

## PROGRAMMING

This decoder supports all types of programming modes and read back features.

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 1=off (horn always on)	0-1	0
CV50	---	Horn type	0-16	4
CV51	---	Horn volume	0-3	3
CV52	---	Bell type	0-6	3
CV53	---	Bell volume	0-7	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
CV63	---	Random noise 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	---	Coupling sound type	0-2, 0=off	1
CV122	---	Diesel notch mode, 0=auto-notch 3>manual notch	0-3	0
CV123	---	Prime mover type (ALCo 244/SD60/SD70/EMD 567B) 0=ALCo 244	0-3	0
CV125	---	Factory default setting, program it to 1 will restore all the 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 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. The default prime mover sound for this decoder is the ALCo 244 which is correct for an RS-3. If for some reason one of the other prime mover sounds are playing, re-setting CV # 125 to a value of 1 will re-set the prime mover sound back to ALCo.

## 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



## HO DC/DCC Synchronized Diesel Sound Decoder with 28 Accessory Functions for Athearn (RTR) RS-3 Locomotive

Item #0001820

Thank you for purchasing our most advanced DC/DCC ALCo 244 sound decoder. Combined with any DCC System or MRC Blackbox, our true live capture digital ALCo sound decoder will bring your Athearn RTR RS-3 loco 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, (F0).
- Programmable user selectable horns and bells
- Supports full read back of all CV's
- Customizable speed curve
- 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
- 18mm speaker included

## INSTALLATION

Refer to the instructions that came with your Athearn RS-3 locomotive for removal of the handrails, walk way and body shell. Remove the plastic clips that hold the wires to the original circuit board and note where they go. (Note: there is a short length of wire for the right side pick-up that is attached to the circuit board with one plastic clip, the other end of this wire is secured to the chassis under the original circuit board by one of the hold down screws, this short length of wire is not needed for the decoder installation, as the decoder will pick up right side current when screwed to the chassis). Don't lose these clips, you will need them to re-attach the wires to the decoder tabs. Remove the two screws that hold the circuit board to the chassis, remove and discard the original circuit board, with the short length of wire mentioned above. Apply tape on the top of the motor to prevent it from touching the decoder. Install the sound decoder with speaker facing down along the long hood end of the loco. Use the two original screws to secure the decoder to the chassis. Re-attach the wires to the decoder with the plastic clips. Make sure there are no stray strands of wire crossing any of the tabs on the decoder, or this can result in a short circuit damaging the decoder.

Refer to the decoder wiring diagram below. There is no right side pick up tab shown on the decoder. the right side pick up is made through the two screws that hold down the decoder to the chassis.

The Athearn locomotive uses 1.5 volt bulbs and the decoders lighting circuit is set up to use these bulbs without any modification. Before re-installing the locomotive body shell, walk way, and handrails...test the locomotive on a test track to check for proper installation and operation of the decoder.

This decoder was made to fit the Athearn RS-3 without any modification to the body shell. Please check clearances inside the body shell as there maybe some variations in the different roadnames.

If there are no visible obstructions inside the body, replace the walkway, body shell and handrails. Now the locomotive is ready to go to work on your layout.

Figure 1.

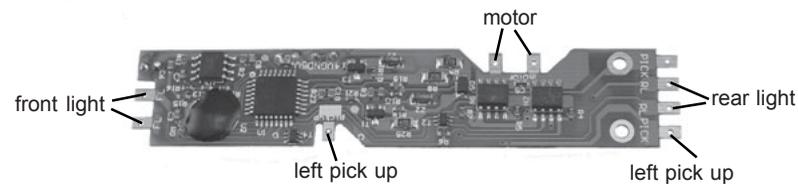
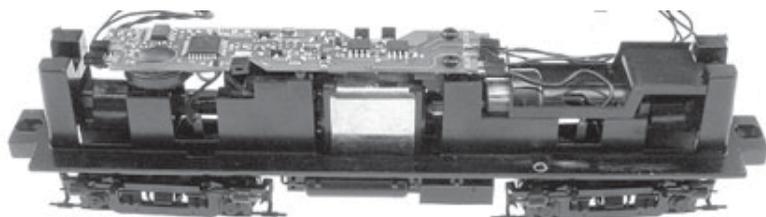


Figure 2.



## 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.

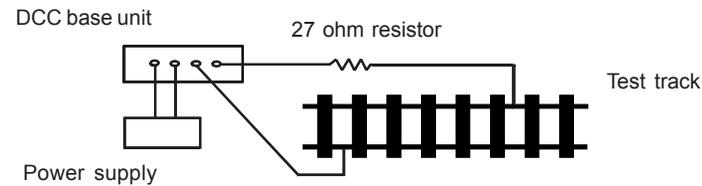


Figure 3. Diagram of test track

## 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. In real life the notch level has nothing to do with travel speed.

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 244 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
F1	Bell on/off
F2	Horn
F3	Air release
F4	Coupling
F5	Brake release (idle) / brake squeal (moving)
F6*	Dynamic brake on/off
F7	Air hose firing/uncoupling lever
F8	Click 3 times 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 Mover Type plus Sound on / off (see CV#123)
F13	Short air release
F14	Flange noise
F15	Air pump
F16	Associated loco sound
F17	Flange noise
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	Coupling
F25	Air release
F26	Flange noise
F27	Air hose firing
F28	Air release

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