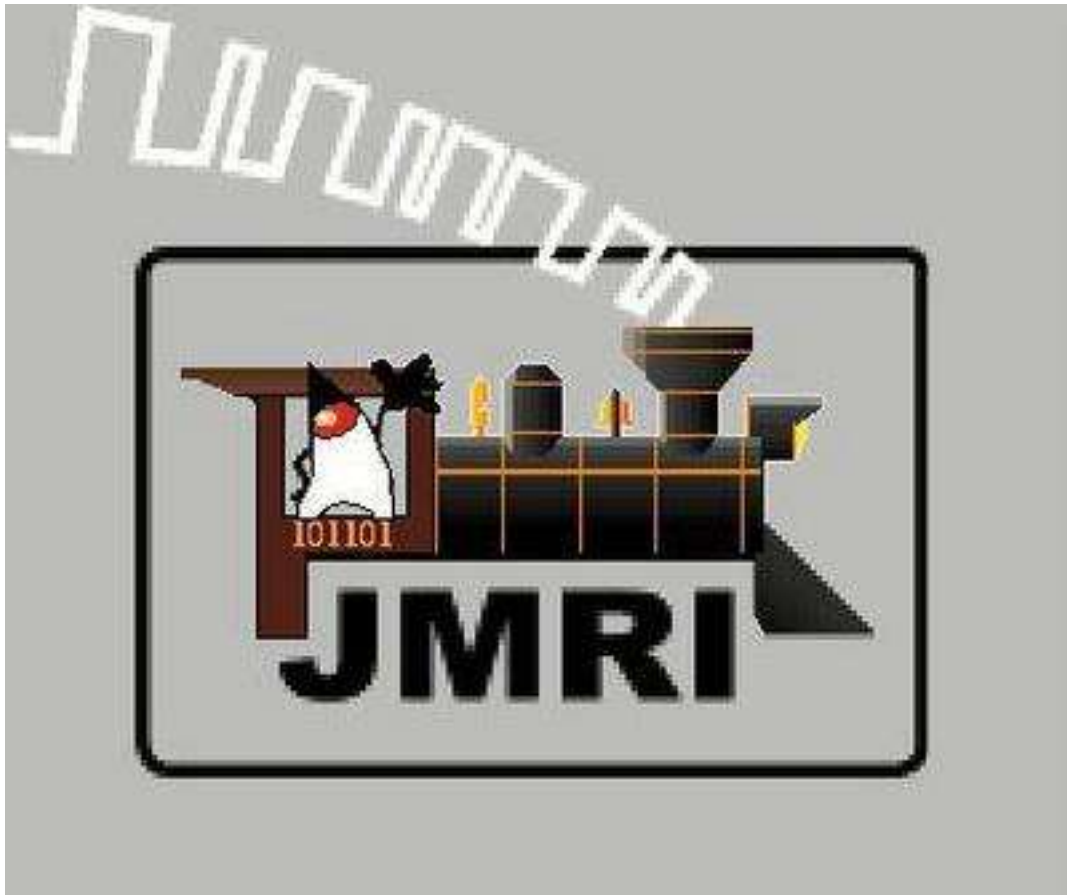


Java Model Railroad Interface



Decoder Pro Clinic - 2018

Hosted by Division Seven

Australasian Region of the NMRA

These notes were prepared for a 4 hour “Hands On” clinic for the NMRA. The clinic was held at the Berowra Library on 25th August 2018. The notes were also intended to be “Hand Outs” at the NMRA Regional Convention on the Gold Coast at the end of September. There were 20 members at the clinic – sitting in pairs with their own laptops and programming devices.

Introduction to the JMRI Programmer

Modern DCC decoders are complicated beasts to program. The simple idea of "put the address in CV01" doesn't cope well when you program complicated functions using combinations of bit patterns. A friendlier interface is needed. There are programs that provide better ways of programming specific decoders. Unfortunately, they are limited to specific types of computers, and only their authors can customize them for new types of decoders.

The **Decoder Pro** programmer is meant to improve this. It is configured using text files, so that it can be adapted to additional decoder types easily. It talks to the decoders using the JMRI programming interface, so that it can run on any computer and layout hardware that JMRI has been ported to. It's freely available for download. **YOU DO NOT NEED TO KNOW ANY CVs** (Configuration Variables) when using **Decoder Pro**.

What you do need - - to use Decoder Pro

Decoder Pro will work on **Windows, Linux, Macintosh** (Mac OS 8.6 through 9.2 and OS X). You need to have a serial port or USB port available, either on the computer itself, or via a USB adapter. You also need to have a connection to **your DCC system**.

As there are **38 DCC systems** that will connect to JMRI and many of the systems have multiple options, I will not go into them here. All the details for each system can be found on the **JMRI website**.

Once you have the Computer connected to you System you can start programming.

THIS CLINC will cover *suggested ways of setting up the screen for your needs and then how to "detect" a decoder and do most of the basic settings with general tips when reading and writing.*

Introduction to Decoder Programming.

Just like any other computer, 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, then - 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. To add to these we have "Indexed CVs" which give us up to 1200 more CVs. While this lets you do a lot with very little memory, it can get very complex for those of us that aren't on speaking terms with binary code.

A **bit** is the smallest piece of information a computer can deal with. A bit can be **on** or **off**. Consider your flashlight. It is a bit -- it's ON or OFF. It's that simple!

In more technical terms, a bit (binary digit) refers to a digit in the binary numeral system, which consists of base 2 digits, that is, there are only 2 possible values: 0 (Off) or 1 (on).

We use the following notation to represent the status of a bit. In its OFF state, we show the bit as a 0 (zero). In its ON state, we show the bit as a 1 (one).

Well, a bit is nifty and all that, but it doesn't do much or represent very much by itself. It can't count or can't keep track of multiple pieces of information. So we need to complicate things.

A byte is simply 8 bits in a row. Or, think of it as 8 flashlights, all lined up. Each flashlight can be on or off.

7	6	5	4	3	2	1	0
---	---	---	---	---	---	---	---

Binary Arithmetic

Always remember-- in most cases you DO NOT have to translate back and forth between Binary and Decimal!

Of course, you should know how to convert back and forth-- it's what makes CVs in your DCC decoder so much **-FUN-**

Just as in the Decimal world, we have columns, and each column represents a "power of 2."

128	64	32	16	8	4	2	1
-----	----	----	----	---	---	---	---

Besides decimal counting we also have Hexadecimal – counting to a base of 16 instead of a base of 10.




BUT you do not have to remember ANY of this just use Decoder Pro

Start up Decoder and Programmer selection

You'll get a new window to configure the programmer with information about a specific type of decoder, or an existing locomotive. This will become your locomotive roster as you program your decoders.

 DecoderPro: All Entries

File Edit Settings Actions SPROG Programmer EasyDCC via Serial Window Help

 New Loco  Identify  Help

Roster Groups	ID	DCC Address	Icon	Decoder Model
All Entries	CEFX1006	1006		AT100LC/KT100LC Diesel
Don Tydd	GN 1012	1012		TSU-1000 DRGW K-Class Steam
Gerry Hopkins	BNSF 1016 bh	1016		WOW Diesel 101 SS2
Peter Jackson	NSW 1018 mw	1018		M1
Warren	GN 1028	1028		TSU-1000 Lt Logging Steam
	GN 1056 gh t4	1056		T4X
	GN 1056 gh v4	1056		WOW Steam 101 SS4
	LMS 1072 gm	1072		ECO-200 UK Steam
	NSW 1100	1100		D13SR

To start working with a newly-installed decoder, click the adjacent **"New Loco"** button to open the list of decoders, then have the programmer read the decoder and attempt to identify it. (You could also explicitly tell the programmer the decoder type). While the programmer is talking to the decoder, status will be displayed in the bottom of the window; "Idle" or "OK" means that things are working. If it succeeds, it will select the decoder model in the selection box. Usually it will only be able to narrow the selection down to a few choices. Check that the right model is selected in the "Decoder Installed" box, update the selection if desired.

Some people prefer a very simple programmer, and some want to have access to every feature. To handle this, Decoder Pro provides several different programming interfaces:

- * **Basic** - A simple one, with just the most popular information
- * **Comprehensive** - The most complete display, with multiple panes of detailed information.
- * **Advanced** - Add advanced panes to the Comprehensive Programmer including a photo of the loco.
- * **Registers** - Complete configuration for a register-only decoder. Very, very, very old decoders.

The first screen lets you set up the **ID** for the file containing all the changes you make to the decoder. It also has the space to set up other data and notes for your own personal use.

Nothing technical here just straight forward information you can type in.

Speed Steps this is normally set to 28/128 the old option on decoders was 14 speed steps but many modern decoders do not have this option.

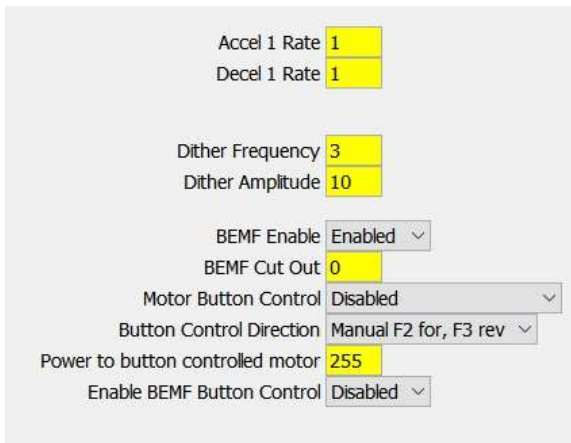
Analog Conversion Mode means the loco can run on DC as well as DCC. It is always advised to turn off the DC option for numerous technical reasons if you are only using DCC. Click "Write Changes". Once this pane is set up we can go on and set our preferred options for the loco.

The next pane is the Motor Control pane. Here you can set up the Acceleration and Deceleration rates. My advice for a starting point is to set Accel to 25 and Decel to 15.

The next screen is called **BASIC** and as the name implies, it has the basic detail information for identifying the loco such as the number on the side of the cab, direction, number of speed steps and whether it can run on DC as well.

This image shows the **number** on the cab and as it is only two digits it is referred to as Short Address.

Also shown here is the **direction** of travel, depending on the decoder you may have to change the way the lights operate but that is on another pane.



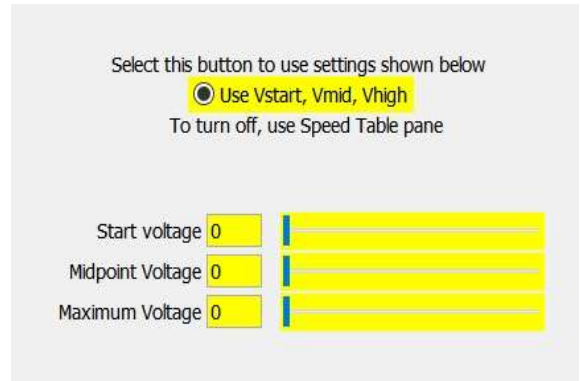
This will work well for most decoders – ESU decoders would have these set - Accel to 100 and Decel to 60 for the same effect.

The rest of the setting on this pane can be left at default for now. The information here will vary depending on the Brand and whether it is non-sound or sound.

of your loco. This is a must if you intend to run locos together – it is called “speed matching” but more of that later.

As most decoders have **Back Electro Motive Force** the start voltage can be left at “0” for now.

We must set the **Maximum Voltage** then the **Midpoint Voltage**. We do this by sliding pointer along the scale until the desired speed is obtained then set the Min Point to about half this.



Out of the box a typical British 4-4-0 loco can run at 230mph – just a little too fast. As a rule of thumb, top speed would be set at 30mph for most locos. **Remember** – with DCC you walk with your train to observe signals, sound the bell, sound whistle/horn as required so 30mph is a good speed.

“With DCC you drive the train NOT the layout.”

Momentum or No Momentum . . . that is the question.....

On different chat lists and at modellers’ meetings, the subject of momentum comes up. Some like it - some hate it. Often the question is “what values do you put in CV3 & CV4?” Although these are the two CVs for the momentum values, there are a number of other factors to take into account that can make the results very different.

First, I set the start speed – loco should just start to move on the first throttle step. On some decoders this is very easy (TCS WOW + Tsunami 2) others need a little adjustment of the BEMF (Tsunami 1 and to a lesser degree the Econami). When set correctly – makes driving a pleasure rather than frustration.

The next part is often overlooked – the top speed! The top speed on my layout is 30 mph for the mainline and 20 mph for switchers. In the Tsunami 1 this is done with the speed table but with the Tsunami 2, Econami and the WOW - then CV5 & CV6 are used.

How does all this relate to the setting in momentum? For both CV3 & CV4 a value of “1” means the time it takes to move from 1 speed step to the next is 0.89 secs. If 30 mph is at speed step 10 then a “nice” brake rate is 10 in CV4 this is 8.9 secs to come to a stop. If 30 mph is at speed step 28 then a value of 10 in CV4 will bring the loco to a stop in 25 secs. The maths have been rounded for simplicity.

When using the brake in a Tsunami or ECO – a value of 120 in CV4 will allow the loco to “coast” for a reasonable distance. With a setting of 110 for the brake, then 120 minus 110 is 10 a “nice” setting.

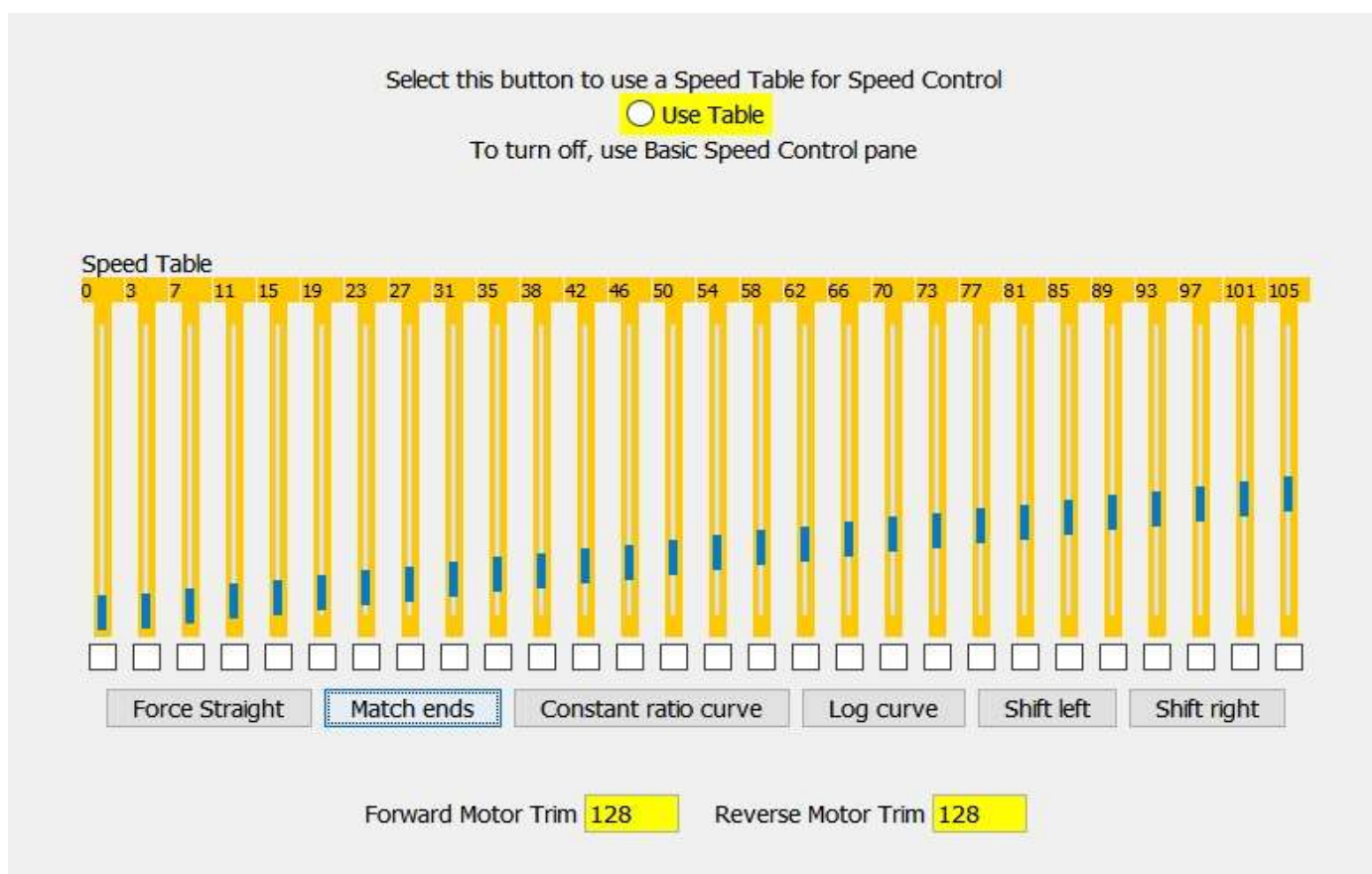
When using the WOW brake, there are 5 settings – you can press the brake up to 5 times for it to stop. First press is 20% brake, second press is 40% brake and so on.

The above momentum settings work for any decoder – we can then add sound to the mix. Because of the “lag” between the decoder setting and the level set in the throttle the sound is changed. On a steam loco the chuff is harder/deeper, while on a diesel the prime mover will notch up.

Just closing the throttle will cause “rod clank” on a steam loco, the prime mover drops to idle for the diesel. While braking will cause brake squeal for both once the loco drops to a moderate speed.

We have looked at the important part – stopping. Now look at acceleration (CV3) this ties in with the “start” point, if that is set correctly, and you turn the knob correctly, you should not notice a setting of 25 in CV3, it should be slightly less than the momentum programmed in.

Back to the easy part. . .



The next pane in **Decoder Pro** is the **SPEED TABLE**. There are 28 speed steps and without Decoder Pro you can program all the steps individually with your command station.

Thanks to Decoder Pro you can do it all in a few easy steps. You can click on the first step and set its value then click on the last step (setting your top speed) and click match ends. The table sets itself up as shown here. Remember to click the circle at the top.

White Wire Effect 0	Constant bright light
White Wire Effect Group	Group 0
White Wire Timing	Function on running forward
Yellow Wire Effect 0	Constant bright light
Yellow Wire Effect Group	Group 0
Yellow Wire Timing	Function on running reverse
Green Wire Effect 0	Constant bright light
Green Wire Effect Group	Group 0
Green Wire Timing	Function on both directions
Purple Wire Effect 0	Constant bright light
Purple Wire Effect Group	Group 0
Purple Wire Timing	Function on both directions
Brown Wire Effect 0	Constant bright light
Brown Wire Effect Group	Group 0
Brown Wire Timing	Function on both directions
Pink Wire Effect 0	Constant bright light
Pink Wire Effect Group	Group 0
Pink Wire Timing	Function on both directions

The next “FUN” pane is the **Light Output** pane. Here you can see the 6 outputs on this decoder. The **EFFECT** can be set to one of many different effects – these do vary with many decoders. Just click on the down arrow at the end of the line and you will see all the effects available in that decoder.

You can also set the output to operate in either direction or in both directions. With a number of decoders there is a further option to control the brightness of each output – it saves having to “play” with different resistors in line with the light.

Headlight Dim When Stopped	Disabled
Opposite Headlight Dim	Disabled
Constant Dim 1 Brightness	16
Constant Dim 2 Brightness	5
Constant Dim 3 Brightness	5
Constant Dim 4 Brightness	5
Headlight Dim Brightness	0
Reverse Light Dim Brightness	0
Mars/Gyra Min Brightness	1
Mars/Gyra Mid Brightness	6

Lighting Outputs . . . What function does what.

Use this sheet to determine which functions will control which outputs

Description	Output wire or operation						Dim	Ditch	Motor	BEMF	Brake
	1 White	2 Yellow	3 Green	4 Purple	5 Brown	6 Pink					
Forward Headlight F0(f)	<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"/>
Reverse Headlight F0(r)	<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 checked="" 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"/>
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 checked="" 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"/>
Function 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" 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 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 type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" 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 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 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 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"/>
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"/>
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"/>

On this pane we can select which function controls which output or outputs. A Function button can control a number of outputs such as **Rotary Beacon** as well as a **cab light** or **step lights**, each one on a different output.

You can also see here that there are other options available on this decoder. These often include Dim, Ditch Lights, Brakes and possibly turn the BEMF on or off.

You can have a lot of fun playing with this page.

Programming - Configuration Variables

CV ^	Value (D...	State	Read	Write	Compare
1	3	From file	Read	Write	Com...
2	0	From file	Read	Write	Com...
3	1	From file	Read	Write	Com...
4	1	From file	Read	Write	Com...
5	0	From file	Read	Write	Com...
6	0	From file	Read	Write	Com...
7	0	From file	Read	Write	Com...
8	153	From file	Read	Write	Com...
10	0	From file	Read	Write	Com...
13	7	From file	Read	Write	Com...
15	0	From file	Read	Write	Com...
16	1	From file	Read	Write	Com...
17	192	From file	Read	Write	Com...
18	77	From file	Read	Write	Com...
19	0	From file	Read	Write	Com...
21	3	From file	Read	Write	Com...

One last pane before we start on a sound decoder contains the Brand information – such as version of firmware, date of firmware and a few other options.

Here you can read any of the CVs in the decoder and compare their values with the values in Decoder Pro. This can be used for fault finding – something may have been changed by accident.

TCS decoders support a decoder locking feature useful when several decoders are used in one loco on the same address, e.g. for adding sound
TCS suggests values of 1=mobile, 2=sound, 3=light/function only

Decoder Lock ID number
Set CV15 equal to this number to unlock the decoder for programming

Decoder Lock control, CV15

Decoder ID
Month of Decoder Manufacture
Day of Decoder Manufacture
Year of Decoder Manufacture

Now you should be able to set up a decoder as you want it and save it. Once saved, you can change any CV and play as much as you like. You will do no harm to the decoder – when you exit the programming you do NOT save as you did the first time. You can then write all panes to the decoder as they were before.

The next part of this clinic will show you how to set up a sound decoder the way you want it – not Claude down at the club.

BEMF and Sound.

I will try to keep this as simple and basic as possible, it does apply to the mainstream sound decoders such as Tsunami 1, Tsunami 2, Econami and WOWs. Soundtraxx gave it the name of Dynamic Digital Exhaust and this seems to cover them all.

Each motor has “dead” spots when under power, at these spots the motor acts as a generator and generates a pulse – **Back Electro Motive Force**. These pulses are seen by the processor and are used to control the motor speed.

When the throttle is set to a particular speed – the motor will turn at that speed – expected - BUT if the decoder has momentum set correctly then there is a difference between the speed set and the actual speed – the processor reads the **BEMF** to see this and increases the sound (the chuffs for a steam loco) until the motor gets to the set speed and then quietens down.

If the loco comes to a grade the motor will try to slow down but the processor sees the change in speed (by reading the BEMF) and adjust the power to the motor accordingly – hence the chuff gets loader. In both the Tsunami 2 and the WOW v4 this is part of the High BEMF calibration.

When the loco is going downhill, provided the rolling stock is free rolling, the motor will try to speed up. The processor sees this and reduces the power to the motor – this is controlled by the Low BEMF calibration. At the bottom of the grade the loco will have to work again until the motor is turning at the set speed – then the chuff will drop back.

Very slight changes in grade or curve radius will affect the BEMF and cause changes to the sound. To get the best response the momentum should be set realistically. I personally use 30 for acceleration and 120 for deceleration - using the brake for stopping.

Besides the Low & High settings there are other adjustments – rate at which the sound changes, how often it reads the BEMF, how big is the window through which it reads.

The above is as simple as I can explain it. There are many advanced algorithms in the decoder to give you the best results – we do not need to know the nitty gritty here just how to use it.

Decoder Pro with Sound Decoders

The first part is exactly the same as with non-sound decoders. With the newer decoders Decoder Pro reads a few extra CVs to get the correct sound file and firmware version. The Tsunami 2 has a limited memory for the sound files so they are split into groups – Steam, Alco, GE, EMD, Baldwin and other. The WOW has a bit more memory – currently 8GB Micro SD Card – so all steam sounds are on one decoder and all diesels are on another decoder. The Loksound decoder has 32k of memory so only a single sound file is loaded.

DecoderPro: All Entries

File Edit Settings Actions SPROG Programmer EasyDCC via Serial Window Help

+ New Loco 🔍 Identify ? Help

Roster Groups	ID	DCC Address	Icon	Decoder Model
All Entries	CEFX1006	1006		AT100LC/KT100LC Diesel
Don Tydd	GN 1012	1012		TSU-1000 DRGW K-Class Steam
Gerry Hopkins	BNSF 1016 bh	1016		WOW Diesel 101 SS2
Peter Jackson	NSW 1018 mw	1018		M1
Warren	GN 1028	1028		TSU-1000 Lt Logging Steam
	GN 1056 gh t4	1056		T4X
	GN 1056 gh v4	1056		WOW Steam 101 SS4
	LMS 1072 gm	1072		ECO-200 UK Steam
	NSW 1100	1100		D13SR

To start working with a newly-installed sound decoder, click the adjacent "New Loco" button to open the list of decoders, then have the programmer read the decoder and attempt to identify it.

(You could also explicitly tell the programmer the decoder type). While the programmer is talking to the decoder, status will be displayed in the bottom of the window. If it succeeds, it will select the decoder model in the selection box. Usually it will only be able to narrow the selection down to a few choices. Check that the right model is selected in the "Decoder Installed" box; update the selection if desired.

Use this sheet to determine which functions will control which outputs

	Extended Function Mapping	Forward Driving	Reverse Driving	Forward Standing	Reverse Standing	Emergency Stop Button
Headlight	F0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Backup Light	F0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FX3 Effect	F1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FX4 Effect	F1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FX5 Effect	F9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
FX6 Effect	F9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dimmer	F11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mute	F8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Independent/Train Brake	F7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Half Speed	F14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Momentum Override	F14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grade Crossing Signal	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forward Whistle Signal	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reverse Whistle Signal	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Stop Whistle Signal	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Brake Select	F12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Alternate Mixer	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RPM+	F5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
RPM-	F6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Airhorn	F2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bell	Disable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

The **Basic** screen is the same as the one used for non-sound decoders. The next screen is the **Motor Control** screen and this often has a little more on it just in case you have a loco that is a little “lazy” to start. The **Basic Speed Control** is the same as before and is adjusted in the same way.

The **Function Pane** is something different and varies across brands. In the **Tsunami 2** any function between “0 and “28” can be assigned to any of the sounds or outputs. Alongside any sound or light output there is a drop down box – just click here and assign a Function Button to it.

In the **TCS WOW** there are 28 Function Buttons and you can assign any one of 380 sounds to any button.

Bel type: Electric E-Bell

Function 0 Sound

- Air Compressor
- Air Spitter
- Bell
- Brake Release
- Brake Squeal
- Coupler Clank
- Crew Alert
- Dynamic Brake
- Exhaust Fan
- Horn
- Manual Notch
- Momentum
- Mute
- Prime Mover Ignition
- Windshield Wipers
- None
- Reserved value 1148
- Reserved value 29

Function 1 Sound

- Air Compressor
- Air Spitter
- Bell
- Brake Release
- Brake Squeal
- Coupler Clank
- Crew Alert
- Dynamic Brake
- Exhaust Fan
- Horn
- Manual Notch
- Momentum
- Mute
- Prime Mover Ignition
- Windshield Wipers
- None
- Reserved value 29
- Reserved value 1148

Function 2 Sound

- Brake Squeal
- Coupler Clank
- Crew Alert
- Dynamic Brake
- Exhaust Fan
- Horn
- Horn Forward
- Horn Long
- Horn Quill
- Horn Reverse
- Horn Short
- Horn Stop
- Rotate Horn
- Manual Notch
- Momentum
- Mute
- Prime Mover Ignition
- Windshield Wipers
- None
- Reserved value 17

Function 3 Sound

- Brake Squeal
- Coupler Clank
- Crew Alert
- Dynamic Brake
- Exhaust Fan
- Horn
- Horn Forward
- Horn Long
- Horn Quill
- Horn Reverse
- Horn Short
- Horn Stop
- Rotate Horn
- Manual Notch
- Momentum
- Mute
- Prime Mover Ignition
- Windshield Wipers
- None
- Reserved value 20

Function 4 Sound

- Brake Squeal
- Coupler Clank
- Crew Alert
- Dynamic Brake
- Exhaust Fan
- Horn
- Horn Forward
- Horn Long
- Horn Quill
- Horn Reverse
- Horn Short
- Horn Stop
- Rotate Horn
- Manual Notch
- Momentum
- Mute
- Prime Mover Ignition
- Windshield Wipers
- None
- Reserved value 18

The **Loksound** is different again and much of the sound allocation depends on the sound file that has been loaded. The Function mapping can be changed but this is best done with the Loksound Programmer.

Row	Conditions (Motion, Direction, F keys, Sensors)	Physical Outputs (Wires)	Logical Functions	Sounds	Row
1	Stopped,Forward	Change	-	Change	1
2	Stopped,Reverse	Change	-	Change	2
3	Moving,Forward	Change	-	Change	3
4	Moving,Reverse	Change	-	Change	4
5	Forward,F0,not F19	Change	Headlight[1]	Change	5
6	ie 3,not F26,not F27,not Wheel Sensor	Change	Aux 7,Aux 8,Aux 1[2]	Change	6
7	F1	Change	-	Change	7
8	F2	Change	-	Change	8
9	F3	Change	-	Change	9
10	F4	Change	-	Change	10
11	F5	Change	-	Change	11
12	F6	Change	-	Change	12

The **Lighting Control Pane** is next which allows you to set any light output the way you want it.

LIGHTING EFFECTS AND CONTROLS	
Headlight F0(f) Effect Selection	Dyno-light
Headlight F0(f) Phase Selection	Use phase A (normal)
Headlight F0(f) Grade Crossing Logic	Disabled
Headlight F0(f) Light Type	LED
Headlight F0(f) Forward Directional Control	<input checked="" type="checkbox"/>
Headlight F0(f) Reverse Directional Control	<input type="checkbox"/>
Backup Light F0(r) Effect Selection	On/Off
Backup Light F0(r) Phase Selection	Use phase A (normal)
Backup Light F0(r) Grade Crossing Logic	Disabled
Backup Light F0(r) Light Type	LED
Backup Light F0(r) Forward Directional Control	<input type="checkbox"/>
Backup Light F0(r) Reverse Directional Control	<input checked="" type="checkbox"/>
FX3 Effect Selection	On/Off
FX3 Phase Selection	Use phase A (normal)
FX3 Grade Crossing Logic	Disabled
FX3 Light Type	LED
FX3 Forward Directional Control	<input checked="" type="checkbox"/>
FX3 Reverse Directional Control	<input type="checkbox"/>
FX4 Effect Selection	On/Off
FX4 Phase Selection	Use phase A (normal)
FX4 Grade Crossing Logic	Disabled
FX4 Light Type	LED
FX4 Forward Directional Control	<input type="checkbox"/>
FX4 Reverse Directional Control	<input checked="" type="checkbox"/>

For each output you can click the down arrow and select the effect that you want. The second box is Phase A or Phase B when a light is set on each they will flash alternatively - provided you have turned on the "Grade Crossing Logic". Next you can select LED or Incandescent lamps – they do respond differently. Then you can select in which direction they operate or both directions.

We can now set the **Braking Characteristics** of the loco. The settings for these were explained earlier – BUT – with the **Tsunami 2** you press F7 once to apply the brake and then press again to release the brake.

CV Unlock Register (0-7)	0
CV Lock ID Code (0-7)	0
CV Lock Enable	Normal operation (no locking)
Independent Brake Rate	110
Independent Brake Rate Sign	Subtract value from baseline braking rate (decreases braking delay)
Train Brake Rate	110
Train Brake Rate Sign	Subtract value from baseline braking rate (decreases braking delay)
Dynamic Brake Rate	0
Dynamic Brake Rate Sign	Add value to baseline braking rate (increases braking delay)
Constant Brake Distance (0-255)	0

TSUNAMI 2

TCS WOW

With the **WOW** you can press the F7 up to five times to apply the brake (20%, 40%, 60%, 80% and 5%) and press F6 to release it at any time or turn the speed knob slightly up or down.

Brake Rate 1	20
Brake Rate 2	15
Brake Rate 3	10
Brake Rate 4	5
Brake Rate 5	2
Brake grinding noise start speed	15
Dynamic brake notch setting	Notch 3
Dynamic Lowest Speed Step	10
Dynamic Decel Rate	50
Dynamic Speed Step Decrease	5

Sound Type Selection This pane allows you to select what sound you want from the decoder. If steam then the size of the loco, non-articulated or articulated, geared. Then you can select the whistle type, between 70 and 95 to choose from. Also the bell type (about 30 of them).

Engine Notch Rate	Engine RPM increases every 14 speed steps
Engine RPM Interlock	Interlock is disabled
Engine Auto Start Enable	Disable
Dynamic Brake Override	Turning on Dynamic Brakes forces engine RPMs to drop to idle
Prime Mover Select	ALCO 251C v12 Super Charged
Airhorn Select	Nathan K3LA
Auxiliary Airhorn Select	Short Horn
Bell Select	ALCO 3: medium-fast
Grade-Crossing Bell Enable	Disable
Air Compressor Select	Engine Driven
Coupler Select	Medium coupler
Coupler Release Function Polarity	Coupler release activated when function is turned off
Max Coach Door Count	5 slams
Emergency Stop	Emergency stop engine idle
Low-pressure alarm bell	Enabled
Poppet Valve Select	Poppet Valve
Generator Select	Steam Generator
True-Idle Enable	Disabled

TSUNAMI 2

The WOW is similar, the actual set up is a bit more involved if you want it to be.

Default Whistle Set	Alamo Michigan Plant Whistle
Steam locomotive type	C&T K27 #463
Articulation type	Non Articulated
Sound Set	4
Rod Clank Set	Rod Clank set 1
Bell	C&O Bell
Cylinder Cox Set	Cylinder Cox Set 1
Idling Sound	Idling Sound 1
Throttle Mode	Prototype throttle

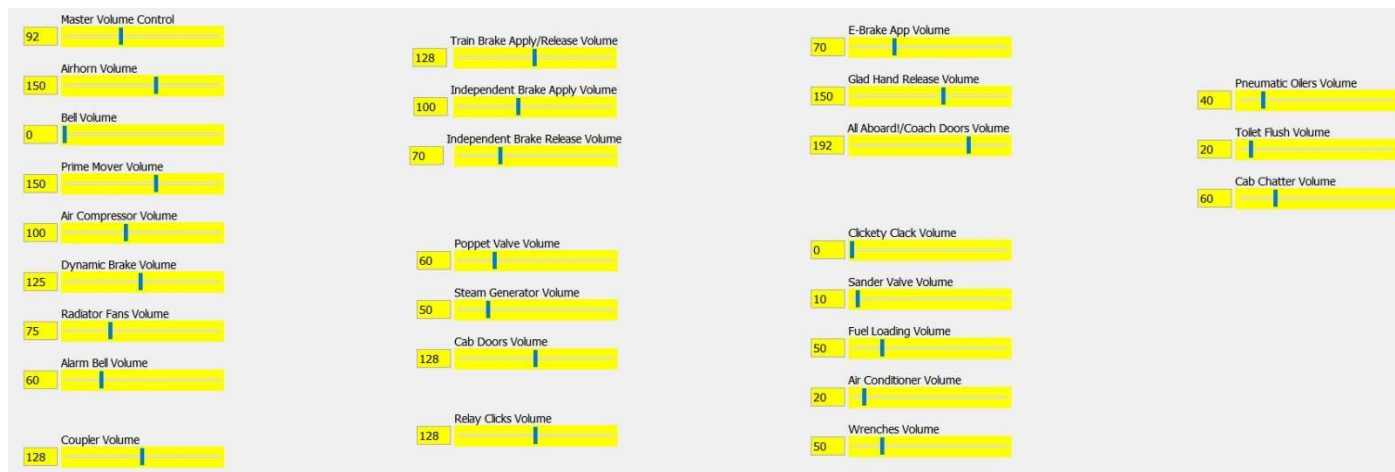
TCS WOW

There are quite a few extra choices here - they are self-explanatory. We are here to learn about Decoder Pro not the itty bitty parts of decoders.

You can see a lot of the extras here and you can play with them as much as you like. Then, when you finished just close Decoder Pro **WITHOUT** saving. Open the file again and "write full sheet" the setting you had earlier are all back where you started from. This applies for both Tsunami and Wow.

Snifter Valves enable	<input checked="" type="checkbox"/>
Rod clank enable	<input checked="" type="checkbox"/>
Idling sound enable	<input checked="" type="checkbox"/>
Forward whistles enable	<input type="checkbox"/>
Reverse whistles enable	<input type="checkbox"/>
Stop whistles enable	<input type="checkbox"/>
Direction change enable	<input checked="" type="checkbox"/>
Random Sound 1 enable	<input checked="" type="checkbox"/>
Random Sound 2 enable	<input checked="" type="checkbox"/>
Random Sound 3 enable	<input checked="" type="checkbox"/>
Random Sound 4 enable	<input checked="" type="checkbox"/>
Play Short Quill	<input checked="" type="checkbox"/>
Play Medium Quill	<input checked="" type="checkbox"/>
Play Long Quill	<input checked="" type="checkbox"/>
Play Quills in Random Order	<input type="checkbox"/>
Cam enable	<input type="checkbox"/>
Mute on startup	<input type="checkbox"/>
Articulated chuff slip	<input checked="" type="checkbox"/>
Rotate Whistle Audio Feedback	<input checked="" type="checkbox"/>
Light Mode/Sound Mode Audio Feedback	<input checked="" type="checkbox"/>
Audio Auto Shutoff Timer	<input type="checkbox"/>
Function 2 toggle in Audio Assist	<input checked="" type="checkbox"/>
Reverse Directional whistles	<input type="checkbox"/>
Power Braking Enabled	<input checked="" type="checkbox"/>
Switching and Mainline momentum Feedback	<input checked="" type="checkbox"/>
Johnson Bar Feedback	<input checked="" type="checkbox"/>

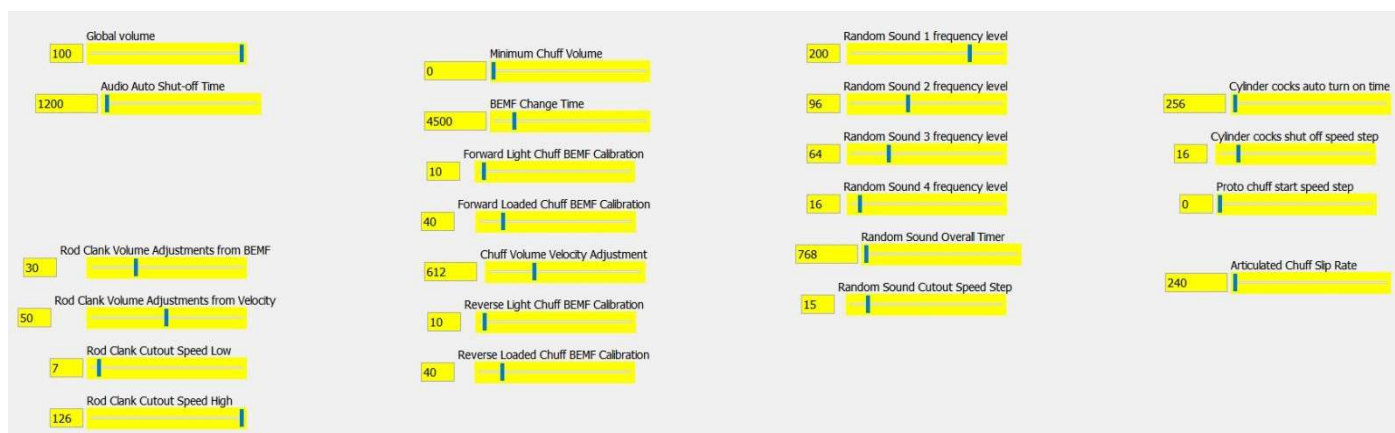
Sound Levels are different for each individual speaker, speaker mounting and decoder set up so we get plenty of options to play with. To adjust any of these without **Decoder Pro** would be very tedious and time consuming.



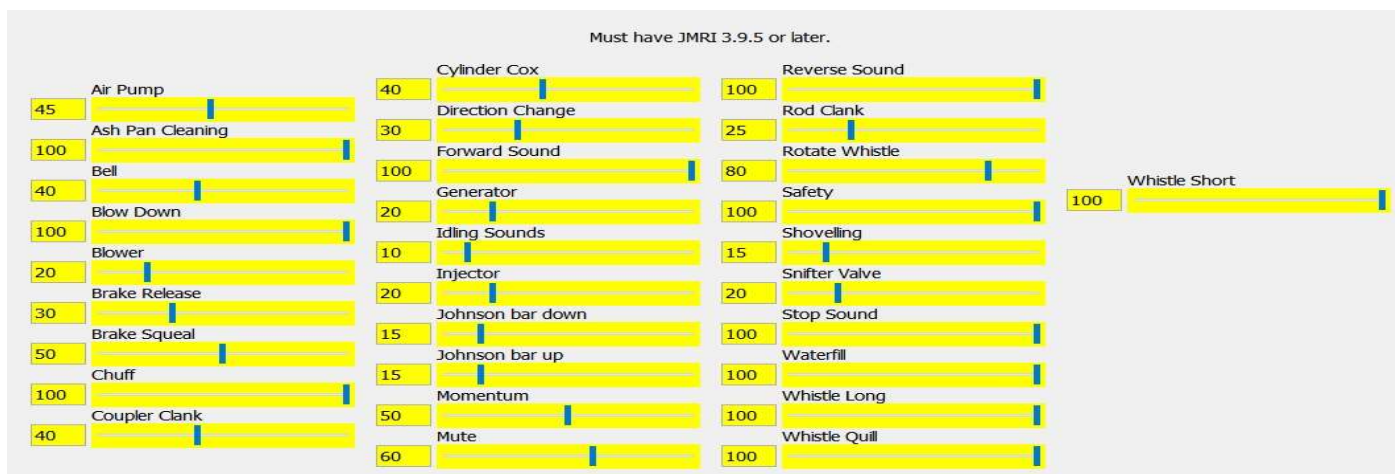
TSUNAMI 2

You can adjust the **Master Level** or any sound on the pane to suit your ears, the speaker and enclosure that you have installed. As you can see above, the Tsunami has many options – I have not yet heard the **Toilet Flush**.

These are the basic volume controls for the **WOW** decoder plus some **BEMF** settings.



In the **WOW** there are so many different sounds this pane shows the volume settings in groups.



For both these decoders you would adjust the Diesel sounds much the same – a lot easier than playing with the buttons on you command station.

Speed Matching . . . with Decoder Pro

Required for Consisting Locomotives of Different Manufacturers Using DCC/Decoder Pro

In most cases, DCC has made it easy to consist engines that could not be run together in analogue mode. The following are tips and procedures that I have used to allow locos to run together. I make it a habit of setting up all of my road/freight locos to run at the same speed (30 mph). I do the same with my switchers (20 mph). If you use the same type of loco for both, you might want to make them all the same speed.

Here is my “**Original**” method. What Speed? Which engine do you select as your constant?

Four possible choices are:

1. The slowest loco (top Speed)
2. Your Favourite loco
3. A sound equipped loco
4. Set a particular “reference” loco to a low max speed (mine run at 30mph max)

All four can be used and each has advantages and disadvantages. The slowest engine has the advantage of guaranteeing that all other locos can be consisted. Specialized locos such as shays are usually ignored. In the past I used a “Reference Loco” for setting up the locos, a P2K with a Bachmann F7 body for the road locos and a P1K RS2 for the switchers. They would have been set up “just the way I want them” and match all locos to these.

A word on motors and decoders; motors can be divided into basically 2 categories. Open frame and can motors. **Open frame** motors tend to be faster and more subject to speed variation than Can motors. They draw more amperage than most can motors and are a little more difficult to get going at low speed steps.

Can motors tend to be much smoother in operation throughout their speed range. They have low current draw and require little maintenance. They are found on newer and better quality engines. The BEMF feature in the newer ones is also very good – no adjustments needed. I would also select a can motored loco as a reference.

Once you have decided on your reference engine and set it up the way you like it, the following steps should allow you to run locos at the same speed.

1. If the loco is new, it should be run in for an hour or two before setting the speed.
2. Warm up both engines and make sure their wheels are clean. 3-5 minutes usually suffices. This will also give you an idea on how close the speeds are for the 2 engines.
3. Make sure CV19 is set to 0 for both locos.
4. If you need to increase the starting voltage on your engine, do it before proceeding to step 5. *To set the Start Voltage (CV2), put the loco on the track and with the display on the throttle reading percentage or 128 speed steps, crack the throttle up to step 2 or 1%. If required, adjust the Start Voltage until the loco just moves.*
5. Make sure the engine you want to match is in your decoder pro roster. Start Decoder Pro and use programming on the main (OPS Mode). Call up the engine you wish to speed match from your roster.

6. Make up a Standard Consist with your reference engine as the lead engine, but second on the track. Do not couple the engines together. 8-10 inches between them is a good start.
7. With both locos running at top speed, adjust the **MAXIMUM SPEED** on the loco being matched – do not adjust the reference loco.
8. You can now set the MID SPEED to half the maximum speed.
9. The next part is setting the Acceleration and Braking for the new loco. As they are both in a consist simply turn the speed up and down and watch for the locos to match one another and adjust **Accel** and **Decl** setting to get the right effect.
10. Some people get very pedantic about speed matching and like to use the speed table for this.
11. Select the speed table screen for the engine called up in Decoder Pro.
12. Select user defined speed table on the screen.
13. Set step 1 of your speed to the starting voltage from the previous page of DP. Set step 28 to 255
14. Click on match ends on the speed table. Then write this to the loco.
15. Run the locos. If you have made a good choice on your reference engine, the “new” engine will be faster. Reduce the speed in step 28 setting. Then “**Match Ends**” and write changes to the engine. Some systems/decoders will allow you to do this on the fly, others will make you stop the engines. It is always a good choice to stop the engine to prevent miss programming even a single step. Repeat this procedure until the engines speed match. *After you do a few you will be able to match an engine faster than you can read this procedure. It also eliminates fooling with forward and reverse trim if you decoder requires it.*
16. If your decoder does not support 28 speed step settings you are better off trashing it and fitting a decoder from this Millennium.
17. I am too old to use the Speed Table method – I would rather be running trains.

This is the way I do speed matching now. I use an electronic timer triggered by two sensors a metre apart. There are a number of different models available – your choice. Run your loco through the trap at full speed to see what it will do. Then adjust the top speed as above until you get the speed you want. Much quicker to do than write about it.

What is a Consist?

It is when a number of locomotives are connected together and are controlled by one driver – with one throttle. The following information covers all brands of decoders and all brands of systems.

There are **four types of consist**, Basic, Standard (sometimes referred to as ‘old?’), Advanced & Hybrid.

The Basic consist has locos using the same decoder address. These would typically be an AB set, an ABA set, or ABBA set. Many railroads used the same number on these locos and just added an A,B,D,C, after the number. Both decoders respond to the same command at the same time.

The Standard (“Old”) consist is stored in the Command Station and normally uses the number of the lead loco as the consist number.

- This type of consist does not change any of the programming in the decoder.
- There can be 4 – 8 locos in this consist depending on the command system used.
- The **consist** address is normally the same as the address for the lead loco.
- Digitrax and Lenz use this as the default type of consist.
- Only the lead loco functions are active.
- All decoders can be used in a Standard consist as their program is not changed.
- This

- consist cannot be taken to a different layout.
- Ideal consist for non-sound locos.

The Advanced Consist requires changes to the decoder. CV19 requires 2 digit number (any number between 1 and 127 is a 2 digit (hexidecimal) number)

- Being a value in the decoder, the consist is portable – can be moved to other layouts and different systems and still be in a consist.
- When using the consist address the loco number is inactive.
- Some decoders e.g. Tsunami2, TCS WOW, ESU allow you to program which Function is active when in the consist. Example: the headlight, bell, horn and Dynamic Brakes and Brake Function on the lead unit and dynamic brakes and train brakes on the other units.

The **Advanced** consist can be created in either of two ways.

- By entering the 2 digit number directly into CV19, if the loco is running backwards in the consist add 128 to the number.
- By following the options on the command station.
- Remember the number entered in CV19 – this is the CONSIST NUMBER. If the consist is taken to any other layout it is treated as a normal loco number.

The Hybrid consist is the method used by NCE – the only one of 38 systems. When setting up the consist on the hand set, the unit asks you for the lead loco, then the rear loco and then any other locos. The hand held keeps a table in its memory of these locos and that they are in the consist.

The consist number is generated by the command station and works its way down from 127. This number is inserted in **CV19** of each decoder in each loco. There is an option for you to choose the number if you wish. This consist will allow you to use any function in the lead loco, but you will have to turn on the required functions in each of the decoders.

Now for the biggest miss-understanding. If the locos are programmed using the “aid” in the command station to set up the **Advanced Consist** or the **Hybrid Consist** and are then removed from the track and possibly taken to different layouts – none of the locos will answer to their loco address – not even the lead loco. ALL locos must be on the track, on the layout where the consist was set up and then have the consist deleted.

If you know the number of the consist you can remove the locos from the track, delete the consist on the command station, put the locos back on the track and they will only answer to their consist address – in **CV19**. It is easy to remove the consist – using ops programming (programming on the main) call the loco by its normal address and set **CV19** to zero. This applies to all systems.

Modelers who have regular operating sessions and use advance consist, normally use the first 2 digits of the lead loco as the consist number. This becomes a psuedo standard or reference point among regular operators.

Some decoders do not have Advanced Consist capabilities – some MRC and the 120 series from Digitrax.

The moral of the story is, if you take your loco to a mates place or the local club and it will not respond when you get home – just set CV19 to 0 and it should be back to normal. There are pros and cons for all forms of consist, I use all 3 forms depending on the application. The one time you do not use a consist is when you are using helper steam engines on a grade, have two drivers who communicate by whistle.

Consisting with Decoder Pro

Advanced Consist Address Consist Acceleration Adjustment
 Locomotive Direction In Consist Consist Acceleration Adjustment Sign
 Consist Deceleration Adjustment
 Consist Deceleration Adjustment Sign

Will decoder respond to function requests at consist address?

Consist Address Active For FL in Forward	<input type="text" value="Locomotive Address Only"/>	Consist Address Active For F13	<input type="text" value="Locomotive Address Only"/>
Consist Address Active For FL in Reverse	<input type="text" value="Locomotive Address Only"/>	Consist Address Active For F14	<input type="text" value="Locomotive Address Only"/>
Consist Address Active For F1	<input type="text" value="Locomotive Address Only"/>	Consist Address Active For F15	<input type="text" value="Locomotive Address Only"/>
Consist Address Active For F2	<input type="text" value="Locomotive Address Only"/>	Consist Address Active For F16	<input type="text" value="Locomotive Address Only"/>
Consist Address Active For F3	<input type="text" value="Locomotive Address Only"/>	Consist Address Active For F17	<input type="text" value="Locomotive Address Only"/>
Consist Address Active For F4	<input type="text" value="Locomotive Address Only"/>	Consist Address Active For F18	<input type="text" value="Locomotive Address Only"/>
Consist Address Active For F5	<input type="text" value="Locomotive Address Only"/>	Consist Address Active For F19	<input type="text" value="Locomotive Address Only"/>
Consist Address Active For F6	<input type="text" value="Locomotive Address Only"/>	Consist Address Active For F20	<input type="text" value="Locomotive Address Only"/>
Consist Address Active For F7	<input type="text" value="Locomotive Address Only"/>	Consist Address Active For F21	<input type="text" value="Locomotive Address Only"/>
Consist Address Active For F8	<input type="text" value="Locomotive Address Only"/>	Consist Address Active For F22	<input type="text" value="Locomotive Address Only"/>
Consist Address Activation for F9	<input type="text" value="Locomotive Address Only"/>	Consist Address Active For F23	<input type="text" value="Locomotive Address Only"/>
Consist Address Activation for F10	<input type="text" value="Locomotive Address Only"/>	Consist Address Active For F24	<input type="text" value="Locomotive Address Only"/>
Consist Address Activation for F11	<input type="text" value="Locomotive Address Only"/>	Consist Address Active For F25	<input type="text" value="Locomotive Address Only"/>
Consist Address Activation for F12	<input type="text" value="Locomotive Address Only"/>	Consist Address Active For F26	<input type="text" value="Locomotive Address Only"/>
		Consist Address Active For F27	<input type="text" value="Locomotive Address Only"/>
		Consist Address Active For F28	<input type="text" value="Locomotive Address Only"/>

Consist Automatic Effects - FWDD
 Consist Automatic Effects - REVD
 Consist Automatic Effects - FWDS
 Consist Automatic Effects - REVS
 Consist Automatic Effects - ESTP

This is a typical “Consist Page” for a sound decoder. This one is from a **Tsunami 2**.

Advanced Consist Address Consist Acceleration Adjustment
 Locomotive Direction In Consist Consist Deceleration Adjustment

Will decoder respond to function requests at consist address?

Consist Address Active For White	<input type="text" value="Locomotive Address Only"/>
Consist Address Active For Yellow	<input type="text" value="Locomotive Address Only"/>
Consist Address Active For Green	<input type="text" value="Respond to Consist Address"/>
Consist Address Active For Purple	<input type="text" value="Respond to Consist Address"/>

This one is a non-sound decoder with 4 outputs (**TCS T4X**), It has similar options as the sound decoder but a lot less. Many earlier decoders – pre 2005 and some of the cheaper brands do not have all these options.

Advanced Consist Address Consist Acceleration Adjustment
 Locomotive Direction In Consist Consist Acceleration Adjustment Sign
 Consist Deceleration Adjustment
 Consist Deceleration Adjustment Sign

Will decoder respond to function requests at consist address?

An early NCE Decoder – **D102EU**

Using the screen for sound loco, set a two digit address in CV19 and the direction of the loco. You can then scroll down to the functions – there are 28 of them available in this decoder. You can turn on ANY function you want that will answer to the **Consist Number**. Remember the lead loco would have the headlight, bell, and horn active – the others would only have auxiliary functions such a brake, brake release, dynamic brake, engine start, engine stop.

You can now take the consist to **ANY BRAND** of command station and drive the consist using the **CONSIST NUMBER in CV19** as just another loco **NOT** a consist.

Numerous Command Stations have “**unique**” ways of constructing the Consist. Decoder Pro does have internal systems that can duplicate a number of them. It will depend on the system you use for “On Line Programming” – **BUT** – using the system above in Decoder Pro will allow you to get know all about consisting and you can take it to **ANY** layout.

READING/DUPLICATING DECODER SETTINGS

When a decoder has been programmed on another system or you just wish to duplicate the decoder settings into an identical loco, just follow some simple steps and it is all done in a few minutes.

READING - If the loco was programmed on a different system, use “**New Loco**” to identify the decoder. Then fill in the ID for the file in your roster. If it is a non-sound decoder just read all sheets, if it is a sound decoder then read each page – one at a time. I say one at a time so that you can get an idea of what programming has been done.

DUPLICATING – If you have put a decoder into a loco and you have three more identical locos to program. You can “**DUPLICATE**” the setting very easily as follows.

NSW 3390 mp	3390	TSU-750 DRGW K-Class Steam
NSW 3390 pf	3390	TSU-1000 DRGW K-Class Steam
NSW 3390 sm	3390	TSU-750 DRGW K-Class Steam
NSW 3402 js	3402	WOW Steam 101 SS4
NSW 3402 ke	3402	TSU-1000 DRGW K-Class Steam
NSW 3405	3405	TSU-1000 DRGW K-Class Steam
NYC 3456 jd	3456	2 function decoder (36-552)

On your roster, highlight the loco you wish to **duplicate/copy**.

NSW 3390 sm	3390	TSU-750 DRGW K-Class Steam	
NSW 3402 js	3402	WOW Steam 101 SS4	
NSW 3402 ke	3402	TSU-1000 DRGW K-Class Steam	
NSW 3405	3405	TSU-1000 DRGW K-Class Steam	
NYC 3456 jd	3456	2 function decoder (36-552)	
SF 3461	3461	T1	
SF 3461 gb	3461	TSU-1000 Heavy	
BR 34066 vb	3466	T1	
BR 34076 vb	3476	T1	
NSW 3501 rc	3501	Austrains C35 Class 4-6-0	
NSW 3503	3503	Austrains C35 Class 4-6-0	
NSW 3503 dk	3503	Austrains C35 Class 4-6-0	
NSW 3503 kb	3503	TSU-1000 DRGW K-Class Steam	
NSW 3503 pf	3503	Austrains C35 Class 4-6-0	
NSW 3503 ps	3503	Austrains C35 Class 4-6-0	

- Program
- Programmer Type >
- Labels & Media
- Throttle
- Print entry...
- Preview entry...
- Duplicate...
- Delete from Roster



Right click on the loco you are going to duplicate as shown above and the drop down box will appear. Click on **“Duplicate”** and another box will appear as shown here.

Enter the new identity of the loco as shown and click on **OK**

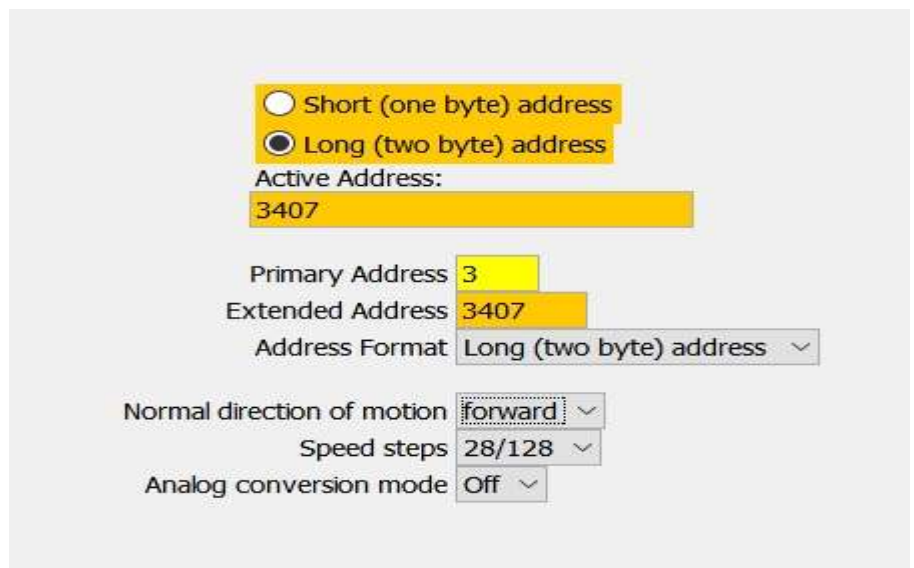
This new identity will appear in the roster but with the old address showing.

Open the roster entry and update the address on the **Basic** pane as shown – then click **Write full sheet**.

You can then go through and write each sheet.

You can do this with each loco – only changing the address on the **Basic** pane

This will save you a lot of time and frustration programming identical locos.



WEB LINKS

- BEMF Calibration <https://www.youtube.com/watch?v=o2uLODOYYTI&t=141s>
- Dynamic Digital Exhaust <https://www.youtube.com/watch?v=l9An47A09YI>
- Speed matching https://www.youtube.com/watch?v=mjFPmDX_dBY&t=165s
- Keep Alive Part 1 <https://www.youtube.com/watch?v=zxEQDVI6c3E>
- Keep Alive Part 2 <https://www.youtube.com/watch?v=mO7rKJYAi3E>
- A Typical Consist <https://www.youtube.com/watch?v=d6oSrQGfMGY&t=206s>