scale handrail stanchions. To be candid, I felt like a youngster on Christmas morning as I excitedly unpacked this inaugural new product from WbB. Of course the fact that Christmas 2012 was only three weeks away may have prompted my septuagenarian adolescent behavior.

Prototype Notes

As a scale model, the GP30 from WbB is as much an answer to the challenges of a changing marketplace as was its early 1960s prototype from EMD. In today's 3-rail O gauge railroading hobby, the swing to realistic scale trains is evident by sales statistics from the manufacturers. And in looking back to the early 1960s,



the sales and horsepower race in real diesel locomotives had begun between EMD and GE with the release of the GE U25B featuring 2500 hp, sealed carbody, centralized air system, and design for maintenance. Also in the horsepower race was Alco with its 2400 hp RS27, but the engine's lackluster sales weren't a competitive threat to EMD or even GE.

At that time, EMD could muster only 2250 hp from its refreshed 567D3 prime mover, so it enlisted the automobile stylists of parent General Motors to design a visually updated, modern appearance. The result was the distinctive hump on top of the long hood, which extended forward over the cab, plus the pointed center windows on the front of the cab. The hump of sheet metal also had a functional purpose in providing the necessary space for the electrical cabinet, turbocharger, and central air intake filters.

Obviously the mechanical and styling package worked for EMD's sales because almost 950 GP30s rolled off the La Grange erecting floor in a little over two years of production. By comparison, GE sold about half that number of its U25Bs over a production run of nearly seven years. Southern had the largest fleet of GP30s at 120, while Union Pacific was a close second with 111 on its roster. The next largest buyer was Santa Fe with 85.



A number of GP30s still exist today as rebuilt units or in their original form working on secondary railroads. Several are also preserved in museums. As a side note, the *2013 BNSF Color Calendar* from McMillan Publications has a photo on the cover, taken in 2011, of a pair of BNSF GP39-2R diesels transferring an intermodal train between BNSF and NS yards in Kansas City. These units still have their distinctive GP30 styling and were rebuilt

from two GP30s, one built originally for the Great Northern and the other for the CB&Q.

Construction and Features

Of course the big news for the O gauge GP30 is the totally new body and frame architecture for WbB and also sounds of the EMD prime mover. This architecture is also widely used today by other manufacturers, and according to Larry Harrington of Williams by Bachmann, it is no more expensive to produce than the original Williams design.

The stamped steel frame mounts the familiar pair of DC can motors with flywheels and die-cast trucks that feature metal gears. Pilots and truck side frames are traditional WbB die-cast parts as is the fuel tank. Also on the frame is the standard WbB electronic reverse unit with a capacity of 6 amps, which is more than ample for normal operations and a few abnormal ones, too. This frame assembly fits inside the body, is held in place by several machine and self-tapping screws, and is completely hidden from normal viewing angles.

The new molded body with separately applied metal handrails, stanchions, and other details make up one major assembly with the frame assembly as the other. I found the body on the GP30 to be a detail hunter's delight. Granted, many of the details are molded-in, but their clarity and crispness speak volumes about the quality



of the new molds that created the body. One such delight was the induction air intake grille on each side of the hood just behind the cab. At first glance, I thought these grilles were fine-wire screens until I took a close second look and realized they were part of the body molding.

Two looks were not necessary to notice and appreciate the safety chains and working drop down steps at each end of the Geep. Several subtle details were the flanges and bolts for each of the separate wire grab irons plus the latch handles for the access doors on the long hood. They're fabulous! For a more complete listing of what's on and in the new Geep, check out the features and details sidebar.

On the prototype GP30, the hump on top of the cab and long hood included the housings for dynamic brake resistors, regardless of whether they were installed or not. Engines with dynamic braking had air grilles in the resistor housings with a cooling fan mounted on top of the body. On engines without dynamics, the grilles and fan were missing. In the first release of its GP30, WbB correctly modeled the dynamic brake grilles and fan on its Great Northern and Union Pacific units. Real Atlantic Coast Line and New York Central GP30s did not have dynamic braking, so the grilles and fan were omitted from the models decorated for the ACL and NYC.

Two new features that really caught my attention are not readily visible in the photos. One is the brass ferule molded into each of the five major screw posts that hold the body to the frame. These ferules are expensive to produce and install, and I've

not seen them and their corresponding machine screws on previous WbB diesels. The other new feature is the use of bronze bushings for each axle in the truck blocks. In previous WbB engines, axle bushings were steel, which seemed to require more periodic lubrication than engines with bronze bushings.

What is readily visible in the photos is the outstanding paint and finish on our evaluation sample. Of course, the Union Pacific livery has been one of my favorites for years, and I get to see it regularly on real trains here in Central Texas. Regardless, I could not find any flaws, voids, or buildup of paint on the model of UP 804, while the lettering and graphics are as crisp as I've seen from any manufacturer. In a word, wow!

At Trackside

On the Editorial Carpet Central Railroad, the Geep powered up in forward immediately after the transformer put power on the rails. With my postwar ZW and its initial 6.5 volts on the track, the GP30 started at a pretty good clip, even with a rather heavy train on its coupler. But with the new ZW-L providing track power at an initial 5 volts, the GP30 eased realistically into motion with the same train and accelerated gracefully as I advanced the throttle.

Immediately after the Geep's startup, its sound system kicked in with the char-

Williams GP30 Features and Details

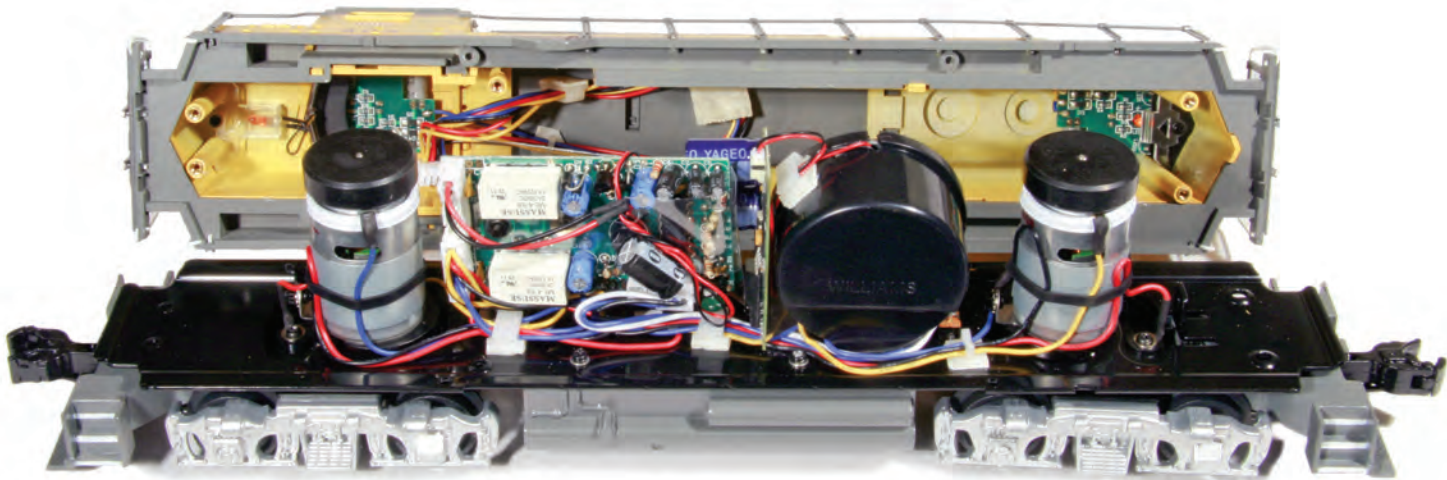
- Molded ABS body on stamped steel frame
- Die-cast truck side frames, pilots, and fuel tank
- Wire handrails with stamped steel stanchions
- Wire grab irons
- Separately applied hand brake, windshield wipers, and horns
- Working drop down steps
- Separate safety chains
- Die-cast operating couplers
- Dual can motors with flywheels
- Metal drive gears
- Die-cast truck blocks with bronze axle bushings
- Four traction tires
- 6-amp electronic reverse unit with direction lockout
- True Blast Plus 16-bit digital sound:
 - EMD diesel prime mover
 - Horn
 - Bell
- Encased speaker enhances bass sound
- Directional LED headlight
- LED markers
- Illuminated number boards
- Tested minimum O36 curve

acteristic sound of an EMD 567 at idle. Although realistic sounds of all eight throttle settings are reproduced, the "revs" didn't start increasing until about 10 volts were on the track, and at that power level, the GP30 was highballing at much more than a scale 60 mph and with our standard O scale test freight train in tow. At this speed, the noise of the train just about drowned out the sounds of the prime mover.

For those operators who don't like the WbB True Blast II horn only sounding the warning for approach to a grade crossing, the new trademarked True Blast Plus produces a single blast of the horn that lasts about a second. With a little finesse on the transformer's horn button, the horn's sound can be modulated at will.

My only criticism of the WbB GP30 is no provision exists for raising or lowering the sound volume or even turning the sound system off. But if I wanted, I could easily put an on-off switch in the power





feed for the sound board to turn it off. In fact, since I never use the lock-out switch for the reverse unit, I'd probably do away with that circuit and wire the switch to shut off the sound system whenever I want.

A detail I didn't notice at first is the fuel tank. It's deeper and more realistic than the tanks I've seen on earlier WbB and Williams diesels. This tank is not a scale width, which I'm sure is to accommodate oversized switch motors on tinplate switches. To me, the new tank dimensions

are a marked visual improvement over the earlier ones. I experienced no clearance problems with the rail-height motors on my Atlas switches, but since I no longer have any Lionel O22 switches, I can't confirm or condemn the engine's compatibility with large switch motors.

While I'm on the topic of compatibility with 3-rail track, I haven't seen any advertisement or other statement about the minimum curve for the GP30. That stated, I ran it successfully on curves down to O36 with a train coupled to it. Each

truck has a considerable amount of swing, and the spring-centered coupler also has a lot of swing, so it's quite likely the engine will negotiate O31 curves and perhaps even O27.

I especially liked the LED directional headlights and the realistic illuminated number boards. Between its new body and lighting, visually the new GP30 is a quantum leap forward for WbB and its modest cost line of model diesel locomotives.

Given the engine's weight and its four traction tires, it's a reasonably good puller.



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Additionally, the final drive ratio on the trucks is compatible with previously produced WbB diesels, such as the F7s, so the GP30 can run in a multiple-unit consist with them. From my vantage point, diesels and electrics from WbB and the predecessor company have always been good runners.

At the End of the Run

As I told Larry Harrington in a conversation about his new GP30, it is a

fabulous locomotive and one that is going to be a tough act to follow. Somehow I get the feeling that WbB is going to follow the GP30 in the foreseeable future with yet another great locomotive. Considering its reasonable retail price and the even lower prices offered by some WbB dealers, a new avenue has just opened for the O gauge railroader who likes conventional locomotives in 1:48 scale size. 

22903 Union Pacific GP30 #804

Retail price: \$349.95 at Williams by Bachmann dealers

Bachmann Trains; www.bachmanntrains.com

Williams by Bachmann GP30 Performance

(sound: on)

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Weight on Driving Wheels: 4 lbs, 9 oz

Tractive Effort: 1 lb, 13 oz @ 10 VAC, 2.3 A, 13 W

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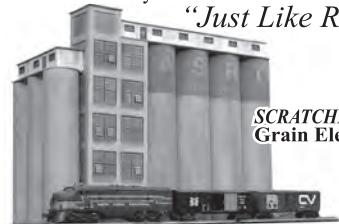


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3rd Rail Santa Fe Class 2900 4-8-4

Review and Photos by George Brown

On the high iron of real railroads, 4-8-4s were big, while on the hi-rails of today's O gauge pikes, scale models of these locomotives are also big. So the immense size and weight of the 1:48 scale 3-rail Santa Fe Class 2900 Northern didn't surprise me at all. The profuse details were also not surprising given what I saw on a previous benchmark Santa Fe locomotive from 3rd Rail, specifically, the Class 3700

4-8-2 that I reviewed in Run 247, January 2011. Our evaluation sample of the AT&SF Northern with its huge 16-wheel oil tender proved to be every bit as detailed as the earlier Mountain. I had high expectations of the 4-8-4, and as I mentioned to Scott Mann of Sunset/3rd Rail in a conversation over the Internet, the model met or exceeded all of them. Scott was in China finishing one of his latest projects.



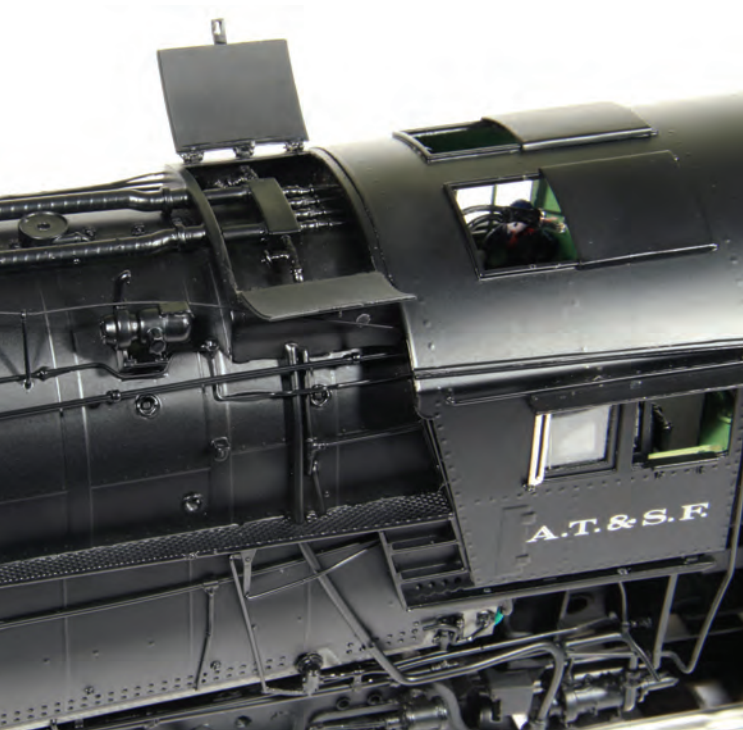
Prototype Notes

Baldwin Locomotive Works built 30 full-sized Class 2900s during WWII in 1943 and 1944 using the design of the pre-war Class 3765 Northern. Not only were the 2900s massive with a 121' overall length, but they were also the heaviest 4-8-4s ever built. Because of wartime restrictions against the use of high-strength steel alloys in steam locomotives, the 2900s were erected using milder strength but heavier steel. With 80" drivers, a boiler pressure of 300 psi, and a loaded weight of over 500 tons, these locomotives produced a tractive effort of 66,000 pounds with approximately 4600 hp available at 50 mph. Fully loaded, they held 24,500 gallons of water and 7,000 gallons of fuel oil.

Built for service across the arid and sparse Southwest, all of the 2900s hauled freight during the war, but afterwards they pulled passenger trains. Normally, the big Northern ran between La Junta, Colorado, and Los Angeles, California, which included the climb over Raton Pass. On occasions they also worked as far east as Kansas City. Retirement of the last 2900 was in 1959, with several on static display today. Santa Fe 2926 is currently being restored to running condition in Albuquerque by the New Mexico Steam Locomotive and Railroad Historical Society.

Construction and Features

As with all previously released O gauge steam locomotive models from 3rd Rail, the Northern is all brass with lost wax castings and various sizes of wire for the details. The frame is milled from solid brass bar stock with etched brass sheets hand-soldered together to form the main structures such as the boiler, cab, and tender. Of course the drivers are coined brass, which is a high-pressure stamping process



that 3rd Rail has used for years. Steel rims pressed onto the drivers give them the necessary durability needed for rolling on rails.

The photos show most of the major details and a number of the subtle ones such as the sand pipes and nozzles in front of the drivers. Other subtle details include posts for flags and the simulated electrical conduit and junction boxes between the steam generator and the headlight plus the classification lamps. On the tender, heating pipes for the oil tank are included along with the rod that firemen on the real engines used to pull waterspouts down to fill the water tank. These are but a few of the details on our O scale Santa Fe 2916. The sidebar lists the salient features and major operating details of the locomotive.

Rollers under both the engine and tender pick up the electrical power from the track's center rail. Command and sound electronics ride inside the tender with a 10-wire tether cable carrying the necessary control and power signals between the tender and engine. The receptacle for this cable is recessed in the back of the engine's frame under the cab floor. With the tether cable connected, the plug is nearly hidden within the frame. On the back of the cab floor, a hinged step plate visually fills the void between the engine and tender and effectively hides the tether cable. However, nimble fingers are necessary to ensure the tether plug is fully seated in its receptacle. If it's not, the engine runs erratically or not at all.

As with its previous command-equipped brass locomotives, 3rd Rail employs the tender wheels and copper alloy wipers to



pick up the radio frequency TMCC signals directly from the track. Two sets of wipers on each truck are wired to the antenna lead for the TMCC receiver board. The normal design for metal steamers with TMCC uses one or more insulated wire handrails for the signal reception antenna.

A hefty speaker inside the tender does an excellent job with the RailSounds 4.0 repertoire of sounds for a large steam locomotive. For conventional operation, a volume control for the sound is located under the rear water hatch on the tender.

Bright plating on the side rods and valve gear was attractive, but I would have preferred a dull aluminum finish on the rods or even a light pewter coating. I liked the painted wheels on the pilot truck and would like to have seen the same finish on the wheels in the trailing truck and tender. I used to prefer bright rods and wheels but now favor the darker ones, or at least not bright and shiny. As I've come to expect from 3rd Rail, the satin black paint with silver lettering is flawless as is the graphite paint on the smokebox front.

In my checking several principal scale dimensions against those of the real 2900s, they were exact. Although I have a partiality for highly detailed steam locomotives, I'm by no means a rivet counter. But I understand from a reliable source that the rivets and other details on the model are accurate or very close to those on the real 2900s. To me, the O scale version of Santa Fe 2916 was fabulous in the detail department.

At Trackside

On the O72 oval of the editorial Carpet Central Railroad, the 2916 proved to be an excellent runner in command mode, which is how I ran it for most of its stay here at the OGR Southwest Office. Conventional operation was fine, but running any locomotive under TMCC brings out its best, and the big Northern was no exception.

A factory-installed 9-volt battery keeps the sound system running through its shutdown sequence in both command and conventional operation. The one recommendation I'd make for the command operator is to take this battery out of the tender. Removing the tender shell is easy, and because the battery serves no real purpose for the command operator, why risk a leaky battery sometime in the future, especially if you happen to forget it's inside the tender. Yes, alkaline batteries can leak.

I especially enjoyed watching the engine haul several different long and heavy trains of weighted steam-era freight cars, which it did without even breaking out into a figurative sweat. Given the herculean tractive effort noted in the performance sidebar, the engine could have hauled a lot more cars if I had both the track length and a sufficient number of cars, which I don't.

Our evaluation sample experienced no problems running on my Atlas 21st Century track and through O72 turnouts in forward or reverse. Naturally, reverse running was slow, especially through the turnouts. Fortunately, slow running was one of the engine's operating attributes with the Electric Railroad cruise control.

On the topic of the ERR Cruise Commander, its motor drive logic ran the locomotive almost silently, which I found delightful. Engine start was smooth at the first speed step, and there were another 99 steps to go for full throttle. Oh, the Northern never saw full throttle, but it tracked rock solid at all speeds.


3rd Rail Santa Fe Class 2900 Features and Details

- Skew-wound Pittman motor with flywheel
- Carbon fiber belt drive
- Ball bearing drive shaft with bronze drive gears
- TMCC with RailSounds 4.0 from The Electric RR Co. under license from Lionel
- ERR Cruise Commander cruise control
- Switch-selectable two or four steam exhaust chuffs per driver revolution
- Traction tires on rear drivers
- LED headlight, classification lamps, number boards, and directional backup light
- Smoke unit switch selectable for command or conventional operation or off
- Coil-operated coupler on tender
- Standard and Santa Fe lifted smokestacks included for owner installation
- Opening turret hatches, cab roof vents, and cab windows
- Illuminated cab with crew figures on seat boxes
- Detailed boiler backhead with hand-painted valve handles
- Opening water hatches on tender cover sound and program controls
- Sprung journals for driver axles and axles on trailing and tender trucks
- Individual articulated side rods
- Dual rods between main and third drivers
- Clear plastic windows in cab
- Minimum 3-rail O72 curve





At the End of the Run

For the brass locomotive aficionado or the modeler of mid-20th-century Santa Fe, a Class 2900 from 3rd Rail could prove quite interesting and enjoyable. It's big and powerful as was its prototype. And on the display shelf, I found the 1:48 scale Santa Fe 2916 to be an unusually appealing and handsome model. 

Santa Fe Class 2900 4-8-4

Retail price: \$1,399.95 at 3rd Rail or 3rd Rail dealers

800-373-7245; www.3rdrail.com



3rd Rail Santa Fe 4-8-4 TMCC Performance

(smoke unit: off; sound: on; speed control: on)

Length: 31" over couplers; 30-1/2" pilot to tender sill

Distance Between Locomotive Pickup Rollers: 5-1/8"

Distance Between Tender Pickup Rollers: 4-9/16"

Weight on Driving Wheels: 8 lbs, 2 oz

Tender Weight: 3 lbs, 8 oz

Power Consumption at Idle @ 18 VAC: 0.3 A, 5 W

Tractive Effort @ 18 VAC: 3 lbs, 4 oz @ 3.8 A, 68 W

Minimum Sustained Speed @ 18 VAC: 1 scale mph @ 0.7 A, 13 W

Maximum Tested Speed @ 18 VAC: 60 scale mph @ 1.8 A, 32 W

Test Train

15-car mixed freight; train weight 13 lbs; pull to move train 7 oz; recent-production O scale cars from various manufacturers



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38573 SP, "Daylight"

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38457 NORFOLK & WESTERN
38458 PENNSYLVANIA
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LIONEL C420 DIESEL, LEGACY
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34757 SEABOARD AIR LINE
34758 SEABOARD AIR LINE**
**34760 NICKEL PLATE ROAD
34761 NICKEL PLATE ROAD**



Erie power rules on Hugh's layout.

A Diamond in the Rough

Article and Photos by John Ciccarelli

In this case, diamond refers to the Erie Railroad diamond, and rough refers to the rather unlikely location of Hugh Earnhart's layout, which happens to be housed on the second floor of a two-car garage in Columbiana, Ohio.

The Erie rules supreme on Hugh's 14' x 15' layout, and his interest in that particular railroad dates back many years to when his father hired on in the late 1920s. He worked his way up from brakeman to conductor, which allowed Hugh to ride in the locomotive cabs many times.

Although when the trains approached Youngstown, he had to beat a hasty retreat into one of the coaches so the superintendents or railroad bulls who frequented the terminal building wouldn't spot him.

As a retired history professor, Hugh wanted to construct a layout that would document parts of his life as well as scenes along the Erie Railroad in northeast Ohio. So several months ago, after I had repainted some engines and rolling stock for Hugh, he asked me if I would help build his layout. Well the only thing I like better than

running trains is creating places to run them. I was definitely onboard for this project.

Hugh had already constructed the basic benchwork, which consisted of Homasote on top of 2x4 braces, so all he needed me to do was to help him transform his ideas into reality by way of a track plan and scenery.

His vision was a two-level layout with a double-track main line on the lower level and a single loop on the upper level. The lower inner loop would have several

switches leading to sidings, yards, and a turntable. The outer loop would also have one switch leading to a passenger train yard near the terminal building. This level would be made up of several vignettes that depict areas of local interest and Hugh's own past.

Structures for the lower level are an eclectic mix of products from many manufacturers including Korber, MTH, Atlas O, and Plasticville. They were purchased from vendors such as Just Trains, Scenic Express, and local retailers like Amer's Hobby Shop. Since Hugh had been collecting and gathering structures for many years, every time I worked on his layout, it was like Christmas morning with all the boxes to open and to discover what was inside each one.

The upper level is home to a turn-of-the-century New England village in winter and encircled by a trolley line. The village is populated with Hugh's extensive collection of Department 56 buildings. Although these structures are a little small for O gauge, they provide some forced perspective since this part of the layout is at the farthest viewing point.

When we built the layout, the New England village was the first order of business since the Department 56 building created rather quickly a finished section of the layout. After Lionel FasTrack was laid and streets glued down, we covered the remaining area with cotton sheeting to represent snow. The sheeting was built up in certain areas to create the illusion of drifts. It was then simply a matter of placing the buildings in the appropriate locations and adding other details such as figures, vehicles, trees, and lampposts. The partial backdrops were painted on plywood with acrylic paints. This area of the layout with its quaint toy appearance is in stark contrast to the hi-rail look of the lower level. The two areas are separated by a high rock wall and connected by a sloping road so they can be viewed individually. Hugh's diminutive trolley is right at home in a setting such as this.



On this sheer rock are two climbers scaling the vertical cliff. Risky business!

Here's a view down Federal Street in downtown Youngstown. Although not an exact representation of the real location as it existed back in the 1940s and 1950s, the scene does capture the general feel of the area.





The Lackawanna passenger train exiting the tunnel is about to pass by a neatly manicured suburban area. A double-track main line runs between two parallel residential streets.



The real Erie terminal building on West Commerce Street in downtown Youngstown has survived the long-ago abandonment of Erie Railroad tracks that served the station, but the structure still exists as a condominium occupied by staff and students at the nearby Youngstown State University. This model is an accurate representation.



Crews work on a siding near the Erie terminal building.

The time period on the lower level is mid-20th century. The level's series of scenes are not geographically or chronologically connected, but they draw attention around the layout from one tunnel portal to the other. As a train exits one tunnel portal, it first passes a residential area where the double-track main line passes between two streets. With its landscaping, the area has a manicured boulevard look. This area could possibly be the Erie's main line in western Pennsylvania or northeastern Ohio.

Farther down the track is a small portion of Idora Park, which models a Youngstown, Ohio, landmark that existed for the better part of the last century. This iconic area is represented by a carousel and an ice cream stand. The actual carousel from the park now operates in Brooklyn, New York.

From there the track turns to enter downtown Youngstown. This scene is dominated by the Erie terminal building. Hugh's wife, Mary Kay, worked in the real building in the late 1950s. Hugh's busy platform area has a siding for storing a couple of Erie passenger coaches used on the local trains. Across the double-track main line is a yard that houses more coaches for longer distance passenger service.

Another downtown icon on the layout is the Strouss-Hirshberg department store. The city area also includes other familiar local landmarks such as the police station, Railway Express Agency depot, Dollar Savings Bank, and other businesses. Behind the block of downtown buildings is a three-track yard where billboard reefers are stored.

Around another curve is a rural area comprised of a hobo village, a lake with its attendant bridges, and a stream that feeds the lake. The lake is not very large, but it is quite busy with fishermen and canoeists. Then comes Hugh's farm in Leetonia, Ohio, and across the tracks is the Earnhart family cemetery along with more homes and some row houses.

Beyond this area, the tracks disappear into another tunnel. A Korber roundhouse, a water tank, and a non-operating turntable comprise the centerpiece on Hugh's layout.

The full-width rock wall is from Scenic Express and yields a quick and effective scenic feature once details such as trees, bushes, and some acrylic paint highlights are added. Another scenic feature of the rock face is a waterfall that I created using



This Korber Models four-stall roundhouse is a centerpiece on Hugh's layout.



Worker houses like these were an ever-present part of northeastern industrial towns.



A group of railfans and a big dog are on a cookout in the park adjacent to a busy main line.



This is the ceramic village on the upper level. A Williams by Bachmann Peter Witt trolley provides reliable service for the citizens.



In the 1950s, a group of boys playing hoops on a lot not far from the railroad tracks was a common sight in many parts of northeastern Ohio and western Pennsylvania.



These homes are in the somewhat affluent middle-class section of town.


clear silicone layered over a piece of cotton sheeting. This waterfall flows into a small pond that empties into the stream. Figures of two brave fellows are scaling the sheer rock face without the benefit of safety ropes.

In addition to the large structures, the layout features several smaller trackside buildings, such as maintenance sheds. Figures from Scenic Express, Bachmann, and Artista populate the various scenes.

Hugh likes to run his Erie No. 5 and No. 6, the real road's Lake Cities passenger trains, and an Erie work train. He also operates trains from other roads that include the New York Central 20th Century Limited, the Wabash Cannon Ball, and the Lackawanna Phoebe Snow; a train that showcases autos from the various decades; his Big Ten train featuring former Ohio State football coach Jim Tressel riding on the pilot; and a World War II troop train. Locomotives and rolling stock are from MTH, Lionel, Weaver, Williams, Atlas O, and 3rd Rail. Power is supplied by an MTH Z-4000 transformer. Structures and scenery materials are from Noch, Heki, and Woodland Scenics.



The Earnhart family farm is scaled down, of course, but there's enough of the feel here to evoke some of Hugh's fond memories.

These past several months have been fulfilling for both Hugh and me. We usually worked just one day a week for about four hours at a time. Hugh likes to say that we started with an idea and a tube of Goo. 

This overview of a major portion of the layout shows sidings packed with billboard reefers.

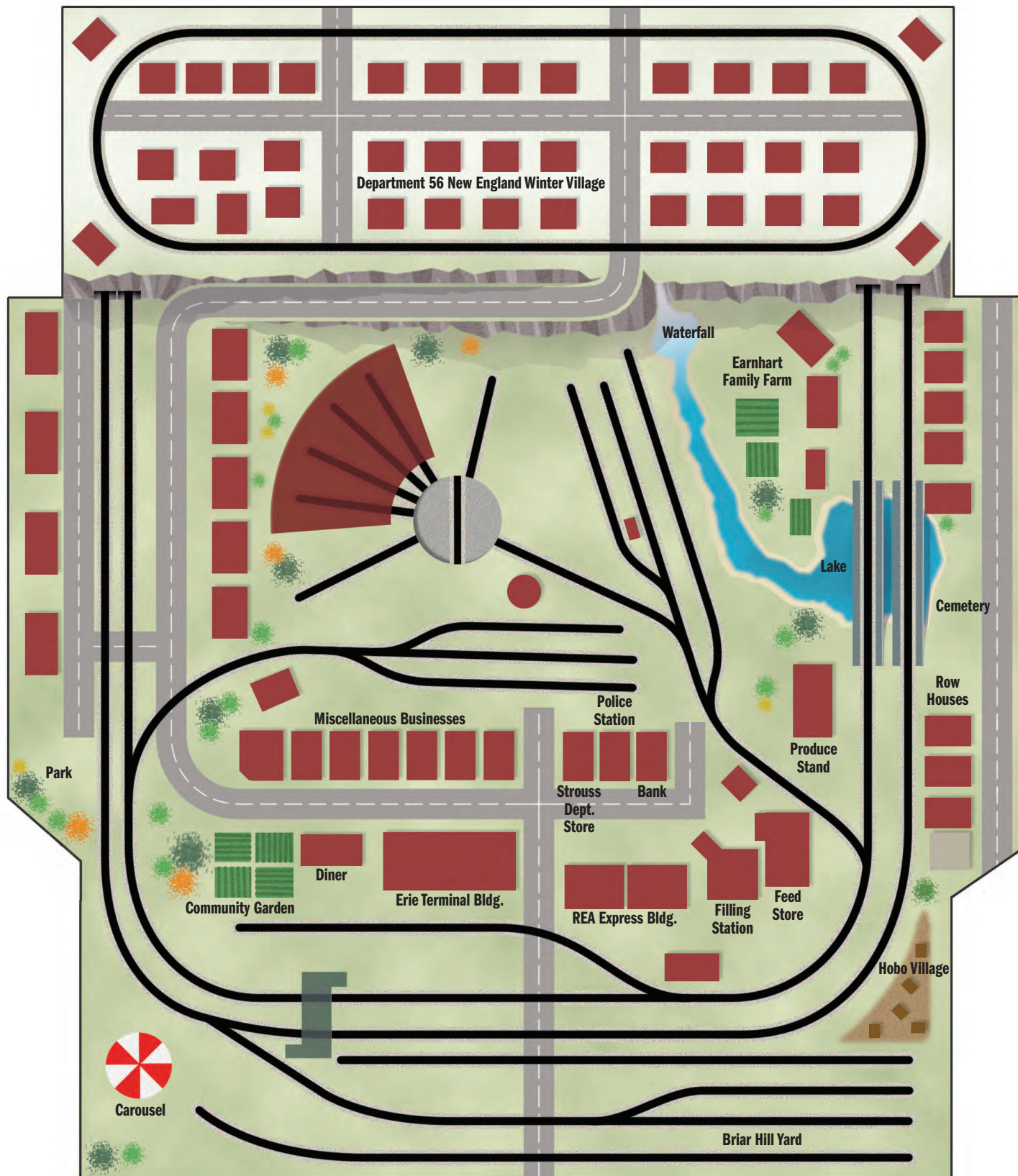


About the Owner

As a retired history professor and department chair, Hugh's interest in history drives his modeling efforts. He and his wife, Mary Kay, also enjoy gardening. Hugh is the past president of the Gardeners of America and the Men's Garden Club of Youngstown.



Hugh and Mary Kay Earnhart



Linda Quick's Red Pine River Railroad

Article and Photos by Bill Parisi

Jim Quick's Red Pine Railroad appeared in Run 254, January 2012, and was also featured in *Great Layout Adventures Volume 7* video from OGR Publishing, Inc. This detailed 18' x 32' hi-rail layout features trains from Atlas O and MTH winding their way through realistic scenery.

Although Linda helps Jim with his layout, the Red Pine Railroad is Jim's empire, themed to his earlier years in a big city environment. He designed the track plan and made basically all the final decisions on what the scenery should look like and where various features should be located. Nevertheless, Linda occasionally advises Jim on the placement of some new purchase or possible



Linda devotes a good amount of time to improving, changing, and further detailing scenes on her Red Pine River Railroad.

enhancements that might be made to the scenery. She has even made subtle changes to something Jim has already completed.

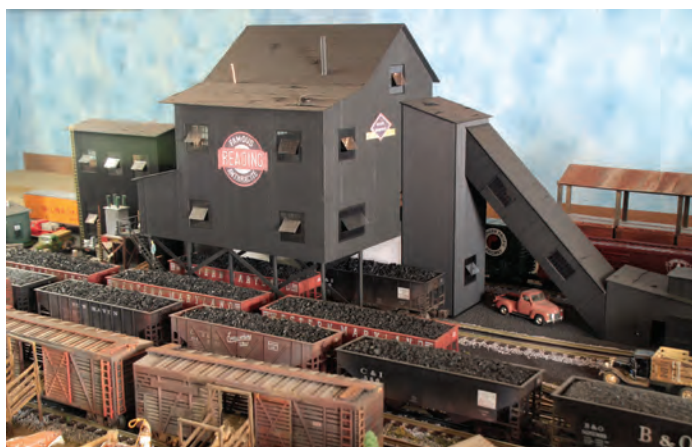
What was not detailed in the previous article or the video, aside from receiving a passing mention, was that Linda also has a separate layout of her own. Instead of storing empty train and accessory boxes below the Red Pine Railroad table, Linda has effectively used that space to create an O gauge empire that reflects her own interests. She calls her layout the Red Pine River Railroad, and it follows the same footprint as Jim's layout located directly above. Upon entering the basement of their home, you immediately notice that you are seeing not

A lumbering freight trundles past a wedding party and a funeral.





As you enter the layout room, it's immediately apparent that you are seeing two distinct layouts on two completely separate levels.



Jim created this impressive coal tipple for Linda's layout.



A Baldwin switcher has just retrieved this refilled tanker in the industrial portion of the layout.

one, but two separate layouts, each with a distinctive theme of its own.

Linda has been working on her layout for the past three years, and it is based on the small-town country environment where she grew up. Jim constructed the

benchwork, designed the track plan with Linda's approval of course, and laid and wired the track. He currently is working on wiring the turnouts and buildings along with the various track and road signals. He also builds and weathers select structures

for Linda. The coal tipple is an excellent example of his abilities. Linda lays ballast on her own track, places recently purchased buildings and dioramas, and attends to creating all the scenic features. Of course Jim will occasionally make a



Big steam is a common sight on Linda's railroad.

change to what she has done. Linda develops many of her scenery ideas from watching OGR videos, reading magazines, and visiting as many O gauge layouts around the country as possible.

With many areas on the layout still waiting to have buildings and scenery added, Linda has already started compiling her shopping list for the TCA April 2013 meet in York. Near the top of that ever-expanding list is a visit to the Scenic Express booth, which is well supplied for anyone seeking scenery materials and layout details of all types and for all scales. There is always something there that catches her attention and quickly becomes a purchase. She also spends extended periods of time at the Layout Refinements booth, home of unique, masterfully detailed, custom-made dioramas created by Frank Mullen. Linda's layout already includes a number of Frank's creations and she is always looking for more. Of course, she always stops by the OGR booth to check out the latest videos.

A series of photographs taken at various locations on Linda's layout illustrate the high level of detail she strives to include in her scenes. When



The Alco RS3 passes the outdoor deck of a local eatery.



The Red Pine River Railroad services many industries large and small.



Those horses alongside the right-of-way seem unperturbed as an Alco RS3 rumbles by.



In this early autumn scene, an Alco RS3 with its consist are en route back to the yard.




Recently acquired structures and other items are temporarily put in place and repositioned to conform to the effect Linda wants. Once she determines a final location, landscaping and more details complete the scene.



Several examples of master diorama builder Frank Mullen are included on the layout, with more added just about every time Linda and Jim attend the semi-annual TCA York Meet.

viewed at close to tabletop level, certainly one of the best ways to view just about any layout, it truly looks as though you are see-

ing a real scene. A low stool to sit on facilitates extended viewing of her layout, but even if you have to bend down to take a

journey through Linda's special O gauge world, it's certainly well worth the effort. 



Along a rail line as busy as this one, a passing steam locomotive—even a large and impressive one—commands little attention from the local population.

Linda's rail operation maintains an ample inventory of spare parts and equipment.





A hunting resort complete with horses tethered at the lodge provides recreational activity and a haven of relaxation along this busy main line.

Scenic features are Linda's handiwork such as this idyllic summer scene with Amish residents tending a bountiful and colorful garden.



Resistance Is Not Futile

Article, Photos, and Diagram by Terry Terrance

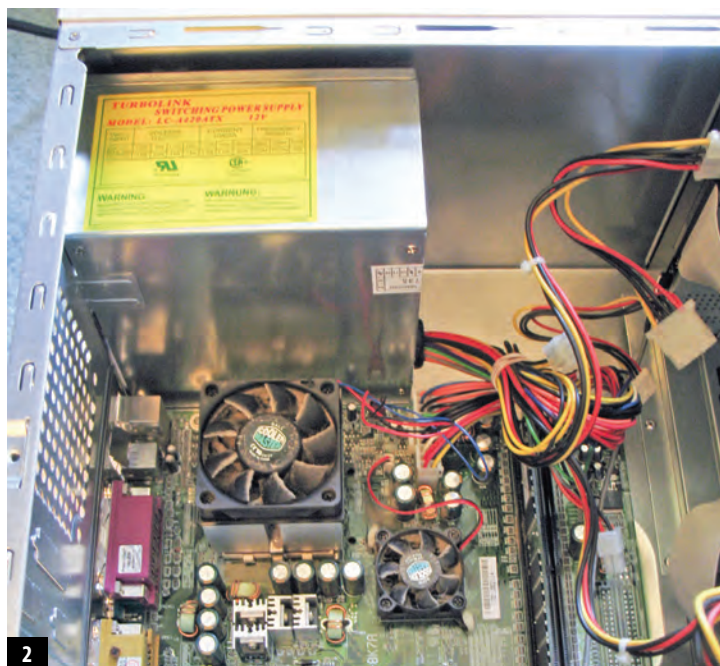
Resistance soldering uses a high current passed through the work being soldered, which must be conductive, plus a resistive electrode to create nearly instantaneous heat at the point where needed. Because soldering temperature is reached in a couple of seconds and the heat is localized, resistance soldering is more controllable than conventional soldering using conductive heating, especially when detail near to the solder joint must be protected. This is the preferred method for soldering fine details such as wire on a catenary or signals. On the other end of the size spectrum, large pieces, for example a brass steam dome and boiler, can be soldered quickly and without applying excessive heat to get the dome and boiler up to soldering temperature.

However, resistance soldering is not suitable for electronics work because of the possibility of stray and eddy currents. If a power pack, digital command control system, or portable or stationary decoder is connected to the track, do not use the resistance soldering rig to solder track. Although it's unlikely, there is the possibility these devices could be damaged by stray currents.

Commercial resistance soldering systems are expensive, but if a discarded PC is available, you can build a resistance soldering rig with three heat ranges for a reasonable price. Even without a surplus computer, you may be able to build this system for around \$50 (Photo 1). Visit Marlin P. Jones & Associates at www.mpja.com. This electronics surplus dealer usually has ATX power supplies at reasonable cost.

PC power supplies can provide tens of amps at several voltages without a large, heavy, and expensive transformer. This large capacity and one or two other features make converting a PC power supply into a resistance soldering rig easy. This project should work with any PC power supply that conforms to the ATX standard for power supplies, which covers the vast majority of such supplies. Some power supplies from Compaq, Dell, HP, IBM, and other major manufacturers may conform to proprietary standards and may have different connectors and wire color codes. The instructions that follow are not applicable to those proprietary power supplies.

This is almost a screwdriver project, and the only soldering required is what is needed to make routine electrical connections. The major tasks for this project are as follows:



- Extracting the PC power supply
- Building the power unit
- Building handpieces and electrodes
- Testing the resistance soldering rig
- Choosing the electrode graphite

Extracting the PC Power Supply

Desktop and tower PC cases are common variants. Most of these will have hex head Phillips screws around the periphery of the back that, once removed, will allow you to remove the top of the case. Some tower cases have a single removable side. Remove the top or side, and the power supply will be against the back wall of the case (Photo 2). If the capacity shown on the supply's label is less than 10 amps for +5V or +12V, it is too low. You will need a supply with a greater capacity.

Extract the power supply. The supply will typically be held by four Phillips screws on the back of the case. These screws will be arranged in an irregular pattern on the back of the supply. The screws circled in red in Photo 3 show the most common arrangement. Do not remove the four screws closest to and arranged in a square around the fan (Photo 4). Removal of these screws will cause the fan to come loose inside the power supply. If you remove all four of these screws and the fan does come loose, stop here. Do not open the supply's case for any reason!

Disconnect all of the power cables that come out of the supply and are attached to the various units within the computer, such as disc drives and others. Remove the power supply. A typical salvaged ATX power supply will look similar to the one in Photo 5.

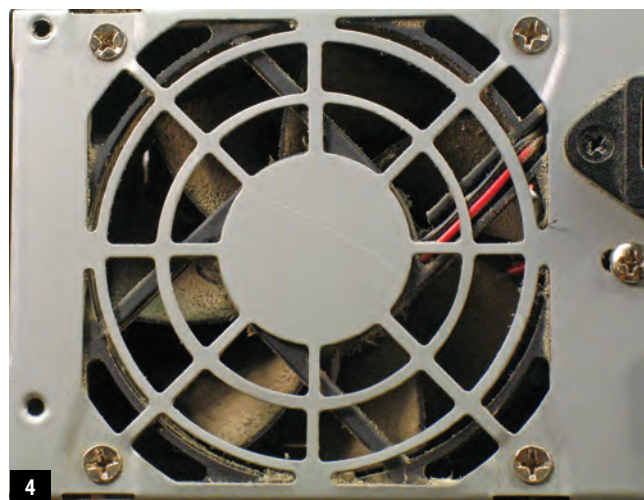
The resistance soldering rig will have three heat ranges, and here is where you determine what the heat ranges will be. The voltages put out by PC power supplies are standardized, but the current available at each voltage is not. Photo 6 shows the label of the supply that I'm using for this project.

The voltages used in the resistance soldering rig are +3.3V, +5V, and +12V. The manufacturer's power supply I used can put out 28, 30, and 25 amps respectively at these voltages. To determine what your heat ranges will be, multiply each voltage by its current to get the output in watts. For example, 3.3 volts at 28 amps (3.3×28) yields 92.4 watts. My power supply will power a resistance soldering rig with three outputs of 92, 150, and 300 watts. Yours may differ. By the way, you don't need a 400W power supply like the one I salvaged. A 250W or even a 150W power supply will serve well.

Building the Power Unit

Although this project may sound intimidating, the power unit is nothing more than a box that houses the connectors and interconnections shown in the wiring diagram. The power supply puts out +3.3V on its orange wires, +5V on its red wires, and +12V on its yellow wires.

Except for the ground (black) wires, all wires can go straight from the PC supply to their respective connectors on the power unit; the box is simply a convenient place to group the connectors. I built an on/off switch and a fuse into the ground return where it can serve for all of the voltages. This type of power supply has a



SWITCHING POWER SUPPLY							
MODEL: LP-6100D (400W MAX)							
+3.3V	+5V	+12V	-5V	-12V	+5Vsb	PS-ON	P.G.
28.0A	30.0A	25.0A	0.3A	0.8A	2.0A	-----	POK
ORANGE	RED	YELLOW	WHITE	BLUE	PURPLE	GREEN	GRAY

fast-acting electronic over-current circuit that will disable the outputs of the power supply long before the fuse blows. Similarly, the power supply has an on/off switch. I added an external on/off source as a foot pedal switch. I believe in redundancy for safety, so the foot pedal switch and fuse are prudent additions.

The following lists some of the parts I used to build the resistance soldering rig:

- Four binding posts or banana jacks (color coding is helpful, but not necessary)
- One SPST 30-amp toggle switch from your local auto parts store
- One 30-amp fuse and fuse holder from your local auto parts store
- One four-position barrier strip
- A two-conductor 1/4" phone jack, such as MCM Electronics #NYS229
- One foot pedal switch, such as MCM Electronics #555-3100
- One metal or plastic project box of approximately 6" x 3-1/2" x 2" or larger

Lay out the switch, binding posts, and phone jack on the project box. Photo 7 shows how I arranged mine. The wires could have been connected directly to their respective binding posts, but I used a barrier strip because there are multiple red, orange, and yellow wires (Photo 8). The heavy yellow wire from the switch shown looping out of the photo's frame and then back down is the automotive fuse holder containing the 30-amp fuse. There are also multiple black wires going to the switch.

Most peripherals in a computer do not draw much power, so the wires supplying them are rather small gauge. Because the resistance soldering rig will draw large amounts of power, I aggregated several individual wires of each color and voltage as well as the black ground wires to get the required current carrying capacity (Photo 9). Most wires coming out of the supply branch off into multiple connectors, so cut these branches away and use only the root wires. Also note that where the wires enter the aluminum case, they are protected by a tube to prevent chafing.

Heavy 12-gauge jumper wires carry the aggregated +3.3V, +5V, +12V and ground to their binding posts. I would not use jumper wires smaller than 14 gauge. Crimp on terminals made for tidy connections.

The final connections are to the phone jack. The motherboard connector from the power supply should be a 20- or 24-pin connector (Photo 10). In this connector is a green wire. When the green wire is connected to ground (a black wire), the power supply turns on. The resistance soldering rig uses this signal in conjunction with a foot pedal switch to initiate the soldering current. Cut the green wire and one of its flanking black wires free of the connector and pull them from their bundle. Route them into the box and solder them to the phone jack. If you are using a metal box, you must solder the black wire to the terminal that is in common with the phone jack's shell. Otherwise, you may create a back circuit that could leave the power on constantly.

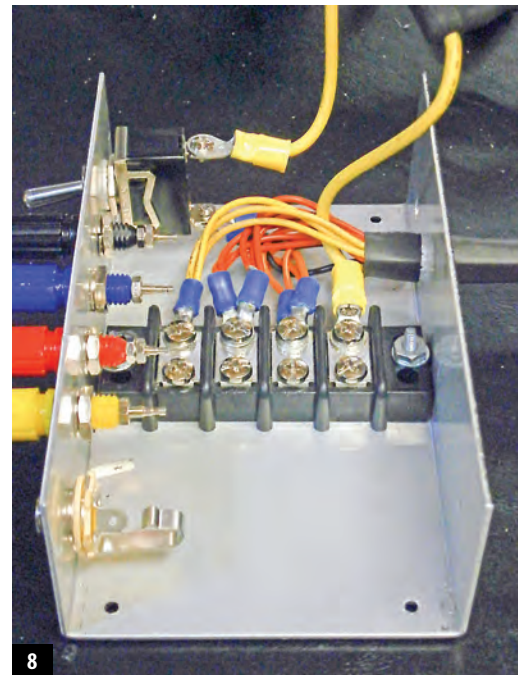
Tuck the fuse inside the case prior to closing it. Usually a fuse inside a closed case is considered poor form, but in the event of an over-current condition, the built-in protective circuits within the computer power supply should act before the fuse blows. You can either secure all unused wires coming from the power supply into a neat bundle using cable ties as I did or cut them off. Photo 11 shows the finished power unit on top of the power supply.

Making a Heavy-Duty Handpiece and Electrode

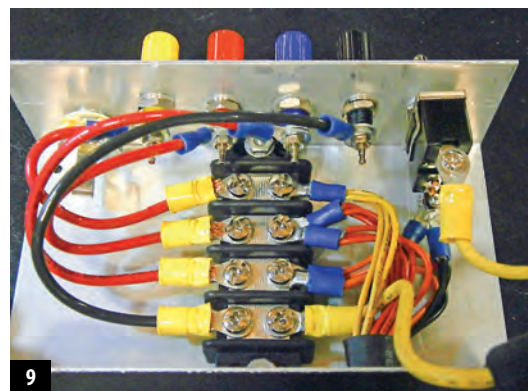
The problem with home-made resistance soldering rigs is the availability of carbon electrodes for the handpiece. Carbon welding rods are readily available,



7



8



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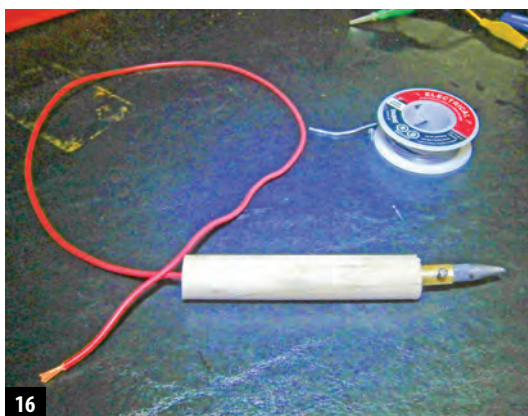
13



14



15



16

but they are typically sold in a box of 50 rods, which is more than a lifetime supply and expensive. For this project, I've utilized another form of carbon: graphite pencils and mechanical pencil refills.

To make a simple heavy-duty handpiece with a heavy-duty electrode, I used a 3/4" dowel, 11/32" K&S Engineering 0.014" wall thickness brass tube, a 2-56 screw, and some 16-gauge wire. The electrode is a graphite artist's pencil. I used General's Woodless Graphite pencils from craft stores (Photo 12).

Cut an approximate 2" section of the tube and then file it square and remove any burrs from the cut end. About 1/4" in from one end, locate and drill a #51 hole. On the other end, locate and drill a 5/64" hole. Polish the inside of the tube. I used a piece of 320 grit sandpaper wrapped around a drill to sand the interior. Take an approximate 24" length of 16-gauge wire, strip one end, insert it into the 5/64" hole, twist it tight, and solder. To make a good solder joint, the tube must be brought up to the proper temperature to melt the solder. Force thread a 1/4", 2-56 screw into the #51 hole. Photo 13 shows the finished subassembly.

Cut a 4" to 5" length of the 3/4" dowel and locate the center of each end. Drill a longitudinal hole into each end as follows:

- On one end, drill an 11/64" hole more than halfway through
- On the other end, drill a hole 11/32" about 1-1/2" deep

The tube assembly should fit into the wooden handle you just created. Thread the wire into the larger hole until it emerges from the smaller hole and then press the tube into the larger hole. If the tube will not fit, expand the larger hole slightly and file the solder joint to allow it to fit snugly. Photo 14 shows the completed electrode holder subassembly.

Measure back 2-1/2" from the point of one of the graphite pencils and cut it off. Remove the outer paint coating from the outside of the pencil with sandpaper. The paint comes off as a white powder. Continue sanding until the white powder gives way to the black carbon of the pencil. Try not to sand the pencil out of round in the process. This is a messy job. Photo 15 shows the final electrode.

Solder a banana plug onto the other end of the wire. Back out the 2-56 set screw, insert the electrode into the handpiece, and finger tighten the set screw. Because the graphite is brittle and fragile, do not tighten the set screw with a tool. The screw prevents the electrode from falling out. Photo 16 shows the finished handpiece.

Treat your electrode with care because it's easily chipped or even shattered. The electrode's point can be sharpened with the sharpener included with the pencils. The electrode can also be filed to whatever shape is needed for the job. When this electrode is used up, simply make another one from the pencil as previously explained.

Make a ground clamp by taking a 24" piece of 16-gauge wire, strip both ends, and solder an alligator clip and banana plug to it (Photo 17). The size of clip is up to you, depending on what you will be soldering.

Making a Light-Duty Handpiece and Electrode

A metal double-ended pin vise makes an expedient and versatile electrode holder for mechanical pencil-size electrodes (Photo 18).

Conversion is simple. Use one end of the vise to clamp and hold the wire. The other end can be used to hold electrodes from less than 1 mm to about 2 mm. Make a wooden handle for this handpiece in the same manner as done for the heavy-duty one. The diameter of the hole drilled for the pin vise will depend on the pin vise you use.



Testing the Resistance Soldering Rig

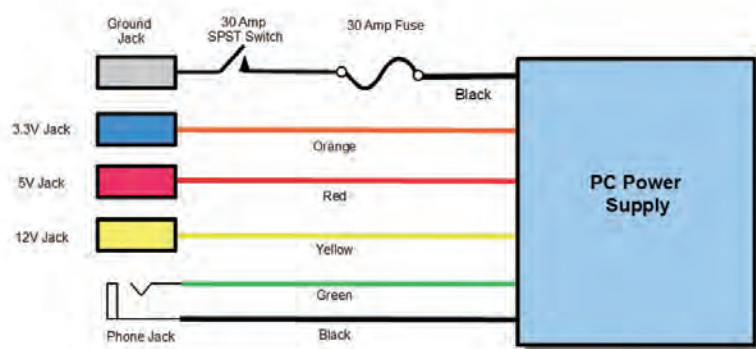
Check your wiring per the wiring diagram. Then test your resistance soldering rig by first plugging the foot pedal switch into the phone jack. Insert a computer AC power cord into the power supply and plug the cord into the wall outlet. Turn the switch on the power supply to the on position. Depress the foot pedal switch, and the fan on the power supply should start turning, indicating that the power supply is on. Releasing the foot pedal switch should cause the fan to stop. If this does not happen, recheck your wiring, including the use of the green wire to the phone jack. If the wiring is correct, then the supply that you have salvaged may not be compliant with the ATX specification.

If all is well, turn the switch on the power unit to the on position, depress the foot pedal switch, and confirm that you have +3.3V, +5V, and +12V on their respective jacks. If not, check the fan first with the foot pedal switch depressed. If it has stopped turning, a short circuit or cross wiring may exist. In addition to short circuits, the internal safeguards in the power supply will activate if any of the positive voltages are cross wired to each other. If the fan is still turning, whether or not you have voltage, continue with the next paragraph.

Insert the ground clamp into the ground jack and insert the heavy-duty electrode into the +5V jack. Attach the ground clamp to a conductive surface. I used a piece of PC board. Add a small piece of solder to the surface, bring the electrode in contact with the solder and the surface, and depress the foot pedal switch. It will take a second or two for the PC power supply to turn on and stabilize its voltages, but after this short lag, the solder should start to melt. The following is important! Release the foot pedal switch before pulling the electrode away from the work. If you don't do this, especially at higher power levels, the sparks can be quite unexpected and impressive!

If all went well, congratulations! You've built an inexpensive resistance soldering rig. When the resistance soldering rig is not in use, turn the switch on the power unit to off, turn the switch on the power supply to off, and disconnect the computer AC power cord.


If you did not have voltage in the test above and the attempt at soldering did not work, you may have a PC power supply that requires a constant load to turn on. You can get and connect a 15-ohm, 15-watt power resistor between the jack for the +5V and ground. This resistor must be 15 watts. Do not try this with a small, low-wattage resistor. The resistor will allow the power supply to sense a 3-amp load when it turns on, which should be enough to get the supply to stabilize. Run the test for voltage again.



Choosing the Electrode Graphite

Use care in choosing the graphite for your electrodes. Obtain graphite that is pure graphite. The General's Woodless Graphite pencils I used are marked as pure graphite. Pentel mechanical pencil refills in many stores have a polymer added that makes them unsuitable for this device. Use one of the Internet search engines to find a potential source and selection of pure graphite mechanical pencil refills.

Be careful not to extend the graphite electrode too far from its holder. A hot spot could form in the middle of the graphite and not at the tip. Start on the lowest heat range and only get to a higher range if more heat is needed. Do not keep the current flowing until the electrode begins to glow. Pump the foot pedal switch to modulate the heat applied to the work.

Match your electrode and power level to the job. Smaller diameter electrodes have higher resistance as do the harder grades of graphite, which you can use to get different heat levels. Limit the smaller diameter electrodes to the lower voltage ranges. Do not use less than 7 mm diameter electrodes on the highest heat range. Use the highest heat range with caution and only with the heavy-duty handpiece and electrode. Between the multiple heat ranges, various diameters of electrodes, and the different harnesses, you can adapt your resistance soldering rig to most appropriate soldering jobs. 

About the Author

Terry Terrance spent several decades as a 3-rail 0 gauge railroader before moving to 2-rail 0 scale. Currently he is building a layout based on the B&O West End centered on the M&K Junction helper station of the early 1950s. His layout features the three-track Cranberry and the two-track Cheat River grades and is designed for helper engine operation closely following the prototype. Terry's blog at 2railoscale.blogspot.com features the construction progress as well as tips and techniques, articles, and videos. He is part of the regular crew of the Model Rail Radio podcast and has appeared on the Model Railcast podcast. Terry works as an aerospace engineer specializing in avionics.

Floor-to-Ceiling O Gauge

Article and Photos by Mike Schrier

My model railroading roots are with Lionel trains, and for some 60 years I have never been without a model railroad to work on in our basement. In the mid-1980s, we built a 24' x 28' garage with a steeply pitched roof. The second story of the garage was finished, carpeted, heated, and air-conditioned, and a second train room was then available. Because the basement layout, which was not O gauge, satisfied my scale modeling, I decided to rescue my

childhood Lionel trains from storage and built a 1950-style layout in the garage complete with operating accessories. I also started collecting Lionel trains and was determined that my collection would not sit on shelves.

I created five unconnected, around-the-wall layouts that held a total of 12 separate main lines. Because the main purpose of the layouts was to display the trains, construction was a tabletop using



Summer fun abounds at Maya's Landing for railfans and outdoor enthusiasts alike. An MTH Hiawatha Hudson and a Lionel Milwaukee Road E6 cross a bridge made by the 100 Year Bridge Company. Figures from Artista and Woodland Scenics are enjoying the Woodland Scenics water. The landing is built from scratch.

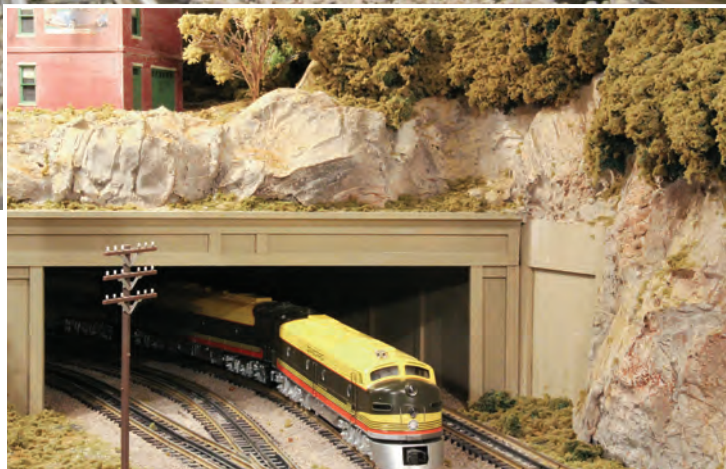


A string of Milwaukee Road Golden Gate head-end cars are seen pulling into Carlson past the Berkshire Valley freight station.

3/4" plywood on a 1x4 frame, with the tables varied in widths of 2' to 4'. Since my collecting interests were focused on passenger trains, I built an eight-track terminal with enough passing sidings to always have 30 trains on the track and ready to run.

However, a funny thing happened along the way. I had laid all the GarGraves track with a minimum 36" radius and fitted the layout with Ross switches. Just as I was completing the track and wiring, K-Line began releasing scale passenger cars, and Williams issued a series of brass scale locomotives: Big Boys, cab forwards, Niagaras, and Js. I had to have them, and that was the first step on the proverbial slippery slope. By the time I arrived at the bottom of that slope, I had sold all my nonscale Lionel and was committed to 3-rail O scale. There would not be any log unloaders or rocket launching cars on my layout.

The transition to scale modeling presented a particular challenge. Creating highly detailed scenes was the aspect of the hobby I liked best, but the slanting roof of the garage, the tabletop construction, and the tight vertical clearances limited my choices. Scenic interest is frequently equated with changes of elevation. However, except on the second of the five levels, tracks crossing over other tracks



An MTH Seaboard E8 emerges from a tunnel and into the daylight. The tunnel portal is made with dimensional balsa wood finished with Floquil aged concrete paint and weathered with chalk.



Chooch at www.choochenterprises.com offers a line of urban buildings that are ideal for interior detailing.

were not possible, and towering mountains were clearly out of the question.

One solution was to create scenery below track level, but when I had constructed the tabletop, I did not really make allowances for that. Diligent application of a Milwaukee Tool Sawsall solved this problem, and then three large rivers appeared complete with all their intrinsic scenic possibilities. The other solution I applied was to build upward. Vertical clearances were limiting, but rock cuts and urban buildings perched on concrete retaining walls provided further scenic focal points.

I have found urban modeling to be particularly attractive because I collect die-cast cars, such as Brooklin, Durham, Rex Toys, Franklin Mint, and Western. I also enjoy building urban structures from scratch or kits. My favorite kits are the laser-cut products from Bar Mills, Scale University, B.T.S., and Model Tech Studios, as well as plaster kits from Downtown Deco. I appreciate the level of detail, but, more importantly, they can be weathered. For wood kits, I apply a wood-aging solution to all the walls that are well braced and then paint them with water-based paints. Before the paint dries, I randomly spray water over the walls, which causes



A Frisco E8 from MTH is seen pulling into Brook Hill. The station is a Model Tech Studios kit. Trees are mainly Sweetwater sagebrush trunks adorned with Woodland Scenics foliage.



A Right-Of-Way PRR Duplex crosses the Steffan River while the end result of combining three HO bridge kits handles the auto traffic. The autos in most scenes are from Brooklin or Rex Toys.



An Atlantic Coast Line F3 from Lionel crosses high above the Vaas River. The bridge was made from a 1x4 fitted with Lionel girder bridge sides and Plastruct railings.



The Berkshire Valley corner drugstore is fitted with a full interior. The Rock Island RS3 is an MTH model.



The Carlson street scenes were all built at my workbench.

some of the paint to fade to reveal the aged wood beneath. For the plaster kits, I apply diluted India ink to the walls, and that creates a concrete color for the foundations and mortar lines. Then I lightly brush a brick color over the brick surfaces. Since the plaster has not been sealed, there is automatic color variation in the bricks. I use pastel chalks for any additional weathering.

One problem for the urban modeler in O scale is the lack of large commercial buildings and factories. Generally, I resort to using parts from various sources including OGR Ameri-Towne kits.

Given the spatial limitations, I am pleased with the scenic aspects of my layout. But over the years, the problem of control systems emerged that I did not anticipate and have not fully resolved. Originally, I ran 16-gauge bus wire under each level, dropped feeds every 12', and connected the bus wires to Lionel ZW transformers. Every loop had its own throttle, and except for the terminal tracks and sidings, there were no blocks. This worked, but I learned that operating four or five passenger trains at the same time would pop circuit breakers on the main electrical panel.

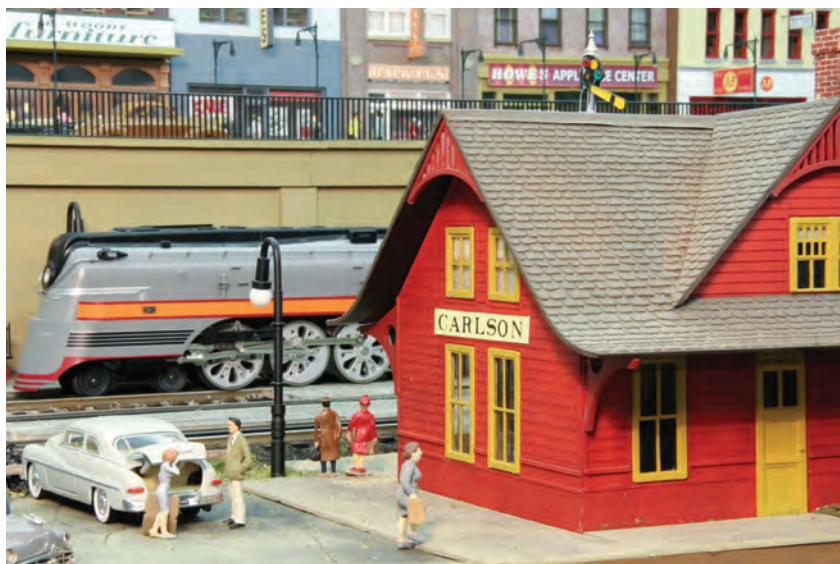
After 20 years, I accumulated many Lionel, Weaver, MTH, 3rd Rail, K-Line, Williams, and Atlas engines with virtually every type of control system made. I had walkaround control on previous layouts, so I installed both DCS and TMCC-Legacy with varying degrees of success.

The TMCC and Legacy control systems were only operational on one level due to interference that resulted if the signal was fed into multiple levels simultaneously. I admit that I am not a fan. In my opinion, DCS is more user-friendly, especially with the original Z-4000 transformer that will run almost any engine. I was able to install DCS for every level even though I did not use the recommended star pattern wiring, and it performed well enough. However, I have found that it does not always recognize an engine.

Level one is 4' deep, 4" off the floor, and 12" below level two. It was originally designed for storage and for housing railroad books and magazines, but when I had filled every nook and cranny of both my basement and garage with my model railroads, level one was the obvious and only choice for expansion. For three years, I learned that crawling under level two should be done on pillows to avoid bruises. I also learned that this was the dumbest project I had ever undertaken in 60 years of model railroading. Ironically, it also was some of the best modeling I have ever done, but I



The Southern Railway Tennesseean from Weaver Models cruises along the Vaas River.



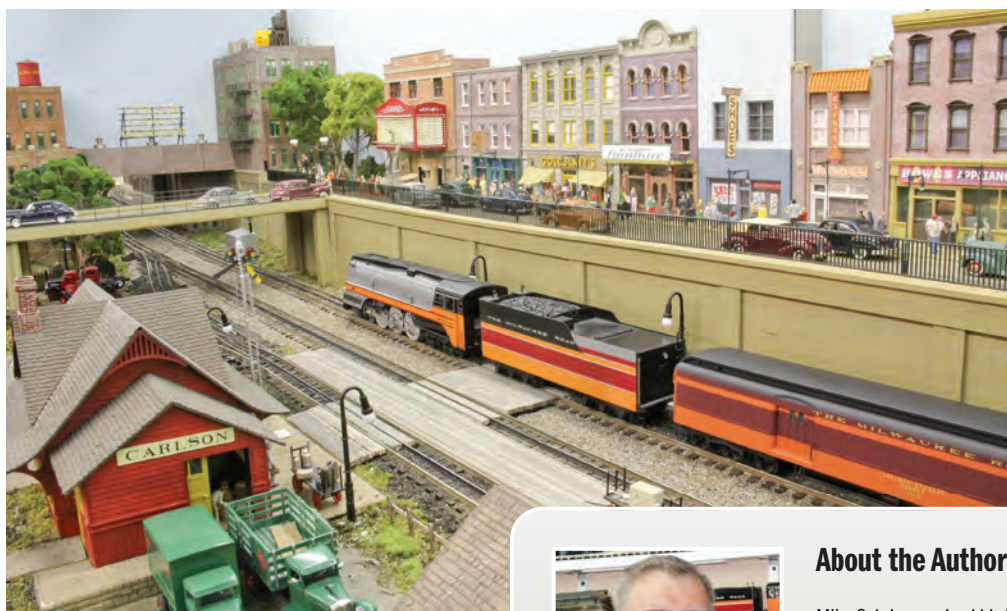
All aboard the Hiawatha! The vintage Mercury is from Franklin Mint. I used Cornerstone HO streetlights on the street above the tracks, which are closer to scale than working O scale streetlights. The MTH streetlight on the station platform is close to scale if the base is removed. The parking lot was joint compound weathered with diluted India ink and chalk.



A Lionel E6 pulls into Carlson. The retaining walls and the bridge are more balsa wood creations.



On the lowest level, an MTH Santa Fe Alco DL109 passes through town. Supports for the next level, 12" above this scene, are clearly visible.



This overview of Carlson shows how raising the town adds scenic interest to a 3' x 14' tabletop. Even though the buildings have detailed interiors, they are just 2" deep.

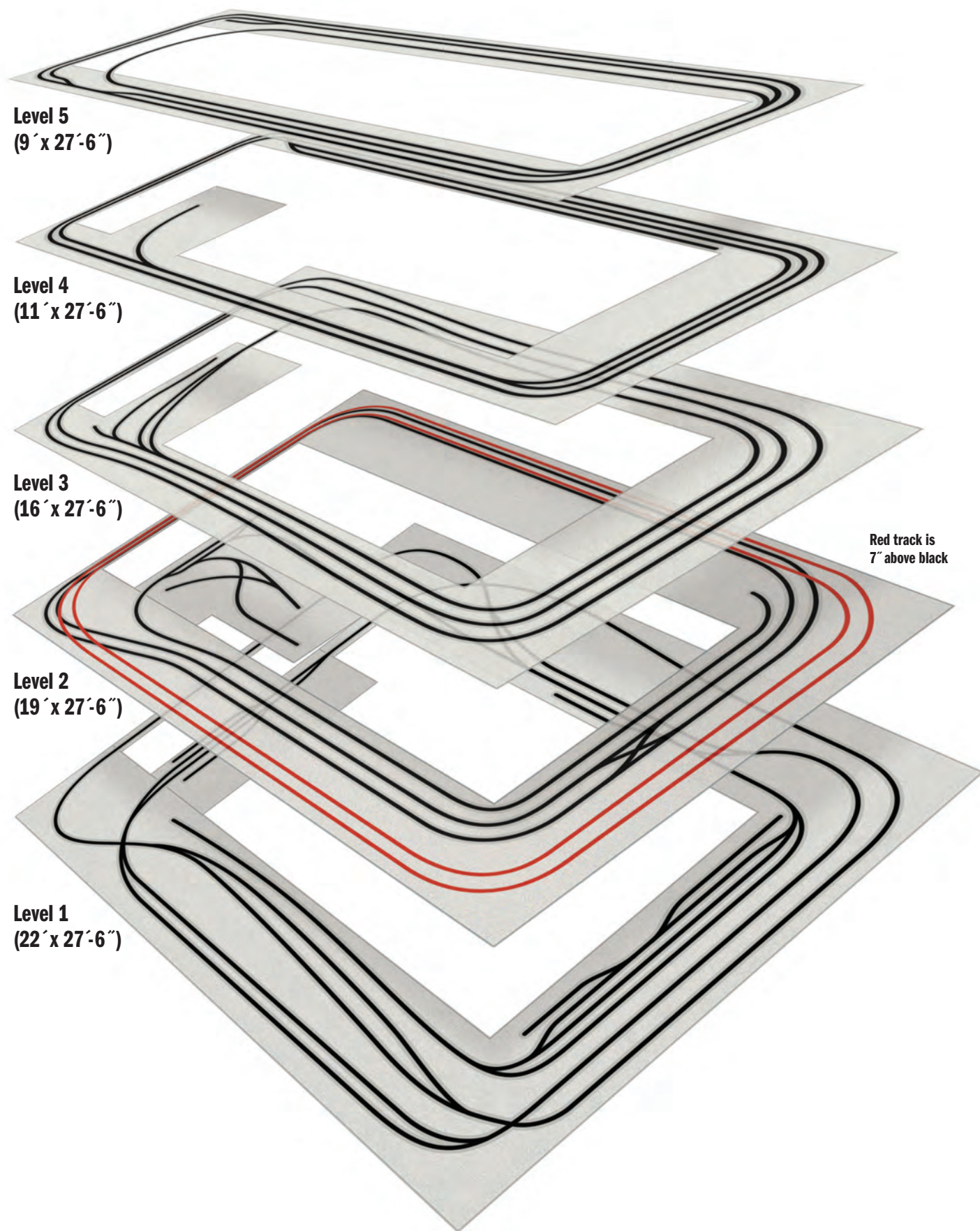
certainly do not recommend this unconventional approach.

This layout is no more. I have moved, and the benchwork for what will likely be my last layout is in place. What has nearly a lifetime of model railroading taught me? No duckunders, no lift outs, no track beyond arm's reach, and no hidden track. There is no such thing as too much lighting, and a spacious workbench is a must. Most importantly, never lay more track than you are willing to clean. 🧹



About the Author

Mike Schrier received his PhD in history from the University of Virginia and taught at Cal State Northridge and at Central College. He also was the tennis coach and chair of the NCAA Division III championships committee. Mike recently retired, but whether that is a good or bad event is yet to be determined. His lifetime interests have been tennis, teaching, and trains, and now only the trains remain. Fortunately, his new expansive train room should keep him busy.



REBECCA'S STORY

Article and Photos by Alexander Müller

After living in our new home for a year and a half, my wife, Judy, and I finally had the opportunity to meet our neighbors who lived two houses away. We were very pleased to finally have made their acquaintance and quickly became good friends. At that first meeting, we observed that Rebecca, their 14-year-old daughter, participated in the conversation more as an adult than as the young teenager she was.

One evening a few weeks later, Rebecca and her 17-year-old brother Jonathan came by to sell fundraising coupons for their high school. I agreed to buy a coupon if they would take a moment for a quick look at what I call my “train set.” Later, Judy invited the entire family over for dinner, and I ran trains for them that evening. Rebecca and Jonathan followed the trains around and around the layout.

Days later, Rebecca came over and asked if she could help me work on the trains. She had a lot of questions about everything, and after a short while I suggested that she help me place and paint some small rocks along the perimeter of the layout. She eagerly pitched in with this landscaping task. Then she asked what made the trains run. I explained electrical power through the rails and that the older locomotives start, stop, speed up, and slow down according to the level of power



Surveying a yard area, Rebecca stands up through a lift-up maintenance hatch.

applied through the transformer. I then told her that many newer trains, like the ones I have, work with constant power on the rails. She then asked how the trains could be controlled if the power always remained at the same level, so I explained model train technology and then provided a lesson in electricity and electronics.

Upstairs in my office, I constructed and explained several simple DC and AC circuits, and we tested them using a multimeter and an oscilloscope. She immediately picked up on and also understood what we were doing. Then back in the train room, I wired a time-delay relay. We

used it instead of a switch to control the crossing signal, and I explained the function of relays in general. A few minutes later, we wrapped-up electronics for the day by adding a capacitor across the full-wave output of a bridge rectifier to smooth its output and then worked on my layout's scenery for a while longer.

On a subsequent visit, Rebecca asked if she could take some pictures of the layout to show her friends since they couldn't possibly imagine what it was really like. Rebecca later brought a longtime friend over and wanted to know if she could show my trains. Once we were in the basement, her friend looked first at the west side where my big trestle bridge is located and gasped. Rebecca showed her friend around the entire layout, providing detailed explanations about every feature. At one point I heard her state in a very sure tone about the trains being exactly 1:48 scale. Her friend wanted to see the trains run, so Rebecca selected a two-engine Union Pacific freight train and a Santa Fe passenger train, and we ran trains for 20 minutes. They both walked around the layout to get close-up views of the trains as they traveled along the lower and upper levels.

Looking back at Rebecca's involvement with the trains, I expected that she would



Rebecca hooks up leads to one of the Accessory Interface Units that controls switches and accessories.



Rebecca's inaugural work on the layout involved placing and painting rocks.




Rebecca adds a top structure to my new grain elevator.

master the DCS and Legacy systems quickly. However, I did not anticipate she would teach me some features of the remotes that I didn't know about. And she did this just a few minutes after she handled the remotes for the first time.

Her attention to detail and her manual dexterity were surprising as well. She cut glazing for the granary windows and later snipped-off and repositioned the arms of stock figures to convert them into archers. She was also interested in many seemingly obscure things such as why light bulbs are wired at the outputs of the TIUs.

Not long after she started working on the trains, Rebecca helped me with the layout and worked on many of its different areas. She made a number of very good suggestions for improving the layout such as the addition of a gas station and a hobo camp. She also offered that we needed to add graffiti to some of the cars. Noticing my puzzled look, she explained that she had seen real trains with graffiti on many of the cars, so why shouldn't some of my cars have it as well, as she pointed to the auto carriers. Of course she knows how to run the trains, where the main power switches for the transformers are mounted, where the TIUs and AIUs are located, and where the relay modules are and what they do.

Rebecca aspires to be a nurse, and in my opinion a fine nurse she will be. Then again, I tease her once in a while and tell her that she could just as well be an engineer. I do not hesitate to speculate, however, that there will be a hi-rail train set in her future. 



Julia, a close friend of Rebecca's, operates an Amtrak train over the trestle that was featured in "Bridging Lake Rowena" in Run 256, April/May 2012.



Jenna, another of Rebecca's friends, takes a close look at some of the details added to a rural scene.

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Flyer's Whistling and Diesel Horn Billboards

American Flyer whistling billboards in the postwar era had no counterparts in the Lionel line. That is because its 3-rail O gauge competitor did not need such an accessory. Lionel steamers had been fitted with DC-actuated, motor-driven air whistles since the late 1930s, and they were a major plus for Lionel in the contest for dominance in the toy train market.

The American Flyer attempt to match this capability in its S gauge line was short-lived because Lionel successfully sued A. C. Gilbert for patent infringement in

1949. This made the No. 314AW Pennsylvania K5 Pacific the only American Flyer locomotive to be equipped with a tender-mounted DC-actuated air whistle during the postwar era. In later years this development was good news for S gauge collectors—the No. 314AW was produced for only part of one year and in small quantities, but in 1950 it was bad news for A. C. Gilbert. Lacking an engine-mounted whistle, the company had to turn to other solutions to get that steam whistle sound for its trains. Fortunately, A. C. Gilbert already

had a colorful, if not totally satisfactory, alternative with its stationary No. 577 Whistling Billboard accessory (Photo 1).

The Circus Years 1946 to 1949

In 1946 American Flyer introduced the No. 577 Whistling Billboard with a striking four-color advertisement for Ringling Bros. Barnum & Bailey Circus, featuring a smiling clown (Photo 2). A white-painted die-cast frame supported the cardboard circus clown insert. The



separate pieces of the frame were fastened together with screws (Photo 3). The mechanism for the No. 577 Whistling Billboard was housed in a stamped steel base behind the sign. A slit near the top allowed light from the two bulbs to illuminate the sign (Photo 4). The two dark rectangles riveted on either side of the base were fiber feet that supported the whistle. The complete unit produced a high-quality whistling sound but it had lots of parts and screws and was labor intensive to put together. It was a natural target for the production people to simplify. This later version was produced from 1947 to 1949 (Photo 5). It looks the same but has a one-piece, stamped steel frame for its paper circus ad (Photo 6). If you look carefully, you can see a rivet on the vertical side of the frame, which the 1946 version did not have or need.

When it came to legal actions and outsiders requiring royalties, 1949 was a bad year for A. C. Gilbert. The Ringling Bros. Barnum & Bailey Circus, after years of allowing the company to use its name, informed A. C. Gilbert that it would have to pay for the privilege or cease and desist using the trademark. A. C. Gilbert immediately changed the ad on the whistling billboards, and the 1950 versions of the No. 577, both lighted and not illuminated, featured a Santa Fe PA speeding under a viaduct with a steam engine in the background traversing the top (Photo 7). Only A. C. Gilbert products were featured on the billboards after 1950.

Special Case Foxmart Whistling Billboard

In 1947 a No. 577 Whistling Billboard was made for the G. Fox Company as part of a Foxmart train set. The G. Fox Company operated a small department store in Connecticut, and very few of the sets and billboards were made. The headlines on the blue cardboard billboard sign depicting a white building and cars said it all: "Visit the Foxmart," "A Division of G. Fox & Co., Serving Rural Connecticut, Route 5 Between East Hartford and East Windsor Hills" (*Greenberg's Guide to American Flyer S Gauge, Volume II*, Greenberg Publishing Company, Inc., Copyright 1991). That slogan alone strongly implied the limited distribution and sales of the promotional set. The G. Fox Company boxcar has been a favorite of S gauge counterfeiters for decades, and recent advances in copiers have made it quite practical to fake a convincing Foxmart whistling billboard using a 1946 production No. 577. Collectors who truly want an original should be especially careful in making such a purchase and should have nothing less than solid proof of authenticity before seriously considering buying.

The 2-in-1 Whistle

In 1949 and 1950, A. C. Gilbert offered the American Flyer No. 762, 2-in-1 Whistle with a handsome four-color ad that proclaimed: "Erector, The World's Greatest Construction Toy" (Photo 8). One of the whistles inside the case sounded as if it came from a nearby locomotive, and the other evoked the sound of a distant steam whistle. A two-button controller activated the separate whistle sounds. On the basis of its good looks, capabilities, and relative scarcity compared to other American Flyer whistling billboards, the No. 762, 2-in-1 Whistle is highly prized by collectors.

Having the two whistles in a single enclosure was a neat feature, but it came at a cost of increased complexity and price, which is probably one of the reasons why the No. 762 was only cataloged for two years (Photo 9). The price of the No. 762 was \$7.95 in

1950 while the No. 577 single whistle was priced at \$5.95. According to the catalog, both whistles cost more when they were purchased in “Denver and West,” which seems kind of quaint in our age of rapid nationwide and global Internet sales.

Later Models and Diesel Billboard Horn Introduction

From 1951 through 1954, the American Flyer Whistling Billboard was cataloged as the No. 566. It used the same image of a Santa Fe PA rolling through a viaduct portal with a black Pennsylvania Railroad steamer hauling passenger cars across the viaduct's top, as was seen on the earlier No. 577. The later whistling billboard did not appear to be any different than the previous model.

In 1955 the No. 566 used a different image: a shot of a Hudson leading a freight on the left side of the sign moving past farmland on the right with “American Flyer Made by Gilbert” printed in a white rectangular area beneath the farm scene. The earlier over and under PA and steamer viaduct ad now adorned the new No. 561 Diesel Billboard Horn. Both the No. 566 Whistling Billboard and No. 561 Diesel Billboard Horn still used the same metal housing for their operating mechanisms as the original 1946 No. 577, but they were painted dark green, and neither was illuminated. The dark green color previewed a major change for both pieces in 1956.

1956 Big Change

A. C. Gilbert modernized the appearance and the materials of the billboard whistle and horn in 1956. The Diesel Billboard Horn kept the 561 number, but the Whistling Billboard was now listed as the No. 568. The idea was to make the units look more like real billboards. That worked well from the front, but it was impossible to completely hide the bulk needed to house the mechanisms for the whistle and the horn. Painting the new plastic housings dark green helped, as did designing new plastic billboard frames so that they covered the workings behind them. The basic appearance of the horn stayed the same until it was discontinued in 1959, and the Whistling Billboard soldiered on in the same form until A. C. Gilbert production ended in 1964.

A closer look at the two accessories shows some clever “productionizing” on A. C. Gilbert’s part that made the whistle and the horn more attractive for American Flyer buyers and cheaper to make for the company (Photo 10).

The white plastic frame for the No. 568 Whistling Billboard sign could be detached as a single piece, which gave easy access to the metal and plastic motorized innards of the whistle (Photo 11). The view from the bottom of the whistle enclosure in Photo 12 emphasizes how much simpler the construction was with significantly fewer parts than the old metal whistle. Even the attractive billboard drawing of a high-end American Flyer steam freight pulled by a No. 336 Northern, the top-of-the-line locomotive, can’t totally camouflage the bulk of the whistle housing (Photo 13). In terms of values, a pristine example of the No. 568, complete with button and box, can command a substantial premium (Photo 14).

The No. 561 Diesel Billboard Horn had a completely different mechanism from the whistle (Photo 15). The new base was designed to hold them both, including a paper tube that deepened the horn sound (Photo 16). The image of the Santa Fe A-B-A



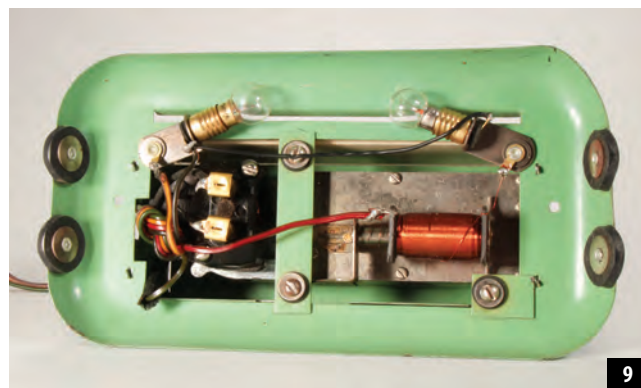
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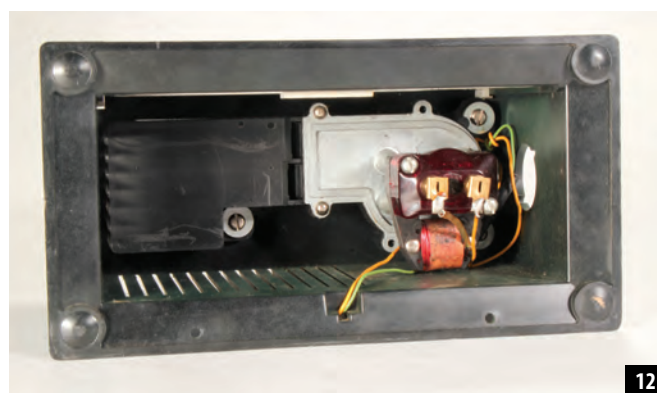
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rolling through rugged western scenery on the billboard was a perfect way to fire up the imaginations of many young railroaders.

1957 to the End

In 1957 the A. C. Gilbert company switched over to a five-digit numbering system to be compatible with an early computerized inventory program, and the No. 568 Whistling Billboard became the No. 23568, while the No. 561 Diesel Horn Billboard number was changed to the No. 23561.

Because the number of A. C. Gilbert trains and accessories that were produced each year began to decline after 1957, five-digit items generally cost more on the collector market than their three-digit equivalents. Bottom line, you can expect to pay more for



13



14

a No. 23568 in a box than a boxed No. 568 Whistling Billboard even though they look the same and are not marked with a number. It is the numbered packaging that results in a significant difference in value.

The American Flyer Billboard Cottage Industry

A. C. Gilbert American Flyer billboards are popular with both Lionel and American Flyer operators and collectors because they look equally attractive sitting on shelves and operating on layouts. Decades of use and inevitable losses have taken their toll of available stock in desirable condition that operators felt they could afford. As a result, a cottage industry has grown up of people who repair and refurbish whistling billboards and even restore the more battered pieces the decades have treated harshly.

One of our advertisers, AJ Trains, specializes in this work and can be reached at ajtrains@optimum.net or 732-859-1606. The reason for this very obvious plug is that Andy Ferrone, proprietor of AJ Trains, has repaired several of my billboards and restored one, so I am certain of the quality of his work. Besides, even though he is a friend of mine, I pay retail for his service, and it is well worth it in my opinion.

Values

The early No. 577 Whistling Billboards with the Ringling Bros. Barnum & Bailey Circus clown ad are worth more than the later No. 577 and No. 566 billboards produced from 1950 through 1954. The circus clown billboards are harder to find in the condition most collectors want, have a more appealing graphic, and are all illuminated. As I have demonstrated in this article, a lighted American Flyer billboard can make quite a difference in viewer impact and collector desirability.

The No. 762, 2-in-1 Whistle usually goes for about twice the price as a No. 577 in the same or similar condition. For example, if the asking price of a 1947 No. 577 in C7 condition is around \$45, you can expect to pay around \$90 for a No. 762, 2-in-1 Whistle correctly graded at C7.

The No. 568 Whistling Billboard in the plastic body and No.

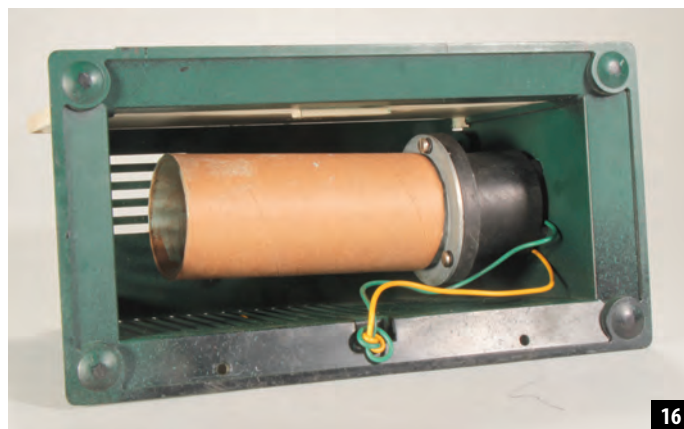
561 Diesel Horn Billboard are usually found in pretty beat-up “operator grade” condition at shows, which is not very appealing to most collectors. Plus, there does not seem to be a premium on any of these later three-digit models, regardless of condition. I am deliberately being a bit vague about pricing because of the fluctuation of recent prices on the Internet and the wide range of asking prices I have seen at shows for American Flyer billboards in the last year or so.

Conclusion

Lionel came out ahead in the steam whistle competition after World War II because American Flyer had to be content with offering a stationary whistle rather than a tender-mounted whistle that moved with the train around the layout and resulted in a more realistic whistle experience. However, even the most expensive Lionel whistle tender could not match the dramatic impact of a lighted American Flyer whistling billboard in a nighttime railroad scene. 🚂



15



16

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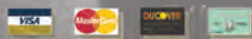
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Recycle an Old Static Model

Article and Photos by Daniel Kleine



A Rivarossi O scale Indiana Harbor Belt locomotive model I built years ago was collecting dust on a shelf. It was unpowered and really did not fit as an operating unit with my 1950s theme layout. Being frugal, I wanted to find a use for it. It was disappointing that no prototype IHB steam engines were ever preserved, so I decided to make my own vintage engine display.

Rather than weathering it like a running engine, I used powders to make it look as though it had been sitting outside for years exposed to the elements and patiently waiting for local volunteers to repaint it (Photo 1). I assumed that a static engine would not have a coal load but might have a steel sheet welded across the bin to give it some shelter from the weather. To protect the engine from dam-



IHB U4A Specifications

Wheel arrangement: 0-8-0

Boiler pressure: 200 pounds per square inch

Cylinders: Three at 23-1/2" in diameter

Driver height: 57"

Total length: 73'

Weight loaded: 147 tons

Tractive effort: 75,700 pounds

With booster: 89,500 pounds

Tender capacity:

Coal-15 tons, bituminous

Water-12,000 gallons



age or graffiti, a chainlink fence would be needed.

Starting from the ground up, a piece of 3/8" plywood painted gray formed the base. A length of O scale track provided rails for the locomotive. I painted the rails a rust color and applied a little ballast and ground foam between the ties. The track under a static engine would not be up to mainline standards, so it would have a partially buried and overgrown look. I glued more ground foam and weed tufts to the base to complete the unkempt yard (Photo 2). Then I sealed everything with a heavy coat of matte medium.

To construct a scale 6' fence, I drilled holes in code 100 rail for the posts, mounted them on the base, and soldered music wire through the holes as pipes. A gate was formed out of brass rod (Photo 3).

Tulle was wrapped around the frame as fence fabric and tied off at intervals. Then a fresh coat of silver paint finished the fence. The fence was not weathered so it would provide some contrast with the weather-beaten locomotive. I drilled holes in the base between the rails and wired the engine and tender down to make it a single portable diorama (Photo 4). It is now used on the modular train club layout as part of a museum scene. The display always generates interesting conversations since it represents the Indiana Harbor Belt, a well-known local railroad.

If you have any defective or dummy locomotives, cabooses, or other interesting rolling stock, you might consider putting them on display in your own railroad park (Photo 5). They can be displayed as weathered pieces, as I chose to do, or just painted

and fresh from the shop.

The Real Indiana Harbor Belt Class U4A


The Indiana Harbor Belt operated three Class U4A switch engines from 1927 until about 1950. They were numbered 100, 101, and 102 and were claimed to be the most powerful 0-8-0 steam engines ever built. Constructed by Alco, they were unusual with a third cylinder in the center of the cylinder saddle and a booster engine under the tender. The extra exhaust blast from the third cylinder gave the locomotive an unusual sound wherein it seemed to be running faster than it actually was.

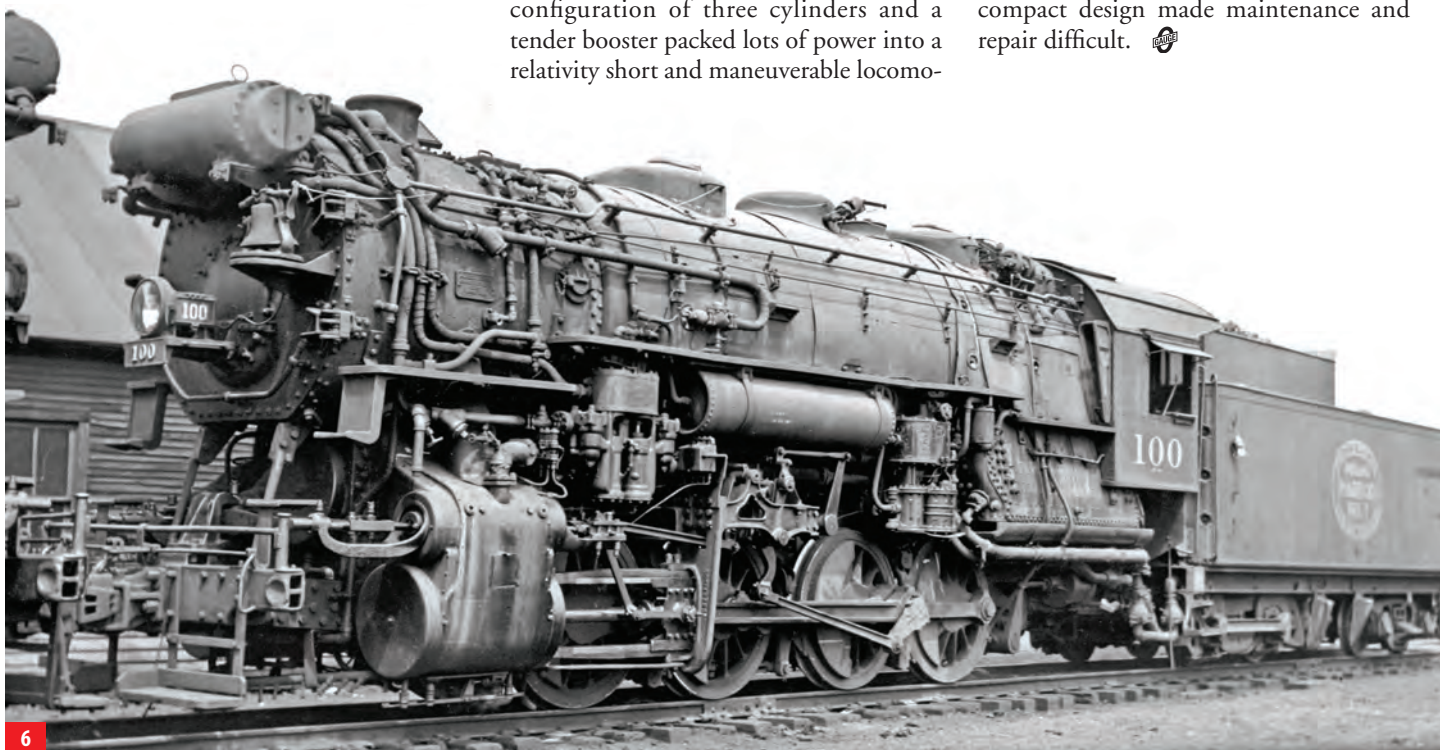
The wheel arrangement meant that the massive weight of the engine was on the eight driving wheels. The small diameter of



5

the wheels limited its speed, but that was acceptable in freight yard service. The feedwater heater tank on the smokebox front gave this class a distinctive look. The configuration of three cylinders and a tender booster packed lots of power into a relatively short and maneuverable locomotive.

It was claimed that one engine could move a 6,000-ton train up a 2.2 percent grade at a steady 2 mph, which was a normal task in the hump yards of the 1930s. The compact design made maintenance and repair difficult. 



6

Photo courtesy The Bruce Campbell Collection

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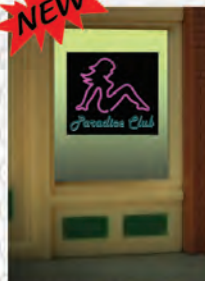
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Soldering Made Easy

Soldering is either you hate the whole idea or it's an easy task. If you've never really learned how to do it, I'm pretty sure it's you hate the whole idea. If this applies to you, you need to unlearn what you know about soldering. Begin by throwing out everything you've ever learned about soldering and try it in the way I describe here with the tools and materials shown in Photo 1.

What Is Solder

Solder is an alloy of two metals, usually tin and lead. Its melting point varies with the mixture, but the most common alloys melt between 360 and 460 degrees Fahrenheit. The action of soldering involves joining two or more metal items together

by melting and flowing yet another metal, the solder, into the joint. This filler material of solder always has a lower melting point than the metals to be joined.

The key item to know is that the solder is never melted by applying heat directly to it and letting it melt onto the metals to be joined. Instead, the two metals to be joined must be heated first, and they in turn must melt the solder. If not done this way, you will never have a solid and secure solder joint.

Soldering is not welding. Welding occurs when two metals to be joined are actually melted and physically mixed to create a joint. That isn't to say that soldering is an inherently weak way to join metals. If a solder joint is properly made, the two metals being joined cannot be physically

pulled apart. That's because the solder joint is always stronger than the metals used to make it.

So why do some solder joints fail? Either the two metals to be joined were not perfectly clean and free of oxidation or the two metals to be joined were not evenly heated first before the solder was applied.

How clean do the metals have to be? In two words: perfectly clean. The moment air is introduced to metal, corrosion starts taking place immediately. As an example, when you remove insulation from the ends of two pieces of copper wire, the copper that was exposed will look very bright and perfectly clean. But the truth is the new bare copper is already too oxidized by humidity in the air to be properly soldered. That is where flux comes in.

About Flux

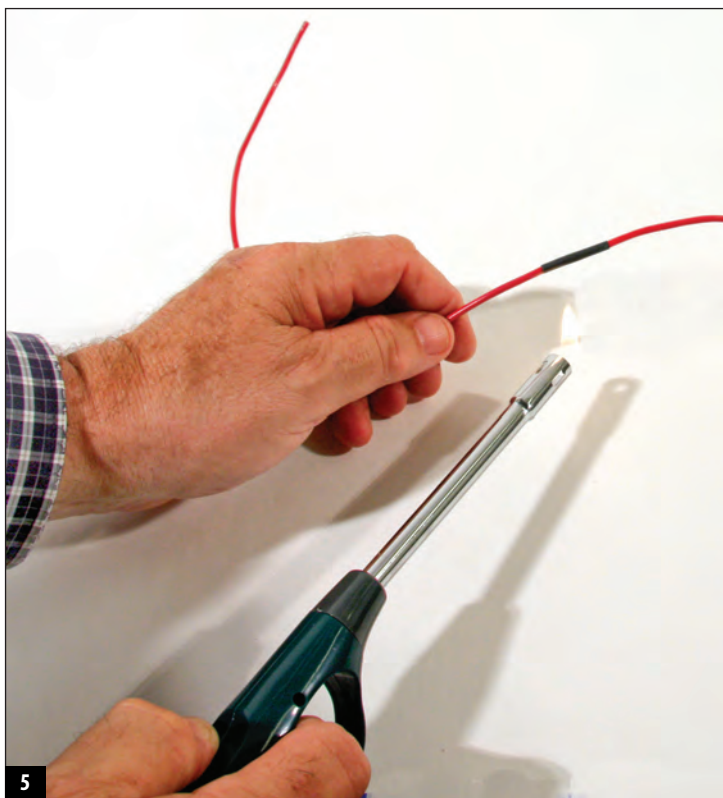
Flux is a chemical that eats into the metals to be soldered together just enough



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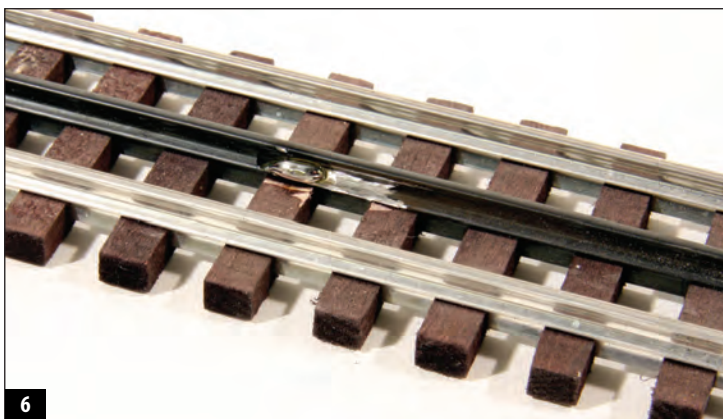
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to expose fresh and clean metal for soldering. Plumbers join copper tubes and fittings together by a practice called sweat soldering. They first clean the tips of the copper tubes and fittings with steel wool and then apply a flux paste to the metal. Using a torch, the two pieces of copper are heated enough to cause solder to melt and flow into the joint. For plumbing purposes, a mild acid-based flux paste is used.

For electrical wiring, a rosin-based flux is used. Because so little flux is needed, solder for electrical purposes will have rosin-based flux already imbedded inside the solder wire. Always make sure the solder you are using is rosin core solder, not acid core solder. The best solder to buy is 60/40

alloy rosin core and it must be labeled suitable for electrical work.

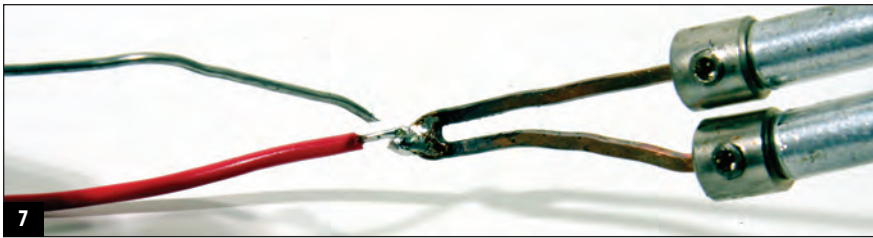
All electrical solders are not created equal. Personally, I would stick with a good solder that professional electricians use, such as Kester .062" diameter 60/40 rosin core solder or an equivalent.

Never use acid core solder for soldering wire. If you use acid-based flux on electrical wire, the leftover flux will eat away at the copper wire beyond the solder joint. When the copper in the wire is eaten away, the wire becomes thinner, resulting in a smaller gauge size. A point will be reached where the wire size can no longer support the current flowing through it and overheats. Eventually the wire will become a fire

hazard as the acid-based flux continues to eat away at the copper wire.

Silver solder should never be used for electrical wiring. It is used only for extremely strong, high-temperature solder joints, such as attaching ends of steel cable to holding devices. An example is the ends of hand brake cables on bicycles and motorcycles. The small ball or barrel-shaped end is soldered onto the end of the cable and is subjected to hundreds of pounds of pulling effort when the hand brake lever is pulled. This type of soldering is also used for fashioning jewelry.

In the past few years, there has been a lot of advertising for resistance soldering devices. They may be good for things like



jewelry work but really have no place in soldering the larger gauge wires we use in O gauge.

The Soldering Gun

The best tool an O gauge railroader can have for wiring work is a Weller model 8200 dual range 100/140-watt soldering gun (Photo 2). The cost at the time of this writing was around \$30 or so. This soldering gun, when properly maintained, makes short work of soldering wires to each other as well as to the track. Quick heating and cooling are among its most desirable characteristics, making it invaluable for doing repetitious short soldering jobs on a layout. The soldering gun has a dual heat range trigger. Fully pulling the trigger applies the maximum 140-watt heat for heating the items to be soldered. Easing back to the first click lets you maintain a constant 100-watt heat to fully flow the solder.

Maintenance of your soldering gun is very important. Start with a clean soldering tip. If it's a new tip, use sandpaper or a scouring pad until the metal on the tip shines. Then heat the tip and "tin" it, which is the process of applying some rosin core solder to the tip when it is hot. While the tip is still hot, wipe away any excess solder on the tip with a wire brush or with a scouring pad. The tinned tip should now look like bright shiny silver.

With time any soldering gun tip gets corroded due to repeated contact with flux and heating cycles. You may need to use a file to remove badly oxidized areas on the tip. Once the tip is clean and shiny, press the soldering gun trigger to high, and as soon as it's hot, tin it again with a coating of solder. Use a rag or scouring pad to spread the solder evenly over the tip.

Eventually the tip will need to be replaced once it has become thin and fragile near the end. Keep a supply of replacement tips handy so you can easily replace a defective or broken one.

Over time and repeated cycles, you may also notice that it takes a progressively longer time for the tip to get hot. It should

get hot within only four or five seconds after pulling the trigger. If it doesn't, the tip probably needs to be tightened in the gun. These tips can work loose, sometimes after only a few heating and cooling cycles. This may not even be detectable when trying to move the tip in its mounting sockets. It is almost always detectable when the tip takes too long to heat up. The tip simply needs to be slightly tightened with an Allen wrench (Photo 3). Don't tighten it too much.

Soldering Technique

The correct way to solder two wires together is to use the soldering gun to heat the wire joint until the wire joint is hot enough to melt the solder. Press the heated soldering gun tip to the wires and then touch the solder to the wires only, not to the soldering gun tip. When the wires are hot enough, the solder will flow over their surface. Once the joint is covered with a thin layer of solder, lift both the solder and soldering gun tip away from the wires being soldered and allow the soldered joint to cool.

It is very important that the solder joint not be disturbed during this cooling period. If it is moved even slightly, you may have what is known as a cold solder joint. A cold solder joint is physically weak and often a poor conductor. You can usually spot a cold solder joint by its dull, sometimes grainy appearance. If this occurs, use your soldering gun to reheat the joint until the solder completely melts and then let it cool again without moving the wire.

Heat Shrink Tubing Protection for a Soldered Joint

Insulating bare solder joints to keep them from shorting against each other is a must. Most of us have at one time or another used black plastic electrical tape to cover a soldered joint, and that is still perfectly fine. Another way is to use heat shrink tubing instead of electrical tape (Photo 4).

Heat shrink tubing comes in a variety

of sizes. It is sold in hobby shops or most hardware or electrical stores and is a great replacement for electrical tape because it never comes off.

Simply cut a length of heat shrink tubing of a sufficient diameter to cover the bare wire you are soldering. Slip the section of tubing over one end before you begin soldering and keep it away from the area being heated. When the solder joint is completed and has cooled, slide the tubing over the joint (Photo 5). Heat the tubing with a flame or other heat source, such as a cigarette lighter, butane barbeque lighter, or so forth, and it will shrink to cover the joint and encase the bare wires. Some people use the soldering gun tip to supply the heat.

Soldering Applications for O Gauge

You can employ soldering to eliminate track contactors. Any method of attaching wires to tracks that involves a compression joint, such as those spring-loaded track contactors for activating accessories, simply guarantees that the electrical flow must pass through a high-resistance connection. With every high-resistance connection, there is some loss of power to the track. You can avoid this by replacing the contactors with wires soldered directly to the rails. It's a simple process and assures a perfect flow of electricity. However, you have to get both the track and the wire hot enough to flow the solder. This is always a challenge when there is more metal in one of the items to be soldered, in this case the track, than there is in the wire. Both metals to be joined must be hot enough to cause the solder to flow when it is applied. When you have two metals of different weights or masses, heating them together may result in overheating one and boiling away the flux before the heavier metal is hot enough to solder. To get around this problem easily, follow these steps:

- Tin the rail first without the wire applied (Photo 6). If there is any coating on the rail, such as the black oxidized surface on many manufacturers' middle rail, buff the spot to be soldered to expose clean metal and then tin the exposed bare metal. I use the round cutting disc on a motor tool to buff a spot clean on the inside of the rail low enough so wheel flanges or pickup rollers will not encounter it. You can also use a

hobby knife to simply scrape away the plating.

- Tin the wire separately from the rail (Photo 7).
- Heat the rail again, this time with the tinned wire resting directly against the tinned rail.
- As soon as the tinned solder on both metals is hot enough to flow, the solder joint is complete (Photo 8). If you want, hide the finished solder joint with a dab of flat black paint.

Electric current also experiences some loss at every track joint. Conventional running requires low voltages to be evenly applied along the entire track circuit for motors to run smoothly at a slow speed. When we operate trains conventionally, that accounts for why extra jumpers are usually attached at intervals for continuous

voltage. Every track connection that is soldered assures a smooth flow of power with no current loss. Wires soldered to the track can also assure signal strength on command control layouts.

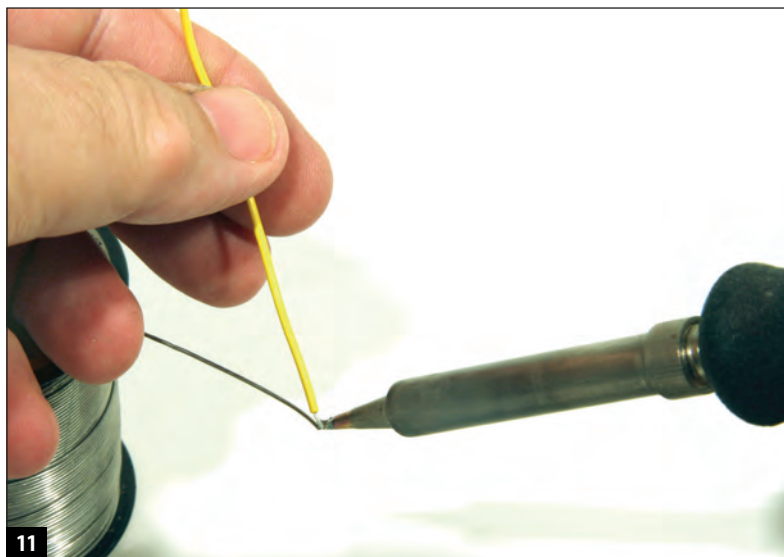
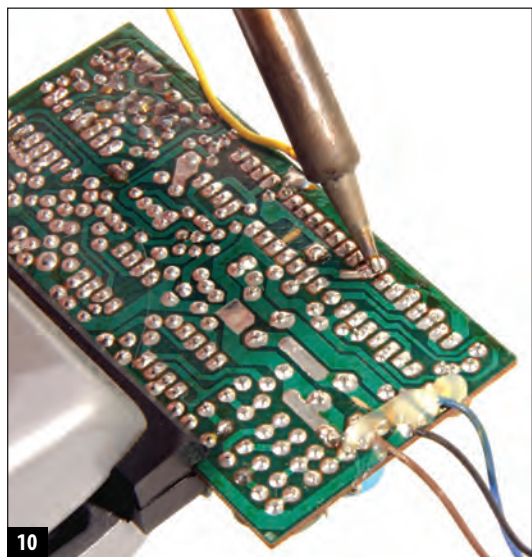
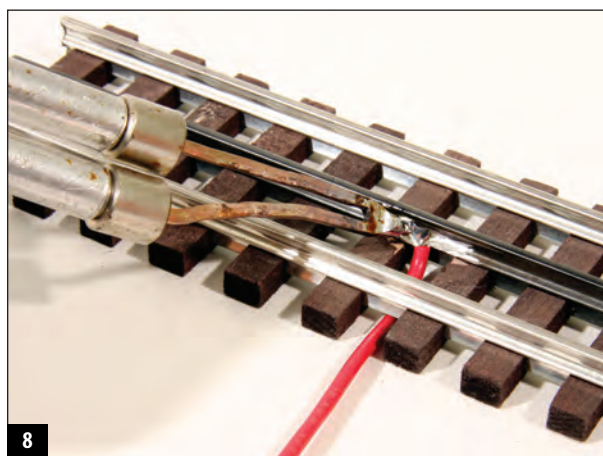
With command systems, we no longer have to worry about loss of low voltages for slow running. We can crank the voltage up to 18–24 volts, and the engine uses only the amount of voltage it needs to satisfy the speed command. We now need only one source of electricity on a given loop or power district. If there is voltage loss in the rails, so be it. It may drop from 24 volts to 16 volts somewhere along the track, but the engine only uses 6–15 volts at any time.

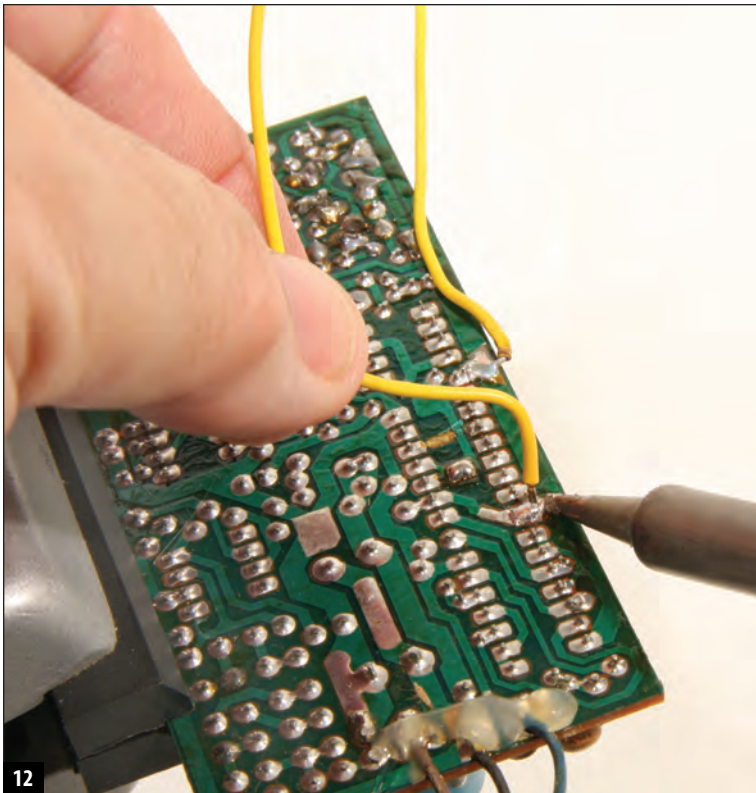
With DCS, it is almost mandatory that we use only one attachment of wires to the center rail because signal strength is badly affected with multiple jumper wires on the same length of rail.

On large professional layouts, every

track connection is usually soldered, which creates a smooth flow of power and command signal strength with no power loss, even though there is only one location where wires are soldered to the track. Every time you eliminate a pressure connection, such as a track joint with pins to carry the electrical current, you have eliminated a loss of either power or signal strength. By using solder and flux at every track joint, you have replaced the pressure connections with solder joints, thereby creating a perfect continuous electrical connection.

Soldering anything to the printed circuit boards commonly used in today's O gauge trains requires a completely different set of tools. Always use a controlled heat soldering station (Photo 9). This example is a simple station with a graduated heat dial and is relatively inexpensive. The challenge is getting heat to a very confined area and using only as much heat as that one






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solder joint needs. Too much heat, such as a conventional soldering gun would provide, can ruin an electronic component very quickly. The key point is that the pencil point tip of a soldering iron must be very clean, properly tinned, and tightly screwed onto the pencil tip holder. Always use an extremely fine diameter of rosin core solder such as .020". Tin the point on the board to be soldered (Photo 10). Also tin the wire or pin to be soldered onto the board (Photo 11). The finished product should be clean and free of excess solder (Photo 12). Cut off any prongs or wire sticking through the board after the solder joint has cooled.

One additional and valuable item worth investing in when you work with printed circuit boards is a simple de-soldering tool. Mine is made by Weller, which also makes soldering guns. The purpose of the de-soldering tool is somewhat obvious. It has a spring-loaded plunger that draws off by momentary vacuum any molten solder adjacent to the tip as the button on the side of the tool is pressed.

Although soldering is not difficult to master, it takes some practice. Once you have done it a few times, soldering becomes almost automatic. Wiring a layout becomes very easy, and the operation of your entire layout will be more dependable and, as a result, much more fun. 



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I have just completed a fairly large 8'x12' layout after having my trains in storage for over eight years while we moved and got settled into our new home. I have a large collection of Lionel, Williams, Weaver, and MTH locomotives. I initially decided to run the locomotives in conventional mode but plan on eventually returning to TMCC operation. I am using an MTH Z-4000 transformer with a Z-4000 wireless controller. As I unpack my locomotives, I find that they all run fine except for the MTH engines. One did not run at all, and another would not leave the neutral state and would only give several dings.

When I called Customer Service at MTH, they suggested I purchase a chip to install temporarily to reset the electronics and also to replace the battery. I have about 20 MTH Premier and RailKing locomotives and, before I attempt to put any more of them on the tracks, I wanted to check with you as to whether I should first replace the battery or attempt to charge it by powering up the locomotive and letting it idle for a while. Will I need to reset each engine with the chip if I have a bad battery? Also, I have found several sources for replacement rechargeable NiMH batteries, buying them in quantity; however, no one seems to

be able to indicate the number of cells in the 9-volt batteries. I know MTH requires 8.4 volts (7 cells), not the 7.2 volts (6 cells); I'm told that some even have 9.6 volts. I am anxious to run the MTH engines but am afraid I may cause one after another to fail if I don't observe precautions.

—Bill McCammon

You need not power up the locomotive and let it idle. In fact, don't do it at all with dead Proto-Sound 1 engines. That may, in fact, injure the chip in the Proto 1 boards. You only need to apply power to the track, and the locomotive's charger will start charging the minute there is power in the track (18 volts or more), regardless of whether the engine is on or not. Just apply power to the track and let all the locomotives sit there for a good 24 hours. If you attempt to start Proto 1 locomotives when they have been totally discharged, even that will sometimes scramble the chip before the battery is charged.

If you are talking about Proto-Sound 2.0 locomotives, only some of the above applies. Just as with Proto 1 locomotives, you only need to apply power to the track for the charger to work. Proto 2 DCS packages do not become scrambled with dead batteries. They merely need to have a charge on the bat-

tery so they can commit to memory all their settings when you power them down.

Purchasing a de-scrambling chip to unscramble Proto 1 chips will probably not be necessary if you first charge the battery before attempting to start it. However, it is a good idea to replace all Proto 1 batteries with NiMH (nickel metal hydride) rechargeable batteries instead of with NiCad (nickel cadmium) batteries. The reason is that NiMH batteries do not develop a memory of being partially charged like NiCad batteries. Proto 1 chargers constantly charge the battery whether it needs it or not, resulting in NiCad batteries thinking that they only have a tiny amount of reusable battery. Proto 2 chargers solved that problem because they only charge the NiCad battery when the battery needs it, not all the time. Since Proto 1 battery-charging circuits do not do such a good job of checking the condition of the battery first before charging, NiMH batteries are what you should use in them. NiMH batteries do not get injured by overcharging them like NiCad batteries. NiCad batteries in Proto 2 engines are a perfect match though.

Whether or not you had a TMCC Command Base connected should have no bearing on everything we just covered. No, I don't know about the 7.2–8.4-volt method of

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confirmation, but if you use the NiMH battery with all Proto 1 engines, you won't have that problem to worry about. They all put out 8.4 volts or more. —Jim

I received four Ross switches with the DZ-1000 switch machines mounted. I have a problem with the DZ-1000 locking in the closed position. No matter which way I throw the switch, it will not lock. I have tried various voltages to the switch machine, but with no luck. I called Ross Custom Switches and was advised to call Z-Stuff for Trains. I also have a friend with the same problem with his Ross switches. I have also tried un-mounting the DZ-1000 and repositioning it so it would lock in at least one of the positions. Throwing the switch the other way will not cause it to go to the locked position.

—Mike Strobel

Anytime I have had this problem, I have solved it by increasing the voltage. Even though the voltage recommended in the information sheet is only 10 to 12 volts or so, I have had no problem using up to 18 volts on the DZ-1000. In fact, using small gauge wiring for the switch machine on long runs demands you use higher voltage to compensate for the voltage loss in the line length. If you can operate the switch machine manually and get a lock on both directions of the switch, the problem is almost certain to be too weak a voltage at the machine. I've never experienced a mechanical problem with a Ross switch. —Jim

I recently acquired some MTH Proto-Sound 2 units from a friend. These were taken out of modern diesel locomotives. I would like to install them into older diesels or even steam locomotives. It seems to me I read that you could change the programming in a PS2. I searched through all of my older OGR issues to no avail. I recently purchased the OGR DVD on how to upgrade original Proto-Sound engines to Proto 2. The reprogramming is not covered. From what I recall, you have to remove the old program before installing the new program. Will you cover this in a future issue?

—Joseph Enright

Download the MTH DCS Consumer Loader from the MTH website and follow the directions it provides. That should get you started on the right track. —Jim

Five years ago when I set up my layout, I read one of your articles on ballasting track. I followed it to the letter except for one of your suggestions, which was to remove the track screws when ballasting is complete because the glued ballast would hold the track down and would make less noise.

Well, I didn't follow that advice, and here it is almost five and a half years later. Funny thing, engines are stopping all over the place with a thunk. Close examination has revealed that some of my track screws, probably because of vibration, have shimmied up just far enough to hit an engine's inside wheels. When that happens, it causes a short and stops the train. So now I am following your advice and removing the screws, but not all at once because there is a load of screws in the layout. The track doesn't move because it's glued down. I wish I had followed your advice.

—Ed Kancler

That must be some serious vibration! Thanks for the letter. I'll pass your experience on to our readers. —Jim

I bought a Lionel banjo signal new two years ago. From the day I bought it, the banjo swung very slowly to not at all. I tried lubing it with a graphite lubricant but with very poor results. I tried cleaning and lubing it again with similar results. The other day I tried silicone spray lubricant on the shaft, pin, and slide. Then I wiped the lubricant off, re-sprayed it, and wiped it off again. I reassembled it and turned on the power. Lo and behold it worked better than new. It has been several days now, and the banjo continues to swing as it was intended. Thought you might like to know.

—Jerry Dowding
Kingsville, ON

Boy, those things can be pesky. I've never tried that with silicone spray. I've got that



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accessory, and I'll try it. Thanks. I'll pass this tip along. —Jim

You had an article in January 2012 about hidden storage space in a layout. In the photos there is a bridge that spans what appears to be a walk-through. I'm interested in the hinge. I have a similar arrangement on the layout I'm constructing. Have you written any past articles on walk-throughs or lift outs?

—Mike Marino
East Amherst, NY

Timely letter! In a coming issue, there will be an article by Bill Bramlage that will tell just how this bridge is done and what materials to use. —Jim

We are longtime subscribers of OGR and are looking for an article that you wrote concerning an under the layout staging yard. We've so many issues of the magazine, we just can't seem to find it. Do you recall which run that article was in? We are starting to plan our layout, and that is a feature we would like to incorporate.

—Jim and Leslie Murdock

It was in "Backshop" Run 209, August 2005. Wow, how time flies! I thought it was within the last two or three years. —Jim

What do you recommend for cleaning the different track systems? I have heard many ideas from using Goo Gone, alcohol, or even fine grit sandpaper, but don't some track systems require different cleaning methods that aren't as abrasive?

—Brian Inch
Dover Foxcroft, ME

It really depends on what kind of cleaning you need to do. If you have concentrated grease and oil that attracts dust and household dirt, then you need to use something like Goo Gone, which is a commercial solvent available at most grocery stores and hobby shops. Then you need to wipe the track clean with alcohol to remove the solvent. If it is corrosion, then you need a light abrasive such as a green kitchen-type scouring pad to

remove the rust. It is also available in grocery stores. If it is anything such as general cleaning, then you can use anything from Goo Gone to commercially available track cleaning fluids. Most hobby track cleaning fluids are very general and can only do you some good if the cleaning needed is just maintenance cleaning. —Jim

I was wondering if a 12-volt low-voltage transformer available for outside lights could be used to power the tracks of my train layout. Could I vary the watts and also have a voltmeter wired in to show the amount of watts that I am putting to the track?

—Rick Wheeler

The only place suitable for using a fixed 12-volt outdoor lighting transformer is for display lighting within buildings. Since you cannot vary the voltage (not watts) delivered by the transformer, it is not really any good for powering trains conventionally to vary their speed. The wattage output of the transformer is fixed and is not something you vary for track speed of a train. Watts is the measurement of the amount of load you put on the transformer, depending on how much or how many things you power with the transformer. —Jim

Can you provide me with a wiring diagram or just instructions on how to wire the Lionel No. 4540 Signal Bridge to

GarGraves track? My plan is to insulate both tracks.

—Dennis Puskaric
Hobe Sound, FL

The easiest way to control the lights on the Lionel No. 4540 Signal Bridge is to use the outside rails of each track to control the lights of each individual signal head. You will need two relays that operate on a separate supply voltage of 12 to 20 volts AC.

On each outside track, insulate a length of the track by cutting a gap in the track at two locations along one of the outside rails. That length of rail will actually have nothing in it until a train causes the AC- to jump from one outside rail over to the insulated outside rail.

From that rail, solder a wire that you will connect to the AC- post of the relay actuator or magnet coil, which will make the relay flip. Power the AC+ of the relay coil from a fixed 12 VAC (+) voltage accessory tap. When the relay flips from one side to the other, attach the wires for the red and green bulbs of the signal bridge to the relay points. When a train occupies the insulated rail section, it will cause the relay to switch the power from the green bulb to the red bulb to indicate the presence of the train. When the train has left the insulated rail, the relay will go back to the original position, making the signal head go back to green. —Jim

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I am running a 22'x 28' layout in my Boston home. I have four different loops with appropriate blocks set up in each loop. I have all Lionel trains running in Legacy CAB-2 mode. I want to run some MTH trains on this layout. I am not sure that I can do so without a TIU and a DCS remote. If I hook up a TIU to the Legacy system, will all my Lionel and MTH trains run using the CAB-2, or do I need to run all of them on a DCS remote in order to get full benefit of Legacy and Proto-Sound?

I also want to build an upper level. However, my track spacing between the loops is variable. The Lionel trestle set will not fit in some places where it is important to provide a sturdy support. Therefore I must find supports that will fit in smaller spaces of the track loops. I thought of small diameter PVC pipe, but I have no idea how to mount this type of support on the table. Do you have any suggestions?

—Frank Nardo
Stoneham, MA

You need a TIU and a DCS remote to get the full advantages of your DCS engines. You can run them in conventional mode without the TIU and the DCS remote, but that will limit what you can get out of the system. The same is true of the TMCC and Legacy features of the Lionel engines. In order to get the full features of the Legacy system, you will need to operate them with the Legacy remote. Both systems will play well together as long as you have both systems hooked to the track.

On the issue of track spacing and track supports, that can only be solved with the addition of custom-made track supports. Without actually seeing your specific situation, there is no way I can suggest a simple, clean answer.

—Jim Barrett

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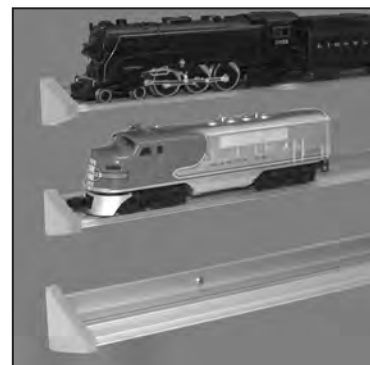


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Beep Beep

On a number of occasions, I've had the opportunity to step back and look somewhat objectively at the O gauge railroading hobby and what it takes or gives back to its aficionado. Always the question arose as to why hobbyists develop enough of an interest in trains to spend some of their disposable income on them and their accessories—perhaps even income that isn't what is normally considered as disposable. But I think I'll step aside on that one and let the behavioral experts deal with it, which to me is not unlike resolving π to its final digit. Another was the observation that model trains frequently foster one or more of an individual hobbyist's other interests, and these often blend seamlessly into that person's train layout.

As a case in point, for over two decades my editorial Carpet Central Railroad was a traditional tinplate layout on the floor with numerous operating accessories and track-

side structures, a Plasticville town and airport, and...die-cast automobiles, lots of them staged more or less appropriately around my layout. You see, I've enjoyed a lifelong interest in autos, especially antique and classic ones. But owning, maintaining, and storing several dozen O gauge locomotives is eminently more practical and a whole lot less expensive than a like number of real automobiles from the 1930s through the 1960s. Actually, a reasonable collection of O gauge trains is usually a lot kinder to the household space and cash budget than even one antique auto. Since automobiles are an integral part of any layout scene set in 20th- or 21st-century America, I could play to my interest in cars and collect them in scales more or less compatible with my trains.

For the most part, my collection of die-cast autos was one of random opportunity rather created than by solicitous selection. Generally, the cheaper the car, the better

chance it had to occupy one of the streets on my layout or park in front of or even inside one of the buildings. To illustrate this point, several years ago a nearby Hallmark card shop was blowing out its inventory of Christmas ornament vehicles, which included 1950s convertibles and pickups. At their retail prices, I wasn't interested in any of these cars. But at three to five bucks each, I loaded up with an example of every car still in stock. As a side note, I also gleaned the store's last copy of the Lionel-licensed 746 N&W Class J 4-8-4 that Hallmark offered a few years ago. That HO model of an O gauge toy train had to be the ultimate in collector trivia, and of course I went for it.

Other low-cost autos were, and still are, 1:43 scale cars sold at mass retailers such as Target and Wal-Mart. These cars that I bought for my layout were not what I'd call detailed, but they filled otherwise open spaces and so served their purposes rather well.

All of the vehicles shown in the photo tickled my fancy in one way or another, which is why they're in my collection. Yup,

at 1:43 scale, these vehicles are slightly oversized for use with O gauge trains, but I didn't consider the variation in scale as a showstopper on my layout. Mainly, they visually fit with 1:48 scale trains such as my CB&Q 40' AAR boxcar. By the way, that boxcar is from an Intermountain kit, but Atlas O now produces these cars as ready to run.

On the other side of the price and quality spectrum, I've found specialty retailers such as Diecast Direct and DHS Diecast Collectables offer some truly spectacular vehicles from various manufacturers, which are frequently in 1:43 scale and often are not inexpensive. By the way, if you're expecting to see high-dollar cars from manufacturers such as Brooklin in my collection, you won't. I find many of these cars enticing, especially those modeling the '40s or '50s, but their prices are simply beyond what I'm willing to pay for layout props. Oh, I've popped a bunch of C-notes for a scale diesel or steam engine, but the car has to be really special before I'll pull more than a sawbuck out of my wallet.

Speaking of layouts and especially those

that faithfully depict a specific era such as the late 1940s, I enjoy studying the photos of these creative works with the correct vehicles for the period. One such layout is in this issue. The buildings and backgrounds fit the scene and sometimes even the figures portray the era. Appropriate years of Chevys, Fords, Pontiacs, Mercs, Hudsons, Studebakers, and other vehicles placed in the scenes carry the effect forward quite well.

Then there are the mistakes. Not long ago, one particular layout really had my interest; that is until I spotted ...whoa—what was that '07 Beemer ragtop doing in a scene representing the '50s! As both a reader and an editor, I've seen a number of this type of subtle slip in the period being modeled and wondered why the hobbyist broke the effect. Cars older than the period are fine, but later model autos can sure upset the scene. Perhaps the oddball car was a well-meaning gift from a loved one, so it went on the layout. Actually, given the wide range of model years from the 1930s to the 1990s of the vehicles on the CCRR, I can't throw too many stones at that glass house.

Model vehicles that serve as accents in

layout scenes aren't limited to autos, trucks, or even motorcycles. From what I've seen of today's die-cast models of contemporary or vintage construction equipment and emergency vehicles, they are every bit as spectacular as the highway and byway travelers. I can easily see where most of this equipment can really stimulate the imagination for creating individual and highly detailed scenes. If nothing else, this equipment can always make an interesting and unusual load on a flatcar, which can also be the centerpiece of a scene.

Y'know, it's conceivable that the trains could lose their star status and become the supporting cast to the myriad of vehicles on a layout. Scale model cars and trucks can now have illuminated headlights and taillights along with occupants, police cars can have flashing take-down lights, and motorized vehicles can run on specially laid SuperStreets. Hmmm, what a concept... an O gauge model car layout. Instead of RailSounds steam whistles or diesel horns, AutoSounds may be the next development in the scale model action world. Beep beep!



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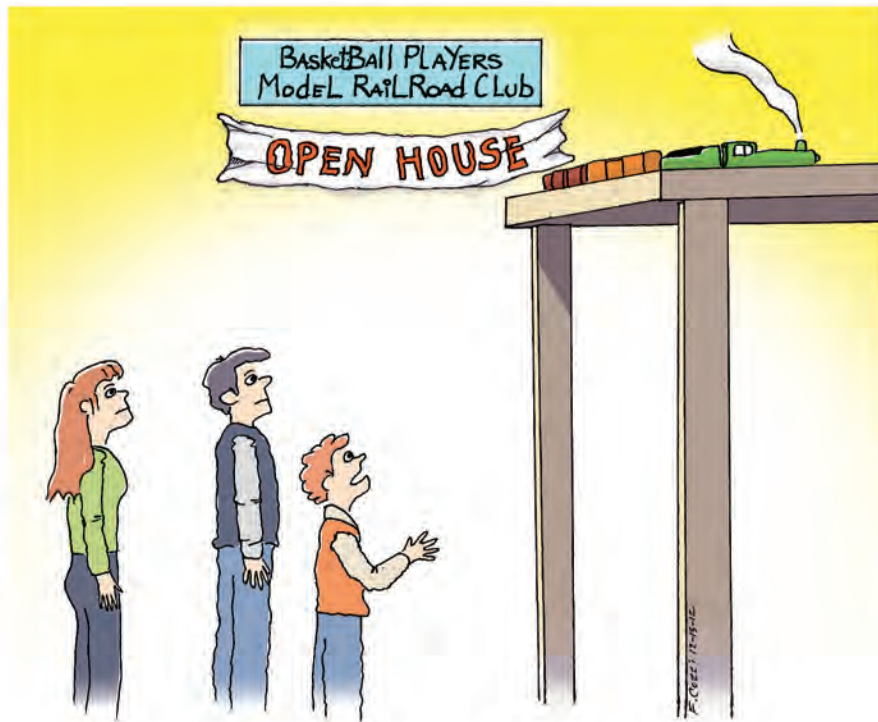
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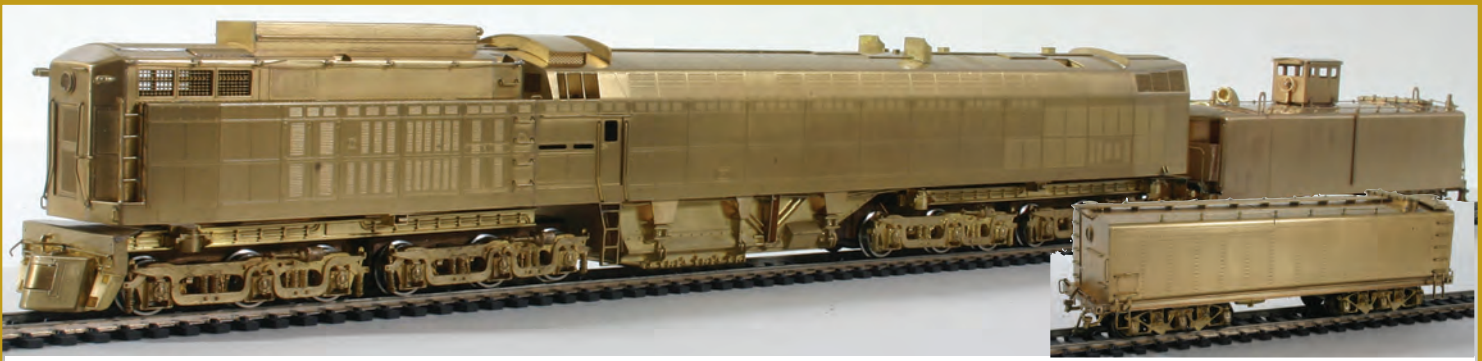
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