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

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. 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.

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 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

MRC™ TECHNOLOGY. PERFECTED.
MODEL RECTIFIER CORPORATION

N Gauge DCC/DC Diesel Sound Decoder with 28 Functions

Item #0001644-2 (Kato SD70 MAC & AC4400)

Thank you for purchasing this MRC DC/DCC Diesel sound decoder. This dash 2 version has 4 prime mover sounds recorded directly from the real SD70 and other type of locomotive. All notching along with increased speeds were also part of the recording process. Unlike some others, we do not use simply increase volume or frequency of the prime mover sound to simulate the notching process. The decoder has presets for all of its functions, so no adjustments should be required. However if you wish to make changes, this decoder has a full range of options

- Digital Signal Process (DSP) and reverb effect
- Built in four types of synchronized diesel prime mover sounds to choose from
- Built in 34 user selectable different horns and 8 bells
- Lifelike, randomly associated locomotive sounds
- 28 accessory functions allowing more sound control than ever
- Programmable individual sound volumes
- 1.0 amp capacity
- Directional headlight and rule 17
- 2-digit (1-127) or 4-digit (1-9999) address
- Supports full read back of CV's
- Programmable start and top voltage
- Programmable acceleration and deceleration rate
- Programmable 14, 28, 128 speed steps
- Supports speed table
- Supports advanced consisting (CV19)
- Supports programming on the main (OPS mode)
- Compatible with NMRA DCC standards
- Built a10mm, 32 ohm speaker
- Directly replaces Kato SD70MAC and AC4400 PC boards

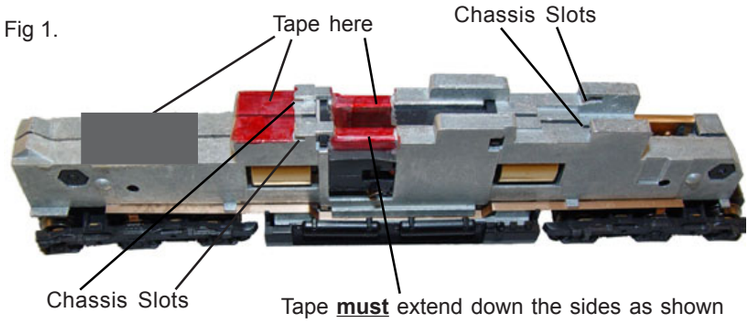
INSTALLATION

Your new MRC 0001644 Sound Decoder will virtually “drop-in” to a Kato SD70MAC & AC4400 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 0001644 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 PC board and 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.

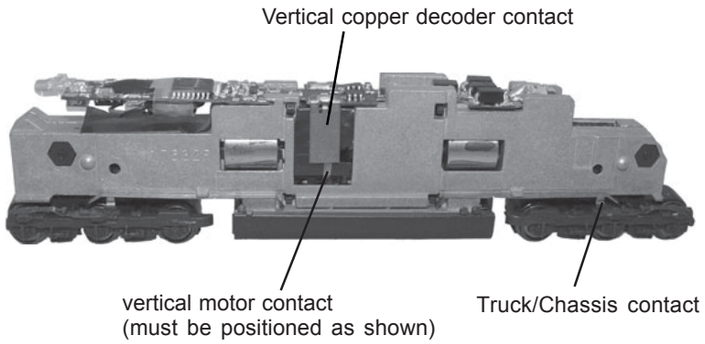
When replacing the body, ensure the copper contacts on the trucks are under the horizontal chassis contacts.

Fig 1.



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.

Fig 2.



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.

Note: The program track is NOT a test track. The program track does not use a current limiting resistor. So it can’t protect an incorrectly installed decoder.

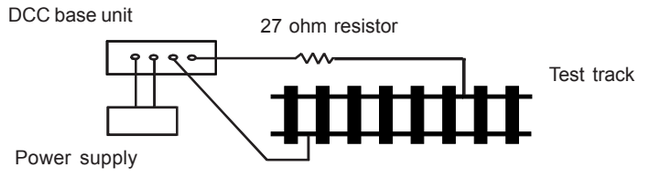


Figure 4. Diagram of test track

TESTING

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!

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.

DCC OPERATION

This decoder has start up and shut down feature. You must 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, 3 times.

DC OPERATION

The 0001644 decoder provides synchronized diesel rumble sounds with DC operation. Bells, horns, etc., cannot be accessed. However, use of the MRC Tech 6 Sound Controller 2.0 **(0001200)** will enable the full range of sounds on a DC system.

DIESEL SOUNDS FUNCTION CHART

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