



# DN163A4

Fits Atlas N-Scale GP30, GP9 and compatible Locomotives

**N Scale**

**Mobile Decoder  
DCC Plug 'N Play  
1.5 Amp/2.0 Amp Peak  
6 FX<sup>3</sup> Functions, 0.5 Amp**

## Features:

- **Digitrax LocoMotion<sup>®</sup> System**-Your locomotives look like the real thing. The Digitrax LocoMotion System makes them run like the real thing, too!
  - Torque Compensation** for smooth as silk silent operation.
  - 128 Speed Step** operation (14 or 28 steps can also be used).
  - Momentum** with acceleration and deceleration.
  - Normal Direction of Travel** is user selectable.
  - Switching Speed** feature for easier and faster access to yard speeds.
  - 3 Step Speed Tables** set start, mid and max voltage for custom control.
  - 28 Step Speed Tables** with 256 level resolution for precise control.
- **Scalable Speed Stabilization (Back EMF)** with simple setup & 256 level resolution.
- **SuperSonic** motor drive for silent operation.
- **FX<sup>3</sup> Functions** for prototypical lighting effects:
  - Constant Brightness Lighting** with directional or independent control.
  - Realistic Effects** like Ditch lights, Mars lights, strobes, and many more.
  - Dynamic and Static Qualifiers** operate functions based on direction, F0 on or off, loco direction and F0, and whether loco is moving.
  - Function Remapping** of 14 functions for custom function setup.
  - Master Light Switch** turns off all lights & functions with one keystroke.
  - Advanced Consist Function Controls**
- **Plug 'N Play** design makes installation quick and easy.
- **Golden-White LEDs** for added realism.
- **Transponder equipped** ready for transponding on your layout.
  - Compatible with digital surround sound systems
- **All Mode Programming with Operations Mode Read Back**-read back CV values right on the mainline.
- **Decoder Factory CV Reset** with or without speed table initialize.
- **Motor Isolation Protection** helps prevent damage to your loco and decoder.
- **Basic, Advanced & UniVersal Consisting**
- **2 Digit and 4 Digit Addressing**
- **DCC Compatible**
- **FCC Part 15, Class B RFI compliant**

## Parts List

1 DN163A4 Decoder

1 Instruction sheet

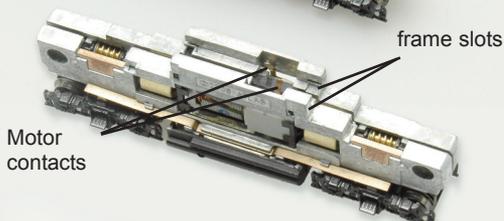
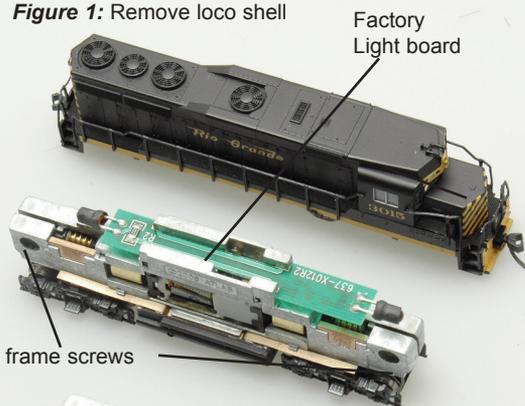
## Installation Information

See the Digitrax Decoder Manual for complete decoder test procedures, installation instructions, programming and technical information. Digitrax manuals and instructions are updated periodically. Please visit [www.digitrax.com](http://www.digitrax.com) for the latest versions, technical updates and additional locomotive-specific installation instructions.

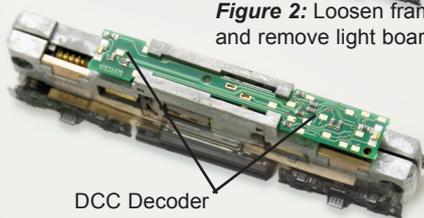
## Installation Instructions - Atlas GP30 Locomotive

1. Carefully remove the locomotive's shell. Note the orientation of the light board inside so that you can install the decoder in the same orientation.
2. Loosen the frame screws enough to allow the removal of the light board. Lift the board out of the frame.
3. Install the decoder, between the frame halves. The narrow part of the decoder fits between the frame with the frame slots holding it at the corners of the decoder cutout. The brass motor contacts should pass through the slots in the matching pads on the bottom of the decoder and be clear of the metal frame. Squeeze the frame halves together to hold the decoder in place.
4. Tighten the frame screws. Replace the trucks if they have fallen out during the installa-

**Figure 1:** Remove loco shell



**Figure 2:** Loosen frame screws and remove light board



**Figure 3:** Place decoder in frame.

tion of the decoder. Place the locomotive on the track, select address 03 on your throttle and apply power. If the motor does not respond but you can control the lights, check the installation for motor short circuits.

5. Replace the locomotive shell. Digitrax decoders are set up with configuration variable (CV) default values so you can run your locomotive right away using address 03. See the Digitrax Decoder Manual for complete instructions on setting up the CVs for customizing your locomotive's performance characteristics.

*Note: The DNI63A4 is a follow on decoder to the DNI63A2 that allows fitting to a wider range of newer Atlas frames and tolerances. The DNI63A4 has maleable solder on the contact pads to ensure good contact with a number of different Atlas frame slot sizes that may be encountered.*

*If frame slot engagement is tight, steady pressure when the frame halves are rejoined will allow the solder to move slightly to allow a snug fit. **Do not apply excessive pressure or non-warranty damage to the frames or decoder may occur.** If you need to file the solder down slightly for a good fit, be sure not to scratch or damage any PCB traces.*

***Be sure to check motor tab clearance to frame after installation.***

### Installation Notes:

1. Do not exceed the decoder's 500mA total function output rating.
2. To use a function output with an inductive (coil) type load, see the Digitrax Decoder Manual for more information to avoid damage to the decoder.
3. See the Digitrax Decoder Manual for full details of wiring 12-16V lamps, 1.5V lamps, and LEDs. Lamps that draw more than 80 mA when running require a 22 ohm 1/4 watt resistor in series with the directional light function lead to protect the decoder.

## Customizing Your Decoder

Your Digitrax decoder is ready to run and will operate using address 03 with no additional programming. For a more prototypical railroading experience, your decoder can be customized for your specific locomotive by programming some of the Configuration Variables, or CVs, available. See the Digitrax Decoder Manual or the Digitrax web site for more information.

## Changing the Decoder Address

The first CV most people change is the decoder address. This allows you to independently control each loco with a unique address. Digitrax decoders are shipped with CV01 (AD2), the two digit address, set to 03. Following is a brief description of how to change the decoder address with a Digitrax DT series throttle. See your Starter Set Manual for complete programming instructions.

1. Place the loco on the programming track. Go into Program Mode on your system.



On DT400/DT402 press **PROG**. On DT300, DT100 & DT200 press **RUN/STOP & FN/F0**.

2. Choose AD2 for 2 digit addressing or AD4 for 4 digit addressing (DT400/DT402 and DT300). (Ad for DT100 & DT200, see set manual for 4 digit instructions).
3. Choose the address you want to set up for the decoder.
4. Complete address programming. On DT400/DT402 press **ENTER**. On DT300, DT100 & DT200 press **SEL**.

**Note:** CV29 must also be programmed to enable 4 digit addressing, this is done automatically by the DT400/DT402 & DT300 but not on earlier throttles.

## **Digitrax LocoMotion® System**

Your locomotives look like the real thing, now you can make them run like the real thing, too. Digitrax decoders incorporate torque compensation for smooth as silk operation. You can also program CVs that control momentum, 3 step and 128 step speed tables, switching speed, normal direction of travel, scaleable speed stabilization and more to take full advantage of the Digitrax LocoMotion® System.

## **Momentum-CV03 & CV04**

Momentum is part of the LocoMotion® System. Acceleration is controlled by CV03 and deceleration by CV04. Both come from the factory set to 000. A range of 000 to 031 is available for both accel and decel. Try CV03:003 and CV04:000 as a starting point for experimenting with momentum.

## **Speed Tables-How the Loco Responds to the Throttle**

With Digitrax LocoMotion®, there are two types of speed tables: 3 Step Tables and High Resolution 28 Step Tables. Please see your Decoder Manual for a

<b>Loco Type</b>	<b>V Start CV02</b>	<b>V Mid CV06</b>	<b>V Max CV05</b>
<b>Switcher</b> Concentrated low speed. Limited top speed	002	038	064
<b>Road Switcher</b> Prototypical top speed w/evenly distributed curve from 0 to top speed	002	048	098
<b>Mainline Loco</b> Quick increase to cruising speed then levels off to prototypical top speed.	002	128	154

discussion of the 28 Step Tables. The 3 Step Tables are set up by programming 3 CVs: Start Voltage (CV02), Mid point Voltage (CV06) and Max Voltage (CV05). These values are set at 000 at the factory. All have a range of values from 000 to 255. We recommend the following CV values as a starting point for experimenting with speed tables.



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## Other LocoMotion® Features: Switching Speed, Normal Direction of Travel & Scaleable Speed Stabilization (Back EMF) Features

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**Switching speed** is controlled by CV54. The factory setting is 000 for OFF. To turn on the switching speed feature, program CV54 to a value of 001. When this feature is on, use F6 to activate and deactivate switching speed. With the feature on the throttle's target speed is effectively reduced by about 50% and the effects of accel and decel programmed into the decoder are reduced by 1/4. This is useful for yard switching operations.

**Normal Direction of Travel** is controlled by CV29. See your decoder manual for additional information on the settings for CV29.

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## SuperSonic Silent Operation and Torque Compensation

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The factory settings in the decoder provide silent, smooth operation of your locomotive under most conditions. For more information about these settings, please see the Digitrax Decoder Manual or our web site

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## Function Outputs on the DN163A4

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The DN163A4 is set up at the factory to control six functions. The unit is prewired with two golden-white LEDs set up for directional lighting. Functions F1 (Green), F2 (Violet), F3 (Brown) and F4 (White/Yellow) can be used by soldering a wire from the pad for the function you wish to use to the lamp (or other function) you wish to control. The wire colors indicated are the standard color code used in the industry (you can use any color you like). These colors are important if you plan to use function remapping.

***CAUTION:** When adding function wires, be very careful that the wires you add do not come into contact with any other pads or components on the board where they might create a short circuit, damage the board and void the warranty.*

All six function outputs can be easily set up with Digitrax FX<sup>3</sup> lighting effects or as standard on/off functions with the following operational qualifiers:

1. Forward or Reverse direction of travel, or
2. Whether F0 is on or off, or
3. Both direction of travel and whether F0 is on or off, or
4. Whether the locomotive is stopped or moving.

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## Function Remapping

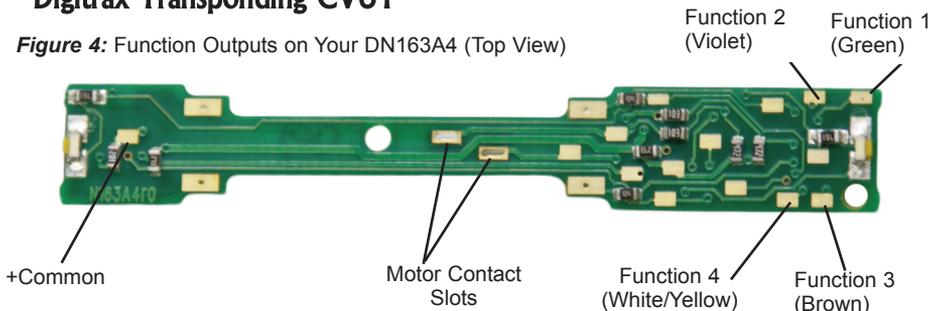
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Function remapping allows you to program the function outputs of your

decoder to be controlled by selected function keys on your throttle. Please consult the Digitrax Decoder Manual or website for information on function remapping.

## Digitrax Transponding CV61

Figure 4: Function Outputs on Your DN163A4 (Top View)



**Digitrax Transponding** is controlled by CV61. The initial factory set value is 000 **Note** If you are using this manual as a reference for your existing or older DN163A2 and this diagram's pinouts do not match your device, please go to the Digitrax website ([digitrax.com](http://digitrax.com)) and use the 'Version 1' manual for the DN163A2 that is archived there.

To

turn on transponding, program CV61 to a value of 002. This allows you to use Digitrax transponding to keep track of your rolling stock. When transponding is enabled, the front light of the locomotive will flicker slightly to indicate transponding signal is being communicated. For optimal transponding operation, we recommend that you hook up the forward and rear lights as shown above.

## Decoder Reset CV08

**Decoder reset** lets you reset all CV values to the initial factory settings. To reset all CV values, program CV08 to a value of 008. You also have the option of resetting all values except the 28 speed step tables. To do this, program CV08 to a value of 009.

## Warranty & Repair

Digitrax gives a one year *"No Worries" Warranty* against manufacturing defects and accidental customer damage on all Digitrax products.

**That's it! A simple, straightforward warranty with no tricky language!**

Visit [www.digitrax.com](http://www.digitrax.com) for complete warranty details and instructions for returning items for repair.

**Damaged decoders should be returned directly to Digitrax for repair.**



2443 Transmitter Rd  
Panama City, FL USA 32404  
www.digitrax.com

T 850-872-9890  
F 850-872-9557

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**Caution:** To prevent damage to your decoder and locomotive, track voltage used during operation must not exceed the operating parameters of the locomotive and its lighting system in which the decoder is installed (typically this is 12V DC). For most N scale layouts, Digitrax recommends using 14 volts DCC or less for operation to avoid damage to the locomotive shell, lamps and decoder.

*Digitrax, Inc. is not responsible for unintentional errors or omissions in this document.*



# DN163A4

Plug and Play Decoder for Atlas N-Scale GP30 Locomotives

## Go Beyond DCC With



### Complete Train Control

### Main Station

Starter Sets  
LocoNet®  
Power Supplies



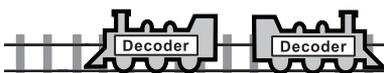
Your Digitrax LocoNet® Starter Set is just the beginning of an exciting trip! Pick the one that's right for you!



**LocoNet®**  
The Digitrax Difference

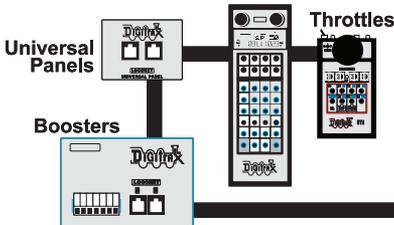
### Locomotive Shops

Mobile Decoders  
Function Decoders  
SoundFX™ Decoders



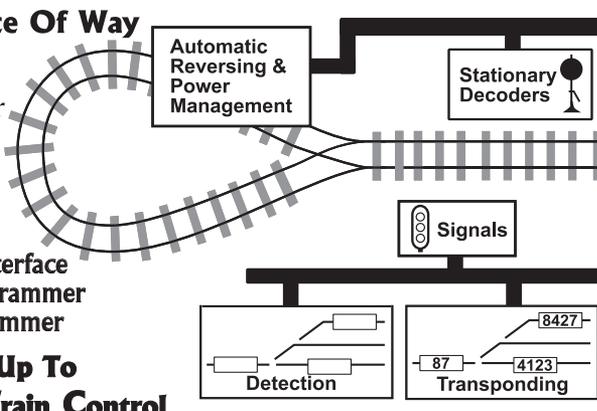
### More Fun For Everyone

Add More Boosters, Advanced & Simple Throttles, Power Supplies, Universal Panels, IR and/or Radio for more trains and operators.



### Maintenance Of Way

Make your layout more fun & simpler to operate!



### Computer Controls

Computer Interface  
Decoder Programmer  
Sound Programmer

### It All Adds Up To Complete Train Control



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Panama City, FL 32404  
www.digitrax.com  
T 850-872-9890  
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