2. MRC Light Effects:
A. “Rule 17” directional headlights: Headlights on/off, (F0), light button. One light is bright to indicate direction of travel and the other is dim. Also in this mode, the (F0) light button turns on the strobe light if hooked up. Normal headlight wiring is used for “Rule 17” lighting (white, yellow & blue common wire).
B. Ditch lights: Use of the long horn (F2) or short horn (F3) buttons will activate ditch lights with horn sounds. Ditch lights will flash 5 times after horn sound ceases. If your DCC system has an F5 button, you can use it to turn ditch lights steady on/off. Otherwise you must use the uncoupling button (F4) to turn ditch lights steady on/off. When horn is activated, the ditch lights will flash. To wire ditch lights, use green and purple accessory wires with blue (headlight) common wire.
C. Strobe light: This light simulates the rooftop strobe light on some locomotives. In the MRC Light Effects mode, the strobe will flash when “Rule 17” headlights are on regardless of loco direction. To wire strobe lights, use brown accessory wire with blue (headlight) common wire.

HOW TO SELECT THE MRC LIGHT EFFECTS
The AD322 decoder supports the following register and CV programming.

2. The other way:
When hooking up accessory lighting, regardless of mode being used, use light bulbs rated at maximum track power. The bulbs receive full track power when the functions are activated. Auxiliary factory installed locomotive lighting that use LEDs or 1.5-volt bulbs will need a resistor placed in line to prevent them from burning out.

PROGRAMMING
The AD322 decoder supports the following register and CV programming.

<table>
<thead>
<tr>
<th>CV</th>
<th>Register</th>
<th>Description</th>
<th>Range</th>
<th>Factory Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV1</td>
<td>R1</td>
<td>Short address</td>
<td>1-127</td>
<td>3</td>
</tr>
<tr>
<td>CV2</td>
<td>R2</td>
<td>Start voltage</td>
<td>0-32</td>
<td>0</td>
</tr>
<tr>
<td>CV3</td>
<td>R3</td>
<td>Acceleration</td>
<td>0-32</td>
<td>0</td>
</tr>
<tr>
<td>CV4</td>
<td>R4</td>
<td>Deceleration</td>
<td>0-32</td>
<td>0</td>
</tr>
<tr>
<td>CV5</td>
<td></td>
<td>Max voltage</td>
<td>0-32</td>
<td>0</td>
</tr>
<tr>
<td>CV29</td>
<td>R5</td>
<td>Basic configuration</td>
<td>---</td>
<td>2</td>
</tr>
<tr>
<td>CV7</td>
<td>R7</td>
<td>Manufacturer version number</td>
<td>---</td>
<td>32</td>
</tr>
<tr>
<td>CV8</td>
<td>R8</td>
<td>Manufacturer ID</td>
<td>---</td>
<td>143</td>
</tr>
<tr>
<td>CV17</td>
<td></td>
<td>Long address upper byte</td>
<td>192-231</td>
<td>192</td>
</tr>
<tr>
<td>CV18</td>
<td></td>
<td>Long address lower byte</td>
<td>0-255</td>
<td>3</td>
</tr>
<tr>
<td>CV19</td>
<td></td>
<td>Advanced consist address</td>
<td>1-127</td>
<td>0</td>
</tr>
<tr>
<td>CV64</td>
<td></td>
<td>Light effect setting</td>
<td>(0=special light effect/1=normal light effect)</td>
<td>0-1</td>
</tr>
<tr>
<td>CV105</td>
<td></td>
<td>User identifier number</td>
<td>0-255</td>
<td>0</td>
</tr>
<tr>
<td>CV106</td>
<td></td>
<td>User identifier number</td>
<td>0-255</td>
<td>0</td>
</tr>
</tbody>
</table>

--- R6 Page number | 0-31 | 1

The MRC AD322 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 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 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 $15.00 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

© 2003 MODEL RECTIFIER CORPORATION
80 NEWFIELD AVENUE
EDISON NJ 08837-3817
Tel. 732-225-6360
PRINTED IN CHINA

AD322 “G” Gauge
Diesel Sound Decoder with MRC Light Effects

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 exciting.

- 8 amp capacity, 3 accessory functions at 0.1 amp rate (F1 – F3)
- 4 sound functions, (bell, long horn, short horn, uncoupling), plus diesel idle and diesel rumble
- 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, 128 speed steps
- Directional lighting control for front and rear lights at 0.2 amp rate
- Supports advanced consisting (CV19)
- Supports programming on the main
- Compatible with NMRA DCC standard
- Complies with the part 15 of FCC
- 2 wired quick disconnect plugs for easy decoder installation
- 2 inch speaker included
- Dimensions: 36mm x 88mm x 23mm
- Suitable for either 1 motor or 2 motor locomotives
INSTALLATION
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 smoke unit.

Figure 1. Connection of standard locomotive.

The decoder will be inserted between the wheel pick-ups and the motor(s). The ‘X’ marks in Figure 1 show you where to disconnect (isolate). Please observe the polarities of both motors in dual motored locomotives since both motors operate in the same direction.

The G scale decoder has 2 sets of red wires, black wires, orange wires and gray wires to make the wiring of your dual motored locomotive easier. You could use just one color of each, depending upon which is easier for you.

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 connects 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.

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.

SPEAKER PLACEMENT
Your AD322 G scale diesel sound decoder comes with a 2” speaker rated at 8 ohms. Placement of the speaker is up to you, usually installed in loco fuel tank or inside top of body shell. Some manufactures have pre-drilled speaker holes somewhere in the loco to aid in placement of the speaker. Also some locos come with a speaker installed. You can use this pre-installed speaker as long as it is rated at 8 ohms.

Use hot glue to affix the speaker to the locomotive. It is also recommended that a baffle be built around the speaker if space permits to obtain a fuller sound. Place speaker onto body/fuel tank, applying hot glue around rim to affix. Place baffle or sound tube over speaker and affix the wire speaker to decoder with hot glue.

Figure 2. AD322 wiring diagram

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 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 AD322 decoder can be operated with diesel idle and rumble turned on or off. If your DCC system has an F8 button, you can use it to activate the engine sound. Otherwise you must double click your headlight button (F0) to turn the diesel idle rumble on or off. When the diesel idle and rumble are turned off, your bell, long horn, short horn and uncoupling sounds can still be activated by using the appropriate function buttons (F1-F4).

The sounds of the AD322 are also active regardless of which mode you program the decoder to: (Normal light/functions mode or MRC Light Effects mode).

The AD322 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-F3 buttons. Sounds will also be activated at the same time with the pressing of these buttons.