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	---	25
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) 34=horn off	0-34	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
CV63	---	Auto ditch lights flash with horn enable	0-1	1(enable)
CV64	---	Rail wheel clack	0-3	3
CV65	---	Kick start voltage	0-63	63
CV67-94		28 speed steps table (must set CV29 bit4=1, to enable the speed table)	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
CV118		ACC1 light mode	0-6	0
CV119		ACC2 light mode	0-6	0
CV121		Ditch flash (=1) or stay on (=0)	0-1	0
CV122	---	Notch mode, 0=auto, 3=manual	0-3	0
CV123		Prime mover type 4 + off	0-2 (2=off)	1
CV124		Back emf load control, 1=on, 0=off	0-1	0
CV125	---	Programming to "1" will restore some CV's to factory settings	---	0

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 16 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 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

DC/DCC HO Diesel Sound Decoder with Wireless remote capability

Item #0001825

Thank you for purchasing our highly advanced DC/DCC Diesel locomotive sound decoder. This decoder will replace the OEM circuit board in Athearn SD45, SD60 and other Locomotives.

- Four types of synchronized diesel prime: Alco 244/SD60/SD70/EMD 567B
- 1.5 amp capacity
- Programmable choice of 34 different horns and 8 bells
- Programmable individual sound volumes
- Programmable for either 2-digit (1-127) or 4-digit (1-9999) addresses
- Programmable start voltage and top voltage
- Programmable acceleration and deceleration rates
- Full read back of all CV's
- Programmable 14, 28, 128 speed steps
- Selectable factory default speed curve
- CV 65 Kick start
- Custom programmable speed curve (CV 67-94)
- Directional lighting (FO) at 0.2 amp rate
- Programmable for either ditch lights, mars light, gyra light, prime strato light.
- 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
- 28mm speaker included
- Dimensions: 96.0mm x 17.8mm x 11.0mm

INSTALLATION

Remove the speaker weight and small front from your Athearn SD45/SD60. Remove the orignal PCB. Mount the sound decoder. Follow the diagram to connect wires. We prefer you solder wires to the decoder for a better connection. If you don't solder, please make sure no wire touch any components on the decoder.
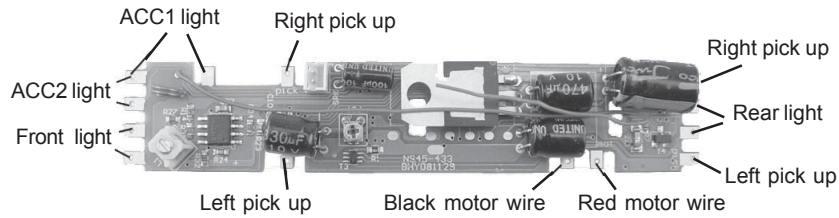
DCC OPERATION

The decoder has been programmed to address #3, 28/128 speed steps. The decoder has start up and shut down features. If the loco was previously shut down you have to start up the engine by press any function key. Once started you can move up the throttle and the loco should move. Push the light button [F0] and headlight should come on. Change the direction of the loco and the loco should change direction. To shut down the engine you must bring the loco to idle and then press F8 three times.

The decoder has four types of diesel prime movers, plus off. You can use F12 to select this. 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 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 all features of this decoder.

Note: 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 activated, the Bell sound will override the other 2 sounds. Rail Wheel Clack can not play while the loco is in idle. When you turn off Dynamic Brake and Rail Wheel Clack sound there will be one second delay.

LIGHT EFFECT PROGRAMMING CHART FOR CV#118/119

Program CV #118 and 119 to choose the desired light effect. CV118 for ACC1 and CV119 for ACC2. For ditch light both CV118 and CV119 must to 0.

CV118/119 value	ACC#1/ACC#2 Light effect
0	Ditch light
1	Gyra light
2	Mars light
3	Prime strato light
4	Single strobe light
5	Double strobe light
6	on/off

DC OPERATION

The decoder can also be operated by a regular DC power pack. The loco will start up around 8V or 60% throttle. 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 Blackbox (item #0001050) or TECH 6 Sound Control #0001200 for DC operation will allow you to control all of the sounds in your sound equipped locomotives. Since the decoder has wireless capability you can purchase MRC wireless transmitter #0001824 which has 9 buttons. It allows you to control loco speed. lights, bell, horn and more. Once you use transmitter to control loco speed, the decoder will disable the DC power pack's throttle. To enable the DC throttle you have to flip the direction switch.

To program the various sounds, turn on the power, move the throttle slowly up until you hear the prime mover sounds start, make sure the loco is in idle. Turn off the power switch (leaving the throttle setting as is) and wait 2 seconds. Press and hold Button #6 while you turn the power switch to ON. When you hear the locomotive say "Program", quickly release Button #6; the locomotive will say "Program" a second time to confirm you are in the program mode.

Button	In Run Mode	In Program Mode
button1	Bell on/off	Change bell
button2	Horn	Change horn
button3	ACC light on/off, air release	Change ACC1 light
button4	Dynamic brake on/off	Change ACC2 light
button5	Stop, Brake release, brake sques	Change diesel volume
button6	Headlight on/off	Program shift
button7	Speed down	Button 6+7=Decrease start voltage
button8	Speed up	Button 6+7=Increase start voltage
button9	Direction	Button 6+7=Change diesel type
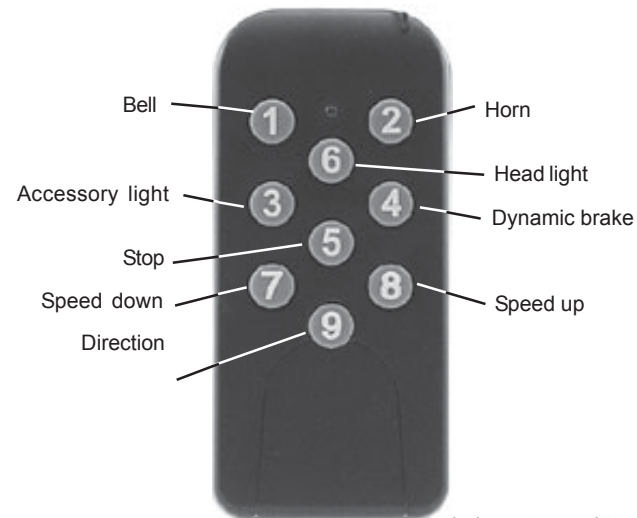
wireless transmitter #0001824

Function	Idle/Moving
F0	Headlight on/off
F1	Bell on/off
F2	Horn
F3	Ditch lights on/off or ACC1 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 mover type including diesel off
F13	ACC2 light on/off 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	Associated loco sound
F26	flange noise 3
F27	sand drop
F28	Ditch lights flash enable/disable (CV121) with air release

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.