Programming

The AD350 decoder supports the following register and CV programming.

MRC *PRODIGY* DCC and MRC Command 2000 users do not need to know all these register/CV numbers because the MRC DCC systems use model railroading terminology. It is easy to understand and easy to program.

CV	Register	Description	Range	Factory Value
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	---	Max voltage	0-32	0
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	1-127	0
CV33	---	Forward headlight	0-255	1
CV34	---	Reverse headlight	0-255	2
CV35	---	Function 1	0-255	4
CV36	---	Function 2	0-255	8
CV37	---	Function 3	0-255	16
CV38	---	Function 4	0-255	32
CV39	---	Function 5	0-255	64
CV40	---	Function 6	0-255	128
CV41	---	Function 7	0-255	64
CV42	---	Function 8	0-255	128
CV62	---	Ditch light flash rate	0-32	16
CV64	---	Light effect setting (0=special light effect/1=normal light effect)	0-1	1
CV105	---	User identifier number	0-255	0
CV106	---	User identifier number	0-255	0
---	R6	Page number	0-31	1

The MRC AD350 decoder should perform well when used with other brand command systems. See your DCC command station's manual to learn how to program and operate the decoder. For more information about register/CVs and their function 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 the Part 15 of FCC rule. 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 cause undesired operation.

Return Procedure
If it should become necessary to return your decoder, unplug the decoder and return the decoder only. Please include a letter (printed clearly) with your name, address, a daytime telephone number and a detailed description of the problem you are experiencing**.** Please also include a $9.00 check for handling and shipping fee. **Be certain to return the decoder only.**

Send the decoder to:

Model Rectifier Corporation
Attn: Parts & Service
80 Newfield Avenue
Edison, NJ 08837-3817 U.S.A

MRC AD350
6-FUNCTION DECODER
with MRC *Light Effects*
Built-in NMRA DCC plug

Thank you for purchasing our highly advanced DCC locomotive decoder. Combined with any DCC System, our decoder will make your model railroad more realistic and more exciting.

- Designed for HO scale
- Built-in NMRA DCC plug
- Maximum current: 2.0 Amp
- Programmable for either 2-digit (1-127) or 4-digit (1-9999) addresses
- Programmable start voltage
- Programmable acceleration rate
- Programmable deceleration rate
- Programmable top voltage
- Programmable 14, 28, or 128 speed steps
- Directional lighting control for front and rear lights at 0.2 amp rate
- Easy setting "Rule 17" lighting, ditch, strobe and Mars lights
- 4 accessory functions (F1 to F4), at 0.1 amp rate
- Supports advanced consisting, (CV19)
- Supports programming on main
- Compatible with NMRA DCC standard
- Complies with the Part 15 of FCC
- Accessory wire provided for decoder wiring
- 43.0mm long x 17.5mm wide x 3.5mm high

INSTALLATION

If your loco has an NMRA DCC socket, all you need to do is plug in the decoder. However, it is quite a challenge to install a decoder into a locomotive without the DCC socket. 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 locomotives. The terminals of the motor and lights are directly connected to the wheel pickups. Each type of loco has its own method of electrical pickup. The connection between wheel and motor/light could be wires, clips, the body or any conductor. Figure out your locomotive's electrical connection and how to disconnect (isolate) the motor and lights. The decoder will be inserted between the wheel pickups and the motor. The 'X' marks in Figure 1 show you where to disconnect.

Figure 1. Connection of a standard loco

Note: The 'X' signs indicate where to disconnect (isolate)

Right side pickup
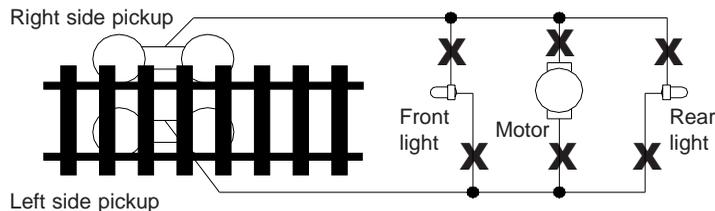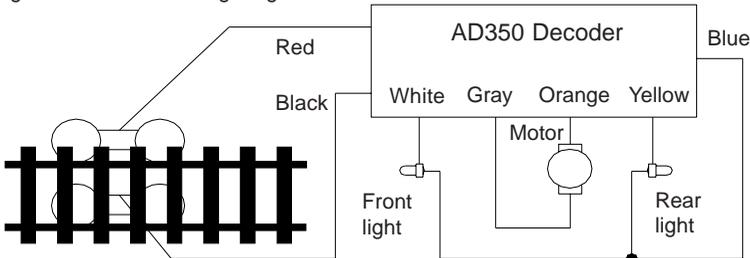
Left side pickup

Front light   Motor   Rear light

Figure 2 shows you how to wire the decoder. After disconnecting the motor terminals from pickups, connect the red wire to the right side pickup and the black wire to the left side pick up. Connect the orange wire to the motor terminal that originally connect 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 very useful when you find that it is hard to isolate one of the light terminals from the pickup. Wiring the bulb this way will also make the light dimmer. If your loco has only a front light, you should connect the white and the yellow wires together.

Solder tabs are furnished on the AD350 decoder for accessory functions F1, F2, F3 and F4. If you wish to use these functions, you can solder wire to these tabs using the supplied accessory wires. Use a small wattage soldering Iron in conjunction with electronic soldering paste. To avoid any damage on the decoder do not solder one tab more than 5 seconds at a time. If you need more time to solder, please let it cool down before soldering again.

Figure 2. Decoder wiring diagram

AD350 Decoder

Red   Blue
Black
White   Gray   Orange   Yellow
Motor
Front light   Rear light

MAKE A TEST TRACK

Before you start with your decoder installation, we strongly recommend building a test track which 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 wired decoder.
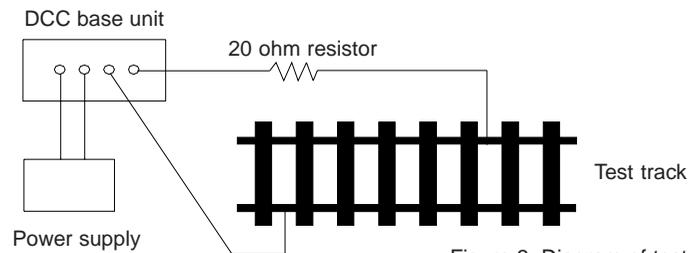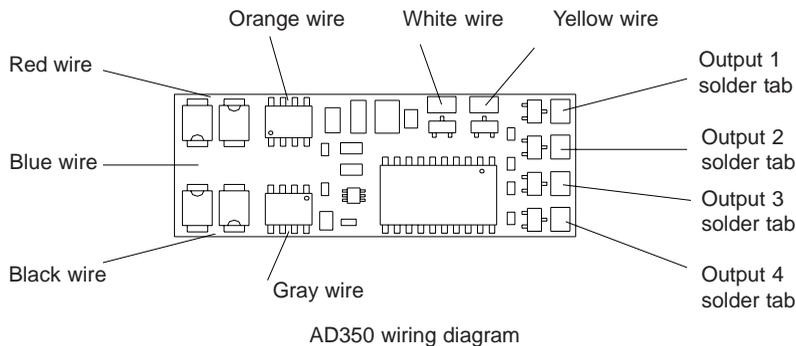
DCC base unit
20 ohm resistor
Test track
Power supply

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 the lights.

Put the loco on the test track. Select the Run Mode of your DCC system and select or acquire address #3. Move up throttle and the loco should move forward. Push the light button and the front light of your loco should turn on. Push the reverse direction button. The loco should move backward and the rear light should turn on. The loco cannot get to normal speed because there is a 20 ohm protection resistor in the test track. If you are able to turn on/off the front and rear lights and you are able to move the loco in forward and reverse, you did a great job. Congratulations! **Do not test the loco on the test track for an extended period of time. To do so will cause the protection resistor to overheat.**

Orange wire   White wire   Yellow wire
Red wire
Output 1 solder tab
Blue wire
Output 2 solder tab
Output 3 solder tab
Black wire
Gray wire
Output 4 solder tab

AD350 wiring diagram

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 your decoder. This is why making a test track is so important.

OPERATION

The AD350 decoder can be operated in either one of two ways:

1. Normal light/functions:
    Headlights are directional, and controlled by your DCC system's F0 button. Decoder function output solder tabs (1, 2, 3 & 4) are normal on/off, controlled by F1-F4 buttons.

2. **MRC *Light Effects***:

    All MRC ***Light Effects*** have adjustable flash rates.

    A. "Rule 17" directional headlights: Headlights on/off, (F0). One light is bright to indicate direction of travel, the other is dim.

    B. Ditch lights: Using decoder function output solder tabs 1 and 2 plus decoder blue common wire.
        F1,F5 button: Pressing F5 button once or double clicking F1 button turns ditch lights steady on or off, still giving you independent operation of F1 function such as bell sound.
        F2 button: Using function button F2, ditch lights will flash fifteen (15) times.
        F3 button: Using function button F3, the ditch lights will flash ten (10) times.

    C. Strobe light: Decoder function output solder tab 3 plus decoder blue common wire.

    D. Mars light: Decoder function output solder tab 4 plus decoder blue common wire.

    The above two MRC ***Light Effects*** (C & D) can be used separately or together and are controlled by function button F4.

HOW TO SELECT THE MRC *LIGHT EFFECTS*

The AD350 is shipped from the factory in the normal/default mode (address #3) normal lights & functions. There are two ways to access the **MRC *Light Effects***:

1. The MRC EZ way (for all DCC systems except the MRC Command 2000): Place your locomotive on a programming track. Program your locomotive to address #1. To adjust the flash rates while in the programming mode, program in a momentum/acceleration rate (CV#3). This step turns our **MRC *Light Effects*** on. Final step: Now program in your locomotive running address, either 2 or 4-digit, and adjust the rest of your running parameters (momentum, start voltage, etc.). That's it! To turn off the **MRC *Light Effects***, simply program the locomotive to address #3 and then follow the final step above.

    You cannot run a locomotive on address #1 and retain normal lights/function or run a locomotive on address #3 with **MRC *Light Effects***. These two addresses are reserved for turning the functions on and off, but a locomotive will still be able to run on these addresses.

2. The other way:
    If your non-MRC DCC system has the ability to program CVs, you can go directly to the CVs to custom tailor your **MRC *Light Effects***. Your can use the register/CV chart we have provided for you in this instruction booklet or visit the National Model Railroad Association website at **www.nmra.org** for a more comprehensive understanding of CVs and registers.