

HO Scale Nickel Plate Products Liberty Liner Conversion

by Bob Dietrich

The Nickel-Plate Electroliner and Liberty Liner models can be made to look good but they never ran well, I wanted a little of both. I happen to have a Liberty Liner with the high doors and other modifications made by the Red Arrow. I believe the methods I describe here can also be made to the Electroliner version of the model, so to avoid any bias I'll simply refer to it as the Liner. My goal in this project was to allow the Liner to negotiate tight curves while keeping the distance between cars at the prototype 16" on straight track. My solution was to move the pivot point away from the ends of the cars. Many model railroad passenger cars use this technique by having truck-mounted couplers. The pivot point is transferred from the end of the car to actually two pivot points at the truck centers. An articulated train, like the Liner, brings a new wrinkle to this concept because the trucks must move toward the inside of the car ends on curves. On the Liner I mounted the trucks on what is basically a drawbar that is attached to the cars 9' from the ends. The result is a Liner that will negotiate a 6 1/2" radius curve. While it may take on a strange appearance on such tight curves I doubt that the prototype train was ever asked to negotiate a 30' bend. Here is how I modified my Nickel Plate Liner.

Motors.

The original motor and coffee grinder gears will not work with this arrangement and must be removed. I used the drives from a Bachmann GE 44 ton engine but NWSL PDTs or other drives can be substituted. I placed a drive in each end unit being sure they are matched for speed. I separated the Bachmann drives by cutting diagonally through the frame then removing the "tanks" below the floor. I cut back the floor of the end Liner units to fit and mounted the Bachmann frame by drilling and tapping some 2-56 screws. Some frame-mounting tabs were removed from the body to allow the power truck to swivel properly.

I made a 4-wire cable that runs the length of the train. A trolley pole mount is located in each end car. In the café car I mounted a DPDT switch for reversing the cars direction. Miniature connectors attach everything together, the pole lead, the switch, wiring in the motor units all get plugged into the cable.

The Drawbars.

The drawbars are actually plates as wide as the truck bolsters in the middle, tapered to about 2' at the ends. I cut a piece of .030 brass 22' x 7' and drilled a #55 hole in the exact center. Placement of the holes is the most critical part of the entire modification. I also drilled a hole at each end on the centerline exactly 9'8" from the center hole. Then I removed the excess from the drawbar as shown in the drawings. Three identical drawbars are required. As you can see in the pictures I customized my drawbars to fit individual locations, but if I were doing it again I would make them all the same.

Under-floor Modifications.

The original truck mounting tabs and diaphragms are no longer needed and were removed and discarded. I cut the tabs from the ends of the floors. Since the floor of the cars is recessed the car sides would interfere with the swing of the drawbars if attached directly to the floors. To avoid this I soldered two pieces of 3/32 x 3/16 rectangular brass tubing to each end of the floor, one piece the width of the floor at the very ends, the other, shorter, piece centered 9' from the ends where the drawbar is attached. I angled the piece on the car that had held the motor to avoid the underbody details. Holes were drilled through the square tubing and floor to accommodate 2-56 mounting screws.

Some underbody details had to be sacrificed to mount the drawbars, I discarded the tanks near the ends of the power units and cut away at the back of other details to allow the swing of the drawbars. You may also want to remove some of the drawbar to clear the details. Just be sure to leave enough so the car does not wobble on the drawbar. Since mine is a Liberty Liner I don't know if additional modifications will be necessary on Electroliners.

Trucks.

There are 5 trucks on the Liner, two were powered and three un-powered. I used the side-frames from the old power trucks to cover the wheels of the Bachmann trucks. That leaves the three un-powered trucks to put under the drawbars. These trucks ride too high and must have the bolster lowered. This is not hard but it can be tricky to assure the side-frames stay in proper alignment. After removing the wheels I clamped one side-frame onto a piece of wood and while heating the solder joint with a torch slid the bolster to its new location. After checking the alignment with the other side-frame to assure the wheels would be perpendicular I flipped it over and did the other side.

The Liner side-frames are mounted on the Bachmann power units with .125 x .250 styrene blocks cut to fit between the wheels and drilled with a # 53 bit, to match the pegs on the power unit. I sacrificed one of the Bachmann side-frames as a guide for drilling. If the Bachmann side-frames are already on the power truck be very careful removing them or the pegs will break and you'll be thinking of a more creative method. The styrene blocks are then epoxied to the side-frames and slid onto the pegs; they can be removed if necessary.

Diaphragms.

The key to keeping the train on the tracks and preventing it from jackknifing are the new diaphragms. They need to fill up the space between the train doors without restricting the movement of the cars negotiating curves. But they need to be firm enough to keep the cars from buckling. I discovered that $\frac{3}{4}$ " heat-shrink tubing was the perfect match for the job but it needed to be shaped to fit the doorway. I decided that a piece of wood slightly smaller than the doorway ($\frac{1}{4} \times \frac{3}{4}$) could be used as a former to shrink the tubing. But it would be difficult to remove the tubing from the wood once it was shrunk. To avoid this problem I used three pieces of wood, two $\frac{3}{32} \times \frac{3}{4}$ and one $\frac{1}{16} \times \frac{3}{4}$. I made a sandwich of these three pieces and shrunk the center of the tubing around it. The middle piece of wood in the former sandwich could then be removed and the other two pieces freed from the tubing. I made my diaphragms should be about $1 \frac{1}{2}$ " long so they float back and forth in the opening. I left some un-shrunk tubing beyond the $1 \frac{1}{2}$ " to keep it from working out of the doorway.

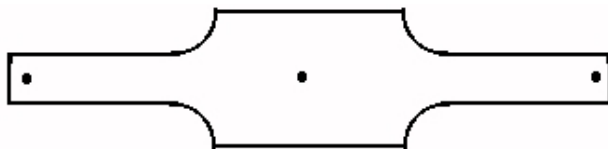
Assembly.

I used the shouldered truck mounting screws and springs that came with the Liner cutting them flush with the top of the drawbars so they don't interfere with the car swing. The trucks are attached to the drawbars and the drawbars to the floors leaving a little play, I found that at least .025 was necessary to allow the model to negotiate my hills. I used a long screw to mount the drawbars and it helps keep the diaphragm in place and I put a locking nut on these screws. After connecting the motor units to the end unit floors I threaded the diaphragms onto the wiring cable and connected the cable. I put on the bodies, stuck in a pole and put it on the track, then did a lot of tuning to do to get the train to track well.

If your goals are the same as mine, to allow the Liner to negotiate tight curves while keeping the distance between cars at the prototype 16" on straight track, then this is a good starting point.

Photos & Notes

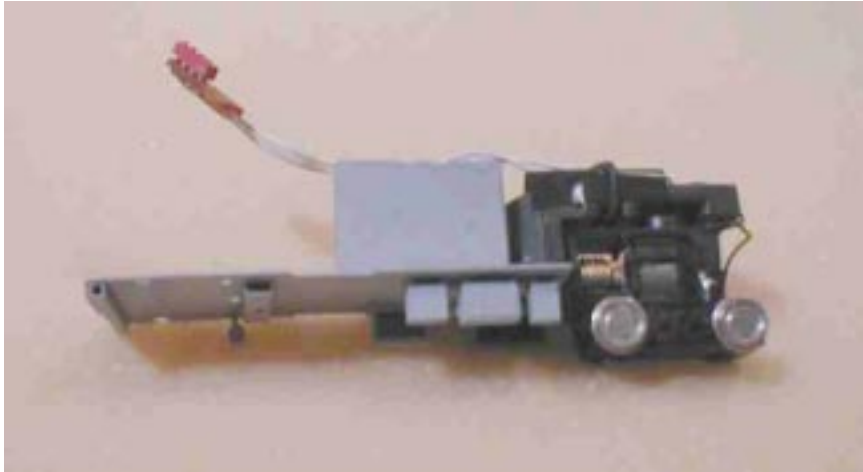
This is the general template for the drawbars. Length is 22' and width is 7', the distance between the holes is 9'8". This drawing is not to scale.



$\frac{3}{32} \times \frac{3}{16}$ rectangular brass tubing is soldered across the end of each floor. Another piece is soldered 9' from each end, the drawbar is attached through this piece with a loose 2-56 bolt and nuts. Lock two nuts together to prevent it from backing out.



The Bachmann frame is cut in half, the fuel tanks removed, and drilled and tapped for 2-56 screws. The floors of the Liner end units are cut back to match and attached to the Bachmann frames.



The underbody assembly is shown here. The blocks behind the motors and in the two center cars are weights, necessary to make the hills on Bob's layout. Because of those grades the whole train is assembled with excess play in the drawbar screws.



The modified liner can bend around a 6" curve, something the prototype was never asked to do. The finished product heads into a curve on Bob's home layout.

