



Thank you purchasing a Laisdcc DCC decoder. The decoder should provide excellent fault free service when installed correctly and configured as per these instructions. The full CV list is included at the end of this manual.

Resetting the decoder back to factory settings:

Should you ever need to reset the decoder back to factory settings, the method used depends on your decoder:

If your read-only value in CV7 is 1, then the reset value is 2. If CV7 is 2, then the reset value is 4.

For a CV7 value of 1;

- A. Write 2 to CV8 and;
- B. Write 2 to CV30 to reset the decoder.

For a CV7 value of 2;

- A. Write 4 to CV8 and;
- B. Write 4 to CV30 to reset the decoder.

Please refer to the CV list for the default / factory reset values.

Note: If you find that after resetting your decoder it keeps all the settings the same as before, you may have locked the decoder – Program CV15 to 0 and CV16 to 1 to unlock it and then reset it again.



Finding out more about your decoders

(Some values only available in Version 2 decoders with a CV7 value of 2)

- a) Read CV7 to see the Manufacturer Version Number of the decoder.
- b) Read CV8 to see the Laisdcc NMRA ID=134
- c) Read CV60 to see the place of manufacture of the decoder. (1=CN, 2=HK, 3=VN, 4=PH, 5=MY)
- d) Read CV's 137, 138, 139 & 140 to find the decoder's production date.

CV137 & CV138=YYYY, CV139=MM, CV140=DD

Eg: If CV137=20, CV138=15, CV139=12 and CV140=15 then the manufacturing date is December 15th, 2015

- e) CV105 & CV106 is the NMRA default for USER ID #1 and USER ID #2. You can also set CV's 48, 62, 65, and 66 as USER ID #3, USER ID #4, USER ID #5 and USER ID #6. NOTE: USER ID's DO NOT reset to factory settings. CV47 can be used for any purpose, but this CV will be reset to 0 after a factory reset.
- f) All other CV's that are not used by Laisdcc can be used freely for any purpose and the value in these CV's will NOT reset.

g) All LaisDcc decoders are fitted with extra stay alive wires (BLUE and BLACK) for connection to a Laisdcc stay alive kit. The blue wire is the function common of the decoder and it is connected to the positive connection (BLUE wire) of the stay alive. The BLACK wire is the Negative connection at the decoder Anode and connects to the BLACK wire of the Laisdcc stay alive.



Note: Laisdcc decoders are compatible with NMRA DCC standards but are NOT compatible with Railcom and Motorola standards. Railcom compatibility will be available at a later date.

For more information, refer to the following installation guides:

www.laisdcc.com/Stayin_Alive_laisdcc.pdf

<http://members.optusnet.com.au/mainnorth/alive.htm>

<https://youtu.be/usXLUmTis5w>

Model / Product numbers of Laisdcc decoders

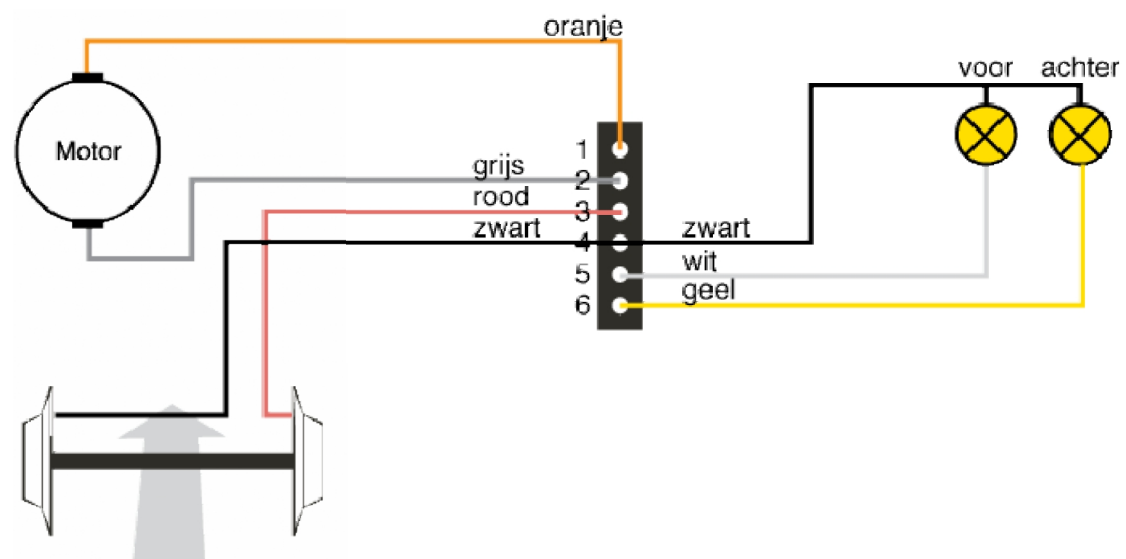
MODEL 860012 (Dimensions 14.5mm x 8.5mm x 3mm)

2 Function decoder with NEM651 6 bare wires, Function Rating of 100mA each, total rating of 1A continuous, 2A peak.

Note: If your decoder has a CV7 value of 1, your decoders will only have a 0.5A continuous rating.

IMPORTANT: EXCEEDING THE CURRENT RATINGS WILL DAMAGE THE DECODER!!

All the wire colors follow the NMRA NEM651 standard. Use the diagram below for reference:





MODEL 860013 (Dimensions 14.5mm x 8.5mm x 3mm)

2 Function decoders with NEM651 6 wire plug, Function Rating of 100mA each, total rating at 1A continuous, 2A peak.

Note: If your decoder has a CV7 value of 1, your decoders will only have a 0.5A continuous rating.

IMPORTANT: EXCEEDING THE CURRENT RATINGS WILL DAMAGE THE DECODER!!

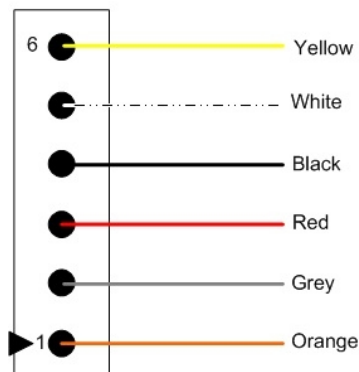
Please make sure you know which pin is No.1 before installation. *PIN 1 on the shrink film is marked with a star sign: **

All the wire colors follow the NMRA NEM651 standard. Use the diagram below for reference:

NMRA 6 Pin DCC Socket

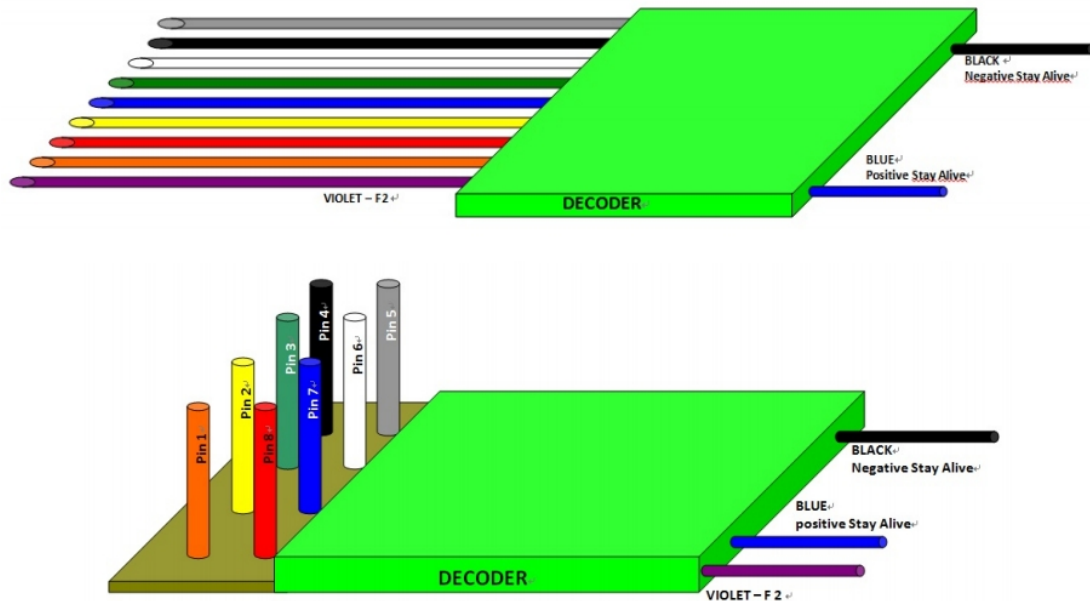
NEM651

Viewed looking down onto the top of the socket



Functions:-

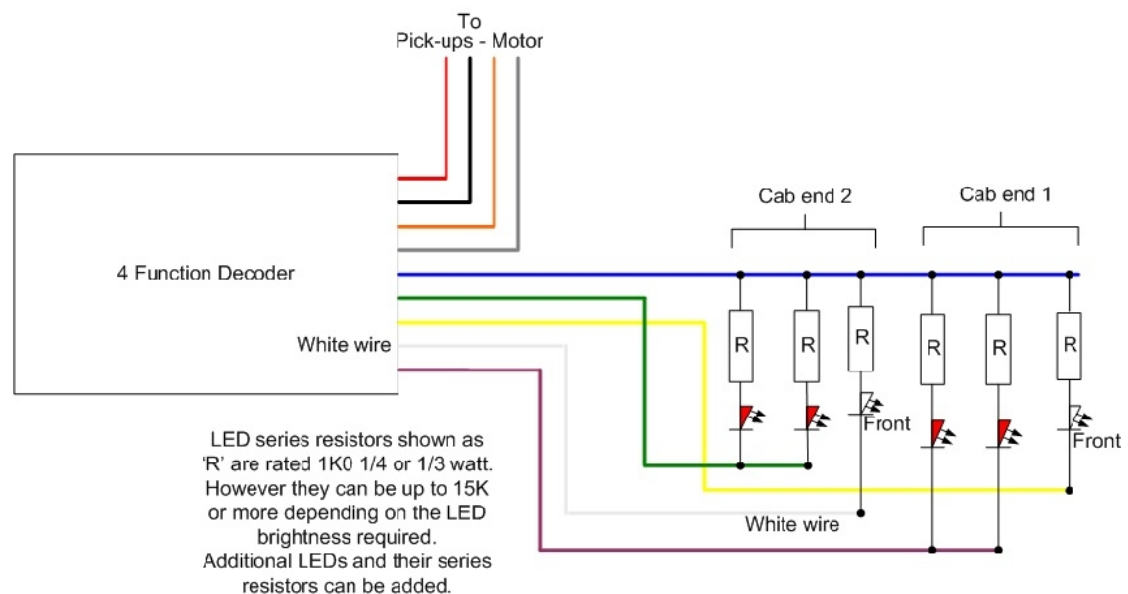
- 1 Orange - Motor Right
- 2 Grey - Motor Left
- 3 Red - Rail/wheel connection (Right rail)
- 4 Black - Rail/wheel connection (Left rail)
- 5 White - Function (Lights etc Often Headlights)
- 6 Yellow - Function (lights etc Often Rear red)

**MODEL 860014**

4 Function decoder with NMRA 9 wire color standard. Function rating of 100mA each, total rating of 1A continuous, 2A peak.

IMPORTANT: EXCEEDING THE CURRENT RATINGS WILL DAMAGE THE DECODER!!

All the wire colors follow the NMRA NEM 652 standard Use the diagram below for reference:



**Color VS Function:**

Orange = Motor Right

Yellow = Reverse Headlight FL(F0R)

Green = Function 1

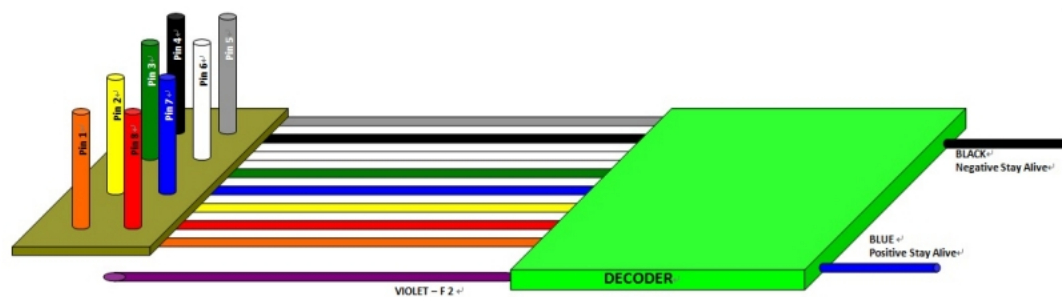
Black = Left Rail

Grey = Motor Left

White = Forward Headlight FL(F0F)

Blue = Function common positive Red = Right Rail

Purple= Function 2

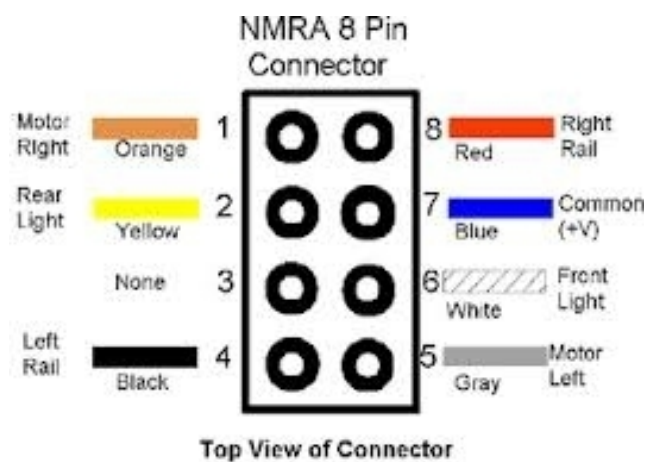
MODEL 860021

4 Function decoder with NEM 652 standard 8-pin plug with a fly out purple wire for F2.

Function rating of 100mA each, total rating of 1A continuous, 2A peak.

IMPORTANT: EXCEEDING THE CURRENT RATINGS WILL DAMAGE THE DECODER!!

All the wire colors follow the NMRA NEM 652 standard. Use the diagram below for reference.



**Color VS Function:**

Orange = Motor Right

Yellow = Reverse Headlight FL(F0R)

Green = Function 1

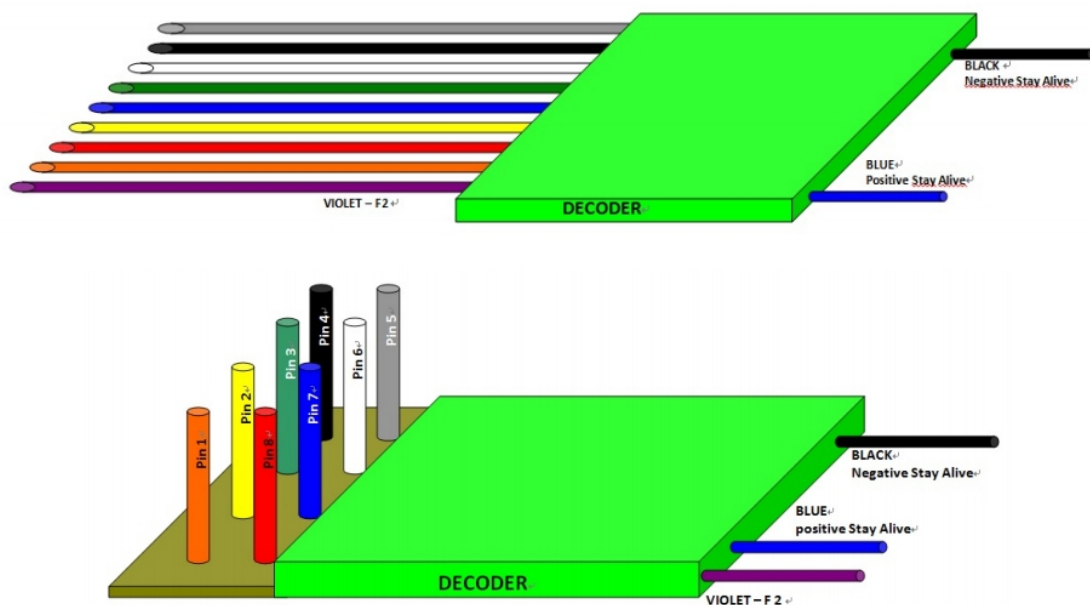
Black = Left Rail

Grey = Motor Left

White = Forward Headlight FL(F0F)

Blue = Function common positive Red = Right Rail

Purple = Function 2

MODEL 860018

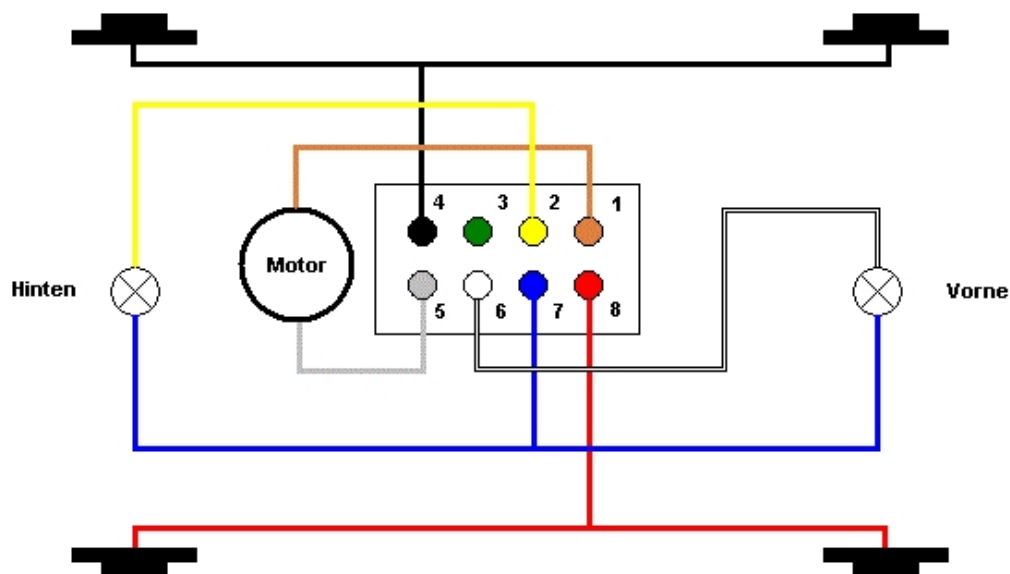
4 Function decoder with NEM 652 standard 8-pin plug with a fly out purple wire for F2.

Function rating of 100mA each, total rating of 1A continuous, 2A peak.

IMPORTANT: EXCEEDING THE CURRENT RATINGS WILL DAMAGE THE DECODER!!

Please make sure you know which pin is No.1 before installation. *PIN 1 on the shrink film is marked with a star sign: **

All the wire colors follow the NMRA NEM 652 standard. Use the diagram below for reference.
















The only difference between models 860021 and 860018 is the 8 PIN NEM 652 plug being either on board or with fly out wires.

MODEL 860019

4 Function decoder with 21-pin MTC standard interface, Function rating of 100mA each, total rating of 1A continuous, 2A peak.

Note: These decoders have a polarity Index on the 21-pin plug so they cannot be installed incorrectly.

Hallsensor 1	1	22		Schleifer, Pantograf
Hallsensor 2	2	21		Räder, Masse
Aux 6 (L)	3	20		DC (-) Funktionen
Aux 4 (L)	4	19		Motor +
Zugbus Clock	5	18		Motor -
Zugbus Data	6	17		Aux 5 (L) / Motor (3)
Licht hinten		7	16	 DC (+) Funktionen
Licht vorne		8	15	 Aux. 1
Lautsprecher 2		9	14	 Aux. 2
Lautsprecher 1		10	13	 Aux. 3 (L)
Verdrehschutz	11	12		Vcc +5V Prozessor



PRIMARY CV Settings (CV LIST)

All Laisdcc decoders follow the same CV settings. The only difference between all the types of decoders is the connection interface.

CV1 - Primary Address/2 Digit Address/Short Address

The default address of the decoder is 3. You can set CV1 to any value from 1-127.

CV17 & CV18 - Extended Address/4 Digit Address/Long address

The Extended Address is the locomotives address when the decoder is set up for extended addressing, (indicated by a value of "1" in bit location 5 of CV#29). Make sure 4-digit Addressing is enabled in CV29 when you use a CV17/CV18 long address. Addresses can be between 128-9999. Adding a value of 32 to the value of CV29 will enable the long address function.

There are many CV17 & CV18 Calculators on the internet, you can search for them on Google or use the Digitrax CV17/CV18 calculator directly:

http://www.digitrax.com/support/cv/calculators/#cv17_18_calc

Usually your command station will assign the value for you. But if not, please program it yourself after calculation.

CV17 & CV18	
Click here for more information on CV17 & CV18	
Loco Address	<input type="text" value="1234"/>
CV17	<input type="text" value="196"/>
CV18	<input type="text" value="210"/>
<input type="button" value="Calculate"/>	

CV19 - Consist Address

Consist Addressing is similar to 2-Digit Addressing in that it can accept values from 1-128.

However, Consist Addressing differs in that it allows for a second address to be applied to



a decoder specifically for use when the locomotive is being operated in a Consist or double headed train. The second differing feature of the Consist Address is that if you add a value of 128 to whatever address you plan to use the locomotives forward and reverse will be swapped. This allows for consists that have locomotives running back to back.

CV21 & CV22 - Consist Lighting Control

You can choose either the White and Yellow Wires or Green and Purple wire outputs to respond to instructions addressed to the consist address or to the locomotive address. By default, the decoders light functions will only respond to the 2/4 Digit locomotive Address. Writing the Green wire/F1 value (1) or Purple wire/F2 value (2) to CV21 will change it to respond to consist address. Writing the White wire/F0R value (1) or Yellow wire/F0R value (2) to CV22 will change it to respond to consist address.

For example, you want the F1 and F2 to respond to consist address, just add 1+2 i.e. write 3 to CV21.

CV15 & CV16 - Decoder Lock

The Decoder Lock is used to change CVs in only one of several decoders with the same short address (CV1) or long address (CV17 and CV18) that are installed in the same locomotive. Assign a number to CV16 in each decoder (i.e. 1 to motor decoder, 2 to sound decoder, 3 or higher to other decoders) before the decoders are installed in the locomotive. To change a value in another CV of one of the installed decoders, first write the number 1 (motor), 2 (sound), or 3 or higher (other) into CV15, then send the new value to the CV to be changed. The decoders will compare CV15 to CV16 and, if the values are equal, the CV to be changed will be changed. If the values in CV15 and CV16 are different,



the update will be ignored.

The default value of CV15 is 0, which unlocks all decoders, setting CV15 to a value of 7, will lock all the decoders.

The default value of CV16 is 1 for motor decoders, and the CV15 range is 0 to 7. The CV16 range is 1-6. This follow NMRA standards, if you have used other brands of decoders, the settings are the same.

Note: If you find that after resetting your decoder it keep all the settings the same as before, you may have locked the decoder – Program CV15 to 0 and CV16 to 1 to unlock it and then reset it again.

CV29 - Decoder Configurations

Laisdcc decoders are compatible with Digitrax CV29 calculators. Use the link below to choose the function you want, then get a value to program into CV29:

http://www.digitrax.com/support/cv/calculators/#cv29_calc

CV29

Click here for more information on CV29

Speed Control

- ☒ Advanced 28/128 speed step control - Use with decoders that will be run on most modern command stations
- ☐ Standard 14 speed step control - Use with decoders that will be run on 14 step command stations only

Addressing

- ☒ 2 Digit Addressing - Use CV01 to set the address. On Digitrax throttles the display shows this as AD2.
- ☐ 4 Digit Addressing - Use CV17 & CV18 to set address. On Digitrax throttles the display shows AD4 and the process is automated.

Analog Mode Conversion

- ☒ On - Use when you want to run your decoder on non-DCC layouts
- ☐ Off - Use when you do not want to run your decoder on non-DCC layouts

Normal Direction of Travel (NDOT)

- ☒ Forward - Use to run decoder in the normal direction of travel defined by the loco wiring
- ☐ Reverse - Use to run decoder in opposite direction of travel defined by the loco wiring

Speed Table

- ☒ Disabled - Use CVs 02, 05, & 06 to set up simple 3 step speed table if desired
- ☐ Enabled - Use CVs 65-95 to set up 28 step speed table with 256 step resolution

CV29

Reset

LIGHTING EFFECTS



Yellow = Reverse Headlight FL (F0R)

Green = Function 1

White = Forward Headlight FL (F0F)

Purple = Function 2

Depending on the model, the decoder will have either 2 or 4 functions. Usually the F1 and F2 is for Forward Head light FL (F0F) and Reverse Head light FL (F0R) and the Green and Purple wires are for Function 1 and Function 2.

Laisdcc decoders can do several interesting light effects. To change how a light function operates, change its CV as follows.

White = CV49 Yellow = CV50 Green = CV51 Purple = CV52

Light Direction Code:

Forward light direction code is 0 Reverse light direction code is 16

Both light direction code is 32

The default setting of CV49 is 0 which means it will only be on in the forward direction.

The default setting of CV50 is 16 which means it will only be on in the reverse direction.

The default setting of CV51 is 32 which means it will be on in both directions.

The default setting of CV52 is 32 which means it will also be on in both directions.

There are also some special lighting effects to use:

Lighting effect Codes:

The lighting effect codes are as follows:

Constant Bright Light effect code = 0

Random Flicker Light effect code = 1



Mars Light effect code	= 2
Flashing Light effect code	= 3
Single Pulse Strobe effect code	= 4
Double Pulse Strobe effect code	= 5
Rotary Beacon effect code	= 6
Gyra Light effect code	= 7
Rule 17(dimmmable light) effect code	=8
Ditch Light Phase A effect code	= 10
Ditch Light Phase B effect code	= 11
Constant Dim Light effect code	= 12
Auto Mars effect code	= 13

Add the effect code to the direction code to get the value you need to program to the CV of the wires/functions.

For example: You want to make Green = Function 1 to be Random Flicker and only on when Forward. The direction code is 0 and the effect code is 1, so you add the direction code to the effect code: $0+1=1$ and the Green wire (Function 1) is control by CV51, so you need program the value 1 to CV51. Then the Green wire will on with Flicker effect when running in Forward.



FUNCTION REMAPPING

Control Key (Buttons on the cab) & Value of the Key (Buttons)

Control Key	Value of Key
Forward	1
Reverse	2
1	4
2	8
3	16
4	32
5	64
6	128
7	4
8	8
9	16
10	32
11	64
12	128

**CV Numbers & Functions**

CV No.	Function	Default Key Value
CV33	Forward Headlight FL(F0F)/White Wire	1
CV34	Reverse Headlight FL(F0R)/Yellow Wire	2
CV35	Function 1/Green Wire(0-6)	4
CV36	Function 2/Purple Wire(0-6)	8
CV37	Function 1/Green Wire(7-12)	0
CV38	Function 2/Purple Wire(7-12)	0
CV39	Function 3/Brown Wire(0-6)	0
CV40	Function 4/Pink Wire((0-6)	0
CV41	Function 3/Brown Wire(7-12)	0
CV42	Function 4/Pink Wire((7-12)	0
CV43	Function 5/Pink/Purple Wire(0-6)	0
CV44	Function 6/Green/Brown Wire(0-6)	0
CV45	Function 5/Pink/Purple Wire(7-12)	0
CV46	Function 6/Green/Brown Wire(7-12)	0
CV123	ON/OFF Rule 17 Dimming	32
CV124	ON/OFF Ditch Light Blink	8
CV134	Button Control of Motor Circuit	2
CV136	BEMF Map	2



Choose the function/wires you want to remap, then program the value of the key you want to use as control to the CV of the function. The button of 0-6 and 7-12 is in different CV.

For example, if you want to remap the function of the purple wire to button (Key) 3, you need to program the value of No. 3 key 16 to CV36.

You can use one button to control multiple wires/functions. For example, button 3 can control both the Green wire and purple wires at the same time by programming the value 16 to both CV35 and CV36. Then the button 3 key will control two lights.

One wire can be operated by multiple buttons also. If you want to use both Button 1 and Button 3 to control the Green wire, you need to program the sum of the value of button 1 and the value of button 3 to CV35: $4+16=20$, so program a value of 20 to CV35.

If you want Button 7 to control the Green Wire, program the value 4 to CV37.

CV2 / CV5 / CV6 - 3 Point Speed Graph

CV2 = Start Volts CV6 = Mid Volts CV5 = Top Volts

To enable 3 Point Speed Curves simply program values into CV 2 (Start Volts), CV 6 (Mid Volts), and CV 5 (Top Volts). The Speed Curve is defined in CV's 2, 6 and 5 with each CV corresponding to approximately one third of the speed range.

Values may range from 1-255 and every value of 18 (approximately) added to one of the Speed Curve CV's adds about 1 volt to the motor speed at the CV being adjusted.

NOTE: 3 Point Speed Curves do not allow for parabolic speed curves. That is to say each consecutive CV must have a value higher than, or equal to, the CV before it.

You can set the start voltage by using CV2. The higher the start voltage, the higher the locomotive's initial speed when started. This adjustment is used to trim the locomotive to



compensate for its motor efficiency. If you have a locomotive that takes a lot of voltage to get started, this adjustment can be helpful.

The mid-point voltage adjustment allows the motor speed curve to be altered at step 15, the midpoint of the motor voltage curve, by using CV6.

The maximum voltage adjustment lets you set the maximum voltage to be applied at the top speed step. Set the maximum voltage in CV5 to limit the top speed of the locomotive.

Start voltage, mid-point voltage and maximum voltage can be used to quickly and effectively set your locomotive's throttle response curve

CV67 to CV94 – Loadable Speed Table

In order to use the speed table, you need to program CV29 with the value 16 to enable the speed table function.

If you wish to be more precise in setting your throttle response curve, loadable speed tables let you define each individual speed step for a locomotive. Once you have defined the speed curve you like, you can use the forward and reverse multiplier to move the curve up or down in speed.

Setting up a loadable speed table involves setting many CV's since you will set a value for each of 28 speed steps. Many DCC users find that using a computer based programmer makes this process much easier. When you use a computer, you can even save the speed tables you like and load them into other decoders quickly and easily via the computer. There are a lot of topics about this and a lot of people share their settings via websites.



You can learn more about it at the following links:

<http://tonystrains.com/dccprimer-intro-faq-how-can-i-customize-each-locos-performance/>

http://dcc-mueller.de/decoder/speedt_e.htm

<https://www.youtube.com/watch?v=ZSy22RR66oY>

CV3 & CV4 - Acceleration & Deceleration Rates

Acceleration is the rate at which the decoder increases speed from one speed step to the next in response to a new increase speed command. The acceleration rate (CV3) can be set to simulate train weight. Deceleration is the rate at which the decoder decreases speed from one speed step to the next in response to a new decrease speed command. The deceleration rate (CV4) can be used to simulate inertia. You can set your locomotives to get off to a slow start because of a heavy load and to take a long time to come to a stop because of the inertia of the train once it is moving.

CV61 - Back EMF (BEMF)

Back-EMF is self-adjusting and can be either on or off. Set CV61 to 1 (default) for on, 0 for 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. e.g. CV10 = 15 will make Back-EMF turn off at speed step 15.



CV59 - Passenger/Coaches Light F0 Control

Note: When you want to use this function, please make sure the F1 & F2 is turned off before setting or else F1 and F2 will not be controlled by F0.

CV59=0: Function turned off

CV59=1: Function 1/Green Wire, Function 2/Purple Wire will be flicker when you use F0 to power it on. Later it will stay on. Both F1 and F2 control by F0.

CV59=2: Forward Headlight FL(F0F) / White Wire, Reverse Headlight FL(F0R) / Yellow Wire, Function 1 / Green Wire and Function 2 / Purple Wire will flicker when using F0 to power it on, then it will stay on. All lights are controlled by F0.

CV136 - Button control of Back EMF

You can choose to turn back EMF on and off at will if you set your decoder up to make this function available. This gives your hands on control of Bck EMF via you chosen function button.

Set CV61 = 3

CV136 should be set as per this table. We recommend that you choose a function 9 or lower for most systems to preserve direct on/off access.



Fn Button	CV136
5	1
6	2
7	4
8	8
9	16
10	32
11	64
12	128

CV64 - Dimmed Brightness function

2 - 6 for LEDs, 12 - 18 for bulbs.

CV133 - Button control of the motor

There are many uses for this: turntables, cranes, conveyor belts & high current devices using up to 1 Amp. Setup is simple:

Establish the motor speed and then choose the style of button control and it's done!

Setting the motor speed: This is important as there is no variable speed control in this mode, just forward or reverse, so unless you are making a model weapon or centrifuge, you are going to want a slower motor speed.

This uses CV133, range is 0~255. Start off with 60.



Choosing your preferred control method:

There are 2 options: The first will use F2 for forward and F3 for reverse. (Just press the Fn on to start, off to stop). This mode is enabled by programming CV61 with a value of 64

The second control option:

This will use Function 2 to turn the motor on and the forward/reverse buttons of your controller for direction. This mode is enabled by programming CV61 with a value of 68.

There is one advantage of the second method. If you want to power several motors like this for a crane, you can remap the functions on each of them differently, set them to the same number and control each with its own specific function buttons.

Manual control of Rule 17 Lighting

Rule 17 Lighting: This is primarily a US lighting style, however UK diesel models often have a “day” and “night” lighting level, and this “rule 17” setup can also help you to get that to work properly in your locomotives.

In general, this rule stipulates that light in the rear of a loco should be on & dimmed when the front light is at full brightness & importantly, that the headlight should also always be dimmed in the direction of travel when;

- (1) At stations/yards where switching is underway.
- (2) If a locomotive is stopped close behind another train.
- (3) On non-sigaled lines when a locomotive is stopped on the main and waiting for an approaching train.
- (4) When a locomotive is approaching and passing the head end & rear end of a train on the adjacent track.



(5) At other times to permit clearly visible passing of hand signals or when safety of employees requires it.

Some decoders offer a very basic form of Rule 17 but Laisdcc decoders have a more advanced, realistic setup. Because it requires several CVs to be set we will describe it in a series of simple steps, each properly explained.

We are going to set up front & rear lighting so that lights:

- * Are not directional on/off (manual on/off selection)
- * Are on separate buttons (F0 and F1) and also...
- * Light in the end opposite to direction auto-dims if on.
- * Are NOT automatically dimmed when stopped but...
- * Can be dimmed when stopped or when switching with F4 no matter which direction the loco is moving.

Let's do it as a step-by-step setup - we will use the White and yellow function wires for Rule 17.

(1) We need to set CV61 to engage "Opposite Dim". Opposite dim needs 32 added to the value already in CV61. As CV61 also controls BEMF it will already be either 1 (BEMF on) or 3 (BEMF on via a function button).

So... For CV 61, enter either $1+32 = 33$ or $3+32 = 35$.

(2) We need to set CV64 to set the Dimming level. The range for this CV is 0~15. The best range to use to dim LED's is 1-6.

So... For CV 64, enter 3.



(3) Now we need to set White wire control / CV49 and Yellow wire control / CV50 to Rule 17 always on.

The options for this are 8 (Rule 17 forward only) 24 (rule 17 Reverse only) or 40 (rule 17 always / manual) So... For BOTH CV49 and CV50, enter 40.

(3) Now to reallocate function control. We are going to make White F0, Yellow F1, Green F2, Purple F3. White is already F0 so leave it. To remap the others just set their function allocation CVs to the following values.

For CV34 enter 4, For CV35 enter 8, For CV36 enter 16.

CV135 - Random Flicker Adjust

For Random Flicker generator the overall speed of the flicker can be adjusted from 1-255 (1 being the fastest and 255 being the slowest).



TROUBLESHOOTING:

Every decoder is factory tested before it was packed, so we are sure that they are ready to use when you receive them. Nothing can go too badly wrong if the loco ran well before you installed the decoder, the decoder is installed correctly and you pre-checked your installation on the program track before putting it on the main line!

Nothing happens

Have you selected the correct address? If it's a new decoder it will be 3. If you can't remember its address simply reset the decoder and it will be 3 again. If it is not reading or running and you do know the address, check to make sure that there is not another sort of loco failure or a problem in the wiring or the decoder may be damaged. Also check you have not locked the decoder settings.

Loco runs reverse when the controller says forward

Simply remove and reverse the 8 pin plug (or if you hard-wired the loco, change over the orange and gray wires at the motor) Alternatively you can add 1 to the value already in CV29.

Light / functions will not work

Have you turned the lights ON with Function 0 (zero) and also tried the direction switch? remember white and yellow functions are both always directional by default.

Have you perhaps wired the LED back to front? (long lead is the LED positive)

Did you add a resistor? If not, you may have damaged the LED! (The function will still be ok).



I think I must have made a CV setting mistake. Now it won't work

Just do a reset and it will go back to the default factory settings.

It has got a big black hole in the heat-shrink!

The only way this can happen is by incorrect wiring, overload or similar. You killed it! (It may only be a dead light function - if in doubt, always try a RESET using CV8 or CV30)

Please Visit our website at www.laisdcc.com

We recommend you buy our products via our distributors in your local country so you can get a good, fast after-sales service.

To find the distributor contact details for your country, Contact us at Sales@laisdcc.com



CV No.	Description	Default	After Reset
1	Primary Address/2 Digit Address/Short Address	3	3
2	Vstart	0	0
3	Acceleration Rate	1	1
4	Deceleration Rate	1	1
5	Vhigh	0	0
6	Vmid	0	0
7	Manufacturer Version Number/When CV7=1, CV8=2 for Reset	1 or 2	Read Only
8	Manufacturer ID/When CV7=2, CV8=4 for Reset	134	CV8=4 Or 2 for Reset
9	Total PWM Period/Not in USE	0	Not Reset
10	EMF Feedback Cutout	0	0
11	Packet Time-Out Value/Not in USE	0	Not Reset
12	Power Source Conversion/Not in USE	0	Not Reset
13	Alternate Mode Function Status	255	255
14	Alternate Mode Function 2 Status	255	255
15	Decoder Lock	0	0
16	Decoder Lock	1	1
17	Extended Address/4 Digit Address/Long address	0	0
18	Extended Address/4 Digit Address/Long address	0	0
19	Consist Address	0	0
20	Reserved by NMRA/Not in USE	0	Not Reset
21	Consist Address Active for F1-F8	0	0
22	Consist Address Active for FL and F9-F12	0	0
23	Acceleration Adjustment	0	0
24	Deceleration Adjustment	0	0
25	Speed Table/Mid-range Cab Speed Step/Not in USE	0	Not Reset
26	Reserved by NMRA/Not in USE	0	Not Reset
27	Decoder Automatic Stopping Configuration/Not in USE	0	Not Reset
28	Bi-Directional Communication Configuration/Not in USE	0	Not Reset
29	Configurations Supported	6	6
30	CV30=4 for Reset	0	0
31	Index High Byte/Not in USE	0	Not Reset
32	Index Low Byte/Not in USE	0	Not Reset
33	Forward Headlight FL(F0F)/White Wire	1	1
34	Reverse Headlight FL(F0R)/Yellow Wire	2	2
35	Function 1/Green Wire(0-6)	4	4
36	Function 2/Purple Wire(0-6)	8	8
37	Function 1/Green Wire(7-12)	0	0
38	Function 2/Purple Wire(7-12)	0	0
39	Function 3/Brown Wire(0-6)	0	0
40	Function 4/Pink Wire((0-6)	0	0
41	Function 3/Brown Wire(7-12)	0	0
42	Function 4/Pink Wire((7-12)	0	0
43	Function 5/Pink/Purple Wire(0-6)	0	0
44	Function 6/Green/Brown Wire(0-6)	0	0
45	Function 5/Pink/Purple Wire(7-12)	0	0
46	Function 6/Green/Brown Wire(7-12)	0	0
47	For USER Use/Will be Reset	0	0
48	USER ID #3	0	Not Reset
49	White Wire/FL Feature	0	0
50	Yellow Wire/RL Feature	16	16
51	Green Wire/F1 Feature	32	32
52	Violet Wire/F2 Feature	32	32
53	Brown Wire/F3 Feature/When Available	0	Not Reset
54	Pink Wire/F4 Feature/When Available	0	Not Reset
55	Not in USE	0	Not Reset
56	Dither Frequency	3	3
57	Dither Amplitude	10	10
58	Not in USE	0	Not Reset
59	Passenger/Coaches Light F0 Control 0=OFF 1=F1/F2 ON 2=ALL ON	0	0
60	Production Place/1=CN, 2=HK, 3=VN, 4=PH, 5=MY	1/2/3/4/5	Read Only
61	Configuration Options	1	1
62	USER ID #4	0	Not Reset
63	Ditch Light Blink Holad Over	63	63
64	Dim Value	6	6
65	USER ID #5	0	Not Reset
66	USER ID #6	0	Not Reset
67	Speed Table Step 1	8	8
68	Speed Table Step 2	16	16
69	Speed Table Step 3	24	24
70	Speed Table Step 4	32	32
71	Speed Table Step 5	40	40



72	Speed Table Step 6	48	48
73	Speed Table Step 7	56	56
74	Speed Table Step 8	64	64
75	Speed Table Step 9	72	72
76	Speed Table Step 10	80	80
77	Speed Table Step 11	88	88
78	Speed Table Step 12	96	96
79	Speed Table Step 13	104	104
80	Speed Table Step 14	114	114
81	Speed Table Step 15	124	124
82	Speed Table Step 16	134	134
83	Speed Table Step 17	144	144
84	Speed Table Step 18	154	154
85	Speed Table Step 19	164	164
86	Speed Table Step 20	174	174
87	Speed Table Step 21	184	184
88	Speed Table Step 22	194	194
89	Speed Table Step 23	204	204
90	Speed Table Step 24	214	214
91	Speed Table Step 25	224	224
92	Speed Table Step 26	234	234
93	Speed Table Step 27	244	244
94	Speed Table Step 28	255	255
95	Reverse Trim/Not in USE	0	Not Reset
96	Reserved by NMRA/Not in USE	0	Not Reset
97	Reserved by NMRA/Not in USE	0	Not Reset
98	Reserved by NMRA/Not in USE	0	Not Reset
99	Reserved by NMRA/Not in USE	0	Not Reset
100	Reserved by NMRA/Not in USE	0	Not Reset
101	Reserved by NMRA/Not in USE	0	Not Reset
102	Reserved by NMRA/Not in USE	0	Not Reset
103	Reserved by NMRA/Not in USE	0	Not Reset
104	Reserved by NMRA/Not in USE	0	Not Reset
105	USER ID #1	0	Not Reset
106	USER ID #2	0	Not Reset
107	Reserved by NMRA/Not in USE	0	Not Reset
108	Reserved by NMRA/Not in USE	0	Not Reset
109	Reserved by NMRA/Not in USE	0	Not Reset
110	Reserved by NMRA/Not in USE	0	Not Reset
111	Reserved by NMRA/Not in USE	0	Not Reset
112	Mars Min Brightness	1	1
113	Mars Max Brightness Time	9	9
114	Mars Total Light Cycle	1	1
115	Mars Mid Brightness	6	6
116	Mars Max Brightness	22	22
117	Ditch Light Blink Rate	3	3
118	Rotary Min. Bright	1	1
119	Rotary Min. Bright Time	5	5
120	Rotary Total Light Cycle	1	1
121	Rotary Mid Brightness	15	15
122	Rotary Max Brightness	25	25
123	ON/OFF Rule 17 Dimming	32	32
124	ON/OFF Ditch Light Blink	8	8
125	Rate 2 Ending Point	0	0
126	Dec Rate 2	0	0
127	Rate 3 Ending Point	0	0
128	Dec Rate 3	0	0
129	Rate 2 Starting Point	0	0
130	Acc. Rate 2	0	0
131	Rate 3 Starting Point	0	0
132	Acc. Rate 3	0	0
133	Power Level for Button Control	0	Not Reset
134	Button Control of Motor Circuit	2	Not Reset
135	Random Flicker Adjust	16	16
136	BEMF Map	2	Not Reset
137	YY/Production Time of Year	YY	Read Only
138	YY/Production Time of Year	YY	Read Only
139	MM/Production Time of Month	MM	Read Only
140	DD/Production Time of Day	DD	Read Only
141-255	Not in USE	0	Not Reset