

## Tsunami Summary & Decoder detail Listings

The Tsunami sound system is a very high-performance, onboard locomotive sound system. Like the soundtraxx DSD-150 it replaces, Tsunami integrates a full-featured sound system, four Hyper-light lighting effects, a motor controller and a DCC decoder into a single, integrated package and is compatible with the NMRA DCC standards and Recommended Practices. The Tsunami sound system can also be used on 'Analog' layouts and controlled with a DC power pack, though it really shines on DCC controlled layouts.

At Tsunami's core is a true 32-bit Digital Signal Processor, or DSP, capable of executing over 120 million instructions per second. With this new level of performance, SoundTraxx was able to give Tsunami 14 functions, over 22 individual sounds, and 4 special effects including the ability to alter the exhaust sound automatically in response to changes in the engine load. The motor controller received numerous enhancements as well, including the use of high frequency PWM and load compensation.

### **New Sounds**

To take advantage of Tsunami's increased sample rate and dynamic range, all sound effects have been re-mastered and re-digitized for the best audio possible. Some of the many new sound effects added to the Tsunami repertoire include:

**Multiple Horns and Whistles** - Each Tsunami includes several horn and whistle selections within each model making it easier to select the right sound of your favorite model. For example, the Southern Pacific 4449 will have an air horn too! Diesel Tsunamis include up to 16 airhorns in each model!

**Short Whistle (or Horn)** - To supplement the primary whistle, a short whistle control has been added to produce a short, snappy toot needed for many common whistle signals.

**Dynamo (steam)** - The dynamo sound effect has been improved to include the sound of the turbine windup when it is first turned on.

**Brake Squeal** - This effect has been added to both steam and diesel models and may be activated manually using a function key or automatically when the engine is slowed to a stop.

**Water Stop (steam)** - The water stop effect can be activated with a function key whenever the engine is stopped and begins with the sound of the tender hatch being opened followed by the sound of water filling the tender.

In all, there are over 22 steam sound effects including the bell, air pump, exhaust chuff, coupler, steam release, cylinder cocks, snifter valves, brake release, side rod clank, Johnson bar/power reverse, blower, injector, pop valve and Fireman Fred. Diesel versions include engine startup, engine shutdown, dynamic brakes, poppet valve, air compressor, radiator fans, bell and more.

### **More Functions = More Fun!**

To help control all these sounds, Tsunami will respond to up to 14 function keys. Function assignments are similar to the SoundTraxx LC decoder series in order to maintain consistency across product lines. Of course, Tsunami's function mapping feature can always be used to change the control configuration to suit one's personal taste.

### **Sound Effect Processor**

Tsunami has four built-in sound effects that allow the individual sounds (i.e., whistle, bell, etc.) to be modified in a particular manner. Each effect is fully adjustable using the decoder's CV settings and each effect can be turned on or off as desired

**Mixer** - Tsunami's new mixer design incorporates several new innovations. To begin with, there are 24 individual volume settings allowing each sound effect level to be independently adjusted. A master volume control has also been added so that the overall

audio level can be easily changed with a single CV. Finally, the mute function has been improved to provide a more pleasing fade-off/fade-on effect

**Playable Whistle** - Owners of Digitrax DT-400 or NCE's latest code update will be able to 'play' the whistle like never before!

**Dynamic Digital Exhaust Processor (DDE) (steam)** - The DDE processor has been greatly improved over the earlier DSD-150 design, sensing changes in the throttle setting, and automatically adjusting the timbre, volume and other parameters of the exhaust sound to simulate what would be heard from a prototype locomotive under similar conditions.

**Reverb** - A digital reverb has been included in the Tsunami system to add "spatial presence" to selected sound effects. By adjusting the reverb level and delay time, the user can simulate multiple prime movers for example, or the effect of operating in hilly terrain.

**Multi-Band Equalizer** - Each Tsunami sound system incorporates a multi-band equalizer similar to the "graphic" equalizer found on many of today's home and automotive stereo systems. Tsunami's equalizer allows the user to cut and boost sound levels by +/- 12dB over seven selected frequency ranges (62Hz, 125Hz, 250Hz, 500Hz, 1KHz, 2KHz and 4KHz) and provides the "ultimate" tone control.

Using the equalizer, the user can easily compensate for deficiencies in the speaker installation to produce a flatter and overall, a more accurate frequency response. Similarly, the equalizer can be used to match the sound system's response to that of the speaker. Consider a typical 12mm speaker. Limited by the laws of physics, this speaker will produce very little bass no matter how big a signal is sent to it. If the low frequencies are too great, the speaker will distort and eventually burn out. In such an instance, the equalizer can be used to lower the bass levels resulting in a clearer and more satisfying sound as well as a longer speaker life.

### **Hyper-drive Motion Control System**

No, the Hyper-drive will not transport you to the next galaxy but it will make your locomotive run better! Tsunami's motion controller incorporates all of the most advanced motor control features found in the DCC marketplace today plus a few new ones:

**High Resolution Speed Steps** - While most decoders today can support 127 speed steps, Tsunami has 2048 speed steps! Admittedly, there are no DCC systems on the market as yet supporting this many speed steps; however, Tsunami interpolates between speed steps during acceleration and braking and as part of its load compensation algorithm. The result is micro-fine speed control.

**High Frequency PWM Drive** - Virtually all DCC decoders use a form of PWM (Pulse-Width-Modulation) to control motor speed, At low frequencies, the PWM signal used to control the motor speed can result in an audible hum or buzz, especially in brass locomotives. Tsunami uses an ultra-sonic PWM frequency adjustable to 39KHz, well beyond the range of human hearing and safe for coreless motors as well.

**Speed Curves** - Like all other SoundTraxx decoders, Tsunami provides a user-customizable speed table and an adjustment for starting voltage as well as 14 preset speed curves.

**Adjustable Momentum** - The acceleration and braking rates are independently adjustable and can be used to simulate the momentum of a heavy train. Additionally, in the event of a sudden direction change, Tsunami will first slow the motor to a full stop before changing directions and then accelerate back to the original speed.

**Hyper-light Lighting System** - Tsunami TSU-1000 provides four function outputs for controlling lights. The Micro-Tsunami TSU-750 provides two function outputs for controlling lights. Each output can be independently set to any of SoundTraxx's 14 different Hyper-light lighting effects including the on-off headlight, dimmable headlight, mars light and firebox flicker. Tsunami also has new effect for steam locomotives called the "Dyno-Light" which synchronizes the lamp brightness to the "output" of the dynamo such that the lamp brightness gradually increases as the dynamo builds up speed.

A new feature added to the Hyper-light system is LED Brightness Correction. An LED exhibits a different output response than an incandescent bulb. As a result, LEDs were historically not recommended for use with the lighting effects, as they tended to be over-bright and a bit lifeless. Tsunami now provides a control mode that corrects for the output differences resulting in a more eye-popping effect regardless of which type of light is used.

Of course Tsunami also includes the other the lighting features found on previous generations of SoundTraxx products such as choice of directional or Rule 17 lighting control, Grade crossing timers and an adjustable flash rate.

The SoundTraxx Tsunami Digital Sound Decoders are compatible with the NMRA Standards and Recommended Practices.

#### **DECODER FEATURES:**

- Compatible with the NMRA DCC Standards and Recommended Practices
- Supports 7 bit address modes for compatibility with 'simple' systems
- Programmable acceleration, deceleration, starting voltage
- Supports 14 bit address modes for addressing any Loco number up to 9,999
- Supports programming on the main

#### **THROTTLE FEATURES:**

- Supports 14, 28, and 128 speed step modes
- Speed interpolation provides smooth 128 speed step response in any mode
- Programmable acceleration, deceleration, starting voltage
- 7 bit consist addressing
- 15 pre-programmed speed tables and 1 user programmable speed table
- High Frequency Silent Motor Drive
- Load Compensation

#### **SOUND FEATURES:**

- High quality digital sound
- Individual, adjustable volume controls
- One watt audio amplifier
- Polyphonic Sound Processor
- 16-bit Audio Processing
- Playable Whistle
- 7-band Audio Equalizer
- Reverb

#### **LIGHTING FEATURES:**

- 15 Lighting effects supporting "Rule 17" or automatic direction control

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**The TSU-1000 Tsunami Digital Sound Decoder is rated for the following loads:**

**Motor Stall Current: 1 AMP Maximum**  
**Function Current: 100mA (each output)**  
**Audio Amplifier: 1 Watt, 8 ohm load**  
**Track Voltage: 27 Volts Maximum**  
**Dimensions: 1.7"x0.67"x0.28"**

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**A note about Pricing: Prices shown are indicative only and were established whilst exchange rates were not particularly favourable.**

**It is probable that currency rates will improve, so please do feel free to check and reconfirm \$Au prices at the time of your order.**

## Tsunami Digital Sound Decoders/DIESEL

| Part Number | Description   | List Price |
|-------------|---|------------|
| 827101      | <b>EMD 567 Diesel Engines</b> - for prototypes manufactured with the 567 Prime Mover (1st Generation). This includes such engines as FT, F-units, E-units, GP7, GP9 and others. Some of the 16 airhorns included are: Wabco E2; Leslie A125, A200, S2M, S3L, S5T; Nathan K3L, M3, M5, P3, P5; Holden M3H, K5H, Hancock 4700 Air Whistle and more!                   | \$179.00   |
| 827102      | <b>EMD 645 Diesel Engines</b> - for prototypes manufactured with the 645 Prime Mover (2nd Generation, turbo-charged). This includes such engines as GP15T, GP39, GP39-2, SD39, GP40, GP40-2, SD40, SD40-2, SD45 and others. Some of the 16 airhorns included are: Wabco E2; Leslie S2M, S3L, RS3L, S5T; Nathan K3L, K5LA, M3, M5, P3, P5; Holden M3H, K5H and more! | \$179.00   |
| 827103      | <b>EMD 710 Diesel Engines</b> - for prototypes manufactured with the 710 Prime Mover (3rd Generation, turbo-charged). This includes such engines as GP59, GP60, GP60M, SD60 SD70, SD70MAC and others. Some of the 16 airhorns included are: Wabco E2; Leslie S2M, S3L, RS3L, RS5T, S5T; Nathan K3L, K5LA, M3, M5, P3, P5; Holden M3H, K5H and more!                 | \$179.00   |
| 827104      | <b>ALCO 244 Diesel Engines (V12)</b> - for prototypes manufactured with the 244 Prime Mover. This includes such engines as FA, PA, RS-2, RS-3, RSC-2, RSC-3, RSD-4, RSD-5, RS-10 and others. Some of the 16 airhorns included are: Wabco E2; Leslie A125, A200, S2M, S3L, S5T; Nathan K3L, M3, M5, P3, P5; Holden M3H, K5H and more!                                | \$179.00   |
| 827105      | <b>ALCO 251 Diesel Engines (V12)</b> - for prototypes manufactured with the 251 Prime Mover, turbo-charged. This includes such engines as RS-11, RS-18, M420, RS-32, RS-36, C424M,C420 locomotives and others. Some of the 16 airhorns included are: Wabco E2; Leslie A200, S2M, S3L, S5T; Nathan K3L, M3, M5, P3, P5; Holden M3H, K5H and more!                    | \$179.00   |

## Tsunami Digital Sound Decoders/STEAM

| Part # | Description  | Price    |
|--------|--|----------|
| 826101 | <b>Light Steam</b> - contains 8 whistles and sounds appropriate for a variety of light steam engines such as switchers and engines with the following wheel arrangements: 4-4-0, 4-4-2, 2-6-0, 4-6-0, 2-8-0 and others. <b>Whistles included are:</b><br><br>C&S #74 (Road Mix)<br>C&S #74 (Yard Mix)<br>Baldwin Consolidation<br>Heisler<br>Westside Lumber Co. Shay #14<br>Peanut Whistle<br>D&RGW Single Chime<br>Reading 6-Chime | \$179.00 |

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|--------|---|----------|
| 826102 | <p><b>Medium Steam</b> - contains 8 whistles and sounds appropriate for a variety of medium steam engines such as engines with the following wheel arrangements: 4-6-2, 2-8-2, 4-6-4, 2-10-0 and others.</p> <p><b>Whistles included are:</b><br/> Santa Fe Freight<br/> B&amp;O 3-Chime #74<br/> PRR Banshee<br/> Lehigh Valley<br/> Nathan 5-Chime (Road Mix)<br/> Nathan 5-Chime (Yard Mix)<br/> USRA 6-Chime</p>  | \$179.00 |
| 826103 | <p><b>Heavy Steam</b> - contains whistles and sounds appropriate for articulated / heavy steam engines including those the following wheel arrangements: 4-8-4, 2-10-2, 2-12-2, 2-8-8-2, 4-6-6-4 etc.</p> <p><b>Whistles included are:</b><br/> Frisco #1522<br/> Norfolk &amp; Western #1218<br/> Union Pacific #4018<br/> Southern Pacific #4449 (whistle)<br/> Southern Pacific #4449 (horn)<br/> USRA 6-Chime</p> | \$179.00 |
| 826104 | <p><b>Denver &amp; Rio Grande K-Class</b> - includes a collection of whistles and sounds commonly heard on D&amp;RGW K-Class Mikados. This decoder is also appropriate for other light and medium steam.</p> <p><b>Whistles included are:</b><br/> K-27 #463<br/> K36 #487<br/> K36 #488<br/> K-36 #489<br/> K-36 #489 (with broken chime)<br/> K-37 #497</p>   | \$179.00 |
| 826105 | <p><b>Southern Pacific Cab Forward</b> - includes classic SP whistles (and a few extra for variety) as well as the signature 'aspirated' airpump.</p> <p><b>Whistles included are:</b><br/> Southern Pacific 6-Chime<br/> Southern Pacific #4449 (whistle)<br/> Southern Pacific #4449 (horn)<br/> Frisco #1522<br/> Norfolk &amp; Western #1218<br/> USRA 6-Chime</p>  | \$179    |
| 826116 | <p><b>Denver &amp; Rio Grande C-Class</b> - includes a collection of whistles and sounds commonly heard on D&amp;RGW C-Class Consolidations. This decoder is also appropriate for other light steam engines.</p> <p><b>Whistles included are:</b><br/> C-19 #340 (Yard Mix)      C-19 #340 (Road Mix)<br/> D&amp;RGW Single Chime<br/> Westside Lumber Co. Shay #14<br/> Peanut whistle</p>                           | \$179    |
| 826120 | <p><b>Light Logging</b> - includes a collection of whistles and sounds suitable for installation in geared and light logging locomotives such as the shay, climax, heisler and other small engines.</p> <p><b>Whistles included are:</b><br/> Westside Lumber Co. Shay #14, Westside Lumber Co. Shay #12<br/> Heisler, Peanut whistle, D&amp;RGW Single Chime</p>   | \$179    |

## Micro-Tsunami Digital Sound Decoders/STEAM

| Part # | Description  | Price |
|--------|--|-------|
| 826001 | <p><b><i>Light Steam</i></b> - 8 whistles and sounds for a variety of light steam engines such as switchers and engines with the following wheel arrangements: 4-4-0, 4-4-2, 2-6-0, 4-6-0, 2-8-0 and others.</p> <p><b>Whistles included are:</b><br/>           C&amp;S #74 (Road Mix)<br/>           C&amp;S #74 (Yard Mix)<br/>           Baldwin Consolidation<br/>           Heisler<br/>           Westside Lumber Co. Shay #14<br/>           Peanut Whistle<br/>           D&amp;RGW Single Chime<br/>           Reading 6-Chime</p> | \$199 |
| 826002 | <p><b><i>Medium Steam</i></b> - 8 whistles and sounds appropriate for most medium steam engines such as engines with the following wheel arrangements: 4-6-2, 2-8-2, 4-6-4, 2-10-0 and others.</p> <p><b>Whistles included are:</b><br/>           Santa Fe Freight<br/>           B&amp;O 3-Chime #74<br/>           PRR Banshee<br/>           Lehigh Valley<br/>           Nathan 5-Chime (Road Mix)<br/>           Nathan 5-Chime (Yard Mix)<br/>           USRA 6-Chime</p>   | \$199 |
| 826003 | <p><b><i>Heavy Steam</i></b> - whistles and sounds appropriate for articulated and heavy steam engines including those with the following wheel arrangements: 4-8-4, 2-10-2, 2-12-2, 2-8-8-2, 4-6-6-4 and others.</p> <p><b>Whistles included are:</b><br/>           Frisco #1522<br/>           Norfolk &amp; Western #1218<br/>           Union Pacific #4018<br/>           Southern Pacific #4449 (whistle)<br/>           Southern Pacific #4449 (horn)<br/>           USRA 6-Chime</p>  | \$199 |
| 826004 | <p><b><i>Denver &amp; Rio Grande K-Class</i></b> - includes a collection of whistles and sounds commonly heard on D&amp;RGW K-Class Mikados. This decoder is also appropriate for other light / medium steam engines.</p> <p><b>Whistles included are:</b><br/>           K-27 #463, K36 #487, K36 #488, K-36 #489<br/>           K-36 #489 (with broken chime)<br/>           K-37 #497</p>   | \$199 |
| 826005 | <p><b><i>Southern Pacific Cab Forward</i></b> - includes classic SP whistles (and a few extra for variety) as well as the signature 'aspirated' airpump.</p> <p><b>Whistles included are:</b><br/>           Southern Pacific 6-Chime<br/>           Southern Pacific #4449 (whistle)<br/>           Southern Pacific #4449 (horn)<br/>           Frisco #1522<br/>           Norfolk &amp; Western #1218<br/>           USRA 6-Chime</p>  | \$199 |

| 826016   | <p><b>Denver &amp; Rio Grande C-Class</b> - includes a collection of whistles and sounds commonly heard on D&amp;RGW C-Class Consolidations. This decoder is also appropriate for other light steam engines.</p> <p><b>Whistles included are:</b><br/> C-19 #340 (Yard Mix)<br/> C-19 #340 (Road Mix)<br/> D&amp;RGW Single Chime<br/> Westside Lumber Co. Shay #14<br/> Peanut whistle</p> | \$199 |
|--|---|-------|
| 826020   | <p><b>Light Logging</b> - includes a collection of whistles and sounds suitable for installation in geared and light logging locomotives such as the shay, climax, heisler and other small engines.</p> <p><b>Whistles included are:</b><br/> Westside Lumber Co. Shay #14<br/> Westside Lumber Co. Shay #12<br/> Heisler<br/> Peanut whistle<br/> D&amp;RGW Single Chime</p>               | \$199 |
| <b>Micro-Tsunami Digital Sound Decoders/DIESEL</b> |   |       |
| Part #   | Description   | Price |
| 827001   | <p><b>EMD 567 Diesel Engines</b> - for prototypes manufactured with the 567 Prime Mover (1st Generation). This includes such engines as FT, F3, F7, GP&amp;, GP9 and others. Some of the 16 airhorns included are: Wabco E2; Leslie A125, A200, S2M, S3L, S5T; Nathan K3L, K5LA, M3, P3, P5; Holden M3H, K5H and more!</p>  | \$199 |
| 827004   | <p><b>ALCO 244 Diesel Engines</b> - for prototypes manufactured with the 244 Prime Mover. This includes such engines as FA-1, FA-2, PA-1, PA-2, RS-2, RS-3, RSC-2, RSC-3 and others. Some of the 16 airhorns included are: Wabco E2; Leslie A125, A200, S2M, S3L, S5T; Nathan K3L, K5LA, M3, P3, P5; Holden M3H, K5H and more!</p>  | \$199 |
| 827010   | <p><b>Galloping Goose</b> - contains horns for the RGS Galloping Goose and other railbuses.</p>   | \$199 |