## **Digitrax Decoder Specification Sheet**

## DH165IP 1.25 Amp HO Scale Mobile Decoder for Kato EMD SD70MAC and other Locos



Physical	.67" x 1.05" x .25"	<b>Current Rating</b>	1.5/2.0 Amps
Size	17.02mm x 26.67mm x 6.35mm		

Interface	Decoder End	Wires	<b>Locomotive End/Plug</b>
IP	Integrated Plug		Integrated Plug

# Functions	6	Function	500mA	Function	FX <sup>3</sup>
		<b>Current Rating</b>		Type	
<b>Prod Date</b>	12/02/2007	Discontinued	Current	Replaced By	Current
MSRP	US\$26.99	Feature Set	Series 5		

**FX**<sup>3</sup> **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.

Series 5 decoders are compatible with Digitrax Sound Bug Sound Only Decoders

## CVs are used for this decoder

CV#	Feature	Default	Range	Notes
Locor	notive 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

Controls Multiple Features	29	Configuration Register	06	See CV29	Must be set to a value
Below	_,				
Configuration Register CV   29					_
29	Conf	iguration Register CV			
Address Selection, 2 or 4 digit   2 Digit   Normal Direction of Travel (NDOT)   Fwd   Fwd/Rev		<del> </del>	06		
Normal Direction of Travel (NDOT)			2 Digit	2 or 4 Digit	
Speed Step Control		Normal Direction of Travel			
Namical Conversion		Speed Step Control	28/128	14 or 28/128	
Oni/Off		Speed Table On/Off	Off		
Locomotive Motion   Characteristics   Acceleration   Acceleration   Rate   00   00 to 31   128 Steps		_	On	On or Off	
Cocomotive Motion Characteristics	Laca				
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           06         Mid Point Voltage         00         00 to 255         128 Steps           06         Mid Point Voltage         00         00 to 255         128 Steps           06         Mid Point Voltage         00         00 to 255         128 Steps           06         Mid Point Voltage         00         00 to 255         128 Steps           06         First Step Step Step Step Step Step Step Ste					
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           06         Mid Point Voltage         00         00 to 255         128 Steps           06         Mid Point Voltage         00         00 to 255         128 Steps           06         Mid Point Voltage         00         00 to 255         128 Steps           00         0 to 255         128 Steps         00 & 00 & 00 & 00 & 00 & 00 & 00 & 00					
Deceleration Rate			00	00 to 31	128 Steps
Three Step Simple Speed Table & Start Voltage	04		00		
02         Start Voltage         00         00 to 255         128 Steps           05         Maximum Voltage         00         00 to 255         128 Steps           06         Mid Point Voltage         00         00 to 255         128 Steps           06         Mid Point Voltage         00         00 to 255         128 Steps           00 & 01 straight line curve         00 & 01 straight line curve           28 Step Speed Tables with 256 Step Resolution         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 See Above Speed         Must be set to a value that enables speed tables           53         FX Decoders do not use CV53 to designate FX effect generated on F3-Brown Wire         NA         NA         Not Available	Thre	e Step Simple Speed Table & St	art Volta	ge	, <u>*</u>
Maximum Voltage					128 Steps
Mid Point Voltage	05		00	00 to 255	128 Steps
Mid Point Voltage					00, 01 & 255 = max
28 Step Speed Tables with 256 Step Resolution  65 Kick Start value 66 Forward Trim 67 First Speed Table Entry 68 28 Step Speed Table Entry 69 Waximum Speed Table Step 69 Reverse Trim 60 128 Step Interpolated 60 128 Step Interpolated 61 128 Step Interpolated 62					
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- 68- 69 28 Step Speed Table Entries 00 128 Step Interpolated 99 Maximum Speed Table Step 00 128 Step Interpolated 95 Reverse Trim 00 128 Step Interpolated 96 See Above Must be set to a value that enables speed tables 97 Tables are disable d 98 Tables are disable Step 100 See Above Tables 99 Tables Are disable Step 100 See Above Speed Tables 90 Speed Tables Are disable Speed South Speed See Above Tables 90 See Above Speed South Speed See Above Speed See Above Speed South Speed See Above Speed South Speed See Instruction Sheet for Speed Speed Speed See Instruction Sheet For Speed S	06	Mid Point Voltage	00	00 to 255	128 Steps
28 Step Speed Tables with 256 Step Resolution65Kick Start value00128 Step Interpolated66Forward Trim00128 Step Interpolated67First Speed Table Entry00128 Step Interpolated68- 9328 Step Speed Table Entries00128 Step Interpolated94Maximum Speed Table Step00128 Step Interpolated95Reverse Trim00128 Step Interpolated29Configuration Register06 Speed Tables 					
65Kick Start value00128 Step Interpolated66Forward Trim00128 Step Interpolated67First Speed Table Entry00128 Step Interpolated68- 9328 Step Speed Table Entries00128 Step Interpolated94Maximum Speed Table Step00128 Step Interpolated95Reverse Trim00128 Step Interpolated29Configuration Register06 Speed Tables are disable dSee Above CV29Must be set to a value that enables speed tablesTorque Compensation and Switching SpeedV29NANot Available53 FX Decoders do not use CV53NANANot Available53 FX Decoders used CV53 to designate FX effect generated on F3-Brown WireNASee instruction sheet for the FX decoder you are using					curve
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 See Above Speed Tables are disable are disable are disable are speed Tables are speed Tables 37 FX Decoders do not use FX3 FX Decoders used CV53 to designate FX effect generated on F3-Brown Wire Speed Tables are using			Resolution	1	
First Speed Table Entry   00   128 Step Interpolated	65				1 1
28 Step Speed Table Entries   00   128 Step Interpolated   93   94   Maximum Speed Table Step   00   128 Step Interpolated   95   Reverse Trim   00   128 Step Interpolated			ļ		
93   Maximum Speed Table Step   00   128 Step Interpolated   95   Reverse Trim   00   128 Step Interpolated   29   Configuration Register   06   See Above   CV29   Tables   are   disable   d    Torque Compensation and   Switching Speed   Speed   Speed   Tables   Are   Switching Speed   53   FX³ Decoders do not use   FX³   CV53   FX Decoders used CV53 to   See instruction sheet for   See instruction sheet   See instruction sheet   See instruction sheet   See instruction sheet   See instruction   See instru	67	First Speed Table Entry	00		128 Step Interpolated
95 Reverse Trim 29 Configuration Register		28 Step Speed Table Entries	00		128 Step Interpolated
Configuration Register  CV29  CV29  Must be set to a value that enables speed tables  Tables are disable d  CV29  Torque Compensation and  Switching Speed  SPECTOR See Above CV29  Torque Compensation and Switching Speed  SPECTOR Speed  SPECTOR SPEED SP	94		00		128 Step Interpolated
Torque Compensation and Switching Speed  53 FX³ Decoders do not use FX³ CV53  53 FX Decoders used CV53 to FX designate FX effect generated on F3-Brown Wire  Speed  CV29 that enables speed tables  that enables speed tables  NA NA  Not Available See instruction sheet for the FX decoder you are using			ļ		1 1
Switching Speed53FX³ Decoders do not use FX³NANANot AvailableFX³CV53See instruction sheet for the FX decoder you are using			Speed Tables are disable		
FX <sup>3</sup> CV53  53 FX Decoders used CV53 to FX designate FX effect generated on F3-Brown Wire  See instruction sheet for the FX decoder you are using	_	ching Speed			
FX designate FX effect generated on F3-Brown Wire the FX decoder you are using	_		NA	NA	Not Available
on F3-Brown Wire using	53	FX Decoders used CV53 to			See instruction sheet for
	FX				
	54	FX <sup>3</sup> Decoders use CV54 to	00	00=SS Off, TC	

FX <sup>3</sup>	control		On	
1 21	Switching Speed &		01=SS On, TC	
	Torque Compensation		On	
	Torque Compensation		16=SS Off, TC	
			Off	
			17=SS On, TC	
			Off	
53	FX Decoders used CV54 to		OII	See instruction sheet for
FX	designate FX effect generated			the FX decoder you are
	on F4-White/Yellow Wire			using
Func				
13	DC Functions ON Not Used		Automatic	Not Used FX <sup>3</sup>
	in FX <sup>3</sup>			
FX <sup>3</sup> I	Functions			
49	F0F, forward light effect	00	See FX <sup>3</sup>	
	white		section	
50	F0R, reverse light effect	00	See FX <sup>3</sup>	
	yellow		section	
51	F1, Function 1 green	00	See FX <sup>3</sup>	
			section	
52	F2, Function 2 violet	00	See FX <sup>3</sup>	
			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	00	00 to 255	
	adjust			
63	Ditch Light Blink hold time	00	00 to 255	2
	Master Light Switch			See FX <sup>3</sup> section
Direc	tional Headlights, Transpondin	ıg, Split F	ield Motor	T
61	Directional Headlight		_	Not controlled by CV61
		onal	Forward &	in FX <sup>3</sup> Decoders
			Reverse	
			See CV61	
	Towns and the	Occ	Section	
	Transponding	Off	Off or On	
			See CV61	
	Split Field Motor	Off	Section Off or On	For AC Motors
	Spin Field Motor	OII	See CV61	TOTAL MIOTORS
			Section Section	
Scale	able Speed Stabilization (Back )	EMF)	Beetion	
55	Static Compensation	128	00 to 255	
56	Dynamic Compensation	048	00 to 255	
57	Speed Stabilizer-Droop	006	00 to 15	
	rSonic (Quiet Operation)		1 3 6 1 2	
09	Motor Frequency SuperSonic	00	00 to 255	Default is MAX
	nced Consisting			
11474				

19	Advanced Consist Address	00	00 to 255	Default is OFF
21	Advanced Consist Function	00	See CV21-22	
	Control Override for F1-F8		Section	
22	Advanced Consist Function	00	See CV21-22	
	Control Override for F0 &		Section	
	F9-F12			
Funct	ion Mapping			
33-	Function Mapping CVs	00	See Function	
46			Mapping	
			Section	
Decod	ler Reset to Default Values			
00	Reset Decoder to Factory	129	Set to 08 to	Set to 09 to reset all CV
08	Reset Decoder to Factory	127	500 00 00	
08	Default CV Values	12)	reset all CV	Values except 28 step
08	-	12)		
	-	12)	reset all CV	Values except 28 step
	Default CV Values	00	reset all CV	Values except 28 step
Decod	Default CV Values ler IDs		reset all CV	Values except 28 step speed table.
<b>Decod</b> 105	Default CV Values  ler IDs  User Private ID #1	00	reset all CV	Values except 28 step speed table.  User Defined
<b>Decod</b> 105 106	Default CV Values  ler IDs  User Private ID #1  User Private ID #2	00 00	reset all CV Values.	Values except 28 step speed table.  User Defined User Defined

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