



North Raleigh Model Railroad Club

Standards and Recommended Practices

T-TRAK Standards & Recommended Practices

May 10, 2019

Questions, comments, corrections and suggestions should be addressed to the NRMRC Standards Committee at wallisjm@att.net

Introduction

This publication was authorized by the Standards Committee on September 4, 2014, and proposed to the general membership. The Club ratified it on September 4, 2014. It is updated from time-to-time.

It is established that the current official standards for T-TRAK modules (<http://www.t-trak.org>) be the adopted base guideline for standards and materials. This document will be unique to the NRMRC, but will ensure full compatibility with T-TRAK standards so NRMRC T-TRAK modules will be fully connectable and interoperable in T-TRAK layouts at shows and conventions.

The standards contained herein are mandatory for member-owned and club-owned modules, except as modified and stated below. The intent of these standards is to ensure compliance during construction, and to enable ongoing maintenance with minimal effort.

Newly constructed modules must be certified as being in compliance with these standards before they can be incorporated into a show layout. Recertification will be required if a major problem develops, or modifications are made to the module. Also, re-certification is required every five (5) years. The Standards Committee and/or the Show Coordinator/Superintendent (see "Show Operating Procedures") will certify new modules and designate modules for re-certification where necessary.

Existing modules are to be brought into compliance with these standards prior to the next 5-year recertification of the modules.

Any corrections or suggestions for changes or improvements should be directed to the Chairman, Standards Committee, North Raleigh Model Railroad Club.

Terminology Used in This Document

The following terminology is used in this document:

- Front, rear, left and right refer to the T-TRAK module when looking at the module from its front — the two main tracks are nearest the front.
 - Width or length is the dimension of the module along the track — width is used in this document. Normally multiples of 310mm. The module base is a few mm shorter so the track hangs over the end of the module.
 - Depth is the dimension from the front-edge to the back-edge of the module, i.e. across the tracks.
 - Height is the dimension from the bottom edge to the top edge of the module base, not counting the adjusting bolts. This is normally 2¾".
 - Running Height is the dimension from the table top to the bottom of the Kato Unitrack.
- The front main track is referred to as the "Red" track; some clubs refer to this as "Track 1".
- The rear main track is referred to as the "Yellow" track; some clubs refer to this as "Track 2".
- Outside rail refers to the front rail on the Red track and the rear rail on the Yellow track.
- Normal T-TRAK color coding is used for the main tracks — Blue to the Outside, i.e. blue — white — white — blue, from front to rear or vice-versa.

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Module Standards & Recommended Practices

Item	T-TRAK Standard	NRMRC Standard
Standard Straight Module	308mm W x 210mm D x 70mm H (12-1/8" W x 8 1/4" D x 2 3/4" H) Height adjustable to 4"	Same as T-TRAK at left. D can be 14-3/8" (365mm) maximum Recommended: 8 1/4" (210mm), 12 1/4" (310mm), or 14" (365mm) Max depth modules [14-3/8" (356mm)] with skyboard must have depth reduced by thickness of skyboard. Full-Depth Module: 28-13/16"
Multiple Length Modules, 2x, 3x, 4x	2x Dimensions 618mm W x 210mm D x 70mm H (24-5/16" W x 8 1/4" D x 2 3/4" H) 3x Dimensions 928mm W x 210mm D x 70mm H (36 1/2" W x 8 1/4" D x 2 3/4" H) 4x Dimensions 1238mm W x 210mm D x 70mm H 48-11/16" W x 8 1/4" D x 2 3/4" H	Same as T-TRAK at left. D can be 14-3/8" (365mm) maximum Recommended: 8 1/4" (210mm), 12 1/4" (310mm), or 14-3/8" (365mm) Max depth modules [14-3/8" (365mm)] with skyboard must have depth reduced by thickness of skyboard. Full-Depth Module: 28-13/16"
	General Rule: (310mm x N)–4mm (leaves about 1/16" overhang at each end)	
Outside Corner Module	Single Outside Corner 310mm W x 310mm D x 70mm H (12 1/4" W x 12 1/4" D x 2 3/4" H) Alternate Single Outside Corner 365mm W x 365mm D x 70mm H (14-3/8" x 14-3/8" x 2 3/4")	Alternate Single Outside Corner 365mm W x 365mm D x 70mm H (14-3/8" W x 14-3/8" W x 2 3/4" D) Double outside corner permitted 732mm W x 365mm D x 70mm H (28-13/16" W x 14-3/8" D x 2 3/4" H")
	Inside Corner Module	Single Inside Corner (25mm) 518mm W x 518mm D x 70mm H (20-3/8" W x 20-3/8" D x 2 3/4" H) Alternate Single Inside Corner 559mm W x 559mm D x 70mm H (22" W x 22"D x 2 3/4"H)
Junction Module (See note below)	No standard	596mm W x 365mm D x 70mm H (23-7/16" W x 14-3/8" D x 2 3/4" H) (NVNTRAK Design)
Module Front/Sides Color	Modeler's Choice	NRMRC Standard color. See below
Leveling Bolts	1/4-20 x 2" Full thread carriage bolt and 1/4-20 threaded T-Nuts installed in all 4 corners of base, 3/4" inset from front and rear of module.	Stainless Flat Point Socket Set Screw, 1/4"-20 Thread, 2-1/2" Length, with 1/4"-20 threaded insert nuts (in place of T-Nuts) installed in all 4 corners of base, 3/4" inset from front and rear of module, with hole drilled through top of module. (Note)

Note: The Set Screw allows turning from the top of the module with a hex wrench. This does not require the module to be lifted or otherwise disturbed, which could affect an adjacent module(s), and can be easily done with the module in place on the layout. Cover the hole with a movable structure or bush

The 1/4-20 insert nuts use a 5/16" hole and screw into the wood using a 1/4" or 5/16" screwdriver bit. These are available from The Home Depot (#54454) and other retailers. Insert nuts that are nailed in are also available.

The Stainless steel Flat Point Socket Set Screw is available from McMaster-Carr (www.mcmaster.com) as Catalog. No 92311A552. The hex driver is McMaster-Carr 5497A39 or 7268A56.

To prevent damage during transport and storage the Stainless Flat Point Socket Set Screw should be fully retracted into the module base.

When moving modules on the table always lift rather than drag so the Set Screws do not mark the table or drag the covering.

On all modules the track must extend 2mm/1/16" beyond the ends of the module. This allows the UniJoiners to lock onto the next module and hold the layout together.

Special Note for Junction Modules

Two Junction Modules joined by the curved tracks will have the normal spacing of two extended corner modules (28-13/16"). Two Junction Modules placed side-by-side along the straight edge will not have a spacing that is a direct multiple of 310mm, thus opposite side modules will not match. A special module that is 10-1/8" in width or a special module that is 2" wide is required to match the side-by-side Junction Modules length.

Module Base Color

The module wood base, legs and any exposed Styrofoam must be painted the standard NRMRC brown. The standard color is available at The Home Depot. The formula is BEHR base 1300, and the rest of the formula is as follows:

CLRNT	BL	CL	IL	KXL
OZ	1	0	0	0
384TH	295	158	191	172

Skyboard

Item	T-TRAK Standard	NRMRC Standard
Skyboard requirement	Optional	Optional
Height (above module)	457mm / 18" maximum Make removable	254mm / 10" maximum from top of base Must be Removable Anchor at 1" from each end and at center of >1x modules
Top Corners	—	Rounded top corners 3/4" radius or less for flat top skyboards. Continuous rounded skyboards allowed.
Base Color	Light blue	See below.

The length of the skyboard should be approximately 1/8" less than the width of the module on which it is mounted. This is to prevent any alignment problem with the skyboard on adjacent modules.

The front, top edge and side edges of all skyboards must be kept in good repair. Chips, gouges, dents, etc. must be smoothed and filled, then painted the standard color.

Skyboards must be removable so that modules can be used in layouts with or without skyboards as specified for the layout.

Skyboard Color

Skyboards must be painted front and back. The skyboard must be painted, front and back, the standard NRMRC light blue. The standard color is available at The Home Depot. The formula is BRHR base 1050, and the rest of the formula is as follows:

CLRNT	BL	DL	EL
101OZ	0	0	0
384TH	4	8	12

The front of the skyboard must be a flat finish, while the rear may be flat or a gloss finish. Gloss finish is recommended to protect the skyboard rear against damage when the module is part of an end board pair for transport. This can be achieved by application of clear gloss over the flat skyboard color,

Non-Standard Modules

The Base Modules defined above are those covered by the T-TRAK standards. These standards allow T-TRAK modules to be located on a standard 30" Banquet table. Any module that goes outside the dimensions of the Base Modules defined above is considered a Non-Standard Module, even if it still matches up and interfaces with the standard T-TRAK base modules. Non-Standard Modules include, but are not limited, to the following:

- Larger Corner and Junction Modules

The tight track radius that can be accommodated on T-TRAK outside corner, expanded outside corner and junction modules may not permit the reliable operation of some long equipment such as large steam locomotives (4-6-6-4, 4-8-8-4), 85' passenger cars (especially with body-mounted couplers, such as the Micro-Trains heavyweight cars), autoracks and similar length modern box cars, and 89' flat cars.

The curved tracks could be flex track or larger than standard radius Unitrack. Such modules could interface with standard T-TRAK modules if the track spacing is correct at each mating end. The track at the connecting ends must be Kato Unitrack.

- Balloon Modules

These modules reverse trains that are traveling on the one track so they re-transit the same module on the other track. A pair of these modules permits a single row of T-TRAK modules, such as along a wall.

- Modules Longer than 4X (Quad)

Such modules would generally be used for a yard, but for modules longer than quad transportation is usually more of an issue. If strong enough such modules could also span between tables when there is open space between the tables (such as when you are short a table).

A long module that spans the space between two tables could be used as a bridge or duck-under for operators to get to the center core (pit) of a layout.

- Modules that Extend out the Front of a Base Module

Effects such as a yard or a station scene, for example, could require a module to extend outwards more than the 1½" of the standard module. Such modules must be constructed so they can overhang the table front without requiring special bracing, and generally should not extend more than 3" or 4" to the front.

- Modules with Special Scenery and/or Tracks

Special scenic effects and/or special trackwork (e.g. a turntable) may require the use of a non-standard module size.

- Half-Length Standard Module

When the expanded corner modules are used a space of about 8" is left in the length of a standard 8' table. Use of a half-length module will fill up the table space to the maximum extent. Note that a module length/width of 7¼"/184mm allows the use of a single 186mm/7-5/16" section of Unitrack.

- 45 Degree Corners

The use of 45 degree corners along with regular corners and junction modules allows a T-TRAK layout to meander or wander rather than be simply square, rectangular, L-shaped, U-shaped, etc.

- Odd Depth Modules

A module or set of modules that use conforming lengths, but are deeper than 14-3/8" must have complementary modules of smaller depth that will allow for a loop to still be created and used on a 30" deep table.

- Offset Modules

A module or set of modules where the tracks swing from the front of the module to the rear of the module, thus allowing the placement of scenery in front of the tracks. Such modules must have complementary modules that bring the tracks back to the normal; position at the front of the module.

- Yard Modules

Yards can be parallel yards or built at an angle to the main module set. They play a very useful role in the setup and tear down of trains, especially during a train show. In the design of yard modules consider the following:

- Use Kato Unitrack # 6 turnouts where ever possible, but always on the main lines. Their use also creates track spacing (49.5mm) that allows for easier placing of rolling stock on the track(s).
- Keep all turnouts located on one module at each end (the throat modules). This allows scalability of the yard, simplifies maintenance of the turnouts, and minimizes control issues.
- Include scenery. Yards are not pretty, but they can be made interesting with the addition of some specialized tracks (e.g. caboose track) where appropriate, maintenance facilities, yard offices, plus some MOW equipment parked in the yard.

In almost all cases non-standard modules must be provided in pairs so the layout will match at the opposite end. All other applicable T-TRAK standards (e.g. electrical) must be met.

Careful construction of non-standard modules will allow these modules to participate within T-TRAK constraints, and thus participate in ordinary T-TRAK meets.

Kato Unitrack Standards & Recommended Practices

Item	T-TRAK Standard	NRMRC Standard
Track distance from front of module	38mm / 1½" from module edge to ballast edge of front track	Same as T-TRAK at left
Track Spacing	25mm / 1" center-to-center	33mm / 1.3" center-to-center. See note
Space between tracks	0mm / 0" (Note 1)	8mm / 5/16"
Mainline tracks	100% Kato Unitrack	100% Kato Unitrack
Other Tracks	All Kato OR Kato for module connectors	All Kato OR Kato for module connectors
Mountain Tracks	No Standard or RP (Note 2)	No Standard or RP (Note 2)
Track Ballast (non-Kato track)	—	User choice
Track Designation	—	Outer main track (front): Red Inner main track (rear): Yellow

Note 1: Owners of modules with 25mm track spacing must provide transition module(s) to 33mm spacing.

Note 2: Discussion underway about using the Kato 216mm/8-9/16" radius track, which maintains the 33mm track spacing, and a height of 60mm.

T-TRAK Electrical Standards & Recommended Practices

Item	T-TRAK Standard	NRMRC Standard
Connector	Kato Compatible	Kato and/or Mini-Tamiya (Note)
No. of Modules with Power Feed	DC — every 30 feet	DC and DCC — every 8 feet maximum All corner and junction modules must have track feeders. Modules with DCC accessory decoders powered from the track. Others as necessary.
Power Feed Connectors	Kato / Mini-Tamiya	Kato / Mini-Tamiya for track feeders.
Track Bus Connectors	—	Anderson Powerpole 30A connector
Track Feeder Color Code	Blue-White-White-Blue	Blue-White-White-Blue
Track Bus	No Standard	12-gauge with Powerpole connectors 2', 4' and 8' Long Track Bus 6" Track Bus Feeder sections One or two track buses as required by layout configuration.
Accessory Power	No standard	15 or 16 VAC @ 5A Each module must provide conversion to needed voltage for accessories (diodes for DC, voltage regulators for less than 15V), and protection (fuse or circuit breaker) in the feeder to the Accessory Bus
Accessory Power Bus	No standard	12-gauge with Powerpole connectors 2', 4' and 8' long Accessory Bus 6" Accessory Bus Feeder sections Single bus per layout
Accessory Power Feed Connectors	Kato / Mini-Tamiya	Kato / Mini-Tamiya for Accessory feeders.
Control System	DC	DCC
	User choice	DCC: Digitrax

Note: The Mini-Tamiya connectors are correctly referred to as Tamiya/Kyosho connectors. The Tamiya connector is the female housing with male pins. The Kyosho connector is the male housing with female pins and the clip tab that holds it to the Tamiya connector. Kato uses these connectors with a 22-gauge blue/white wire pair for track power, and a red/black wire pair for turnouts.

Following is ordering information:

- Male/Female set with two housings and pins for one Tamiya and one Kyosho connector: Cat. No. 2913
- Male (Kyosho) connector w/female pins and clip tab: Cat. No. 2914
- Female (Tamiya) connector w/male pins: Cat. No.2917

The pins require a standard Molex type crimp tool capable of crimping .062" diameter pins, such as the GC/Waldorm W-HT-1921.

These connectors can be ordered from Maxx Products at <http://www.maxxprod.com/>, and other suppliers.

T-TRAK Module Electrical Standard

The b-w-w-b color code for track feeders originated at the first inception of T-TRAK by Lee Monaco-FitzGerald and Jim FitzGerald, as follows:

"Kato had the 20-041 2-7/16" straight track with an electrical connection. This required no soldering and a variety of wiring extension units were available. Because of the solid ends of the module box/base unit used, there needed to be a way to change or check that the special connector was plugged into the track unit. That meant that a 3/4" diameter hole needed to be drilled through the module top, centered under the track and 1 3/4" in from the end of the base. This was done at the right end of the front track and the left end of the rear track. When done this way, there was easy access to the wiring of each track loop.

Because the #20-041 tracks were facing in the opposite directions, the "b-w-w-b" wiring was the result. At that time (2001) there was no Kato double crossover on the market and very little DCC in use on N Scale layouts."

From Jim FitzGerald, May 6, 2012

DCC on T-TRAK would in general be a lot easier if we had "b-w-b-w", but the standard is "b-w-w-b" and that is followed in this document.

Track Feeders

Many T-TRAK layouts that fill one or two tables can operate satisfactory with a single set of feeders, especially if the control is DC. With DCC, however, more feeders are needed, especially as the layout becomes larger and more complex. For DCC-controlled layouts it is recommended that all corner modules be equipped with track feeder cables. This ensures that no module is ever more than about 8 feet away from a power feed, with most modules within 4 feet.

It is recommended that the following T-TRAK modules be equipped with track feeders:

- All corner and junction modules
- Modules with track sections between two turnouts with insulated UniJoiners at the four frog rails of the turnouts (e.g. a passing siding).
- Modules with DCC stationary decoders to operate turnouts should also have their own track feeders or, as a minimum, be located directly beside a module with track feeders.
- Other modules with specific needs for track power feeders.

For the most flexibility, especially at train shows, it is recommended you equip all modules with track feeders, even though there are times when they will not be used. You can arrange the show layout however you want without worrying about where modules with feeders are located.

It is important to label the feeders so it is known to which track each is connected; use red and yellow colored tape. For Junction Modules mark the straight through track as the straight feeder, and, looking at the module from the front (straight) mark the curved track feeders as left and right.

References

- NTRAK Manual, Current edition, NTRAK Publishing, Garland, TX.
- Documentation from T-TRAK official web site at <http://www.t-trak.org> and NTRAK Newsletters.
- Email communications with several people.

- Paul Musselman, "The Unofficial T-TRAK Handbook", at <http://T-TrakHandbook.com>
- Documentation from Northern Virginia NTRAK web site.
- Kato Unitrack information from Kato official web site at <http://www.katousa.com>.
- Thomas M. Tuerke, "Shelf-Top Modules", Thomas.Tuerke.Net at <http://thomas.tuerke.net/on/mrr/?thread=1173489516>
- T-TRAK Email list at Yahoo Groups
- Kato Unitrack Email list at Yahoo Groups
- Andrew George, Phillip Hillebrand, Ted Heath, John Rumping, Eddie Stavieu, David Bromage, Adrian Cooper and Trevor May, "Australian T-TRAK-N Guidelines, published by Andrew George, Version 2, December 2009.