DN163K0D

**Fits Kato EMD F40PH
and Other Locomotives**

N Scale
Mobile Decoder
DCC Plug 'N Play
1.0 Amp/2.0 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.

- **Scalable Speed Stabilization (BackEMF)** with simple setup & 256 level resolution.

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

- **FX³** 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.

- **SMT 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**

Complete Train Control
Run Your Trains, Not Your Track!

Parts List

1 DN163K0D Decoder   1 Instruction sheet

Installation Information

See the Digitrax Decoder Manual for complete decoder test procedures, instal-
lation 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 N-Scale F40PH Locomotive

1. Carefully remove the locomotive's shell from the frame.

2. Carefully remove the plastic plug that retains the brass motor clips and bend the brass motor clips up and away from the circuit board.

Plastic Plug   Brass motor clips

Figure 1: Remove loco shell, remove plastic plug, bend brass motor clips up, slide board forward, remove board

3. Slide the circuit board forward to release it from the clip on the locomotive frame and lift the board off the frame.

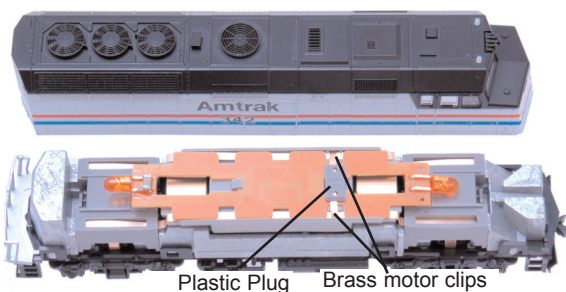4. Gently lift up (about 3 or 4 mm) the brass pickup rail from one side of the locomotive, being careful not to bend it. Wrap a small piece of yellow Kapton tape (supplied with the Digitrax decoder) around the rail just to the front of the dimple (between the dotted lines in photo, right). The tape should wrap around the outside edge to ensure the brass motor clip is completely isolated from the brass pickup rail when it is reinstalled. Trim excess tape on the INSIDE edge of the brass pickup rail and reinstall it in the locomotive, lining it up over the position pin. Repeat the process for the other brass pick up rail. (*Figure 2*)

![Digitrax logo]

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

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

5. Install the decoder between the motor clips. Press down and slide the board back to lock the board under the plastic retainer clip in the frame.

6. **Make sure the Kapton tape wraps completely around the brass pick up rails.** Bend the motor clips down over the pads on the decoder Reinstall the plastic plug to hold the motor clips tightly against the pads of the circuit board and the circuit board in place. If the plug is not secure, the motor will not function properly. **The final step in the installation process is to add a piece of Kapton tape extending from one side of the loco frame, up and across the decoder to the other side of the frame, thereby insuring the decoder remains securely in position** (see Fig 3 below)

Yellow Kapton tape installed here

Retainer Clip
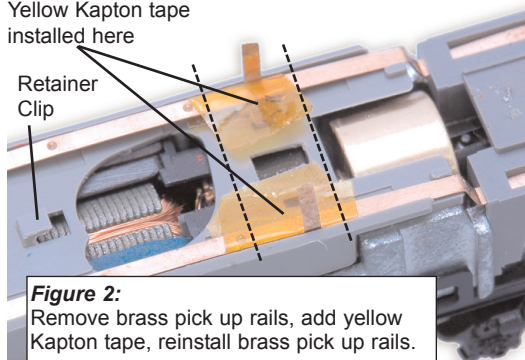
Figure 2:
Remove brass pick up rails, add yellow Kapton tape, reinstall brass pick up rails.

7. Place the locomotive on the track, select address 03 on your throttle and

Rear LED

Kapton tape installed as a final step, securing the decoder

Plastic plug

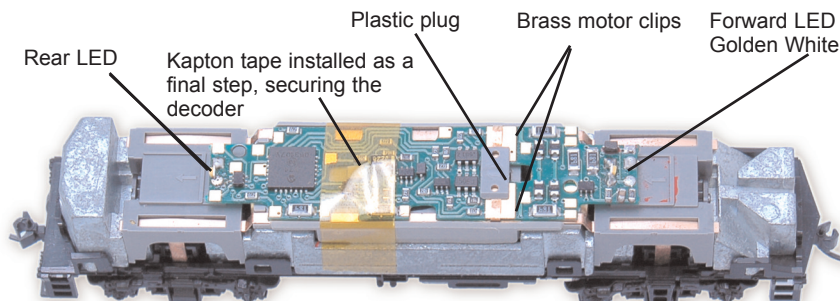Brass motor clips

Forward LED Golden White

Figure 3: Install the decoder, bend brass motor clips over decoder, reinstall plastic plug to hold decoder in place.

apply power. If the motor does not respond but you can control the lights, check the installation for motor short circuits. For this installation again, be sure the kapton tape is preventing contact between the brass pick up rails and the brass motor clips.

8. Replace the locomotive shell.

9. 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.

The rest of this page was left intentionally blank.

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 so that the loco can be independently controlled with it's own unique address. All Digitrax decoders are shipped with CV01 (AD2), the two digit address, set to 03. See your Starter Set Manual for complete programming instructions. Following is a brief description of how to change the decoder address with a DT series throttles.

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 set manual for 4 digit instructions).

3. 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.

Figure 5: Connecting More Functions to Your DN163K0D
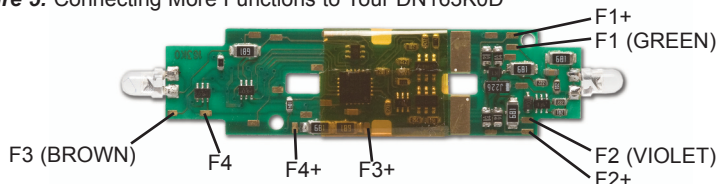
Momentum-CV03 & CV04

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. We recommend that you try CV03:003 and CV04:000 as a starting point for experimenting with momentum.

Speed Tables-How the Loco Responds to the Throttle

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

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

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.

Switching Speed, Normal Direction of Travel & Scaleable Speed Stabilization (Back EMF) Features

Switching speed is controlled by CV54. The default value is 000 for OFF. To turn on switching speed, program CV54 to a value of 001. This allows you to use F6 to activate/deactivate switching yard speed.

Normal Direction of Travel is controlled by CV29.

The intensity of **Scaleable Speed Stabilization (Back EMF)** is controlled by CV57. The default value 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 Decoder Manual for info about CVs 55 & 56 and their effects on scaleable speed stabilization.

Function Outputs on the DN163K0D

The DN163K0D is set up at the factory to control six functions. The unit is prewired with one golden-white LED set up as Function 0 (F0F-forward and F0R-reverse) for directional lighting shown in *Figure 5* as F0F/F0F+ for the

front light. The front light will go off when the locomotive is running in reverse. Functions F1, F2, F3 and F4 are available on the decoder and can be used by soldering wires from the pads indicated to the lights (or other functions) you wish to control. All six functions can be easily set up with Digitrax FX^3 functions. 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.

The DN163K0D decoder for the Kato EMD F40PH locomotives is set up with a factory-installed white LED for forward and rear lighting. The LEDs and other lights you add can easily be set up using the decoder's CVs to create many different Digitrax FX^3 prototypical lighting effects.

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 Section 6.12 or website for information on function remapping.

Digitrax Transponding CV61

Digitrax Transponding is controlled by CV61. The default 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.

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.

Warranty & Repair

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

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.

Go Beyond DCC With Digitrax® **C**omplete **T**rain **C**ontrol
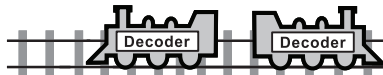
Main Station

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 **Chief** *xtra*™

Super **EMPIRE BUILDER** *xtra*™

Zephyr *xtra*™

LocoNet®
The Digitrax Difference
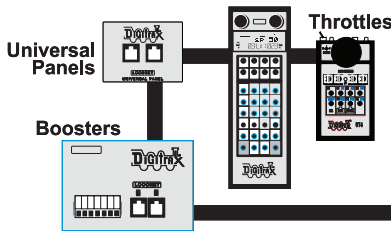
Decoder   Decoder

Locomotive Shops

Mobile Decoders
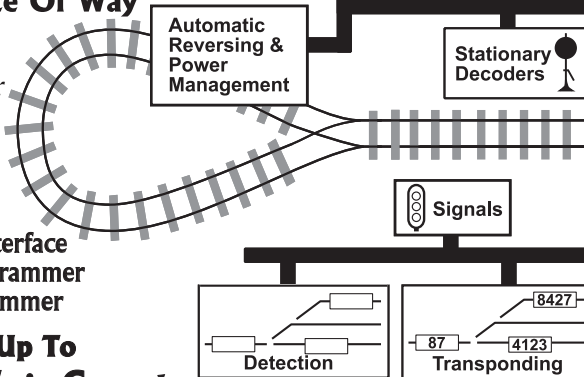Function Decoders
SoundFX™ Decoders

More Fun For Everyone

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

Universal Panels

Throttles

Boosters

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
8427
87   4123

DN163K0D

6 52667 05041 8

307-DN163K0D