

SPROG DCC

SPROG Ilv4 DCC Decoder Programmer User Guide *(Also applies to SPROG Ilv3)*



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Introduction

SPROG II is a DCC decoder programmer for connection to the USB port of a personal computer or similar device. SPROG II is supported by DecoderPro and PanelPro, both part of the JMRI project (<http://jmri.sourceforge.net/>) which, by use of the java programming language, allows platform independent support of a wide range of DCC hardware. The JMRI software is shareware available as a free download.

SPROG II is also capable of operating a small layout using the features of DecoderPro and PanelPro. A larger layout can be driven by using an external booster.

Requirements

- DecoderPro from <http://jmri.sourceforge.net/> or the optional USB stick
- Regulated DC Power Supply (see Table 1)
- Short length or small oval of track for programming and/or test running

Features

- Programs virtually **all** NMRA compliant DCC decoders
- No extra hardware required for programming sound decoders (e.g. QSI, Soundtraxx)
- Easy to use graphical interface with DecoderPro
- USB interface for easy connection to PC
- USB activity LED shows communication with the PC
- Power LED flashes when programming track power is live

Specification/Operating Conditions

Parameter	Minimum	Nominal	Maximum	Units	Note
DC Input supply voltage	10V		15V	V	1
Vin supply current – not programming		50		mA	
Vin supply current – programming		300		mA	2
Vin supply current – Operating Layout			1	A	3
Operating Temperature Range		25		°C	
Output Load - programming			250	mA	2
Output Load – Operating Layout			1	A	3

Table 1 Specification/Operating Conditions

Notes:

1. Minimum supply voltage depends upon the requirements of the decoder being programmed. In general it is safer to use as low a voltage as possible in case of problems with a newly installed decoder.
2. SPROG II will remove track power if output current exceeds 250mA as measured 100ms after applying power. Surge current during decoder power-up may be considerably greater than this.
3. Depends upon required DCC current.
4. SPROG II is protected against reverse polarity connection of the power supply but will not work unless the polarity is correct.

! SPROG II is not protected against track and power connections being
• interchanged.

Installation

The following steps are required to install SPROG II before you can use it for the first time:

- Install the latest production version of JMRI (4.22 at the time of writing)
- Connect the Power Supply
- Install SPROG II USB drivers (if required, depending on Operating System)
- Edit DecoderPro preferences
- Connect the Programming Track

This document gives brief installation instructions. Please refer to the appropriate driver installation document on the optional USB stick or on the SPROG DCC Ltd website.

For instructions to install the JRE and DecoderPro on Linux, please refer to the Install Guides on the JMRI website at <http://jmri.sourceforge.net/download>

Install DecoderPro

DecoderPro should be installed from the optional USB stick or a downloaded copy. The USB stick includes a recent production version (but not necessarily the latest). A newer version of DecoderPro may be available from the JMRI download page <http://jmri.sourceforge.net/download>

This user guide assumes you are using version 4.22, or later.

To install from the USB stick, browse to the directory specific to your operating system to find the JMRI installer. For example, if your USB stick drive is D: browse to D:\Windows and double click the JMRI executable found therein.

Connect the Power Supply

Power supplies packaged with a SPROG II are already connected to the green pluggable terminal block.

For any other supply used, connect as described below.

- Cut off the low voltage DC plug
- Separate the two conductors for about 3cm

- Strip 6-8mm of insulation from each conductor and twist the copper cores of each conductor together
- Insert the positive conductor the +V terminal and tighten the screw
- Insert the other conductor in the 0V terminal and tighten the screw

SPROG II is protected against reverse polarity connection of the power supply but will not work unless the polarity is correct.

The power LED will only illuminate steadily when power is connected to a SPROG IIv4 *and* the USB is connected to the host computer (next step).

The power LED will only illuminate steadily when power is connected to a SPROG IIv3.

The power LED will flash when power is being applied to the track output.

Install the USB Drivers (if required)

Please refer to the appropriate document for your operating system on the SPROG DCC Ltd website <https://www.sprog-dcc.co.uk/download-page>.

Getting Started with JMRI (DecoderPro and PanelPro)

DecoderPro and PanelPro are different interfaces to the same underlying JMRI software. The split exists for historical reasons only. There are some differences in the functions that are available from the menus but a lot of features are available through both interfaces.

It has become customary to think of DecoderPro as the tool for programming decoders and PanelPro for controlling a layout.

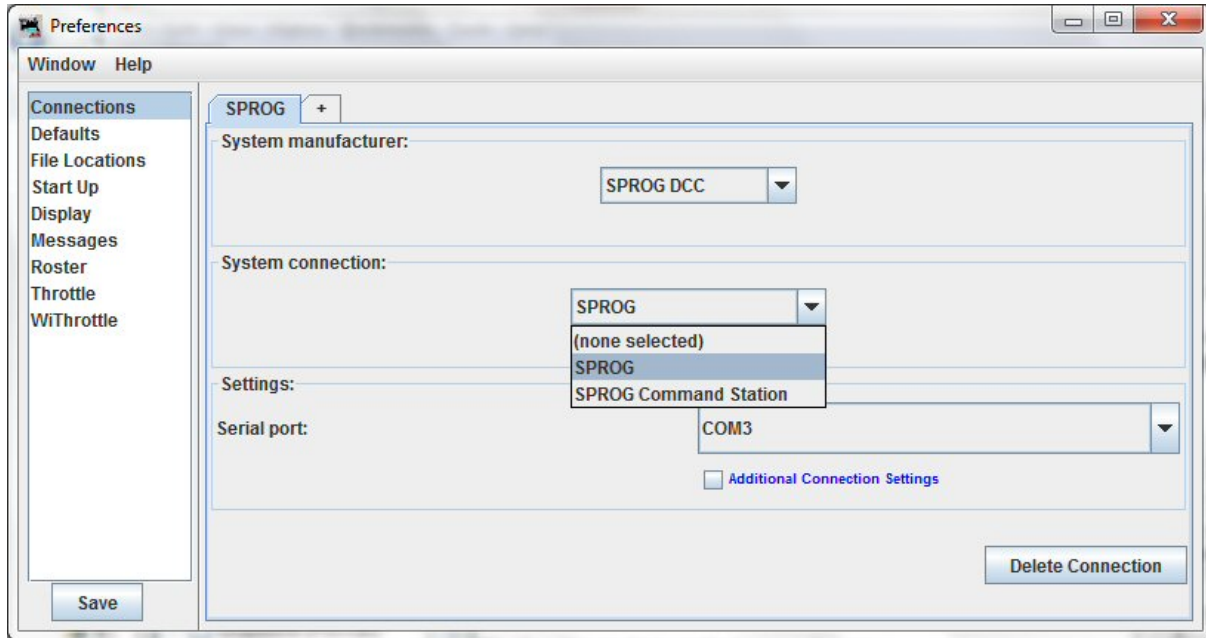
DecoderPro will often be used with a dedicated programming track for 'service mode' programming. This allows full read and write access to all Configuration Variables (CVs) in a **single** decoder.

PanelPro will often be used with 'on the main' or 'ops mode' programming in conjunction with layout control. In this mode CVs may be written, but (without special hardware such as Railcom) values cannot be read back. The SPROG II does not support reading from decoder in ops mode. The advantage of ops mode programming is that any loco, out of all the locos on a layout, may be programmed. Unlike service mode there is no single loco limit.

We will use that distinction (DecoderPro for service mode programming and PanelPro for ops mode programming) in discussing the use of the SPROG II.

Setting the JMRI Connection Preferences

Now start DecoderPro by double clicking the icon that was placed on the Windows desktop during the installation.



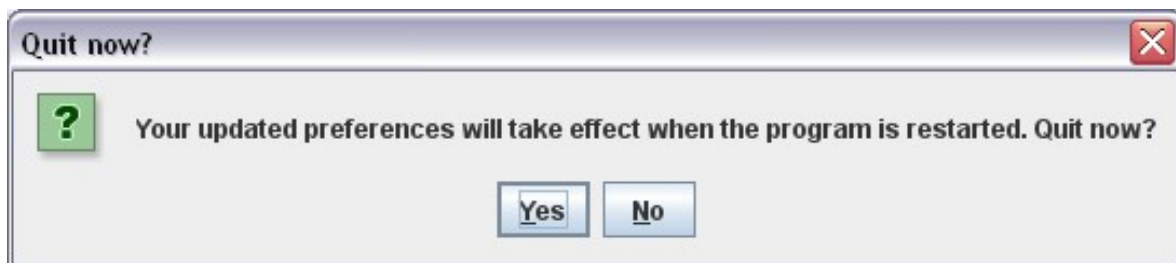
Click the arrow in the **System manufacturer** field and scroll down to select **SPROG DCC**.

Then in the **System connection** field, select **SPROG** (not SPROG Command Station just yet!). This will create a connection for using the SPROG as a programmer. To use the SPROG as a command station you would select **SPROG Command Station**.

Click the arrow in the **Serial Port** field and select the COM port noted during driver installation.

Do not select any other fields at this time.

Click “**Save**” at the lowest left of the window.



Click “**Yes**”. DecoderPro will save the new settings and exit.

Connect the Programming Track

- ! The programming track MUST be isolated from all other DC or DCC control systems and connected only to the SPROG II. Damage may result to the SPROG II or other equipment if this rule is not followed.**

Connect the SPROG II to the programming track using the “Track” terminals of the pluggable terminal block. There is no requirement to observe any particular polarity when connecting the programming track. The DCC output voltage will be approximately 1V below the power supply voltage, typically about 11V with the standard power supply provided.

During programming the track current is sensed 100 milliseconds after the programming track is powered up. If the current exceeds 250 milliAmps then the programming track power is removed to avoid potential damage to an incorrectly installed decoder.

Getting Started with DecoderPro

See the DecoderPro website <http://jmri.sourceforge.net> for any updates and latest information.

Join the JMRI group <https://groups.io/g/jmriusers/topics> for help from other DecoderPro users and the team who develop it.

Ensure that all software and drivers are installed and that DecoderPro preferences have been setup in accordance with the previous steps.

Start DecoderPro. The main window will open and show the current connection status. In the following example “Service Mode Programmer SPROG Programmer Is Online” shows that the connection is setup to use the SPROG as a programmer, rather than a command station. In command station the Operations Mode Programmer would be available instead.

Getting Started

Click on the "New Loco" Button in the toolbar to get started.

Then either select your decoder from the list or choose "Read type from decoder".

Once Selected, click on "Open Programmer" to then begin programming your decoder.

In the next screen enter in the basic information of the loco to create your first roster entry.

1

2

3

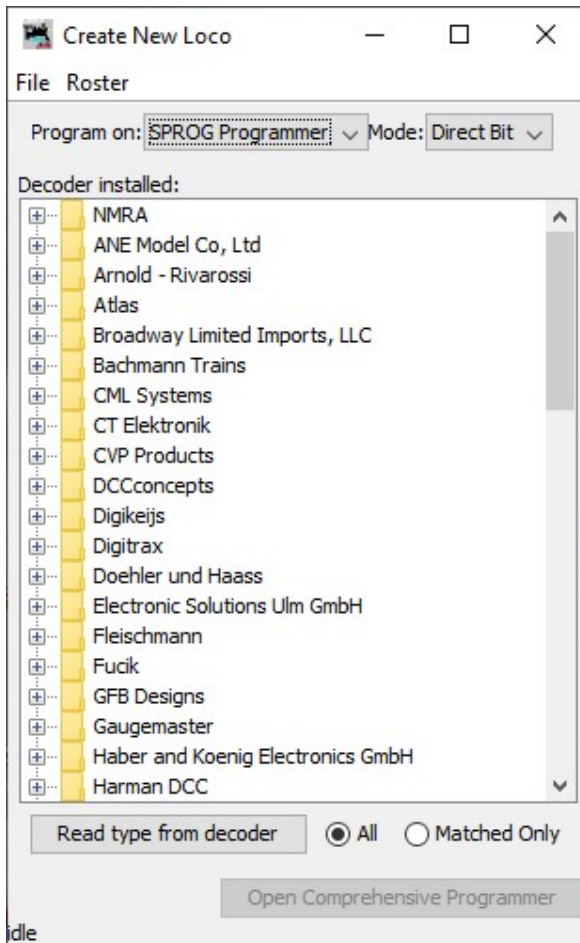
ID:
Road Name:
Road Number:
Manufacturer:
Owner:
Model:
DCC Address:
Decoder Family:
Decoder Model:
Filename:

Programming Track
 Edit Only

Program
Labels & Media
Throttle

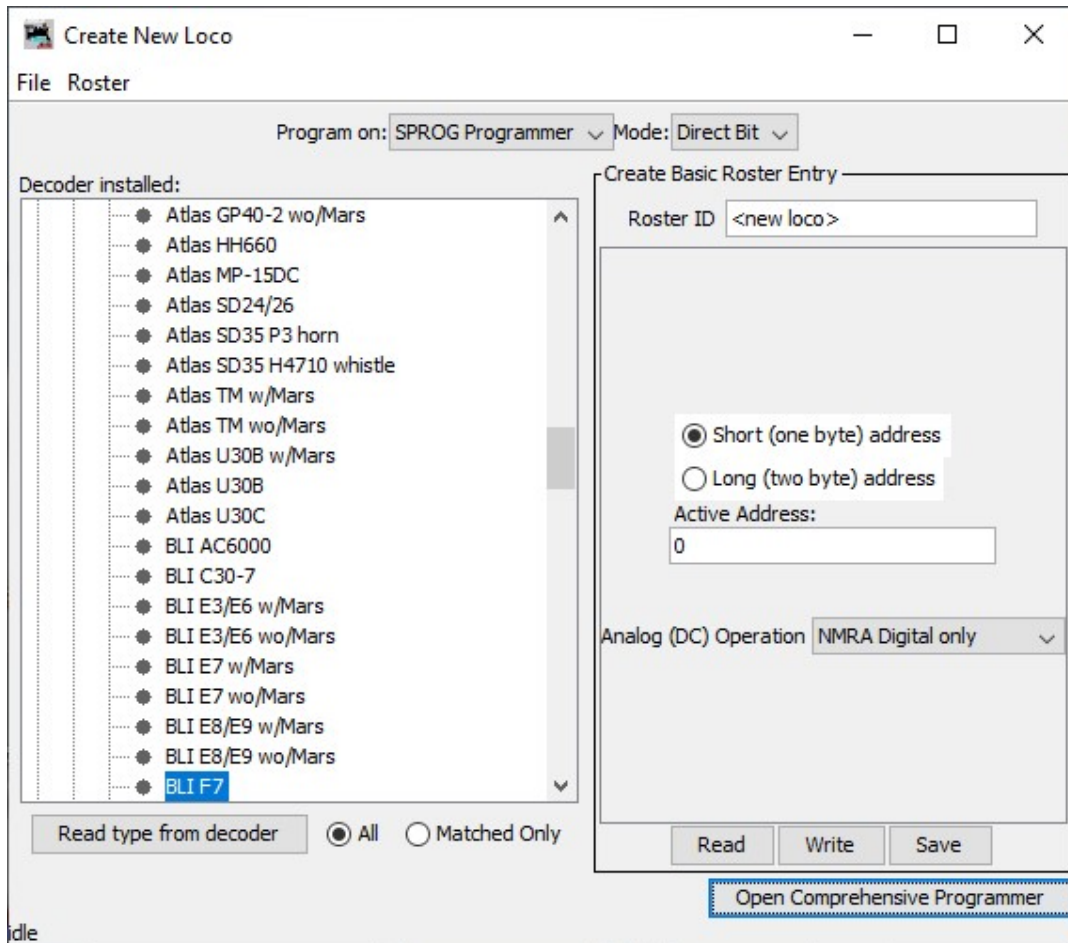
Service Mode Programmer SPROG Programmer Is Online No Operations Mode Programmer Available Programmer Status: Idle Active Profile: SPROG 3 COM7 Prog

Click “New Loco” to open the Programmer Setup window. A new window will pop up which shows a list of decoder manufacturers.



Clicking the control or double clicking the folder icon next to a manufacturer name will open a list of decoder types from that manufacturer. You can always manually select a decoder type in this way. In most cases, however, DecoderPro can determine the manufacturer and decoder type automatically.

Place a decoder equipped loco on the programming track and click on “**Read type from decoder**”. In the example below, DecoderPro has identified a QSI Industries BLI F7. Sometimes DecoderPro can identify the manufacturer but not exact model of decoder fitted. This is because the vendors often use the same readable ID version for multiple similar decoders. Often the difference is in a physical fit, for an SD60 having a different shape from an AC44, or for a set of specific sounds for a different railroad; these do not affect the programming, and so they use a common number for that whole series of models. In these cases it will be necessary to select the decoder type manually, often from several highlighted possibilities.



Once the decoder type has been selected, and programming operations have completed, click “Open Comprehensive Programmer”.

The service mode programmer window opens with a selection of “tabs”, grouped in rows below the menu bar. Clicking on a tab selects a group of CVs to be programmed, related to the title of the tab. The selection of tabs available will vary depending upon the features supported by your decoder and the CVs available.

On the “Roster Entry” tab you may enter arbitrary details of the loco to be saved on the PC for future reference. You need to enter a unique name in the top box (initially marked <new loco>) as this will be the name of a file in the Roster (saved on your computer) with all the settings for this loco. The road number is often a good choice.

Everything else on this pane is optional, and for your convenience. The DCC address field will be filled in by DecoderPro once the decoder has been read or programmed. If you wish to use the Roster then you should make sure to click “Save” on the Roster Entry tab when you have finished programming the

decoder. The Roster is especially useful if the decoder loses its settings as seems to happen occasionally with some decoders. Alternatively, you may wish to program a second loco with similar CV settings.

The screenshot shows the 'Program <new loco> in Service Mode (Programming Track)' window. The 'Roster Entry' tab is active, displaying various fields for loco configuration:

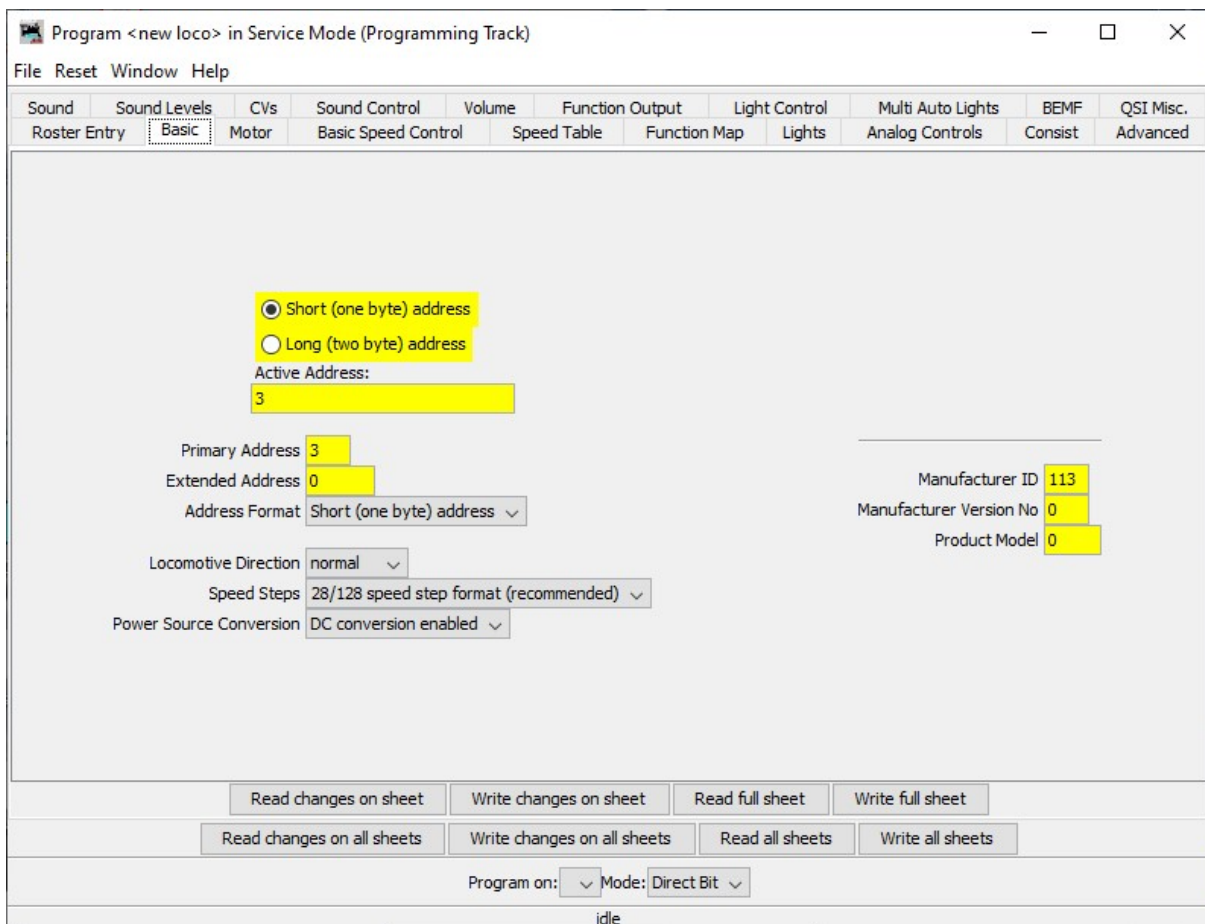
- ID:** <new loco>
- Road Name:** (empty)
- Road Number:** (empty)
- Manufacturer:** (empty)
- Owner:** andrew
- Model:** (empty)
- DCC Address:** 3 (DCC Short)
- Throttle Speed Limit:** 100 %
- Comment:** (text area)
- Decoder Family:** QSI Diesel Ver. 7
- Decoder Model:** BLI F7
- Decoder Comment:** (text area)
- Date Modified:** (empty)

Buttons at the bottom include 'Save to Roster', 'Reset to defaults', 'Read changes on all sheets', 'Write changes on all sheets', 'Read all sheets', and 'Write all sheets'. The 'Program on:' dropdown is set to 'idle' and the 'Mode:' dropdown is set to 'Direct Bit'.

Note on 'ID:!' When you click Save, the ID will become the file name of the roster entry created for this loco, and also the entry in the list for you to be able to select a previously-programmed and saved loco in future, by using the **Ident** button on the main DecoderPro window. Name these entries wisely! Many people use the loco type and number, or Operator/road name and number, but choose a system that will be meaningful to you.

Click on the “Basic” tab and you will see the most essential settings for the decoder including the address. Initially, all of the data fields are coloured red or yellow to show that no data has been read from or written to the decoder. There are eight read and write buttons at the bottom of the window. Click “Read full sheet” to read the data for the current tab from the decoder. That will read CVs 1, 29, 17, 18, 19, 7, 8, 105 and 106 and fill in these values from the loco.

! Clicking “Read all sheets” will read every CV from the decoder and may take a considerable time to complete.



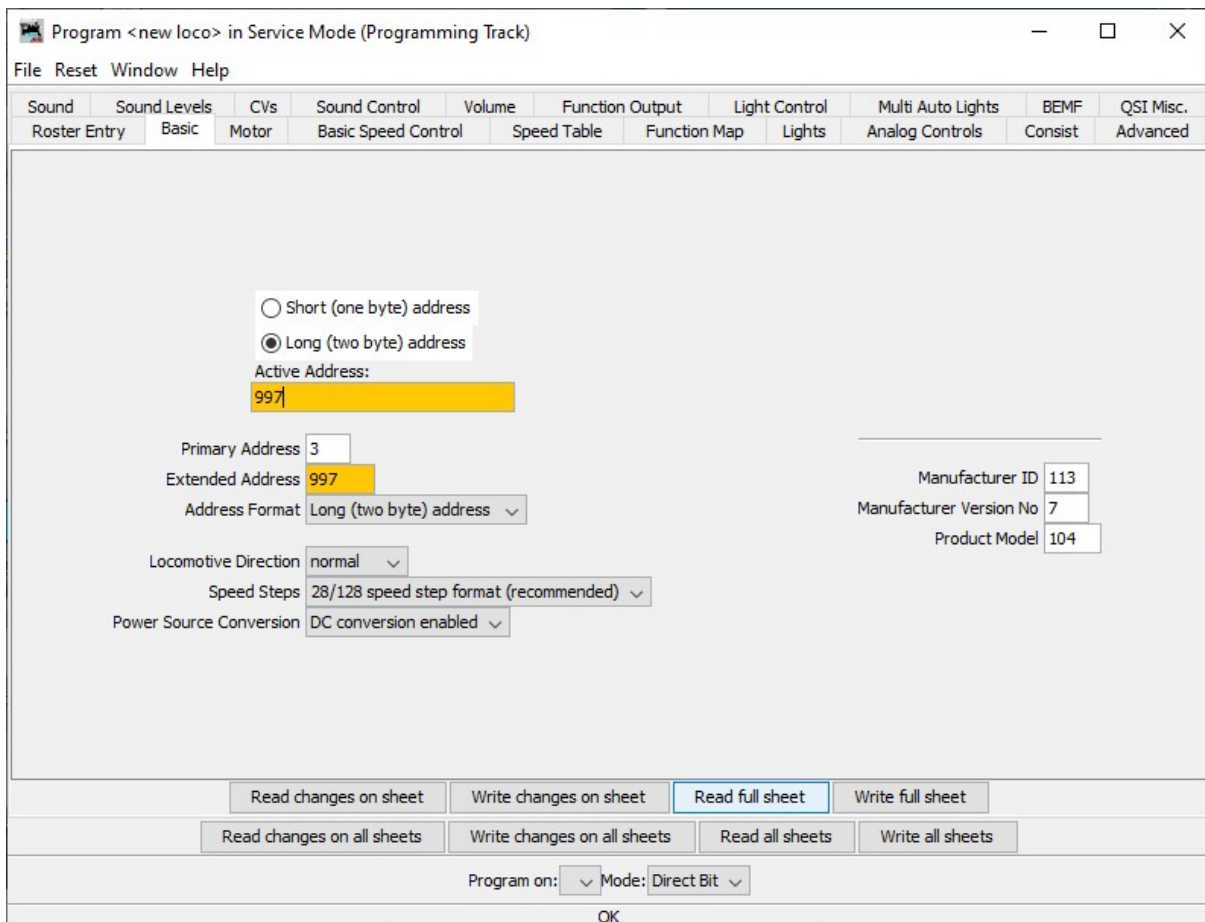
Each data field should return to white or the background colour of the window.

Check that you see what you expected, especially if you are reading a decoder that was already programmed elsewhere!

The exact look and layout of these programming panes may vary as versions of DecoderPro or the specific decoder types are updated, but the essential

information and capabilities remain consistent.

To change the locos address, type a new address in the Active DCC Address followed by carriage return. The address field will turn orange, indicating that the address has been changed but not yet written to the decoder. Select the type of address to be set (short or extended).

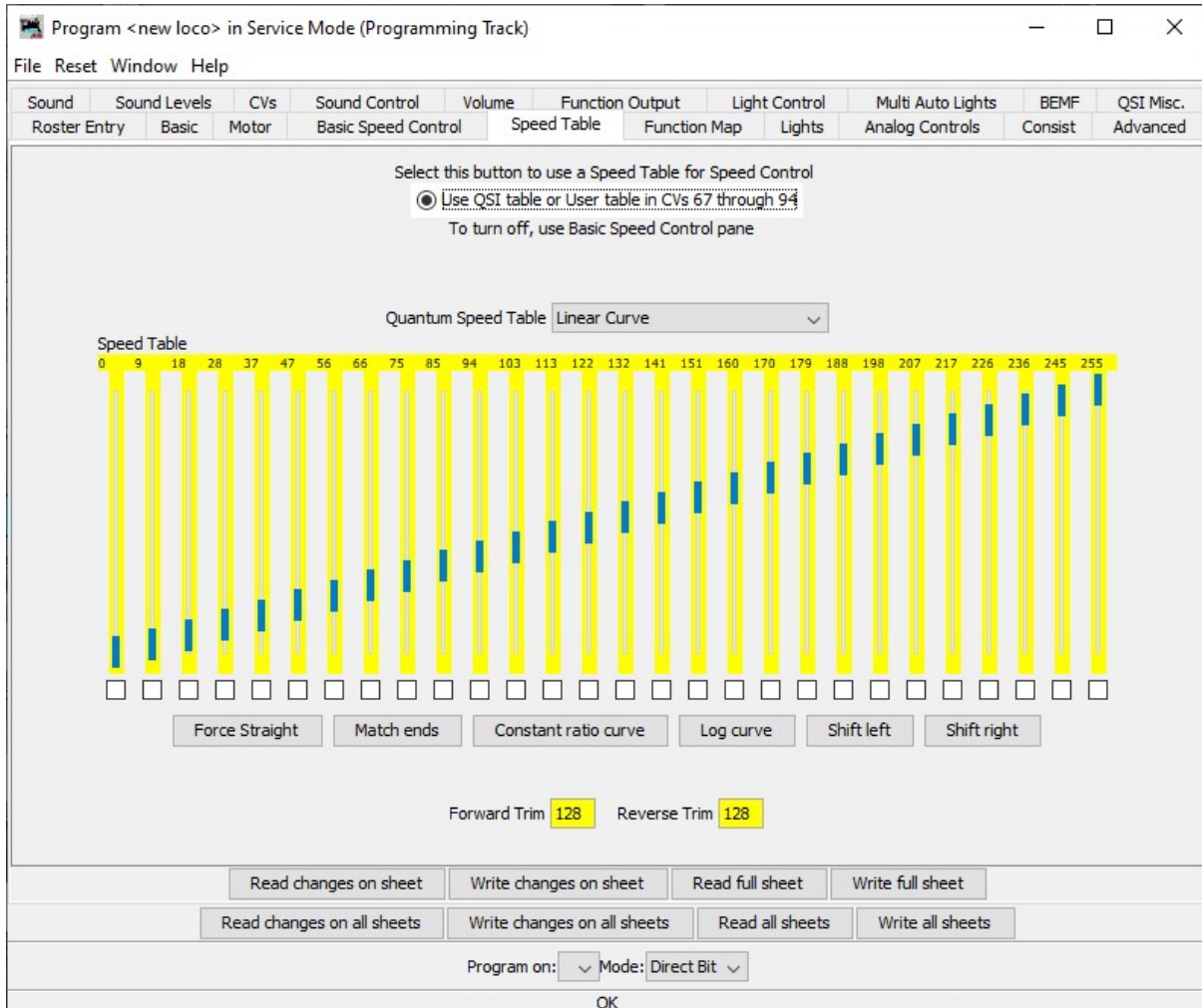


Click “Write changes on sheet” to write the new address to the decoder. The address will turn red and then white as it is written to the decoder. You can set other basic properties such as the direction and DC operation on this tab.

To Save your data to the Roster record on your computer, either pick from the menu bar at the top of the screen, or go back to the first pane where there is a “Save to Roster” button.

The other tabs work in a very similar way. You may find it useful to have the decoder documentation available when setting more complex or manufacturer specific features.

Next, we'll look at the Speed Control tab that allows you to fine tune the way the loco responds to the throttle. Click on the "Speed Control" tab.



The decoder in this example has a choice between "Use Straight-Line response" and "Use QSI table or User table in CVs 67 through 94". The "look and feel" of this tab will vary between decoders but most recent decoders support the use of a speed table.

It is left as an exercise for the reader to experiment with the sliders for setting the speed table and the buttons just below. The "Force Straight" option will give a linear relationship between the throttle position and the speed of the loco. "Constant ratio curve" will give little change in speed at low throttle settings, greater change at higher throttle.

Remember to write the changes on each sheet before moving to a new one.

Next, click on the "Function Map" tab.

The Function Map allows you (in those decoders that support it) to control which throttle function key is mapped to each output wire or operation (e.g. sound effect) of the decoder.

Program <new loco> in Service Mode (Programming Track)

File Reset Window Help

Sound Sound Levels CVs Sound Control Volume Function Output Light Control Multi Auto Lights BEMF QSI Misc.
 Roster Entry Basic Motor Basic Speed Control Speed Table Function Map Lights Analog Controls Consist Advanced

Use this sheet to determine which functions will control which outputs

Description	Output wire or operation													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Forward Headlight F0(f)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reverse Headlight F0(r)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Function 1	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Function 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Function 3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Function 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Function 5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Function 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Function 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Function 8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Function 9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Function 10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Function 11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Function 12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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

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

Program on: Mode: Direct Bit

OK

DecoderPro comes into its own for programming the many and varied options in a sound decoder. Here is an example Sound tab from the BLI F7 where the volume of individual effects may be set. Note the slider at the right to scroll down to see more settings.



Again, remember to write your changes.

Hovering over an item with the cursor will often show a short description for that item, but it is highly recommended that you read the documentation for your decoder to get the best from it with DecoderPro.

Locos that have been saved to the Roster will appear in the Roster View in the main window.

Clicking a Roster entry will highlight the Program button to allow the programmer to be opened again, populated with the previously save settings. Alternatively, click the Identify button and DecoderPro will try to match the

loco against one that is saved in the Roster.

The screenshot shows the DecoderPro software interface. At the top, there is a menu bar with 'File', 'Edit', 'Settings', 'Actions', 'SPROG Programmer', 'Window', and 'Help'. Below the menu bar is a toolbar with buttons for 'New Loco', 'Identify', and 'Help', along with a power icon labeled 'Unknown'. The main area contains a table with the following data:

ID	DCC Address	Icon	Decoder Model	Road Name	Road Number	Manufacturer	Model	Owner	Date Modified
UP997	997		BLI F7					andrew	Apr 21, 2021 ...

Below the table, there is a detailed view of the selected decoder (UP997). The fields are:

- ID:
- Road Name:
- Road Number:
- Manufacturer:
- Owner:
- Model:
- DCC Address:
- Decoder Family:
- Decoder Model:
- Filename:

On the right side of this view, there are radio buttons for 'Programming Track' (selected) and 'Edit Only'. Below these are buttons for 'Program', 'Labels & Media', and 'Throttle'.

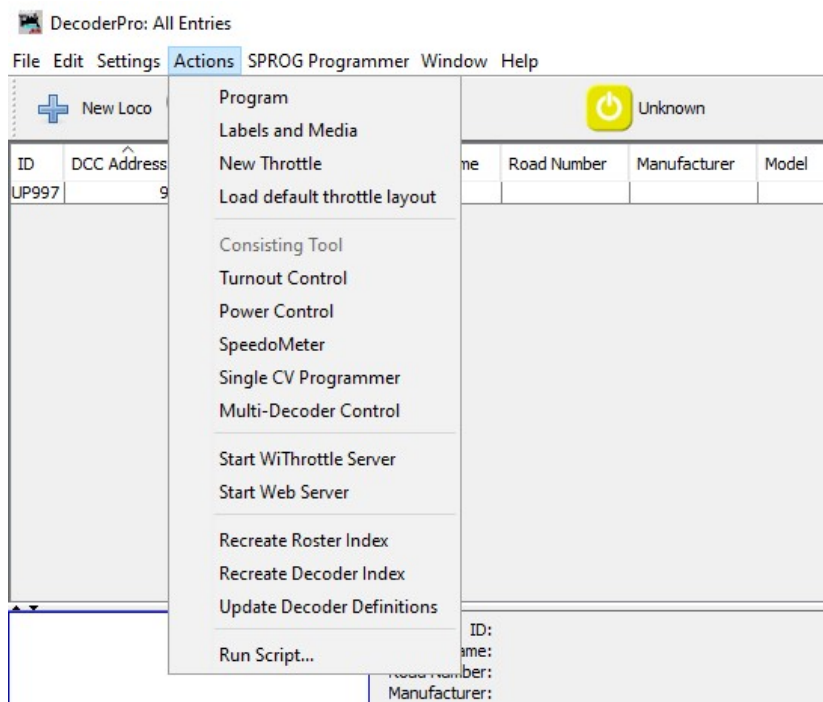
At the bottom of the window, there is a status bar with the following text: 'Service Mode Programmer SPROG Programmer Is Online', 'No Operations Mode Programmer Available', 'Programmer Status: Idle', and 'Active Profile: SPROG 3 COM7 Prog'.

Using the DecoderPro Throttle

Using a DecoderPro throttle, it is possible to test run a loco after programming CVs, e.g., to test the effect of changing the speed table of function mapping. Using a rolling road or a continuous loop of track for programming is recommended for test running.

! Care should be taken when using the service mode programmer that
only one loco is on the layout during programming, or that the layout is isolated except for a short section of track for programming. If a programming operation is performed whilst the whole layout is connected, then incorrect data will be read from CVs and all locos on the layout will be re-programmed.

On the main DecoderPro window, click on the “Actions” menu item and then select “New Throttle”



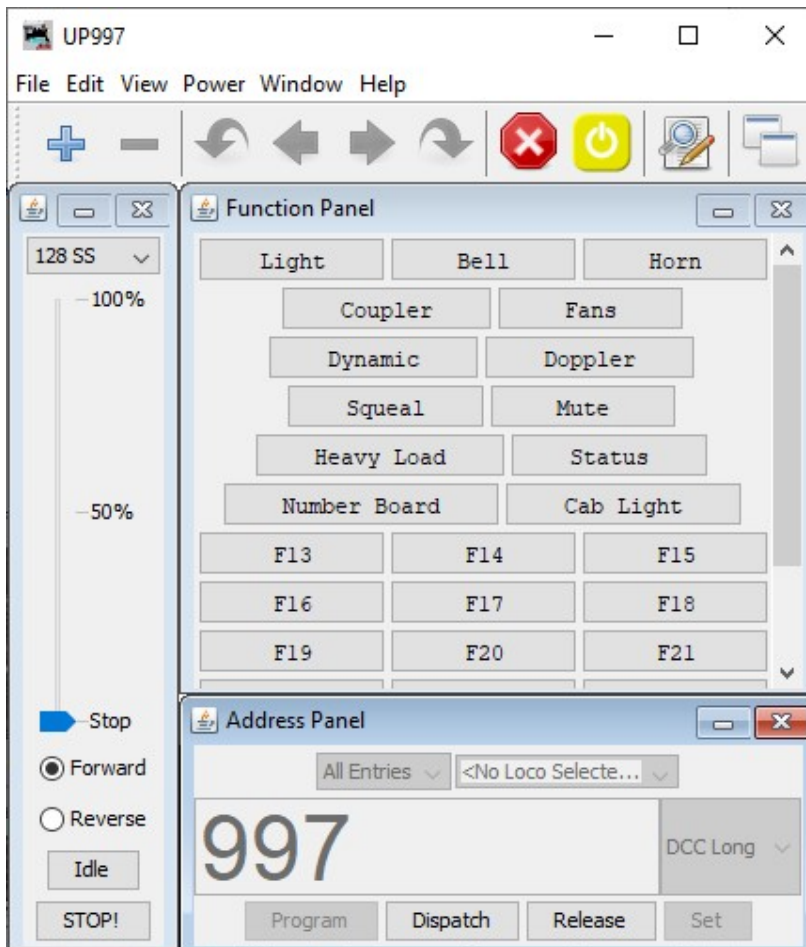
SPROG II, when used as a programmer, supports the use of one DecoderPro throttle. See “Layout Control with SPROG II” for details of how to use SPROG II as a command station with multiple throttles.


When the throttle window opens, enter the loco address and click “Set”.

With SPROG II, loco addresses less than 128 can be short or long

addresses. Use the drop-down to select the address type. Addresses greater than 127 are always long addresses.

Setting the loco address will enable the function buttons and speed slider. In this example the Loco is in the Roster and DecoderPro is able to label the function buttons appropriately.



The Power  icon on the right of the menu bar is the track power control and must be clicked until it is green to turn on the track power. The SPROG II power LED will flash when the track power is live.

Note: After programming using the service mode programmer, the track power is always left in the off state and must be turned on again from the throttle power control before the loco can be run.

The function keys mostly have a latching operation. Click once to turn a function on, click again to turn the function off. This behaviour can be changed by right-clicking a function button and changing the properties.

To control the loco speed, click and drag the slider caret (the pointy bit!). For

fine control of speed, click on the slider just above or below the caret.

The “STOP!” button will stop the loco but does not turn off the track power.

To set a different loco address, click the “Dispatch” or “Release” button.

These two buttons have the same effect with SPROG II.

Measuring Loco Current

Loco current may be measured by using SPROG II in command station mode and using the slot monitor, see “Layout Control with SPROG II”.

Getting Started With PanelPro

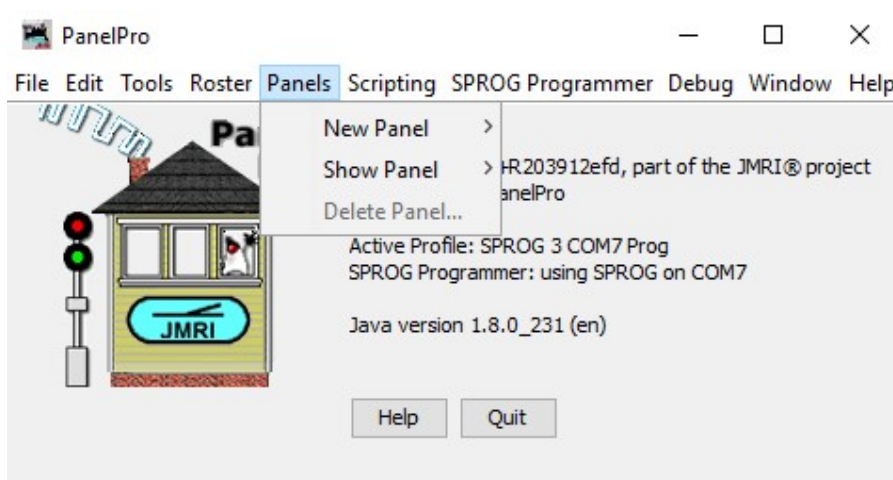
The PanelPro tool included with JMRI allows SPROG II to be used for the control of DCC accessory decoders for point (turnout) control.

The limited output voltage and current capability of SPROG II means that it is not suitable for use with accessory decoders that take power from DCC. Accessory decoders should be chosen that take commands from DCC but use a separate power input for the point motors.

This is only a very brief introduction, see the PanelPro homepage at <http://jmri.sourceforge.net/apps/PanelPro/PanelPro.html> for more details.

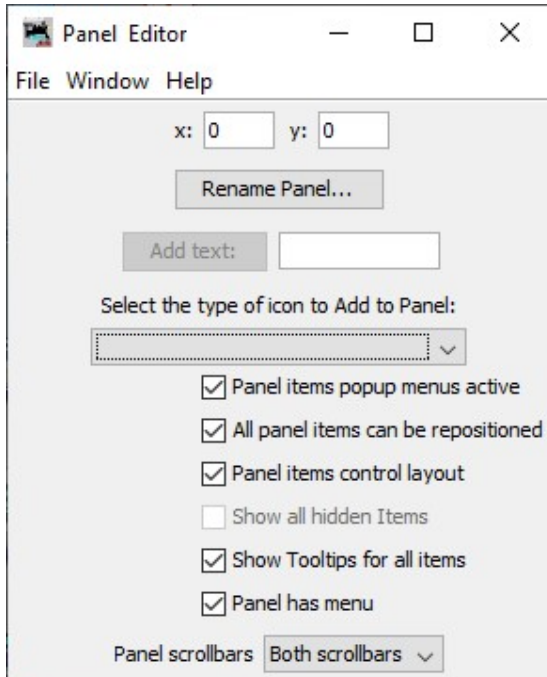
When starting PanelPro you can select the same connection preference as you created for DecoderPro to ensure locos saved in the roster will be available in PanelPro.

On the main DecoderPro window, click on the “Panels” menu item and then select “New Panel...”



Choose the Panel Editor

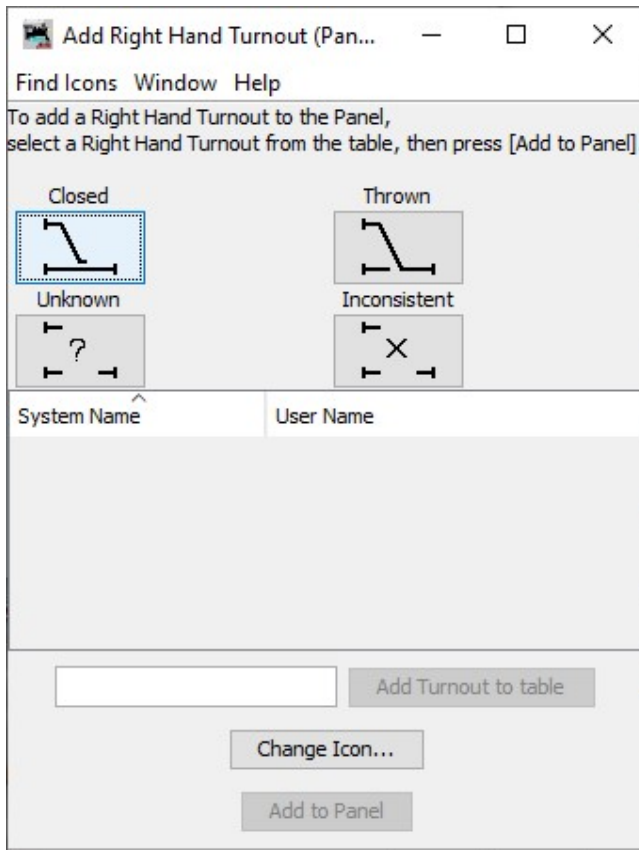
A blank Panel and the Panel Editor window will open



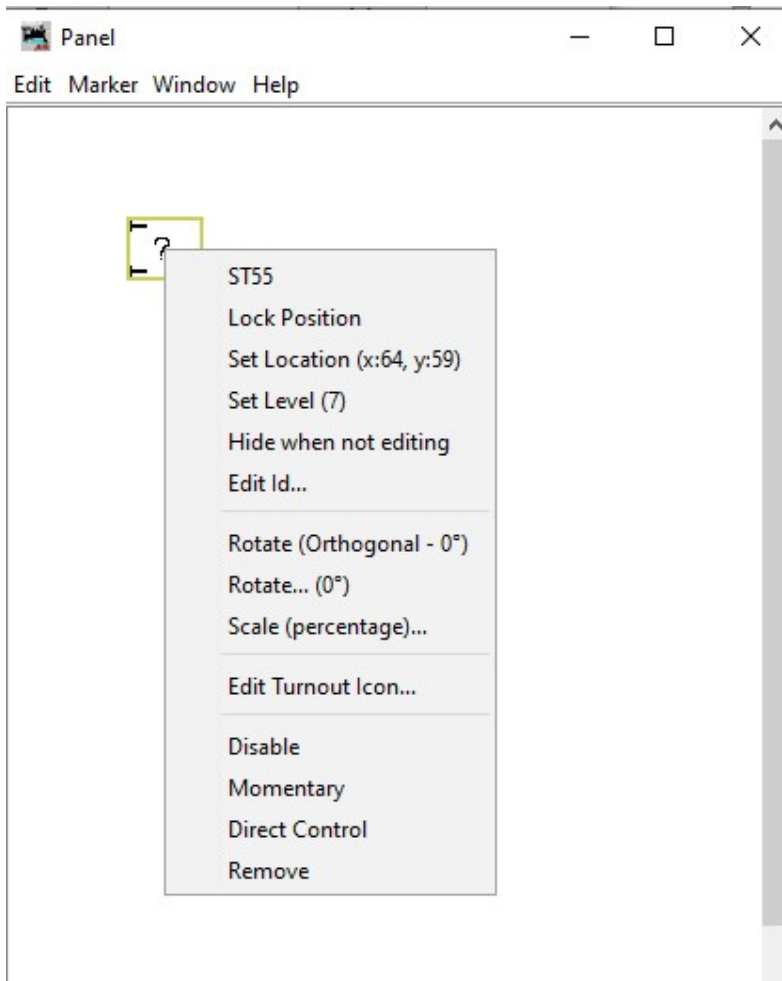
You can set the panel name to be used when saving the panel. Use the File menu in the panel editor to save the panel.

You can draw a background track plan in a graphical editing tool and then load the image as the background for the panel. It may take some experimenting to get the track spacing correct to match the panel icons.

To add a turnout, use the dropdown to select the type of icon to add to the panel.

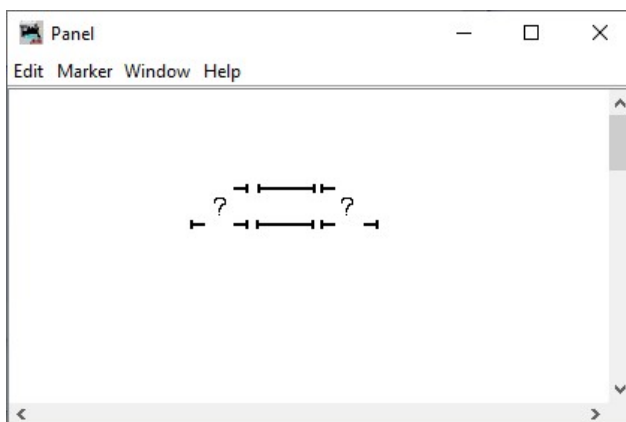


Enter the accessory address of the turnout and click “Add Turnout to table”. Click “Add to panel” and a turnout icon will be added to the panel. The icon may be repositioned by clicking and holding the right mouse button and dragging the icon to its new position. In the example below, a right-hand turnout has been added and moved. The pop-up menu shows the accessory address prefixed with “ST” for “SPROG Turnout”. The turnout may be rotated, disabled or removed using the same menu.



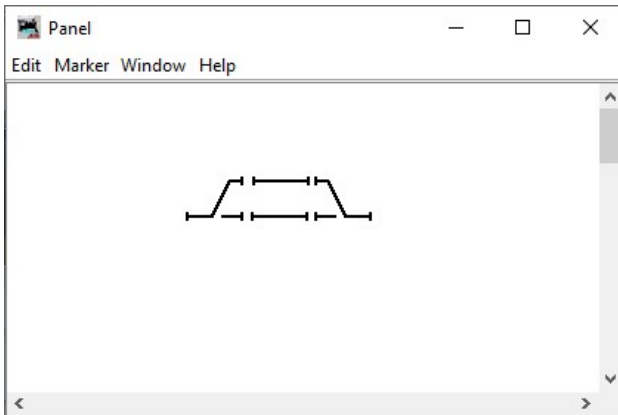
Selecting “Icon” in the Panel Editor will allow a straight track section to be added.

In the next step two straight line segments and a left hand turnout (address 2) have been added and aligned to represent the layout of a passing loop.

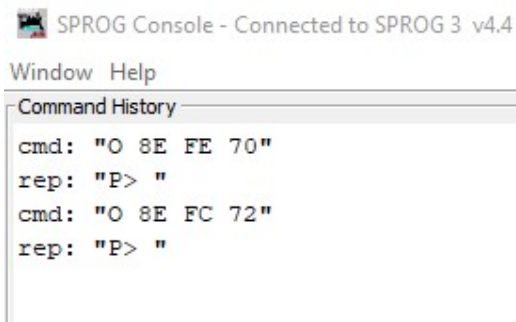


Left clicking on a turnout icon will change the icon and send the appropriate

DCC accessory command to change the turnout on the layout. Here, both turnouts have been clicked to select the route into and out of the passing loop.



The SPROG Console window shows the raw DCC packets that were sent to the layout.



! The track power must be on for any accessory commands generated from the panel to be effective.

This is only a brief introduction. Please consult the on-line help or the JMRI User's group for more details.

Layout Control with SPROG II

SPROG Command Station Mode

A feature in DecoderPro is the ability to use SPROG II as a command station with control of multiple locos through on screen throttles.

When operating in this mode, SPROG II is no longer a service mode (programming track) programmer. CVs may still be written in operations mode (also known as “on the main” programming) but the contents of CVs cannot be read back.

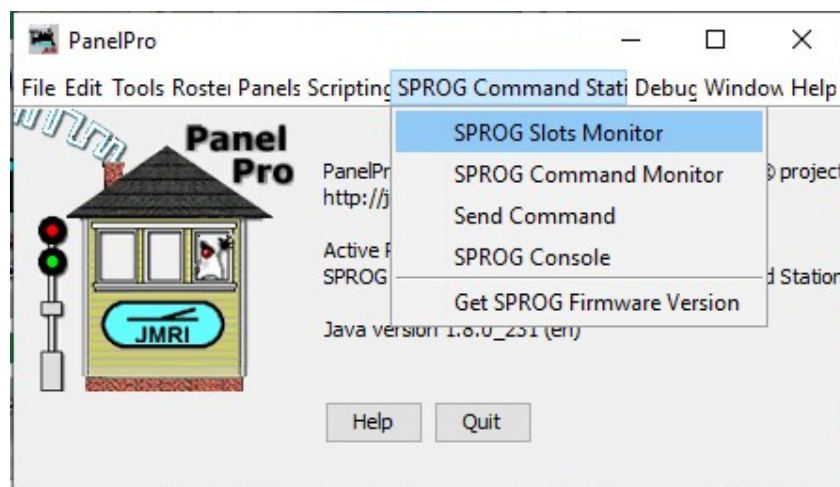
To use SPROG II as a command station, you must first modify the DecoderPro preferences in a similar manner as was done during initial installation of the SPROG II.

Set the System connection to SPROG Command Station rather than SPROG and save the new settings.

Start DecoderPro (or PanelPro) again. You may now open multiple throttles, one for each loco you wish to control. See below for a note on the limit to the number of locos that can be controlled.

Use the power control in any of the throttles to turn the track power on or off.

An additional feature in Command Station mode is the Slots Monitor which is accessed from the SPROG menu in the main DecoderPro or PanelPro window

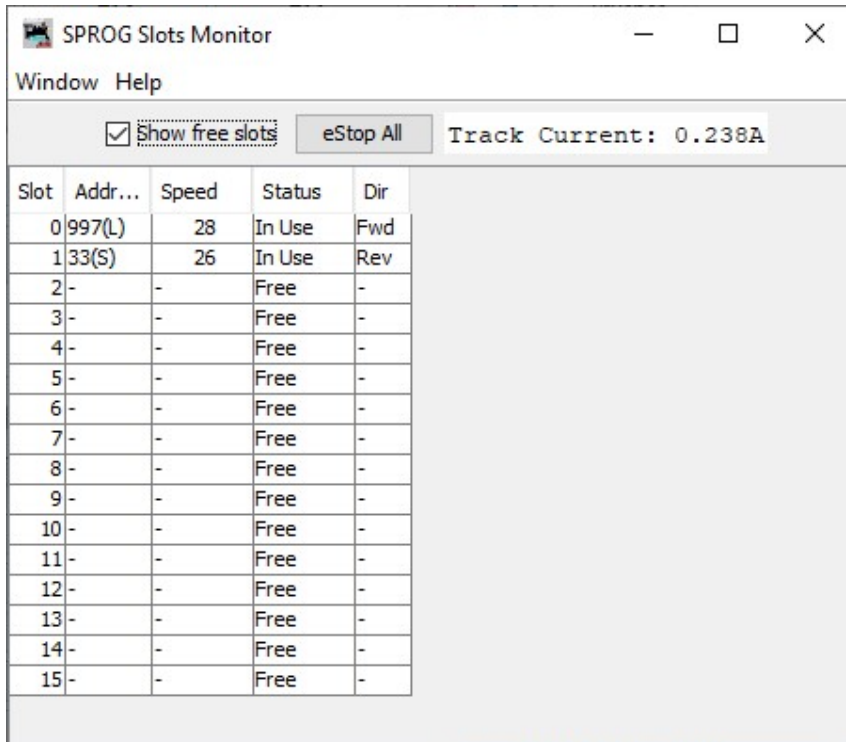


The top portion of the slot monitor contains a checkbox to control whether unused slots are displayed, a button to force an emergency stop of all locos and the output current being supplied by the SPROG II.

The output current reading will not reflect the layout current if an external booster is being used.

The output current readings are filtered and averaged over a number of readings by SPROG II and the display in the slot monitor will change more slowly than the actual output current.

The remainder of the slot monitor is the list of slots, at least one slot is associated with each throttle (see below).



Slot	Addr...	Speed	Status	Dir
0	997(L)	28	In Use	Fwd
1	33(S)	26	In Use	Rev
2	-	-	Free	-
3	-	-	Free	-
4	-	-	Free	-
5	-	-	Free	-
6	-	-	Free	-
7	-	-	Free	-
8	-	-	Free	-
9	-	-	Free	-
10	-	-	Free	-
11	-	-	Free	-
12	-	-	Free	-
13	-	-	Free	-
14	-	-	Free	-
15	-	-	Free	-

In this example, SPROG II is supplying 259mA to the layout. A loco with long address 997 is running forward at speed step 28 and a loco with short address 33 is running in reverse at speed step 26

When you use a function button on a throttle, an extra slot may be occupied for as long as the function is active. Functions are grouped so setting all 28 functions on a loco does not consume 28 slots! To allow for errors in reception, function commands are repeated three times. If the function control is momentary, and no other functions in the same group are active, the slot will be cleared after the third copy is sent.

In the following example two slots are occupied by one or more functions in each of two function groups 0 – 4 and 9 – 12.

Slot	Addr...	Speed	Status	Dir
0	997(L)	F0to4Pkt	In Use	-
1	997(L)	F9to12Pkt	In Use	-
2	-	-	Free	-
3	-	-	Free	-
4	-	-	Free	-
5	-	-	Free	-
6	-	-	Free	-
7	-	-	Free	-
8	-	-	Free	-
9	-	-	Free	-
10	-	-	Free	-
11	-	-	Free	-
12	-	-	Free	-
13	-	-	Free	-
14	-	-	Free	-
15	-	-	Free	-

How Many Locos Can Be Controlled?

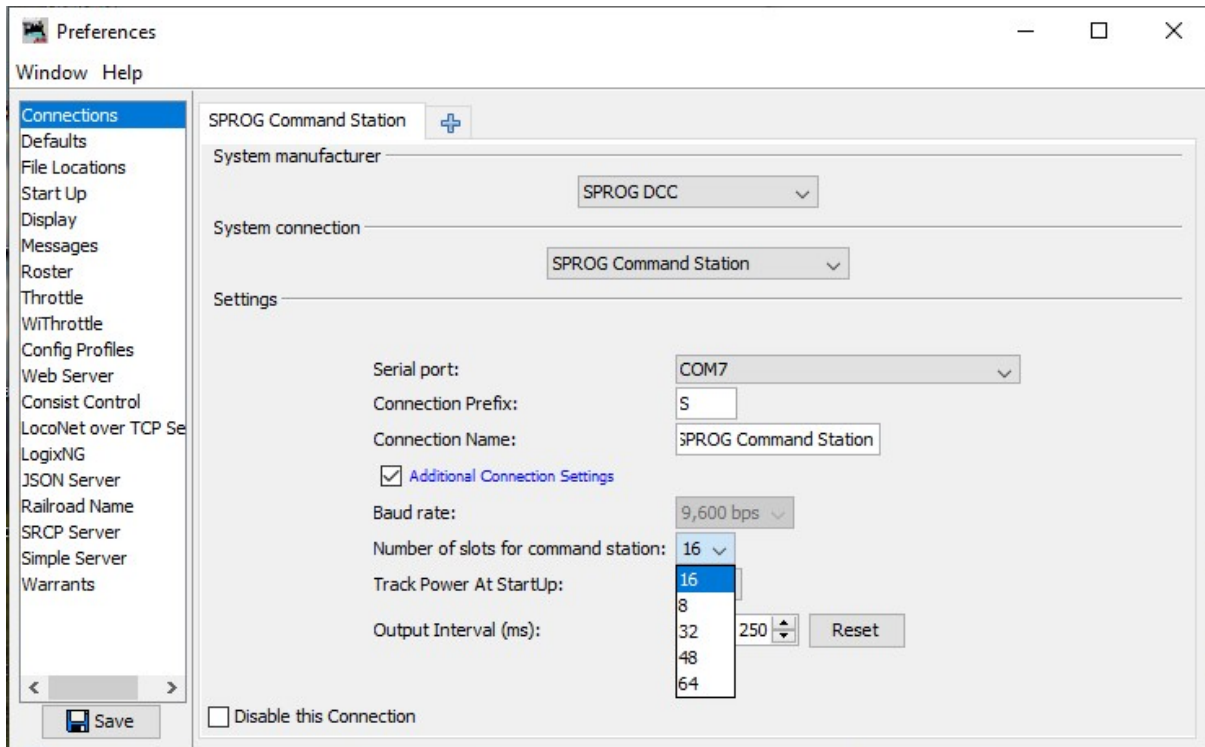
By default, sixteen slots are available, but SPROG II is not capable of powering sixteen locos without an external booster.

Run each loco individually with a representative load and note the current reading. The total required for your layout will depend upon the “diversity” or how many, and which, locos are to be operated at the same time.

It should be possible to run at least 3 or 4 modern HO, 00 or N lightly loaded locos.

Some slots should always be left free for sending function control commands. These free slots will be shared between throttles as required, it is not necessary to have a free slot for every throttle.

From JMRI version 4.23.3 an advanced connection preferences allows more slots to be used. This can be accessed by selecting the Additional Connection Settings checkbox when editing the preferences.



The more slots that are occupied, the longer the delay will be between commands sent to an individual loco.

Enabling more slots is useful if latching (i.e. non-momentary) functions are being use in multiple locos.

Short (one byte) Versus Extended (two byte) Addressing

In SPROG Command Station mode the allowable address ranges are:

- Short addresses in the range 1 – 127
- Extended addresses in the range 1 – 10239

Using an External Booster with SPROG II

Please consider the SPROG DCC SBOOST, a 2.5A booster that is designed specifically for use with the SPROG family of programmers.

Connecting and Using Multiple SPROG IIs

At the present time it is not possible to use the alternate connection method in DecoderPro to connect a second SPROG II.

It is, however, possible to run two (or more) separate instances of DecoderPro connected to two (or more) SPROG IIs, e.g.

- One SPROG II in command station mode running the layout

- One SPROG II in normal or command station mode running PanelPro to control accessories

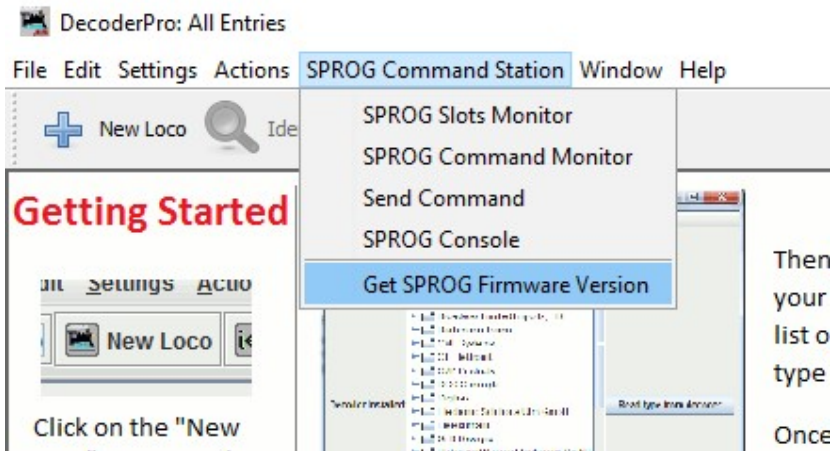
- One SPROG II in normal mode connected to a programming track

If used this way, the programming track should be wired via a DPDT switch so that it can be connected to the main layout (to allow locos to be driven on to it) or connected to the SPROG II programmer, not both at the same time.

- ! Never connect more than one SPROG II or a SPROG II and any other DCC booster or DC controller to the same section of track.**

Determining the SPROG II Firmware Version

Select “Get SPROG Firmware Version” from the SPROG menu



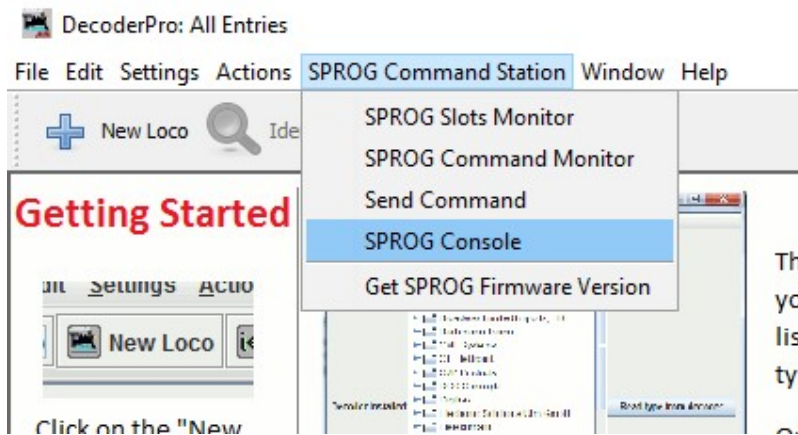
The SPROG firmware version will be displayed in a new window.



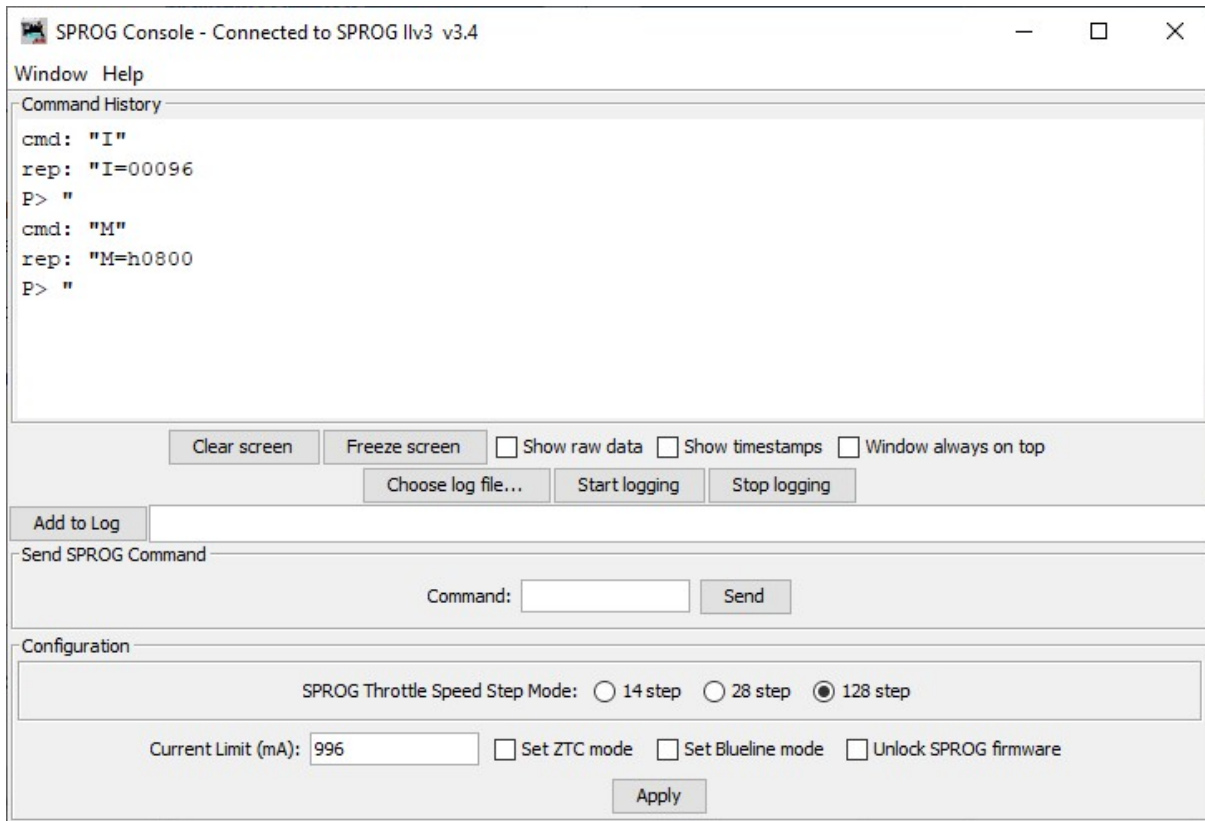
Click “OK” to close the window.

The SPROG Console

The SPROG console allows optional SPROG features to be enabled and disabled. Select the SPROG Console from the SPROG menu



A typical console display is shown below. Some features may not be available, depending upon the firmware version of the SPROG.



Title Bar

The title bar includes the type and firmware version of the connected SPROG, e.g SPROG Ilv3.

Command History

The command history pane provides the same functionality as the basic Command Monitor (available on the SPROG menu) and captures commands to and replies from the SPROG. The history may be saved to a file on the computer by first choosing a log file and then selecting “Start logging”. The command history can be useful in diagnosing problems encountered in using the SPROG.

The “Add Message” field can be used to add annotations to the command history.

Send Command

The “Send Command” field provides the same functionality as the basic Send

command utility available on the SPROG menu. Enter a command in the Command field and press return on the keyboard or click the send button to send the command to the SPROG.

Selecting SPROG Operating Modes

- ! After changing any of the following modes, you should use the “Save” button to store the changes in the SPROG.

Speed Step Modes

Choose the speed step mode to be used by the SPROG throttle. The default is 128 step, which is recommended for all recent DCC decoders.

Current Limit

Set the current limit for the SPROG track output when using a SPROG throttle, or when connected in Command Station mode. The maximum current limit is 996mA or 0.996 Amps.

Set ZTC Mode

Some older ZTC decoders cannot be reliably programmed on some systems, even though they conform to the DCC standards. Select this option to configure SPROG for programming these decoders. It should still be possible to program other decoders with this mode enabled. If in doubt, disable this mode by de-selecting the tick box.

Set Blueline Mode

Blueline decoders use a slightly different interpretation of the DCC standards for direct mode programming to that normally assumed by SPROG. Select this option to configure SPROG for programming Blueline decoders in direct mode.

It will still be possible to program most other decoders with this mode enabled, but reading CVs from the decoder will be slower. If in doubt, disable this mode by de-selecting the tick box.

Unlock Firmware

Select this option if you are about to update the SPROG firmware using the bootloader. This mode is automatically canceled when the power is removed from the SPROG.

Save

Always click this button after selecting a new mode. The selected modes (apart from “Unlock Firmware”) will be stored in the SPROG, so that they are effective each time you use your it, even after the power has been removed.

Updates to the SPROG II Firmware

The “firmware” is the small computer program that runs on the microprocessor at the heart of the SPROG. Occasionally it becomes necessary to update the SPROG firmware to add new features or fix bugs.

The SPROG DCC philosophy is that all versions of SPROG, whether SPROG or SPROG II, USB or serial are totally forwards and backwards compatible and that any new features and bug fixes are made available to all existing users.

The firmware can be updated by returning your SPROG to SPROG-DCC (or appointed representative) or, for some SPROG versions, by using the “bootloader” (see below).

Returning Your SPROG for Update

If your version of SPROG does not support the bootloader then please contact us to discuss returning it for update. This is usually free of charge but return postage is always appreciated. To avoid a large workload, please only request an upgrade if you are sure you require it, e.g. for programming QSI sound decoders.

Firmware Update Using the Bootloader

! Currently, the bootloader is only supported on USB SPROG IIs with firmware version 2.4 and above.

The “bootloader” is a feature of SPROG that allows new firmware to be downloaded to the SPROG via the normal USB connection.

Before proceeding, please download and install DecoderPro version 2.12, or later and ensure that your SPROG is firmware version 2.4 or later (see “Determining the SPROG II Firmware Version”).

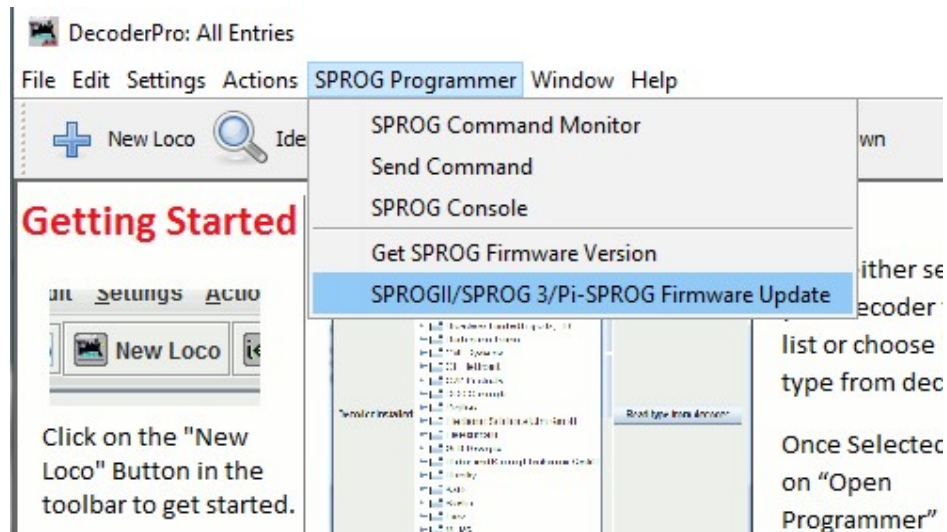
Download the new firmware (if available) as a .hex file from the SPROG-DCC website and save it in a convenient place on your computer.

If the bootloader download is interrupted for some reason (e.g. if power or USB connection are removed), the SPROG may be left in an unusable state. In this case it will need to be returned for repair.

Follow the step-by-step instructions to download the new firmware:

1. Open the SPROG console in DecoderPro (see “The SPROG Console”).
2. Tick the “Unlock firmware” selection by clicking with the mouse.

3. Click “Save” and close the Console.
4. Select the “SPROG II/SPROG 3 Firmware Update” utility from the SPROG menu.

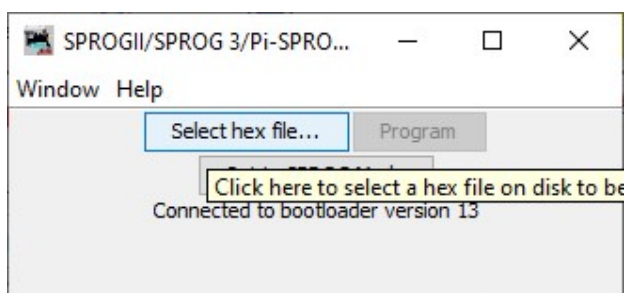


Click “Update” if you have the new firmware file available and are ready to

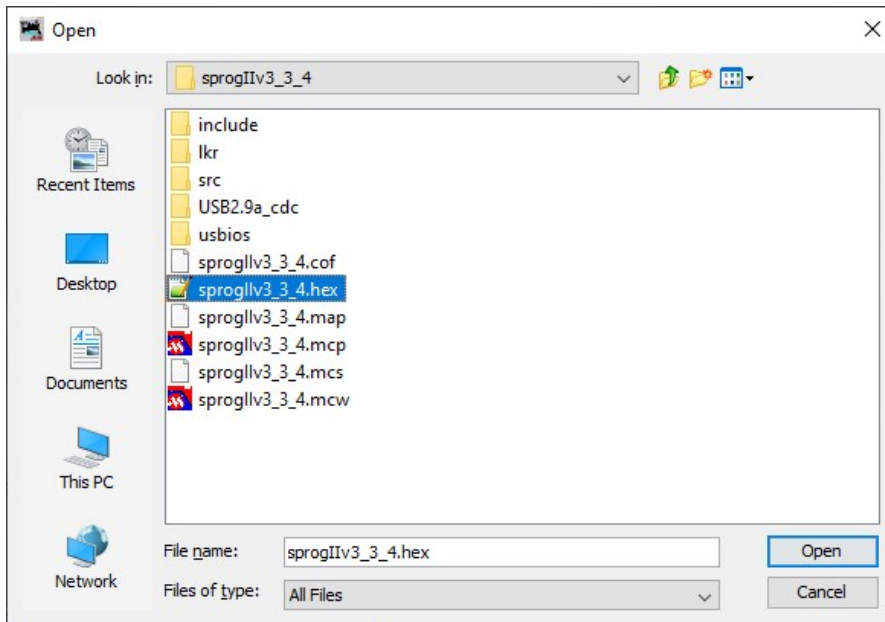


proceed.

Click “Select hex file” and navigate to the directory where you saved the downloaded .hex file.



Open the firmware file.

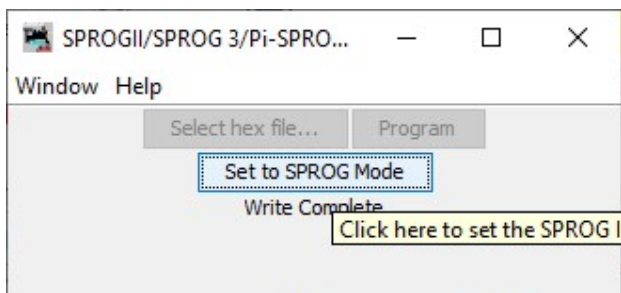


Click “Program”

First the old firmware will be erased, and then the new firmware will be written. Progress is reported in the status line of the window. If the Console is still open, you will also see the messages flowing between the computer and the SPROG.

You may see a pause in activity with the message “Skip Bootloader”. This is normal, the software is skipping over (not reprogramming) the bootloader itself.

When “Write Complete” is displayed, click “Set SPROG Mode”.



Close the window and the firmware update is complete.

Troubleshooting

Before reporting any problems please check the SPROG II homepage for any bug reports or updates. There is a SPROG II FAQ page which will be updated to reflect the most common questions people have about SPROG.

One common problem is the configuration of the “Virtual COM Port” for USB SPROGs. Please review the information in the section “Edit DecoderPro Preferences”.

If you are experiencing intermittent faults with your SPROG, please ensure that you are using a good quality DC, regulated power supply.

If you have problems with programming a decoder, or operating DecoderPro throttles, for instance, please use the SPROG console (found under the SPROG menu in DecoderPro), recreate the problem and send the output of the command monitor to sprog@sprog-dcc.co.uk or (for North American customers) sprog@bbmgroup.com with a description of the problem.

Useful Links

SPROG homepage <https://www.sprog-dcc.co.uk> for the latest information, updates, downloads, etc., for SPROG II.

North American distributor for SPROG II <https://www.bbmgroup.com/sprog>

SPROG DCC group <https://groups.io/g/sprog-dcc/topics> for latest news and discussion of DecoderPro.

Java Model railroad Interface <https://www.jmri.org/> for DecoderPro.

JMRI group <https://groups.io/g/jmriusers/topics> for latest news and discussion of DecoderPro.