**CMRA**

**Greater Cincinnati Modular Railroad Association**

www.cincygcmra.org

Email: president@cincygcmra.org

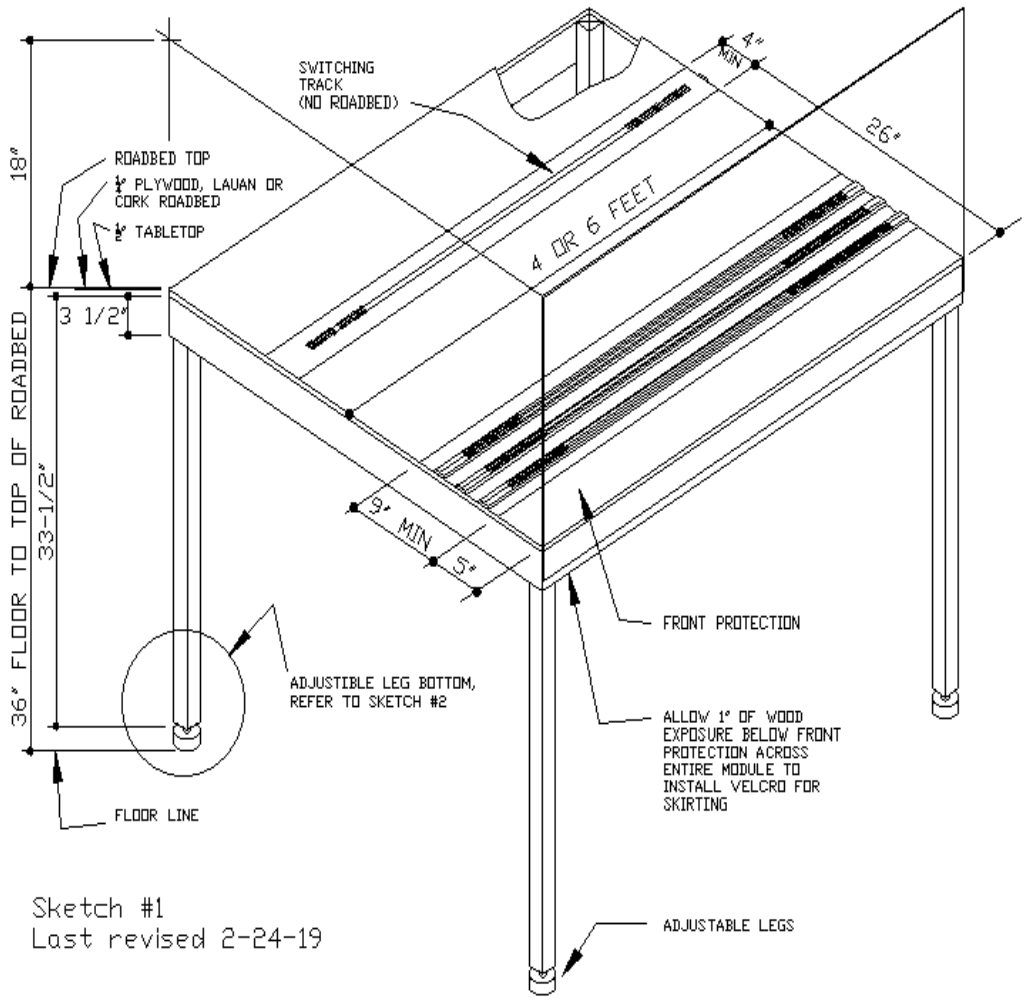
# GCMRA CONSTRUCTION SPECIFICATIONS AND GUIDELINES

## NOTE: INSTALLATION OF THE SWITCHING TRACK ON THE MODULE IS OPTIONAL BUT ENCOURAGED

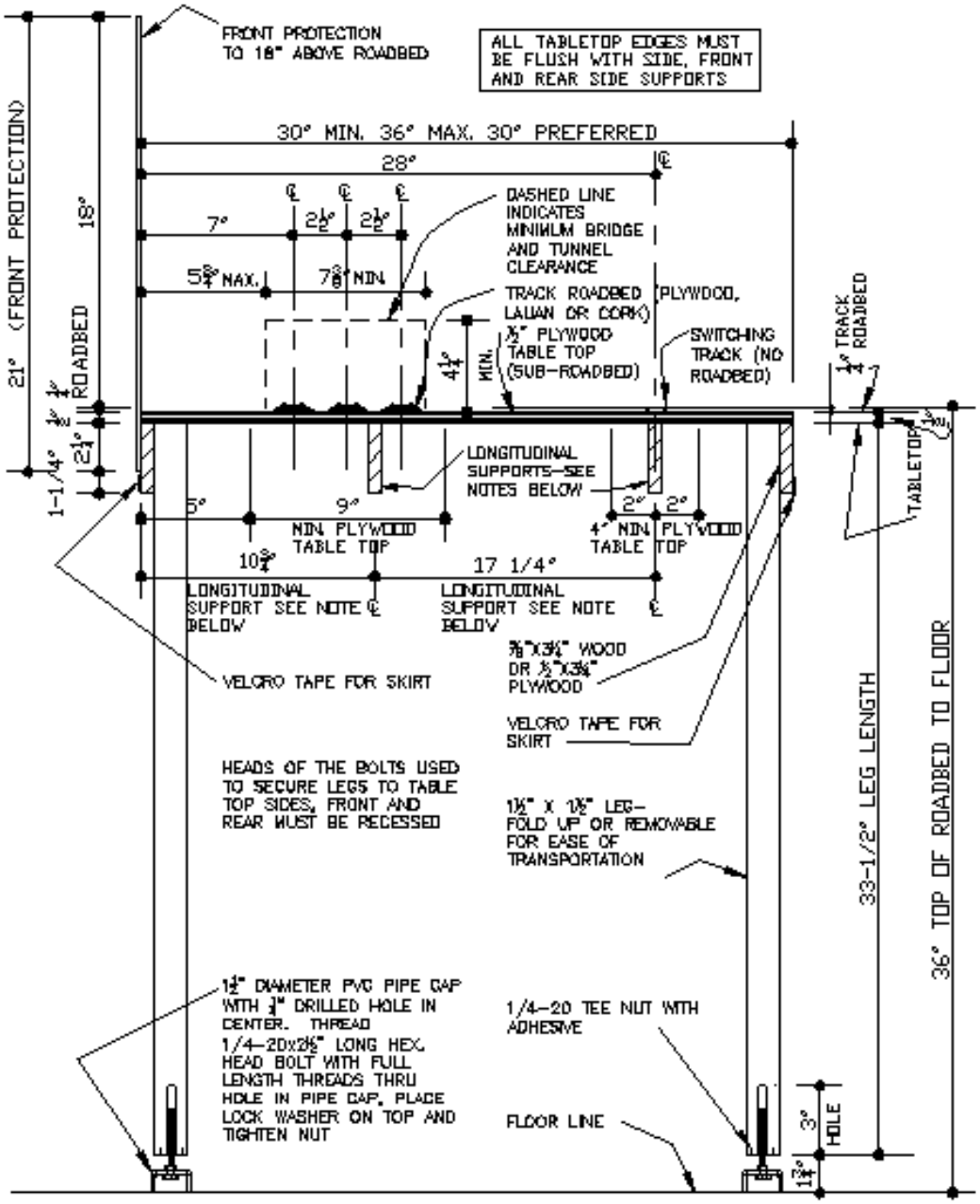
## PLEASE CONSULT WITH A MEMBER OF THE CLUB BEFORE STARTING CONSTRUCTION OF YOUR MODULE

### Modular Table Construction – Refer to Sketch #1 and #2

The table length must measure 4 ft. or 6 ft. in length. The minimum depth, front to back, is 30", maximum depth is 36 inches with a **preferred** depth of 30 inches. Table sides and ends are to be nominal 1 x 4's (actual 5/8"x 3¼'' +/-) wood boards or ½" x 3¼" plywood to allow for clamping of modules together. Two longitudinal supports to prevent tabletop sagging are required beneath the ½" plywood tabletop (sub roadbed). This brace is to be of the same material and size as the table ends and front. The table height from the floor to the top of track **roadbed** is 36". The legs are 33½", to be adjustable plus or minus ¾", by using a 2½" x ¼ - 20 full threaded bolt attached to a 1-½" PVC pipe cap to compensate for uneven floors encountered at shows. The main line tabletop (sub roadbed) should be ½" thick plywood, minimum of 9" wide at the main tracks and 4" wide at the switching track times the length of the table. The remainder of the tabletop material is your choice although many members use additional plywood for modular rigidity. The final track roadbed that is fastened to the tabletop (sub roadbed) is to be ¼" thick plywood, ¼" thick (actually approximately 3/16" thick) Lauan plywood, or commercial cork roadbed. The ¼" plywood or Lauan is to be cut the entire length on a 45-degree angle or slope (a jig saw is a good tool to use) to assist in creating a realistic roadbed profile. Note that roadbed is **not** installed under the switching track. (Instructions continue following Sketch #2)




Sketch #1
Last revised 2-24-19




NOTES TO SKETCH

A. THE LONGITUDINAL SUPPORT LOCATED AT 28" FROM FRONT OF MODULE IS NOT REQUIRED ON A 30" MODULE.

B. ALSO, THIS LONGITUDINAL SUPPORT IS NOT REQUIRED, BUT IS ENCOURAGED, IF A SWITCHING TRACK IS NOT INSTALLED ON A 36' DEEP MODULE.

SKETCH #2 Last Revised 2-24-19

**Module assembly tip** - Modular tables take a beating traveling between home and shows. For rugged assembly construction use wood glue and 1½" long drywall screws into pilot holes. Build your modular table as lightweight as possible for ease of transporting.

**Finishing touches** - Paint the front, sides, and back of your module and legs using "Behr Paint" Midnight Dream # 570F-7 Semi-Gloss Sheen, available at Home Depot. Frequently, a club member will have excess paint available which can be shared. Inquire to a member listed on the last page of these specifications.

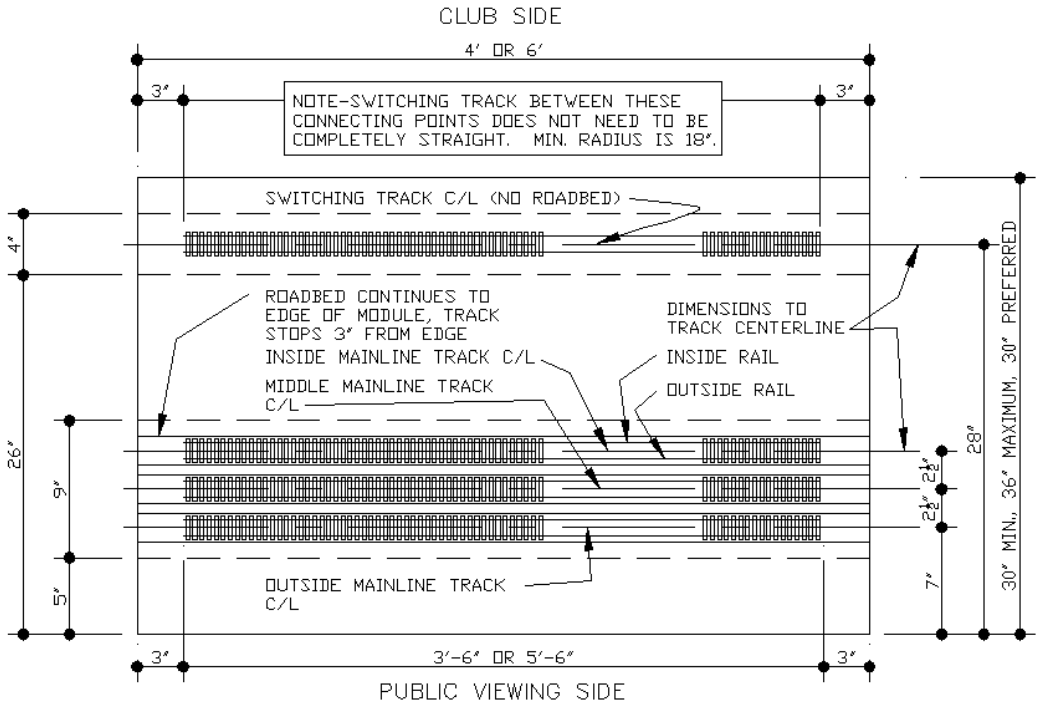
## Track Laying and Turnout Specifications – Refer to Sketch #3

A flat roadbed is required and obtained with vertical wood support braces placed beneath the ½" plywood tabletop (sub roadbed). These supports are the longitudinal supports noted in the "Modular Table Construction" section and Sketch #2 and are at 10¾" and 28" from the front (public viewing side) of the module. From the front (public viewing side) edge of the table to the centerline of the outside mainline track is **7"**. The middle mainline track centerline is **9½"** from the module front. The inside mainline track centerline is **12"** from the module front. Tracks therefore are on 2½" centers. An additional track, the switching track, is to be installed at a centerline 28" from the module front. Use these dimensions to draw straight parallel track centerlines the full length of the track roadbed and extend this centerline to the edge of the module. Commercially available **Code 100-nickel silver, plastic tie, flex-track is required.** "Atlas" brand track is the most rugged and is recommended. Place a straight edge (metal yardstick works great) against one edge of the track while nailing it down. Sight down the length of the track to eliminate any zigzags. Trains run trouble free on straight, level track. Take the time to do it correctly! Hand laid track is **not** acceptable. **Track length begins exactly 3"** from each end of the module table. Please get this dimension precise. At the train shows, a 6" commercial rigid track section is installed on each end (3" which is on your module and 3" which is on your neighbor's module) to connect all mainline tracks. Fine gravel ballast is required, and gravel ballast is prohibited above the top of the track ties as it can derail some cars and engines. No ballast is permitted where the connector tracks between modules are installed.

**No turnouts are allowed on any of the mainline tracks.**

Turnout(s) along the "Switching Track" are permitted. If turnouts from the switching track are used, Peco brand turnouts are encouraged, but not mandatory. All turnouts must have a manual ground throw attached.

If your module scene depicts a vehicle grade crossing over the 3 mainline tracks, **you must install "Atlas" brand code 100 nickel silver rerailers** where the simulated road is located.




SKETCH #3 LAST REVISED 2-24-19 NOTE SWITCHING TRACK IS OPTIONAL

## Your Scene

Your scene need not be typical of a real railroad, town or countryside. Many of the modules in our layout have scenes not true to life. However, we encourqge details be added to your scene. Visitors are fascinated by detail and motion and linger at modules that contain substantial detail such as vegetation, people, animals, structures, animation etc. What you model is up to you. Any member can assist you with the decision. Just ask.

## Front Protection Required. Refer to Sketch #1 and #2

Visiting adults and children can become so excited at what they see that they lean the over module to point out some feature. Their body or loose apparel can damage trains, buildings and scenery. Railroad cars, autos, and other items can "vanish" from modules without protection. Flexible clear plastic protection running the full length of your module is inexpensive insurance. The top of the protection should be 18" above the **roadbed** and be 3/16" thick Plexiglas so it will stand alone without supports when fastened to the front edge of the module. (The Plexiglas must be 18" above the front of the module). Leave 1" at the bottom of the front edge of the module so Velcro and skirting can be attached. An acceptable alternative to Plexiglas is 1/8" "Lexan". Pre-drill mounting holes in

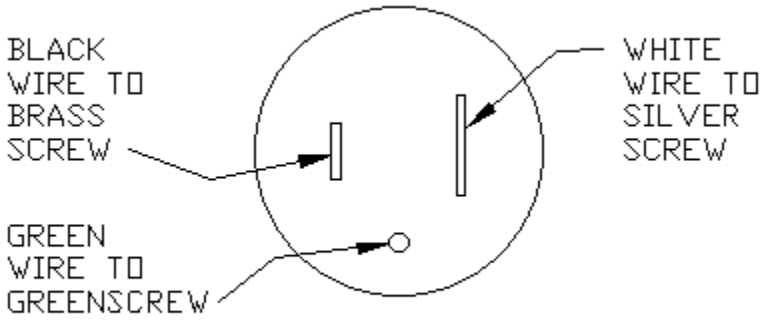
your ”glass” and use finish or fender washers with your bolts to secure to the module.

## Electrical Wiring - Refer to Sketch #5

Two electrical systems are required, a 115-120 Volt AC system and a 12 Volt DC system. As a club, we realize that the installation of the electrical systems is meticulous and detail orientated and, at times, does appear to be confusing. Likewise, as a club, we do not want you to become discouraged with this section or any section of these instructions. We encourage interested new members to contact any person on the last page if you believe you need assistance with the wiring or if you have any questions about any section of these instructions.

The first electrical system, the 115-120 Volt AC system carries power from module to module to provide electricity to modules that uses a power pack to operate lights, accessories etc. or any other accessory requiring AC power. If need power on your module, then install a 115-120 Volt AC outlet box on the inside of the back of the module. If you do not foresee the need for power on your module, then you will need to install a pass-through cord (extension cable). Both of the above options require that the male plug extends beyond the left end and female socket extends beyond the right end beneath your module. (See Sketch#5) This cord must be **14** or **16**-gauge copper **grounded** (3-wire cord) and it must extend a minimum of 12” beyond each end of the module. It is permanently mounted under the module along the rear edge with plug and socket ends hanging down to connect to the adjoining modules. Home Depot, Lowe's or most hardware stores stock the above electrical components.

To maintain polarity on the 115-120 Volt AC system, the following wire colors for the plug and socket screw terminals should be adhered to. See sketch 4A




SKETCH #4A

The second electrical system referenced above carries 12-Volt DC power to the track from beneath the module. The 12-Volt DC wire also carries the Digital Command Control (DCC) system.

The Club has available for purchase, **at the Club's cost and for your convenience**, a complete "**Wiring Kit**" (Items a-e). Also available is a **"Wiring Kit**" packaged just for the switching track. Just provide the length of your module and the necessary items will be provided.

a. Two (2) 4 position terminal blocks and Two (2) 2 position terminal blocks.
b. Six (6) lengths of 14-gauge **COPPER STRANDED color-coded** bus wire long enough to go between the terminal blocks.
c. The proper size wire terminals to attach the bus wires to the terminal blocks.
d. Sixteen (16) lengths of 20-gauge **SOLID WIRE** for the drop wires from the track rails to the terminal block. (Track Feeder Wires)
e. Two (2) sets of pigtails with colored-coded 16ga wire and matching Power Pole connectors. These are installed on each end of the module on the terminal blocks, matching color with the bus wires.

**Wiring Note:** We have standardized on a (6) color wiring system to aid in trouble shooting electrical problems.

**Lamp cord or any other wiring is not allowed for either electrical requirements.**

Recently the Club has made a decision to replace the Jones Plugs with a new type connector. As of 2022 we are now using Anderson Power Poles for the connection between modules. These connectors are color-codes to match the wiring on the module. This allows us to trouble shoot problems at shows and make corrections in a more timely manner. (See Sketch #5)

The optional switching track wires use connectors from Radio Shack. The outside or public side rail of the track is attached to the pointed side or end of the plug with a white colored wire. The black wire is attached to the other side of the plug. Remove the tabs as illustrated in the sketch 4B that follows.

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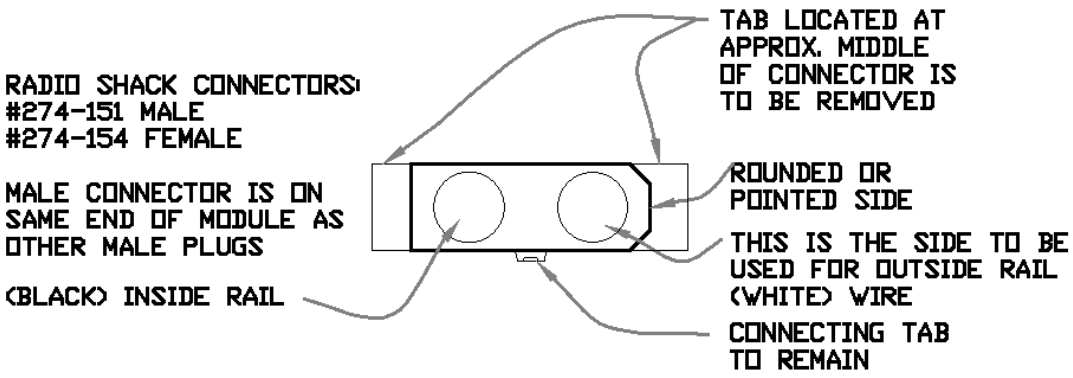



SKETCH #4B

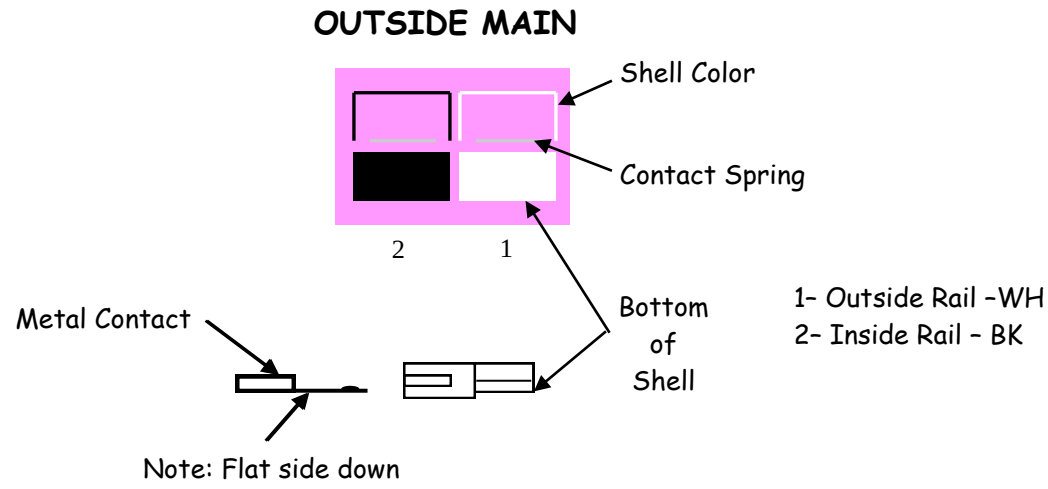
Remember that wire should be 14 or 16 gauge with ground (3-wire cord) for the 115-120 Volt AC System. The 12-Volt DC System should be 14 gauge stranded color-coded bus wire, 16-gauge stranded color coded wire for the Power Pole ends and 20 gauge solid wire for the track feeders to the terminal blocks.

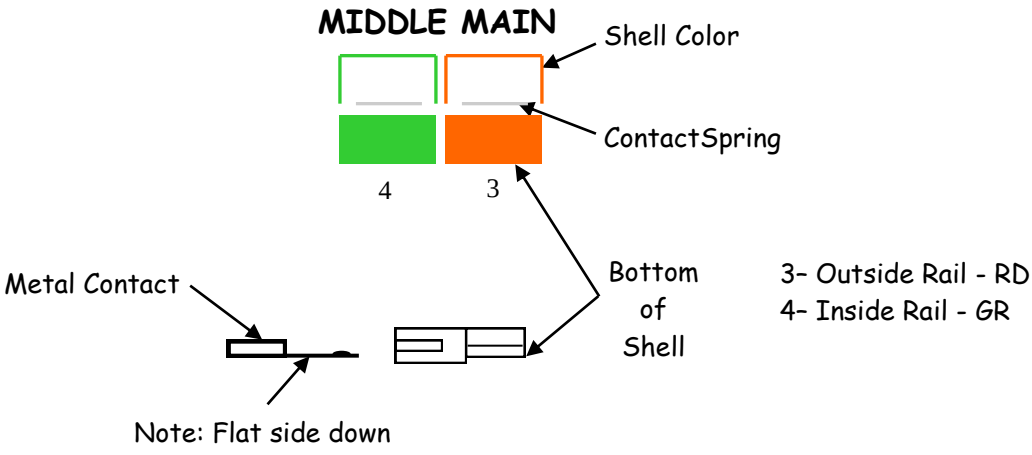
Install the terminal blocks underneath each end of the module for the 12 Volt DC system bus.

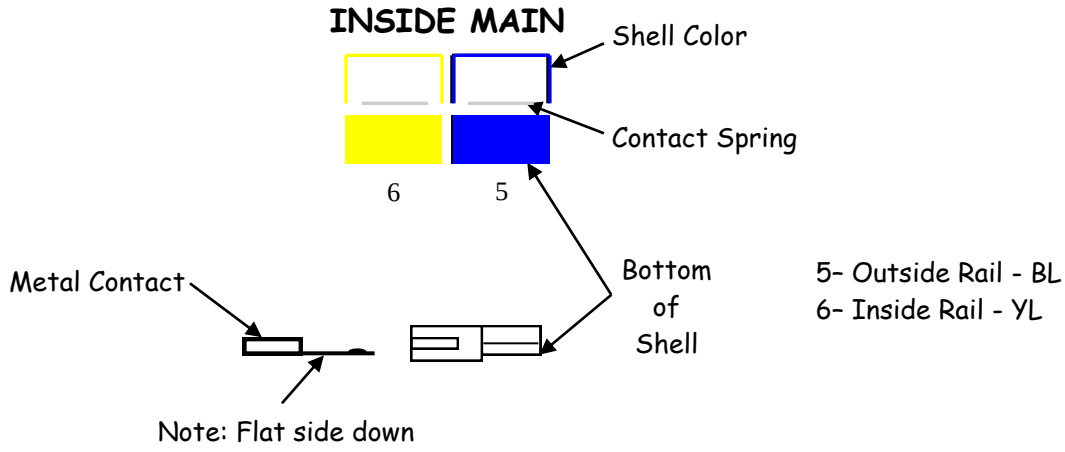
**Solder** 20-gauge solid feeder wires to the track rails on the ***outside*** of the rail (so the solder joint will not interfere with the wheel flanges) at least 6" from the track ends. This is a more dependable connection than rail joiner type wiring. The other end of these feeder wires should attach to the appropriate screw on the terminal block. In addition to soldering feeder wires to the tracks, all track joints on the mainlines and switching track must be soldered.

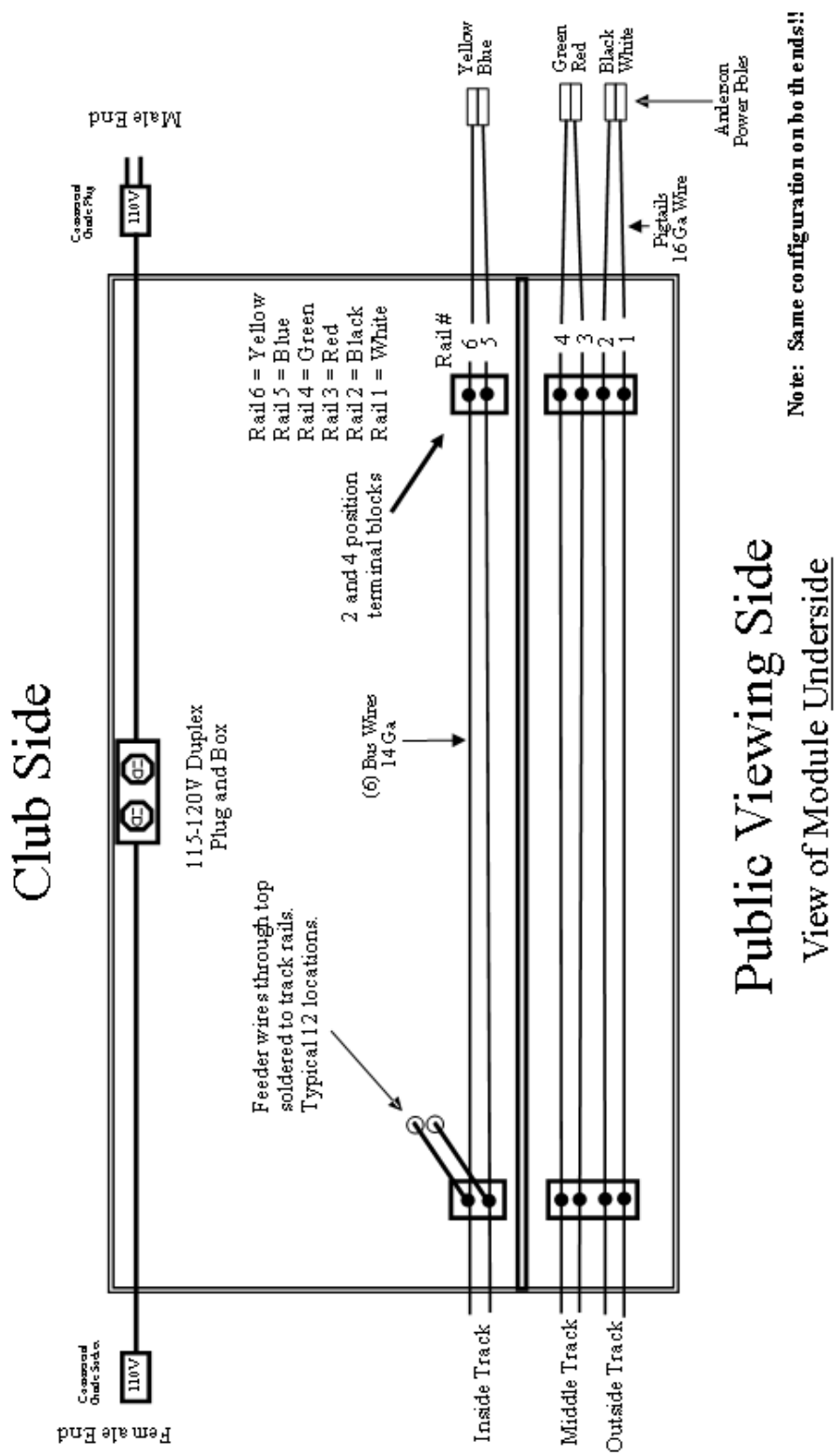
Insulated rail joiners may **NOT** be used on any mainline tracks on the module.

# Orientation of New Power Poles for GCMRA Modules






Sketch #5 Last revised 1-10-23

The **outside rail** of a track is the rail closest to the ***public viewing side*** of the module. The **inside rail** is the opposite rail of the same track closest to the ***club side*** of the module.

Notes for Electrical Sketch #5:

Note A: Left and Right are reversed, you are looking underneath the module.

Note B: All 115-120 Volt AC and 12 Volt DC pigtails are to extend a minimum of 12" beyond the module ends for ease of connecting at shows.

Note C: Caution, 115-120 Volt AC is dangerous!! If you do not feel you can make this electrical connection safely, let us know and we will help you.

## Skirting

Front and rear skirting and Velcro are required for your module. The skirting is 4" longer than your module length for overlapping the adjacent module and is 1" to 2" above the floor. The skirting material is available from the "Club" at the club's cost so that it matches the current dye lot. The skirting material will need to be hemmed and sewn. The "Club" has the name and phone number of an individual that will complete the necessary sewing for a very reasonable amount. The total cost including all skirting fabric, Velcro, and labor for a four-foot module should be about $40, a six-foot module, about $45. The club members that inspect your module will assist you in determining the correct dimensions, hemming requirements etc. and Velcro placement.

## 6' Corner Modules – Refer to Sketch #6A, #6B and #7

All corner modules are referred to as 6' corners. The larger radii possible on these modules provides for better operation of many engines and long trains. Construction, tracks and electrical requirements are the same for the 6' corner module as the basic module with the following modifications:

The six (6) foot corner starts as a 4' x 8' sheet of ½" plywood. Refer to sketches #6A and #6B. Typically, the corner modules are cut into two equal sections as illustrated for ease of transportation, but this division is not mandatory. Drawings and specifications assume that unit will be in two sections.

Sketch #7 illustrates the straight track, track radius and track centerline requirements.

Track radii are: Outside mainline track *centerline* is a 59” radius.
Middle mainline track *centerline* is a 56½” radius.
Inside mainline track *centerline* is a 54” radius.
Switching track *centerline* is a 38” radius.

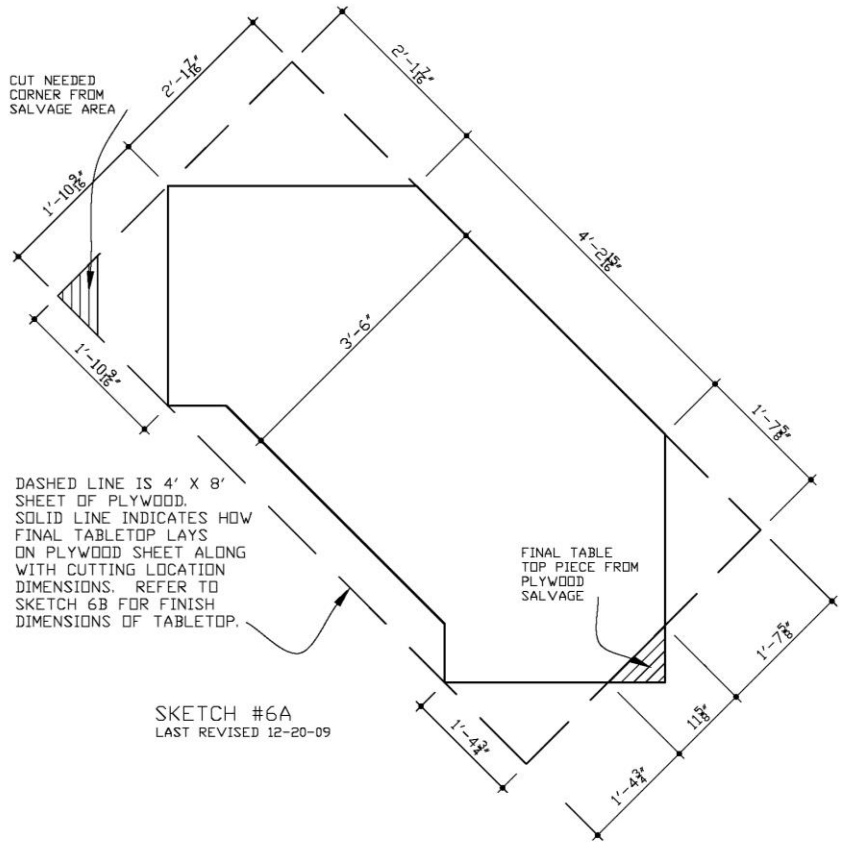
Straight track: Three inches (3”) of straight track is required before the beginning of each track radius (curve).

Track Centerlines: The track centerlines must be **7”, 9½”, 12” and 28”** (optional switching track) from the public viewing side along the joining end of the module.

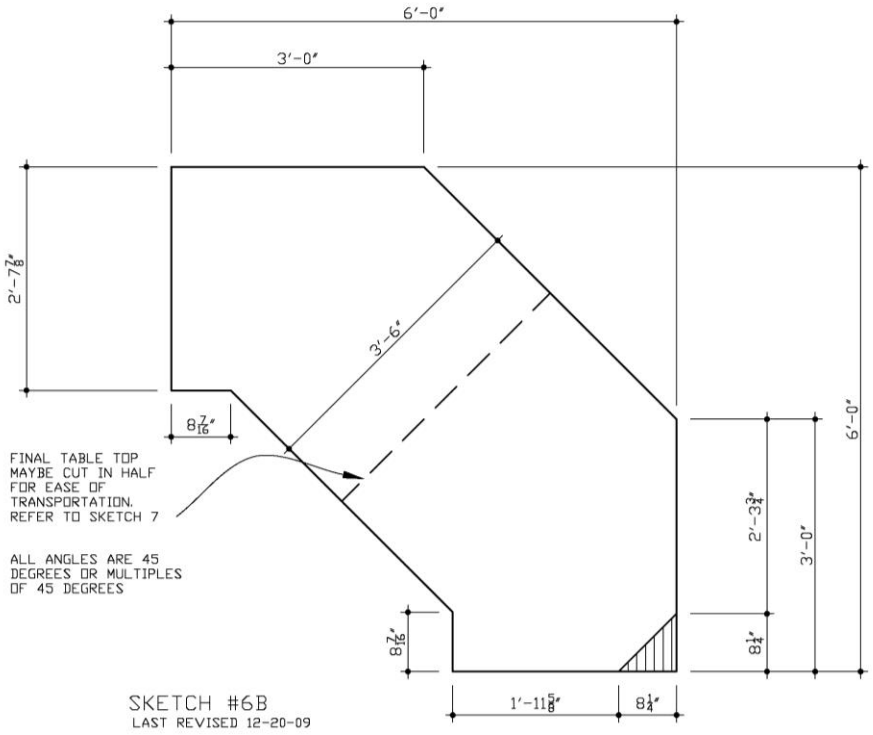
The wiring is the same as the basis straight module, but you will need two (2) wiring kits, one for each module section.

Please take some time and plan out your basic module concept. As another option you may just want to install the plywood for the sub-roadbed and fill in the remaining area with styrofoam to reduce the weight of the module. You must still have the support braces, table legs, wiring etc. under your module. PLEASE CONSULT WITH A CLUB MEMBER BEFORE STARTING THIS TYPE OF MODULE CONSTRUCTION.

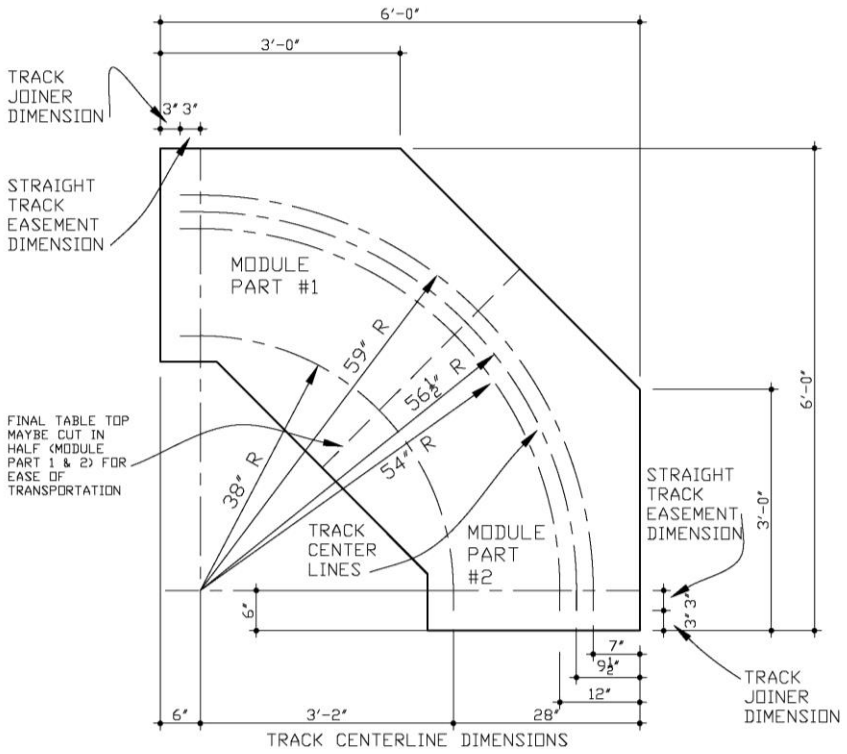
Other special module types can be constructed, such as a 6’ inside corner, a 6’ reversible inside/outside corner, etc. If you are interested in constructing a special module type, please consult with either a member listed at the end of these specifications, with the club at a train show, or at a club meeting.




SKETCH #6A
LAST REVISED 12-20-09




SKETCH #6B
LAST REVISED 12-20-09




Sketch #7 Last revised 12-31-09

By now, you may believe the specifications are complicated and require a lot of work. NOT SO! Once you get started, it is easy and fun.

You have seen our layout at shows and this has sparked and excited your interest. The first show in which you participate will provide much personal satisfaction and far exceed the short time required to build a module. Club members are always willing to answer questions and explain how to build a module. Just ask…and remember

**"WE TALK AND RUN TRAINS"**

As we have previously mentioned, please discuss with any member of the Club your idea before starting construction of a module. If you need assistance building a module or you are interested in building a specific module type other than the modules illustrated in the sketches, please contact any of the following members, Nick Androne @ 513-607-7007, Mark Cooper @ 513-314-1744 or Chuck Ficker @ 513-851-5430. Website suggestions or questions should be addressed directly using the website (cincygcmra.org) contact area. For new module inspections, please contact Nick Androne or Mark Cooper. Please call Mark Cooper, the club treasurer, to obtain his mailing address if you need it.

Last Document Revision: January 10, 2023