Amherst Belt Lines
Modular Railway System
Amherst Railway Society
Amherst, MA

HO GAUGE

MODULAR SPECIFICATIONS

January 2017 edition

Contents

Overview

First and foremost, give credit where credit is due…

In 1978, Bill Venman brought forth the idea of a modular layout to the Amherst Railway Society. Building modules adapted from plans by the Mt. Clare Division of the NMRA in the late 1970's, and the seeds of what would become the Amherst Belt Lines Modular Railway System were planted. Through the years as participants, tools and technologies have evolved, so has our specifications. The current version presented here has little or no identifiable correlation to those original plans, but without that as a foundation, we would not be where we are today.

Prior versions of the specifications were more narrative in nature and were subject to a certain level of interpretation. This edition is a significant departure from prior versions in the sense that these are the detailed specifications that all new modules are required to meet. Existing modules are not required to be updated to meet these specifications. However, when existing modules are updated these specifications should be taken into consideration and adhered to whenever possible.

While there is a process to vary from these specifications, that should be considered the extreme exception. Before initiating the variance process, be sure to review the Specification FAQ document to understand the reasoning behind the current specification.

As long as the module meets the specifications, the method of construction and materials may vary. To assist in the module building process there is a new "Module Kit" available from the club, which is the simplest means of building a module with precut, predrilled materials which can be easily assembled by a novice. In addition to this there is also now a new supporting "Build Sheet" which provides multiple styles of construction methods as well as detailed measurements and a materials list if you prefer. These construction styles have been chosen and detailed out in an effort to meet the varying needs of both the novice and experienced wood workers.

If you have any questions, comments or concerns about these specifications or the module building process, please reach out to the modular coordinators sooner rather than later via amherstbeltlines@amherstrail.org.

1. General Benchwork and Legs

1.1. The length of a module-set can be any increment of 24”

1.2. The width of a module-set shall not exceed 36”

1.3. The height of the rail-head at the module end plate shall be 40”

1.4. The module must have an adjustable leg to allow for a variation of +/- 1 ½”

2. Module End-Plates (mating faces)

2.1. End-Plates of a module-set will either be parallel to each other, OR in the in the case of a corner module or at 90 degrees to each other

2.2. End-Plates of a module-set shall be no less than 4” and no more than 6” in height

2.3. The inside of the End-Plates shall have a “clamping area” free of obstructions, positioned on the bottom edge for the purposes of connecting one module-set to another

2.3.1. There shall be at least one clamping-area measuring 2” high by 6” wide centered at 6” from the “front” edge under the two main-lines

2.3.2. Preferably there will be two clamping-areas measuring 2” high by 6” wide, one centered at 6” from the “front” edge under the two main-lines and the other centered 18” from the “front” edge

2.3.3. Ideally there will be a clamping-area 2” high from the bottom edge for the entire width of the module

3. Basic Track-Work

3.1. The track may be commercial flex-track or hand-laid, but must conform to an NMRA Standards

3.2. Main Line Track

3.2.1. The module will have two main line tracks spaced 2” on center.

3.2.1.1. Track 1 will be 5” from the front edge at the module-set’s end plate.

3.2.1.2. Track 2 will be 7” from the front edge at the module-set’s end plate.

3.2.2. Mainline track will be code 100

3.2.3. Mainline track shall be straight and at 90 degrees for not less than 3” from the end of the module

3.2.4. Mainline track shall NOT have an grade or super-elevation within 3” from the end of the module

3.2.5. Mainline rail should end at least 1” prior to the end of the module-set

3.2.6. Mainline rails shall accommodate the use of insulated rail joiners between modules

3.2.7. The points of any mainline turnout should not be within 4” of the end of the module-set

3.2.8. Mainline turnouts shall be #6 or larger

3.2.9. Mainline track radius shall be no less than 38” and 40” for the two mainlines

3.3. Secondary Track

3.3.1. Any parallel secondary track shall be spaced a minimum of 2” from any main line track

3.3.2. Secondary track may be any Code but should have appropriate transition if connected to the Code 100 of the main line

3.4. Rail Gaps – (Figure 3)

3.4.1. A module-set with no turnouts in either mainline track does not require any rail gaps

3.4.2. All turnouts in the mainline tracks **MUST** have insulated rail joiners installed in all four rails beyond the frog and no further than 4” from the frog

3.4.3. All turnouts within secondary track should be gapped similar to the mainline

4. Electrical

4.1. Mainline Feeder Connections (Figure 3)

4.1.1. All mainline rail sections shall have a 20 gauge solid feeder wire soldered to the rail on one end and connected to a terminal block on the other.

4.1.2. All modules will require at least 4 feeder wires

4.1.3. Each turnout within the mainlines will add a minimum of two additional feeder wires

4.1.4. Each individual module of a module-set shall have its own main line feeders

4.1.5. The use of metal rail-joiners to conduct mainline track current between adjoining modules it not permitted

4.2. Through Wiring Bus

4.2.1. Through Wiring Bus will be #12 stranded wire

4.2.2. Each #12 stranded wire will be one continuous length from one end of a module to the other

4.2.3. Through wires will have the appropriate MOLEX connector at each end

4.2.3.1. Each module will require two MOLEX connectors per end for a total of four

4.2.3.1.1. One 2-terminal MOLEX type male plug with female pins and one 2-terminal MOLEX type female socket with male pins per module end

4.2.3.2. The MOLEX metal fittings will be soldered and crimped to the #12 stranded wire

4.2.4. Each through wire shall be connected to no less than one terminal block and no more than two terminal blocks per module

4.2.5. Connections between the through wire and terminal blocks will be created using:
#12 Scotch-Lock connector, #12 stranded wire, spade connector

4.3. Secondary Track Wiring

4.3.1. Feeder wires on secondary track should follow the same practices as those on the mainline

- 4.3.2. All secondary track feeders should terminate to secondary terminal block(s)
- 4.3.3. Generally all secondary track should be electrically connected to the adjacent mainline track
- 4.3.4. The connection from the through block terminal to the secondary block terminal must be removable via spade connectors at the ends or inline MOLEX style connectors
- 4.3.5. The connection from

4.4. Local Control Panels

- 4.4.1. There shall be no toggles connected to any mainline track
- 4.4.2. The use of local control panels to toggle power to a track from one power source to another is <u>not recommended</u>
- 4.4.3. The use of a local control panels to toggle power to secondary tracks on or off is acceptable

5. DCC Integration

5.1. All required DCC equipment will be furnished by the club

5.2. All personally owned DCC Equipment must be registered with the club prior to use.

5.3. The use of "permanently" attached DCC equipment (Accessory Decoders, Auto-Reversers, Breakers, etc.) must be approved by the variance process.

5.4. No DCC equipment (Accessory Decoders, Auto-Reversers, Breakers, etc.) shall be connected <u>directly</u> to the Through Wiring Bus

6. Scenery

6.1. Any scenic components must not interfere with the operation of trains on the mainlines of a module

6.2. No scenic components shall be installed in such a manner in which they exceed the vertical plane of the module-set end-plates

7. Variance Process

7.1. In the event there is one or more specifications within this document which you wish to deviate from, you must request a variance from the modular coordinators. To do so:

- 7.1.1. eMail the coordinators at amherstbeltlines@amherstrail.org listing the specifications you wish to deviate from and the reason you wish to receive a variance.
- 7.1.2. The modular coordinators review and provide a response in a timely fashion
  - 7.1.2.1. Prior to responding, additional information and/or a discussion on the topic may be requested

8. Glossary

8.1. ABEL – Refers to Amherst Belt Lines, a special interest group of the Amherst Railway Society

8.2. End-Plate – The mating end of a module or module-set that will be used to connect to additional module-sets when assembled as part of a layout

8.3. Module – A single structural component built to conform to the ABEL Modular Specifications

8.4. Module-Set – One or more modules assembled to create a single continuous section which conforms to the ABEL Modular Specifications

8.5. Rail Gap – a gap in the rail provided by the use of an insulated rail-joiner OR a cut in the rail filed with styrene or similar material

8.6. Toggle – any device to change the electrical connection from one or more sources to another.

9. Parts Listing

At this time there is not a complete listing of all the parts required to build a module. The primary factor, because we do not require a specific construction method or module size so the parts will vary depending on your choices.

There are however required electrical components. As of this writing, the complete listing is not incorporated within this specification, but will be in the future. Another future state will be the ability to purchase a "Module Wiring Kit" from the ARS on-line store. Until that time, all of the through-wiring components are available from the modular coordinators (amherstbeltlines@amherstrail.org).

Figure 1 *Module End-Plate*

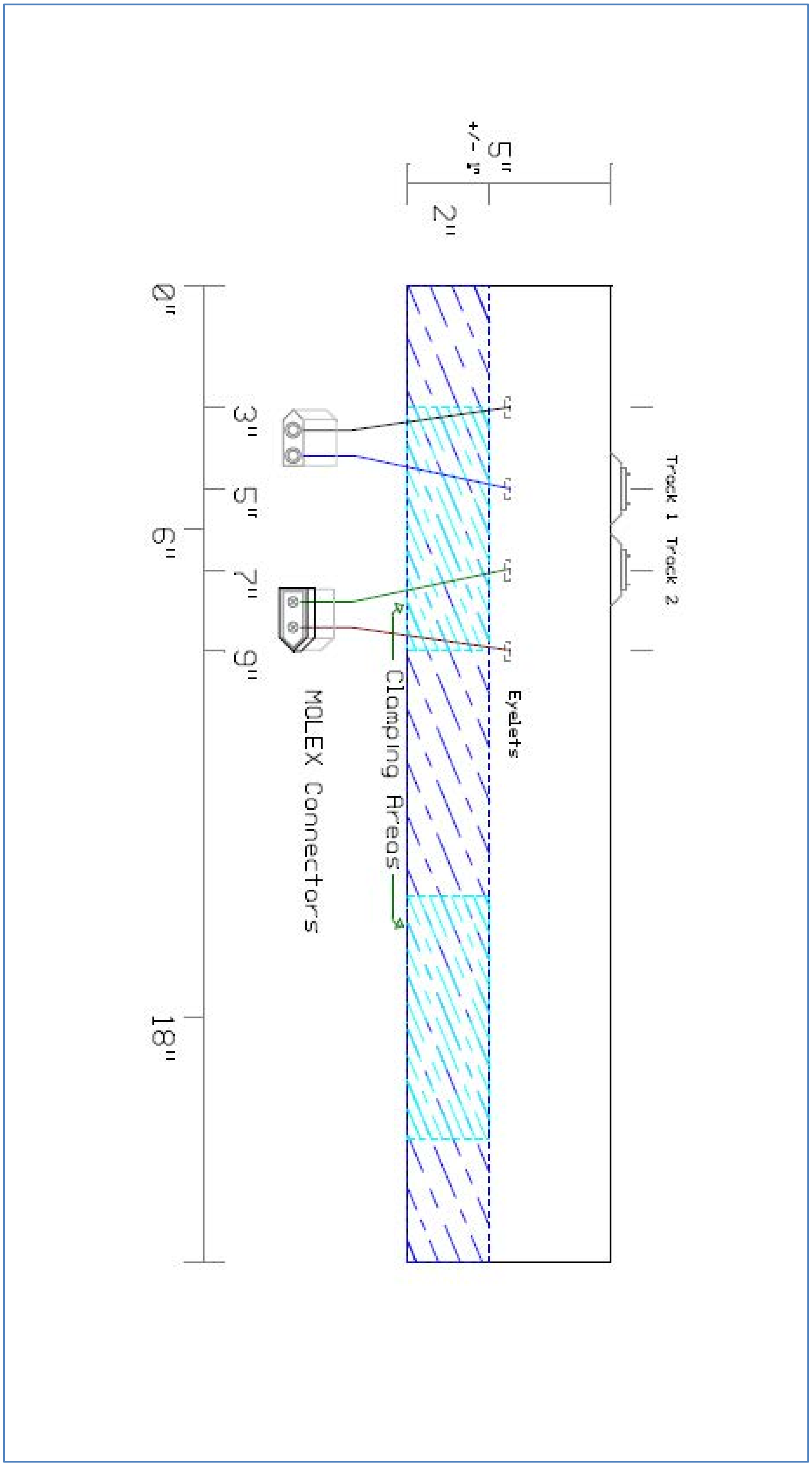

Figure 2 *Example Rail Gaps and Feeder Locations (not to scale)*

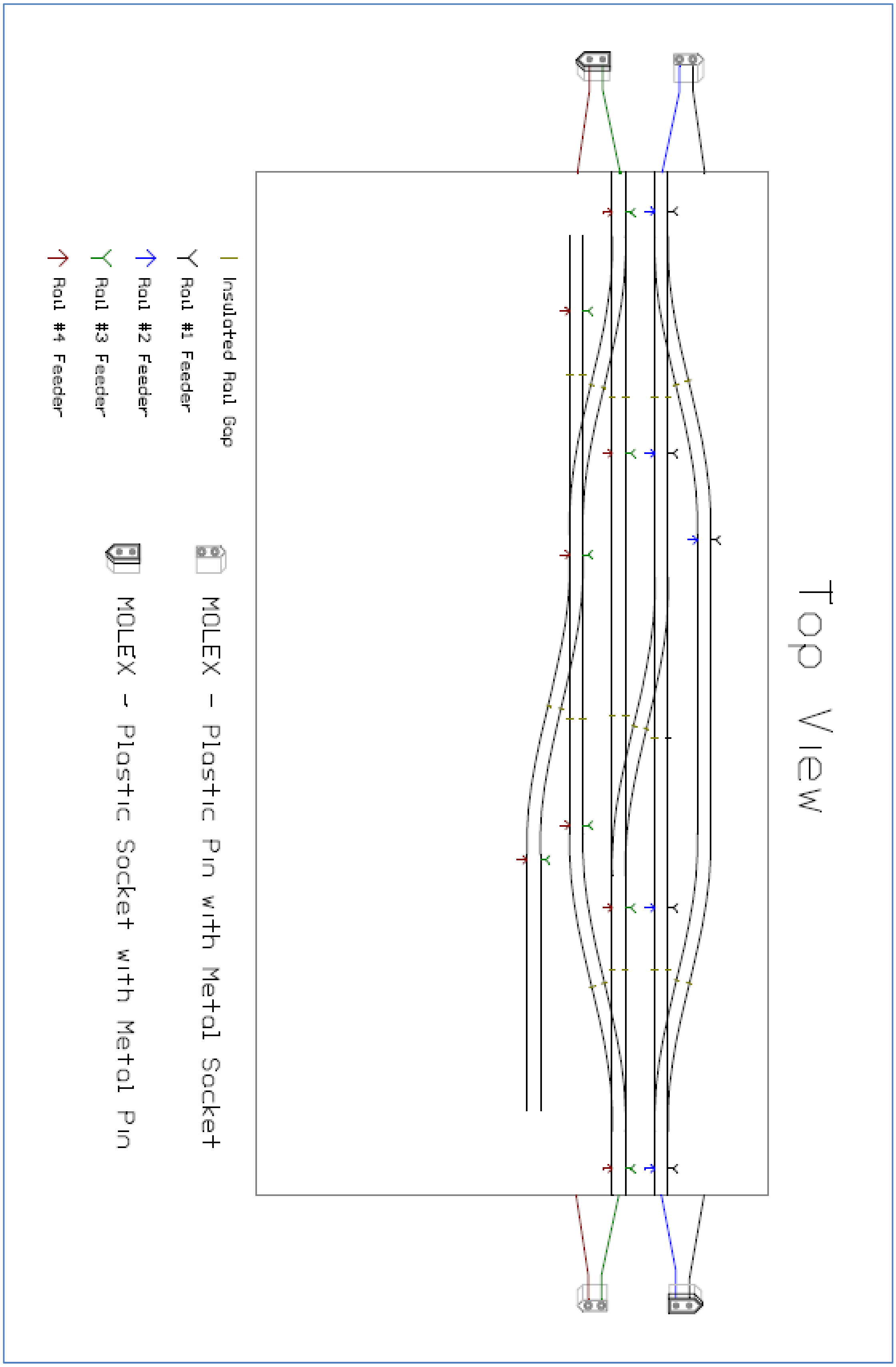

***Figure 3** Example Feeder Connections* *(through wires removed for clarity) (not to scale)*

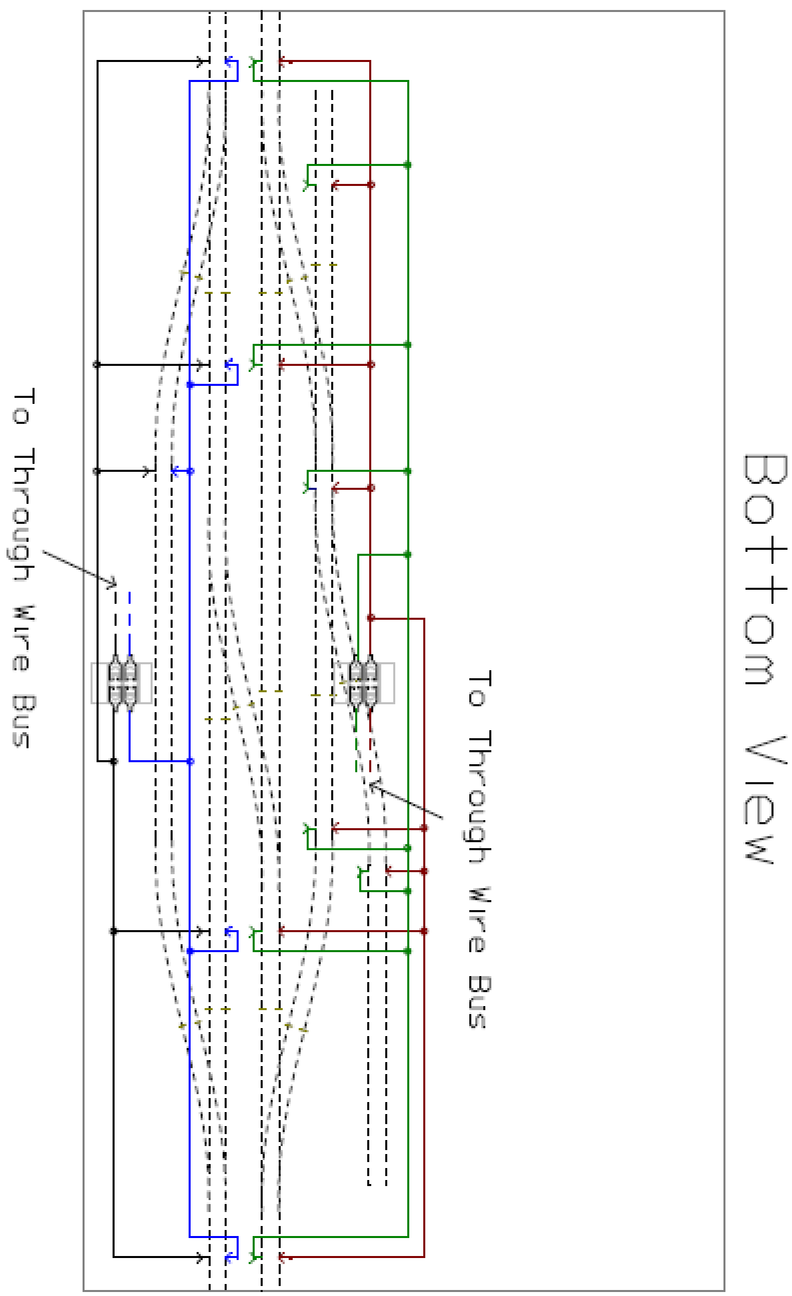

Figure 4 *Through Wiring (not to scale)*