



Hear Everything, Always

SBS User Manual v1.2 **January 2020**

Introduction

Hello,

My name is Ted and I have designed, assembled, tested and hand signed your SBS (Stereo Boost Selector) pedal. I thank you for your purchase and welcome you to the Sonic Nuance Electronics family - people like you who crave to hear everything, always!

The SBS is designed specifically to not color the input signals thus I made the outputs as low noise and transparent as possible. Much care went into the design of this pedal including multiple prototype revisions and tweaks from live testing by myself and friends. Audiophile-grade quality components were used (including wide dynamic range, low noise, expensive op amps and rugged, low distortion mechanical relays, film capacitors and tightly matched resistors) for the all analog signal path to provide uncompromising sound quality over a wide dynamic range for years to come. The pcb layout was done with massive ground planes to minimize possibility for ground loops and to add mechanical stability.

The SBS may at first glance appear intimidating, but reading this manual and setting up the SBS for your situation, I am sure you will find it is actually simple to use. However, don't hesitate to contact me should you have any questions or suggestions at sonicnuance.com.

History

I started Sonic Nuance Electronics in 2012 with the original TDI (tuner DI) after years of playing live and worship gigs as an amateur bassist and acoustic guitarist. Being a member of a portable church I quickly realized that the gear I was using was lacking in sonic detail and/or not rugged. My dream was to minimize the gear I needed to bring (for reliability and convenience) while still having pristine sound. The idea was to combine the only pieces of equipment I consistently needed (a tuner, a DI and a patch cable connecting them for my TDI product), and removing the need for a separate power source like a battery or DC adapter. Figure 1 shows the concept.

Since then, I have focused on other accessories like instrument, patch and snake cables with the same attention to detail and uncompromising quest for high quality gear. The SBS was born after talking with friends (thanks David!) who wished for a pedal allowing selection of two instruments while being able to interface with stereo effects.

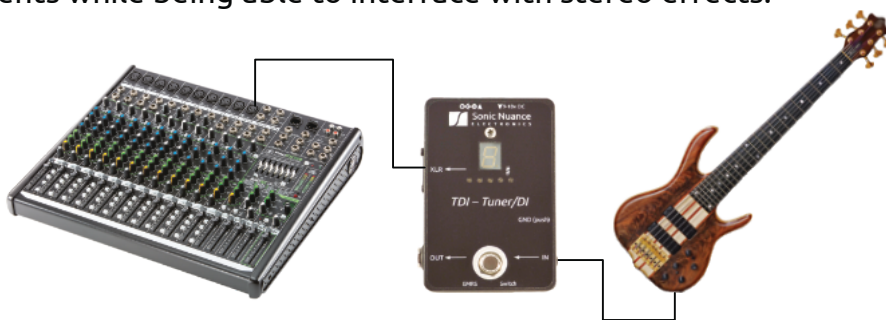


Figure 1: Minimalist setup with mixing board powering the TDI.

SBS Overview

There are three concepts important in understanding the SBS:

- 1) It has two signal paths: the Selectable Boost and the Stereo.
- 2) It can be reconfigured simply by what is or isn't connected to it.
- 3) The boost knob only affects IN1

All three of these concepts are detailed on the Front Panel Graphic so you don't have to reference this manual in the future...

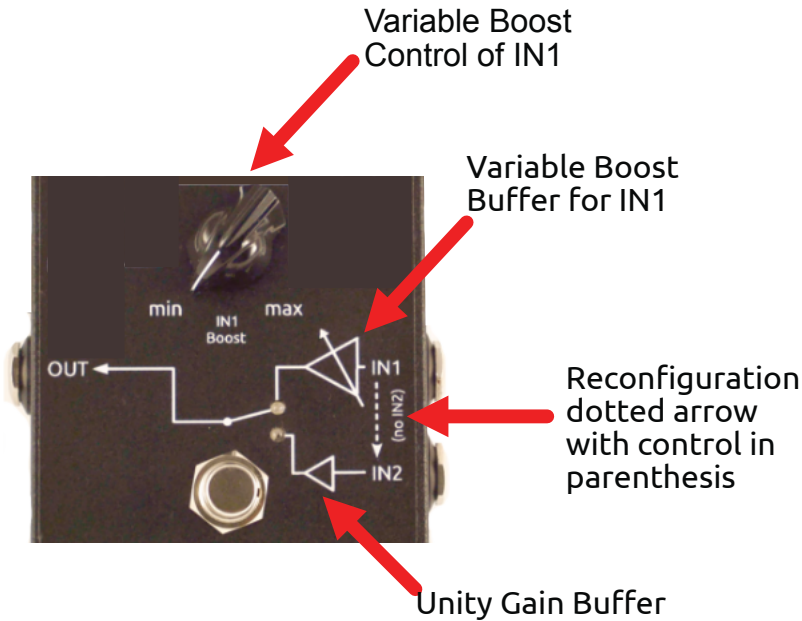


Figure 2 Selectable Boost Signal Path Graphics Isolated for Clarity

Understanding the Front Panel Graphic

The front panel graphic shows the symbols for unity gain buffers, variable boost buffer and how dashed arrows represent reconfiguration based on interconnect. This is shown on Figure 2. The LEDs indicate which path is selected.

The reconfiguration is detailed in parenthesis. For example, if there is no plug in the ROUT jack, then LOUT is the buffered sum of LIN and RIN. This is shown on Figure 3.

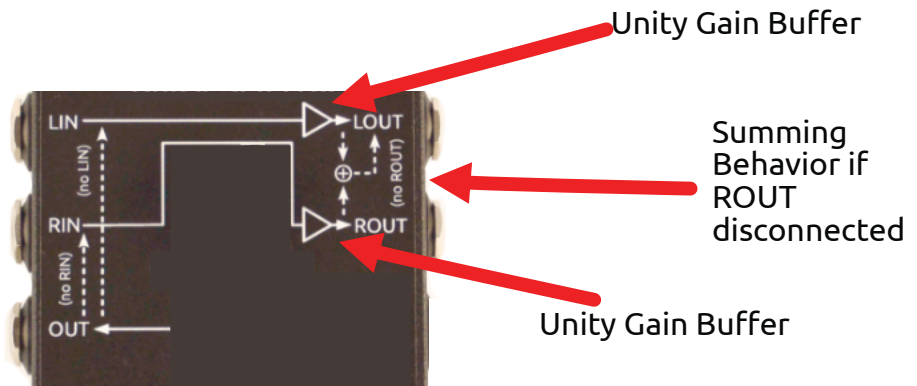


Figure 3 Stereo Signal Path Graphics Isolated for Clarity

Front Panel

Figure 4 shows the SBS's front panel, please take a moment to familiarize yourself with it.

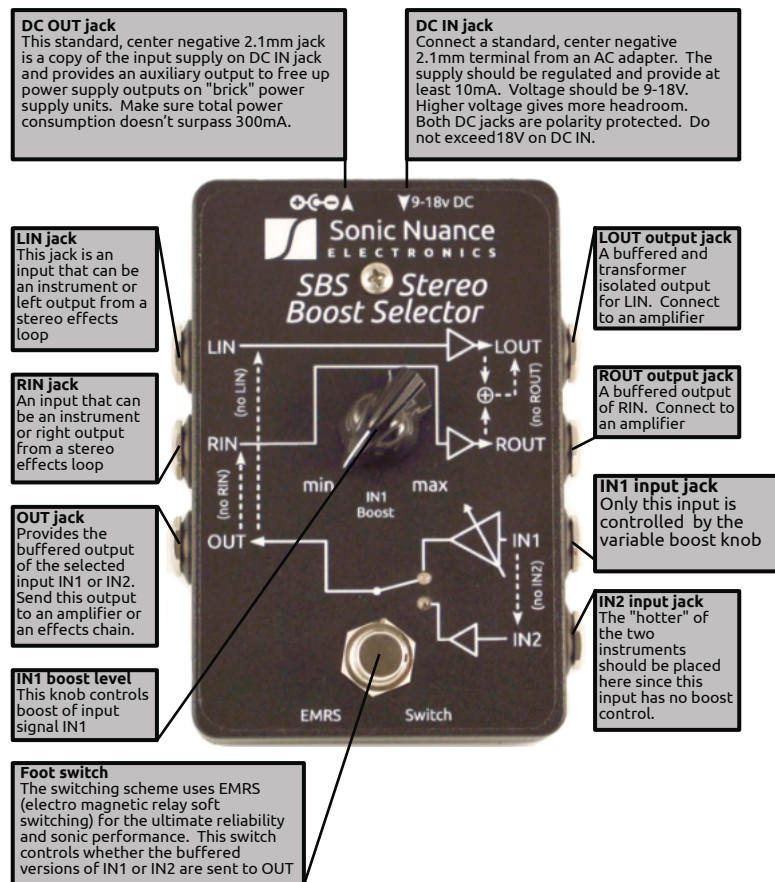


Figure 4: SBS Front Panel

Additional Notes on the Front Panel

DC IN Jack: This jack is polarity and over-voltage protected. Use a center negative DC supply (not included) with 9 to 18V voltage. (18V is preferred as it gives additional headroom to the signal path which further reduces unwanted distortion). The SBS uses very little current (less than 10mA) so a standard 100mA power source will be plenty. I

DC OUT Jack: This output is polarity protected so if you accidentally were to plug a power supply here it won't damage the SBS under normal circumstances. This will be a copy of the voltage provided on the DC IN jack. Make sure the power supply tied to DC IN has a current capacity high enough to drive the SBS plus whatever is tied to DC OUT (maximum 300mA out of DC OUT which is fuse protected).

Foot switch: This will respond to toggling about once every three seconds. Faster toggle rates will be filtered out and ignored.

Using the SBS

The SBS has many configurations in which it can be used. The following figures illustrate many of these followed by a summary table.

Please note that while the SBS has many configurations, you may only need one for your particular application.



Figure A: AB switch with boost and DC output driving another effect. In this scenario the stereo signal path is left unused.



Figure B: Foot switchable boost with Stereo buffering and ground isolation. Guitar signal sent to stereo chorus effect. Stereo output sent to two outputs with transformer isolation on LOUT.

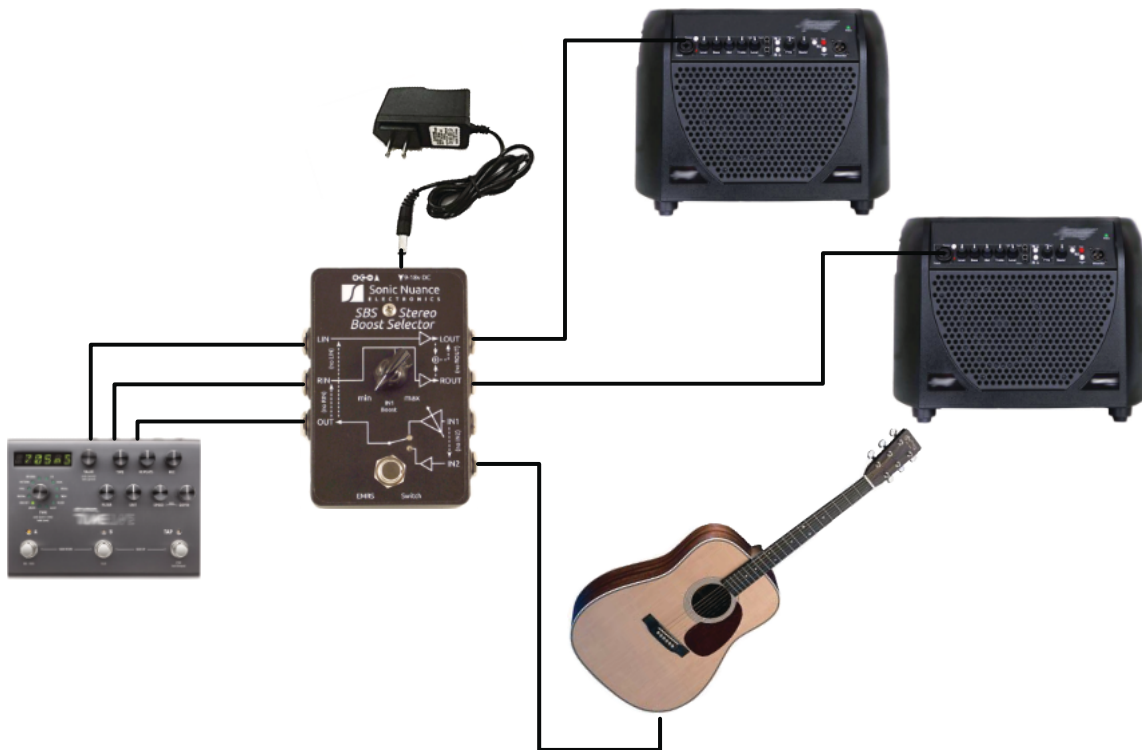


Figure C: Foot switchable mute with stereo buffering and ground isolation. Selecting IN1 mutes the signal allowing the musician to unplug his instrument to save its battery . SBS drives stereo amps with transformer isolation on LOUT

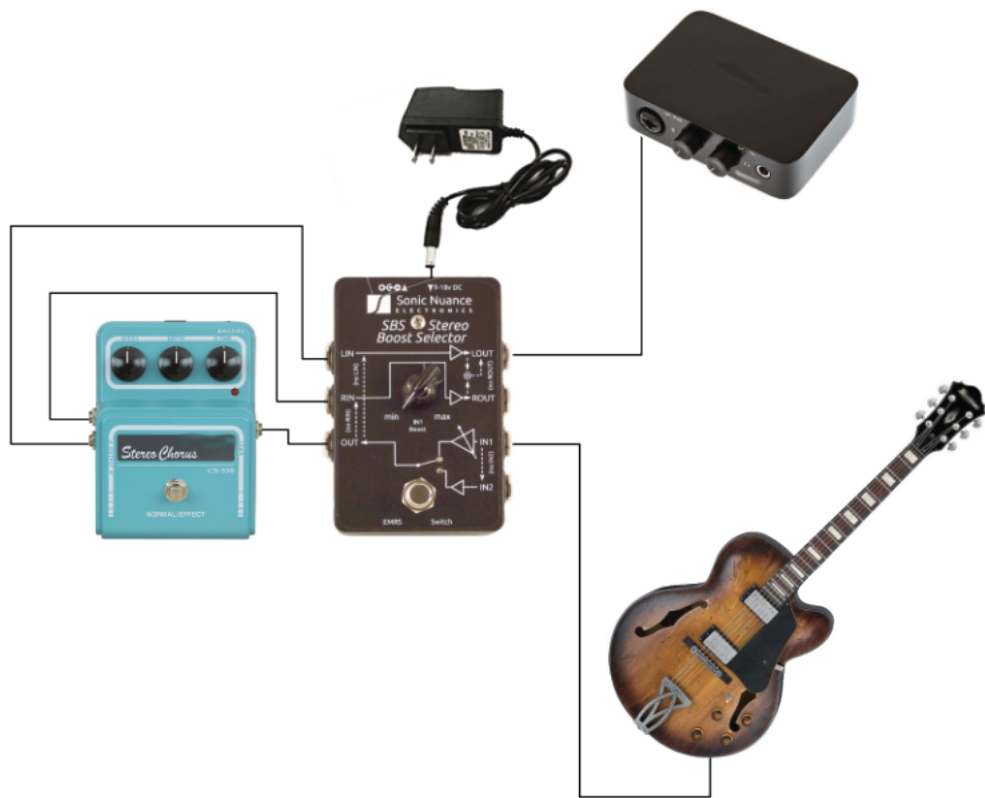


Figure D: Foot switchable boost with stereo summing. Stereo output of effect is summed in mono and sent with transformer isolation on LOUT to a computer audio interface.

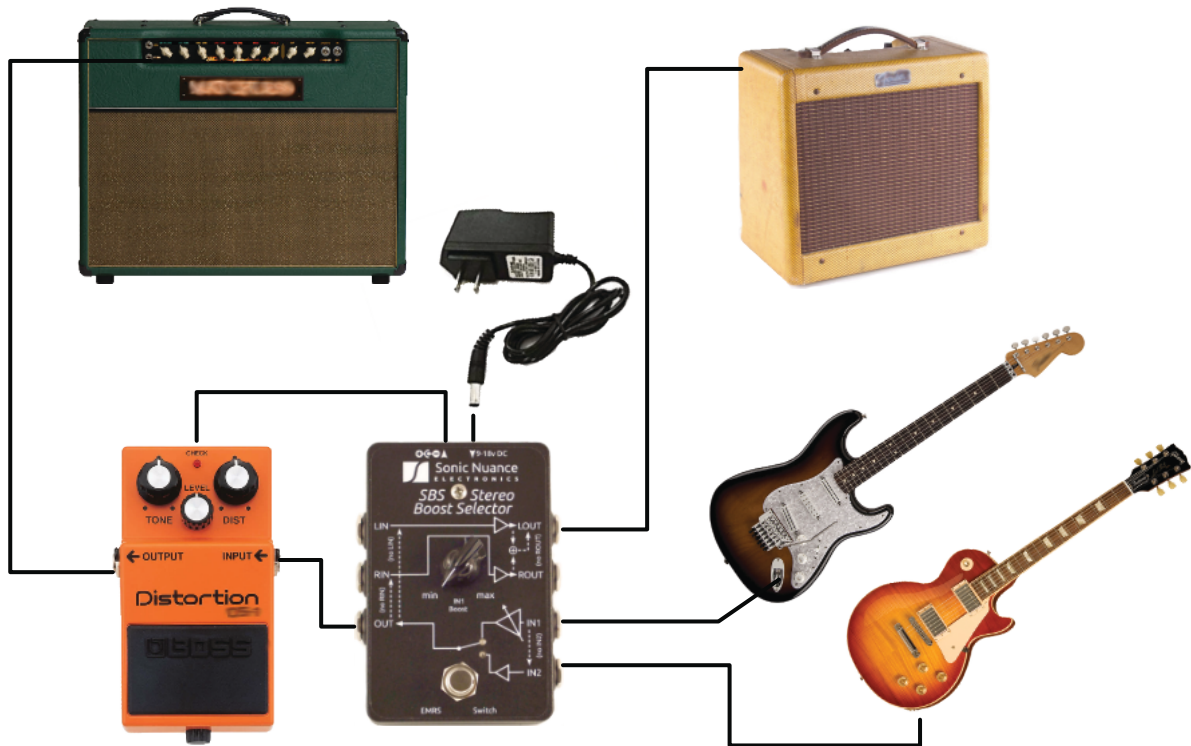


Figure E: "Wet/Dry" AB switch with boost. "Wet" tone sent to amp via OUT. "Dry" tone sent to a separate amp via transformer isolation on LOUT. Note that ROUT could also be used to send "Dry" tone somewhere else.

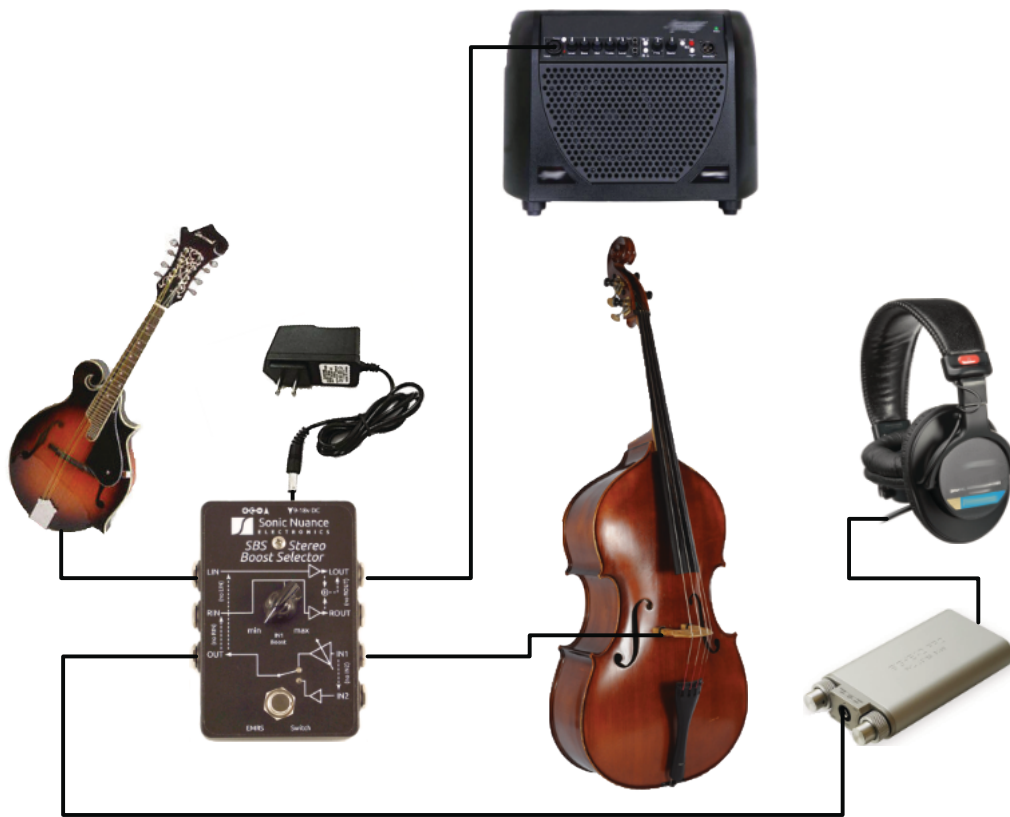


Figure F: Dual channel mixer with foot-switchable boost, transformer isolated output (LOUT) and monitoring of one channel. Independent monitoring of foot-switchable boost of IN1 sent to headphone amp and headphones.

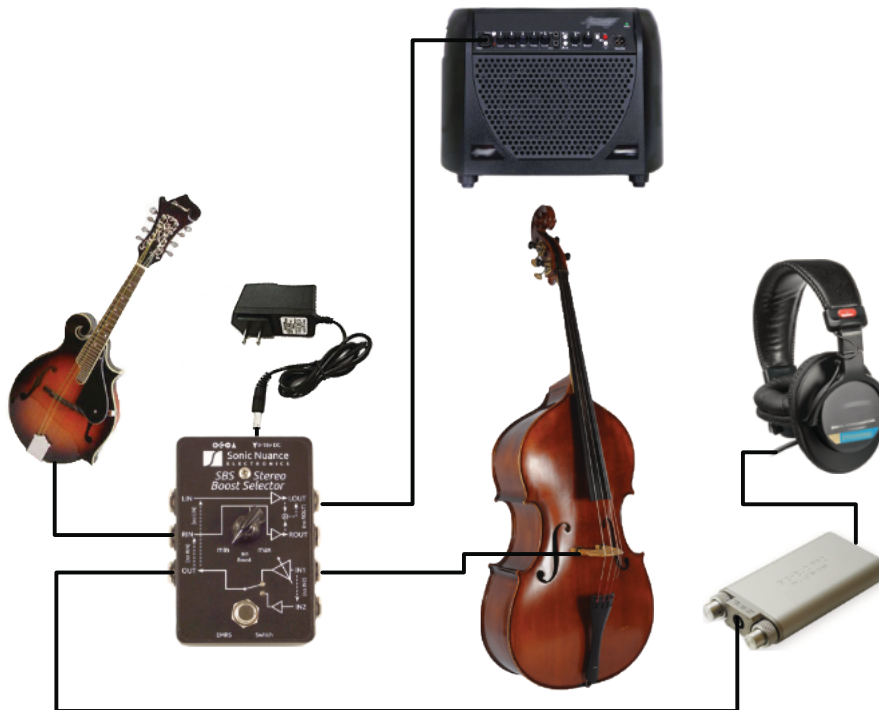


Figure G: Dual channel mixer with foot-switchable boost, transformer isolated output (LOUT) and monitoring of one channel. This scenario shows RIN can be used in a similar fashion as LIN in Figure F

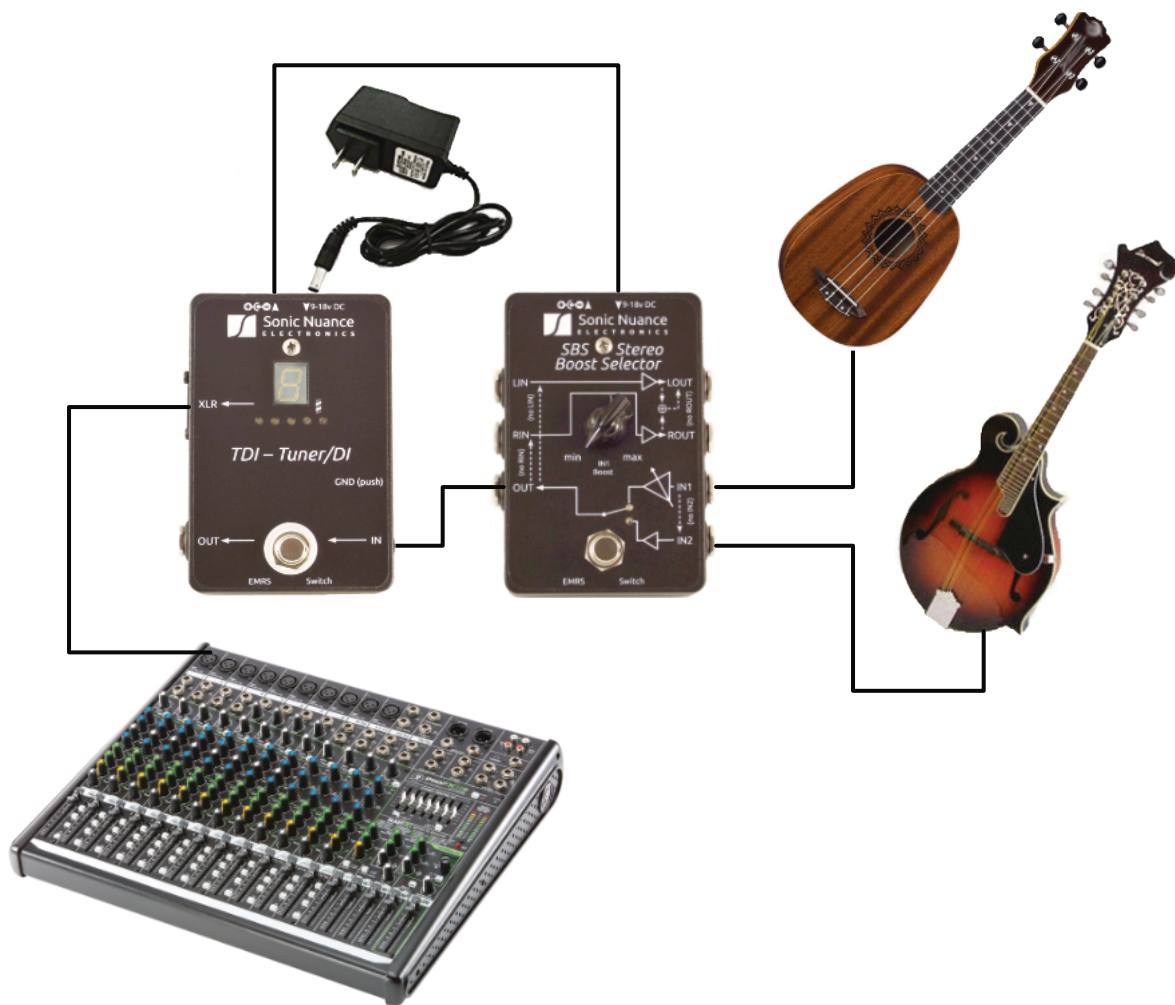


Figure H: AB switch with boost and DC input driven by a Sonic Nuance Electronics TDI (tuner + DI). It is recommended to put the instrument with the weakest signal on IN1 so it can use the boost to equalize its level to IN2

Configuration Summary Table

Selectable Boost Signal Path					
Figures	Inputs		OUT		Usage Notes
	IN1	IN2	IN1 selected	IN2 selected	
			Muted	Muted	Ensures SBS starts up muted when no inputs are connected
B,D,F,G			IN1 variable boost	IN1 buffered	Foot switchable boost for one instrument. Useful for solos, etc
C			Muted	IN2 buffered	Great for muting an instrument to unplug it to save its battery
A,E,H			IN1 variable boost	IN2 buffered	Great for selecting between two different instruments of different levels
Stereo Signal Path					
Figures	Inputs		Outputs		Usage Notes
	LIN	RIN	LOUT (isolated)	ROUT	
A,E,H			OUT	OUT	Two additional outputs useful for DIs, monitors, etc.
G			OUT (OUT + RIN if no ROUT)	RIN	Simple buffering or summing two signals if no ROUT
F			LIN (OUT + LIN if no ROUT)	OUT	Simple buffering or summing two signals if no ROUT
B,C,D			LIN (LIN+RIN if no ROUT)	RIN	Stereo buffers with ground loop isolation or stereo sum if no ROUT
		means a 1/4" plug is connected to this jack			

Powering the Unit

To avoid the transient audio "pop" when powering up or down the SBS, follow this rule: *make sure that what the SBS's output jacks are connected to are **muted or off first**.*

For example, before powering on or off the SBS when connected to the input of an amplifier, make sure the amp is muted or off. This way the turn on or off transient "pop" of the SBS (or any other equipment in the signal chain for that matter) will be muted.

After powering up the SBS, it is recommended to wait 2-3 minutes before using the foot switch. Due to the high input impedance of the buffers as well as wide frequency bandwidths, it takes some time to allow internal voltages to stabilize and make the switching as quiet as possible.

Additional Design Information

I spent a lot of time designing the signal path to make it as low noise, and transparent as possible as I didn't want the SBS to color the signal in any way. In doing so I changed from a typical "hard" mode switching scheme using latching foot switches which wear out to using electro mechanical

relays with foot switch actuators and “soft” switching. This was more expensive but more reliable and consistently quiet during switching. The circuit uses a combination of high reliability and noise immune digital circuits combined with electro-mechanical relays designed specifically for low level signals. The relays are hermetically sealed and have over 10 million cycle lifetimes. The foot switch actuator used in the design translates up to 500 pounds to about 100 grams of force on the internal circuit board. This virtually eliminates wear and tear to the SBS's internal circuits due to switching. I call this switching scheme EMRS (electro mechanical relay soft) switching. I don't claim to have invented this approach, I just couldn't find an easier way to describe it.

I also made the LOUT signal transformer isolated to prevent ground loops when driving two amps simultaneously. I used high end op amps with wide dynamic ranges and low distortion. I also made the SBS able to be powered via with a voltage anywhere from 9V to 18V for more headroom. Because of the high input impedances for the buffers, piezo pickups can drive the SBS directly. I also added a DC output so that this “accessory” pedal doesn't use up a precious DC power line on effects boards.

Finally, please don't tighten any of the screws unless they are obviously loose. Thread locking compound was used in many cases and over tightening could damage the unit.

-Ted

Specifications (Typical Values Unless Stated Otherwise)

Frequency Response (+/-0.5dB)	20~20kHz
Input Impedance	2Meg ohms
Output Impedance	100 ohms
Variable Boost	0dB (min setting), 15dB (max setting)
Maximum Input for 1% distortion all buffers & IN1 @ min boost	3.6V Peak @ 9V DC IN, 8V Peak @ 18V DC IN
Maximum Input for IN1 @ max boost and 1% distortion	0.6V Peak @ 9V DC IN, 1.3V Peak @ 18V DC IN
Maximum DC out current	Limited by the smaller of the DC IN's supply or 300mA
Power Requirements for DC IN	9-18V regulated DC. 100mA min
Mechanical Relay Lifetime	10,000,000 cycles
Warranty	Three years limited. See website for details

California Proposition 65 Requirement

To meet the requirements of California Proposition 65, it is our responsibility to inform you of the following: **WARNING:** This product contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. Please take proper care when handling and consult local government regulations before discarding.



Sonic Nuance
E L E C T R O N I C S

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www.sonicnuance.com