Complete Train Control
Run Your Trains, Not Your Track!

# DN163K4A

**Fits Glacier Express and other Kato locomotives produced for the EU**

**N Scale**
**Mobile Decoder**
**DCC Board Replacement**
**1 Amp/1.25 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 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 & 256 level resolution
- **SuperSonic™** motor drive for quiet 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** for custom function setup
  - **Master Light Switch** turns off all lights & functions with one keystroke
  - **Advanced Consist Function Controls**
- **White LEDs** for added realism
- **Transponder ID 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**

## Parts List

1 DN163K4A 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 Glacier Express Locomotive

1. Carefully remove the locomotive's shell and light board clip from the frame, following any manufacturer instructions. Notice the orientation of the light board inside so that you can install the new decoder in the same orientation.

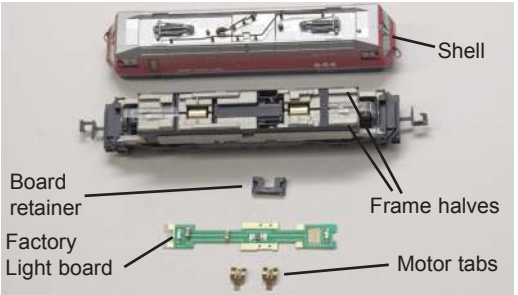



***Figure 1:*** Remove loco shell and lightboard retainer

2. Carefully remove the factory light board by sliding it toward the front of the locomotive. Then gently lift the board out of the frame being cautious of the light pipes. Be careful not to bend or damage the motor tabs. *(Figure 2)*

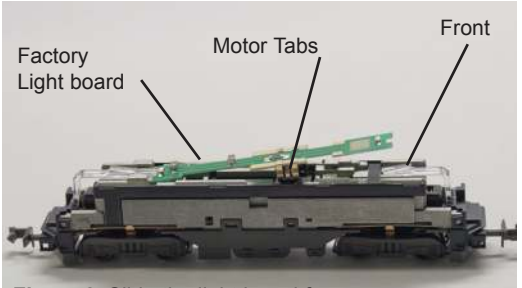



***Figure 2:*** Slide the light board from under frame notches to remove light board

3. Carefully remove the motor tabs from the factory light board. The motor tabs attach to the board at right angles with slight spring tension. Reinstall these motor tabs onto the DN163K4A decoder board as shown in *Figure 3*.

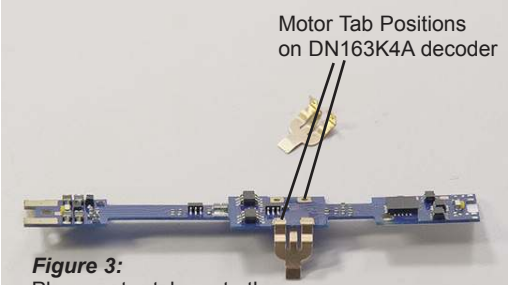



***Figure 3:*** Place motor tabs onto the DN163K4A as shown

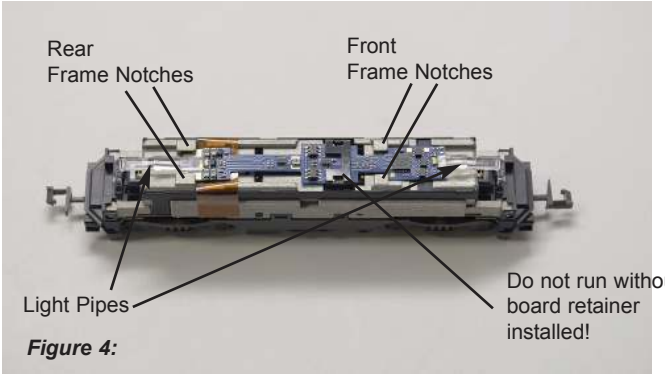



***Figure 4:***

4. Install the DN163K4A decoder by tilting it slightly down at back as you insert the decoder into the rear frame notches. Carefully maneuver the decoder motor tabs down over the motor contacts and then level and slide the decoder board backwards so the board's corners are under the front frame notches, as shown in *Figure 4*. Done correctly, the motor tabs should now touch the motor contacts. Check to insure the decoder makes good contact with the rear frame notches. Kapton tape may be needed under the decoder near the rear frame notches to insure good contact with the frame. Finally, replace the light board clip and insure that the light pipes rest on top of the decoder against the surface mount LEDs.

5. Place the locomotive on the track, select address 03 on your throttle and apply power. If the loco does not respond at all ensure that decoder is making good contact with rear frame notches. 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 motor clips are not touching the frame.

6. Once your loco is operational replace the locomotive shell. Digitrax decoders are set up with configuration variable (CV) default values so you can run your locomotive right away using address 03.

**Installation Notes:**

1. Do not exceed the decoder's 500mA total function output rating.
2. 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.
3. 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.

## 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.

## Function Outputs on the DN163K4A

The DN163K4A is set up at the factory to control six functions. The unit is prewired with two white LEDs set up for directional lighting as F0F/F0F+ for the front light and F0R/F0R+ for the rear light. Functions F1 (Green), F2 (Violet), 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 wire 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 on the board where they might create a short circuit, damage the board and void the warranty.*

All six function outputs can be easily set up with Digitrax FX³ 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.

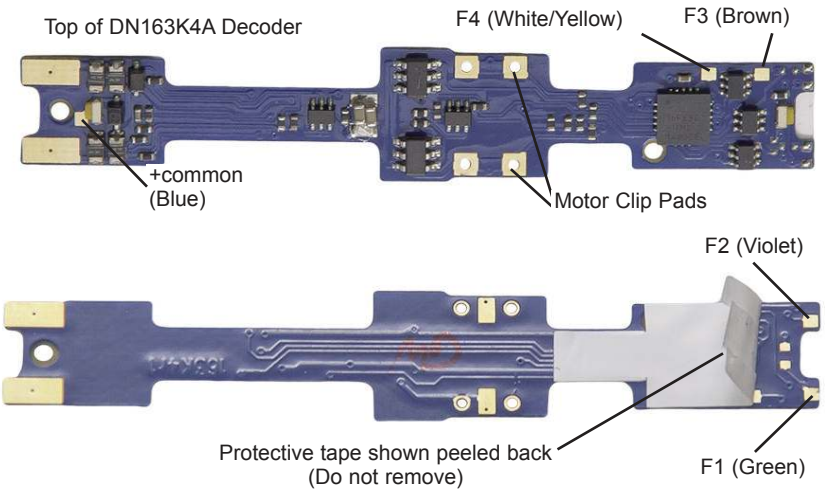



***Figure 6:*** Connecting More Functions to Your DN163K4A Decoder

## 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.

## 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 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. 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.

**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.**

***This product is covered by one or more patent provisions and other intellectual property protections. For more information see www.digitrax.com/patents/***

# DN163K4A

**Fits Glacier Express and other Kato locomotives produced for the EU**

## Go Beyond DCC With Digitrax® Complete Train Control

### 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™

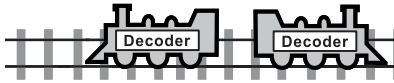
Super Empire Builder xtra™

Zephyr xtra™

LocoNet® The Digitrax Difference

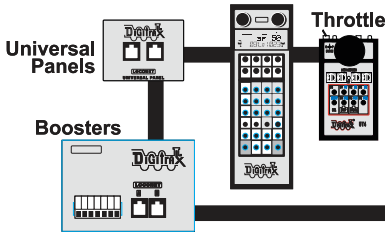
### Locomotive Shops

Mobile Decoders
Function Decoders
SoundFX™ Decoders



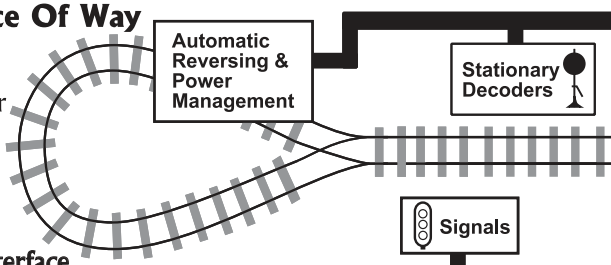

### More Fun For Everyone

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




### Maintenance Of Way

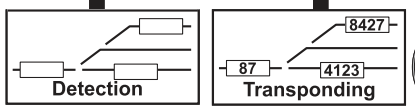
Make your layout more fun & simpler to operate!




### Computer Controls

Computer Interface
Decoder Programmer
Sound Programmer




### It All Adds Up To Complete Train Control


2443 Transmitter Road
Panama City, FL 32404
www.digitrax.com
SUPPORT: techsupport@digitrax.com
REPAIR: repair@digitrax.com


Made in U.S.A.

CE

DN163K4A

6 52667 05073 9

307-DN163K4A

# Digitrax Decoder Specification Sheet

## DN163K4A 1.25 Amp N Scale Board Replacement Decoder for Kato N Scale Glacier Express and 4-8-4 FEF Steam Locomotive

UPC: 652667-05067-8

| | | | |
|---|---|---|---|
| **Physical Size** | 0.411” x 2.351” x .061”<br>10.46mm x 59.72mm x 15.57mm | **Current Rating** | 1.0/1.25 Amps |

| **Interface** | **Decoder End** | **Wires** | | **Locomotive End/Plug** |
|---|---|---|---|---|
| Board Repl | Board Replacement | | | Board Replacement |

| | | | | | |
|---|---|---|---|---|---|
| **# Functions** | 6 | **Function Current Rating** | 500mA | **Function Type** | $FX^3$ |
| **Prod Date** | 12/06/2011 | **Discontinued** | Current | **Replaced By** | Current |
| **MSRP** | US$36.00 | **Feature Set** | Series 3 | | |

**$FX^3$ decoders** have motor isolation protection. If the decoder senses that the motor is not isolated, it will not run the motor. In this case, you will be able to control the loco’s functions but the motor will not work.

**CVs are used for this decoder**

| CV# | Feature | Default | Range | Notes |
|---|---|---|---|---|
| **Locomotive Address CVs** | | | | |
| 01 | 2 Digit Decoder Address | 03 | 001-127 | |

| | | | | |
|---|---|---|---|---|
| 17 | 4 Digit Address (High Byte) | 00 | 0128-9983 | CV17 & 18 are used Together to program the 4 digit address. Current production Digitrax throttles handle this automatically. See calculator below if separate values are needed by your system for programming 4 digit address |
| 18 | 4 Digit Address (Low Byte) | 00 | 0128-9983 | |
| 29 | Configuration Register Controls Multiple Features | 06 | See CV29 Value Table Below | Must be set to a value that allows either 2 digit or 4 digit addressing |
| **Configuration Register CV** | | | | |
| 29 | Configuration Register | 06 | | |
| | Address Selection, 2 or 4 digit | 2 Digit | 2 or 4 Digit | |
| | Normal Direction of Travel (NDOT) | Fwd | Fwd/Rev | |
| | Speed Step Control | 28/128 | 14 or 28/128 | |
| | Speed Table On/Off | Off | Speed Table On or Off | |
| | Analog Mode Conversion On/Off | On | On or Off | |
| **Locomotion CVs-Control Locomotive Motion Characteristics** | | | | |
| **Acceleration and Deceleration** | | | | |
| 03 | Acceleration Rate | 00 | 00 to 31 | 128 Steps |
| 04 | Deceleration Rate | 00 | 00 to 31 | 128 Steps |
| **Three Step Simple Speed Table & Start Voltage** | | | | |
| 02 | Start Voltage | 00 | 00 to 255 | 128 Steps |
| 05 | Maximum Voltage | 00 | 00 to 255 | 128 Steps<br>00, 01 & 255= max voltage at step 28 |
| 06 | Mid Point Voltage | 00 | 00 to 255 | 128 Steps<br>00 & 01= straight line curve |
| **28 Step Speed Tables with 256 Step Resolution** | | | | |
| 65 | Kick Start value | 00 | | 128 Step Interpolated |
| 66 | Forward Trim | 00 | | 128 Step Interpolated |
| 67 | First Speed Table Entry | 00 | | 128 Step Interpolated |
| 68-93 | 28 Step Speed Table Entries | 00 | | 128 Step Interpolated |
| 94 | Maximum Speed Table Step | 00 | | 128 Step Interpolated |
| 95 | Reverse Trim | 00 | | 128 Step Interpolated |
| 29 | Configuration Register | 06 Speed Tables | See Above CV29 | Must be set to a value that enables speed tables |

| | | | | |
|---|---|---|---|---|
| | | are disabled | | |
| **Torque Compensation and Switching Speed** | | | | |
| 53 FX$^3$ | FX$^3$ Decoders do not use CV53 | NA | NA | Not Available |
| 53 FX | FX Decoders used CV53 to designate FX effect generated on F3-Brown Wire | | | See instruction sheet for the FX decoder you are using |
| 54 FX$^3$ | FX$^3$ Decoders use CV54 to control Switching Speed & Torque Compensation | 00 | 00=SS Off, TC On<br>01=SS On, TC On<br>16=SS Off, TC Off<br>17=SS On, TC Off | |
| 53 FX | FX Decoders used CV54 to designate FX effect generated on F4-White/Yellow Wire | | | See instruction sheet for the FX decoder you are using |
| **Functions** | | | | |
| 13 | DC Functions ON Not Used in FX$^3$ | | Automatic | Not Used FX$^3$ |
| **FX$^3$ Functions** | | | | |
| 49 | F0F, forward light effect white | 00 | See FX$^3$ section | |
| 50 | F0R, reverse light effect yellow | 00 | See FX$^3$ section | |
| 51 | F1, Function 1 green | 00 | See FX$^3$ section | |
| 52 | F2, Function 2 violet | 00 | See FX$^3$ section | |
| 113 | F3, Function 3 brown | 00 | | Not Available |
| 114 | F4, function 4 white/yellow | 00 | | Not Available |
| 115 | F5, Function F5 white/green | 00 | | Not Available |
| 116 | F6, Function F6 white/blue | 00 | | Not Available |
| 62 | FX Rate and Keep alive adjust | 00 | 00 to 255 | |
| 63 | Ditch Light Blink hold time | 00 | 00 to 255 | |
| | Master Light Switch | | | See FX$^3$ section |
| **Directional Headlights, Transponding, Split Field Motor** | | | | |
| 61 | Directional Headlight | Directional | Map F0 Forward & Reverse See CV61 Section | Not controlled by CV61 in FX$^3$ Decoders |
| | Transponding | Off | Off or On | |

| | | | | |
|---|---|---|---|---|
| | | | See CV61 Section | |
| | Split Field Motor | Off | Off or On See CV61 Section | For AC Motors |
| **Scaleable Speed Stabilization (Back EMF)** | | | | |
| 55 | Static Compensation | 128 | 00 to 255 | |
| 56 | Dynamic Compensation | 048 | 00 to 255 | |
| 57 | Speed Stabilizer-Droop | 006 | 00 to 15 | |
| **SuperSonic (Quiet Operation)** | | | | |
| 09 | Motor Frequency SuperSonic | 00 | 00 to 255 | Default is MAX |
| **Advanced Consisting** | | | | |
| 19 | Advanced Consist Address | 00 | 00 to 255 | Default is OFF |
| 21 | Advanced Consist Function Control Override for F1-F8 | 00 | See CV21-22 Section | |
| 22 | Advanced Consist Function Control Override for F0 & F9-F12 | 00 | See CV21-22 Section | |
| **Function Mapping** | | | | |
| 33-46 | Function Mapping CVs | 00 | See Function Mapping Section | |
| **Decoder Reset to Default Values** | | | | |
| 08 | Reset Decoder to Factory Default CV Values | 129 | Set to 08 to reset all CV Values. | Set to 09 to reset all CV Values except 28 step speed table. |
| **Decoder IDs** | | | | |
| 105 | User Private ID #1 | 00 | | User Defined |
| 106 | User Private ID #2 | 00 | | User Defined |
| 07 | Version ID | 64 | Digitrax Version ID | Read Only |
| 08 | Manufacturer ID | 129 | Digitrax | Not affected by reset |

Information provided here is correct to the best of our knowledge.