Digitrax Sound Decoder Specification Sheet

SDH164K1B
1 Amp HO Scale Mobile Decoder with SoundFX
for Kato SD38-2 Locos

Physical Size	3.11" x 0.64" x 0.23" (78.98mm x 16.26mm x 5.91mm)	**Current Rating**	1.0/1.3 Amps
Speaker Rating	32 Ohm	**Speaker Size**	28mm Round
Capacitor	330uF (9.96mm round with clip x 13.43mm high)	**Factory Sound Scheme**	SD38-2
Simultaneous Voices	3	**Onboard Sound Storage**	4 megabit

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

# Functions	6	**Function Current Rating**	500 mA	**Function Type**	FX3
Prod Date	04/05/2010	**Discontinued**	Current	**Replaced By**	Current
MSRP	US$59.95	**Feature Set**	Series 3	**UPC**	652667-20009-7

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 disable	See Above CV29	Must be set to a value that enables speed tables

		d		
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 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 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	For AC Motors

			See CV61 Section	
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

SD38-2 Diesel Scheme included with this decoder

Copyright	Digitrax, Inc.	**Date**	05-23-2006
Project	sd38_2.spj	**SDF**	SD38 Diesel Scheme
Author	AJ Ireland	**Type**	Diesel
Simultaneous Voices	3		

Function Key Usage:

Function Key	Feature	Notes
Locomotive Address CVs		
F0	Lights	
F1	Bell	
F2	Horn	CV150 Selects Horn Type
F3	Coupler Crash	Auto coupler/brake set by CV151 Max speed
F4	Air feature disable	F4 OFF enables pop-off drier and starts compressor
F5	Dynamic Brake Fans	
F6	Manual Notch Up	If CV155 is NOT 00
F7	Crossing Gate Air horn	Or Manual Notch Down, if CV155 is NOT 00
F8	Mute Control	F8 ON is muted, F8 OFF is unmuted
F9	Brake Squeal	
F10	Crossing Gate Air Horn Sequence	
F11	Engine Hand Brake	
F12-F19		Available for user added sounds

Sound CVs Used for this .spj

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=diesel scheme	Only One Scheme available
CV120	Read Only		Read Only	Manufacturer defined Not User Configurable Read Only
CV121	Software Version	03	2 or higher	
CV122	Product Type	12	Read Only	
CV123	Hardware Version	17	Read Only	
CV124	Flash Signature	2	Read Only	
CV125	16KB free blocks	0	Read Only	
CV126	FAT flags	7	Read Only	
CV127	Internal Flags	0	Read Only	
CV128	IPL Counter	0	Read Only	
CV129	Mode Control	0		0=standard DC mode 1=use relay in DC mode
CV130 to 139	Manufacturer defined in sound definition file (SDF)	Unique to Mfg	Unique to Manufacturer	Global Configuration Flags
CV132	Diesel Notch Rate	127		Notch 8 @ 44%

CV133	Steam Chuff/CAM Configuration			Not Used in this Scheme
CV134	Steam Gear Ratio Trim			Not Used in this Scheme
CV135	Volume When Muted	00	00-64	00=mute, 64=full volume
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 Volume	60	00-64	
CV141	Bell Volume	25	00-64	
CV142	Horn Volume	60	00-64	
CV143	Air Features Volume (Pop off, Drier, Compressor sounds)	30	00-64	
CV145	Misc Sounds Volume	40	00-64	
CV146	Bell Delay (24mS intervals)	7	01-100	
CV147	Drier Rate	2	01-64	1=approx. 2 seconds
CV148	Compressor Start Rate	30		
CV149	Compressor On Time	20		
CV150	Horn Selector	00	00 = Standard 01 = Playable Volume 02 = Alternate	
CV151	Peak Speed To Allow Auto Coupler / Brake On Direction Change and F3 On	48	00-60	
CV152	Author ID Digitrax=0xDD/221	221	221	Not User Configurable
CV153	Project ID GP38	21		Not User Configurable
CV154				Not used in this scheme
CV155	Notching Mode	00	00 = Automatic 01 = Semi-auto 02 = Manual	
CV156	Horn delay threshold	10		
CV160	Variant ID	2		Not User Configurable

Notes:

For CV155=01 semiautomatic notching, the Prime mover lowest Notch setting is set by the throttle speed setting. F6 (ON) can increase the Notch and F7 (ON) will decrease the Prime mover to the minimum notch set by current throttle setting.

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