MRH \$500 CONTEST HONORABLE MENTION

A starter layout you can build for under \$500

– By Chris Di Paolo & David Gallagher

A traction layout for beginners: If you've never considered modeling an electric prototype, here's a way to start ...



onceptually we tried to put ourselves in the shoes of a potential new modelers and



remember what it was like for us getting started.

One thing that jumped out at us right away was the fragmentation of the hobby into different subsets and schools of thought, so we made the decision that we should treat the layout as a teaching tool and design it in a building-block fashion while trying to provide for maximum entertainment after building the initial layout, thus satisfying the immediate gratification itch of folks. Without that immediate payoff, we felt that the new modeler might lose interest and not continue to develop the layout and grow in technical skill.

With that in mind we specifically targeted the age group of 14 to 25 year olds in terms of who we were designing for. Why? Because if we could design a layout that this age group could build with little to no experience, limited funds and limited space, then anyone with more experience or skill and more space for a layout could also build it and get into the hobby. Looking at that age group, we assumed very tight space restrictions – they had to keep it in their room at home, apartment or dorm. So, this meant we had to design a compact, sturdy, and transportable (in terms of the physical box) layout with a boatload of expansion capabilities, essentially trying to "future proof" the layout so it could grow with the modeler. From a technology perspective, this meant that the layout had to be "DCC-Ready" and also ready for computer control as well (we include tablets and smart-phones also).

I think you will find we achieved these goals, and have a layout that is "out of the box" because of its ease of initial build and potential future expansion.

When one looks at this layout initially, they may say, "oh, it's just another figure 8" and they'd be missing the point. The "main line" of our layout is the two-track reserved right-ofway that ducks under our small town park/fountain. This line is straddled by two lanes of roadway and is the "gateway" to expanding this layout to other sections on both sides of it.







1a-1b: Benchwork.

From a modeling perspective you can model these stub ends as abandoned lines or as modern light rail expansion into the next phase. The return loop goes up a slight hill revealing a town center with a park and fountain in the middle and winds its way back around. In straight DC mode, after the initial build, you could easily operate two vehicles simultaneously in different directions, adding to the fun. We also provide for a yard expansion that has four tracks. All are long enough to hold modern era light rail Vehicles, including the five-carbody length currently being produced by Halling in Europe.

Turning radius was a big consideration in the design. We looked at several alternatives and radii but, ultimately chose the minimum 8" for two primary reasons.









1) It allowed for modern LRV models to run on the layout, yes, we know you can run them on 6" radius also, but not always without modification, which defeats our building-block approach.

2) We could purchase off-the-shelf track, specifically the "Electric Avenue" track system from Proto:87 Stores (proto87. <u>com</u>}. This track comes with 8" and 10" radius curves and is simply glued down to your building surface. This eliminates any bending of flex track and keeps a clear straightforward installation for the beginner.

Benchwork

The benchwork for this Self-Contained Trolley/Light Rail Layout/Module looks difficult at first, but breaking it down will make simple work of its assembly. To help this, I divided the layout and color coded the various heights to avoid confusion (1a-b).

The white sections are at zero or the base level. The yellow area is the sub-grade that will duck under the bridge/park etc. This area will ramp down to 1" below zero. The green area indicates the level will be between zero and ¼" high. The yellow/

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pink area goes from ¼" to 1¼", and the pink area is 1¼" above zero. This will give us 2¼" of clearance between the duckunder and the bridge/park. This distance is a little less than the modern-day railroad clearance requirement, but many current railroads are limited by the construction done in the steam era. The change of grade was done to East Penn Traction Club standard of 10% maximum grade (1a-b).

Material

We also considered that we wanted the module to be strong, but not too heavy. The goal of this module was something a beginner could construct without a heavy investment in tools. For this reason, I took a trip to my local home center and found the section in the lumber department with small dimensional materials (oak, poplar, pine and aspen).

Further notes for the table: We will bolt them to the end of the module to serve as legs. EPTC standard is to have them cut

Benchwork - Lumber					
Qty	Description	Thickness	Width	Length	
3	Aspen, long runners	1/2"	4"	48"	
2	Pine, long runners	1/2"	4"	36"	
2	Aspen, underpass	1/2"	3"	24"	
6	Aspen, other pieces	1/2"	2"	36"	
1	Pine, East Penn interface*	3/8"	3"	36"	
1	Luan sheet, 4x8	1/8"	48"	96"	
2	Plywood pieces	3/4"	24"	48"	

*This piece will be ripped on the table saw later to be 7/8 of an inch wide and will be part of the module interface. If I did not have access to a table saw, I would use 3/8" square stock. to 36" long (most home centers will do one cut for free). You may find 4' to be more comfortable as height for now. Those who have access to a wood shop with a thickness planer will find it to be worth the time to plane the 1" dimension which measures ¾" thick, down to ½" thick instead of buying the craft boards that are ½" thick. Either method will keep the weight of the layout/module down, but still provide plenty of strength.

Note The reason for the variety of types of wood was due to some pieces being warped, and I wanted to start with lumber that was as straight as possible. You could easily build this with one type of wood.

The total for all the lumber was \$75.

Fabrication

We start by laying out the parameter framework. To make the module adaptable to other East Penn Modules, I first start with a 3/8" lip which both allows for easy leg construction and connection to other modules built to the same interface standard. Down the line, modifying the module to have built-in folding legs may be worth your time, but to make the initial construction simple, we will use the $\frac{3}{4}$ " legs.

The longest part of the module is 60" long. I subtract the two 3/8" lips $(3/8 + 3/8 = 6/8 = \frac{3}{4})$ which gives the length of 59 $\frac{1}{4}$ " for the two runners (since I could only find $\frac{1}{2}$ " wood with a maximum length of 48 inches, I will splice two boards to get to 59 $\frac{1}{4}$ "). Now I calculate the length of the two boards that constitute the ends. Both the runners are $\frac{1}{2}$ " thick, which added together, is 1" thick, so I subtract 1 from 30 and find they should be 29" wide. All the boards except the 3/8" thick mentioned above are $\frac{1}{2} \times 4$ s (colored in green on figure 2). To







2: Benchwork framework for the layout.

save weight, I now switch to $\frac{1}{2}$ x 2s. I cut two at 29" long and place them at the 12" and 48" long locations (colored in pink on figure 2). Now comes the tricky part, allowing for the over and underpass. I have determined that the underpass will only go down by one inch to keep the grade down to ten percent. We will use foam for the ramps and to get to the 1 $\frac{1}{4}$ " rise for the bridge over the underpass. This keeps a lot of the framework simple. To allow for the 1" duck under, the "I" section that is on the diagonal should be secured with the top of this framework 1" lower than the top of the zero or the rest of the module (colored in yellow on figure 2). This permits the down-grade to be just after the switches that will allow for future expansion (toward the inside of the module). After the framework indicated by the green, pink and yellow lines has been installed, the remaining dark black lines should be cut and installed with the tops at the zero level (these will also be $\frac{1}{2}$ " x 2" pieces) of framework.

When assembling the benchwork, I will pre-drill the holes, including a countersink to prevent the wood from splitting. All joints will also be glued. The glue will provide most of the strength, with the screws holding everything into place while the clue sets. The luan top, and ½" x 2" crossbracing will work together to keep the module straight and prevent warping. Assembly will take place on a flat surface, either a flat basement floor or a work table.

Trackage

For this project we looked at several types of track for the layout but, decided to use Atlas code 83 flex track (concrete rail ties) for the private right-of-way and Proto:87 Stores "Electric Avenue" street track system.

On the track plan, we show a four-track rail yard, that is for a planned future expansion, but not for the initial layout. The remainder of the track plan is for the initial build including the turnout for the yard. We would purchase Electric Avenue track with the six turnouts, a complete double oval kit, transition track, alignment pins, electrical Flat Wiring, and extra straight and curve sections of track from Proto 87 stores for \$147 and a few sections of Atlas code 83 flex track with concrete rail ties for approximately \$20.

Surface Modeling

The surface will be made out of foam which will be carved to create the different elevation changes.







3: Roadways indicated on the plan in green.

Roadways

While this is a model railroad contest, we believe that providing for non-rail vehicular traffic adds to the appeal of the module. We have a rough idea of where roads could be located. We are planning to use these roadways with not only static models, but the Faller Car system. This will not be implemented in the initial build because of the cost limitation, but is planned for a future expansion of layout. The green highlighted areas on the above diagram roughly outlines the alignment of these roadways. The pink highlighted area is alongside the rail private right-of-way part of the layout that passes under the roadway.

Going into detail on the Faller Car system and the roadways is beyond the scope of this article. We leave figuring that out as an exercise for the reader. Animating the roadways on your layout can add an extra dimension of fun for a traction layout that goes beyond just the trains.

Budget

The contest's spending limit is \$500. One distinct advantage with this layout is its ability to pack a lot of action in a small space allowing for two continuous-running lines and stub ends. The budget below is suggested based on building the initial plan with basic scenery, allowing the modeler to personalize their layout and expand.

Cost summary		
Item	Cost	Note
Benchwork	\$75.00	
Foam	\$20.00	
Track	\$147.00	
Trolley	\$60.00	Used
Street coverings	\$70.00	Brick
Transformer	\$50.00	
Wiring	\$20.00	
Scenery/buildings	\$58.00	
Total	\$500.00	

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Chris DI Paolo started in model railroading as a teenager but had left the hobby until his wife got him a Polar Express train set to run with their children.

Chris got into modern urban traction

modeling which is his primary interest. His daughters actively help plan, run and set up the trains. His older daughter (7) just installed her first switch recently. Chris is a member of the East Penn Traction Club (EPTC) eastpenn.org.

Yes, MRH is indexed. To learn more, click here.



David Gallagher started in model railroading as a child, encouraged by his father who built a small loop of track, circled by a Tyco single-truck trolley. He has been active with the East Penn Traction club for almost 25 years, primarily in HO, but also with O scale. He does restoration

work with the Electric City Trolley Museum Association in Scranton, Pennsylvania.

David brings modular trolley layouts to several shows a year on the eastern side of Pennsylvania, Baltimore, and occasionally in New England. His goal is to have both modern and historic trolleys to show to young and old visitors alike.



\$500 Starter Layout Contest Rules

Here are the rules for the \$500 Starter Layout Challenge Contest we ran from August to November of 2012.

- You have a \$500 total budget.
- Assume basic tools: hammer, saw, drill, screwdriver, scissors, single-edged razor blades, soldering iron.
- Assume advanced tools like a table saw, router, or lathe are NOT available.
- Must design an operating layout or module (continuous running optional).
- Include a shopping list not exceeding \$500 must cover benchwoork, road bed, track, wiring, control system, rolling stock, locos, structures, and scenery.
- Common items listed on the web like eBay or Yahoo train yard sale okay.
- Thinking outside the box encouraged.



