

MISSION EXPRESSION PEDALS

User Guide



Version 1.1

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Mission Pedal Models

The Mission pedal models covered in this guide are:

SP-1 – Expression pedal with integrated foot switch

SP1-R – Same as the SP-1 with the addition of a polarity reversal switch

EP-1 – Expression pedal without the foot switch

EP1-R – Same as the EP-1 with the addition of a polarity reversal switch

SP-2 – Expression pedal with two foot switchable channels

Introduction

The SP-1 and SP1-R expression pedals are designed principally for use with the Fractal Audio Axe-FX guitar processor. By integrating a foot switch with the continuous pedal, and utilizing the two footswitch inputs and programmable features of the Axe-FX, guitar players can get the toe down switch behavior of a traditional analog wah pedal with the Axe-FX. The expression can be applied to many different effects including wah, whammy, delay repeats etc, and the switch can be used to toggle the effects on and off.

The EP-1 and EP1-R are a more typical expression pedal design with no foot switch and a single expression pedal out jack that can be connected to the expression pedal inputs on a wide range of musical processors and controllers.

The SP-2 is designed to allow a single expression pedal to control two processors or signal chains. An on board foot switch toggles the expression pedal between the two outputs. A two state LED indicates which channel is selected. Typical uses of the SP-2 include:

1. Channel 1 controlling volume and channel 2 controlling expression.
2. Channel 1 controlling amp processor and channel 2 controlling out board effect processor.
3. Channels 1 and 2 controlling two independent stomp boxes such as a modulation effect and a delay effect.

Unfortunately there is no accepted standard for the wiring of expression pedals; different manufacturers wire their equipment in different ways so there is no assurance that a particular expression pedal will work with all equipment. The SP-1 is designed to operate using the two foot switch inputs on the rear panel of the Axe-FX processor, however, it maybe possible to use the pedal in conjunction with various MIDI controllers and other equipment that accept analog expression pedal and footswitch inputs. The EP-1 and SP-2 models are compatible with a wide range of processors. The -R models are additionally fitted with a polarity switch that reverses the polarity of the tip and ring connections on the continuous (pedal) output to increase the chances of compatibility with different devices. The switch outputs on the SP-1 and SP1-R are fitted with a stereo (TRS) jack connected as detailed in section 2, Connections.

Connections

The Pedal out on all models is wired as follows:

Potentiometer	Pedal Out
Clockwise (CW)	----- Sleeve
Counter Clockwise (CCW)	----- Ring
Wiper (SL)	----- Tip

Operating the polarity switch on the -R models reverses the polarity of tip and ring on the pedal out so that SL becomes connected to Ring and CCW becomes connected to Tip.

The switch outputs on the SP-1 and SP1-R pedals are fitted with a latching switch by default. A momentary switch may have been installed as an option if requested for compatibility with certain MIDI controllers that require this. The Axe-Fx supports both latching and momentary switches.

The switch out on the SP-1 and SP1-R is wired as follows:

Switch	Switch Out
Terminal 1	----- Sleeve
Terminal 2	----- Tip
Terminal 3	----- Ring

The latching switch toggles between tip – sleeve and tip – ring. The momentary switch normally connects tip – ring and connects tip – sleeve while the switch is depressed. When the switch is release it reverts to tip – ring.

The SP-1 and EP-1 pedals are passive devices and as such require no internal power. There is no internal battery or power supply jack for these pedals. The SP-2 pedals utilize a bi-state LED to indicate which channel is selected and internal power is required on the SP-2 to operate the LED. The SP-2 will either have been fitted with an internal battery or will have an external power jack depending on what was specified when the pedal was ordered. The SP-2 switching and pedal functions will still operate as normal with no power, but the LED will not function unless the correct power is available. The battery version uses a 9V type battery. The external power version requires a Boss type power supply with the following specifications:

9V DC, 2.1mm, center pin negative.

Most power supplies designed for use with Roland Boss type 9v stomp boxes should work fine with the SP-2. Note that using an incorrect power supply, particularly using power supplies with reversed polarity or with power output greater than 9V may cause the LED to fail and the pedal will need to be returned to Mission Engineering for repair. **Always use a suitable 9v DC power supply. Never connect a Mission pedal direct to AC mains power.**

Setting up the SP-1 with an Axe-Fx

If using an SP-1 or SP1-R pedal with a Fractal Audio Axe-FX, it is recommended that the following setup instructions are followed first. Once everything is verified working, different configurations with various MIDI controllers or other devices can be experimented with. The example below configures the controller to work as a wah pedal and for the switch to turn the wah effect on and off.

1. Using a stereo (TRS) ¼" audio cable, connect the pedal out on the SP1 to Pedal 2 on the Axe-FX.
2. Using a stereo (TRS) ¼" audio cable, connect the switch out on the SP1 to the remaining Pedal 1 on the Axe-FX.

If using a SP1-R with a polarity switch, put the switch in the down position.

Set Axe I/O pedal 2 to continuous.

1. Hit the I/O button, page over to CTRL, scroll down to one of your free External controllers, i.e. EXTERNAL 2, hit the "Enter" button and move your expression pedal... the Axe should detect it and set External 2 to your expression pedal input.

2. Edit your wah block, page over to the appropriate tab, move your cursor to the appropriate parameter you want the expression pedal to operate on. This would normally be 'freq' for the wah. Hit "Enter". This brings up the modifier page. Now, for the source, select the modifier that represents your expression pedal. Start and end values would normally be 0 (start) and 127 (end) for a full sweep. You can set a smaller range if you want. Setting them the other way (127 and 0) will make the wah operate in reverse.

To setup the switch:

1. Plug the stereo cable from switch out to pedal 1 on the axe. Set Axe I/O pedal 1 to 'latching' if using the default latching switch or 'momentary' if your pedal is fitted with the optional momentary switch. Set wahwah1 bypass to pedal 1. In the wah block on the Axe-FX turn off auto engage and set source to EXTERNAL 1.

Play for a while operating the wah pedal and make sure the sweep is even from low frequency pedal up to high frequency pedal down. If not, flip the polarity switch.

MIDI Controller Setup

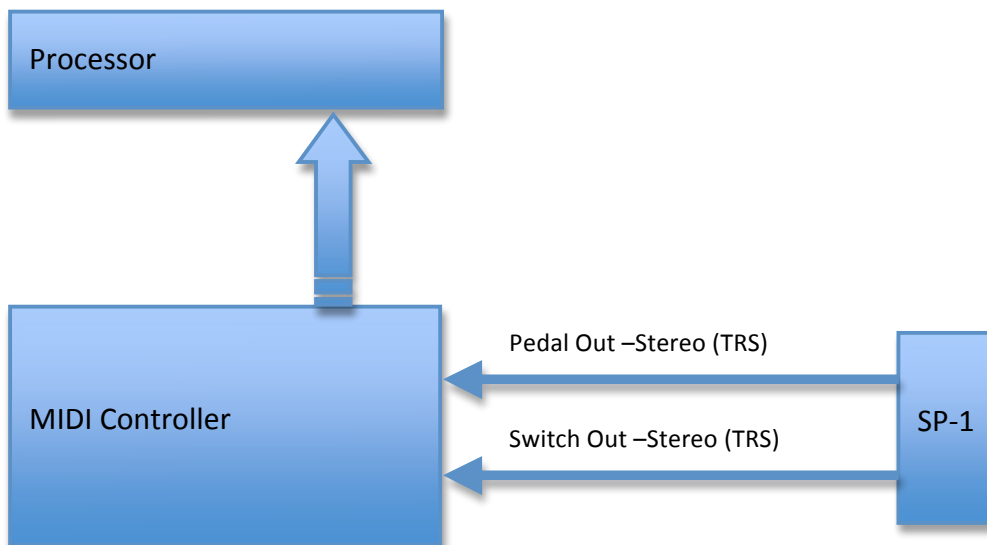
Although designed primarily for direct connection to the Axe-Fx pedal inputs, it should be possible to use Mission Pedals with various MIDI controllers. Because there is no standard for wiring of footswitch and expression connections, the R pedal with polarity reversal option offers the best chance of success with different devices. Other pedals may function too, depending on the model of controller. Pedals may be returned to Mission Engineering at any time for upgrade to add the polarity switch if required.

Depending on the controller make and model, there may be inputs for expression pedal only, dedicated expression pedal and footswitch inputs, or inputs that are configurable to accept both expression and switch devices. Please check the compatibility guide on the website at www.mission-engineering.com for the latest details. In the event that the controller does not support a switch input, the switch function can still be used by connecting the switch out direct to the Axe-Fx

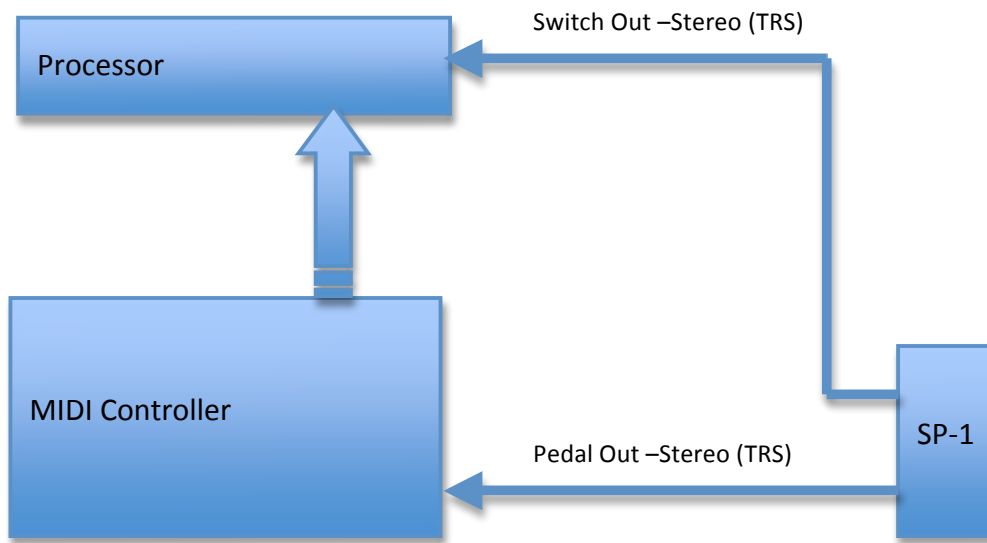
Note that when connecting the pedal to a separate controller rather than to the Axe-Fx, the analog to MIDI conversion is done by the controller. MIDI data is then passed back to the Axe-FX by the controller. The pedal calibration feature of the Axe-Fx will not be available when connecting via a MIDI Controller.

Block Diagrams

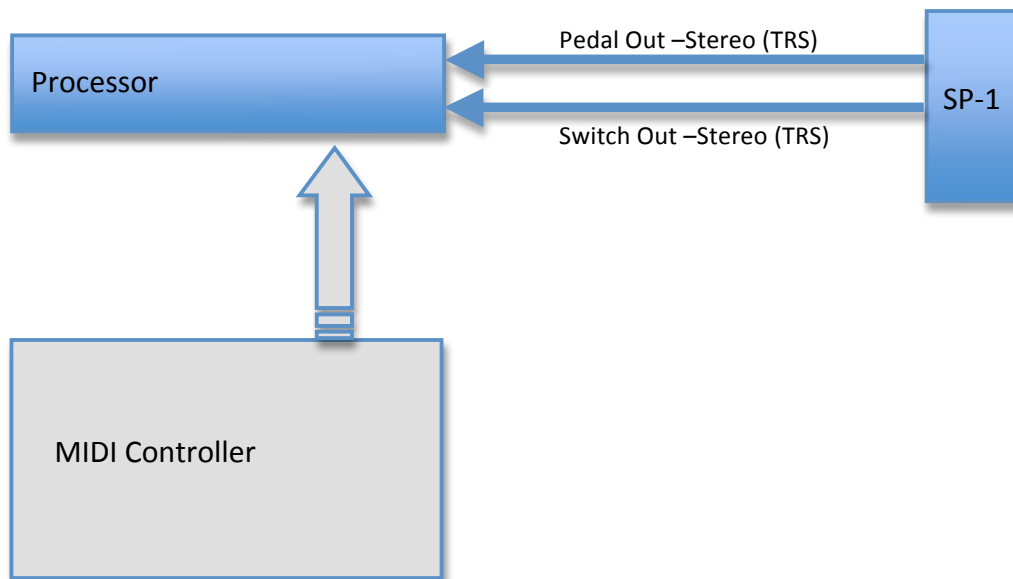
The following block diagrams illustrate some typical configurations using an SP-1 pedal with a rack processor and a MIDI floor controller. Many different configurations are possible depending on your exact pedal model and equipment setup, but these should serve as a guide to get started. If you have an EP-1 pedal you will omit the switch connection shown in the diagrams. If you have an SP-2 pedal the switch connection can be replaced with the second pedal connection.



In this configuration the SP-1 pedal and switch outputs are both connected to the MIDI controller using $\frac{1}{4}$ " stereo (TRS) instrument cables. The controller does analog to MIDI conversion, and MIDI data for the expression and switch are passed from the controller to the processor. This configuration is also valid for the two pedal outputs from an SP-2 pedal.



This configuration is suitable when using MIDI controllers that only have a single expression pedal input. In this case the SP-1 pedal output is connected to the MIDI controller using $\frac{1}{4}$ " stereo (TRS) instrument cable. The switch output is connected directly to the processor. The controller does the analog to MIDI conversion for the pedal out, and by the processor does the conversion for the switch out. This configuration is also valid for the two pedal outputs from an SP-2 pedal.



In this configuration the SP-1 pedal and switch outputs are both connected to the processor with stereo TRS cables. The processor does the analog to MIDI conversion and all pedal features of the processor are available. A MIDI controller may, of course, still be used independently of the expression pedals.

Specifications

Potentiometer

Internal resistance – 20KOhm

Taper – custom, reverse logarithmic

Connections – Clockwise (CW), Counter clockwise (CCW), Wiper (SL)

Function – Voltage divider

Usage rating- 1,000,000 operations

Switch

Latching - 3PDT

Momentary – 2PDT

External Power (SP-2 only)

Voltage – 9V DC

Current - 200mA

Polarity – Center pin negative

Plug Size – 2.1mm

Dimensions

Base length at longest point ----- 9.9"

Base width at widest point ----- 4.0"

Height at highest point including feet ----- 3.25"

Pedal length ----- 8.7"

Pedal width at widest point ----- 3.0"

Pedal width at narrowest point ----- 2.3"

Weight ----- 3.5lbs

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