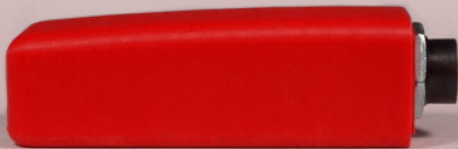


# MIDI EXPRESSION | USER MANUAL



MIDI EXPRESSION



MIDI EXPRESSION  
*Quattro*



MIDI EXPRESSION iO



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# Introduction

If you've purchased a MIDI Expression device, thank you for your support and I hope you enjoy using it.

This manual gives you a good look at how MIDI Expression devices and the MIDI Expression Control application work. While they are both easy and intuitive to use, this manual is worth reading to familiarize yourself with their features and to discover aspects of their use that are not so obvious.

## Features

- Pedal Sensing Technology.
- Polarity reversing inputs.
- Class compliant driverless implementation.
- Standalone operation (MIDI Expression iO)
- Powerful preset editor.
- Parameter feedback.
- Value persistence.

## Pedal Sensing Technology

MIDI Expression devices automatically detect and setup the pedals plugged into them. They can detect expression pedals, sustain pedals, hihat controllers, and dual footswitches. The pedal sensing feature automatically loads an associated preset based on the type of pedal plugged in, providing a simply plug and play experience.

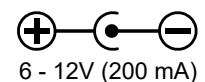
Polarity reversing inputs ensure compatibility with pedals from all manufactures. Take a look in the [appendix](#) for wiring diagrams for each pedal type.

## Class Compliant

MIDI Expression devices will run on virtually any system that supports USB including Windows, OSX, Linux, iOS, and Android, without the need to install drivers. For use in the USB host port of 3rd party MIDI devices such as an iConnect interface, a 'pared-down' version of the firmware can be used as described [here](#).

## Standalone Operation

The MIDI Expression iO can operate in Standalone Mode without a connection to a computer. The device automatically enters this mode when powered by a USB charger or a Roland / BOSS style 9V DC power adapter. In standalone mode, MIDI from MIDI in port is merged with MIDI generated by pedals and is routed out the MIDI Out port.



## Colors

MIDI Expression devices come in six different colors, each with a unique MIDI port name. This makes it easy for you and your software to distinguish multiple MIDI Expressions plugged into the same computer. The 'color' of a device can be changed by in [the firmware update section](#) in the MIDI Expression control application.

## On-Board LED

MIDI Expression devices have an LED that provides visual feedback when you plug in the device, plug in a pedal. By default the LED is normally off, only briefly turning on for feedback, but can be changed to normally on from the **Settings Panel** of the Control Application.

The MIDI Expression iO has two additional normally off LEDs that flash in response to MIDI messages at either MIDI DIN port. The MIDI DIN In LED will flash even when the MIDI Expression is not powered.

## Parameter Feedback

MIDI Expression devices monitor their MIDI In ports and update their internal CC values, allowing them to stay in sync with your music software. See [here](#) for more information.

## Value Persistence

MIDI Expression devices remember their toggle positions and current patch values even after being unplugged, ensuring that your device is always in the exact state as you last left it in.

## Default Settings

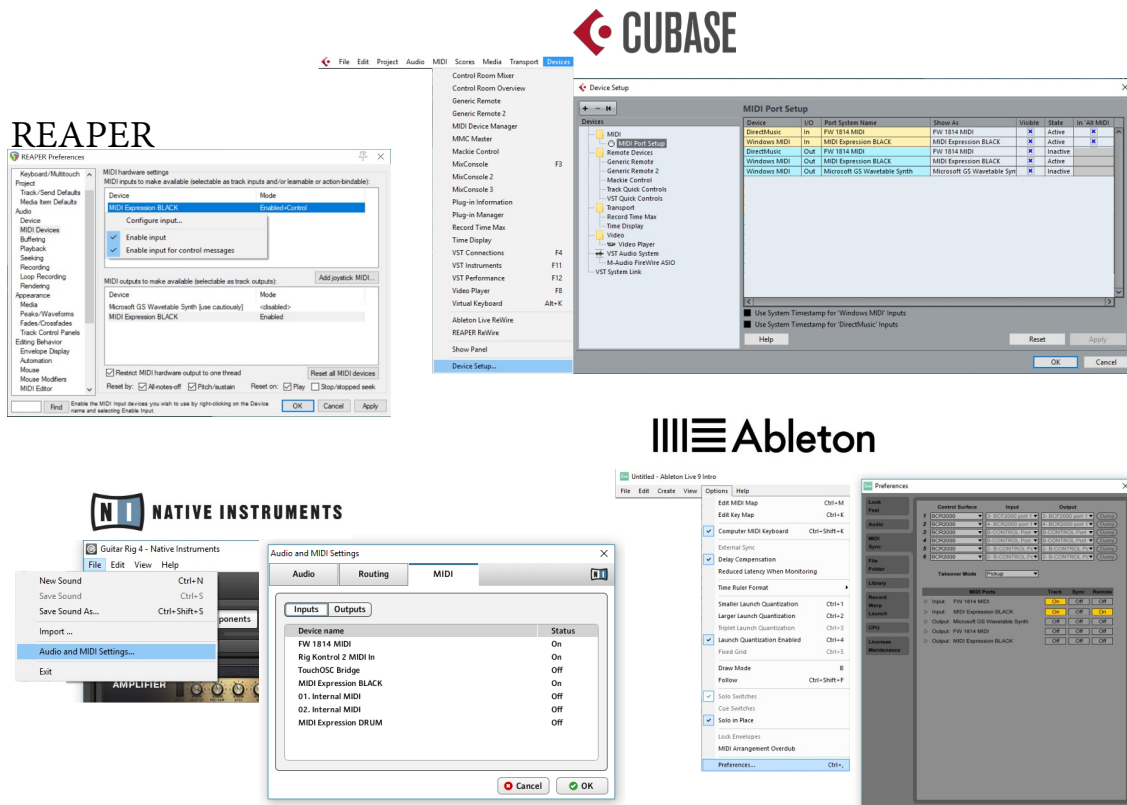
	Input 1	Input 2	Input 3	Input 4
Expression	CC Chan: 1 CC: 7	CC Chan: 2 CC: 7	CC Chan: 3 CC: 7	CC Chan: 4 CC: 7
Sustain	CC Chan: 1 CC: 64	CC Chan: 2 CC: 64	CC Chan: 3 CC: 64	CC Chan: 4 CC: 64
Hihat	CC Chan: 10 CC: 4	CC Chan: 10 CC: 4	CC Chan: 10 CC: 4	CC Chan: 10 CC: 4
Footswitch	CC Chan: 1 CC: 1 Chan: 1 CC: 2	CC Chan: 2 CC: 1 Chan: 2 CC: 2	CC Chan: 3 CC: 1 Chan: 3 CC: 2	CC Chan: 4 CC: 1 Chan: 4 CC: 2

# Getting Started

Because MIDI Expression devices are class compliant, they work 'right out of the box'. Simply connect your device with a USB cable and you are ready to go.

## Setting Up Your MIDI Software

If you want to control an application via MIDI, especially in Windows, you will likely need to enable the MIDI Expression in the application's MIDI setup. Every application is slightly different. Here are some screenshots showing how to enable MIDI Expression in various applications.



## Connecting Pedals

MIDI Expression devices support expression pedals, sustain pedals, footswitches, hihat controllers, and more. For pedals with removable cables, it's best to plug the cable into the pedal before connecting it to the MIDI Expression. Plugging in a cable without a pedal attached can confuse the Pedal Sensing and resulting in your pedal being setup incorrectly.

In addition to standard pedal types, MIDI Expression also supports the TC-Helicon Switch 3, Digitech FS3X, Studiologic SLP3-D, Kawai F-10H, active sensors like Hall effect and light sensors, soft-pot ribbon controllers, and rotary encoders with push buttons.

MIDI Expression devices do not support piezo based kick pedals. These pedals produce high AC voltages that can damage the MIDI Expression, and the MIDI Expression outputs DC voltage which can put strain on piezos.

## Changing Device Settings

To change settings for you device, download and install the **Control Application**, which is available for Windows, macOS, Linux (Ubuntu), and iOS.

# Control Application

As MIDI Expression devices have no physical buttons, any changes you want to make need to be done using the MIDI Expression Control application. The window of the application is scalable, so you can adjust the size to best suit the resolution of your display.



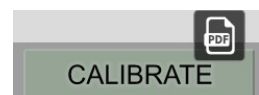
## Standalone vs. Plugin Mode

The MIDI Expression Control application comes in two varieties—a standalone version and a plugin version. The plugin version is useful for experienced users who need a way to load custom settings for a particular song / project in their DAWs. Only the most advanced of users should consider using the plugin version of the control application. More information is available [here](#).

The Control Application is also available for iOS. It's recommended to **disable the keyboard interface** of your MIDI Expression as it can interfere with the iOS onscreen keyboard can cause the device to be detected slowly.

## Learning the Software

Right-Clicking on most of the controls in the UI will bring up a context menu with a direct link to information about it in the user manual, and sometimes links to related YouTube videos.



## Device and Input Selector

The topmost part of the MIDI Expression control application is reserved for selecting the device and input you want to edit.











When using a multi-input MIDI Expression, an input can be selected for editing by clicking on its graphic in the center of the top header.

If you have more than one MIDI Expression connected, icons for each device become visible allowing you to select the device you want to edit. The control application supports editing up to four devices at one time.

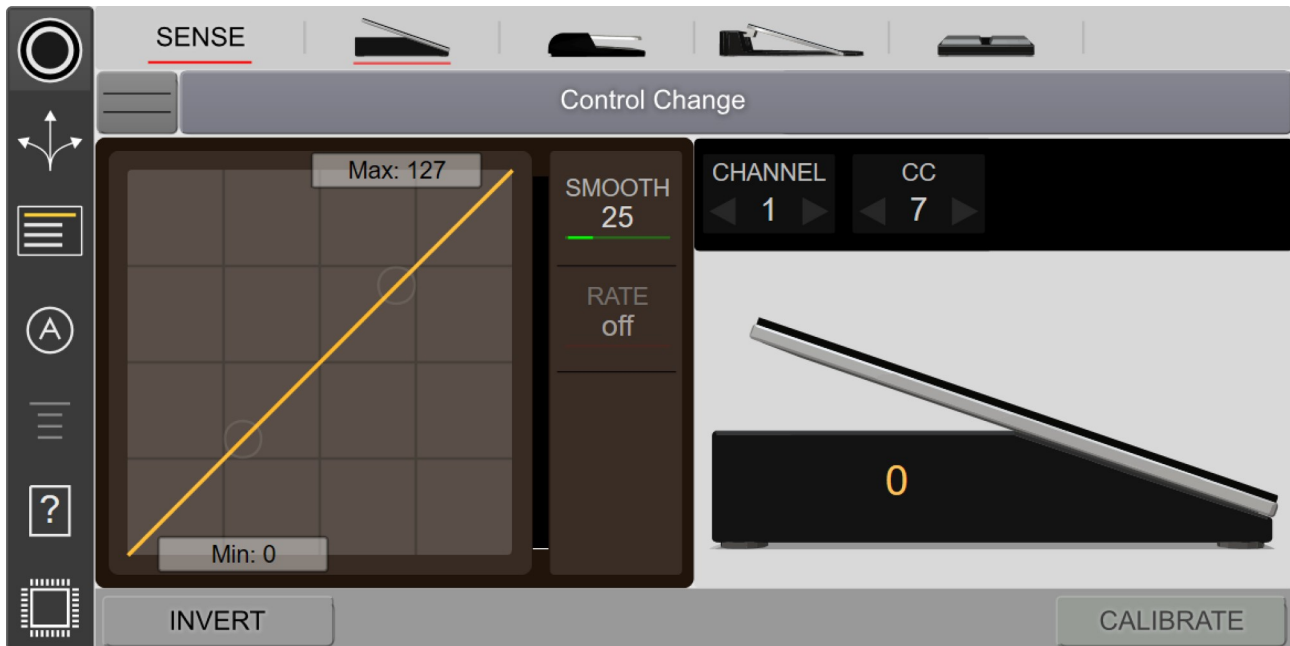
## Sidebar

The sidebar controls the device settings that you want to edit.

	This icon displays the <b>Input editor</b> . You can use it to edit the behavior of your pedals and the kind of MIDI messages they produce.
	The <b>Routing Editor</b> lets you control how MIDI is routed through the device and set the MIDI resolution of the inputs.
	The MIDI Transformer is a MIDI effect that allows you to use pedals to dynamically manipulate the MIDI messages the device generates.
	The <b>Snapshot Manager</b> lets you save entire snapshots of your device's memory, allowing you to quickly change the entire configuration of a device with a single click.
	When the Autoselect option is on (default), the Input Editor will automatically select an input for editing when its pedal moves.
	The <b>Settings Panel</b> is where you can adjust preferences for the Control Application as well as your MIDI Expression device.
	This button opens up the MIDI Expression manual.
	The firmware for MIDI Expression devices is periodically updated to fix bugs and add new features. Click this icon to <b>Update Your Firmware</b> .

Note: First generation MIDI Expression devices (sold from 2013-2015 with mini-B USB connectors) do support all the features described in this manual and related features are greyed out in the Control Application.

## Input Editor



The Input Editor lets you make changes to the behavior of your pedals and the type of MIDI messages they produce.

## Pedal Type Selector



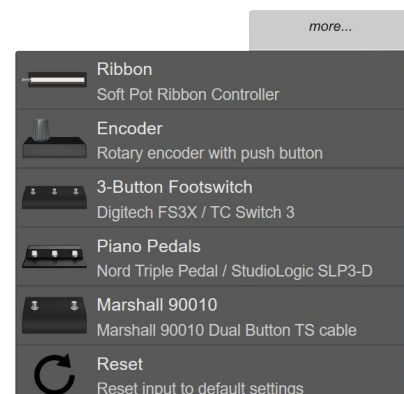
Each MIDI Expression input has a pedal sensing feature which allows it to automatically detect the type of pedal plugged in. When the **SENSE** control is underlined (default), pedal sensing is on and the pedal type is automatically selected, making the input plug 'n play.

You can override the pedal sensing by manually selecting one of the four pedal types. When manually selecting a pedal type, the Sense control is no longer underlined indicating that the Pedal Sensing feature is turned off.

Note: With Pedal Sensing off, the input will remain configured for the selected pedal type even after plugging in a different type of pedal or unplugged the device. To restore the pedal sensing feature for that input, you will need to ensure that SENSE is switched back on.

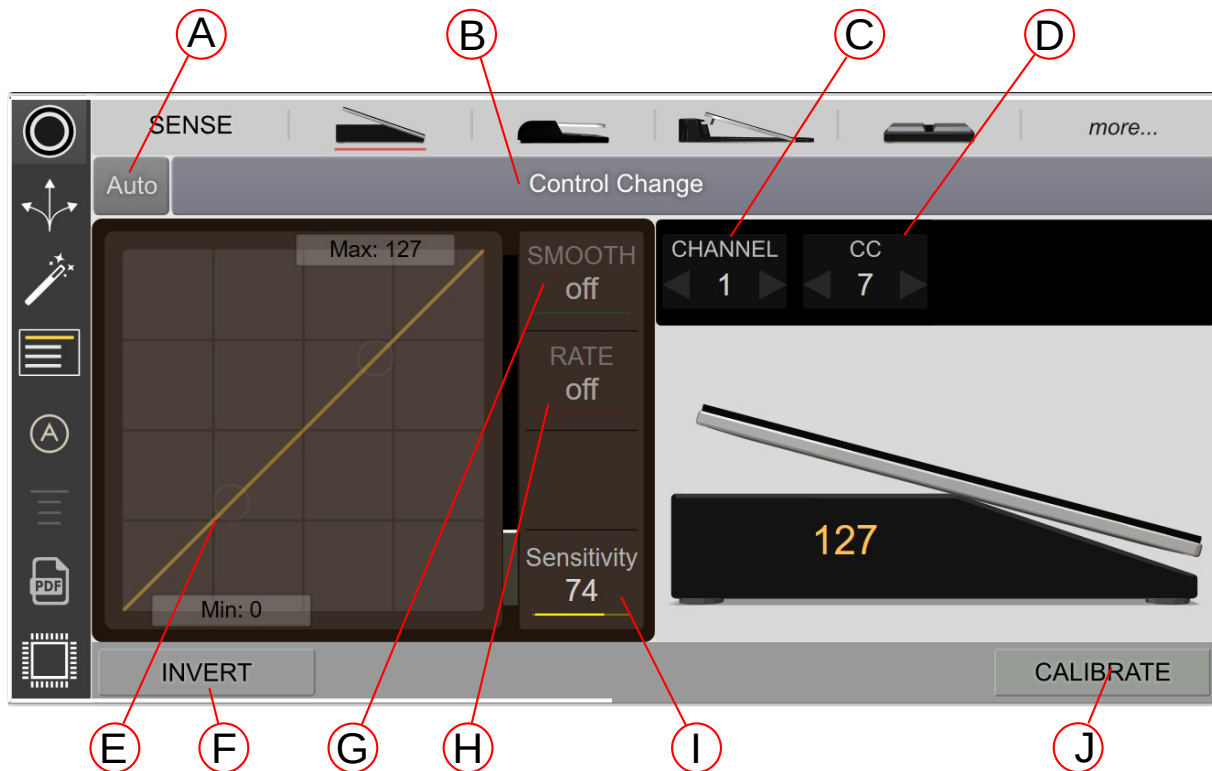
### More Input Types

MIDI Expression devices can also support **rotary encoders**, softpot membrane potentiometers, as well as several custom pedal types. Click on the more button select one of these pedal types.





# Using Expression and Hihat Pedals



## Controls for Expression and Hihat Pedals

### (A) Input Polarity Switch

Expression pedals can be wired in different ways. In order to support pedals from all manufacturers, the polarity of individual MIDI Expression inputs is reversible.

There are three possible values for this control, “Auto” (Default), standard, or reversed. Generally speaking, you should leave set to auto unless your particular pedal is having issues with the ‘Auto’ setting.

### (B) Mode Selector

Clicking the Mode Selector allows you to change the behavior of the pedal and the type of MIDI messages it generates. Look [here](#) for more detailed information about modes for expression pedals and hihat controllers.

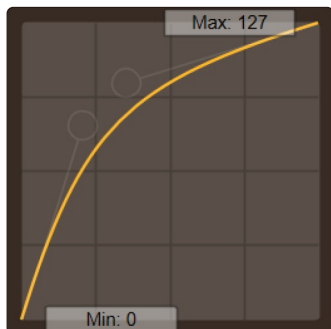
### (C-D) Channel and Control Change

The values in these boxes can be adjusted in a variety of ways. You can drag the values up or down with your mouse. For more precision, hold down the SHIFT key while you drag. Values can also be manually entered by double clicking on the box. Lastly, the values can be incremented and decremented using the up and down arrows.

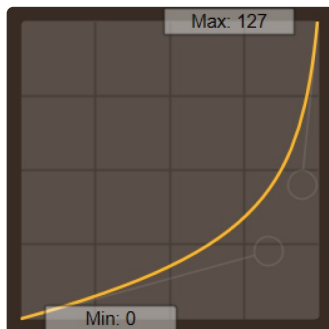
## (E) Expression Curve

The Expression Curve control allows you to customize the response curve of your pedal. It allows you to set the minimum and maximum values, as well as the transition between these values.

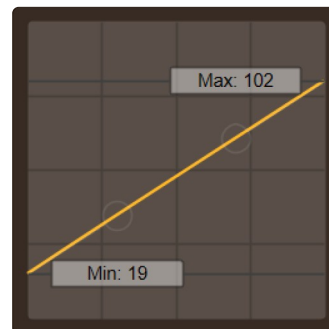
When you adjust the min, max, or curve, the background lights up indicating that the Expression Curve control is on. Clicking anywhere in the background will turn it off again. The MIN and MAX controls show a range from 0 - 127 by default, but you can change to a percentage (%) value by right-clicking on them.



Expression Curve used to add more resolution at the top of the pedal's travel.



Expression Curve used to add more resolution at the bottom of the pedal's travel.



Expression Curve used to limit the range of values output by the pedal.

## (F) Invert

The invert control is pretty straight forward. If you get a value of 127 with the pedal pressed down and 0 with it up, checking INVERT will give 127 with the pedal up and 0 when pressed down.

## (G) Smoothing

This function applies a filter to a pedal's input to prevent abrupt changes in the measured value. Please note that using smoothing adds a bit of delay which becomes very noticeable at higher values. If you need extremely fast response, turn smoothing off.

## (H) Rate Control

This control sets a limit on the number of values that are output per second. For example, if the control is set at 10 values / second, and you move the pedal from 0 up to 100, the MIDI Expression will slowly output values from 0 to 100 over a ten second period. The feature can be very useful for controlling long sweeping motions such as fade outs and fade ins.

## (I) Sensitivity














This control adjusts the amount of noise filtering applied to the pedal. Increasing this control will improve the responsiveness of the pedal to small movements, but setting it too high will cause the pedal send MIDI data even when it's not moving.

## (J) Calibrate

If your pedal will not output values all the way down to zero or all the way up to 127, then you may need to calibrate. When calibrating, take the pedal through its full range of a motion, pressing it all the way up and down a few times. You can also adjust the range by dragging the sides with your mouse. After you are done, click the calibrate switch again to save.

Note: Watch out for pedals with adjustment knobs. For best performance, adjust to allow for the greatest range of values.

## Modes for Expression and Hihat Pedals

Auto  Control Change		
 Control Change Control a parameter	 NRPN Non Registered Parameter	 Transformer Channel Set output channel of transformer
 PitchBend Alter the pitch of MIDI notes	 14bit CC 14 bit Control Change message	 Transformer Transpose Set output (value 1) of transformer
 Aftersustain Channel Pressure	 Hihat Mode Function as a hihat controller	 Transformer Velocity Set output (value 2) of transformer
 Note Mode Trigger Velocity Sensitive Notes	 Expression with switches Control a parameter and Switches	 F0 Send SysEx Send a SysEx message

By default, MIDI Expression devices are setup to send Control Change messages when used with expression pedals and Hihat mode when used with a hihat controller. However, they can be configured to run in different modes and produce many different types of MIDI messages.

The different modes are grouped into “Basic” and “Advanced” categories. The basic group is described below and the advanced group is described on the following page.

### Basic Modes

#### Control Change

This is the standard type of message sent out by expression pedals. In this mode, the MIDI Expression sends out a MIDI Control Change value corresponding to the position of the pedal. This type of message is typically used to control knobs or faders.

There are some standardize control values that are useful to know. Some of the more important ones are listed below:

- CC1 Modulation
- CC2 Breath Controller
- CC7 Volume
- CC10 Pan
- CC11 Expression
- CC64 Damper

#### Pitch Bend

This mode is often used with synthesizers to slightly vary the tuning of a note. You can use the Dead Size control shown on the right to create a region in the middle of your pedal's range that will always be measures as exactly center, making it easy to stop the pedal precisely in the center position,

#### Channel Pressure

Sometimes called aftersustain, channel pressure is a type of MIDI message that some professional keyboards send after a note is played. If you keyboard doesn't support aftersustain, you can use this mode with an expression pedal to simulate it.

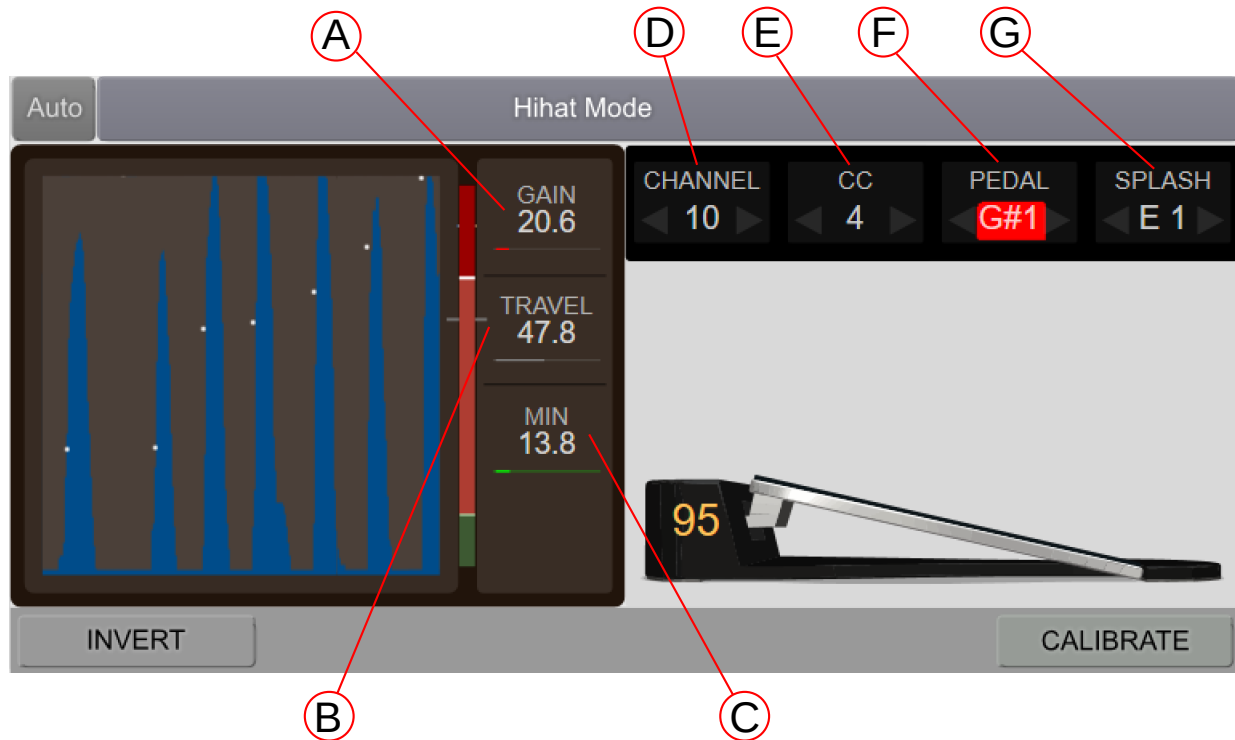


The Dead Size control creates an area in the middle of the pedal's travel that will always be exactly center.

## Advanced Modes

### Note and Hihat Modes

Note Mode and Hihat Mode allow you to trigger velocity sensitive MIDI notes. The two modes work the same except that Note Mode only generates MIDI Notes, while Hihat Mode also sends control change messages representing the position of the pedal.



### Using Note and Hihat Mode

To make using these modes as easy as possible, MIDI Expression employs an automatic optimization routine to best support your pedal and playing style. To help it settle in on good settings, play your pedal as if it was a real kick drum pedal, being sure to play some hard fast notes so it knows the velocity range of your pedal. The device will reoptimize its settings any time the MIDI Expression is plugged in, a new pedal is plugged into the input, your pedal is calibrated, or you adjust the Scantime setting.

#### (A) Gain

Generally speaking, the faster your pedal can move, the lower you can set the Gain Control. Hihat controllers typically work best with a gain set to 14-20 ms. Expression type pedals work best with times closer to 65 ms.

#### (B) Travel

The travel control determines the point along a pedal's travel where a note will be generated.

#### (C) Min

The Min control allows you to filter out low velocity notes. If you find your pedal is triggering on low velocity notes when you don't want it to, try increasing the Min to filter them out.

## (D) Channel

This is the MIDI Channel the Control Change values and Notes will be transmitted on.

## (E) Control Change

This is the Control Change value that the pedal outputs as it moves. If you simply want to trigger notes, use Note Mode and these messages will not be transmitted. If however you want the pedal to function as a hihat controller, then you will likely need to set this to 4.

## (F) Pedal Note

This is the note value that is output when the pedal is pressed down quickly.

## (G) Splash Note

If you are using a hihat controller, you will also be able to trigger a second note by releasing the pedal very quickly after triggering a pedal note.

## Non-Registered Parameter Numbers (NRPN)

NRPNs are a lot like Control Change messages, except that they can have a value between 0 and 16383 (14 bit resolution).

Although NRPNs support up to the 18363 different parameters, MIDI Expression only supports parameters 0-127.

## CC with Gesture Switches

This mode allows an expression pedal activate switches when it moves quickly up or down.

As you move the pedal, the velocity and direction of motion are tracked and shown as the red indicator between the switches.

If the velocity is high enough, it'll activate the respective switch.

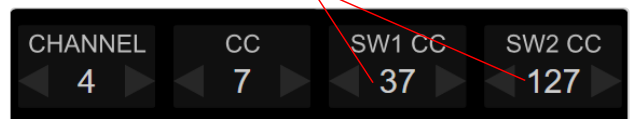
The switches can then be used to toggle effect in 3<sup>rd</sup> party application

You can drag the area between the two switches to set the amount of velocity required to activate the switches.

To assist with MIDI learn functionality in 3<sup>rd</sup> party applications, you can click on a switch and it will send out its assigned CC.

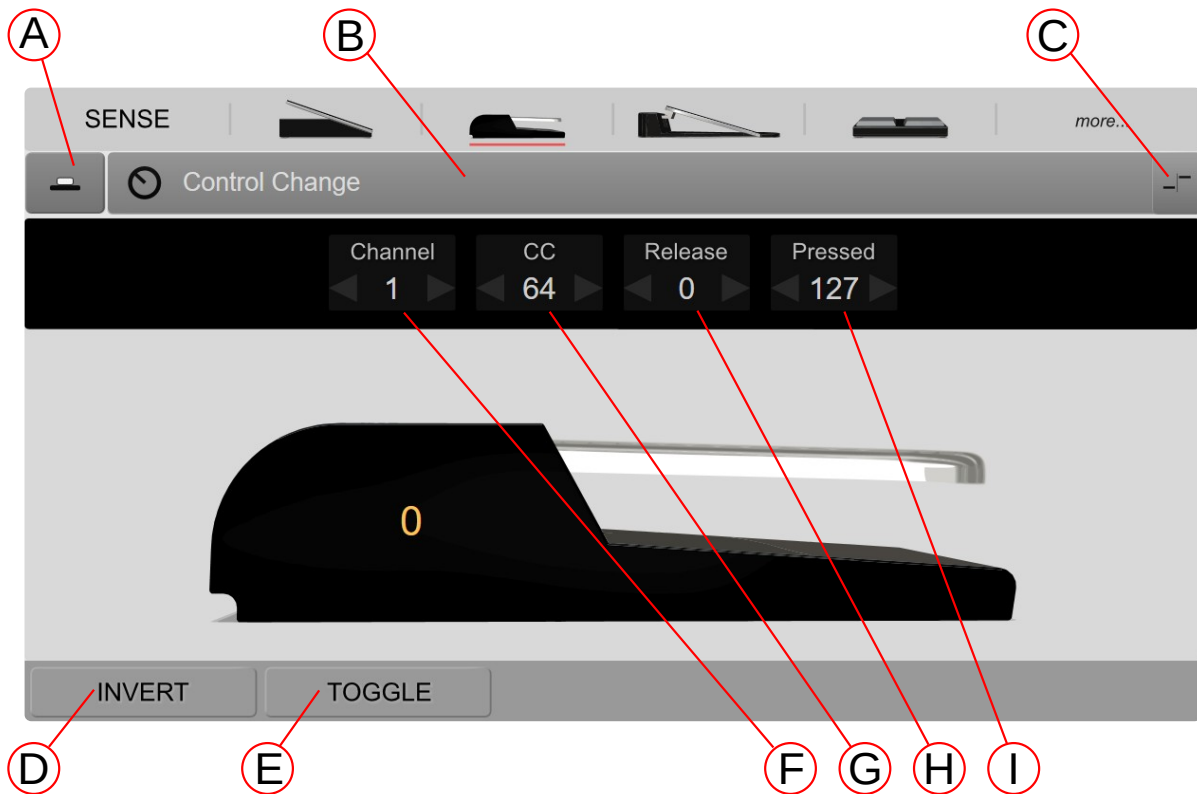


*Assign CC numbers to the switches*



*Click a switch to send its CC*  
*Drag up and down to adjust the amount of velocity needed to activate the switches.*

## Using Sustain Pedals



### Controls for Sustain Pedals

#### (A) Switch Type

This is used to tell MIDI Expression the type of switch your pedal uses. A latch style switch is one that alternates between on and off every time it is pressed, much like a light switch in your home. A momentary switch, on the other hand, switches 'on' when pressed, and back to 'off' when released.

#### (B) Mode Selector and Switch-Mode

Sustain pedals and footswitches are capable sending out MIDI messages, key commands, and controlling the MIDI Transformer. The function a pedal performs and how it behaves is controlled by the Mode and Sub-mode controls, described on the next two pages.

#### (D) Invert

The Invert control is pretty straight forward. If you get a value of 127 with the pedal pressed down and 0 with it up, checking Invert will give 127 with the pedal up and 0 when pressed down.

#### (E) Toggle

Toggle allows a 'momentary' switch to simulate a 'latching' switch, which only sends out one value each time the pedal is pressed.

#### (F-I) Channel and Control Change

The values in these boxes can be adjusted in a variety of ways.

- Drag the values up or down with your mouse. (hold down SHIFT for precision)
- Use the arrows to incremented and decremented the value.
- Manually entered by double clicking on the value.

## Modes for Sustain Pedals

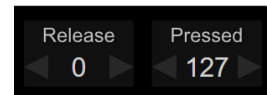
Control Change		
Control Change Control a parameter	NRPN Non Registered Parameter	Transformer On / Off Set instance on / off
Program Change Send a program change	14bit CC 14 bit Control Change message	Transformer Channel Set Transformer output channel
Note Send note with fixed velocity	System Realtime Send start, pause, or stop	Transformer Transpose Set output (value 1) of transformer
Keypress Send keystroke with modifiers	Send SysEx Send a SysEx message	Transformer Learn Transpose Learn transpose via ext. MIDI

The modes for sustain pedals are organized into three groups, Basic, Advanced, and MIDI Transformer. The modes for the MIDI Transformer are described in a separate section [here](#). Each mode has up to 3 switch-modes that dictate how the MIDI Expression will react to your pedal.

### Switch-Modes

#### Press / Release

This mode sends one value when the pedal is pressed and another when released. If using a momentary switch, you likely want to enable 'toggle' so the input switch between the two values each time the pedal is pressed.



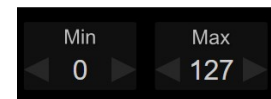
#### Short / Long

This mode sends one value when the pedal is pressed quickly and another when it is long pressed. It is only available for pedals that use momentary style switches. Values are only sent after the pedal is released, so it might not be suitable for timing sensitive situations. The Invert control can be used to reverse short / long assignments.



#### Inc / Dec

When using this switch-mode your pedal will send a range of value defined by Min and Max. A short press will increment the value, and a long press will decrement the value, moving past min or max will cause the value to wrap.



### Basic Modes

#### Control Change

Control Change messages are useful for toggling On / Off parameters in DAWs and virtual instruments.

If the switch-mode is set to Short / Long, this mode lets you control two separate controllers where 'Short CC' and 'Long CC' refer to different CC numbers.

Normally, the device sends two values for each CC. For example, for a short press, the device will send out the 'Short CC' with a value of 127, shortly followed by a value of 0. By enabling the 'Only 127' option, the device will not send the CC with a value of 0.



The Short / Long switch-mode can also be used to toggle the values of two separate CCs between 0 and 127. When toggling is enabled, the value of the controller will respond to **parameter feedback**.





## ☰ Program Change

This mode lets you send program change messages, which are typically used to swap between two different presets in a virtual instrument or plugin.

## 🎵 Note On / Off

Note On / Off messages can be used to trigger samples. Note on / off can only be used in press / release switch mode and so the switch mode setting is ignored.

## 🗉 Key Command

This mode allows your pedal to function like a computer keyboard. Clicking on the keyboard icon brings up an onscreen keyboard that allows you to set your key command. Your pedal can be set up to send a combination of a single regular key (green) and any number of modifiers (blue).

If your pedal is setup as a momentary type, the key command will start when the pedal is pressed and end when the pedal is released. Holding down the pedal will produce similar results to holding down the keys on a real keyboard. If however, your pedal is setup as a latch type, the key commands are sent and released immediately.



The short / long switch-mode is available for this mode, allowing you to send out two separate key commands.

**NOTE:** The short / long switch-mode does not work with latching type switches. If this switch-mode is selected for a latch pedal, only the first of the two key commands will be sent.

## Advanced Modes

### 🕒 14bit CC

14bit Control Change messages are handled by sending two control change messages one after another. Support for 14bit CC messages is limited in the audio industry.

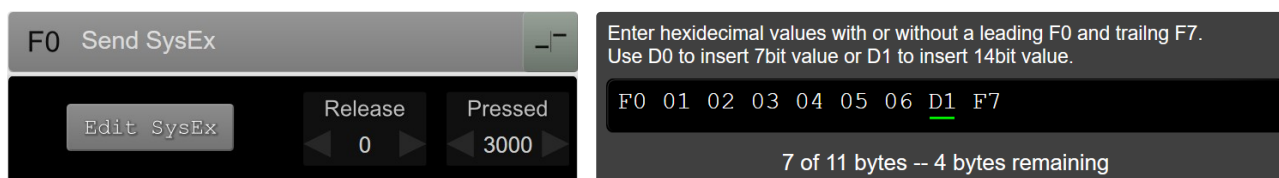
### ▶ System Realtime

System realtime message are used to control a sequencer or DAW's transport. MIDI Expression can send the 'start', 'continue', and 'stop' message. Switch between them by clicking on the control. There are currently no sub-modes for this mode.



## F0 System Exclusive Messages

This mode lets you send system exclusive messages with the value of the pedal embedded as a 7bit or 14bit hex value. The sysEx can be up to 11 bytes long. To insert a 7bit value, use the hex code D0 and to insert a 14bit value, use D1.



The example above uses a 14bit value and when the pedal is pressed, it sends:

F0 01 02 03 04 05 06 **38 17** F7

and when released it sends:

F0 01 02 03 04 05 06 **00 00** F7



# Using Footswitches



A footswitch can be thought of as two sustain pedals patched into a single input. In fact, using a suitable adapter (HOSA YPP117, shown bottom right), two sustain pedals can be ganged together into a single MIDI Expression input and function as a footswitch.

The settings for footswitches are identical to those of sustain pedal, with the exception of the 'Link' and 'swap' buttons which are described below. Look [here](#) for a description of the settings for sustain and footswitch pedals.

## Link

This button is available for Control Change, Program Change, and Transformer Channel modes and works just like the Inc / Dec sub-mode except one button increments the value and the other decrements it. Long pressing a button causes the value to change by 10 and unlike the Inc / Dec sub-mode, when the buttons are linked the value will not wrap around.

## Swap

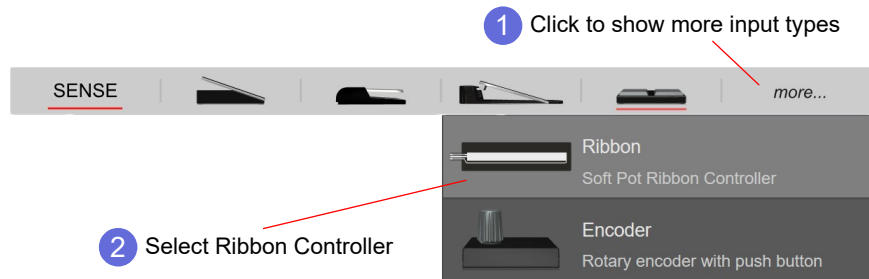
Because there is no standardize way to wire a dual footswitch, the order of the buttons in the UI might not match the order of the buttons on your physical pedal. If that's the case, you can enable the 'Swap' button to make them match.



# Using Ribbon Controllers

MIDI Expression devices allow you to connect a softpot membrane potentiometer to an input and use it as a ribbon controller. A ribbon controller is touch sensitive and detects position. They can be configured to send a variety of MIDI messages, but are typically used for pitchbend.

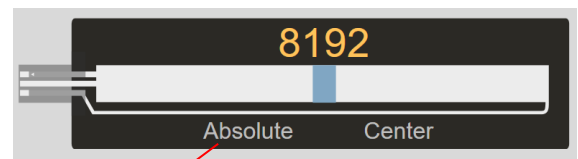
To use a ribbon controller, make sure it's wired correctly to a TRS jack, and then select the ribbon controller from the 'more' input types.



## Position Tracking

The position can be set to 'absolute' or 'relative'. With absolute tracking, the position is determined by where you touch the softpot. With relative tracking, the position is adjusted by touching and swiping up or down.

With 'relative' position tracking and the ribbon controller set to send control change messages, the position value can be updated via **parameter feedback**.



Position Tracking  
- absolute  
- relative

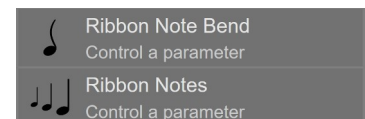
Release Behavior  
- center  
- hold

## Release Behavior

When you lift your finger off the softpot, the default behavior is to 'hold' the current position. By setting the release behavior to 'center', the position will return to center. You can use the Rate and Smoothing controls to control how quickly the position returns to center.

## Custom Modes

While ribbons controllers can send many different kinds of messages, there are two custom modes specifically for ribbon controllers. Ribbon Note / Pitchbend sends a fixed note when your finger touches the controller and then used pitchbend to adjust its pitch.

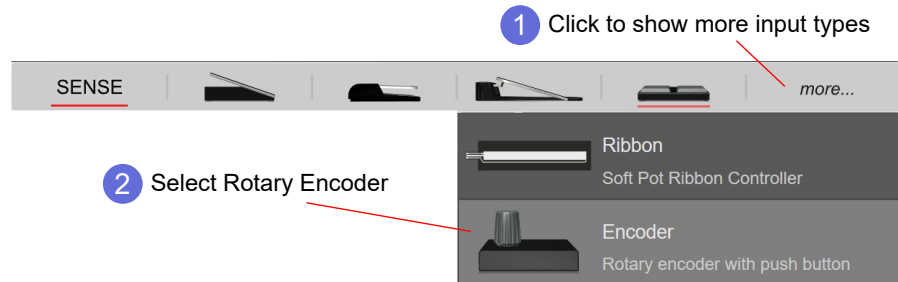


Ribbon Note Mode also sends a note when you touch the controller, but the velocity of the note is determined by where you touch the softpot.

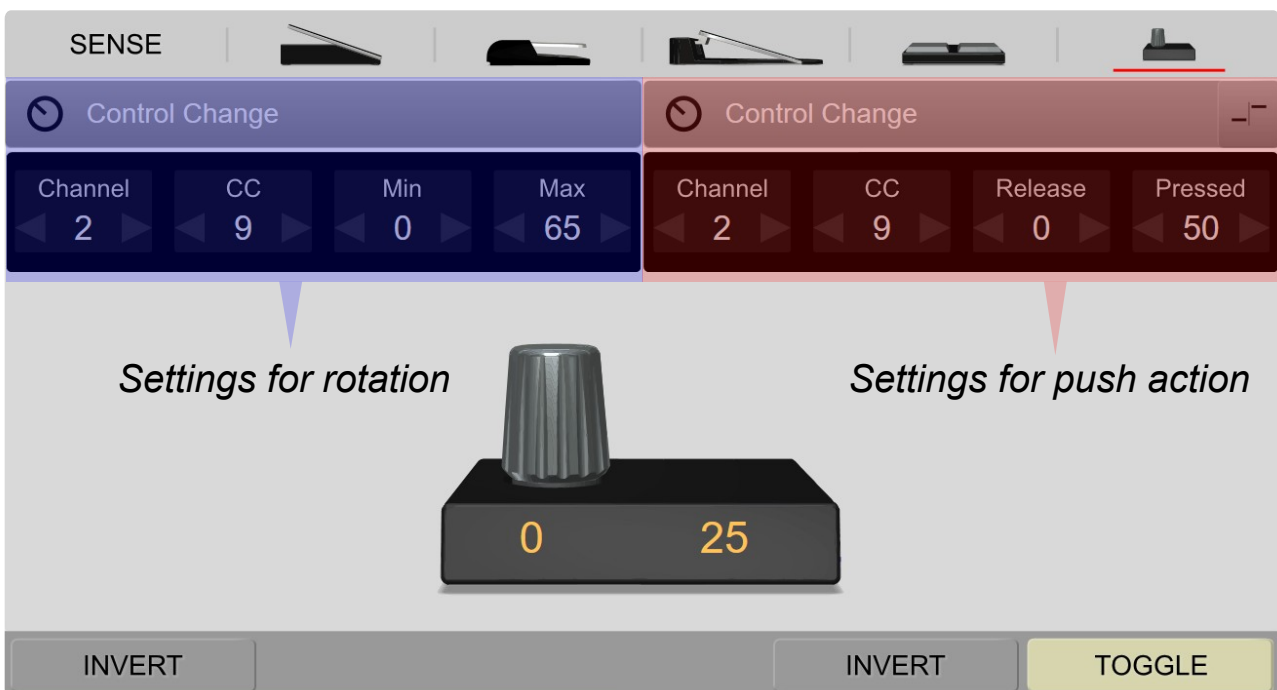
# Using Endless Rotary Encoders

MIDI Expression inputs support rotary encoders with push button functionality. Check the **wiring diagrams** to see how to properly wire up a rotary encode.

To use a rotary encoder, make sure it's wired correctly to a TRS jack, and then select the Rotary Encoder from the 'more' input types.



Rotary encoders have two sets of settings. One for the rotation of the knob, and another for when you push the knob down (assuming your encode is 'push' encoder).



## Settings for Rotation

Rotary Encoders can send many of the same messages as an expression pedal, but one big difference is that rotary encoders can react to parameter feedback which allows their values to be updated by host automation software when configured to send control change messages. Look here more information about MIDI Expression **parameter feedback** capabilities.

INVERT

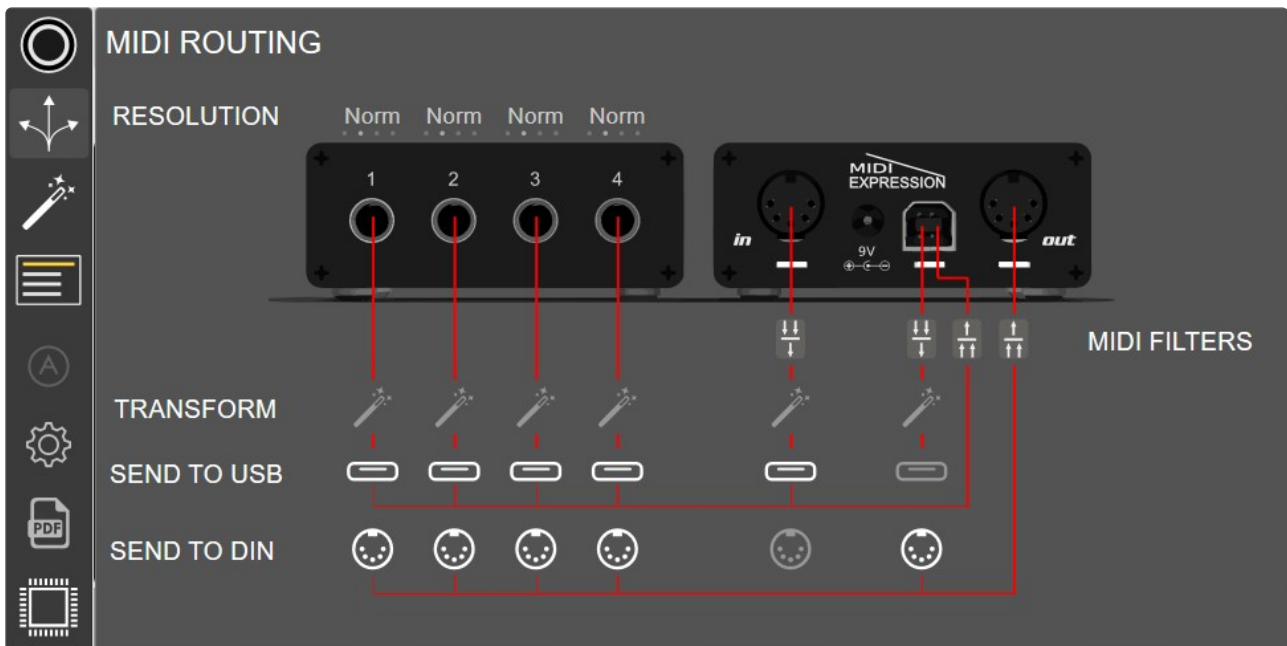
If you find that turning your encoder clockwise decrements the value when it should increment it, you can enable the Invert button to reverse its direction.

## Settings for Push

If your rotary encoder functions as a momentary switch when you press down the knob, you can configure that switch the same way you would a sustain pedal. Please consult the **wiring diagram** to ensure you connect it correctly.

# MIDI Routing

The Routing page looks different depending on the type of MIDI Expression you have connected. The settings are organized into columns, each representing a MIDI source. The MIDI Expression iO has 4 pedal inputs, 1 MIDI DIN In, and 1 USB MIDI In, for a total of 6 sources of input.



Each source of input can be routed to the MIDI Transformer, the USB Host, and the MIDI Din out by clicking on their respective toggle buttons. Note that only MIDI Expression iO devices will have the options to route MIDI Out Din.

**NOTE:** When the MIDI Expression iO is powered by a USB charger or DC Jack, it automatically goes into standalone mode. In standalone mode, all MIDI from the MIDI in DIN and pedals is automatically merged and sent out through the MIDI Out DIN.

## USB MIDI Loopback ↻

When enabled, the MIDI Expression can operate like an external MIDI effect. Used in combination with the MIDI Transformer, this feature allows you to send MIDI Data to your MIDI Expression from a host application, process it, and then return it back to the host.

## Resolution


You can adjust the maximum MIDI resolution of each pedal input. Low = 50 values / second, Norm = 125 values / second, High = 250 values / second, and Max = 500 values / second.

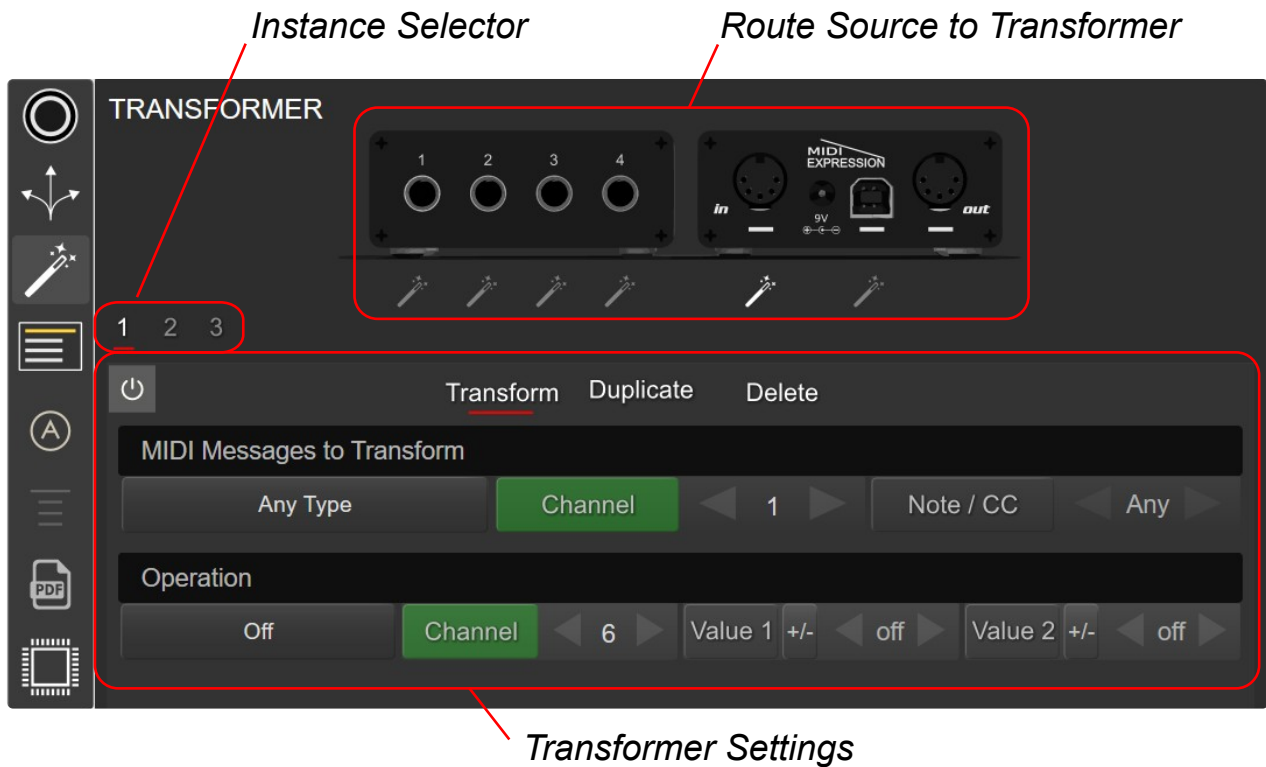
## MIDI Filters

The MIDI Expression iO has 4 four MIDI filters, one for each MIDI source and destination. These are useful for filtering out unwanted MIDI messages like MIDI clock or active sensing. Click on the filter icon to specify the types of messages you wish to filter.

# MIDI Transformer

The MIDI Transformer is a MIDI effect that lets you dynamically manipulate MIDI messages passing through your device in real-time. A typical application might be to allow a single expression pedal to control multiple parameters by changing its MIDI channel or CC using a sustain or a footswitch.


You can open the routing page by clicking on the  icon in the page bar on the left.



The transformer is used by routing a source of MIDI, an expression pedal for example, though the Transformer. Optionally, another pedal can be used to turn the Transformer on and off, or used to adjust how the transformer affects the MIDI.

## Routing MIDI to the Transformer

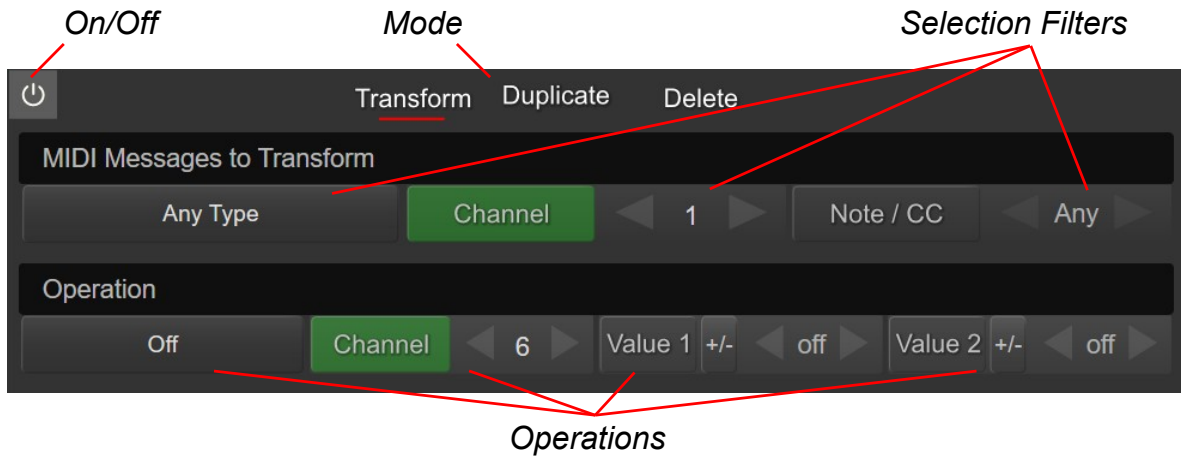
Each source of MIDI, including the pedal inputs, the MIDI In DIN, and the USB MIDI can be routed the transformer instance(s).

Click on the  icon below a source of MIDI to route its MIDI. When the MIDI from a source is being affected by the Transformer, its icon will flash orange.

The MIDI Expression Quattro and iO each have three MIDI Transformer instances, You can switch between instances by clicking on the numbers in the Instance Selector. The single input MIDI Expression only has one instance.

## Setting Up an Instance of the Transformer

Each Transformer instance can be set transform a MIDI message, duplicate it, or delete it. When you transform a message, the original message is no longer sent. Using 'duplicate' mode, an additional message is sent along with the original allowing a pedal to send multiple messages.



### On/Off Button

The power button enables / disables an instance of the transformer. These buttons can be toggled in real-time using a sustain or footswitch connected to the device. Look [here](#) for more information about assigning pedals to Transformer Controls.

### Selection Filters

By default, an instance of the transformer will process any compatible MIDI messages, but you can filter the messages that will be processed by type, channel, or the value of the second MIDI byte.

### Operations

When transforming or duplicating messages, you can modify the type, channel, value 1, and value 2 of a message. Each of these parameters can be enabled or disabled by clicking on its label. Labels with a green background are enabled. Except of the 'type', these parameters can be adjusted in real-time using pedals.

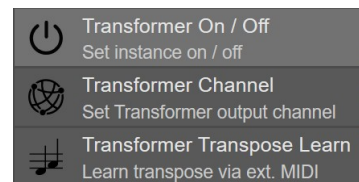
The message type can be set to 'off' (don't change the type), control change, note on / off, program change, aftertouch, and channel pressure. Please note that not all MIDI events will transform nicely into other types, and the transformer will only transform compatible message types.

The value 1 and value 2 operators can each operate in multiple modes. Click the Mode button to switch between modes.



# Assigning Pedals to Transformer

For each instance of the transformer, you can use pedals to dynamically change its settings. Assigning a transformer setting to a pedal is done by selecting a MIDI Transformer mode from the mode selector.



When you select one of the transformer modes, use the Transformer Instance control to set which instance you want to control. Click on the control to switch between instances.

**NOTE:** The single input MIDI expression only has one MIDI Transformer instance, so this control will not be visible.

## Transformer Modes for Switch Pedals

There are three Transformer settings you can control with switch type pedals.

### Transformer On / Off

The Transformer On / Off mode allows you to enable / disable an instance of the transformer. An example of how you might use this would be with multi-timbral instruments. Imagine that you have a flute on MIDI Channel 1, and a bass guitar on Channel 2 and you want to access both instruments from your keyboard that's set to MIDI Channel 1. You might setup a transformer instance to transform the MIDI Channel to Channel 2 and transpose a few octaves. Then using this mode, you could have a sustain pedal toggle the transformer on and off allowing you to effectively switch between the two instruments.

### Transformer Channel

This mode allows you to increment and decrement the MIDI Transformer channel using a signal pedal. A quick press increments the channel value, and a long press decrements the value. For footswitch pedals, there's also a linked Channel Inc / Dec mode allowing you to use one switch to increment the channel and the other switch to decrement it.

### Learn Transpose




Designed for use with keyboards, the Transpose mode allows you to use a pedal to toggle learning a transpose value. When the pedal is pressed and held, the device monitors its USB MIDI In / MIDI In Din for a note message and uses that note to set the transpose value. If the pedal is released before the device 'sees' a note, the process is canceled.

The amount of transpose is set by comparing the value of the note to middle C (60). If the value of the note is middle C, the transpose value is set to 0. If the note value is C# (61), the transpose value is set to +1. If the note is the F above middle C (69) it'll see the transpose value to +5. The amount of transpose can be set between -60 and +64.



## Modes for Expression Pedals

With an expression pedal, hihat controller, or rotary encoder, there are three different transformer mode.

	Transformer Channel Set output channel of transformer
	Transformer Transpose Set output (value 1) of transformer
	Transformer Velocity Set output (value 2) of transformer

### Transform Channel

This mode will let you use the pedal to sweep between a range of MIDI Channels. This is great if you are controlling a Multi-Timbral instrument and would like to use an expression pedal to select which channel to transmit on.

You can use the Expression Curve to adjust the range of MIDI Channels the pedal will sweep through. Using an expression pedal to switch between 4 channel for example will be a lot more practical than trying to switch between 16.

### Transpose

This mode lets you sent the velocity (value 1) of MIDI Messages using the position of a pedal. This can be used to set the pitch of a MIDI note, or the controller number of a CC message.

### Set Velocity

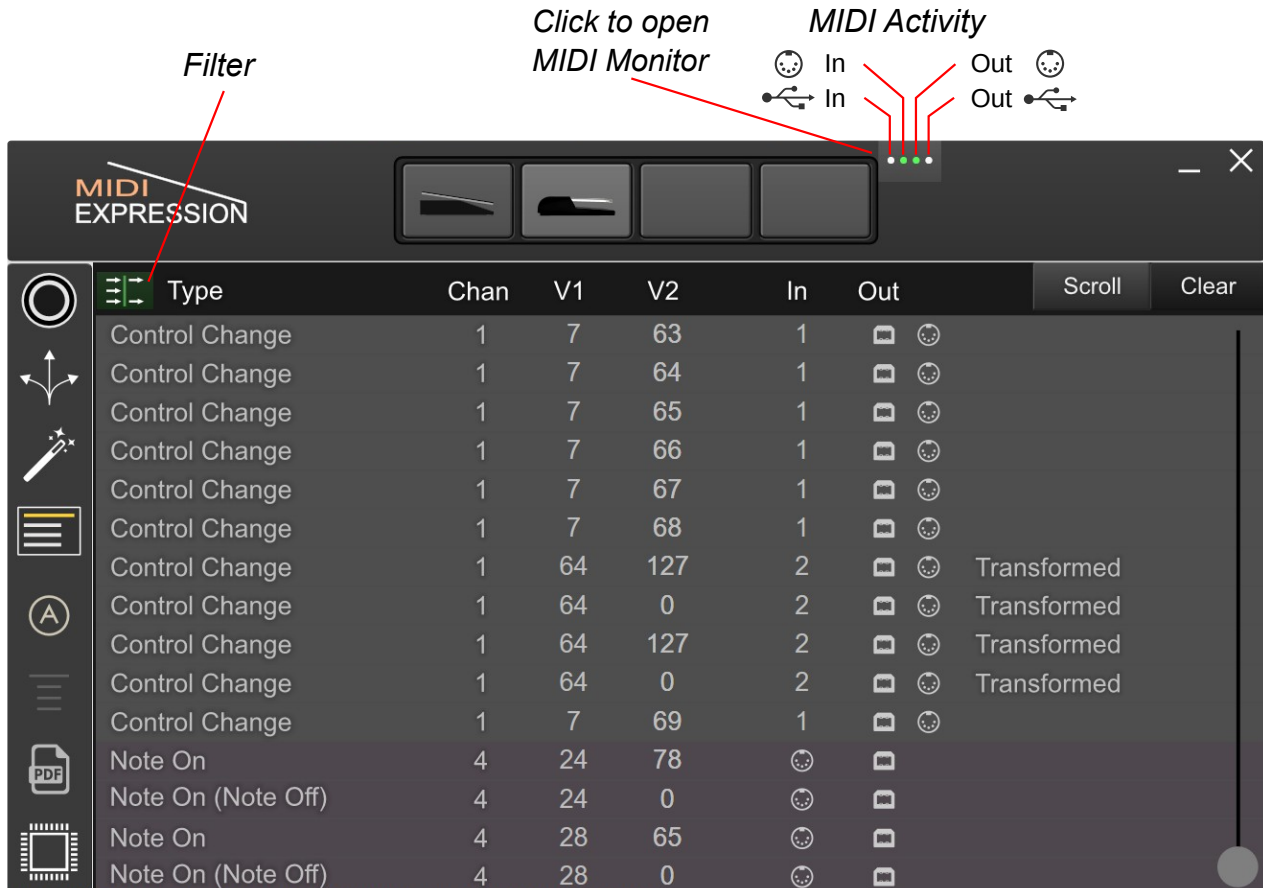
This mode lets you sent the velocity (value 2) of MIDI Messages using the position of a pedal. This might be useful if you have a keyboard for example that doesn't have velocity sensitive keys. You could effectively use the expression pedal to encode the velocity of the notes.



# MIDI Activity Monitor

The MIDI Activity Monitor gives you feedback about how MIDI is entering and leaving your device.

The four LED dots will light green indicating the presence of Active Sensing and MIDI clock messages, and red for all other messages. Click on the dots to reveal the complete MIDI Monitor.



The MIDI Monitor has a buffer of 1000 events. Once the buffer is filled up completely, earlier events will be dropped to make room for new ones. To function efficiently, messages do not arrive in real-time. They are buffered and sent in packets and can arrive up to 100ms after the actual MIDI event.

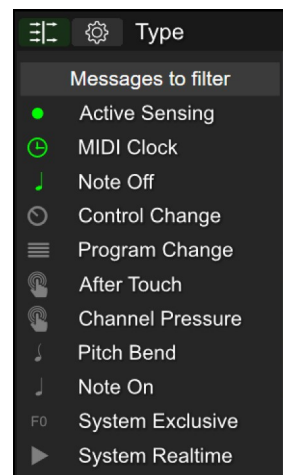
For those familiar with MIDI message format, the MIDI Monitor layout will be very intuitive. The messages are tracked from their source (In) to their final destination (Out).

## Scroll

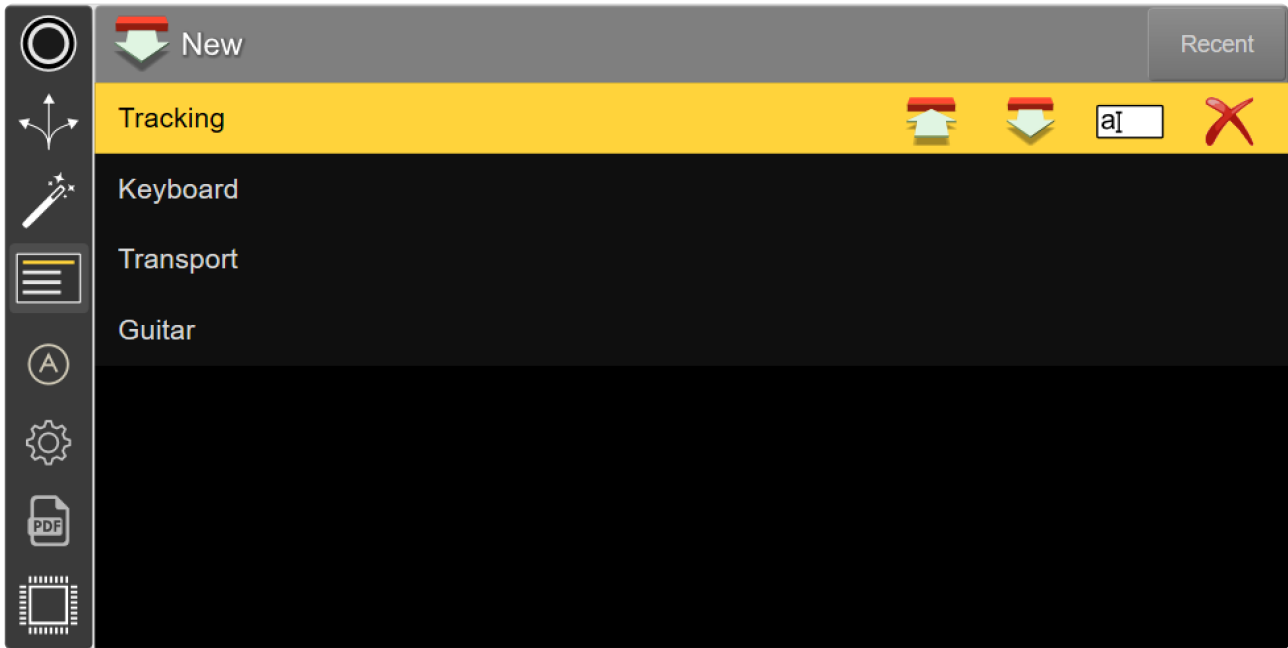
When you use your mouse wheel to scroll through the events in the monitor, this button gets deactivated to prevent newly arriving events from changing the current position in the log. Click this button to resume auto-scrolling when new events arrive.

## Filter

On by default, this filters out Active Sensing, MIDI Clock, and Note Off messages. The vertical bar in the icon will flash when MIDI messages are actively being filtered. You can toggle the filter by clicking on it, or configure exactly which messages will be filtered by clicking the cog icon.



# Snapshot Manager



The Snapshot Manager lets you save and load entire snapshots of a MIDI Expression device's internal memory to local storage. These snapshots can be used to quickly swap between different configurations of the device, to create a backup of your settings, or to copy the settings from one device to another.




To create a new snapshot, click the  New icon and then give the snapshot a name.

To the far right is the sort method button. By default the most recently saved snapshots are listed first, however you can also sort the presets alphabetically.

*Snapshots can be sorted by their modified date or alphabetically.*




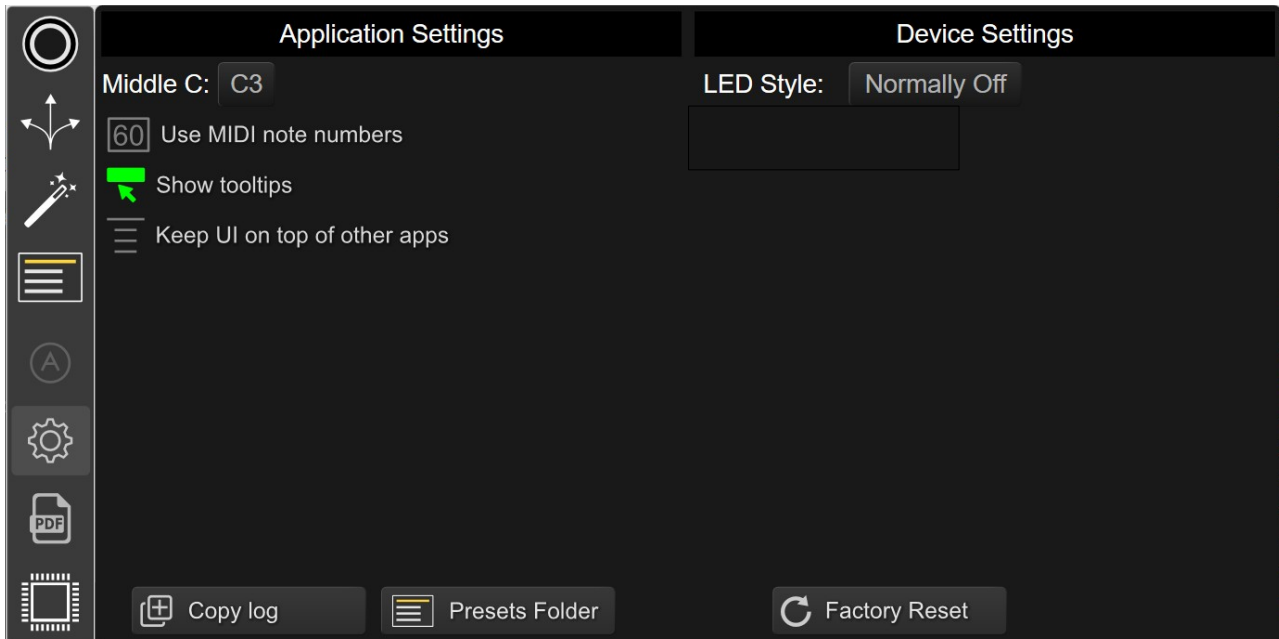
The following commands can be used to manage your presets:

-  Send a snapshot to the device.
-  Overwrite the currently selected snapshot with a new snapshot from the device.
- Rename the selected snapshot
-  Delete the currently selected snapshot.

**Note:** You can load a snapshot by clicking on the load icon. Alternatively, you can simply double click a snapshot to load it.

# Settings Panel

The settings panel can be opened by clicking on the  icon in the size bar. Here you can adjust settings for the Control Application and well as the currently selected device.



## Middle C

There is no set standard for converting MIDI note numbers to MIDI note names. Most manufactures either define note 60 as C3 or C4. For completeness the control application allows you to set note 60 between C2 to C5.

## Use MIDI Note Numbers

Causes Note controls to display MIDI numbers instead of MIDI note names.

## Show Tooltips

Helpful tips when you move your mouse over a control which can become a distraction when your competency with the software improves.

## Keep UI on Top

Only available on Windows, this option keeps the Control Application on top of other apps.

## Snapshot Folder / View Log

These buttons will open the respective file locations. If you want to migrate your saved snapshots to a new system, this will help you locate the corrects paths.

## LED Style

By default the status LED on the MIDI Expression is normally off, and briefly flashes on to provide feedback. The setting lets you reverse this behavior, such that LED is normally on, and flashes off to provide feedback.

## Factory Reset

This simply resets are setting to their defaults.

# AU / VST Control Application

Using the plugin version of the Control Application allows you to save and load custom configurations for your MIDI Expression devices along with your projects in your audio sequencer. The plugin version of the control application is available in VST and AU formats for Windows and OSX.



## Why Would You Want to Use It?

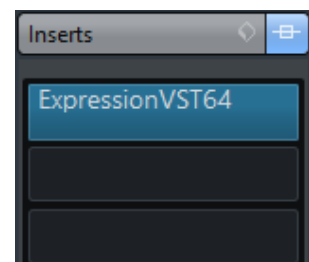
Most people will likely want to use the standalone Control Application, but here's a quick list of situations where you might want to consider the Plugin version.

- You want to temporarily change the function of a pedal for a particular project.
- You want to be able to store and recall complete configurations for all your MIDI Expression devices with a click of a button.
- You want to use host presets to quickly change the function of your pedal to suit aspects of your work flow.
- You use a INC / DEC mode and you want the current value of saved along with your project so it's not lost when you switch to a new project.

## Adding the Plugin To Your Project

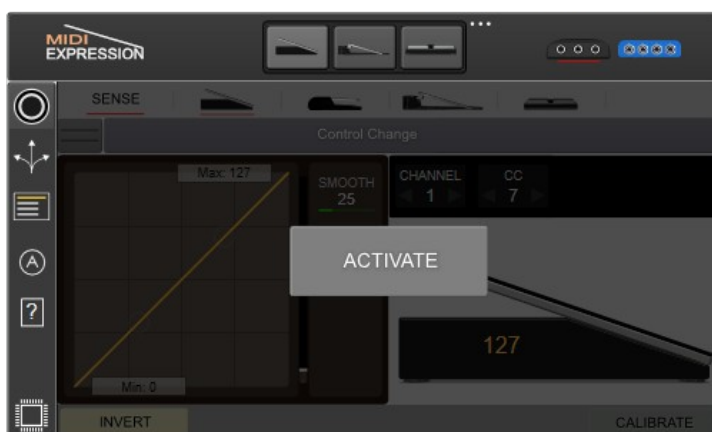
The plugin version of the Control Application is an audio effect and as such, you can insert it on an audio track much like you would any other audio effect.

The plugin does not actually change the audio passing through it, so you can safely insert it pretty much anywhere in your project, but you should probably avoid putting it on any track that you might freeze.



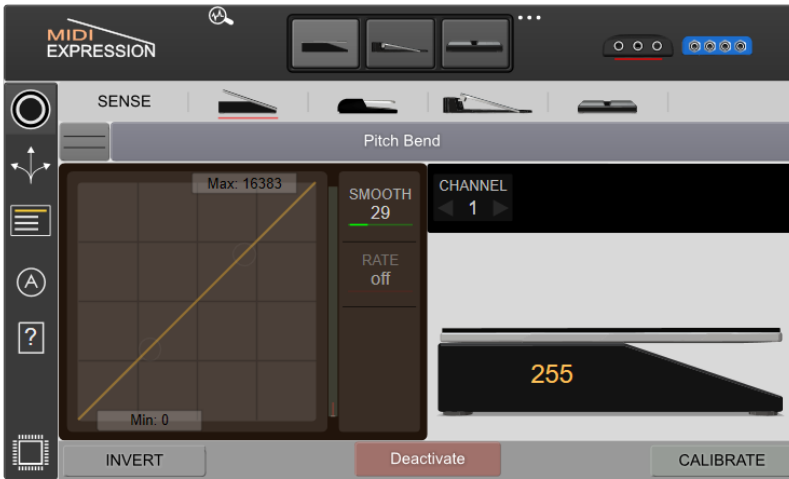
## Activating and Deactivating inputs

The plugin version works by putting MIDI Expression inputs into 'plugin mode'. In this mode, settings for the inputs are managed by the plugin, and any changes you make to the presets are saved within the plugin itself.



Before the plugin takes control of a MIDI Expression input, the input needs to be activated first.

Any inputs that are not activated will not be managed by the plugin and their settings can still be adjusted using the regular control application.



You can deactivate an input an input by clicking on the red Deactivate icon at the bottom of the interface.

When an input is deactivated, the settings from the plugin are offloaded and the settings saved on the device itself are restored.

Activating and deactivating an input effectively lets you switch between using the settings stored in the plugin and the settings stored in the device.

Similarly, when the plugin is removed or the project is closed, all settings stored in the plugin will be offloaded and the settings stored on the devices themselves will be restored.

Toggling between activating and deactivating an input effectively lets you swap between two configurations for that input.

### Using presets

Taking advantage of your host sequencer's preset system, you can load and save settings for any number of MIDI Expressions with a single mouse click.

# iOS Control Application

The control application is available as an iOS app from the Apple App Store. Keep in mind that only devices using firmware version 2.6 or later are compatible.

## Getting Connected

Because the iOS version of the Control Application communicates using System Exclusive MIDI messages, there are several way in which they can connect to one another: using a USB cable connected directly to your iOS device, using or Network MIDI, and even with MIDI cables connected to a 3rd party MIDI Interface (MIDI Expression iO only).

Note: Legacy iOS devices with lightning connectors will require an Apple Camera Connection Kit.

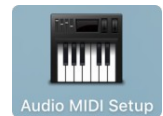
When the Control Application is opened, it sends out a sync request over all available MIDI ports. Any connected to devices will respond the this request automatically, so there is no MIDI setup that needs to be done inside the Control Application. When changes to the MIDI Setup on your iDevice occurs, the Control Application automatically resends sync requests. You can manually resync the connected device by clicking on the refresh icon.



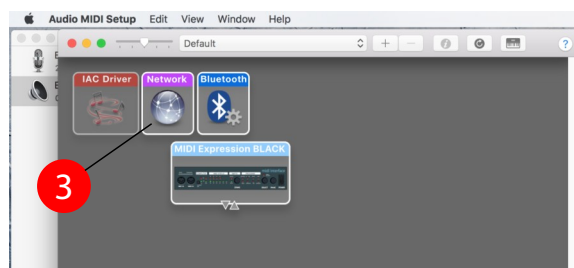
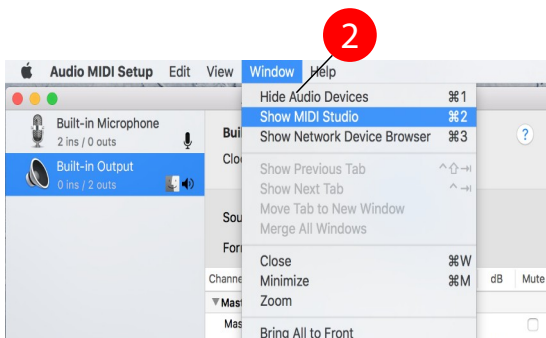
## Network MIDI

You can also use the iOS Version of the Control Application to remotely control MIDI Expression devices connected to a computer on your local network.

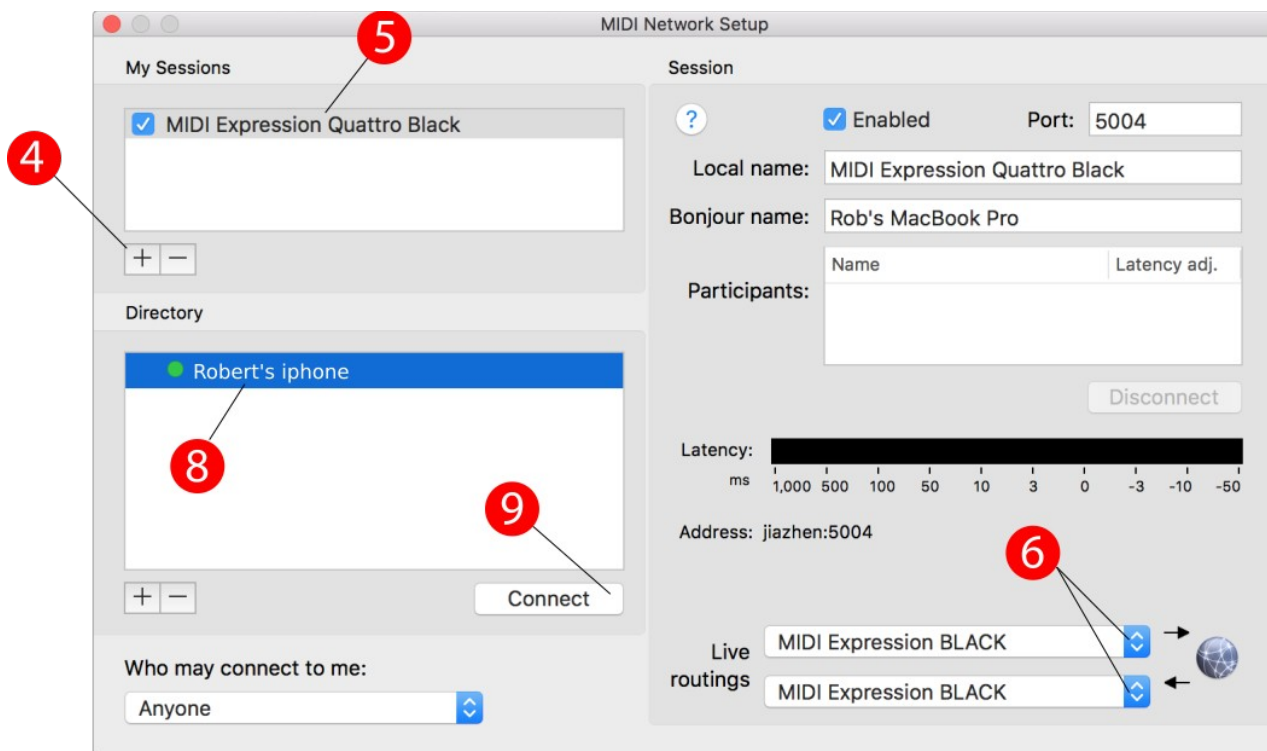
This is done using the Audio MIDI Setup



1. Open the Audio MIDI Setup, found in Utilities.



2. From the "Window" menu, select "Show MIDI Studio".
3. Double click on the "Network" object.



4. Click on the + sign to create a new session.
5. Give it a meaningful name and check the checkbox to enable it.
6. Setup the Live Routings. Be careful to pick the right MIDI Inputs. Do not chose the 'Network' MIDI connections.
7. Open the Control Application on your iOS device.
8. Select your iPhone or iPad.
9. Click on the Connect button.

That's it. The Control Application should automatically find and connect to your MIDI Expression. You'll need to create and connect to a different session for each MIDI Expression device you want to connect to over the network.

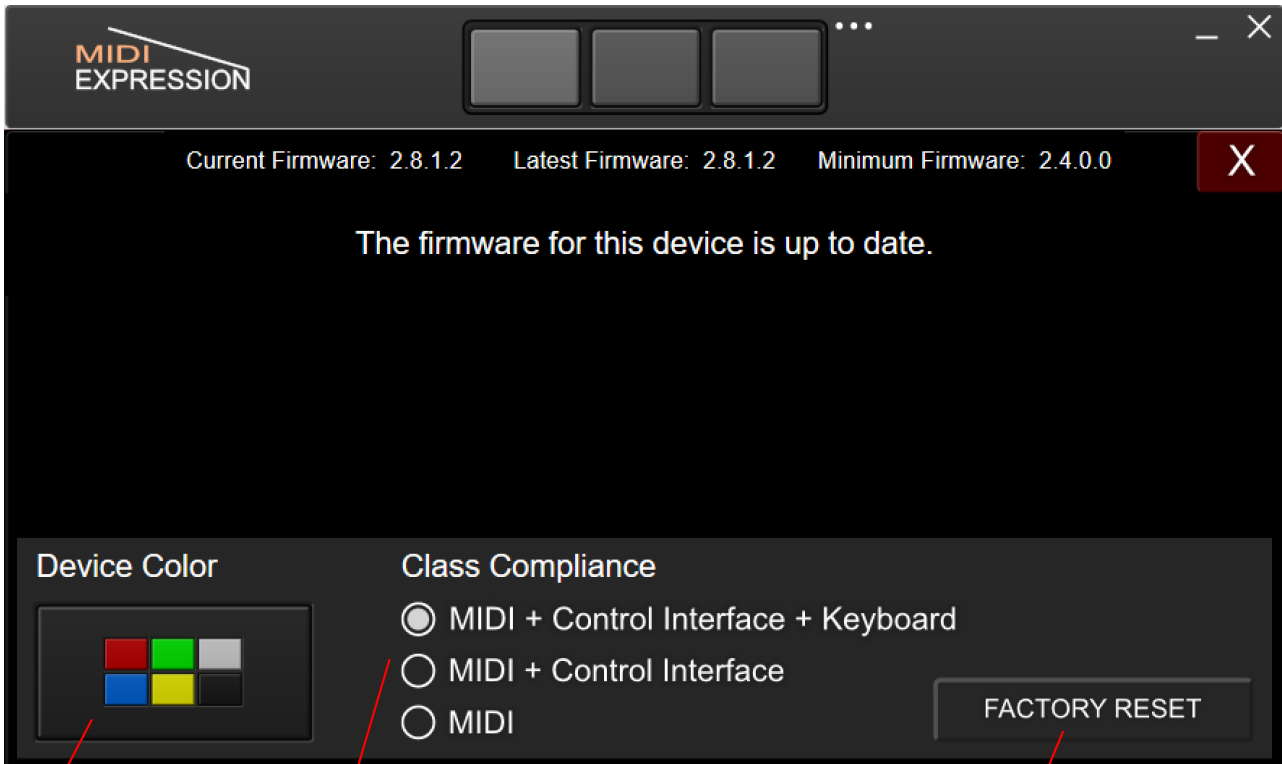
### MIDI Cables (MIDI Expression iO)

If you have your MIDI Expression connected to a third party MIDI Interface, such as an iConnectMIDI4+, you can Control your MIDI Expression iO provided both MIDI In and MIDI Out cables are connected. When you start up the Control Application, it should automatically find any connected devices. If you connect your device after the Control Application is already open, click on the refresh icon start search for connected devices.



# Updating the Firmware

The MIDI Expression firmware is periodically updated to add new features or fix bugs. The latest firmware for MIDI Expression devices is always included with the MIDI Expression Control application. The firmware can be updated or changed by clicking on the Firmware Update icon (shown left) located at the bottom left hand side of the UI. Please note that the iOS version of the Control Application does not support updating device firmware, but does allow you to change the color and Class Compliance.



## (A) Changing Colors

If you have more than one MIDI Expression of the same color connected to the same computer, you might want to change the 'color' of one of the devices in order to change the name of its MIDI port to prevent your host sequencer and yourself from getting the devices mixed up.

## (B) Class Compliance

MIDI Expression devices combine several USB interfaces, including a USB MIDI Interface for sending MIDI, an HID for communication with the MIDI Expression Control Application, and a keyboard interface for sending key-commands.

To maintain maximum compatibility with 3<sup>rd</sup> party gear with USB Host ports, you can change the interfaces that are exposed. The various setups are described on the next page.



## MIDI + Control Interface + Keyboard

This is the default and preferred setup when using the MIDI Expression connected to a PC or Macintosh computer.

## MIDI + Control Interface

This setup removes the keyboard interface. This is the preferred setup when using the MIDI Expression with an iOS device and many 3<sup>rd</sup> party USB Host ports. On iOS devices, the keyboard interface can interfere with the iOS on-screen keyboard, so unless you really need to send key-commands to your iOS device, then you'll have a better experience using this setup.

If you are having trouble getting your MIDI Expression to work connected to a 3<sup>rd</sup> party USB Host port, then try using this setup before attempting to use the pure 'MIDI' setup described below.

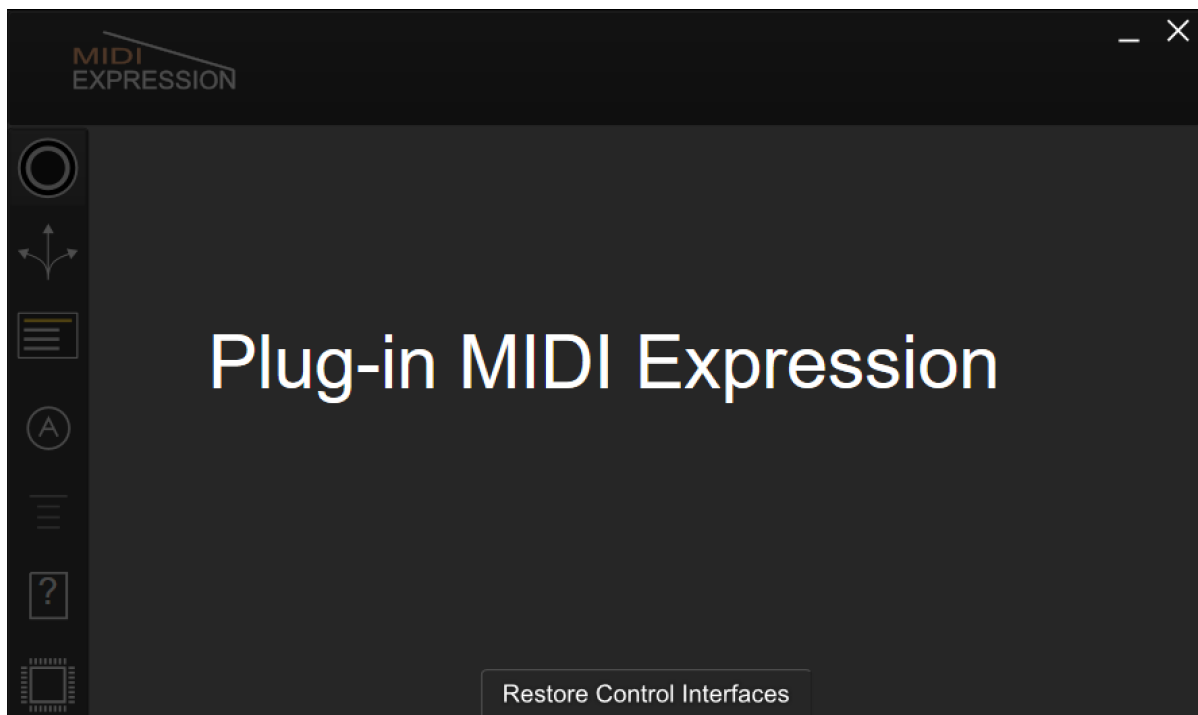
## MIDI

If your device will not work connected to a 3<sup>rd</sup> party USB Host port using the MIDI + Control Interface, then you can try using this pure MIDI interface. Please keep in mind that the device settings cannot be edited using the Control Application with this setup, except using the iOS version of the Control Application. You can however restore the Control Interface using the MacOS or PC version of the Control Application.

## Restoring the Control Interface

If you have put your MIDI Expression into the 'MIDI' only setup, you can easily restore the Control Interface using the Control Application.

When you plug-in your device and start the Control Application, any devices that are in the MIDI only setup can have their Control Interfaces restored by clicking on the 'Restore Control Interlaces' at the bottom of the screen. PC users should take care to ensure no applications are currently accessing the MIDI Expression MIDI port as this will prevent the Control Application from communicating with the device.



# Using Parameter Feedback

Parameter Feedback allows pedals and controllers connected to a MIDI Expression to stay in sync with your music applications. Sustain pedal, footswitches, rotary encoders, and ribbon controllers are all capable of parameter feedback, depending on the types of messages they are configured to send. Expression pedals and hihat controllers are not.

## Sync with Host Automation

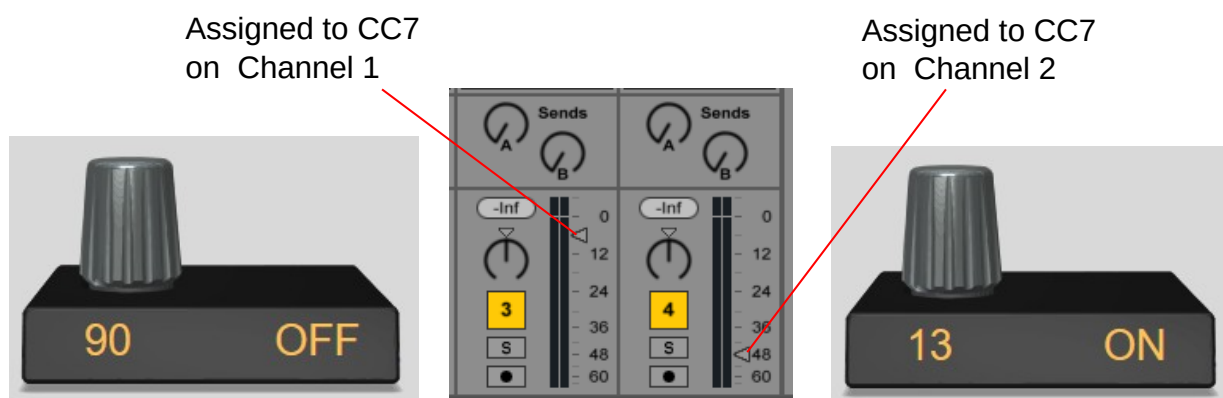
If you use host automation to a control parameters in your DAW, when you move the control in the DAW, it will send MIDI feedback to the MIDI Expression allowing it to update its settings.

For example, if in Ableton you assign a rotary encoder to the volume fader of a track, when you move the fader in Ableton with your mouse, the value of the encoder stored in the MIDI Expression will be updated so the two stay in sync.

## Sync with Transformer

In fact, the MIDI Expression remembers the value of all Control Change and NRPN messages for all channels. This allows the MIDI Expression to update its values even when changing control change assignments or when using the **MIDI Transformer** to dynamically modify MIDI messages.

For example, let's assume the knob of a rotary encoder is setup to send control change message 7 on channel 1, and the push button is used to dynamically transform the channel of the encoder between 1 and 2. If the volume of track 1 is assigned to CC7 on channel 1 and the volume of track 2 is assigned to CC7 on channel 2, then using the pushbutton to turn on or off the transformer will cause the value of the encoder to update maintaining synchronization.

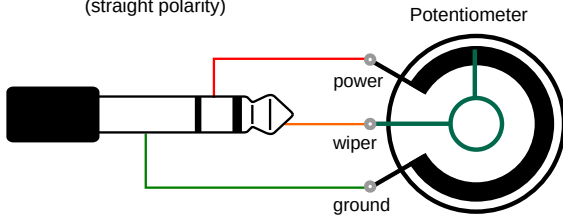


Using the push encoder to transform the knob's channel between 1 and 2 causes the knob's value to automatically update and maintain synchronization.

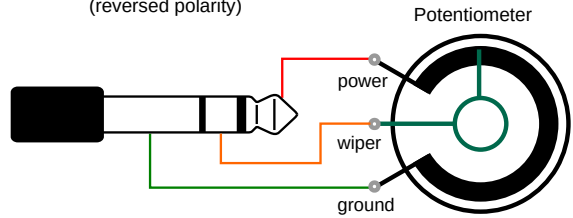
# Wiring Diagrams

Most commercially available pedals should work fine with MIDI Expression. The wiring diagrams below are included for DIY enthusiasts who intend to build their own controllers.

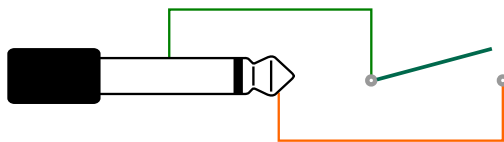
### Expression Pedal (straight polarity)



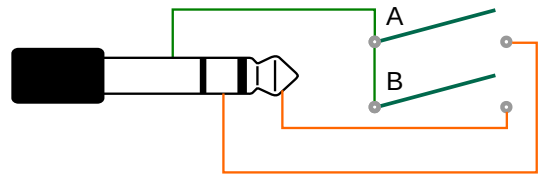
### Expression Pedal (reversed polarity)



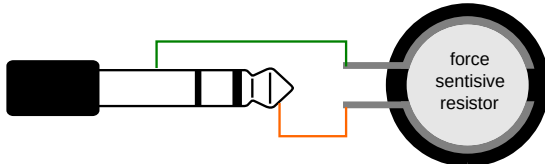
### Sustain Pedal



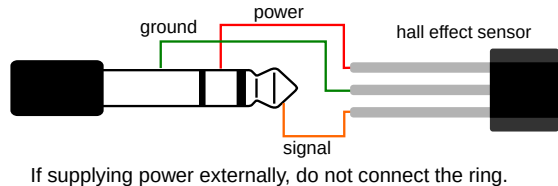
### Dual Footswitch



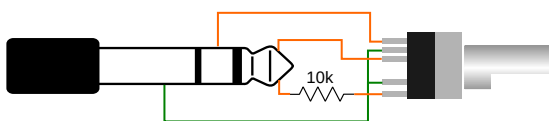
### FSR HiHat Controller



### Hall Sensor HiHat Controller



### Rotary Encoder



Voltage on pedal inputs should be in the range of 0V to 3.3V. If externally powering a pedal input, you risk damaging the pedal input if the voltage goes outside of this range.

# MIDI Implementation

## MIDI Expression MIDI Implementation

Function	Transmit	Respond	Passthru	Remarks
Channel	1 - 16	1 - 16	1 - 16	Learn Note
Notes	0 - 127	0 - 127	0 - 127	Learn Note
Velocity	1 - 127	X	0 - 127	
Aftertouch	O	X	O	
PitchBend	O	X	O	14 bit
Control Change	0 - 127	0 - 127	0 - 127	Parameter Feedback
Program Change	0 - 127	X	0 - 127	
System Exclusive	O	O	O	Control, Display
System Real-Time	O	X	O	
System Common	X	X	O	
RPN	X	X	O	
NRPN	0 - 127	0-127	O	14 bit

*Updated August 16th 2024*

X - Not Used

O - Used