

The #0345 DCC decoder is factory-installed in Atlas HO scale H15/16-44 locomotives. The characteristics of this decoder are:

- \* Provides 1.0A continuous motor current.
- \* Has two function outputs for LED headlights that can be configured for special effects including directional, independent, dimming, Mars light, Gyro light, single Strobe, and double Strobe.
- \* Provides two additional function outputs for bi-color LEDs to provide directional green or red marker lights at front and rear. These outputs can be configured by the user for on/off control by a specified DCC function.
- \* Supports both short (2-digit) and long (4-digit) addressing.
- \* Supports advanced consist control (lashing up locomotives that have different DCC addresses)
- \* Operates on conventional DC layouts; this feature may be disabled by setting a CV.
- \* Provides full support for all forms of programming that are described in NMRA RP-9.2.3.
- \* Supports both short form instructions and long form instructions in operations mode programming (programming on the main line)
- \* Can be set for operation with 14/27 speed-steps, 28/55 speed-steps, or 128 speed-steps with direct drive.
- \* Can choose either Precision Glide Control or Silent Drive for motor control

## DCC Decoder for Atlas HO Scale H15/16-44 Locomotives

Item # 0345  
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## DCC Decoder for Atlas HO Scale H15/16-44 Locomotives

Atlas' HO 4-Function Dual-Mode Decoder (DMD) for Atlas HO scale H15/16-44 Locomotives presents a whole new concept in the evolution of DCC. Modelers are able to run a decoder-equipped locomotive on a standard DC powered (analog) layout, without experiencing the typical speed differential of a decoder-equipped vs. a non-decoder-equipped locomotive. The Atlas #345 DCC decoder for H15/16-44 locomotives can be used with all popular NMRA-compliant DCC systems. This decoder is in full conformance with all NMRA Standards and Recommended Practices and has been augmented to work well with all major DCC systems on the market.

The Atlas #345 decoder is packed with all the features that you expect in a high-end decoder:

- Special lighting effects for front and rear headlights including directional, independent, dimming, Mars light, Gyro light, single Strobe, and double Strobe.
- Two additional function outputs for directional bi-color (green and red) front and rear marker lights.
- Supports both short (2-digit) and long (4-digit) addressing.
- Advanced consist control (operating and controlling several locomotives as if they were a single entity by sending speed and direction commands to a common consist address that is stored in the decoder of every locomotive in the consist).
- Operations mode programming (programming on the main line).
- Full support for all the various motor speed-step modes, including the 128 speed-step mode.
- Choice of either Precision Glide Control or Silent Drive for motor control.

Many characteristics of the Atlas #345 decoder can be programmed to customize the decoder to its locomotive. Please read *The Configuration Variables and their Definitions* section for details on the configuration variables supported by this decoder. The Atlas #345 decoder supports all forms of programming described in NMRA Recommended Practice 9.2.3, including the user friendly direct CV (Configuration Variable) programming mode and operations mode programming. For example, you can operate the decoder with the factory-default speed curve, or you may specify your own customized speed curve. You can also set which end of the locomotive is to be the forward end. You can even decide whether or not you want to be able to operate the locomotive on conventional DC layouts. If your DCC system supports operations mode programming, you can change the values of all CVs **[except for the**

**locomotive's 2-digit, 4-digit, and consist addresses in CV1, (CV17 and CV18), and CV19; respectively]** while the locomotive is on the main line.

## Lighting Options for the Atlas #345 Decoder

The Atlas #345 DCC decoder has four function outputs: A, B, C, and D. Decoder outputs A and B are designed to control the LEDs used for the front and rear headlights, respectively, in these locomotives. The front and rear headlights can be configured by Bit 0 in CV51 to be either directional or independently controlled. It is also possible to dim, using a DCC function, either directional headlights or independently controlled headlights.

If the headlights are configured for independent control, the front headlight may be configured with the appropriate bits in CV51 to operate as a Gyro light, a Mars light, a single pulse Strobe light, or a dual pulse Strobe light. Similarly, when the headlights are configured for independent control, the rear headlight may be configured with the appropriate bits in CV57 to operate as a Gyro light, a Mars light, a single pulse Strobe light, or a dual pulse Strobe light.

Decoder outputs C and D are designed to control the bi-color LEDs used for the front and rear marker lights in these locomotives. Decoder outputs C and D are auto-reversing so that the bi-color LEDs show green in the direction that the locomotive is traveling and red in the opposite direction. The only control over these marker lights is on or off. By default, function F2 is used to turn these lights on or off. If desired, this default setting can be changed simply by modifying CV54; by writing the proper value into CV54, the marker lights can be switched on or off by any function F1 through F8.

If you are using a Digitrax DCC system where function F2 is momentary, you should remap F2 to another function that is **not** momentary. For example, to program DCC function F3 control the marker lights, set CV54 = 4.

If you are using an NCE Power Pro DCC system, you will need to change the values of two parameters in your command station to get proper operation of the H15/16-44 directional marker lights. The Number of Temp Packets must be changed from 5 to 8, and the Function Repeat Rate must be changed from 0 to 250. Refer to the NCE System Reference Manual for instructions on how to change the values of these parameters.

## Silent Drive or Precision Glide Control

The Atlas #345 DCC decoder provides an option to use either Silent Drive or Precision Glide Control for motor control. Silent Drive is best for

coreless motors and for applications where you want absolutely silent operation. Precision Glide Control provides much more precise slow speed operation because it pulses the motor to ensure the friction of the motor and drive train does not interfere with the operation. The default is Precision Drive Control. The motor control selection is made using CV50.

## Replacing an Atlas #345 DCC Decoder

Although the #345 decoder has many internal safeguards to prevent damage, you must not allow any metal part of the locomotive to touch surface components of the decoder other than the pickup pads on the decoder that connect to the wheel-sets, the headlights, and the motor.

**Any contact to other parts of the decoder can cause a direct internal short circuit and destroy the DCC decoder.**

The #345 decoder is not completely protected against static electricity and has sensitive electronic parts. When installing this decoder in your HO scale locomotive, it is recommended that you wear a grounded anti-static wrist strap. Also be careful in handling the decoder, especially in the area around the top rear part of the decoder (the area where the microprocessor is located).

After replacing a #345 DCC decoder in your H15/16-44 HO scale locomotive, you should first put the DC-only/DC-and-DCC jumper plug into its DC-only position. (See the instruction sheet that came with your locomotive for diagrams illustrating the two positions of this jumper plug.) Test the locomotive (without its body shell) for proper operation on conventional DC power. Replace any worn out parts, such as brushes. Also clean any dirt or oxidation from the wheels and pickups to insure that electrical contact is good. Now is also a good time to lubricate your locomotive. A locomotive that runs well under conventional DC will also run exceptionally well under DCC.

After you have completed installing the decoder in your locomotive and testing it on conventional DC power, move the DC-only/DC-and-DCC jumper plug in its DC-and-DCC position. Place the locomotive (again without its body shell) on your DCC programming track and read back the locomotive's address from the decoder. If the decoder is properly installed, you will be able to read back the factory pre-set address 03. If your DCC system does not support reading decoder properties, observe carefully the decoder's behavior while on the isolated programming track. Each time you try to program the decoder you can see the acknowledgement that is sent by the decoder in the form of a brief and minor jerk of the locomotive. A successful acknowledgement means that you have installed the decoder correctly.

Remove the locomotive from the programming track and, if necessary, correct any installation errors. Once you have successfully programmed the decoder, reinstall the body shell and retest the locomotive on the programming track. If this test is successful, the loco is ready to use.

## Programming the Atlas #345 DCC Decoder

The Atlas #345 DCC decoder supports all forms of both service mode (programming on an isolated programming track) and operations mode programming (programming on the main line). Using any of these programming methods, many features (such as the locomotive's address, acceleration, and configuration) can be customized to the individual locomotive in which the decoder is installed. These customized properties will be saved in non-volatile memory locations on the decoder so that they will retain their values even after power has been removed. All parameter values are set electronically, which means that the locomotive does not need to be opened again after the decoder has been installed to read or modify the values of these so-called Configuration Variables (CVs). The Atlas #345 decoder has a total of 128 CVs. Not all of them are used at this time because many have been reserved for future use.

Any NMRA-compliant DCC Command Station, such as the Atlas Master Commander, can be used to program the Atlas #345 decoder. With several entry-level systems, only CV #1 (the locomotive address) can be set unless you use a separate DCC programmer. More advanced DCC systems, including the Atlas Commander, support the ability to set many more CVs. The Atlas #345 decoder supports all programming modes and can be programmed by all NMRA-compliant DCC systems. ***The locomotive's 2-digit and 4-digit addresses in CV1, CV17, and CV18 CANNOT be programmed in operations mode.*** Instructions for reading and writing CVs are given in the user manual of your DCC system.

**Note: for newly programmed CV values to take effect after service mode programming, the decoder must go through a power reset. If your DCC command station does not support automatic power reset, simply rock the locomotive off the track after programming.**

## Configuration Variables and their Definitions

The Atlas #345 decoder supports a full range of features, which are activated by setting Configuration Variables. All CVs are numbered. These numbers are used during programming and are identical for all decoders that conform to NMRA standards, regardless of the decoder manufacturer. The following table lists the CVs supported in the Atlas #345 decoder. Both CV numbers and Register numbers are provided for cross-reference.

Some CVs (such as CV29) have specific meanings for each bit. To conform to the NMRA convention for bit numbering, the CV bit assignments shown in this table use the bit-numbering scheme of 0 to 7.

**Table 1: Configuration Variables (CVs) for Atlas #345  
DCC Decoder (for HO Scale H15/16-44 Locomotives)**

CV	Reg.	Description	Range	Default Value**
1	1	<b>Short address:</b> This is the number that you enter into your DCC system to tell it which locomotive you wish to run with a short (2-digit) address.	1-99	3
2	2	<b>Start voltage:</b> This is the voltage applied to the motor in speed step 1. Set this value so that the locomotive is barely moving in speed step 1.	0-31	8
3	3	<b>Acceleration Momentum:</b> Determines the rate of change of speed upon acceleration. A higher value leads to a slower acceleration.	1-255	1
4	4	<b>Brake Momentum:</b> Determines the rate of change of speed upon braking. A higher value leads to longer braking distances.	1-255	1
-	5	<b>Contains CV29 (see definition of CV29 below)</b>	0-55	6
-	6	<b>Page Register:</b> Normally this Register is not modified directly by a user. For correct operation, R6 should be set to have the value "1" after any use.	0-127	1
7	7	<b>Version Number:</b> This location stores the version number of the decoder. This CV is read-only.	-	46
8	8	<b>Manufacturers Identification:</b> This value is the manufacturer ID of the decoder, (Atlas=127). <b>Writing the decimal number "33" to this Register will reset all CVs in the decoder to their factory-default values EXCEPT FOR the speed step settings in CV67 to CV94.</b>	-	127
17	-	<b>Long Address, High Byte</b> The long (also called extended) address, if used, is contained in CV17 and CV18.	192-231	0
18	-	<b>Long Address, Low Byte</b>	0-255	0
19	-	<b>Advanced Consist Address</b> The Advanced Consist address, if used, is stored in CV19.	1-99	0

CV	Reg.	Description	Range	Default Value**
29		<p><b>Decoder Configuration, Byte 1:</b></p> <p>Several decoder properties are set with CV29. Changes are easiest if done in binary mode, but can also be done by adding together the decimal values (shown in parenthesis) for all the desired features and writing the total into CV29. (For an example, see the section <i>Converting Binary Values of Individual Bits within a Configuration Variable into the Equivalent Decimal Value of the Entire CV.</i>)</p> <p>The definitions for the individual bits of CV29 are given below.</p>	0-55	6
	Bit 0	<p><b>Locomotive direction:</b></p> <p>This bit sets the direction that the locomotive will move when told to move forward in digital (DCC) mode.</p> <p>0 = locomotive's direction is normal 1 = locomotive's direction is reversed</p>	0,1	0  (1)
	Bit 1	<p><b>Headlight mode:</b></p> <p>0 = Operation with 14 or 27 speed-step systems. This setting must be selected when the locomotive decoder is used with any DCC system that does not support the 28 speed-step mode. If the headlights turn on and off as the speed is increased, the command station is configured for 28 speed-steps, and the decoder is set for 14 speed-steps.</p> <p>1 = Operation with 28, 55 or 128 speed steps. If you use this setting, the Command Station must also be configured to use either the 28 speed-step mode or the 128 speed-step mode; otherwise, the headlights cannot be controlled.</p>	0,1	1  (2)
	Bit 2	<p><b>Usage on conventional DC layouts:</b></p> <p>0 = locomotive operates only in digital (DCC) mode 1 = locomotive can operate in either analog (conventional DC) or digital (DCC) mode</p>	0,1	1  (4)
	Bit 3	Always 0	0	0
	Bit 4	<p><b>Speed curve:</b></p> <p>0 = Factory-default speed curve is used 1 = User-defined speed curve is used. Please enter the appropriate values into CVs 67 to 94 before setting this bit.</p>	0,1	0  (16)
	Bit 5	<p><b>2-digit or 4-digit Addressing:</b></p> <p>0= Short (2-digit) address used 1= Long (4-digit) address used</p>	0,1	0  (32)
	Bit 6	Not used		0
	Bit 7	Both bits always 0		0

CV	Description	Range	Default Value**
<b>50</b>	<b>Decoder Configuration, Byte 2</b>		
Bit 0	Not used		1
Bit 1	Not used		0
Bit 2	<b>Brake momentum on DC operation.</b> Used to achieve prototypical braking at red signal indications if conventional DC control is disabled. (CV29.2 = 0*) 0 = locomotive proceeds with track-voltage-dependent speed inside the conventional DC section. 1 = locomotive brakes in the conventional DC section with preset brake momentum.	0,1	0  (4)
Bit 3	Motor Drive Selection 0 = Precision Glide Control 1 = Silent Drive	0,1	0  (8)
Bits 4-7	Not used		0
<b>51</b>	<b>Lighting Effects for Output A (front headlight)</b>	0-247	6
Bit 0	<b>Directional or Independent Headlights:</b> 0 = Headlights are directional. 1 = Headlights are independent per Rule 17, with F0 controlling front headlight and F1 controlling rear headlight.	0,1	0  (1)
Bit 1	<b>Front Headlight Dimming Control:</b> If CV51.2=1, the value in CV52 is used for front headlight dimming with the dimming controlled as follows: CV51.1=0: Front headlight always dimmed CV51.1=1: If CV51.0=0, function F1 dims front headlight; if CV51.0=1, function F4 dims front headlight.	0,1	1 (2)
Bit 2	<b>Dimming of Front Headlight:</b> 0 = Front headlight cannot be dimmed 1 = Front headlight can be dimmed	0,1	1 (4)
Bit 3	Not used		0
Bit 4	0 = No effect 1 = Front headlight functions as Gyro light	0,1	0 (16)
Bit 5	0 = No effect 1 = Front headlight functions as Mars light	0,1	0 (32)
Bit 6	0 = No effect 1 = Front headlight functions as single pulse Strobe light	0,1	0 (64)
Bit 7	0 = No effect 1 = Front headlight functions as double pulse Strobe light	0,1	0 (128)

CV	Description	Range	Default Value**
51	Notes for CV51: Bits 4 to 7 of CV51 are effective if and only if CV51.0=1. Dimming is inactive if any of bits 4 to 7 are set to "1." If more than one of Bits 4 to 7 of CV51 is set to "1," only the highest numbered of these bits is effective.		
52	<b>Dimming for Output A (front headlight)</b> The value in CV52 is used to dim the front headlight. Using the value "0" for this CV results in a completely dark front headlight, when it is dimmed. Using the value "255" keeps the front headlight at its maximum possible brightness, even when dimmed.	0-255	64
54	<b>Function Mapping for Outputs C and D (front and rear marker lights)</b>	0-255	2
	Bit 0 0 = No effect 1 = Marker lights controlled by F1	0,1	0 (1)
	Bit 1 0 = No effect 1 = Marker lights controlled by F2	0,1	1 (2)
	Bit 2 0 = No effect 1 = Marker lights controlled by F3	0,1	0 (4)
	Bit 3 0 = No effect 1 = Marker lights controlled by F4	0,1	0 (8)
	Bit 4 0 = No effect 1 = Marker lights controlled by F5	0,1	0 (16)
	Bit 5 0 = No effect 1 = Marker lights controlled by F6	0,1	0 (32)
	Bit 6 0 = No effect 1 = Marker lights controlled by F7	0,1	0 (64)
	Bit 7 0 = No effect 1 = Marker lights controlled by F8	0,1	0 (128)
57	<b>Lighting Effects for Output B (rear headlight)</b>	0-246	6
	Bit 0 Not used		0
	Bit 1 <b>Rear Headlight Dimming Control:</b> If CV57.2=1, the value in CV58 is used for front headlight dimming with the dimming controlled as follows: CV57.1=0: Rear headlight always dimmed CV57.1=1: If CV51.0=0, function F1 dims rear headlight; if CV51.0=1, function F4 dims rear headlight.	0,1	1 (2)
	Bit 2 <b>Dimming of Rear Headlight:</b> 0 = Rear headlight cannot be dimmed 1 = Rear headlight can be dimmed	0,1	1 (4)

CV	Description	Range	Default Value**
57	Bit 3 Not used		0
	Bit 4 0 = No effect 1 = Rear headlight functions as Gyro light	0,1	0 (16)
	Bit 5 0 = No effect 1 = Rear headlight functions as Mars light	0,1	0 (32)
	Bit 6 0 = No effect 1 = Rear headlight functions as single pulse Strobe light	0,1	0 (64)
	Bit 7 0 = No effect 1 = Rear headlight functions as double pulse Strobe light	0,1	0 (128)
	Notes for CV57: Bits 4 to 7 of CV57 are effective if and only if CV51.0=1. Dimming is inactive if any of bits 4 to 7 are set to "1." If more than one of Bits 4 to 7 of CV57 is set to "1," only the highest numbered of these bits is effective.		
58	<b>Dimming for Output B (rear headlight)</b> The value in CV58 is used to dim the rear headlight. Using the value "0" for this CV results in a completely dark rear headlight, when it is dimmed. Using the value "255" keeps the rear headlight at its maximum possible brightness, even when dimmed.	0-255	64
67 to 94	<b>Speed Step Values for Customized Speed Curve</b> These CVs are used to specify the speed step values for a customized speed curve. The factory-default values for these CVs are specified in Table 2 in the section <i>Creating a Customized Speed Curve</i> .	0-255	<b>Factory Default Speed Step Values</b>
128	<b>Decoder Software Version</b> – read only		1

\* The notation CVx.y = z means that bit y of CVx has the value "z". For example, CV29.2 = 0 means that bit 2 of CV29 has the value "0."

\*\* In the Default Value field, the numbers shown in parenthesis () are the decimal values that must be written into a CV for the specified bit of that CV to have the binary value "1".

## Converting Binary Values of Individual Bits within a Configuration Variable into the Equivalent Decimal Value of the Entire CV

### *Reasons for Setting and Clearing the Individual Bits of a Configuration Variable*

To make a DCC decoder perform in the manner that you wish, you sometimes need to set or clear individual bits of a CV. To program a DCC decoder using a DCC system that allows only the writing of decimal values into CVs (such as the Atlas Master Commander), it is first necessary to convert the values of all the individual bits of that CV that are to be set to the binary value 1 into their equivalent decimal values. It is then necessary to add together all of these equivalent decimal values.

### *Procedure for Converting Individual CV Bit Values into a Decimal Equivalent Value for the CV*

The following table illustrates how to calculate the decimal value that must be written into a CV to set and/or clear a specified set of individual bits within that CV.

Each bit of a CV that is to be set to the binary value "1" can be represented by the equivalent decimal number shown in the second column of this table. To determine the equivalent decimal value to be written into the CV, first write in column 3 of this table the decimal equivalent values of all the bits of the CV that are to be set to a binary 1. Write nothing in column 3 for each bit of the CV that is to be cleared, i.e., set to a binary 0. Then add up all the numbers that you have written in column 3. The sum that you get is the equivalent decimal value you need to write into the CV.	<b>Bit Number</b>	<b>Decimal Equivalent</b>	<b>Decimal Values for CV Calculation</b>
	0	1	
	1	2	
	2	4	
	3	8	
	4	16	
	5	32	
	6	64	
	7	128	
		<b>SUM:</b>	

**Example: Calculating the Default Value for CV29**

<p>From the definition of CV29 given in Table 1, we see that the default values of bits 1 and 2 are binary 1s; whereas, all other bits in CV29 have a default value of binary 0.</p> <p>To compute the decimal equivalent default value of CV29, simply write in the rightmost column of this table the number "2" for bit 1 and the number "4" for bit 2.</p> <p>Then add up all the non-zero numbers that you have entered into this rightmost column. Since the sum of these numbers is 6, the decimal number to be programmed into CV29 is 6.</p>	Bit Number	Decimal Equivalent	Decimal Values for CV Calculation
	0	1	
	1	2	<b>2</b>
	2	4	<b>4</b>
	3	8	
	4	16	
	5	32	
	6	64	
	7	128	
		<b>SUM:</b>	<b>6</b>

## Creating a Customized Speed Curve

Common reasons for specifying a customized speed curve for a DCC-equipped locomotive are to:

- (1) Insure that dissimilar locomotives have the same performance characteristics
- (2) Have model locomotives perform more prototypically

In this example of creating a customized speed curve, we will assume that the Atlas #345 decoder has been properly installed and tested. We also assume that you are familiar with the general process of programming CVs using your DCC system.

The first step in creating a customized (non-default) speed curve is to assign a value to each internal speed step. This assignment is done by specifying a value for each of the CVs from CV67 to CV94 using a table such as that below, but substituting your desired speed step settings for the default CV values given in the *Internal Speed Step Value* column of this table.

The second step in creating a customized speed curve is to write the value listed in the *Internal Speed Step Value* column into the CV corresponding to that speed step.

The third and final step is to activate your customized speed curve by writing the binary value "1" into bit 4 of CV29 (i.e., CV29.4 =1). Unless this bit in CV29 has been set to a binary 1, the default speed curve that was preset into the decoder at the factory will be used.

**Table 2: Default Speed Step Values for Atlas # 345 DCC Decoder**

Speed Step in 14/27 Step Mode	Speed Step in 28 Step Mode	Internal speed step value (defaults shown)	CV
1	1	4	67
	2	8	68
2	3	12	69
	4	16	70
3	5	20	71
	6	26	72
4	7	32	73
	8	38	74
5	9	44	75
	10	50	76
6	11	58	77
	12	66	78
7	13	74	79
	14	82	80
8	15	90	81
	16	100	82
9	17	110	83
	18	120	84
10	19	130	85
	20	140	86
11	21	152	87
	22	164	88
12	23	174	89
	24	186	90
13	25	200	91
	26	216	92
14	27	234	93
-	28	254	94

To calculate the correct speed-step value for the 128 speed-step mode, the Atlas #345 decoder will internally average the values for 28 speed steps that were specified in (CVs 67 to 94).

## Troubleshooting Decoder Programming Problems

Fault	Cause and Solution
Locomotive does not move when you address it on DCC system.	Check to see if you have selected the correct address for that locomotive.
Locomotive does not move when DCC system is set to the address in CV1, even though this address can be read from CV1.	You have entered the short address (CV1), but the decoder is set to use the long address, i.e., bit 5 of CV29 has been set. Use the long address or else clear bit 5 of CV 29.
Locomotive does not move when DCC system is set to the short address in CV1. The short address can be read from CV1, and DCC functions can be activated when the DCC system is set to the address in CV1.	Check to see if an advanced consist address has been programmed into CV19, i.e., check to see if CV19 has a value greater than 0. If CV19 has a non-zero value, you must either use this advanced consist address to operate the locomotive or program the value 0 into CV19.
DCC functions can be activated when DCC system is set to the locomotive address, but the locomotive does not move.	Decoder is set to use a customized speed curve (CV29.4 = 1), but you entered zero values into CVs 67 to 94. Either clear bit 4 of CV29 or enter suitable non-zero speed step values into CVs 67 to 94.
The locomotive does not appear to be using the customized speed curve values that you have entered into CVs 67 to 94.	Bit 4 is not set to "1" in CV29.
Function 0 (lighting) cannot be switched on and off.	Matching of speed steps is incorrect: The decoder has been set to 28/128 speed steps, but the DCC system has been set to 14/27 speed steps. Either set the DCC system to 28/128 speed steps <b>or</b> change the decoder speed step setting to 14/27 speed steps. (CV29.1 = 0).
Locomotive headlights are only illuminated when the locomotive speed is increased or decreased; the locomotive headlights go on and off as the locomotive speed changes.	Matching of speed steps is incorrect: The decoder has been set to 14/27 speed steps, but the DCC system has been set to 28/128 speed steps. Either set the DCC system to 14/27 speed steps <b>or</b> change the decoder speed step setting to 28/128 speed steps. (CV29.1 = 1).

## Atlas Limited One-Year DCC Decoder Warranty

Please fill out and mail the warranty card, within 30 days of purchase. Atlas Model Railroad Company, Inc. warrants that this decoder will be free from defects in material and workmanship for a period of one year from the date of purchase. (This one-year decoder warranty is in addition to the standard Atlas 90-day locomotive warranty.) If this decoder fails during the warranty period, carefully pack the entire locomotive, with its decoder installed, in the original locomotive carton. Send it (together with a copy of the dated sales receipt and a letter containing your name, address, and a description of the problem) to:

Atlas Model Railroad Company, Attention HO/N Repair, 378 Florence Avenue, Hillside, NJ 07205. Defects due to misuse, improper maintenance and/or abuse are not covered by the warranty. This warranty gives you specific legal rights and you may also have other rights, which vary from state to state.



## For Technical Assistance

[www.atlasrr.com](http://www.atlasrr.com)

[dcc@atlasrr.com](mailto:dcc@atlasrr.com)



This equipment complies with Part 15 of 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.

## Please save this manual for future reference.

Lenz GmbH designed the #345 DCC decoder for Atlas Model Railroad Co., Inc.

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