HOTrack of the Sunrise Trail

TECHNICAL SPECIFICATIONS

for

HO Scale Module layout components

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HOTrack STANDARDS

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1. INTRODUCTION

Modular railroad construction is not a new idea, N-TRACK has been around for a long time (since 1973 when they first got together for a meeting in Signal Hill, California). With the publication of this specification HOTrack of the Sunrise Trail hopes to achieve a degree of standardization of the construction of modules in the New York, Long Island and adjacent areas.

HOTrack's modules are used to build large display layouts as well as home and club layouts. Modeler's from all over the world can build modules, bring them to a show, connect to the next module, and become part of a giant HO scale layout. To be sure each module fits the next one to it, a set of standards has been worked out. This standard is the result of experience gained from both HO and N scale modules. These specification conform to the proposed NMRA modular standards.

HOTrack of the Sunrise Trail (hereafter HOTrack) is an informal organization run by volunteers and amateurs. Our purpose and objective is to encourage model railroading in HO scale. In addition to this standard we help coordinate HOTrack layouts for public showings. HOTrack layouts combine the beautifully detailed modules with long trains running on the three main line tracks. A fourth track, the branch line, is used for picking up and setting out cars at the many industries along the way. You can be part of the scene by building a module. The length of the module you build will be part of your early planning. The 4' module will fit inside most cars and allow enough room for industrial and city scenes. The 6' module will fit inside most station wagons and is large enough to model many types of scenes. The big problem with the 8' module is transporting them. They must be protected from the wind and rain. This means a van or covered trailer. Several 4' modules can be combined to model a complex scene.

Since the modules are moved about, construction is different from home layouts. This manual is provided as a guide for the module builder and gives many ideas, but in general, remember that there will be great changes in humidity and temperature, as well as vibration. The framework should be assembled with glue and screws. Weight is a problem too, (you have to lift and move the module) so consider plastic foam mountains instead plaster. Structures should either be well glued in place or packed

separately. The key to good operation is good trackwork. One bad piece of mainline will ruin operations for everyone. The meet coordinator may order repairs or the module removed from the layout. Be sure to check your turnouts with the NMRA track gage for clearance and gauge. Be sure the points are free moving and the flangeways are clear of ballast. Gently blowing a single truck thorough your trackwork will show up any obstructions or tight spots.

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2. GENERAL INFORMATION

DEFINITION: HOTrack is a modular system of track and bench work constructed in HO scale (1:87), built to specific dimensions for height, width, length, main and branch line location, and inter-module wiring.

PURPOSE: To provide a means of common enjoyment for all concerned.

FORMAT: The HOTrack standard is composed of specifications that define those characteristics that must be uniform for each module and must be complied with by the module builder and comments, which are provide as a possible way to do something, but not the only way.

3. SPECIFICATIONS GENERAL:

The specifications for HOTrack modules are contained in this section. They are divided into the following parts;

3.1.BENCHWORK SPECIFICATION

3.2.TRACK PLAN SPECIFICATION

3.3.120 VOLT ELECTRICAL WIRING SPECIFICATION

3.4.TRACK WIRING ELECTRICAL SPECIFICATION

3.5.JOINING MODULE SECTIONS SPECIFICATIONS

3.6.MATERIALS REQUIRED

3.7.SPECIFICATION FIGURES

All directions are relative to the viewing edge of the module which is South. Things to the left are West, to the Right are East, and opposite the viewing edge (the skyboard) is North.

All information presented in this section is a requirement and must be complied with unless preceded by :COMMENT. The comments have been included to assist the user and are not part of the specifications.

3.1. BENCHWORK SPECIFICATIONS:

LENGTH:

1: Minimum length is 24", with 24" incremental increases permitted. See figure 1.

2: COMMENT - There is no maximum, however the 48" length module is the most common and is preferred. Any module over 96" becomes next to impossible to transport and should be built in two or more 48" sections. The interface between sections of a group of modules may be nonstandard at the modeler's option but, the interface ends of the complete module group must comply with these specifications.

WIDTH:

1: A standard width of 24" establishes the viewing and rear edges of the module. Front and/or rear extensions of up to a maximum of 6" beyond the standard width are permitted, however the total maximum width of the module shall not exceed 30". All extensions to the front must be brought forward at an angle of no more than 45 degrees from the front edge of the module, rear extensions will come straight back. See figure 1.

2:COMMENT - The additional width is permitted to provide for additional local trackage and/or structures at the builders option. Transportation requirements and moving a wider module become more demanding.

HEIGHT:

1: The distance from the top of the mainline rail heads to the floor shall be 40", adjustable +/- 1.5". See figure 2.

2:COMMENT - The adjustment is required to compensate for uneven floors. The leg length from rail head to leg bottom with out the adjustment screw should be 38 1/2".

FRAME:

1: The minimum size lumber used should be 1" x 4" for a 48" long module. The use of 1" x 6" lumber is recommended for modules over 48" long. All corners shall be made 90 degrees and square. Clamp cutouts must be provided for clamping when lumber larger than 4" is used to maintain a 4" deep clamping interface. Modules must be ruggedly constructed to maintain the required square, flatness and dimensional stability. See figures 1, 2, and 3 for details on the standard module and figures 4, 5, and 9 for corner module details.

2:COMMENT -The corners and joints should be well braced and at the least, glued and screwed. It may be either of table top or open grid construction. If open grid is used, 1" (nominal) thick lumber should be used for the sub roadbed of the main lines. It is recommended that the front, rear, and side panels as well as the internal bracing be made of kiln dried wood. For table top construction, the top should be make with 1/4" plywood minimum, and 3/8" or thicker plywood should be used for modules over 48" long. A lighter weight module results when the table top is made by using a 1" x 6" (for two track main, increase 2" for each siding added) sub roadbed and foam plastic board for the scenic area base.

LEGS:

1: The legs will be constructed of 2x2 " kiln dried clear wood or of a suitable material of a suitable size,. The module legs must be equipped to provide for a minimum of plus or minus 1.5" of adjustment, three inches overall. See figure 2.

2:COMMENT - They may be constructed to be removable or fold up inside the module frame for storage. All bolts used to hold the legs should be flush with the surface of the frame. T-nuts & 3/8" x 4" full thread bolts work well.

COLOR:

1: Paint all of the above benchwork parts Sico Velvet Latex Brown (#2120-53) or equal.

BACKDROP:

1: Must be 14" above the top of the module surface (rail head) and extend along the entire rear edge of the module. Scenery wings are to be placed along the interface edges of the module to visually isolate the scene of one module from that of another except where the scene is continued in a module group. The scenery wings extend forward at the full height of the backdrop to a point 14" maximum from the front of the module and then slope downward to track level at a point 12.75" from the front edge of the module. See figure 2. Paint the rear of the backdrop and the side braces Sico Velvet Latex Brown (# 2120-53) or equal. Paint the skyboard surface Sico Velvet Blue (# 2038-61) or equal.

2:COMMENT -1/4" plywood works well for the backdrop while 3/8" plywood can be used for the scenery wings. The backdrop may be made removable at the builder's option for transportation.

CLAMPS:

1: The modules are held together at each interface with two three inch opening "C" clamps with a minimum of a 2-1/2" deep throats. These clamps will be provided by the module owner. See figure 8.

2:COMMENT -Space needs to be reserved under the module for the clamps. Room for the clamp jaws as well as room for hand tightening of the clamps should be provided for. If interface ends are greater than 4", then cutouts must be provided for the clamps so they will be able to reach a 4" deep interface.

PROTECTION:

1: A lexan or Plexiglas shield must be provided that extends along the entire front surface of the module. The top of the shield should be 10" above the top of the rails. The front of each module should be skirted with brown fabric suspended from the front of the module. See figure 3.

2:COMMENT - A 12" wide piece of shield is used and may be mounted using four screws into the front edge of the module, or any other suitable mounting method. The plastic shield will allow the module to be viewed while protecting the scenery and operating equipment from the wandering hands of the public. The skirt material serves to hide the legs and anything that might be stored underneath the module during a show.

3.2. TRACK PLAN SPECIFICATION:

1: A module shall consist of three main line tracks; identified as the RED, YELLOW and GREEN tracks the centerlines of which are located at 3", 5" & 7", respectively, from the front face of the module; and may have an additional branch line track, identified as the BLUE track and located at 9". The branch line may be run thorough or be switched from the mains as desired. See LOCAL TRACKAGE below. Each of the main line tracks and those branch line tracks that continue past a module inter-face shall terminate three (3) inches from the interface end of the module and the roadbed shall continue to the interface edge of the module. See figure 8.

2:The main line track centers are spaced two (2) inches apart from the outside main line which is located three (3) inches from the viewing edge of the module (see figure 3). If local tracks are used and they cross a module interface, special wiring considerations are required. (See section 3.7. for additional information). Roadbed is required for the three main lines and the branch line. Use of cork or other firm roadbed material is required. Use of soft roadbed (foam or other pliable materials) is not permitted.

2:COMMENT - When two modules are joined together, the resulting six (6) inch gap in the track is filled with a six (6) inch piece of snap track. See figure 8 and section C.

LOCAL TRACKAGE:

1: Additional local trackage may be added to the module at the builders discretion. If local trackage is a part of the module it must be switched from the branch (BLUE) line. All local trackage must be COMPLETELY isolated from the main and branch lines and under the control of a local throttle and power source. Local trackage MUST NOT feed power into the branch or main line trackage.

Local trackage configuration is left to the modeler's discretion. The only requirement being that all local trackage be totally gapped and electrically isolated from the branch line to which it makes its connection. (See paragraph 3.2.1).

TRACK REQUIREMENTS:

A) RAIL: All rail used on main and branch lines shall be nickel-silver code 100 to permit operation of oversized wheel flanges. Track may be hand-laid or flex.

B) RADIUS: Minimum radius is thirty six (36) inches except on the branch (BLUE) on a corner module where it may be thirty four (34) inches. See figure 4 for outside corner details, and figure 5 for inside corner details.

C) TURNOUTS: All crossover turnouts shall have a frog angle equal to or greater than a number six. Branch line turnouts shall have a frog angle equal or greater than a number four. All main and branch line turnouts shall have metal frogs (plastic will wear down with the heavy use). All turnouts used on the main and branch lines shall permit operation with oversize wheel flanges such as A.H.M., etc.

D) TRACK GRADE: The main and branch lines shall be flat (no grade). Local line grade is left to the modeler's discretion.

E) UNCOUPLING MAGNETS: Permanent magnets (buried or top mounted) are not permitted on the main or branch lines. Electromagnetic uncouplers are permitted at any position on the mains, branch lines, or local tracks, provided they are positively controlled and cause no problems.

F) All trackwork on the modules MUST comply with NMRA Standards.

3.3. 120 VOLT ELECTRICAL WIRING SPECIFICATIONS:

1: Each module shall be equipped with a UL approved prewired outlet strip with a minimum of four outlets and a cord at least two feet longer than the length of the module. Mount the outlets within 6" of the West interface of the module and fasten the cord along the rear of the module so that 24" or more of the plug and cord extend past the East interface of the module. The electrical system is designed so that 120 volt electrical power is available on all modules and is continuous throughout the modular layout.

CAUTION: IF NOT FAMILIAR WITH 120 VOLT WIRING REQUIREMENTS, SEEK COMPETENT HELP - 120 VOLTS IS LETHAL.

2:COMMENT - Conformance to code is required because modules may be subjected to local fire inspection and rejection prior to a public show.

3.4.TRACK WIRING ELECTRICAL SPECIFICATION:

PLEASE NOTE: THESE INSTRUCTIONS APPLY TO EACH TRACK ON THE MODULE THAT CROSSES AN INTERFACE.

1: The main lines and the branch line, if it exists, are each wired as isolated blocks, and are not electrically interconnected by wiring or by rail. (There is no common return or common rail.)

2: a) Track power is carried under the modules by feed-lines using 18 gauge or heavier two conductor wire for each track. The feed-lines shall be identified by color: (from the front of the module): #1 RED, #2 YELLOW, #3 GREEN, #4 BLUE. Feed-lines shall be firmly attached to the front half of the underside of the module and shall terminate not less than 12" past the East interface of the module in a 2 pin male connector, and at/or 6" past the West interface of the module in a 2 pin female connector.

NOTE: the male ends of the track power connectors and the 110 Volt Power strip are both at the same, East, end of the module

COMMENT: The use of zip-cord is suggested for the track power wiring below the module. Connect the ribbed conductor to the wide blade (pin 1) of the connector. Radio Shack # 278-1430 or equal can be used for the 18 gage zip-cord

b) Power from the feedlines shall be brought up to the track by 20 gage minimum wire leads soldered to the outside of the rails.
COMMENT: "Solder terminal Strips" make an easy to trouble shoot connection point. Use as many power feeds per track as needed to supply adequate power to the rails for its entire length.

3) DC Power is carried under the module by a single two conductor wire. This wire shall be 16 gauge or heavier. This wire shall be identified by the color WHITE. It shall be firmly attached to the rear of the underside of the module and shall terminate not less than 12" past the East interface of the module in a 2 pin male connector, and at/or 6" past the West interface of the module in a 2 pin female connector.

COMMENT: The use of zip-cord is suggested for the track power wiring below the module. Connect the ribbed conductor to the wide blade (pin 1) of the connector. Radio Shack # 278-1440 or equal

can be used for the 16 gage zip-cord.
COMMENT: The DC Power Wire runs straight thru the module without being connected to the tracks or to any thing else.

4: All electrical connections shall be soldered and/or taped or otherwise insulated.

5: The connectors shall be TRW-Cinch part numbers P-302-CCT for the male cable connector and part number S-302-CCT for the female cable connector or S-302-AB for the surface mounted female connector. The connectors will have the wide blade (pin 1) connected to the South (outside) rail and the narrow blade (pin 2) connected to the North (inside) rail. The DC power supply wiring line (WHITE), the # 1 pin (wide) is +DC.

COMMENT: The male cable connector is available as Radio Shack part number 274-201 and the female cable connector is available as Radio Shack part number is 274-202. The surface mounted female connector is not presently a Radio Shack item but can be found in some electronic parts supply houses.

6: Track power connectors shall be marked (paint or colored tape) with color coding as follows: #1 main track RED, #2 main track YELLOW, #3 main track GREEN, #4 branch track BLUE, DC Power connectors WHITE.

7: No section of main line or passing track shall depend on power being fed from the adjacent module thru the Module Joiner Track.

8: Since a single large power supply is used with many throttles on a large layout, the tracks must not have any common connection. Gaps must be used on both rails on any crossover tracks. If the tracks are part of a yard, it must be possible to isolate them electrically.

9: Powering of local tracks, switch machines, building lights, etc. is the responsibility of the individual builder and shall be separate from circuits which interface with other modules in a layout.

COMMENT: The local tracks on your module that run into the branch line track can be powered several different ways. If you have only a siding or two and don't plan more than pick up and set out of cars, then just an on-off switch between your track and the branch line power is all that is needed. See figure 11b. This way locomotives can be parked on your tracks by turning the switch off. If you plan on more in the way of switching, then so you do

not to tie up the branch line throttle, you should provide your own throttle and connect it in with a DPDT switch, (figure 11c). This would be "Two Cab" wiring with the branch (BLUE) line as one cab and your throttle as the other. A control panel for your module should use the same color code for mainline and branch line tracks as the connectors. During a show others may need to operate your module and the controls should be easy to use and clearly marked. Even without your guidance, another operator should be able to work the turnouts and power the tracks with a minimum of confusion. An HOTrack layout is a joint venture, and everyone should be able to operate all parts of it. Complicated momentum throttles can cause much confusion for first time users and are better saved for the home layout.

3.5: LAYOUT ELECTRICAL COORDINATION

1: For small HOTrack layouts, each main can be powered by a single throttle controlling a single train per loop. With layouts over 48' long the three tracks can be broken into four or more "electrical blocks" each and more trains can be run. Modular layouts may be easily divided into control blocks for multi train operations. Blocks will normally be used to control trains on your own module or group of modules. To insert a block unplug the connectors at each end of the block for that track and install a throttle in the block. You will need two blocks per train for good control (each block will require a throttle and a six (6) inch piece of snap track. See figure 8). Single block loops can be powered by regular power packs fitted with cinch two pin "Y" connectors (figure 11d). In the larger layouts, electrical blocks are formed by using isolated track joiners & connecting tracks (figure 8) and not plugging in the track connectors at the block boundaries. Each loop can be divided into several blocks, each with its own throttle. The HOTrack throttles are powered by a high amperage DC power supply fed thru the WHITE coded cable connectors. Use a "Y" type cable made with both a male and a female connector wired to the throttle input and output (figure 11a). The throttle connectors may be placed at any convenient point within its block. The "Y" connectors are connected between any two module connectors and then send power in both directions to the block boundary.

3.6. JOINING MODULE SECTIONS SPECIFICATION:

1: Each module is joined mechanically at the interface by two "C" clamps that are provided by the module owner. The modules are joined electrically by connecting the track connectors together and plugging the 120 volt plug into one of the outlets of the adjacent module. The tracks are joined by a six (6) inch piece of nickel/silver snap track (module joiner track) (Atlas or equal) to form a connection to the adjoining module tracks. See section C below. Each track that crosses a module interface shall;

A) Have the ties firmly secured to the roadbed as close to the interface joint as possible, but not more than three ties from the end.

B) Have the ties prepared so that nickel/silver rail joiners can be slipped back onto the rail their full length (cutting away the cast spikes and tie plates on two ties will do this).

COMMENT: This will allow the snap track sections to be dropped straight down into place after the module frames have been clamped together. Rail joiners should be slid back on the track sections before the modules are disassembled to reduce the risk of damage to module or joining tracks.

C) The module joiner track is a 6" section of snap track.

D) Block boundaries are joined with a six (6) inch section of snap track that has insulated rail joiners at one end. No air gaps are allowed.

COMMENT: The track on each module is electrically isolated from the other except when the track power cords are connected. This allows ease in breaking the layout into control blocks and the quick location of shorts, should they occur. Track is not used to feed the electric supply from one module to the other thus allowing the use of insulated joiners.

4.1. TYPES OF MODULES:

STRAIGHT MODULE: The construction of a straight module is fully detailed in the specifications section on benchwork (see section 3). These module provide for the maximum scenery expression and provide interesting opportunity for modeling.

CORNER MODULE: The corner modules are specific as to their dimensions. The framing techniques and materials are similar to those previously described in the section regarding benchwork (see section 3). The corner modules are designed to allow a 40" radius on the east bound siding, a 38" radius on the east bound main, a 36" radius on the west bound main, and a 34" radius on the west bound siding. Corner modules are 48" x 48" less the front and rear cut-off. See figure 4 and figure 5.

The construction of an "inside corner" module can add an interesting effect to an otherwise basic oval layout. The specifications and dimensions for it can be found in figure 5. NOTE: The straight sections of track must be provided at each end of all corner modules.

CROSSOVER MODULE: The construction of a crossover module (straight) allows for the exchange of trains between the tracks. All turnouts should have a frog angle equal or greater than a number six. The framing of this module is essentially the same as any straight module. Track work must be electrically isolated to prevent shorting as the turnouts are thrown. Use insulated rail joiners on all rails between lines. See figure 6.

BRIDGE MODULE: Often during shows not enough modules are available of the proper length to complete a closed oval layout. In this case, "bridge" modules serve to fill the gaps left when an odd number of modules arrive for a show. These modules are restricted in size to allow only enough width to accommodate the four tracks. These modules have no legs and are supported entirely by "C" clamps to the adjacent module. See figure 7. In addition, these modules do not have to have backdrops or skirts.

Bridge modules are wired the same as in a full size module. See section 3.3. 120 VOLT ELECTRICAL WIRING SPECIFICATION and section 3.4.TRACK WIRING ELECTRICAL SPECIFICATIONS.

COMMENT: Bridge modules serve as "duck under" points where club members can enter and exit the enclosed layout without disturbing

any of the equipment or materials that are usually stored under the modules.

With the addition of some electrical switches, the bridge module can also be used to control the spacing of trains when more than one train is operated on each line without blocks.

YARD MODULE: The design of yards is not controlled but the module interface portion must meet standard module requirements. Yard Modules do not have to have backdrops to allow for easy access to the yard tracks to remove and add trains.

3.7.SPECIFICATION FIGURES

Figure 11a HOTrack TYPE THROTTLE

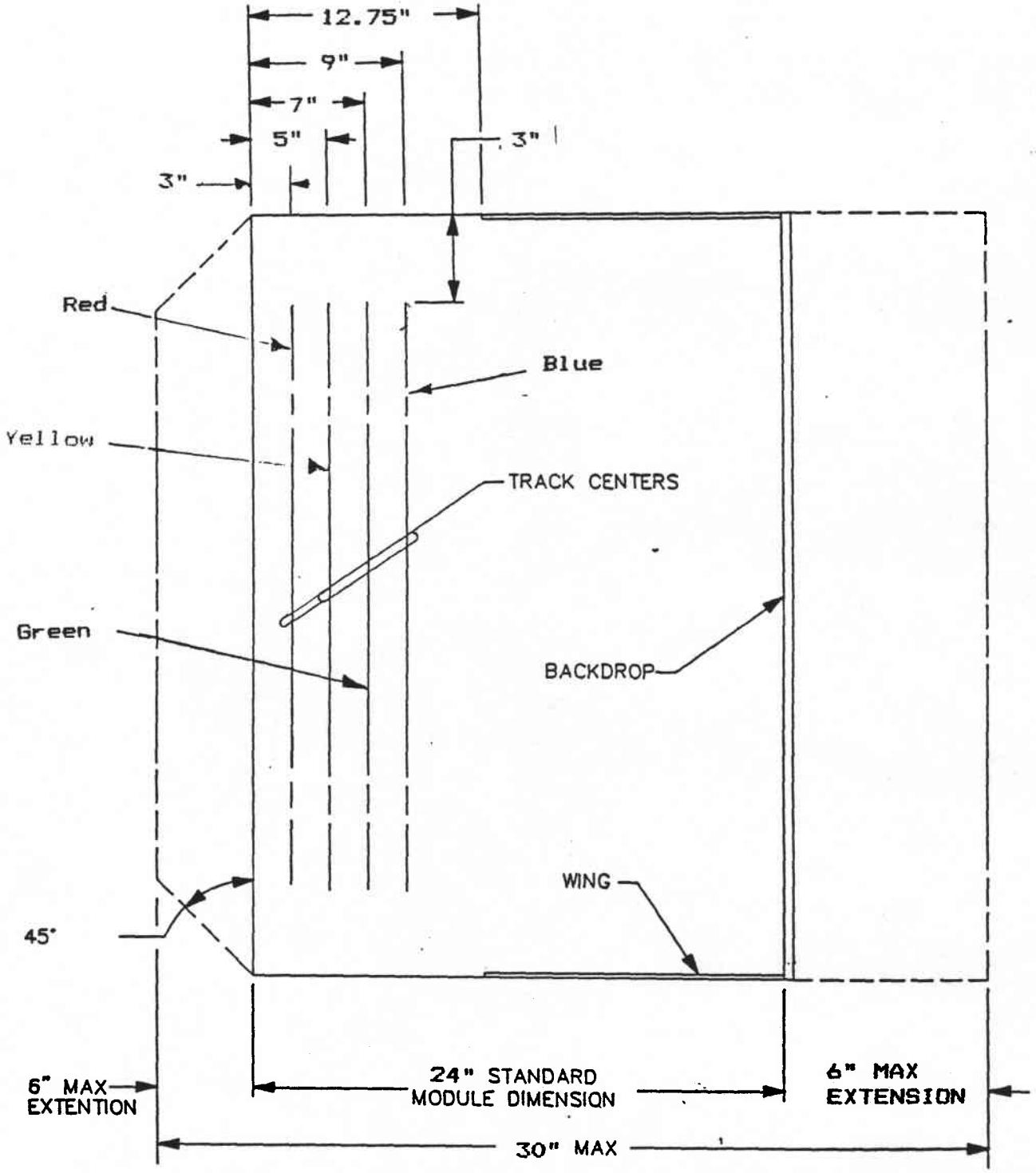
Figure 11b SIMPLE ON-OFF SIDING CONTROL

Figure 11c TWO CAB TYPE CONTROL

Figure 11d STANDARD POWER PACK WIRING

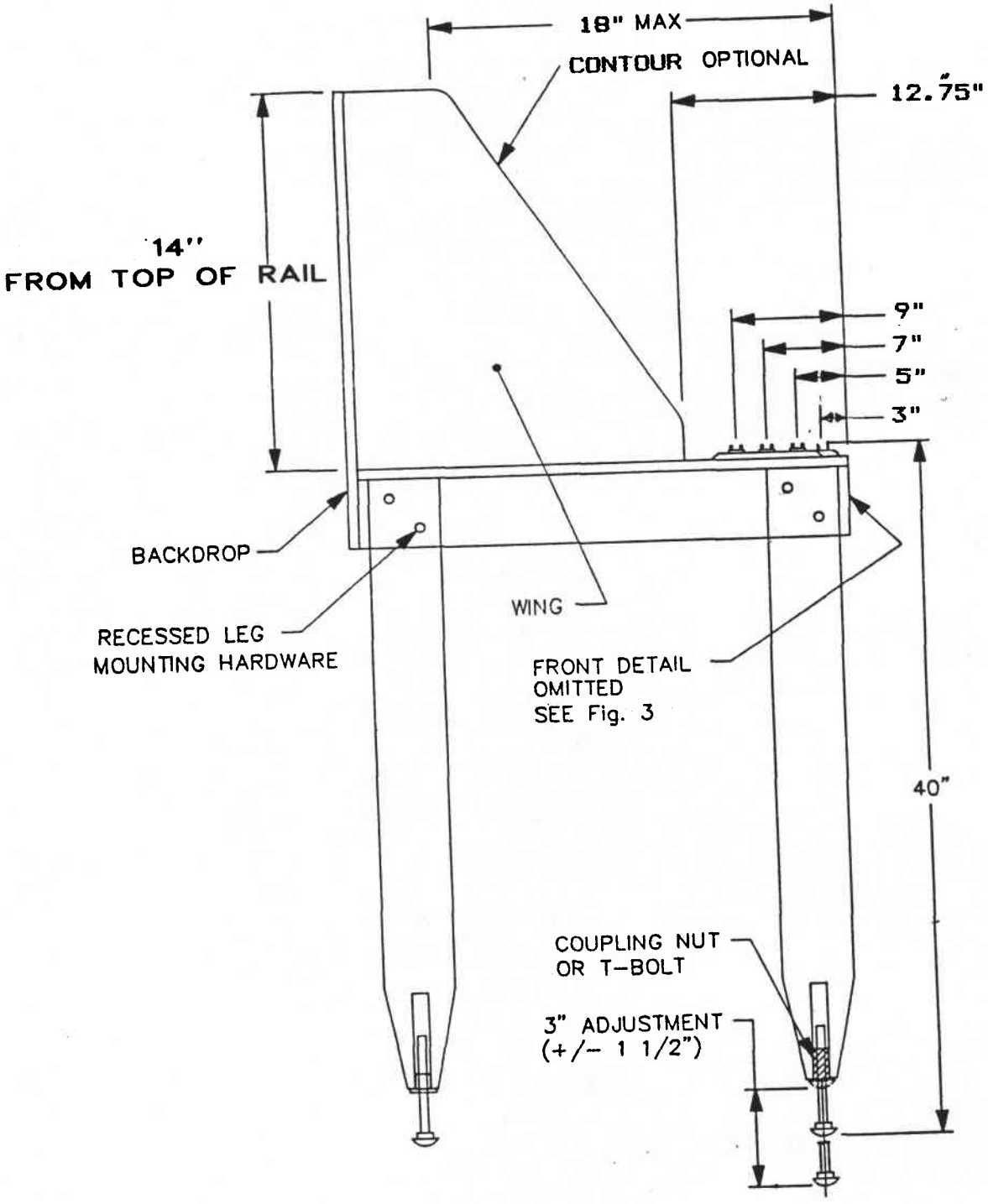
STANDARD MODULE PLAN

FIGURE 1



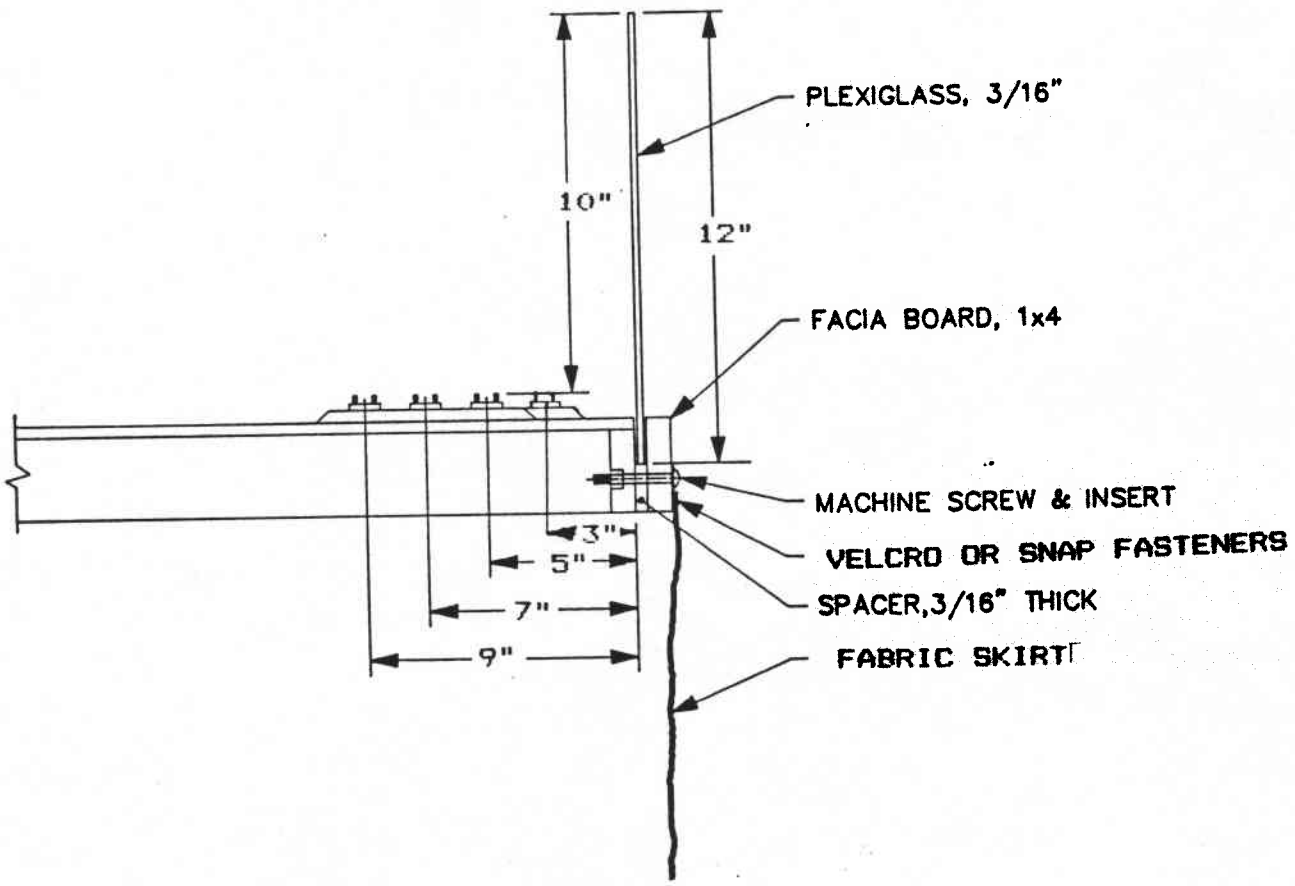
MODULE END VIEW

FIGURE 2



FROUNT OF MODULE DETAIL

FIGURE 3



OUTSIDE CORNER MODULE PLAN

FIGURE 4