**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 select throttle to 28 speed steps and run your loco at speed step 1. Use program CV on the main to change CV67’s value (1-255) to adjust step 1’s speed. The kick voltage, CV65 is only applied when the speed step changes from 0 to 1. You should switch between 0 to 1 many times to check step 1’s speed. When done with CV67, select speed step 2 and program CV68. CV68’s value must be greater then 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 DCC to program addresses it will automatically disable the speed table (set CV29’s bit 4 to “0”). Programming CV125 to 1 will also disable the speed table and re-program CV67-CV94 to a default linear speed setting.

**TROUBLE SHOOTING**

Whenever the decoder doesn’t work please use the program track to program CV8 125 with value 1 to restore the decoder to 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 slowly, you should clean its momentary by reprogramming CV3 and CV4 to zero. If step 1’s speed is too high, you should program start voltage, CV2 to zero. If its top speed is too slow, program top voltage CV5 to 31. 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 Standard & Recommended Practices, RP-9.2.2. 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 interfer- ence 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 include 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 $8.00 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 $25.00 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

Send the decoder to:
 Model Rectifier Corporation
 Attn: Parts & Service
 80 Newfield Avenue
 Edison, NJ 08837-3817 U.S.A
 Printed in USA
MAKING A TEST TRACK

We strongly recommend building a test track with a 27 ohm resistor to limit current. Only test your installed decoder on the test track. The test track will reduce the chance of damaging your decoder due to an incorrectly installed decoder. Note- The test track is not your program track.

TESTING

The decoder has been programmed to address #3, 26/128 speed steps. To test, place the loco on the test track. Select address #3 and 28 speed step. Move up the throttle and the loco should move. Push the light button[F0] and headlight should come on. Change the direction of the loco and the loco should change direction. The loco cannot reach full speed, due to the resistor. If all the above occurs, you passed the test. Congratulations! Do not run the loco for an extended period of time on the test track or the resistor will overheat. If your installed decoder does not pass the test, find the problem, correct it and test it again. As long as you test the decoder on the test track there is little chance of damaging the decoder. This is why the test track is so important.

OPERATION

The decoder has 24 types of chuff sounds. You can use F24 to select them or F12 to turn the chuff off, with the whistle always remaining on. With our unique double chuff enable, (CV 122), you can also have 12 articulated chuff sounds. You can use F19 to select 34 different whistles, and use F18 to select 7 different bell sounds. With MRC Prodigy Advance® DCC which has 28 functions, you can easily setup and access all the decoder's functions. With all other DCC systems you have to use CV programming to setup the decoder. If your locomotive has a Mars Light, use acc 1 light for hook up. The Mars Light Flash rate can not be changed. If you want your locomotive to have a firebox ficker, use acc 2 light for hook up. The firebox ficker rate can not be changed. This decoder also features easy re-mapping. This feature lets you easily switch 3 functions to different buttons if you desire. See the enclosed CV chart for CV numbers - 37, 39 and 42. The decoder can also be operated by a regular DC power pack. This will give you synchronized engine sounds only. If you wish to enjoy the full array of sound functions using your DC power pack, the unique MRC Blackbox (item #0001050) for DC operation will allow you to control all of the sounds in your sound equipped locomotives. And, the MRC Blackbox is easy to setup and use.

INSTALLATION

It is quite a challenge to install the decoder in your loco. You should have some basic electrical knowledge. If you do not have, please ask the dealer for help in installation.

Figure 1 shows the electrical circuit of most standard locos. The terminals of the motor and lights are directly connected to the wheel pickup. Each type of loco has its own method of electrical pickup and distribution. There is no standard rule for installing decoders. It is always better to consult the loco manufacturer on how to install a decoder in your particular loco. First, figure out your loco's electrical wiring and how to disconnect (isolate) the motor and light(s). Label all wires before you disconnect them.

Figure 2 shows the electrical wiring and how to disconnect (isolate) the motor and light(s). Label all wires before you disconnect them.

Figure 3 shows the electrical wiring and how to disconnect (isolate) the motor and light(s). Label all wires before you disconnect them.

Figure 4 shows the electrical wiring and how to disconnect (isolate) the motor and light(s). Label all wires before you disconnect them.

Figure 5 shows the electrical wiring and how to disconnect (isolate) the motor and light(s). Label all wires before you disconnect them.

Figure 6 shows the electrical wiring and how to disconnect (isolate) the motor and light(s). Label all wires before you disconnect them.

Figure 7 shows the electrical wiring and how to disconnect (isolate) the motor and light(s). Label all wires before you disconnect them.

Figure 8 shows the electrical wiring and how to disconnect (isolate) the motor and light(s). Label all wires before you disconnect them.

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Note: Bell, Dynamic Brake, and Rail Wheel Clack cannot play at the same time.

Note: If your loco at low speed binds or stops in a curve, or climbing a grade repeatedly pressing F7 will give little kick start boosts to the loco, until it is able to sustain the low speed setting on it's own.