AXSGTR™ | Axess Electronics™

User Manual

BS23™ Buffer/Splitter

The BS23™ Buffer/Splitter is a hand-built and signed (by Mario) limited release of the Axess Electronics™ BS2™ Buffer/Splitter from the early 2000's and one of the first off-the-shelf guitar buffers ever available — and used by countless pros like Eddie Van Halen, Wolfgang Van Halen, Alex Lifeson, Brad Paisley, Jeff Schroeder, and many, many more...

The BS23™ Buffer/Splitter is manufactured using the final handful of NOS gold-plated printed circuits boards from the last full-scale BS2™ production run from 2009, and the circuit has been tweaked to Axess Electronics' modern 2023 specifications, resulting in an even more natural sounding guitar audio buffer experience.

From the 2008-2009 BS2™ User Manual;

Features

- The BS2™ Buffer/Splitter prevents the loss of (1) signal level (2) high end frequency response, and (3) low end punch that is caused by cable capacitance and poorly designed input stage/circuitry of some effect pedals.
- The buffer circuit is a very high quality op-amp based design that is both low-noise and musical, don't let other's deceive you, nothing is transparent!!!
- Three outputs allow a single guitar signal to feed a tuner and two amplifiers without signal loss and/or tonal degradation.
- Two of the three outputs are connected in parallel and the third is transformer isolated to prevent ground loop hum/noise when driving two amplifiers.
- The transformer isolated output includes a phase reverse switch to prevent any phase cancellation issues from occurring when driving two amplifiers.

Overview

The BS2™ has been designed as a solution to several problems that we've solved using custom-made buffers/splitters over the past several years.

As a buffer, the BS2™ should be used as early in the signal path as possible. Ideally it should be the first thing your guitar plugs into to, but unfortunately that can't always be the case. Some Fuzz and WAH pedals do not like to be fed with a buffered signal. If you find these pedals don't sound right with the buffer in front of them, simply connect the buffer after these devices. In this situation, it would be ideal if these pedals had true-bypass switching to ensure the BS2™ gets the best possible signal that it can... Using the BS2™ in this application will prevent the loss of (1) signal level, (2) high end frequency response and (3) low end punch that is caused by cable capacitance and poorly designed input stage/ circuitry of some effect pedals.

As a splitter for driving two amplifiers with the same effect pedals, the BS2™ must be used last in the signal chain so that both amplifiers get the same signal… If using the BS2™ in this manner, you may want to consider getting a second one to use as a buffer to prevent some of the losses described above (using the BS2™ as a buffer). If one of the amps is to get a dry and un-effected signal or is to be fed with a separate chain of pedals, than the BS2™ can be used as a buffer and the second amplifier or pedals can simply be fed with a signal from the ISO'D OUT jack (to prevent Ground Loop Hum/Noise).

I/O DESCRIPTION

INPUT is a ¼" TS (tip-sleeve) jack that accepts an instrument level signal from either a guitar, the output of an effect pedal or a pedal/loop switcher.

MAIN OUT is a ¼" TS (tip-sleeve) jack that is meant to be connected to the input of an amplifier, an effect pedal, or a pedal/loop switcher.

⚠️ ***ATTENTION*** ⚠️ *Any device that contains an audio isolation transformer is susceptible to hum from the magnetic field generated by a power transformer, such as those found in an amplifier, effect processor, wall-wart power adapter or pedalboard power supply. Even with adequate shielding of the audio isolation transformer and the device itself, there can still be a potential for unexpected hum. So if an unusual hum does occur, try re-locating the BS23™, typically it would only require being moved/rotated a small distance in a particular direction to resolve this particular type of hum.*

ISO'D OUT is a ¼" TS (tip-sleeve) jack that is meant to be connected to; (i) the input of a second amplifier (ii) the input of an effect pedal or chain of pedals, feeding the second amplifier, or (iii) the input of a tuner. The audio isolation transformer prevents ground loop hum and noise issues when running a second amplifier or other noise issues that can be caused by some tuners.

Note: *Pedals that are connected between the ISO'D OUT jack and the input of the second amplifier must be powered from a different wall-wart power adapter or pedalboard power supply's output than the BS23™, tuner and/or pedals feeding the first amplifier. Otherwise, a ground loop will be created, resulting in unwanted hum and noise.*

PHASE is a latching push-button switch that changes the phase of the ISO'D OUT signal in relation to the INPUT, MAIN OUT, and SPLIT OUT signals. When the button is in the [IN] position, the signals are in-phase/normal (0deg), and when the button is in the [OUT] position, the signals are inverted/reversed (180deg).

Note: *Running multiple amplifiers at once can sometimes lead to a phase cancellation problem, which results in a sound that can be described as hollow, thin, not as loud, lacking low end or fullness... The best way to test and fix this is to try and set the amplifiers to the same volume level, individually. Then run both amplifiers simultaneously using the BS23™ and listen with the PHASE push-button in both positions. The best and correct setting will result in a sound that can be described as fuller and/or slightly louder.*

SPLIT OUT is a ¼" TS (tip-sleeve) jack that is connected directly (in-parallel) to the MAIN OUT jack. Use this output jack whenever a transformer-isolated signal/split is not needed such as when feeding the input of another pedal, a noise gate key, or a tuner (which is

known not to induce noise — if the tuner is inducing noise, see the ISO'D OUT and the following note for more information).

Note: *If the SPLIT OUT has an optional audio isolation transformer installed, it can be used to feed; (i) the input of a third amplifier (ii) the input of an effect pedal or chain of pedals, feeding the third amplifier, or (iii) the input of a tuner. The audio isolation transformer prevents ground loop hum and noise issues when running a third amplifier or other noise issues that can be caused by some tuners.*

Note: *Pedals that are connected between the SPLIT OUT jack (that has an optional audio isolation transformer installed) and the input of the third amplifier must be powered from a different wall-wart power adapter or pedalboard power supply's output than the BS23™, tuner and/or pedals feeding the other two amplifiers. Otherwise, a ground loop will be created, resulting in unwanted hum and noise.*

BLUE LED is the power LED and when it is lit up — that indicates the BS23™ Buffer/Splitter is receiving power.

9VDC is the external power supply jack and it accepts a standard 2.1mm x 5.5mm male barrel plug from a 9VDC wall-wart power adapter or pedalboard power supply with a NEGATIVE CENTER plug. Refer to the SPECIFICATIONS section for additional information and maximum operating voltage(s).

⚠️ ***ATTENTION*** ⚠️ *Some switched-mode power supplies (SMPS) and wall-wart power adapters are noisier than others, which can result in an audible high-pitch "whine". Trying to run too many devices from a single adapter or power supply output can also result in noise and/or an audible "whine". If this occurs, we recommend either trying another wall-wart power adapter or a pedalboard power supply with enough isolated outputs to power every device/effect on your pedalboard individually; better power = less noise = more tone!!*

SPECIFICATIONS

Operating Voltage: 9VDC
Maximum Operating Voltage: 10VDC
Power Jack: 2.1x5.5mm Barrel
Current Draw: Less than 100mA@9VDC
Dimensions (LxWxH): 4.81x2.62x1.54inch
122.3x66.6x39.1mm
Acrylic/LED (*add to H, above*): 0.07inch/1.8mm

Specifications are subject to change without notice.

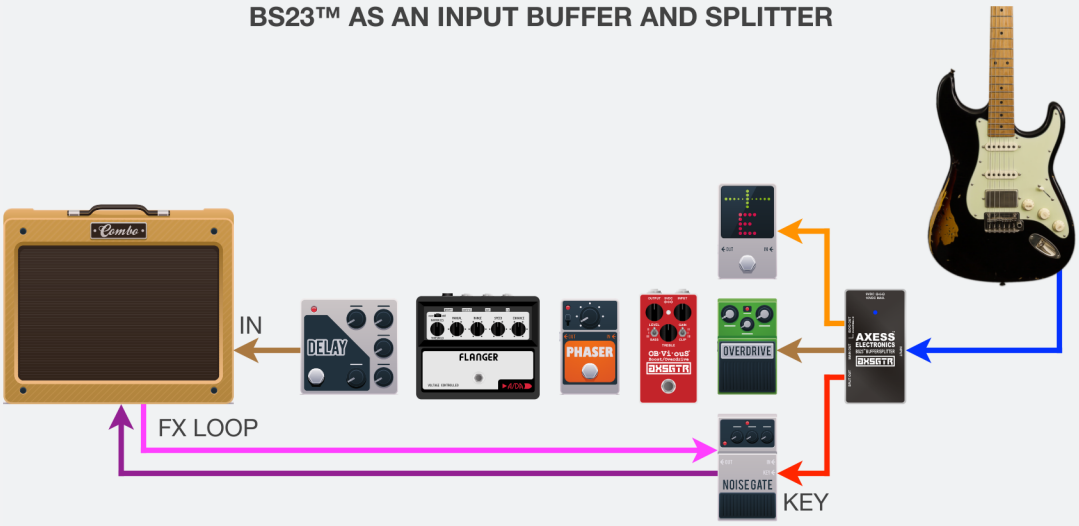
CONNECTION DIAGRAMS

The following pages highlight some of the different ways the BS23™ Buffer/Splitter can be utilized. Hi-res PDFs of the individual diagrams are also available on our website.

Follow us on Instagram and Twitter at @axsgtr and tag us using #axsgtr and #axesselectronics OR if you require assistance, contact us by email or via our website, as follows;

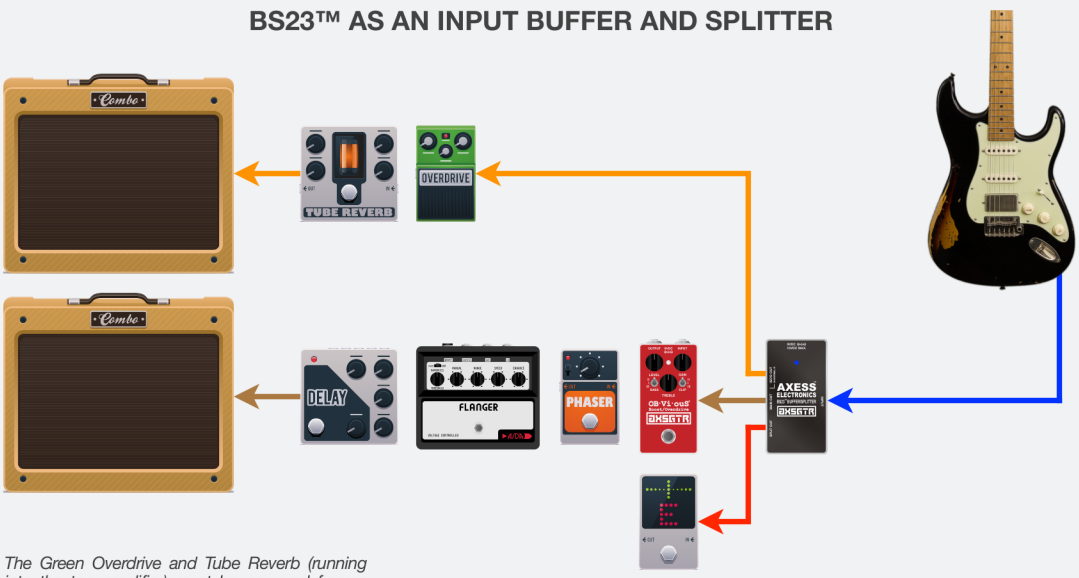
info@axesselectronics.com *axesselectronics.com*

BS23™ AS AN INPUT BUFFER AND SPLITTER



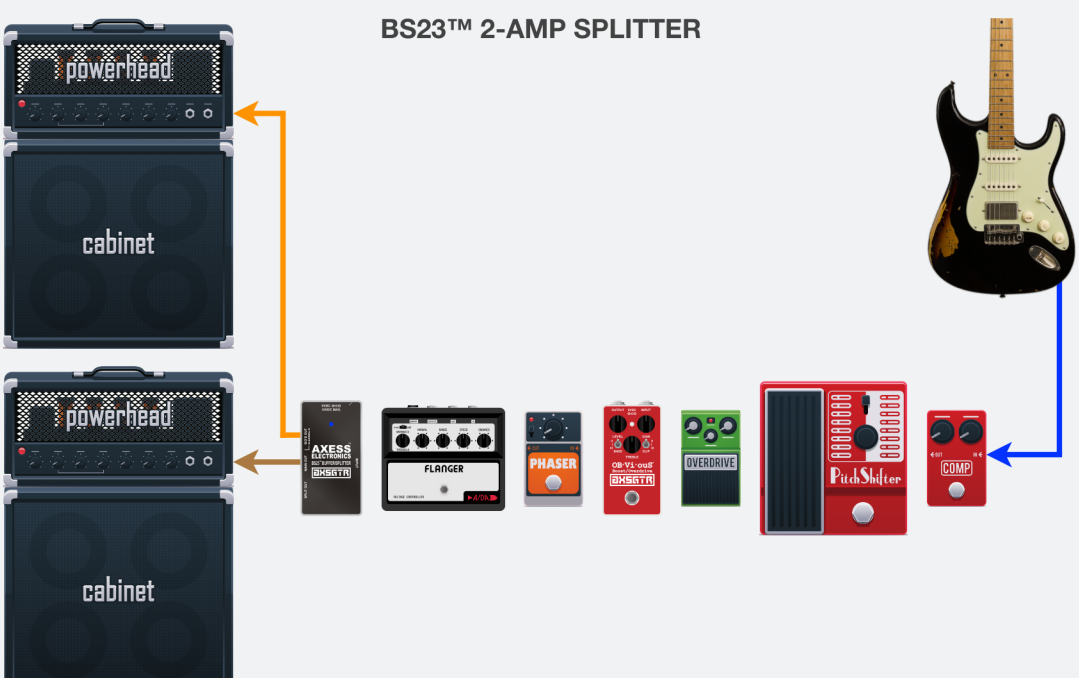
Some (older/old-school) tuners are noisy and a rig can benefit not only from having the tuner out of the signal path, but also from feeding it with an audio isolation transformer. This prevents the tuner's noisy ground currents from getting into the audio signal path.

BS23™ AS AN INPUT BUFFER AND SPLITTER

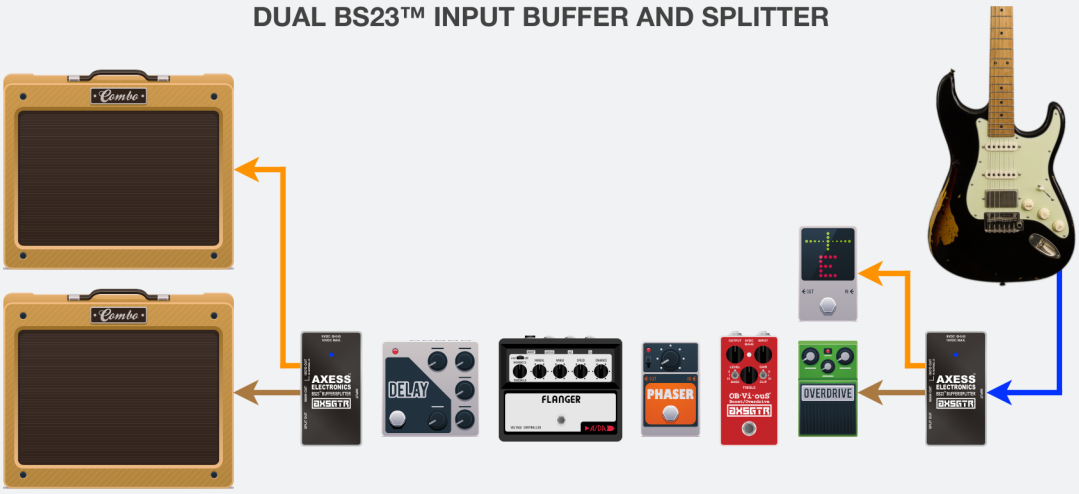


The Green Overdrive and Tube Reverb (running into the top amplifier) must be powered from a different wall-wart power adapter or pedalboard power supply's output than the BS23™, tuner and all the pedals feeding the other (bottom) amplifier. Otherwise, a ground loop will be created, resulting in unwanted hum and noise.

BS23™ 2-AMP SPLITTER

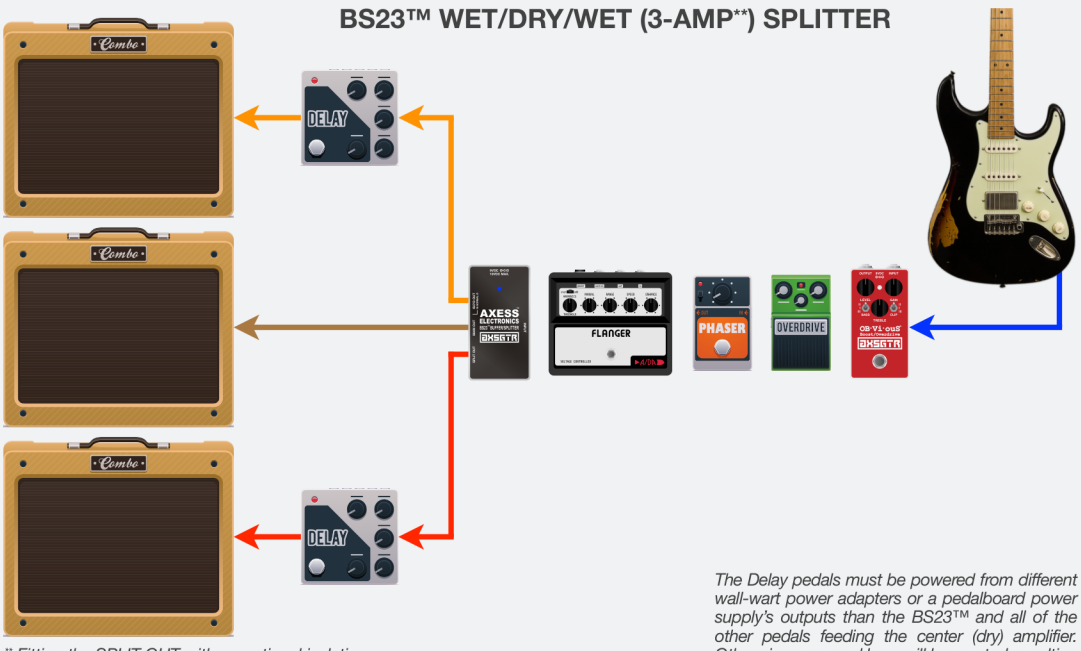


DUAL BS23™ INPUT BUFFER AND SPLITTER



Some (older/old-school) tuners are noisy and a rig can benefit not only from having the tuner out of the signal path, but also from feeding it with an audio isolation transformer. This prevents the tuner's noisy ground currents from getting into the audio signal path.

BS23™ WET/DRY/WET (3-AMP**) SPLITTER



*** Fitting the SPLIT OUT with an optional isolation transformer allows the BS23™ to feed 3 amps.*

The Delay pedals must be powered from different wall-wart power adapters or a pedalboard power supply's outputs than the BS23™ and all of the other pedals feeding the center (dry) amplifier. Otherwise, a ground loop will be created, resulting in unwanted hum and noise.

BS23™ GROUND-LOOP ELIMINATOR

A ground loop occurs when an amp(s)/rig sees more than one path to (earth) ground, as is the case when running multiple amplifiers and/or other devices/effects that are grounded via a 3-prong AC-plug, and results in an audible and annoying 60 cycle hum.

To eliminate a suspected ground loop, simply insert the BS23™ in the signal path, right before an amplifier's input, as shown.