

# Reflex Universal Expression Controller User's Guide



## Welcome

Thank you for purchasing the Reflex Universal Expression Pedal. The Reflex is one of the most versatile and advanced expression controllers on the market.

It has seven expression outputs that can all be used simultaneously: three analog expression outputs, three digital (MIDI) expression outputs, and one sensor output. Each output has flexible, independent configuration options.

The Reflex also can store up to 128 different MIDI-recallable presets, allowing you to save different settings for different songs or sets, easily recalling them on stage with a MIDI controller.

The USB connectivity gives the Reflex an extra boost of power, with plug-and-play DAW compatibility, firmware updates, and more!

Enjoy!

- The Source Audio Team

## Overview

**Three Analog Expression Outputs** – Connect to up to three external devices using the analog expression ports. These can be individually set up as passive potentiometers or active control voltages.

**Three Digital (MIDI) Outputs** – A single hardware MIDI output (or USB MIDI output) can carry up to three independently configurable MIDI expression signals.

**Highly Configurable** – All expression outputs can be independently configured to be compatible with different expression standards. The taper, polarity, range, LFO, and other parameters can be set up differently for each output.

**USB-MIDI Interface** – Class-compliant USB drivers make the Reflex plug-and-play ready for Mac and Windows computers. The Reflex is a USB MIDI device that can be used in digital audio workstation (DAW) software or to control software synthesizers and virtual instruments.

**MIDI Recallable Presets** – Save up to 128 presets and recall them at any time with a MIDI controller.

**MIDI Merge** – Merge MIDI input data to the output for maximum system compatibility.

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## Quick Start

This section will guide you through the steps of connecting the Reflex to a standard passive expression port on a device such as a synthesizer or a guitar effects unit. By default, the Reflex is set up to connect using a three-conductor TRS cable, with the supply on the ring contact, the expression signal on the tip contact, and ground on the sleeve contact. The Reflex can be configured to be compatible with other plug configurations (such as TS for compatibility with Line 6 products), but for the purposes of this quick start guide, it is assumed that a standard TRS plug with expression on the tip contact is being used.

### Power

The Reflex ships with an included 9V battery. Insert the battery into the battery compartment and press the ON/OFF button to power on the device.

### Expression Connections

Using a ¼" TRS plug, connect the expression input on the device you wish to control to Expression Output 1 on the Reflex. At this point, the Reflex should be set by default to work as a passive 10 kilohm ( $k\Omega$ ) linear expression pedal.



## Interface Overview

**Parameter Button:** Selects one of five parameters (min, max, depth, channel, or type) to edit for the currently selected expression output.

**LED Display:** Displays the value of the parameter currently being edited.

**Output Select Button:** Selects one of the seven expression outputs to configure.

**Shape Button:** Sets the shape (linear, exponential, sine LFO, saw LFO, square LFO, triangle LFO, random, or user) for the currently selected expression output.

**Save Button:** Saves the current configuration into one of 128 preset locations.

**Load Button:** Recalls a saved configuration from preset memory.

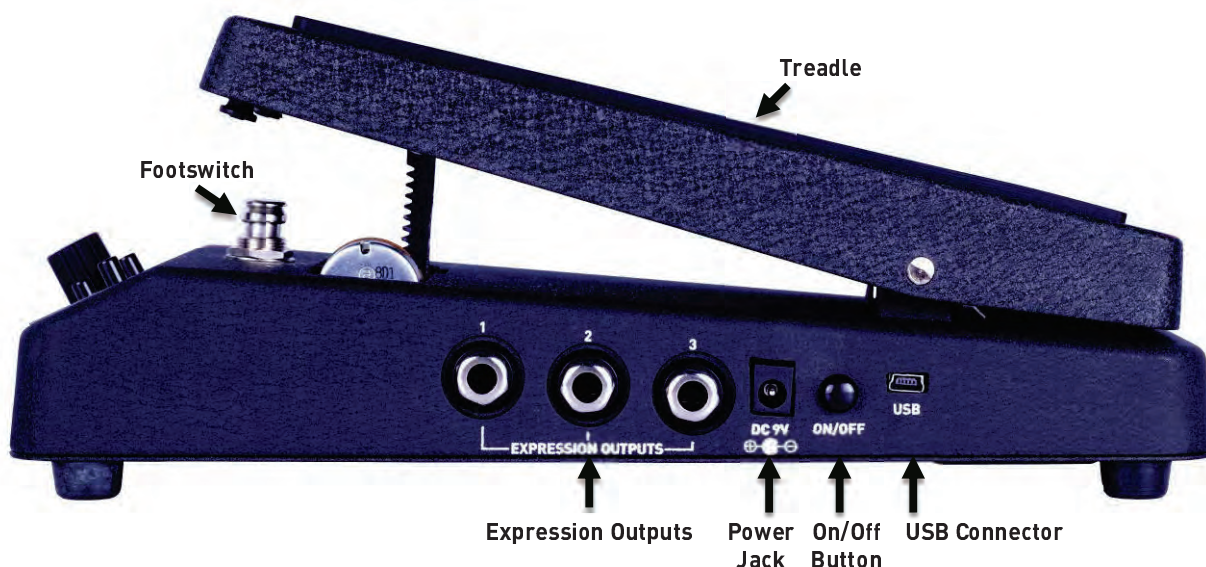
**Control Knob:** Modifies the currently active parameter.

**Footswitch:** Mutes or un-mutes the expression outputs.



## Connections

### Left Side Connections



#### Expression Output 1

Passive 10 k $\Omega$  expression output. By default, the ring contact is power, the sleeve contact is ground, and the tip contact is ground. Can also act as an active control voltage (CV) output ranging from 0V to 5V. The plug configuration can be modified using the dip switches on the bottom of the pedal.

#### Expression Output 2

Passive 10 k $\Omega$  expression output. By default, the ring contact is power, the sleeve contact is ground, and the tip contact is ground. Can also act as an active control voltage (CV) output ranging from 0V to 5V. The plug configuration can be modified using the dip switches on the bottom of the pedal.

#### Expression Output 3

Passive 50 k $\Omega$  expression output. By default, the ring contact is power, the sleeve contact is ground, and the tip contact is ground. Can also act as an active control voltage (CV) output ranging from 0V to 5V. The plug configuration can be modified using the dip switches on the bottom of the pedal.

#### DC 9V (Power)

Standard barrel connector designed to accept a regulated 9V DC power supply. The tip of the connector is negative and the sleeve is positive. The power supply must be able to source at least 45 mA. The Reflex can be powered either by an external DC power supply, by a 9V battery, or directly by the USB port.


**Warning:** Using a non-Source Audio supply, especially an unregulated supply, could damage the unit. Please be very cautious when using 3<sup>rd</sup>-party power supplies.

#### On/Off Switch

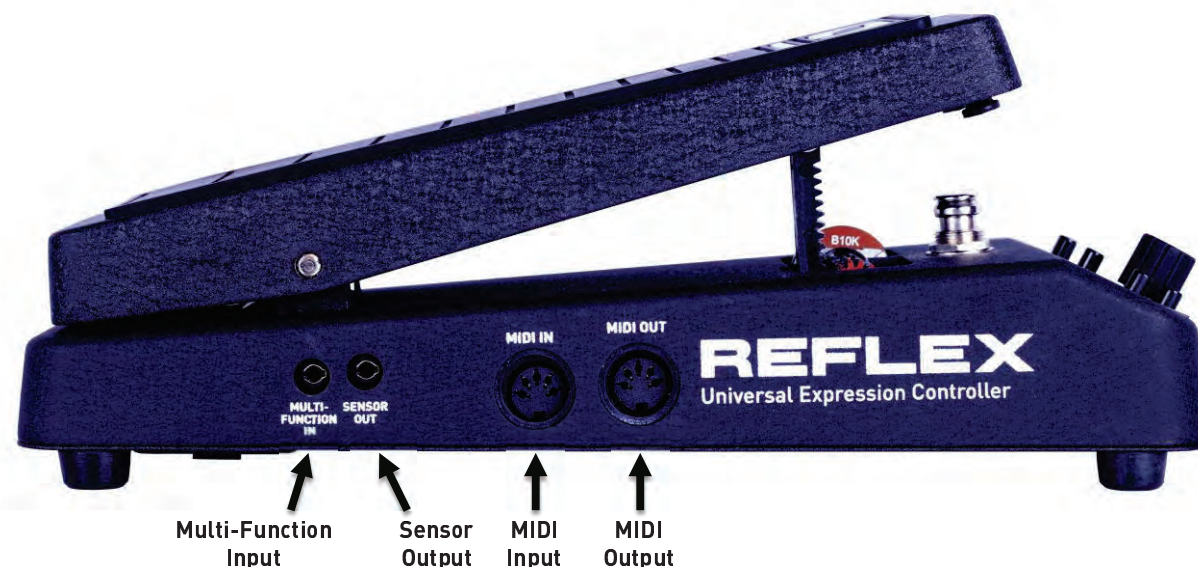
Turns the Reflex on or off. This is useful to conserve the battery when the Reflex is not in use.



## USB

Connect your computer (Mac or Windows) to the Reflex's USB port (denoted by the  icon) using a standard mini USB cable. The Reflex is a class compliant USB device, meaning that it should be recognized by Mac and Windows computers automatically. For more information about the Reflex's USB capabilities, refer to the USB section of the User's Guide.

## Right Side Connections



### MIDI Out

This standard 5-pin DIN connector outputs expression signals as standard MIDI messages. The Reflex has three independently configurable digital outputs, each of which is mapped to a MIDI message (typically a continuous controller).

### MIDI In

This standard 5-pin DIN connector receives MIDI messages from external devices. The most common use case is using a MIDI controller to send program change messages to the Reflex, allowing for instant recall of any of its 128 user presets.

### Sensor Out

This 3.5mm (1/8") TRRS connector interfaces with Source Audio products such as the One Series family of effects or the Soundblox 2 effects pedal line, allowing for direct control of effect parameters.

### Multi-Function In

This connector is reserved for future use with the Neuro Hub. Functionality will be added in the future via firmware updates.

## Basic Operation

At its simplest, an expression pedal is simply a passive potentiometer. The treadle (controlled by the user's foot) changes the resistance between the terminals of the potentiometer. This changing

resistance is sensed by the device connected to the potentiometer and can be used to change various effect parameters.

Some expression pedals can also act as active control voltage sources, in which case they output a voltage within a given range and send it out to the connected device. This approach is common with devices such as modular synthesizers, where control voltages are abbreviated as CV.

Traditionally, expression pedals have a linear taper, which means that the movement of the foot treadle over a certain range of motion corresponds to a linear change in the resistance of the potentiometer. Some expression pedals might instead have what is known as a logarithmic or audio taper, which translates the linear motion of the treadle into a logarithmic or “curved” change in resistance, which closely models the way that we perceive sound intensity.

The Reflex, however, is much more than a typical expression pedal. It can generate linear tapers, logarithmic/audio tapers, or more complex user-defined tapers. It can even create internal LFOs that sweep the expression outputs periodically, following a number of different wave shapes. With the highly configurable hardware options, the Reflex can adapt to a wide range of applications.

## Expression Outputs

There are a total of seven expression outputs on the Reflex. Four of these have physical connections: the three analog expression outputs and the sensor output. The remaining three expression outputs are digital outputs, which are available on the hardware MIDI connector as well as the USB port.

The three analog expression outputs can be configured to match 4 common plug configurations (see [Expression Output Plug Configuration](#)). The sensor output, designed to work with Source Audio products, uses a fixed plug configuration (see [Sensor Output Plug Configuration](#)).

All of the seven expression outputs have independently configurable shapes (selected from an assortment of tapers or LFOs), as well as configurable minimum value, maximum value, and depth (in the case of an LFO). The digital outputs have two additional parameters – type, which defines the MIDI continuous controller (CC) to be used, and channel, which defines the MIDI channel.

All expression outputs can be thought of as having a range between 0 and 127.

For the digital expression outputs, this concept is convenient, because it maps directly to the MIDI continuous controller values 0 to 127.

The analog expression outputs, on the other hand, map this value to a resistance or a voltage.

For example, expression output 1 has a 10 k $\Omega$  potentiometer, meaning that the value of 0 maps to a resistance of about 0 $\Omega$ , the value of 127 maps to a resistance of about 10k $\Omega$ , and a value of 64 (half-way between 0 and 127) maps to a resistance of about 5k $\Omega$  (half-way between 0 $\Omega$  and 10k $\Omega$ ).

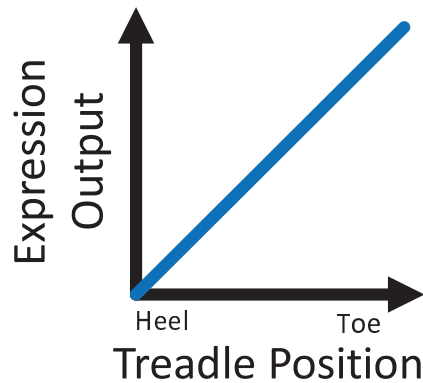
Similarly, an analog expression output configured as a control voltage (CV) output has a voltage range of 0V to 5V, meaning that the value of 0 maps to a voltage of about 0V, the value of 127 maps to a voltage of about 5V, and a value of 64 maps to a voltage of about 2.5V.

## Tapers

Two basic tapers are available by default: linear and logarithmic/audio.

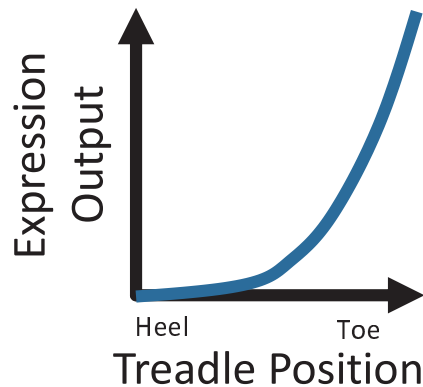
### Linear Taper

The linear taper has a linear relationship between the position of the treadle and the expression output.



### Audio Taper

The audio taper has a logarithmic relationship between the position of the treadle and the expression output.

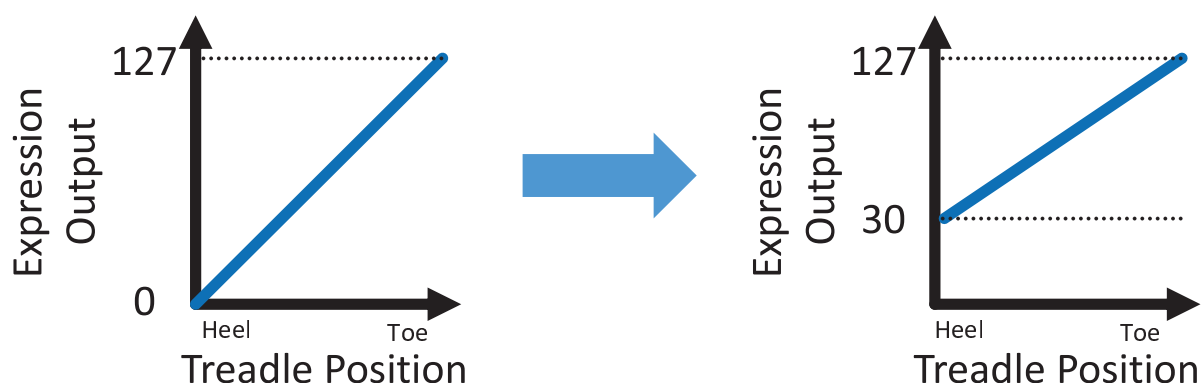


### Taper Min Parameter

When a taper is active for a given expression output, the Min parameter controls the minimum value which is output when the treadle is in the heel down position (except when the depth of the taper is inverted). By default, the Min parameter is set to 0, meaning that the expression output ranges from 0 to 127. If the Min parameter is increased, then the range of the expression output is decreased.

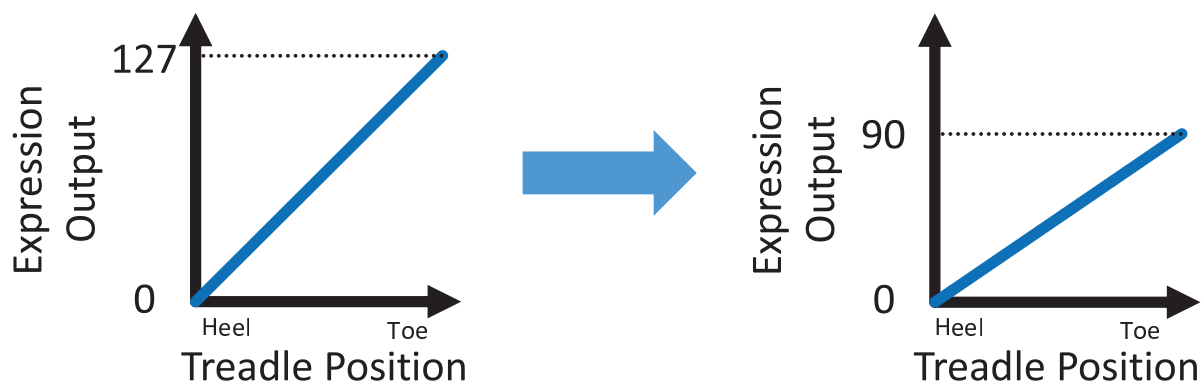


The following figure shows an example where the Min parameter has been raised from 0 to 30, so that the expression output is now limited to the range between 30 and 127.



### Taper Max Parameter

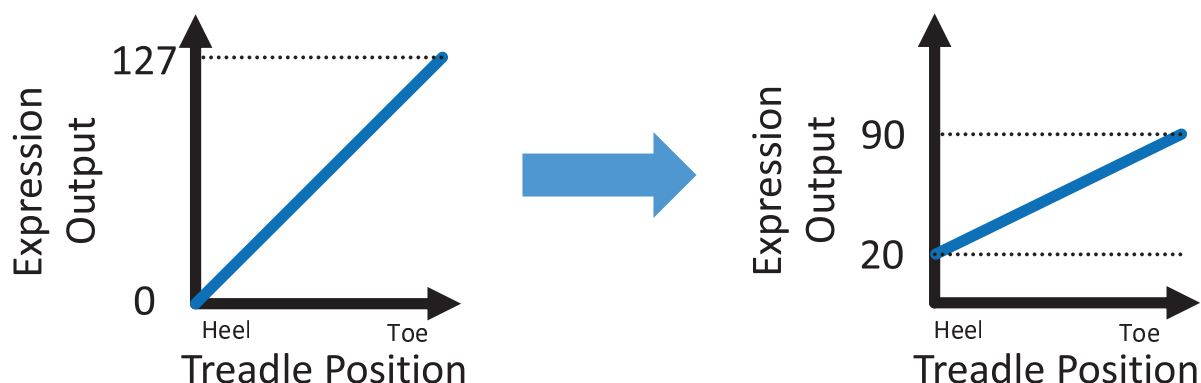
When a taper is active for a given expression output, the Max parameter controls the maximum value which is output when the treadle is in the toe down position (except when the depth of the taper is inverted). By default, the Max parameter is set to 127, meaning that the expression output ranges from 0 to 127. If the Max parameter is decreased, then the range of the expression output is decreased. The following figure shows an example where the Max parameter has been lowered from 127 to 90, so that the expression output is now limited to the range between 0 and 90.



The Min parameter must always be less than or equal to the Max parameter.

It is possible to lower the Max parameter and raise the Min parameter, resulting in an even smaller expression output range.

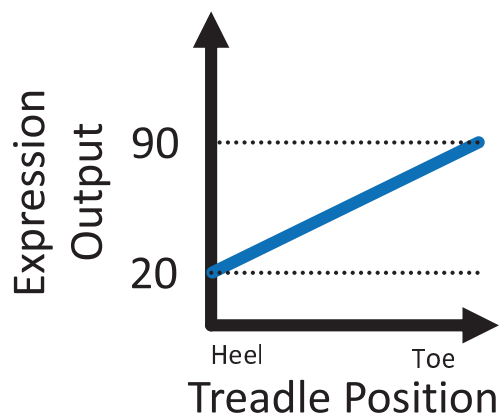
The following figure shows an example where the Min has been increased from 0 to 20, and the Max has been decreased from 127 to 90, resulting in an output range of 20 to 90.



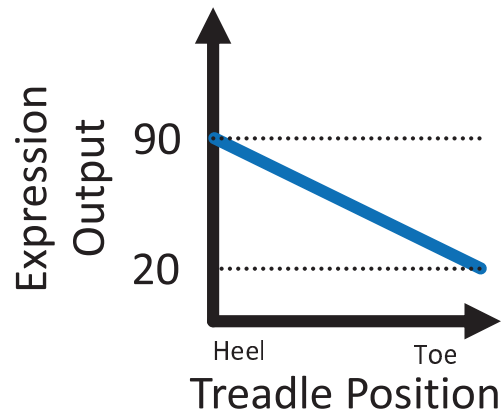
### Taper Depth Parameter

When a taper is active for a given expression output, the Depth parameter sets whether the expression output is inverted or not. It only has two possible values: 64 and -63. When the Depth is set to 64, the output range is not inverted. When the Depth is set to -63, the output range is inverted.

The following figure shows an example where the Min is set to 20, the Max is set to 90, and the Depth is set to 64 (no inversion):



The following figure shows an example where the Min is set to 20, the Max is set to 90, and the Depth is set to -63 (the output is inverted):

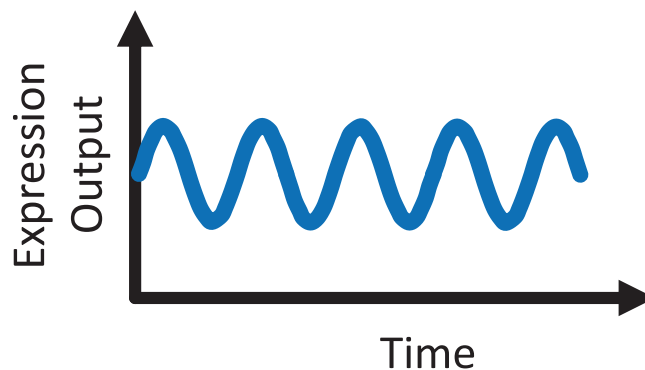


### Low Frequency Oscillators (LFOs)

There are five built-in low frequency oscillators (LFOs) which can be used to modulate the expression output periodically with a certain wave shape. When an LFO is active, the position of the treadle controls the frequency, or rate, of the LFO.

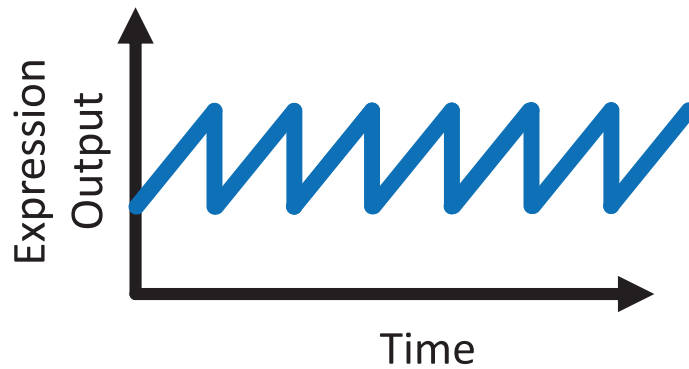
#### Sine LFO

The sine LFO follows the typical sine shape that is widely used in modulation effects such as chorus and phaser.

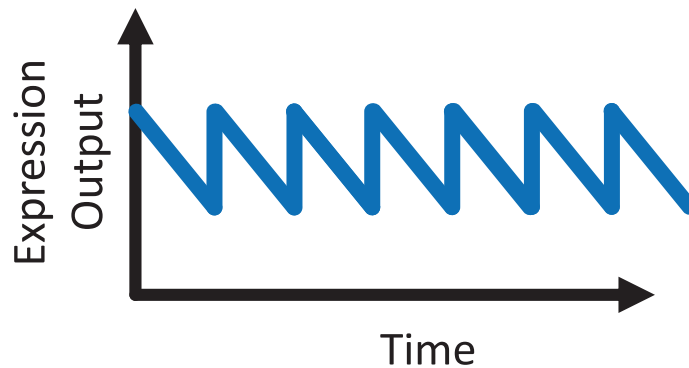


### Sawtooth LFO

The sawtooth LFO increases linearly until a certain point when it jumps back to its original value. This sudden jump creates a strong sense of rhythm, which is why the sawtooth LFO is often used in synthesizers and filter effects that are synchronized to the beat of the song. By default, this LFO shape is what is known as a rising sawtooth shape, which means that the value rises linearly from the min value to the max value, and then resets again to the min value:

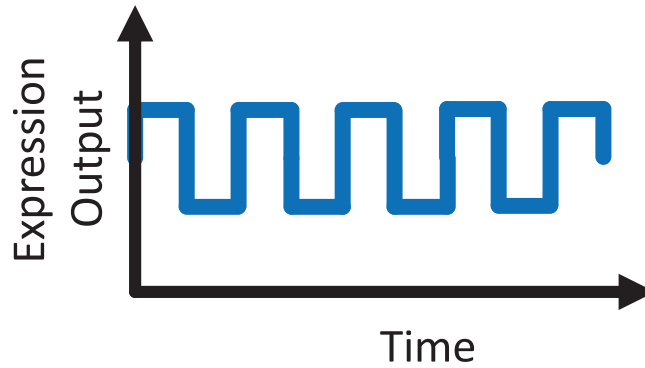


The shape of the sawtooth LFO can be changed from a rising sawtooth to a falling sawtooth by inverting the depth parameter:



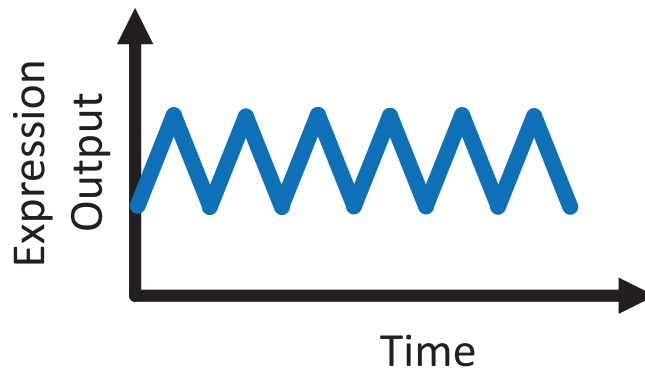
### Square LFO

The square LFO outputs only two values, instantly jumping between them at a fixed interval. Square waves can create an even stronger sense of rhythm than sawtooth LFOs, and are often used to create choppy effects in time with the music.



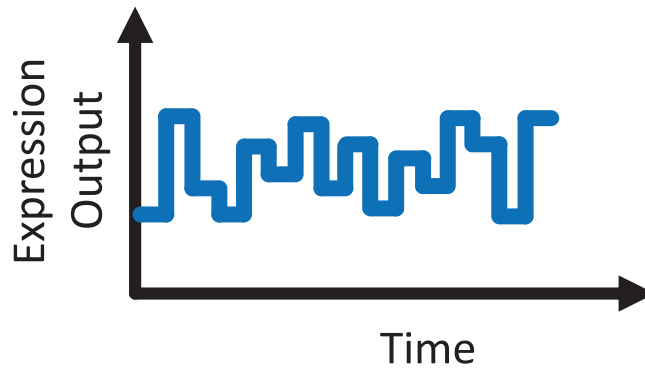
### Triangle LFO

The triangle LFO is similar in shape to the sine LFO, but it follows a linear path between its minimum and maximum values. Triangle LFOs are ubiquitous in modulation effects like phasers as well as synthesizers.



### Random Sample-and-Hold LFO

The random sample-and-hold constantly undulates between values selected at random (actually, it is a long, repeating pseudo-random sequence). A random value is chosen (or “sampled”) and that value is held on the output for a certain amount of time until a new random value is chosen. This wave shape can create very chaotic effects and first became popular in the golden age of modular synths.



### LFO Min Parameter

When an LFO is active for a given expression output, the Min parameter controls the minimum frequency of the LFO. This corresponds to the minimum (heel depressed) position of the treadle. By default, the minimum frequency is 0.1 Hz.

### LFO Max Parameter

When an LFO is active for a given expression output, the Max parameter controls the maximum frequency of the LFO. This corresponds to the maximum (toe depressed) position of the treadle. By default, the maximum frequency is 10 Hz.

### LFO Min and Max Parameters with MIDI Clock

If the LFO Min or LFO Max parameters are used when MIDI Clock is being sent to the Reflex, the LFO can be synchronized to beat divisions in time with the MIDI Clock signal.

In order to use the LFO beat division options, decrease the LFO Min and LFO Max parameters until they reach a value below zero. There are 6 possible values below zero: 1-4, 1-3, 1-2, 1-1, 2-1, and 4-1. These represent the ratios of a beat that the LFO can sync to.

The following table shows the relationship between the parameter value on the Reflex’s display and the corresponding beat division, as well as the musical equivalent.

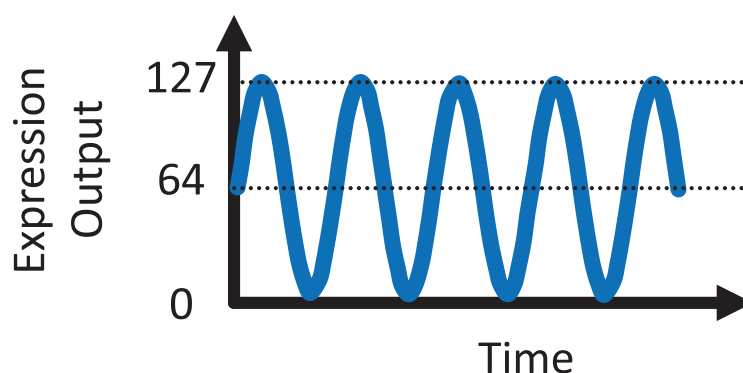
Parameter Display	Beat Division	Musical Equivalent
1-4	1/4	Sixteenth note
1-3	1/3	Triplet
1-2	1/2	Eighth Note
1-1	1	Quarter Note
2-1	2	Half Note
4-1	4	Whole Note



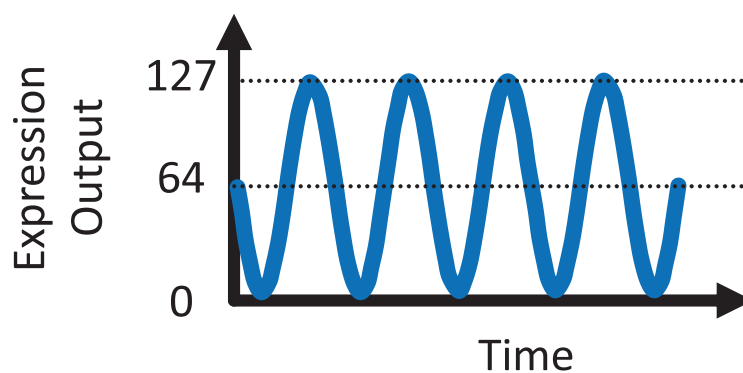
The treadle can be used to sweep through beat division values. For example, if the Min is set to 1-2 (eighth note) and the max is set to 1-4 (sixteenth note), then the treadle will sweep between eighth notes (heel down), triplets (middle position), and sixteenth notes (toe down). For more information, refer to [MIDI Clock Synchronization](#).

### LFO Depth Parameter

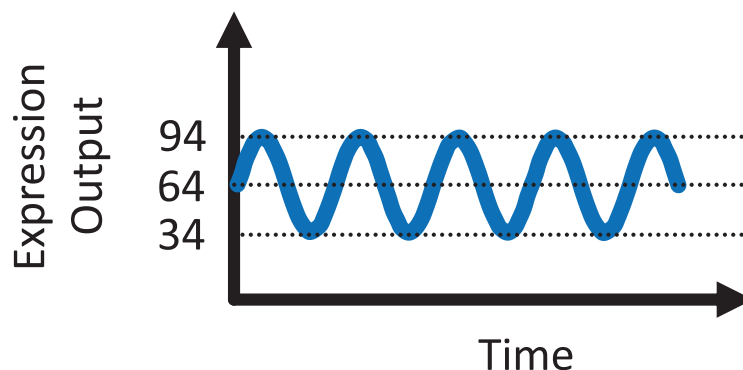
When an LFO is active for a given expression output, the Depth parameter controls the amplitude of the expression output. The output is always centered at 64, and the depth parameter dictates how far from that center value the LFO will deviate. At maximum depth (64), for example, the output is centered at 64 and ranges from 0 to 127.



Negative depth values invert the shape of the LFO. At a minimum depth (-64), the output is centered at 64 and ranges from 0 to 127.



If the depth is set to an intermediate value, then the LFO range is reduced. For example, at a depth of 30, the output will be centered at 64 and range from 34 to 94.



### Controlling LFO Depth with the Treadle

The LFO depth can be controlled directly by the treadle position in LFO Pedal Depth Mode or Inverted LFO Pedal Depth mode.

#### *LFO Pedal Depth Mode*

To use LFO Pedal Depth Mode, increase the Depth parameter until the display shows **Pd**. In this mode, the LFO depth will be zero when the treadle is in the heel down position, and the depth will increase linearly with the treadle position until it reaches maximum depth (64) when the treadle is in the toe down position.

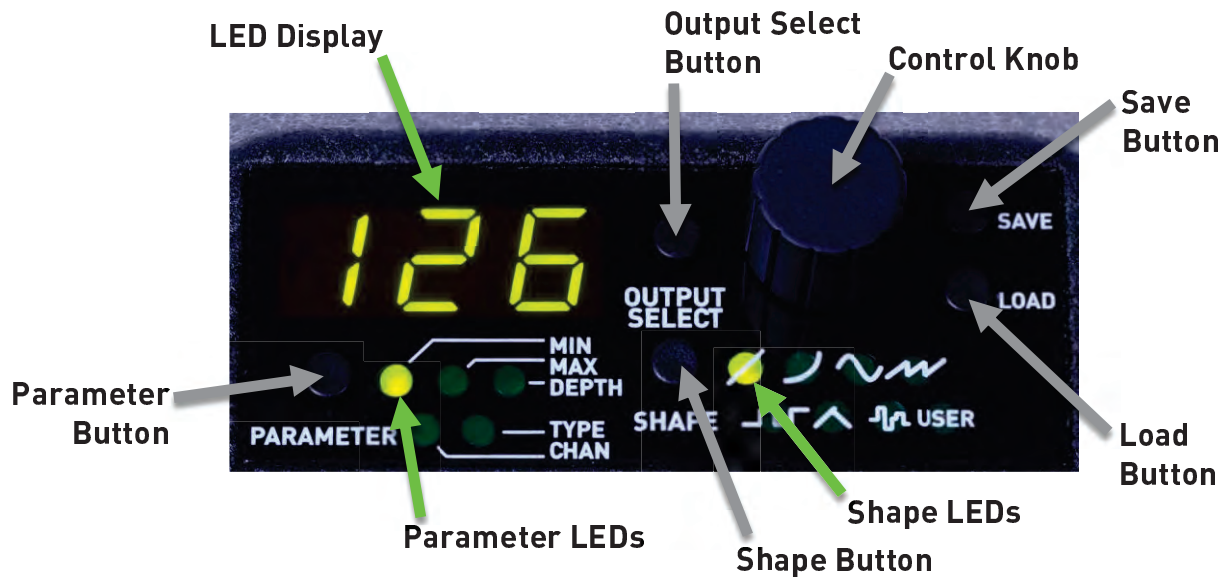
#### *Inverted LFO Pedal Depth Mode*

To use Inverted LFO Pedal Depth Mode, decrease the Depth parameter until the display shows **-Pd**. In this mode, the LFO depth will be zero when the treadle is in the heel down position, and the depth will increase linearly with the treadle position until it reaches maximum depth (-64) when the treadle is in the toe down position. Since the depth is inverted in this mode, LFO wave shapes will be inverted. For example, the sawtooth LFO will be a falling sawtooth instead of a rising sawtooth shape.

### User Shape

The Reflex supports a user-defined shape, which may be either a taper or an LFO. Users can define a shape using the USB editor software, which is available at the Source Audio website.

## Controls and Configuration



### Output Selection








The Output Select button selects one of the 7 outputs for editing. When an output is selected, its abbreviation will be shown on the LED display for a short time.

- E1** (Analog) Expression Output 1
- E2** (Analog) Expression Output 2
- E3** (Analog) Expression Output 3
- d1** Digital (MIDI) Output 1
- d2** Digital (MIDI) Output 2
- d3** Digital (MIDI) Output 3
- Sn1** Sensor Output

The Parameter Button, Shape Button, and Control Knob will allow you to edit the behavior of the currently selected output. Note that all 7 outputs will always be active, but only one output can be selected for editing at any given time.

## Shape Selection

The Shape Button selects which shape will be used for the currently selected output. The corresponding LED will indicate which shape is active. If no LED is lit, the output is disabled.

-  Linear Taper
-  Audio/Logarithmic Taper
-  Sine LFO
-  Sawtooth LFO
-  Square LFO
-  Triangle LFO
-  Random Sample-and-Hold LFO
- USER User-Defined Shape

**OFF** If all LEDs are turned off and the LED display briefly displays the word OFF, this means that the selected output is disabled.

## Parameter Editing

The Parameter Button selects which parameter to edit using the control knob. There are a total of 5 parameters: Min, Max, Depth, Type, and Chan. The analog expression outputs and the sensor output only utilize the first 3 parameters: Min, Max, and Depth. The digital (MIDI) outputs utilize all 5 parameters. When the Parameter button is pressed, a corresponding LED will light up to show which parameter is currently being edited.

Use the Control Knob to edit the currently selected parameter.

### Min Parameter

When an output is configured with a taper shape, the min parameter defines the minimum value it can output. For more information, refer to [Taper Min Parameter](#).

When an output is configured with an LFO shape, the min parameter defines the minimum frequency of the LFO. For more information, refer to [LFO Min Parameter](#).

### Max Parameter

When an output is configured with a taper shape, the max parameter defines the maximum value it can output. For more information, refer to [Taper Max Parameter](#).

When an output is configured with an LFO shape, the max parameter defines the maximum frequency of the LFO. For more information, refer to [LFO Max Parameter](#).

### Depth Parameter

When an output is configured with a taper shape, the depth parameter can invert the taper shape. For more information, refer to [Taper Depth Parameter](#).

When an output is configured with an LFO shape, the depth parameter controls the amplitude of the LFO. For more information, refer to [LFO Depth Parameter](#).

### Channel (Chan) Parameter

The digital (MIDI) outputs will send MIDI messages on a specific channel. There are a total of 16 channels possible.

### Type Parameter

Each MIDI message sent by the digital outputs has a specific message type. The Reflex is capable of generating three types of MIDI message:

<i>000</i> to <i>127</i>	Continuous Controller (0 to 127)
<i>P 16</i>	Pitch Bend
<i>AF 1</i>	Aftertouch

### LED Display

The LED Display shows the value of the currently selected parameter. Occasionally, it shows other information such as the currently selected output or the currently selected preset (for saving and loading).

### Save Button

The Save Button is used to save a preset. For more information, refer to [Preset Storage and Recall](#).

### Load Button

The Load Button is used to load a preset. For more information, refer to [Preset Storage and Recall](#).

## Footswitch

A footswitch is located beneath the treadle. It can be activated when the treadle is in the toe down position by pushing downward on the toe with some extra force. Activating the footswitch will mute the expression outputs. The Footswitch can also be used to calibrate the range of the treadle.

### Muting the Expression Outputs

When the Footswitch is activated, the LED display will show *888*. This signifies that the outputs have been muted. The behavior of the outputs depends on their shape:

- All expression outputs that use a taper shape will jump to their minimum value, as defined by the Min parameter.
- All expression outputs that use an LFO shape and a depth ranging between -63 and 64 will jump to zero.
- All expression outputs that use an LFO shape and the Pedal Depth (or Inverted Pedal Depth) mode will jump to their center value, 64.

### Un-Muting the Expression Outputs

When the expression outputs are muted, they can be restored, or un-muted, by clicking the footswitch a second time. There are two modes for un-muting the outputs: Normal and Mute Restart. The un-mute mode can be selected using the USB Editor Software.

## Normal Un-Mute Mode

In normal un-mute mode, when the outputs are muted and the footswitch is clicked a second time, the expression outputs will become active and immediately jump to their expected values based on the position of the treadle.

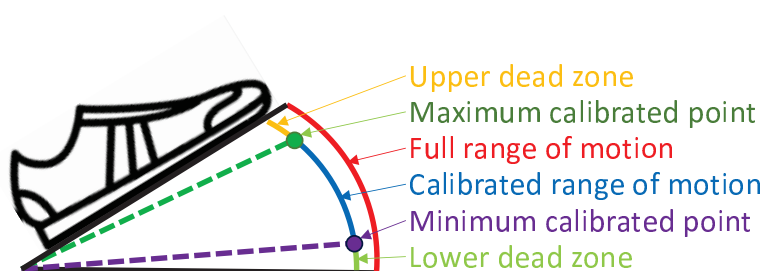
## Mute Restart Mode

In Mute Restart Mode, when the outputs are muted and the footswitch is clicked a second time, the LED display will change from **888** to **000**. This signifies that the Reflex is ready to un-mute, but the expression outputs have not yet been activated. The final step required to un-mute the outputs is to return the treadle to its minimum position. Once this has been done, the LED display will show the value of the currently selected parameter, expression outputs will activate, and any expression outputs with an LFO shape will restart.

## Calibrating the Range of Motion

In order to get proper operation over the desired range of motion of the treadle, it may be necessary to perform a calibration. The calibration is a global setting that applies to all outputs for all presets. To perform a calibration, follow these steps:

1. Reach in with your finger and press and hold the footswitch for about 2 or 3 seconds until the LED display shows **CAL**.
2. Move the treadle over the desired range of motion you would like to use. Note that it is possible to create “dead zones” if desired, by only using a limited range of motion. This is shown in the image below.
3. Reach in with your finger and press the footswitch again to complete the calibration.



**NOTE:** Using your foot to activate the footswitch during calibration may lead to incorrect results. Therefore, we recommend that you use your finger to activate the footswitch during calibration.

## Preset Storage and Recall

The Reflex can store 128 presets. These presets contain all of the data related to the shapes and parameter settings of all 7 expression outputs.

### Saving a Preset

To save the Reflex's current configuration to a preset, follow these steps:

1. Press the Save button once. The LED display will begin to blink and show a number between 1 and 128. This number represents the preset location where the configuration will be saved.
2. Use the Control Knob to scroll through the numbers and select a preset location.



3. Press the Save button to save the configuration to the selected preset location. The LED display will blink 3 times to show that the preset was successfully saved.

## Recalling a Preset

To recall a previously saved configuration, follow these steps:

1. Press the Load button once. The LED display will begin to blink and show a number between 1 and 128. This number represents the preset location to load.
2. Use the Control Knob to scroll through the numbers and select a preset location.
3. Press the Load button to load the configuration from the selected preset location.

Presets can also be loaded by sending a program change message to the Reflex's MIDI input. For more information, see [MIDI Input](#).

## MIDI

### MIDI Output

The Reflex's 5-pin DIN MIDI output jack connects to a standard MIDI cable. It simultaneously sends MIDI messages for Digital Expression Output 1, Digital Expression Output 2, and Digital Expression Output 3.

### MIDI Input

MIDI program change messages and MIDI beat clock may be sent to the Reflex via its 5-pin DIN MIDI input jack. By default, the Reflex receives messages on MIDI channel 1. The global MIDI channel can be configured using the USB Editor Software, or by configuring it manually using the footswitch (see [Setting the MIDI Input Channel](#)).

### Recalling Presets via MIDI Program Changes

If the Reflex receives a program change message, it will instantly recall the preset with the corresponding number. There are a total of 128 possible program change messages, each corresponding to one of the Reflex's 128 presets.

### MIDI Clock Synchronization

The Reflex syncs to MIDI clock (also known as MIDI timing clock or MIDI beat clock). MIDI clock is tempo-dependent and is used to ensure that multiple MIDI-enabled devices stay in synchronization. A common use of MIDI clock with the Reflex is when recording along to a click track in a DAW (Digital Audio Workstation) running on a computer. MIDI clock can be sent to the Reflex directly on the MIDI Input jack or via USB-MIDI. When MIDI clock is received, a small dot between the first and second digits on the LED display indicate that the Reflex is receiving clock sync data.



MIDI Beat Clock Indicator

The Reflex begins to sync its LFO to the MIDI Clock as soon as the first MIDI Clock message is received. If the tempo changes, the rate of MIDI Clock messages will change as well, and the Reflex

will adjust to resynchronize itself accordingly. The Reflex doesn't require any special configuration to use MIDI Clock; just start sending it MIDI Clock messages and it will synchronize itself automatically.

By default, LFOs start synchronized with the first MIDI Clock message received. If you wish to offset the LFO start time, for example by an eighth note, simply start playback in your DAW an eighth note earlier or later than the beginning of the measure.

In order to synchronize an LFO with MIDI clock, set either the Min or Max parameters (or both) to one of the subdivision settings (1-4, 1-3, 1-2, 1-1, 2-1, or 4-1). This will synchronize the LFO to divisions or multiples of the musical beat using the MIDI clock as a basis for the tempo. Musically speaking, this means that the LFO can run at the rate of whole notes, half notes, quarter notes, eighth notes, triplets, or sixteenth notes. For more information, refer to [LFO Min and Max Parameters with MIDI Clock](#).

### Setting the MIDI Input Channel

To set the Reflex's MIDI channel, follow these steps:

1. Press and hold the Footswitch with your finger. Continue to hold the footswitch for several seconds. The LED display will show **CH** and then **CO 1**.
2. Release the footswitch. Turn the control knob to set the MIDI channel.
3. Press the footswitch once to complete the MIDI channel setting.

### MIDI Merge Function

The Reflex is capable of merging MIDI data input to its MIDI Input jack and outputting it on both its MIDI Output jack and USB-MIDI output.

## USB

The Reflex's USB port is plug-and-play ready for Windows and Mac computers. The Reflex uses class-compliant drivers, so no special drivers are needed. Just connect it to the computer using a USB cable. The computer should automatically recognize the Reflex, which will be identified as "Source Audio REFLEX Controller" in Windows operating systems or as "Generic USB MIDI Device" in Mac operating systems.

USB connectivity brings many benefits, such as the ability to download firmware updates to the Reflex, configuration of advanced parameters, and MIDI connectivity to audio production software running on the computer.

### USB Editor Software

USB Editor Software is currently in development and will be made available for free download on the Source Audio website. It will allow for editing of advanced parameters that let the user further customize the Reflex. For more information, refer to the Source Audio website.

### USB-MIDI

The Reflex will appear as a MIDI device in your computer's operating system. As a result, the Reflex can communicate with audio production software that utilizes MIDI, such as Pro Tools, Ableton Live, Logic Pro, and more. MIDI messages can be sent directly to the Reflex using the USB connection, which allows for automation of the Reflex within host software such as a DAW. For example, presets

can be recalled by outputting MIDI program change messages from the host software to the Reflex via the USB connection.

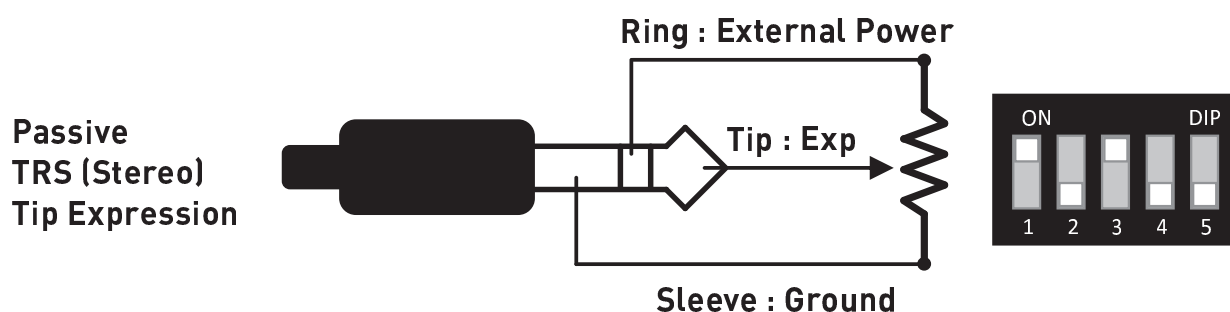
## Expression Output Plug Configuration

The three analog expression outputs on the Reflex are highly configurable. Three sets of DIP switches mounted on the bottom panel of the Reflex housing allow for configuration of each of the expression outputs.

Each DIP switch package contains 5 switches. There are a total of three DIP switch packages, one for each of the three expression outputs.

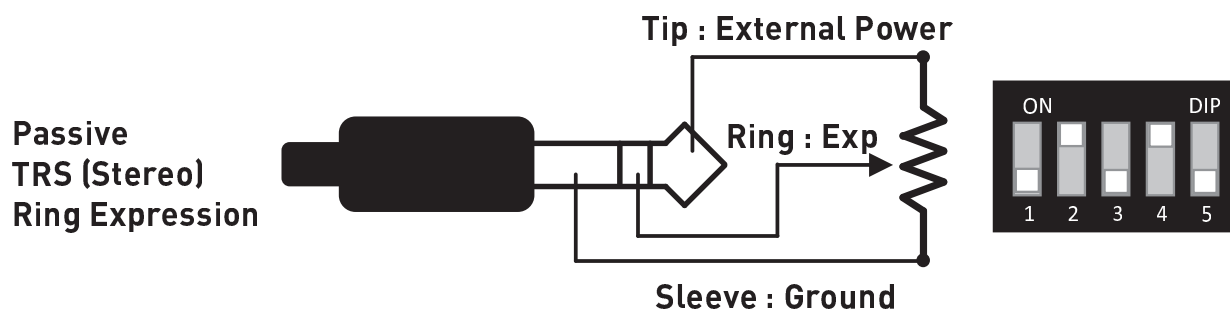
### Passive TRS (Tip Expression)

The most common expression pedal plug configuration is passive TRS with the expression signal on the tip. Power is supplied externally on the ring contact, and the sleeve contact is ground. This configuration requires a stereo (TRS) cable. This configuration can be found on products from companies including Source Audio, Boss, Roland, Moog, Strymon and Behringer. In this mode, the corresponding DIP switches 1 to 5 should be set On, Off, On, Off, Off, respectively.



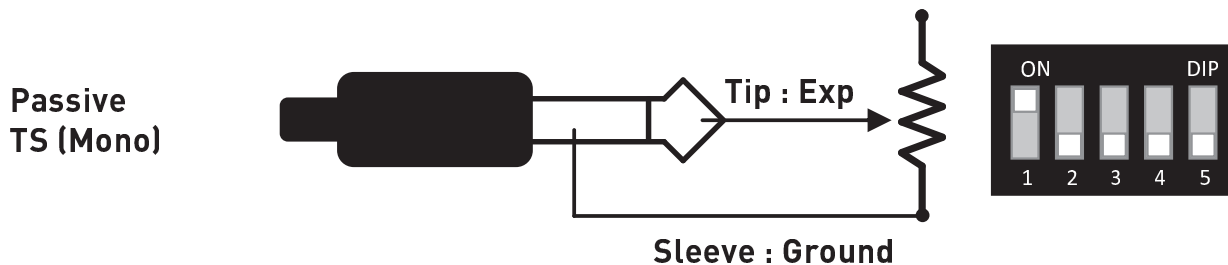
### Passive TRS (Ring Expression)

Passive TRS plugs can also be configured with the expression signal on the ring contact instead of the tip contact. In this case, power is supplied externally on the tip contact, and the sleeve contact is ground. This configuration requires a stereo (TRS) cable. This configuration can be found on products from companies including Zoom and Korg. In this mode, the corresponding DIP switches 1 to 5 should be set Off, On, Off, On, Off, respectively.



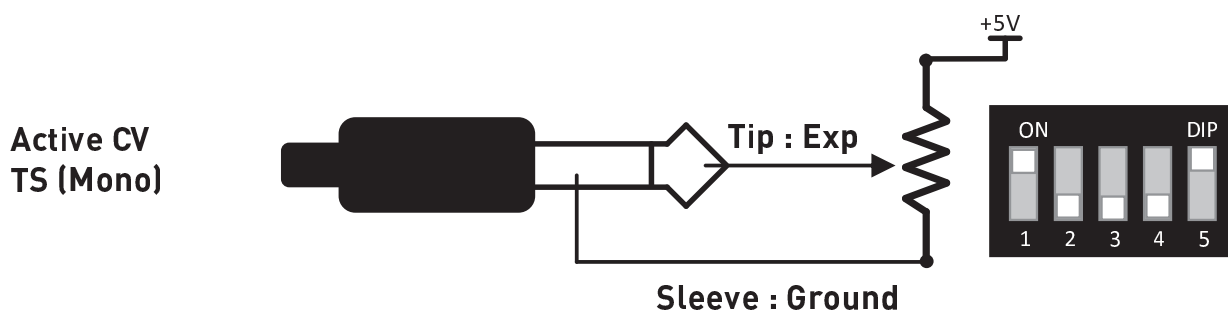
## Passive TS

Some passive expression ports do not require a separate power connection. In this case, the expression signal is on the tip contact, and the sleeve contact is ground. This configuration requires a mono (TS) cable. This configuration can be found on products from companies including Line 6 and Eventide. In this mode, the corresponding DIP switches 1 to 5 should be set On, Off, Off, Off, Off, respectively.



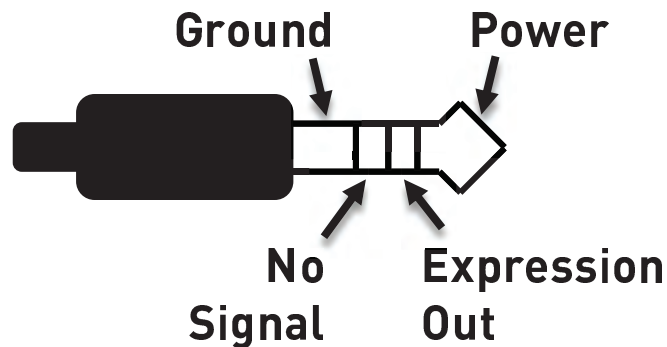
## Active TS Control Voltage (CV)

Devices like modular synthesizers can be controlled by the Reflex if its outputs are configured in active control voltage mode. In this mode, an internal 5 Volt source is connected to the potentiometer, and an active control voltage is output on the tip contact. This configuration requires a mono (TS) cable. In this mode, the corresponding DIP switches 1 to 5 should be set On, Off, Off, Off, On, respectively.



## Sensor Output Plug Configuration

The Sensor Output was designed to work directly with Source Audio's One Series products as well as Soundblox 2 products. It accepts a 3.5mm (1/8") jack with 4 conductors (TRRS). The plug configuration, shown in the following figure, is standard across Source Audio products and cannot be changed.

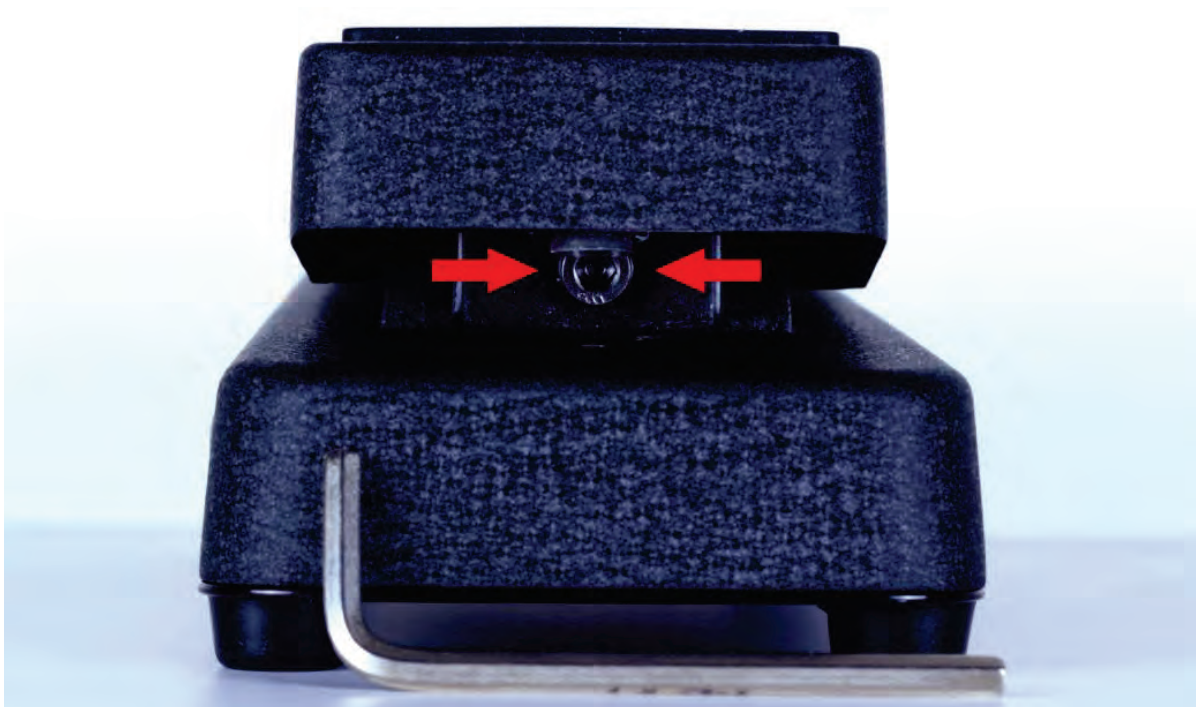


## Battery Compartment

The bottom panel of the Reflex contains a battery compartment that accepts a standard 9V battery.

## Adjusting Treadle Resistance

The friction, or resistance to motion, of the treadle can be adjusted. There is a small screw under the heel of the treadle that accepts a hex wrench. Insert the hex wrench and tighten clockwise to increase the resistance, or loosen counterclockwise to reduce the resistance. The screw is indicated by red arrows in the image below.



## Specifications

### Dimensions

- Length: 26.67 cm (10.5 inches)
- Width: 9.53 cm (3.75 inches)
- Height: 7.00 cm (2.75 inches)

### Weight

- 1 kilogram (2.2 pounds)

### Power

- 45 mA @ 9V DC negative tip (positive sleeve) barrel power jack, 2.1 mm inner diameter, 5.5 mm outer diameter
- 5V DC bus power (USB)
- 9V (PP3) battery (included)

### Analog Expression

- Resistance: 10k $\Omega$  (Outputs 1 and 2), 50k $\Omega$  (Output 3)
- Accuracy: 10-bits, 1024 values, 10 $\Omega$  step size (Outputs 1 and 2), 50 $\Omega$  step size (Output 3)

## Troubleshooting

### Unit Appears Dead / No LEDs Lit

**Dead battery:** Check that the 9V battery is new. In the case of a rechargeable battery, make sure the battery is fully charged.

**Wrong power supply:** Use correct power supply. For more details, refer to [Power](#).

**Corroded power cable plug:** Check power plug for corrosion on sleeve. Swap out power supply if necessary.

### Hard Reset

**Hard Reset - Restore Original Firmware:** In cases where the Reflex stops working, a firmware reset may solve the problem. Firmware updates will be made available on the Source Audio website.

## Waste Disposal Notes



If possible, dispose of the device at an electronics recycling center. Do not dispose of the device with the household waste.

For full compliance with EN 61000-4-6 standard, input cable must be less than 3 meters in length.



## Warranty

### Limited Transferrable Warranty

Source Audio, LLC (hereinafter “Source Audio”) warrants that your new Source Audio Reflex Universal Expression Controller, when purchased at an authorized Source Audio dealer in the United States of America (“USA”), shall be free from defects in materials and workmanship under normal use for a period of two (2) years from the date of purchase by the original purchaser. Please contact your dealer for information on warranty and service outside of the USA.

Under this Limited Warranty, Source Audio’s sole obligation and the purchaser’s sole remedy shall be repair, replacement, or upgrade, at Source Audio’s sole discretion, of any product that, if properly used and maintained, proves to be defective upon inspection by Source Audio. Source Audio reserves the right to update any unit returned for repair and to change or improve the design of the product at any time without notice. Source Audio reserves the right to use reconditioned parts and assemblies as warranty replacements for authorized repairs. Any product repaired, replaced, or upgraded pursuant to this Limited Warranty will be warranted for the remainder of the original warranty period.

This Limited Warranty is extended to the original retail purchaser. This Limited Warranty can be transferred to anyone who may subsequently purchase this product provided that such transfer is made within the applicable warranty period and Source Audio is provided with all of the following information: (i) all warranty registration information (as set forth on the registration card) for the new owner, (ii) proof of the transfer, within thirty (30) days of the transfer, and (iii) a photocopy of the original sales receipt. Warranty coverage shall be determined by Source Audio in its sole discretion. This is your sole warranty. Source Audio does not authorize and third party, including any dealer or sales representatives, to assume any liability on behalf of Source Audio or to make any warranty on behalf of Source Audio.

### Warranty Information

Source Audio may, at its option, require proof of the original purchase date in the form of a dated copy of the original authorized dealer’s invoice or sales receipt. Service and repairs of Source Audio products are to be performed only at the Source Audio factory or a Source Audio authorized service center. Prior to service or repair under this Limited Warranty, the purchaser must request from Source Audio a return authorization, which is available at:

Source Audio LLC  
120 Cummings Park, Woburn, MA 01801  
(781) 932-8080 or at [www.sourceaudio.net](http://www.sourceaudio.net)

Unauthorized service, repair, or modification will void this Limited Warranty.

### Disclaimer and Limitation of Warranty

Do not open the effects pedal under any circumstance. This will void the warranty.

The foregoing limited warranty is the only warranty given by Source Audio and is in lieu of all other warranties. All implied warranties, including warranties of merchantability and fitness for any particular purpose, exceeding the specific provisions of this limited warranty, are hereby disclaimed.

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## Version History

July 1, 2015: Initial Release



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