

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 at slow speed, 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, all accessory functions will follow its own address. When CV21=1, all functions will follow the consist address	---	0
CV49		sound on/off except horn	0-1	1=on
CV50	---	Horn type (0-16, 16=off)	0-16	4
CV51	---	Horn volume	0-3	3
CV52	---	Bell type (0-7)	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	2
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	---	Diesel notch mode, 0=auto-notch 3>manual notch	0-3	0
CV123		prime mover type (2=off)	0-2	1
CV125	---	Factory default setting, program it to 1 will restore some CV to default setting	---	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 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 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

Printed in USA



N Scale Drop in DCC Decoder for KATO SD40-2 Locomotive

Item #0001806

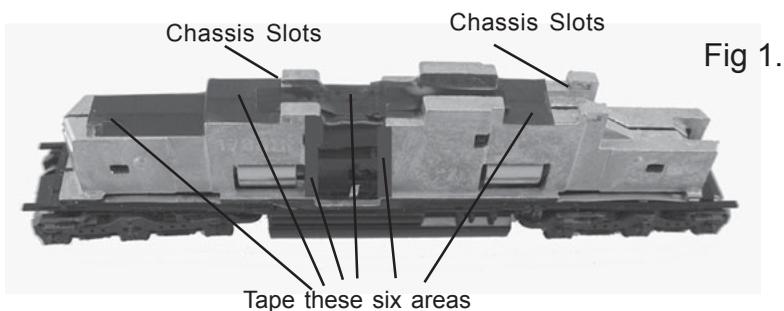
Thank you for purchasing our most advanced DCC locomotive sound decoder. Combined with any DCC System or MRC Blackbox, our true live capture digital SD40 sound decoder will make your model railroad come to life.

- SD40 synchronized diesel prime mover sounds
- 0.75 amp capacity
- 16 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
- 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 consist (CV19)
- Supports programming on the main (OPS mode)
- Compatible with NMRA DCC standards
- Complies with Part 15 of FCC Rules
- 13mm, 32 ohm speaker included
- PCB size: 72mm x 9.7mm x 3mm
- Directly replaces Kato SD40-2 PC Boards

INSTALLATION

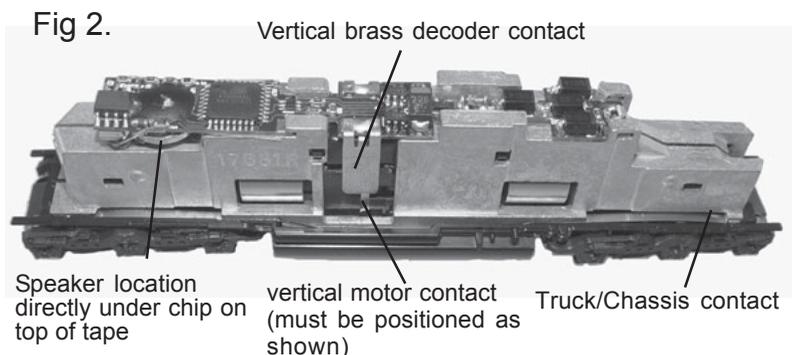
Your new MRC 0001806 Sound Decoder will virtually “drop-in” to a Kato SD40-2 diesel locomotive. Although easy, please follow instructions carefully. Remove the locomotive body following Kato’s instructions being careful not to bend any of the motor contact tabs. There are two motor contact tabs attached to the original PCB. Remove these two tabs and set aside, you will need to install them on the decoder board in the same location. Carefully slide and lift the Kato PCB to the rear of the chassis, removing it completely. After following the steps below to isolate the chassis, the 0001806 sound decoder is installed in place of the Kato PCB.

First, 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 due to a short circuit between chassis halves and the decoder. Any part of the decoder except the four pickup tabs touching chassis will damage 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. Re-install the motor contacts tabs removed earlier. Ensure the vertical brass contacts (on the decoder) cover the thin vertical motor contacts. The motor and decoder contacts must not touch the loco chassis. Use a multi-meter to check and make sure there is no continuity between motor terminals and the two chassis halves. Test the loco before replacing the body. (See section on making a test track).



CAUTION:

The decoder must be isolated as shown. Apply electrical tape or plastic equiv.) tape in the areas shown in dark area to prevent the electrical contacts from touching the chassis and damaging the decoder.



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.

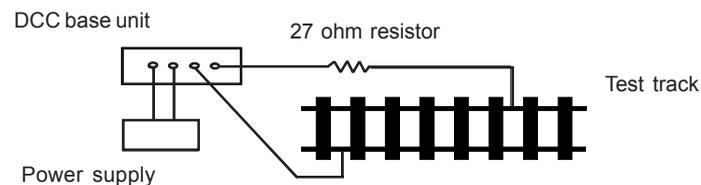


Figure 4. Diagram of test track

TESTING

The decoder has been programmed to address #3, 28/128 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 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.

The decoder is programmed to the default SD40 diesel prime mover sound. There is a second diesel prime mover sound you may enjoy. You can use F12 to select either prime mover sound or “off”. You can use F19 to select 16 different horn sounds and use F18 to select 8 different bell sounds. With MRC Prodigy Advance² DCC which has 28 functions, you can easily setup and access all the decoder’s functions. If not, you may not be able to access all the features of the decoder. If you DCC system allows CV programming, you would have to use this type of programming to access all the features of the decoder.

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

If you don’t have DCC system, you have to use the MRC Blackbox (item #0001050) for the DC operation. It will allow you to control all of the sounds in your sound equipped locomotives. The MRC Blackbox is easy to setup and use.

LIGHT EFFECT PROGRAMMING CHART FOR CV#117

Program CV117 to choose 3 different modes of headlight effects (0=normal directional, 1=off/dim/bright cycle, 2=rule 17).

Function	Idle/Moving
F0	Headlight on/off or rule 17 or cycle of dim, bright, off
Double F0	Sound all on/off except horn (F2)
F1	Bell on/off
F2	Horn
F3	Air release
F4	Coupling 1
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	Change prime diesel mover type (2 types and diesel off)
F13	Air release
F14	Coupling crash
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 16 different horns)
F20	Reverser gear
F21	Change bell volume (use F1 to turn off bell after adjustment)
F22	Change horn volume
F23	Change diesel rumble volume
F24	Coupling 2
F25	Loco associated sound
F26	Flange noise 3
F27	Flange noise 4
F28	Short air release

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.

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

Although there is a 32 ohm speaker included, the amplifier can handle 8 or 16 ohm speakers, if you wish to change it.