Speed matching locos with a SPROG, DecoderPro and Accutrack Speedometer

Preparation

I use an oval of track, made up of 8 curved sections and 6 straight equivalents (allowing for power connectors, and rerailer sections for convenience) made by Kato.

First, make sure that the track is set up and connected right, and is clean.

Next, check that all locos that will be speed matched are running as expected.

Run each loco for 5 minutes, slow and fast, forward and reverse, to make sure everything is as expected. If any loco is wildly out of speed with the others, it is a candidate for some servicing. Random hesitancy is usually a sign of wheels or track needing cleaning.

Any loco that is reluctant to start at low speed steps should have its kick–start voltage (if supported by the decoder) adjusted until it just starts to move at speed step 1.

Ideally, all locos will crawl very slowly at step 1, run at the desired maximum speed at full throttle, and have a linear speed curve in between. The procedure described here will enable you to adjust any locos that do not meet that, in order to be as close as is practical to the other locos with which they will be required to work.

Typical Usages

A general-purpose mainline freight loco on most railways will need to run at up to 60-75mph, and have good speed linearity from 0-75. Express passenger locos can have higher target speeds, while a switcher will not be required to exceed 25mph in most cases, but will want very fine speed control at the lower end of its speed range. Select the right usage for a loco, and set it up for the most useful speed range to meet that need.

The Accutrack speedometer is a compact unit that sits over the track, and will give the ability to set the top speed of the locos to the planned scale speed, and then match intermediate points to get consistent behavior of all the locos across the whole speed range. Of course, it is possible to match two locos to each other without a Speedometer, and to measure scale speeds by timing the loco over a known distance, but this Speedometer unit makes the whole task much easier, and more enjoyable too!

SPROG and DecoderPro Setup

The SPROG and DecoderPro are installed as described in the standard instructions.

I am initially describing using the Programming Mode (also called Service Mode in DecoderPro) to set up each locomotive individually.

In DecoderPro, make sure that you have all locos in the roster. This is very simple to do if you have not already done this; just put the loco on the track, and click New Loco. Run through the selection steps, and save the details with a unique "ID". Once saved in the Roster, it is easy to recall the settings for that loco and reuse them.

Then to use any loco, put it alone on track and click Identify.

Once the loco is recognized, click the Program button to open the Program views, and select the Speed Table pane.

Now also open a Throttle; go back to the Roster window and click the Throttle button, or pick New Throttle from the Actions menu. During this procedure we will switch between the Throttle (to run the locos) and the Program Speed Table (to adjust settings) numerous times, and so you want them on screen together.
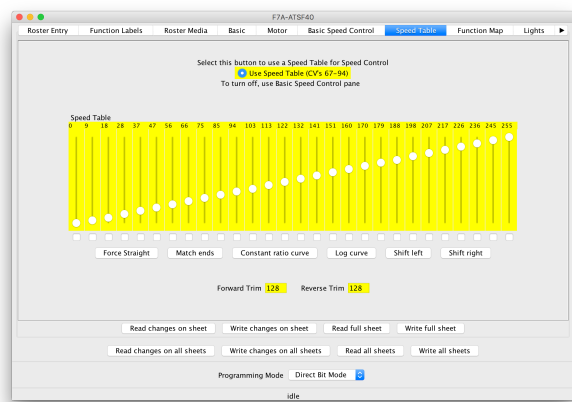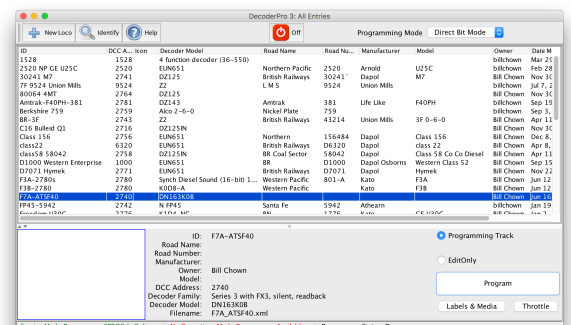
Example

For my first example, I am setting up an N Scale F7 pair of A and B units to run as passenger locos for the historic Santa Fe trains. These F7 units were originally rated for 100mph maximum operating speed, and so I will adjust these to meet that range.
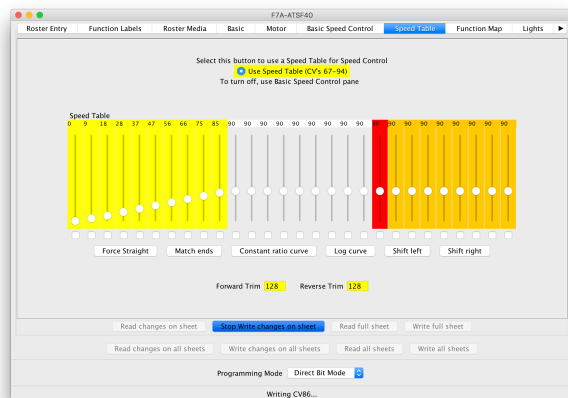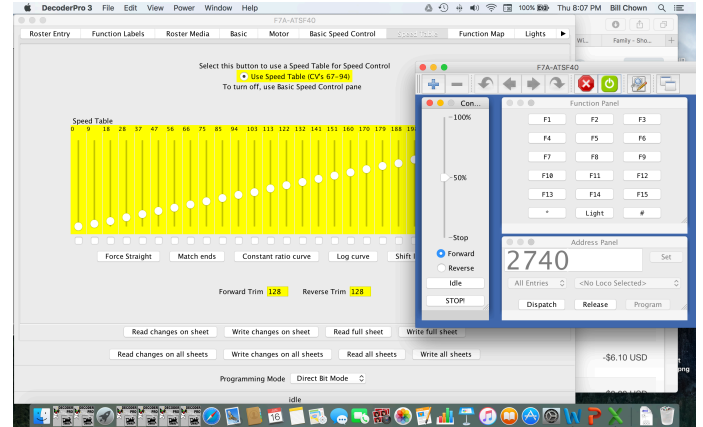
In this case, the A unit has a Digitrax drop-in decoder DN163K0B, and the B unit has the same drop-in.

On first running, both A and B units ran at well over 100 scale mph even at mid throttle setting, and so a first step is to adjust the top speed to meet the 100mph target. I started the adjustment procedure with the F7A alone on the track.

With both views on screen, I turned on the track power (showing green at the top of the Throttle view) and set the speed with the slider.
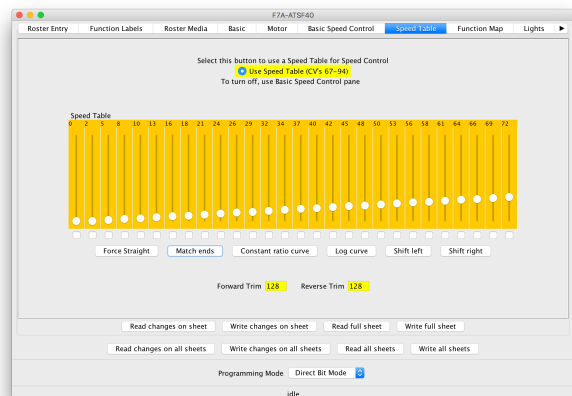

The initial speed curve showed linear default settings, and so a first step was to pull down the right hand slider to an approximate estimate of the desired point to deliver 100mph at full speed.

To do this, it is not necessary to stop the loco, or turn off track power. Just click in the Speed Table window, and adjust the slider to suit.

Note here I have only pulled down the right hand slider, and as it reduces, so DecoderPro successively reduces each lower slider too. This ensures that higher steps equate to higher speed settings, and you don't end up with strange curves!

Then click the Write Changes on Sheet button, and the loco will stop, the programming will occur, and you will see the sliders change color as each programming step takes effect. When all sliders have cleared the color, showing the write was successful, click in the Throttle window again, and then turn on track power by clicking the (now red) power button.

I selected 90 out of 255 as a first try, and then ran the loco again. Still too fast, and so a progression of reducing the setting of the top Speed Table entry, and retry the circuit around the loop arrived at 72 as the right setting for top speed.

Now to set a middle point speed, we need to align those sliders into a more normal slope. There can be reasons to have different shaped curves, but this example of a flat speed profile for all steps above about 30% would not be a very likely choice. See later in this article for more about the value of some other curves.

To align the speed steps, just click the Match Ends button, and DecoderPro will set all the sliders to a straight line between the bottom end setting and our newly selected top speed, in concept giving us a linear speed curve and so we should expect 50 scale mph at 50% throttle.

Write Changes on Sheet again.

Testing this loco at 50% showed a significantly higher speed at 50% throttle, and so now we want to adjust the curves evenly to give the right mid-point speed, without affecting the end points, or introducing any flat areas again with no differences between steps.

The Speed Table includes a very effective mechanism to do this in the form of the small check boxes at the bottom of each slider.

Check the first and last boxes to hold those positions, and then we want to move the mid point. Check that box as well, and then when moving the slider for step 14, DecoderPro will maintain a straight line between there and each end point (which we are not moving).

Write Changes on Sheet once more, and run the loco again to check that adjustment has met our goals.

In this case, the speeds required are now programmed into the loco, and so we can close the Program activity, and save the settings to the Roster. When closing the Speed Table view, you will see a box showing "these settings have not been saved to the Configuration File" and asking if you wish to save. Select the Save and Close button, and the Roster entry will be updated.
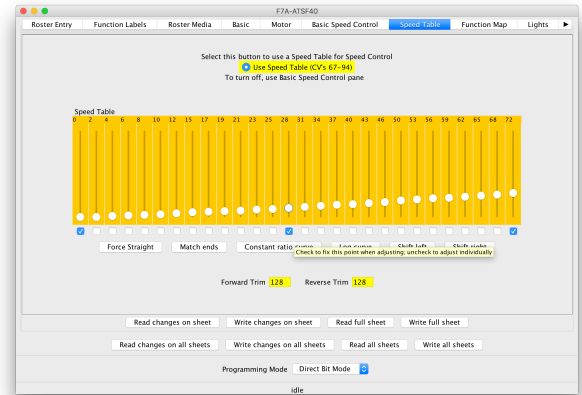
The next loco

For the B unit, as this has an identical decoder in it, I was able to use a simplification to the process. I just set both A and B units to the same decoder address, and used the same initial Roster entry for both. My first step was to access the B unit loco as above, and then select the Speed Table pane and write the Full Sheet. This should set both locos to similar performance.

Although these are nominally identical mechanisms and exactly the same decoder type, the B unit ran more slowly, and increasing the step 28 value to 74 was required to get 100mph through the Speedometer. Then adjusting the value of step 14 down to 36 delivered the desired speed at 50%.

Saving those values

Of course, now I have two different sets of Speed Table values, and I'll want to keep track of that. So, temporarily I can discard the changes I made for the B unit in the Roster entry I am using, which was created for the A unit. Close the program views, and do not "save to the Configuration File" the changes made in programming the B unit. In the Roster view, select the item for the A unit loco, right-click on it and select Duplicate. Give it a new ID name, and you now have a Roster entry for the second unit. Select that entry, open the Program view, select the Speed Table, and Read Full Sheet to import the values from the loco. Close and this time do "save to the Configuration File". Now you have saved the actual values for each loco and can adjust as needed in future.

Now the final check; run both locos at selected speed steps across the range and look for closing or opening spacing between them. For locos needing different addresses, now is the time to reset those.

Three point speed settings, or Speed Table

Some decoders support Speed Tables, some support Min, Max and mid point 'voltage' settings, so have only Min and Max, and so it is important to check what your selected decoder can support before starting on Speed matching. In the example above, although these Digitrax decoders support both Speed Table and all 3 points, I chose to use the Table, but used it as if I were just setting the Min, Max and Mid values. The same techniques described can also be used with the Speed Table to control – for example – the 25% and 75% points or finer granularity, and so it is the most flexible option. As explained, the effort and time to use this method is about the same as the three points would be.

A future edition of this article will cover more features and several other examples.

SPROG DCC, from the BBM Group.   http://sprog.us.com   June 2016