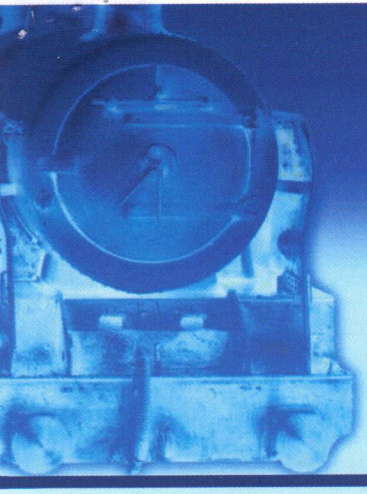


DCC concepts thinking outside the square

Zen By DCCconcepts

Basic CV settings for Zen decoders

Overall CV listing & commonly used CV descriptions

Most users of Zen decoders will never have to worry about the details, as Zen performs well without any adjustment.

However, its good to have more detail available for those who like to add something a little special to their DCC installations so here is an expanded CV listing for Zen Decoders.

We have bolded text for the CVs that are most often changed as well as those that have some special effects ability that you may find interesting. The balance of those listed are complex CV's that should only be attempted by experienced users.

(Please note - there are further installation guides available on our website, including expanded setup guides for loco lighting)

Please feel free to experiment: Even if you make a mistake you can quickly re-set the locomotive to default settings.

Re-set: This is accomplished by setting CV8 to 8. When you reset the decoder all settings will be restored to the values in this chart, and the address will return to number 3.

Addressing: The default address for all decoders is #3.

The short (1-byte) address range is actually 1~127 but we do suggest that you stay with 1~99. This will leave 100~127 free as potential "consist" addresses. Please note: To prevent novice users making accidental addressing errors, short address can ONLY be changed on the programming track.

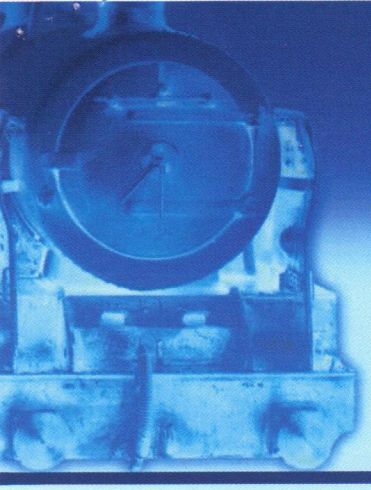
The long (2-byte) address range is 128 to 9999. A Decoders long address is stored in CV's 17 and 18. While you can use a CV address calculator to work out the numbers you will need, most quality controllers will do all of this automatically for you.

Start Volts: This is CV2. After lots of experiments, we decided that rather than simply raise step 1's level as most brands do, we'd leave it at a low level and set the default at 9, which is enough to ensure that nearly all RTR Loco's will move at speed step 1 on your controller. However, there are both more & less efficient loco drives too, so if needed, adjust this value up or down until your loco moves off consistently at speed step #1

Acceleration/Deceleration: These are CV3 & 4 respectively. We have pre-set both of them to 6 to give a small delay effect however feel free to try other settings. Higher will give greater delay times, lower will make them shorter.

V-high and V-mid: These are CV 5 and 6 respectively (Also known as top volts and mid volts). They control the overall speed and the size of each of the 128 speed steps. Adjust CV5 to give your desired top speed. Once that is done, we suggest that you also try setting CV6 at appx 1/3 of the value chosen in CV5, as this will give the loco a nice refined low speed-step range and give you really good control at slower speeds.

CV#	Description	Default value	CV setting Range
1	**Primary Address**	**3**	**1~127**
2	**Start Volts**	**9**	**1~255**
3	**Acceleration**	**3**	**1~255**
4	**Deceleration**	**3**	**1~255**
5	**Vhigh**	**0**	**1~255**
6	**Vmid**	**0**	**1~255**
7	Manufacturer Version	34x	(varies)
8	Manufacturer ID	36	36
8	**Decoder Re-set (default = #3)**	**Set CV8 = 8**	**to re-set**
10	BEMF Feedback Cut-off	85	85
13	Alternate Mode Fn Status F1-F8	3	3
14	Alternate Mode Fn Status F9-F12	3	3
15	**Decoder lock Number**	**0**	**0~7 (see note)**
16	**Decoder Unlock Number**	**1**	**1~7 (see note)**
17	Upper Byte extended Address	0	Set by ctrl
18	Lower Byte extended Address	0	Set by ctrl
19	Consist Address	0	Set by ctrl
21	Consist Address Active for F1-F8	0	Set by ctrl
22	Consist Address Active for FL-F9-F12	0	Set by ctrl
23	Acceleration Adjustment (Trim)	0	0
24	Deceleration Adjustment (Trim)	0	0
29	**Decoder primary Configuration**	**6**	**Set by ctrl**
30	IMPULSE (stimulation frequency)	3	1~12
31	IMPULSE (stimulation level)	10	1~36
33	Front Light/F1 Function allocation (White) allocatable to F0 ~ F6 only	1	(In Advanced Instructions)
34	Reverse Light/F2 Function allocation (Yellow) allocatable to F0 ~ F6 only	2	(In Advanced Instructions)
35	F3/Aux1 Function allocation (Green) This CV is for Functions F0 to F6 only however if CV37 is used, Aux1-Green can be allocated function F7 ~ F12	4	(In Advanced Instructions)
36	F4/Aux2 Function allocation (Purple) This CV is for Functions F0 to F6 only however if CV38 is used, Aux2-Purple can be allocated to function F7 ~ F12	8	(In Advanced Instructions)
37	F3/Aux1 extended Function allocation (Green) This CV will allow it to be allocated to function F7 ~ F12	16	Zen Buddha only
38	F4/Aux2 extended Function allocation (Purple) This CV will allow it to be allocated to function F7 ~ F12	32	Zen Buddha only
39	Function 3 Map (Brown 0-6)	16	(in Advanced)
40	Function 4 Map (Pink 0-6)	32	(in Advanced)
41	Function 3 Map (Brown 7-12)	0	(in Advanced)
42	Function 4 Map (Pink 7-12)	0	(in Advanced)



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Overall CV listing & commonly used CV descriptions

Decoder Lock. This is controlled by CV's 15 and 16.

CV16 defines the "lock number" and CV15 provides the key.

Decoder lock is useful when you have two or more decoders in one train or loco, and all of them share one number. Examples might be a 2 decoder locomotive or A-B set, a train with both loco and lighting decoders or any similar application.

Without it. if you try programming on either program track or on the main all decoders would be affected - with it, you can easily individually unlock one at a time and make changes that will ONLY affect that decoder, so using this feature lets you make specific changes, one decoder at a time, anytime you want.

There are two "Master key" numbers: The default is CV15 = 0, which unlocks all decoders or set CV15 = 7 & all are unlocked.

Example of Decoder locking: You have a 3-car DMU with a drive decoder in the power car and a lighting decoder in each of the 2 added coaches. They'll all be set to the same number to give easier selection and control... however you'll want to set up the lights independently. (Up to 6 decoders possible)

Step #1: Before installing them, set CV16 in each of them to a different #. Example =loco decoder =1. The others to 2 & 3.

Step#2: Install them, put the whole train onto the main and set the address. They should all take the same number as CV15 is still at the "all decoders unlocked master default setting" of 0.

Step #3: Change CV 15 to 1. Now only the loco decoder that has CV16=1 will be unlocked. You now can set up drive CVs without affecting any other decoder, and configure its lighting.

Step #4: Change CV15 to 2. Set up the lighting decoder in which you set CV16 to 2.

Step #5: Change CV15 to 3. Set up the lighting decoder in which you set CV16 to 3.

Step#6: Finally, change CV15 to 7. This will lock all decoders.

Fluorescent Flicker: This is controlled by CV47. It is an easy to add effect that has been specifically created for modellers who have DMU or EMU passenger sets, or for those whose modelling period includes coaches fitted with fluorescent lighting. It adds another level of realism with almost no effort at all!

CV47 = 0. Fluorescent flicker is off, all lighting normal.

CV47 = 1. Front and rear lighting normal, Aux 1 and Aux 2 on, fluorescent flicker is active. All lighting controlled by F0.

CV47 = 2. Front and Rear lighting become linked to Aux 1 and Aux 2, and fluorescent flicker is active on all light outputs. All lighting is simultaneously on or off. All are controlled by F0.

Do play with this one—we think you will find it a neat feature!

CV#	Description	Default value	CV setting Range
43	Function 5 Map (Pink/Purple 0-6)	0	(in Advanced)
44	Function 6 Map (Green/Brown 0-6)	0	(in Advanced)
45	Function 5 Map (Pink/Purple 7-12)	0	(in Advanced)
46	Function 6 Map (Green/Brown 7-12)	0	(in Advanced)
47	**Fluorescent Light Effects. 0 = disabled 1 = only Aux 1 and 2 flicker (front/rear lights will stay at default) 2 = all lights flicker**	**0**	**0,1,2**
49	Forward Light Feature (White)	0	(in Advanced)
50	Reverse Light Feature (Yellow)	16	(in Advanced)
51	Function One Feature (Green)	32	(in Advanced)
52	Function Two Feature (Purple)	32	(in Advanced)
60	Year and Month of Manufacture	32 (xx)	Varies
61	BEMF on/off, Dimming,	1	(in Advanced)
63	Ditch Light blink rate timing	64	(in Advanced)
64	Constant dimming light level	64	(in Advanced)
67	Step 1 Speed Table	8	8
68	Step 2 Speed Table	16	16
69	Step 3 Speed Table	24	24
70	Step 4 Speed Table	32	32
71	Step 5 Speed Table	40	40
72	Step 6 Speed Table	48	48
73	Step 7 Speed Table	56	56
74	Step 8 Speed Table	64	64
75	Step 9 Speed Table	72	72
76	Step 10 Speed Table	80	80
77	Step 11 Speed Table	88	88
78	Step 12 Speed Table	96	96
79	Step 13 Speed Table	104	104
80	Step 14 Speed Table	114	114
81	Step 15 Speed Table	124	124
82	Step 16 Speed Table	134	134
83	Step 17 Speed Table	144	144
84	Step 18 Speed Table	154	154
85	Step 19 Speed Table	164	164
86	Step 20 Speed Table	174	174
87	Step 21 Speed Table	184	184
88	Step 22 Speed Table	194	194
89	Step 23 Speed Table	204	204
90	Step 24 Speed Table	214	214
91	Step 25 Speed Table	224	224
92	Step 26 Speed Table	234	234
93	Step 27 Speed Table	244	244
94	Step 28 Speed Table	255	255

DCC thinking outside the square concepts

Zen By DCCconcepts

Basic CV settings for Zen decoders

Overall CV listing & commonly used CV descriptions

CV29 - The complex configuration and control CV:

This CV is a sort of "Master setup" control area for decoders.

Most of the time the control system will make all of the CV29 settings automatically, so you won't need to worry about it, but there are also some special things that you can do with CV29 in specific circumstances, so we'd like to explain it in detail.

Be aware that fiddling withCV29 and making a "wrong guess" will make your decoder inoperable - so play with CV29 only when comfortable with its use and potential settings as below.

If you DO make a mistake here, don't worry too much, as you can return the decoder to life with a simple change that will bring it to life again... You can either reset it (CV8 = 8) or make a specific address related correction: If the decoder had a short address, set CV29 to 6. if it had a long address, set it to 36.

OK... Here we go...

CV29 will contain a single number. That number is the sum of some choices that you will make when setting up a decoder.

Each of 7 options is represented by one "bit" of data. The "bits" are represented by zero (off) or a specific number (on). The value in CV29 is just the result of adding up all of the choices.

So for example if have a loco with normal direction (0) a short address (0) and we say yes to 28/128 steps (2) and run on DC (4) , we add together 0+0+2+4 for a total of 6. If we chose long address & the same options, we get 0+0+2+4+32 which is 36.

Those two values (6 and 36) will be the two most common settings within a decoder. Default will always be 6 and if you change to a long address it will always be 36. These things will happen automatically and be done by your control system so you don't usually need to concern yourself too much with them.

112	Mars Light, lowest light level	1	(in Advanced)
113	Mars Light, Time at bright level	9	(in Advanced)
114	Mars Light total cycle time	1	1~3
115	Mars Light Mid Light Level	6	1~24
116	Mars Light Brightest Light Level	22	1~24
117	Ditch light blink rate frequency	3	1~128
118	Rotary Beacon, lowest light level	1	1~24
119	Rotary Beacon , Time at bright level	5	1~24
120	Rotary Total Light Cycle	1	1~3
121	Rotary Mid Brightness	15	1~24
122	Rotary Max Brightness	24	1~24
123	On/Off rule 17 Dimming	32	32
124	Ditch Light Blink	8	8
125	Rate 2 Starting Point	0	(in Advanced)
126	Acceleration Rate 2	0	(in Advanced)
127	Rate 3 Starting Point	0	(in Advanced)
128	Acceleration Rate 3	0	(in Advanced)
129	Rate 5 Ending Point	0	(in Advanced)
130	Deceleration Rate 5	0	(in Advanced)
131	Rate 4 Ending Point	0	(in Advanced)
132	Deceleration Rate 4	0	(in Advanced)
133	Power level (drive voltage) for button control of the motor circuit	0	(in Advanced)
134	Button Control of Motor Circuit	0	(in Advanced)
135	Random flicker (adjusting this CV can make firebox flicker work differently to emulate gas or oil lamp flicker)	16	(in Advanced)
136	BEMF ctrl / other	2	(in Advanced)

AN EXPLANATION OF THE MANY CHOICES THAT ARE ALL CONTAINED IN CV29

Bit #	Bit values	Bit name	Bit actions / features that are controlled by specific values
0	0 or 1	Direction	Options Normal (off) or Reversed direction (on) **[relative to controller indication]**
1	0 or 2	Speed Step setting	Options 14 steps (off) or 28/128 steps (on) **[controller selects between 28 and 128]**
2	0 or 4	Run on DC	Options are deny (off) or allow (on) **[loco will or will not run on a DCC layout]**
3	0 or 8	Railcom enabled	Options are no (off) or yes (on) **[Usually left off unless Railcom included in the decoder]**
4	0 or 16	Std or speed curve	Options are use CVs 2/5/6 (off) or 28 step CV67~94 speed curve (on). **[usually left off]**
5	0 or 32	Long address	Options are short address (off) or long address (on) **[controller usually sets this CV]**
6	0 or 64	Usually not used	[free for use by manufacturers, please refer to decoder manufacturer-specific instructions]
7	O or 128	Usually not used	[free for use by manufacturers, please refer to decoder manufacturer-specific instructions]

An "Advanced settings" Zen decoder set-up manual is also available. Visit our website @ www.dccconcepts.com