Hatton's DCC Decoder Instructions

Thank you for purchasing one of our Hatton's DCC decoders.

Our decoders meet all NMRA DCC specifications and will give good performance out of the pack, however by using this manual, you can learn how to get the best from your decoder and the very best possible performance. Take your time and enjoy setting up your decoder.

Contents

General Information

Basic Specifications

Max continuous load (amps): 1.1A
Peak amps: 1.6A
Number of functions: 4
Function load (amps): 0.2
Back EMF: Yes
Sides: 2
NMRA Compliant: Yes
Quiet drive: Yes
Auto detect (DCC): Yes
Qty of speed steps: 128
2 or 4 digit addressing: Both

Power Handling

1.1 amp continuous
1.6 amp peak
0.2 amp per function
Will run almost any N, TT, HO, OO, On30 or similar locomotive. Some smaller O gauge locos may also work but we advise checking current draw before installation.

DC/Analogue Running

When running a decoder fitted loco on an analogue layout, but you will need to apply more power than with a DC loco to start the locomotive moving. Our decoders retain back EMF support & constant lighting on DC.

Silent Drive

Silent drive for quiet running is included on all decoder models.

1. Addressing

Default Address: 3
Accepted addresses: 1 - 9999.

Once your locomotive has had its decoder installed, it can be tested to check that there are no problems by placing it on the programming track and reading it or running it on the main track as default loco 3. Once you are happy that the installation is correct, it is time to set the address and motor control.

1.1 Setting your chosen address

This should be done on the programming track
1. Follow your DCC system's instructions to enter "programming track mode".
2. If your DCC system can read CVs, it will first read manufacturer number and then the software number. This is usually followed by an invitation to set the long and short address.
3. Your decoder can be set to any number between 1 and 9999.
4. Recall the number you just set on your controller and check the loco will respond to it.

1.2 Short Address

Most DCC systems accept 1-99 but some go up to 123. As 100-123 can be a short or long address we do not recommend using them as it can cause confusion when recalling them on some systems.

Do not add any extra zeros before your number, eg for 1 do not enter 01, 001 or 0001.

1.3 Long Address

Long addresses can be anywhere between 124 and 9999. Following your DCC system instructions, work through to the instructions for setting a long address and enter your chosen number.

Do not add any extra zeros before your number, eg for 124 do not enter 0124.

1.4 Resetting the Address

To re-set the address of an unknown decoder, set CV8 to a value of 8 on a programming track. This will revert the decoder to default address (as well as all other settings).

2. Motor Control

All CVs needed to set-up are supported.
The range of all general CVs is 0 - 255.
Please note that with Speed related CVs 5 and 6, zero (0) = 255, and is the default setting.

2.1 Setting up motor control

You do not have to do this but for best results for every loco it is advised. If you make a mistake, do not worry, just reset the decoder by changing CV8 to 8 and try again.

All of these CVs have a range of 0 - 255.

CV Number	Name	Use	Advice
CV2	Start Voltage	Set the voltage that it takes to move the locomotive	If the locomotive does not move off on speed step 1, inclease CV2 until it does.
CV3	Acceleration Inertia	Set up the acceleration curve of the locomotive	Increasing this value slows the acceleration of the locomotive.
CV4	Deceleration Momentum	Set up the deceleration curve of the locomotive	Increasing this value slows the deceleration of the locomotive.
CV5	Top Speed	Set the top speed the locomotive will achieve	The higher the value, the lower the top speed.
CV6	Mid Speed	Sets the mid speed of the locomotive	Recommended to be 1/4 to 1/3 of the value of CV5.

2.2 Back EMF

A preset back EMF function that will give smooth low speed control without the need for any adjustment other than CV2 is included. Ready-to-run locomotives usually run well at default settings with no need to adjust Back EMF. Back EMF can be turned off at a desired speed step or assigned to a function to enable switching on or off as required.

Back EMF is self-adjusting and can be either on or off.

CV61 1 = on (default)
0 = off

If you want Back EMF to turn off after the locomotive is underway (for example, if consisted locos fight each other, this will make consisting smoother) set CV10 to the speed step at which you want it to turn off.

CV10 = 15 will make back EMF turn off at speed step 15.

3. Functions

3.1 Functions

Function load (each): 0.2 amps

All Hatton's decoders have 4 functions.

Functions 1(A) (white) and 2(B) (yellow) are preset at the factory for directional front and rear lights. They are turned on and off with F0 or the light function and will automatically turn on and off depending on locomotive direction.

Function 3(C) (also known as Aux 1) which uses the Green wire is controlled by default with function button 1.

Function 4 (also known as Aux 2) which uses the Purple wire is controlled by default with function button 2.

All 4 functions can be reset to be directional or always on. They can be set to have different light effects as well. They can also be re-allocated to operate using different buttons if you wish. This is called "function re-mapping".

All functions can also be used for active accessories such as smoke units providing that the accessory you have chosen operates within the power rating of the function. If you wish to use an accessory that might need more power than one function can supply, you should parallel two function wires and re-map their control buttons so they turn on and off at the same time.

3.2 Using and setting up lighting

The wires that control lighting are

Blue - this is the common positive ground and should be connected to all lights.
White - this is the front headlight wire.
Yellow - this is the rear light wire.
Green - this is a spare function, often used for drivers cab or a flickering firebox.
Purple - can be used for any other function you choose.

By default, front white and rear yellow light wire are both turned on by function 0 or the "light" or "headlight" function button. Green is usually turned on with function 1 and purple with function 2.

To change WHEN a light function is on (directional or constant)

CV	Wire Colour	Use	Default	Other settings
CV49	White	Headlight	0	Set it to 0 for only on forward, set it to 16 for only on reverse or 32 for always on.
CV50	Yellow	Tail or reverse light	0	Set it to 0 for only on forward, set it to 16 for only on reverse or 32 for always on.
CV51	Green	Aux1 or F3	32	Set it to 0 for only on forward, set it to 16 for only on reverse or 32 for always on.
CV52	Purple	Aux2 or F4	32	Set it to 0 for only on forward, set it to 16 for only on reverse or 32 for always on.

Hatton's decoders can replicate several light effects. To change how a light function operates, change its CV as follows.

Light Type	Forward Only	Reverse Only	Either Direction
Constant light	0	16	32
Firebox Flicker	1	17	33
Mars Light	2	18	34
Single Flash	3	19	35
Double Flash	4	20	36

3.3 Changing which button will operate a function

CV Number	Controls the function	Default
CV33	White wire - Headlight	1
CV34	Yellow wire - Reverse/tail light	2
CV35	Green Wire - Aux1/Function 3	4
CV36	Purple Wire - Aux2/Function 4	8

All functions can be controlled by any function button on your controller up to function 6 by using these values and entering them into the CV that controls the chosen wire colour.

Function Button	F0 (Forward)	F0 (Reverse)	F1	F2	F3	F4	F5	F6
Value to set	1	2	4	8	16	32	64	128

The Green and Purple wire can also be controlled by function 7 to 12 if you use these values.

Function Button	F7	F8	F9	F10	F11	F12
Value to set	4	8	16	32	64	128

4. Harness

When fitted with a wiring harness (not on all decoders), if fitting to a non-DCC locomotive, please take care to follow the wiring colour codes as incorrect wiring will damage your decoder.

1. Orange - Motor Right
2. Yellow - Function B (rear lights)
3. Green - Function C
4. Black - Pickup Left
5. Grey - Motor Left
6. White - Function A
7. Blue - Function Common +
8. Red - Pickup Right

Please note that the purple wire on all decoders is for function 4 (aux2) and is operated by default using function button 2. If you are not connecting a 4th function, please be sure to isolate the bare end of this wire to prevent accidental short circuits.

5. Brake on DC

To make it possible to use brake on DC you will need to turn off DC running. This is done by reducing the value already set in CV 29 by 4 (for example, if it is set to 6, make it 2, if it is set to 38, make it 34).

6. Locking

The decoder can be "locked" once it has been programmed, therefore removing any chance of later accidental re-programming – This is very helpful when you wish to use two or more decoders in for example a single DMU/EMU set, as they can then be set up to respond to different function buttons while sharing one address, making operation easier.

7. Consisting

Hatton's decoders support all forms of consisting and double-heading.

8. Reset

Should you want to reset your Hatton's decoder after experimentation or if you can't remember the address you can restore all settings to defaults by setting CV8 to 8. Once this is done, the decoder address will be number 3.

9. Warranty

Our decoders are covered by our standard warranty. Please see www.hattons.co.uk/returns for more details.

10. Troubleshooting

Problem	Suggestion	Solution
Nothing happens	Have you selected the address?	If it's a new decoder the address will be 3. If you can't recall it's number then reset the decoder (CV8 to 8) it will now be 3 again.
	If it is not reading or running and you know the address	Be sure that it is not suffering from loco failure or a short circuit in the wiring.
Loco runs reverse when the controller says forward	Decoder is installed backwards (8 pin only)	Make sure pin 1 lines up with the orange and red end of the harness.
	Loco wiring is reversed	Check the wires to the motor and pickups are on the correct sides. Read CV29 on controller and add 1 to the value and reprogram.
Lights/functions will not work	Are the functions turned on?	Check if your controller uses function 0 or a seperate headlight button. Check the direction of the loco.
	Are LEDs installed correctly	LEDs need to be installed the correct way as they are diodes, unlike standard lamps.
Mistake when changing CVs	CVs or decoder will not work	Set CV8 to 8 to reset the decoder to default values and start again.
There is a black hole in the heat shrink	Decoder will not work	This usually means the decoder has been installed incorrectly, has shorted against part of the chassis, had function wires crossed or overloaded. Usually this means the decoder is now beyond repair but just try a CV8 to 8 reset to make sure it is.

11. More info and contact

If you require more information on these decoders or to order some more please visit :-

www.hattons.co.uk

Or contact :-

0151 733 3655
info@hattons.co.uk

Hatton's Model Railways
17 Montague Road
Widnes
Cheshire
WA8 8FZ
United Kingdom