



# DN163K0E

Fits Kato N-Scale EMD E5A  
and Other Locomotives

**N Scale**

**Mobile Decoder  
DCC Board Replacement  
1.5 Amp/2.0 Amp Peak  
6 FX<sup>3</sup> Functions, 0.5 Amp**

## Features:

- **Digitrax LocoMotion<sup>®</sup> System**-Your locomotives look like the real thing. The Digitrax LocoMotion<sup>™</sup> 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.
- **FX<sup>3</sup> 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.
- **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**

## Parts List

1 DN163K0E 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](http://www.digitrax.com) for the latest versions, technical updates and additional locomotive-specific installation instructions.

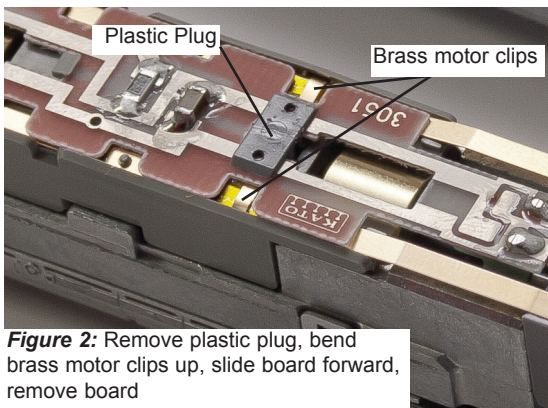
## Installation Instructions - Kato N-Scale EMD E5A Locomotive

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.
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.



**Figure 1:**  
Remove loco shell

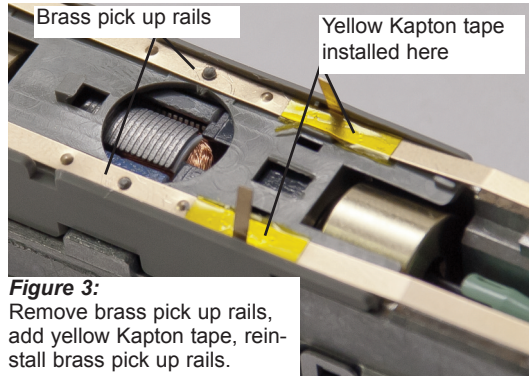
3. Slide the circuit board forward to release it from the clip on the locomotive frame and lift the board off the frame.
4. Remove the brass pick-up rail from one side of the locomotive, being careful not to bend it. Wrap a small piece of yellow Kapton tape



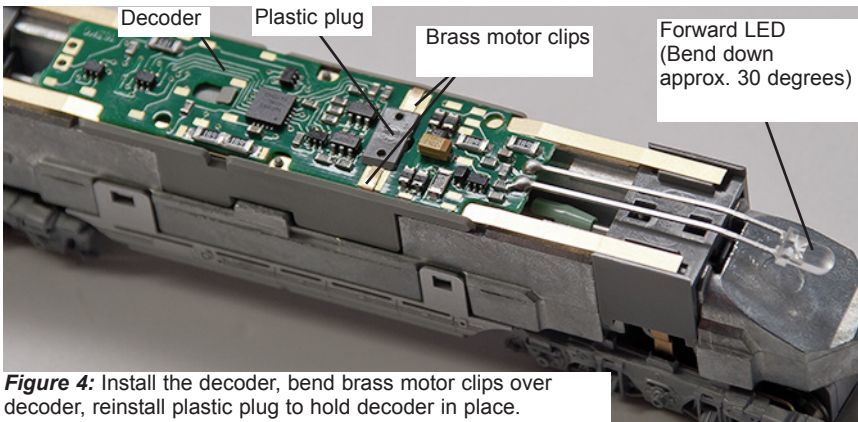
**Figure 2:** Remove plastic plug, bend brass motor clips up, slide board forward, remove board

(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 pickup rail. (**Figure 3**)

5. Install the decoder between the motor clips. Press down and slide the board back to lock the board under the plastic clip in the frame. Be careful to keep the brass pick up rails in position.



6. Bend the motor clips down over the pads on the decoder making sure the Kapton tape insulates them from the brass pick up rails. Reinstall the plastic clip 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, add a piece of tape to secure the decoder against the motor clips. Bend the forward LED to about a 30 degree angle to locate it at the end of the head light pipe.



7. Place the locomotive on the track, select address 03 on your throttle and apply power. If the motor does not respond but you can control the lights, check the installation for motor short circuits. For this installation, 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.



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## Customizing Your Decoder

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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.

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## Changing the Decoder Address

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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.

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## Momentum-CV03 & CV04

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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.

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## Speed Tables-How the Loco Responds to the Throttle

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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
<b>Switcher</b> Concentrated low speed. Limited top speed	002	038	064
<b>Road Switcher</b> Prototypical top speed w/evenly distributed curve from 0 to top speed	002	048	098
<b>Mainline Loco</b> Quick increase to cruising speed then levels off to prototypical top speed.	002	128	154

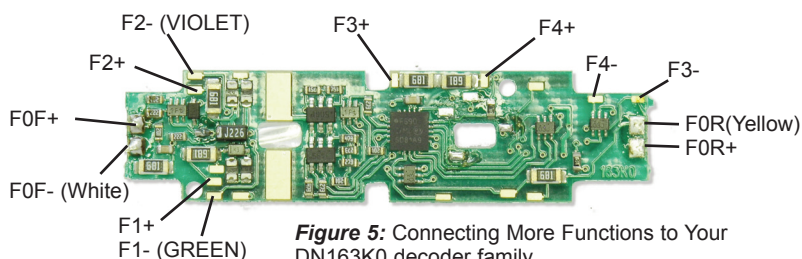
## Switching Speed, Normal Direction of Travel & Scaleable Speed Stabilization (Back EMF) Features

**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.

## Function Outputs on the DN163KOE

The DN163KOE is set up at the factory to control six functions. The unit is prewired with one 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 and F0R/F0R+ for the rear light. 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



**Figure 5:** Connecting More Functions to Your DN163K0 decoder family

up with Digitrax FX<sup>3</sup> 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 DN163K0E decoder for the Kato EMD E5A locomotive is set up with a factory-installed white LED for forward lighting. The LEDs and other lights you add can easily be set up using the decoder's CVs to create many different Digitrax FX<sup>3</sup> prototypical lighting effects. The following example shows just one possibility.

## **Function Remapping**

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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.

## **Digitrax Transponding CV61**

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**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**

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**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.



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## Digitrax 'No Worries' Warranty & Repair

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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!**

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DN163K0E

DN163K0E Kato N-Scale EMD E5A and Other Locos

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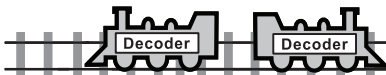
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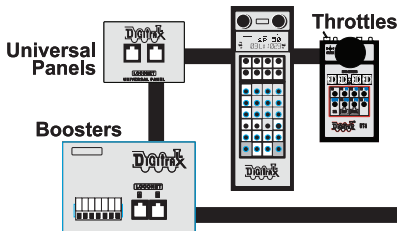
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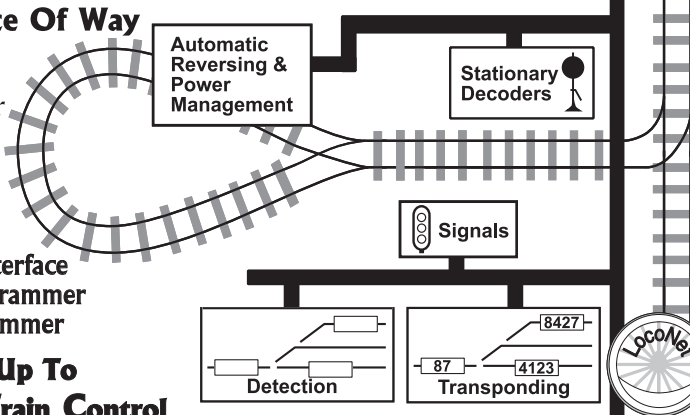
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