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DCC OPERATORS GUIDE

Default DCC Address for All Locomotives: 3 (no leading zeros)

Decoder Reset: CV8 = 8

Thank you for your purchase of the InterMountain Railway Company N scale SD40-2 locomotive. Your locomotive is equipped with either a LokPilot Micro Slide-In V4.0 non-sound decoder OR a LokSound Select Micro Slide-In sound decoder. This guide directs you through basic operational and decoder functions for DCC operation. More in-depth information is available on our website in the DCC Assistance section. Should you have any questions that are not answered in this guide or online, please feel free to contact InterMountain at the contact information listed above.

Operating your N Scale SD40-2

We do not recommend operating the decoder equipped version of the N scale SD40-2 on analog DC track power. If you do not want to invest in a DCC system, please purchase the DC only version of the SD40-2 and it will operate on analog DC the same way as other analog DC locomotives. If you decide later to upgrade to DCC, your locomotive can be easily upgraded to DCC or DCC with sound. Contact us for more information.

DCC Non-Sound Decoder Operation

The non-sound DCC equipped locomotive responds to address 3 (no leading zeros) out of the box. Increase the speed on your DCC throttle and the locomotive should move in the direction your throttle is set for. The locomotive lighting is controlled by various function keys. Please see the table on the following page for the functions available in the non-sound decoder. Please verify that all lighting and motion is working properly before making any programming changes to the decoder. If you should have any issues, contact us.

DCC Sound Decoder Operation

The DCC sound equipped locomotive responds to address 3 (no leading zeros) out of the box. Upon placing your locomotive on the track, you will not hear any sound. **You must press the F8 function key in order to get the locomotive's prime mover started.** As the prime mover is starting, your locomotive will not move even if you give it a speed command. A prototype locomotive cannot move until it is fully started and your model simulates this! After the prime mover settles into idle (20-30 seconds), you should be able to give it a speed command, hear the prime mover throttle up, hear the brakes release and watch it slowly move. If you reduce the speed to 0, you should hear the brake squeal as the locomotive comes to a stop. Please see the table on the following page for all of the lighting and sound functions available in the sound decoder.

The F8 function key operation can be changed to allow track power to start the prime mover by setting CV32 to 2 FIRST, and then CV403 to 32. A prototype locomotive's horn and bell can still be operated with the prime mover shut-down as long as enough air is available. The LokSound Select decoder operates in just this way!

Extended Addressing

After you have verified that your locomotive operates properly on address 3, you'll want to give it an address other than 3. Today's DCC Systems give you the option to enter a 3 or 4 Digit Extended (long) Address. This is usually the cab number of the locomotive. Any address from 128 and above is considered by most DCC systems as a long address. If you want an address between 1-127, set it as a short address. Refer to your DCC System's manual for step-by-step guidance as to how to do this. Once you have set the new address, verify that all lighting and motion works properly before proceeding to any other programming.

Full Throttle Features

Function 9 activates **Drive Hold**. Drive Hold allows you to throttle up or down the prime mover sound while maintaining a constant speed with your locomotive.

Function 10 activates the **Independent Brake.** Just be sure to release the brakes before you try to move again!

Run 8 and **Coast** are also included in the decoder but are not mapped to a function key. Visit our website's DCC Assistance section for more information on mapping Run 8 and Coast.

For more detailed information on all of the FULL THROTTLE features visit:
http://intermountain-railway.com/fullthrottle.html

(F14 is not used)

Default DCC Decoder Function Table

Function Key	DCC Sound N SD40-2	DCC Non-Sound N SD40-2
F0 / Headlight	Directional Headlights / Number board lights	Directional Headlights / Number board lights
F1 / Bell	Bell (Steel Bell by Default)	N/A
F2 / Horn	Playable Air Horn (Leslie S3L by Default)	N/A
F3	Coupler	N/A
F4	Dynamic Brake	Dynamic Brake Logic (used when operating with a sound unit)
F5	Rotary Beacon (if applicable)	Rotary Beacon (if applicable)
F6	Directional Ditch Lights (if applicable)	Directional Ditch Lights (if applicable)
F7	Acceleration / Switching Mode* (see below)	Acceleration / Switching Mode* (see below)
F8	Prime Mover Start-up / Shut-down (mute if moving)	Virtual Drive Sound (used when operating with a sound unit)
F9	Drive Hold	N/A
F10	Independent Brake	N/A
F11	Radiator Fan	N/A
F12	Headlight Dimmer	Headlight Dimmer
F13	AUX 4 Lighting Output (Not Used)	AUX 4 Lighting Output (Not Used)
F15	Slow Spitter Valve #2	N/A
F16	Spitters on Shutdown OFF	N/A
F17	Brake Set / Brake Release OFF	N/A
F18	Sanding Valve	N/A
F19	Short Air Let Off	N/A
F20	Compressor	N/A
F21	Slow Spitter Valve #1	N/A

*Acceleration / Switching mode halves the acceleration and deceleration rates set by CV3 and CV4. This is useful when you need the locomotive to accelerate and stop faster during switching maneuvers.

Sound Volume CV Defaults Table:

Function	CV #	Range	N SD40-2
Master Volume Control	63	0-192	192
****** SET CV32 to 1 BEFORE CHANGING CV 257 THROUGH CV 511 ******			
Prime Mover	259	0-128	128
Horn	275	0-128	128
Bell	283	0-128	64
Coupler	291	0-128	128
Dynamic Brake	299	0-128	100
Air Compressor	307	0-128	64
Radiator Fan	315	0-128	50
Modern E-Bell	323	0-128	8
Independent Brake	339	0-128	40
Brake Set / Brake Release	347	0-128	40
Sanding Valve	355	0-128	128
Short Air Let Off	363	0-128	128
Slow Spitter Valve #2	371	0-128	50
Slow Spitter Valve #1	387	0-128	50
Spitters on Shutdown	395	0-128	50
Air Reverse	403	0-128	50
Run 8	411	0-128	128
Coast	419	0-128	128
Milwaukee E-Bell	427	0-128	128
Gong Bell	435	0-128	128
Random Sounds	451	0-128	64
Brake Squeal	459	0-128	64

Decoder Reset: CV8 = 8

CV48 Sound Selection Table:

The default horn in the SD40-2 locomotive is the Leslie RS3L. There are 15 other horns to choose from if you should prefer a different horn sound or your prototype uses a different horn. The bell defaults to the standard EMD Steel Bell, however there are four other bell sounds included in the sound file. These can all be changed with your DCC system. The value for CV48 is calculated by adding the values for the prime mover, the horn, and two of bell sounds using the charts below. (Access to the three alternate bells requires extra CV programming). As an example, the N EMD SD40-2 default values include:
Prime Mover = 0, Horn = 6, Bell = 0 **Total = 0 + 6 + 0 = 6 (Default)**

Track Power MUST be interrupted to the locomotive after changing the value of CV48. The locomotive can be simply rocked off one rail briefly to accomplish this task.

DEFAULT	**6**
Prime Movers	**N SD40-2**
0	EMD 16cyl 645E - **(Default)**
Horns	**N SD40-2**
0	Nathan K5LA
1	Nathan K3L
2	Nathan M5
3	Nathan P3
4	Nathan Old Cast P5
5	Nathan K3H
6	Leslie RS3L - **(Default)**
7	Leslie RS5T
8	Leslie A125
9	Nathan M3
10	Leslie RS3K
11	Nathan K5H
12	Leslie A-125
13	Nathan / Holden M3H
14	Leslie S3E
15	Leslie S5TRF
Bells*	**N SD40-2**
0	Steel Bell - **(Default)**
64	Bronze Bell

*There are three other bell varieties in this sound file:
Modern E-Bell activated by F1, change the following CV's, in order: CV32 = 2 FIRST, CV302 = 0, CV303 = 1

MILW E-Bell activated by F1, change the following CV's in order: CV32 = 2 FIRST, CV302 = 0, CV304 = 32

CNW Gong Bell activated by F1, change the following CV's in order: CV32 = 2 FIRST, CV302 = 0, CV304 = 64

Troubleshooting

N scale decoder equipped locomotives require very reliable electrical connections and contacts. If you are experiencing operating issues with your locomotive, the track and/or locomotive wheels might be dirty. Both of these items need to be cleaned thoroughly on a regular basis for reliable operation. Denatured alcohol works very well for these tasks.

DCC in general also requires plenty of power to the rails in all locations. If you have problem areas with any DCC locomotive, it may be beneficial to add more feeder wires in these locations. Items like turnouts and rail joints are never reliable for passing electrical current. Rail joints can be soldered and extra feeders can be wired on sections of track attached to turnouts to ensure reliable power distribution.

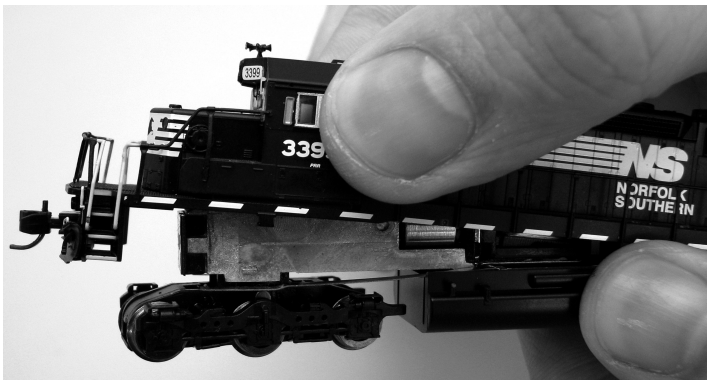
If the above is not improving the operation of your locomotive, check that the copper contacts are in the proper locations above each truck and are making solid contact with the truck contacts. These copper contacts can be bent down slightly if they are not making firm enough contact with the trucks. Adjust anything that might be out of alignment and try your locomotive again.

If you are having programming difficulties remember that ESU LokSound decoders DO NOT require a program track booster! If you have a program track booster in-line between your DCC system and program track, you must bypass it for programming ESU decoders. More programming information can be found on our website under DCC Assistance.

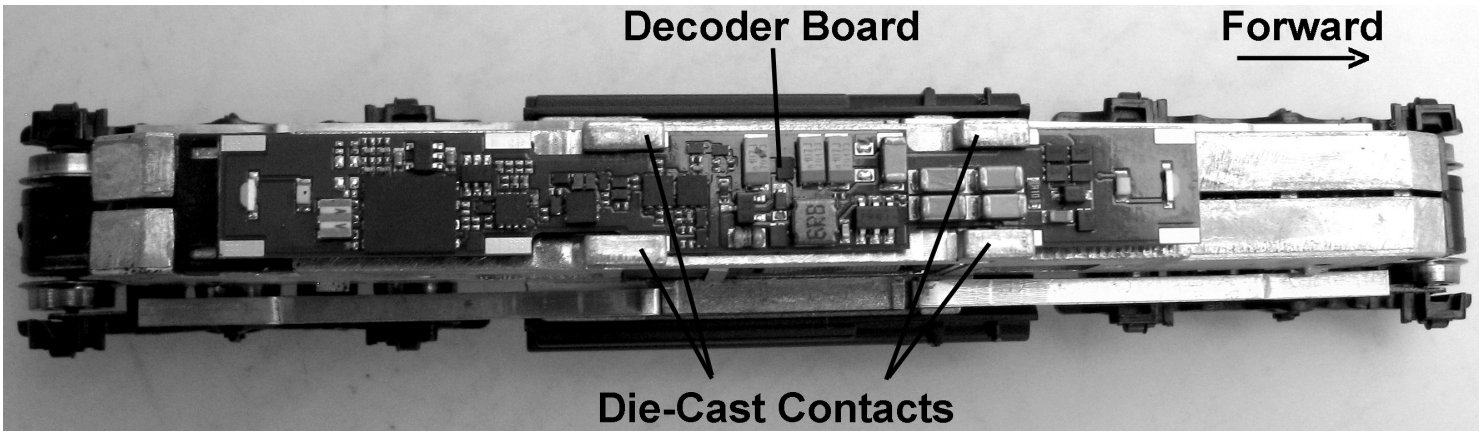
Decoder Reset: CV8 = 8

SHELL REMOVAL INSTRUCTIONS

The locomotive shell can be easily removed by holding the fuel tank and slowly sliding the shell upwards. The couplers DO NOT need to be removed. We find that sliding the shell around the cab area is a great way to get it started. **Be very careful not to put pressure on the handrails during this process.**



Once the shell is off you will see the decoder on top of the die-cast chassis. If you need to remove the decoder for any reason, sliding it forward gently will release it from the die-cast contacts. The decoder can only be installed one way so if it doesn't slide back in easily, don't force it. Check that it is oriented correctly and carefully try again.



There are no user serviceable parts on the decoder. If it should fail for any reason, it will have to be returned to InterMountain for replacement. Contact us for more information should you need a replacement decoder.

The speaker for the sound equipped units sits inside a black plastic housing inside a cavity under the fuel tank. Despite the holes in the bottom of the fuel tank, the sound is instead projected upwards through the locomotive and the speaker is sealed from debris. The speaker and black plastic housing are one unit and this unit can be removed from the die-cast cavity if necessary. The speaker **cannot** be removed from the black plastic housing without doing permanent damage to the speaker!

DO NOT attempt to remove the speaker from the black plastic housing.
Damage to the speaker in this manner is NOT covered under warranty!

MAINTENANCE TASKS

Your InterMountain N scale SD40-2 locomotive is designed to provide hours of enjoyment with little or no maintenance. On occasion the drive gear mechanism should be lubricated. Utilize a plastic compatible lubricant such as Labelle® 107 Oil. To lubricate your locomotive place a few drops on the gears of the drive mechanism. Only a small amount is required.

Service Needs: Although rare, at some time you may require service for your locomotive. Please contact InterMountain Railway Company service department by either email (service@intermountain-railway.com), or telephone (800-472-2530), whenever you have a question or need a repair.

Resetting the decoder solves 95% of the decoder related issues we handle. Decoder Reset: CV 8 = 8