

The Pedalfects Manual



©1998 Michael Berry
mikeb@nmol.com

Contents

1. Introduction	3	
2. Getting Started		4
3. The Effects	5	
4. The Graph	8	
5. Using Sound with Pedalfects		10
6. Recording	11	
7. Patches and Banks	12	
8. MIDI	13	
9. Computer Speed	14	
10. Effect Reference		15

Copyright notice: "ASIO is a trademark of Steinberg
Soft- und Hardware GmbH"

1. Introduction

Pedalfects is an easy-to-use, real-time effects processor. Pedalfects can produce eight simultaneous effects. Each effect can be controlled from the screen or by MIDI. Pedalfects also has six low frequency oscillators which can control effects. Effects can be patched together freely. Feedback connections are possible.

Pedalfects can use the audio inputs to your computer, the audio output of your CD-ROM drive, or a stereo sound file saved on a hard drive as its sound input source. You will hear the sound output in real-time from your computer speakers and you can record this output to a hard drive.

Pedalfects uses specialized code to achieve very low-latency performance. This means that there is very little delay between the time a sound comes in and when it goes out. The overall sound latency is about 22 milliseconds (ms.). Control latency (or how long it takes Pedalfects to respond to MIDI) is about 11 ms.

A single configuration of Pedalfects is called a patch. You may save patches individually or in banks of up to 128 patches. You can switch between patches in a bank quickly by using MIDI program changes.

Pedalfects can be downloaded at:

<http://www.nmol.com/users/mikeb/pedal.htm>

When you download a copy, it will be disabled. You can try it out, but you cannot save any patches or record any sounds. Once you register your copy for \$100 U.S. I will send you a registration code which will unlock your version. See the ReadMe file that accompanies the download package for more information about how to register Pedalfects.

2. Getting Started

Once you have downloaded Pedalfects, start the program. You will see the main window open like this:

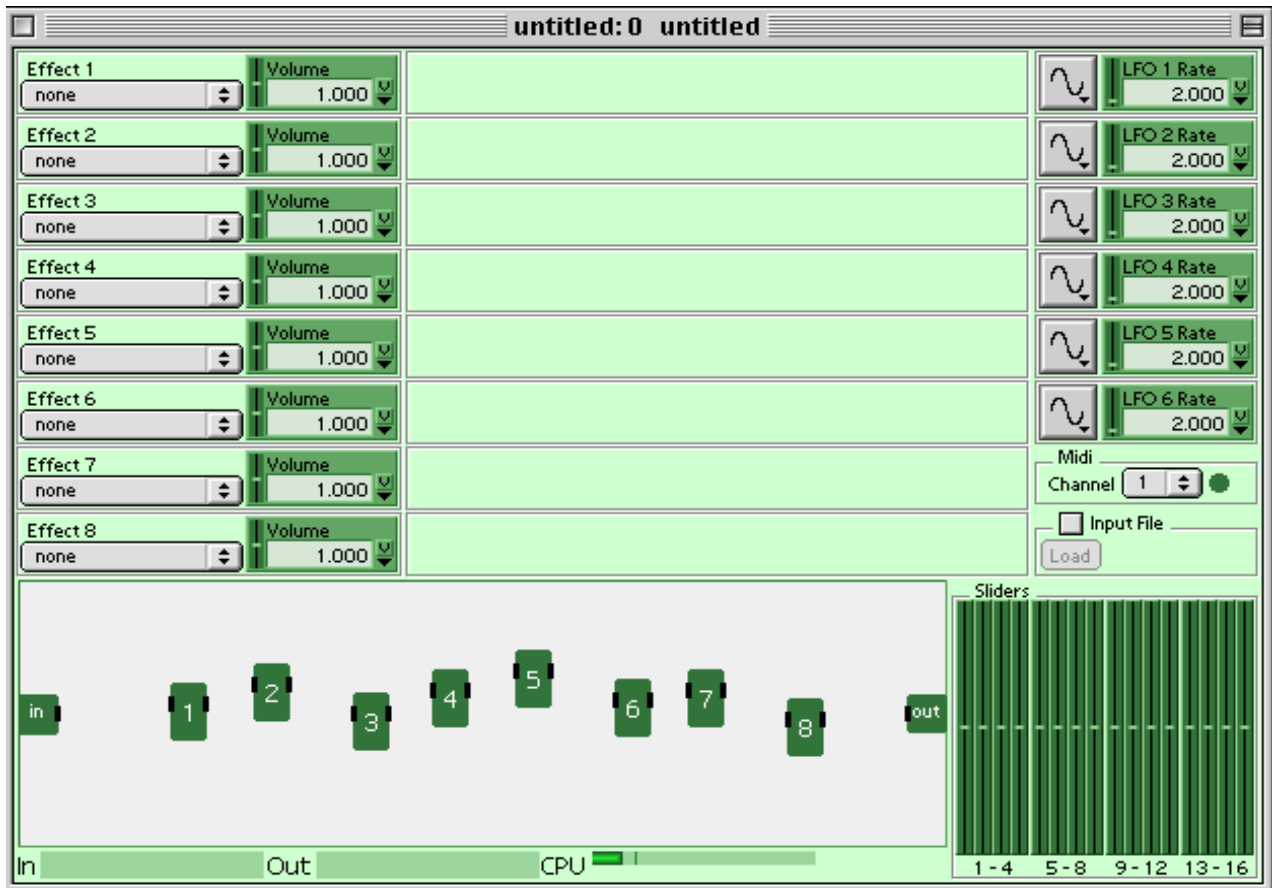


Figure 1

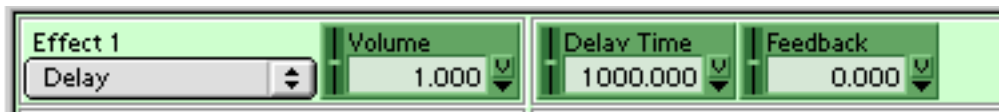
The window in Fig. 1 is where all of the action takes place. At the left, the eight effects are listed with each of their parameters. Below them is the *graph*, where the eight effects are arranged and connected to each other and to the input and output. Below the graph are the *input* and *output* volume meters and the *CPU* load meter. To the right are the six *low frequency oscillators* (LFO's).

Below them are the *MIDI* and *Input File controls*. Finally, in the lower right corner, there are sixteen sliders which can be used to control effect parameters.

3. The Effects

Pedalfects can process up to eight effects at one time. The total number you can use at one time will depend on your computer (see 10. Computer Speed). Figure 2 is an example effect:

Figure 2



Use the menu on the left to choose which kind of effect you want. All effects (even "none") have a volume. Each effect will have a different combination of other parameters, appearing to the right of the volume, up to a maximum of four.

Effect parameters (and many other Pedalfects parameters) are controlled using *value controllers*. Here is a sample value controller:

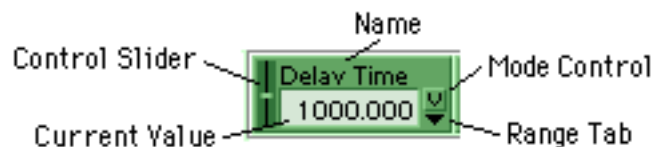


Figure 3

This value controller is in *value mode*. You can move the value up or down using the control slider. The control slider will shift the value by increments. The further you displace the slider, the larger the increment. You can also type a value directly into the value controller. First, click on the current value. It will turn red. Now you can type in a new value. When you hit return, the new value will be activated.

Each value controller has a range of values available to it. You can change the range by clicking on the *range tab*. The value controller will open up to look like Figure 4:

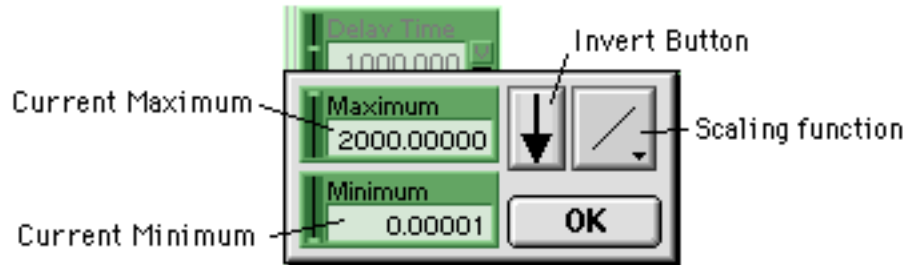


Figure 4

The *current maximum* and *current minimum* are the largest and smallest values to which the value controller can be set. Pedalfects also sets hard and fast upper- and lower- bounds for most parameters. For instance, you can never set the delay time below 0.00001 ms. But you may set the minimum to be 10 ms, if you wish. The current maximum and minimum will be more important when we discuss the other modes.

In addition to value mode, a value controller can be in *slider mode*, *MIDI mode*, or *LFO mode*. You can switch between the different modes using the *mode control button* on the value controller. You can also switch directly to a new mode using the keyboard, once the value controller is selected. These keys switch between the different modes:

<u>Key</u>	<u>Mode</u>
v or V	value mode
s or S	slider mode
m or M	MIDI mode
o or O	LFO mode

In slider mode, the parameter is no longer controlled directly from the value controller. Instead, one of the sixteen sliders will set the parameter, as in Figure 5:

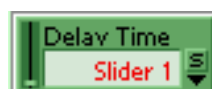


Figure 5

This value controller is now set to respond to slider 1. You can change the slider number with the control slider or by typing in a new number.

When a value controller is in a mode other than value mode, the maximum and minimum become more important. These set the range for the external control. For instance, in the example in Figure 4 above, the maximum is 2000 ms. and the minimum is 0.00001 ms. The top of slider 1 will correspond to 2000 ms and the bottom to 0.00001 ms. If you want the slider to only operate on a more limited range, change the minimum and maximum to different values.

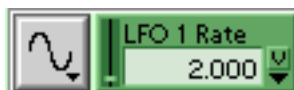
The *invert button* and the *scaling function* in Figure 4 also affect how an external control is mapped to a value controller. If you press the invert button down, the minimum and maximum will flip. Now the top of the slider will be 0.00001 ms. and the bottom will be 2000 ms.

The scaling function can change the mapping of intermediate values. The default setting is to a linear function. Here, the middle of the slider would be at 1000 ms. Using the scaling function menu, you can choose between two convex and two concave functions as well. Now the center will be shifted closer to the bottom or top of the range.

When you set a value controller to MIDI mode, the parameter will be controlled by a MIDI controller. You can choose a controller between 0 and 120 (see 8. MIDI).

If you choose LFO mode, the value will be set by one of the six LFOs. Figure 6 is a sample LFO:

Figure 6



The menu on the left sets the shape of the LFO. You have five shapes to choose from: *sine*, *sawtooth*,

square, triangle, or random. The LFO has a value controller which sets the frequency in Hertz (Hz.). For the first four shapes, the LFO will complete one full cycle in the specified frequency. If you choose random, the LFO will create a new random value at the given frequency. A setting of 2 Hz. would mean 2 new values per second. The LFO rate can be controlled externally, just like any other parameter.

4. The Graph

The graph is where you can connect effects together to create a sound path. Each of the eight effects has a corresponding icon in the graph. The input and output also have icons. You can draw connections from the output of one icon to the input of another. The sound output from the first effect is then sent to the input of the second.

A connection looks like Figure 7:

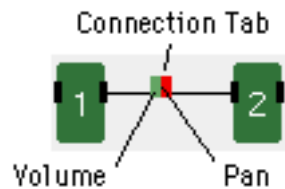


Figure 7

I made this connection by dragging the output of effect 1 and dropping it on the input of effect 2. When you grab an output, the effect will turn purple. When you move over an input, the number of the effect will turn red.

Each connection has a connection tab, which allows you to set the volume and pan of the connection. If you click on the green part of the connection tab, a volume value controller will open. If you click on the red part, a pan

controller will open. Click on the same part again to hide the controller.

The example in Figure 7 is a stereo connection. Both the left and right outputs from effect 1 are passed to effect 2. The pan controls the relative volumes of the left and right. Connections can also be mono-left, or mono-right. Shift-click once on the connection tab to make it mono-left. Shift-click again to make it mono-right. Shift click once more to make it stereo again. When a connection is mono-left only the left channel of effect 1 is passed to both the left and right inputs of effect 2. Mono-right is similar, passing only the right channel of effect 1.

You can remove a connection by command-clicking on its connection tab.

Pedafects also has shortcuts to make certain kinds of connections. If you control-click on an effect icon, you will automatically create a connection from the sound input to the effect input and from the effect output to the sound output. If you option-click on an effect, you will make connections to the previous and next effect icons in the graph. Command-clicking on an effect will remove all connections to and from that effect.

The effects will be processed from right-to-left as they appear in the graph. You can move the effects around into any configuration. For example, effect 1 can be located to the right of effect 2 by clicking on it and dragging it to a new position.

5. Using Sound with Pedafects

When you first start Pedafects, it will use the sound input to your computer. Most Power Macs have several possible sources of sound input. If

you are using System 8.0 or earlier, the menu choice **Set Sound Input...** under the **Setup** menu will be available. From this dialog you will be able to choose the input source, including your CD-ROM drive. If you are using System 8.1 or later, this dialog box will not be available. Instead, you need to choose your source in the control strip.

Pedalfects can also use sound files which are stored on a hard drive. The sound files must be stereo, 44.1 kHz., AIFF files in order for Pedalfects to read them. They should also be stored on a relatively fast hard drive, since they need to be continuously read in real-time. Finally, they should be at least 1 second long.

To use a sound file, first check the box in the main window labeled "Input File." Then click the "Load" button. Pedalfects will ask you to choose the file. Once the file is loaded, it will loop indefinitely. To return to the audio inputs, click the "Input File" check box again. You may also load a different file at any time.

Certain actions in Pedalfects may cause an input file to temporarily loop on a small section of audio. For instance, any time you set the range of a value controller, Pedalfects will stop reading from the disk while the range box is open. As soon as you close it, the sound file will resume normal playing.

As of version 1.2.0, ASIO support has been added. ASIO is a Steinberg interface for aftermarket audio systems. Pedalfects supports ASIO 1 and ASIO 2 audio drivers, which must be located in the ASIO Driver folder supplied with the download package. To choose an audio system, go to **Preferences...** and select the desired audio system from the Audio System menu.

An automatic output limiter has also been added in version 1.2.0. The output limiter will minimize the effects of overloading (clipping) the output.

The bar under the CPU meter shows the current output limit control. As the bar get smaller, the output levels are reduced. This happens automatically as the output signal goes beyond full range. You can adjust the speed at which the limiter recovers in the Preferences dialog.

6. Recording

Pedalfects allows you to record your work, if you have registered your copy. All recordings are stereo, 44.1 kHz, AIFF files. Like input files, the recordings should be made to a relatively fast hard drive for best results.

You can record the sound output whether you are using a file or an audio input for Pedalfects. However, the process is slightly different for each. If you are recording from the audio inputs, select **Choose Record File...** from the **Recording** menu. In the resulting dialog, select the name of the output file.

Pedalfects has a variable *preroll* length. During the preroll, the input is turned off. This is mainly to allow any effects that store past events (like Delays) to clear themselves. You should set the preroll to at least twice the length of your longest delay in the patch.

Once you have selected the record settings, you can record at any time by pressing the space bar. First, Pedalfects will indicate that it is in preroll. Then it will begin to record. If you are using an input file, the file will begin at the beginning when Pedalfects switches from preroll to recording. To stop recording, press the space bar again. You can choose the kind of file you wish Pedalfects to create. Under the **Setup** menu, select **Choose Out File App Type...** Pedalfects will ask you to find the sound application that you would like the recorded files to available to. Find the app

and select it. From then on, all recorded files will be AIFF files with that application as the creator.

7. Patches and Banks

Pedafects has two ways to save your work: patches and banks. Neither is available until you have registered your copy. A patch is a single collection of all of the settings in the main window. A bank is 128 patches.

You can open or save a patch file at any time. When you load a new patch, it will automatically become active. You can also reset the main window by choosing **Load Blank Patch** from the **Bank** menu.

You always have a bank loaded, even if it is the default "untitled" bank. You can tell the name of the loaded bank from the title of the main window. The title is always:

bank name: patch number patch name

At any time you can save a patch to the current bank using **Save Patch to Bank** under the **Bank** menu. This will overwrite the patch that is stored in the current patch number of the bank. If you have not yet named the patch, you will be prompted to do so. You can also save the patch to a different patch number using **Save Patch to New Position...** You will be asked for a new patch number in the bank.

You can load a patch from the current bank using **Load Patch From Bank...** You will be asked for the new patch number. You can also send a MIDI

program change to Pedalfects which will switch to the corresponding patch number.

You can view the bank using **View Bank**. A dialog will open which shows the patch names in the bank, 32 at a time. You can move patches around in the bank by dragging them to new locations. You can copy patches by holding the option key while you drag them. If you double click on a patch, it will be opened in the main window.

Finally, you can save and load entire banks, using **Save Bank...** and **Load Bank...** under the **File** menu.

8. MIDI

Pedalfects uses Open MIDI System (OMS), from Opcode, to receive MIDI from other programs and MIDI devices. OMS is available for free from www.opcode.com. The OMSLite package is suitable for use with Pedalfects. If OMS is not installed, you will need to install it and restart your computer.

Pedalfects only receives MIDI on one channel at a time. You can choose this channel in the main window. Pedalfects receives controllers 0 - 120 on that channel. The controller values are sent to any value controllers which are set to MIDI mode. Pedalfects also receives program changes on that channel which switch the current patch. Any time that MIDI is received, the *MIDI Led* to the right of the channel menu will turn red.

9. Computer Speed

The speed of your computer will determine how much you can do with Pedalfects at one time. I

wrote Pedalfects on a 7500/100, so I am sure that it can run on any Power Mac. However, on slower machines, you will not be able to use as many effects at one time.

Pedalfects' first priority is always the generation of sound. Because of this, as you increase the load on the CPU, the graphics will become choppy. As you get near the limit, even the mouse will be sluggish. Eventually, you will hear the sound output become choppy. This will correspond with the CPU meter going into the red. At this point, you have run out of speed.

Because Pedalfects always works in real-time, you need to leave some extra processing power if you are using an input file or recording your work. Pedalfects must be able to perform the disk reading and writing in addition to creating sound output.

10. The Effect Reference

These are all of the effects which are currently available in Pedalfects, along with a description of each parameter.

Delay The input is delayed by the **Delay Time** (in ms.) and then output. You can use the **Feedback** to add a fraction of the delayed sound back into the delay, resulting in a repeating echo.

Ping Pong Delay This is just like the regular delay, except that the delay occurs first in the left channel, then in the right.

Resonator The resonator has three resonances, which are at **Frequency 1**, **Frequency 2**, and **Frequency 3** (in Hz.). The amount of resonance is controlled by the **Feedback**.

Flanger The flanger creates a pronounced sweeping effect. The **Rate**, **Depth**, and **Center** of the sweep are all controllable.

Phaser The phaser creates a less-pronounced sweep. It also has a **Rate**, **Depth**, and **Center**. The **Feedback** determines how apparent the effect is.

Low Pass Filter The low pass filter allows all frequencies below the **Cutoff** to pass through. As the **Resonance** is increased, the filter will have more of a ringing sound at the cutoff frequency.

High Pass Filter The high pass filter allows all frequencies above the **Cutoff** to pass through.

Band Pass Filter The band pass filter allows a range of frequencies to pass through. The range is centered at the **Center**. As the **Sharpness** increases, the range becomes smaller.

Parametric EQ The parametric EQ boosts or cuts a particular range of frequencies, while letting the others through unchanged. The range is set by the **Center** and **Bandwidth**. The amount of change is set by the **Boost/Cut**.

Compressor The compressor can reduce the dynamic range of the sound by clamping down on loud sounds. The **Threshold** sets where the compressor kicks in. As the **Ratio** increases, the effect becomes more extreme. The **Attack** and **Release** determine how long the effect persists after it is triggered.

Gate The gate cuts out all sounds below its **Threshold**. The **Release** determines how long the gate stays open after it is triggered.

Envelope The envelope creates an envelope whenever a sound is above the **Threshold**. The sound will ramp up for the **Attack** time, hold steady during the **Sustain** time, and then tail off during the **Release**. Once a sound has released, the envelope can be triggered again.

Pitch Shifter The pitch shifter transposes the sound up or down, according to the **Pitch Ratio**. 0.5 would be half the pitch (one octave down). 2.0 would be twice the pitch (one octave up).

Chorus The chorus adds copies of the sound which are slightly detuned. The **Depth** controls the amount of detuning. The **Mix** controls the amount of detuned and unaffected sound.

Distortion The distortion crunches the sound like an overdriven amplifier. The **Drive** sets the amount of distortion.

Allpass Filter An allpass filter is a component of traditional reverb simulators. The sound is delayed without any frequency alterations, but the phase is affected.

Reverb This is a reverb network of 8 comb filters and 2 allpass filters. **Time** and **Liveness** determine the sound of the reverb. **Wet/Dry** mixes the amount of reverb to clean sound.

Version History

- 1.2.0 July 2001 Added ASIO support, output limiting.
- 1.1.0 Dec. 1998 Added Allpass and Reverb. Improved Flanger and Resonator. Shortened latency.
- 1.0.0 Oct. 1998 Initial release.

Credits and Acknowledgments

Chris Brown and Matt Ingalls for alpha and beta testing and advice.

The music-dsp mailing list for code, discussion, and lively entertainment.

Catie Berkenfield for editing and forbearance.