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 with only horn on	0-1	1
CV50	---	Horn type	0-14	4
CV51	---	Horn volume	0-3	3
CV52	---	Bell type	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
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	disable
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, on/off, cycle, rule 17	0-2	0
CV118		Front gyra (ACC1) light effect	0-5	0
CV119		Rear Gyra (ACC2) light effect	0-5	0
CV121		Red mars light controls all lights on/off	0-1	0
CV122	---	Diesel notch mode, 0=auto-notch 3=manual notch	0-3	0
CV123		Diesel sound on/off with all other sounds on	0-1	1
CV125	---	Factory default setting, program it to1 will restore all the CV to default settng	---	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 a custom curve 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 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**. 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 China

MRC ⬇
TECHNOLOGY. PERFECTED.
MODEL RECTIFIER CORPORATION

HO Gauge EMD MP-15 Drop-in Diesel Sound Decoder with 28 Accessory Sound Functions for Athearn MP-15 Locomotive

Item #0001804

Thank you for purchasing our highly advanced DC/DCC Dual Mode locomotive sound decoder. Combined with any DCC System,or the MRC Blackbox, our new decoder with authentic MP-15 sound will make your model railroad come to life.

- Replaces stock Athearn circuit board
- Synchronized MP-15 prime mover with random associated locomotive sounds
- 28 accessory functions allowing more sound control than ever
- Programmable individual sound volumes
- 1.5 amp capacity
- Programmable for either 2-digit (1-127) or 4-digit (1-9999) addresses
- Programmable start voltage, aceleration, deceleration, and top voltage rates
- Programmable custom speed curve
- Programmable kick start
- Full read back capability
- Programmable 14, 28, 128 speed steps
- Selectable factory default speed curve
- Directional lighting (FO) at 0.2 amp rate
- Programmable accessory lighting
- Supports advanced consisting (CV19)
- Supports programming on the main (OPS mode)
- Compatible with NMRA DCC standards
- Complies with Part 15 of FCC
- 16 X 35 rectangular speaker included

Your MRC Synchronized MP-15 Sound Decoder(0001804) is equipped with normal directional lighting, plus MRC light effects. (see Figure #1). You can choose to hook up the accessory lights as per the prototype road name. Your MP-15 can also have "Rule 17" directional headlights,or cycle of dim,bright, or off, through simple programming. See the CV Chart for programming these features.
The red mars light is a safety feature used by the Southern Pacific, when activated, it shuts all other lights off. This feature is easily programmed by using CV 121, (see Chart).

INSTALLATION

It is quite a challenge to install a decoder into a loco. You should have some basic electrical knowledge and soldering skills. If you do not have the above require-ments, please ask the dealer for help in installation.
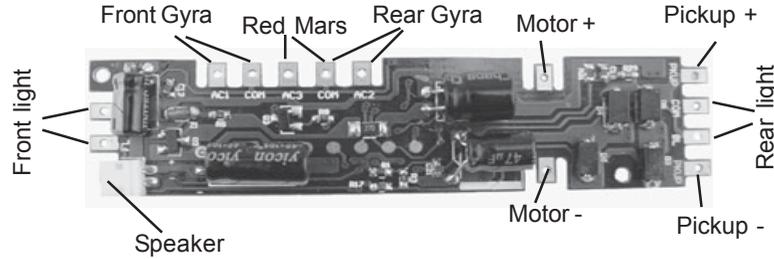

Figure 1 shows the connections to the decoder board.

Remove the body shell from the Athearn MP-15 locomotive by referring to the instructions that come with it. The wires for the locomotive are held to the original circuit board by plastic clips attached to tabs on the board. Remove the clips and save them as they hold the wires to the sound decoder tabs. Make note on which wires go to the original circuit board. Remove the original circuit board from the motor mount clips. Install the decoder in place of the original board, install wires, (see figure 2), and plastic clips. The Athearn MP-15 uses 1.5 volt bulbs and the decoder is set up to power these bulbs. If you want to add extra accessory lighting as per the prototype roadname, additional bulbs can be purchased from Athearn Trains 1-310-763-7140.
There is a weight on top of the front gear tower that must be removed to install the speaker. The included speaker is made to fit exactly in place of the weight, use the screws that held the weight to secure the speaker. Plug speaker into the sound decoder.
Check to see that no wires are binding, and that no stray wires strands are making contact across the decoder tabs. Re-install body shell.

Note- by removing this weight, some pulling power may be sacrifieced.

LIGHT EFFECTS

CV118= ACC1 and CV119=ACC2. For directional gyra lights both CV118 and CV119 must equal 0. Red Mars light can not be changed to a different light effect, only the gyra lights can be changed.

CV118/119 value	ACC#1 front gyra/ACC#2 rear gyra effect
0	Gyra light
1	Marslight
2	Prime strato light
3	Single strobe light
4	Double strobe light
5	on/off

MAKING A TEST TRACK

Before you begin 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.
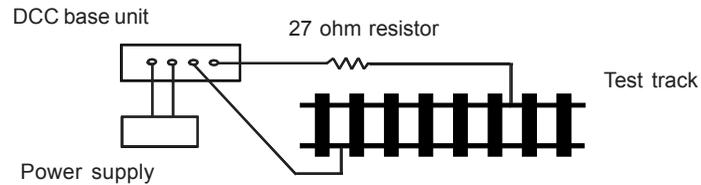

Figure 2. Diagram of test track

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 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.*

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 has two types of diesel prime movers. You can use F12 to select them. It can also be operated with the diesel sounds off. So it can be used in an Electric Type Traction Loco such as Trolley or GG-1. You can use F19 to select 15 different horn sounds. With MRC Prodigy Advance[2] 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. For other types of DCC systems you have to use CV programming to setup 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 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 unique MRC Blackbox (item #0001050) for DC operation will allow you to control all of the sounds in your sound equipped locomotives. The MRC Blackbox is easy to setup and use.

Function	Idle/Moving
F00	Double click turns sound off
F0	Headlight on/off or cycle of dim, bright, off
F1	Bell on/off
F2	Horn
F3	Gyra light on/off,(acc1 and acc2), with air release
F4	Red Mars light on/off, air release
F5	Brake release (idle) / brake squeal (moving)
F6	Associated loco sound
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	Diesel sound on /off
F13	short air release
F14	Coupling
F15	Air pump
F16	Associated loco sound
F17	flange noise
F18	Associated loco sound
F19	Horn type select (total 15 different horns)
F20	reverse
F21	Associated loco sound
F22	Change horn volume
F23	Associated loco sound
F24	Coupling
F25	flange noise
F26	flange noise
F27	sand drop
F28	air release

Note: Bell, and Rail Wheel Clack cannot play at the same time. If you active the Bell sound [F1], while the Rail Wheel Clack sounds is activated, the Bell sound will override the rail clack. Rail Wheel Clack cannot play while the loco is in idle. When you turn off the Rail Wheel Clack sound there will be one second delay.