DN166I0

**Fits InterMountain N-Scale SD40T-2/
SD45T-2 Tunnel Motor Locos
3.5" x .367" x .135" w/LED
88.9mm x 9.32mm x 3.42mm**

N Scale
Mobile Decoder
Board Replacement
1.5 Amp/2.0 Amps Peak
6 FX³ Functions, 0.5 Amp

Features:

■ **FX³ Function outputs** for prototypical lighting effects and on/off control:

Constant Brightness Lighting with directional or independent control.

Optimized selectable LED or incandescent lamp operation

Realistic Effects like Ditch lights, Mars lights, strobes, and many more

Configurable Pulse Function available on all function outputs.

FX³ & Standard Function Qualifiers operate functions based on direction, F0 on or off, direction and F0, and whether loco is moving.

Function Mapping for custom function setup.

Master Light Switch turns off all lights & functions with one keystroke.

Advanced Consist Function Controls.

■ **Digitrax LocoMotion® System**-Your locomotives look like the real thing. The Digitrax LocoMotion System makes them run like the real thing, too!

Scaleable Speed Stabilization (Back EMF) with simple setup & 256 level resolution.

Torque Compensation.

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.

■ Program CVs using any Digitrax Compatible Control system without having to buy any extra equipment.

■ Golden-White LEDs for added realism.

■ 2 Digit and 4 Digit Addressing.

■ Basic, Advanced & UniVersal Consisting.

■ SuperSonic motor drive for silent operation.

■ Direct mode programming.

■ Decoder Reset CV with or without speed table reset.

■ Transponder Equipped ready for transponding on your Layout.

■ Motor Isolation Protection helps prevent damage to your decoder.

■ Automatic Analog Mode Conversion when running on DC layout.

■ Decoder Lock for individual programming of multiple decoders in one loco.

■ Digitrax "No Worries" Warranty.

Parts List

1 DN166I0 Mobile 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. **CAUTION: Programming and layout track must not exceed 16V when using this decoder.**

Installation Instructions

1. Carefully remove the locomotive's shell from the frame. Notice the orientation of the light board inside so that you can install the decoder in the same orientation.

2. Carefully remove the plastic light shroud at the front of the loco and loosen the frame screws enough to allow the removal of the light board. Lift the board out of the frame.

3. Apply the Kapton insulating tape on the front of frame to completely cover the flat area above the frame screw. Install the decoder, **square CPU on the bottom**, between the frame halves. The narrow part of the decoder fits between the frame with the frame clips holding it at the corners of the decoder cutout. The brass motor contacts should contact the pads on the bottom of the decoder. The motor contacts can also be in-
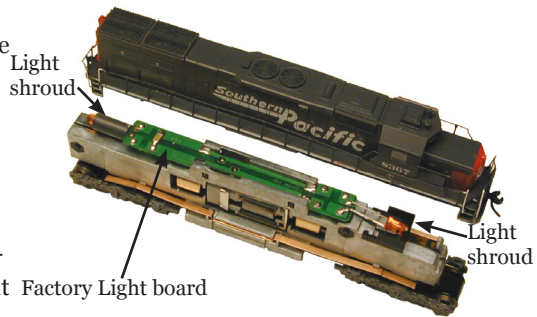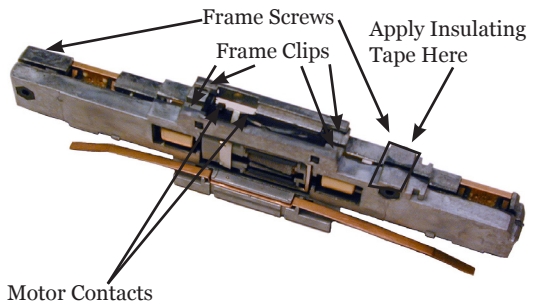
Light shroud

Light shroud

Factory Light board

Figure 1: Remove loco shell

Frame Screws

Frame Clips

Apply Insulating Tape Here

Motor Contacts

Figure 2: Loosen frame screws and remove light board

Apply Kapton Insulating Tape Here
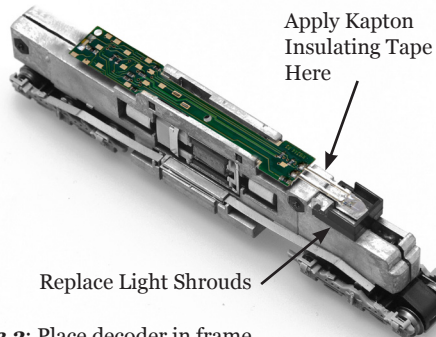
Replace Light Shrouds

Figure 3: Place decoder in frame.

serted through the slots of the motor tabs. Squeeze the frame halves together to hold the decoder in place.

4. Tighten the frame screws. Replace the trucks if they have fallen out during the installation of the decoder. 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.

5. 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. See the Digitrax Decoder Manual for complete instructions on setting up the CVs for customizing your locomotive's performance characteristics.

Note: Motor contacts may optionally be bent to engage provided slots on the decoders (See figure 4) Be sure to check clearance to frame after installation.

Installation Notes

1. Do not exceed the decoder's 500mA total function output rating.
2. We recommend that the Blue wire, also called +Common or Lamp Common, be connected as shown. If you wish to omit the Blue wire in your installation, consult the Digitrax Decoder Manual for more information.
3. The head lamp should be hooked up using the Blue/+Common wire for optimal Digitrax transponding operation.
4. 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.
5. 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.
6. Some locomotives employ filter capacitors for RFI suppression in the locomotive wiring. These may cause problems with Supersonic decoders and non-decoder analog operation on DCC. This capacitor should be removed for safe operation.

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 DT4XX series throttle. See your Starter Set Manual for complete programming instructions.

1. Place the loco on the **programming track not to exceed 16V**. Go into Program Mode on your system. On DT4XX throttle press **PROG**.
2. Choose AD2 for 2 digit addressing or AD4 for 4 digit addressing.
3. Choose the address you want to set up for the decoder.
4. Complete address programming by pressing **ENTER**.

Note: CV29 must also be programmed to enable 4 digit addressing, this is done automatically by the DT4XX throttles. See your Digitrax Decoder Manual or the Digitrax Toolbox App for how to set up CV29.

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, scalable speed stabilization and more to take full advantage of the Digitrax LocoMotion System.

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.

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

Other LocoMotion® Features: Switching Speed, Normal Direction of Travel & Scalable 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 or the Digitrax Toolbox App for additional information on the settings for CV29.

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

SuperSonic Silent Operation and Torque Compensation

The factory settings in the decoder provide silent, smooth operation of your locomotive under most conditions. For more information about these settings, please see the Digitrax Decoder Manual or our website.
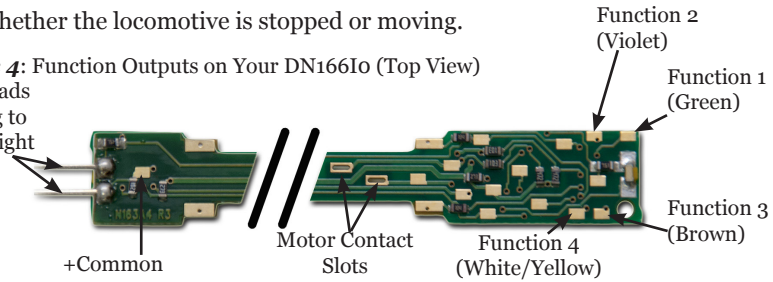
Function Outputs on the DN166I0

The DN166I0 is set up at the factory to control six functions. The unit is prewired with two golden-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 color you like). These colors are important if you plan to use function remapping.

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 4: Function Outputs on Your DN166I0 (Top View)

LED Leads Leading to Front Light

+Common

Motor Contact Slots

Function 4 (White/Yellow)

Function 2 (Violet)

Function 1 (Green)

Function 3 (Brown)

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 the CV 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 command stations, boosters, throttles, decoders, power supplies and layout control devices.

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.

Please return warranty items directly to Digitrax - DO NOT return items to place of purchase.

Go Beyond DCC With Digitrax®

Complete Train Control

Main Station

Starter Sets
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DUPLEX EQUIPPED
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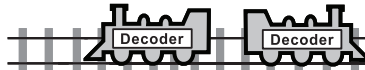
Your Digitrax LocoNet® Starter Set is just the beginning of an exciting trip! Pick the one that's right for you!

Super Chief xtra™

Super EMPIRE BUILDER xtra™

Zephyr xtra™

LocoNet®
The Digitrax Difference

Locomotive Shops

Mobile Decoders
Function Decoders
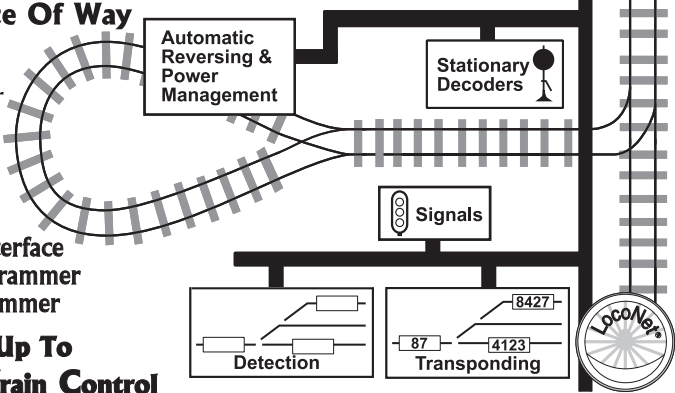SoundFX™ Decoders

Decoder   Decoder

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

Boosters

Throttles
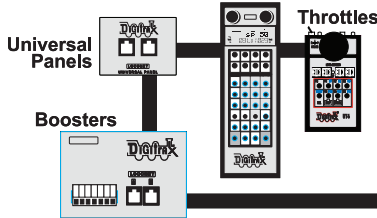
Maintenance Of Way

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