

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, horn 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	1
CV56	---	Brake squeal volume	0-3	2
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 with horn enable/disable	0-1	1
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, 2=rule 17	0-2	0
CV118		ACC1 light mode	0-6	0
CV119		ACC2 light mode	0-6	0
CV122	---	Diesel notch mode, 0=auto-notch 3>manual notch	0-3	0
CV123		Prime mover type(2 types plus diesel off) 0=G.E.	0-2	0
CV124		Back emf load control on/off	0-1	0
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 15 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. 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 USA



HO Gauge Synchronized Diesel Sound Decoder For G.E. U23B

(With NMRA 8 pin plug and 9 pin JST connector)

Item #0001805

Thank you for purchasing our highly advanced DCC locomotive sound decoder. Combined with any DCC System, our new decoder with "Carnegie Hall" sound quality will make your model railroad come to life.

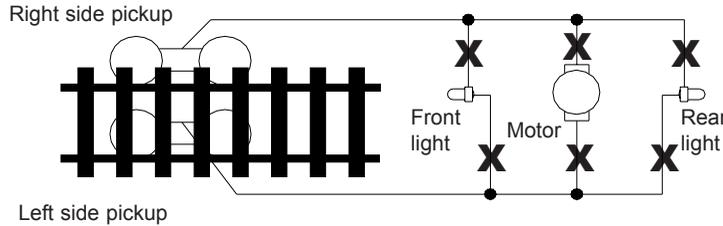
- Recorded from real G.E. U23B locomotive, plus extra optional prime mover sound
- 1.5 amp capacity
- Programmable choice of 34 different horns and 8 bells
- Programmable individual sound volumes
- Programmable for either 2-digit (1-127) or 4-digit (1-9999) addresses
- Programmable start voltage, and top voltage
- Programmable acceleration rate, and deceleration
- Kick Start (CV 65)
- User programmable custom speed table (CV 67-94)
- Programmable 14, 28, 128 speed steps
- Selectable factory default speed curve
- Directional lighting (FO) at 0.2 amp rate
- Programmable for either ditch lights, mars light, gyra light and prime strobe light
- 28 accessory functions (F1-F28)
- Supports advanced consisting (CV19)
- Supports full read back of CV's
- Supports programming on the main (OPS mode)
- Compatible with NMRA DCC standards
- NMRA 8 pin plug and 9 pin JST connector
- Complies with Part 15 of FCC
- 20mm speaker with baffle included (other size, aftermarket speakers are available from MRC)
- Dimensions: 40.0mm x 17.0mm x 6.5mm

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 requirements, please ask the dealer for help in installation.

Figure 1 shows the electrical circuit of most standard locos. The terminals of the motor and light(s) are directly connected to the wheel pickup. Each type of loco has its own method of electrical pickup and distribution. The connection between the wheels, motor and light(s) could be wires, clips, the body or chassis, PC board or any other type of conductor. First, figure out your loco's electrical wiring and how to disconnect (isolate) the motor and light(s).

Figure 1. Connection of standard locomotive. *Note: The 'X' marks indicate where to disconnect (isolate).*



The decoder will be inserted between the wheel pickup and the motor.

Each manufacturer and loco may have different ways of decoder installation. There is no standard rule for installing decoders. It is always better to consult the loco manufacturer on how to install a decoder in that particular loco.

The decoder has a NMRA 8 pin plug and 9 pin JST connector for easy installation into DCC ready locomotives. If the locomotive is not DCC ready, follow figure 1 as how to isolate the locomotives electrical circuits. After disconnecting the motor terminals from the pickup, connect the red wire to the right side pickup and the black wire to the left side pickup. Connect the orange wire to the motor terminal that was originally connected to the right pickup. Connect the gray wire to the motor's other terminal. Connect the front light to the blue wire and the white wire. Connect the rear light to the blue wire and the yellow wire.

The blue wire is the common terminal for lights and accessory functions. You may use the black wire or the red wire to replace the blue wire. This is useful if isolating one of the light terminals from the pickup is difficult. Wiring the bulb this way will make the light dimmer. If your loco has only a front light, you should connect the white and the yellow wires together. If your locomotive has a NMRA 8 pin receptacle, remove the dummy plug. Match first pin and plug in the decoder.

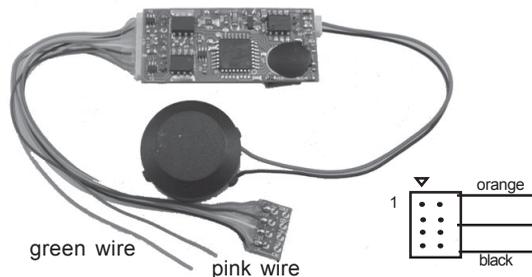


Figure 2. 0001805 decoder with NMRA plug.

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.

The program track is NOT a test track. Please use the following diagram to make a test track, and test the installation prior to programming or running the loco.

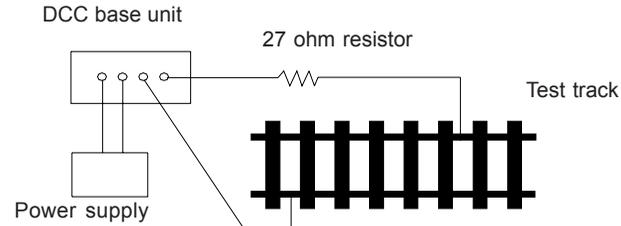


Figure 3. Diagram of test track

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. As long as you test the decoder on the test track there is little chance of damaging the decoder. That is why the test track is so important. 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.

OPERATION

The decoder has two types of diesel rumble. You can use F12 to select different diesel rumbles, plus "off". The decoder has start up and shut down feature. 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 horn sounds and use F18 to select different 8 bell sounds. If you don't have MRC Prodigy Advance DCC you have to use CV programming to select these features.

The decoder is default to automatic notch. You can program CV122 to 3 for manual notching of the loco for realistic operation. You can 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. If you don't use MRC Prodigy² you may not be able to access all the features of the decoder.

Function	Idle/Moving
F0	Headlight on/off or rule 17 or cycle of dim, bright, off
F1	Bell on/off
F2	Horn
F3	Air release/ Accy light 1 on/off (see CV118)
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	Associated loco sound
F12	Change prime diesel mover (2 type2 plus diesel off)
F13	Air release / Accy light 2 on/off (see CV119)
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	Safety valve pop
F27	sand drop
F28	Ditch lights flash enable/disable with Air release

LIGHT EFFECT PROGRAMMING CHART FOR CV#118/119

Program CV117 to choose 3 different modes of headlight effects (0=normal directional, 1=off/dim/bright cycle, 2=rule 17). Both ACC1 and ACC2 has 7 different accessory lights effects. Program CV #118/119 to choose the desired light effect. CV118 for ACC1 and CV119 for ACC2. For ditch light both CV118 and CV119 must be 0. In ditch light mode, use F3 to turn on/off and use F28 to enable/disable flash. When you blow the horn the ditch lights will flash. The ditch lights will remain flashing for several seconds after horn is off.

CV118/119 value	ACC#1/ACC#2 (green/pink) Light effect
0	Ditch light
1	Gyra light
2	Marslight
3	Prime strato light
4	Single strobe light
5	Double strobe light
6	On/off