Multiverse

Effect Creator
Quick Start Guide

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Revision History

v0.1 - (Sept. 10, 2022) Pre-release draft
v1.0 - (Jan. 23, 2023) Release
v1.1 - (Feb. 15, 2023) Release Update

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Introduction

The **Effect Creator** application allows you to create custom audio effects for the Multiverse platform. Once an effect has been created, it can be used in the **Aviate Audio Designer** application and uploaded to the Aviate Audio webstore using your developer account. The process to create an effect has several steps:

1. Fill out the *General Information* section including effect name, number of inputs/outputs, etc.
2. Add and edit the details for each of the effect controls in the *Control Editor* section.
3. Auto-generate the boilerplate C++ code, then add in your custom code (the audio algorithm).
4. (optional) assign any custom graphic images for controls and the pedal itself.
5. Build the effect and resolve any compilation errors.

Application Overview

The application interface consists of five primary sections.

1. *Primary Buttons* - these buttons carry out the primary actions in the program.
2. *General Information* - this section is for information that applies to the effect as a whole.
3. *Control Editor* - this table contains detailed information for each effect control. Each row in the table is a box containing all the necessary details for a single control.
4. *Multi-function Buttons* - these buttons select which information is displayed in the Multi-function Window.
5. *Multi-function Window* - this area shows one of several different views including graphic previews, source file lists and compile logs.

Quick Start

When starting the application for the first time, or clicking the **RESET** button (*Primary Buttons*), the program resets to the default effect which is a basic volume pedal with two controls: bypass and volume.

All effects for Multiverse must have these two mandatory controls as the Multiverse audio framework requires them.

The defaults provide a fully buildable, working effect and provide an ideal starting place for creating your own custom effects. Since you have something that works immediately, you can add to it to create your own effect and can easily identify the issue if you run into problems.

Let's walk through all the steps necessary to build this effect and test it in the Pedalboard Designer Application.

Step 1 - Reset to Defaults

Click the RESET button to ensure everything is restored to default.

You should see the *General Information* section set for the "Volume Pedal DEMO" along with the default, mandatory controls below.

Step 2 - Save the Project

Notice the *Project Directory* field at the top of the *General Information* area is blank. Before we can generate the boilerplate code for the effect, we need to provide a location to save the project data.

Click the **SAVE AS** button to choose a folder to save the project into. It is recommended to create a dedicated folder on your computer for each effect. *NOTE: the application will save projects files into the directory you select, it does not create a sub-folder.*

If you use your file browser to look at the contents after saving you will see a project file and several directories. See below for an example.
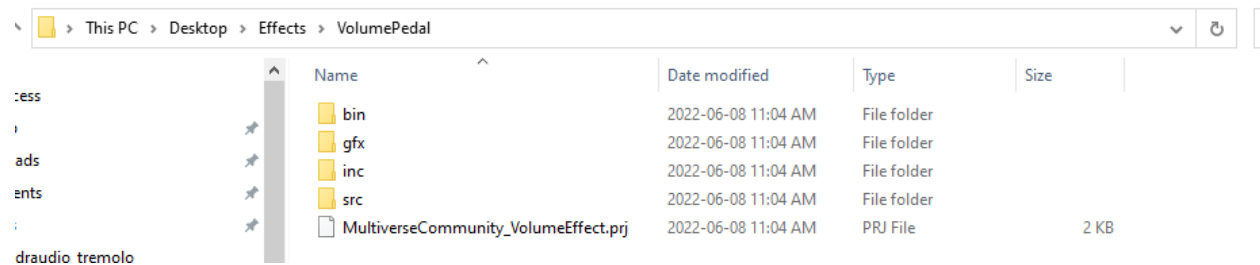
MultiverseCommunity_VolumeEffect.prj - this file contains your effect project information. The name is created based on the company name and the effect name.

bin - this directory is where you will find your effect package once it has been built. Effect packages have a *.efx* file extension.

gfx - this directory is where graphic image files associated with your project will be stored. They are copied here automatically during project saving once you have selected them using the file browsers in the *Effect Creator* and click the **SAVE** button to save the project.

*inc* - this directory is where public source code header files go.

src - this directory is where private source code headers and cpp files go.

Step 3 - Generate the Boilerplate Files

Click the **GEN** button to auto-generate all the C++ Multiverse Framework code needed for your effect. This code is generated based on the information entered in the *General Information* and *Control Editor* sections.

After generating the code, the *Multi-function Window* will switch views from **ARRAY** to **LIST**. The **LIST** view shows all the public headers and private source files in your effect's project.
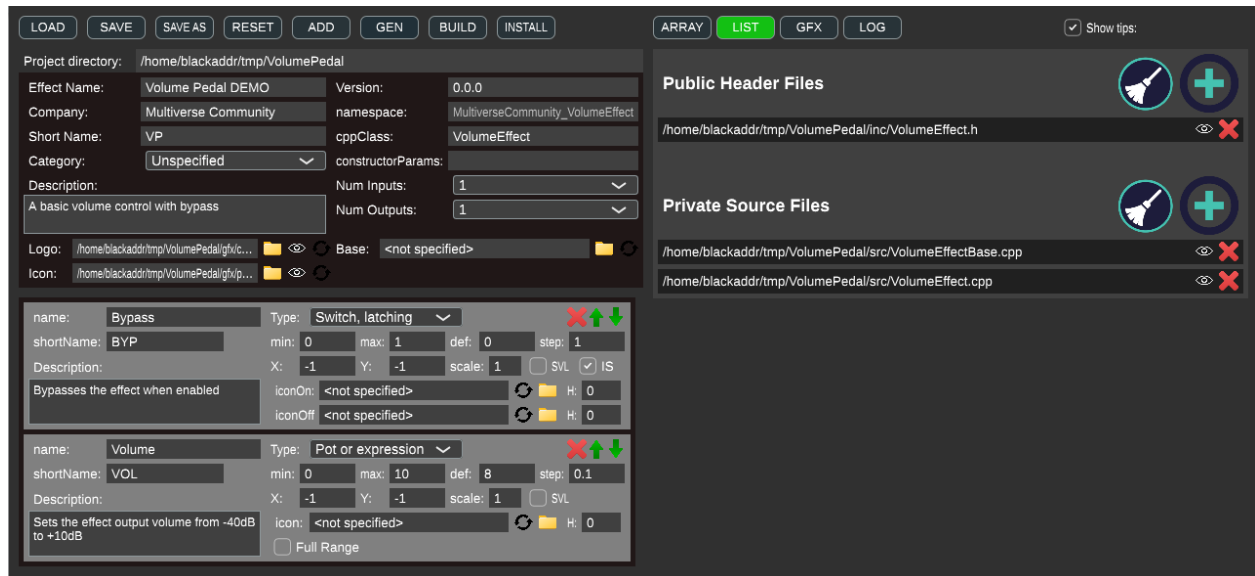
At a minimum you will always have three files. You may need to add more files when creating your custom effects.

VolumeEffect.h - this is the public header file that was generated and named according to the *General Information* section. In particular, the filename comes from the *cppClass* field. You will likely modify this generated file when creating your own custom effects, but for now no edits are necessary.

VolumeEffectBase.cpp - this private source file is auto-generated according to the data entered in the *Effect Creator* application. You should never edit this file as it is completely regenerated each time the **GEN** button is clicked.

VolumeEffect.cpp - this private source file is the primary implementation of the effect. It contains all the implementation for all the functions declared in the public header file. Normally this file is generated once you have set up all your controls. Then, you edit it to add any custom functions. This is also where you will change the audio processing loop (a function called *update()*) from the default volume control to your actual audio algorithm. For now, the default audio volume pedal with bypass is sufficient.

Step 4 - Build the Effect Package

Click the **BUILD** button to create the effect package.

The *Effect Creator* application has the compiler built right into the application so you don't need to install any compilation tools or worry about configuring compiler settings.

The **BUILD** button will attempt to compile the effect for the pedal hardware using the source files generated in the previous step. Since we haven't modified anything, there shouldn't be any compilation errors. After successful compilation, a linker test will also run to ensure the effect is built properly.
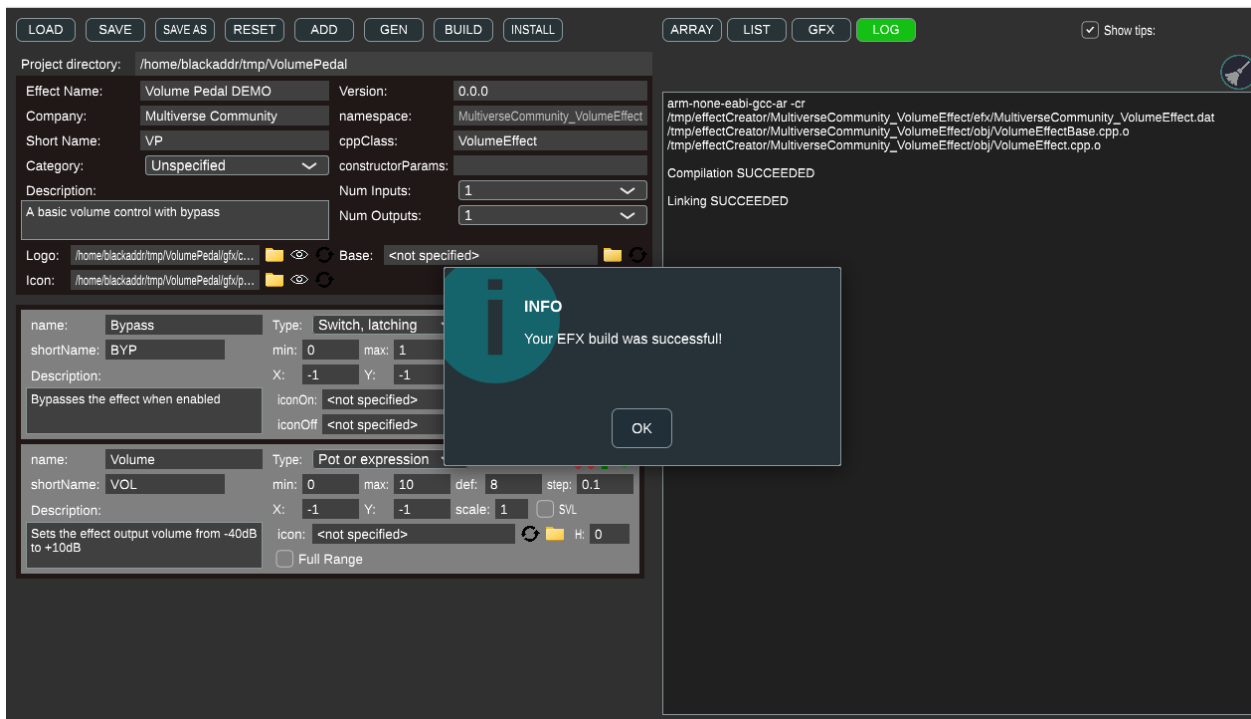

If the **BUILD** is successful, you will see a popup message indicating the EFX is built. The *Multi-function Viewer* will also automatically switch to the **LOG** view, which shows the output of the compilation. If errors occur, the information will appear in the **LOG** view.

Step 5 - Install the EFX Package

Normally, EFX files are downloaded from the Aviate Audio webstore and imported into the Pedalboard Designer application by users. However, for developers we can install them directly from *Effect Creator* using the **INSTALL** button.

You will see a popup message indicating the effect has been installed to your *Aviate Audio Designer* in the *Effect Library*.
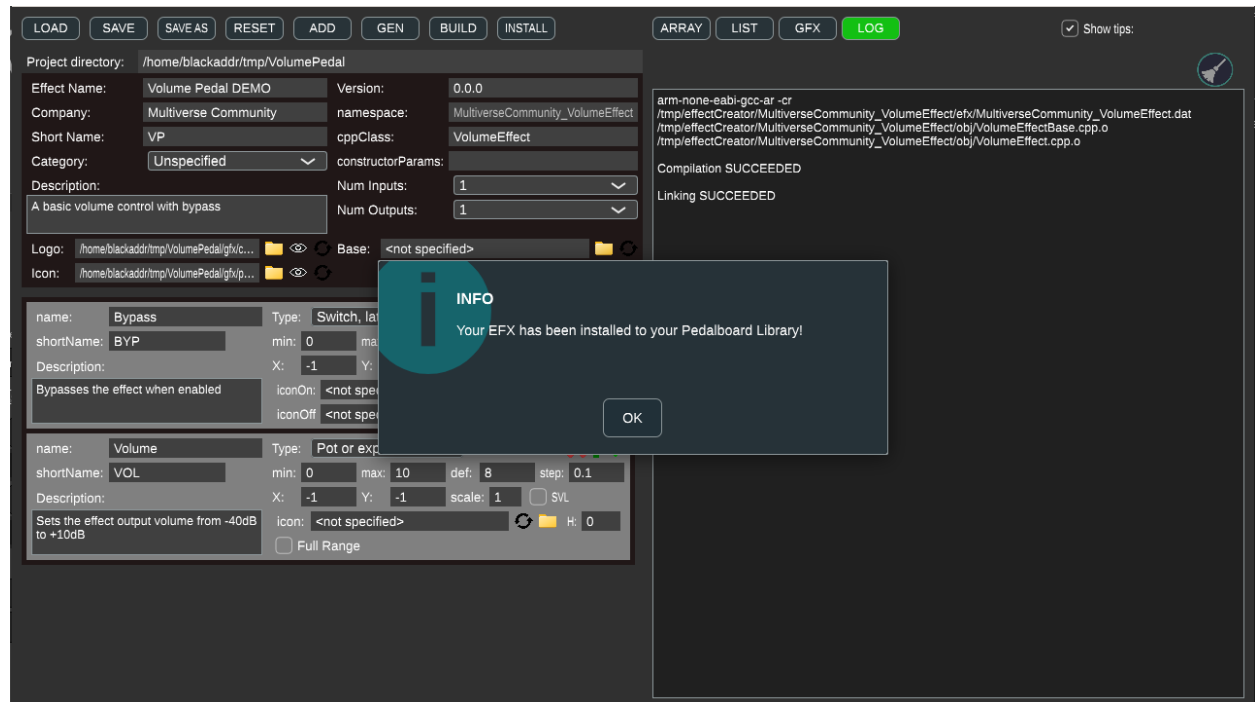

Step 6 - Programming the Multiverse Pedal

i) Launch your *Pedalboard Designer* application and you should see your newly created effect in the *Effect Library* section. The default effect uses a default pedal icon, but you can alter this when you create your own effects using a pre-made icon from the *Multiverse Gallery* or creating your own custom one.

ii) You can right-click on the effect icon in the *Effect Library* area to call up the information for your effect.
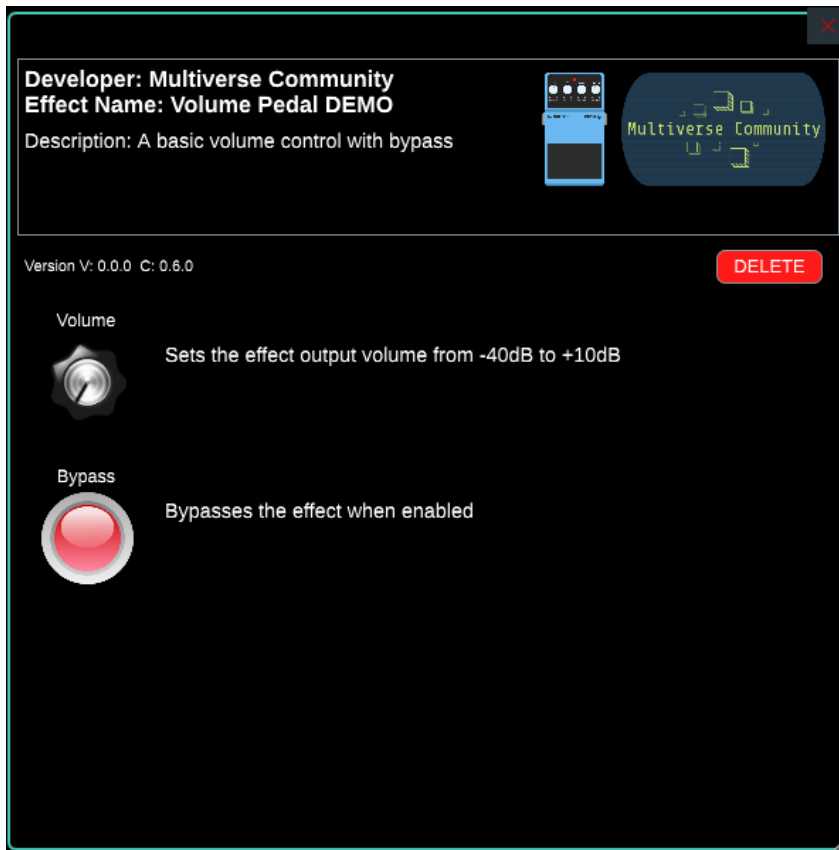

The information was created using the data fields in the Effect Creator application. If you do not provide a custom company logo, the *Effect Creator* will use the Multiverse Community logo and a default blue pedal icon.

iii) Close the window by clicking on the 'X' in the top-right corner.

iv) Left-click to drag the **INPUT** effect, **Volume Pedal** and **OUTPUT** effect icons onto the *Pedalboard*. Place them adjacent to each other as shown in the image below. Ensure the routing mode is set to **AUTO** to automatically create patch cables between them.
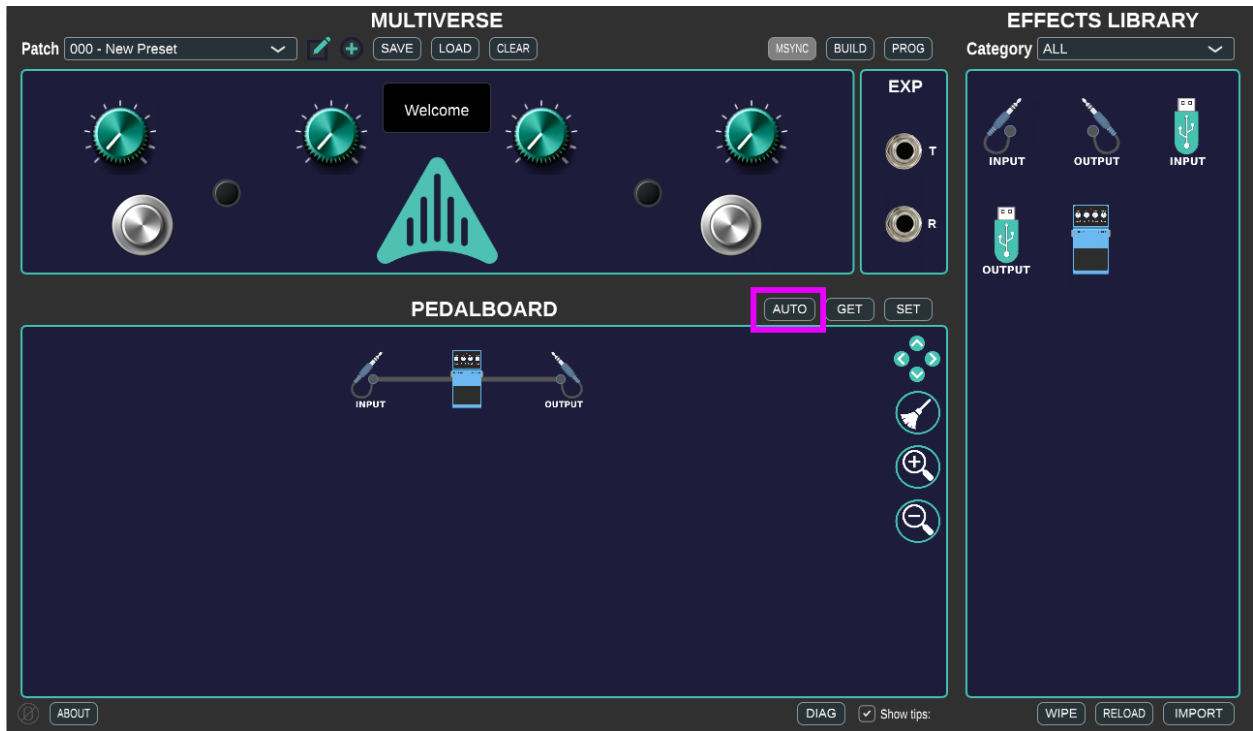
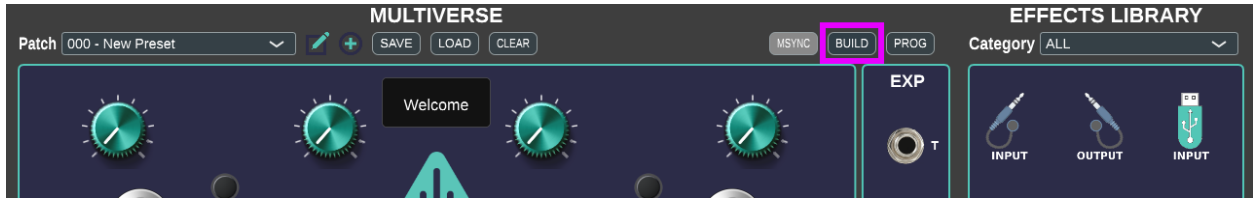v) Click the **SET** button to save the virtual pedalboard / patch.
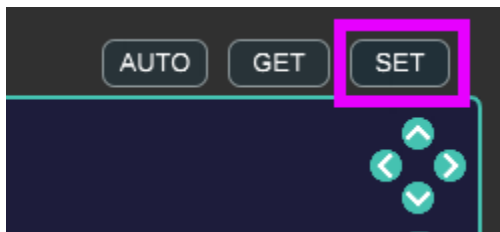
You will see a popup notification that the pedalboard has been saved.
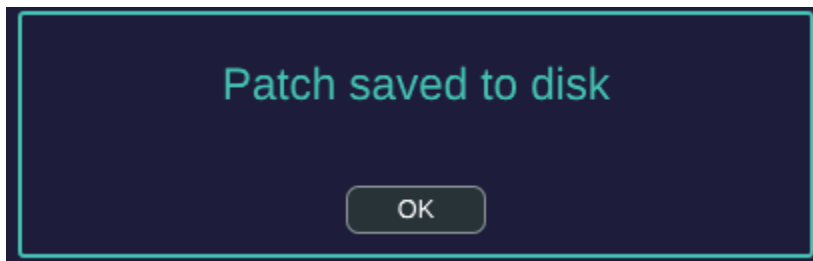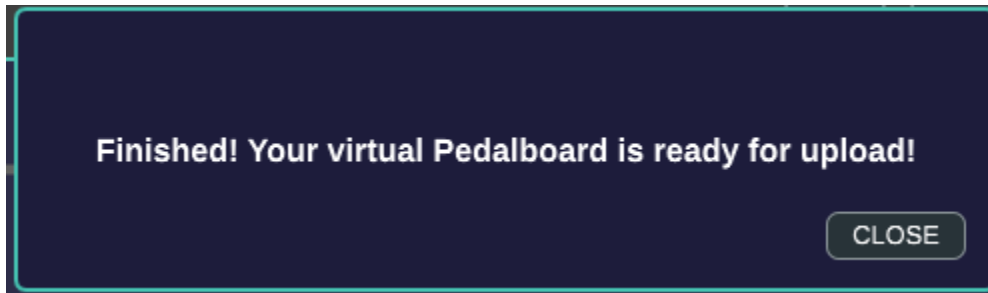

vi) Acknowledge the message by clicking **OK**.

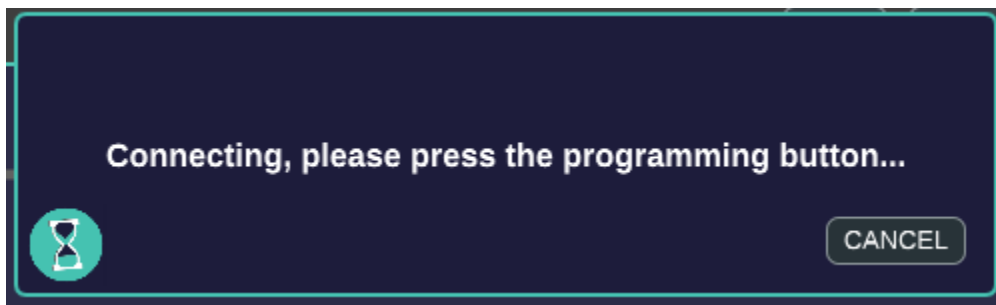vii) Click the **BUILD** button near the top to create the virtual pedalboard.

You should receive a popup indicating success.

viii) Click the **CLOSE** button and connect the USB cable between your Multiverse hardware pedal and your computer running the *Pedalboard Designer* application.

ix) Click the **PROG** button in the application.

x) Press the hardware **PROG** button *on the side of the Multiverse hardware pedal*. You will see a message that the pedalboard is being uploaded followed by a success message if no problems occur.
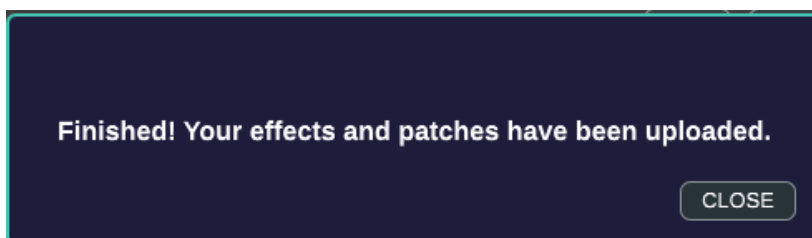
xi) Click the **CLOSE** button.

Step 7 - Controlling Effects

The easiest way to control your effects running on the hardware pedal is to use the *Multiverse Designer* application, but of course you can always run the hardware pedal without the need for the software application, including adjusting your effect parameters using the hardware knobs and switches. For details, see the *Aviate Audio Designer User Guide*.

Once you have built and programmed your virtual pedalboard to the Multiverse hardware pedal, you should see the MSYNC button colored green to indicate the hardware and application are communicating and synchronized to the same pedalboard patch.

If you right-click on the **Volume Pedal** icon on the *Pedalboard Area* this time (not the *Effect Library* area), you will see the *Effect Control Window* for that effect.
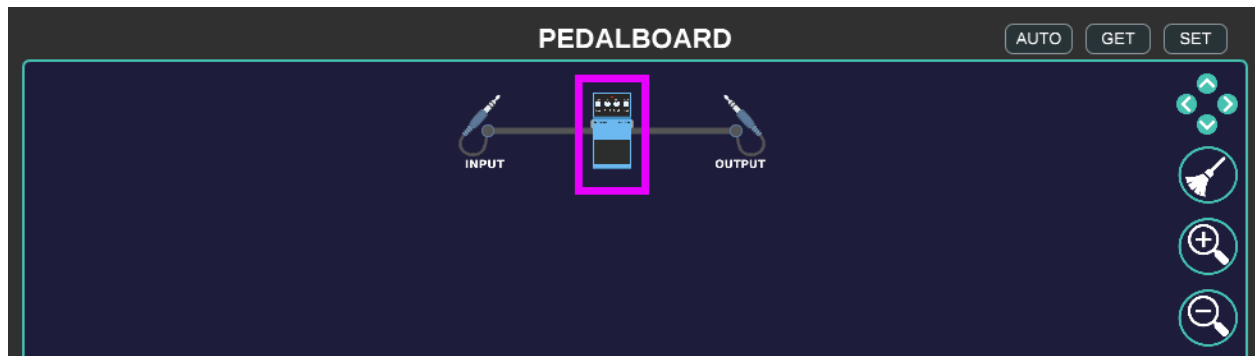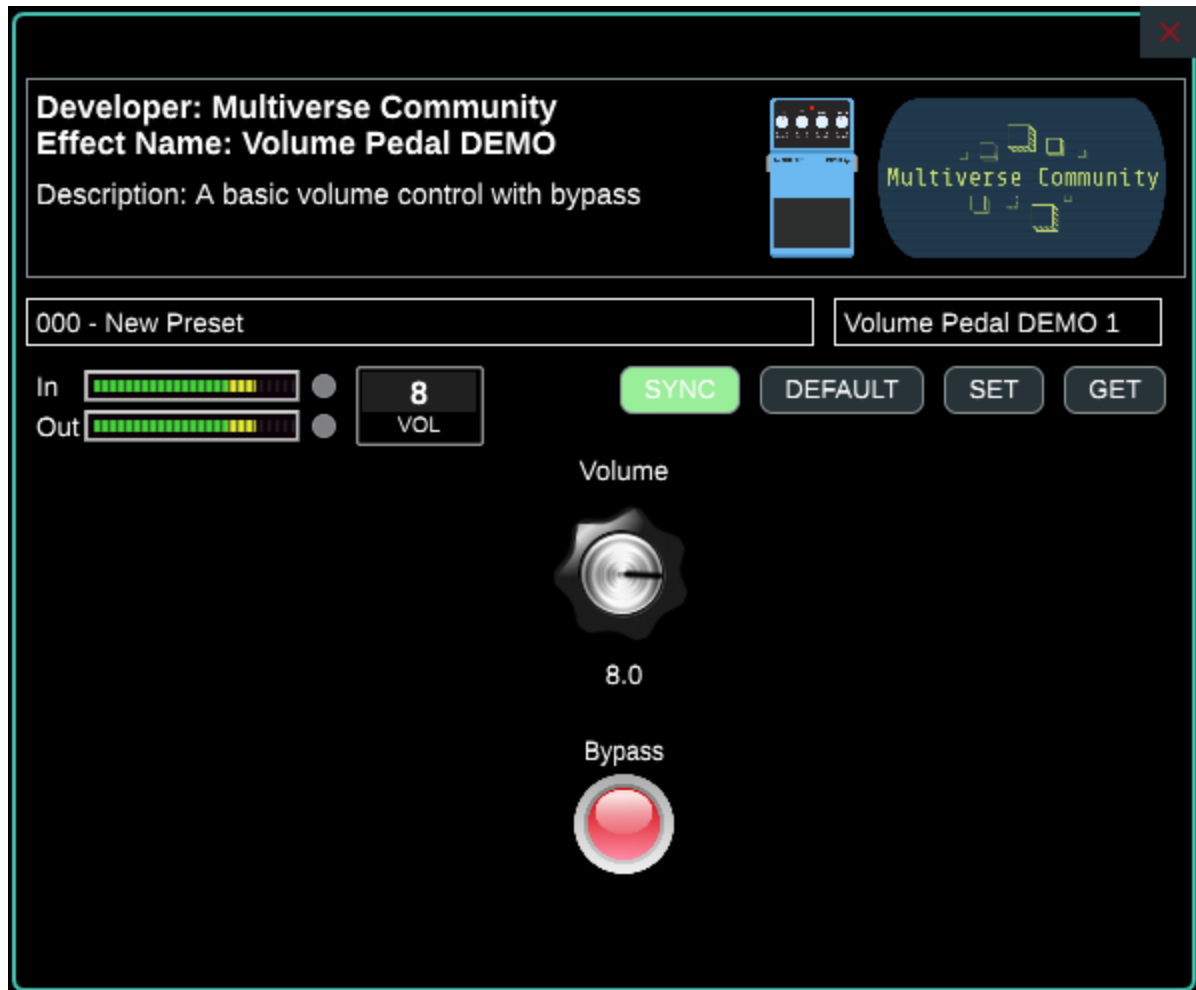
The sound level meters in the top left labeled *In / Out* show the volume level of the input channel 0 and output channel 0 on the effect for basic monitoring.

Try adjusting the volume knob and bypass button. They will control the volume on the hardware pedal in real time, and whether the volume control is active or bypassed. As you adjust controls, you will also see the OLED display on the hardware pedal showing effect control changes, using both their name, and the value.

Summary

The purpose of this Quick Start Guide is to familiarize yourself with the essential steps to create an effect and get it running on the Multiverse hardware pedal. By creating a simple effect that works immediately without modification, you have a solid foundation on which to experiment with building your own effects.

This guide barely scratches the surface of what you can do as a Multiverse Developer. Please review the *Effect Creator User Guide* and *Pedalboard Designer User Guide* for complete instructions and documentation.

Thank You

Welcome to the Multiverse Community! The Aviate Audio crew is very excited to see *your* creativity in action, creating boutique digital effect pedals, and sharing your creations with each other Multiverse pedal user.

If you need support, please contact the Aviate Audio team and we will be happy to assist you.

Email: **contactus@aviateaudio.com**

Or join the 'Aviate Audio Multiverse' community Discord (https://discord.gg/B9jRYKUS).