

DecoderPro®

User's Guide Version 2.4

JMRI Organization



Decoder
Pro



PREFACE

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

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

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

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

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

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

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

Thanks for reading, and Let's Run Trains!

DecoderPro® User's Guide Version 2.4

REVISIONS

<i>DECODERPRO® REVISION RECORD</i>			
Version	Revision Date	Author	Revision Notes
1.1.9	9/4/2002	Joe Ellis	CEO, Bethlehem-Ares Railroad, a 1:160 Corporation
1.3	No date	Bob Blackwell	
2.4	2/15/2009	Dale A. Tripp and Bruce Shanks	Updated to JMRI version 2.4, new sections added

DecoderPro® User's Guide Version 2.4

TABLE OF CONTENTS

REVISIONS	I
DecoderPro® Revision Record	i
TABLE OF CONTENTS	II
CHAPTER 1 - GETTING STARTED WITH DECODERPRO®	9
What is DCC?	9
What DCC systems will Decoder Pro work with?	10
What hardware do I need?	10
How do I start the program?	10
How do I set up my preferences?	12
CHAPTER 2 - USING DECODERPRO®	15
Setting Up the Programmer	15
Reading your Decoder On the programming track:	15
Reading from your Decoder on the main:	16
Programming Modes	18
Determining type of decoder installed	18
CHAPTER 3 - THE BASIC PROGRAMMER	21
The Roster Entry Pane	21
Using the Basic Programmer	25
CHAPTER 4 - DECODERPRO® COMPREHENSIVE PROGRAMMER	28
Roster Entry Pane	28
Expanded Basic Pane	29
The Read and Write Buttons	30
Motor Control Pane	31
Speed Control Pane	33
Some suggestions on using the basic motor controls and programming on the main.	34

DecoderPro® User's Guide Version 2.4

The Speed Table Pane	35
Function Mapping Pane	39
Function Labels Pane	40
Lighting and FX Functions Pane	41
Consisting Functions Pane	43
Advanced Features Pane	46
Analog Controls Pane	47
Sound FX Pane	48
Sound Levels Pane	49
Global CV Listing Pane	50
Decoder Locking	50
Manufacturer Specific Data Pane	52
Printing Decoder Data	53
CHAPTER 5 - DECODERPRO® PROGRAMMERS	56
Simple CV Programmer	56
Service Mode Programmer	57
Service Mode	57
Reading your Decoder On the programming track:	57
Service Mode Programmer (Programming Track) Setup	58
Operations Mode Programmer	60
Operations Mode programming	60
Multi-Decoder Control	60
CHAPTER 6 - DECODERPRO® MAIN WINDOW	62
Main Window Overview	62
Menu Bar	62
Service Mode	62
Operations Mode	62
Help button	62
Quit button	63
<i>ADDITIONAL BUTTONS (Optional)</i>	63
New Throttle..	63
LocoNet monitor	64
Power Control button	64

DecoderPro® User's Guide Version 2.4

Menu Overview	64
File	65
Edit	65
Tools	65
Roster	65
Panels	66
<i>SYSTEM</i> (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.)	66
Debug	66
Window	66
Help	67
 File Menu	 67
Print Decoder Definitions...	67
Print Preview Decoder Definitions...	68
Quit	68
 Edit Menu	 68
Cut	68
Copy	68
Paste	68
Preferences...	68
 Tool Menu	 69
Programmers	69
• Single CV Programmer	69
• Service Mode Programmer	69
• Ops-Mode Programmer	69
• Multi-Decoder Control	69
Tables	69
Throttles	69
• New Throttle...	69
Throttle Window Menu Bar	70
Frame Properties	71
Address Panel	71
Throttle Control Panel	72
Throttle Function Panel	73
• Save Throttle Layout...	74
• Load Throttle Layout...	74
• Save Throttle Preferences...	74
Consisting Tool...	74
• Consisting Control Window	74
Three types of consists are used on DCC systems:	74
• A basic or primary address consist	74
• A Command Station Assisted Consist	74
• A Decoder Assisted Consist (DAC),	75
DecoderPro Consisting Tool	75
Clocks	76
• Setup fast Clock...	76
• Nixie Clocks	77
• LCD Clock	77
• Analog Clock	78

DecoderPro® User's Guide Version 2.4

Power Control...	78
Turnout Control...	78
Simple Signal Logic	79
Sensor Groups....	79
Speedometer...	79
Light Control	80
Dispatcher...	81
Send DCC Packet...	81
USS CTC Tool	81
Operations	81
 Roster Menu	 81
Create Entry...	81
Edit Entry...	82
Copy entry...	83
After you select the roster, Input prompt	83
Import Entry...	83
The Open dialog is displayed, select the roster file (roster.xml) that you wish to import. Input prompt	83
Export Entry...	83
Delete Entry...	84
Print Summary...	84
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).	84
Print Preview	84
 Panels Menu	 85
New Panels	85
• Panel Editor	85
• Layout Editor	86
Load Panels...	87
Store Panels...	87
Show Panels	87
Run Script...	87
Thread Monitor...	88
Script Output	88
Script Entry	88
 System Dependent Menu	 <hr/>
(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.)	88
ACELA MENU	89
Command Monitor	89
Send Command	89
Configure Nodes	89
CMRI Menu	90
CMRI Monitor	91
Send Command	91
Run Diagnostics	91
Run CMRI Diagnostic window	91
Configure C/MRI Nodes	92
Configure C/MRI Nodes Window	92
List Assignments	92

DecoderPro® User's Guide Version 2.4

EasyDCC Menu	93
Command Monitor	93
Send Command	93
<i>GRAPEVINE MENU</i>	93
Communications Monitor	93
Send Command	94
Configure Nodes	94
Node Table	94
LocoNet Menu	95
Monitor LocoNet	95
Monitor Slots	95
LocoNet Slot Monitor Window	95
Monitor Clock	96
A Digitrax LocoNet can contain it's own fast clock timebase. This can be driven either by a DCS100/DCS200 command station, or by a separate fast clock module such as those made by Logic Rail Technologies. LocoNet Fast Clock Monitor	96
Monitor LocoNet Stats	97
Configure LocoIO	98
Configure PM4	98
Configure SE8C	99
Configure DS64	99
DS64 Programmer Window	99
Limitations	100
Configure Command Station	101
Configure LocoNet ID	101
Start LocoNet Server	101
Start LocoNet over TCP Server	101
Send Throttle Messages	101
Send LocoNet Packet	102
Download Firmware	102
Firmware Downloader	102
Download Sounds	104
Edit SPJ Sound File	105
Select PR3 Mode	105
NCE Menu	105
Command Monitor	105
Send Command	105
Send Macro	106
Edit Macro	106
Edit Consist	107
DCC Packet Analyzer	108
Monitor Clock	109
Booster Programming	109
OakTreeSystems Menu	110
Communications Monitor	110
Send Command	110
Powerline Menu	110
Communications Monitor	110
Send Command	110
QSI Menu	111
Command Monitor	111
Send Command	111

DecoderPro® User's Guide Version 2.4

<i>RPS MENU</i>	111
RPS Monitor	111
RPS Receiver Control	112
RPS Polling Control	112
RPS Debugging Window	113
RPS Tracking Display	113
RPS Sound Speed Monitor	114
RPS Alignment Tool	114
SECSI Menu	115
Communications Monitor	115
Send Command	115
SPROG Menu	115
Command Monitor	115
Send Comamnd	115
Console	116
Get SPROG Firmware Version	116
SPROG V3/V4 Firmware Update	116
SPROG II Firmware Update	117
TMCC Menu	117
TMCC Monitor	117
Send Command	117
Wangrow Menu	117
Command Monitor	117
Send Command	117
XpressNet Menu	118
XpressNet Monitor	118
XpressNet System Information	118
Send XpressNet Command	118
Command Station Database Manager	119
LI101 Configuration Manager	119
LZ100 Configuration Manager	120
LZV100 Configuration Manager	120
LV102 Configuration Manager	121
Zimo Menu	121
Command Monitor	121
Send Command	121
Debug Menu	122
Memory Usage Monitor	122
Import Decoder File	122
Import Decoder URL	122
Recreate Decoder Index	123
Recreate Roster Index	123
Check XML File	123
Validate XML File	123
Check Decoder Names	123
Check Programmer Names	123
Load Logixs Disabled	123
Log Message	124
PRICOM	124
• PRICOM Packet Tester	124
• Connect—	124
PRICOM Pocket Tester	124

DecoderPro® User's Guide Version 2.4

Pocket Connection Tester dialog	124
• PRICOM Flash Update	126
USB Input Control	126
USB Device Viewer	126
Rail Driver Throttle	126
Start Mini Web Server	126
Window Menu	127
Minimize	127
Help Menu	127
Window Help...	127
General Help...	127
License...	127
Locations...	127
Context...	128
Communications Monitor Window	128
Controls at the bottom of the window.	128
Logging to a File	129
Adding Messages to Log File	129
CHAPTER 7 - DECODER DEFINITION	130
Getting Started	130
Getting Started on a decoder definition	130
Format	130
Formatting the decoder definition	130
Author	130
Decoder Family and Model	131
Programming modes the decoder will accept:	131
Testing	132
Testing the decoder definition	132
Submitting to JMRI	133
Submitting to JMRI	133
How do I go about getting these approved and into the next release?	133
To do this:	133
CHAPTER 8 - DECODERPRO® ERROR MESSAGES	134
Decoder Programmer Common Error Messages	134
<i>JMRI ERROR CODES(http://jmri.sourceforge.net/help/en/html/Errors.shtml)</i>	134

CHAPTER 1 - 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.

DecoderPro® User's Guide Version 2.4

000000WHAT DCC SYSTEMS WILL DECODER PRO WORK WITH?

Decoder Pro will work with the following DCC systems:

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

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

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

WHAT HARDWARE DO I NEED?

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

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

HOW DO I START THE PROGRAM?

DecoderPro® User's Guide Version 2.4

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



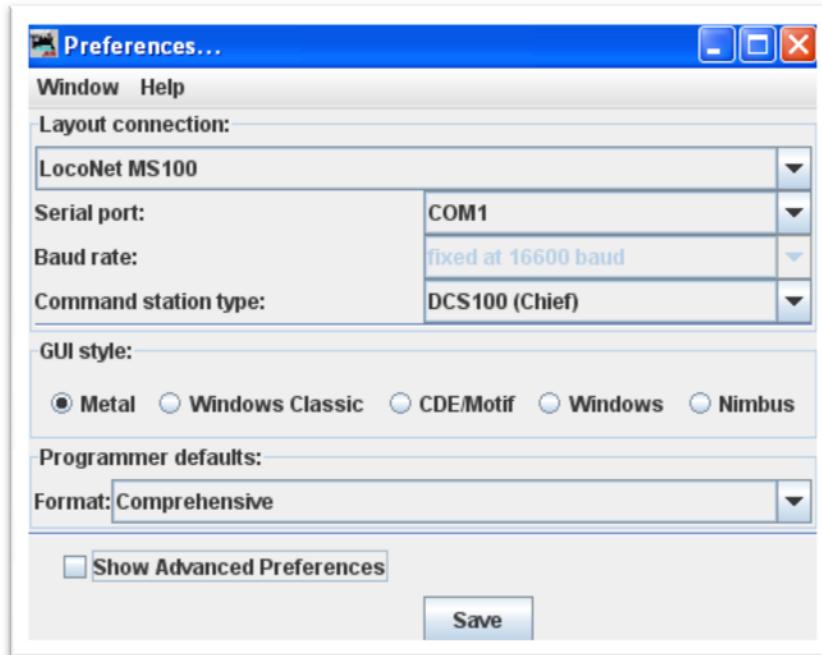
It may take a while for this screen to come up, especially on older and slower computers. Remember that you are essentially running the program on a Java emulator over your native operating system software. New computers can do this fairly quickly, but older ones will feel like they're taking forever.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

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

HOW DO I SET UP MY PREFERENCES?

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

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

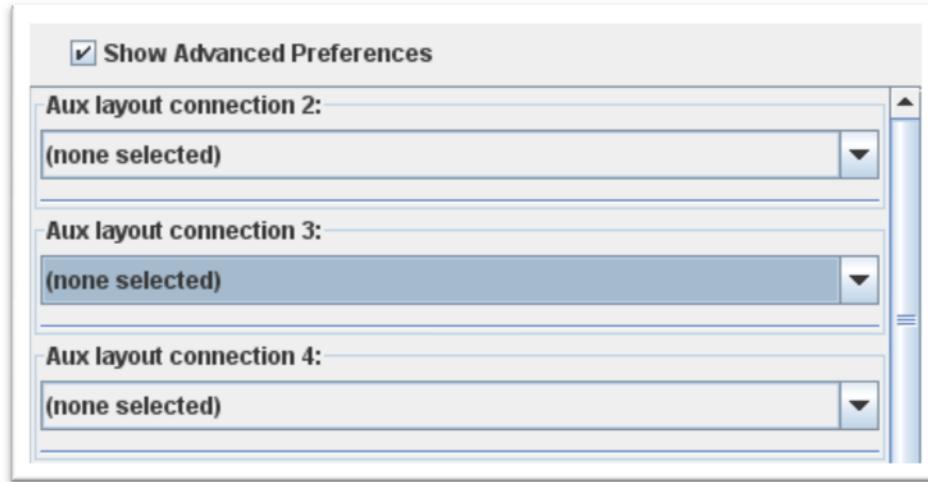


Layout connection :	Drop-down list with all of the supported DCC system interfaces that you can use with Decoder Pro. Select the option that matches your hardware.
Serial port:	Drop-down list to select the serial port to which your DCC interface is connected. If you do not know, check your system hardware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

To change any of these options just click on the arrows to open the drop-down list. To change the GUI options, click on the appropriate radio button. When you are finished, click on the "Save" button to save your preferences.

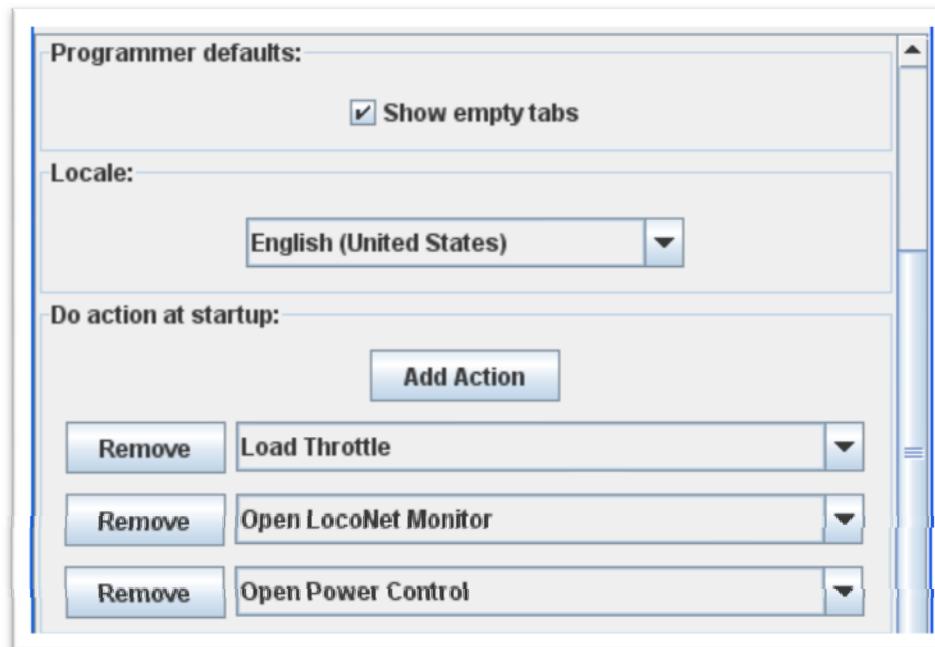
Changes in preferences will not take effect until the program is re-started.

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



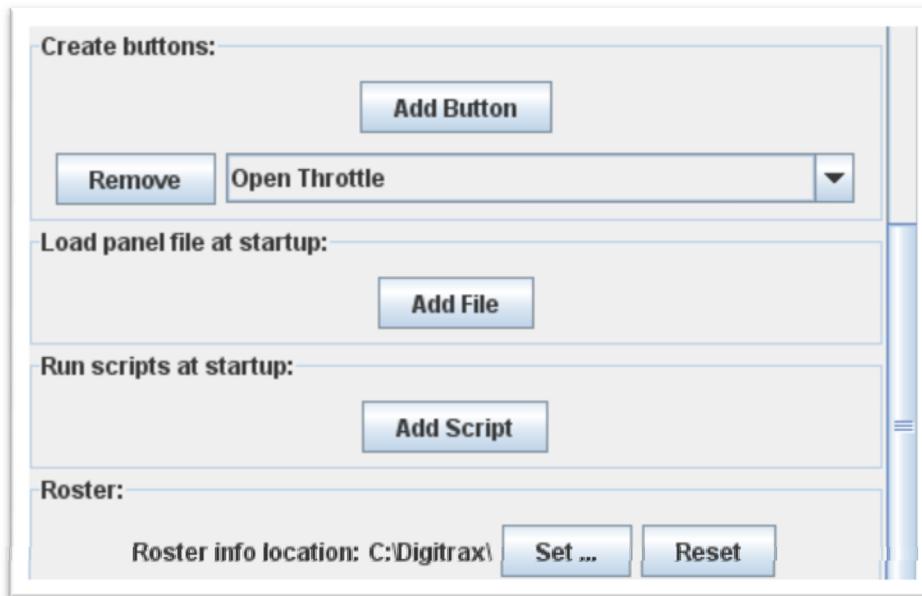
Advanced Preferences:

Auxiliary layout connection 2 thru 4	Provides for multiple connections to JMRI
--------------------------------------	---



Advanced Preferences [Programmer defaults]

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



Advanced Preferences [Create Button and Load Files]

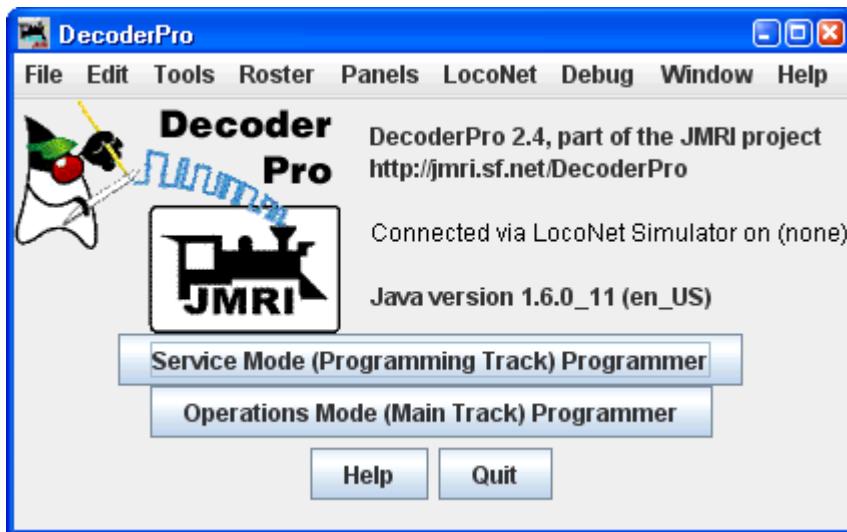
Add Button	Provides a means of adding buttons to the GUI to add additional throttles etc.
Remove Button	Used to remove buttons from your program interface that you no longer want to use
Load panel file at starting	For advanced users to load panel files created with the Panel Pro programs
Run script at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

CHAPTER 2 - USING DECODERPRO®

SETTING UP THE PROGRAMMER

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

On opening DecoderPro, the main page will be displayed:



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

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

READING YOUR DECODER ON THE PROGRAMMING TRACK:

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

Basically the decoder is asked a whole series of questions and when the answer is “yes” it turns on the motor for only a very brief time. The command station notices the current being drawn

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

WRITING TO DECODER ON THE PROGRAMMING TRACK:

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

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

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

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.

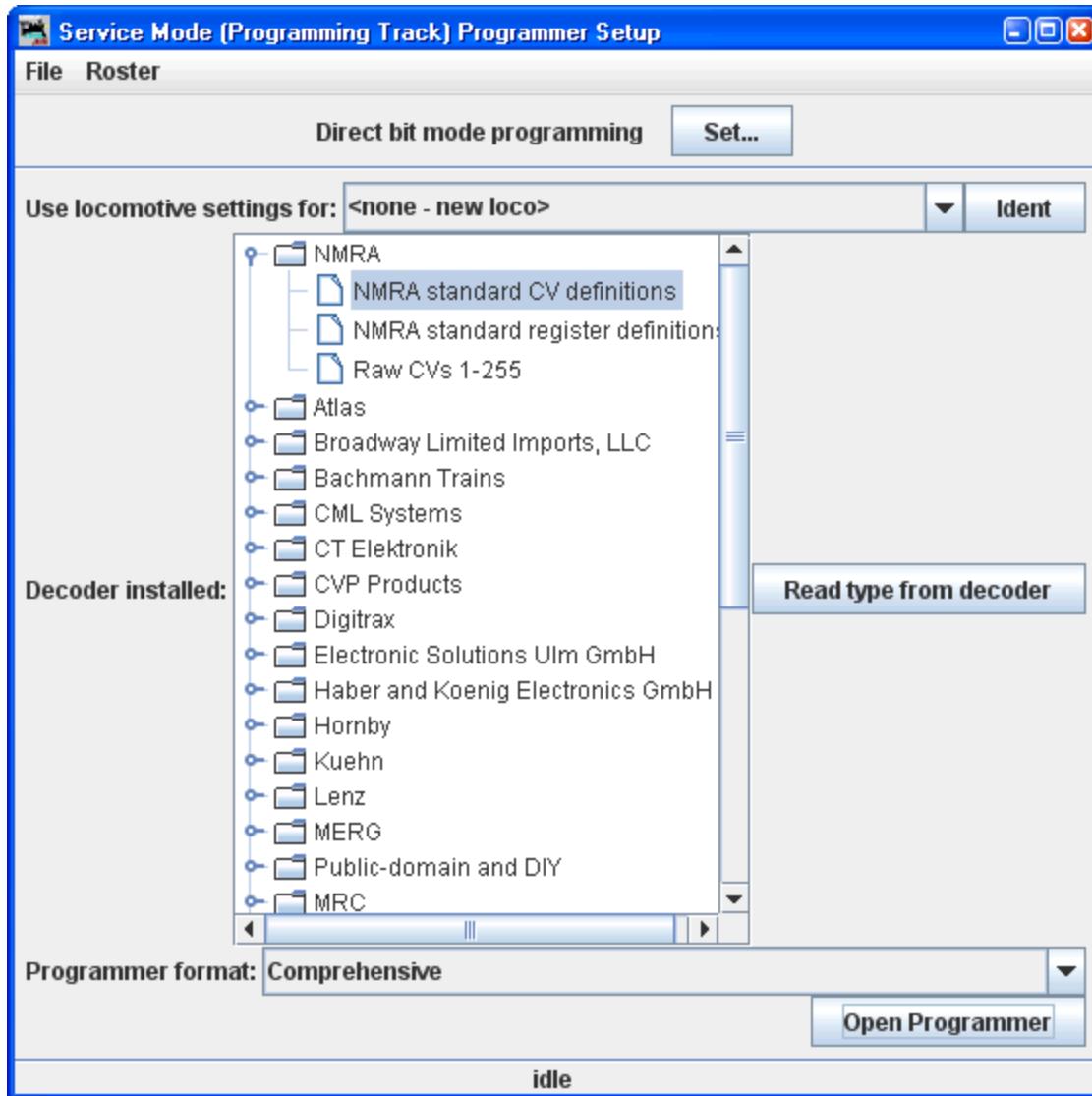
The decoder is first addressed by the Command Station, then the CV is addressed and then the data that is to be written into that CV of that decoder is sent. An exception is if address zero is used,(or you forget to enter an address when you start). Then **ALL** decoders on the main will write that data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

The other two buttons are:

3. **Help** - Accesses the help files
4. **Quit** - Exits the program.

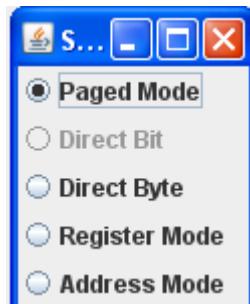
Click on **Service Mode (programming track) Programmer** and the Service Mode Programmer (Programming Track) Setup window opens



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

uses the selection of command station from your Preferences selections, combined with the decoder manufacturer and type selections (which we'll get to real soon now). Just accept what's there as a good start. And, fear not, for each pane in the programmer has a button which can be used to change programming mode if you have a problem.

PROGRAMMING MODES



Some brief comments on Programming Modes

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

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.

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

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

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

DETERMINING TYPE OF DECODER INSTALLED

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

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

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

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

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

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

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

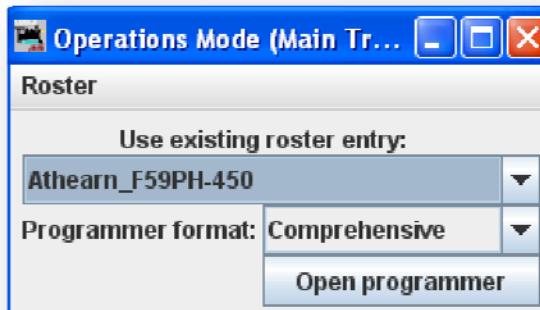
The last item on this pane is the Programmer Format entry. It is preset by your Preferences entry, but you can select other programmers using the drop down arrow. For now use the **Basic** programmer, because you won't be able to do much damage if you make mistakes. We'll get into the other programmers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

But before we do that let's cover the other type of programming, namely **Operations Mode programming** (Ops Mode) or Program on the Main(POM). All the discussion above had to do with working on a physically separate piece of track away from the layout. In Ops Mode we program directly on the main line while the locomotive is in operation. Great for getting those speeds and sounds just right. Most all of the programming panes we will discuss will work just as well when you are programming on the main, and you get instant feedback to your changes. How cool is that?

If you click on **Operations Mode (Main Track) Programmer** the *Operations Mode (Main Track) Programmer setup* window will open.



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 we were about to do in the **Service Mode programmer**.

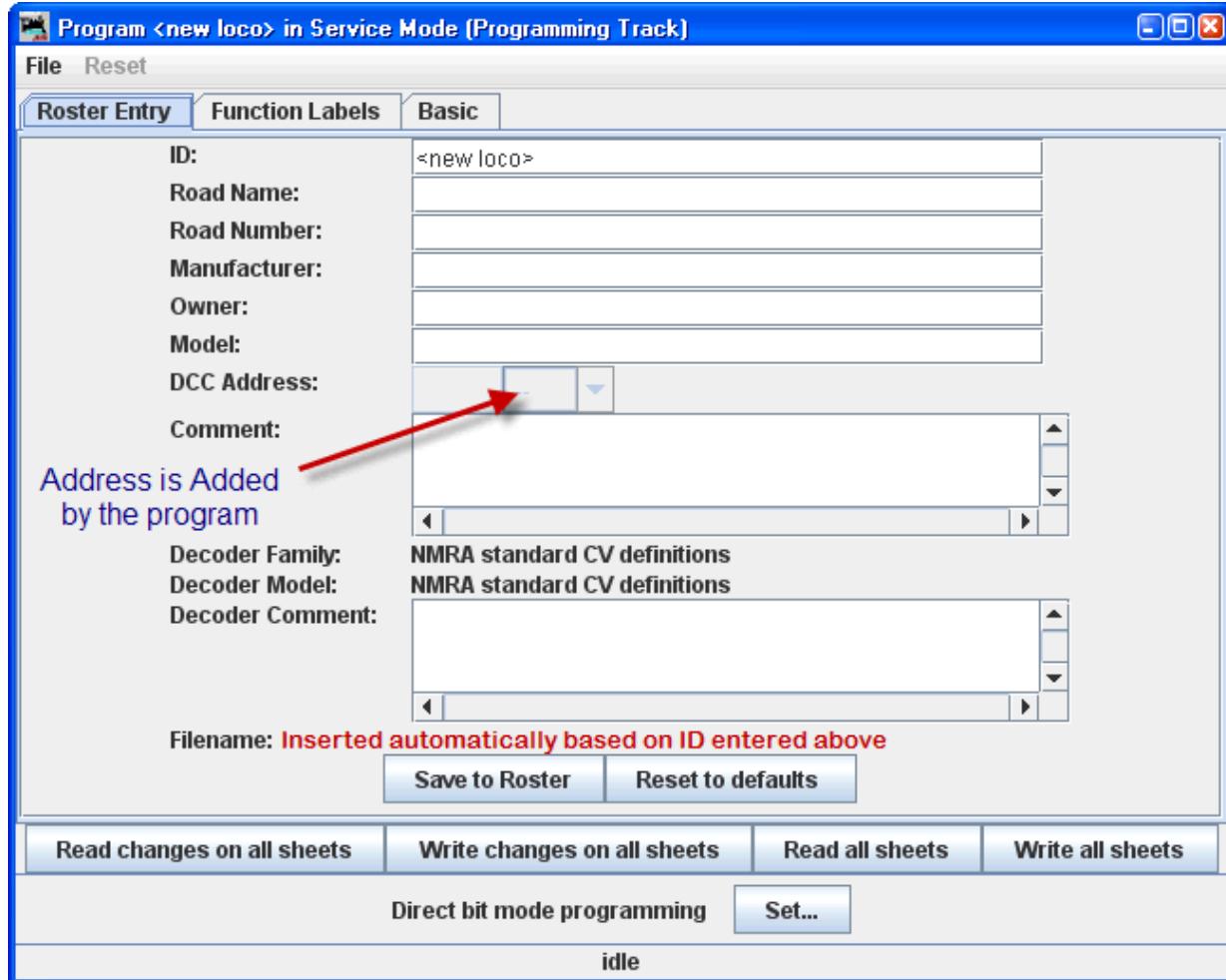
Getting back to the **Service Mode Programmer**, which is now completely set-up with a decoder and the Basic programmer selected, let's move on to Basic Programming. Click on the **Open Programmer** button to open the programmer panes.

CHAPTER 3 - THE BASIC PROGRAMMER

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

THE ROSTER ENTRY PANE

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



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

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

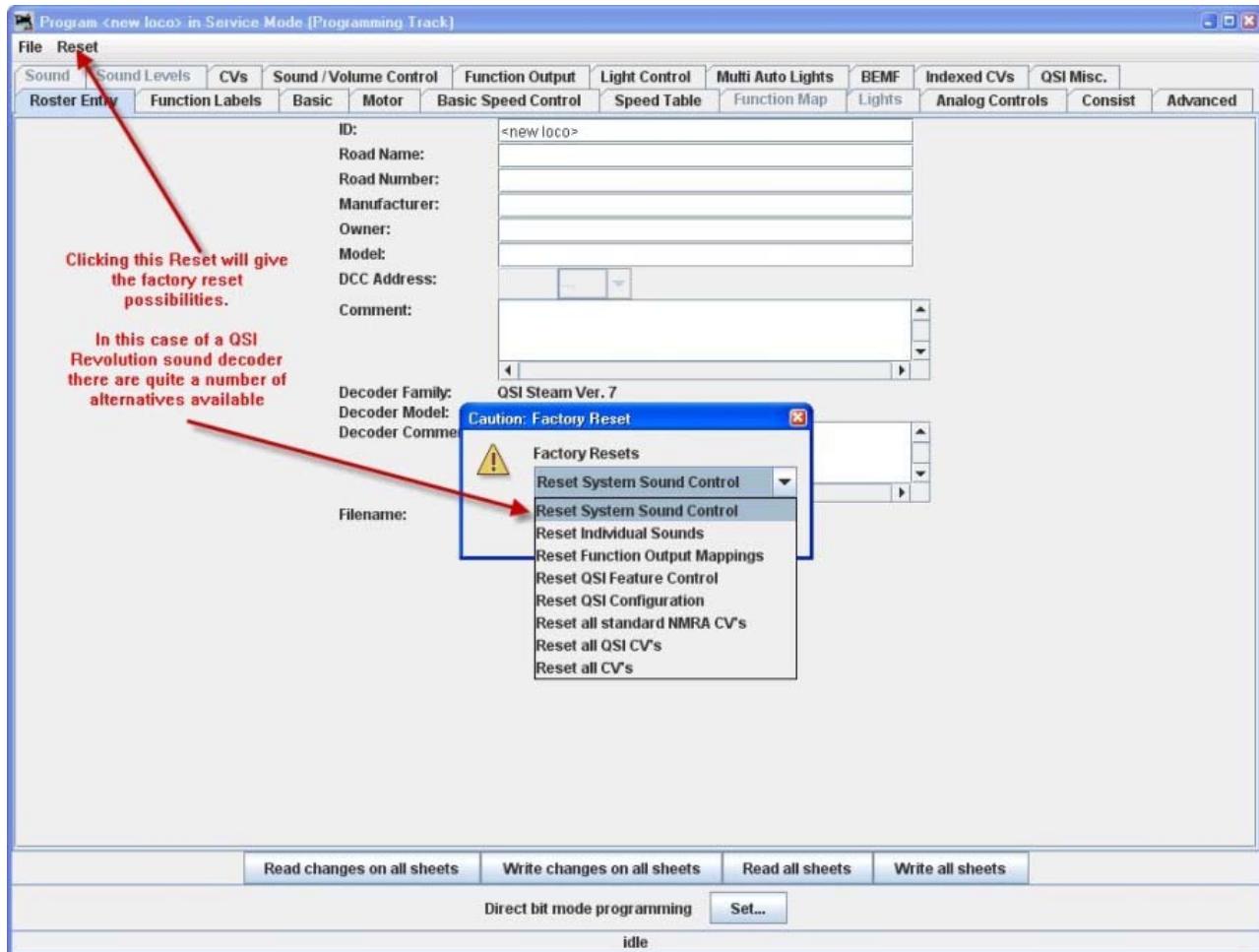
The **Save** button stores the current decoder information to your computer hard drive and folder where your roster file is located. The default storage is the same directory where the program is installed.

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

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

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

DecoderPro® User's Guide Version 2.4



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

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



DecoderPro® User's Guide Version 2.4

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

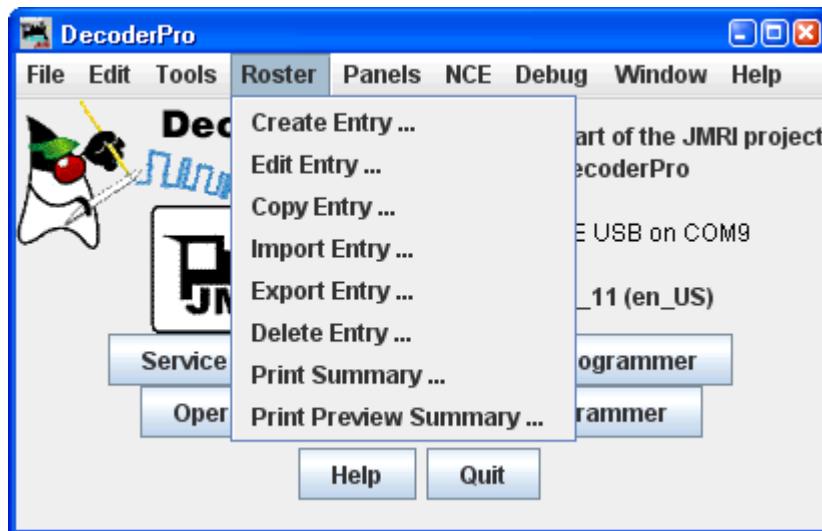
For most newer decoders, stay with **Paged mode** or whichever Direct mode your Command Station supports. Your decoder documentation should let you know if programming in some other mode is necessary... but if you are having problems, experiment. If a mode is not supported for the selected decoder and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

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

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

But, first a let's talk a bit about Roster management. The Set-up screen (the one where we selected the decoder) and the initial DecoderPro "Splash" screen have a top tab called Roster. When you click on it you get opportunities to modify, print and move your roster files.

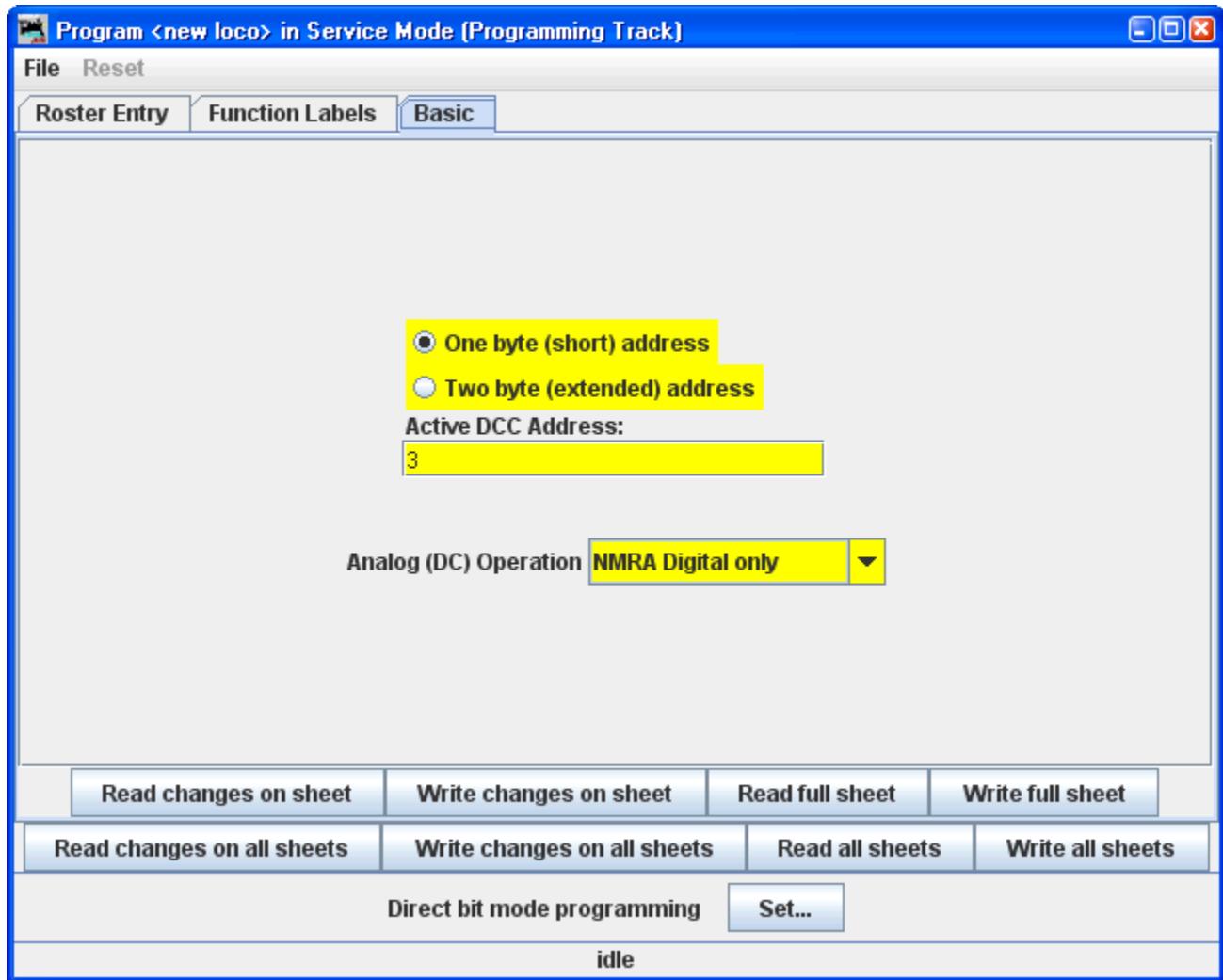
Particularly interesting are **Export/Import** and **Copy**. Let's say you and a friend have two identical Berkshires, and you desire to have yours to be set up just like your friends. Now, you could put his loco on your track and read all the CVs out and then put them in yours, but if he lives on the other coast that's not practical. So, have him use DecoderPro to export his loco file and e-mail it to you. You import it into DecoderPro, change the address if you wish and then use that roster entry to program your loco. Similarly you can Copy a roster entry to duplicate one of your own locomotives into a second roster entry with it's own address.



Let's move on to the Basic Programmer.

USING THE BASIC PROGRAMMER

You may have noticed that at the top of the window are Three tabs: **Roster Entry**, **Function Labels** and **Basic**. We have completed the **Roster Entry** pane of the Program window, and at this time we will not be concerned with the **Function Labels** tab. Now, click on the **Basic** tab to change panes to continue with programming your decoder. The Basic pane will be displayed and look similar to the following illustration: Many panes in the programmer contain decoder dependent features, as a result what you see may not exactly agree with what you see here. Only those variables that your decoder can implement will be shown.



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

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

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

To read the actual settings for these options (and IF your system and installed decoder will allow readback of decoder values), click on the **Read 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 sheet** and **Read all** functions are dependant on your command station. If your system does not have the capability to read CVs, then these buttons will not be available.

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

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

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

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

To finish this "basic" programming of a decoder, click once more on the **Roster Entry** tab. You will see that the address field has now been filled in, so you can now click on the **Save** 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 study a bit on 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 is the only other programmer **Normal Users** will ever need, because it is, well...Comprehensive. So why all the others?

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

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

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

And that leaves us with the 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".

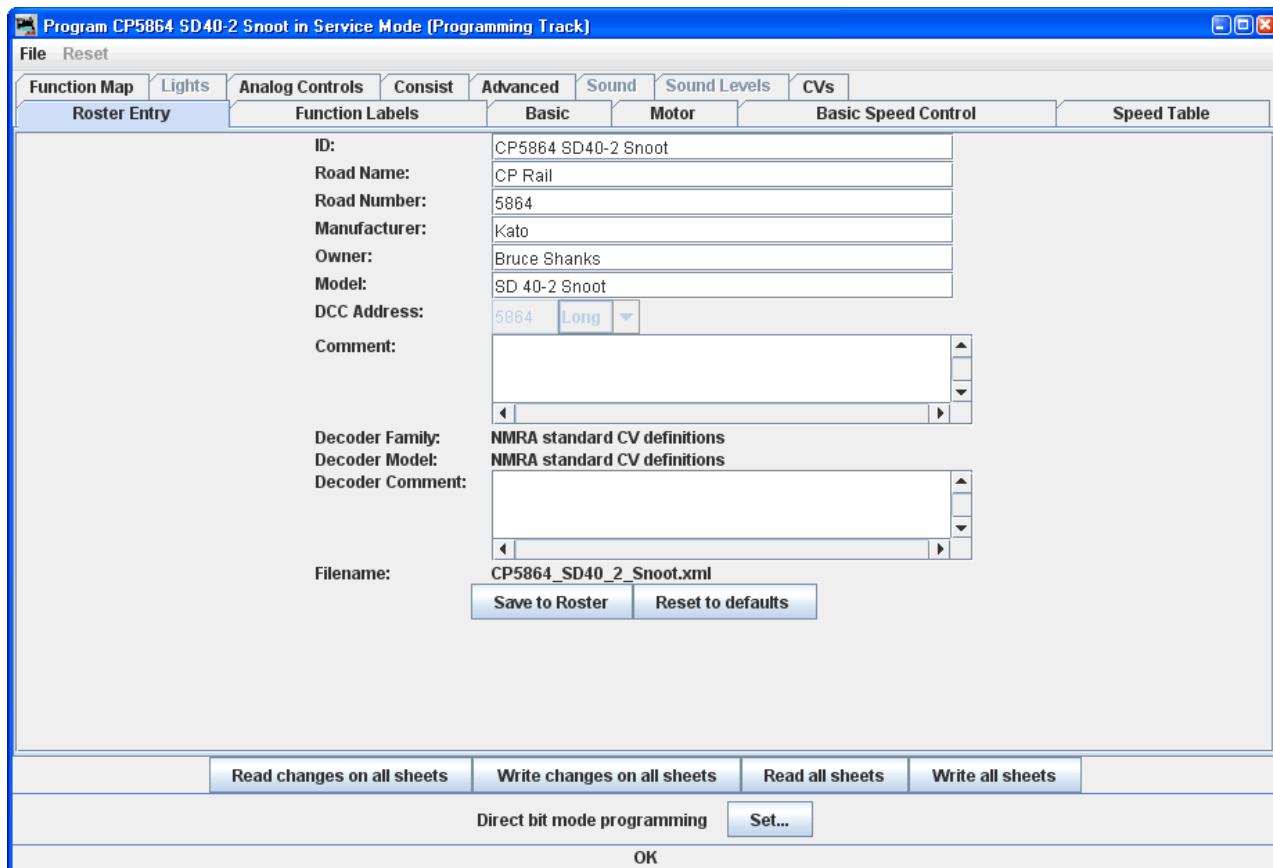
Now that we've narrowed our "real" choices down to the Basic and Comprehensive, let's explore the Comprehensive Programmer!

CHAPTER 4 - DECODERPRO® COMPREHENSIVE PROGRAMMER

ROSTER ENTRY PANE

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

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

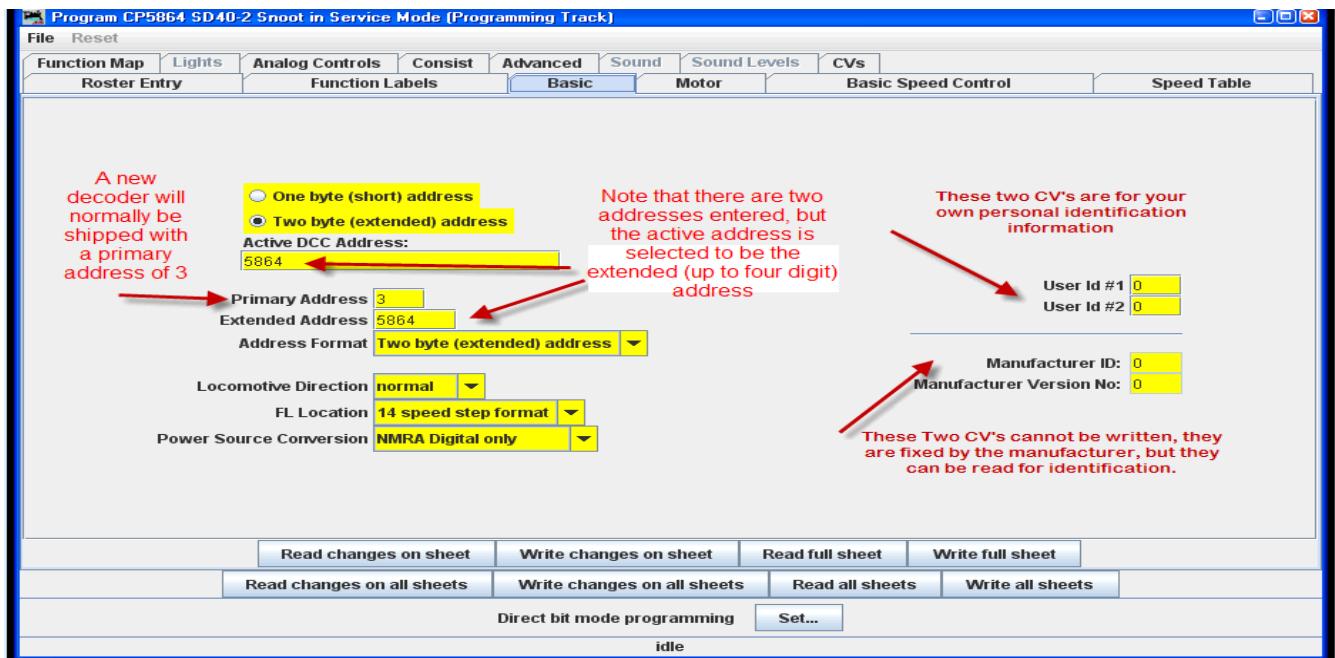


Note that the **Roster** pane is essentially unchanged from the **Basic** programmer, but the window has a LOT more options in the **Tabs** at the top! If you are unsure how to handle the **Roster** information, go back to that section in the **Basic Programmer**. If you're ready to move on to bigger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

DecoderPro® User's Guide Version 2.4

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).

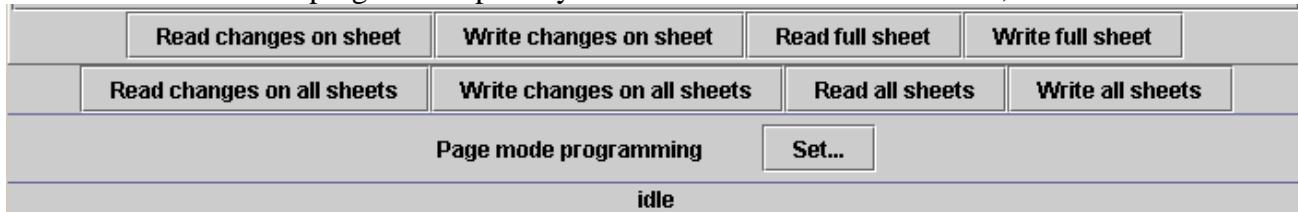
FL Location: Unless your command station or decoder can only handle 14 speed steps, you'll find you get much finer control of your locomotives by using the **28/128 speed steps** option. If you happen to set the decoder to 14 speed steps by mistake, and your command station is in 28 step mode, you will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

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

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

THE READ AND WRITE BUTTONS

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



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

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

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

DecoderPro® User's Guide Version 2.4

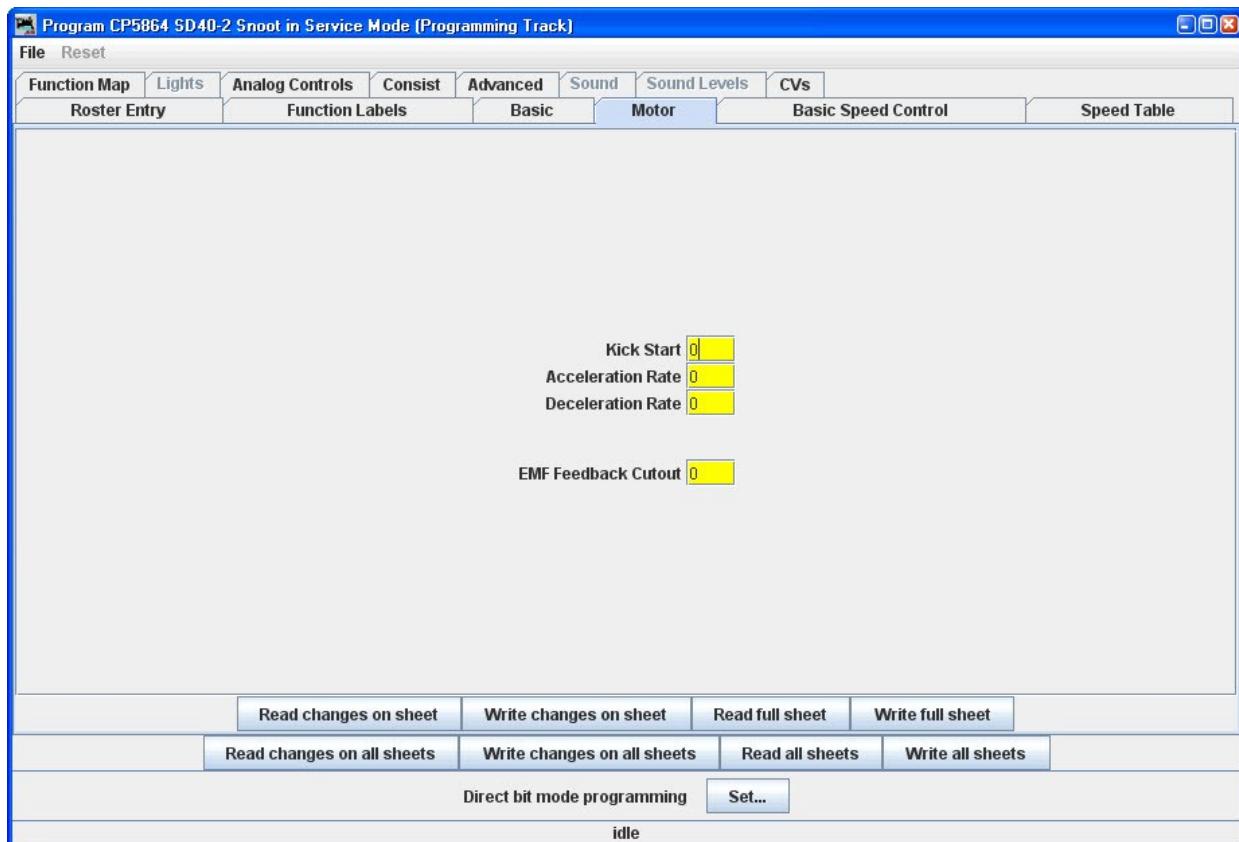
Below the two rows of buttons is a text line that shows what the current **programming mode** is, and a **Set...** button that allows you to change it without exiting the programmer. See **Programming Modes** for further information on Programming Modes.

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

MOTOR CONTROL PANE

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

The Motor Pane



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

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

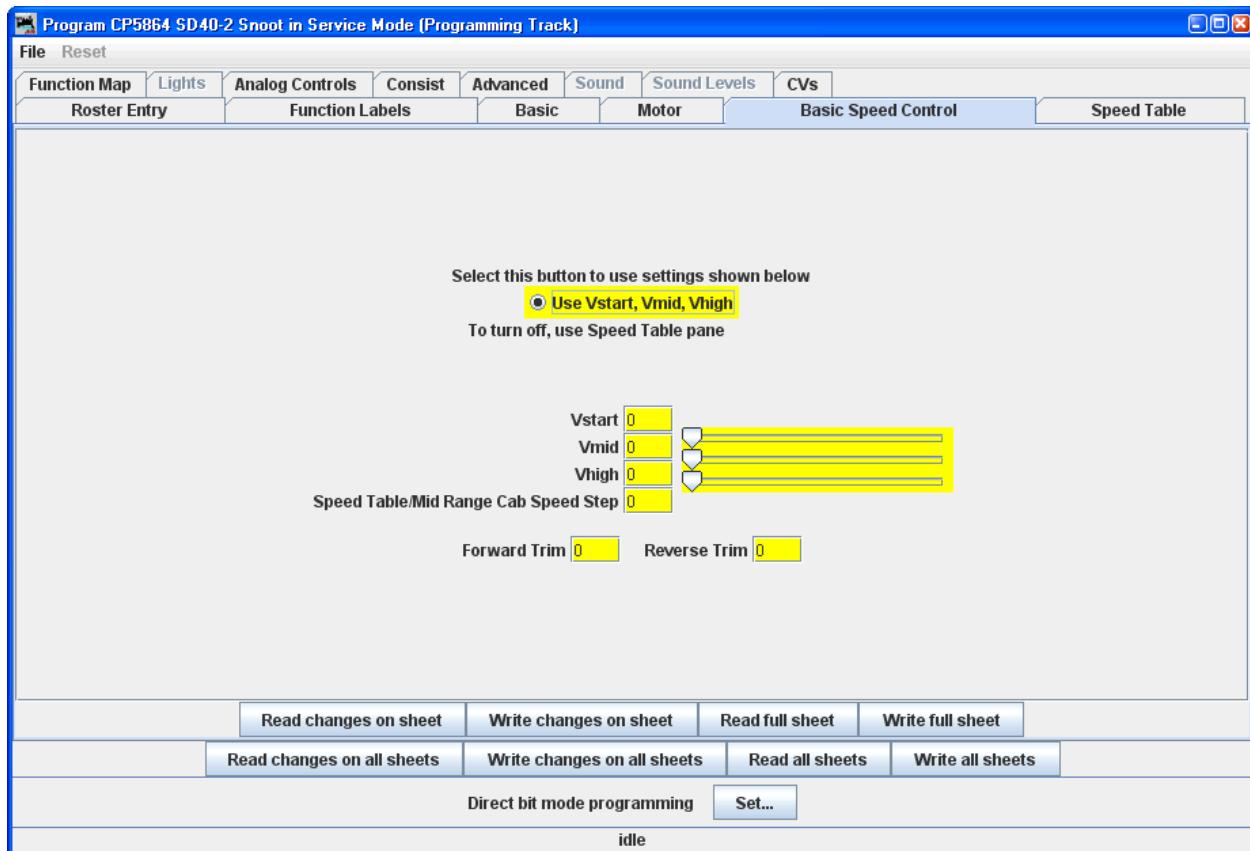
Acceleration Rate and **Deceleration Rate** help simulate a locomotive under load - but don't use them unless you have very clean track, because an interruption of power can make a locomotive stop and cycle through the acceleration curve again! On the latest Tsunami Diesel sound decoders the firmware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

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

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

SPEED CONTROL PANE

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



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

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

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

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

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

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

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

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

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

Some suggestions on using the basic motor controls and programming on the main.

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

Start with the **Kick start** value, and **Programming on the main** rather than the programming track. Set the locomotive to be programmed on throttle step 1. If it moves at all, don't change the **Kick start** value. If it doesn't move, slowly step up the throttle until it does. Then, turn the throttle down. If the locomotive stops at the same setting it started, you won't need to set the **Kick start** value. However, if it continues to run at a slower speed than it would start, then increase the **Kick start** value until it will start and run at its slowest possible speed.

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

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

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

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

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

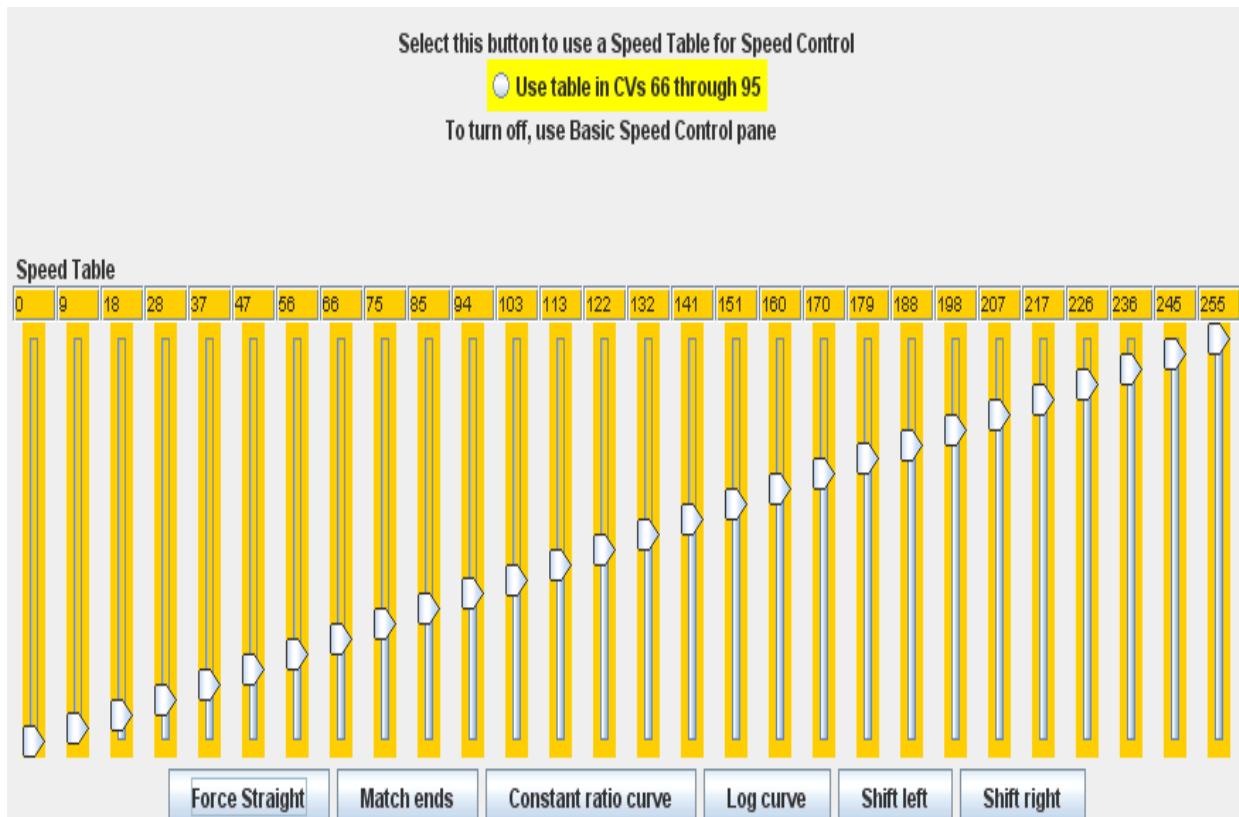
If you select **Speed Table** all of the settings in this pane are ignored.

THE SPEED TABLE PANE

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

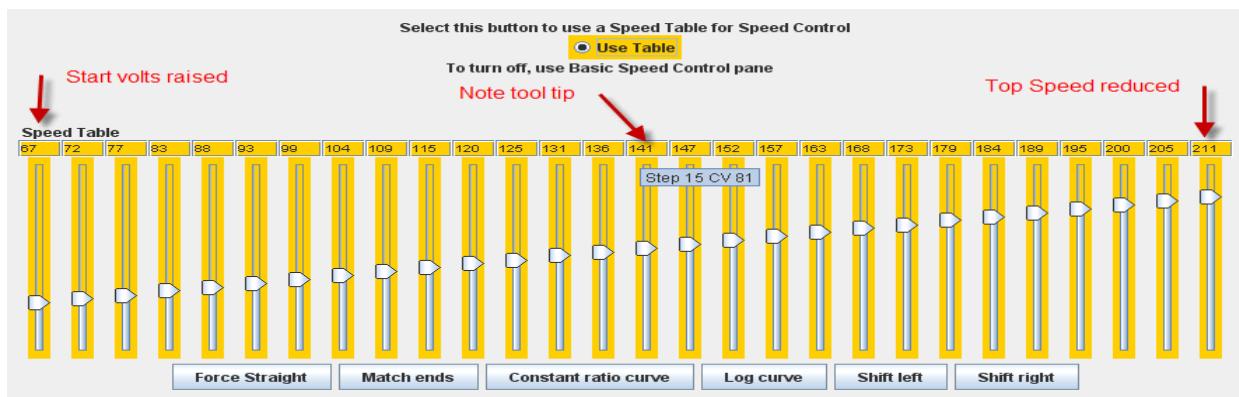
You now have the option of using **Speed Table** (this pane) which if selected and written to the decoder will replace the **Basic Speed Control** to set your locomotive's speed control mode. Whichever one you select last and write to your decoder will be the method used for speed control. To select the use of speed tables, the **Use Table** radio button is selected at the top of the pane:

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



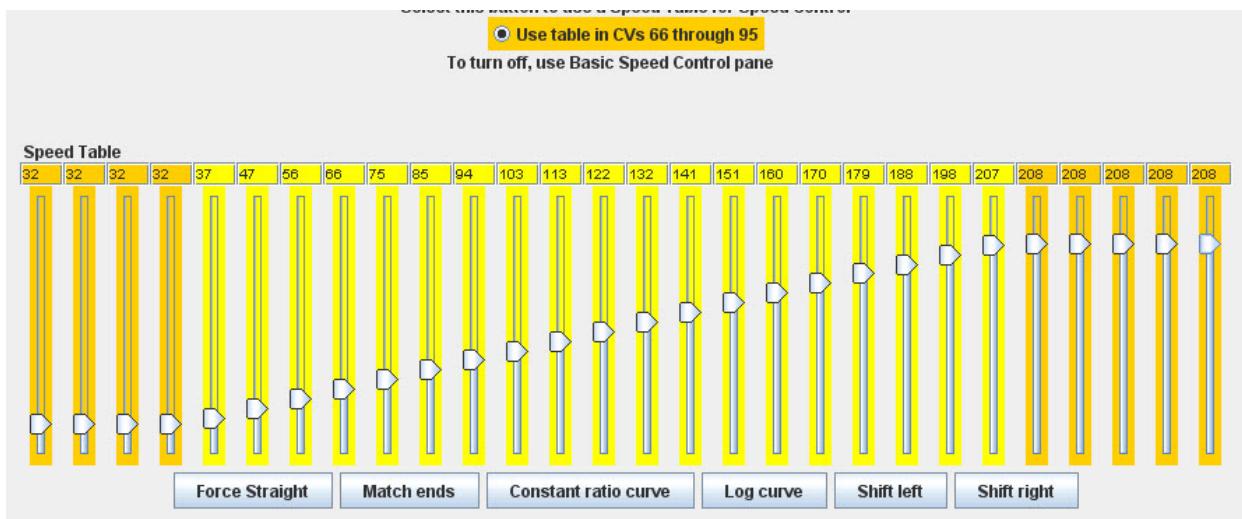
As you can see, you have both numbers and sliders to work with. Changing either a number or slider will make the other change to match it. If you are CV inquisitive, you can use the tool tip to advantage. By hovering over any of the sliders, the tool tip will reveal the CV to which you are pointing .

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.

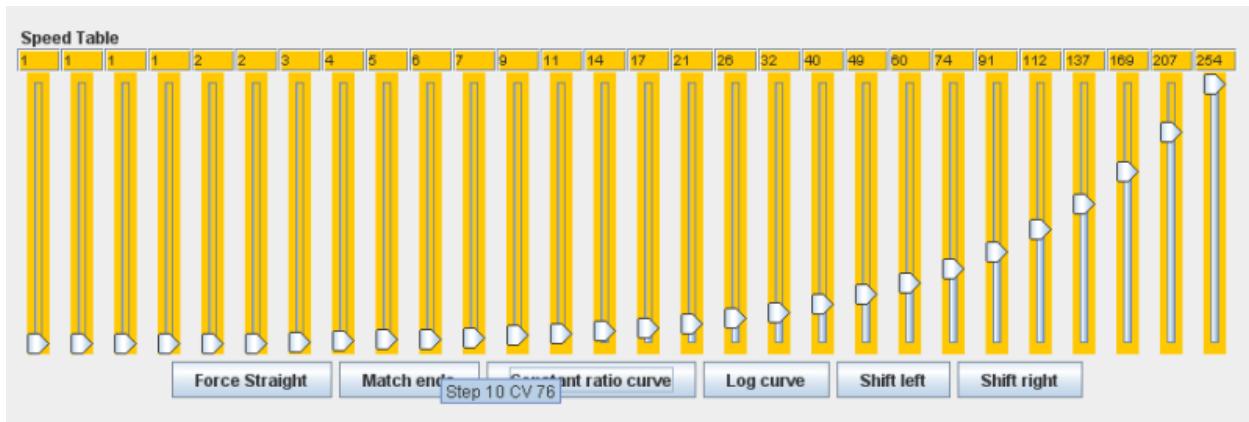


DecoderPro® User's Guide Version 2.4

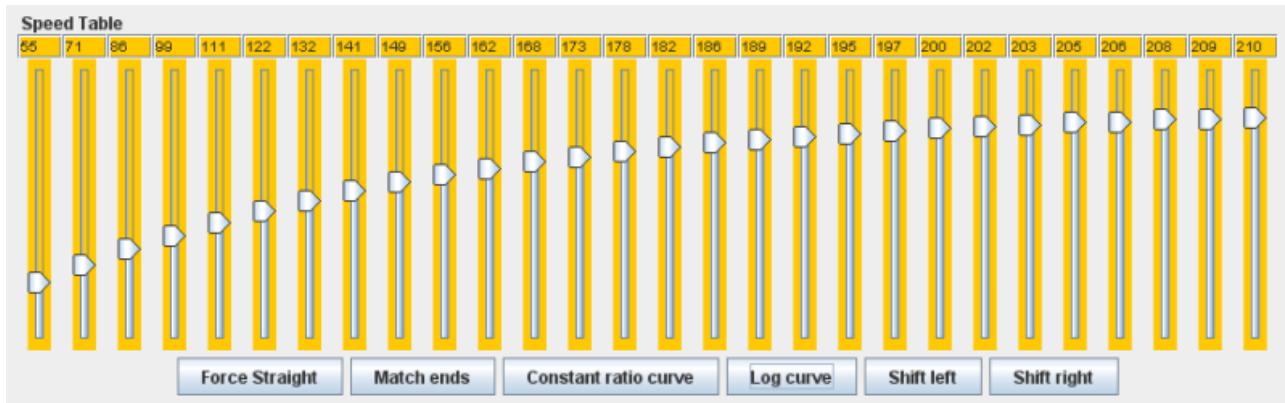
If you want to set up a loco for switching you can set a start speed that is the same for the first portion of the throttle revolution and lower the top speed for use in the yard as shown below:



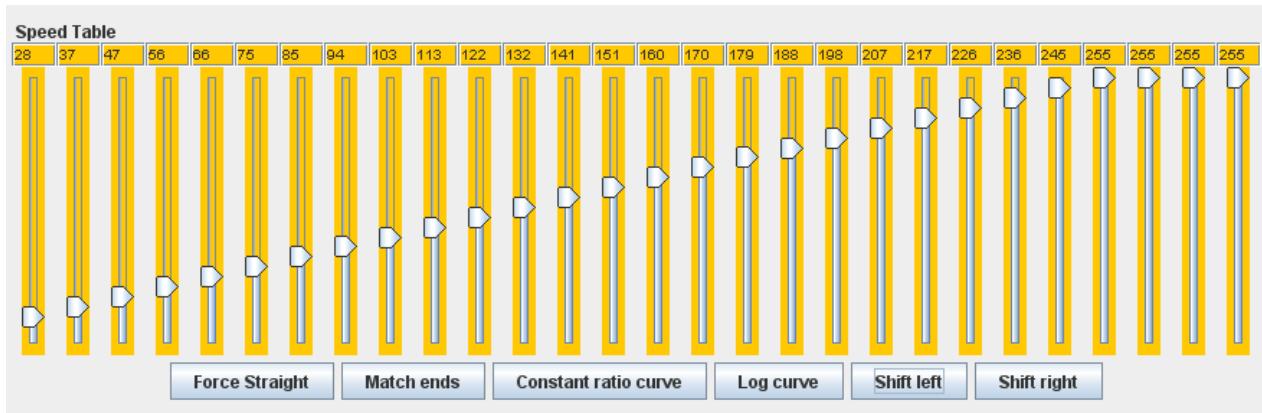
If you don't desire a straight-line response curve, there are other options available. The **Constant ratio curve** gives you a response that increases slowly in the low end, and rapidly at high throttle. This function will also draw the curve between preset end points.



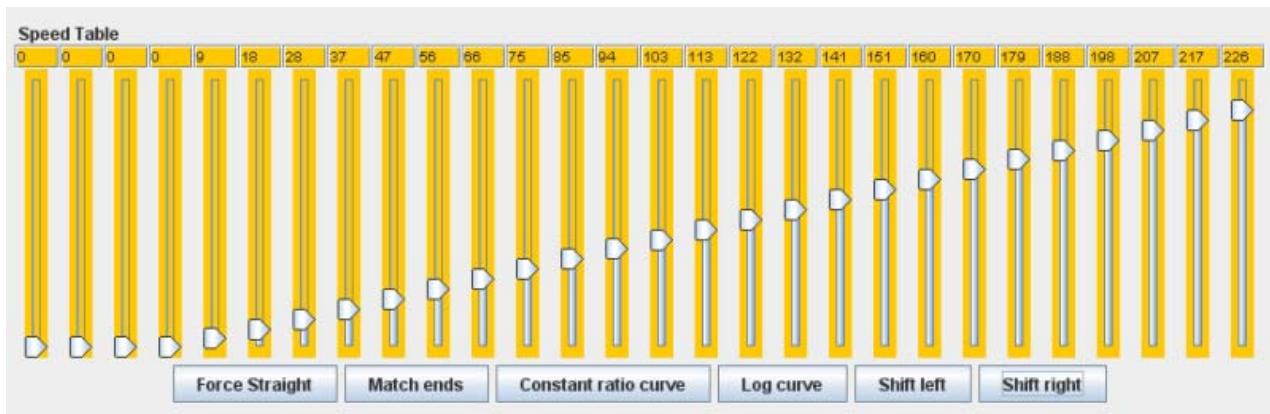
The **Log curve** reverses this response, giving you a logarithmic response curve with high acceleration at low speeds, but topping out quickly. It will also draw the curve between preset end points.



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



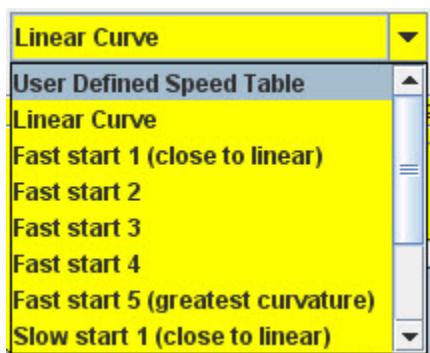
The **Shift right** buttons move the entire speed table the right one space with each click on the button. The example below shows a linear 0-255 speed table that has been **Shifted right** three times.



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

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

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

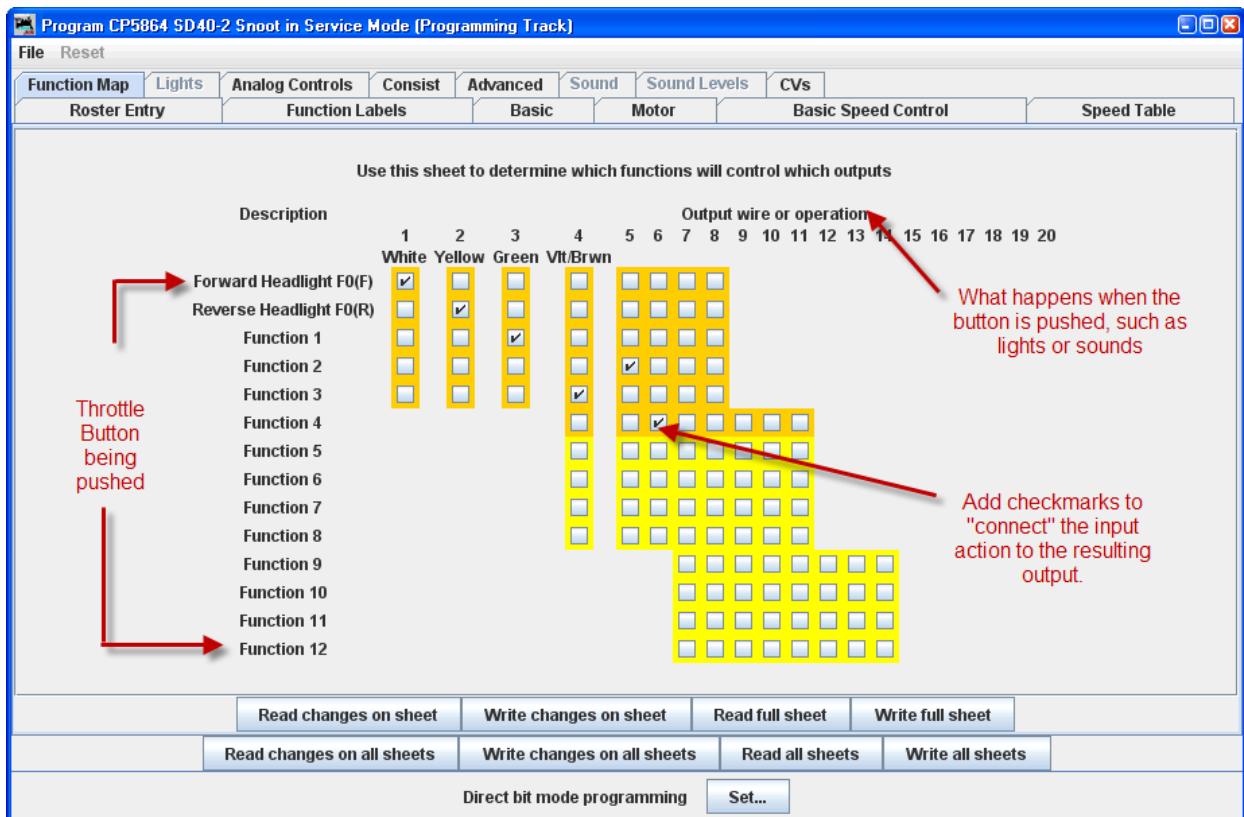


FUNCTION MAPPING PANE

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

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

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



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

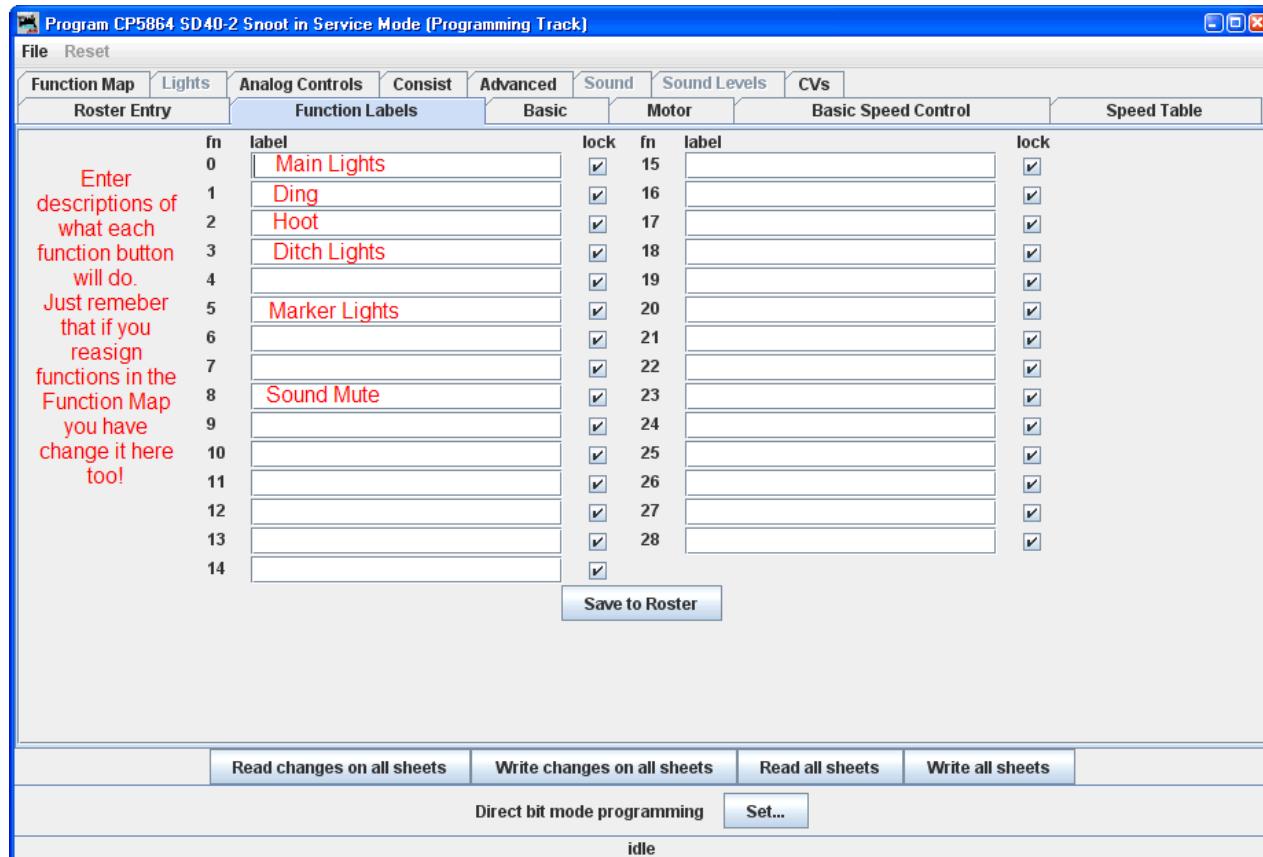
FUNCTION LABELS PANE

This Pane is a new edition and is still being worked on by the developers.

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

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

DecoderPro® User's Guide Version 2.4

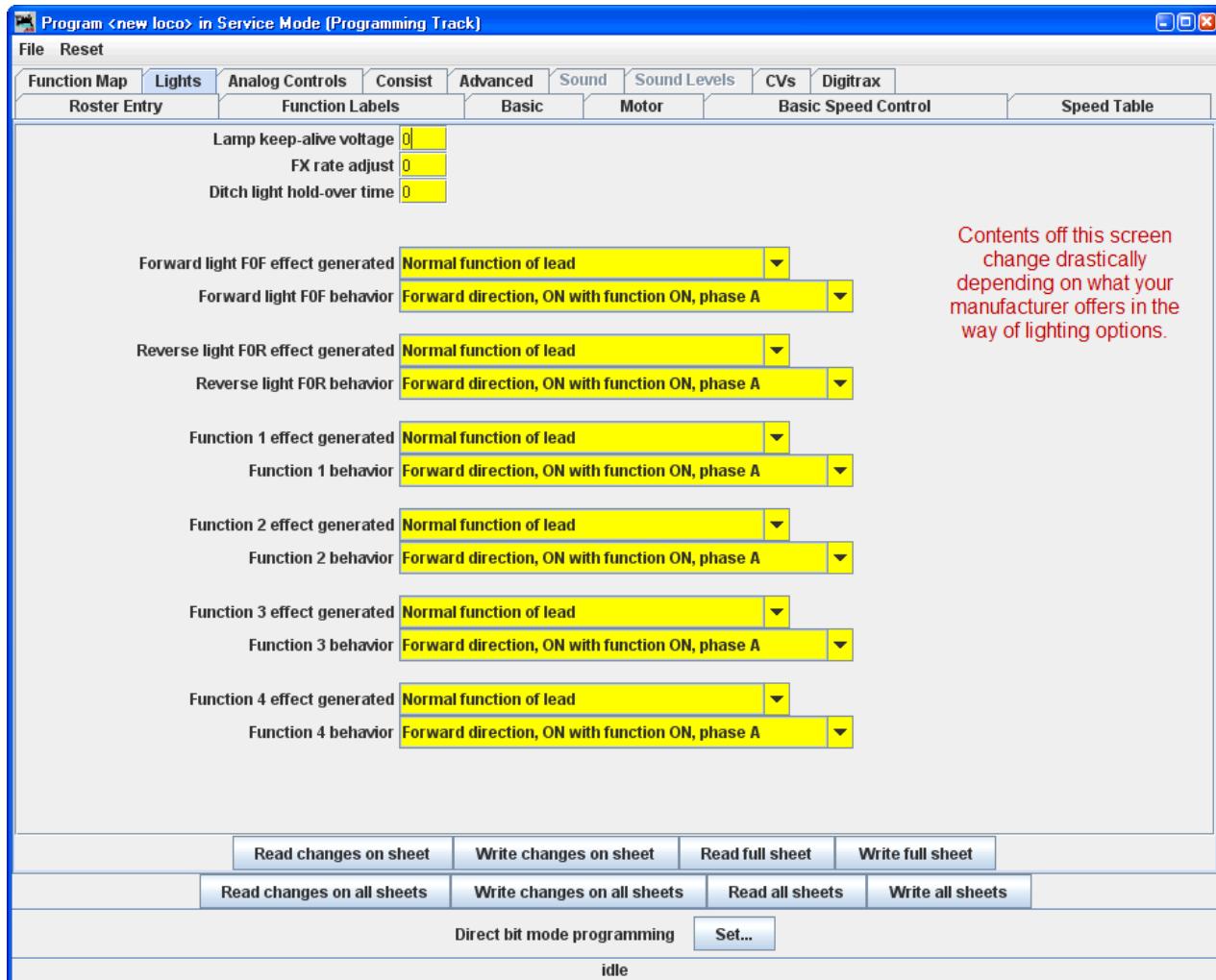


It is planned to have it possible to enter these button labels from an active JMRI throttle. You then have to save the throttle and also save the throttle information to your roster. This capability is under development, as of the writing of this manual (2/2009).

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.

DecoderPro® User's Guide Version 2.4

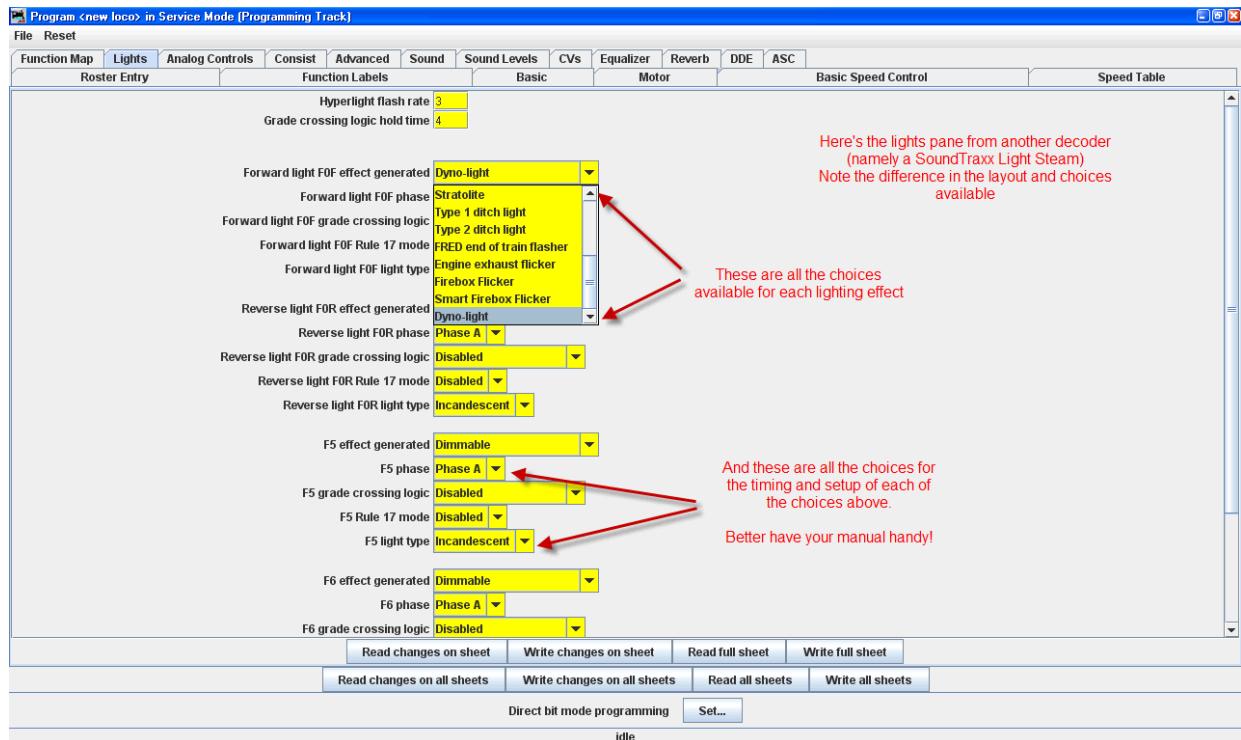


The specific effects available differ widely between manufacturers, and even between different "families" of decoders from the same maker. The above example is from a Digitrax FX decoder. Some of the advanced features you will see in many decoders (though they may go by different but similar names)

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

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

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



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

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

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.

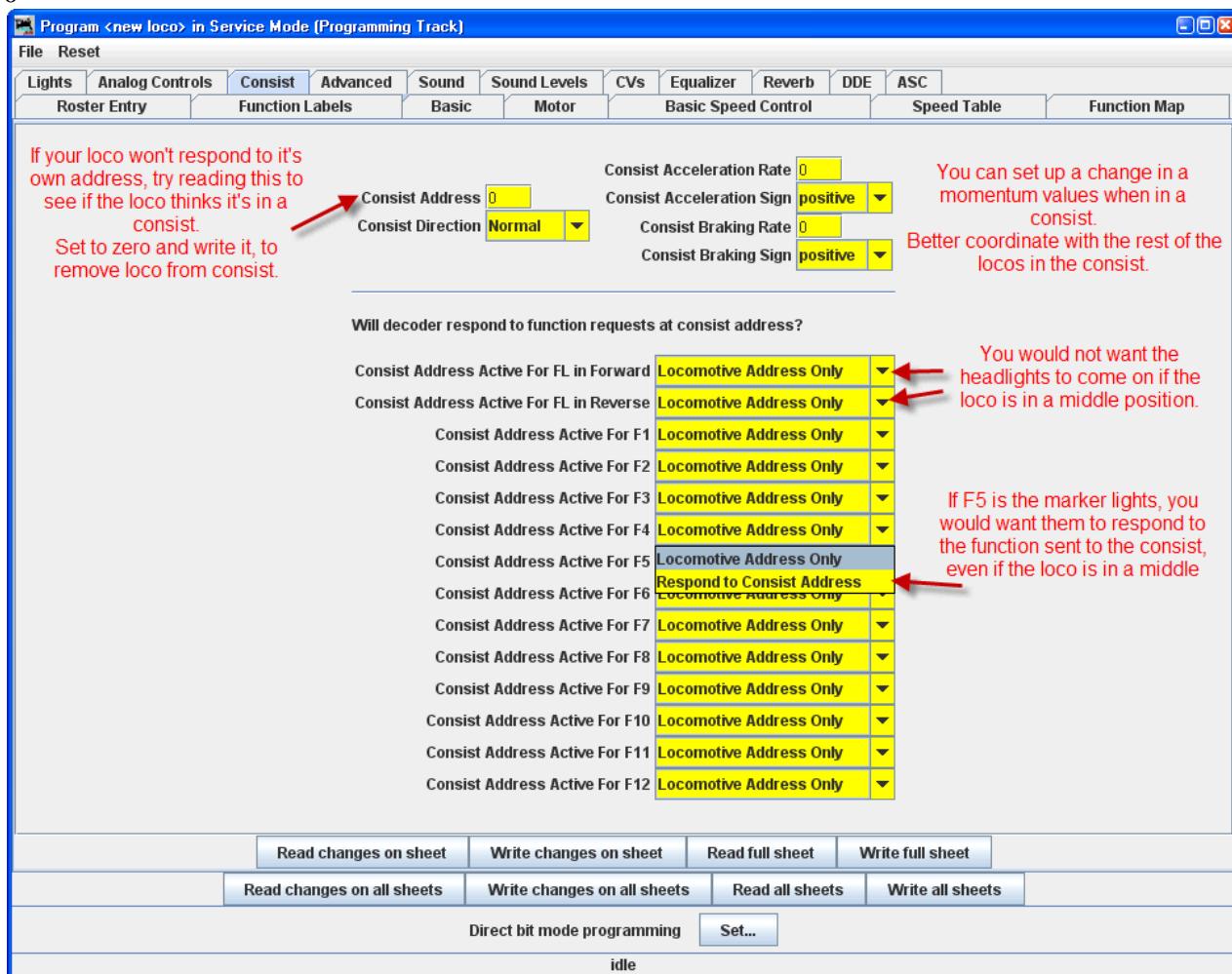
The NMRA calls the command station based system Basic Consisting. The command station keeps a list of all the locos in the consist. When an action is needed the command station sends an individual packet to every locomotive in the consist, which causes them to then act together. Since this method is 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.

DecoderPro® User's Guide Version 2.4

0



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.

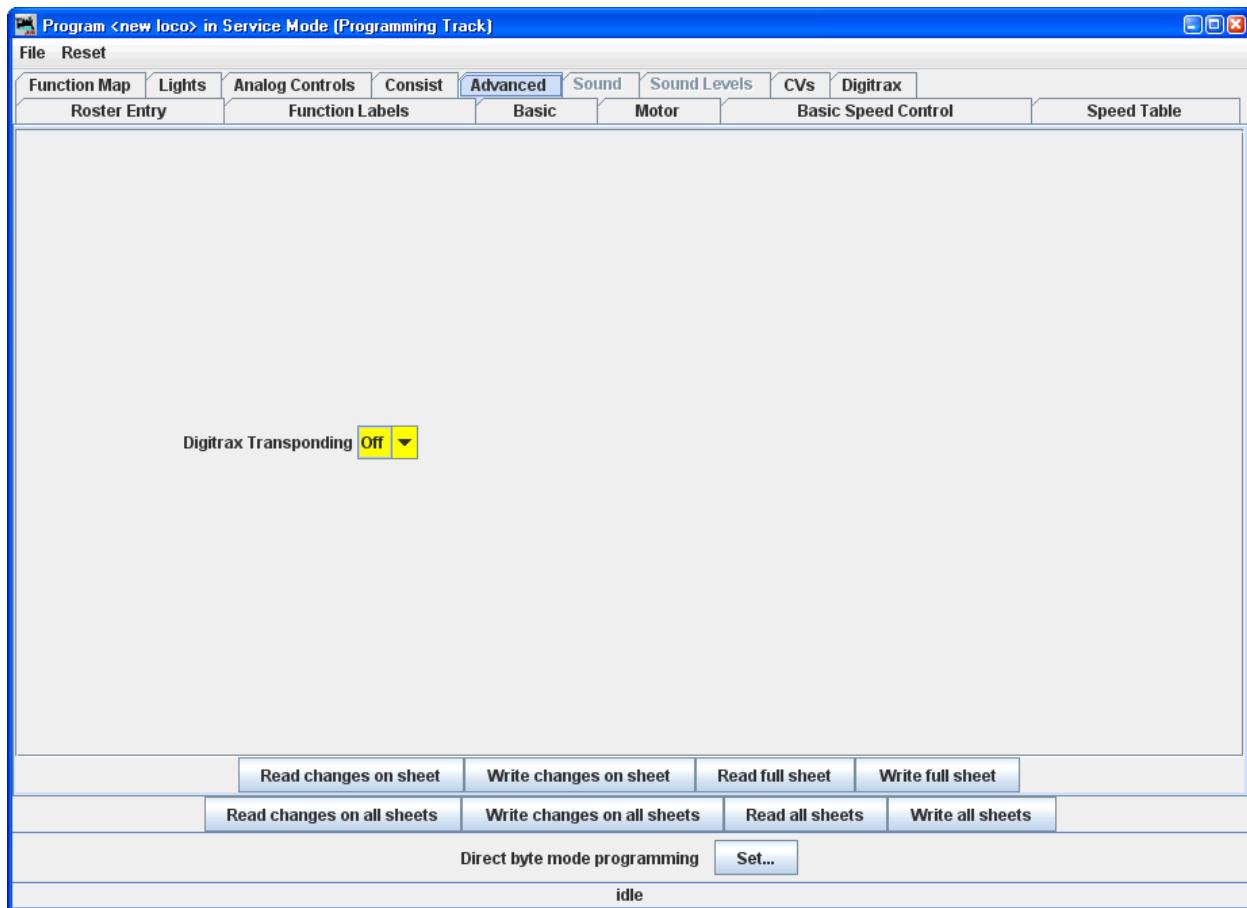
DecoderPro® User's Guide Version 2.4

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

ADVANCED FEATURES PANE

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

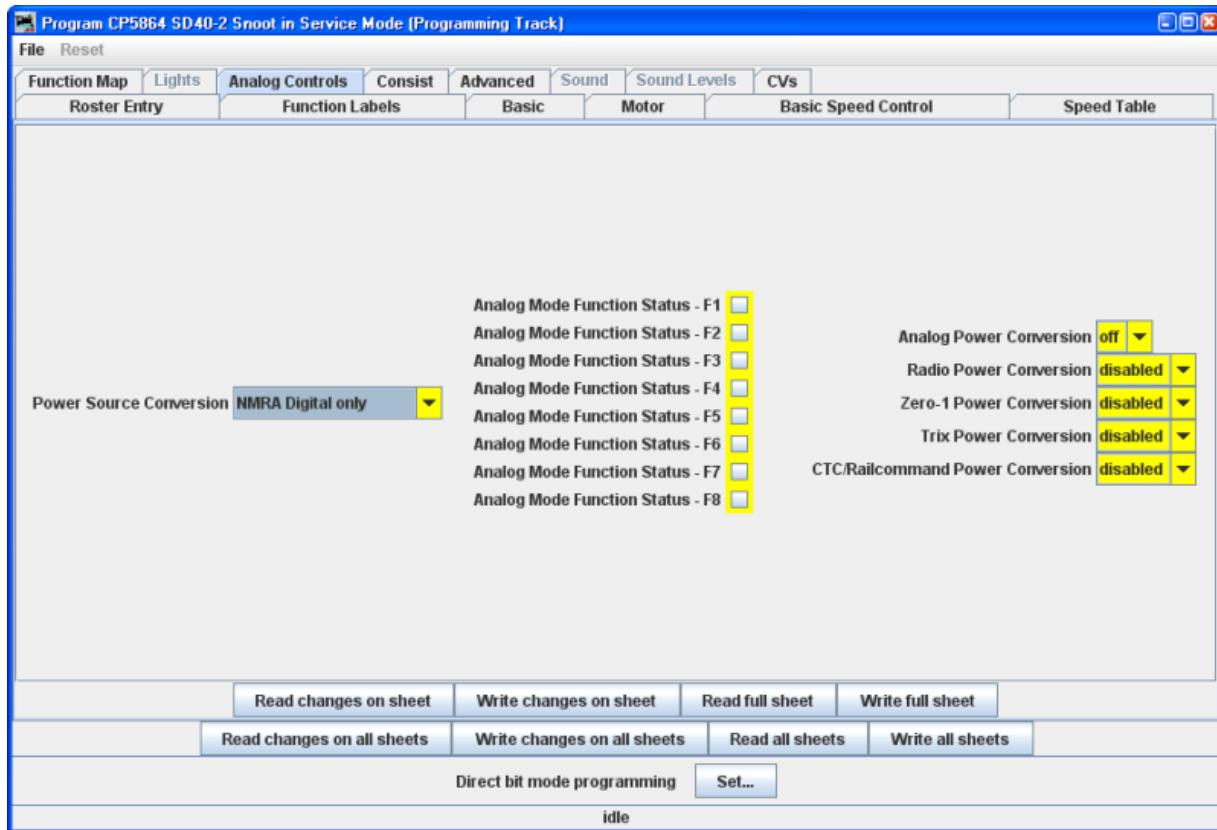
There may be one or several of these panes, depending on how complex the decoder programming is and the style of the person who wrote the definition file for your particular decoder.



DecoderPro® User's Guide Version 2.4

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.



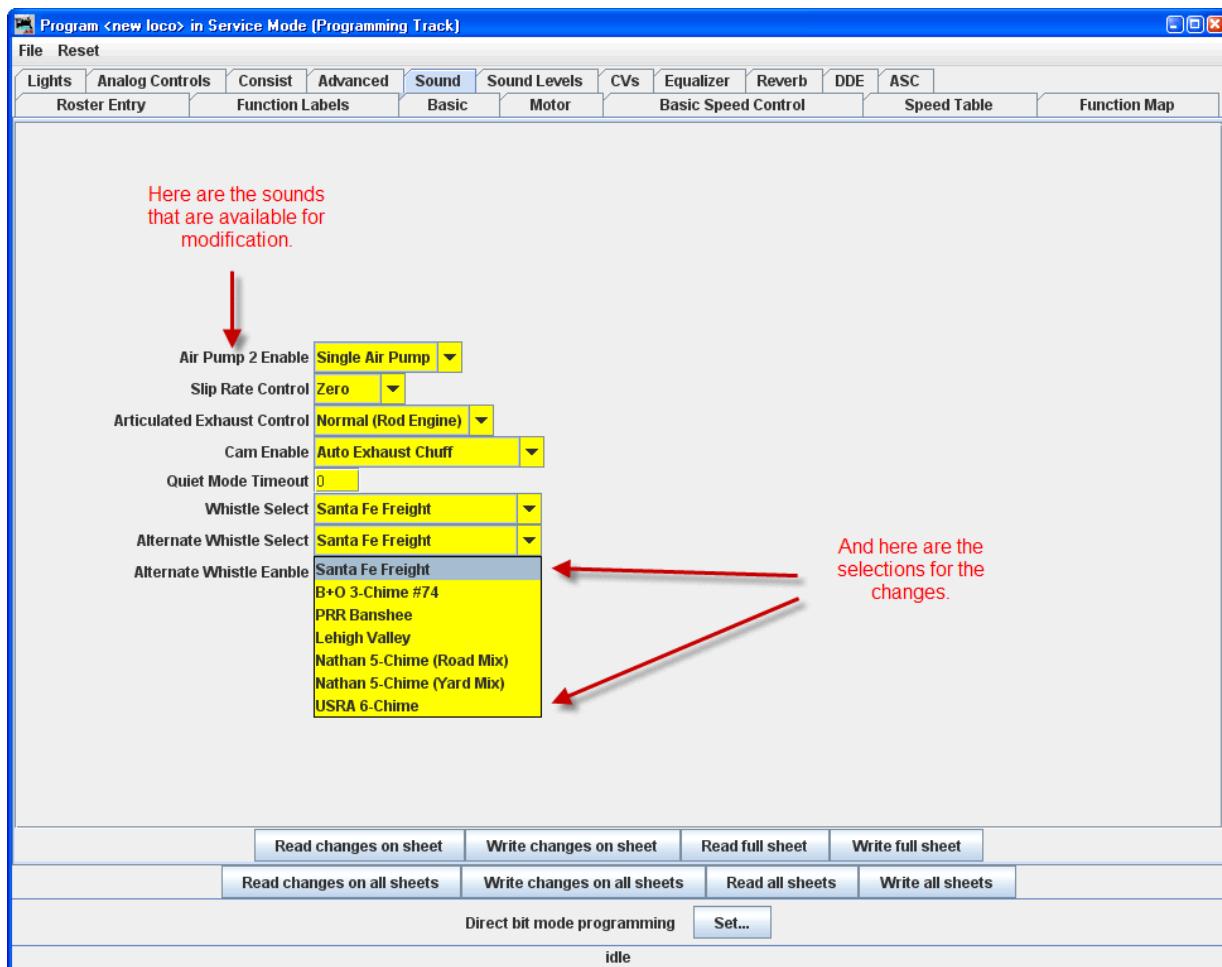
DecoderPro® User's Guide Version 2.4

SOUND FX PANE

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

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

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



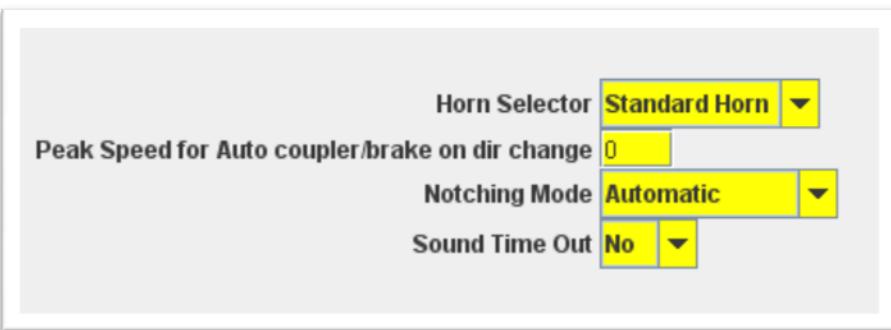
For specific function options, see your decoder documentation and the programmer for the specific decoder. Sometimes (depending on the volunteer that wrote the decoder definition file) there are “tool tips” that appear if you hover over a selection entry box.

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

Athearn N Scale Big Boy and Challenger

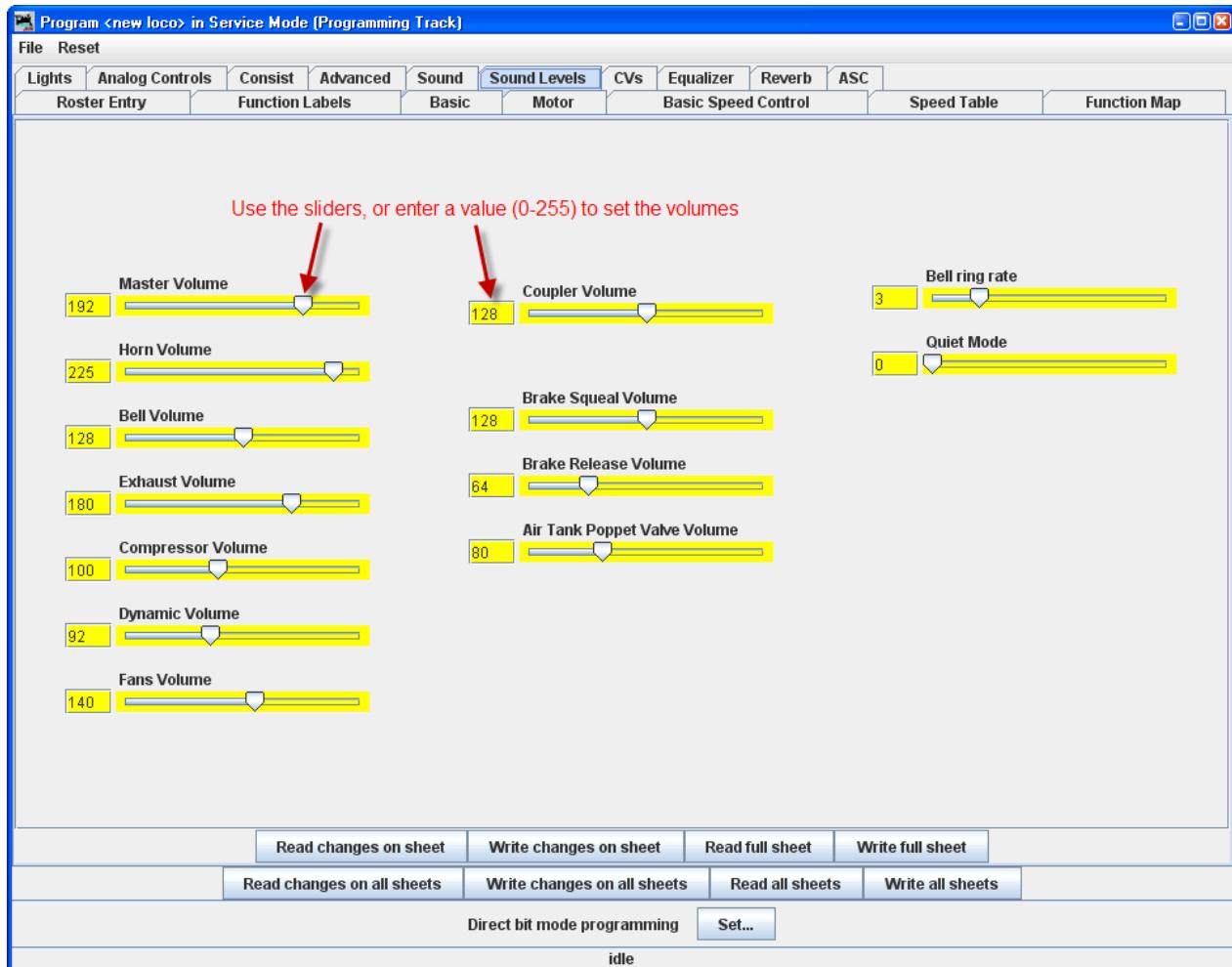


Digitrax F40PH



SOUND LEVELS PANE

Here are the controls for the relative volume levels and timing nuances of the sound decoder. Again, this is an example of one implementation. See your decoder documentation and the specific decoder programmer for details applicable to your equipment. Above all, don't be afraid to play with these settings and those in the **Sound FX** 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.

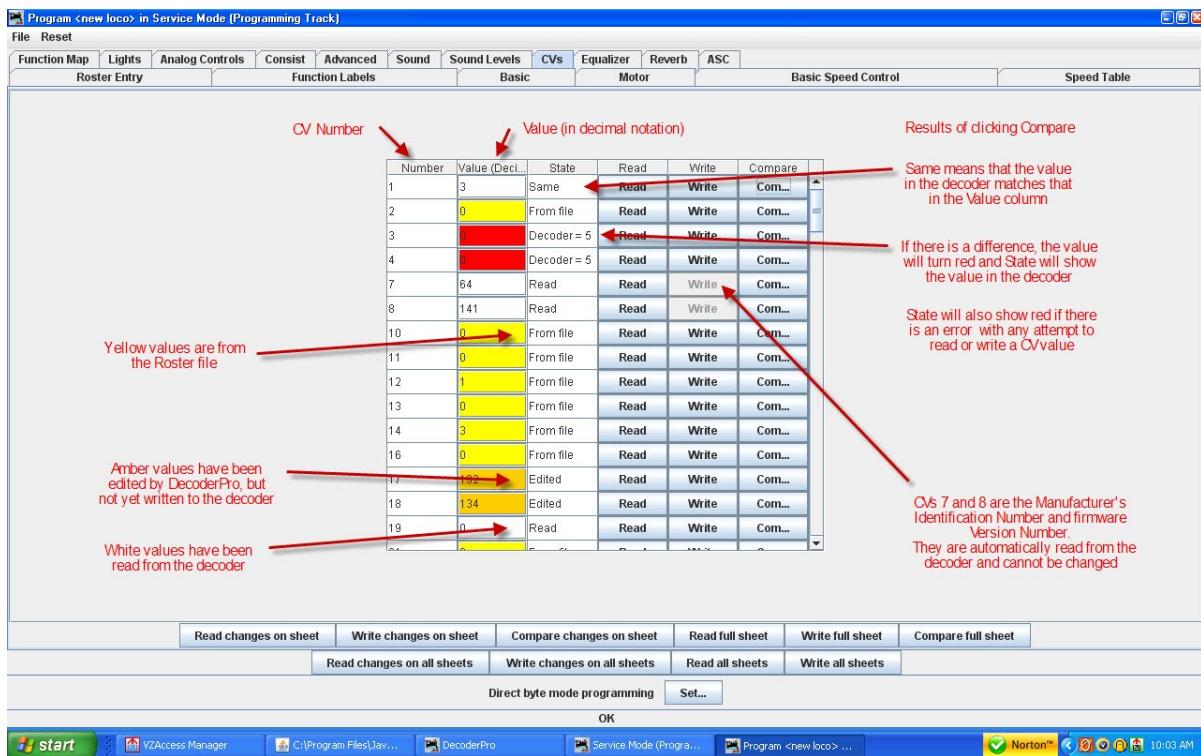
DECODER LOCKING

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 Simple CV Programmer to write CV15. It can be found in the Tools menu on the Main Page, under Programmers.

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

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

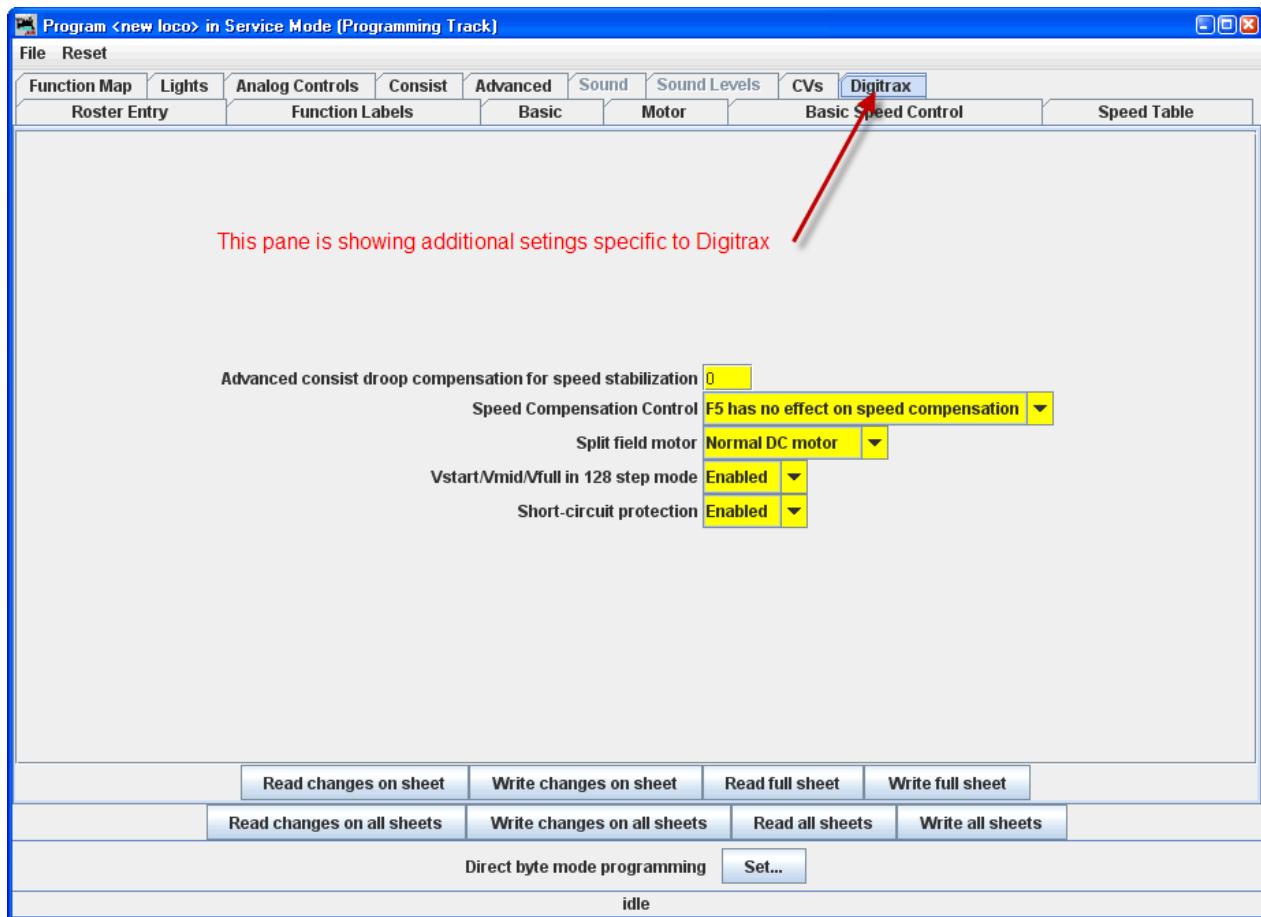


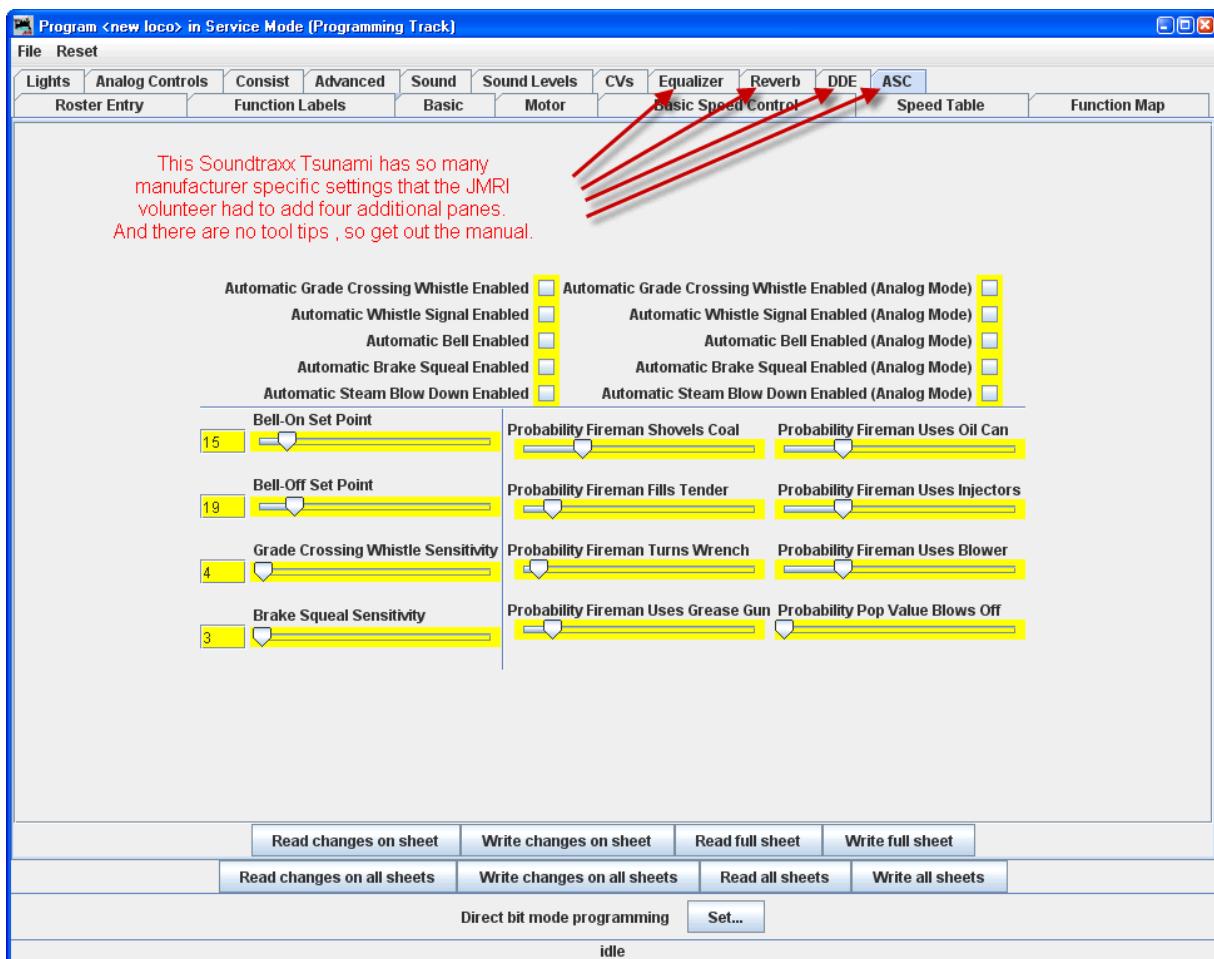
One thing to keep in mind about the **CV** listing on this pane - anything you can do here you can do from one of the other panes in Decoder Pro, without having to know the **CV** number or how to compile the values to get the desired effect. This pane is meant for advanced users of DCC used to crunching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

DecoderPro® User's Guide Version 2.4

MANUFACTURER SPECIFIC DATA PANE

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





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

PRINTING DECODER DATA

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

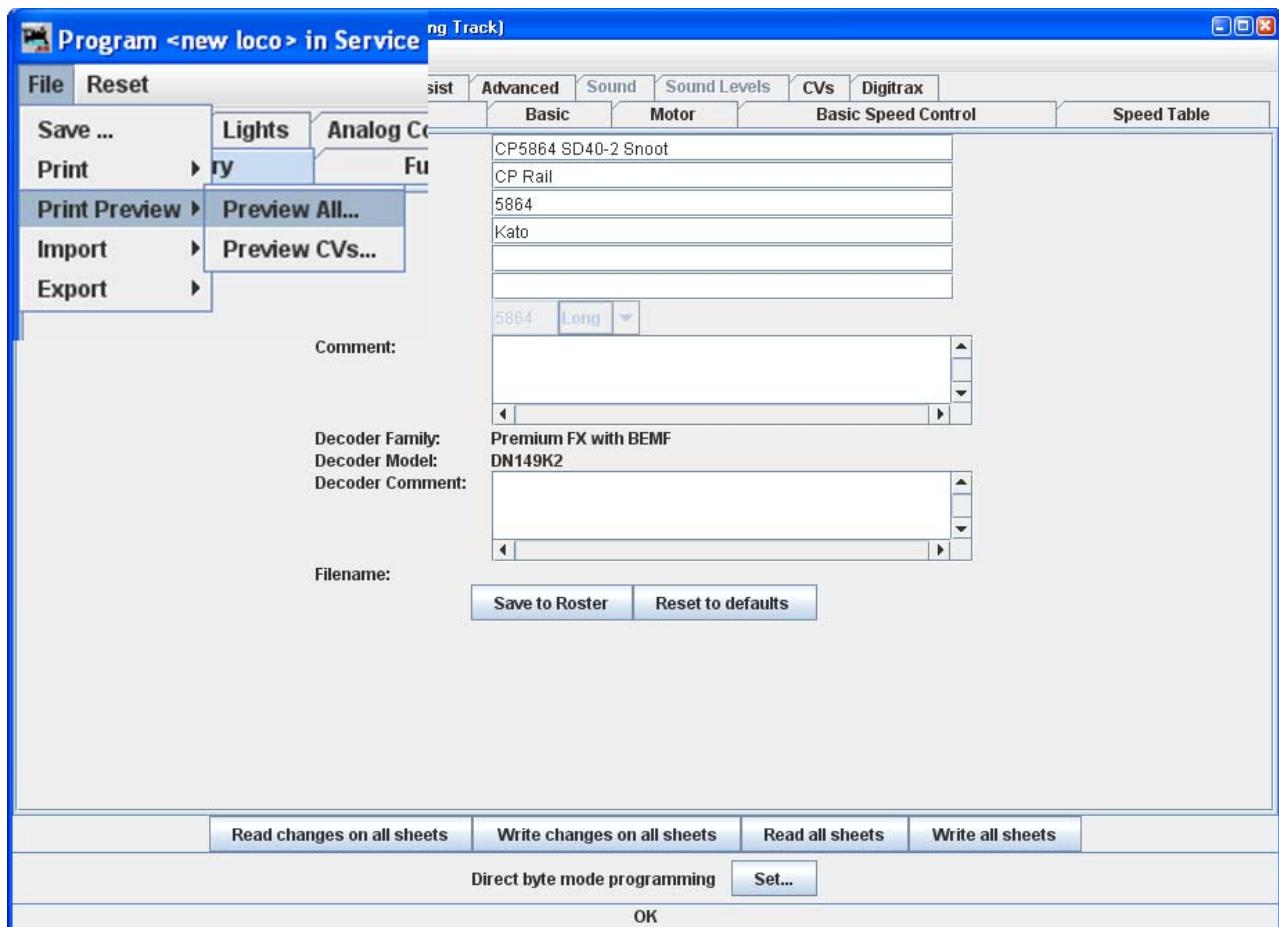
Print preview will look like it's about to print the list, and ask for which printer to use. Don't panic!, that's only to get the preview to work. Go ahead and select the printer and you'll only get the preview.

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

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

All are two columns, CV#, and Value)

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



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

DecoderPro® User's Guide Version 2.4

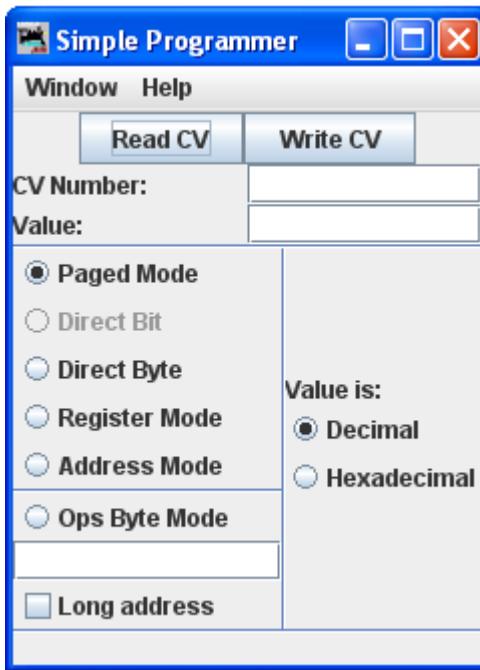
CP5864 SD40-2 Snoot		December 26, 2003 12:50 PM																																																																																																																																	
																																																																																																																																			
ID: CP5864 SD40-2 Snoot Filename: CP5864_SD40-2_Snoot.sm1 CF Mail: Model: SD40-2 Snoot Manufacturer: Rete Model: SD40-2 Snoot ECU Address: 1000 Comment: MT Equipped, Payment Decoder Model: SD40-2 Snoot Decoder Family: Precision FX with SDMP																																																																																																																																			
BASIC <table border="1"> <thead> <tr> <th>Field</th> <th>Setting</th> </tr> </thead> <tbody> <tr> <td>Addressing Mode</td> <td>4 digit addressing</td> </tr> <tr> <td>Primary Address</td> <td>1</td> </tr> <tr> <td>Long Address</td> <td>1000</td> </tr> <tr> <td>Normal direction of motion</td> <td>forward</td> </tr> <tr> <td>Speed steps</td> <td>30/128</td> </tr> <tr> <td>Analog compensation mode</td> <td>00</td> </tr> <tr> <td>User Private ID #1</td> <td>0</td> </tr> <tr> <td>User Private ID #2</td> <td>0</td> </tr> <tr> <td>Decoder ID</td> <td>0</td> </tr> <tr> <td>Version ID</td> <td>0</td> </tr> </tbody> </table>		Field	Setting	Addressing Mode	4 digit addressing	Primary Address	1	Long Address	1000	Normal direction of motion	forward	Speed steps	30/128	Analog compensation mode	00	User Private ID #1	0	User Private ID #2	0	Decoder ID	0	Version ID	0																																																																																																												
Field	Setting																																																																																																																																		
Addressing Mode	4 digit addressing																																																																																																																																		
Primary Address	1																																																																																																																																		
Long Address	1000																																																																																																																																		
Normal direction of motion	forward																																																																																																																																		
Speed steps	30/128																																																																																																																																		
Analog compensation mode	00																																																																																																																																		
User Private ID #1	0																																																																																																																																		
User Private ID #2	0																																																																																																																																		
Decoder ID	0																																																																																																																																		
Version ID	0																																																																																																																																		
MOTOR <table border="1"> <thead> <tr> <th>Field</th> <th>Setting</th> </tr> </thead> <tbody> <tr> <td>Kick Start</td> <td>0</td> </tr> <tr> <td>Acceleration Rate</td> <td>0</td> </tr> <tr> <td>Deceleration Rate</td> <td>0</td> </tr> <tr> <td>Static compensation for speed</td> <td>128</td> </tr> <tr> <td>Stabilization</td> <td></td> </tr> <tr> <td>Dynamical compensation for speed</td> <td>48</td> </tr> <tr> <td>Stabilization</td> <td></td> </tr> <tr> <td>SDM operation drop compensation</td> <td>4</td> </tr> <tr> <td>for speed stabilization</td> <td></td> </tr> </tbody> </table>		Field	Setting	Kick Start	0	Acceleration Rate	0	Deceleration Rate	0	Static compensation for speed	128	Stabilization		Dynamical compensation for speed	48	Stabilization		SDM operation drop compensation	4	for speed stabilization																																																																																																															
Field	Setting																																																																																																																																		
Kick Start	0																																																																																																																																		
Acceleration Rate	0																																																																																																																																		
Deceleration Rate	0																																																																																																																																		
Static compensation for speed	128																																																																																																																																		
Stabilization																																																																																																																																			
Dynamical compensation for speed	48																																																																																																																																		
Stabilization																																																																																																																																			
SDM operation drop compensation	4																																																																																																																																		
for speed stabilization																																																																																																																																			
SPEED CONTROL <table border="1"> <thead> <tr> <th>Field</th> <th>Setting</th> </tr> </thead> <tbody> <tr> <td>Line Speed Table</td> <td>Use Vstart, Vmid, Vhigh</td> </tr> <tr> <td>Start Volts</td> <td>0</td> </tr> <tr> <td>Mid Volts</td> <td>0</td> </tr> <tr> <td>Max Volts</td> <td>0</td> </tr> <tr> <td>Forward Trim</td> <td>0</td> </tr> <tr> <td>Inverser Trim</td> <td>0</td> </tr> <tr> <td>Speed Table</td> <td>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</td> </tr> </tbody> </table>		Field	Setting	Line Speed Table	Use Vstart, Vmid, Vhigh	Start Volts	0	Mid Volts	0	Max Volts	0	Forward Trim	0	Inverser 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																																																																																																																		
Field	Setting																																																																																																																																		
Line Speed Table	Use Vstart, Vmid, Vhigh																																																																																																																																		
Start Volts	0																																																																																																																																		
Mid Volts	0																																																																																																																																		
Max Volts	0																																																																																																																																		
Forward Trim	0																																																																																																																																		
Inverser Trim	0																																																																																																																																		
Speed Table	0,9,18,27,36,45,54,63,72,81,91,100,109,118, 127,136,145,154,163,173,182,191,200,209,218, 227,236,245																																																																																																																																		
CP5864 SD40-2 Snoot		December 26, 2003 12:50 PM																																																																																																																																	
FUNCTION MAP <table border="1"> <thead> <tr> <th>Field</th> <th>Setting</th> </tr> </thead> <tbody> <tr> <td>F1(FWD) controls output 1</td> <td>0</td> </tr> <tr> <td>F1(FWD) controls output 2</td> <td>0</td> </tr> <tr> <td>F1 controls output 3</td> <td>0</td> </tr> <tr> <td>F2 controls output 4</td> <td>0</td> </tr> </tbody> </table>		Field	Setting	F1(FWD) controls output 1	0	F1(FWD) controls output 2	0	F1 controls output 3	0	F2 controls output 4	0																																																																																																																								
Field	Setting																																																																																																																																		
F1(FWD) controls output 1	0																																																																																																																																		
F1(FWD) controls output 2	0																																																																																																																																		
F1 controls output 3	0																																																																																																																																		
F2 controls output 4	0																																																																																																																																		
LIGHTS																																																																																																																																			
<table border="1"> <thead> <tr> <th>Field</th> <th>Setting</th> </tr> </thead> <tbody> <tr> <td>Bi-directional headlights</td> <td>Normal headlight operation</td> </tr> <tr> <td>Lamp keep-alive voltage</td> <td>0</td> </tr> <tr> <td>FX rate address</td> <td>0</td> </tr> <tr> <td>FX rate hold-over time</td> <td>0</td> </tr> <tr> <td>Forward light FOF effect generated</td> <td>Normal function of lead</td> </tr> <tr> <td>Forward light FOF effect behavior</td> <td>Normal direction, CM with function ON, phase A</td> </tr> <tr> <td>Reverse light FOF effect generated</td> <td>Normal function of lead</td> </tr> <tr> <td>Reverse light FOF behavior</td> <td>Normal direction, CM with function ON, phase A</td> </tr> <tr> <td>Function 1 effect generated</td> <td>Normal function of lead</td> </tr> <tr> <td>Function 1 behavior</td> <td>Normal direction, CM with function ON, phase A</td> </tr> <tr> <td>Function 2 effect generated</td> <td>Normal function of lead</td> </tr> <tr> <td>Function 2 behavior</td> <td>Normal direction, CM with function ON, phase A</td> </tr> <tr> <td>FO Forward during DC operation</td> <td>off</td> </tr> <tr> <td>FO Reverse during DC operation</td> <td>off</td> </tr> <tr> <td>F1 during DC operation</td> <td>off</td> </tr> <tr> <td>F2 during DC operation</td> <td>off</td> </tr> </tbody> </table>		Field	Setting	Bi-directional headlights	Normal headlight operation	Lamp keep-alive voltage	0	FX rate address	0	FX rate hold-over time	0	Forward light FOF effect generated	Normal function of lead	Forward light FOF effect behavior	Normal direction, CM with function ON, phase A	Reverse light FOF effect generated	Normal function of lead	Reverse light FOF behavior	Normal direction, CM with function ON, phase A	Function 1 effect generated	Normal function of lead	Function 1 behavior	Normal direction, CM with function ON, phase A	Function 2 effect generated	Normal function of lead	Function 2 behavior	Normal direction, CM with function ON, phase A	FO Forward during DC operation	off	FO Reverse during DC operation	off	F1 during DC operation	off	F2 during DC operation	off																																																																																																
Field	Setting																																																																																																																																		
Bi-directional headlights	Normal headlight operation																																																																																																																																		
Lamp keep-alive voltage	0																																																																																																																																		
FX rate address	0																																																																																																																																		
FX rate hold-over time	0																																																																																																																																		
Forward light FOF effect generated	Normal function of lead																																																																																																																																		
Forward light FOF effect behavior	Normal direction, CM with function ON, phase A																																																																																																																																		
Reverse light FOF effect generated	Normal function of lead																																																																																																																																		
Reverse light FOF behavior	Normal direction, CM with function ON, phase A																																																																																																																																		
Function 1 effect generated	Normal function of lead																																																																																																																																		
Function 1 behavior	Normal direction, CM with function ON, phase A																																																																																																																																		
Function 2 effect generated	Normal function of lead																																																																																																																																		
Function 2 behavior	Normal direction, CM with function ON, phase A																																																																																																																																		
FO Forward during DC operation	off																																																																																																																																		
FO Reverse during DC operation	off																																																																																																																																		
F1 during DC operation	off																																																																																																																																		
F2 during DC operation	off																																																																																																																																		
COMPS																																																																																																																																			
<table border="1"> <thead> <tr> <th>Field</th> <th>Setting</th> </tr> </thead> <tbody> <tr> <td>Advanced Constat address</td> <td>0</td> </tr> <tr> <td>Advanced Constat direction</td> <td>forward</td> </tr> </tbody> </table>		Field	Setting	Advanced Constat address	0	Advanced Constat direction	forward																																																																																																																												
Field	Setting																																																																																																																																		
Advanced Constat address	0																																																																																																																																		
Advanced Constat direction	forward																																																																																																																																		
CP5864 SD40-2 Snoot		December 26, 2003 12:50 PM																																																																																																																																	
ADVANCED <table border="1"> <thead> <tr> <th>Field</th> <th>Setting</th> </tr> </thead> <tbody> <tr> <td>Digitalinx Transponding</td> <td>OFF</td> </tr> </tbody> </table>		Field	Setting	Digitalinx Transponding	OFF																																																																																																																														
Field	Setting																																																																																																																																		
Digitalinx Transponding	OFF																																																																																																																																		
CM																																																																																																																																			
<table border="1"> <thead> <tr> <th>CV</th> <th>Value</th> <th>CV</th> <th>Value</th> <th>CV</th> <th>Value</th> <th>CV</th> <th>Value</th> </tr> <tr> <th>CV</th> <th>Dec Min</th> <th>CV</th> <th>Dec Max</th> <th>CV</th> <th>Dec Min</th> <th>CV</th> <th>Dec Max</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0 00</td> <td>53</td> <td>0 00</td> <td>79</td> <td>0 18</td> <td>84</td> <td>114 3A</td> </tr> <tr> <td>2</td> <td>0 00</td> <td>51</td> <td>0 00</td> <td>71</td> <td>36 24</td> <td>85</td> <td>163 A3</td> </tr> <tr> <td>3</td> <td>0 00</td> <td>53</td> <td>0 00</td> <td>72</td> <td>45 20</td> <td>86</td> <td>163 3D</td> </tr> <tr> <td>4</td> <td>0 00</td> <td>53</td> <td>128 00</td> <td>73</td> <td>15 34</td> <td>87</td> <td>162 3E</td> </tr> <tr> <td>5</td> <td>0 00</td> <td>56</td> <td>68 30</td> <td>74</td> <td>63 3F</td> <td>88</td> <td>191 3F</td> </tr> <tr> <td>6</td> <td>0 00</td> <td>57</td> <td>0 00</td> <td>75</td> <td>22 44</td> <td>89</td> <td>192 3G</td> </tr> <tr> <td>7</td> <td>0 00</td> <td>61</td> <td>0 00</td> <td>76</td> <td>81 91</td> <td>90</td> <td>209 D3</td> </tr> <tr> <td>8</td> <td>0 00</td> <td>62</td> <td>0 00</td> <td>77</td> <td>91 9B</td> <td>91</td> <td>218 0A</td> </tr> <tr> <td>13</td> <td>0 00</td> <td>63</td> <td>0 00</td> <td>79</td> <td>108 64</td> <td>92</td> <td>218 3D</td> </tr> <tr> <td>17</td> <td>207 CF</td> <td>65</td> <td>0 00</td> <td>79</td> <td>109 60</td> <td>93</td> <td>234 E2</td> </tr> <tr> <td>18</td> <td>24 18</td> <td>66</td> <td>0 00</td> <td>80</td> <td>118 76</td> <td>94</td> <td>245 F5</td> </tr> <tr> <td>19</td> <td>24 00</td> <td>67</td> <td>0 00</td> <td>81</td> <td>127 70</td> <td>95</td> <td>245 3D</td> </tr> <tr> <td>29</td> <td>38 26</td> <td>68</td> <td>9 09</td> <td>82</td> <td>134 80</td> <td>105</td> <td>0 00</td> </tr> <tr> <td>49</td> <td>0 00</td> <td>69</td> <td>19 12</td> <td>83</td> <td>145 91</td> <td>106</td> <td>0 00</td> </tr> </tbody> </table>		CV	Value	CV	Value	CV	Value	CV	Value	CV	Dec Min	CV	Dec Max	CV	Dec Min	CV	Dec Max	1	0 00	53	0 00	79	0 18	84	114 3A	2	0 00	51	0 00	71	36 24	85	163 A3	3	0 00	53	0 00	72	45 20	86	163 3D	4	0 00	53	128 00	73	15 34	87	162 3E	5	0 00	56	68 30	74	63 3F	88	191 3F	6	0 00	57	0 00	75	22 44	89	192 3G	7	0 00	61	0 00	76	81 91	90	209 D3	8	0 00	62	0 00	77	91 9B	91	218 0A	13	0 00	63	0 00	79	108 64	92	218 3D	17	207 CF	65	0 00	79	109 60	93	234 E2	18	24 18	66	0 00	80	118 76	94	245 F5	19	24 00	67	0 00	81	127 70	95	245 3D	29	38 26	68	9 09	82	134 80	105	0 00	49	0 00	69	19 12	83	145 91	106	0 00		
CV	Value	CV	Value	CV	Value	CV	Value																																																																																																																												
CV	Dec Min	CV	Dec Max	CV	Dec Min	CV	Dec Max																																																																																																																												
1	0 00	53	0 00	79	0 18	84	114 3A																																																																																																																												
2	0 00	51	0 00	71	36 24	85	163 A3																																																																																																																												
3	0 00	53	0 00	72	45 20	86	163 3D																																																																																																																												
4	0 00	53	128 00	73	15 34	87	162 3E																																																																																																																												
5	0 00	56	68 30	74	63 3F	88	191 3F																																																																																																																												
6	0 00	57	0 00	75	22 44	89	192 3G																																																																																																																												
7	0 00	61	0 00	76	81 91	90	209 D3																																																																																																																												
8	0 00	62	0 00	77	91 9B	91	218 0A																																																																																																																												
13	0 00	63	0 00	79	108 64	92	218 3D																																																																																																																												
17	207 CF	65	0 00	79	109 60	93	234 E2																																																																																																																												
18	24 18	66	0 00	80	118 76	94	245 F5																																																																																																																												
19	24 00	67	0 00	81	127 70	95	245 3D																																																																																																																												
29	38 26	68	9 09	82	134 80	105	0 00																																																																																																																												
49	0 00	69	19 12	83	145 91	106	0 00																																																																																																																												
DIODES																																																																																																																																			
<table border="1"> <thead> <tr> <th>Field</th> <th>Setting</th> </tr> </thead> <tbody> <tr> <td>Advanced constrop drop compensation for speed</td> <td>0</td> </tr> <tr> <td>Stabilization</td> <td></td> </tr> <tr> <td>Speed Compensation Control</td> <td>0</td> </tr> <tr> <td>Vstart/Vmid/Vhigh in 128 step mode</td> <td>Normal</td> </tr> <tr> <td>Short-circuit protection</td> <td>Enabled</td> </tr> </tbody> </table>		Field	Setting	Advanced constrop drop compensation for speed	0	Stabilization		Speed Compensation Control	0	Vstart/Vmid/Vhigh in 128 step mode	Normal	Short-circuit protection	Enabled																																																																																																																						
Field	Setting																																																																																																																																		
Advanced constrop drop compensation for speed	0																																																																																																																																		
Stabilization																																																																																																																																			
Speed Compensation Control	0																																																																																																																																		
Vstart/Vmid/Vhigh in 128 step mode	Normal																																																																																																																																		
Short-circuit protection	Enabled																																																																																																																																		

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

CHAPTER 5 - DECODERPRO® PROGRAMMERS

SIMPLE 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

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

READING YOUR DECODER ON THE PROGRAMMING TRACK:

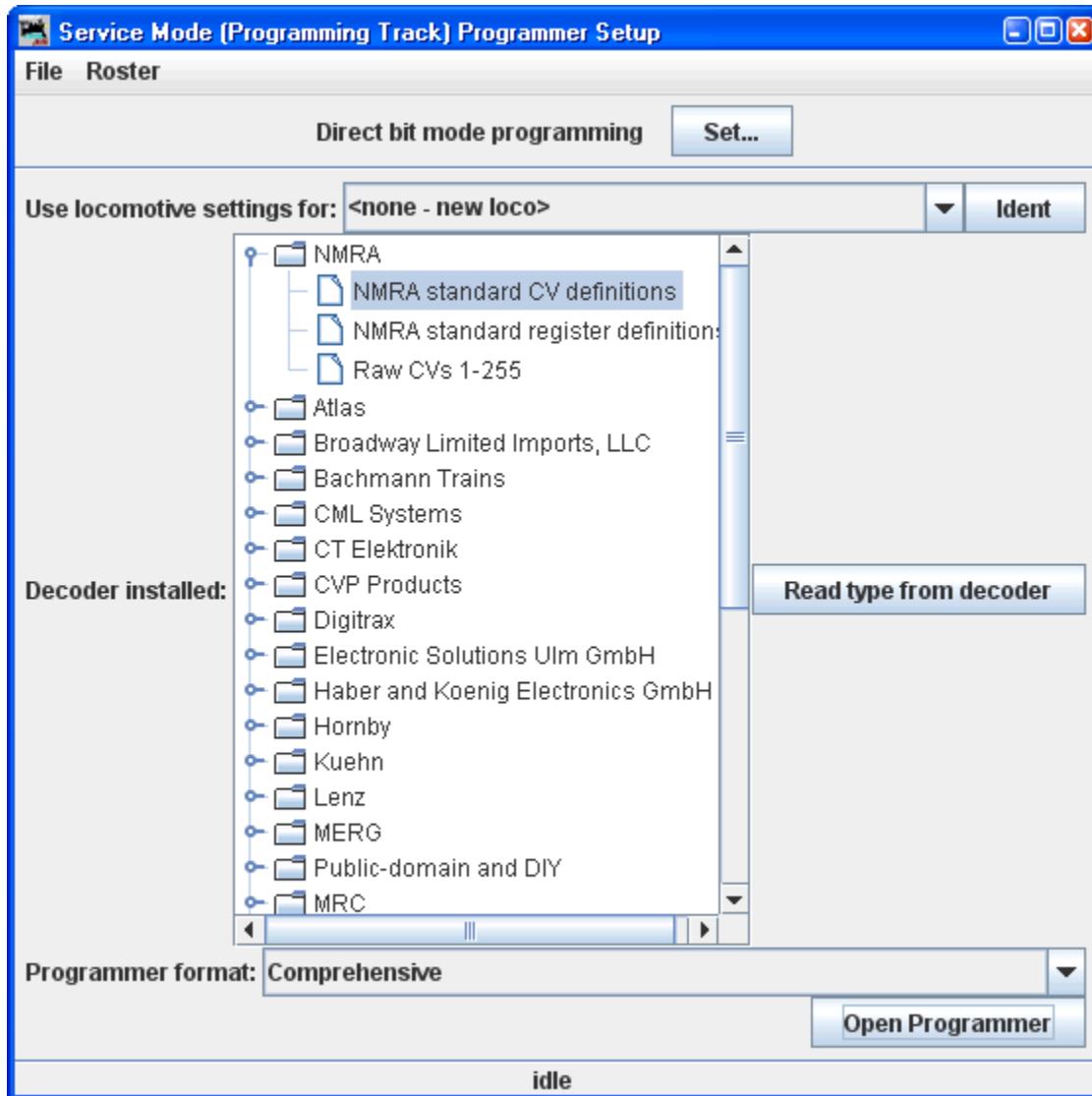
To obtain information from the decoder on the programming track we rely on the ability of the decoder to respond to a query, what is known as **Readback**. Most decoders cannot talk to send information back to the command station. They just respond to instructions, so special instructions were developed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

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

WRITING TO DECODER ON THE PROGRAMMING TRACK:

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

SERVICE MODE PROGRAMMER (PROGRAMMING TRACK) SETUP window opens



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

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

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

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

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

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

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

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

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

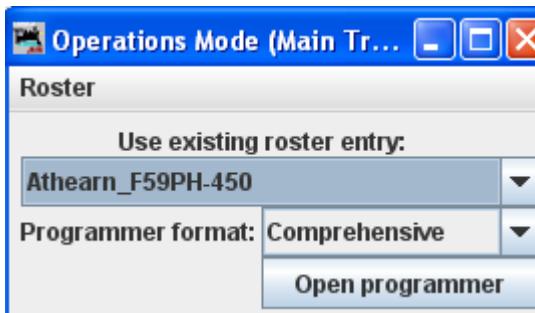
Once you have selected a decoder, or Decoder Pro has done it for you, the **Open Programmer** button will become activated and you'll be able to move on with Service Mode Programming.

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

OPERATIONS MODE PROGRAMMER

OPERATIONS MODE PROGRAMMING (Ops Mode) or Program on the Main(POM). All the discussion above had to do with working on a physically separate piece of track away from the layout. In Ops Mode we program directly on the main line while the locomotive is in operation. Great for getting those speeds and sounds just right. Most all of the programming panes we will discuss will work just as well when you are programming on the main, and you get instant feedback to your changes. How cool is that?

If you click on **Operations Mode (Main Track) Programmer** the *Operations Mode (Main Track) Programmer setup* window will open.



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. All programmers, Basic and Comprehensive, open to the Roster Entry pane

MULTI-DECODER CONTROL

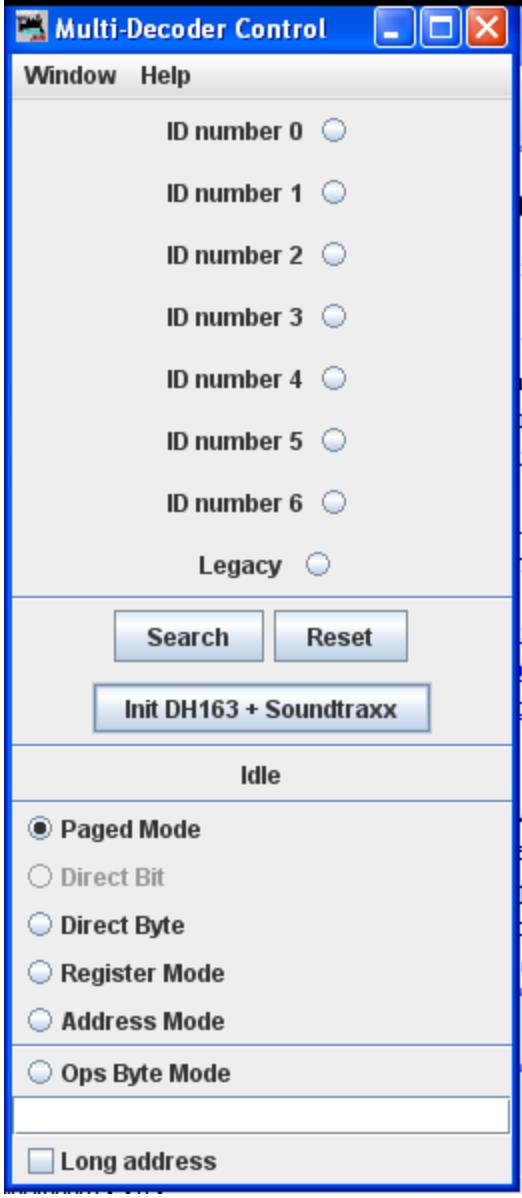
The **Multi-Programmer Control** provides a convenient way to program CV's when you have more than one decoder installed in a locomotive. For example, if you have separate decoders to control the motor and provide sound, and they both use the same CV locations, programming one decoder would change the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



The screenshot shows the 'Multi-Decoder Control' window with several sections:

- Top Bar:** Window, Help, Minimize, Maximize, Close.
- Buttons:** ID number 0 through 6, Legacy, Search, Reset, Init DH163 + Soundtraxx.
- Status Message:** Idle.
- Mode Selection:** Paged Mode (selected), Direct Bit, Direct Byte, Register Mode, Address Mode, Ops Byte Mode.
- Checkboxes:** Long address.

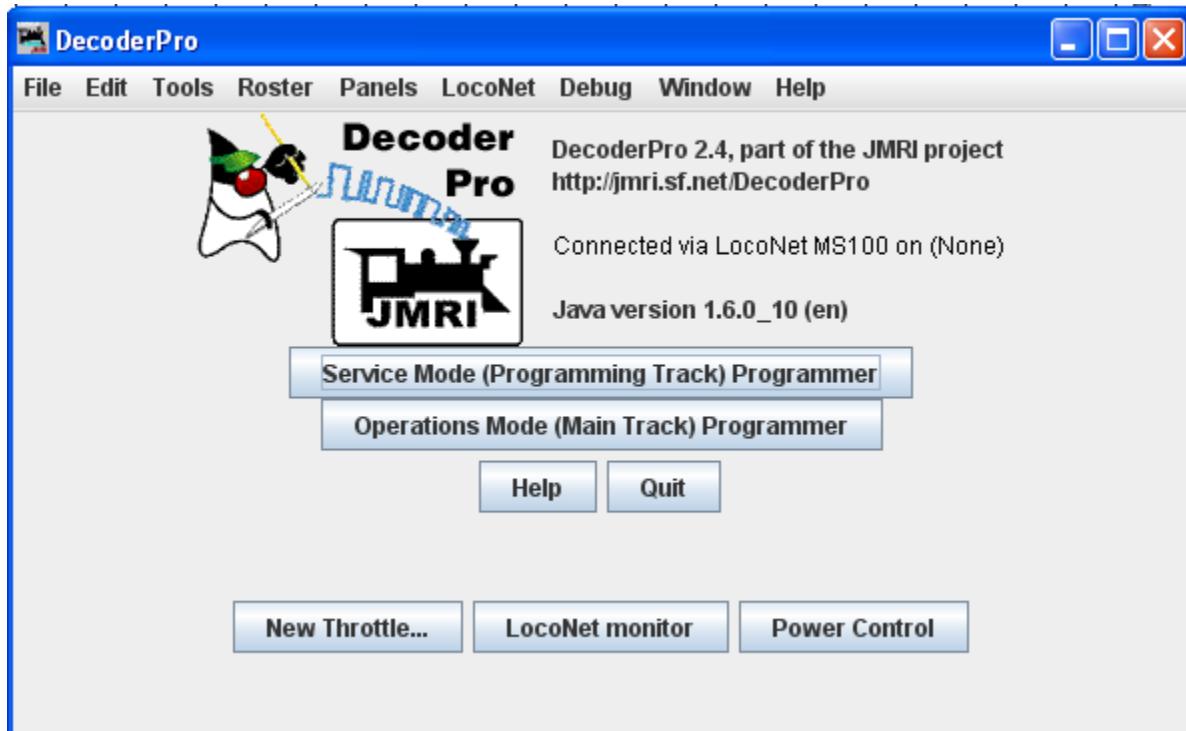
Text Labels and Descriptions:

- ID number buttons:** The ID number buttons numbered 0 thru 6 let you select the value that will unlock the decoder with the corresponding number in it's lock CV16.
- Legacy button:** DecoderPro then reads back the value in CV16 to confirm that the decoder has successfully unlocked.
- Search button:** 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.
- Reset button:** Search button sequentially works through the possible addresses and marking those decoder addresses that are found to be present.
- Init DH163 + Soundtraxx button:** 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.
- Status message:** Status message are displayed below the buttons, shows idle when no action is occurring.
- Mode selection:** At the bottom of the window you can select the Programming Mode. Any mode not supported by your command station will be grayed out.
- Ops mode details:** If you select the Ops mode, which programs on the main track, you need to enter the address of the decoder (locomotive) that you are programming. Your DCC system may require you to check the Long address check box if the address is a long address.

CHAPTER 6 - DECODERPRO® MAIN WINDOW

MAIN WINDOW OVERVIEW

When you start Decoder Pro, the DecoderPro window is displayed. From this window you can access all the functions of DecoderPro.



MENU BAR

Provides access to the menus that allow you to access all the features of DecoderPro

SERVICE MODE (Programming Track) Programmer button

Provides access to the decoder programming capability in **Service Mode Programmer**.

OPERATIONS MODE (Main Track) Programmer button

Provides access to the **Operations Mode Programmer**.

HELP BUTTON

Opens the Help Window

QUIT BUTTON

Exists the program, with confirmation dialog.

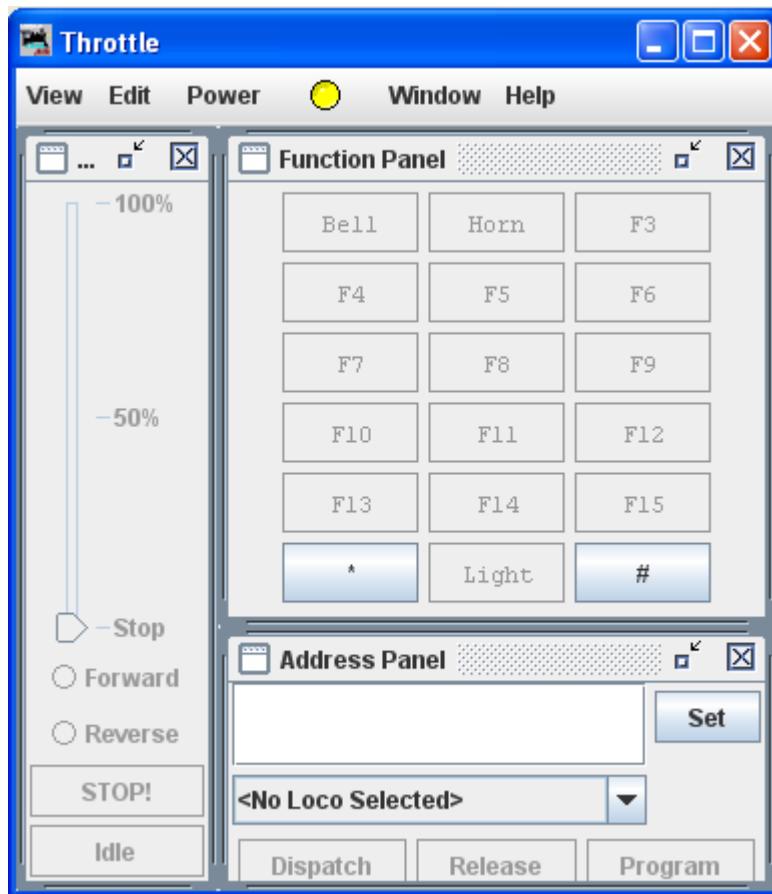
Additional buttons at the bottom of the window will depend on how you set your **preferences**, You can add additional buttons or set the button to load on start up as you require for your use. Sample buttons are:

ADDITIONAL BUTTONS (Optional)

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

NEW THROTTLE.. button

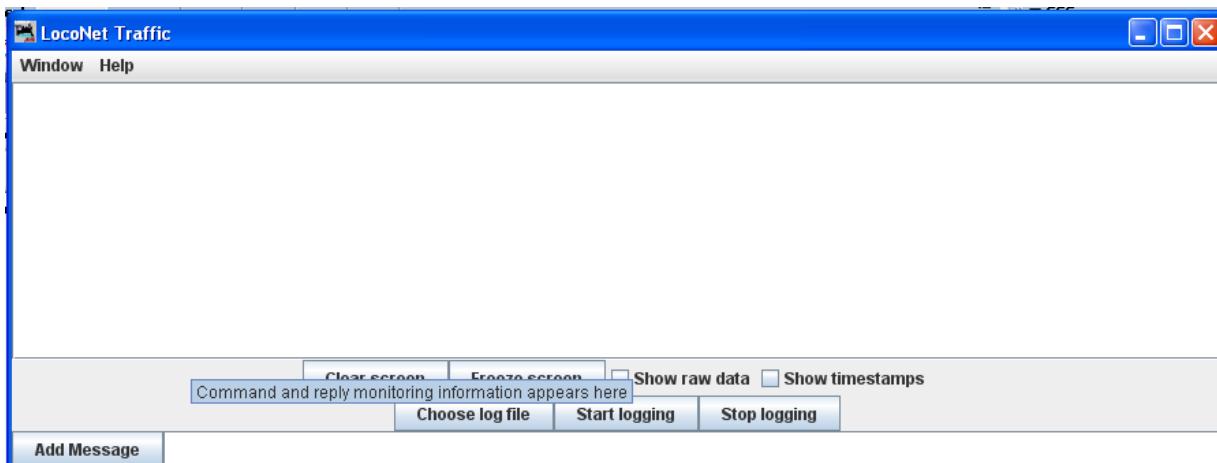
Opens a throttle window provides a tool to control your trains, you may open more than one throttle and position on the computer screen



DecoderPro® User's Guide Version 2.4

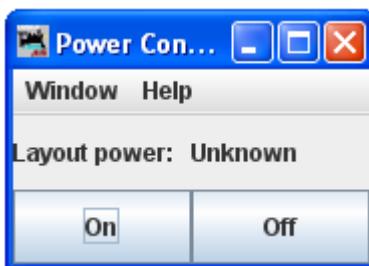
LocoNet MONITOR button

Opens the LocoNet Traffic window that allows you to monitor the commands and responses on the LocoNet. (other systems would display a similar window)



POWER CONTROL BUTTON

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



MENU OVERVIEW

Most of the DecoderPro functions can be accessed via the menu bar on the DecoderPro window



FILE

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

EDIT

- Cut
- Copy
- Paste
- Preferences...

TOOLS

- Programmers
 - Single CV Programmer
 - Service Mode Programmer
 - Ops-Mode Programmer
 - Multi-Decoder Control
- Tables
 - Various Tables used with Panel Pro and not covered in this manual
- Clocks
 - Setup Fast Clock...
 - Nixie Clock
 - LCD Clock
 - Analog Clock
- Power Control
- Turnout Control...
- Simple Signal Logic
- Sensor Groups...
- Speedometer...
- Light Control...
- Dispatcher...
- Send DCC Packet...
- USS CTC Controls...(not covered in this manual)
- Operations (covered in another section)

ROSTER

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

- [Print Summary...](#)
- [Print Preview Summary...](#)

PANELS

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

SYSTEM

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

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

DEBUG

- Memory Usage Monitor
- Import Decoder File
- Import Decoder URL
- Recreate Decoder Index
- Recreate Roster Index
- Other options are beyond the scope of this manual

WINDOW

- DecoderPro
- LocoNet Traffic
- Power Control

HELP

- Window Help...
- General Help...
- License...
- Locations...
- Context....

FILE MENU

PRINT DECODER DEFINITIONS...

Opens your computer Print dialog to print the installed decoder definitions. The complete list may be more than 15 printed pages. The format is shown below.

The screenshot shows a printed page titled "DecoderPro V2.4 Decoder Definitions" at the top left. At the top right, it says "January 5, 2009 12:46 AM". In the center-right, there is a logo for "Decoder Pro" featuring a cartoon character holding a train and the text "Decoder Pro" above a stylized "JMRI" logo.

The main content of the page lists various decoder manufacturers and their products:

- NMRA**
 - NMRA standard CW definitions
 - NMRA standard register definitions
 - Raw CUs 1-255
- Atlas**
 - Four Function Dual Mode
 - Four Function #345
 - Dual Mode
 - Atlas N-Scale
 - V01000 (Part #500099)
- Broadway Limited Imports, LLC**
 - Blueline
 - Diesel
 - Steam
- Bachmann Trains**
 - Bachmann E-Z Command decoders
 - E-Z Command Locomotives
 - E-Z Command lfn (36-551)
 - Bachmann 4-function decoders
- CML Systems**
 - DAC10
- CT Elektronik**
 - Function Decoder
 - DCX30
 - DCX30V
 - DCX Series

PRINT PREVIEW DECODER DEFINITIONS...

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

QUIT

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

EDIT MENU

CUT

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

COPY

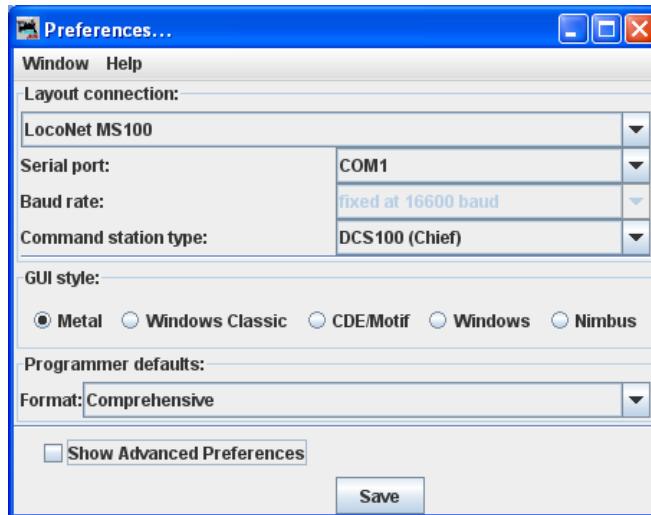
Copies selected text into the computer's clipboard

PASTE

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

PREFERENCES...

Opens the Preferences window.



TOOL MENU

PROGRAMMERS ►

- **Single CV Programmer**

Opens the Simple Programmer

- **Service Mode Programmer**

Opens the Service Mode Programmer.

- **Ops-Mode Programmer**

Opens the Ops-Mode Programmer.

- **Multi-Decoder Control**

Opens the Multi-Decoder Control window.

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

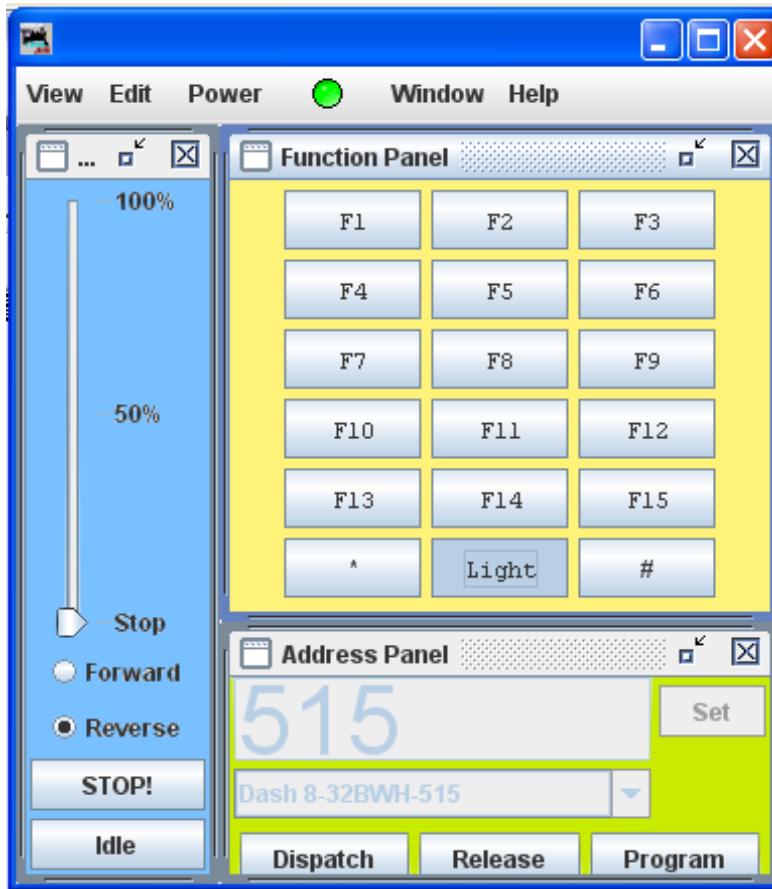
A series of tables that are used with PanelPro Panels to automate your layout.

THROTTLES ►

- **New Throttle...**

(more than one throttle may be in use at a time)

The DecoderPro 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.



(color shading added to show functional areas throttle panels)

The Throttle Window contains **Menu Bar** 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:

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

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

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

Throttle Window Menu Bar

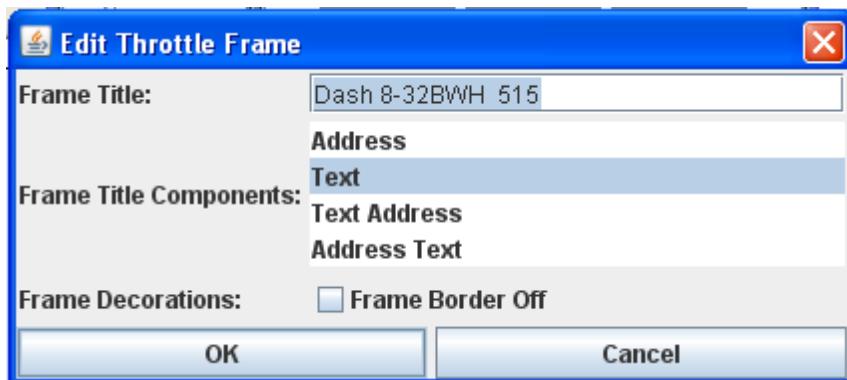


- View
 - Address Panel
 - Control Panel
 - Function Panel
 - Show All Function Buttons
- Edit
 - Frame Properties (see below)
 - Reset Function Buttons
 - Save Function Buttons

Opens prompt box to save the function buttons to your roster entry. Roster entry must be selected in the Address Pane

- Power
 - Power On
 - Power Off
 - (Track Power Indicator: yellow - not connected, red - off, green - on)
- Window
 - Shows all DecoderPro windows status, open windows are checked.
- Help
 - Window Help...
 - General Help...

Frame Properties



Frame Title: Type the title of your choice for the Throttle frame

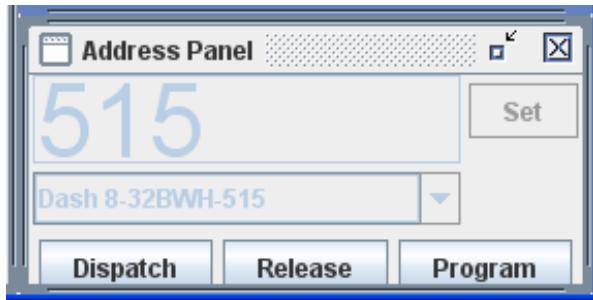
Frame Title Components: Select the text component desired

Frame Decorations: check for Frame Border Off

OK button adds the edits

Cancel button aborts the operation

Address Panel



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 entered [Function labels](#), the label text will appear on the throttle buttons.

Click on the **Set** button to send the address to your system.

Dispatch button is used to dispatch the locomotive which releases the trottle for

that address so that it can be acquired by another throttle

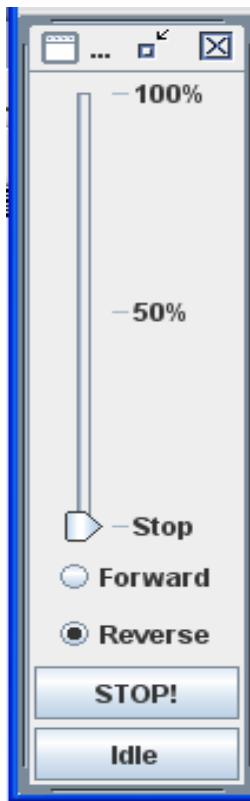
Release button is used to release the address from your system.

Program button opens the [Programmer](#) for the locomotive selected

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

[Top](#)

Throttle Control Panel



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.

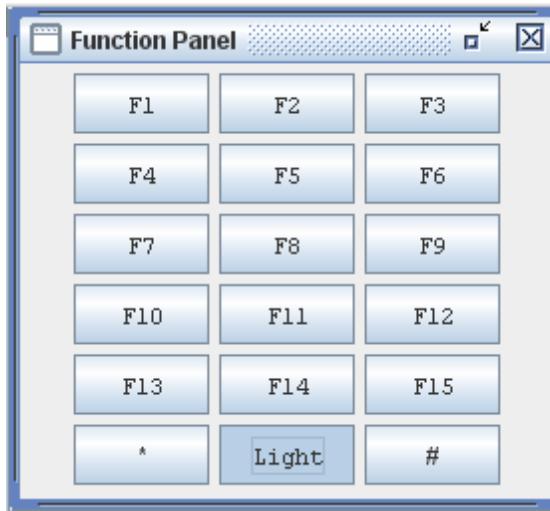
Forward and **Reverse** buttons set the locomotives direction.

STOP! button executes an emergency stop, locomotive stops immediately overriding any BEMF or De acceleration programmed into the decoder.

Idle button sets the locomotive in the idle mode.

[Top](#)

Throttle Function Panel

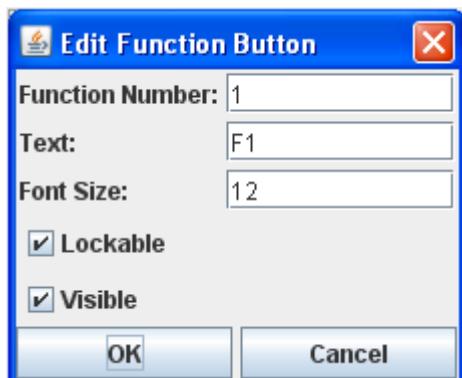


The Throttle Function Panel allows you to select the decoder functions from F0 through F15 on first overlay and F16 through F28 on second overlay. Many new Sound decoders use up to 28 functions..

The Asterisk (*) button is used to toggle between lower functions and upper ffunctions (Functions beyond F15).

The function buttons may be labeled using the Comprehensive Programmers [Function Labels Pane.](#)

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.

Text: the text displayed on the button.

Font Size: Select the font size in points.

Lockable - locks the function when button is clicked.

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 Button option.

OK button sets all the values edited.

Cancel Button exits dialog without

change.

You can use the **Save** button on the [Address Panel](#) to save the edited functions to your locomotives Roster entry.

- **Save Throttle Layout...**

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

- **Load Throttle Layout...**

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

- **Save Throttle Preferences...**

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

CONSISTING TOOL...

- **Consisting Control Window**

Three types of consists are used on DCC systems:

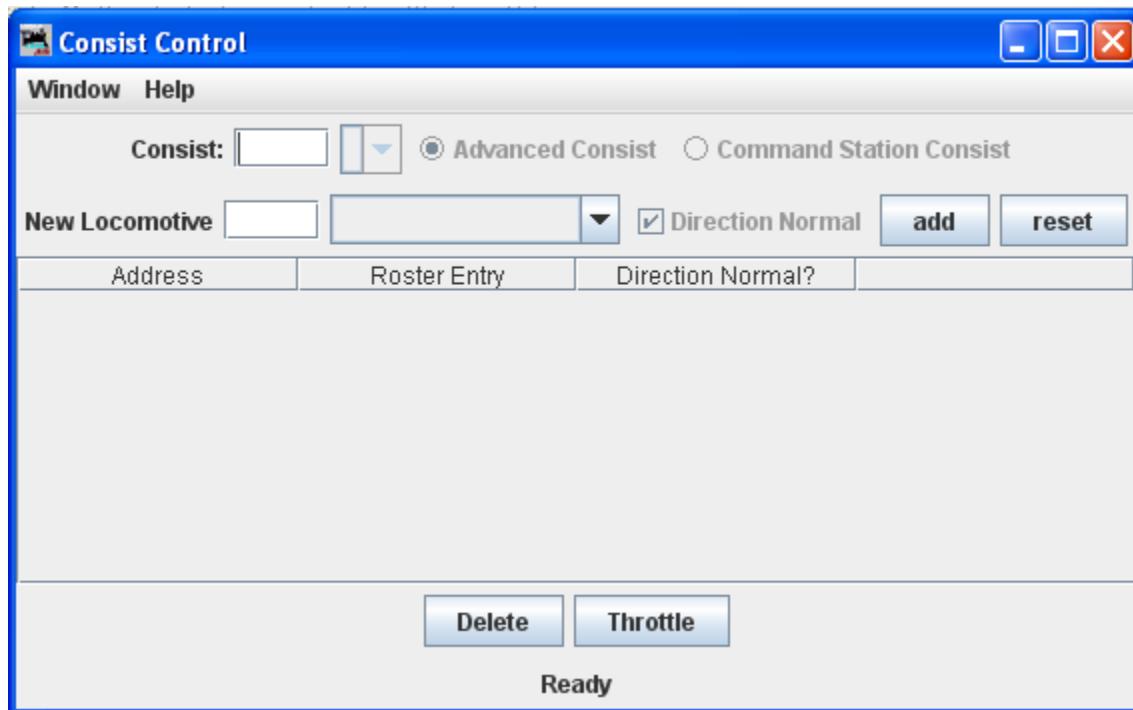
- A basic or primary address consist, where each locomotive is assigned the same address on the programming track, or on the main with [OpsMode Programming](#) (if supported by the command station and decoder).
- A Command Station Assisted Consist (CSAC) which builds the consist using a function of your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

Manufacturer	Trade Name	Usage Notes
Digitrax	Universal	Limited to the number of slots supported by the system.
	Consist	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**.



The **Advanced Consist** and the **Command Station Consist** allow you to select either consisting 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 you roster using the drop-down list.

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

Clicking the **reset** button 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.

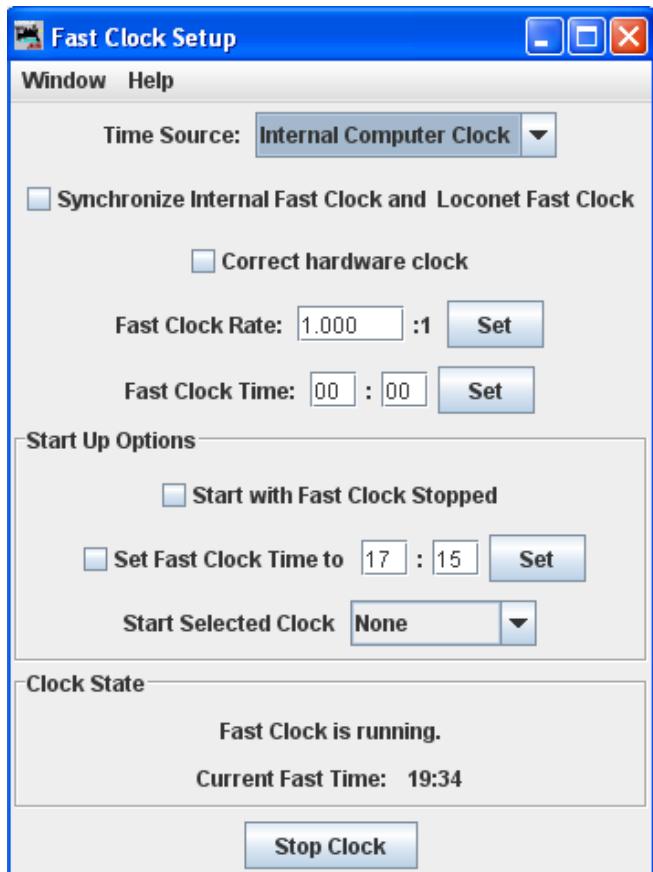
Delete button removes the consist. The list of the consist will have a DEL button for each locomotive, allowing you to remove any locomotive from the consist.

Throttle button opens a throttle for the consist.

Below the **Delete** and **Throttle** button is the status bar, where messages are displayed during the consisting of your locomotives.

CLOCKS

- **Setup fast Clock...**



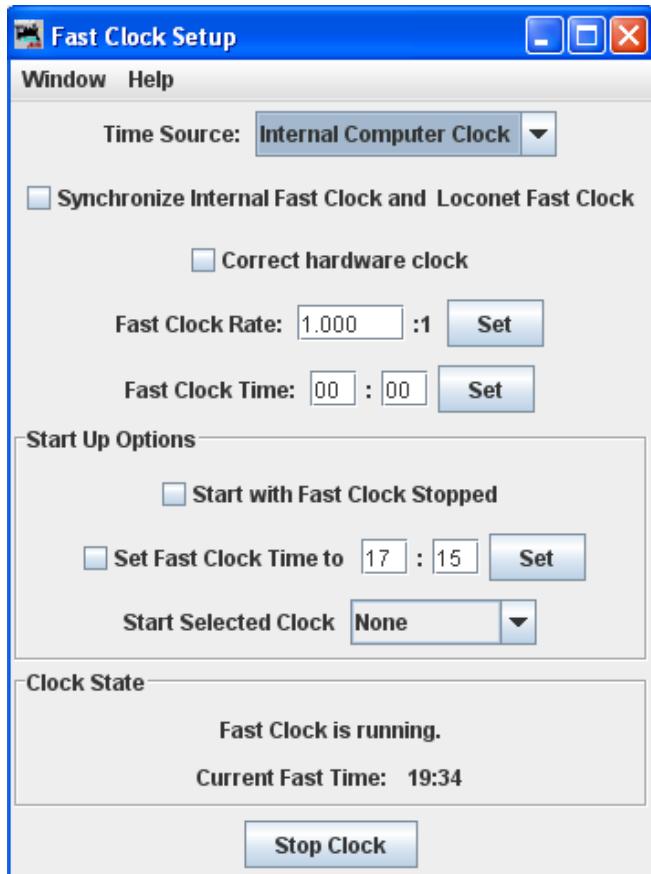
Time Source drop-down list allows you to select the your clock source. Usually, the Internal Computer Clock is selected unless you have a DCC clock on your system.

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.

Set the wall clock time. Example: 4.000 rate over 15 minutes. Click on **Set** button to set displayed. If the rate is valid then it will be sent



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) 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.

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

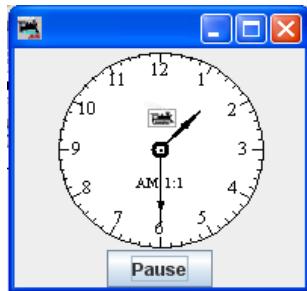
- **Nixie Clocks**



- **LCD Clock**

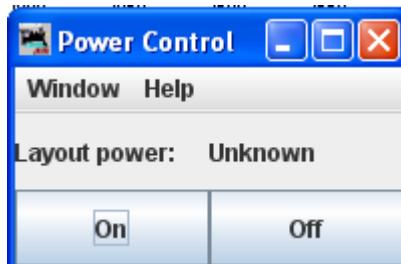


- **Analog Clock**

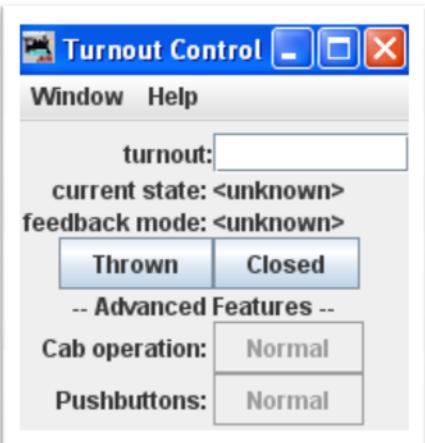


POWER CONTROL...

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



TURNOUT CONTROL...



turnout: enter the accessory number or turnout system name for the accessory or turnout you wish to control.

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 the state of the turnout. TWO 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.

Thrown button: push this button to throw the turnout.

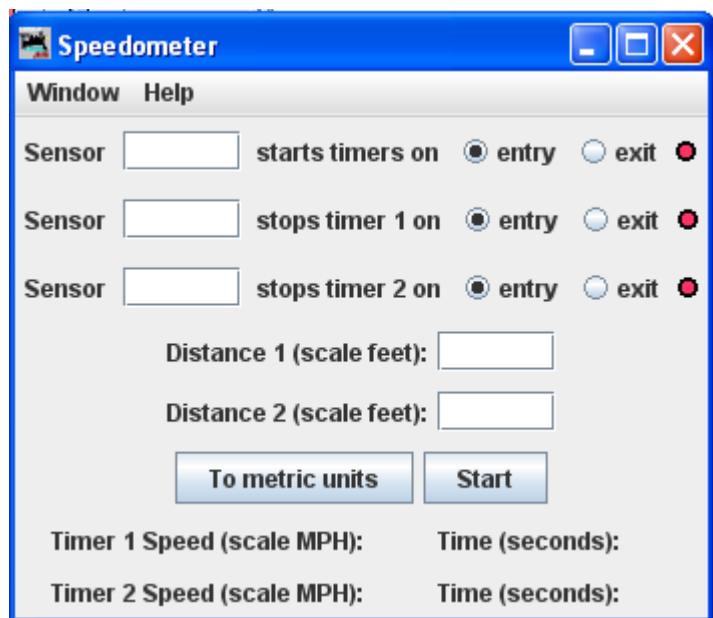
Closed button: push this button to close the turnout.

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

SIMPLE SIGNAL LOGIC (advanced users, beyond the scope of this manual)

SENSOR GROUPS.... (advanced users, beyond the 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

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.

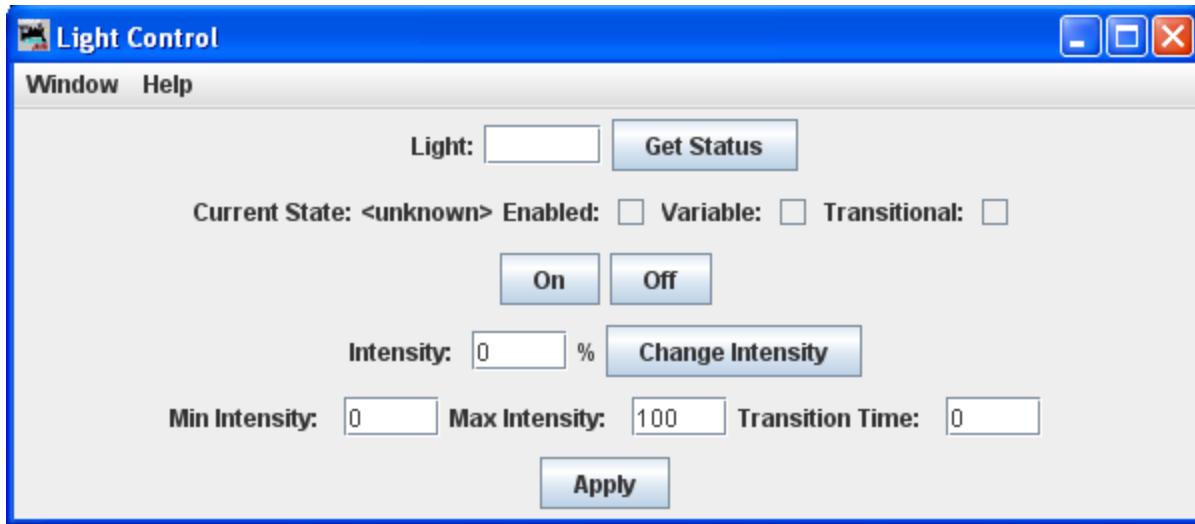
Enter the **Distance 1 (scale feet)**: in text box, which is the distance between sensor 1 and 2.

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

The **Start** button starts the speedometer. **To metric units** button converts output to metric values.

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.

<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 the scope of this manual)

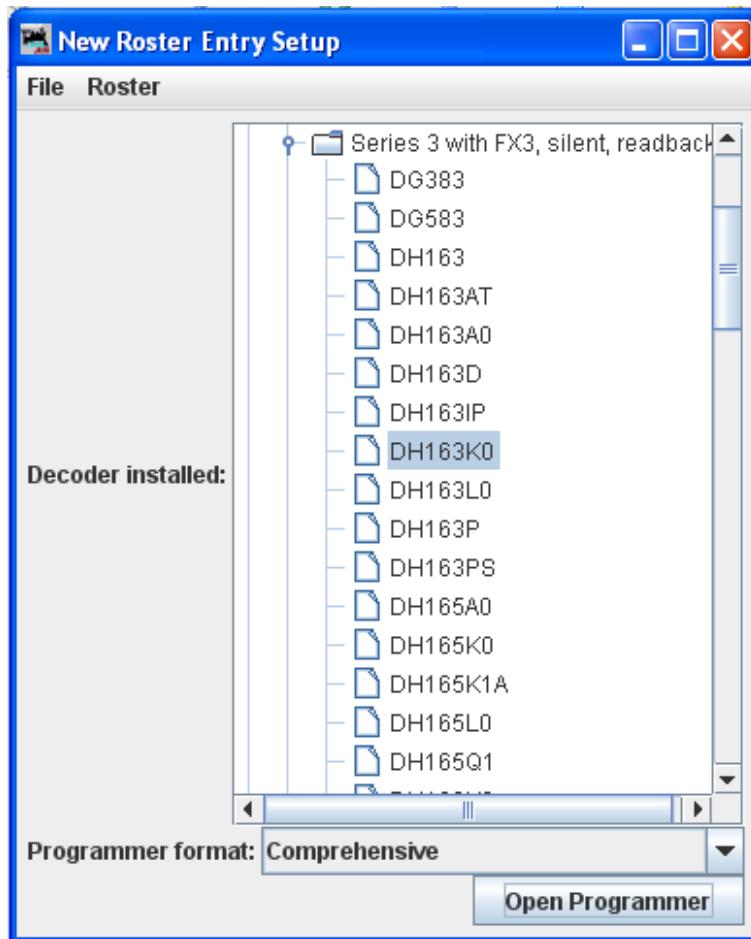
SEND DCC PACKET... (not covered in this manual)

USS CTC TOOL ━━ (advanced users, beyond the scope of this manual)

OPERATIONS ━━ (not covered in this manual)

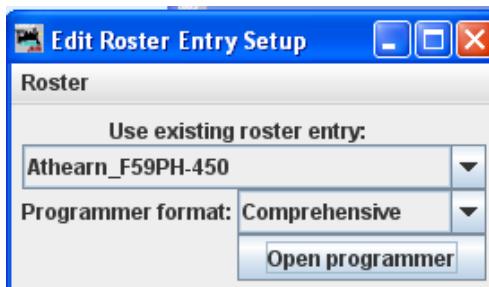
ROSTER MENU

CREATE ENTRY...



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...



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...



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.

After you select the roster, Input prompt

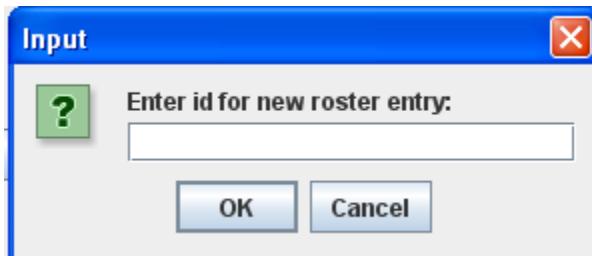


Type the name of the new roster you wish to process then click on the **OK** button. Click **Cancel** button if you wish to abort this function.

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

IMPORT ENTRY...

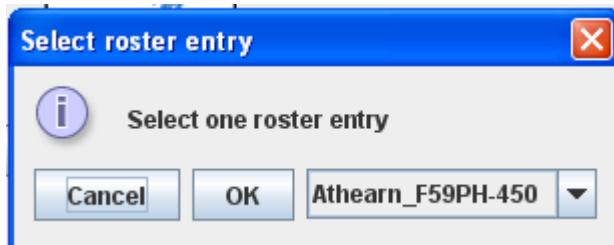
The Open dialog is displayed, select the roster file (roster.xml) that you wish to import.
Input prompt



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.

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

EXPORT ENTRY...



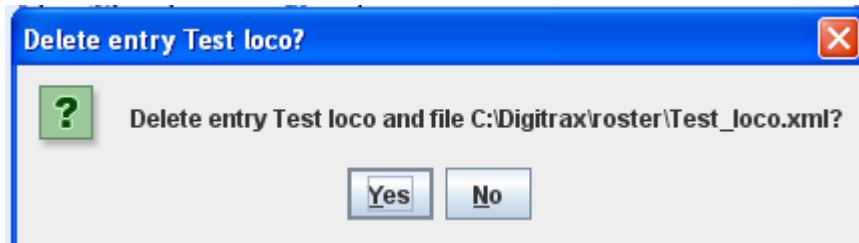
From the drop-down list select the roster that you wish to process, then click on the **OK** button. Click **Cancel** button if you wish to abort this function.

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

DELETE ENTRY...



Select the roster from the drop-down list that you wish to delete from DecoderPro. Click **OK** and the Confirmation box **Delete entry *fileName*?** is displayed.. Click **Cancel** button if you wish to abort this function.



Yes button deletes file, **No** button aborts the operation.

Used to remove an entry from the DecoderPro roster.

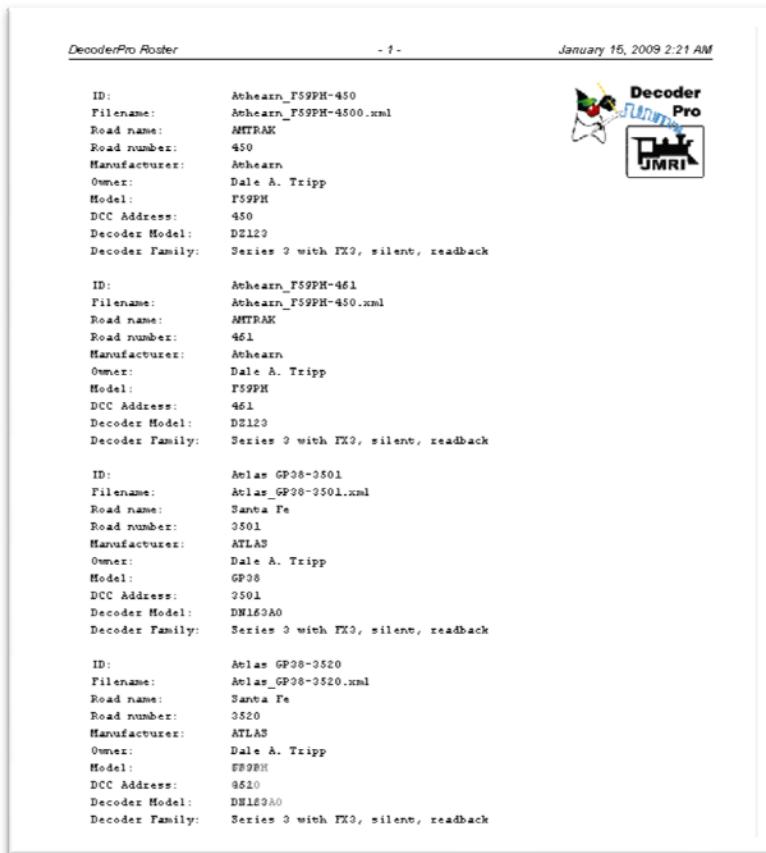
Print Summary...

OPENS YOUR OPERATING SYSTEMS PRINTER DIALOG AND WHEN PRINT IS SELECTED, PRINTS A COMPLETE SUMMARY OF YOUR ROSTER ENTRIES. (TYPICALLY 5 ENTRIES PER PAGE, SO BE PREPARED TO PRINT SEVERAL PAGES).

PRINT PREVIEW

DecoderPro® User's Guide Version 2.4

Open your operating systems printer and when the print is initiated the preview window is shown.

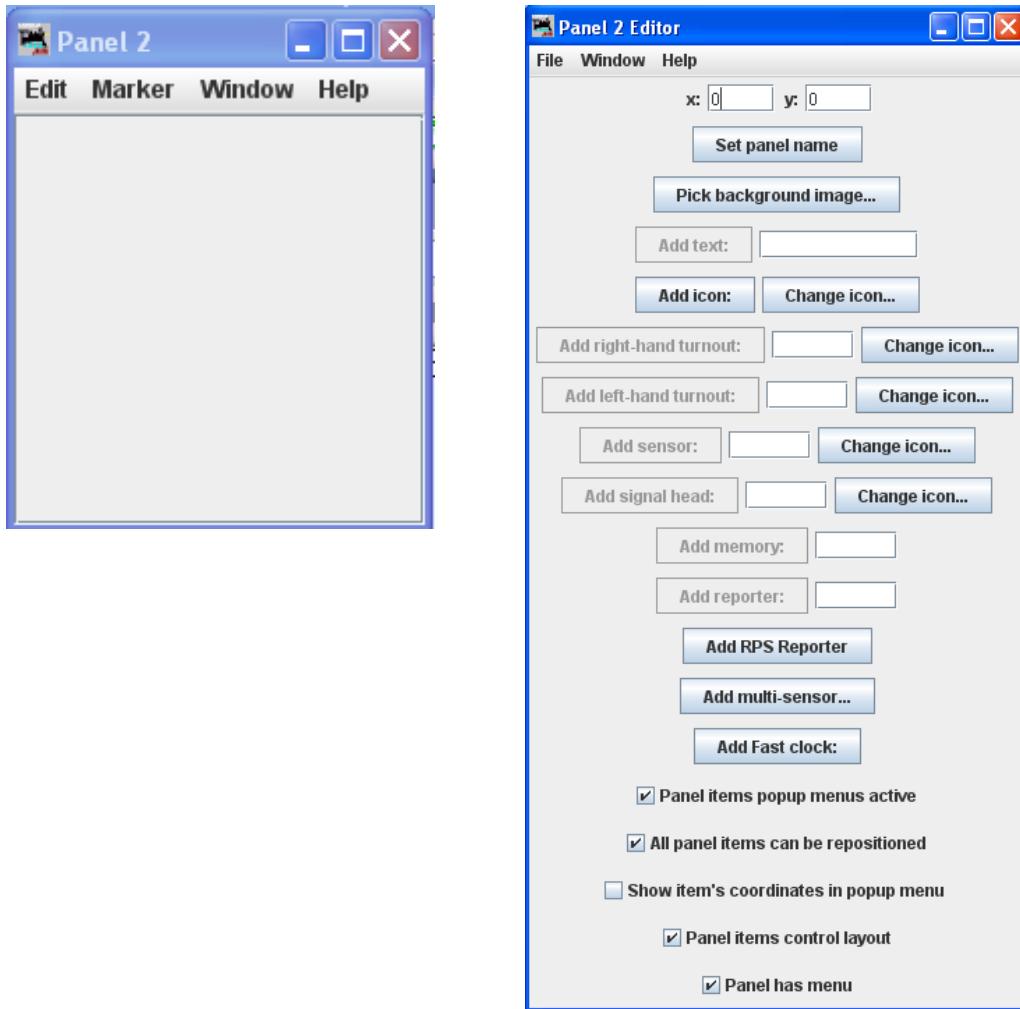


PANELS MENU

DecoderPro is only one facet of the JMRI suite of programs. Another facet is **PanelPro**, which is software that allows you draw a track diagram and then interface the items in that diagram to the electronic hardware on the real layout so that the hardware can be operated via the JMRI Interface. For a tutorial on how to work with PanelPro go to PanelPro Layout Editor Tutorial (<http://jmri.sourceforge.net/community/clinics/NMRA2008/LayoutEditorClinic2008/LayoutEditOrClinic.pdf>) and PanelPro Clinic (<http://www.rr-cirkits.com/Clinics/Clinics.html>). 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 the there is a Panels menu on the DecoderPro main window that allows access to some of the PanelPro functions.

NEW PANELS... ►

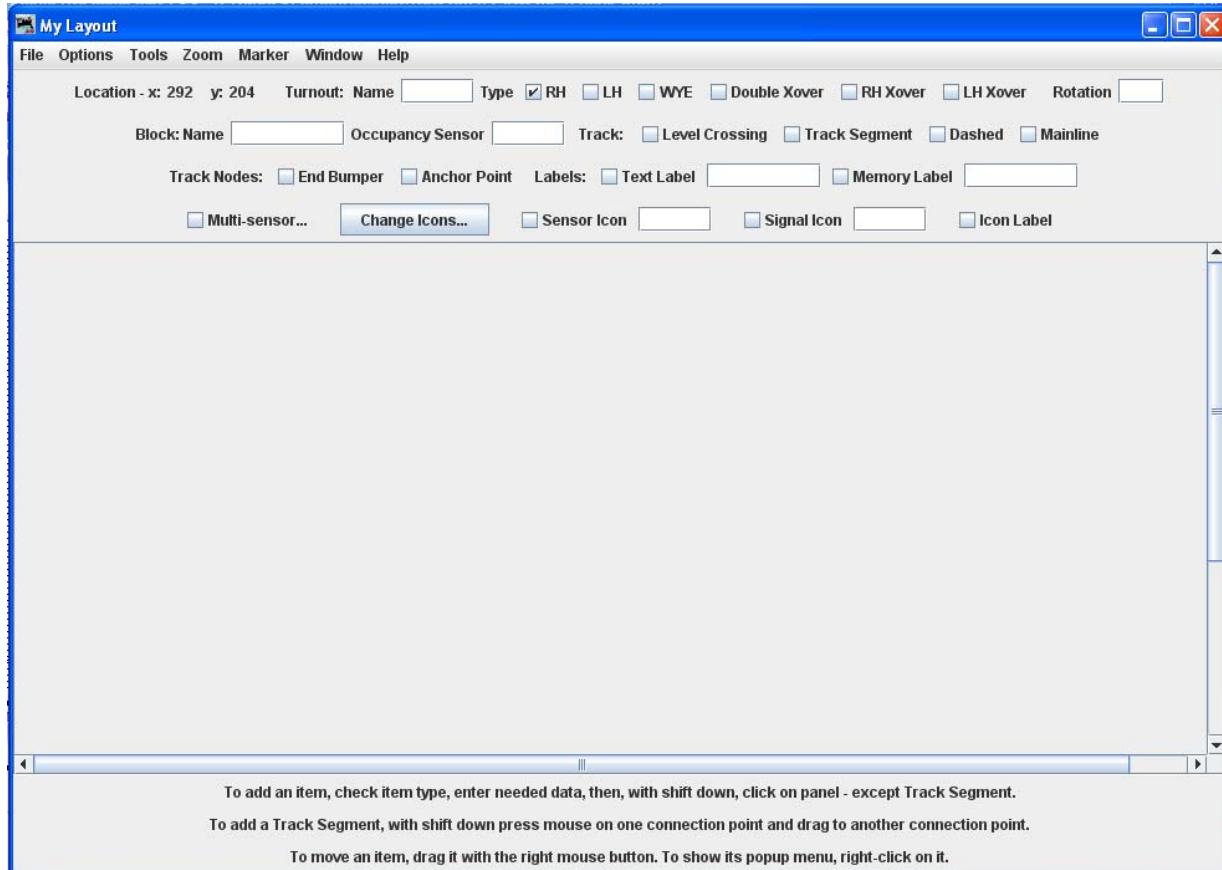
- **Panel Editor**



- **Layout Editor**

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

DecoderPro® User's Guide Version 2.4



LOAD PANELS...

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

STORE PANELS...

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

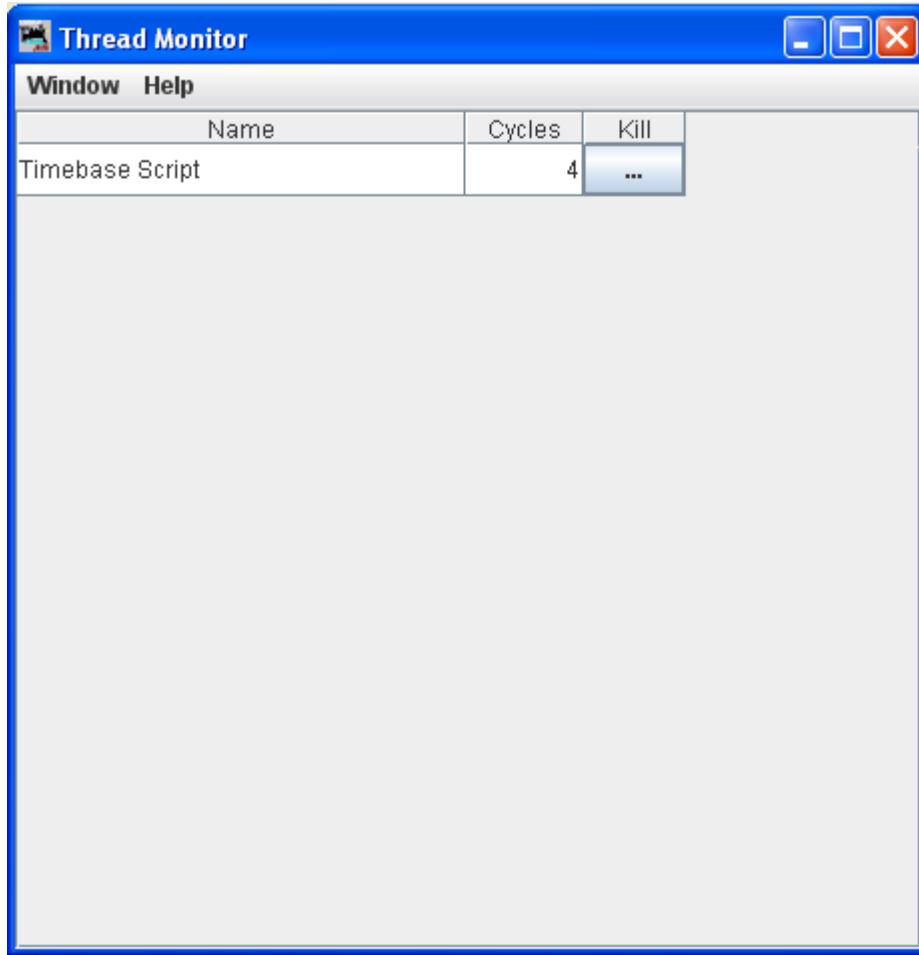
SHOW PANELS ➔

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

RUN SCRIPT...

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

THREAD MONITOR...



SCRIPT OUTPUT

Displays the **Script Output** window.

SCRIPT ENTRY

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

System Dependent Menu

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

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

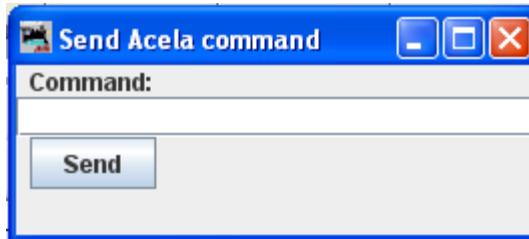
ACELA MENU

Command Monitor

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

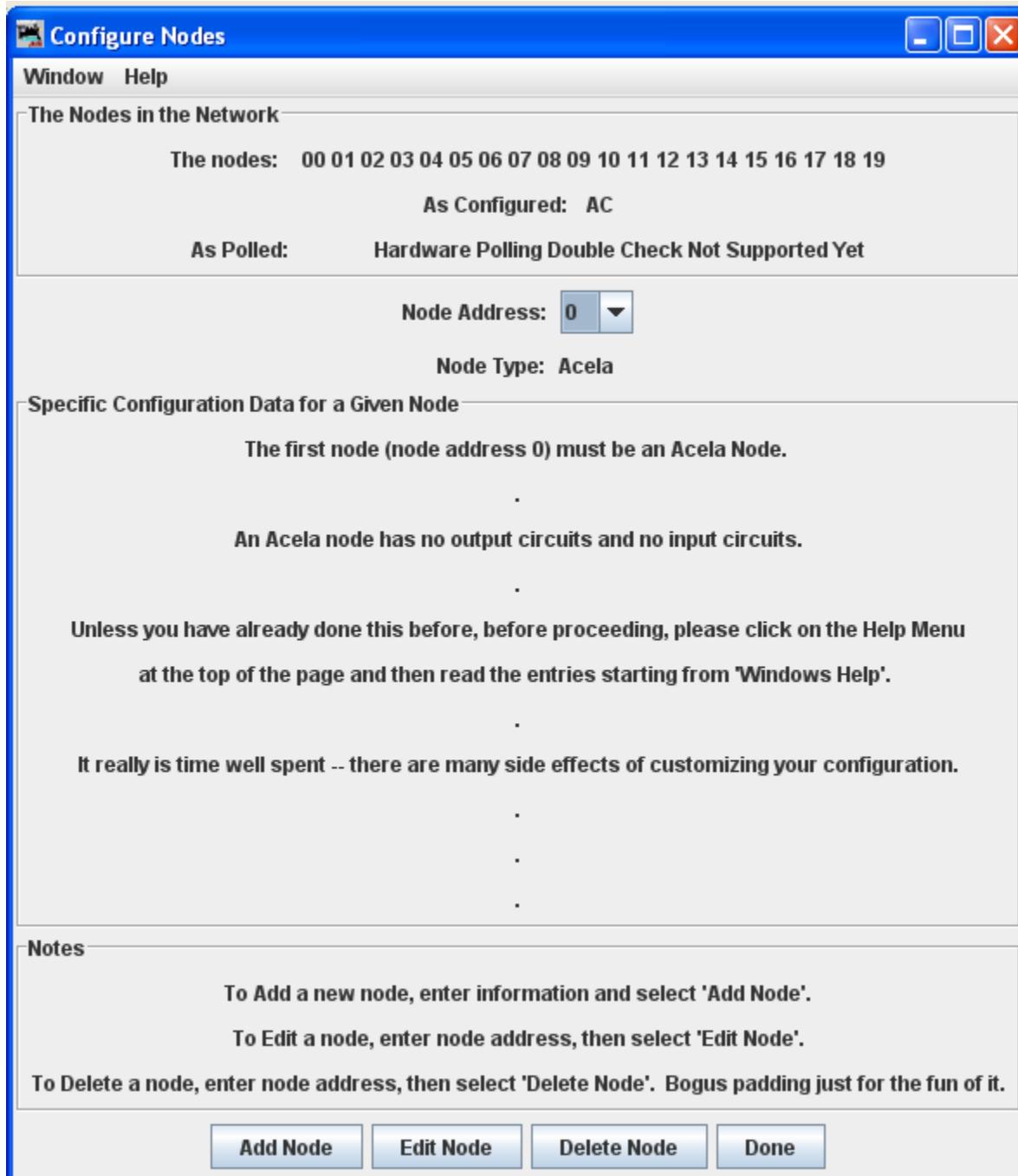
Send Command

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



Configure Nodes

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



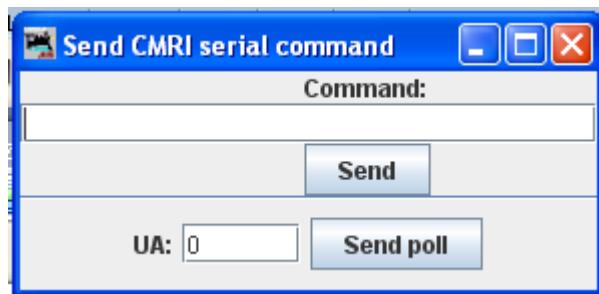
CMRI Menu

CMRI Monitor

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

Send Command

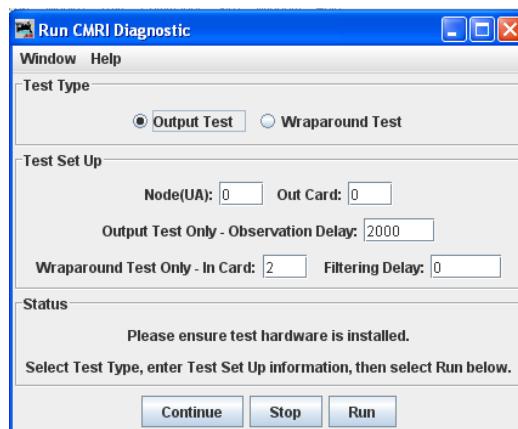
Opens the **Send CMRI serial command** prompt. You may poll devices on the CMRI serial link, using the **Send poll** button. You can send a command to the device using the **Command:** text box and the **Send** button.



Run Diagnostics

Run CMRI Diagnostic window

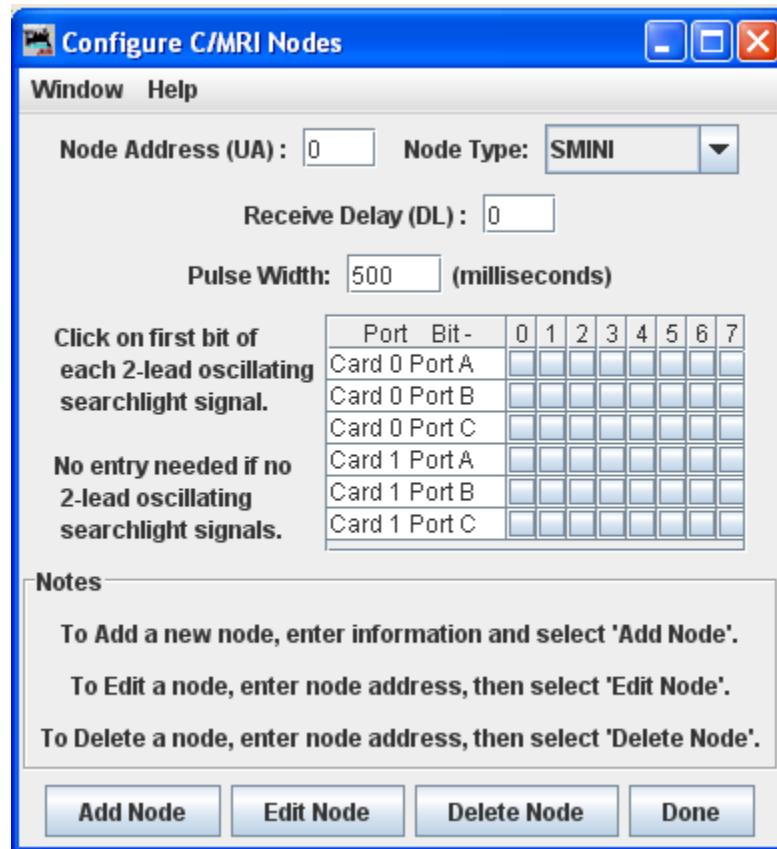
Provides a tool for testing your CMRI serial cards in the system using either an Output Test or a Wraparound Test.



Configure C/MRI Nodes

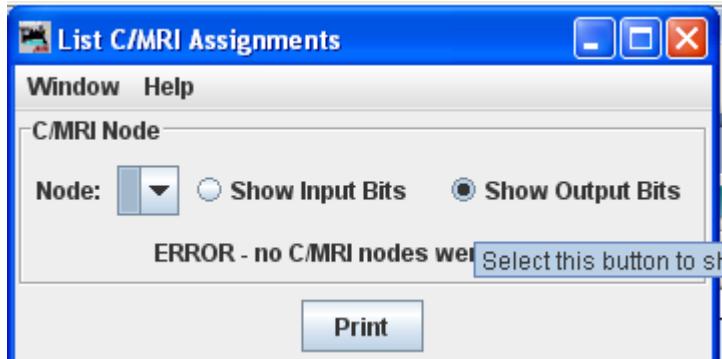
Configure C/MRI Nodes Window

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



List Assignments

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



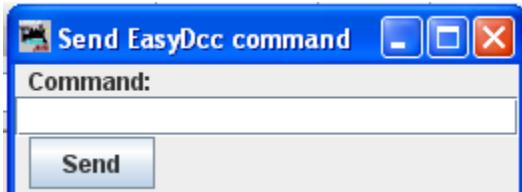
EasyDCC Menu

Command Monitor

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

Send Command

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



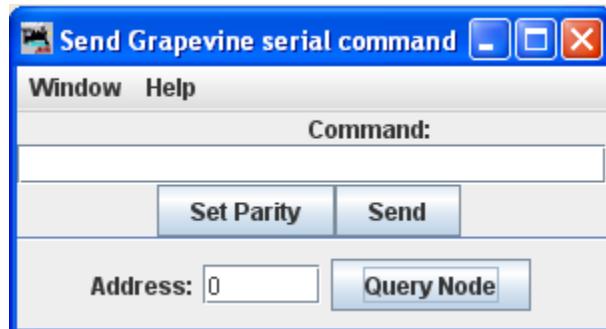
GRAPEVINE MENU

Communications Monitor

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

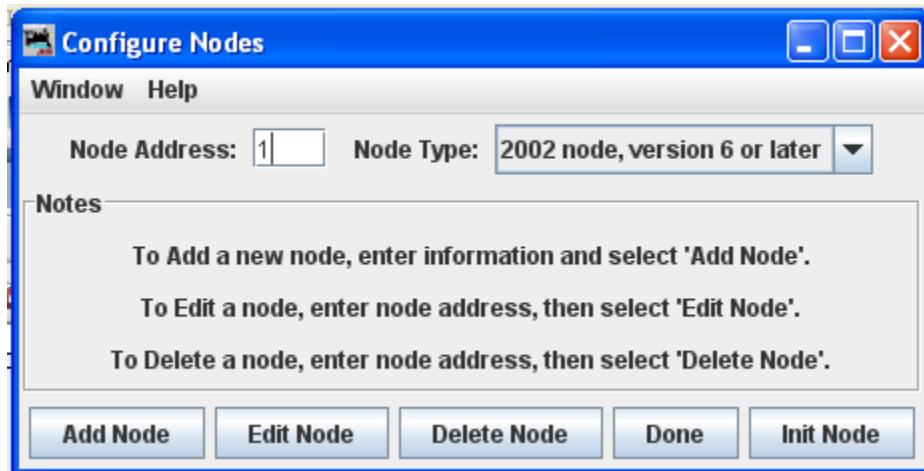
Send Command

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



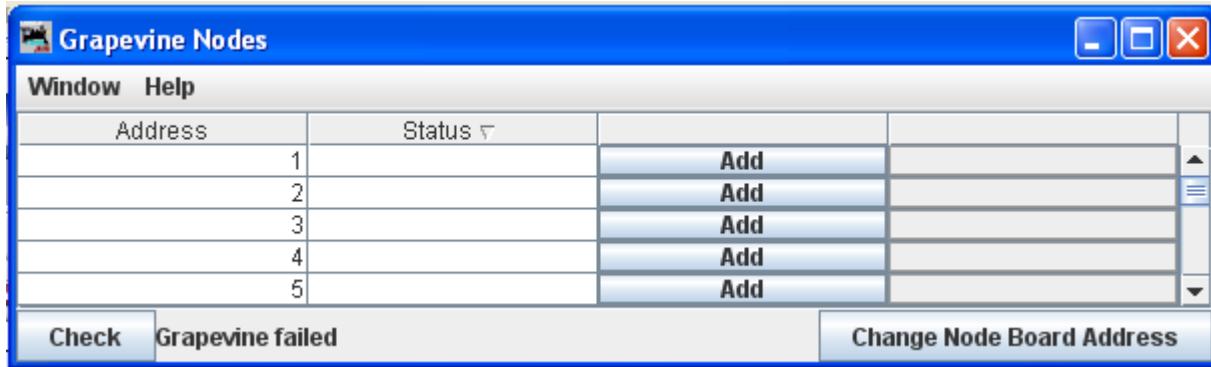
Configure Nodes

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



Node Table

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



LocoNet Menu

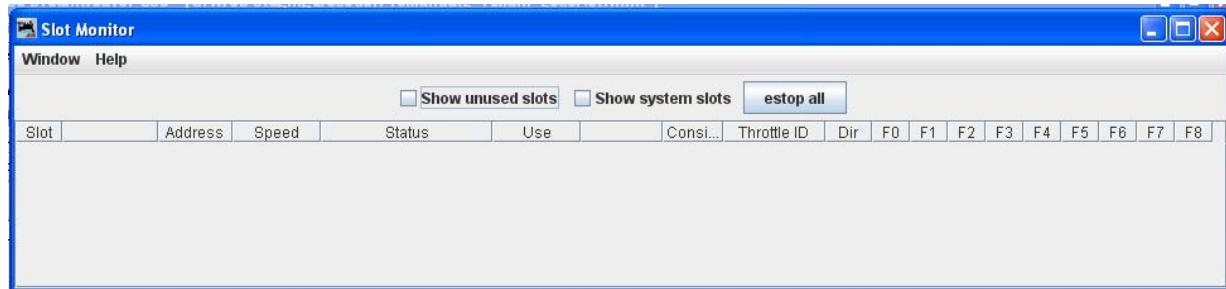
Monitor LocoNet

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

Monitor Slots

LocoNet Slot Monitor Window

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



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

- Show unused slots**

Show system slots

estop all

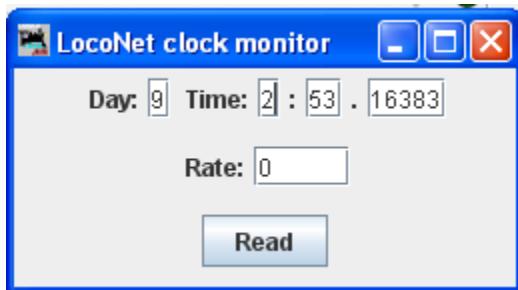
Executes an **Emergency Stop** for all locomotives.

The columns are:

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

Monitor Clock

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



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

- the current contents of the LocoNet fast clock
- Set the **Day** and **Time**

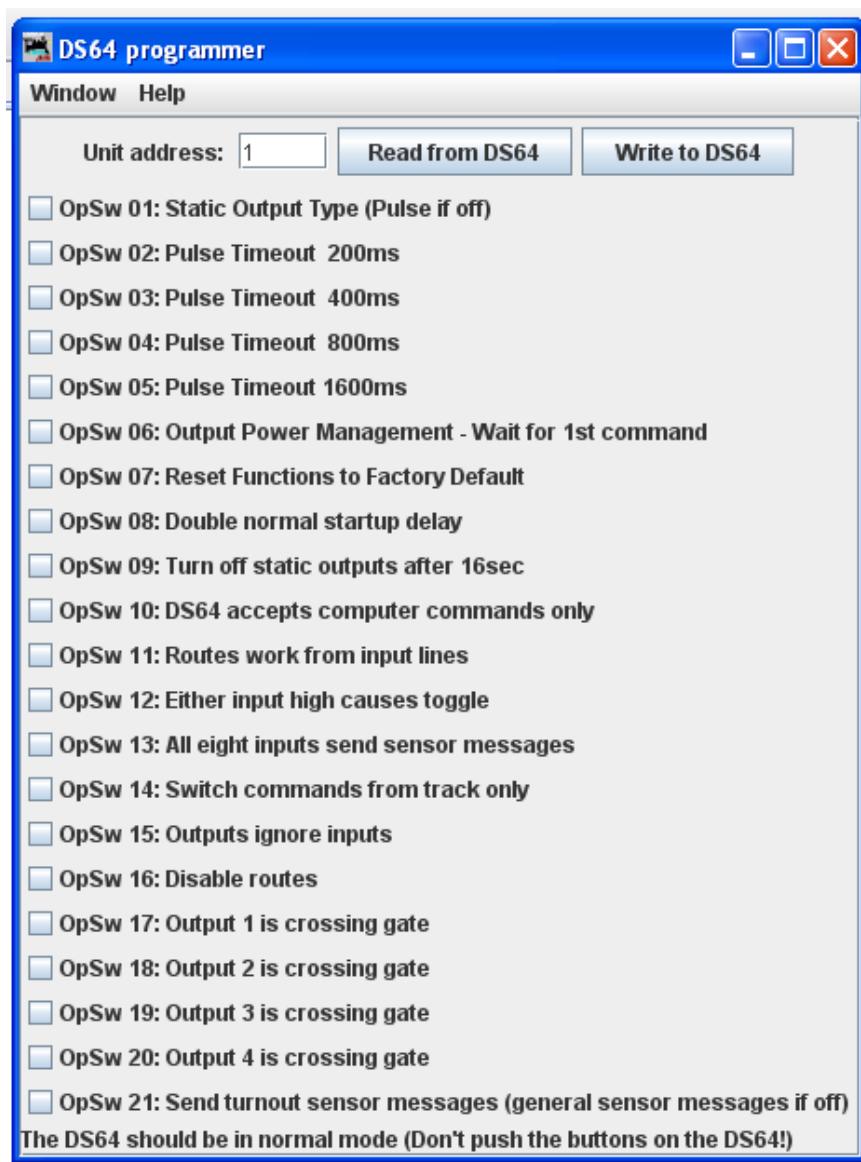
- Set the **Rate**. Note that you can't explicitly pause a LocoNet clock, but you can stop it by setting the rate to zero.

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

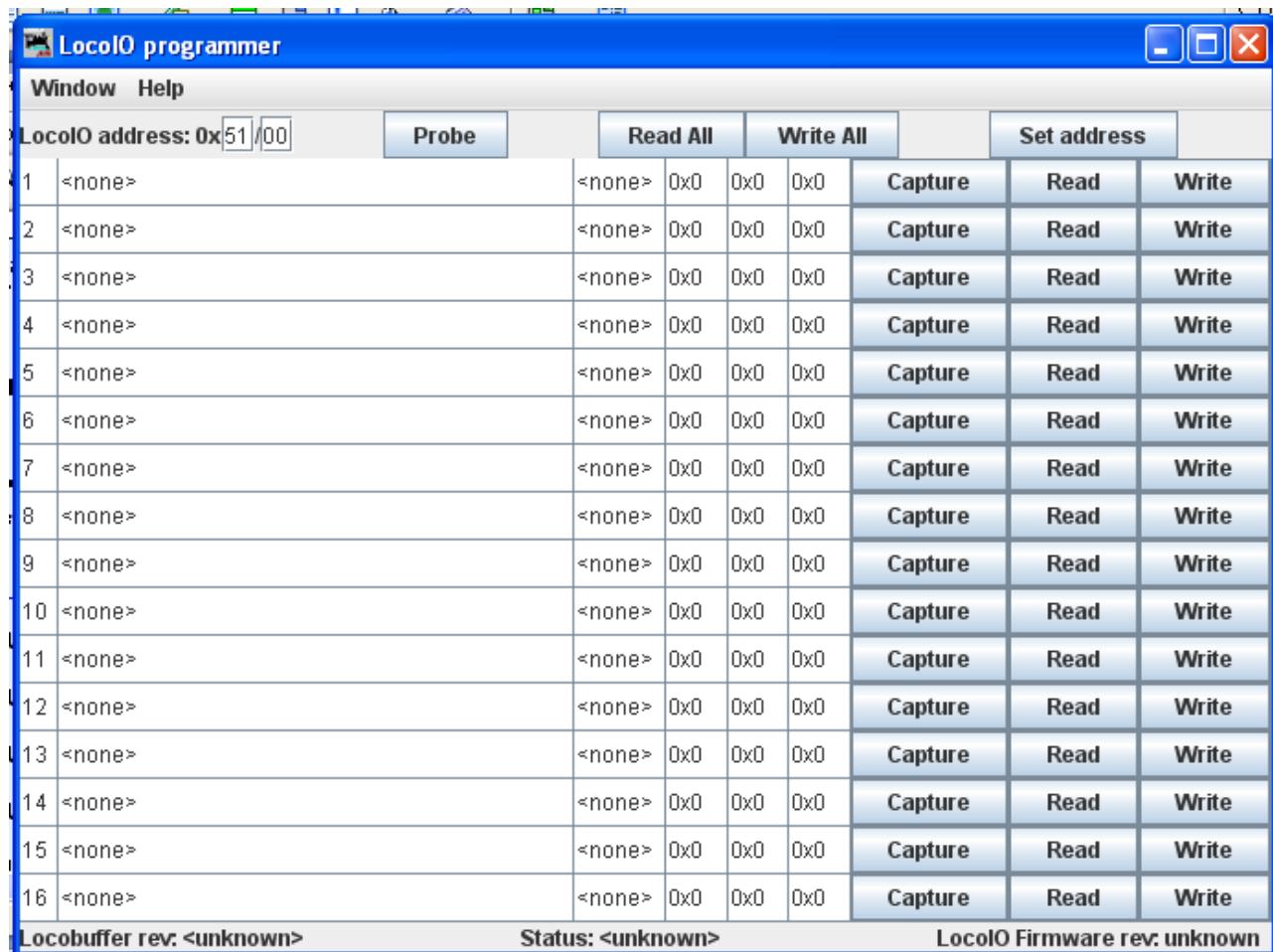
Monitor LocoNet Stats

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

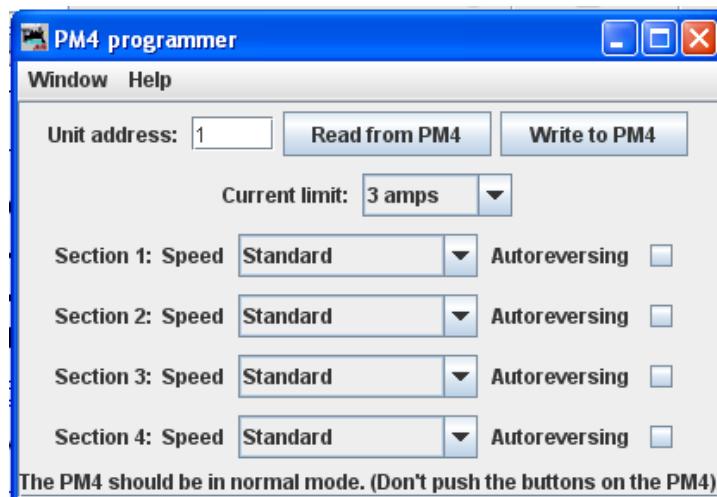
Configure BDL16



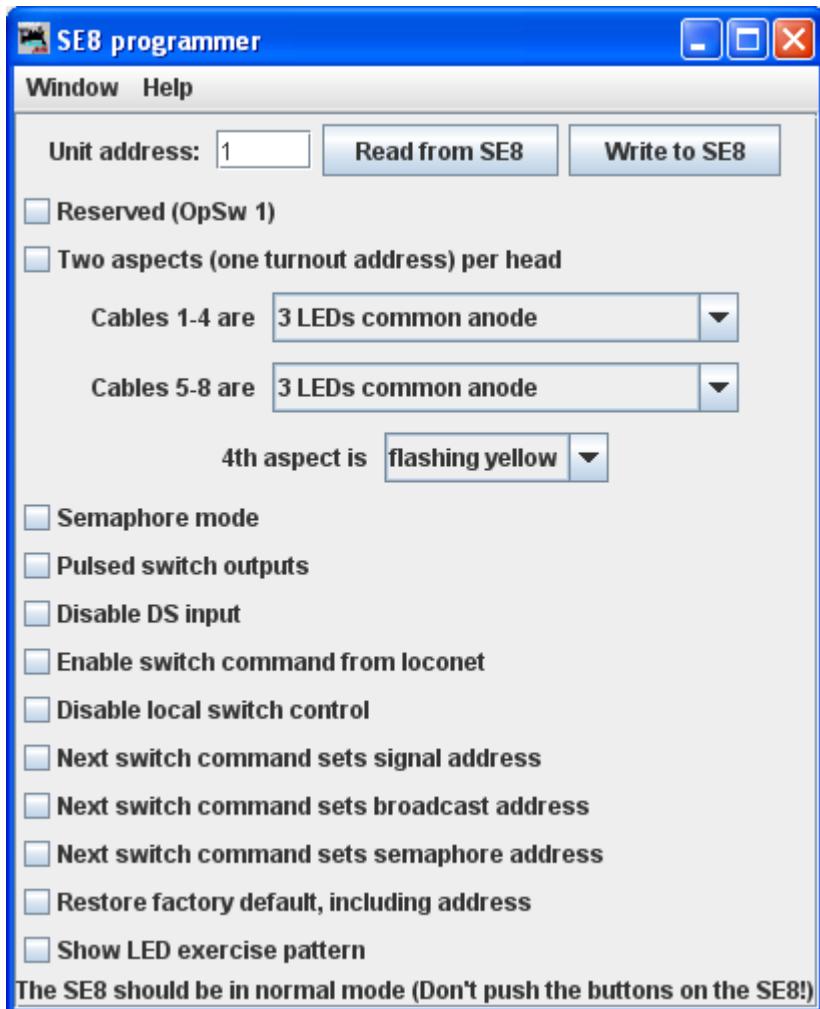
Configure LocoIO



Configure PM4



Configure SE8C



Configure DS64

DS64 Programmer Window

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

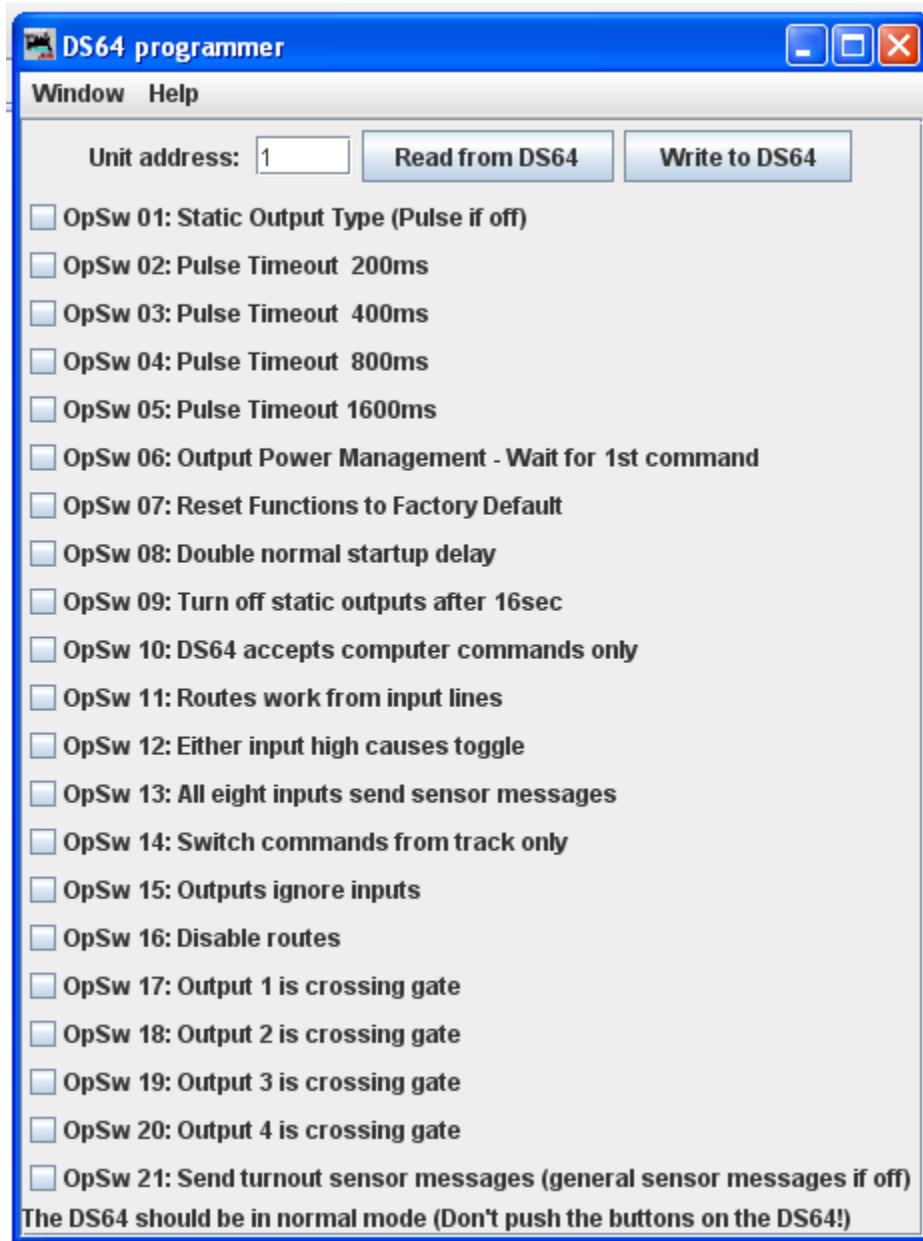
Type the address of a DS64 board in the text field and click **Read from DS64**. The tool will read back the current state of the various options, and set the check boxes to correspond to their current values.

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

Limitations

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

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



Configure Command Station

Opens the DCS100(Chief) Programmeer

Configure LocoNet ID

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

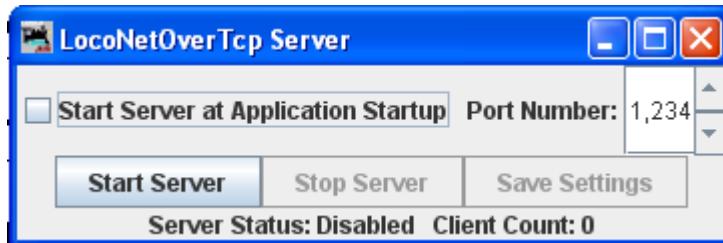


Start LocoNet Server

Starts the LocoNet server.

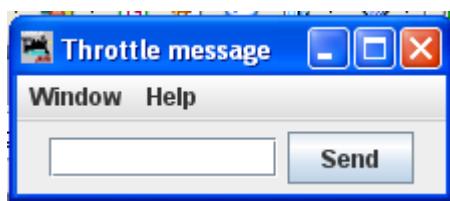
Start LocoNet over TCP Server

Opens the LocoNetOver Tcp Server dialog.

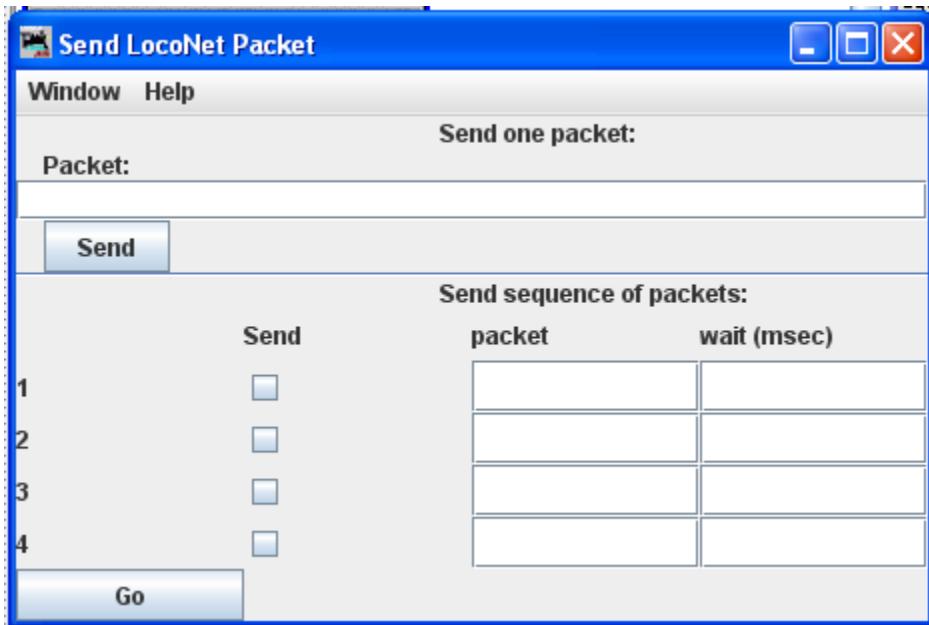


Send Throttle Messages

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



Send LocoNet Packet



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

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

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

Download Firmware

Firmware Downloader

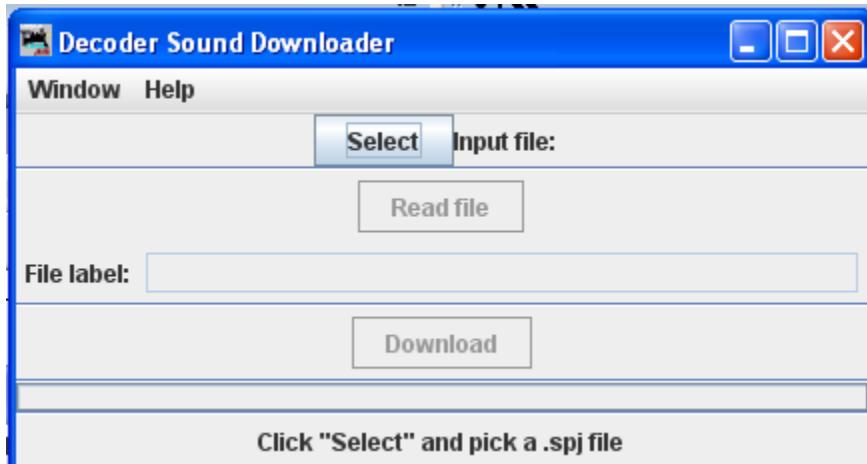
Some Digitrax products can have new firmware downloaded to them. The firmware updates are distributed as .dml (Digitrax Mangled Firmware) files. They contain both the code itself, and various management information to make sure that it can be downloaded into the hardware it expects.



To use this tool:

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

Download Sounds



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

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

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

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

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

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

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

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

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

"Starting download; erase flash"

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

"Sending initialization message"

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

"Send SDF data"

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

"Send WAV data"

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

"Done"

The download load completed OK.

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

Edit SPJ Sound File

Opens Sound File editing tool.

Select PR3 Mode

Open the Select PR3 Mode dialog.

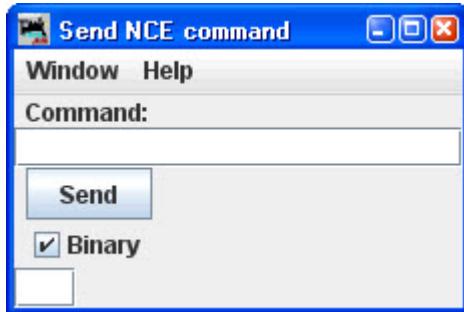
NCE Menu

Command Monitor

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

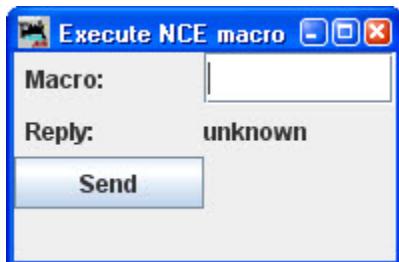
Send Command

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



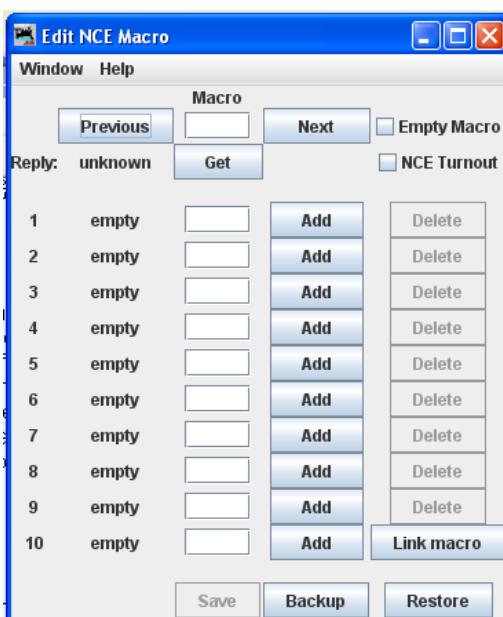
Send Macro

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



Edit Macro

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



Backup button

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

Restore button

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

Get button

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

Add button

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

Delete button

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

Link Macro button

Links this macro to another one.

Previous and Next buttons

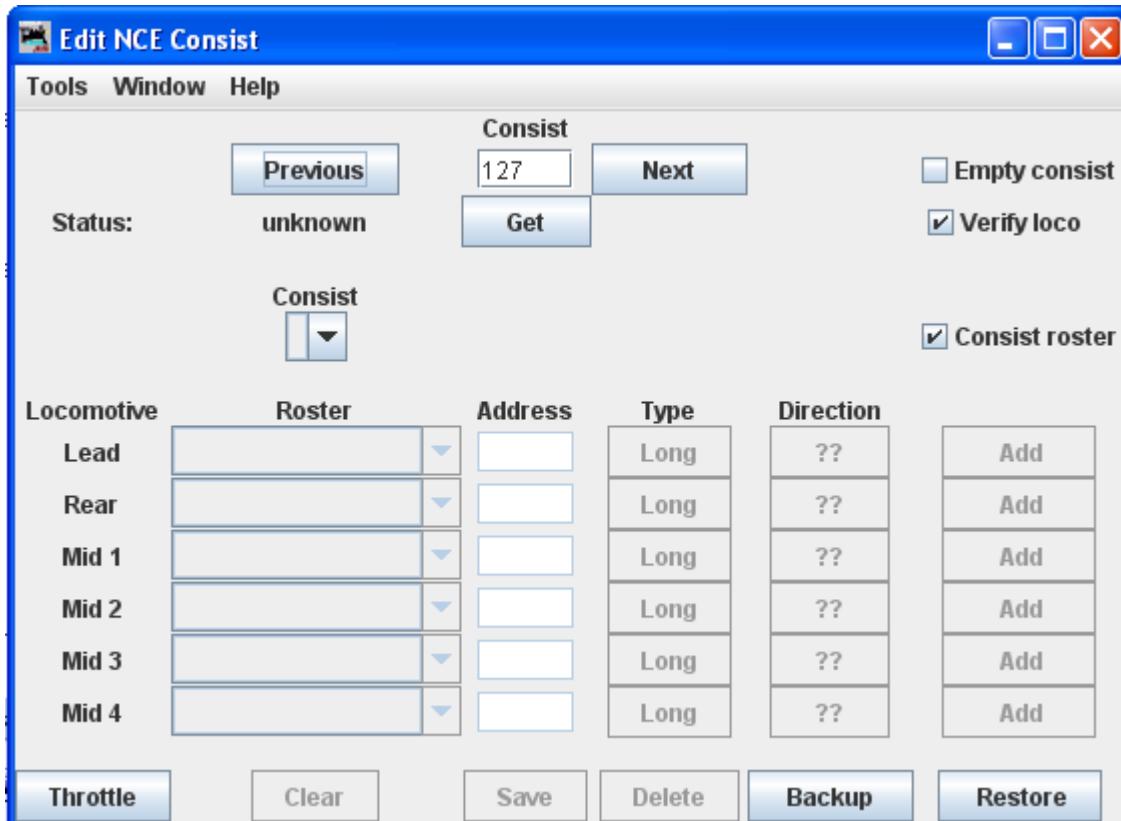
Allow you to search the macros.

Save button

Saves macros to the NCE command station

Edit Consist

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



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

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

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

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

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

Consist roster enables saving and maintaining consist roster when checked.

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

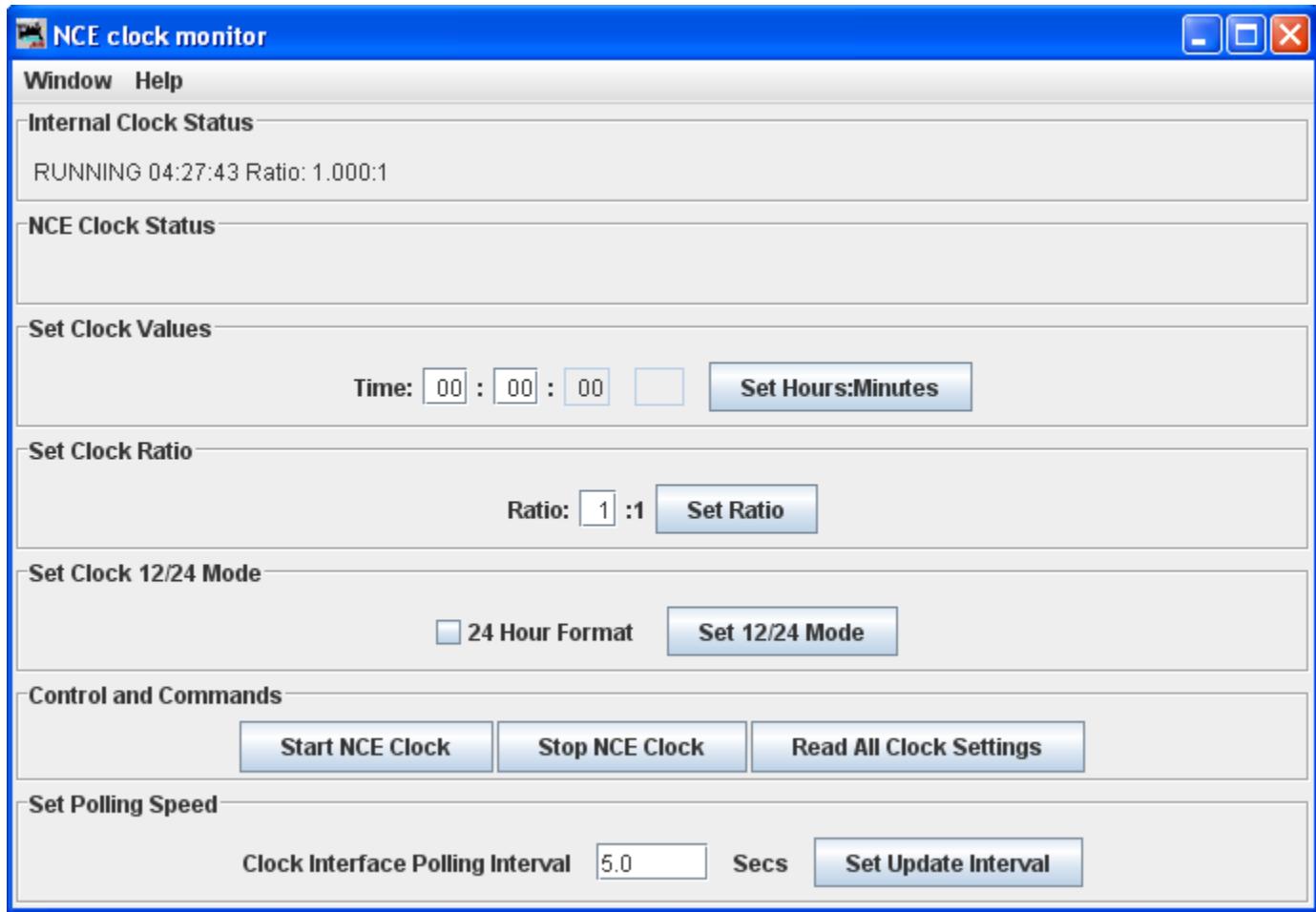
Clear button removes all the locomotives from a consist.

DCC Packet Analyzer

The DCC packet analyzer entry is software to log data from a hardware device sold by NCE which allows the user to observe the packets on the NCE Command Bus, or alternatively directly from the track. The latter feature allows the device to look at track packets sent from any Command Station that conforms to the NMRA standard (such as Digitrax or Lenz). The

input signal is interpreted and sent to JMRI through a serial interface. With it the user can see speed and function instructions being sent from the Command Station to the decoder

Monitor Clock



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

Booster Programming

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

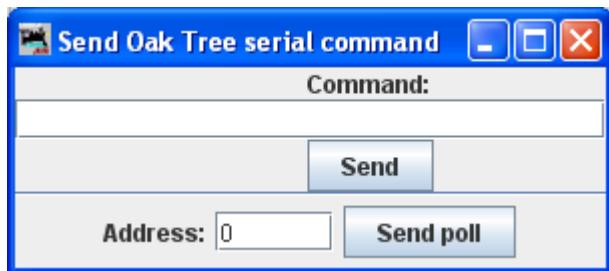
OakTreeSystems Menu

Communications Monitor

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

Send Command

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



Powerline Menu

Communications Monitor

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

Send Command

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



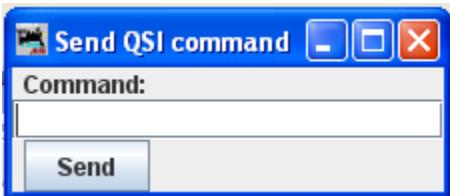
QSI Menu

Command Monitor

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

Send Command

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

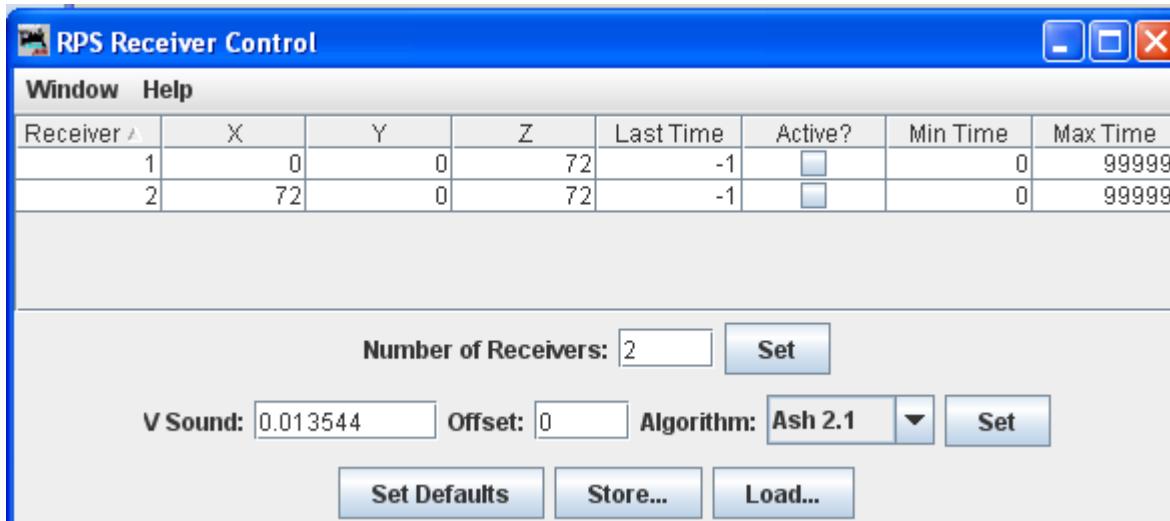


RPS MENU

RPS Monitor

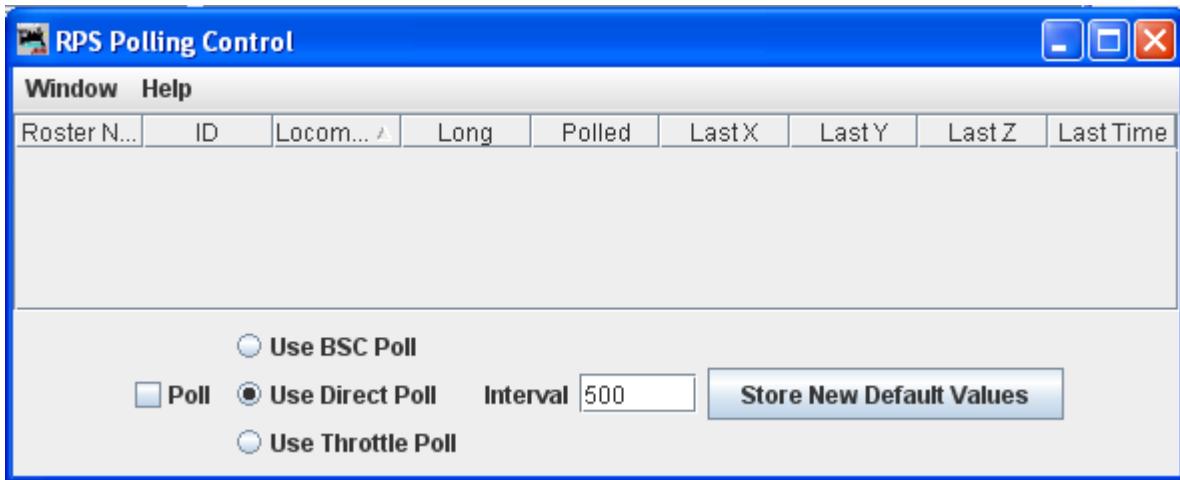
Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

RPS Receiver Control



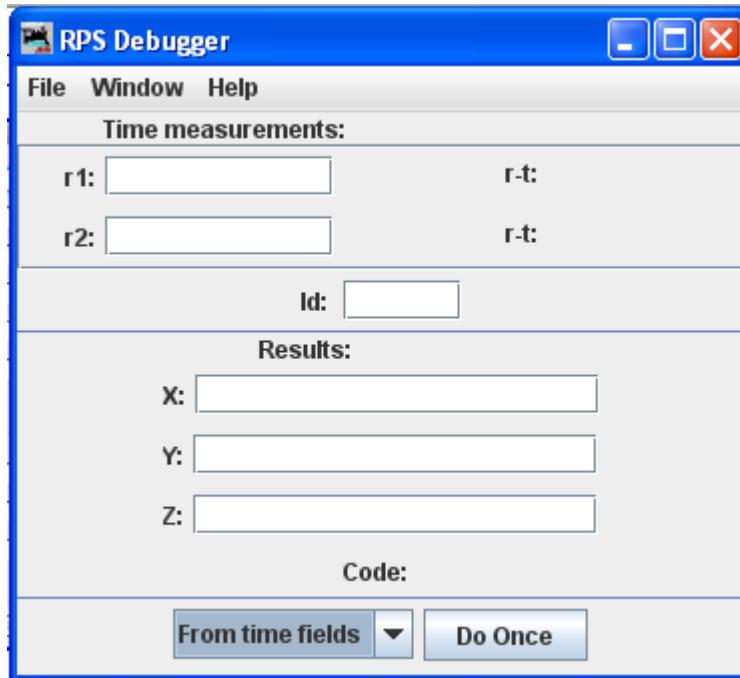
Will detect how many receivers it has and set up a table with the right number of rows.

RPS Polling Control



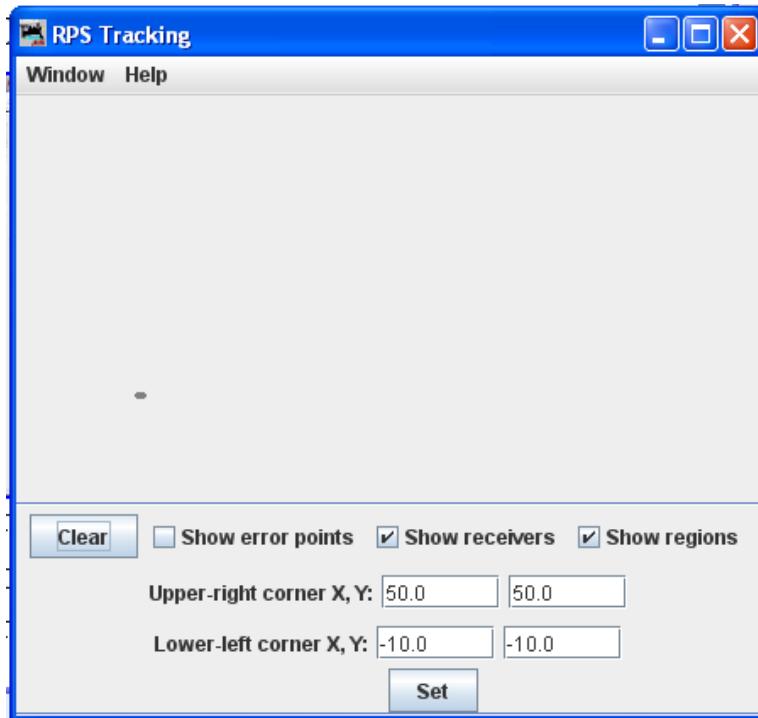
Where you tell the RPS system which of your locomotives have RPS transmitters installed, and how often to talk to them.

RPS Debugging Window



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

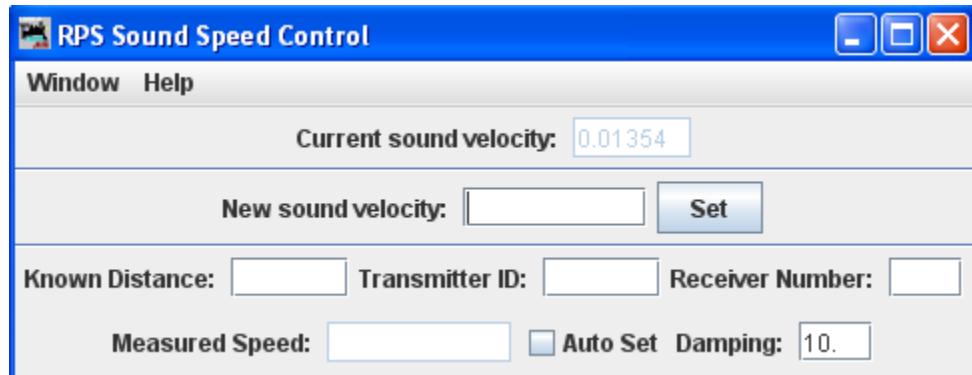
RPS Tracking Display



DecoderPro® User's Guide Version 2.4

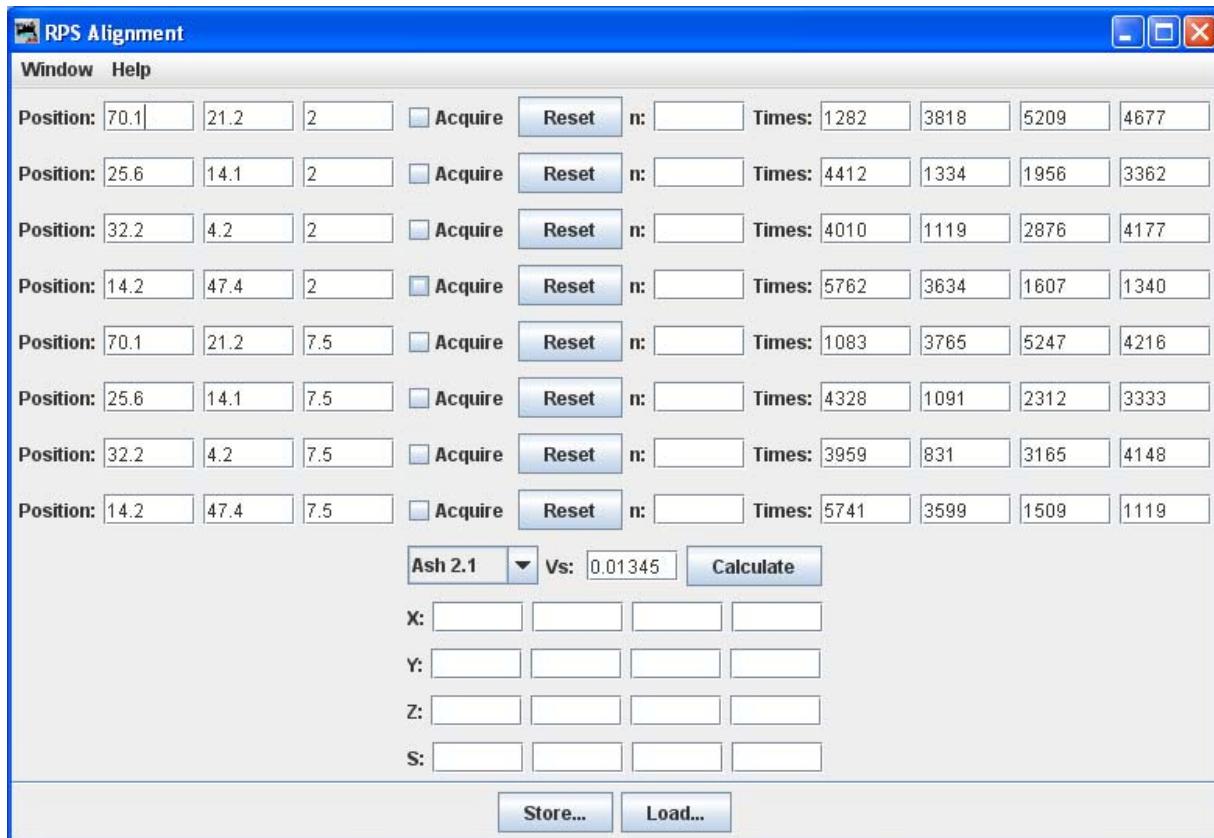
Displays two types of things, the measured positions and paths of RPS transmitters and the *detection regions* used for RPS blocks and sensors.

RPS Sound Speed Monitor



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

RPS Alignment Tool



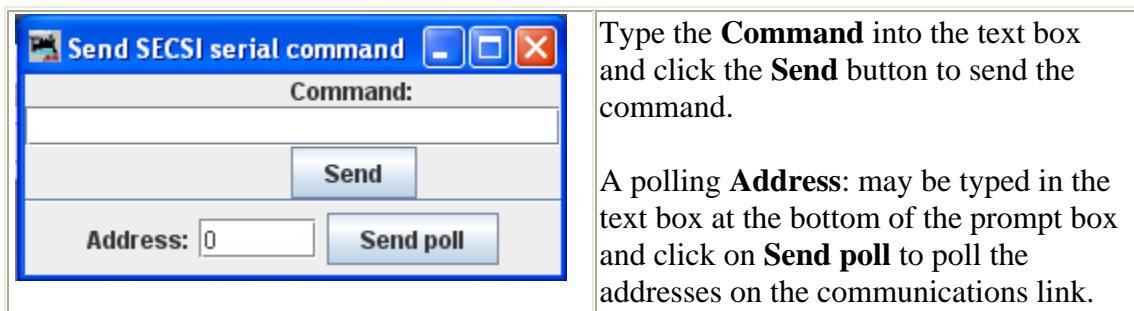
SECSI Menu

Communications Monitor

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

Send Command

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



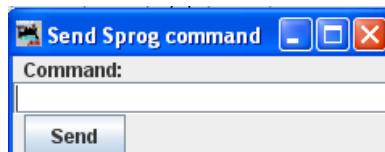
SPROG Menu

Command Monitor

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

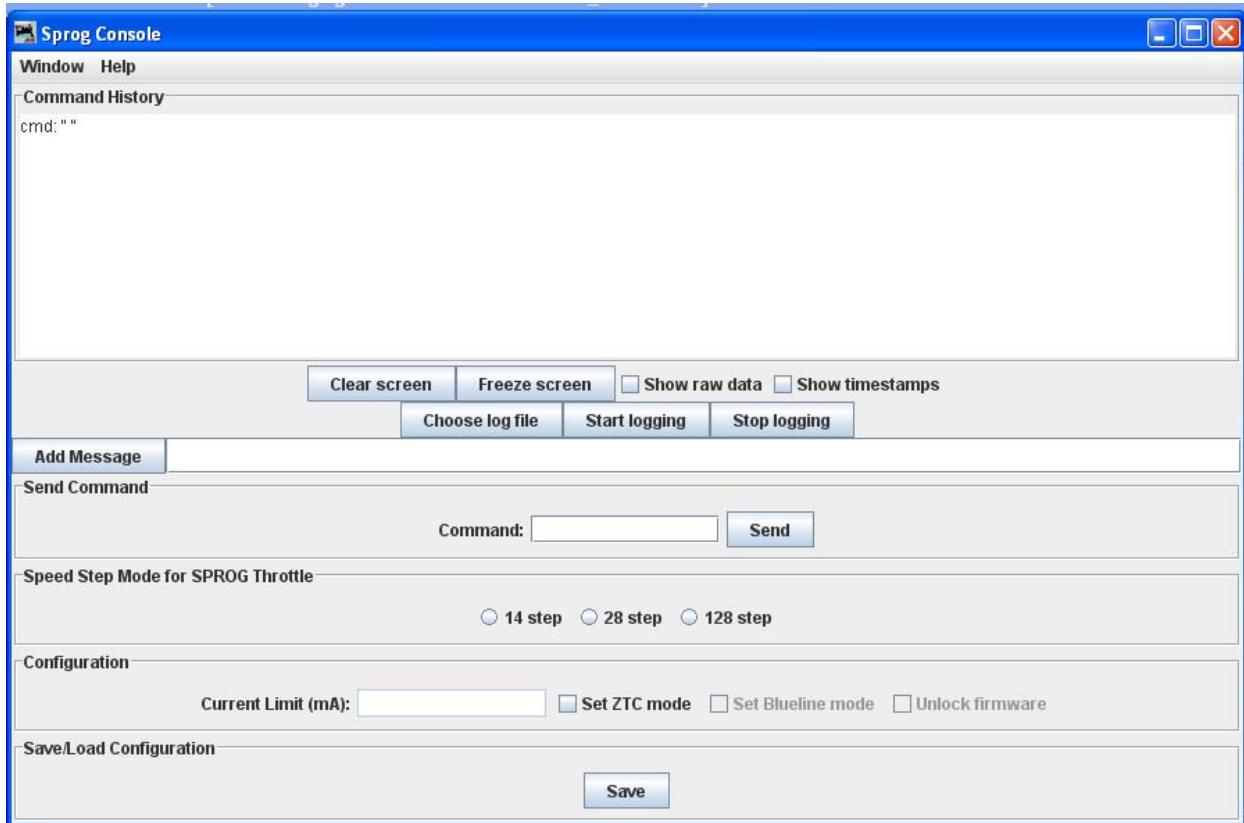
Send Comamnd

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



Console

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

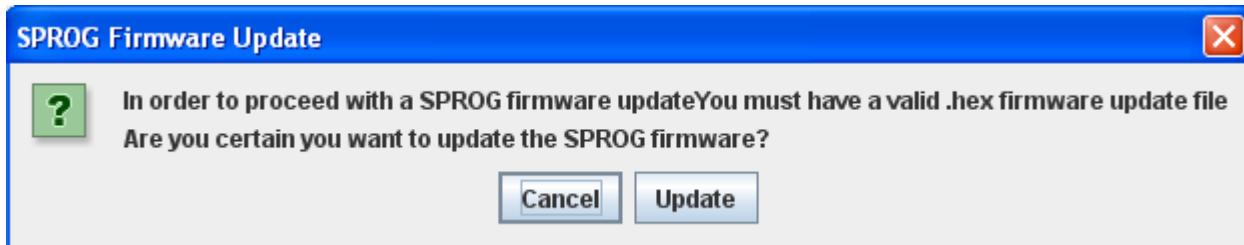


Get SPROG Firmware Version

Retrieves the SPROG firmware version and displays that information.

SPROG V3/V4 Firmware Update

Starts the SPROG Firmware Update wizard.



SPROG II Firmware Update

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

TMCC Menu

TMCC Monitor

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

Send Command

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



Wangrow Menu

Command Monitor

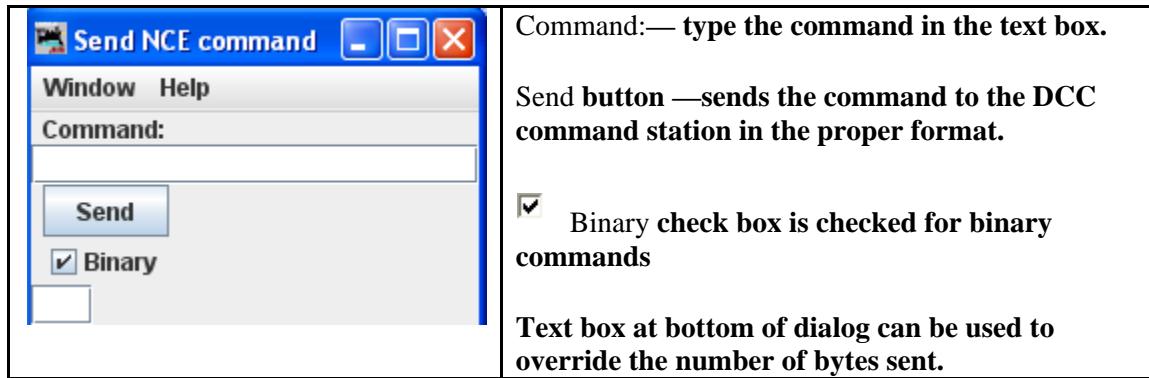
Opens the [Communications Monitor Window](#) and automatically displays the information that is being sent and received on the communications link between your computer and your DCC system.

Send Command

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

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

Commands range from 0x80 to 0xBF



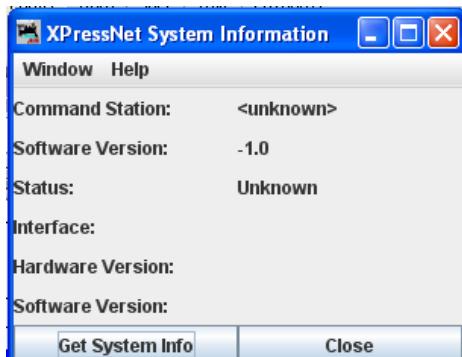
XpressNet Menu

XpressNet Monitor

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

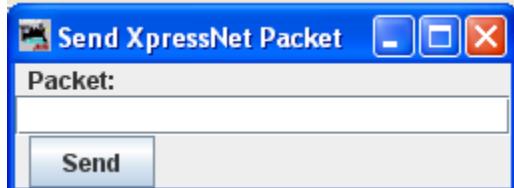
XpressNet System Information

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



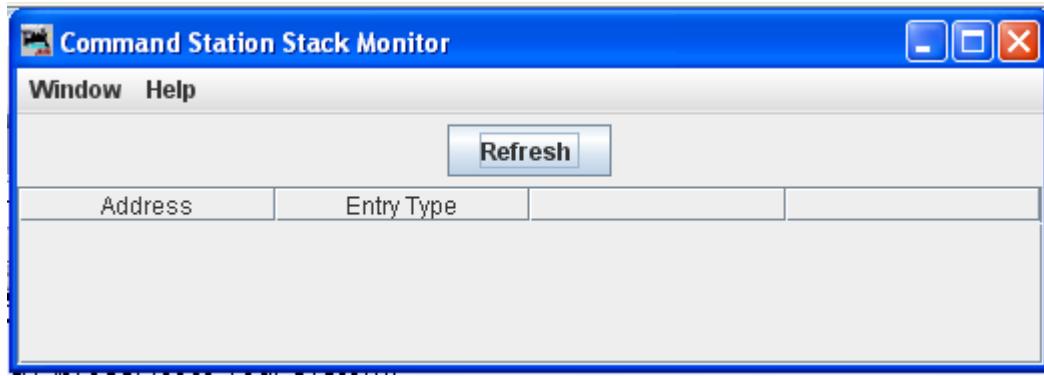
Send XpressNet Command

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

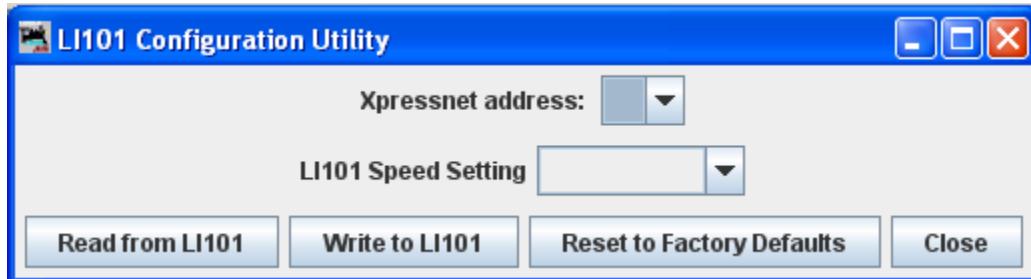


Command Station Database Manager

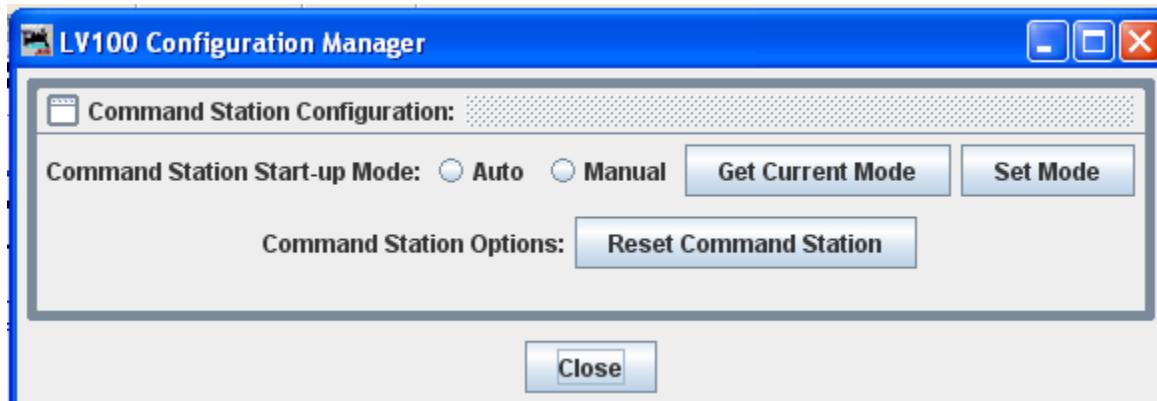
Click the **Refresh** button to update the display to the current information.



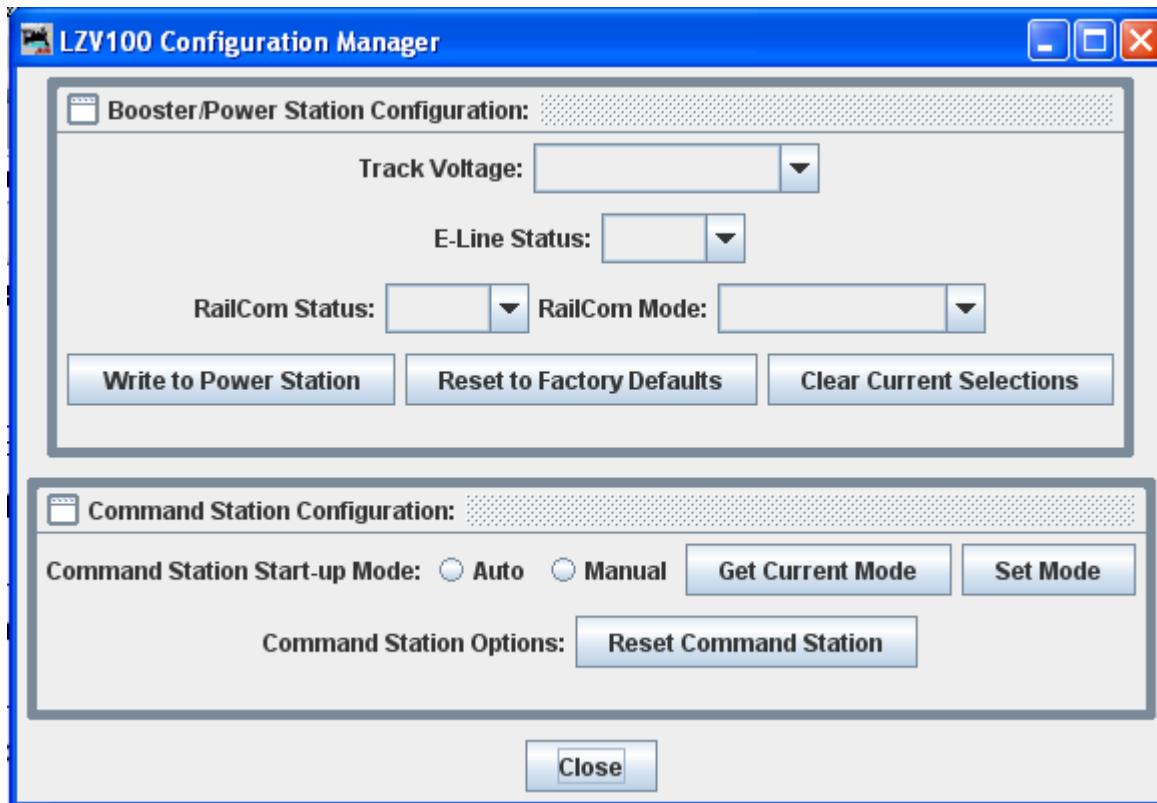
LI101 Configuration Manager



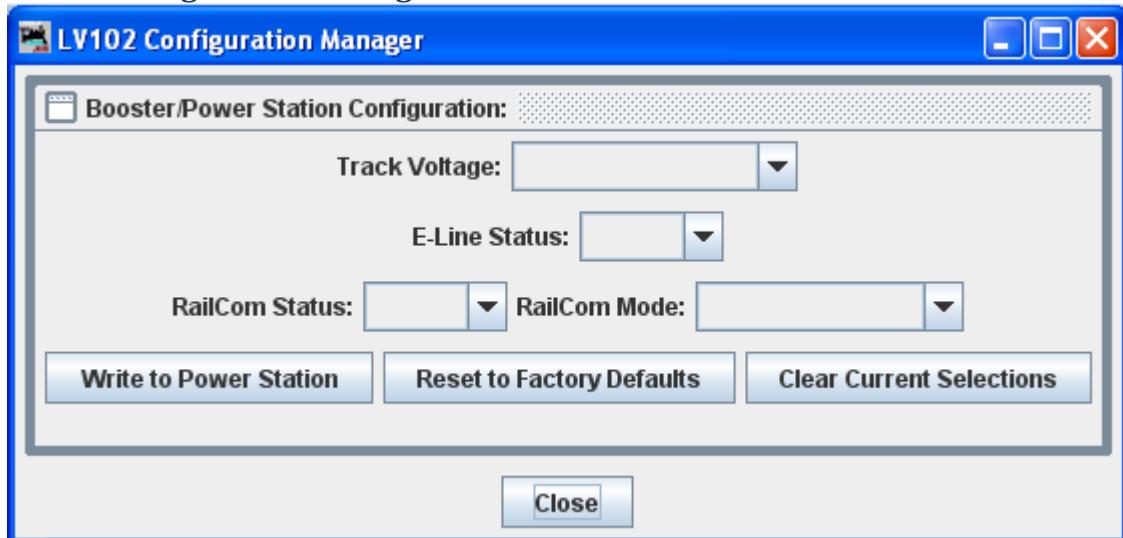
LZ100 Configuration Manager



LZV100 Configuration Manager



LV102 Configuration Manager



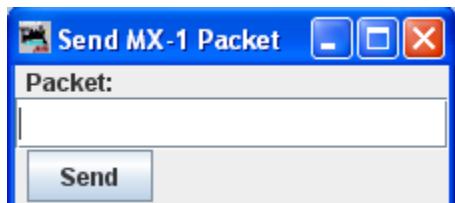
Zimo Menu

Command Monitor

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

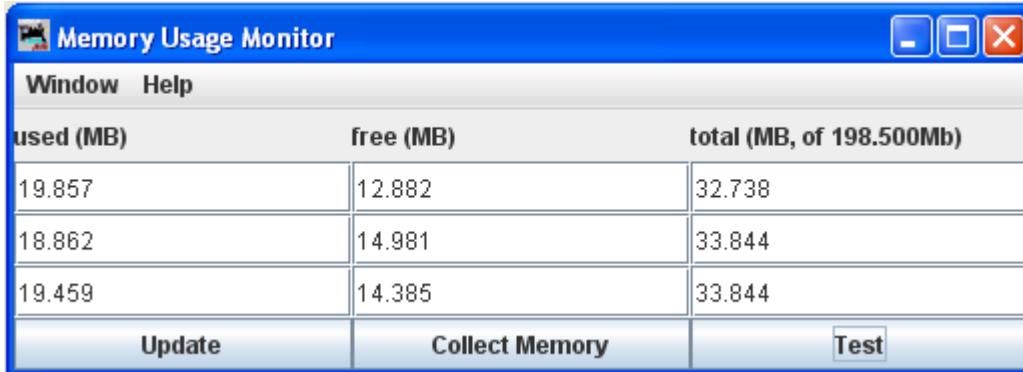
Send Command

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



DEBUG MENU

Memory Usage Monitor



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

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

The buttons located at the bottom each column:

- **Update** button - puts a new series of values in the bottom row of the memory display and moves the old values up one row.
 - **Collect Memory** button - reduces the amount of used memory to the minimum possible by asking Java to run a garbage collection.
 - **Test** button - Runs a test of the memory allocation and collection process (not used by regular users)
-

Import Decoder File

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

Import Decoder URL

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

Recreate Decoder Index

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

Recreate Roster Index

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

Check XML File

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

Validate XML File

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

Check Decoder Names

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

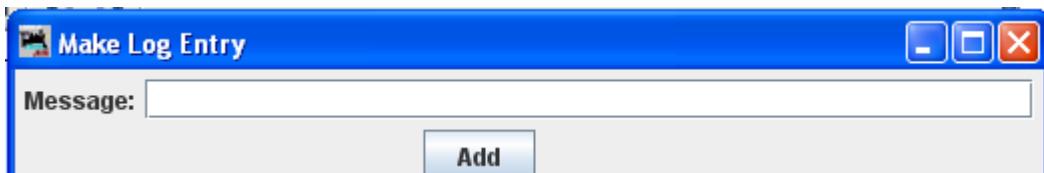
Check Programmer Names

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

Load Logixs Disabled

Will disable Logixs when loaded by the Panels menu.

Log Message



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

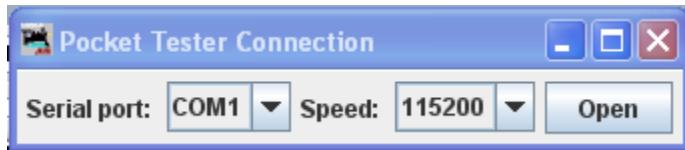
PRICOM ▶

- PRICOM Packet Tester ▶
- Connect—

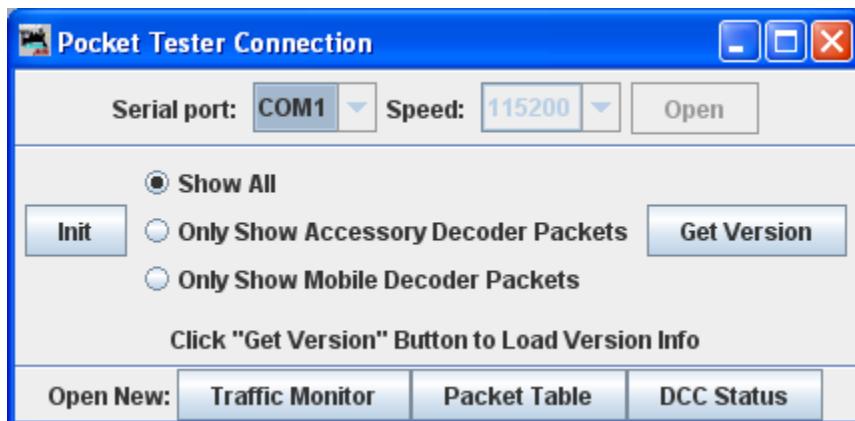
PRICOM Pocket Tester

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

Pocket Connection Tester dialog



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



DecoderPro® User's Guide Version 2.4

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

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

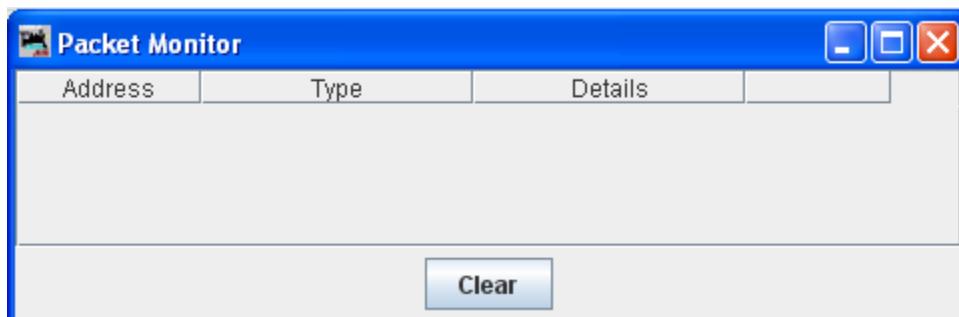
Init button initializes the tester..

Get Version button queries the tester for its version information.

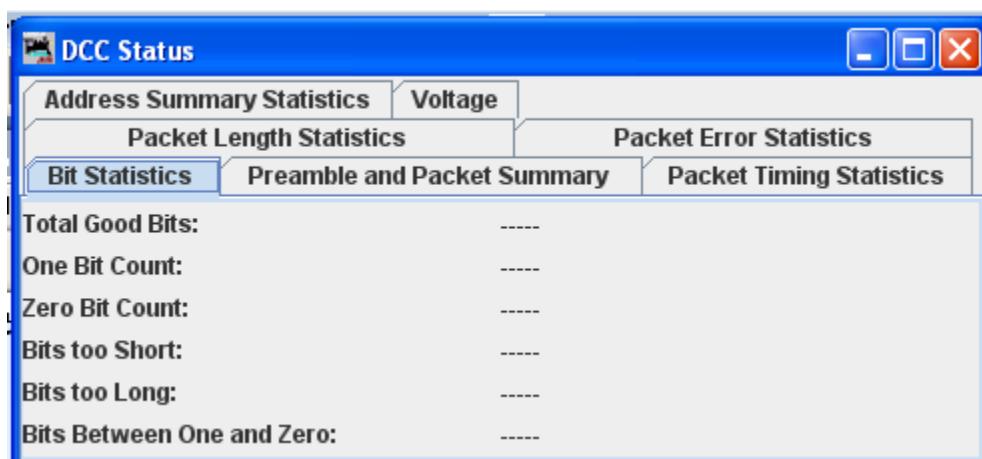
Open New: (at the bottom of window)

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

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



DCC Status button—Open the DCC Status window.



- *PRICOM Flash Update*

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

USB Input Control

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

USB Device Viewer

Allows user to view USB devices in use.

Rail Driver Throttle

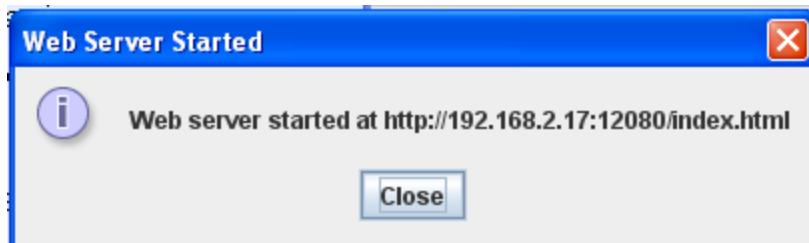
Opens a Throttle window that is designed to work with Rail Driver

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

Start Mini Web Server

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

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



DecoderPro® User's Guide Version 2.4

WINDOW MENU

Minimize

DecoderPro

Power Control

Throttle

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

HELP MENU

Window Help...

Displays help that for the current window.

General Help...

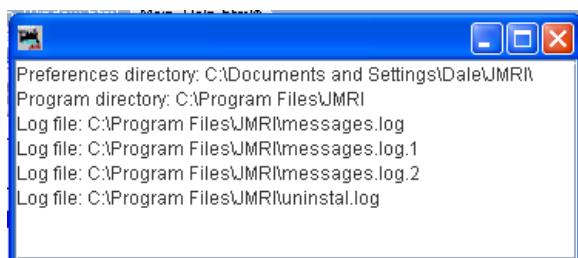
Displays general information about DecoderPro and other JMRI programs.

License...

Displays the License agreement under which JMRI operates.

Locations...

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



Context...

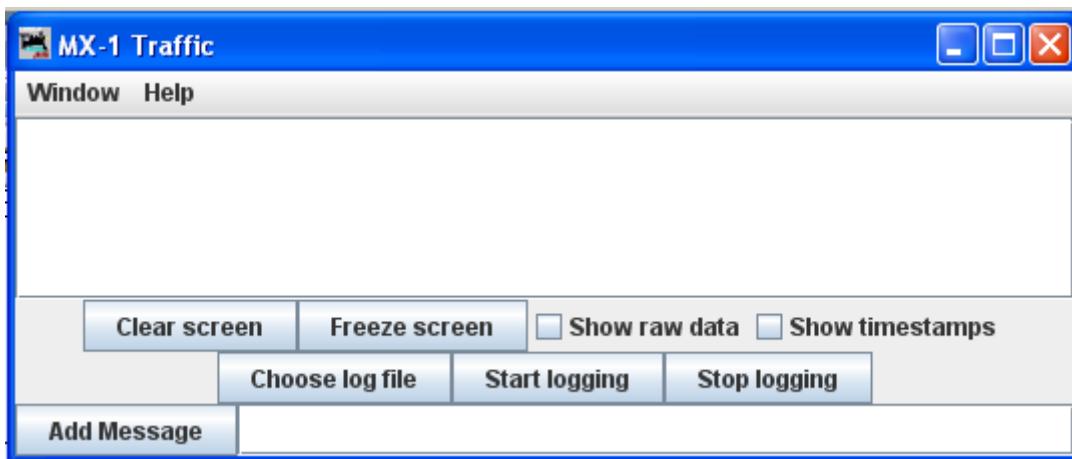
Opens a window that shows the configuration setting for your DecoderPro installation.

COMMUNICATIONS MONITOR WINDOW

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

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

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



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

Controls at the bottom of the window.

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

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

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

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

Logging to a File

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

To do this:

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

Adding Messages to Log File

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

CHAPTER 7 - DECODER DEFINITION

GETTING STARTED

GETTING STARTED ON A DECODER DEFINITION

In this part of the manual we will introduce you to the process of creating a file to describe a new decoder. You might benefit from reading the other sections of the DecoderPro user guide to get background information, especially the XML introduction [Intro to XML files](#) and the section on what the configuration files contain [Configuration files](#).

The easiest way to create a configuration file is to modify an existing one, so that you can follow the format. The decoder definition is configured per the [decoder-config.dtd](#). (most of you will not be interested in this dtd, if you are open in a text editor).

To get started, locate a decoder definition XML file that is close to the new decoder that you would like to define.

FORMAT

FORMATTING THE DECODER DEFINITION

The easiest way to create a new decoder definition is to edit one that already exists that has parameters similar to your new decoder. Hundreds of decoder definitions are available in JMRI, so you should be able to find one that is similar as a starting point. Don't feel bad about standing on someone else's shoulders, that's the spirit of JMRI and open source software in general. Although you can call this new file anything you like, it will work best if you use the same convention as the provided files. That is "**manufacturer name**"_"**decoder family**".xml, for example: **Digitrax_1x2.xml** and **Atlas_DualMode.xml**.

Now that you have located a Decoder Definition file as a starting point open the file with an XML editor (editors recommended by jmri are at <http://jmri.sourceforge.net/help/en/html/doc/Technical/XmlEditors.shtml>) or your favorite text editor. **DO NOT** try an advanced word processor like Word. Use a basic text file editor like Notepad, or an XML editor, XML Marker is a good one and it's free.

The beginning XML lines deal with the Header:

Author

```
<decoder-config>
    <version author="jake@physics.berkeley.edu"
        version="10" lastUpdated="20050112">
    <version author="Walter Thompson wsthompson@earthlink.net"
        version="11" lastUpdated="20080412">
```

Decoder Family and Model

```
<decoder>
    <family name="Premium FX with BEMF" mfg="Digitrax"
        lowVersionID="240" highVersionID="250">
        <model model="DH142" numOuts="4" numFns="2">
            <output name="4" label="Violet"/> </model>
        <model model="DN141" numOuts="4" numFns="2">
            <output name="4" label="Violet"/> </model>
        <model model="DN142" numOuts="4" numFns="2">
            <output name="4" label="Violet"/> </model>
        <model model="DN141K2" numOuts="4" numFns="2">
            <output name="4" label="Violet"/> </model>
        <model model="DN141E2" numOuts="4" numFns="2">
            <output name="4" label="Violet"/> </model>
        <model model="DN149K2" numOuts="4" numFns="2">
            <output name="4" label="Violet"/> </model>
    </family>
```

Programming modes the decoder will accept:

```
<programming direct="byteOnly" paged="yes"
    register="yes" ops="yes"></programming>
```

The next part of the file consists of a set of 'variable' elements defining specific variables, nested inside a 'variables' (note the extra "s") element. Here's where the real definition is determined.

Each variable represents one thing to configure. They can represent a single CV, e.g. address, or a few bits that can be configured to control a particular function. If some of these aren't appropriate to your decoder, you can just remove them. Make sure you remove the entire element from the `<variable>` to the matching `</variable>`. You can also rearrange them if you'd prefer a different sequence.

```
<variables>
    <variable label="Primary Address" CV="1" comment="Short address"
        item="Short Address" default="03">
        <shortAddressVal/></variable>
```

```
<variable label="Forward light FOF effect generated" CV="49" mask="XXXXVVVV">
    item="Function FOF effect generated">
<enumVal>
    <enumChoice choice="Normal function of lead">
    <enumChoice choice="Random flicker">
    <enumChoice choice="Mars light">
    <enumChoice choice="Flashing head light">
    <enumChoice choice="Single pulse strobe">
    <enumChoice choice="Double pulse strobe">
    <enumChoice choice="Rotary beacon simulation">
    <enumChoice choice="Gyralite">
    <enumChoice choice="Rule 17 dimmable headlight">
    <enumChoice choice="FRED end of train light">
    <enumChoice choice="Right ditch light; when F2 on, flashes alternately">
    <enumChoice choice="Left ditch light; when F2 on, flashes alternately">
    <enumChoice choice="Reserved (0x0C)">
    <enumChoice choice="Reserved (0x0D)">
    <enumChoice choice="Reserved (0x0E)">
    <enumChoice choice="Reserved (0x0F)">
</enumVal>
</variable>
```

Once you get your variables all in order, it's time to test the definition.

TESTING

TESTING THE DECODER DEFINITION

At this point, you've created a new configuration file! You can check it for syntax by selecting the Check XML File item from the Debug menu. The **Open** dialog is displayed; select your file and click . If all is well, a dialog box will display that says "OK". If not, you'll get a completely incomprehensible error message. About the only useful part of that message is the line number. Re-open the editor to that line and try to see what's wrong with the syntax.

Once you have a decoder definition file that checks out for syntax, you need to try it in DecoderPro. Your new file should copied into the jmri decoders folder (windows C:\Program Files\JMRI\xml\decoders).

- Now start up DecoderPro, and open the Debug menu. Select the **Recreate Decoder Index** option.
- The computer will run for a minute or two with the selection highlighted. As soon as that goes away, the new decoder index should be created and your new definition should be available to use.

When you are happy with your definition, you'll probably want to share it with the JMRI world, so next we'll look at submitting the definition to JMRI for inclusion in the next release.

SUBMITTING TO JMRI

SUBMITTING TO JMRI

How do I go about getting these approved and into the next release?

If you're happy with them, you can contribute them to the next release by creating a "Patch" for the project.

To do this:

1. If you have a SourceForge account (they're free!), log on.
If not, don't worry about it. Go to the [patch web site](#) on SourceForge:
2. Click on "Add new artifact" near the center-left of the screen.
3. On the new page that comes up, enter something in the following fields:
 - a. Summary (This is really the title)
 - b. Detailed Description (Just a little more info)
 - c. If you don't have a SourceForge account, make sure to put your name and email address in the Detailed Description field so we know who to thank!
4. Check the box labelled **Check to Upload and Attach a File** underneath the description text box.
5. Click choose file, and navigate to a copy of the file on your computer. (You can do this more than once if you've got multiple files)
6. Click submit. This way, nothing gets lost, and we've got a trail of what was contributed when.

CHAPTER 8 - DECODERPRO® ERROR MESSAGES

DECODER PROGRAMMER COMMON ERROR MESSAGES

Various things can go wrong when JMRI tries to work with your DCC command station to program a DCC decoder. This page lists the error message that can result, and describes what they mean.

JMRI ERROR CODES(<http://jmri.sourceforge.net/help/en/html/Errors.shtml>)

301 — no locomotive detected

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

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

302 — programmer busy

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

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

303 — requested not implemented in command station

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

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

304 — aborted by user

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

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

305 — confirm failed

Some command stations allow you to "confirm" the content of a CV, rather than read the value from it. In general, this is faster than doing a complete read. If the value in the CV doesn't match the expected value, this message is issued. It's considered an error because if the values don't match, we know that we don't know the correct value for the CV contents.

306 — timeout talking to command station

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

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

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

307 — Unknown error

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

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

308 — No acknowledge from locomotive

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

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

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

309 — Short Circuit on Programming Track

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

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

DecoderPro® User's Guide Version 2.4

INDEX

)

) addressing, 25

A

Acceleration Rate, 32
access all the functions, 62
Acela Menu, 89
Address Consisting, 43
addressing, 29
Addressing Mode, 29
Advanced Consisting, 44
Advanced Features, 46
Advanced pane, 52
Advanced Preferences, 14
Advanced Preferences:, 13
Analog, 26, 47
Analog Clock, 78

B

Back EMF, 32
Basic programmer, 19
Basic Programmer, 28
Basic tab, 23
Baud rate:, 12
beacons, 43

C

CMRI Menu, 90
Comment field, 22
communications monitor, 128
Comprehensive Programmer, 28, 52
Configuration Variables, 9
consist, 45
consisting, 44
Constant ratio curve, 37
Conventional DC layouts, 47
CSV file, 54
CV data, 50
CV listing, 51
CV listings, 50
CV Number, 56
CV15, 60
CV16, 60

D

DC mode, 47
DCC, 9
DCC standard, 52
Debug Menu, 122
Deceleration Rate, 32

decoder definition, 130
decoders on the programming track, 57
Direct mode, 24
Ditch light hold-over time, 43
ditch lights, 43

E

EasyDCC Menu, 93
EPF, 45
expanded Basic Pane, 29
Export Data, 54
Extended address, 29
Extended Packet Format, 45

F

File menu, 53
FL Location, 30
Force Straight, 35
Formatting the decoder definition, 130
Forward Trim, 34
function assignments, 39
Function Labels, 25
FX Rate, 42
FX rate adjust, 42

G

GrapeVine Menu, 93
GUI style, 12

H

hardware, 10
headlights, 45

I

Ident, 23
IDENT, 18, 59
idle, 31
Import Data, 54

J

JMRI defaults, 63
JMRI Error Codes, 134

K

Kick start, 32, 34

DecoderPro® User's Guide Version 2.4

L

Lamp keep-alive voltage, 42
Layout connection, 12
LCD Clock, 77
lighting effects, 43
lighting functions, 45
lights, 41
locking, 50
Locomotive direction, 29
LocoNet Menu, 95
Log curve, 37
Logging to a File, 129
Long address, 56

M

main page, 15
Match ends, 36
Max Voltage, 34
Max Volts, 35
Maximum Voltage, 34
Mid Voltage, 34
Mid Volts, 35
Midpoint Voltage, 34
Motor Control pane, 31
Multi-Decoder Control, 69
Multi-Programmer Control, 60

N

NCE Menu, 105
Nixie Clocks, 77

O

OakTreeSystems Menu, 110
Open Programmer, 19, 28
Operations Mode, 16, 20
Operations Mode programming, 60
ops mode, 34
Ops mode, 56
Ops-Mode Programmer, 69

P

Paged mode, 24
Power Control, 64
Power Control Panel, 78
Power Source **Conversion**, 30
Powerline Menu, 110
PR1DOS file, 54
PR1WIN file, 54
preferences, 63
Preferences, 12, 66
Primary address, 29
Print Data, 53
Print preview, 53

Print Preview, 84
programming mode, 31

R

read, 16
Read, 51
Read all, 26, 51
Read changes on sheet, 30
Read CV, 56
Read full sheet, 30
Read sheet, 26, 51
Read Sheet, 26
Read Type, 19
READ TYPE, 59
Readback., 15, 57
Registers programmer, 27
Reset Menu, 22
Reset to Defaults, 22
Reverse Trim, 34
Roster, 28
Roster Entry, 21, 25, 26
Roster management, 24
RPS Menu, 111

S

Save, 22
SECSI Menu, 115
Serial port:, 12
Service Mode, 15, 17, 57
Service Mode programmer, 20
Service Mode Programmer, 69
Set programming mode, 23
Setup Pane, 28
Shift left, 38
Shifted right, 38
Simple Programmer, 56
Single CV Programmer, 69
Sound, 48
sound effects, 48
Speed Control pane, 33
Speed stabilization, 32
Speed Table, 35
Speed Tables, 34
SPROG Menu, 115
Start Voltage, 33
Start Volts, 34

T

The Motor Pane, 31
throttle, 40, 63
Throttle, 69
TMCC Menu, 117
Top Voltage, 34
TrainShowBasic, 27
Transponding, 46, 52

DecoderPro® User's Guide Version 2.4

U

unlock, 50
user defined speed table, 39
User ID, 30

V

Vhigh, 33
Vmid, 33
volume levels, 49
Vstart, 33

W

Wangrow Menu, 117

Write, 51
Write all, 51
Write changes on sheet, 30
Write CV, 56
Write full sheet, 30
Write sheet, 26, 51
Writing, 16

X

XpressNet Menu, 118

Z

Zimo Menu, 121