Installation

The polarity of the speaker terminals is only important when using multiple speakers. If you have installed multiple speakers, make sure they are phased properly, i.e., positive lead to positive lead and minus lead to minus lead of each speaker (see the Installation Guide for more information).

Lighting Connections

Each DSD is equipped with four function outputs that are intended to drive headlight, backup light and special effect lights. Each output is rated for 100mA. **Do not exceed this rating!** Be sure that the combined current of all lights as well as the motor stall current measured does not exceed the decoder rating.

12-16V lamps can be directly wired to the function outputs as shown in Figure 1. Connect the WHITE wire to one of the Headlight leads. Connect the other bulb lead to the BLUE wire. Connect the YELLOW wire to one of the Backup Light leads. Connect the other bulb lead to the BLUE wire.

To connect the Function 5 lamp, connect the BROWN wire to one lead and connect the other lead to the BLUE wire. To connect the Function 6 lamp, connect the GREEN wire to one lead and connect the other lead to the BLUE wire.

Tsunami decoders may also be used with 1.5 Volt bulbs or LEDs, which require the use of a resistor. See the **Installation Guide** if you need more information.

Exhaust Cam Connections *(steam only)*

Connect the TAN wire from the 3-pin Speaker/Cam harness of the DSD to the exhaust cam wiper switch. The decoder is factory-programmed to operate using the Auto-Exhaust feature. If you wish to use an exhaust cam, you must enable the cam-synchronized exhaust by setting CV 112 to 128.

Installing Tsunami in a DCC-ready Model

If your locomotive is wired with an NMRA-compatible 8-pin socket, you may solder a mating connector to the DSD's wire harness, which will allow you to easily install the decoder by simply plugging the connector into the socket, with the exception of the connections for Functions 5 and 6, the speaker and the exhaust cam. SoundTraxx offers P.N. 810123, which is a package of four connectors that meet NMRA specifications.

1. Remove the 'dummy' plug from the NMRA socket.
2. We highly recommend you test the socket itself to ensure it is properly wired. Assuming the locomotive manufacturer wired the socket correctly can be dangerous! If you don't know how to do this, see the **Installation Guide.**
3. Wire the connector to the decoder's wire harness according to the illustration. Solder the wires from the sound decoder to the cup side of the connector as shown in the Figure 2.

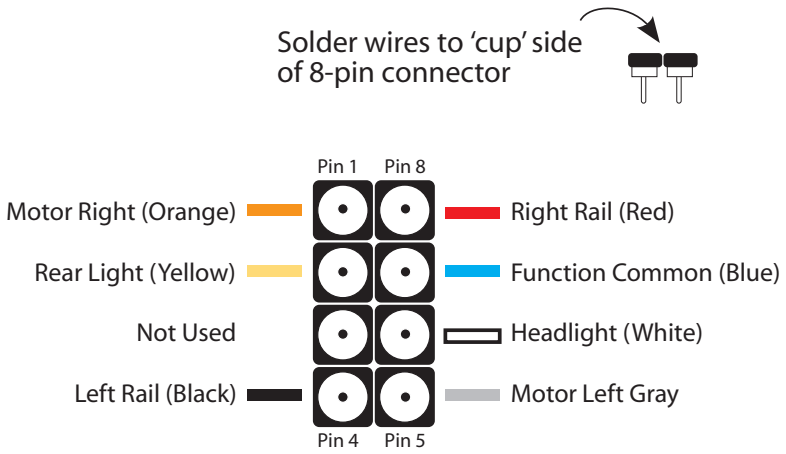


Figure 2 - NMRA 8-Pin Connector Wiring Code

4. Plug the newly wired connector into the socket with the orange wire at pin 1 on the manufacturers circuit board. Most manufacturers have labeled the sockets with pin 1 or pin 8 (at a minimum). Once you have plugged in the 8-pin connector, you will still need to wire the speaker and cam according to the instructions for a non DCC-ready model.

Operation

Quick Start

Your SoundTraxx Tsunami has been shipped with all CVs pre-programmed so you can begin using your locomotive immediately without having to worry about what adjustments to make. All Tsunami Digital Sound Decoders are shipped with the address set to 3. Function Assignments are as follows:

Steam Decoders

Function Key	*Effect*
F0	**Headlight/Backup Light/Dynamo**
F1	**Bell**
F2	**Whistle**
F3	**Short Whistle**
F4	**Steam Release**
F5	**FX5 Output**
F6	**FX6 Output**
F7	**Light Dimmer**
F8	**Mute the Sound**
F9	**Water Stop**
F10	**Injectors**
F11	**Brake Squeal/Release**
F12	**Coupler Clank**

Diesel Decoders

Function Key	*Effect*
F0	**Headlight/Backup Light**
F1	**Bell**
F2	**Airhorn**
F3	**Short Horn**
F4	**Dynamic Brake On/Off**
F5	**FX5 Output**
F6	**FX6 Output**
F7	**Light Dimmer**
F8	**Mute the Sound**
F9	**RPM+**
F10	**RPM-**
F11	**Brake Squeal/Release**
F12	**Coupler Clank**

Programming

Programming and Reading CVs

Certain command stations allow you to read a CV during Service Mode Programming, which is useful to verify its current setting. If you have trouble reading or verifying CVs, the problem may be due to the design of your command station and not the DSD itself. Tsunami and all other decoders communicate back to the command station using what's called an acknowledgment pulse, which is defined in NMRA RP-9.2.3 as "an increased load on the programming track of at least 60mA for at least 5ms." Like most decoders, the DSD generates the acknowledgment pulse by momentarily applying power to the motor.

If your DSD is otherwise working properly (i.e., responds properly on the mainline to speed and direction commands) but your command station is having troubles reading CV data from the DSD, it may be due to incompatibilities between the electrical requirements of the DSD (which are different from conventional decoders due to the added audio circuitry) and the electrical characteristics of your programming track. In such an event, you will need to use a Programming Track Booster, such as SoundTraxx PTB-100 (P.N. 829002). The PTB-100 amplifies the programming track signals to levels that work best with Tsunami. It is easy to install (see below) and inexpensive. An advantage to using the PTB-100 is that it also provides short circuit detection and some helpful diagnostics. It works well for all other SoundTraxx decoders, too.

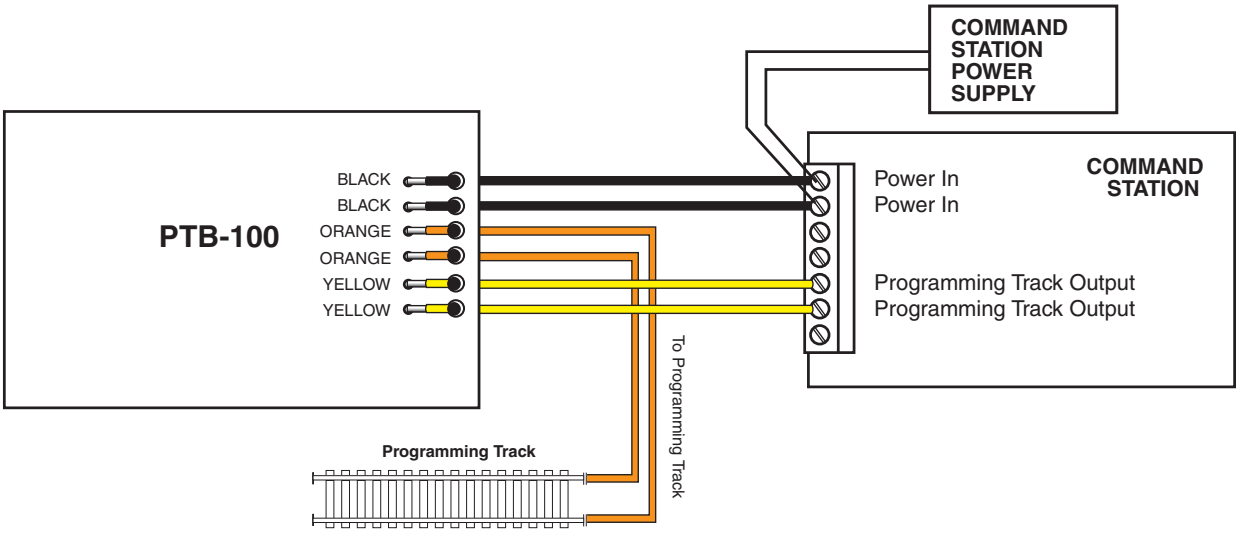


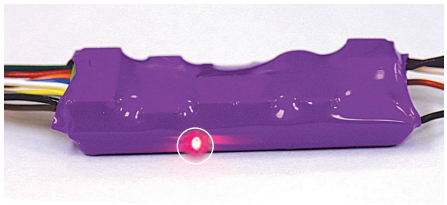
Figure 3 - General Wiring Diagram for the SoundTraxx PTB-100

Diagnostic Lamps

Tsunami has two red LEDs on the circuit board which may be helpful for resolving potential difficulties.

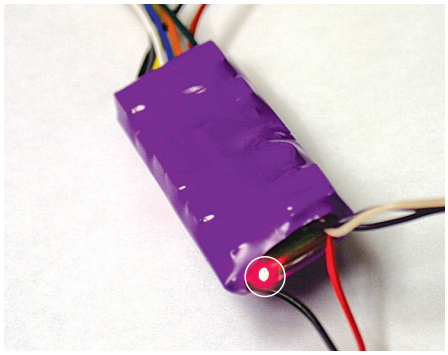
Pilot Light

The pilot light indicates that the decoder is receiving power. If this light does not come on, it may indicate an improperly wired decoder. It could also indicate a loose wire, poor track pickups, no output from the command station or other problem with your layout wiring.



Fault Light

During normal operation, the fault light will turn on and off with the headlight, and is useful for establishing basic control of the decoder. Additionally, Tsunami monitors a number of its input signals and if a fault is found, reports an error code by flashing the fault light as well as the headlight and backup light (if connected). The number of times the light flashes corresponds to the number of the error code. Error codes whose conditions can usually be solved by the user are as follows:



Error 9: Over-temperature Fault
Error 10: Over-voltage Fault
Error 11: Motor Connection Fault
Error 12: Motor Over-current Fault
Error 16: CV Reset has ocurred and CVs have been set to default values

List of Configuration Variables (CVs)

The following is a quick reference list of CVs used by Tsunami. See the Tsunami Technical Reference for detailed information about their uses.

CV 1	Primary Address Control
CV 2	Vstart
CV 3	Baseline Acceleration Rate
CV 4	Baseline Braking Rate
CV 7	Manufacturer Version ID (Read Only)
CV 8	Manufacturer ID
CV 10	BEMF Cutout
CV 11	Packet Time Out Value
CV 12	Power Source Conversion
CV 13	Analog Function Enable 1
CV 14	Analog Function Enable 2
CV 15	CV Unlock Register
CV 16	CV Lock ID Code
CV 17,18	Extended Address
CV 19	Consist Address
CV 21	Consist Function Group 1
CV 22	Consist Function Group 2
CV 23	Consist Acceleration Rate
CV 24	Consist Braking Rate
CV 25	Speed Table Select Register
CV 29	Configuration Register 1
CV 30	Error Information/Alternate Mode Selection
CV 33	FL(f) Output Location
CV 34	FL(r) Output Location
CV 35	F1 Output Location
CV 36	F2 Output Location
CV 37	F3 Output Location
CV 38	F4 Output Location
CV 39	F5 Output Location
CV 40	F6 Output Location
CV 41	F7 Output Location
CV 42	F8 Output Location
CV 43	F9 Output Location
CV 44	F10 Output Location
CV 45	F11 Output Location
CV 46	F12 Output Location
CV 47	Analog Whistle Control
CV 49-52	Hyperlight Effect Select (for FL(f), FL(r), Function 5, 6)
CV 59	Flash Rate
CV 60	Crossing Hold Time
CV 61	F11 Braking Rate
CV 62	Transponding Control
CV 66	Forward Trim
CV 67-94	Loadable Speed Table
CV 95	Reverse Trim
CV 105	User Identifier #1
CV 106	User Identifier #2
CV 112	Sound Configuration 1
CV 113	Quiet Mode Timeout Period
CV 114	Bell Ring Rate
CV 115	Whistle Select
CV 116	Engine Exhaust Control
CV 119	Effect Processor Select
CV 128	Master Volume Control
CV 129	Whistle Volume
CV 130	Bell Volume
CV 131	Exhaust Volume
CV 132	Air Pump Volume
CV 133	Dynamo Volume
CV 134	Blower Volume
CV 135	Rod Clank Volume
CV 136	Steam Release Volume
CV 137	Coupler Volume
CV 138	Reserved
CV 139	Brake Squeal Volume
CV 140	Brake Release Volume
CV 141	Snifter Valve Volume
CV 142	Johnson Bar/Power Reverse Volume
CV 143	Pop Valve Volume
CV 145	Blower Draft Volume
CV 146	Water Stop Volume
CV 147	Injector Volume
CV 148	Fireman Fred's Shovel Volume
CV 149	Fireman Fred's Wrench Volume
CV 150	Fireman Fred's Oil Can Volume
CV 151	Fireman Fred's Grease Gun Volume
CV 153	Equalizer Control
CV 154	62 Hz Equalizer Cut/Boost
CV 155	125 Hz Equalizer Cut/Boost
CV 156	250 Hz Equalizer Cut/Boost
CV 157	500 Hz Equalizer Cut/Boost
CV 158	1K Hz Equalizer Cut/Boost
CV 159	2K Hz Equalizer Cut/Boost
CV 160	4K Hz Equalizer Cut/Boost
CV 161	Reverb Control
CV 162	Reverb Output Level
CV 163	Reverb Delay
CV 164	Reverb Gain
CV 169	Whistle Reverb Effect Send Level
CV 170	Bell Reverb Effect Send Level
CV 171	Exhaust Reverb Effect Send Level
CV 172	Air Pump Reverb Effect Send Level
CV 173	Reserved
CV 174	Reserved
CV 175	Reserved
CV 176	Reserved
CV 177	DDE Throttle Gain
CV 178	DDE Motor Load Gain
CV 179	DDE Attack Time Constant
CV 180	DDE Release Time Constant
CV 181	Exhaust Low Volume Limit
CV 182	Exhaust High Volume Limit
CV 183	Side Rod Clank Low Volume Limit
CV 184	Side Rod Clank High Volume Limit
CV 185	DDE Filter Initial Frequency
CV 186	DDE Filter Control Gain
CV 187	DDE Filter Initial Frequency
CV 188	DDE Tracking Coefficient
CV 193	Automatic Bell-On Set Point
CV 194	Automatic Bell-Off Set Point
CV 195	Grade Crossing Whistle Sensitivity
CV 196	Brake Squeal Sensitivity
CV 197	Analog Mode Automatic Sound Configuration
CV 198	Digital Mode Automatic Sound Configuration
CV 201	Event Probability: Fireman Fred Shovels Coal
CV 202	Event Probability: Fireman Fred Fills the Tender
CV 203	Event Probability: Fireman Fred Turns His Wrench
CV 204	Event Probability: Fireman Fred Uses His Grease Gun
CV 205	Event Probability: Fireman Fred Uses His Oil Can
CV 206	Event Probability: Fireman Fred Uses the Injectors
CV 207	Event Probability: Fireman Fred Uses the Firebox Blower
CV 208	Event Probability: Pop Valve Blow Off
CV 209	Kp Coefficient
CV 210	Ki Coefficient
CV 212	Motor Control Intensity
CV 213	Motor Control Sample Period
CV 214	Motor Control Sample Aperture Time

Support

Service and Warranty Policy

Each SoundTraxx Digital Sound Decoder is tested thoroughly before it is shipped and warranted to be in good working order and free of manufacturing defects. However, in the event that a mistake does occur during installation, SoundTraxx will cover the repair under our 'Safety-Net' Service Warranty. See the full warranty statement in the the **User's Manual**, along with tips for troubleshooting common problems.

Our service department is available to help you Monday through Friday, 9:00am to 5:30pm Mountain Time .

Contact us either by phone, our 24-hour fax or by email:

SoundTraxx Service Department
210 Rock Point Drive
Durango, CO 81301
Telephone (970) 259-0690
Fax (970) 259-0691
Email: support@soundtraxx.com

COMPATIBLE WITH
THE NMRA DCC STANDARDS
AND RECOMMENDED
PRACTICES

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