Con-Cor's HO Scale CNS&M Electroliner

By Eric Bronsky
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It takes endless superlatives to describe North Shore Line's twin streamlined trains, the *Electroliners*. Influenced by modernism and streamline design of the 1930s, these trains were innovative and futuristic upon their debut in 1941, and they still appear remarkably contemporary some 68 years later.

The ingenuity that went into the brand new HO scale ready-to-run model of the Electroliner released in June of 2009 is no less impressive. This model is currently available numbered as 801-802 or 803-804 (the trains are otherwise identical). A Liberty Liner version of this model may be released at a later date, contingent on whether sufficient advance reservations are received.

The manufacturer is Con-Cor International Ltd., 8101 East Research Court, Tucson, Arizona 85710, www.con-cor.com. Models may be ordered through hobby dealers and online merchants, or direct from the manufacturer. The current list price is $439.98.

A VERY BRIEF HISTORY

The multifaceted story of the North Shore Line and its unique streamlined trains has been thoroughly documented in several fine books ranging from historical and technical works to pictorials, including those published by Central Electric Railfans' Association, William D. Middleton, George V. Campbell, and Morning Sun Books. Briefly, in want of new passenger equipment to compete with the paralleling steam roads, the North Shore Line contracted St. Louis Car Co. to construct the trains. Delivered in early 1941, the twin Electroliners maintained an arduous schedule of five round trips per day between Chicago and Milwaukee over the next 22 years.

Following North Shore abandonment, both trains were sold to Philadelphia Suburban Transit, which modified and re-christened them as Liberty Liners. Operated on the former Philadelphia & Western between 69th Street and Norristown, both trains were retired by the late 1970s. 801-802/Valley Forge went to the Illinois Railway Museum, where it is being restored as an Electroliner. 803-804/Independence Hall went to the Rockhill Trolley Museum in Pennsylvania and is currently for sale.

BACKGROUND

Previous to the Con-Cor version, all commercially available HO models of the Electroliner were produced in brass. In the 1960s, Model Tramway System imported a small quantity of models from Japan. Nickel Plate Products imported a run of models during the '70s, and later, Beaver Creek Models brought in a factory-painted version.

Generally speaking, the earlier imports varied in their fidelity to the prototype, and were aimed more towards brass collectors than layout operation. Many modelers opted to rebuild or replace the crude drive mechanisms, and a few also modified the articulated joints to negotiate sharper curves. Painting the striped salmon and turquoise livery on unfinished models challenged even experienced custom painters.

Con-Cor initially announced an HO Electroliner model in 2002, but when advance orders fell short of their goal, they reluctantly mothballed this project. Due to his personal interest in this train, though, Con-Cor founder Jim Conway refused to give up. Subsequent technological advances in tool- and die-making for the injection molding process made it economically feasible to revive this project and bring it to completion.

Many of us assume that having a model manufactured overseas boils down to sending a package of scale drawings and photos to the factory. Much more is involved, as Conway explains:

"*A project like the Electroliner probably has about 1,000 hours of work at our end, as well as being a major topic of discussion on at least 3 different trips to the China factory. We do 80% of the engineering in the States, and go through many sets of drawings with revisions and changes—hundreds of emails back and forth. So if you add up those 1,000 hours, multiple trips to the Illinois Railway Museum, visiting the St. Louis Car Co. Archives in St. Louis, the cost of the drawings from the China Engineering Group, etc., a lot of time and money are invested just in the pre-engineering work. This does not include any of the actual tooling costs*."

IN THE BOX

Con-Cor's packaging is very attractive. The top of the box is wrapped with a stunning full-color photo of the restored 801-802 at the Illinois Railway Museum, photographed by Mike Schafer. On a side panel is a smaller photo depicting the Liberty Liner version. I wish that this gift-style box was sturdier.

Inside, the four individual cars of the train are wrapped in poly bags and nested in foam rubber cut-outs. Several pages of information provide concise, easy-to-understand instructions on lubrication, how to connect the train, disassembling the individual cars, and installing a decoder if DCC operation is desired (while Con-Cor does not sell DCC components, they do provide a list of major manufacturers). Well-rendered exploded diagrams of each car illustrate how all components fit together, and each of the parts is keyed to a description and order number.

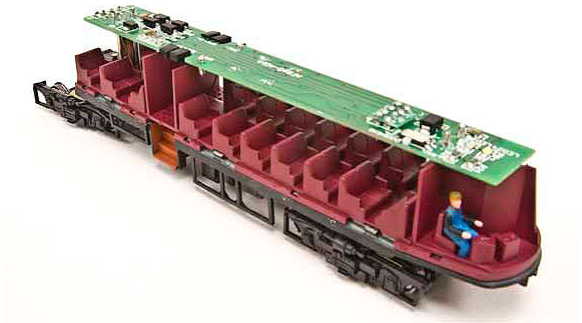
An extraordinary amount of historical information is bundled with each model. Especially noteworthy is a slick-paper reprint of *The Electroliner Legend*, the superb two-part article written by John D. Horachek for *Trains Magazine* (the original article

appeared in the October and November, 1982 issues). To this, Con-Cor added three pages of photos from the St. Louis Car Company Collection (from Washington University Archives).

Yet another bonus is color reprints of portions of the April 27, 1941 and December 1, 1942 timetables publicizing the Electroliners. And, did you know that you can purchase an extra coach section to lengthen this model into a 5-car train? The North Shore actually contemplated doing this at one time—indeed, the folks at Con-Cor thought of *everything*.

BODY SHELL

This model represents the Electroliners following mid-1941 modifications that included enlarging the pilots and adding steel framing to protect underbody equipment, and later on, replacing the painted emblems with cast aluminum plates. Tooling and dies were developed in China. The four body shells are comprised of injection-molded styrene with some detail molded in, and many other details were added during factory assembly. The overall dimensions and proportions check out to be highly accurate. Crucial to the appearance of this model are the fishbelly contour of the sides and the compound curvature of the streamlined ends, likewise beautifully rendered.



Contained within each car body are (from the rails up) the truck assemblies, a chassis with molded underbody detail (diecast metal in the powered "A" unit, plastic elsewhere), metal weights in the non-powered cars, a detailed 1-piece car interior with seats and partitions, and a printed circuit board "ceiling."

The body shell is secured to the chassis by molded tabs, and it's a *very* snug fit (at the risk of sounding "old-school," I prefer machine screw fasteners to the tab-lock mechanisms of plastic models). To disassemble a body shell from a chassis, you're told to insert wooden toothpicks to spread the body shell away from the molded tabs, then flip everything right-side-up, grasp the body with your fingers to spread it even further apart … and if all goes well the chassis should "slide out a few millimeters."

Well, friends, mine wouldn't budge even one millimeter without plenty of additional coaxing and nudging. Besides this being an awkward maneuver, there *is* a risk of damaging the body shell if you're not very careful. Take your time, work over a padded surface, and above all, don't inadvertently jam the toothpicks between the outer shell and the window glazing because this will prevent the shell and chassis from separating. Some additional helpful photos and information may be found online at http://www.con-cor.com/ElectroBody.html.

DETAILING AND FINISH

The windows are glazed with clear injection-molded styrene inserts. A raised metallic silver-painted border around the perimeter of each opening represents the aluminum window frames. The glazing is nearly flush with the outer surface of the body shell,

eliminating the thick-walled appearance that detracts from so many other cast resin and plastic traction models.

Pilot details, anticlimbers, headlight/horn cowlings, vents, and roofwalks are molded into the car body shells. Wire hand rails, photoetched windshield wipers, trolley retrievers, MU cables (delicate!) and rubber diaphragms are factory-installed. Photoetched North Shore Line emblem plates on the curved ends are an exquisite touch.

The interiors of each car contain a surprising amount of detail. The partitions are in the proper places, the seats (painted to match a swatch of the actual fabric) have distinct cushions and armrests, the toilet compartments are fully equipped, and a painted motorman figure and controls occupy the "A" unit cab.

The factory paint job is topnotch. The salmon and turquoise colors perfectly match the prototype paints (yes, I compared the model to samples of the actual paints), and the striping is reasonably uniform and sharp. The finish has an overall semi-gloss sheen. I prefer this to high-gloss, which tends to give scale models a toy-like appearance. Trucks and underbody are black.

Only on close inspection did I notice three relatively minor points. The splotches of salmon on the roof over the headlight/horn cowlings at the "A" unit ends are squared off—they should taper to a "V;" the insides of the step wells should be painted black, not salmon; and the trolley poles should be painted black, not turquoise, with silver on the pole towards the base.

The lettering, numerals and lightning bolts on each car are accurately and crisply rendered; since they're printed directly onto the model, there is no decal film. My only quibble is that the dots on the "i" in "Electroliner" are not separated; it looks more like "Eletrollner."

TROLLEY POLES

The four trolley poles, fabricated in brass, come pre-installed and wired. The non-rotating trolley wheels conform to the specifications found in NMRA Standards Sheet S-5 (revised August, 1982). With a width of 1/16 in. and a diameter of 1/8 in., the trolley wheels are considerably larger than scale (note that trolley *shoes*, not wheels, were standard equipment on all North Shore cars), and the pole bases also appear somewhat clunky. The manufacturer was prudent to adhere to recommended practices, but the tradeoff is that the trolley wheels and pole bases are just about the only things that detract from the otherwise scale appearance of this model. The pole bases swivel in brass bushings inserted through the roof. Flexible wire leads connect each pole to the circuit board. The poles are not easily removed due to keeper pins soldered to the pole bases on the underside of the roofs.

ELECTRICAL AND MECHANICAL

This state of the art model incorporates some of the more sophisticated features and options available on today's finest scale model trains. To date, this level of enhancement has appeared on only a handful of traction models intended for the USA market.

The drive mechanism is located entirely within the "A" unit. An instrument-quality can motor and flywheel are installed entirely underfloor in a housing concealed behind underbody equipment and step wells. Did I say "concealed?" Heck, it's practically invisible! A drive shaft and universal joints connect the motor shaft to a gearbox on the truck at the front end of the "A" unit, and a series of machined plastic spur gears transmit the power to both axles. Only one truck out of five on the entire train is powered, but the traction tires fitted onto one of its two axles provide a fair amount of oomph. The motor, gears and needle-point axle bearings are lubricated at the factory and exhibit remarkably low friction.

The trucks are comprised of detailed plastic sideframes and nickel silver wheels with needlepoint bearings. The kingpins and articulated joints swivel freely but the trucks, being neither sprung nor equalized, are fairly rigid. Merely turning each car upside-down and loosening the kingpin screws just enough to give the trucks a bit more vertical play will help reduce derailments on uneven track. Sideframe bearings are formed from .030" brass. Shim brass wipers protruding from the underside of the chassis make electrical contact with brass plates on top of each truck.

In checking the trucks with an NMRA standards gage, I found four wheelsets to be slightly narrower than the recommended gauge. It took me mere minutes to correct these. No tools are needed to remove the wheelsets; just spread the sideframes gently until the axles pop out of the bearings. Adjust the gauge by pulling/twisting the wheels.

The printed circuit board in each car serves multiple functions: It electrically interconnects the power truck, trailer trucks, trolley poles, headlights, car interior lighting, and DCC decoder through 8-pin electrical connectors placed between each car. When the train is coupled together, these connectors are completely hidden by the rubber diaphragms. When disassembling the body shell from the chassis, note that the wire leads from the trolley poles plug into tiny receptacles on top of the circuit boards; these should be unplugged (don't forget to reconnect them before reassembly). A (labeled) subminiature slide switch on the "A" unit circuit board selects between 2-rail and overhead wire pickup; as-delivered, this switch is preset for 2-rail.

The interior lighting in all four cars is the frosting on the cake. Several ultra-miniature white LEDs are strategically placed along the underside of each circuit board so that all compartments are more or less uniformly lit. Even with straight DC power, as long as there is a trickle of current, the lights will stay on. When the train is in motion, the brightness remains constant with little or no flickering. The headlights illuminate in the direction of travel. In the reverse direction, though, the headlights turn to red. In actual practice, the railroad used two red marker lanterns on brackets at the rear of the train.

An 8-pin socket on the printed circuit board in the motorized "A" unit will accommodate (optional) industry-standard DCC decoders available from several manufacturers. There are also provisions for installing a sound decoder and speakers—perhaps it's only a matter of time before someone creates a module that will generate digital sound effects appropriate to the Electroliner.

When coupling the four cars together, correct alignment of the 8-pin electrical connectors between sections is essential. This is tricky because the rubber diaphragms obstruct a clear view of the connectors. Use a flashlight and/or a magnifying glass, if needed. Even one misaligned pin can lead to an electrical malfunction. Rather than struggle to assemble the train under wire on a dimly lit layout, I found it easier to do this on my workbench, and then transport the model to the layout using a board as a tray

2-RAIL OPERATION

Before commencing passenger service, the Electroliners made several test runs including clearance tests on Chicago's elevated. Like the prototype, I operated my sample into Wells Street Terminal on my HO scale Metropolitan West Side "L," and also toured other properties, both third rail (2-rail) and overhead wire. Be sure to watch my video of Con-Cor's Electroliner touring several familiar (and unfamiliar) sites at http://www.youtube.com/watch?v=ZYJwfacH4ic.

Notch up the controller and the train quietly and gently eases into motion. The power mechanism is remarkably smooth and quiet at all speeds—you hear mainly the sound of the wheels on the rails. On "first point," the model creeps imperceptibly slow, and in "full parallel," it rockets along the straightaway at a scale speed that seems a smidgeon faster than 80 mph. But through the entire speed range, the model glides along as though on a cushion of air. In two-rail mode, all 20 wheels pick up electrical current, virtually eliminating stalls that would be caused by dirty track.

The manufacturer states that this model can navigate 10-inch radius curves. In HO, this translates to about 72 scale feet. The sharpest curves traversed by the Electroliners in regular service were the 90-foot radius curves on Chicago's elevated, and the model had no problem nosing around a 10½-inch radius curve on my "L" layout.

To check this model's ability to handle steep grades, I rigged a test track. At 3 percent, it took a bit more juice to get the model moving upgrade compared to straight level track. Helped along by the two traction tires, it rolled without apparent wheel slippage, providing that the controller was notched up *gradually*. Moving downgrade, the model's tendency to coast after shutting off power increased noticeably. With the grade increased to 6 percent, much more wheel slippage occurred and the model struggled to climb. Installing traction tires on *both* powered axles would surely improve this model's performance on grades, especially with the optional passenger car added.

OVERHEAD WIRE OPERATION

Following its successful trials in third rail (2-rail) territory, the Liner made a test-run under wire on Ken Spengler's *Oglesby Electric Light & Traction* system. As on many HO scale traction layouts, the overhead wire fittings here are optimized to work with

closer-to-scale trolley shoe pickups such as those made by Kemtron/Precision Scale. So, it was not surprising to see the poles dewire repeatedly at frogs and crossings. The contact force of the trolley poles against the wire is marginal at just under 0.2 oz.

As mentioned earlier, this model is not designed to handle curves sharper than 10" radius, however one or more trucks derailed on a few broader curves and spring switches. This is attributable to insufficient car body weight, but the diaphragms and friction at the electrical contact wipers could also be factors.

It's not practical to wire this model for pole reverse operation, so you will need to reverse direction (i.e. change polarity) by operating the directional switch on your power supply. In overhead wire mode, just half of the wheels (all on one side of the train) pick up current.

The Southern California Traction Club, whose HO overhead wire and trolley poles were built to NMRA standards, also experienced a problem with trolley pole operation. George Huckaby's detailed assessment of the problem and the Club's solution is a must-read at http://www.trolleyville.com/tv/times/aug2009/headline07.html.

OVERALL IMPRESSIONS

What were surely the finest and most advanced (for 1941) interurban trains ever built in the USA deserve to be represented in miniature by nothing less than the best. Con-Cor's Electroliner is unequivocally the finest commercial HO traction model that I've had the pleasure to add to my roster.

Modeling by Ken Spengler

Should it matter that the outer shell is fabricated from plastic and not brass? Brass is unquestionably heftier, less prone to damage, and has cachet with collectors. But Con-

Cor's new Liner demonstrates how plastic models can be equal to or better than brass in terms of cost, workmanship, and performance. The cachet should eventually follow.

Owing to the sophistication and sheer complexity of the model's design, and the extraordinary amount of mechanical and electrical gear crammed into its fully detailed interior, it's easy to overlook any minor glitches. My only real beefs are the trolley poles and the difficulty of disassembling the body shells from the chassis.

Con-Cor's next traction model, a pre-war PCC, will feature many of the excellent attributes found in their HO Electroliner. Continued production of ready-to-run traction models of this quality will surely attract more converts to the hobby.

IDEAS AND SUGGESTIONS

The joy of a model that looks great and operates beautifully straight out of the box will more than satisfy most modelers. But for experienced modelers who enjoy taking things a step or two further, here are some enhancements to consider:

First, if the model is to operate under live overhead wire, it will be necessary to either modify or replace the trolley poles. Removing the poles with standard soldering equipment is not recommended. Unless you have a resistance soldering rig and a deft touch, you'll risk melting the plastic roof. The only alternative is to clip off the wire and pin, which will essentially destroy the trolley pole.

So, the most logical course of action is to try to modify the poles without removing them—replace the wheels with shoes, tighten the springs a bit, paint the assemblies black, and lubricate the pole bases with a plastic-compatible oil. Start with the pole in the powered "A" unit. If the modified pole works well, then the same changes can be made to the other three poles. Discard and replace the poles only as a last resort.

Adding at least one ounce of weight to each of the three non-motorized cars should improve the train's tracking ability. The most logical places to add weight are the center aisles, vestibules, and the underside of the roof.

While the train is disassembled, consider weathering the undercarriage and truck sideframes. Don't overdo this—after all, these trains were the North Shore's pride and joy—but a coat of flat almost-black paint followed by a light dusting of chalk powder or airbrushing a grimy color will enhance realism and bring out all the rich detail. While you're at it, paint the step wells black, too.

The brightly illuminated car interiors just beg to be superdetailed. The partitions, painted the same reddish color as the seats, can be hand-painted to lighter pastel shades. Adding seated passengers will further enhance the realism. If you really want to go all out, set the tables in the diner with miniaturized placemats and plates, and form tiny "buns" out of tan modeling clay to simulate Electroburgers!

Those cool white LEDs emulate fluorescent lighting, which the real Liners did not have. For a warmer incandescent look, perhaps you could tint the LEDs with yellow and/or orange felt-tip markers.

If the red LED that (incorrectly) illuminates the headlights in the reverse direction bothers you, it's mounted on the PC board and can be blanked out with a piece of shim brass. To install rear marker lamps would make sense only if the train were operated mostly in the "forward" direction.

Modifying this model to navigate sharper curves would require slightly increasing the distance between cars—this would entail making some rather radical changes to the trucks and the way they mount to the carbody, and also moving the electrical connectors. Anyone courageous enough to try?

Finally, if you will need to switch back and forth between 2-rail and overhead mode more than just occasionally, consider relocating the mode switch to a more accessible location, perhaps beneath the carbody. Maybe some DCC wizard will figure out a way to replace this manual switch with a remote control device, thus enabling a switch between third rail and overhead "on the fly," as capable North Shore trainmen once did routinely at East Prairie Road.