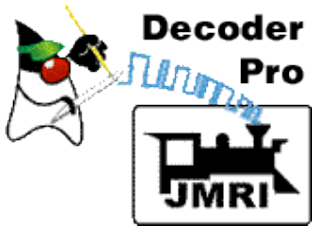


Programming DCC/Sound Decoders JMRI and DecoderPro

Dave Duchamp

What is JMRI?

JMRI (Java Model Railroading Interface) is open source (no cost) software for connecting a model railroad layout to a computer, and performing various model railroading tasks via the computer.

JMRI was/is developed by a group of volunteer programmers under the leadership of Bob Jacobsen.

How is JMRI Organized?

JMRI has of an extensive library of model railroading software, and several front-end applications focusing on different areas of model railroading.

All JMRI applications use this common library.

JMRI Applications include:

DecoderPro - Programming DCC decoders.

PanelPro - Layout display for running trains.

What Computer Systems are Supported by JMRI?

Windows – Windows 7, Vista, XP, 2000, 98SE

Macintosh - MacOS X

Linux - several flavors

Warning Note: Version 3.0, scheduled for the summer of 2012, JMRI will no longer support some older Macintosh and Windows Systems.

What Model Railroading Systems are Supported by JMRI?

Loconet - Digitrax (Chief, Empire Builder, Zephyr),
Uhlenbrock - Intellibox

Lenz - LI100, LI100F, LI101, LIUSB

NCE	Atlas Commander	
C/MRI	ZIMO MX-1	Roco
EasyDCC	ZTC	m-RPS
Wangrow	Fleischmann	Hornby
SPROG	TMCC (Lionel)	Protrak Grapevine
XPA Modem	Oak Tree Systems	**and More…**

What Model Railroading Tasks are Supported?

Programming DCC decoders

Computer Panel Displays (including full CTC Panel)

Computer throttles

Consisting

Control of Turnouts (Including Optional Feedback)

Routes (Controlling groups of Turnouts and/or Sensors)

Logix (Control and Automation Logic)

Control of Layout Lighting

Operations support (Switch Lists)

Control of Signals **and Many More …**

How do I get started?

Detailed instructions for various computers and model railroading systems are on JMRI web site.

http://jmri.org

No computer programming is required.

More information in your handout.

Computer Connection Example

Workshop system:

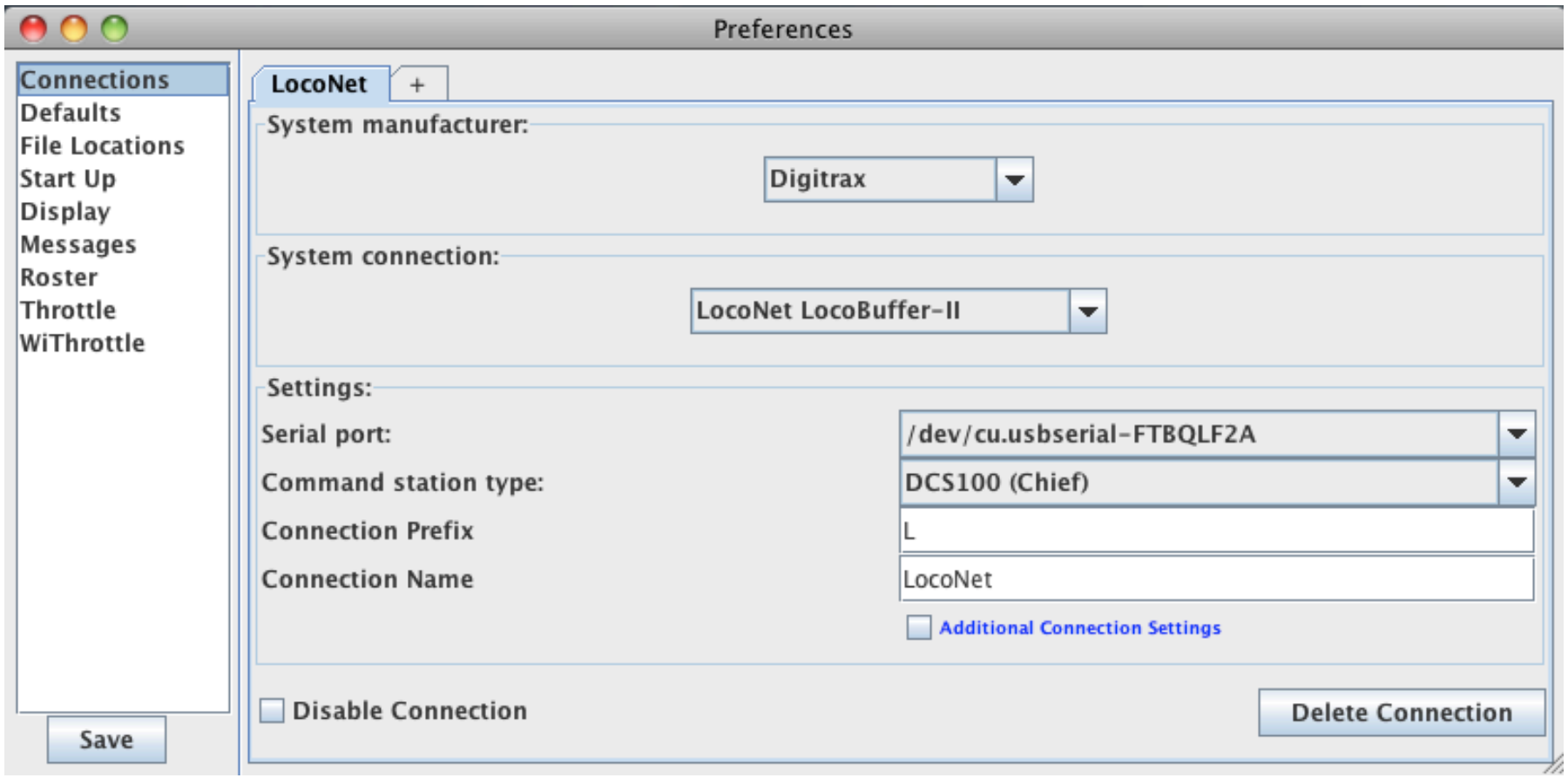
Digitrax DCS100

Locobuffer II

Serial to USB adapter

Macintosh MacBook Pro

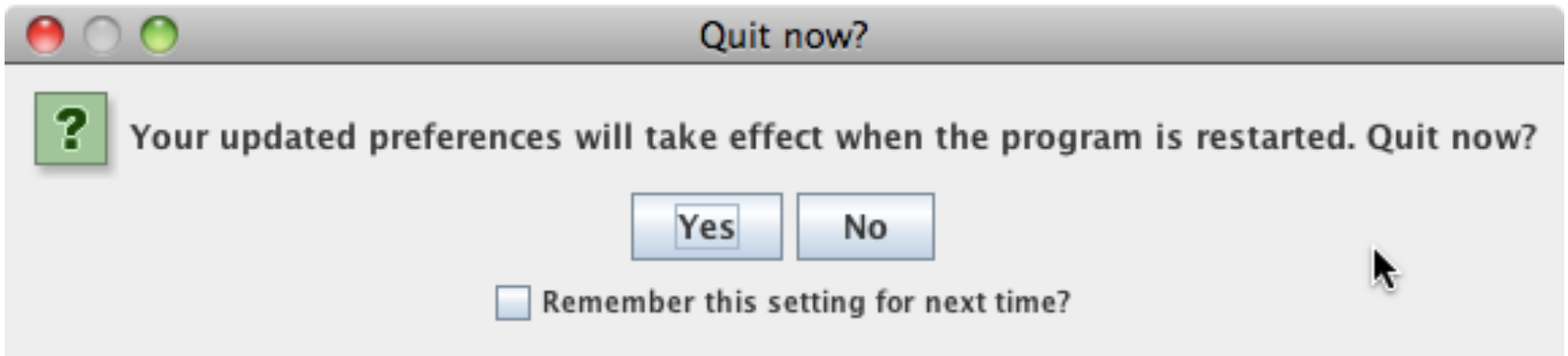
Configuration Panel



- Select the type of layout connection from an extensive pull-down menu. Multiple connections are supported.
- Select configuration options for your layout connection.
- Set other startup options as desired by bringing up dialogs from the menu on the left.
- Click the “Save” button to write the connection configuration to disk.

Click the “Yes” button, to quit the program.

Restart the JMRI application.



Notes: Restart is required anytime preferences are changed for the preferences to take effect.

Preferences must be set for each JMRI application. They each have separate preferences files.

The program is set up according to the saved preferences.

Note: Startup window contains program version and Java version, in addition to connection information.

How do I get help?

1st - Most JMRI windows have a Help menu.

Window Help … Documentation related to that window

General Help … Overall JMRI documentation

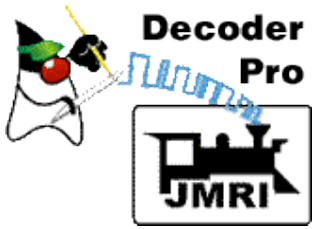
2nd - The JMRI web site - *http://jmri.org/*

Documentation and detailed instructions

3rd - JMRI Yahoo discussion group. **jmriusers**

Monitored by JMRI 'experts', eager to provide help.

Information in your handout on how to sign up.



What is DecoderPro?

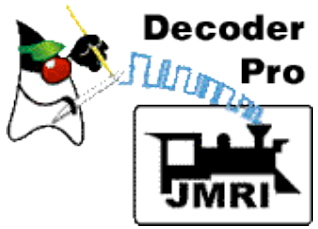
DecoderPro is a JMRI application.

DecoderPro is a better tool for programming DCC decoders.

DecoderPro simplifies the job of configuring complicated DCC decoders.

DecoderPro supports mobile decoders (decoders in locomotives).

DecoderPro supports some static decoders.



Basic Terminology

Decoder - small microcomputer based control unit

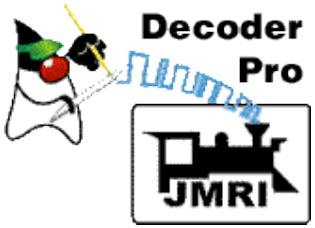
Mobile Decoder - Decoder in a locomotive, "decodes" DCC commands to control locomotive.

CV (Control Variable) - 8-bit data byte in a decoder that specifies user options.

Programming a Decoder - setting the values of the CV's to user's options.

Decoders have many CV's. Many CV's follow **NMRA Standards**, but some are vendor specific.

Each mobile decoder has an **Address** - a number that allows the locomotive to be uniquely identified.



Setting up an Address

Decoder (locomotive) addresses can be 2 digits or 4 digits on modern decoders and DCC throttles.

Usually set the address to the locomotive number.

Most decoders are set to address 03 on arrival.

A locomotive will respond to speed control and function commands that bear its address.

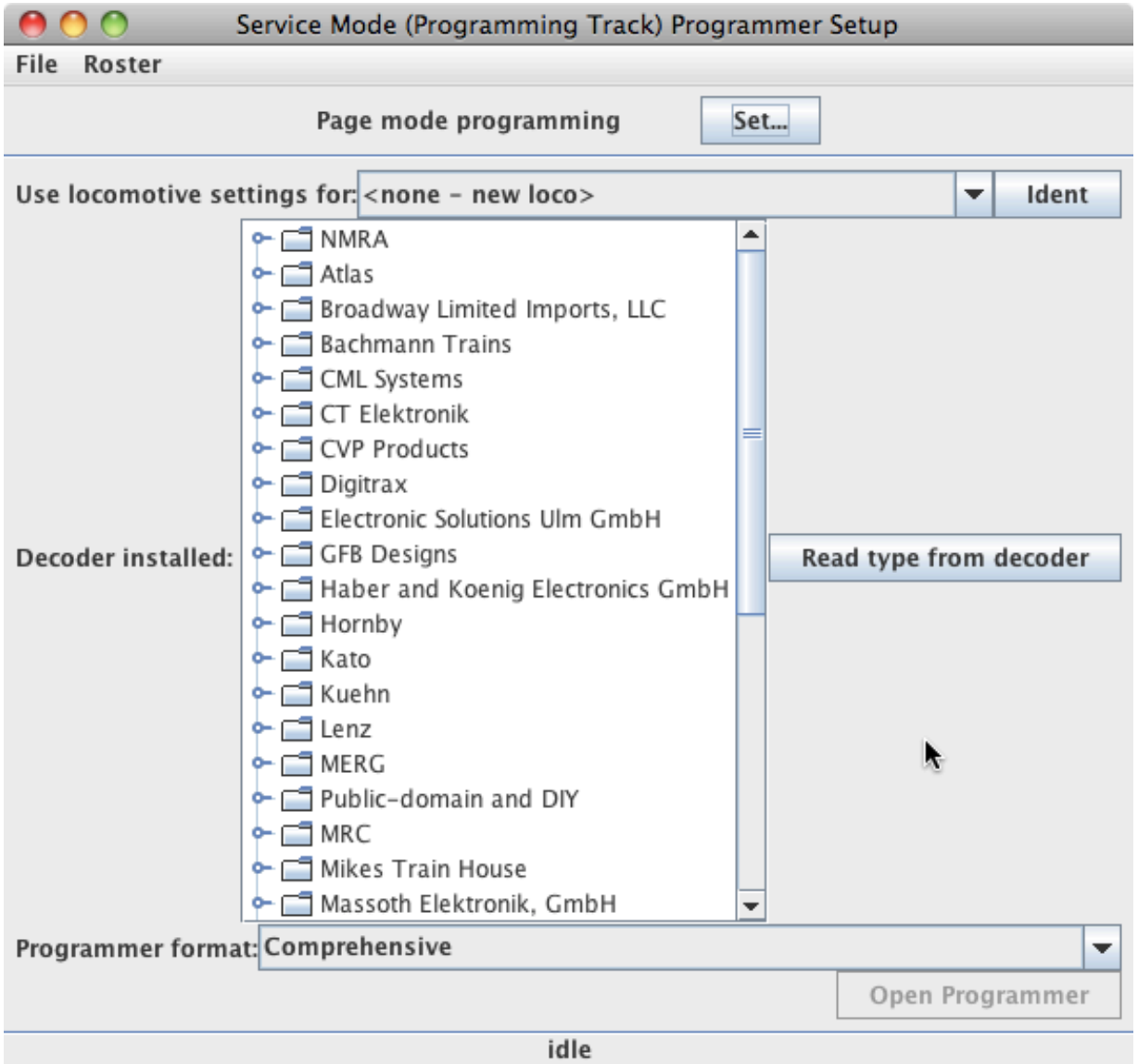
Setting the address is usually the first (and sometimes the only) programming needed.

It's easy to set up an address in DecoderPro.

Example - Setting the address of a new decoder

Put the locomotive with the new decoder on the programming track.

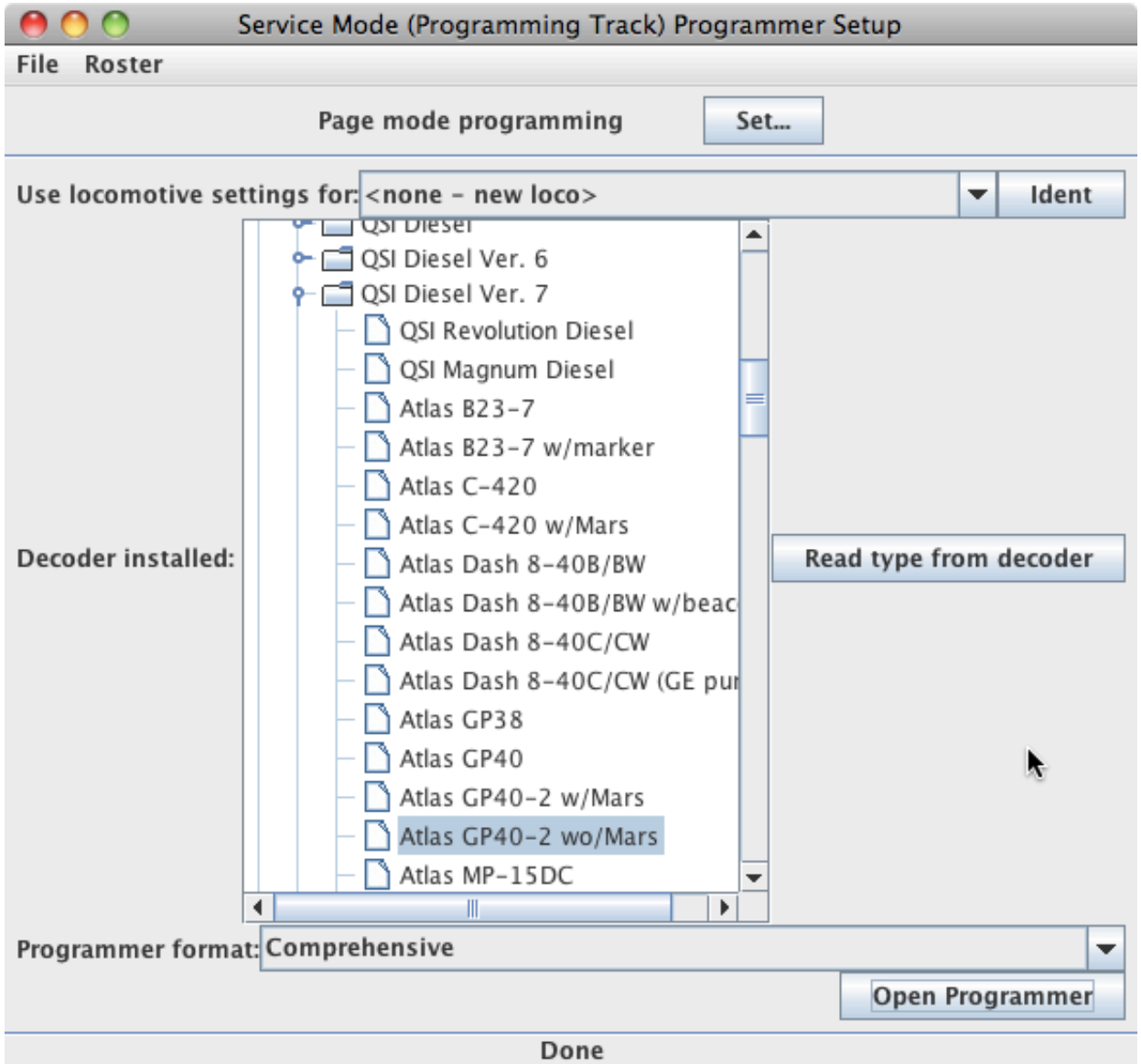
Start Decoder Pro. When the window below comes up, click "**Service Mode (Programming Track) Programmer**"



NMRA standards:
Two CV's identify a decoder:
CV8 - Manufacturer ID
CV7 - Manufacturer Version Number.
Both are read only.

<- Click here to have DecoderPro attempt to identify the decoder by reading these CV's.

Note: Some command stations cannot read CV's! For these, select the decoder in the list manually.

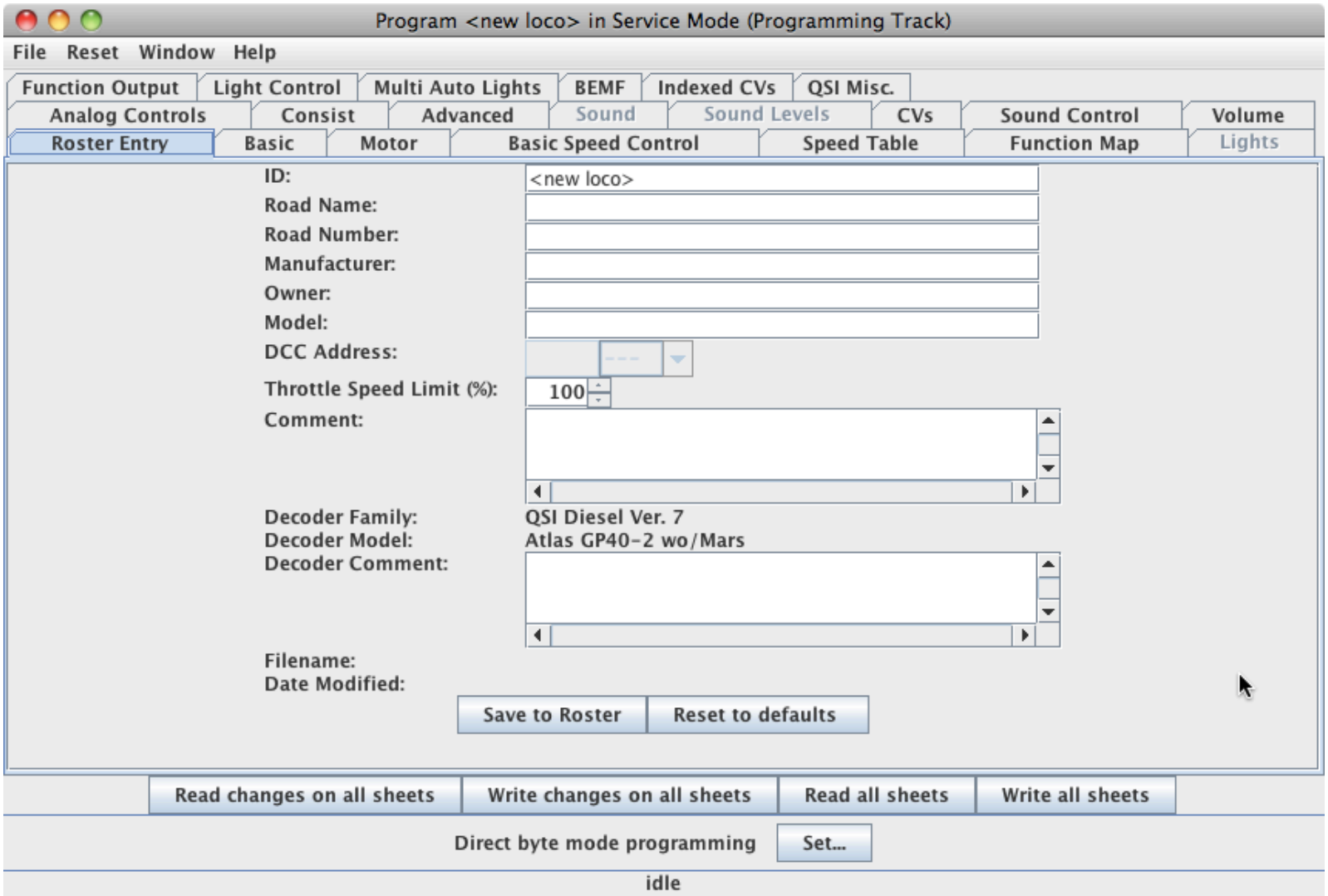


DecoderPro identified the decoder as a QSI Diesel Ver. 7 for an Atlas GP40-2 wo/Mars

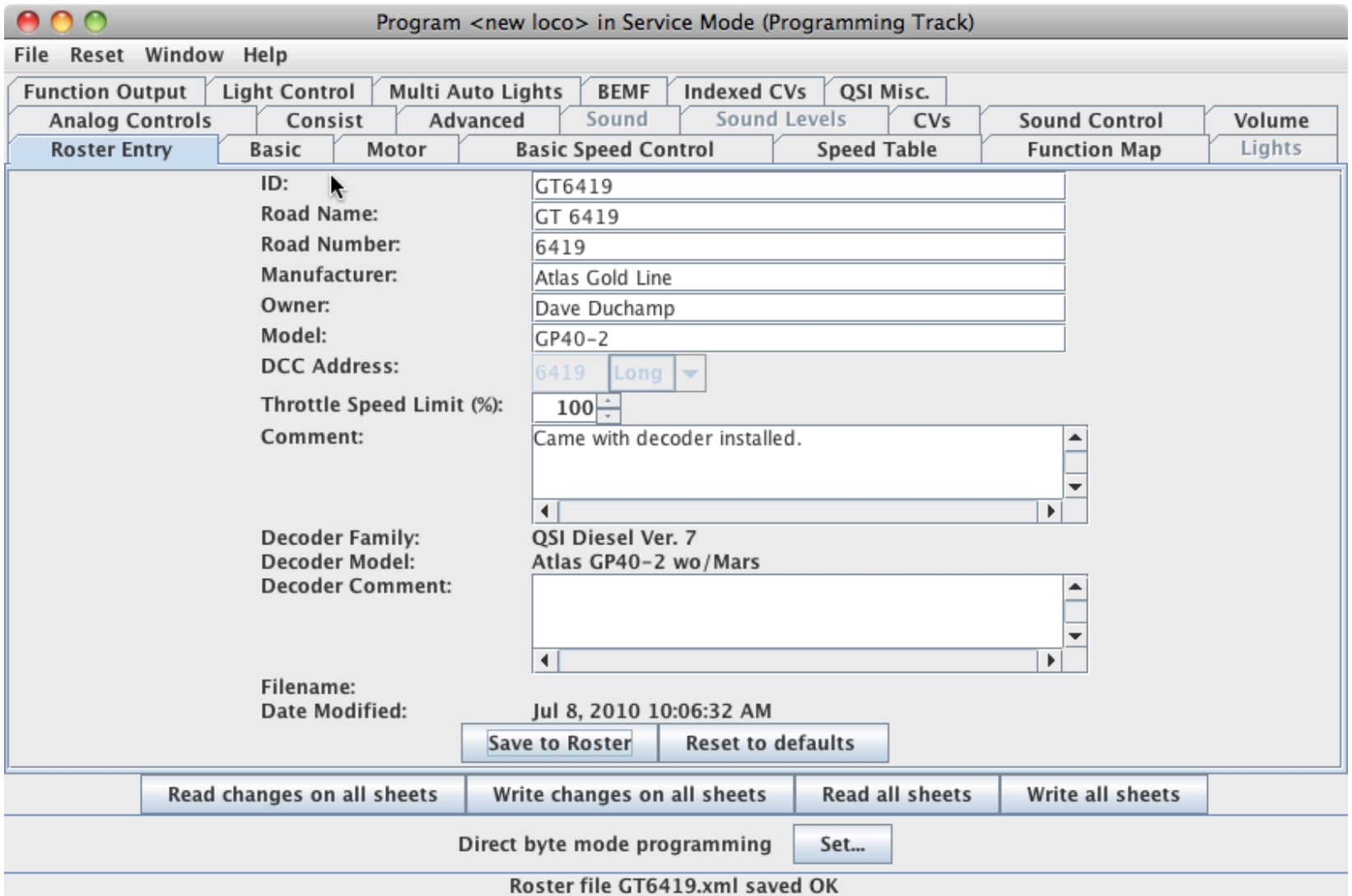
(Sometimes the user has to choose among several possibilities.)

Click Atlas GP40-2 wo/Mars, to select it, and click "Open Programmer". <-

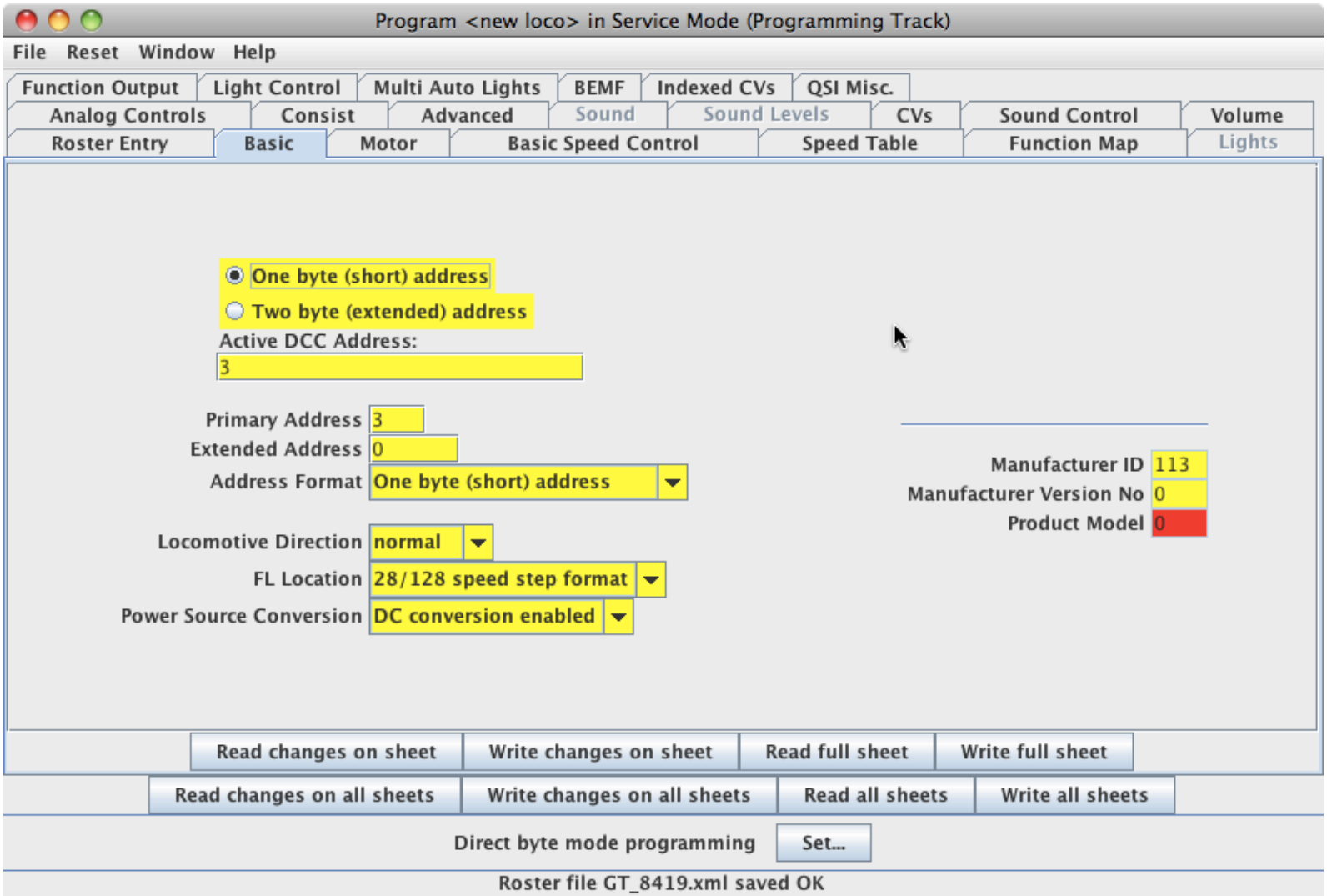
Fill in Roster information and click “Save to Roster”.



Click the Basic tab.

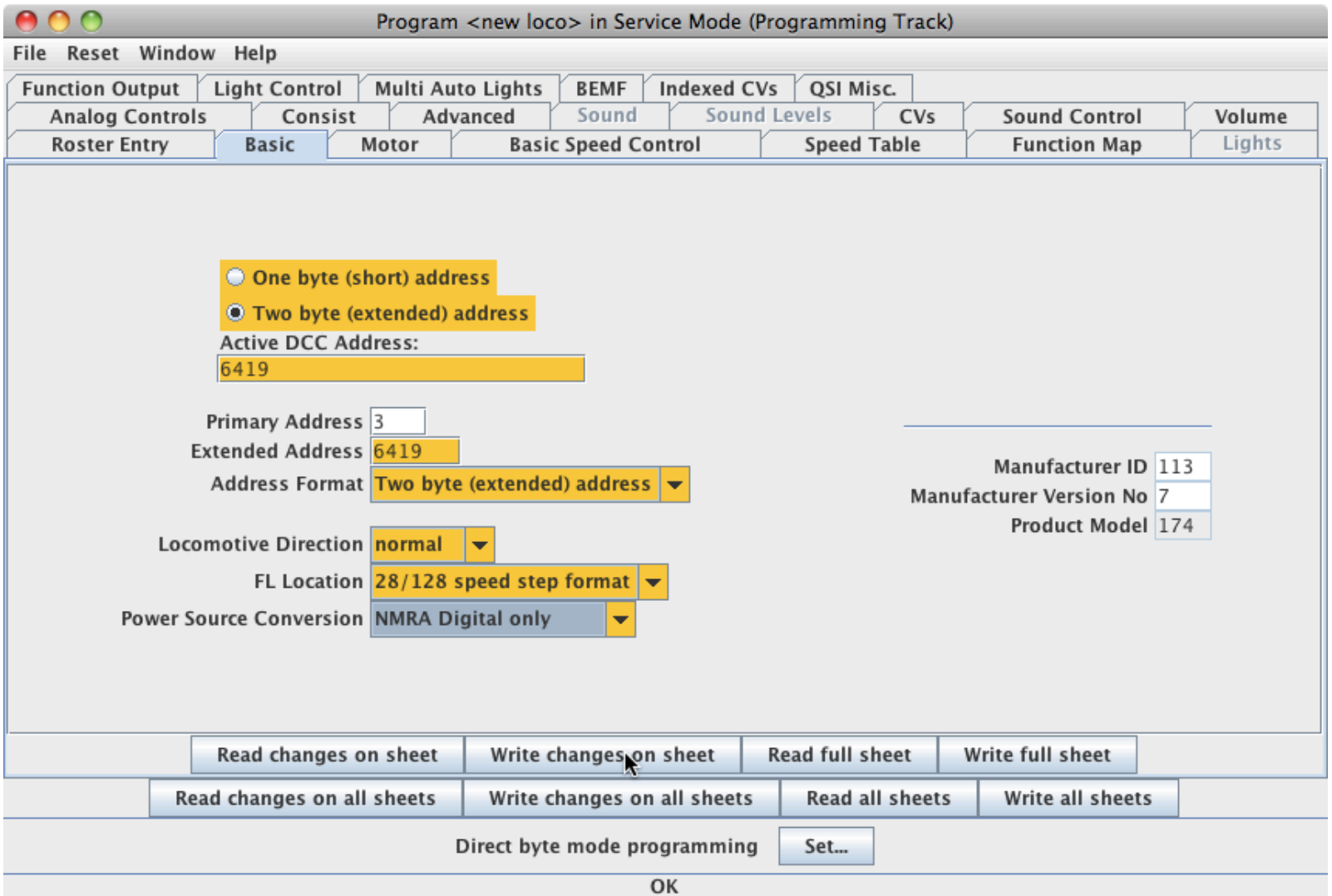


Click “Read full sheet”. Yellow items are replaced with values read from the decoder.



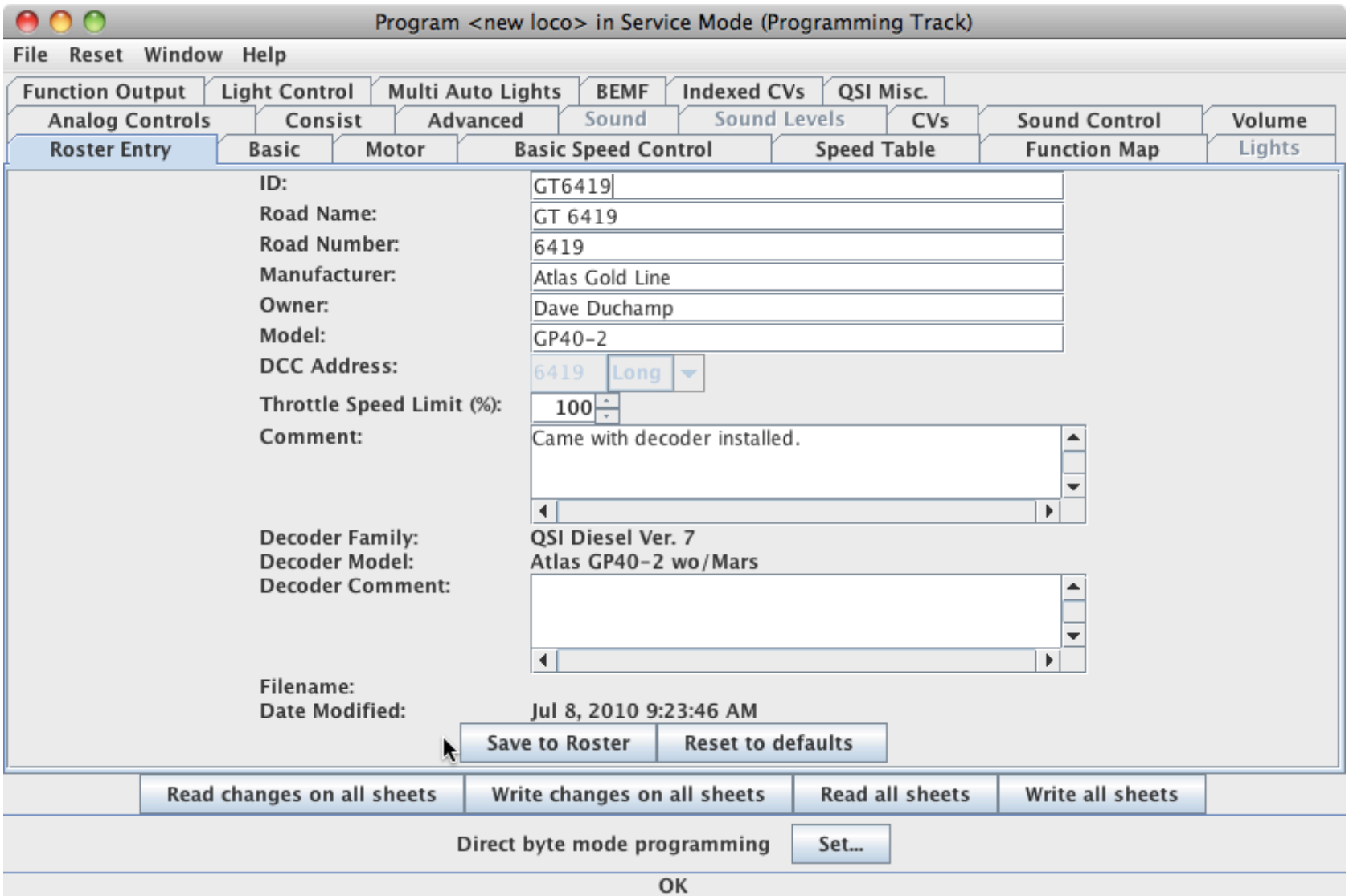
Switch off analog, and set new two-byte address.

Click “Write changes on sheet” to send to loco.



Return to Roster Entry and “Save to Roster” to update Roster on disk.

All done!



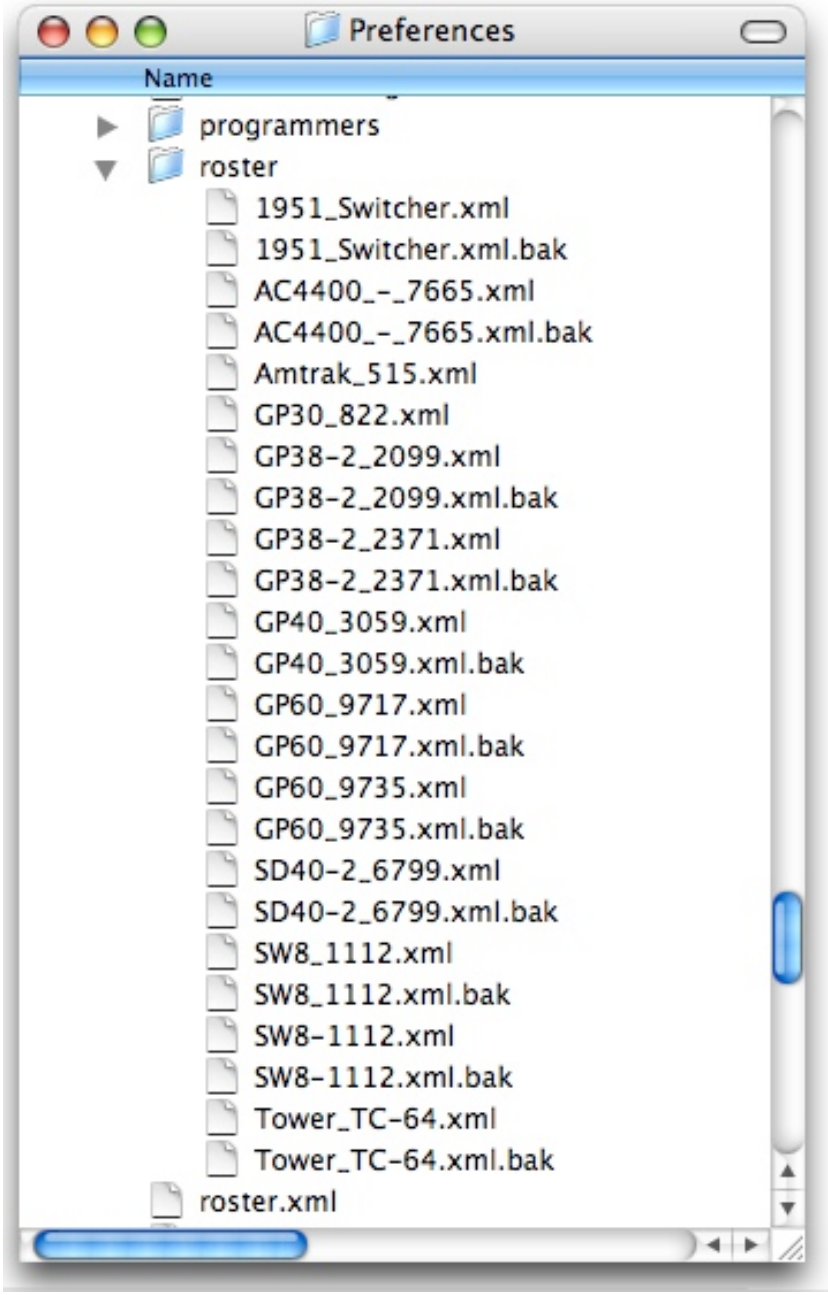
What are Roster Files?

DecoderPro stores the final information for each decoder in a **Roster File**.

These Roster Files are used to construct a Roster menu for JMRI applications.

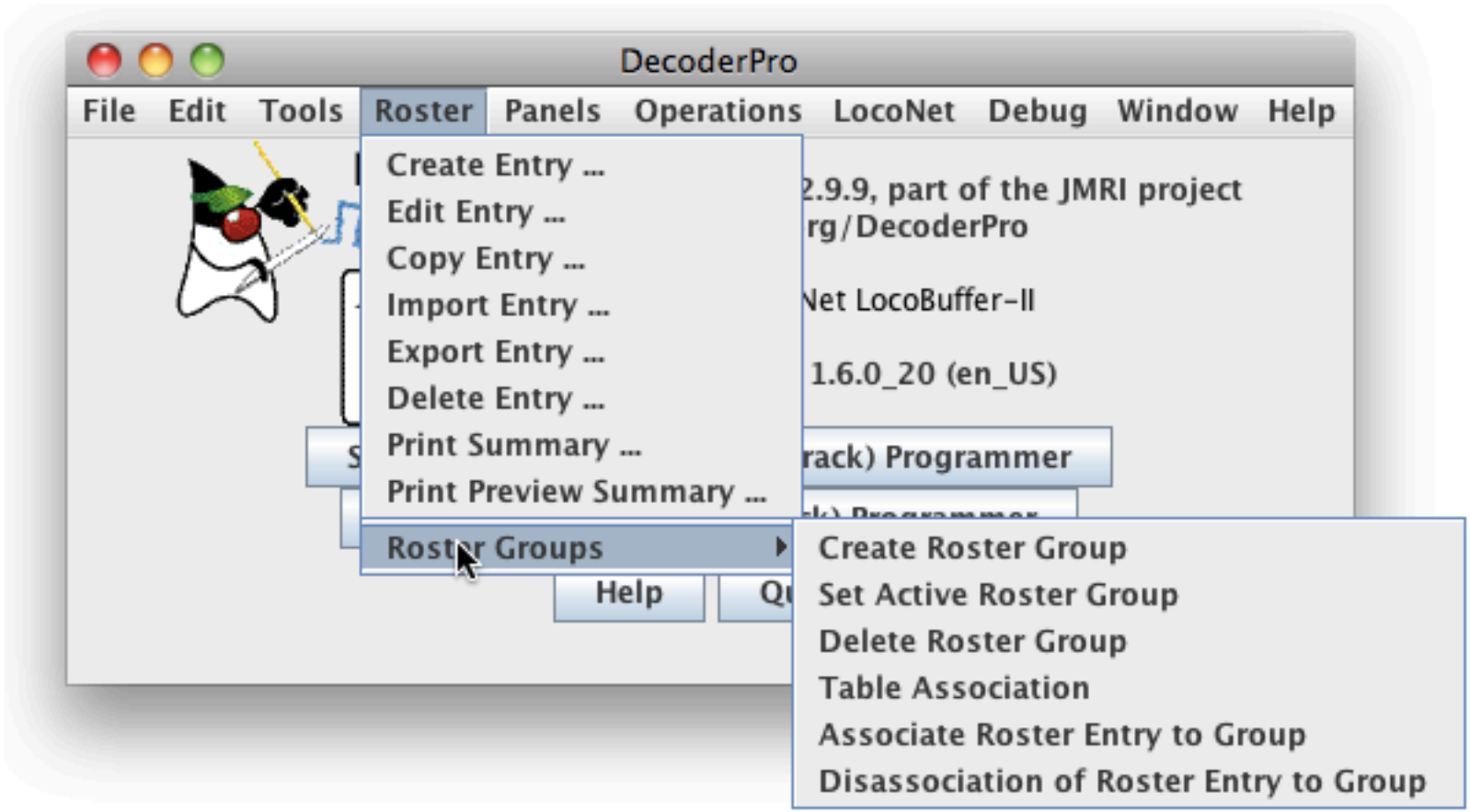
A Roster file allows easy reprogramming if decoder needs to be reset.

The Roster menu allows easy selection of a loco in JMRI tools--decoder programmer, throttle, consist, etc.

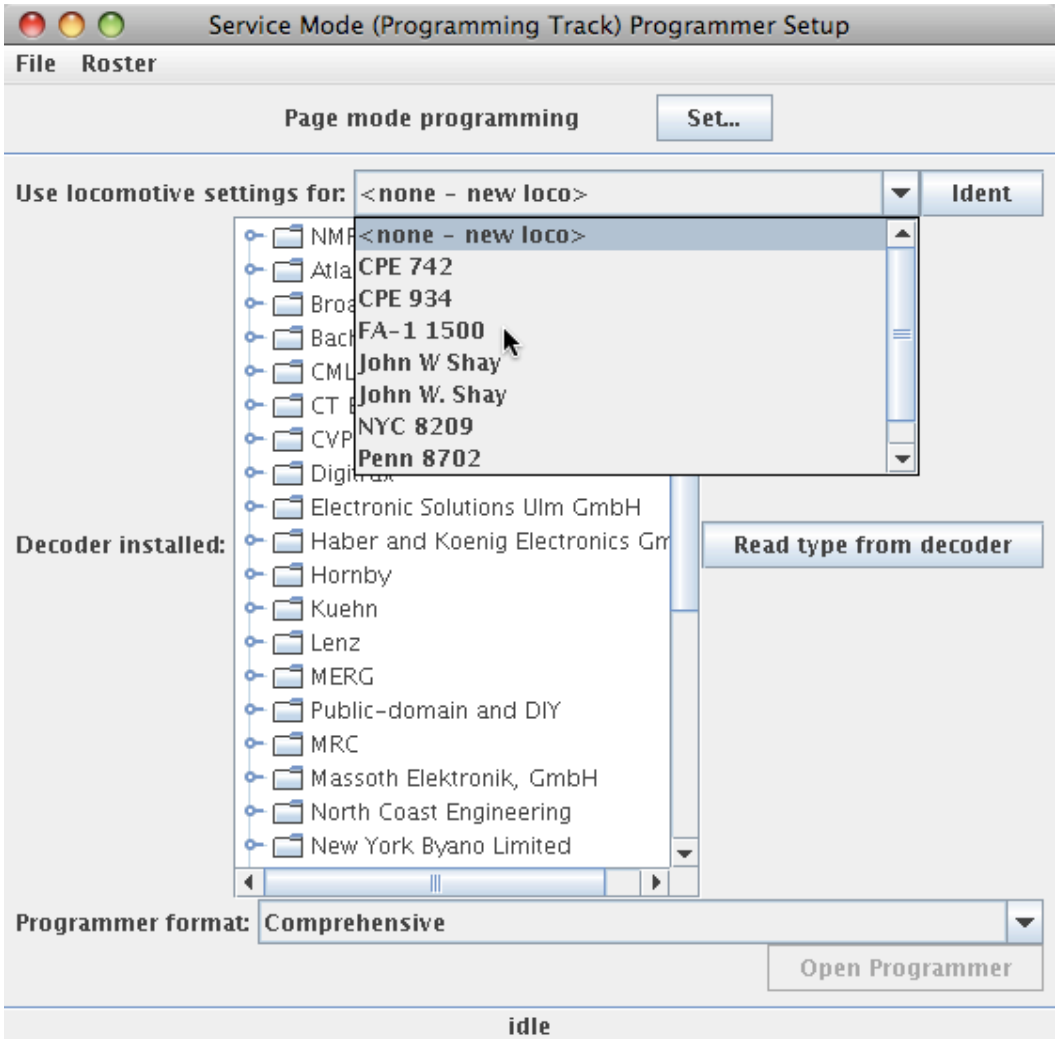


Roster Menu

Roster Groups



Changing a decoder's programming



Select loco from Roster

- or -

<- Click "Ident" to have DecoderPro read the loco address and find it in the Roster.

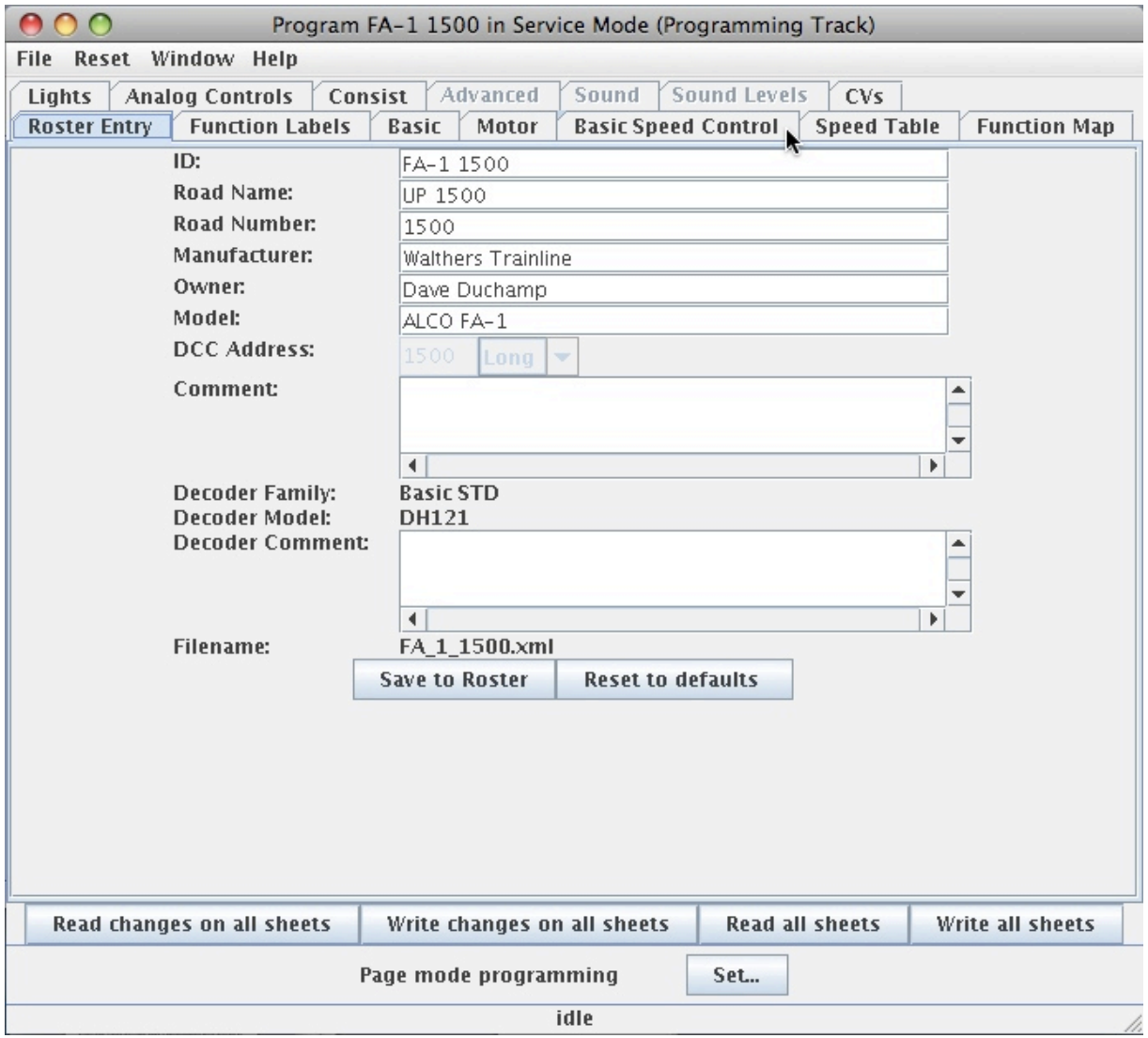
After loco is identified, click "Open Programmer"

Note: "Open Programmer" is not active until a decoder is identified.

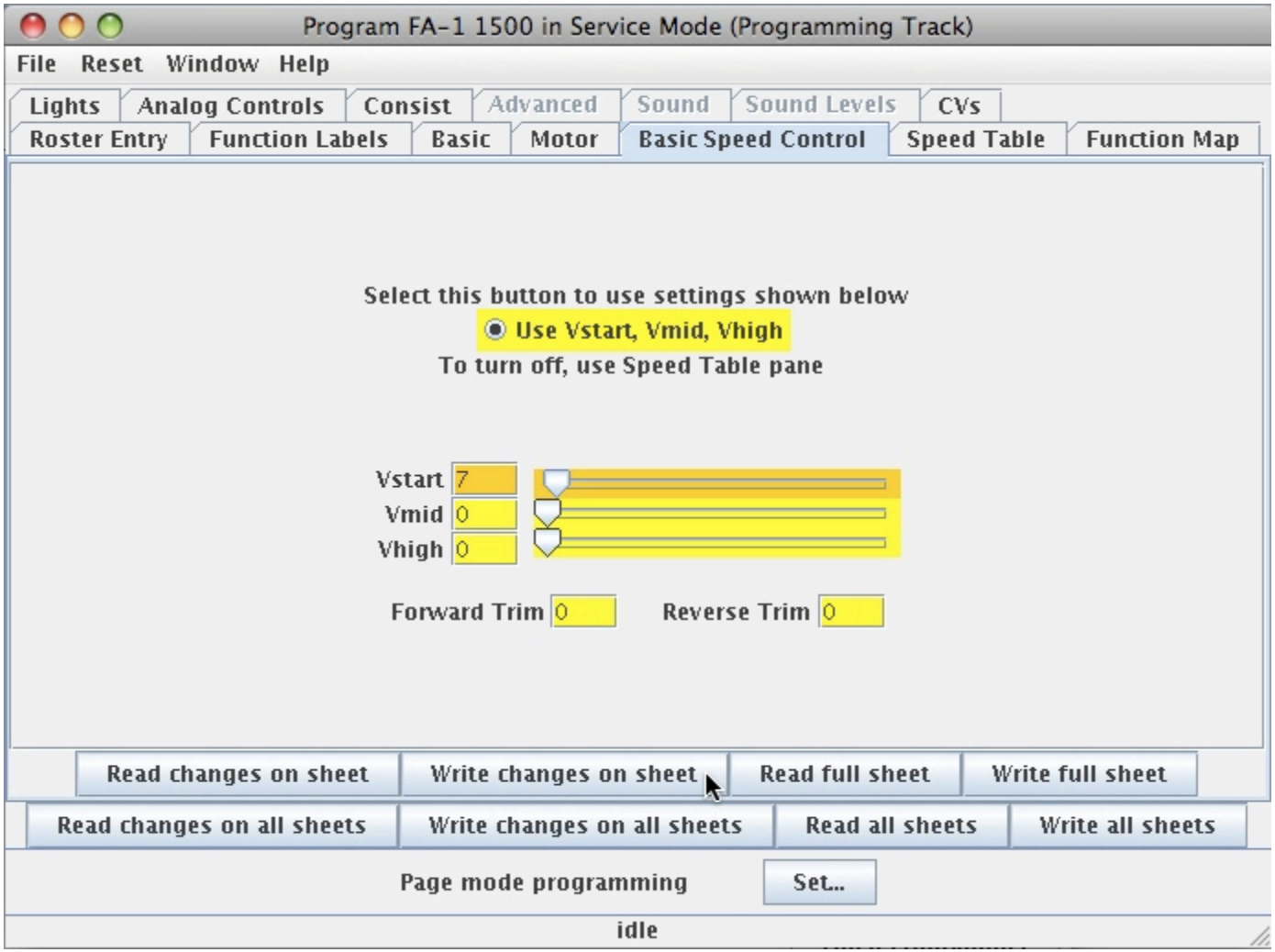
<-

The saved information is back!

Click “Basic Speed Control”.



Yellow color indicates the values are from the Roster file. Orange - changed, but not written to decoder.



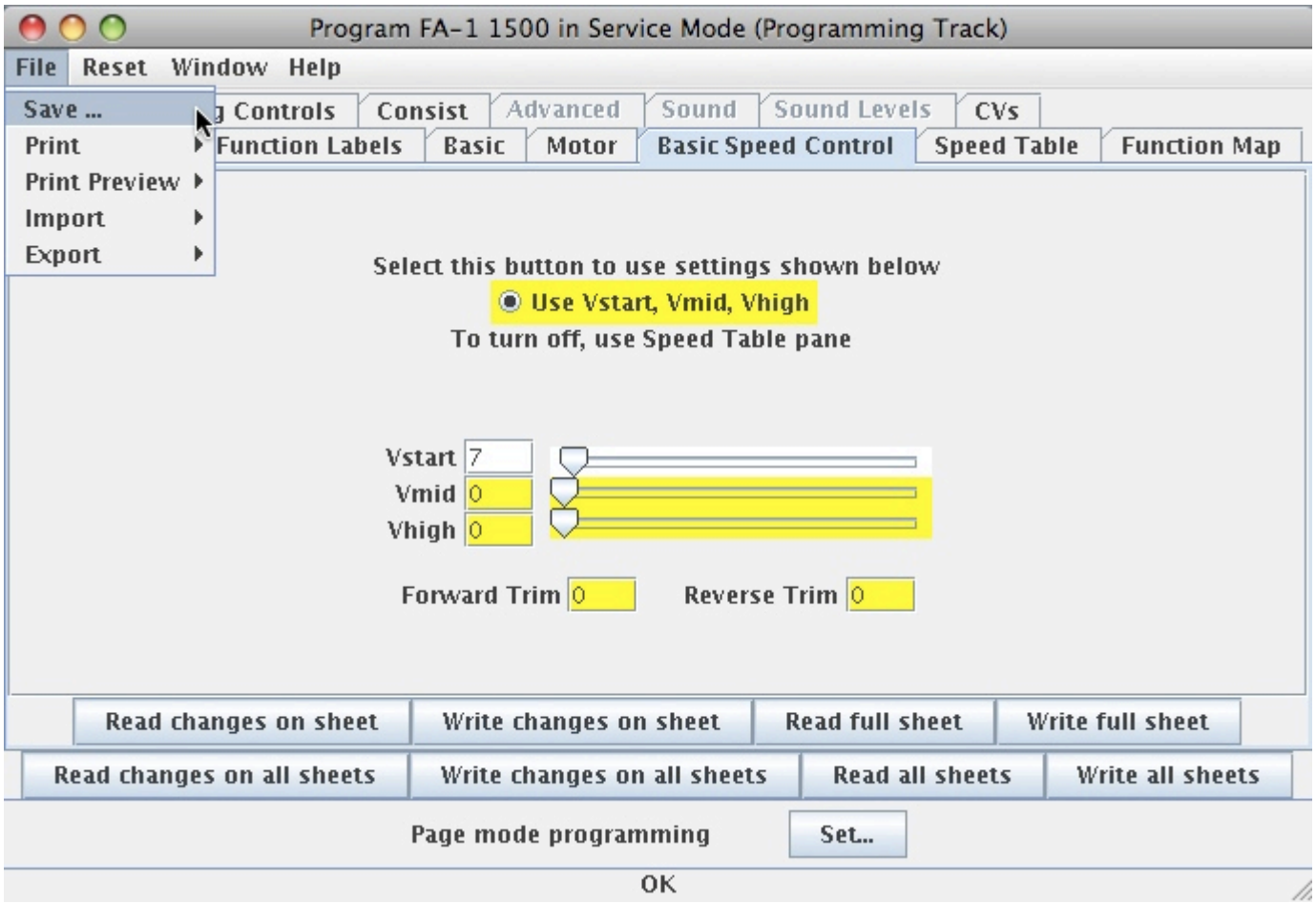
Enter a value in "Vstart".

Click "Write changes on sheet"

<-

Changed Vstart was written to the decoder.

Select File>Save… to save the change to disk.



It's done.

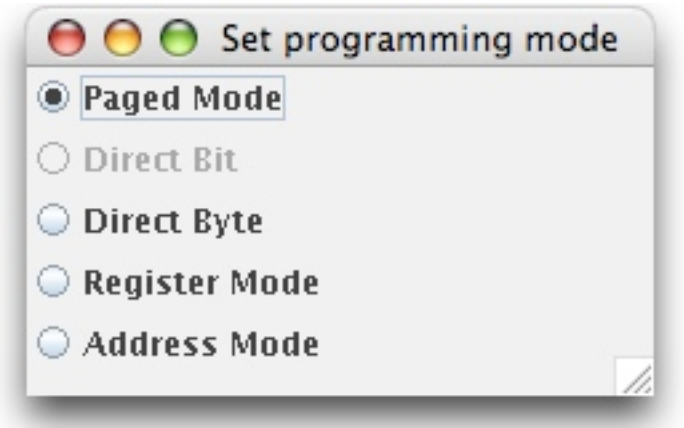
Go run the loco!

Miscellaneous Info and Tips

Support for new decoders is continuously added to DecoderPro.

DecoderPro works through the command station, so it's usually limited to what you can do with your throttle. **Think of DecoderPro as a smart throttle.**

DecoderPro supports other modes of programming. Access these other modes using the "Set…" button to get the dialog shown at the right. **Some decoders need a different mode for programming.**



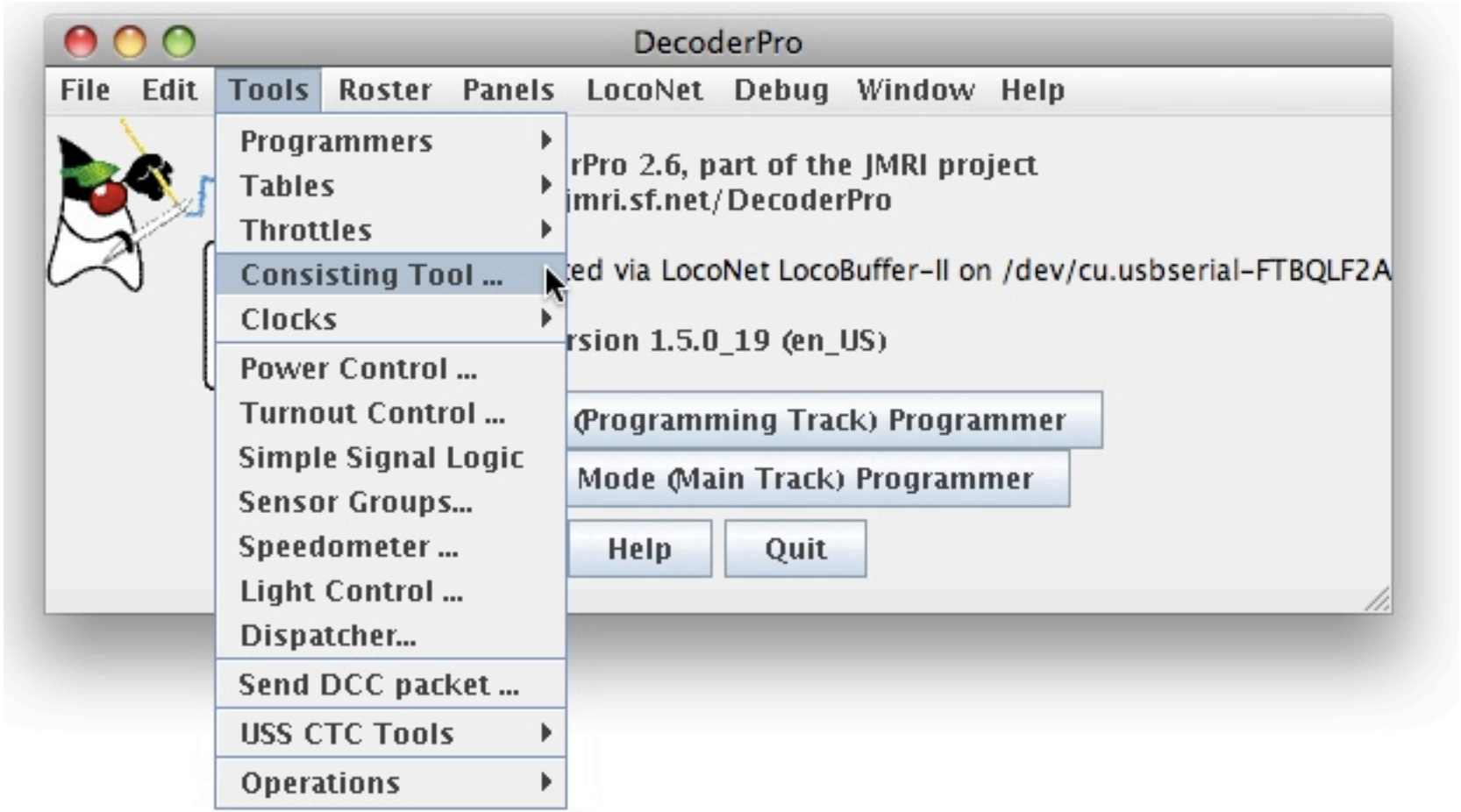
Some new sound decoders need a programming track booster to communicate with some command stations.

Example: Procedure for Speed Matching Engines for Consists

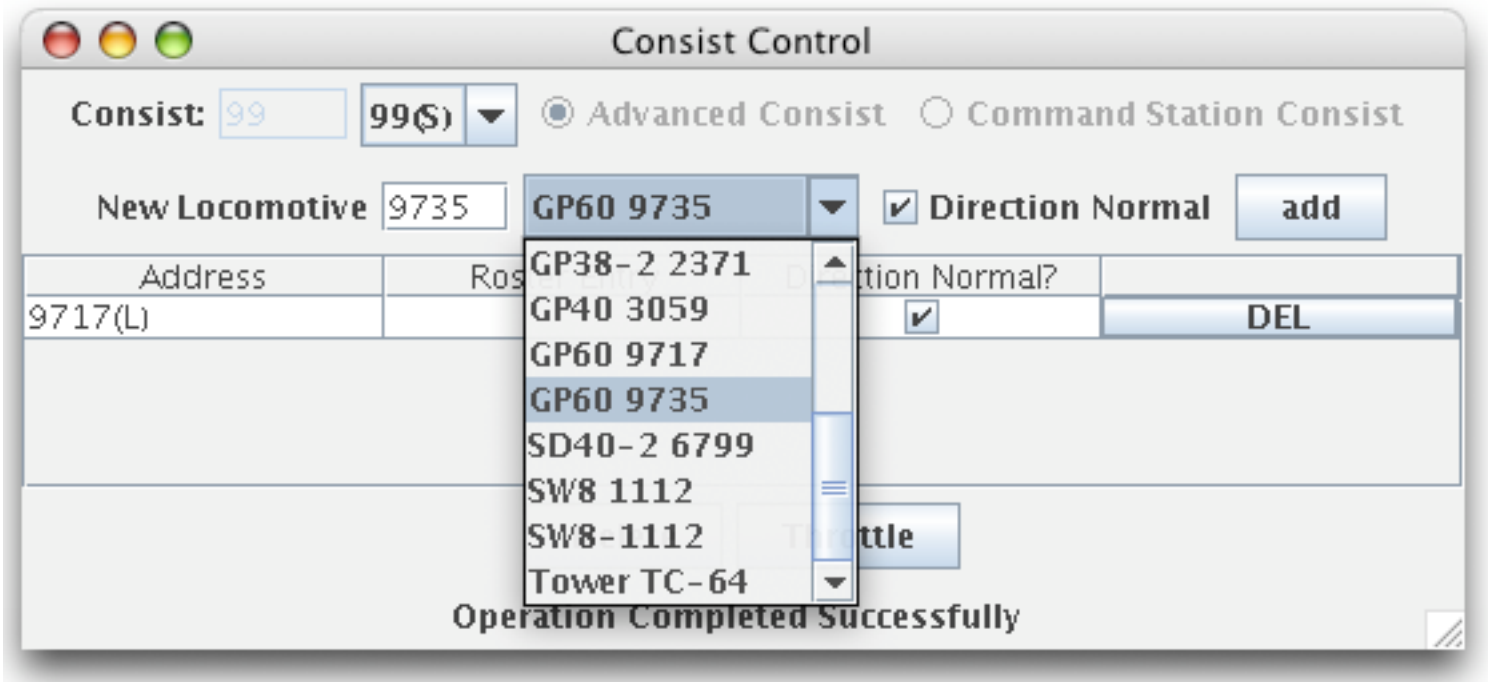
Object: To match the speed of two or more engines.

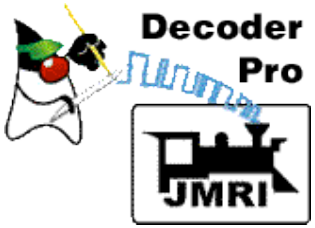
1. Preliminary: Determine which engine runs slowest. Warm up engines (3-4 minutes).
2. Make sure wheels and track are clean!
3. Make sure all engines have DecoderPro roster files, and start speeds are set.
4. Make a consist with your slowest engine as the lead engine. **Do not couple the engines.**

Select the JMRI Consisting Tool.

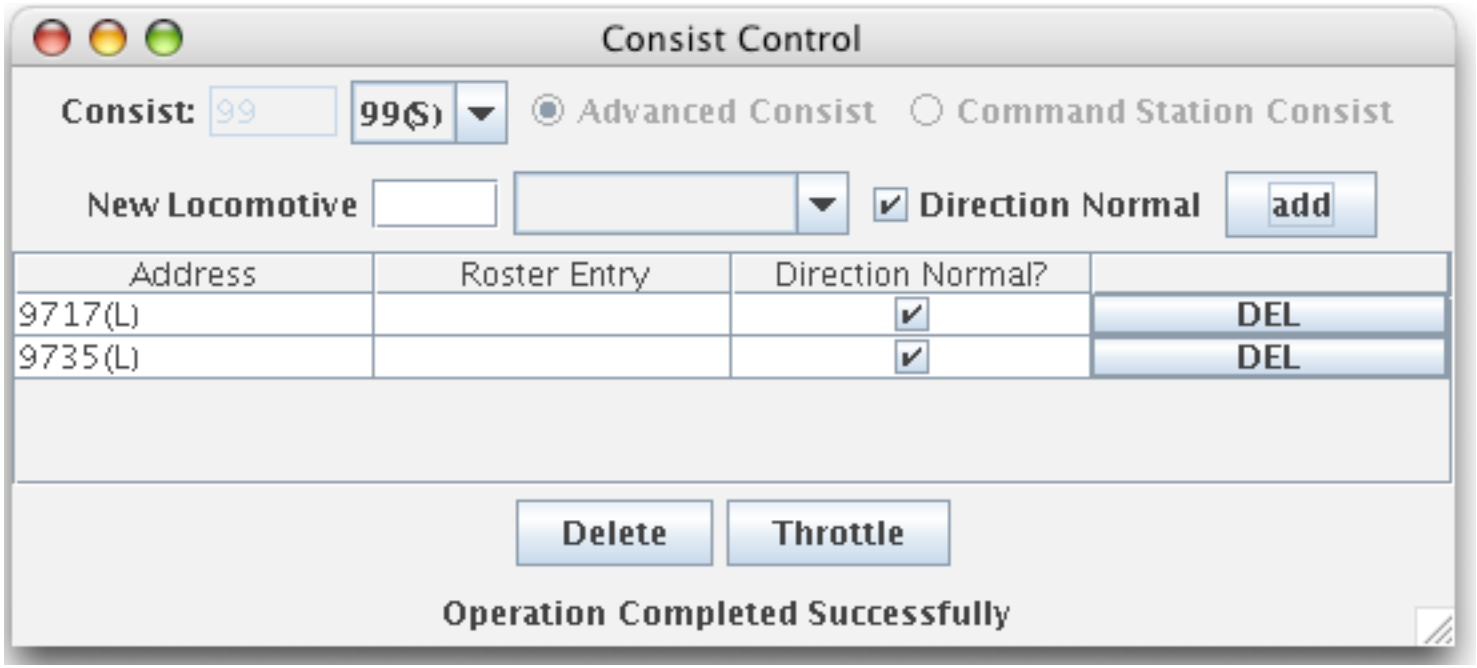


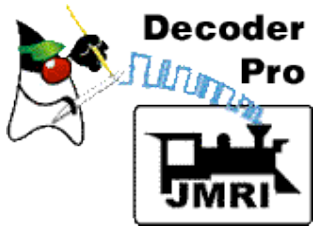
Give the new consist a two-digit address, and add the two engines to the table for the new consist, the slowest first.





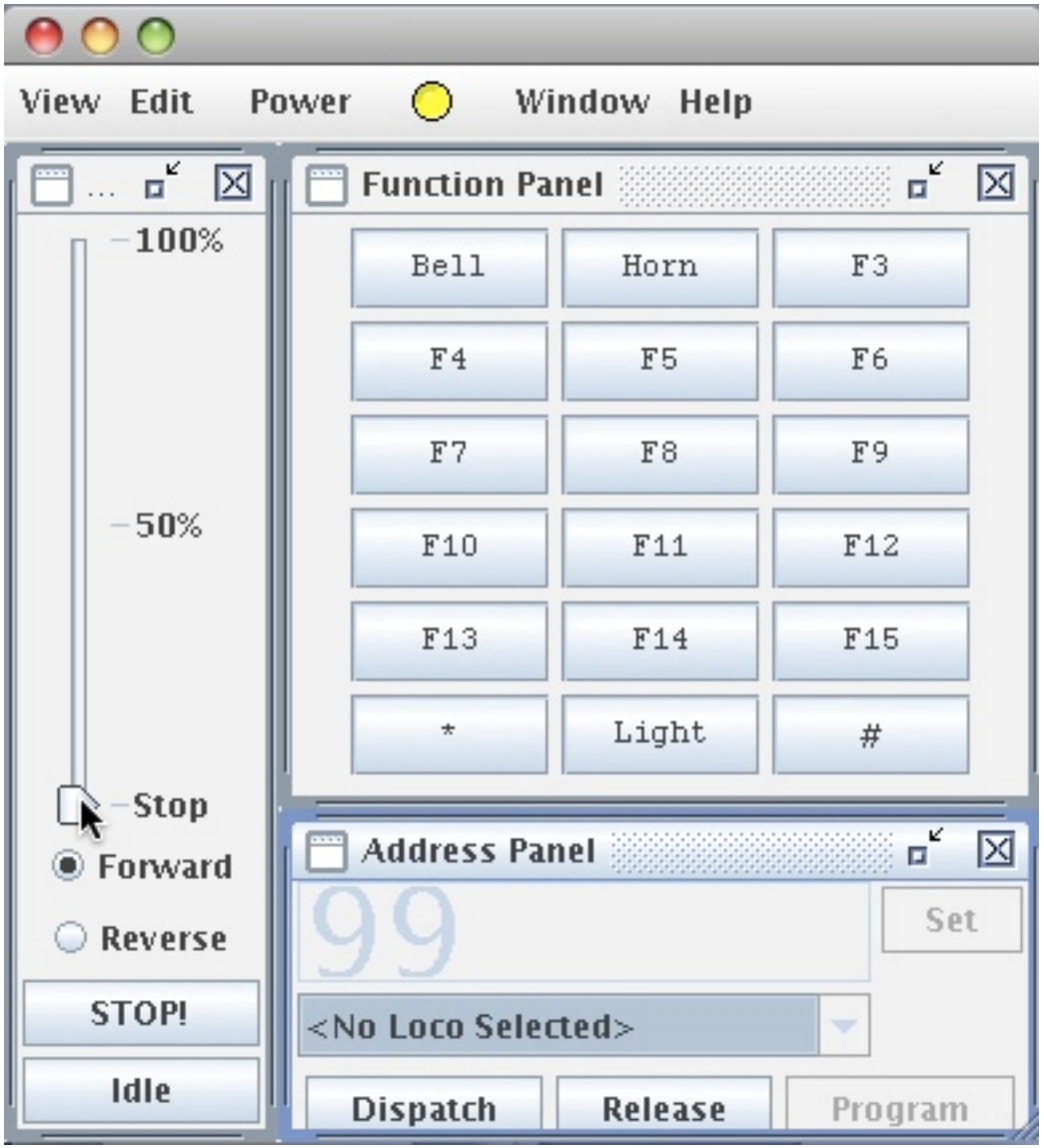
After locomotives are in the table, hit the "Throttle" button to make the consist and open a new JMRI Throttle to control it.





You can now run the consist using this throttle.

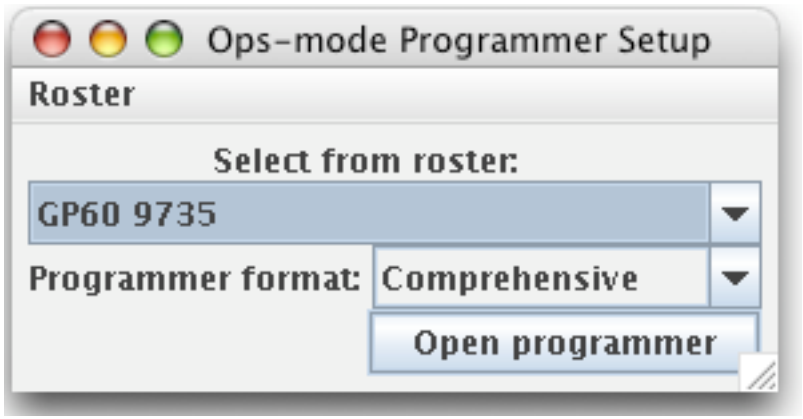
Remember: Do not couple the locos. Space them about 12 inches apart.



4. Open a programmer for the faster loco in DecoderPro using “Ops mode”.

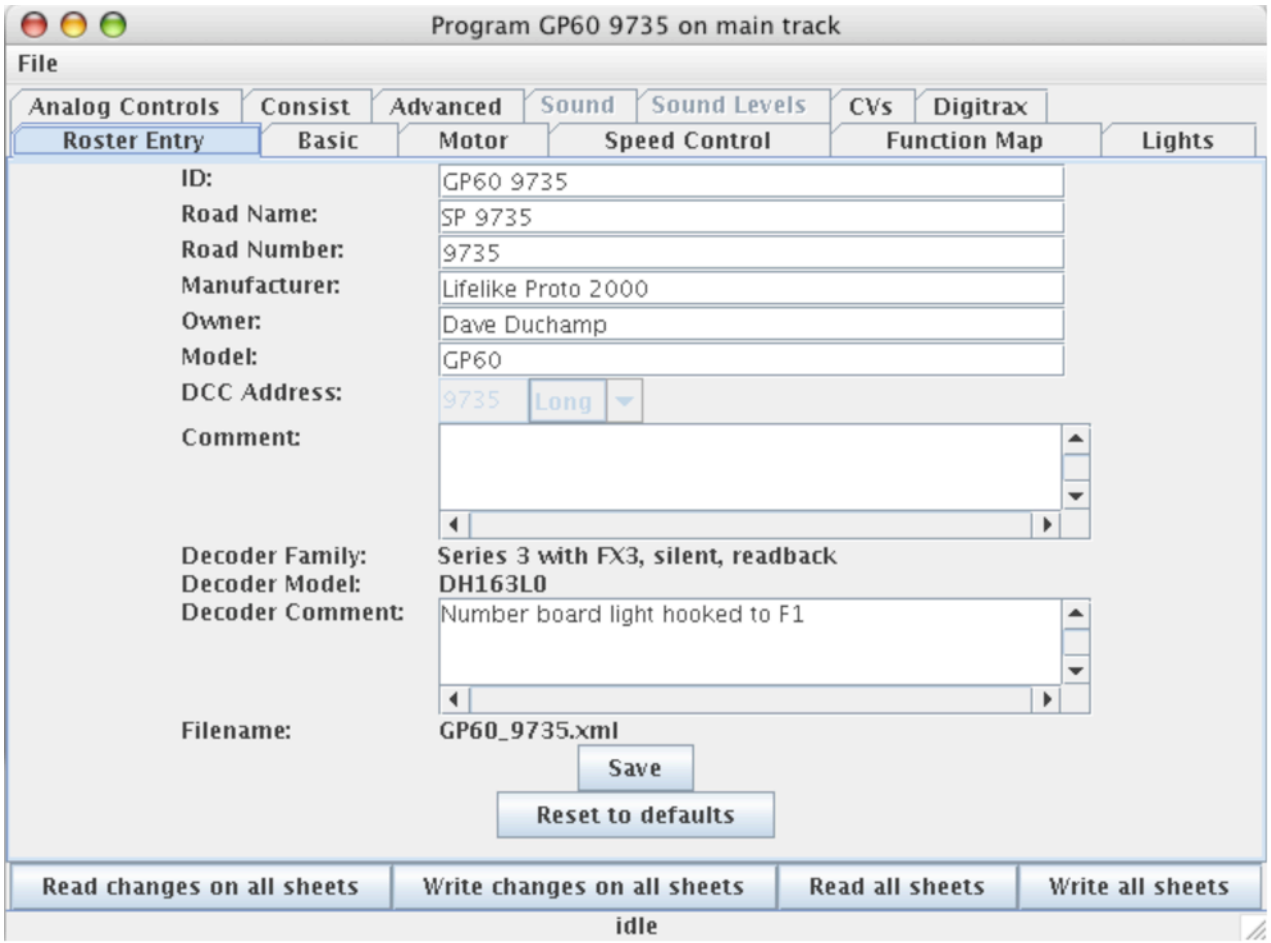
Select “Operations Mode (Main Track) …”

Select the roster entry for the faster loco, and click “Open Programmer”.

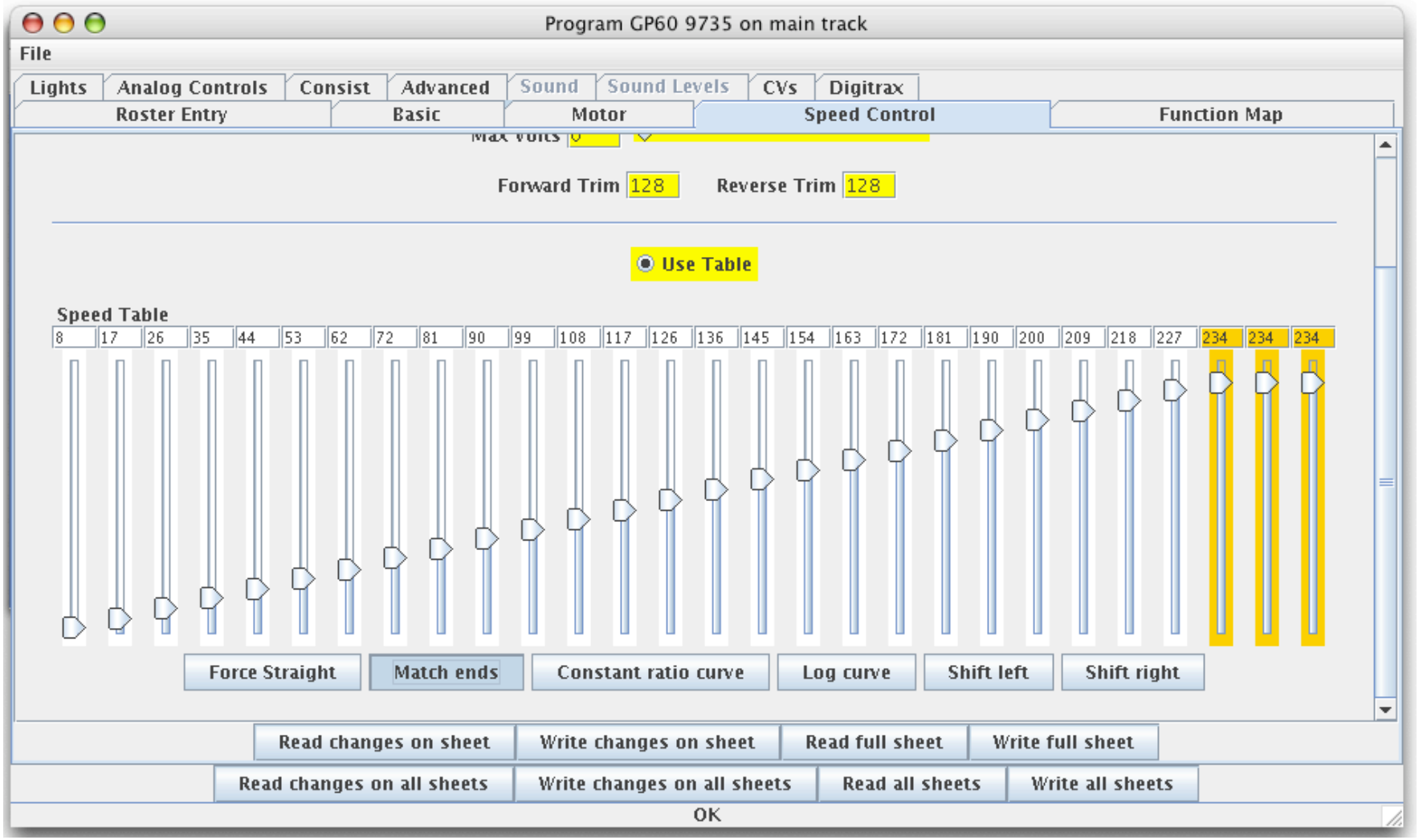


5. Slow the faster loco using the decoder speed table.

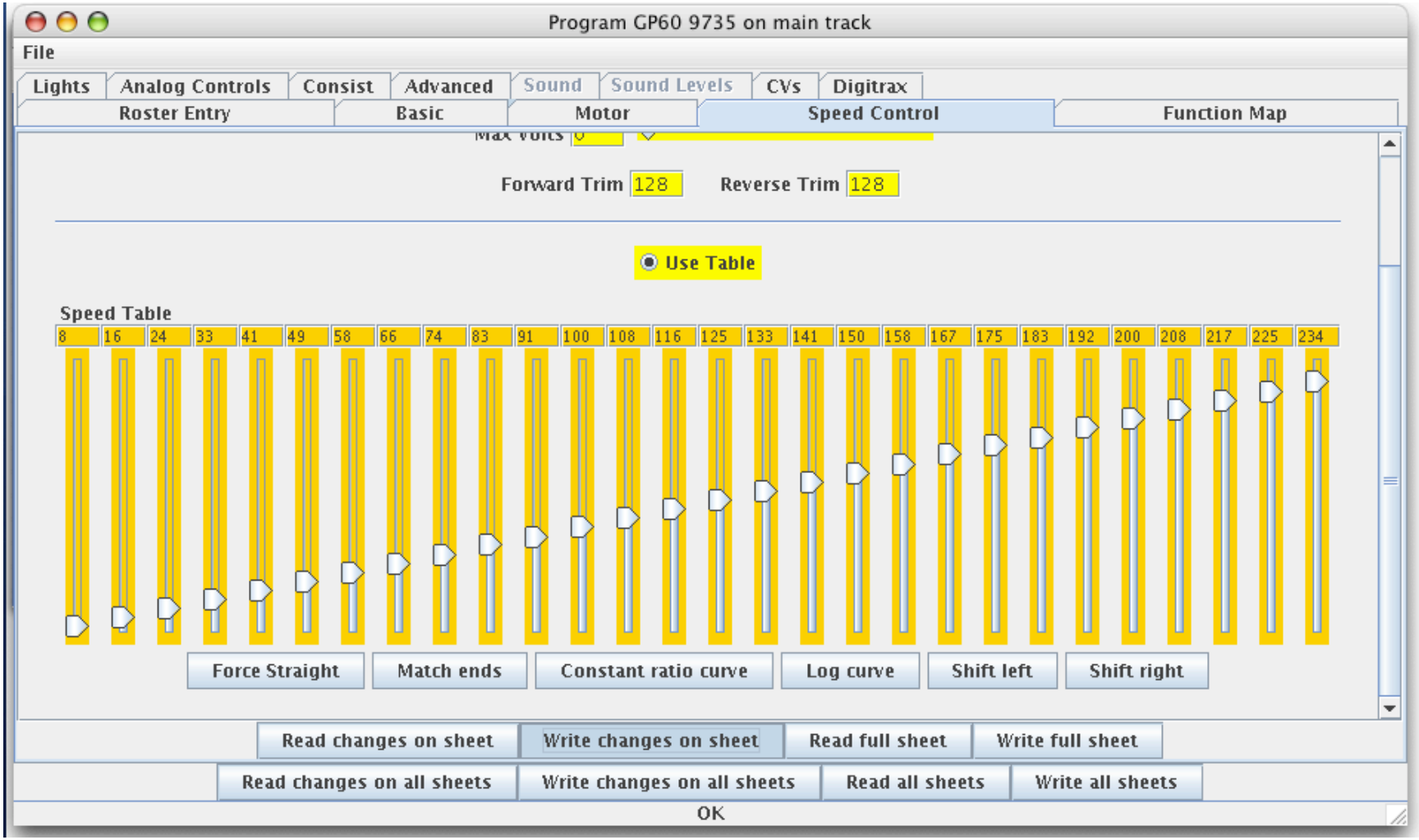
Select the “Speed Control” tab. (“Speed Table” tab on current version)



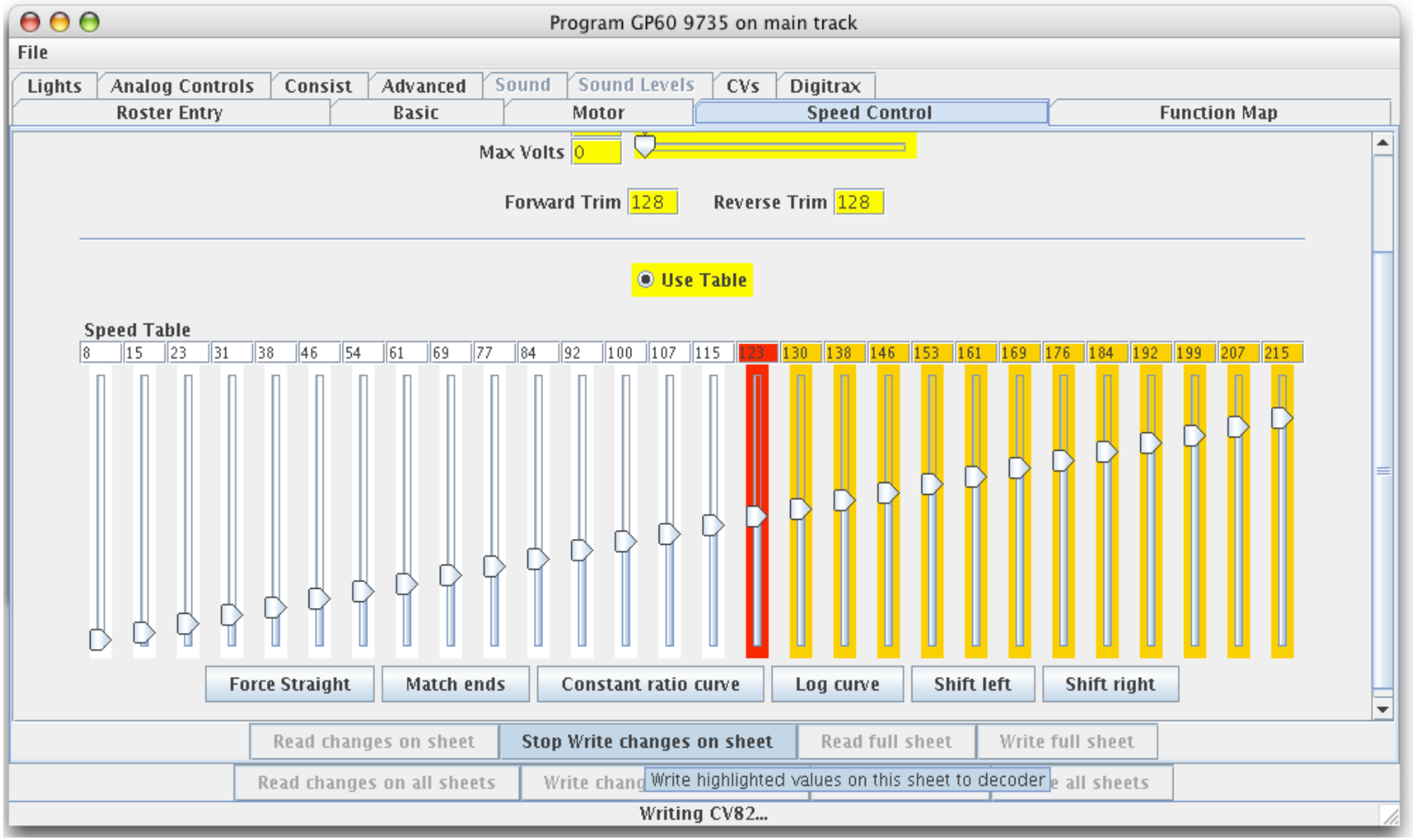
Select “Use Table”, and reduce the value in the 28th (last) step of the speed table.
Click “Match Ends” to adjust all steps.

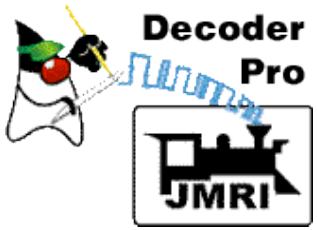


Click “Write changes on sheet” to send the new table to the decoder.



As each step is written, DecoderPro indicates progress as shown below.





6. Continue to adjust speed table until loco runs the same speed as the lead engine.

Run consist the same speed each trial (50% works well).

Stop consist between speed table adjustments if the speeds are much different.

Note: When programming on the main, CV's usually cannot be read--only written!

Remember to Save the roster file when done.

Sound Decoder Demo

DecoderPro Animated Demos:

Peter Ulvestad (Edmonton Model Railroad Association)

http://www3.telus.net/public/ulvestad/DecoderProDemos.html