

SECTION 1, GENERAL NOTES ON MODULES CONSTRUCTION  
Revised 2011

1. All modules will require independently powered mainline tracks A, B, and C. Switches to connect mainline to local track is optional.
2. Construction of multiple modules to be used as one module unit eliminates the restrictions on track termini where they join each other. Track termini restrictions do apply at module extremes where they interface with other standard modules.
3. Each module is to be equipped with two "C" clamps for securing to adjoining modules.
4. Each module is to be equipped with three 9 inch sections of Atlas nickle-silver snap track (or equivalent) for the purpose of joining the module trackage. There shall be no track joints above or in line with module joints.
5. The use of road bed other than cork is now allowed because of the problem of cork that is less than 1/4 thick. Cork can still be used, using care to shim it to the proper height. Use of plywood, homosote, truscale or other suitable material is permitted. (Sept. 83)
6. Brown paint (Benjamin Moore code N333-48, Brown (2099-10) (2099-10)) is to replace the Jungle Green paint. (Sept.83). Ask a club member for any spare paint.
7. Proper color and type of material for curtains is available from the club supply office.
8. The proper color and size ballast is available from the club supply office. It is made from white silica sand (Mid grade sandblasting silica) and Highball Products cinder ballast or equivalent. For each 10 lbs. of sand, two one pound bags of cinder are added and mixed to obtain an even consistency.
9. The telephone poles used along the right of way are placed approximately half way between the front of the module and the outside rail of "A" track. They are placed approximately 6" in from each end and about every 12" apart down the length of the module. Recommend that they are removable as they are easily broken.

SECTION 2 MODULES DESIGN  
Revised 2009

1. Exterior module frame is to be made of suitable materials as needed for the design. Dimension lumber or high quality ½ plywood is suitable.
2. Sub-road bed, top of module, should be 3/8" minimum thickness high quality plywood and should be placed directly on top of the module frame.
3. Road bed of 1/4 inch thickness is to be laid directly on sub-road bed. This can be glued and stapled in place.
4. Sub-road bed are to be laid flush to the module ends. The first 4 ½ inch should be less than 1/4 inch thick to prevent humping of the 9 inch snap track joiners. Beveling the ends will protect from chipping
5. Depth of module is to be 30" at each end of a module or set of modules. Depth of module(s) may not exceed 36" at any cross section. This is due to the limitations of doorway widths at many of our setup sites.
6. The height where the modules bolts together should be 5 ½ inches and designed to withstand abuse from constant clamping.
7. Modules standard lengths are 30", 60", or 90" long. You can design your project around a combination of those lengths. Example, Fisherville, the module with the drive in movie, is designed to be set up from 90" to 270" in total length. Modules exceeding 90 inches in length, even though they represent a standard of two or more standard modules, may not be usable in all setups due to not fitting in some stairs, elevators, and entrance ways. All modules are designed to work with multiples of those three length standard when we plan our display setups.
8. The use of diagonal internal bracing or box beam construction will reduce twisting of the modules during handling and set up that can damage scenery. Construct the module on a flat surface to prevent it from becoming warped. A small amount of twisting, about ½ inch in a 90 inch module, is desirable.
9. Each straight module is to be equipped with two legs minimum. The best method for constructing sturdy, easy to assemble legs, is to use 3 inch schedule 30 plastic pipe that mounts into a 5 inch thick socket fastened to the corner, or about 6 inches from the end, of the module.
10. Module legs must have adjustable feet to allow for leveling. Length of module legs should be set so that the top of a module may be lowered to 39" above the floor, or raised to 41" above the floor. Adjustable bed frame legs have been found to be the most durable for this purpose.
11. The modules are to be painted brown on front and back surfaces, legs may also be painted brown. The underside can be painted white.

12. Brown curtains for the front of the module are placed approximately 3” down from the top edge of the module.

13. The curtain may be attached to the module with Velcro, snaps, or other suitable device. Tacks are not recommended as they tend to end up on the floor and in someone's foot. For more information on curtains, see the special section on curtains.

14. A clear plastic strip, minimum 2 inches in height above the top of the module, is recommended for the protection of rolling stock in case of a derailment. You are encouraged to use a taller plastic shield in front in order to protect your landscape from little and big hands. Design the taller shields so that they can be easily removed.

15. See one of the senior club members if you wish to design a corner module. Our corners are designed around the dimensions of a six foot square surface, curve the track a total of 90 degrees and match the standard. 4, 6, and 26 inch track spacing measured from the spectator side of the module.

### SECTION 3 TRACKAGE

1. Where the modules are connected to other modules, the outside mainline track ( "A" track) is to be 4" from the front edge of the module to the center line of the track at it's termini.
2. The inside mainline track. ("B" track) is to be 6" from the front edge of the module to the center line of the track at it's termini.
3. The branch line-local track ("C" track) is to be 26" from the front of the module to the center line of the track at it's termini.
4. You are free to change the distance of any track from inside your module or group of modules providing that;
  - A. Minimum radius for curves allowed on "A" or "B" track shall be 30".
  - B. Minimum radius on "C" track shall be 18".
5. Minimum turnout allowed on "A" or "B" track shall be #6 switches.
7. Minimum turnout allowed on "C" track shall be #4 switches.
8. Track must be code 100 nickle-silver on plastic ties for tracks "A", "B", and "C".
9. Ballast shall be of the same size, color and consistency on all modules for tracks "A", "B", and "C" and any crossover connection to those tracks. Ballast is made from white silica sandblasting sand with a 20% mix of modeling black cinder ballast. This ballast is available from the club store or you can mix your own.
10. All mainline grades on any module or module set may not exceed 3%.
11. The termini for tracks "A", "B", "C" must be 4 ½" from each end of the module.
12. Super elevation (banking) on curves is optional.
13. Easements on curves are optional.
14. You may use ballast of any color on your sidings suitable to your module theme.
15. You may use tighter curves, steeper grades, and #2 ½ switches for your sidings.

SECTION 4, ELECTRICAL  
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1. Each module is to be equipped with two pairs of modular 4 wire trailer plugs that can be found most anywhere. They are wired as followed;

Track A, B and C mainline setup for the left side facing of the module, spectator side.

1. Using the three male end connector;

Track A red wire to connector green.

Track A black wire to connector yellow.

Track B red wire to connector brown

Track B black wire to connector white

2. Using the one male end connector;

Track C Main red wire to connector green

Track C Main black wire to connector yellow.

Track C Local red to connector brown

Track C Local black to connector white

Track A, B and C mainline setup for the right side facing of the module, spectator side.

1. Using the one male end connector;

Track A red wire to connector green.

Track A black wire to connector yellow.

Track B red wire to connector brown

Track B black wire to connector white

2. Using the three male end connector;

Track C Main red wire to connector green

Track C Main black wire to connector yellow.

Track C Local red to connector brown

Track C Local black to connector white

Wiring the two connectors to a Radio Shack #274-678 terminal block or similar device will make servicing of any connectors that go bad quick and easy. Two pairs of trailer plugs and two 8 lead terminal blocks are needed per module.

2. The terminal block is to be mounted to the inside center of the module ends. See the recommended wiring practice for how to wire track to the terminal blocks.

## 120V AC power for modules

1. Each module (set) is to be equipped with 120V electrical service, including at least one duplex outlet. Wire is to be 14 gauge minimum with a 3 prong grounded plug. You may use a 14 gauge rated heavy duty appliance extension cord of suitable length for this purpose. All outlets will be grounded through the module plug. Lateral placement of the duplex outlet is not specified. The left hand end of the 120V service (when looking at the module from the front) is to have the standard grounded male plug. The right hand end will have the female plug.

To avoid problems, follow the UL standard for wiring all outlets. If you are uncomfortable with doing this type of wiring, ask a senior club member or electrician for help.

2. The 120W wire should extend at least 12 inches from the top edge of the module to the end of the plug and hang straight down from the inside center end of the module frame.

3. You have the option of supplying a pass through UL appliance grade rated, 15 amp, extension cord with a three plug outlet for use with your module instead of wiring the module for 120V AC.

## RECOMMENDED WIRING PRACTICES TO POWER TRACK

### Wire.

16 gauge pass through wire is recommended. 20 to 22 gauge can be used to connect track to the pass through wire. Stranded wiring is far more reliable than solid which is more easily broken through bending.

Refer to the wiring instructions on how to wire the pass through wiring to the terminal blocks of the module connectors.

If two or more modules are to be connected in a set, feeder wire should be brought up to the center of each module. You are free to use what type of connector is suitable for your module set connector.

For A and B track where control is maintained exclusively through the club power supply, connect at least one set of feeder wires as followed; The red insulated feeder wire is attached to the outside rail, or spectator side. Black insulated wires are connected to inside rail.

### Optional Shut offs.

Shut offs may be applied to any or all tracks. However, If a shut off is applied to either A or B track, it should be applied to both. Branch line would be optional.

When wiring a shut off, the rail closest to the inside of the module, black wired one, are the ones used to shut off power. The use of a single pole single throw (SPST) switch is all that is required. For the shut off to be functional, the inside rail of the track to be isolated will have to be insulated on each end. That can be designed in the track layout, or be done using insulators on the 9 inch snap track jointers.

Sidings can be isolated using the same SPST setup.

## Local Power on C Track

When DCC controls is in use for C track, this option is no longer necessary for local switching operations.

Local power requires the use of a double pole, double throw (DPDT) switch with center off. Local power requires that both rails be insulated at each end of the block. If a block is more than one modules with no independent feed, the connecting module will need to be equipped with a DPDT switch.

To use local control on adjoining modules equipped with the DPDT switch, you should feed local power to the C local wiring and set the switch to local power. Be sure to insulate the track jointers on the drop ends of those modules under your control and plug in a local control wiring isolator into the C connection, a short double ended trailer plug where the brown and white wire has been removed.

Wire your control DPDT switch as follows;

1. Center terminals connect to the track and, if you are controlling more than one module, connect to the C local pass through wiring.
2. Wire the lower pair of terminals to the C main pass through wiring.
3. Wire the upper pair of terminals to your local control power supply.

Wire the controlling module switch as follows;

1. Center terminals connects to the track.
2. Wire the lower pair of terminals to the C Main pass through wiring.
3. Wire the upper pair of terminals to the C Local pass through wiring.

Position the switch on your control panel so that when the switch is down, the track is on local power. If the switch works in reverse of this, simply rotate it 180\* in the mounting hole.

For protection of your power supply, it is recommended that you wire in a volt meter into your local power supply circuit so that you can verify that mainline power is not feeding back into the local wiring when you switch over the track to local control

## CROSSOVER TRACKS

We do not recommend using direct crossover tracks on the mainline due to possible feedback to the power supplies and chance for collisions. For those modules with mainline crossover, it is up to the engineer doing switching in that module to give mainline traffic the right of way.

## SWITCHING BETWEEN A, B, AND C TRACK

A to B Switching;

Provisions have been made in our Transition and Folgelsinger Yard Modules for this type of switching due to problems with feedback when there is no buffer section to control power between the interlocking.

B to C Switching.

The track between the two switches is to be insulated on both ends and controlled with a DPDT center off switched wired as follows;

1. Wire the center terminals to the track
2. Wire the lower terminals to the B pass through power supply.
3. Wire the upper terminals to the track feed to the C track.

The rule for driving a train through is kill the power to the connecting track, drive the train onto the track until it stops making sure that all power pickups have cleared the insulators, then switch power to the track you are heading for.