

## PROGRAMMING

This decoder supports all program mode and read back feature. 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	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	3
CV115	---	Auto brake squeal enable/disable	0-1	1(enable)
CV116	---	Auto bell with horn enable	0-1	0(disable)
CV117		light mode, 0=normal headlight 1=off, dim, bright cycle	0-2	0
CV121		Mars light flashing on/off (F28)	0-1	1
CV122	---	Diesel notch mode, 0=auto-notch 3>manual notch	0-3	0
CV123		prime mover type	0-3	2
CV125	---	Program it to 1 will restore some the CV to factory 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 18 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 to 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](http://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](mailto: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



## HO DC/DCC Synchronized Diesel Sound Decoder with 28 Accessory Functions for Proto 2000 PA/PB Locomotive

Item #001803

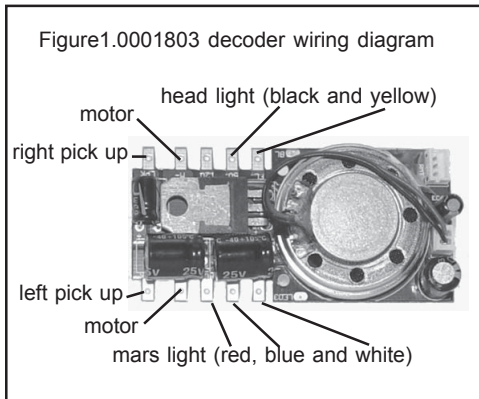
Thank you for purchasing our most advanced DC/DCC ALCo sound decoder. Combined with any DCC System or MRC Blackbox, our true live capture digital ALCo sound decoder will bring your Proto 2000 PA/PB to life.

- Synchronized diesel prime mover with random associated locomotive sounds
- 1.5 amp capacity
- Programmable for either 2-digit (1-127) or 4-digit (1-9999) addresses
- Programmable start voltage and top voltage
- Programmable acceleration and deceleration rate
- Programmable 14, 28/ 128 speed steps
- Directional lighting, (FO).
- Programmable user selectable horns and bells
- Supports full read back
- 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
- Programmable individual sound volumes
- 28mm speaker included

## INSTALLATION

Refer to the instructions that came with your PA/PB locomotive for removal of the body shell. Remove the three screws that hold down the original circuit board. Don't lose these screws, you will need two of them to install the decoder. Gently lift the original circuit board and note the locomotive wire colors and locations from where they originate inside the chassis. remove the plastic clips that hold these wires to the original circuit board, and remove the wires from the circuit board. You will use the clips to attach the wires to the decoder.

There are three red wires, (four red wires if the loco has a mars light), and four black wires, do not mix these up! Two red wires are from the right side wheel pickups, one red wire goes to the motor brush, and one red wire goes to the mars light if equipped. Two black wires are from the left side wheel pick ups, and one black wire goes to the motor brush. The other black wire goes to the headlight. The other wires are as follows- yellow to headlight. white and blue to the mars light, (if equipped), with the blue wire as the mars light common. The decoder is set up to use the bulbs that came with the locomotive, no change is needed. Install the wires to the decoder as noted in the following diagram.



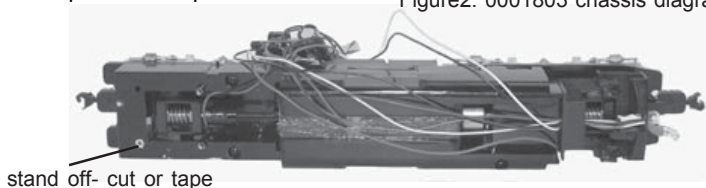
make sure to twist the wire leads tightly as not to have a stray strand cause a short circuit on the decoder. Use the plastic clips to attach the wires to the decoder. You can also solder the wires to the decoder if you prefer instead of using the clips.

There are three circuit board stand offs on the rear of the chassis that the original circuit board sat on. The three screws removed earlier held the circuit board to these stand offs. Only the two front stand offs are needed. The stand off on the rear corner can be clipped flush with the chassis with a pair of diagonal cutting pliers. Please wear safety glasses when clipping the stand off. Install the decoder with wires attached onto the front two stand offs and secure the decoder with two of the screws removed earlier.

Note- if you do not wish to clip the stand off, place a small piece of insulating tape over the stand off where it contacts the underside of the decoder.

Re-install body shell making sure none of the wires that go to the decoder are pinched or pulled out.

Figure 2. 0001803 chassis diagram



## Make a Test Track

Before you start with your decoder installation, we strongly recommend building a test track that uses a 20-ohm resistor to limit current. Only test your installed decoder on the test track. The test track will prevent any damage due to an incorrectly installed decoder.

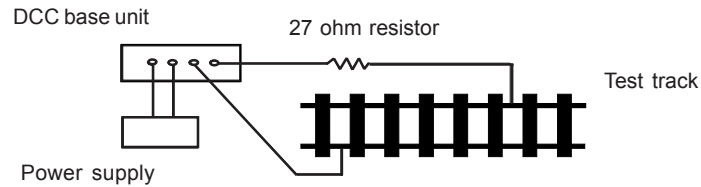


Figure 3. Diagram of test track

## TEST

All MRC decoders have been factory programmed with address #3, 28/128 speed steps and maximum top voltage. After you have finished your decoder installation you are ready to test it. Never run the installed decoder on your layout without first passing the test. You may damage the decoder if it is not wired correctly or if you have not properly isolated the motor and lights.

Put the loco on the test track. Select the "Run" mode of your DCC system and select or acquire address #3. Advance 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, the loco should change direction and the rear headlight, [if equipped], should come on. The locomotive cannot get to full speed, due to the resistor. If the loco moved forwards and backwards, and the light(s) came on, you did a great job. Congratulations!

Do not run the loco for an extended period of time on the test track or the resistor will overheat.

*\*NOTE- 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. Also do not confuse a test track with a program track. A program track does not use the current limiting resistor. Sound decoders need full power to the program track to install all programming instructions.*

## DCC OPERATION

This decoder has diesel start up and shut down features. 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. If the loco is previously shut down you have to start up the engine. You can use F19 to select 34 different horns and use F18 to select 1 of 8 bells. If you don't have MRC Prodigy Advance DCC you will have to use CV programming to select these features.

The decoder is defaulted to automatic notch. You can program CV122 to 3 to set manual notch for more realistic operation. Then use F9 to notch up and use F8 to notch down. Using this feature gives you the true to life feeling of operating a real locomotive.

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

## DC OPERATION

This decoder provides synchronized, true ALCo diesel rumble sounds with DC operation. Bells, horns, etc., cannot be accessed. Use of the MRC BlackBox will enable the full range of sounds on a DC system.

Function	Idle/Moving
F0	Headlight on/off or cycle of dim, bright, off
F1	Bell on/off
F2	Horn
F3	Mars light on/off with 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, (4 types) including off
F13	Short air release
F14	Coupling 2
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	Flange noise 3
F27	Sand drop
F28	Mars light flash enable/disable with Air release (CV 121)

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

## ADDITIONAL INFORMATION

The MRC 1803 HO gauge synchronized diesel sound decoder should perform well when used with other brand command systems. See your DCC command stations manual to learn how to program and operate the decoder. For more information about register/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](http://www.nmra.org).