

# Mini Module Concept

Standards document - Rev 1C, November 2025

## 1. Overview

The Mini Module Concept aims to provide a small modular layout design that is easy to store, transport, set up and run trains.

The layout will consist of standard modules which will be laser cut from 6mm MDF (also known as Superwood). Standard straight modules would have a foot print of 500x350mm. Curve modules will cater for a 609.6mm (24") outer radius. The same modules are used as a base for both N and HO/OO scale standards. Modules will rest on top of folding trestle tables as a leg system.

The concept is focused around building small modules that can be taken to various public venues to showcase the hobby.

## 2. Objectives

### Primary Objectives

The primary objectives of the Mini Module Concept are as follows:

- **Small and light weight modules** : Encourage the building of small modules that are light weight thus making them easy to store, move and quick to set up to run trains.
- **Public display**: Make it easy to take modules into public spaces to showcase the hobby and the club
- **Encourage participation**: This modular system will hopefully encourage people to build modules and participate in helping to try to grow the hobby.

### Secondary Objectives

The secondary objectives of the Mini Module Concept are as follows:

- **High Detail**: modules can be highly detailed without high cost as they are small.
- **Low cost**: Modules will be reasonably low cost compared to full sized modules as they require less materials to build them.
- **Easy entry into the hobby**: Due to the low cost of the system, it will easily allow new people to join the hobby and easily run trains. No expensive tools or skills are needed to build modules.
- **Potential Newsletter Articles**: As people build their modules they can document the process for Emrig newsletter articles.
- **Skill building**: The small size of the modules will hopefully encourage people to develop new modeling skills

### 3. Module construction standards

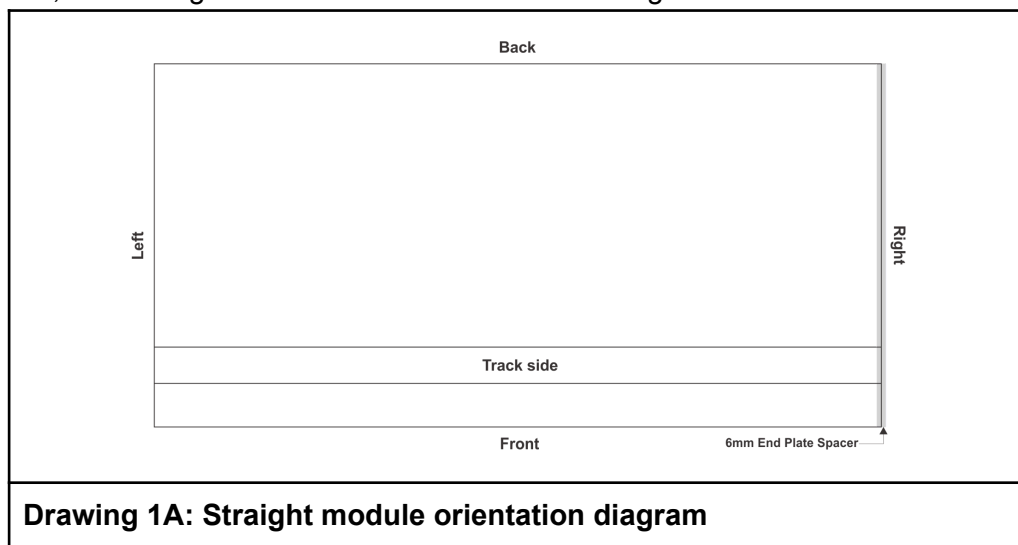
The following outlines the design standards for the Mini Module Concept.

#### 3.1 Module construction

All modules will be laser cut from 6 mm MDF to ensure consistency between modules. Modules will be glued and bolted together. Once assembled the module should be painted with PVA paint (preferably flat black) to seal the module and prevent the module from absorbing moisture.

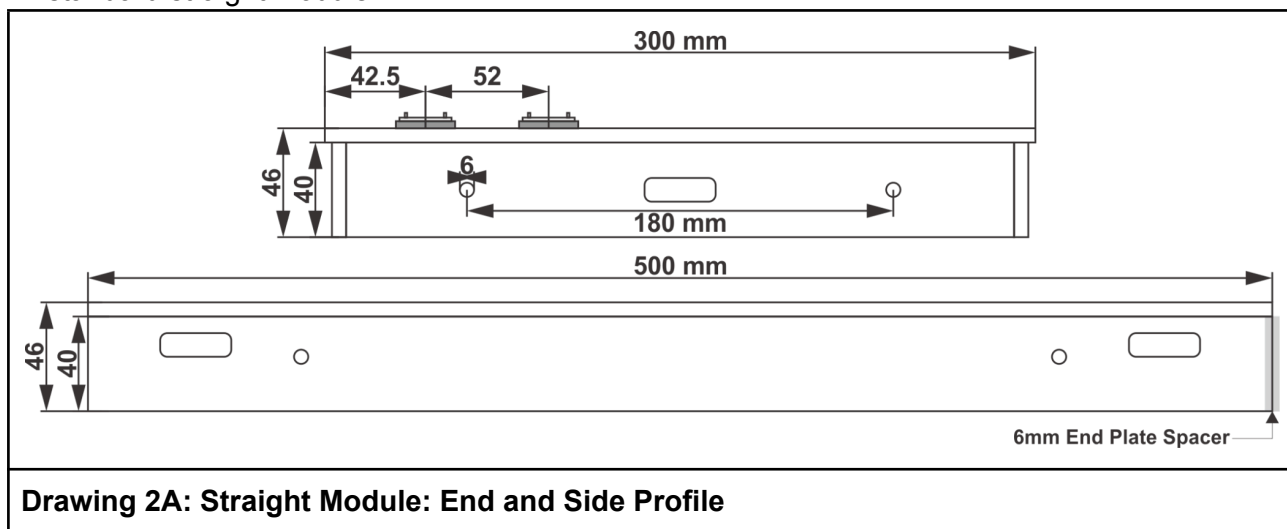
#### 3.2 Module orientation

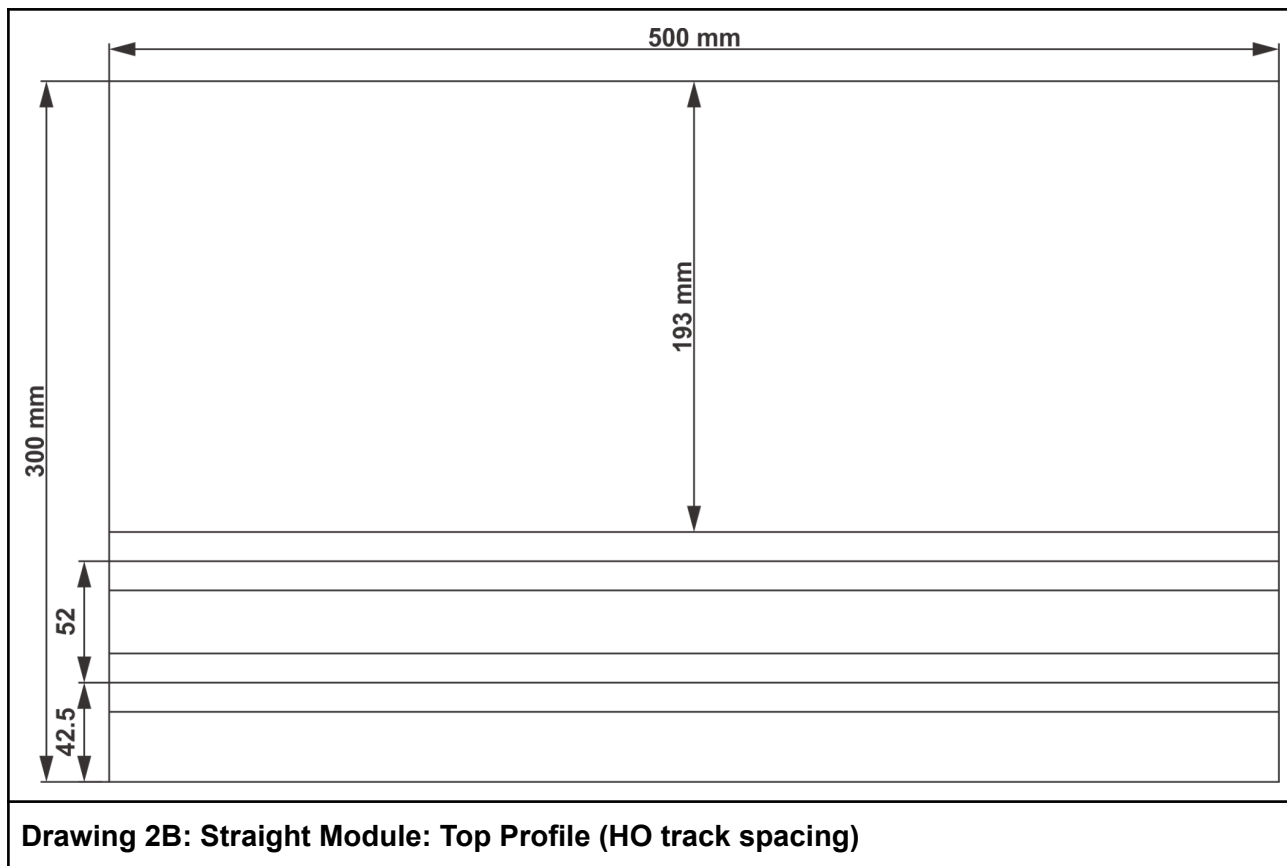
Front, rear, left and right refer to the module when looking at the module from the track side.



#### 3.3 Standard straight module dimensions

The following diagram shows the side profiles, footprint and critical dimensions for a standard straight module.



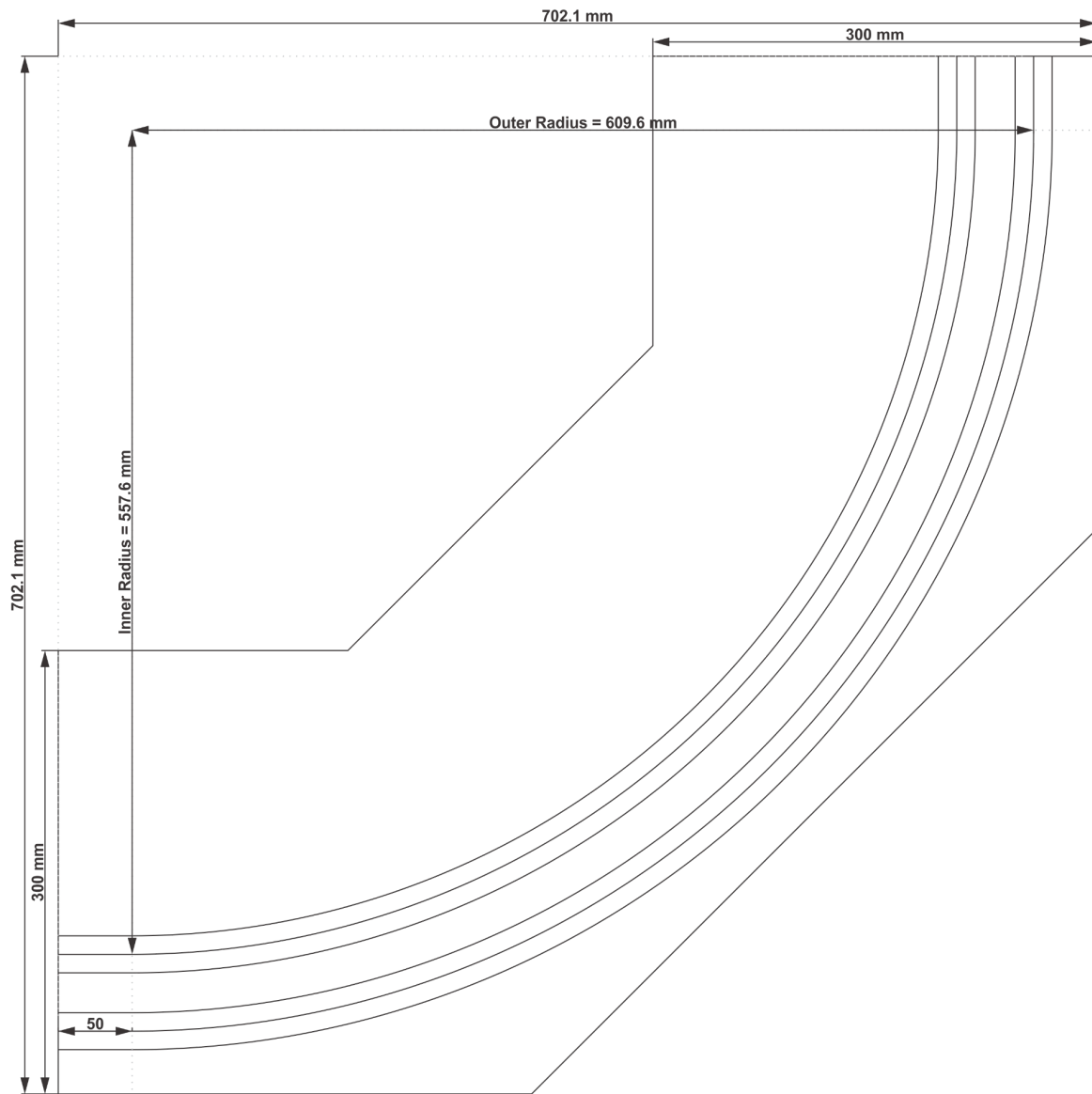


Note the 6mm End plate spacer will be on the right hand side of the module when the track is closest to the viewer. The spacer plate fills the gap between the end plates of two modules.

### 3.4 Curved module dimensions

The following drawing (Drawing 3) shows the footprint and critical dimensions for a curved module. Note that the end profile for the module is the same as the end profile for a straight module.

The first 50mm of track at each end of the module is straight before bending into the 609.6mm (24") radius to allow for easier alignment of track between modules.



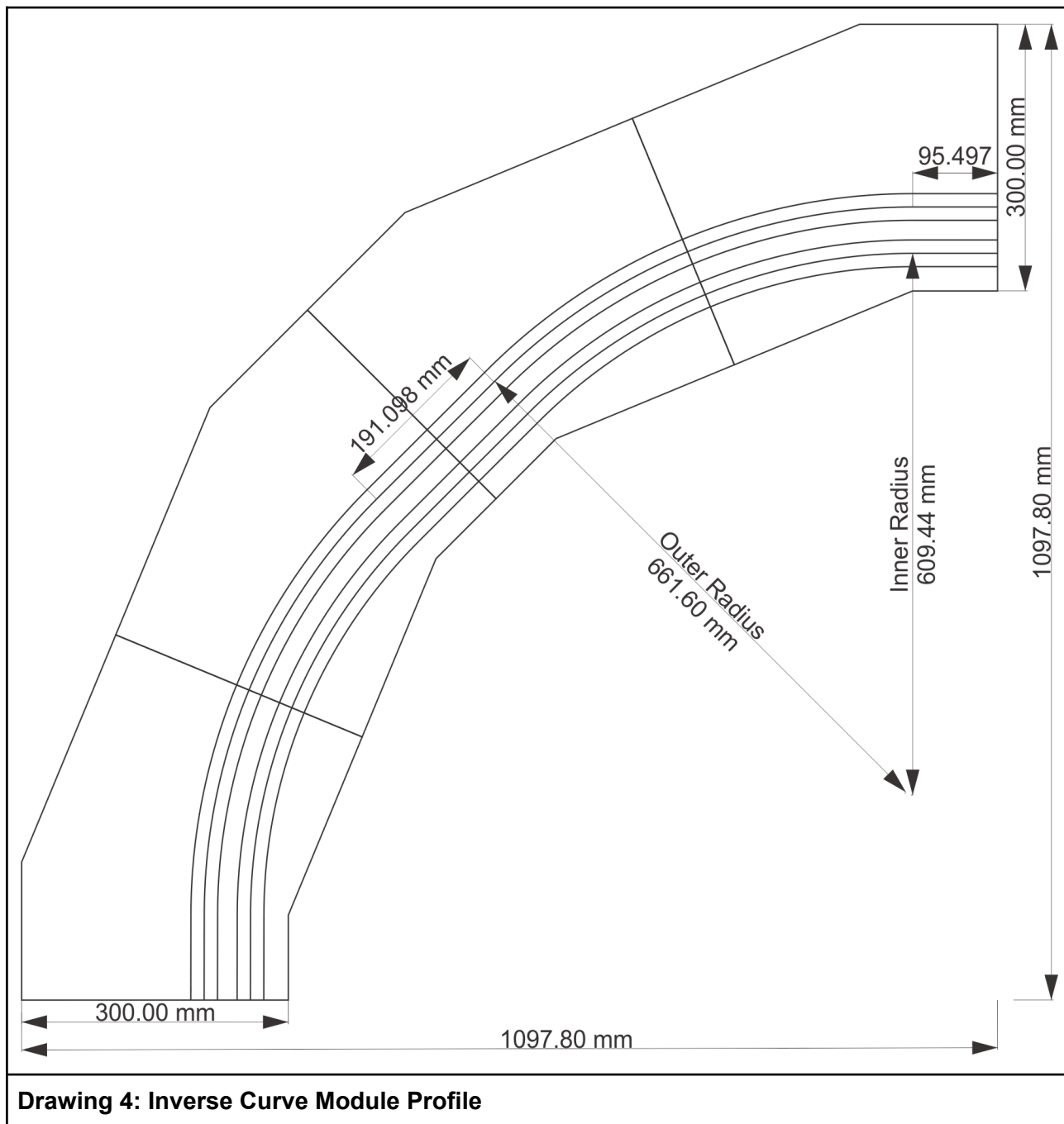
**Drawing 3: Corner Module Top Profile**

### 3.5 Inverse Curved module dimensions

Inverse curved modules allow for layout designs other than normal oval or square designs such as L-Shape, T-Shape, etc. Due to the size of the inverse curved modules, a single inverse curve module is made up of two separate but identical modules to allow for easier moving and storage of the modules. The design of these modules was dictated by the existing curve and straight modules.

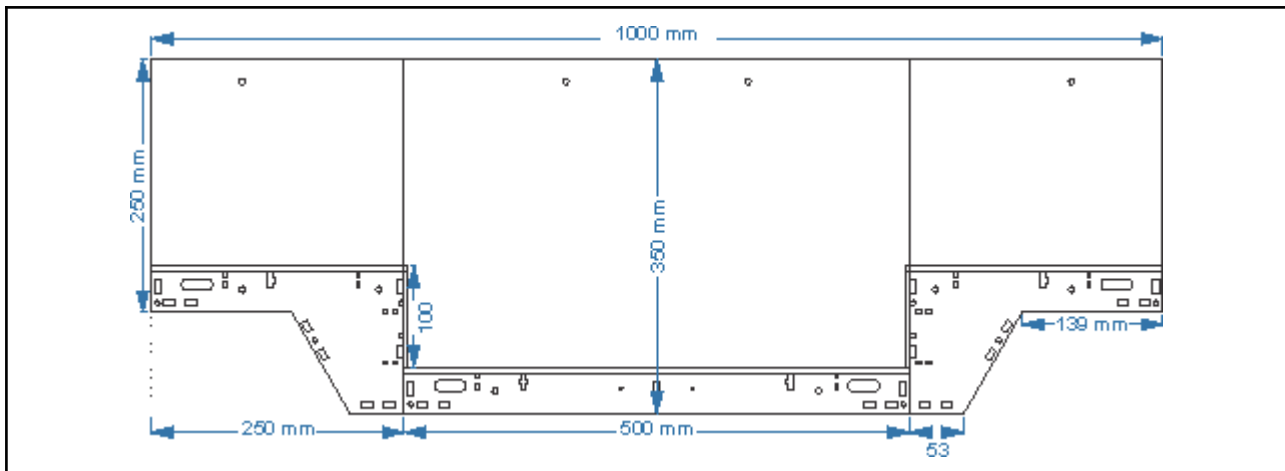
The first ~95mm from each edge is kept straight before bending into the curve to allow for better connecting of modules and running reliability. The outer line maintains the minimum standard of a 609.6mm (24") radius while the inner curve becomes a slightly bigger radius at 661.6mm (~26").

The following drawing (Drawing 4) shows the footprint and critical dimensions for a curved module. Note that the end profile for the module is the same as the end profile for a straight module.



### 3.6 Bridge Modules

Bridge modules can be added to the layout in order to add some variety to the layout scenery. Standard bridge modules are made up of two sections of 250mm and a standard straight module of 500mm thus making up a total length of 1000mm.



**Drawing 5: Standard bridge module**

The standard “valley depth” of the bridge module is 100mm down from the normal top face of the module.

### 3.7 Expansion modules

Sometimes it may be required by the module owner to add some extra space to their module for the purposes of adding extra track or scenic items. This will generally freely be allowed as long as the expansion does not interfere with track alignment, connection of modules or electrical connections.

The expansion can be placed either in front of, or behind a module depending on what the module owner is attempting to achieve.

When using expansion modules there isn't necessarily a limit to the width that expansion modules can be limited to, care should be taken to not make the modules excessively large, heavy or bulky.

In the event that additional length is needed on a set of modules this can be done with expansion modules as long as the total length of the module (or pairs of modules) equals 500mm or multiples of 500mm's.

### 3.8 Connecting of modules

The end plate of all modules have got two 6 mm holes in the end allowing for modules to be bolted together. Standard 6 mm gutter bolts, wing nuts and washers can be used when joining modules.

Modules can also be clamped using small F-clamps, however this will require that the modules hang over the edge of the tables that they are resting on.

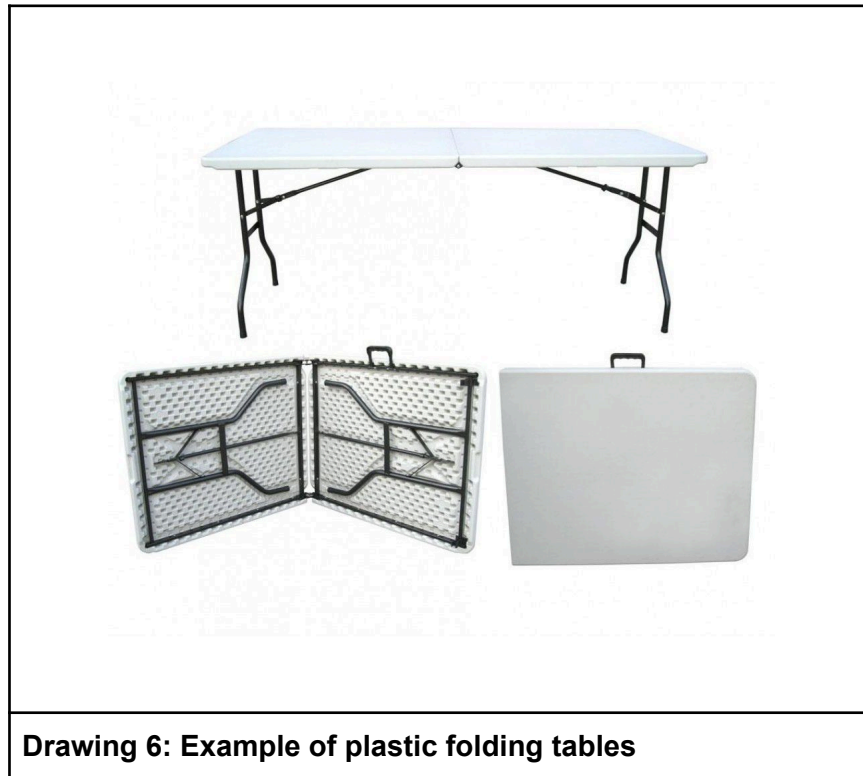
### 3.9 Permanent connection of modules

The permanent connection of multiple straight modules would be allowed. This would allow for fewer track and wiring connections as well as larger scenery sections to be built. Ideally no more than two straight modules would be connected thus making the total module size of 1000 x 300 mm.

If multiple modules are connected let the layout design coordinator know so that they can plan accordingly.

### 3.10 Module legs

Modules will be placed on top of standard plastic folding trestle tables. These generally have a standard dimensions of 1800 x 700 x 740 mm. These types of tables are lightweight and easy to transport thus making them ideal for this application. The number of tables required will depend on the layout design used.

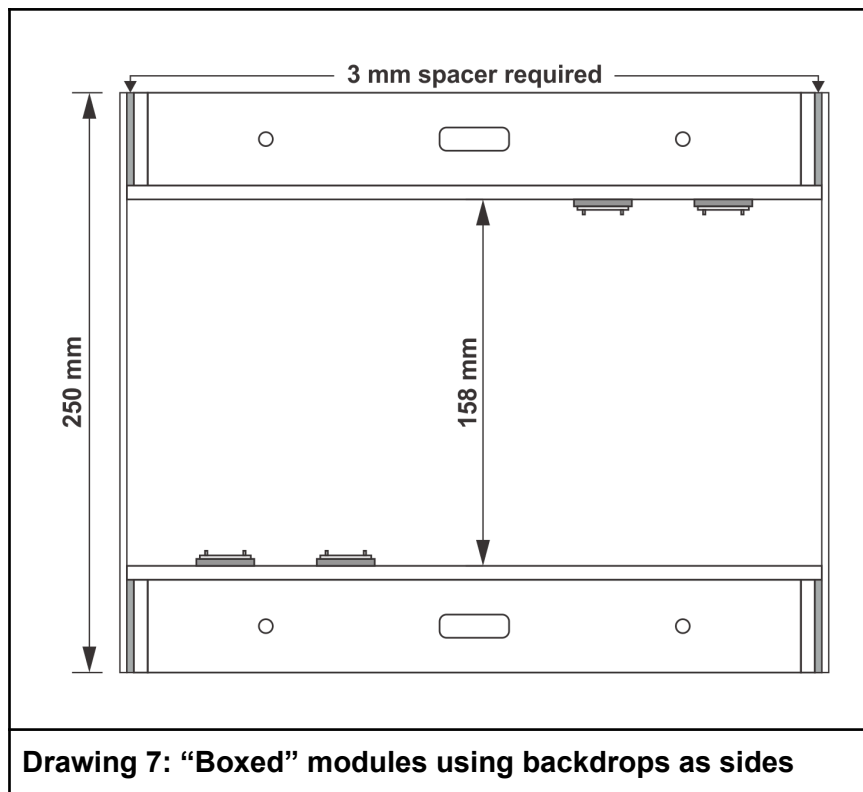


**Drawing 6: Example of plastic folding tables**

### 3.11 Module backdrops

If modules are fitted with backdrops the backdrop is to measure 500 mm long x 250 mm tall. A 3 mm spacer will be needed to allow the backdrop to sit flush with the back of the top of the module. Backdrops will be cut from 3mm MDF and have matching holes so that it can be bolted to the module

One advantage of the backdrops is they would allow for easy storage of modules in a box form. This would protect scenery on the module from being damaged while being stored and transported as per the following drawing.



It should be noted that there is no standard as to the appearance of the front of the backdrop. However the back of the backdrop should be painted black.

## 4. Track standards

Both HO and N scale will have a double track on the module so the multiple trains can easily be run in all configurations. Note the following track standards.

### 4.1 General track standards

|                                                                | HO / OO                    | N                         |
|----------------------------------------------------------------|----------------------------|---------------------------|
| Track                                                          | Nickel Silver*<br>Code 100 | Nickel Silver*<br>Code 80 |
| Number of mainline tracks                                      | 2                          | 2                         |
| Road bed thickness                                             | 3 mm                       | 3 mm                      |
| Distance from the front of the module to center of first track | 42.5 mm                    | 42.5 mm                   |
| Spacing between track centers                                  | 52 mm                      | 32 mm                     |
| Outer Radius on curve modules                                  | 609.6 mm (24")             | 609.6 mm (24")            |
| Inner radius for curves modules                                | 557.6 mm                   | 577.6 mm                  |
| Minimum point / turnout size                                   | Peco Small**               | Peco Small                |
| Recommended point / turnout size                               | Peco Medium                | Peco Medium               |

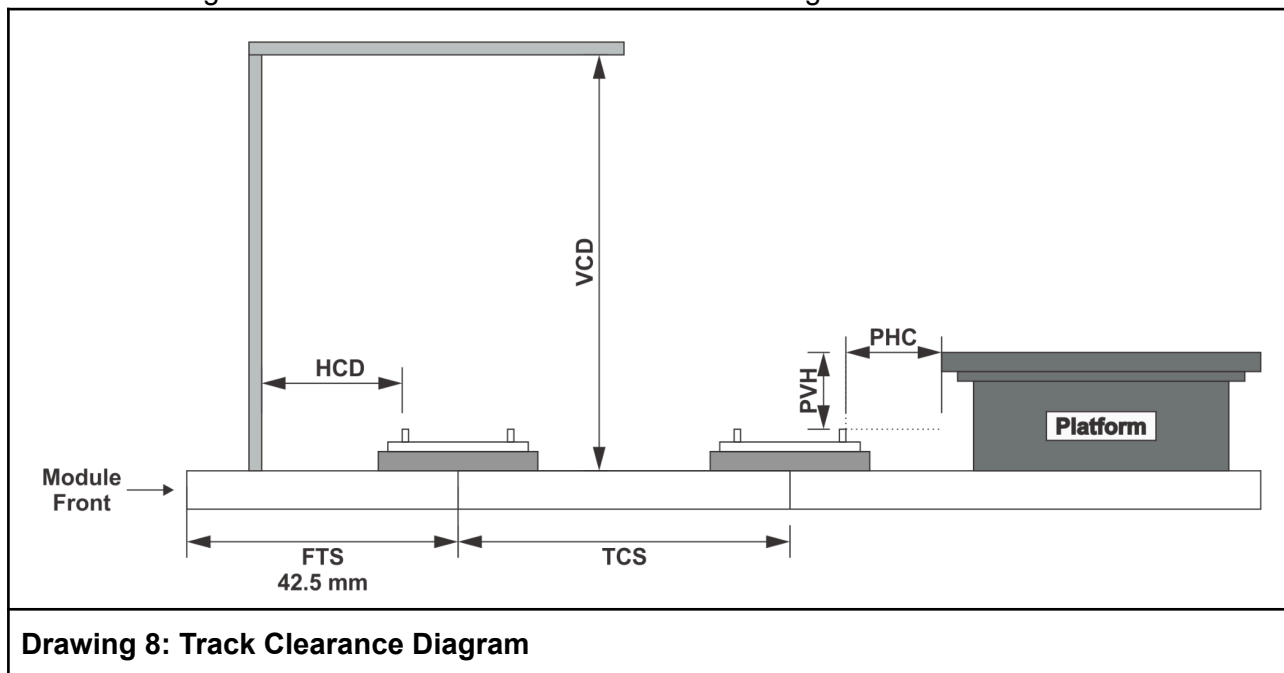


\* - Track must be Nickel Silver. Track such as Lima set track is not permitted.

\*\* - Lima or other smaller radius points will not be permitted

## 4.2 Clearances

The following clearances should be observed when building modules



|                                                                                      | HO / OO | N       |
|--------------------------------------------------------------------------------------|---------|---------|
| FTS - Front of module to center of first track                                       | 42.5 mm | 42.5 mm |
| TCS - Track spacing between track centers                                            | 52 mm   | 32 mm   |
| HCD - Clearance from rail to any horizontal object                                   | 22 mm   | ?       |
| VCD - Vertical minimum clearance from top of module to underside of tunnel or bridge | 65 mm   | 48 mm   |
| PVH - Height from the top of the rail to the top of a platform                       | 12mm    | 6 mm    |
| PHC - Clearance from outside of the rail to the edge of a platform                   | 15mm    | ?       |

## 4.3 Connection of tracks between modules

The connection of tracks between modules will be done with a butt joint method. This means that the tracks will need to be cut flush at the end of each module so that they can align with the next adjacent module.

# 5. Wiring standard

The following outlines the wiring standards for modules

## 5.1 Track wiring standard

The track will be wired for DCC control only. This will minimize the amount of wiring needed between modules.

### 5.1.1 Track Power Bus

The basic wiring between the ends of adjacent modules or sets of modules shall consist of two wires, 1.5mm<sup>2</sup> each in size which will be plug-coupled at each end. Rails are color coded as follows:

- Front Rail - Red (rail(s) closest to the front edge of the module)
- Back Rail - Black

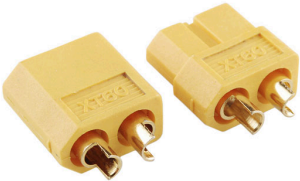
The Track bus should be placed towards the front of the module underneath the track.

### 5.1.2 Track Feeders

The feeds between the Power Bus and the rails should be made with a wire size of between 0.2 - 0.5mm<sup>2</sup> wire. Color coding must follow as per the power bus above. If tracks on the module are joined using rail joiners, each individual rail must get its own feed to the power bus regardless of length of the track. This ensures better track power across the module.

### 5.1.3 Track Power bus plug connections

Standard XT60 connector plugs will be used between the modules. These are available from a number of different electronic retailers and are commonly used in Radio Controlled and 3D printing spaces.

|                                                                                   |                                                                                   |                                                                                     |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|  |  |  |
| <b>Diagram 9A: XT60 Connectors (Pair)</b>                                         | <b>Diagram 9B: XT60 Male Connector</b>                                            | <b>Diagram 9C: XT60 Female Connector</b>                                            |

The positive terminal (flat side) on the connector will be soldered to the red power bus wire. The negative terminal (angled side) will be soldered to the black power bus wire.

Note the following layout for the connectors on the module:

- The male connector will be on the left hand side of module
- The female connector will be on the right hand side of module

#### 5.1.4 Dual Track bus setups

In some cases there may be a requirement to separate each track so that trains can be controlled via both analogue and digital systems on separate tracks. The standard for doing this is outlined in Addendum 1 of the standard available [here](#). It should be noted that different clubs may have different requirements. As such consult with your club to confirm what is needed.

## 5.2 Connecting to the DCC system

Unless otherwise specified a Digitrax DCC system will be used to provide power to the track. Track power will be fed to the layout via a pair of the above mentioned XT60 connectors that are wired back to back. These will then be connected to the track power bus between two modules.

A separate programming track can be made available on a micro module to allow for loco programming to be done off the layout.

Due to the low profile of the modules, it is not possible to mount the Digitrax UP panels to the modules. The UP panels can be mounted into boxes and then clamped to the corner of the tables that the modules are placed on. Alternatively infrared receivers or a Wifi receiver (Raspberry Pi system) can be used for control.

## 5.3 Auxiliary Bus Wiring Standard

The auxiliary power bus is an external cable used to carry power for lighting, animation, or other non-track options. This bus will be 12V DC only. If lower voltages are required it is up

to the module owner to make sure that the voltage is rectified and stepped down for their devices as needed.

The basic wiring between the ends of adjacent modules or sets of modules shall consist of two wires, 1.5mm<sup>2</sup> each in size which will be plug-coupled at each end. Bus wires are color coded as follows:

The same XT60 connectors will be used as for the Track Power bus. The positive terminal (flat side) on the connector will be soldered to the Orange power bus wire. The negative terminal (angled side) will be soldered to the Blue power bus wire.

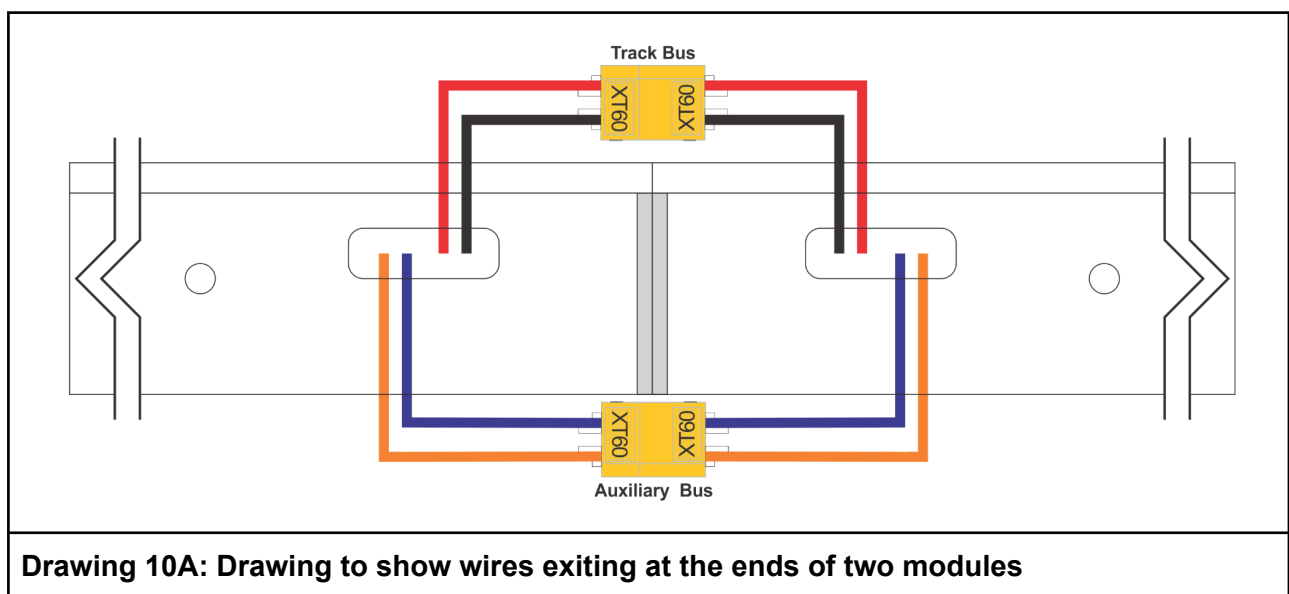
Note the following layout for the connectors on the module:

- The male connector will be on the left hand side of module
- The female connector will be on the right hand side of module

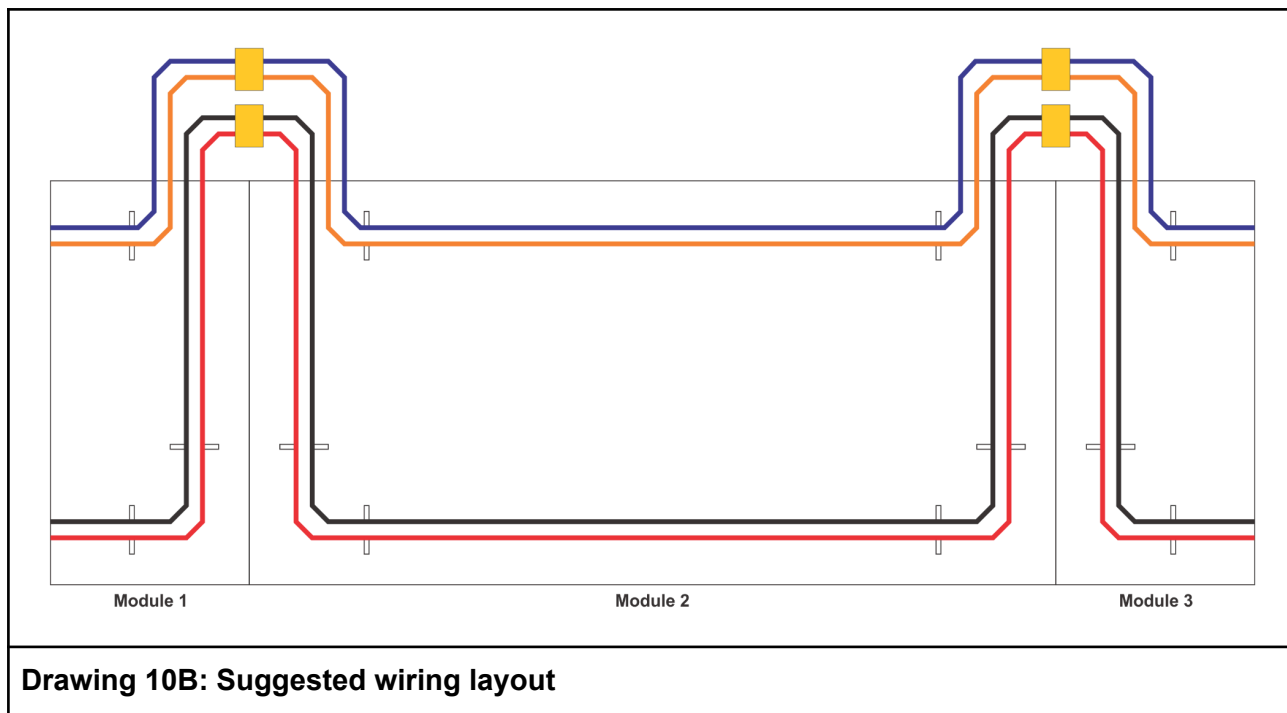
The Auxiliary Bus should be placed towards the back of the module away from the track.

## 5.4 Wire layout and routing

To make it easier to connect the wiring between modules, the plugs and wires will exit the module on each end of the through a hole on the side of the module.



Provision has been made on the module to help keep wiring tidy under the modules. The following drawing shows the suggested wiring layout.



## 6. Paint standards

The following standards should be adhered to in order to make the layout look like a cohesive unit.

### 6.1 Fronts of modules

The faces of the modules should be painted with matt black PVA (or similar). This enables quick touching up at exhibitions and other venues as well as giving a cohesive layout appearance.

### 6.2 Back of backdrops

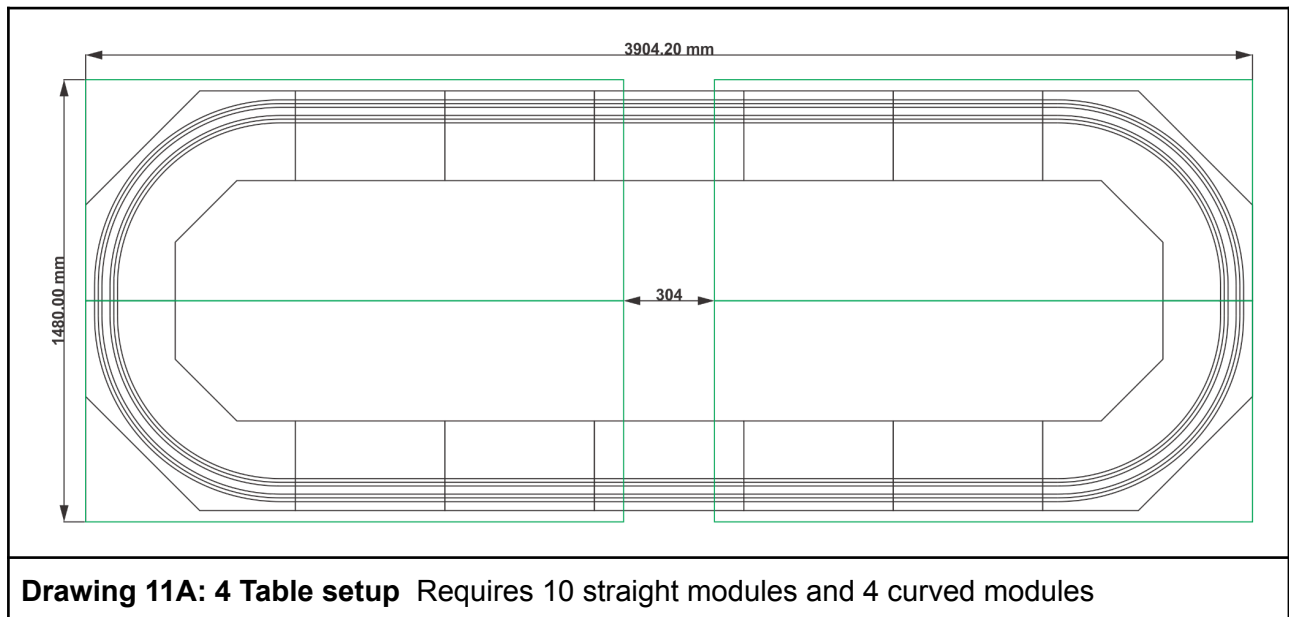
The backside of backdrops (i.e inside of the layout) should be painted with matt black PVA paint (or similar). This helps to create a more finished and cohesive look to the layout when displaying at public events.

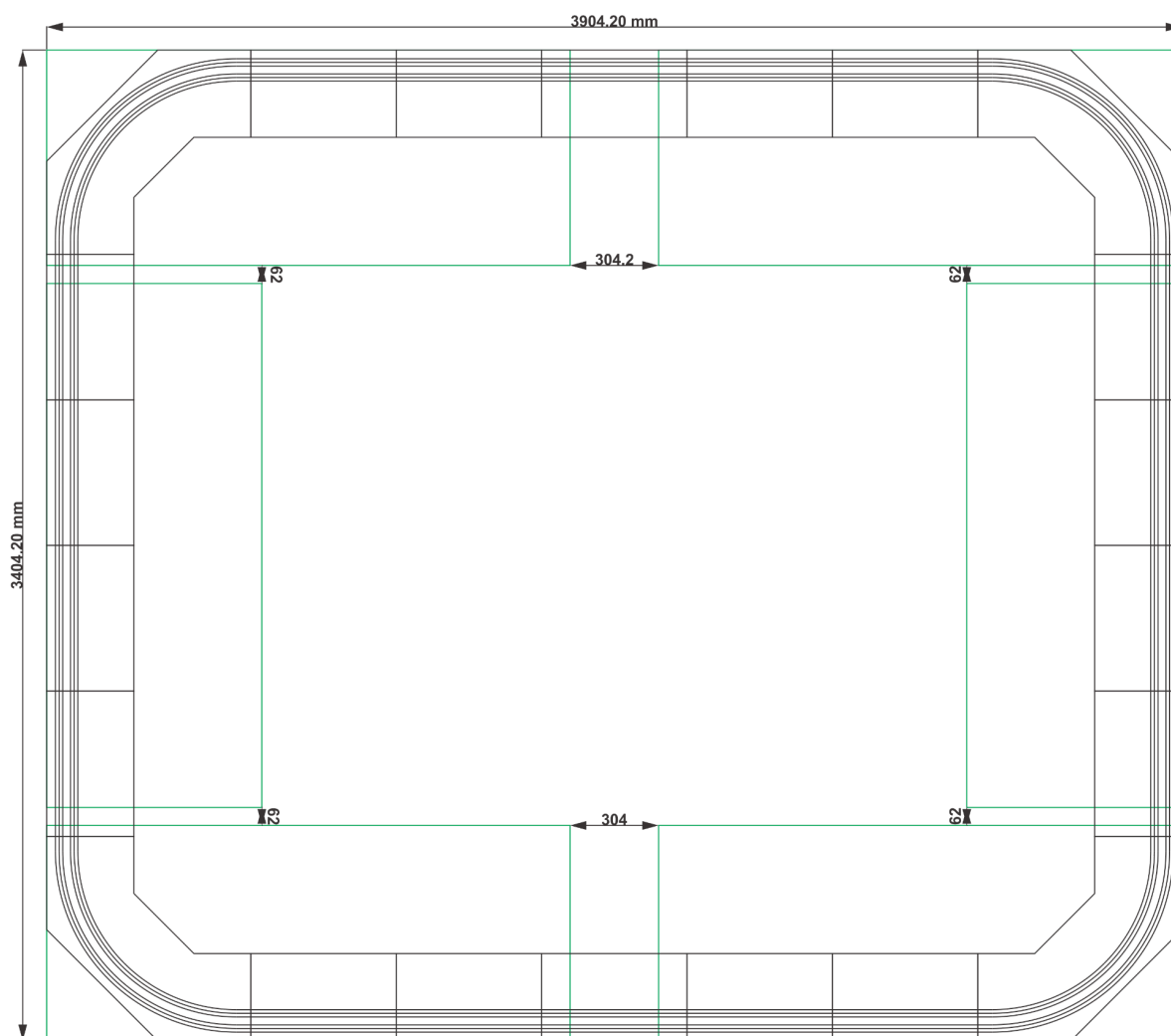
## 7. Scenery standards

All scenery can be built free form to the modules owners taste as long as the clearances above are met. Scenery is not limited to any one theme or region.

## 8. Potential Layout design iterations

The following drawings show potential layout designs and their requirements for modules. Other design options are possible but are beyond the scope of this document. Diagrams are based on tables that are 1800 x 740 mm in size





**Drawing 11B: 6 Table setup** Requires 18 straight modules and 4 curved modules

## 9. Module ownership, maintenance and storage

Modules will be owned by individual members. As such the maintenance and storage is the responsibility of the individual who owns the module.

It is however suggested that the club owns four corner modules as these will commonly be used in all setups of a layout. Club members can be approached to build and maintain the corner modules on behalf of the club.

## 10. Maintaining the standards

With any type of modular layout that is used in a club environment it is critical that standards are maintained. As such the committee or the appointed person will hold inspections prior to new modules being included in live running sessions. This will reduce problems during setup and running at public events.

## 10.1 Changes or additions to the standards (Works Orders)

From time to time it may be necessary to make small changes to the standard for a variety of reasons as the standard grows.

To ensure that these changes are carried out on all existing modules, a Work Order can be issued. The Work Order will serve as formal notice to all existing module owners so that their modules can conform to the updated standard. Work Orders should include information on why the change needs to be made, included the new details as set out in the standards document and included a reasonable timeline in which the changes need to be made.

The issuing of Work Orders should be carefully considered so as not to cause major changes to existing modules.

## 11. Potential drawbacks with the concept

As with all concepts there are some potential drawbacks with the concept. These could include:

- The small radius on the curves may not allow larger locos to be run.
- Limited running options as the layouts that are built will generally be small.
- Due to the small size of the modules there will be multiple track and wire joints.
- Modules should be constructed out of a harder material such as plywood. However these modules are not expected to have an extremely long lifespan.
- Module lengths are not optimized to standard flex track sizes. This may result in a small amount of waste.
- Not all fold up tables are created equally, especially in terms of height. As far as possible a standard table will need to be used
- The layout is not at an ideal viewing or operational height. While this is not ideal from a modeling perspective, it does have advantages that small children will be able to view the layouts easier in public spaces.
- Some scenery elements such as rivers may be difficult to incorporate due to the low profile of the modules. While there are options these would need to be explored on a case by case basis.
- Digitrax Universal Panels (UP3 or UP5) can not be mounted onto the modules due to the low profile of the modules. A possible workaround for this would be to mount the UP panels into boxes that are then clamped to the tables that the modules are placed on. Alternatively infrared receivers can be used.



## 12. Change Log

The following documents major changes to the standard.

| Date         | Change description                                                                                                                                                       |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| March 2025   | <ul style="list-style-type: none"><li>• Change Log added - Introduction of change log</li><li>• Addition of inverse corners</li></ul>                                    |
| October 2025 | <ul style="list-style-type: none"><li>• Introduction of Works Orders (Section 10.1)</li><li>• Standardizing back of backdrops paint colour (Section 6.2)</li></ul>       |
| January 2026 | <ul style="list-style-type: none"><li>• Corrected "General track standards", "Spacing between track centers " to 52mm</li></ul>                                          |
| June 2026    | <ul style="list-style-type: none"><li>• Added Dual track bus in the wiring section</li><li>• Added expansion module explanation</li><li>• Added bridge modules</li></ul> |

Things that need updates:

Track end plates - documentation needs updating