CV1 Short decoder address; 1-127 valid
CV7 Decoder version number. This decoder is 1
CV8 Manufactuer ID. NCE = 11
CV8 Set this CV to 8 **on the programming track** and the decoder will reset to factory settings.
CV11 Packet timeout value (in ½ second increments) Time the decoder will wait before braking to a stop after running into a section of track with DC power. 0=Don't brake
CV15 Decoder programming lock "KEY". This CV is always programmable even when "locked"
CV16 Decoder programming lock ID. When CV15=CV16, programming is unlocked and the decoder will respond to programming commands. If CV15 is not equal to CV16 then decoder programming is locked and it will not program (except CV15) or read.
CV17 High byte of long (4 digit) address
- bit 6,7 always= 1
- bits 0-5 are upper 6 bits of address

CV18 Low byte of long (4 digit) address
CV19 Consist address. (0 or 128 = no consist active)
- bits 0-6 short consist address (1-127 valid)
- bit 7 0= direction is normal, 1= direction is reversed

CV21 Functions active in consist mode. Bit 0 =F1, Bit 7=F8
CV22 Functions active in consist mode. Bit 0,1 controls F1,bit 2=F9, bit 2=F10,bit 3=F11, Bit 4+F12.
- 1=function can be controlled at consist address, 0 = no consist control

each bit 1=function can be controlled at consist address, 0 = no consist control
CV29
- bit 0 1= direction of operation is reversed, 0= direction is normal
- bit 2 1= analog operation mode enabled, 0 = disabled
- bit 5 1= use long address in CV17/18, 0= use short address CV1
- bits 1,3,4,6,7 are ignored by the decoder

CV130-CV153 Effects configuration registers for outputs 1-6
CV161 Outputs on in DC mode
CV162 Ditch light hold time (in seconds)

CV NOTES: All CV numbers not listed above are ignored. This decoder supports all DCC programming methods.

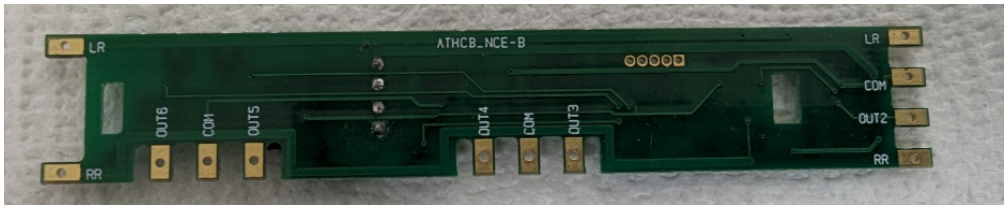
Age 14+

Athearn Caboose Decoder

Version 1.0

Features of this decoder:

- ✓ No flicker circuitry keeps lights from flickering on dirty track
- ✓ 6 function outputs,each have lighting effects generators
- ✓ Select from 14 different lighting effects
- ✓ Built in support for LED lighting
- ✓ Simplified function mapping to all functions F0-F28
- ✓ Decoder programming lock mechanism
- ✓ Support for all forms of programming



Warning: This product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

Abbreviations and 'bit naming' conventions used in the manual:

A - Address data

D – General data

Dir – Direction data

Ext – Extended address enable

F – Function Number

Out – Decoder output number

X – Don't care (doesn't matter if 0 or 1)

0 – bit is zero

1 – bit is one

N/A – bit is not applicable

Bit 'Weight' Illustration

Bit 7 128	Bit 6 64	Bit 5 32	Bit 4 16	Bit 3 8	Bit 2 4	Bit 1 2	Bit 0 1
D7	D6	D5	D4	D3	D2	D1	D0

Desired bit pattern for CV

Bit 7 128	Bit 6 64	Bit 5 32	Bit 4 16	Bit 3 8	Bit 2 4	Bit 1 2	Bit 0 1
0	0	1	1	0	0	0	1

Add up the bit 'weights' that correspond to the ones

Bit 7 128	Bit 6 64	Bit 5 32	Bit 4 16	Bit 3 8	Bit 2 4	Bit 1 2	Bit 0 1
		32	16				1

Value for CV: 32+16+1 = 49

Function mapping and effects programming examples

Ditch lights:
What we want to do:
- ➡ Use outputs 5 and 6 for the left and right ditch lights
- ➡ They will be controlled by F2 which is the HORN button on most DCC systems
- ➡ They should remain on full after the HORN button is released

How to do it:
- ✓ Program outputs 5 and 6 to both be activated by F2. Set the output 5 mapping (CV150) and output 6 mapping CV (CV154) to 2.
- ✓ Program outputs 5 and 6 for ditch light operation. Set CV151 to 40 and CV155 to 44. Using these values the lights will be 'qualified' by the headlight AND function 2. The headlight must be on for the ditch lights to be activated by F2. Type A ditch lights are on constantly on when the headlight is on and alternately flash when the horn is blown. Type B ditch lights are normally off until the horn is blown. This example is for the more common Type 1. If you prefer Type 2 use values 48 and 52 instead of 40 and 44.
- ✓ One last thing: Set CV138 to something other than 2 so output 3 is not also controlled by F2

Rule 17 lighting:
Rule 17 refers to how the locomotive engineer operates the locomotive headlights during the running of the train. The rule varies from road to road but generally requires the dimming of the headlight(s) when in a siding waiting to meet another train, passing through passenger stations or moving within yard limits.
What we want to do:
- ➞ Use output 2 for the Headlight
- ➞ The headlight is to be on bright in both directions of locomotive travel
- ➞ We also want to be able dim the headlight
- ➞ Use output 6 for the rear light. It is to come on in reverse, off in forward

How to do it:
- ✓ Configure output 2 to be activated by F0, set CV134 = 0 .
- ✓ Configure output 2 as an F4 dimmable output. CV135 to 56. CV137 controls the brightness of the output when dimmed.
- ✓ Configure output 6 to be activated by F0 by programming CV150 to 0.
- ✓ Configure output 2 to be on in reverse and off in forward operation: Set CV151 to 2

Switcher:
What we want:
- ➞ Headlights that dim in the opposite direction that the locomotive is travelling
- ➞ Use output 2 as Headlight and output 3 as Rear light

How to do it:
- ✓ Configure output 2 to be activated by F0 by programming CV134 to 0.
- ✓ Configure output 3 to be activated by F0 by programming CV138 to 0.
- ✓ Configure output 3 as bright in forward, dim in reverse. Set CV135 to 36
- ✓ Configure output 4 as bright in reverse, dim in forward. Set CV139 to 32
- ✓ CV136 and CV140 control brightness of outputs 3 and 4 when outputs are bright
- ✓ CV137 and CV141 control brightness of outputs 3 and 4 when outputs are dimmed
- ✓ Brightness CVs have a range of 0 (off) to 255 (full bright)

Value for CV	Description of Lighting Effect
0	Standard on/off function output
4	FRED – flashing rear end device
8	Mars light
12	Rotary beacon
16	Gyralight
20	Double strobe
24	Single Strobe
28	Dimmed when on, off when off
32	Dim in forward, bright in reverse
36	Dim in reverse, bright in forward
40	Type A Ditch light phase A - Flash if F0 and F# - On bright if F0 on and F# off - Off if F0 off
44	Type A Ditch light phase B, - Flash if F0 **and** F# - On bright if F0 on **and** F# off - Off if F0 off
48	Type B Ditch light phase A - Flash if F# - Off if F# off
52	Type B Ditch light phase B - Flash if F# - Off if F# off
56	F0 Dimmed when F4 on, bright when F4 off
60	Output is always off

Note: F# means the function number programmed into the function mapping CV for that particular output

CV 1
Primary Short Address

Default Setting: 3
Associated CVs: 29
Useful Range of values: 1 - 127

Description

This is the primary address the decoder uses when CV29 is set to use the short address.

Technical stuff about this CV:

Bits A0-A6 determine the decoder short address. Bit 7 must remain 0.

Bit 7							**Bit 0**
0	A6	A5	A4	A3	A2	A1	A0

See Appendix A for a binary to Decimal conversion chart

Per NMRA standard S-9.1.1 programming CV1 will:
- clear CV19=0 Disabling any consist address in CV19
- clear CV29 bit 4 Disabling the long address and enabling the short address (the long address values in CV17 and CV18 will be preserved)

CV 7
Software Version

Setting: 1

Associated CVs: none

Useful Range of values:

Description

This is the version number for the decoder's software.

Technical stuff about this CV:

This CV is 'read only' and cannot be changed.

Bit 7							Bit 0
0	0	0	0	0	0	0	1

See Appendix A for a binary to Decimal conversion chart

Lighting configuration CVs

CV130 - Function number to which output 1 will respond
CV131 - Lighting effect for output 1 (on board LEDs).
CV132 - Brightness for output 1
CV133 - Brightness when output 1 is dimmed

CV134 - Function number to which output 2 will respond
CV135 - Lighting effect for output 2
CV136 - Brightness for output 2
CV137 - Brightness when output 2 is dimmed

CV138 - Function number to which output 3 will respond
CV139 - Lighting effect for output 3
CV140 - Brightness for output 3
CV141 - Brightness when output 3 is dimmed

CV142 - Function number to which output 4 will respond
CV143 - Lighting effect for output 4
CV144 - Brightness for output 4
CV145 - Brightness when output 4 is dimmed

CV146 - Function number to which output 4 will respond
CV147 - Lighting effect for output 5
CV148 - Brightness for output 5
CV149 - Brightness when output 5 is dimmed

CV150 - Function number to which output 6 will respond
CV151 - Lighting effect for output 6
CV152 - Brightness for output 6
CV153 - Brightness when output 6 is dimmed

CV162 – Ditch light hold time after F2 goes off

Each output can select from different lighting effects by using its associated lighting effect CV.

Pick the value for the CV from the table below.
- Add 1 if you want the effect to be active only in the forward direction
- Add 2 if you want the effect to be active only in the reverse direction.

Example: Single strobe on only in reverse would be 24+2=26

CV ranges:
- Brightness CVs have a range of 0 (off) to 255 (full bright).
- Function number (function mapping) CVs have a range of 0-28.
- Lighting Effect CVs have a range of 0-63.

CV 162
Ditch Light Hold Time

Default Setting: 5
Associated CVs:
Useful Range of values: 0-15

Description

Controls how long (in seconds) the ditch lights will continue to flash after F2 turns off.

Technical stuff about this CV:

Bit 7							Bit 0
D7	D6	D5	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 8
Manufacturer ID / Factory Reset

Default Setting: 11
Associated CVs: none
Useful Range of values:

Description

This is the ID number Assigned by the NMRA (www.NMRA.org) for NCE Corporation. Reading this CV will always show a value of 11.

Writing a value of 8 to this CV **on the programming track** will reset the decoder to original factory settings.

Technical stuff about this CV:

Writing a value of 8 to this CV **on the programming track** will cause the decoder to reset all its CVs to original factory settings. **This only works on the programming track** not with programming on the main.

Reads of this CV are always 11 as below

Bit 7							Bit 0
0	0	0	0	1	0	1	1

See Appendix A for a binary to Decimal conversion chart

CV 11
DCC Packet Timeout

Default Setting: 0

Associated CVs:

Useful Range of values: 0-255

Description

Packet timeout value (in ¼ second increments) Time the decoder will wait before converting to analog mode after running into a section of track with DC power. A setting of 4 = 1 second. A setting of 16 = 4 seconds.

A setting of 0 = Don't convert, the decoder will just keep doing what is has been doing.

Technical stuff about this CV:

Bit 7							Bit 0
D0	D6	D5	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 161
Output On in Analog Mode

Default Setting: 63

Associated CVs: 11, 29

Useful Range of values: 0-63

Description

Controls which outputs will be active in Analog (DC) mode.. Bit 2 in CV29 must be set to 1 for Analog mode to be enabled.

Technical stuff about this CV:

Bit 7							Bit 0
D7	D6	Out6	Out5	Out4	Out3	Out2	Out1

See Appendix A for a binary to Decimal conversion chart

CV 153
Dimmed Brightness of Output 6

Default Setting: 75
Associated CVs: none
Useful Range of values: 0-255

Description

Controls the brightness of the lighting effect when dimmed. A brightness value of 0 is off and a value of 255 is maximum brightness (not dimmed at all).

This CV is used with effects 32 and 36

Technical stuff about this CV:

Bit 7							Bit 0
D7	D6	D5	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 15, CV16
Decoder Lock/Unlock

Default Setting: 0
Associated CVs:
Useful Range of values: 0 - 7

Description

Decoder Lock is used to prevent unwanted of programming of the decoder. Its primary purpose is to allow changing CVs in only one of several decoders that have a common address.

It is not necessary to lock a decoder if there are no other decoders on the layout with the same address.

For decoders you wish to lock assign a different number to CV16. If the decoders are in the same locomotive and have the same address normal convention is to assign 1 to a motor decoder, 2 to a sound decoder, 3 or higher to other decoders (this decoder would get 3).

To change a CV of one of the installed decoders, first write the number 1 (motor), 2 (sound), or 3 or higher (other) into CV15 corresponding to the decoder you wish to program. All 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.

Technical stuff about this CV:

CV15

Bit 7							Bit 0
0	0	0	0	0	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV16

Bit 7							Bit 0
0	0	0	0	0	D2	D1	D0

CV 17, CV18
Extended Address (also called Long Address)

Default Setting: 0

Associated CVs: 1, 19, 29

Useful Range of values: 0 - 10239

Description

This is the primary address the decoder uses when CV29 is set to use the long address. CV17 and 18 work together to allow ad decoder to have an address that ranges from 0000 to 10239. Most DCC systems will only operate with addresses up to 9999.

The details of programming CV17 and 18 are generally handled by your DCC system. More specific information is below if your system will not program a long address automatically.

It is important to note that setting CV17 and 18 will program the long address but will NOT activate it. CV 29 bit 5 must be set to actually activate the address.

Technical stuff about this CV:

CV17 – most significant byte (bits 6,7 must be set to 1)

Bit 7							Bit 0
1	1	A13	A12	A11	A10	A9	A0

CV18 – least significant byte

Bit 7							Bit 0
A7	A6	A5	A4	A3	A2	A1	A0

See Appendix A for a binary to Decimal conversion chart

CV18 should be programmed first (some decoder require this) and CV17 should be programmed next, this decoder doesn't care.
Do not forget to set bit 5 of CV25 to activate the address

Example:
Calculate the value for CV18:
Divide the desired extended address by 256. Take the remainder of the division result. This is the value for CV18.

Calculate the value for CV17:
Divide the desired extended address by 256. Take the whole number of the division result (quotient) and add 192. This is the value for CV17

Do not forget to set bit 5 of CV25 to activate the address

CV 152
Brightness of Output 6

Default Setting: 150

Associated CVs: none

Useful Range of values: 0-255

Description

Controls the overall brightness of the lighting effect. A brightness value of 0 is off and a value of 255 is maximum brightness.

Technical stuff about this CV:

Bit 7							Bit 0
D7	D6	D5	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 151
Lighting Effect for Output 6

Default Setting: 0

Associated CVs: none

Useful Range of values: 0-63

Description

Controls which lighting effect is displayed for this outpu. It also controls whether it is active in either direction, only in forward or only in reverse when activated. Choose the value for the CV effect from the Table Of lighting Effects. If you want the effect to be active only in the Forward direction of travel add 1 to the table value. If you want the effect to be active only in the reverse direction of travel add 2 to the table value. Adding 0 or 3 to the table value enables the effect in both directions.

Technical stuff about this CV:

Bit 7							Bit 0
0	0	D3	D2	D1	D0	Rev	Fwd

See Appendix A for a binary to Decimal conversion chart

The 'direction' bits REV and FWD have no effect when the output is configured as an F4 dimmable output (value of 56)

CV 19
Consist Address

Default Setting: 0

Associated CVs: 1, 17, 18, 29, 21, 22

Useful Range of values: 0 - 255

Description

Sets the decoder 'consist' address (also the direction the decoder operates within the consist). A consist allows 2 or more decoders to operate together by responding to commands sent to the 'consist address'.

Technical stuff about this CV:

Bit 7							Bit 0
Dir	A6	A5	A4	A3	A2	A1	A0

See Appendix A for a binary to Decimal conversion chart

Bit 7 of CV19 controls the direction of the decoder within the consist. When set to 1 the decoder will operate in its normal forward direction. If set to 0 the direction of operation will be reversed from normal.

Bits A0-A6 form the consist address ranging from 1-127. Setting the addres to 0 disables the consist.

When in a consist the decoder will still respond to function commands and OPs programming commands to its primary address (CV1 or CV17,18 depending on the setting of CV29 bit 5).

When in a consist the decoder will respond to speed/direction commands sent to the consist address and ignore and speed/direction sent to the primary address.

The decoder will respond to function commands sent to the consist address only if the corresponding bits for those functions are set in CV21 and CV22.

CV 21
Consist Functions Active Group 1

Default Setting: 255
Associated CVs: CV19
Useful Range of values: 0-255

Description

Controls which unctions can be controlled by commands sent to the consist address.

Note: Functions may always be controlled by commands sent to the decoder's primary address.

Technical stuff about this CV:

Bit 7							Bit 0
F8	F7	F6	F5	F4	F3	F2	F1

See Appendix A for a binary to Decimal conversion chart

Setting bits F1 through F8 to 1 enables the decoder to respond to corresponding function commands sent to the decoder's consist address in CV19. Setting a bit to 0 disables response of that function to functions commands sent to the consist address. Disabled consist functions will still respond to function commands sent to the primary decoder address (CV1 or CV17,18 as determined by CV29 bit 5).

CV 150
Function number for Output 6

Default Setting: 4
Associated CVs: none
Useful Range of values: 0-28

Description

Controls which function number activates this output. Set this CV to the function number to which you want the output to respond.

Technical stuff about this CV:

Bit 7							Bit 0
0	0	0	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 149
Dimmed Brightness of Output 5

Default Setting: 75
Associated CVs: none
Useful Range of values: 0-255

Description

Controls the brightness of the lighting effect when dimmed. A brightness value of 0 is off and a value of 255 is maximum brightness (not dimmed at all).

This CV is used with effects 32 and 36

Technical stuff about this CV:

Bit 7							Bit 0
D7	D6	D5	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 22
Consist Functions Active Group 2

Default Setting: 63
Associated CVs:
Useful Range of values: 0-63

Description

Controls which functions can be controlled by commands sent to the consist address.

Note: Functions may always be controlled by commands sent to the decoder's primary address.

Technical stuff about this CV:

Bit 7							Bit 0
0	0	F12	F11	F10	F9	F0	F0

See Appendix A for a binary to Decimal conversion chart

Setting bits F0 through F12 to 1 enables the decoder to respond to corresponding function commands sent to the decoder's consist address in CV19. Setting a bit to 0 disables response of that function to functions commands sent to the consist address. Disabled consist functions will still respond to function commands sent to the primary decoder address (CV1 or CV17,18 as determined by CV29 bit 5).

Setting either or both F0 bits results in F0 responding to function commands sent to the consist address. To disable operation [at the consist address] of F0 both F0 bits must be set to 0.

CV 29
Decoder Configuration Register

Default Setting: 4
Associated CVs: 1,17,18, 161
Useful values: 0, 1, 4, 5, 32, 33, 36, 37

Description

Controls which functions can be controlled by commands sent to the consist address.

Note: Functions may always be controlled by commands sent to the decoder's primary address.

Technical stuff about this CV:

Bit 7							Bit 0
0	x	Ext	x	x	D2	x	DIR

See Appendix A for a binary to Decimal conversion chart

Bit 0- DIR normal direction of operation bit.
0 = normal operation
1 = directional operation operation is reversed from normal.

Bit 2 - Analog Mode enable
0 = Analog operation (on DC voltage) is disabled. Outputs last enabled on DCC will be active
1 = Analog operation (on DC voltage) is enabled. Outputs enabled in CV161 will be active

Bit 5 - Extended Address Enable
0 = Address in CV1 is active
1 = Address in CV17 and 18 is active

CV 148
Brightness of Output 5

Default Setting: 150
Associated CVs: none
Useful Range of values: 0-255

Description

Controls the overall brightness of the lighting effect. A brightness value of 0 is off and a value of 255 is maximum brightness.

Technical stuff about this CV:

Bit 7							Bit 0
D7	D6	D5	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 147
Lighting Effect for Output 5

Default Setting: 0

Associated CVs: none

Useful Range of values: 0-63

Description

Controls which lighting effect is displayed for this outpu. It also controls whether it is active in either direction, only in forward or only in reverse when activated. Choose the value for the CV effect from the Table Of lighting Effects. If you want the effect to be active only in the Forward direction of travel add 1 to the table value. If you want the effect to be active only in the reverse direction of travel add 2 to the table value. Adding 0 or 3 to the table value enables the effect in both directions.

Technical stuff about this CV:

Bit 7							Bit 0
0	0	D3	D2	D1	D0	Rev	Fwd

See Appendix A for a binary to Decimal conversion chart

The 'direction' bits REV and FWD have no effect when the output is configured as an F4 dimmable output (value of 56)

Lighting configuration CVs

The following pages describes programming of the lighting outputs. Each lighting output has four associated CVs. These CVs control to which function number the output responds, what lighting effect the output will have, the overall brightness and the amount of dimming if the lighting effect has a dimming effect.

The table of lighting effect below will be used when programming CV numbers 131,135,139,143,147 and 151

Table of Lighting effects

Value for CV	Description of Lighting Effect
0	Standard on/off function output
4	FRED – flashing rear end device
8	Mars light
12	Rotary beacon
16	Gyralight
20	Double strobe
24	Single Strobe
28	Dimmed when on, off when off
32	Dim in forward, bright in reverse
36	Dim in reverse, bright in forward
40	Type A Ditch light phase A - Flash if F0 and F# - On bright if F0 on and F# off - Off if F0 off
44	Type A Ditch light phase B, - Flash if F0 **and** F# - On bright if F0 on **and** F# off - Off if F0 off
48	Type B Ditch light phase A - Flash if F# - Off if F# off
52	Type B Ditch light phase B - Flash if F# - Off if F# off
56	Dimmed when on, off when off
60	Output is always off

CV 129
Output Status

Default Setting: 1

Associated CVs: none

Useful Range of values: 0-63

Description

This CV holds the current on/off state of the decoder outputs It is also used to restore that state during layout shut down so the decoder will resume operation where it left off.

This CV is automatically updated every time a function output is turned on or off. While it is possible, it is not necessary to program this CV.

Technical stuff about this CV:

Bit 7							Bit 0
0	0	Out5	Out4	Out3	Out2	Out1	Out0

See Appendix A for a binary to Decimal conversion chart

CV 146
Function number for Output 5

Default Setting: 3

Associated CVs: none

Useful Range of values: 0-28

Description

Controls which function number activates this output. Set this CV to the function number to which you want the output to respond.

Technical stuff about this CV:

Bit 7							Bit 0
0	0	0	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 145
Dimmed Brightness of Output 4

Default Setting: 75
Associated CVs: none
Useful Range of values: 0-255

Description

Controls the brightness of the lighting effect when dimmed. A brightness value of 0 is off and a value of 255 is maximum brightness (not dimmed at all).

This CV is used with effects 32 and 36

Technical stuff about this CV:

Bit 7							Bit 0
D7	D6	D5	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 130
Function number for Output 1

Default Setting: 5
Associated CVs: none
Useful Range of values: 0-28

Description

Controls which function number activates this output. Set this CV to the function number to which you want the output to respond.

Technical stuff about this CV:

Bit 7							Bit 0
0	0	0	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 131
Lighting Effect for Output 1

Default Setting: 0

Associated CVs: none

Useful Range of values: 0-63

Description

Controls which lighting effect is displayed for this outpu. It also controls whether it is active in either direction, only in forward or only in reverse when activated. Choose the value for the CV effect from the Table Of lighting Effects. If you want the effect to be active only in the Forward direction of travel add 1 to the table value. If you want the effect to be active only in the reverse direction of travel add 2 to the table value. Adding 0 or 3 to the table value enables the effect in both directions.

Technical stuff about this CV:

Bit 7							Bit 0
0	0	D3	D2	D1	D0	Rev	Fwd

See Appendix A for a binary to Decimal conversion chart

The 'direction' bits REV and FWD have no effect when the output is configured as an F4 dimmable output (value of 56)

CV 144
Brightness of Output 4

Default Setting: 150

Associated CVs: none

Useful Range of values: 0-255

Description

Controls the overall brightness of the lighting effect. A brightness value of 0 is off and a value of 255 is maximum brightness.

Technical stuff about this CV:

Bit 7							Bit 0
D7	D6	D5	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 143
Lighting Effect for Output 4

Default Setting: 2

Associated CVs: none

Useful Range of values: 0-63

Description

Controls which lighting effect is displayed for this outpu. It also controls whether it is active in either direction, only in forward or only in reverse when activated. Choose the value for the CV effect from the Table Of lighting Effects. If you want the effect to be active only in the Forward direction of travel add 1 to the table value. If you want the effect to be active only in the reverse direction of travel add 2 to the table value. Adding 0 or 3 to the table value enables the effect in both directions.

Technical stuff about this CV:

Bit 7							Bit 0
0	0	D3	D2	D1	D0	Rev	Fwd

See Appendix A for a binary to Decimal conversion chart

The 'direction' bits REV and FWD have no effect when the output is configured as an F4 dimmable output (value of 56)

CV 132
Brightness of Output 1

Default Setting: 150

Associated CVs: none

Useful Range of values: 0-255

Description

Controls the overall brightness of the lighting effect. A brightness value of 0 is off and a value of 255 is maximum brightness.

Technical stuff about this CV:

Bit 7							Bit 0
D7	D6	D5	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 133
Dimmed Brightness of Output 1

Default Setting: 75

Associated CVs: none

Useful Range of values: 0-255

Description

Controls the brightness of the lighting effect when dimmed. A brightness value of 0 is off and a value of 255 is maximum brightness (not dimmed at all).

This CV is used with effects 32 and 36

Technical stuff about this CV:

Bit 7							Bit 0
D7	D6	D5	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 142
Function number for Output 4

Default Setting: 0

Associated CVs: none

Useful Range of values: 0-28

Description

Controls which function number activates this output. Set this CV to the function number to which you want the output to respond.

Technical stuff about this CV:

Bit 7							Bit 0
0	0	0	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 141
Dimmed Brightness of Output 3

Default Setting: 75
Associated CVs: none
Useful Range of values: 0-255

Description

Controls the brightness of the lighting effect when dimmed. A brightness value of 0 is off and a value of 255 is maximum brightness (not dimmed at all).

This CV is used with effects 32 and 36

Technical stuff about this CV:

Bit 7							Bit 0
D7	D6	D5	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 134
Function number for Output 2

Default Setting: 6
Associated CVs: none
Useful Range of values: 0-28

Description

Controls which function number activates this output. Set this CV to the function number to which you want the output to respond.

Technical stuff about this CV:

Bit 7							Bit 0
0	0	0	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 135
Lighting Effect for Output 2

Default Setting: 0

Associated CVs: none

Useful Range of values: 0-63

Description

Controls which lighting effect is displayed for this outpu. It also controls whether it is active in either direction, only in forward or only in reverse when activated. Choose the value for the CV effect from the Table Of lighting Effects. If you want the effect to be active only in the Forward direction of travel add 1 to the table value. If you want the effect to be active only in the reverse direction of travel add 2 to the table value. Adding 0 or 3 to the table value enables the effect in both directions.

Technical stuff about this CV:

Bit 7							Bit 0
0	0	D3	D2	D1	D0	Rev	Fwd

See Appendix A for a binary to Decimal conversion chart

The 'direction' bits REV and FWD have no effect when the output is configured as an F4 dimmable output (value of 56)

CV 140
Brightness of Output 3

Default Setting: 150

Associated CVs: none

Useful Range of values: 0-255

Description

Controls the overall brightness of the lighting effect. A brightness value of 0 is off and a value of 255 is maximum brightness.

Technical stuff about this CV:

Bit 7							Bit 0
D7	D6	D5	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 139
Lighting Effect for Output 3

Default Setting: 1

Associated CVs: none

Useful Range of values: 0-63

Description

Controls which lighting effect is displayed for this outpu. It also controls whether it is active in either direction, only in forward or only in reverse when activated. Choose the value for the CV effect from the Table Of lighting Effects. If you want the effect to be active only in the Forward direction of travel add 1 to the table value. If you want the effect to be active only in the reverse direction of travel add 2 to the table value. Adding 0 or 3 to the table value enables the effect in both directions.

Technical stuff about this CV:

Bit 7							Bit 0
0	0	D3	D2	D1	D0	Rev	Fwd

See Appendix A for a binary to Decimal conversion chart

The 'direction' bits REV and FWD have no effect when the output is configured as an F4 dimmable output (value of 56)

CV 136
Brightness of Output 2

Default Setting: 150

Associated CVs: none

Useful Range of values: 0-255

Description

Controls the overall brightness of the lighting effect. A brightness value of 0 is off and a value of 255 is maximum brightness.

Technical stuff about this CV:

Bit 7							Bit 0
D7	D6	D5	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 137
Dimmed Brightness of Output 2

Default Setting: 75

Associated CVs: none

Useful Range of values: 0-255

Description

Controls the brightness of the lighting effect when dimmed. A brightness value of 0 is off and a value of 255 is maximum brightness (not dimmed at all).

This CV is used with effects 32 and 36

Technical stuff about this CV:

Bit 7							Bit 0
D7	D6	D5	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart

CV 138
Function number for Output 3

Default Setting: 0

Associated CVs: none

Useful Range of values: 0-28

Description

Controls which function number activates this output. Set this CV to the function number to which you want the output to respond.

Technical stuff about this CV:

Bit 7							Bit 0
0	0	0	D4	D3	D2	D1	D0

See Appendix A for a binary to Decimal conversion chart