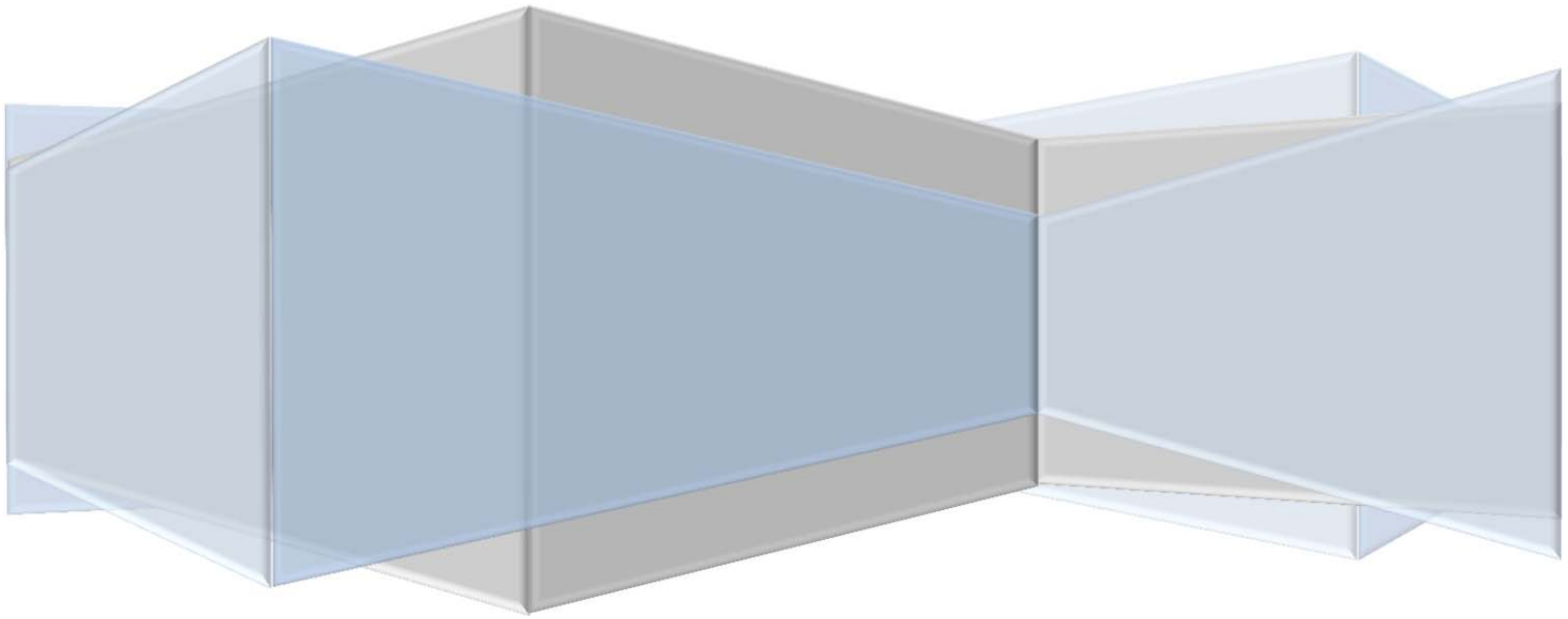
DecoderPro3® User's Guide version 2.14

February 26, 2012



DecoderPro3® User's Guide version 2.14

JMRI Organization

Revised February 26, 2012

Preface

DecoderPro3® is a Java-based cross-platform application for model railroaders.

DecoderPro 3 ® can run on any computer system that will run Java 1.6.0 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/

Note: 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. All programming examples shown are with Digitrax PR3(MS100 mode) connected to Digitrax Super Chief Radio Command Station. Most of the decoders in locomotive samples will be Digitrax, except for sound examples.

Note: This entire manual has been updated to correspond to JMRI® 2.14 DecoderPro3® only and the HTML verified using HTML4 and Cascading Style Sheets. If the formatting looks odd, you probably need to update your browser.

Revisions

Version	Revision Date	Editors	Major Revisions
2.14	Original 2/26/2012	Dale A, Tripp Bruce Shanks	Create DecoderPro3® User's guide

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Installing JMRI®

Preparing to Install JMRI®

The JMRI software package includes:

- DecoderPro
- **DecoderPro 3**
- PanelPro
- SoundPro
- Operations is embedded in DecoderPro® and PanelPro®

There are always two versions of the software available:

- Production Version: The current stable version that is fixed in design and for general use. If just starting, this is the version for you.
- Development Version: The version that is under development for testing and is used to validate new features and changes to existing features. If you are familiar with JMRI and want to help in the validation and testing process, then use this version.

Supported systems (http://www.jmri.org/help/en/html/hardware/index.shtml.)

Prior to installing JMRI, you must download (http://www.jmri.org/download/)the correct version for your computer system.

- Windows
- Mac OS X
- Linux

Installing JMRI software

After downloading the JMRI file, now install using the appropriate Installation guide:

- Windows Installation Guide http://www.jmri.org/install/WindowsNew.shtml
- Mac OS X Installation Guide http://www.jmri.org/install/MacOSX.html
- Linux Installation Guide http://www.jmri.org/install/Linux.html
    - Ubuntu GNU/Linux http://www.jmri.org/install/Ubuntu.shtml
    - Xubuntu http://www.jmri.org/install/decTop.shtml
    - OpenSuSe linux http://www.jmri.org/install/OpenSUSE.shtml

Getting Started

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 **CV**s, 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.

What DCC systems will DecoderPro 3® work with?

Decoder Pro 3 will work with the following DCC systems:

- Atlas
- C/MRI
- CTI Electronics Acela
- CVP Products Easy DCC
- DCC Specialties
- Digitrax (Loconet)
    - Digitrax PR3 interface

    - RR-CirKits LocoBuffer-USB
    - LocoBuffer-II (LocoBuffer)
    - MS100 interface
- ESU
- Fleischmann
- Hornby
- Lenz
- Lionel TMCC
- Maple Systems
- MERG CBUS
- NAC Services
- NCE
- Oak Tree Systems
- Pro Trak Grapevine
- QSI Solutions
- PI Engineering RailDriver
- Roco
- SPROG II
- SRCP
- Uhlenbrock
- Wangrow
- X10
- Zimo
- ZTC Controls

Depending on the specifics of your system and computer, some type of hardware interface may be required.
JMRI Hardware Support (http://www.jmri.org/help/en/html/hardware/index.shtml)

What hardware do I need?

You will need, a means to connect between your computer and the track on which the locomotive rests, that will take serial instructions and generate DCC packets on the rails. At a minimum, a command station/booster (your DCC system will probably suffice), an additional hardware interface to send commands from your computer to the command station (this could be as simple as a serial cable), 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.

For those who do not have any DCC hardware yet and are considering purchasing a DCC locomotive and want to use Decoder Pro to program it consider the SPROG II USB. It has all the electronics in one package with enough output to run a locomotive. It comes complete with the USB cable, power supply, instructions and JMRI on disk. All you need in addition is the test track.

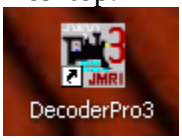
You will also need, of course, some locomotives with the decoders installed which you can program.

How do I start the DecoderPro3® program?

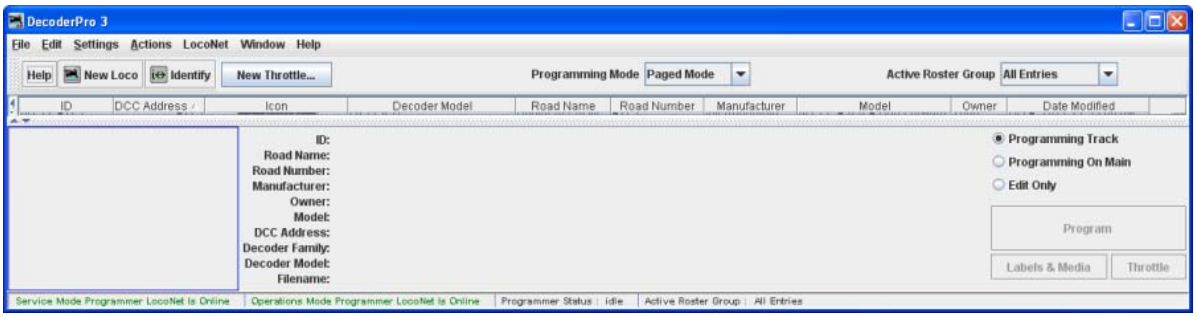
IF YOU ARE A FIRST TIME USER WITH NO ENTRIES IN THE ROSTER OR PREFERENCES

GO TO PAGE 5.

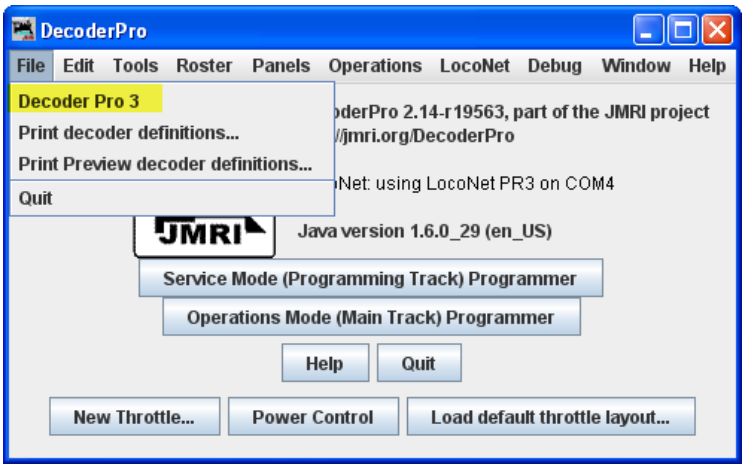
Once you have downloaded the JMRI software and installed it, simply open the program in the usual manner for your operating system. An icon for DecoderPro3® should be installed on your Desktop.



DecoderPro3® may be opened by one of two methods, double click on the Desktop icon and the DecoderPro3® initial screen as shown below will be displayed on completion of startup.



DecoderPro3 may also be started from within DecoderPro From the File menu.:



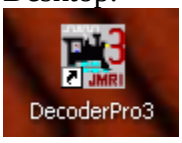
It may take a while for this screen to come up, especially on older and slower computers. Remember that you are essentially running the program on a Java emulator over your native operating system software. New computers can do this fairly quickly, but older ones will feel like they're taking forever. 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 after you installed the software, the **Preferences** screen will come up automatically to allow you to set up the system for your particular configuration. Also if you change your system configuration, or if you have your laptop away from the railroad, but you want to play with JMRI there is a simulator mode you may want to try. So click next, and we'll have a look at preferences.

How do I start the DecoderPro3® program for New User?

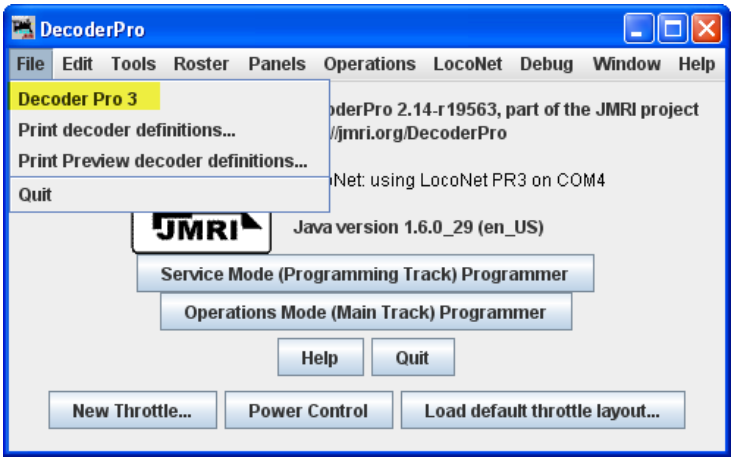
First Time (totally new) Install.

Once you have downloaded the JMRI software and installed it, simply open the program in the usual manner for your operating system. An icon for DecoderPro3® should be installed on your Desktop.

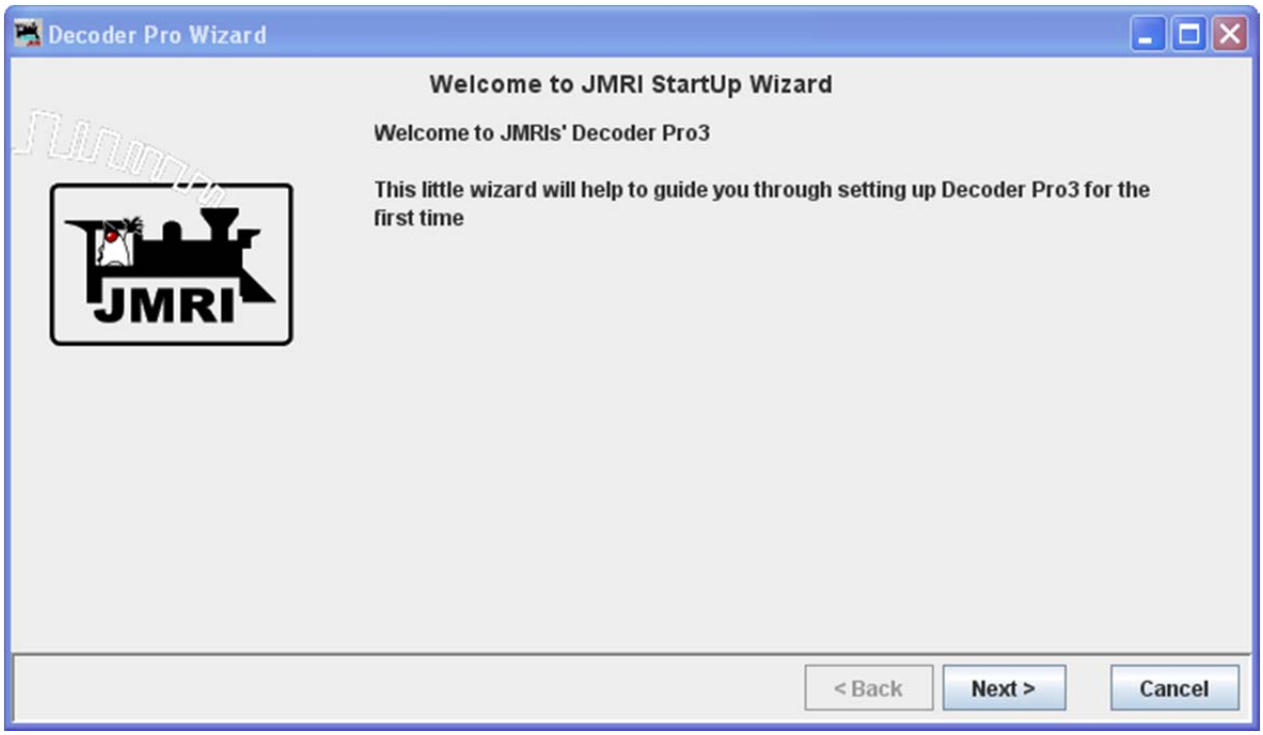


DecoderPro3® may be opened by one of two methods, double click on the Desktop icon and the DecoderPro3® initial screen as shown below will be displayed on completion of startup.

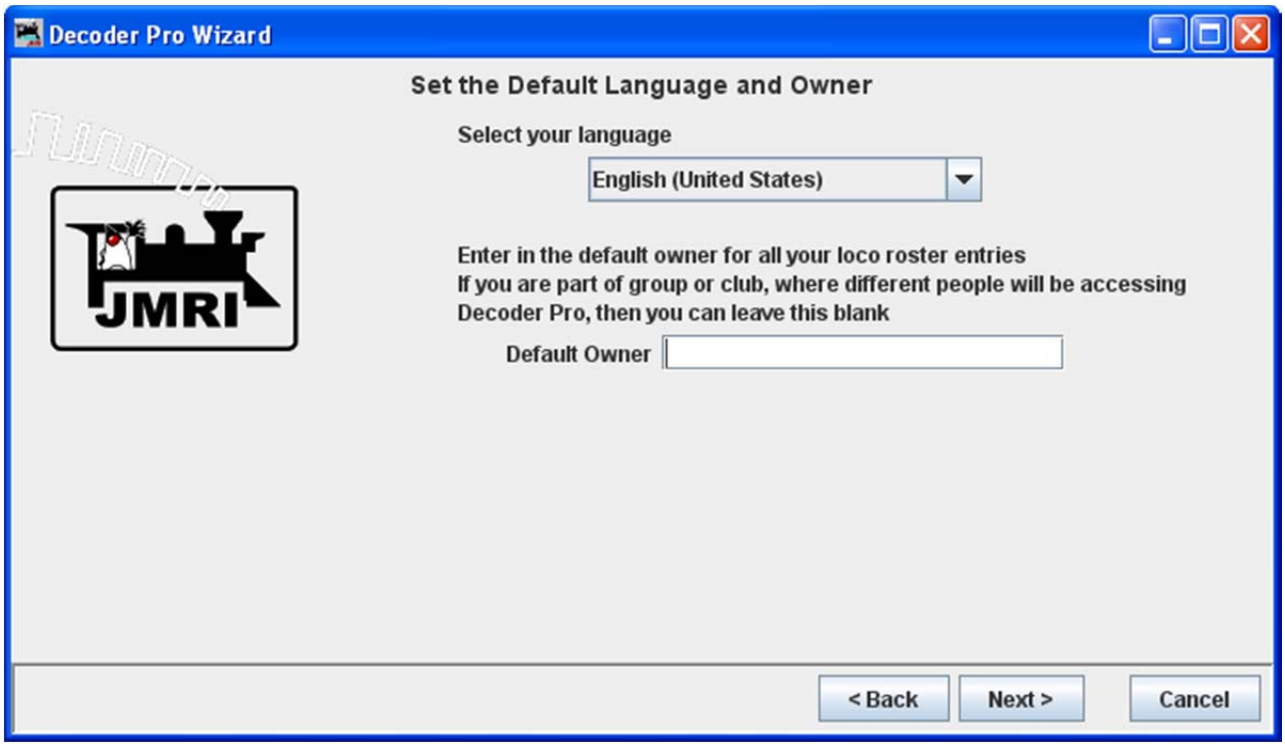
DecoderPro3 may also be started from within DecoderPro From the File menu.:



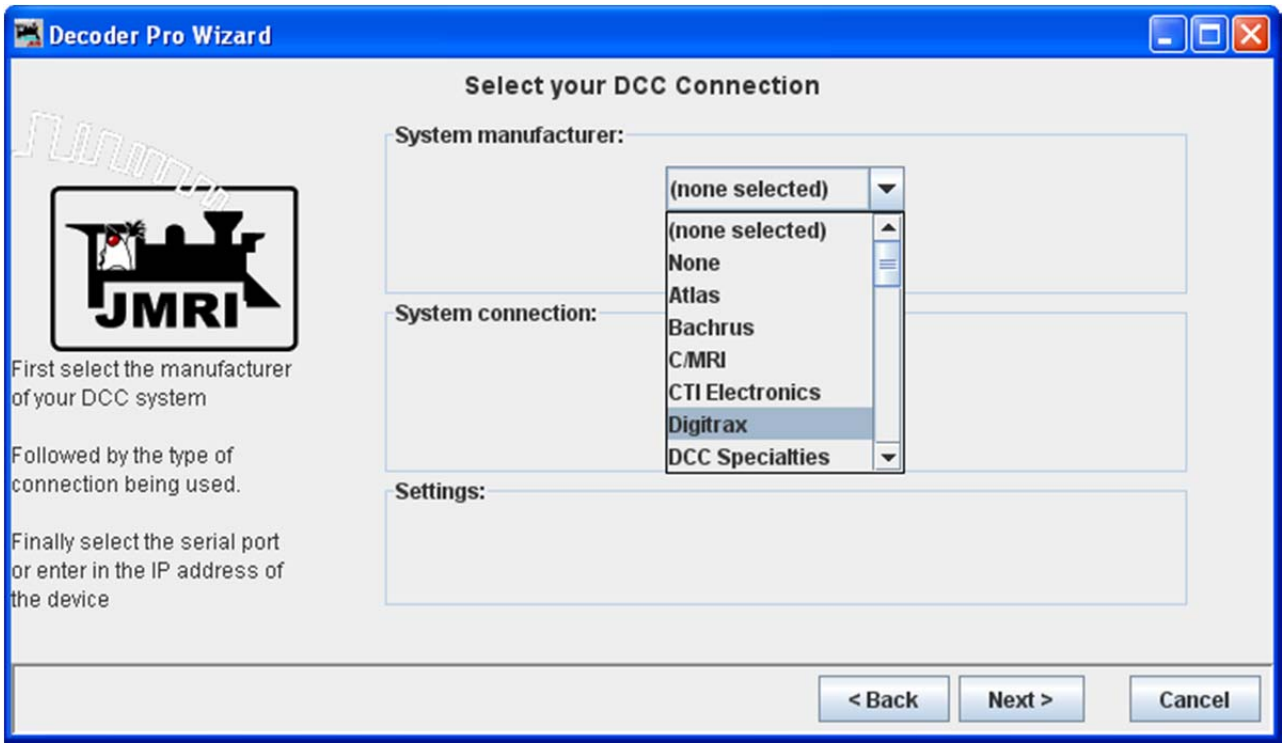
First time install start screen



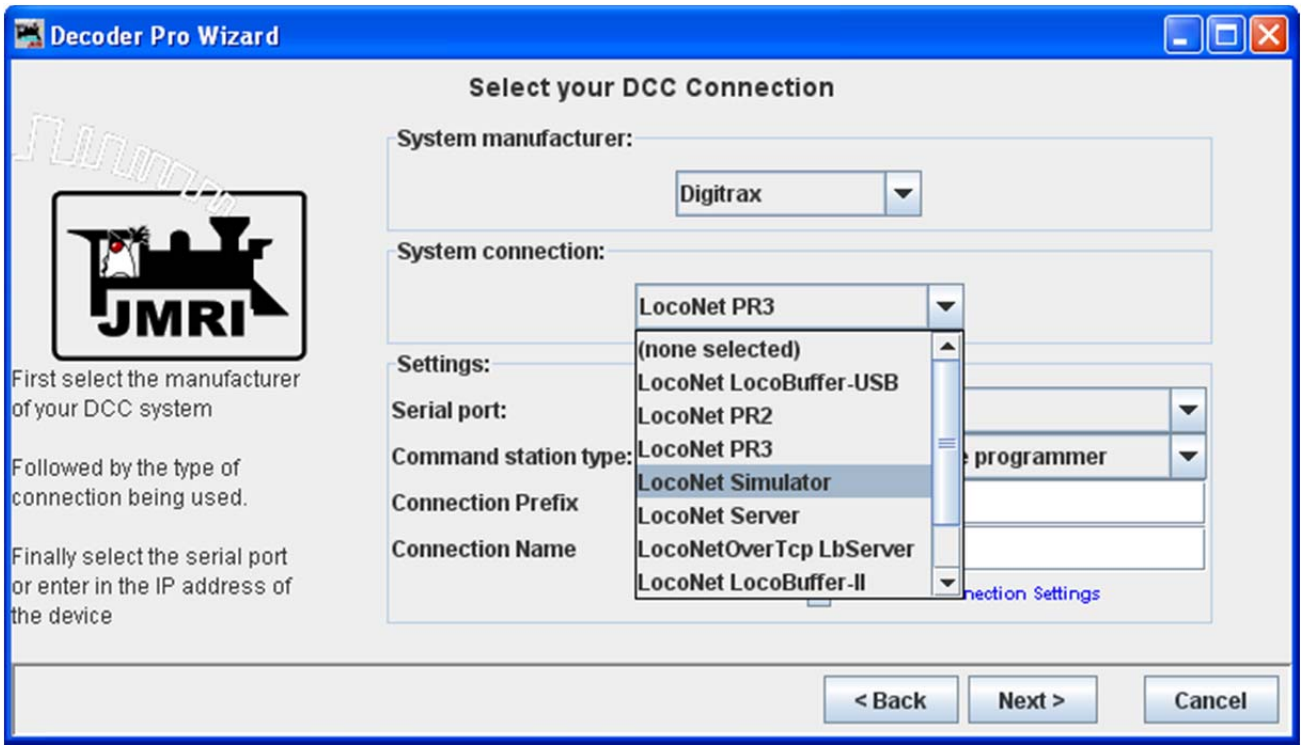
Press the Next button, starts the wizard..



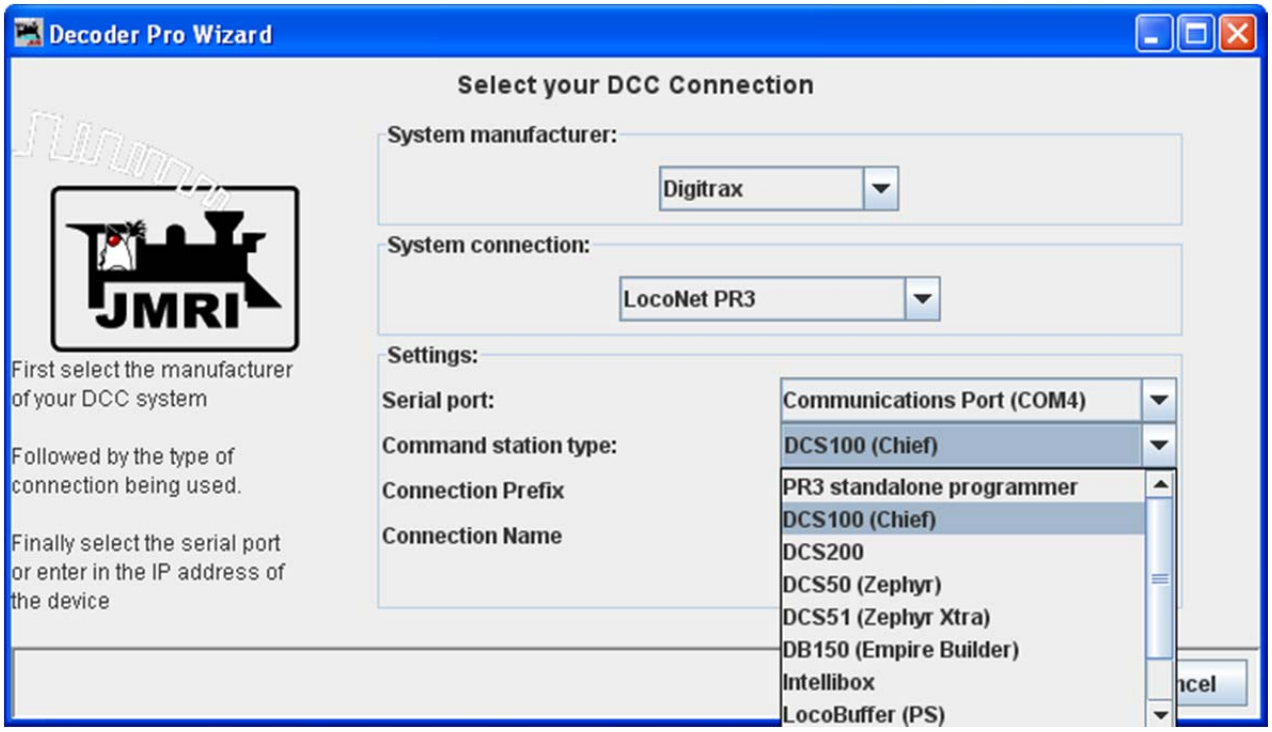
Press the Next button to continue



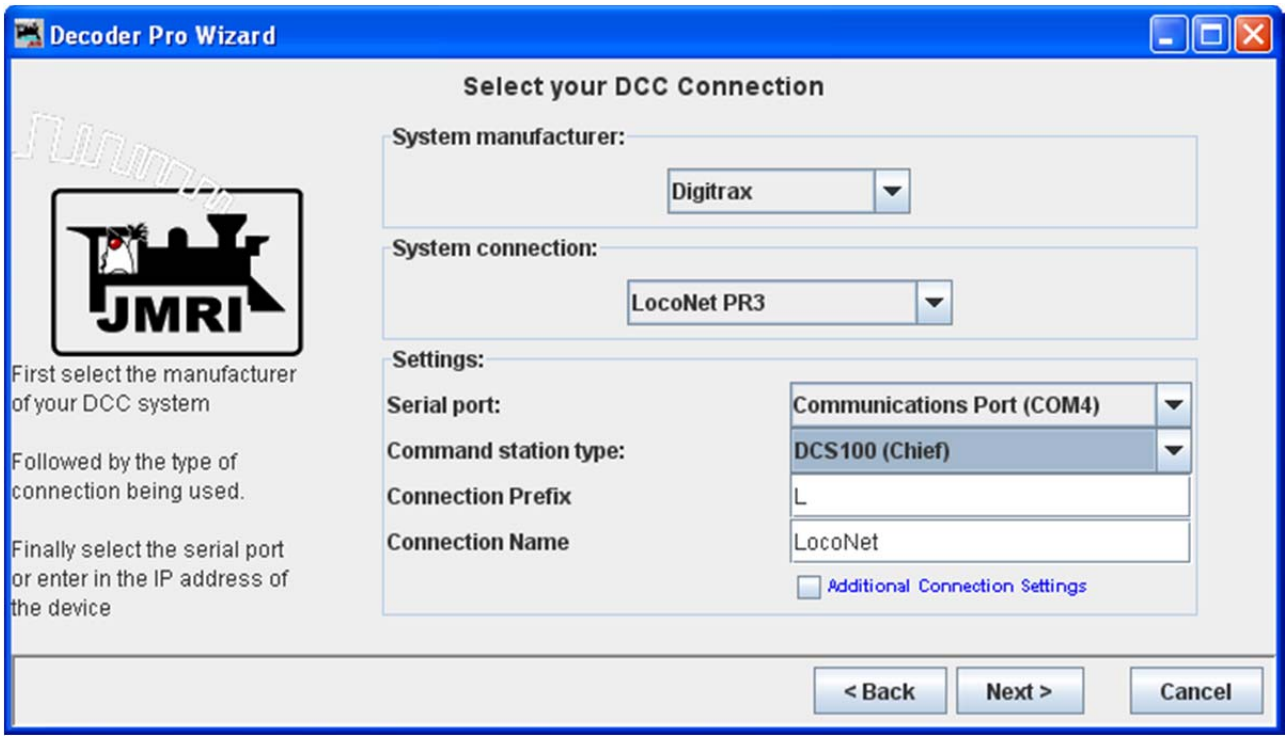
Select your system and other options for your system will be shown.



Select your system connection.

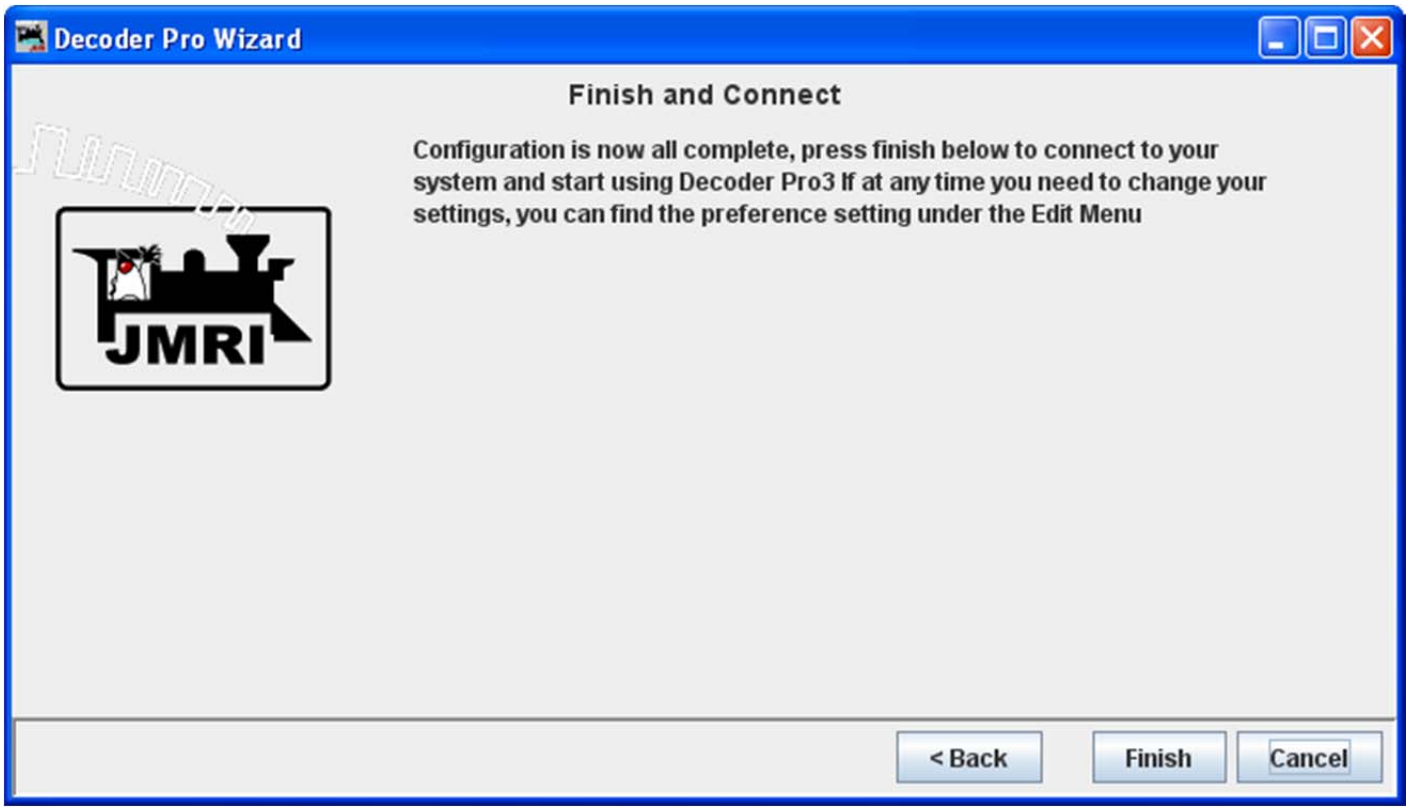


Select your Serial port and Command station type.



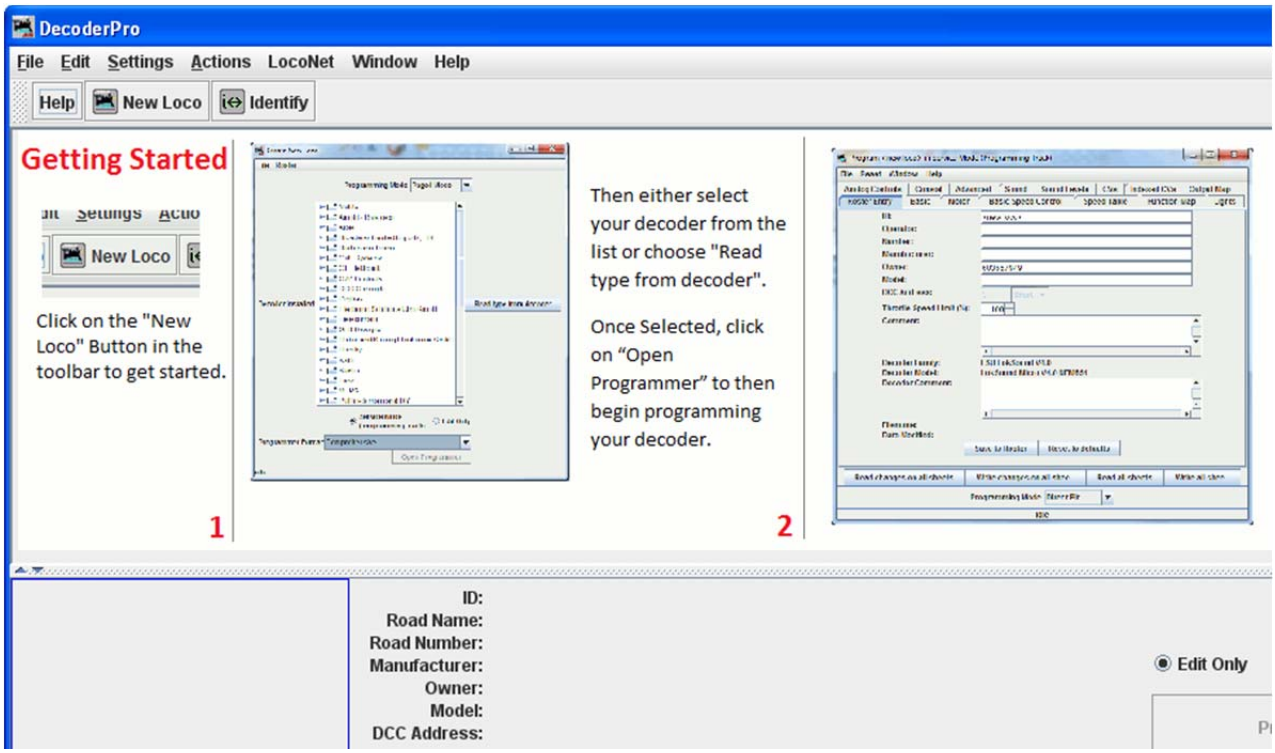
Next Connection Prefix and Connection Name, At this time leave as default.

Press the Next button



Press the Finish button

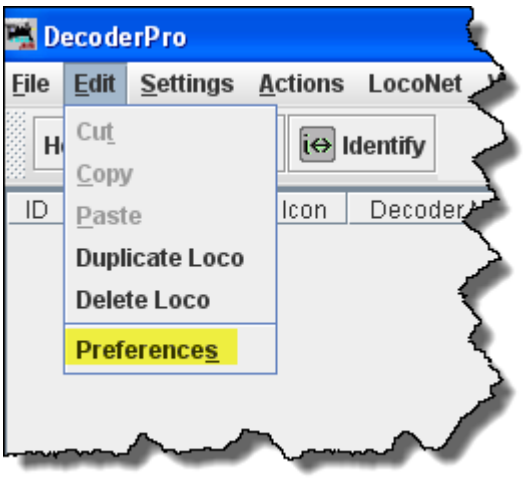
DecoderPro3® main window is displayed with instructions for Getting Started



You may want to set up the other preferences at this time, if so go to Preferences screen will come up that allows you to set up the system for your particular configuration.

How do I set up my preferences?

From the Edit menu in DecoderPro3 select Preferences option:



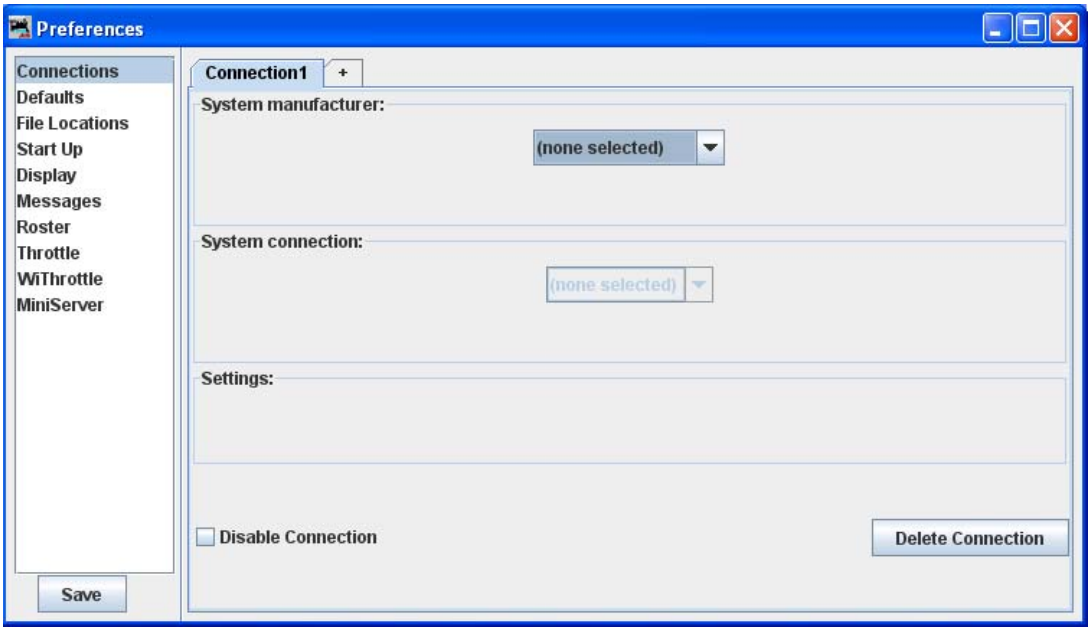
(This window may open automatically the first time you run the program.)

As a first time user the most important information is the **Connections** screen where you describe how the computer will talk to the command station. Most of rest you can leave at the initial or "default" settings until you find a need to change things to suit your fancy.

Most importantly, you must click to finalize your settings and then re-start the program to have them take effect.

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. An important concept to keep in mind is that JMRI is nothing more than a very smart throttle. If you can do something with your throttle you can probably do it faster and easier with JMRI. However, if your system can't do what you want, either because your system is not connected properly (it's broken) or the system manufacturer did not incorporate that capability, then JMRI will not be able to do it either. In the latter case JMRI will probably give you an error message or have the command "greyed out" to help you identify why it can't accomplish your request.

The window is split into two panes, on the left side is a list of preference groups that may be set. Clicking on one of the items opens the options that may be set in the right side pane. No selection have been made



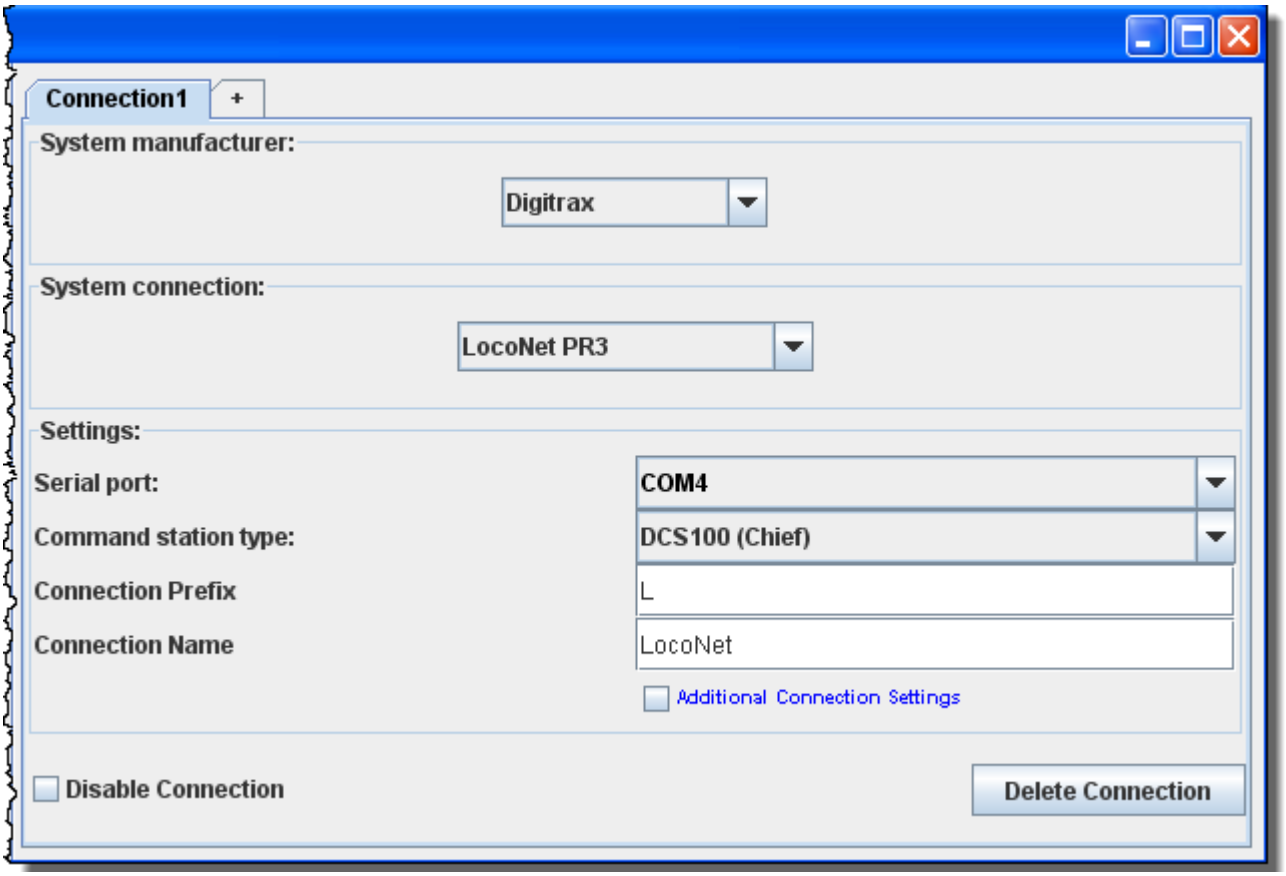
Connections	Allows you to select the system connection that you are using for controlling DCC and the connection to your computer. This is the only required preferences to define your DCC system. The rest of the features are used to customize your specific system.
Defaults	Shows system default settings
File Locations	Set default location for saving User files and Script Files
Start Up	Allows you to set Actions, Buttons, Files and Scripts that run at Start Up
Display	Allows you to select your computer display mode
Messages	Set default actions for system message when displayed
Roster	Allows you to set your default Programmer and roster location
Throttle	Allows you to set up you Throttle preferences
Wi Throttle	Allows you to set up a Wi Throttle settings
MiniServer	Sets up the Decoder Pro® miniServer

Now we will set up preferences for the JMRI environment with your command station.

I am using a Digitrax Super Chief Command Station (radio) interfaced to the computer via loconet, PR3 (MS100 mode) and USB port. I keep master roster on the System Drive.

Connections Pane (TABS are configured to the system your selected)

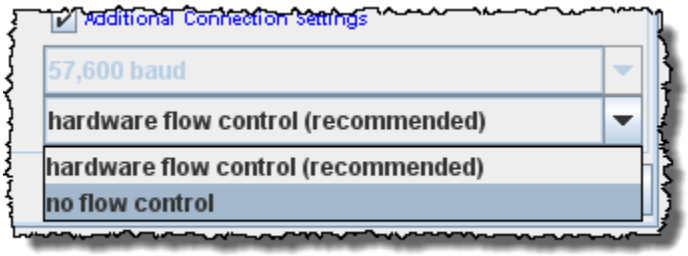
Now select Connections and connection options display in right pane. After saved and restarted, the TAB will read LocoNet. This the set up for Digitrax Chief system with PR3 interface.



System manufacturer:	Drop-down list with all the supported DCC manufacturers, select the manufacturer of your system.	
System connection:	Drop-down list with all of the supported DCC system interfaces supported by the manufacturer that you selected, select the interface that you are using.	
Settings:	Serial Port:	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. A second drop-down list

		may include a selection if there are more than one possibility. possibilityDrop-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. A second drop-down list may include a selection if there are more than one possibility
	Command station type:	Drop-down list to select the command station type that JMRI will be using to send your DCC commands.
	Connection prefix	Include the prefix for your connection, in the case shown the "L" is default
	Connection name	Should default to the connection used

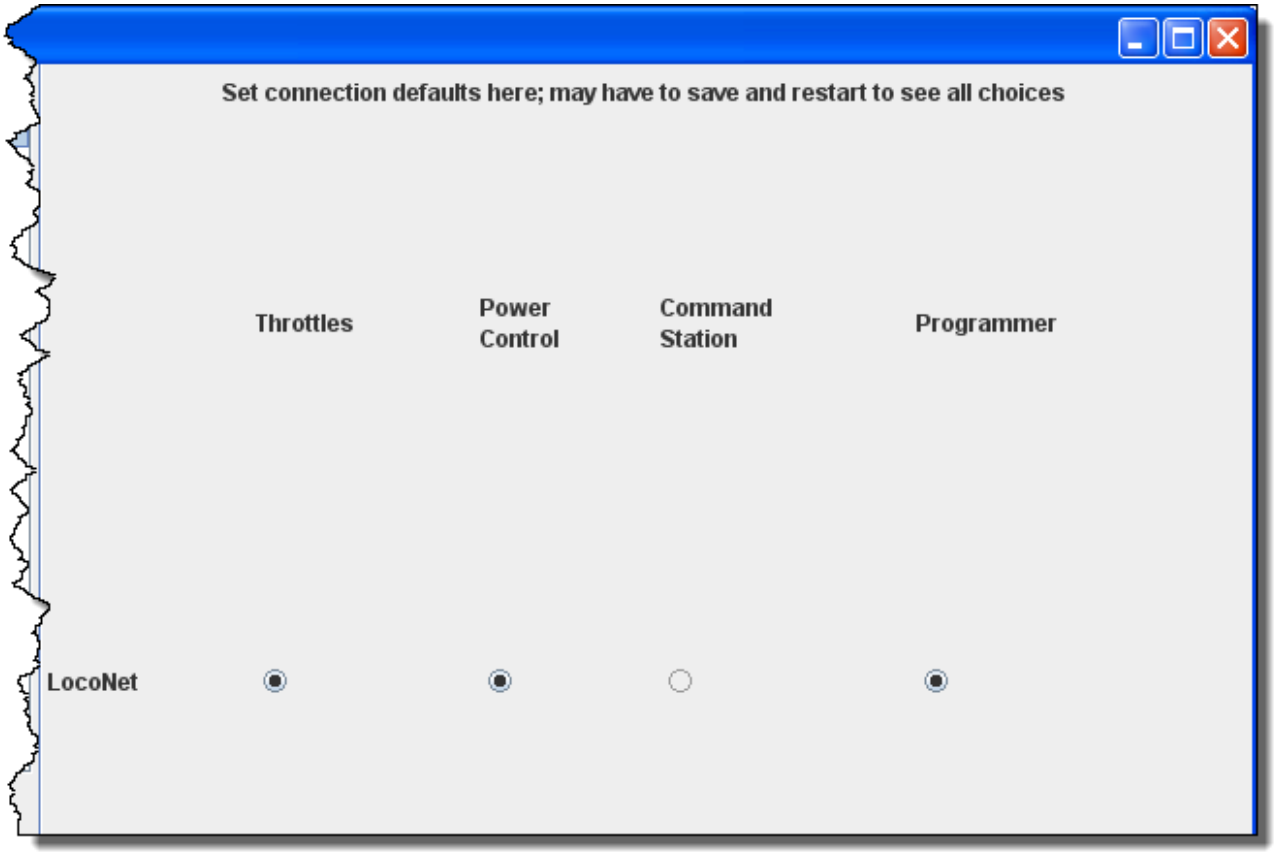
☐ Additional Connection Settings, if checked:



Disable Connection will disable all the connection settings.

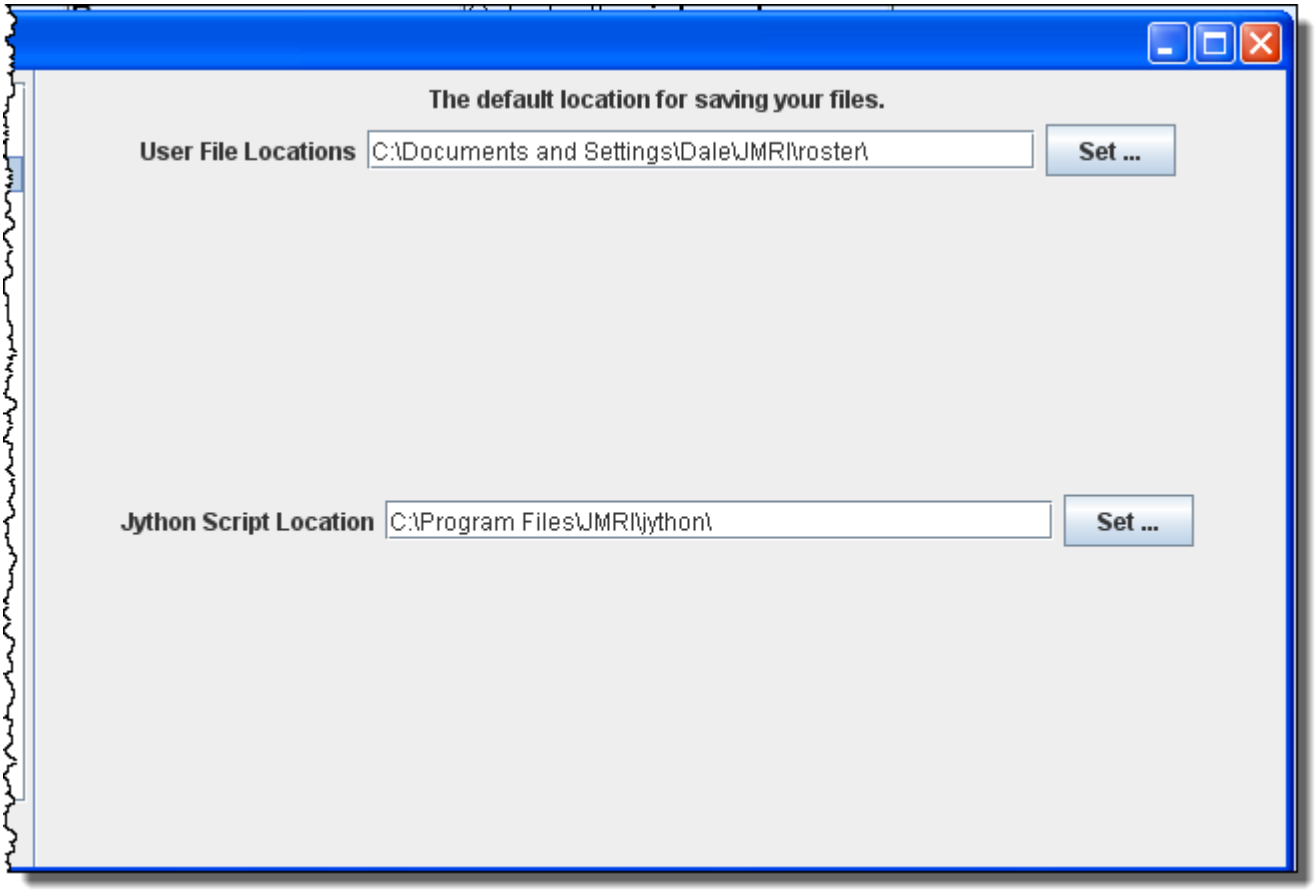
Delete Connection will delete all the connection settings.

Defaults Pane



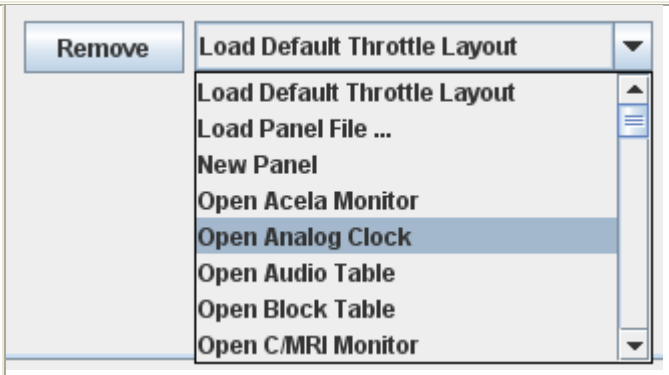
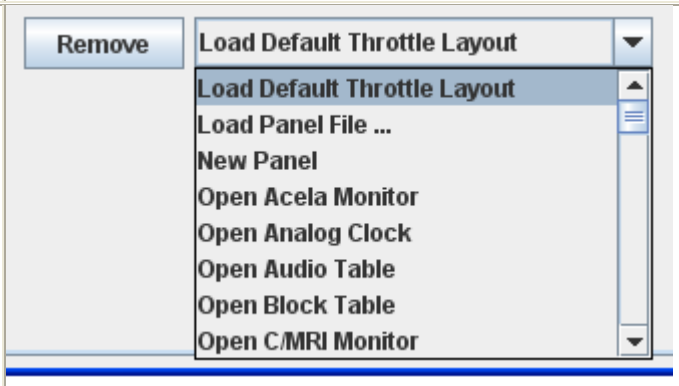
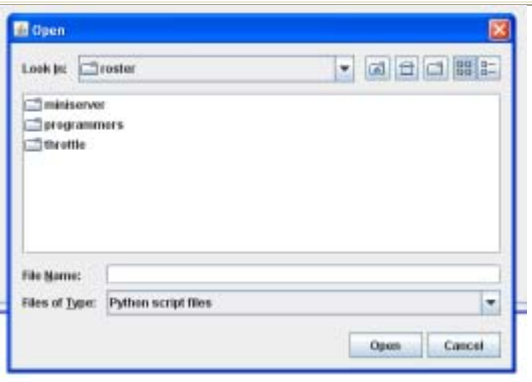
Shows the default settings which will depend upon the system used.

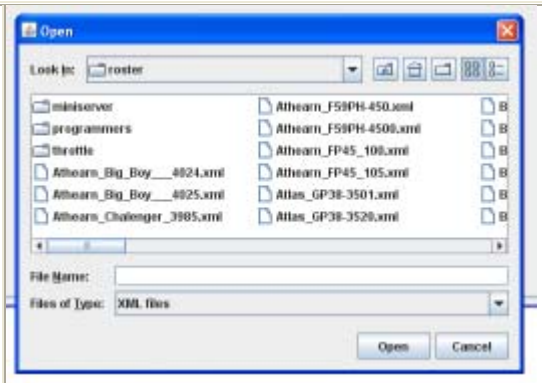
File locations Pane



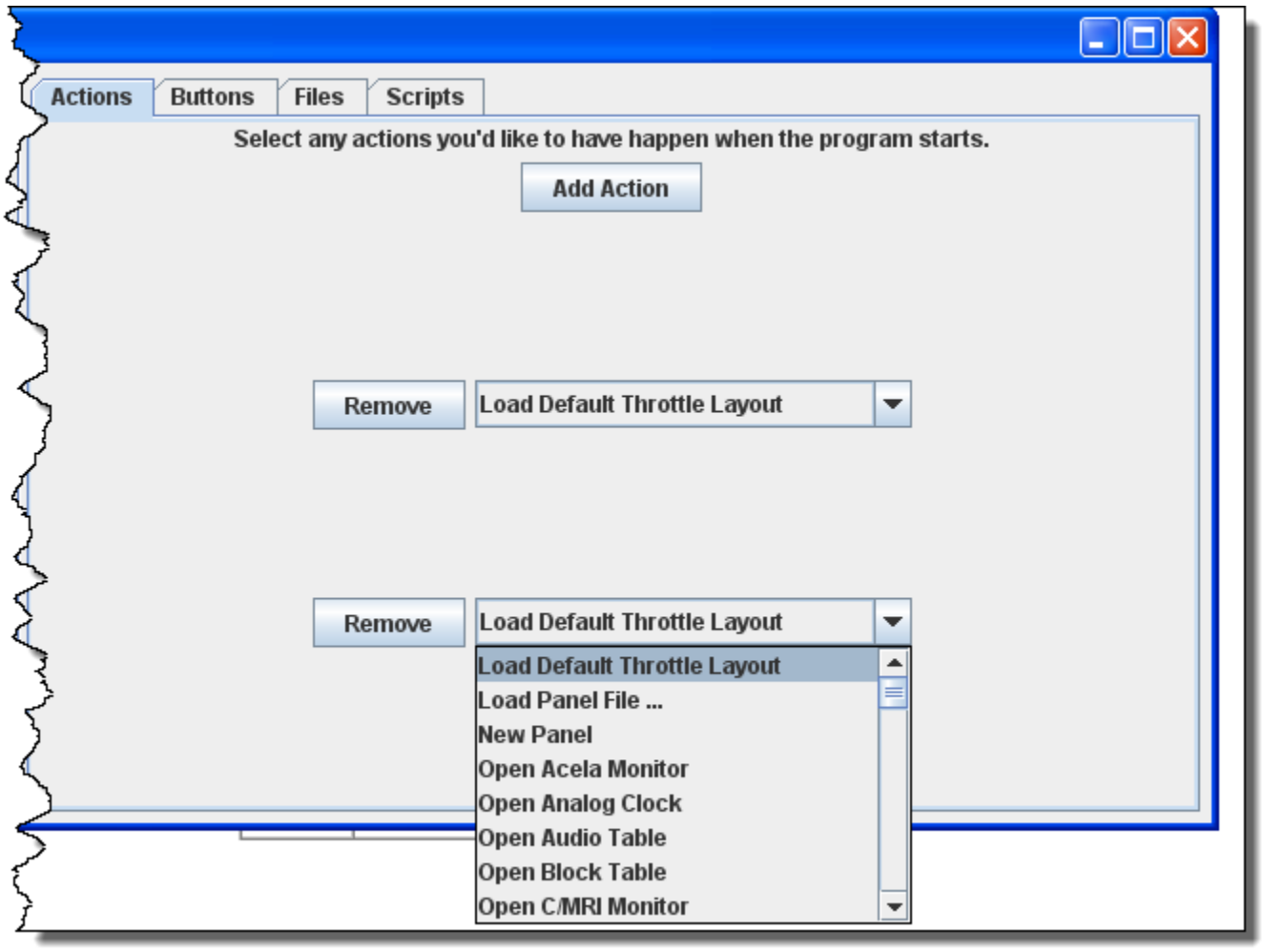
User File Locations	Select the location for your user files on your system
Jython Script Location	Set the location of Jython Script files

Start Up Pane

Actions TAB	Add Action to set up a Startup action	
Buttons TAB	Add Button to the toolbar of DecoderPro3	
Files TAB	Add Files that you want to load at startup	

Scripts TAB	Add Scripts to load at startup	

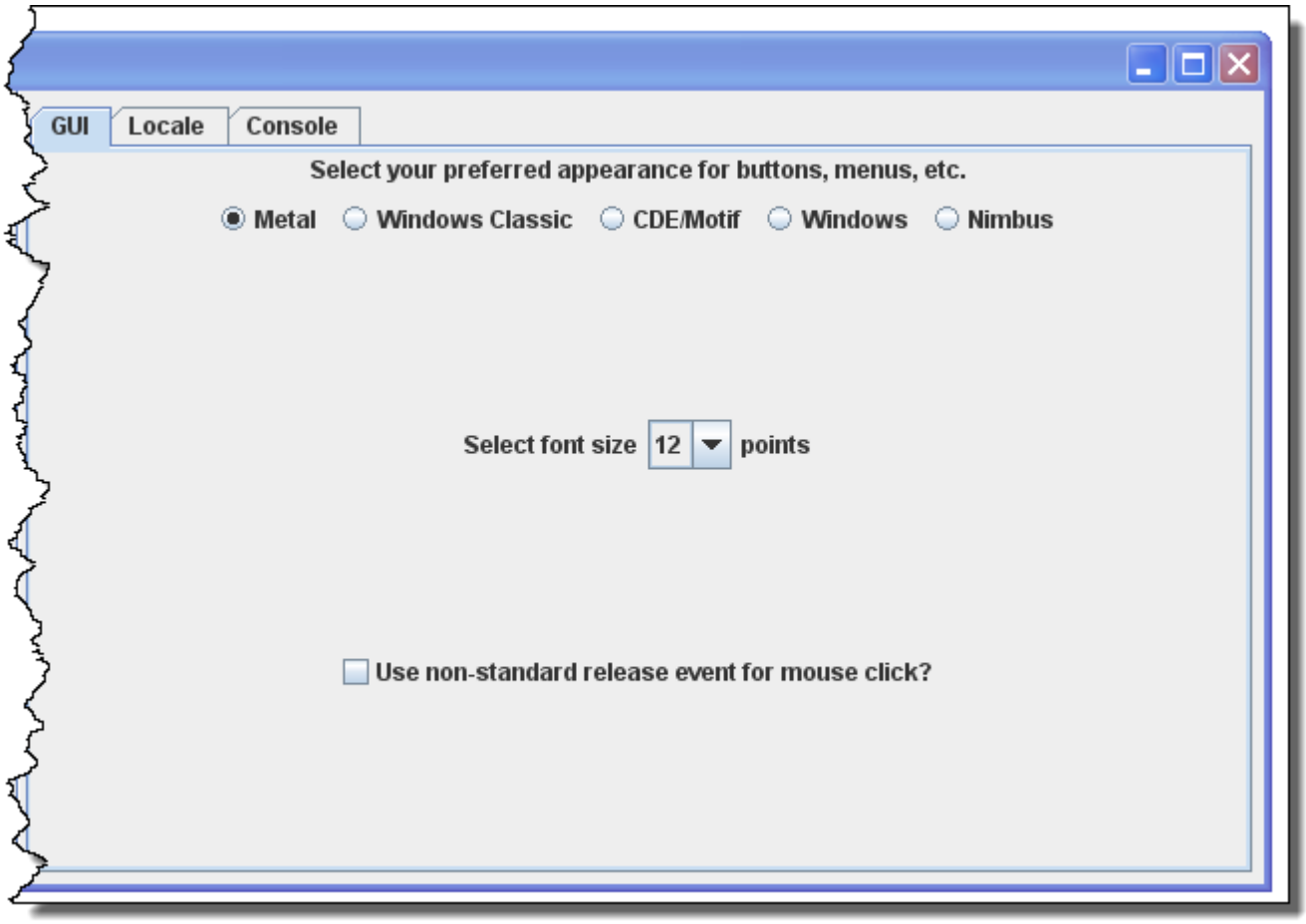
You may add as many items as you want to open on start up. Example of **Actions**



Remove removes the item from the Start Up sequence. All of the panes are of the same format.

Display Panes

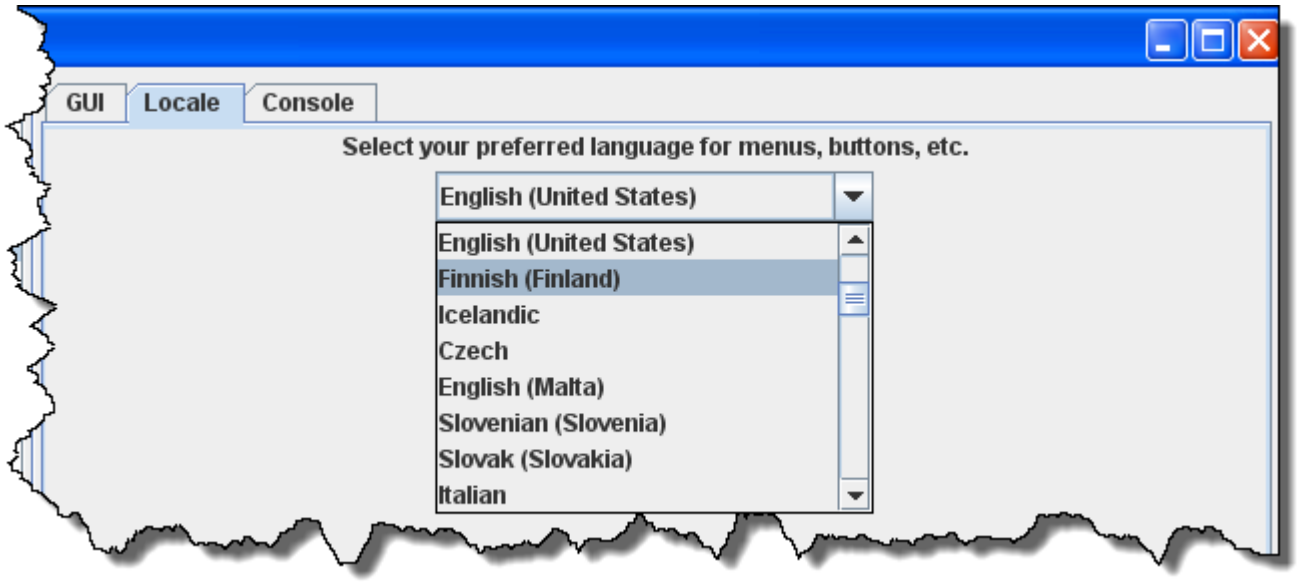
GUI TAB



Select your preferred appearance for buttons, menus, etc.	Metal
	Windows Classic
	CDEMotif
	Windows
	Nimbus
Select font size in points	Top of Form

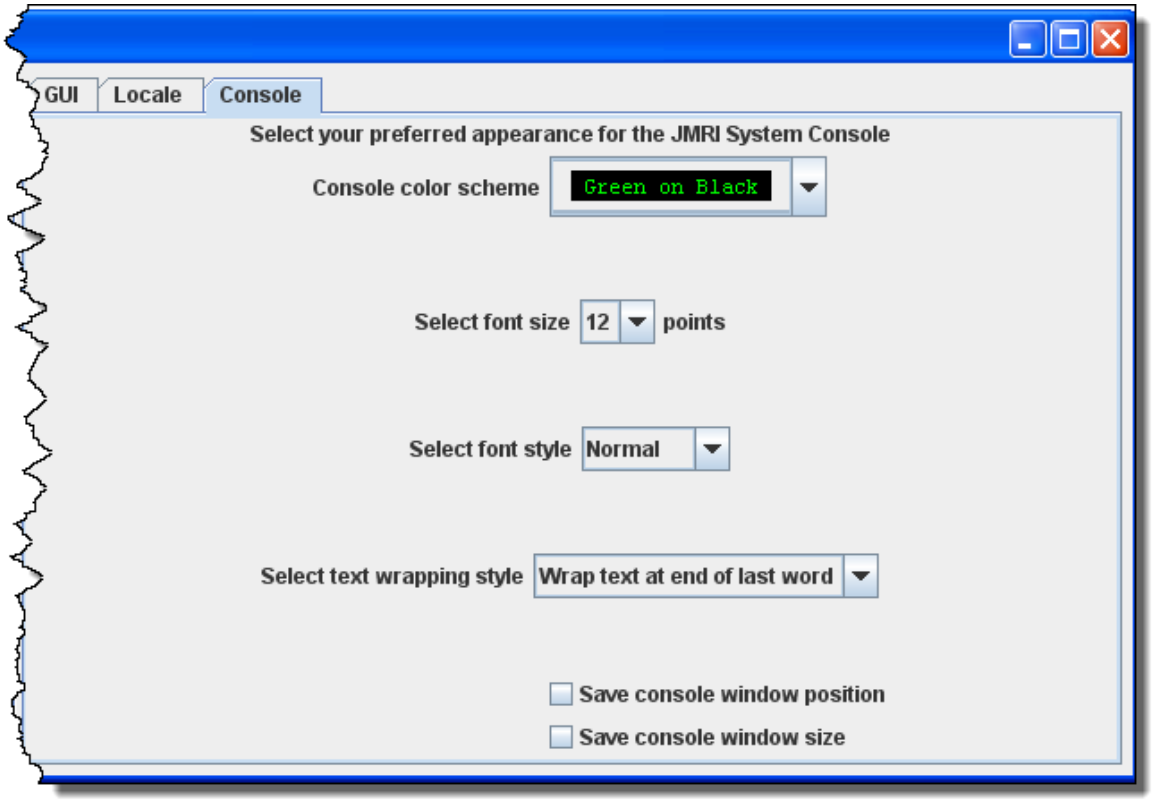
	select font size Bottom of Form
Use non-standard release event for mouse click?	

Locale TAB



Drop-down list to select your location and language

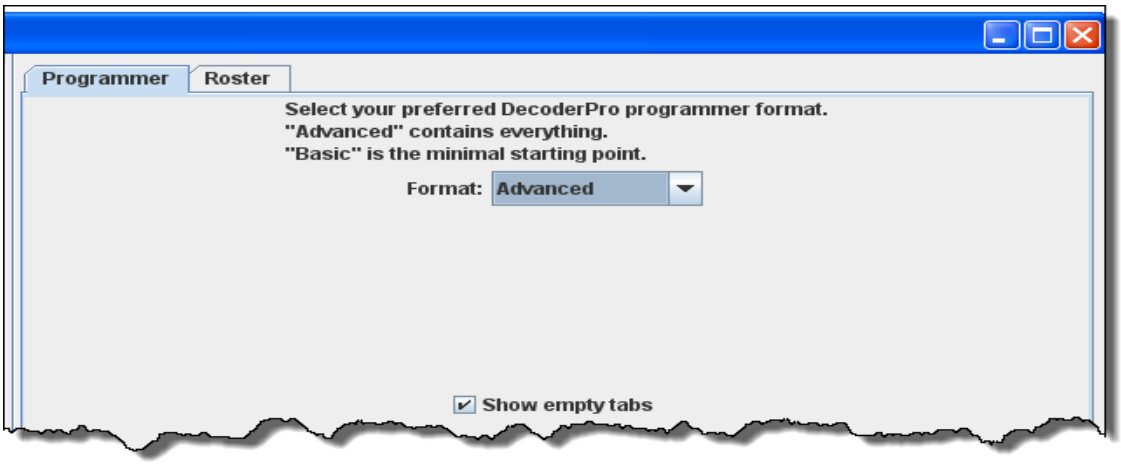
Console TAB



Display settings for the JMRI system console.

messages Panes

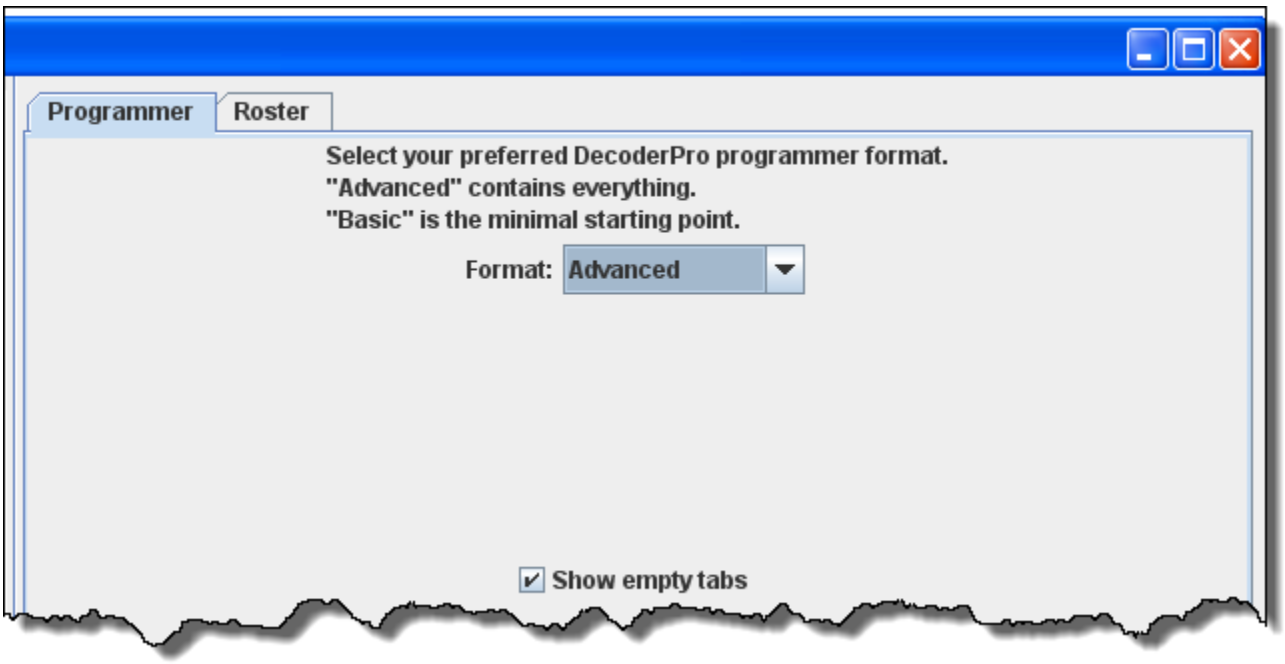
TABS and selections can be used to set how and when messages are displayed.



Roster Panes

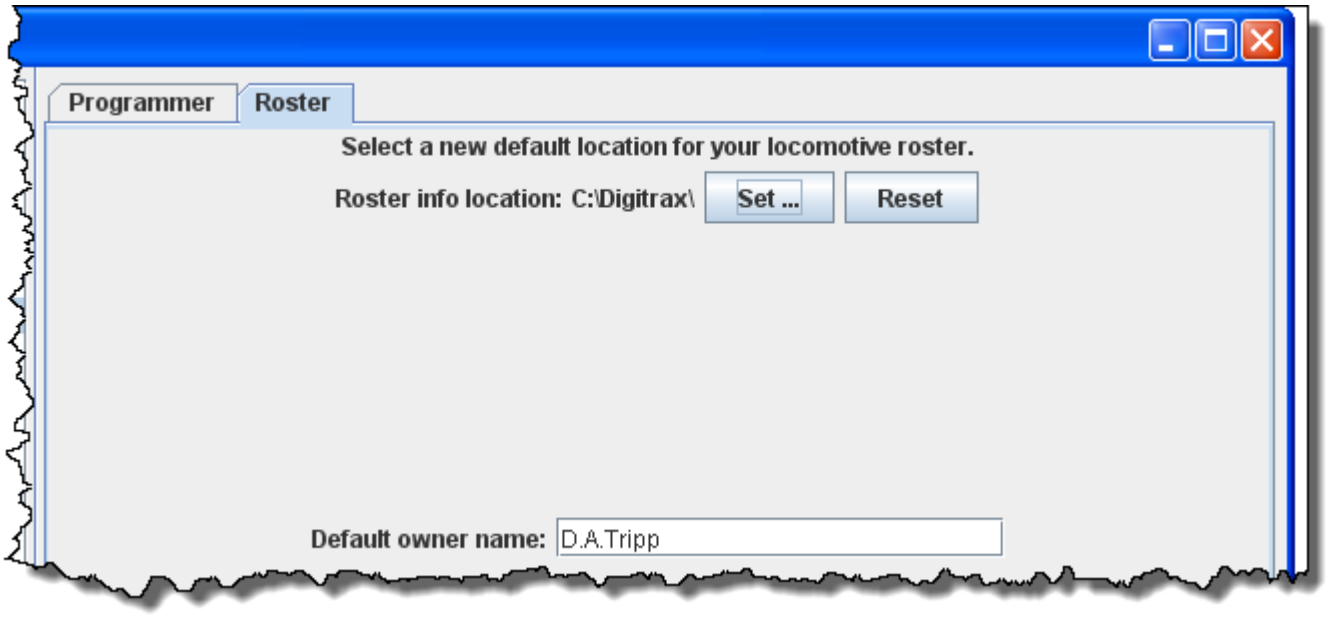
Programmer TAB

Used to set the preferred decoder programmer.



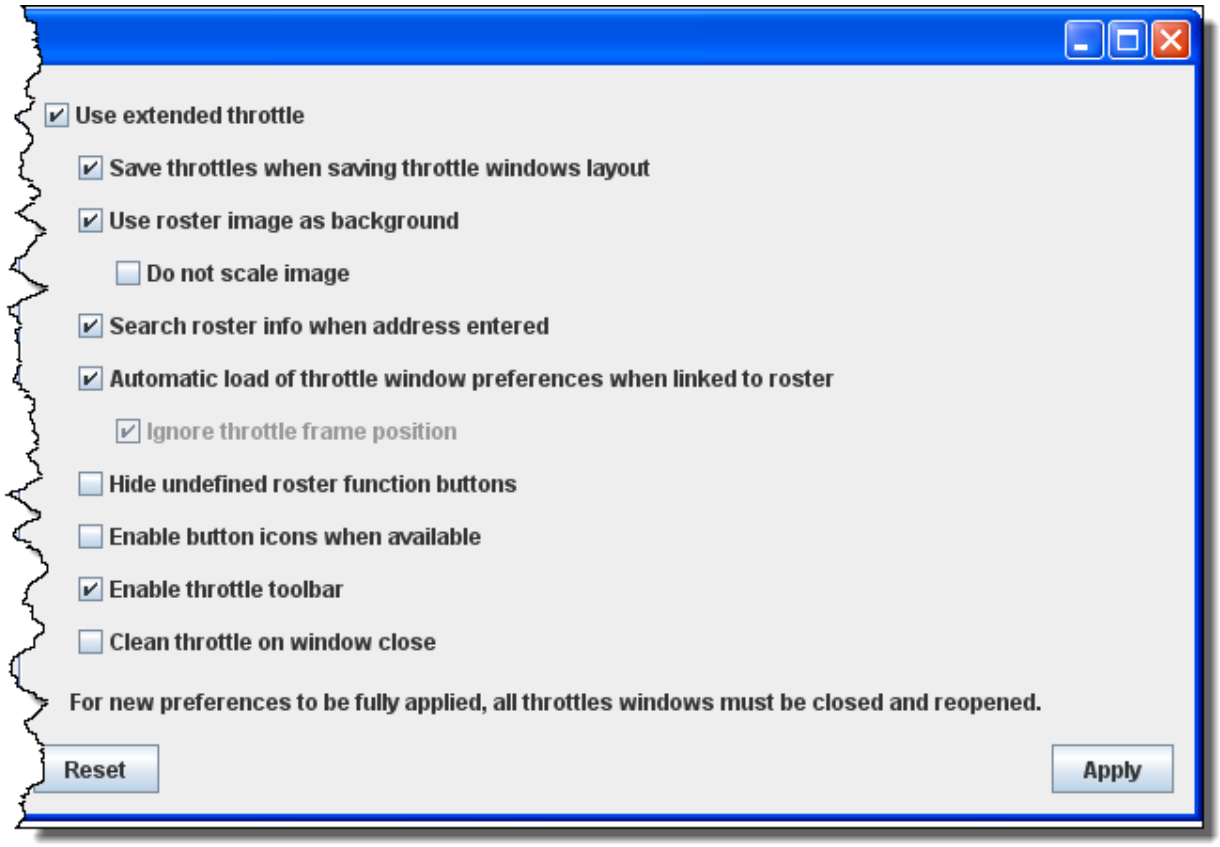
Roster TAB

You may set the default location of the locomotive roster and the default owners name.



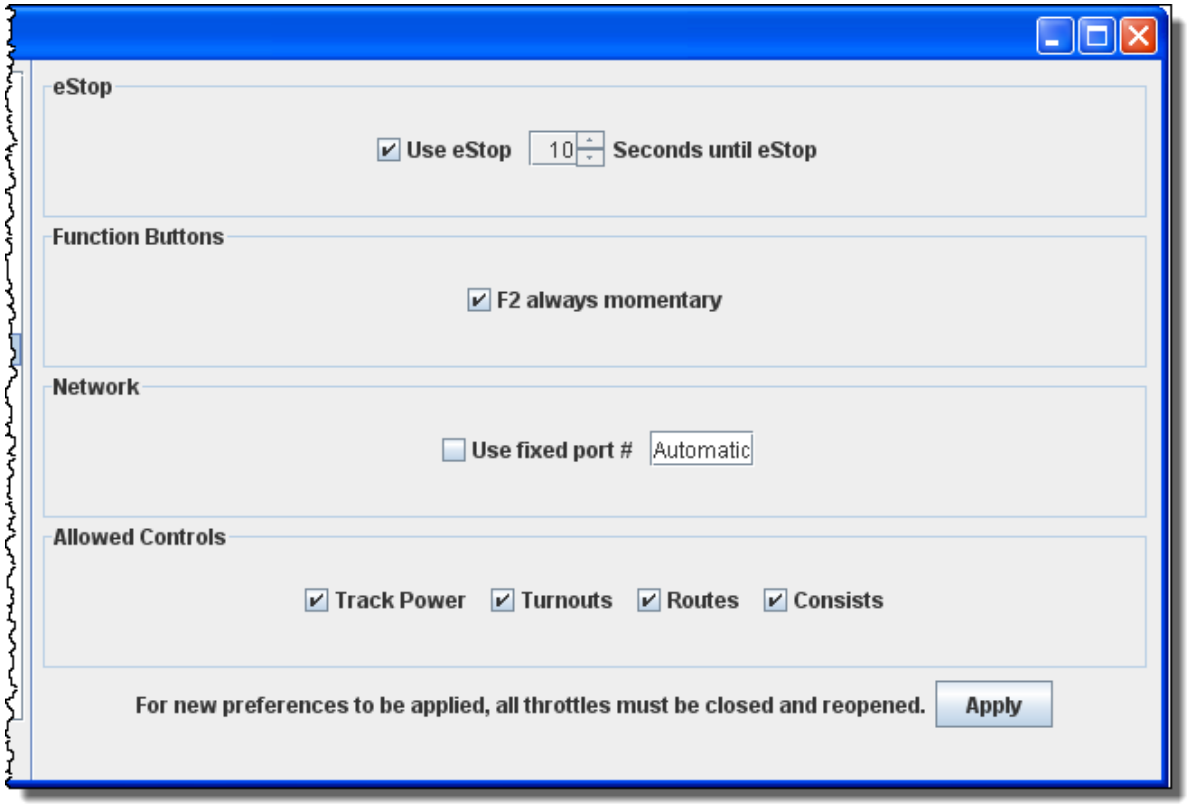
Throttle Pane

Select throttle startup conditions, shown are defaults, but you may change the settings.



WiThrottle Pane

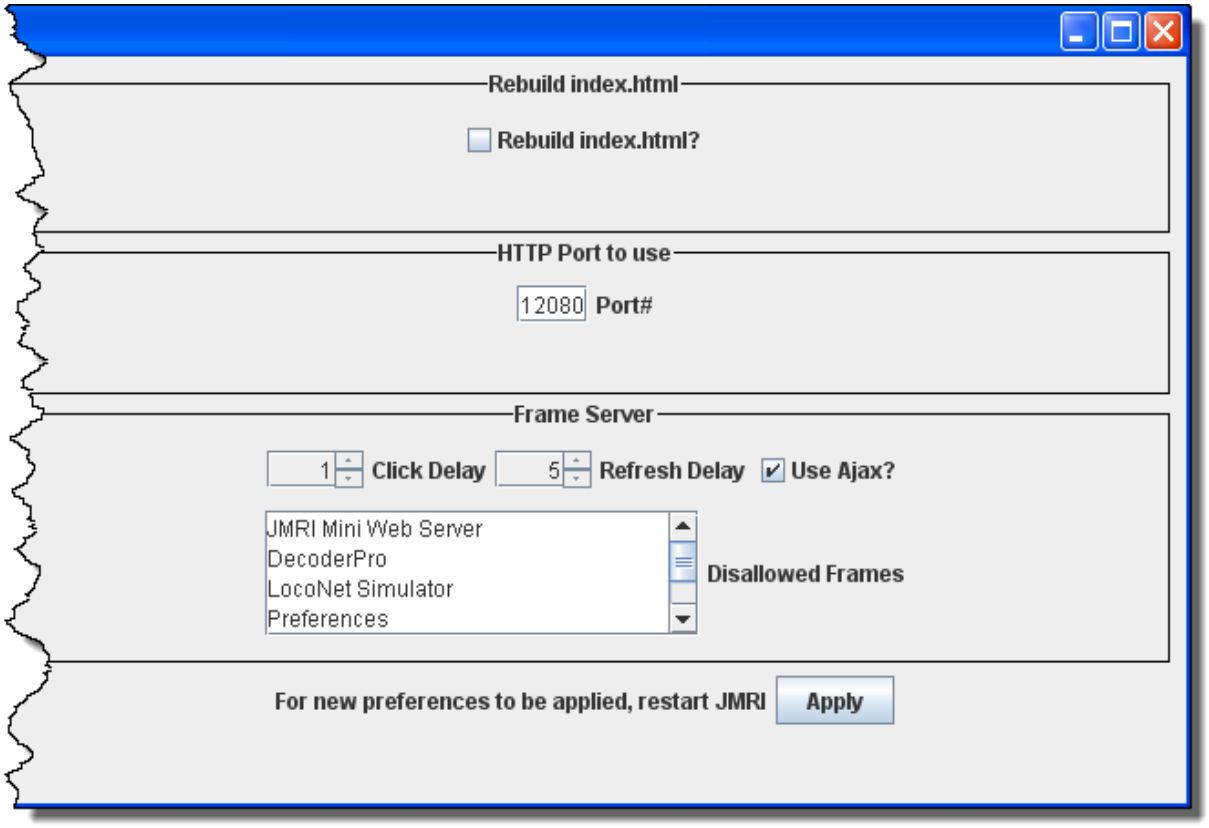
This pane allows WiThottle users to customize the setup.



MinServer Pane

Use this pane to setup MiniServer if you are using it.

Ajax is now in use for smoother image refresh and clicking. For older browser you may want to unselect Ajax.



BEFORE YOU EXIT THE PREFERENCES, CLICK ON BUTTON TO SAVE ALL YOUR SELECTIONS.

YOU MUST RESTART DECODERPRO FOR PREFERENCES TO TAKE EFFECT

Using DecoderPro3®

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.

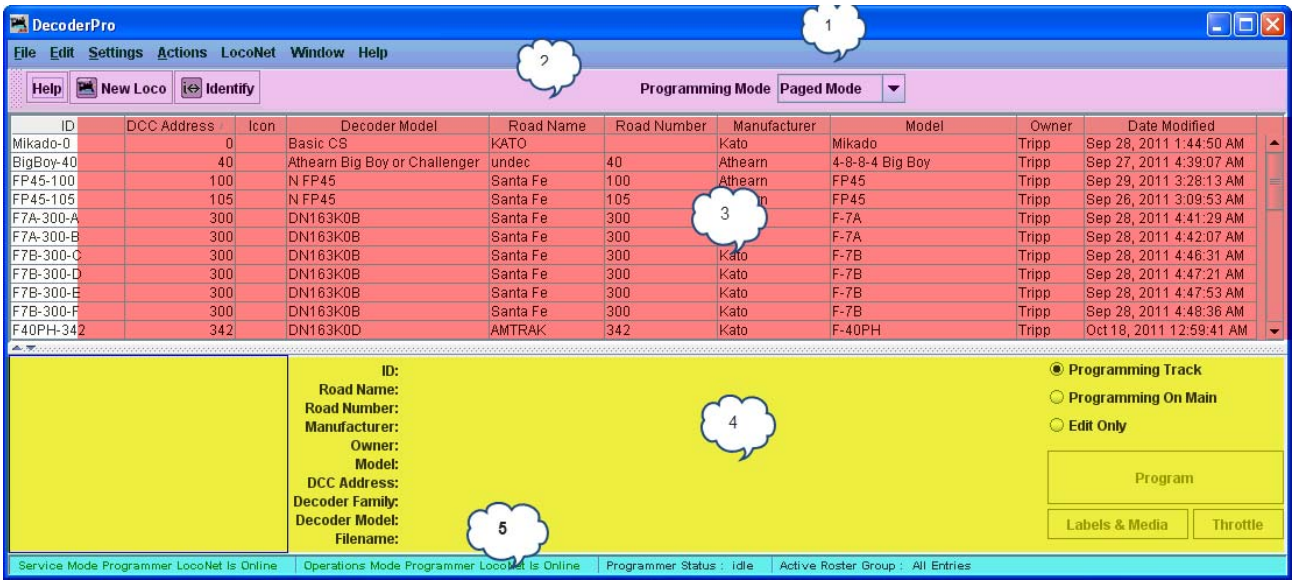
On your initial opening DecoderPro3, the main page will be displayed: (After preferences are set) the list of locomotives programmed by DecoderPro3 will be blank until you add a locomotive. From then on when it is opened a list of all the locomotives whose decoders you have previously programmed in DecoderPro3 or classic DecoderPro will be listed.

DecoderPro3 provides access to the JMRI tools required to program DCC decoders. If you are an advanced user, using PanelPro to run your layout, then you may start PanelPro and then from the File menu start DecoderPro3.

If you already have roster entries and you want to start programming in **Comprehensive Programmer**, double-click on the roster entry.

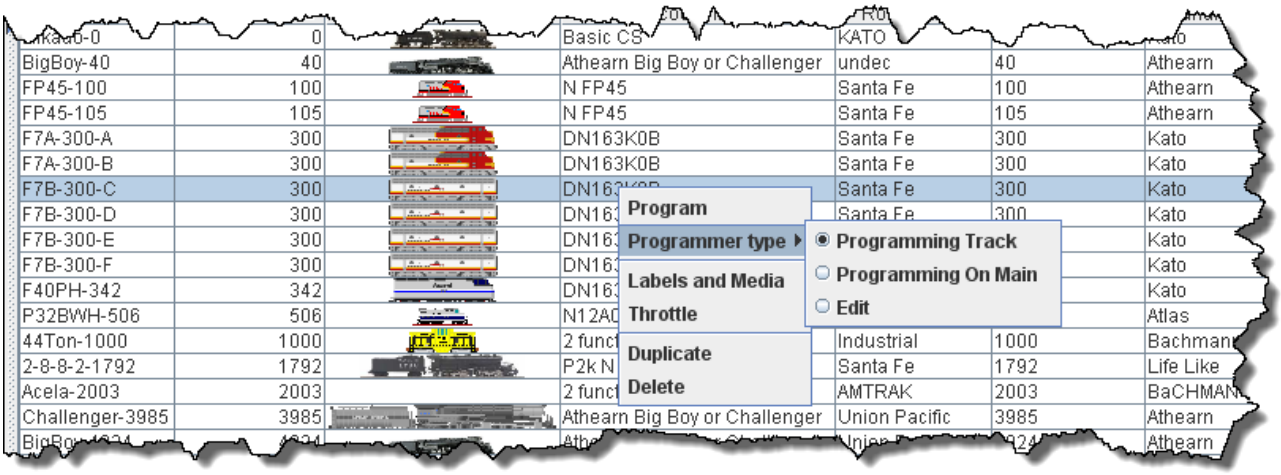
DecoderPro3 by its self may program DCC decoders and also use the other JMRI tools to manually operate your trains from the computer interface. These include throttle control and power control of your layout if your DCC system allows them..

The DecoderPro3 window is divided into five main sections from top to bottom.



1. **The Menu Bar**.
2. **The Tool Bar**
3. **The Roster Table**: a list of all the decoders in your roster that are part of the active roster group. To set-up a roster group in addition to the default group of **All Entries** see **Settings for Roster groups.**.
4. **The Decoder Information Area**. Show information about any selected locomotive in the roster list.
5. A status bar that reports information about DecoderPro3 operation including errors.

Anywhere in the roster table you may right-click and a context menu will be displayed.



Program

Programmer type

Programming Track

Programming on Main

Edit (Allows you to edit roster without making changes to program)

Labels and Media — Opens programming page to select either Labels TAB or Roster Media TAB

Throttle — Opens JMRI Throttle

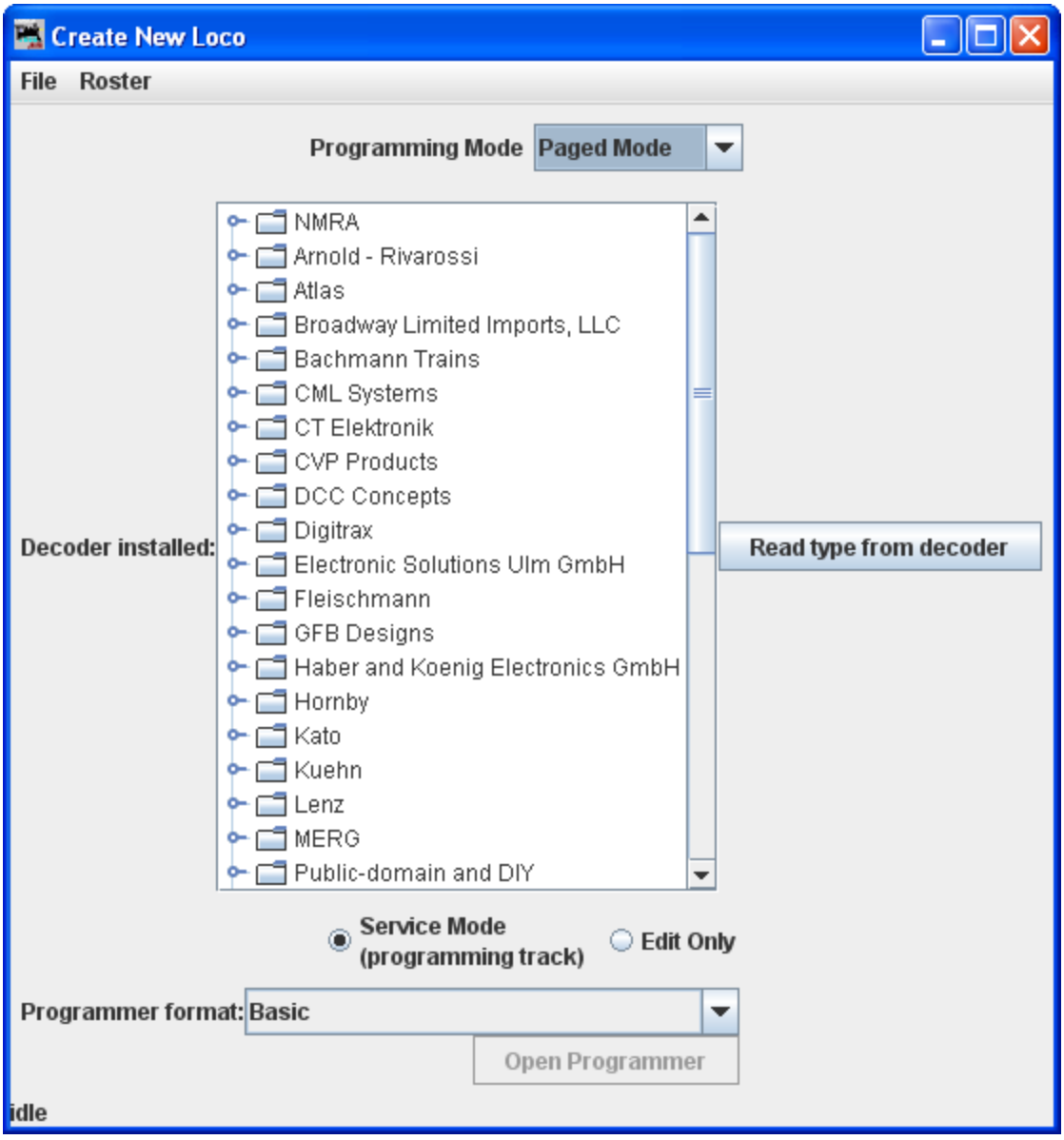
Duplicate — Duplicates the selected roster entry to use for same type of locomotive.

Delete — Deletes roster entry.

At this time we have no entries in the Roster list of locomotives. We will now add our first locomotive to the list.

Adding New Locomotive

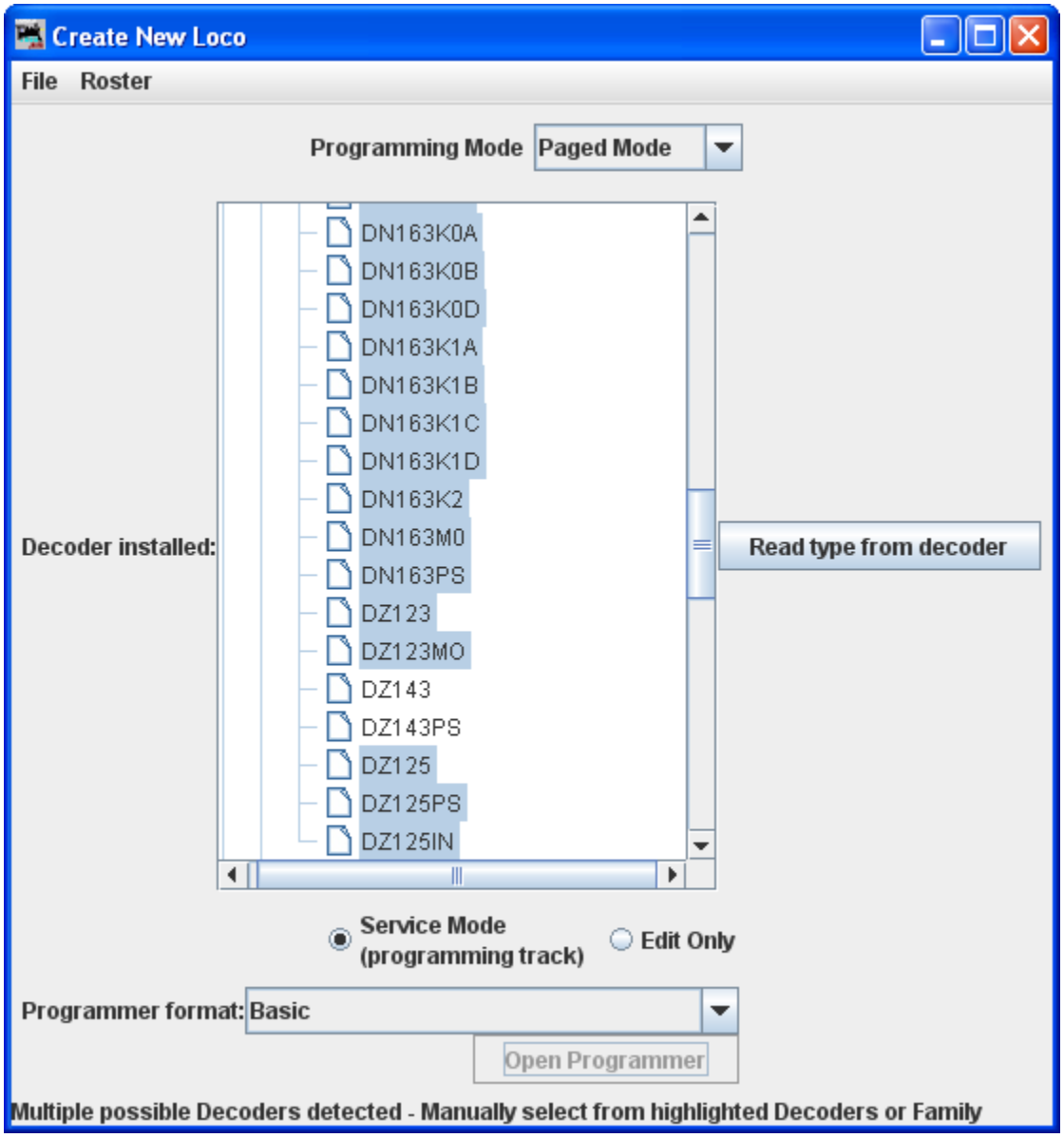
On the Tool Bar is an icon labeled **New Loco**, click on the icon and the **Create New Loco** window opens. Click on the Service Mode radio button on the bottom of the screen. Place a locomotive (with the decoder installed) on the Programming Track (Service Mode), click on Read type from decoder button (mid right side)



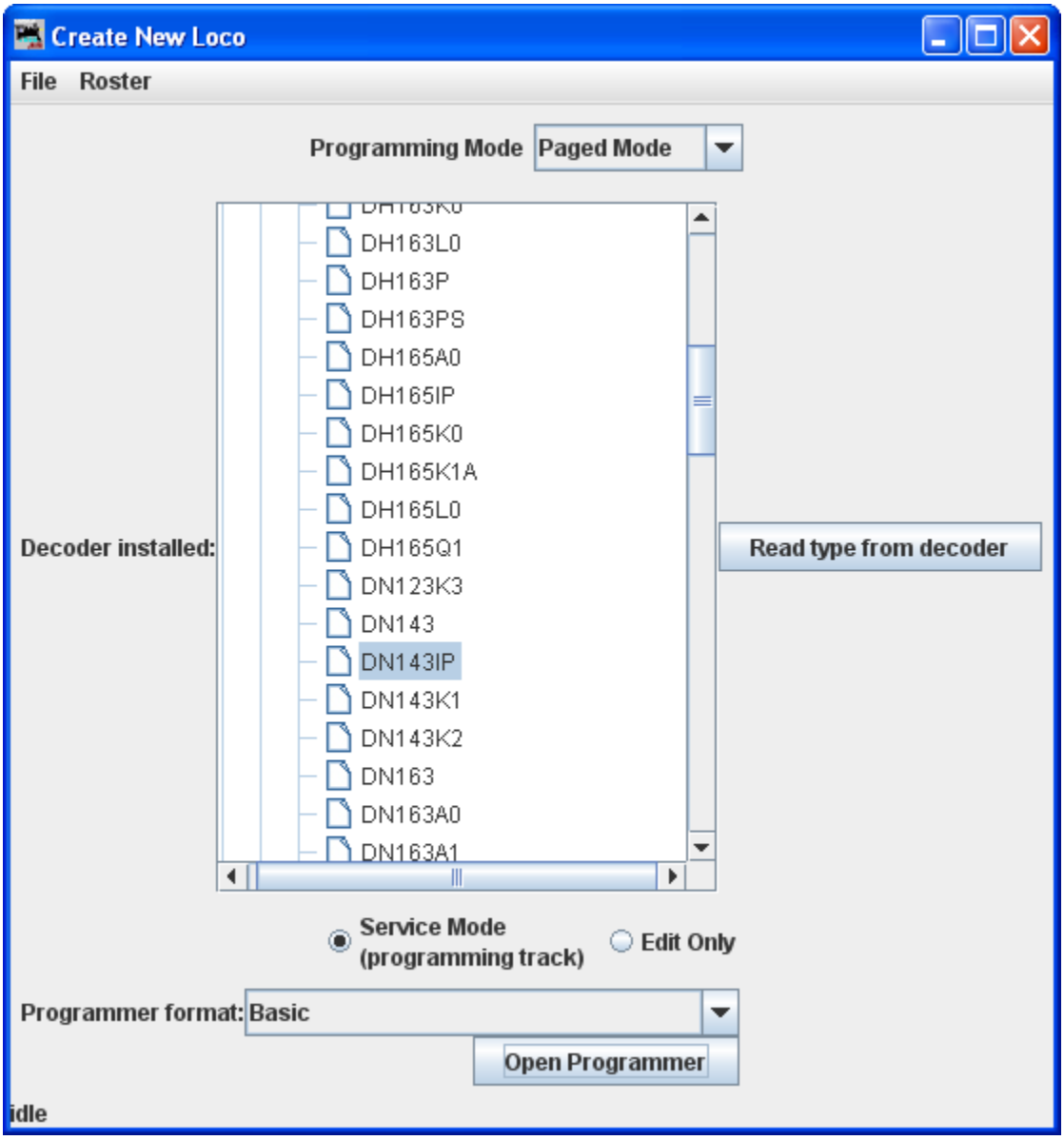
As in the screen below several possible decoders will probably be highlighted. This happens because the decoders are electrically the same but are packaged differently to fit the locomotives that they are used

in. If you know which decoder is in use, then select that one. If not, in most cases any of the highlighted decoders will work, and you should select the one with the least letters at the end, since letters are often used to denote locomotive specific variations.

I know that this decoder is DN143IP plug-in version for a Burlington Zephyr in n scale. So I will select that decoder.



Note that we have selected a decoder, which is highlighted. Also the **Open Programmer** button is activated to allow us to enter the programmer and the Pr**ogrammer format**: is **Basic**.



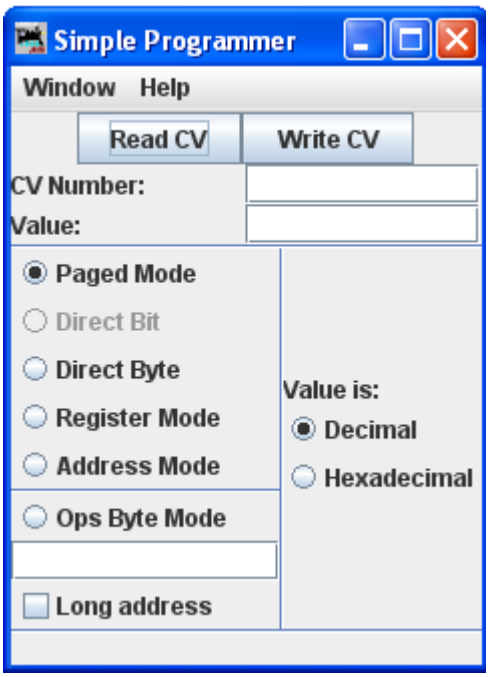
Click on the Open Programmer button and the **Roster Entry** Pane will open for the Basic Programmer.

Go to the next page

DecoderPro3® Programmer 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:

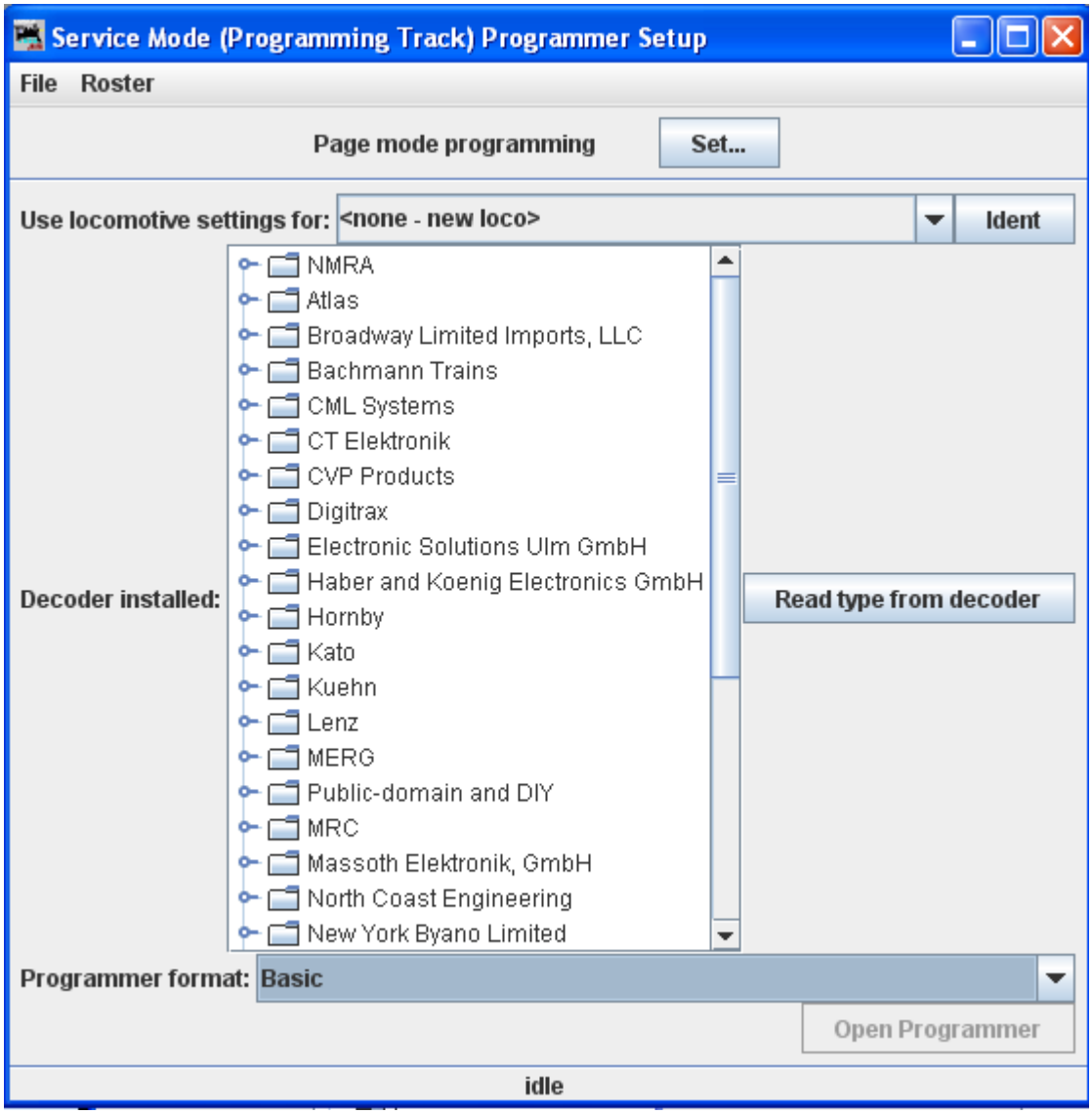
To obtain information from the decoder on the programming track we rely on the ability of the decoder to respond to a query, what is known as **Readback.** Most decoders cannot talk to send information back to the command station. They just respond to instructions, so special instructions were developed 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 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 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 click on the **Open Programmer** button, the selected Programmer window will open. Both programmers, Basic and Comprehensive 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!

Ops Mode setup Window button

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

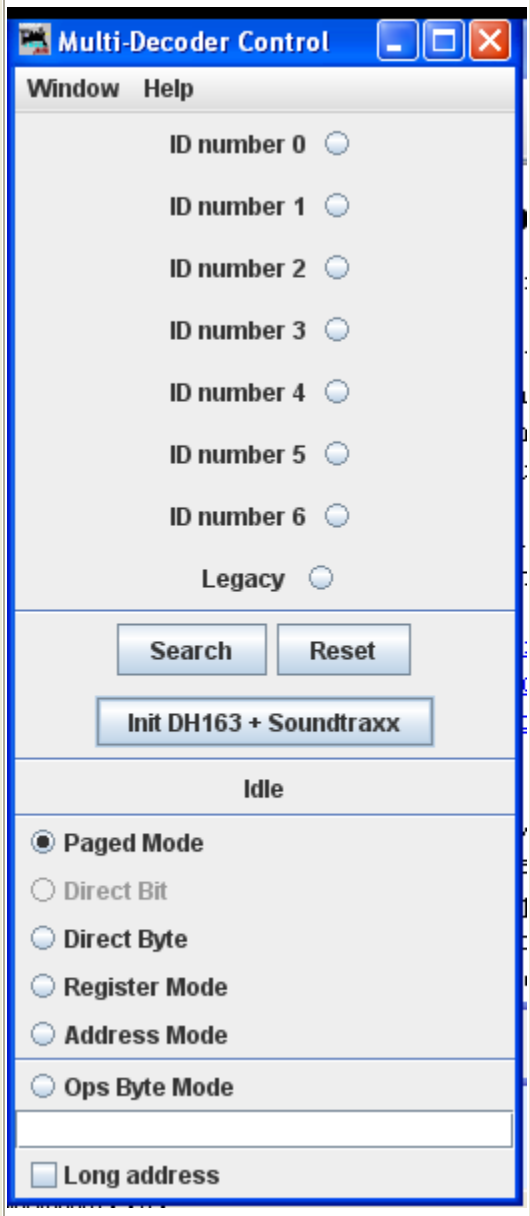
sound decoder value of 2

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.

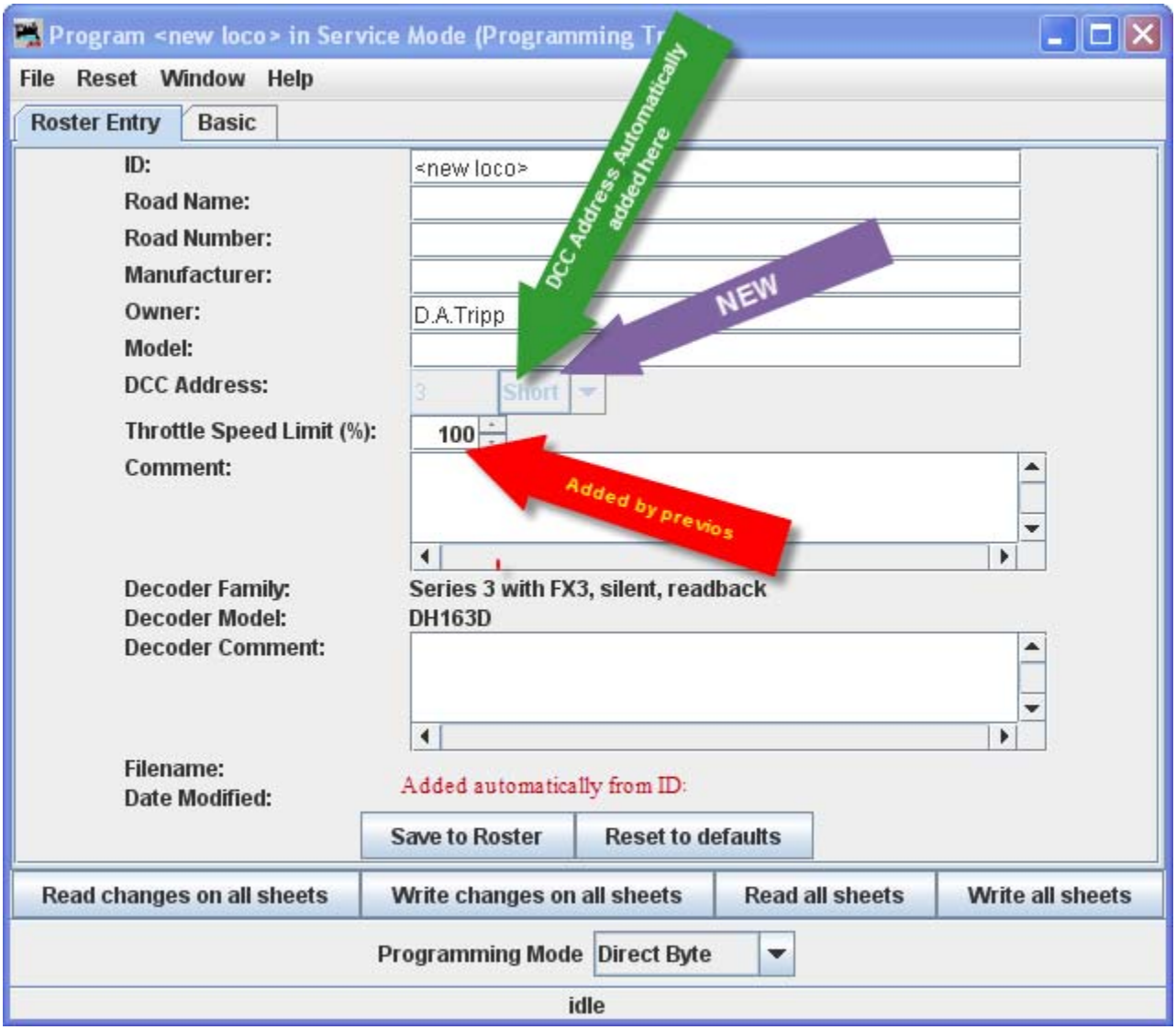
	Reset button looks for possible combinations to unlock a decoder that has been inadvertently locked. Only use this option if you have just one decoder in the locomotive. If you have more than one , it will unlock all of them, which may cause confusion later. **Init DH163 + SoundTraxx** button configures 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.

The Basic Programmer

The Roster Entry Pane

The first action in programming a locomotive with DecoderPro3® is to fill out the roster entry screen.

A **roster** is a database of all locomotives that your installation of DecoderPro3® has programmed. All of this information will be contained in the list on the DecoderPro3 main page. It includes the information seen in the screen below:



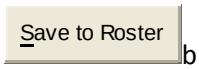
Most of these fields are self-explanatory. However, note that the first field (ID) becomes the file name in the Roster for the locomotive you are programming. Set up a schema to identify your locomotive to its decoder program. i.e. Mfr, Loco Type, and Address (Kato_SD40-2_5645). Spaces in the ID field 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. This is not as necessary with DecoderPro3 as it is in the classic DecoderPro®, because it is now possible to sort the information on the opening screen using any of the columns by clicking on the column heading. DecoderPro3 also allows you to categorize roster entries into Groups, so you could have a separate group for each member.

We'll get to Groups and all the other neat stuff that can be done with DecoderPro3 in a while. I just thought I'd give you peek behind the curtain, and give you a chance to mentally thank the JMRI developers for all their work on DecoderPro3. Of course a message to that effect posted to the JMRI Yahoo group would also be warmly received.

The DCC address will be filled in automatically when we get to programming the address. The Decoder Family and Model are entered automatically from the Selection page we just used to get here.

The **Decoder 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 

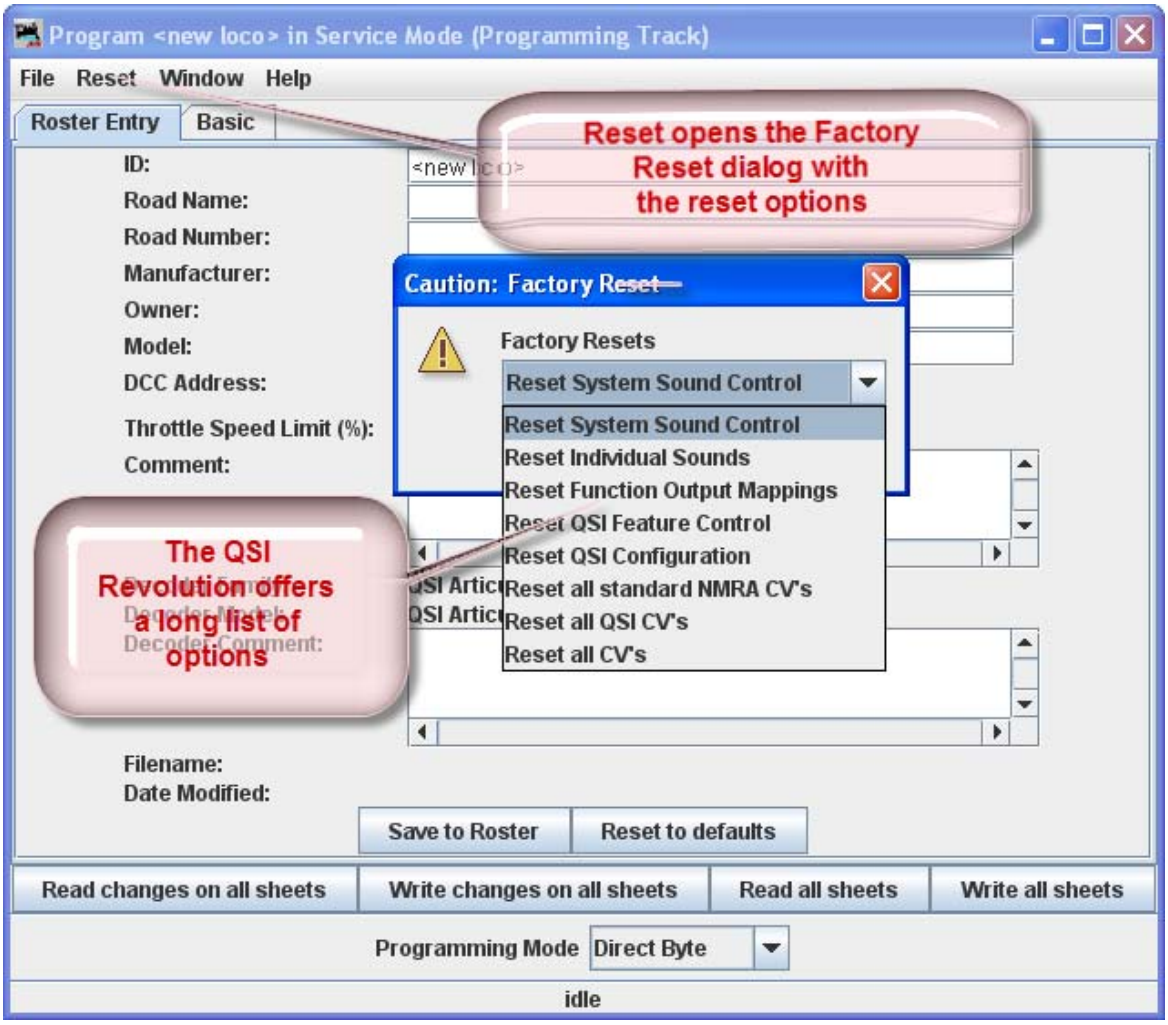
button stores the current decoder information to your computer hard drive and folder where your roster file is located. The default storage is the same directory where the program is installed.

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 decoder manufacturers baseline default set and start again.

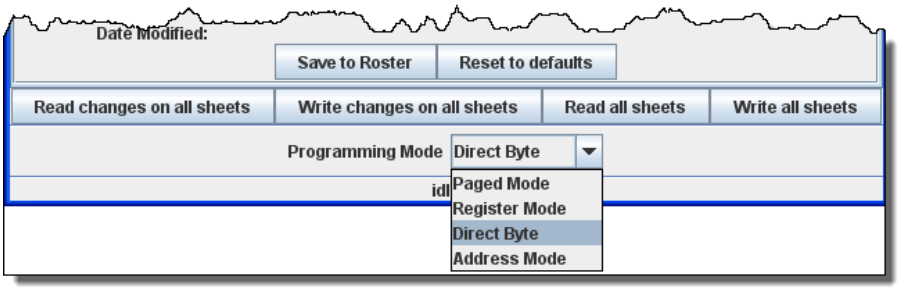
Most decoders will activate the **Reset Menu** (next to the File menu at the top of the page). This will reset the decoder to the manufacturers default settings for all the CVs, or just some of them if the manufacturer has several reset routines. It does this by writing directly to a CV in the decoder, 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 drop down box

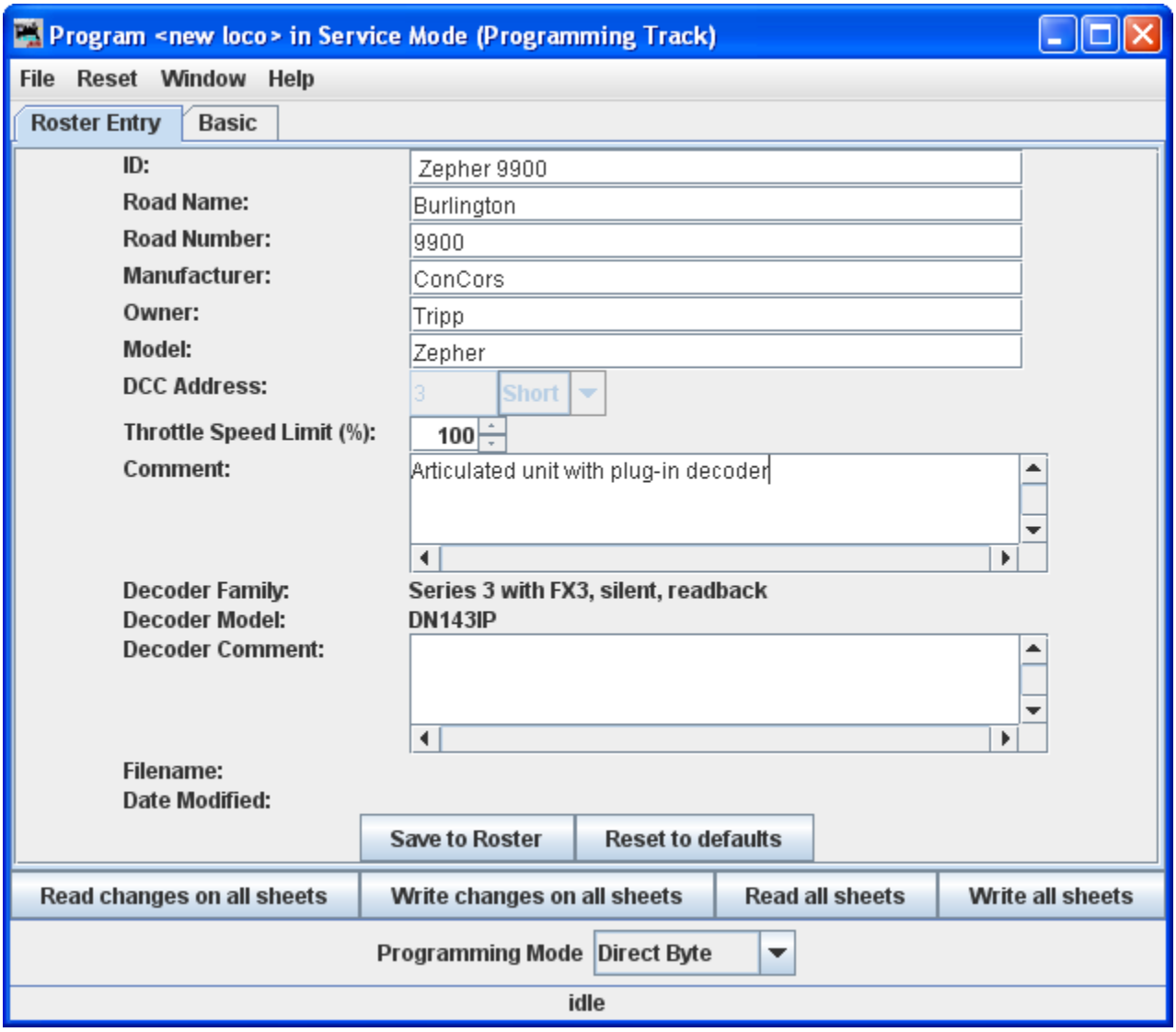


There are options for several programming modes. JMRI now selects the best mode for you. It determines this from the command station type you are using and the decoder model you are attempting to program. Usually this will be OK. If you find that you are having a problem with programming you may try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

Below is a Basic Programming Roster setup for Burlington Zephyr n scale with Digitrax DN143IP decoder.



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

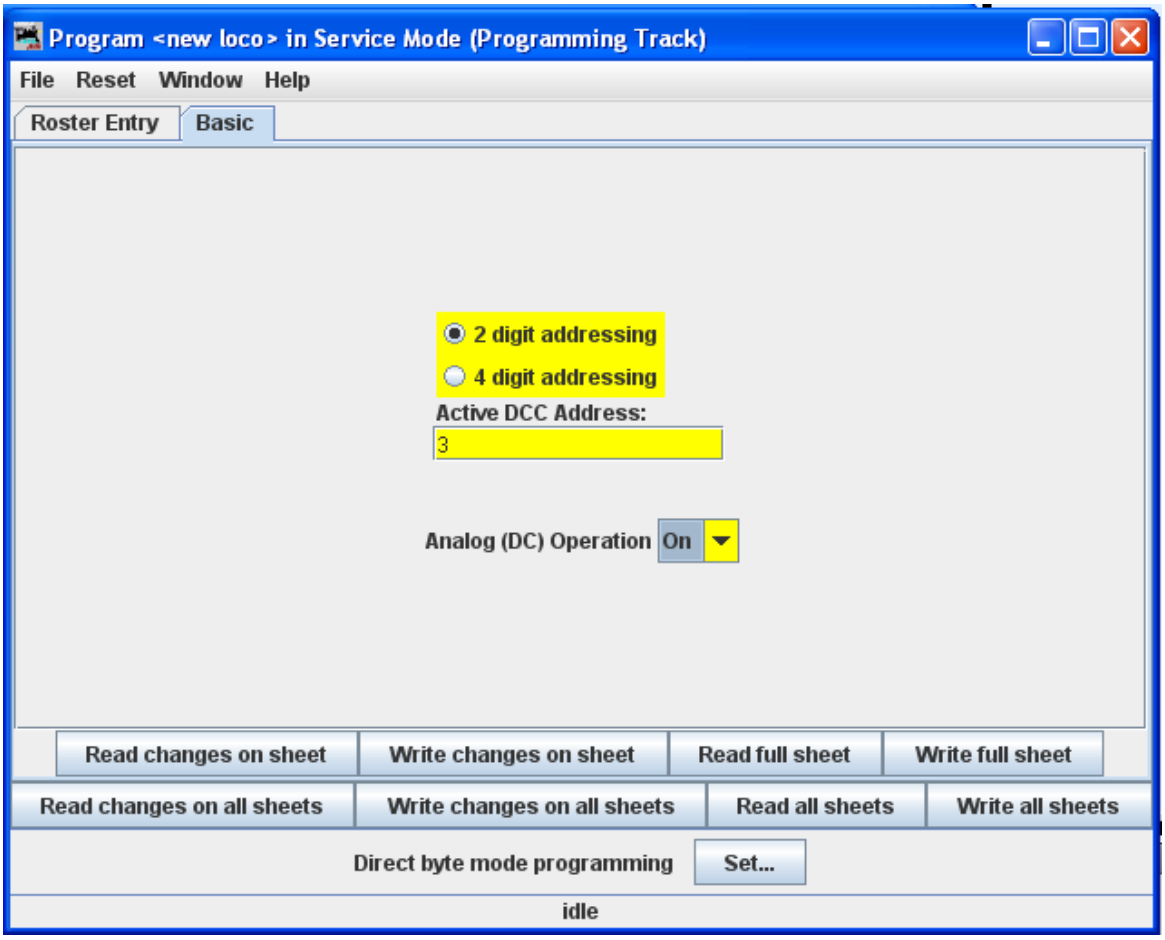
Now it's time to click on the **Save to Roster** button to save this data. Note that there will be brief message in status bar at the bottom of the screen that roster has been saved.

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.

Below is a screen for Digitrax DN143IP that is used in the Burlington Zepher and is shown in factory settings, which is normally address 3.



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

1. The decoder address (should be unique among your locomotives, unless you are operating sevral as a set) 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 to run under regular DC voltage/analog control) Enable Analog Operation with caution, as some decoders will jump to full speed resulting in a "Runaway locomotive" if they are enabled for Analog Operation and encounter power spikes on a DCC digital signal. They seem to get confused, and revert to Analog operation and use the full track voltage DCC power to take off and GO! There is no stopping them without removing layout power. Very disturbing to your operating mates, but better than running into them at full tilt.

   To enable Analog (old style DC, some vendors refer to this as dual mode) Operation select the appropriate entry from the drop-down list.

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 button and Read all sheets button functions are dependent 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.

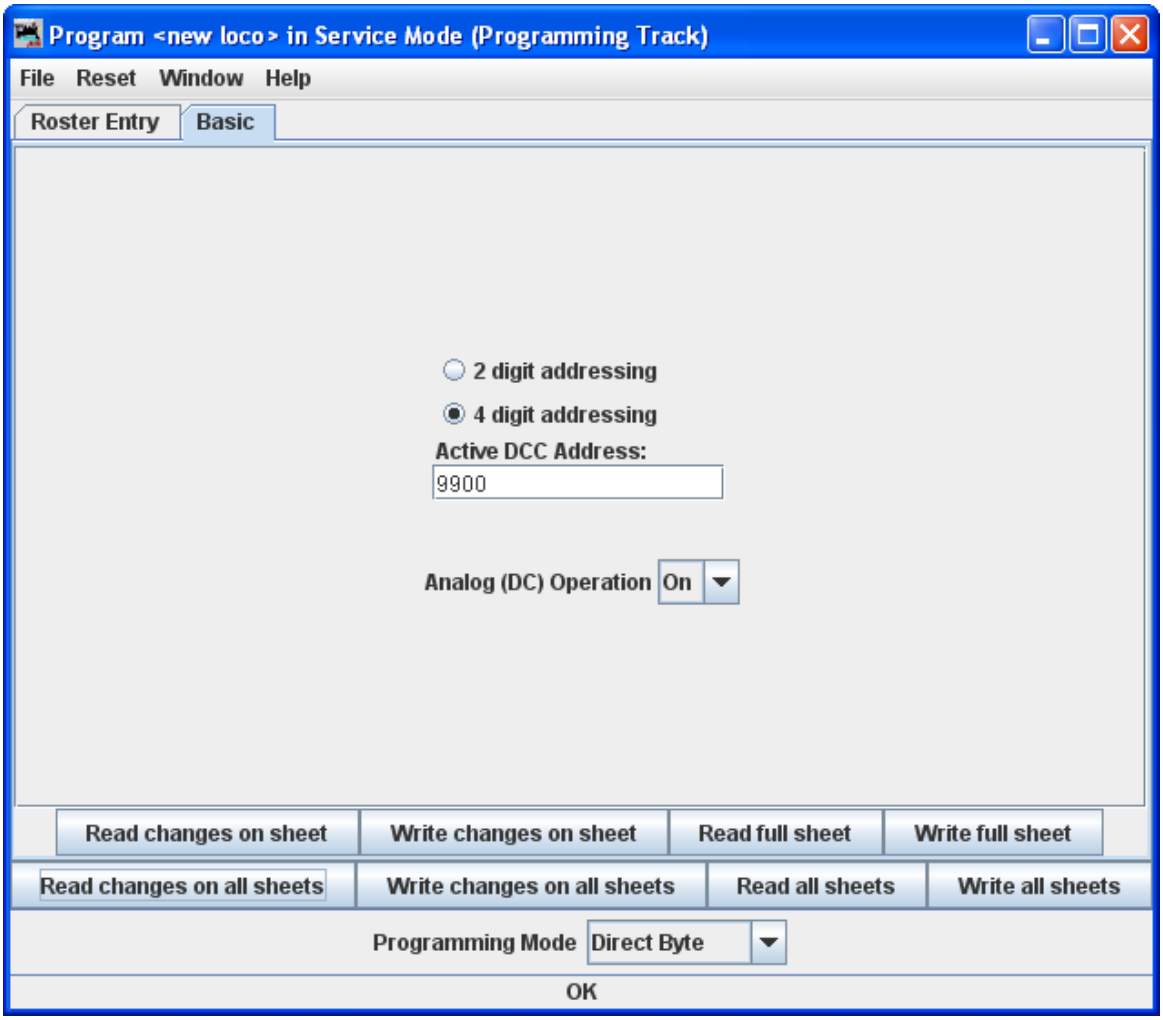
When you are finished, click on Write full sheet button to write the new values in the decoder.

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.

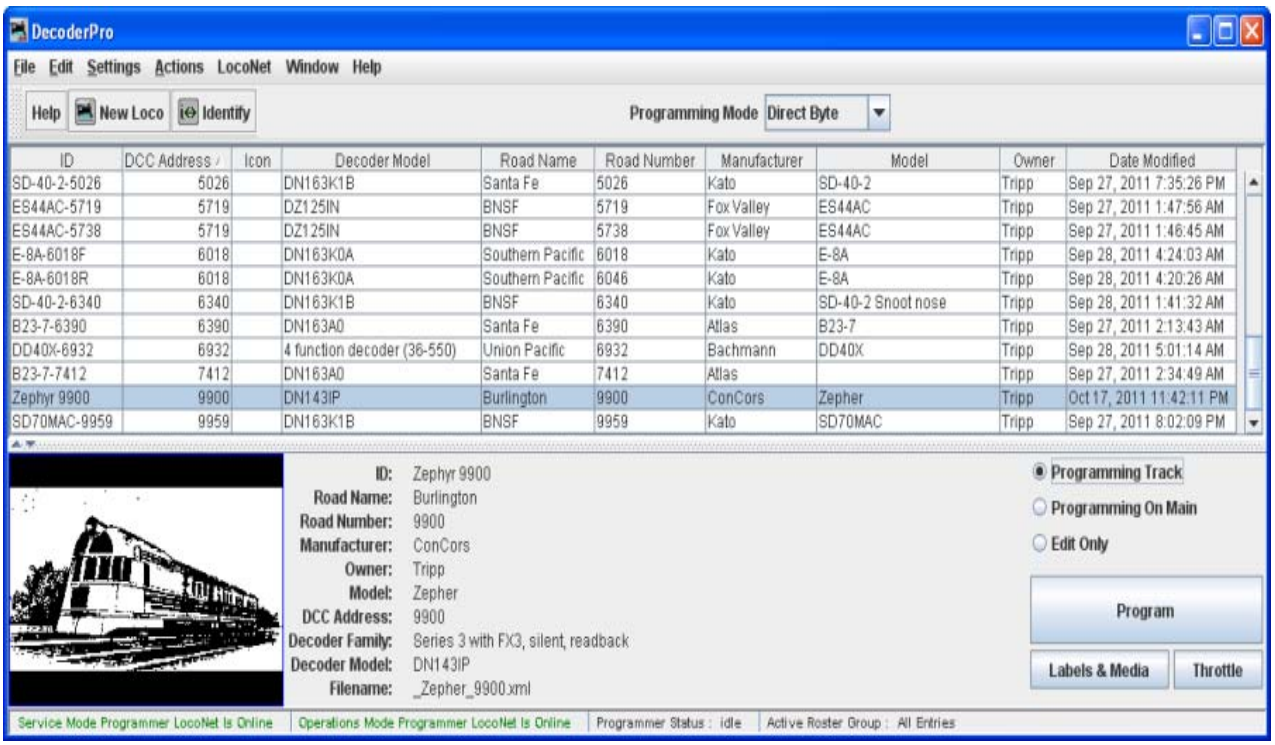
To finish this "basic" programming of a decoder, click once more on the **Roster Entry** tab, You will see that the address field has now been filled in, so you can now click on the Save to roster button . Your new decoder settings have now been written not only to the decoder, but also saved to a computer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

I have programmed the address for this locomotive and clicked on the Write full sheet button to send the address to the command station to program the decoder. Note that the status line keeps you updated as to what is writing and should finish with OK, which is good or an error message which usually meand the write was not completed. All the entries are now in white color as they match the decoder.



Now that we have entered the Roster data and set the desired address, lets return to DecoderPro3 Main window by closing the Programming window.

Notice that we now have a list of all the locomotives programmed so far that are in our roster.



What we've done so far is what is available in the Basic mode of programming in DecoderPro 3. A good place to start for new folks or at a club. It's hard to go wrong, but you can change the loco address and add it the roster, which are the two most often needed actions with programming.

The classic DecoderPro offered a number of modes, most of which were often redundant and confusing showing how the user could edit the underlying file to make special application programming modes. The Comprehensive Programmer was the most popular for a long time until Advanced came along with added features. So now they've been combined in DecoderPro3. Thus the Comprehensive Programmer with added advanced features is the only other programmer that DecoderPro3 offers.
Since we've already covered **Basic**, let's explore the DecoderPro3 Comprehensive Programmer!

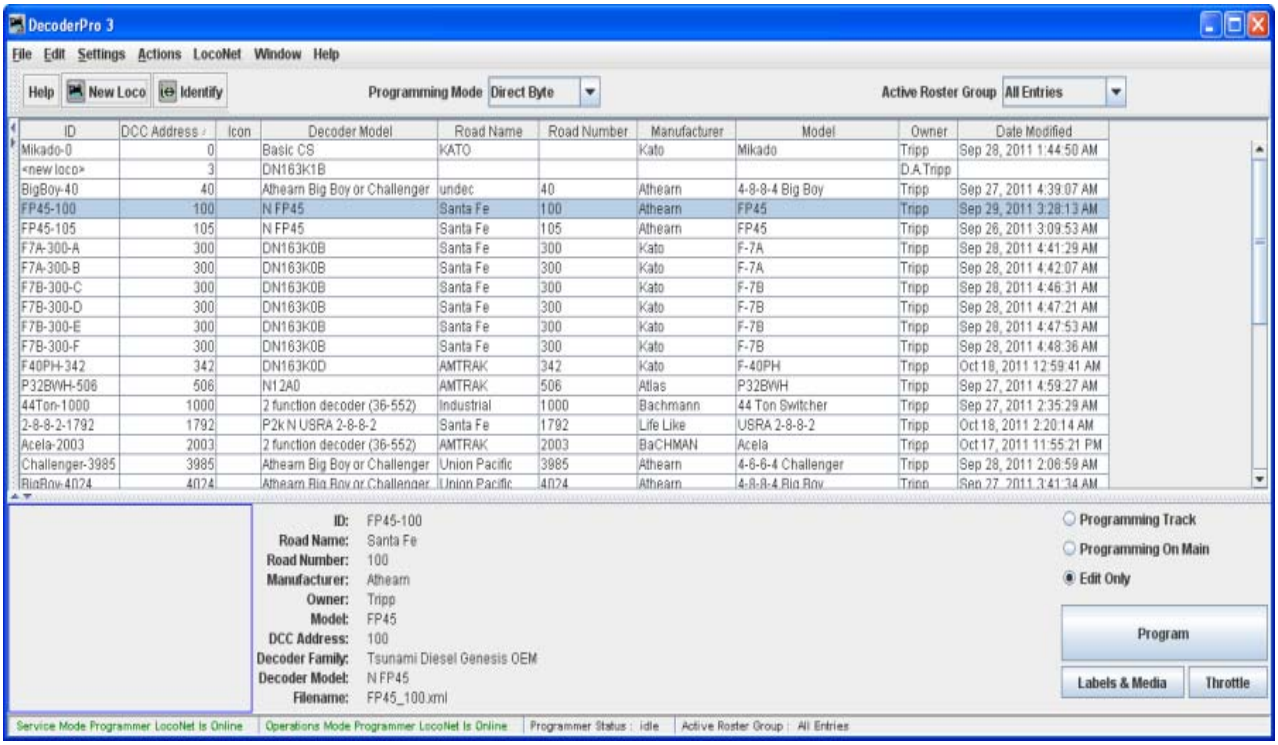
At the bottom of the window is the Labels & Media and Throttle buttons. Use these buttons to set up the Icon photos for Click the links that we've included your roster entries and to set-up the Function Labels on the software throttle included in JMRI. and take a look.

DecoderPro3® Comprehensive Programmer

Roster Entry Pane

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.

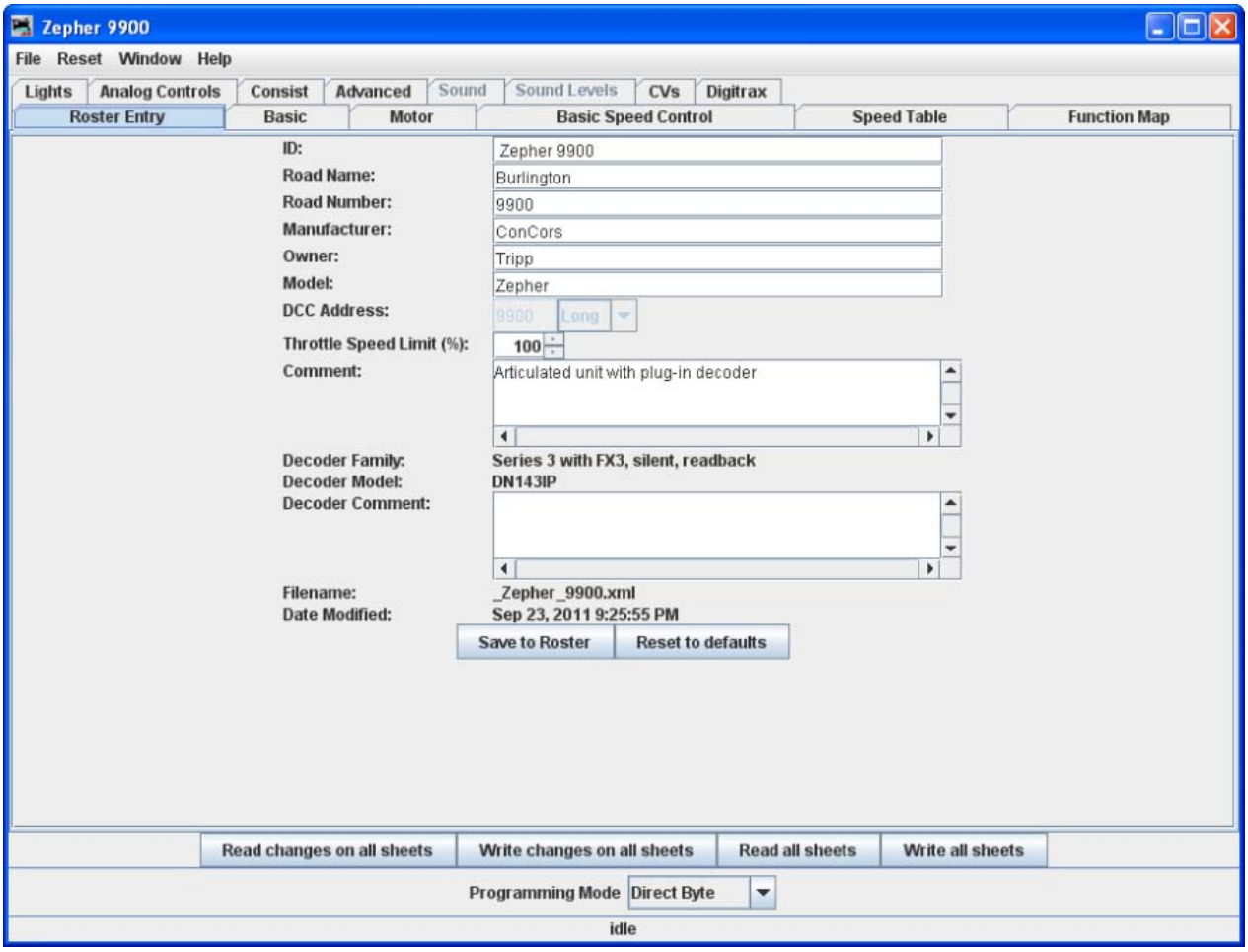
Just be sure that you select the Comprehensive Programmer in the DecoderPro3 Preferences, Roster pane, Program TAB, then selelct locomotive you wish to program on the DecoderPro3 main screen from the roster list, now press the Program button.



We have programmed the Zephyr in the Basic Programmer, it is on the roster list and has been addressed. If we want to add the extra features of the decoder, we will select the locomotive from the roster list then, set preferences for Comprehensive Program the click on the Program button.

Programmer window will open as shown below. All programmers, Basic and Comprehensive, open to the Roster Entry pane, which will be similar to that shown below for the Zephyr.

The programmer opens with the roster entry page filled in because we selected the loco from the roster panel in the previous screen.. Note that there are now a whole lot more TABs at the top of the page, allowing us to program more features.



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[page 39]**. 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

One 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, but you can get a hint by looking at our discussion of decoder locking at (**Decoder Locking**).

Normal direction of motion: 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).

Speed Steps: Unless your command station or decoder can only handle 14 speed steps,choose the 28/128 setting. If your decoder offers 128 speed step operation, you'll find you get much finer control of your locomotives by using the **128 speed steps** setting. You choose between 128 or 28 with your throttle, when the locomotive is ready to roll on the track.

Analog operation (enables the decoder to run under regular DC voltage/analog control) Enable Analog Operation with caution, as some decoders will jump to full speed resulting in a "Runaway locomotive" if they are enabled for Analog Operation and encounter power spikes on a DCC digital signal. They seem to get confused, and revert to Analog operation and use the full track voltage DCC power to take off and GO! There is no stopping them without removing layout power. Very disturbing to your operating mates, but better than running into them at full tilt.

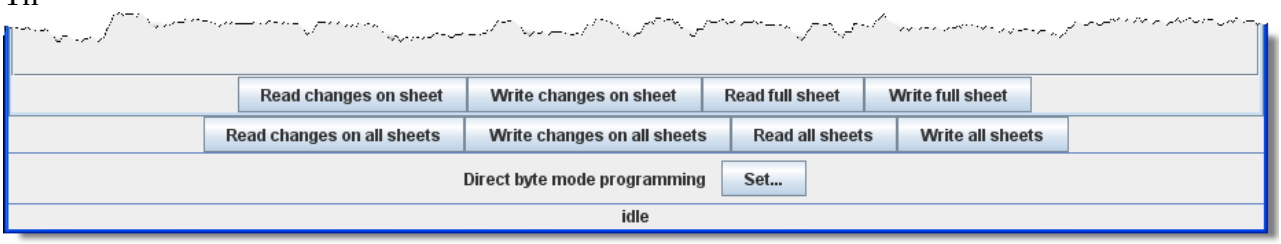
To enable Analog (old style DC, some vendors refer to this as dual mode) Operation select the appropriate entry from the drop-down list.

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 :

Th



e 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.

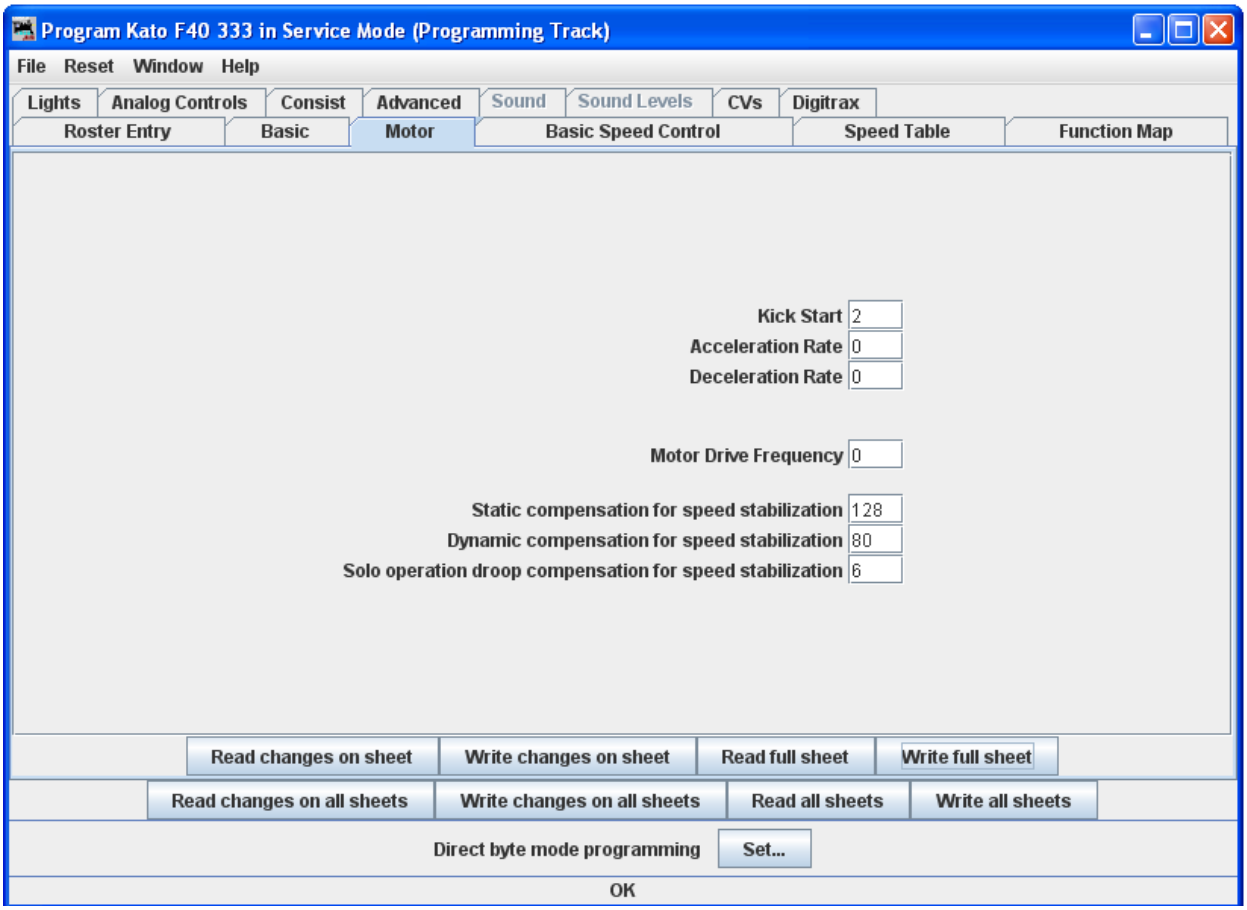
Below the two rows of buttons is a text line that shows what the current **programming mode** setting, and a **Set...** button that allows you to change it without exiting the programmer. Finally, the bottom line of the pane is a status bar that tells you exactly what the system is doing. It shows **idle** in these screen shots because the system was not actively programming decoders when they were made.

Now let's go to the Motor TAB.

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 tie 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.

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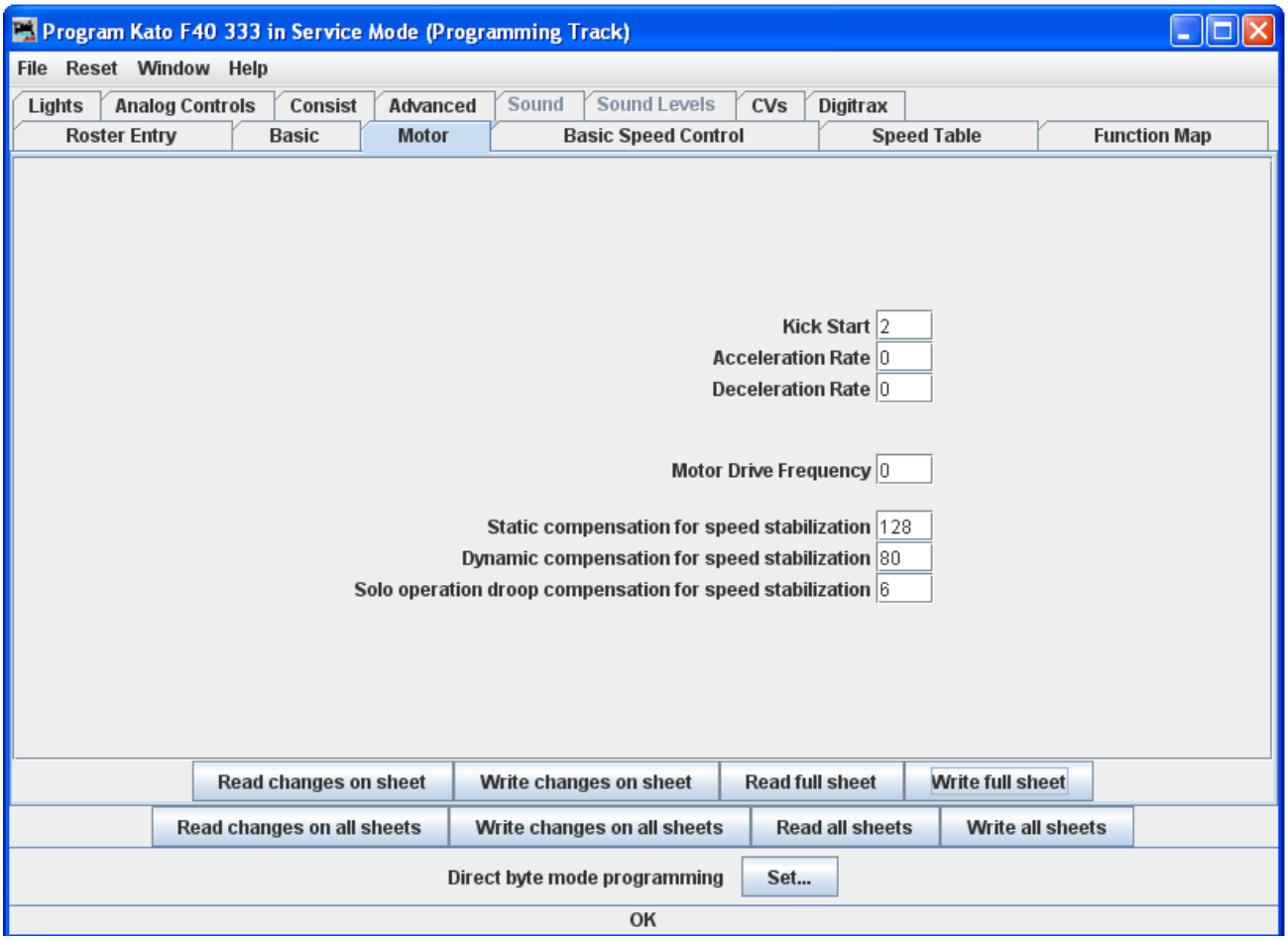

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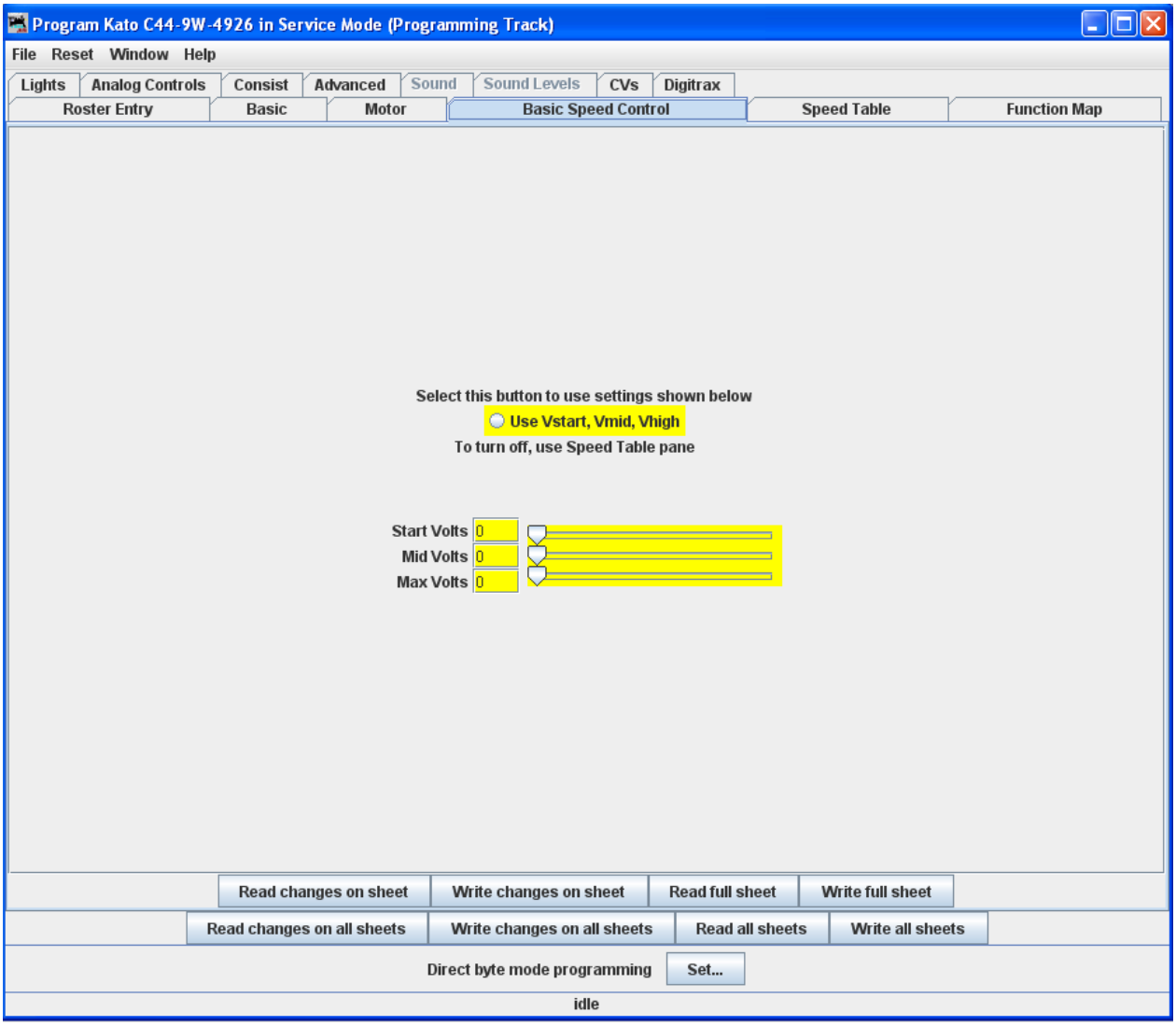
Speed Control Pane

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. Use the tabs at the top of the screen to select the method you wish to use and then click the button in the top center for the page to select that method of speed control. Whichever one you select last with the button will be the method used for speed control.

Now back to Basic Speed Control Pane. We see the **Vstart, Vmid, Vhigh** radio buttons. What appears in the body of this panel is dependent on what is available from your decoder manufacturer. Most have something similar to what is shown, but the Soundtraxx Tsunami

series is very limited. We'll show you a way around this limitation when we get to the Speed Table screen.

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 your DCC 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. A similar looking limit can be set on the Roster Entry screen, but it only apples to JMRI Throttles.

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.

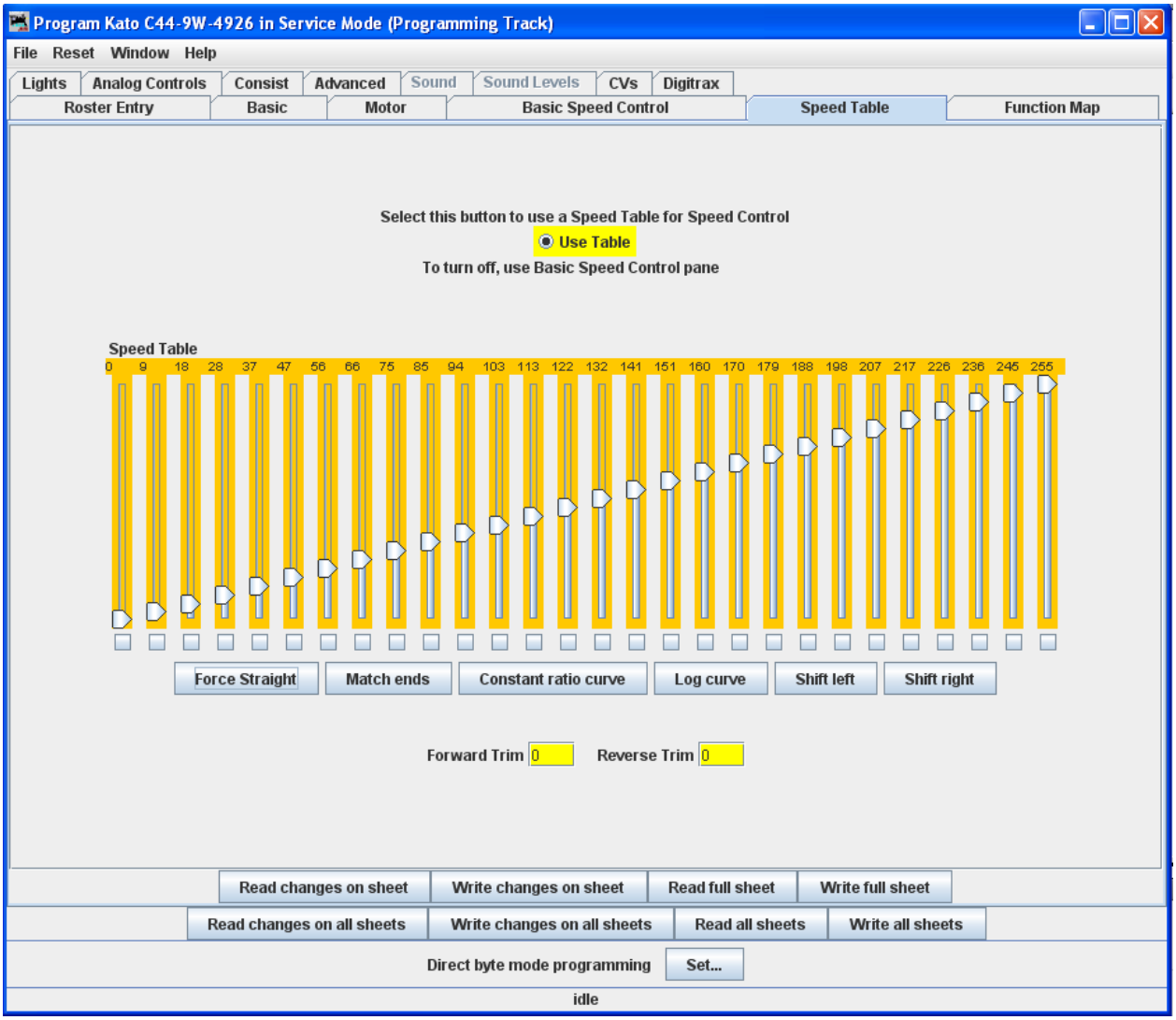
If you select **Speed Table** all of the settings in this pane are ignored.

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.

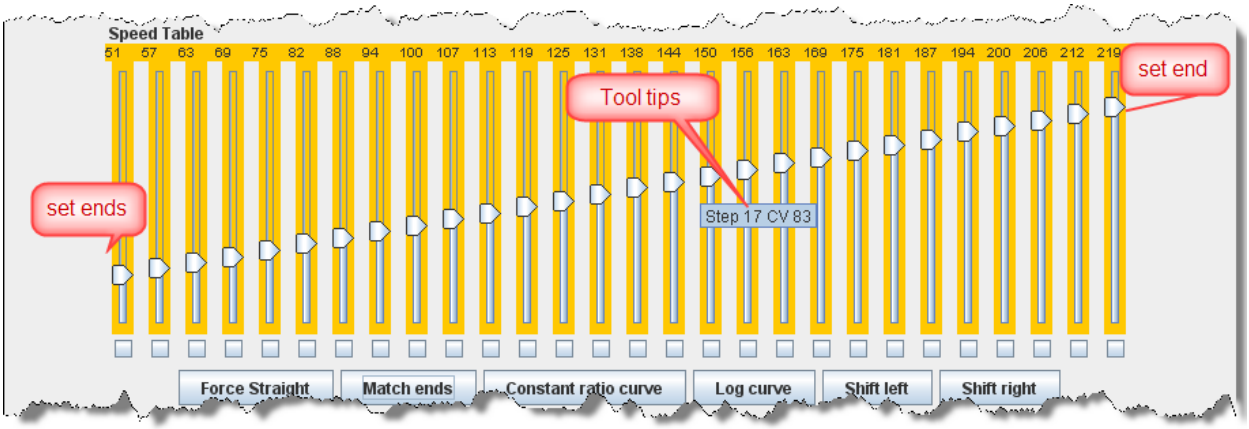
The default speed table for most decoders is a straight line from zero on the left to maximum on the right. The below the table duplicates that in the table..



Straight Line Speed Curve

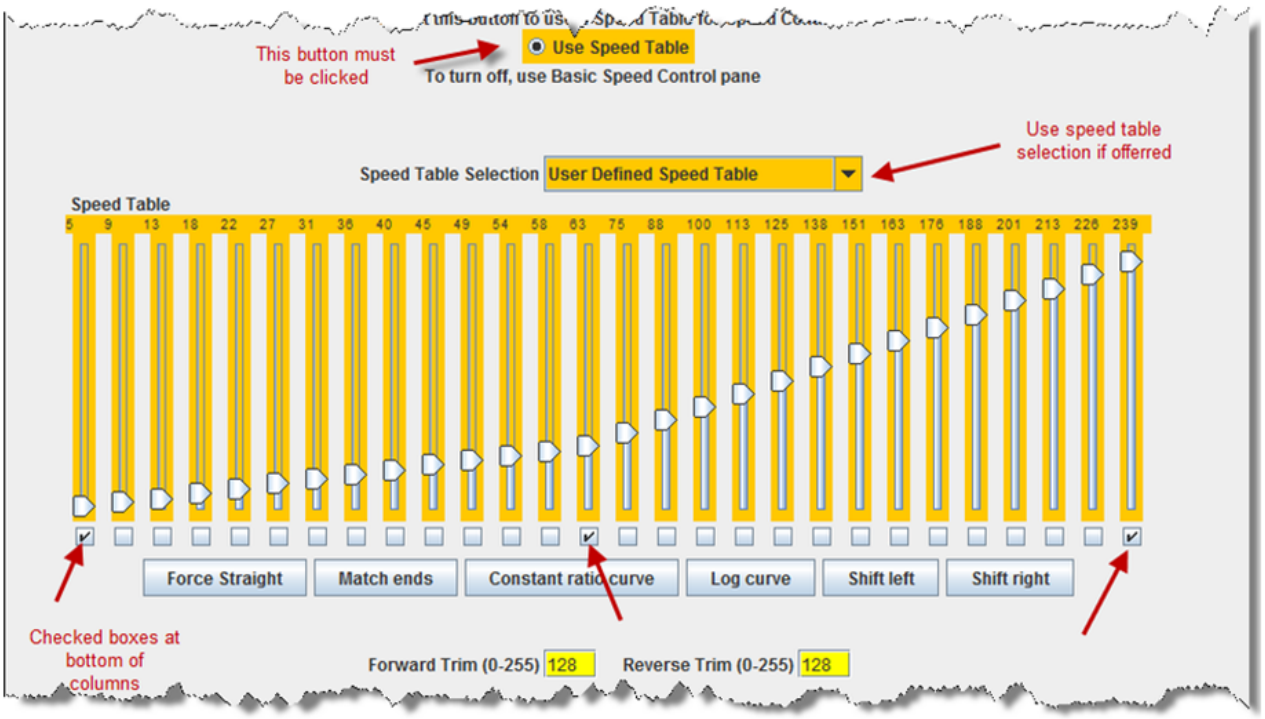
As you can see, you have both numbers and sliders to work with. Changing either a number or slider will make the other change to match it. If you are CV inquisitive, you can use the tool tip to advantage. By hovering over any of the sliders, the tool tip will reveal the CV to which you are pointing .

The 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.



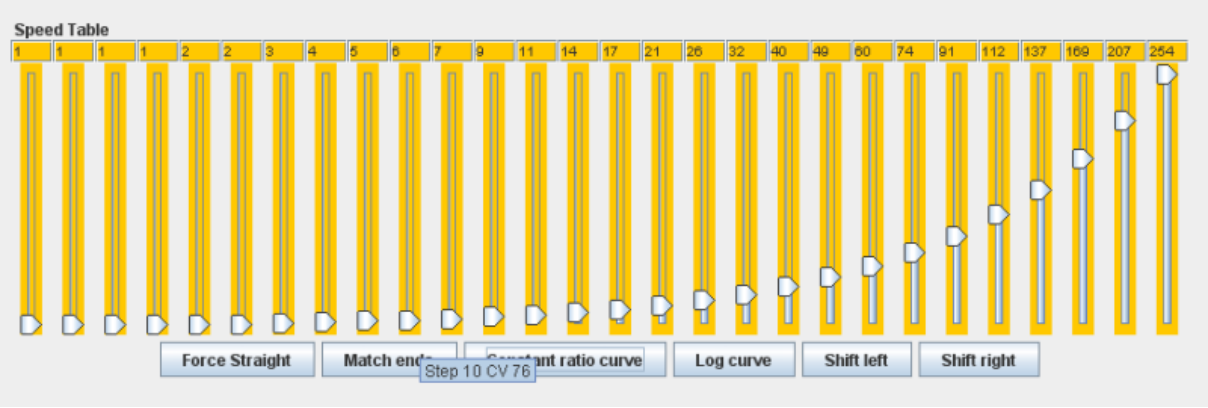
Now if you've used DecoderPro in the past, you're probably wondering what those little boxes at the bottom of each slider are used for. Well, they're difficult to explain, but easy to use. They basically allow you to set a slider to control every slider in columns to its left as well as to its right. 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 that 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.



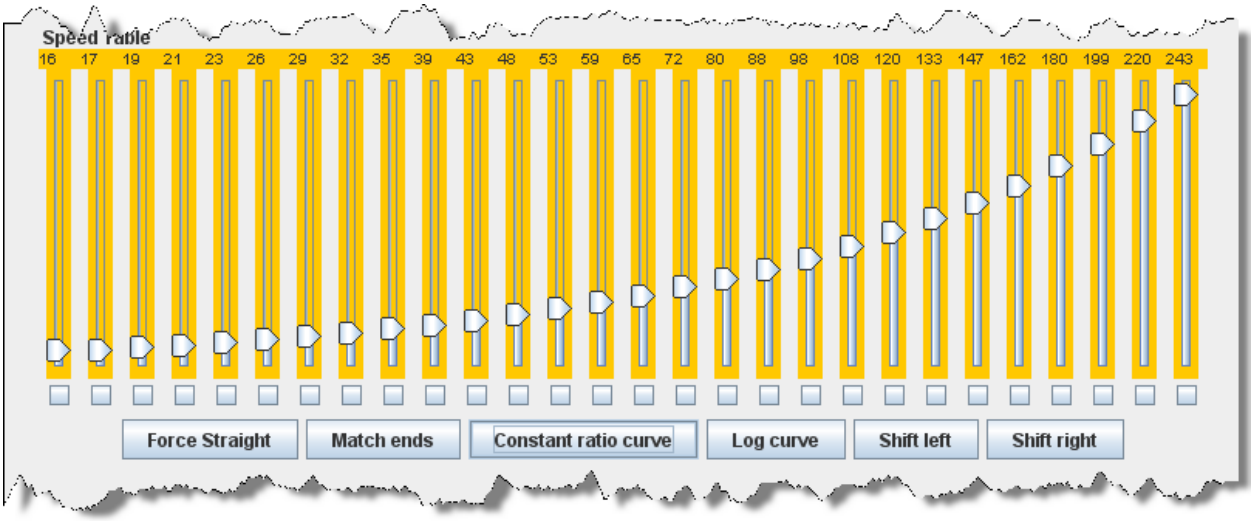
Substitute for Quick Speed Matching

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:



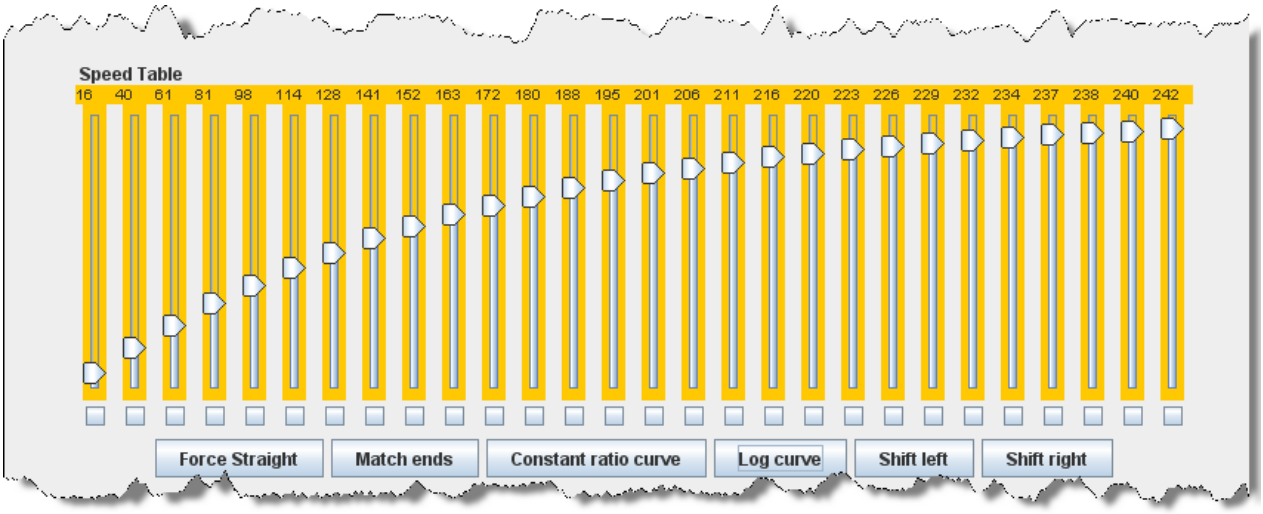
Switcher Speed Curve

if you don't desire a strait-line response curve there are other options available. The Constant 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.



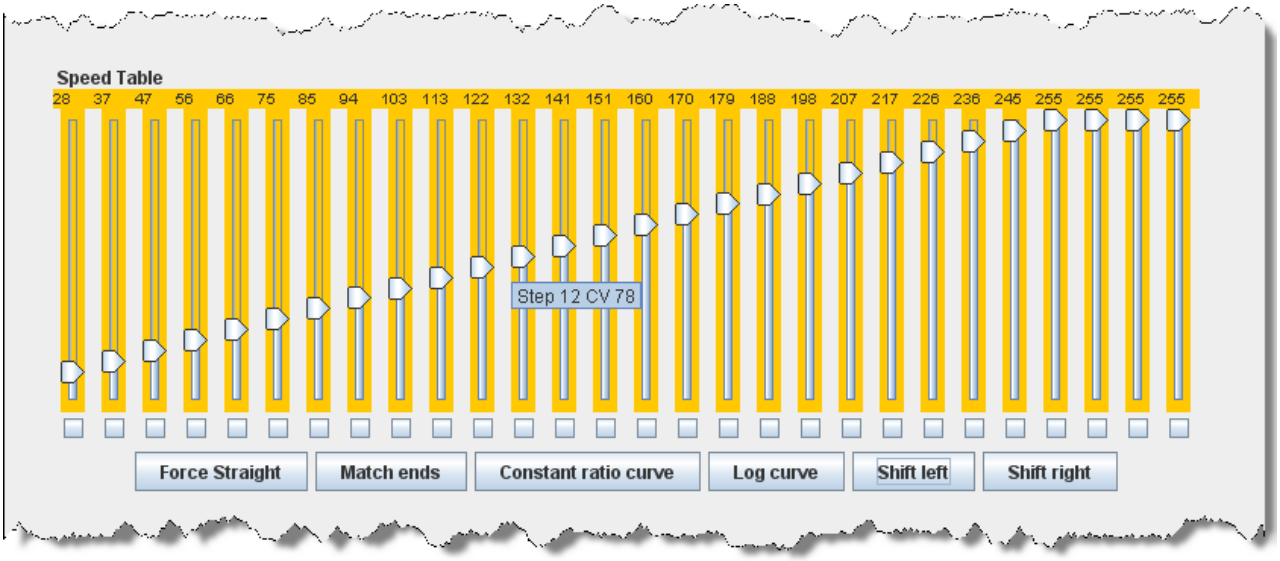
Constant Ratio Curve

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.



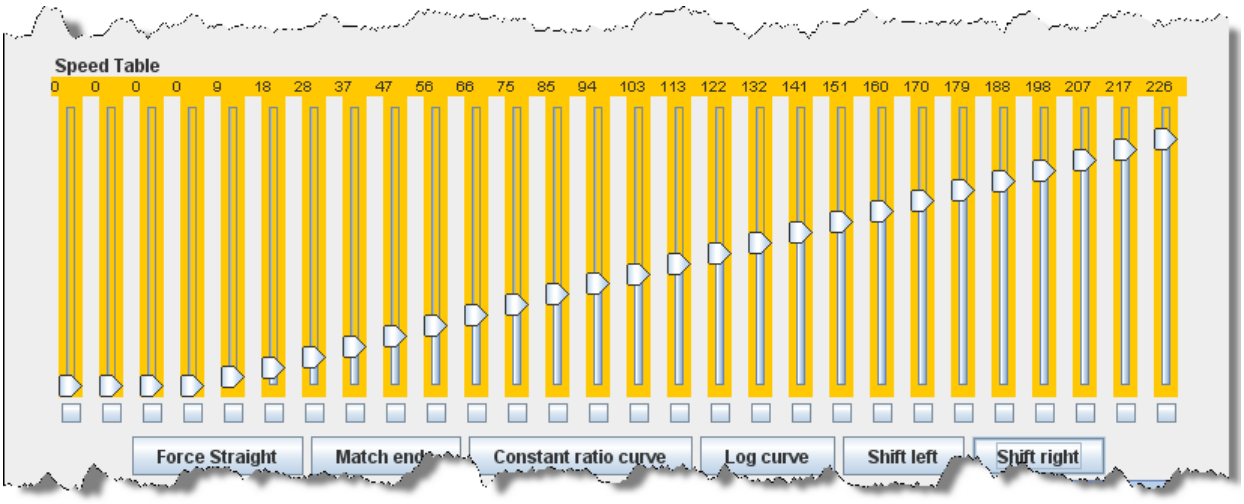
Logarithmic Speed Curve

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 button moves the entire speed table to 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.

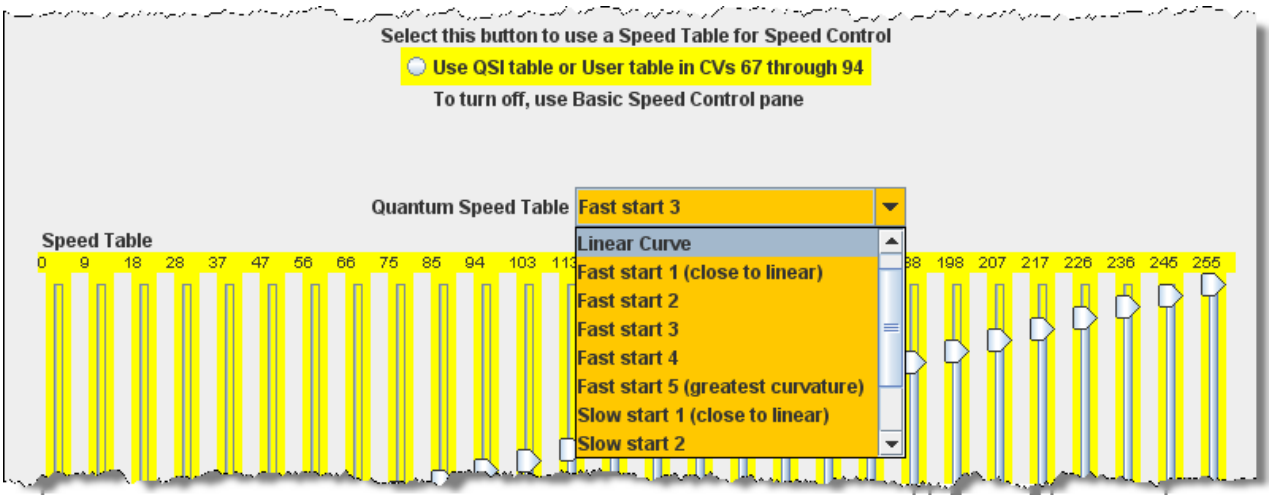


Curve Shifted Right

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.

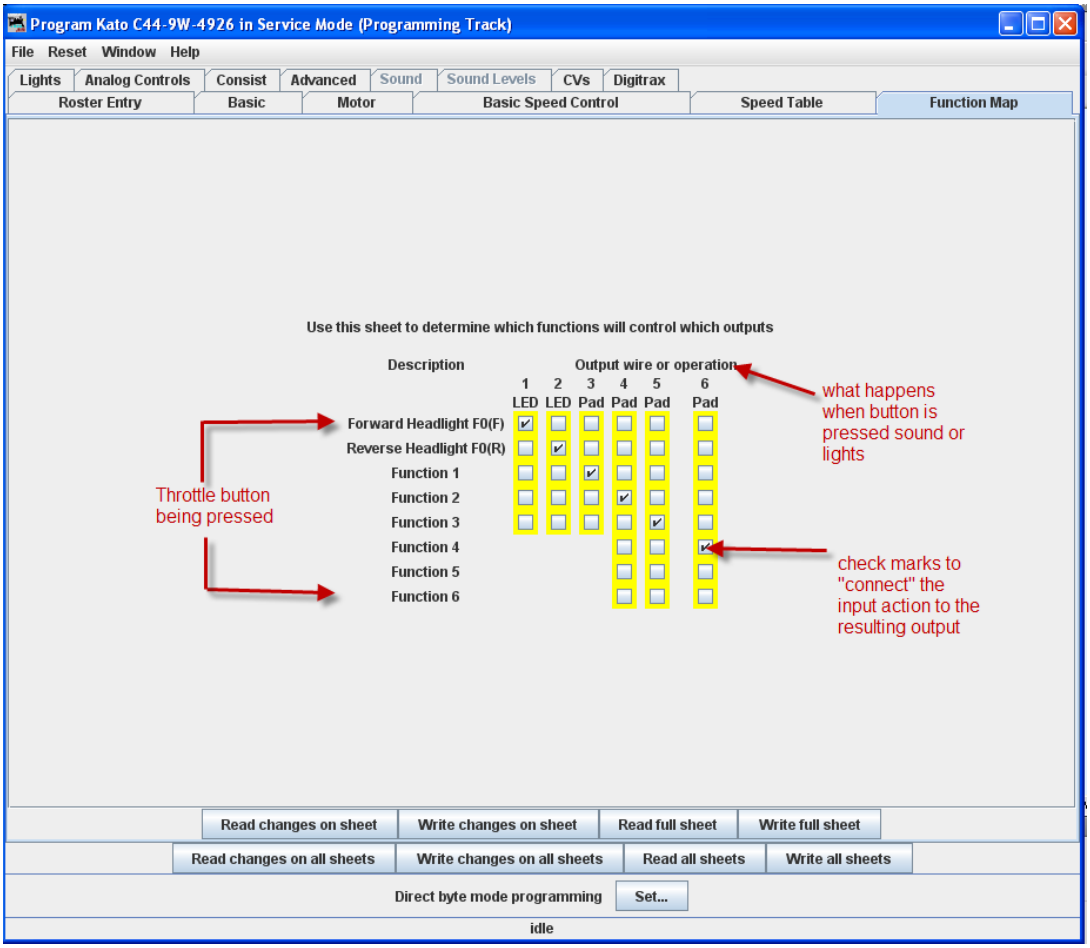


Function Mapping Pane

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.

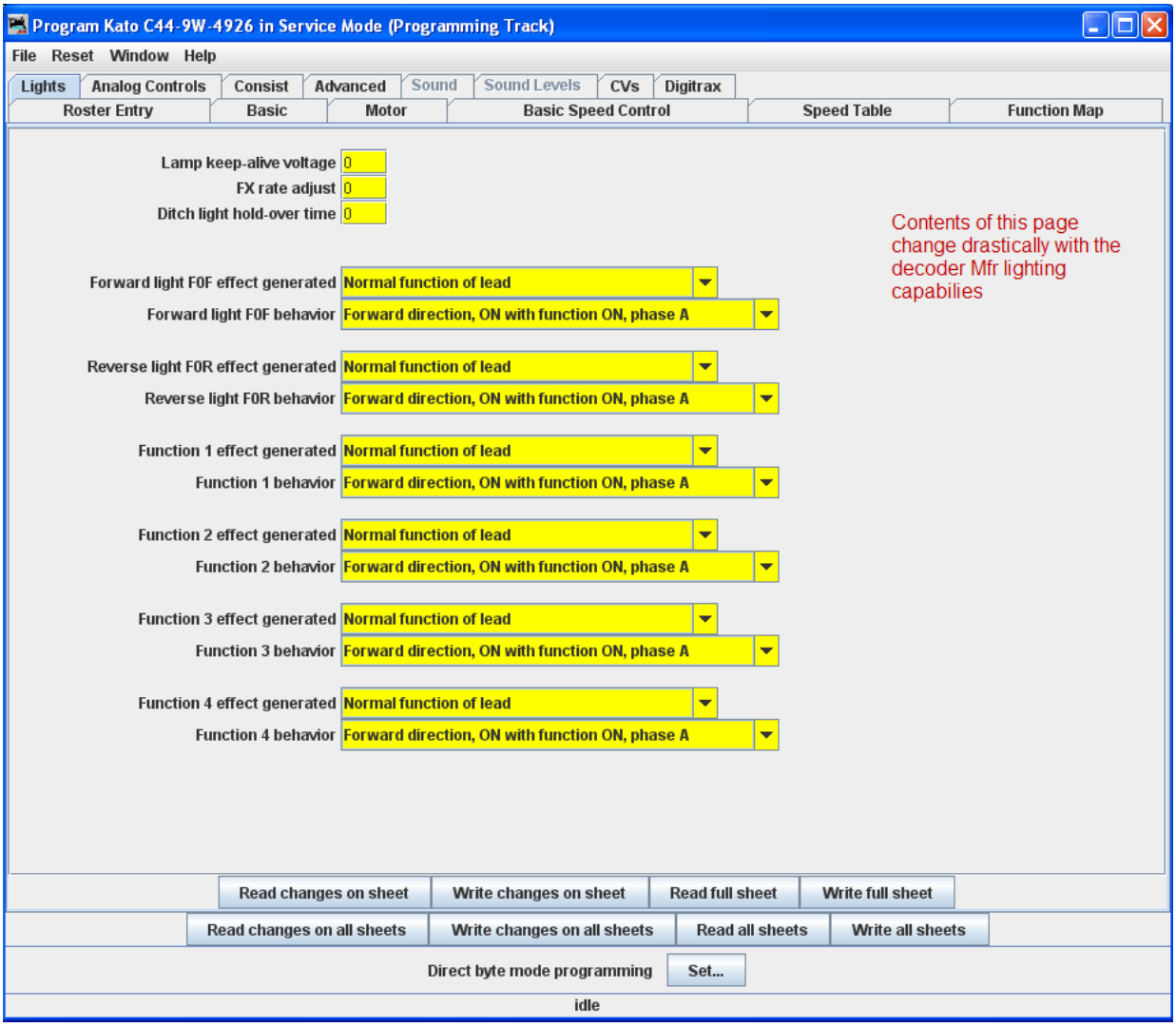
When this capability is present, the check boxes as shown in the window below are active and allow you to choose to which function key on the throttle each output responds.



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.

Pane Lighting and FX Functions

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.

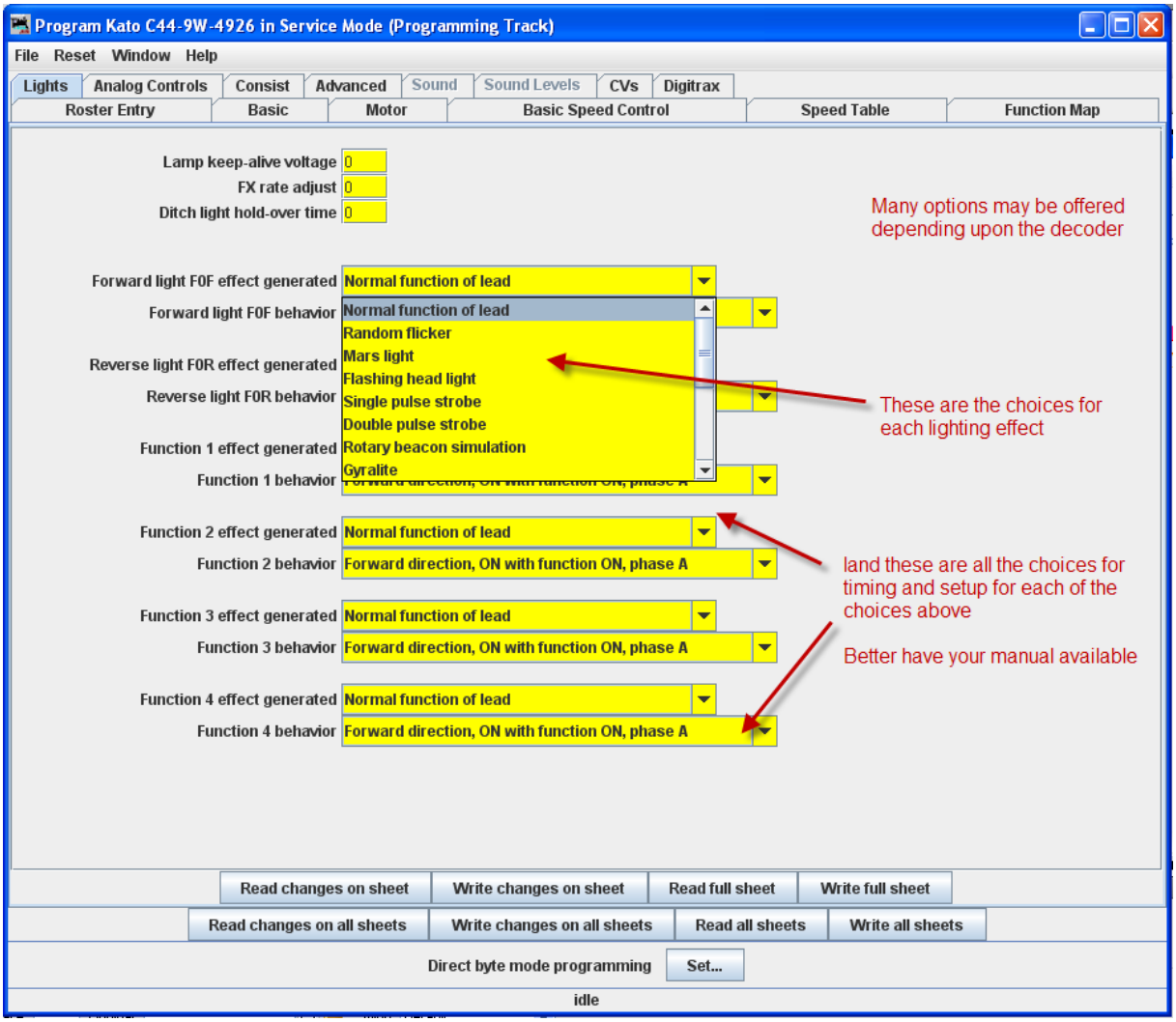


The specific effects available differ widely between manufacturers, and even between different "families" of decoders from the same maker. The above example is from a Digitrax FX decoder. Some of the advanced features you will see in many decoders (though they may go by different but similar names)

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.

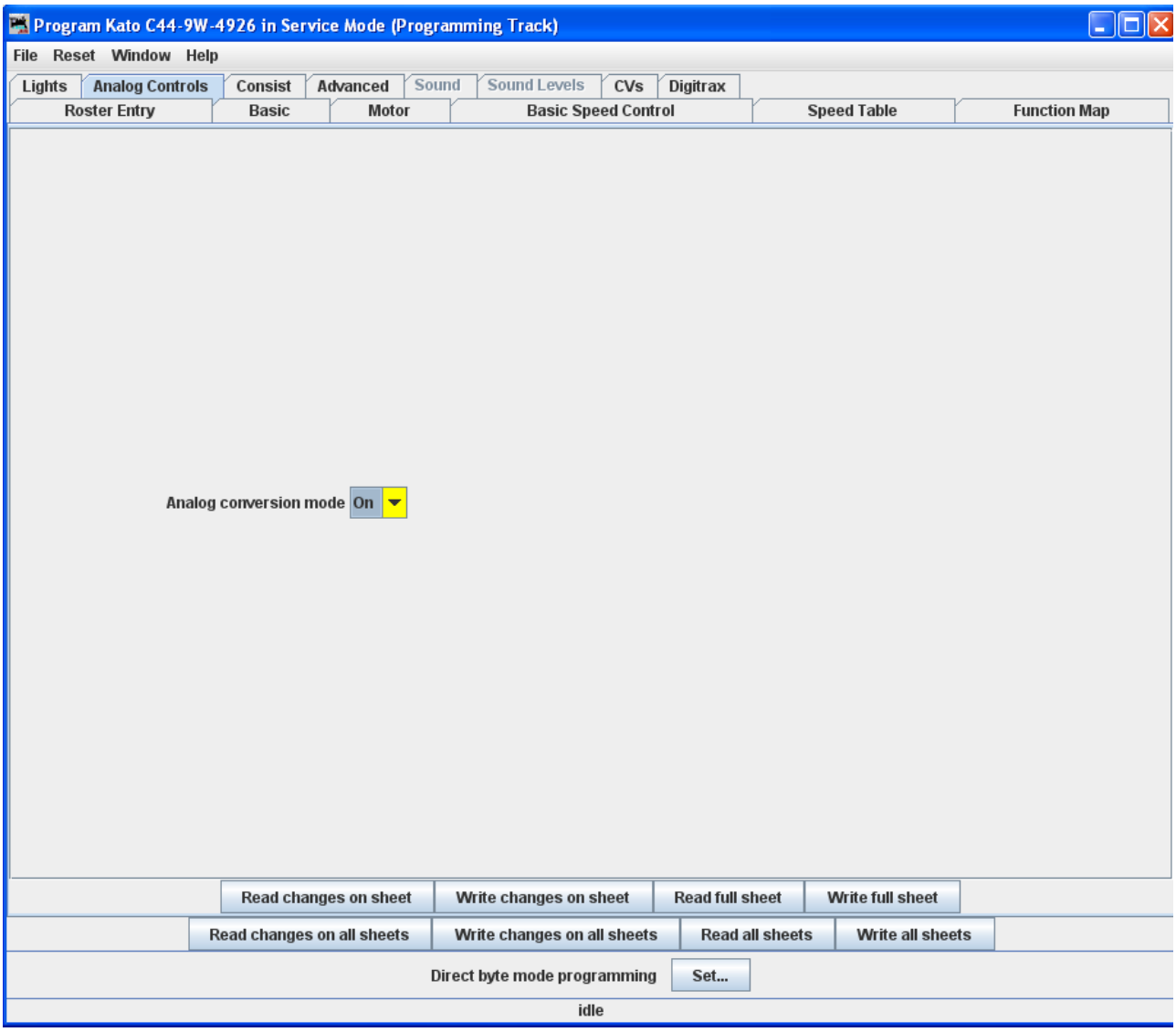


The other lighting effects are highly variable between decoders. Check your specific decoder documentation for what the decoder is supposed to be capable of doing, and have fun playing with them. They are the most visually satisfying of all the capabilities of the decoders!

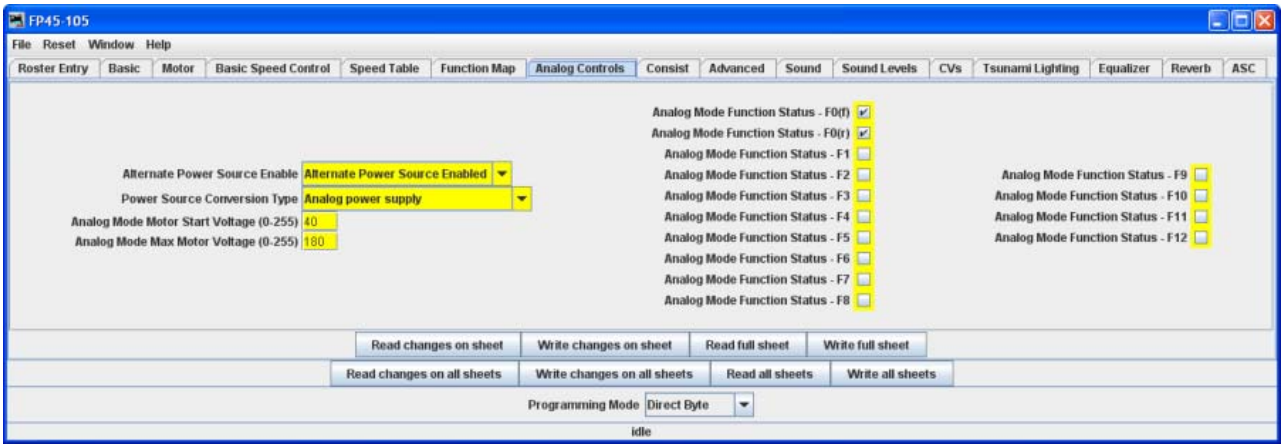
Even if the function and effect are available, you may have to add the lighting to your locomotive in order to be able to use that function, such as adding ditch lights, beacons, etc.

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.



OEM This is a more complex pane used with the Diesel Tsunami 750


FP45-105
File Reset Window Help
Roster Entry Basic Motor Basic Speed Control Speed Table Function Map Analog Controls Consist Advanced Sound Sound Levels CVs Tsunami Lighting Equalizer Reverb ASC
Alternate Power Source Enable
Alternate Power Source Enabled
Power Source Conversion Type
Analog power supply
Analog Mode Motor Start Voltage (0-255)
40
Analog Mode Max Motor Voltage (0-255)
180
Analog Mode Function Status - F0(f)
Analog Mode Function Status - F0(r)
Analog Mode Function Status - F1
Analog Mode Function Status - F2
Analog Mode Function Status - F3
Analog Mode Function Status - F4
Analog Mode Function Status - F5
Analog Mode Function Status - F6
Analog Mode Function Status - F7
Analog Mode Function Status - F8
Analog Mode Function Status - F9
Analog Mode Function Status - F10
Analog Mode Function Status - F11
Analog Mode Function Status - F12
Read changes on sheet
Write changes on sheet
Read full sheet
Write full sheet
Read changes on all sheets
Write changes on all sheets
Read all sheets
Write all sheets
Programming Mode
Direct Byte
idle

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.

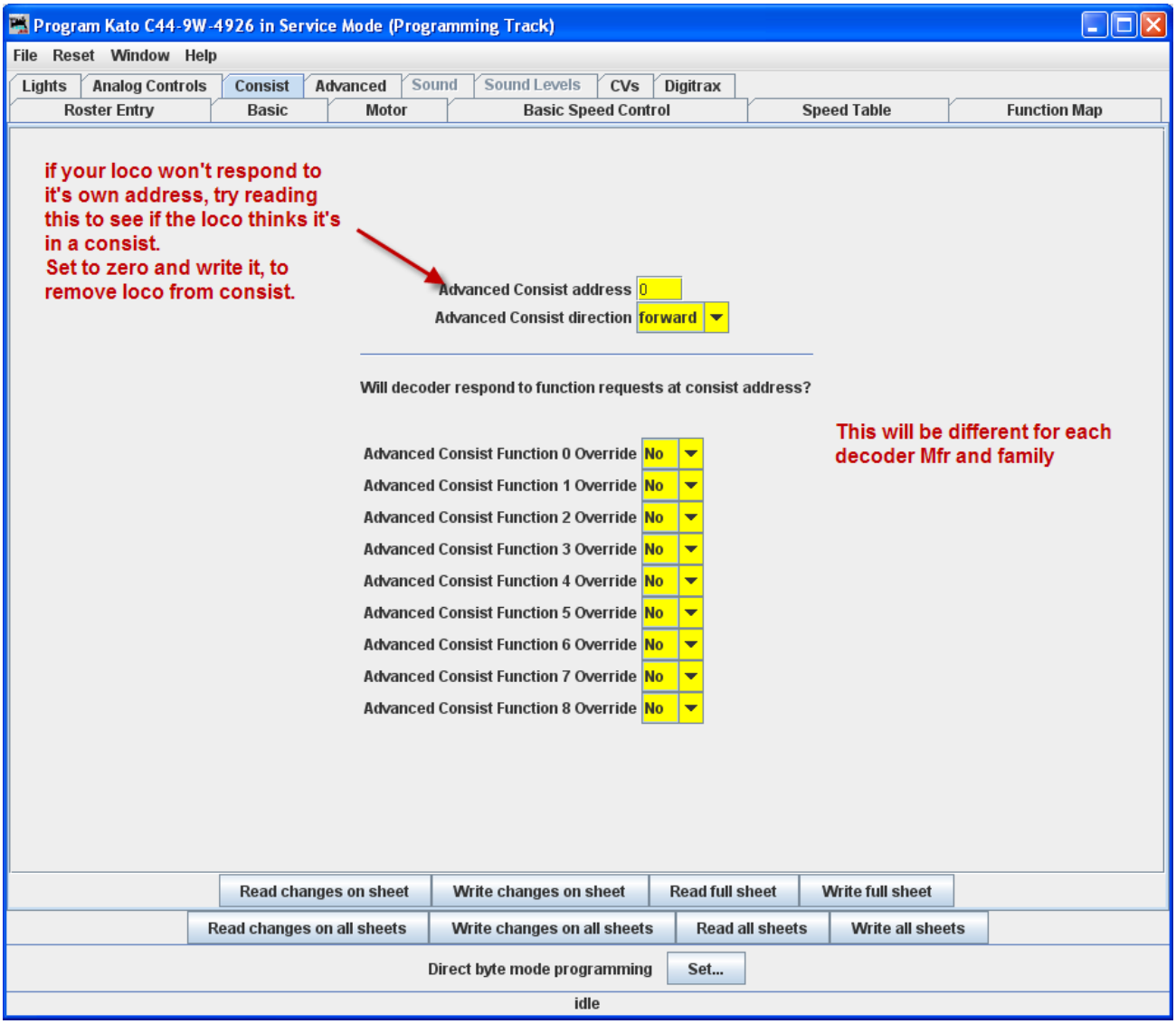
Address Consisting. You merely set the address of every locomotive to be the same, and we can use the Basic Programmer pane to do this. Then a DCC instruction sent to a locomotive with address XX will cause all the locomotives with address XX to respond. It works well for locomotives that are always 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

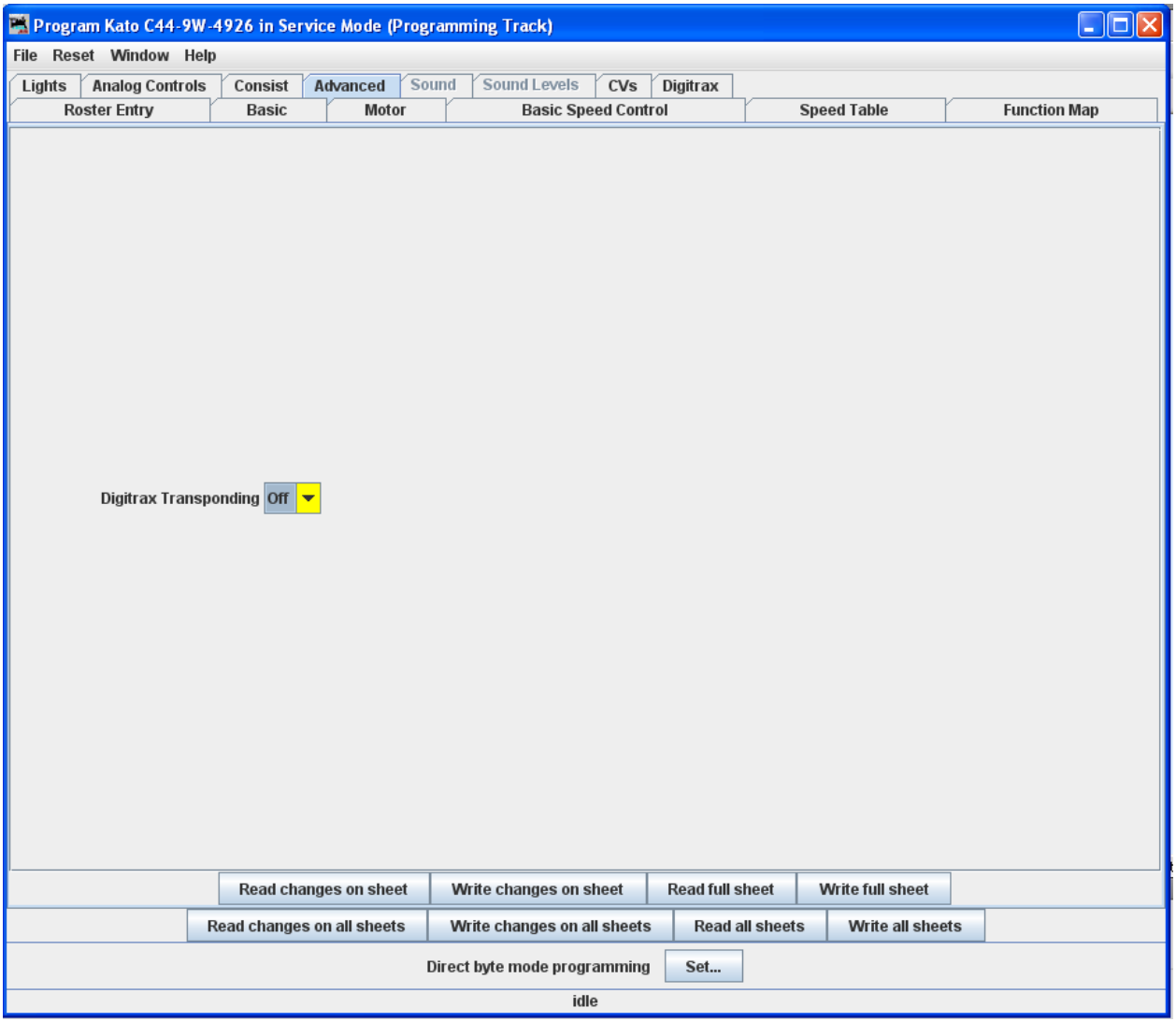
middle, or tail end. This can be handy if only the "B" unit has sound. You can set it's lights to be off in a consist, but it can sound it's horn even though it's in the consist.

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.

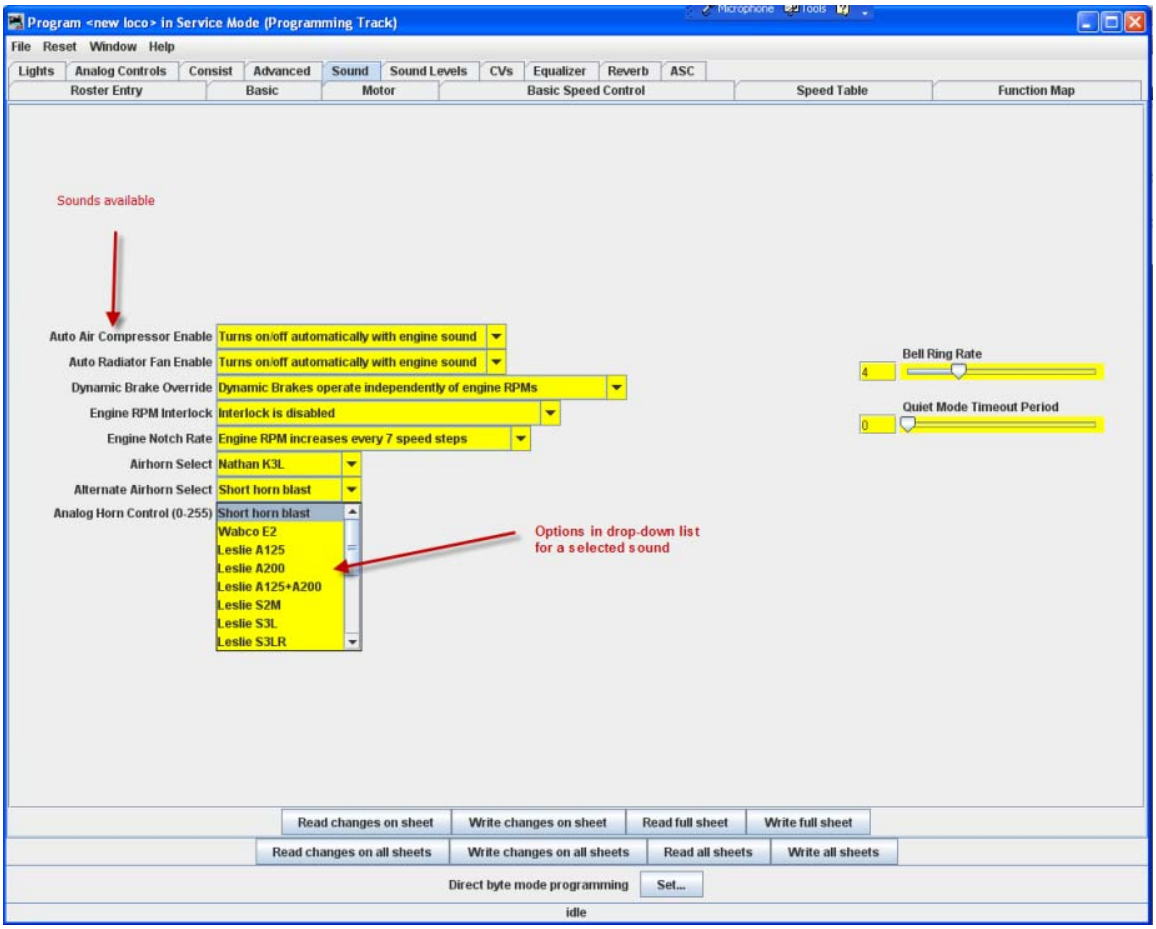


Sound FX Pane

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.

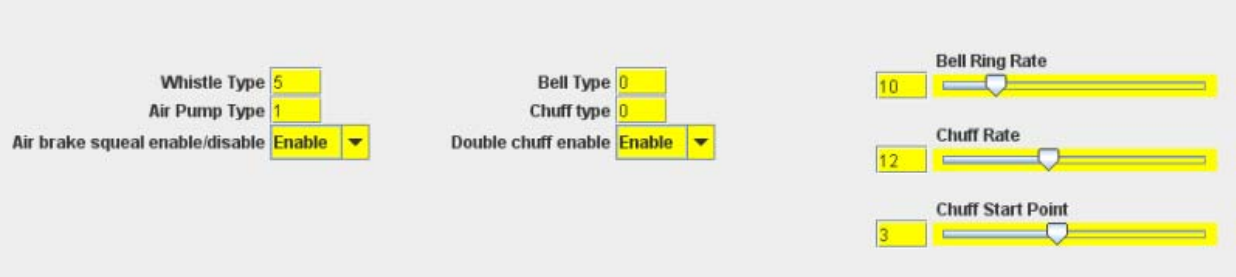
This pane allows for the selection of sound effects from sound decoders, and the **Sound Levels Pane** allows for setting the loudness levels of those sounds when they play back.



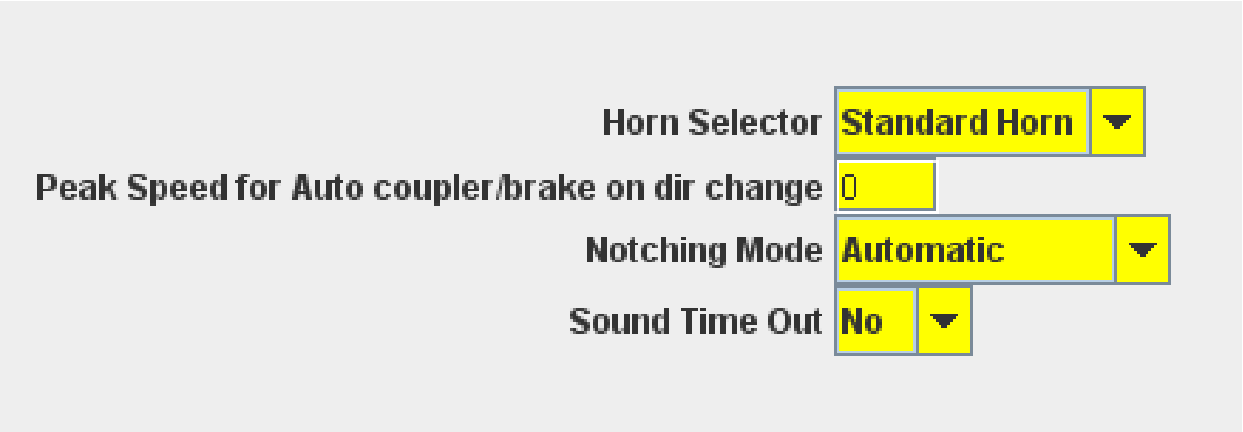
For specific function options, see your decoder documentation and the programmer for the specific decoder. Sometimes (depending on the volunteer that wrote the decoder definition file) there are "tool tips" that appear if you hover over a selection entry box.

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

Athearn N Scale Big Boy and Challenger

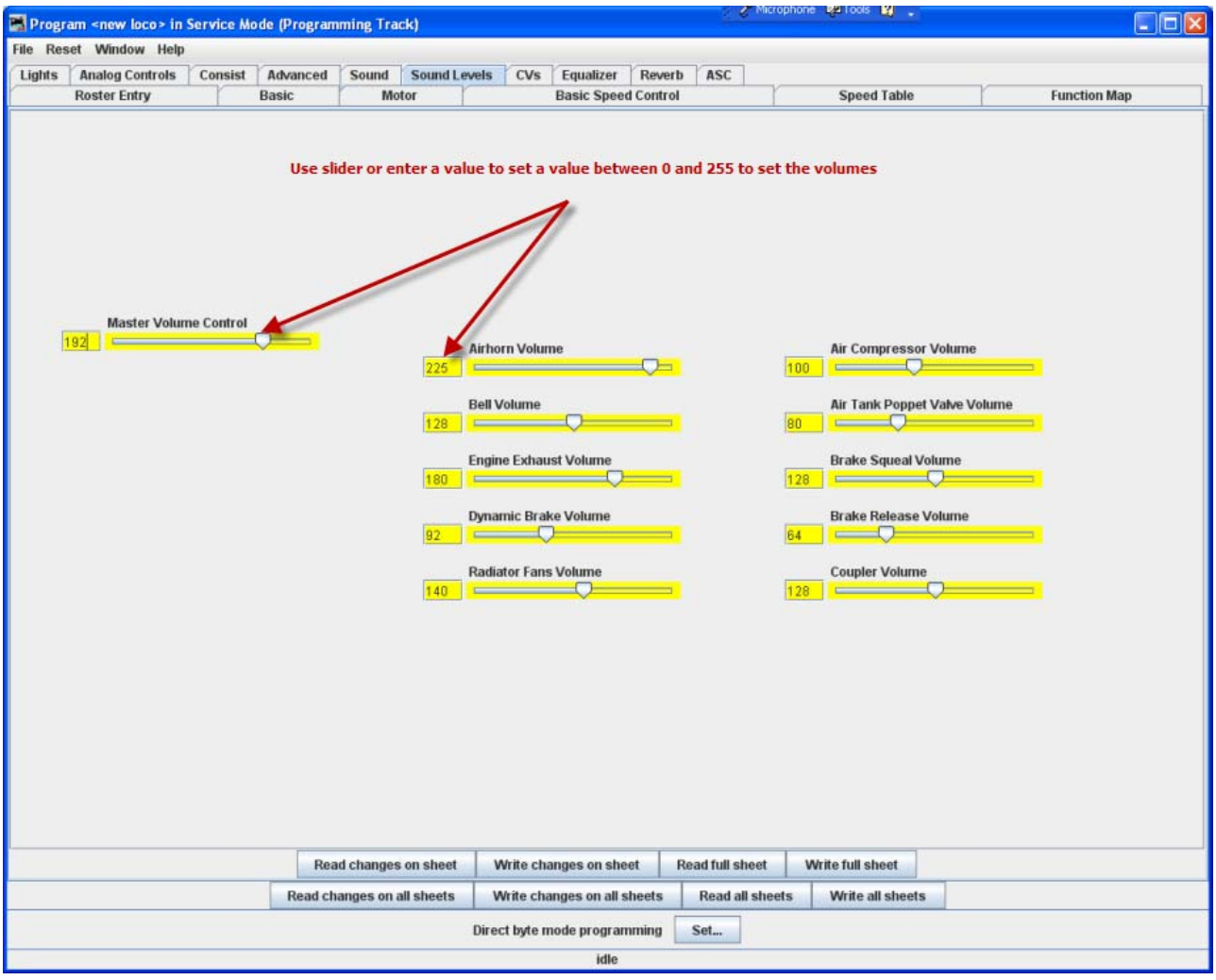


Digitrax F40PH



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 [see page 35]**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

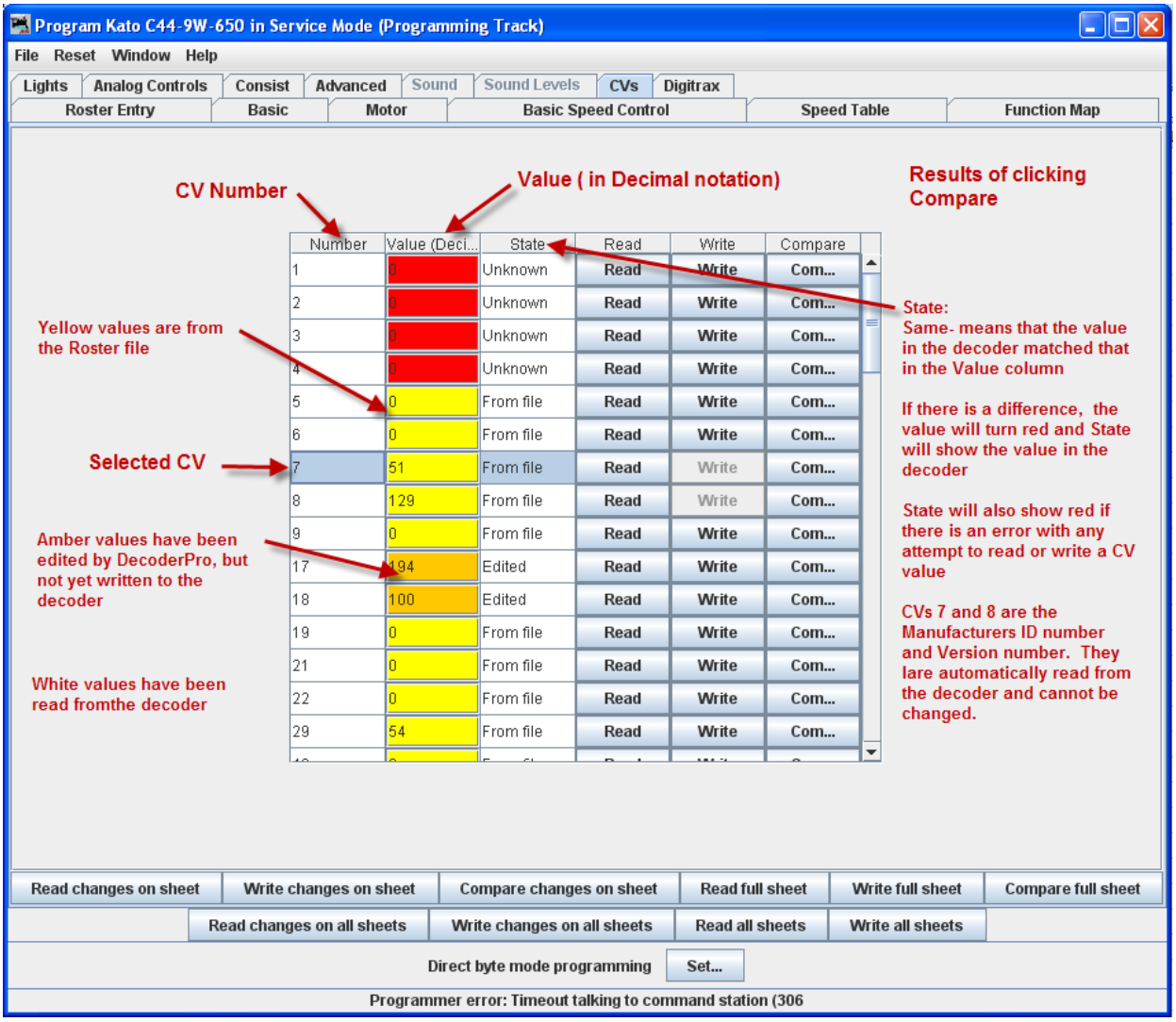
For the hard-core programmer, this pane is a listing of the raw CV data by CV number, with data in decimal format. You may change data by typing new numbers into the **Values** window. **State** shows the validity of the data, whether it was taken **From file** (the decoder information saved in the **Roster**), **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 [see page 31] 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 [see page 36] 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.

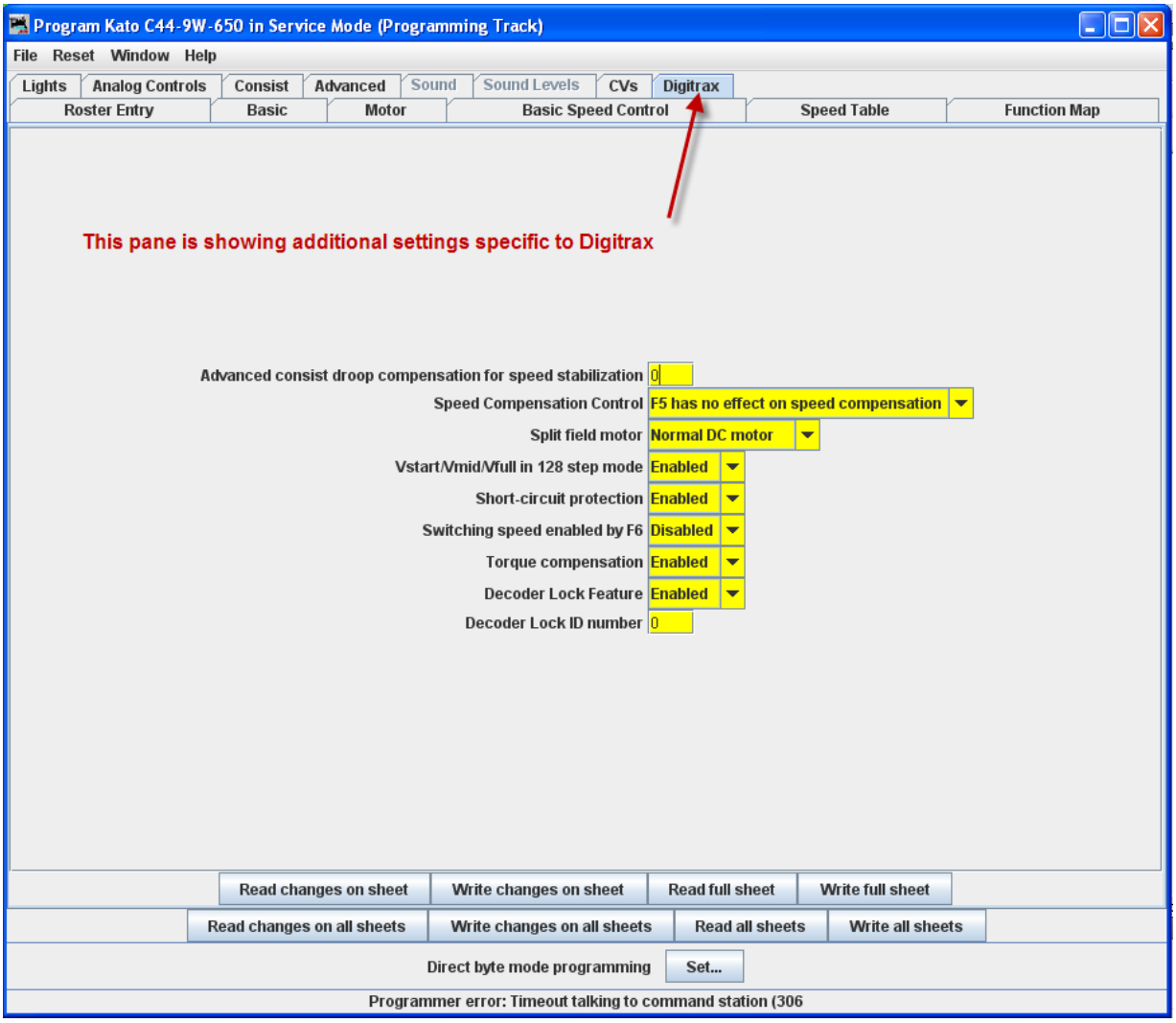
You may **Read** or **Write** individual CVs using the buttons in their row. On this page, a **Read sheet** or **Write sheet** operation is the same as a **Read all** or **Write all**. Again, a reminder: you can only read CVs if your command station has that capability.

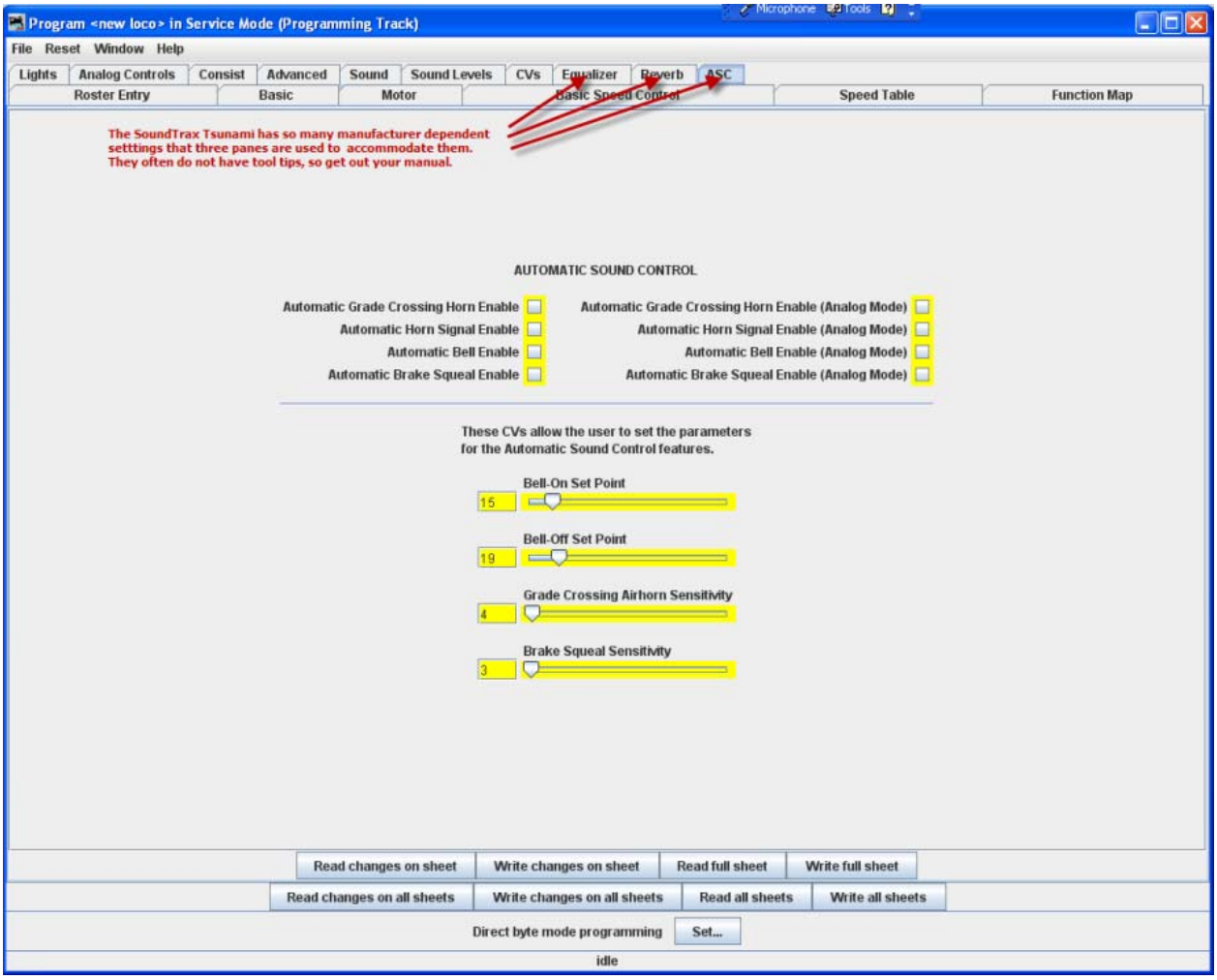


One thing to keep in mind about the **CV** listing on this pane - anything you can do here you can do from one of the other panes in Decoder Pro, without having to know the **CV** number or how to compile the values to get the desired effect. This pane is meant for advanced users of DCC used to crunching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



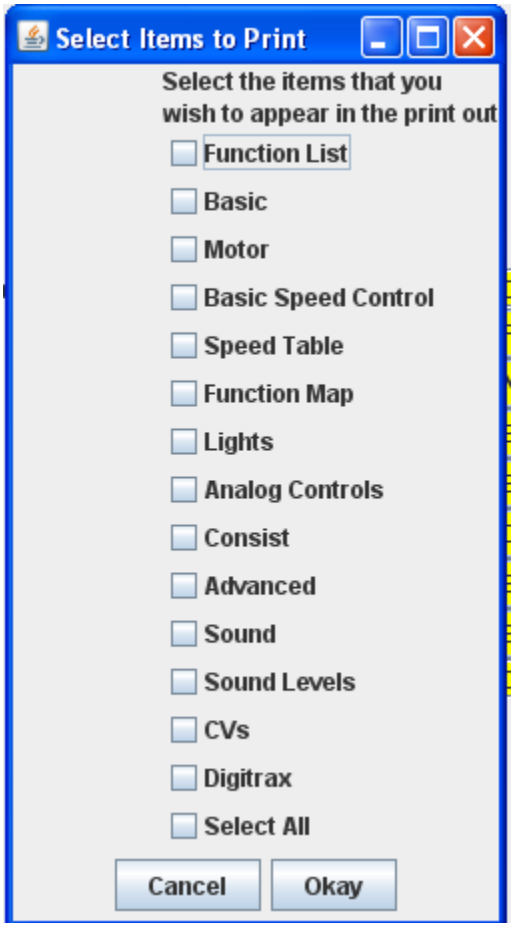


These items will, by definition, vary greatly between manufacturers. Once again, your best resource is the documentation for the specific decoder you are programming and this pane in the programmer for that decoder.

Printing Decoder Data

Print Data: DecoderPro provides the capability to print out a full list of the decoder CV data or selected data. To print, select the **File** menu of any Comprehensive Programmer Pane, then select the Print or Print Preview options.

Print all..., Preview all... Displays **Select Items to Print** dialog box



Select each or all of the decoder items that you want to print

Click to print then Print dialog for your computer system is displayed.

Print CVs...,Preview CVs...Displays **Select Items to Print** Dialog box or Preview screen

These printouts show the variables by name in each category that is selectected.(as shown on the DecoderPro panes) along with their CV number and Value. A handy reference for the future.

Print preview will look like it's about to print the list, and ask for which printer to use. Don't panic!, that's only to get the preview to work. Go ahead and select the printer and you'll only get the preview.

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.

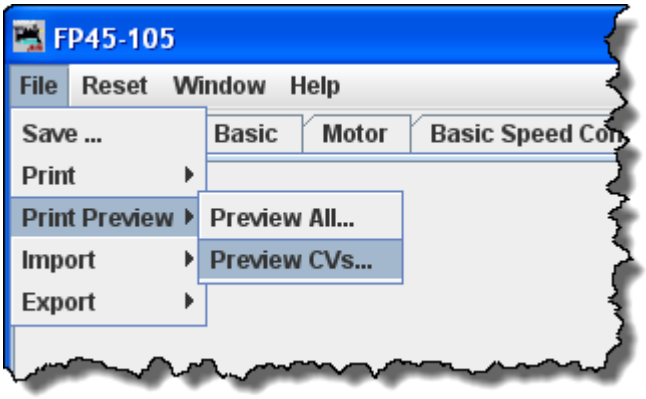
Export Data: you may export the list as one of several file types :

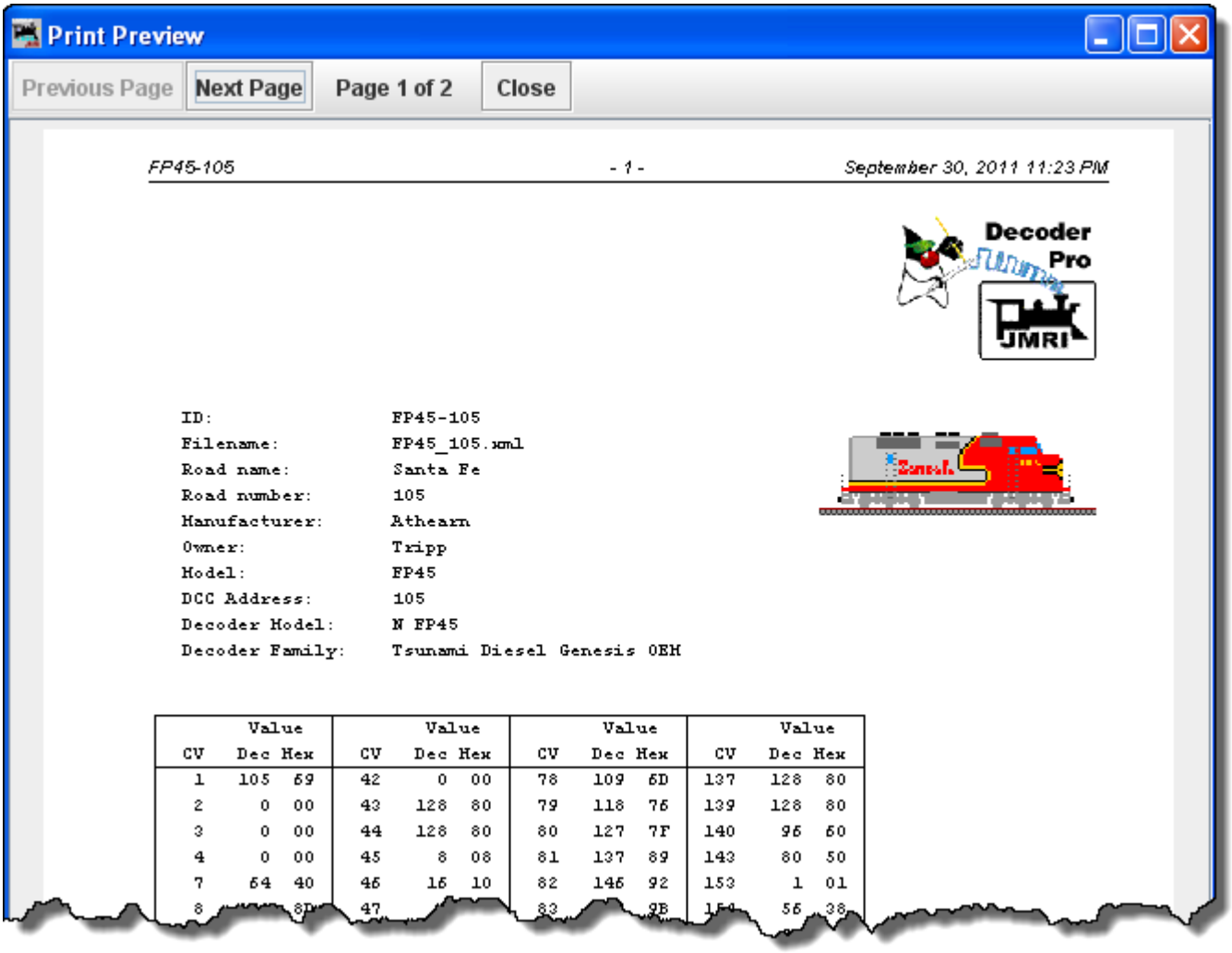
CSV file... (Comma separated variables)

PR1DOS file...

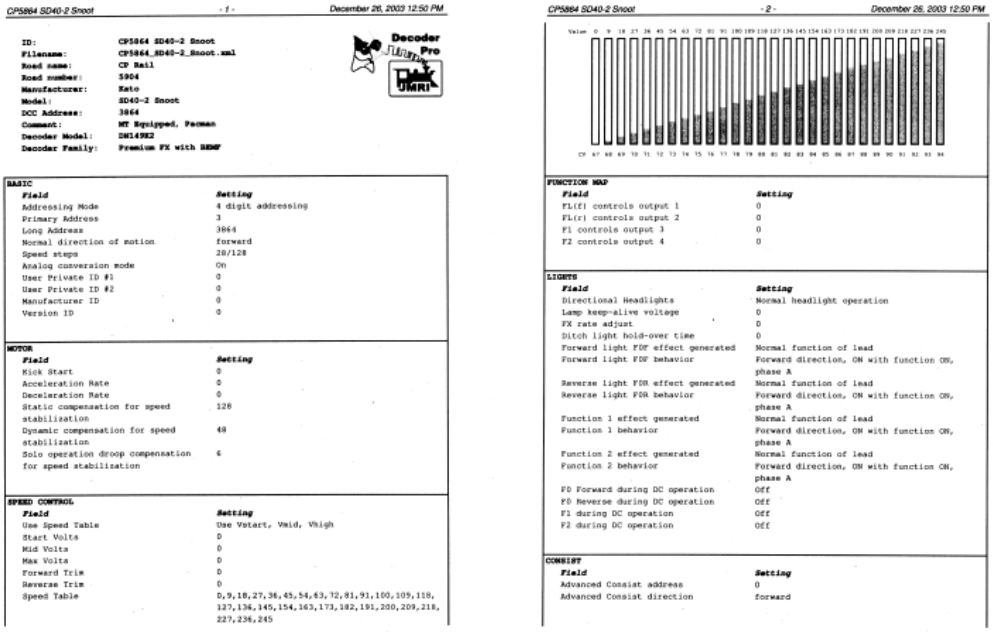
PR1WIN file...

All are two columns, CV#, and Value in Decimal and Hexadecimal





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.



CP5864 SD40-2 Snoot - 1 - December 26, 2003 12:50 PM

ID:	CP5864 SD40-2 Snoot
Filename:	CP5864_SD40-2_Snoot.xml
Road name:	CP Rail
Road number:	5904
Manufacturer:	Kato
Model:	SD40-2 Snoot
DCC Address:	3864
Comment:	MT Equipped, Pacman
Decoder Model:	DN149X2
Decoder Family:	Premium FX with BEMF

BASIC

Field	Setting
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

MOTOR

Field	Setting
Kick Start	0
Acceleration Rate	0
Deceleration Rate	0
Static compensation for speed stabilization	128
Dynamic compensation for speed stabilization	48
Solo operation droop compensation for speed stabilization	6

SPEED CONTROL

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	0,9,18,27,36,45,54,63,72,81,91,100,105,118, 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

FUNCTION MAP

Field	Setting
FL(f) controls output 1	0
FL(r) controls output 2	0
F1 controls output 3	0
F2 controls output 4	0

LIGHTS

Field	Setting
Directional Headlights	Normal headlight operation
Lamp keep-alive voltage	0
FX rate adjust	0
Ditch light hold-over time	0
Forward light F0F effect generated	Normal function of lead
Forward light F0F behavior	Forward direction, ON with function ON, phase A
Reverse light F0R effect generated	Normal function of lead
Reverse light F0R 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

CONSIST

Field	Setting
Advanced Consist address	0
Advanced Consist direction	forward

CP5864 SD40-2 Snoot - 3 - December 26, 2003 12:50 PM

ADVANCED

Field	Setting
Digitrax Transponding	Off

CVS

CV	Value Dec	Value Hex	CV	Value Dec	Value Hex	CV	Value Dec	Value Hex	CV	Value Dec	Value Hex
1	3	03	50	0	00	70	27	1B	84	154	9A
2	0	00	51	0	00	71	36	24	85	163	A3
3	0	00	52	0	00	72	45	2D	86	173	AD
4	0	00	55	128	80	73	54	36	87	182	B6
5	0	00	56	48	30	74	63	3F	88	191	BF
6	0	00	57	6	06	75	72	48	89	200	C8
7	0	00	61	0	00	76	81	51	90	209	D1
8	0	00	62	0	00	77	91	5B	91	218	DA
13	0	00	63	0	00	78	100	64	92	227	E3
17	207	CF	65	0	00	79	109	6D	93	236	EC
18	24	18	66	0	00	80	118	76	94	245	F5
19	0	00	67	0	00	81	127	7F	95	0	00
29	38	26	68	9	09	82	136	88	105	0	00
49	0	00	69	18	12	83	145	91	106	0	00

DIGITRAX

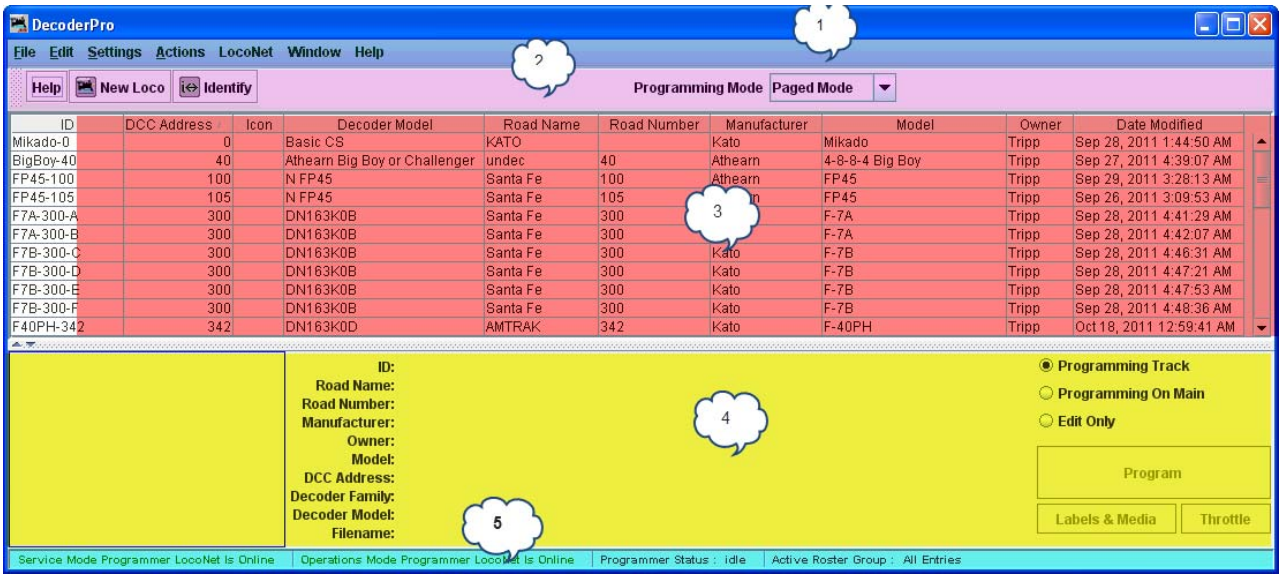
Field	Setting
Advanced consist droop compensation for speed stabilization	0
Speed Compensation Control	F5 has no effect on speed compensation
Split field motor	Normal DC motor
Vstart/Vmid/Vfull in 128 step mode	Enabled
Short-circuit protection	Enabled

OK! That's it! You now know how to use DecoderPro to program your decoders, and document the results.. Now let's run trains!

DecoderPro® Main Window

Main Window Overview

When you start Decoder Pro3, the DecoderPro window is displayed. All of the JMRI functions can be accessed via the menu bar on the DecoderPro3® windows.



1. Menu Bar[see page 88]
2. **Tool Bar[see page 145]**
3. Roster Table [see page 146]
4. **Decoder Information Area[see page 148]**
5. Status bar

Displays message, so that you can determine the state of DecoderPro3 during operation.

Menu bar

Most of the DecoderPro3® functions can be accessed via the menu bar.

File

New Decoder Pro Window

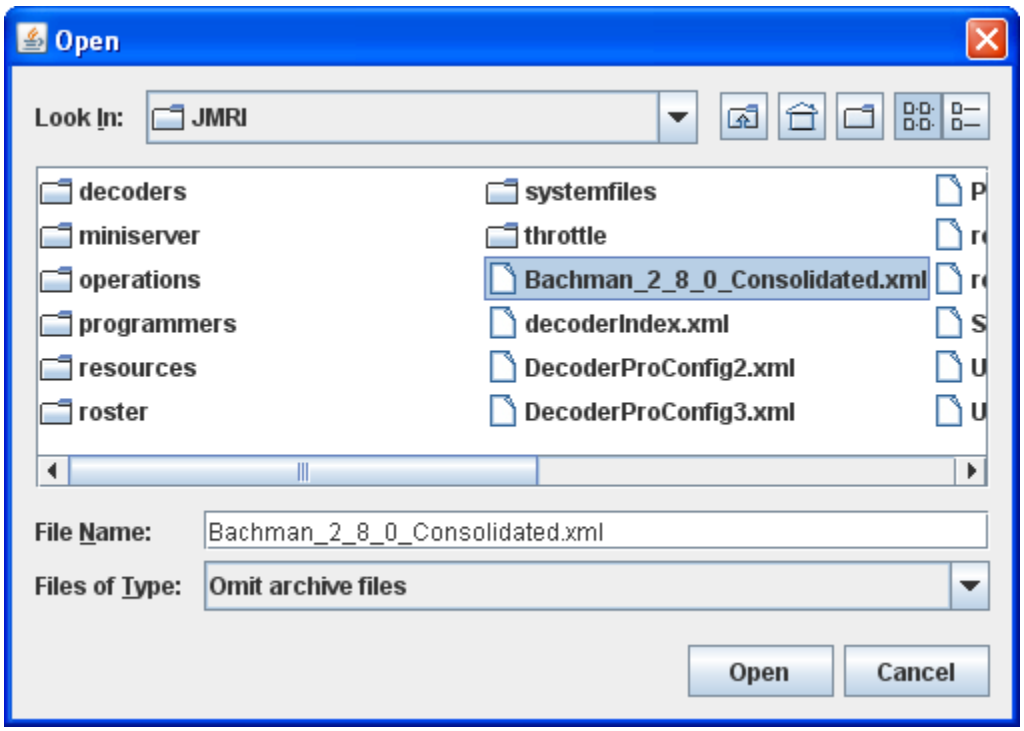
Opens another instance of Main DecoderPro3 window.

Import Roster

Imports Roster into DecoderPro3®

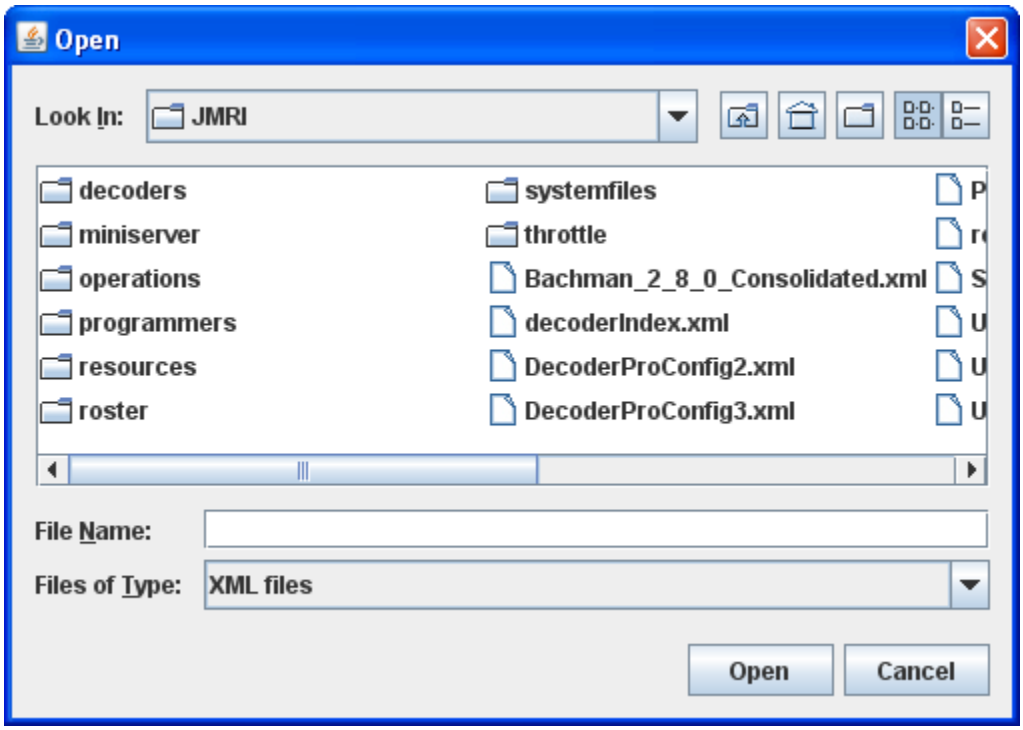
Import Roster Entry

Open the **Open** dialog to allow you to select a Roster Entry to import.

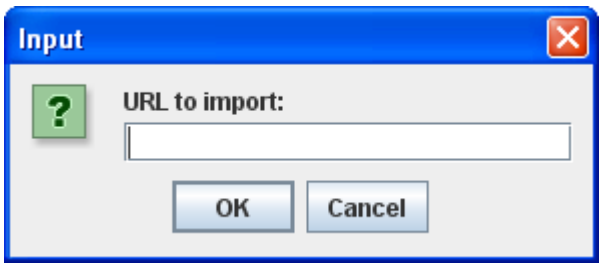


Import Decoder File

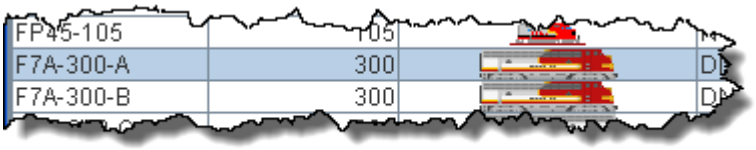
Opens the Open dialog to allow you to select a Decoder File to import.



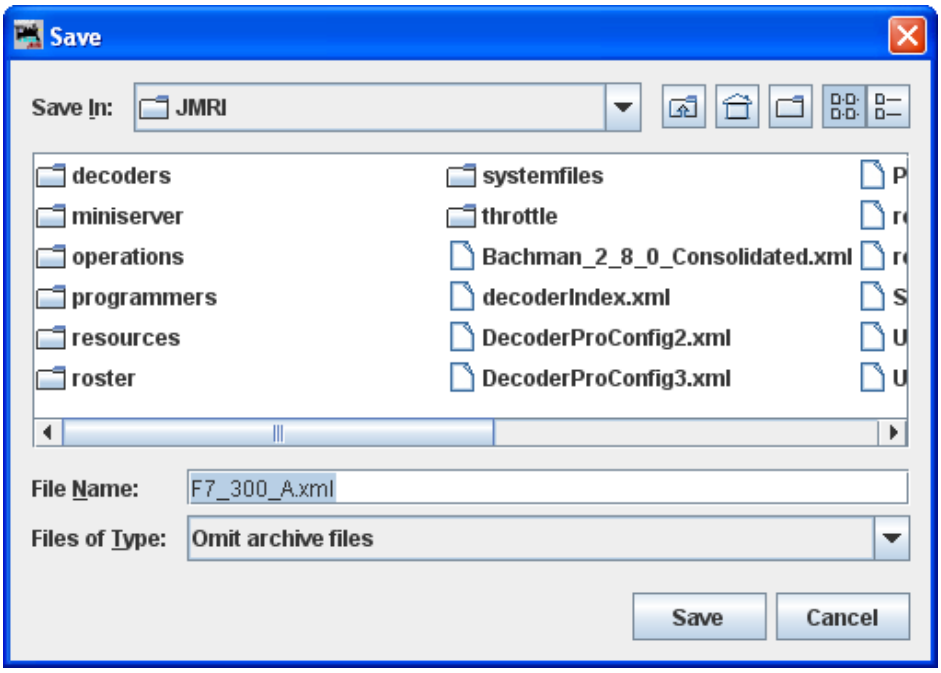
Import Decoder URL



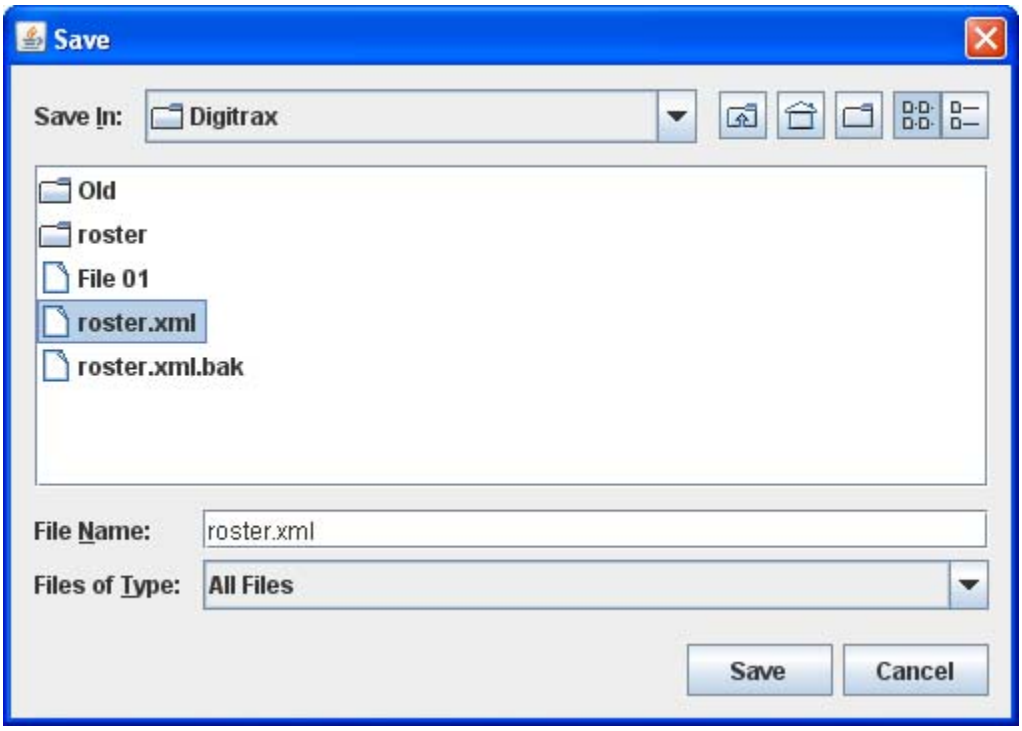
Export Roster Entry



Exports .xml file for the selected locomotive on your roster.



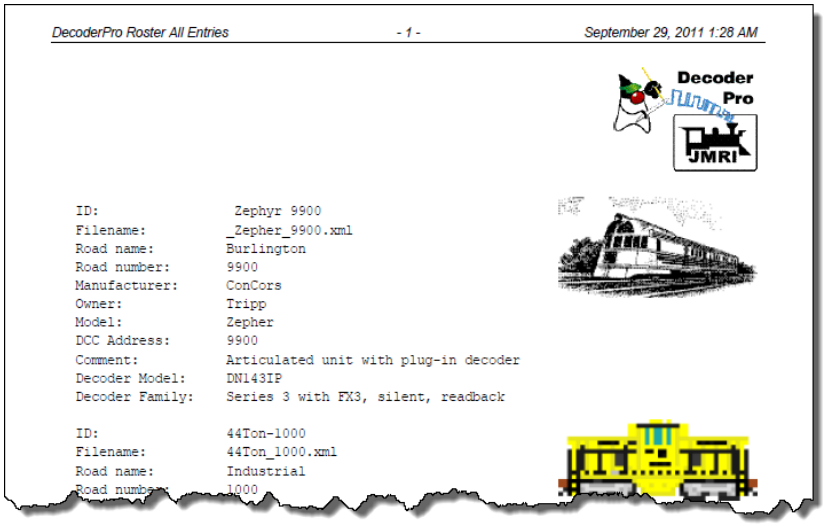
Export Complete Roster



Print Roster

Entry

Opens the **Select Items to Print** dialog



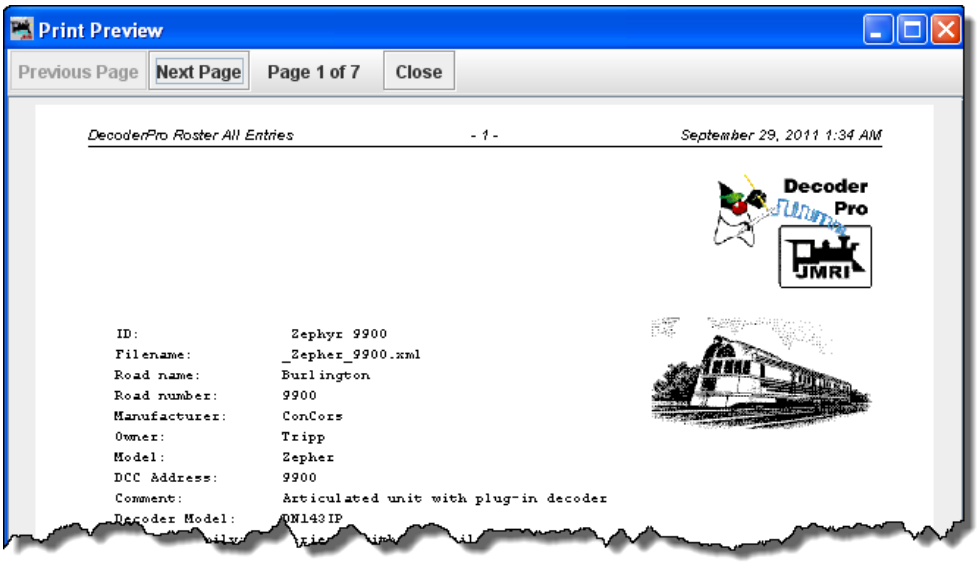
Summary

Print ***Preview*** *Roster*

Entry

Opens the Select Items to Print dialog

Summary



Quit

Edit

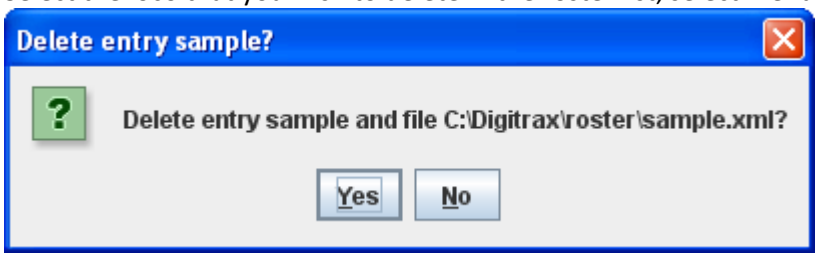
- Cut
- Copy
- Paste
- Duplicate Loco

  Select the roster entry that you would like to duplicate. Enter a new name for the duplicate entry.

  press OK and the duplicate is now added to the roster list. You may now edit or reprogram as required.

.

- Delete Loco
  Select the loco that you wish to delete in the roster list, select menu item.



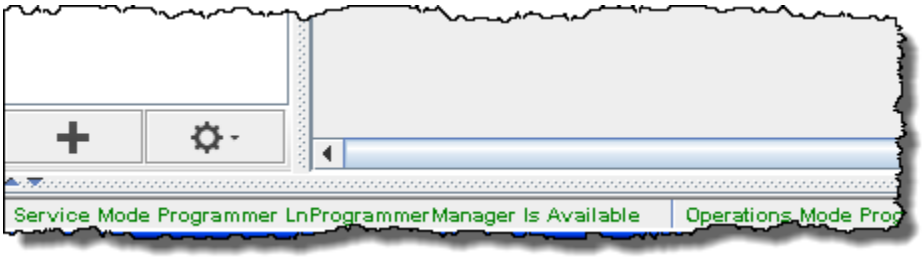
- Preferences

  Opens the **Preferences** window.

- **Settings**
  - **Hide/Show Summary Pane**
    Toggles the decoder information on/off, Part 4 of the main window

Show decoder summary pane

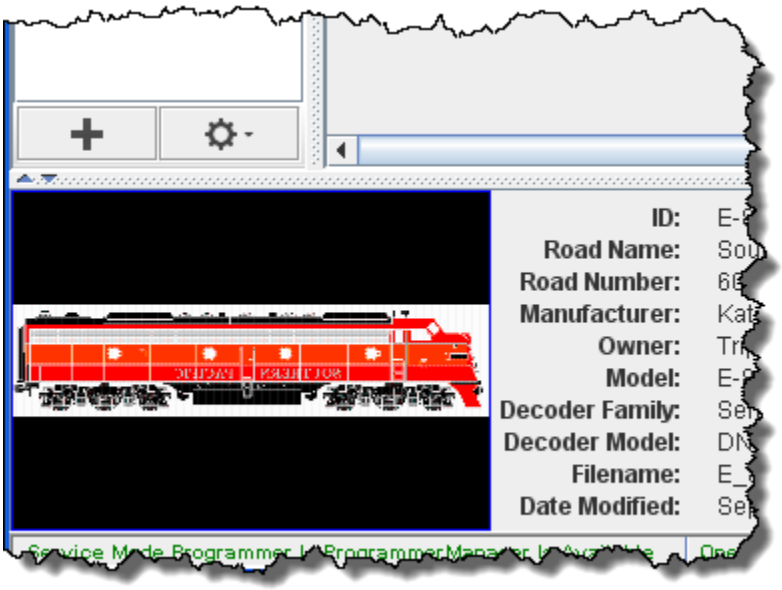
Hide decoder summary pane



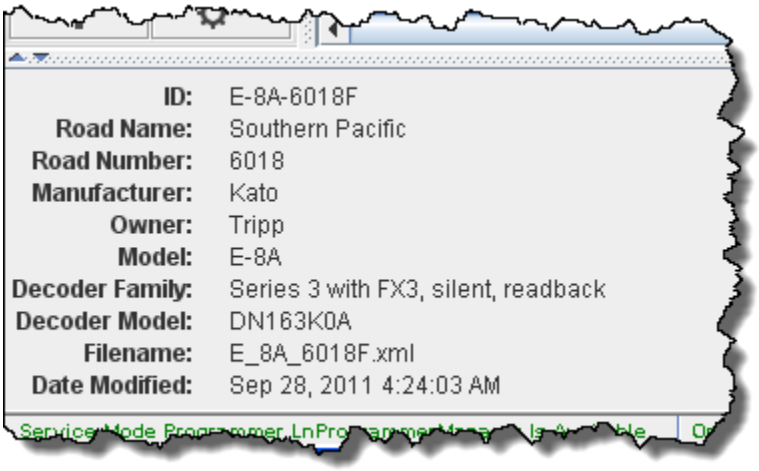
  - **Reset Window Sizes**
    not available yet
  - **Reset Column Widths**

- **Hide/Show Roster Images**
  Toggles the roster image in Part 4 of the main window on/off

Roster image on.



Roster image off



Hide/Show Roster Groups

- Programming

  - **Service Mode**
    Selects the **Service Mode** (Programming Track)[see page 32]
  - **Operations Mode**
    Selects the **Operations Mode** (Program on Main) [see page 35]

- **Edit Mode**
  Selects Edit Mode that allows you to edit locomotive roster without changing the program

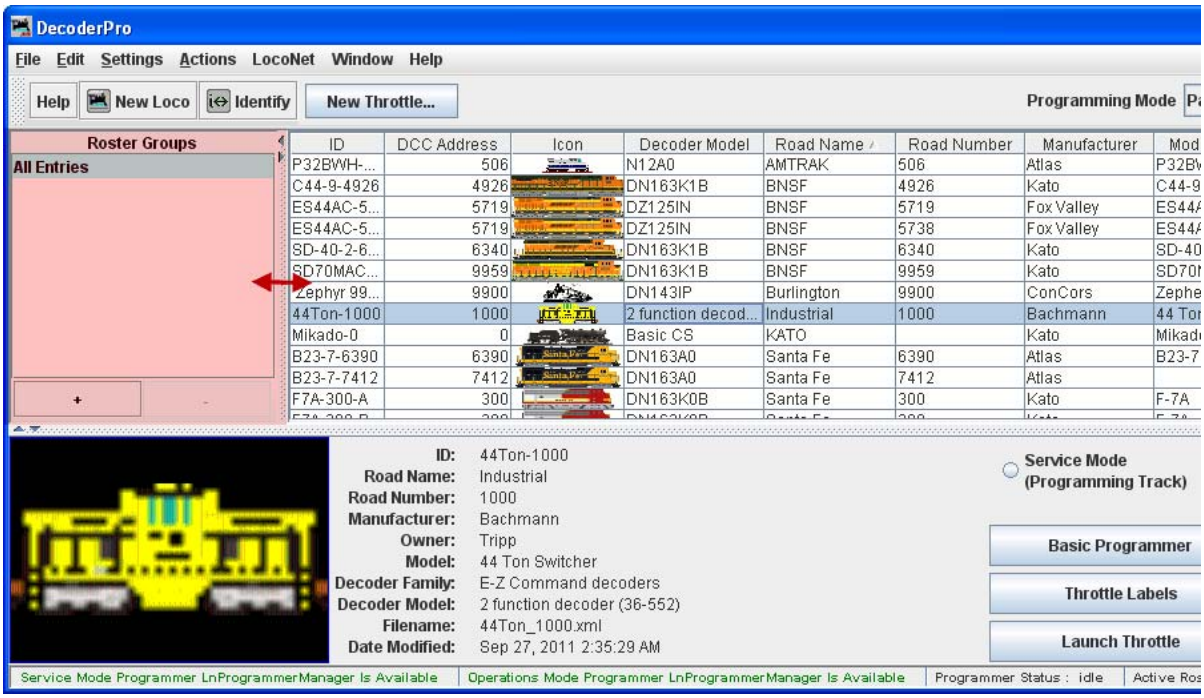
o **Create Roster Group**

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 Smith 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.

Hide/Show Roster Groups

The Hide/Show Roster Groups control is used to toggle the Roster Groups Display Panel on/off in the area highlighted in pink. This must first be activated by clicking on the Settings tab and then clicking on Hide/Show Roster Groups. If the Roster Groups panel does not display when you click on the setting, try to grab the frame on the left side of the area and drag it open (make sure the Hide/Show is in the correct state.)

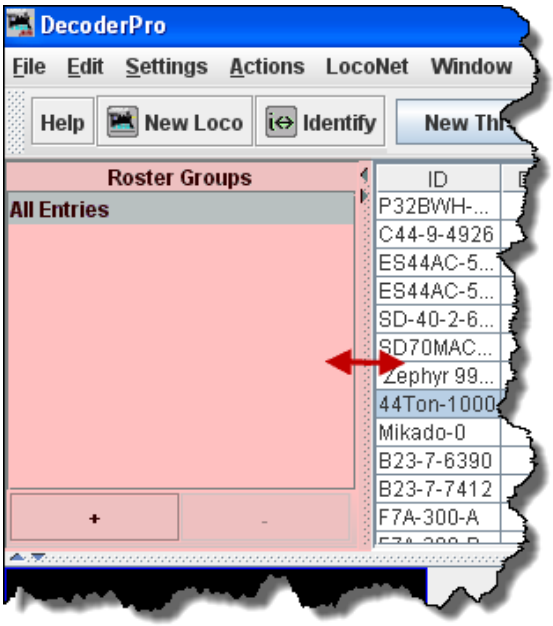
The panel width may be sized by dragging the frame as indicated by the red arrows. The small arrowheads will allow you to close the panel or open the panel



The Roster Groups will be listed in the Roster Group panel as we create them. The + button will create a new Roster Group and the - button will delete the selected Roster Group.

Create Roster Group

Use Create Roster Group to define any other groups you wish. From the Settings menu Create Roster Group opens the **New Roster Group** dialog. This same **New Roster Group** dialog may be opened using the + button above.

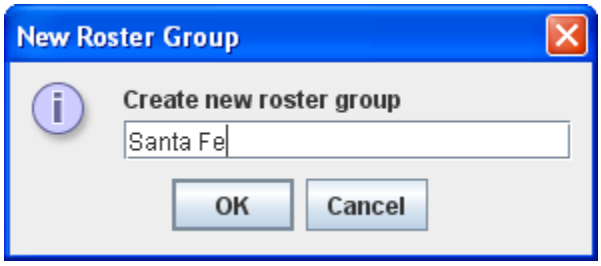


Roster Groups Pane

\+ button Creates a New Roster Group

\- button Deletes a Roster Group that is selected.

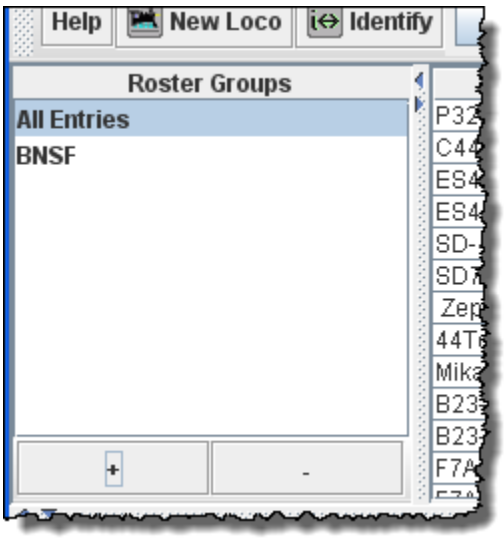
Handles on the panel frame will allow you to size the panel.



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



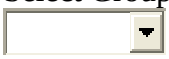
The OK button will Add the Roster Group to the list in the panel and to the drop-down list on Main window toolbar.

You can now add locomotives to the Groups either by dragging from the locomotive roster list or using the Table Associate, discussed later.

Rename Roster Group

Opens the Rename Roster Group dialog box.

Select Group to rename



if you do not to complete the action

Opens the Rename Roster Group AMTRAK dialog box

Enter the new name in the text box.

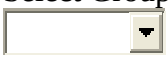
if you do not want to complete the action

completes the renaming of the roster group

Duplicate Roster Group

- Opens the Duplicate Roster group ____ dialog box.

Select Group to Duplicate



if you do not want to complete the action

Opens the Duplicate Roster Group AMTRAK dialog box

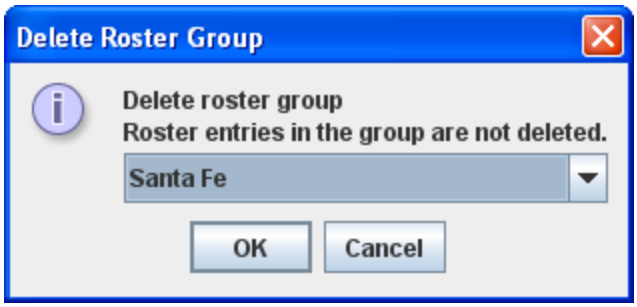
Enter the name for the new roster group in text box.

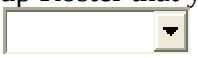
if you do not want to complete the action

duplicates the roster group with the new name.

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

OK Deletes the selected roster group as active

- You may also delete roster groups by selecting group in the Roster Group panel then pressing the - button.

Set Active Roster Group

- Opens the **Active 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

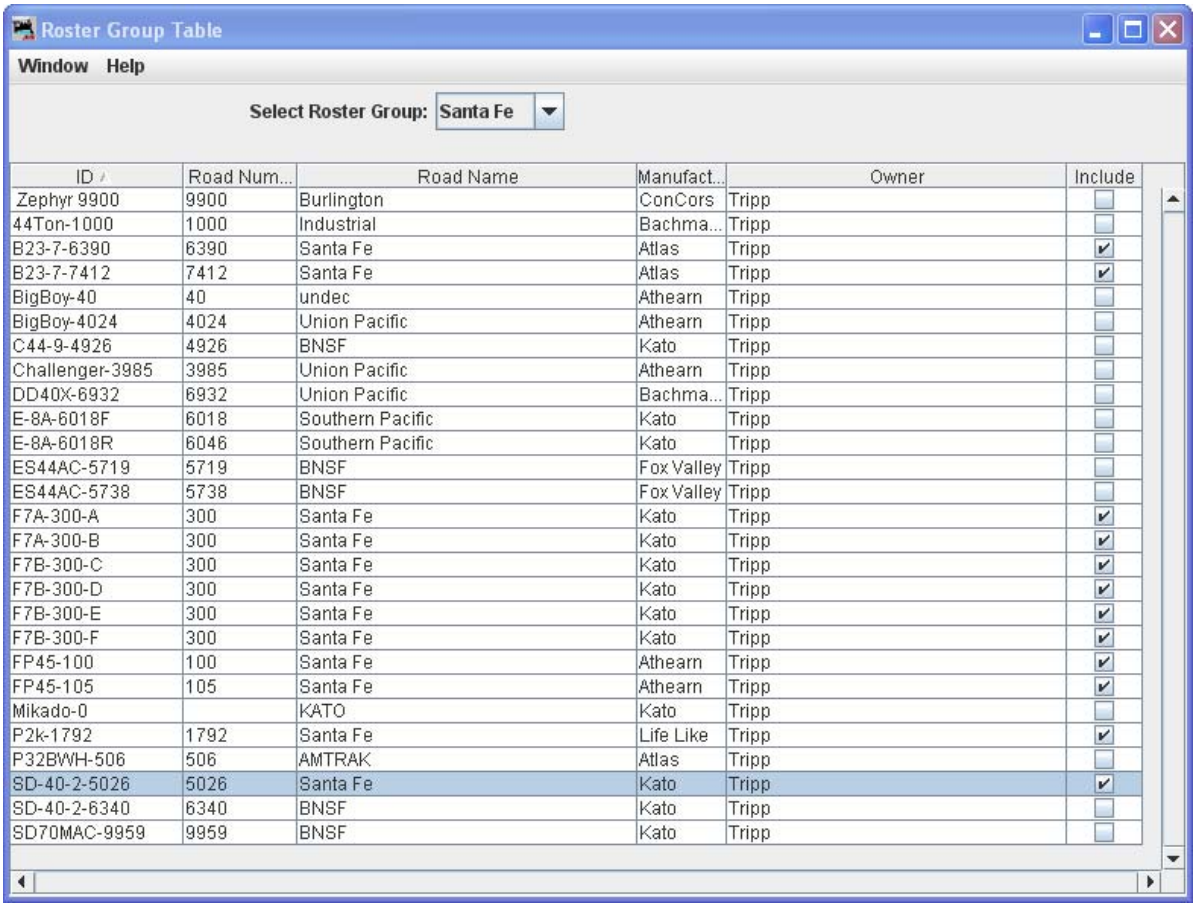
Cancel if you do not want to set an active roster Group

OK Sets the selected roster group as active

- A group may also be set Active by selection in the Roster Group pane.

Roster Group Table Association

- Once the groups are named, then you "associate" the roster entries with their group. This can be done by using 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.



ID	Road Num...	Road Name	Manufact...	Owner	Include
Zephyr 9900	9900	Burlington	ConCors	Tripp	☐
44Ton-1000	1000	Industrial	Bachma...	Tripp	☐
B23-7-6390	6390	Santa Fe	Atlas	Tripp	☑
B23-7-7412	7412	Santa Fe	Atlas	Tripp	☑
BigBoy-40	40	undec	Athearn	Tripp	☐
BigBoy-4024	4024	Union Pacific	Athearn	Tripp	☐
C44-9-4926	4926	BNSF	Kato	Tripp	☐
Challenger-3985	3985	Union Pacific	Athearn	Tripp	☐
DD40X-6932	6932	Union Pacific	Bachma...	Tripp	☐
E-8A-6018F	6018	Southern Pacific	Kato	Tripp	☐
E-8A-6018R	6046	Southern Pacific	Kato	Tripp	☐
ES44AC-5719	5719	BNSF	Fox Valley	Tripp	☐
ES44AC-5738	5738	BNSF	Fox Valley	Tripp	☐
F7A-300-A	300	Santa Fe	Kato	Tripp	☑
F7A-300-B	300	Santa Fe	Kato	Tripp	☑
F7B-300-C	300	Santa Fe	Kato	Tripp	☑
F7B-300-D	300	Santa Fe	Kato	Tripp	☑
F7B-300-E	300	Santa Fe	Kato	Tripp	☑
F7B-300-F	300	Santa Fe	Kato	Tripp	☑
FP45-100	100	Santa Fe	Athearn	Tripp	☑
FP45-105	105	Santa Fe	Athearn	Tripp	☑
Mikado-0		KATO	Kato	Tripp	☐
P2k-1792	1792	Santa Fe	Life Like	Tripp	☑
P32BWH-506	506	AMTRAK	Atlas	Tripp	☐
SD-40-2-5026	5026	Santa Fe	Kato	Tripp	☑
SD-40-2-6340	6340	BNSF	Kato	Tripp	☐
SD70MAC-9959	9959	BNSF	Kato	Tripp	☐

- 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, Include... 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.
- 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, **Select Roster Group** to All Entries, or Global. Then you may be certain that you are working with all engines in your roster.
- ***Disassociation of Roster Entry to Group***
- To diassociate a roster entry to a Roster Group, open Roster Group Table and uncheck roster selection and save new Group by closing the Roster Group Table.

- **Actions**

Program

Opens the Programmer that is setup in your preferences, **Comprehensive Programmer**,[see page 47] defaults to **Basic Programmer**[see page 39]

Labels and Media

Opens the Labels and Media window with two tabs to set these parameters for the selected roster entry in your roster. Select the **Function Labels** TAB to edit your throttle function labels. Select the **Roster Media** TAB to edit the icon for your roster selection.

New Throttle

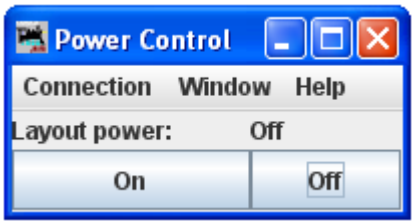
- Load Default Throttle Layout

Opens the default throttle that is set in preferences

Consisting Tool

Turnout Control

Power Control

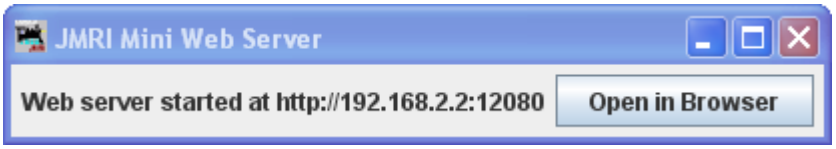


Speedometer

Single CV Programmer

Start WiThrottle Server

Start Mini Web Server



Recreate Roster Index

Recreates the Roster Index when adding new XML roster files.

Recreate Decoder Index

Used to update Decoder Index when new decodeer files are added.

Run Script

Opens a dialog to allow you to select a script that will run within DecoderPro3®.

Manufacturer Specific Menu

This menu is dependent upon the equipment you are using.

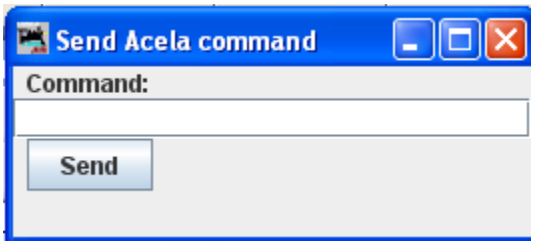
Acela Menu

Command Monitor

Opens the Communications Monitor Window[See page 143] and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

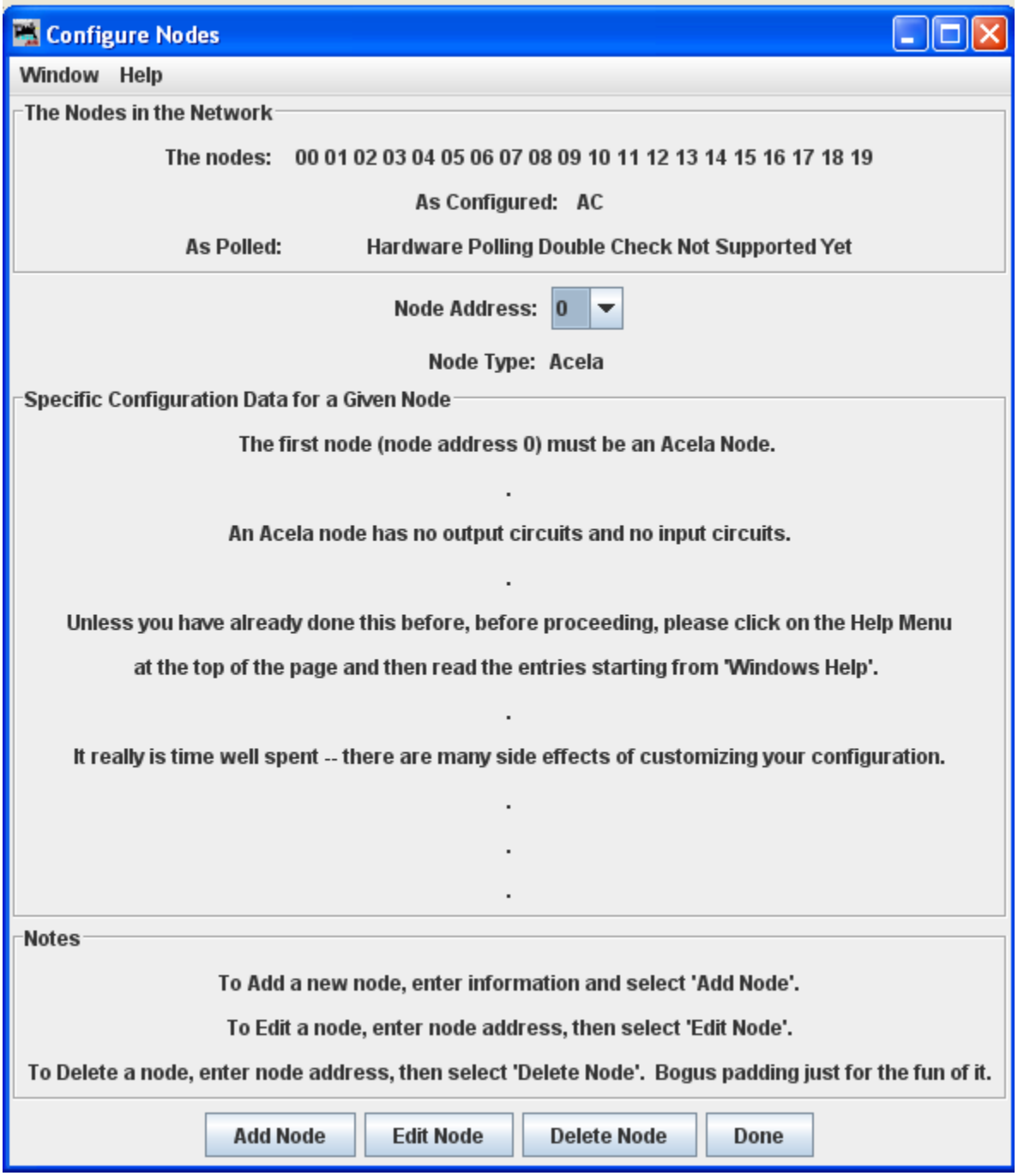
Send Command

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.


Configure Nodes
Window Help
The Nodes in the Network
The nodes: 00 01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19
As Configured: AC
As Polled: Hardware Polling Double Check Not Supported Yet
Node Address: 0
Node Type: Acela
Specific Configuration Data for a Given Node
The first node (node address 0) must be an Acela Node.
.
An Acela node has no output circuits and no input circuits.
.
Unless you have already done this before, before proceeding, please click on the Help Menu
at the top of the page and then read the entries starting from 'Windows Help'.
.
It really is time well spent -- there are many side effects of customizing your configuration.
.
.
.
Notes
To Add a new node, enter information and select 'Add Node'.
To Edit a node, enter node address, then select 'Edit Node'.
To Delete a node, enter node address, then select 'Delete Node'. Bogus padding just for the fun of it.
Add Node
Edit Node
Delete Node
Done

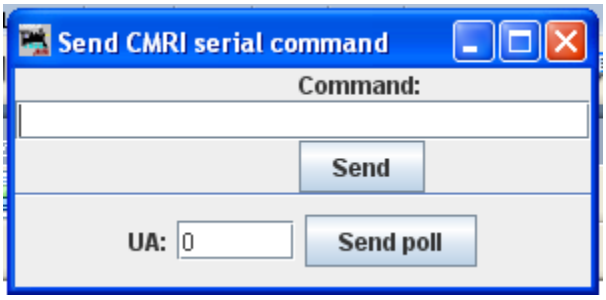
CMRI Menu

CMRI Monitor

Opens the Communications Monitor Window [see page 143] 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

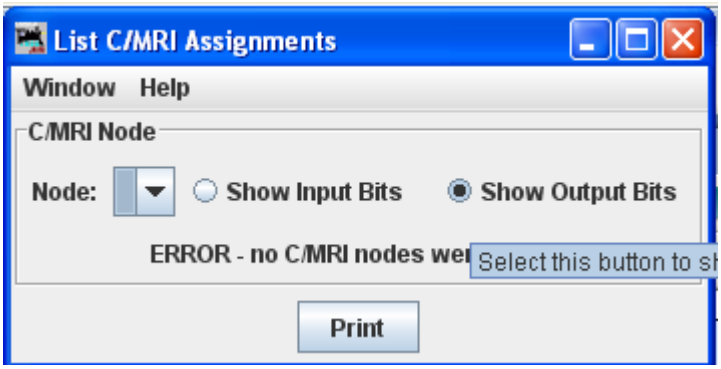
Open the Run CMRI Diagnostics window.

Configure C/MRI Nodes

Opens the Configure C/MRI Nodes Window.

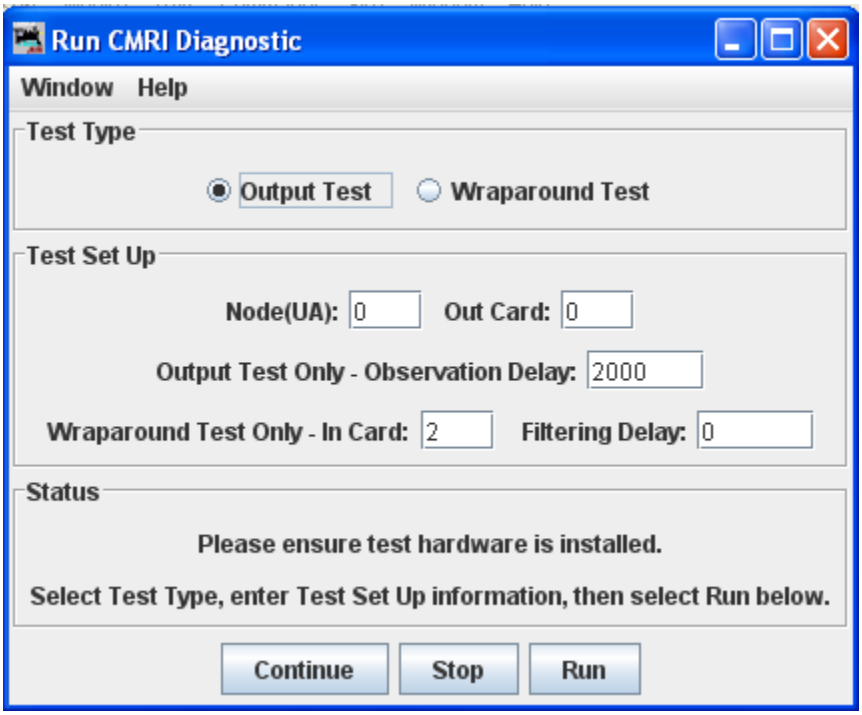
List Assignments

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



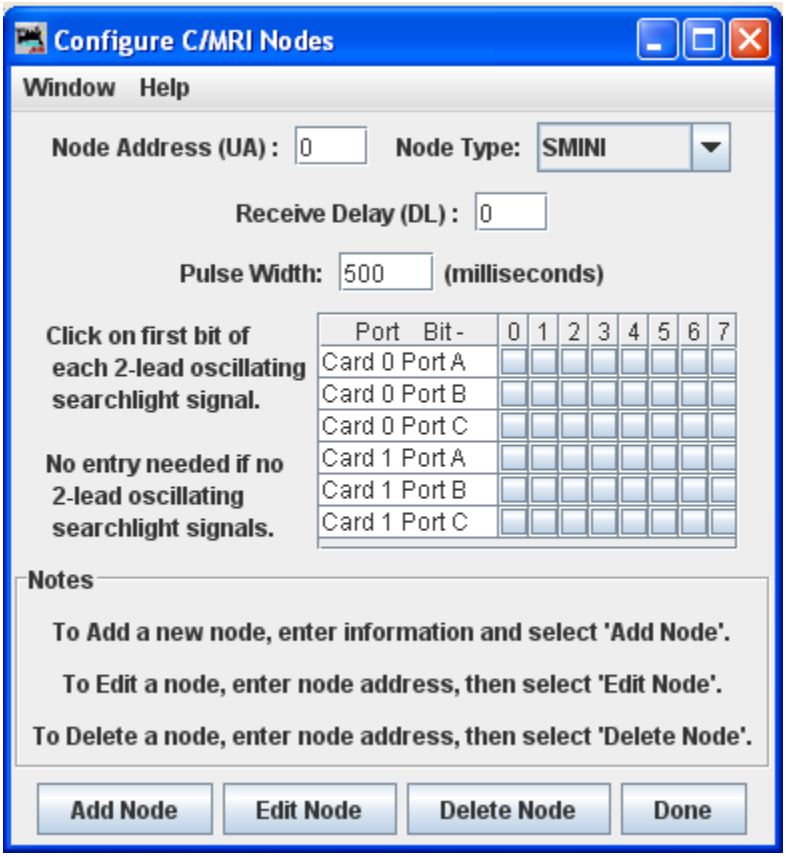
Run CMRI Diagnostic window

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 Window

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



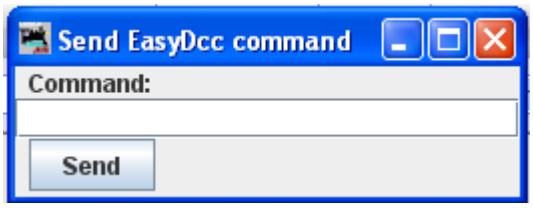
EasyDCC Menu

Command Monitor

Opens the Communications Monitor Window [see page 143] 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.



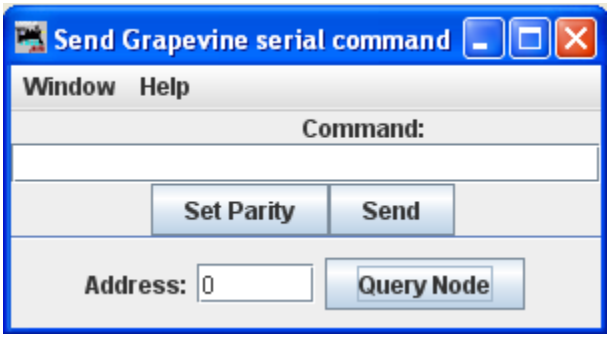
GrapeVine **Menu**

Communications Monitor

Opens the Communications Monitor Window [See page 143] and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

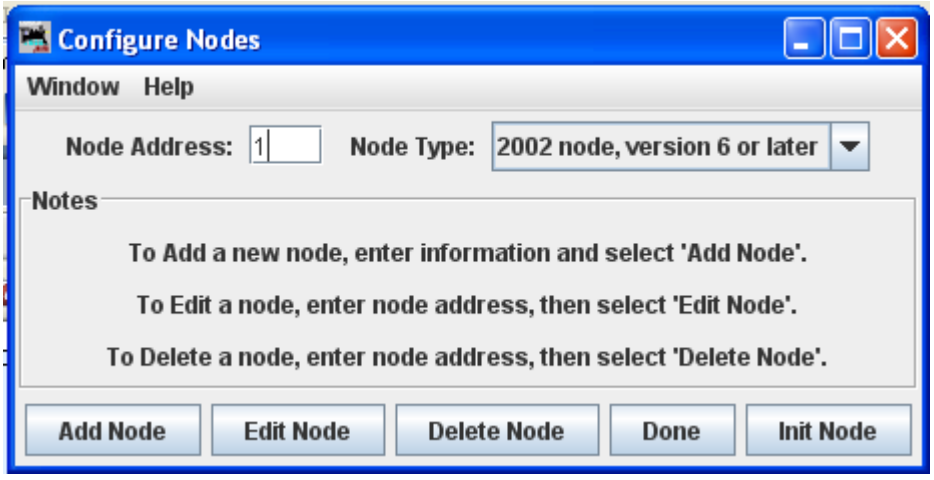
Send Command

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.



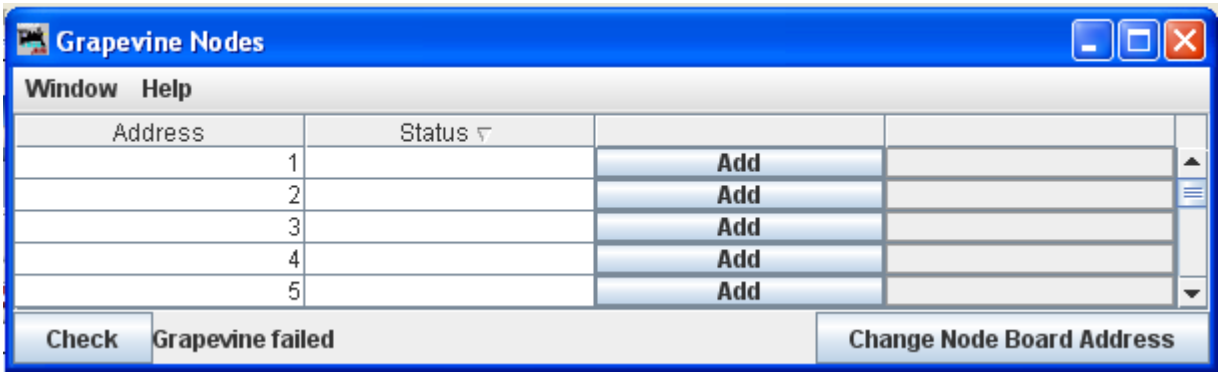
Configure Nodes

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.



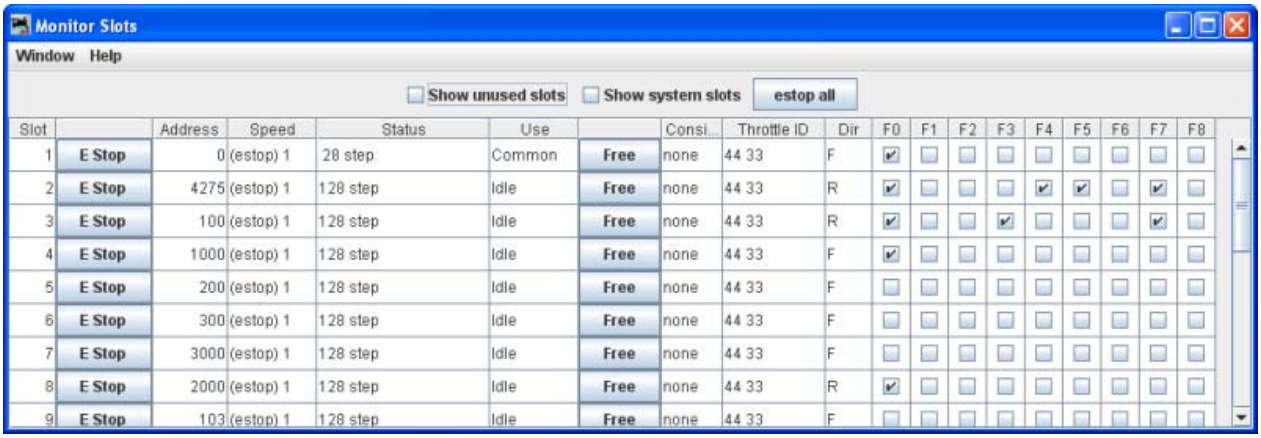
LocoNet Menu

Monitor LocoNet

Opens the Monitor LocoNet Window(Generic Communications Monitor Window) See page 143] and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

Monitor Slots

Opens the Monitor Slots window, and displays a table of the "command station slots" contents. 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.

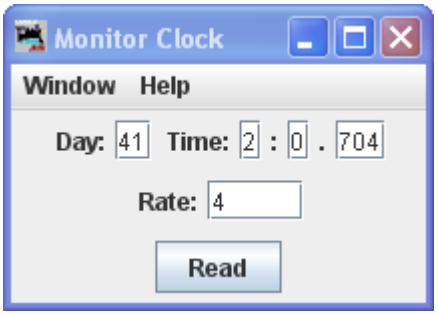


The checkboxes at the top allow to select what slots are displayed.

Show unused slots Monitor Clock

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. The Monitor Clock dialog allows you to control this feature.



The **Clock Monitor** tool provides a convenient way to:

the current contents of the LocoNet fast clock

Set the **Day** and **Time**

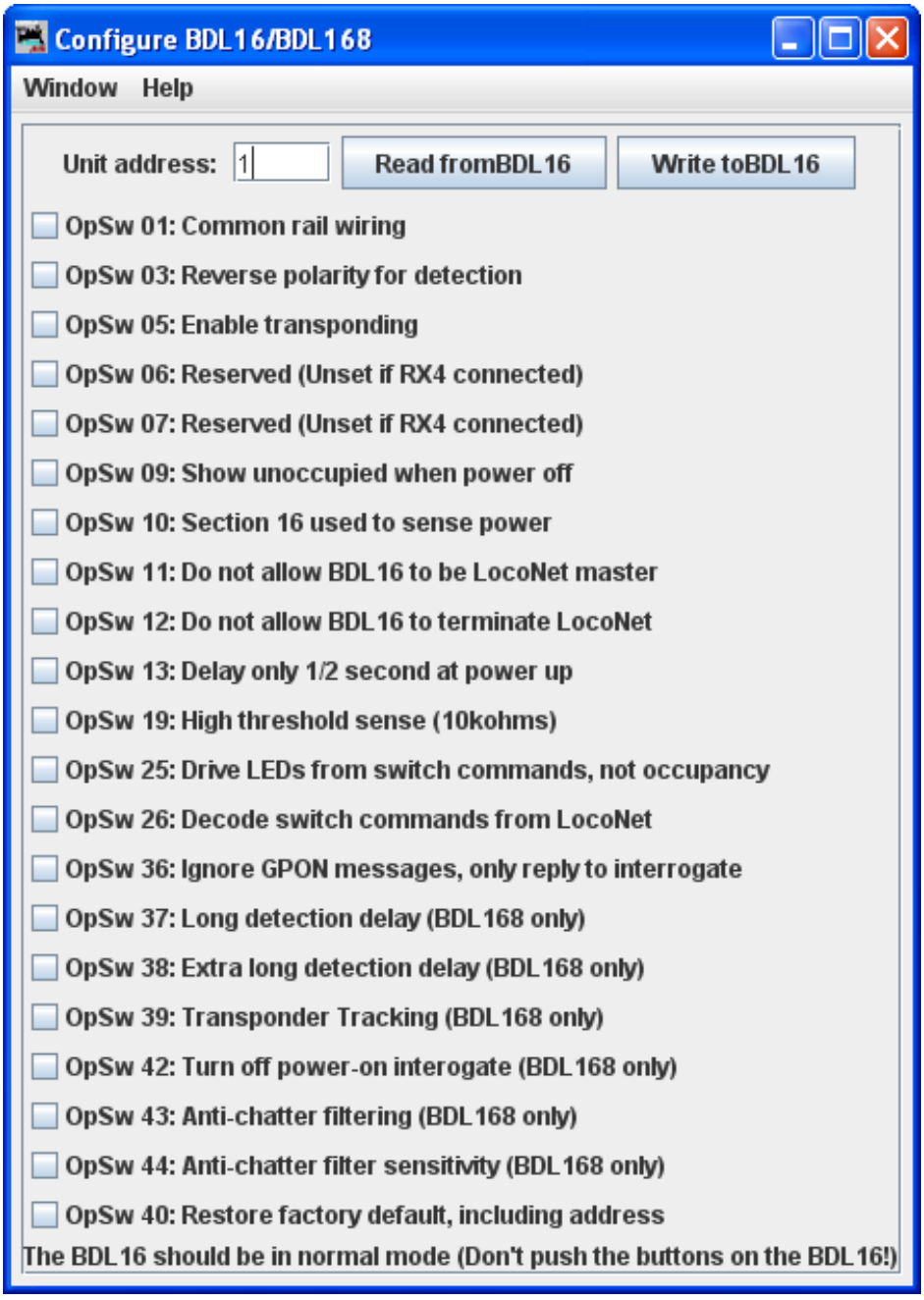
Set the **Rate**. Note that you can't explicitly pause a LocoNet clock, but you can stop it by setting the rate to zero.

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

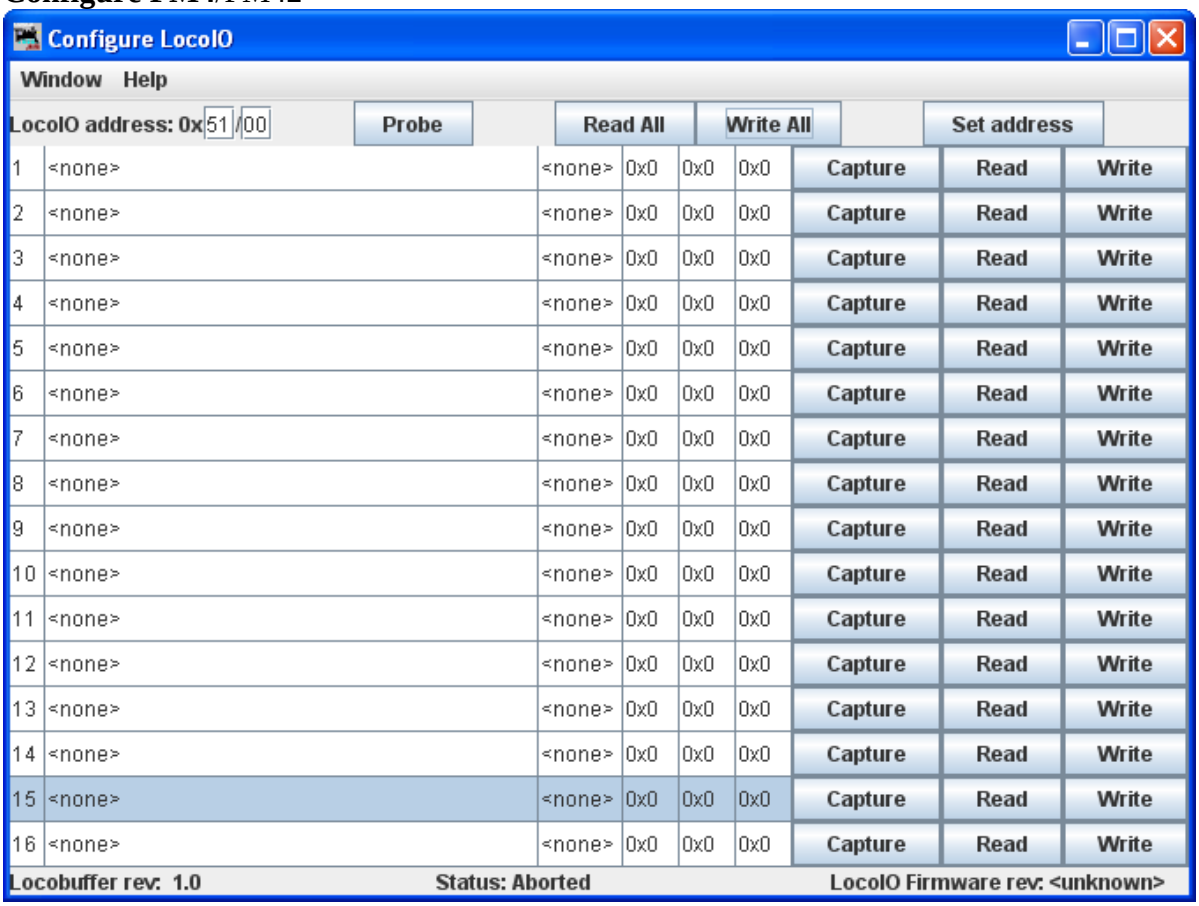
If active displays the statistics related to traffic on the LocoNet Monitor **LocoNet Stats** Window.

Configure BDL16/BDL168

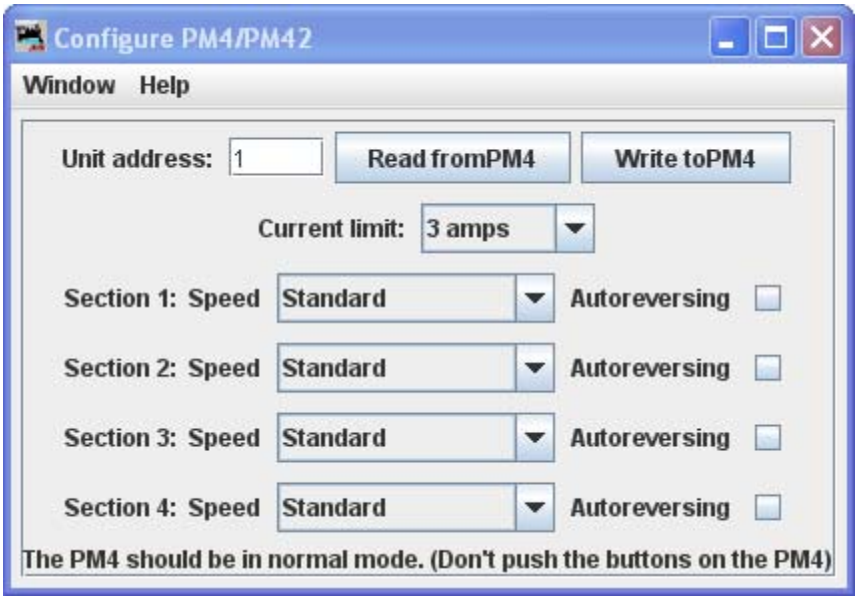


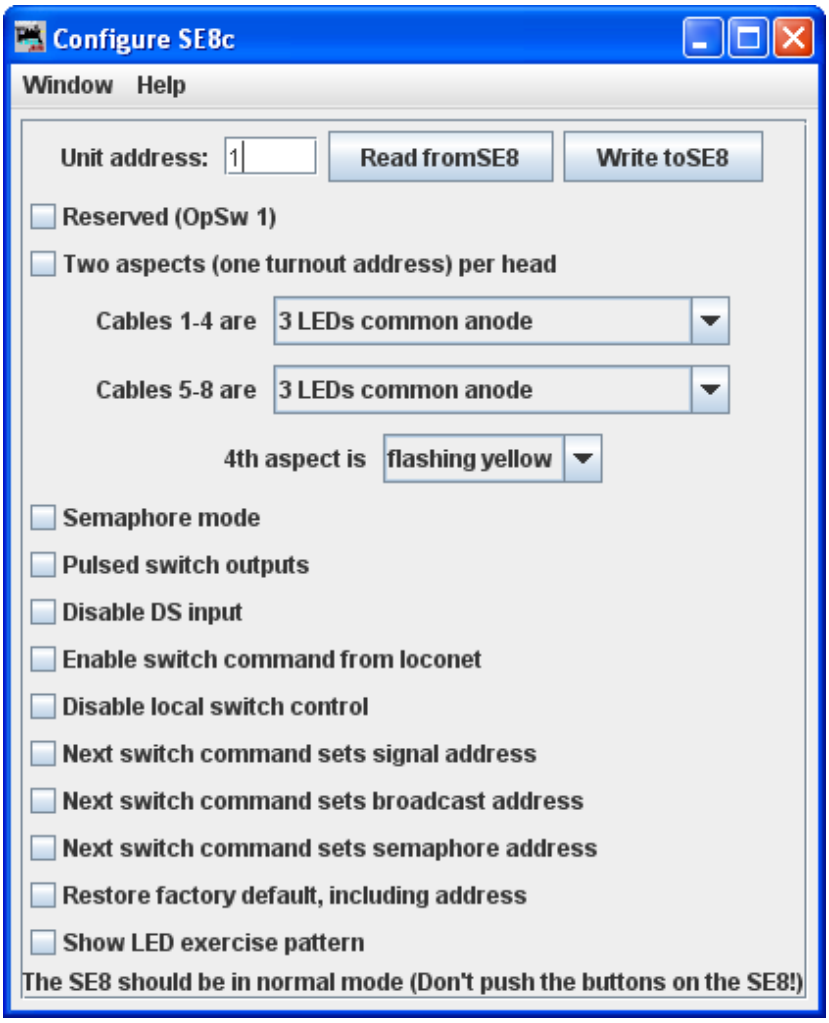
Configure LocoIO

Configure PM4/PM42



Configure SE8C



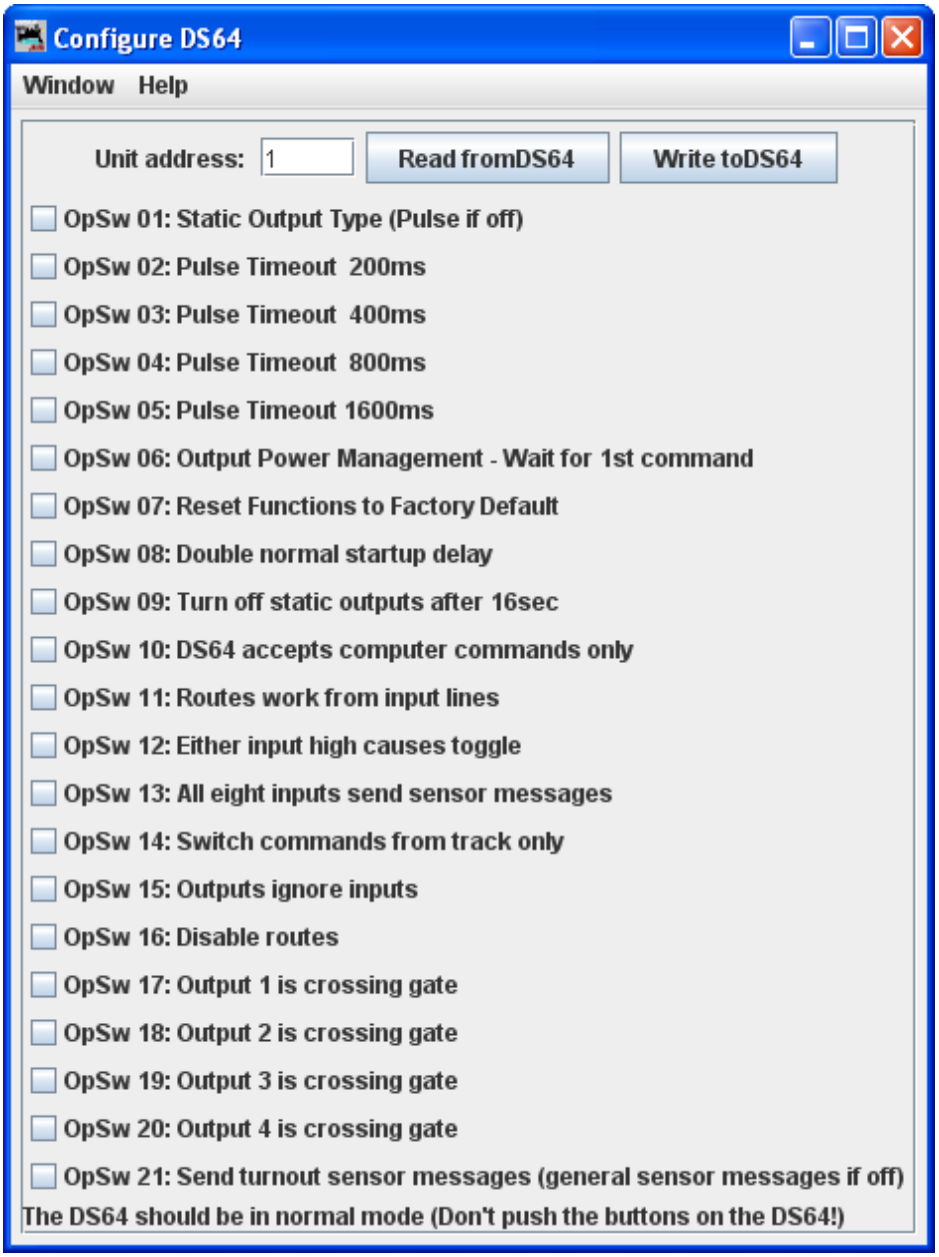


Configure DS64

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.



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.

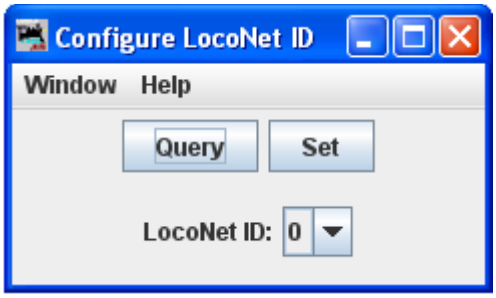
You can then, if you wish, change the checkboxes and click Write to DS64 to make your changes permanent.

Configure Command Station

Opens the Configure Command Station window

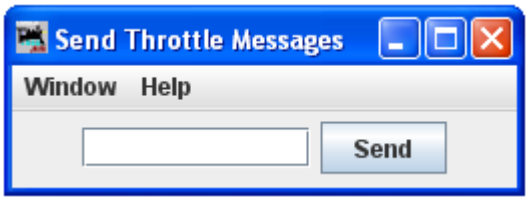
Configure LocoNet ID

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



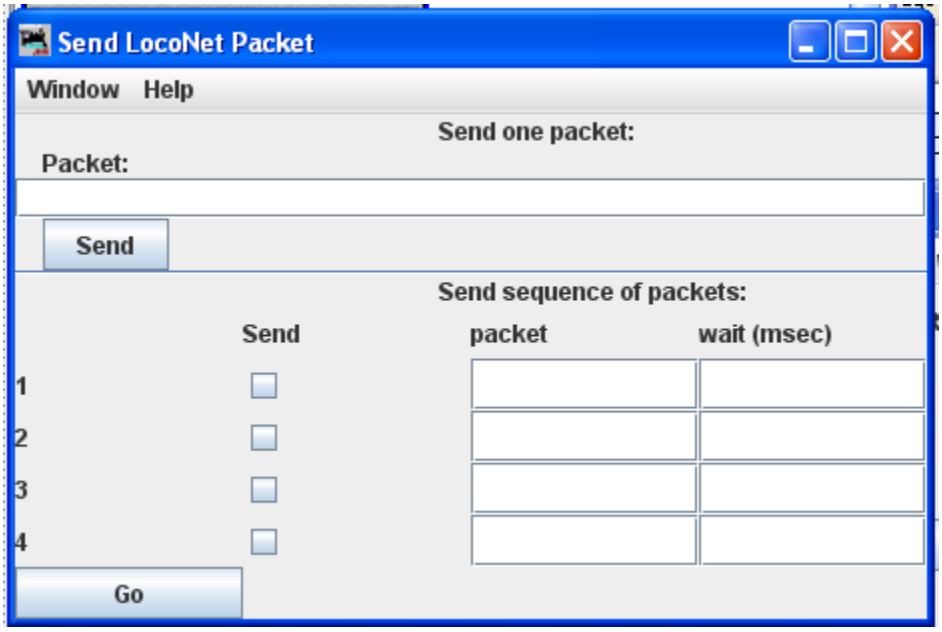
Send Throttle Messages

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



Send LocoNet Packet

Opens the Send LocoNet Packet dialog, that lets you directly command the LocoNet devices.



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.

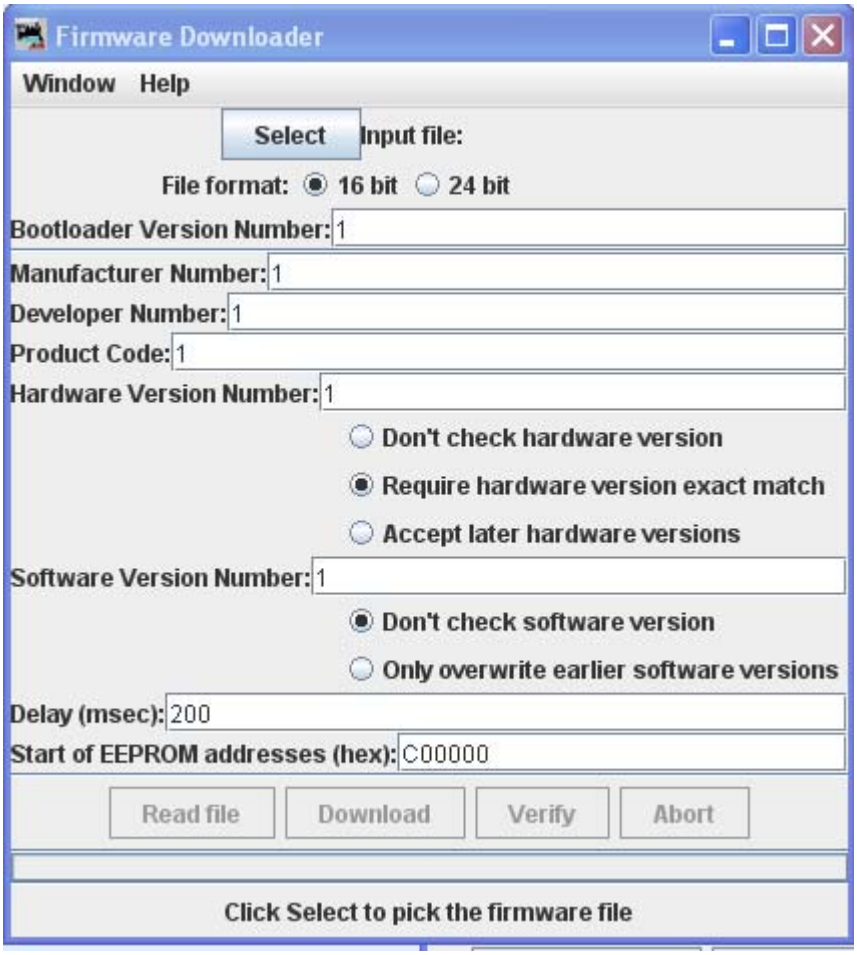
The bottom section lets you enter from one to four packets that will be repeatedly sent in sequence, with the user-defined delays in between. Press the Submit to start transmission sequence, and press again to stop the sequence.

Select PR3 Mode

Opens the **Select PR3 Mode** dialog.

Download Firmware

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.

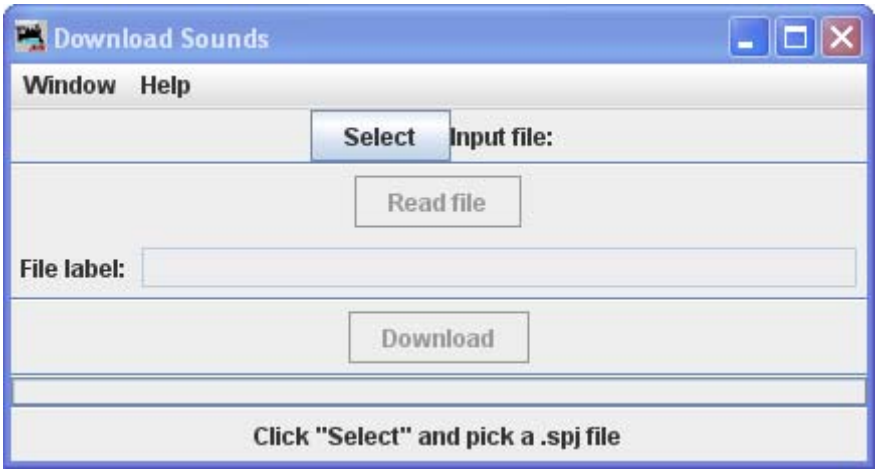
Click Read file to read the file into the program and verify its contents.

Only if instructed to by Digitrax, change the various values in the control fields (this is usually not needed

Click Dow nload to load the firmware. This will take a little while.Back

Download Sounds

Opens the Decoder Sound Downloader.



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.

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 to include new sounds and even to change the sound logic. 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.

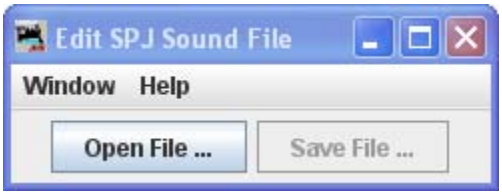
   "Done"

   The download 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

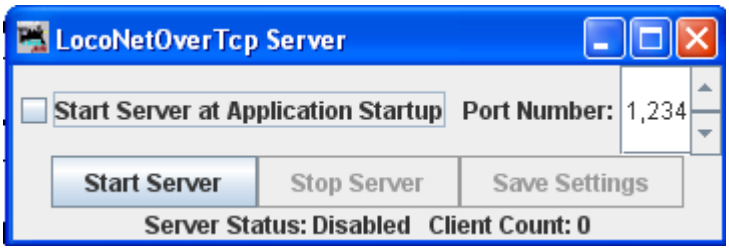


Start LocoNet Server

Starts the LocoNet server.

Start LocoNet over TCP Server

Opens the **LocoNetOver Tcp Server** dialog.



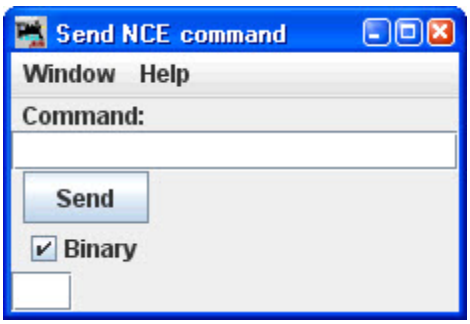
NCE Menu

Command Monitor

Opens the Communications Monitor Window [See page 143] and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

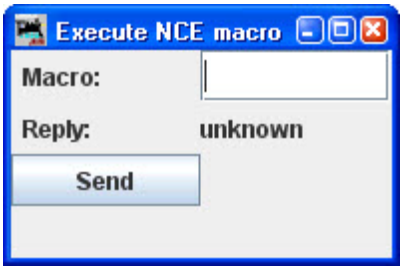
Send Command

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



Send Macro

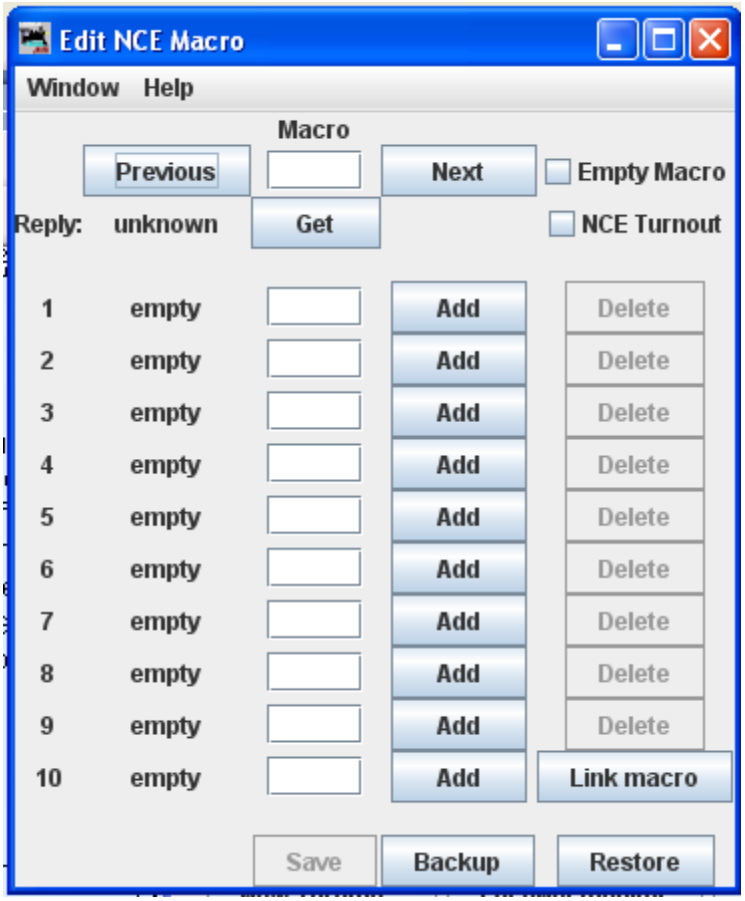
Opens the **Execute NCE Macro** Window which allows you to enter the Macro number to be executed. Clicking the **Send** button sends the macro.



Edit Macro

Open the Edit NCE Macro window.

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 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.

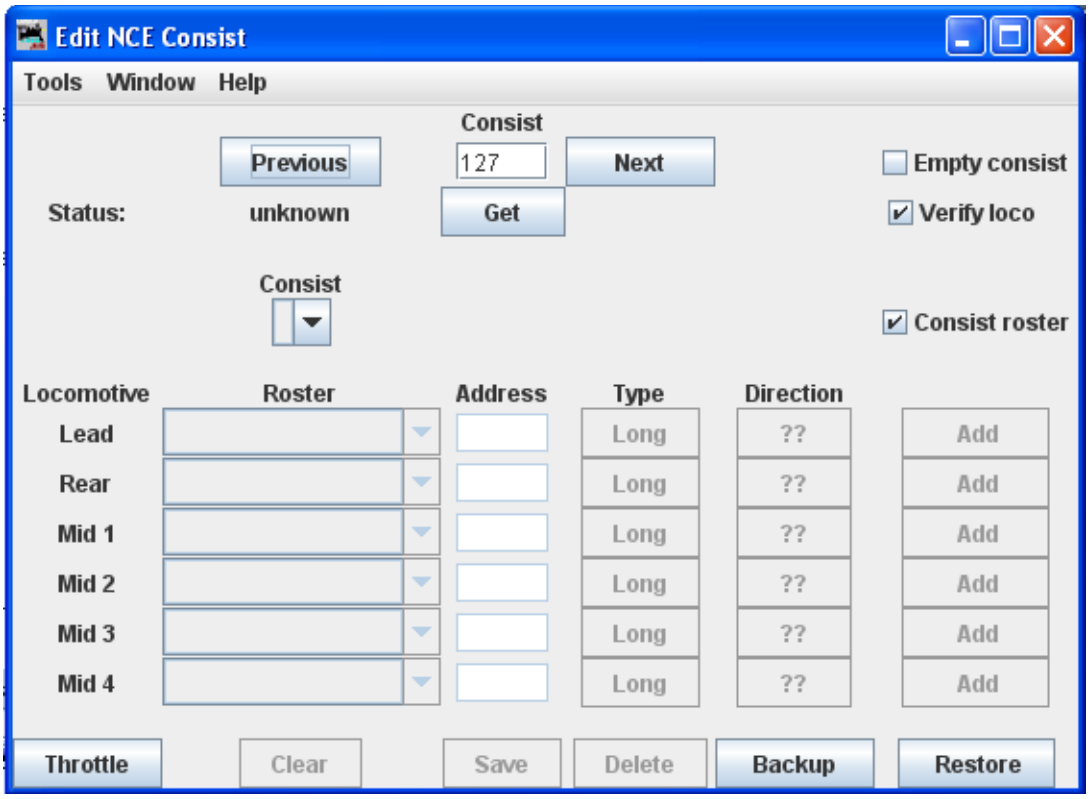
Save button

Saves macros to the NCE command station

Edit Consist

Opens the Edit NCE Consist window.

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.

You may add a locomotive by entering the address and clicking the **??** button to set forward or reverse running. The **Type** button toggles between **Long** and **Short** address (remember that NCE allows both long and short addresses in the range below 128). 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.

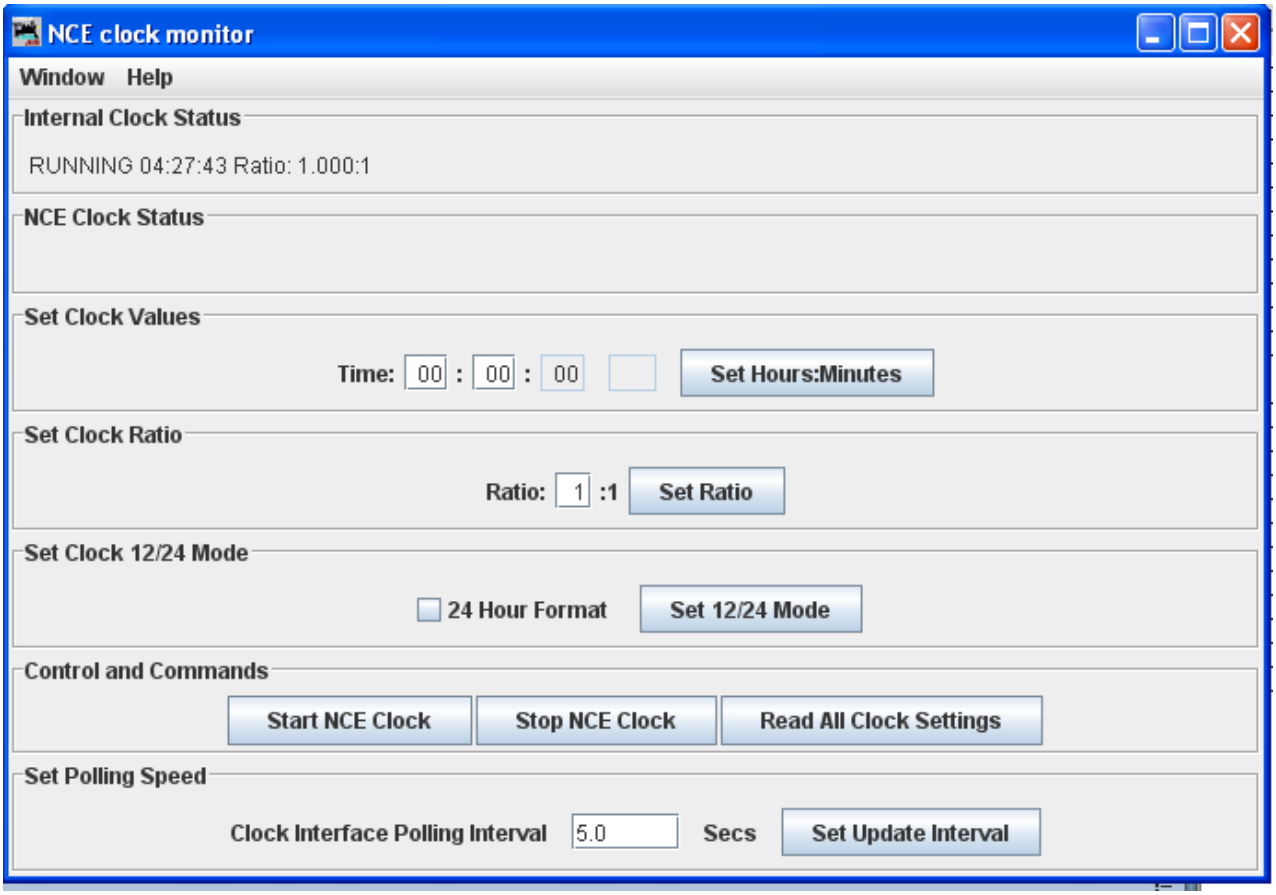
Clear button removes all the locomotives from a consist.

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

Opens the NCE Clock Monitor window. 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.



Show Cabs

Opens a window that displays the cabs currently on the system. This is handy for determining the cab number assigned to a throttle that doesn't have a display. Just use "Show Cabs" to display the cabs currently on the system. Then plug in the cab in question and use it again to see which one is added. If you have a standalone set-up bench it's even easier. Cycle the power to clear the command station memory. Then plug in the new cab and Show Cabs will display its number

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.

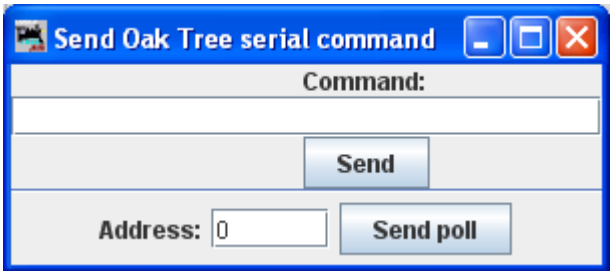
OakTreeSystems Menu

Communications Monitor

Opens the Communications Monitor Window [See Page 143] 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 Send. You may also type in an **Address:** and poll the system by clicking on the Send poll.



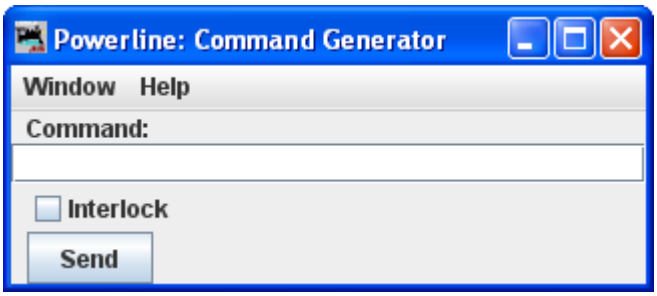
Powerline Menu

Communications Monitor

Opens the Communications Monitor Window [See page 143] 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 it to the powerline device.



QSI Menu

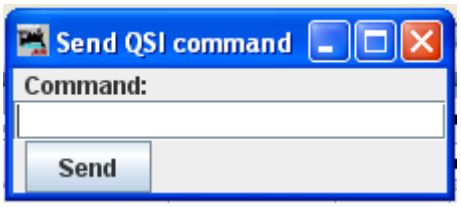
Command Monitor

Opens the Communications Monitor Window [See page 143] 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

.



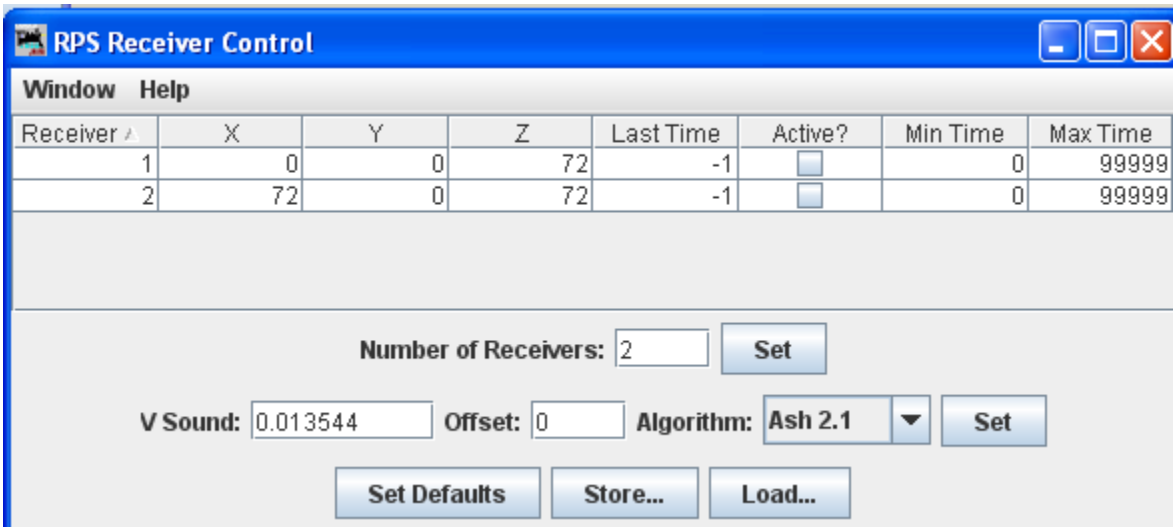
RPS Menu

RPS Monitor

Opens the Communications Monitor Window [See page 143] and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

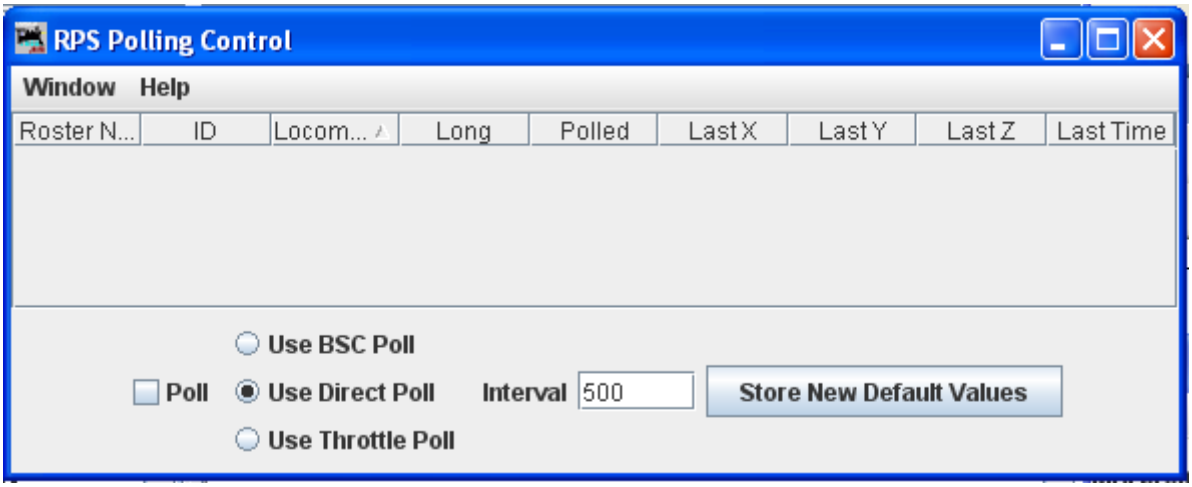
RPS Receiver Control

Opens the RPS Receiver Control window, which will detect how many receivers it has and set up a table with the right number of rows.



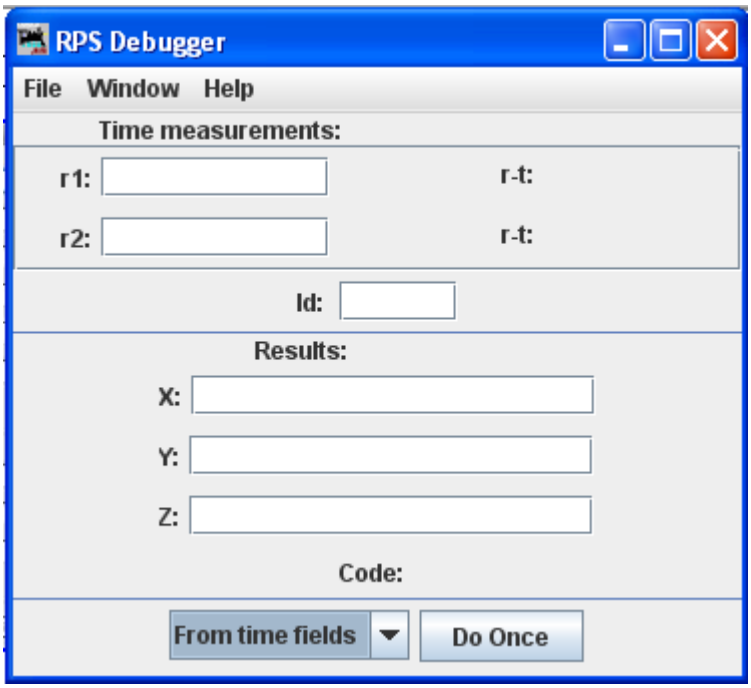
RPS Polling Control

Opens the RPS Polling Control window where you tell the RPS system which of your locomotives have RPS transmitters installed, and how often to talk to them.



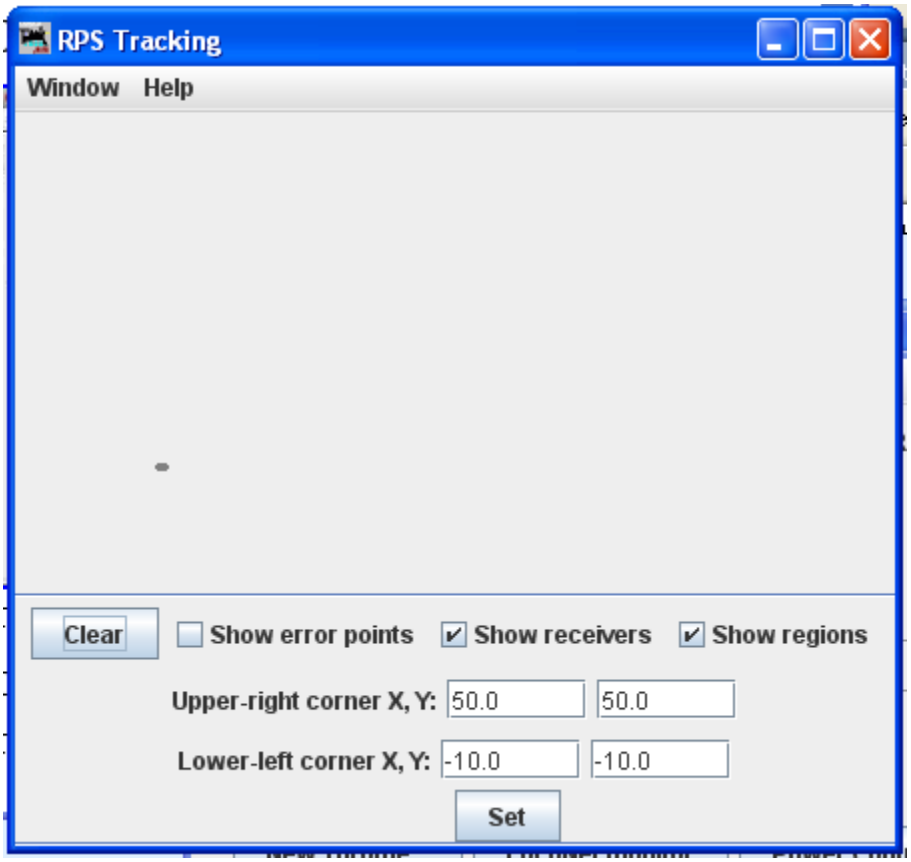
RPS Debugging Window

Opens the RPS Debugger window that lets you look at information as it moves throught the RPS system.



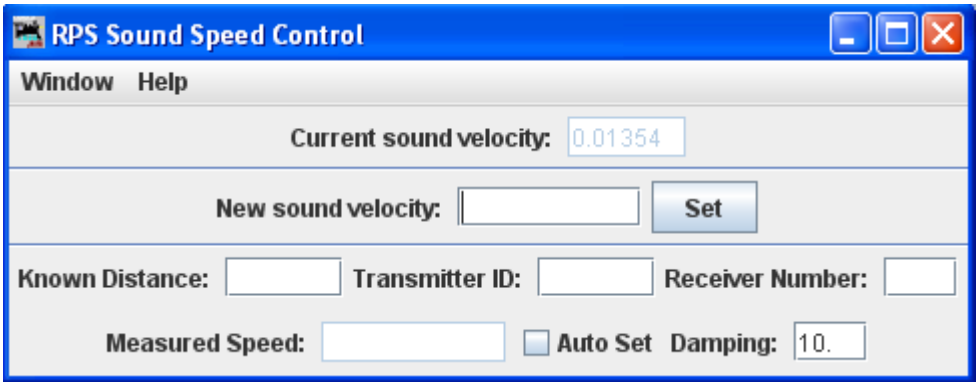
RPS Tracking Display

Opens the RPS Tracking frame that displays two types of things, the measured positions and paths of RPS transmitters and the *detection regions* used for RPS blocks and sensors.



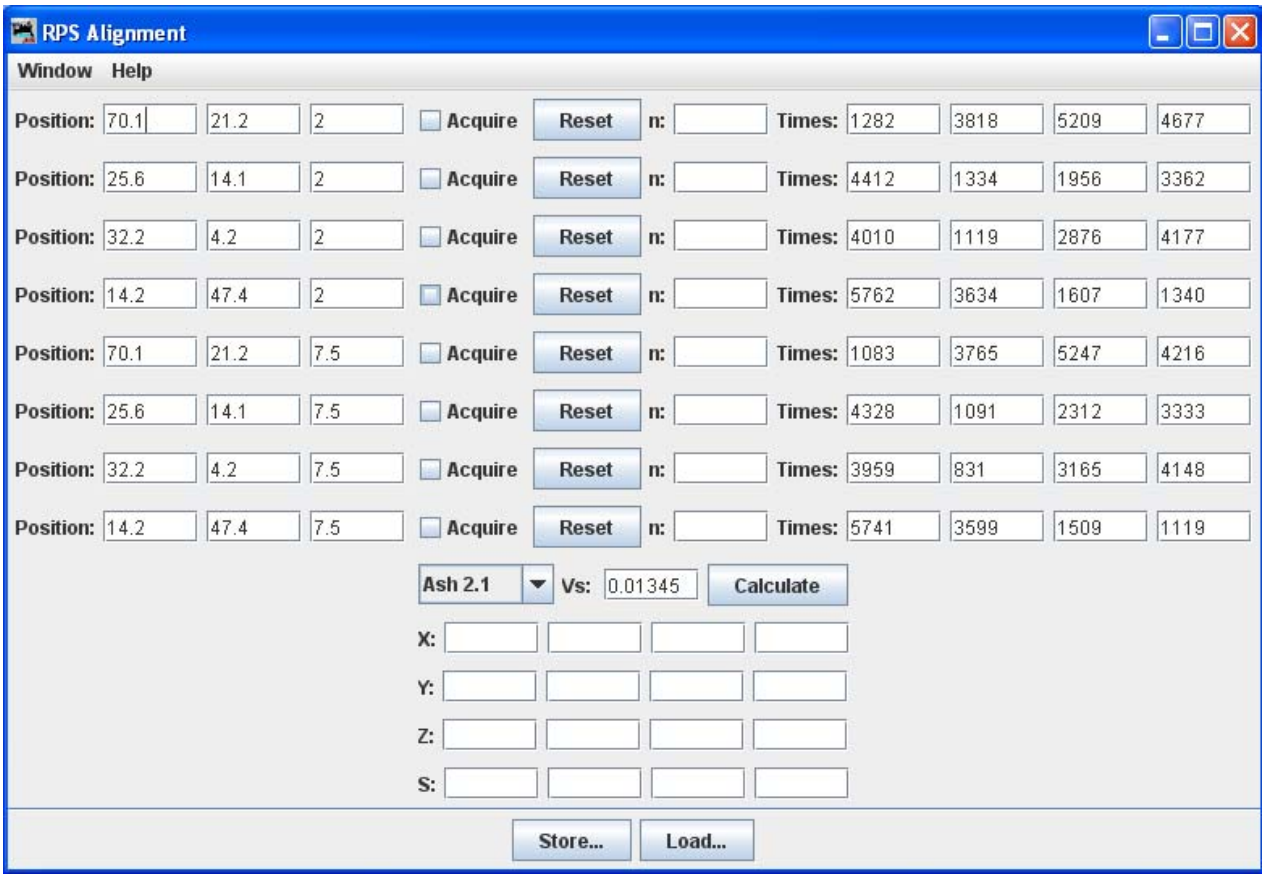
RPS Sound Speed Monitor

Opens the RPS Sound Speed Control window that lets you monitor and control the speed of sound used by the RPS system.



RPS Alignment Tool

Open the RPS Alignment window that allows you to align the sensors.



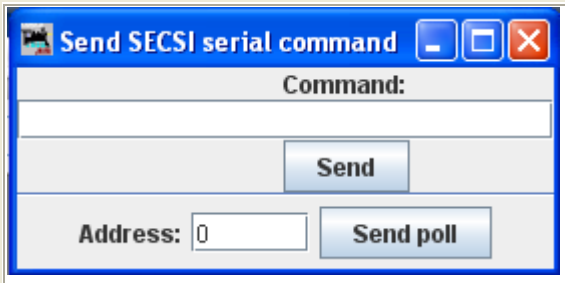
SECSI Menu

Communications Monitor

Opens the Communications Monitor Window [See page 143] 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.



Type the **Command** into the text box and click the **Send** button to send the command.

A polling **Address**: may be typed in the text box at the bottom of the prompt box and click on **Send poll** to poll the addresses on the communications link.

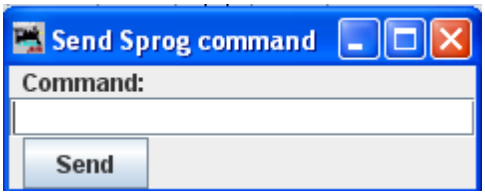
SPROG Menu

Command Monitor

Opens the Communications Monitor Window [See page 143] and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

Send Command

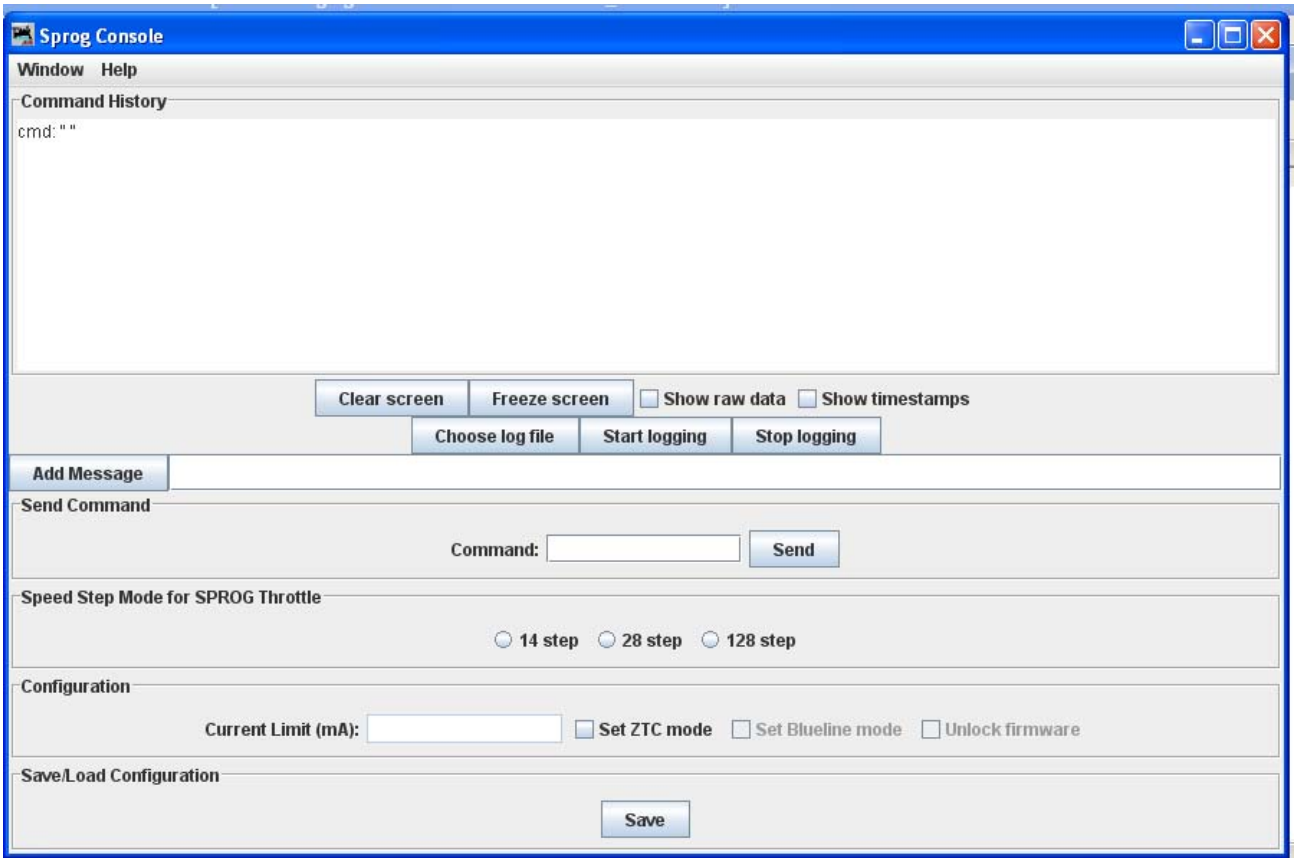
Opens the Send prompt with a text box to enter the **Command** message that will be sent to the DCC system when you click on the **Send** button.



Console

Opens the Sprog Console window that combines the communications monitor, Send Command and other features into a single user interface.

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



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)

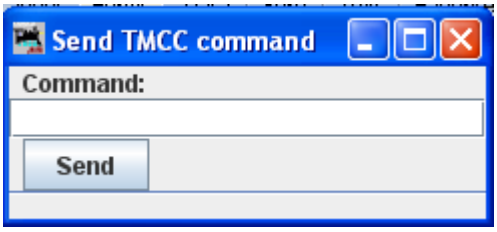
TMCC Menu

TMCC Monitor

Opens the Communications Monitor Window [See page 143] 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 oommand.



Wangrow Menu

Command Monitor

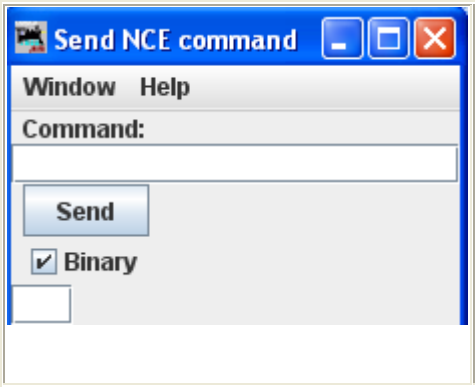
Opens the Communications Monitor Window [See page 143] and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

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



Command:— type the command in the text box.

Send button —sends the command to the DCC command station in the proper format.

Binary check box is checked for binary commands

Text box at bottom of dialog can be used to override the number of bytes sent.

XpressNet Menu

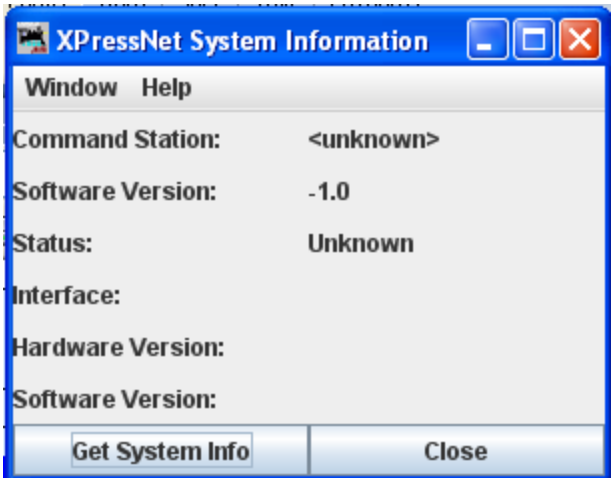
XpressNet Monitor

Opens the Communications Monitor Window [See page 143] 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

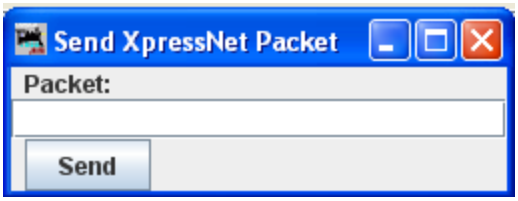
Opens the XPressNet System Information Dialog.

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



Send XpressNet Command

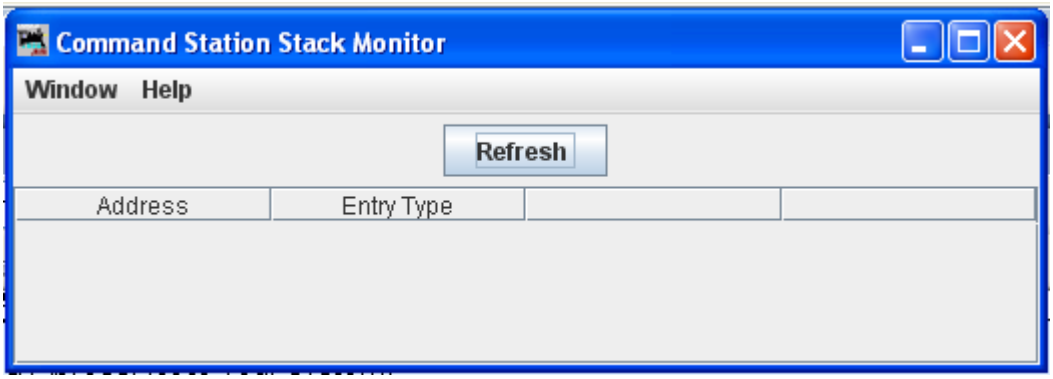
Opens the Send XpressNet Packet prompt so that you can type in a Packet: and click on the Send to transmit via XpressNet to your system.



Command Station Database Manager

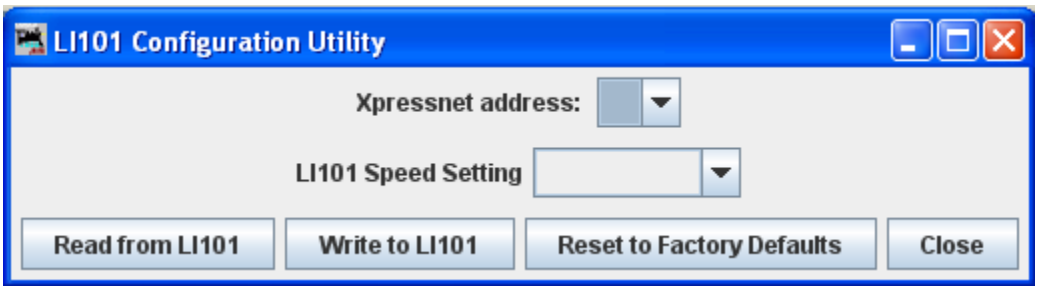
Opens the Command Station Stack Monitor window [See page 143] that allows you to monitor the status of the command station stack (database).

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



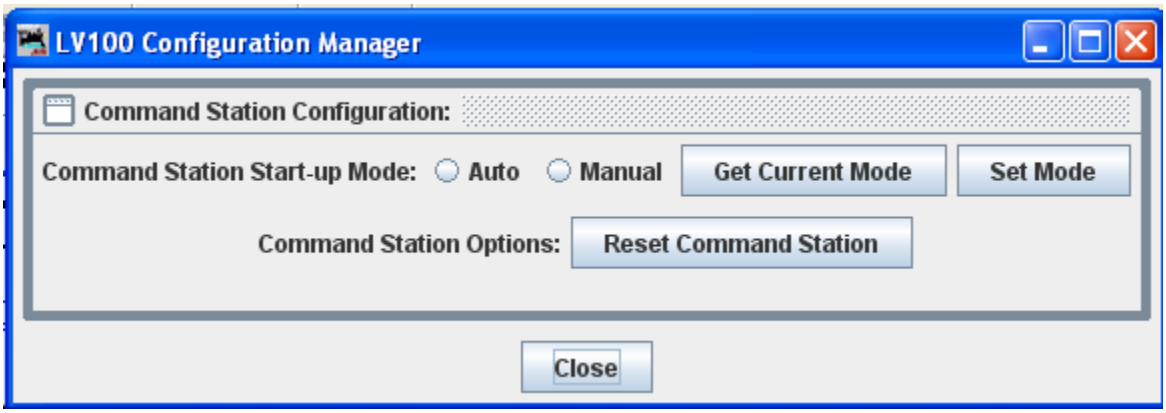
LI101 Configuration Manager

Open the LI101 Configuration Utility Window.



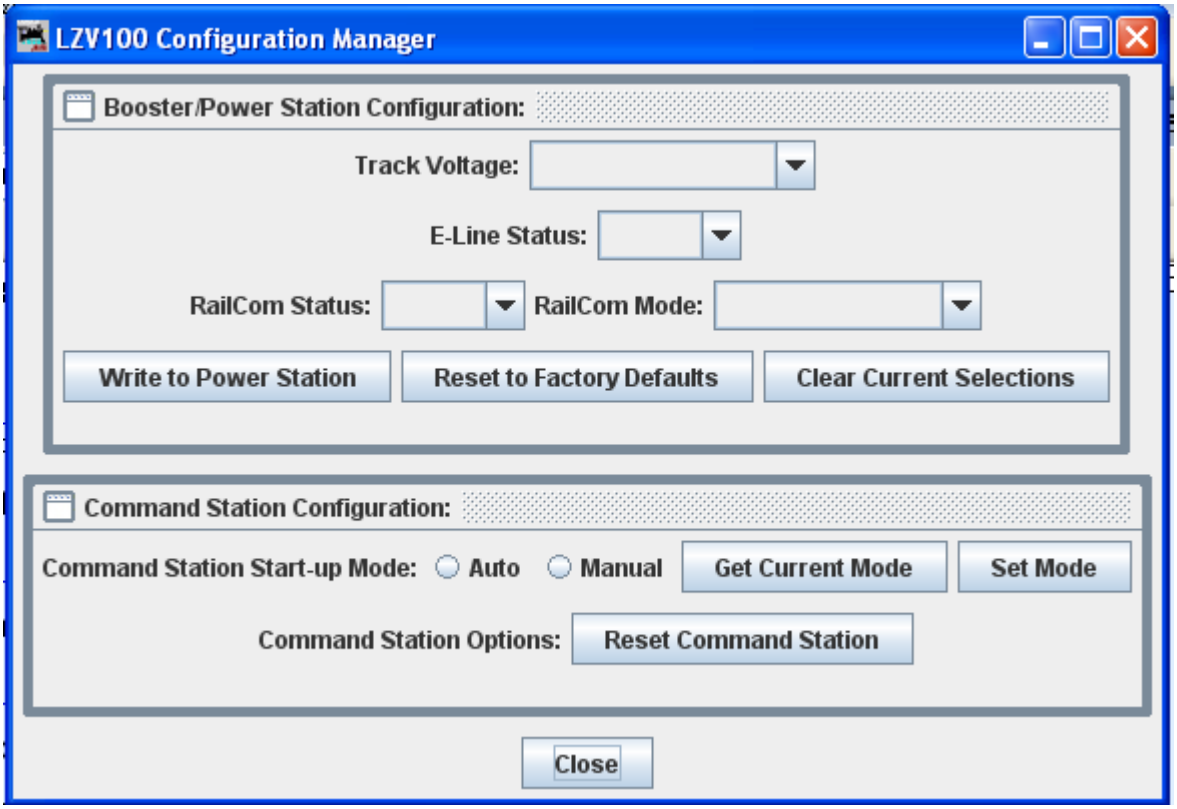
LZ100 Configuration Manager

Open the LV100 Configuration Manager Window



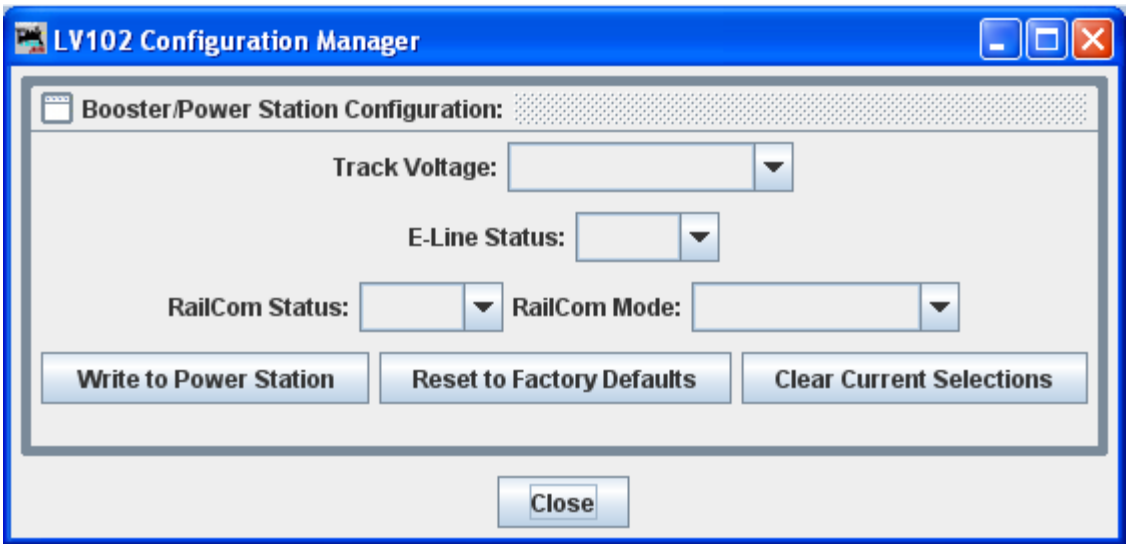
LZV100 Configuration Manager

Open the LZV100 Configuration Manager Window



LV102 Configuration Manager

Open the LV102 Configuration Manager Window.



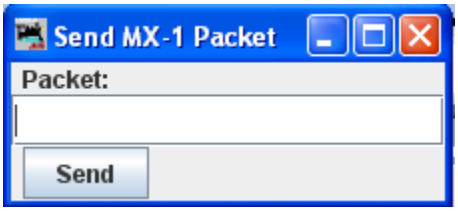
Zimo Menu

Command **Monitor**

Opens the Communications Monitor Window [See page 143] 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.



Window

Minimize

open windows listed

Help

Window Help...

General Help...

License...

Locations...

Context...

System Console...

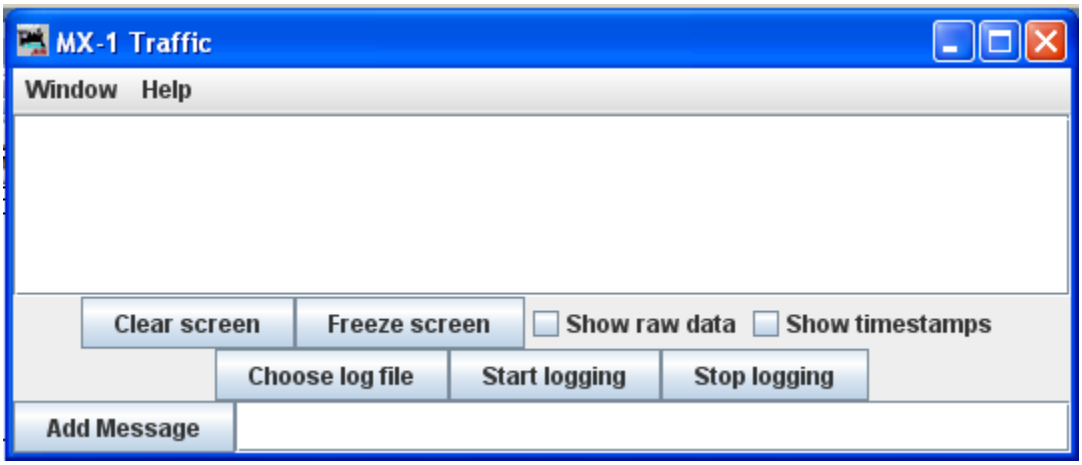
Upload Debugging Info...

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 recieved, 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:

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.

When you are ready to capture the data that you want to save, click on the **Start logging** button on the monitor window.

When done, clidk the **Stop logging** button to store the data and close the file.

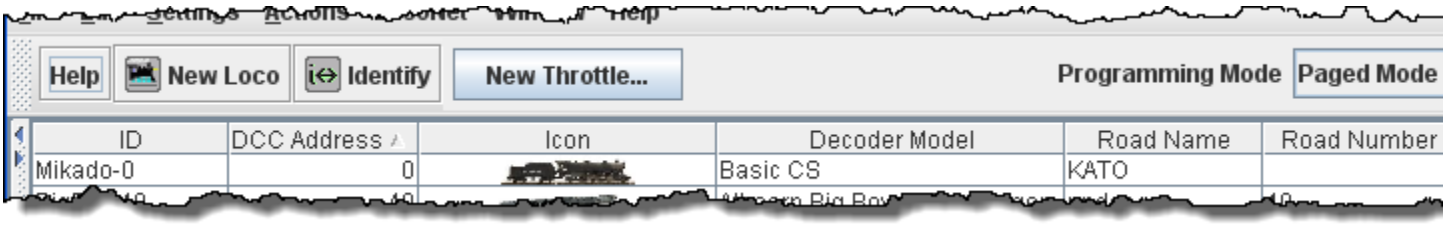
Adding Messages to Log File

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

…….

DecoderPro3® Main Window

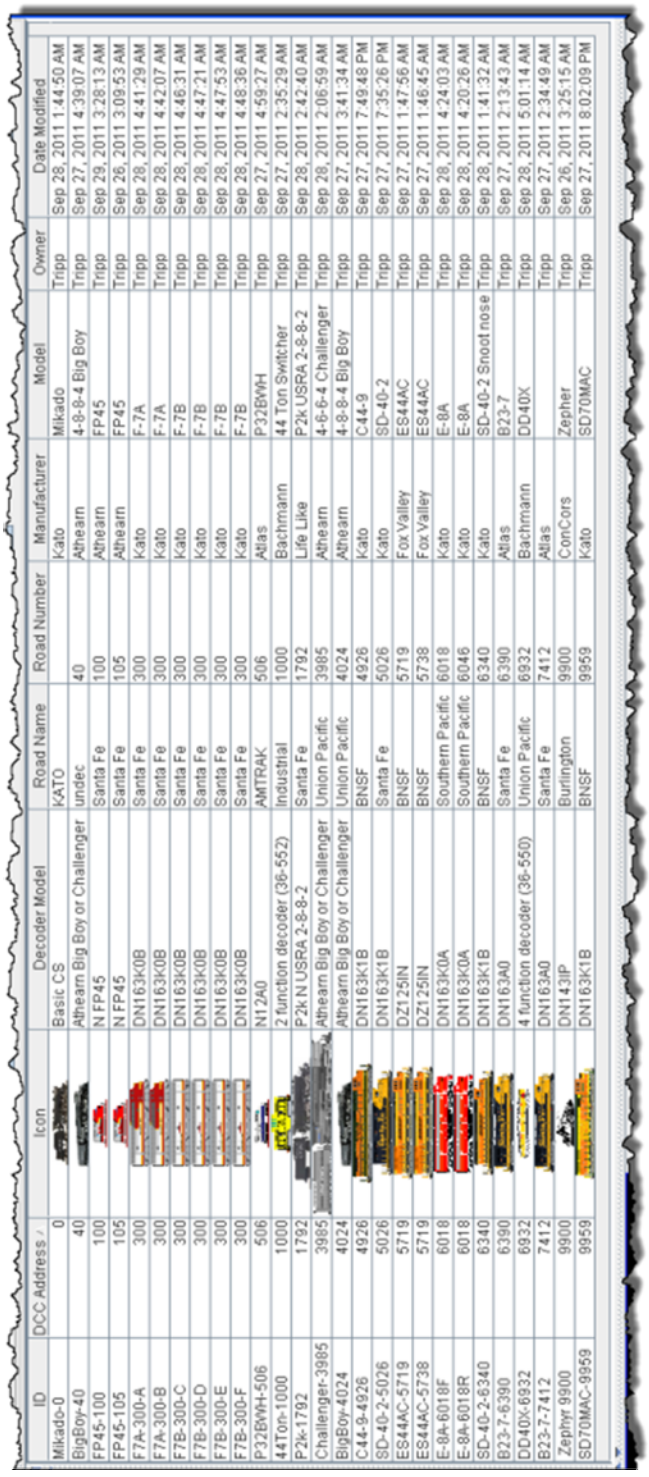
Toolbar



Help	Dispays the Help file for the DecoderPro® window
New Loco	Opens the **create new loco** window
Identify	Attempts to Identify the locomotive in the roster.
New Throttle...	Opens new **Throttle or other buttons added by preferences.**
Programming Mode Paged Mode	Drop down list allows you to select Programming Mode
Select Roster Group Santa Fe	Drop down list of valid **Roster Groups** , Will not display if their are no Roster Groups

The Roster Table

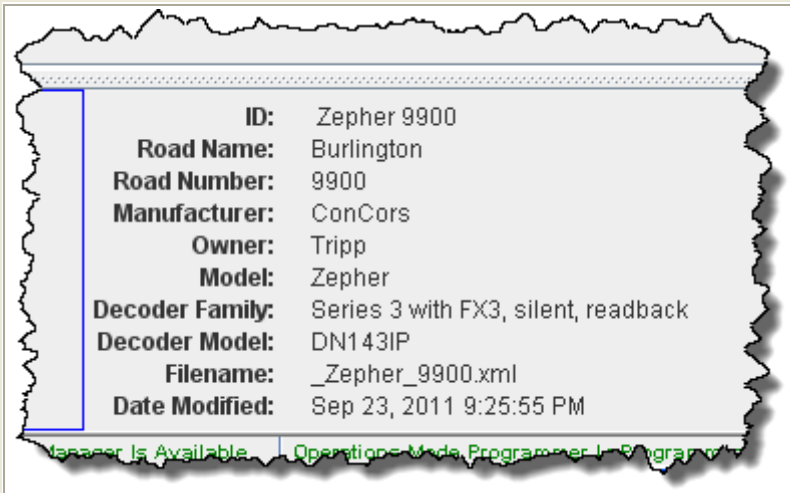
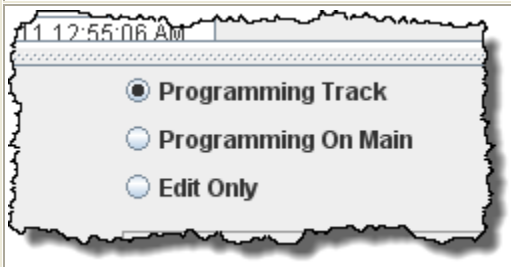
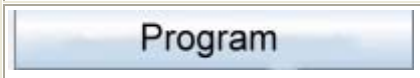
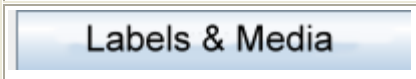
The Roster Table in the main body of DecoderPro3® displays all of the locomotives in your roster or selected roster groups.



ID	DCC Address	Icon	Decoder Model	Road Name	Road Number	Manufacturer	Model	Owner	Date Modified
Mikado-0	0		Basic CS	KATO		Kato	Mikado	Tripp	Sep 28, 2011 1:44:50 AM
BigBoy-40	40		Athearn Big Boy or Challenger	undec	40	Athearn	4-8-8-4 Big Boy	Tripp	Sep 27, 2011 4:39:07 AM
FP45-100	100		N FP45	Santa Fe	100	Athearn	FP45	Tripp	Sep 29, 2011 3:28:13 AM
FP45-105	105		N FP45	Santa Fe	105	Athearn	FP45	Tripp	Sep 26, 2011 3:09:53 AM
F7A-300-A	300		DN163K0B	Santa Fe	300	Kato	F-7A	Tripp	Sep 28, 2011 4:41:29 AM
F7A-300-B	300		DN163K0B	Santa Fe	300	Kato	F-7A	Tripp	Sep 28, 2011 4:42:07 AM
F7B-300-C	300		DN163K0B	Santa Fe	300	Kato	F-7B	Tripp	Sep 28, 2011 4:46:31 AM
F7B-300-D	300		DN163K0B	Santa Fe	300	Kato	F-7B	Tripp	Sep 28, 2011 4:47:21 AM
F7B-300-E	300		DN163K0B	Santa Fe	300	Kato	F-7B	Tripp	Sep 28, 2011 4:47:53 AM
F7B-300-F	300		DN163K0B	Santa Fe	300	Kato	F-7B	Tripp	Sep 28, 2011 4:48:36 AM
P32BWH-506	506		N12A0	AMTRAK	506	Atlas	P32BWH	Tripp	Sep 27, 2011 4:59:27 AM
44Ton-1000	1000		2 function decoder (36-552)	Industrial	1000	Bachmann	44 Ton Switcher	Tripp	Sep 27, 2011 2:35:29 AM
P2k-1792	1792		P2k N USRA 2-8-8-2	Santa Fe	1792	Life Like	P2k USRA 2-8-8-2	Tripp	Sep 28, 2011 2:42:40 AM
Challenger-3985	3985		Athearn Big Boy or Challenger	Union Pacific	3985	Athearn	4-6-6-4 Challenger	Tripp	Sep 28, 2011 2:06:59 AM
BigBoy-4024	4024		Athearn Big Boy or Challenger	Union Pacific	4024	Athearn	4-8-8-4 Big Boy	Tripp	Sep 27, 2011 3:41:34 AM
C44-9-4926	4926		DN163K1B	BNSF	4926	Kato	C44-9	Tripp	Sep 27, 2011 7:49:48 PM
SD-40-2-5026	5026		DN163K1B	Santa Fe	5026	Kato	SD-40-2	Tripp	Sep 27, 2011 7:35:26 PM
ES44AC-5719	5719		DZ125IN	BNSF	5719	Fox Valley	ES44AC	Tripp	Sep 27, 2011 1:47:56 AM
ES44AC-5738	5719		DZ125IN	BNSF	5738	Fox Valley	ES44AC	Tripp	Sep 27, 2011 1:46:45 AM
E-8A-6018F	6018		DN163K0A	Southern Pacific	6018	Kato	E-8A	Tripp	Sep 28, 2011 4:24:03 AM
E-8A-6018R	6018		DN163K0A	Southern Pacific	6046	Kato	E-8A	Tripp	Sep 28, 2011 4:20:26 AM
SD-40-2-6340	6340		DN163K1B	BNSF	6340	Kato	SD-40-2 Snoot nose	Tripp	Sep 28, 2011 1:41:32 AM
B23-7-6390	6390		DN163A0	Santa Fe	6390	Atlas	B23-7	Tripp	Sep 27, 2011 2:13:43 AM
DD40X-6932	6932		4 function decoder (36-550)	Union Pacific	6932	Bachmann	DD40X	Tripp	Sep 28, 2011 5:01:14 AM
B23-7-7412	7412		DN163A0	Santa Fe	7412	Atlas		Tripp	Sep 27, 2011 2:34:49 AM
Zephyr 9900	9900		DN143P	Burlington	9900	ConCors	Zepher	Tripp	Sep 26, 2011 3:25:15 AM
SD70MAC-9959	9959		DN163K1B	BNSF	9959	Kato	SD70MAC	Tripp	Sep 27, 2011 8:02:09 PM

This table may be sorted by any column by clicking on the column header. This table presently is sorted by DCC address. If you want to edit a roster entry, then highlight the loco and select the task to perform, either from the menu or the decoder information area buttons.

decoder Information Area

	Displays the information about the current decoder selected.
	You may select the programming mode: **Programming Track** **Programming on Main** **Edit Only** allows you to edit the roster without programming the locomotive.
	Opens the **Default Programmer** for the selected decoder in the Roster List
	Opens the Labels & Media Window for the selected roster member. **Functions labels** TAB opens the Function labels pane which allows you to label throttle function buttons **Roster Media** TAB opens the

	Roster Media pane which allows you to assign an image to the roster entry
Throttle	Opens a **throttle** tool for the selected loco in the Roster List.

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

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 that 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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