



**Tsunami® Digital Sound Decoder™**

**User's Guide Addendum  
for the TSU-IM1000 Digital Sound Decoder**

Software Release 1.18

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# All Aboard!

## Overview

Congratulations on the purchase of your SoundTraxx®Tsunami® TSU-IM1000 Digital Sound Decoder™. This **User's Guide Addendum** contains the unique information required to take full advantage of all features offered with the Tsunami for **InterMountain HO diesel locomotives**. For the power user, the **Tsunami Diesel Technical Reference** contains a list of all CVs available for use with Tsunami decoders, including their exact functions and make-ups, providing a complete reference for advanced programming techniques.

Technical Bulletins and Application Notes covering various topics are also published from time to time and may be downloaded free of charge from our website at [www.soundtraxx.com](http://www.soundtraxx.com).



# Operation

## Operation Overview

Each SoundTraxx Tsunami TSU-IM1000 comes with all CVs pre-programmed so you can begin using your locomotive immediately after installation without having to make any adjustments. However, the software for these decoders is as unique as the prototypes and includes several special features to enhance the experience of running your InterMountain diesel locomotive.

The TSU-IM1000 decoder is available in three versions to accommodate the following InterMountain HO diesel releases: F-Units – EMD 567 (P.N. 828070); SD40s – EMD 645 Turbo (P.N. 828071); and ES44ACs/ES44DCs – GE GEVO-12 (P.N. 828074). This addendum describes features for each version. Additional programming information can be found in the Tsunami Diesel Technical Reference, available for download free of charge at [www.soundtraxx.com](http://www.soundtraxx.com).



# Operation

## Function Mapping Tables

CVs 33 – 46 allow you to customize which DSD outputs or sound effects are controlled by which function keys. Each function input, F0 through F12, is assigned a unique CV that allows the corresponding function control to be redirected to up to 14 different DSD function outputs or sound effects. This allows a single function key to control more than one output, if desired.

The F0 function has two CVs – one for forward direction and one for reverse. Function outputs mapped to these registers will be directional unless the same output is mapped to both F0 CVs.

**Note:** All function inputs cannot be mapped to all outputs. Tables A and B graphically indicate which inputs can control which outputs based on the locomotive being used. In each table, bold numbers indicate default values. Also note that Tables A and B are specific to TSU-IM1000 decoders and contain slightly different values than those in the Function Mapping Table provided in the Tsunami Diesel Technical Reference.



# Operation

**Table A. Function Mapping Table: EMD 645 Turbo and GE GEVO-12**

Function Key	Control CV	Headlight	Backup Light	Horn	Bell	FX5	FX6	Dynamic Brake	Short Horn	FX7*	Radiator Fans (RPM+)	Dimmer	Mute	Air Compressor (RPM-)	Brakes	Coupler
F0 (f)	33	<b>1</b>	2	4	8	16	32	64	128							
F0 (r)	34	1	<b>2</b>	4	8	16	32	64	128							
F1	35	1	2	4	<b>8</b>	16	32	64	128							
F2	36	1	2	<b>4</b>	8	16	32	64	128							
F3	37				1	2	4	8	<b>16</b>	32	64	128				
F4	38				1	2	4	<b>8</b>	16	32	64	128				
F5	39				1	<b>2</b>	4	8	16	32	64	128				
F6	40				1	2	<b>36</b>	8	16	32	64	128				
F7	41							1	2	4	8	<b>16</b>	32	64	128	
F8	42							1	2	4	8	16	<b>32</b>	64	128	
F9	43							1	2	4	<b>8</b>	16	32	64	128	
F10	44								1	2	4	8	16	<b>32</b>	64	128
F11	45								1	2	4	8	16	32	<b>64</b>	128
F12	46								1	2	4	8	16	32	64	<b>128</b>

**Bold Numbers indicate default settings.**

*\*Programming lighting function FX7 turns on FX5B (the second lighting output associated with function 5). See the section on CV 53 listed on page 4 for additional information related to FX5B lighting control.*

**Table B. Function Mapping Table: EMD 567**

Function Key	Control CV	Headlight	Backup Light	Horn	Bell	FX5	FX6	Dynamic Brake	Short Horn	FX7*	Radiator Fans (RPM+)	Dimmer	Mute	Air Compressor (RPM-)	Brakes	Coupler
F0 (f)	33	<b>1</b>	2	4	8	16	32	64	128							
F0 (r)	34	1	<b>2</b>	4	8	16	32	64	128							
F1	35	1	2	4	<b>8</b>	16	32	64	128							
F2	36	1	2	<b>4</b>	8	16	32	64	128							
F3	37				1	2	4	8	<b>16</b>	32	64	128				
F4	38				1	2	4	<b>8</b>	16	32	64	128				
F5	39				1	2	<b>4</b>	8	16	32	64	128				
F6	40				1	<b>2</b>	4	8	16	32	64	128				
F7	41							1	2	4	8	<b>16</b>	32	64	128	
F8	42							1	2	4	8	16	<b>32</b>	64	128	
F9	43							1	2	4	<b>8</b>	16	32	64	128	
F10	44								1	2	4	8	16	<b>32</b>	64	128
F11	45								1	2	4	8	16	32	<b>64</b>	128
F12	46								1	2	4	8	16	32	64	<b>128</b>



# Operation

## Locomotive Lighting Effects

Each TSU-IM1000 decoder includes six lighting outputs that have been pre-programmed to match the locomotive's lighting features. Each output can be independently set to any of 15 different Hyperlight™ lighting effects, which include dimmable headlight, Mars light, Gyalight, single and double-flash strobe lights, and Type I and II ditch lights, among others. Table C highlights the default lighting outputs of each decoder as they correspond to the six pins on the connector, including which CV adjusts that output's Hyperlight effect. For example, to change the ditch lights on a GE GEVO-12 decoder from Type I to Type II, adjust the values in CVs 52 and 53. Additional information related to lighting effect CVs 53 – 58 immediately follows Table C.

**Table C. TSU-IM1000 Default Lighting Outputs**

	Hyperlight CV	EMD 567	EMD 645 Turbo	GE GEVO-12
Pin 1	51	Mars Light	Number Board	Number Board
Pin 2	49	Headlight	Headlight	Headlight
Pin 3	50	Number Board	Backup Light	Backup Light
Pin 4	52	Side Lights	Ditch Lights	R Ditch Light
Pin 5	N/A	+ Common	+ Common	+ Common
Pin 6	53	-	-	L Ditch Light

### CV 53: FX5B Lighting Control

CV 53 is used to control the second lighting output associated with Function 5 (i.e., FX5B). FX5B can be programmed with any of SoundTraxx's Hyperlight lighting effects. Program FX7 as indicated in Tables A and B of this addendum to turn on FX5B lighting control. Refer to the Tsunami Diesel Technical Reference for full information related to programming CV 53 for FX5B lighting control.

### CV 54: FX6B Lighting Control

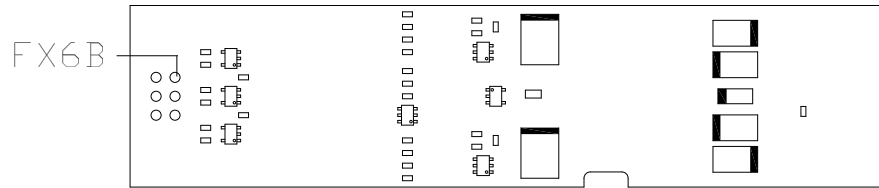
CV 54 is used to control the second lighting output associated with Function 6 (i.e., FX6B). FX6B can be programmed with any of SoundTraxx's Hyperlight lighting effects. Refer to the Tsunami Diesel Technical Reference for full information related to programming CV 54 for FX6B lighting control.

**IMPORTANT NOTE:** Lighting function FX6B is not directly supported on the 6-pin wire harness. To use FX6B lighting control, you must solder a wire to the FX6B output. To locate the FX6B output, orient the decoder so that the 6-pin connector is on the left side and the three 2-pin connectors are on the right. Flip the decoder over (top over bottom, not end over end) so that the 6-pin connector is on the left underside. The FX6B output will be the top right-hand pad in the set of six pads on the far left side of the decoder.





# Operation



## CV 57: FX5, FX6 Directional Control

CV 57 is used to control the directionality of function outputs FX5A, FX5B, FX6A and FX6B. Setting a bit to 1 enables the corresponding function in the indicated direction. To make a function bidirectional, set both the forward and reverse bits to 1. Refer to the Tsunami Diesel Technical Reference for full information related to programming CV 57.

Bit 7								Bit 0
FX6B.R	FX6B.F	FX6A.R	FX6A.F	FX5B.R	FX5B.F	FX5A.R	FX5A.F	

## CV 58: FX5, FX6 Lighting Override

CV 58 can be used to configure FX5 and FX6 so that all other lighting function outputs automatically turn off when the corresponding function is turned on. For example, if Bit 0 of CV 58 (i.e., FX5OVR) is left at the default setting of 0, FX5 will operate normally. However, if FX5OVR is set to 1, the headlight, backup light and FX6 will turn off automatically when FX5 is on.

**Note:** If FX5OVR and FX6OVR have both been set to 1, FX5 will have precedence.

Bit 7									Bit 0
							FX6OVR	FX5OVR	



# Operation

## Advanced Motor Control CVs

To ensure the best motor control match, advanced motor control CVs 209 – 214 have been set to the following default values.

**Table D. TSU-IM1000 Advanced Motor Control Default Values**

CV	Description	EMD 567	EMD 645 Turbo GE GEVO-12
209	Kp Coefficient	30	25
210	Ki Coefficient	25	25
212	Motor Control Intensity	255	255
213	Motor Control Sample Period	24	24
214	Motor Control Sample Aperture Time	7	7