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JMRI Control Panel Editor for Modern Style Dispatching Panels
Types of JMRI PanelPro Editors

- Layout Editor
- Panel Editor
- Control Panel Editor
<table>
<thead>
<tr>
<th>Type</th>
<th>Images</th>
<th>Unique Features</th>
<th>Track styles</th>
<th>Signal Control</th>
<th>Train Automation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Layout Editor</td>
<td>Vector based track images and raster based background images</td>
<td>Captures the full connectivity of your layout as you draw it. Only single instances of each vector Item are allowed. Predetermined look and feel. Vector based items may show both animation and occupancy.</td>
<td>SSL Logix Masts</td>
<td>Uses <strong>Dispatcher</strong> and <strong>Transits</strong>.</td>
<td></td>
</tr>
<tr>
<td>Panel Editor</td>
<td>Raster Images used for both track and background images</td>
<td>Multiple instances of any Item are allowed. Uses both supplied and custom images as required for panel visual fidelity. Raster Images used to show animation. Occupancy info possible, but difficult, to show using track colors.</td>
<td>SSL Logix Masts</td>
<td>None other than by <strong>Scripting</strong>.</td>
<td></td>
</tr>
<tr>
<td>Control Panel Editor</td>
<td>Raster Images used for both track and background images</td>
<td>Multiple instances of any Item allowed. Uses both supplied and custom images as required for panel visual fidelity. Raster Images to show animation. Occupancy and automated train status info shown.</td>
<td>SSL Logix Masts</td>
<td>Uses <strong>Warrants, OBlocks, and Portals</strong>. Use of <strong>Masts</strong> allows automated trains to operate at signal indicated speeds. Train recording supported.</td>
<td></td>
</tr>
</tbody>
</table>
To add an item, check item type, enter needed data, then, with shift down, click on panel - except Track Segment.

To add a Track Segment, with shift down press mouse on one connection point and drag to another connection point.

To move an item, drag it with the right mouse button. To show its popup menu, right-click on it.
This image shows a Layout Editor panel in operation. Turnouts may be thrown by clicking on them. Red track is occupied, and white is clear.
Panel Editor
This image shows a Panel Editor panel in operation. Of course a classic CTC panel did not include working signal mast images. Turnouts may be thrown by clicking on them or by throwing the appropriate levers. (by clicking on the levers)

Track with yellow indicators is occupied.
Control Panel Editor

Prototype

Model
The Reality

- The Actual Signals at CP-293
The Reality

- The Dispatcher's view of CP-293  As far as I can tell from the information that I have, this train is westbound so we are probably looking at the middle set of signals that protect eastbound traffic. Note that the dispatcher has a very simplified view of the situation. The two crossovers are located under the train. The point motor is about where the trailing truck of the second engine is. The yellow 'Reminder Switch Tag' indication shows locations with switch heaters. The little 'house afire' logo is the heater control. Main 2 is on the right, Main 1 is center, and the track on the left is a controlled siding. Obviously the photo and the panel are at different times.
Getting Started

- Start JMRI by using the PanelPro icon. DP3 locks you out of the panel creation options. This release is actually from just a few days ago.

- I am creating this clinic on a Linux machine. Your startup window may look slightly different. For example on Windows it would show a serial Com port number in the LocoBuffer-USB connection information line.
In this clinic we will make the assumption that you are already somewhat familiar with JMRI and PanelPro. We are only going to cover the items that are unique to the Control Panel Editor.

- Under 'Panels' select 'New Panel' and then click on 'Control Panel Editor'.
- This will open a new Control Panel Editor window.
Getting Started

- All the Control Panel Editor functions are reached from the drop down menu bar.
The 'Saving' thing.

Note that it says 'Save Panels...', not 'Save Panel'. All loaded panels will be saved in a single 'PanelS' file. Also just closing a panel does NOT delete it. Think about the consequences of 'closing' then reloading a panel.
The 'Saving' thing.

- We will call it 'RMU-2014-Clinic-1. The .xml extension will be added automatically.
- After you enter the new File Name, then click on the 'Save Panels...' button.
- I am using Linux, so your windows may look a bit different.
- Save your panels often, and change File Names in case you make a grave error.
Add Items

To add items to our new panel select 'Add Items' then click on 'Item Palette' or else select the panel and then type <Ctrl + P>

This opens a new 'Item Palette' window with various selection tabs for all the different kinds of things that we might want to add to our panel.

- Some tables may be automatically populated depending on the system used.
- This is the desired appearance of our finished panel.
Add Items - Background

- You may either use existing or custom icons to build a background like a classic CTC panel, or simply select a single 'Background Color' like the basic black of the modern CRT panels.

- Click 'Background Color'.
Add Items - Background

- Here we have selected Black from our pick list.

- Obviously that is not the only choice we have. Delay the mouse pointer over any item and it will show the RGB values for that color. (e.g. 0, 0, 0 for black)

- After the selection is made the new background color will be applied to the 'Preview' pane.

- Click 'Done' to apply the color to your panel. Solid black is difficult to see, so we will use a 153, 153, 153 medium grey until we are nearly finished.
The Control Panel Editor includes the option of creating various shapes on the panel. We will use this feature to create the shaded boxes that highlight each of the Control Points on a modern panel.

- Select 'Draw Shapes' then click on 'Draw Rectangle'.

Add Items - Shapes

- The 'New Rectangle Shape' window opens with various selection options.
- Here we have selected our rectangle to have a fill color of dark gray. First select 'Fill Color' then click on the desired color.
- You may choose one line color and a different fill color.
- We would also select 'Opaque' to prevent any background image from showing through our rectangle image.
Add Items - Shapes

- Now use the mouse to select an area where the shape will be created.
Add Items - Shapes

- Release the mouse to create your shape.
- To move your new shape first select it with a <Shift + Left Click>.
- Once it is highlighted you may also move it around with a <Shift + Drag>.
- Right Click in the rectangle to select it and open its options.
- The 'Edit Rectangle Shape' option returns you to the selection window to make changes.
- 'Remove' is the nuclear option to let you start over.
- Use 'Edit Tooltip' to add a tool tip for the shape. For example 'CP 293'.
### Be sure to setup your system hardware as required for detection.

### The above example shows setting up a RR-CirKits WatchMan to monitor 4 of its block detectors to send LocoNet events 117-120.
Now let's add some track. In Panel Editor track is just static images taken from the icon set.

Control Panel Editor expands on that option by adding six sets of active icons for track based on the track's status.

- Power Error
- Occupied
- Clear
- Out of Service
- Allocated
- Train Position
UTCS = 'Unified Train Control System'

As we can see, the UTCS track icons are not a part of the default 'Icon Sets' for indicator track, so we will need to add them.

Do this by clicking on 'New Icon Set'.
Add Items - Indicator Track

- UTCS = 'Unified Train Control System'
- As we can see, the UTCS track icons are not a part of the default 'Icon Sets' for indicator track, so we will need to add them.
- Do this by clicking on 'New Icon Set'.
- Type in a name for the new set and then click 'OK'.

![Item Palette](image)
Add Items - Indicator Track

- Drill down in the file Catalogs until you reach the 'track/UTCS/TrackSeg' images and open them.
Add Items - Indicator Track

- Drill down in the file Catalogs until you reach the 'track/UTCS/TrackSeg' images and open them.
- Drag images from the catalog to the Icon Set area to match your system.
- Then click 'Done' to add the new set.
Now our new UTCS (Unified Train Control System) image set appears as an option to use.

Control Panel Editor has basic ideas about the necessary track states and colors. These are not 100% in line with the actual prototype control panel requirements.

Some possible additions and changes.

- Clear – In Manual Mode - Tan
- Clear – In Automatic Mode - White
- Train Position – direction Left/Right (Red arrows)
Add Items - Indicator Track

- Click on 'Open Detector Picklist' to select a Sensor or OBlock for this piece of track.
- You may pick from an existing list or fill in the blanks and click 'Add to Table'.
- Drag the sensor from the list into the 'Occupancy Circuit' box to connect the image to a sensor.
Add Items – Indicator Track

- To add track to the panel simply select it from the 'Drag to Pane' box and drag it onto the panel where it is needed.
- Note that part of the new track icon is hidden underneath the rectangle shape.
This introduces us to a very key concept in how Control Panel Editor actually accomplishes its magic.

Every object in the panel exists on a 'Level' or layer of the panel. Higher Level objects will cover over objects at a lower level unless they have 'Transparency' or pixels that are transparent.
Items – Level

- To access this 'Level' information <Right Click> on the object. Note: some objects may require a <Shift + Right Click> to access.

- We see from this that the Indicator Track defaults to Level= 7.
To access the Shape 'Level' information requires a <Right Click> to access the menu. (<Shift + Right Click> in some older versions of JMRI)

We see from this that the Indicator Rectangle Shape defaults to Level= 10 which is a higher level than the track, which explains why the track is hidden by it.

Once we see the problem the solution is simple. We want everything to be on top of the background which is at Level=1. Our gray Rectangle Shape which is placed under all other icons should be set to Level=2. Note: do NOT set it to Level=1 or you will no longer be able to access it. (don't ask) Fortunately I do know how to edit the .xml files.
Items - Level

- Now that we have changed the Level of the Rectangle Shape to Level=2 our track is showing on top of it.

- This same Level setting trick can be used for other places as well. For example Indicator Track and Indicator Turnouts both default to Level=7. However sometimes we would like to position a turnout image on top of a track image. If they are both at Level=7 then it is random which image will be visible. If we change the Indicator Track to Level=6, then the turnout will always show up on top of the track.
Now let's add a track circuit for this set of icons. When we first added the Indicator Track we simply assigned it to a sensor. However we can actually define a complete track circuit for later use.
Now let's add a track circuit for this set of icons. When we first added the Indicator Track we simply assigned it to a sensor. However, we can actually define a complete track circuit for later use.

- Select the Circuit Builder drop down and click on 'Add Detector Circuit'
Items - Occupancy Block

Now lets add a track circuit for this set of icons. When we first added the Indicator Track we simply assigned it to a sensor. However we can actually define a complete track circuit for later use.

- Select the Circuit Builder drop down and click on 'Add Detector Circuit'
- This opens a small 'New Track Circuit' window. Fill in the System and User Names for this circuit. The System Name will automatically have 'OB' added and be forced to uppercase.
Items - Occupancy Block

- When we click on 'Add OBlock Circuit' this window opens.
- We can either 'Open Sensor Picklist' and drag the sensor into place, or simply type in 'LS122' to enter the OBlock detection sensor and any error sensor if available.
When we click on 'Add OBlock Circuit' this window opens.

We can either 'Open Sensor Picklist' and drag the sensor into place, or simply type in 'LS122' to enter the OBlock detection sensor and any error sensor if available.

When we click on 'Done' a warning pops up. This one is because we had attached the track directly to the sensor rather than the OBlock which hadn't existed yet. Just right click to edit the icon data.
Its been pretty slow getting to this point, but it gets easier. The Control Panel Editor includes a 'Duplicate' option. Simply right click on the item you need to duplicate, and click on 'Duplicate'. All the details will be duplicated, not just the image.

The duplicate item will appear with a yellow highlight. Drag it to its new location.

The UTCS icon set is designed to indicate a gap when loosely spaced, or no gap when lapped.
- We have copied a couple of the track icons.
- We then changed the OBlock name of the last one to 'OBWH-OS-M2' (OBlock Whithead OS Main 2) However this isn't working right because the new OBlock doesn't have a sensor attached.
- Return to the main PanelPro window and select 'Tools' – 'Tables' – 'Occupancy Blocks' and we will just add in the rest of them to make it easier later in the process.
Items – Occupancy Block

A new window then opens with several options.
At first we are only interested in the Occupancy Block Table portion.

We already see our original entry and the half entered new entry. To add the desired track occupancy sensor. (LS121) Double click on the entry to edit it.

Continue by adding in the remaining Occupancy Blocks one at a time in the blank bottom row of the table.
Here we see the completed section that covers the tracks of the demo layout.

These Occupancy Blocks are now available as occupancy information for any track that we will add to the control panel.

We typed in all of our sensors. Optionally we can open the 'Item Palette', choose the 'Sensor' tab, and drag the sensor into each field. For 'LS121' this seems like the hard way to do things, but for more complex items it can save typing and possible errors.

Length, speed and other values are options to be compatible with JMRI Blocks for setting train speeds when using Dispatcher and Active Trains, and may be ignored for now. 'Warrants' uses the Mast Aspect indications to control train speeds.
### Occupancy Block Table

**Summerizing:**

- **System Name** - is the internal name used by JMRI for each Occupancy Block.
- **User Name** - as we entered it will show in tool tips and selections for better understanding.
- **Comments** - are for extra info.
- **Sensor** - is the system event name/number used by the detection hardware.
- **Paths** - are the various possible routes through the OBlock from one Portal to another Portal.
- To delete an OBlock click on the 'Delete' button.
- **Length, Curvature, etc.** - are options to be compatible with JMRI Blocks for setting train speeds when using Dispatcher and Active Trains.
- To manually add a new OBlock simply select the last (blank) entry and start entering data.
- The System Name will automatically be corrected if you do not include the initial 'OB' or fail to enter it in upper case.
- The Occupancy Block Table may be sorted by any column simply by clicking on the column header. Click on the arrow to change the order.
Blocks are implemented as JMRI OBlocks, which are extensions of JMRI Blocks. They have the following characteristics:

- An OBlock has from 1 to N Portals, or ways to enter/exit the block.
- Although an OBlock can be defined without a sensor, i.e. a "Dark Block", it should normally have a sensor. If it has more than one physical sensor, these sensors should be "OR"ed together and trigger a single internal sensor for the block. This may be done electrically or logically by using Logix or layout hardware.
- An OBlock has from 1 to N paths. A path is a route through the block from one portal to another.
- An OBlock has 0 to N turnouts.
Now we will add an Indicator Turnout to our panel, but first use the Turnout Table to setup and test the hardware.

- Add user names and any other options such as feedback sensors.
- Once the actual turnouts are working we can add them to our panel.
First we need to add the UTCS icons the same way that we did for the indicator track icons.

- We will actually add two sets, left hand and right hand images. (UTCS-Left and UTCS-Right)
- Click on 'Edit Icons' for each icon type and drag the desired images to their boxes.
Items - Indicator Turnout

- First we need to add the UTCS icons the same way that we did for the indicator track icons.
- We will actually add two sets, left hand and right hand images. (UTCS-Left and UTCS-Right)
- Click on 'Edit Icons' for each icon type and drag the desired images to their boxes.
- Do this for each item in the palette.
First we need to add the UTCS icons the same way that we did for the indicator track icons.

We will actually add two sets, left hand and right hand images. (UTCS-Left and UTCS-Right)

Click on 'Edit Icons' for each icon type and drag the desired images to their boxes.

Do this for each item in the palette.

The results should look something like this.

Do the same for the UTCS-Right images.
First we need to add the UTCS icons the same way that we did for the indicator track icons.

We will actually add two sets, left hand and right hand images. (UTCS-Left and UTCS-Right)

Click on 'Edit Icons' for each icon type and drag the desired images to their boxes.

Do this for each item in the palette.

The results should look something like this.

Do the same for the UTCS-Right images.

Close the Item Pallete and be sure to save the new options when the system asks you to.
Items - Indicator Turnout

- Now let's add an Indicator Turnout to our panel.
- Click to open the picklist and simply drag the occupancy info to the 'Occupancy Circuit' box.
- Now that we have the OBlock defined we will use it rather than the sensor. Either will work.
Items - Indicator Turnout

- Highlight the entry in the Turnout Table.
- Drag the icon to your panel
- Now that we have the OBlock defined we will use it rather than the sensor. Either will work.
- If the turnout appears as a red X when you drag it to the panel, simply click it.
- Once it appears you can place it properly.
To fine tune the image positions note that the images each have a transparent row of pixels at the ends of the indicator sections. If you butt the icons together, then the dark field will show through as a 'Gap'. (In this example it is light gray)

If you crowd the icons together, then the transparent portion isn't visible and the line appears to be continuous.
The second Indicator Turnout is not inverted as we need it to be.

Open the icon menu by right clicking and select 'Rotate (degrees)'.

Enter 180 then click 'Set'.

The icon can now be moved into place.
Items - Duplicate

- If you left click in an open area of the panel you can create a 'Surround' box that will select all items included within it. The selected items will have yellow boxes around them.

- Open the icon menu of any selected item by right clicking and select 'Duplicate'.

- As with a single item, all selected items will be duplicated.

- The duplicated icons can now be moved into their new place.
After a few uses of 'Duplicate' we now have the above panel.

Open the icon menu of each newly created item by right clicking and selecting 'Edit Indicator Track Icon'.

Click on 'Open Detector Picklist' and drag their new OBlock names into each icon, then click on 'Update Panel' for each.

Don't forget to do a 'File' - 'Save Panels' as you add to your work.
One more group duplicate gives us the above.

Again go through the newly duplicated icons and update each of their references.
- Now right click to open 'Edit Turnout Icon' to open this window.
- Change the 'System Name'.
- Open the Detector Picklist and change the 'Occupancy Circuit'.
- Change the selected Icon Sets from 'UTCS Left TO' to 'UTCS Right TO'.
- Click on 'Update Panel' to correct the icon.
- Do the same for the second turnout icon.
Now we have the correct facing turnouts and icon information. However they are not yet in their correct locations.

Move them and their connecting track segments around to correct the icon positions.
Add another background box. Be sure to change its Level to '2', and change its 'Tooltip' to the correct name. (in this case 'CP Manion')
Items - Text

- Add another background box. Be sure to change its Level to '2', and change its 'Tooltip' to the correct name. (in this case 'CP Manion')

- To add text labels to the panel click on 'Add Items', select the 'Item Palette', and then click on the 'Text' tab.

- A little bit of text dresses the panel up and makes things a lot more clear.
Adding text to a panel with the Control Panel Editor is much easier than with the Panel Editor. When you select 'Text' from the item palette this window opens up. It has all the required configuration information in one place. Once you make your format choices and add the text you place it on the panel by dragging and dropping from the preview box to the panel.

Once you have placed a text item you can right click it and select 'Edit Text' to just change the text, or else select 'Edit Text Attributes' to change not only the text, but any other attributes such as size or style as well.

With 3.4 you can now easily make jump-to text that go to new panels or web links.
Now we can change the background color to black and see the results of using some dark gray rectangles for demarking control points. We also moved everything to the center.

Actually there is no 'Edit' window to change the background color. Simply select 'Background' from the Item Palette again, and assign a new color. I wanted something darker than the darkest grey swatch which is (51, 51, 51), but not pure black (0, 0, 0). To create this custom color background select the 'RGB' tab and enter whatever value you need. I used (25, 25, 25) in this example.

If you have an image that you prefer as a background, then place it in your preferences directory in a folder named 'resources'. It will then show up when you click 'Add Icon'. 
For this clinic we will dress it up even more.

- White Text = Locations
- White Numbers = Turnouts
- Small Jewels = Sensors for test and demo use
- Yellow = Main Lines
The 'Portal Table' is part of the Occupancy Blocks Window.
Portals are the logical dividing lines that separate two blocks. They have the following characteristics:

- A Portal has exactly two Blocks. (no more, no less)
- A portal may have 0 to 2 Signal masts. If a portal has a signal mast, it faces one of its blocks. A second signal, if it exists, faces the other block. Each signal controls the movement of a train exiting the block it faces and thus the entrance of the train into the next block.
- Depending on the detection method a portal may be located at the physical gaps located between two blocks that are using current detection, or it may be at the logical 'gaps' in some other detection method.
To enter data into the Portal Table select entries from the OBlock Table and drag them into the Portal Table.
To enter data into the Portal Table select entries from the OBlock Table and drag them into the Portal Table.

Name the Portals that this creates.

Portals are simply the junction of two blocks. There is no direction information implied.
Select 'OpenTables' and then click on 'Show Block-Port CrossReference' to get a complete list of Block Names and the Portals that you have defined.
Blocks and Portals

- Select 'OpenTables' and then click on 'Show Block-Portal CrossReference' to get a complete list of Block Names and the Portals that you have defined.

- Sidings or off panel blocks will have a single Portal entry. (e.g. Block 13)

- Single blocks will show two Portals, one for each end. (e.g. Block 11)

- Interlockings will have three or more references depending on their complexity. (e.g. CP Seale)
Paths are possible ways to traverse a block. They are implemented as JMRI OPaths, which are extensions of JMRI Paths. They have the following characteristics:

- A Path has 0 to N turnouts.
- A path has at least one (a dead end track) and no more than two portals. (a through track)
- To enter the possible Paths through an OBlock click on the 'Paths' button.
There is only one way to go through 'Block 11'. It is from the Portal 'CP Moorman W1' to the Portal 'Wheeler'.

Drag Portal 'CP Moorman W1' to one side and 'Wheeler' to the other side.

Give the path a name. (then hit <Enter> to register the new value)

Close the window.
Now consider 'CP Seale'. Because CP Seale includes a turnout there can be more than one path through it.

The first path is formed when the turnout is 'Closed' or normal for the main line. It goes from the Portal 'CP Seale West' to the Portal 'CP Seale E2'. It includes a turnout so the 'Turnouts' button is active.
### Paths

- Enter the turnout System or User Name and the setting that is required for this path. For a complex path multiple turnouts may be involved.
- Enter the other path and its turnout position.

<table>
<thead>
<tr>
<th>System Name</th>
<th>User Name</th>
<th>Comment</th>
<th>Sensor</th>
<th>Length</th>
<th>Curvat...</th>
<th>Paths</th>
<th>Delete</th>
</tr>
</thead>
<tbody>
<tr>
<td>OBBLOCK 11</td>
<td>Block 11</td>
<td>LS11</td>
<td>0.00 cm</td>
<td>None</td>
<td>Paths</td>
<td>Delete</td>
<td></td>
</tr>
<tr>
<td>OBBLOCK 12</td>
<td>Block 12</td>
<td>LS12</td>
<td>0.00 cm</td>
<td>None</td>
<td>Paths</td>
<td>Delete</td>
<td></td>
</tr>
<tr>
<td>OBBLOCK 2</td>
<td>Block 2</td>
<td>LS2</td>
<td>0.00 cm</td>
<td>None</td>
<td>Paths</td>
<td>Delete</td>
<td></td>
</tr>
<tr>
<td>OBBLOCK 3</td>
<td>Block 3</td>
<td>LS3</td>
<td>0.00 cm</td>
<td>None</td>
<td>Paths</td>
<td>Delete</td>
<td></td>
</tr>
<tr>
<td>OECB MOORMAN 1</td>
<td>Block 11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OECB MOORMAN 2</td>
<td>Block 12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OECB MOORMAN 3</td>
<td>Block 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Path Table for Block "CP Seale"

<table>
<thead>
<tr>
<th>From Portal</th>
<th>Path Name</th>
<th>To Portal</th>
<th>Turnouts</th>
<th>Clear</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP Seal West</td>
<td>Seale Closed</td>
<td>CP Seale E2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Turnout Table for Path "Seale Closed" in Block "CP Seale"

<table>
<thead>
<tr>
<th>System or User Name</th>
<th>Turnout Setting</th>
<th>Delete</th>
<th>Clear</th>
</tr>
</thead>
<tbody>
<tr>
<td>LT1</td>
<td>Closed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
When you exit the process the Control Panel Editor evaluates what you have done and notifies you of any possible errors that it finds.

In this case it is warning us that we have not yet added the path into dark territory.
When you exit the process the Control Panel Editor evaluates what you have done and notifies you of any possible errors that it finds.

In this case it is warning us that we have not yet added the path into dark territory.
CP Moorman Main 2 (lower track) has 3 turnouts in its path between the east and west ends. This section of track is divided into two OBlocks, the upper section and the lower section with gaps in the two crossovers. (21 & 22)

We will also need to add a third Path Table entry for the path from 'CP Moorman W2' to the siding at OBlock 25. It will also include the same 3 turnouts, but LT23 will be 'Thrown'.
- CP Moorman Main 2 (lower track) has 3 turnouts in its path between the east and west ends. This section of track is divided into two OBBlocks, the upper section and the lower section with gaps in the two crossovers. (21 & 22)

- We will also need to add a third Path Table entry for the path from 'CP Moorman W2' to the siding at OBlock 25. It will also include the same 3 turnouts, but LT23 will be 'Thrown'.

- The fourth path is from the East crossover to the siding.
When we are done we should have 6 paths through CP Moorman. (theoretically 8 paths)

- 11 to 23  Main 1
- 11 to 24  Main 1 to Main 2
- 11 to 25  Main 1 to Siding
- 12 to 23  Main 2 to Main 1
- 12 to 24  Main 2
- 12 to 25  Main 2 to Siding

We do not count the two paths that crossover then immediately back while going from 12 to 24 or 12 to 25.
Path Errors

- Early in your entering of data many 'Warning' windows will pop up. As long as I am still entering data I pretty much ignored them. However as you get close to completing the data entry you will need to start paying close attention because they are notifying you of connections that the Editor sees as possible, but yet undefined.
Warrants

- A Warrant contains the information needed to run a train. This includes the DCC address of the locomotive(s), the route train will take, the settings of the turnouts to traverse the route and the throttle commands to use at various points along the route - e.g. speed, when to show lights, sound horns, bells or other sound effects.

- NOTE: Warrants can only be created if the PanelPro configuration has at least two OBlocks defined.

- There are three steps in creating a warrant,
  1. Define the route.
  2. Select a train.
  3. Record the throttle commands.

- You may also create an NX (eNtry eXit) warrant. This sets up a single use warrant that may be run automatically or manually by an engineer.
To create a new Warrant Select 'Warrants' then click on 'Create New Warrant'.
To create a new Warrant Select 'Warrants' then click on 'Create New Warrant'.

This opens a window where you enter the new Warrant's name. When finished click on the 'Done' button.
- Start by dragging the Originating and Destination OBlocks from the selection list into their proper locations.
Start by dragging the Originating and Destination OBlocks from the selection list into their proper locations.

Click on Calculate.
- In this case the program automatically calculated the route required.
- Select the motive power from your roster by clicking on 'Engine Roster' (I'll use 522)
I added small clickable icons along the bottom of the panel to let us play with the panel even without any layout attached.

The turnouts are also 'clickable' to change them.
The Warrant List shows each train with a previously saved Warrant. Train #1 and #2 have prerecorded throttle commands as well as destinations. Trains '522 W' and '522 E' are meant to be operated manually by an engineer.

Columns in the Warrant Table

- **Warrant**: - The name of the warrant.
- **Route**: - The route of the warrant is listed in a drop down combo box.
- **Train Name**: - The Train Id, as stated in the Roster.
- **DCC Address**: - The DCC Address of the locomotive or consist.
- **Allocate**: - A button that reserves the route for the warrant.
- **Deallocate**: - A button that removes the reservation for the warrant.
- **Set**: - A button the sets the turnouts for the warrant route and shows the portal directions.
### Columns in the Warrant Table Continued.

- **AutoRun**: A button that runs the train over the route according to the automated throttle commands. The recorded speed of the train will be modified according to the occupancy and signal aspects encountered on the route.

- **ManRun**: A button that assigns the route and expects the user to run the train based on the signals he encounters along the way.

- **Control/Status**: The status of the warrant is shown. It also has a drop down combo box that can send the following commands to a running train. Note: This column has two functions - Status messages and control buttons.
  - Halt, Resume, Retry and Abort commands to an automated running train.
  - Edit: A button that opens an editing window for the warrant,
  - Delete: A button that deletes the warrant.
At the lower left of the Warrant Table there is a button to generate a quick warrant.
**NX Warrants**

- You may type in the block names for the start and end points, or more simply just click on the Control Panel itself to fill in each item.

<table>
<thead>
<tr>
<th>Originating Location</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Block Name</td>
<td>Path Name</td>
</tr>
<tr>
<td>[Image of Originating Location]</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Destination Location</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Block Name</td>
<td>Entry Portal Name</td>
</tr>
<tr>
<td>[Image of Destination Location]</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Via Location</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Block Name</td>
<td>Path Name</td>
</tr>
<tr>
<td>[Image of Via Location]</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Avoid Location</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Block Name</td>
<td>Path Name</td>
</tr>
<tr>
<td>[Image of Avoid Location]</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed 0.5</td>
<td>Forward ✔</td>
</tr>
<tr>
<td>EStop at Destination Block</td>
<td>Ramp Speed Intervals (sec) 4.0</td>
</tr>
<tr>
<td>Halt Start of Warrant</td>
<td></td>
</tr>
</tbody>
</table>

| Max Number of Blocks in Route | 1.0 |
| Create NX Warrant | Cancel |
You may type in the block names for the start and end points, or more simply just click on the Control Panel itself to fill in each item.

You may also select 'Via' and 'Avoid' locations, but this is optional.

Click on 'Create NX Warrant'

Oops, a pretty scary warning appears! What is going on here?
You may type in the block names for the start and end points, or more simply just click on the Control Panel itself to fill in each item.

You may also select 'Via' and 'Avoid' locations, but this is optional.

Click on 'Create NX Warrant'

Oops, a pretty scary warning appears! What is going on here?

Actually the message is telling us that the destination (Manion East Main 2) can not be reached by entering from 'Squires 2'. Why would it try that? Because we didn't tell it any differently.
Go to the Path Name and Portal Name boxes and check to see that each one is correct for this train move. Sure enough we see that the default selection for the 'Entry Portal Name' is 'Squires 2' where it needs to be 'Manion E2'. 
Go to the Path Name and Portal Name boxes and check to see that each one is correct for this train move. Sure enough we see that the default selection for the 'Entry Portal Name' is 'Squires 2' where it needs to be 'Manion E2'.

Try again to create our NX Warrant.

This warning I can understand.

Fill in the other boxes if you need some different values. Also be sure to uncheck the 'Forward' box if your engine is facing the wrong way for this move.
Now we have a properly completed quick warrant form.

Click (again) on 'Create NX Warrant' and this time it allocates the route and waits for the train to arrive at the starting point. (if not already there)
Now we have a properly completed quick warrant form.

Click (again) on 'Create NX Warrant' and this time it allocates the route and waits for the train to arrive at the starting point. (if it is not already there)
Finally success! Train 522L appears on our control panel and runs automatically to its destination.

If you check the 'halt at start' check box, then the NX will wait for you to manually start the train by clicking on 'Resume' in the Control/Status box. At any point in the route you can pause the train by clicking on 'Halt'. You can also abort the Warrant. (best to 'Halt' first)
Questions

- ?