



Digitrax Command Control
Run Your Trains, Not Your Track!

DN163K0a

Fits Kato N-P42 Genesis, PA-1, E8
and Other Locomotives

N Scale

Mobile Decoder
DCC Plug 'N Play
1.5 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.
- **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**

Parts List

1 DN163K0a 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 N-Scale P42 Genesis 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.
3. Slide the circuit board forward to release it from the clip on the locomotive frame and lift the board off the frame.

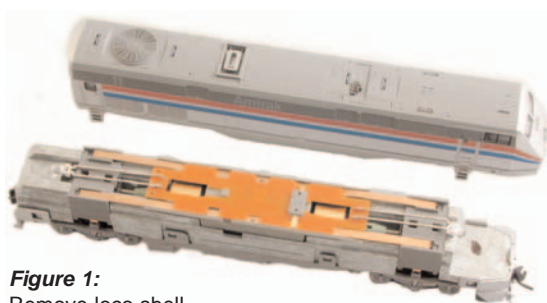


Figure 1:
Remove loco shell

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 (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**)

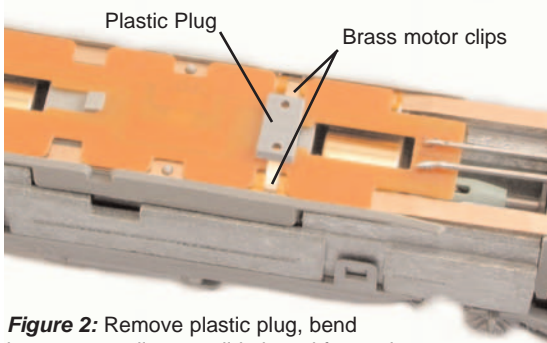


Figure 2: Remove plastic plug, bend brass motor clips up, slide board forward, remove board

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.

Note: For PA-1 & E8 remove the rear LED from the decoder prior to installation of the board.

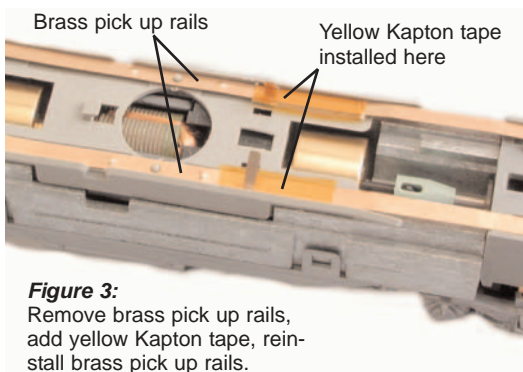


Figure 3:
Remove brass pick up rails, add yellow Kapton tape, reinstall brass pick up rails.

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.

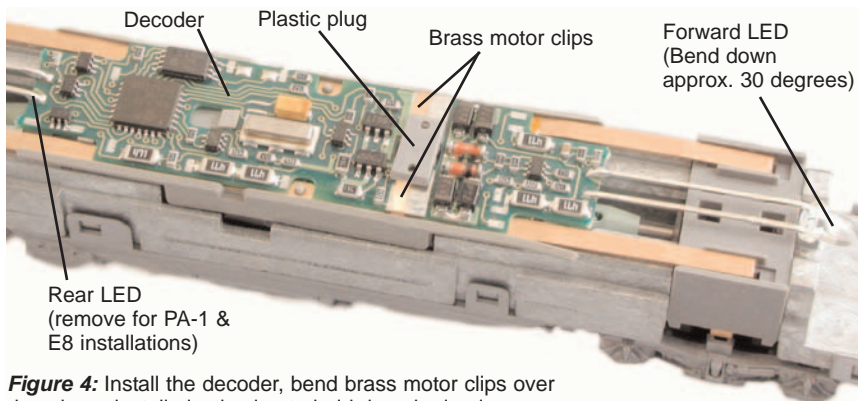


Figure 4: Install the decoder, bend brass motor clips over decoder, reinstall plastic plug to hold decoder in place.

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.



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.

Momentum-CV03 & CV04

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

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/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 in the Kato Genesis P42.

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

Switching speed is controlled by CV54. The default value is 000/x00 for OFF.

To turn on switching speed, program CV54 to a value of 001/x01. This allows you to use F6 to activate/deactivate switching yard speed.

Normal Direction of Travel is controlled by CV29 bit 0.

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

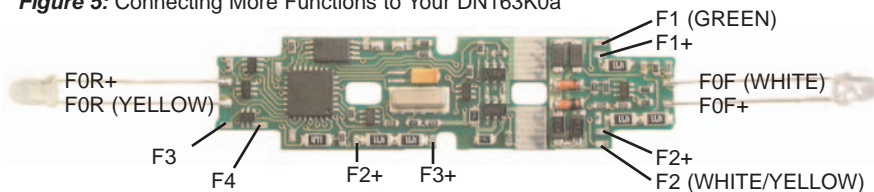
The intensity of **Scaleable Speed Stabilization (Back EMF)** is controlled by CV57. The default value for this feature is 006/x06 which is suitable for most locos. You can adjust this value in the range of 000/x00 for OFF to 015/x0F for the maximum effect. Consult your Decoder Manual for info about CVs 55 & 56 and their effects on scaleable speed stabilization.

Function Outputs on the DN163K0a

The DN163K0a is set up at the factory to control six functions. The unit is prewired with two golden-white LEDs 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 up with Digitrax FX³ 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 DN163K0a decoder for the Kato P42 Genesis locomotive is set up with factory-installed golden-white LEDs for forward and reverse lighting. If you remove the rear LED for installation in the PA-1 or E8, the headlight will be on in the forward direction and off in reverse. The LEDs and other lights you add

Figure 5: Connecting More Functions to Your DN163K0a



can easily be set up using the decoder's CVs to create many different Digitrax FX³ prototypical lighting effects. The following example shows just one possibility.

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.

Quick Start for Digitrax FX3 Lighting Effects for the P42 Genesis

The prototype of the P42 Genesis uses ditch lights in conjunction with the headlight. To set up ditch lights on your P42 follow these instructions:

1. Install the DN163K0a decoder in the locomotive, test for proper operation.
2. Install two incandescent 1.5V/15mA lamps (or LEDs) as shown in **Figures 5 & 6**. We strongly recommend the incandescent lamps for realism. The leads from the lamps/LEDs are soldered to F1/F1+ pads on the decoder (**Figure 6**) for the left ditch light and F4/F4+ pads for the right ditch light.
3. Use a 3/16" piece of 1/16" thick foam tape to mount the lamps on the frame. Leave a 5/16" clearance between the front of the lamp and the front edge of the frame for the light pipe to be re-installed. Use tweezers and be very careful not to break the lamp when bending the lamp leads.
4. Remove the light pipe assembly and modify it as shown in **Figure 7** to separate the headlight from the ditch lights. You will end up with three separate light pipes: one for the head light and two for the ditch lights. Use foam tape to attach the headlamp light bar to the shell. Use gel type super glue to attach the two ditch light pipes to the shell.
5. Program CV51 to a CV value of 107/x6B and CV114 to a CV value of

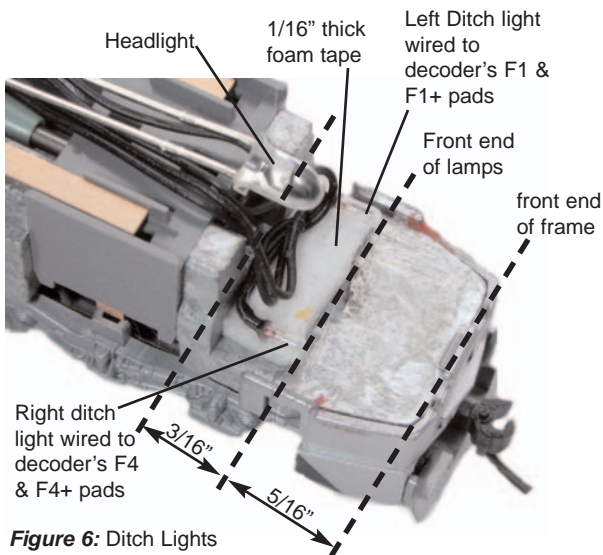


Figure 6: Ditch Lights

106/x6A to turn ditch lights on while running forward and F0 is on. When F2 is on, ditch lights will flash alternately to simulate operation at grade crossing. F2 is a momentary function on Digitrax throttles so that as long as the key is held down, the function operates & when released, it goes off.

6. Program CV62 to a value of 005/x05 to set the ditch light rate. Program CV63 to a value of 030/x1E to set a realistic ditch light hold over time.

Note: To experiment further with FX³ effects, check your Decoder Manual.

Digitrax Transponding CV61

Digitrax Transponding is controlled by CV61. The default 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.

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/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.

Warranty & Repair

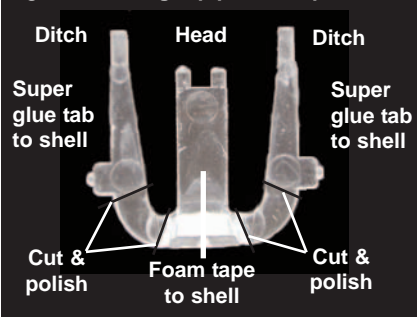
All warranties on Digitrax products are limited to refund of purchase price, repair or replacement at Digitrax's sole discretion. Except as expressly stated in the full warranty statement, there are no warranties, express or implied, including but not limited to any warranties of merchantability or fitness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

Damaged decoders should be returned directly to Digitrax for repair.

Caution: To prevent damage to your decoder and locomotive, track voltage used during operation must not exceed the operating parameters of the locomotive and its lighting system in which the decoder is installed (typically this is 12V DC). For most N scale layouts, Digitrax recommends using 14 volts DCC or less for operation to avoid damage to the locomotive shell, lamps and decoder.

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Figure 7: Cut light pipe into 3 parts





DN163K0a

Kato N-Scale P42 Genesis, PA-1, E8 & Other Locos

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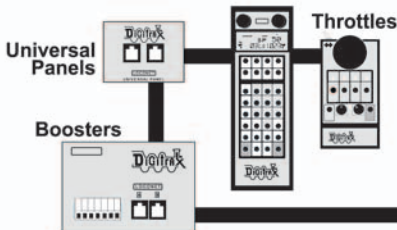
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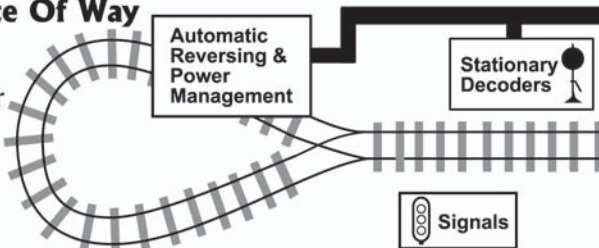
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