PROGRAMMING
This decoder supports all program modes and read back features. With MRG Prodigy Advance DCC, you can read its address and CV value.

<table>
<thead>
<tr>
<th>CV Register</th>
<th>Description</th>
<th>Range</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV1</td>
<td>R1</td>
<td>1-127</td>
<td>2</td>
</tr>
<tr>
<td>CV2</td>
<td>R2</td>
<td>0</td>
<td>0-32</td>
</tr>
<tr>
<td>CV3</td>
<td>R3</td>
<td>0</td>
<td>0-32</td>
</tr>
<tr>
<td>CV4</td>
<td>R4</td>
<td>0</td>
<td>0-32</td>
</tr>
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<td>R5</td>
<td>0</td>
<td>0-32</td>
</tr>
<tr>
<td>CV6</td>
<td>R6</td>
<td>0</td>
<td>0-32</td>
</tr>
<tr>
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</tr>
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</tr>
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</tr>
<tr>
<td>CV26</td>
<td>R26</td>
<td>0</td>
<td>0-32</td>
</tr>
</tbody>
</table>

SPEED TABLE CVST-CV84 FOR 28 SPEED STEPS
When CV209's bit 4 is set to "1" it will use the speed table formed by CVST-CV84 to control speed (motor voltage). It allows you to setup each speed for all 28 speed steps. First, program CV209 to 18 for short addresses (1-127) or program CV209 to 50 for long addresses (128-255) 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 CVST's value (1-255) to adjust step 1's speed. The kick voltage, CV85 is only applied when the speed step changes from 0 to 1. You should adjust kick voltage to 0.1 to 1.0 times the kick step 1's speed. When done with CVST, set speed step 2 and program CV80. CVST's value must be greater then CV67's. When done with CVST-CV84, use read back CV to make sure the values are in increasing order.

Note: When using MRG Prodigy Advance DCC to program addresses it will automatically disable the speed table and re-program CVST-CV84 to a default linear speed setting.

TROUBLE SHOOTING
This decoder should perform well with all DCC systems. The maximum DCC output should be less than 0.15 V. If the locomotive does not respond to commands, it may have lost its address. Please re-program the address and program CVST to 18 (disable consist). If it responds slowly, you should clear its momentum by re-programming CVST and CV67 to zero. If step 1 speed is too high, you should program start voltage, CV2 to zero. If its top speed is too slow, program top voltage CV1 to 31. You should also check the track to improve electrical pickup. Reset 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-8.2.2. This is available directly on the NMRA or their website at www.nmra.org. Whichever the decoder doesn't work please use the program track to program CVST 125 with value 1 to restore the decoder to factory settings. This should bring the decoder to life with address 1.

FCC COMPLIANCE
This decoder 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 include a letter (printed clearly) with your name, address, daytime phone number, and a description of the problem you are experiencing. Please include a check or a money order for $25.00 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 $20.00 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 772-225-8908 between the hours of 8:30am and 6:00pm EST, or by emailing: rrtuch@modruleficer.com

Send the decoder to:
Model Rectifier Corporation
Attn: Parts & Service
80 Newfield Avenue
Edison, NJ 08837-3817 USA

N Gauge DCC/DCC Synchronized Diesel Sound Decoder with 28 Accessory Sound Functions
Item #0001810 (Fits Kato F40PH)
Thank you for purchasing our most advanced DC/DCC locomotive sound decoder. Combined with any DCC System or MRC Blackbox, our true live capture digital sound decoder will make your model railroad come to life.

- 4 types of synchronized diesel prime mover sounds to choose from
- 0.75 amp capacity
- 34 different types of horns and 8 types of bells
- Programmable individual sound volumes
- Programmable either 2-digit or 4-digit addresses
- Programmable start voltage and top voltage
- Programmable acceleration and deceleration rates
- Programmable 14, 28, 128 speed steps
- Supports full read back of CV's
- Selectable factory default speed curve
- Advanced speed table control CVST-CV84
- Kick start voltage control CV86
- 3 headlight effects: Directional / rules 17 1/2 off/mid-bright cycle
- 28 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 regulations
- 13mm, 32 ohm speaker included
- PCB size: 66x mm x 14mm x 3.5mm
- Directly replaces Kato F40 circuit board
**MAKING A TEST TRACK**

When you complete the decoder installation, 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 may prevent damage from an incorrectly installed decoder. A Program Track is not a test track.

**TEST**

All MRC decoders have been factory programmed with address #3, 28128 speed steps and maximum top voltage. Never run the installed decoder on your layout without first successfully running on test track. Otherwise, you may damage the decoder if it is not wired correctly or if you have not properly isolated the motor, chassis and lights.

To test, place the loco on the test track. Select the "Run" mode of your DCC system and select the address from the control panel. Make sure the throttle and the loco should move forward. Push the light button [F0] and the front headlight should come on. Change the direction of the loco and the loco should change direction and the rear headlight (if equipped) should come on. The loco cannot reach full speed, due to the resistor. If all above occurs, you passed the test. Congratulations!

If your installed decoder does not pass the test, find the problem, correct it and test it again.

**OPERATION**

The decoder has start up and shut down features. If the loco was previously shut down you have to start up the engine. Press any function key to start up the engine before operating the loco. To shut down the engine you must bring the loco to idle and then press F0 three times.

Double click F0 will turn off/on sound (CV45). You can't turn off horn which is always on. The decoder has four types of diesel prime movers, plus "off". You can use F12 to select this feature or use CV 123. You can use F10 to select 34 different horn sounds and use F16 to select 8 different bell sounds. With MRC Prodigy Advance DCC which has 28 functions, you can easily setup and access all the decoder's functions. If your DCC System is limited in functions or can not program CV's you may not be able to access all the features of this decoder.

With some DCC Systems you will have to use CV programming to set up the decoder.

The decoder default is set to automatic notch. You can program CV122 to 3 for manual notch for realistic operation. And then use F9 to notch up and use F8 to notch down.

There are many more program features available with this decoder. Please refer to the CV Chart to explore other features of the decoder.

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 MRC Blackbox (item #000100) 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.

**Note:** When CV122=3 (manual notch up/down), F8 will notch down and F9 will notch up.

Bell, Dynamic Brake and Rail Wheel Clack cannot play at the same time. If you activate the bell sound [F1], while either the Dynamic Brake or Rail Wheel Clack sounds are in use, the Bell sound will override the other 2 sounds. Rail Wheel Clack cannot play while the loco is in idle. When you turn off Dynamic brake and Rail Wheel Clack sound there will be one second delay.