



# Willamette Cascade Model Railroad Club

## Module Specifications & Standards

"Pride of the Tunnel Country"

*Revised 3/12/2024*

The object of these standards is to provide the specifications for a HO scale modular railroad system. The module system will continue to be used at conventions and public displays as the club directs.

To ensure complete interchangeability amongst any combination of modules, certain restrictions must be placed on the individual. These restrictions will apply to interface dimensions, track construction, size and placement of turnouts and electrical system. The module committee realizes that in certain instances complete compliance is not feasible. Therefore, variations will be considered upon submittal to the module committee.

Each module shall have a minimum of **Three (3)** main tracks running its full length. No grades will be allowed on the main line tracks on single modules. Grades on contiguous modules will be allowed upon approval of the module committee. Contiguous modules are a series of modules depicting one scene which must be assembled in a given order and will be considered as one module for the club purposes.

Any module which develops track or electrical problems which endangers other members equipment or safety shall not be allowed to be used in any subsequent setup until all such defects are corrected..

### I. CONSTRUCTION STANDARDS:

- a) NMRA Standards and Recommended Practices shall be followed where applicable.
- b) All standards shall be subject to modification toward improving the system. Modifications shall be adopted by a vote of the club membership.
- c) Size:
  - 1) Modules shall be in increments of two (2) feet. Contiguous modules of any length are acceptable as long as the overall length is a two (2) foot increment.
  - 2) Modules shall be 30 inches wide at each interface.

#### d) Framing:

Basic frame construction is builder's choice, subject to approval by the module committee. A 1" X 4" cross frame shall be used and a 1" X 6" on all interfaces. Interior framing shall be sufficient to support the track without any sag.

All construction joints shall be glued and screwed for strength. **NO NAILED JOINTS WILL BE ALLOWED.**

Deeper modules for scenic effect are acceptable but must match club interfaces for connections at each end.

#### e) Height:

Floor to top of rail shall be 40 inches.

Legs shall be braced 2" X 2" as shown on drawings.

Legs shall be fastened as shown on drawings with 3/8" machine bolts, washers, and nuts. Wing nuts are optional. Recommended that bolts are treaded full length.

All legs shall have a 3/8" X 3" long minimum bolt with "T-nut" in the bottom

for height adjustment. The hole in the bottom of each leg must be at least the length of the bolt used.

All legs shall provide interface support in a style similar to that shown on the drawings.

f) Interface Surface:

- Must be square front to back and vertically.
- Must be smooth and clear of all obstructions.
- Any scenery supports must be on inside of interface.
- All bolts or screws shall be countersunk flush with interface surface.
- All modules shall be bolted together as shown on the drawings.

g) Table Top:

- Top of module is builder's choice of natural. If other than wood, the main tracks must have additional support.
- Track base or ballast board shall be **wood or Cork** for at least six (6) inches at each end.
- Tunnels are acceptable provided there is,
- At least six (6) inches of exposed track between interface and entrance to the tunnel, and
- Internal access for maintenance and rescue of errant equipment.

h) Buildings:

- Buildings may be permanently installed.
- Recommend that buildings be keyed into scenery and removed for transportation.

i) Scenery:

- Scenery is required on all modules for public show unless the show or module is of an instructive nature.
- Scenery should be of lightweight materials for portability.
- A box or frame is recommended to fit over the module while in transit to protect the scenery and allow stacking in transit.

2. TRACKAGE STANDARDS:

a) Main Tracks:

- Shall be code 100 nickel-silver rail.
- Shall have all non-insulated rail joints within the module soldered or jumpered.
- Expansion joints (non-soldered rail joiner in each rail) shall be located within one (1) foot of the module interface or just beyond any turnouts in this area.

Shall be flex-track, or hand laid on individual ties. **NO FIBER TIES OR SNAP TRACK EXCEPT FOR THE YARD!**

Shall be stained and ballasted for appearance.

Track and ballast shall stop three (3") inches short of interface at each end, ballast on ballast board slope should continue to interface.

b) Turnouts:

Number 8 (#8) are recommended, but #6 are acceptable to local trackage.

**EXCLUDED ARE TRUESCALE HI-SPEED, ATLAS!**

Recommended: **Peco, Lambert, Truescale True Switch, Walthers or equivalent.**

c) Turnout Controls:

Main track turnouts shall be controllable from the operator side of the module by switch machine, choke control, etc.... with spring pressure to maintain point contact .

Ground throws (hand operated switch stands) may be used on local trackage. May also be used on main tracks IF:

All local trackage is powered from main tracks, AND

There are no scenery features or structures impeding operator reach to turnout controls, AND

No switch stand is installed between main line tracks, AND

All switch stands must clear nearest rail of closest track by 1".

All uncontrolled turnouts shall be spiked for main route. Any switch that does not maintain electrical continuity through the points and closure rails shall be considered uncontrolled.

d) Locations:

All main tracks shall be straight and parallel to the front edge of the module and square vertically to the interface for a minimum of 6" from the interface.

Outside main trackage shall be set back 4" from the front edge of the module to the track centerline.

Inside main track shall be set back 6" from the front edge of the module to the track centerline.

Back track shall be set back 20" from the front edge of the module.

Balance of track configuration is the builder's choice with the following restrictions:

Turnout points shall be at least 4" from the interface.

Minimum radius shall be 36" on 2 1/4" centers.

Easements recommended.

Minimum of 4" straight track between "S" curves, not required on spiraled curves.

No hand-laid track.

e) Track Direction Priority:

Track one (1) (outside main) is Eastbound, Counter clockwise.

Track two (2) (inside main) is Westbound clockwise.

Track three (3) (back track) is Bi-directional (operations)

f) Roadbed:

Reliever 1\16" deep for the first 3" from interface to accommodate splice tracks.

Balance is builder's choice.

Roadbed shall be stained and ballasted, no ballast in relieved area for splice tracks.

g) Spliced Tracks:

Each module shall have two (2) 6" Splice tracks.

Re-railer is desirable.

h) Local Trackage and Turnouts:

Builder's choice.

3. ELECTRICAL STANDARDS:

a) Main Line Buses:

Six (6) #14 or #12 Stranded (AWG) wires shall run full length of each module.

Two-prong "Molex" plugs on twelve (12) inch pigtailed at each end of the module.

Male plug on right end (from inside of layout. West end.)

Female receptacle on left end (from inside of layout. East end.)

Track one (1) outside (South) rail to pin #1.

Track one (1) inside (North) rail to pin #2.

Track two (2) outside (South) rail to pin #1.

Track two (2) inside (North) rail to pin #2.

Back Track

Track three (3) outside (South) rail to pin #1

Track three (3) inside (North) rail to pin #2

12 Volt DC Accessory Power

Pin #1

Pin #2

b) Control:

Turnouts on main track (s) must be insulated and fed so that there will be neither loss of power nor short circuits created beyond the fouling point on the main track regardless of position of turnout

points.

All rail sections shall have positive electrical feed.

Local trackage equipped with local control must be insulated from main track (s) in connecting turnout (s).

If desired to access main track (s) from local control, such main track (s) shall be insulated in both rails at both ends of locally controlled section. Inter-modular feeder system shall also contain isolation and bypass circuit to be activated when track (s) is (are) under control.

If desired to access local trackage from main track controls, such trackage must be wired to prevent short circuits and/or interties between both main track controls and/or local controls.

Insulation between modules will depend on above requirements and particular conditions of master block control system.

All modules having local power accessibility to main line tracks shall use insulated rail joiners in both rails at one end of all splice tracks.

It is recommended that all wires from rails in module come to guarded screw type terminal strips within that module to facilitate easier maintenance, modification, and troubleshooting.

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## **HELPFUL TOOLS FOR SET UP AND TEAR DOWN OF WCMRRC MODULAR RAILROAD**

**The following list of tools would be helpful to bring if you are involved in the set up or tear down of the club's HO scale modular railroad**

**\*Needle nose pliers gauging rail joiners for tighter fit on rail ends**

**\*Rail nippers to replace a worn out or bad piece of track-DO NOT CUT ANY TRANSITION PIECES OF FITTER TRACKS AS ALL HAVE BEEN DONE TO A GAUGE FOR VARIOUS LENGTHS.**

**\*Small screwdriver for freight car repairs or for pushing rail joiners on to an end of a piece of track**

**\*Safety glasses or magnifiers for better accuracy of getting the rail joiners actually fitted to each end of each piece of track**

**\*Battery operated drill with extension and sockets for dismantling modular pieces owned by the club and for attaching sandwich boards for loading at the end of a show. Sockets need to be 9/16 for drill or box end wrench 3/8 to raise and lower bolts on modular legs.**

**\*Level of 12" length for leveling of the layout between modules**

**\*Emergency kit of rail spikes, rail joiners, insulated rail joiners, Kadee couplers, coupler pockets, graphite, reamer for rail journals, coupler springs etc.**

**\*Small file for squaring up a freshly cut piece of replacement track**

**\*Battery operated Dremel tool with wire brush for cleaning of locomotive wheels or freight car wheels that get dirty**

**\*Multi-Tester of electrical circuits, dead shorts, etc.**

**\*Headlight you can wear so you can see what you are working on**

**\*Light duty soldering iron with silver solder**

**\*NMRA gauge for wheel gauge, Kadee coupler height gauge, coupler pliers for raising coupler gladhands or lowering of gladhands**

**\*set of various sizes of screwdrivers for straight edge or Phillips screw heads**

**\*Spring pick as supplied by Kadee if a spring comes loose from one of your sprung trucks**

**\*Tape measure of at least 25 feet in length**

**\*Multiple extension electrical strip or extension cord**

**\*Hand truck for hauling in and out modular pieces from club trailer or your own personal railroad items**

**\*Roll of duct tape**

**\*Knee pads**

**\*Abrasive stone for cleaning of track**

**\*Wheel cleaner by Kadee or other manufacturer**

**\*Electrical conductor spray for motors or other electrical items**

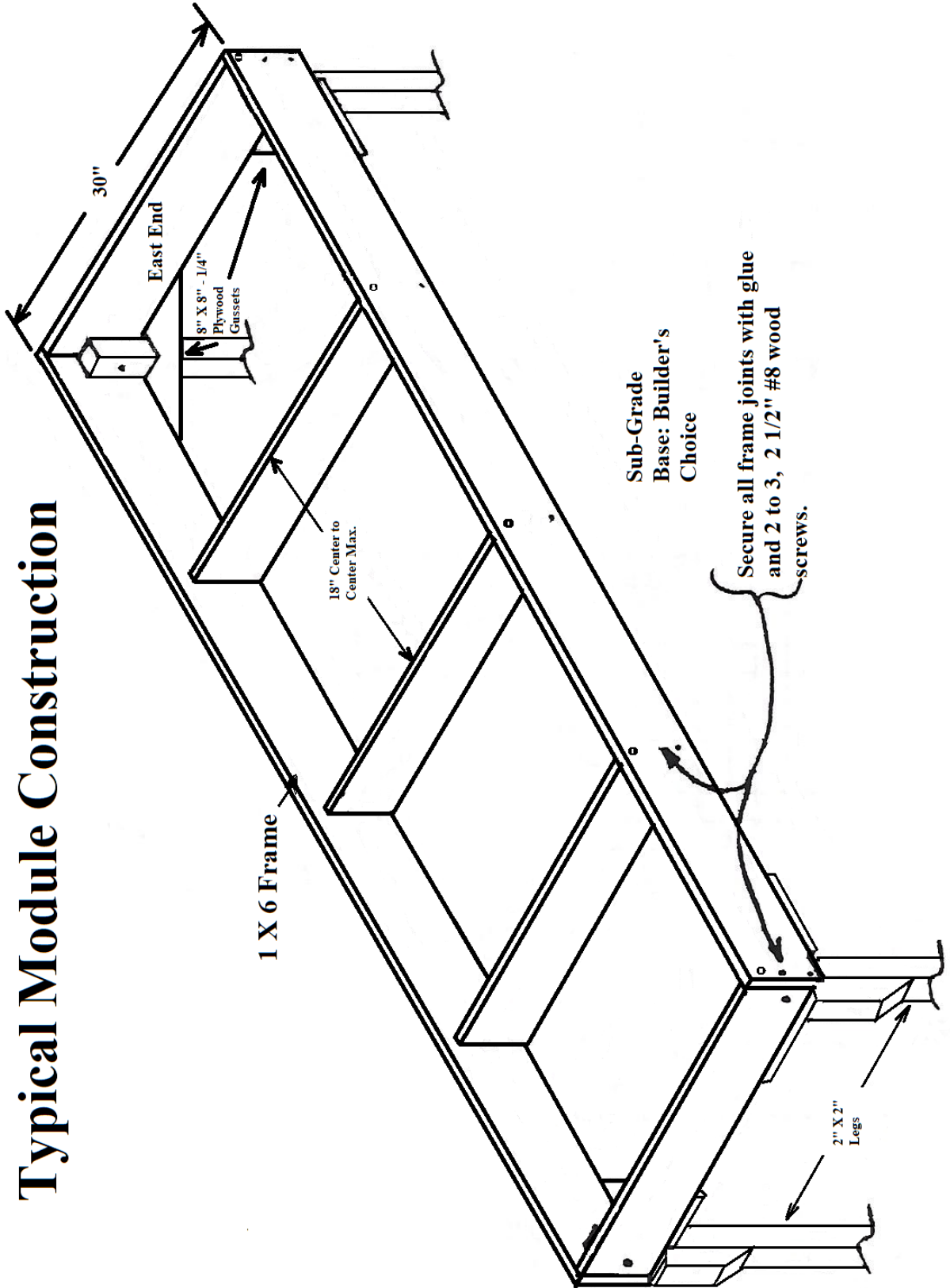
**\*Toolbox dedicated for set up and tear down purposes separate from your regular tools**

**\*Stubby hammer**

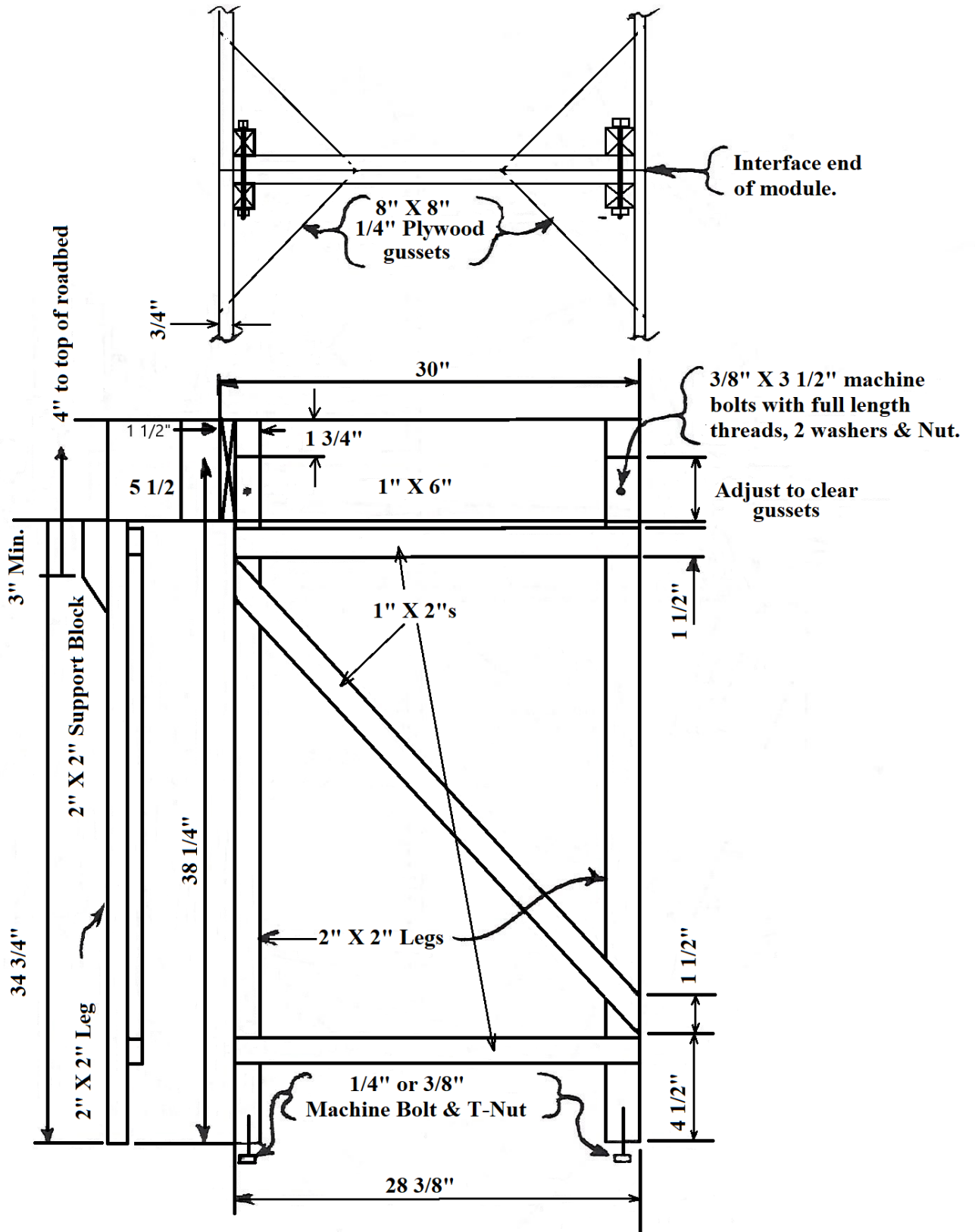
**\*Electric drill with bits of various sizes**

**\*Rags for rail clean of gunk**

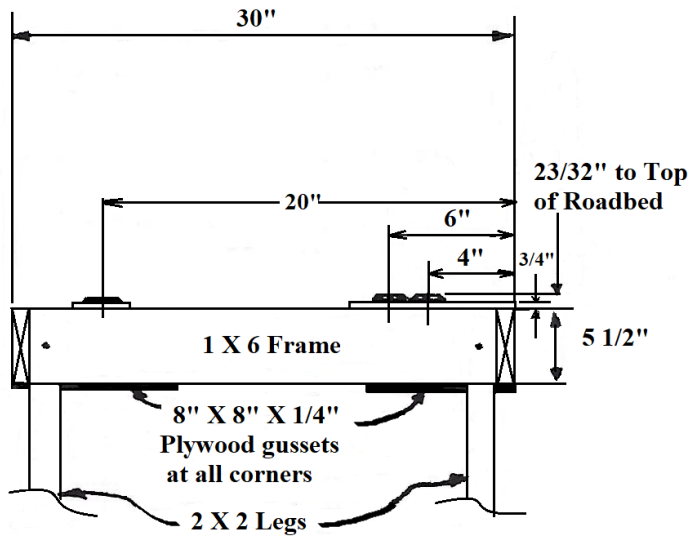
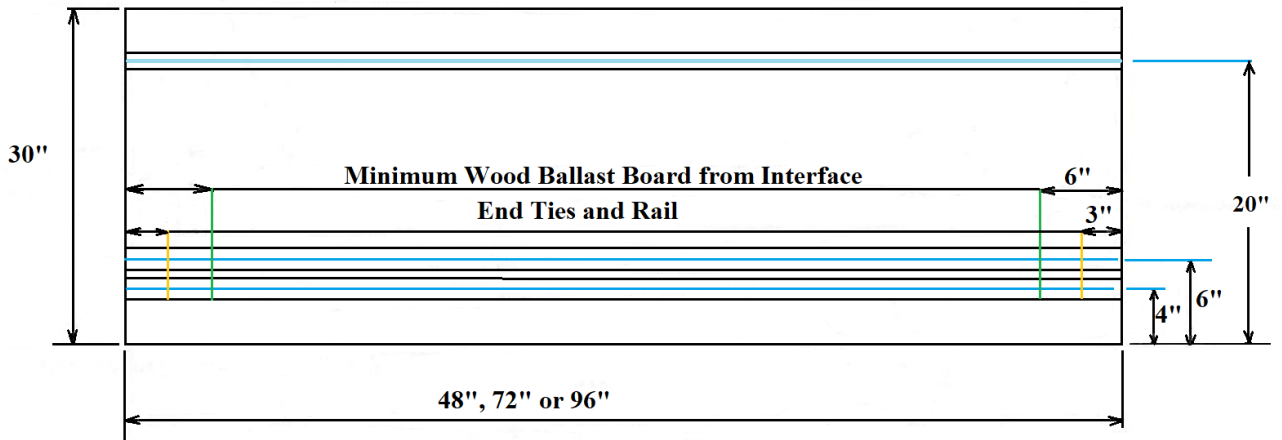
# Typical Module Construction



## Leg Details

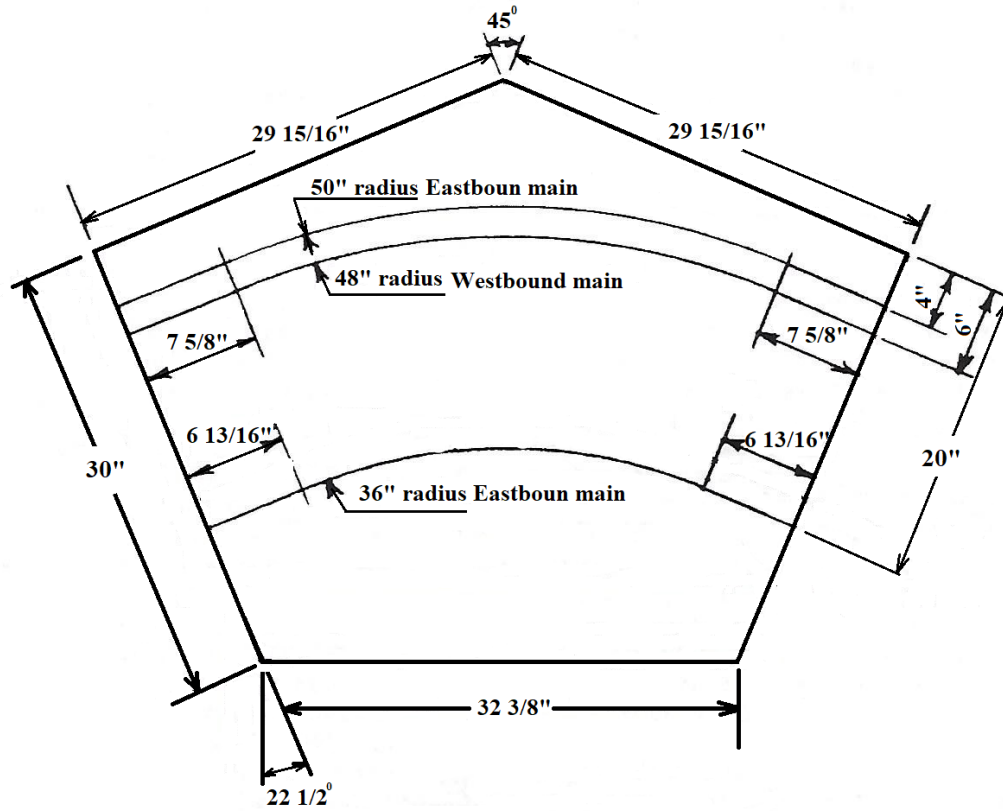


Side Module

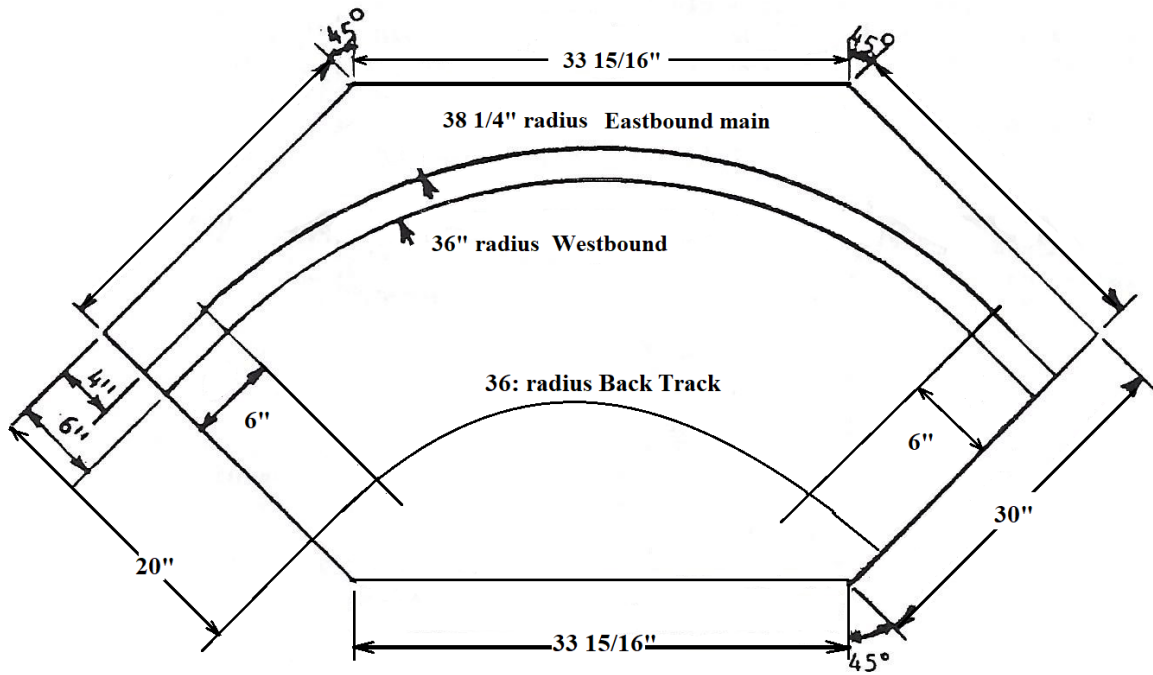




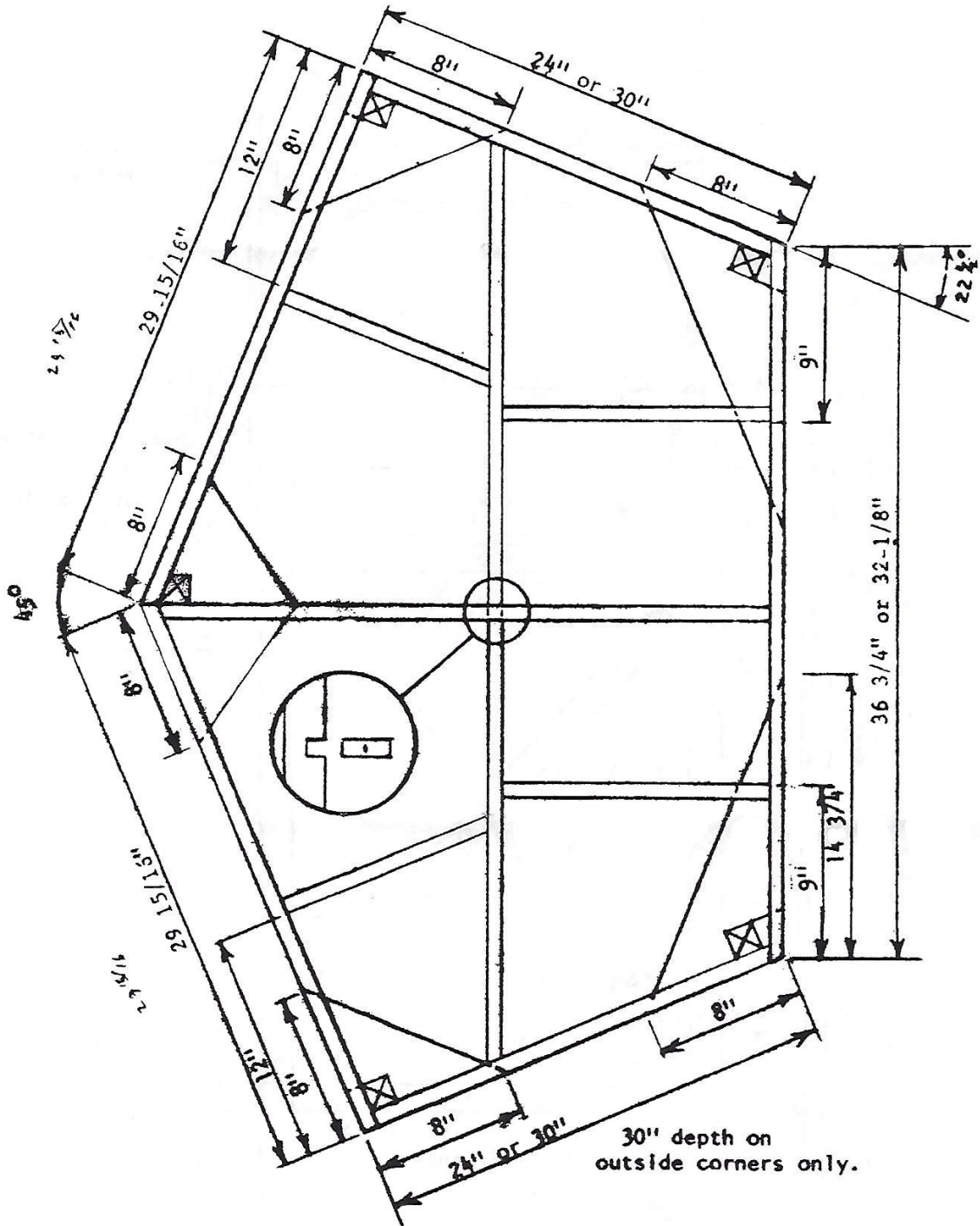
45 Degree Corner



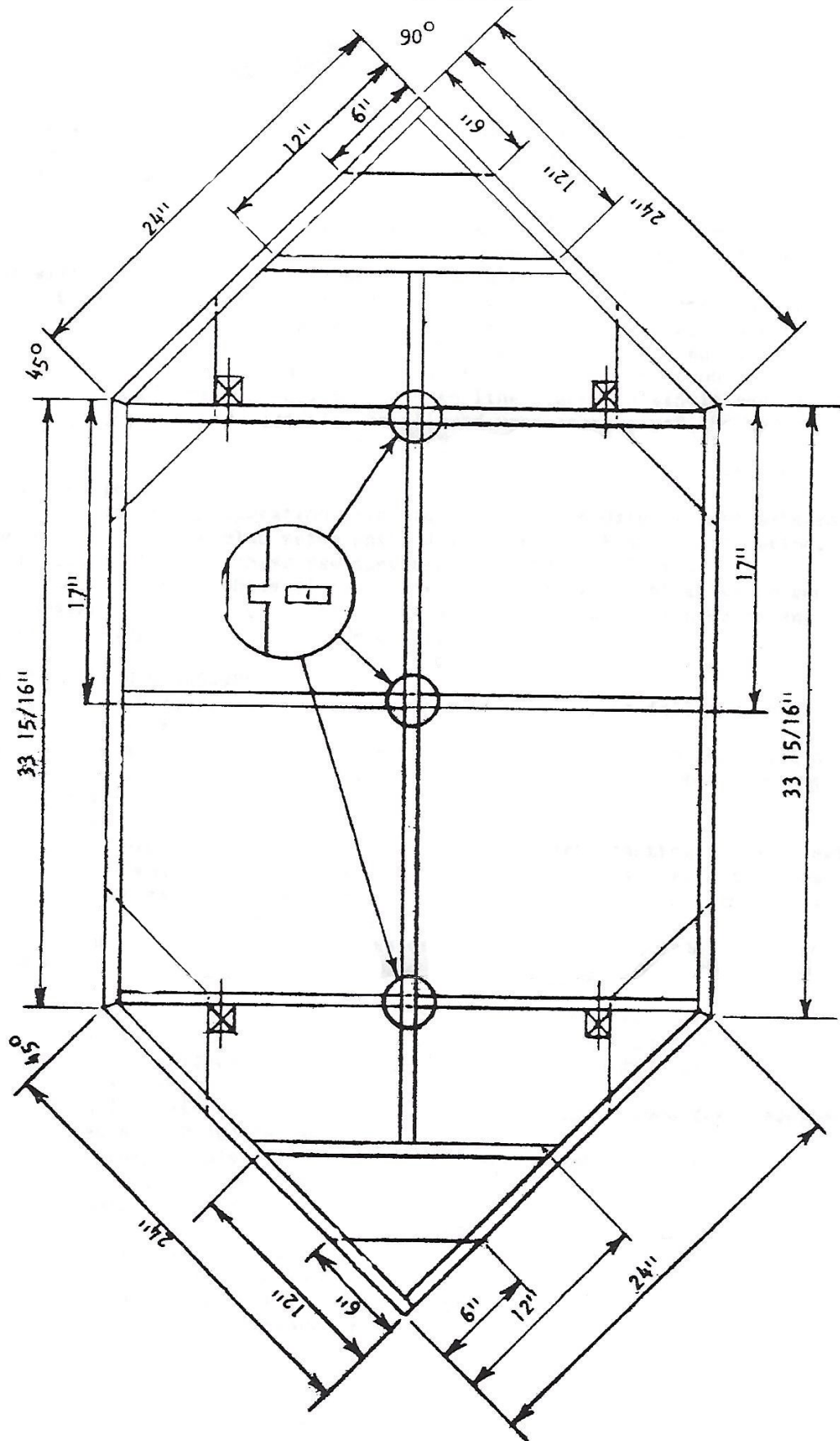
90 Degree Corner



### 45 Degree Corner Details



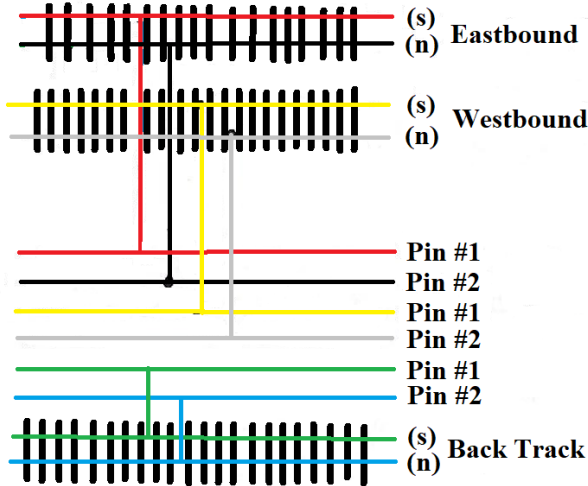
### 90 Degree Corner Details



## Wiring Diagrams

### Runthru Module

Male Plugs



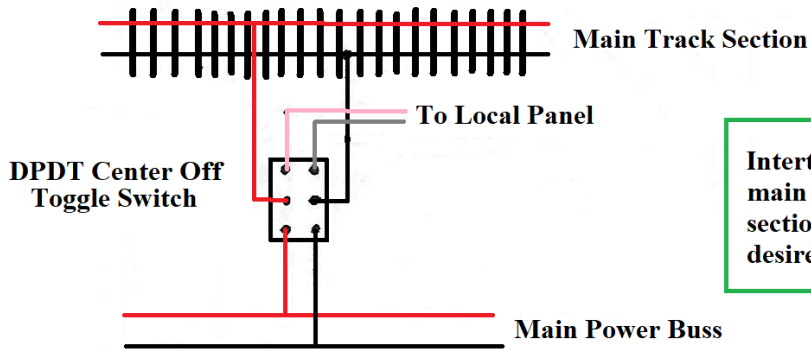
Female Plugs

- Red Wire
- Black Wire
- Yellow Wire
- White Wire
- Green Wire
- Blue Wire

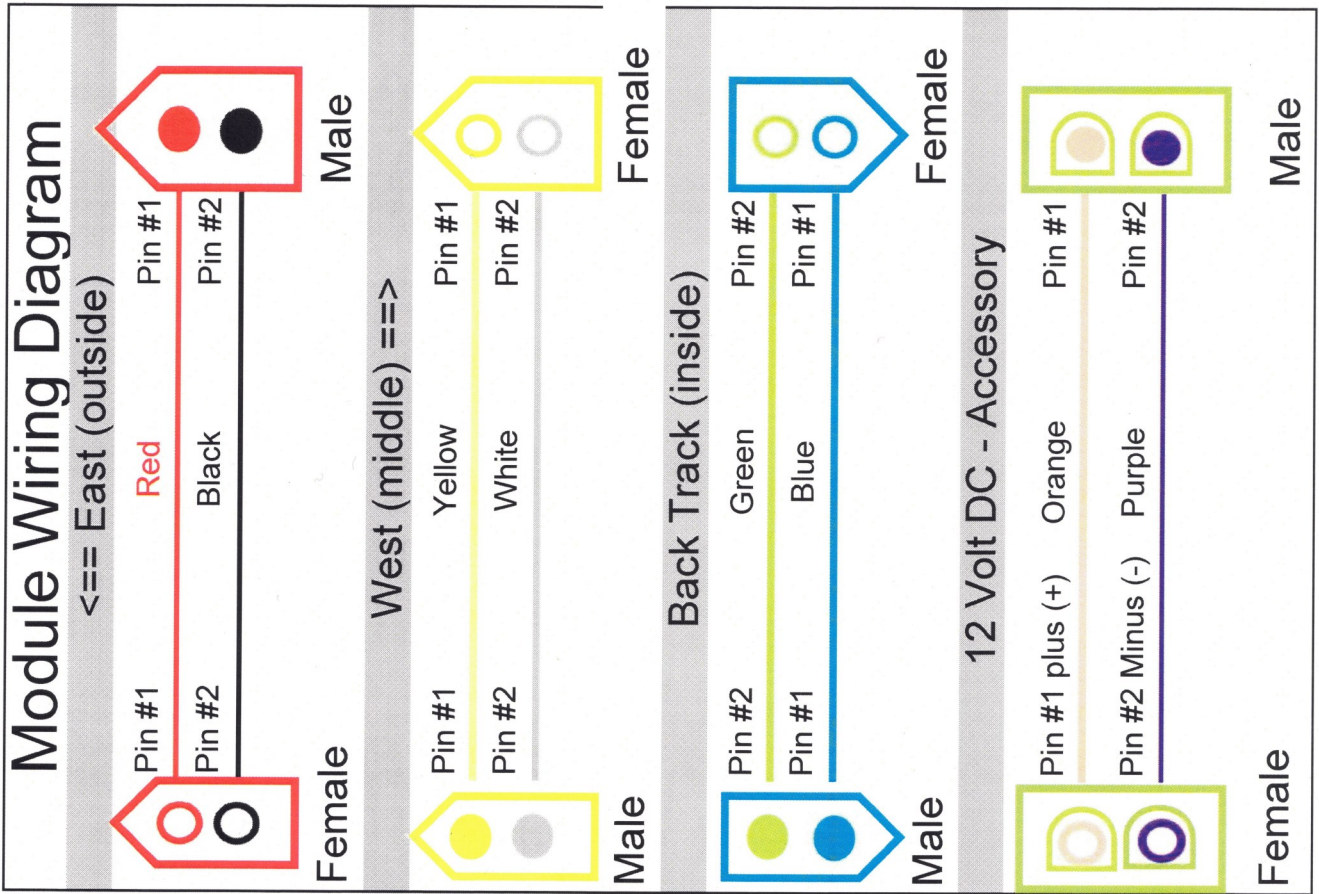
DC Brown  
DC Purple

Color of DC Wiring at the discretion of builder !

### Local Control Intertie to Main Bus



**Intertie shown is required in all main track feeders to main track sections to which local control is desired.**



Connector parts	
East, West, Back Track	
P/N: 0018121602	Female Socket Crimp
P/N: 03-12-1022	Plastic Connector for Female Socket
P/N: 0018122601	Male Pin Crimp
P/N: 03-12-2022	Plastic Connector for Male Pin

**NOTE: Orientation is module viewed from top.**

Connector parts - 12 VDC	
PN: 0002081002	Female Socket Crimp
P/N: 0050841020	Plastic Connector for Female Socket
P/N: 0002082004	Male Pin Crimp
P/N: 0050842020	Plastic Connector for Male Pin