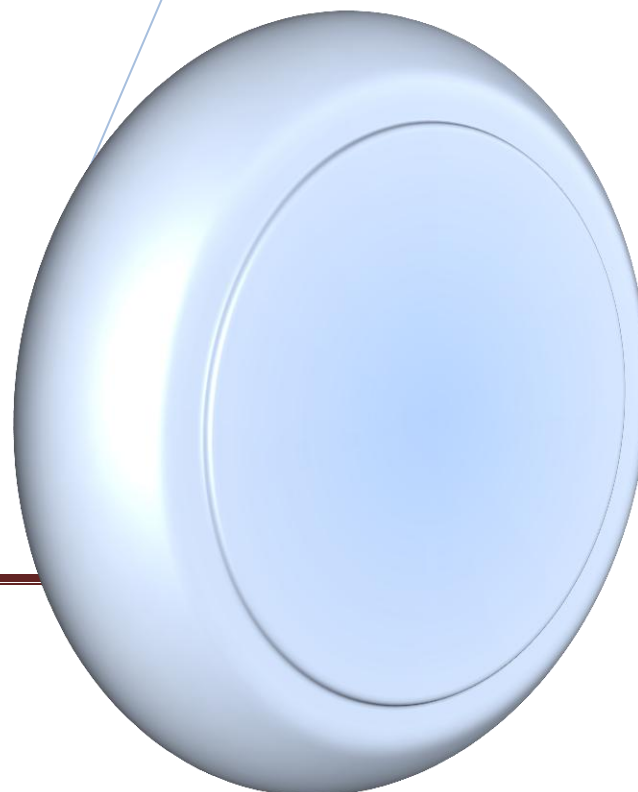


DecoderPro® 3.4 User's Guide

Version 3.4



8/29/2013



DecoderPro® 3.4 User's Guide

DecoderPro® Version 3.4 User's Guide

Revised 8/29/2013

JMRI® is a Java-based cross-platform application for model railroaders. JMRI® contains applications for:

The programming of Digital Command Control (DCC) decoders, (DecoderPro®).

Programming decoders and using throttle to run trains, DecoderPro3®

Drawing computer based panels for depicting a model railroad layout , and automated operation (PanelPro®).

Controlling the layout , (Layout Editor).

Creating train manifests for duplicating railroad operations, Operations

Controlling the signals on the layout

Controlling lighting and sound in the room, and so forth. (SoundPro®)

All this capability is contained in one program (JMRI®) which has several “start-up” screens for the various applications.

JMRI® 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:

java.sun.com/getjava/

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

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® 3.4 DecoderPro® from the online SHTML version.

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Revisions

Version	Revision Date	Editors	Major Revisions
original	9/4/2002	Joe Ellis	Bethlehem-Ares Railroad, a 1:160 Corporation
1.3	no date	Bob Blackwell	Updated to JMRI version 1.3
2.4	2/15/2009	Dale A. Tripp Bruce Shanks	Updated to JMRI 2.4, new sections added added Main Menu information added Decoder Definition How to added Error code page
2.8	1/15/2010	Dale A. Tripp Bruce Shanks	Updated to JMRI 2.8 Expanded Table of Contents with addition direct links Updated Comprehensive Programmer, moved Function Label pane to Advanced Programmer added Advanced Programmer features, including Roster Media pane Added Roster Group feature Updated decoder definition submission process Added Operations section
2.12	9/15/2011	Dale A. Tripp Bruce Shanks Walter Thompson	Updated to JMRI 2.12 Installation information added Contents updated to current functions
2.14.1	7/26/2012	Dale A. Tripp Bruce Shanks	Updated from JMRI 2.12
3.0	8/9/2012	Dale A. Tripp Bruce Shanks	Updated from JMRI 2.14.1
3.2	1/20/2013	Dale A. Tripp	Updated from JMRI® 3.0 and separated Operations to separate User's Guide
3.4	8/29/2013	Dale A. Tripp	Updated from JMRI® 3.2

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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 www.jmri.org/help/en/html/hardware/index.shtml

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

- Windows
- Mac OS X
- Linux

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Installing JMRI software

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

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

Getting Started with DecoderPro®

What is DCC?

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

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

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

What DCC systems will DecoderPro® work with?

Decoder Pro3® will work with the following DCC systems: (Which can select in preferences)

- Atlas
- Bachrus
- C/MRI
- CTI Electronics Acela
- CVP Products Easy DCC
- DCC Specialties
- Digitrax (Loconet)
 - Digitrax PR3 interface
 - RR-CirKits LocoBuffer-USB
 - LocoBuffer-II (LocoBuffer)
- ESU
- Fleischmann
- Hornby
- Lenz
- Lionel TMCC
- Maple Systems
- MERG CBUS
- NCE
- Oak Tree Systems
- Open LCB
- Pro Trak Grapevine
- QSI Solutions
- PI Engineering RailDriver
- Roco
- RPS
- SPROG
- SRCP
- Tams
- Uhlenbrock
- Vlessmann
- 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 www.jmri.org/help/en/html/hardware/index.shtml

What hardware do I need?

You will need 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 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.

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How do I start the DecoderPro® program?

Once you have downloaded the DecoderPro® software and installed it, simply open the program in the usual manner for your operating system, windows will show icon on desktop.

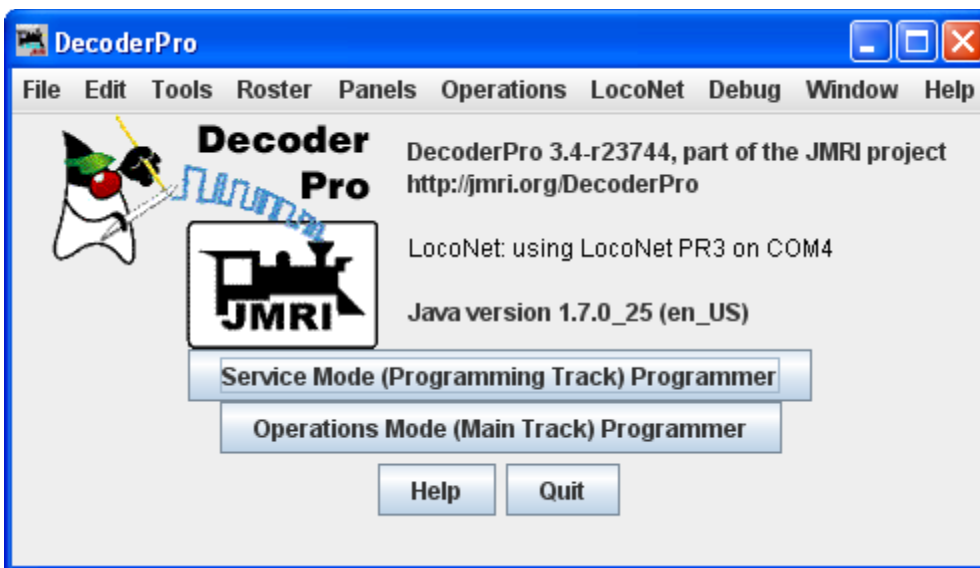


Double click on the icon for the program to open, in this case we will open DecoderPro®

This dialog will appear briefly as the program is loading.



You should see this or a similar opening screen displayed after program starts:



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

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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 set up my preferences?

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

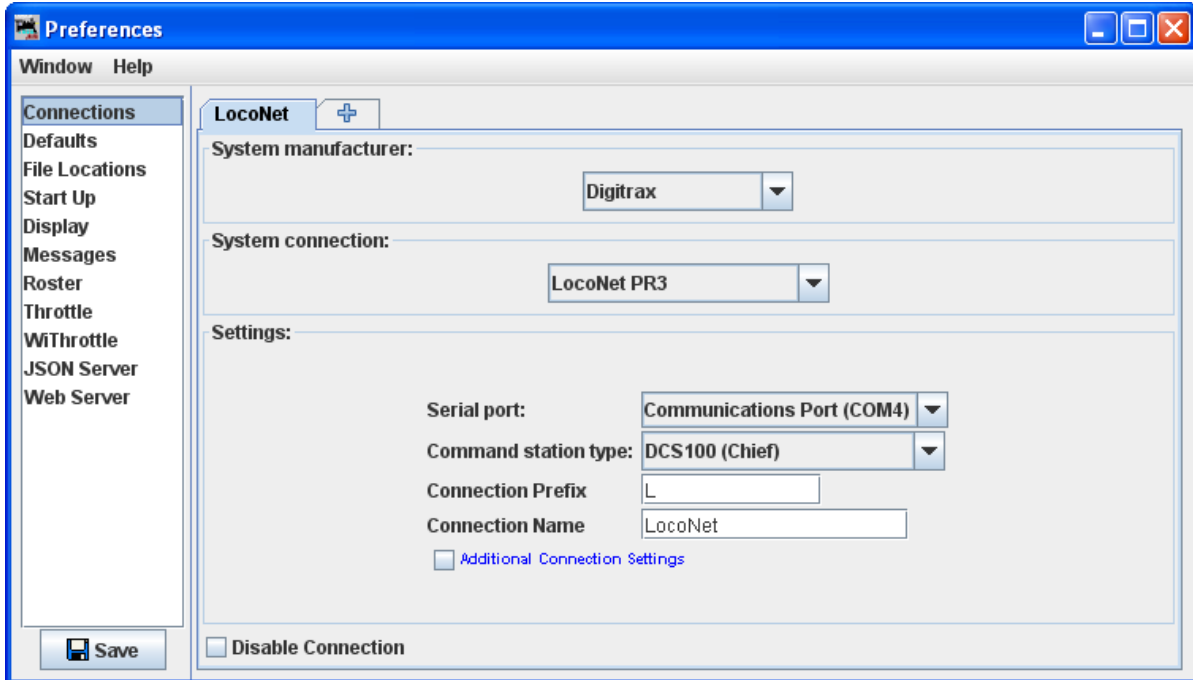
As a first time user the most important information is the **Connections** screen where you describe how the computer will talk to the command station. Most of rest you can leave at the initial or "default" settings until you find a need to change things to suit your fancy.

Most importantly, you must click Save button 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.

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

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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
JSON Server	Opens JSON Server Preference settings pane
Web Server	Sets up the Decoder Pro® miniServer

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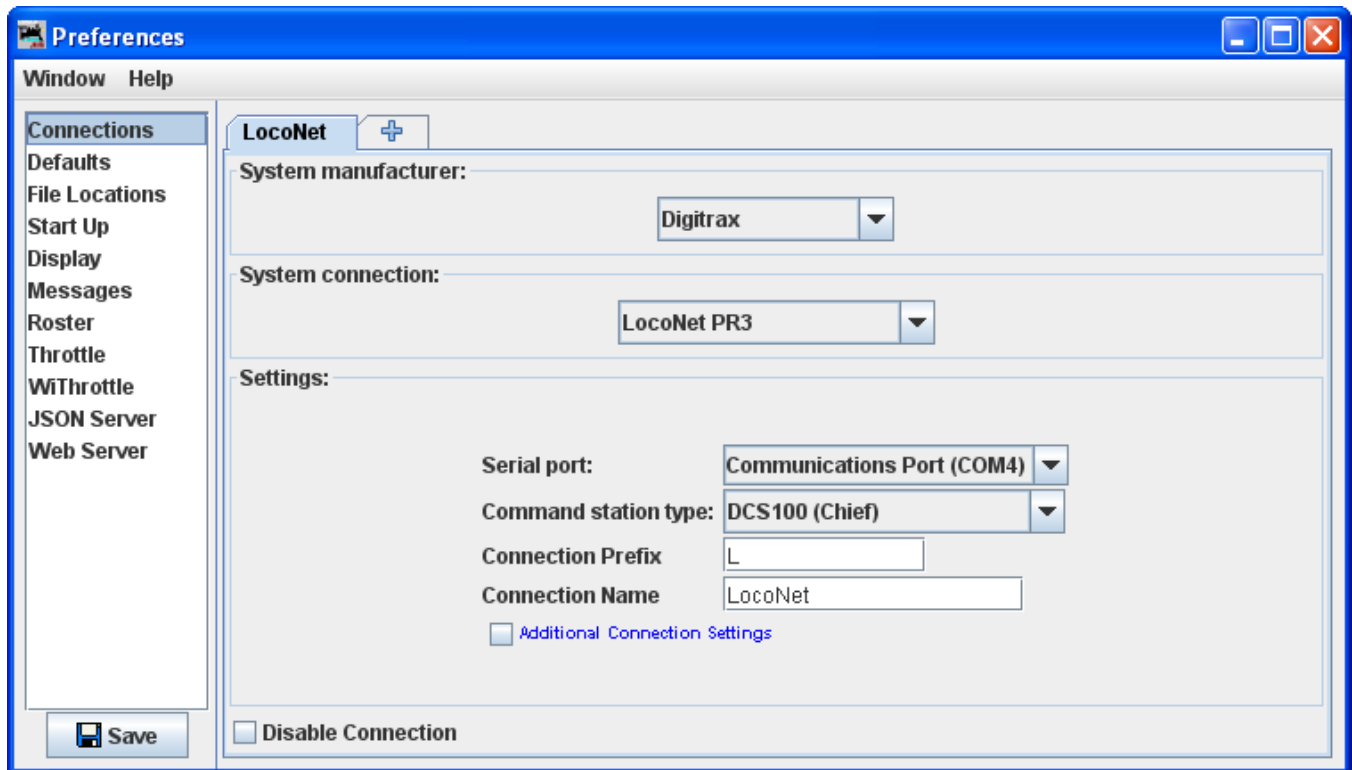
Now we will set up preferences for the JMRI environment with your command station.

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.

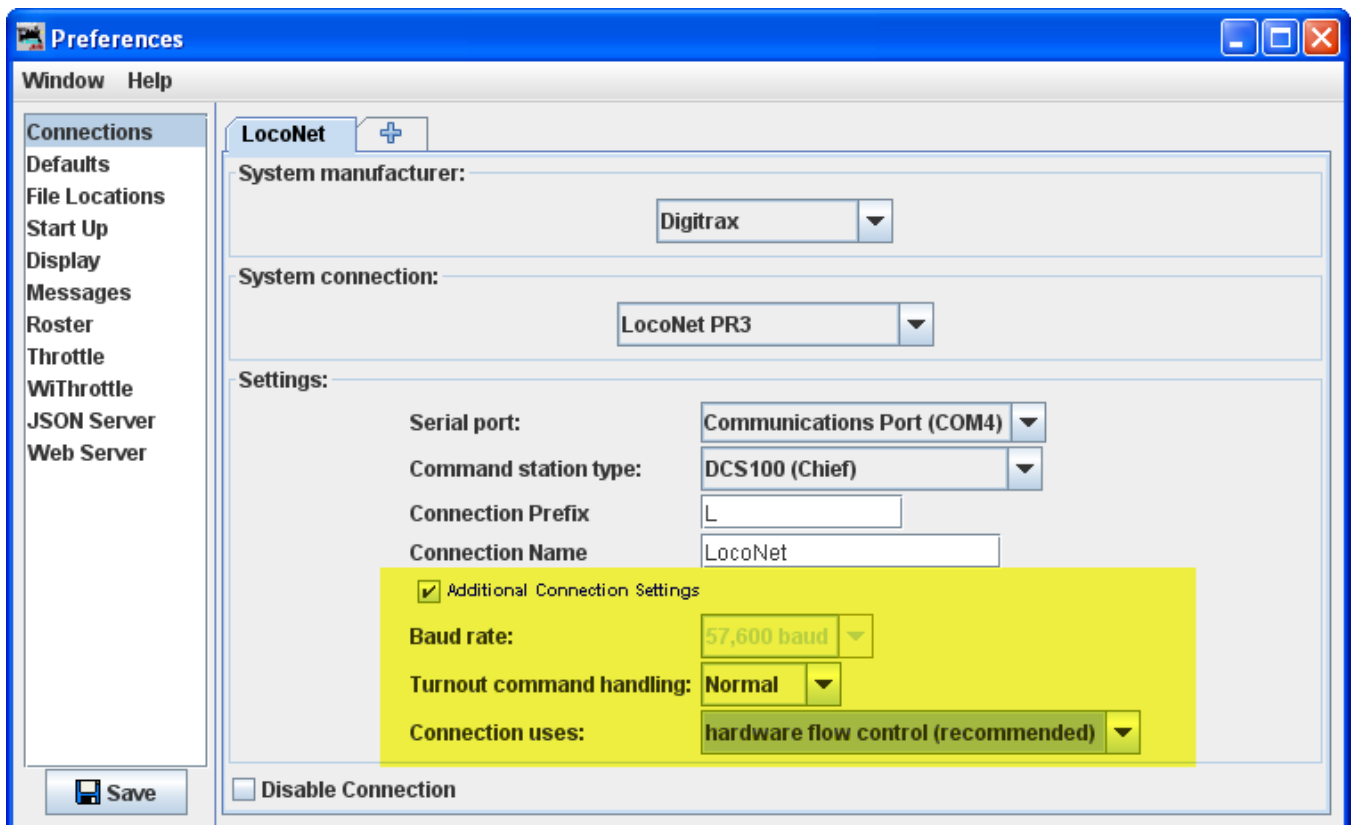


System manufacturer:	Drop-down list with all the supported DCC manufacturers, select the manufacturer of your system.	
System connection:	Drop-down list with all of the supported DCC system interfaces supported by the manufacturer that you selected, select the interface that you are using.	
Settings: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

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		selection if there are more than one possibility. possibility 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
	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:

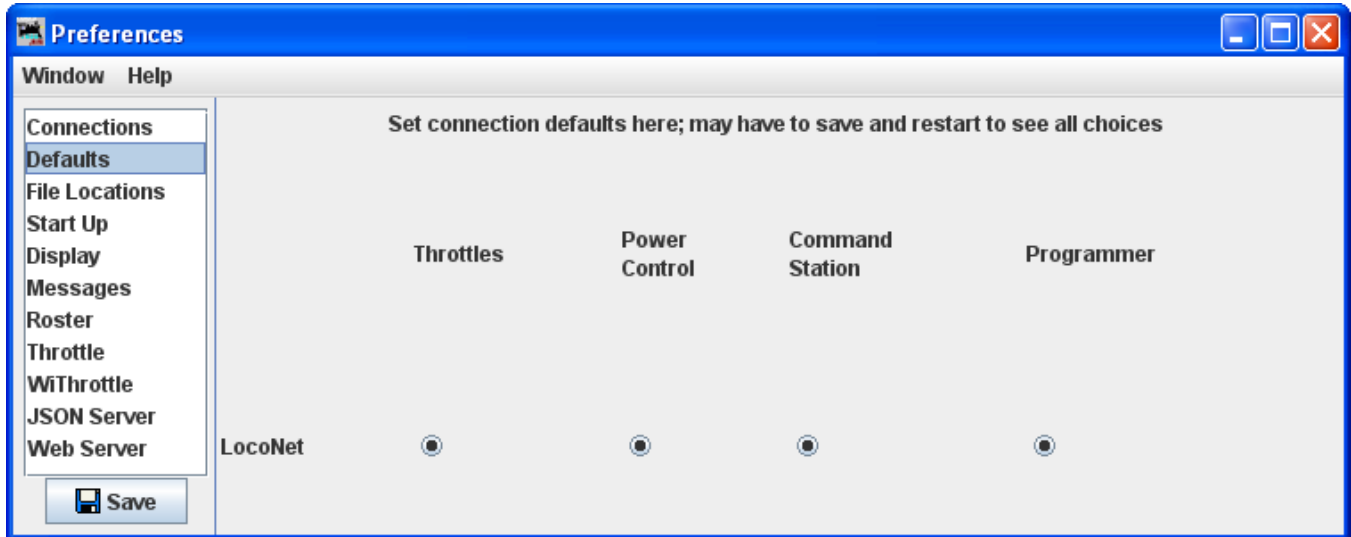


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The **Disable Connection** button will disable all the connection settings.

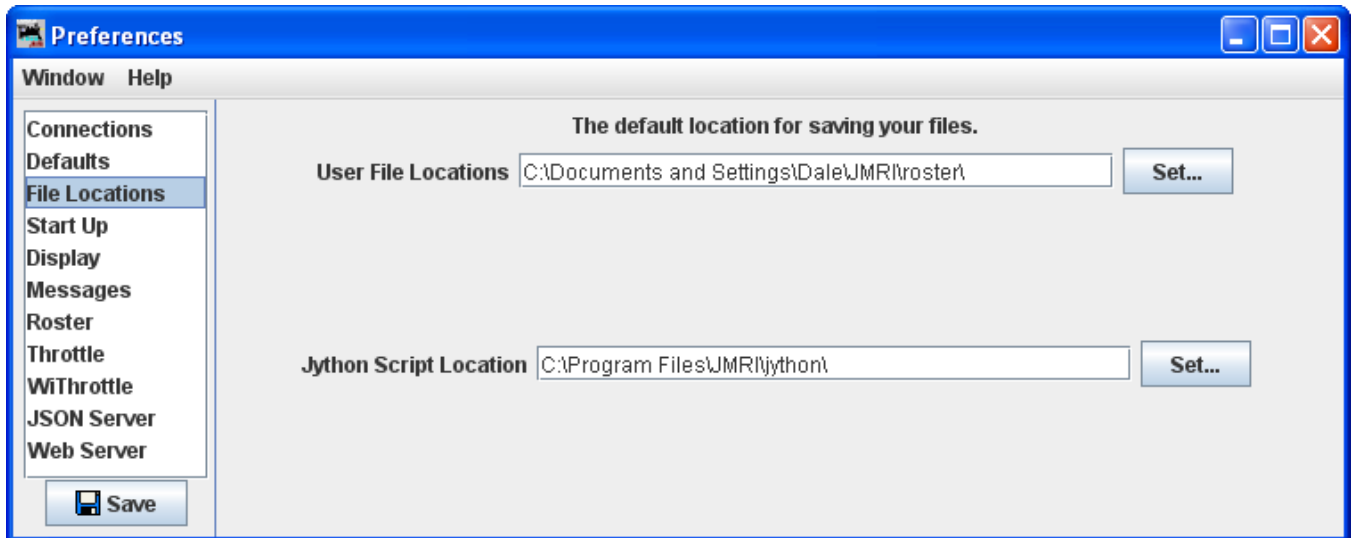
The **Delete Connection** button will delete all the connection settings.

Defaults Pane



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

File locations Pane

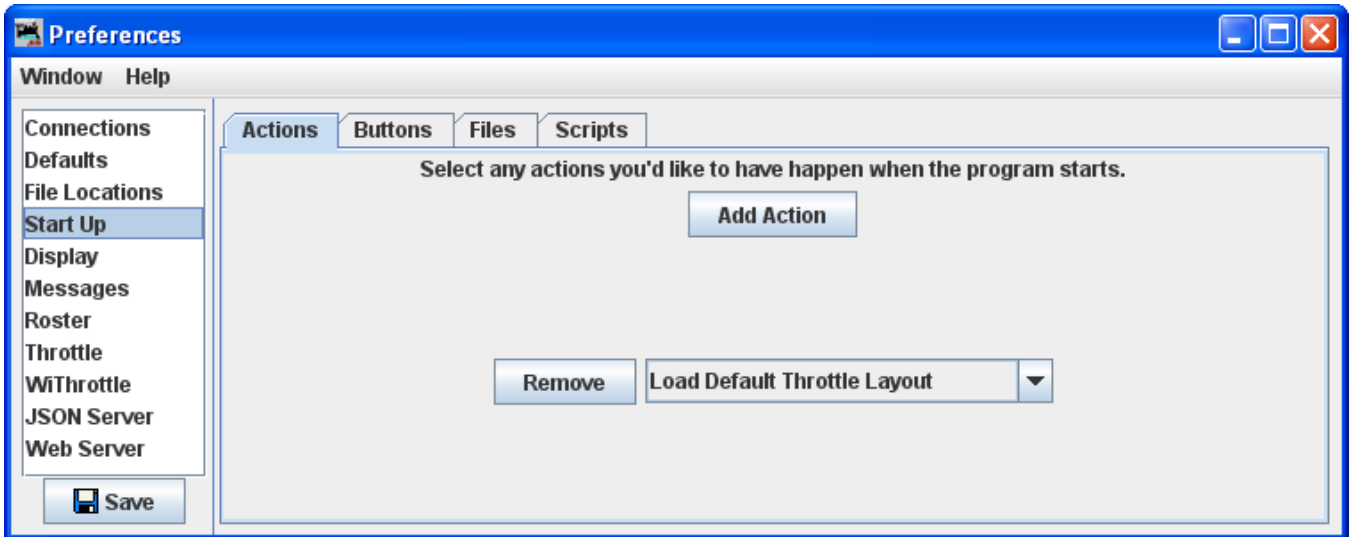


User File Locations	Select the location for your user files on your system
----------------------------	--

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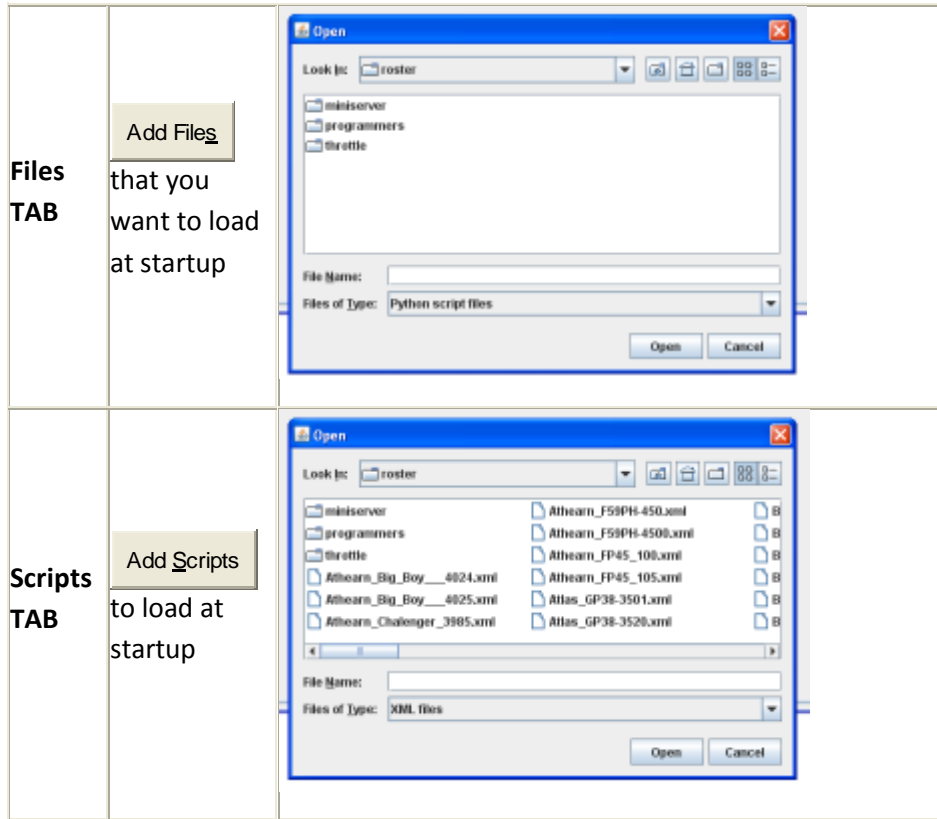
Jython Script Location	Set the location of Jython Script files
-------------------------------	---

Start Up Pane

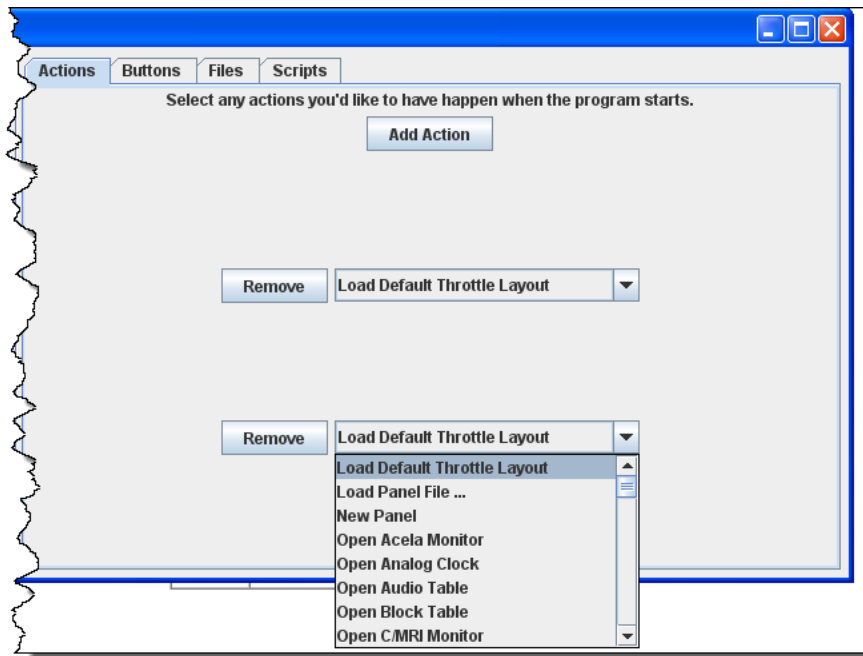


Actions TAB	<p>Add Action to set up a Startup action</p>	<p>Remove Load Default Throttle Layout</p> <ul style="list-style-type: none">Load Default Throttle LayoutLoad Panel File ...New PanelOpen Acela MonitorOpen Analog ClockOpen Audio TableOpen Block TableOpen C/MRI Monitor
Buttons TAB	<p>Add Button to the toolbar of DecoderPro3</p>	<p>Remove Load Default Throttle Layout</p> <ul style="list-style-type: none">Load Default Throttle LayoutLoad Panel File ...New PanelOpen Acela MonitorOpen Analog ClockOpen Audio TableOpen Block TableOpen C/MRI Monitor

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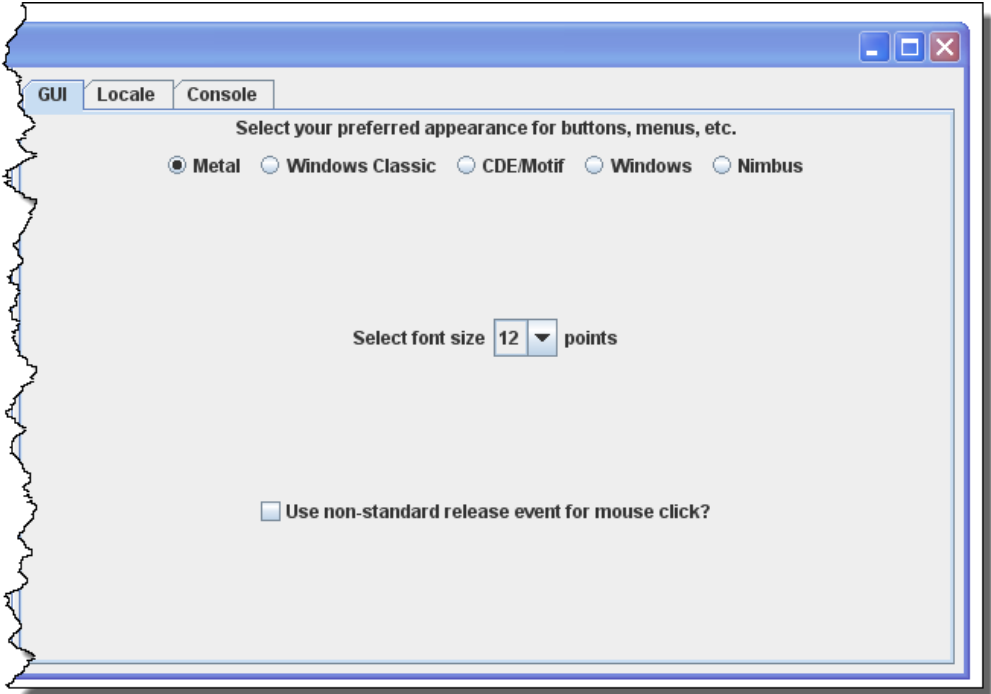
You may add as many items as you want to open on start up. Example of **Actions**



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

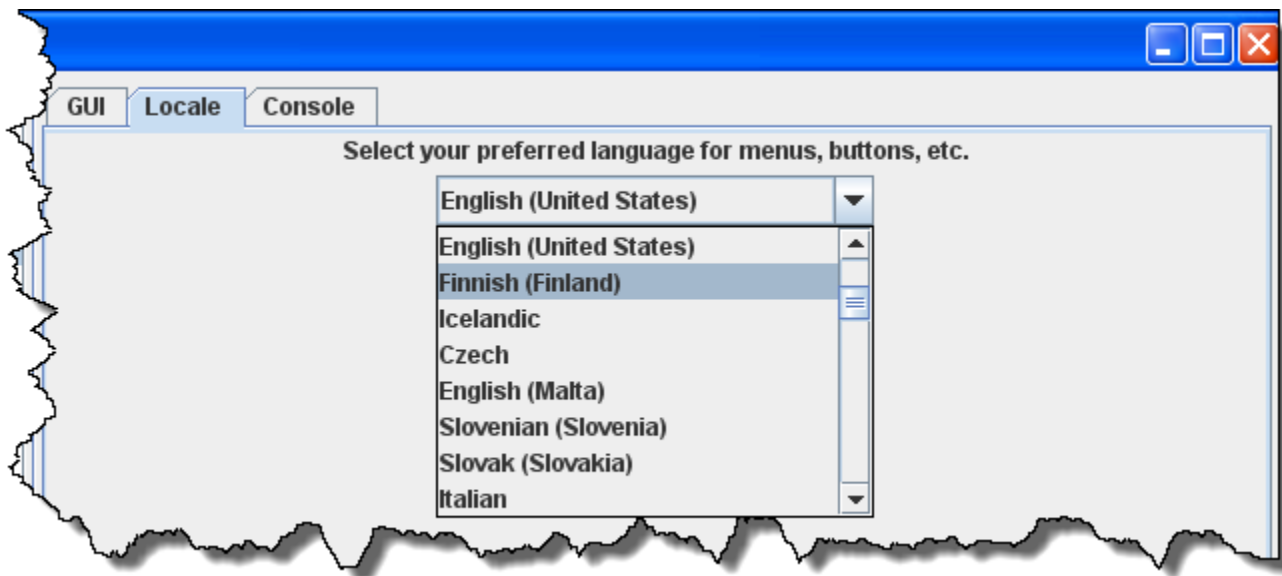
Display Panes

GUI TAB



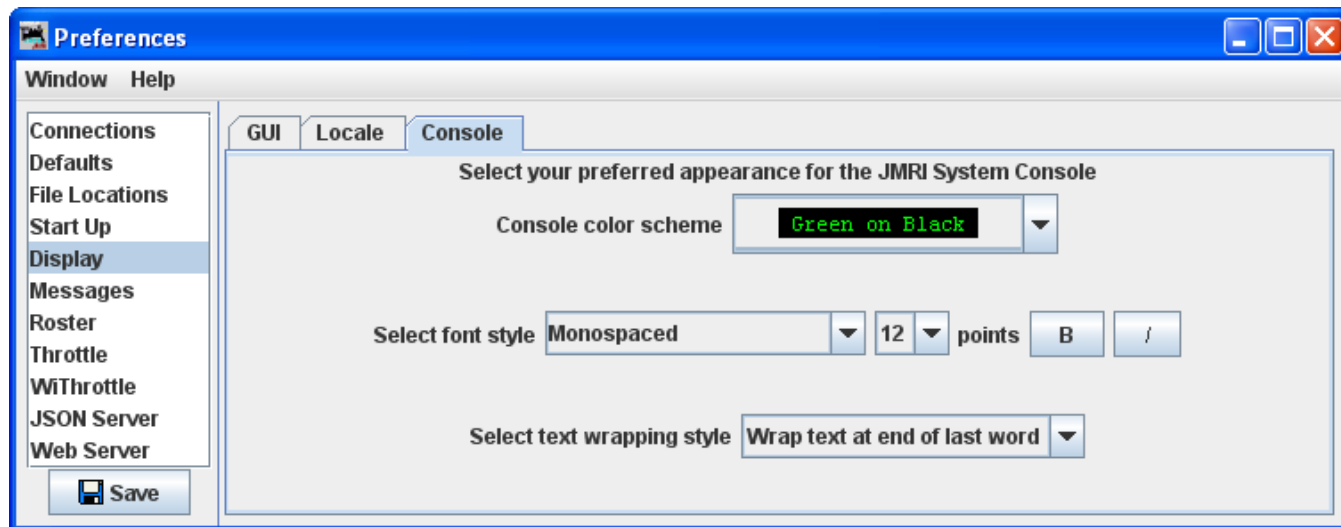
Select your preferred appearance for buttons, menus, etc.	<input checked="" type="radio"/> Metal
	<input type="radio"/> Windows Classic
	<input type="radio"/> CDEMotif
	<input type="radio"/> Windows
	<input type="radio"/> Nimbus
Select font size in points	<input type="text" value="12"/> select font size
<input type="checkbox"/> Use non-standard release event for mouse click?	

Locale Pane



Drop-down list to select your location and language

Console Pane

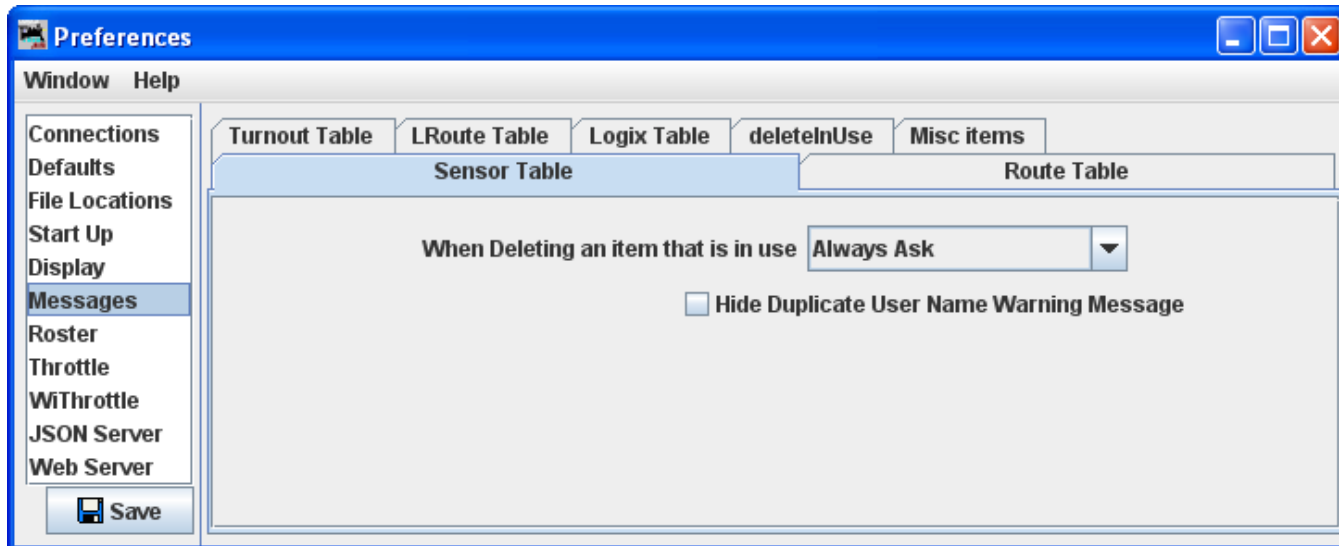


Display settings for the JMRI system console.

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Messages Panes

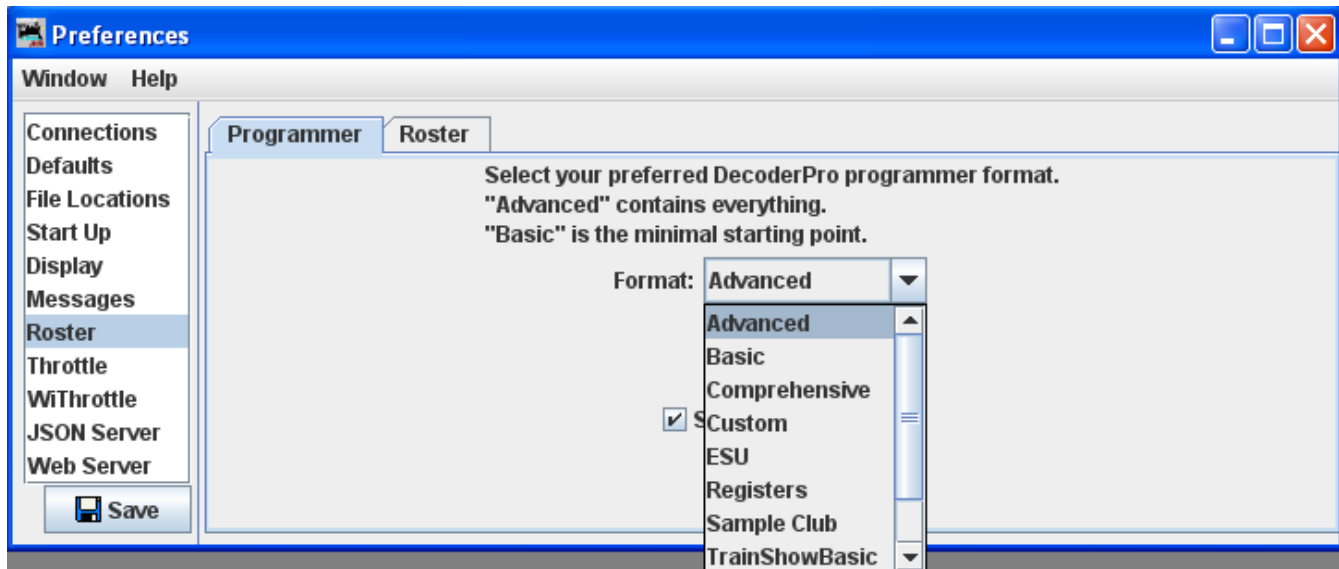
TABS and selections can be used to set how and when messages are displayed.



Roster Panes

Programmer Pane

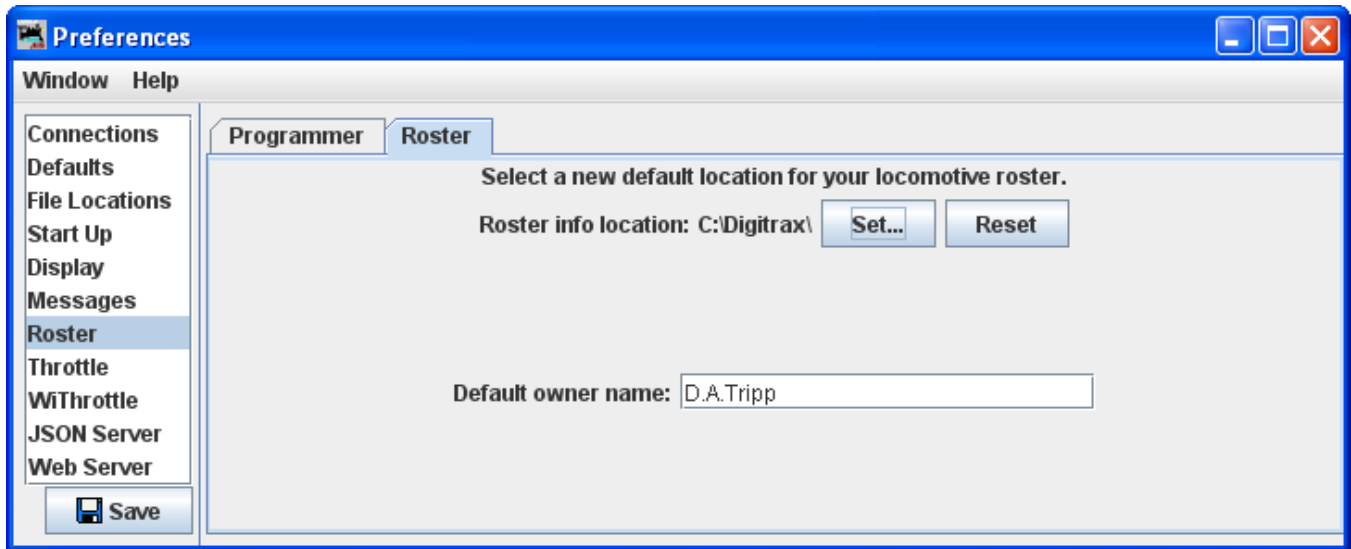
Used to set the preferred decoder programmer.



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Roster Pane

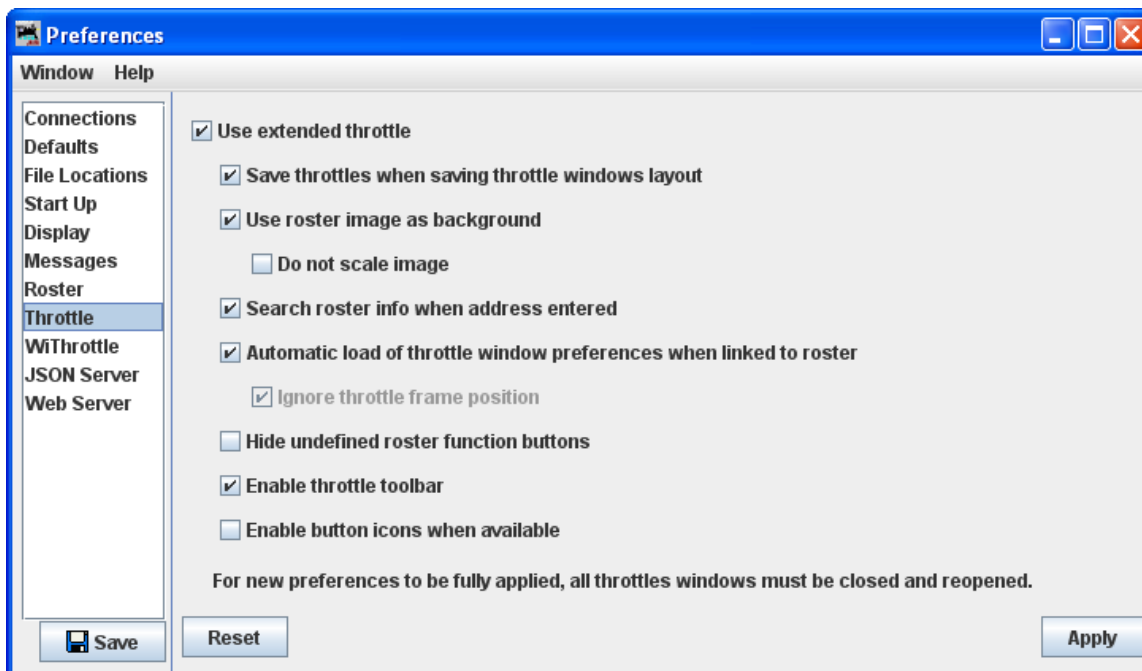
You may set the default location of the locomotive roster and the default owners name.



Note that I do not use the default roster file location. This location is a Network accessible location for my three systems and WiFi connection.

Throttle Pane

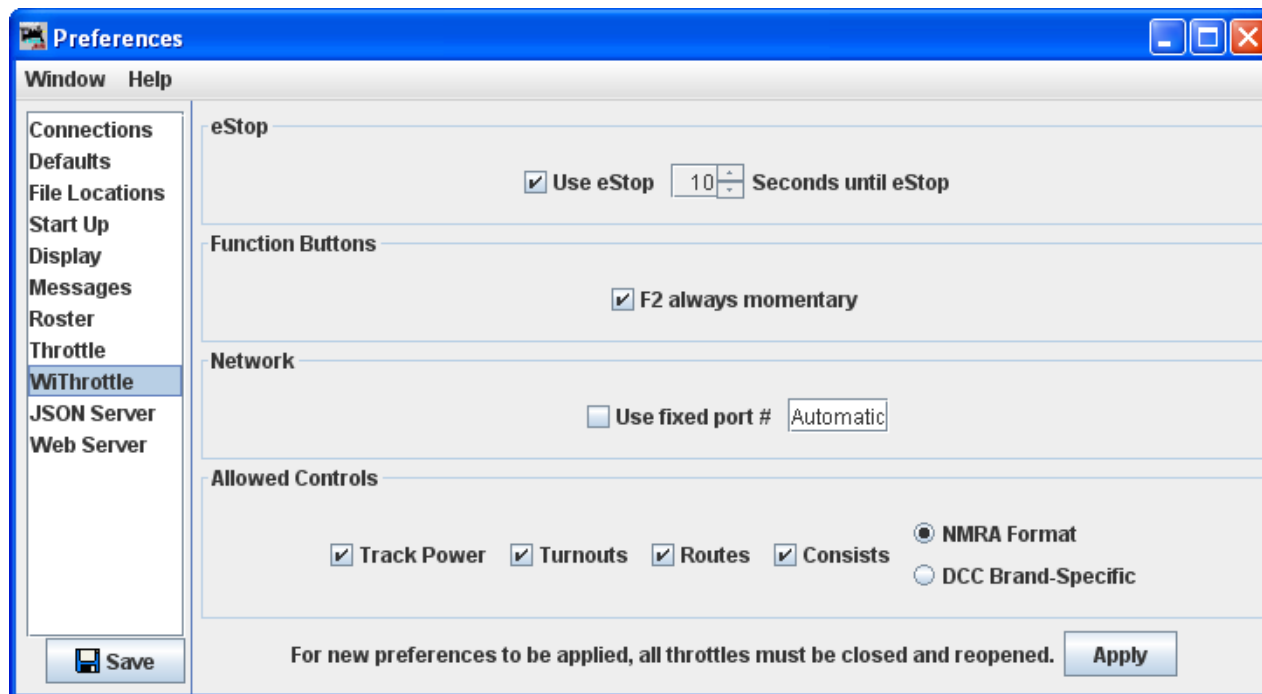
Select throttle startup conditions, shown are defaults, but you may change the settings.



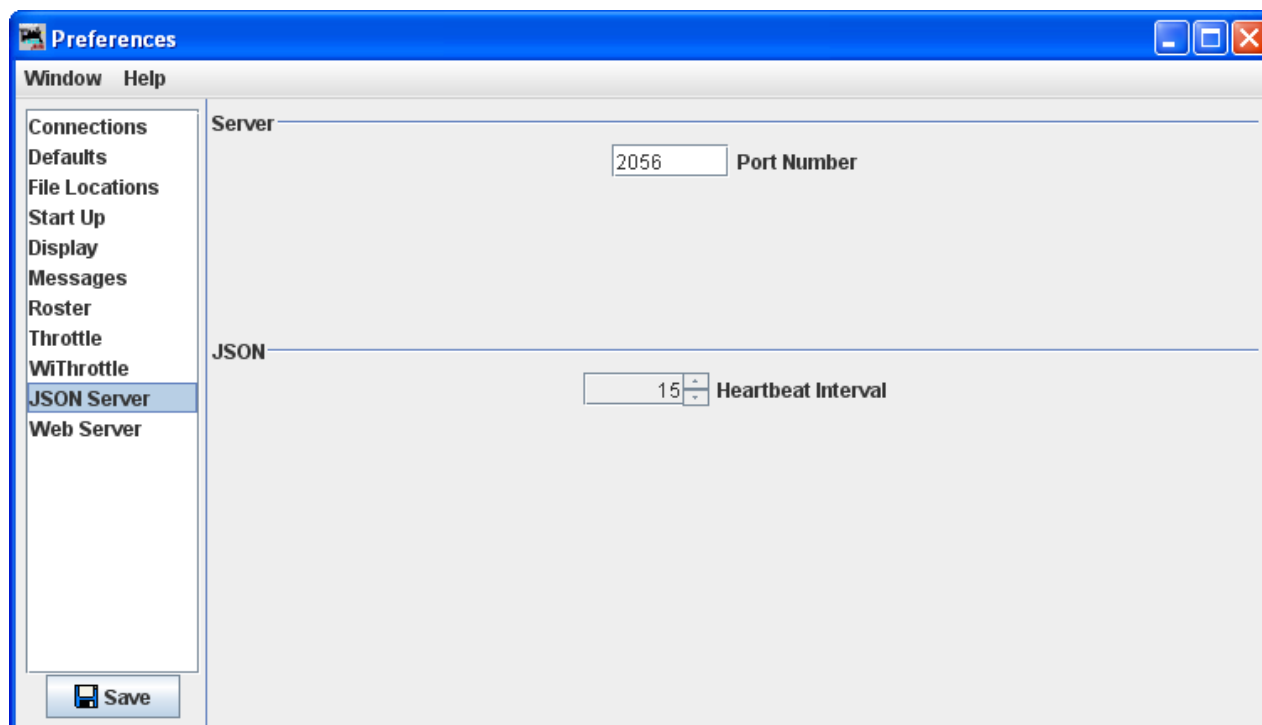
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WiThrottle Pane

This pane allows WiThrottle users to customize the setup.



JSON Server Pane

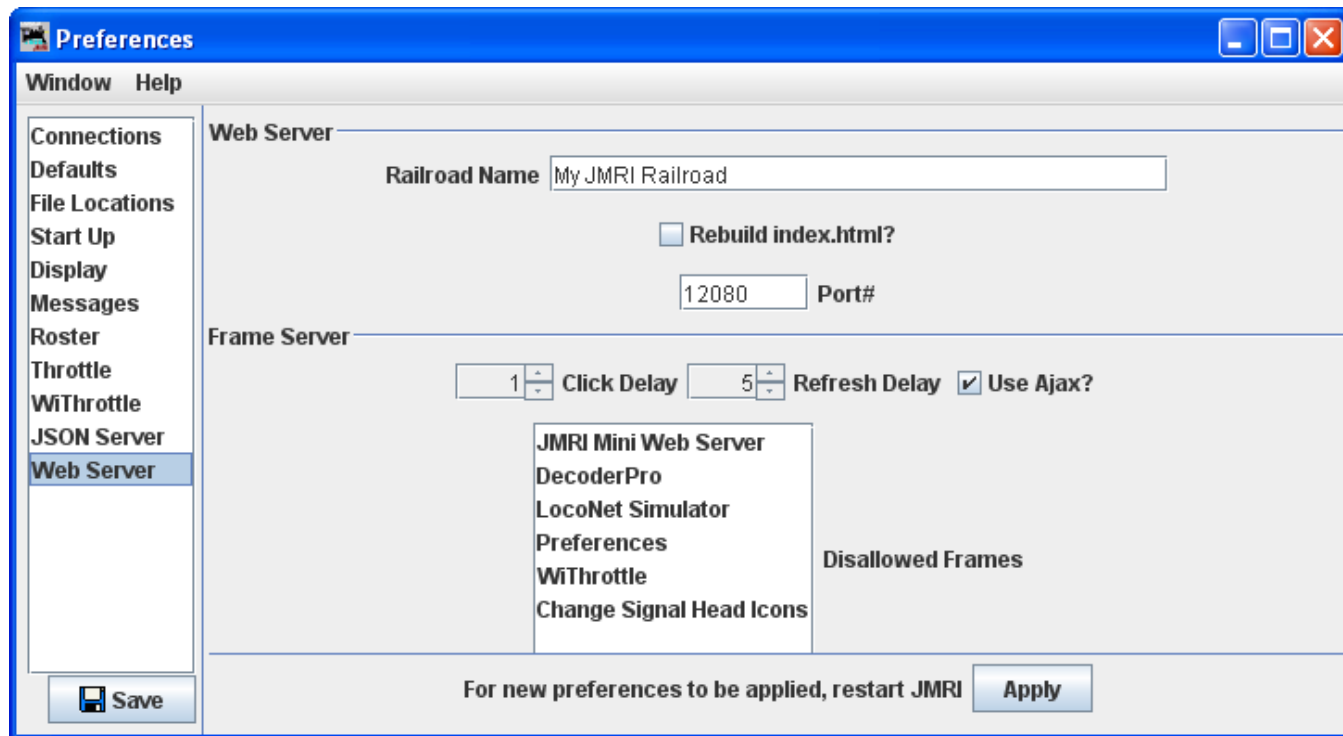


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Web Server Pane

Use this pane to setup Web Server 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.

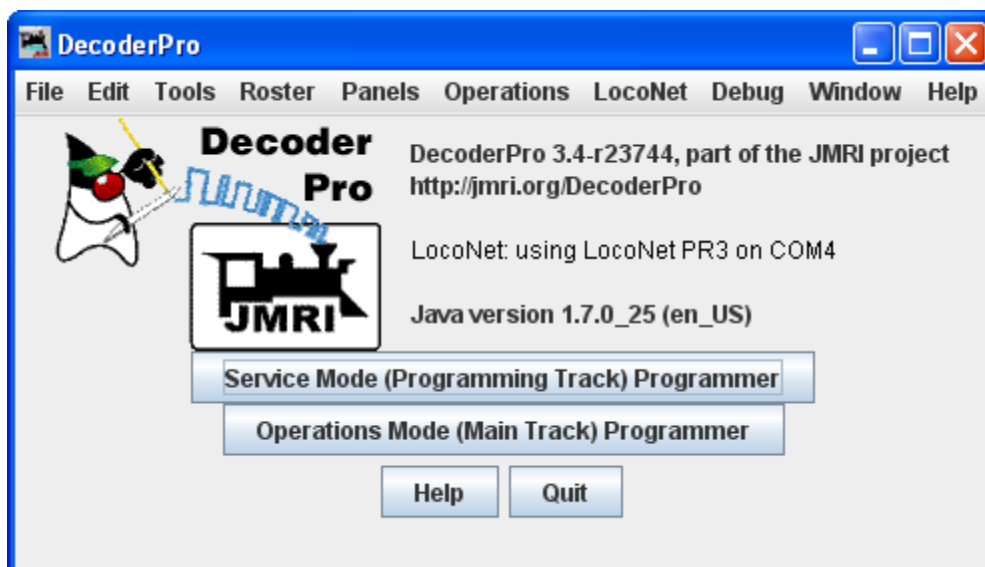
YOU MUST RESTART DECODERPRO FOR PREFERENCES TO TAKE EFFECT

Using DecoderPro®

How do I set up to program a decoder?

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

On opening DecoderPro, the main page will be displayed: (After preferences are set)



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

Service Mode (Programming Track 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

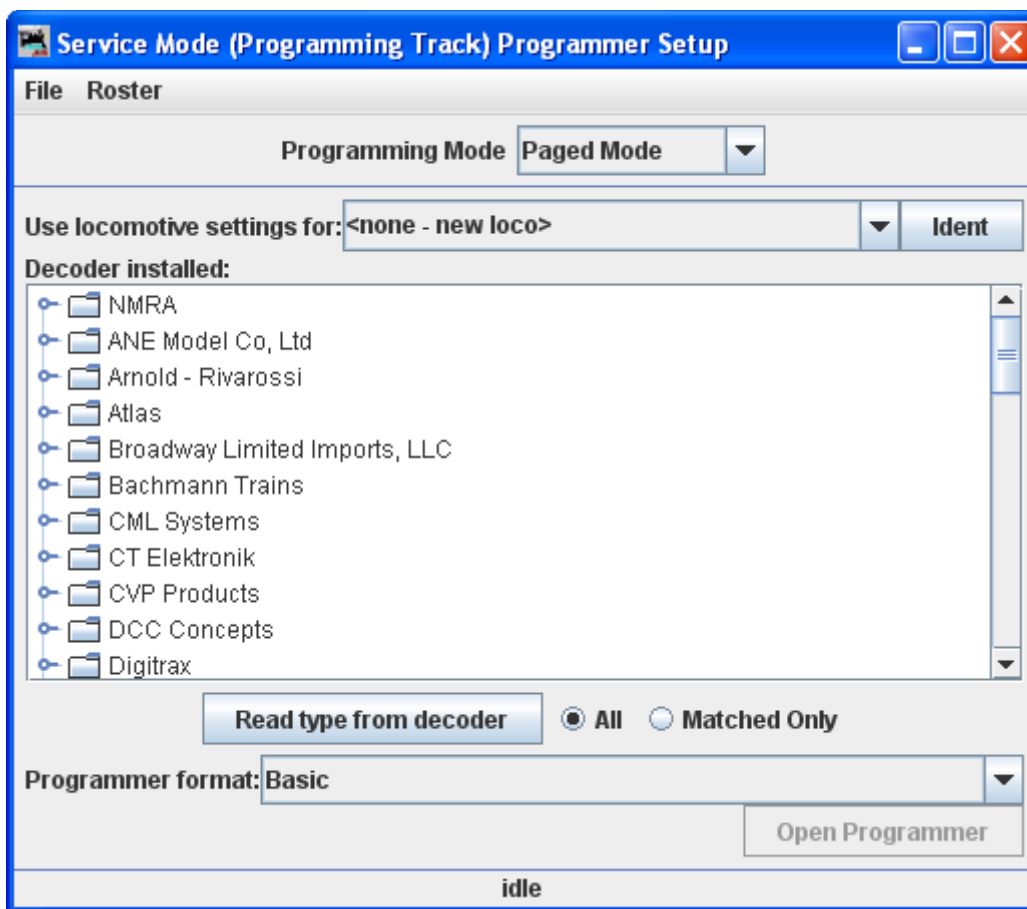
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questions, since it got the *yes* answer to the last question. This can take a bit of time since the command station must ask all possible values waiting for the *yes* response. You can observe the process by looking down at the bottom line of all 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 button** and the Service Mode Programmer (Programming Track) Setup window opens

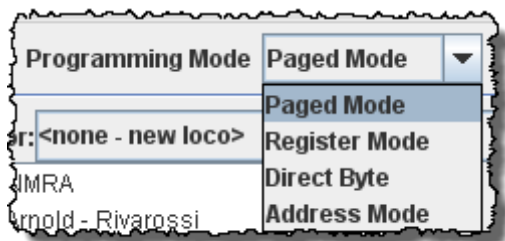


The first item at the top of the service mode programmer pane is a selection for the mode used to program your decoders. This is a legacy to the olden times and rather technical, but fortunately DecoderPro has matured to the point that it is quite good at selecting the best mode for you. It uses the

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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.

Programming Modes



Some brief comments on Programming Modes

Paged Mode

is an expansion of Register mode that gives full access to all decoder CVs.

Register Mode

is an expanded form of Address Mode, and is still used by some older and/or lower end decoders, particularly some from MRC and Wangrow. It is inherently limited in its ability to access all CVs in a decoder.

Direct Byte

is another method, not yet supported by all decoders, that allows full access. There are two ways of implementing Direct Mode. The Direct Byte method(s) your command station supports will be activated.

Address Mode

is an outdated programming method that is included here for the sake of full compliance with the NMRA DCC standard.

If you experience difficulty programming a decoder in Paged Mode, try Direct Byte, then Register Mode, and finally Address Mode. The EasyDCC AD4 Accessory Decoder can only be programmed in Direct Byte.

Identifying Decoder

Now let's determine the type of decoder that's installed in the locomotive that you would like to program.

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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 its manufacturer and firmware version are. The first method is **IDENT**, and the other is **READ TYPE**. You can use one or the other, but they are mutually exclusive.

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

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

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

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

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

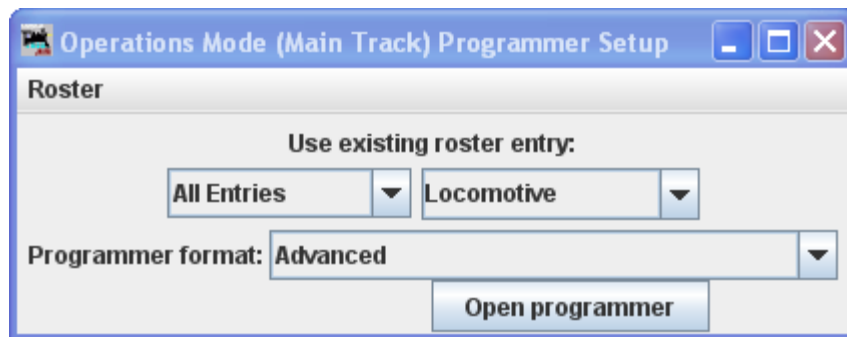
Once you have selected a decoder, or Decoder Pro has done it for you, the **Open Programmer** button will become activated and you'll be able to move on with Service Mode Programming.

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

Operations Mode (Main Track) Programmer

Ops Mode Programming

Operations Mode (Main Track) Programmer - or **Programming on the main (POM The Operations Mode (Main Track)** window is opened to allow you to 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. There also a risk of programming other locomotives inadvertently.



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".

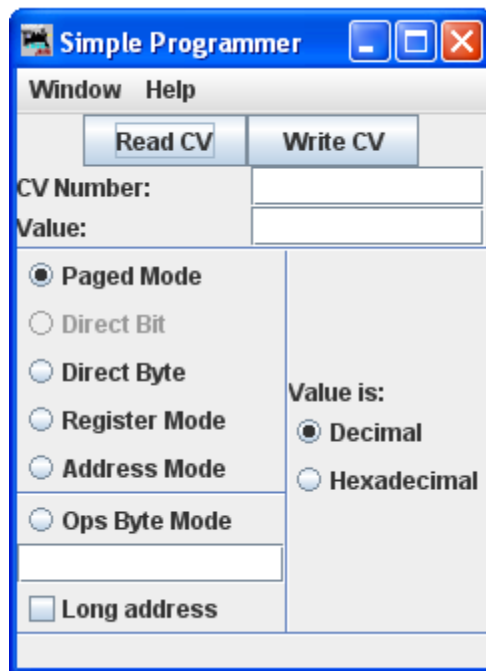
Some command stations will only "broadcast" programming commands, which can mean every locomotive on the layout gets the same programming! If in doubt, check your documentation.

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**.

Additional programmers that is available.

Single CV 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.

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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:

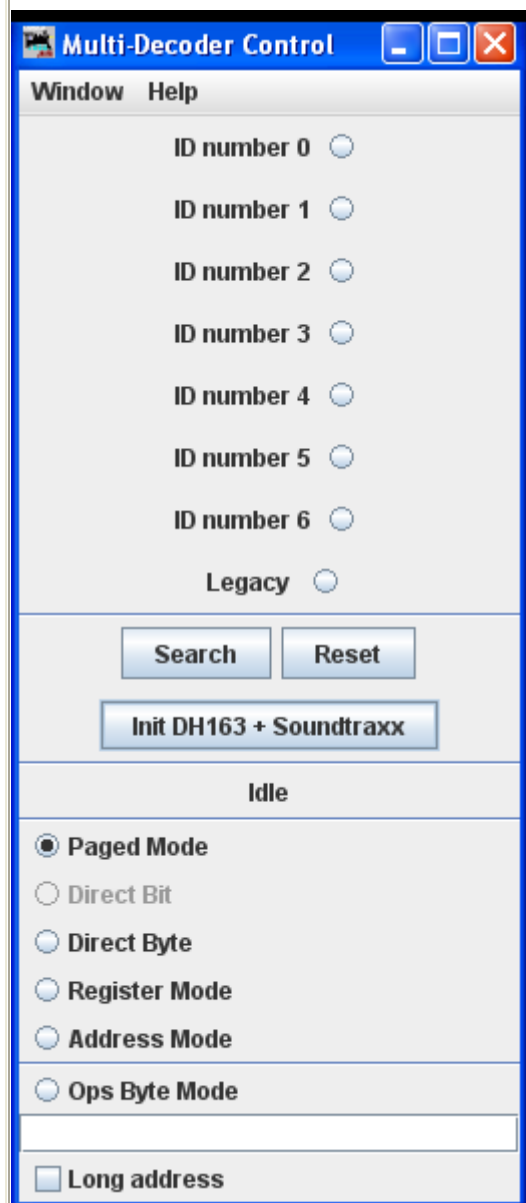
- motor decoder value of 1
- sound decoder value of 2
- function only decoder value of 3
- other uses values of 4 thru 7

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.

to unlock one of them. The Multi Decoder Control is the tool for that.

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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.

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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.

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

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What are the Programming Modes?

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

On opening DecoderPro, the main page will be displayed



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

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

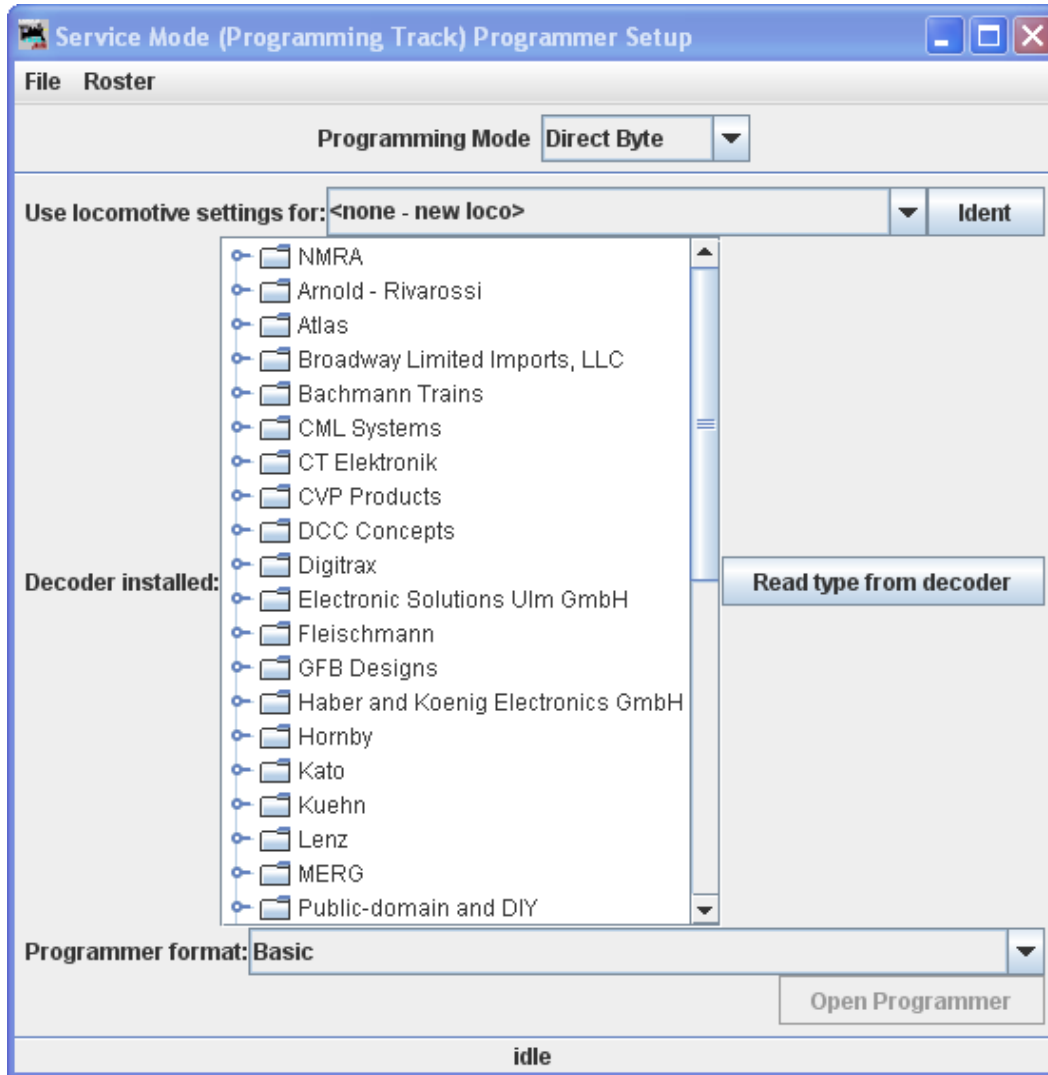
Operations Mode (Main Track) Programmer **Operations Mode (Main Track) Programmer** - or **Programming on the main(POM)**. This lets you program a specific decoder on the layout, even while it is operating.

Help button- Accesses the help files

Quit button- Exits the program.

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

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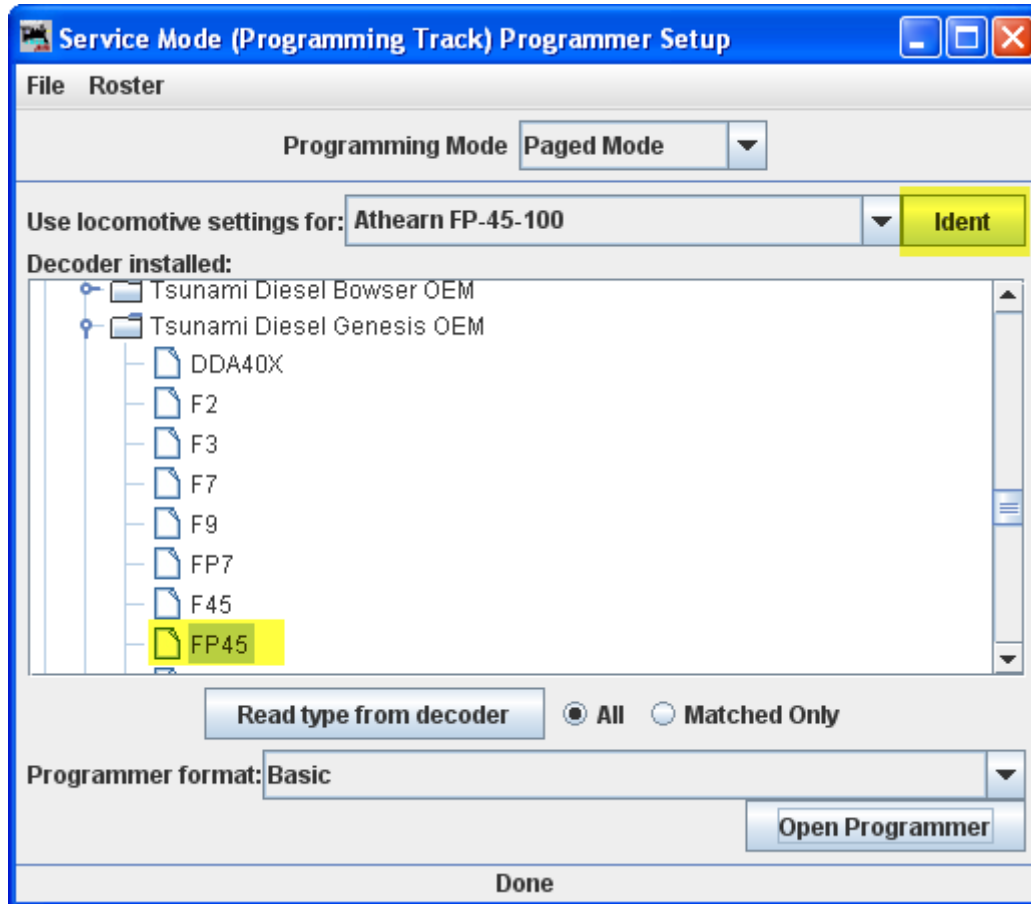


The first item at the top of the service mode programmer pane is a selection for the mode used to program your decoders. This is a legacy to the olden times and rather technical, but fortunately DecoderPro has matured to the point that it is quite good at selecting the best mode for you. It uses the 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 its manufacturer and firmware version are. The first is method is using **Ident** button,

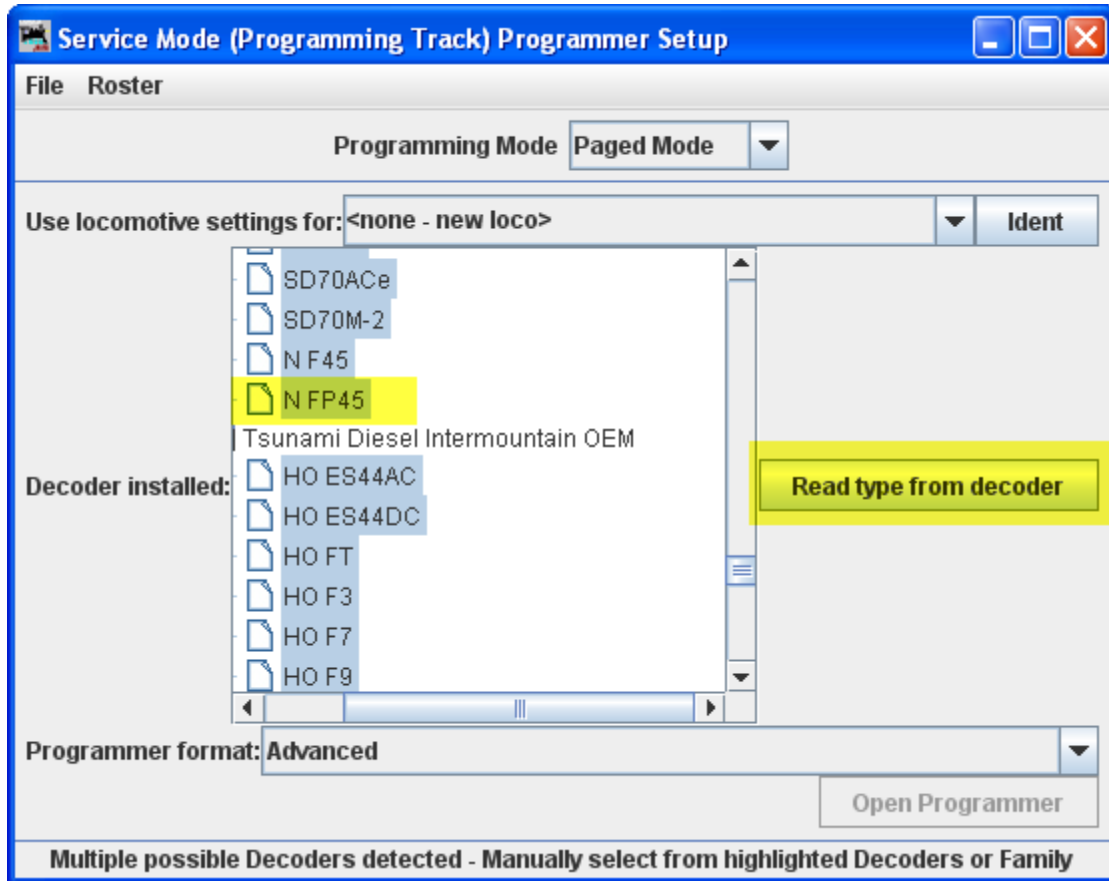


The **Ident** button was clicked and the locomotive was located on the programming track, in this case an Athearn N Scale FP-45 locomotive with OEM Tsunami Sound decoder which is the Roster.

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

The other is use the Read type from decoder button. You can use one or the other, but they are mutually exclusive.

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READ TYPE is the other method located in the center of the page. If you click on **the 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

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

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

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

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

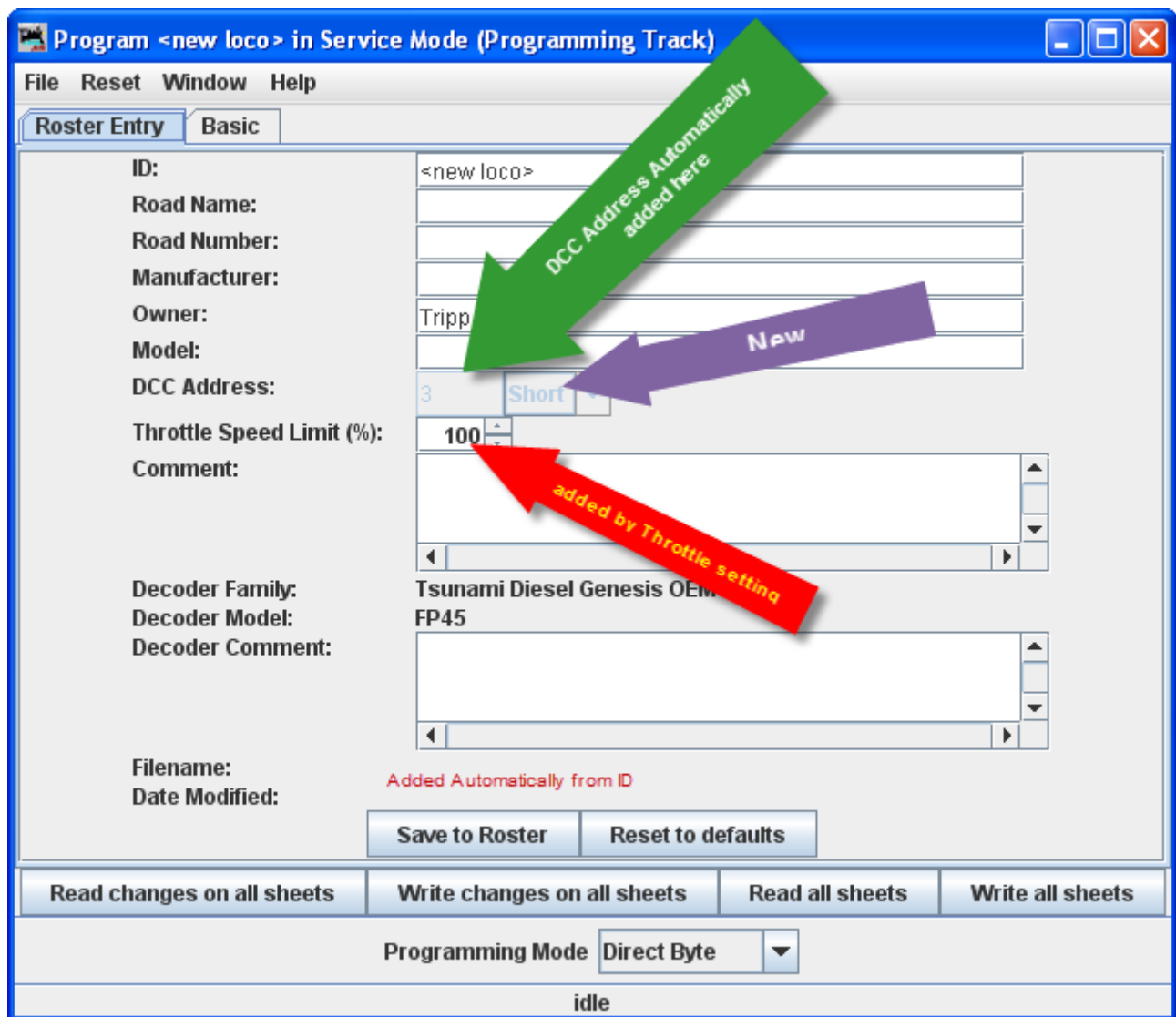
Now let's open the **Basic Programmer**, which is now completely set-up with a decoder and the Basic programmer is selected.

The Basic Programmer

The Roster Entry Pane

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

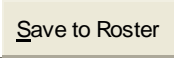
A **roster** is a database of all locomotives that your installation of DecoderPro® has programmed. All of this information will be contained in the list on the DecoderPro3 main page. It includes the information seen in the screen below:

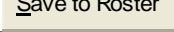


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Most of these fields are self-explanatory. However, note that the first field (**ID**) becomes the file name in the Roster for the locomotive you are programming. Set up a schema to identify your locomotive to its decoder program. i.e. Mfr, Loco Type, and Address (Kato_SD40-2_5645). Spaces in the ID field will be changed to underscores (_) when the file is written. In a club environment, often the ID begins with the owner's name, or member number. This way the Roster (which is sorted alphabetically) will keep all of an owner's locomotives listed together.

The **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.

 Save to Roster

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.

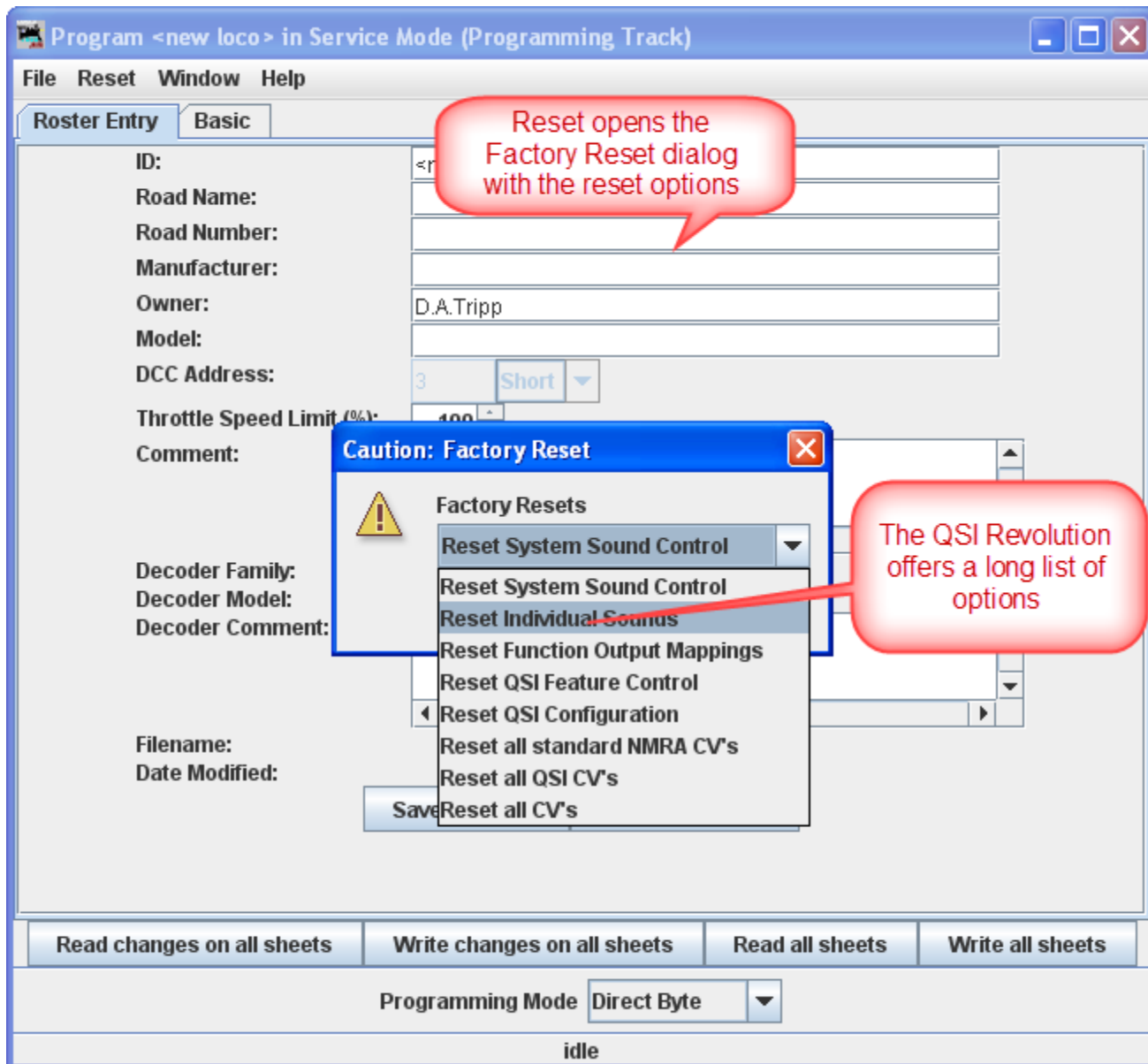
 Reset to Defaults

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:

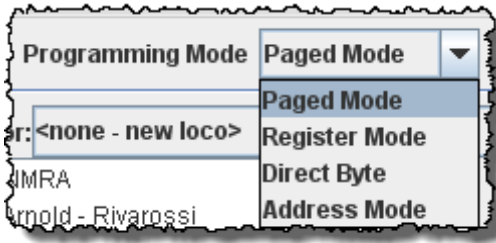
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You will note that the decoder address is shown but grayed out (or blank if this is a new locomotive in the roster). This field is automatically filled in by the program and is determined from the address entered using the **Basic** tab which we will 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 selecting mode from drop-down list at the bottom of the window. To the left of the Drop-down list is the current programming mode that is selected.

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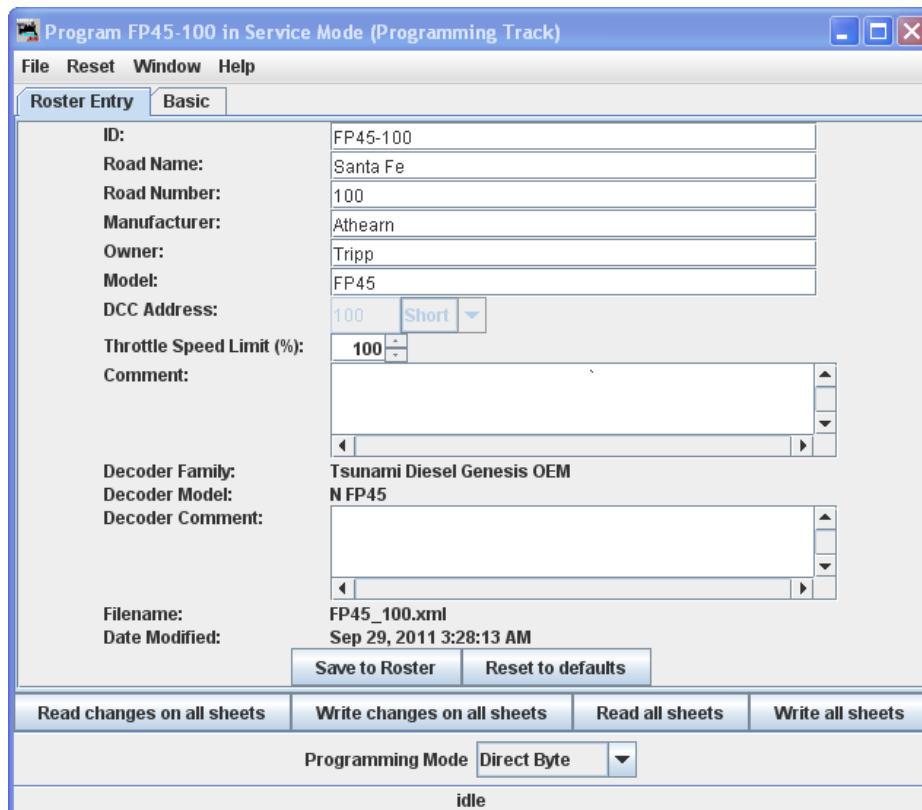


There are several programming modes. JMRI now selects the best mode for you. It determines this from the command station type you are using and the decoder model you are attempting to program. Usually this will be OK. If you find that you are having a problem with programming you may try a different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

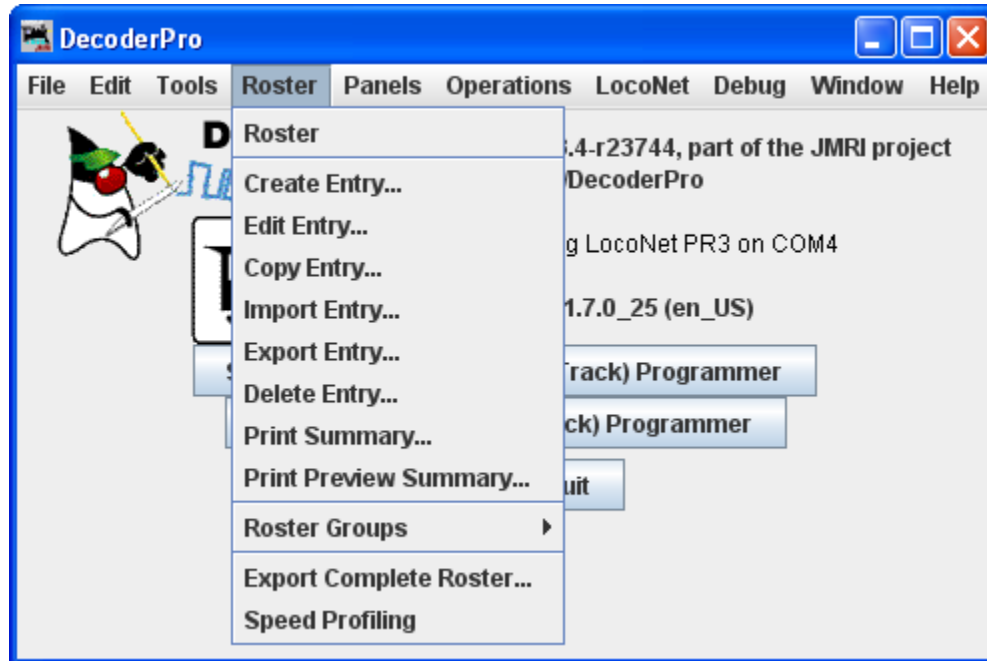
For most newer decoders, stay with **Paged mode** or whichever Direct mode your Command Station supports. Your decoder documentation should let you know if programming in some other mode is necessary... but if you are having problems, experiment. If a mode is not supported for the selected decoder and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

When you make your selection, the programming mode should now display to the left of the drop-down list.

Basic Programming Roster is setup for Athearn FP45 n scale with Digitrax Tsunami Diesel Genesis OEM decoder.



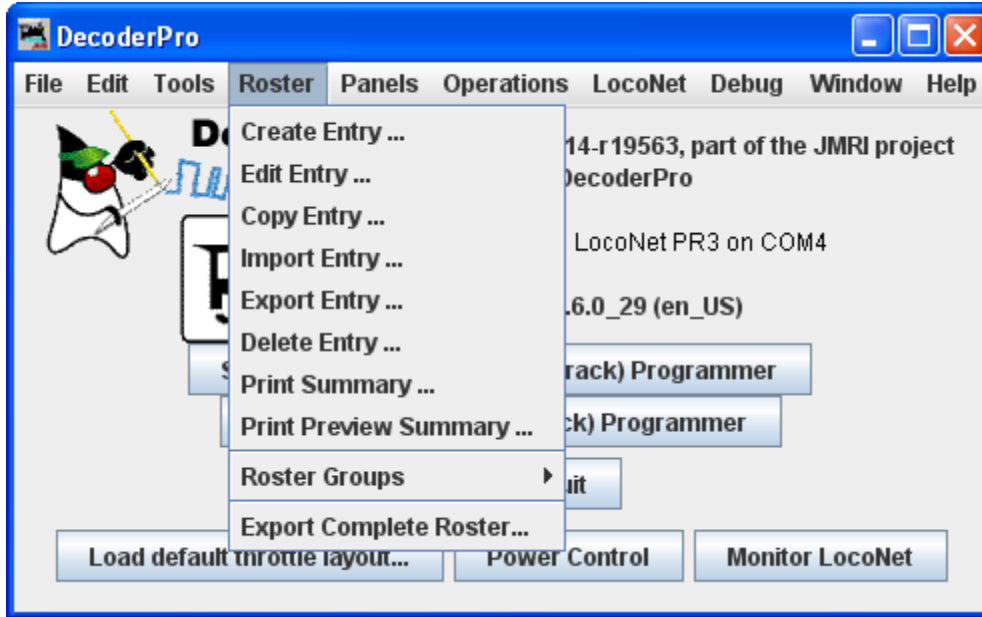
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Now that we have the Roster information all in order, we can continue with programming the decoder.

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

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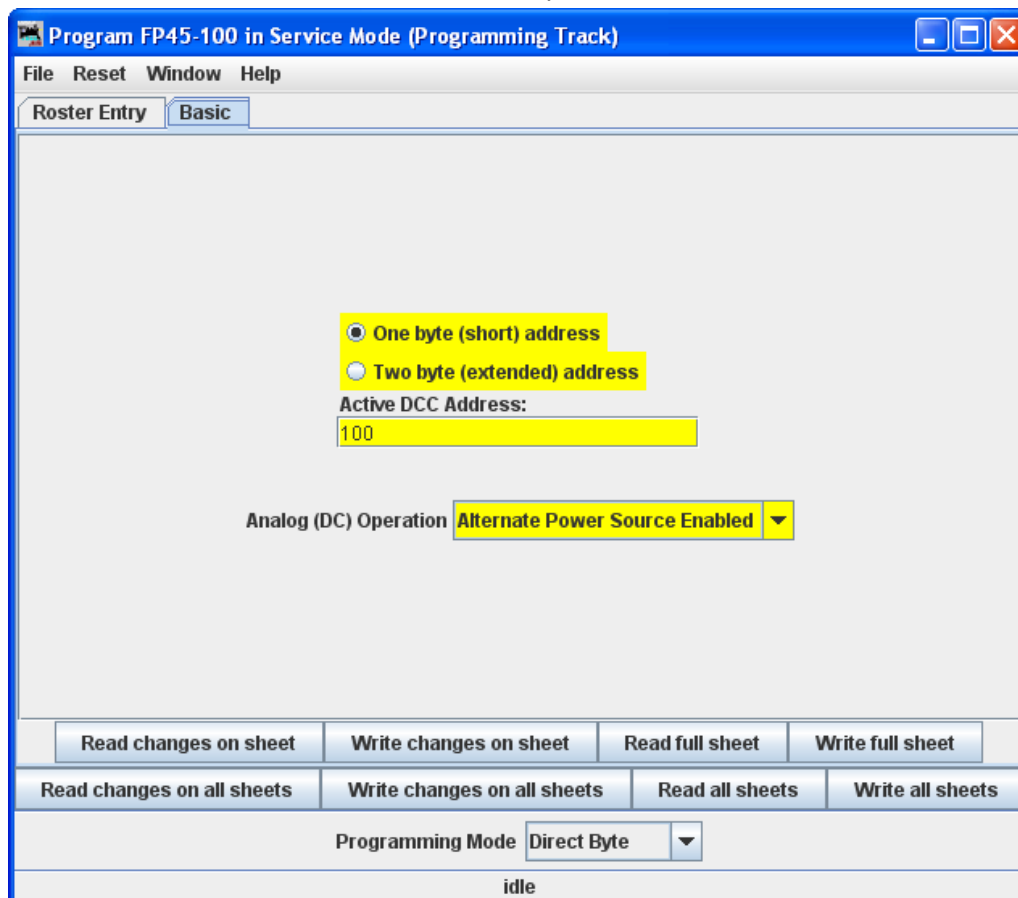
Let's move on to the Basic Programmer.

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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 OEM decoder that is used in the **Athearn FP-45** locomotive. 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 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 running under regular DC voltage/analog control)

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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.

Color Codes

That is used in the programming panes.

Edited

You've changed this value, or it contains default values from the decoder file. This is shown as orange, since the value differs from what's in the decoder.

From File

The field contains values read from a locomotive file. This is shown as yellow, since we're not certain that the file agrees with the decoder contents.

Read

The value shown has been read from the decoder. This is shown as white to indicate that the value is trustworthy.

Stored

The value show has been written to the decoder. This is also shown as white.

Unknown

If something goes wrong with the read or write process, we might have a completely untrustworthy result. This results in the variable's state being marked as UNKNOWN and shown as red.

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.

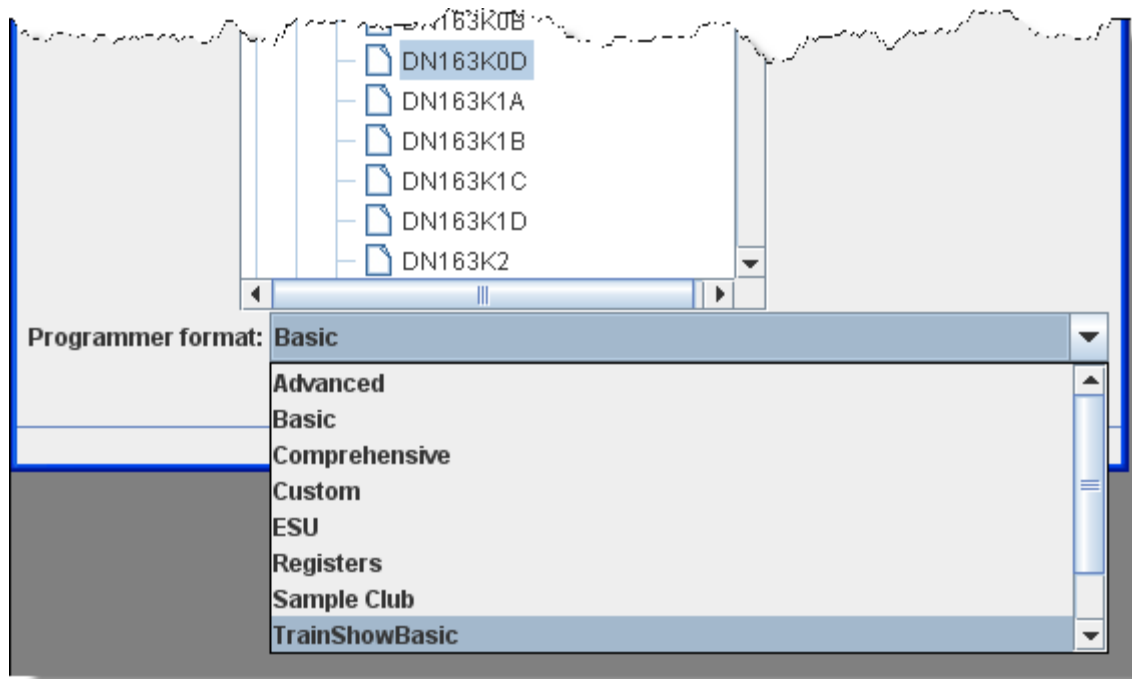
When you are finished, click on **Write full sheet** button to write the new values in the decoder.

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

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

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



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

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

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We can also eliminate the **Tutorial** and **Custom** programmers. They were put in to show folks that want to **write their own** programmer (not you right?) all the possible ways to gather input and to have a common starting point in the roster pane. If you have need for a special situation programmer you might want to look at **Sample Club** or **TrainShowBasic** to see what panes can be taken out of Comprehensive to make an intermediate complexity, special purpose programmer. Again, how to do this is a subject for another manual.

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

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

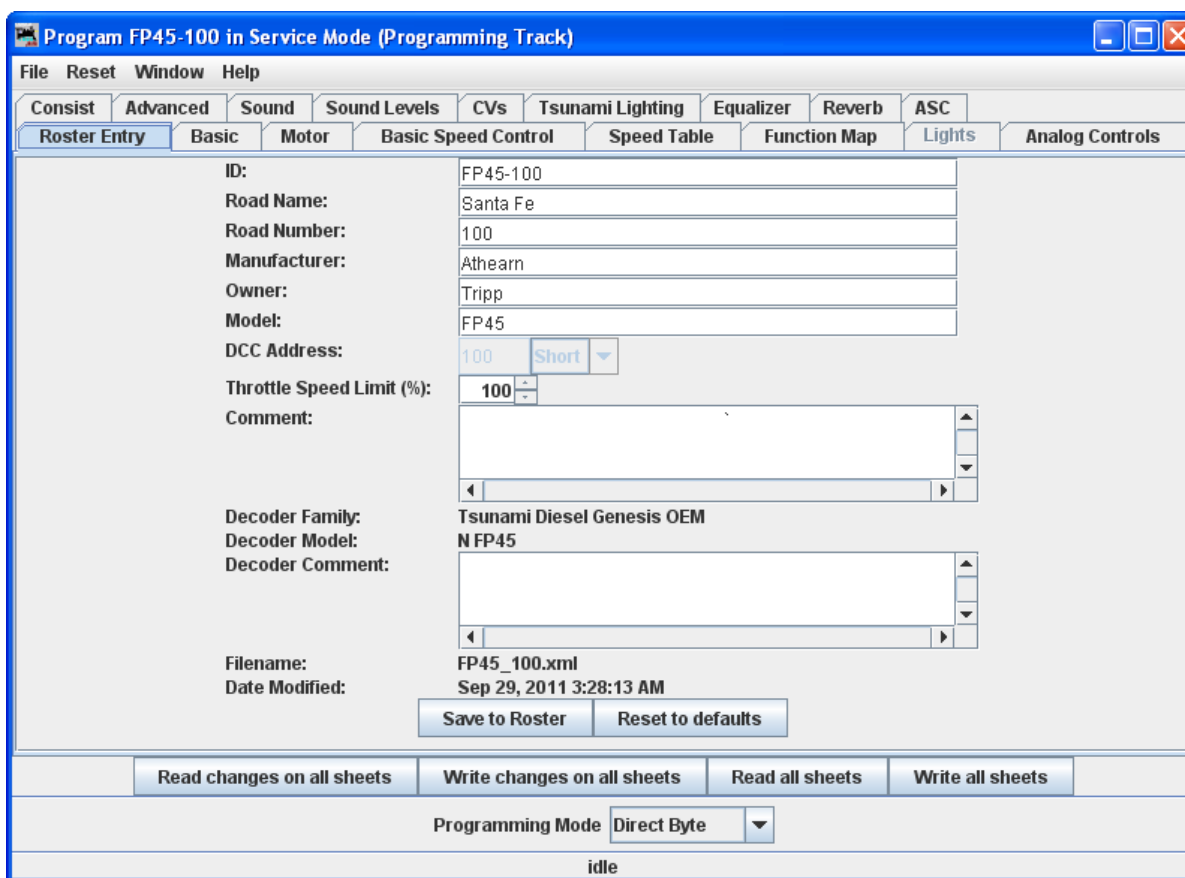
So now we've narrowed our "real" choices down to **Advanced**, **Basic** and **Comprehensive**. Since we've already covered **Basic**, let's explore the **Comprehensive Programmer**!

DecoderPro® Comprehensive Programmer

Roster Entry Pane

The Comprehensive Programmer begins the same way as the Basic Programmer, opening with the **Roster Entry Pane**. The contents are identical, so they will not be repeated here. . To use the Comprehensive Programmer just be sure that you select the Comprehensive Programmer in the **Preferences**.

When you are on the **Service Mode Programmer** Setup and click on the **Open Programmer** button, the appropriate Programmer window will open, in this case the Comprehensive Programmer.. All programmers, Basic and Comprehensive, open to the Roster Entry pane, which will be similar to that shown below. (Using Tsunami Diesel Genesis OEM for Athearn N FP45 decoder examples) in the **Program(locomotive roster title) (Programming Track)**

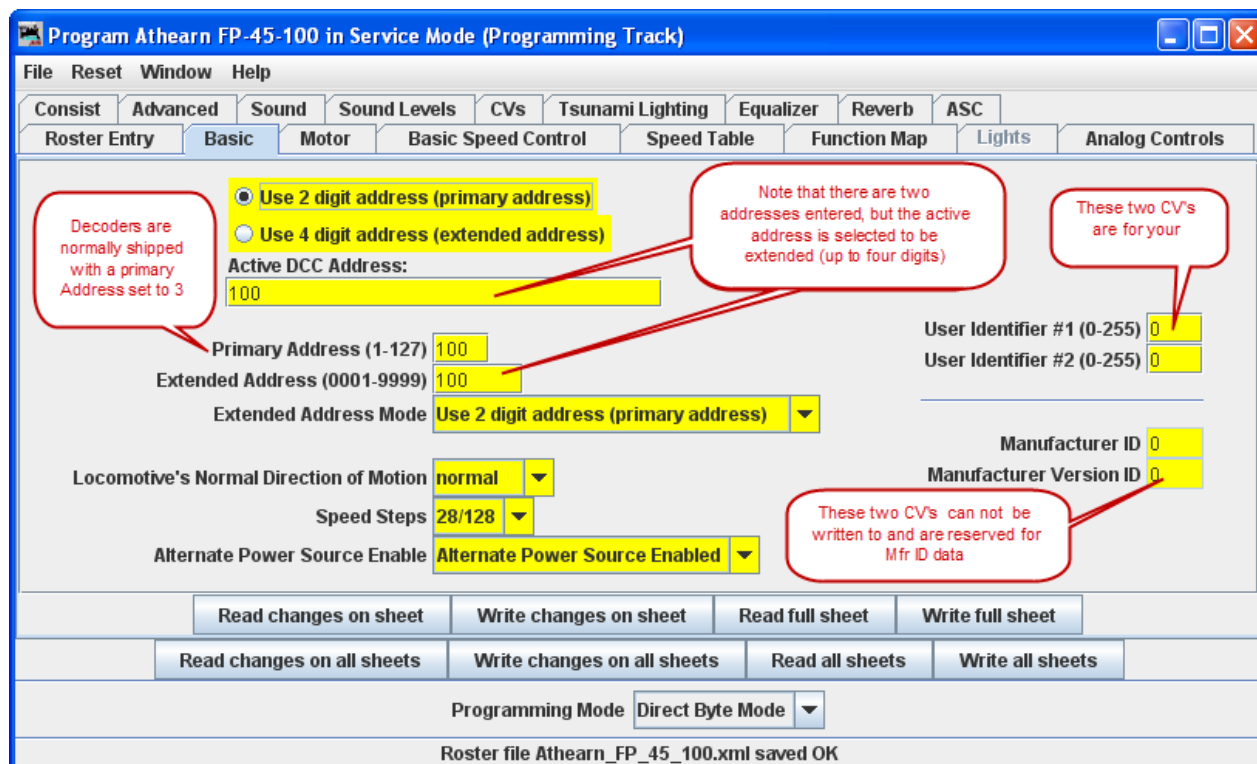


Note that the **Roster Entry** pane is essentially unchanged from the **Basic** programmer, but the window has a LOT more options in the **Tabs** at the top of the window!!! If you are unsure how to handle the **Roster Entry** information, go back to that section in the [Basic Programmer](#). If you're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

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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.

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).

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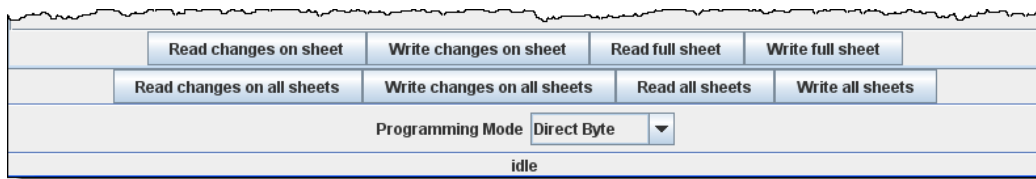
FL Location: Unless your command station or decoder can only handle 14 speed steps, you'll find you get much finer control of your locomotives by using the **28/128 speed steps** option. If you happen to set the decoder to 14 speed steps by mistake, and your command station is in 28 step mode, you will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

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

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

The Read and Write Buttons

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



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

1. **Read changes on sheet** - an "Oops!" button that lets you recover data from the decoder if you've changed it accidentally on the computer (and don't remember what the values were!), but only if you haven't written it yet.
2. **Write changes on sheet** - faster than writing all the data on the sheet, and ideal for tweaking changes in **Ops mode**, programming on the main track.
3. **Read full sheet** - read all data in this pane from the decoder. Note this may take a great deal of time, depending upon the speed of your computer and the controller station in use.
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.

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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. **click here** for further information on Programming Modes.

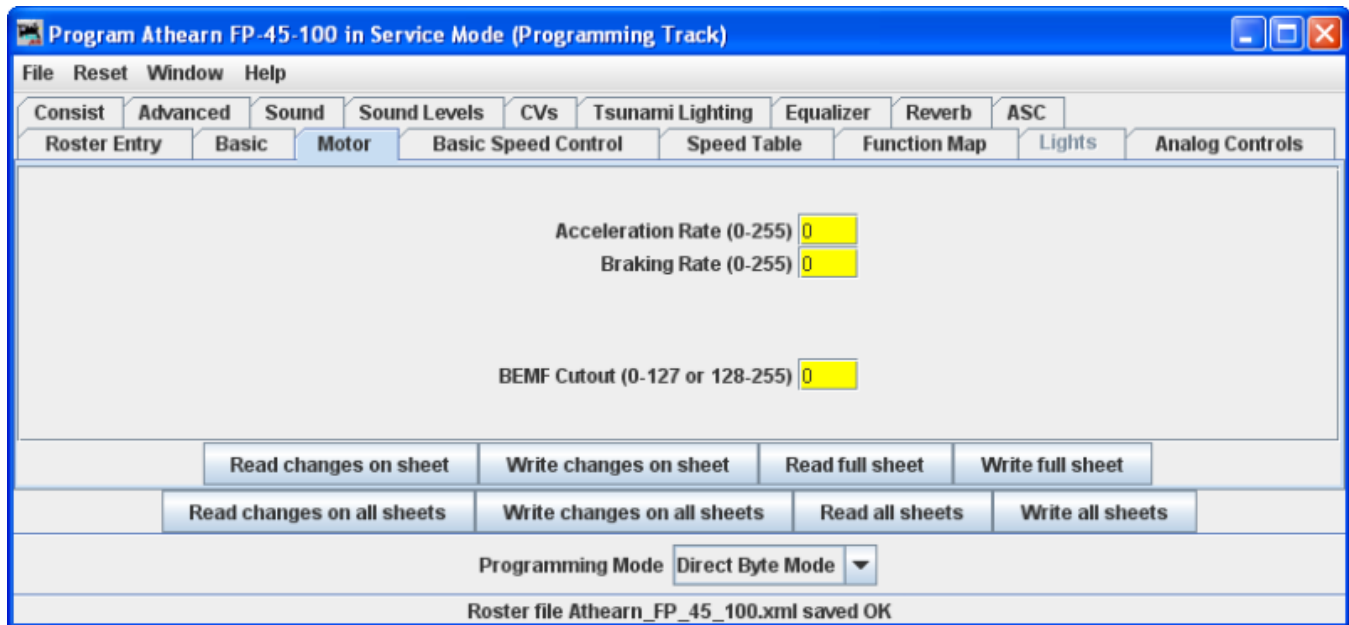
Finally, the bottom line of the pane is a status bar that tells you exactly what the system is doing. It shows **idle** in these screen shots because the system was not actively programming decoders when they were made.

Now Let's go to the Motor TAB.

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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 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:

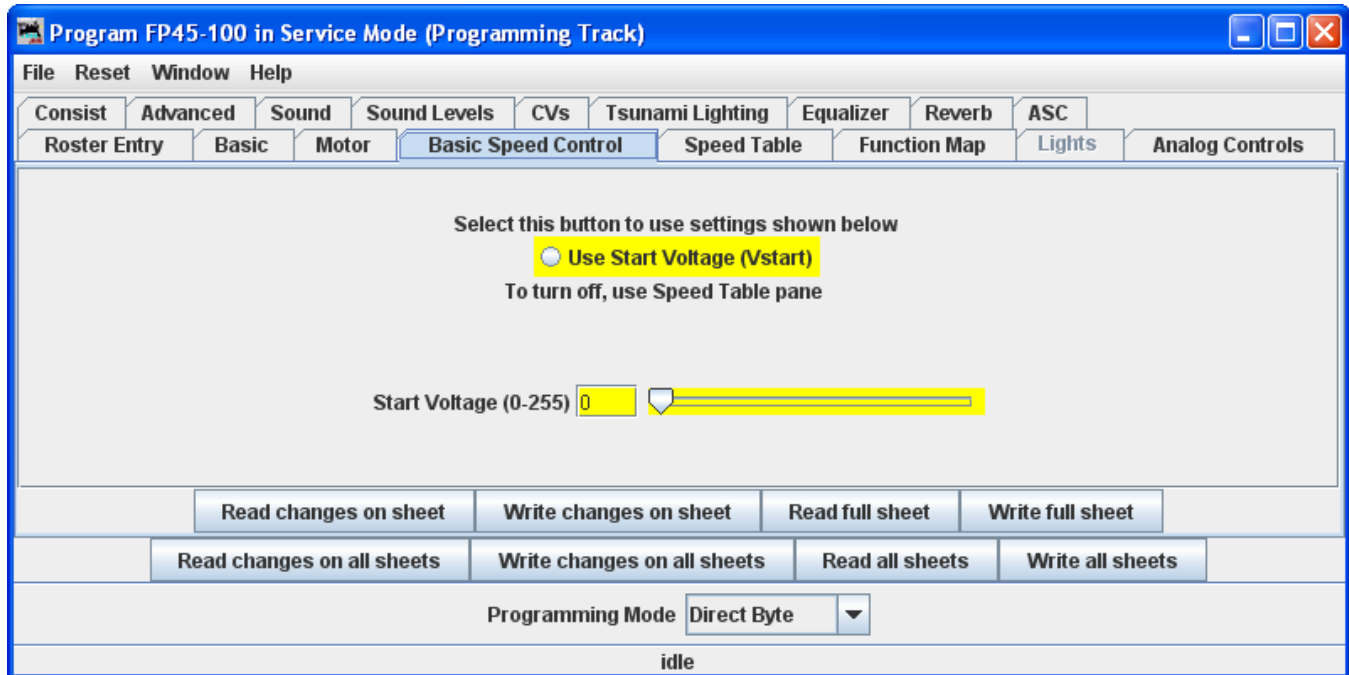
Acceleration Rate and **Deceleration Rate** help simulate a locomotive under load - but don't use them unless you have very clean track, because an interruption of power can make a locomotive stop and cycle through the acceleration curve again! On the latest Tsunami Diesel sound decoders the firmware 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.

Basic Speed Control Pane

The Basic **Speed Control pane** looks very complicated, but it can be one of the most significant in improving the performance of your locomotive fleet. Remember if you use **Speed Table** TAB this TAB is not used.



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. Whichever one you select last and write to your decoder will be the method used for speed control. To select this pane:

Depending upon the decoder manufacturer, any of these settings could be on this pane.

You have the capability to select the **Use Vstart, Vmid, Vhigh** settings. The actual names and capability will vary with the manufacturers.

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

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

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

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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.

[Suggestions for 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** 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.

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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.

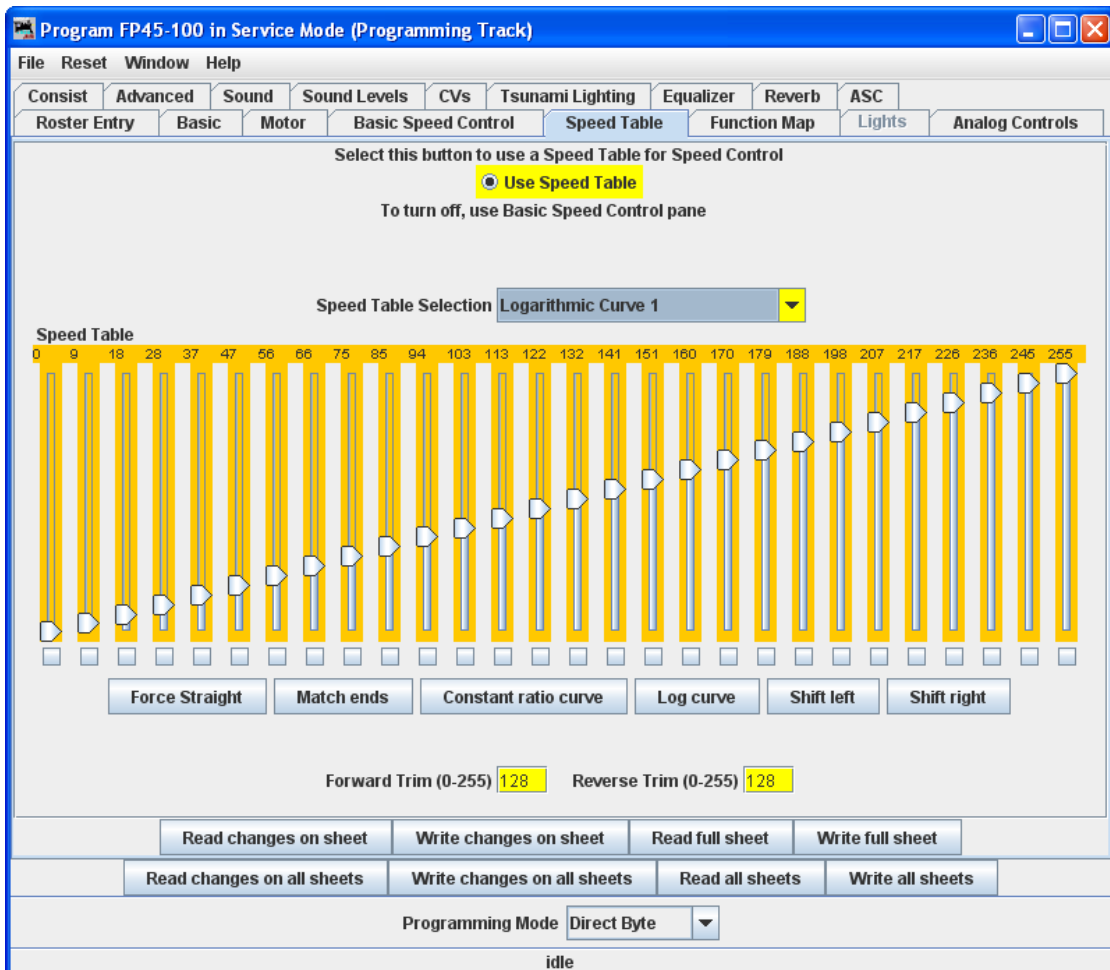
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The Speed Table Pane

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) Some decoders may only have preset curves that you can select.

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..

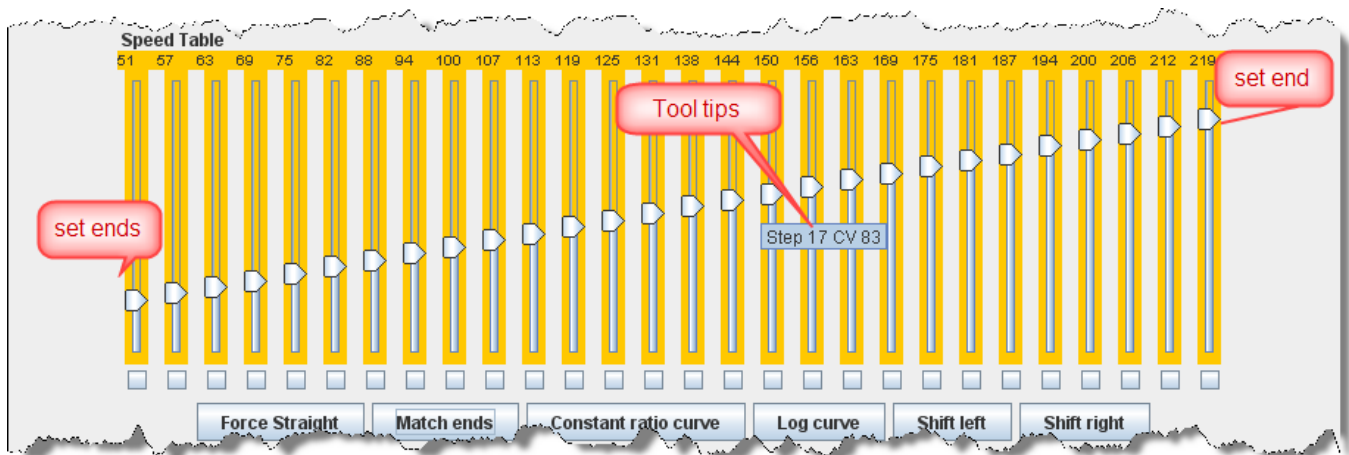


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Straight Line Speed Curve

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

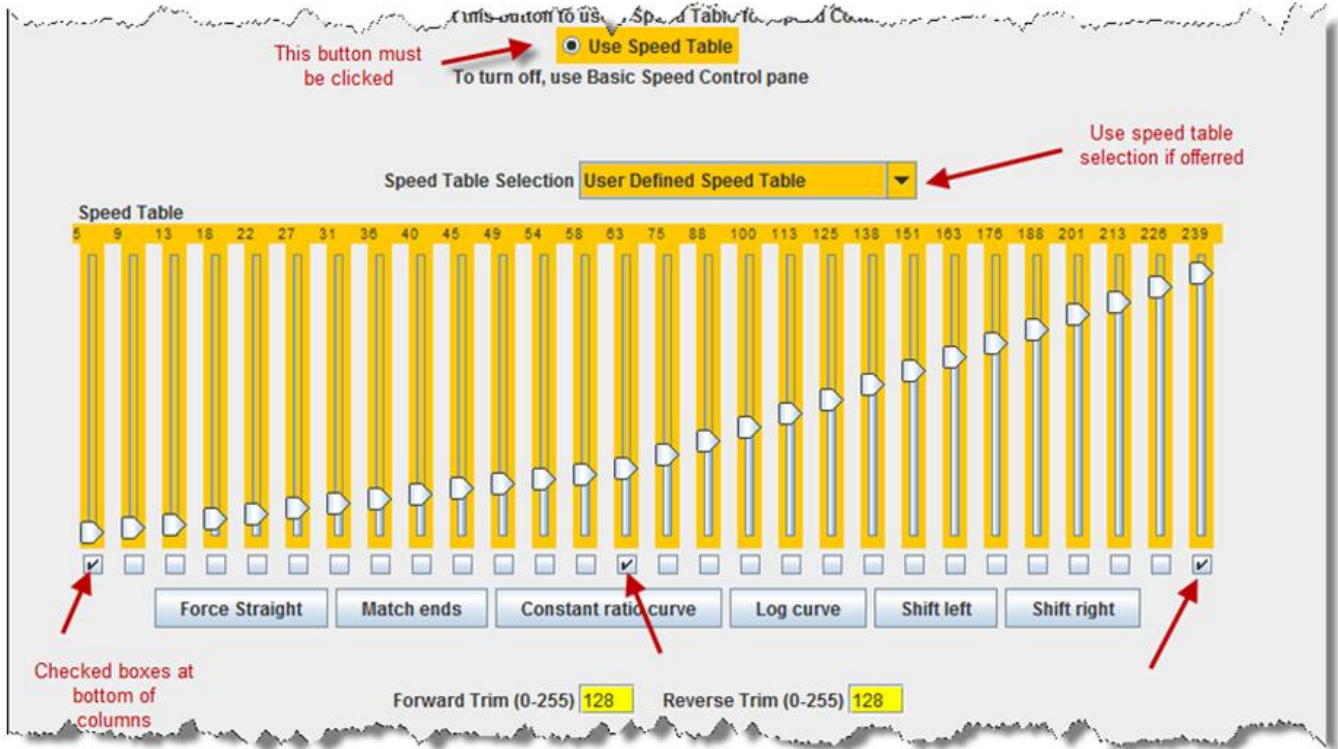
The **Match ends** button will also result in a straight-line graph, but you can offset the beginning and end by any amount you wish. The first and last steps are used to set to minimum and maximum values for the straight line. The function will then draw a straight line between those two end points.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



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

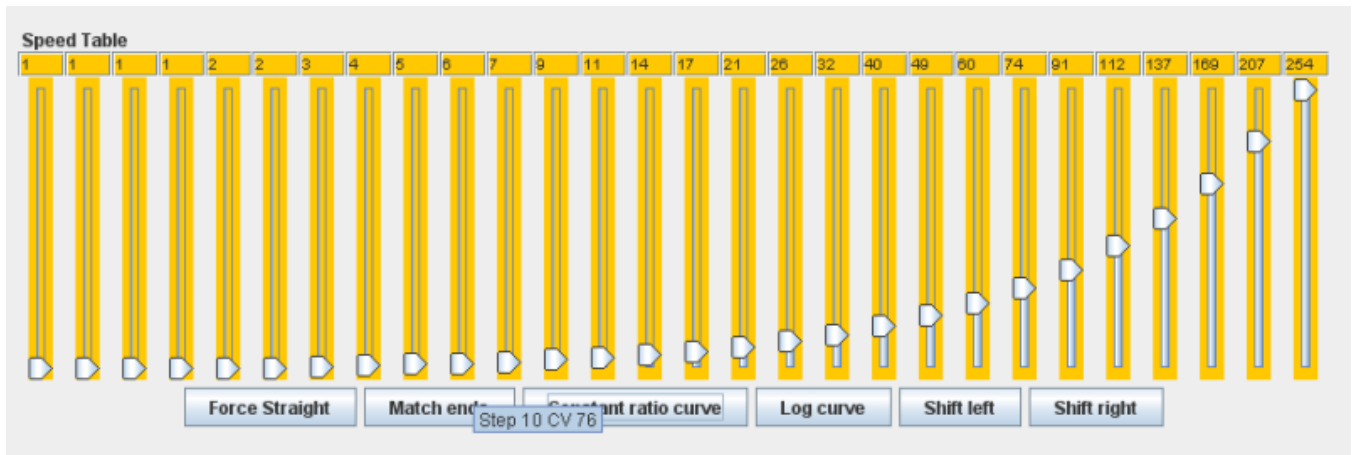
What could that possibly be used for, you ask? Well, many decoders (like the Soundtraxx Tsunami in this example) do not support V-start, V-mid and V-max. So, if you are trying to use the simplified method of speed matching locos, these decoders won't support it. Well now you have a way. Check the left-hand,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

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Substitute for Quick Speed Matching

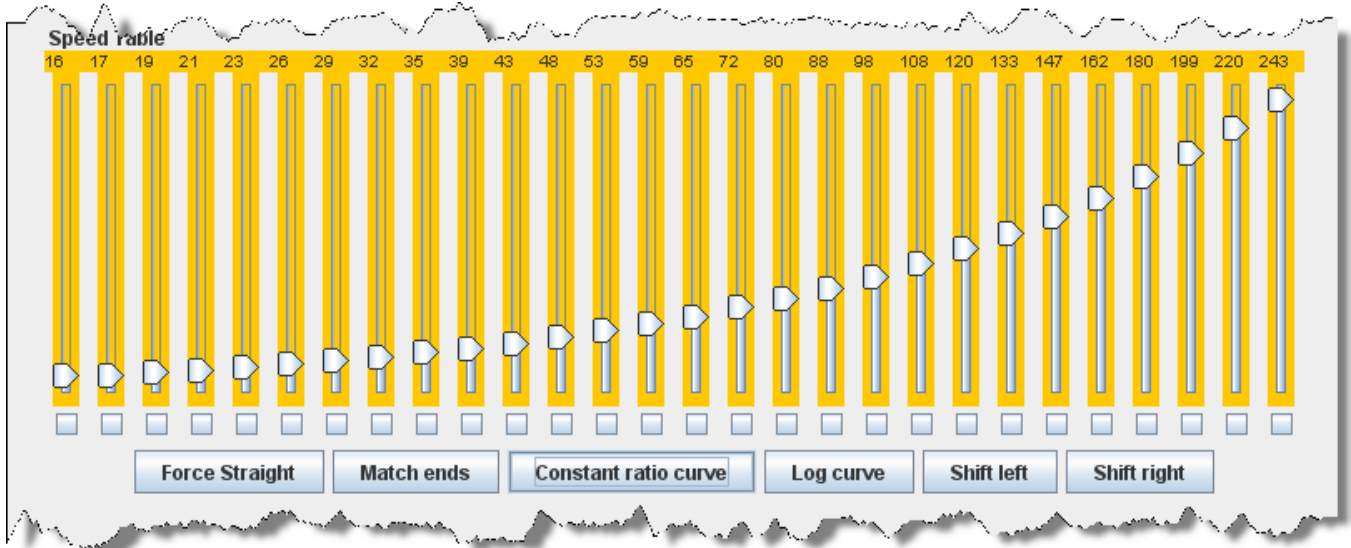
If you want to set up a loco for switching you can set a start speed that is the same for the first portion of the throttle revolution and lower the top speed for use in the yard as shown below:



Switcher Speed Curve

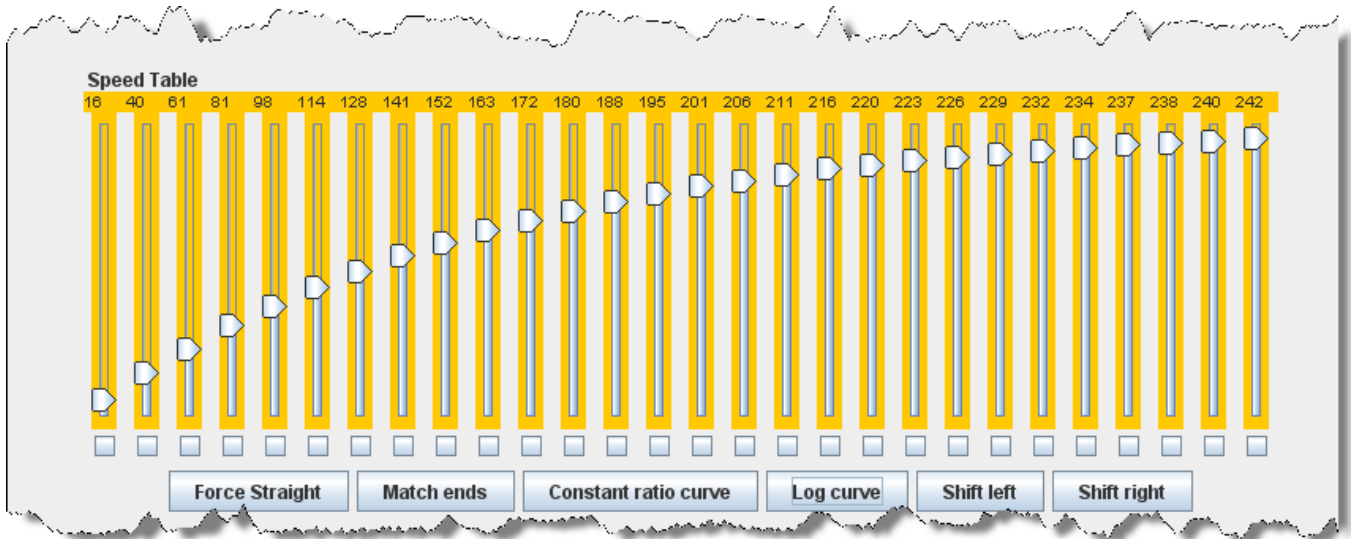
if you don't desire a strait-line response curve there are other options available. The Constant ratio curve gives you a response that increases slowly in the low end and rapidly at high throttle. This function will also draw the curve between preset end points.

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Constant Ratio Curve

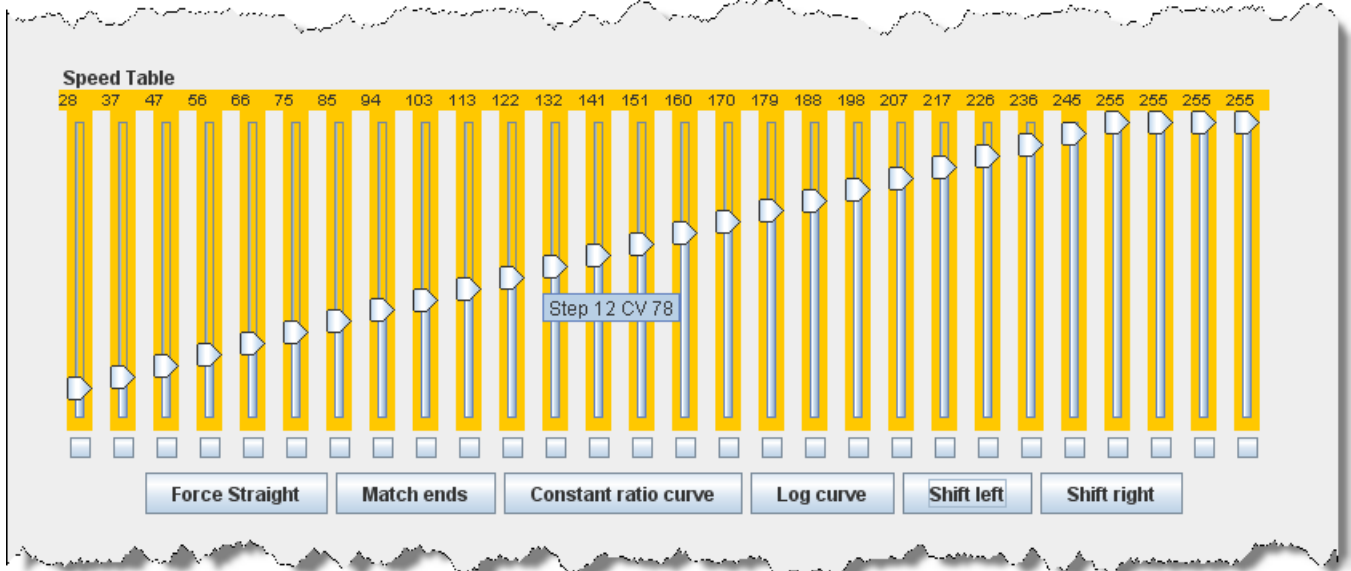
The **Log curve** reverses this response, giving you a logarithmic response curve with high acceleration at low speeds, but topping out quickly. It will also draw the curve between preset end points.



Logarithmic Speed Curve

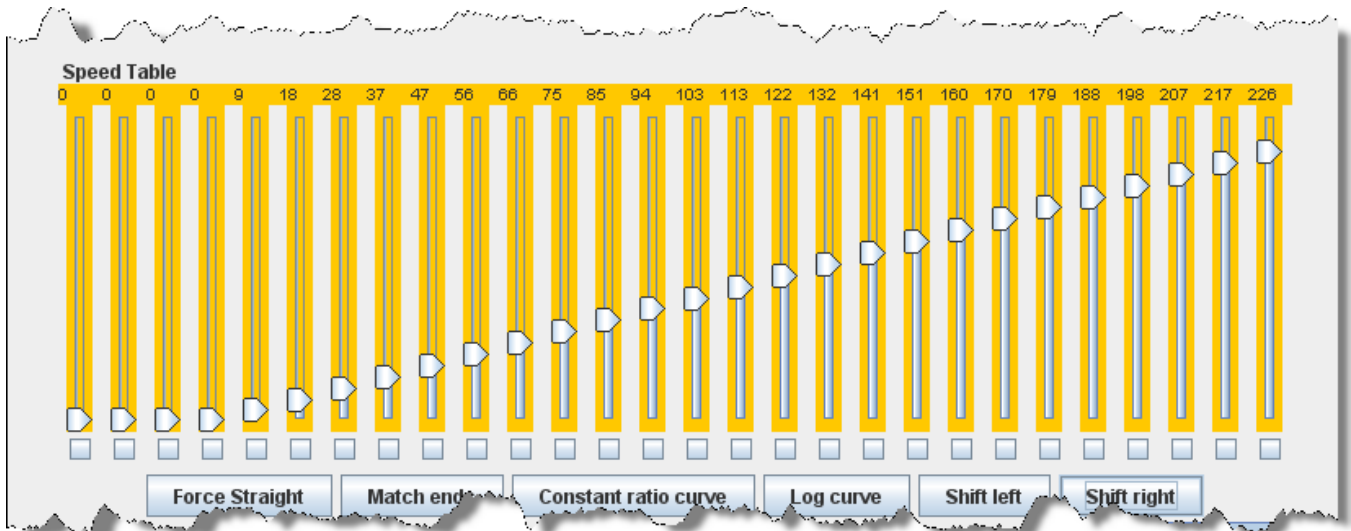
The **Log curve** button moves the entire speed table to the left one space with each click on the button. The example below shows a linear 0-255 speed table that has been **Shifted left** three times.

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Curve Shifted Left

The **Shift left** 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.



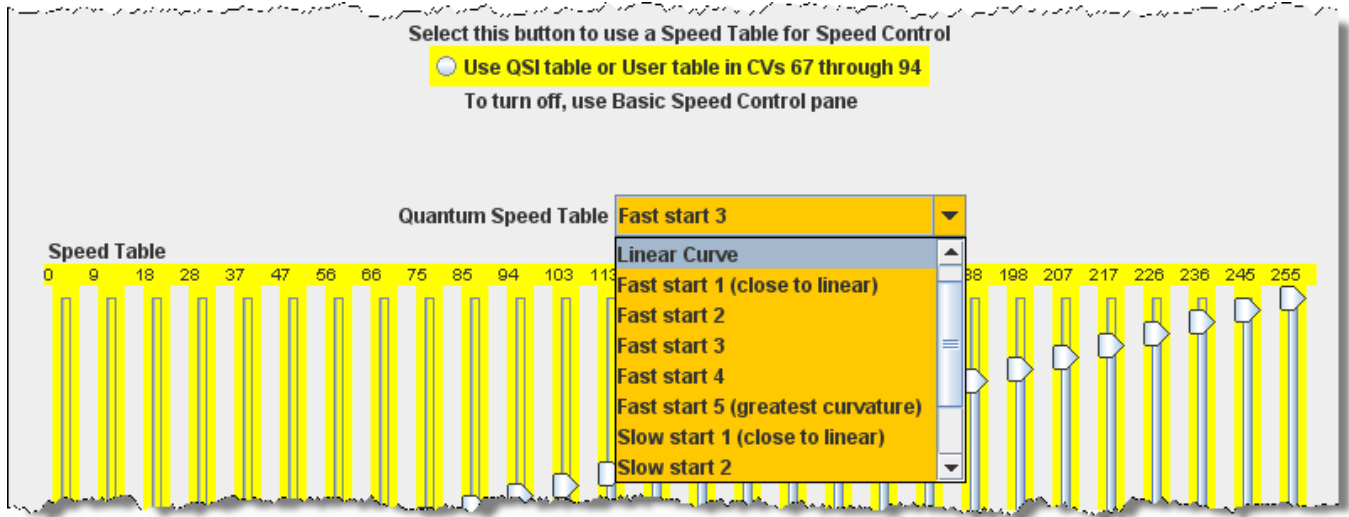
Curve Shifted Right

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!**

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



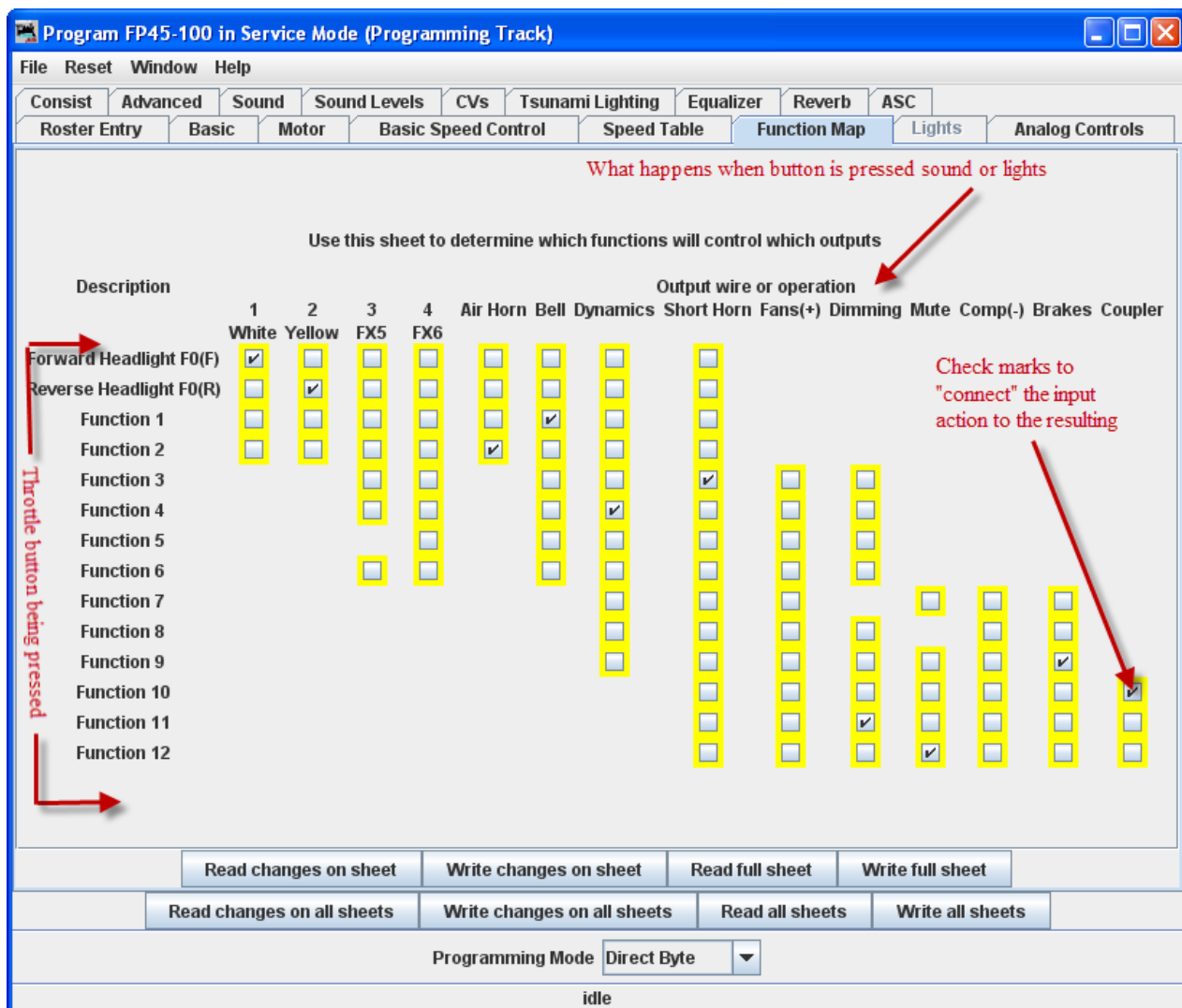
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Function Mapping Pane

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

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

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



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

Lighting and FX Functions Pane

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

Every Manufacturer and decoder family handles the lighting in a unique manner, so there are many versions of this pane.

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.

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The screenshot shows the 'Program Kato C44-9W-4926 in Service Mode (Programming Track)' window. The 'Lights' tab is active, and the 'Function Map' sub-tab is selected. The interface displays various lighting effect settings for functions 1 through 4. A dropdown menu is open for 'Forward light F0F behavior', showing options like 'Normal function of lead', 'Random flicker', 'Mars light', 'Flashing head light', 'Single pulse strobe', and 'Double pulse strobe'. Red arrows point from text annotations to these settings.

File Reset Window Help

Lights Analog Controls Consist Advanced Sound Sound Levels CVs Digitrax

Roster Entry Basic Motor Basic Speed Control Speed Table Function Map

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 Normal function of lead
Reverse light F0R effect generated Mars light
Reverse light F0R behavior Flashing head light
Function 1 effect generated Rotary beacon simulation
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
Function 3 effect generated Normal function of lead
Function 3 behavior Forward direction, ON with function ON, phase A
Function 4 effect generated Normal function of lead
Function 4 behavior Forward direction, ON with function ON, phase A

Many options may be offered depending upon the decoder

These are the choices for each lighting effect

land these are all the choices for timing and setup for each of the choices above

Better have your manual available

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

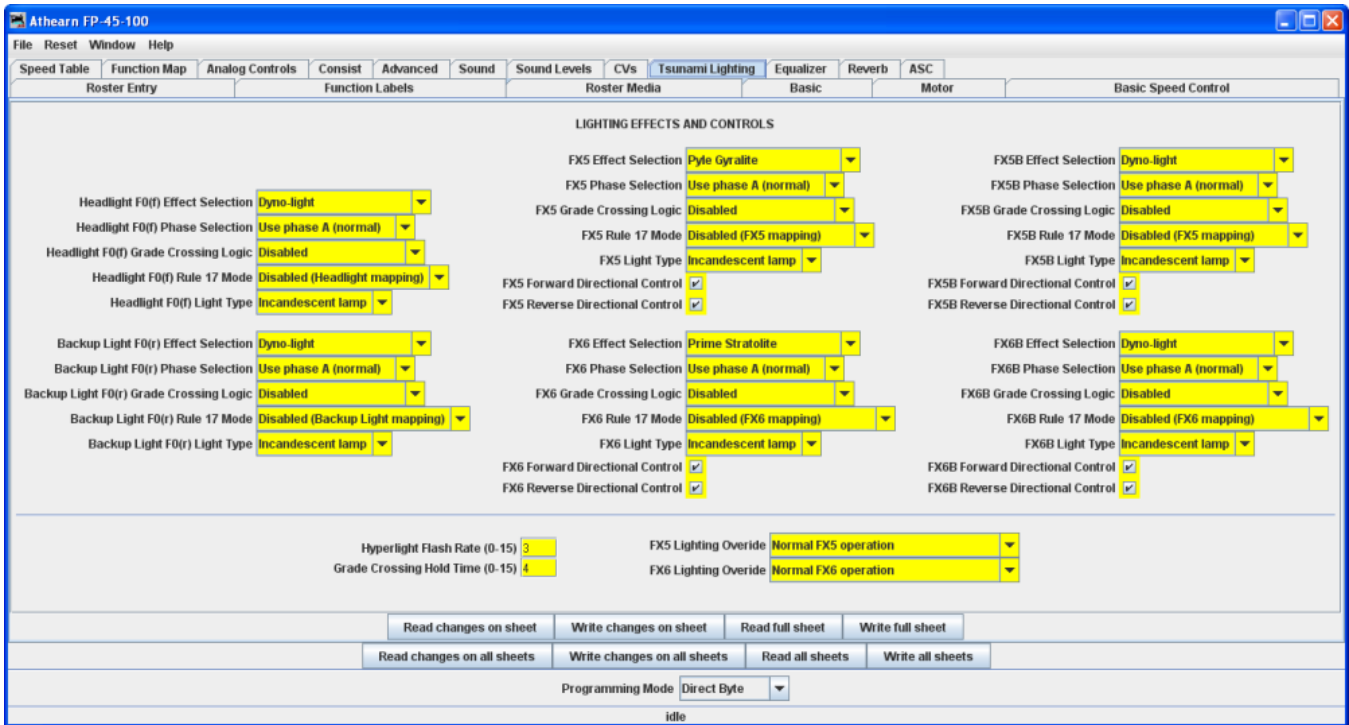
Read changes on all sheets Write changes on all sheets Read all sheets Write all sheets

Direct byte mode programming Set...

idle

DecoderPro® 3.4 User's Guide

Sound decoders such as the Tsunami in our OEM FP-45 has an extremely complicated Lighting program pane.



Note that some of the lighting functions can be tied to a sound function which is unique to sound decoders. Sound decoders have many more functions than normal motor control decoders.

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!

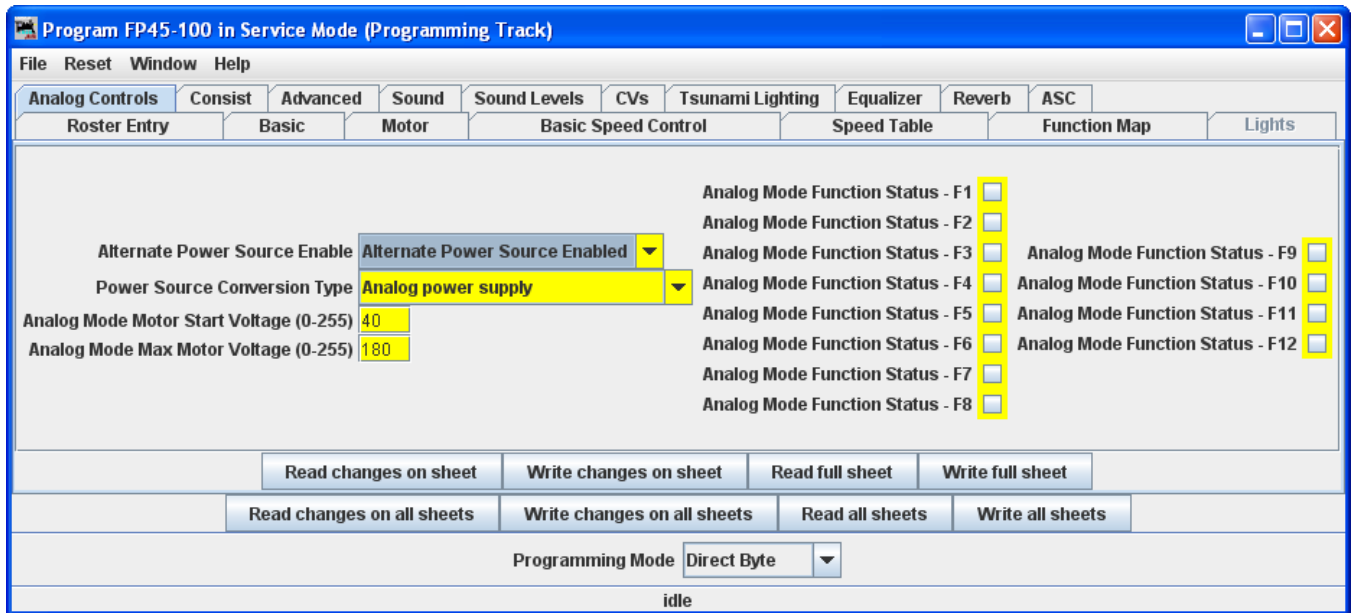
Even if the function and effect are available, you may have to add the lighting to your locomotive in order to be able to use that function, such as adding ditch lights, beacons, etc.

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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.

Some decoders are Analog Controls ne is simple and others such as the FP-45 are complicated.



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.

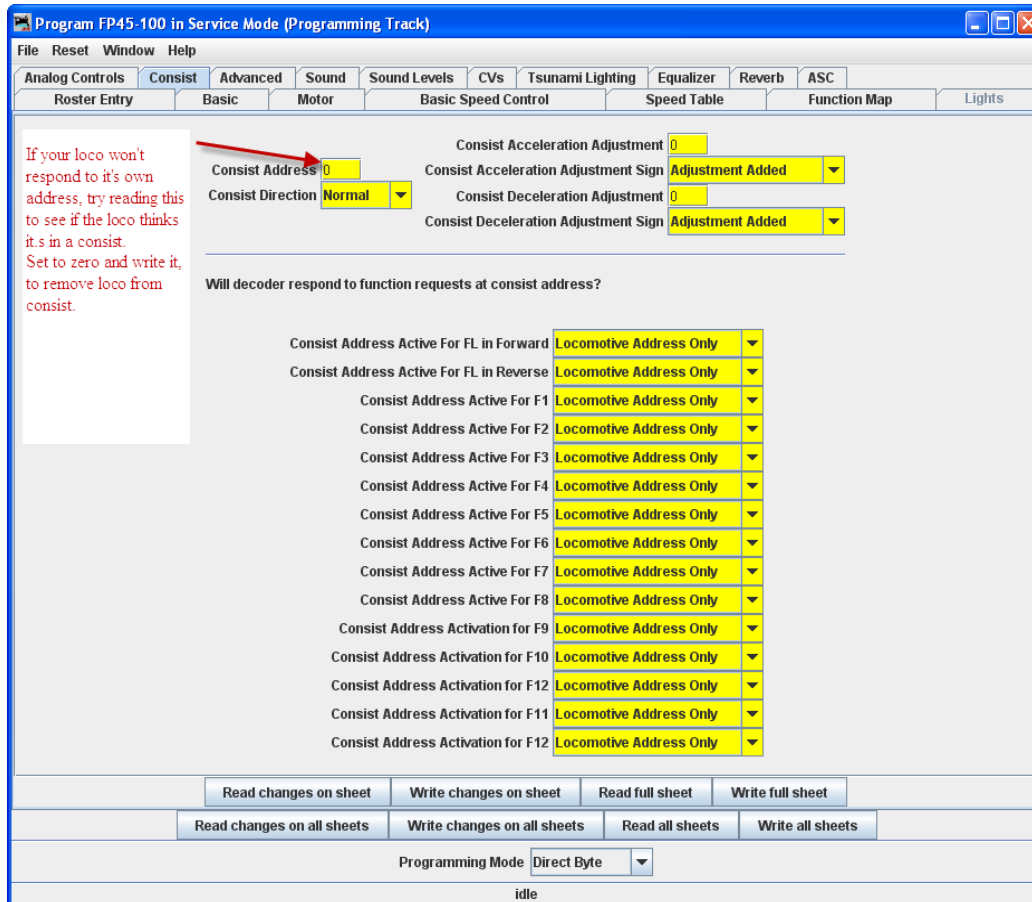
So, the NMRA came up with two additional means of consisting. One is set up in, and remembered by the command station, and the other is set in the decoders.

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.

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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.

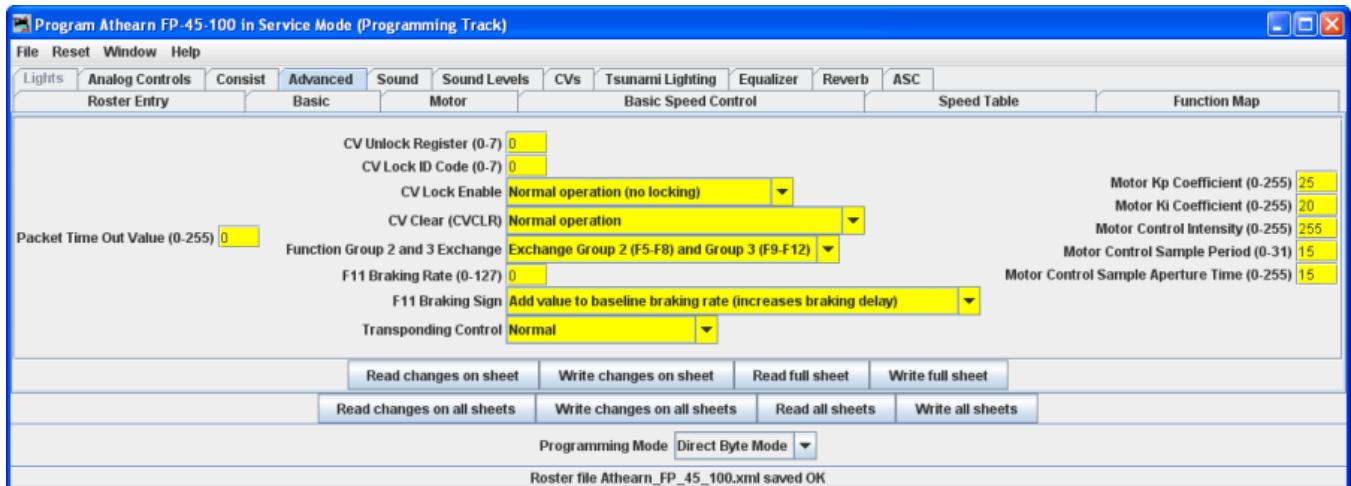
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Advanced Features Pane

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.

Note that the Tsunami decoder has advanced, Tsunami Lighting, Equalizer, Reverb, and ASC TAB that are unique to this decoder and will not be discussed in this manual.



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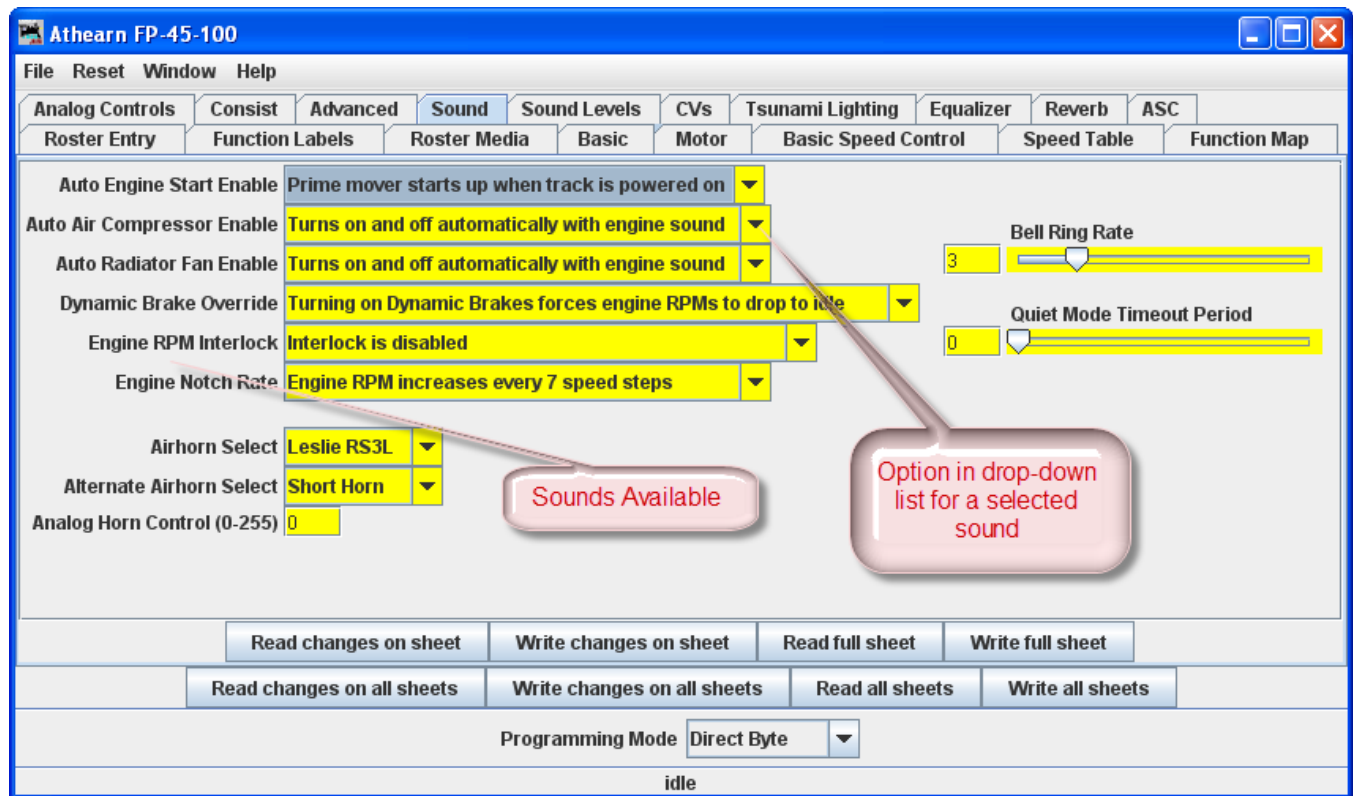
Sound FX Pane

This pane will only be displayed for Sound decoders.

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 Tsunami OEM FP-45 sound decoder. There are also steam 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:

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Athearn N Scale Big Boy and Challenger

Whistle Type	<input type="text" value="5"/>	Bell Type	<input type="text" value="0"/>	Bell Ring Rate	<input type="text" value="10"/>
Air Pump Type	<input type="text" value="1"/>	Chuff type	<input type="text" value="0"/>	Chuff Rate	<input type="text" value="12"/>
Air brake squeal enable/disable	<input type="text" value="Enable"/> ▼	Double chuff enable	<input type="text" value="Enable"/> ▼	Chuff Start Point	<input type="text" value="3"/>

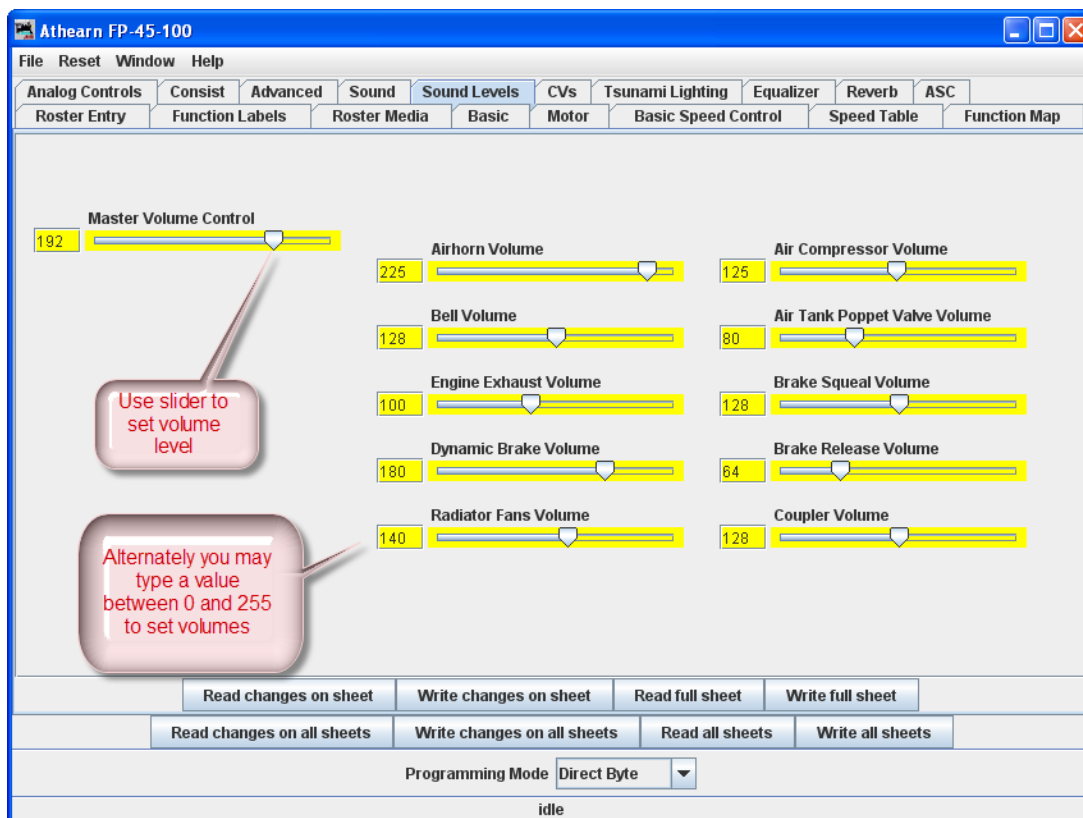
Digitrax F40PH

Horn Selector	<input type="text" value="Standard Horn"/> ▼
Peak Speed for Auto coupler/brake on dir change	<input type="text" value="0"/>
Notching Mode	<input type="text" value="Automatic"/> ▼
Sound Time Out	<input type="text" value="No"/> ▼

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Sound Levels Pane

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



Global CV Listing Pane

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

Decoder Locking

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

If you have more than one decoder in your locomotive, you probably have a decoder locking scheme implemented to be able to access each one individually for programming.

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

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Program Kato C44-9W-650 in Service Mode (Programming Track)

File Reset Window Help

Lights Analog Controls Consist Advanced Sound Sound Levels CVs Digitrax

Roster Entry Basic Motor Basic Speed Control Speed Table Function Map

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

CV Number (points to Number column)

Value (in Decimal notation) (points to Value (Deci... column)

Results of clicking Compare (points to Compare column)

State: Same- means that the value in the decoder matched that in the Value column

If there is a difference, the value will turn red and State will show the value in the decoder

State will also show red if there is an error with any attempt to read or write a CV value

CVs 7 and 8 are the Manufacturers ID number and Version number. They are automatically read from the decoder and cannot be changed.

Yellow values are from the Roster file (points to CV 5)

Selected CV (points to CV 7)

Amber values have been edited by DecoderPro, but not yet written to the decoder (points to CV 17)

White values have been read from the decoder (points to CV 1)

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

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

Direct byte mode programming Set...

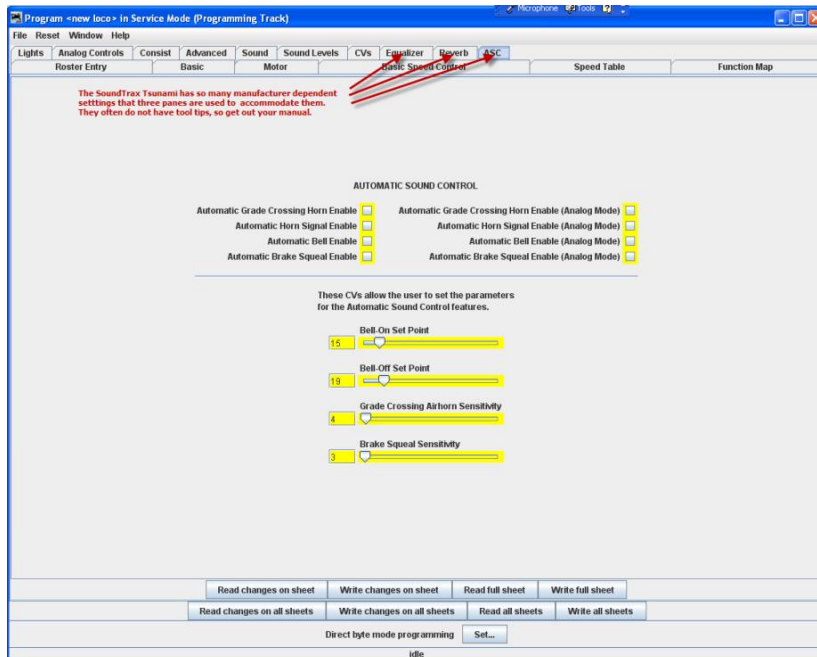
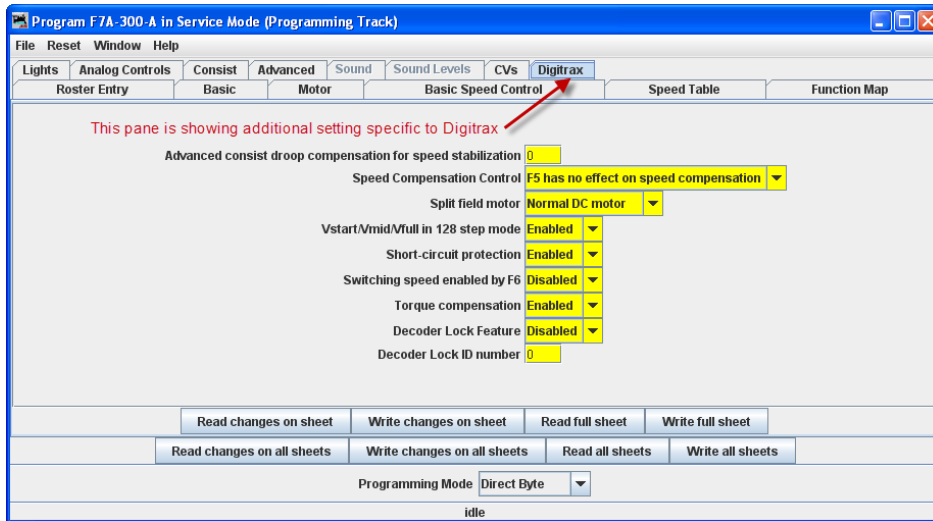
Programmer error: Timeout talking to command station (306)

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

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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 NMRAs 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

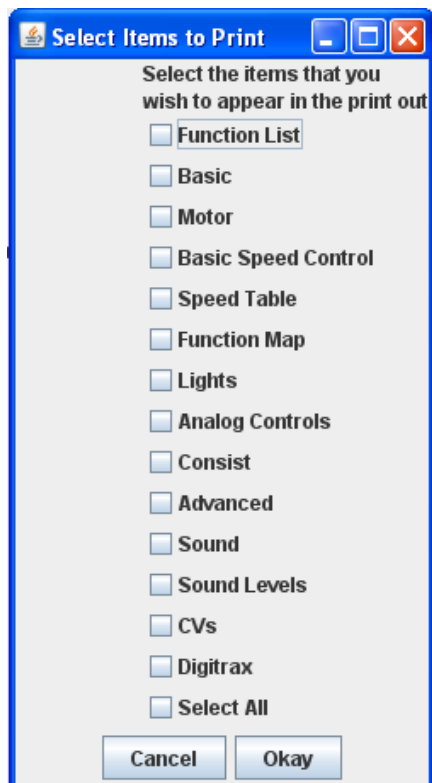


These items will, by definition, vary greatly between manufacturers. Once again, your best resource is the documentation for the specific decoder you are programming and this pane in the programmer for that decoder.

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 selected. (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.

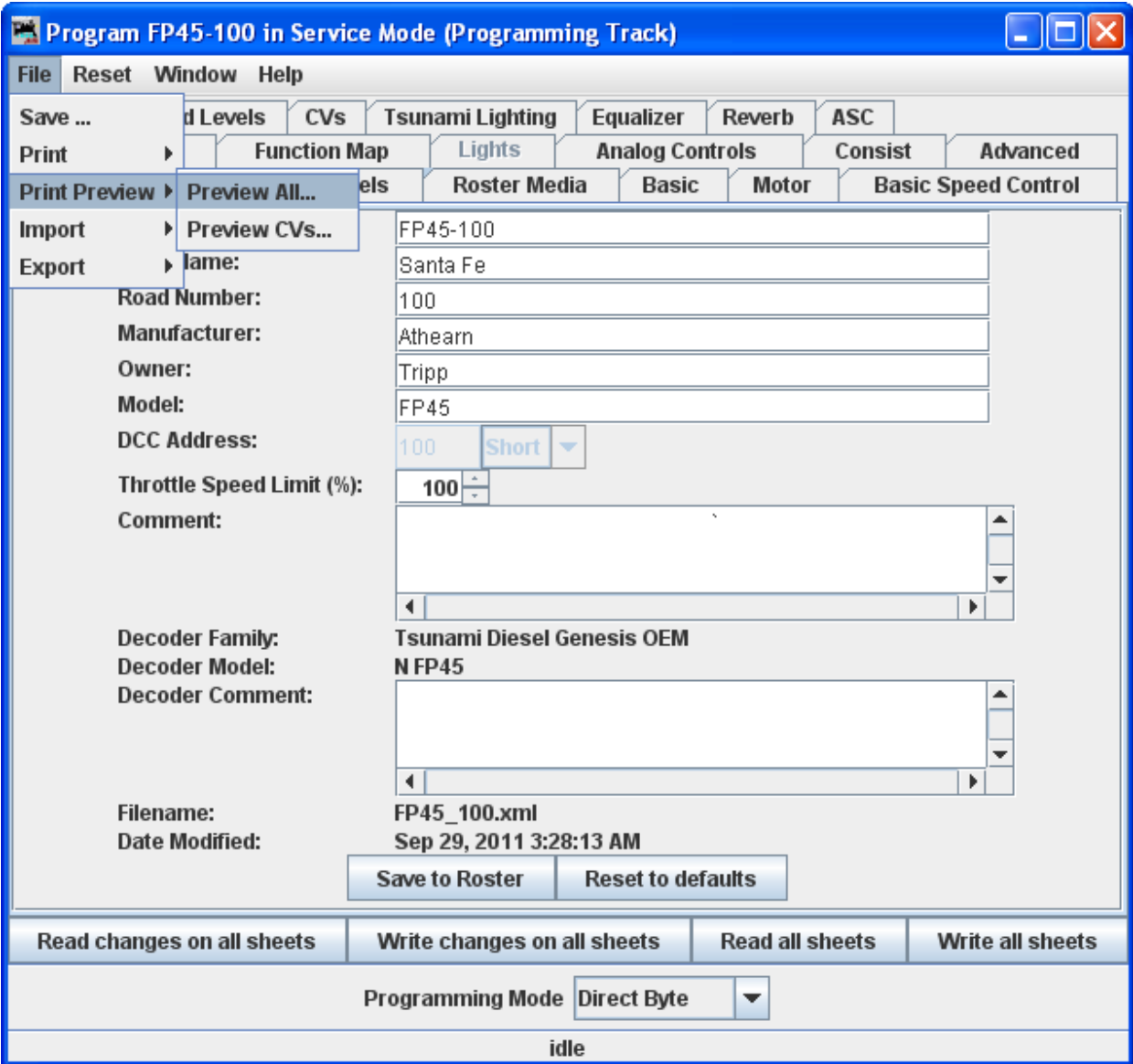
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Export Data: you may export the list as one of several file types :

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

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

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CP5864 SD40-2 Snoot

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December 28, 2002 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: NY Equipped, Pacman
Decoder Model: SH149E2
Decoder Family: Premium FX with HSW



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, 109, 118, 127, 136, 145, 154, 163, 173, 182, 191, 200, 209, 218, 227, 236, 245

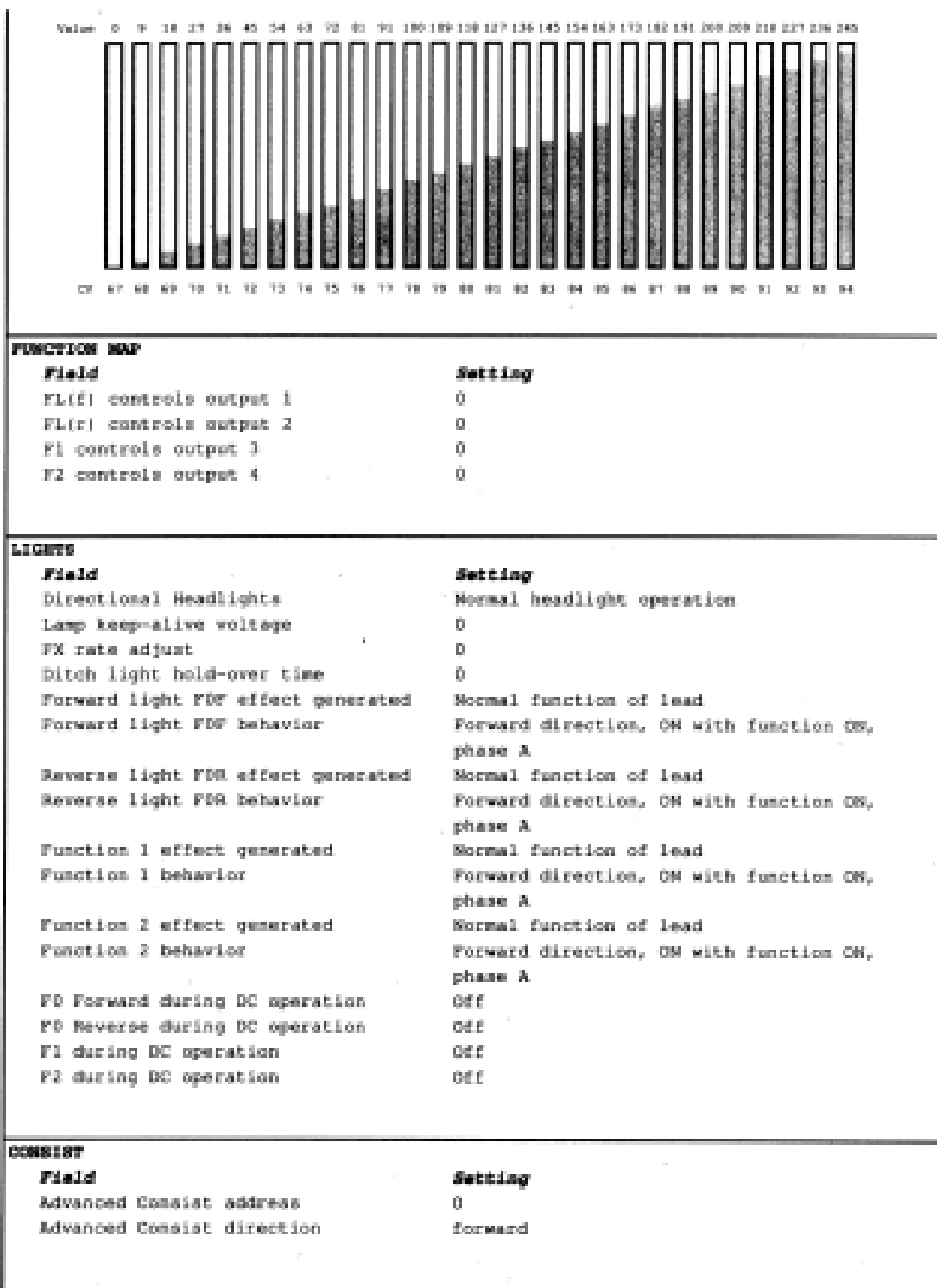
The three images below are samples of the "All" printout from the SD40-2 that has been used as an example in many places in this manual. Click on the page to see a larger image in a new window.

DecoderPro® 3.4 User's Guide

CP5884 SD40-2 Snoot

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December 26, 2003 12:50 PM



FUNCTION MAP

Field	Setting
FL(l) 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 FDR effect generated	Normal function of lead
Forward light FDR behavior	Forward direction, ON with function ON, phase A
Reverse light FDR effect generated	Normal function of lead
Reverse light FDR 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

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CP5004 SD40-2 Snoot

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ADVANCED			
Field		Setting	
Digitrax Transponding		off	

CVE							
Value		Value		Value		Value	
CV	Dec Hex	CV	Dec Hex	CV	Dec Hex	CV	Dec 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	53	128 80	73	54 36	87	182 B6
5	0 00	54	48 30	74	63 3F	88	191 BF
6	0 00	55	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	64	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
23	38 26	68	9 09	82	136 88	105	0 00
49	0 00	69	18 12	83	145 91	106	0 00

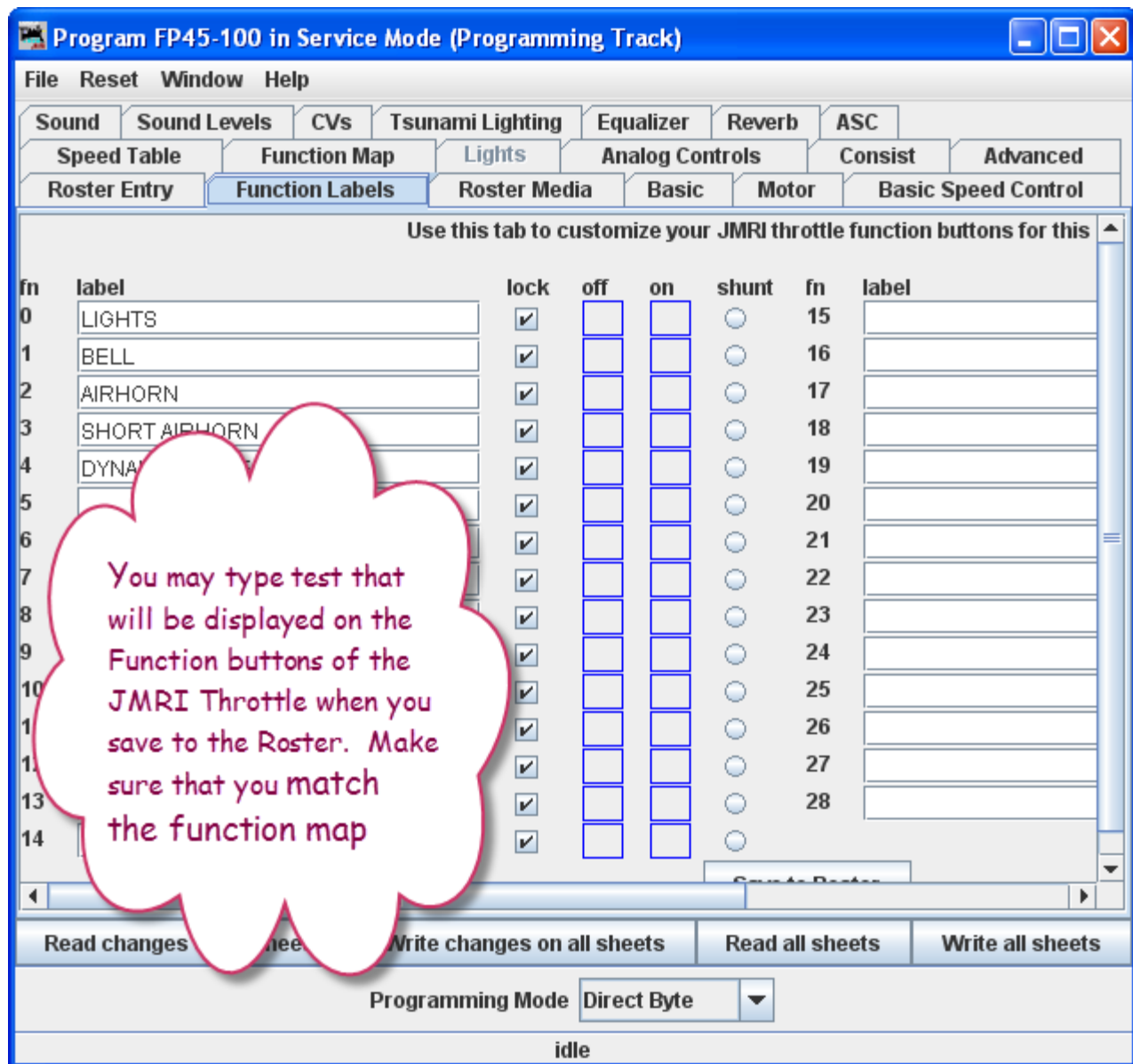
DIGITRAX			
Field		Setting	
Advanced consist droop compensation for speed stabilization		0	
Speed Compensation Control		F5 has no effect on speed compensation	
Split field motor		Normal DC motor	
Vstart/Vmid/Vfull in 128 step mode		Enabled	
Short-circuit protection		Enabled	

Advanced Programmer

The advanced Programmer is the same as the Comprehensive Programmer with the exception of the Functions Labels Pane and Roster Media Pane

Function Labels Pane

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

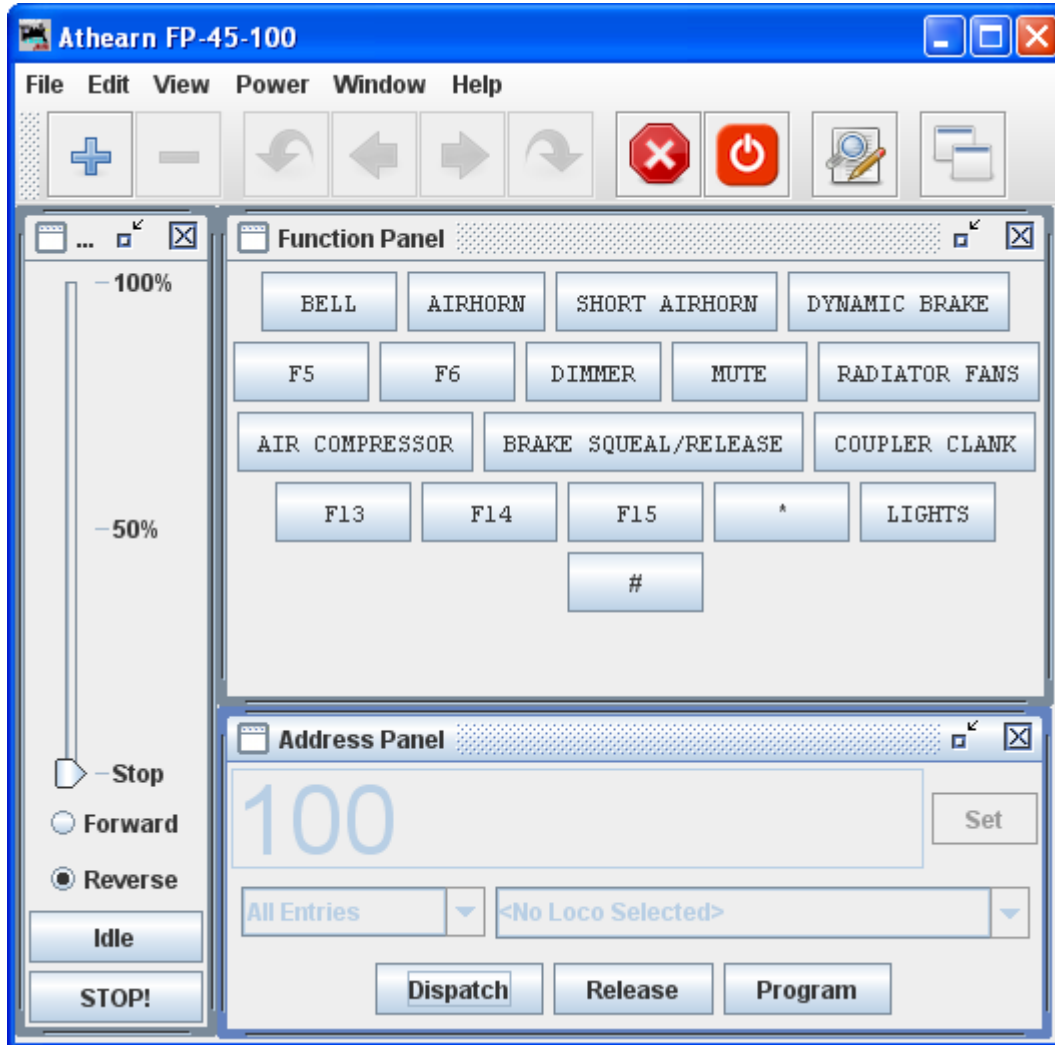


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The **Function Labels** Tab makes settings for the Software Throttles within JMRI. Primarily the on-screen throttles, but some of the settings are mirrored on smart-phones (iPhone/Android) using the WiThrottle interface.

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

In this example, the Function keys on the Throttle will be labeled for the FP-45 with Tsunami OEM Sound decoder with sounds and lighting functions.



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Using the checkboxes, space holders and the radio button to the right of each function may be set to:

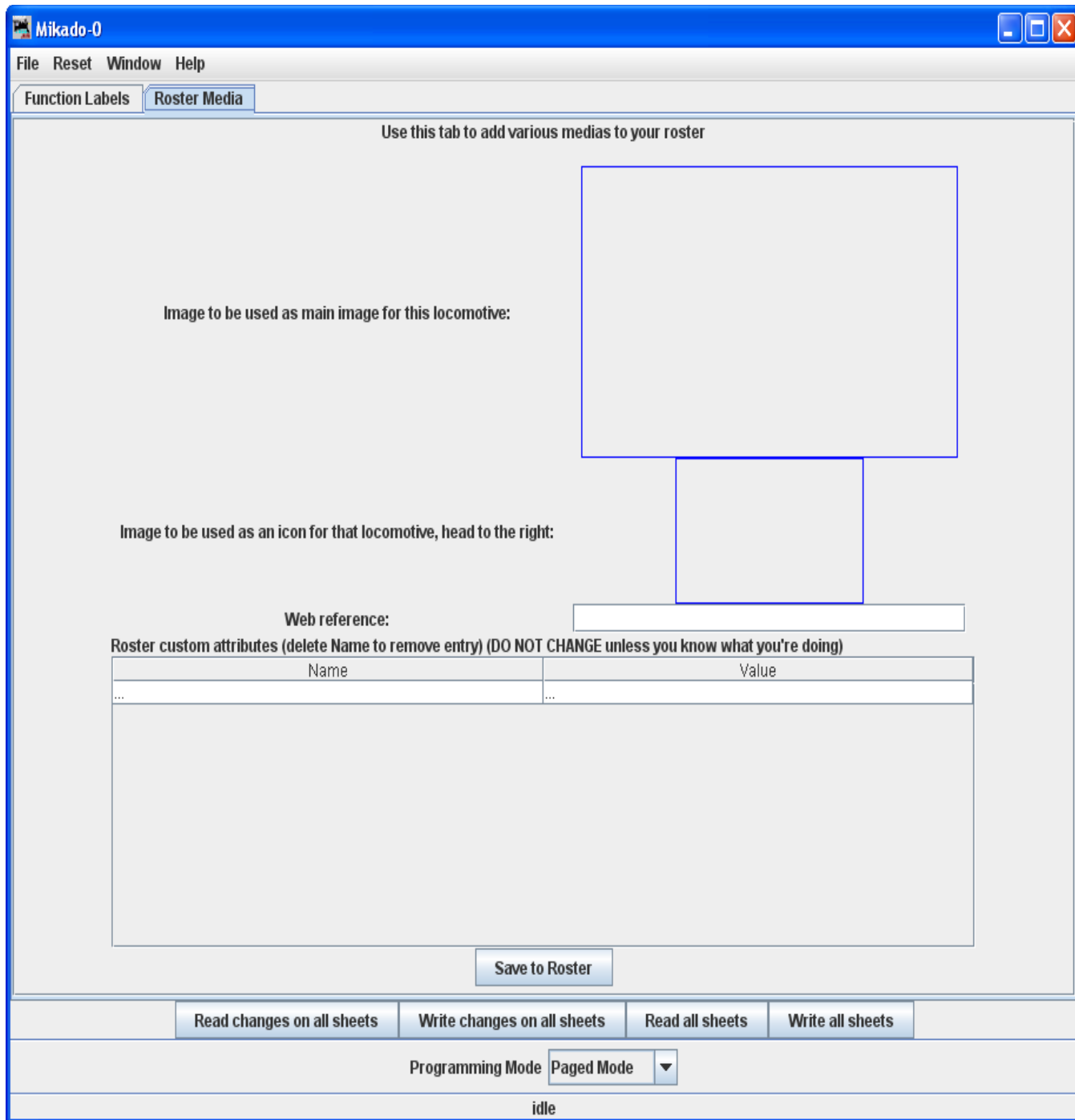
lock	Makes the function button "latching" or "non-latching". When the box is checked the function is "locked" or "latched". Latched Function when pressed will stay on(down position) until pressed again i.e. Function button labeled "Bell" would ring until pressed again. Unlatched Function when pressed toggles on and then off. i.e. Function Button labled "short horn", when pressed provides one blast of horn.
off	Place holder for icon that is displayed on Function Button when it is in off state.
on	Place holder for icon that is displayed on Function Button when it is in on state.
shunt	Sets "virtual" funtion key for software throttle. The "lock" option also needs to be set simultaneously with the "shunt" virtual function key activation. When this Function key is pressed the throttle speed slider on the software throttle changes to "center off" style for shunting, rather than the "full-range with separate direction key"

You may drag and drop icons into the off or on space holder herer or in the Throttle Function pane properties.

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

Roster Media Pane

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

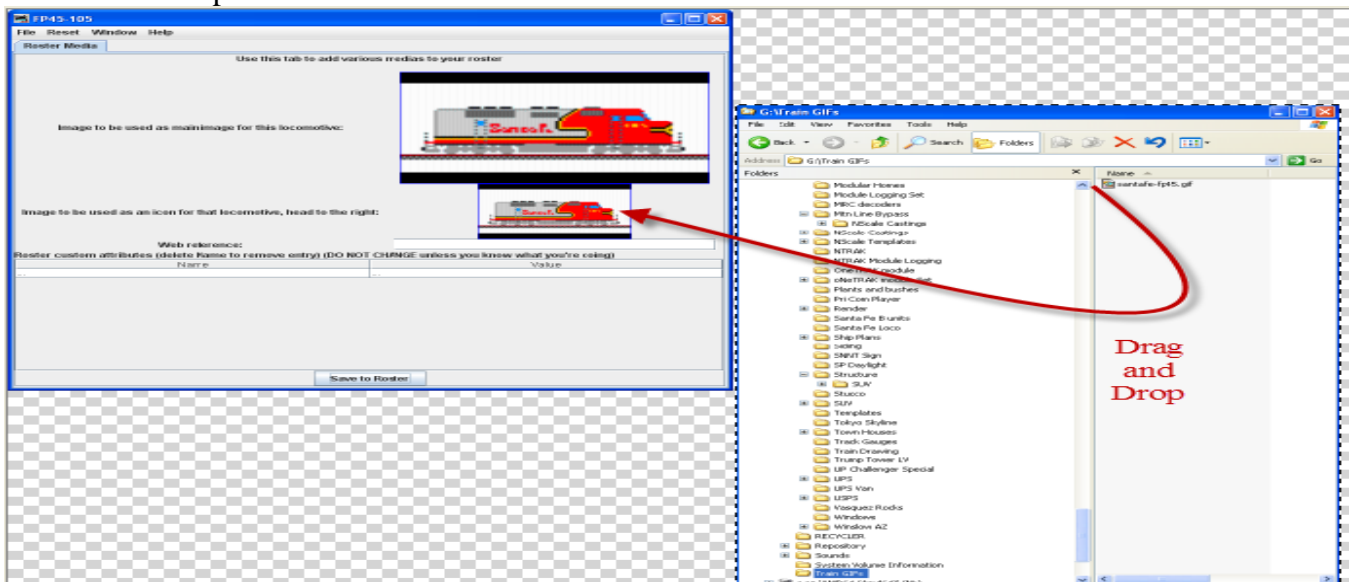


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Image to be used as main image for that roster: The large black box is the image holder. The image is placed into the image holder by following these instructions.

1. First you must find the image of the Locomotive and store it on your disk drive.
 - a. Sources
 1. Images downloaded from a website to your computer
 2. Photos taken with a digital camera or scanned from film
 3. Other sources, CD, DVD frames from videos etc. saved as an image to your computer
 - b. Format
 1. The GIF format is preferred with transparent background
 2. PNG with transparent background
 3. JPG
2. After storing image on your computer open the Roster Media Pane, then open Windows Explorer or File Manager for your system and drag and drop the image file into the large black box. You may also save the image to your Desktop and drag and drop to Roster Media from there. **DO NOT** try to drag and drop from a website.
- 3.

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



To remove either image from the Roster, Right click and click remove in the context that displays, however, it will not remove the image from the Resources folder.

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

1. Next you must find the image of the Locomotive to use as an icon and store it on your disk drive.

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- a. Sources
 1. Images downloaded from a website to your computer
 2. Photos taken with a digital camera or scanned from film
 3. Other sources, CD, DVD frames from videos etc. saved as an image to your computer
 - b. Format
 1. The GIF format is preferred
 2. PNG with transparent background
 3. Do not use JPG.
2. After storing icon image on your computer open the Roster Media Pane, the open Windows Explorer or File Manager for your system and drag and drop the image file into the small black box. You may also save the image to your Desktop and drag and drop to Roster Media from there. DO NOT try to drag and drop from a website.

To remove either image from the Roster, Right click and click remove in the context that displays, however, it will not remove the image from the Resources folder.

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

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

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

www.railserve.com/TrainGIFs/

www.djcooley.com/info/gifs/loco/gifloco.htm

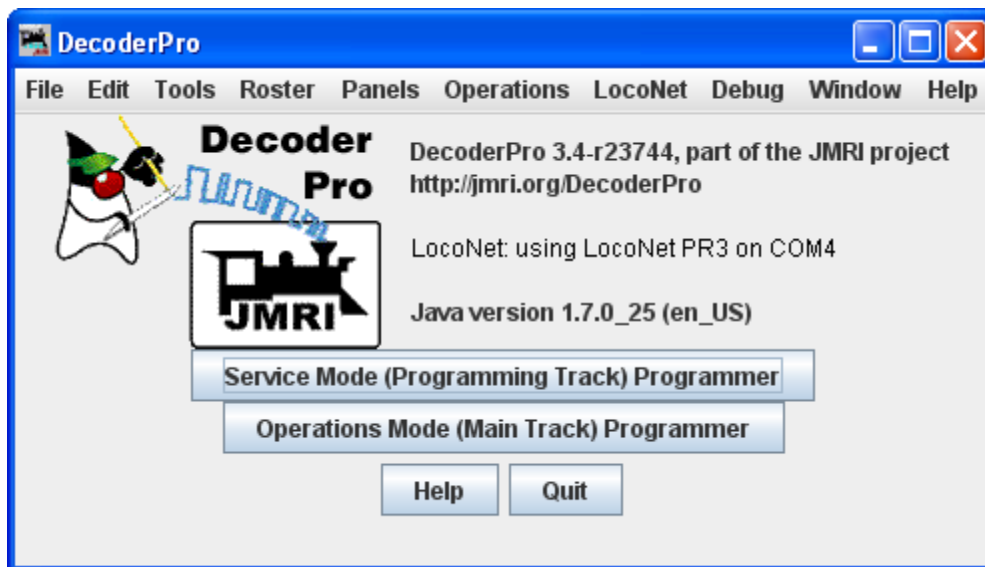
www.kls2.com/~karl/rr/consists/

www.bluarcher.com/traingifs/edtraingifsSD40.htm

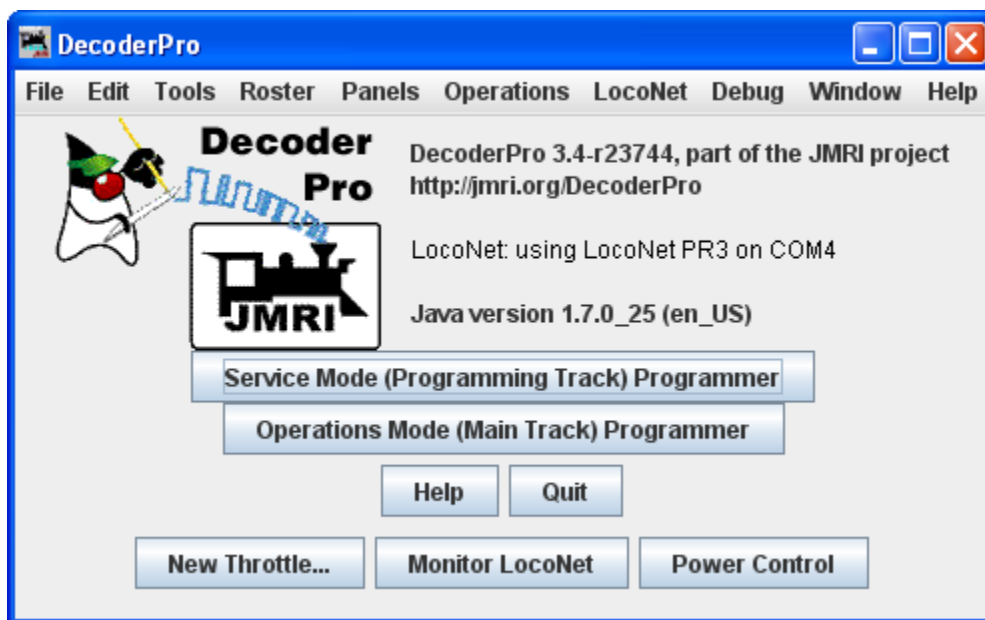
DecoderPro® Main Window

Main Window Overview

When you start Decoder Pro, the DecoderPro window is displayed. All of the JMRI functions can be accessed via the menu bar on the DecoderPro® window, additional menus are added when functions are selected, example



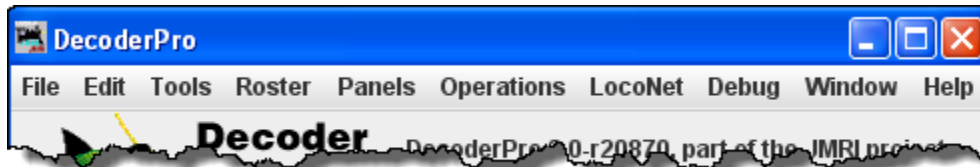
After initial setup of preferences, you may have added buttons at the bottom of the screen to open various tools that you may want to use. These buttons will vary to match your preferences, I have setup buttons for **New Throttle**, **Power Control** and **Monitor Locomot.**



DecoderPro® 3.4 User's Guide

Menu Bar

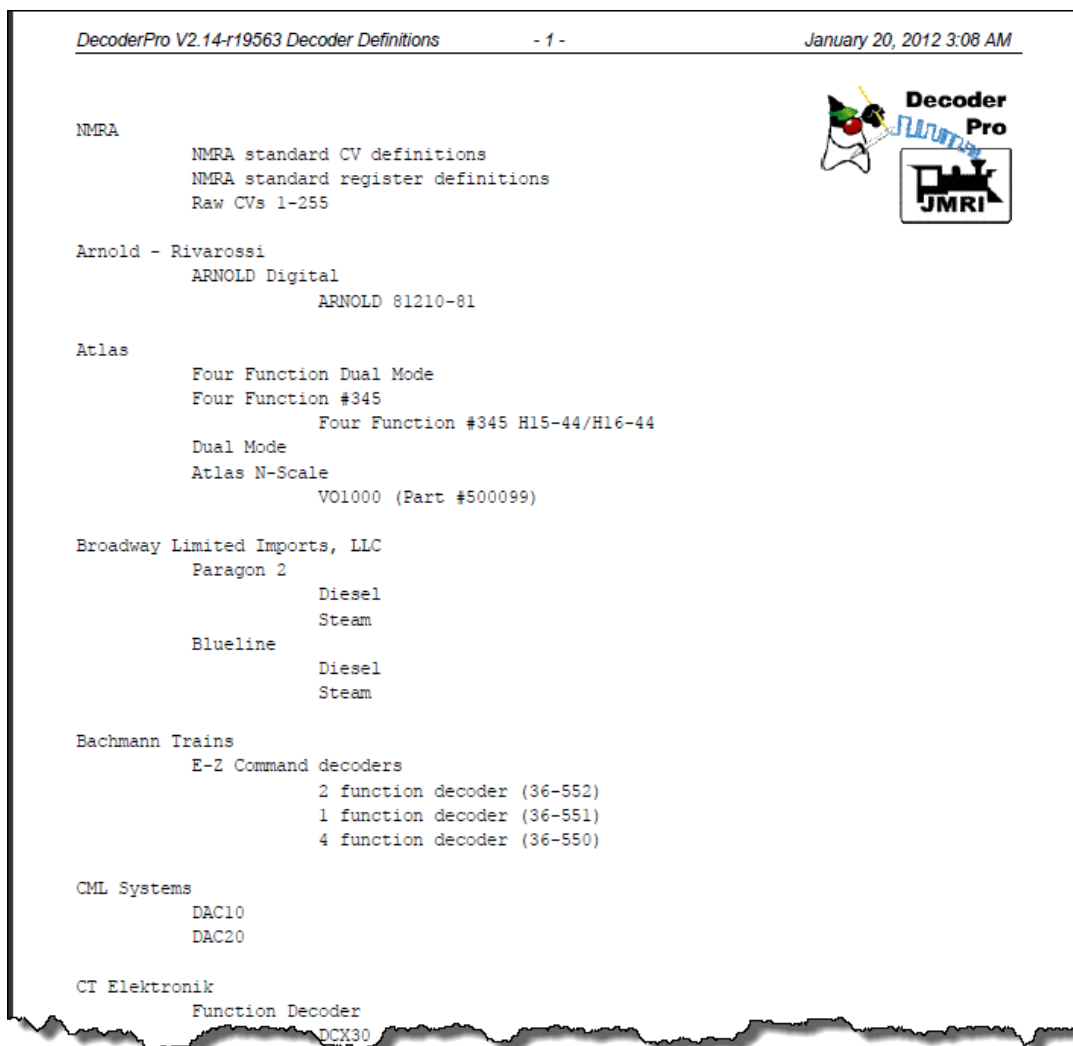
All of the JMRI functions can be accessed via the menu bar on the DecoderPro® window.



File Menu

Print Decoder Definitions...

Opens your computer Print dialog to print the installed decoder definitions. The complete list may be more than 25 printed pages. The format is shown below.



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Print Preview Decoder Definitions...

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



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Quit

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

Edit Menu

Cut

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

Copy

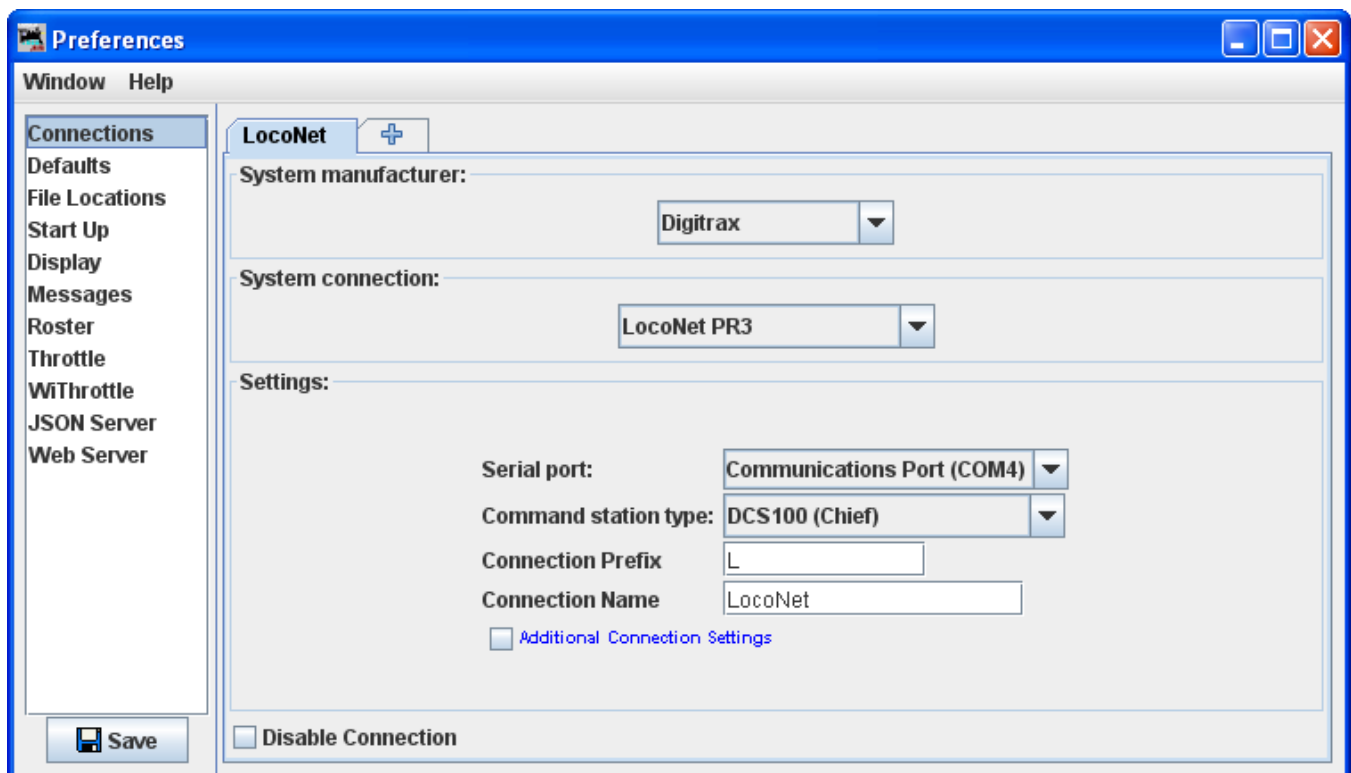
Copies selected text into the computer's clipboard

Paste

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

Preferences...

Opens the **Preferences window**.

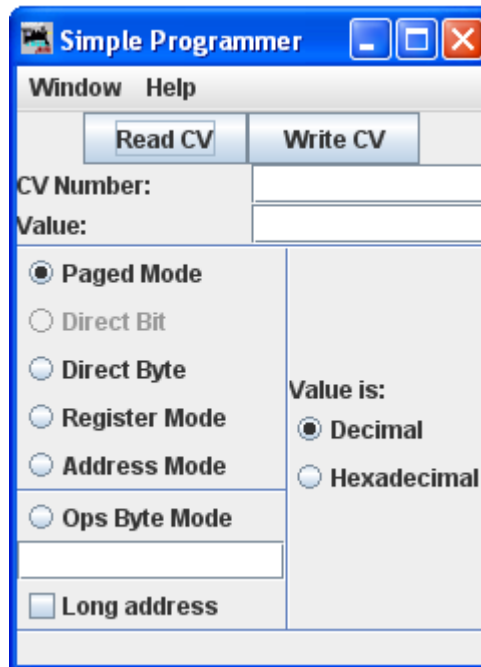


Tools Menu

Programmers ►

Single CV 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

Opens the Service Mode Programmer.

Ops-Mode Programmer

Opens the Ops-Mode Programmer.

Multi-Decoder Control

Opens the Multi-Decoder Control window.

Tables ►

(advanced users, beyond the scope of this manual)

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

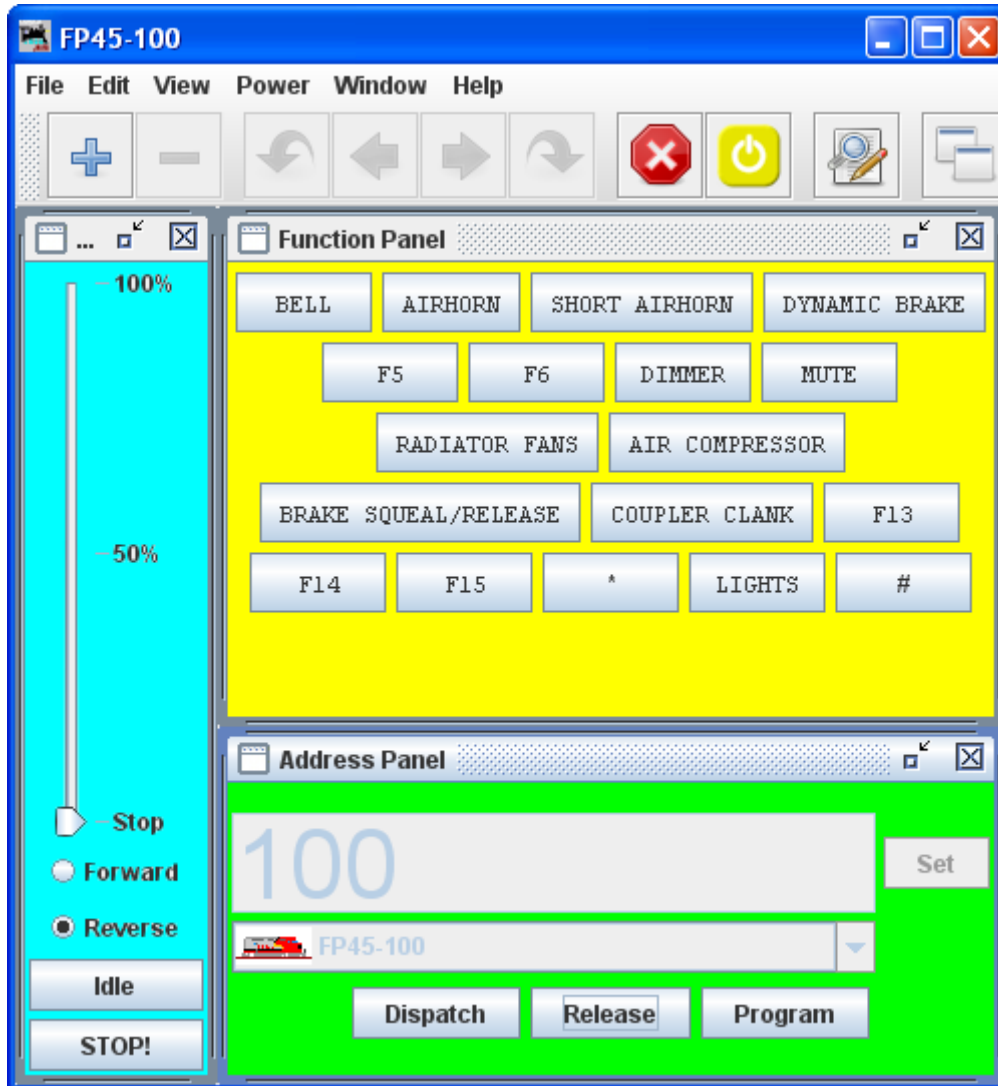
Throttles ►

New Throttle....

Opens Throttle window.

The JMRI® Throttle may be used on your computer screen to replace the vendor throttle that is furnished with your DCC system. One or several throttles may be in use at one time. The Throttle opens as a floating window that may be positioned anywhere on your desktop. Note the Title Bar contains the locomotive address information.

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(color shading added to show functional areas throttle panels)

The Throttle Window contains **Menu Bar**, **Toolbar** and three panels which may be enabled or disabled via check box in the View menu. Each panel has a title bar with windows controls to minimize, maximize and exit :


MINIMIZE THE PANEL, WHICH MEANS IT IS NO LONGER VISIBLE BUT THE RESTORE BUTTON IS LOST BEHIND THE REST OF THE PANELS. THE WAY TO EASILY GET IT BACK, IS TO GO INTO THE VIEW MENU, UNCHECK IT THERE, THEN GO BACK AGAIN AND RE-CHECK IT. YOU MAY ALSO DRAG THE PANELS OUT OF THE WAY TO UNCOVER THE MAXIMIZE ICON FOR A MINIMIZED PANEL.


Address Panel (green shading) facilitates setting the address of the locomotive you wish to control with the throttle.


Throttle Address Panel

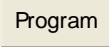


Primary use is to identify the decoders address, and to dispatch or release the identified address. Locomotive address may be entered by one of two methods: typed into text box or use drop-down list to select locomotive from your roster. . If you have added **Function labels**, to your Roster, the label text from the Roster will be displayed on the throttle function buttons.

Click on the  to send the address to your system to make this throttle active.

 is used to dispatch the locomotive which releases the throttle for that address so that it can be acquired by another throttle

 is used to release the address from your system.

 opens the **Programmer** for the locomotive selected in ops-mode (Programming on the Main) Only active when roster entry is used to select the address for the throttle.

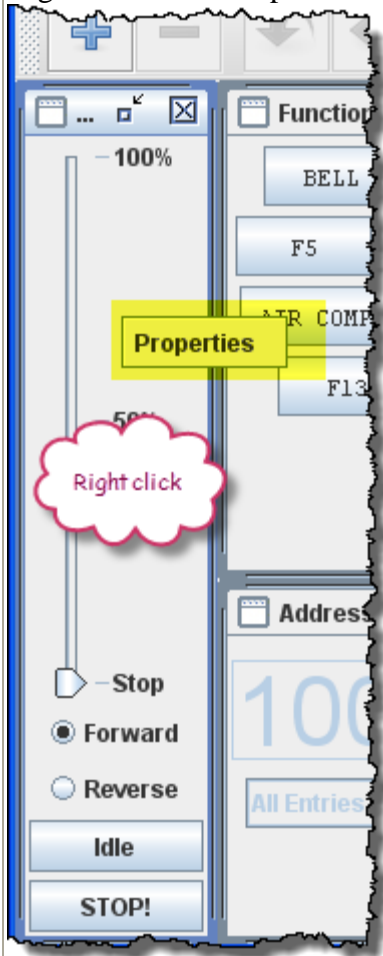
Any of the buttons may be grayed out depending on the status of your system.

Control Panel

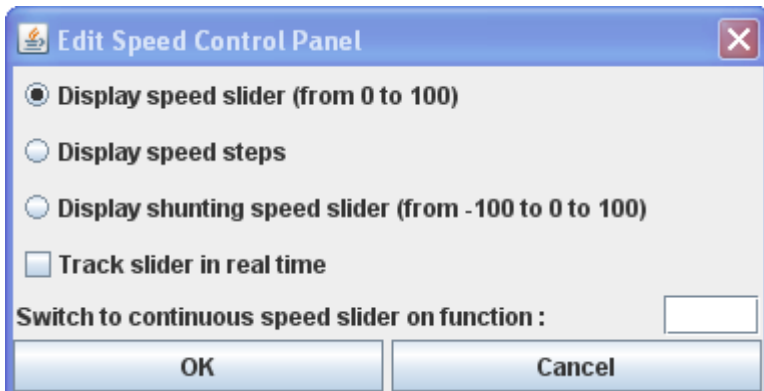
(blue shading) contains the controls for applying power to the locomotive that is addressed and controlling speed

Throttle Control Panel

Right Click in the Speed Control Panel space and context menu with Properties is displayed.



Click on Properties and Edit Speed Control Panel window opens.



Control Panel Properties may be set by right clicking on the Throttle Control Panel(Speed), the **Edit Speed Control Panel** dialog is displayed. This allows you to select either of the two slider or step speed control

Display Speed Slider(from 0 to 100)-- displays the Throttle Control shown at the left

Display Speed Steps -- displays the Throttle Control shown in the middle

DecoderPro® 3.4 User's Guide

Display shunting speed slider(from 100 to 0 to 100) -- displays the Throttle control shown on the right

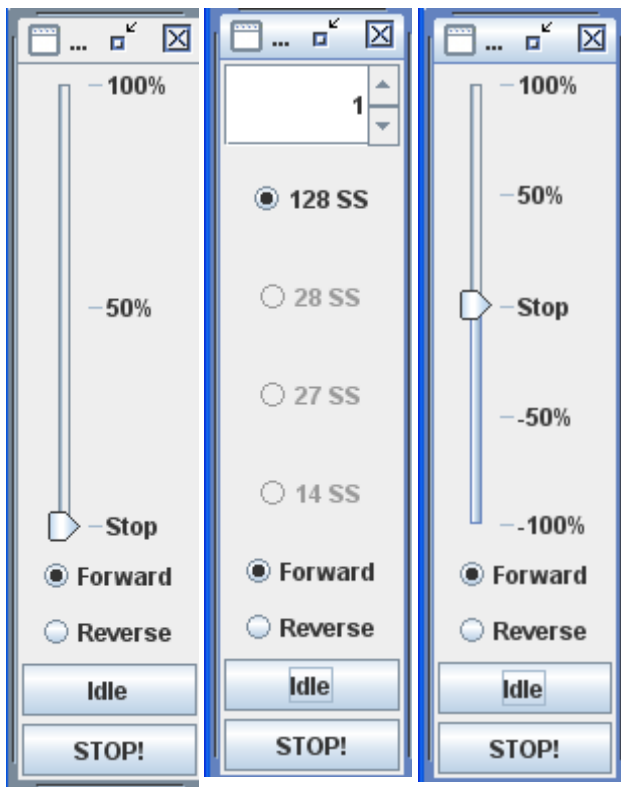
Track sider in real time

Switch to contiuous speed slider on

function: Enter the function from the **Function Panel** that you want to use.

OK button sets the selections

Cancel button cancels any settings



Slider from 0% to 100%

Speed steps

Slider 100% to 100% through 0%

After you have established an address for the throttle, you should be able to run the train on your layout. The Control panel is used to control the speed and direction on your locomotive when the throttle is used to operate on a layout.

The throttle slider controls the speed and indicates the percentage of power from **Stop** to **100%**. Use mouse to drag the slider to the desired speed

Alternately, the slider may be set to STOP in the middle and move to + 100% or to -100% to control locomotive speed.

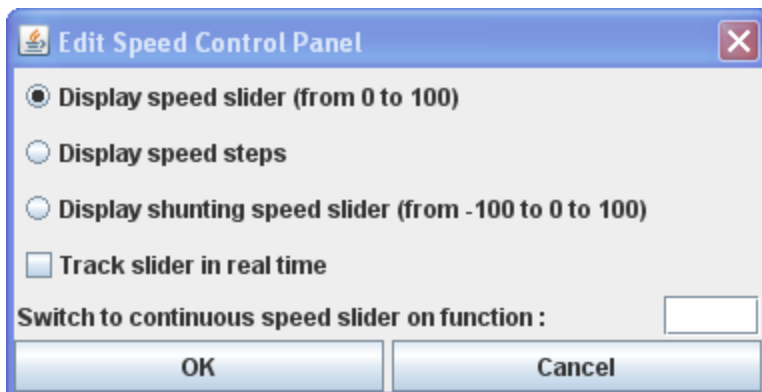
In the Step mode the up and down arrows control the speed one step at a time, or you may enter a number into the text box area between 0 and the max step indicated.

Forward and **Reverse** set the locomotives direction.

executes an emergency stop, locomotive stops immediately overriding any BEMF or momentum programmed into the decoder.

stops the locomotive smoothly using any momentum setting programmed into the decoder..

Control Panel Properties may be set by right clicking on the Throttle Control Panel(Speed), the **Edit Speed Control Panel** dialog is displayed. This allows you to select either of the two slider or step speed control



Display Speed Slider(from 0 to 100)-- displays the Throttle Control shown at the left

Display Speed Steps -- displays the Throttle Control shown in the middle

Display shunting speed slider(from 100 to 0 to 100) -- displays the Throttle control shown on the right

Track sider in real time

Switch to continuous speed slider on function: Enter the

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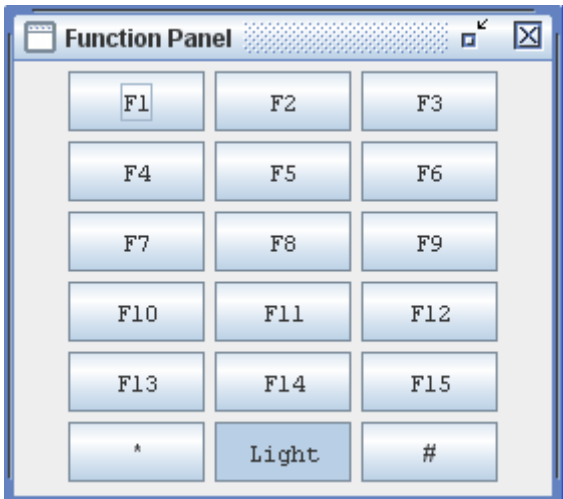
function from the **Function Panel** that you want to use.

Sets the selections

Cancels any settings

Throttle Function Panel

(yellow shading) contains all the function buttons used to control the addressed locomotives functions.

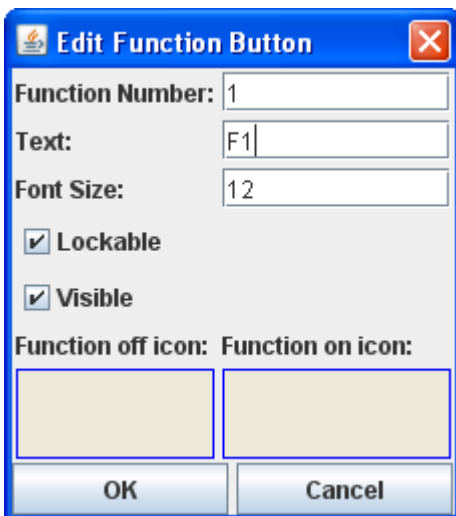


The **Throttle Function Panel** allows you to select the decoder functions from F0 through F15 on first overlay and F16 through F28 on second overlay. Many new Sound decoders use up to 28 functions..

use the  to toggle between the two overlays

If you have entered **Function labels_** the label text will appear on the throttle Function buttons.

Another way to change the labels on the function buttons, is to right click on the button that you want to edit, the word **Properties..** is displayed and when clicked on, an **Edit Function Button** dialog box will be displayed.



Edit Function Button allows you to edit the text displayed on the button and the function assigned.

Function Number: text box to set the function assigned to the button.

WARNING!!! MAKE SURE YOU DO NOT ASSIGN THE SAME FUNCTION NUMBER TO MORE THAN ONE BUTTON, OTHERWISE, UNDESIRABLE RESULTS MAY OCCUR

Text: the text you want displayed on the button.

Font Size: Select the font size in points.

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Lockable - locks the function when button is clicked. eg makes the button a push on / push off button.

Visible - makes the button visible. When unchecked the button will not show in the panel. To restore use the **View** menu and select **Show All Function Buttons** option.

Function off icon:

Drag and drop icon of your choice into the box. To remove icon right click and click on Remove.

Function on icon:

Drag and drop icon of your choice into the box. To remove icon right click and click on Remove.

Sets all the values edited.

exits dialog without change.

You can use the **Save** button on the **Address Panel** to save the edited functions to your locomotives Roster entry.

The descriptions shown above are only a small part of what the Throttle Window can do. The author(s) of the Throttle Window have created an extensive set of Help files to help you customize Throttle Windows to your way of operating. To access Help, just open a New Throttle. Then, click on Help and select Window Help from the dropdown box. There's lots of good stuff in there.

Throttle Window Menu Bar

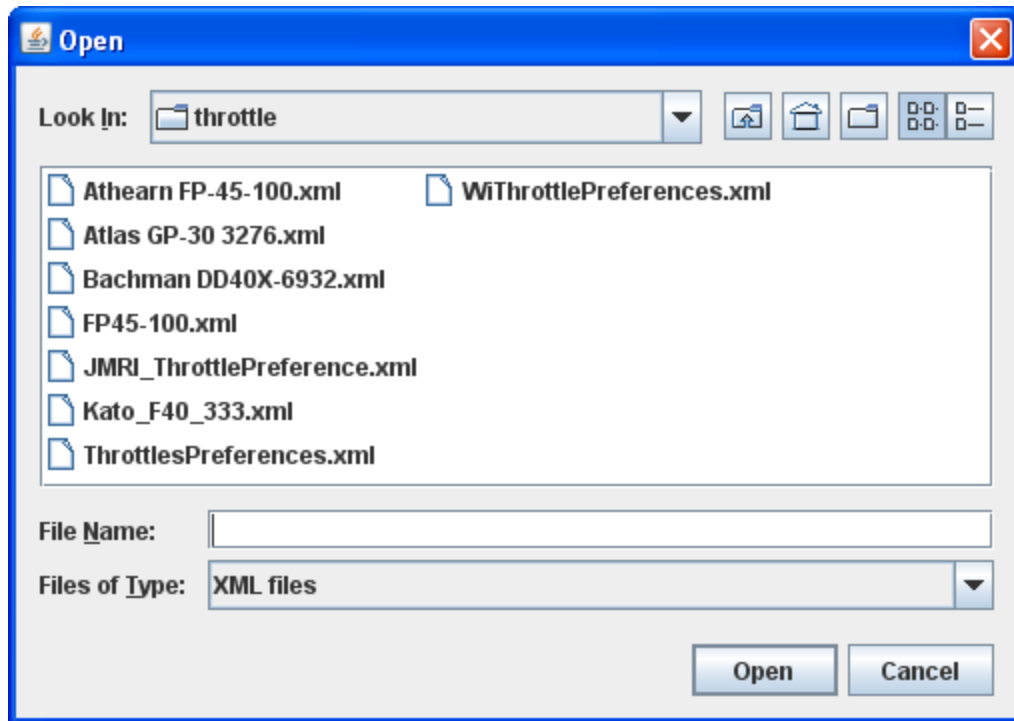


File

New Throttle...

Opens new copy of the throttle

Open Throttle



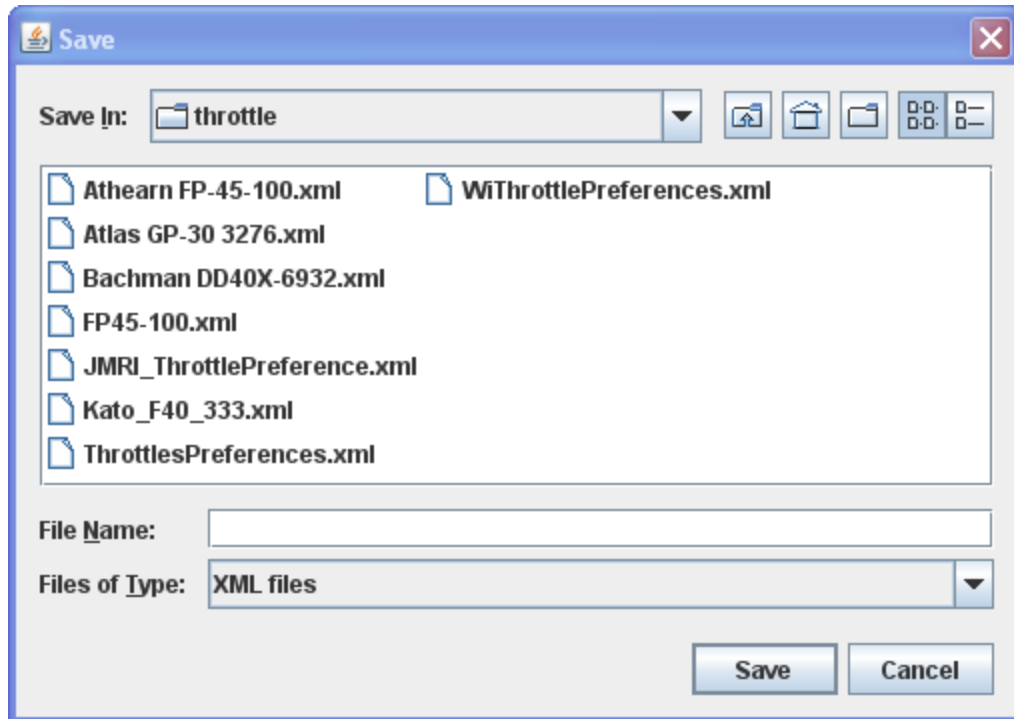
Select a saved throttle XML: file.

Save Current Throttle

Save a throttle file that has been opened and modified

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Save Current Throttle As...



Opens the Save dialog to allow you to save the Throttle XML file in the location you select and using the name you specify

Open Throttles Layout...

Opens Throttle layout that you select.

Save Throttles Layout...

Save Throttles Layout to file in Throttle Folder

Load Default Throttles Layout

Load the default throttle layout from Throttle Folder

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Save As Default Throttles Layout

Save as the default throttle layout from Throttle Folder

Start WiThrottle

This window controls the connection between WiFi throttles, e. g. an iPhone, iPod Touch, or Android Phone and JMRI **Preference** in the Wi/Throttle Pane.



Menu Bar



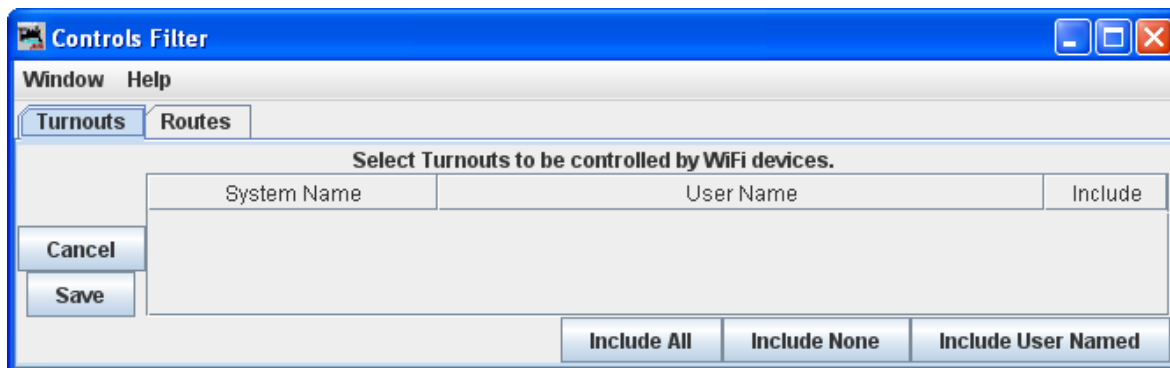
WiThrottle

Start Server

Starts the server for the Withrottle

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Filter Controls



Set up Turnouts and Routes that can be controlled by DecoderPro3® for control by WiThrottle.

Preferences...

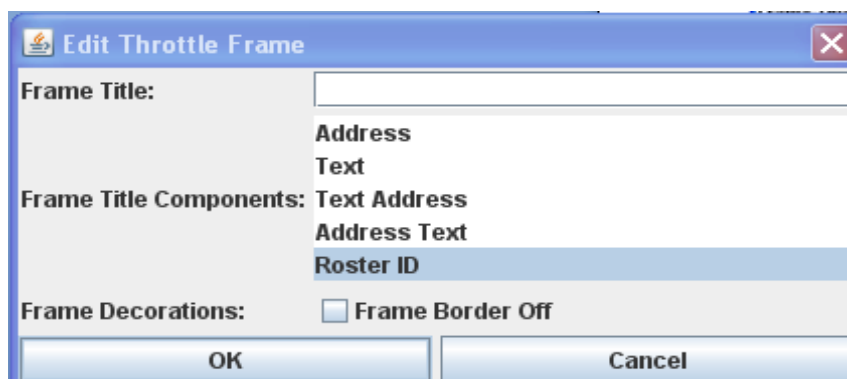
Opens the WiThrottle Preferences Pane in preferences.

Window

Help

Edit

Frame Properties



Frame Title:Type the title of your choice for the Throttle frame. This is referred to below as "text".

Frame Title Components: Select the text component desired. There are two components which can be in the title bar of the throttle "Text" and "Address" The selections allow either or both to be in the title (in the order they appear in the selection), or one can opt for the description in the locomotive Roster Entry

Address --Automatically display the address of whatever locomotive is selected. (default)

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Text -- Display the text that you enter in the field as the title at the top of this window

Text Address -- Display the text you entered, followed by the selected address

Address Text -- Display the selected address, followed by the text you entered

Roster ID -- Display the selected roster ID

(Note that if you enter text, it will not be visible unless one of the middle three modes is selected)

Frame Decorations:

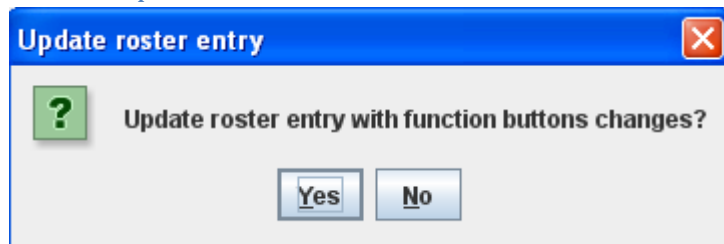
This will remove the individual control bars for the separate panes of the throttle. This is advised for Windows users, as clicking the minimize buttons causes the restore button to be lost behind the rest of the panels. Recovery entails using the view menus to remove and then restore the panel in question.

OK button adds the edits

Cancel aborts the operation

Opens the **Edit Throttle Frame** dialog and allows you to edit the current throttle window title and selected Frame properties.

Export Current Throttle Customization to roster

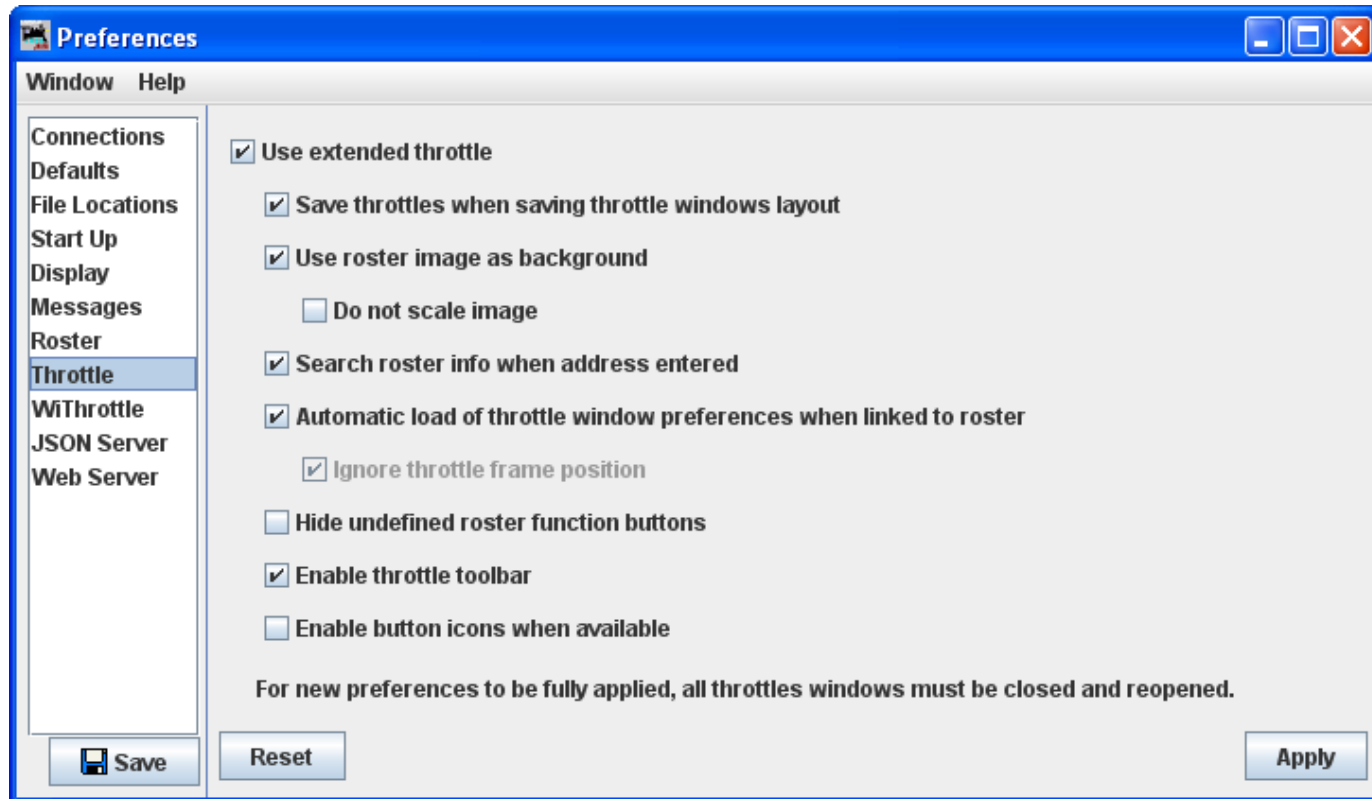


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Throttle Preferences

Throttle Pane in DecoderPro® preferences

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



View

Allows you to select which of the three panels of the throttle are being shown. Place a check mark in each of the panels that your want to display.

Address Panel

Control Panel

Function Panel

You may ask yourself, "Why would I want to turn off any of these panels?" As only one example, let's say we have an observation car at the rear of a passenger train. We could equip this car with a function only decoder to control:

1. Interior lights,
2. Rear marker lights, and

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3. A rear Drum light.

We have no need for the speed control pane and only need three function buttons for this “Throttle”. With a whole passenger train equipped like this, lots of screen space can be conserved by using the throttle set-up files to optimize the **Throttle** windows. Then you could turn off the lights in the kitchen and lower the lights in the dining area so the passengers can enjoy the sunset as they transit the Rockies enjoying the beautiful sunset sipping Cognac.... but I digress. You get the idea.

Reset Function Buttons

Resets all the Function buttons to the default settings, , , etc.

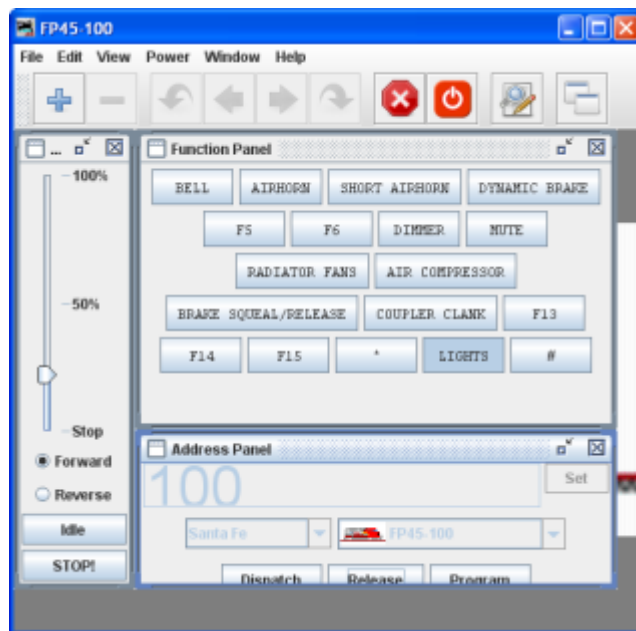
Get all current throttle components in bounds

Returns all the throttle panels to the throttle frame.

Switch Throttle frame view mode

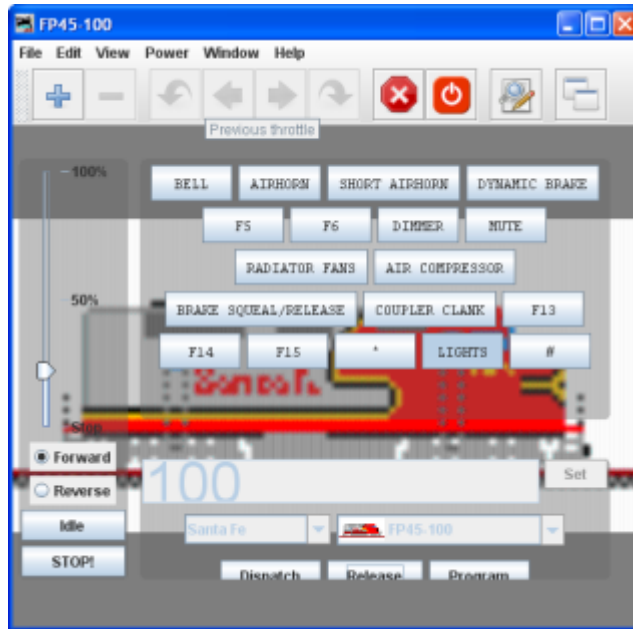
Toggles the Throttle frames on/off

Frames on.



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Frames off

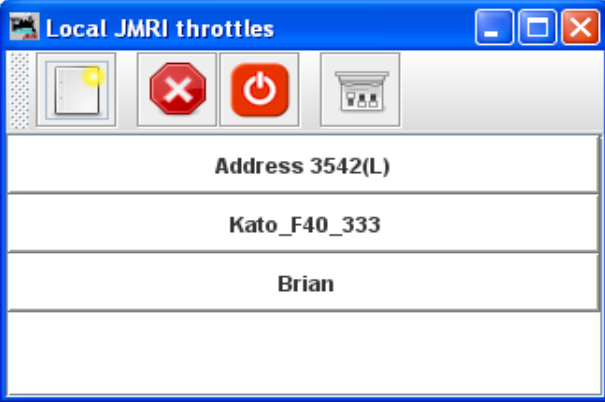


Show/Hide Throttles list window

Toggles the **Local JMRI throttles** list window on or off

Opens the Local JMRI throttles Window displaying all the throttles that are in use on your program.

	Opens a new Thottle
	Emergency stop for all Throttles under JMRI control
	Track power control
	Opens the Throttles preferences window

	
Address 3542(L)	
Kato_F40_333	
Brian	

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Power

(track power control, if supported by your system)

Power On

Power Off

Window

Minimize

Lists all open DecoderPro windows. If one of the windows is clicked it will be brought to the front so that you can minimize it to the system tray.

Help

Window Help...

General Help...

License...

Locations...

Context

System Console

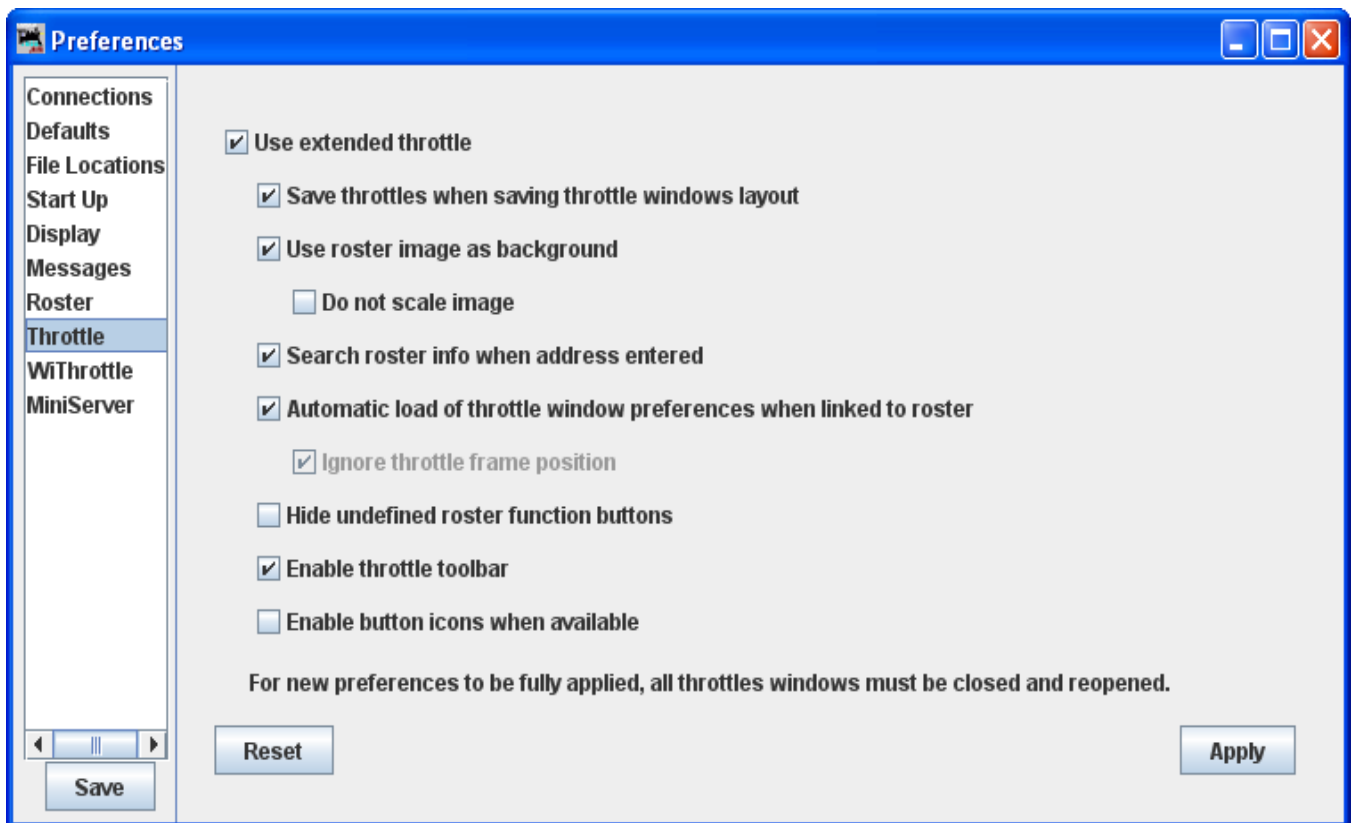
Upload Debugging Info...

Toolbar



The Throttle toolbar is enabled from the Throttles Preferences Pane

Use Throttles preferences window to set the desired preferences.



When it is enabled, a Throttle Window can host a set of Throttles. You can browse through these throttles: Add a new Throttle in that Throttle Window. Once the number of Throttles in a Throttle Window is greater than one, Next and Previous Icons are enabled.

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Open a new Throttle Window



Closes the current Throttle Window



Return to Previous running Locomotive.



Goes to previous throttle.



Goes to next throttle



Goes to next running locomotive



Issues an emergency stop command to all locomotives under JMRI control.



Controls track power on or off, if supported.



Switch to or revert from Edit Throttle mode.



Opens the Local JMRI Window

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Consisting Tool

Three types of consists are used on DCC systems:

- A **basic** or **primary address consist**, where each locomotive is assigned the same address on the programming track, or on the main with **OpsMode Programming** (if supported by the command station and decoder).
- A **Command Station Assisted Consist** (CSAC) which builds the consist using a function of your command station. Command Station Assisted Consists go by the trade names listed below.

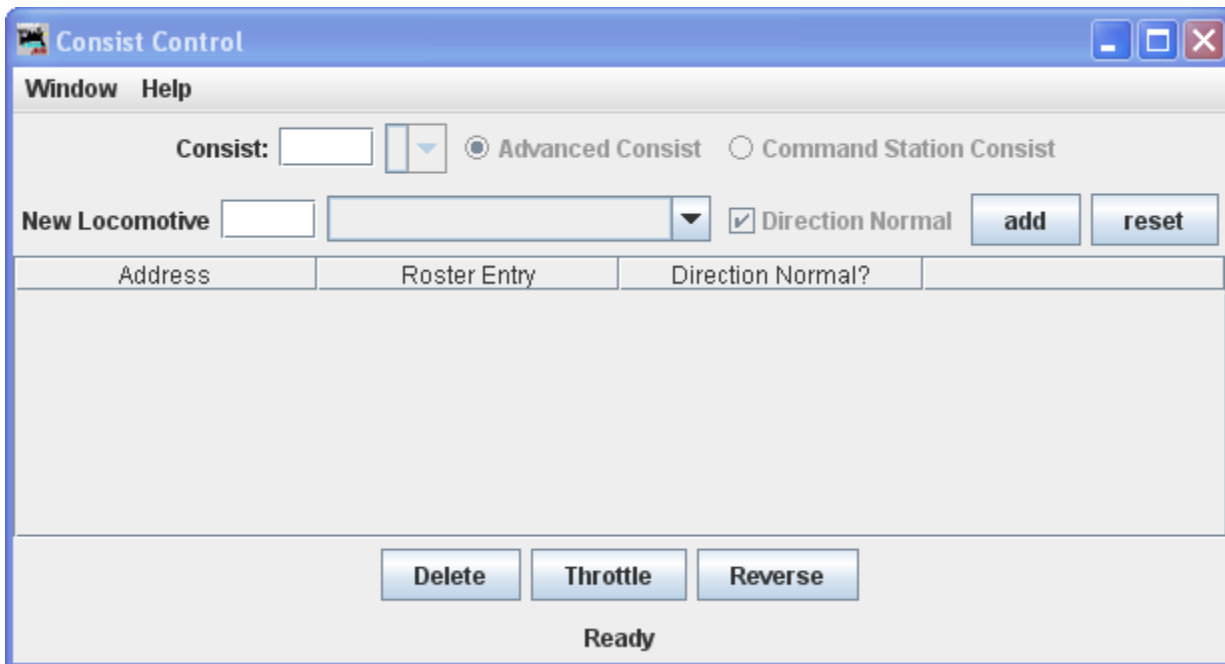
Manufacturer Trade Name		Usage Notes
Digitrax	Universal Consist	Limited to the number of slots supported by the system. Allows any address
Lenz	Double Header	Limited to 2 locomotives. Allows any address but 00 to be used
NCE	Old Style Consist	Limited to 8 locomotives. Allows any address but 00 to be used
EasyDCC	Standard Consist	Limited to 8 locomotives. Allows any address but 00 to be used

-
- A **Decoder Assisted Consist** (DAC), often referred to as Advanced Consist. The NMRA[®] has set aside CV19 as a dedicated location for consist addresses. If CV19 contains a value other than 0, the locomotive will respond to speed and direction instructions sent to the address in CV19. If CV19 contains zero then it will respond to speed and direction commands sent to the usual short or long decoder address. Since the consist address is a single CV, it is limited to the range of 1 to 127. If you add 128 to the consist address, the locomotive will run backwards (relative to its normal direction of travel) in the consist. The DAC can be set up in the **Consisting** tab in the Comprehensive Programmer.

DecoderPro Consisting Tool

The consist tool provides a visual tool for manipulating the **Decoder Assisted Consists** and , on some command stations, **Command Station Assisted Consists**.

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The **Advanced Consist** and the **Command Station Consist** allow you to select either consist mode if supported by your command station. If not supported the options will be grayed out.

Consist text box: type the consist ID assigned to the locomotives in the consist for **Decoder Assisted Consists**. For Command Station Consist, this is automatically filled in with the address of the lead locomotive in the consist.

New Locomotive text box : type in a new locomotive address or select from your roster using the drop-down list.

Clicking the will add the locomotive to the consist and it will appear in the list area of the window.

Clicking the will clear the information of the current locomotive.

The **Direction Normal** determines the direction of the locomotive travel as forwarded or reverse when the consist is traveling forward. Will be grayed out until the lead locomotive is selected.

removes the consist. The list of the consist will have a for each locomotive, allowing you to remove any locomotive from the consist.

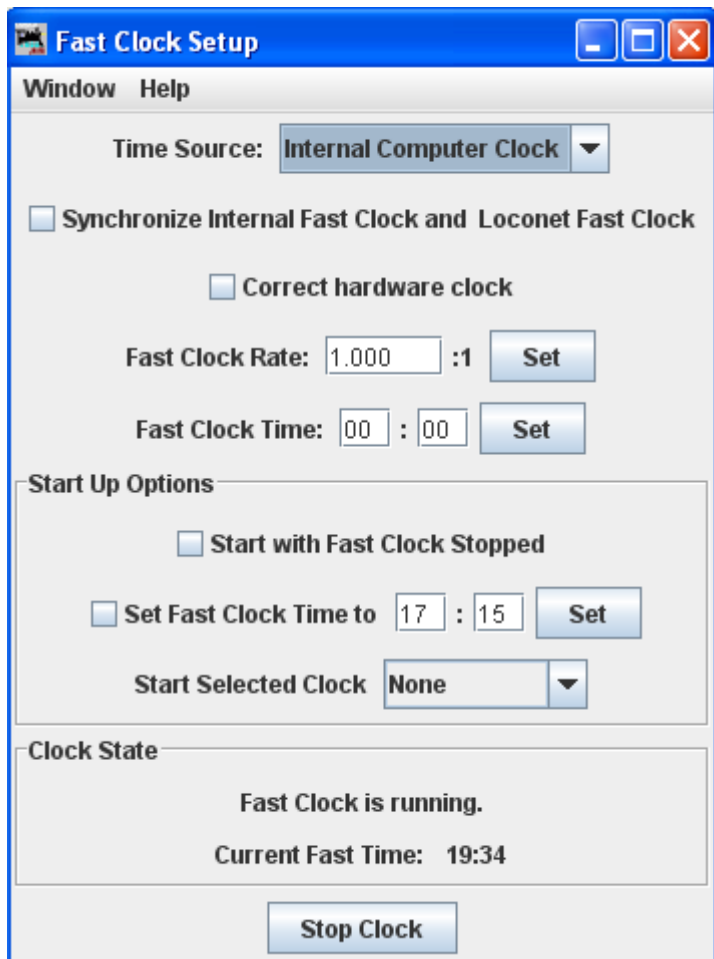
Delete button deletes the entire consist.

Throttle button opens a **throttle** for the consist.

Reverse button reverses the direction of the consist.

Clocks ►

Setup fast Clock...



Time Source drop-down list allows you to select the your clock source. Usually, the Internal Computer Clock is selected unless you have a DCC clock on your system.

- Synchronize Internal Fast Clock and system Fast Clock** will normally be checked. (Loconet shown with Digitrax).
- Correct hardware clock** used to maintain accurate time when using a hardware fast clock.

If you clock supports computer setting of 12/24 hour display, **Use 12-hour clock display** will be displayed.

Fast Clock Rate text box, type in the multiplier factor for the wall clock time. Example: 4.000 rate would mean than fast clock move 1 hour while wall clock moves 15 minutes. Click on **Set** button to set the rate. If anything is incorrect an error message will be displayed. If the rate is valid then it will be sent to all clocks, even if they are synchronized.

Fast Clock Time text box, type in time in hours and minutes using 24 hour clock. Click **Set** button to set all clock times.

Start Up Options

All options set in this section take effect when you load either Panel file or configuration file if you do not use a panel.

- Start with Fast Clock Stopped** is checked your Fast Clock will start up Stopped (Paused)

Clock Status

Status of the clock is displayed as is the **Current Fast Time**:

The button at the bottom of the window toggles between **Stop Clock** and **Start Clock** when clicked, allowing you to start/stop clock as you desire.

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else it will start at file loading time.

- Set Fast Clock Time** to hours and minutes as 24 hour clock. Click **Set** button to set the time.

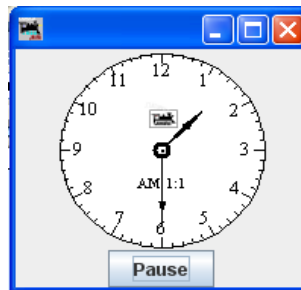
Nixie Clocks



LCD Clock

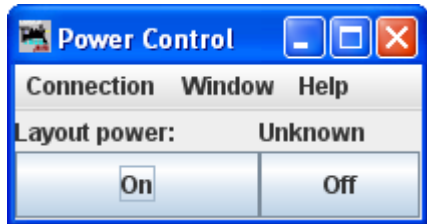


Analog Clock

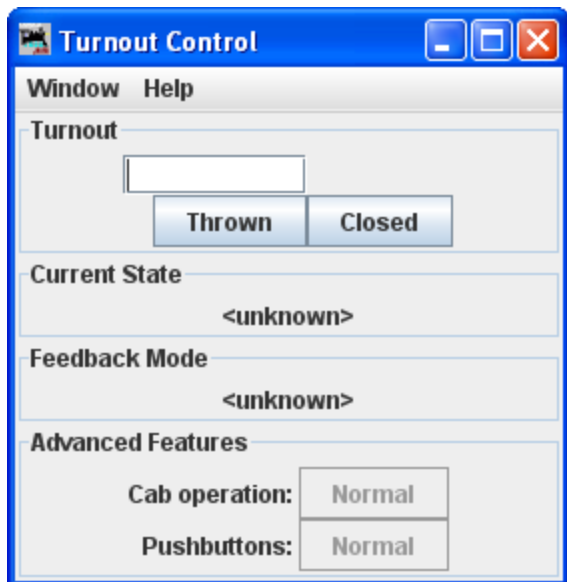


Power Control

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



Turnout Control...



Turnout Control

Turnout

Enter the accessory number or turnout system name for the accessory or turnout you wish to control. For example, entering 678 and by pressing either the or , you should be able to change the state of accessory number 678 on the layout.

Another example, a valid turnout system name for NCE could be NT456. Then by pressing either the Thrown button or Closed Button , you should be able to change the state of turnout or accessory number 456 on the layout

Another example, a valid turnout name could be IT123 which is internal turnout number 123. Pressing either the Thrown button or closed button will only change the state of the internal turnout and will not change a turnout on the layout.

current state: A turnout can have four states: <unknown>, <inconsistent>, <thrown> and <closed>

feedback mode: some of the available feedback modes are: <DIRECT>, <ONE SENSOR>, <TWO SENSOR>, and <MONITORING>. A turnout using DIRECT mode does not have feedback from the layout. ONE SENSOR use one sensor on the layout to provide feedback on he state of the turnout. TWO

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SENSOR uses two sensors for feedback, one for closed and one for thrown. MONITORING gets feedback from the system by either listening to cab commands on the layout or polling the system for turnout status.

Cab operation: some turnouts can be locked. If the control button is grayed out, the lock feature is not available.

Pushbuttons: Shows state of Pushbuttons.

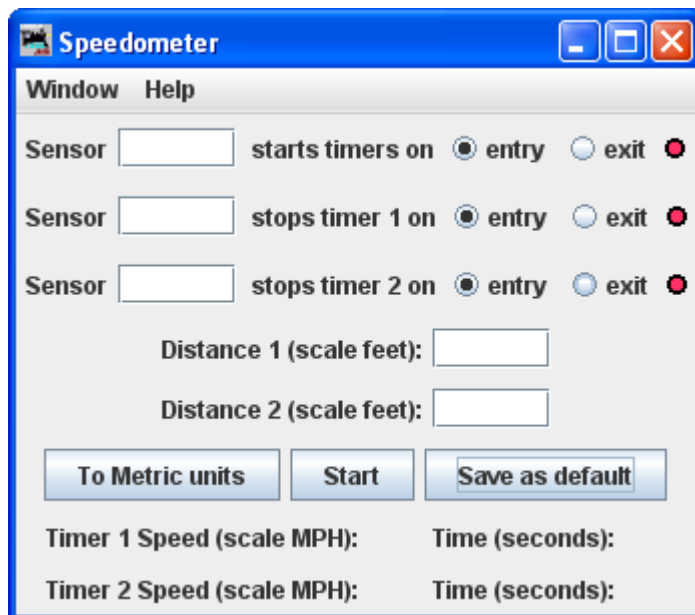
Simple Signal Logic

(advanced users, beyond scope of this manual)

Sensor Groups...

(advanced users, beyond scope of this manual)

Speedometer...



Three sensors are installed on your layout, sensor 1 and 2 for slow speeds, and sensor 1 and 3 used for higher speeds. The time to travel between the sensors is used with the distance to calculate the speed in English or Metric units

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Enter the sensor number for each of the sensors in the **Sensor** text box. You can set to start or stop on the **entry** or **exit** of the block.

Enter the **Distance 1 (scale feet)**: in text box, which is the distance between sensor 1 and 2.

Enter the **Distance 2 (scale feet)**: in text box, which is the distance between sensor 1 and 3.

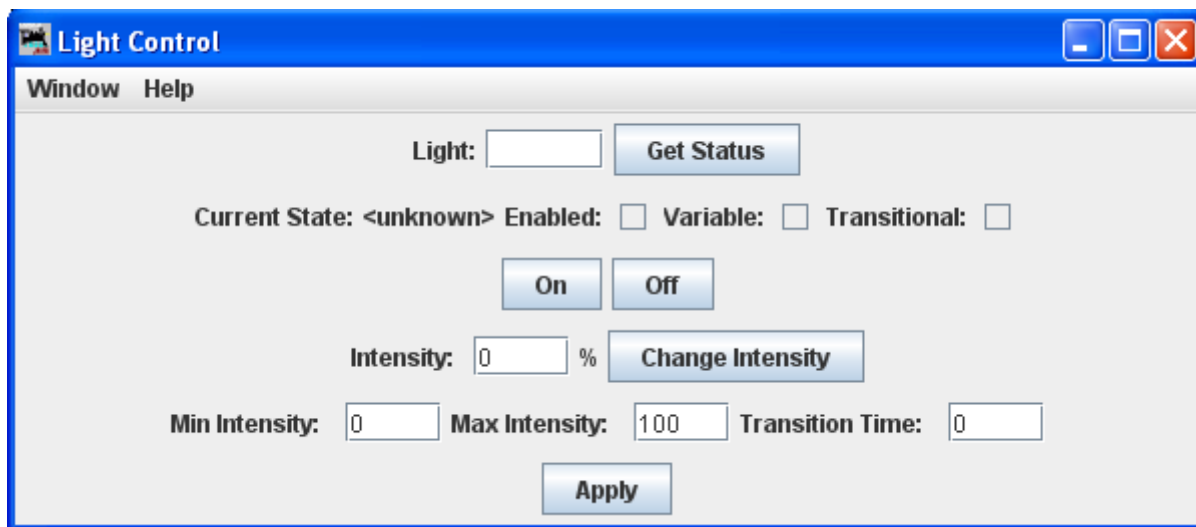
To metric units button converts output to metric values.

The **Start** button starts the speedometer.

The **Save as default** button saves the defined speedometer as the default setup

The **Timer 1 and 2 Speed(scale MPH)**: and **Time (seconds)** is displayed.

Light Control...



This tool is used to control Powerline Devices that are used to control your layout lighting.

Enter the light system name for the light you wish to control in the **Light:** text box

Click on either the **On** button to turn the light on or **Off** button to turn off the light.

Current State: Shows the current known state of the light.

<Unknown> Either no light selected or invalid light name.

<Off> Light is at minimum intensity, if variable intensity is supported, or off

<On> Light is at maximum intensity if variable intensity supported, or full on.

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<**Intermediate**> Light intensity is between 0 and 100% and the current intensity is equal to the target intensity.

<**Transitioning Higher**> Target intensity is higher than the current intensity and light is adjusting every fast minute according to Transition Time value.

<**Transitioning Lower**> Target intensity is lower than the current intensity and light is adjusting every fast minute according to Transition Time value

.<**Transitioning to Full On**> Target intensity is higher than the current intensity, and equal or higher than maximum intensity and light is adjusting every fast minute according to Transition Time value.

<**Transitioning to Full Off**> Target intensity is lower than the current intensity, and equal or lower than minimum intensity and light is adjusting every fast minute according to Transition Time value.

Configuration Options of Lights:

- Enabled:** The light will respond to its automatic control type.
- Variable:** Light may be commanded to values between 0% and 100%.
- Transitional:** Changes the intensity will use the transition time to step between current and target intensity.

On button turns on the light.

Off button turns off the light.

[Dispatcher...](#)

(advanced users, beyond scope of this manual)

[Send DCC Packet...](#)

(advanced users, beyond scope of this manual)

[USS CTC Tools»](#)

(not covered in this manual)

Operations ►

(on menu bar only if checked in the Operations Settings)

Covered in separate User's Guide

Start JMRI Web Server

- Starts a Web Server on your computer. You can access the Index.shtml page using the URL displayed in the dialog.
- The JMRI web server is meant to be a quick and easy way for model railroaders, not Masters of the Web, to get a web connection to JMRI up and running.



JMRI can provide web access to your model railroad.

The basic method was developed by Konrad Froetzheim and colleagues in the early 1990's for their "Internet Model Railroad". A standard web server communicates with the user's normal web browser, accepting HTTP requests in the usual way. Details of the JMRI web server

For example, the user can have their browser request the current contents of a JMRI frame (window), which is returned back to the browser as an image to be displayed. The user can click on the image of that JMRI frame, which causes the browser to request a click in the same position on that JMRI frame. JMRI acts on that click, and also sends back an image of the updated frame.

Also, client applications such as WiThrottle <http://www.withrottle.com/WiThrottle/Home.html> and Engine Driver <http://enginedriver.rrclubs.org/> can use the JMRI web server to provide additional features, such as panel access and roster icons.

Starting Web Access

JMRI web access is included in the usual JMRI downloads. To use it, you just have to start it.

Before attempting to use web access, please make sure that the basic configuration of your JMRI application is working. Check that you can properly communicate with and operate your layout.

To start web access from the menus, select "Start JMRI Web Server" under the "Tools" menu.

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Next, check the connection.

If you're using a Bonjour/Zeroconf-enabled web browser like Safari you should see a "My JMRI Railroad" web site in the "Bonjour" tab. Chrome and FireFox users can enable the "Bonjour" feature with the DNSSD plug-in. <http://dnssd.me/> You can just click on the "My JMRI Railroad" link to get to the welcome page of the JMRI web server.

Otherwise, enter the starting URL, which will be something like "http://192.168.1.7:12080" (or if you're browsing on the same computer right now. The default port is 12080, but this can be changed in Web Server Preferences. You should see a welcome screen, which serves as the home page for the JMRI web server. This page (by default) contains a number of useful examples and links.

Next, let's make sure you can access JMRI functions. From the JMRI Tools menu select "Power Control", which should open a new window. enter the URL

```
http://localhost:12080/frame/Power%20Control.html
```

This should display the Power Control window on your web browser. (Note: "localhost" is an alias for your computer; if you want to access the computer running JMRI from some other computer, replace "localhost" with the IP address displayed on the main screen, e.g.

```
http://192.168.1.7:12080/frame/Power%20Control.html
```

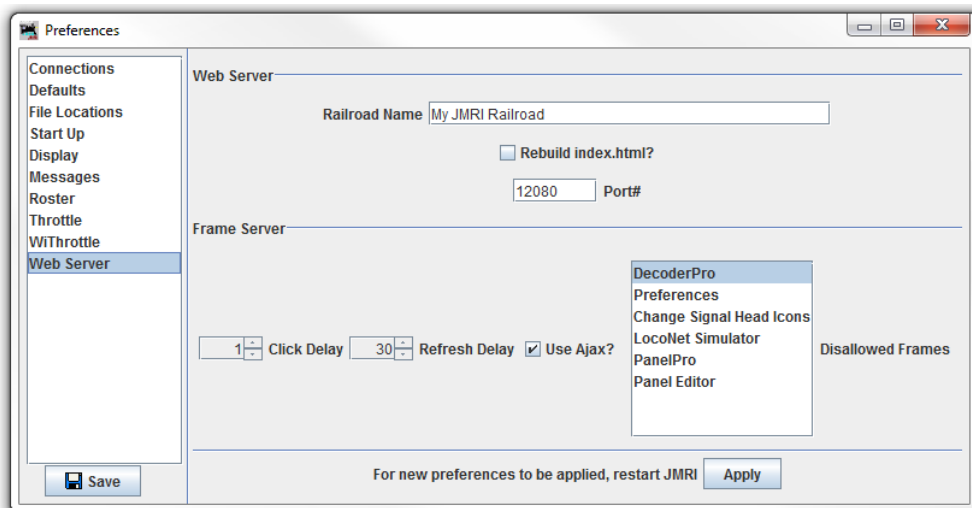
or something similar) If everything is working, you should see the Power Control window on your browser screen. Click the "On" button to turn layout power on.

Configuring

You can use "[Preferences](#)" to tell JMRI to start the server each time you start the program.

To do this, open the Preferences window, select the "Start Up" tab, and click "Add Action". In the new selection box that appears, select "Start Web Server". Don't forget to save your changes!

Web Server Preferences



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There are a number of Web Server-related settings that you can change in Preferences, Web Server (see image at right, click to enlarge)

The "index.html" page is automatically created by the program in the JMRI preferences directory. You can edit it to display whatever you want; by default, JMRI won't modify it if it exists. You can include links to web pages outside JMRI, and links to various JMRI-served pages, see below. On the other hand, we periodically improve the page, so you might want to turn on "Rebuild index.html?" in Preferences to let JMRI replace it with the newest version.

Access URLs

You can create your own web pages using any tool you'd like. To access JMRI from those pages, you just need to know the proper URLs to request the services you'd like. Several examples are linked from the index.html (JMRI Web Server home page),

Open Window (Frame) Access

To display any *already open* JMRI window as a **clickable** image that periodically refreshes, use a URL like:

<http://127.0.0.1:12080/frame/Monitor%20Slots.html>
<http://127.0.0.1:12080/frame/Analog%20Clock.html>
<http://127.0.0.1:12080/frame/Turnout%20Table.html>

Note the frame title in the URL, followed by ".html". Replace any spaces in the title with "%20".

For current, dynamically-generated list of available windows, use this URL:

<http://127.0.0.1:12080/frame>

Note: Adjust defaults such as refresh timing, disallowed frames and ajax usage in Web Server Preferences.

You can override the defaults for individual pages by using the following parms in your URL:

- **plain** (hide the footer links)
- **protect** (protect the frame from user clicks, i.e. read-only image, but with refresh)
- **ajax** (use ajax for updates)

Example, showing no links, protected, using ajax to refresh every 12 seconds:

<http://127.0.0.1:12080/frame/Power%20Control.html?ajax=true&plain=true&protect=true&retry=12>

inControl throttle web application

To use the throttle web application, you can go to:

<http://localhost:12080/web/Scan2BeInControl.html>

It will generate and display a scannable and clickable locomotive list from your JMRI roster.

Each smartphone scan will open an inControl web throttle in it.

Each click on a link will open a new inControl web throttle browser window or tab. You may also call the **inControl** directly:

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<http://localhost:12080/web/inControl.html>

See **JMRI web server** starting page for more info or jump to the **inControl** help page:

</help/en/package/jmri/jmrit/inControl/inControl.shtml>

To Display a Local File

A local HTML file (web page), graphic or text file can be displayed using the appropriate URL.

Files in your JMRI preferences directory can be accessed via a URL that starts with "prefs":

<http://localhost:12080/prefs/index.html>

(The index.html file is in your preferences directory)

Files in certain directories in the JMRI program directory can be accessed via a URL that starts with "dist":

<http://localhost:12080/dist/help/en/webindex.shtml>

will reference the index to the help system, while

<http://localhost:12080/dist/resources/logo.gif>

will load a JMRI logo graphic from the resources directory. "dist/web" and "dist/xml" also work as prefixes.

Displaying Formatted Panel Files

The "panel files" that JMRI uses to store configuration and display information can be displayed in a convenient format by a web browser. The JMRI web server works with your browser to do this formatting. You can then view, print, save, etc the formatted file. For example, to display "MyFile.xml" from the JMRI preferences directory, use

<http://localhost:12080/prefs/MyFile.xml>

To Display a formatted JMRI roster list

To get a nicely formatted view of your JMRI roster simply go to:

<http://localhost:12080/prefs/roster.xml>

Note that this is your roster.xml file displayed only using a xslt transformation.

XML and Ajax access

JMRI provides XML and Ajax access via a [XML IO custom servlet](#).

There are three sample pages that show how this can be used:

<web/request.html>

Makes a single XML request for all available sensors, and shows their status in a table.

<web/monitor.html>

Uses delayed requests to monitor the status of all sensors, updating a table when any change.

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web/throttle.html

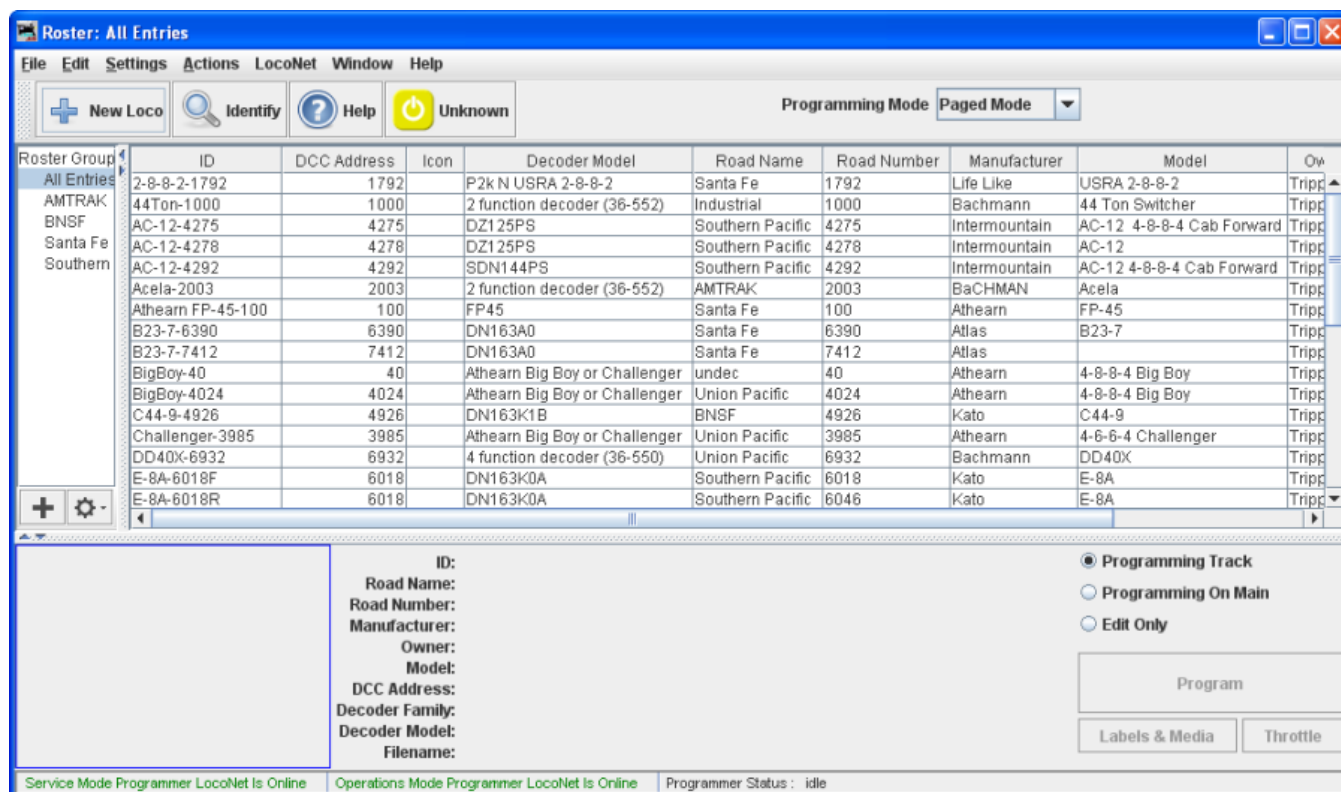
Sends a speed command to a DCC locomotive on the layout when a button is pressed.

By default, this is configured to handle URLs that start with "/xmltio". Information on use and customization can be found on jmri.org/help/en/html/web/XMLIO.shtml

Roster Menu

Roster

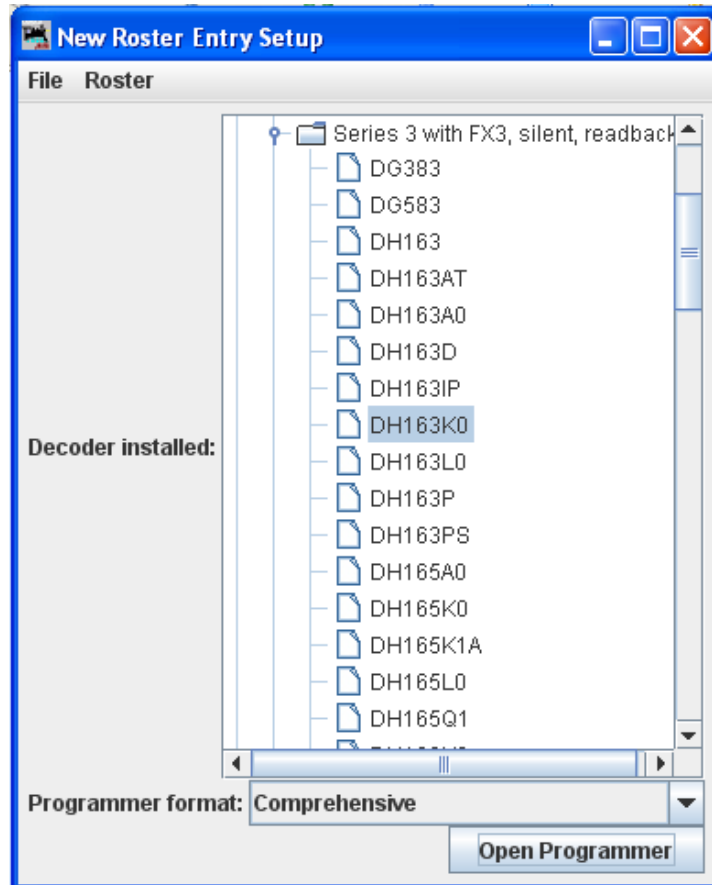
(opens DecoderPro3)



Create Entry...

New Roster Setup Pane

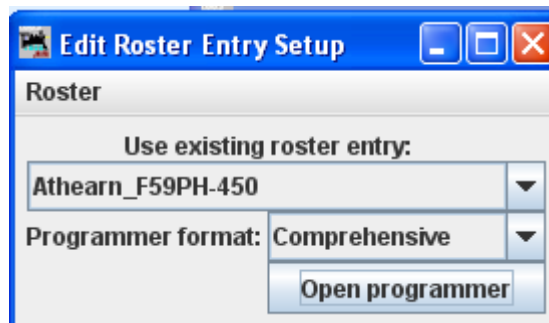
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Select a decoder that matches the one installed in your locomotive. The Open Programmer button will now become activated and you'll be able to move on with the Programmer selected from the drop-down list, then click on the **Open Programmer** button,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

[Edit Entry...](#)

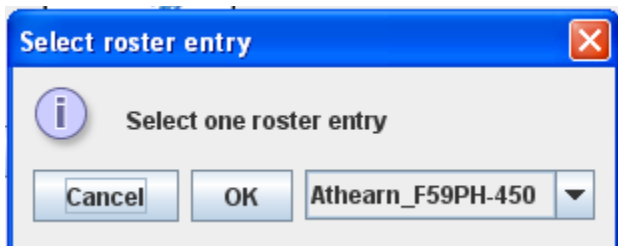
Edit Roster Entry Setup Pane



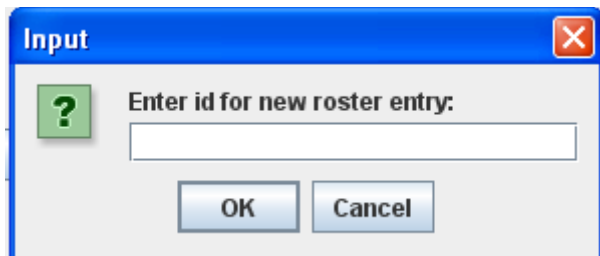
Select the roster entry from the drop-down list that you wish to edit. Select the Programmer format that you wish to use from the drop-down list. Click on the Open Programmer button and **Roster Entry Pane** of selected programmer will open.

Copy Entry...

Opens



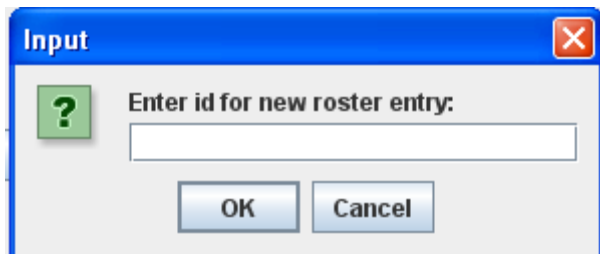
From the drop-down list select the roster that you wish to process, then click on the **OK** button. Click **Cancel** button if you wish to abort this function.



Type the name of the new roster you wish to process then click on the **OK** button. Click **Cancel** button if you wish to abort this function.

Import Entry...

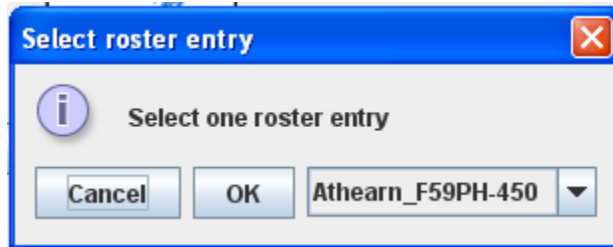
The **Open** dialog is displayed, select the roster file (roster.xml) that you wish to import. The [Input prompt](#) will be displayed.



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

Export Entry...

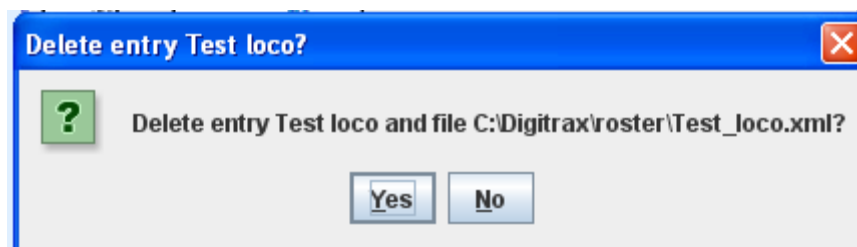
Opens.



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

[Delete Entry...](#)

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



Used to remove an entry from the DecoderPro roster.

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[Print Summary...](#)

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

DecoderPro Roster All Entries

- 1 -

August 24, 2013 1:06 AM



ID: 2-8-8-2-1792
Filename: P2k_1792.xml
Road name: Santa Fe
Road number: 1792
Manufacturer: Life Like
Owner: Tripp
Model: USRA 2-8-8-2
DCC Address: 1792
Decoder Model: P2k N USRA 2-8-8-2
Decoder Family: QSI Articulated Steam Ver. 7

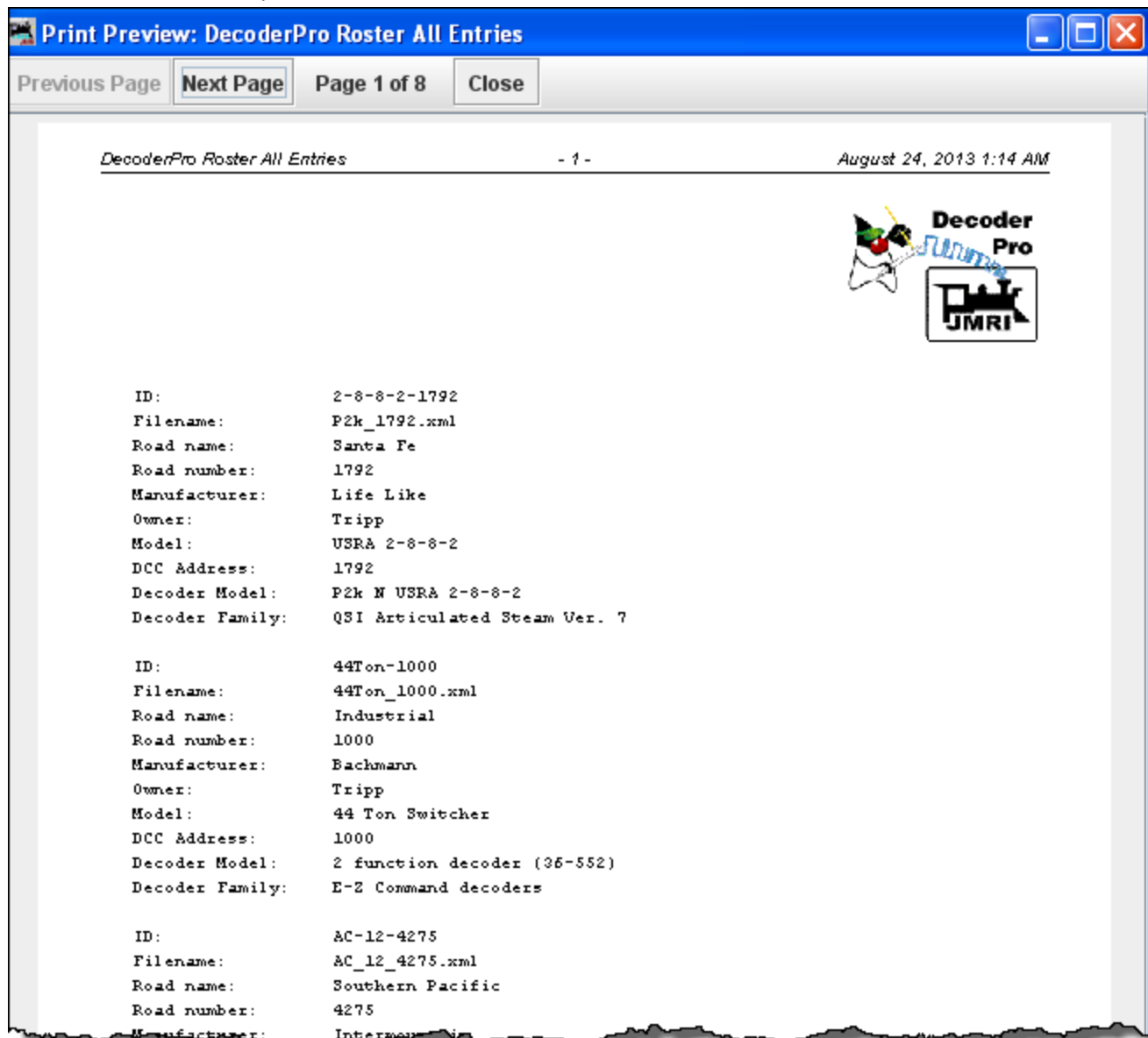
ID: 44Ton-1000
Filename: 44Ton_1000.xml
Road name: Industrial
Road number: 1000
Manufacturer: Bachmann
Owner: Tripp
Model: 44 Ton Switcher
DCC Address: 1000
Decoder Model: 2 function decoder (36-552)
Decoder Family: E-Z Command decoders

ID: AC-12-4275
Filename: AC_12_4275.xml
Road name: Southern Pacific
Road number: 4275
Manufacturer: Intermountain
Owner: Tripp

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[Print Preview Summary...](#)

Preview Roster Summary

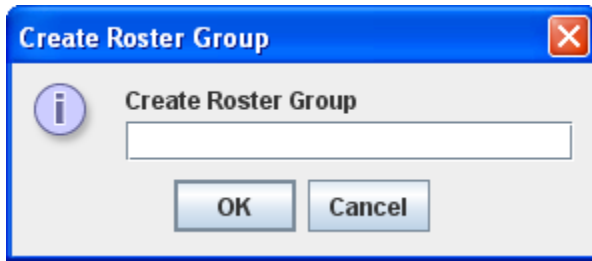


[Roster Groups](#) ►

[Create Roster Group](#)

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

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Type the name of your new roster group in the
Create new roster Group
if you do not want to create a new roster
Group
creates a new roster group

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
if you do not want to delete a roster Group
Deletes the selected roster group as active

Table Association

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

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

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Road Num...	ID #	Road Name	Manufact...	Owner	Ad...
505		AMTRAK	ATLAS	Dale A. Tripp	
450	Athearn_F59PH-4...	AMTRAK	Athearn	Dale Tripp	
461	Athearn_F59PH-4...	AMTRAK	Athearn	Dale Tripp	
3276	Atlas GP-30 3276	Santa Fe	Atlas	Dale Tripp	
3501	Atlas GP38-3501	Santa Fe	ATLAS	Dale Tripp	
3520	Atlas GP38-3520	Santa Fe	ATLAS	Dale Tripp	
4603	Atlas SD26	Santa Fe	Atlas	Dale Tripp	
6365	B23-7-6365	Santa Fe	Atlas	Dale Tripp	
6365	B23-7-6366	Santa Fe	Atlas	Dale Tripp	
6390	B23-7-6390	Santa Fe	ATLAS	Dale Tripp	
6932	Bachman DD40X-...	Union Pacific	Bachman	Dale Tripp	
1000	Bachmann 44ton ...	none	Bachma...	Dale Tripp	
2003	Bachmann Acela...	AMTRAK	Bachma...	Dale Tripp	

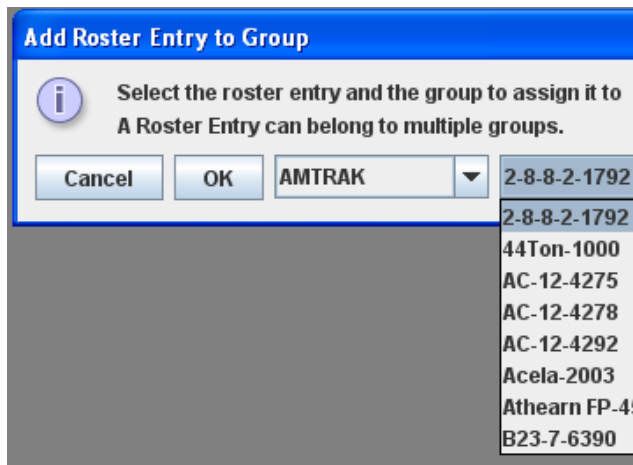
Select Roster Group: the roster group that you want to add entries to.

The table shows all the engines in your roster.

In the right column, Add to... select the entries that you wish to add to the Roster Group, click individually to select a single item, hold the shift key down to select a range of items, hold the CNTRL key down to randomly select items. Close the Table and the entries will be added to the group.

Add Roster Entry to Group

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



Select the Roster Group

In the next selection select the engine to add to the group

if you do not want to associate an engine to a roster Group

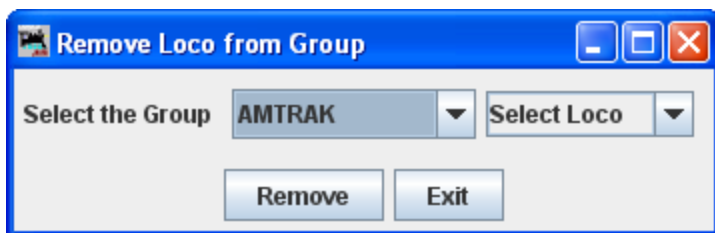
Associates the selected Engine to the selected roster group.

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

Remove Roster Entry from Group

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



Select theGroup

Select loco

Removes the selected loco from the selected Roster Group

Exits the dialog

Export Complete Roster...

Opens the Save dialog box to allow you to select directory and name the file.

Panels Menu

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

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

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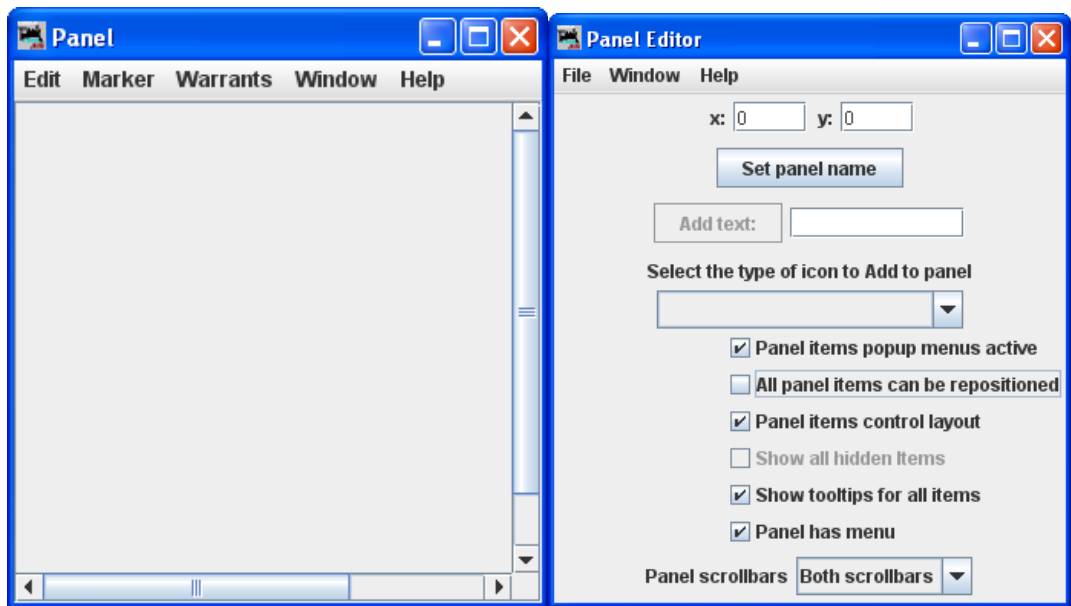
PanelPro go to PanelPro Layout Editor Tutorial

jmri.org/community/clinics/NMRA2008/LayoutEditorClinic2008/LayoutEditorClinic.pdf

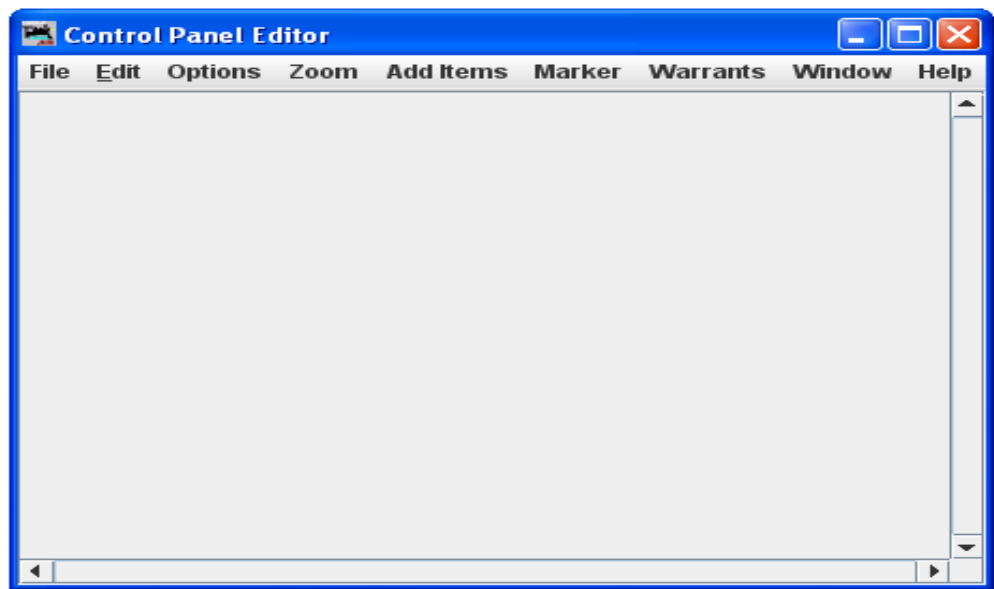
New Panels... ▶

Panel Editor

Panel and Panel Editor



Control Panel Editor



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Layout Editor

See for more information

jmri.org/help/en/package/jmri/jmrit/display/LayoutEditor.shtml



Open Panels...

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

Save Panels...

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

Show History

Opens untitled window with History of panel operations

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Show Panels ▶

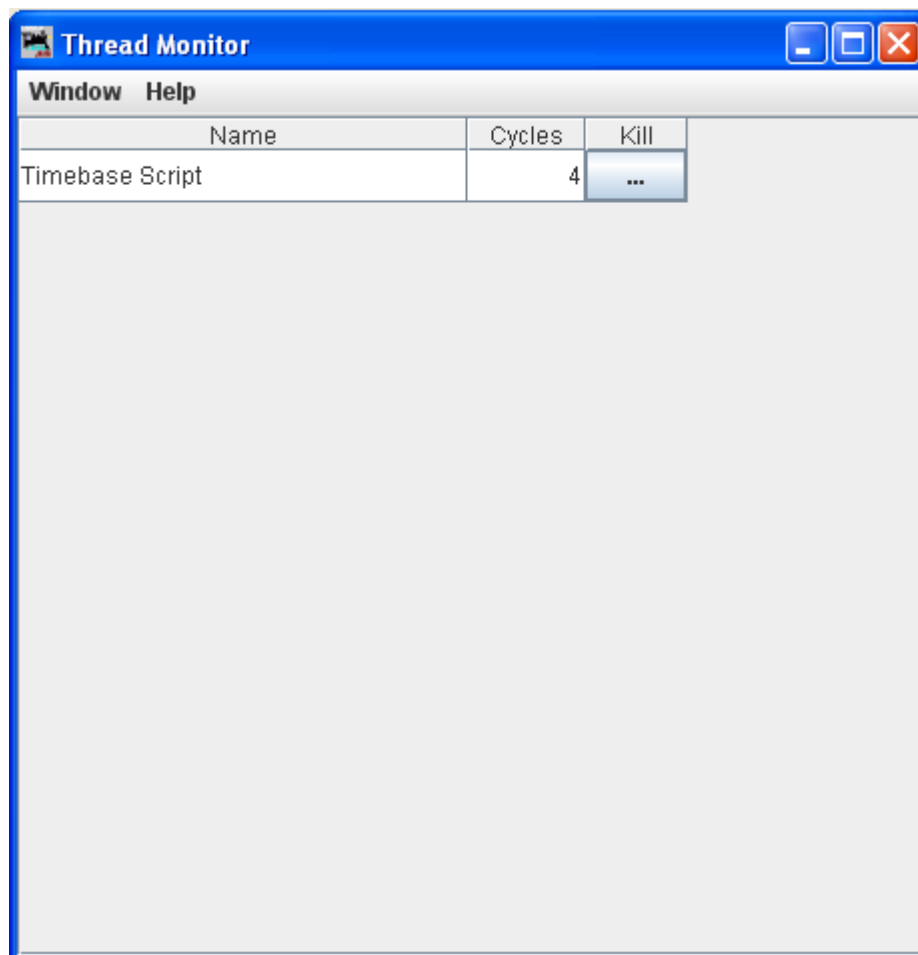
A list of available panels is displayed, select the panel that you would like to display on your desktop window. The selected file will display on your computer.

Run Script...

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

Thread Monitor

Opens the [Thread Monitor](#) pane.

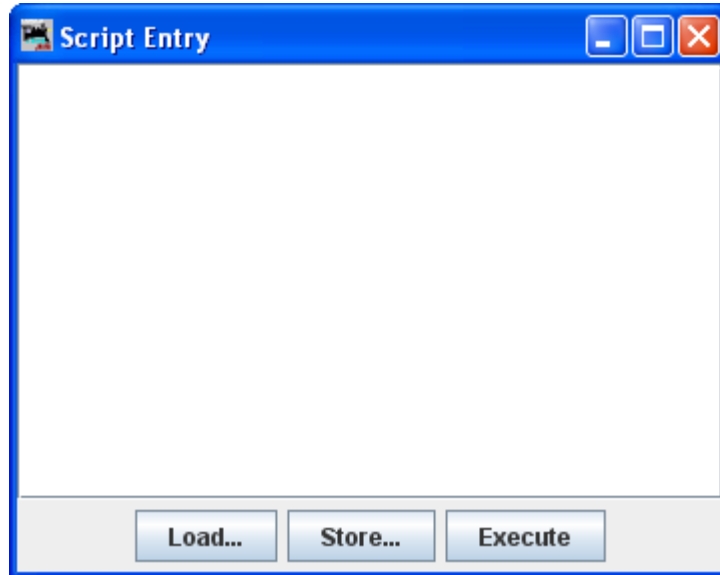


Script Output

Displays the **Script Output** window.

Script Entry

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



f and flash video files). The subject of panels is included here only show what is available in the DecoderPro menus with a brief illustration/description of what these menu selections access. They are covered here because there is a Panels menu on the DecoderPro main window that allows access to some of the PanelPro functions.

Operations ►

(on menu bar only if checked in the Operations Settings) (covered in separate User's Guide for Operations)

System Menu

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

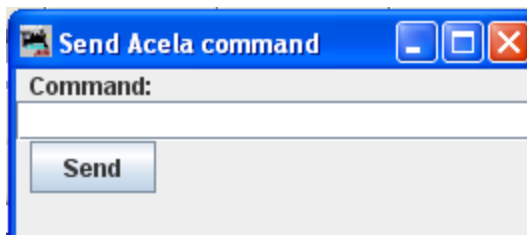
Acela

- **Command Monitor**

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

- **Send Command**

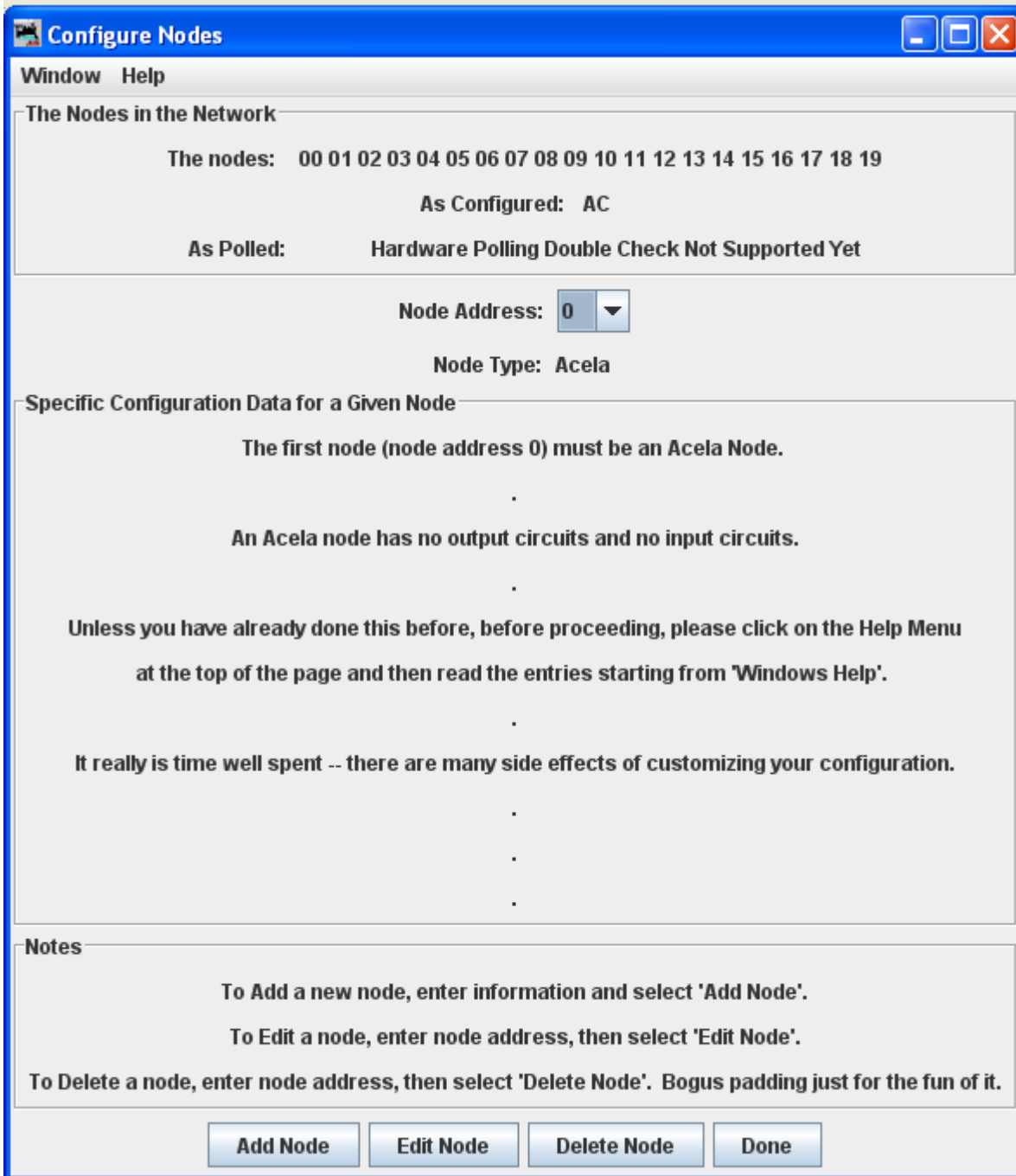
Opens the **Send Acela command** prompt, type in your command and click on **Send** button to execute the command.



- **Configure Nodes**

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

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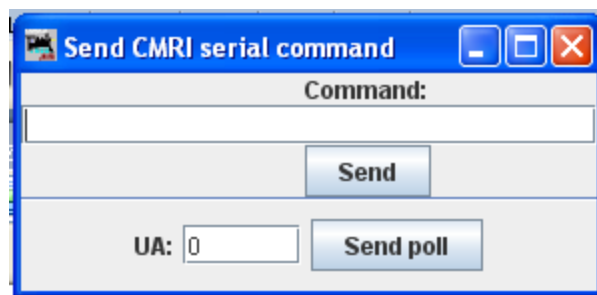
CMRI

- **CMRI Monitor**

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

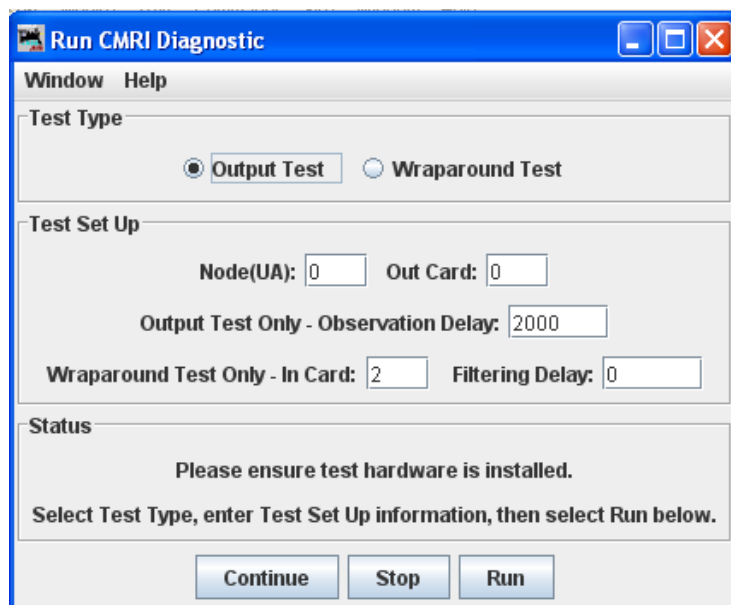
- **Send Command**

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



- **Run Diagnostics**

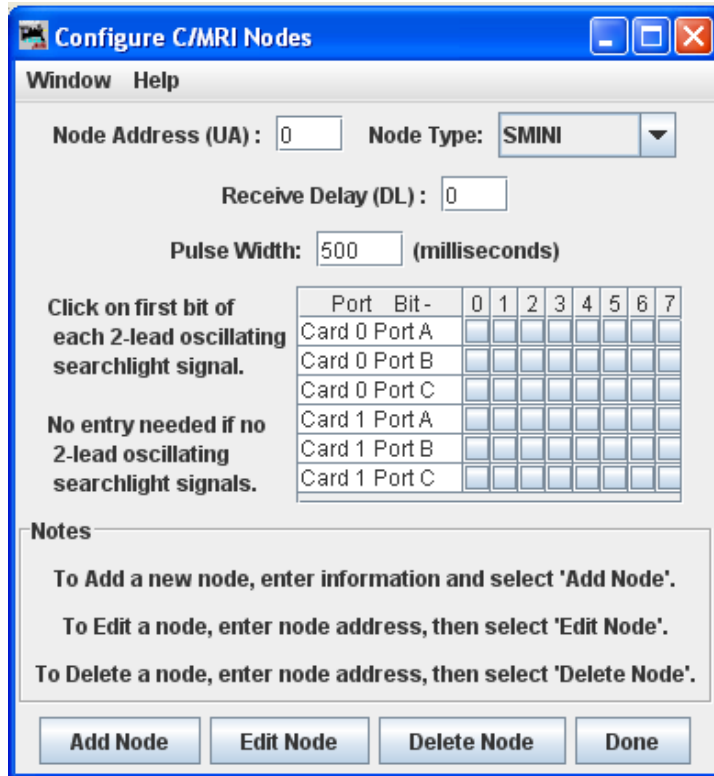
Provides a tool for testing your CMRI serial cards in the system using either an Output Test or a Wraparound Test.



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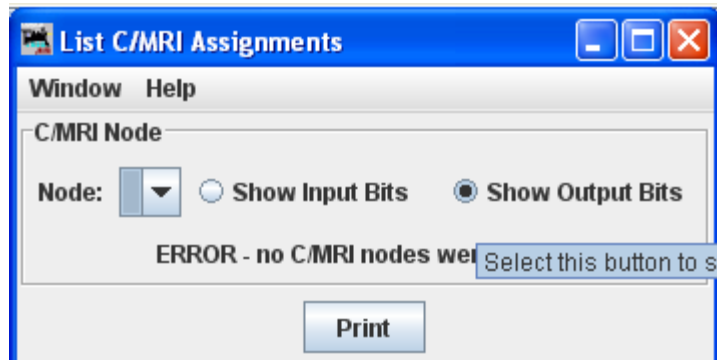
- **Configure C/MRI Nodes**

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



- **List Assignments**

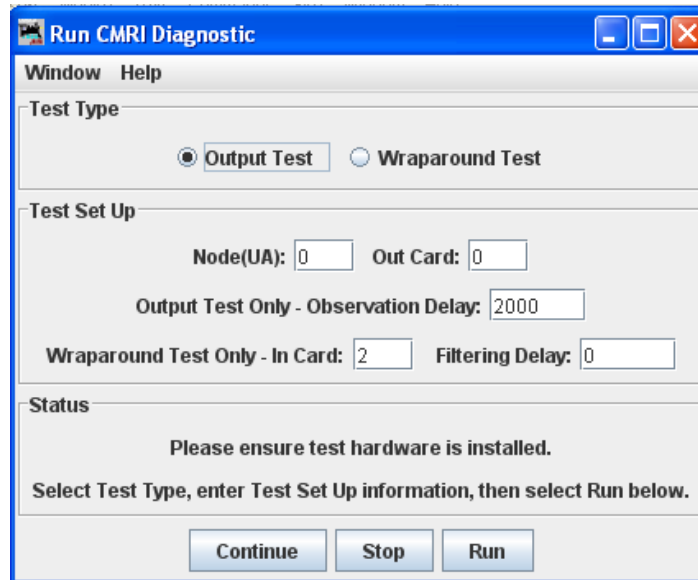
Opens **List C/MRI Assignments** window. This tool lets you check the pin assignments of your C/MRI Nodes and print them.



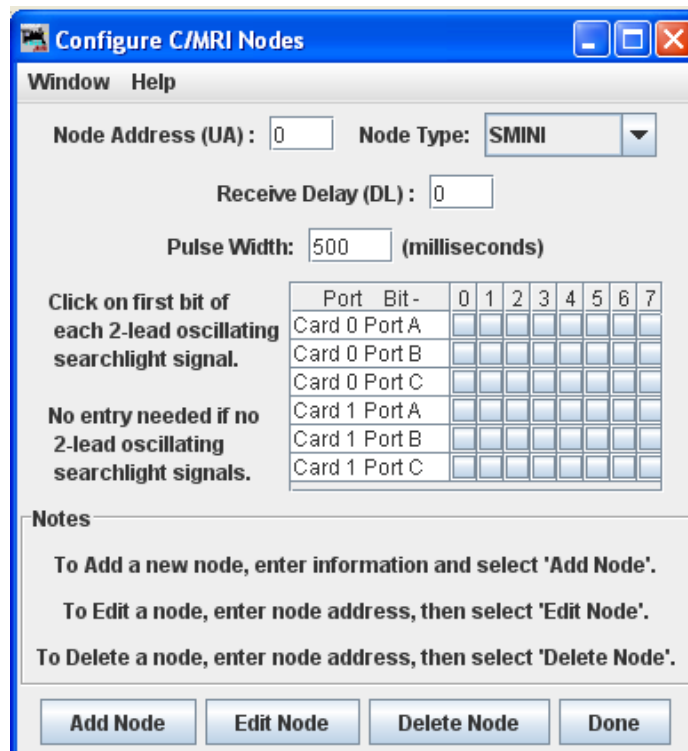
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Run CMRI Diagnostic window

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.



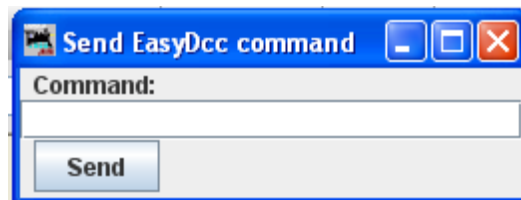
EasyDCC

- **Command Monitor**

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

- **Send Command**

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



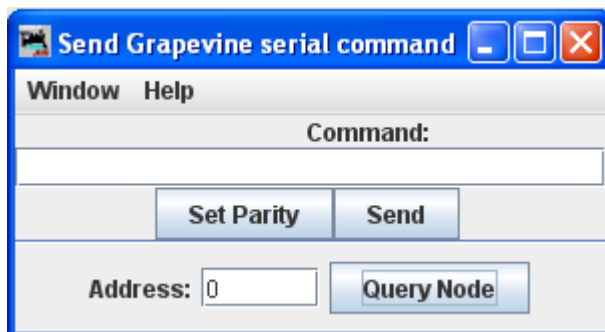
Grapevine

- **Communications Monitor**

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

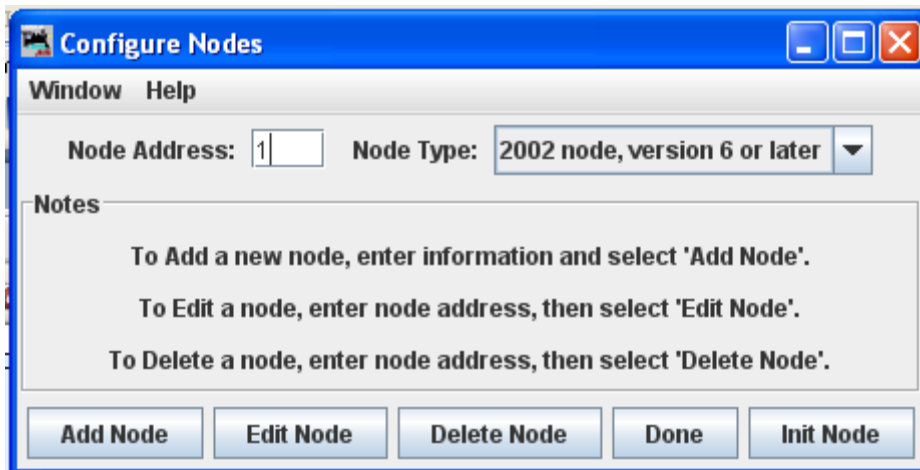
- **Send Command**

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



- **Configure Nodes**

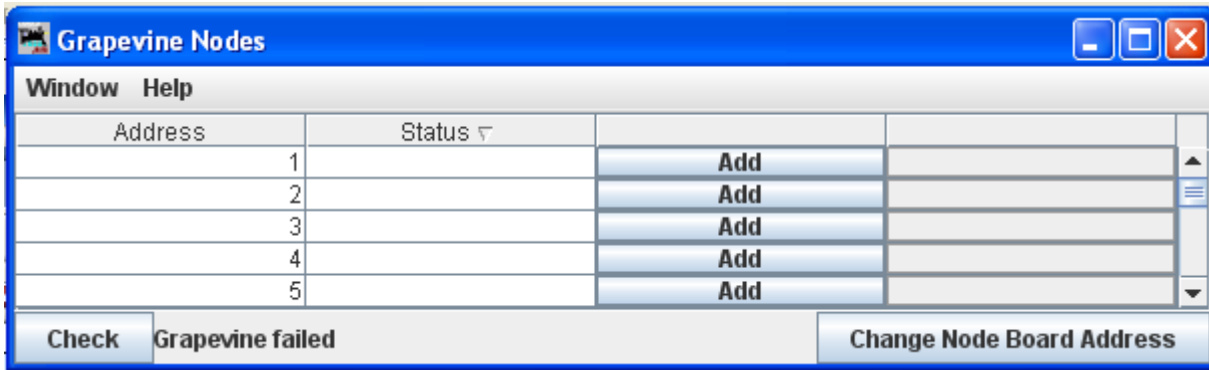
Opens **Configure Nodes** window, which provides the tools for setting the Grapevine Serial Bus nodes.



- **Node Table**

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

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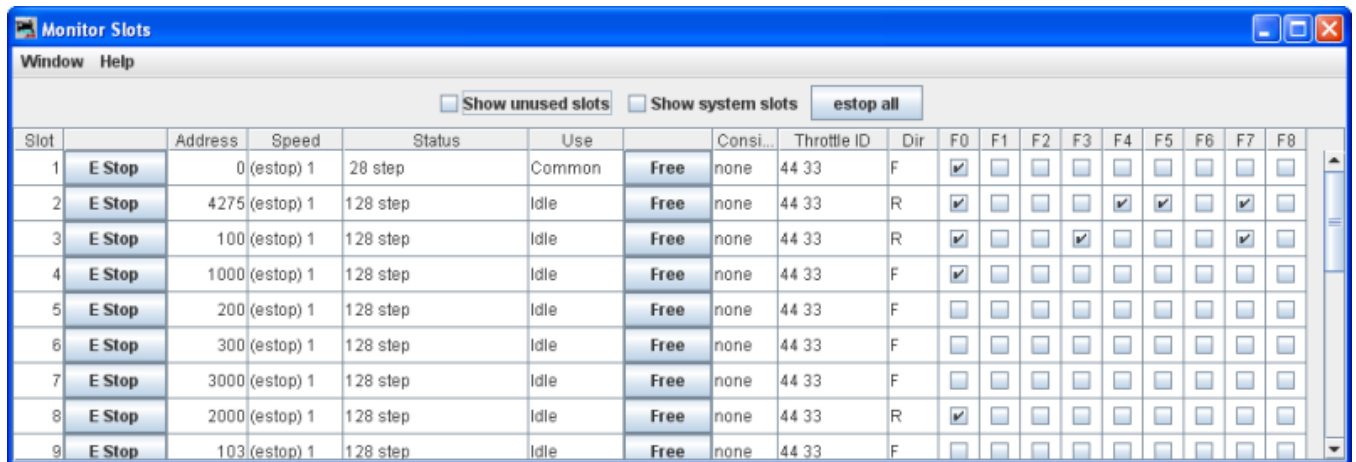
LocoNet

- **Monitor LocoNet**

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

- **Monitor Slots**

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



- The checkboxes at the top allow to select what slots are displayed.
- **Show unused slots**
- **Show system slots**
- Executes an **Emergency Stop** for all locomotives.
- The columns are:

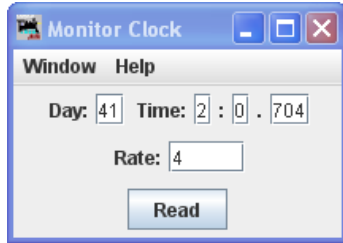
DecoderPro® 3.4 User's Guide

Column	Displays	
Slot	The number of the slot	
Address	Locomotive address the slot controls	
Speed	For unconsisted locomotives and addresses that are at the top of a consist, this is the current speed setting. It is an internal value for consisted slots.	
Decoder Type	The format of the commands being sent to the decoder, typically, either 128 step or 28 step, though other values are possible.	
Status	One of the four possible states:	
	Free	Not reserved for any particular use, no contents
	Idle	Not reserved for any particular use, no contents
	Common	Not in use at the moment, but still contains valid data for the last decoder to use it.
In Use	Currently controlling a decoder	
Consisted	Displays the consist status of the slot, whether it is not consisted, the top of a consist, included in a consist, etc.	
Throttle ID	The UT4 throttles have a fixed throttle ID. The DT400 has a fixed common leading HEX value and a user programmable second HEX value. . It is displayed as two hexadecimal bytes, see the Digitrax instructions for details.	
Direction	Whether the decoder is currently being commanded to go Forward or Reverse.	
F0-F8	The current function settings	

- **Monitor Clock**

A Digitrax LocoNet can contain it's own fast clock timebase. This can be driven either by a DCS100/DCS200 command station, or by a separate fast clock module such as those made by Logic Rail Technologies. The [Monitor Clock](#) dialog allows you to control this feature.

DecoderPro® 3.4 User's Guide

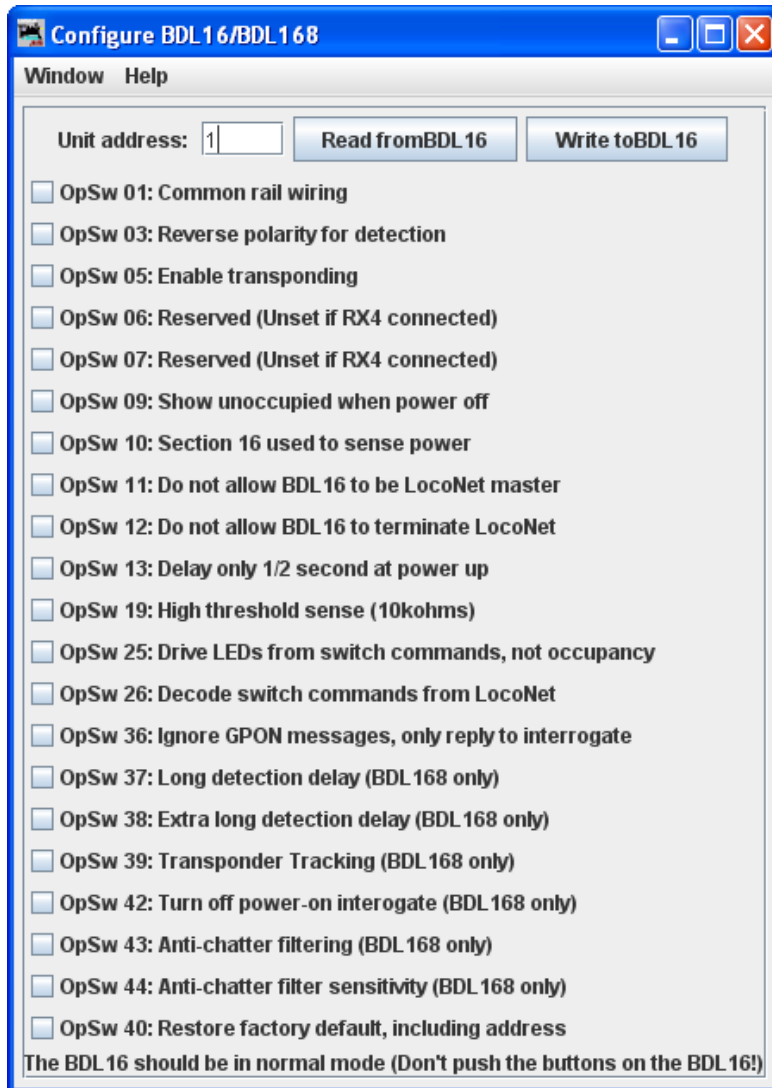


- **Monitor LocoNet Stats**

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

- **Configure BDL16/BDL168**

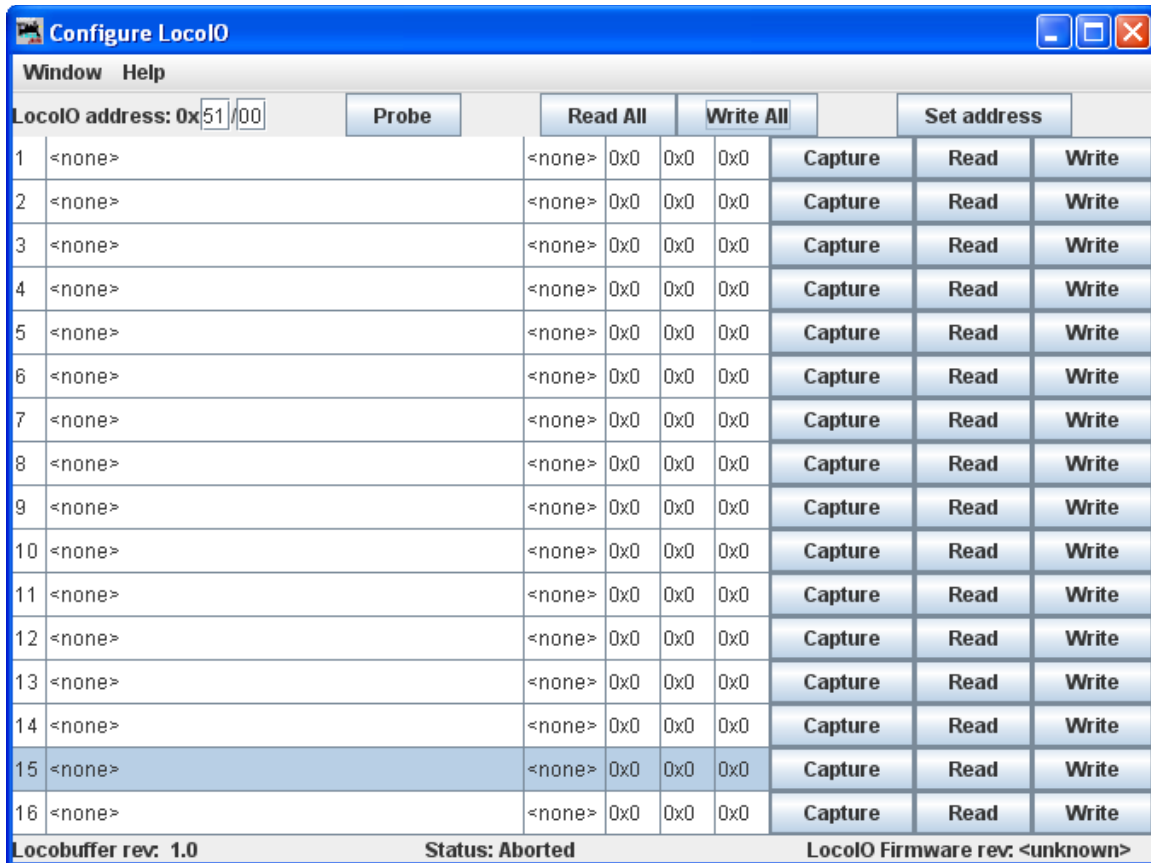
Opens [Configure BDL 16/BDL168](#) window



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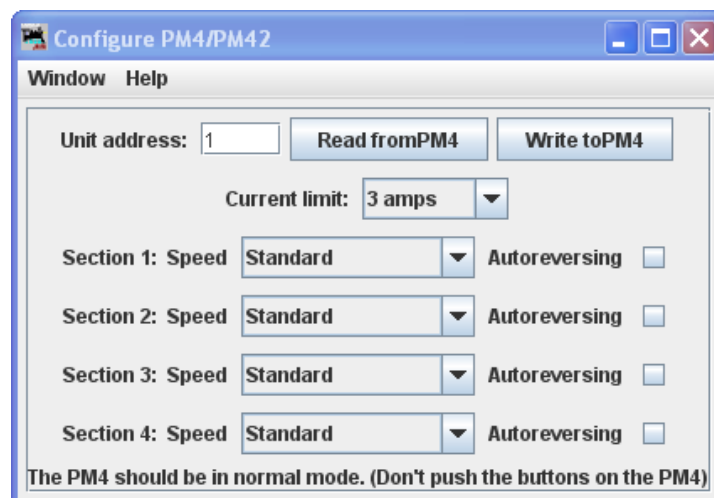
- **Configure LocoIO**

Opens the [Configure LocoIO](#) window.



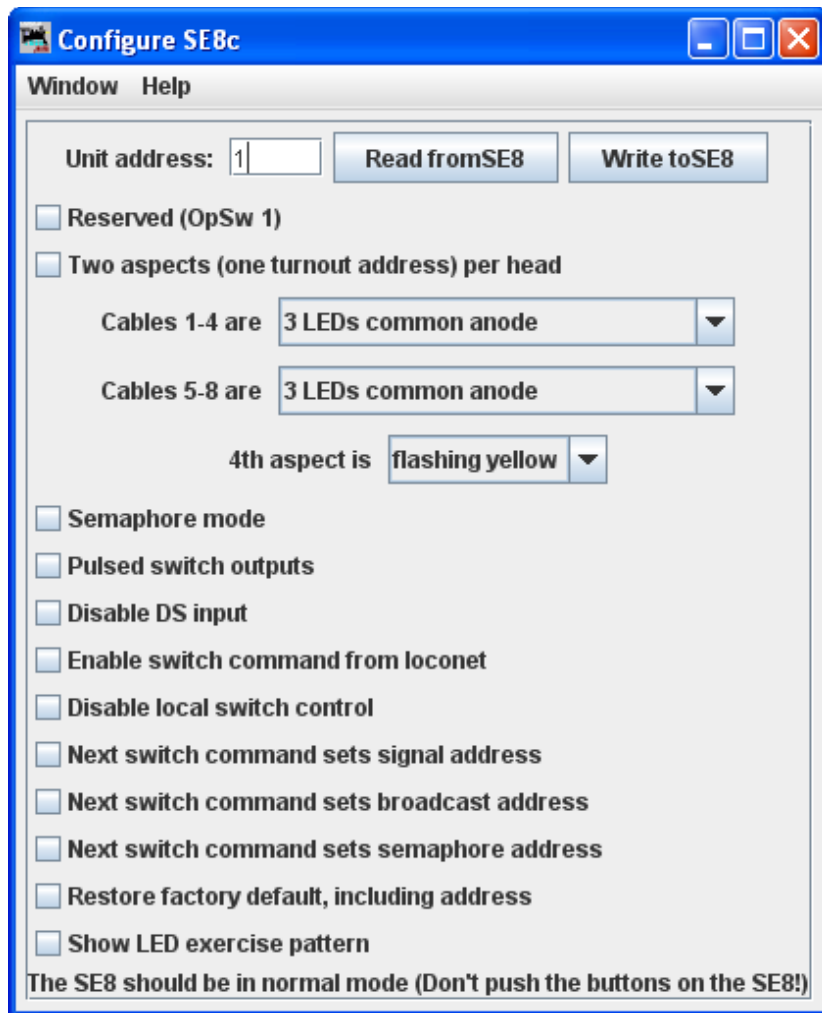
- **Configure PM4/PM42**

Opens the [Configure PM4/PM42](#) window.



- **Configure SE8C**

Opens the [Configure SE3C](#) window.



- **Configure DS64**

Opens the [Configure DS64](#) window.

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

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

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

Limitations

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

DecoderPro® 3.4 User's Guide

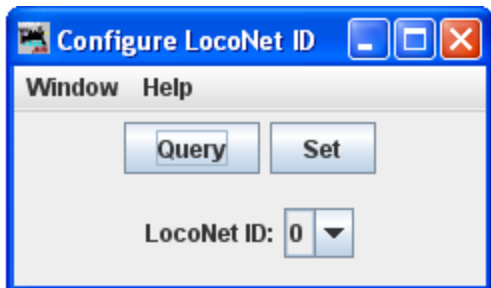
At present, DS64 routes cannot be programmed by this tool. It's possible, but nobody has written the code for it yet because JMRI routes are more powerful and easier to use.

- **Configure Command Station**

Opens the Configure Command Station window

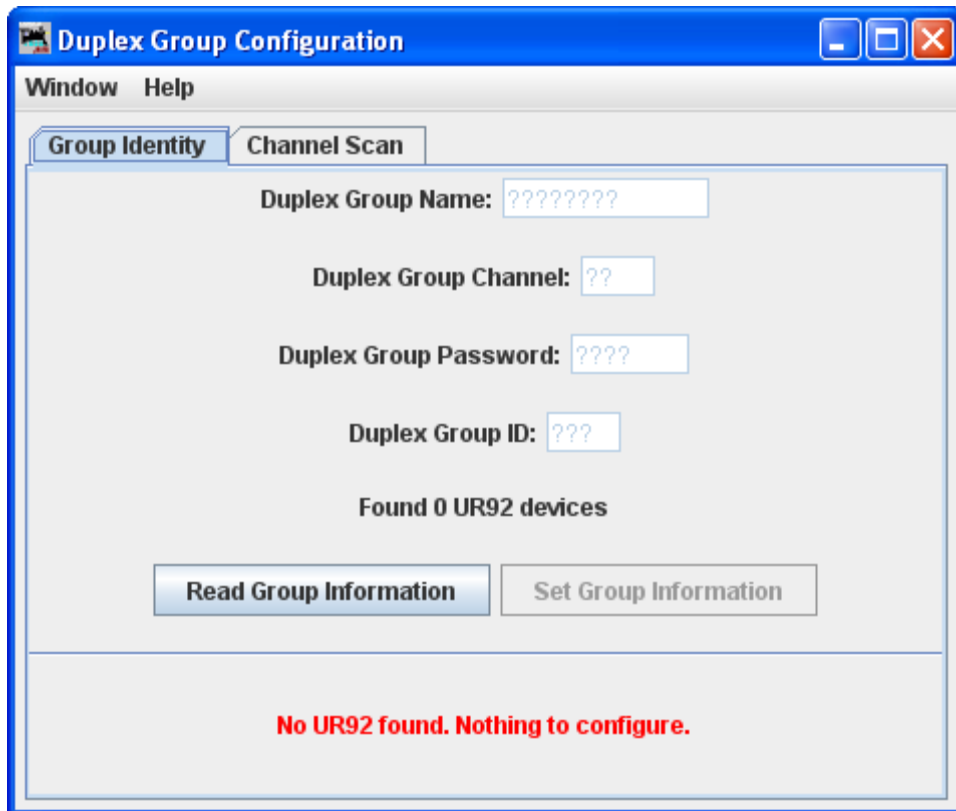
- **Configure LocoNet ID**

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



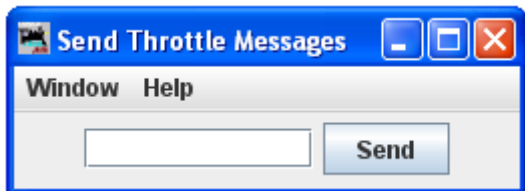
- **Configure Duplex Group**

Provides dialog to configure duplex Radio system



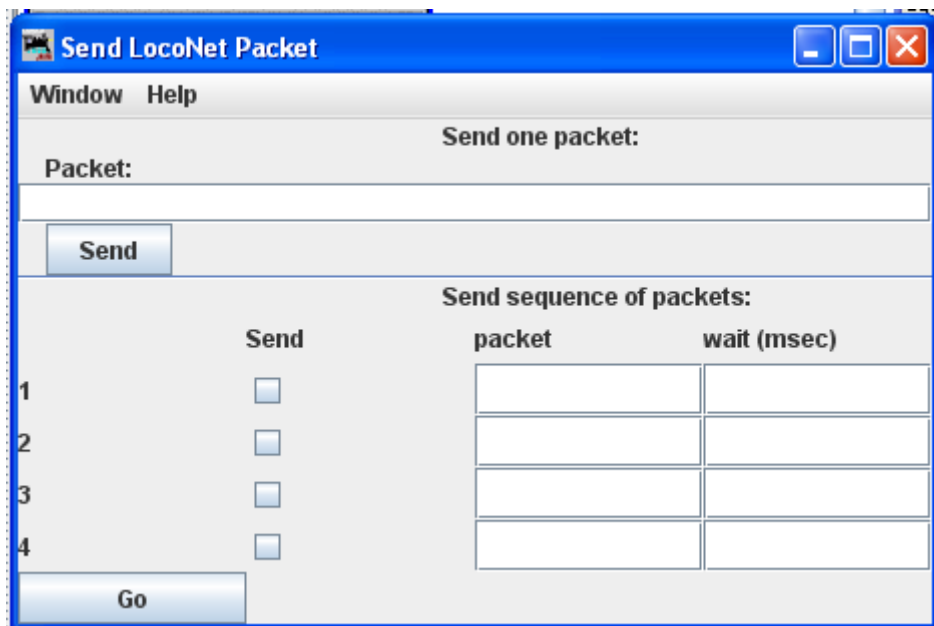
- **Send Throttle Messages**

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



- **Send Loconet Packet**

Opens the [Send Loconet Packet](#) dialog that lets you directly command 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 hexadecimal numbers and click Send button, 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 Go button to start transmission sequence, and press again to stop the sequence.

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- **Select PR3 Mode**

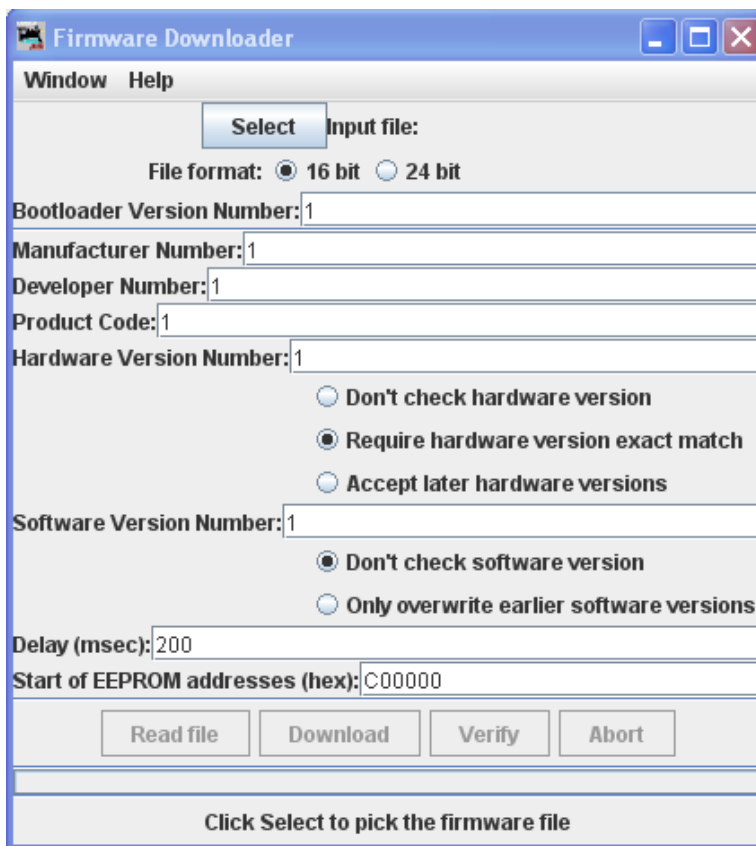
Opens the **Select PR3 Mode** dialog.



-
- **Download Firmware**

Opens the [Firmware Downloader](#).

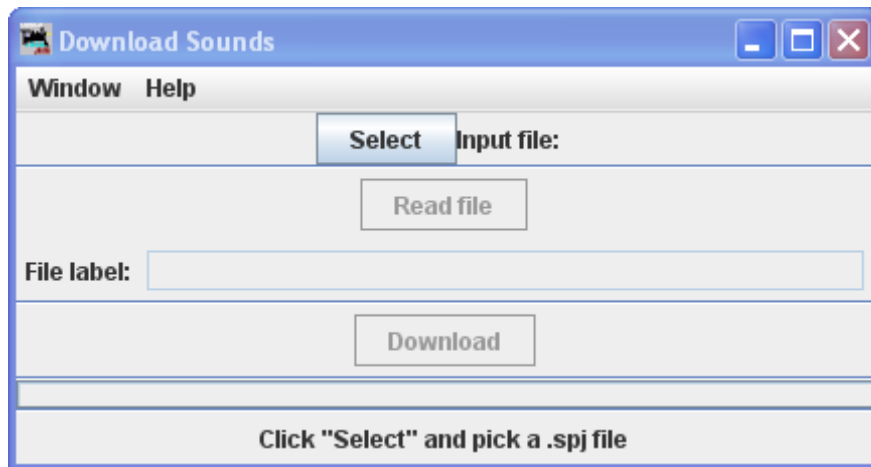
Some Digitrax products can have new firmware downloaded to them. The firmware updates are distributed as .dml (Digitrax Mangled Firmware) files. They contain both the code itself, and various management information to make sure that it can be downloaded into the hardware it expects.



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To use this tool:

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



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

The Decoder Sound Downloader tool lets you load a new .spj file into a Digitrax sound decoder via a Digitrax PR2 or PR3 interface. If you're using a PR3, it needs to be put into "Programmer mode" before trying to download, see the main [PR3 page](#).

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).

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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.

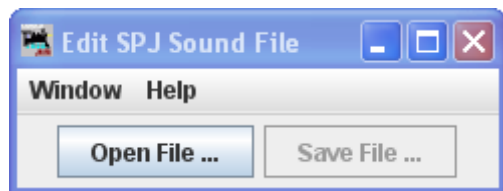
"Done"

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



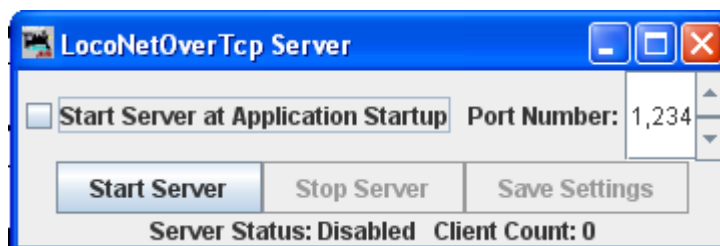
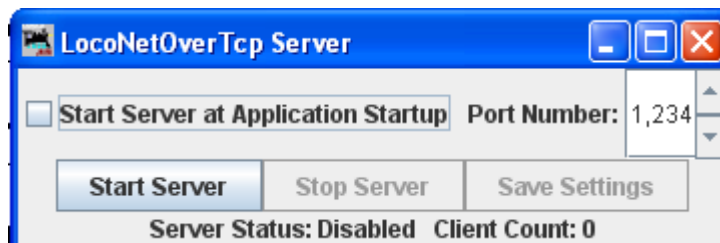
- **Start LocoNet Server**

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Starts the LocoNet server.

- **Start LocoNet over TCP Server**

Opens the **LocoNetOver Tcp Server** dialog



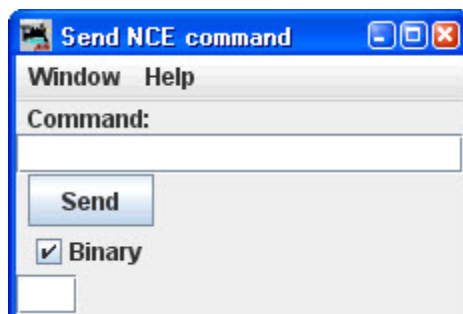
NCE

- **Command Monitor**

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

- **Send Command**

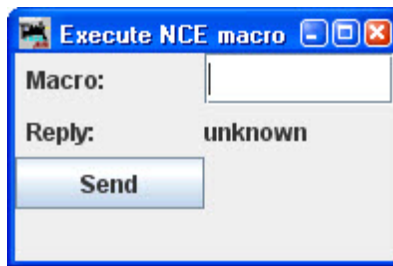
Opens the **Send** prompt with a text box to enter the NCE Format command that you want to send.



- **Send Macro**

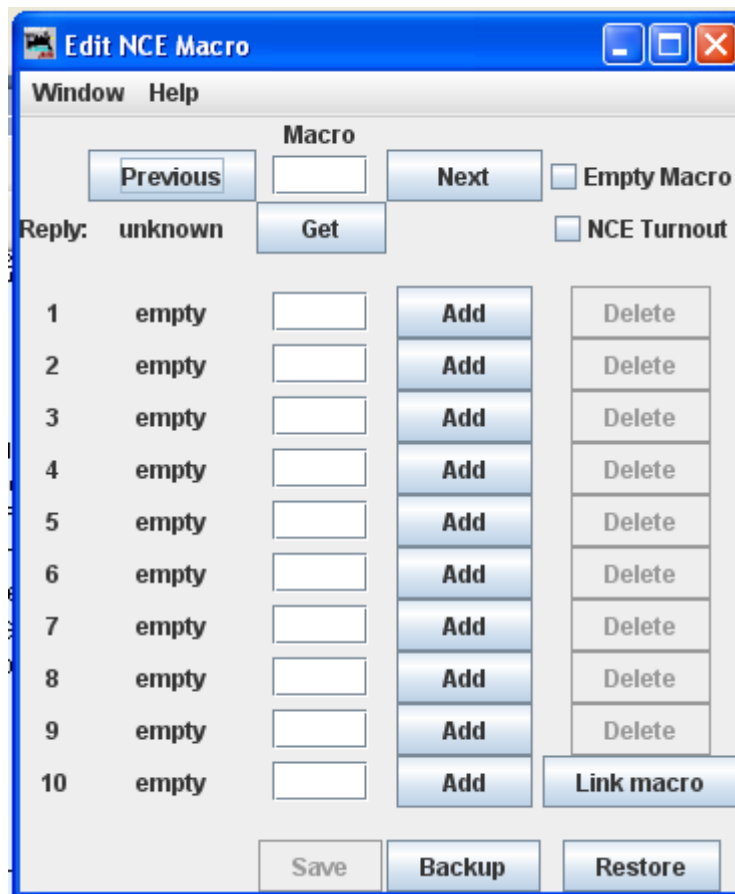
DecoderPro® 3.4 User's Guide

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



- **Edit Macro**

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



Backup button

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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.

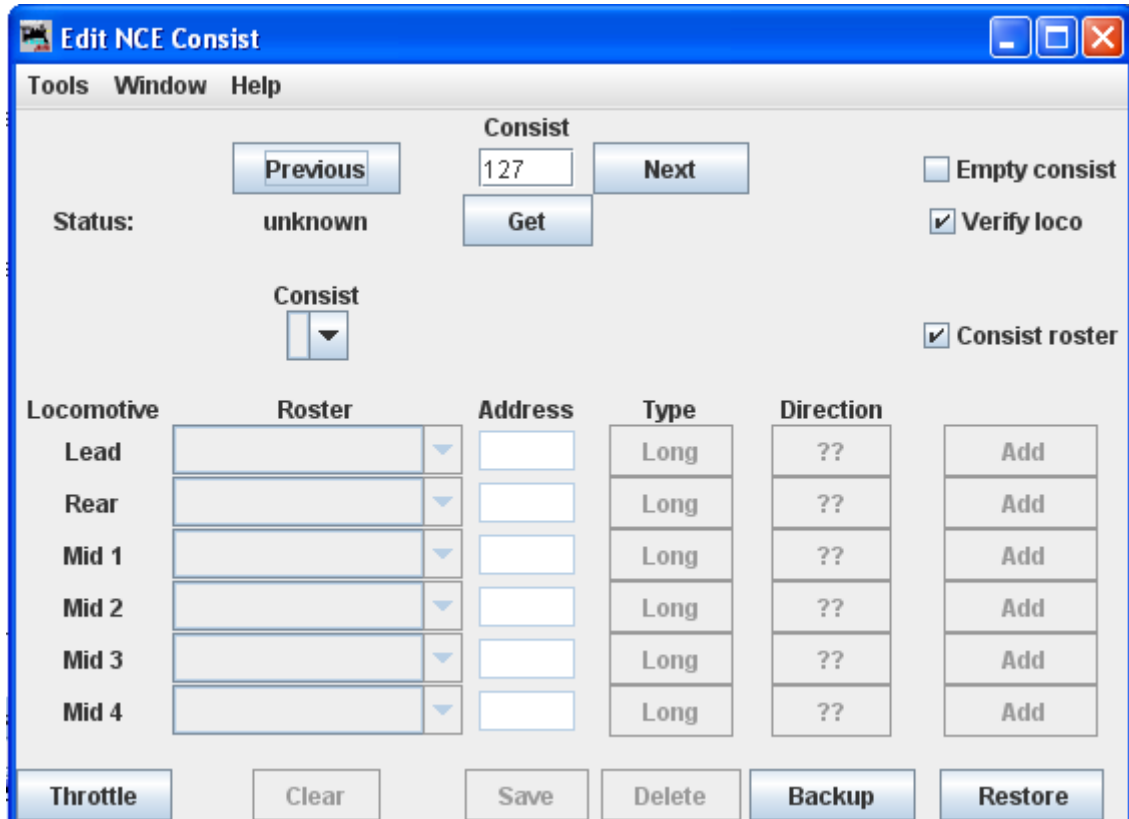
Save button

Saves macros to the NCE command station

- **Edit Consist**

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.

DecoderPro® 3.4 User's Guide



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.

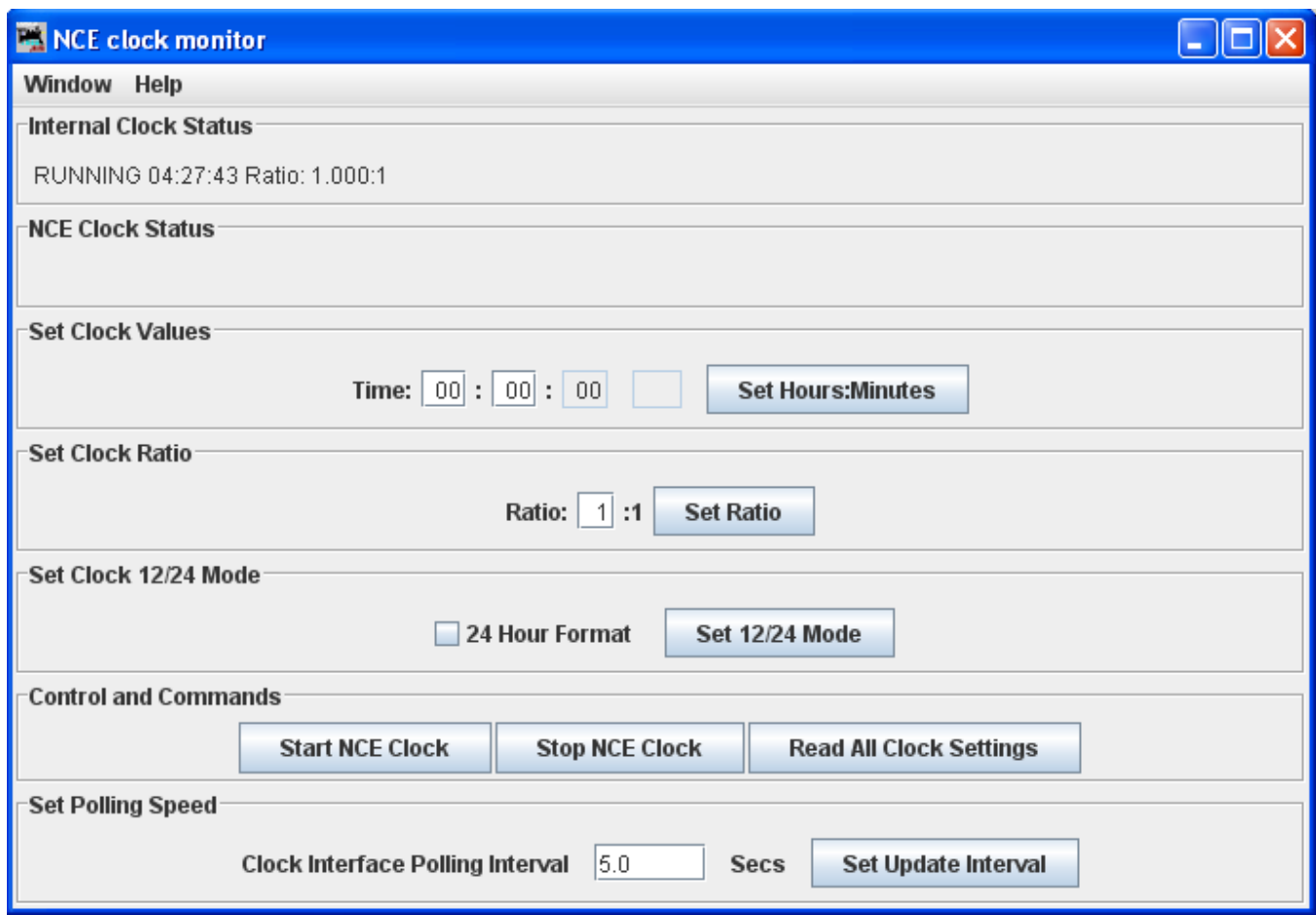
- **DCC Packet Analyzer**

DecoderPro® 3.4 User's Guide

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

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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.

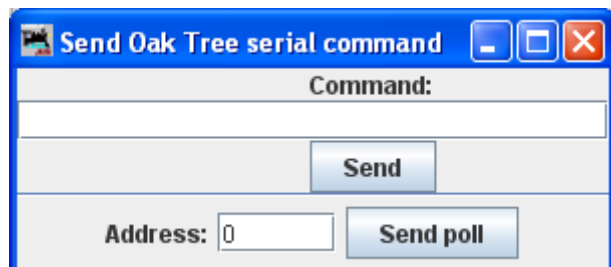
OakTreeSystems

- **Communications Monitor**

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

- **Send Command**

Opens the Send Oak Tree serial command prompt, which will allow you to type in a **Command**: then click on . You may also type in an **Address**: and poll the system by clicking on the .



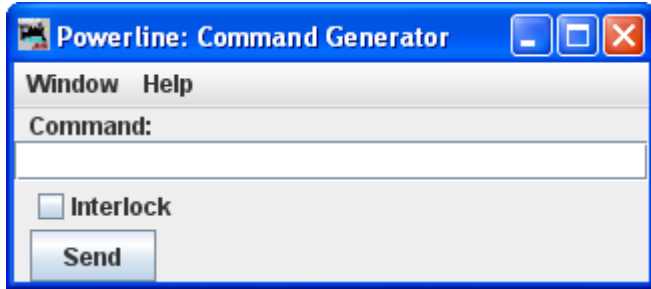
Powerline

Communications Monitor

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

Send Command

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




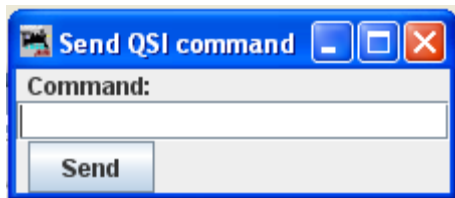
QSI

Command Monitor

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

Send Command

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



RPS

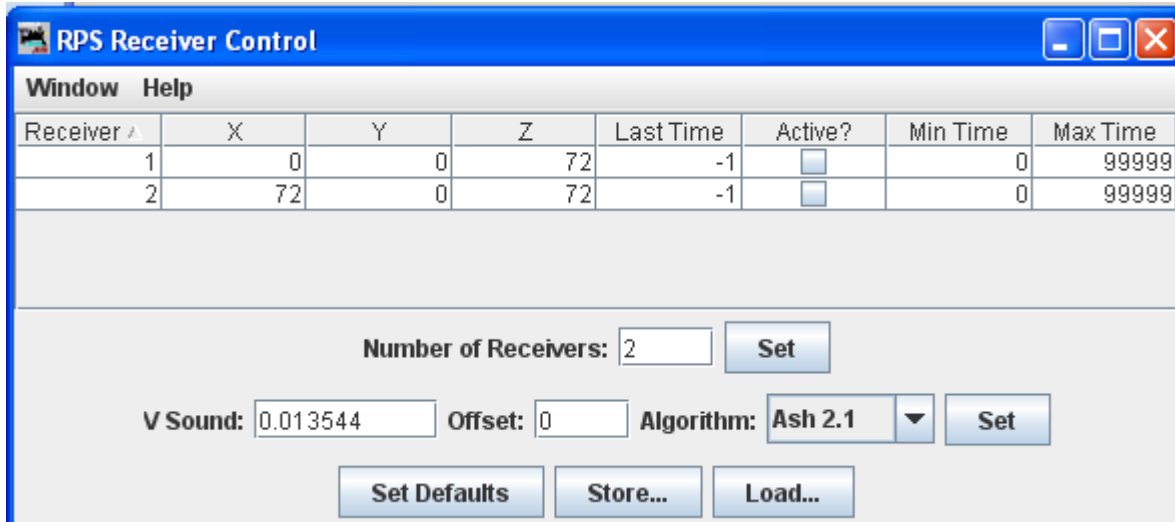
RPS Monitor

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

RPS Receiver Control

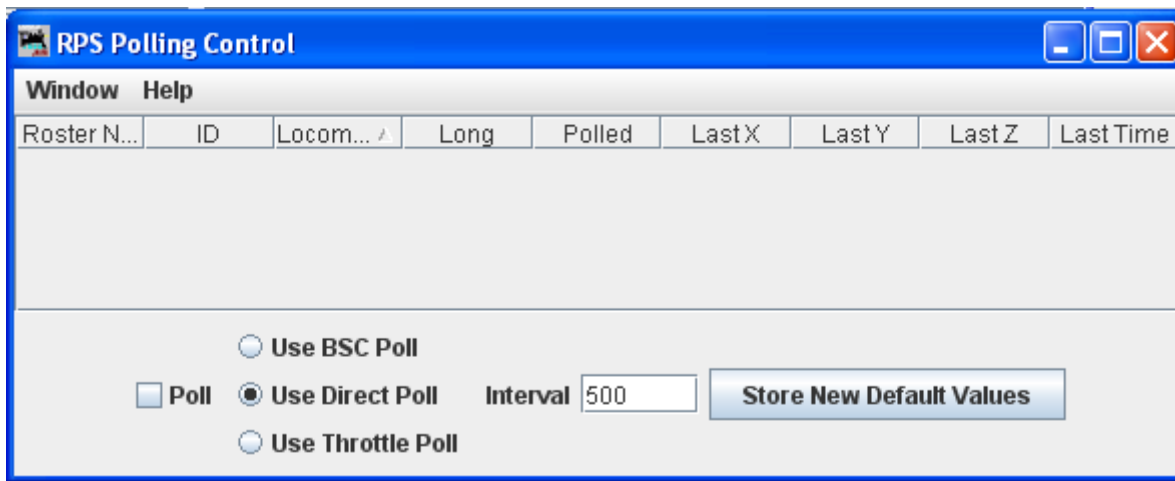
Opens the [RPS Receiver Control](#) window, which will detect how many receivers it has and set up a table with the right number of rows.

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RPS Polling Control

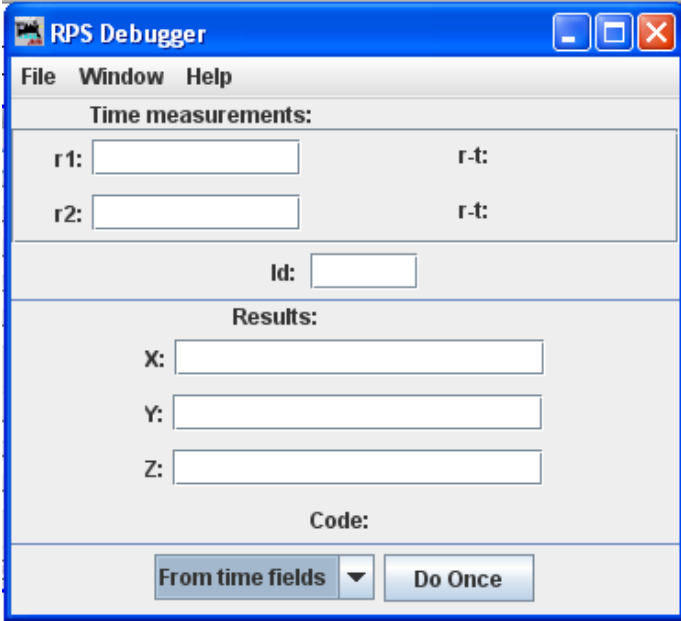
Opens the [RPS Polling Control](#) window where you tell the RPS system which of your locomotives have RPS transmitters installed, and how often to talk to them.



RPS Debugging Window

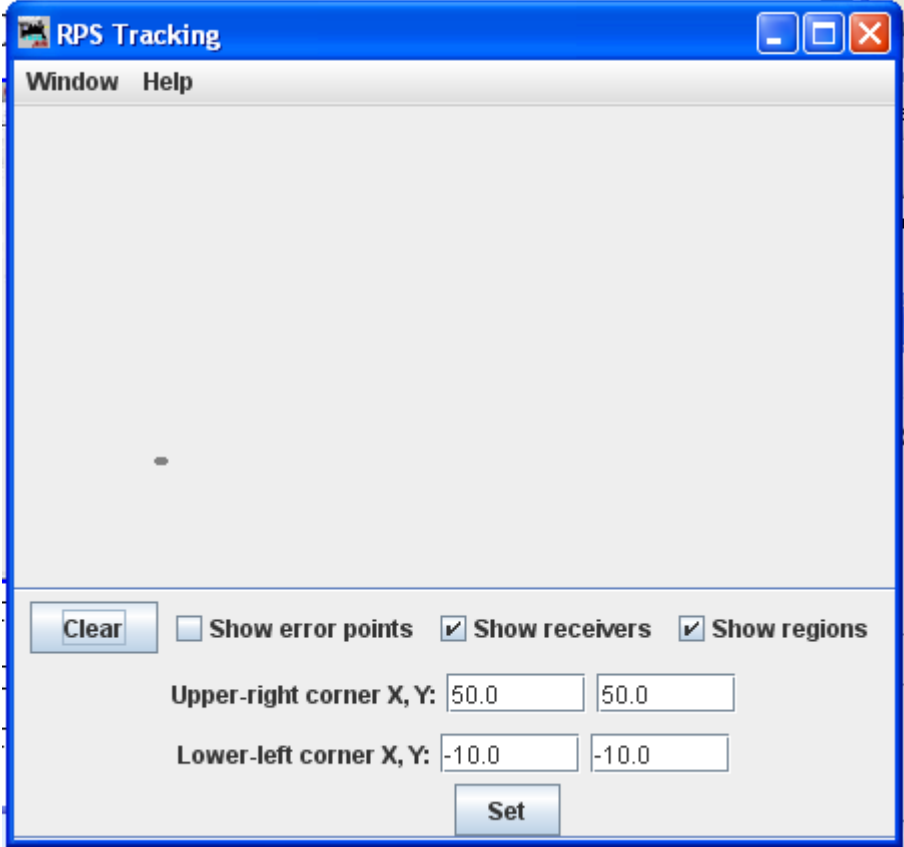
Opens the [RPS Debugger](#) window that lets you look at information as it moves through the RPS system.

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RPS Tracking Display

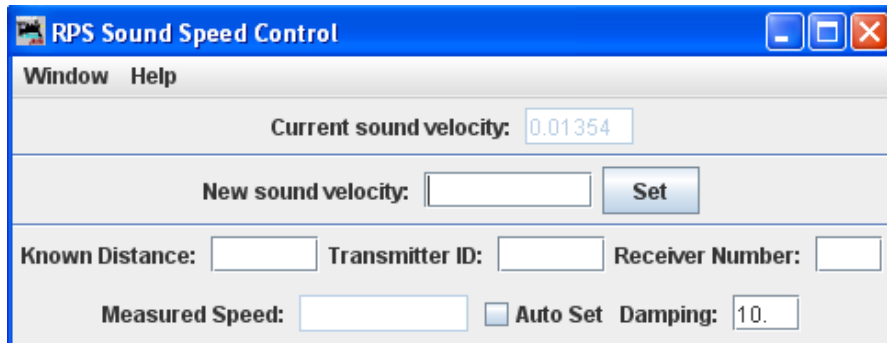
Opens the [RPS Tracking](#) frame that displays two types of things, the measured positions and paths of RPS transmitters and the *detection regions* used for RPS blocks and sensors.



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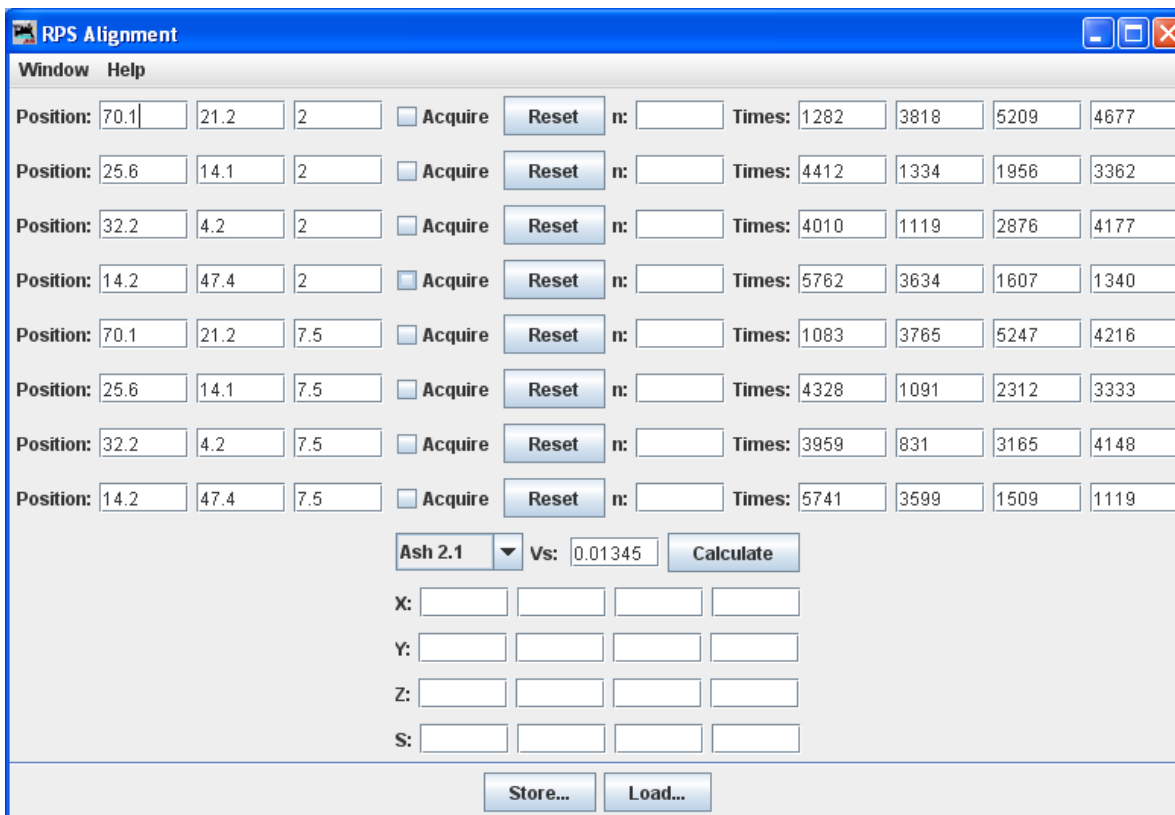
RPS Sound Speed Monitor

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.



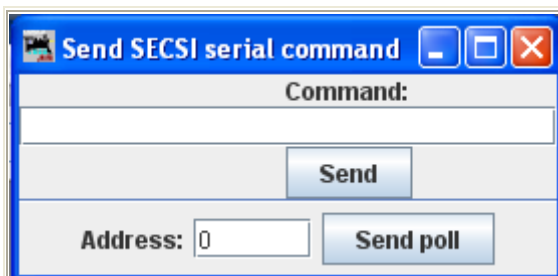
SECSI

Communications Monitor

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

Send Command

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



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.

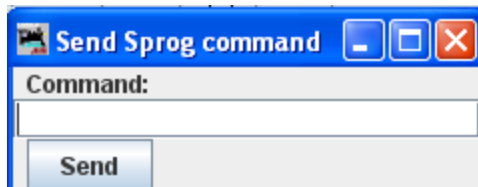
SPROG

Command Monitor

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

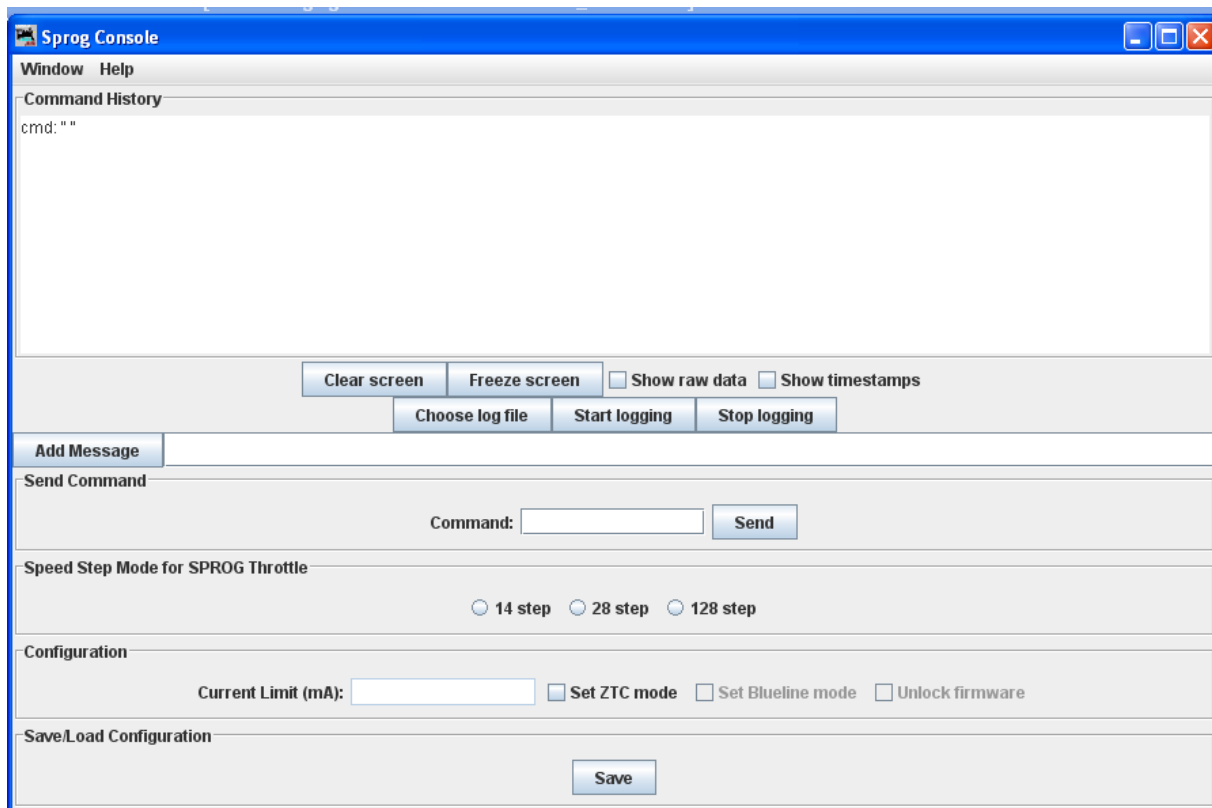
Send Command

Opens the Send prompt with a text box to enter the **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.

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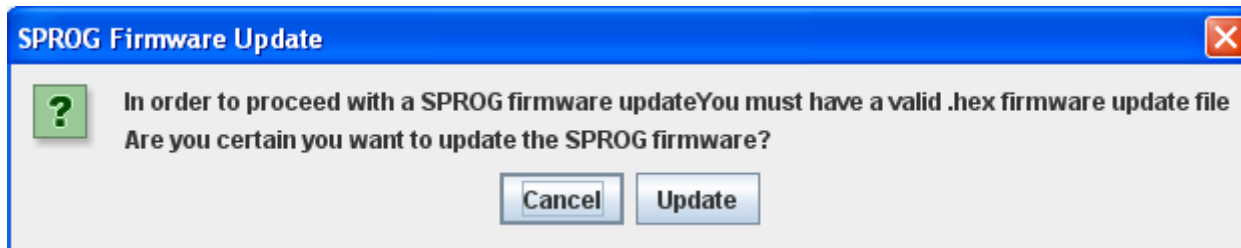


Get SPROG Firmware Version

Retrieves the SPROG firmware version and displays that information.

SPROG V3/V4 Firmware Update

Starts the SPROG Firmware Update wizard.



SPROG II Firmware Update

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

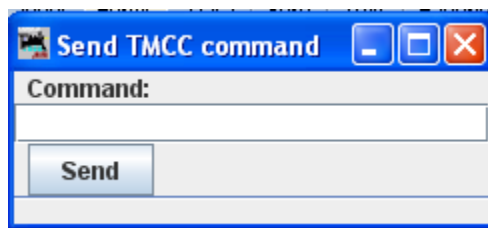
TMCC

TMCC Monitor

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

Send Command

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



wangrow

Command Monitor

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

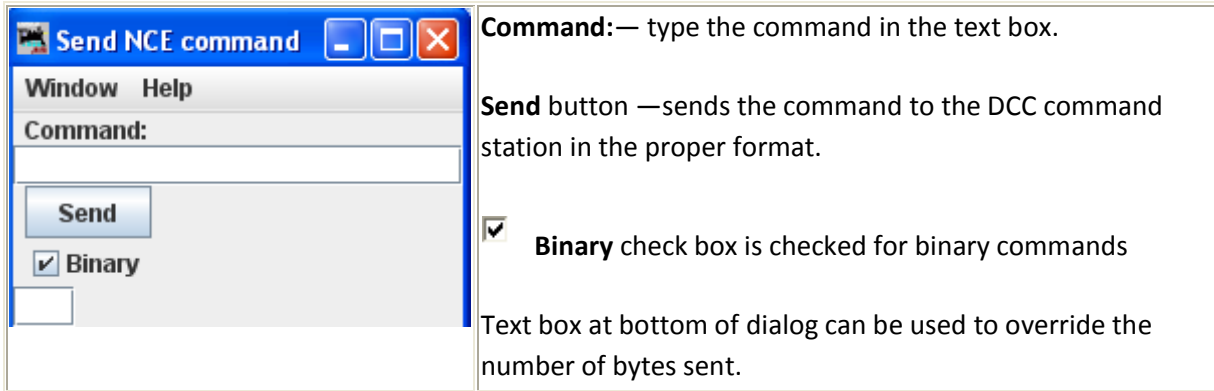
Send Command

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

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

Commands range from 0x80 to 0xBF

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XpressNet

DecoderPro® Main Window



XpressNet Menu

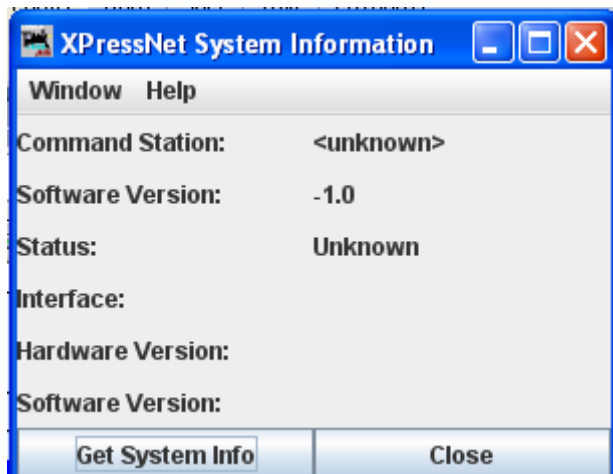
XpressNet Monitor

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


XpressNet System Information

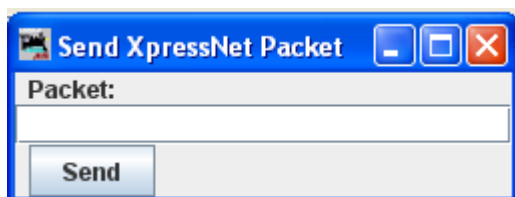
XPressNet System Information Dialog

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




Send XpressNet Command

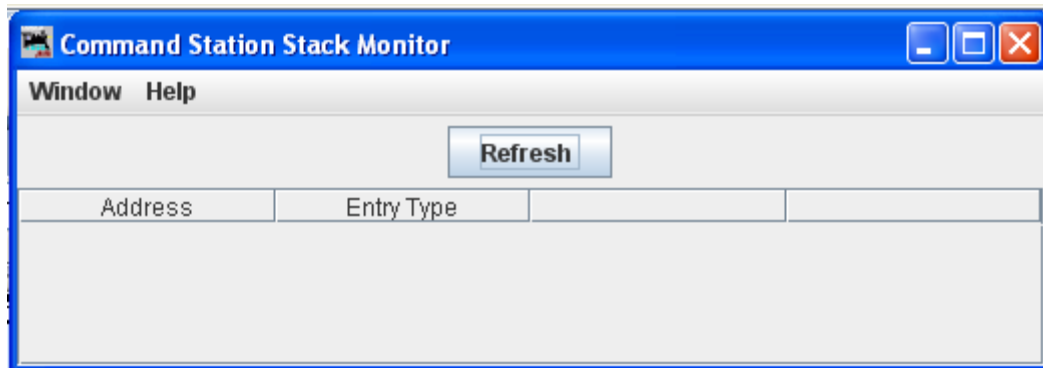
Opens the Send XpressNet Packet prompt so that you can type in a Packet: and click on the  to transmit via XpressNet to your system.



Command Station Database Manager

Command Station Stack Monitor

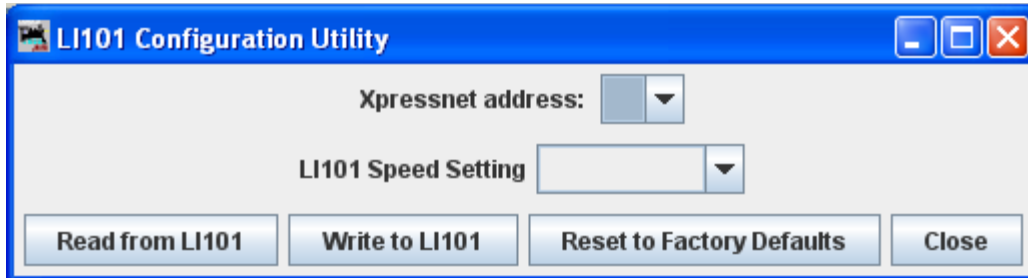
Click the  to update the display to the current information.



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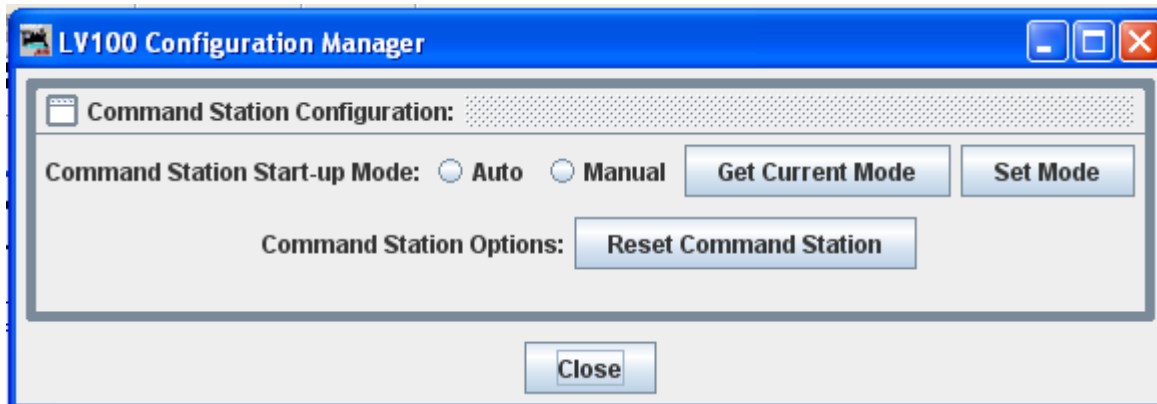
LI101 Configuration Manager

Open the [LI101 Configuration Utility](#) Window.



LZ100 Configuration Manager

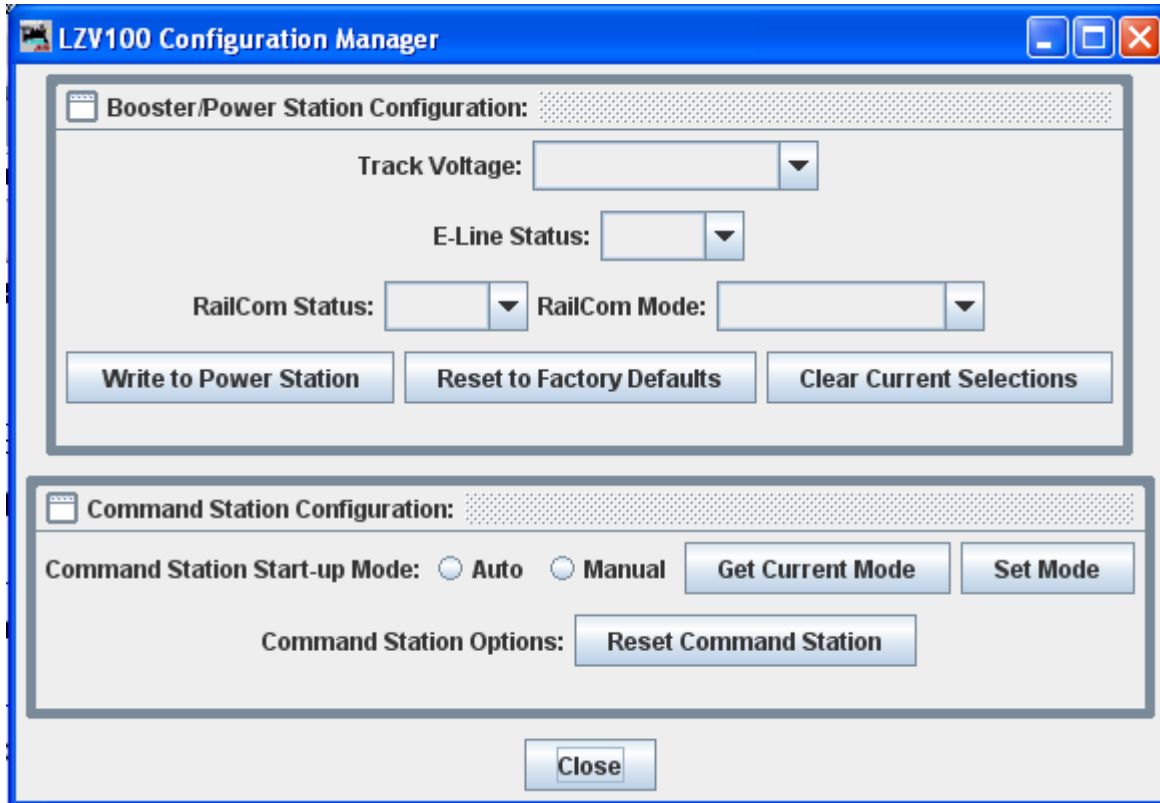
Open the [LV100 Configuration Manager](#) Window



LZV100 Configuration Manager

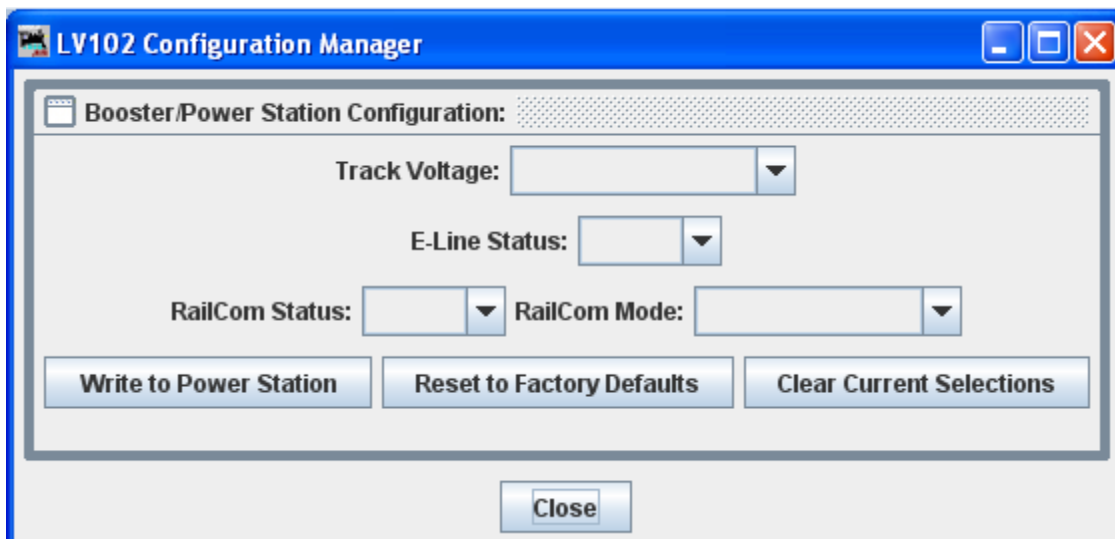
Open the [LZV100 Configuration Manager](#) Window

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LV102 Configuration Manager

Open the [LV102 Configuration Manager](#) Window.



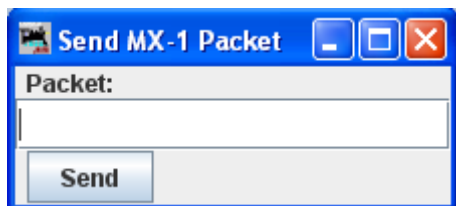
Zimo

Command Monitor

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

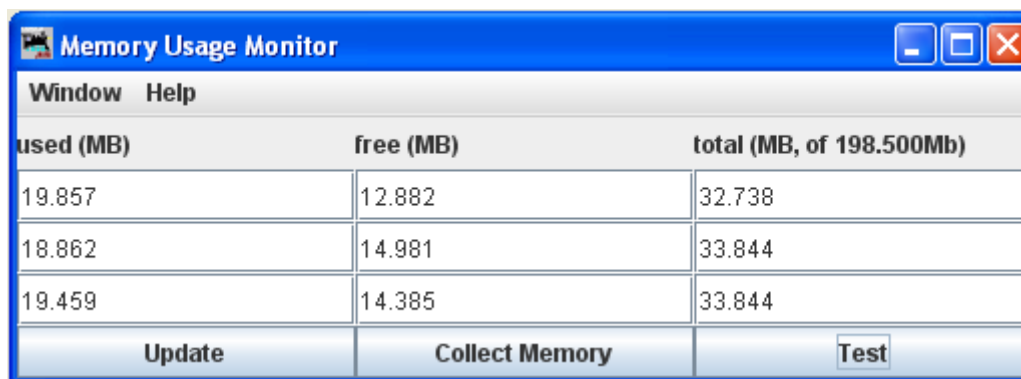
Send Command

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



Debug Menu

Memory Usage Monitor



used (MB)	free (MB)	total (MB, of 198.500Mb)
19.857	12.882	32.738
18.862	14.981	33.844
19.459	14.385	33.844

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

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

The buttons located at the bottom each column:

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

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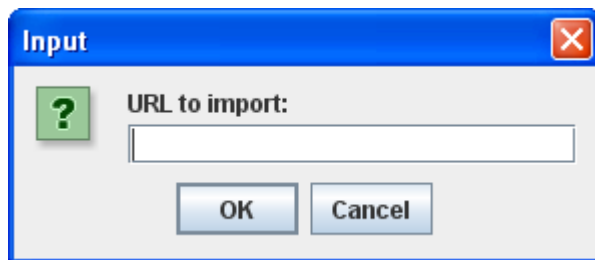
- Collect Memory- reduces the amount of used memory to the minimum possible by asking Java to run a garbage collection.
 - Test button Runs a test of the memory allocation and collection process (not used by regular users)
-

Import Decoder File

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

Import Decoder URL

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



Recreate Decoder Index

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

Recreate Roster Index

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

Check XML File

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

Validate XML File

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

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Check Decoder Names

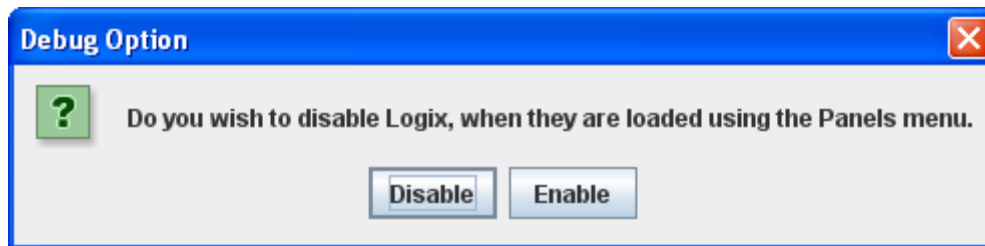
Opens the **Open** dialog from which you may select a decoder definition file that will be checked for standard names and lists the items contained in the file that do not have standard names. These are not errors, but they will not show up in the Comprehensive Programmer. To display they must be put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

Check Programmer Names

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

Load Logix Disabled

Will disable/enable Logixs when loaded by the Panels menu.



Log Message

Opens the **Make Log Entry** prompt to allow you manually enter an entry in the log file.



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

Display Message Log

Displays window with Log messages displayed.

Display Log Categories

Displays the **Display Log Categories** window which displays a list of all the jmri log message categories.

Virtual Sound Decoder

VSDecoder Manager

Manage Virtual Sound Decoders

The VSDecoder Manager window provides a consolidated window to manage all the VSDecoders running on a system. Each active VSDecoder appears as a "control panel" within the Manager window, and all of the key controls required are at the user's fingertips.

Launch the VSDecoder Manager by selecting "Virtual Sound Decoder -> VSDecoder Manager" from the Debug menu. A simple window will appear, with a blank panel, a volume/mute control, and an "Add Decoder" button.



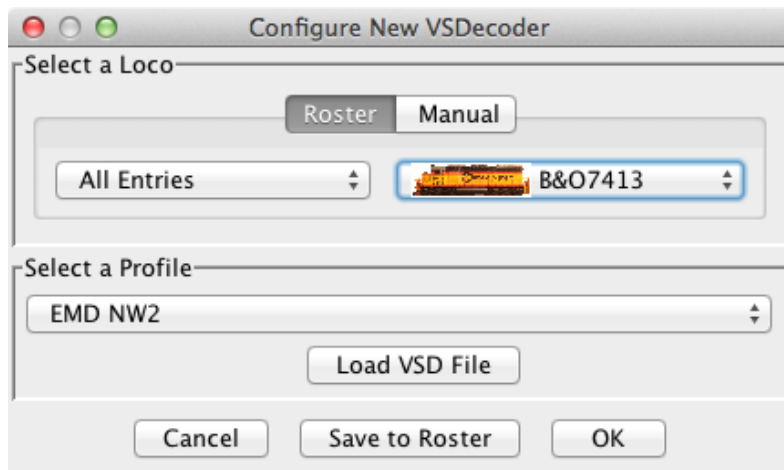
To create a new VSDecoder, click "Add Decoder". This will open a Configuration Dialog ("Config Dialog") where you can choose a locomotive and a sound profile. Once you close the Config Dialog, a new Control Panel will be added to the VSDecoder Manager window.

Each time you add a VSDecoder, a new Control Panel will be added to the main window. You can remove Control Panels by clicking the "Delete" button.



Once you have added a Control Panel, the VSDecoder will respond to throttle and function button presses from a throttle assigned to the locomotive's address, or to button presses on the Control Panel.

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The Configuration Dialog allows you to create a new VSDecoder. Choose a locomotive from the Roster or set an Address manually. Then select a Profile from the Profile Select combo box. To load Profiles, click the "Load VSD File" button or choose File->Load VSD File from the menu bar.

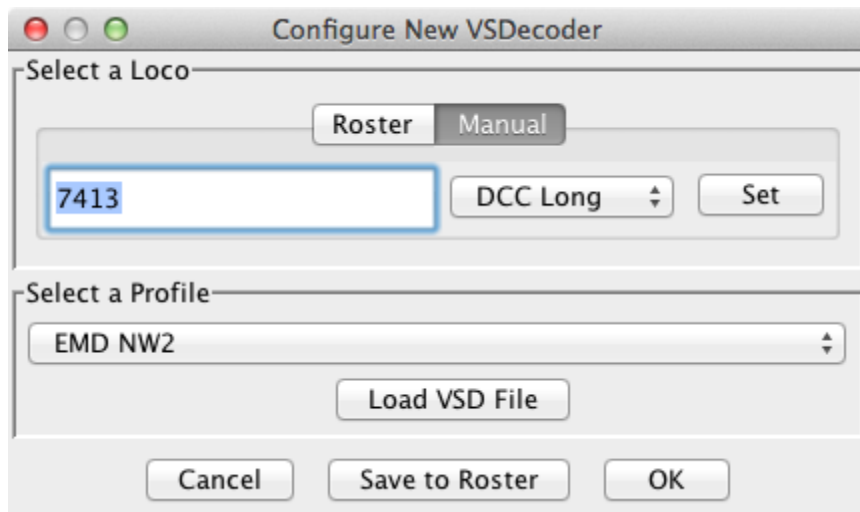
Note: You must have a Locomotive assigned *and* a Profile selected before the "OK" button is enabled.

You can save a Profile to a Roster Entry so that it is automatically configured when the Roster Entry is selected. To do this:

1. Select the Roster Entry
2. Load a VSD File and choose a Profile
3. Click the "Save to Roster" button

To manually set a locomotive address:

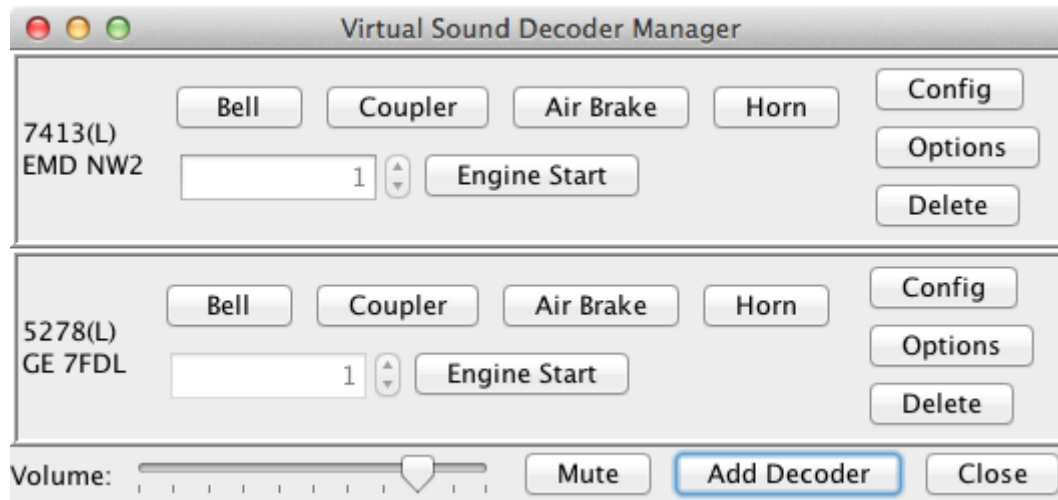
1. Choose the "Manual" tab in the "Select a Loco" section
2. Enter an address and choose a protocol
3. Click the "Set" button



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Control Panel: Each VSDecoder gets a Control Panel within the VSDecoder Manager window. The Control Panel is divided into three sections:

- The Loco Address and Profile Name
- Sound activation buttons
- Configuration, Options, and Delete buttons



The left section shows the assigned Loco Address and Profile Name. The center section provides buttons for activating sounds. The right section has buttons for controlling or deleting the Control Panel.

Sounds can also be activated by a throttle assigned to the same address as the VSDecoder.

Volume / Mute control: At the bottom of the window is a master volume slider and mute button. These control the overall sound level for all VSDecoders within the VSDecoder Manager.

Menu Items

File->Load VSD File

Load the Sound Profiles from a VSD File. Profiles loaded will be available to any currently running or newly launched VSDecoder. This is the same action as the "load VSD File" button on the Config Dialog.

Edit->VSDecoder Preferences

Set preferences for VSDecoder operation.

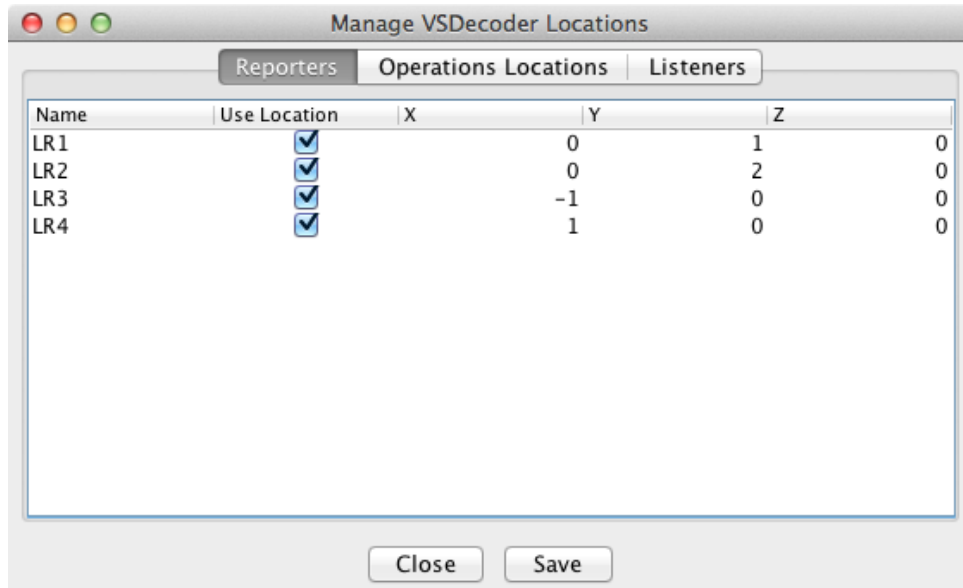
Manage VSD Locations

The **Manage VSD Locations** window provides a consolidated location to manage and set the apparent physical location of sounds for trains using Virtual Sound Decoder

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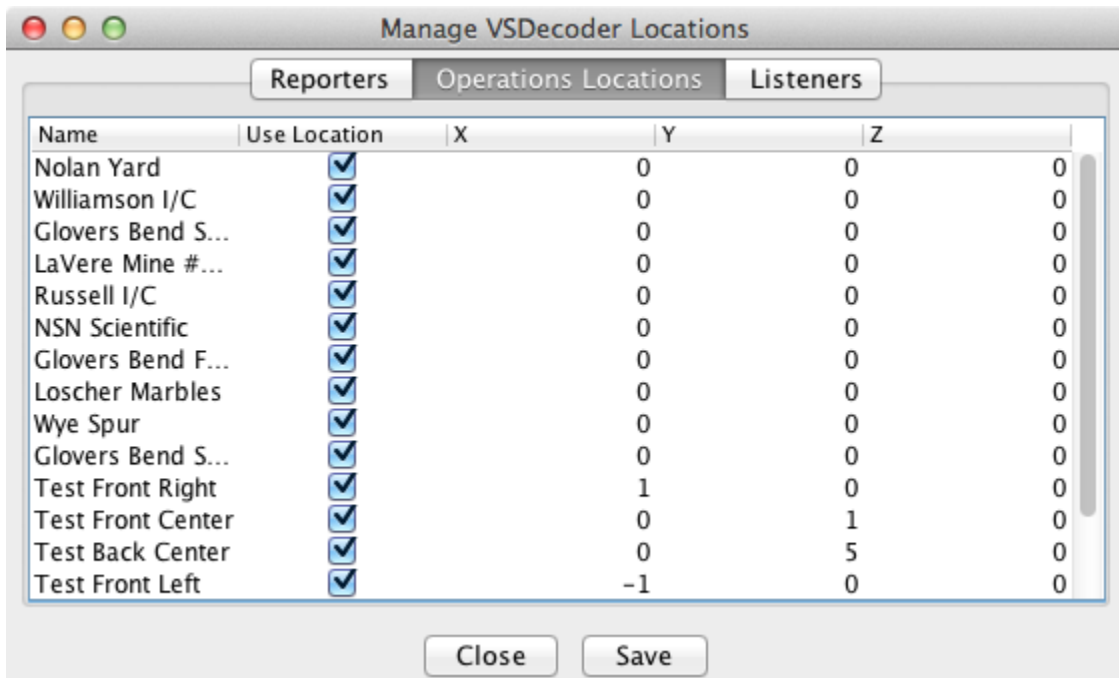
The **Manage VSD Locations** window has three tabs: Reporters, Operations Locations, and Listeners. Each tab shows a list of objects, each with a check-box to enable/disable use (for VSD purposes, not for other JMRI purposes), and entry cells for X, Y, and Z location coordinates.

Reporters



The Reporters tab shows a list of all currently defined Reporters. This is intended for use with Digitrax Transponding or other similar locomotive tracking hardware systems.

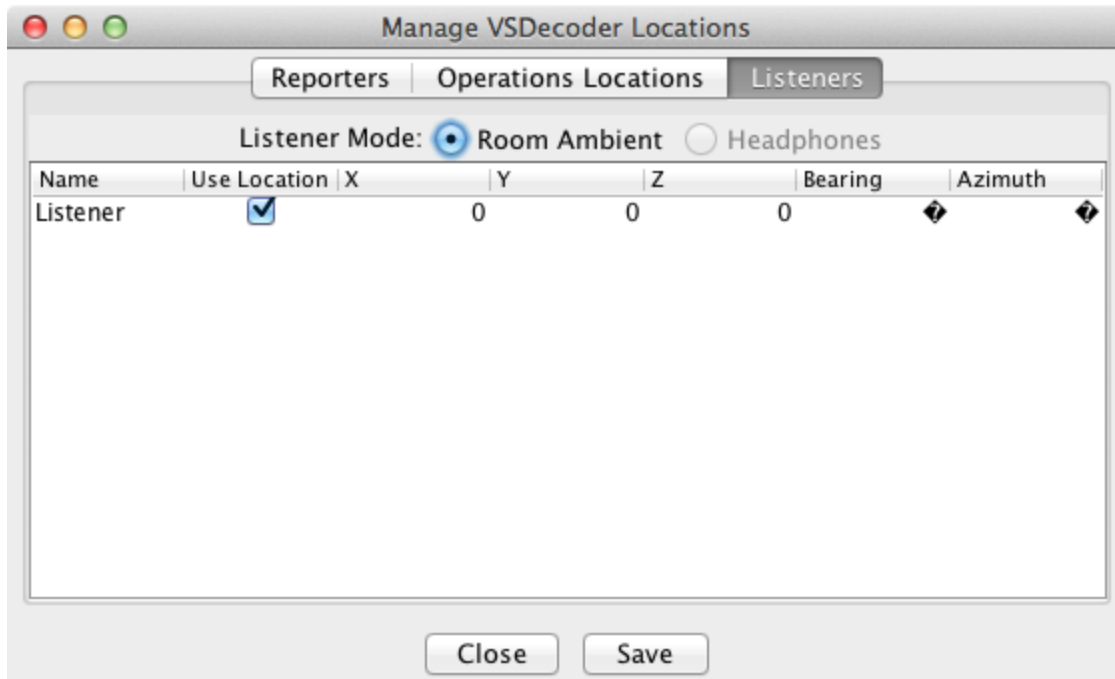
Operations Locations



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The Operations Locations tab shows a list of all Locations defined within the JMRI Operations system.

Listeners



The Listeners tab shows the location of the Listener in the VSD sound system. The Listener position has two additional measurements: the Bearing (angle clockwise from the Y axis) and Azimuth (angle up or down from the X/Y plane) which together describe which way the Listener is facing.

Location Following

With input from locomotive tracking hardware, Virtual Sound Decoder is able to move the apparent source of the locomotive sound to follow the locomotive's position on the layout.

Location Following Setup

To enable location following you will need a hardware method of tracking the locomotive's position on the layout. VSD currently supports the following tracking systems:

- Digitrax Transponding (tested)
- ESU ECoS (not tested)
- RFID (not tested)
- RPS (not tested)
- RailCom / DCC4PC (not tested)

If you have one of the systems noted as "not tested", and would like to help with testing and debug of this feature, please contact me on the [JMRIUsers Yahoo! Group](#). More systems will be added in the future. To enable VSD Location Following, follow these steps:

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1. Follow the directions appropriate to your hardware system for [setting up Reporters](#).
2. Select Debug->Virtual Sound Decoder->Manage VSD Locations
3. In the dialog, set X / Y / Z coordinates for each reporter you wish to use for VSD location following. Uncheck the "Use Location" box for Reporters you do not wish to use for VSD tracking.
4. Click "Save" to store the new values.
5. Save your configuration either in a config file or as part of a Panel

Note: Reporters are not added to the Manage VSD Locations "live". If you add new Reporters, you must close and re-open the Manage VSD Locations window to make the new Reporters appear.

Coordinate System

The VSD Locations system uses a standard "right handed" **Cartesian coordinate system**, (http://en.wikipedia.org/wiki/Cartesian_coordinate_system) where a location is defined by a combination of distances along an X, Y, and Z axis. The Origin, or center of the coordinates can be in any convenient location, such as the center of the room, a corner of the room, or a corner of the layout.

The X / Y / Z location values can be in any unit you choose, including an arbitrary relative scheme, as long as you are consistent. By default, positive X is to the space's right, positive Y is "forward", and positive Z is "up". Negative values are left, behind, and down, respectively. Alternately you may prefer to think of +X as "East", +Y as "North", and +Z as "up".

Note: The coordinate system can be rotated in any way that makes sense to the user. If it suits the railroad's arrangement better, +Y could be "East", +X "South", and +Z "Up". It is not recommended that the Z axis direction be changed however, unless your operators are accustomed to hanging from the ceiling.

A convenient system for a typical rectangular room-sized layout would be to place the origin at the near corner to the guest's left as the guest stands in the entry door, or the "bottom left" corner of the layout's track plan map, and with Z=0 at the layout's lowest nominal track elevation for the "live" part of the layout. This system ensures that all locations used will have positive X / Y / Z values.

Listener Location

If you do not specifically set the Listener location and orientation, the Listener by default will be at (0, 0, 0) and facing straight ahead along the +Y axis (bearing 0.0 degrees / azimuth 0.0 degrees). To set a different Listener location and/or orientation, go to the Listeners tab and set the X / Y / Z coordinates of the Listener's location. The coordinates and units must be the same as those used for the Reporters.

The Bearing and Azimuth values set the orientation of the Listener, or the direction the Listener is facing. Bearing is measured clockwise from the +Y axis. Azimuth is measured up (or down if negative) from the X/Y plane. Both measurements are in units of degrees of angle. For example, a Listener standing at the Origin (0, 0, 0) and facing "West" and halfway "up" would have a Bearing of 270 and an Azimuth of +45.

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Using Locations

When you have followed the above setup steps, launch the VSDecoder Manager window, create a VSDecoder and run the locomotive. As your locomotive moves around the layout, the sound will follow the locomotive's reported position.

Note: The sound will appear to "jump" from location to location as the locomotive's reported location changes. This effect will be smaller with additional and more closely spaced reporters.

Location Following using JMRI Operations

If you do not have a hardware tracking system, you can use the JMRI Operations feature to enable a rudimentary form of location following.

To set the Operations locations:

1. Select Operations->Settings
2. Select Tools->Options
3. Check the "Enable physical locations for Virtual Sound Decoder" option, and save the changes.
4. Create Operations Locations within JMRI Operations
5. Launch the Manage VSD Locations window
6. Set the locations of the defined Operations Locations.

To use Operations for location following, assign the specific locomotive to the train, then select the train in the locomotive's VSDecoder Options pane. When you *MOVE* the train in Operations, the sound will move to the next location on the Route.

For more information on Operations, see the JMRI® Operations User's Guide

Note: Operations Locations following is temporarily disabled in JMRI 3.1.6 but will be re-enabled in 3.1.7.

PRICOM ►

PRICOM Pocket Tester»

Connect

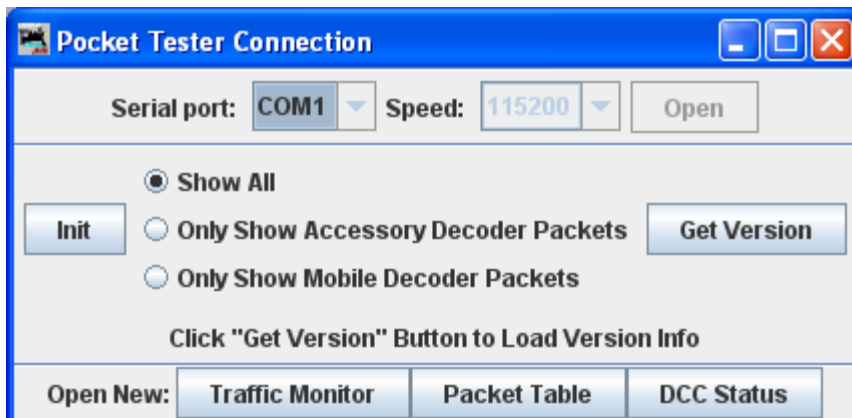
The DCC Pocket Tester is portable, reliable, and accurate way to test and verify the DCC Protocol. It can be connected to your serial port to monitor traffic from DecoderPro.

Pocket Connection Tester dialog

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



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

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

Init button initializes the tester..

Get Version button queries the tester for its version information.

Open New: (at the bottom of window)

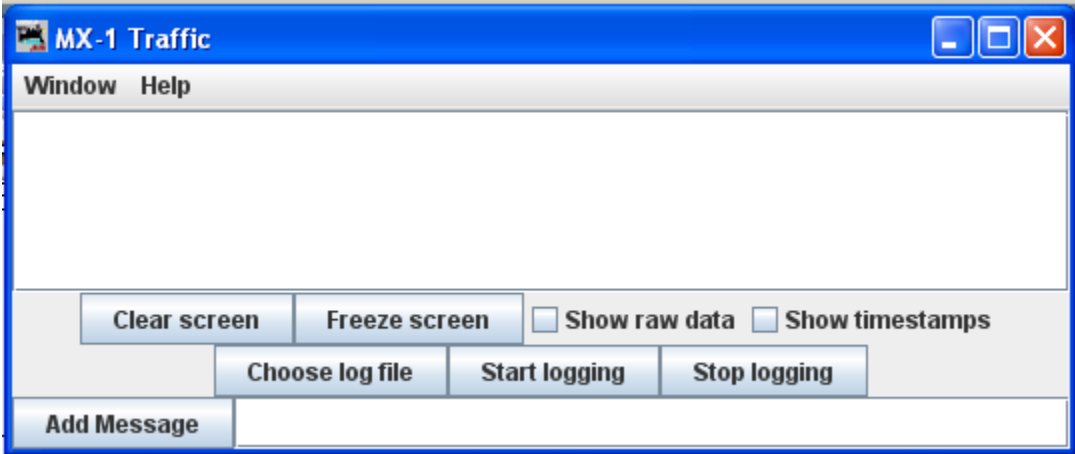
Traffic Monitor button—opens the [Monitor window](#).

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.

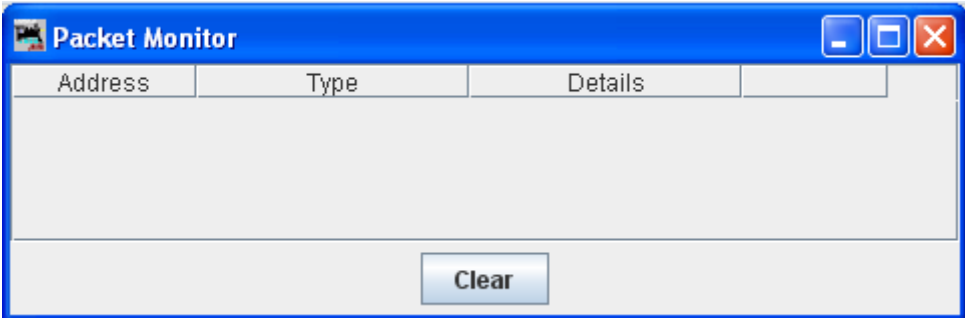
When the monitor window opens, it will automatically display all traffic on the communications link.

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

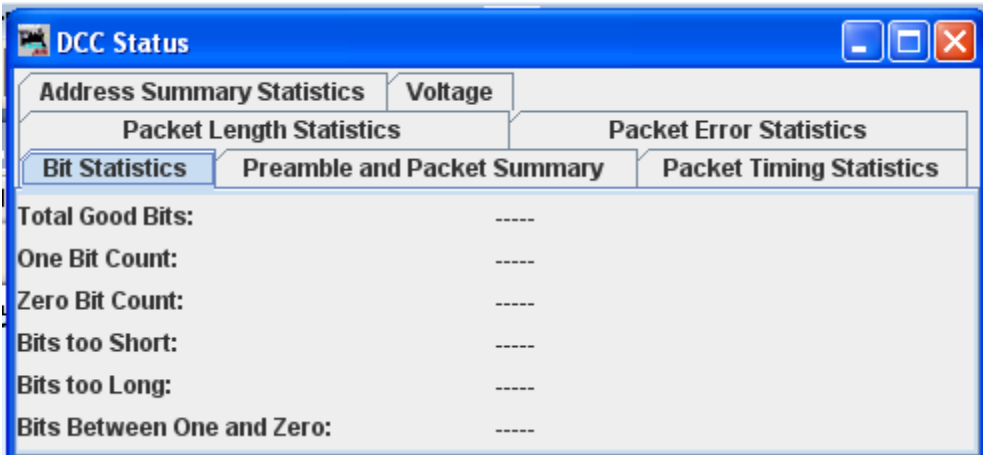
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Packet Table button—Opens the **Packet Monitor** window.



DCC Status button—Open the DCC Status window.



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PRICOM Flash Updater

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

- ---

USB Input Control

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

USB Device Viewer

Allows user to view USB devices in use.

RailDriver Throttle

Opens a **Throttle** window that is designed to work with Rail Driver www.raildriver.com/

Start JMRI Web Server

Starts a Web Server on your computer. You can access the Index.shtml page using the URL displayed in the dialog. <http://jmri.org/help/en/html/web/index.shtml>



Start Wi Throttle

Opens the WiThrottle window which controls the connection between Wi Throttle and iphone, or ipad touch and JMRI

Additional information at jmri.org/help/en/package/jmri/jmrit/withrottle/UserInterface.shtml



<http://jmri.org/help/en/package/jmri/jmrit/withrottle/UserInterface.shtml>

Window Menu

[Minimize](#)

(lists all DecoderPro windows that are open)

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

Help Menu

[Window Help...](#)

Displays help that for the current window.

[General Help...](#)

Displays general information about DecoderPro and other JMRI programs.

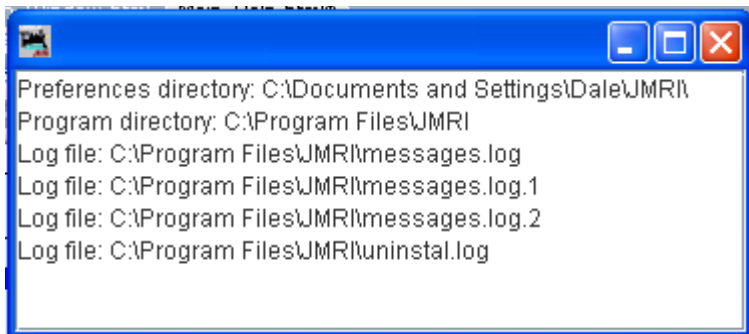
[License...](#)

Displays the License agreement under which JMRI operates.

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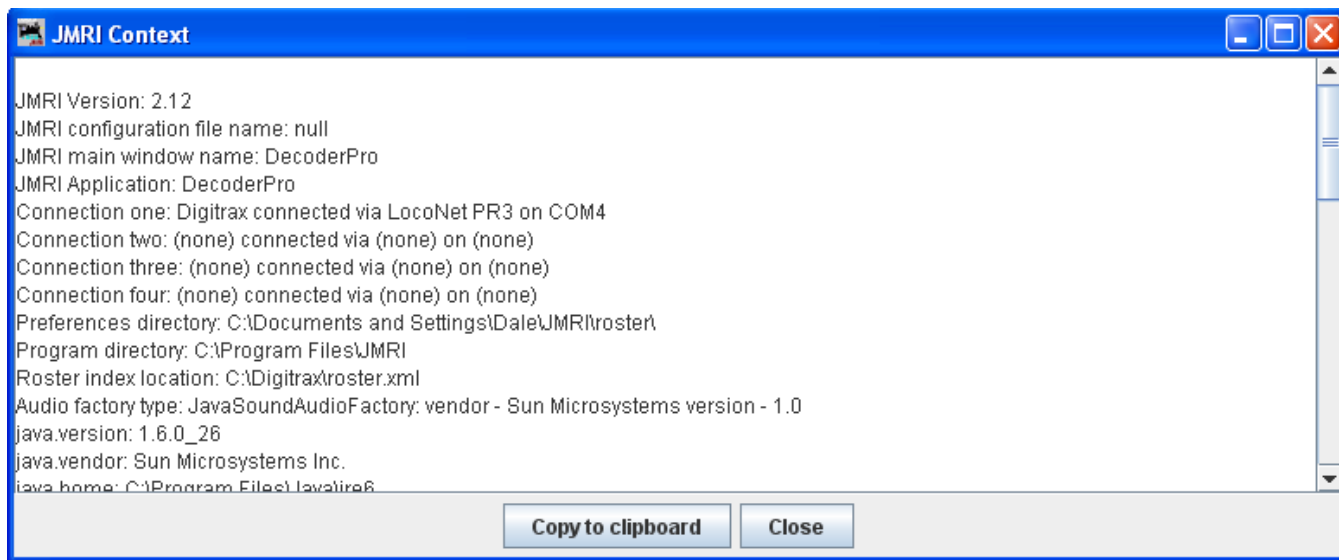
Locations...

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



Context....

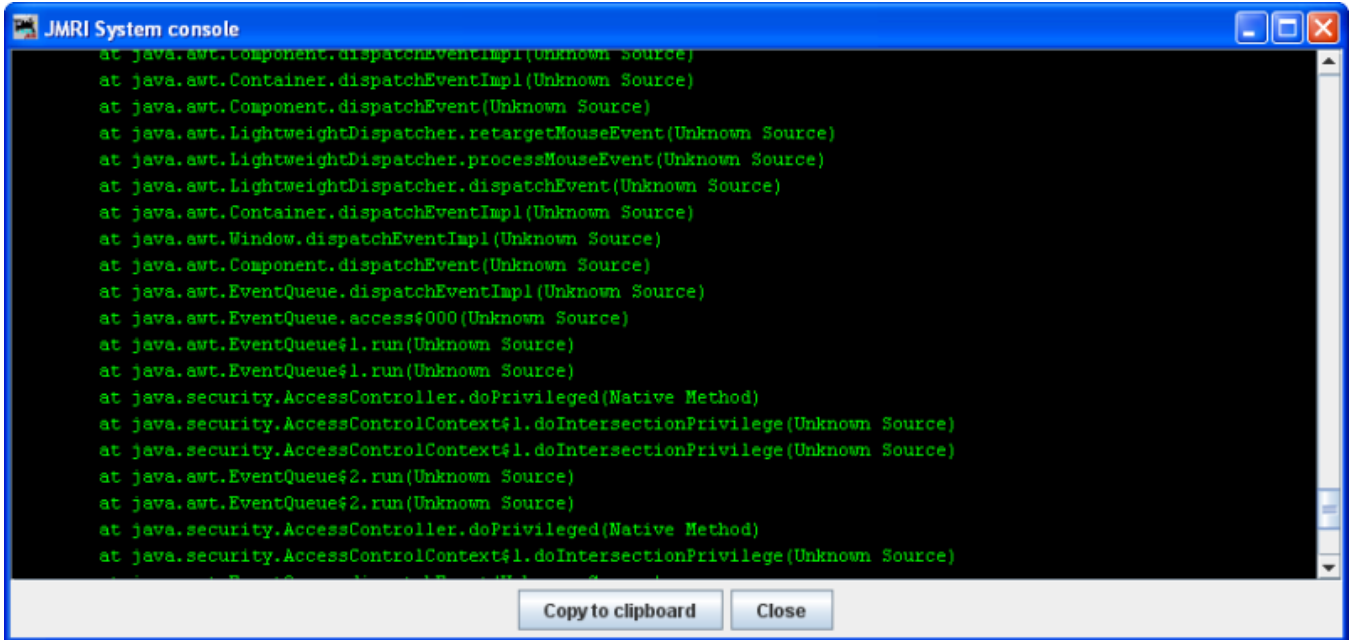
Opens the **JMRI Context** window that shows the configuration setting for your DecoderPro installation.



System Console...

Opens the JMRI System console window that displays the Java Execution activity. Now Right Click Context menu to copy to clipboard, wrap messages, change color scheme.

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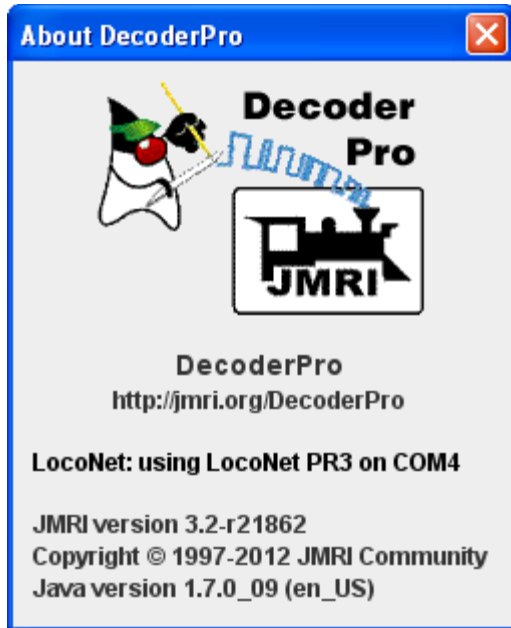
[Upload Debugging Info...](#)

Opens the **Upload Debugging Info** Window

The screenshot shows a window titled "Upload Debugging Info" with a blue title bar and standard window controls. The window contains a "Window Help" menu, a heading "Fill this page out to upload information that will help debug your problem.", and three input fields: "Your email address:", "Short summary (title):", and "Describe the problem:". At the bottom, there are three checked checkboxes: "Include context information", "Include network information", and "Include log file". A "Send" button is located at the bottom center.

About DecoderPro

Opens the Credits and Version Window



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

jmri.org/help/en/html/Errors.shtml

301 — no locomotive detected

The command station has reported that it doesn't see a locomotive on the programming track.

This can happen if the locomotive isn't making good electrical contact or if there's a wiring fault in the locomotive.

302 — programmer busy

The command station has reported that it's busy doing something else, and can't do any programming right now. This usually means that some other part of the DCC system is doing a programming operation, e.g. a hand-held throttle.

Some DCC systems can't do ops-mode programming (programming on the main) while also using the service mode programming track, in which case they'll return this error message.

303 — requested not implemented in command station

This means that JMRI has requested the command station do something that it doesn't support.

This is not supposed to happen, as JMRI should disable programming modes that the command station can't provide. If you do see this message, please report the circumstances on the jmriusers mailing list.

304 — aborted by user

The user has requested that the read or write operation stop early.

This is considered an error, because the program doesn't know whether the decoder actually saw the operation complete or not.

305 — confirm failed

Some command stations allow you to "confirm" the content of a CV, rather than read the value from it. In general, this is faster than doing a complete read. If the value in the CV doesn't match the expected

value, this message is issued. It's considered an error because if the values don't match, we know that we don't know the correct value for the CV contents.

306 — timeout talking to command station

The program did not hear back from the command station when it expected to.

This is by far the most common error message when people first start using JMRI. In that case, it usually means that the connection to the command station isn't correct. This could be a problem with the cable(s) making the connection, or a problem with how the preferences are set. Picking the wrong serial port is particularly common.

Once JMRI is working properly, this error may occasionally happen due to a transient error. DecoderPro generally will retry it successfully in that case.

307 — Unknown error

An error has happened, but JMRI doesn't know enough about it to be able to report more detail.

In general, JMRI is pretty good at deciphering what went wrong, and this message isn't very common. If you do see this message, please report the circumstances on the jmriusers mailing list.

308 — No acknowledge from locomotive

At the end of a CV read or write operation, the locomotive replies ("acknowledges") to the command station using a pulse of current.

If that pulse isn't seen, some command stations provide this error message. It could be due to poor electrical connections to the programming track or within the locomotive. It could also be that the decoder doesn't support readback.

Some decoders, particularly certain sound decoders, draw so much current that the reply pulse isn't detected by the command station. In that case, one of the various "programming boosters" may solve the problem.

309 — Short Circuit on Programming Track

The command station has reported seeing a short circuit on the programming track. That prevents programming operations.

Check the electrical connections to the programming track, and also within the locomotive.

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