



Digitrax Command Control
Run Your Trains, Not Your Track!

DH165K1A

HO Scale

Board Replacement Decoder Fits
Kato SD40-2, AC4400 Locos

Mobile Decoder
Plug 'N Play
SFX SoundBug™ compatible
1.25 Amp/2 Amp Peak
6 FX3 Functions, 0.5 Amp

Features:

- **Accepts Plug-in SFX SoundBug™ sound modules**
- **Onboard White LEDs for Headlights and Ditch lights.**
- **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**
- **Plug 'N Play** 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**
- **DCC Compatible**

Parts List

1 DH165K1A 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 - Kato HO Scale EMD SD-40

1. Carefully remove the locomotive's shell from the frame. Note the orientation for proper reinstallation. (**Figure 1**)
2. Remove the four track power pick-up wires clipped to the lightboard at mid point (**Figure 1**)

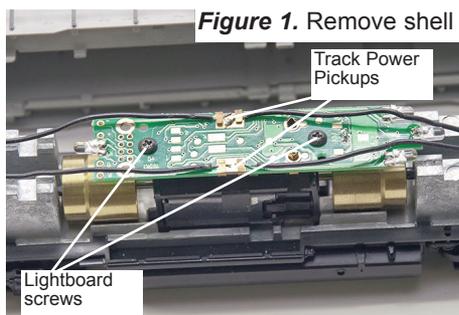


Figure 1. Remove shell

3. Unscrew the two screws securing the lightboard and lift it from the frame. (**Figure 2**)

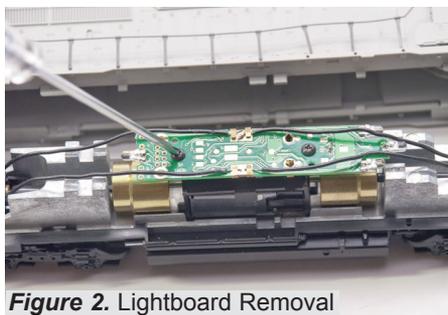


Figure 2. Lightboard Removal

4. Remove the lightboard by pulling it gently straight up, off the motor clips. (**Figure 3**)

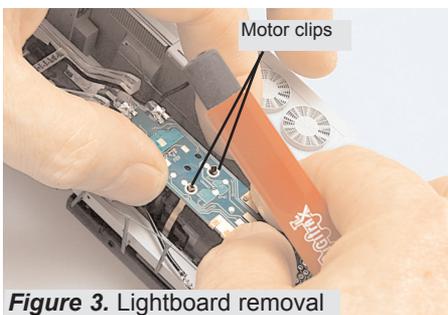


Figure 3. Lightboard removal

5. Decoder installation is the reverse

of what we've done so far. Snap the decoder into place over the motor clips. Be sure motor clips are spread enough to engage snugly in to decoder holes. Secure the decoder with screws. **(Figure 4)** Re-attach Track Power Pickup wires **(Figure 5)** and check Light Pipe alignment **(Figure 6)**.

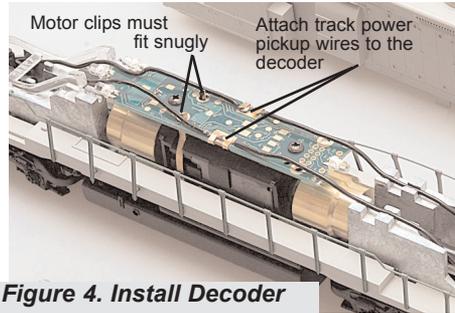


Figure 4. Install Decoder

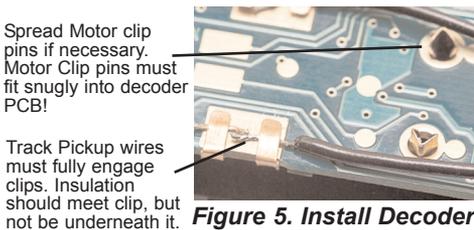


Figure 5. Install Decoder



Figure 6. Install Decoder

5. Replace the locomotive shell.
6. Digitrax decoders are set up with configuration variable (CV) factory settings so you can run your locomotive using address 03. This installation will allow the loco to run short hood forward. To setup ditch lights to operate on F2/Horn key, program CV51=106 and CV52=107

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.

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

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.



Other LocoMotion™ Features: Switching Speed, Normal Direction of Travel & Scaleable Speed Stabilization 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.

SuperSonic™ and Torque Compensation

The factory settings in the decoder provide quiet, 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.

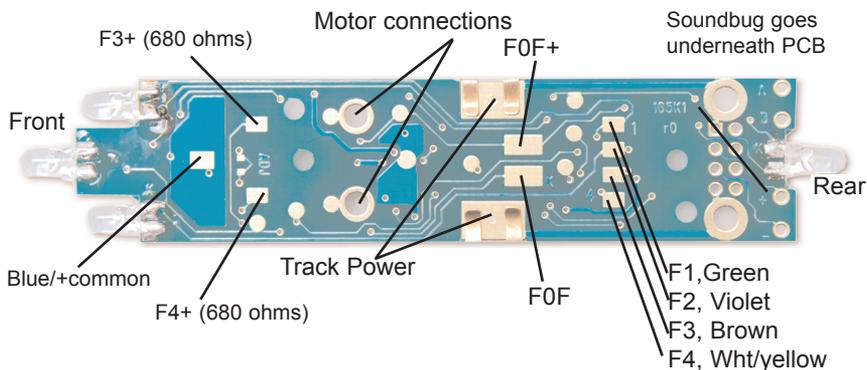
Decoder Reset CV08

Decoder reset lets you reset all CV values to the 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.

Functions on the DH165K1A

The DH165K1 is set up at the factory to control six function outputs, with white factory LEDs on the; F0F-forward/white lead, F0R-reverse/Yellow lead (for directional lighting), F1/Green lead and F2/Violet leads (for Ditch lights).

Figure 5. DH165K1A Decoder Function Outputs (front of loco to the right)



Functions 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.

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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Panama City, FL USA 32404
www.digitrax.com

SUPPORT: techsupport@digitrax.com
REPAIR: repair@digitrax.com

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.



DH165K1A

Board Replacement Decoder Fits Kato SD40-2, AC4400 H0 Scale 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

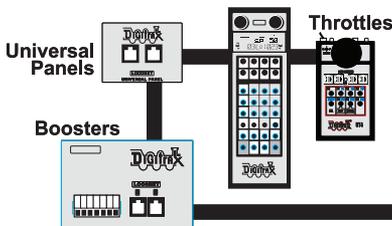
Locomotive Shops

Mobile Decoders
Function Decoders
SoundFX™ Decoders



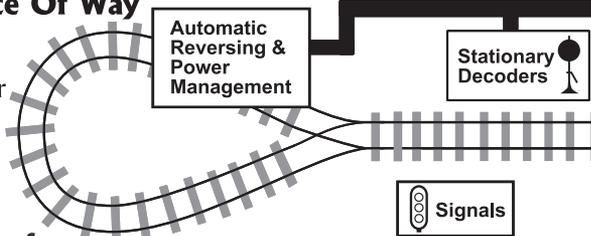
More Fun For Everyone

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



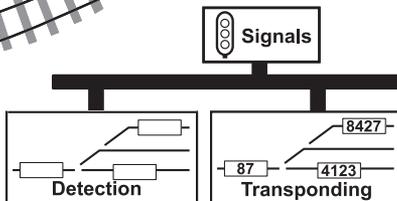
Maintenance Of Way

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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