

The S-MOD System

BUILDING A PORTABLE CONTROL PANEL

for S-MOD RAILCAB LAYOUTS (Part 2)

by Don DeWitt

In the last issue I described the construction of the S-MOD Interface for the Portable S-MOD Control Panel. Before you read the following description of the Control Panel construction, please review the ideas set forth in Part 1.

In Figure 2 of Part 1, we left off with a nondescript box representing the control panel. It is now time to explore our options and begin construction. Remember that our overall goal here is to be able to assign either of the Mainline Cabs (RED or YELLOW) or a Local Cab (BLUE) to one or both of the mainlines in a double-track S-MOD RailCAB layout. There are two common methods for building a control panel that requires Cab Selectors.

ROTARY SWITCHES

Rotary switches that are double-pole input and output are used by many. Double-pole? What's that? Two poles refers to the switch's ability to direct output to two wires at once. In other words, we need to send output to each rail of each track, so we need a double-pole switch for each track. In addition, we need to have several pairs of two-wire inputs, with one pair from each Cab. Minimally we would need two input pairs for the RED and YELLOW Cabs. In addition, if you wish to have the ability to use a Local Cab, then the switch needs three pairs of inputs. Finally, our rotary switches need some way of turning the block off. This can be done by buying rotary switches that have at least one more input position. It is even better to buy switches with two more positions to allow for off positions between each Cab Position as shown in Figure 1. So I suggest using 5-position, double-pole rotary switches.

Remember that in the S-MOD RailCAB System, the RED and YELLOW Cabs can be accessed by any control panel in the division because all control panels can access Cab Lines 1-2 and 7-8, while a Local BLUE Cab can only be used within the block to which it is connected. (Refer to my article in the February DISPATCH.) Thus, a four-block layout would have one RED and one YELLOW Mainline Cab and as many as four BLUE Local Cabs. Note also that one could have two Local Cabs (BLUE & WHITE) if desired. A Third? Color it GREEN.

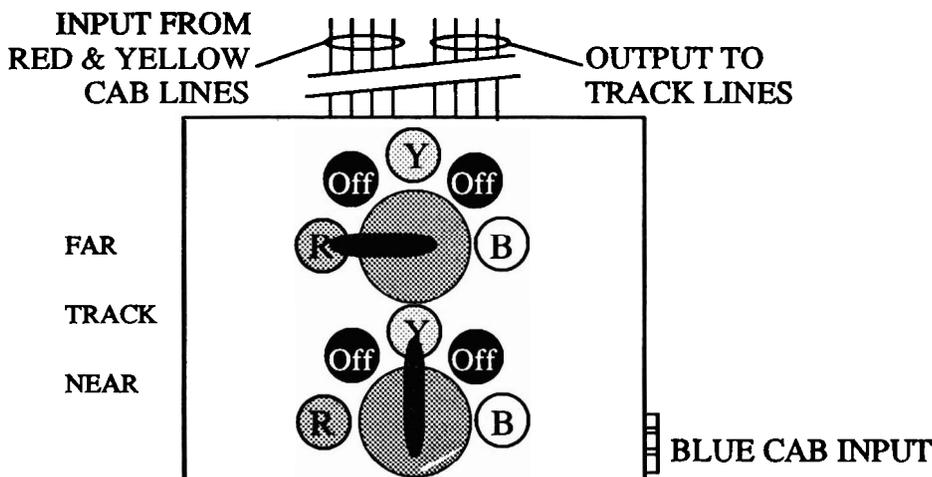
TOGGLE SWITCHES

Another method often used for control panels is a combination of two double-pole-double-throw (DPDT) switches for each track. Two switches per track? That sounds complicated. I thought so too when Ken MacKenzie introduced me to the concept when he and I were working together in the NASG Module Standards Committee. The use of rotary switches has several advantages and of course so does the use of toggle switches. Rotary switches are compact and you can fit several on a complicated control panel or a small control panel. The disadvantage is that it is difficult to determine the maximum current that a rotary switch can handle. For instance, Radio Shack sells some 6 position double pole rotary switches for about \$2. We have used them in the Central Jersey S Scaler club control panels, but I still do not know how much current they can handle. Since we run only scale equipment, our locomotives with their can motors pull so little current that it has not been a problem. (Yes, I asked the Radio Shack people but they don't know either!!)

MORE →

S-MOD PORTABLE CONTROL PANEL (Rotary Switch Style)

Figure 1



One of the purposes of this article is to show how to build a universally usable control panel. In other words, I want a design that I can recommend to our Hi-Rail friends as well as my scale buddies. So I want to build a panel that has switches that can handle at least 10 amps. I recommend using the following toggle switch method because 10-amp toggle switches are easy to find. Because this control panel is designed to handle only two mainlines (or one), there is plenty of room in the box for four toggle switches. Finally, remember also that all wires should be 16 gauge, and it is much easier to fasten 16-gauge wires to toggle switches than it is to fasten them to rotary switches. Sooo . . .

Shown in Figure 2 is the Toggle Switch Style of Portable Control Panel. As in Part 1 of this article, Module 1 is in the control block because Track Lines are connected. Module 2 is not affected by this control panel. When the control panel is placed on the Normal Operator's Side of the modules, and the Control Panel Interface Box is connected as shown, the top row of toggle switches controls the FAR TRACK (Track 1 with Track Lines 3-4), while the lower row controls the NEAR TRACK (Track 2 with Track Lines 5-6). If the control panel is placed on the other side of the module (the NORMAL Viewer's Side), DO NOT DISCONNECT THE INTERFACE BOX AND TURN IT AROUND. The RED painted plug and socket on the interface should always be connected to Cab Lines 1 and 2. If you connect the RED plug and socket to Cab Lines 7 and 8, then the top row of toggles will control Track 2, the new FAR TRACK. The control panel output to TRACK LINES 3 and 4 would go to TRACK LINES 5-6, etc. IF YOU NEED TO PLACE THE CONTROL PANEL on the Normal Viewer's Side, then just twist the cable and plug the interface in as if you had placed the

control panel on the Normal Operator's Side. To "kill" a track simply turn the right toggle to the Center-Off position. To use the Local Throttle with its S-MOD Throttle Interface, connect it to the Blue CAB Input and turn the right toggle to the B position. To switch to Red CAB, turn the right toggle toward the left (the R/Y position), and push the left toggle up to the R position. To switch to the Yellow CAB, flip the left toggle down to the Y position. This sounds more complicated than it really is.

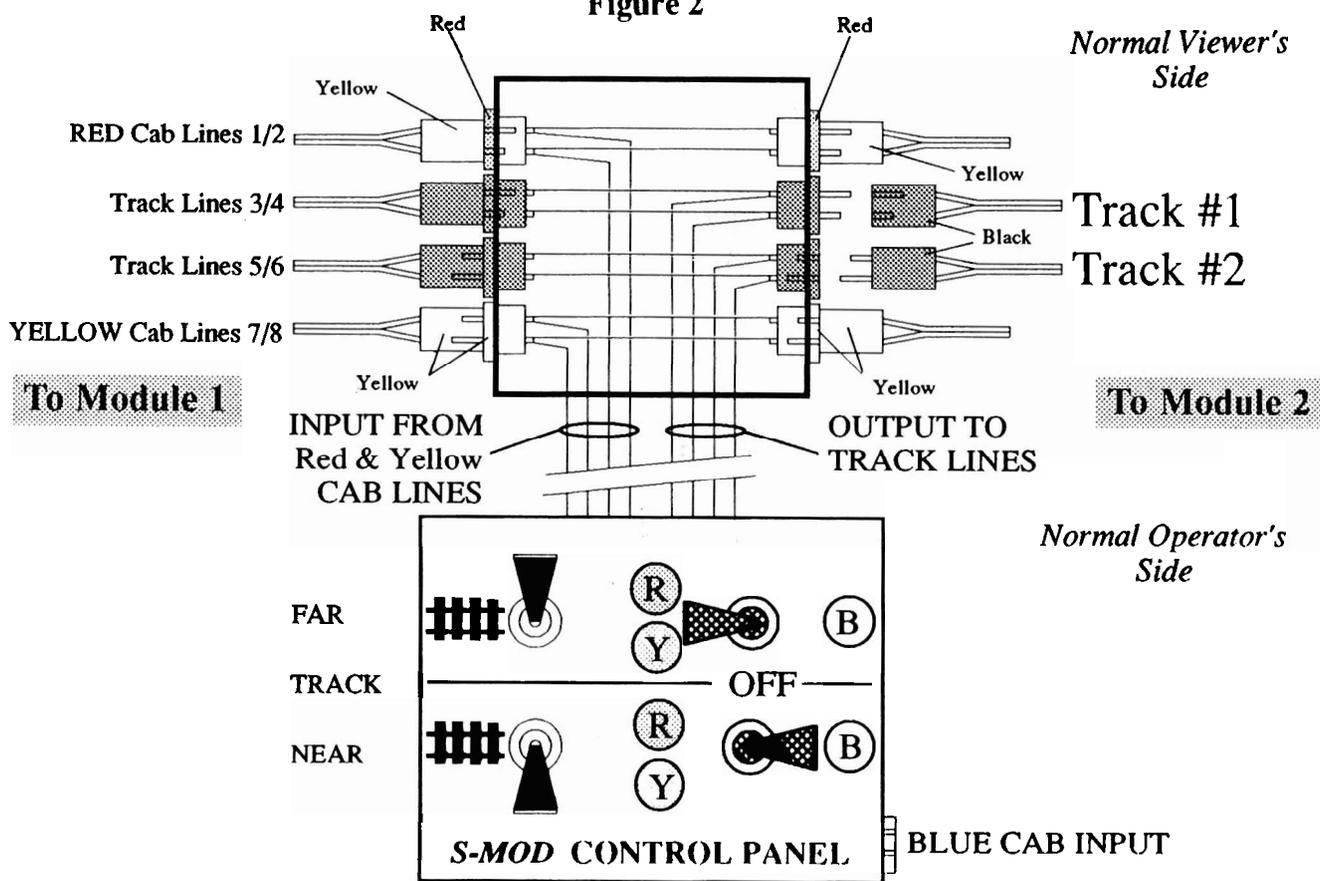
Now let's open it up and start connecting the Input and Output wires to the appropriate DPDT terminals. CAUTION HERE!! There are two common errors that you are likely to make if you have never worked with this type of paraphernalia. Remember that to work on the backs of the switches, we must turn the control panel cover over. That means that everything on the right in Figure 2 is now on the left in Figure 3. Secondly, as shown in Figure 3B, toggle switches are built in a seemingly odd way. If you push a toggle switch to the right, the center terminals are connected to the left pair of input terminals and vice versa. If you remember these two warnings, you should have fun with this project rather than aggravation.

If you look at Figure 4C, you can see where we are going to end up. Rather than simply adding wires here and there, let's do it in an organized way so that it makes sense, and then maybe you can teach someone else in the future. (There will be a quiz at the start of the next class!! Oh, sorry, I knew I shouldn't have written this while I was writing final exams!!)

In Figure 3A, I have shown how to connect the INPUT wires coming from Cab Lines 1-2 and 7-8. Now you can see how these DPDT switches are used to make a selection between RED or YELLOW Cabs. Note also that if you

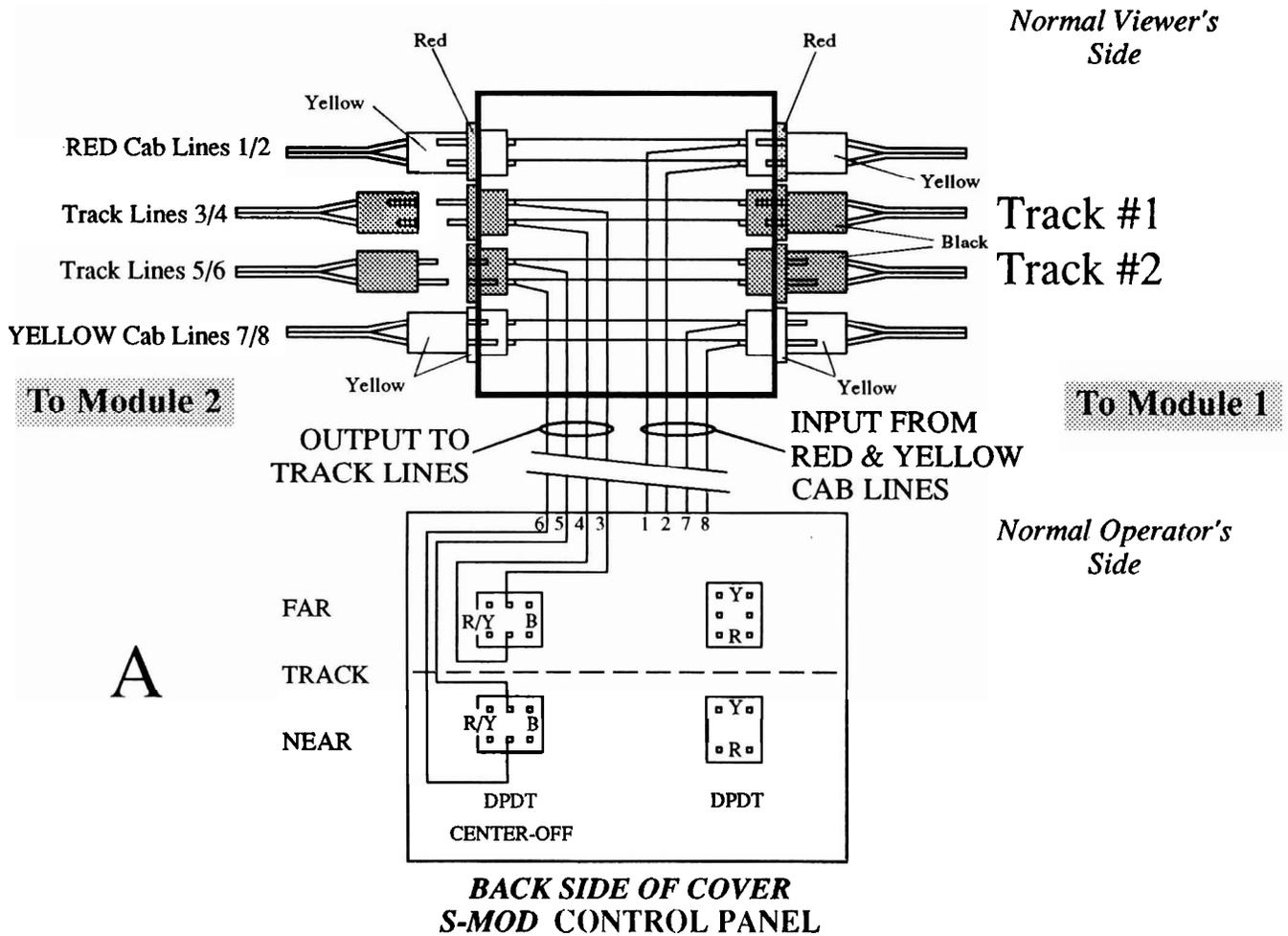
S-MOD PORTABLE CONTROL PANEL (Toggle Switch Style)

Figure 2

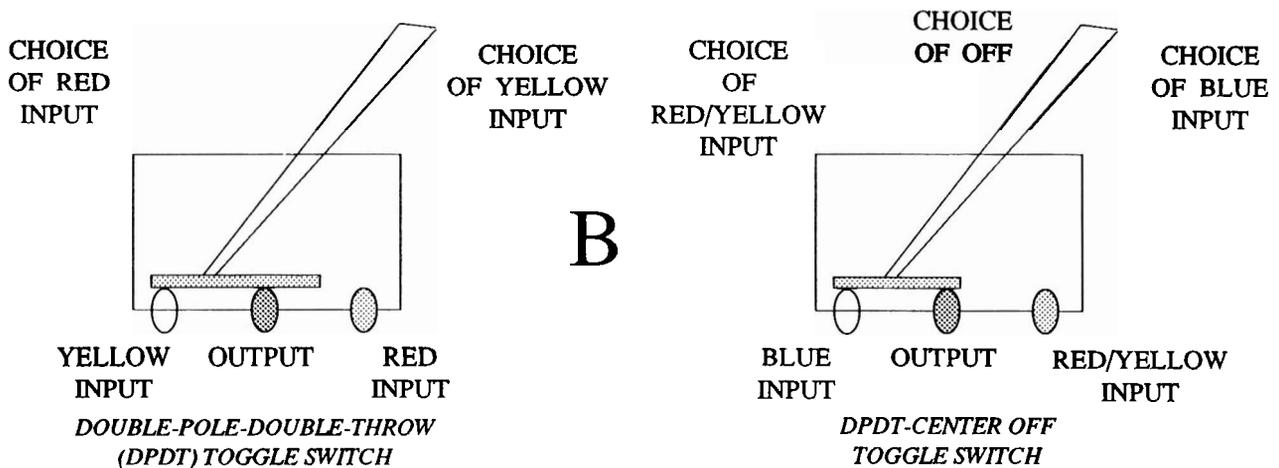


S-MOD PORTABLE CONTROL PANEL

Figure 3

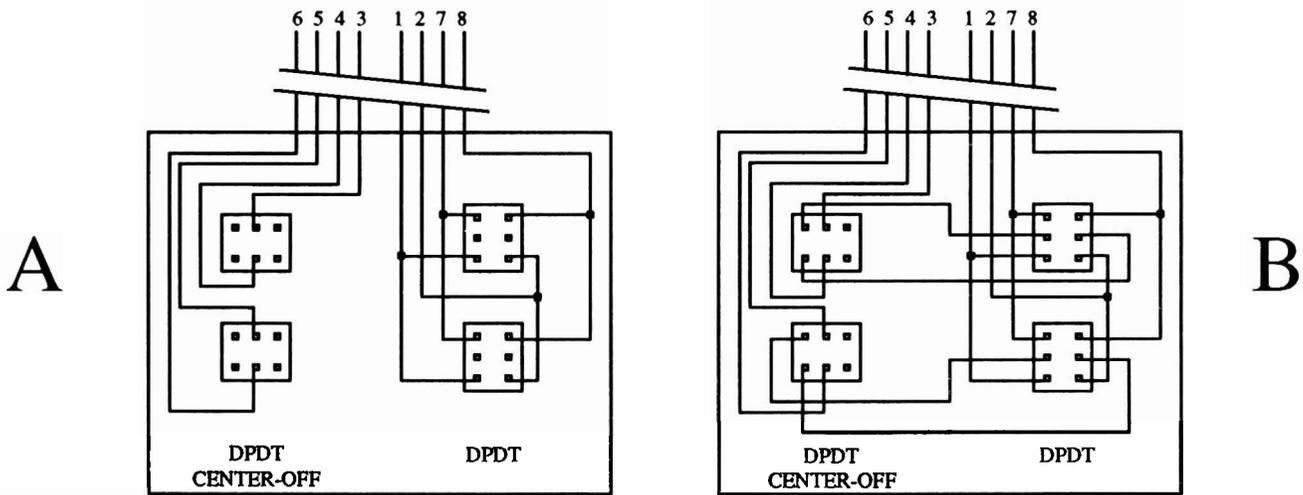


The Control Panel cover has been removed and the entire assembly has been flipped left to right in order to view the back sides of the toggle switches. The wiring from the DPDT-Center Off toggle switches to the Track Lines is shown. Note that the terminals for a toggle switch choice are on the opposite side of the switch, as shown below in a side view of the two kinds of switches. The outputs of the toggle switch are the center two, while the outer, left and right pairs are inputs.



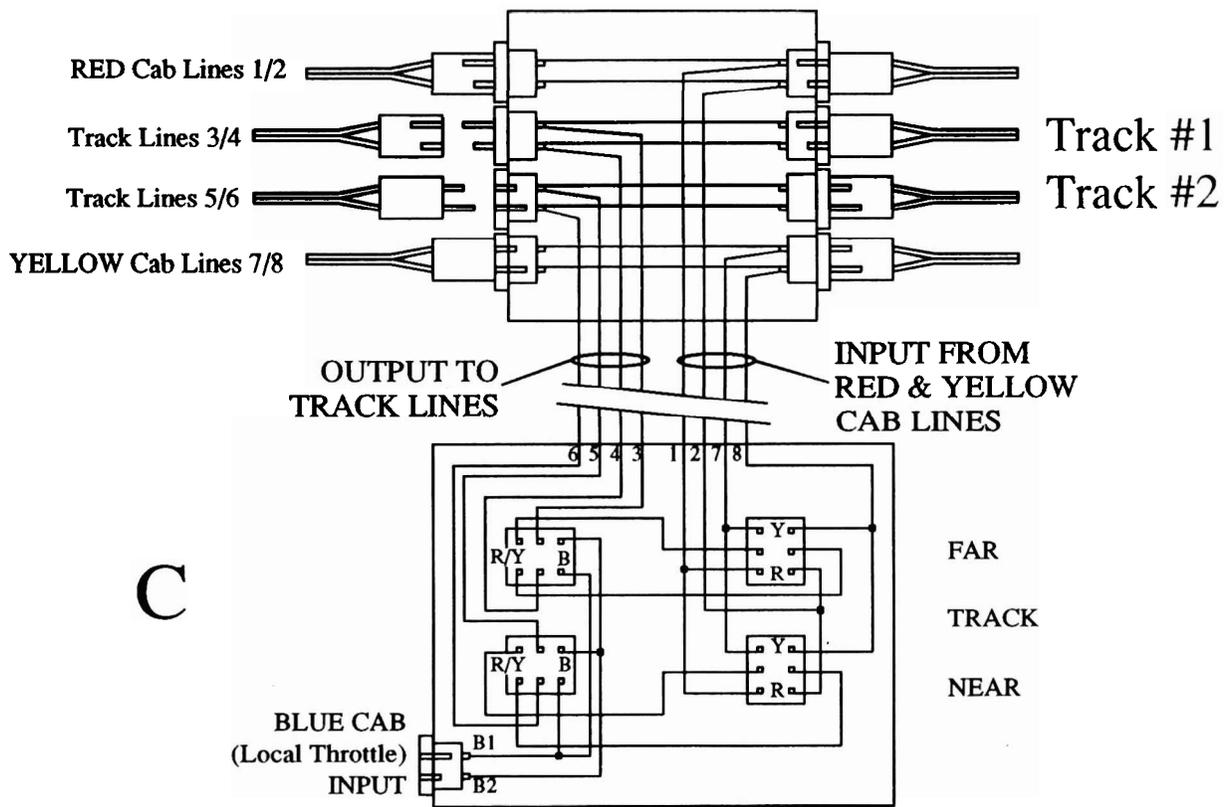
S-MOD PORTABLE CONTROL PANEL

Figure 4



Addition of Red and Yellow Cab Inputs to DPDT Toggle Switches.

Addition of Output lines from DPDT to Red/Yellow Inputs on DPDT-Center Off Toggle Switches.



Final Configuration. Addition of Blue (Local) Cab lines to Blue Inputs on DPDT-Center Off Toggle Switches.

do not intend to add a BLUE Cab option, then the entire panel gets much easier to build. I recommend however, that you make the effort to add the BLUE Cab. When someone is running the mainline trains with the RED or YELLOW Cabs in another block, you can do some local switching with your BLUE Cab by flipping the DPDT center-off switch to B. When the mainline trains are ready to enter your block again, simply flip the DPDT center-off switch back to R/Y position. OK, so lets deal with the switch that allows a choice between OFF, RED/YELLOW Cabs, or BLUE Cab.

The DPDT center-off switch is the master switch for each track. Figure 4A shows how to connect the wires leading to Track Lines 3-4 and 5-6. Make sure you connect the top switch to Track Lines 3-4 and the lower switch to Track Lines 5-6. Figure 4B shows how to connect the output of the DPDT switches to their corresponding terminals on the DPDT center-off switches. All connections must be followed exactly or you will not be able to move a train on Track 1 over to Track 2 when both tracks are connected to the same Cab. Finally, Figure 4C shows how it is supposed to look when you are finished. The last step involves adding the BLUE Cab input lines to the DPDT center-off switch.

Now that you are all done, does it work? DO NOT EVEN CONSIDER THE POSSIBILITY THAT YOU HAVE CONNECTED EVERYTHING CORRECTLY. Here is a way to test all of the options. Do not plug the interface box into anything yet.

Testing the Control Panel Interface Box

1. Kill each track by turning the DPDT center-off switch to OFF.
2. Get out your Module Testing kit that you built after you read my article in the DISPATCH two issues back.
3. Check to make sure that Lines 1 through 8 on one side of the box are connected only to the same lines on the opposite side of the box. Use your ohmmeter for this and check for continuity and isolation.

Testing the Entire Assembly

1. Turn the DPDT center-off switch to either R/Y or B. All Lines 1 through 8 should NOT still be isolated. That is because we want the Track Lines to be connected to the Cab Lines. The question is: Are they connected correctly?
2. Turn the FAR TRACK DPDT center-off switch to R/Y and the FAR TRACK DPDT switch to Red, and then YELLOW. Then turn the DPDT Center-Off switch to Off, and finally to BLUE.

TRACK LINE	connected to	CAB LINE	DPDT C-OFF SWITCH	DPDT and SWITCH
3		1	R/Y	RED
4		2	R/Y	RED
3		7	R/Y	YEL
4		8	R/Y	YEL
3		-	OFF	RorY
4		-	OFF	RorY
3		BLUE1	BLUE	RorY
4		BLUE2	BLUE	RorY

and then YELLOW. Then turn the DPDT Center-Off switch to Off, and finally to BLUE.

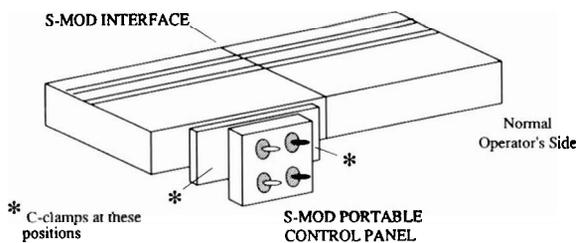
TRACK LINE	connected to	CAB LINE	DPDT C-OFF SWITCH	DPDT and SWITCH
5		1	R/Y	RED
6		2	R/Y	RED
5		7	R/Y	YEL
6		8	R/Y	YEL
5		-	OFF	RorY
6		-	OFF	RorY
5		BLUE1	BLUE	RorY
6		BLUE2	BLUE	RorY

During this testing of the NEAR TRACK, if the FAR TRACK DPDT CENTER-OFF switch is really OFF, then Track Lines 3-4 should be isolated from all CABS.

4. Now turn the NEAR TRACK DPDT CENTER-OFF switch to R/Y and turn the DPDT switch to R. Then set the FAR track to operate via the Yellow Cab. Re-test for these conditions. Switch around. Hopefully, everything is ok.

Now I can just hear you after reading this test procedure. "I'm not going to waste my time doing all of that testing!! I'm just going to plug it all in and see what happens!!!" OK, go for it!! When it doesn't work, maybe you can use this procedure to figure out what went wrong. The problem with just plugging it in is that you may not remember to try every different combination. Then of course the missed combination will be needed during the next show, and WHAM . . . "How come it doesn't work, Don? I tested it in my basement but I only had one throttle," etc., etc., yawn . . . blah . . . blah . . . blah. Well boys, it looks like we'll be eating lunch under the module!! "Hey dad, how come I can't run my train?" The moral of the story is that you can spend the time before the show, or during the show, checking your new S-MOD Control Panel. Guess which one will make your Layout Coordinator happy??

ATTACHING YOUR NEW S-MOD PORTABLE CONTROL PANEL
Figure 5



OK, IT WORKS!! NOW WHAT? How do I attach it to a module? If you attach the panel to a board as shown if Figure 5, then you can C-clamp the assembly to the side of any module. Make sure that your cable from the control panel to the Interface Box is long enough to handle a 3-foot-wide module, as that is the widest that we recommend. Also allow enough slack for the angle the cable will take from the middle of the module to the electrical interface.

In the next issue I'll complete the testing procedures for single-track modules and begin answering questions that you may wish to send me. If you expect a direct answer, please include a self-addressed, stamped business-size envelope.

During this testing of the FAR TRACK, if the NEAR TRACK DPDT CENTER-OFF switch is OFF, then Track Lines 5-6 should be isolated from all CABS.

3. Turn the NEAR TRACK DPDT center-off switch to R/Y and the NEAR TRACK DPDT switch to Red,