Victorian Railways (Victoria, Australia) signal files for JMRI

1. Introduction

These files allow Victorian Railways to be selected as the Signal System for signals defined in JMRI so Victorian Railways three position aspect names and rules can be used.

Aspects and speeds are defined for three types of signal masts:
  double searchlight heads (A and B heads);
  double searchlight heads with a C head added;
  single head, typically used for dwarf signals.

These can be used for home or automatic signals.

These files map the aspect name to the appearance of each head on the mast, i.e. what colour each head displays. These apply to searchlight heads, "traffic light" heads or semaphore arm positions.

References used for these are vicsig.net and victorianrailways.net

2. JMRI Signalling

There is an excellent reference on JMRI's web site to guide you through the steps necessary to set up signalling in JMRI, using JMRI's signal mast logic. Use this link: JMRI Panel Pro Getting Started

The signalling logic will determine the appropriate aspect for a mast based on occupancy in the section ahead, the signal at the end of the section ahead, the position of points and speed restrictions. The logic also uses a group of files to integrate signalling rules for simulating a specific prototypical signalling practice. Each railroad has its own rules and therefore its own set of files. The files described here fulfil this role for Victorian Railways 3 position signalling.

In case you're wondering, Simple Signal Logic is not simple to use so forget it.

Aspects

Aspect Name	Double searchlight	Double searchlight with C light	Single head (dwarf)
STOP (red over red)	🔴🔴	🔴🔴⚪	🔴
NORMAL SPEED WARNING (yellow over red)	🟡🔴	🟡🔴⚪	
CLEAR NORMAL SPEED (green over red)	🟢🔴	🟢🔴⚪	
MEDIUM SPEED WARNING (red over yellow)	🔴🟡	🔴🟡⚪	
CLEAR MEDIUM SPEED (red over green)	🔴🟢	🔴🟢⚪	
REDUCE TO MEDIUM SPEED (yellow over green)	🟡🟢	🟡🟢⚪	
LOW SPEED CAUTION (red over red over yellow)		🔴🔴🟡	🟡
CLEAR LOW SPEED (green)			🟢

3. Installing the Signal files

Open JMRI with your desired profile, select Help and Open User Files Location. Place the zip file in this location and extract here. If they don't already exist, create a folder called "resources" and sub-folders called "signals" and "icons" in the resources folder.

Copy the VictorianRailways folder from the signals folder in the extracted zip file to the signals folder just created.

Copy the smallschematics folder from the icons folder in the extracted zip file to the icons folder just created.

The VictorianRailways folder under signals contains xml files and a VictorianRailways folder containing gif files will be in the icons\smallschematics\aspects folder.

You may need to restart JMRI, just do it to be sure.

4. Creating signal masts

JMRI has Signal Heads and Signal Masts. Signal Masts is the recommended way to go. However, depending on what signalling hardware you use and how they connect to JMRI, you may have to define each signal heads in JMRI and use "Signal Head Controlled Mast" as the Mast Driver in JMRI Signal Mast table.

As examples, this note steps through the process to use these Victorian Railways definitions to create Virtual Masts, DCC controlled masts using NCE's Light-It modules and Microprocessor controlled masts using MQTT communication, though JMRI does not yet support MQTT for signals.

4.1. Virtual Mast

Virtual Masts are useful for having the signals on your Layout Editor diagrams if you don't want or are not ready to put signals on the layout. Only a mast is required, you do not need to configure individual heads.

Create a Virtual Mast by selecting Victorian Railways as the Signal System, which of the three mast types you require and Virtual Mast as the Mast Driver. See Figure 1.

Figure 1: Creating a Virtual Mast
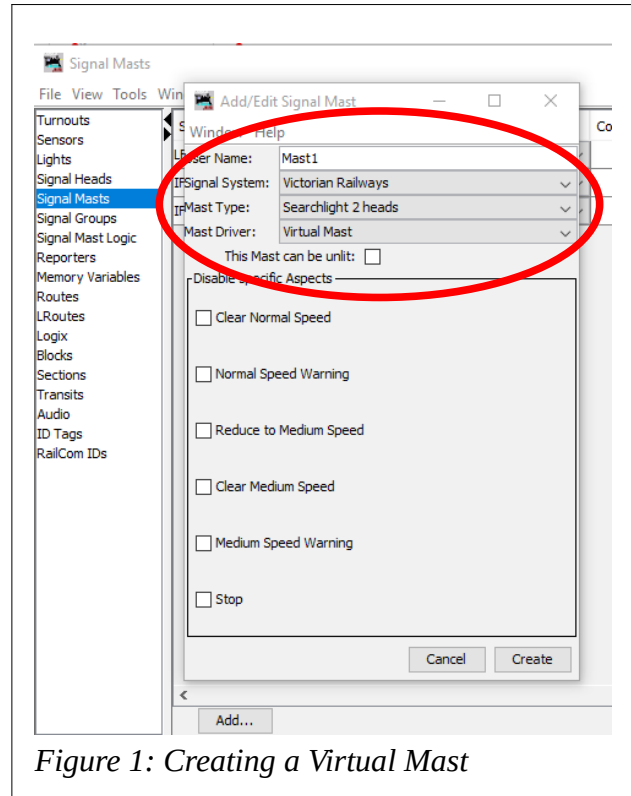
4.2 MQTT Mast

Note: This is not yet available in JMRI.
Only a mast is required, there is no need for individual heads. The aspect name will be sent to the MQTT signal microprocessor. Leading portions of the MQTT topic are set up on the MQTT Connection panel and the last portion is the hardware address defined for the mast.

4.3. DCC mast

This example describes setting up NCE Light-It decoders for Victorian Railways signals. They connect to DCC track power so will work on any brand DCC system, not just NCE.

A Light-It can control up to 3 single-colour LEDs. These have a common anode (+ve) connection. You can use bicolour LEDs (3 legs) or tricolour LEDs (4 legs), connecting each leg to its appropriate mount point. Note that the common leg connects to +5V so LEDs must be common anode. Common cathode LEDs and 2-leg bipolar LEDs cannot be used.

There are several configuration options possible though your choice is limited to match the type of LEDs your mast uses.
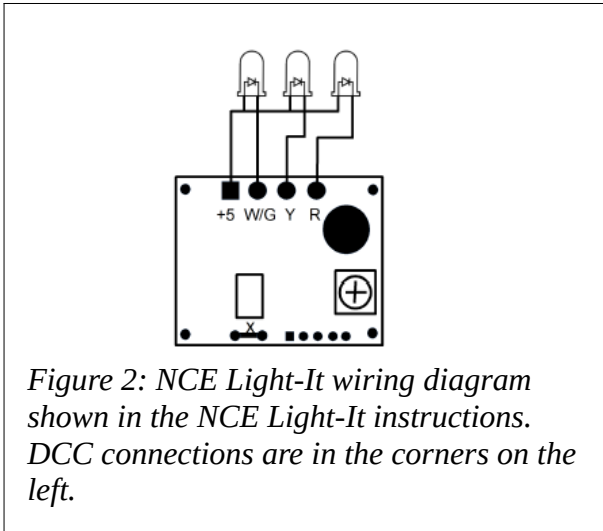
Figure 2: NCE Light-It wiring diagram shown in the NCE Light-It instructions. DCC connections are in the corners on the left.

To support all Victorian Railways aspects available on twin searchlight signals, two Light-It modules are required – one for each of the heads. If you only require one speed, i.e. top or bottom always red, then a standard red LED can be used for that with just the other head being controlled by a Light-It. A "C" light must be considered as a third head but it can be controlled by the same Light-It in some cases as described below.

Refer to the NCE decoder instructions for guidance on setting the DCC address and to adjust brightness if needed. The table shown in Figure 3 is an extract from the instructions, showing what aspect number to use in the signal mast definition to get the desired colour.

For Victorian Railways, each head requires only red, yellow and green. There are several ways this can be done, depending on the type of LEDs being used. Three options are described here.

4.3.1. Option 1 – twin "traffic lights" with standard LEDs
Connect a red, a yellow and a green led to the relevant connection points on each of two Light-It modules. If a C light is required, that will be the 7th LED so requires a third Light-It or some other connection option. This option shown here excludes a C light.

This option requires two signal heads to be defined in JMRI and then a signal mast using "Signal Head Controlled Mast". Create the heads with their DCC address as shown in Figure 4. The default appearance numbers for red, yellow and green are correct for the Light-It.

Aspect	Effect Number	Lighting effect
0	0	Red
1	1	Yellow
2	2	Green
3	3	flash red
4	4	flash yellow
5	5	flash green
6	6	red+yellow
7	7	flash red+yellow
8	8	red+flash yellow
9	9	red+green
10	10	flash red+green
11	11	red+flash green
12	12	yellow+green
13	13	flash yellow+green
14	14	yellow+flash green
15	15	effect 15=all on
30	--	all flash
31	--	all off

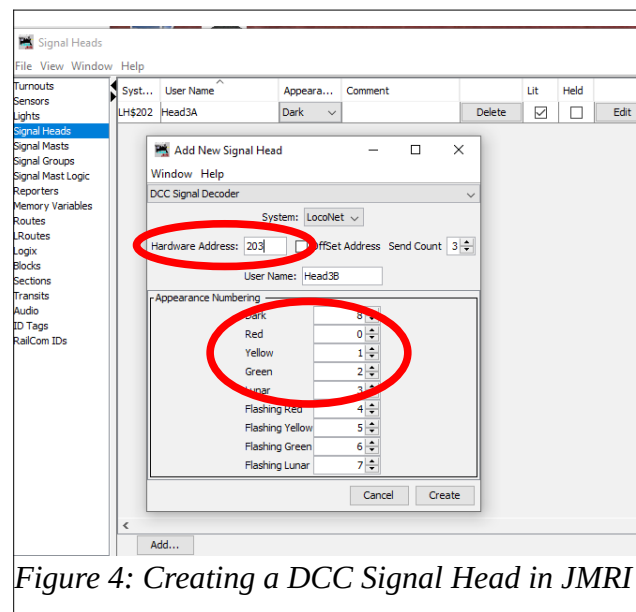*Figure 3: Aspect numbers and colours as shown in the NCE Light-It instructions.*

Figure 4: Creating a DCC Signal Head in JMRI

Create the mast in JMRI, selecting "Signal Head Controlled Mast" and the two heads created as shown in Figure 5.

Once these are created, selecting an aspect name for the mast will set the required colours for the heads as shown in Figure 7

4.3.2. Option 2 – "search lights" using bicolour or tricolour LEDs
Signals can be created as virtual signals that can be displayed on layout panels with or without having

corresponding signals physically on the layout. Signals on layouts can be controlled by DCC or microprocessor devices. Below are instructions for setting up Virtual signals and signals controlled by NCE Light-It DCC decoders or by ESP devices using MQTT protocol.

This option is almost identical to option 1. It is essential that these LEDs are common anode type, to connect to the +5V. The other LED legs connect to their relevant connection points on the Light-It. For bicolour LEDs, connect the red and green legs to the red and green connection points, Use aspects 0 and 2
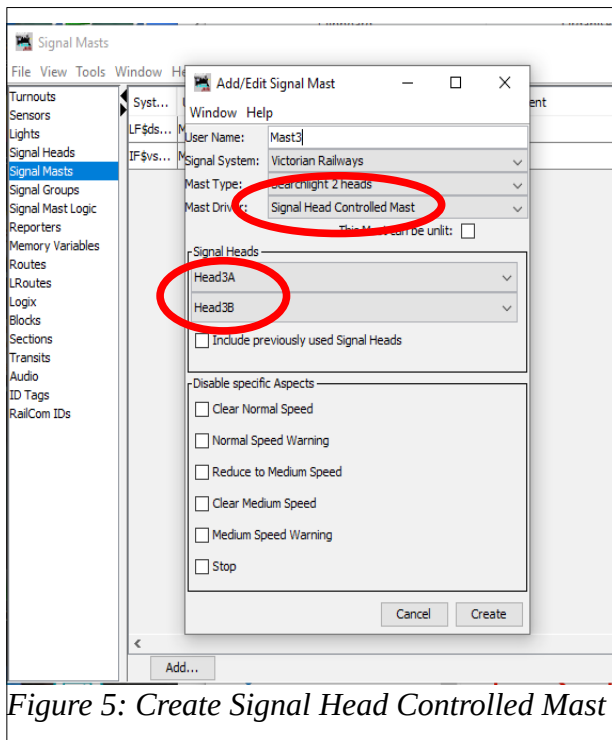

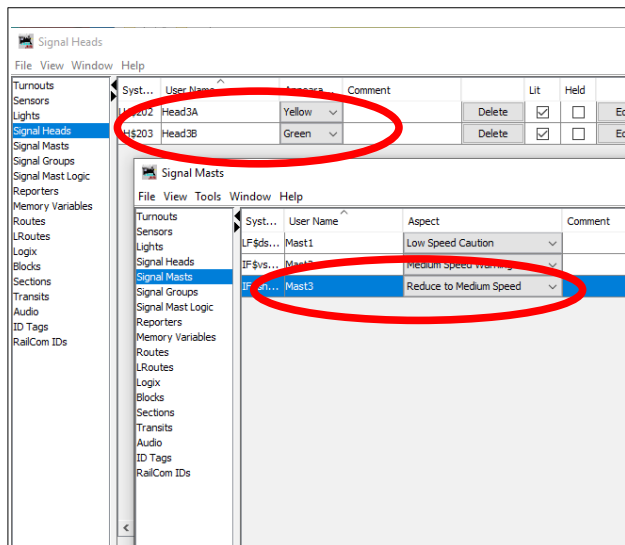*Figure 5: Create Signal Head Controlled Mast*

Figure 7: Setting head colours by selecting mast aspect,

respectively for red and green and use aspect 9 to switch on both colours to give yellow.
The unused yellow light socket can be configured as a third head for a C light as shown in Figure 6

4.3.3. Option 3 – Single speed with bicolour LED
This option is for masts that only ever display one speed, either normal or reduced speed. It only requires one Light-It so therefore is also cheaper and easier.

Use a standard red LED, independently powered, for the head that remains red. Use a bicolour (3 leg), red – green LED for the second head, with the red and green legs connected to the Light-It. If a C light is required, as shown in this example, a yellow LED can be attached to the yellow connection point on the Light-It.

This option only uses a mast in JMRI. Figure 6 below shows how to configure this. Note that when the Low Speed Caution aspect is selected, aspect id value of 6 sets bicolour LED head to red and switches on the yellow C light.
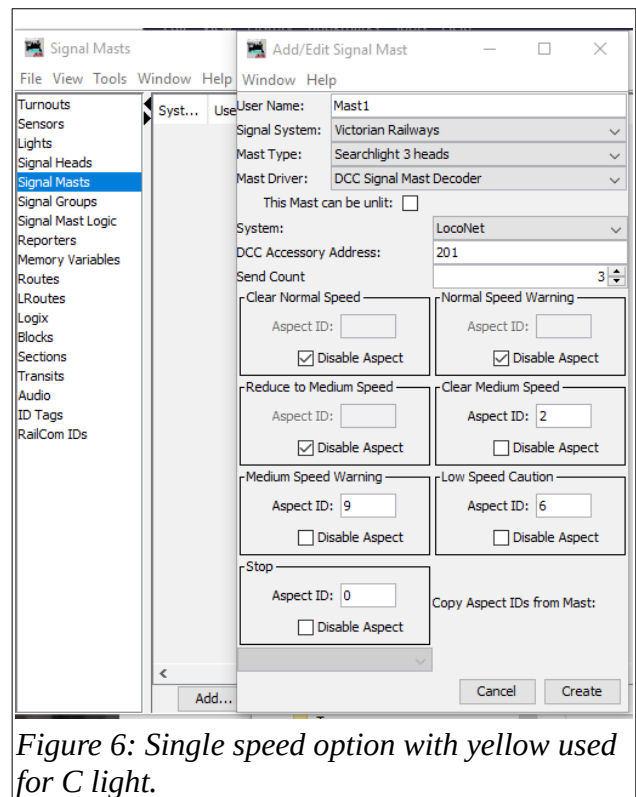

Figure 6: Single speed option with yellow used for C light.

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