

JMRI Panel Tutorial



Introduction To Layout Editor And Panel Editor (JMRI)

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There are several parts of the JMRI program. Decoder Pro, Decoder Pro3 and Operations are covered in other material. This tutorial will come in three parts and cover the Panel Editor and the Layout Editor. It does not cover the similar Control Panel Editor.

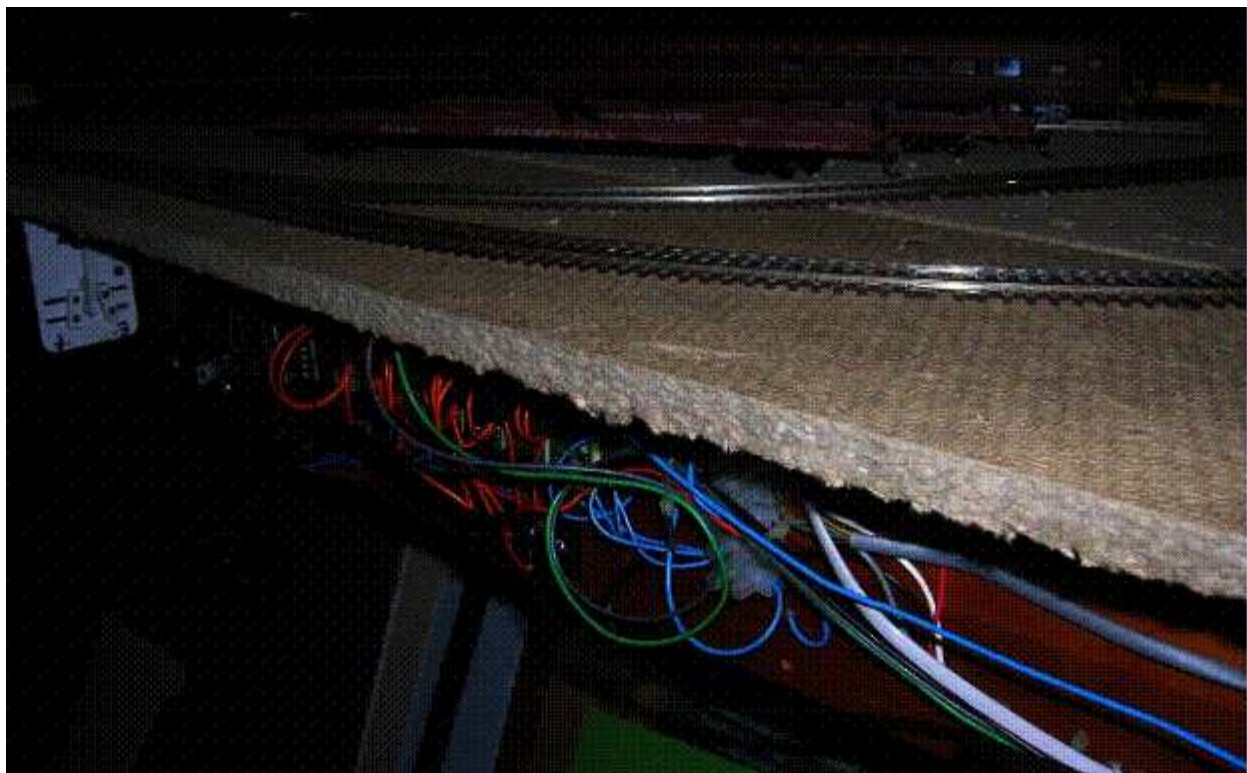
Completing the tutorial will show you how to construct two simple panels in JMRI as shown on the cover page. I hope it will give you an understanding of the basic concepts so you can move on and construct a larger panel for your own layout.

Background

I have been using the Panel Pro feature of JMRI since 2003. I first discovered Nick Kulp's early CTC panel and then learning much more from Dick Bronson's clinics, both on line and in person. Today the Quaker Valley Railroad uses NCE equipment to control trains and turnout accessory decoders and a standalone LocoNet with no command station for block detection and signaling.

To support a JMRI clinic of my own at the 2006 NMRA National Convention in Philadelphia, I constructed a small (42"x72") demo layout as shown in FIG 1.

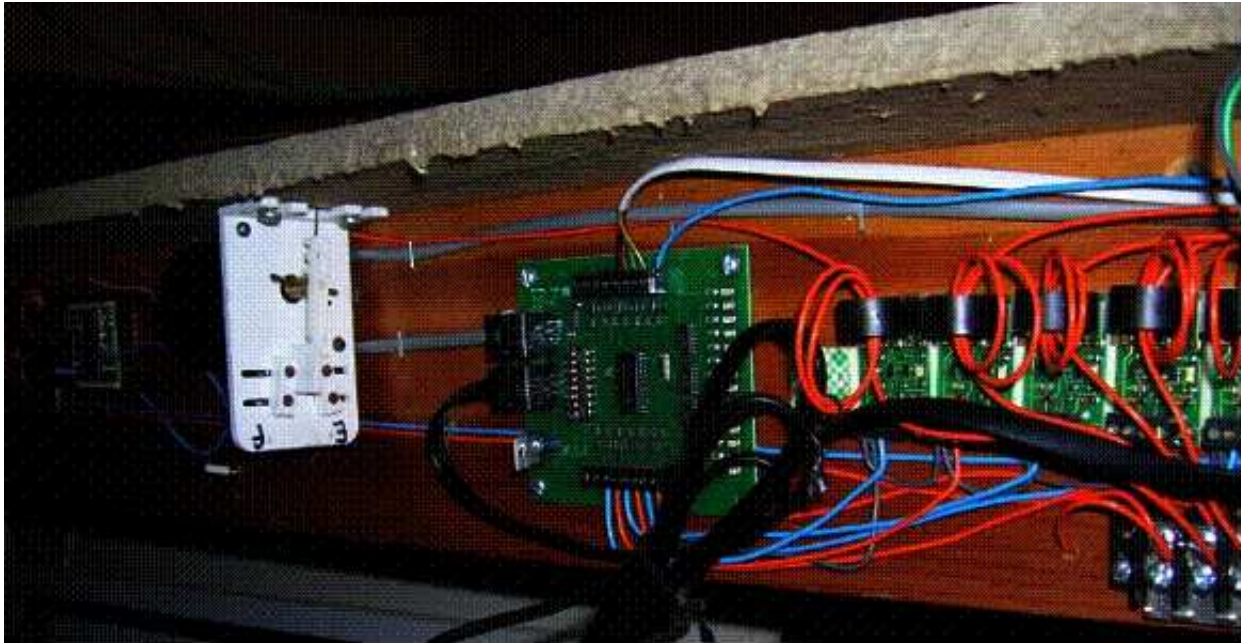
FIG 1 - DEMO LAYOUT



The layout used NCE hardware, as shown in FIG 2, for block detection and turnout control, but it is not necessary to construct any layout to complete this tutorial. We will use the simulator feature of JMRI so no layout or hardware is needed at all.

FIG 2 – TEST LAYOUT HARDWARE

NCE SWITCH-IT, HANKSCRAFT SWITCH MOTOR, AIU AUXILIARY INPUT UNIT, BD20 BLOCK DETECTORS

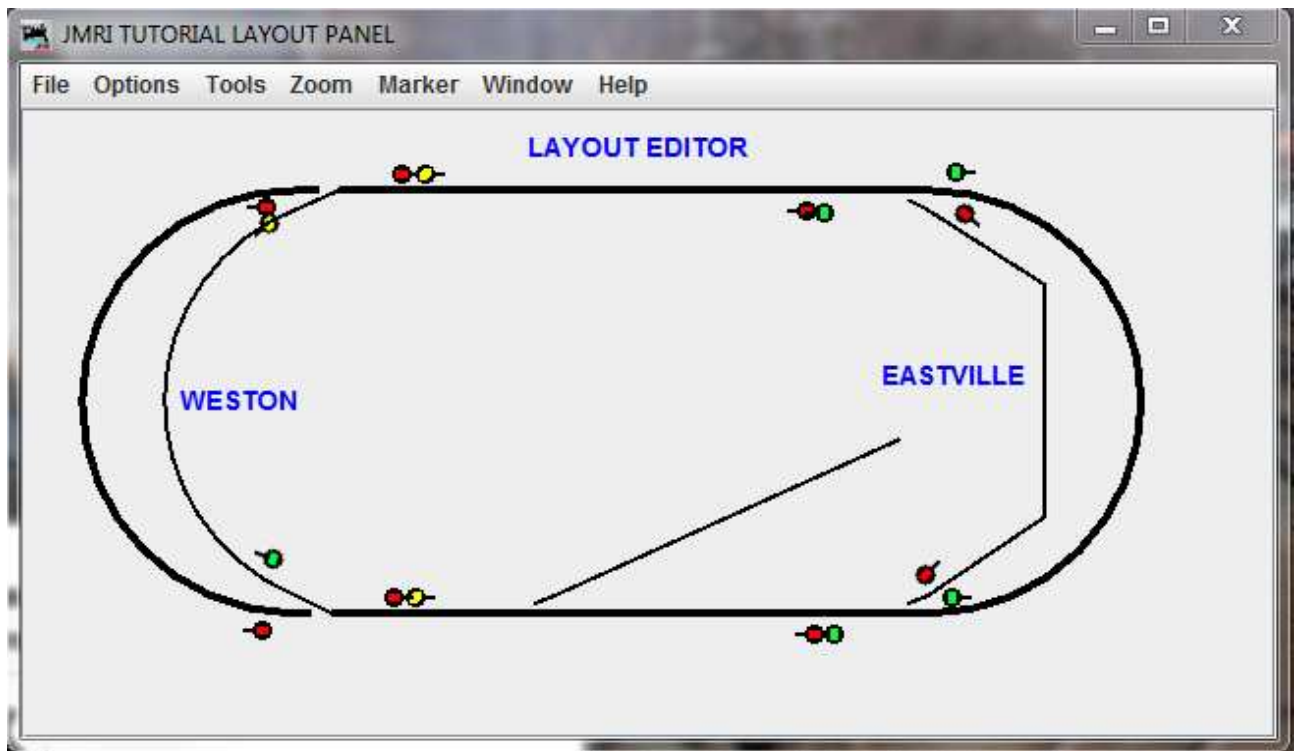


There are many ways to accomplish the construction of the panels shown. And no tutorial can cover them all. This tutorial will show you one way and then turn you loose to explore other features of JMRI on your own.

Layout Editor

The Layout Editor allows you to construct a diagram, which logically places the elements of your layout. In this tutorial, we will place track, turnouts and text to represent the demo layout. This figure also shows signals which will be added in Part 3 of the tutorial. The finished layout panel is shown in FIG 3.

FIG 3 – DEMO LAYOUT EDITOR



Layout Editor allows JMRI users to create animated schematics of a model railroad layout. The Layout Editor differs from Panel Editor in several ways, including:

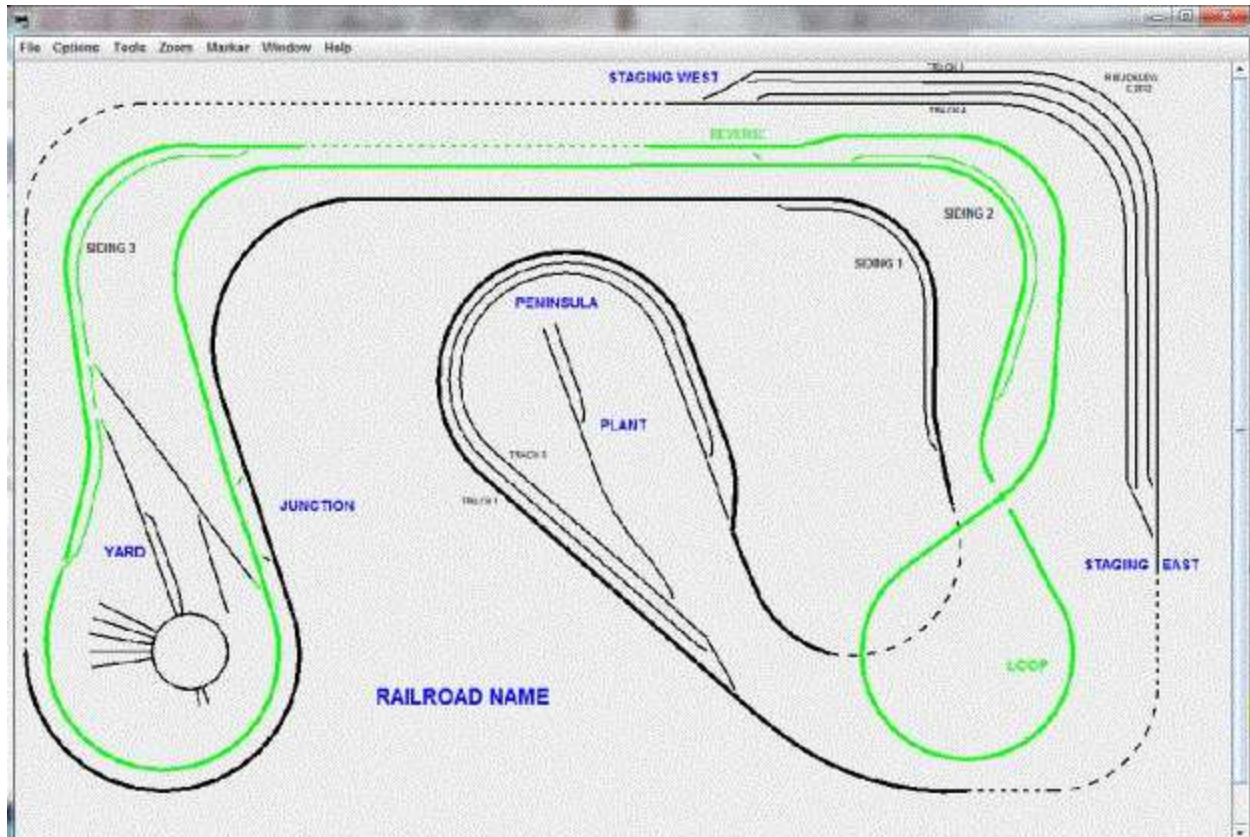
- ❖ Layout Editor uses a drawn track schematic, instead of the icon-based schematic used by Panel Editor
- ❖ Layout Editor captures the full connectivity of blocks and signaling automatically as the layout schematic is constructed. This is useful with advanced JMRI tools like Robot Throttle and Automated Dispatcher
- ❖ Layout Editor supports new JMRI animation features and tools.

Layout Editor is similar to Panel Editor in many ways, including:

- ❖ Both build on the same JMRI configuration items, such as, turnouts, sensors, and signal heads.
- ❖ Both use the same icons for panel items other than the track schematic.

The Layout Editor can be used to construct more complex plans as shown in FIG 4 and FIG 8.

FIG 4 – SAMPLE LAYOUT EDITOR

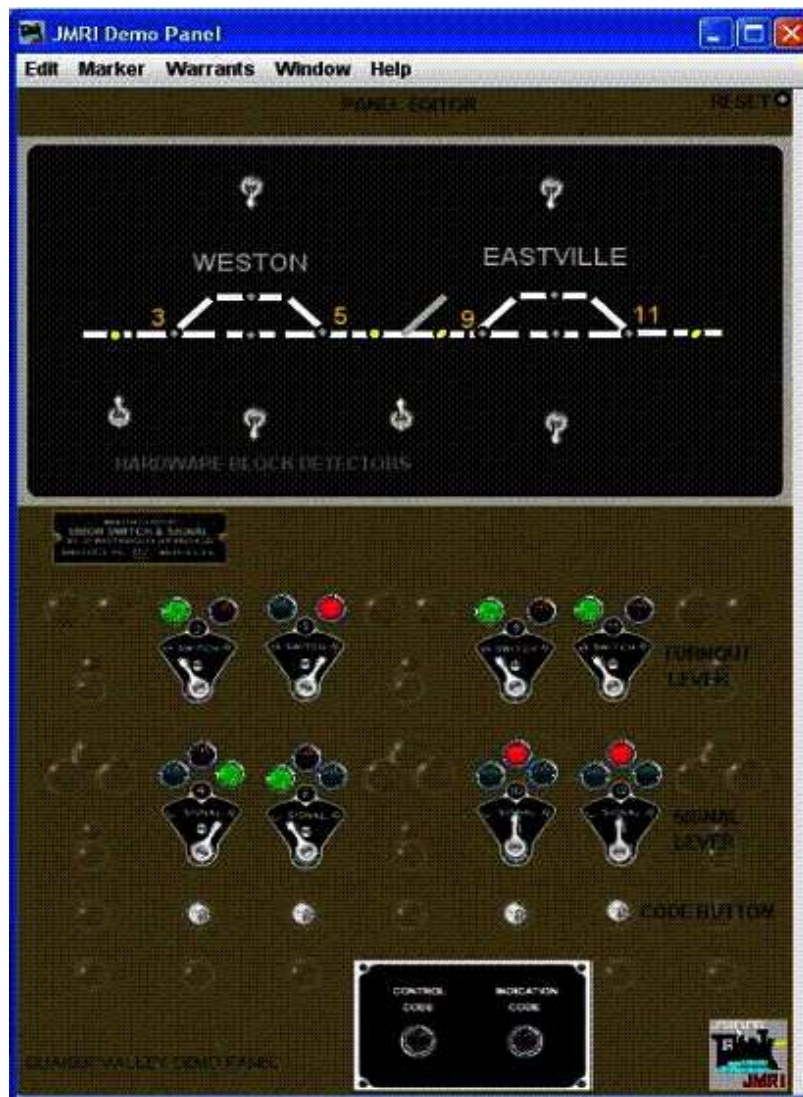


Panel Editor

The Panel Editor allows you to construct many different looking panels because it is constructed of computer graphics (icons). A large number of icons are downloaded when you install JMRI, but you can create and add your own as needed. Graphics can be created with simple programs like Paint or more sophisticated programs like GIMP. (Also a free download from the sourceforge.net web site)

We are going to use Panel Editor in part 2 of this tutorial to construct a US&S CTC panel used by many railroads in the 1940s through the 1990s. For more information on these panels, see the description at the end of Part 2 and 3 of this Tutorial series. The finished panel will look that as shown in Fig 5.

FIG 5 – FINISHED DEMO CTC PANEL



The Quaker Valley Railroad uses two CTC panels on a touch monitor for Dispatcher control. These are used along with a Layout Editor panel to insure that all signaling logic is working before the hardware signals are installed on the layout as shown in FIG 6, FIG 7 AND FIG 8.

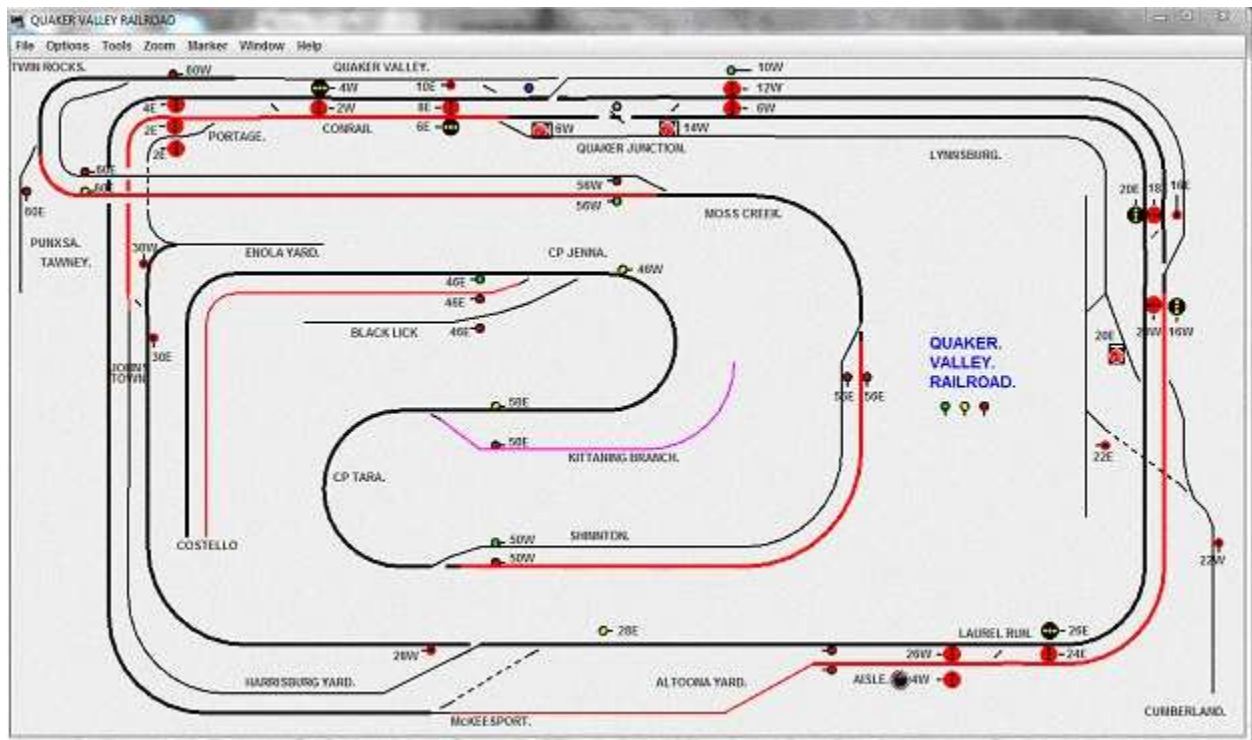
FIG 6 – QUAKER VALLEY CTC PANEL



FIG 7 – QUAKER VALLEY CONRAIL LINES CTC PANEL



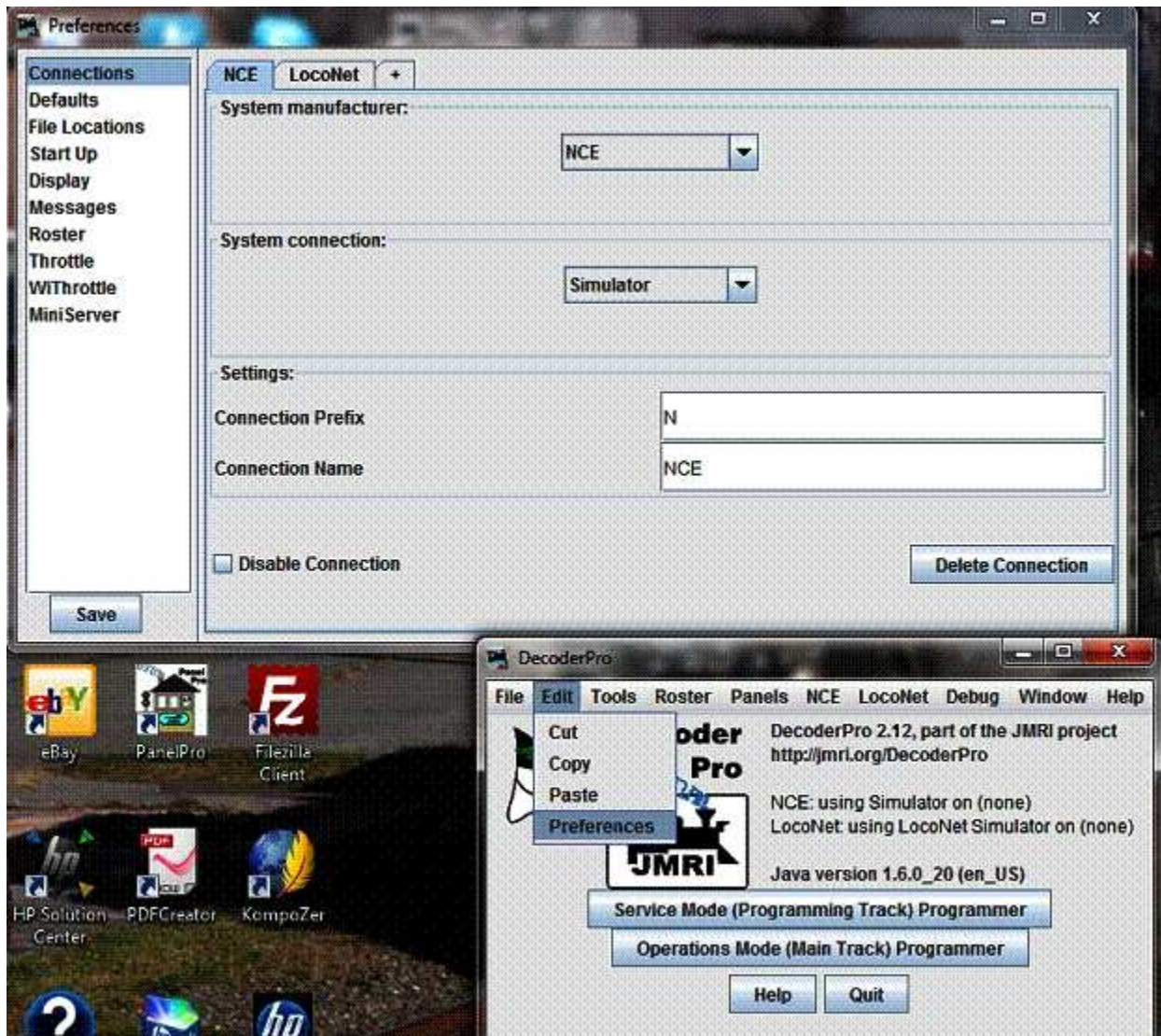
FIG 8 – QUAKER VALLEY LAYOUT PANEL



Getting Started

To begin, download and install JMRI software version 2.12 or newer on your PC or Mac. When you first open JMRI it asks you to set your preferences. Select the NCE Simulators shown in FIG 9.

FIG 9 SCREEN SHOT – PREFERENCES



If you already have JMRI installed and are using other hardware, just add a NCE Simulator to your preferences. If you are using NCE, change it to Simulator so not to interfere with your railroad. Please remember your COM connections and software level so you can set it back. I have created a second JMRI icon on my desktop, which starts both a NCE and LocoNet simulator. This is useful when developing a panel away from the layout and no hardware is available.

Create a directory on your computer to store your panels and any special graphics you need. I suggest C:\JMRI_Panels\. Download the two gif files from the Quaker Valley web site at http://quaker-valley.com/CTC/JMRI_Panel_Tutorial.html to this directory on your computer. We'll use them in Part 2 of the tutorial.

JMRI Tables

JMRI uses various defined tables to define the real and imagined hardware for the railroad. The demo layout has 4 turnouts, 6 detected blocks (sensors), 4 calculated blocks (sensors) and an undetected siding. Later we will add 12 signals. It also uses Logix defined in tables to control the actions desired from the panel. We'll deal with each of these tables as needed. Before we start panel development, we will define the turnouts and block sensors needed by the demo layout.

Turnout Table

The Turnout Table can include turnouts connected to hardware on your layout and internal turnouts used to represent parts of your panel. I'm also using the internal turnout as shown on the Layout Editor panel to represent a manually thrown turnout not connected to any DCC hardware. JMRI uses ITxxx to denote internal turnouts and NTxxx to denote NCE controlled turnouts. LocoNet and Digitrax users would use LTxxx and other hardware is available as described on the JMRI web site. For this Tutorial, we will use the NCE designation NTxxx.

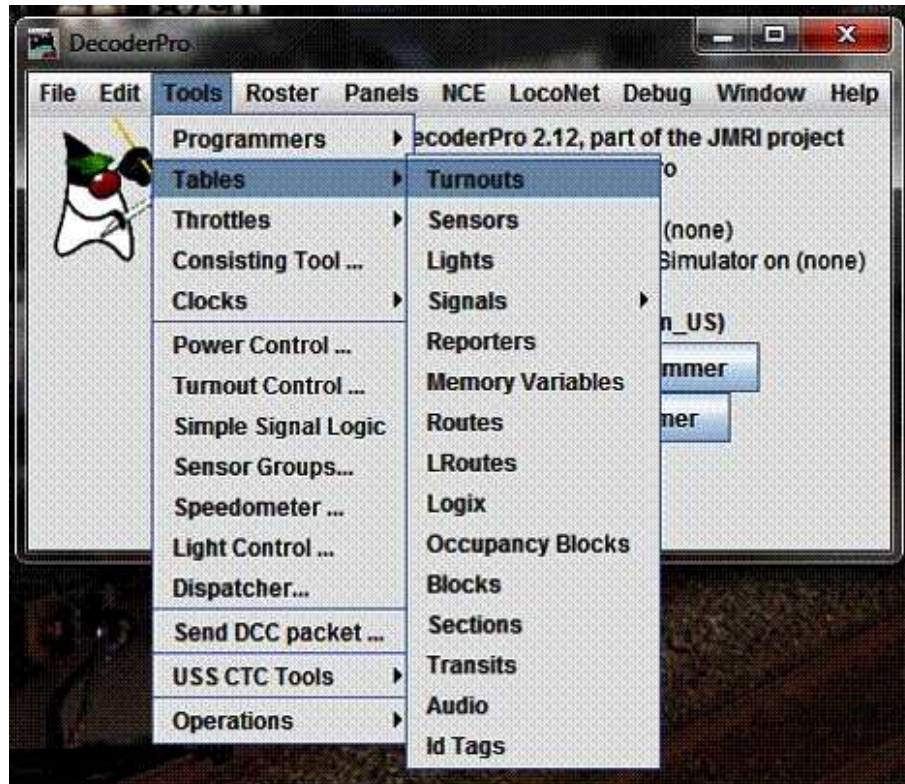
Open the JMRI program and view the Main Panel as shown in FIG 10.

FIG 10 – MAIN JMRI PANEL



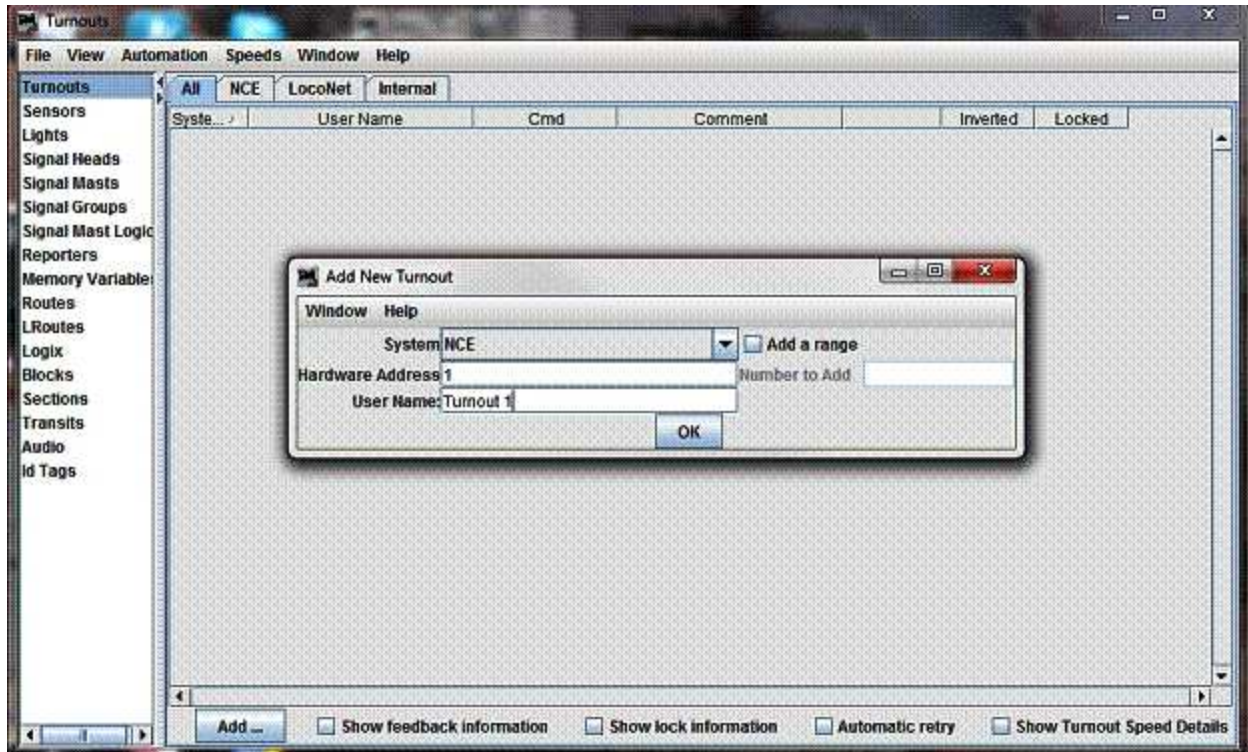
From the main screen, select Tools, Tables, Turnouts as shown in FIG 11.

FIG 11 – SELECTING TURNOUT TABLE



Press the ADD button and enter the first turnout as shown in FIG 12. Note that when entering the turnout, you select the type NCE, Digitrax or Internal and enter only the number. JMRI will enter them in the table with the correct prefix.

FIG 12 – FIRST TURNOUT ENTERED



Continue to add turnouts NT2, NT3, NT4 and IT5. Your complete turnout table should look like that shown in FIG 13.

FIG 13 – FIVE TURNOUTS ENTERED



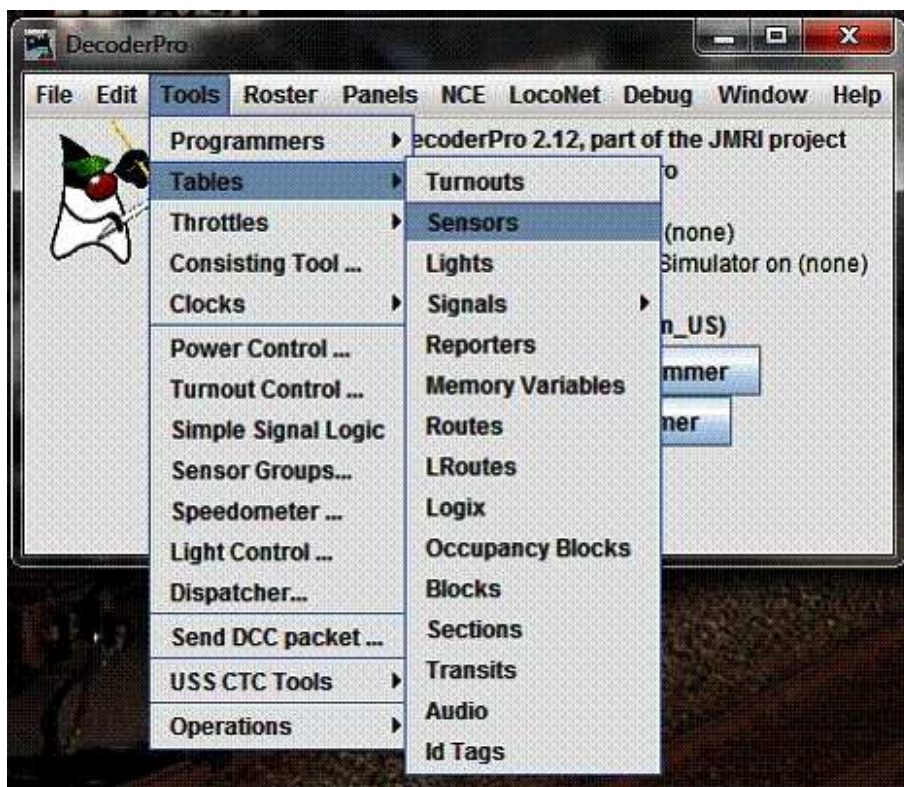
Sensor Table

The Sensor Table can include sensors connected to hardware on your layout like block detectors, push buttons or toggle switches. It also is used for internal sensors used to represent parts of your panel. JMRI uses ISxxx to denote internal sensors and NSxxx to denote NCE monitored sensors. LocoNet and Digitrax users would use LSxxx and other hardware is available as described on the JMRI web site. For this Tutorial, we will use the internal sensors ISxxx and NCE designation NSxxx.

For this tutorial, we are going to use internal sensors to denote block occupancy. These sensors will be controlled by Logix that monitor the hardware block detector sensors, adding a delay to eliminate flicker caused by dirty track.

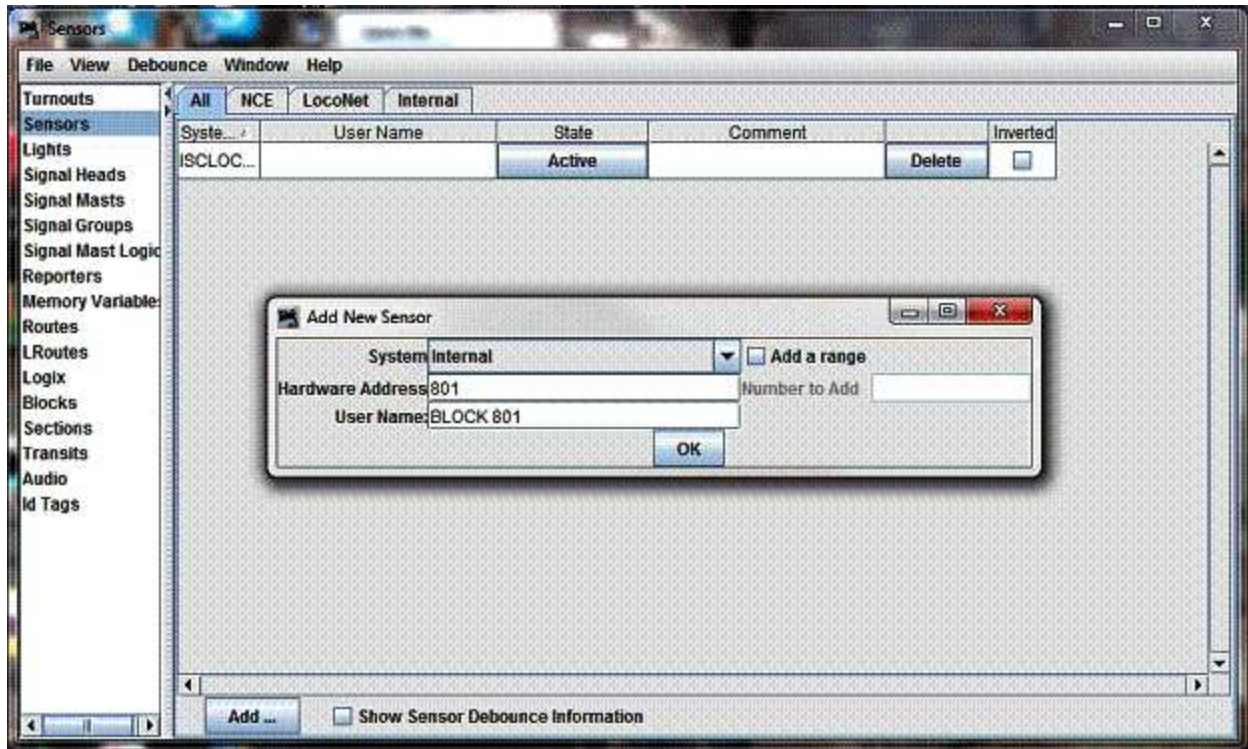
1. From the main screen, select, Tools, Tables, Sensors as shown In FIG 14

FIG 14 – SELECTING SENSOR TABLE



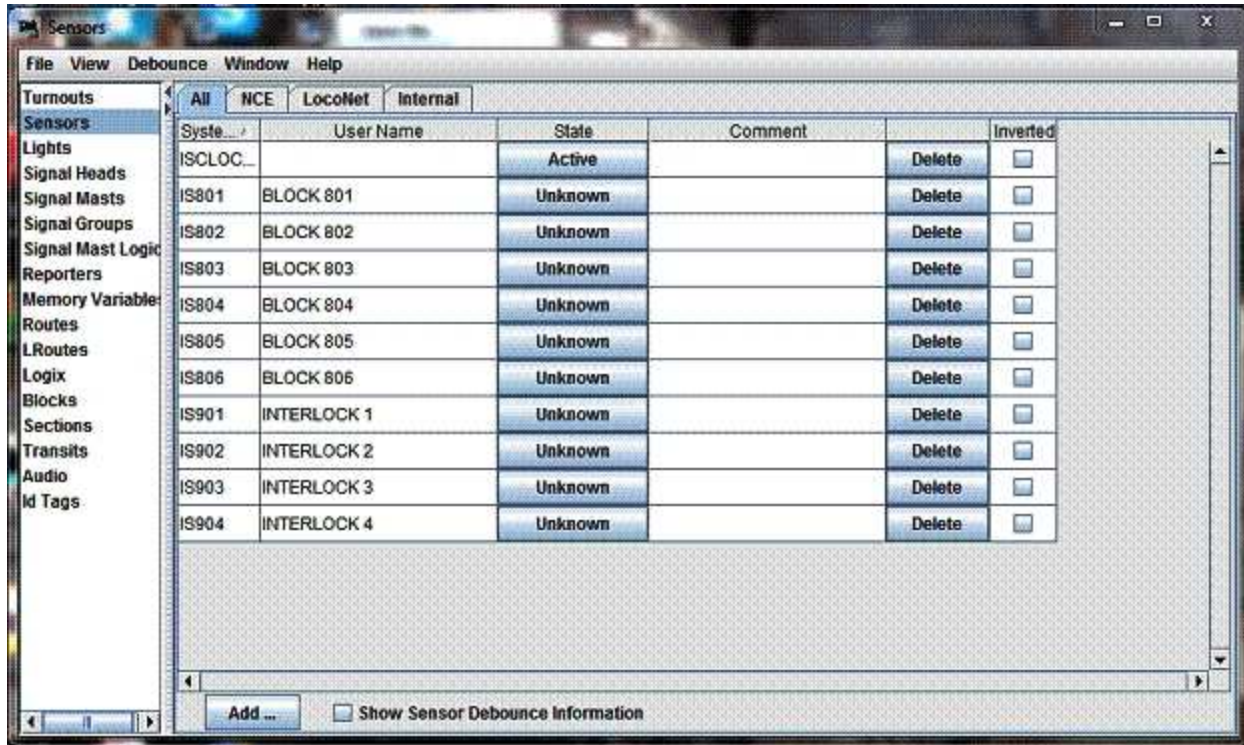
2. Press the ADD button and enter the first internal sensor IS801 as shown in FIG 15. Note that when entering the sensor, you select the type NCE, Digitrax or Internal and enter only the number. JMRI will enter them in the table with the correct prefix.

FIG 15 – FIRST INTERNAL SENSOR ENTERED



3. Continue to add sensors IS802 through IS806.
4. Add four additional sensors IS901 through IS904. Your complete sensor table should look as shown in FIG 16

FIG 16 – TEN SENSORS ENTERED



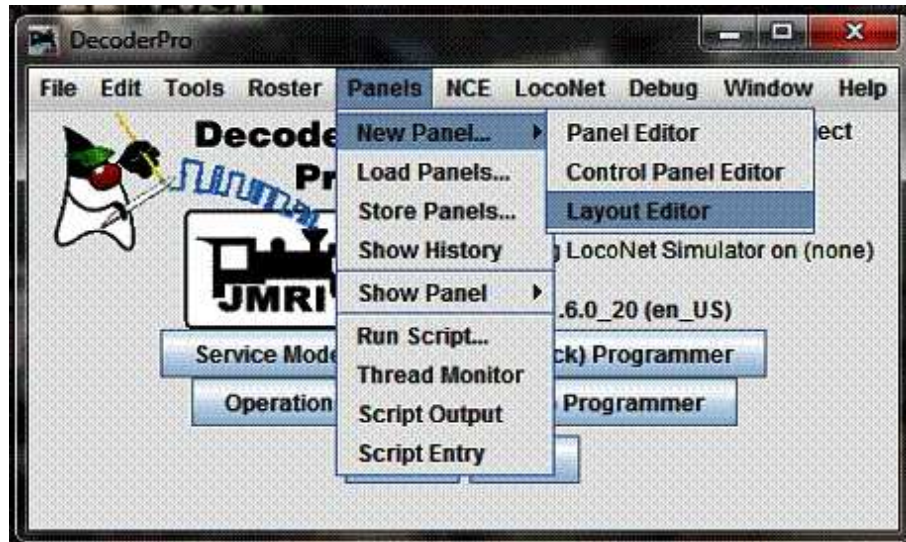
The selection of these sensor numbers is rather arbitrary for internal sensors. However the hardware sensor numbers will be dictated by the settings of your block detector boards. Internal sensors IS901-IS904 will be used to denote occupancy over the four turnouts. You may add block current detectors or infra-red detectors on your own layout. For this simple demo, we will create virtual sensors.

Layout Editor Development

We are ready to start development of the first panel using Layout Editor.

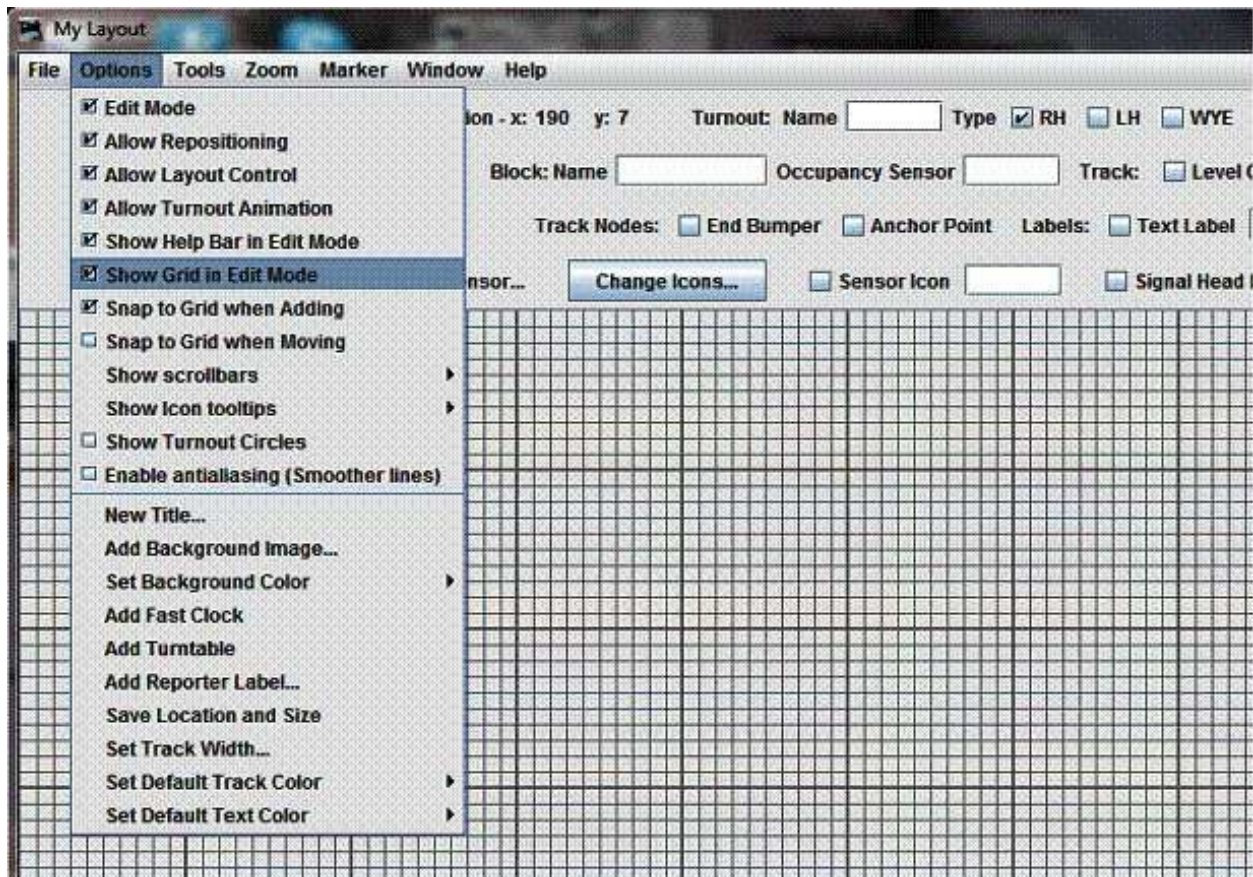
1. From the main screen, select, Panels, New Panels, Layout Editor as shown In FIG 17

FIG 17 – STARTING LAYOUT EDITOR



2. The panel is shown in edit mode. Check the boxes for “Show Grid in Edit Mode” and “Snap to Grid when Adding” as shown in FIG 18.

FIG 18 – LAYOUT EDITOR OPTIONS



3. Start by adding the first turnout. Enter NT1 in the box “Turnout Name” and place a check in the LH left hand turnout box. Hold the shift key and click on the panel.
4. Right click on the turnout and drag it to position as shown in FIG 19 and FIG 20. We will construct the panel within a space of 3 by 6 grid blocks. Resize the window frame to outline these blocks.

FIG 19 – TURNOUT PLACEMENT ON LAYOUT EDITOR PANEL

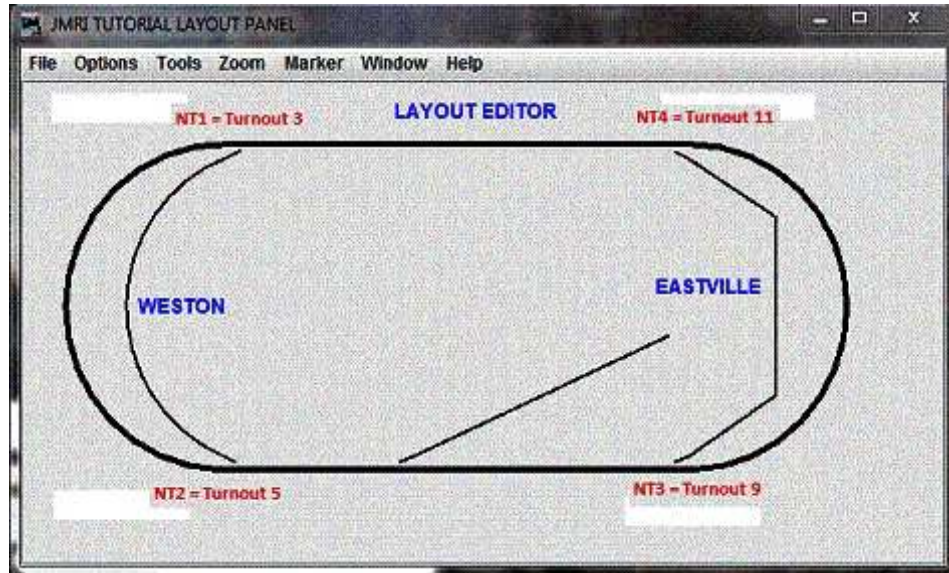
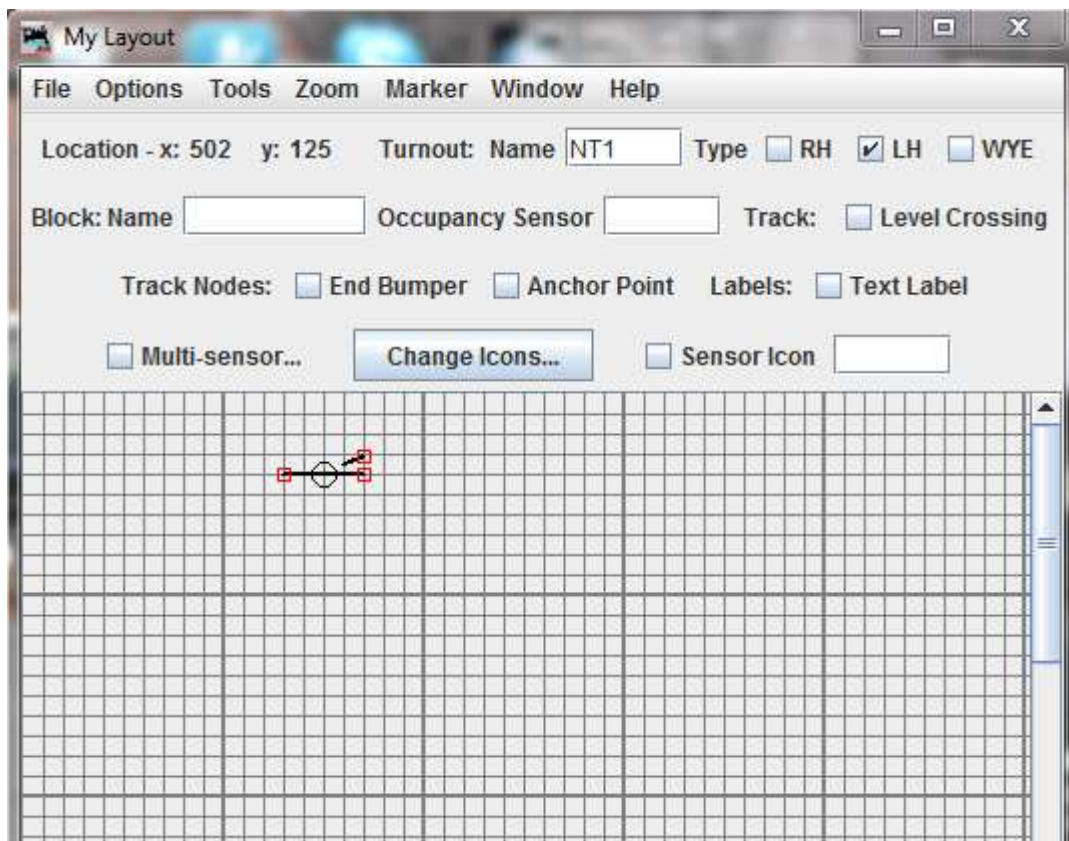
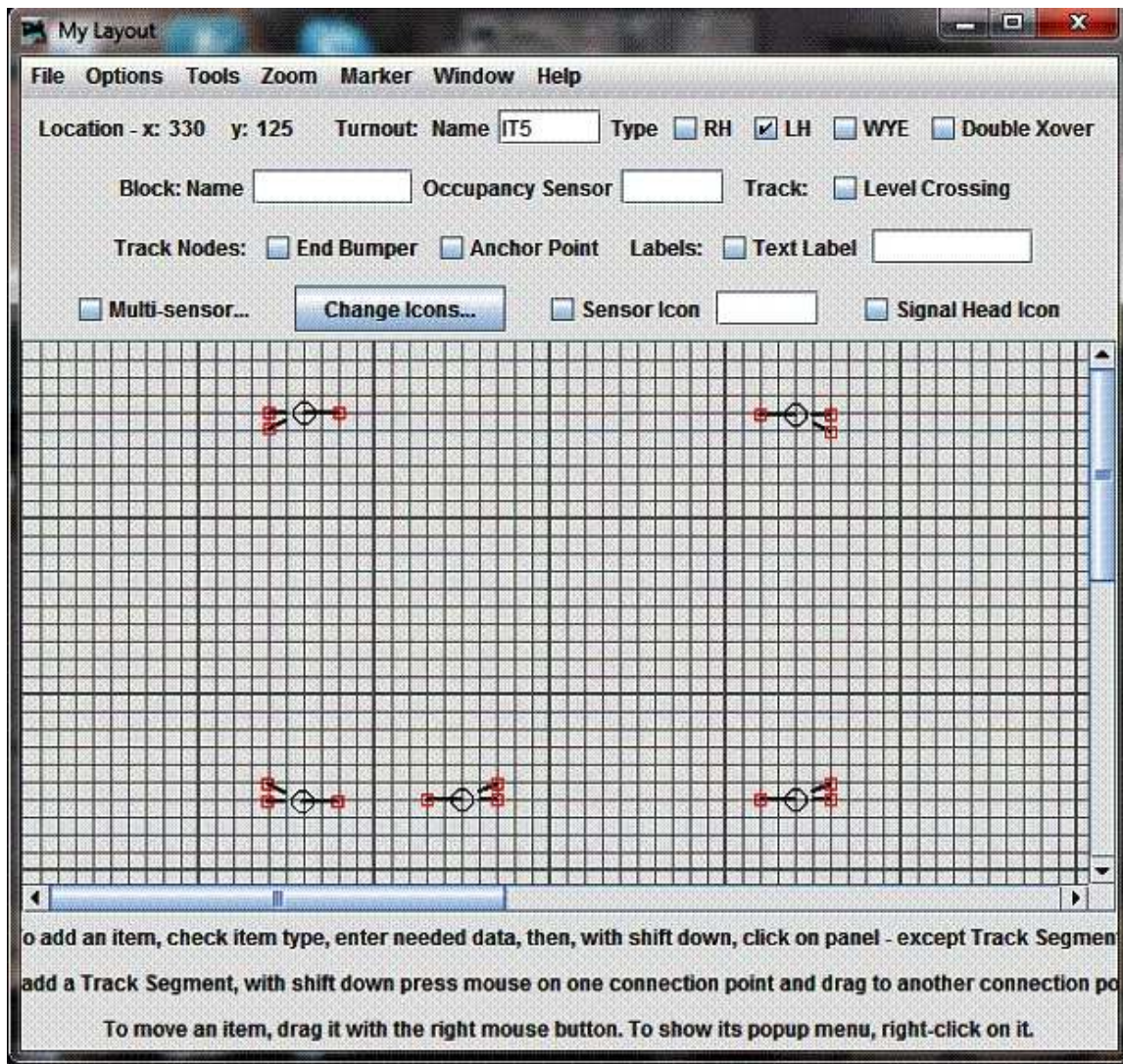


FIG 20 – FIRST TURNOUT PLACED ON THE PANEL BEFORE 180 DEGREE ROTATION



Continue to add the remaining three NT turnouts to the panel, making sure to note they are left or right handed. NT2 is the lower left, NT3 is the lower right and NT4 is placed upper right. Right click and Rotate NT1 and NT2 180 degrees and move them as needed. Right click and remove if you make a mistake. Also add the internal Turnout IT5 for the hand thrown siding. When you are done, your panel should look as shown in Fig 21.

FIG 21 – LAYOUT EDITOR WITH 5 TURNOUTS IN PLACE



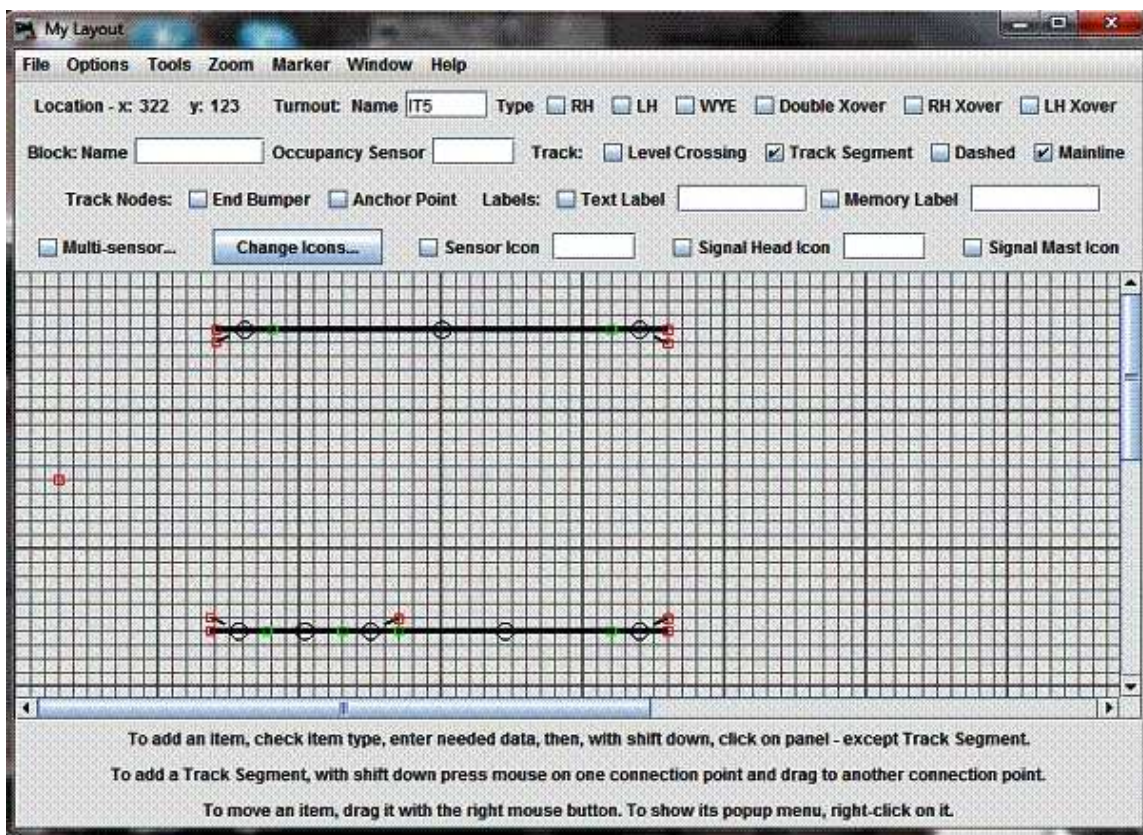
Notice that when you first place the turnout, it may be in an unknown state. Clicking on it will make it go Closed and Thrown. (JMRI terminology – you may consider them Normal and Reverse) If you open the Turnout Table, you will see that the turnout in the table and the turnout on the panel are linked. If you had a connection to a real layout, the turnout on the railroad would throw as well.

Adding Track

Notice that the three ends of the turnout have a red square attached. These are open nodes waiting to be attached to track segments. Let's start by placing a mainline track between the top two turnouts.

1. Check the box **Mainline and Track Segment** box. Hold the shift key and click on the panel at the red anchor point on the first turnout. While holding the shift key, drag the track to the opposite turnout. When you see a cross hair, release the shift key. The track segment is added and both anchor points turn green, denoting they are complete.
2. Add straight segments of track at the bottom of the layout as well. Your panel should look as shown in FIG 22. (FIG 22 omitted – refer to FIG 23)
3. Click on the anchor point box and shift click to add an anchor point in the middle of the left side of the layout as shown in FIG 23.

FIG 23 – ADDING STRAIGHT TRACK SEGMENTS TO LAYOUT EDITOR



4. Click back on track segment and shift click to drag track between the left turnouts and the new anchor point.
5. Right click the circle in the middle of the track segment and Change to Circle. You may have to flip the angle if it is wrong. You can drag the circle center to get a nice radius fit. You can also move the anchor point. Notice the anchor point is still red waiting for a second track segment.

6. Add the second track segment and make it a circle (arc) too. Your panel should look as shown in FIG 24 and FIG 25.

FIG 24 – ADDING CIRCLE TRACK SEGMENTS TO LAYOUT EDITOR

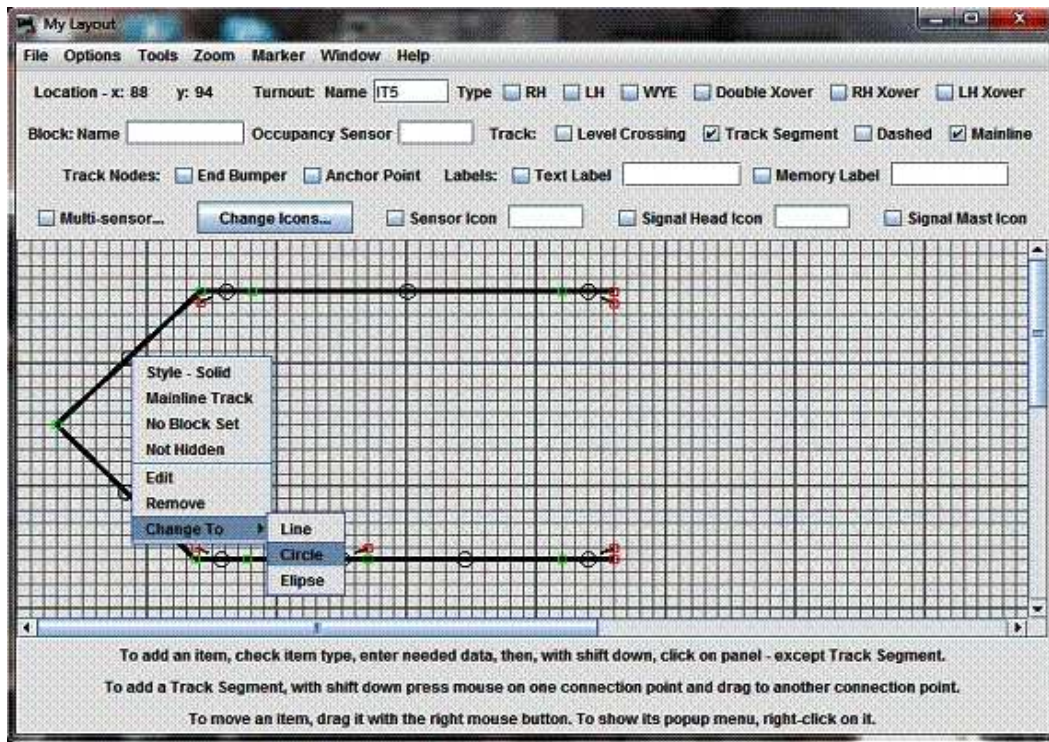
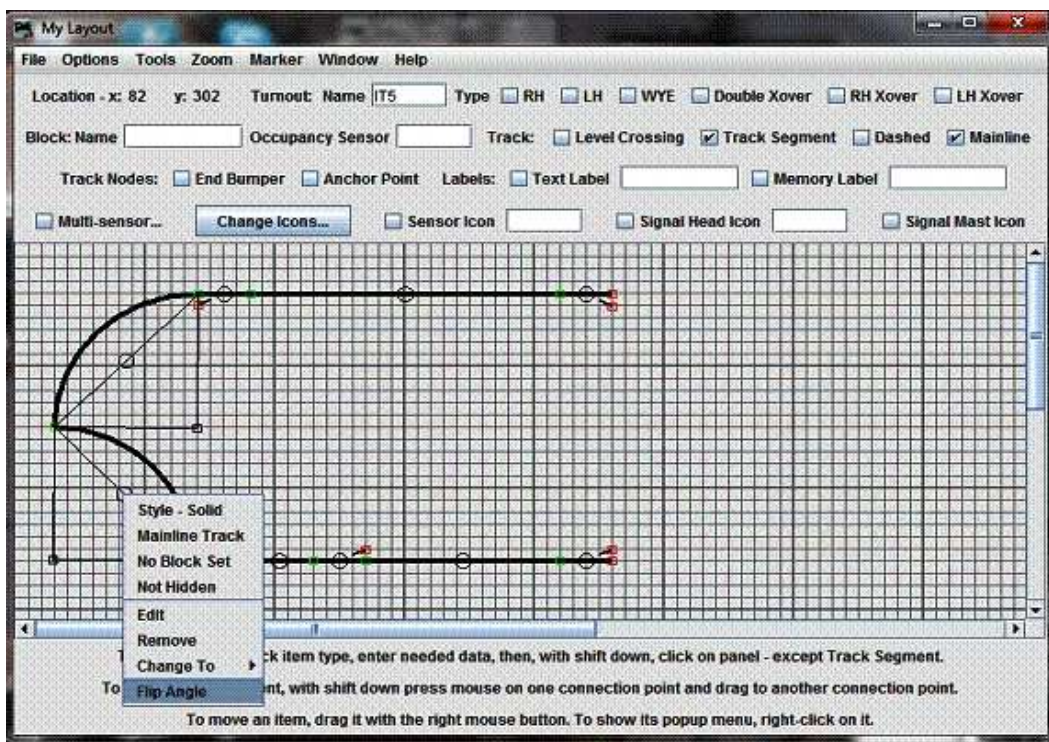


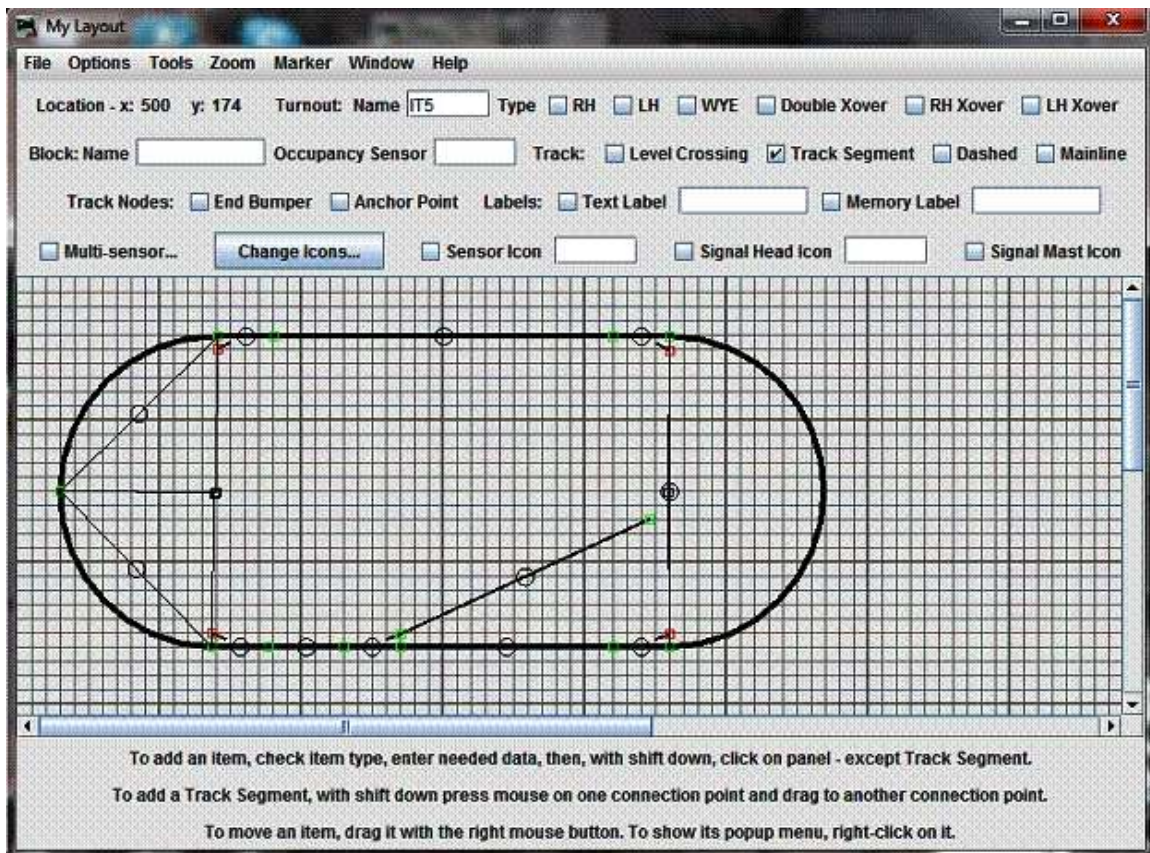
FIG 25 – ADDING CIRCLE TRACK SEGMENTS TO LAYOUT EDITOR



On the right side, we are going to add a single semi circular track segment between the turnouts.

1. Check the box *Mainline* and *Track Segment* box. Hold the shift key and click on the panel at the red anchor point on the upper right side turnout. While holding the shift key, drag the track to the lower right side turnout. When you see a cross hair, release the shift key. The track segment is added and both anchor points turn green, denoting they are complete.
2. Right click the circle in the middle of the new track segment and *Change to Circle*. You may have to flip the angle if it is wrong. You can right click and drag the circle center to get a nice radius fit.
3. Click the box for an *End Bumper* anchor point and shift click to add it in the center of the loop.
4. Uncheck the *Mainline* box and add a straight segment of track between this anchor and the siding turnout. Note the bumper anchor turns green with just one segment. Your panel should look as shown in FIG 26

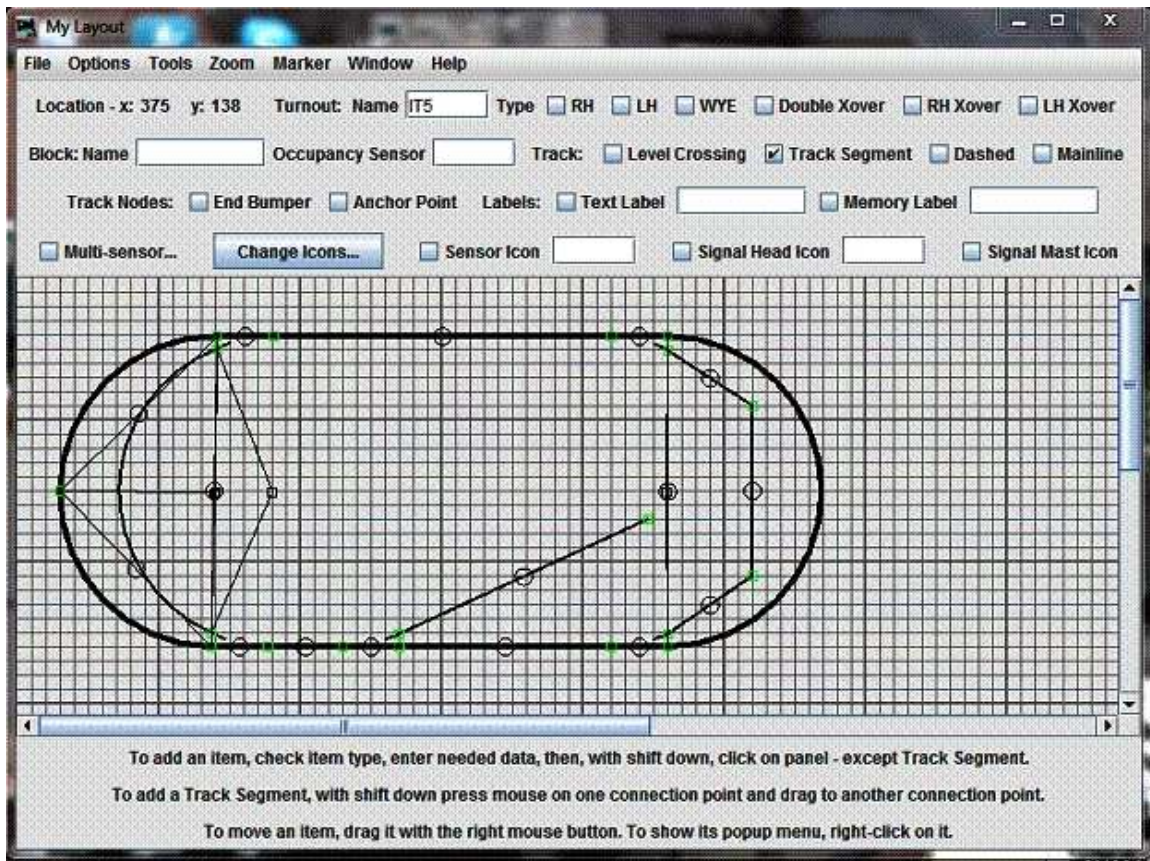
FIG 26 – ADDING MORE TRACK SEGMENTS



1. Uncheck the box *Mainline* and check the *Track Segment* box. Hold the shift key and click on the upper left turnout to add the passing siding. While holding the shift key, drag the track to the lower left side turnout. When you see a cross hair, release the shift key. The track segment is added and both anchor points turn green, denoting they are complete.
2. Right click the circle in the middle of the new track segment and *Change to Circle*. You may have to carefully select the new track segment, as it is right on top of the circle centers for earlier added track segments. You can use the zoom feature to better see the difference between the circles. You may have to flip the angle if it is wrong. You can drag the circle center to get a nice radius fit. Note the siding track is thinner than the mainline track.

3. We'll do something different on the right. Add Anchor points and straight track segments as shown in FIG 27

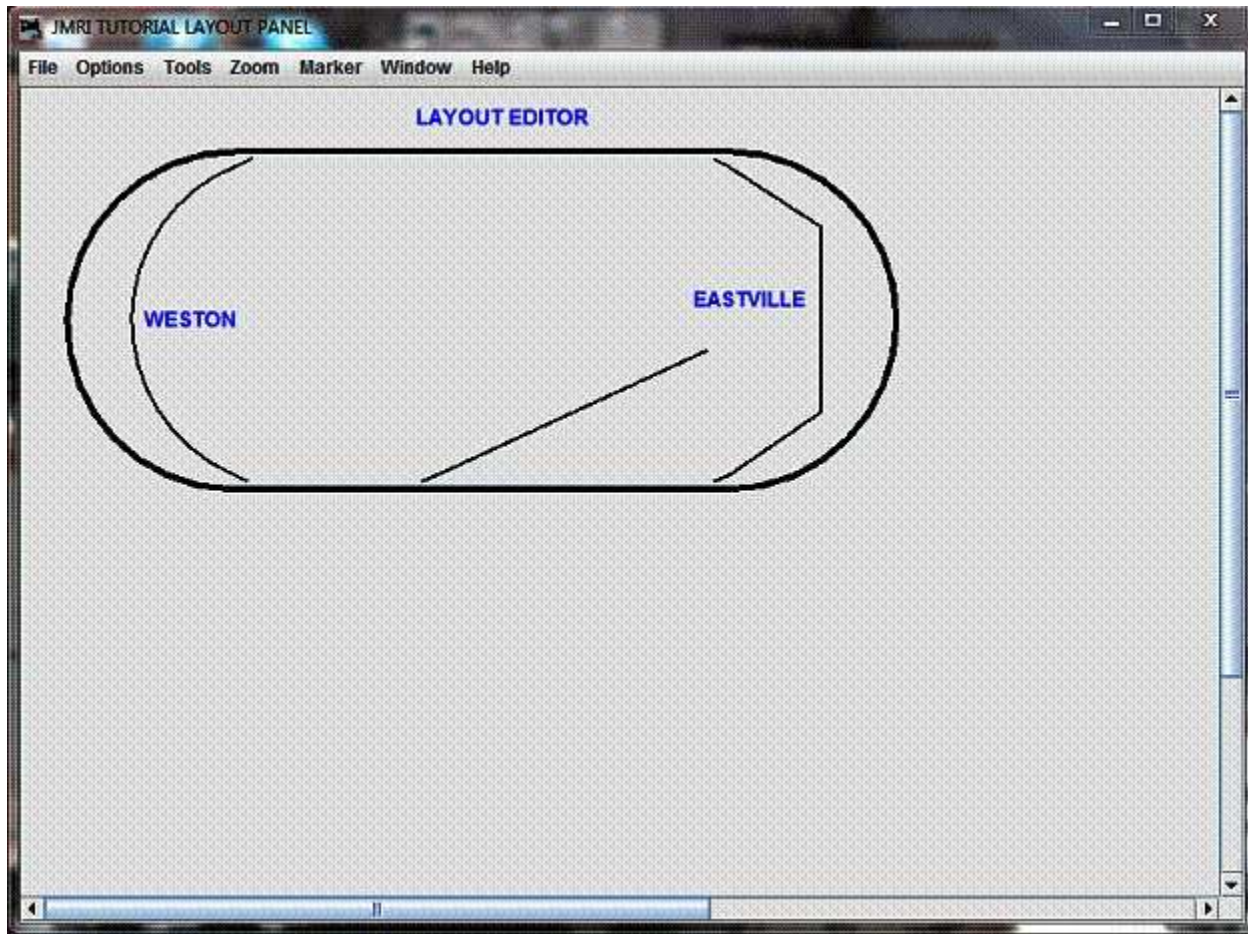
FIG 27 – COMPLETED LAYOUT EDITOR PANEL IN EDIT MODE



4. Let's give the panel a title – Click on the Text Label box and type "LAYOUT EDITOR" in the wide box to the right. Shift click to place it on the panel. Right click to set Font size and color. Right click to drag it to position.
5. Add the text for Weston and Eastville to your panel
6. Now give the finished panel a name. Click on the menu Options, select New Title and enter a name.

7. Click on the menu *Options*, turn off the edit mode. Your panel should look as shown in FIG 28.

FIG 28 – COMPLETED LAYOUT EDITOR PANEL VIEWED OUT OF EDIT MODE

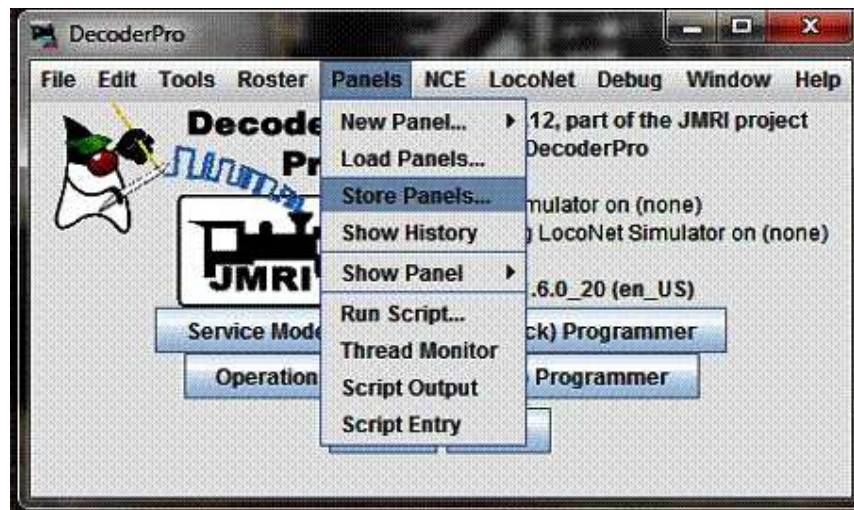


We'll come back later and create blocks and add sensors and signals to the Layout Editor panel. But you could already control turnouts with the right DCC hardware and JMRI. Before you save your panel, select *Options* from the menu and *Save Location and Size*. With this set, your Layout panel will open in the same place and size each time.

SAVE your work!

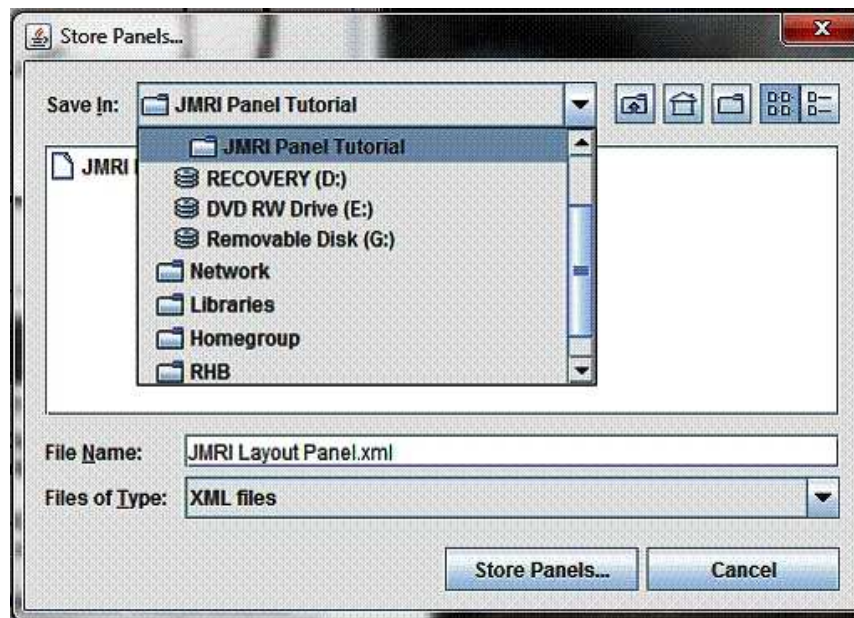
1. From the main JMRI screen, select *Panels, Store Panels* as shown in FIG 29.

FIG 29



2. Navigate to the JMRI Panel Tutorial directory we created earlier as shown in FIG 30.
3. Store the panel with a name like "JMRI Layout Panel". Click the Store Panels button.

FIG 30



The saved file will have an xml file extension and can be viewed with a simple text editor like WordPad. Don't change the file with an editor unless you know what you are doing! Leave this layout panel open while we work on the second CTC panel with the panel editor. Move it to the side if you like. Wherever it is located when the xml file is stored is where it will be when the panel is loaded from JMRI. The xml file contains the sensor, turnout and Logix tables, as well as the Layout and Panel information. All of the information needed is in one place. Save your work frequently and give it a new name periodically so you can go back to working panel(s) if you get way off track ;-)

This completes Part 1 of the Panel Tutorial covering the Layout Editor. Open up Part 2 to delve into the Panel Editor and create a US&S CTC panel.

Special thanks to Dan Foltz for improving the format of the tutorial.

If you have a question for me, contact me via email at bob@quaker-valley.com

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