## PROGRAMMING

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

| CV | Register | Description | Range | Default |
|---|---|---|---|---|
| CV1 | R1 | Short address | 1-127 | 3 |
| CV2 | R2 | Start voltage | 0-32 | 0 |
| CV3 | R3 | Acceleration | 0-32 | 0 |
| CV4 | R4 | Deceleration | 0-32 | 0 |
| CV5 | --- | Top voltage | 0-32 | 32 |
| CV6 | | Speed curve select (0=linear, 1=slow increase, 2=fast increase at slow speed | 0-2 | 0 |
| --- | R6 | Page number | --- | --- |
| CV29 | R5 | Basic configuration | --- | 2 |
| CV7 | R7 | Manufacturer version number | --- | 32 |
| CV8 | R8 | Manufacturer ID | --- | 143 |
| CV17 | --- | Long address upper byte | 192-231 | 192 |
| CV18 | --- | Long address lower 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 |
| CV49 | | Sound on/off except horn that is always on | 0-1 | 1 |
| CV50 | --- | Horn type (34 types) | 0-33 | 4 |
| CV51 | --- | Horn volume | 0-3 | 3 |
| CV52 | --- | Bell type (8 types) | 0-7 | 3 |
| CV53 | --- | Bell volume | 0-3 | 3 |
| CV54 | --- | Bell ring rate | 0-50 | 3 |
| CV55 | --- | Diesel rumble volume | 0-3 | 3 |
| CV56 | --- | Brake squeal volume | 0-3 | 3 |
| CV57 | --- | Dynamic brake volume | 0-3 | 3 |
| CV58 | --- | Air release volume | 0-3 | 3 |
| CV59 | --- | Air pump volume | 0-3 | 3 |
| CV60 | --- | Safety pop valve volume | 0-3 | 3 |
| CV61 | --- | Engine cooling fan volume | 0-3 | 3 |
| CV62 | --- | Coupling volume | 0-3 | 3 |
| CV64 | --- | Rail wheel clack | 0-3 | 3 |
| CV65 | | Kick start voltage | 0-63 | 63 |
| CV67-94 | | 28 speed steps table while CV29.4=1 | 1-255 | linear |
| CV105 | --- | User identification number | 0-255 | 0 |
| CV106 | --- | User identification number | 0-255 | 0 |
| CV113 | --- | Coupling fire volume | 0-3 | 3 |
| CV114 | --- | Brake release volume | 0-3 | 0 |
| CV115 | --- | Auto brake squeal enable/disable | 0-1 | 1(enable) |
| CV117 | | light mode, 0=normal headlight 1=off, dim, bright cycle, 2=rule 17 | 0-2 | 0 |
| CV122 | --- | Notch mode, 0=auto, 3=manual | 0-3 | 0 |
| CV123 | | Prime mover type (4=diesel off/all other sounds on) | 0-4 | 2 |
| CV125 | --- | Programming to "1" will restore some CV's to factory 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 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

This decoder should perform well with all DCC systems. The maximum DCC output should be less than 15 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 clear its momentum 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 DCC Standard & Recommended Practices, RP-9.2.2. This is available directly from the NMRA or their website at **www.nmra.org**. Whenever the decoder doesn't work please use the program track to program CV# 125 with value 1 to restore the decoder to factory settings. This should bring the decoder to life with address #3.

## 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 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 $29.00 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

Print in USA



# N Gauge DCC/DC Synchronized Diesel Sound Decoder with 28 Accessory Sound Functions

### Item #0001808 (Fits Kato SD80)

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.

- Four 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 decelaration rates
- Programmable 14, 28, 128 speed steps
- Supports full read back of CV's
- Selectable factory default speed curve
- Advanced speed table control CV67-CV94
- Kick start voltage control CV65
- 3 headlight effects: Directional / rule 17 /off-dim-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
- 10mm, 32 ohm speaker included
- PCB size: 77mm x 9.7mm x 3.5mm
- Directly replaces Kato SD80 circuit board

## INSTALLATION

Your new MRC 0001808 Sound Decoder will virtually "drop-in" to a Kato SD80 diesel locomotive. Although easy, please follow instructions carefully.
Remove the locomotive body following Kato's instructions. Remove the original circuit board by very carefully sliding the circuit board slightly to the rear of the chassis. Lift out. The sound decoder is installed in the same location.

First, deburr the chassis (with emery cloth) any casting flash that may cause a sharp edge under the location of the insulation tape. Then, using **electrical or equiv plastic tape**, carefully tape the chassis in the areas as indicated (See fig 1 & 2) to isolate the decoder from the chassis. This must be done to prevent damage to the decoder. Align the decoder and carefully insert it in the slots in the chassis. Gently press down on the rear (speaker side) of the decoder while sliding it into position, being careful not to bend the vertical copper motor contacts on the side of the chassis. Ensure the vertical copper contacts (on the decoder) cover the thin vertical motor contacts. The motor contact must not touch the loco chassis. Remove the white protective film from the speaker and "stick" it in place as shown. The decoder installation is complete.

When replacing the body, ensure the copper contacts on the trucks are under the horizontal chassis contacts.
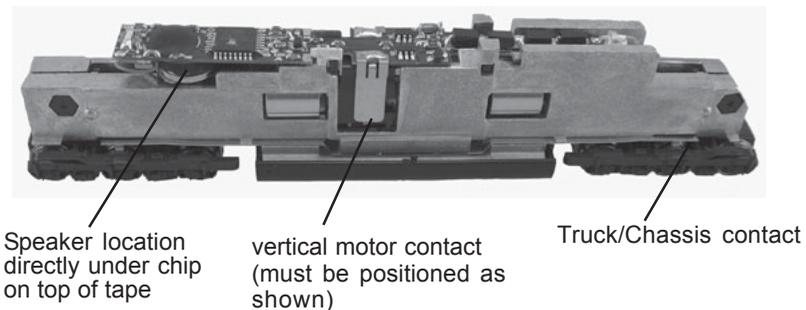
Fig1



Tape here    Chassis Slots

Chassis Slots

Tape **must** extend down the sides as shown
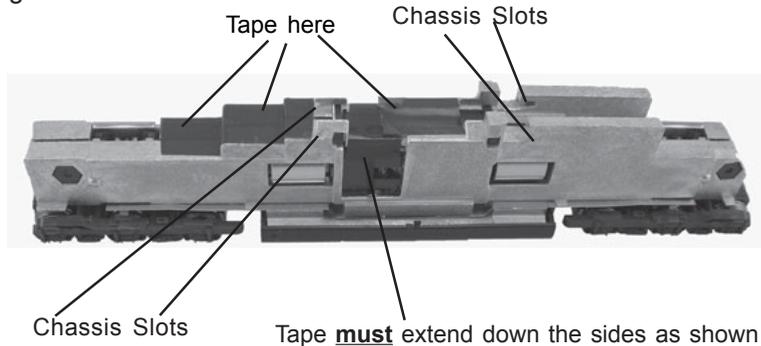
## CAUTION:
**The decoder must be isolated as shown. Apply electrical tape or plastic equiv.) tape in the areas shown in red to prevent the electrical contacts from touching the chassis and damaging the decoder.**

Fig2



Speaker location directly under chip on top of tape

vertical motor contact (must be positioned as shown)

Truck/Chassis contact

## 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.
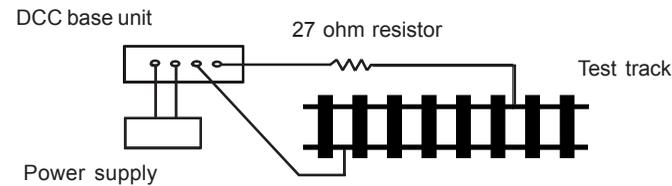


DCC base unit    27 ohm resistor    Test track

Power supply

Fig3. Diagram of test track

## TEST

All MRC decoders have been factory programmed with address #3, 28/128 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 or acquire address #3. Move up 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 F8 three times.

Double click F0 will turn on/off sound (CV49). 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 F19 to select 34 different horn sounds and use F18 to select 8 different bell sounds. With MRC Prodigy Advance[2] 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 #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.

| Function | Idle/Moving |
|---|---|
| F0 | Headlight on/off or rule 17 or cycle of dim, bright, off |
| Double F0 | Double click F0 within 1 second will turn on/off sound (CV49) |
| F1 | Bell on/off |
| F2 | Horn |
| F3 | Air release |
| F4 | Uncoupling lever |
| F5 | Brake release (idle) / brake squeal (moving) |
| F6 | Dynamic brake on/off |
| F7 | Air hose firing/uncoupling lever |
| F8 | Click 3 times during idle will shut down / notch down while CV122=3 |
| F9 | Engine cooling fan / notch up while CV122=3 |
| F10 | Rail wheel clack (only moving) |
| F11 | Traction air compressor |
| F12 | Select four prime diesel mover types and diesel off |
| F13 | Air release |
| F14 | Coupling |
| F15 | Air pump |
| F16 | Associated loco sound |
| F17 | Flange noise 1 |
| F18 | Change bell type (use F1 to turn off bell after adjustment) |
| F19 | Horn type select (total 34 different horns) |
| F20 | Associated loco sound |
| F21 | Change bell volume (use F1 to turn off bell after adjustment) |
| F22 | Change horn volume |
| F23 | Change diesel rumble volume |
| F24 | Air Release |
| F25 | Flange noise 2 |
| F26 | Associated loco sound |
| F27 | Sand drop |
| F28 | Air release |

Note2: 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.