

# NMRA-MCR Division 10 – The Kentucky Division

## T-TRAK Module Build Instructions

### Engineering Specification Document v6

November 24, 2018

#### Introduction

One of the beautiful aspects of T-TRAK is the simplicity of the specifications. In actuality, there are very few "formal" specifications for a T-TRAK module, however, if those few specifications are followed, all T-TRAK modules are compatible with each other.

In order to begin the conversation on standards some definitions must be established. The "length or width" of the module is the axis parallel to the track. The terms length and width are used interchangeably in T-TRAK. The "depth" of the module is the dimension perpendicular to the track and is the distance from the front (nearest the track) of the module to the back. The "height" of the module is measured from the bottom of the module to the base of the track.

#### The Edges

The first item in the list of **formal T-TRAK specifications** is that the track at the module **edges** must be Kato Unitrack.

Modules in a layout are not clamped or bolted together in any fashion. The only thing that holds the modules together in a layout is the Kato unijoiners. **It is acceptable to use track from other manufacturers between the Kato Unitrack interfaces;** however, most T-TRAK builders use Kato Unitrack exclusively on their T-TRAK modules. Builders must ensure the trackwork on their modules will not cause issues while running trains. The first time T-TRAK builder is advised to use Kato Unitrack exclusively on their first few modules.

#### The Separations

The concept of easy layout assembly requires that the module bases be slightly smaller than the standard length of Kato tracks. This means that the track should overhang the edge of the module by 1mm (3/64"). The module dimensions accommodate this overhang. All of this creates a separation of 2mm between modules.

#### The Width of the Modules

The use of Kato track created an early "informal" standard for the length of track on a module to be 310mm (which is ~12.25"). A module of this size is typically referred to as a **"single"**. A module with 620mm of track is referred to as a **"double"**. Naturally, those with 930mm of track (3 x 310mm) are known as

**"triples"** and, yes, there are **"quads"** (1240mm) and even longer T-TRAK modules, but the last two stray from the small, easy to store, easy to transport tenets that make T-TRAK attractive.

### **The Depths of the Modules**

The division standard is to use 14" deep modules.

### **Track Placement**

It is required that all track on straight modules be built as a multiple of 310mm units of track for reasons of compatibility. The reason this is advised is because most T-TRAK layouts consist of a double row of modules on a table and a non-standard length module on one side will not permit the loop to be closed. In order for a non-standard length module to be used, another module of equal length must be built and used on the other side of the table, or the layout must be constructed as a single row of modules with return loops on each end. While a non-standard length T-TRAK module can be constructed, the builder should recognize that doing so might limit the usability of that module in our multi-person, and possible multi-club layout.

While on the subject of Kato Unitrack, it should be noted that Kato produces straight track in increments of 62mm. (i.e. 62mm, 124mm, 186mm, 248mm and the double crossover is 310mm) and straight track is packaged four pieces to the package so for most typical track combinations (e.g. 124+186; 248+62) two packages of track are enough for two single modules or one double module.

There are other combinations that create 310mm of track but they will require more pieces. Since Kato track is measured in metric units it is easiest to build modules using metric measurements.

### **Initial Club-owned Modules (For Historical Purposes only)**

The Division allocated monies to have six Division Members build the four Division-owned corner modules and two Division-owned straight modules. This will assure the ability to demonstrate an oval installation.

The initial club-owner modules were built as inverted (upside down modules).

Our original six modules were built using a video series from Model Railroader Magazine. This required the use of member owned woodworking tools and was basically a lidless, polyfoam filled, inverted box.

In a typical double row, oval layout this depth permits a gap between the backs of modules. Since the Division straight section modules have a 14" (maximum) depth standard, and the two corners have a combined depth

of 28.75" there is room (~ 2 ¾") to place a banner-type backdrop between the backs of the modules advertising the Division's layout.

### **The Division Formal Standard Module Box Design.**

There are multiple ways to build a T-TRAK module.

- The modeler can use the same hand built techniques that the division used for its initial modules.
- A simpler choice is to use Masterpiece Module Kits Depressed Deck Kit which uses a 1" thick slab of polyfoam. The depression lets the modeler work below track grade on culverts and streams. **Recommended**
- If the modeler wants to work with a solid plywood top, they can also choose to use the Masterpiece Module Kits Flush Deck version, or they can purchase equivalent modules built in Bowling Green from Bluegrass Model Railway Supply

On the bottom of the module there are always four threaded ¼ x 20 T-Nuts. The screw that fits onto that nut is used to adjust the height off of the table allowing the modules to all be perfectly matched horizontally. It is recommended that the screws be 2 inch, steel, ¼ x 20 hex head. They can be purchased at Home depot or Lowes. Do not use the plastic versions supplied by Masterpiece models. They are impossible to adjust after the module has been placed in the layout.

### **The Current Division Formal Standard Straight Module Box Design.**

For a module of single length (i.e. 310mm of track), the box should be no more than 308mm (12 1/8") wide. The formal standard of 1mm of track overhang on each side of the module is built into this dimension.

The formal standard height of the module is 70mm (2 3/4") and is adjustable to a height of 100mm (4") by using leveling bolts. The height measurement is from a flat surface to the base of the Kato track. The division has standardized on a 14" depth of the module.

It is recommended that the builder use two Kato double track (20-042) sections as alignment tools to assure proper separation of the inside and outside track.

Order Masterpiece N T-Trak Single 14 Flush Deck or Depressed Deck

### **The Current Division Formal Standard Corner Box Design.**

The outside corner module (compatible with T-TRAK) corner specifications have dimensions of 14.375" (365.12mm) x 14.375" (365.12mm) x 2 3/4". The formal standard of 1mm of track overhang on each side of the module is built into this dimension.

The Division's track placement standard for T-TRAK modules is the same as the T-TRAK standard, and is an outcome of the use of Kato Unitrack at the module edges.

The mandatory offset from the front fascia to the nearest edge of the ballast (not track center) of the front track, or outer main, is (1 1/2").

The track should extend about 1mm (3/64") over the edge of the modular box. This gap provides for 2mm (3/32<sup>nd</sup> ") of track overhang between adjacent modules. This overhang is part of the formal T-TRAK standards. It was implemented to allow flexibility with connecting to other modules that may not be built squarely, or for those that are warped or flexed.

The center-to-center spacing for the second, or inner main will be 33mm. Track spacing of 33m is the most common spacing for existing modules and is identical to Kato's double track pieces (e.g. concrete tie track, double cross over, etc.).

It is imperative that both front and back tracks are even and square with respect to each other and the box upon which they are affixed. It is a best practice to use Kato's double track sections (20-042) as alignment tools when affixing the two sections of track to both ends of a module.

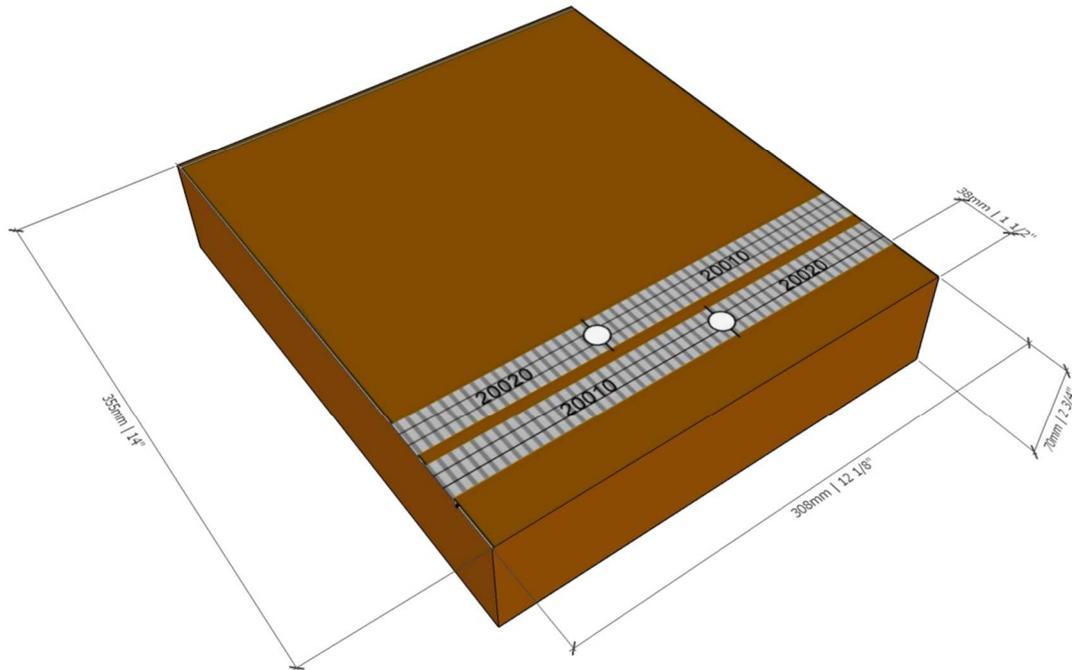
This module can be ordered From Bluegrass Railway Model Supply or from Masterpiece Module Kits,

Order Masterpiece N T-12R Out Corner Flush Deck or Depressed Deck

### **Straight Modules**

The new standard depth will be 14"D.

The single straight module outside dimensions are 14"D x 12 1/8"W

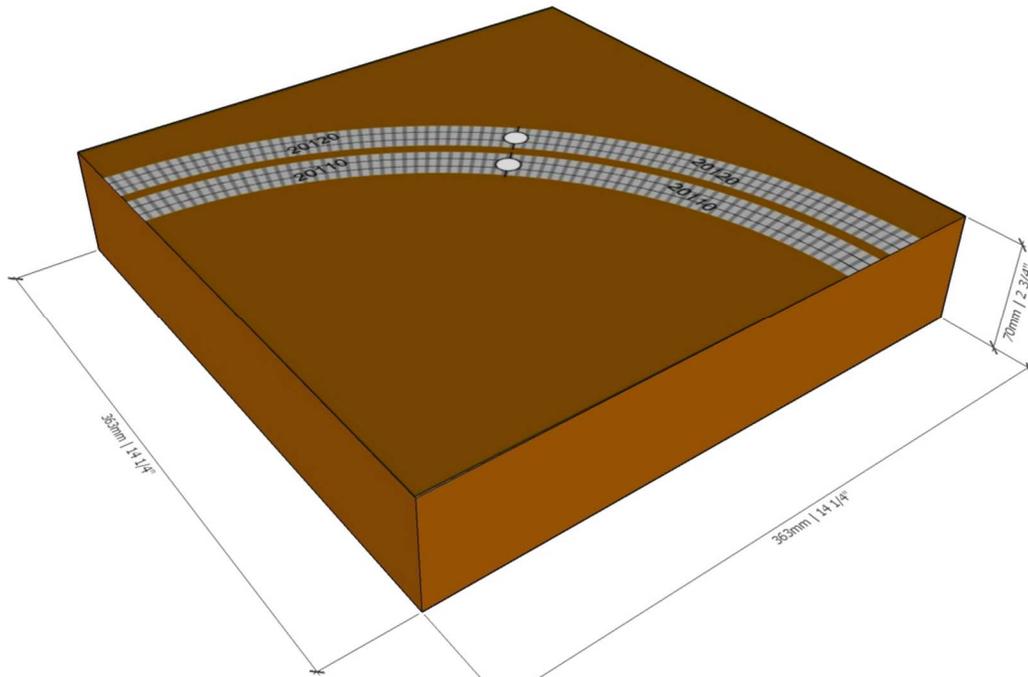


**Single Straight Module Dimensions**

The double straight module outside dimensions are 14" D x 24 5/16" W  
This is our most popular module.

## Inside Corner Modules

The inside corner module dimensions are 14 ¼”D x 14 ¼”W



**Outside Corner Dimensions**

## Division Painting Standards

All edges that are exposed to the air shall be primed and painted with Latex Paint primer. The standard final coat of paint shall be Valspar Zero VOC, **sample size container**, 3010-8, **Cowboy Hat**, Satin, Base C (purchased from Lowes). If there is foam on the top, it shall also be painted with Cowboy Hat.

## Division Electrical Standards

All Division modules will be permanently wired with power wiring.

The modules will be wired for track power and using standard Kato track connectors. The standard is that the rails, beginning with the front rail on the front track, be wired in a Blue, White, White, Blue order. The outside track will also be identified by placement of a band of red tape at the connector. Similarly, the inside track will also be identified by placement of a band of yellow tape at the connector.

If your module uses 12v dc power for animations, terminate your Red and Black wires on a 5.5/2.1mm power receptacle. If you have done this correctly, you

should also be able to put a 12v wall-wart on the jack and test your module at home. John Gorman can supply you with the proper receptacle for your module.

All Division modules will use the **Kato Part, #24-818**, terminal joiner, which replaces the standard unijoiners (4) positioned between the two track sections near the middle of the module. This will provide us with the maximum flexibility to power the layout.

It is a best practice to have a power drop every six to eight single modules (approximately every 2 meters, or 6-8 feet) around a layout. The Kato wiring accessories (e.g. Unitrack DC Extension cord, Unitrack 3-Way Extension Cord) are sufficient to power layouts that are three tables in length. Our bus cables are capable of an unlimited capacity, constrained only by length.

**Before the track is permanently attached to the base**, the track (straight or curved) should be placed on the module according to the placement standards.

Determine the location where the two sections of each track join each other and mark those spots on the foam of plywood.

After locating this location for each track, a 1/4 inch wire hole should be drilled through the foam and base (> 2 3/4" depth)

The inside unijoiner that came with the track now needs to be removed. To remove the existing unijoiners, grab the ends of the plastic unijoiner with pliers and carefully pull the unijoiner away from the track. **Pull the Kato 24-818 terminal joiners from the bottom of the module up and on the track, one at a time, making sure that the wire follows the standard, (beginning with the front rail on the front track, the tracks are wired in a Blue, White, White, Blue order).**

#### **Attaching the track to the Module when the top is plywood**

Underneath each Kato track at the end closest to the end on the Module, find a plastic support collar. Using small drill, drill a 1/16" hole in the center of this collar through to the tie level of the track. Do this at each edge of the pair of tracks nearest the edge of the module.

Place the power wire down into the two holes (as drilled above) and out the bottom of the Module. Use a drinking straw as a conduit if the wires bind in the foam.

Locate the track onto the module. **The end of the each track should extend about 3/64<sup>th</sup> inches over the edge of the module.** This allows the rail joiners to lock onto the next module

Use the provided short piece of Kato Straight Double Track is included in the building kit for the member to use as a mounting template to insure proper track separation. The edge of the template should be **3/64<sup>th</sup> inches** past the edge of the module. Use the template first on one side, and then on the other side. **Be sure to provide the 1 1/2" distance from the front of the fascia to the edge of the ballast of the outside track.**

Draw the lines of the edges of the Kato Unitrack on the surface of the module.

**Place small strip of silicone adhesive across the track line. Then with a small #8, 5/16" nail**, attach the rail section (s) to the wooden support piece in the module, using the holes you drilled into the track bed. Alternately, a very small round-headed screw can be used. Take care to assure that the screw head does not interfere with the glad hand on the couplers.

#### **Attaching the track to the Module when the top is foam**

Locate the track as described above, Drill a half inch hole where each terminal joiner is attached to the track though the foam and the plywood bottom. This hole will be 3 1/2" long. Feed the jack end of the joiner wire through the hole

Place the power wire down into the two holes (as drilled above) and out the bottom of the Module. Use a drinking straw as a conduit if the wires bind in the foam.

Locate the track onto the module. **The end of the each track should extend about 3/64<sup>th</sup> inches over the edge of the module.** This allows the rail joiners to lock onto the next module

Use the provided short piece of Kato Straight Double Track included in the building kit for the member to use as a mounting template to insure proper track separation. The edge of the template should be **3/64<sup>th</sup> inches** past the edge of the module. Use the template first on one side, and then on the other side. **Be sure to provide the 1 1/2" distance from the front of the fascia to the edge of the ballast of the outside track.**

**Then, with small beads of silicone sealant placed on the foam**, attach the rail section (s) to the foam pieces piece in the module, using the holes you drilled into the track bed for the wire. Weight the track down with heavy objects like a brick or equivalent and let dry over night.

#### **Final Step**

Seal up the power holes in the plywood with more silicone sealant. Fill the holes in the bottom piece of plywood with ample amounts of sealant. This is to prevent damage to the power railjoiner and acts like a strain relief. You may also want to glue a wooden clothes pin on the inside of the module to use as a place to store the power wire when not in use.

**Skyboards**

The subject of skyboards has been discussed but the Division has not yet standardized on their design.

**Hope all of this makes sense and thanks for agreeing to build the module for the club. Now you are ready to enjoy the satisfaction of operating modular layouts.**