

# Thamesiders Model Railroad Group

## Thamesiders Model Railroad Group Construction specification for HO scale modules

Document Reference TM-S1

Issue 1F

January 2015

# Thamesiders Model Railroad Group

## 1. Introduction

This specification has been developed with the end objective to create a modular model railroad that can be assembled in almost any configuration and is reliable in operation. We have developed our own standard as neither the NMRA Module standards nor the Free-Mo standards meet our requirements. This standard covers basic scenic requirements in addition to construction and operation in order to ensure that the end result is cohesive and to a high standard.

The Free-Mo style of end-to-end modular layout would provide for most prototypical operation but a circular layout gives more flexibility for UK exhibition operation. The intention is to allow the modules to be assembled in any format, although this is dependant upon the modules being available. Both straight and curved modules are allowed as long as they meet the requirements for minimum radius.

This document describes the mandatory aspects of module construction to enable reliable interface with other Thamesiders modules. To assist members with some other aspects of module construction not considered mandatory the module committee will issue recommended practices. Please refer to the documentation reference sheet (document TM-DR1) for full details of these.

Please note: This document uses both portrait and landscape orientation.

## 2. Glossary of terms and Abbreviations

Module	A modelled scene which cannot be broken down any further, may contain multiple boards
Board	A discrete unit, one or more of which form a module
DCC	Digital Command Control
DC	Direct Current
AC	Alternating Current

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## 3. Module Dimensions and Construction

Modules must meet the minimum requirements for dimension and construction detailed below. For ease of understanding these are presented in a list form.

### Straight Modules

Width:	2ft
Length:	Any multiple of 4ft
Height of frame:	4in
Backscene :	12in high from board top

### Curved Modules

Further details to follow after consultation with Chris Coombes.

### Layout Height

The track height is to be 45in from floor level to railhead. All modules to be self-supporting and all legs are to have height adjustment. The Minimum height adjustment to be provided is  $\pm 1$ in.

A suitable leg has been designed by Chris Coombes. Please see document TM-RP3 for details.

### Alignment and fastening

The modules will be aligned with pattern makers dowels fitted to the ends of the module and will be joined by use of 6mm fixings. The module ends must be manufactured to the profile shown in drawing number CONS/ENDPRO/1. A steel drilling jig has been produced, this is available for loan on request to the module committee. To ease construction the module committee can provide pre-drilled module ends on request.

### Construction

Use of plywood construction is encouraged but is not essential.

### Finish

Module sides are to be painted flat black

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## 4. Track

In order that train meets will be a major focal point the standard mandates a single mainline.

### Mainline

Distance from front of board: 7in from the front of the module  
Minimum radius: 48in.  
Track: Peco "83 Line" Code 83 flextrack,  
Switches: Code 83 number 8 or larger, live frog,  
Peco switches are preferred. Please refer to the  
Technical Manger before making any purchases.

### Other Trackage

The individual modeller is free to use any other track on the rest of the module.

### Notes

All turnouts must be DCC compatible, either by modification or as purchased. Please see the Technical Manager for more details.

All track must meet the requirements of NMRA Standard S7 for clearances, S8 Class Ia for track centres and Recommended Practice RP-11 for minimum curvature.

The first 6in of track at each end of the module must be straight to avoid sharp 'S' curves, which may derail long rolling stock. In conjunction with the use of standard module ends a short "track alignment" fixture will be used to ensure the track at the module interface are in the correct position. The group will loan this to the individual modeller when required. All track switches must be remotely controlled. Controls at the rear of the module shall be available for use at public exhibitions. Control from the front is optional but is attractive for use at informal gatherings. Where DCC accessory decoders are used to control switch machines no other controls are required. See section 5.1 for more details.

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## 5. Electrical

### 5.1 Layout Control System

The module control system shall be the Lenz Digital Plus DCC system. The wiring has been designed to support the full use of this system. A normal DC controller can be fitted in the event of catastrophic DCC system failure. Sockets for alternative systems are NOT included in this specification but are discussed in the appropriate recommended practice. (Please see the Documentation reference sheet TM-DR1 for more details.)

#### Locomotive Addresses

All locomotives are to have a four-digit address. Two digit addresses are reserved for consists.

All locomotives to be used on the modular layout must be registered with the Technical Manager to ensure address conflicts can be managed. Further details of decoder configuration are not necessary but could be very useful. A suggested format for presenting this information is shown in document TM-RP4.

#### Accessory Decoder Addresses

The use of the Lenz DCC system allows for the use of accessory decoders to operate switch machines (point motors). Their use is not mandatory but where they are used the addresses will be allocated by the Technical Manager to eliminate issues of addresses conflicts. A master list of addresses will be held by the Technical Manager and will be available on request.

### 5.2 Wiring

Each module is to provide two bus circuits through the module from one end to the other,

- A three-wire track bus, which will be used to feed the mainline track on that module and to provide track power to the adjoining module(s). This bus will also provide a common point to ensure all boosters etc are referenced to the same potential. The common wire is connected to the “I” (Inverted T) terminal on the Lenz DCC equipment. Please note this is NOT an earth.
- An eight wire DCC control bus
- An optional two wire accessory bus, the mounting locations for this bus should be left clear. This is to ensure compatibility across all modules should this bus become mandatory in the future.

#### Track Bus

The track bus will use a 3-pin XLR locking socket at each end of the module, pin 1 will feed the front rail and pin 2 the rear rail. Pin 3 is used to provide the common point. This bus uses 1.5mm square cable such as 30 x 0.25 cable or lighting ring cable (stripped down to separate cables). The red and black cables shall be gently twisted together with approximately 12” between twists. Please refer to drawing number WIRE/TRACK/1 for full details.

All modules longer than 4’ must include a power input connector as shown in the drawing.

#### DCC Control Bus

A DCC Control bus shall provide connections between DCC boosters and to provide a cab bus for connections between the command station and the handheld cabs. The DCC control bus is to be an 8-wire bus connected via an 8-pin circular type DIN socket at each end of each module. It is important that this bus is maintained around the layout and the same DIN connects should be used at each intermediate joint. To reduce interference between this bus and the main DCC track bus this bus must use eight core twisted pair Category 5 cable as used for computer Ethernet cables. Please see drawing number WIRE/DCC/2 for

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full details, when the bus is constructed care should be taken to maintain the correct pair connections at each connector.

The eight-pin bus encompasses three independent Lenz system busses, which we have combined for simplicity.

- 4 wire Xpressnet cab bus, used to connect the cabs to the command station.
- 2 wire booster bus, used to connect additional power boosters to the command station
- 2 wire feedback bus. Provided to support future use of feedback modules

To provide the connections for the handheld cabs 5-pin 180 degree DIN sockets are to be provided. The number of these is left to individual choice and simple modules may not require any. Where these connections are provided the maximum recommended distance between connectors is 5ft. Where provided sockets shall be placed on both the front and rear fascia of the module.

All modules longer than 4ft must include a DCC Bus input socket for connection to a booster or command station as shown in drawing WIRE/DCC/2.

## Accessory Bus

The accessory bus is an optional bus designed to carry a 2-wire 16V AC power bus for powering accessory devices, such as building lights or animated accessories.. The bus will use a 6-pin audio locking chassis plug with the AC bus connected to pins 1 and 2. If the bus is used the remaining four pins must be terminated at a small tagstrip or "choc block" near to the socket to allow easy connection in the future without needing to remove the plugs from their fixings

Due to the fact that many different devices could be connected to the bus at any one time it is sensible for all modules to be provided with short circuit protection to ensure a small fault does not stop the rest of the layout from functioning. Please see drawing number WIRE/ACC/1 for full details.

At the module end the sockets shall be mounted on the rear fascia of the layout following the layout shown in drawing number CONS/SOC/1.

## Interconnecting Leads

The modeller must provide a set of plug-to-plug leads, one of each type, for connecting the modules to each other. The group will hold a buffer stock of leads for use if leads are forgotten.

The module wiring has been designed so any module can be used to connect the command station and boosters to the layout. This means a special "power module" will not required and will be achieved by the use of an additional set of connectors, one for each bus located underneath (or at the rear of) the module, which the boosters can be connected into. The group will hold a minimum of one set of these additional leads. DCC equipment owners are encouraged to build a set to ensure sufficient are available.

## Track switch (turnout) control

If electric switch motors are required individual modellers must provide their own power supply.

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## 6. Scenery

In order that the modules can form a cohesive layout it is essential that the scenery colours flow around the entire layout and do not jar against each other. Although we do not want to force the modeller to base their modules in specific parts of the country some specifications for base colours are required.

Before any other scenery is applied each module will be painted a mid-brown colour. (The delta boards (Junctions) have a pale brown seal coat of Homebase vinyl matt "Pebble".)

The basic scatter will be light to mid green. The basic ground cover used to provide the base colours on all modules is

Burnt Grass Fine Turf (T44)  
Earth Fine Turf

Other colours/textures recommended are

Green Grass Fine Turf (T45)  
Green Blend Fine Turf (T49)

All from Woodland Scenics

All mainline tracks are to be ballasted using Woodland Scenics Medium Gray ballast to the shoulder profile of the end plates. This can be purchased in a small bag as product code B82 or in a shaker jar as B1382. Some Fine Gray Ballast can be added to fill any gaps if required. The choice of ballast for passing sidings and spurs is left to individual choice.

The backscene is to be 12" high from the board surface. This is a compromise between appearance and usability.

All scenery and structure clearances must meet the requirements of NMRA standard S7.

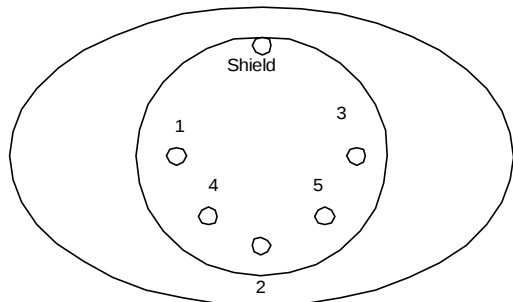
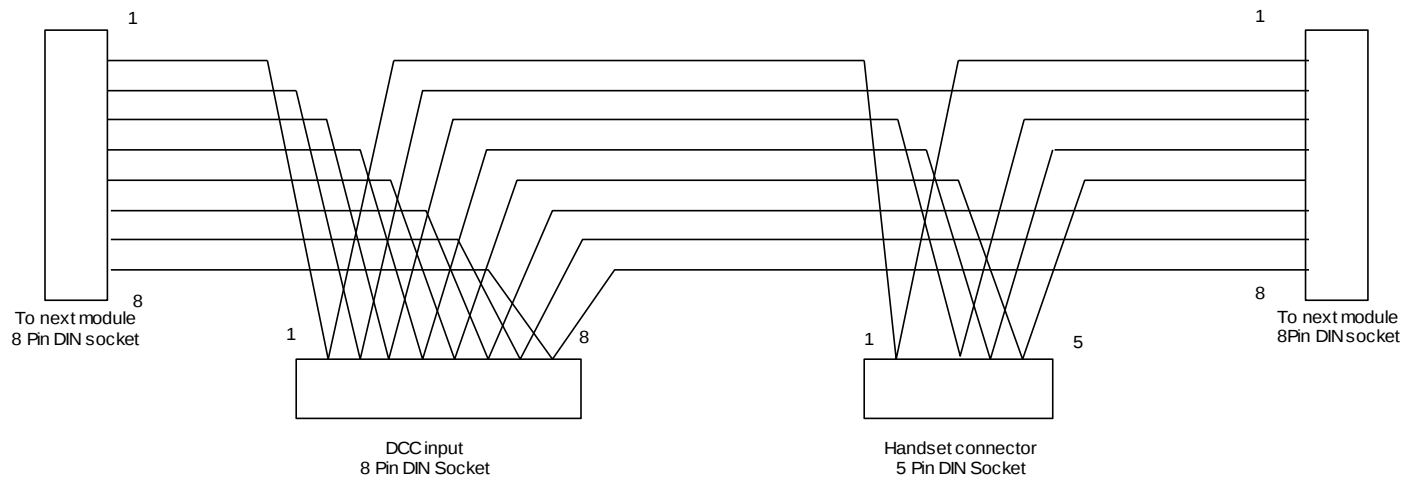
## 7. Uncouplers

All uncouplers are to be magnetic, compatible with Kadee couplings. No permanent magnets are to be fitted in the mainline track. Permanent magnets on a mechanism to move the magnet away from the rails when not in use is acceptable for use on the mainline but the design must be agreed with the Technical Manager before construction. Any type of magnet may be fitted to the other trackage.

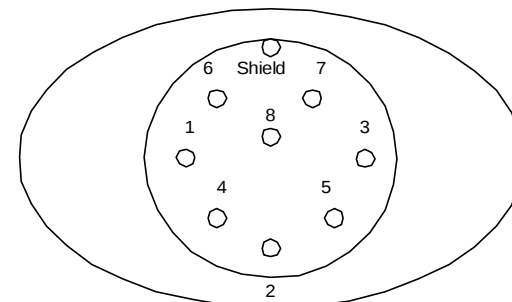
## 8. Acceptance

All modules must pass acceptance tests by the Technical Manager prior to the first use of that module in the layout and after major changes are made to the wiring. These tests shall ensure the engineering standards are maintained. It is suggested that informal peer-review style techniques be used to ensure the scenery is acceptable to the group as a whole.

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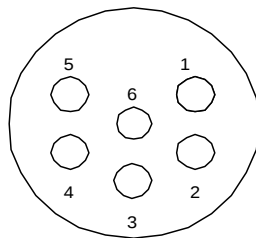
Connection List			
8 Pin SOC Pin No.	5 Pin SOC Pin No.	Lenz name	Colour
5	5	- RS-485 "B"	White/Green
4	4	+ RS-485 "A"	Green
1	1	+ 12V "L"	Brown
3	3	Ground "M"	White/Brown
6		Booster Bus "C"	Gold
7		Booster Bus "D"	White/Gold
2		Feedback bus "R"	
8		feedback bus "S"	



Thamesiders Model Railroad Group			Modular Layout Specification
DWG No WIRE/DCC/2	Issue B	Date 26/11/2010	Description : DCC Control Bus Wiring



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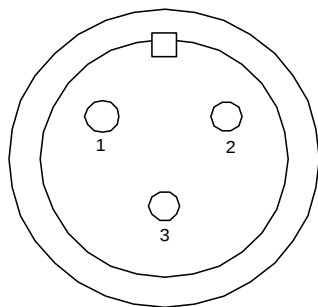
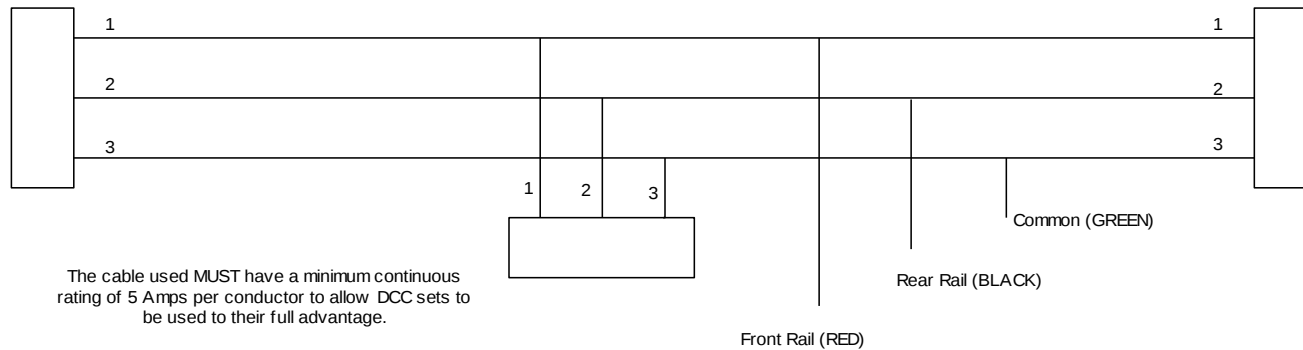


View of connection for chassis plug

Parts List	
Description	Maplin Part Number
6 way audio locking chassis Plug	FM54J
6 way audio locking line socket	FK26D
6 core cable	Any 6 way cable 5 Amp max load

Thameside Model Railroad Group			Modular Layout Specification
DWG No WIRE/ACC/1	Issue B	Date : 02/08/05	Description : Module accessory bus

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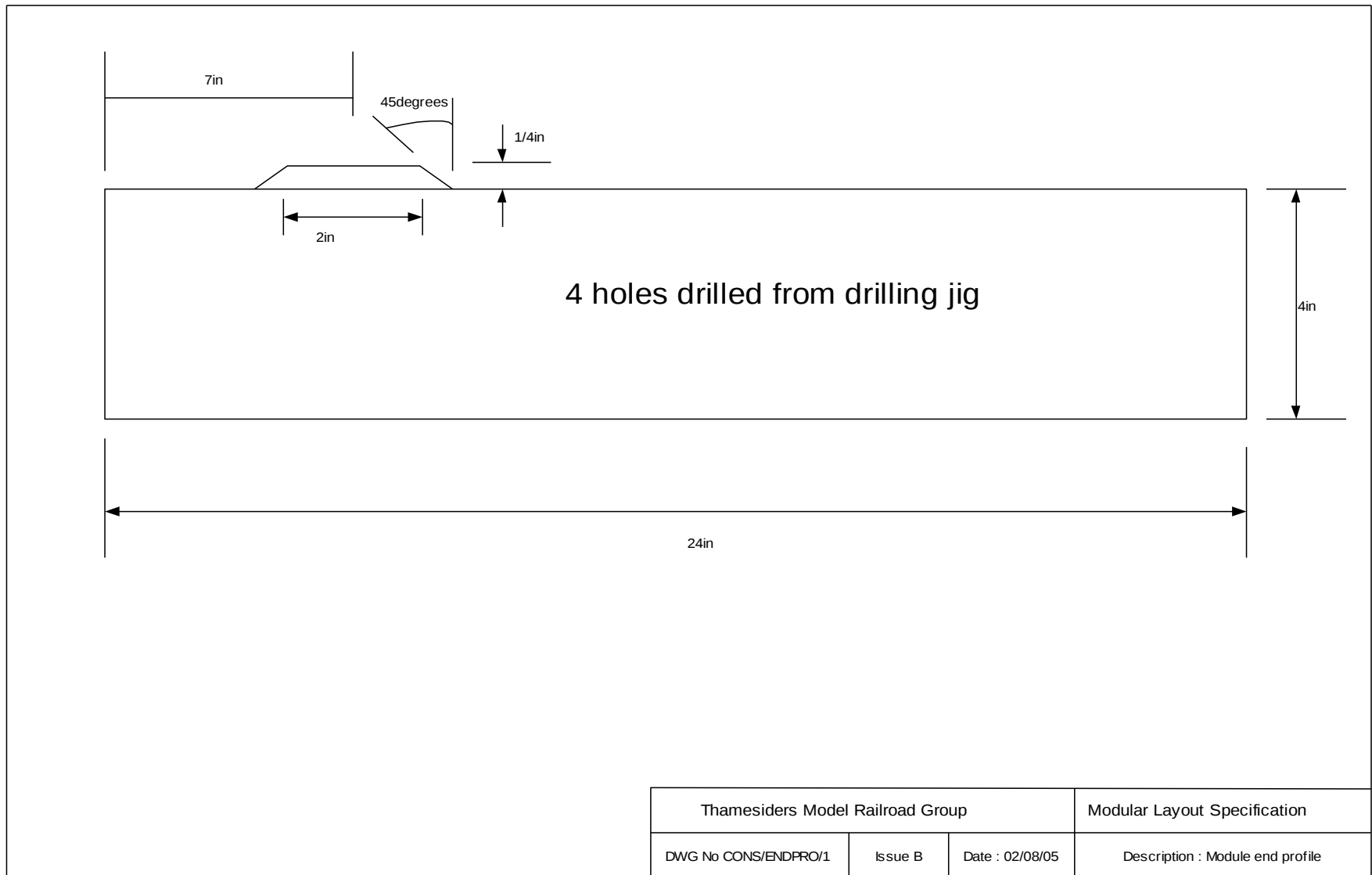
View from rear of 3 pin Canon (XLR) Chassis socket

Connection List		
Pin	Use	Colour
1	Front rail	Red
2	Rear rail	Black
3	Common	Green

Parts List		
Description	Maplin Part Number	CPC Order Code
3 pin XLR chassis socket	BW90X	AR70648
3 pin XLR line plug	BW89W	AR70645
Red cable		
Black cable		
Green cable		

Thameside Model Railroad Group			Modular Layout Specification
DWG No Wire/Track1	Issue C	Date : 14/05/2005	Description : Track bus wiring

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