PROGRAMMING CV CHART

CV | Description | Range   | Default
---|-------------|---------|---------
CV1 | Short address | 1-127 | 3
CV2 | Start voltage | 0-63 | 15
CV3 | Acceleration, 1/16 sec, max. 63 sec to reach top speed | 0-63 | 0
CV4 | Deceleration, 1/16 sec, max. 63 sec to stop at top speed | 0-63 | 0
CV5 | Top voltage, 63/16th. full voltage, 0/16th. of the top speed | 0-63 | 63
CV6 | Adaptive back EMF control enable, 1=enable, 0=disable | 0-1 | 1
CV29 | Basic configuration | --- | 2
CV7 | Manufacturer version number | --- | 0
CV8 | Manufacturer ID | --- | 143
CV17 | Long address upper byte | 192-231 | 192
CV18 | Long address low byte | 0-255 | 3
CV19 | Advanced consist address | 0-127 | 0
CV21 | When CV21=0, functions follow its own address. CV21=1, functions follow the consist address | --- | 0
CV37 | 0=normal, 1=PF and P4 exchange | 0-1 | 0
CV39 | 0=normal, 1=PS and P6 exchange | 0-1 | 0
CV42 | 0=normal, 1=FS and F2 exchange | 0-1 | 0
CV49 | Master sound volume, 16/max volume, 0=off sound | 0-16 | 16
CV50 | Speaker included | 0-3 | 0
CV51 | Horn volume | 0-16 | 12
CV52 | Bell type | 0-3 | 0
CV53 | Bell volume | 0-16 | 12
CV54 | Bell ring rate | 0-50 | 3
CV55 | Prime mover volume | 0-15 | 12
CV56 | Brake squeal volume | 0-15 | 12
CV57 | Dynamic brake volume | 0-15 | 12
CV58 | Air release volume | 0-16 | 12
CV59 | Air pump volume | 0-15 | 12
CV60 | Safety pop valve volume | 0-15 | 12
CV61 | Engine cooling fan volume | 0-15 | 12
CV62 | Coupling volume | 0-15 | 12
CV63 | F3 control air release enable | 0-1 | 1
CV64 | Rail wheel clock | 0-15 | 12
CV65 | Kick start voltage | 0-63 | 63
CV67-94 | 28 speed steps table w/while CV29=1 | 1-255 | linear
CV112 | Back EMF control proportional gain Kg | 0-15 | 20
CV113 | Back EMF load control proportional gain Kg | 0-15 | 20
CV114 | Back EMF load control integral gain KI | 0-15 | 10
CV115 | Brake sound type, 1/2=brake sound off | 0-2 | 0
CV116 | Brightness of dim light | 0-255 | 120
CV117 | Headlight light effect | 0-15 | 0
CV119 | Advisory light mode | 0-15 | 0
CV120 | Strobe light | 0-255 | 256
CV121 | Air compressor mode | 0-1 | 0
CV122 | Diesel Notch mode, 0=bravo, 3=manual | 0-3 | 0
CV123 | Prime mover type, 1=types | 0-5 | 0
CV124 | Back EMF load control intensity (mWatt) | 0-255 | 160
CV125 | Programming to “1” will restore some CV’s to its default settings | --- | 0

SPEED TABLE CV67-CV94 FOR 28 SPEED STEPS

When CV29’s bit 4 is set to “1” it will use the speed table formed by CV67-CV94 to control speed (motor voltage). It allows you to setup each speed for all 28 speed steps. First, program CV29 to 18 for short addresses (1-127) or program CV29 to 50 for long addresses (128-9999) to enable speed table control. Then set throttle to 28 speed steps and run your loco at speed step 1. Use program CV on the decoder to change CV67’s value (1-205) to adjust step 1’s speed. The kick voltage, CV65 is only applied when the speed step change comes from 0 to 1. You should switch between 0 to 1 many times to check step 1’s speed. When done with CV29, select speed step 2 and program CV68. CV68’s value must be greater than CV67’s. When done with CV67-CV94, use read back CV to make sure their values are in increasing order.

Note: When using MRC Prodigy Advance DCC to program addresses it will automatically disable the speed table (set CV29’s bit 4 to “0”). Programming CV25 to 1 will also disable the speed table and re-program CV67-CV94 to a default linear speed setting.

TROUBLE SHOOTING

If the loco is running without sound click F12 to turn on the sound. Whenever the decoder doesn’t work please use the program track to program CV# 125 with a value of 1 to restore the decoder to the factory settings. This should bring the decoder to life with address 3. This decoder should perform well with all DCC systems. The maximum DCC output should be less than 21 V. If the locomotive does not respond to commands, it may have lost its address. Please re-program the address and program CV19 to 0 (disable consist). If it responds too slowly, you should clear its momentum by reprogramming CV3 and CV4 to zero. If step 1’s speed is too high, you should should program CV2 to zero. If its top speed is too slow, program top voltage CV5 to 30. You should also clean the track to improve electrical pickup. Read your DCC system manual to learn how to program and operate the decoder. For more information about registers/CVs and their functions, please refer to the NMRA DCC Standard & Recommended Practices, RP-92.2. This is available directly from the NMRA or their website at www.nmra.org.

FCC COMPLIANCE

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions. (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

RETURN PROCEDURE

This decoder carries a 6 month warranty against factory defects. This warranty does not include abuse, misuse, neglect, improper installation, or any modifications made to this decoder, including but not limited to the removal of the NMRA plug if applicable. If it should become necessary to return the decoder for warranty repair/ replacement, please include a copy of the original sales receipt. Please provide a letter (printed clearly) with your name, address, daytime phone number, and a detailed description of the problem you are experiencing. Please also include a check or a money order for $11.00 to cover return shipping and handling. If the decoder is no longer considered under warranty, then please include a check or a money order for $35.00 to cover the cost of repair or replacement and return shipping and handling. Be certain to return the decoder only.

Any questions regarding Warranty Policy can be directed to our Customer Service Department by calling 732-225-6360 between the hours of 8:30am and 6:00pm EST, or by emailing: rrtech@modelrectifier.com

Thank you for purchasing our most advanced 16 bit DCC locomotive sound decoder. Combined with any DCC System, MRC Blackbox or Tech 6, our true live capture digital sound decoder will make your model railroad come to life.

- Six synchronized prime mover sound
- 1.0 amp capacity
- 22 different types of horns and 8 bells
- Adjustable individual sound volumes (16 levels)
- Programmable either 2-digit or 4-digit addresses
- Programmable start voltage and top voltage
- Programmable acceleration and deceleration rates
- Programmable, 24, 128 speed steps
- Back EMF load control
- User controlled service brake and dynamic brake with sound
- Supports read back address and CV values
- Advanced speed table control CV67-CV94
- Kick start voltage control CV65
- Easy function mapping
- 17 light effects: ditch lights, mars light, gyra light, strobe light, prime strobe...
- 22 accessory functions (F1-F28)
- Supports advanced consisting (CV19)
- Supports programming on the main (OPS mode)
- Compatible with NMRA DCC standards
- Complies with Part 15 of FCC Rules
- Speaker included
- Dimensions: 25.2mm x 17.2mm x 4.4mm

Printed in USA
You can use dynamic brake F6 to reduce the speed of the loco to half of the throttle speed. When you turn on F6 the prime mover will notch down to 1 and you will hear the dynamic brake sound and the loco will reduce its speed. When you release F6 the loco will speed up to the original speed. If you forget to turn off F6 and move throttle up it will automatically disable the dynamic brake and loco will start to move. To apply the dynamic brake again you have to cycle F6 off and on.

BACK EMF LOAD CONTROL (PID CONTROLLER)

This decoder is equipped with adjustable back EMF load control feature. It is a closed loop speed control. With back EMF load control the locomotive will maintain its speed regardless of pulling up hill or driving downhill. You may program the back EMF load control intensity, CV124, to a lower value to get less back EMF load control. This will enable the locomotive to slow down uphill at a speed slower than you would like.

The PID controller contains three components: proportional gain (CV113); the integral gain (CV114); and derivative gain (fixed). Designing (tuning) a PID controller is a kind of ‘rocket science’. So we optimized these gains at the factory and still give the customer final settings. We recommend that you do not change these settings. Too much gain may cause the motor to oscillate (become unstable). Too little gain may cause a slow response. Additional knowledge of PID feedback control is required before attempting to adjust CV113 and CV114. If CV113 and CV114 are programmed incorrectly, the locomotive will not run smoothly. Program CV125 to “1” will automatically restore the default PID controller settings. If you can not get the decoder to work properly you don’t have to program CV6 to enable adaptive PID control to let the decoder to select the best back EMF control for your locomotive. You can also turn off the Back EMF load control by program CV124 with a value of 0 if the adaptive control fails.

LIGHT EFFECT PROGRAMMING CHART FOR CV117/118/119

The decoder has 17 different light effects. CV 117 controls both front and rear headlight effect. Use F0 to turn on or off the Headlight. CV118/119 control ACC1/ACC2 light effect. Use F3 to turn on or off ACC1 and ACC2. For dixt light operation you must program CV118 and CV119 to the same ditch light type. In type A the ditch lights will flash when F2 (horn) or F3 is on. In type B the ditch lights will flash when F2 is on and stay on when F3 is on. If you use a value inconsistent with actual headlights, (CV117), the headlights will default to normal on/off. For example if you are trying to use a value of 14 in CV117 for firebox flicker, the headlight will default to normal on/off.

To make air compressor’s speed synchronize to the prime mover, program CV121 with a value of 1. For a constant speed program CV121 with a value of 0.

SERVICE BRAKING

To apply service brake (needs CV #4 set to maximum) set throttle to zero and press F5. The loco will slow down fast and you will hear the brake squeal. You can pump the brake by turning F5 on and off to stop the loco at desired location. The brake rate is proportional to deceleration rate that you program in CV4. If you forget to turn off F5 and move the throttle up. The loco will move. However, when you release the throttle the service brake will apply again. The service brake can only operate when throttle is at 0. If you don’t hear the brake sound program CV115 with a value of 2.

DYNAMIC BRAKING

You can use dynamic brake F6 to reduce the speed of the loco to half of the throttle speed.