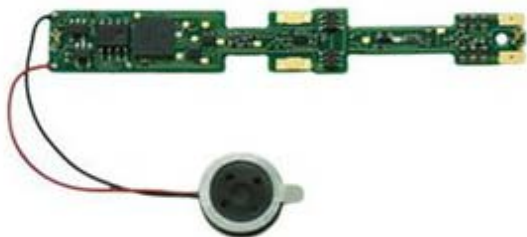# Digitrax Sound Decoder Specification Sheet

SDN144K1E
1 Amp N Scale Mobile Decoder with SoundFX
for Kato SD40-2 and similar locos

Physical Size	0.40" x 2.97" x 0.11" (10.24mm x 75.37mm x 2.11mm)	Current Rating	1.0/1.25 Amps
Speaker Rating	8 Ohm	Speaker Size	13mm round
Capacitor	100uF (6.25mm round x 7.8mm high)	Factory Sound Scheme	Dual SD40-2/GE Evolution Diesel Scheme
Simultaneous Voices	3	Onboard Sound Storage Capacity	4 Megabit

Interface	Decoder End	Wires		Locomotive End/Plug
Board Repl	Board Replacement			Board Replacement

# Functions	4	Function Current Rating	200mA	Function Type	FX^3
Prod Date	07-23-2010	Discontinued	Current	Replaced By	Current
MSRP	US$69.95	Feature Set	Series 4	UPC	652667-20019-6

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 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

18	4 Digit Address (Low Byte)	00	0128-9983	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
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 00, 01 & 255= max voltage at step 28
06	Mid Point Voltage	00	00 to 255	128 Steps 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 are	See Above CV29	Must be set to a value that enables speed tables

			disabled		
Torque Compensation and Switching Speed					
53 FX³	FX³ 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 FX³	FX³ Decoders use CV54 to control Switching Speed & Torque Compensation	00	00=SS Off, TC On 01=SS On, TC On 16=SS Off, TC Off 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 FX³		Automatic	Not Used FX³	
FX³ Functions					
49	F0F, forward light effect white	00	See FX³ section		
50	F0R, reverse light effect yellow	00	See FX³ section		
51	F1, Function 1 green	00	See FX³ section		
52	F2, Function 2 violet	00	See FX³ 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 FX³ section	
Directional Headlights, Transponding, Split Field Motor					
61	Directional Headlight	Directional	Map F0 Forward & Reverse See CV61 Section	Not controlled by CV61 in FX³ 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

Sound CVs

Sound Control CVs For SDF Originally Shipped With Decoder: <spj file name here> Note: If another sound project was loaded, refer to .sdf files for information about CV#s & Values for that sound project file				
CV#	**Feature**	**Default Value**	**Value Range**	**Notes**
CV58	Master Volume	09	00-15	0 = Maximum volume F8 used to mute sound
CV60	Sound Scheme Selection	00	00=steam scheme 01=diesel scheme	
CV120 to 121	Read Only			Manufacturer defined Not User Configurable Read Only
CV122	Product Type	12	12	
CV123	Hardware Version			
CV124	Read Only			

to 128				
CV130 to 139	Manufacturer defined in sound definition file (SDF)	Unique to Mfg	Unique to Manufacturer	Global Configuration Flags
CV132	Diesel Notch Rate	127	01-127	
CV133	Steam Chuff/CAM Configuration	63	01-128	128 = External cam input 1-127 = Driver diameter in inches
CV134	Steam Gear Ratio Trim	32	00-32	32 = 100%
CV135	Volume When Muted	00	00-64	
CV140 to 240	User defined in sound definition file (SDF)	Unique to SDF	Unique to SDF	CV# & CV value range are unique to each SDF
CV140	Prime Mover Diesel/Chuff Volume	60	00-64	
CV141	BELL Volume	25	00-64	
CV142	Whistle/Horn Volume	60	00-64	
CV143	Air Features Volume (Pop off, Drier, Compressor sounds)	30	00-64	
CV145	Miscellaneous Sounds Volume	40	00-64	
CV146	Bell Delay (24mS intervals)	07	01-100	
CV147	Drier Rate (1= about 2secs)	02	01-64	
CV148	Compressor / Air Pump Start Rate	30		
CV149	Compressor / Air Pump Run Time	20		
CV150	Horn / Whistle Selector	00	00 = Standard 01 = Playable Volume 02 = Alternate	
CV151	Peak Speed To Allow Auto Coupler / Brake On Direction Change and F3 On	48	0-60	
CV152	Author ID Digitrax=0xDD/221 [221]	221	221	Not User Configurable
CV153	Project ID Steam/SD38_2 [5]			
CV154	Steam Blow down / Safety Volume	60	0-64	
CV155	Notching / Slip Mode	00	00 = Automatic 01 = Semi-auto 02 = Manual	

**CV134 and CV133 work together to control the loco's chuff rate.

Programming CV133 to a value between 1 and 127, initiates Autochuff mode. Autochuff uses internal software to simulate driver chuff timing.

CV133's default value of 63, simulates a loco driver diameter of 63 inches. If you program the value to 32, you will double the chuff rate.

CV134 (gear ratio) also affects the Autochuff rate. CV134's default value of 32 assumes no gear reduction. Doubling this value to 64 simulates a 2:1 gear reduction (doubling the chuff rate).

Setting CV133 to a value of 128 activates the white cam input on the 10 pin sound harness. This lets you configure an actual cam input on your locomotive to control chuffing. A chuff is triggered when a pulse greater than 6 volts or DCC track voltage is seen on the white cam input lead. This voltage must go off (0 volts) before the next chuff is triggered.

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