DH163PS

**Fits Many DCC-Ready
HO Locomotives**

HO Scale

**Mobile Decoder
DCC Plug 'N Play with 1.25" Harness
1.5 Amp/2 Amp Peak
6 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 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.

- **Transponder equipped** ready for transponding on your layout.

- **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** prevents damage to your decoder.

- **Basic, Advanced & UniVersal Consisting**

- **2 Digit and 4 Digit Addressing**

- **DCC Compatible**

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

Parts List

1 DH163PS Decoder   1 Instruction sheet
1 DHWHP Digitrax Easy Connect 3.5" 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 shell (Fig. 1). Note the orientation to the frame for correct reinstallation.

2. Remove the jumper plug/s from the locomotive's DCC-ready socket. *Figure 2* The jumper plug/s allow the loco to operate on a standard DC track or in analog mode on a DCC track.

Figure 1. Remove loco shell

3. Insert the DCC plug end of the harness into the socket. The pin with the orange wire plugs into the hole marked 1. *Figure 3* Seat the decoder firmly in the socket.

Jumper plug

Figure 2. Carefully remove jumper plug(s)

4. Plug the Digitrax 9 pin connector end of the harness into the DH163PS.Decoder. The plug is notched for proper orientation of plug and socket.

5. Outputs for F1(Green) and F2 (Violet) can be wired to additional functions if desired.

6 Replace the loco shell on the frame. The loco is now ready to run on your DCC system using the factory set address 03. See next page for customizing some of the functions of the DH163PS decoder.
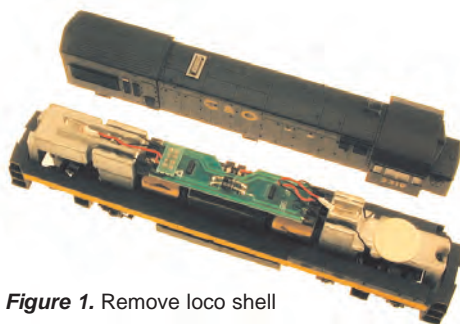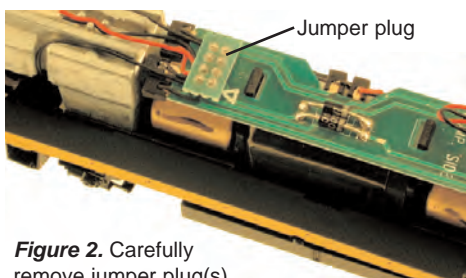

DCC Medium Plug
F1 (Green)
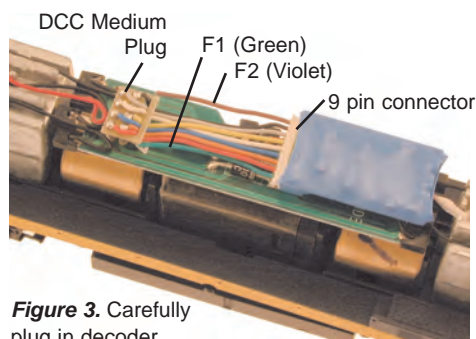F2 (Violet)
9 pin connector

Figure 3. Carefully plug in decoder

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

2. Choose AD2 for 2 digit addressing or AD4 for 4 digit addressing (DT300 & DT400). (Ad for DT100 & DT200, see your Starter Set manual for 4 digit instructions).

3. Use your throttle to choose the address you want to set up for the decoder.

4. Complete address programming. On DT400 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 DT300 & DT400 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/x00. A range of 000/x00 to 031/x1F is available for both accel and decel. We recommend that you try CV03:003/x03 and CV04:000/x00 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 Digitrax 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/x00 at the factory. All have a range of values from 000/x00 to 255/xFF. 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/x02	038/x26	064/x50
Road Switcher Prototypical top speed w/evenly distributed curve from 0 to top speed	002/x02	048/x30	098/x62
Mainline Loco Quick increase to cruising speed then levels off to prototypical top speed.	002/x02	128/x80	154/x9A

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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/x00 for OFF. To turn on the switching speed feature, program CV54 to a value of 001/x01. When this feature is on, use F6 to activate and deactivate switching speed. When switching speed is ON and F6 is ON, the switching speed feature is on. 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 (Back EMF) intensity, or droop, is controlled by CV57. The factory setting for this feature is 006/x06 which is suitable for most locos. You can adjust this value in the range of 000/x00 for OFF to 015/x0F for the maximum effect. Consult your Digitrax Decoder Manual for info about CVs 55 & 56 and their effects on scaleable speed stabilization. The factory setting for both CV55 & CV56 is 000/x000.

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 website.

Digitrax Transponding CV61

Digitrax Transponding is controlled by CV61. The initial factory set value is 000/x00 for OFF. To turn on transponding, program CV61 to a value of 002/x02. 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/x08. 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/x09.

Function Outputs on the DH163PS

The DH163PS is set up at the factory to control six function outputs. The DH163PS is configured to control the lights on the factory light board through the DCC medium plug using Function 0 (FOF-forward and FOR-reverse) for directional lighting. Functions F1(Green) and F2 (Violet) are part of the harness for easy hookup.

F3 and F4 are also available on the decoder board. These can be accessed by snipping the shrink wrap and peeling it back to expose the solder pads that control these functions (Figure 2). To use these functions, solder a wire from the pad for the function you wish to use to the lamp (or other function) you wish to control. The Blue/+Common pad works the same way as the blue wire on the harness and is provided here for convenience. 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 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.

Figure 2. DH163PS Decoder Function Outputs

Function 3 (Brown)
Blue/+Common
Function 4 (White/Yellow)

Digitrax Easy Connect 9 pin socket (to wire harness)

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.

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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 in the section: *Setting FX & FX³ Effects of Function Outputs.*

Digitrax Easy Connect Harness System

Your DH163PS comes with the Digitrax Easy Connect system–a socket on the decoder board and a 1.25" wire harness to connect to your locomotive. The DHWHPS harness has a DCC medium plug on one end that plugs into a DCC ready locomotive and a Digitrax 9 pin plug on the other end that plugs into the decoder. The Digitrax 9 pin connector has been adopted by other companies in the DCC industry, too.

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 send in the decoder.

Simply install harnesses in your locos and share decoders among your locos. 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. These are available in a 3.5" long (DHWHPS) wire length version with the Digitrax plug on one end and a DCC medium plug on the other end; the DHWH with the Digitrax plug on one end and wires on the other end for installation in other locomotives; and the DHAT with the Digitrax plug on one end and simple no-solder connections to Athearn standard locomotives on the other end.

Warranty & Repair

All warranties on Digitrax products are limited to refund of purchase price, repair or replacement at Digitrax's sole discretion. Except as expressly stated in the full warranty statement, there are no warranties, express or implied, including but not limited to any warranties of merchantability or fitness for a particular purpose. For complete warranty details see www.digitrax.com.

Damaged decoders should be returned directly to Digitrax for repair.

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DH163PS

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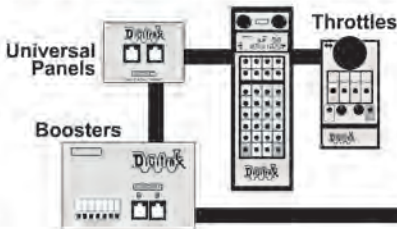ZEPHYR™

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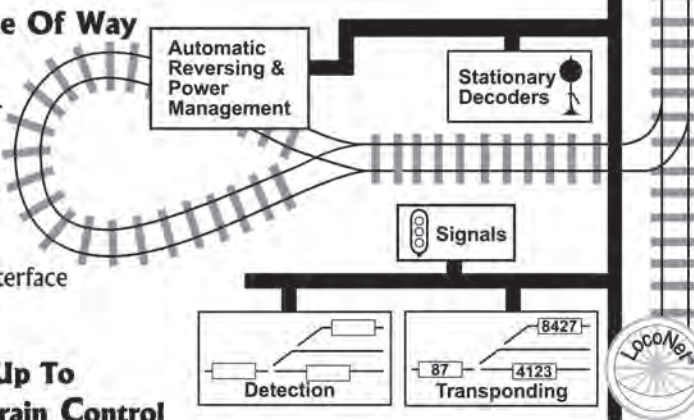SoundFX™ Decoders

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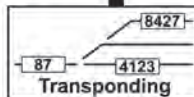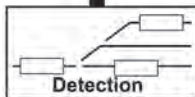Throttles
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