Module Standards
and
Acceptance Criteria

V9

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Module Standards

Introduction

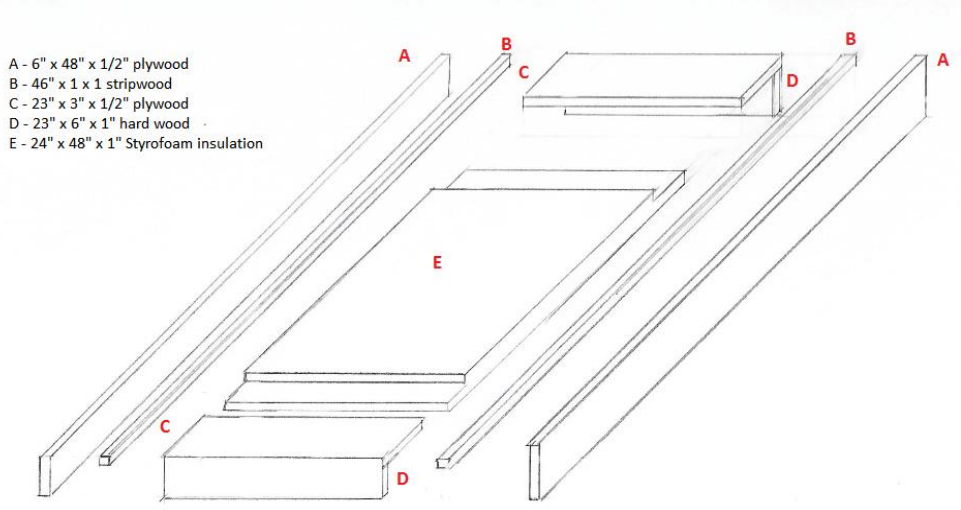
This document is to be used as the basis for the construction of modules for Cantrak layouts. The goal is to not be overly pedantic about the standards but to create a guide with enough specificity that we end up with modules of a high quality that overall permit easy assembly, running of trains and look like they belong together in some fashion, as applicable. However, any deviation from these standards should be reviewed with the Board and / or Show Manager before committing to a final design and implementation.

As this document is expected to change over time, existing modules which have been approved and used in shows will be grandfathered in HOWEVER, if issues are identified with a module which affects it such that trains cannot run or scenery is coming off or other items which cause the module to not meet the current standards and acceptance criteria then that module may be required to be repaired before it can again be used in a show. This would be decided by the show manager – generally in consult with the module owner and one or more board members. Any such module that requires repair will be required to be used at a Play Day in advance of again being used at a show.

Construction of table

The club standard module is two feet wide, four feet long, and one meter (39.37”) high at the rail head, it stands on four legs 1½” square, and a 4” eye bolt (1/4”–20) is attached in the bottom of each leg utilizing a ¼” blind nut (T-nut) (1/4”-20) in such a fashion that the rail height can be adjusted from thirty-eight inches to fourty inches (38” to 40”) to allow for uneven flooring. It is most important that the height can be lowered to 38” (or close) as we can always use cardboard or wooden blocks to increase the height. Note that a 4” eye bolt is 4” long excluding the eye (if the eye is included it would be 5 7/32”). Be aware that during module setup spacers (thin wooden blocks and/or cardboard) are placed under the eye bolts and these can be used to increase the height of the table as well as provide protection for the floor. The legs with eye bolts MUST be able to be set to a length such that the rail head can easily be set to 1 meter WITH THE WOODEN / CARDBOARD SPACERS UNDER THE EYE BOLTS. Members may build modules of any length they wish; however, they then assume the responsibility for constructing another module to extend theirs to conform to a 2’ x 4’ grid, or at the club’s discretion, a module that can be inserted in the opposite side to make a rectangular design possible. The drawing below shows the recommended construction materials list as it applies to a 2’ x 4’ module. It is left to the owner and/or builder to decide if a sheet of ¼” plywood should be installed between the foam and the side strips, or the alternate of at least 3 cross brace strips will be used, to support the foam.

Tables that are constructed using materials and methods other than those documented run the risk of not being suitable for use in a Cantrak Layout. These documented materials and methods have been shown to create a robust, trouble-free module that withstands the temperature changes and bumps & bangs of shipping. In particular, MDF (Medium Density Fiberboard) and similar products are not suitable.



While the above materials are recommended, members are free to substitute other materials providing the table retains the dimensions as documented. In particular, Thinner wood to reduce the weight can be

used as long as it doesn't warp. We want to ensure that the table retains its dimensions over time to ensue it can easily be integrated into the layout with other modules.

Module frame fronts are to be painted "Cantrak blue" and the ends, backs and legs are to be painted flat black. See Appendix 1 for paint formulas.

Table Legs

A number of modules (both club and private) were constructed with folding, self-locking table legs. However, over time it has been found that these tend to leave a table too wobbly. If you wish to use this method, please ensure that when setup your table is secure. The current recommended methodology is to create a pocket in each corner that allows a leg to be inserted with a bolt coming in from the front (or back for the back legs) outside of the table through the leg and threading into a blind nut which has been secured (and glued) into the leg. For this, the leg will need to be drilled to accept the bolt and the blind nut needs to be countersunk to about half ways through the leg as we use standard 1 ¾" bolts (the same ones that are used to secure end plates to pairs of modules). As well a large fender washer should be glued to the sides of the module where the bolt passes through. This fender washer should recessed so that it doesn't accidentally come off and it should be secured with a product like "no more nails" to keep it in place. A Forstner bit can be used to create a "countersink" for the washer.

When extended legs should be at 90 degrees to the table both horizontally and laterally (90 degrees to the base on all sides). While some slight deviation may be present due to how the leg brackets are constructed, the legs should be able to achieve the 90 degrees.
When the legs are folded up, they must easily lock in place, this may require some woodworking on crossmembers or other braces to ensure that the legs fold far enough.

Club Construction of Tables for Members

From time to time members may offer to build tables for other Members. If you are interested in this service please contact the Board to see if the offer is currently available and to obtain contact information. While these tables should adhere to the most recent published standards and thus should pass all acceptance Criteria, any agreement is a private agreement between two people. It is still up to the person getting the module built to ensure that it meets the current standards.

The Club currently offers a service to "wire" the module. This service includes the bus wiring and connectors for two tracks on a standard 2' X 4' module. The current cost (as of November 2018) for this is $20 per module, installed. Installation means that the drops that the table owner has already installed will be electrically attached to the bus wires, the bus wires will be attached to the bottom of the table and Anderson Powerpole connectors will be attached to both ends of the bus wire with the appropriate amount of slack to allow for easy connection to adjacent tables. If desired the owner can have the club attach the drop wires to the track as well. Continuity will be checked to ensure that the wiring is correct. Additional track or different sized modules may have

additional charges applied. Also included in this service is the club DC bus which will extend the length of the module plus 12" on either side and use standard 12 Volt Power Plugs.

Wiring and track placement

Track placement is quite direct, assuming a standard two foot by four foot module, the front track will have its centre line 4½" from the front of the module; the second track centre line will be a further 1½" behind or 6" from the front of the module. If the module owner has chosen to extend their module in front, these measurements will need to be adjusted. Members may add additional tracks in front or behind these two required tracks, however the first adjacent track shall also be on a 1 ½" centre, further tracks may be at any spacing the builder desires. Currently the preferred track is Peco code 80 Flex track. Turnouts may be Peco electro-frog or insul-frog, however short wheelbase locomotives **MUST** be able to traverse the turnout at low speed without stalling. In 2023, it was decided that Kato Unitrak could also be used providing it meets the spacing standards, this includes turnouts as well. Kato #6 turnouts are preferred if Kato is being used.

The original standard was for track to be cut back 2 7/16" from the end to allow an insulated Atlas 5" joiner section to be inserted between tables. In 2023 a decision was made to utilize Kato expandable Track Joiner sections (Kato # 20-050) when joining tables together. As these expansion sections can only extend a maximum of 4 ¼", it is necessary to reduce the gap between tables. While the expansion section track can be reduced to 3", the Kato rail joiners stick out an additional ¼" on each end which means that the gap between the track ends when the tables are put together must be at least 3 ½" so that the track joiner can be dropped in. To reduce the original gap, a short piece of Kato Track (33mm (1 5/16") or preferably 38mm (1 ½")) needs to be added to the end of the track on the RIGHT HAND SIDE (from the spectators view) of the track, reducing the gap on that side only! That gap needs to be 1" and can be up to 1 ¼" maximum. Kato part # 20-092 contains both of these short tracks (Short Track Assortment B). This piece of short track needs to be soldered to the rest of your track and firmly glued down to the table. Longer sections of Kato Track can be used as long as the gap to the end of the table is maintained (1"). This track will have one regular (power routing) joiner on the left rail (rail closest to the back of the layout) with the inside tab of that joiner cut off. The track on the LEFT HAND SIDE (from the spectators view) will be 2 1/2" from the edge of the table. This track will have NO JOINERS on the open end of it. If Kato track is used on the Left Hand side then it needs to have one regular (power routing) joiner on the left rail (rail closest to the front of the layout) with the inside tab of that rail joiner trimmed off PLUS, the module builder is responsible to supply a pair of Kato expandable joiners for the right hand side as the standard Cantrak joiners are not configured for this. The user supplied joiners must use insulated track joiners, with the inside tabs clipped off on both ends. The expandable joiners that Cantrak supplies have one non-insulated joiner on the left end and two joiners on the right end, one insulated and one non-insulated. This ensures that the two tables are electrically isolated from one another and only the bus under the table provides electrical power between tables.

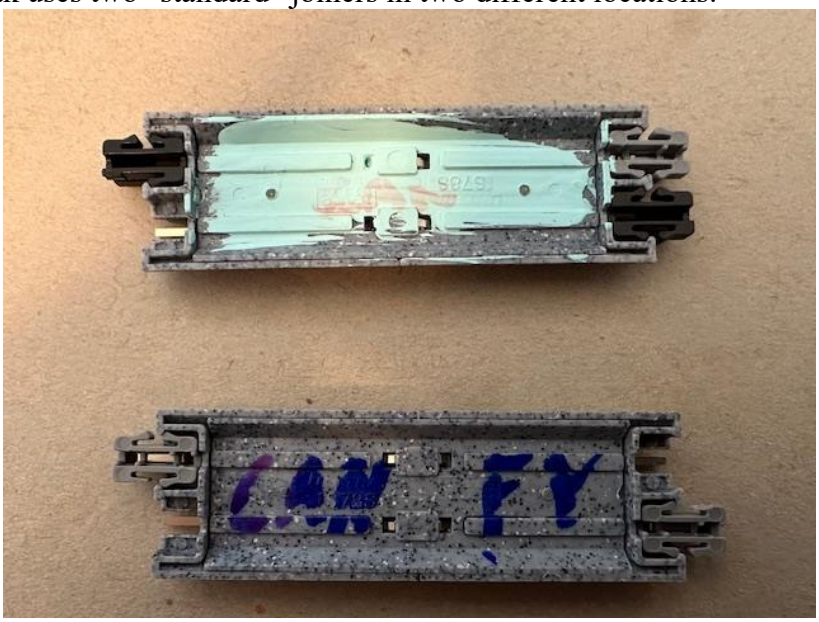
Additional Circuit Breaker for back tracks.

In the event that you decide to put in additional tracks other than the 2 mainlines with or without 2 adjacent tracks (basically the CANTRAK standard 4 tracks) then it is HIGHLY RECOMMENDED that when you tap into the main DCC power supply for your back tracks you route that power through a Circuit Breaker that is set to trip at LESS than 2 Amps. This is to protect the CANTRAK mainline from any accidental shorts that may happen on your additional track. The NCE Circuit Breaker has been found to work quite well and of course a PSX unit can be used as well although it is larger and more expensive.

Kato Expandable Joiners

Cantrak uses the Kato expandable track joiners, part # 20-050 (78mm – 108mm; 3” – 4 ¼”) Expansion Track sold as 1 piece per package. As described above, these require a gap of at least 3 ½” to be inserted with a maximum gap of about 4”.

Cantrak uses two “standard” joiners in two different locations:

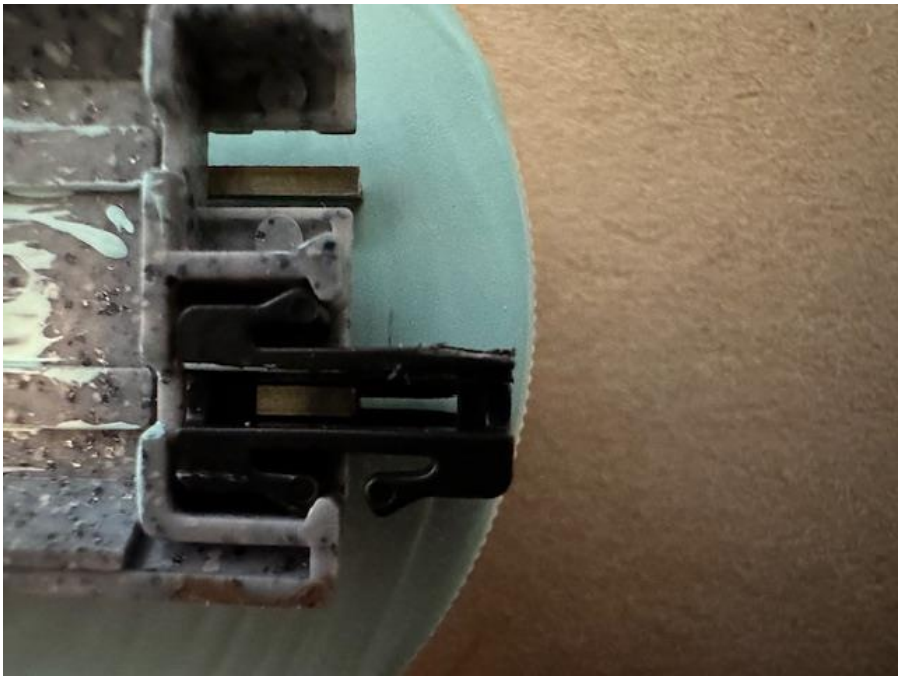


The top joiner with the red “CAN” on the bottom is a regular joiner which is used to connect modules together. It is used where there is a 1” gap on the right side of the table (from the spectator’s view at the front) and a 2 ½” gap on the left side of the adjacent table.

The bottom joiner with the blue “CAN FY” on the bottom is a joiner that is used for the Fiddle Yard only and is configured to route power between tables.

This is a regular joiner end which connects to flex track. One of the rail joiners is insulated (the black one) while the other transmits power. The clips are not trimmed back because these joiners do not plug into Kato track:

And here you see the opposite end which is designed to plug into Kato track. Note that the inside edge of the insulated joiner has been clipped off. This is to facilitate easier insertion and removal:



Module Standards

This is a close up of a regular insulated joiner and a second one with the one edge clipped off. All of the club joiners have this edge clipped off if that joiner is meant to connect to Kato track. PLUS, Kato track at the end of the table also has its edge clipped off. It is strongly recommended that if members choose to utilized Kato joiners, they follow this procedure as it makes removal far easier.

The club standard connectors provide electrical isolation between tables while ensuring that the expandable joiner is powered. The club does not have any isolated joiners which are set up to connect Kato track to Kato track and as such, if a member chooses to use Kato track on their table then they are responsible to provide joiners to connect their modules to the rest of the layout. As we need to maintain module isolation, that joiner piece needs to have insulated joiners at each end.

Note that the joiners inside clips have been trimmed off.

Bus Wires

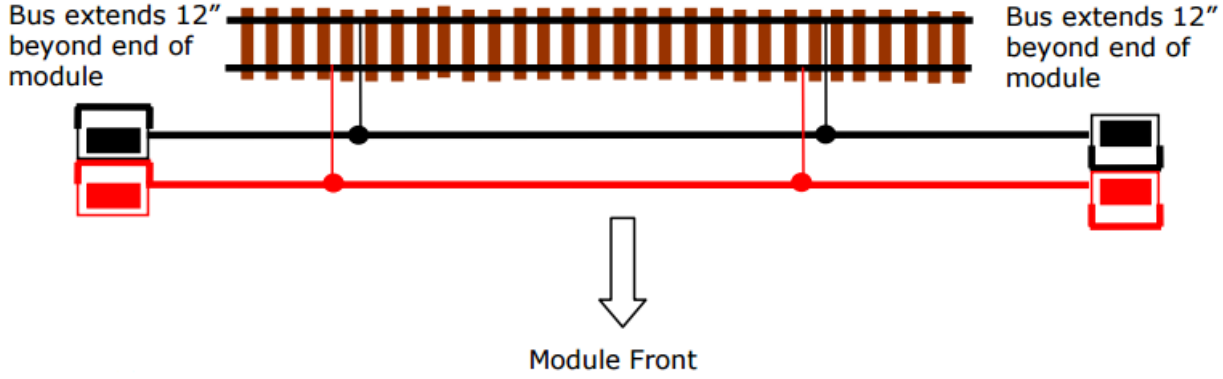
The bus wires will extend 12” beyond each end of the module and there will be a separate bus for each track. The bus wire will be #12 stranded wire, either red and black or white and black, a pair of (20-24 gauge solid) drop wires will connect from the track to the bus 6” from each end of the module, and an additional drop will be placed every 2’ thereafter. All track must have feeders attached or the track needs to be soldered to track which does have feeders attached. The exception to this Kato Track, it does not have to be soldered but if using Kato Track you still must have a minimum of 2 feeder drops over a 4 foot table with no more than 3 feet between drops. For Kato track it is recommended that you solder your feeders directly to the bottom of the metal joiners or directly to the bottom of the track. We do not rely on mechanical connection (such as point rail to main rail on a turnout) for conducting electrical current. The only exception to this is if you wish to power a siding through the turnout, that’s OK as long as the mainline does NOT require the turnout to transmit power. The drop wire will be attached to the bus in such a way as to not cut the bus wire, normally the insulation is removed, the dropper soldered to the bus and the splice is covered by a shrink wrap sleeve, clear or colour coordinated or sufficient electrical tape. More recently we have been using Wago connectors to connect feeders to the bus. Because the track will be ballasted, the colour of the drop wire is not significant, however using a red dropper to connect to the black bus could cause unnecessary confusion. IDC connectors are NOT allowed, N-TRAK’s experience suggests the use of bulk supplies of low-cost IDC’s has been detrimental to their show success. Feeder wires shall be painted to help hide them.

For the new Fiddle Yard, the bus wire is 16AWG stranded wire. The Fiddle Yard does not transmit power to any other modules and has a significant amount of wiring under it. Using wire that is a bit smaller in gauge makes it easier to wire and then connect and disconnect during shows. Note that ANY other deviation from the 12AWG standard needs to be approved by the board.

If a user decides to install a crossover between the two mainline rails then some kind of auto reverse unit will be required to avoid shorting. It is up to the user to acquire a suitable auto reverse unit (PSX-AR is recommended) and do the appropriate installation and track gapping. Please contact the board in advance of doing this to ensure there are no issues. And, there are members who can help with this wiring if desired.

The ends of the bus wires will be connected to an Anderson Powerpole® PP30 30 Amp connector (part number 1331) and will be enclosed in a Red PP30 Amp housing (part number 1327)

or Black PP30 30 Amp housing (part number 1327G6). The housings may be connected together via the moulded-in dovetails. Due to the number of wires between tables, the new Fiddle Yard uses a 16 pin connector instead of Anderson Powerpoles.



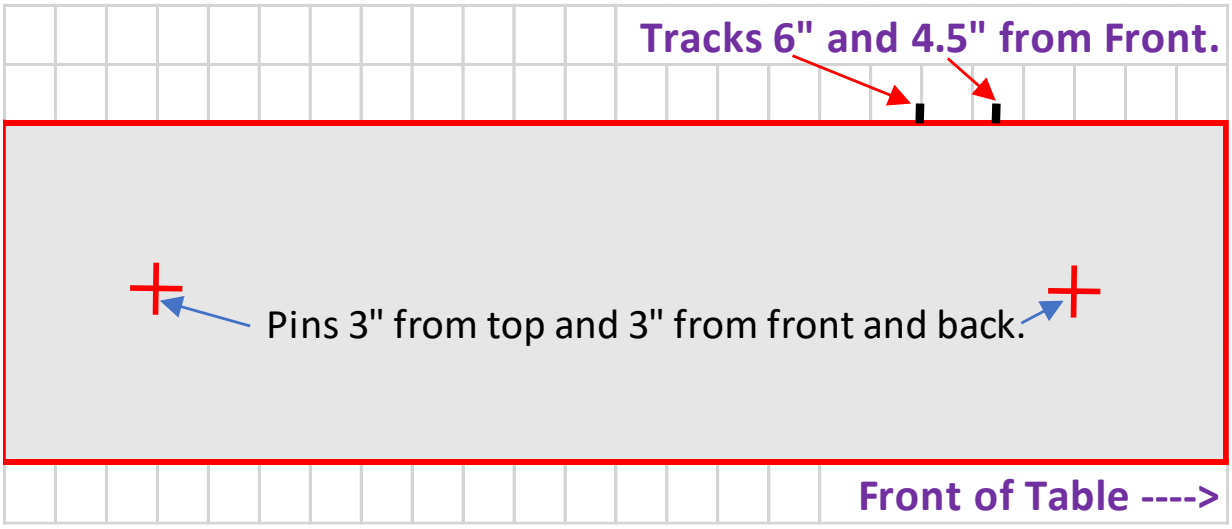
Powerpole® connectors on the track power buses are to be paired horizontally, red in front of black on each end of the module. Adjacent track Powerpole® pairs should not be joined in stacks, with the exception of the fiddle yard. The red connector always feeds the front rail and the black connector the rear rail.

Anderson 30A Powerpole® Connector - Cutaway View

Mated Powerpole Connectors

There are a number of advantages to the Anderson Powerpole® connector. As bulk connectors go, it is relatively inexpensive and the contacts are self-cleaning. Both Free-Mo and NTRAK have standardized on it.

End plates



Optionally, a table leaf alignment pin shall be inserted 3" from the front and back of each end of each module (18" apart), 3" from the top of the track on a standard 2' deep table. Sockets will be

inserted in the left end, pins in the right end (left / right end when looking at the table from the main viewing side). Contact the Board to obtain the current specification for alignment pin standards as this may change. Note that if you don't have hard wood that has been well seasoned then the wood may shrink and expand causing the tables to become misaligned even when the pins are used.

For tables which are a different depth (ie not 2'), the alignment pins will still be 3" from the top of the track and will be 1.5" in front of a vertical line drawn down from the center of the front track to ensure that the track will line up. The rear pin will be 3" from the top and 18" behind the front pin.

A module shall consider all personal modules making up a set to be a single module. Thus a "module" may be comprised of several tables (typically 2 or 3). While it is up to the member to determine how tables connect together, it is recommended that they follow these standards.

Bunting mounting strips

A 46" strip of HVAC metal strapping will be attached to the front of each 2' x 4' module so that blue bunting may be held in place with magnets. The top of the strip will be placed 1" down from the top of the table. A 46" strip of HVAC metal strapping will be attached to the bottom of each Backboard (see below) so that black bunting may be held in place with magnets. The top of the strip will be placed 1" down from the top of the table.

Backboards

Each module will have a removable scenic backdrop or skyboard, made from 1/8 to 1/4 inch Masonite, and painted "sky blue". See Appendix 1 for paint formula. It is desirable for skyboards to have clouds and other scenery painted on them. The skyboard will extend from one side to the other the complete length of the module so that it will butt up against the skyboard of whatever table is attached beside it. The Skyboard will be 15" to 16" high with 11" above the top of the table (although part of that may well be covered by scenery in front).

Member Supplied Modules additional items

When Members bring out modules, they need to bring additional items as follows:

1) A minimum of one pair of clamps per Table. These clamps need to be the same as what the club currently uses.
2) Any inter-table joiners if the member's module has more than 1 Table. A set for each pair of tables. If the tables have the track soldered to copper plates of any kind at the end and the tracks just meet each other then no inter-table joiners are required. It is recommended that Kato expandable joiners be used as these will allow for track expansion and contraction when a layout is set up overnight or over longer periods.
3) If the Member's module requires any additional power for items like lighting or automation then the member needs to include a source of power (wall wort, transformer, batteries etc.) and if using AC power an extension cord of the appropriate length (likely 50'), preferably outdoor quality.

4) If the member wishes to make use of the Cantrak 12 Volt bus they must ensure that what they are using it for draws no more than 1Amp and that the feed is fused so that if more than 1Amp is drawn the fuse will "blow". The club standard is to use what is commonly used in vehicles, a mini-blade 1Amp fuse. It is recommended that the member carry spare fuses.
5) Make sure that all additional items are clearly marked with the owners name so that they can retrieve and store them when the layout is removed.

Module Acceptance Criteria

Overview of Module Acceptance

Overall, Modules must adhere to the current standards as documented above, be in good overall condition, completed to a point where the general public would consider them complete and meet with the approval of the Board. The first level of acceptance shall be done by the current Show Manager who may seek the advice of at least two other club Members. The Board will have the final say overall.

As standards are subject to change over time, Modules which met earlier standards but do not meet current standards will need to be assessed by the Show Manager to determine whether the Module is acceptable for any given show or not. However, Modules should be updated to the newest standards when possible.

Modules which are not fully compliant with all Standards may still be used at Play Days and some shows at the discretion of the Show Manager.

While there is no explicitly stated schedule, Members who are going to build Modules should have the following meetings (note that email works in most cases). Also note that the Board may choose to delegate its authority in this matter to an individual Member or group of Members. When more than one person is determining acceptance, a simple majority suffices.

1) An initial meeting with the Board to discuss the overall plan.
2) A meeting with the Show Manager or delegate to review the module build quality once the module is at a stage for track to be laid (ie, once all the structural woodwork / base has been completed). The module builder will need to bring their module to the Show Manager or delegate at which point the module will be checked to make sure it meets standards (is the correct dimensions, legs are adjustable as documented, table is square etc.).
3) An initial Play Day once track work and electrical has been completed before doing any scenic work. We strongly recommend that your trackwork and electrical be fully tested at a Play Day to verify that it works when attached to different modules and by having trains of different lengths and types running across it. If you choose to do scenery work before having your modules track work and electrical checked then we recommend you construct it in a fashion where the scenery is easily removable should the track work need to be repaired or redone.
4) A final meeting with Board delegates to determine overall module acceptance. This may be combined with the final “live test” at a Play Day or can be separate.
5) A final test of the module needs to be done at a Play Day. The Show Manager needs to be informed well in advance (at least 2 weeks) that you plan to bring your module. At the Play Day, your module will first be evaluated against the current standards and then inserted into the overall module layout so that trains can be run through it.

Module Acceptance

Modules will be reviewed based upon the current standards. The following criteria will be reviewed along with any other identified standards. This is not a comprehensive list but forms a starting point.

Physical characteristics:

1) The module is square (we'll use a square and tape measure to check).
2) The ends are perpendicular (again, we'll use a square).
3) All track is at the correct distance from the ends (we'll measure 2 7/16" to 2 ½" on the left hand side and 1" to 1 ¼" on the right side with the Kato piece installed).
4) All track is at the correct distance from the front of the module.
5) All track is in gauge throughout (we'll use an NMRA or similar gauge).
6) The track work is well done:
    a. No solder blobs.
    b. No humps or depressions on the track.
    c. Overall the track is level from one end to the other (no dips or raises) unless due to a specific plan.
    d. Feeder wires are hidden / painted.
    e. All track has a set of feeder wires or is soldered to track that does and there are a minimum of 2 sets of feeders over the 4' span.
    f. Inside of the track is free of glued on ballast and other contaminants.
    g. Track is clean (you should have cleaned it before bringing it out).
    h. The track ends are "clean" such that Kato joiners are able to slide on and make electrical contact to power the inter-table joiners.
7) No buildings, scenery or other material shall infringe on the right of way.
    a. We run cars that extend past the ties so require 8mm past the ties to be clear (ballast & low grass only).
    b. We run cars that are tall and extend out so again, building overhangs need to be placed back at the 8mm mark.
8) Nothing between the rails that is above the track (like at crossings) that would "catch" a car's trip pin.
9) The rail height is set to 1 meter (39.37") and can be adjusted as documented above.
10) The module is painted to specifications.
11) The module front has metal stripping placed as documented.
12) The backboard extends 11" from the base and at least 4" down from the base in the back and has metal stripping on it. The back is painted black. The back is attached using bolts and blind nuts or similar fastening, NOT screws.
13) Wiring will be tested:
    a. The rails will be tested for continuity through the bus connectors.
    b. The Anderson Powerpole connectors will be set up appropriately so that they can be easily attached to standard modules.
    c. The feeder wire connections to the bus will be reviewed to make sure they meet standards.

d. All rail needs to be attached to the bus through feeders or soldered to rail which attaches to feeders. We don't rely on a physical connection (like a point rail to a main rail in a turnout) to transmit power. The exception to this if someone wishes to power a siding via the turnout – this is permissible as long as the mainline doesn't rely on it on the turnout for power.
e. The bus and feeder wires will be neatly attached to the bottom to ensure they do not dangle and cannot easily be caught up during transportation.
f. The wiring shall be fully accessible from under the module.

14) The module must be easy to transport (legs need to fold up out of the way, wiring needs to tucked away etc.). It is recommended that Velcro be attached at the inside end of the tables so that the cable can be secured by it for transportation.

Aesthetics and general look:

1) The module will be looked at to make sure it "fits in" with other modules in that it has been done to a similar (or better) skill level.
2) Buildings and Scenery will be reviewed to make sure they are solidly affixed or placed in such a fashion as to not fall off or be in the way of operations on the module.
3) Removable buildings and features will be installed in such a fashion that their removability will not be noticeable to viewers. No obvious gaps between the building bottoms and scenery that is viewable.
4) Extra features such as lighting, sound, animation and others shall be reviewed to make sure they are working as designed. If these are included then some kind of instruction guide should be included so that if things need to be done such as shutting down components or starting up components, that can be done when the person isn't there.

Layout Testing:

1) The module will be inserted between two existing modules and "set up" as other modules are. We will note how easy it is to setup.
2) We will note how easy it is to adjust the module height so that the track is at the same level as the other modules.
3) Standard Kato expandable joiners will be inserted between the modules and we'll observe how easy this is to do.
4) During the Play Day, trains will be run over the module at varying speeds to ensure everything is working properly. It is expected that trains of every length, from small double axle single engines to long multi-loco trains run smoothly.
5) The track will be tested at both a very slow speed and at a high speed.
6) All track will be tested including sidings.
7) Disassembly will be reviewed to ensure that the module can be easily disassembled and packed up for transportation.

Maintenance Work

Track Cleaning

When the club meets for a Playday or for a show we want to make sure that the track is clean and we don't experience any issues caused with dirty track. While pretty much everyone has their favorite track cleaning process we want to have a CANTRAK standard that is inexpensive and easy to use so that it does get used. To simplify things we are primarily concerned with track that has accumulated dust, a light coating of dirt and / or other generally minor grime. Members should have cleaned their modules before bringing them out, in particular cleaning glue and other residue from construction.

For cleaning track at a running session we will focus on 3 potential tools. Felt pads, either the ones from Woodland Scenics or the ones that the club provides. Cork pads supplied by the club. Both of these are more gentle cleaning tools. For stuck on grime, a "Track Brite Cleaner" can be used (this is an eraser type of tool with a mild abrasive)

When cleaning, either the cork or felt pad should be used to rub over the track being careful around turnouts. The top of the track should be shiny when done, if there is material stuck to the surface of the rail, use the Brite Cleaner to run over that area and finish with the cork / felt.

Cleaning should be done at the end of setup and the start of any running session (mornings of shows) or any other time that track conductivity seems questionable.

Locomotive Wheel Cleaning

While Track cleaning will help our trains to run better, the track isn't the only thing that gets dirty. Often the locomotive wheels are the culprit when you have issues running. Again, there are a number of methods of cleaning. Perhaps the easiest way is to wet a paper towel with rubbing alcohol, lay that on the track and put either the front or rear wheels of your engine on that paper towel with the other set of wheels on the track. Now, holding your engine turn up the speed for the locomotive to full power and let the wheels spin on the paper towel. Move the engine around slightly and do this same process for the other set of wheels. You'll see that the paper towel has black streaks on it.

Woodland Scenics also makes a locomotive wheel cleaner that you can use. This wheel cleaner can be used for both engines (powered) and cars (unpowered).

With engines that have really stubborn gunk on them, a Trix brass wheel cleaner can be used. This tool is placed on the track, your throttle is turned up to max and the wheels of the locomotive are placed on the brass brushes. The wheels will turn and rub against the brass. Be careful using this as it is NOT compatible with traction tires.

While this process should be done at home before bringing your trains out, if you aren't able to do this at home or your trains just get dirty while running then do this in the Fiddle Yard.

Maintenance Work

Rail Car Wheel Cleaning

Like the locomotives, your rail car wheels will collect dirt on them as well and when dirty they will spread that dirt on the track. We want to avoid that which means cleaning the wheels of your rolling stock. This can be done with a commercial wheel cleaner such as that offered by Woodland Scenics. However, a simple method that can be used at home is to soak a paper towel in alcohol and manually run your car over the wet paper towel. You can also lay your paper towel over some track and again manually run your rolling stock over that. Note that if you have cars with lights in them (passenger cars in particular), flickering lights in the cars are often caused by dirty wheels.

Coupler and Trip Pin Height

Rail cars either purchased new or used may well have their trip pins set too low. When this is the case then the trip pins can catch on objects between the tracks. This can include RR crossings, rerailers and the Kato expandable track sections. All of your rolling stock should have their trip pins checked to make sure that the bottom of the trip pin is ABOVE the track head. It only needs to be half a millimeter or so above but cannot be below. If below, use pliers or other tools to raise them up. Also, the trip pins may have the leading part pointing down. There are special pliers (or use regular needle nose pliers carefully) that you can use to create more of a bend in the trip pin so the leading part is pointing up. Some folks remove trip pins altogether.

Also, couplers should match in height. There are different coupler manufacturers and different heights (low, mid and high). If your cars sometimes (or often) come apart during running that could be because of a mismatch of couplers. To fix this you'll need to replace the problem couplers.

There are also Truck mounted and Body mounted couplers. Each has their strengths and weaknesses and everyone has a personal opinion. Either will work fine and generally they work well together but if you are having issues with your rolling stock, check the mounting system of the couplers on offending cars to see if there is a mismatch.

Rolling Stock Weight

In general, most rolling stock that is purchased will be underweight. What is underweight you ask? NMRA publishes specifications as to how much a car should weigh. For N Scale that is 0.5 ounces plus 0.15 ounces per inch of car body length. The following paragraphs are from the "NMRA Recommend Practices RP-20.1 Car Weight".

> Carefully documented tests, show a decided advantage in performance past obstructions in the track for cars weighted to an optimum weight. Since the radial forces tending to cause derailments are greater in longer cars, this optimum weight will vary with car length.
>
> While cars of less than optimum weight will often perform satisfactorily on good track work, increasing weight to the optimum will improve the safety factor with which rougher

track will be negotiated. Mixing light weight cars into a train of heavier cars is not recommended because of the possibility that the lighter weight cars may be pulled off the track in sharp curves.

Weight in excess of the optimum will seldom add to the ability of a car to roll down a given grade since the additional weight is almost exactly balanced by the increased friction of the axles in their journals. Extra weight simply adds to the drag of a train and adds more weight to be lifted to the summit of a grade.

Cars should be constructed to keep the lowest possible center of gravity. Supplementary weight added to bring the car to optimum weight should be kept as low as possible.

Adding weight to cars can be done with weights purchased from your local hobby shop although people use many different items (BBs, Nuts, etc.). Generally a scale (postal scale) is used to weigh the cars and weights to be added. Bodies need to be removed and weights then need to be glued into the car (as per the above, as low as possible). Epoxy, Super Glue, White Glue, Caulk can all be used although I find that double sided tape works well. While this is relatively easy to do with a box car, it becomes more problematic with gondolas, flat decks etc.

Note that when you add weight to cars you will need more locomotive power to pull the same number of cars as before. This may require you to create consists with more than one locomotive pulling your cars (a whole different topic).

You may not want to weight passenger cars as these often come in sets and will run very well as that set.

If you have questions, as always, please talk to other CANTRAK members.

Fiddle Yard Operations

How to use the Fiddle Yard:

While our Automated Fiddle Yard is designed to make things easier for all, there are some basic guidelines that need to be followed.

When bringing a train in:

1) Note that you will be using the left control panel. The one with 6 push buttons and 6 toggle switches on it. Push buttons are to select routes and automatically move turnouts while toggle switches are used to turn track power on and off for a given siding.
2) Preselect your Fiddle Yard track. Check to see if it is in use or not (are there any trains on it?). Once you have determined which track you'll be coming in on, turn on the power for that track by pushing the corresponding toggle switch on the control panel towards the track (to the right) and observing that the red LEDs come on for that track.
3) Select the route for that track by pressing the corresponding button on the control panel and observe that the green route LEDs come on for that route.
4) Now, as your train approaches the IN module, pull the IN module toggle switch towards you to activate the turnout and move it to the diverging route. Observe that the green light comes on by the toggle switch and the green light on the diverging route of the turnout comes on. Do not hold the toggle switch, just a momentary pull is enough.
5) Make sure your train is running at yard speed so that it will come in nice and smoothly and won't derail.
6) Once the end of your train has cleared the turnout on the IN module by at least a couple of inches you need to return the turnout to the straight through route. To do this press the toggle switch away from you and observe that the green lights go out.
7) Once your train is fully in the Fiddle Yard, clear of the turnouts, you can turn off the track power by moving the toggle switch on the control panel away from the track (to the left). You should reduce your locomotive speed to zero BEFORE turning off track power otherwise you risk your train taking off if anyone turns power on for that track.
8) When you bring your train in, it is preferable to park it just past the turnouts (by a foot or so). That way if someone else wants to set up to go out and there is room in front of your train, they can use the same track. Alternatively it can be parked at the far end in front of a turnout so that additional trains can be brought in on that rail.

Fiddle Yard Operations

When taking a train out:

1) Note that you will be using the right control panel. The one with 7 push buttons and 7 toggle switches on it. Push buttons are to select routes and automatically move turnouts while toggle switches are used to turn track power on and off for a given siding.
2) When you set up your train select a track that isn't being used if you can. The red power LEDs for that track should be off.
3) Before setting up your train it is recommended that you place your locomotive on the track and verify that it runs under the DCC address you've selected on your throttle. If you have a consist it is recommended that both engines be placed on the track, about a foot apart and run back and forth to make sure that they are in the correct direction. If you have not run your locomotives for some time you may want to run a couple of loops around the layout with just those locomotives before attaching cars.
4) Once your train is setup and ready to go, you'll want to turn power on for the track you are on. From the Control Panel push the toggle switch towards the track (left) and observe that the red power LEDs come on.
5) Check the mainline to make sure that there is lots of room / time for you to bring your train out.
6) Push the push button on the Control Panel to select your route and note that the green LEDs show you your route.
7) Move over to the OUT module, verify that no trains are coming and pull the toggle switch towards you and note that the green LED by the toggle switch comes on as well as the green light on the diverging route of the turnout.
8) Use your throttle to move your train out of the Fiddle Yard onto the main line at a reasonable yard speed.
9) Once your last car has cleared the main Fiddle Yard, turn off the power to the track you were on and note that the red LEDs go out.
10) Once your train has cleared the turnout on the mainline you need to realign the turnout to straight through. Push the OUT module toggle switch away from yourself and note that the green light by the toggle switch and the green light on the turnout diverging route are both turned off.

Fiddle Yard Notes:

1) Note that each siding can have power applied from either end of the Fiddle Yard. These are simple toggle switches that either turn power on or off. Either or both toggles can turn on power. If you turn off power with a toggle switch and the red LEDs stay on (indicating

that the track is powered) that's likely because the toggle switch at the other end of the Fiddle Yard has power turned on.

2) If you see that a track is powered on and no-one is using it or about to use it, please turn off power to avoid confusion.

3) If you press a button and the route you want isn't selected, you can press that button again. Holding it down won't do any good. You may want to select another route and then reselect your route again. In case of a failure with the push button system, the turnouts can be moved manually with the Kato black slider.

4) You may notice that after a period of time all the green route lights go out. This is deliberate. If you push any of the buttons then that route will be selected and the green LEDs will go back on.

5) Track number is from 1 to 7 with the track closest to the backboard (furthest away from you) being track number 1. Note that only tracks 1 through 6 can be selected and controlled from the Control Panel on the IN Module. The Fiddle Yard thus has 6 tracks that can be used for IN and 7 that can be used for OUT.

References

https://powerwerx.com/anderson-power-powerpole-sb-connectors#/specFilters=129m!#-!305&pageSize=90&orderBy=0&pageNumber=1

Appendix 1 Paint formulas

The front trim of the modules will be painted "Cantrak blue"

"Cantrak Blue"

Glidden Base GHEIN20MB "Glidden Epic Int. Eggshell"
additions are (oz. and 384th's), "CL" 0 124, "EL" 5 344, "VUL" 1 304, "KXL" 3 372
mixed 23-10-29 Home depot probably Tuscany location as I got the paint from Gord S.

The back and side trim and the legs will be painted Rustoleum Painters Touch Flat Black

The backboard (skyboard) will be painted "Sky blue"

"Sky Blue"

Glidden Base GHPRIN40MB "Glidden Premium Satin Azure Afternoon"
additions are "BL" 0 24, "DL" 0 32, "EL" 2 352, "KXL" 1 16
mixed 23-10-29 Home depot probably Tuscany location as I got the paint from Gord S.