Lightweight N-TRAK Module Construction

Dave Thompson, North Raleigh Model Railroad Club

Important considerations when building a module

- Length
  - Match standards
  - Consider ease of transportation
- Width
  - Lesser importance
  - Match standard
- Square
  - Very important if module is part of a loop
  - Plan view
  - Vertical end
  - Minimize gap between modules
- Eliminate racking
  - Extreme forces exerted on modules when layout is shifted to close up loop
  - Scenery damage
  - Track alignment
- Lightweight
  - Easier to transport
  - Easier to set up
  - Less likely to incur damage in set up and transport
- Speedy set up
  - Eliminate loose hardware where possible
  - Eliminate need for tools
  - Use dowel pins where possible to assure fast alignment between modules
  - Use folding legs
  - Longer modules equate to less setup effort per length

What is Racking Anyway?

When a loop type modular layout is erected it is common to find that the last two modules to be joined together do not align. It is then standard practice to call the set-up staff together and move the clamped together modules until the last two modules are in alignment. This places incredible stress on modules. If you do not want that snapping sound to come from your module care must be used to keep your module from racking.

Plywood Top This method uses sheet plywood cut to the same dimensions as the module nailed and/or screwed and glued to the top of the module frame. Use of a plywood top is the most effective way to eliminate racking and also provides a flat and even surface upon which to lay track.

Gussets with Track Laid on Plywood This method limits the use of plywood to those areas that will support track. Therefore, the plywood cannot be relied on to prevent racking. The use of corner braces or gussets can be a very strong and the track is still laid on plywood.

Gussets with Foam Top This method uses gussets as above but uses Extruded Polystyrene foam for the surface to lay tracks on. Foam is soft and susceptible to damage on the edges from handling during set up and transport. Therefore, it is a good practice to inset the foam within the module frame.

Materials

- 1/8" Birch plywood
  - Smooth, straight, strong
- 1/4" Luan plywood
  - Not as smooth as birch but less costly
- 1/8" Luan plywood (door skin)
  - Very light and strong
- Extruded Polystyrene foam (blue, green or pink)
- 1" x 4" pine
- 1" x 4" Poplar
- 5/4 Southern Yellow Pine

Lightweight

Lightweight modules that withstand the stress of set up and transport can be made with careful choice of materials.

- Build to fly
  - As a model airplane enthusiast, we learned to resist making our planes strong enough to withstand crashes but instead made the planes light enough to fly well and thus, hopefully, avoid crashes.
  - Add lightness wherever you can.
- Use science rather than heavy materials
  - Box beam
  - I beam
  - L Girder
  - T Girder
  - Triangles
  - Use thick where it is needed and thin/light where you can

Speedy set up

Set up of a modular layout is almost always done under tight time constraints. Modules often don't arrive on time while show time is rapidly approaching and cannot be delayed. Take down is rushed similarly because you need to get packed up and get home to mow the lawn. Here are some considerations to speed up the set up and take down process.

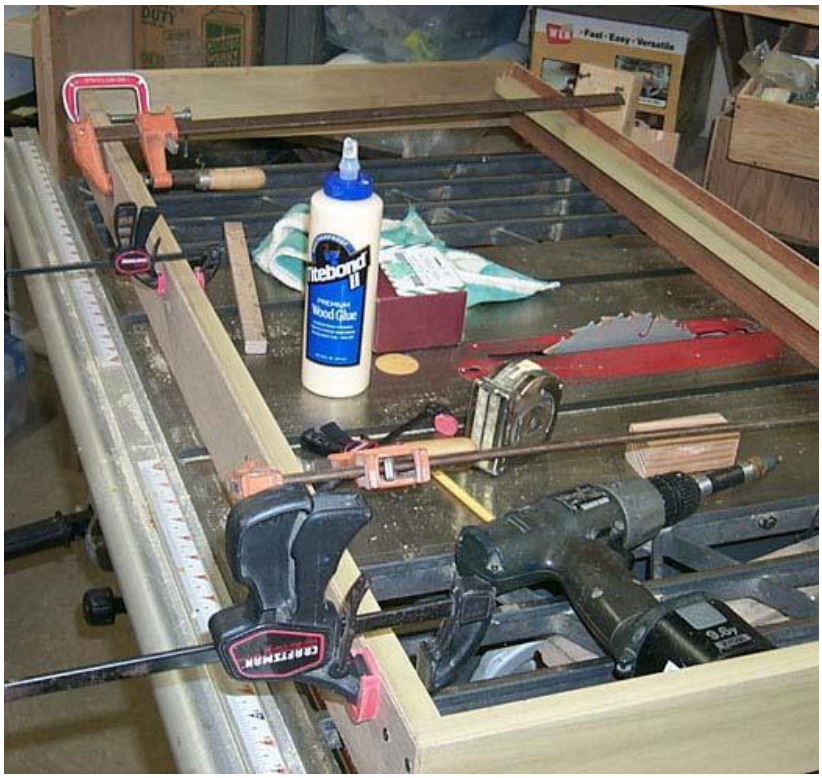
- No Bolts
  - Use of loose hardware should be minimized.
  - No tools should be required
- Folding legs
  - My favorite speed up method
  - All legs and parts are with the module and therefore cannot be left at home
  - Use lightweight bracing to improve stability
- Identical Legs
  - If folding legs cannot be used, each leg should be identical so that there is no sorting of legs between modules and even between corners of a module.
  - Legs should be secured in a pocket with a thumb screw
    - No tools required
    - Legs do not fall out when module is moved

A Lightweight, 4 foot, NTRAK Module Example

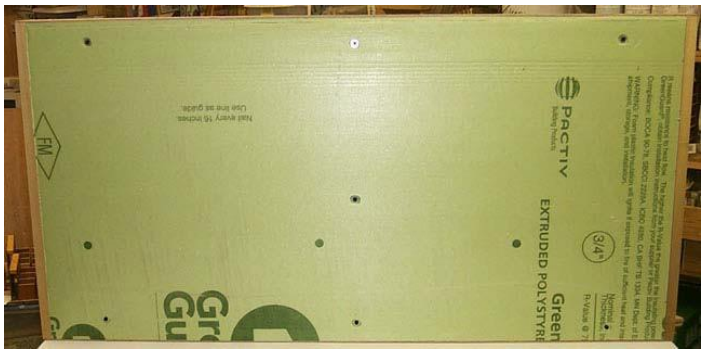
For this clinic I have chosen as an example the foam top with gusset type of module.

Lightweight sides are cut from 1/8" luan plywood and ends are cut from 1 X 4 Poplar.

Sides overlap the ends and are joined with glue and screws. Clamps and a temporary block aid assembly.



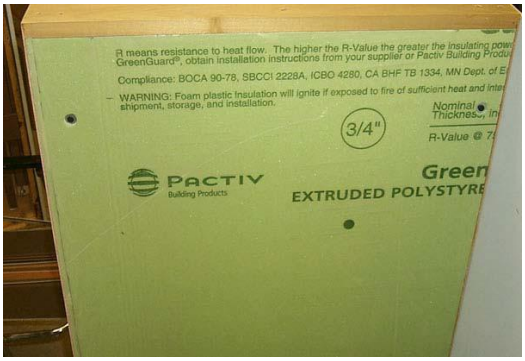
1 1/8” Stiffeners are ripped from 1 X 4 poplar, glued and screwed to sides and ends to form a T girder, serve as a ledge for the foam top as well as stiffen the sides.



The foam is inserted on top of the ledges and inside the module ends and sides.

Now, after ensuring that the module is square, corner gussets are glued and screwed to the stiffeners to eliminate racking.

Cross braces are added 4” from each end and across the center of the module. These provide additional support for the foam as well as creating a place to mount the folding legs.

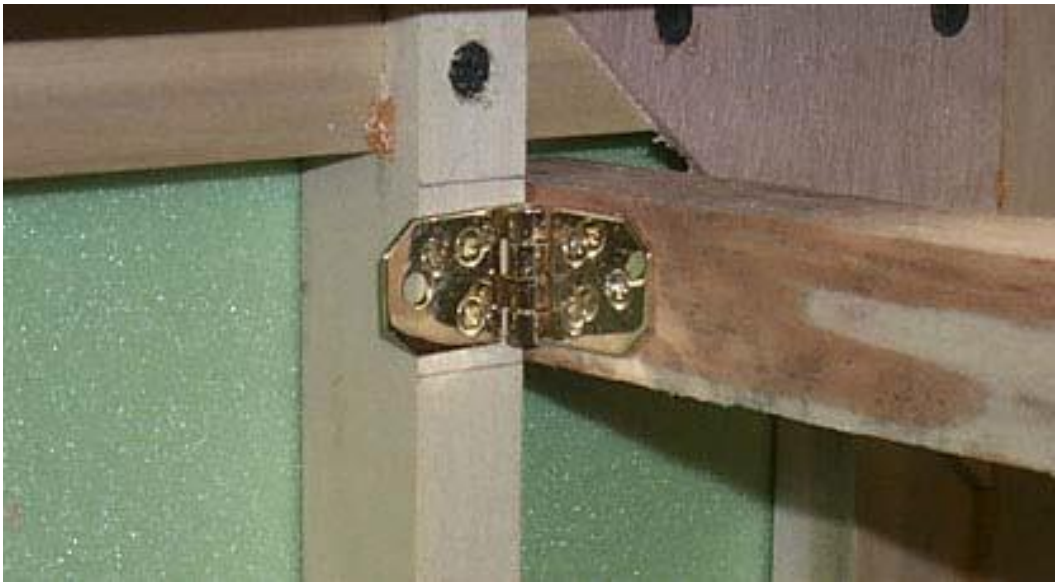


Foam is secured to module using screws with fender washers. The resulting depressions can be filled with lightweight spackling.

Sky board is attached with screws.

The first pair of legs is attached using hinges. Note that the braces are on the back side of the 5/4” legs.

The second pair of legs is attached. Note that this set of legs has extended braces, mounted on the front side of the legs, so that the captive diagonal braces will be secured when the legs are folded.



A close up view of the hinge used to attach leg pairs.

A simple hook latch secures the legs so they won’t come flying out when transported.

And here is the final view of the completed module frame erected and ready for track and scenery.