TROUBLE SHOOTING

- If the decoder does not work, it may have simply lost its address. Please use **program track** to program CV# 125 with value 1 to restore the decoder to factory settings. This should bring the decoder to life with an address #3.
- If it does not have sound, use F12 to turn on the sound. F12 is sound on/off.
- Do not operate this decoder at a track voltage greater than 18volts.
- If the locomotive responds too slowly, you should clear its momentum by reprogramming CV3 and CV4 to zero.
- If the speed is too fast at step 1, you should program start voltage, CV2 to zero.
- If its top speed is too slow, program top voltage CV5 to 31.
- If your locomotive runs erratic or is not starting smoothly, you should clean the track and wheels to improve electrical pickup.
- Refer to your DCC system manual to learn how to program, read back 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 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

80 NEWFIELD AVENUE
EDISON, NJ 08837-3817
Tel. 732-225-6360
PRINTED IN USA

Address = 5941
CV29 = 38

MRC
TECHNOLOGY, PERFECTED.
Model Rectifier Corporation

N Gauge Drop in Diesel Sound Decoder for Athearn FP45

Item #0001832

Thank you for purchasing this MRC DCC Diesel sound decoder. It is a drop-in decoder designed for Athearn FP45. Besides the diesel prime mover sound for FP45, this decoder has an additional 3 prime mover sounds. All of these sounds are recorded directly from the real locomotive. The start up and shut down and 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.

- Four diesel prime mover sounds to choose from
- Start up and shut down sound
- 0.75 amp capacity
- 34 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 decelaration rates
- Programmable 14, 28, 128 speed steps
- Supports full read back of CV's
- 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 consisting (CV19)
- Supports programming on the main (OPS mode)
- Compatible with NMRA DCC standards
- Complies with Part 15 of FCC regulations
- 10mm, 32 ohm speaker included
- PCB size: 77mm x 9.7mm x 3.5mm
- Directly replaces Athearn FP45 circuit board

INSTALLATION

Your new MRC 0001832 Sound Decoder will virtually "drop-in" to a Athearn FP45 diesel locomotive. Although easy, please follow instructions carefully.
Remove the locomotive body following **Athearn**'s instructions. Remove the original circuit board by very carefully sliding the circuit board out of the chassis. The sound decoder is installed in the same location.

First, Carefully tape the chassis in the areas as the picture shows to prevent the speaker shorting the chassis. 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. Ensure the vertical copper contacts (on the decoder) cover the vertical motor contacts. The motor contacts must not touch the loco chassis.

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

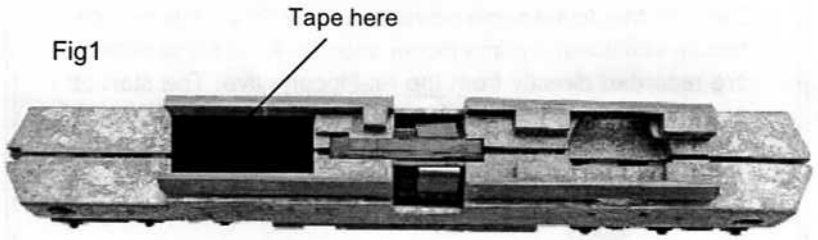

Fig1

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.

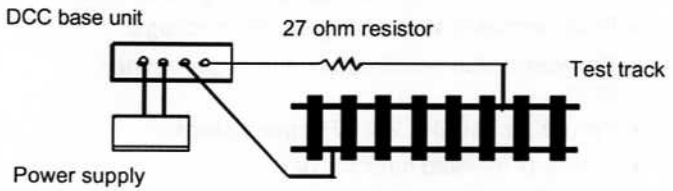

Fig3. Diagram of test track

TEST

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!

If your installed decoder does not pass the test, find the problem, correct it and test it again.

PROGRAMMING

This decoder supports all programming modes and read back features. With MRC Prodigy Advance DCC you can read its address and all CV values.

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

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.

Double click F0 will turn on/off sound (CV49). You can't turn off horn which is always on. The decoder has four types of diesel prime movers, plus "off". You can use F12 to select this feature or use CV 123. You can use F19 to select 34 different horn sounds and use F18 to select 8 different bell sounds. With MRC Prodigy Advance^2 DCC which has 28 functions, you can easily setup and access all the decoder's functions. If your DCC System is limited in functions or can not program CV's you may not be able to access all the features of this decoder. With some DCC Systems you will have to use CV programming to set up 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 program 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 MRC Tech 6 Sound Controller 2 (item #0001200) for DC operation will allow you to control all of the sounds in your sound equipped locomotives. And, the MRC Tech 6 Sound Controller 2 is easy to setup and use.

SPEED TABLE CV67-CV94 FOR 28 SPEED STEPS

This feature can be a little difficult for first time users. However it is a nice option if you wish to consist (lash) this locomotive with another model that has a different speed range.

The speed table feature allows you to program every speed increment of all 28 speed steps. You can customize the speed curve. In order to use the speed table control you have to set CV29's bit 4 to 1.To get there, you can program CV29 to 18 for short address or to 50 for a long address). When you operate the loco at 28 speed steps, the decoder will use the speed table formed by CV67-CV94 to control speed (motor voltage). {If you own a MRC Prodigy Express, Advance or Wireless system we recommend you to order the **MRC computer interface** to program your decoder's speed table. JMRI software can be used for other systems}.
Now select throttle to 28 speed steps and operate 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. You may also need to adjust the kick voltage, CV65, to get a nice slow speed at speed step 1. The kick voltage is the voltage kick in when the speed step changes from 0 to 1. 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 the read back CV feature to make sure their values are in an increasing order.

Note: When using MRC Prodigy DCC or some other systems, programming in a new address will automatically disable the speed table (because it sets 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. If you have the MRC software interface, you can read back the speed table and it will draw the speed curve for you.

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.