Digitrax

Complete Train Control
Run Your Trains, Not Your Track!

DN135D

Wire-in decoder fits Many N and HO Locomotives

N / HO Scale

Mobile Decoder
Digitrax Easy Connect 8-pin Harness
1.0 Amp/1.25 Amp Peak
3 FX³ Functions, 0.5 Amp

Features:

- **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.

- **Scaleable Speed Stabilization (Back EMF)** with simple setup & 256 level resolution.

- **SuperSonic** motor drive for silent operation.

- **FX³** Function outputs for prototypical lighting effects and on/off control:

  Constant Brightness Lighting with directional or independent control.

  Realistic Effects like Ditch lights, Mars lights, strobes, and many more.

  FX³ & Standard Function Qualifiers operate functions based on direction, F0 on or off, 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

- **Plug 'N Play compact** design makes installation quick and easy in many smaller locomotives. Narrow enough to fit N-scale narrow diesel units!

- **Plug and Harness arrangement** for economic decoder-sharing options.

- **Transponder equipped** ready for transponding on your layout. Compatible with digital surround sound systems

- **All Mode Programming with Operations Mode Read Back** reads back CV values right on the mainline.

- **Decoder Reset CV** with or without speed table reset.

- **Motor Isolation Protection** helps prevent damage to your decoder.

- **Basic, Advanced & UniVersal Consisting**

- **2 Digit and 4 Digit Addressing**

- **FCC Part 15, Class B RFI compliant**

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Parts List

1 DN135D Decoder   1 Instruction sheet
1 DNWH Digitrax Easy Connect 8-pin Harness

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

1. Carefully remove the locomotive's shell from the frame. Notice the orientation of the shell to the frame so that you can reinstall it correctly.

2. The DN135D uses the DNWH Digitrax Easy Connect 8-pin Harness System which consists of an approximately 4.5" harness that has a Digitrax 8-pin plug on one end and wires on the other. The harness allows the decoder to be easily installed in a variety of locomotives. The ends of the wires of the harness are wired to the motor connections, power pickup connections and the lights as shown in **Figure 1** below.

3. Plug the 8-pin plug on the DNWH harness into the socket on the decoder. The plug is notched to fit easily into the socket in only one orientation.

4. Replace the loco shell. You are now ready to run your locomotive. The DN135D is factory programmed to address 03. You can easily customize the address and other features. See section "Customizing Your Decoder" that follows.

Figure 1. DN135D Wiring Diagram
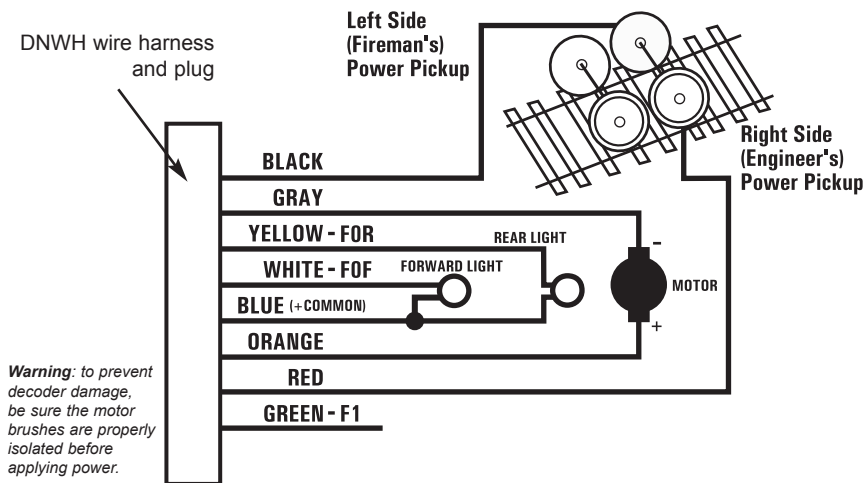
Installation Notes:

1. Do not exceed the decoder's 500mA total function output rating.

2. We recommend that the Blue wire, also called +Common or Lamp Common, be connected as shown. If you wish to omit the Blue wire in your installation, consult the Digitrax Decoder Manual for more information.

3. The head lamp should be hooked up using the Blue/+Common wire for optimal Digitrax transponding operation.

4. 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.

5. 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.

6. 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 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.

Function Outputs on the DN135D

The DN135D is set up at the factory to control three function outputs. The DN135D is configured to control the forward and reverse lights on the locomotive through the white lead and yellow lead using Function 0 (F0F-forward and F0R-reverse) for directional lighting. Function F1(Green) is part of the harness for easy hookup.

All three function outputs can be easily set up with Digitrax FX^3 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.

Function Remapping

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.

Master Light Switch

Each of the three 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 in the section: *Setting up FX & FX^3 Effects On Function Outputs*.

Digitrax Easy Connect 8-Pin Harness System

Your DN135D comes with the Digitrax Easy Connect system– a socket on the decoder board and a wire harness to connect to your locomotive as shown in Figure 2 below.

Figure 2. DN135D Decoder and wire harness

Digitrax DNWH Easy Connect 8-pin wire harness with plug

DN135D decoder with 8-pin socket
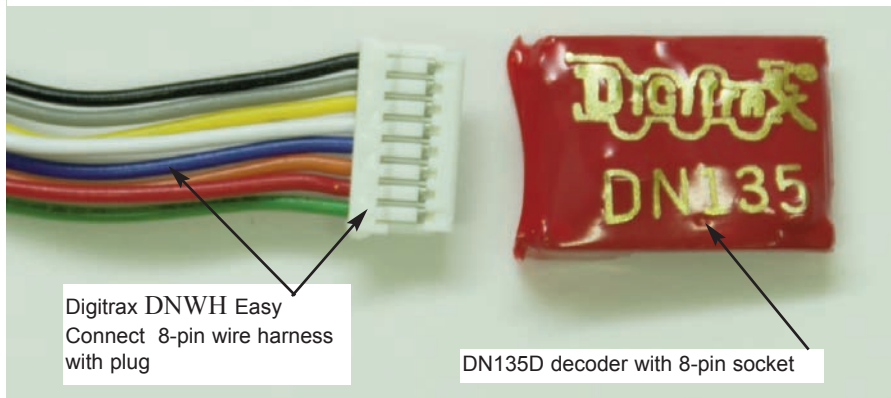
The DHWH harness which is included with your decoder has bare wires on one end that will be wired to the locomotive and a 8-pin plug on the other end that plugs into the decoder.

Once you have installed the harness in your locomotive, it's easy to unplug the decoder from the loco. This is useful if you have many locos to equip and a limited budget. It also makes it easy to unplug a decoder and try a different one if you suspect a problem. And, if you need to return the decoder for service, you won't have to remove the wiring from the loco, just unplug and send in the decoder.

Simply install DNWH harnesses in your locomotives and share decoders among your locomotives. To run your harness equipped locos on DC, just add a shorting plug, DHDP. The wire harnesses and shorting plugs are sold separately by your dealer. Clubs often use this approach so that their members who don't run DCC at home can still enjoy it at the club.

Your decoder can also be used with one of the other Digitrax Easy Connect Harnesses. This is available in short (DNWHPS) wire length versions with the Digitrax plug on one end and a DCC medium plug on the other end.

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.

Damaged decoders should be returned directly to Digitrax for repair.

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

DN135D

Can be wired into many N and HO Locomotives

Go Beyond DCC With Digitrax®

Complete **T**rain **C**ontrol

Main Station

Starter Sets
LocoNet®
Power Supplies

DUPLEX EQUIPPED
Available

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

Super **Chier xtra**™

Super **EMPIRE BUILDER xtra**™

Zephyr™

LocoNet®
The Digitrax Difference

Locomotive Shops

Mobile Decoders
Function Decoders
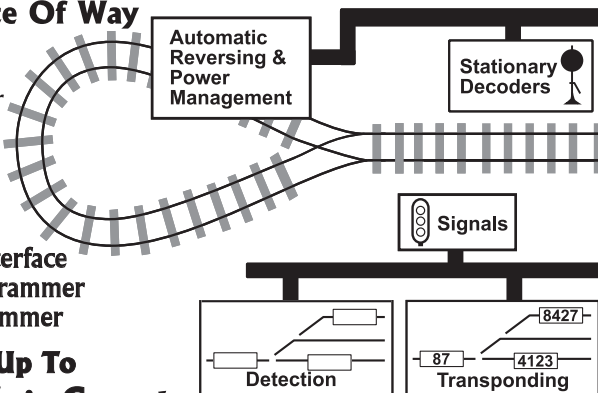SoundFX™ Decoders

Decoder   Decoder

More Fun For Everyone

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

Universal Panels

Boosters

Throttles
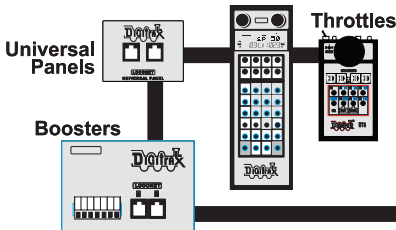
Maintenance Of Way

Make your layout more fun & simpler to operate!

Automatic Reversing & Power Management

Stationary Decoders

Computer Controls

Computer Interface
Decoder Programmer
Sound Programmer

Signals

It All Adds Up To Complete Train Control

Detection   Transponding

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87   4123

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