



DH165A0

Fits Athearn, Genesis, Kato,
Stewart, Atlas & Other
HO Locomotives

HO Scale

Mobile Decoder
Circuit Board Replacement
SFX SoundBug™ compatible
1.25 Amp/2 Amp Peak
6 FX³ Functions, 0.5 Amp

Features:

- **Accepts Plug-in SFX SoundBug™ sound modules**
- **Regulated Headlights:** convenient no-resistor install of LEDs and lamps.
- **Digitrax LocoMotion® 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** with simple setup & 1024 level resolution.
- **SuperSonic** motor drive for silent operation.
- **FX³ Functions** for prototypical lighting effects:
 - Constant Brightness Lighting** 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** for custom function setup.
 - Master Light Switch** turns off all lights & functions with one keystroke.
- **Advanced Consist Function Controls**
- **Circuit Board Replacement** design makes installation quick and easy.
- **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 Detection** prevents damage to your decoder.
- **Basic, Advanced & UniVersal Consisting**
- **2 Digit and 4 Digit Addressing**

Parts List

1 DH165A0 Decoder

1 Instruction sheet

Installation Information

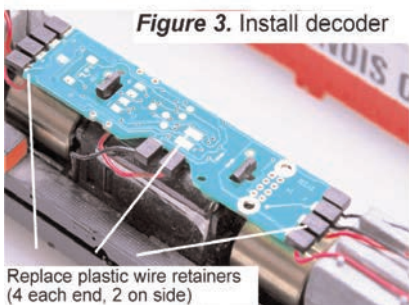
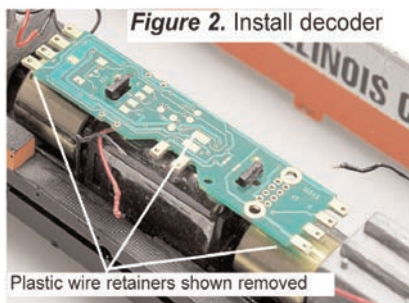
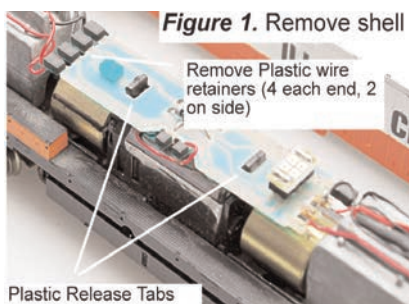
See the Digitrax Decoder Manual for complete decoder test procedures, installation instructions, programming and technical information. Digitrax manuals and instructions are updated periodically. Please visit www.digitrax.com for the latest versions, technical updates and additional locomotive-specific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

Installation Instructions - Atlas U33 Locomotive

1. Carefully remove the locomotive's shell from the frame. Notice the orientation of the circuit board inside so that you can install the decoder in the same orientation. (*Figure 1*)
2. Remove the 10 black plastic plug from the lightboard that secure the wires to the PCB. There are 4 plugs (retainers) on each end and 2 on the side for the motor connection. Remove the red and black wires, **carefully noting** where each wire originally connected to the PCB. Remove the lightboard itself by pinching the black plastic release tabs and pulling the board up and off of the loco frame. (*Figure 1*)
3. The DH165A0 decoder is installed in the same orientation as the factory board. Push the decoder over the plastic release tabs to hold it in place on the frame. Reconnect the wires to the decoder in the same configuration as the factory board using the black plug/wire retainers. (*Figures 2 and 3*)

Decoder Board Installation

4. You are now ready to run your locomotive. The DH165A0 is factory programmed to address 03. you can easily customize the address and other features. See the following sections and the Digitrax Decoder Manual for more information.





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.
4. Some locomotives employ filter capacitors for RFI suppression in the locomotive wiring. These may cause problems with Supersonic decoders and non-decoder analog operation on DCC. This capacitor should be removed for safe operation.

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 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.

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



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

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.

Scaleable Speed Stabilization intensity, or droop, is controlled by CV57. The factory setting for this feature is 006 which is suitable for most locos. You can adjust this value in the range of 000 for OFF to 015 for the maximum effect. Consult your Digitrax Decoder Manual for info about CVs 55 & 56 and their effects on scaleable speed stabilization.

SuperSonic Silent Operation and Torque Compensation

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.

Digitrax Transponding CV61

Digitrax Transponding is controlled by CV61. The initial factory set value is 000 for OFF. 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 using the standard installation instructions.

Decoder Reset CV08

Decoder reset lets you reset all CV values to the factory default 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.

Functions on the DH165A0

The DH165A0 is set up at the factory to control six function outputs.

The DH165A0 is configured to control the forward-headlight F0F/white lead and reverse-headlight F0R/yellow lead for directional lighting. These two headlight function leads are current regulated for LEDs or lamps, with factory setting of approx 15mA, with no resistors required. Cut the ADJ link to increase headlight current to approx 30mA- see fig 4.

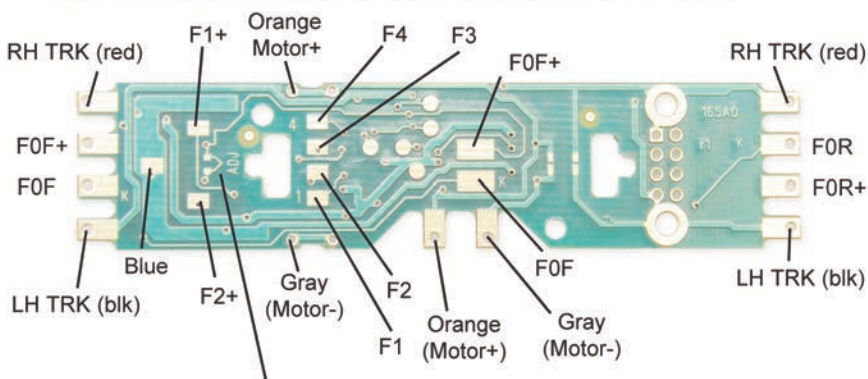
Functions F1 (Green), F2 (Violet), F3 (Brown) and F4 (White/Yellow) are full track voltage and can be used by soldering a wire from the pad for the function you wish to use to the lamp (or other function) you wish to control. The wire colors indicated are the standard color code used in the industry (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.

All six function outputs can be easily set up with Digitrax FX3 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.

Figure 4. DH165A0 Decoder Function Outputs (front of loco to the left)



Lighting ADJ option: Cut this '>' pathway for 30 milliamp applications such as large lamps, etc. Leaving the '>' intact provides 15 milliamp outputs for LEDs and smaller lamps (on F0F/F0R only). Other functions may require resistors!



2443 Transmitter RD
Panama City, FL 32404
www.digitrax.com

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

Function Mapping

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 web site for information on function remapping.

Master Light Switch

Each of the six function outputs can be programmed to turn on and off with the F0 ON/OFF key on your throttle, creating a Master Light Switch. The CV values for creating this effect are listed in the Digitrax Decoder Manual which is available at our website.

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 for complete warranty details and instructions for returning items for repair.

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DH165A0

Fits Athearn Genesis, Kato, Stewart, Atlas & Other Locomotives

Go Beyond DCC With **Digitrax** Complete Train Control

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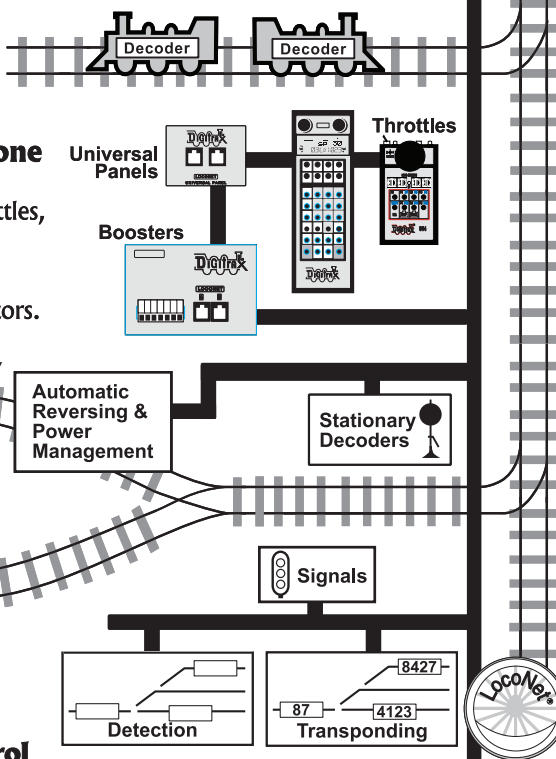
Computer Interface
Decoder Programmer
Sound Programmer

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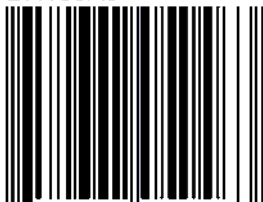
Your Digitrax LocoNet® Starter Set is just the beginning of an exciting trip! Pick the one that's right for you!



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2443 Transmitter Road
Panama City, FL 32404

www.digitrax.com
T 850-872-9890
F 850-872-9557

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