

# DecoderPro®

User's Guide Version 2.8

JMRI Organization



## PREFACE

A Java-based cross-platform application for the programming of Digital Command Control (DCC) decoders for model railroad use.

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DecoderPro® is one of a set of cross-platform applications for model railroaders. It can run on any computer system that will run Java 1.5.0 or later, whether it is Macintosh, Windows, or Linux based. It does require that Java be installed on the computer. You can get Java as a free (but very large...) download at:

<http://java.sun.com/getjava/>

If this is your first visit to our manual we suggest that you take the DecoderPro® tour at:  
<http://jmri.sourceforge.net/help/en/html/apps/DecoderPro/Tour.shtml>  
to get an overview of what we're about to cover..

Note that all screen shots in this manual are from a Windows machine using the "Metal" User Interface option. While your screens will probably differ in some layout details, they will be essentially the same.

To give feedback on this HTML manual, ask questions about things not covered, or make suggestions for improvements to the manual or the software, join us on the JMRI Users mailing list at <http://groups.yahoo.com/group/jmriusers/>

Suggestions for revisions are best submitted to the [JMRI E-mail list](#) in plain text format. This will make it easier to copy into the files, and help prevent "Microsoft Bloat" in the HTML.

Thanks for reading, and Let's Run Trains!

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## REVISIONS

<b><i>DECODERPRO®® REVISION RECORD</i></b>			
<b>Version</b>	<b>Revision Date</b>	<b>Author</b>	<b>Revision Notes</b>
<b>1.1.9</b>	9/4/2002	Joe Ellis	CEO, Bethlehem-Ares Railroad, a 1:160 Corporation
<b>1.3</b>	No date	Bob Blackwell	
<b>2.4</b>	2/15/2009	Dale A. Tripp and Bruce Shanks	Updated to JMRI version 2.4, new sections added
<b>2.8</b>	1/15/2010	Dale A. Tripp and Bruce Shanks	Updated to JMRI 2.8. Expanded Table of Contents with additions of sub titles, Updated Comprehensive Programmer, added Advanced Programmer features, including Roster Media pane, added Roster Group feature, Updated decoder definition submission process and added Operations section.

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## CHAPTER 1 - GETTING STARTED WITH DECODERPRO®®

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### *WHAT IS DCC?*

In short, DCC is Digital Command Control, a system for operating model railroads in a more prototypical manner. Each locomotive contains a tiny, specialized controller. These controllers (decoders) accept digital commands over a network (the rails) addressed to them and interprets them to control the locomotive's speed, direction, lighting effects, sound, and other functions. Each decoder responds only to those commands addressed to it. Not every decoder will have functions beyond basic throttle commands available. Although there are NMRA® standards for the format of communication (allowing the decoders from different manufacturers to work on the same railroad), beyond that there is considerable variety in the functions supported and the implementation of those functions.

Just like any other controller, decoders must be programmed by the user to reach their full potential. While they come with basic "default" programs, most users will want to customize the decoder address, motor control, lights, sound, and other functions to meet their specific needs. You do so by editing **CVs**, or **Configuration Variables**, in the decoder. Some CVs use values ranging from 0 to 255, others use their space in the decoder's memory as a bank of 8 on/off switches. While this lets you do a lot with very little memory, it can get very complex for those of us that are not on speaking terms with binary code.

Decoder Pro attempts to help overcome the inevitable complexity of this system by providing a clear, usable, user friendly open source software solution for programming these on-board decoders. Programming panel designs are written in **XML**, (a close relative of HTML) and can be modified or even created from scratch by users with even a passing familiarity with the format without previous XML experience.

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## *WHAT DCC SYSTEMS WILL DECODER PRO WORK WITH?*

Decoder Pro will work with the following DCC systems:

- C/MRI
- CTI Electronics Acela
- CVP Products Easy DCC
- DCC Specialties
- Digitrax (Loconet)
- ESU
- Fleischmann
- Hornby
- Lenz/Atlas
- Maple Systems
- MERG CBUS
- NCE/Wangrow
- QSI
- Roco
- SPROG DCC
- SRCP
- Trainmaster
- Wangrow/Wangrow
- X10
- Zimo
- ZTC Controls

Depending on the specifics of your system and computer, some type of hardware interface may be required.

Hardware Support at <http://jmri.sourceforge.net/help/en/html/hardware/index.shtml>

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## *WHAT HARDWARE DO I NEED?*

You will need, at a minimum, a command station/booster for your DCC system, and a programming track set up according to the manufacturer's instructions. For some systems, you will also need an additional hardware interface to send the commands from your computer to the command station, and from there on to the decoder in the locomotive. For a Digitrax system, for example, you will need either the **MS100 interface**, **PR3 programmer** or a **LocoBuffer**. The **PR1** device from Digitrax is a stand-alone programmer and is not usable with this software.

You will also need, of course, some locomotives with the decoders installed which you can program.

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## *HOW DO I START THE PROGRAM?*

Once you have downloaded the Decoder Pro software and installed it, simply open the program in the usual manner for your operating system. You should see this or a similar opening screen displayed:



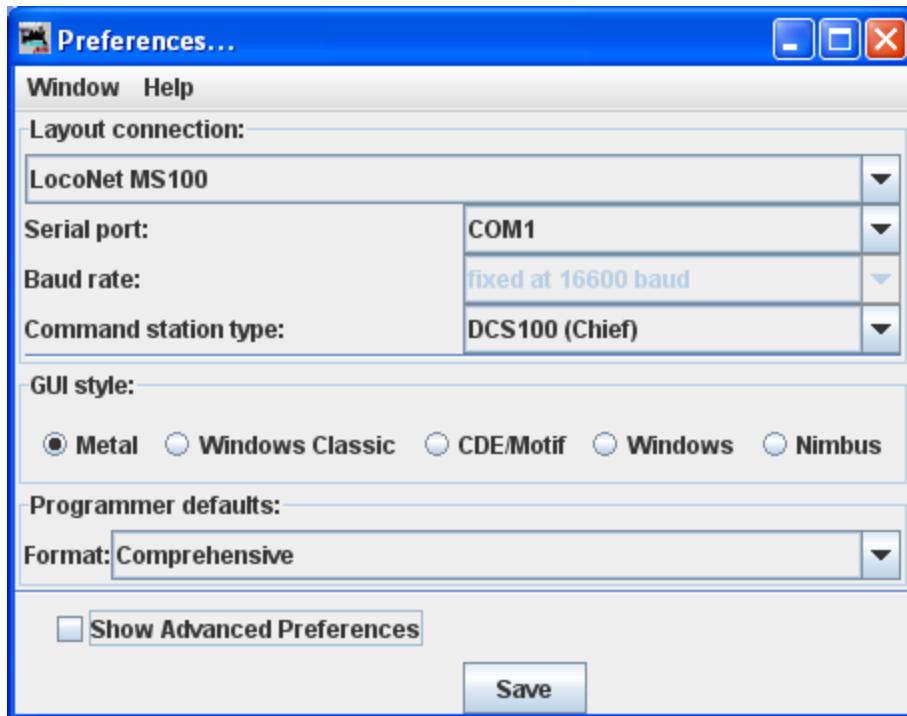
It may take a while for this screen to come up, especially on older and slower computers. Remember that you are essentially running the program on a Java emulator over your native operating system software. New computers can do this fairly quickly, but older ones will feel like they're taking forever. Be patient - it will come up eventually! Even on older computers, once the program is up the response time is quite good.

If this is the first time you have run the program, the preferences screen will also come up automatically to allow you to set up the system for your particular configuration.

## *HOW DO I SET UP MY PREFERENCES?*

Click on the Edit menu and then Preferences... option in the screen above, which opens the Preferences window. (This window may open automatically the first time you run the program.)

The Preferences window provides access to the basic configuration information to connect your computer to your DCC system. You will be using that system to actually program and operate trains equipped with DCC decoders.



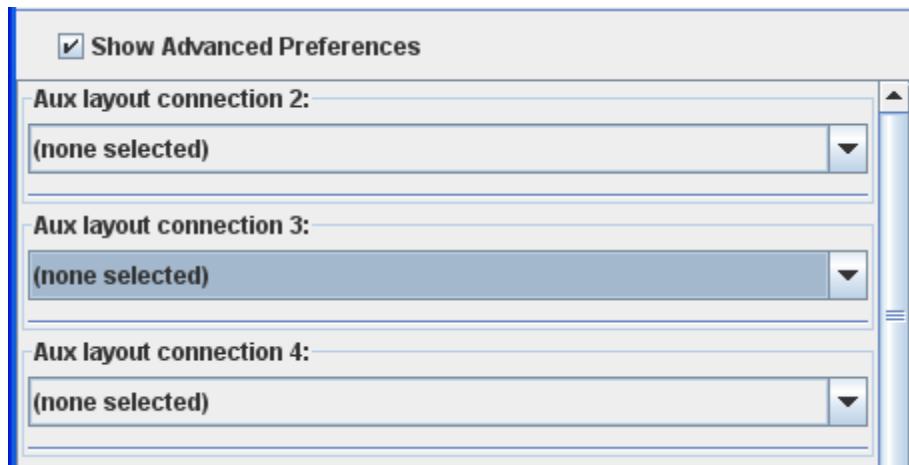
<b>Layout connection :</b>	Drop-down list with all of the supported DCC system interfaces that you can use with Decoder Pro. Select the option that matches your hardware.
<b>Serial port:</b>	Drop-down list to select the serial port to which your DCC interface is connected. If you do not know, check your system hardware configuration manual
<b>Baud rate:</b>	Drop-down list with all the options for your hardware, set to that required by your interface. It may default and not be selectable
<b>Command station type:</b>	Drop-down list of all supported command stations, select the correct one for your layout
<b>GUI style:</b>	Select the style suitable for your operating system

<b>Format:</b>	Select the programmer format desired, use Comprehensive if you do not have a preference
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To change any of these options just click on the arrows to open the drop-down list. To change the GUI options, click on the appropriate radio button. When you are finished, click on the "Save" button to save your preferences.

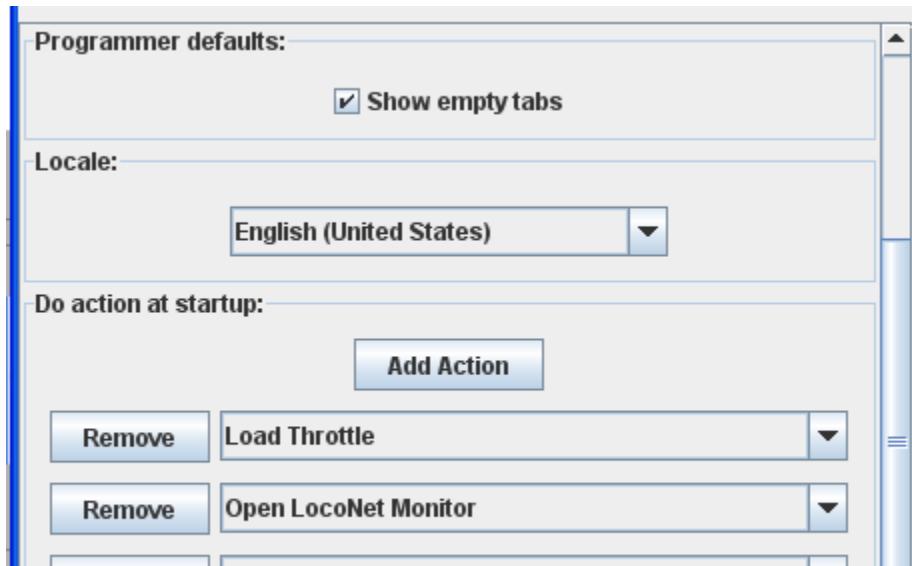
Changes in preferences will not take effect until the program is re-started.

There are additional preferences available if you check the **Show Advanced Preferences** check box. This is shown below:



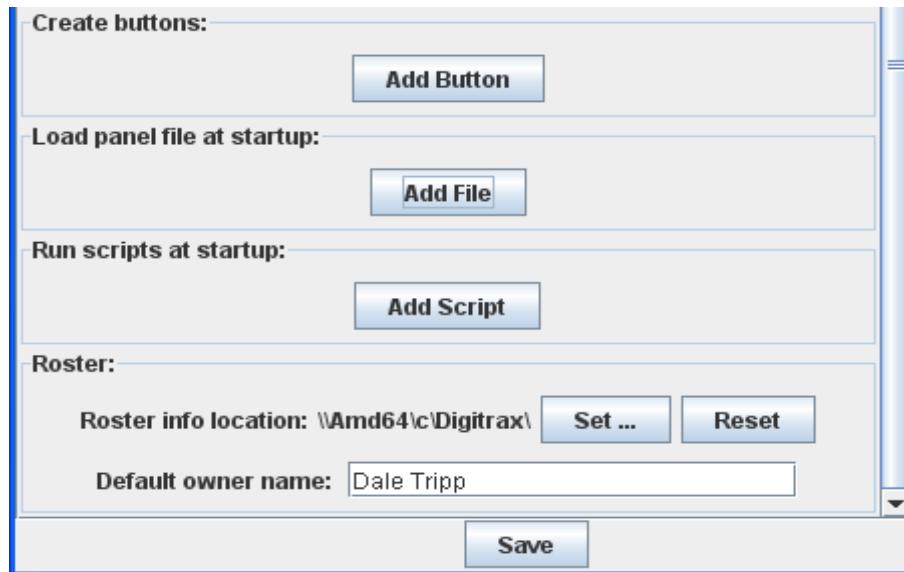
## Advanced Preferences:

<b>Auxiliary layout connection 2 thru 4</b>	Provides for multiple connections to JMRI
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## Advanced Preferences [ Programmer defaults]

<b>Show Empty Tabs:</b>	Display all tabs on the programmer screen even if the decoder does not support those features. Any tabs that are not applicable to a given decoder will be grayed out to indicate that. If this is unchecked, the tabs that do not apply to that decoder will not be displayed at all.
<b>Locale:</b>	The language to use, in this case US English. Several languages are available in the drop-down list
<b>Do action at startup</b>	Selected actions will execute when starting JMRI program. Select the action from any or all of the options, typically a Monitor, Throttle and Power on/off.  After making selection click the Add Action button to add that feature  If you want to remove a feature use the Remove button



## Advanced Preferences [ Create Button and Load Files ]

Add Button	Provides a means of adding buttons to the GUI to add additional throttles etc.
Remove Button	Used to remove buttons from your program interface that you no longer want to use
Load panel file at starting	For advanced users to load panel files created with the Panel Pro programs
Run script at startup	For advanced users To select a script that will run at startup
Roster:	Set the directory and file for the roster if other than default
Default Owner:	The name entered here will be pre-filled on the roster entry page to save typing when entering your locomotive roster

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## CHAPTER 2 - USING DECODERPRO®®

### *HOW DO I SET UP TO PROGRAM A DECODER?*

Prior to using the programmer you need to have completed the previous section ([Getting Started](#)), have your computer connected to your command station/booster with the required interface device for your DCC system, you are now ready to actually program a decoder that has been installed in your locomotive.

On opening DecoderPro®, the main page will be displayed:



There are four buttons near the bottom, the first two of which are:

**Service Mode (programming track) Programmer**- With this button you select a programmer to program the locomotive(decoder) on the dedicated programming track. (Probably because the Locomotive has to be taken to the servicing track to be programmed). Not all command stations support a dedicated programming track, and some brands will shut down the mainline power when in programming mode (not pleasant when you have an ops session in progress).

**Operations Mode (Main Track) Programmer - or Programming on the main(POM)**. This lets you program a specific decoder on the layout, even while it is operating. However, because it addresses a specific decoder address, some decoders will not allow you to change the decoder's address using this method! Some command stations will only "broadcast" programming commands, which can mean every locomotive on the layout gets the same programming! The same is true if you try to program a loco with address zero (or forget to enter an address when you start). If in doubt, check your documentation.

**Help** - Accesses the help files

**Quit** - Exits the program.

*ADDITIONAL PROGRAMMERS THAT ARE AVAILABLE.*

**Single CV Programmer** Lets you program older decoders one CV at a time.

**Multi-Programmer Control** provides a convenient way to program CV's when you have more than one decoder installed in a locomotive. For example, if you have separate decoders to control the motor and provide sound, and they both use the same CV locations, programming one decoder would change the settings on the other, usually an undesired feature.

Now that you have decided on which Programming Mode to use, you may continue

### *WHAT ARE THE PROGRAMMING MODES?*

Prior to using the programmer you need to have completed the previous section (Getting Started), have your computer connected to your command station/booster with the required interface device for your DCC system, you are now ready to actually program a decoder that has been installed in your locomotive.

On opening DecoderPro®, the main page will be displayed:



There are four buttons near the bottom, the first one which is:

Service Mode (Programming Track) Programmer

**Service Mode (programming track) Programmer** - We will start with this button to program your locomotive on the dedicated programming track.  
**Note:** not all systems may support this option.

Operations Mode(Main Track) Programmer

**Operations Mode (Main Track) Programmer - or Programming on the main(POM).** This lets you program a specific decoder on the layout, even while it is operating.

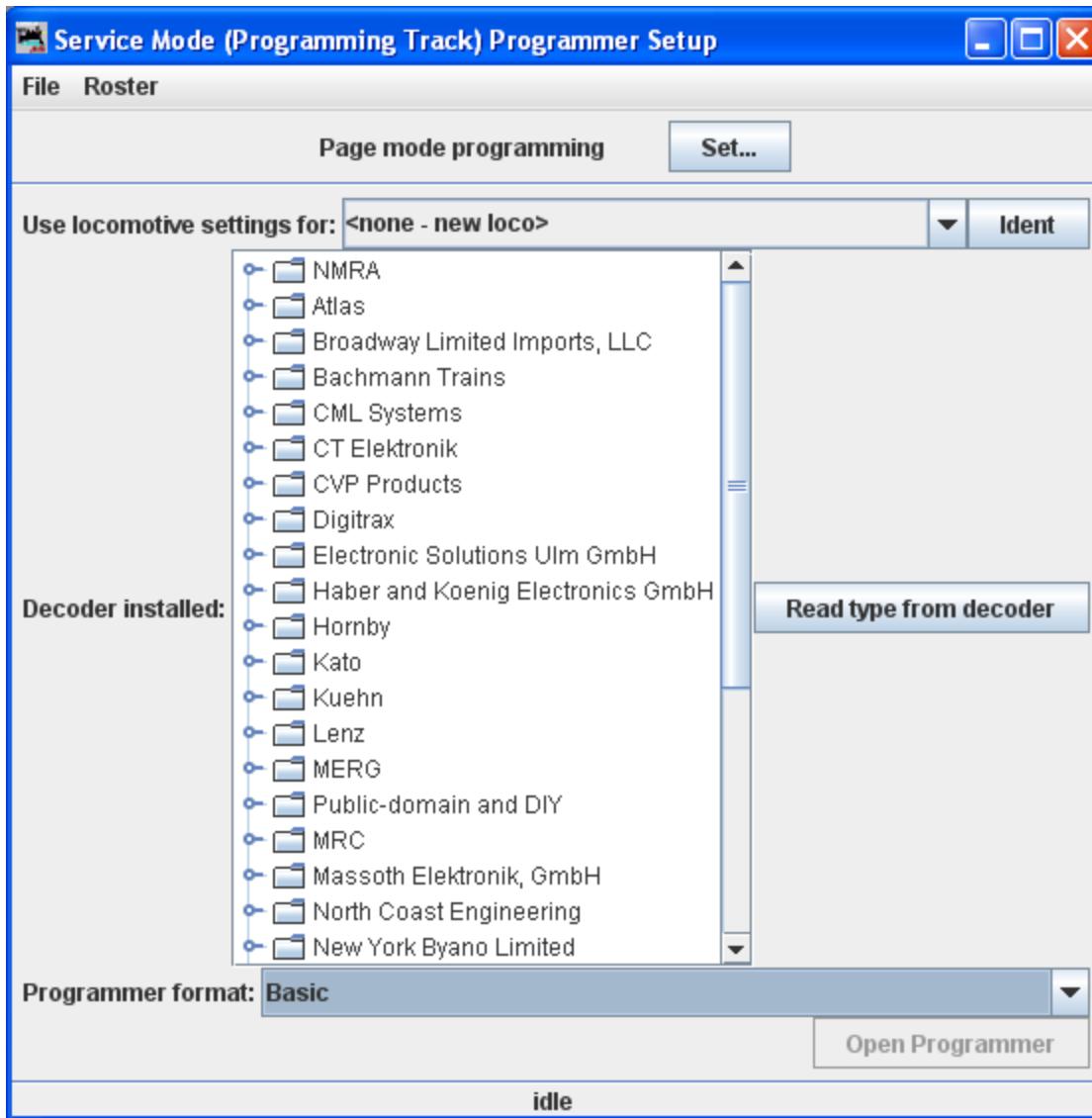
Help

**Help** - Accesses the help files

Quit

**Quit** - Exits the program.

Click on Service Mode (Programming Track) Programmer and the **Service Mode Programmer (Programming Track)Programmer Setup** window opens



The first item at the top of the service mode programmer pane is a selection for the mode used to program your decoders. This is a legacy to the olden times and rather technical, but fortunately DecoderPro® has matured to the point that it is quite good at selecting the best mode for you. It uses the selection of command station from your Preferences selections, combined with the decoder manufacturer and type selections (which we'll get to real soon now). Just accept what's there as a good start. And, fear not, for each pane in the programmer has a button which can be used to change programming mode if you have a problem. Now let's determine the type of decoder that's installed in the locomotive that you would like to program.

The decoder identification is entered by using the selections in the middle of the page.

Since we want to know what type of decoder is in the locomotive, we can either look up what was listed when it was entered in the roster stored in this computer, or we can ask it what it's manufacturer and firmware version are. The first is method is **IDENT**, and the other is **READ TYPE**. You can use one or the other, but they are mutually exclusive.

**IDENT** is used to identify a locomotive that is already stored in your computer's roster file. You can use the drop down arrow to display a listing of locomotives in your roster, and then select the desired locomotive from the list. An alternative is to be lazy and click the **IDENT** button. The program will then query the locomotive to get its address which is linked to the roster entry. The Decoder Pro roster entry includes the decoder type used when it programmed the locomotive. If it gets a valid address, but there is no roster entry with that address, then you will get an error message.

**READ TYPE** is the other method located in the center of the page. If you click on **Read Type From Decoder** button, the system will query the decoder to get the manufacturer and firmware version number. From this information it will highlight all the decoders which are known to match. There may be several, usually with differences in the physical shape and size to fit in a particular locomotive's shell, or a few more "bells and whistles". When confronted with a large selection, you can either remove the shell to try to read information printed on the decoder itself, or just select one of the ones with the fewest letters in the model number. (Letters are often used to separate the shape differences which have no bearing on the electronic functions of the decoder.) Just be aware that some functions that Decoder Pro allows you to program may not be fully operable.

As noted above, these methods will work only with command stations which are capable of reading back the contents of CV's, and the process does take some time. Many lower end and/or older systems and decoders do not provide readback capability. If the command station cannot read CV's from the programming track, you will have to select the decoder manually by using the large selection box in the middle of the page. With it you can select the manufacturer, family and specific model of the decoder. This manual method may be the best and fastest way if you know for sure "What's in there".

If you have a decoder that doesn't appear in the listing, you may want to check to be sure that you are using the most up to date version of Decoder Pro, because manufacturers are adding models almost faster than the team can enter the new decoder definitions into the files. You can

choose a manufacturer's version which is as close as you can find, or if you're only interested in basic programming functions, use the NMRA® decoder which is a generic file of the CV's contained in their standards.

The last item on this pane is the Programmer Format entry. It is preset by your Preferences entry, but you can select other programmers using the drop down arrow. For now use the **Basic** programmer, because you won't be able to do much damage if you make mistakes. We'll get into the other programmers later on.

Once you have selected a decoder, or Decoder Pro has done it for you, the **Open Programmer** button will become activated and you'll be able to move on with Service Mode Programming.

When you are on the **Setup Pane** and click on the **Open Programmer** button, the selected Programmer window will open. All programmers, Basic, Comprehensive and Advanced, open to the Roster Entry pane.

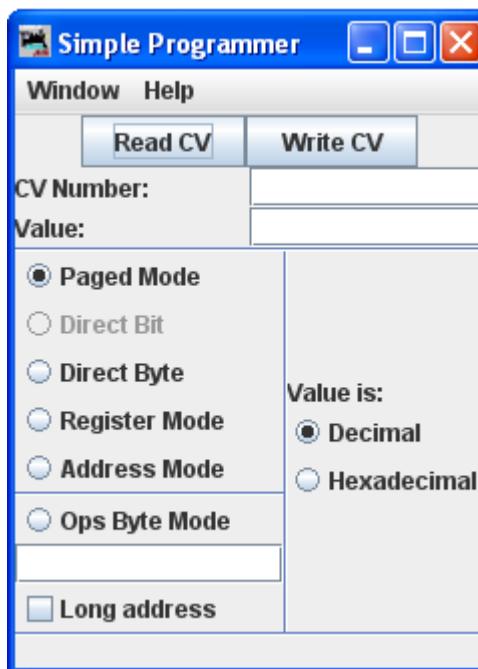
Now lets open the **Basic Programmer**, which is now completely set-up with a decoder and the Basic programmer selected, let's move on to Basic Programming. Click on the **Open Programmer** button to open the programmer panes.

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## CHAPTER 3 DECODERPRO®® PROGRAMMING MODES

### *SIMPLE PROGRAMMER*

The Simple Programmer allows you to read or write CV values in DCC decoders one at a time.



Prior to reading a CV value you should enter the CV Number (address) into the **CV Number** text box. If writing a CV value you should enter the CV Number and then a value in the **Value** text box. You may enter the value as Decimal or Hexadecimal depending upon the option selected in **Value is:** area.

On the left side of the window you can select the Programming Mode. Any mode not supported by your command station will be grayed out.

If you select the **Ops** mode, which programs on the main track, you need to enter the address of the decoder (locomotive) that you are programming. Your DCC system may require you to check the **Long address** check box if the address is a long address. Most DCC systems do not allow you to read on the main, if so, the **Read CV** button will be disabled.

Now that you have everything setup, you may read the current value in the decoder's memory from the CV by clicking on the **Read CV** button or write your new value to the CV by clicking on the **Write CV** button.

### *SERVICE MODE PROGRAMMER*

**Service Mode (programming track) Programmer** - Select to program the locomotive on the dedicated programming track. (Probably because the Locomotive has to be taken to the servicing track to be programmed). Not all command stations support a dedicated programming track, and some brands will shut down the mainline power when in programming mode (not pleasant when you have an ops session in progress).

## **Reading your Decoder On the programming track:**

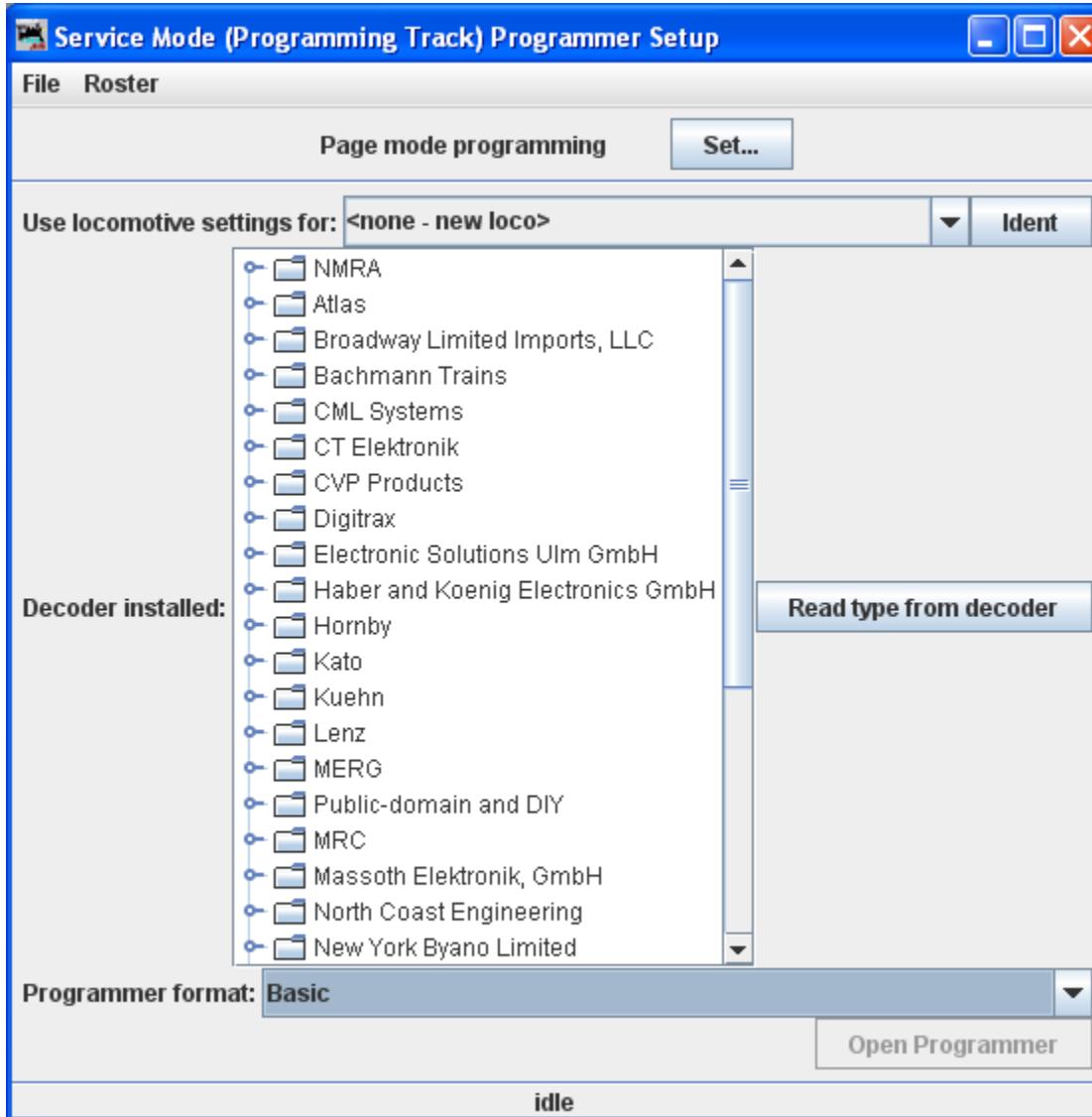
To obtain information from the decoder on the programming track we rely on the ability of the decoder to respond to a query, what is known as **Readback**. Most decoders cannot talk to send information back to the command station. They just respond to instructions, so special instructions were developed which allow the Command Station to determine the contents of the decoder's memories

Basically the decoder is asked a whole series of questions and when the answer is “yes” it turns on the motor for only a very brief time. The command station notices the current being drawn and stops asking questions, since it got the *yes* answer to the last question. This can take a bit of time since the command station must ask all possible values waiting for the *yes* response. You can observe the process by looking down at the bottom line of all the panes (the status bar) where the word *idle* is normally shown when the programmer is inactive. When DecoderPro® is working it will show you what events are being performed. Sometimes you can see the loco jump a bit as the decoder pulses the motor for “yes”. The computer folks call this an ack (for acknowledgement). When the Command Station sends the decoder data that is in agreement with what is in the CV of the decoder, the decoder will send an ack. If the ack is never received the Command Station tells DecoderPro® that the Decoder did not respond.

## **Writing to Decoder on the programming track:**

The CV data is written to ANY and ALL decoders on the programming track. When the write has been successful the decoder will acknowledge (ack) to the Digital Command Station (DCS.) If the ack is not seen by the DCS it says the decoder did not respond. (error code 308 in JMRI)

Click on **Service Mode (programming track) Programmer** and the Service Mode Programmer (Programming Track) Setup window opens



The first item at the top of the service mode programmer pane is a selection for the mode used to program your decoders. This is a legacy to the olden times and rather technical, but fortunately DecoderPro® has matured to the point that it is quite good at selecting the best mode for you. It uses the selection of command station from your Preferences selections, combined with the decoder manufacturer and type selections (which we'll get to real soon now). Just accept what's there as a good start. And, fear not, for each pane in the programmer has a button which can be used to change programming mode if you have a problem. Now let's determine the type of decoder that's installed in the locomotive that you would like to program.

The decoder identification is entered by using the selections in the middle of the page.

Since we want to know what type of decoder is in the locomotive, we can either look up what was listed when it was entered in the roster stored in this computer, or we can ask it what it's manufacturer and firmware version are. The first method is **IDENT**, and the other is **READ TYPE**. You can use one or the other, but they are mutually exclusive.

**IDENT** is used to identify a locomotive that is already stored in your computer's roster file. You can use the drop down arrow to display a listing of locomotives in your roster, and then select the desired locomotive from the list. An alternative is to be lazy and click the **IDENT** button. The program will then query the locomotive to get it's address which is linked to the roster entry. The Decoder Pro roster entry includes the decoder type used when it programmed the locomotive. If it gets a valid address, but there is no roster entry with that address, then you will get an error message.

**READ TYPE** is the other method located in the center of the page. If you click on **Read Type From Decoder** button, the system will query the decoder to get the manufacturer and firmware version number. From this information it will highlight all the decoders which are known to match. There may be several, usually with differences in the physical shape and size to fit in a particular locomotive's shell, or a few more "bells and whistles". When confronted with a large selection, you can either remove the shell to try to read information printed on the decoder itself, or just select one of the ones with the fewest letters in the model number. (Letters are often used to separate the shape differences which have no bearing on the electronic functions of the decoder.) Just be aware that some functions that Decoder Pro allows you to program may not be fully operable.

As noted above, these methods will work only with command stations which are capable of reading back the contents of CV's, and the process does take some time. Many lower end and/or older systems and decoders do not provide readback capability. If the command station cannot read CV's from the programming track, you will have to select the decoder manually by using the large selection box in the middle of the page. With it you can select the manufacturer, family and specific model of the decoder. This manual method may be the best and fastest way if you know for sure "What's in there".

If you have a decoder that doesn't appear in the listing, you may want to check to be sure that you are using the most up to date version of Decoder Pro, because manufacturers are adding models almost faster than the team can enter the new decoder definitions into the files. You can choose a manufacturer's version which is as close as you can find, or if you're only interested in basic programming functions, use the NMRA® decoder which is a generic file of the CV's contained in their standards.

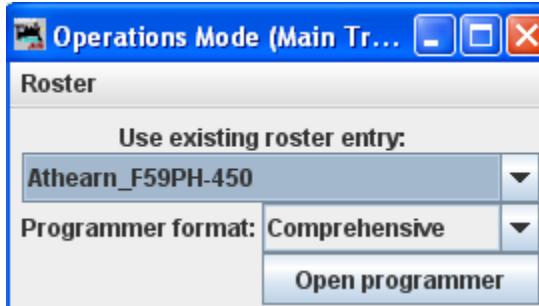
The last item on this pane is the Programmer Format entry. It is preset by your Preferences entry, but you can select other programmers using the drop down arrow.

Once you have selected a decoder, or Decoder Pro has done it for you, the **Open Programmer** button will become activated and you'll be able to move on with Service Mode Programming.

When you are on the **Setup Pane** and click on the **Open Programmer** button, the selected Programmer window will open. All programmers, Basic, Comprehensive and Advanced, open to the Roster Entry pane.

### *OPS MODE PROGRAMMING*

**Operations Mode (Main Track) Programmer** - or **Programming on the main(POM)**. Opens the **Operations Mode (Main Track)** window. This lets you program a specific decoder on the layout, even while it is operating. However, because it addresses a specific decoder address, some decoders will not allow you to change the decoder's address using this method!



Some command stations will only "broadcast" programming commands, which can mean every locomotive on the layout gets the same programming! The same is true if you try to program a loco with address zero (or forget to enter an address when you start). If in doubt, check your documentation.

### **Reading from your Decoder on the main:**

With a few exceptions it is not possible to read from a CV on the Main. If reading fails it usually reports as a 306 error (Timeout Talking to Command Station.)

### **Writing to your decoder on the main:**

Program on the Main writes are often called a "blind write" because there is no response from the decoder that the write was successful. POM is very useful for tuning loco performance while it is operating and the ack is the change in performance.

The decoder is first addressed by the Command Station, then the CV is addressed and then the data that is to be written into that CV of that decoder is sent. An exception is if address zero is used,(or you forget to enter an address when you start). Then **ALL** decoders on the main will write that data into the appropriate CV which usually is an "unintended consequence".

Some command stations will only "broadcast" programming commands, which can mean every locomotive on the layout gets the same programming! If in doubt, check your documentation.

In this window you select the locomotive in which you wish to change CV values, and what programmer you want to use. Once they are selected you click **Open Programmer** button just as you would do in the **Service Mode programmer**.

### *MULTI-DECODER CONTROL*

The **Multi-Programmer Control** provides a convenient way to program CV's when you have more than one decoder installed in a locomotive. For example, if you have separate decoders to

control the motor and provide sound, and they both use the same CV locations, programming one decoder would change the settings on the other, usually an undesired feature.

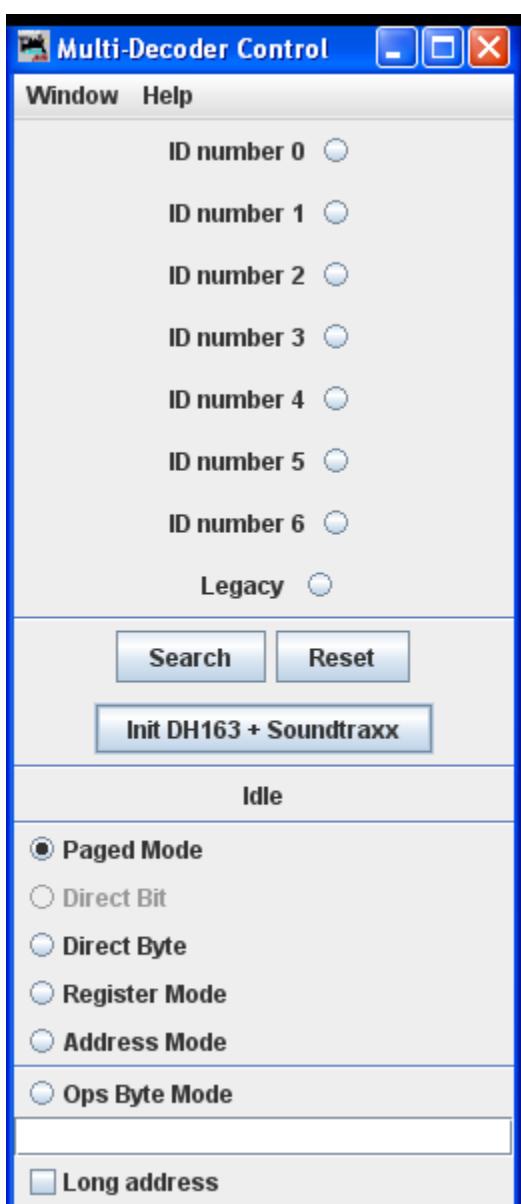
This control uses CV15 and CV16 to control writing and reading CV values. Prior to installation of the decoders into the locomotive, each one would have a separate and specific value programmed into CV16

Recommended values:

- motor decoder value of 1
- sound decoder value of 2
- function only decoder value of 3
- other uses values of 4 thru 7

Decoders should ship with the value of 0 in both CV15 and CV16. You can only perform a read or write operation on the decoder if CV15 and CV16 are the same value. In effect, CV16 is a lock and CV15 is the key. Once the decoder is locked in this way, the ONLY CV that can be programmed is CV15 (you do need to be able to unlock it).

So now you have two decoders with the same address (both of them locked) and you want to unlock one of them. The Multi Decoder Control is the tool for that.



If you followed the recommended values we talked about above, then you know what the un-lock number is. The **ID number** buttons numbered 0 thru 6 let you select the value to be entered into CV15 that will unlock the decoder with the corresponding number in its lock (CV16).

DecoderPro® then reads back the value in CV16 to confirm that the decoder has successfully unlocked.

Once you are done with your programming the tool can again be used to insert a zero into CV15, thereby locking this decoder.

The **Legacy** button writes a 7 to CV15, which is a special case. Many decoders, especially older models, do not have this locking mechanism present. In some cases, specifically a Digitrax FX3 or later decoder and an early SoundTraxx decoder, it's possible to emulate the lock using sequential writing of the CVs. Clicking the **Legacy** button activates this procedure.

Unfortunately, it's not an entirely reliable method.

But, what if you didn't follow the recommendations? The **Search** button sequentially works through the possible values and marks values found to be present. If you're dealing with a single decoder to unlock, than you're home free. If we're talking about multiple decoders with the same address we're probably going to get more than one value marked. It's up to you to figure which is which. One way is by changing the address of one and then testing to see what action changed with the new address.

**Search** button sequentially works through the possible addresses and marking those decoder addresses that are found to be

present.

**Reset** button looks for possible combinations to unlock a decoder that has been inadvertently locked. Only use this option if you have just one decoder in the locomotive. If you have more than one , it will unlock all of them, which may cause confusion later.

**Init DH163 + SoundTraxx** button configures the **Legacy** mode discussed above.

Status message are displayed below the buttons, shows **idle** when no action is occurring.

At the bottom of the window you can select the Programming Mode. Any mode not supported by your command station will be grayed out.

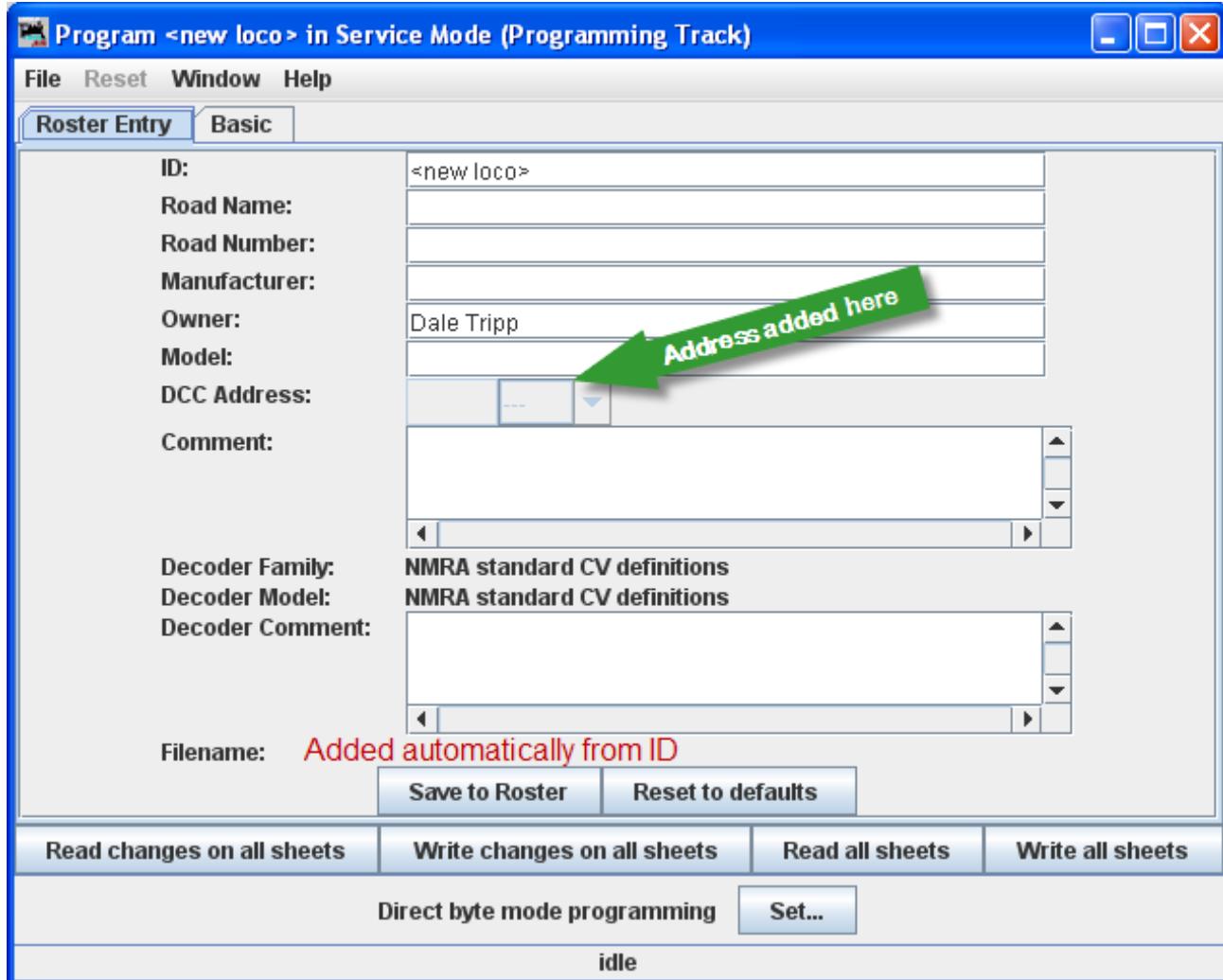
If you select the **Ops** mode, which programs on the main track, you need to enter the address of the decoder (locomotive) that you are programming. Your DCC system may require you to check the **Long address** check box if the address is a long address.

## CHAPTER 4 THE BASIC PROGRAMMER

### THE ROSTER ENTRY PANE

The first action in programming a locomotive with Decoder Pro is to fill out the roster entry screen.

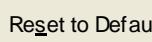
A **roster** is a database of all locomotives that your installation of Decoder Pro has programmed. It includes the information seen in the screen below:



Most of these fields are self-explanatory. However, note that the first field (**ID**) becomes the file name in the Roster for the locomotive you are programming. Set up a schema to identify your locomotive to its decoder program. i.e. Mfr, Loco Type, and Address (Kato\_SD40-2\_5645). Spaces in the ID field will be changed to underscores (\_) when the file is written. In a club environment, often the ID begins with the owner's name, or member number. This way the Roster (which is sorted alphabetically) will keep all of an owner's locomotives listed together.

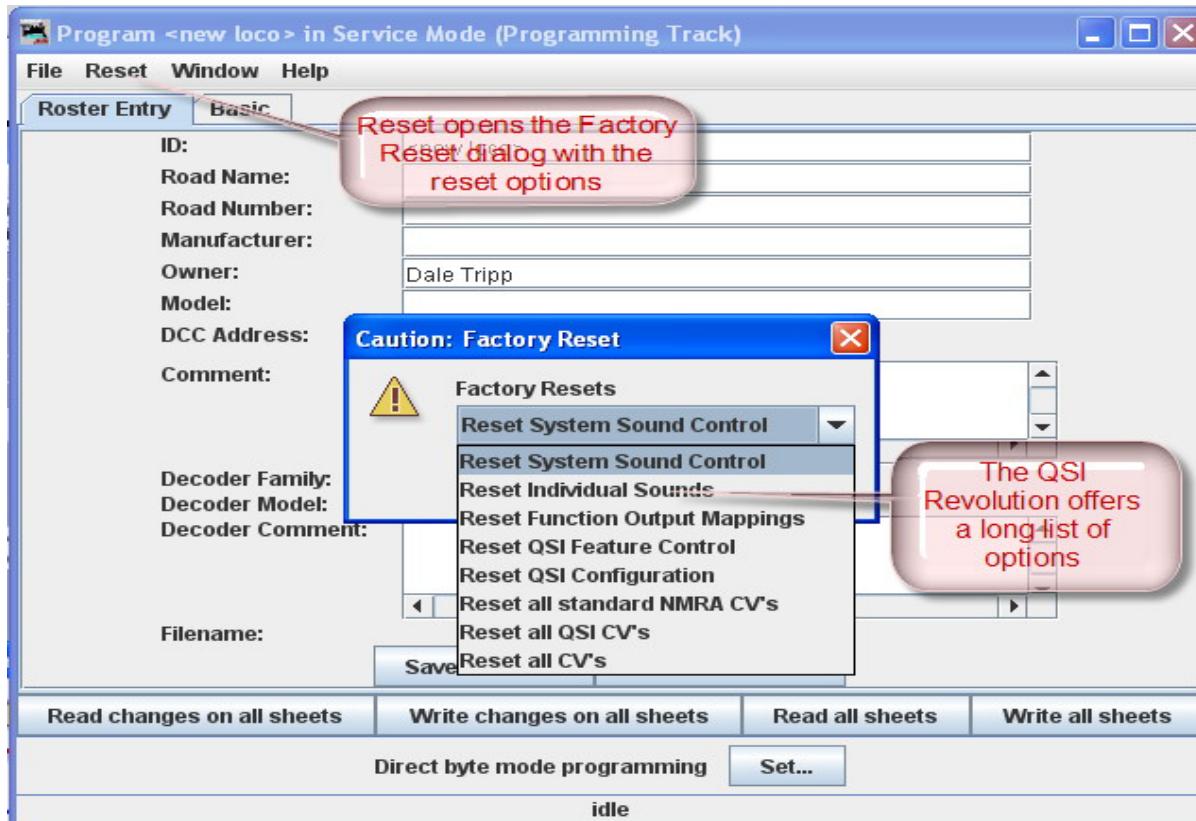
The **Comment** field is a good place to add the date you purchased the locomotive, price, or any other information you might feel is important to record.

The  button stores the current decoder information to your computer hard drive and folder where your roster file is located. The default storage is the same directory where the program is installed.

The  button can be used to return the Roster file to the condition of a new file for the type and version of the decoder listed in the roster entry. It does NOT change the values in the roster file on your hard disk, unless you specifically save it after using this reset button. It also is not written to the decoder until you specifically select a write operation. It was included in DecoderPro® so that if you get hopelessly confused in proceeding screen to screen entering variables, you can return to the manufacturers baseline default set and start again.

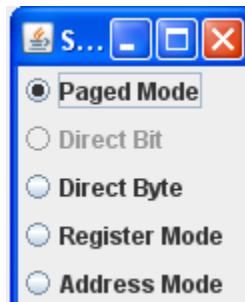
Most decoders will activate the **Reset Menu** (next to the File menu at the top of the page). This will reset the decoder to the manufacturers default settings for all the CVs, or just some of them if the manufacturer has several reset routines. It does this by writing directly to a CV in the decoder, if the decoder has that feature, CV8 in the case of Digitrax. All decoders may not support reset and how they work is manufacturer and decoder dependent.

One decoder with a lengthy list of reset routines is the QSI Revolution decoder, which enables a drop-down list of options for resetting the decoder as shown below:



You will note that the decoder address is shown but grayed out (or blank if this is a new locomotive in the roster). This field is automatically filled in by the program and is determined from the address entered using the **Basic** tab which we will get to shortly. This address is used with the **Ident** function on the start page if you wish to recall a locomotive that is already in your roster.

The Programming mode can be changed by clicking on the **Set...** button at the bottom of the window. To the left of the **Set...** button is the current programming mode that is selected. When you click on the **Set..** button, the **Set programming mode** dialog box displays.



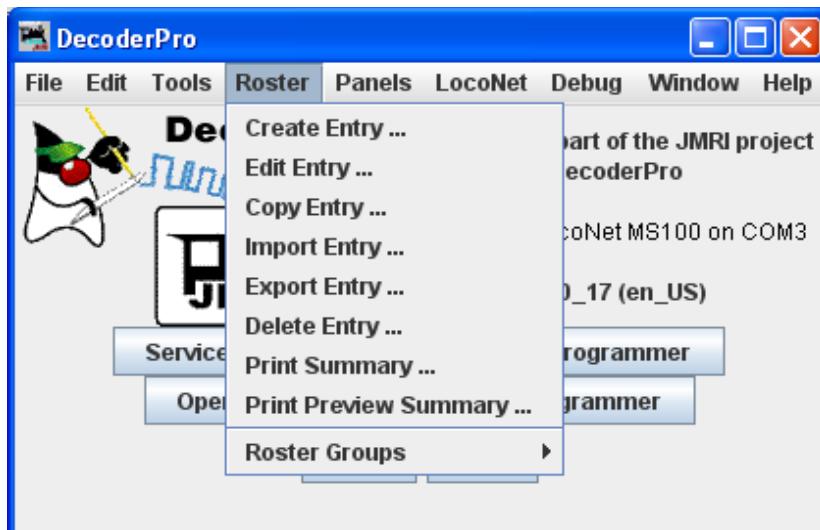
There are radio buttons for several **programming modes**. JMRI now selects the best mode for you. It determines this from the command station type you are using and the decoder model you are attempting to program. Usually this will be OK. If you find that you are having a problem with programming you may try a different mode.

For most newer decoders, stay with **Paged mode** or whichever Direct mode your Command Station supports. Your decoder documentation should let you know if programming in some other mode is necessary... but if you are having problems, experiment. If a mode is not supported for the selected decoder and system, that option will be grayed out.

When you make your selection, the programming mode should now display to the left of the Set button.

Now that we have the Roster information all in order, we can continue with programming the decoder.

But, first a let's talk a bit about Roster management. The Main DecoderPro® window (the one where we selected the programmer) and the initial DecoderPro® "Splash" screen have a menu called **Roster**. When you click on it you get opportunities to modify, print and move your roster files. Particularly interesting are **Export/Import** and **Copy**. Let's say you and a friend have two identical Berkshires, and you desire to have yours to be set up just like your friends. Now, you could put his loco on your track and read all the CVs out and then put them in yours, but if he lives on the other coast that's not practical. So, have him use DecoderPro® to export his loco file and e-mail it to you. You import it into DecoderPro®, change the address if you wish and then use that roster entry to program your loco. Similarly you can Copy a roster entry to duplicate one of your own locomotives into a second roster entry with it's own address. Details about the **Roster Menu**

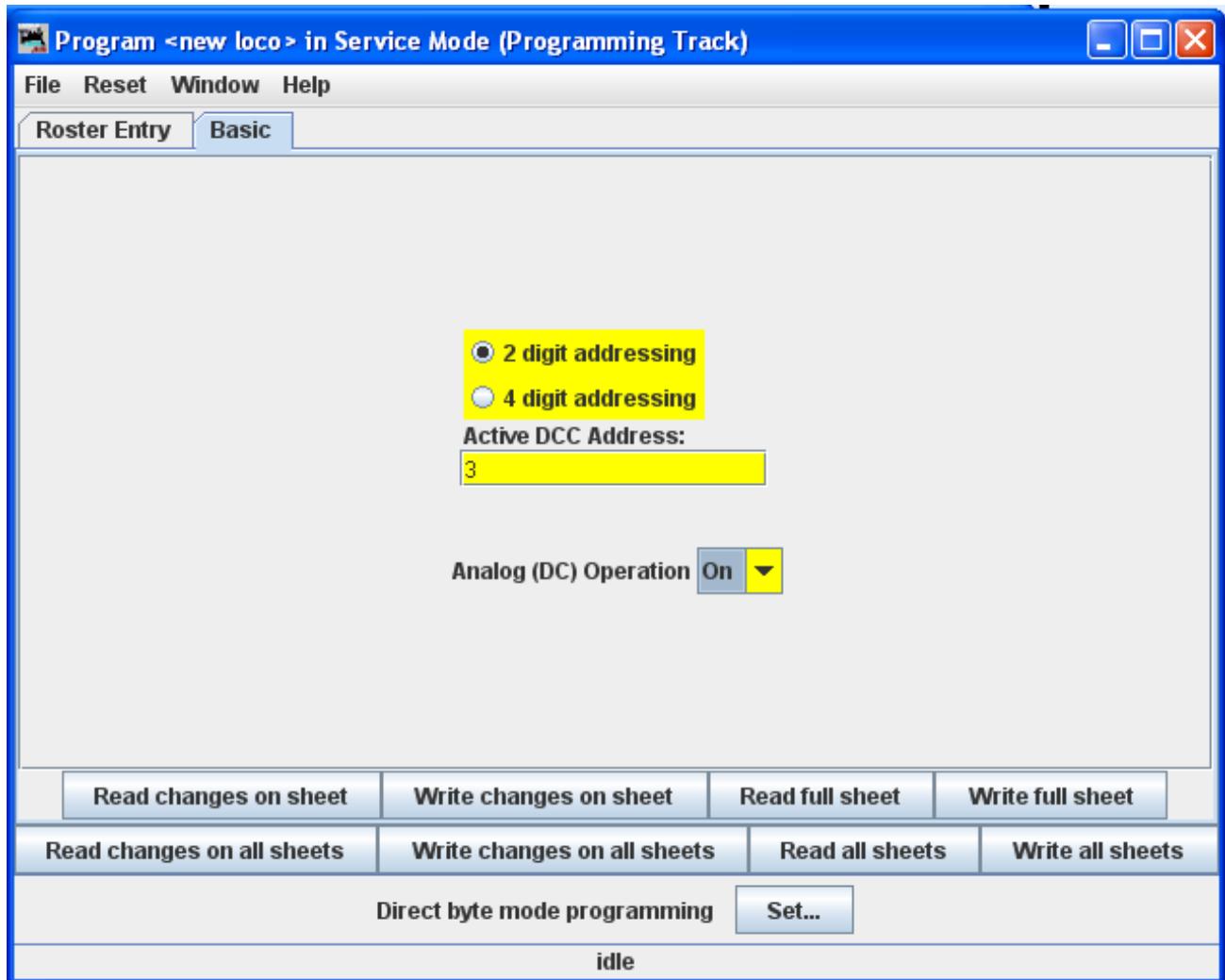


Let's move on to the Basic Programmer.

## BASIC PANE

You may have noticed that at the top of the window are Two tabs: **Roster Entry** and **Basic**. We have completed the **Roster Entry** pane of the Program window, now, click on the **Basic** tab to change panes to continue with programming your decoder. The Basic pane will be displayed and

look similar to the following illustration: Many panes in the programmer contain decoder dependent features, as a result what you see may not exactly agree with what you see here. Only those variables that your decoder can implement will be shown.



You will see three options you can change, highlighted in yellow:

1. The decoder address (should be unique among your locomotives) often the locomotive number is used.
2. Two radio buttons that let you toggle between 2 digit (one byte, normal) or 4 digit (two byte, extended) addressing
3. Analog operation (enables the decoder running under regular DC voltage/analog control)

The yellow highlighting indicates these options are "probable" settings and have not been confirmed from the decoder. Settings that have been changed by the user and have not been written back to the decoder appear in a orange color. You will see examples of this throughout the manual.

To read the actual settings for these options (and IF your system and installed decoder will allow readback of decoder values), click on the **Read full Sheet** button. The individual settings will turn red while they are in the process of being read (clever, eh?), and will turn white once the values have been read successfully from the decoder. Once again, Decoder Pro must play "Twenty Questions" to get this information, and sometimes even has to ask a couple of times.

Be patient, especially with older computers. At the very bottom of the pane (where it says "idle") you will see a running account of exactly what DecoderPro® is doing, for example, the specific CV being read.

Again, the **Read full sheet** and **Read all sheets** functions are dependant on your command station. If your system does not have the capability to read CVs, then these buttons will not be available.

If you wish to change the address of the locomotive, type in the new address. To turn on or off 4 digit addressing, select the desired radio button. . Be sure that the address type agrees with the number of characters in the address.

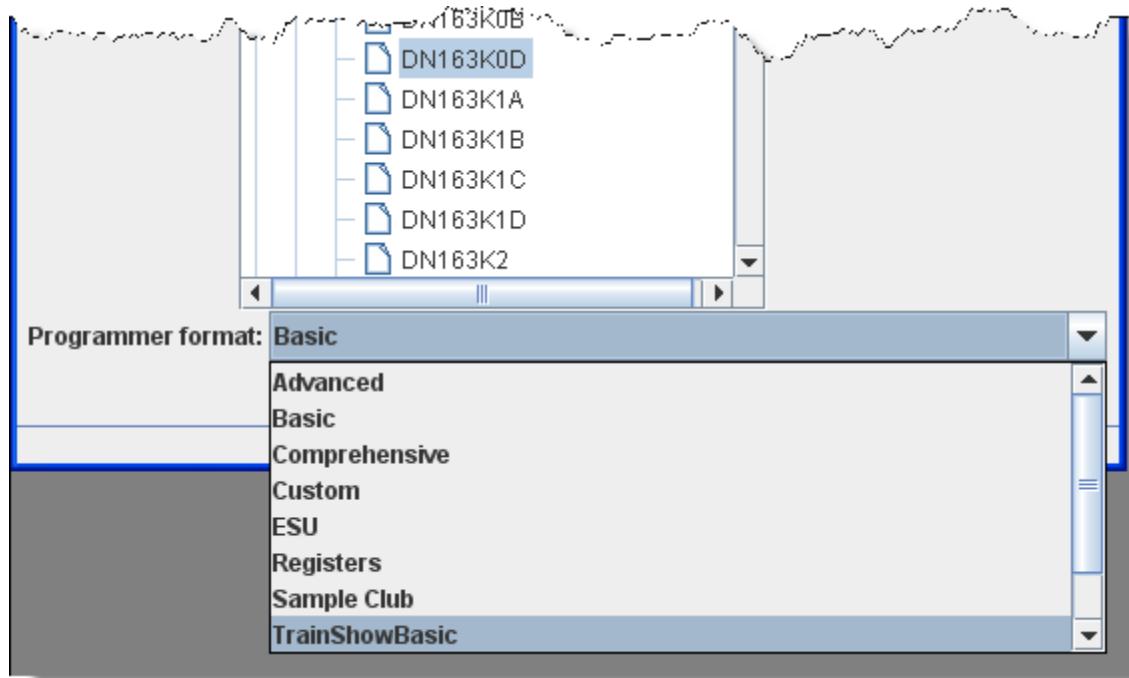
To enable Analog (old style DC) Operation select the appropriate entry from the drop-down list.

When you are finished, click on **Write full sheet** to write the new values in the decoder. It's that easy!

Writing usually takes much less time than reading, because the value can be sent directly. As the write operation proceeds, the data will change from yellow to white. If there is difficulty writing to the decoder, the data will change to red. The software will automatically keep trying until the write operation is successful. In some instances the system will "time-out" after a certain number of tries without an acknowledgement from the decoder. This does not necessarily mean that the values have not been written, just that the program has not received an acknowledgement. This can be due to the locomotive moving and getting on dirty track so that it can't pulse back, or possibly because the command station or decoder cannot read back. Try moving the loco and try again. If it is a command station or decoder read-back issue, try the loco on the mainline and see if the programming was successful.

To finish this "basic" programming of a decoder, click once more on the **Roster Entry** tab. You will see that the address field has now been filled in, so you can now click on the **Save to Roster** button. Your new decoder settings have now been written not only to the decoder, but also saved to a computer file where they may be recalled in the future. .

But you say..."I want to change more than what's shown on the Basic decoder pane." Well... there are other programmers that are available. But... first we need to look at the various options. In fact there are so many options the programmers had to use a slider to get them all to show. Here are the option windows. Don't panic....Most are of no use to the average user.



Comprehensive and Advanced are the only other programmers **Normal Users** will ever need, because it is, well...Comprehensive and the Advanced adds features that are optional.. So why all the others?

First of all eliminate the Manufacturer specific programmers (unless of course you have a Zimo or ESU system).

We can also eliminate the Tutorial and Custom programmers. They were put in to show folks that want to **write their own** programmer (not you right?) all the possible ways to gather input and to have a common starting point in the roster pane. Now if you wish to pursue writing a custom programmer go to this [site](#).

If you have need for a special situation programmer you might want to look at Sample Club or TrainShowBasic to see what panes can be taken out of Comprehensive to make an intermediate complexity, special purpose programmer. Again, how to do this is a subject for another manual.

And that leaves us with the Advanced and Registers programmers. The Advanced programmer has a couple of sophisticated features added on top of the Comprehensive programmer and a name was needed. Well, why not call it Advanced? We'll cover the additional features once we get through with Comprehensive.

So what about the Registers programmer? If you have an old or bargain basement decoder that only programs using registers, then of course you'll be interested in **Registers**.

So now we've narrowed our "real" choices down to Advanced, Basic and Comprehensive. Since we've already covered Basic, let's explore the Comprehensive Programmer!

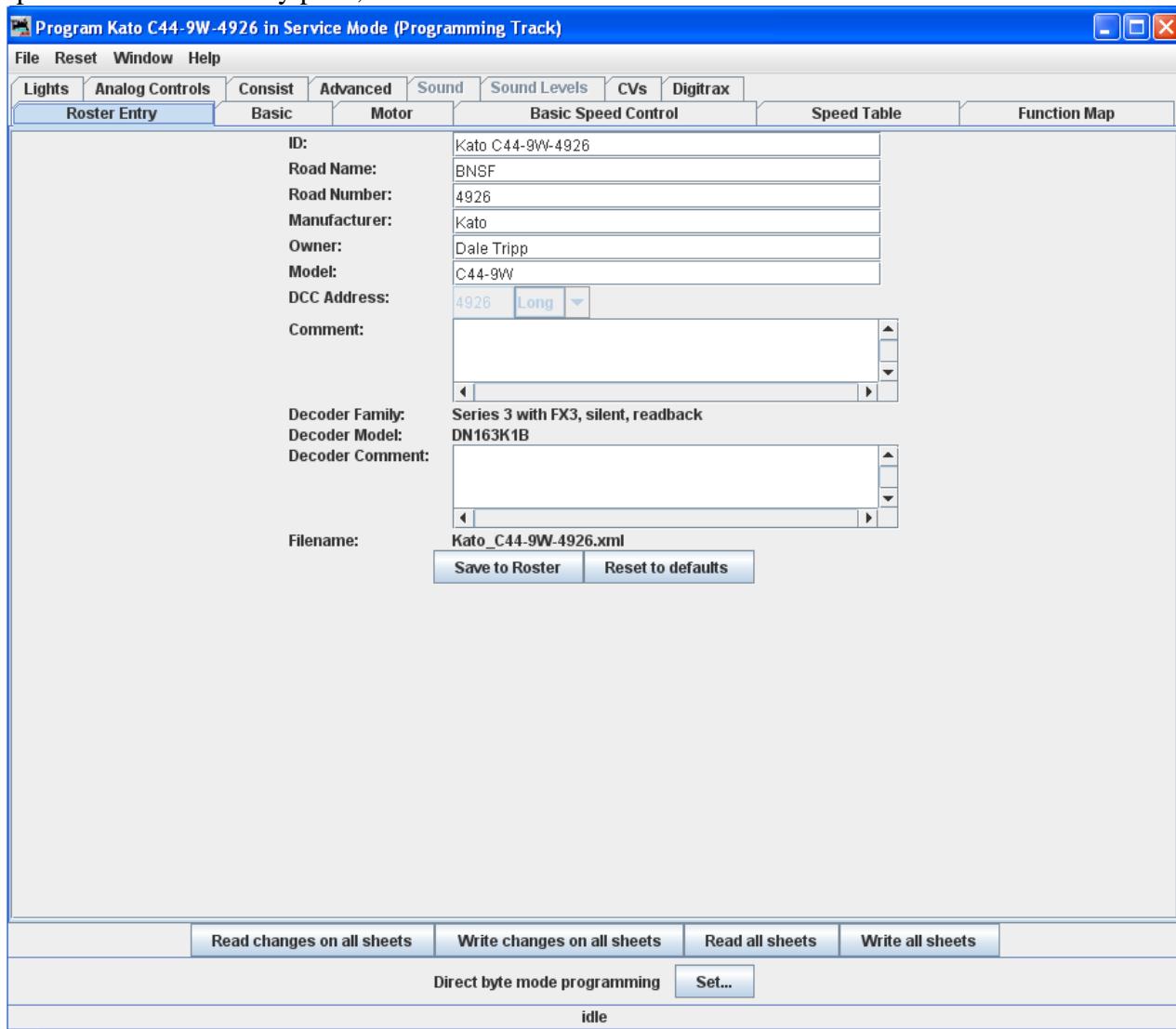


## CHAPTER 5 COMPREHENSIVE PROGRAMMER

### *ROSTER ENTRY*

The Comprehensive Programmer begins the same way as the Basic Programmer, with a Programmer Setup Pane and a Roster Pane. The content are identical, so they will not be repeated here. Just be sure to select the Comprehensive Programmer on the Setup Pane. (Tab Programmer Setup),

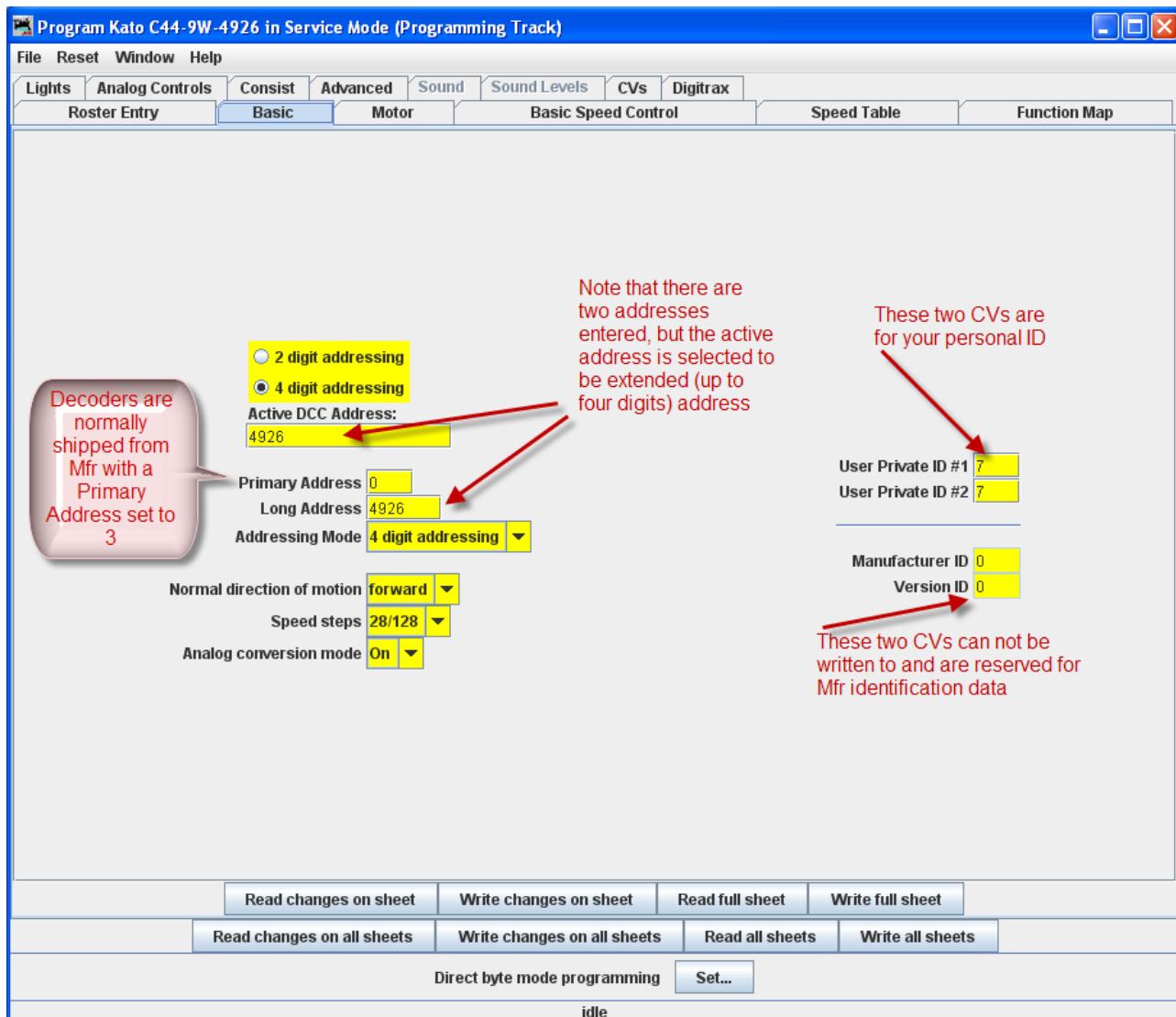
When you are on the **Setup Pane** and click on the **Open Programmer** button, the appropriate Comprehensive Programmer window will open. All programmers, Basic and Comprehensive, open to the Roster Entry pane, which will be similar to that shown below.



Note that the **Roster** pane is essentially unchanged from the **Basic** programmer, but the window has a LOT more options in the **Tabs** at the top! If you are unsure how to handle the **Roster** information, go back to that section in the **Basic Programmer**. If you're ready to move on to bigger and better things, let's go to the next tab, the **Expanded Basic Tab**.

## *EXPANDED BASIC PANE*

of the first things you will notice about the expanded Basic Pane in the Comprehensive Programmer is that there are a lot more options than you found in the Basic Programmer.



Select 2 or 4 digit **addressing** radio button to select which mode of addressing you wish to be active

You can enter locomotive addresses in both the **Primary address** and/or the **Extended address**. The address of a decoder is the prefix for the code it responds to. This is how you are able to run multiple locomotives on a single line and keep all their speeds and functions independent. Decoders originally could have only a two digit address... after all, who could possibly need more than 100 locomotives? Some lower-end command stations and decoders still use only two digit addressing. Newer decoders can have up to a four digit address. The "**Addressing Mode**" option lets you choose between two and four digit addresses. The addresses themselves are input into the appropriate text boxes. The "**Extended Addressing**" check box turns on and off the 4 digit address mode. This allows you to have two different addresses stored in a decoder, and toggle between the two. Great for locomotives with separate decoders for the motor and for sound. Exactly how folks are implementing this is beyond the scope of this manual.

Set the **Locomotive direction: normal** or **reverse** from the drop-down list. The option for **Normal direction of movement** is important for people who model railroads like the NS, who ran diesel locomotives long hood forward, or for the person who occasionally makes a mistake and hooks the decoder up in reverse. It lets you change the direction defined in the decoder as "forward" (no disassembling and rewiring).

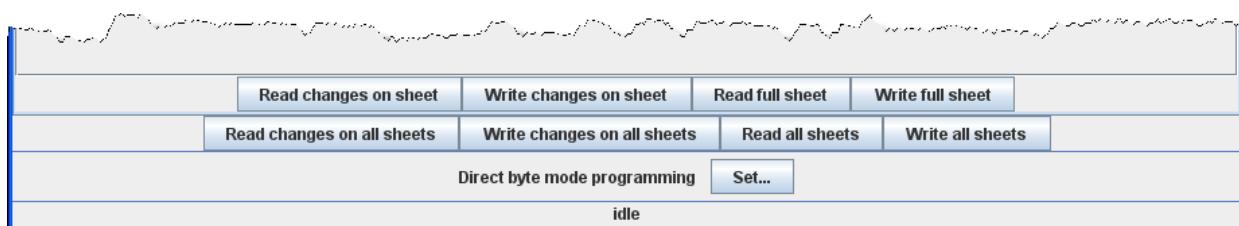
**FL Location:** Unless your command station or decoder can only handle 14 speed steps, you'll find you get much finer control of your locomotives by using the **28/128 speed steps** option. If you happen to set the decoder to 14 speed steps by mistake, and your command station is in 28 step mode, you will find that the headlight will turn on an off as you move through the speed steps.

**Power Source Conversion** mode allows the decoder to run under regular analog DC voltage control or DCC commands. If you find that your locomotive is "breaking away" and running out of control at high speed on a DCC layout, you might want to disable this capability. Decoder equipped locomotives tend to run slower when they are on a conventional analog layout, and lighting functions will be dim or off at low speeds because sufficient voltage is not available.

**User ID #1** and **User ID #2** (off to the right} there are two CVs that have nothing to do with any function of the decoder. They simply provide you with a method of electronically marking your equipment. Use these CVs, even though you may have custom-painted equipment for your own freelanced railroad - it provides one more way to identify your decoders if they are removed from the loco.

## **THE READ AND WRITE BUTTONS**

At the bottom of all the programmer panes you will find three rows of buttons, as shown :



The top row operates only on the currently visible pane. These buttons are:

1. **Read changes on sheet** - an "Oops!" button that lets you recover data from the decoder if you've changed it accidentally on the computer (and don't remember what the values were!), but only if you haven't written it yet.
2. **Write changes on sheet** - faster than writing all the data on the sheet, and ideal for tweaking changes in **Ops mode**, programming on the main track.
3. **Read full sheet** - read all data in this pane from the decoder.
4. **Write full sheet** - writes all data in this pane to the decoder.

The second row of buttons performs essentially the same functions, but on the **entire range** of CVs for the decoder. This allows you to read all CVs, for example, or to make a series of changes across several panes, and when done then write them all to the decoder. Again, you have the option of reading/writing only the changed data, or all data.

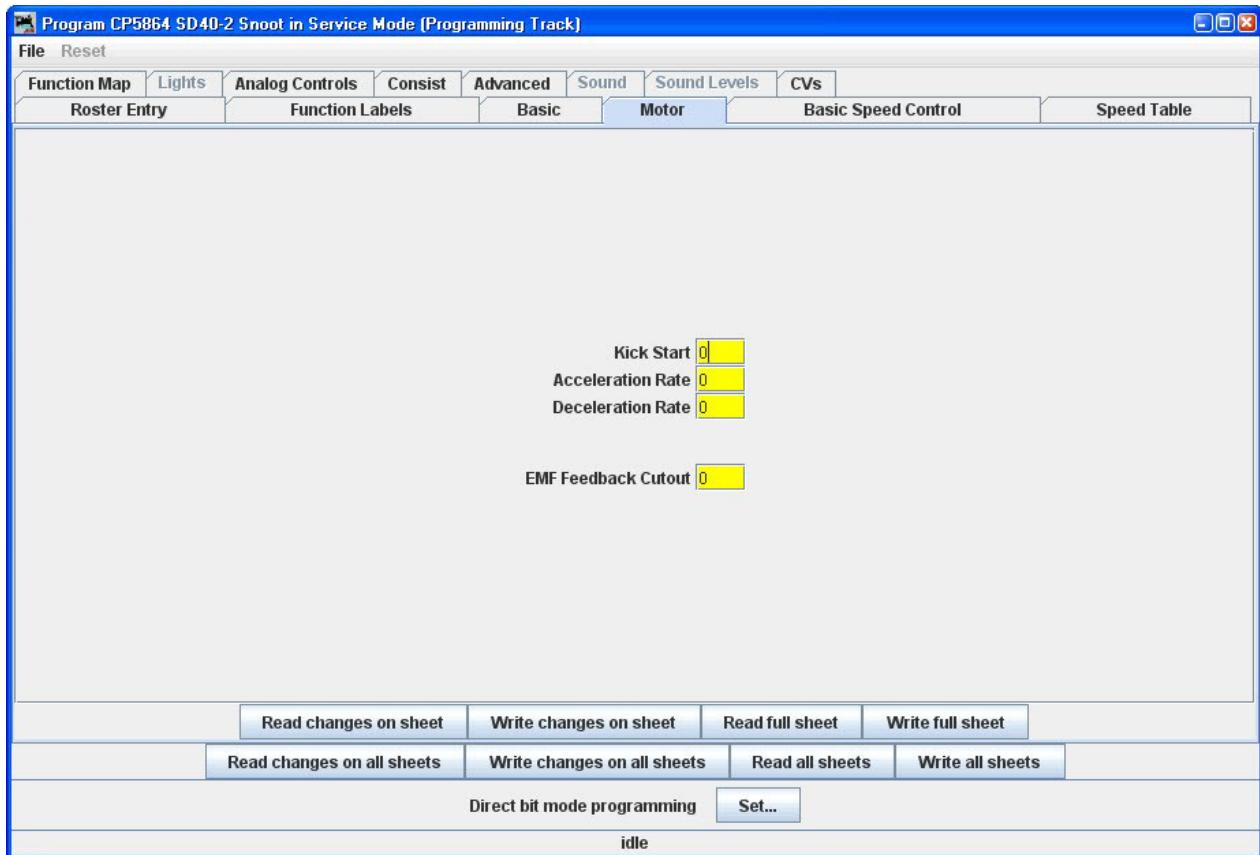
Below the two rows of buttons is a text line that shows what the current **programming mode** is, and a **Set...** button that allows you to change it without exiting the programmer. Basic Mode for further information on Programming Modes.

Finally, the bottom line of the pane is a status bar that tells you exactly what the system is doing. It shows **idle** in these screen shots because the system was not actively programming decoders when they were made.

### *MOTOR CONTROL PANE*

Motor control is divided into three separate panes. The **Motor Control pane** deals with CV's for simulating locomotive weight or inertia. The [\*\*Basic Speed Control pane\*\*](#) deals with basic motor control CV's and the third [\*\*Speed Table pane\*\*](#) covers those dealing with the Speed Table method of controlling the motor. These last two methods of motor control are mutually exclusive. The selection is made with a radio button at the top of each of those two panes. The default selection is Basic Speed Control.

## The Motor Pane



The contents of the Motor pane will vary significantly between different brands and models of decoders. In the case of the decoder shown in the illustration:

**Kick start** is an extra burst of power at the first speed step to help start balky motors. Compare this to the "Minimum voltage" CV we'll see in the [Basic Speed Control](#) pane, which is a sustained increased level of power. Between the two it is quite possible to tune a decent quality locomotive so that it creeps at less than a tick a minute.

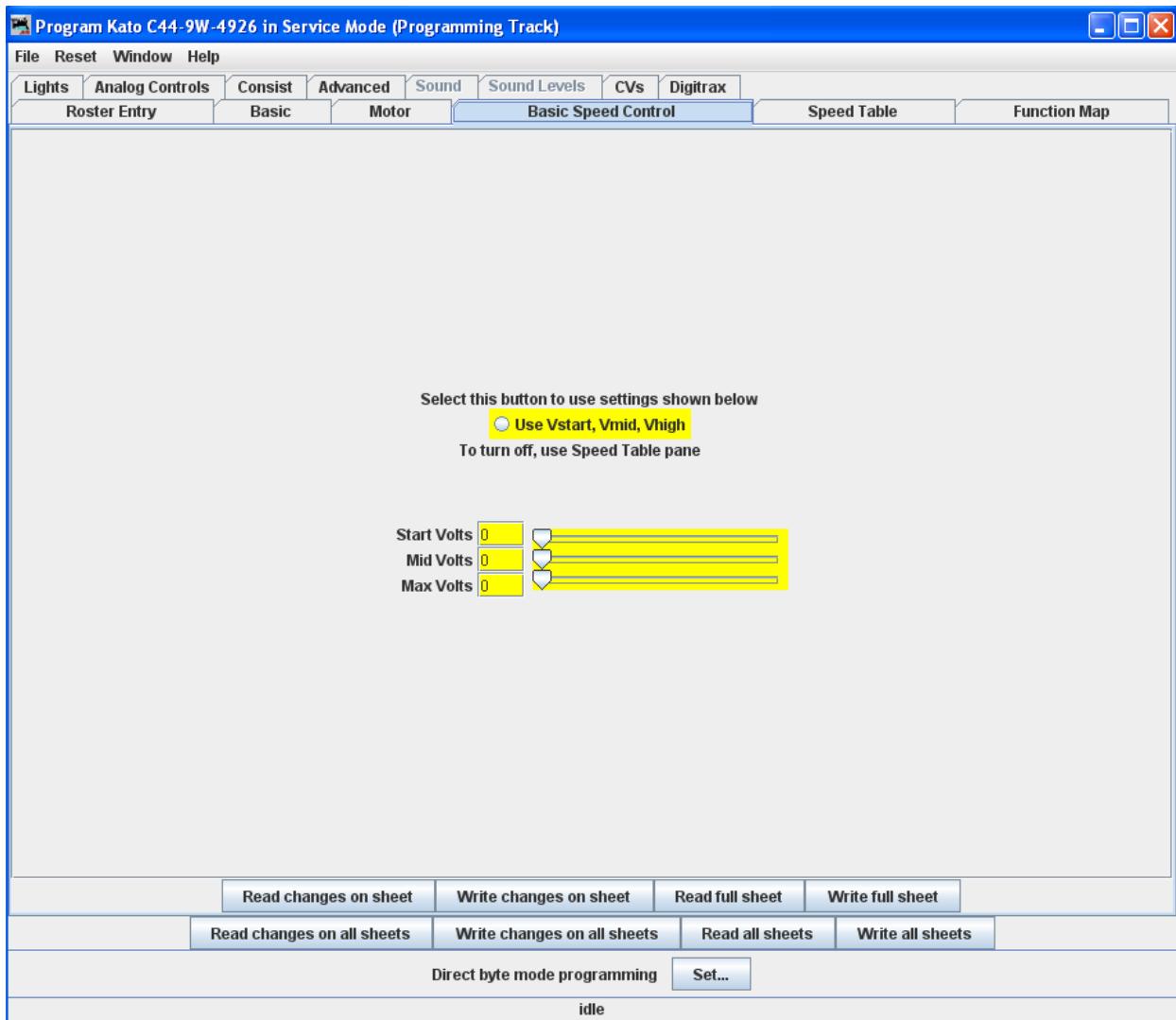
**Acceleration Rate** and **Deceleration Rate** help simulate a locomotive under load - but don't use them unless you have very clean track, because an interruption of power can make a locomotive stop and cycle through the acceleration curve again! On the latest Tsunami Diesel sound decoders the firmware has been changed. The decoder now returns to the last speed setting before the power interruption but it has no knowledge of where it was in the acceleration curve. So if you have been in the habit of using lots of momentum and setting speed to maximum to get the sound of a notch 8 motor, be aware that if the loco loses power for just an instant from a dirt spot on the rails, it will resume at the top speed step and appear to be running away.

High deceleration rates can make station stops and switching realistic, but very challenging!

**Back EMF or Speed stabilization** is implemented differently by each manufacturer.. See your decoder documentation for the best ways to implement these variables, and be prepared to do a lot of experimenting! However they do it and whatever they call it, you should find it in this pane.

## *SPEED CONTROL PANE*

The **Speed Control pane** looks very complicated, but it can be one of the most significant in improving the performance of your locomotive fleet.



Let's look first at the top of the pane: You now have the option of using Basic Speed Control (this pane) or Speed Table to control your locomotive's speed. Which ever one you select last and write to your decoder will be the method used for speed control. To select this pane:

Click on the **Use Vstart, Vmid, Vhigh** radio button.

Three important CVs are programmed in this pane Vstart, Vmid and Vhigh. They work together to make a very basic three point speed table. On some decoders these settings may be labeled differently and all three may not be available. Decoder Pro will show the correct options for your selected decoder.

**Vstart(Start Voltage)** is the voltage at the first speed step. If your locomotive didn't start moving until there were three volts on the track with analog power, this lets you set up the decoder to give it 2.99 volts right away, so it will start moving when you advance the throttle.

**Vhigh(Top Voltage, Max Voltage, Maximum Voltage)** is the maximum amount of power the locomotive will get from the decoder. If your locomotive looks like Chuck Yeager's X-1 at full throttle, then you can trim the top speed down to a more reasonable scale level.

**Vmid(Mid Voltage, Midpoint Voltage)** lets you configure the slope between **Vstart** and **Vhigh** a bit, so that if your locomotive reaches full speed at 5 volts, you can stretch out the lower end of the curve to get more fine control in a useful speed range.

If you are having problems with unpredictable speeds with your locomotives, check these settings. Sometimes, one or more of these settings have been changed accidentally (usually due to an error in programming CV's with a throttle), leading to very odd speed performance. In particular, if the **Vmid** is lower than **Vstart** or higher than **Vhigh**, results can be highly unpredictable. Decoder Pro will not let you make this mistake.

**Forward Trim** and **Reverse Trim** allow you to compensate for differences in the forward speed and reverse speed of the locomotive. Most model locomotives do not run at exactly the same speed forward and backward due to the motor mechanics and the gear train to the wheels.

The settings for these controls are not as intuitive as you might think. A setting of 0 in these CVs turns them off. However, a setting of 128 in either of them will have no visible effect! To make the forward and reverse trim effective, raise the value above 128 to increase speed, and lower it below 128 to decrease speed in this pane. The Forward and Reverse Trim does not work the same for all decoders, with variations between manufacturers.

### **SOME SUGGESTIONS ON USING THE BASIC MOTOR CONTROLS AND PROGRAMMING ON THE MAIN.**

Unless you want to get into some precision speed matching, you probably won't need to use the **Speed Tables** you'll see on the [Speed Table pane](#)- you'll be able to accomplish much of what you want using just **Kick start** ([previous pane](#)), and **Start Volts**, **Mid Volts**, and **Max Volts** if they are available in this pane... but how to do this?

Start with the **Kick start** value, and [Programming on the main](#) rather than the programming track. Set the locomotive to be programmed on throttle step 1. If it moves at all, don't change the **Kick start** value. If it doesn't move, slowly step up the throttle until it does. Then, turn the

throttle down. If the locomotive stops at the same setting it started, you won't need to set the **Kick start** value. However, if it continues to run at a slower speed than it would start, then increase the **Kick start** value until it will start and run at its slowest possible speed.

Now, if the locomotive isn't running at throttle step 1, increase the **Start Volts** value (and write it) without changing the throttle until the locomotive barely crawls... you can usually get this down to a speed of a tie a minute or so if you like! Remember, you are doing this in "**ops mode**", so you can make these changes while the locomotive is actually running. Don't forget to write the value changes to the decoder - they won't take effect unless you do.

Now, set the top speed of the locomotive. Run the throttle up to full, and lower the **Max Volts** value (and write it) until the locomotive runs at the maximum speed you want it to reach, but don't forget that adding a train will slow it down!

Finally, set the **Mid Volts** value about half-way between **Start Volts** and **Max Volts**. Setting it above or below the median of the **Start Volts** and **Max Volts** values will give you a crude, three point speed table.

There are no hard and fast rules for the exact numbers to use. Even identical locomotives with identical decoders will need different numbers, due to variances in motors and drive trains. Experiment with the settings - Decoder Pro makes it easy!

Note: Not all decoders will have Start, Mid and Max Volts, but will have some version of this which will be displayed by Decoder Pro for the specific decoder.

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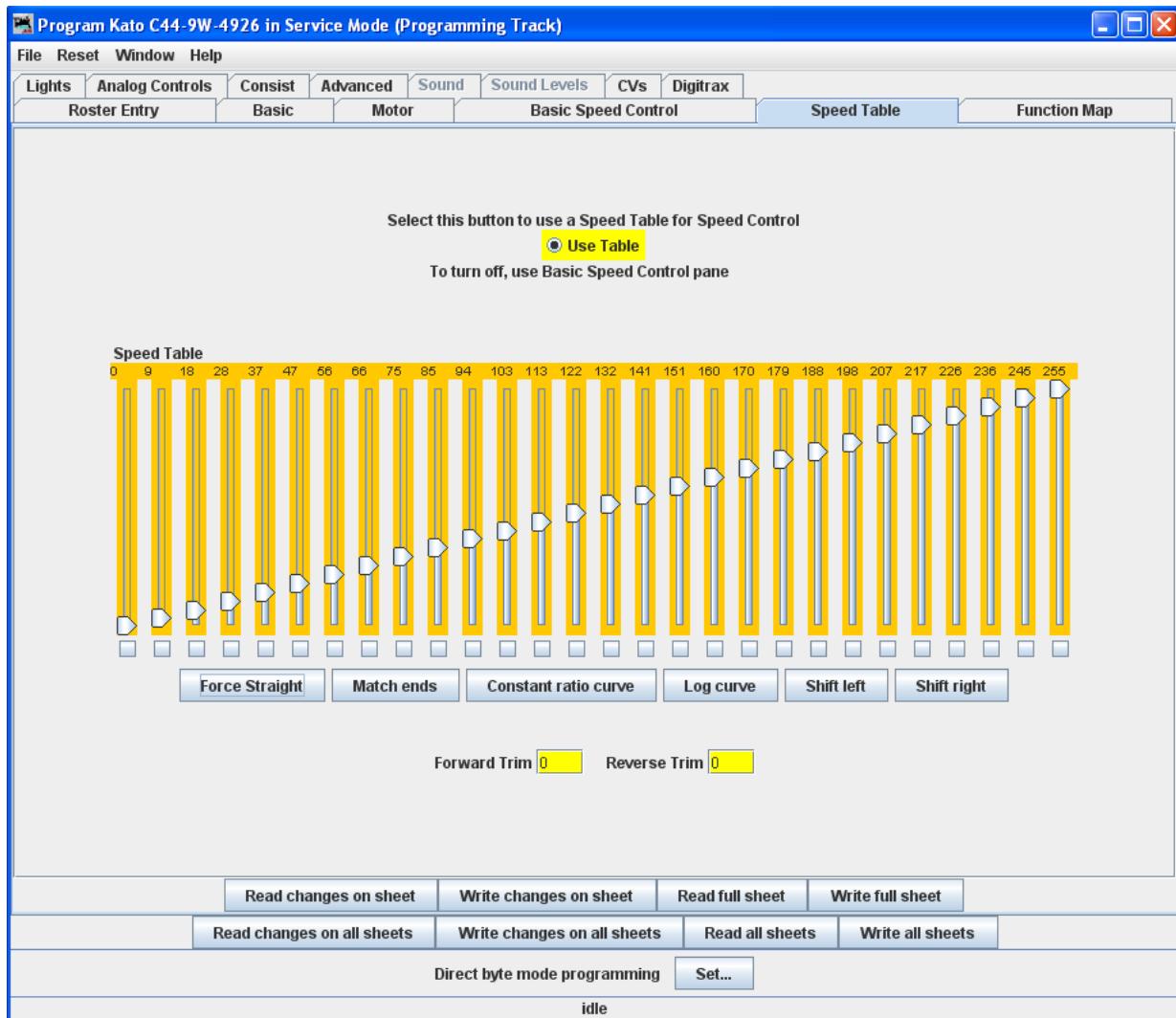
If you select **Speed Table** all of the settings in this pane are ignored.

### *THE SPEED TABLE PANE*

The **Speed Table** allows you to fine-tune the throttle response of your locomotive. You might opt to match all of your locomotives so they run at the same speed for the same throttle setting, or you might want to set the table up so that your locomotive runs at the actual scale speed indicated by the throttle. Or maybe you have someone in your operating group that likes to switch the yard at Mach 2.5, and you want to slow them down a bit. There are a lot of ways to use this feature. (This feature may vary by manufacturer and decoder series)

You now have the option of using **Speed Table** (this pane) which if selected and written to the decoder will replace the **Basic Speed Control** to set your locomotive's speed control mode. Which ever one you select last and write to your decoder will be the method used for speed control. To select the use of speed tables, the **Use Table** radio button is selected at the top of the pane, and in the case of Soundtraxx and QSI decoders, the drop down selection box must be used. See the discussion at the end of this section for an example.

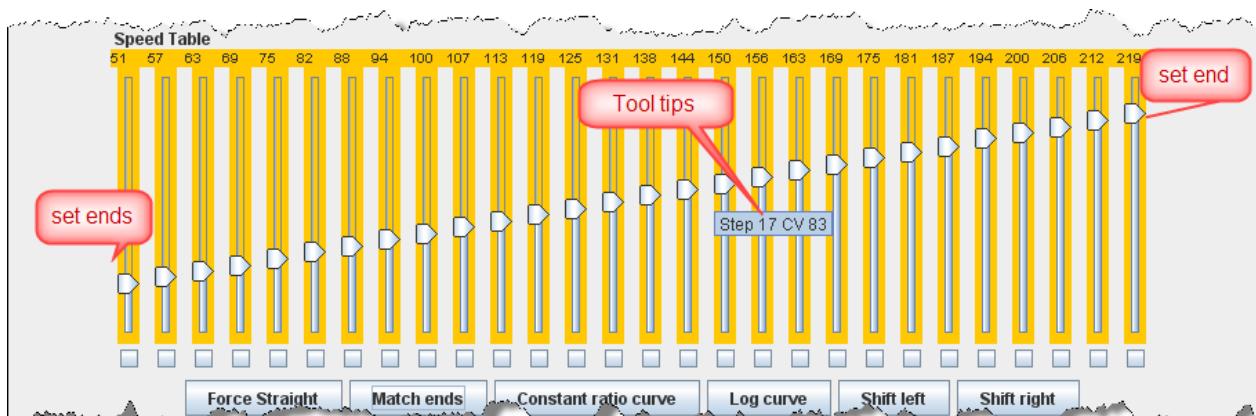
The default speed table for most decoders is a straight line from zero on the left to maximum on the right. The **Force Straight** button below the table duplicates that.



## Straight Line Speed Curve

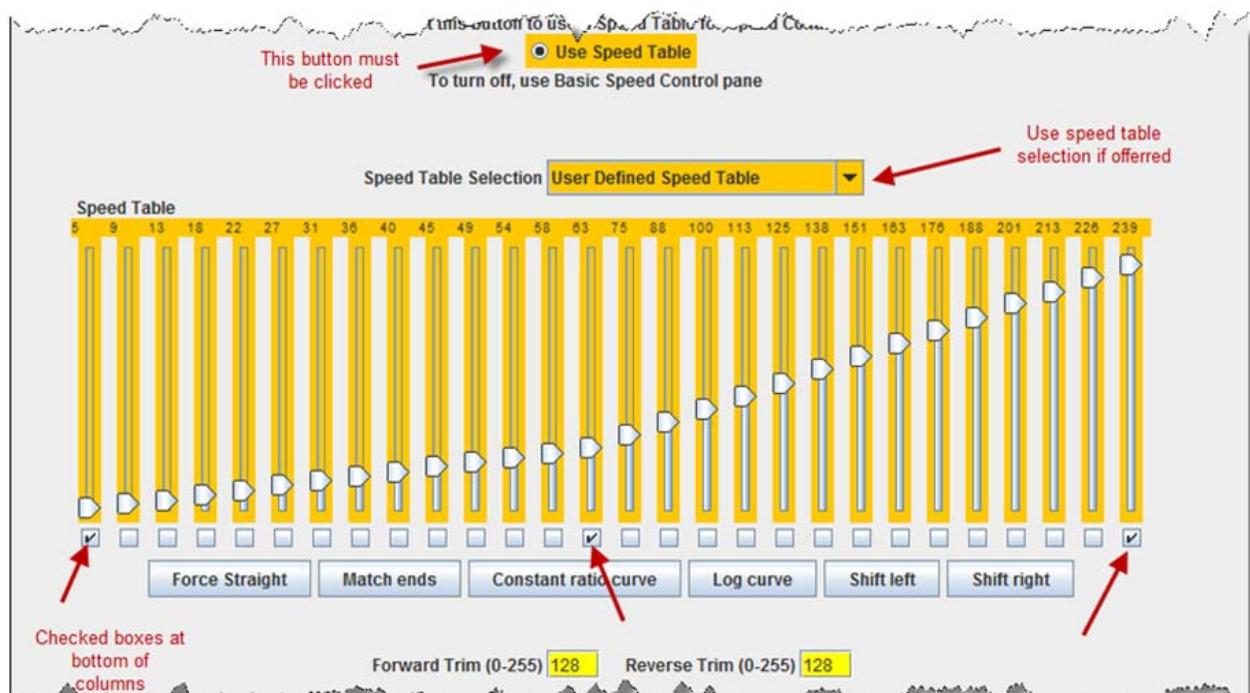
As you can see, you have both numbers and sliders to work with. Changing either a number or slider will make the other change to match it. If you are CV inquisitive, you can use the tool tip to advantage. By hovering over any of the sliders, the tool tip will reveal the CV to which you are pointing .

The **Match ends** button will also result in a straight-line graph, but you can offset the beginning and end by any amount you wish. The first and last steps are used to set to minimum and maximum values for the straight line. The function will then draw a straight line between those two end points. Below is an example of the result.



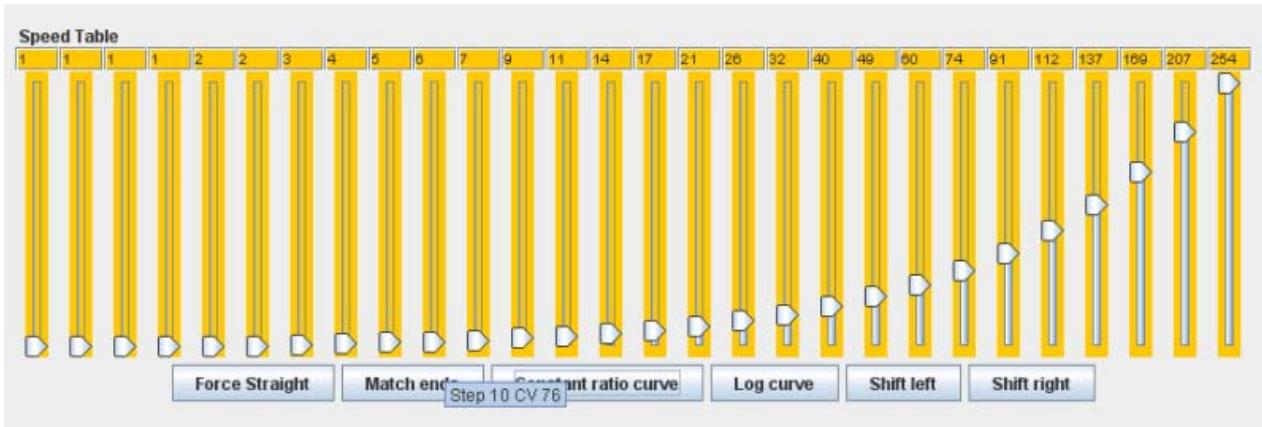
Now if you've used DecoderPro® in the past, you're probably wondering what those little boxes at the bottom of each slider are used for. Well, they're difficult to explain, but easy to use. They basically allow you to set a slider to control every slider in columns to its left as well as to its right. If you click two of the boxes and then move one of those sliders you'll see that they are linked to the sliders between them. Points to the right never are higher than the slider being moved, and the points to the left are never lower than the slider being moved. This "always increasing left to right" is normally the way the sliders worked, but now the ones in between the check are linked. If the slider is lowered and then raised the straight line is drawn between the column checked to the right and the column that the slider is controlling. It's difficult to describe, but try it and you'll see.

What could that possibly be used for, you ask? Well, many decoders (like the Soundtraxx Tsunami in this example) do not support V-start, V-mid and V-max. So, if you are trying to use the simplified method of speed matching locos, these decoders won't support it. Well now you have a way. Check the left-hand, right-hand and middle columns. Set the left-hand column to V-start, the right-hand to V-max and then slide the middle slider up and down until you get the V-mid that you want. Now all you have to do is write this speed table to the loco and you've accomplished what you wanted to do, but the decoder manufacturer didn't provide for.



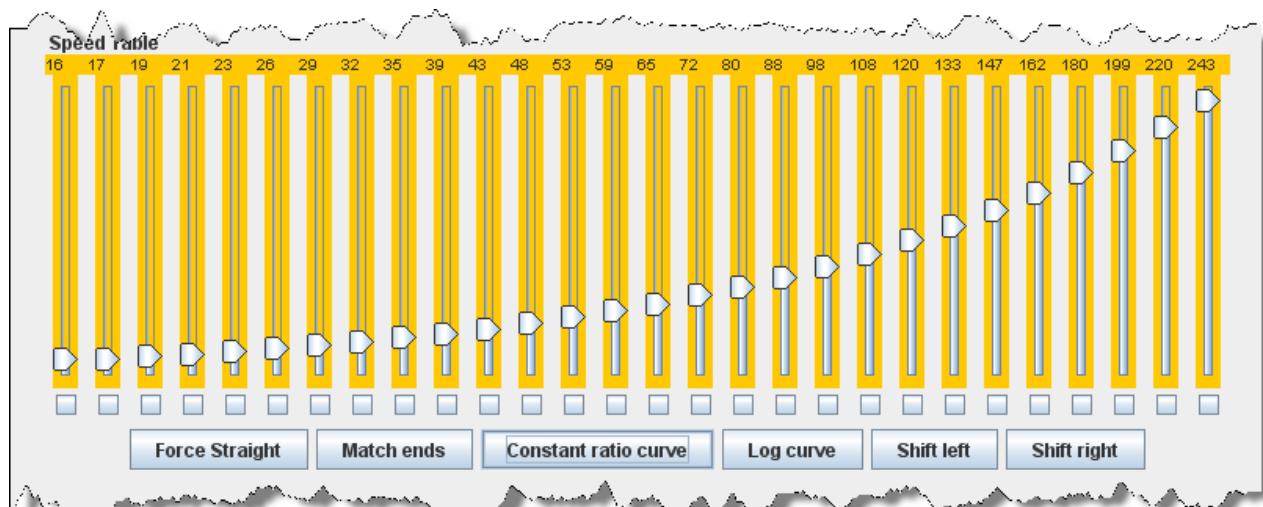
## Substitute for Quick Speed Matching

If you want to set up a loco for switching you can set a start speed that is the same for the first portion of the throttle revolution and lower the top speed for use in the yard as shown below:



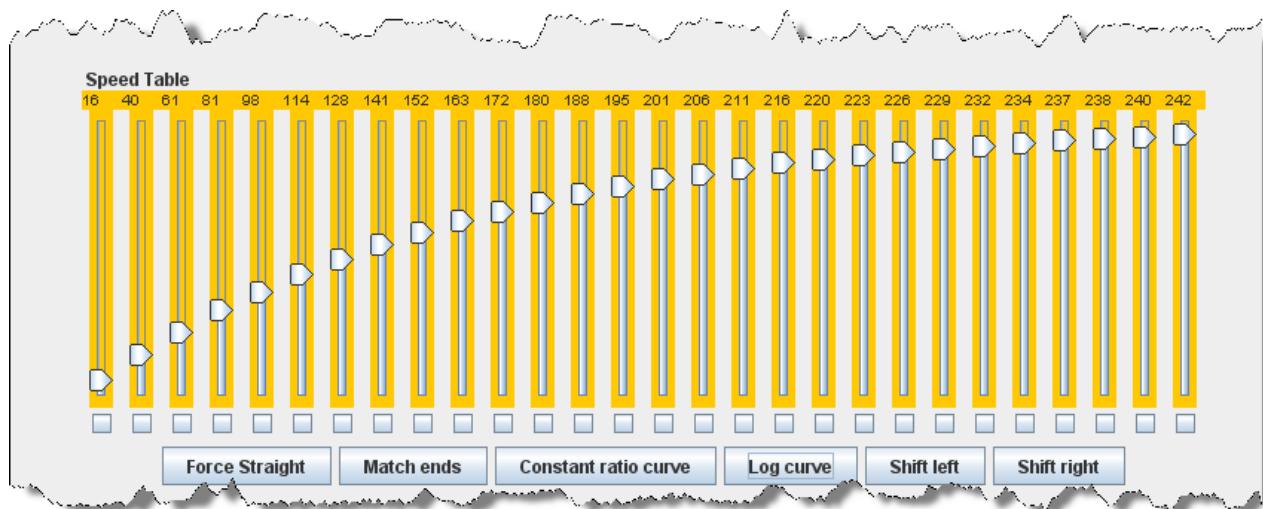
## Switcher Speed Curve

if you don't desire a strait-line response curve ther are other options available. The Contant ratio curve gives you a response that increases slowly in the low end and rapidly at high throttle. This function will also draw the curve between preset end points.



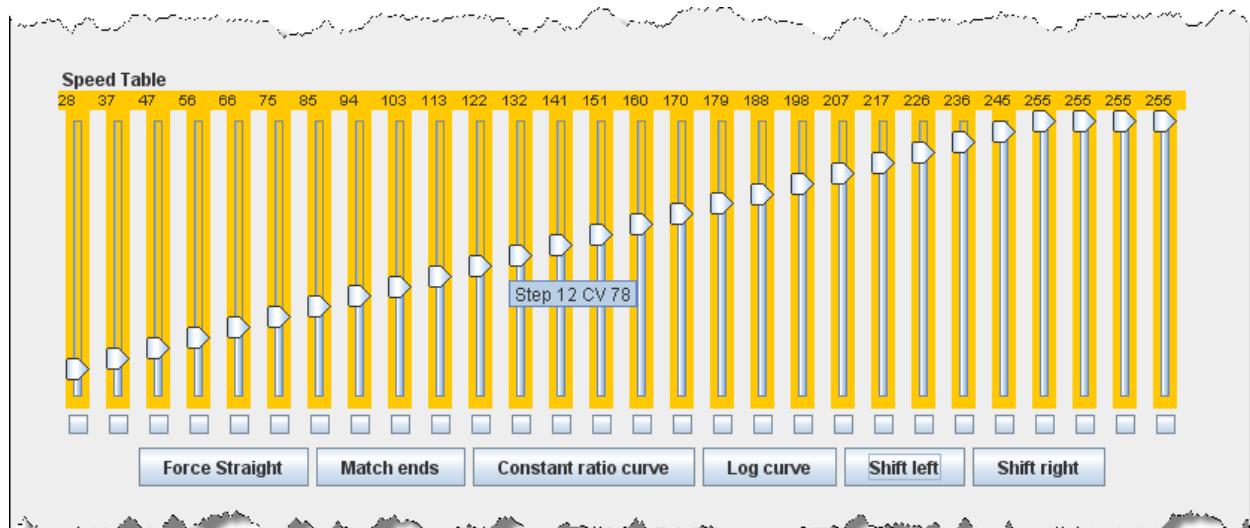
### Constant Ratio Curve

The **Log curve** reverses this response, giving you a logarithmic response curve with high acceleration at low speeds, but topping out quickly. It will also draw the curve between preset end points.



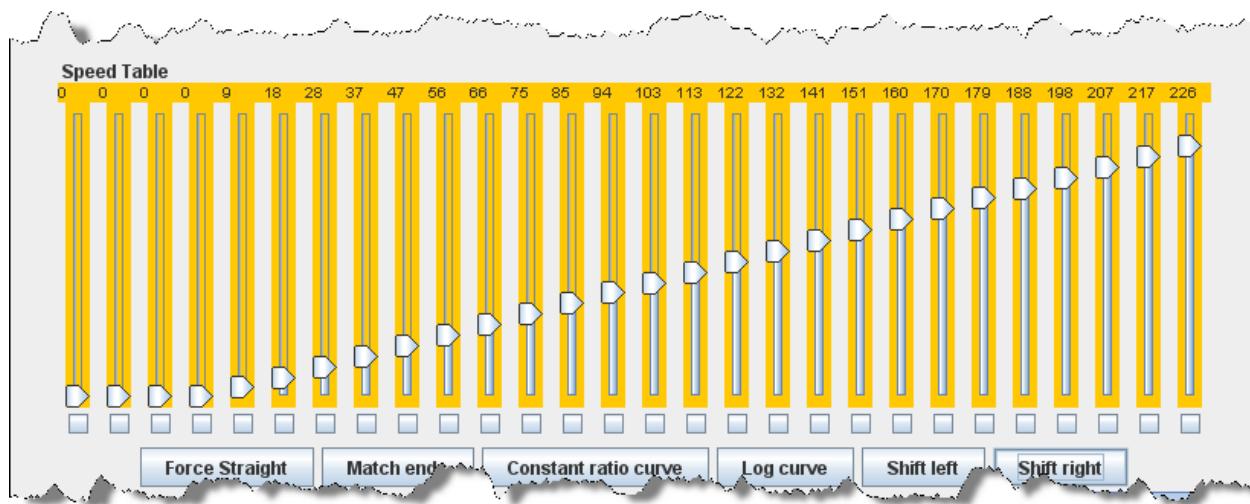
### Logarithmic Speed Curve

The **Shift left** button moves the entire speed table to the left one space with each click on the button. The example below shows a linear 0-255 speed table that has been **Shifted left** three times.



### Curve Shifted Left

The **Shift right** buttons move the entire speed table the right one space with each click on the button. The example below shows a linear 0-255 speed table that has been **Shifted right** three times.

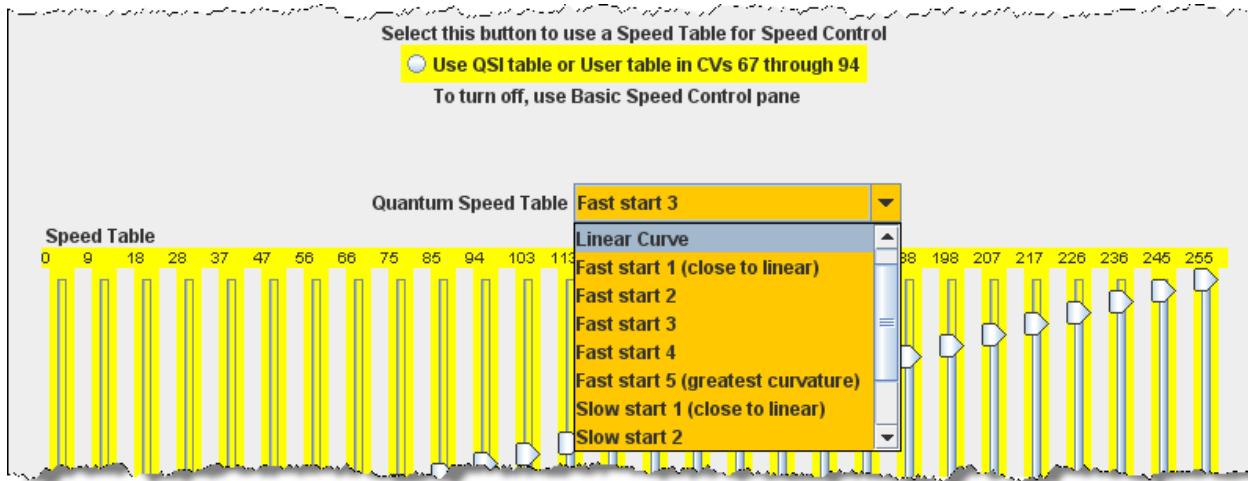


### Curve Shifted Right

Of course, you can enter the numbers individually or move the sliders one at a time to create your own fully customized speed table. To aid you with setting the individual values, the slider value is shown at the top of each slider. Also, by hovering the mouse at a slider column the number of the CV being entered will be revealed.

One very important thing to remember: No matter how pretty your speed table looks, it has absolutely no effect on the locomotive unless you write it to the decoder!

And this point is especially pertinent with the QSI and Soundtraxx Tsunami decoders, because they have a separate drop down box like the QSI box below. They require that you select the **user defined** speed table entry in this box or your table will not be written to the decoder. Interestingly, Tsunami puts the selection at the bottom of the list making it very easy to miss.



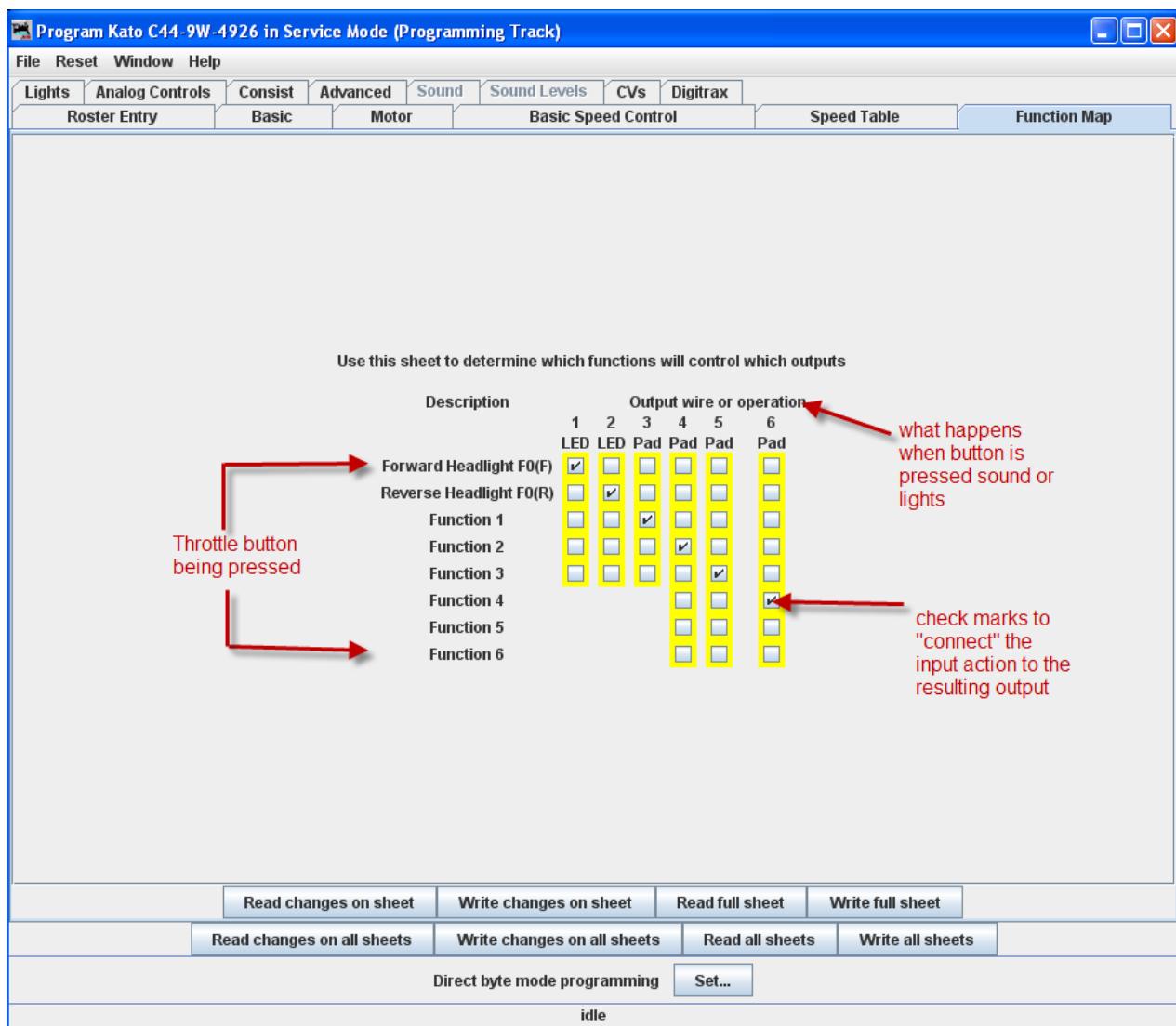
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## FUNCTION MAPPING PANE

Some decoders allow you to change the function assigned to each set of output wires (or pads). Multiple choices for function assignments are shown by several check boxes. This is more common in decoders with more than four functions, and in sound decoders.

Some of the new sound decoders may have up to 28 functions, and your throttle may have a limited function capability. So, here's your opportunity to pick which ones you can operate from your throttle.

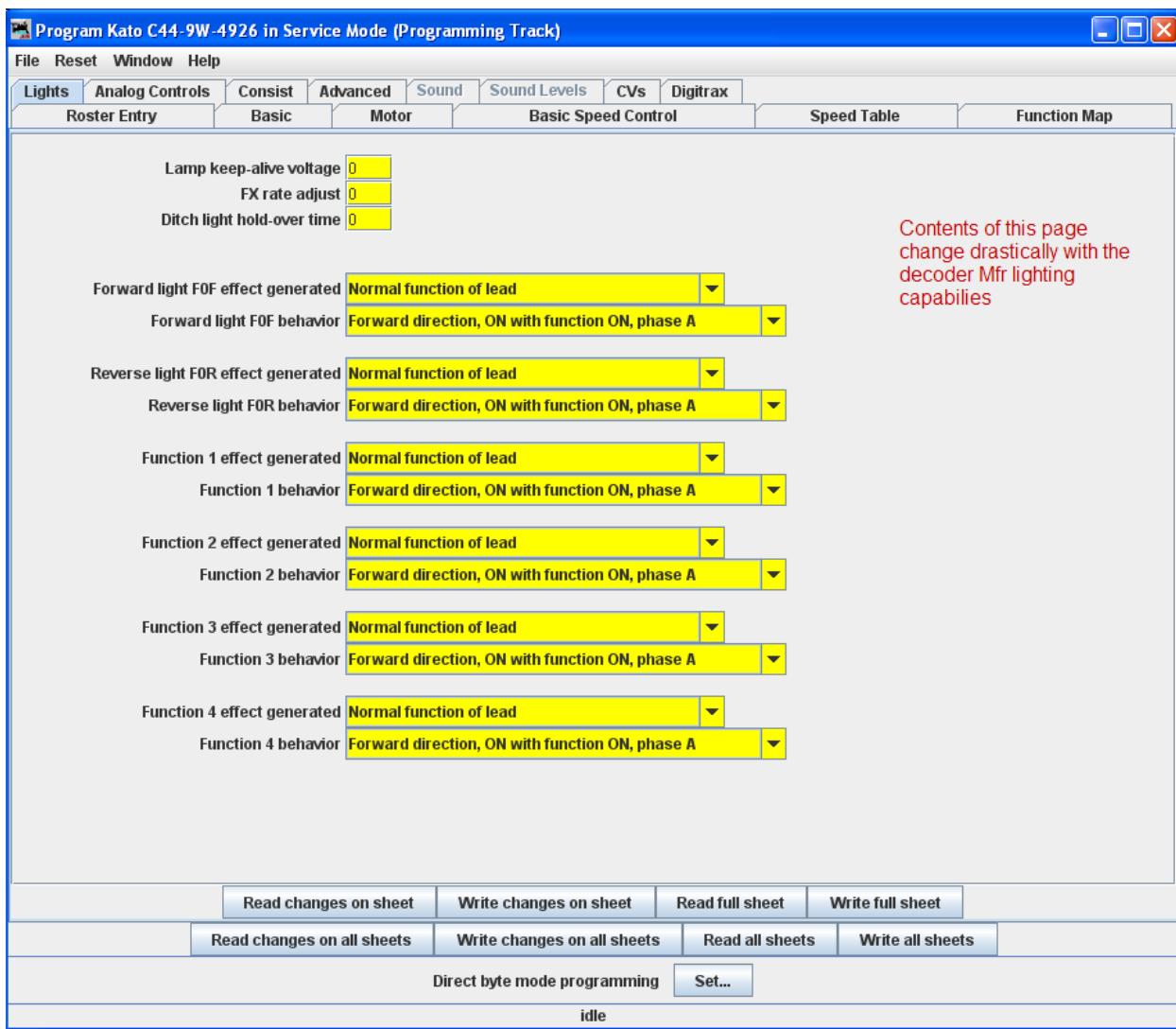
When this capability is present, the check boxes as shown in the window below are active and allow you to choose to which function key on the throttle each output responds.



If a checkbox is dimmed that indicates that no changes in function assignments are possible. Not all decoders allow you to remap the functions and others have very limited functions.

## LIGHTING AND FX FUNCTIONS PANE

This pane provides for control of some of the most "gee-whiz" functions on the decoder. While fine-tuning the motor is important, and speed tables help add to the realism of operation, everyone notices the lights - especially when they change intensity, flicker, flash, or fade. They attract even more attention when, for example, the ditch lights that were steadily shining as the locomotive approached the crossing suddenly begin flashing alternately, then return to a steady glow; or when a locomotive pulls into a siding, stops, and dims its headlight for the approaching train. All these effects are possible with the right decoder and proper set-up, and set-up is what DecoderPro is all about.

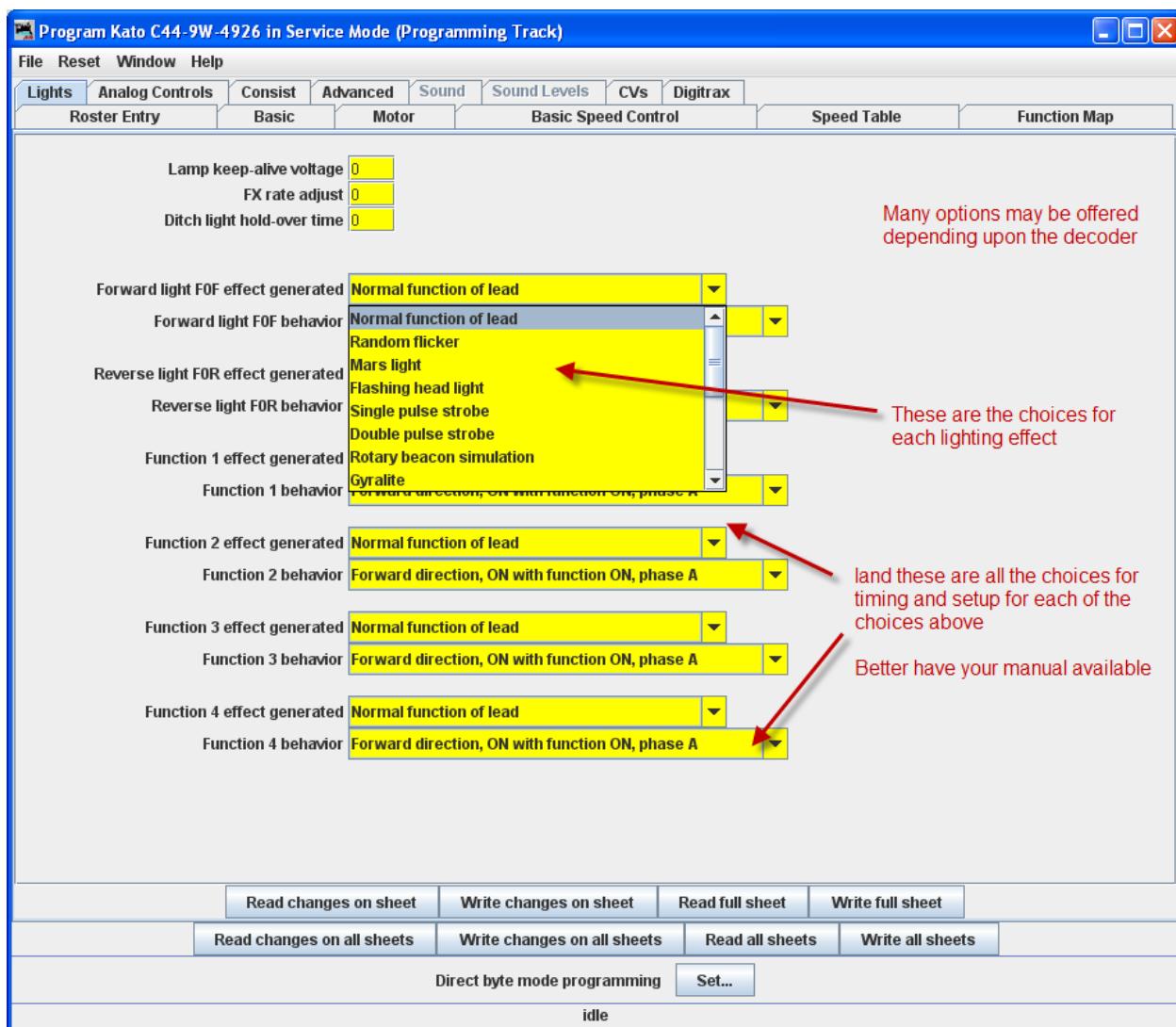


The specific effects available differ widely between manufacturers, and even between different "families" of decoders from the same maker. The above example is from a Digitrax FX decoder. Some of the advanced features you will see in many decoders (though they may go by different but similar names)

The **Lamp keep-alive voltage** determines how dark a light gets between "full on" moments. This can let you adjust effects to give the impression of, for example, a marker light that also has a rotary beacon in the same housing. Play with this value and see what kind of results you get for your specific decoder.

**FX rate adjust** controls how fast an FX effect operates. The higher the number, the slower the frequency of flash or "rotation" of the effect. This can be used to set subtle differences between locomotives. As you can see from the panel above, there are twin alternating strobe lights on the engines. If you vary the setting for the **FX Rate** slightly, the locomotives flash at slightly different rates. This keeps MU units from looking too coordinated!

**Ditch light hold-over time** CV establishes how long the ditch light effect (alternating flashing) stays activated after you hit the **F2** function key. Since the **F2** key is non-latching (think of it as a momentary contact switch) that normally turns off when it is released. By raising the value of this CV you can make them stay on for up to 30 seconds from a single momentary activation.

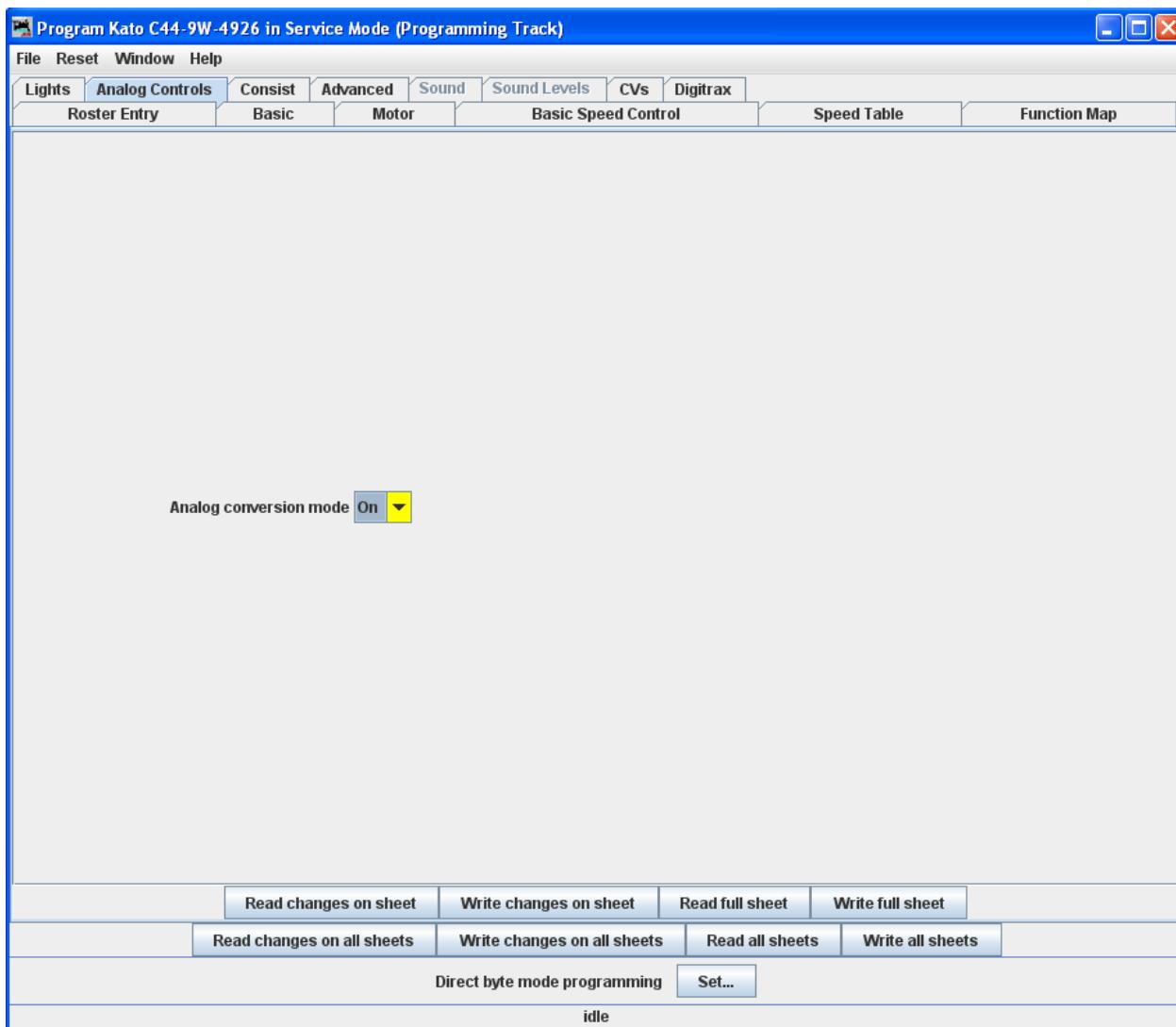


The other lighting effects are highly variable between decoders. Check your specific decoder documentation for what the decoder is supposed to be capable of doing, and have fun playing with them. They are the most visually satisfying of all the capabilities of the decoders!

Even if the function and effect are available, you may have to add the lighting to your locomotive in order to be able to use that function, such as adding ditch lights, beacons, etc.

## *ANALOG CONTROLS PANE*

As discussed in the [Expanded Basic Pane](#), some decoders allow operation on Analog or Conventional DC layouts. At the discretion of the manufacturer, some of the non-motor responses may be changeable by setting CV's in the decoder. This pane is where you would set these values. Typical would be whether any of the various functions (such as lights and bell) would be on or off when in DC mode. Consult your decoders manual for options available.



## *CONSISTING FUNCTIONS PANE*

Consisting is a means to have two or more locomotives respond to orders from the command station, and do it together in unison. There are a number of terms used to describe consisting, and the manufacturers don't agree what those terms should be. The NMRA has adopted terminology, so that is what will be used in this discussion.

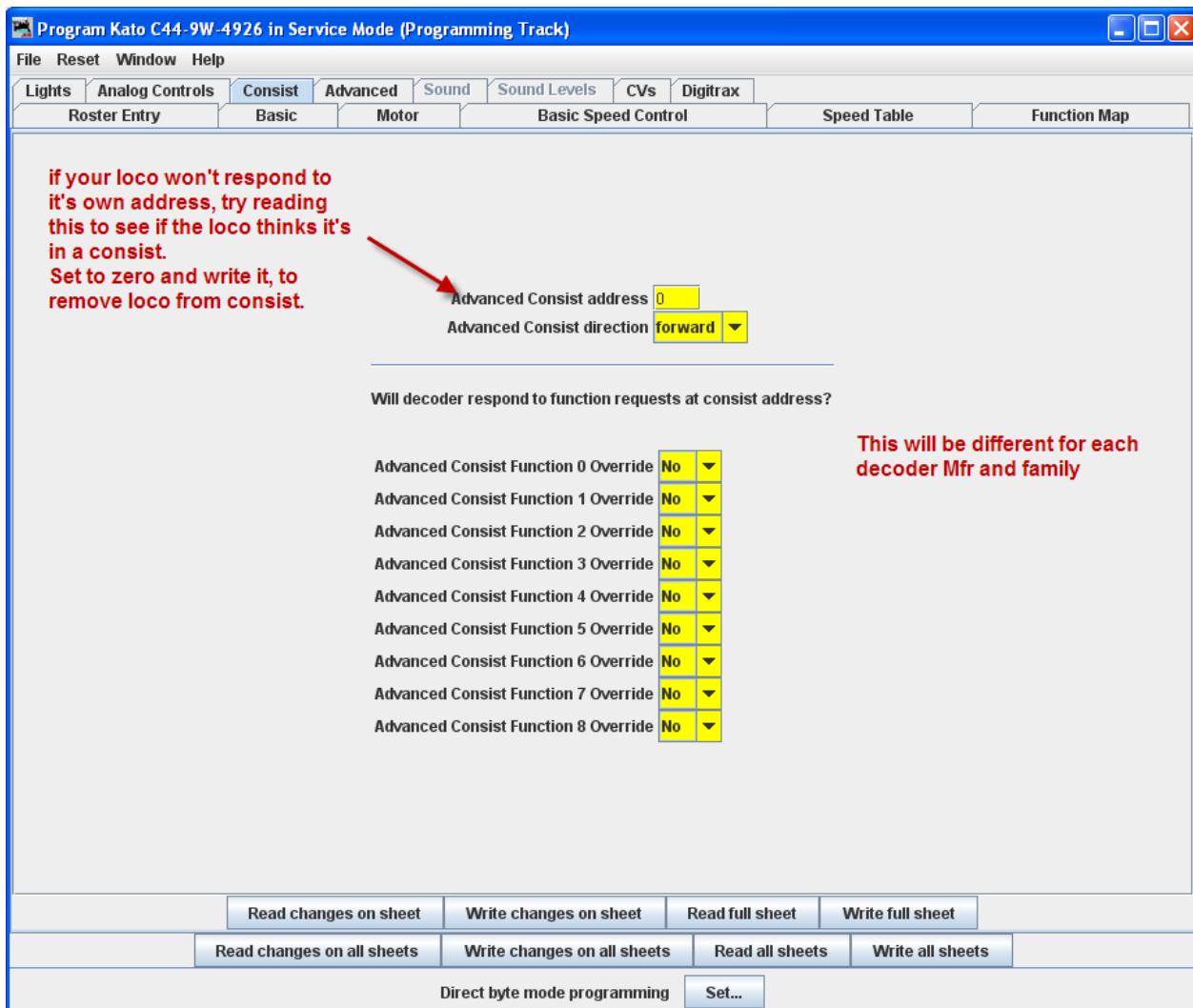
**Address Consisting.** You merely set the address of every locomotive to be the same, and we can use the Basic Programmer pane to do this. Then a DCC instruction sent to a locomotive with address XX will cause all the locomotives with address XX to respond. It works well for locomotives that are always run together, and is portable from one layout to the other. The disadvantage is that it's a pain to keep re-addressing your locomotives if you don't always run them together.

So, the NMRA came up with two additional means of consisting. One is set up in, and remembered by the command station, and the other is set in the decoders.

The NMRA calls the command station based system **Basic Consisting**. The command station keeps a list of all the locos in the consist. When an action is needed the command station sends an individual packet to every locomotive in the consist, which causes them to then act together. Since this method is command station based the consist is not portable to another system. Also, since it does not need to be programmed into the decoders, DecoderPro® doesn't need to deal with it.

The NMRA calls the decoder based system **Advanced Consisting**. To implement this system the decoder has to have a special memory space (CV19) which is used to store a consist address. This type of consisting is portable between layouts, since the information that the loco is part of a consist, and the address information for that consist is carried in the decoder. The disadvantage is that once the locomotive is assigned to a consist it will only respond to the consist address. If you forget to "break" the consist at the end of an operation, you will be puzzled as to why your locomotive won't respond to requests for motion, even though it will respond to some of the lighting functions.

DecoderPro® utilizes the Consisting Pane to set up NMRA Advanced Consists and the response of the locomotive to function requests sent to the consist address.



The Advanced Consist Address is for **EPF (Extended Packet Format)**, as defined by the NMRA Recommended Practices for DCC. If the consist address is **any value other than zero**, the locomotive is considered to be in a consist and will only respond to instructions sent to the consist address. Thus we set a short address here to create a multiple engine group that will all respond to the same address. Think of it as an MU specific locomotive address. Since the address is in the same range as non-consisted locomotives with short addresses, we need to be sure the address is unique on the layout. A way of doing this is to use higher end of the short address range starting from 127 and going down. Most folks working with single locomotives with short addresses tend to be using the manufacturer's default of 3, or other low values, typically for their logging locomotives.

This Pane also allows one to instruct the decoder what effects are to be active when the locomotive is in a consist, assuming the decoder is capable of responding appropriately. As an example, this allows you to specify if the headlights and other lighting functions are to be always off if the locomotive is in the middle, or tail end. This can be handy if only the "B" unit has

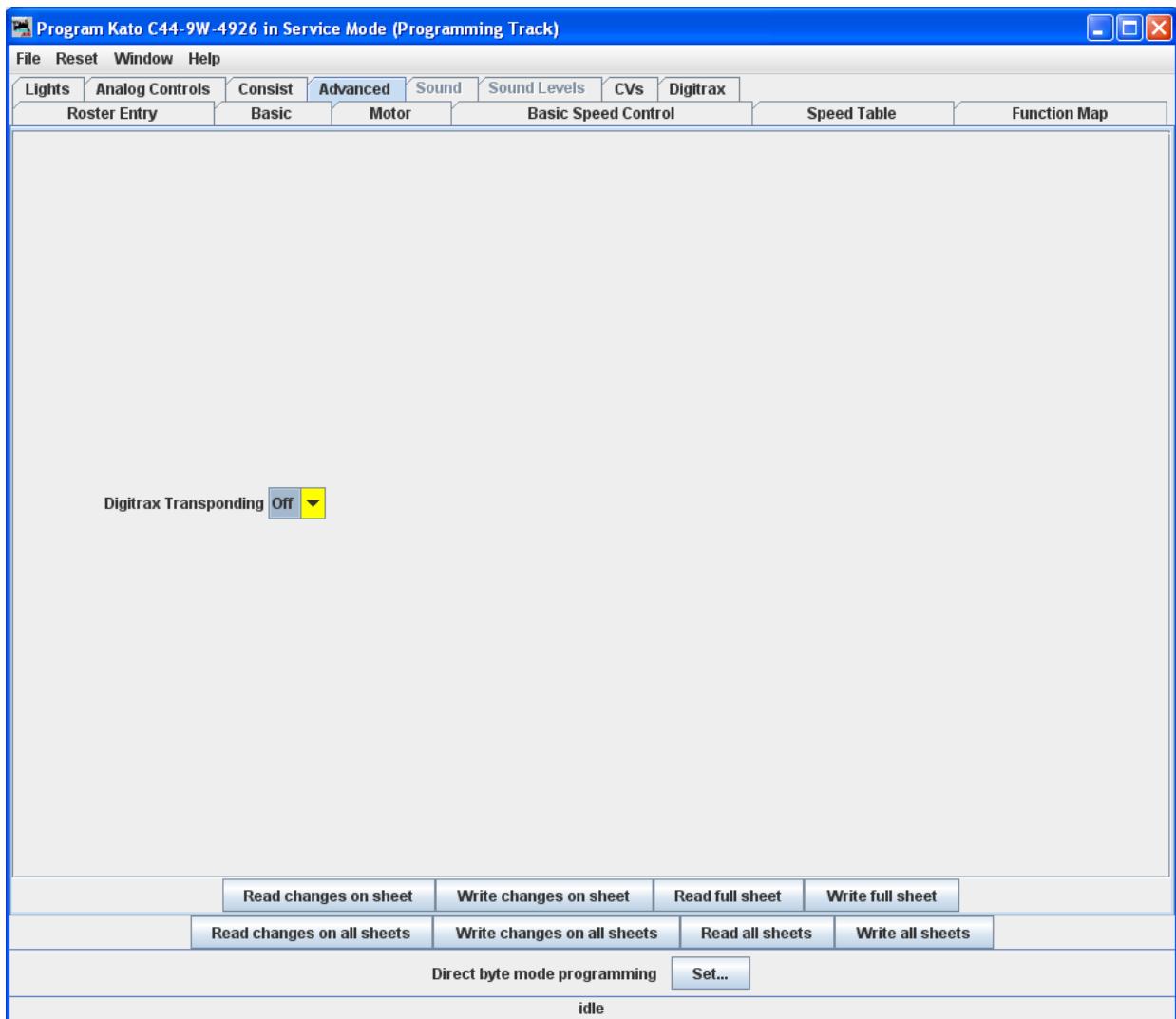
sound. You can set it's lights to be off in a consist, but it can sound it's horn even though it's in the consist.

If you've had your locomotives on another layout and ran them together, but can't get them to run separately on your home system, check this to see if it's consist address has been set.

## ADVANCED FEATURES PANE

The **Advanced Features** pane covers CVs that don't fall readily into one of the other categories, and more importantly are not generally part of the NMRA DCC standard. This is a bit like the Netscape/Microsoft Browser Wars, areas where the manufacturer is pushing the envelope. In this case, the CV here controls the Transponding feature of newer Digitrax decoders, which allows them to report their location and engine number back to the Loconet.

There may be one or several of these panes, depending on how complex the decoder programming is and the style of the person who wrote the definition file for your particular decoder.

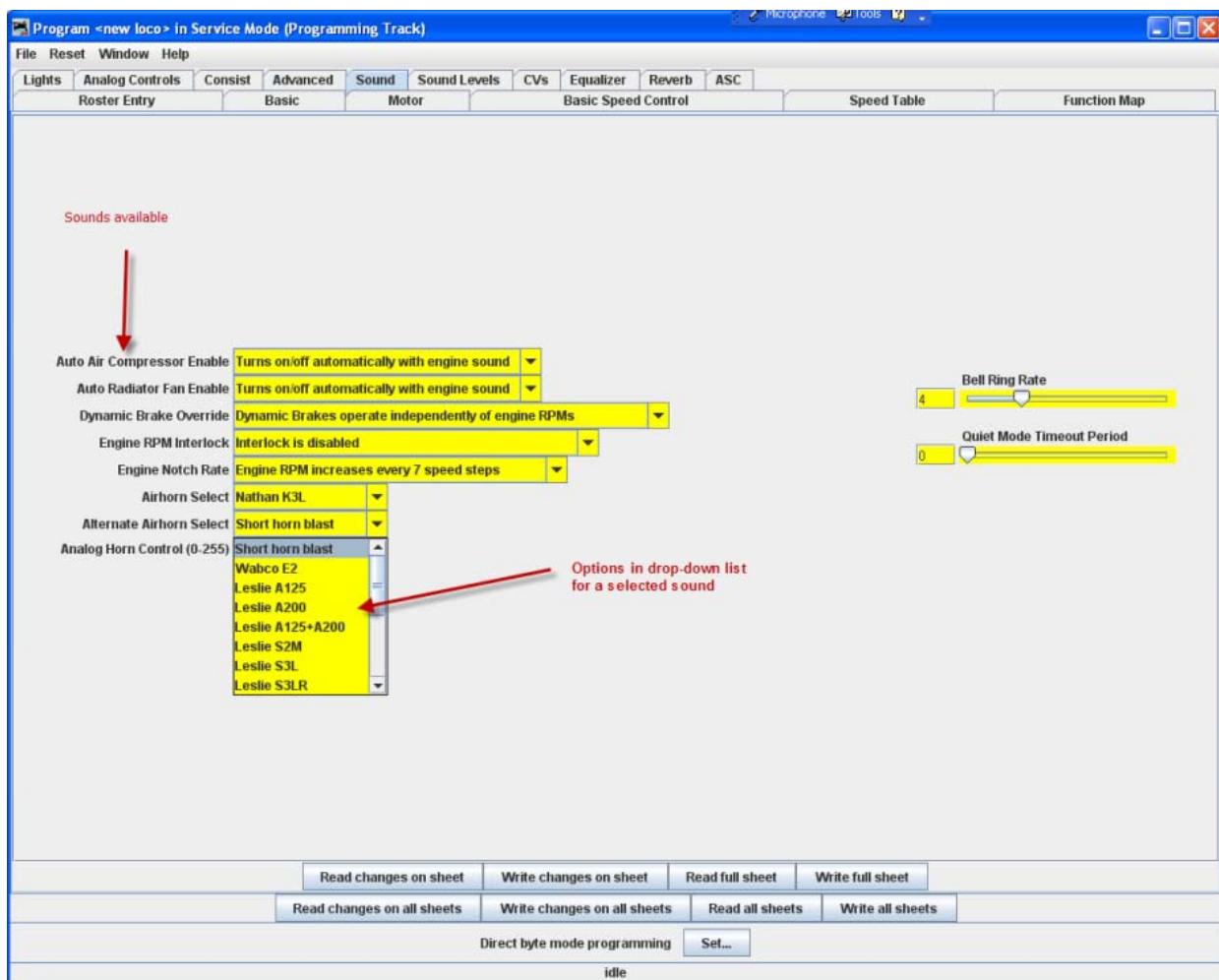


## SOUND FX PANE

Several manufacturers now offer decoders that include sound functions. This pane is designed to control those CVs. The screen shot below is from a programmer for SoundTraxx steam sound decoders. There are also diesel sound decoders available.

These sounds can be coordinated with the mechanism of the locomotive, and appropriate sounds can be triggered from the function keys of the throttle. Others can be set to be triggered at startup or to run in the background.

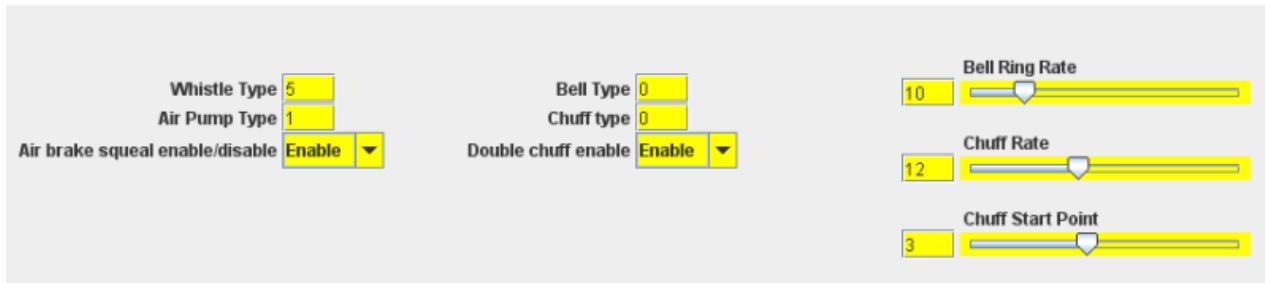
This pane allows for the selection of sound effects from sound decoders, and the [Sound Levels Pane](#) allows for setting the loudness levels of those sounds when they play back.



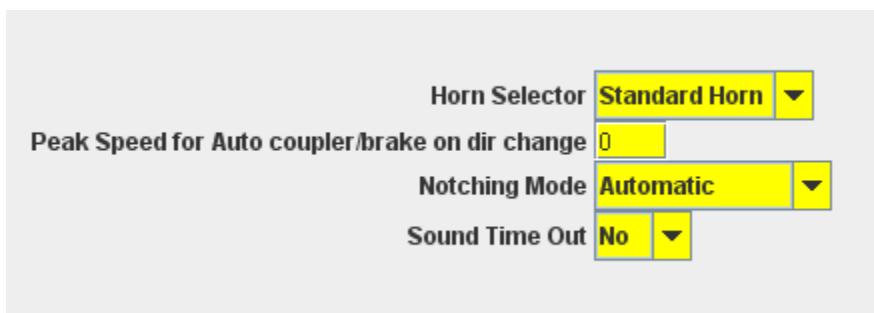
For specific function options, see your decoder documentation and the programmer for the specific decoder. Sometimes (depending on the volunteer that wrote the decoder definition file) there are “tool tips” that appear if you hover over a selection entry box.

Here are a sampling of sound functions on some other decoders:

## Athearn N Scale Big Boy and Challenger

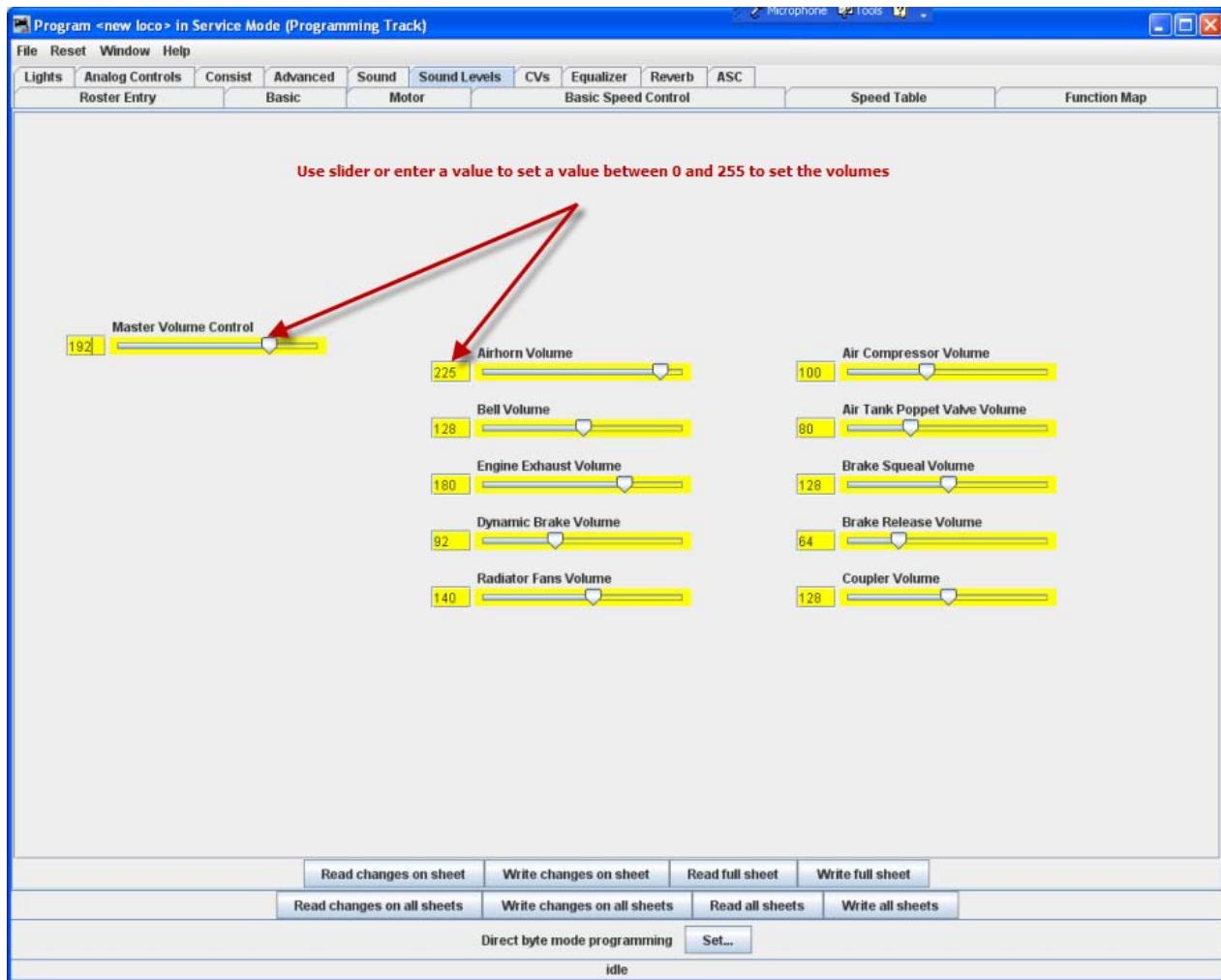


## Digitrax F40PH



## SOUND LEVELS PANE

Here are the controls for the relative volume levels and timing nuances of the sound decoder. Again, this is an example of one implementation. See your decoder documentation and the specific decoder programmer for details applicable to your equipment. Above all, don't be afraid to play with these settings and those in the [Sound](#) pane until you get sound you like. It's much easier to do here than it is to try to program these using a throttle! And even easier, if you are using the Ops Mode option to program the unit when it's running on the track. If you "write changes" after doing your selection change, you'll get instant feedback of how the sound has changed.



## *GLOBAL CV LISTING PANE*

For the hard-core programmer, this pane is a listing of the raw CV data by CV number, with data in decimal format. You may change data by typing new numbers into the **Values** window. **State** shows the validity of the data, whether it was taken **From file** (the decoder information saved in the **Roster**), **Edited**, **Read** directly from the decoder, **Stored** to the decoder or if the status is **Unknown**. Note the **scroll bar** on the right side of the listings. You may scroll up or down to access all of the CV listings.

## **Decoder Locking**

You tried to read a CV value and get “Error 308, No Acknowledgement from Decoder”, well the decoder may be locked. CV 15 and 16 deal with locking, if your manufacturer implements this feature (and manufacturers have slight differences as to how they implement it). If the decoder is locked, then you will not be able to read data from it or write to it. To unlock the decoder, you must enter a value into CV15 (the only CV that can be written when the decoder is locked), that is equal to the value that is currently in CV16. Now I hear you thinking “but I can't read CV16 to know what to put into CV15”. Well, you'll have to try all possible values, which isn't that hard since it can only have 8 possible values 0 thru 7. After each write, try to read CV16. It's the fastest read since it can only have 8 possible values. If JMRI responds with the no-ack error, then try the next value. If it returns the value in CV16, you've unlocked the decoder and you're in. If you have unsuccessfully tried all the 8 possibilities, then check your layout connection and the loco's wheels for poor connections and try again. Now you say, “I've looked thru the list several times and CV 15 doesn't appear”. That's on purpose, to minimize inadvertent locking by a Write All Sheets. You will have to use the Single CV Programmer to write CV15. It can be found in the Tools menu on the Main Page, under Programmers.

If you have more than one decoder in your locomotive, you probably have a decoder locking scheme implemented to be able to access each one individually for programming. There is a Multi-decoder control tool in JMRI. It is located on the main window under Tools menu, programmers option. It is accompanied with a comprehensive help describing its use.

You may **Read** or **Write** individual CVs using the buttons in their row. On this page, a **Read sheet** or **Write sheet** operation is the same as a **Read all** or **Write all**. Again, a reminder: you can only read CVs if your command station has that capability.

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**CV Number**

**Value (in Decimal notation)**

**Results of clicking Compare**

**Yellow values are from the Roster file**

**Selected CV**

**Amber values have been edited by DecoderPro, but not yet written to the decoder**

**White values have been read from the decoder**

**State:**  
Same- means that the value in the decoder matched that in the Value column  
If there is a difference, the value will turn red and State will show the value in the decoder  
State will also show red if there is an error with any attempt to read or write a CV value  
CVs 7 and 8 are the Manufacturers ID number and Version number. They are automatically read from the decoder and cannot be changed.

Number	Value (Deci...)	State	Read	Write	Compare
1	0	Unknown	Read	Write	Com...
2	0	Unknown	Read	Write	Com...
3	0	Unknown	Read	Write	Com...
4	0	Unknown	Read	Write	Com...
5	0	From file	Read	Write	Com...
6	0	From file	Read	Write	Com...
7	51	From file	Read	Write	Com...
8	129	From file	Read	Write	Com...
9	0	From file	Read	Write	Com...
17	194	Edited	Read	Write	Com...
18	100	Edited	Read	Write	Com...
19	0	From file	Read	Write	Com...
21	0	From file	Read	Write	Com...
22	0	From file	Read	Write	Com...
29	54	From file	Read	Write	Com...
40	5	From file	Read	Write	Com...

Read changes on sheet   Write changes on sheet   Compare changes on sheet   Read full sheet   Write full sheet   Compare full sheet

Read changes on all sheets   Write changes on all sheets   Read all sheets   Write all sheets

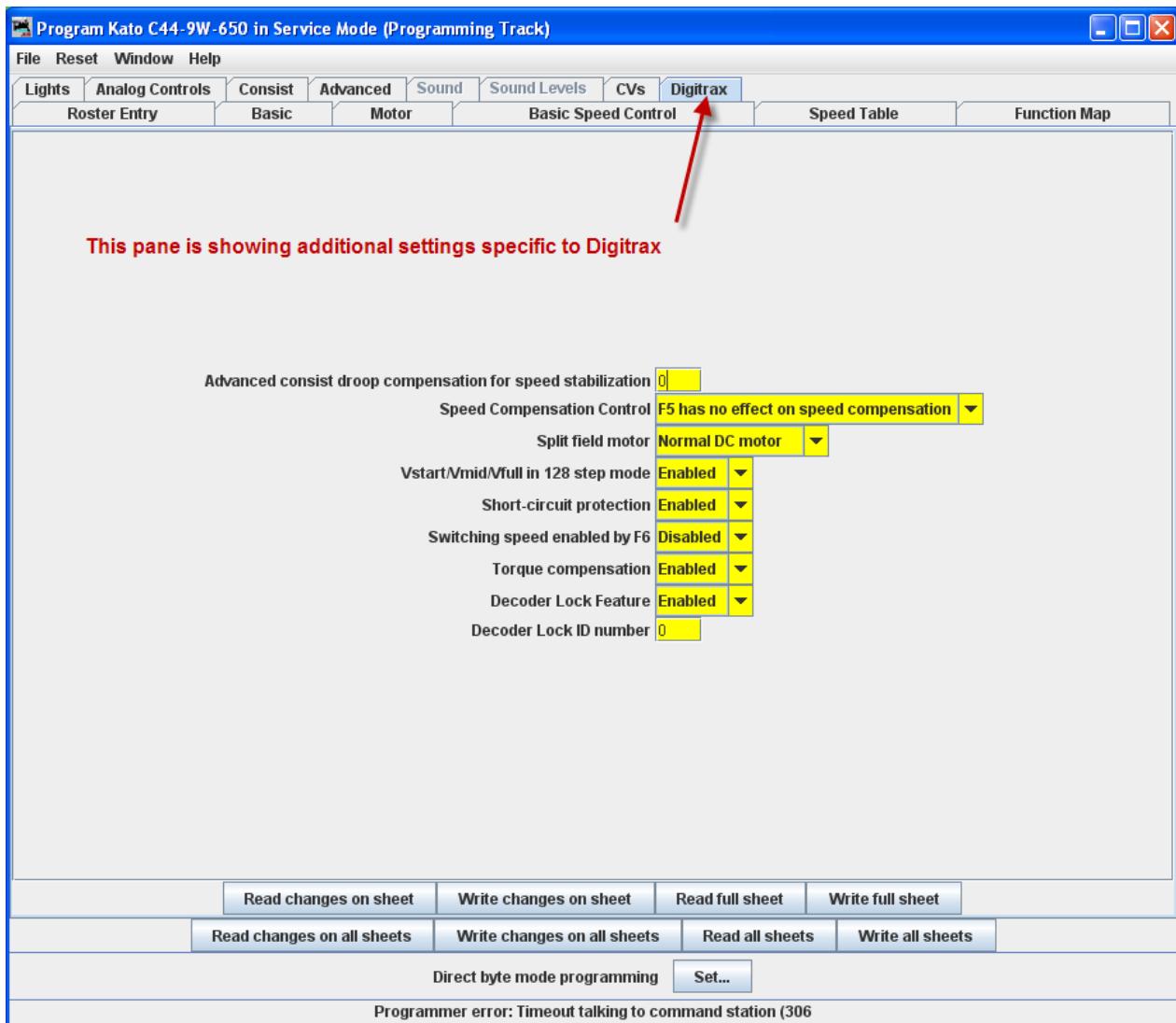
Direct byte mode programming   Set...

Programmer error: Timeout talking to command station (306)

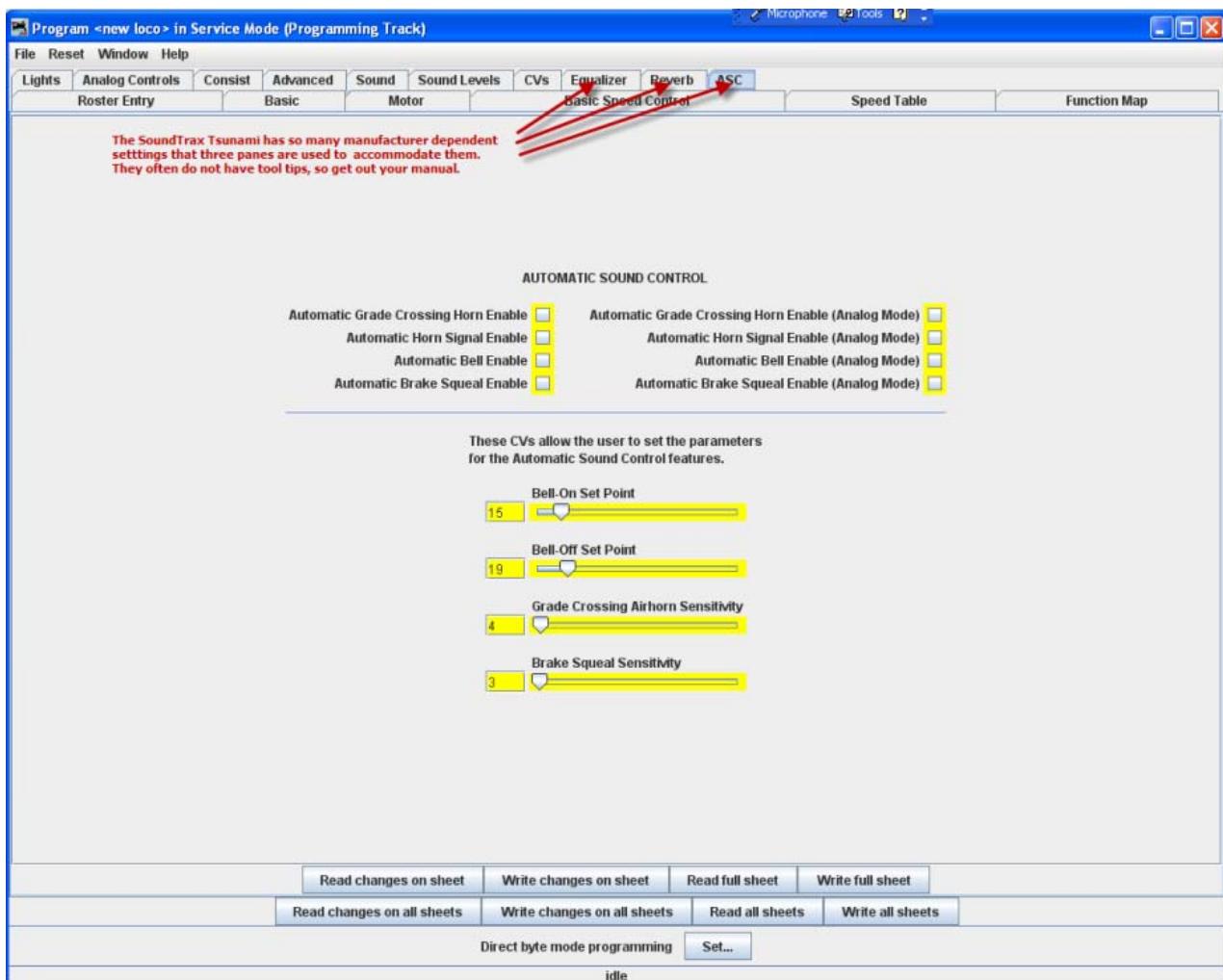
One thing to keep in mind about the **CV** listing on this pane - anything you can do here you can do from one of the other panes in Decoder Pro, without having to know the **CV** number or how to compile the values to get the desired effect. This pane is meant for advanced users of DCC used to crunching the numbers themselves. Those new to DCC can safely ignore this panel without losing any capability at all.

## MANUFACTURER SPECIFIC DATA PANE

This pane in the **Comprehensive Programmer** provides programming for functions that are specific to an individual manufacturer, but outside the realm of the DCC standard. While items like **Transponding** may eventually find a place in the NMRA DCC standard, and are therefore in the Advanced pane, these items are obviously beyond that category. This pane will be manufacturer dependent and decoder family dependent



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These items will, by definition, vary greatly between manufacturers. Once again, your best resource is the documentation for the specific decoder you are programming and this pane in the programmer for that decoder.

## PRINTING DECODER DATA

**Print Data:** DecoderPro® provides the capability to print out a full list of the decoder CV data. To print, select the **File** menu of any Comprehensive Programmer Pane, then select the Print or Print Preview options. These printouts show the variables by name in each category (as shown on the DecoderPro® panes) along with their CV number and Value. A handy reference for the future.

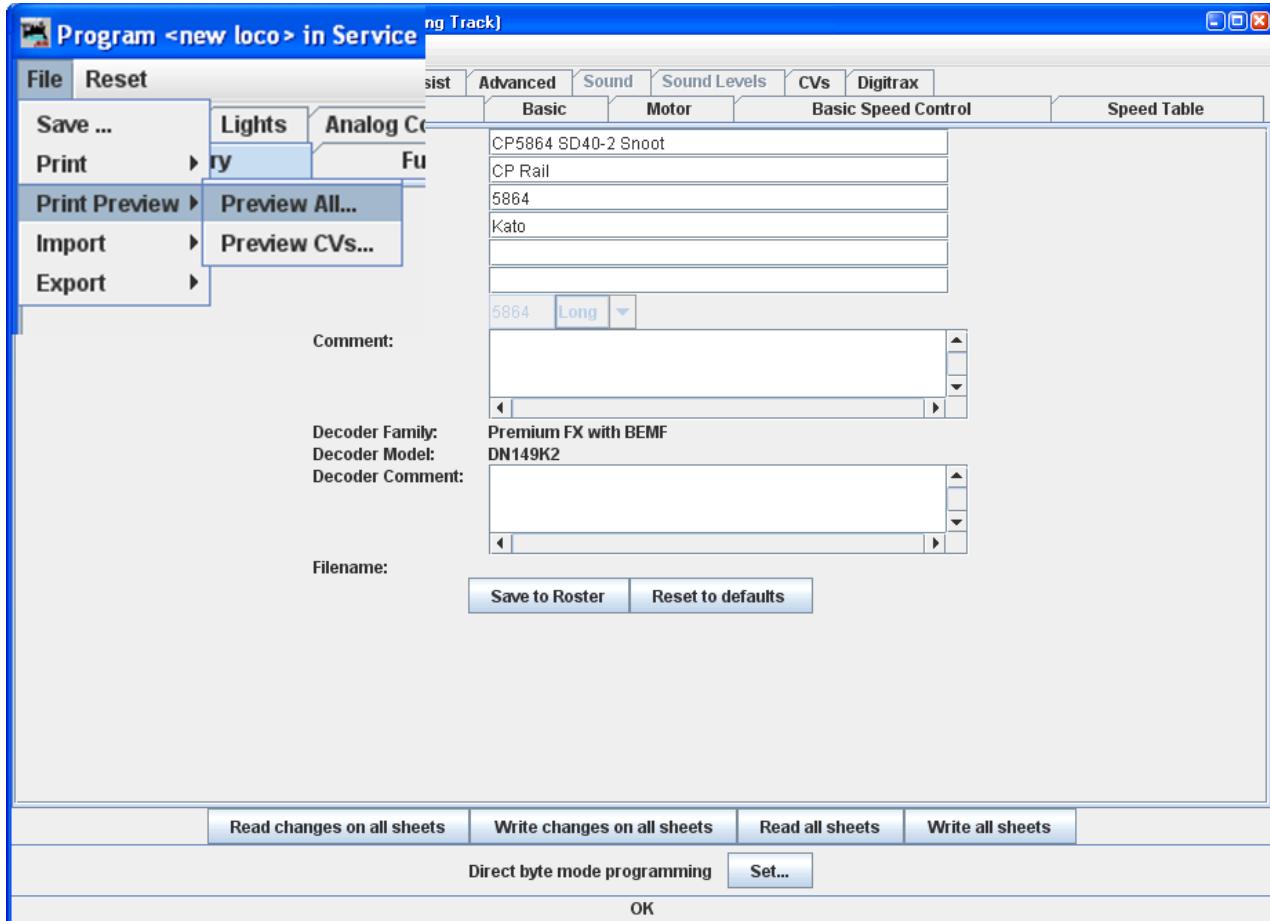
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**Export Data:** you may export the list as one of several file types :

- CSV file... (Comma separated variables)
- PR1DOS file...
- PR1WIN file...

All are two columns, CV#, and Value)

**Import Data:** You may import the list from another computer in the PR1 file format. Thus, the Export and Import capability allows you to take the data from one computer system to another.



The three images below are samples of the "All" printout from the SD40-2 that has been used as an example in many places in this manual. Click on the page to see a larger image in a new window.

# DecoderPro®® User's Guide Version 2.8

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CP5864 SD40-2 Snoot		- f -	December 26, 2003 12:50 PM
ID:	CP5864 SD40-2 Snoot	Decoder	Pro
Filename:	CP5864_SD40-2_Snoot.xml	UMRI	UMRI
Road name:	CP Rail		
Road number:	5904		
Manufacturer:	Kato		
Model:	SD40-2 Snoot		
DCC Address:	3864		
Comment:	MT Equipped, Fasman		
Decoder Model:	DB149E2		
Decoder Family:	Premium FX with RDMF		
<b>BASIC</b>			
Field	Setting		
Addressing Mode	4 digit addressing		
Primary Address	3		
Long Address	3864		
Normal direction of motion	forward		
Speed steps	20/128		
Analog conversion mode	On		
User Private ID #1	0		
User Private ID #2	0		
Manufacturer ID	0		
Version ID	0		
<b>MOTOR</b>			
Field	Setting		
Kick Start	0		
Acceleration Rate	0		
Deceleration Rate	0		
Static compensation for speed	128		
stabilization			
Dynamic compensation for speed	48		
stabilization			
Solo operation droop compensation for speed stabilization	6		
<b>SPEED CONTROL</b>			
Field	Setting		
Use Speed Table	Use Vstart, Vmid, Vhigh		
Start Volts	0		
Mid Volts	0		
Max Volts	0		
Forward Trim	0		
Reverse Trim	0		
Speed Table	0,9,18,27,36,45,54,63,72,81,91,100,109,118,127,136,145,154,163,173,182,191,200,209,218,227,236,245		

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CP5884 SD40-2 Snoot		- 2 -	December 26, 2003 12:50 PM																																			
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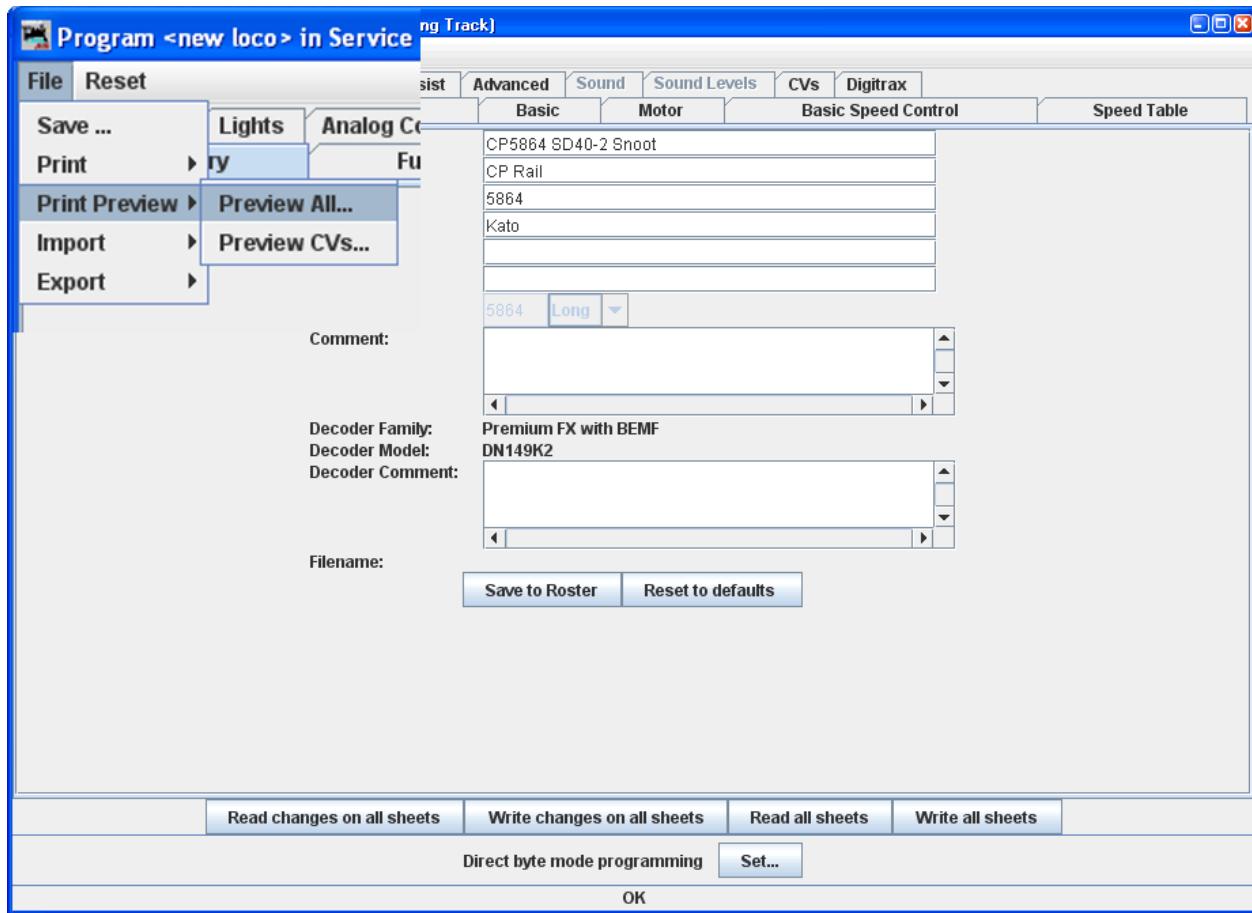
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CP5864 SD40-2 Snoot - f - December 26, 2003 12:50 PM

ID: CP5864 SD40-2 Snoot  
 Filename: CP5864\_SD40-2\_Snoot.xml  
 Road name: CP Rail  
 Road number: 1904  
 Manufacturer: Ratio  
 Model: SD40-2 Snoot  
 DCC Address: 3864  
 Comment: MT Equipped, Pacman  
 Decoder Model: DM14982  
 Decoder Family: Premium FX with SNMR



<b>BASIC</b>	
<b>Field</b>	<b>Setting</b>
Addressing Mode	4 digit addressing
Primary Address	3
Long Address	3864
Normal direction of motion	forward
Speed steps	28/128
Analog conversion mode	On
User Private ID #1	0
User Private ID #2	0
Manufacturer ID	0
Version ID	0

<b>MOTOR</b>	
<b>Field</b>	<b>Setting</b>
Kick Start	0
Acceleration Rate	0
Deceleration Rate	0
Static compensation for speed	128
stabilization	
Dynamic compensation for speed	48
stabilization	
SDO operation droop compensation for speed stabilization	6

<b>SPEED CONTROL</b>	
<b>Field</b>	<b>Setting</b>
Use Speed Table	Use Vstart, Vmid, Vhigh
Start Volts	0
Mid Volts	0
Max Volts	0
Forward Trim	0
Reverse Trim	0
Speed Table	0,9,18,27,36,45,54,63,72,81,91,100,109,118,127,136,145,154,163,173,182,191,200,209,218,227,236,245

CP5864 SD40-2 Snoot - 2 - December 26, 2003 12:50 PM

<b>FUNCTION MAP</b>	
<b>Field</b>	<b>Setting</b>
F1(F1) controls output 1	0
F1(F1) controls output 2	0
F1 controls output 3	0
F2 controls output 4	0

<b>LIGHTS</b>	
<b>Field</b>	<b>Setting</b>
Directional Headlights	Normal headlight operation
Lamp keep-alive voltage	0
FX rate adjust	0
Ditch light hold-over time	0
Forward light POF effect generated	Normal function of lead
Forward light POF behavior	Forward direction, ON with function ON, phase A
Reverse light POF effect generated	Normal function of lead
Reverse light POF behavior	Forward direction, ON with function ON, phase A
Function 1 effect generated	Normal function of lead
Function 1 behavior	Forward direction, ON with function ON, phase A
Function 2 effect generated	Normal function of lead
Function 2 behavior	Forward direction, ON with function ON, phase A
F0 Forward during DC operation	Off
F0 Reverse during DC operation	Off
F1 during DC operation	Off
F2 during DC operation	Off

<b>CONSIST</b>	
<b>Field</b>	<b>Setting</b>
Advanced Consist address	0
Advanced Consist direction	forward

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CP5064 SD40-2 Snoot		- 3 -		December 26, 2003 12:50 PM	
<b>ADVANCED</b>		<b>Setting</b>			
<b>Field</b> Digitrax Transponding					
		Off			
<b>CVS</b>					
CV	Value	CV	Value	CV	Value
	Dec Max		Dec Max		Dec Max
1	3 03	50	0 00	70	27 18
2	0 00	51	0 00	71	36 24
3	0 00	52	0 00	72	45 2D
4	0 00	55	128 80	73	54 36
5	0 00	56	48 30	74	63 3F
6	0 00	57	6 06	75	72 46
7	0 00	61	0 00	76	81 51
8	0 00	62	0 00	77	91 5B
13	0 00	63	0 00	78	100 64
17	207 CF	65	0 00	79	109 6D
18	24 18	66	0 00	80	118 76
19	0 00	67	0 00	81	127 7F
29	38 26	68	9 09	82	136 88
69	0 00	69	18 12	83	145 91
				106	0 00
<b>DIGITRAX</b>					
<b>Field</b>		<b>Setting</b>			
Advanced consist droop compensation for speed stabilization					
Speed Compensation Control		F5 has no effect on speed compensation			
Split field motor		Normal DC motor			
Vstart/Vmid/Vfull in 128 step mode		Enabled			
Short-circuit protection		Enabled			

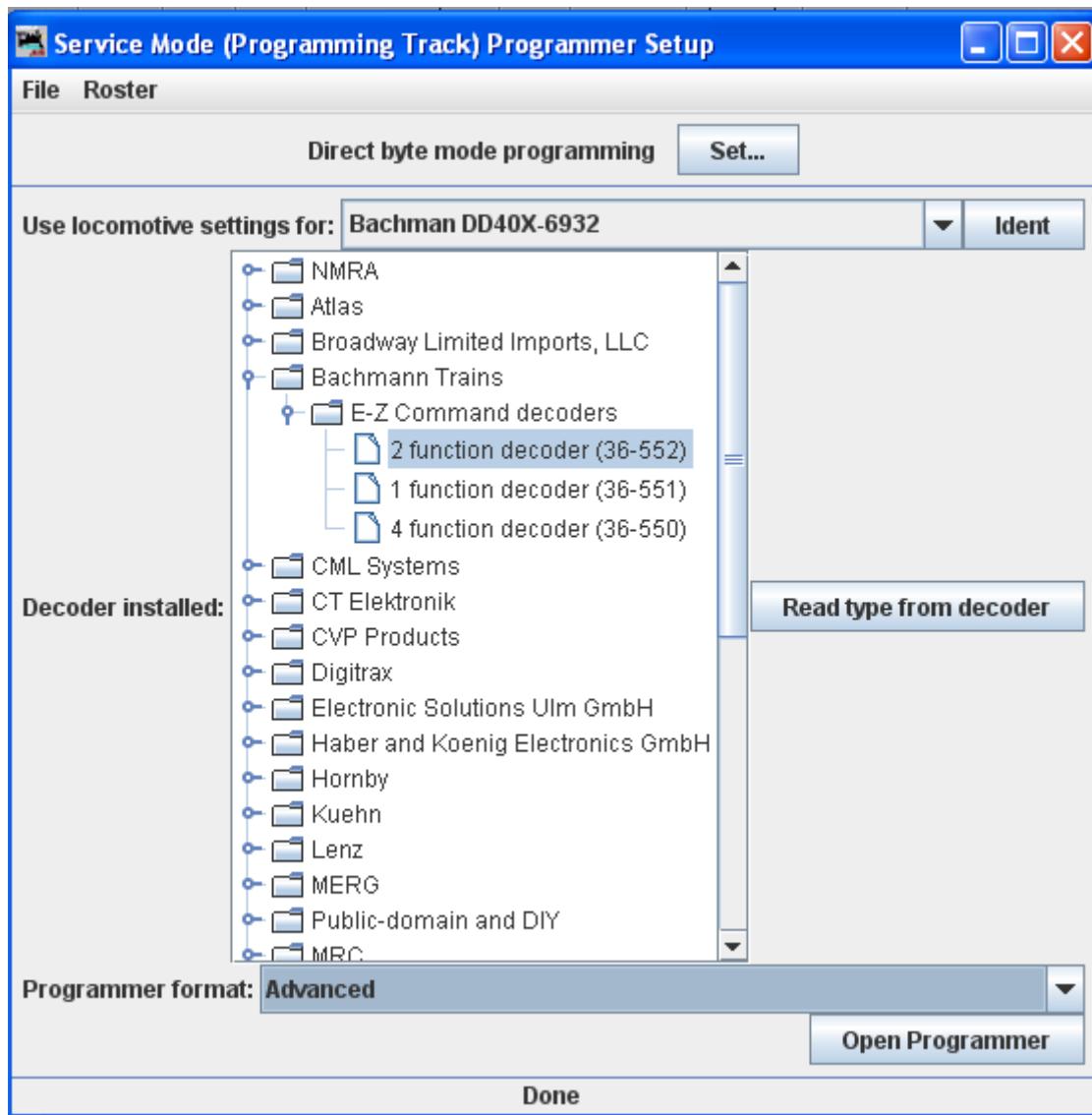
OK! That's it! You now know how to use DecoderPro® to program your decoders. Now let's run trains!

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## CHAPTER 6 – ADVANCED PROGRAMMER

### *ROSTER ENTRY*

From the main DecoderPro® window, select whether you want Service or Operations Mode programming. For this demonstration we have chosen **Service Mode (programming track) Programmer**. When the Service Mode Programmer starts the Setup window opens. This section will only cover new items that are enabled by the Advanced Programmer, refer to [Comprehensive Programmer](#) for all other tabs.



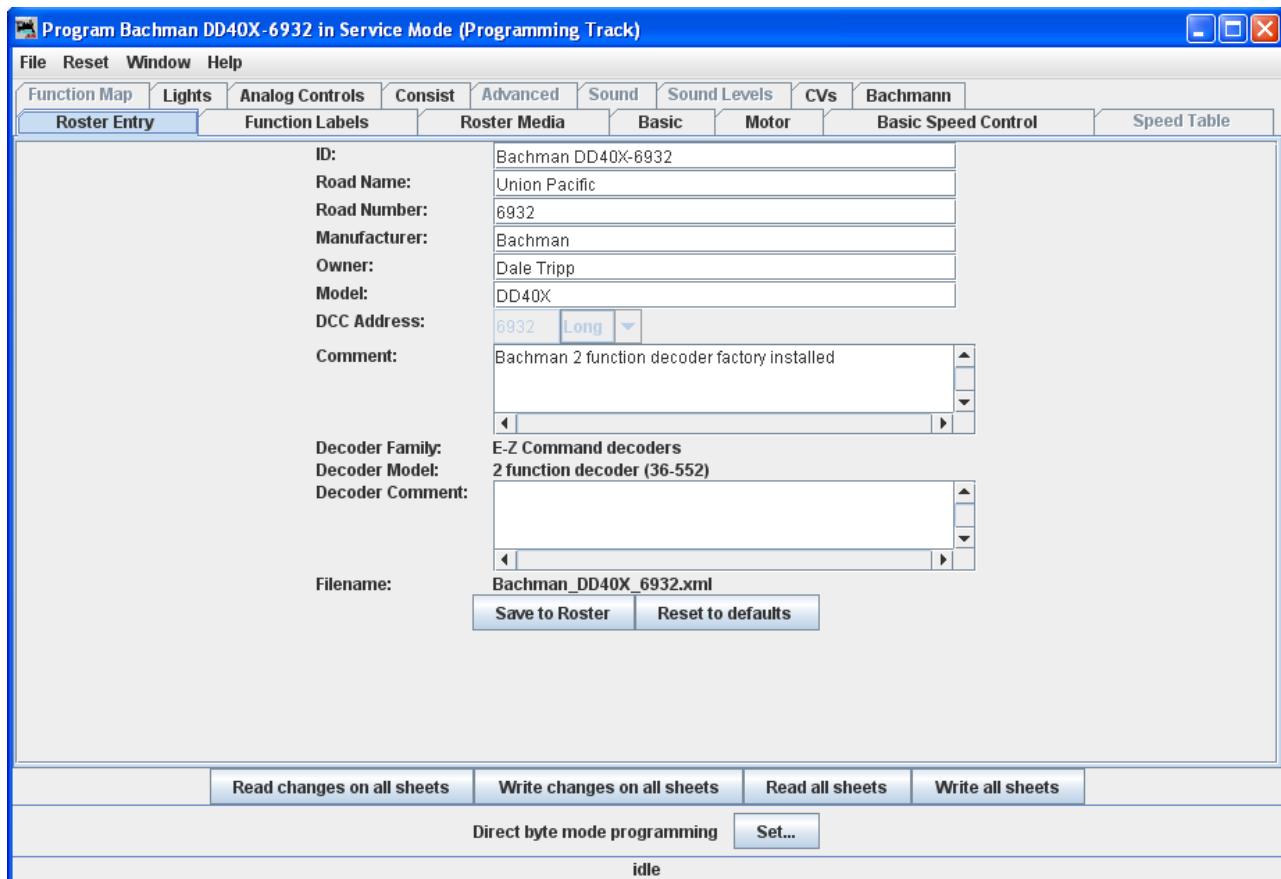
In the **Programmer format** drop-down box at the bottom of the window select the **Advanced** programmer. If you wish for the Advanced programmer to be your default for all future DecoderPro® sessions you may set this up by editing your Preferences in the main DecoderPro® window.

## DecoderPro®® User's Guide Version 2.8

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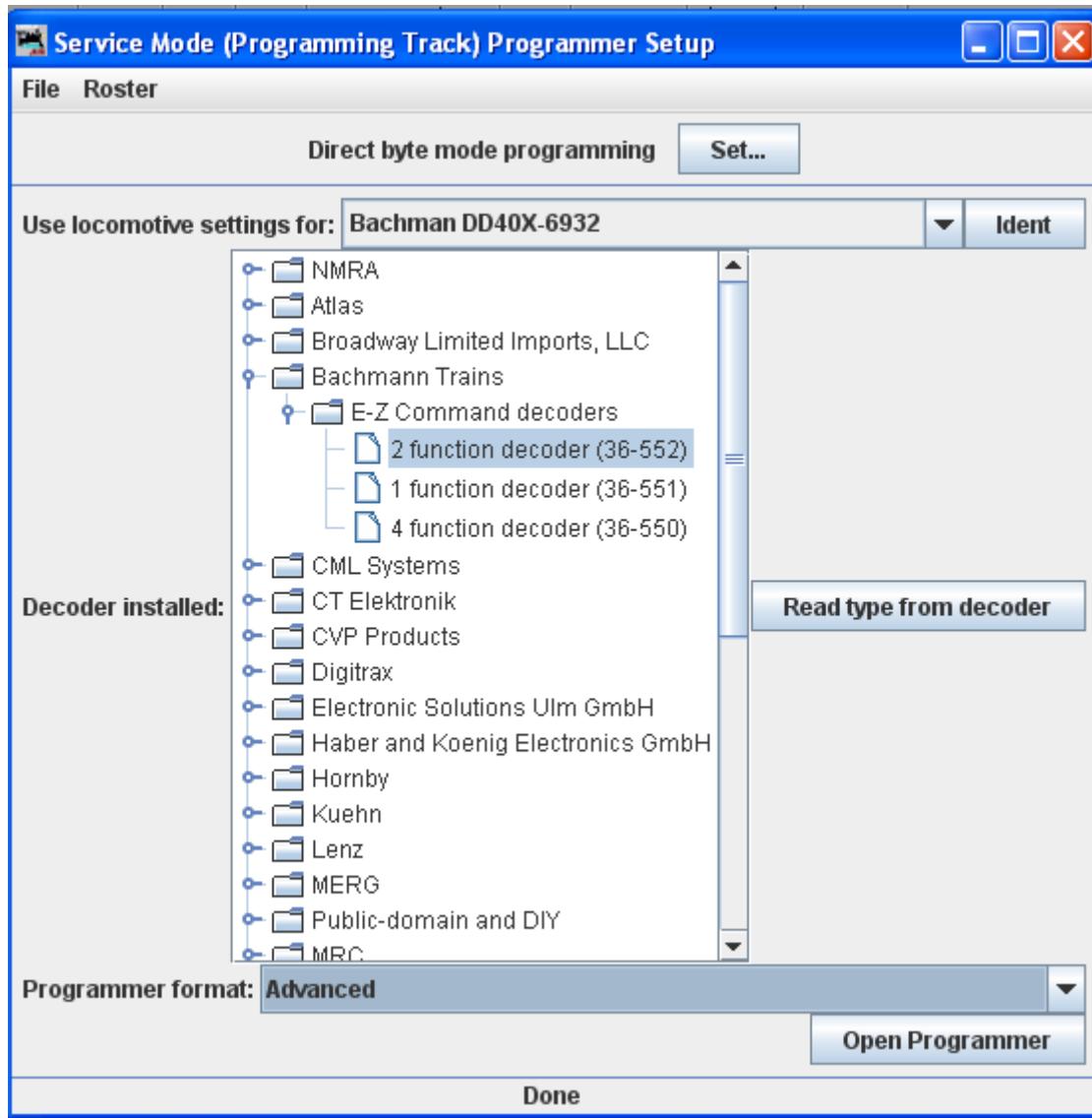
Next, Select the decoder you wish to program, if you have not already done so. This is done just as you would in the Comprehensive programmer.

Now click on the Open Programmer button to get to the Advanced Programmer Screen.



Note the Advanced Programmer has two new TABS, **Function Labels** and **Roster Media**, all other TABS are the same as those available (depending upon decoder) in Comprehensive programmer.

From the main DecoderPro® window, select whether you want Service or Operations Mode programming. For this demonstration we have chosen **Service Mode (programming track) Programmer**. When the Service Mode Programmer starts the Setup window opens. This section will only cover new items that are enabled by the Advanced Programmer, refer to Comprehensive Programmer for all other tabs.

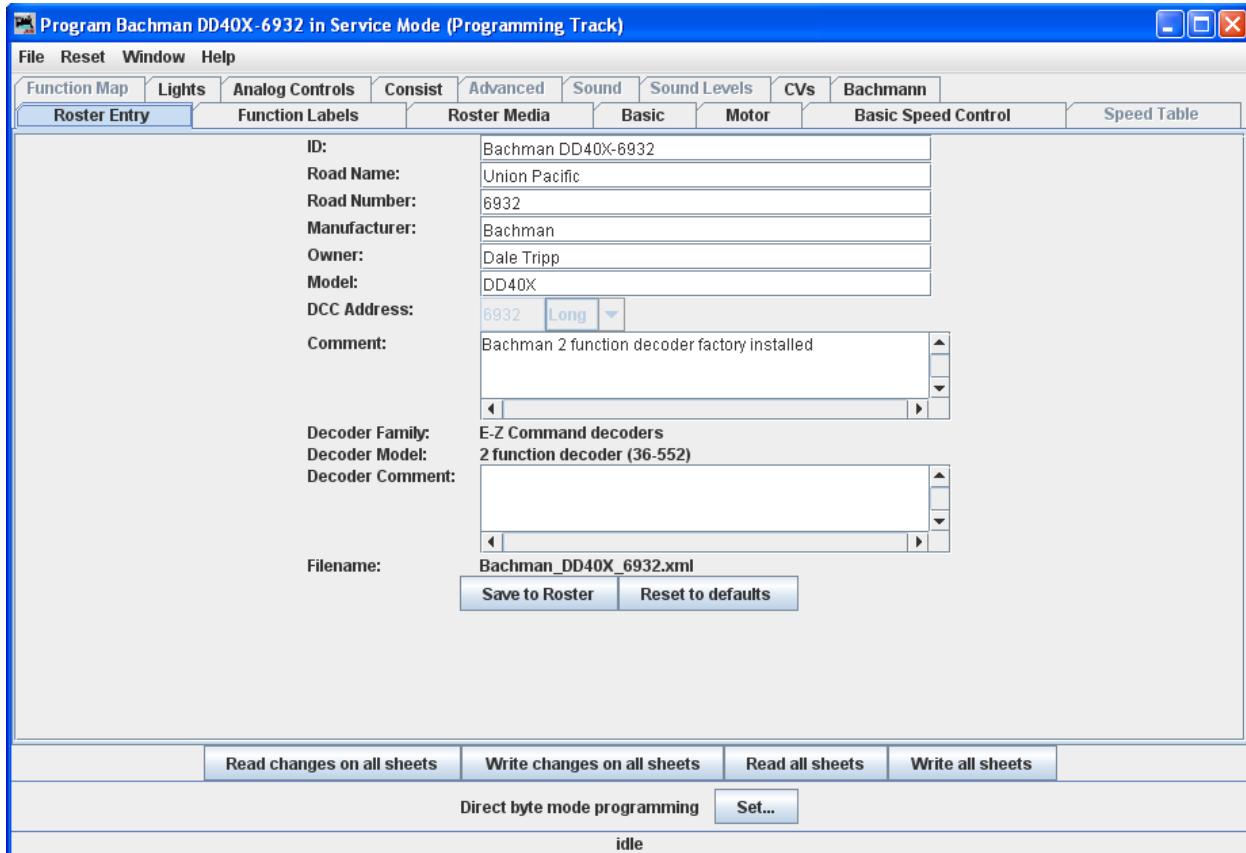


In the **Programmer format** drop-down box at the bottom of the window select the **Advanced** programmer. If you wish for the Advanced programmer to be your default for all future DecoderPro® sessions you may set this up by editing your Preferences in the main DecoderPro® window.

Next, Select the decoder you wish to program, if you have not already done so. This is done just as you would in the Comprehensive programmer.

Now click on the Open Programmer button to get to the Advanced Programmer Screen.

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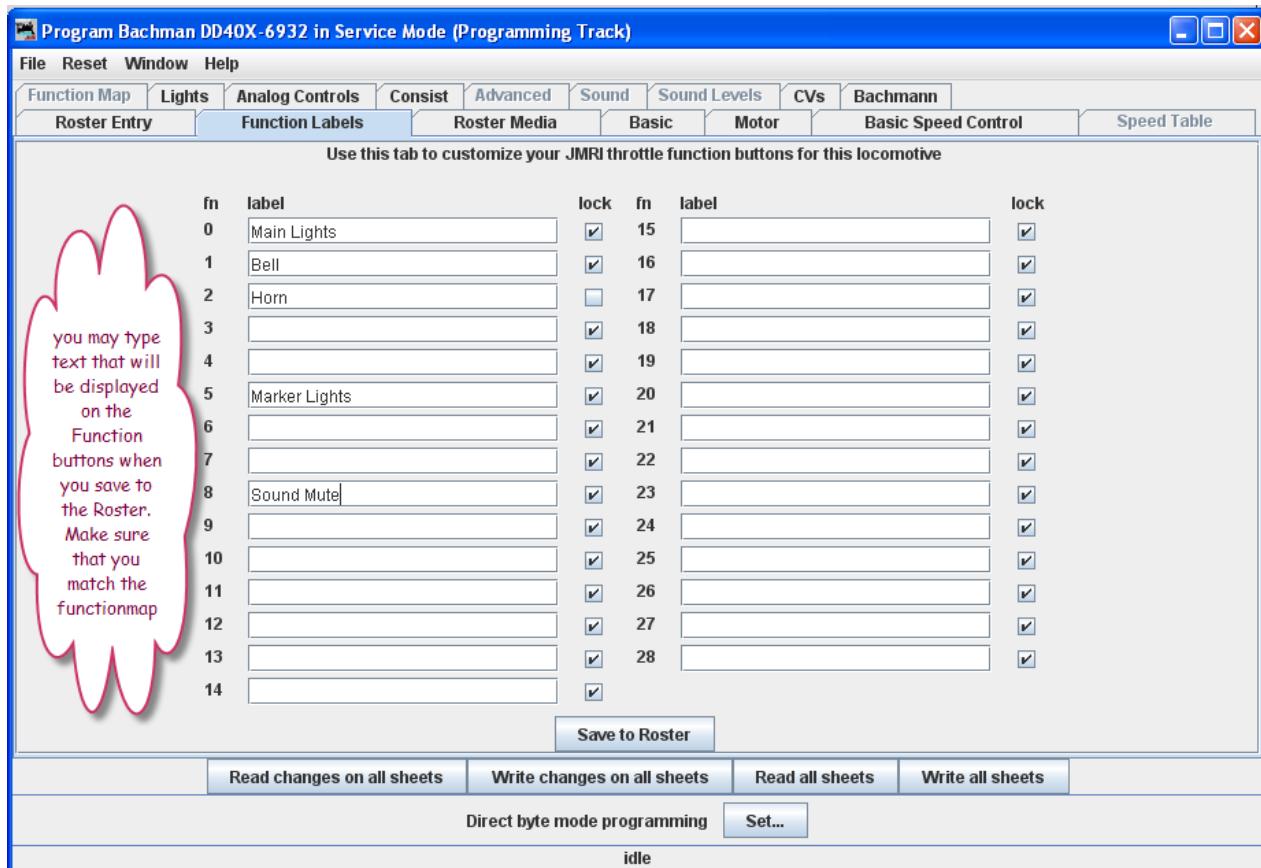


Note the Advanced Programmer has two new TABS, **Function Labels** and **Roster Media**, all other TABS are the same as those available (depending upon decoder) in Comprehensive programmer.

## FUNCTION LABELS PANE

This pane is more than a scratch pad to keep track of what happens when function buttons are pushed. It also interacts with the [JMRI throttle](#).

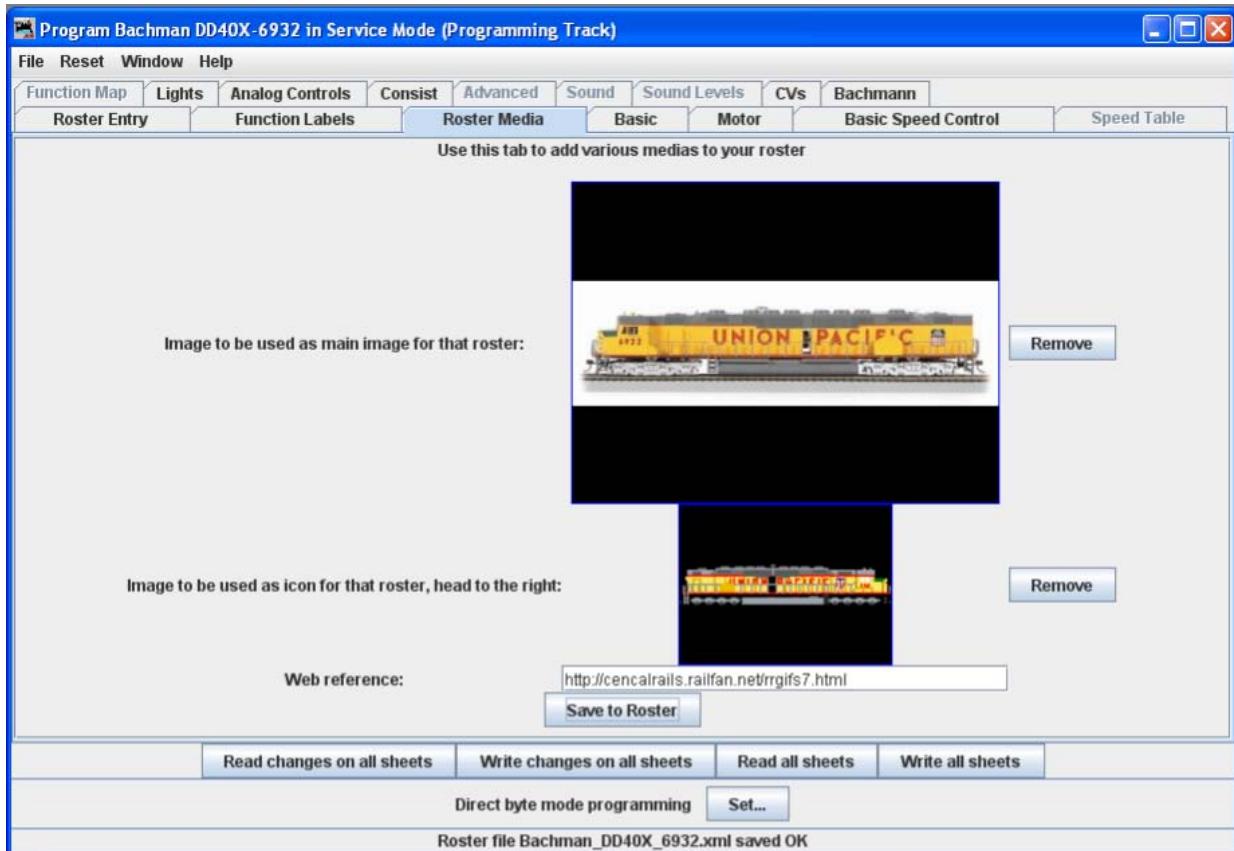
When you use the roster pull-down on the JMRI throttle to select a loco from your roster, the function buttons will be marked with the descriptions you have entered for those functions in this pane.



You may also edit the function button text in the JMRI Throttle and save those changes to the selected Roster entry. To use these changed entries in the future, make sure you click on the **Save to Roster** button to save these values into the Roster entry that is in use.

## ROSTER MEDIA PANE

The Roster Media Pane allows you to add a main image and an icon to the engines roster. The main image may be used for Throttle background image if selected in the Throttle preferences. The icon image is used in the Throttle list and various roster combo boxes.



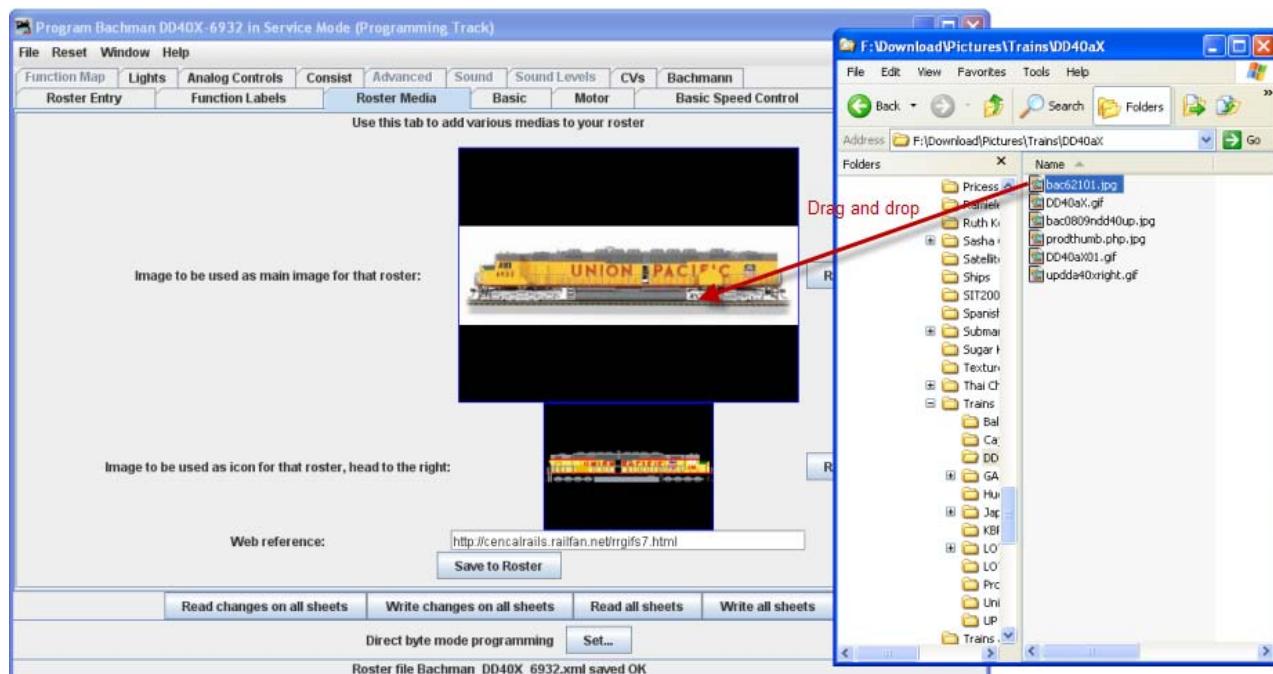
**Image to be used as main image for that roster:** The large black box is the image holder. The image is placed into the image holder by following these instructions.

1. First you must find the image of the Locomotive and store it on your disk drive.
  - a. Sources
    1. Images downloaded from a website to your computer
    2. Photos taken with a digital camera or scanned from film
    3. Other sources, CD, DVD frames from videos etc. saved as an image to your computer
  - b. Format
    1. The GIF format is preferred with transparent background
    2. PNG with transparent background
    3. JPG
2. After storing image on your computer open the Roster Media Pane, then open Windows Explorer or File Manager for your system and drag and drop the image file into the large black box. You may also save the image to your Desktop and

drag and drop to Roster Media from there. DO NOT try to drag and drop from a website.

3.

Roster images are stored in the <JMRI Preferences folder>/resources. When an image is updated or removed it is not removed from this folder.



**Remove** Is used to remove the image from the Roster, however, it will not remove the image from the Resources folder.

**Image to be used as icon for that roster, head to the right:** similarly, there is a small black box which can be filled with a picture to be used as an icon for roster entry identification. The instructions are the also similar:

1. Next you must find the image of the Locomotive to use as an icon and store it on your disk drive.
  - a. Sources
    1. Images downloaded from a website to your computer
    2. Photos taken with a digital camera or scanned from film
    3. Other sources, CD, DVD frames from videos etc. saved as an image to your computer
  - b. Format
    1. The GIF format is preferred
    2. PNG with transparent background

3. Do not use JPG.
2. After storing icon image on your computer open the Roster Media Pane, the open Windows Explorer or File Manager for your system and drag and drop the image file into the small black box. You may also save the image to your Desktop and drag and drop to Roster Media from there. DO NOT try to drag and drop from a website.

 Remove

Again used to remove the icon image from the Roster Media pane, however, it will not remove the image from the Resources folder.

**Web reference:** You can copy the URL of the website where you located the images for reference

 Save to Roster

After adding images to the image boxes for main image and icon, click on this button to store images in your Roster.

**Links for icons in GIF and images of most Locomotives are listed below:**

Central California Rails <http://cencalrails.railfan.net/home.html>

Rail Serve <http://www.railserve.com/TrainGIFs/>

Dans Depot <http://www.railserve.com/TrainGIFs/>

Train GIF Railyard <http://www.djcooley.com/info/gifs/loco/gifloco.htm>

Steam Locomotive Roundhouse <http://www.trainweb.org/rrgiroundhouse/steamgif.html>

## *EXPANDED BASIC PANE*

Same as Comprehensive Programmer

## *MOTOR CONTROL PANE*

Same as Comprehensive Programmer

## *SPEED CONTROL PANE*

Same as Comprehensive Programmer

## *SPEED TABLE PANE*

Same as Comprehensive Programmer

## *FUNCTION MAPPING PANE*

Same as Comprehensive Programmer

## *LIGHTS PANE*

Same as Comprehensive Programmer

## *CONSISTING PANE*

Same as Comprehensive Programmer

## *ADVANCED FEATURES PANE*

Same as Comprehensive Programmer

## *ANALOG CONTROLS PANE*

Same as Comprehensive Programmer

## *SOUND PANE*

Same as Comprehensive Programmer

## *SOUND LEVELS PANE*

Same as Comprehensive Programmer

## *GLOBAL CV PANE*

Same as Comprehensive Programmer

## *MANUFACTURER-SPECIFIC PANE*

Same as Comprehensive Programmer

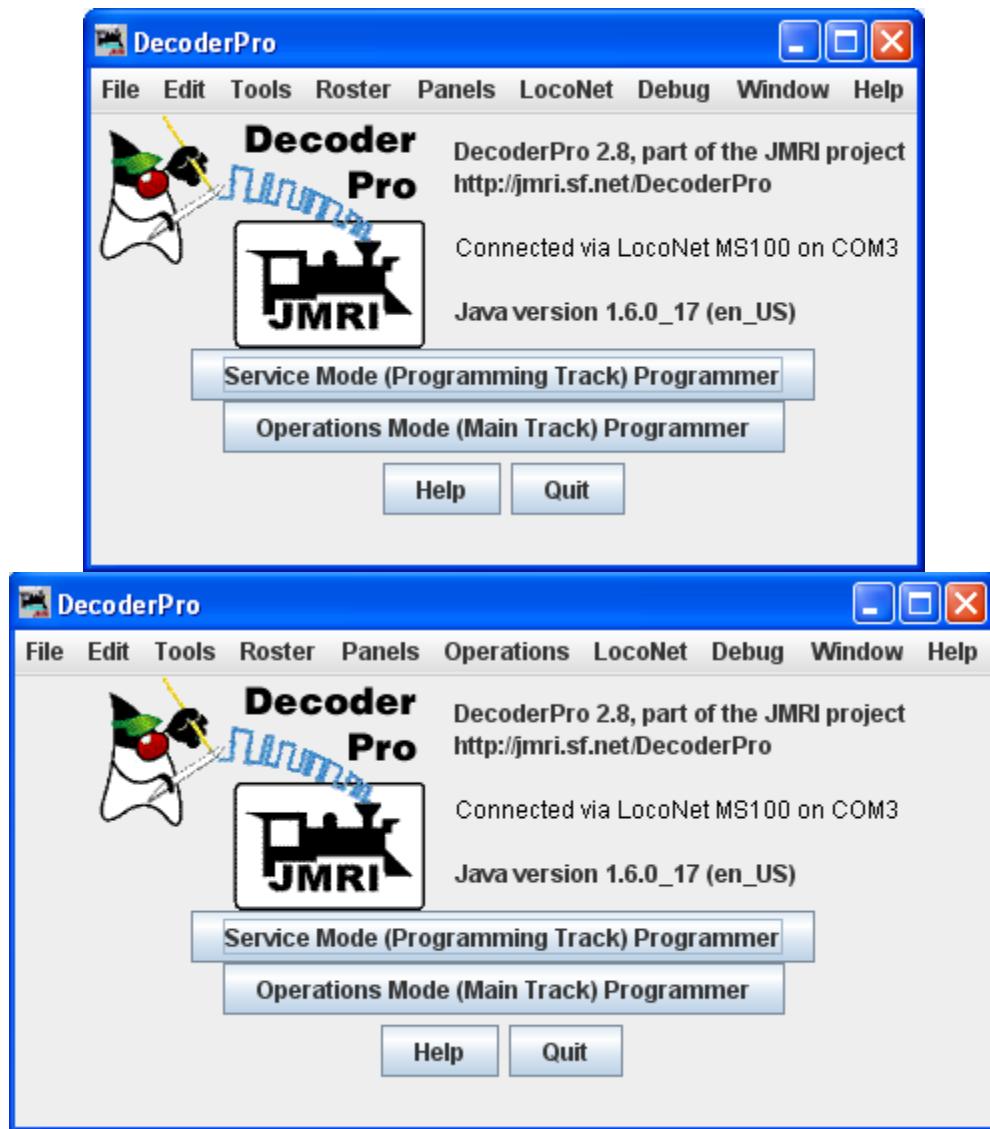
## *PRINTING THE DECODER DATA*

Same as Comprehensive Programmer

## CHAPTER 7 MAIN WINDOW

### MAIN WINDOW OVERVIEW

When you start Decoder Pro, the DecoderPro® window is displayed. All of the JMRI functions can be accessed via the menu bar on the DecoderPro®® window



### Menu Bar

Provides access to the menus that allow you to access all the features of JMRI/

### Service Mode (Programming Track) Programmer button

Provides access to the decoder programming capability in [Service Mode Programmer](#).

## Operations Mode (Main Track) Programmer button

Provides access to the [Operations Mode Programmer](#).

## Help button

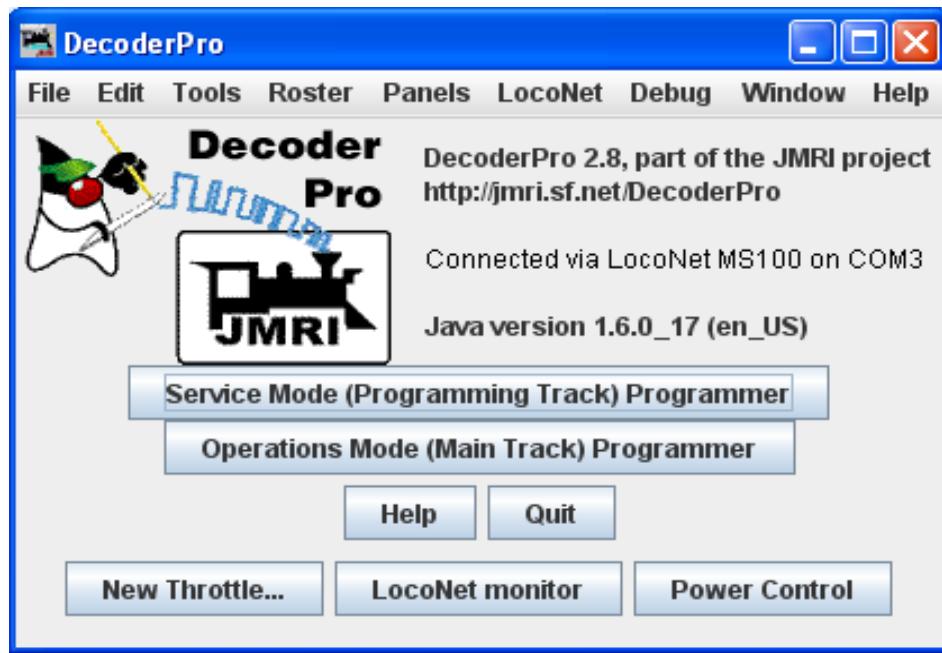
Opens the Help Window

## Quit button

Exits the program, with confirmation dialog.

Additional buttons at the bottom of the window will depend on how you set your **preferences**. You can add additional buttons or set the button to load on start up as you require for your use. Sample buttons are:

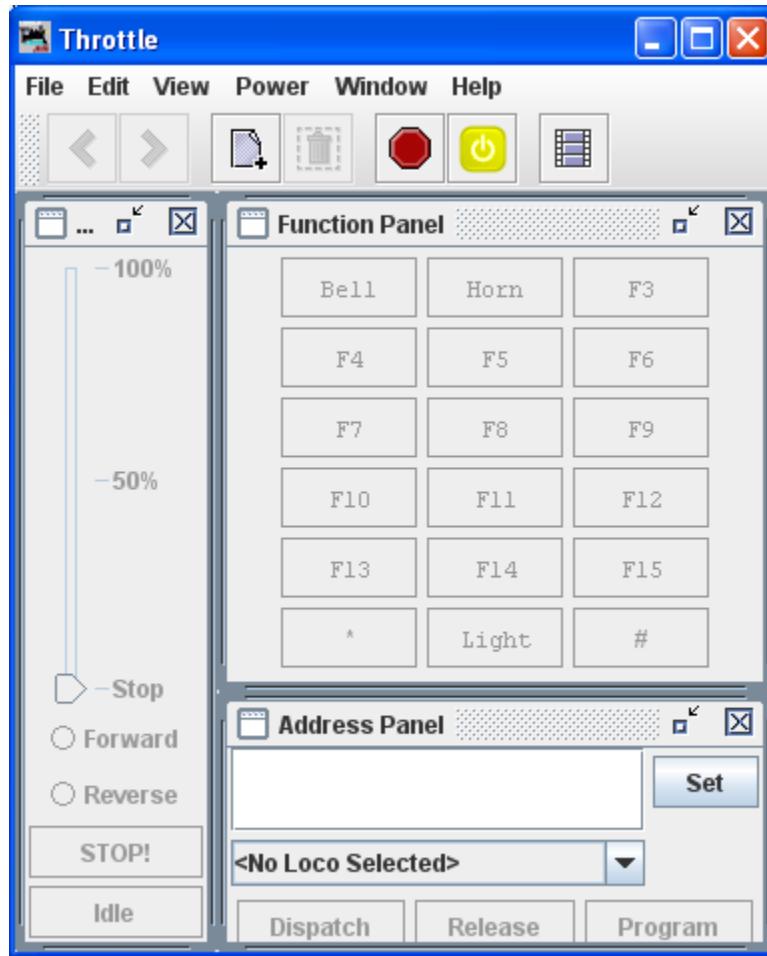
## Additional Buttons (Optional)



The buttons shown at the bottom of the window are not JMRI defaults, but instead are setup in your preference to open each time you start DecoderPro®®. The following are samples that could be set in your preferences. (Shown are for a Digitrax LocoNet system)

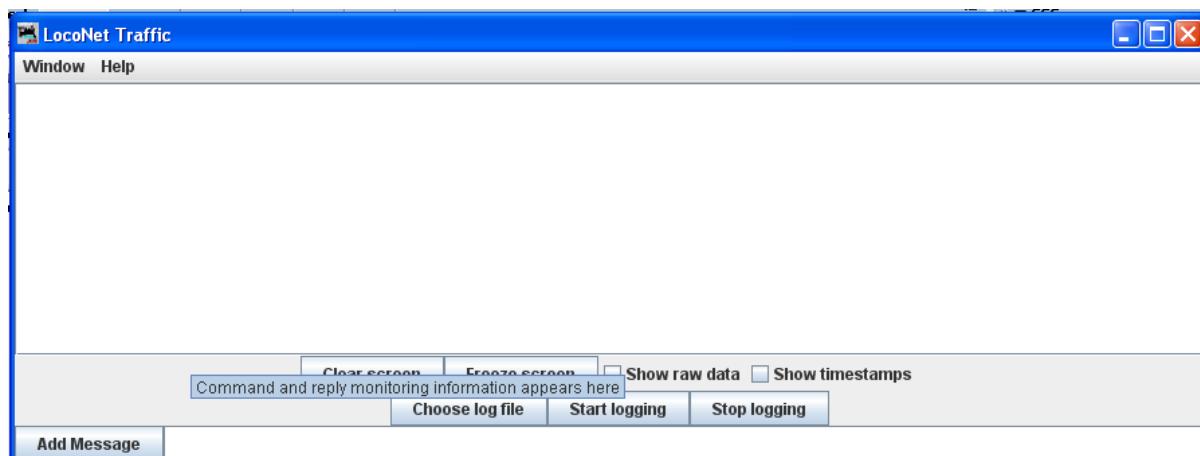
## New Throttle.. button

Opens a throttle window provides a tool to control your trains, you may open more than one throttle and position on the computer screen



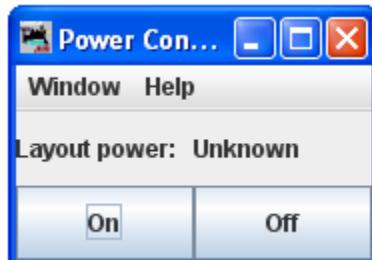
## LocoNet monitor button

Opens the LocoNet Traffic window that allows you to monitor the commands and responses on the LocoNet.



## Power Control button

Opens Power Control window, which allows you to turn track power on or off during operations.



These are just samples of the possible buttons that may be added at startup.

## *MENU OVERVIEW*

All of the JMRI functions can be accessed via the menu bar on the DecoderPro®® window.



## File

- Print Decoder Definitions...
- Print Preview Decoder Definitions...
- Quit

## Edit

- Cut
- Copy
- Paste
- Preferences...

## Tools

- **Programmers ►**
  - Single CV Programmer
  - Service Mode Programmer
  - Ops-Mode Programmer
  - Multi-Decoder Control
- **Tables»**
  - Various Tables used with Panel Pro and not covered in this manual
- **Throttles ►**
  - New Throttle...
  - Save Throttle Layout...
  - Load Throttle Layout...
  - Save as Default Throttle Layout
  - Load Default Throttle Layout
  - Throttle Preferences...
- **Consisting Tool...**
- **Clocks ►**
  - Setup Fast Clock...
  - Nixie Clock
  - LCD Clock
  - Analog Clock
- **Power Control**
- **Turnout Control...**
- **Simple Signal Logic**
- **Sensor Groups...**
- **Speedometer...**
- **Light Control...**
- **Dispatcher...**
- **Send DCC Packet...**
- **USS CTC Tools»(not covered in this manual)**
- **Operations ►**(on menu bar only if checked in the Operations Settings)
  - [Settings](#)
  - [Location](#)
  - [Cars](#)
  - [Engines](#)
  - [Routes](#)
  - [Trains](#)

## Roster

- **Create Entry...**
- **Edit Entry...**
- **Copy Entry...**
- **Import Entry...**
- **Export Entry...**

- **Delete Entry...**
- **Print Summary...**
- **Print Preview Summary...**
- **Roster Groups ►**
  - Create Roster Group
  - Set Active Roster Group
  - Delete Roster Group
  - Table Association
  - Associate Roster Entry to Group
  - Disassociation of Roster Entry to Group

## Panels

Beyond the scope of this manual, primarily for use in connection with PanelPro

## **System**

(This menu name will depend upon the system that you selected in Preferences. The options are listed. If (none) is selected in Preferences this menu will not be displayed.)

- [Acela](#)
- [CMRI](#)
- [EasyDCC](#)
- [Grapevine](#)
- [LocoNet](#)
- [NCE](#)
- [OakTreeSystems](#)
- [Powerline](#)
- [QSI](#)
- [RPS](#)
- [SECSI](#)
- [SPROG](#)
- [TMCC](#)
- [wangrow](#)
- [XpressNet](#)
- [Zimo](#)

## Debug

- **Memory Usage Monitor**
- **Import Decoder File**
- **Import Decoder URL**
- **Recreate Decoder Index**
- **Recreate Roster Index**
- **Check XML File**
- **Validate XML File**
- **Check Decoder Names**

- **Check Programmer Names**
- **Load Logix Disabled**
- **Log Message**
- **PRICOM ►**
  - PRICOM Pocket Tester»
    - Connect
  - PRICOM Flash Updater
- **USB Input Control**
- **USB Device Viewer**
- **RailDriver Throttle**
- **Start Mini Web Server**
- **Start Wi Throttle**

## Window

- **Minimize**

(lists all DecoderPro® windows that are open)

- **DecoderPro®**
- **LocoNet Traffic**
- **Power Control**

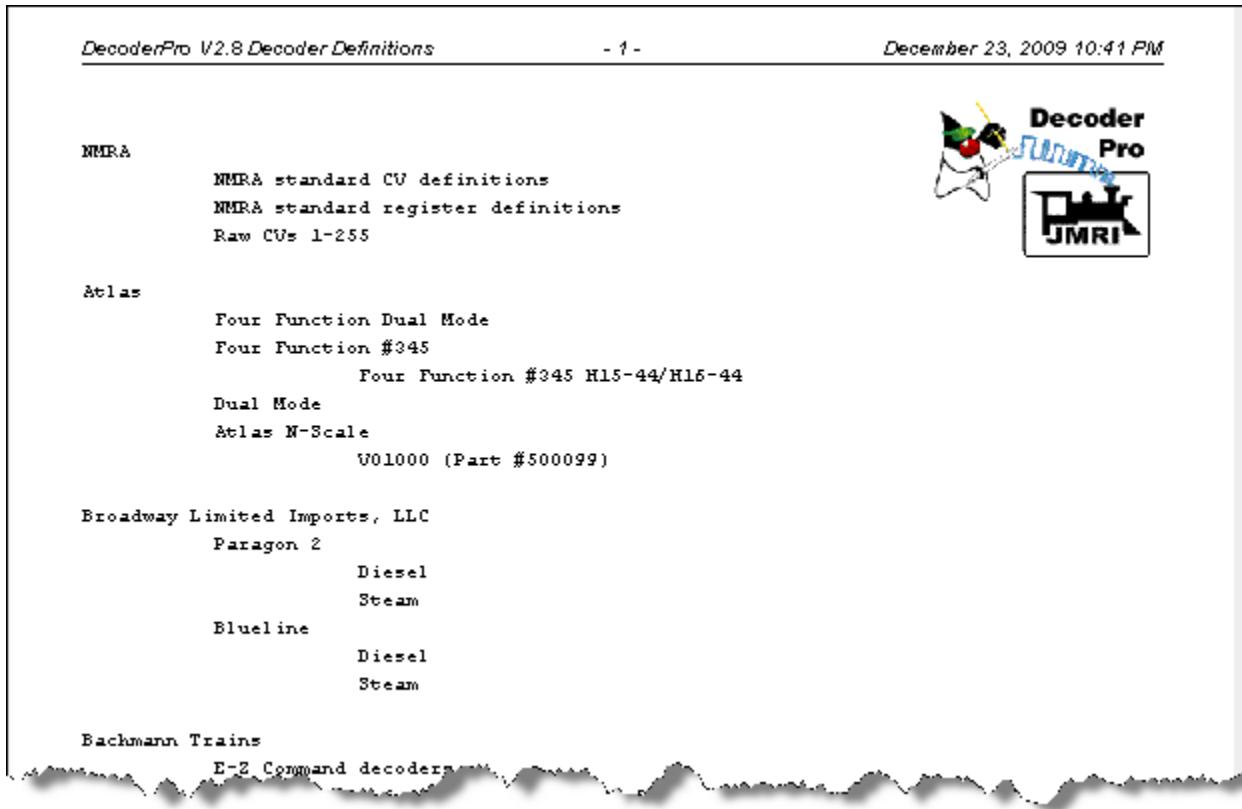
## Help

- **Window Help...**
- **General Help...**
- **License...**
- **Send Problem Report...**
- **Locations...**
- **Context....**

## FILE MENU

### Print Decoder Definitions...

Opens your computer Print dialog to print the installed decoder definitions. The complete list may be more than 20 printed pages. The format is shown below.

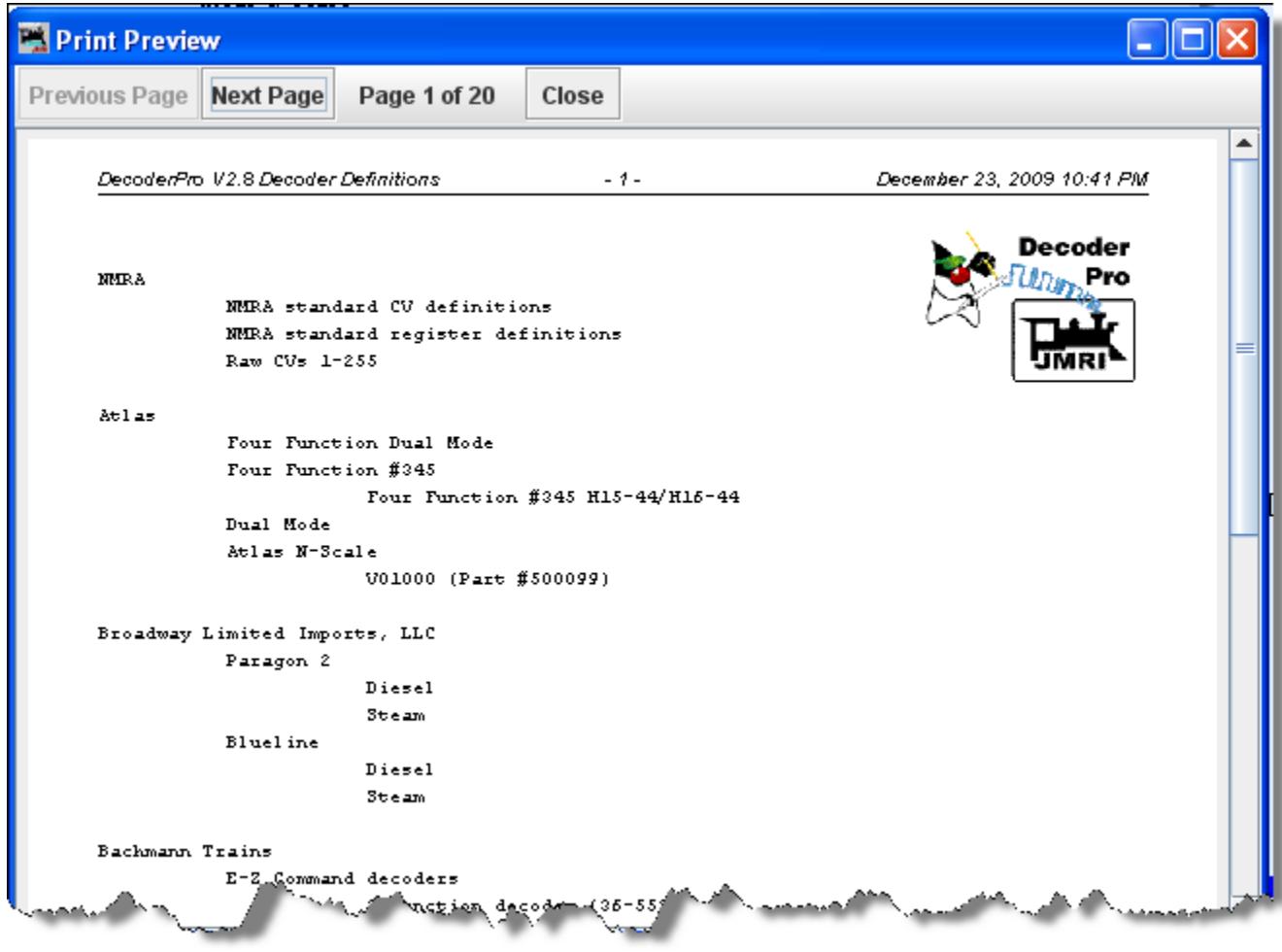


### Print Preview Decoder Definitions...

Opens your computer Print dialog, click OK and the Print Preview window opens. A list of all the Decoder Definitions installed in DecoderPro® will be displayed. You then can decide whether to print the pages.

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## Quit

Close DecoderPro® and all associated functions, same as clicking on the Quit button

## *EDIT MENU*

### Cut

Removes the selected text and temporarily stores it in your computer's clipboard

### Copy

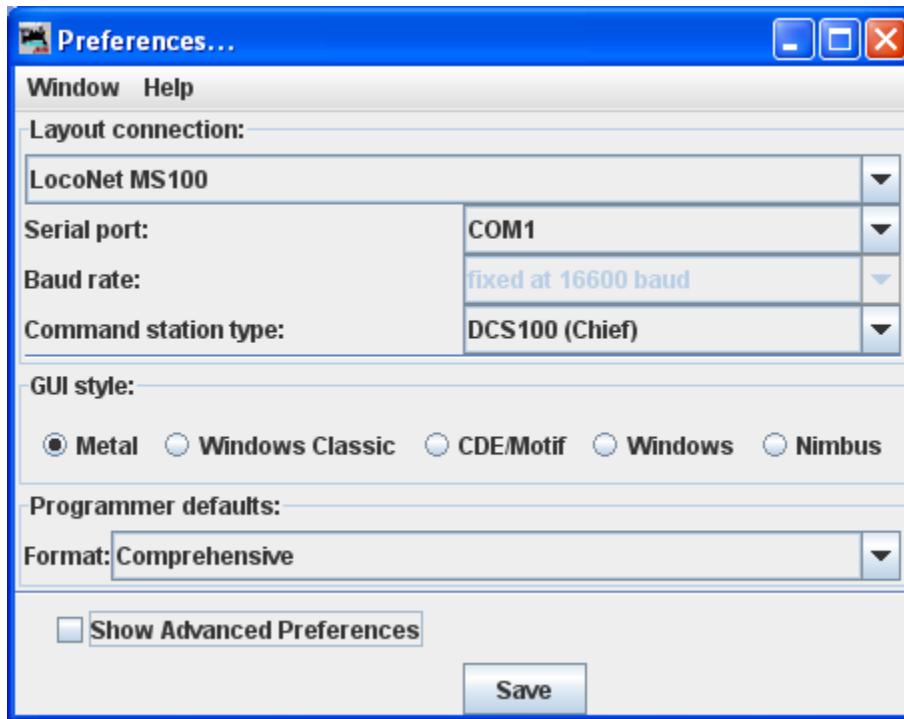
Copies selected text into the computer's clipboard

### Paste

Pastes the contents of your computer's clipboard to the location of your cursor

## Preferences...

Opens the [Preferences window](#).



## TOOL MENU

### Programmers ►

- Single CV Programmer

Opens the [Simple Programmer](#)

- Service Mode Programmer

Opens the [Service Mode Programmer](#).

- Ops-Mode Programmer

Opens the [Ops-Mode Programmer](#).

- Multi-Decoder Control

Opens the [Multi-Decoder Control](#) window.

## Tables ►(advanced users, beyond the scope of this manual)

A series of tables that are used with PanelPro Panels to automate your layout.

## Throttles ►

- New Throttle...

Opens a [Throttle](#) window (more than one throttle may be in use at a time)

- Save Throttle Layout...

Displays the **Save** dialog box to save your throttle as an XML file to the default folder, in Windows XP: C:\Document and Settings\userName\JMRI\throttles. This can be changed in the save dialog box.

- Load Throttle Layout...

Displays the **Open** dialog box allowing you to select a throttle file that has been saved in the default folder above, or the location of your choice.

- Save as Default Throttle Layout

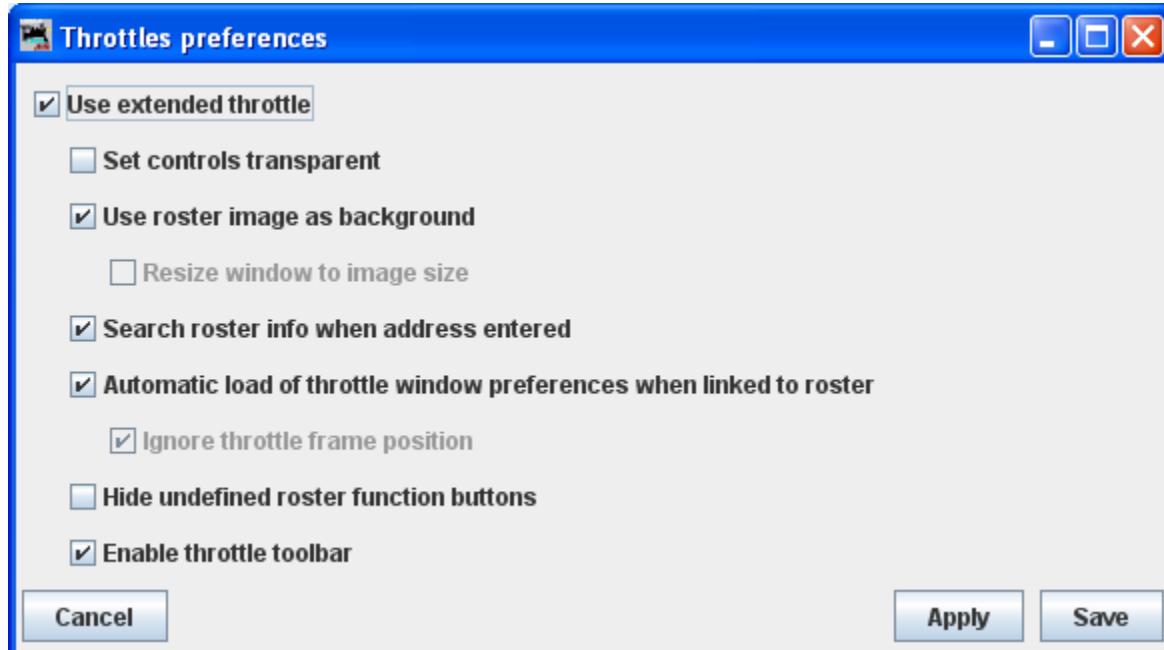
Saves your current Throttle as the default layout

- Load Default Throttle Layout

Loads the Throttle that you saved as the default

- Throttle Preferences...

Opens the Throttles preferences dialog



Select the options that you require

- Use extended throttle**
- Set controls transparent
- Use roster image as background
- Resize window to image size
- Search roster info when address entered
- Automatic load of throttle window preferences when linked to roster
- Ignore throttle frame position
- Hide undefined roster function buttons
- Enable throttle toolbar

At the bottom of the dialog are three buttons

 Cancel

cancels the dialog with no preferences saved

 Apply

Applies the preferences without saving to let you preview them

 Save

Saves the preferences as selected and closes the dialog

Saves your throttle preferences, you must have a throttle open, in the throttle folder above.

## Consisting Tool..

Opens the Consist Control window.

## Clocks ►

- [Setup fast Clock...](#)

Opens Fast Clock Setup window

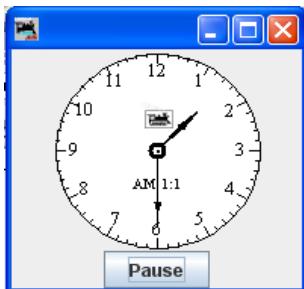
- Nixie Clocks



- LCD Clock



- Analog Clock



## **Power Control...**

Opens the Power Control Panel, which allows you to turn the power to layout ON/OFF



## **Turnout Control...**

**Simple Signal Logic** (advanced users, beyond the scope of this manual)

**Sensor Groups....** (advanced users, beyond the scope of this manual)

## **Speedometer...**

## **Light Control...**

**Dispatcher...** (advanced users, beyond the scope of this manual)

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**Send DCC Packet...** (not covered in this manual)

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**USS CTC Tool ►** (advanced users, beyond the scope of this manual)

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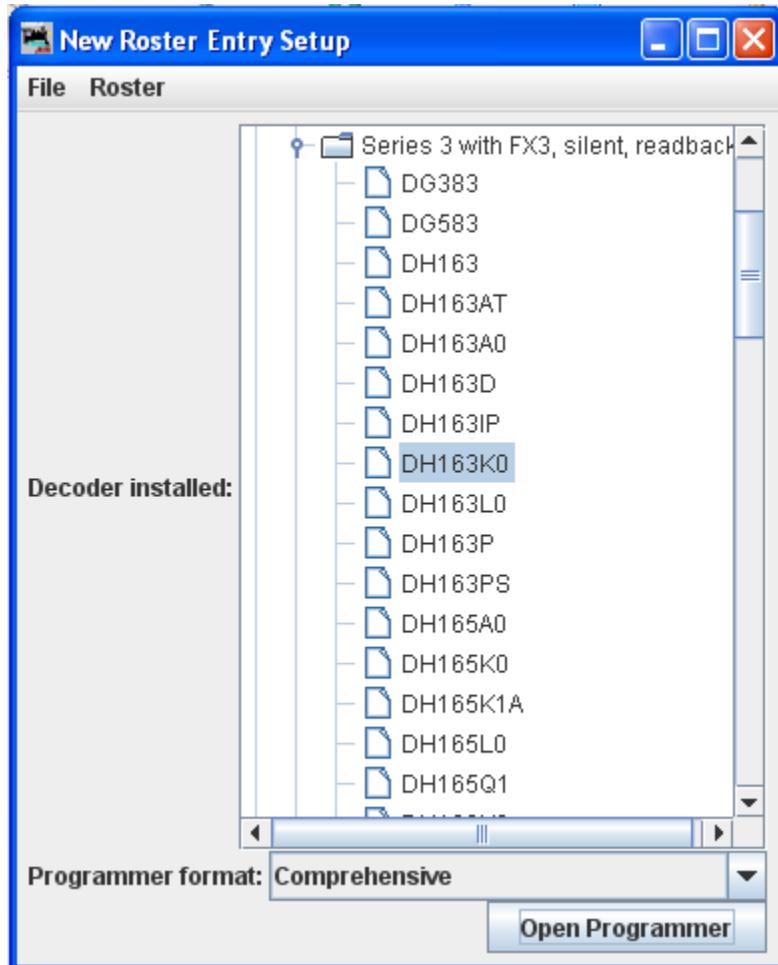
## **Operations►**

- Settings
- Locations
- Cars
- Engines
- Routes
- Trains

## *ROSTER MENU*

### Create Entry...

Opens New Roster Setup Pane.



Select a decoder that matches the one installed in your locomotive. The Open Programmer button will now become activated and you'll be able to move on with the Programmer selected from the drop-down list, then click on the **Open Programmer** button, the selected Programmer window will open. All programmers, Basic and Comprehensive, open to the [Roster Entry pane](#).

### Edit Entry...

Opens Edit Roster Entry Setup Pane.



Select the roster entry from the drop-down list that you wish to edit. Select the Programmer format that you wish to use from the drop-down list. Click on the Open Programmer button and [Roster Entry Pane](#) of selected programmer will open.

### **Copy Entry...**

Opens the [Select roster entry](#) dialog box.



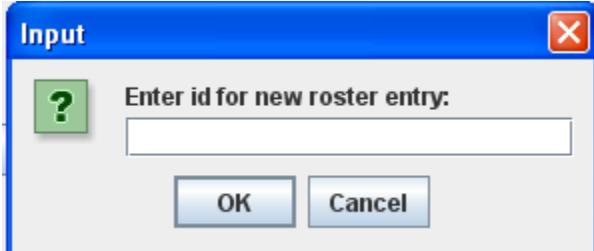
After you select the roster, the [Input prompt](#) will be displayed.



Useful when you have two locomotives with the same decoder program but different addresses.

### **Import Entry...**

The Open dialog is displayed, select the roster file (roster.xml) that you wish to import. The [Input prompt](#) will be displayed.



The roster file will be imported, update your roster index in the Debug menu.

## **Export Entry...**

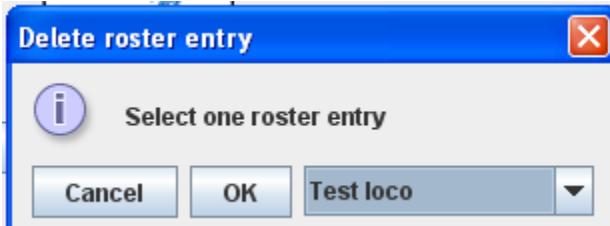
Opens the [Select roster entry](#) dialog box.



Next the **Save** dialog will be displayed, select the location where you would like to save the roster file.

## **Delete Entry...**

Opens [Delete roster entry](#) prompt box.



Used to remove an entry from the DecoderPro® roster.

## **Print Summary...**

Opens your operating systems printer dialog and when print is selected, prints a complete summary of your roster entries. (typically 5 entries per page, so be prepared to print several pages).

Both generate a printout that looks like this. The difference is that preview is only on your screen, whereas print summary prints it onto paper.

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DecoderPro Roster

- 1 -

January 15, 2009 2:21 AM



ID: Athearn\_F59PH-450  
Filename: Athearn\_F59PH-4500.xml  
Road name: MTRAK  
Road number: 450  
Manufacturer: Athearn  
Owner: Dale A. Tripp  
Model: F59PH  
DCC Address: 450  
Decoder Model: DZ123  
Decoder Family: Series 3 with FX3, silent, readback

ID: Athearn\_F59PH-461  
Filename: Athearn\_F59PH-450.xml  
Road name: MTRAK  
Road number: 461  
Manufacturer: Athearn  
Owner: Dale A. Tripp  
Model: F59PH  
DCC Address: 461  
Decoder Model: DZ123  
Decoder Family: Series 3 with FX3, silent, readback

ID: Atlas GP38-3501  
Filename: Atlas\_GP38-3501.xml  
Road name: Santa Fe  
Road number: 3501  
Manufacturer: ATLAS  
Owner: Dale A. Tripp  
Model: GP38  
DCC Address: 3501  
Decoder Model: DN163A0  
Decoder Family: Series 3 with FX3, silent, readback

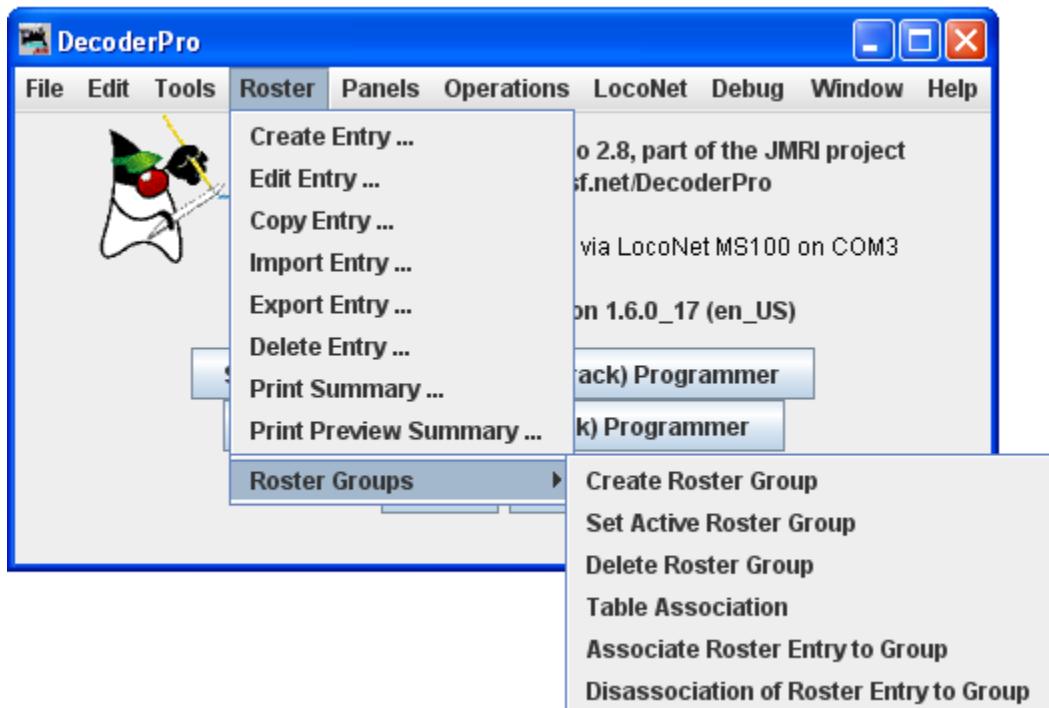
ID: Atlas GP38-3520  
Filename: Atlas\_GP38-3520.xml  
Road name: Santa Fe  
Road number: 3520  
Manufacturer: ATLAS  
Owner: Dale A. Tripp  
Model: GP38H  
DCC Address: 3520  
Decoder Model: DN163A0  
Decoder Family: Series 3 with FX3, silent, readback

## Print Preview Summary...

Open your operating systems printer and when the print is initiated the preview window is shown. but nothing will be sent to the printer, but nothing will be sent to the printer.

## Roster Groups ►

The **Roster Groups** function allows you to take your entire roster and categorize it. At home you might want to break it down by diesel vs. steam, or by railroad. At a club it would be handy to have categories by member name in addition to any other category you might think of. A roster entry can be associated with more than one group. Again in a club environment, a roster entry could be associated with the Steam, Union Pacific and John Member groups all at the same time. There is always one group present and it is called Global. All the roster entries are in the Global Group.



## Roster Groups ►

- **Create Roster Group**

Use Create Roster Group to define any other groups you wish. Opens **Create new roster group** dialog



Type the name of your new roster group in the Create new roster Group

**Cancel** if you do not want to create a new roster Group

**OK** creates a new roster group

- o **Set Active Roster Group**

Opens the **Select roster group** dialog. Once the associations have been made, then you can select the Active Roster Group.



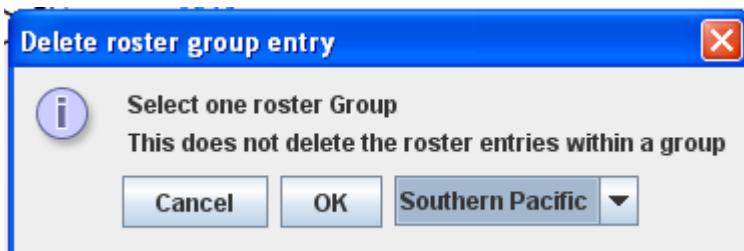
The Global Roster Group all rosters entries is the current active group. You may select one of the Roster Groups to be active

**Cancel** if you do not want to set an active roster Group

**OK** Sets the selected roster group as active

- o **Delete Roster Group**

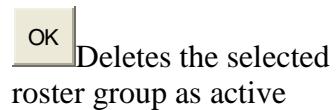
Opens the Delete roster group entry. This does not delete individual roster entries.



Select the Group Roster that you want to delete

**Cancel** if you do not want

to delete a roster Group



## Association of roster entries to a Roster Group

Once the groups are named, then you “associate” the roster entries with their group. This can be done two ways.

1. You can use the **Associate Roster Entry to Group** to select a group and a roster entry. This method is best used when only a few associations need to be made, like when a new loco has been added to the roster. Then you can concentrate on the groups it belongs to.
2. The other method is to use the **Table Association** selection. At the top of the table you select the group you wish the roster entries to be associated with, then the roster entries that you want to associate with that group.

- o **Table Association**

Opens the **Roster Group Table** which will allow you to assign roster entries to a Roster Group.

The screenshot shows a Windows application window titled "Roster Group Table". The window has a standard title bar with "Window" and "Help" menus, and a close button. Below the title bar is a toolbar with three icons. The main area is a table with the following columns: Road Num..., ID /, Road Name, Manufact., Owner, and Add to ... (containing checkboxes). A dropdown menu labeled "Select Roster Group: Santa Fe" is open above the table. The table contains the following data:

Road Num...	ID /	Road Name	Manufact...	Owner	Add to ...
505		AMTRAK	ATLAS	Dale A. Tripp	<input type="checkbox"/>
450	Athearn_F59PH-4...	AMTRAK	Athearn	Dale Tripp	<input type="checkbox"/>
461	Athearn_F59PH-4...	AMTRAK	Athearn	Dale Tripp	<input type="checkbox"/>
3276	Atlas GP-30 3276	Santa Fe	Atlas	Dale Tripp	<input checked="" type="checkbox"/>
3501	Atlas GP38-3501	Santa Fe	ATLAS	Dale Tripp	<input type="checkbox"/>
3520	Atlas GP38-3520	Santa Fe	ATLAS	Dale Tripp	<input type="checkbox"/>
4603	Atlas SD26	Santa Fe	Atlas	Dale Tripp	<input type="checkbox"/>
6365	B23-7-6365	Santa Fe	Atlas	Dale Tripp	<input type="checkbox"/>
6365	B23-7-6366	Santa Fe	Atlas	Dale Tripp	<input type="checkbox"/>
6390	B23-7-6390	Santa Fe	ATLAS	Dale Tripp	<input checked="" type="checkbox"/>
6932	Bachman DD40X-...	Union Pacific	Bachman	Dale Tripp	<input type="checkbox"/>
1000	Bachmann 44ton ...	none	Bachma...	Dale Tripp	<input type="checkbox"/>
2003	Bachmann Acela...	AMTRAK	Bachma...	Dale Tripp	<input type="checkbox"/>

Select Roster Group:  the roster group that you want to add entries to.

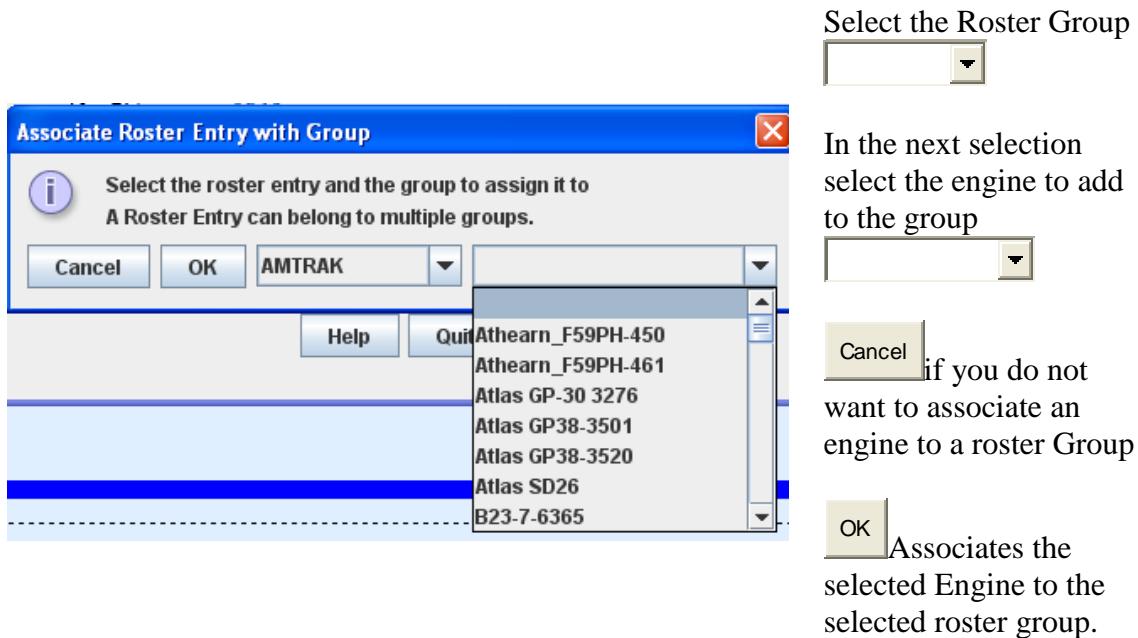
The table shows all the engines in your roster.

In the right column, Add to... select the entries that you wish to add to the Roster Group, click individually to select a single item, hold the shift key down to select a range of

items, hold the CNTRL key down to randomly select items. Close the Table and the entries will be added to the group.

- **Associate Roster Entry to Group**

Opens the **Associate Roster Entry** dialog with Group which allow you to select individual items.



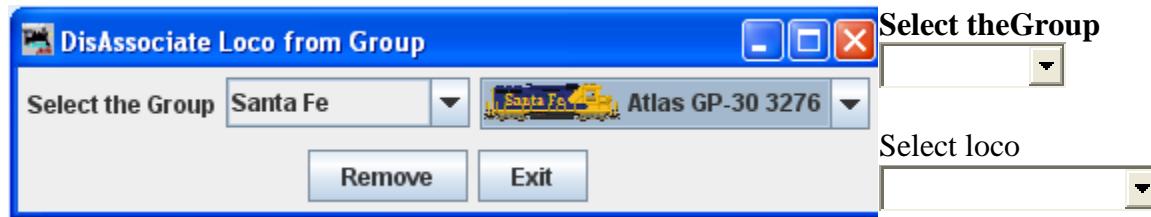
Once the associations have been made, then you can select the Active Roster Group. Once this is done then the Print and Print Summary actions will show only the roster entries associated with that group. As an example you could select the Group **Santa Fe** and only the roster entries in this Roster Group will be printed. The printout does not currently show the active group in the header. The active group will also influence any drop down box which has a list of entries in it, such as Throttle, edit entry, copy, etc. Also, when adding a new roster entry it will automatically be associated with the currently active group, so it is good practice when finishing working with a group to return the active group to Global.

### ***Restoring Roster to include all Engines***

To return your roster to show all engines, **Set Active Roster Group** to Global. Then you may be certain that you are working with all engines in your roster.

- **Disassociation of Roster Entry to Group**

Opens the **DisAssociate Loco from Group** dialog.



**Remove** Removes  
the selected loco  
from the selected  
Roster Group

**Exit** Exits the dialog

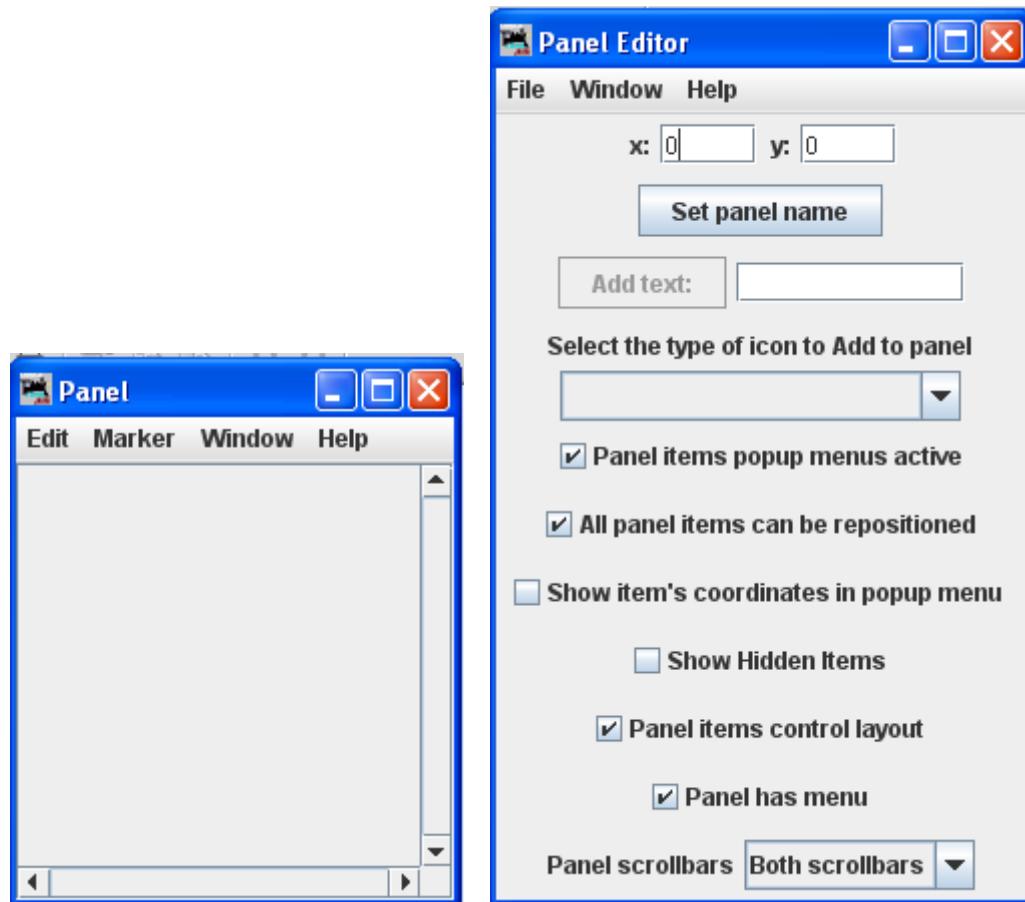
## PANELS MENU

DecoderPro® is only one facet of the JMRI suite of programs. Another facet is **PanelPro**, which is software that allows you draw a track diagram and then interface the items in that diagram to the electronic hardware on the real layout so that the hardware can be operated via the JMRI Interface. For a tutorial on how to work with PanelPro go to [PanelPro Layout Editor Tutorial](#)

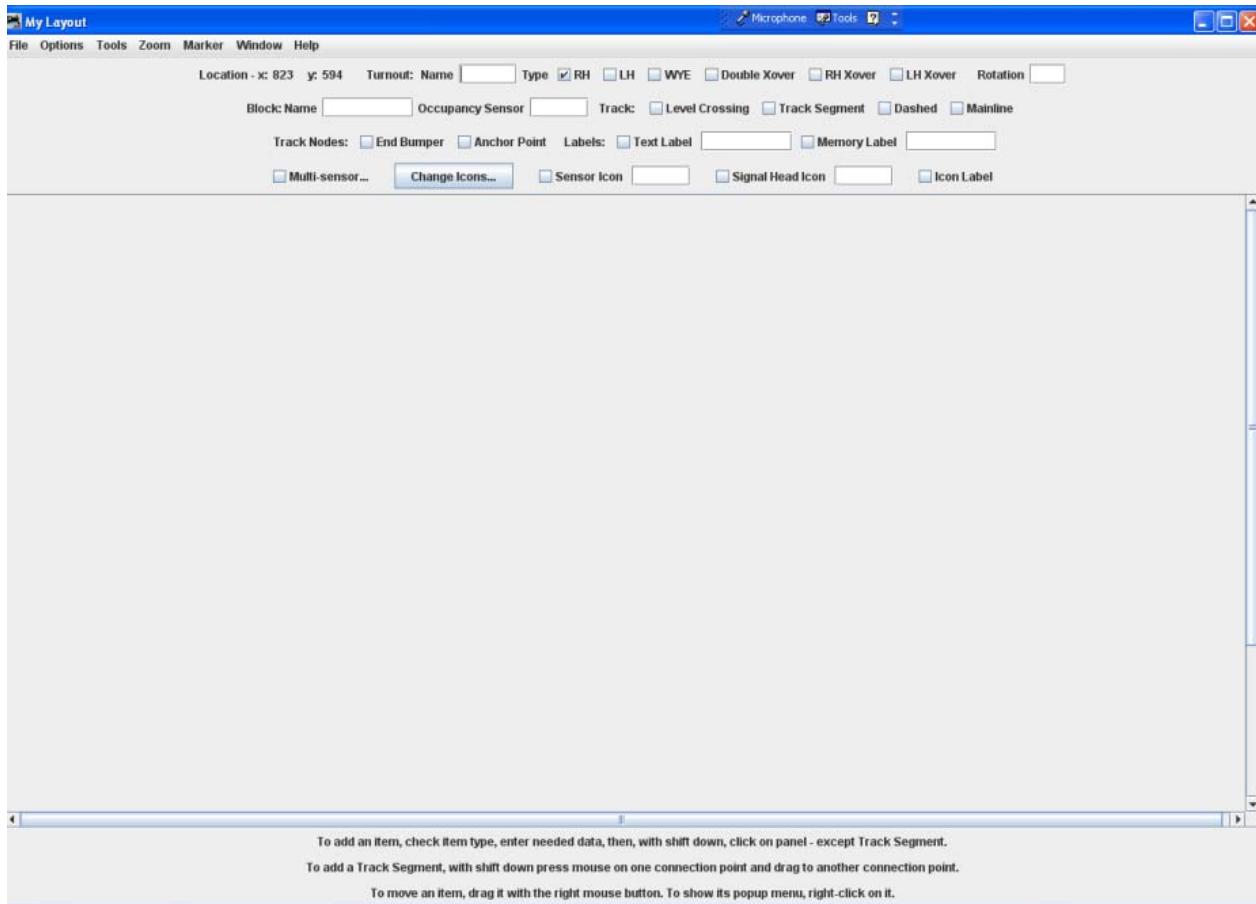
(<http://jmri.sourceforge.net/community/clinics/NMRA2008/LayoutEditorClinic2008/LayoutEditorClinic.pdf>) and [PanelPro Clinic](http://www.rr-cirkits.com/Clinics/Clinics.html) (<http://www.rr-cirkits.com/Clinics/Clinics.html>) (pdf and flash video files). The subject of panels is included here only show what is available in the DecoderPro® menus with a brief illustration/description of what these menu selections access. They are covered here because there is a Panels menu on the DecoderPro® main window that allows access to some of the PanelPro functions.

New Panels... ➞

## PANEL EDITOR



**LAYOUT EDITOR** For more information on how to use the [Layout Editor](#).



## Load Panels...

The **Open** dialog opens, select the panel file that you would like to load.

## Store Panels...

The Save dialog opens, select the location on your computer that you would like to store your panel file.

---

## Show Panels ►

A list of available panels is displayed, select the panel that you would like to display on your desktop window. The selected file will display on your computer.

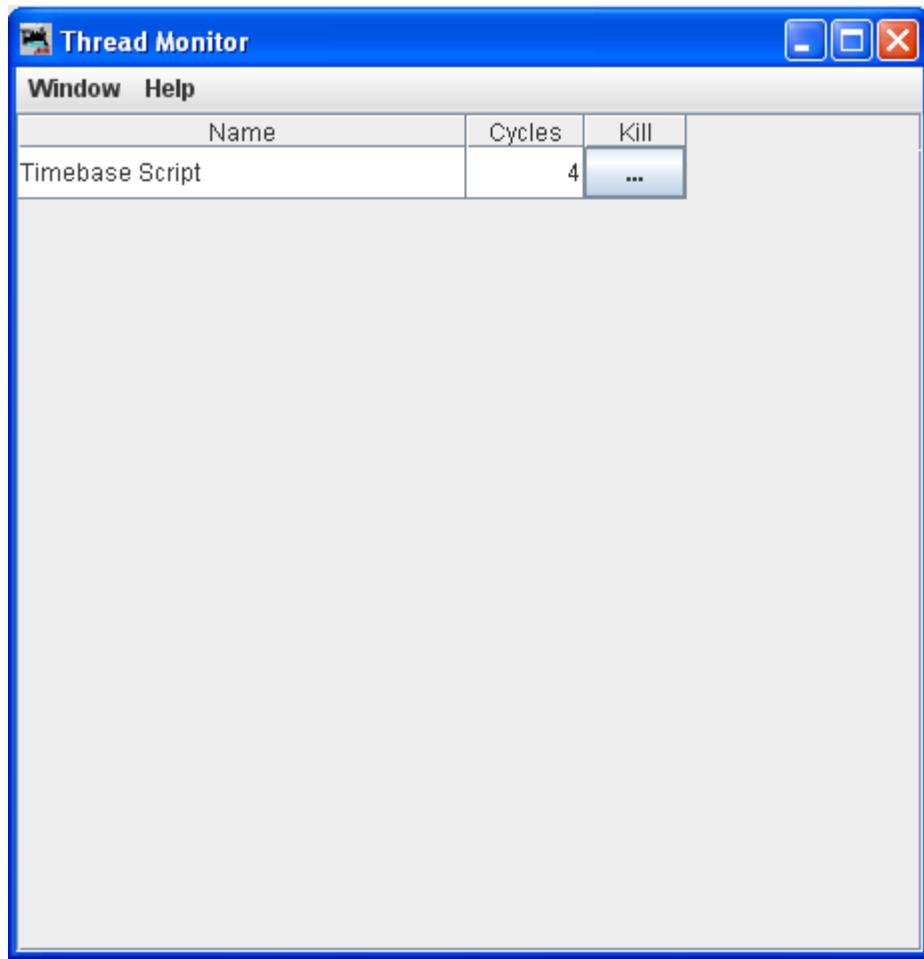
---

## Run Script...

Opens the **Find desired script file** dialog, you can select the script that you would like to open.

## Thread Monitor

Opens the [Thread Monitor](#) pane.



## Script Output

Displays the **Script Output** window.

## Script Entry

Displays the **Script Entry** window, in which you may enter scripted function and click on the **Execute** button to execute the script.

## SYSTEM DEPENDENT MENU

---

(THIS MENU NAME WILL DEPEND UPON THE SYSTEM THAT YOU SELECTED IN PREFERENCES. THE OPTIONS ARE LISTED. IF (NONE) IS SELECTED IN PREFERENCES THIS MENU WILL NOT BE DISPLAYED.)

- [Acela](#)
- [CMRI](#)
- [EasyDCC](#)
- [Grapevine](#)
- [LocoNet](#)
- [NCE](#)
- [OakTreeSystems](#)
- [Powerline](#)
- [QSI](#)
- [RPS](#)
- [SECSI](#)
- [SPROG](#)
- [TMCC](#)
- [wangrow](#)
- [XpressNet](#)
- [Zimo](#)

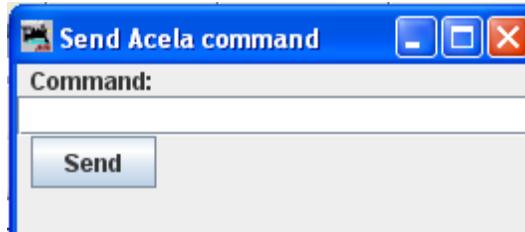
## ACELA MENU

### Command Monitor

Opens the Communications Monitor Window and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

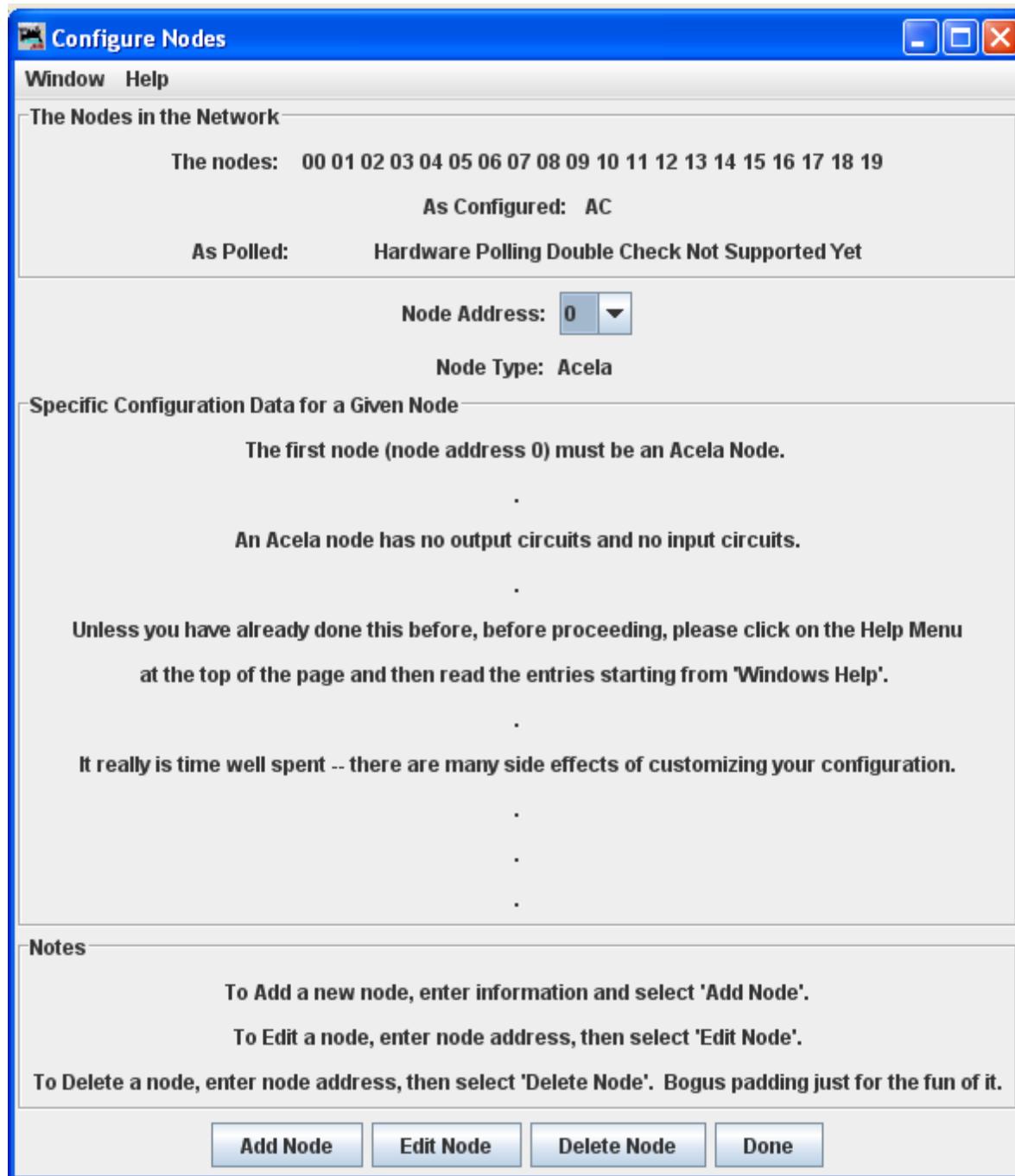
### Send Command

Opens the **Send Acela command** prompt, type in your command and click on **Send** button to execute the command.



## Configure Nodes

Opens the Configure Nodes window. This tool facilitates configuring the Acela network nodes.



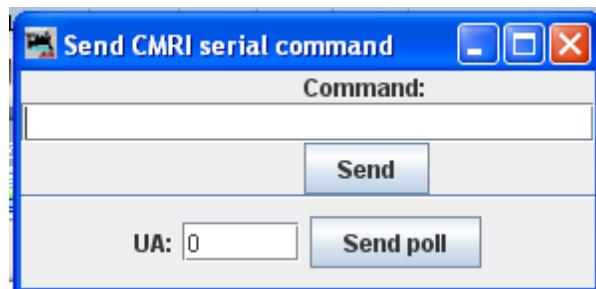
## CMRI Menu

### CMRI Monitor

Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

### Send Command

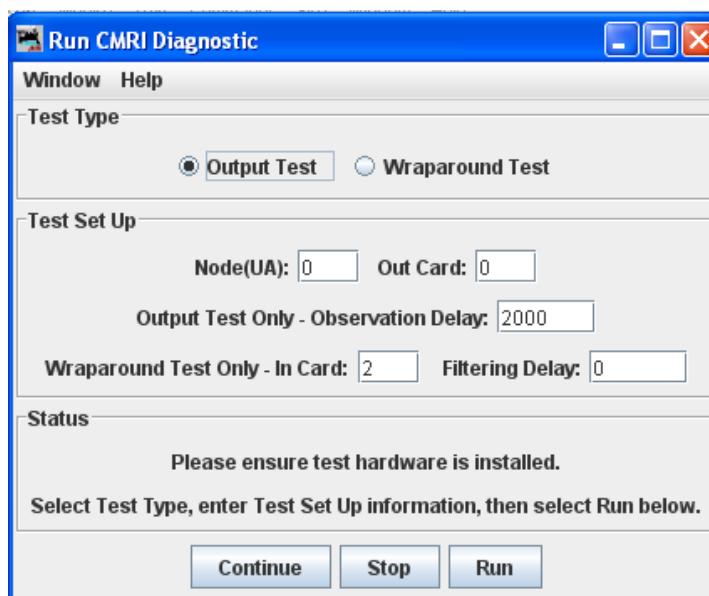
Opens the **Send CMRI serial command** prompt. You may poll devices on the CMRI serial link, using the **Send poll** button. You can send a command to the device using the **Command:** text box and the **Send** button.



### Run Diagnostics

#### Run CMRI Diagnostic window

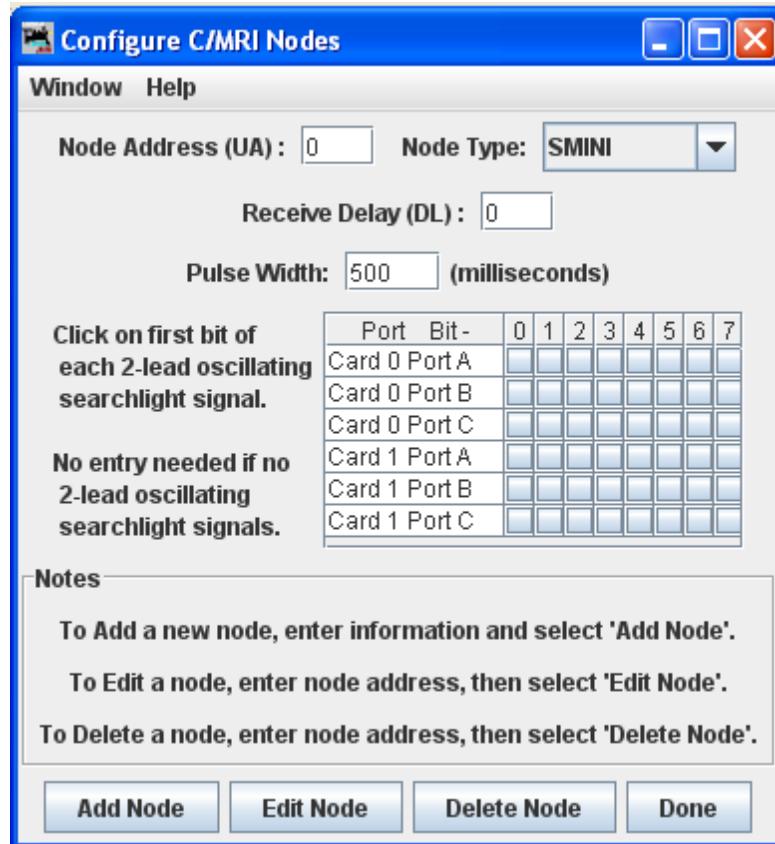
Provides a tool for testing your CMRI serial cards in the system using either an Output Test or a Wraparound Test.



## Configure C/MRI Nodes

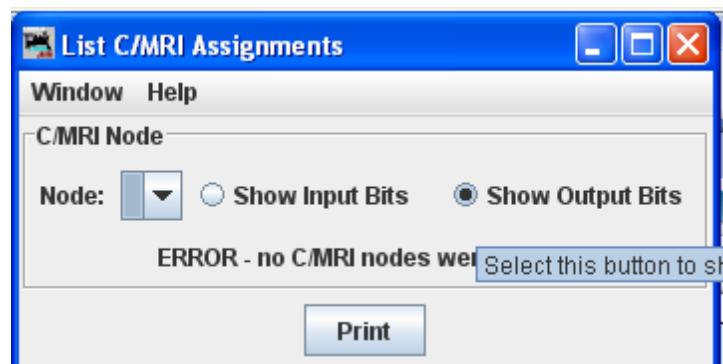
### Configure C/MRI Nodes Window

Tool the allows you to configure your C/MRI system Nodes.



## List Assignments

Opens **List C/MRI Assignments** window. Thsi tool lets you check teh pin assignments of your C/MRI Nodes and print them.



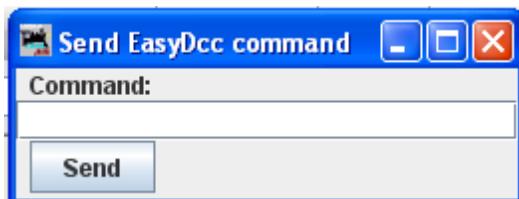
## EasyDCC Menu

### Command Monitor

Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

### Send Command

Opens the Send EasyDcc command prompt, which is used to send commands using DecoderPro®.



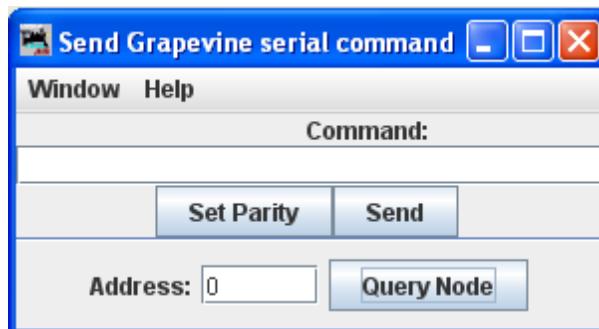
## GRAPEVINE MENU

### Communications Monitor

Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

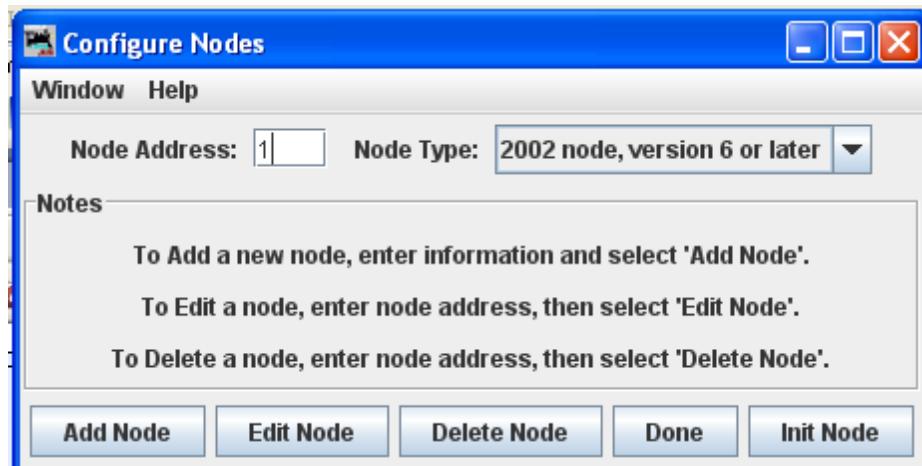
### Send Command

Opens **Send Grapevine serial command** prompt. Type **Command** and click the **Send** button to send the command via serial Bus. Type node **Address** and click on **Query Node** button to query the Grapevine serial bus node.



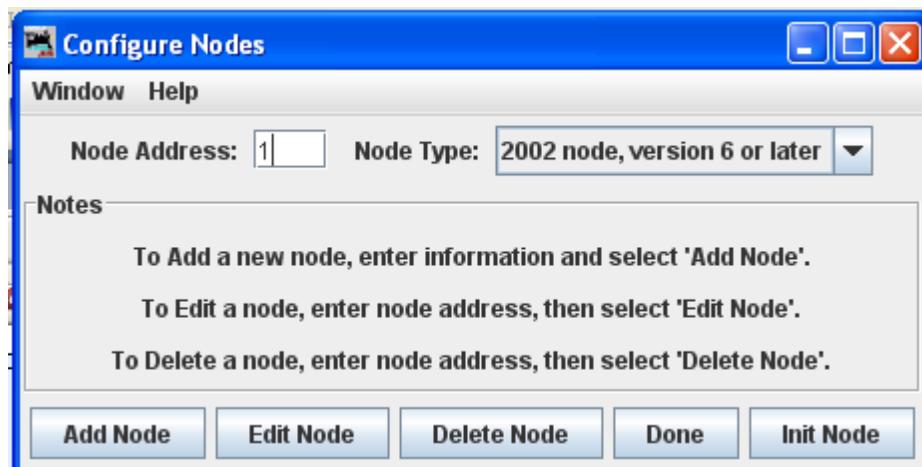
## Configure Nodes

Opens **Configure Nodes** window, which provides the tools for setting the Grapevine Serial Bus nodes.



## Node Table

Opens **Grapevine Nodes** window which displays a table of the nodes.



## LocoNet Menu

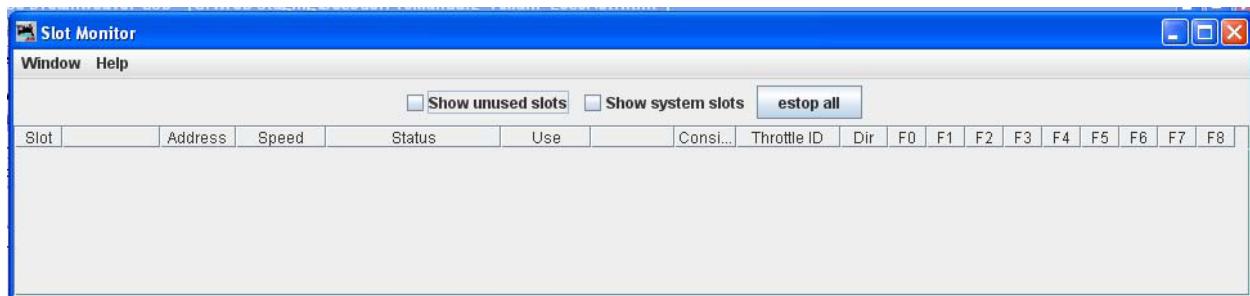
### Monitor LocoNet

Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

## Monitor Slots

### LocoNet Slot Monitor Window

Slots are used to control individual locomotive and consists. The display includes the decoder's speed step format, current speed and function settings, consist information and status. You may choose to show all slots or just the ones being actively used.



The checkboxes at the top allow to select what slots are displayed.

**Show unused slots**

**Show system slots**

**estop all** Executes an **Emergency Stop** for all locomotives.

The columns are:

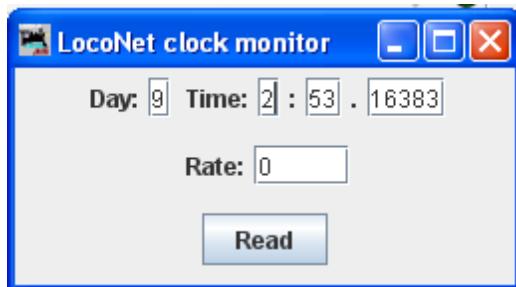
Column	Displays	
Slot	The number of the slot	
Address	Locomotive address the slot controls	
Speed	For unconsisted locomotives and addresses that are at the top of a consist, this is the current speed setting. It is an internal value for consisted slots.	
Decoder Type	The format of the commands being sent to the decoder, typically, either 128 step or 28 step, though other values are possible.	
Status	One of the four possible states:	
	Free	Not reserved for any particular use, no contents
	Idle	Not reserved for any particular use, no contents
	Common	Not in use at the moment, but still contains valid data for the last decoder to use it.
	In Use	Currently controlling a decoder
Consisted	Displays the consist status of the slot, whether it is not consisted, the top of a consist, included in a consist, etc.	
Throttle ID	The UT4 throttles have a fixed throttle ID. The DT400 has a fixed common leading HEX value and a user programmable second HEX value. . It is displayed as two hexadecimal bytes, see the Digitrax instructions for details.	
Direction	Whether the decoder is currently being commanded to go Forward or Reverse.	

F0-F8

The current function settings

## Monitor Clock

A Digitrax LocoNet can contain it's own fast clock timebase. This can be driven either by a DCS100/DCS200 command station, or by a separate fast clock module such as those made by Logic Rail Technologies. **LocoNet Fast Clock Monitor**



The **LocoNet clock monitor** tool provides a convenient way to:

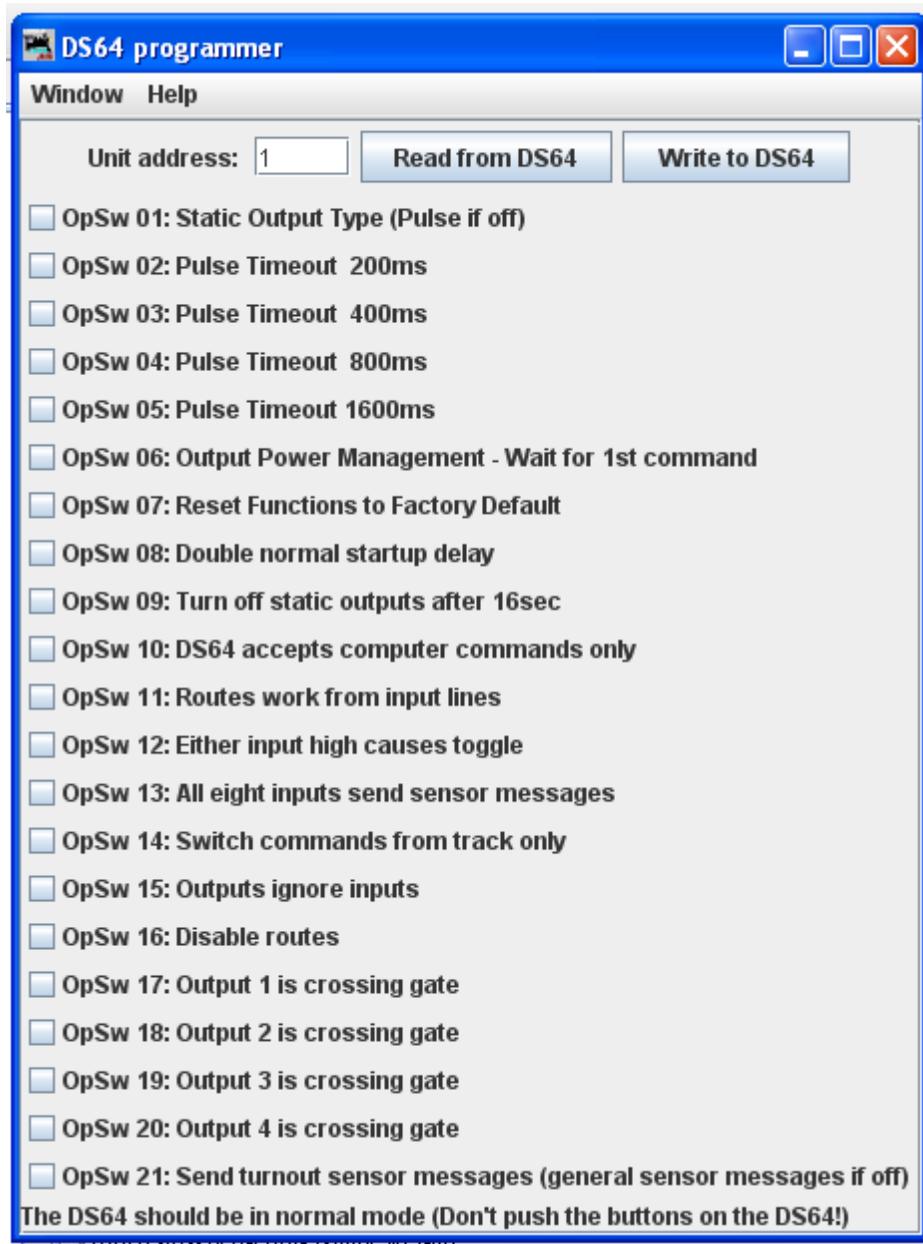
- **Read** the current contents of the LocoNet fast clock
- Set the **Day** and **Time**
- Set the **Rate**. Note that you can't explicitly pause a LocoNet clock, but you can stop it by setting the rate to zero.

If you are using a DCS100 or DCS200 command station to create your LocoNet fast clock, you may have noticed that it doesn't keep particularly good time. If you select the "Correct LocoNet Fast Clock Master", JMRI will adjust the rate of the LocoNet clock so that it keeps better time.

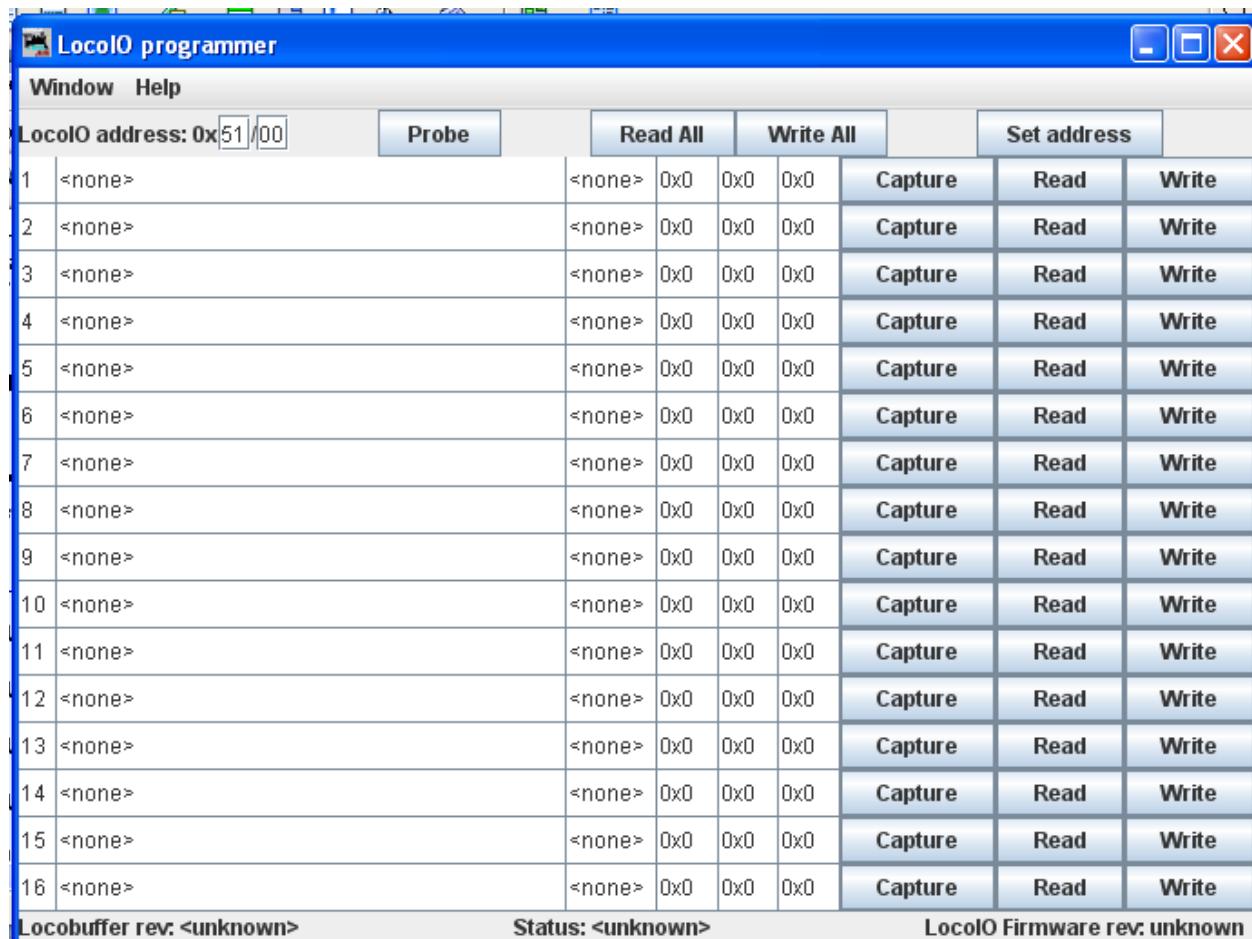
## Monitor LocoNet Stats

If active displays the statistics related to traffic on the LocoNet.

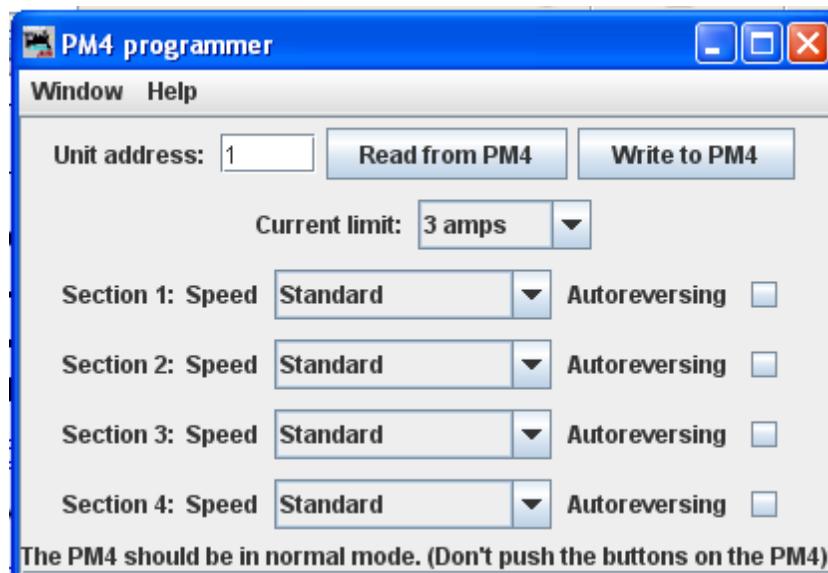
## Configure BDL16



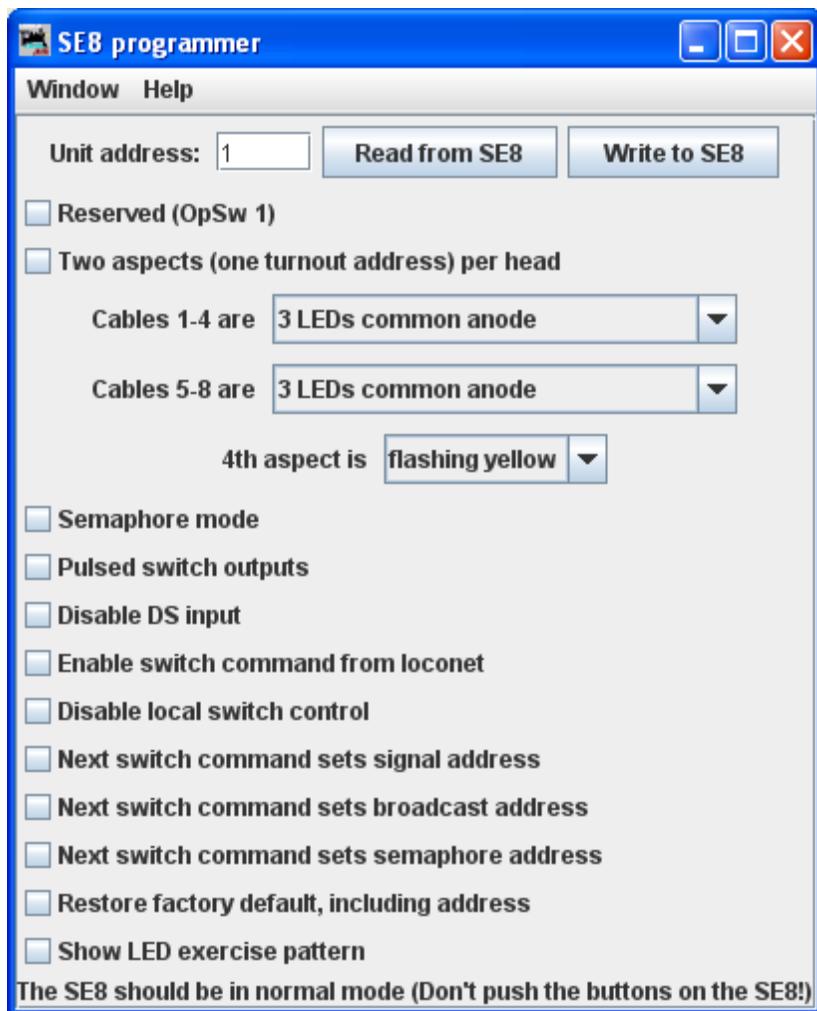
## Configure LocoIO



## Configure PM4



## Configure SE8C



## Configure DS64

### DS64 Programmer Window

The DS64 programming tool lets you configure the internal options of a DS64 directly from your computer.

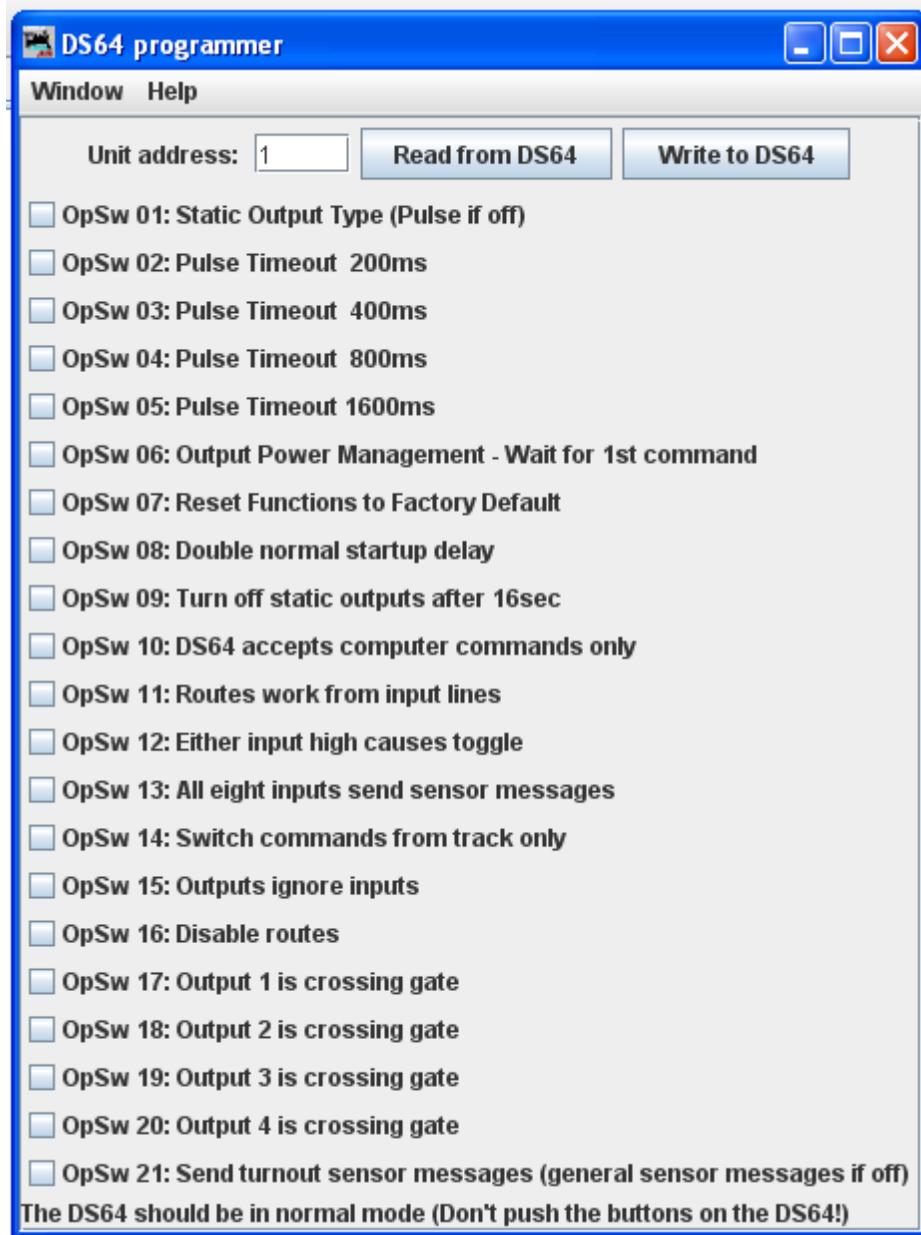
Type the address of a DS64 board in the text field and click **Read from DS64**. The tool will read back the current state of the various options, and set the check boxes to correspond to their current values.

You can then, if you wish, change the checkboxes and click **Write to DS64** to make your changes permanent.

## Limitations

Because of the way the DS64 board works, this tool can't change the basic address of the unit.

At present, DS64 routes cannot be programmed by this tool. It's possible, but nobody has written the code for it yet because JMRI routes are more powerful and easier to use.



## Configure Command Station

Opens the DCS100(Chief) Programmeer

## Configure LocoNet ID

Opens the Set LocoNet ID dialog that allows you to Read or Set the LocoNet ID **Value**:

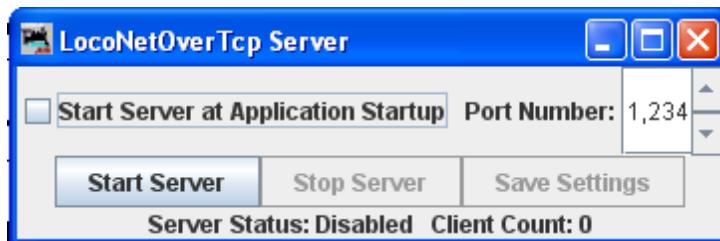


## Start LocoNet Server

Starts the LocoNet server.

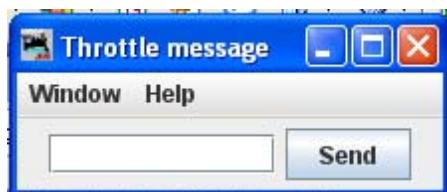
## Start LocoNet over TCP Server

Opens the **LocoNetOver Tcp Server** dialog.

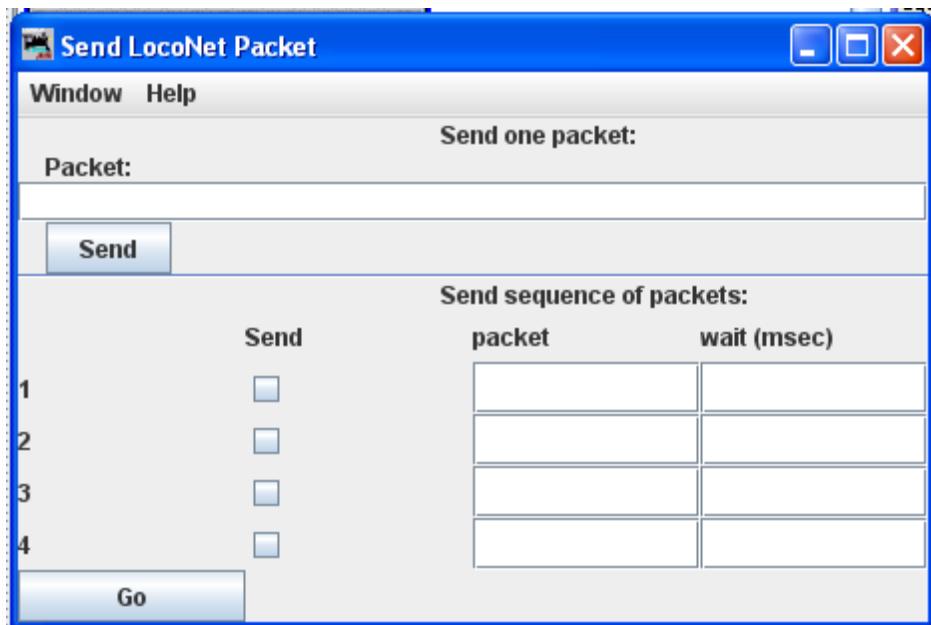


## Send Throttle Messages

Opens **Throttle message** prompt with limited capabiltiy to send messages to handheld throttle.



## Send LocoNet Packet



LocoNet packets are sent in raw hexadecimal format, you may use the [Monitor Window](#) in the **Show Raw Data** option to monitor the packets.

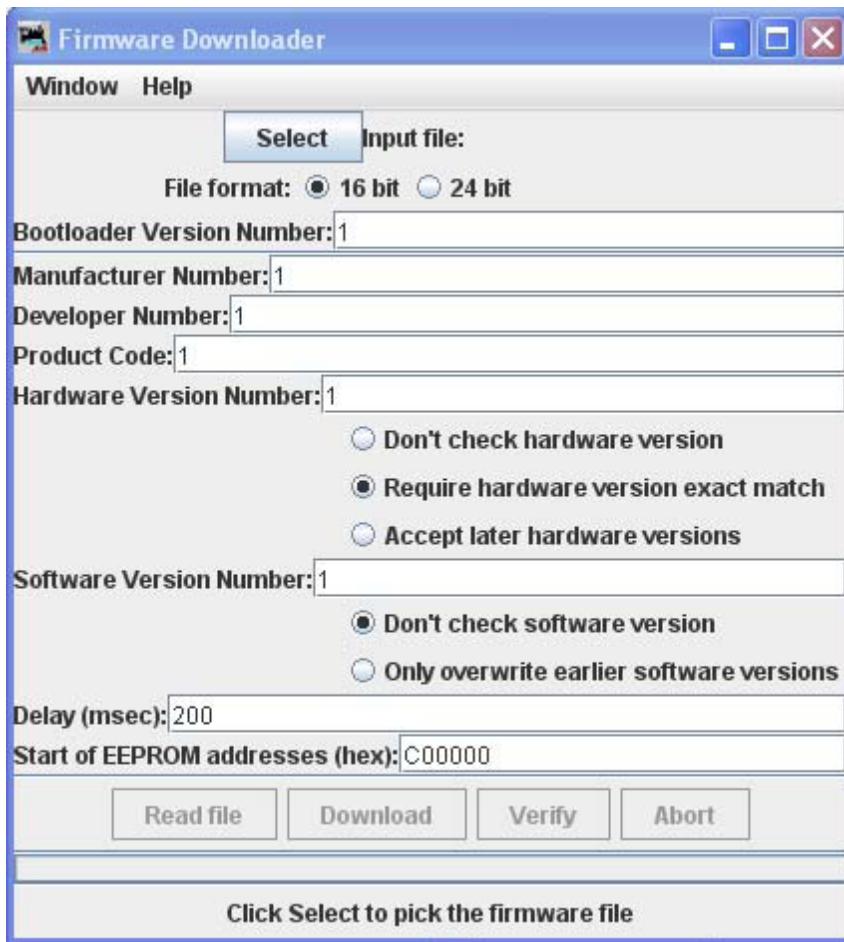
The top section lets you send a single LocoNet packet. Type the hexidecimal numbers and click **Send**, you should include the byte for the checksum at the end of the message.

The bottom section lets you enter from one to four packets that will be repeatedly sent in sequence, with the user-defined delays in between. Press the **Go** to start transmission sequence, and press again to stop the sequence.

## Download Firmware

### Firmware Downloader

Some Digitrax products can have new firmware downloaded to them. The firmware updates are distributed as .dml (Digitrax Mangled Firmware) files. They contain both the code itself, and various management information to make sure that it can be downloaded into the hardware it expects.



To use this tool:

- Click **Select** and select the .dmf file you want to download.
- Click **Read file** to read the file into the program and verify its contents.
- Only if instructed to by Digitrax, change the various values in the control fields (this is usually not needed)
- Click **Download** to load the firmware. This will take a little while..

## Download Sounds



Digitrax sound decoders are loaded with "sound projects", stored in "Sound Project" (.spj) files. Those contain a number of "sound fragments" in .wav format, plus some additional control information.

The Decoder Sound Downloader tool lets you load a new .spj file into a Digitrax sound decoder via a Digitrax PR2 or PR3 interface. If you're using a PR3, it needs to be put into "Programmer mode" before trying to download, see the main [PR3 page](#) (<http://jmri.sourceforge.net/help/en/html/hardware/loconet/PR3.shtml> ).

Digitrax provides sample sound project files at their Sound Depot (<http://www.digitrax.com/sounddepot.php>) web site. You can also find links to documentation and additional tools there.

JMRI also provides tools for [editing sound project files](#) (<http://jmri.sourceforge.net/help/en/package/jmri/jmrix/loconet/soundloader/EditorFrame.shtml>) to include new sounds and even to [change the sound logic](#) (<http://jmri.sourceforge.net/help/en/package/jmri/jmrix/loconet/sdfeditor/EditorFrame.shtml> ). When you first select the Download Sounds tool, it opens a dialog with most of the controls disabled:

(Click on any image on this page to see a larger version)

The status line at the bottom will walk you through the steps needed.

1. First, click "Select" and pick the .spj file you want to download.
2. Next, click "Read" to read the file (this is a separate step so you can just click "Read" multiple times if you're editing and saving new versions of the file).

If everything is OK, the file will be read into the program and verified, a version string from the file will be displayed, and the "Download" button will be enabled.

3. Click "Download" to start the download process. It will take a little while. The progress is described in the status line:

"Starting download; erase flash"

The first step is to erase the decoders memory so it can take new data. This will take up to about 30 seconds, depending on the specific decoder.

"Sending initialization message"

Set up the decoder to accept data after being erased. This should only take a fraction of a second.

"Send SDF data"

Load the Sound Definition data into the decoder, which should only take a few seconds

"Send WAV data"

The sound data is being downloaded. As each block is sent you'll get an update: "Send WAV data block 1", then 2, then 3, etc.

"Done"

The download load completed OK.

If something goes wrong, the final status will be "Download aborted". The most common reason is that the PR2 couldn't handle the data that was being send, which is listed as "PR2 not ready". If this happens repeatedly, make sure that the serial port and cable that the PR2 is using as the control lea

## Edit SPJ Sound File

Opens Sound File editing tool.

## Select PR3 Mode

Open the Select PR3 Mode dialog.

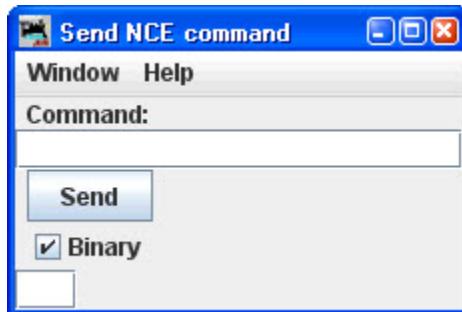
## NCE Menu

### Command Monitor

Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

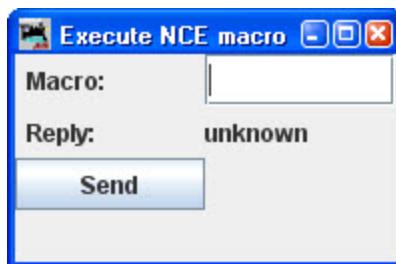
## Send Command

Opens the **Send** prompt with a text box to enter the NCE Format command that you want to send.



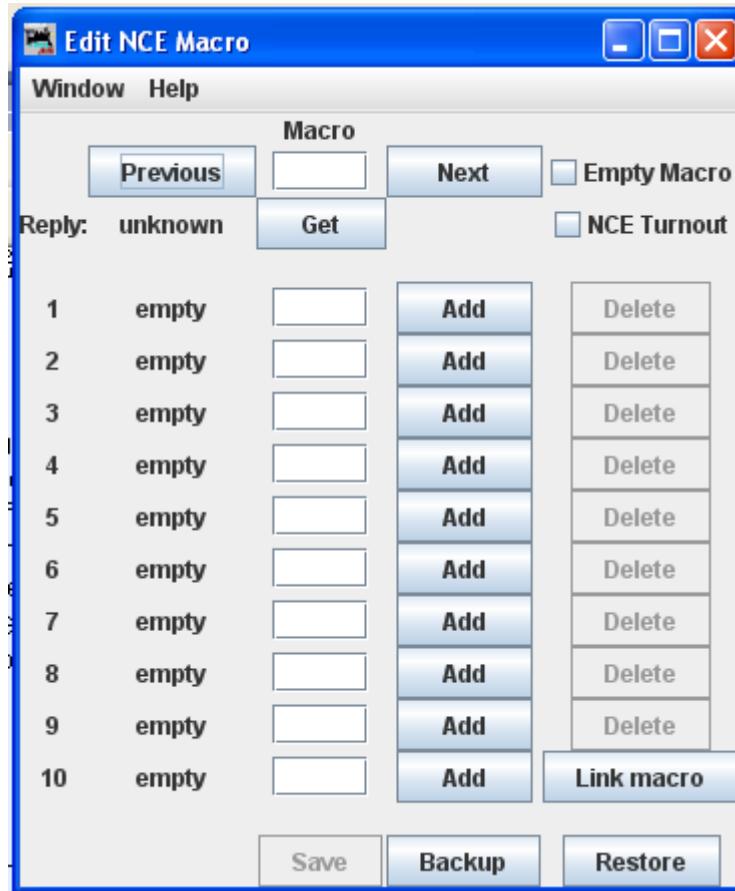
## Send Macro

Opens the **Execute NCE Macro** Window which allows you to enter the Macro number to be executed. Clicking the **Send** button sends the macro.



## Edit Macro

This tool allows you to review, edit and save NCE style macros. It also allows you to backup and restore all the NCE command station macros to and from a file. The file format is identical to NCE, so you can restore a file that was generated by the NCE backup command. It is recommended that you set the baud rate at 9600 when using this tool.



### Backup button

Click on the **Backup** button located on the bottom row. This will open the **Save** dialog. This will read the NCE command station memory and store the contents into the file you selected.

### Restore button

Click the **Restore** button located on the bottom row. This will display the **Open** dialog, select the file you want to restore to the NCE command stations memory and click on **Open** button.

### Get button

To review a macro, enter the number of the macro in the text box under the heading **Macro** and click the **Get** button. This will retrieve the macro from the command station's memory. If the macro currently exists, **Reply:** will be macro found. If the macro does not exist, the **Reply:** will be macro empty. If there is a macro, the editor will show a list of accessories that the macro is programmed to activate.

### Add button

The **Add** button will add an accessory's address

### Delete button

The **Delete** button will remove an accessory's address

### Link Macro button

Links this macro to another one.

### Previous and Next buttons

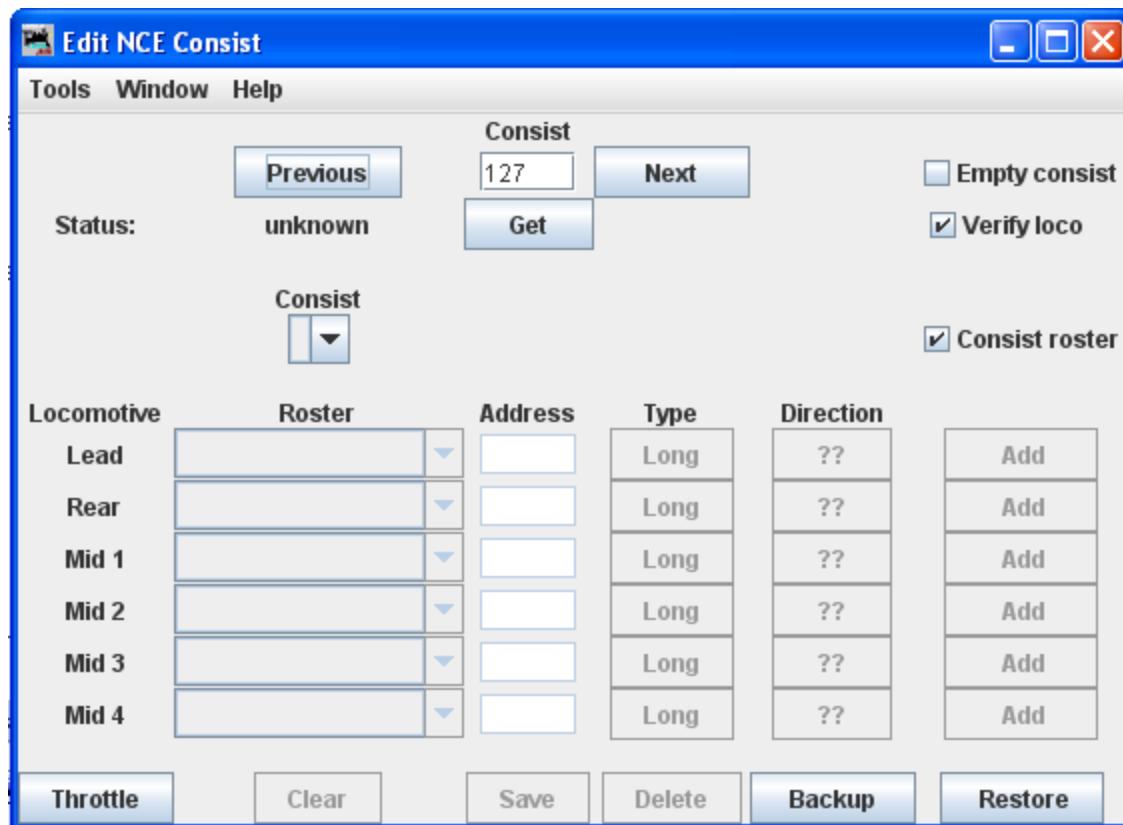
Allow you to search the macros.

### Save button

Saves macros to the NCE command station

## Edit Consist

This tool allows you to review, edit and save NCE style consists. Also allows you to backup and restore all the NCE command station consists to and from a file.



**Backup** button allows you to backup all of your consists to a file from the NCE command Station.

**Restore** button allows you restore consists from a file to the NCE command Station.

**Get** button is used to retrieve the consist from the command station's memory.

# DecoderPro®® User's Guide Version 2.8

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You may add a locomotive by entering the address and clicking the ?? button. The **Type** button toggles between **Long** and **Short** address. Click the **Add** button and that locomotive will be added to the consist.

Alternately, you may add a locomotive from your roster with the drop-down list, then click the **Add** button.

**Consist roster** enables saving and maintaining consist roster when checked.

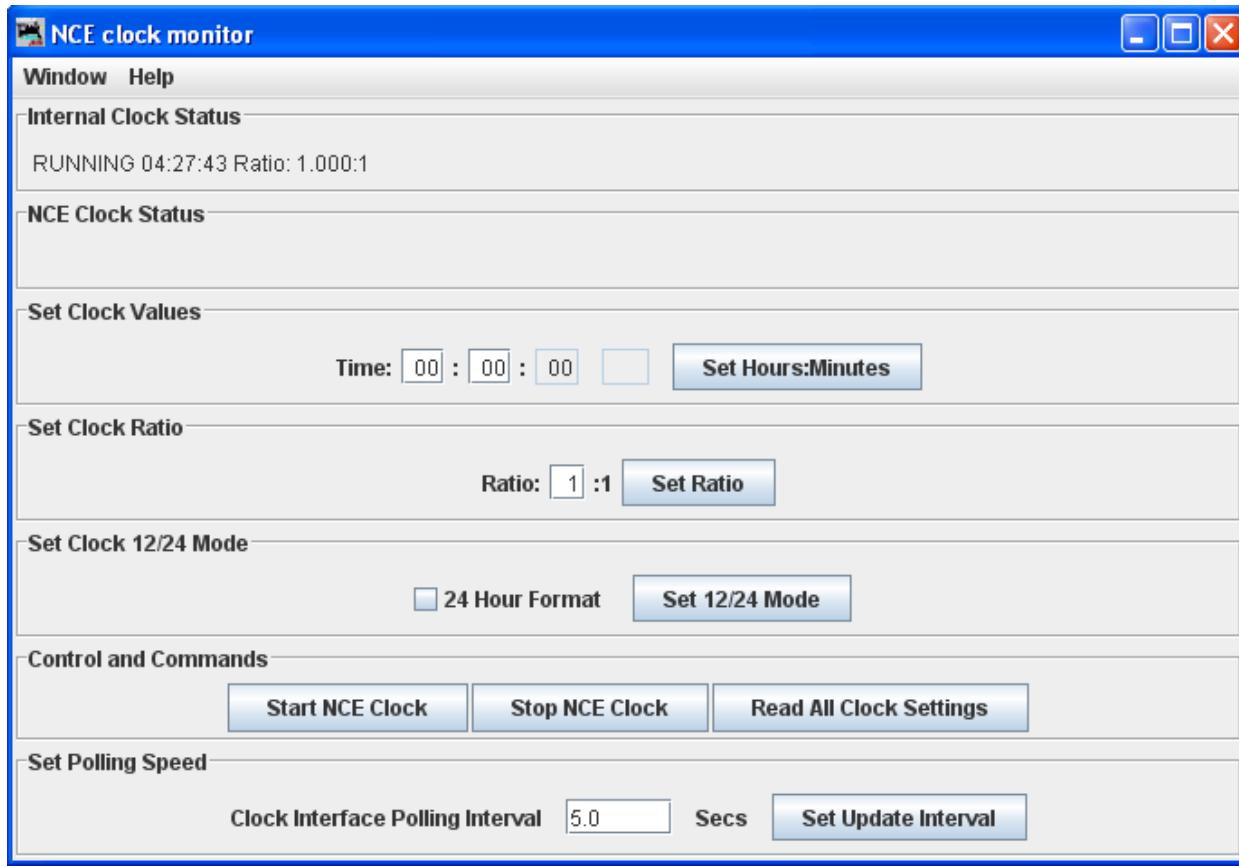
**Save and Load** Button is displayed as a **Save** button when program has detected that a change has been made to a consist. When you select a consist to load from the consist menu, it becomes the **Load** button.

**Clear** button removes all the locomotives from a consist.

## DCC Packet Analyzer

The DCC packet analyzer entry is software to log data from a hardware device sold by NCE which allows the user to observe the packets on the NCE Command Bus, or alternatively directly from the track. The latter feature allows the device to look at track packets sent from any Command Station that conforms to the NMRA standard (such as Digitrax or Lenz). The input signal is interpreted and sent to JMRI through a serial interface. With it the user can see speed and function instructions being sent from the Command Station to the decoder

## Monitor Clock



When the clock is running as clock master mode, the internal clock rate is adjusted to match time with the NCE command station clock. The goal is the minute should roll over at the same time for the internal clock and ProCab displays.

## Booster Programming

Booster Programming is stated to be only for NCE booster testing, and warns that the booster must be disconnected from the track before using.

## OakTreeSystems Menu

### Communications Monitor

Opens the Communications Monitor Window and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

### Send Command

Opens the Send Oak Tree serial command prompt, which will allow you to type in a **Command:**

then click on . You may also type in an **Address:** and poll the system by clicking on the .



## Powerline Menu

### Communications Monitor

Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

### Send Command

Opens the **Send power line device command** prompt to allow you to type in a **Command** and  to the powerline device.



## QSI Menu

### Command Monitor

Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

### Send Command

Opens the **Send QSI command** prompt to type in a **Command:** and click on **Send**.

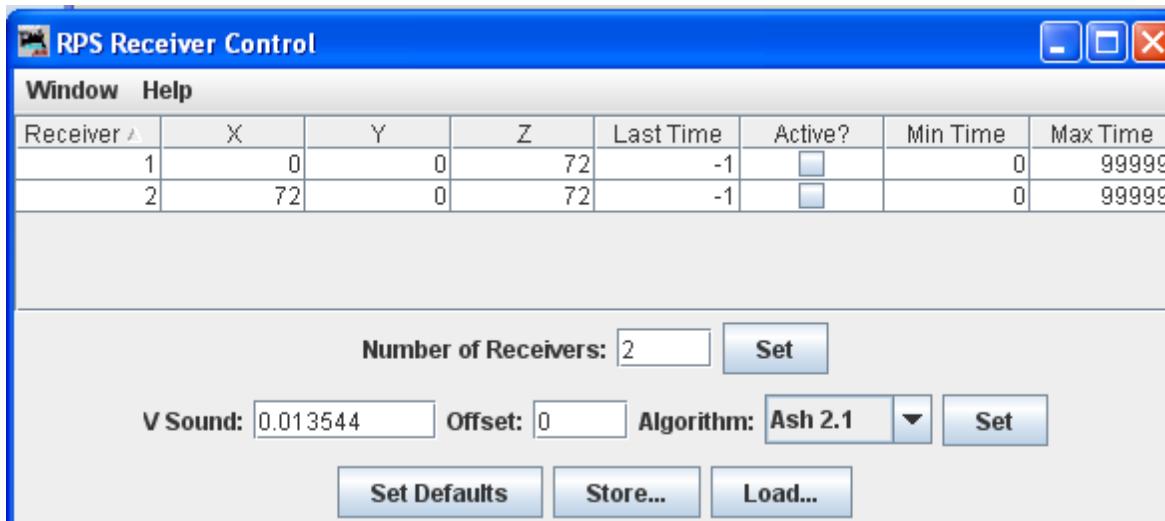


## RPS MENU

### RPS Monitor

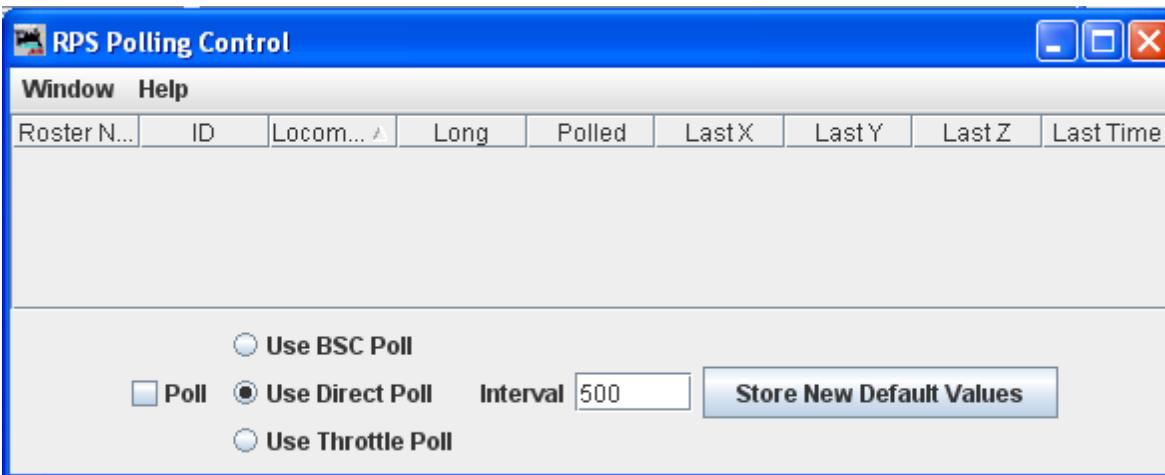
Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

### RPS Receiver Control



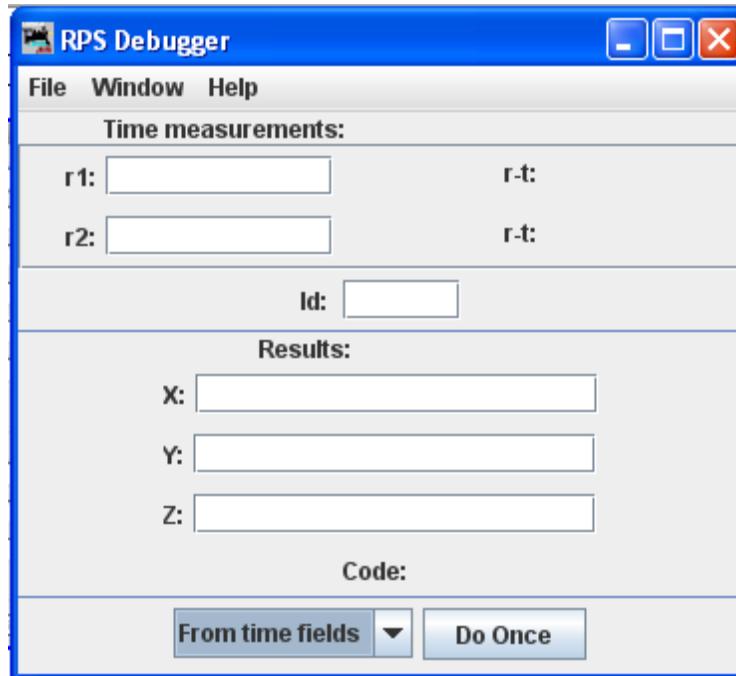
Will detect how many receivers it has and set up a table with the right number of rows.

### RPS Polling Control



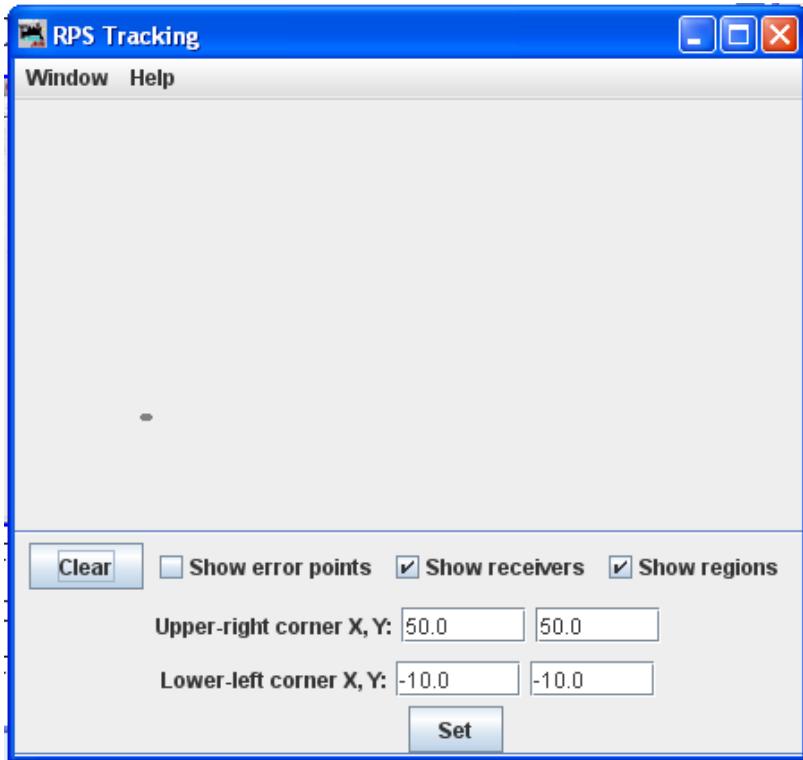
Where you tell the RPS system which of your locomotives have RPS transmitters installed, and how often to talk to them.

## RPS Debugging Window



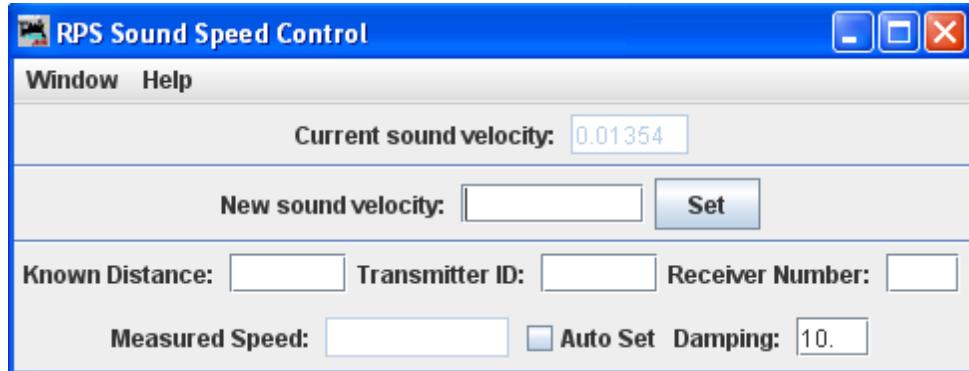
Lets you look at information as it moves through the RPS system.

## RPS Tracking Display



Displays two types of things, the measured positions and paths of RPS transmitters and the *detection regions* used for RPS blocks and sensors.

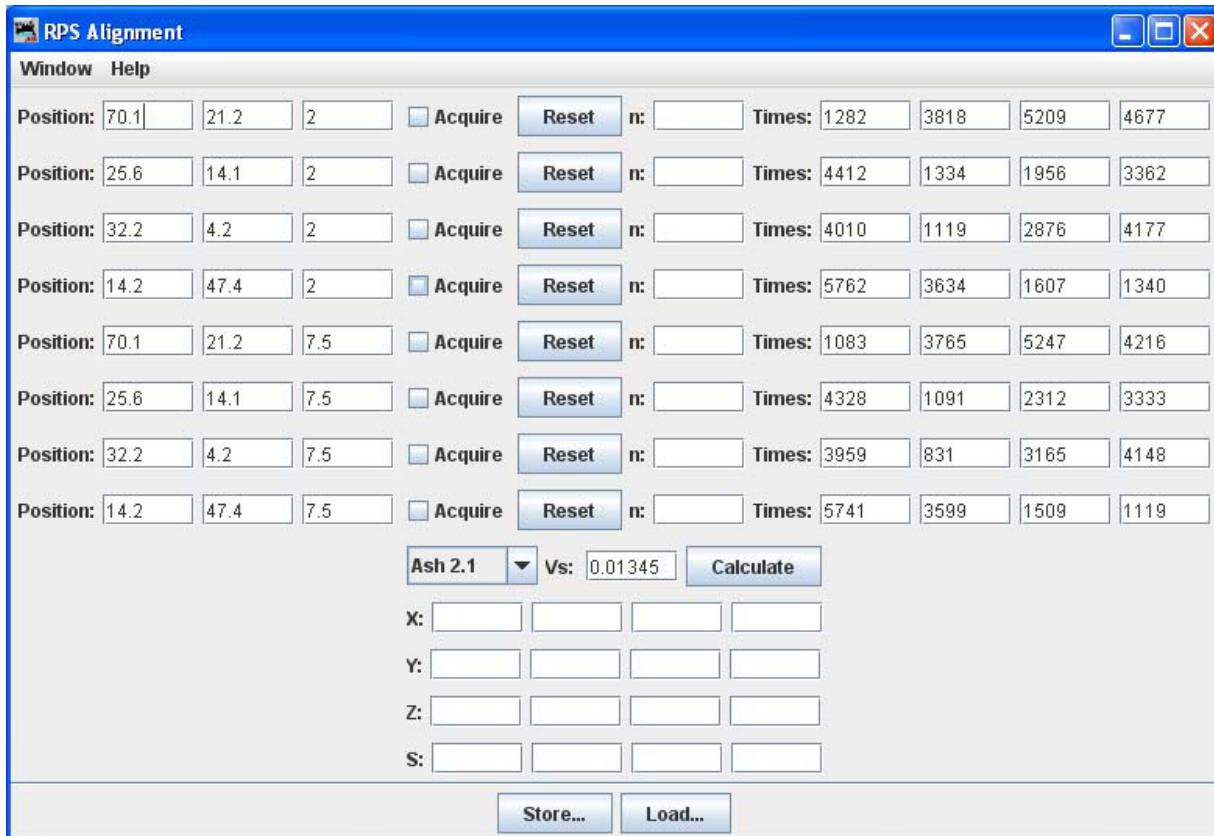
## RPS Sound Speed Monitor



Lets you monitor and control the speed of sound used by the RPS system.

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## RPS Alignment Tool



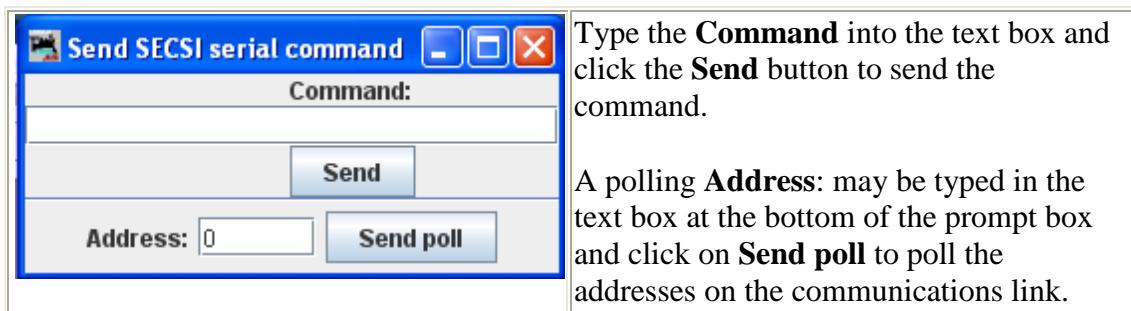
## SECSI Menu

### Communications Monitor

Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

### Send Command

The **Send SECSI serial command** prompt opens.



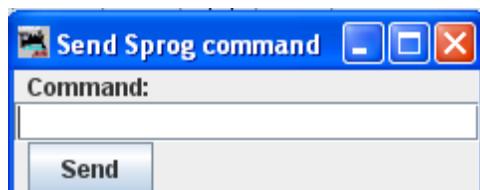
## SPROG Menu

### Command Monitor

Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

### Send Comamnd

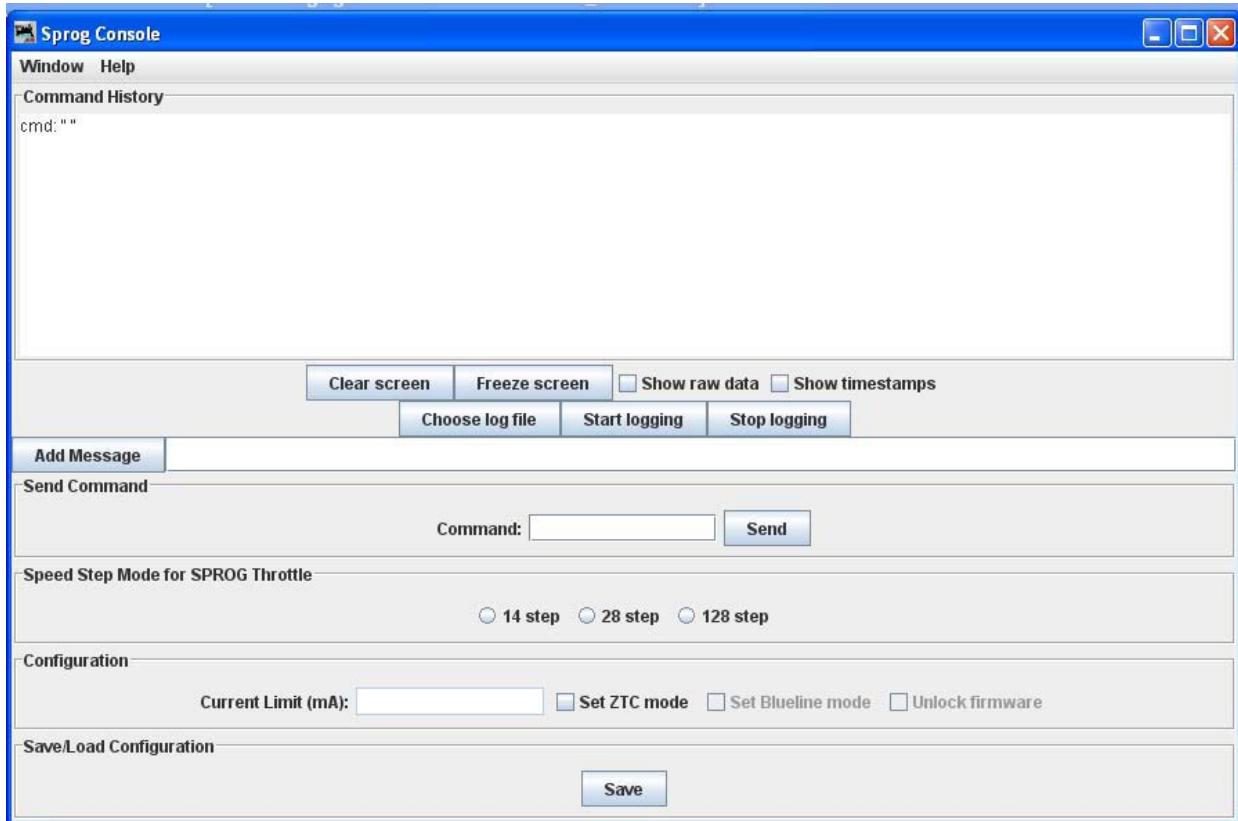
Opens the Send prompt with a text box to enter the **Command** message that will be sent to the DCC system when you click on the **Send** button.



## Console

The Console combines the Communications Monitor, Send Command and other features into a single interface.

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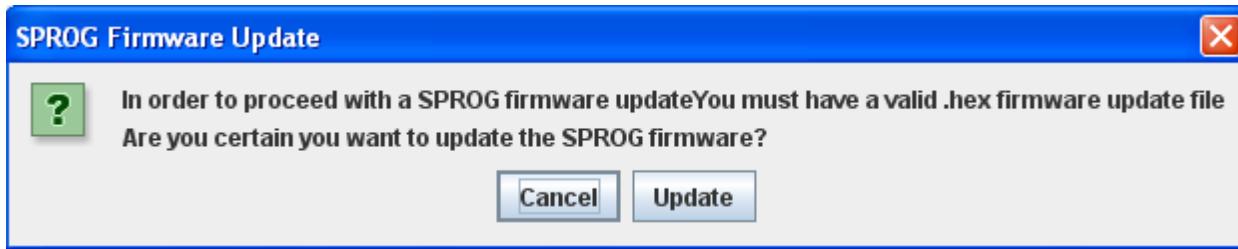


## Get SPROG Firmware Version

Retrieves the SPROG firmware version and displays that information.

## SPROG V3/V4 Firmware Update

Starts the SPROG Firmware Update wizard.



## SPROG II Firmware Update

Starts the SPROG II Firmware Update Wizard (basically the same as above)

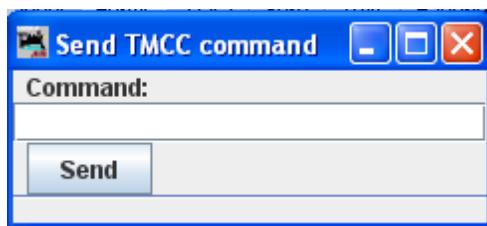
## TMCC Menu

### TMCC Monitor

Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

### Send Command

Opens the Send TMCC command prompt to send a command to the DCC system by typing in the **Command** text box and clicking the **Send** button to send the command.



## Wangrow Menu

### Command Monitor

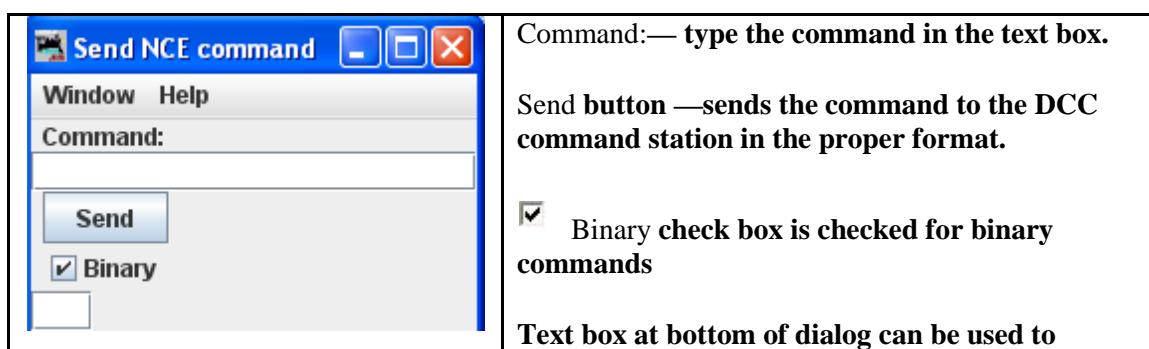
Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

### Send Command

Opens the NCE Command Generator, Whose binary commands are designed to work in a computer friendly mode.

Command format (cmd number) (data) (data) ...

Commands range from 0x80 to 0xBF



override the number of bytes sent.

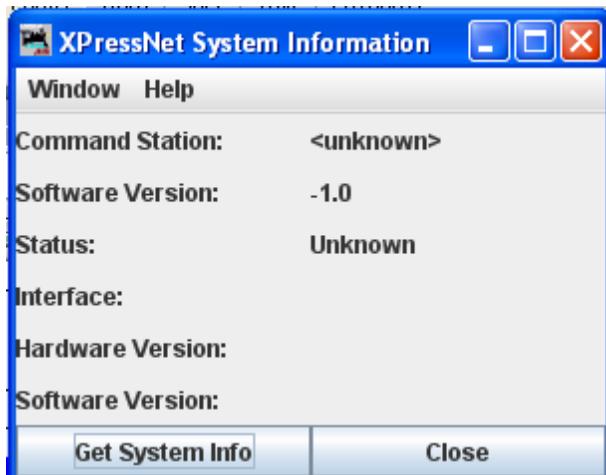
## XpressNet Menu

### XpressNet Monitor

Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

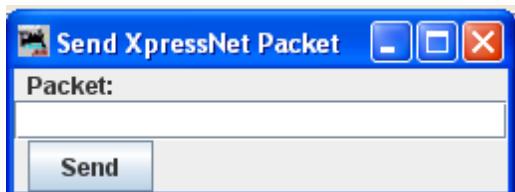
### XpressNet System Information

Click on the to query the system (Lenz or other) for system information that will be displayed in the dialog. Click on to close the dialog.



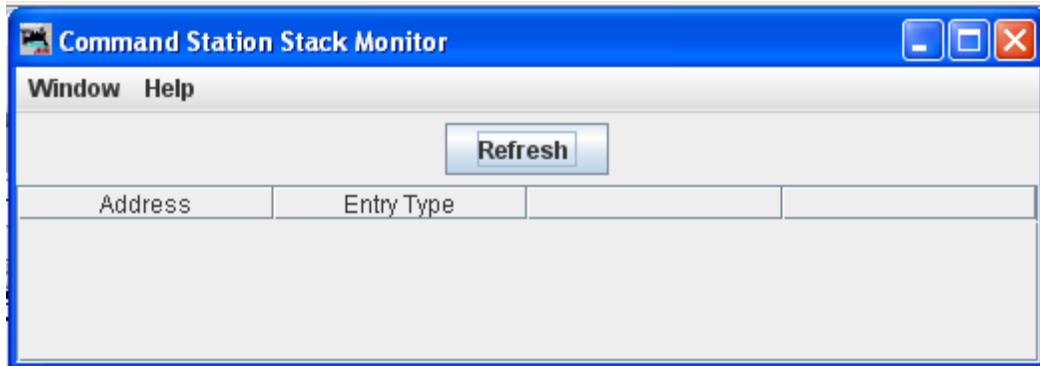
### Send XpressNet Command

Opens the Send XpressNet Packet prompt so that you can type in a Packet: and click on the to transmit via XpressNet to your system.

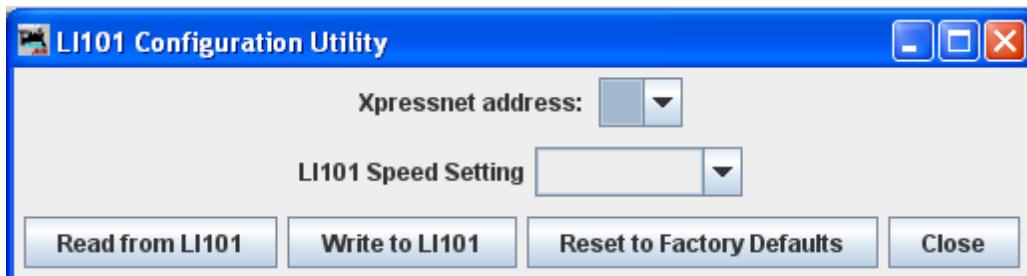


## Command Station Database Manager

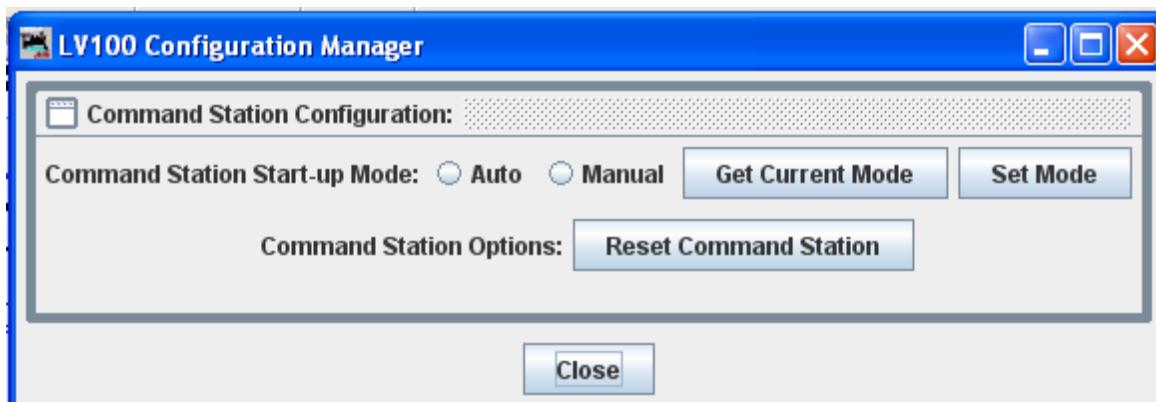
Click the **Refresh** button to update the display to the current information.



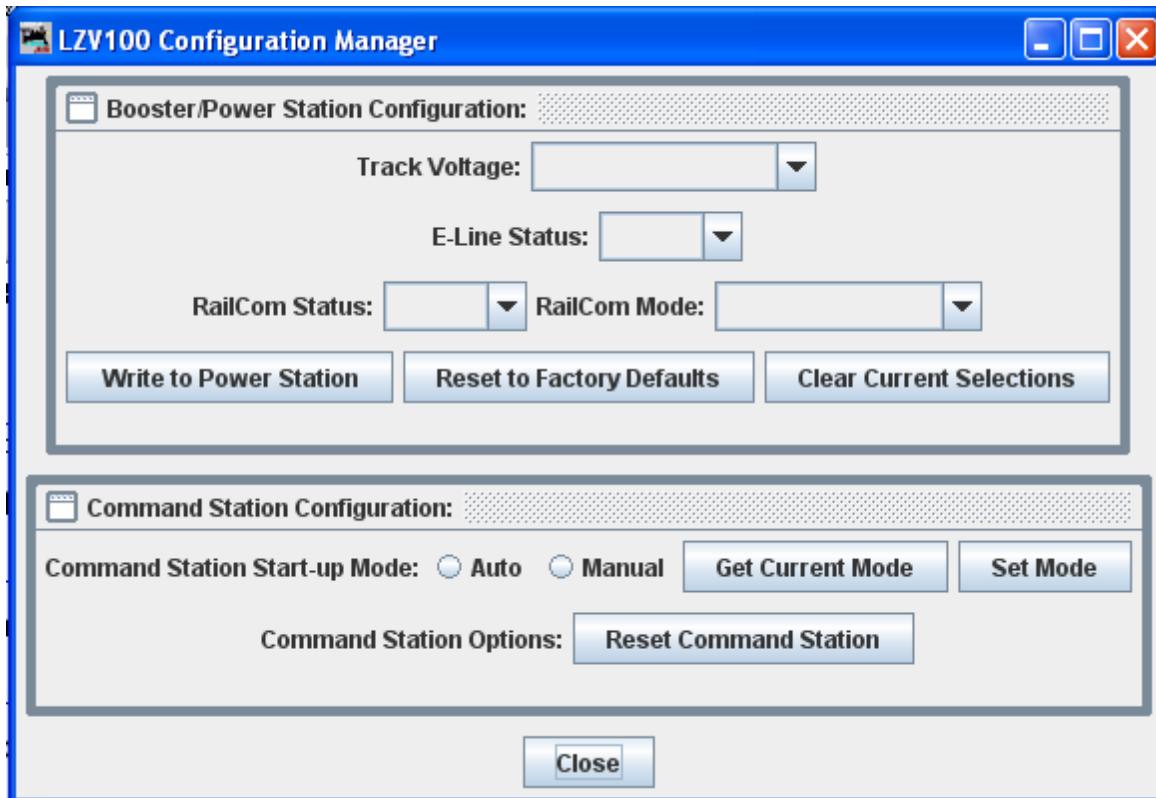
## LI101 Configuration Manager



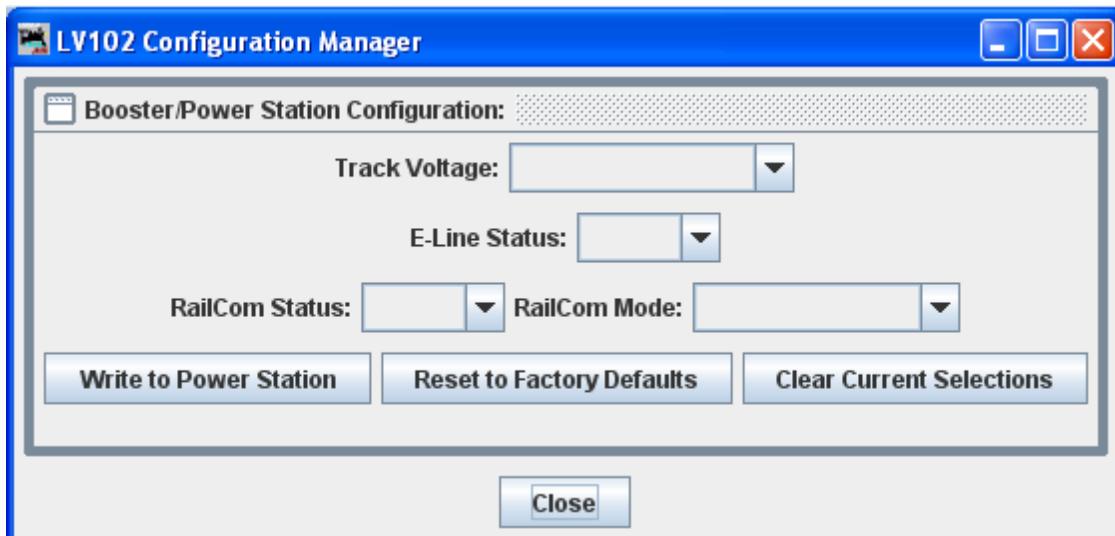
## LZ100 Configuration Manager



## LZV100 Configuration Manager



## LV102 Configuration Manager



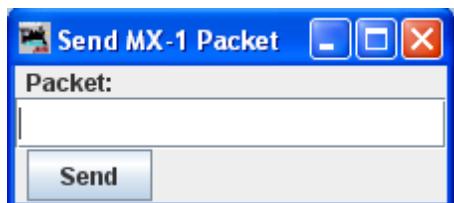
## Zimo Menu

### Command Monitor

Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

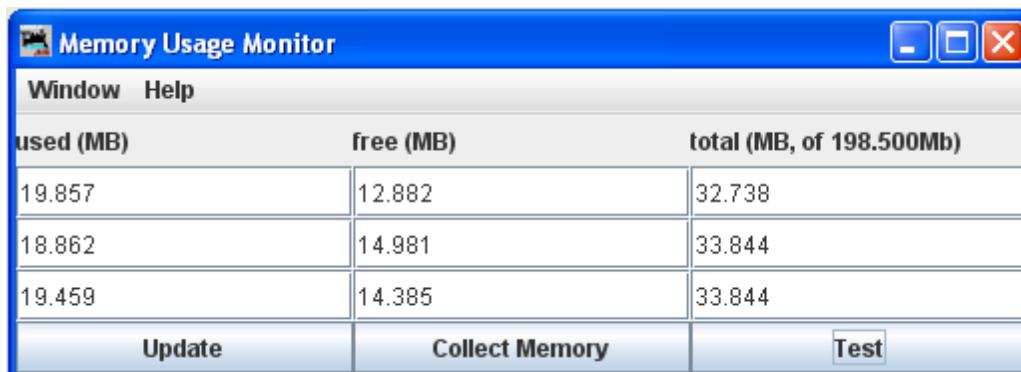
### Send Command

Opens the Send prompt with a text box to enter the Packet message that you want to sent.



### DEBUG MENU

### Memory Usage Monitor



There are three columns in the display at the top of the panel:

- **used (MB)** - the amount of memory currently in use.
- **free (MB)** - the amount of memory currently allocated to JMRI, but not in use, free for later use.
- **total (MB, of 198.500 Mb)** - the total memory available to JMRI.

The buttons located at the bottom each column:

- **Update** button - puts a new series of values in the bottom row of the memory display and moves the old values up one row.

- **Collect Memory** button - reduces the amount of used memory to the minimum possible by asking Java to run a garbage collection.
  - **Test** button - Runs a test of the memory allocation and collection process ( not used by regular users)
- 

## Import Decoder File

Opens your operating systems **Open** dialog to open to locate a decoder definition file to install in DecoderPro®.

## Import Decoder URL

Opens an **Input** prompt in which you type an URL of a file to download and install a decoder definition file in DecoderPro®..

## Recreate Decoder Index

After adding a decoder definition, updates the decoder index that is used by the Programmers in DecoderPro®.

## Recreate Roster Index

After importing a new roster file, updates the roster index used by DecoderPro®.

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## Check XML File

Opens the operating systems **Open** dialog, and checks the syntax of the selected XML file and either displays an information box with OK or the line number of the error message. Used when you create your own decoder definition.

## Validate XML File

Opens the operating systems **Open** dialog, and Validates the selected XML file against the DTD for that file and either displays an information box with OK or an error message. Used when you create your own decoder definition or modify any XML file used in DecoderPro®.

## Check Decoder Names

Opens the **Open** dialog from which you may select a decoder definition file that will be checked for standard names and lists the items contained in the file that do not have standard names. These are not errors, but they will not show up in the Comprehensive Programmer. To display they must be put in a pane in the decoder definition. Used when you create a decoder definition.

## Check Programmer Names

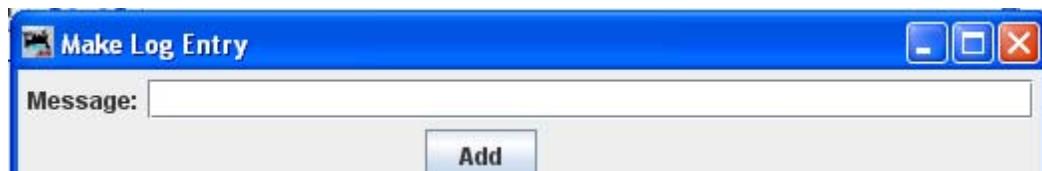
Opens the **Open** dialog from which you may select a programmer definition file that will be checked for standard programmer names and lists the items contained in the file that do not have standard names. This feature is used when developing your custom programmers.



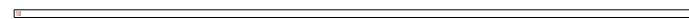
## Load Logixs Disabled

Will disable Logixs when loaded by the Panels menu.

## Log Message



**Message:** Type your message and then click the **Add** button to add to the log file.



## PRICOM

- PRICOM Packet Tester
- Connect—

### *PRICOM Pocket Tester*

The DCC Pocket Tester is portable, reliable, and accurate way to test and verify the DCC Protocol. It can be connected to your serial port to monitor traffic from DecoderPro®.

### *Pocket Connection Tester dialog*



With the pocket tester connected to your COM n port, you may select the that COM port from the **Sserial port** drop-down list. The speed that you want to use for testing can be selected from the **Speed** drop-down list. click on the **Open** button to open the connection. This opens the Pocket Tester Connection window.



The middle pane shows options to select the packets that you wish to view.

- Show All**
- Only Show Accessory Decoder Packets**
- Only Show Mobile Decoder Packets**

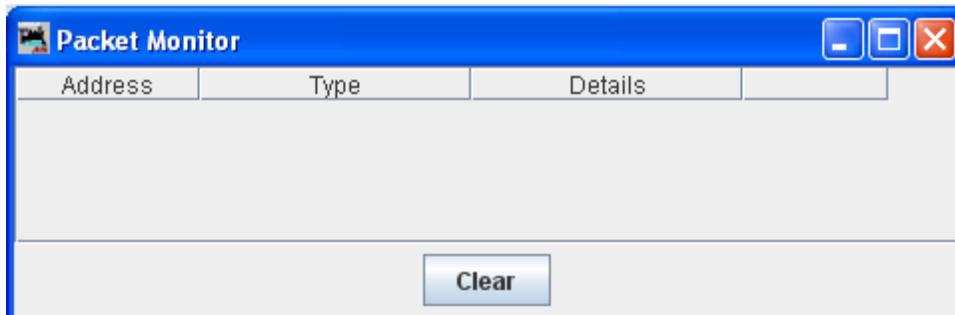
**Init** button initializes the tester..

**Get Version** button queries the tester for its version information.

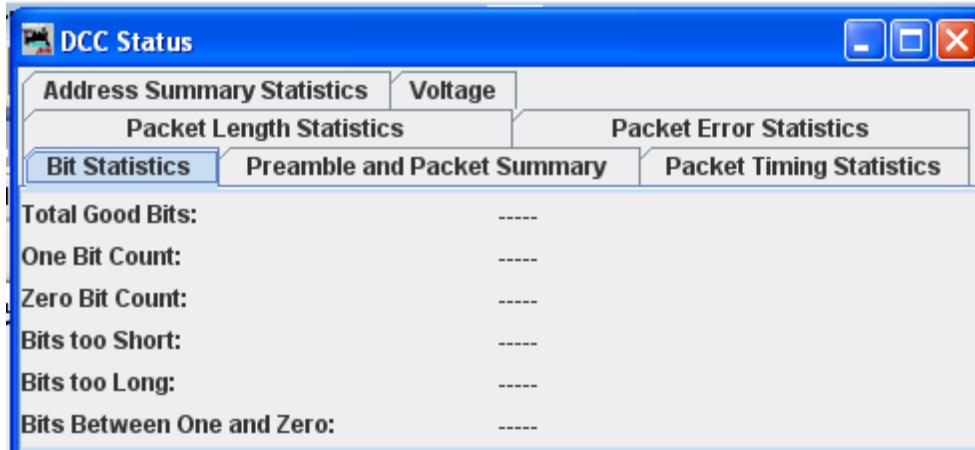
**Open New:** (at the bottom of window)

**Traffic Monitor** button—opens the [Monitor window](#).

**Packet Table** button—Opens the **Packet Monitor** window.



**DCC Status** button—Open the DCC Status window.



- *PRICOM Flash Update*

Opens the **PRICOM Flash Updater** window to facilitate updating the firmware.

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## USB Input Control

The [USB Input Control window](#) lets you connect JMRI sensors and memories to USB input devices on your computer. For example, you could have a JMRI sensor go ACTIVE when you type a key or press a joystick button. You can then use [Routes](#) and [Logix](#) to use that USB input to control your layout.

## USB Device Viewer

Allows user to view USB devices in use.

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## Rail Driver Throttle

Opens a Throttle window that is designed to work with Rail Driver

( <http://jmri.sourceforge.net/help/en/html/hardware/raildriver/index.shtml> ).

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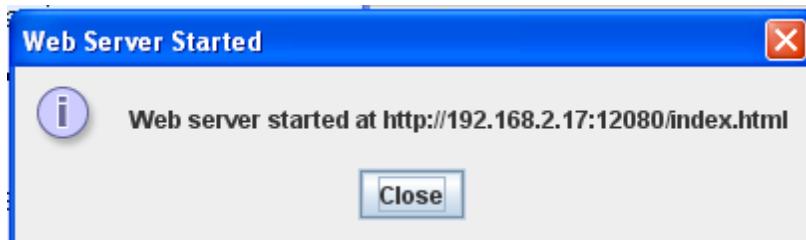
## Start Mini Web Server

Starts a Web Server on your computer. You can access the Index.html page using the URL displayed in the dialog.

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The JMRI mini web server ( <http://jmri.sourceforge.net/help/en/html/web/index.shtml> ) is meant to be a quick and easy way for model railroaders, not Masters of the Web, to get a web connection to JMRI up and running.



### ***WINDOW MENU***

#### **Minimize**



**DecoderPro®**

**Power Control**

**Throttle**

Shows all DecoderPro® windows that are open, active windows will be checked.

### ***HELP MENU***

**Window Help...**

Displays help that for the current window.

**General Help...**

Displays general information about DecoderPro® and other JMRI programs.

**License...**

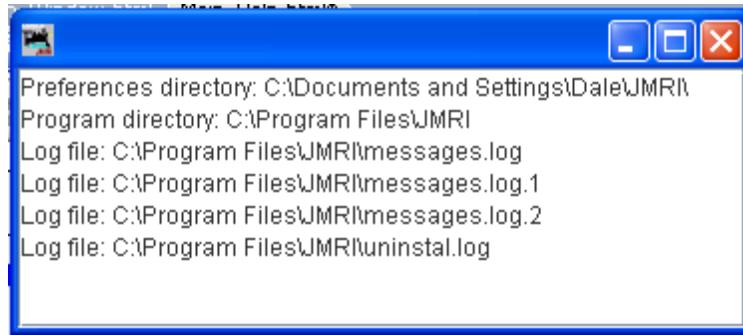
Displays the License agreement under which JMRI operates.

**Locations...**

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Opens an information box showing the location of JMRI programs and files related to DecoderPro®.



Context...

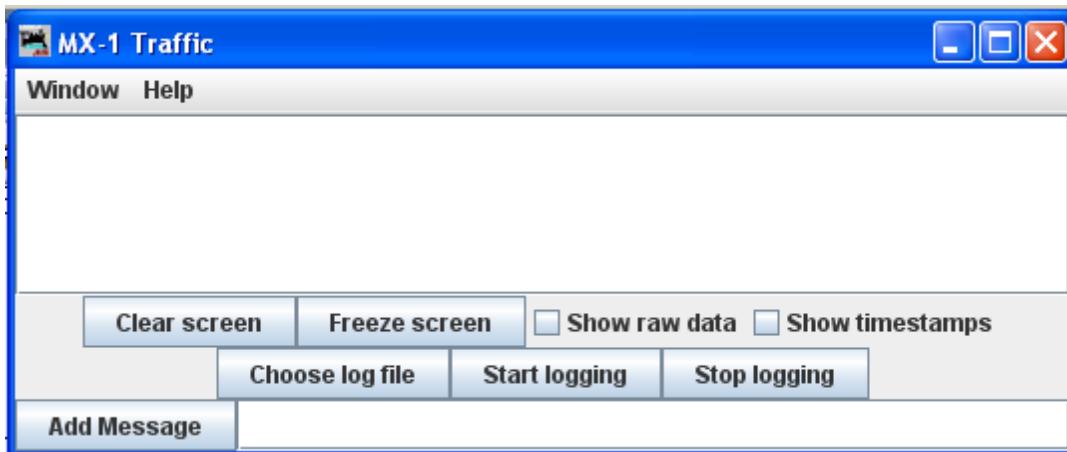
Opens a window that shows the configuration setting for your DecoderPro® installation.

### *COMMUNICATIONS MONITOR WINDOW*

DecoderPro® provides a communications monitor window so that you can see what is happening on the communications link between the program and the layout hardware.

When the monitor window opens, it will automatically display all traffic on the communications link.

The Title bar will display the *name* of your DCC systems communications link.



The messages that are sent and received over the communications link are displayed in the main pane of the window.

#### **Controls at the bottom of the window.**

**Clear screen** button— Erases the log area of the screen where the messages are displayed.

**Freeze screen** button—Stops acquiring new information, so that the captured information stops scrolling.

**Show raw data**—Normally, the monitor displays the program's interpretation of what it's seeing. If you want to see the raw bytes, check this box.

**Show timestamps**—Normally, the program just displays the data from the communication link.. If you would like each message to be preceded by the time it was sent or received, check this box.

## Logging to a File

Sometimes, it is useful to capture the events that are happening. If a problem occurs, then the information capture in the log file can be sent to the group for analysis of the problem. Small amounts of information can be copied from the display pane of the monitor window. If more information is needed than is provided by the window, you need to write the information to a log file on your computer's disk.

To do this:

1. Click the **Choose log file** button. This opens a **Save** dialog on your computer, locate the folder where you would like to save the log file, give the log file a name ( if you use the name of an existing file, it will be overwritten). Click on **Save** button.
2. When you are ready to capture the data that you want to save, click on the **Start logging** button on the monitor window.
3. When done, click the **Stop logging** button to store the data and close the file.

## Adding Messages to Log File

Type your message in the Add Message text box, then click on the **Add Message** button to add your message to the log file.

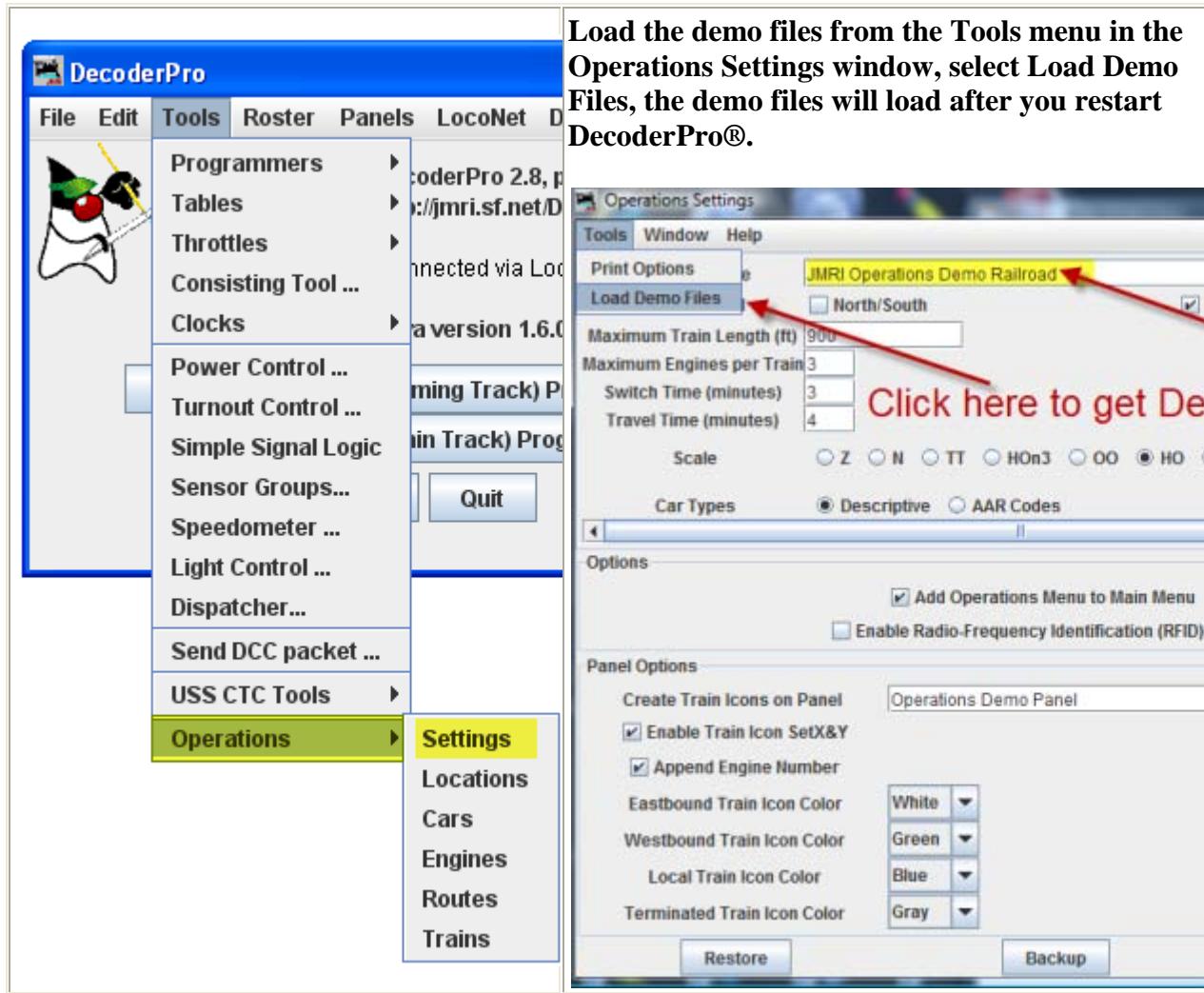
## CHAPTER 8 – OPERATE TRAINS

### *WHAT DOES OPERATIONS DO?*

The operations program allows you to build computer generated car manifests for your railroad. A manifest or switch list defines where a car is located on the railroad and how and where it should be eventually positioned on the railroad. The program allows you to build a roster of cars, define locations on the railroad, and routes for trains to travel. The car roster includes information about the car, including road name, type of car, color, length, date built, and its owner. Trains are assigned routes that define locations where cars can be picked up or dropped. Features include the ability to define what car types and car road names a location can service, the available track space for a location, and the maximum length the train can be between any two locations on the route. Locations can have sidings, yards, staging and interchange tracks. Optionally, trains can be configured to require a caboose or car with FRED. The program generates car manifests for each train and optionally for any location. The program can also place icons representing trains on a JMRI panel. The icon can be taught to move in the panel along with the train from location to location.

### *Operations Demo Files*

The operations program provides a set of demo files to help introduce you to some of the features and capabilities of this program.

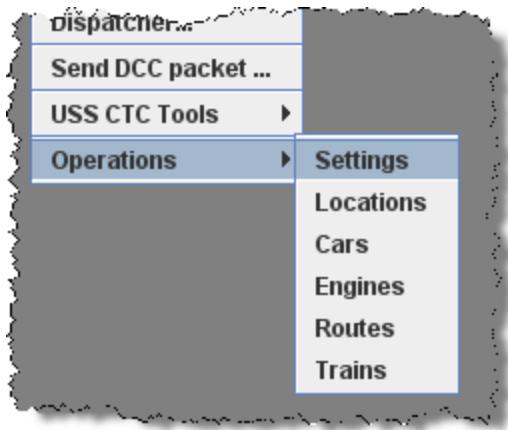


The program will create a backup of your current configuration if you have one, and then load the demo files. Restart JMRI to complete the demo load process. To get rid of the demo files, use the Restore function to reload the first backup date, which is the blank entry form.

The program also supplies a simple panel to show how the train icons work. Load the panel before building the trains by selecting in the main JMRI menu, "Panels->Load Panels .." a window should appear and open the "operations" directory and then open the "Operations Demo Panel" xml file.

## *Quick Start*

In the Main DecoderPro® menu Select Tools menu.



There are six items in this menu. It is recommended that you start with **Settings** and work your way down to **Trains**. We also recommend that when defining your locations that you first use yard and siding tracks, and try staging and interchange tracks when you're more comfortable with how the program operates.

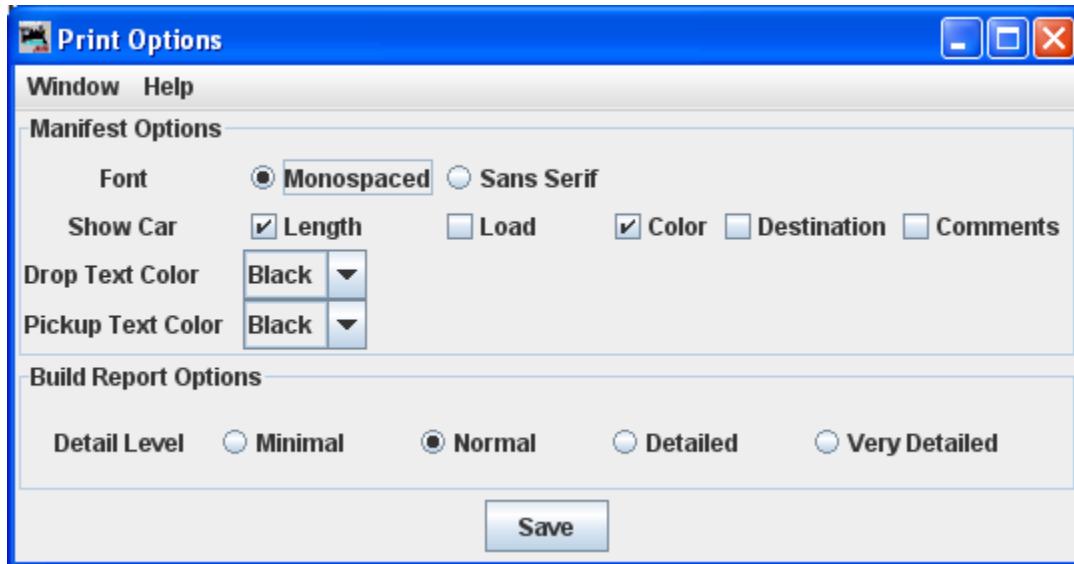
### ***British Railways***

The program supports an alternate set of railway terminology for our British modelers. To use British terminologies, go to the JMRI Advanced Preferences (Edit->Preferences.. select the Show Advanced Preferences checkbox) and select English (United Kingdom) in the "Locale:" menu box. The program will also convert from centimeters to meters when entering wagon, locomotive, or location lengths, just append "cm" to any length.

### ***OPERATIONS SETTINGS WINDOW***

In the **Tools** menu you may select the [Print Options...](#) opens the Print Options Window. You can modify the how the program prints the train manifests and the amount of detail that the build report provides.

## OPERATIONS PRINT OPTIONS



You can modify the how the program prints the train manifests and the amount of detail that the build report provides.

### Manifest Options

**Font**  **Monospaced**  **Sans Serif**

The program supports two types of fonts for printing. Select the desired font.

**Show Car**  **Length** Shows the car length in your manifests and switch lists.

**Load** optional show whether the car is empty or loaded.

When a car is delivered to a siding the load state will change. You can also create your own loads but there are restrictions. Cars with **loads** other than empty or loaded can only be serviced by sidings with a [Schedule](#). It is strongly recommended that you not create your own loads until you become very familiar with how the program works. For many operators, showing whether the car is empty or loaded adds just enough realism to their operations.

**Color** Select if you want the car's color shown in your manifests and switch lists.

**Destination** If you want your manifest and switch lists to show the cars destination when picking it up. The program always provides the car's destination when dropping a car from the train.

**Comments** For each car or engine in your roster, you can have an optional

comment. Adds comment added to your manifest and switch lists,

**Drop Text Color**  You can select the text color of your manifest when the operation is to drop off a car.

**Pickup Text Color**  You can select the text color of your manifest when the operation is to pick up a car.

## Build Report Options

**Detail Level** You can adjust the amount of information that the build report will show. Select one of the four levels. The program when generating the build reports stores the **Very Detailed** information to disk.

- Minimal** -- provides the least amount of information.
- Normal** -- setting shows which engines and cars are being excluded from the train, and which engines and cars are being picked up and dropped.
- Detailed** -- setting will generate quite a few pages depending on the size of your railroad. It will show all available cars and engines, and a bit how the program finds destinations for the cars and engines.
- Very Detailed** -- setting produces the most pages, and will show why cars are not picked up or dropped.

Be sure and press  after changing the build report selection.

## Build Report Details

You can adjust the amount of information that the build report will show. Select one of the four levels using the radio buttons. The program when generating the build reports stores the "Very Detailed" information to disk. The radio buttons control how much of that data is actually printed. The "Minimal" radio button provides the least amount of information and "Very Detailed" provides the most. If you're only interested why a train won't build, the "Minimal" setting can provide you with this information. The "Normal" setting shows which engines and cars are being excluded from the train, and which engines and cars are being picked up and dropped. The "Detailed" setting will generate quite a few pages depending on the size of your railroad. It will show all available cars and engines, and a bit how the program finds destinations for the cars and engines. The "Very Detailed" setting produces the most pages, and will show

why cars are not picked up or dropped. Be sure and press  after changing the build report selection.

## *OPERATIONS LOCATIONS WINDOW*

The Operations Tool, Locations opens the Locations window as shown. Locations are places on your railroad that trains visit to pickup or drop off cars and engines. Locations can be cities,

towns, or just places where trains need to work cars. To enter a new location press  which will open the **Add Location** window which we will discuss in a moment. But first let's discuss the "Locations" window itself.



### **menu bar**

- **Tools**

- Print
- Preview
- [Schedules](#)

Opens the **Schedules** panel. If you would like to see cars delivered in a particular sequence, or with a specific load for delivery or shipping, the program allows you to apply a schedule to a siding. This is an optional feature and shouldn't be used until you become very familiar with how the program generates manifests and switch lists.

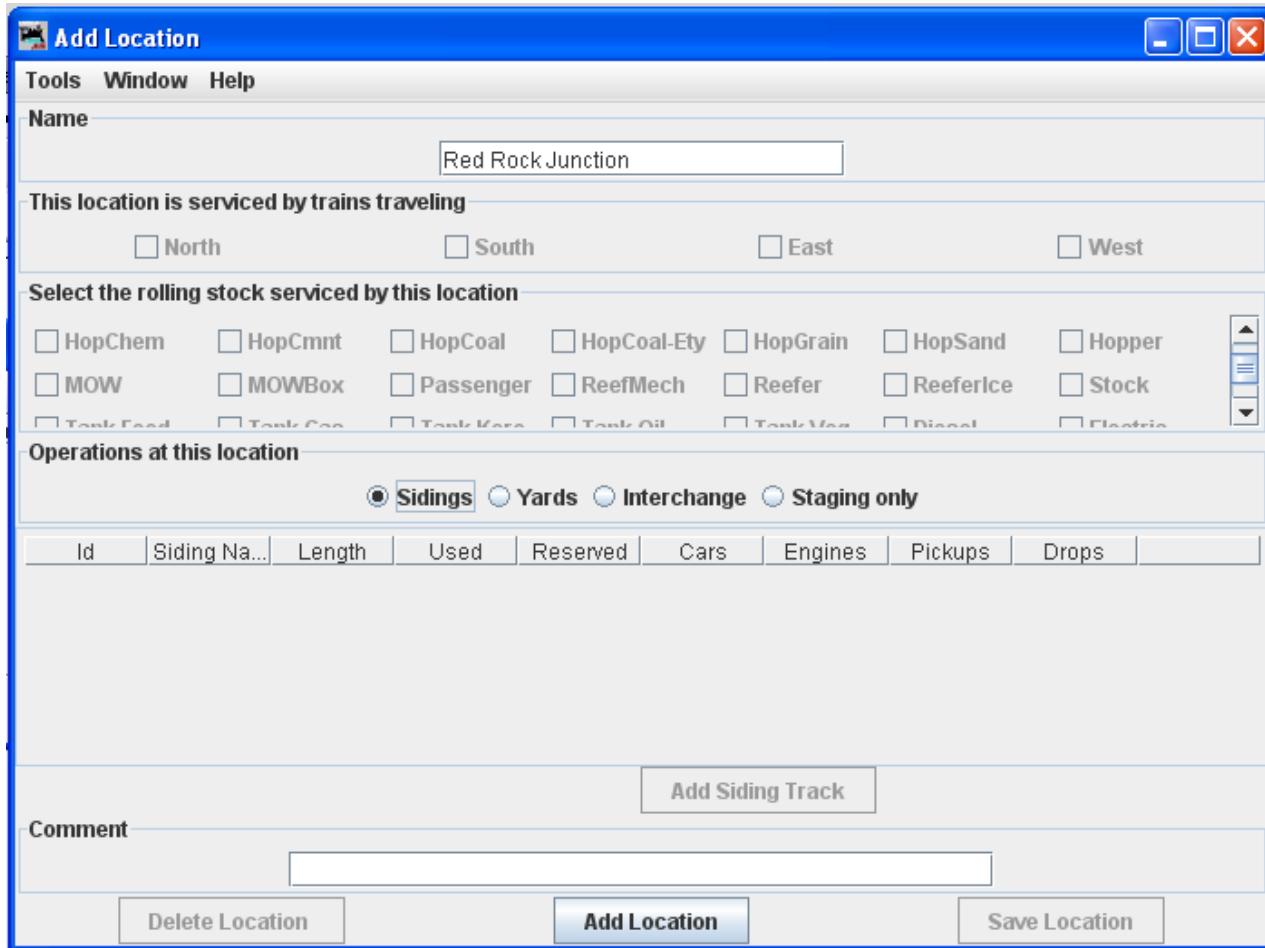
- Modify Locations -- Allows you to modify the location parameters.
- Show Cars -- Shows a listing of cars at this location.

  Sort by  Name  Id Sets the sort order for the locations

 Press to add a location

The **Add Location** window is opened. At this point only the Location Name and the type operation at this location entries are active.

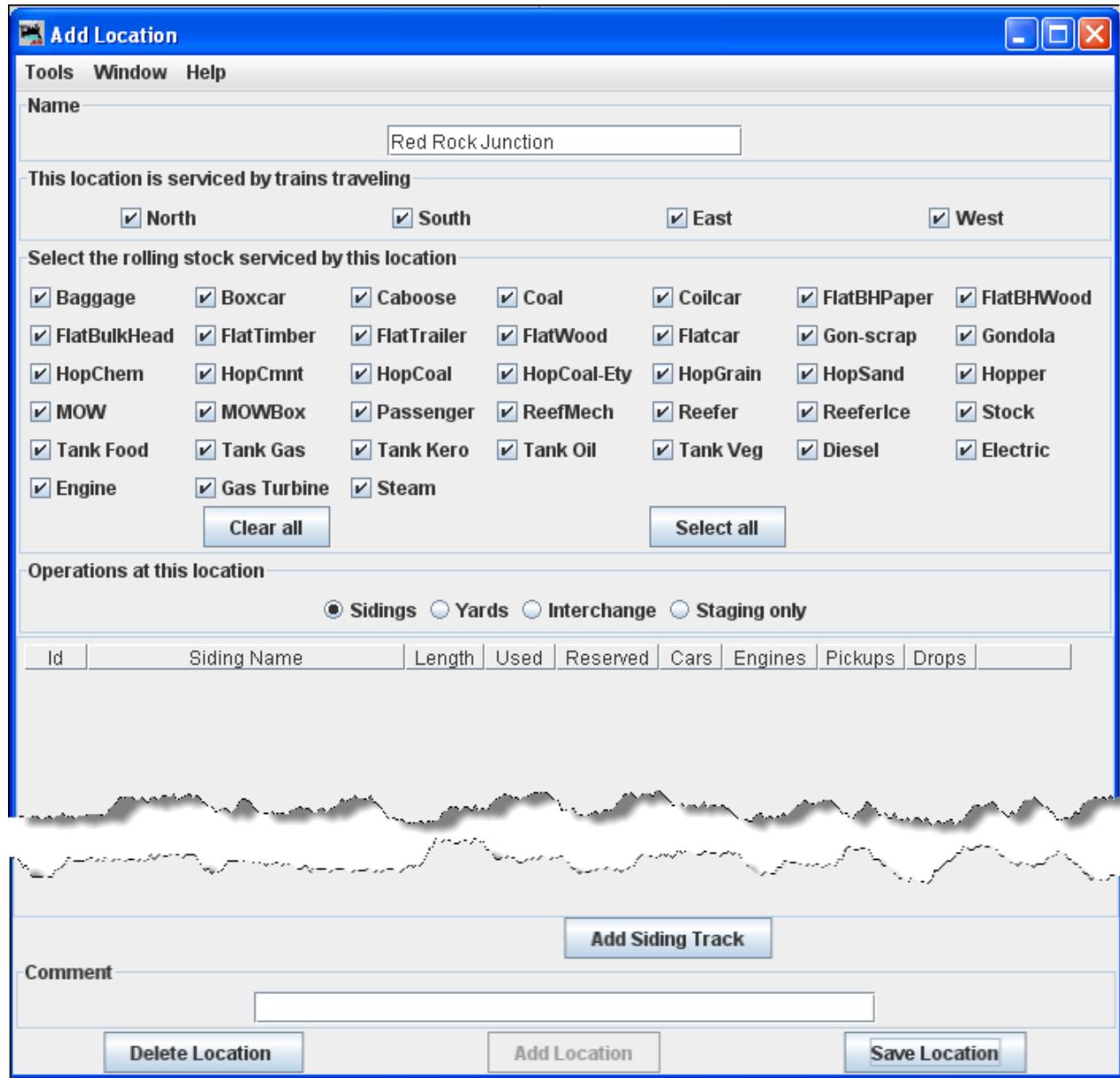
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**Name**  The location name must be unique; the program will not allow two locations with identical names. However, if you want more than one location to have the same name for your manifests and switch lists, add a hyphen and a number to the locations name. For example, **Boston-1** and **Boston-2** will print as **Boston**. The program will remove the hyphen and number when printing manifests and switch lists.

Press the  at the bottom of the panel. The various fields that were disabled should be enabled.

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Each location can have several yard, siding, interchange or staging tracks. Yards are where cars and engines are placed for temporary storage. A siding can be an industry or any place where a car is loaded or unloaded. For a train to service a location, there must be at least one track for that location. See below how to add tracks to your location.

The tables show the length of the tracks, the amount of track that is occupied (Used) by cars and engines, the total number of cars and engines (Rolling Stock) at each location, the number of cars and engines that will be picked up (Pickups) by trains, and the number of cars and engines that will be delivered (Drops) by trains.

**This Location is Serviced by Trains Traveling**  North  South  East  West  
You can decide which train direction the location can service. For example, if only south bound

trains can access the location select South and deselect the other directions. This can be useful if you want to only support trailing point switching for a given location. If a location can support multiple directions then select the ones that are appropriate.

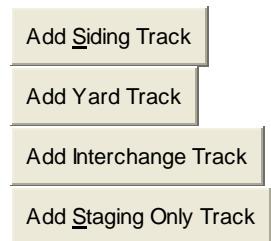
**Select the Rolling Stock serviced by this Location** You can control the rolling stock a location can service. Push the "Clear All" to deselect all types, or "Select All" to select all types, then select or deselect the rolling stock you wish the location to accept.

**Operations at this location**  Sidings  Yards  Interchange  Staging only

To add a location, press the "Add ... Track" button. Now enter the name of the location along with the length of the track in scale feet or in actual inches. Append a double quote ("") to the length when entering actual inches and the program will convert the length into scale feet.

Append cm if you want to convert from centimeters to meters. Press the "Add ... Track" button at the bottom of the panel and the disabled fields should now appear.

The  at the bottom of the window will change corresponding to the location added.



Each of these buttons opens a corresponding dialog to describe its function.

### **ROLLING STOCK SERVICED**

You can control what type of rolling stock the yard can service. Note that the yard rolling stock is restricted to the ones that the location can service. If the rolling stock that you wish doesn't appear for a yard, confirm that the location's rolling stock types are properly selected. If the rolling stock type you want doesn't exist for a location, you will have to create the type using the "Cars" panels, see [Cars](#) below.

### **ROAD NAMES SERVICED**

You can also restrict which roads a yard can service. Select "Accept Only" if you want to build a list of road names that the yard will accept. Select "Exclude" if you want to build a list of road names that you want to exclude from the yard.

### **COMMENT**

You can enter an optional comment for the yard.

### **SAVE YARD TRACK**

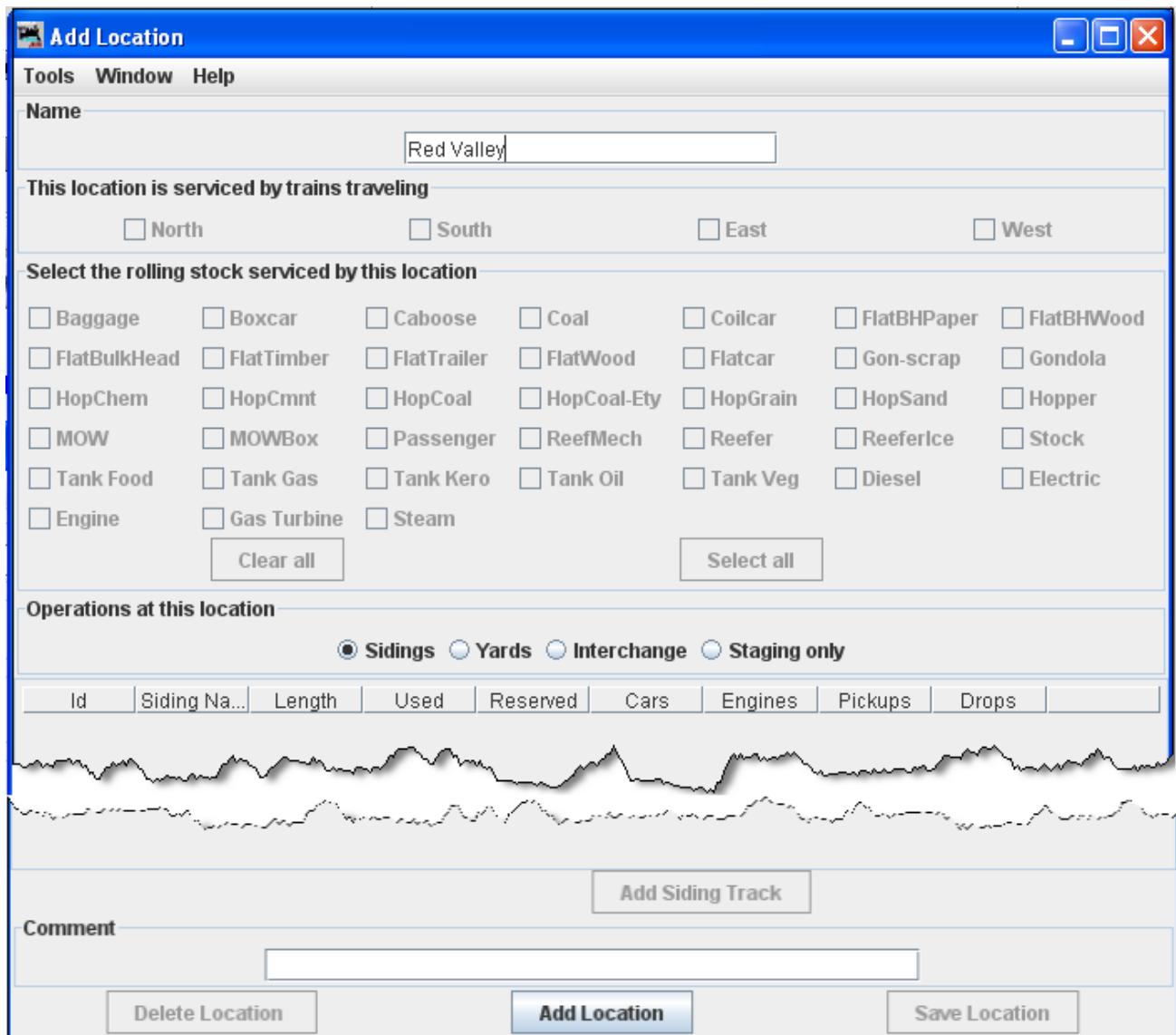
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Press the **Save Location** button to save your work. The program will create a file (OperationsLocationRoster.xml) in your JMRI directory in a folder called "operations". The program will also create a backup file containing the last settings for all of your locations.

## **ADD SIDINGS, YARDS, INTERCHANGE, OR STAGING ONLY(CORRESPONDING TO THE PRESENT TASK)**

To add a location , press the "Add ... (location)" button.

### **ADD SIDINGS**

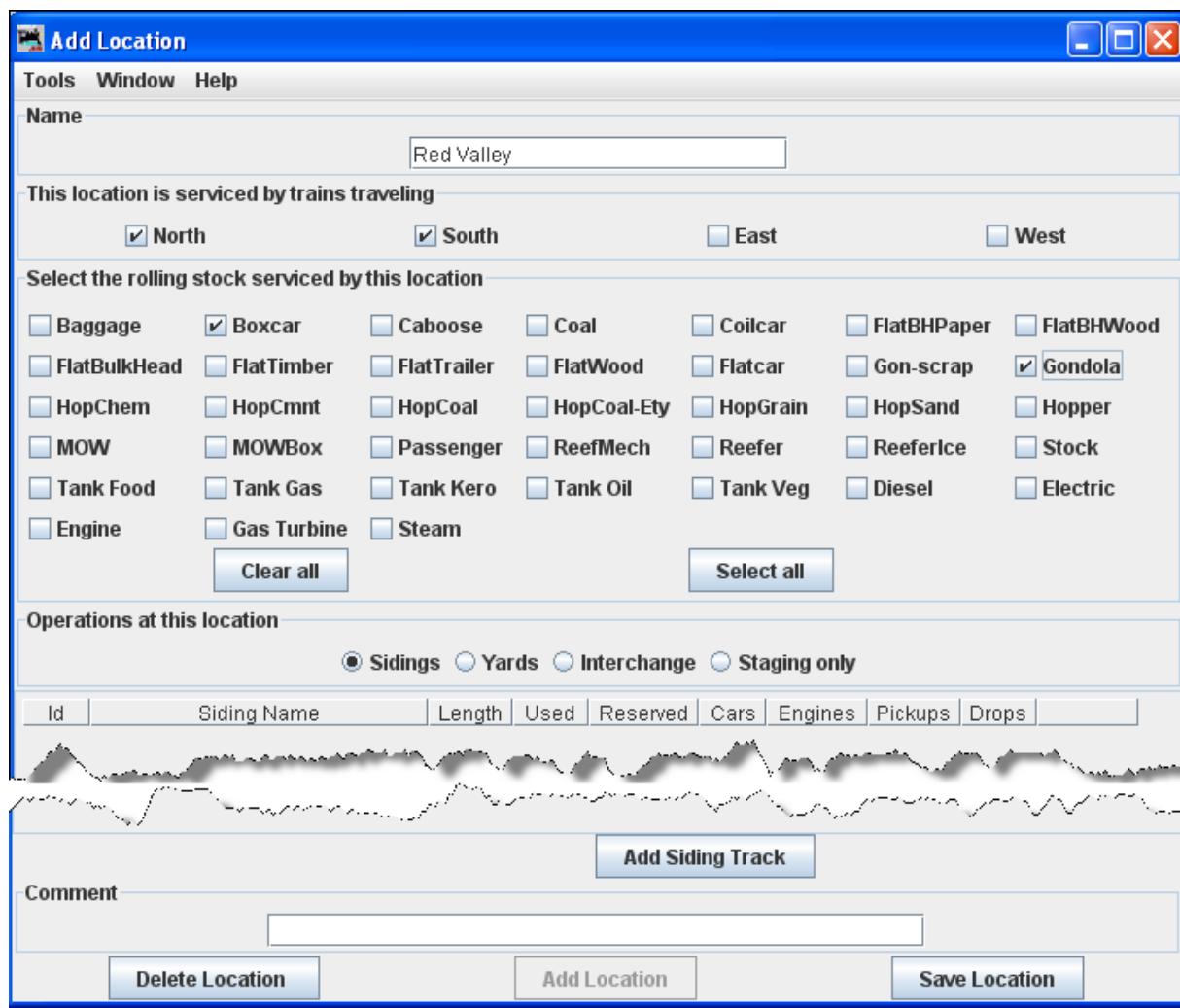


To add a location as a siding: in the **Add Location** window, type the **Name** [ ] of the siding location, note most of the window is greyed out until the location is added. The location name must be unique; the program will not allow two locations with identical names. However, if you want more than one location to have the same name for your manifests and switch lists, add a hyphen and a number to the locations name. For example, "Boston-1" and "Boston-2" will print as "Boston". The program will remove the hyphen and number when printing manifests and switch lists.

Now select **Operations at this location** [ ] **Sidings**, then press the **Add Location** [ ] at the bottom of the window.

A siding can be an industry or any place where a car is loaded or unloaded. For a train to service a location, there must be at least one track for that location.

This opens the **Add Location** window with all the options enabled.



You may select **This location is serviced by trains traveling**, select at least or any number of the directions depending on access to your siding. We have selected  North and  South

You can decide which train direction the location can service. For example, if only south bound trains can access the location select "South" and deselect the other directions. This can be useful if you want to support only trailing point switching for a given location. If a location can support multiple directions then select the ones that are appropriate.

**Local Switcher:** If you want only a local switcher to service a siding, deselect all of the direction boxes for that siding. The program will only allow a train that has one location in its route (local switcher) to service the siding. This would be useful if you wanted your trains to pick up and drop cars to a yard, and then have a local switcher move them to the town's sidings.

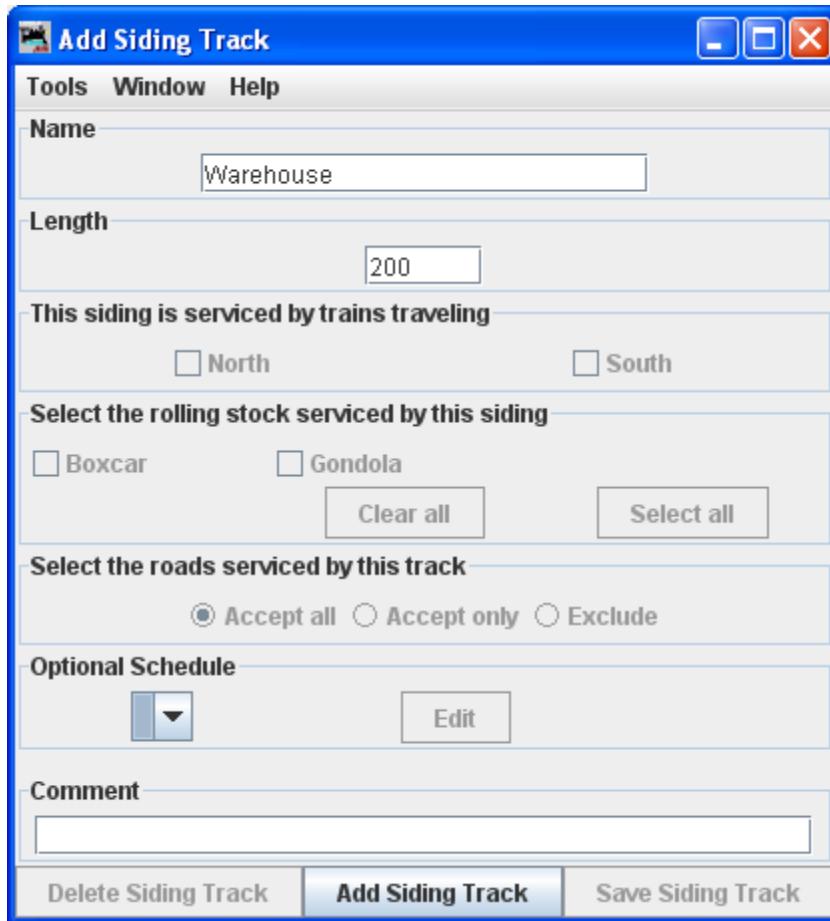
Next **Select the rolling stock serviced by this location**, note the  and  may be used to select. We have used the Clear All button and then selected  **Boxcar** and  **Gondola** for this location.

You can control the rolling stock a location can service. Push  the to deselect all types, or  to select all types, then select or deselect the rolling stock you wish the location to accept.

Since the **Operations at this location** is a  **Sidings** the  is now enabled near the bottom of the window.

We also have the option to  or

Press  then the **Add Siding Track** window is displayed, so that you can detail the siding



## In Name

type the specific siding track to be serviced at this location.

**Length**  of the siding track in scale feet. You may enter the measurement in actual inches as

6 and the program will convert to the scale feet that you select during setup.

Press

Add Siding Track | the siding track is added and the greyed out features are activated.

**Add Siding Track**

Tools Window Help

Name: Warehouse

Length: 200

This siding is serviced by trains traveling:

North       South

Select the rolling stock serviced by this siding:

Boxcar       Gondola

Select the roads serviced by this track:

Accept all     Accept only     Exclude

Optional Schedule:

Comment:

You may **Select the roads serviced by this track**

Accept all

Default accepts rolling stock from any railroad.

Accept only

Allows you to list the railroads whose rolling stock you will accept.

Exclude

Accept all rolling stock except from those railroads that are excluded.

We will use the default. If you want to edit the roads accepted go to [Select road serviced](#)

[Optional Schedule](#) may be edited.

You may enter a **Comment**

for the track.

You may now press [Save Siding Track](#) to add to the location or press

**Delete Siding Track**

if you do not want to store the track.

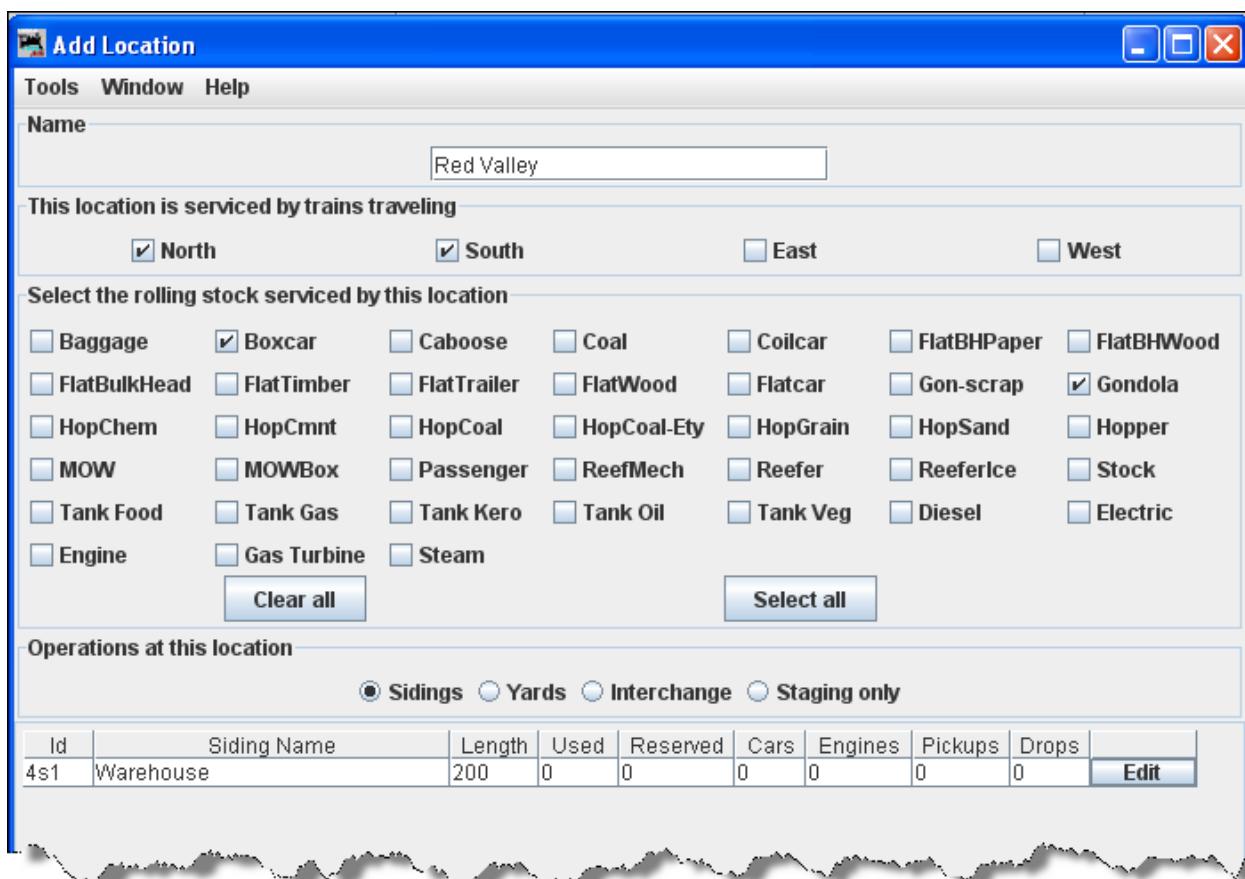
If you want to add another track to this siding location, then enter new data and Press

**Save Siding Track**

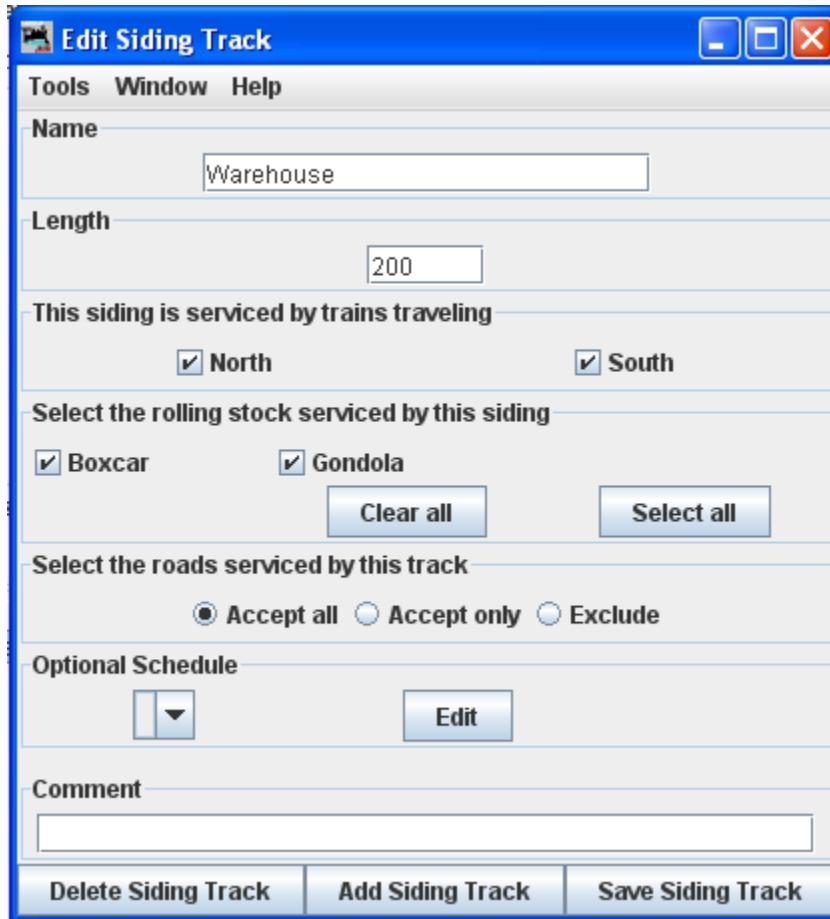
to add the track.

Close the window when done with this location.

The **Add Location** window shows one siding track at the Warehouse in Red Valley.



If you want to change information for any track entry, press **Edit** and the **Edit Siding Track** window will open.



Note that it is identical to the Add Siding Track except for the title.

Change any of the entries that you want to edit and then press the

**Save Siding Track**

to save the changes.

You may also

**Delete Siding Track**

from your data base.

When done with editing close the window.

The Locations window shows all the locations in your database.

You may Edit any one of them, which opens the **Edit Location** window, which is the same as the [Add Location](#) window except it contains the info for the location you are editing.



You may add as many locations and track as you need to complete the description of your layout.

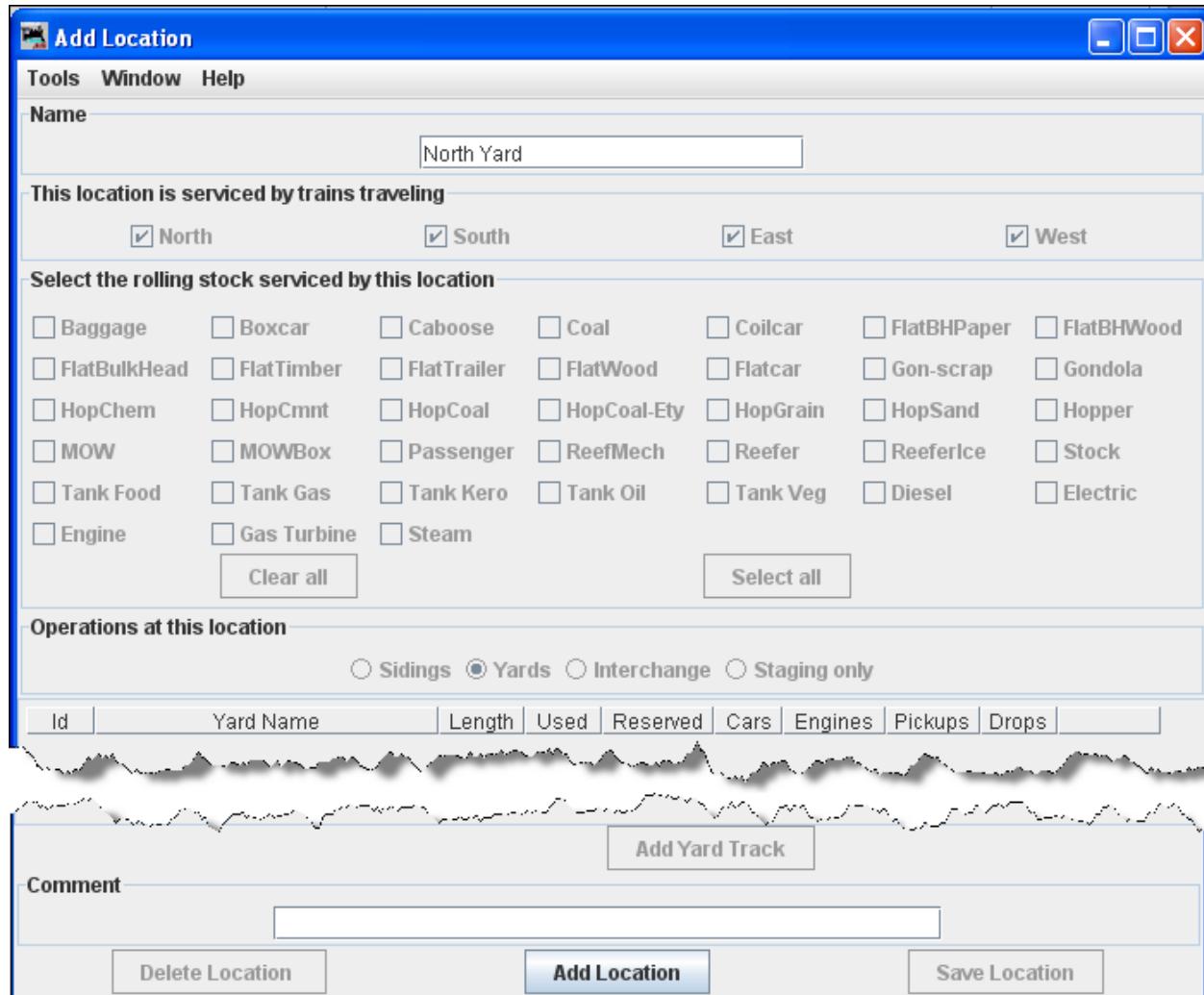
## **ADD YARDS**

Add [Location as Yards](#) and the **Add Location** window will be displayed.

A **classification yard** (US and Canada) or **marshalling yard** (UK and Canada)(including **hump yards**) is a railroad yard found at some freight stations, used to separate railroad cars on to one of several tracks. First the cars are taken to a track, sometimes called a **lead** or a **drill**. From there the cars are sent through a series of switches called a **ladder** onto the classification tracks. Larger yards tend to put the lead on an artificially built hill called a **hump** to use the force of gravity to propel the cars through the ladder.

Freight trains that consist of isolated cars must be made into trains and divided according to their destinations. Thus the cars must be shunted several times along their route in contrast to a unit train, which carries, for example, automobiles from the plant to a port or coal from a mine to the power plant. This shunting is done partly at the starting and final destinations and partly (for long-distance-hauling) in classification yards.

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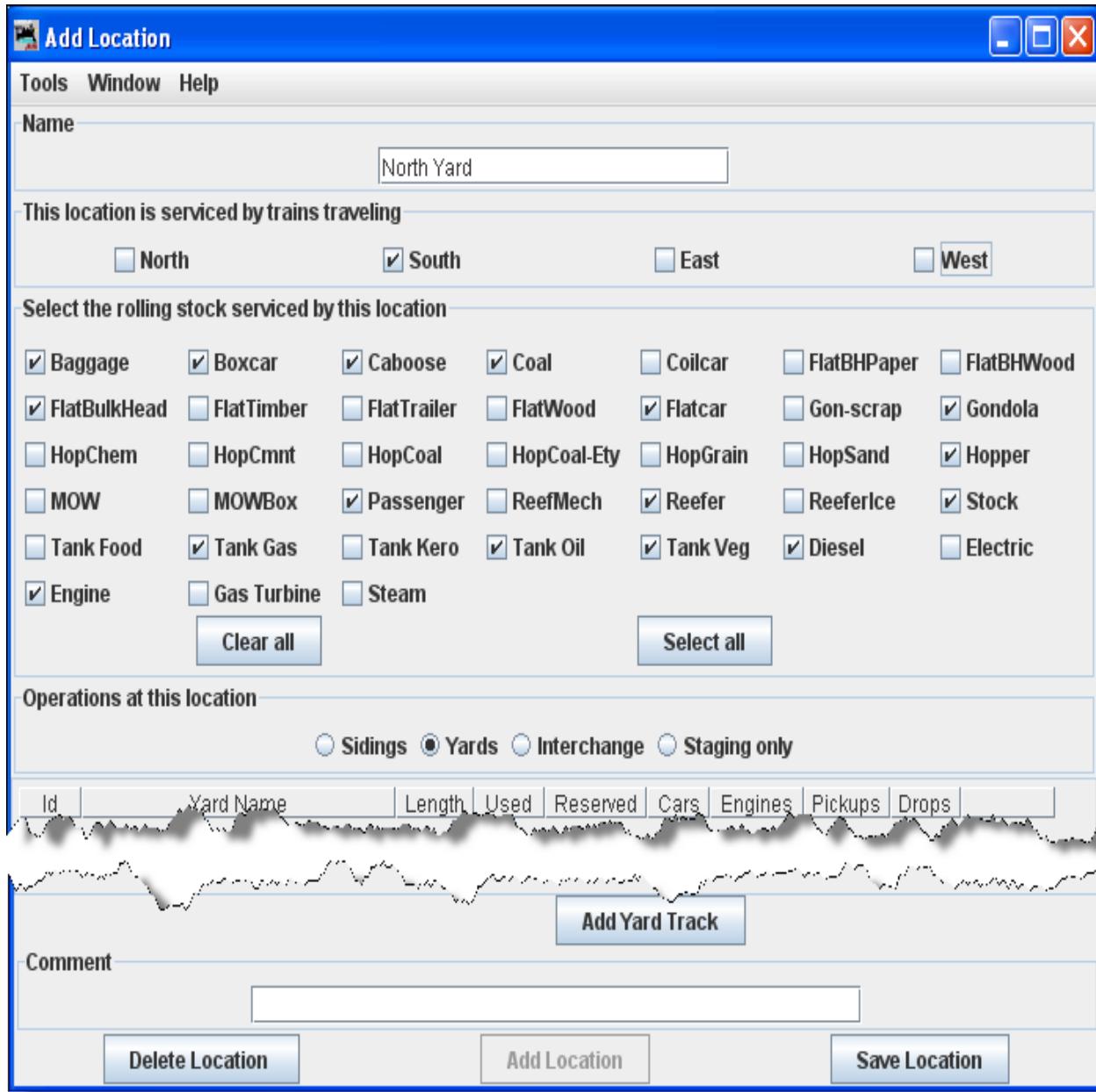


To add a location as a Yard: in the **Add Location** window, type the **Name** [ ] of the Yard location, note most of the window is greyed out until the location is added. The location name must be unique; the program will not allow two locations with identical names. However, if you want more than one location to have the same name for your manifests and switch lists, add a hyphen and a number to the locations name. For example, "Boston-1" and "Boston-2" will print as "Boston". The program will remove the hyphen and number when printing manifests and switch lists.

Select **Operations at this location** [ ] **Yards**, then press the **Add Location** [ ] at the bottom of the window.

A yard will contain several tracks that must be defined.

This opens the **Add Location** window with all the options enabled.



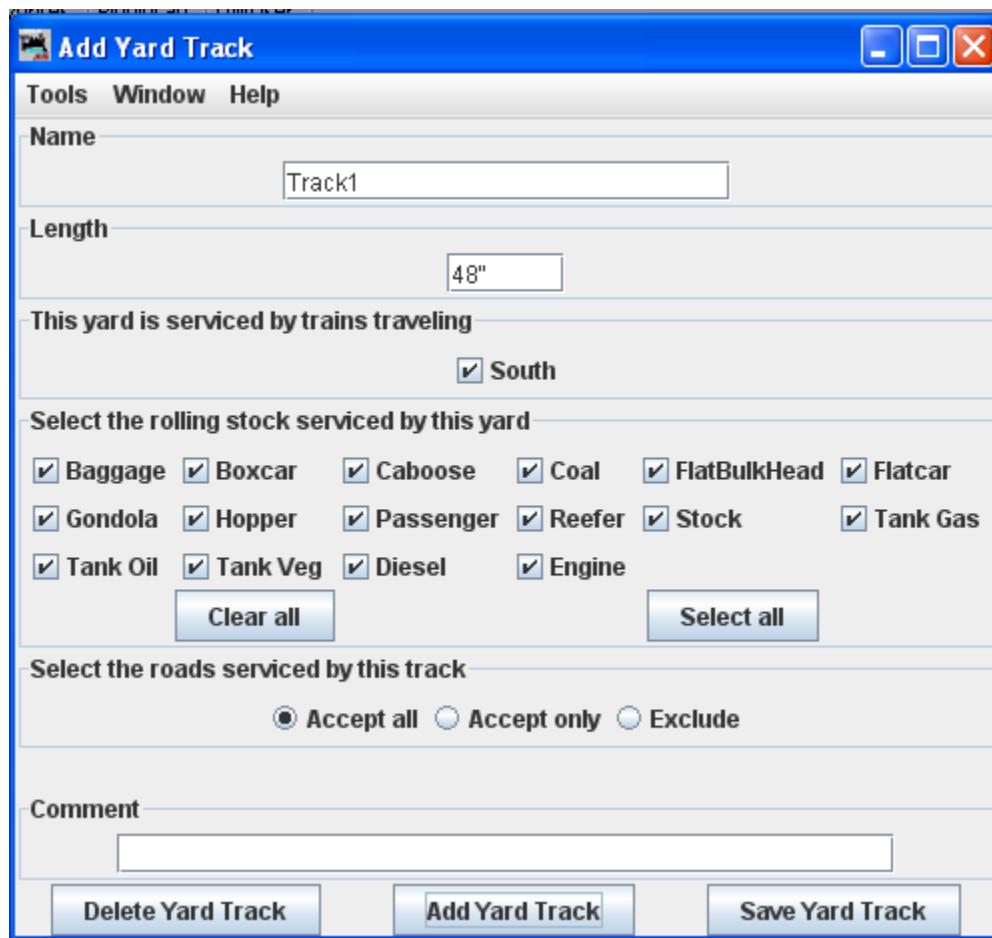
You may select **This location is serviced by trains traveling**, select at least one or any number of the directions depending on access to your siding. We have selected  South, since this is the North Yard. You can decide which train direction the location can service. For example, if only south bound trains can access the location select "South" and deselect the other directions.

Next **Select the rolling stock serviced by this location**, You can control the rolling stock a location can service. Push  to deselect all types, or  to select all types, then select or deselect the rolling stock you wish the location to accept.

Since the **Operations at this location** is a  **Yards** the  is now enabled near the bottom of the window.

We also have the option to  or

Press  then the **Add Yard Track** window is displayed, so that you can detail the siding.



In **Name**  type the specific siding track to be serviced at this location.

**Length**  of the Yard track in scale feet. You may enter the measurement in actual inches as  and the program will convert to the scale feet that you select during setup.

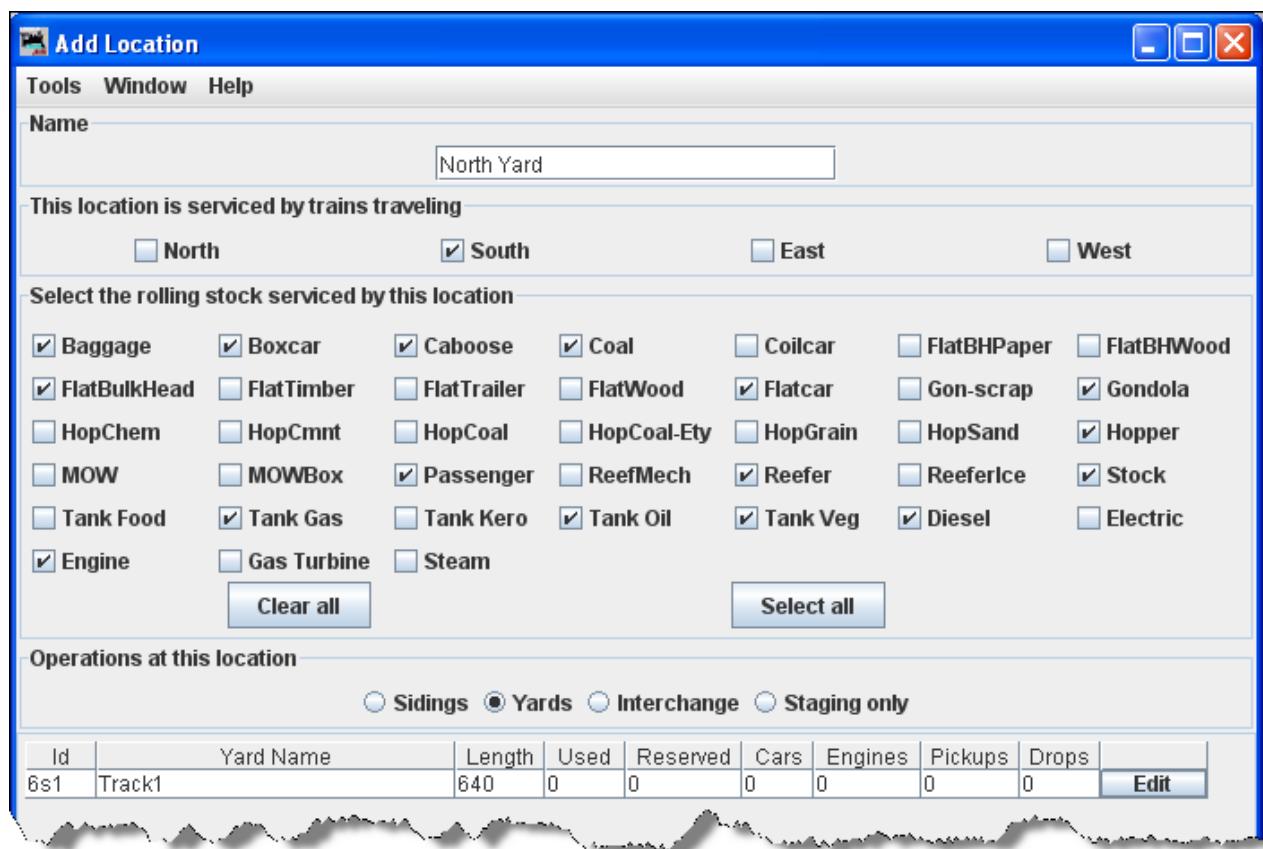
Press  the siding track is added and the greyed out features are activated. the track.

You may now press **Save Yard Track** to add to the location or press **Delete Yard Track** if you do not want to store the track.

If you want to add another track to this siding location, then enter new data and Press **Save Yard Track** to add the track.

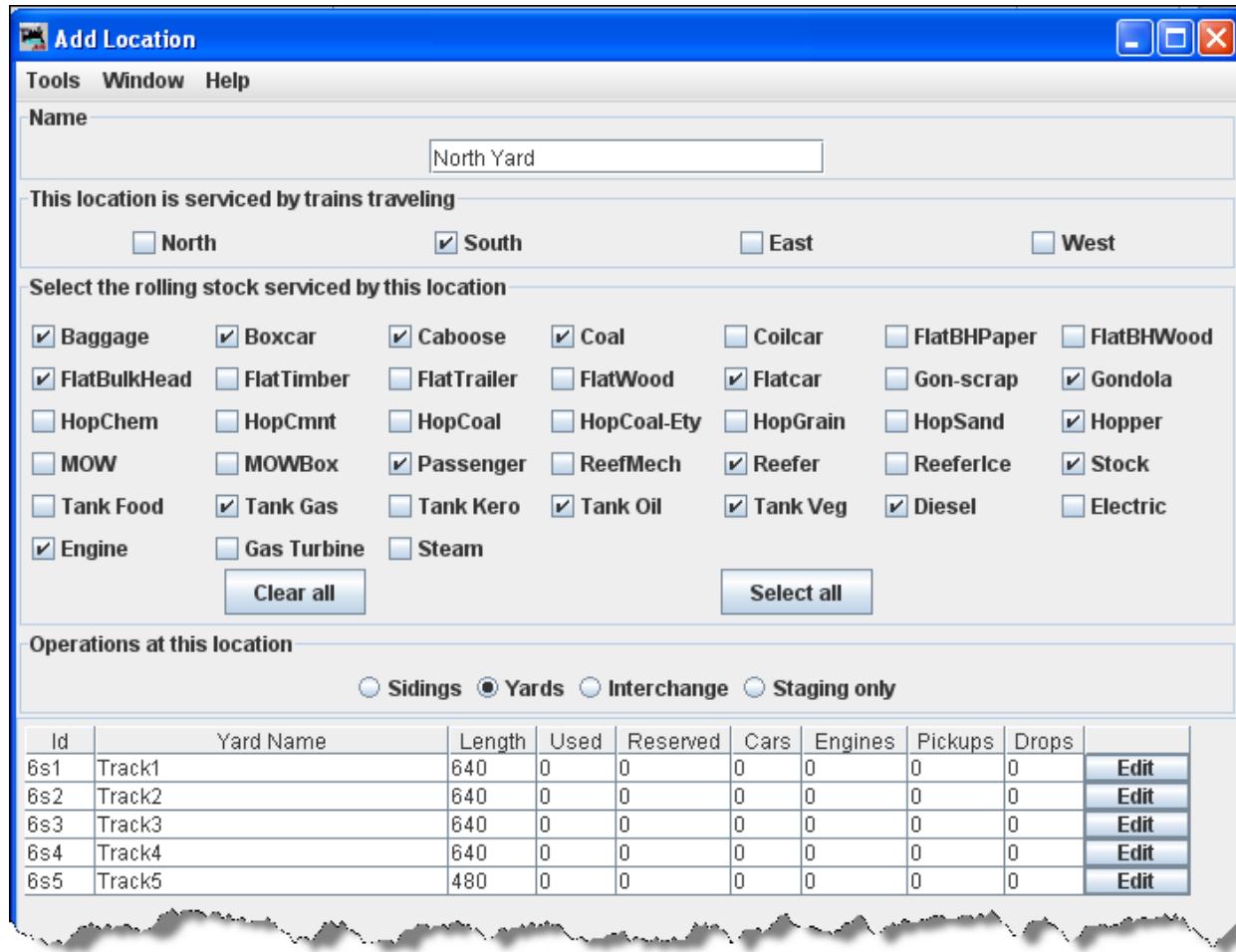
Close the window when done with this location.

The **Add Location** window shows one Yard track at the North Yard.



Let's add some more tracks to the yard.

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If you want to change information for any track entry, press **Edit** and the **Edit Siding Track** window will open

**Edit Siding Track**

Tools Window Help

Name  
Warehouse

Length  
200

This siding is serviced by trains traveling  
 North       South

Select the rolling stock serviced by this siding  
 Boxcar       Gondola  
     

Select the roads serviced by this track  
 Accept all     Accept only     Exclude

Optional Schedule

Comment

Note that it is identical to the Add Siding Track except for the title.

Change any of the entries that you want to edit and then press the

to save the changes.

You may also

from your data base.

When done with editing close the window.

The Locations window shows all the locations in your database.

You may Edit any one of them, which opens the **Edit Location** window, which is the same as the [Add Location](#) window except it contains the info for the location you are editing.

**Locations**

Tools Window Help

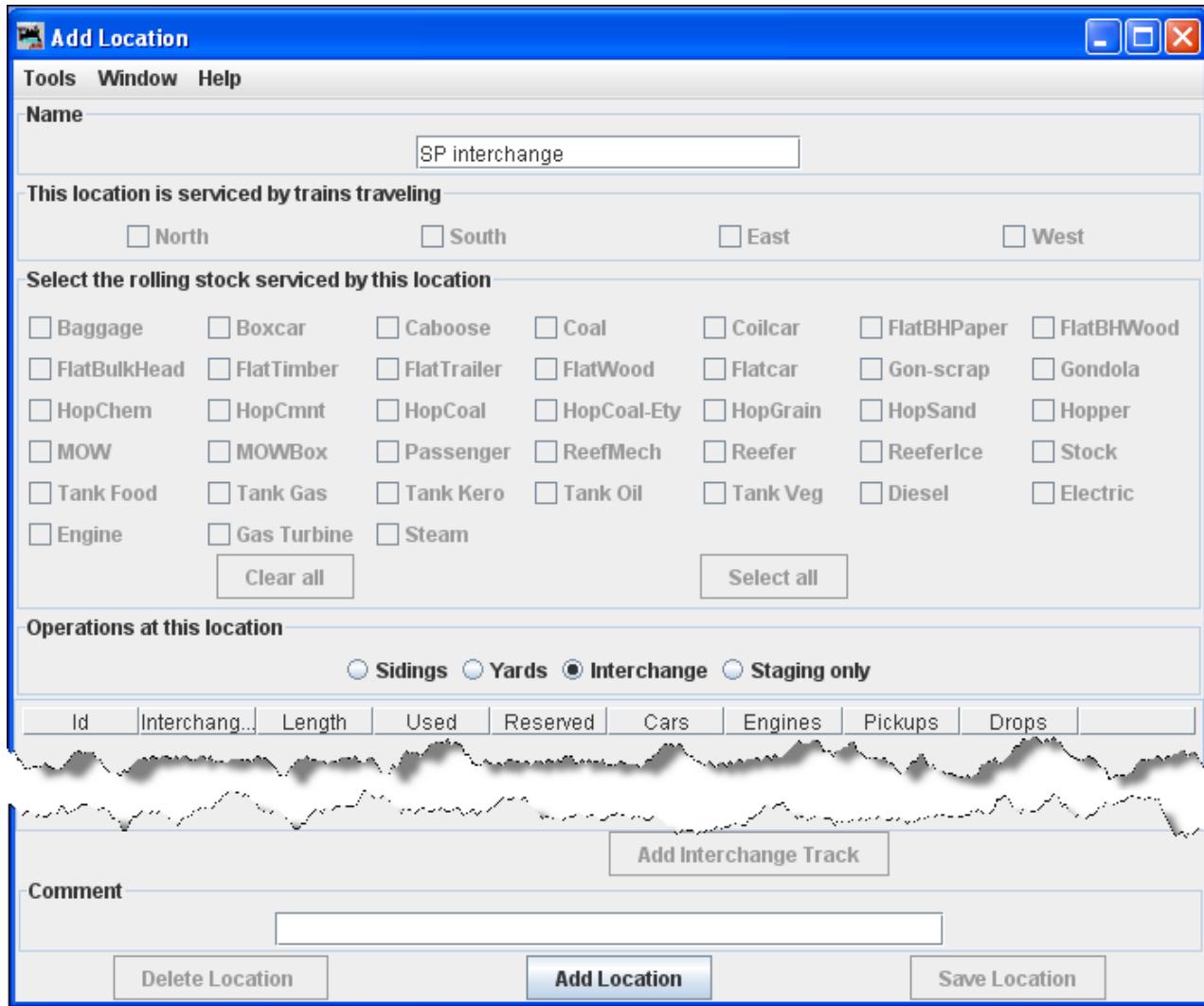
ID	Name	Length	Used	Rolling Stock	Pickups	Drops	
1	Red Rock Junction	300	0	0	0	0	<input type="button" value="Edit"/>
2	new town	200	0	0	0	0	<input type="button" value="Edit"/>
3	Green Valley	200	0	0	0	0	<input type="button" value="Edit"/>
4	Red Valley	200	0	0	0	0	<input type="button" value="Edit"/>
6	North Yard	3040	0	0	0	0	<input type="button" value="Edit"/>

Sort by  Name  ID

You may add as many locations and track as you need to complete the description of your layout.

## **ADD INTERCHANGE**

Add [Location as Interchange](#) and the **Add Location** window will be displayed.



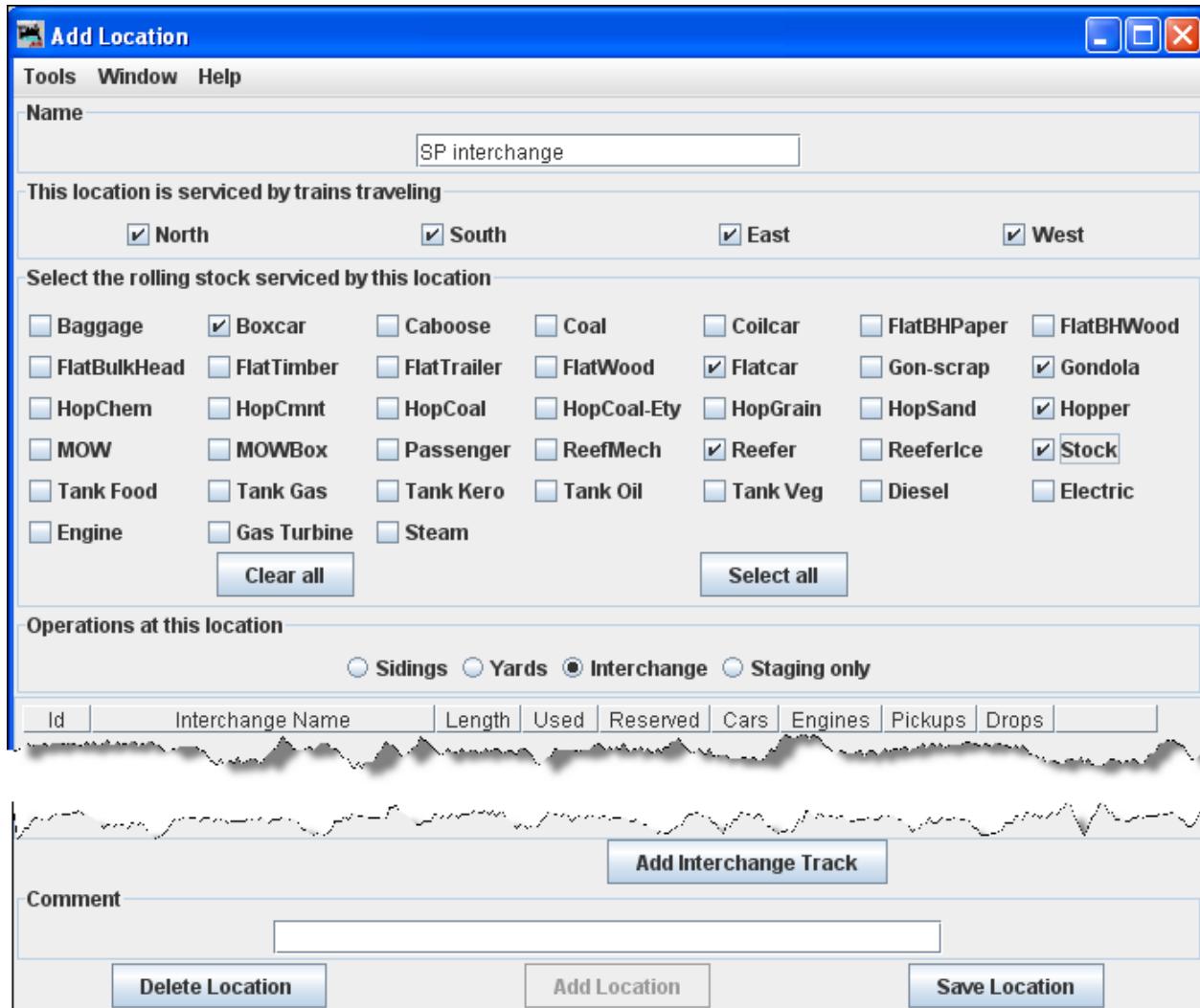
To add a location as an Interchange: in the **Add Location** window, type the **Name** [ ] of the Interchange location, note most of the window is greyed out until the location is added. The location name must be unique; the program will not allow two locations with identical names. However, if you want more than one location to have the same name for your manifests and switch lists, add a hyphen and a number to the locations name. For example, "Boston-1" and "Boston-2" will print as "Boston". The program will remove the hyphen and number when printing manifests and switch lists.

Select **Operations at this location** [ ] **Interchange**, then press **Add Location** [ ] at the bottom of the window.

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An Interchange may contain several tracks that must be defined.

This opens the **Add Location** window with all the options enabled.



You may select **This location is serviced by trains traveling**, select at least one or any number of the directions depending on access to your siding. We have selected All directions, for this interchange.

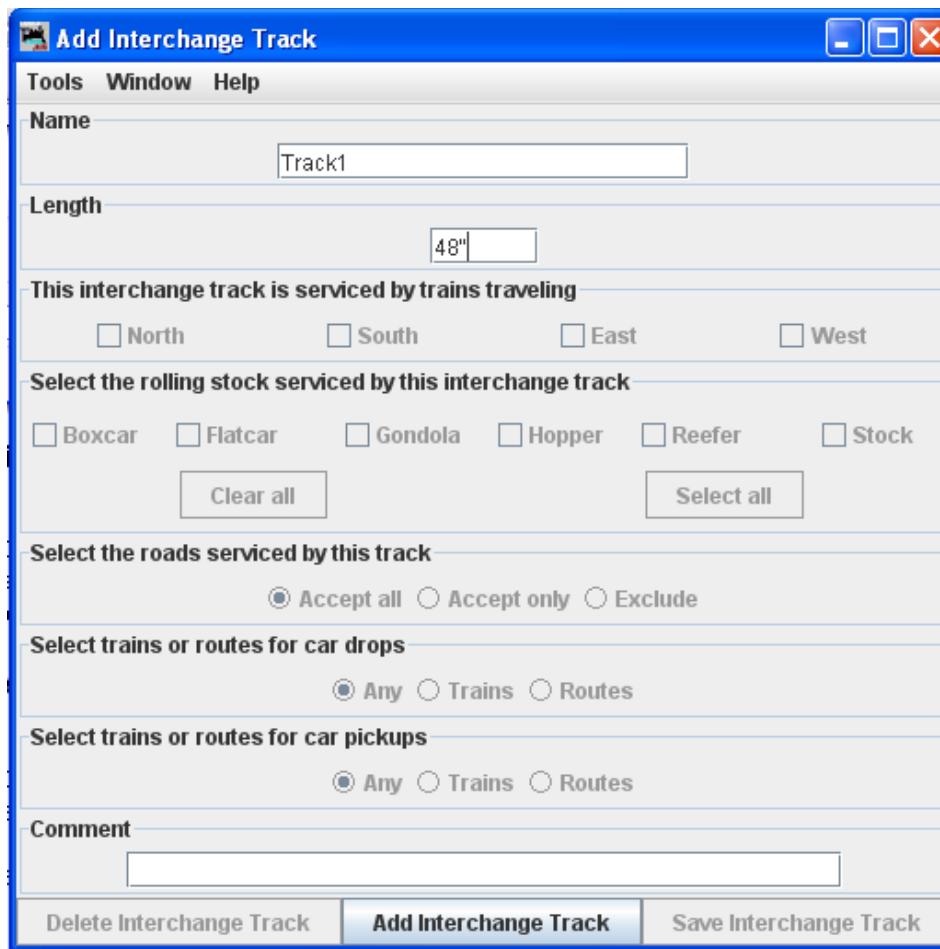
For example, if only south bound trains can access the location select "South" and deselect the other directions. This can be useful if you want to support only trailing point switching for a given location.

Next **Select the rolling stock serviced by this location**, you can control the rolling stock a location can service. Push **Clear All** the to deselect all types, or **Select All** to select all types, then select or deselect the rolling stock you wish the location to accept.

Since the **Operations at this location** is a  **Interchange** the **Add Interchange Track** is now enabled near the bottom of the window.

We also have the option to **Delete Location** or **Save Location**

Press **Add Interchange Track** then the **Add Interchange Track** window is displayed, so you can detail the siding.



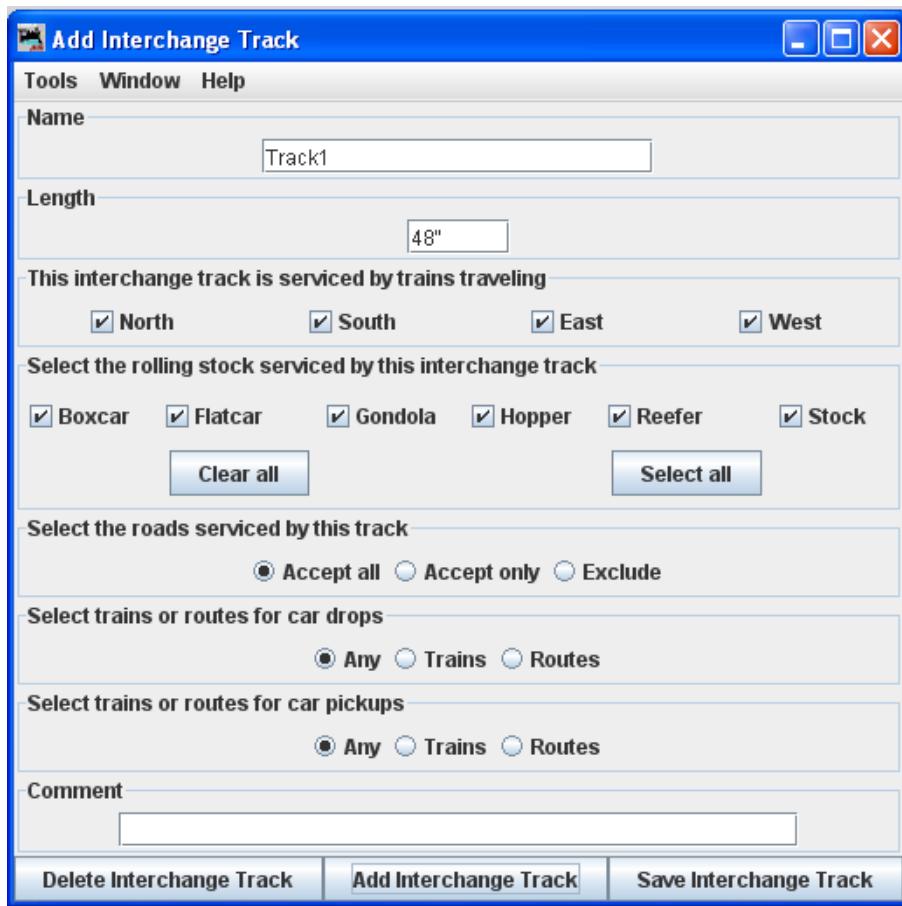
#### In Name

type the specific track to be serviced at this location.

**Length**  of the Yard track in scale feet. You may enter the measurement in actual inches as  6 and the program will convert to the scale feet that you select during setup.

Press

**Add Interchange Track**  
the siding track is added and the greyed out features are activated.



You may **Select the roads serviced by this track**

Accept all

Default accepts rolling stock from any railroad.

Accept only

Allows you to list the railroads whose rolling stock you will accept.

Exclude

Accept all rolling stock except from those railroads that are excluded.

We will use the default. If you want to edit the roads accepted go to [Add Cars](#) then Edit Roads to add a road that is not in the drop-down list.

## Select trains or routes for car drops

Any -- default

Trains

Routes

## Select trains or routes for car pickups

Any -- default

Trains

Routes

We will use the default go to links to setup Trains or Routes. The Trains and Routes must be created prior to selecting.

You may enter a **Comment**  for the track.

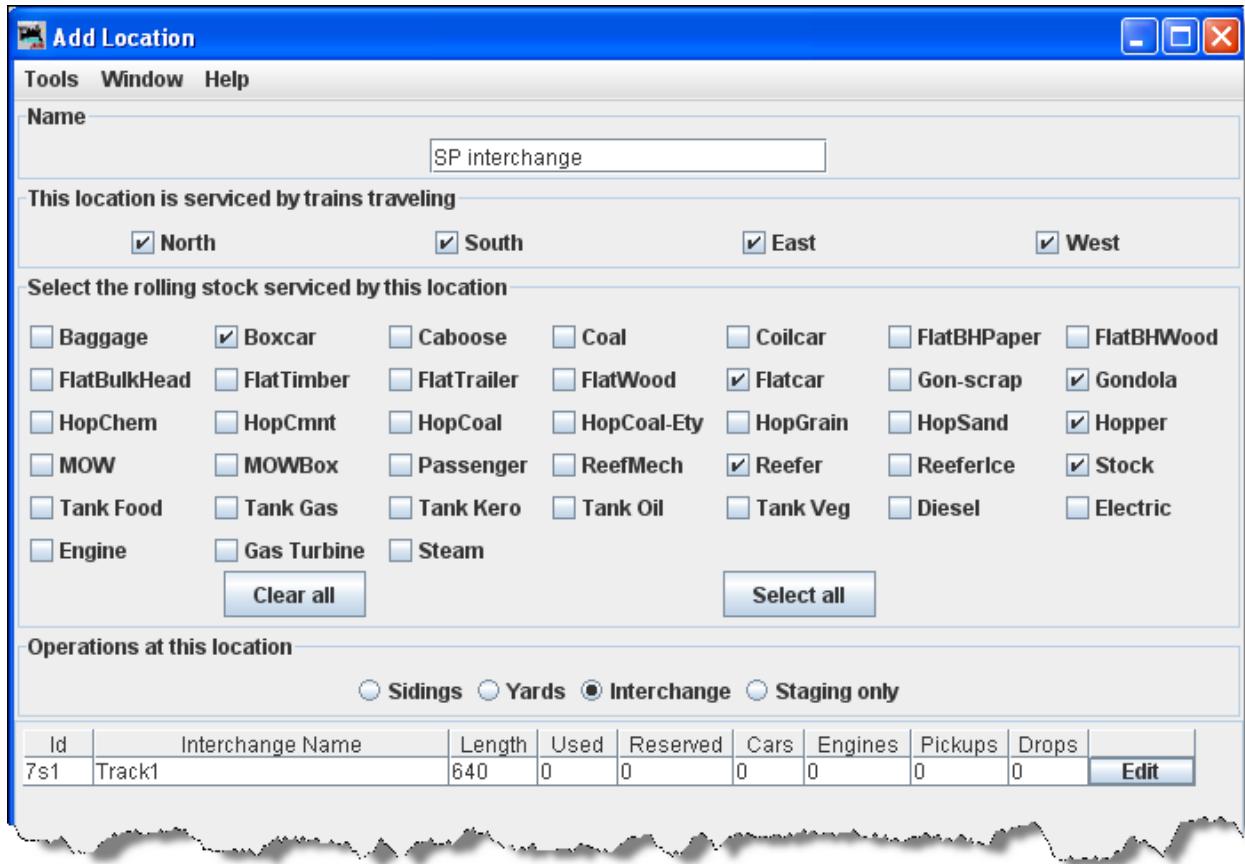
You may now press  to add to the location or press  if you do not want to store the track.

If you want to add another track to this interchange location, then enter new data and Press  to add the track.

Close the window when done with this

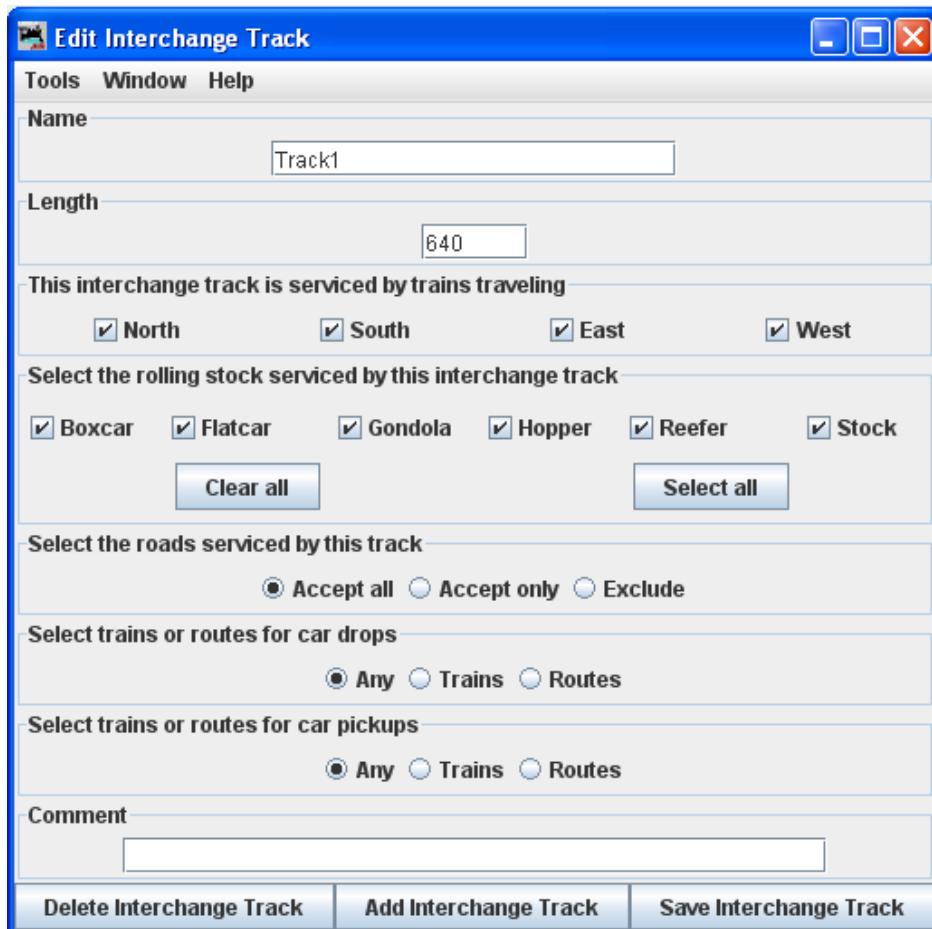
The **Add Location** window shows one Interchange track at the SP interchange

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You may add as many tracks as required for the Interchange.

If you want to change information for any track entry, press the **Edit** button and the **Edit Interchange Track** window will open.



Note that it is identical to the Add Yard and Staging Track except for the title.

Change any of the entries that you want to edit and then press the

**Save Interchange Track**

to save the changes.

You may also

**Delete interchange Track**

from your data base.

When done with editing close the window.

The Locations window shows all the locations in your database.

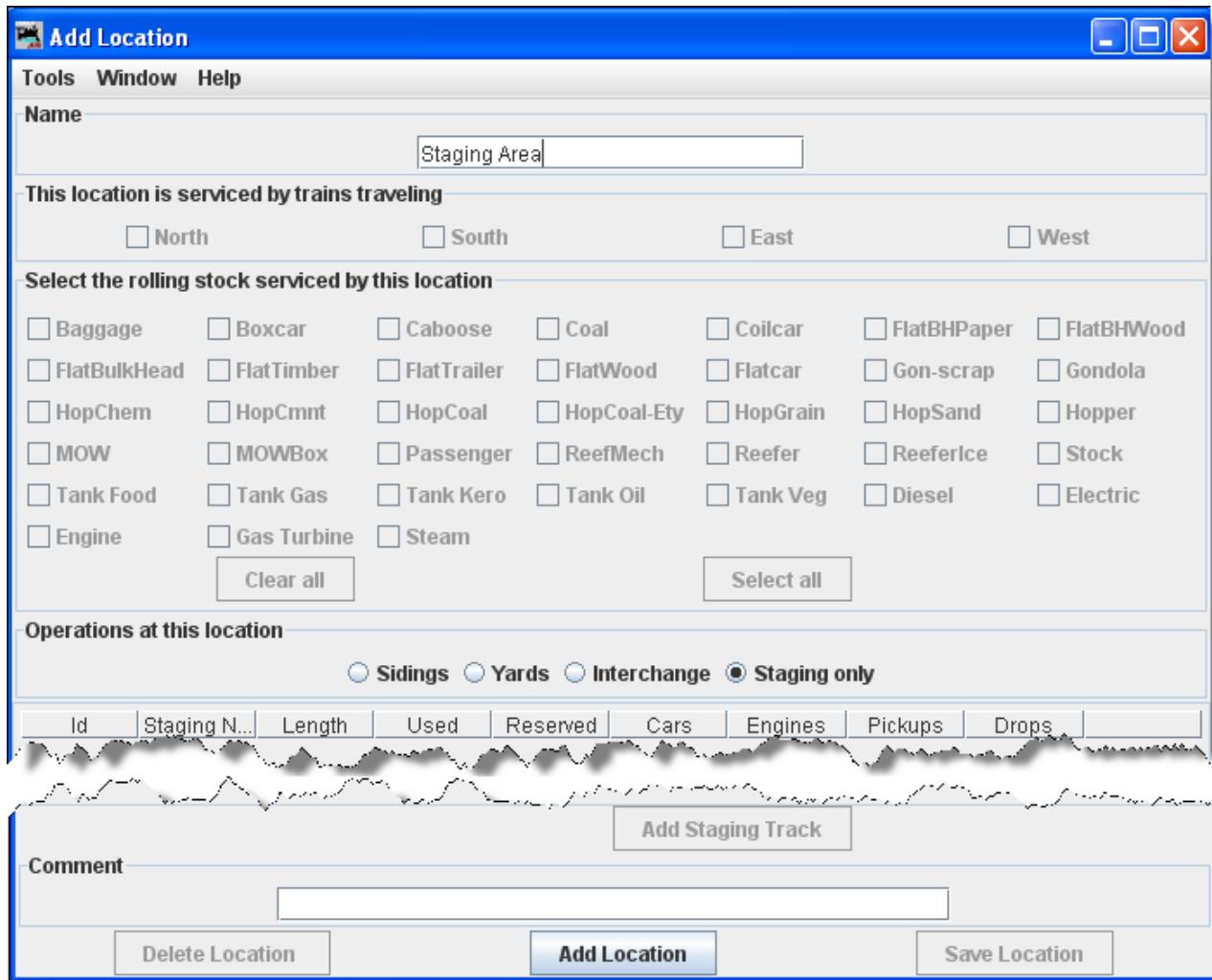
You may Edit any one of them, which opens the **Edit Location** window, which is the same as the [Add Location](#) window except it contains the info for the location you are editing.

Id	Name	Length	Used	Rolling Stock	Pickups	Drops	
1	Red Rock Junction	300	0	0	0	0	<b>Edit</b>
2	new town	200	0	0	0	0	<b>Edit</b>
3	Green Valley	200	0	0	0	0	<b>Edit</b>
4	Red Valley	200	0	0	0	0	<b>Edit</b>
6	North Yard	3040	0	0	0	0	<b>Edit</b>
7	SP interchange	640	0	0	0	0	<b>Edit</b>

You may add as many locations and track as you need to complete the description of your layout.

## ***ADD STAGING ONLY***

Add [Location as Staging Only](#) and the **Add Location** window will be displayed.

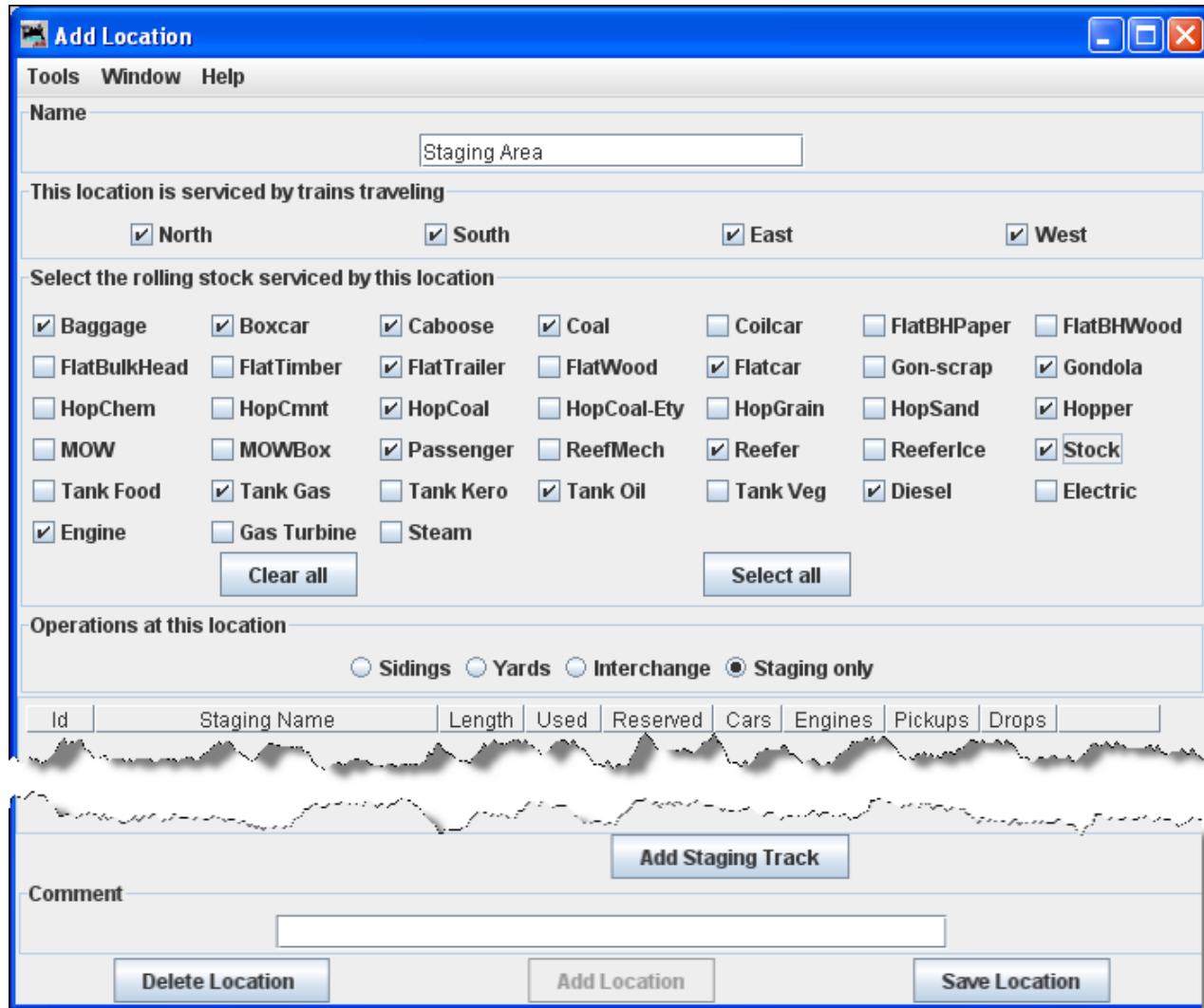


To add a location as a Staging Only: in the **Add Location** window, type the **Name** [ ] of the Staging Only location, note most of the window is greyed out until the location is added. The location name must be unique; the program will not allow two locations with identical names. However, if you want more than one location to have the same name for your manifests and switch lists, add a hyphen and a number to the locations name. For example, "Boston-1" and "Boston-2" will print as "Boston". The program will remove the hyphen and number when printing manifests and switch lists.

Select **Operations at this location** [ ] **Staging Only**, then press the **Add Location** [ ] at the bottom of the window.

A Staging Only area may contain several tracks that must be defined.

This opens the **Add Location** window with all the options enabled.



You may select **This location is serviced by trains traveling**, select at least one or any number of the directions depending on access to your siding. We have selected All directions, for this interchange.

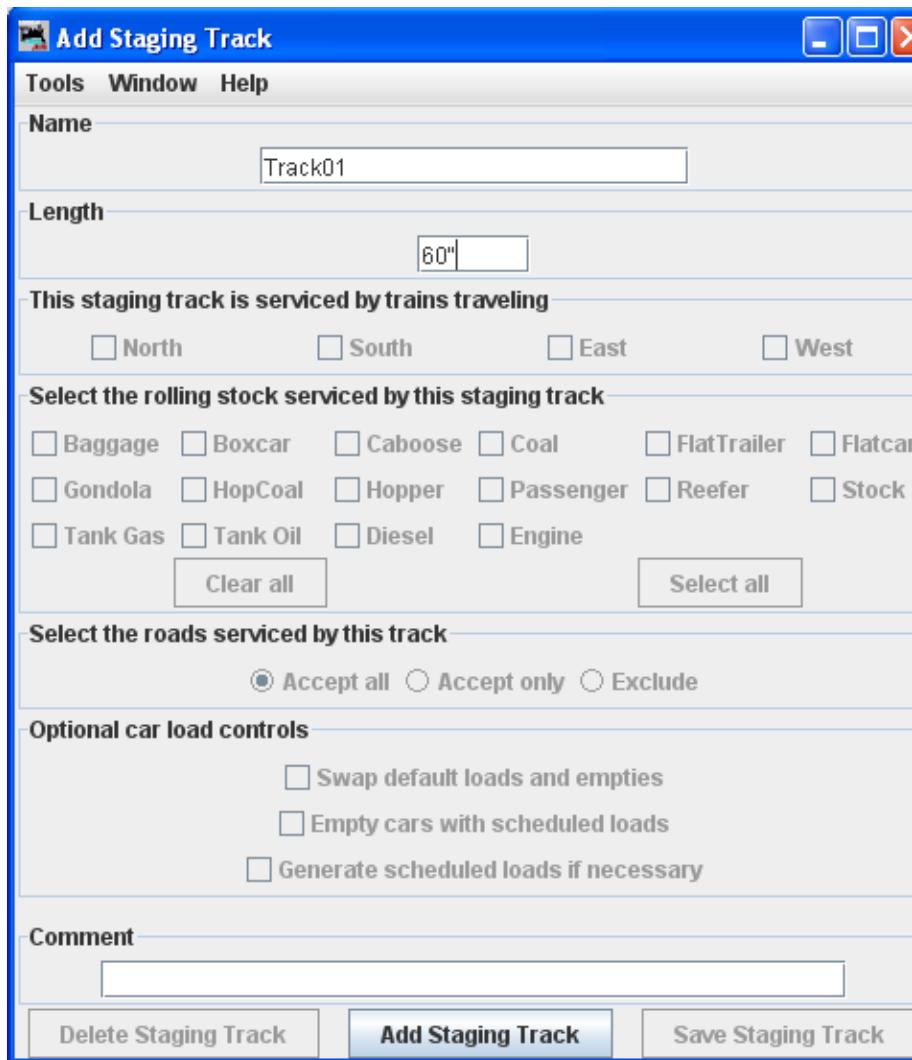
You can decide which train direction the location can service. For example, if only south bound trains can access the location select "South" and deselect the other directions. This can be useful if you want to support only trailing point switching for a given location. If a location can support multiple directions then select the ones that are appropriate.

Next **Select the rolling stock serviced by this location**, you can control the rolling stock that a location can service. Push **Clear All** to deselect all types, or **Select All** to select all types, then select or deselect the rolling stock you wish the location to accept.

Since the **Operations at this location** is a  **Staging Only** the **Add Staging Track** is now enabled near the bottom of the window.

We also have the option to **Delete Location** or **Save Location**

Press **Add Staging Track** then the **Add Staging Track** window is displayed, so that you can detail the siding.



#### In Name

type the specific track to be serviced at this location.

#### Length

of the Yard track in scale feet. You may enter the measurement in actual inches as

6 and the program will convert to the scale feet that you select during setup.

Press

**Add Staging Track** the staging track is added and the greyed out features are

**Add Staging Track**

Tools Window Help

Name:

Length:

This staging track is serviced by trains traveling:

North     South     East     West

Select the rolling stock serviced by this staging track:

<input checked="" type="checkbox"/> Baggage	<input checked="" type="checkbox"/> Boxcar	<input checked="" type="checkbox"/> Caboose	<input checked="" type="checkbox"/> Coal	<input checked="" type="checkbox"/> FlatTrailer	<input checked="" type="checkbox"/> Flatcar
<input checked="" type="checkbox"/> Gondola	<input checked="" type="checkbox"/> HopCoal	<input checked="" type="checkbox"/> Hopper	<input checked="" type="checkbox"/> Passenger	<input checked="" type="checkbox"/> Reefer	<input checked="" type="checkbox"/> Stock
<input checked="" type="checkbox"/> Tank Gas	<input checked="" type="checkbox"/> Tank Oil	<input checked="" type="checkbox"/> Diesel	<input checked="" type="checkbox"/> Engine		

Select the roads serviced by this track:

Accept all     Accept only     Exclude

Optional car load controls:

Swap default loads and empties  
 Empty cars with scheduled loads  
 Generate scheduled loads if necessary

Comment:

activated.

You may Select the roads serviced by this track

Accept all

Default accepts rolling stock from any railroad.

Accept only

Allows you to list the railroads whose rolling stock you will accept.

Exclude

Accept all rolling stock except from those railroads that are excluded.

We will use the default. If you want to edit the roads accepted go to [Add Cars](#) then Edit Roads, to add another selection to the drop-down list.

### Optional car load controls

Swap default loads and empties

Empty cars  
with scheduled  
loads

Generate  
scheduled loads if  
necessary

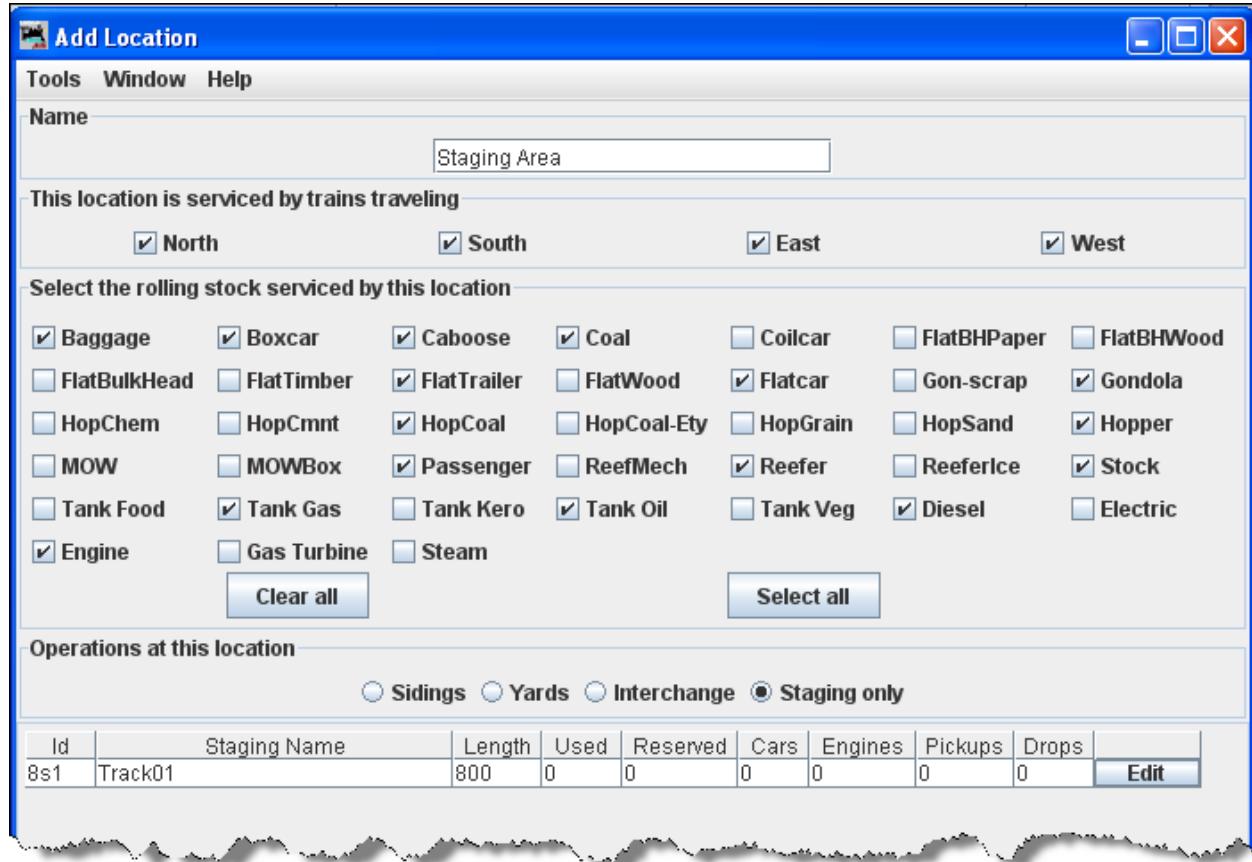
You may enter a  
**Comment**  
 for  
the track.

You may now  
press  
**Save Staging Track**  
to add to the  
location or press  
**Delete Staging Track**  
if you do not  
want to store the  
track.

If you want to  
add another track  
to this  
interchange  
location, then  
enter new data  
and Press  
**Save Staging Track**  
to add the track.

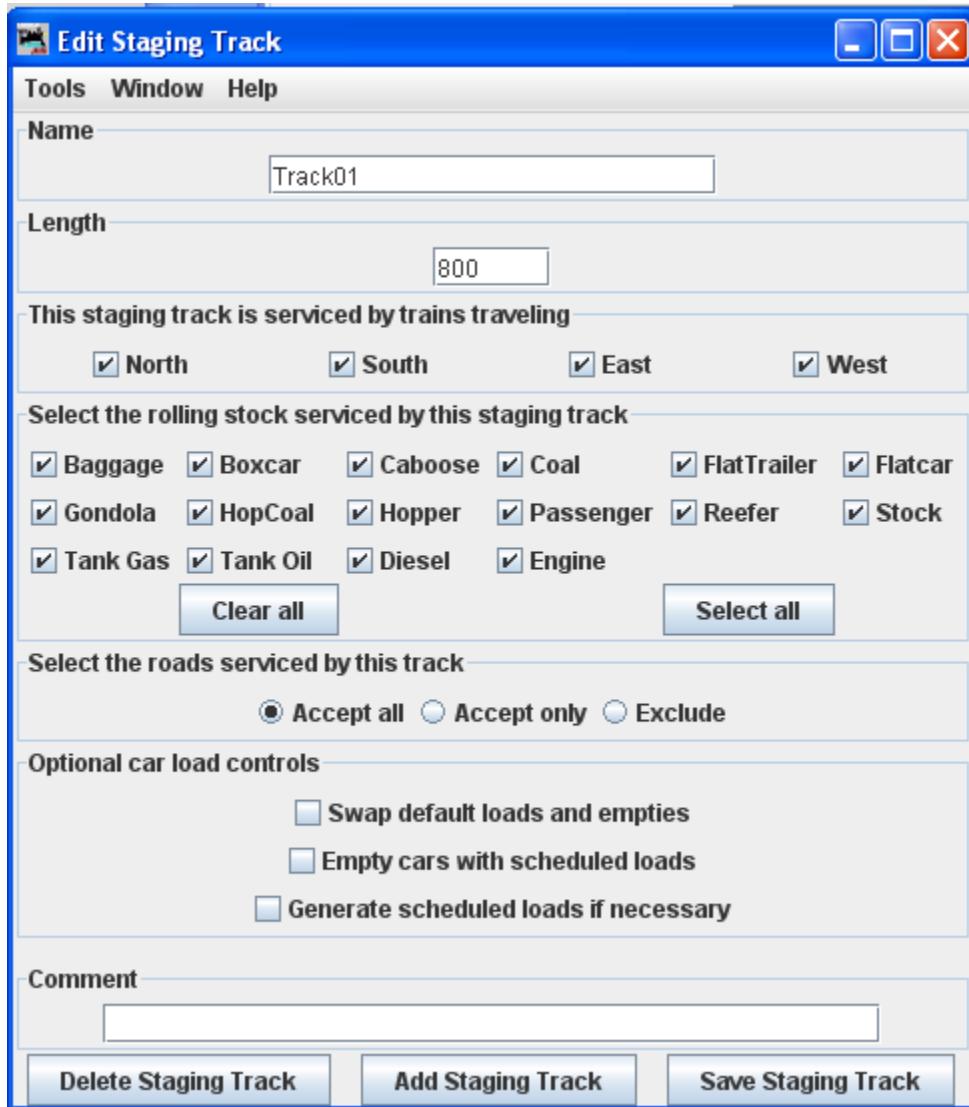
Close the window  
when done with  
this location.

The **Add Location** window shows one Staging track.



You may add as many tracks as required for the Staging area.

If you want to change information for any track entry, press **Edit** and the **Edit Staging Track** window will open.



Note that it is identical to the Add Interchange and Yard Track except for the title.

Change any of the entries that you want to edit and then press the

**Save Staging Track**

to save the changes.

You may also

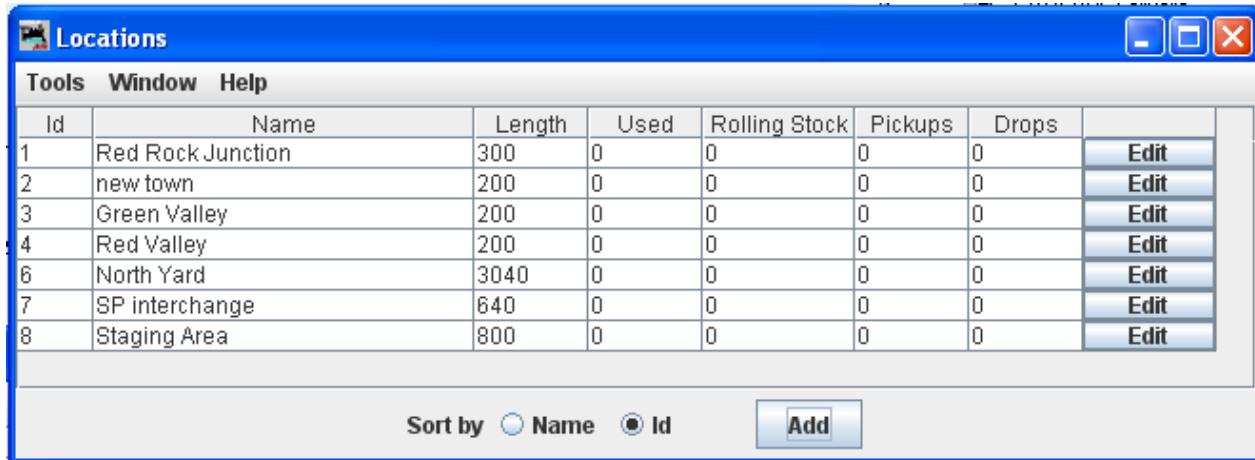
**Delete Staging Track**

from your data base.

When done with editing close the window.

The Locations window shows all the locations in your database.

You may Edit any one of them, which opens the **Edit Location** window, which is the same as the [Add Location](#) window except it contains the info for the location you are editing.

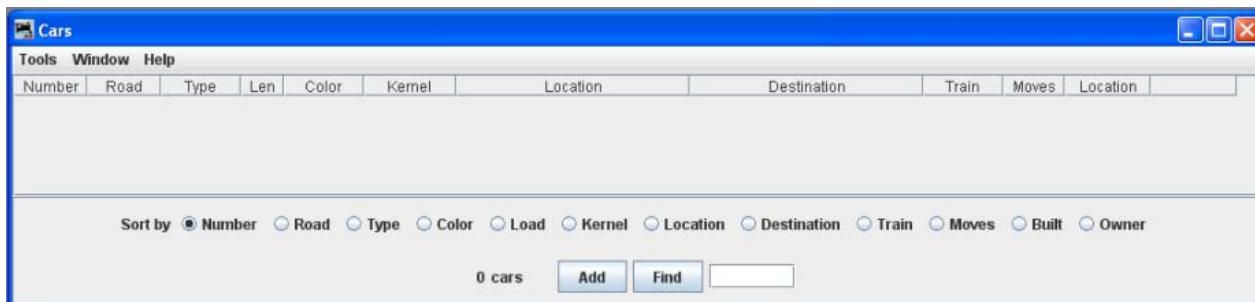


You may add as many locations and track as you need to complete the description of your layout.

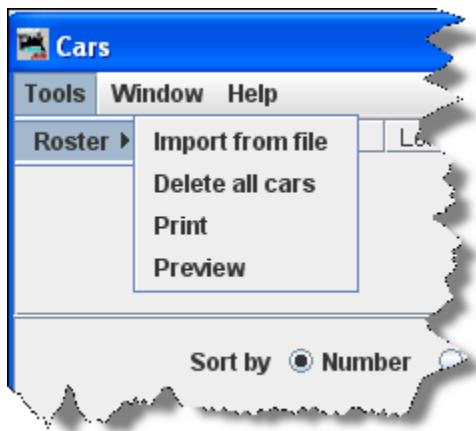
Sidings are very similar to [Yards](#), so see above for more information. You can if you wish schedule the order that cars will be delivered to a siding. See [Schedules](#) below for more information.

#### *OPERATIONS CARS WINDOW*

The cars window allows you to edit your car roster. You can enter a car's number, road, type, and length. The program will automatically calculate the car's weight based on length and the scale you are modeling. You can optionally add the car's color, build date, load and owner. If you want a group of cars to be switched as a unit, you can create a "kernel". You can assign any number of cars to a kernel but the type of the first car assigned will be used by the program to determine if the kernel is allowed at a location. The entire length of the kernel is used to determine if the cars in the kernel will fit. Note that the program also includes space for the car's couplers when calculating the length of a kernel.



## MENU BAR



## Tools

- **Roster »**
  - [Import from file](#) -- opens windows **Open** dialog box.
    - Opens a Windows **Open** dialog box to allow you to select the file of your choice and a file that meets the criteria defined herein. Note that the program will only add cars that don't exist in the program's car roster. If the car already exists, the import will be skipped by the program. You must also create the locations and their tracks before importing the cars into the operations program.
    - To improve the speed of the car import, you can close the **Cars** window. It takes significantly more processor cycles to update the cars panel than to actually import the cars.
    - After importing your cars, you must save them if you want to keep them as part of your roster. Select any car by pressing the edit button and then press the **Save** button that can be found at the bottom right of the **Edit Car** window.
    - If you already have a list of cars in a database, you can import the cars into the program. The import function requires an ASCII text file, with one line for each car. The import order is car number, car road name, car type, car length, car weight, car color. The following shows two examples of the correct format:
      - 336 GCR Flat 40 3.8 Black
      - 655578 UP Boxcar 40 3.8 Yellow
      - Each line can start with a space and multiple spaces between fields is okay. Optionally you can include additional information in the following order, owner name, date built, and location. The location can have two fields, the location name followed by the location's siding or yard name separated by a hyphen. The following shows two examples of the correct format:

- 336 GCR Flat 40 3.8 Black AT 1930 Home Town USA - George's Oil Terminal
- 655578 UP Boxcar 40 3.8 Yellow DB 1934 York - York Freight
- If you prefer to use comma delimiters instead of spaces, place the word "comma" at the start of your import file and use commas instead of spaces. The following are two examples of importing cars with comma delimiters.
- comma
  - 336,GCR,Flat Car,40,3.8,Black,AT,1930,Home Town USA,-,George's Oil Terminal
  - 655578,UP,Tank Car,40,3.8,Yellow,DB,1934,York,-,York Freight
- You need to be very careful with spaces when importing a comma delimited file. The program will include leading and trailing spaces if they exist between the commas.
- Delete all cars -- Opens the **Delete all cars?** confirmation dialog box.
- Print -- Opens your computers **Print** window and will print your car roster.
- Preview -- Opens your computers **Print** window and when you click **OK** will show the preview of your car roster.

Window --same as other DecoderPro® menus.

Help -- same as other DecoderPro® menus.

*Body of window*

**Sort by** -- select the element in the roster by which you would like to sort your car roster, we will use car  **Number**

(number) **cars** -- only shows number of cars in your roster.

 when selected opens the [Add Car](#) window.

  Locate a car in your roster, when you type the road number into the text box.

## **ADD CARS WINDOW**

The **Add Car** window is opened.





**Help** -- Same as other DecoderPro® Menus

Select **Road** if your road is not listed then press **Edit** and the [Edit Car Road](#) dialog box will display.

To the right of each of the car attributes (**Road**, **Type**, **Length**,

**Color**, **Kernel**, **Load**, **Owner**) **Edit** dialog to allow you to edit the list of attributes available to us for Car

definition. Use this to **Add**, **Delete** or **Replace** the available attributes for a car.



**Add** To add a new car attribute, enter the desired text in the text box and

press **Add**. When you first enter a new car attribute it will show up at the start of the list. Later when you restart the program it will be sorted in the correct order.

**Delete** To delete a car attribute, select the attribute you want to delete in the menu box and press **Delete**.

**Replace** If you need to change a specific car attribute (road, type, color,

etc) in your entire car roster, you can use the Replace found at the bottom right of the edit car attribute panel.



For example, if you wish to change the car road name attribute "UP" to "UPS"

for all of your cars. Press Replace for any of your cars in the Cars panel, and the Replace All? dialog will display

with a Yes or No option. Enter the new road "UPS" in the text box, select "UP" in the menu box, and press

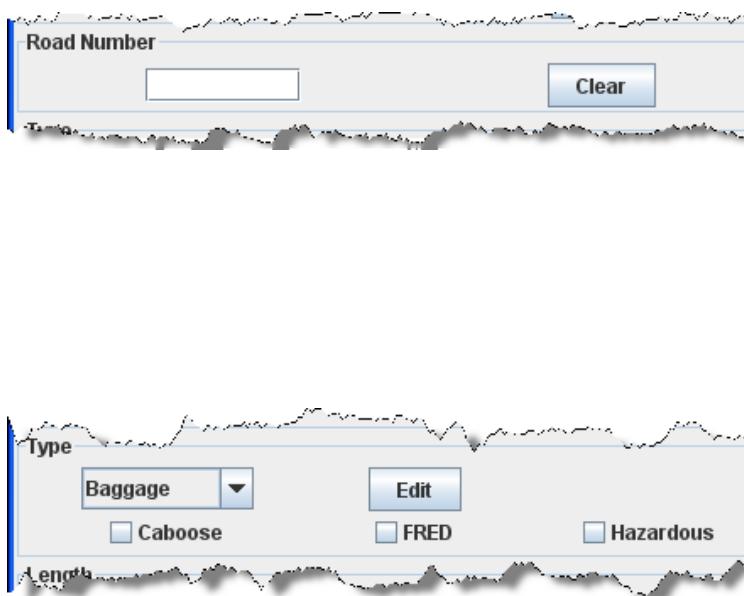
Replace. All cars with "UP" as their road will now have "UPS" as their road name.

Here is a reference for the **Railroad Reporting Marks.**(

<http://www.pwrr.org/rrm/rrmb.html>)

Enter the car's Road Number

. The program requires a unique road name and road number for each car. If you have cars with identical roads and numbers, simply add a -1, -2, etc. to each of the car numbers. The program when printing out the manifest or switch list will drop the -1, -2, etc. from the car's road number.



Select the car's Type  if your type is not listed then press Edit and the [Edit Car Type](#) dialog box will

If the car is a  **Caboose**, has a  **FRED** (Flashing

Rear End Device), or is  **Hazardous**, select the proper box. The program uses the caboose and FRED functions to place the car at the end of a train when the train requires a caboose or car with FRED. The hazardous checkbox will cause the program to add a note to the switch list that the car is transporting hazardous materials. Your railroad's policy regarding hazardous materials can than be applied to this car!

display.

The program supports the ability to add a subType to your car types. Adding a "-subType" to your car type will create a new type of car. The "-subType" is not printed on the manifest or switch lists. For example you might have coal cars with loads and coal cars that are empty. If you enter the car type as HopCoal-C for your cars with coal, and HopCoal-E for the empties, the program can use this information to assign and deliver cars to their appropriate trains and locations respectively.



Select the car's **Length**  if your length is not listed then press ans the [Edit Car Length](#) dialog box will display.



The car **Weight** is automatically calculated when the  **Auto** is selected based on car's length, but you can enter a different weight if necessary. If the  **Auto** is not checked then you may use the

**Calculate**  to calculate the weight. When entering the length of a car, enter the length of the body and not the total length. For example, a forty foot boxcar has a length of 40 feet. The program when calculating lengths will add two feet to each end of a car for the couplers. Therefore when you place a forty foot car at a siding, it will consume 44 feet of track.



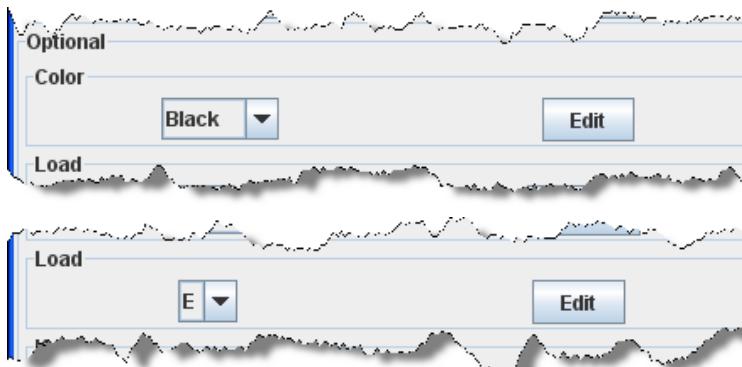
Now you select the cars **Location** . The first selection is the location, city, yard etc. that was created in the [Locations](#).

The second selection

is based on the first and only has entries if there is more than one track at this location

If the car is off the layout, set the location to none (blank space)

## Optional Car Attributes



Select the car's **Type**  if

your type is not listed then press  and the [Edit Color](#) dialog box will display.



You can optionally set the **Load**  state of the car. Select E for

empty or L for loaded. Press  to create your own car loads, but there are restrictions. Only sidings with [Schedules](#) can load or unload cars with loads that you've created. It is also suggested that you use a format similar to L(commodity) to describe your loads. For example a load of tools could be entered as L(Tools).



If wish this car to be part of a kernel which is a group of cars that you want

to switch as one unit, press  across from **Kernal**

and enter a [kernel name](#). Then select the kernel from the menu box.

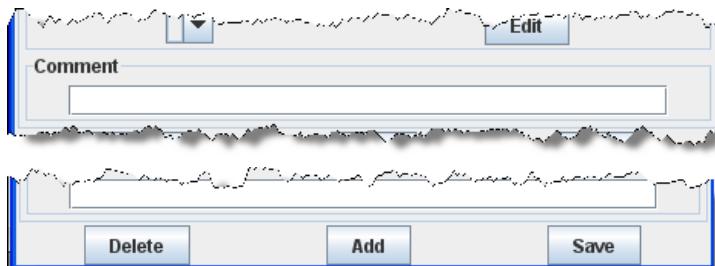


Optional Built  you may enter the build date.



You may optionally select an **Owner**

or press  to enter an [owner](#). Then select owner from the menu box.



**Comment**  for this car.

**Add**  add another car.

**Delete**  delete a car.

**Save**  to store the car's settings. The program will create a file (OperationsCarRoster.xml) in your JMRI directory in a folder called "operations". A backup file with the last settings for all of your cars is also created each time the **Save**  button is pressed.

Now lets add several cars to our Car Roster. When we add and save the cars they will be added to the roster and shown in the **Cars** window.

Number	Road	Type	Len	Color	Kernel	Location	Destination	Train	Moves	Location	
1948	ALRK	Reefer	40	Yellow		North Yard (Track3)			0	Set	Edit
2462	SP	Passenger	75	Daylight		North Yard (Track5)			0	Set	Edit
2462-1	SP	Passenger	75	Daylight		North Yard (Track5)			0	Set	Edit
2660	SP	Passenger	75	Daylight		North Yard (Track5)			0	Set	Edit
2660-1	SP	Passenger	75	Daylight		North Yard (Track5)			0	Set	Edit
10006	FGEX	Reefer	52	Yellow					0	Set	Edit
10006-1	FGEX	Reefer	52	Yellow					0	Set	Edit
10012	FGEX	Reefer	52	Yellow		North Yard (Track3)			0	Set	Edit
10012-1	FGEX	Reefer	52	Yellow		North Yard (Track3)			0	Set	Edit
10014	FGEX	Reefer	52	Yellow					0	Set	Edit
39829	DODX	FlatHeavy	60	Gray					0	Set	Edit
90835-1	ATSF	Flatcar	50	Red		North Yard (Track2)			0	Set	Edit
300145	PFE	Reefer	52	Orange		North Yard (Track3)			0	Set	Edit
300149	PFE	Reefer	52	Orange		North Yard (Track3)			0	Set	Edit
300153	PFE	Reefer	52	Orange		North Yard (Track3)			0	Set	Edit
300163	PFE	Reefer	52	Orange		North Yard (Track3)			0	Set	Edit
3001711	PFE	Reefer	52	Orange		North Yard (Track3)			0	Set	Edit
	SP	Passeng...	86	Silver		North Yard (Track5)			0	Set	Edit

Sort by  Number  Road  Type  Color  Load  Kernel  Location  Destination  Train  Moves  Built  Owner

18 cars  Add  Find

Now if you desire to change a value in a **Cars** attributes that is already in the Cars roster, press **Edit**  to the right of that car. The **Edit Car** window will open, it is almost identical to the **Add Car** window.

**Edit Car**

Window Help

Road

PFE

Road Number  
300149

Type  
Reefer   
 Caboose     FRED     Hazardous

Length  
52

Weight  
Ounces: 1.1   Auto  
Tons: 86

Location  
North Yard  Track3

Optional

Color  
Orange

Load  
E

Kernel

Built

Owner  
Date

Comment

You may now

removes the selected car from the roster.

**Add**

**Add** add the edited car as another car to the roster.

**Save**

**Save** make changes and save them in the car roster.

**Set**

The **Set** when pressed, opens the Set Car Location panel and allows you to override the program and set a car at a location that is defined in your Operations data base.

**Menu** is standard for DecoderPro®®.

**Car** displays the selected car.

**Location using Name**

**Name**  and

**Track**

you can set the car at any defined location on your layout.

**Optional**

**Destination**

optionally set the **Name**

of

location and the

**Track**

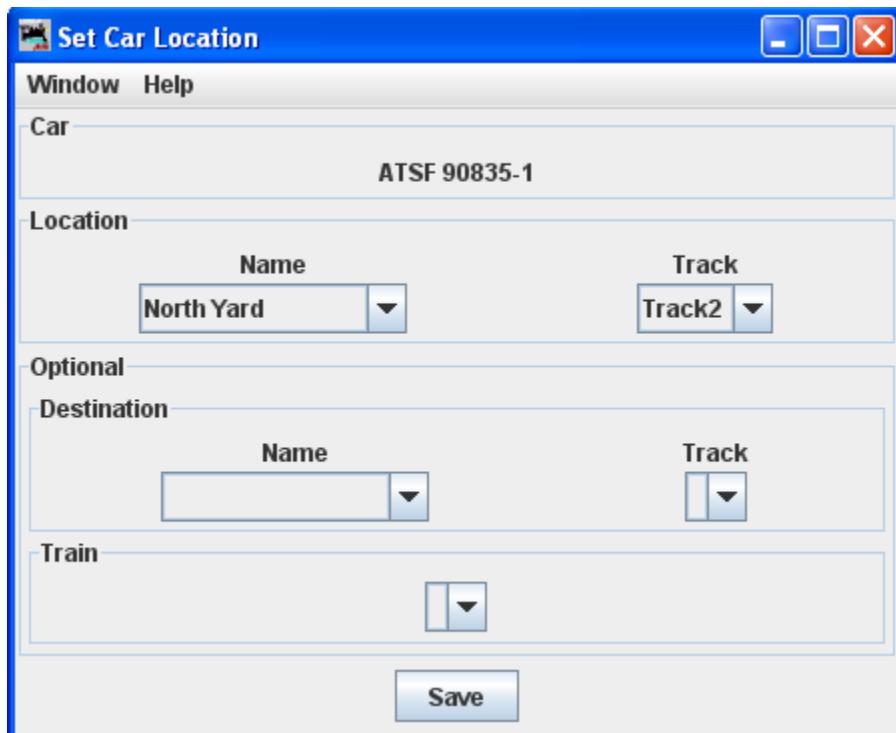
.

**Train**

optionally set the train.

**Save**

**Save** press to save the car locations that you have set.

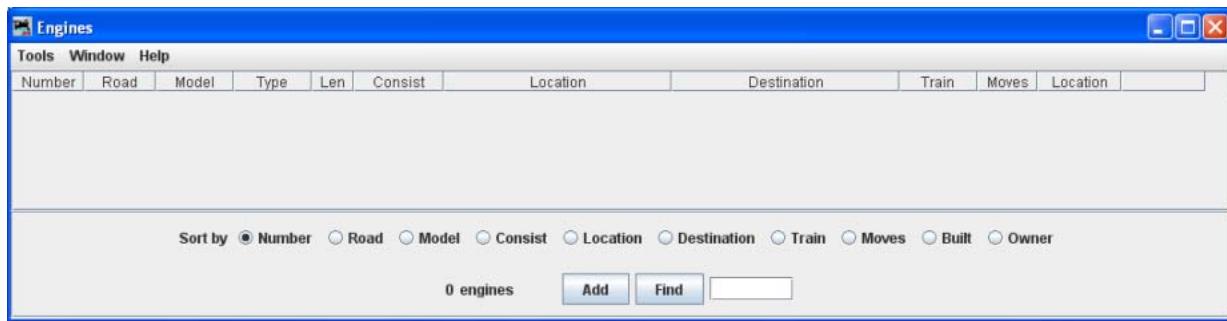


Close the window  
when completed.

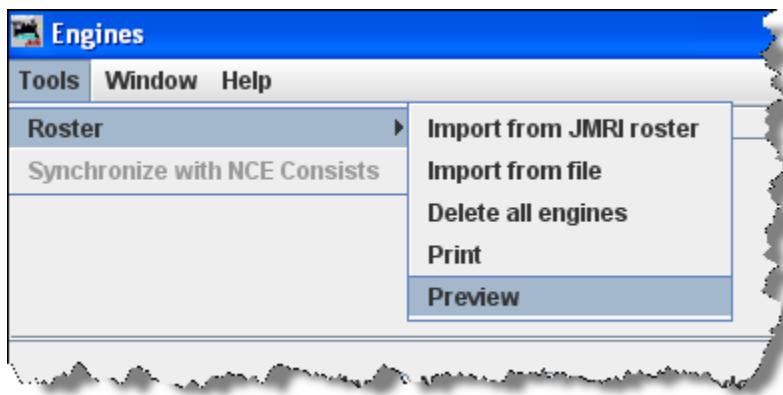
Now that you have your cars stored in the roster, you will probably want to add some [Engines](#) to move your cars about the layout.

## *ENGINES WINDOW*

The engines panel allows you to edit your engine roster. You can enter an engine's number, road, model, type, and length. You can optionally add the engine's build date and owner. If you want a group of engines to be assigned as a unit, you can create a "consist". The engine type is used by the program to determine where engines are picked up and or stored at the various locations on your layout. Some of default engine types are electric, diesel, gas turbine, and steam.



## Menu Bar



## Tools

- **Roster** ►
  - [Import from JMRI roster](#)
    - If you already have a [DecoderPro®® roster](#) created when programming decoders, you may import them into the Operations program. All engines

that are not already in your Operations roster will be imported and a message will be displayed informing you of how many engines were imported. This way you can use this tool any time you add engines to your DecoderPro®® engine roster. The DecoderPro®® engine roster doesn't have the engines length, so a default length is entered for you. You should correct the engine length if you want the program to correctly calculate your train lengths.

- [Import from file](#)
  - The import from file function requires an ACSII text file, with one line for each engine. The import order is engine number, engine road name, engine model, and engine length. The following shows two examples of the correct format:
    - 236 UP RS4 40
    - 5578 SP SW1200 42
  - Each line can start with a space and multiple spaces between fields is okay. Optionally you can include additional information in the following order, owner name, date built, and location. The location can have two fields, the location name followed by the location's siding or yard name separated by a hyphen. The following shows two examples of the correct format:
    - 236 UP RS4 40 AT 1930 Home Town USA - Engine Terminal
    - 5578 SP SW1200 42 DB 1934 York - York Engine Yard
  - If you prefer to use comma delimiters instead of spaces, place the word "comma" at the start of your import file and use commas instead of spaces. The following are two examples of importing engines with comma delimiters.
    - comma
    - 236,UP,RS 4,40,AT,1930,Home Town USA,-,Engine Terminal
    - 5578,SP,SW 1200,42,DB,1934,Town of York,-,York Engine Yard
  - You need to be very careful with spaces when importing a comma delimited file. The program will include leading and trailing spaces if they exist between the commas.
  - Note that the program will only add engines that don't exist in the program's engine roster. If the engine already exists, it will be skipped by the program.
  - After importing your engines, you must save them if you want to keep them as part of your roster. Select any engine in the **Engine** window by pressing  and then press  that can be found at the bottom right of the **Edit Engine** window
  -
- **Delete all engines** -- Opens the **Delete all engines?** confirmation dialog box.
- **Print** -- Opens your computers **Print** window and will print your engine roster.
- **Preview** -- Opens your computers **Print** window and when you click **OK** will show the preview of your engine roster.

**Window** -- same as other DecoderPro®® menus.

**Help** -- same as other DecoderPro®® menus.

## *Body of window*

**Sort by** -- select the element in the roster by which you would like to sort your engine roster, we will use engine  **Number** selection.

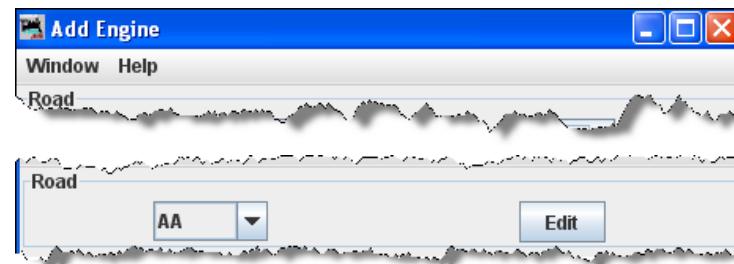
(number) **engines** --shows number of engines in your roster.

 when selected opens the [Add Engine](#) window.

  Locate an engine in your roster, when you type the road number into the text box.

## *ADD ENGINE*

The Add Engine window is displayed.

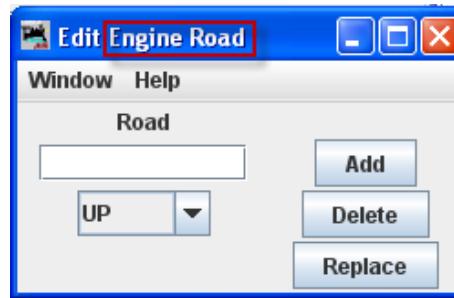


The Add Engine Window and Help menus are the standard DecoderPro®® menus used on most windows.

Select the Road  for the engine. If the desired road doesn't exist, press  Opens the [Edit Engine Attributes](#) dialog for Road.

To the right of each of the engine's attributes (**Road**, **Model**, **Type**, **Length**, **Horsepower**, **Consist**,

 **Owner**)  dialog to allow you to edit the list of attributes available to us for an Engine definition. Use this to ,  or  the available attributes for an engine.

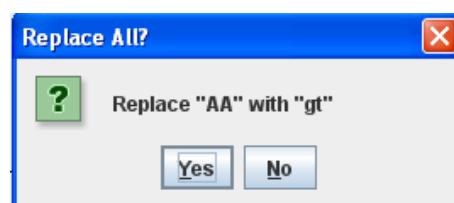


**Add** To add a new engine attribute, enter the desired text in the text box

and press **Add**. When you first enter a new engine attribute it will show up at the start of the list. Later when you restart the program it will be sorted in the correct order.

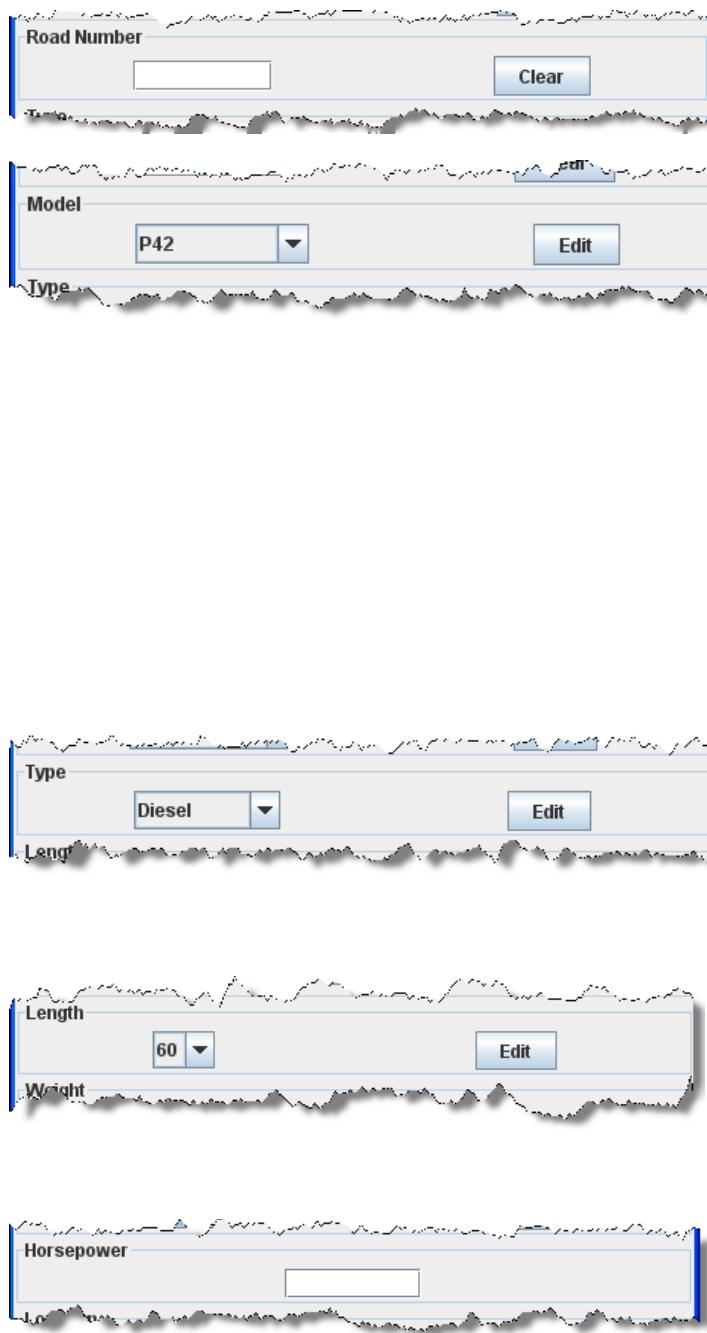
**Delete** To delete an engine attribute, select the attribute you want to delete in the menu box and press **Delete**.

**Replace** If you need to change a specific engine attribute (road, Model, type, etc) in your entire engine roster, you can use the **Replace** found at the bottom right of the edit engine attribute panel.



For example, if you wish to change the engine road name attribute "UP" to "UPS" for all of your cars. Press

**Replace** for any of your cars in the Cars panel, and the Replace All? dialog will



display with a  Yes or  No option. Enter the new road "UPS" in the text box, select "UP" in the menu box, and press  Replace. All cars with "UP" as their road will now have "UPS" as their road name.

Type the Engine's Road Number  
 use  Clear to remove your entry if you make a typing error.

Select the Model  if the model you need is not in the list then press  Edit and the [Edit Engine Attributes](#) dialog for Model will open.

The program allows you organize your engines by model. Each model can only have one engine type, length, weight and horsepower rating associated with it. For example, if you assign the model name "RS11" to a set of engines, when you change the length of one of the "RS11"s, the length will also change for the others

Now select the engine's Type  
 if the type you need is not in the list then press  Edit and the [Edit Engine Attributes](#) dialog for type will open.

Now select the engine's Length  
 if the length you need is not in the list then press  Edit and the [Edit Engine Attributes](#) dialog for Length will open.

Now enter the engine's Horsepower  
. The engine's horsepower, the train's weight, and



track grade is used by the program to calculate how many engines are required when using the "Auto" feature when building trains.

## Now set the engine's Location

and the track on the layout that you created in [Locations](#).



If the engine is off the layout, set the location to none (blank space).

If wish this engine to be part of an

**Optional Consist** , press [Edit](#) which opens the [Edit Engine Consist Attribute](#) dialog where you may enter a consist name. Then select the consist name from the menu box.

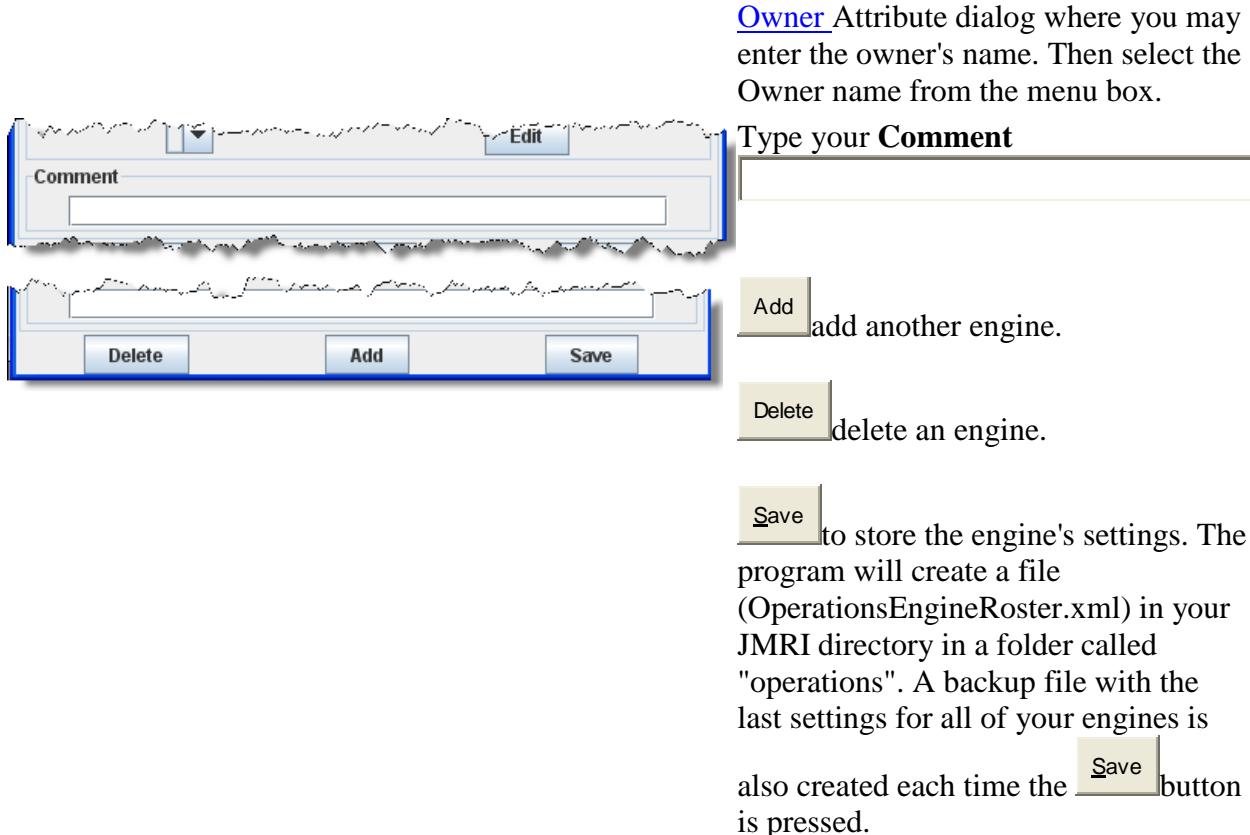
## Synchronize with NCE Consists

If you are using NCE as your DCC command station, you can have the program synchronize your consist numbers with your engines. The program will read all of the consists out of the NCE system and then will search for matching engines in your operations roster. The program will assign the consist name nce\_xxx where xxx is the consist number. To synchronize your consists, select "Synchronize with NCE Consists" under the "Tools" menu.



You may enter the optional **Built** date

Optional **Owner** , if the owner's name is not in the list  
press [Edit](#) which opens the [Edit Engine](#)



Now lets add the engines in the DecoderPro®® Roster created when we programmed our engines. [Import from roster](#)

Now we should have engines in the Operations Engine roster.

Number	Road	Model	Type	Len	Consist	Location	Destination	Train	Moves	Location
1	Electro-M...	SD60	Engine	50				0	Set	Edit
5	AMTRAK	P42	Engine	50				0	Set	Edit
11	AMTRAK	P42	Engine	50				0	Set	Edit
34	AMTRAK	P42	Engine	50				0	Set	Edit
52	AMTRAK	P42	Engine	50				0	Set	Edit
94	AMTRAK	P42	Engine	50				0	Set	Edit
100	Santa Fe	FP45	Engine	50				0	Set	Edit
107	Santa Fe	FP45	Engine	50				0	Set	Edit
300	Santa Fe	F7A	Engine	50				0	Set	Edit
333	AMTRAK	...	Engine	50				0	Set	Edit

Sort by  Number  Road  Model  Consist  Location  Destination  Train  Moves  Built  Owner  
 57 engines

These engines were imported from JMRI Roster, so we will need to edit them to set the correct length, Consist, Location as required.

Press **Edit** to the right of the engine that you wish to edit and the **Edit Engine** window is opened

**Edit Engine**

**Road** UP Edit

**Road Number** 6932 Clear

**Model** DD40X Edit

**Type** Diesel Edit

**Length** 95 Edit

**Horsepower** 5000

**Location** North Yard Track2

**Optional**

**Consist**

**Built**

**Owner** Dale Tripp Edit

**Comment**

**Buttons**: Delete Add Save

I now edit the  
**Road** to

was  
in the roster as  
Union Pacific

**Road Number**  
was imported  
correctly.

**Model** was  
imported  
correctly

**Type** was not in  
Roster so set to

**Length** was set  
to default

so

edit to

which is the  
correct length of  
body not  
including  
couplers.

**Horsepower**  
was not  
imported, so set  
to

as

this model was  
basically two  
2500 HP units  
on a single  
frame.

**Location** is not  
imported from  
the Roster, So I  
located the

engine at  
  
and set on  
.

## Optional

**Consist** not set.

**Built** not entered.

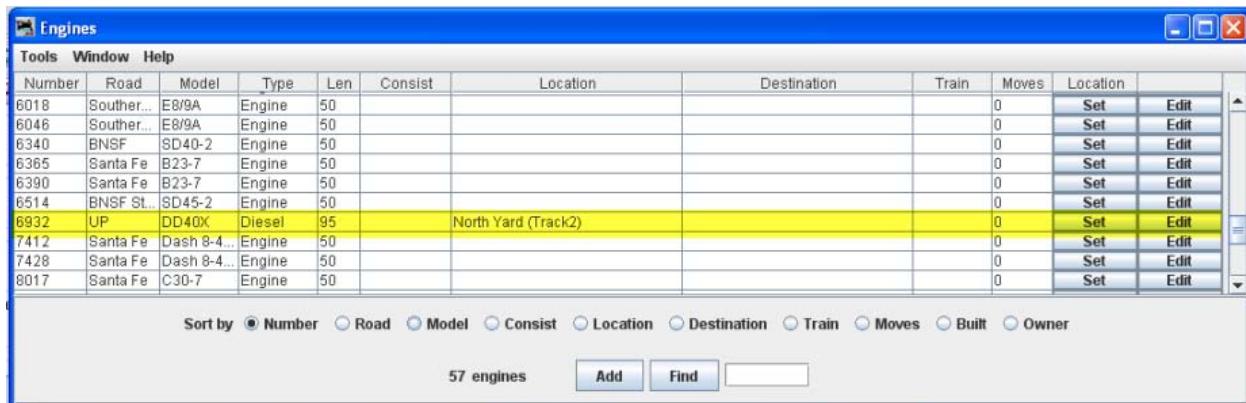
**Owner** is not imported, so selected  
.

No **Comment** for this engine

Now to store  
 press  and this will add the edits to any edited menu item.

  updates your Operations Engine Roster.

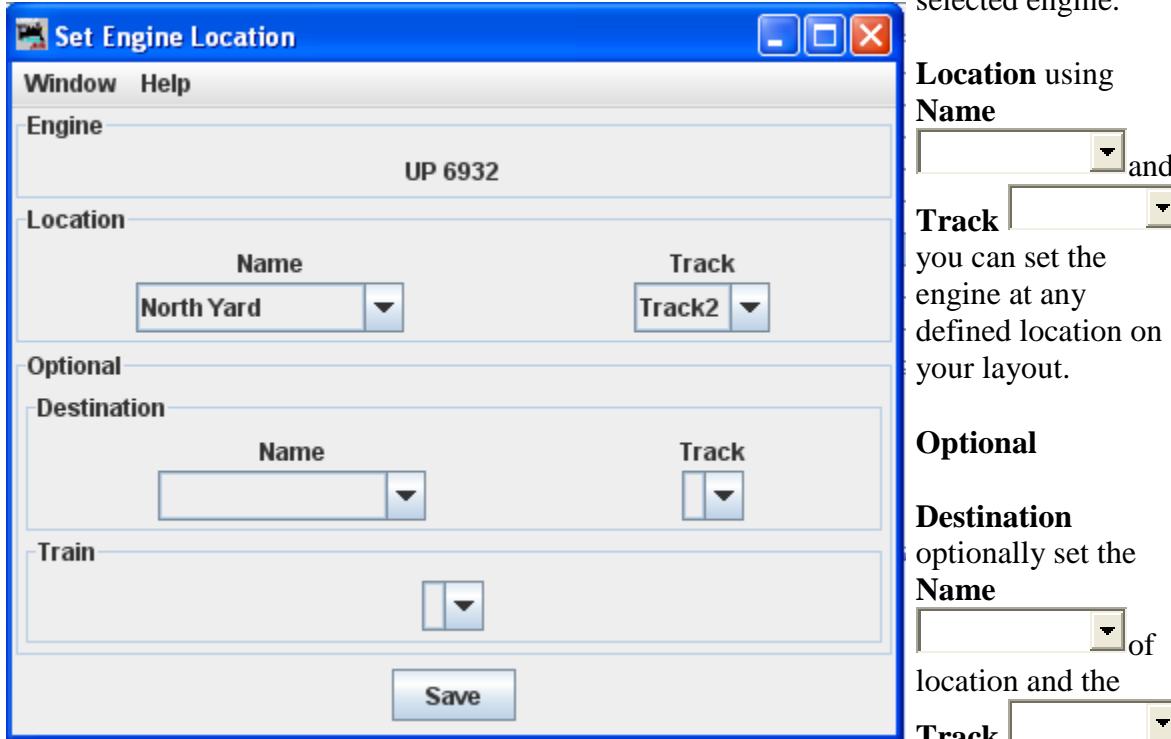
Take a look at the Edited Operations Engine Roster, note the highlighted entry which we just edited.



The **Set** to the right of selected engine, when pressed, opens the Set Engine Location panel and allows you to override the program and set an engine at a location that is defined in your Operations data base.

**Menu** is standard for DecoderPro®®.

**Engine** displays the selected engine.



**Location using Name**

and **Track**

you can set the engine at any defined location on your layout.

### Optional

**Destination** optionally set the **Name**

of location and the **Track**

### Train

optionally set the train.

 **Save** press to save the car locations that you have set.

Close the window when completed.

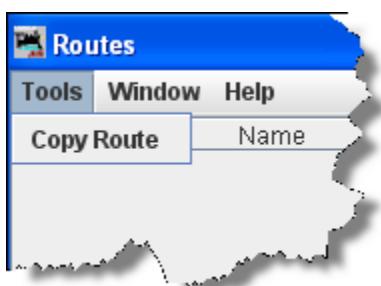
Now that you have your engines stored in the roster, you will need to add [Routes](#) that your trains will use to operate on your layout.

## *ROUTES WINDOW*

A route is a list of locations that a train will visit. Later you can decide if the train stops at a location for work. Routes can be point to point or out and back. The current Routes are shown in the **Routes** window.

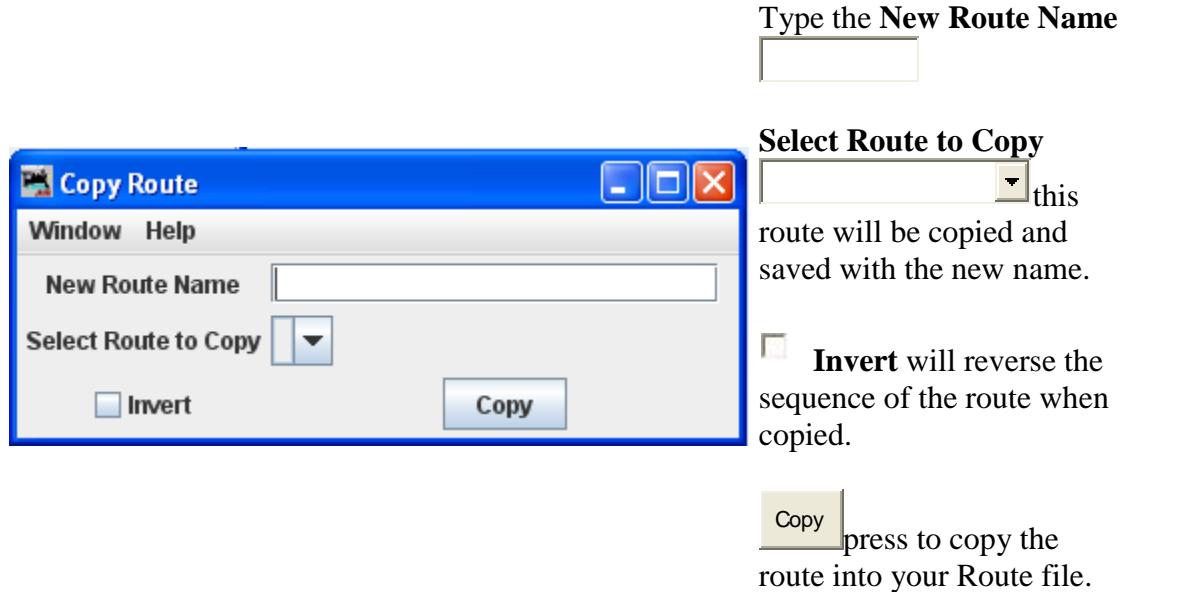


## *MENU BAR*



## **Tools**

**Copy Route** opens the **Route Copy** dialog. This allows you to copy an existing route.



**Window -- Standard DecoderPro®® window menu.**

**Help -- Standard DecoderPro®® Help menu.**

## **Body**

shows existing routes id, name and status.

## **Bottom of window**

**Sort by**  **Name**  **Id** establishes the sort order of the routes.

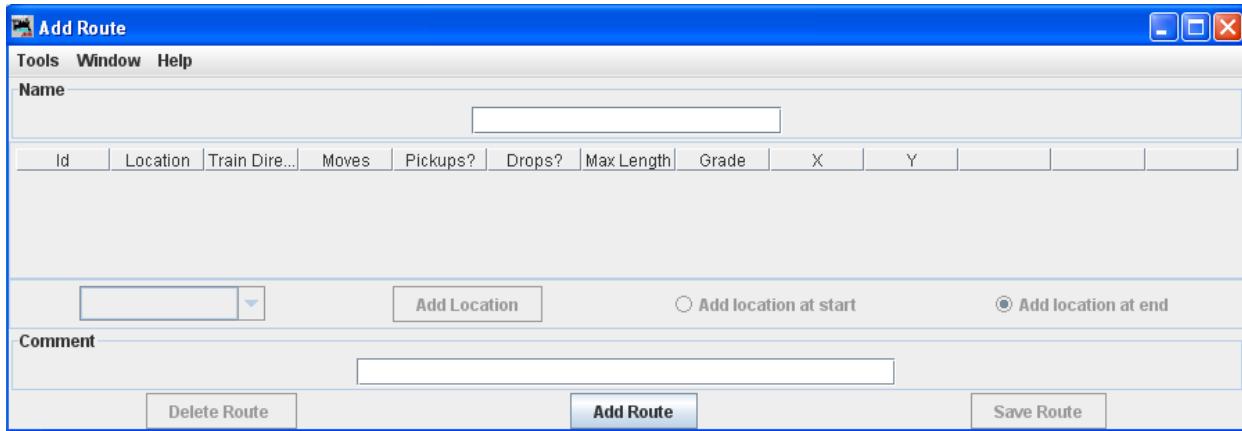
**Add** opens the [Add Routes](#) window to allow you to add routes to your Operations data base.

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## ADD ROUTES

The Add Route Window opens and now you can add a route to your Operations data base.



### Menu Bar

#### Tools

Print -- Prints your Routes.

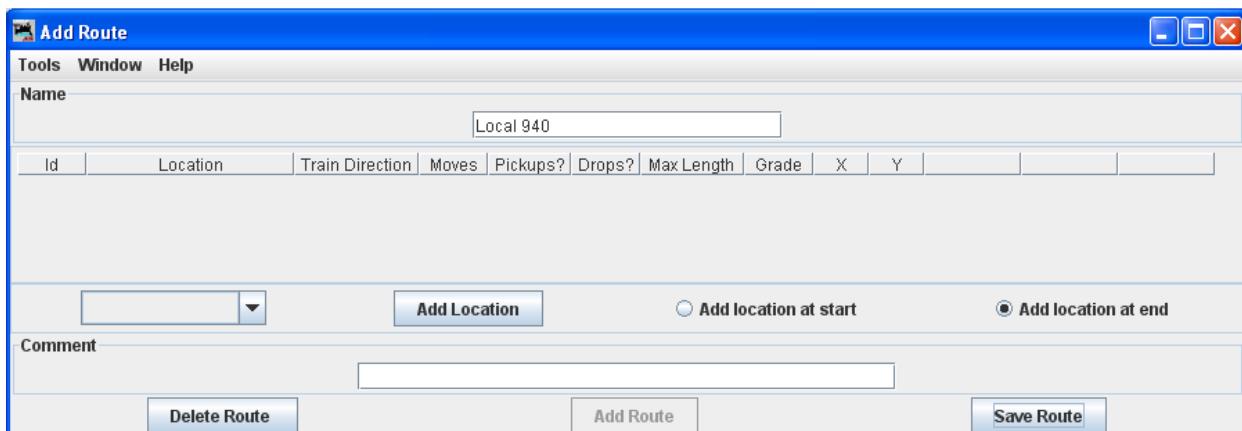
Preview -- Lets you preview the Routes prior to printing.

Window-- Standard DecoderPro®® window menu.

Help -- Standard DecoderPro®® window menu.

Type the route **Name** . Each route must have a unique name.

Then press **Add**  located at the bottom of the window. The Add Route window now activates the attributes required to enter the route.

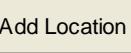


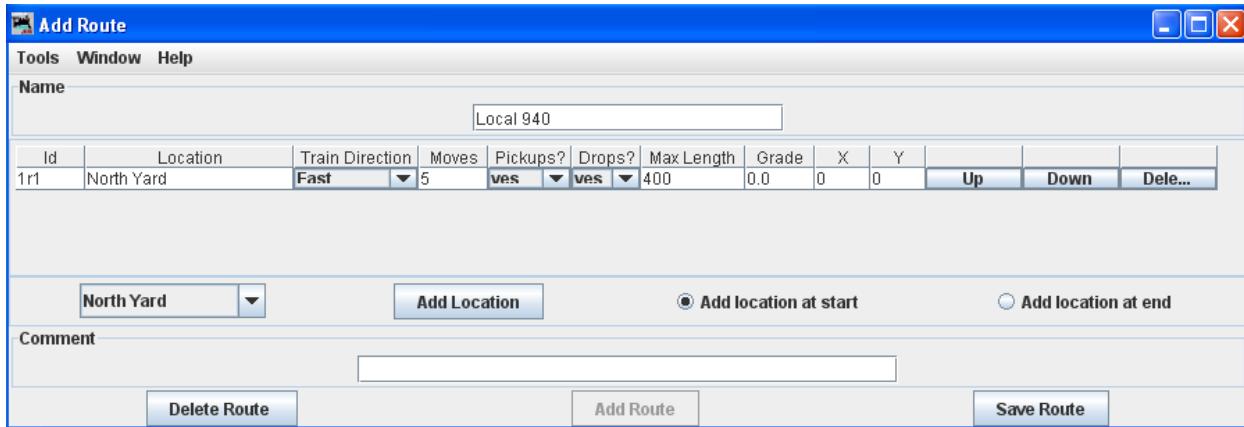
## DecoderPro®® User's Guide Version 2.8

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Now select the location from which the train will depart by selecting the location  located at the left bottom side of the window.

Select  Add location to start  Add location at end

Press  Updated Add Route window will be displayed.

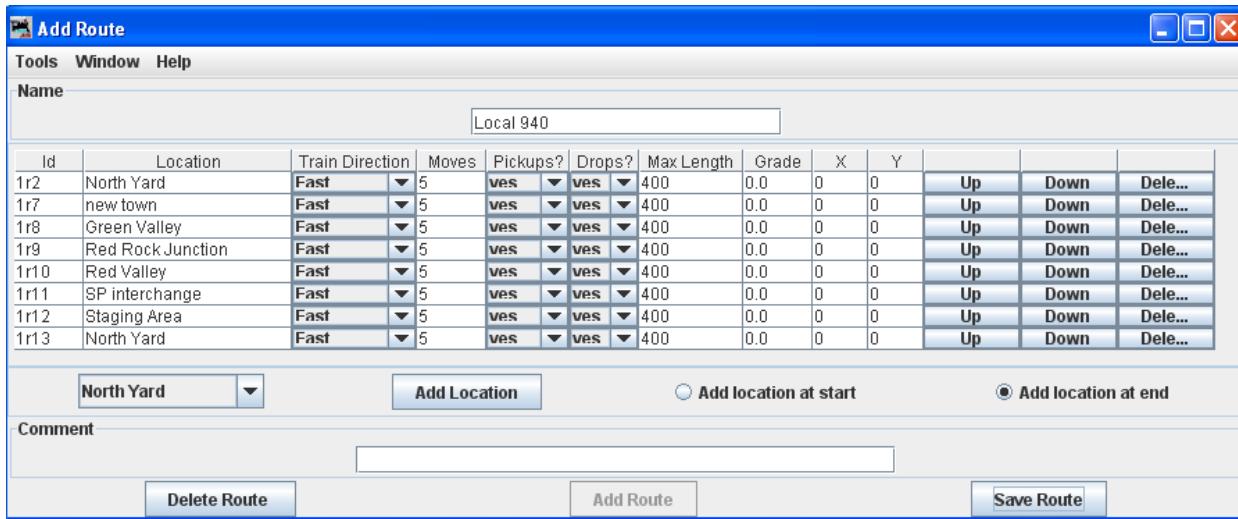


Now build your route by selecting the next location the train will visit, select all locations that the train will pass through even if the train will not work the location. This way your train's engineer will know when reading his manifest the towns he will be traveling through. Each time you add a location to the route, the table shows the order in which the train will visit. You can move a location up or down in the sequence if needed.

We will now add all the locations to the route. Now make sure that  **Add location at end** is selected to add after the first location.

Make sure you press  when you are done with entering the locations.

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We have now added a route that will go around the layout and return to the North Yard.

Each **Location** has the train's departure direction(**Train Direction**), number of desired car **Moves**, and whether car **Pickups?** and or car **Drops?** are allowed at that location.

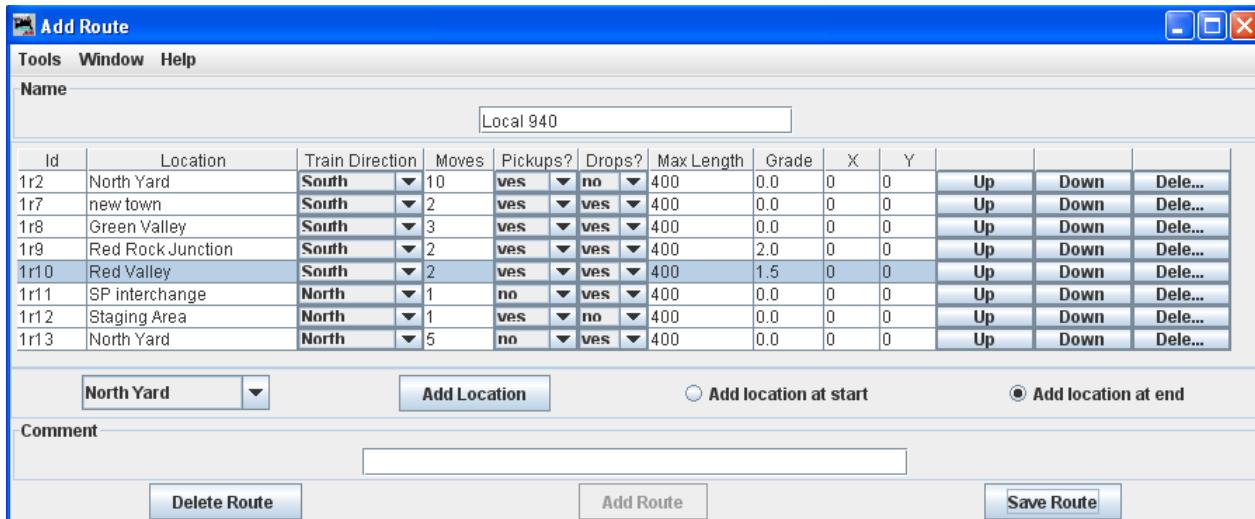
You can also adjust the maximum train length (**Max Length**) that can depart that location. A car move can be a car pickup or car drop at that location. For example, 5 moves can be 5 pickups or 5 drops or any combination of 5 pickups or drops.

The **Grade** is used to determine how many engines the train will require for that segment. The **X** and **Y** are the coordinates on your dispatcher's panel for the optional train icon. You can set the coordinates here, or use the "SetX&Y" train icon popup menu to teach the program where you want the train icon placed when the train is at the specified location. Leave the X and Y coordinates at zero if you want to manually move the icon or you're not using the icon feature. After setting the number of moves, maximum length, or coordinates, click on the table to make sure it is recognized by the program.

Press **Save Route** which save your route. The program will create a file (OperationsRouteRoster.xml) in your JMRI directory in a folder called "operations". A backup file with the last settings for all of your routes is also created each time **Save Route** pressed.

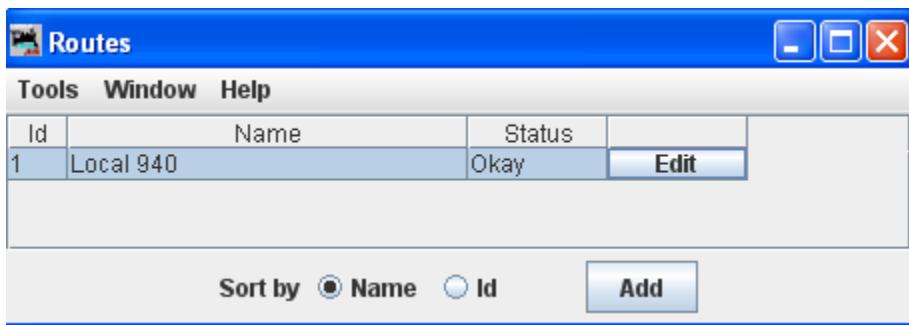
Now we have our first route set up.

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You may start a new route using the Add Route window and entering a new route name and repeat this process for each route.

Now back to the Route window, which will show us a list of all the routes.



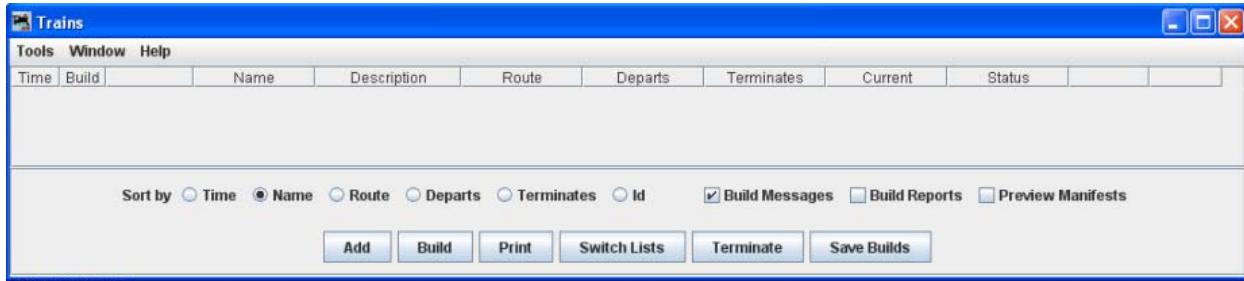
Note that you may press **Edit** on any route and the **Edit Route** window opens which is identical to the **Add Route** window.

You may now press **Add** to add another route, repeating the process just completed.

Now that we have routes setup we need to set up some [Trains](#).

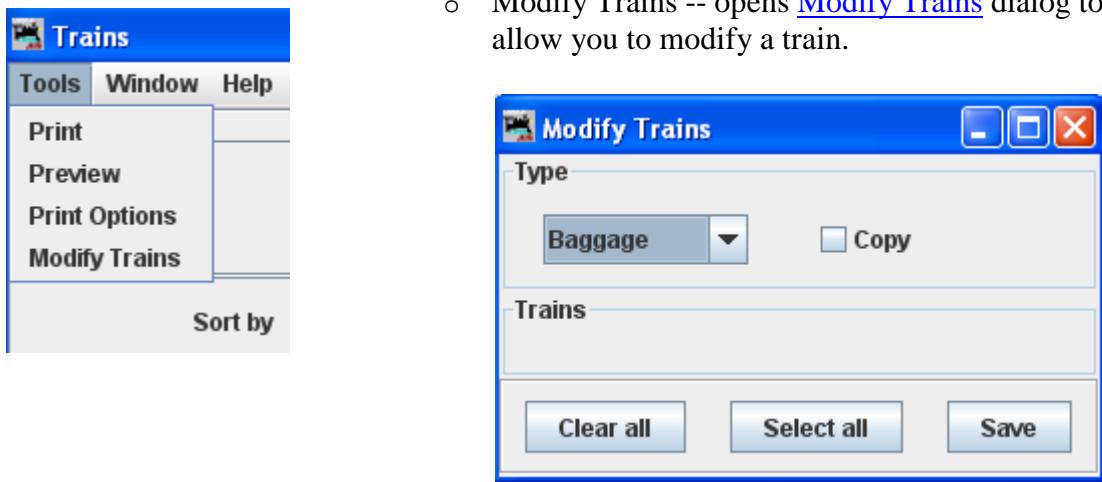
## *TRAINS WINDOW*

The **Trains** window opens which allows you to build trains to run on your layout.



## Menu Bar

- Tools
  - Print -- opens printer dialog for your default printer.
  - Preview -- opens printer dialog for your default printer. OK then preview is displayed.
  - Print Options -- opens [Print Options](#) dialog that lets you set up your manifest printing.
  - Modify Trains -- opens [Modify Trains](#) dialog to allow you to modify a train.



- Windows -- standard DecoderPro®® format.
- Help -- standard DecoderPro®® format.

Select a Sort by  Name (default)

At the bottom of the window is a series of buttons, at this time press Add to open the [Add Train](#) window.

## **ADD TRAIN WINDOW**

**Add Train**

**Tools Window Help**

<b>Name</b> <input type="text"/>	<b>Description</b> <input type="text"/>		
<b>Departure Time (hh:mm)</b> <input type="button" value="00"/> <input type="button" value="00"/>	<b>Route</b> <input type="button" value=""/> <input type="button" value="Edit"/>		
<b>This train services the following locations</b>			
<b>Select car types serviced by this train</b> <input type="checkbox"/> Baggage <input type="checkbox"/> Boxcar <input type="checkbox"/> Caboose <input type="checkbox"/> Coal <input type="checkbox"/> Coilcar <input type="checkbox"/> FlatBHPaper <input type="checkbox"/> FlatBHWo <input type="checkbox"/> FlatBulkHead <input type="checkbox"/> FlatHeavy <input type="checkbox"/> FlatTimber <input type="checkbox"/> FlatTrailer <input type="checkbox"/> FlatWood <input type="checkbox"/> Flatcar <input type="checkbox"/> Gon-scrap <input type="checkbox"/> Gondola <input type="checkbox"/> HopChem <input type="checkbox"/> HopCmnt <input type="checkbox"/> HopCoal <input type="checkbox"/> HopCoal-Ety <input type="checkbox"/> HopGrain <input type="checkbox"/> HopSand			
<b>Select car roads serviced by this train</b> <input checked="" type="radio"/> Accept all <input type="radio"/> Accept only <input type="radio"/> Exclude			
<b>Select engine types serviced by this train</b> <input type="checkbox"/> Diesel <input type="checkbox"/> Electric <input type="checkbox"/> Engine <input type="checkbox"/> Gas Turbine <input type="checkbox"/> Steam			
<b>Train Requires</b> Engines <input type="button" value="0"/> Model <input type="text"/> Road <input type="text"/> <input checked="" type="radio"/> None <input type="radio"/> FRED <input type="radio"/> Caboose    Road <input type="text"/>			
<b>Comment</b> <input type="text"/>			
<input type="button" value="Delete Train"/>	<input type="button" value="Reset Train"/>	<input style="background-color: #ccc; border: 1px solid #ccc; font-weight: bold; color: black;" type="button" value="Add Train"/>	<input type="button" value="Save Train"/>

Enter the train's Name  and optional Description ,

To Add a train press

Both will show up on the train's manifest. The train's name will also show up on the train icon, so short names work best.

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**Add Train**

Tools Window Help

Name: Morning Special      Description: Local Freight

Departure Time (hh:mm): 00:00      Route: [dropdown] Edit

This train services the following locations:

Select car types serviced by this train:

Baggage     Boxcar     Caboose     Coal     Coilcar     FlatBHPaper     FlatBHWood  
 FlatBulkHead     FlatHeavy     FlatTimber     FlatTrailer     FlatWood     Flatcar     Gon-scrap  
 Gondola     HopChem     HopCmmt     HopCoal     HopCoal-Ety     HopGrain     HopSand  
 Hopper     MOW     MOWBox     Passenger     ReefMech     Reefer     ReeferIce  
 Stock     Tank Food     Tank Gas     Tank Kero     Tank Oil     Tank Veg

Select car roads serviced by this train:

Accept all     Accept only     Exclude

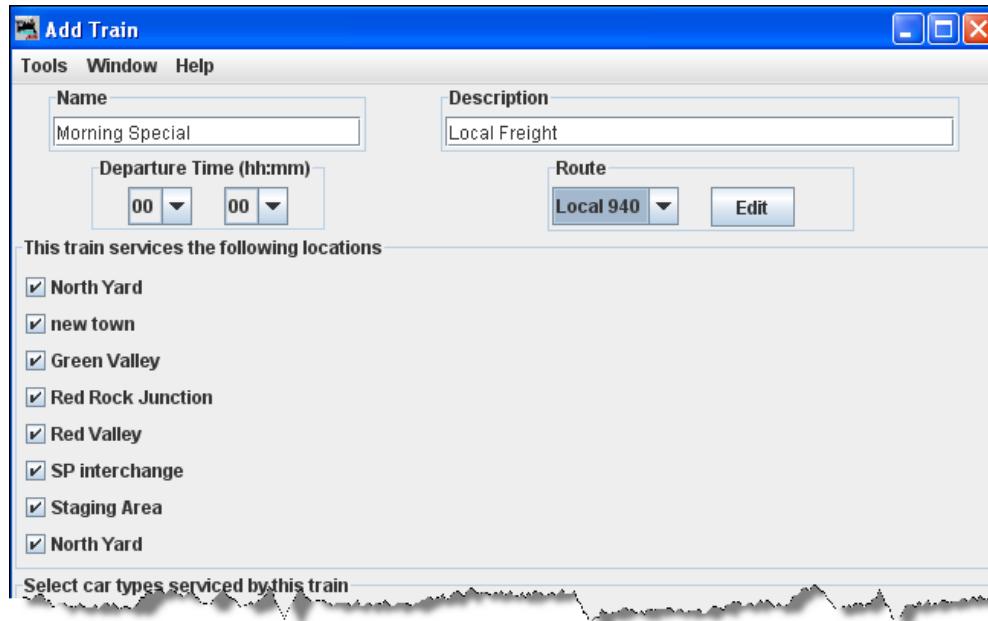
Select engine types serviced by this train:

Diesel     Electric     Engine     Gas Turbine     Steam

Train Requires:

Engines: 0      Model: [dropdown]      Road: [dropdown]  
 None     FRED     Caboose    Road: [dropdown]

Comment: [text input]



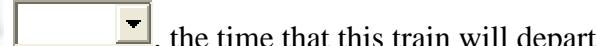
## Select Route



that this train will travel.

There's an  to the right of the route that allows you to directly edit the selected route. Once a route is selected a list of locations that the train will visit should appear. You can deselect any location that you don't want the train to work.

## Set the Departure Time(hh:mm)



, the time that this train will depart the first location in its route. You can use the departure time to sort your trains in the order that you want them built .

Select car types serviced by this train

<input checked="" type="checkbox"/> Baggage	<input checked="" type="checkbox"/> Boxcar	<input checked="" type="checkbox"/> Caboose	<input checked="" type="checkbox"/> Coal	<input checked="" type="checkbox"/> Coilcar	<input checked="" type="checkbox"/> FlatBHPaper	<input checked="" type="checkbox"/> FlatBHWood
<input checked="" type="checkbox"/> FlatBulkHead	<input checked="" type="checkbox"/> FlatHeavy	<input checked="" type="checkbox"/> FlatTimber	<input checked="" type="checkbox"/> FlatTrailer	<input checked="" type="checkbox"/> FlatWood	<input checked="" type="checkbox"/> Flatcar	<input checked="" type="checkbox"/> Gon-scrap
<input checked="" type="checkbox"/> Gondola	<input checked="" type="checkbox"/> HopChem	<input checked="" type="checkbox"/> HopCmmt	<input checked="" type="checkbox"/> HopCoal	<input checked="" type="checkbox"/> HopCoal-Ety	<input checked="" type="checkbox"/> HopGrain	<input checked="" type="checkbox"/> HopSand
<input checked="" type="checkbox"/> Hopper	<input checked="" type="checkbox"/> MOW	<input checked="" type="checkbox"/> MOWBox	<input checked="" type="checkbox"/> Passenger	<input checked="" type="checkbox"/> ReefMech	<input checked="" type="checkbox"/> Reefer	<input checked="" type="checkbox"/> ReeferIce
<input checked="" type="checkbox"/> Stock	<input checked="" type="checkbox"/> Tank Food	<input checked="" type="checkbox"/> Tank Gas	<input checked="" type="checkbox"/> Tank Kero	<input checked="" type="checkbox"/> Tank Oil	<input checked="" type="checkbox"/> Tank Veg	

You can determine what type of rolling stock the train will service. Select the Rolling stock the train will carry by clicking on the appropriate check boxes. A checked box means the train will service this type of rolling stock.

Select car roads serviced by this train

Accept all  Accept only  Exclude

Select car types serviced by this train

You can control the car road names that the train will service. If the train will service any road name, select  Accept all.

If you want to accept only some road names, select  Accept

only.  
Then use  
the menu  
of road  
names and

Add Road

to make a  
list of road  
names that  
the train  
will  
service. To  
remove a  
road name  
from your  
list, select  
the road  
name from  
the menu  
and use the

Delete Road

To build a  
list of road  
names that  
the train  
will not  
service,  
select

Exclude

Use the  
menu of  
road names  
and the

Add Road

to build a  
list of  
roads that  
this train  
will not  
service.



Select engine types serviced by this train by checking all required engine types.

you can control the number of engines that will be assigned to this train, and optionally, the engine's model and road name. If you want two or more engines assigned to a train, the engines must be part of a consist. If you select "Auto", the program will calculate the number of engines required for this train based on the weight of the train,



the track grade, and the horsepower of the engines.

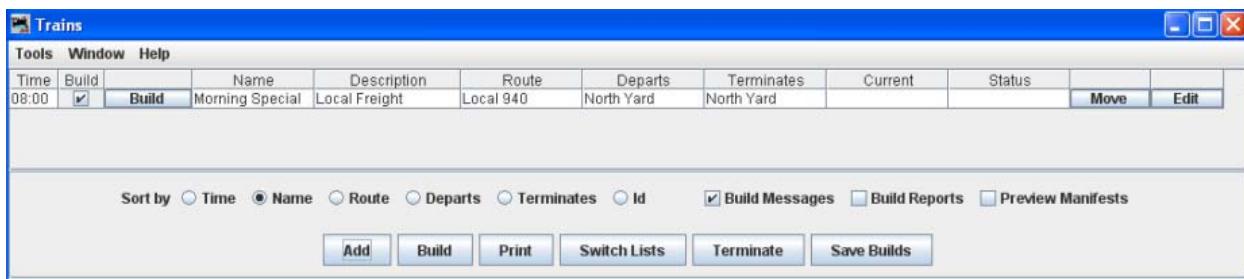
You can also require a caboose or car with FRED (Flashing Rear End Device) as the last car in the train, and you can optionally specify the road name for the caboose or car with FRED. If you leave the road name blank, the program will try and find a caboose with the same road name as the engine.



**Reset Train** allows you to remove engines and cars that have been assigned to a train. Useful when you want to try various build options and don't what to physically move engines and cars on the railroad.

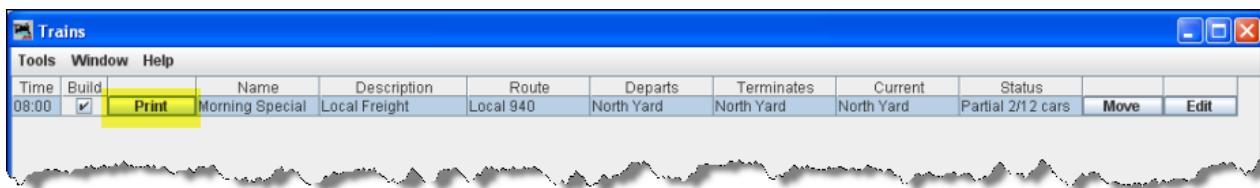
Press **Save Train** to save your train. The program will create a file (OperationsTrainRoster.xml) in your JMRI directory in a folder called "operations". A backup file with the last settings for all of your trains is also created each time the **Save Train** is pressed.

Note that the train we created is shown in the **Trains** window.

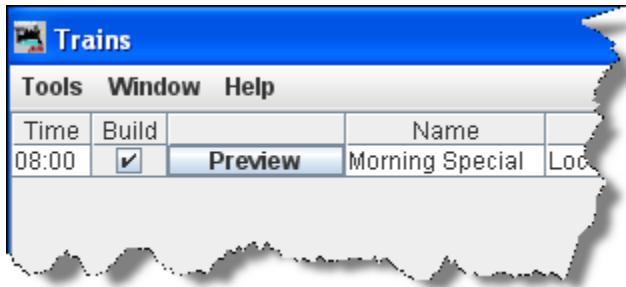


## Building Trains

To build one train, press **Build** in the row for the desired train in the **Trains** panel. After the train is built **Build** changes to **Print**.



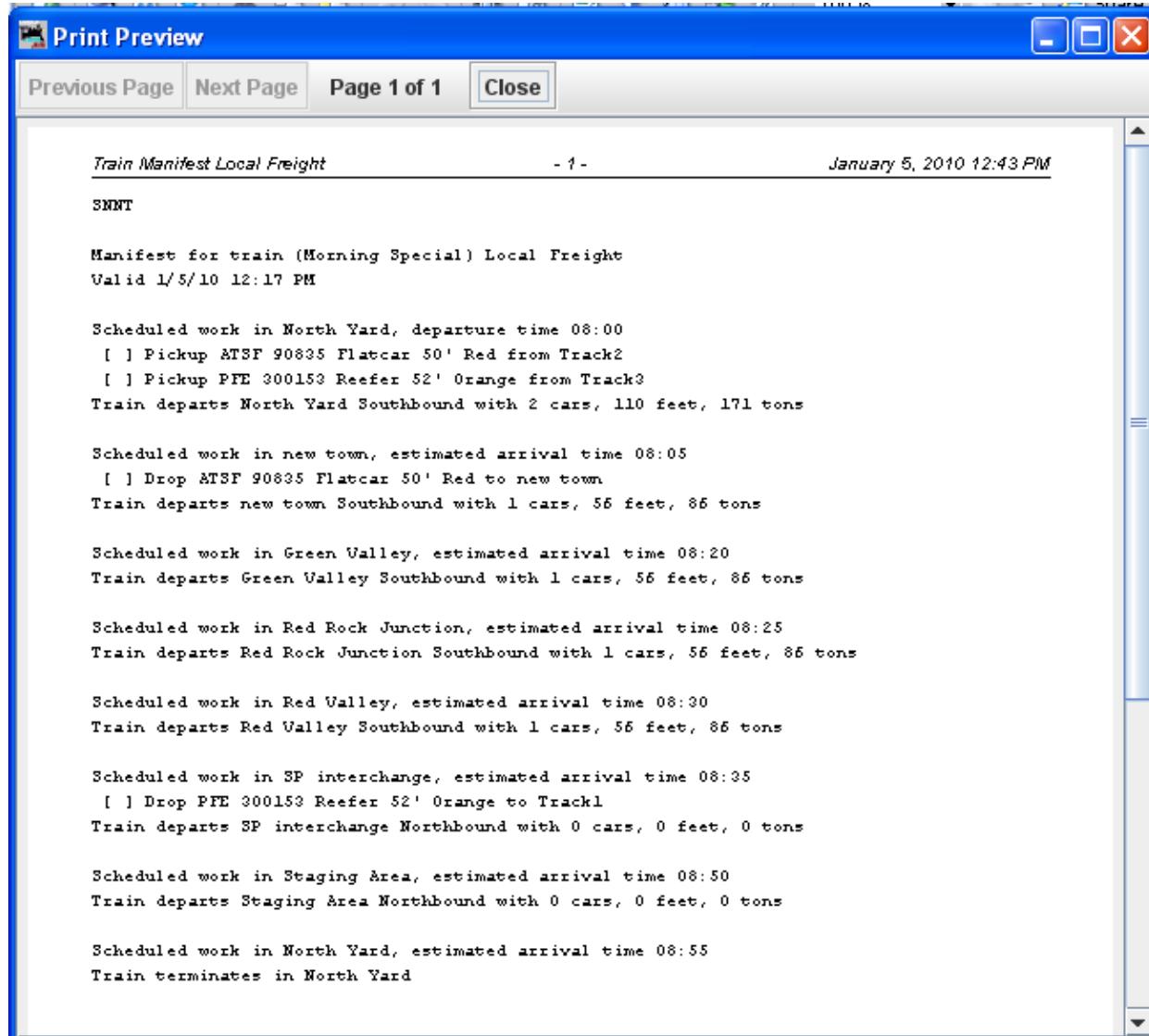
If you want to review how the train was built, select the  **Build Reports** before pressing **Preview** for the desired train. If the  **Preview Manifest** is selected, the program will generate the build report and manifest and present them in preview windows.



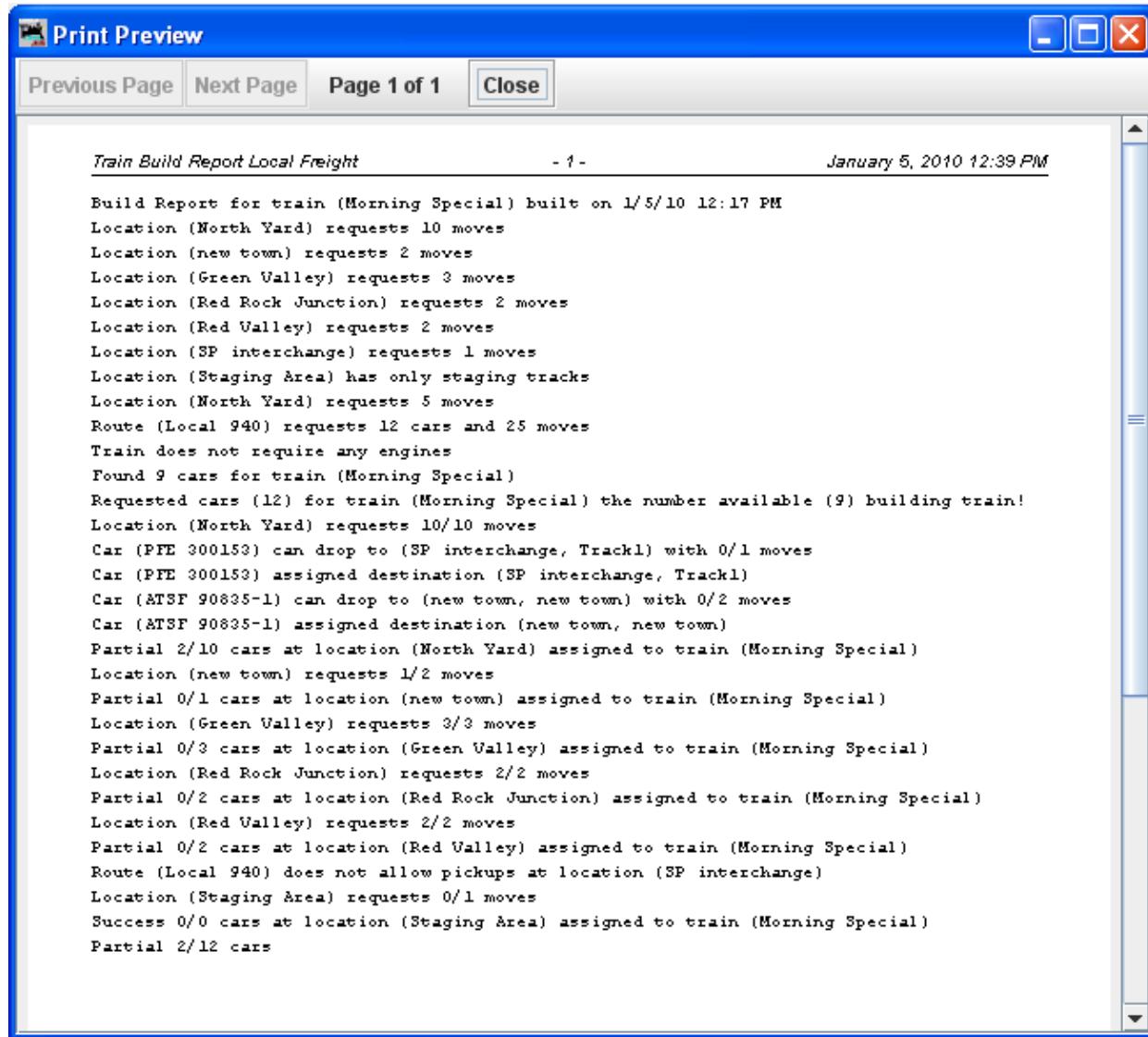
If you want to build several trains without having to press individual buttons for each train, select the trains that you want built in the **Build** column  and press **Build** found at the bottom of the trains panel. The program will then build manifests for all of the selected trains.

If a train fails to build, the **Move** button will change its text to **Report**. Pressing **Report** will print or preview the build report for this train. Whenever a train fails to build, a build failure message will appear. If you want to disable this feature deselect the checkbox  **Build Messages**.

With  **Preview Manifest** press **Preview** and the Train Manifest is previewed, then you may print the manifest using your system print dialog.



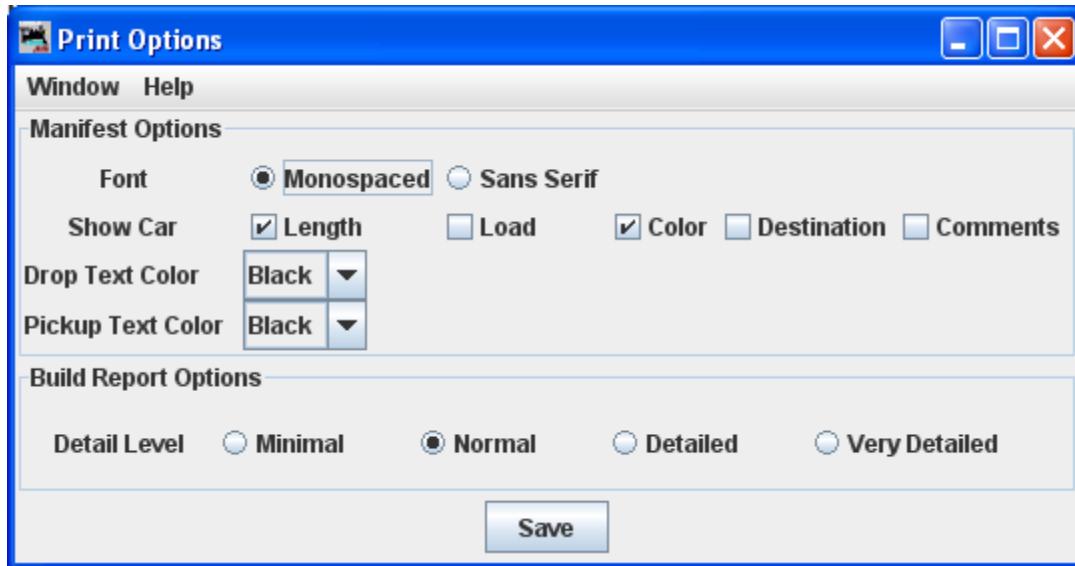
With  **Preview Manifest**,  **Build Reports** and  **Build Messages** selected, press Preview and all the Reports and Train Manifest are previewed, then you may print the desired reports or manifest using your system print dialog.



## Problems Building Trains

If you have a problem building a train you can select the  **Build Reports** checkbox at the bottom of the train panel. When a build fails for any reason and the  **Build Reports** checkbox is selected, the program will send a report to your printer if the  **Preview Manifests** isn't selected; or to a preview window if the  **Preview Manifests** is selected. The build report can print out different levels of detail, from minimal to very detailed. See the Settings section [Build Report Details](#) for more information on how to change the build report detail level.

## Print Options



You can modify the how the program prints the train manifests and the amount of detail that the build report provides.

### Manifest Options

**Font**  **Monospaced**  **Sans Serif**

The program supports two types of fonts for printing. Select the desired font.

**Show Car Length**  Shows the car length in your manifests and switch lists.

**Load** optional show whether the car is empty or loaded.

When a car is delivered to a siding the load state will change. You can also create your own loads but there are restrictions. Cars with **loads** other than empty or loaded can only be serviced by sidings with a [Schedule](#). It is strongly recommended that you not create your own loads until you become very familiar with how the program works. For many operators, showing whether the car is empty or loaded adds just enough realism to their operations.

**Color** Select if you want the car's color shown in your manifests and switch lists.

**Destination** If you want your manifest and switch lists to show the cars destination when picking it up. The program always provides the car's destination when dropping a car from the train.

**Comments** For each car or engine in your roster, you can have an optional comment. Adds comment added to your manifest and switch lists,

**Drop Text Color**  You can select the text color of your manifest when the operation is to drop off a car.

**Pickup Text Color**  You can select the text color of your manifest when the operation is to pick up a car.

## Build Report Options

**Detail Level** You can adjust the amount of information that the build report will show. Select one of the four levels. The program when generating the build reports stores the **Very Detailed** information to disk.

- Minimal** -- provides the least amount of information.
- Normal** -- setting shows which engines and cars are being excluded from the train, and which engines and cars are being picked up and dropped.
- Detailed** -- setting will generate quite a few pages depending on the size of your railroad. It will show all available cars and engines, and a bit how the program finds destinations for the cars and engines.
- Very Detailed** -- setting produces the most pages, and will show why cars are not picked up or dropped.

Be sure and press  after changing the build report selection.

## Build Report Details

You can adjust the amount of information that the build report will show. Select one of the four levels using the radio buttons. The program when generating the build reports stores the "Very Detailed" information to disk. The radio buttons control how much of that data is actually printed. The "Minimal" radio button provides the least amount of information and "Very Detailed" provides the most. If you're only interested why a train won't build, the "Minimal" setting can provide you with this information. The "Normal" setting shows which engines and cars are being excluded from the train, and which engines and cars are being picked up and dropped. The "Detailed" setting will generate quite a few pages depending on the size of your railroad. It will show all available cars and engines, and a bit how the program finds destinations for the cars and engines. The "Very Detailed" setting produces the most pages, and will show

why cars are not picked up or dropped. Be sure and press  after changing the build report selection.

Add

Opens the **Add Trains** panel so that you may add another train.

Build

press the button in the row for the desired train in the **Trains** panel. The button will become or after the train is built. If you want to review how the train was built, select the  **Build Reports** before

pressing the or for the desired train. If the  **Preview Manifest** is selected, the program will generate the build report and manifest and present them in preview windows. If you want to build several trains without having to press individual buttons for each train,

select the trains that you want built and press found at the bottom of the trains panel. The program will then build manifests for all of the selected trains.

If a train fails to build, the will change its text to . Pressing will print or preview the build report for this train. Whenever a train fails to build, a build failure message will appear. If you want to disable this feature deselect the checkbox  **Build Messages**.

Print

This will be **Print** or **Preview** dependent upon checkbox settings at the bottom of the panel.

Switch Lists

Press the if you want a switch list printed for a given location. A menu will appear that allows you to select which locations to preview or print. Once you've determined which locations you want to print or preview, press the to keep your selections.

Terminate

When you terminate a train, you are asking the program to move the train from its current location to its final destination. The cars and engines associated with the train will be picked up and delivered to the locations shown in the train manifest. To terminate several trains, select the trains you wish to terminate in the build column and press the at the bottom of the **Train** panel.

Save Builds

Pressing this button causes the program to update the train, car, engine, and location xml files. Any time you **Move** a train the operations program will make changes to the train, car, engine, and location databases. These databases must be saved before you shut down JMRI, otherwise you will lose all of the changes that the operations program made to move a train to the next location. Pressing this button before quitting JMRI allows the

operations program to resume exactly at the point where you pressed the

**Save Builds**

## Building Multiple Trains for a Session

Most operating sessions require more than one train to keep your operators busy. The correct way to do this is to build and print all of the trains needed before terminating them. So if you need a dozen trains for a session, you must build twelve trains before you terminate any one train. Terminating a train tells the program that the engines and cars in that particular train have been delivered to their final locations and can be used again when building new trains. So always build all, print all, THEN terminate each train after completing its run! It is okay to build all

trains, print all train, and then use the **Save Builds** and shut down the program. Later you can restart the program and terminate the trains that completed their runs.

The correct time to terminate a train is when the train actually arrives at its destination. Terminating a train before it completes its run means that the operation database believes that the engines and cars have been delivered. It is better to build and print twelve trains and then later find out that only nine trains completed their runs. You would then terminate nine trains, and leave the other three for next time. Or if you wish you could reset any trains that didn't depart from their terminal. Resetting trains really isn't necessary, the trains that didn't run during this session could run during the next session.

An alternate method is to build, print, and use the **Move** for each train to track the actual movement of the trains during your session. As long as the trains on your layout match the locations in the program you can build a new train.

## Moving Trains

After providing your operators with a printed manifest or location switch list, you must keep the program database synchronized with the actual movement of trains on your layout. This is done

by the **Move** located on the far right of the train menu. Pressing the **Move** will cause the train to depart its current location move to the next location in the route. The engines and cars assigned to the train will travel to the next location on the railroad. At each location, cars can be picked up

or dropped off. You can also move a train by selecting the train's icon and selecting **Move** from the icon's popup menu. Each press of the **Move** moves the train closer to its terminal location.

When the train arrives at the last location in the route, the last press of the **Move** will terminate the train. Once a train is terminated, you can build it again.

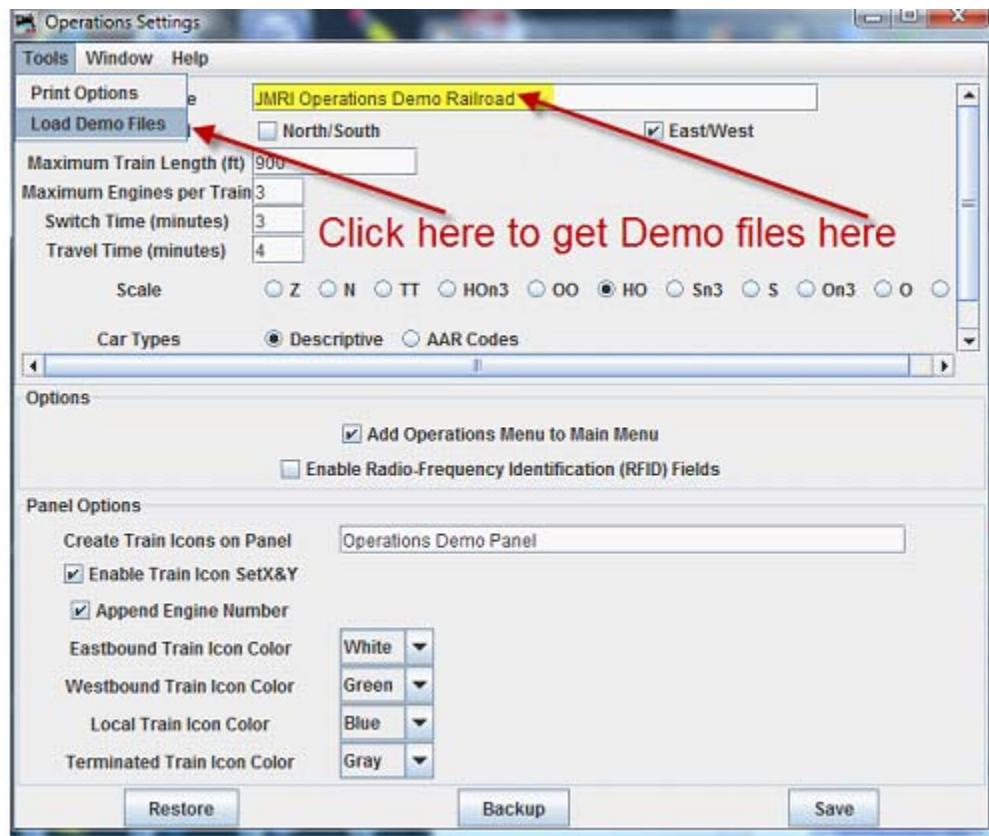
Each time an engine or car is moved a count associated with them is incremented. The program uses this to determine which cars haven't moved recently and tries to select cars with the least

number of moves when building new trains. Each time a location has a car picked up or dropped, the program increments a count associated with that location. The program tries to move cars to locations that have experienced the least number of car operations.

## A TRIP THROUGH OPERATIONS

Well, we've had an overview of Operations, so let's see if we can make it work. We could sit down and enter a whole bunch of information into the Locations, Cars, Engines, Routes and Trains screens or do it the easy way and use the built-in Demo Railroad. Since this is a training (pun intended) exercise, we'll use the Demo files.

To get the demo files entered, Go to the main menu and click on Tools, scroll all the way to the bottom to select Operations, and slide sideways to select Settings. On the Operations Settings screen click the box marked Tools and slide down and click on Load Demo Files.



Now go back to the DecoderPro® main menu to quit and then re-start the program. When the program presents the main DecoderPro® screen, click on Tools, scroll all the way to the bottom to select Operations, slide sideways and this time click on Locations. You should have a Locations Screen that looks like this:

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Id	Name	Length	Used	Rolling Stock	Pickups	Drops	
78	Bakersfield	6573	2927	63	0	5	<a href="#">Edit</a>
60	Danville	2540	1166	24	0	0	<a href="#">Edit</a>
5	Farmington	1981	1528	35	0	0	<a href="#">Edit</a>
89	Fremont	715	569	12	0	0	<a href="#">Edit</a>
83	Hillsboro	2157	943	21	2	15	<a href="#">Edit</a>
92	Lakeview	5200	543	10	0	0	<a href="#">Edit</a>
84	Port Arthur	1697	425	9	0	0	<a href="#">Edit</a>
91	Susamsville	3200	1118	24	0	0	<a href="#">Edit</a>

If you select Lakeview and click on the Edit box way over on the right of the entry for Lakeview, you'll see a screen like that below, showing that Lakeview is a staging area that can accommodate almost any kind of car. This will be the starting point for our mythical trip.

This location is serviced by trains traveling

East       West

Select the rolling stock serviced by this location

<input checked="" type="checkbox"/> Baggage	<input checked="" type="checkbox"/> Boxcar	<input checked="" type="checkbox"/> Caboose	<input checked="" type="checkbox"/> Coal	<input checked="" type="checkbox"/> Coilcar	<input checked="" type="checkbox"/> Flat	<input checked="" type="checkbox"/> Flat Timber
<input checked="" type="checkbox"/> FlatBH	<input checked="" type="checkbox"/> FlatBHP	<input checked="" type="checkbox"/> FlatBHwd	<input checked="" type="checkbox"/> FlatTimb	<input checked="" type="checkbox"/> FlatTrail	<input checked="" type="checkbox"/> FlatWood	<input checked="" type="checkbox"/> Flatcar
<input checked="" type="checkbox"/> Gon-pipe	<input checked="" type="checkbox"/> Gon-scrap	<input checked="" type="checkbox"/> Gondola	<input checked="" type="checkbox"/> HopChem	<input checked="" type="checkbox"/> HopCmmt	<input checked="" type="checkbox"/> HopCoal	<input checked="" type="checkbox"/> HopCoal-E
<input checked="" type="checkbox"/> HopGrain	<input checked="" type="checkbox"/> HopSand	<input checked="" type="checkbox"/> Hopper	<input type="checkbox"/> MOW	<input type="checkbox"/> MOWBox	<input checked="" type="checkbox"/> Passenger	<input checked="" type="checkbox"/> Reefer
<input type="checkbox"/> Reefer Milk	<input checked="" type="checkbox"/> Reefer Meat	<input checked="" type="checkbox"/> ReeferIce	<input checked="" type="checkbox"/> Stock	<input checked="" type="checkbox"/> Tank Chem	<input type="checkbox"/> Tank Corn Sv	<input checked="" type="checkbox"/> Tank Food

Operations at this location

Sidings  Yards  Interchange  Staging only

Id	Staging Name	Length	Used	Reserved	Cars	Engines	Pickups	Drops	
92s1	#94 Yard Track	1300	0	0	0	0	0	0	<a href="#">Edit</a>
92s2	#95 Yard Track	1300	0	0	0	0	0	0	<a href="#">Edit</a>
92s3	#96 Yard Track	1300	0	0	0	0	0	0	<a href="#">Edit</a>
92s4	#97 Yard Track	1300	543	0	8	2	0	0	<a href="#">Edit</a>

Add Staging Track

Comment

Staging

Delete Location    Add Location    Save Location

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We will now exit the description screen for Lakeview by clicking the red X in the upper right. Next, let's take a look at what's available to make up our train. The Cars Screen is loaded with entries from which the Operations Program can choose, so many that there's a slider on the right to scroll the list. Again clicking on the Edit box on the right we could see the specifics of any one car and of course Edit the data (if it was our own). We won't bother.

The screenshot shows a Windows application window titled "Cars". The main area is a grid table with columns: Number, Road, Type, Len, Color, Kernel, Location, Destination, Train, Owner, and Location. The table contains numerous entries, mostly consisting of "Boxcar" type cars with various road numbers (e.g., 82, 83, 84, 85, 101, 102, 104, 105, 208, 259, 352, 401, 447, 482, 500, 505, 508, 606, 607, 631) and colors (e.g., Yellow, Tuscan, Black, Blue, Green, Brown, Grey, Gray, Green, Black, Tuscan). The "Edit" column for each row contains a small red "X" icon. At the bottom of the table, there is a "Sort by" dropdown menu and several filter checkboxes. Below the table, there are buttons for "Add", "Find", and a search input field. The status bar at the bottom indicates "269 cars".

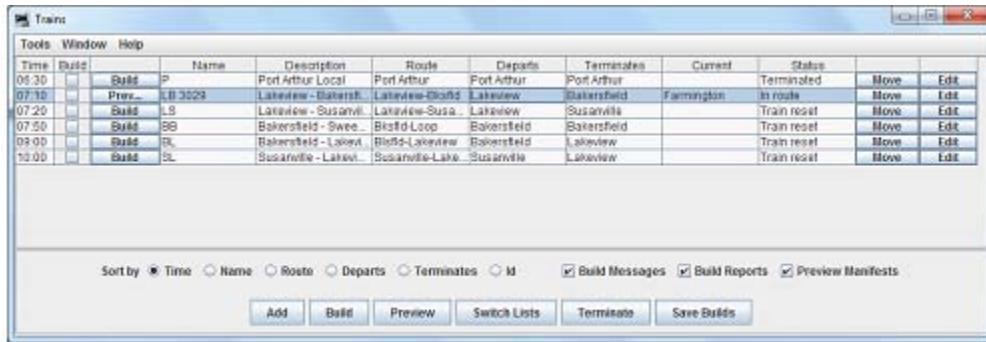
Of course, we'll need Motive Power to pull our train, so let's look at what's in the Engines stable.

The screenshot shows a Windows application window titled "Engines". The main area is a grid table with columns: Number, Road, Model, Type, Len, Consist, Location, Destination, Train, Moves, and Location. The table contains entries for various locomotives, mostly "Diesel" type engines with road numbers such as 1017, 1019, M33, 5141, 5023, 3029, 4802, 4805, 5010, 6151, 4160, 5162, 5166, 6294, and 5107. The "Edit" column for each row contains a small red "X" icon. At the bottom of the table, there is a "Sort by" dropdown menu and several filter checkboxes. Below the table, there are buttons for "Add", "Find", and a search input field. The status bar at the bottom indicates "15 engines".

Since we know we're departing from Lakeview we probably want to eyeball that pair of Trainmasters sitting over on track #97. The Command Station on our Demo railroad is obviously an NCE product because these locos are assigned NCE consist #118.

So how does Operations REALLY work?? Well, once you have all the data entered as we've seen above, we can generate a set of manifests for the train operations. To do this we use the Trains Screen:

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Here there are several trains ready to build. The highlighted train is #LB3029 from Lakeview to Bakersfield. By putting a check mark in the box under build and then clicking the Build Box at the bottom of the screen we were able to get the manifest built so that we can preview it. It's a short run, but still takes more than one page of fine print instructions for the crew.

*Train Manifest Lakeview - Bakersfield* - 1 - January 8, 2010 3:27 PM  
JMRI Operations Demo Railroad

Manifest for train (LB) Lakeview - Bakersfield  
Valid 1/8/10 3:28 PM  
Staging to large yard with sidings and interchange  
[ ] Engine SP 3023 (TRAINMASTER) assigned to this train  
[ ] Engine SP 3020 (TRAINMASTER) assigned to this train  
Pickup engine(s) at Lakeview, #05 Yard Track

Scheduled work in Lakeview, departure time 07:10  
[ ] Pickup ATSF 180224 HopCoal 31' Tuscan from #05 Yard Track  
[ ] Pickup B&O 320008 HopCoal 31' Black from #05 Yard Track  
[ ] Pickup B&O 320124 HopCoal 31' Black from #05 Yard Track  
[ ] Pickup B&O 321603 HopCoal 31' Black from #05 Yard Track  
[ ] Pickup B&O 321602 HopCoal 31' Black from #05 Yard Track  
[ ] Pickup MILW 94637 HopCoal 39' Tuscan from #05 Yard Track  
[ ] Pickup PRR 220005 HopCoal 31' Tuscan from #05 Yard Track  
[ ] Pickup PRR 220189 HopCoal 31' Tuscan from #05 Yard Track  
[ ] Pickup PRR 220287 HopCoal 31' Tuscan from #05 Yard Track  
[ ] Pickup PRR 723035 HopCoal 42' Black from #05 Yard Track  
[ ] Pickup RUT 10025 HopCoal 31' Black from #05 Yard Track  
[ ] Pickup WDLX 101 HopCoal 31' Orange from #05 Yard Track  
[ ] Pickup WDLX 102 HopCoal 31' Orange from #05 Yard Track  
[ ] Pickup WDLX 104 HopCoal 31' Orange from #05 Yard Track  
[ ] Pickup WDLX 105 HopCoal 31' Orange from #05 Yard Track  
[ ] Pickup BM 401 Caboose 34' Blue from #05 Yard Track  
Train departs Lakeview Westbound with 16 cars, 716 feet, 1012 tons

Scheduled work in Farmington, estimated arrival time 07:14  
Train departs Farmington Westbound with 16 cars, 716 feet, 1012 tons

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---

Scheduled work in Hillsboro, estimated arrival time 07:18  
[] Pickup SP 163049 Boxcar 40' Silver from Railroad Express  
[] Pickup CRR 47003 HopCoal 33' Black from yard  
[] Drop ATSF 180224 HopCoal 31' Tuscan to yard  
[] Drop B&O 320086 HopCoal 31' Black to yard  
[] Drop B&O 320124 HopCoal 31' Black to yard  
[] Drop B&O 321603 HopCoal 31' Black to yard  
[] Drop B&O 321682 HopCoal 31' Black to yard  
[] Drop MILW 04537 HopCoal 33' Tuscan to yard  
[] Drop PRR 220005 HopCoal 31' Tuscan to yard  
[] Drop PRR 220188 HopCoal 31' Tuscan to yard  
[] Drop PRR 220207 HopCoal 31' Tuscan to yard  
[] Drop PRR 723035 HopCoal 42' Black to yard  
[] Drop RUT 10025 HopCoal 31' Black to yard  
[] Drop WDLX 101 HopCoal 31' Orange to yard  
[] Drop WDLX 102 HopCoal 31' Orange to yard  
[] Drop WDLX 104 HopCoal 31' Orange to yard  
[] Drop WDLX 105 HopCoal 31' Orange to yard  
Train departs Hillsboro Westbound with 3 cars, 250 feet, 208 tons

Train Manifest Lakeview - Bakersfield

- 2 -

January 8, 2010 3:27 PM

Scheduled work in Danville, estimated arrival time 08:13  
Train departs Danville Westbound with 3 cars, 250 feet, 208 tons

Scheduled work in Port Arthur, estimated arrival time 08:17  
Train departs Port Arthur Westbound with 3 cars, 250 feet, 208 tons

Scheduled work in Bakersfield, estimated arrival time 08:21  
[] Drop SP 163049 Boxcar 40' Silver to #68 Heritage Fum  
[] Drop CRR 47003 HopCoal 33' Black to yard  
[] Drop BM 401 Caboose 34' Blue to Caboose Track  
[] Drop engine(s) to Engine Terminal  
Train terminates in Bakersfield

We pick up our engines in Lakeview and head over to the yard to gather up a bunch of cars and a caboose. Then we get ready to depart at 7:10 on the fast clock. We should arrive at Farmington at 7:14, and since there were no Farmington bound cars in Lakeview, and nothing in Farmington bound for Hillsboro or Bakersfield, the program has scheduled no work to do at Farmington. So we'll keep going. When we arrive at Hillsboro (hopefully at 7:18), we have some set-outs and pick-ups to attend to. Then, we're off to Bakersfield, gliding through Danville and Port Arthur on the way. Arriving at Bakersfield right on time at 8:21, we drop the boxcar at Heritage Furniture, the Coalhopper in the yard, and slide the caboose gently into the caboose track. Now we can take the motive power over to the engine terminal and call in to Dispatch asking for the trip to be terminated.

The trip is terminated by selecting it in the Trains screen and clicking the terminate button. This would then enter the new locations of the rolling stock into the data screens and release them for the next build.

So that wasn't so difficult, was it? Hope you enjoyed your cab ride.

## CHAPTER 9 - DECODER DEFINITION

### *GETTING STARTED*

#### *GETTING STARTED ON A DECODER DEFINITION*

In this part of the manual we will introduce you to the process of creating a file to describe a new decoder. You might benefit from reading the other sections of the DecoderPro® user guide to get background information, especially the XML introduction [Intro to XML files](#) and the section on what the configuration files contain [Configuration files](#).

The easiest way to create a configuration file is to modify an existing one, so that you can follow the format. The decoder definition is configured per the [decoder-config.dtd](#). (most of you will not be interested in this dtd, if you are open in a text editor).

To get started, locate a decoder definition XML file that is close to the new decoder that you would like to define. . If you don't know what is "close", well don't sweat it. Let's just move on to looking at a definition file and you'll get a feel about what we're talking about.

### *FORMAT*

#### *FORMATTING THE DECODER DEFINITION*

The easiest way to create a new decoder definition is to edit one that already exists that has parameters similar to your new decoder. Hundreds of decoder definitions are available in JMRI, so you should be able to find one that is similar as a starting point. Don't feel bad about standing on someone else's shoulders, that's the spirit of JMRI and open source software in general. Although you can call this new file anything you like, it will work best if you use the same convention as the provided files. That is "**manufacturer name**"\_"**decoder family**".xml, for example: **Digitrax\_1x2.xml** and **Atlas\_DualMode.xml**.

Now that you have located a Decoder Definition file as a starting point open the file with an XML editor (editors recommended by jmri are at <http://jmri.sourceforge.net/help/en/html/doc/Technical/XmlEditors.shtml>) or your favorite text editor. **DO NOT** try an advanced word processor like Word. Use a basic text file editor like Notepad, or an XML editor, XML Marker is a good one and it's free.

The beginning XML lines deal with the Header:

Author

```
<decoder-config>
    <version author="jake@physics.berkeley.edu"
        version="10" lastUpdated="20050112">
    <version author="Walter Thompson wsthompson@earthlink.net"
        version="11" lastUpdated="20080412">
```

## Decoder Family and Model

```
<decoder>
    <family name="Premium FX with BEMF" mfg="Digitrax"
        lowVersionID="240" highVersionID="250">
        <model model="DH142" numOuts="4" numFns="2">
            <output name="4" label="Violet"/> </model>
        <model model="DN141" numOuts="4" numFns="2">
            <output name="4" label="Violet"/> </model>
        <model model="DN142" numOuts="4" numFns="2">
            <output name="4" label="Violet"/> </model>
        <model model="DN141K2" numOuts="4" numFns="2">
            <output name="4" label="Violet"/> </model>
        <model model="DN141E2" numOuts="4" numFns="2">
            <output name="4" label="Violet"/> </model>
        <model model="DN149K2" numOuts="4" numFns="2">
            <output name="4" label="Violet"/> </model>
    </family>
```

Programming modes the decoder will accept:

```
<programming direct="byteOnly" paged="yes"
    register="yes" ops="yes"></programming>
```

The next part of the file consists of a set of 'variable' elements defining specific variables, nested inside a 'variables' (note the extra "s") element. Here's where the real definition is determined.

Each variable represents one thing to configure. They can represent a single CV, e.g. address, or a few bits that can be configured to control a particular function. If some of these aren't appropriate to your decoder, you can just remove them. Make sure you remove the entire element from the `<variable>` to the matching `</variable>`. You can also rearrange them if you'd prefer a different sequence.

```
<variables>
    <variable label="Primary Address" CV="1" comment="Short address"
        item="Short Address" default="03">
        <shortAddressVal></variable>
```

```
<variable label="Forward light FOF effect generated" CV="49" mask="XXXXVVVV"  
    item="Function FOF effect generated">  
    <enumVal>  
        <enumChoice choice="Normal function of lead">  
        <enumChoice choice="Random flicker">  
        <enumChoice choice="Mars light">  
        <enumChoice choice="Flashing head light">  
        <enumChoice choice="Single pulse strobe">  
        <enumChoice choice="Double pulse strobe">  
        <enumChoice choice="Rotary beacon simulation">  
        <enumChoice choice="Gyralite">  
        <enumChoice choice="Rule 17 dimmable headlight">  
        <enumChoice choice="FRED end of train light">  
        <enumChoice choice="Right ditch light; when F2 on, flashes alternately">  
        <enumChoice choice="Left ditch light; when F2 on, flashes alternately">  
        <enumChoice choice="Reserved (0x0C)">  
        <enumChoice choice="Reserved (0x0D)">  
        <enumChoice choice="Reserved (0x0E)">  
        <enumChoice choice="Reserved (0x0F)">  
    </enumVal>  
</variable>
```

Once you get your variables all in order, it's time to test the definition.

## TESTING

### TESTING THE DECODER DEFINITION

At this point, you've created a new configuration file! You can check it for syntax by selecting the Check XML File item from the Debug menu. The **Open** dialog is displayed; select your file and click . If all is well, a dialog box will display that says "OK". If not, you'll get a completely incomprehensible error message. About the only useful part of that message is the line number. Re-open the editor to that line and try to see what's wrong with the syntax.

Once you have a decoder definition file that checks out for syntax, you need to try it in DecoderPro®. Your new file should copied into the jmri decoders folder (windows C:\Program Files\JMRI\xml\decoders).

- Now start up DecoderPro®, and open the Debug menu. Select the **Recreate Decoder Index** option.
- The computer will run for a minute or two with the selection highlighted. As soon as that goes away, the new decoder index should be created and your new definition should be available to use.

When you are happy with your definition, you'll probably want to share it with the JMRI world, so next we'll look at submitting the definition to JMRI for inclusion in the next release.

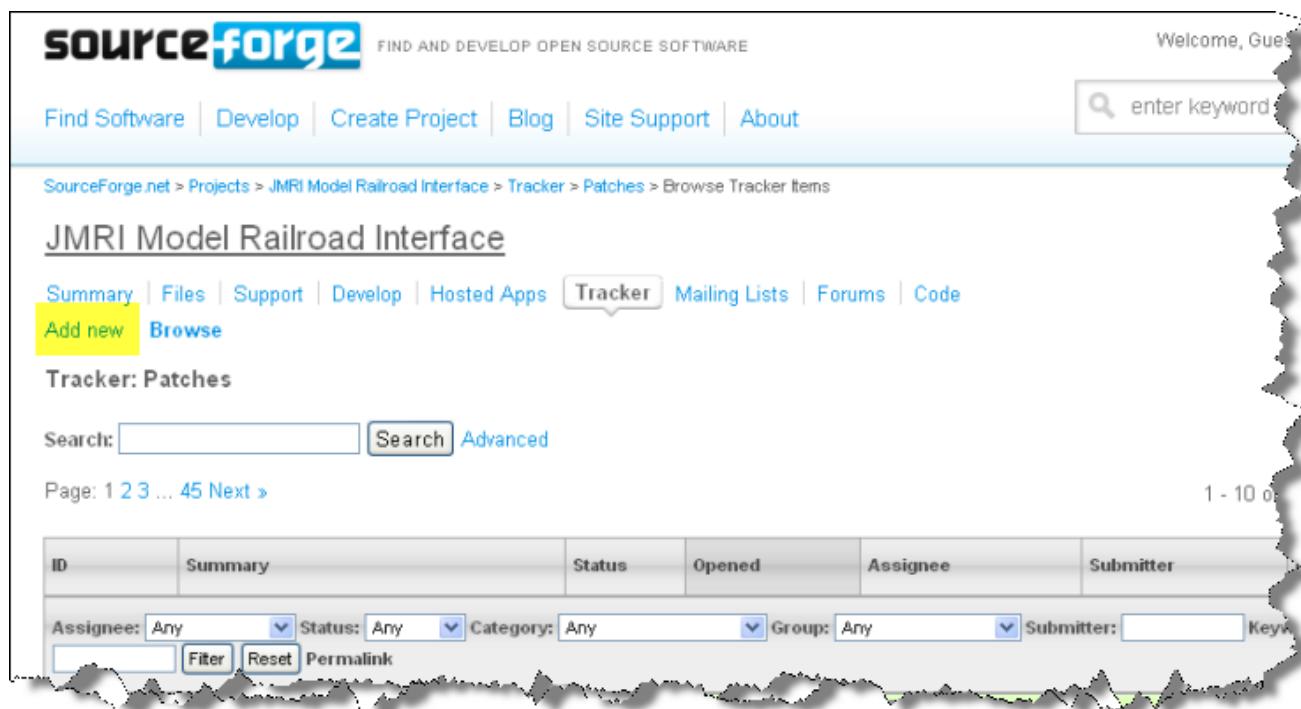
## Submitting to JMRI

### How do I go about getting these approved and into the next release?

If you're happy with them, you can contribute them to the next release by creating a "Patch" for the project.

#### To do this:

1. If you have a SourceForge account (they're free!), log on.  
If not, don't worry about it. Go to the [patch web site](#) on SourceForge:
2. Click on **Add new** on left side of the screen as shown



3. On the new page that comes up, enter something in the following fields:

## JMRI Model Railroad Interface

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- d. Upload a file attachment **File:**   locate the file on your computer and select it.
- e. Now form is completed, click on  Your file is submitted for inclusion in a release.

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## CHAPTER 10 - DECODERPRO®® ERROR MESSAGES

### *DECODER PROGRAMMER COMMON ERROR MESSAGES*

Various things can go wrong when JMRI tries to work with your DCC command station to program a DCC decoder. This page lists the error message that can result, and describes what they mean.

*JMRI ERROR CODES( <http://jmri.sourceforge.net/help/en/html/Errors.shtml> )*

#### **301 — no locomotive detected**

The command station has reported that it doesn't see a locomotive on the programming track.

This can happen if the locomotive isn't making good electrical contact or if there's a wiring fault in the locomotive.

#### **302 — programmer busy**

The command station has reported that it's busy doing something else, and can't do any programming right now. This usually means that some other part of the DCC system is doing a programming operation, e.g. a hand-held throttle.

Some DCC systems can't do ops-mode programming (programming on the main) while also using the service mode programming track, in which case they'll return this error message.

#### **303 — requested not implemented in command station**

This means that JMRI has requested the command station do something that it doesn't support.

This is not supposed to happen, as JMRI should disable programming modes that the command station can't provide. If you do see this message, please report the circumstances on the jmriusers mailing list.

#### **304 — aborted by user**

The user has requested that the read or write operation stop early.

This is considered an error, because the program doesn't know whether the decoder actually saw the operation complete or not.

#### **305 — confirm failed**

Some command stations allow you to "confirm" the content of a CV, rather than read the value from it. In general, this is faster than doing a complete read. If the value in the CV doesn't match the expected value, this message is issued. It's considered an error because if the values don't match, we know that we don't know the correct value for the CV contents.

## **306 — timeout talking to command station**

The program did not hear back from the command station when it expected to.

This is by far the most common error message when people first start using JMRI. In that case, it usually means that the connection to the command station isn't correct. This could be a problem with the cable(s) making the connection, or a problem with how the preferences are set. Picking the wrong serial port is particularly common.

Once JMRI is working properly, this error may occasionally happen due to a transient error. DecoderPro® generally will retry it successfully in that case.

## **307 — Unknown error**

An error has happened, but JMRI doesn't know enough about it to be able to report more detail.

In general, JMRI is pretty good at deciphering what went wrong, and this message isn't very common. If you do see this message, please report the circumstances on the jmriusers mailing list.

## **308 — No acknowledge from locomotive**

At the end of a CV read or write operation, the locomotive replies ("acknowledges") to the command station using a pulse of current.

If that pulse isn't seen, some command stations provide this error message. It could be due to poor electrical connections to the programming track or within the locomotive. It could also be that the decoder doesn't support readback.

Some decoders, particularly certain sound decoders, draw so much current that the reply pulse isn't detected by the command station. In that case, one of the various "programming boosters" may solve the problem.

## **309 — Short Circuit on Programming Track**

The command station has reported seeing a short circuit on the programming track. That prevents programming operations.

Check the electrical connections to the programming track, and also within the locomotive.

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