HOW TO SELECT THE MRC LIGHT EFFECTS

The AD324 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#s). This step turns on our MRC Light Effects. 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.

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. You 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.

PROGRAMMING

The AD324 decoder supports the following register and CV programming.

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.

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It is quite a challenge to install a decoder into a “G” scale 2-motor locomotive. 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(s), light(s) and smoke unit are directly connected to the wheel pick-ups. Each type of loco has its own method of electrical pick-up and distribution. The connection between the wheels, motor(s), light(s) and smoke unit could be wires, clips, the body or chassis, a PC board or any other type of conductor. Figure out your loco’s electrical system and how to disconnect (isolate) the motor(s), light(s) and the smoke unit.

**MAKE A TEST TRACK**

Before you start with your decoder installation, we strongly recommend building a test track that 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. Smoke units draw a lot of current! If your locomotive comes equipped with a smoke unit, do not attempt to power it off any of the decoder functions. Wire it directly to the wheel pick-ups for constant smoke emission.

**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 test 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 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 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.

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 AD324 decoder can be operated in either one of two ways:

1. Normal light/functions:
   - Headlights are directional and are controlled by your DCC system's light button (F0). Decoder functions (accessory lights) 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 (F3). One light is bright to indicate direction of travel, the other is dim. Uses normal headlight wiring (white, yellow and blue common wire).
     - B. Ditch lights: Using decoder accessory function wire (F1-green and F2-purple) and blue common wire.
     - C. Strobe light: Using decoder accessory function wire (F3-brown) and blue common wire.
     - D. Mars light: Using decoder accessory function wire (F4-pink) and blue common wire.

**Figure 2** shows how to wire the decoder. After disconnecting the motor terminals from pick-ups, 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 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 two blue wires are 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.

Smoke units draw a lot of current! If your locomotive comes equipped with a smoke unit, do not attempt to power it off any of the decoder functions. Wire it directly to the wheel pick-ups for constant smoke emission.

**Figure 3** shows you how to wire the decoder. After disconnecting the motor terminals from pick-ups, 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 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.

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**Figure 2. AD324 wiring diagram**

**Figure 3. Diagram of test track**