Spectrum®

Quick Start Guide

**For Bachmann®
DCC Sound-Equipped Locomotives**

**Featuring Tsunami®
DCC Sound Technology by SoundTraxx®**

- 16-Bit Sound Processor

- Automatic Dual Mode Decoder for DC and
  DCC Operation

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Table of Contents

All Aboard!

Overview

Congratulations on the purchase of your Bachmann locomotive with digital sound installed. This state-of-the-art Digital Sound Decoder™ is based on SoundTraxx® Tsunami® Digital Sound Technology and will provide all the pleasures of high quality, digital onboard sound and the benefits of today's DCC (Digital Command Control) technology.

This **Quick Start Guide** assumes that you have some understanding of, or experience with other SoundTraxx Digital Sound Decoders. It covers the differences you may need to know between these decoders and any you may have previously used.

If you are new to SoundTraxx Digital Sound Decoders, you should start with the **User's Guide** which will walk you through the various aspects of programming your sound decoder, as well as some tips on troubleshooting. For the power user, the **Technical Reference** will provide a list of all the CVs available for use with your sound decoder and their exact function and make-up for those who wish to have a complete reference for advanced programming techniques. These documents are available on the CD packaged with your locomotive. Please note that you need to have Adobe® Acrobat Reader installed on your computer to open and print these files. This is available as a free download from www.adobe.com.

Features

Features and Specifications

SoundTraxx Digital Sound Decoders have a great number of features designed to enhance your operating experience. The custom decoder installed in your locomotive has been pre-programmed for a great ready-to-run experience. However, there are many features available that you may wish to experiment with or adjust to suit your personal preferences. Many features operate similarly to previous SoundTraxx decoders, but some features will require a little explanation.

Features

The Digital Sound Decoder installed in your model has been designed with a powerful Digital Signal Processor (DSP), which provides more features and better sound quality than ever before! We've outlined just a few key features here.

Sound Features

For users of other SoundTraxx decoder models, there are many new sound effects and the ability to adjust the sounds to suit your ear has been greatly expanded and improved. You can now adjust the volume of each sound effect individually with your own built-in mixer!

The addition of a short whistle effect will allow the user to more easily incorporate signaling practices into their operations.

For those with limited function keys, you may wish to enable the automatic signal feature, which will activate Stop, Forward, Reverse and Grade Crossing whistle signals automatically in response to train motion. You will also want these features active if you are not using DCC to operate your locomotive.

Throttle Features

The Digital Sound Decoder that comes with your Bachmann model have many advanced throttle features as part of SoundTraxx's Hyperdrive system. With the addition of these features, you will be able to better control your locomotive speed under varying conditions.

Specifications

Decoder Specifications
- Supports extended address mode for assigning any locomotive number up to 9,999.
- Supports advanced consist addressing.
- Supports 'Operation Mode Programming', allowing CVs to be changed on the mainline without using a programming track.

Throttle Specifications
- Supports 14, 28 and 128 speed step modes.
- Programmable acceleration, deceleration and starting voltage for prototypical starting and stopping.
- Use of standard and alternate speed tables.

Lighting Specifications
- Supports "Rule 17" operation or automatic direction control
- 100mA Current Sink Capacity
- Outputs may be programmed with our Hyperlight™ Lighting effects.

Steam Sound Specifications
- Adjustable Volume Controls
- 1-Watt Audio Amplifier
- Auto-Exhaust™ allows chuff to be synchronized to the locomotive speed without the complexity of a synchronizing cam.

Steam Effects
- Steam Exhaust Chuff
- Bell
- Whistle
- Short Whistle
- Airpump
- Dynamo
- Water Stop
- Brake Squeal
- Brake Release
- Side Rod Clank
- Snifter Valve
- Cylinder Cocks
- Johnson Bar/Power Reverser
- Firebox Blower
- Cylinder Blowdown (Hiss)
- Coupler Clank
- Dynamic Digital Exhaust™ modifies exhaust volume, cutoff and timbre as locomotive load changes.

Quick Start

Let's Get Started!

Your Digital Sound Decoder has been installed with all CVs pre-programmed so you can begin using your locomotive immediately without having to worry about what adjustments to make. Items such as the exhaust chuff rate have already been calculated and optimized for the locomotive. The decoder is set to operate immediately using either a 12 volt DC power pack or NMRA-compatible DCC command station.

Operating with DCC

Your locomotive will respond to address 3 as it would if you had just installed any DCC decoder. Since these decoders have two rather than four lighting outputs, we have made some changes to the standard function assignments so that those using command stations with limited functions keys can access some additional sound functions. The table below shows the function assignments of the decoder. The **User's Guide** located on the CD will give you all the information you need to adjust your decoder to suit your taste.

For now, simply set your controller to Locomotive 3, place the locomotive on the mainline and away you go!

Sound Decoder Function Assignments	
Function Key	**Default Effect**
F0	Headlight
F1	Bell
F2	Whistle
F3	Short Whistle
F4	Cylinder Blowdown (Hiss)
F5	Dynamo
F6	Water Stop
F7	Coupler
F8	Mute

Programming and Reading CVs

Some 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 Tsunami decoder 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, your Digital Sound Decoder generates the acknowledgment pulse by momentarily applying power to the motor.

If your sound decoder is otherwise working properly (i.e., responds properly on the mainline to speed and direction commands) but your command station is having trouble reading CV data from the decoder, it may be due to incompatibilities between the electrical requirements of the sound decoder (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 for your sound decoder. 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.
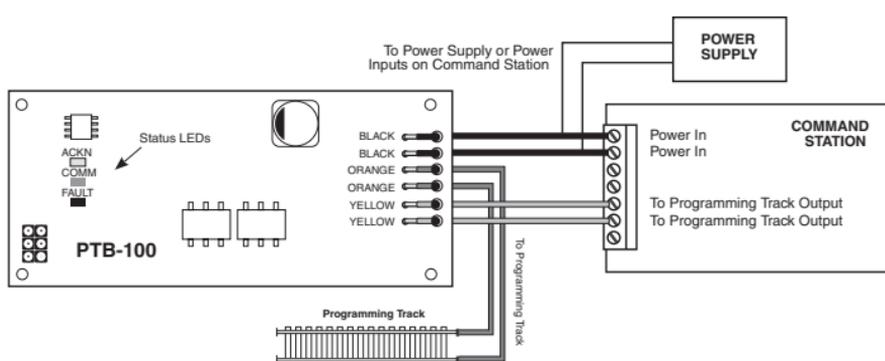

Figure 3 - General Wiring Diagram for the SoundTraxx PTB-100

Since CVs are pre-programmed for individual models to achieve the best possible sound and operation, default values will vary from locomotive to locomotive. You can find the default values for each model listed on the Bachmann website (www.bachmanntrains.com).

Operating in Analog Mode Using a DC Power Pack

While the sound system installed in your Bachmann model is first and foremost a DCC decoder, it may be used on a DC powered layout. When analog mode is enabled, you may control your locomotive using an ordinary power-pack though operation will be a bit different than when running non-decoder equipped locomotives.

With the power pack's throttle set to zero, the decoder will be silent as it has no power. The throttle must be turned up to around 5 volts or so to provide sufficient voltage to power up the internal circuitry of the decoder. At this point, you will begin to hear the background sounds such as the blower and airpump start.

Increasing the throttle further to around 7.5 volts or so will set the locomotive in motion, increasing speed as the throttle is increased. Note that the direction can only be changed when the locomotive is stopped.

When operating in analog mode, be careful not to exceed the decoder's input voltage rating of 27 volts. When your track voltage exceeds 21 volts, the decoder will automatically shut off the sound and motor and flash the front and rear lights: back down on the throttle immediately.

Important: Your sound decoder will work best in analog mode when using a high quality, electronically regulated power pack, preferably one that supplies smooth, filtered DC power. Older rheostat style power packs and pulse power packs will result in erratic and unreliable operation and should not be used with this sound decoder. If your power pack provides a Pulse power switch, leave it in the 'Off' position.

Depending on the quality of the power pack's track voltage, some automatic sound functions such as the grade crossing whistle may require a higher sensitivity setting than needed for DCC operation to avoid continual triggering of the sound effect.

Automatic Sound Configuration Register

CV 197 selects which automatic sound functions are enabled when the decoder is operating in analog or DC mode. This has been preset to have the Automatic Whistle Signals activated so that whenever the locomotive is stopped or started, the sound decoder will produce the correct whistle signal appropriate for the direction of travel:

One short toot = Stop
Two Medium Toots = Forward
Three Short Toots = Reverse

There are an additional four sound features that can be programmed for automatic operation using a DCC system:

Automatic Grade Crossing Signal - When enabled, the decoder will play a grade crossing signal (two long whistle blasts followed by a short and another long) triggered by a sudden upward spike in the throttle.

Automatic Bell - With this feature activated, the sound decoder will turn the bell on and off at preset speed points such as might occur when passing through a yard or station platform.

Automatic Steam Release - If turned on, this feature will cause a short steam release to sound whenever the locomotive is brought to a stop.

Automatic Brake Squeal - The brake squeal can be activated by slowing the train down by a predetermined amount.

Additional information about automatic sound functions can be found in the **User's Guide.**

Quick Start

Programming Notes

Use this space to record any special programming notes about your sound-equipped locomotive.

COMPATIBLE WITH
THE NMRA DCC STANDARDS
AND RECOMMENDED
PRACTICES

For service/repair, contact the Bachmann Service Department at 1-800-356-3910 or via e-mail at service@bachmanntrains.com. Bachmann's Service Department is available Monday thru Friday, 8:00 am to 4:00 pm ET.

Please be aware you may need to leave a message on our voice mail system. Your call will be returned as soon as a service technician is available. We thank you in advance for your patience.

You can also send your locomotive to:

Bachmann Trains
Service Department
1400 East Erie Avenue
Philadelphia, PA 19124

Please include a detailed description of your concern and complete contact information. For some service issues regarding DCC sound decoders, the Bachmann Service Department may forward your locomotive to SoundTraxx for resolution.