Audiofab USB Programmer

High-speed USB programming for the FV-1
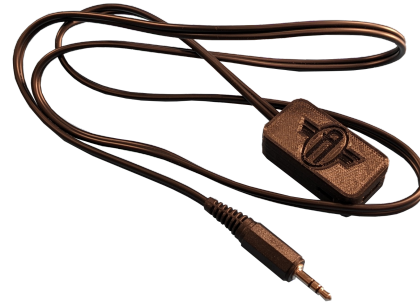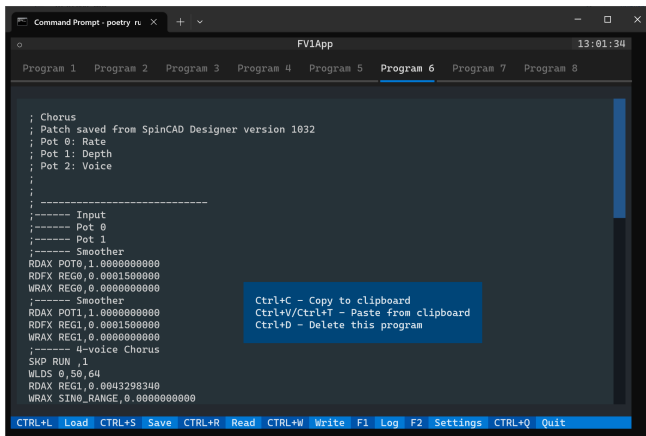

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Introduction

The Audiofab USB programmer is a USB-based programming interface designed to work with the Audiofab Easy Spin pedal. In combination with the FV-1 programming software (fv1_programmer, available as a free download), it provides a fast and convenient way to assemble FV-1 programs and load them into the Audiofab Easy Spin pedal.

The hardware portion of the Audiofab USB programmer can be purchased from Audiofab -- please visit our store. You will need to provide your own USB-A to USB-C cable (or USB-C to USB-C cable -- the cable needed depends on your computer) to connect the Audiofab USB programmer to your computer.

The FV-1 programming software can be downloaded and installed from https://pypi.org/project/fv1-programmer/.

You will need a computer with a USB port (at least USB 2.0) running Windows 10 or above, Mac OS X 10.7 (or later) or a Linux distribution with a kernel that supports USB CDC class drivers.

Audiofab USB Programmer Features

- Compatible with many operating systems
- No drivers to load (for newer operating systems)
- Super fast
- Easy to use

FV-1 Programming Software Features

- Simple to use and upgrade
- Integrated assembler
- Super fast programming
- Selective programming (programs all FV-1 "slots" or only a few)
- Able to save and reload banks of programs
- Compatible with output from SpinCAD or raw assembler

FV-1 Programming Software

Installation

This software requires Python 3.8 or greater, so if you do not have Python installed, begin by downloading and installing the latest version of Python for your operating system from the [Python website](#).

Next, install the `fv1-programmer` module. The easiest way to install this utility is with Python's built-in pip (NOTE: this will also install a bunch of dependencies directly into your Python environment):

```
pip install fv1-programmer
```

If you care about a clean Python environment, a better alternative to install this utility is to first install [pipx](#), and then install it with:

```
pipx install fv1-programmer
```

Either way, you will now have a `fv1_programmer` command on your path, which you can run in a terminal. If you are using Windows 10, we recommend downloading and using [Windows Terminal](#) from the Microsoft Store as it provides a better experience compared to the standard Windows Command Line. Windows Terminal is the default for Windows 11 so there is no need to download it.

To run the software, open a command line window and run the programming software by typing `fv1_programmer` and hit ENTER. (Alternatively, you can create a desktop shortcut to the fv1_programmer and simply double click it.) This will start the FV-1 programming software.

Upgrading

Once you have the software installed, it is very simple to update it to the latest version whenever a new release is available.

If you installed the software with `pip`, you can upgrade it by running:
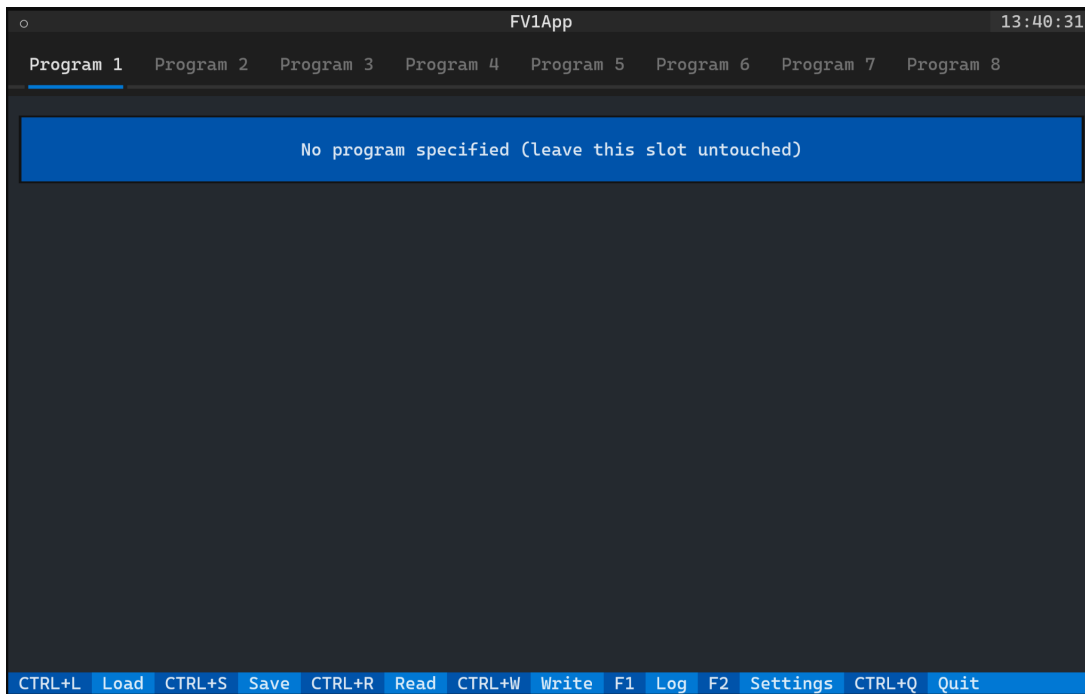
```
pip install -U fv1-programmer
```

If you installed the software with `pipx`, you can upgrade it by running:

`pipx upgrade fv1-programmer`

Use

Once fv1_programmer is running, you will see the main screen

Paste an assembly file into the window (download and copy from a text editor or if using SpinCAD, choose "File | Copy ASM to Clipboard" and then paste it into the Window using either CTRL-V (or on Windows Terminal CTRL-T).

If the file pastes successfully, it will automatically assemble (using [asfv1](#)) and be ready for download to the Easy Spin. If there are any input file errors or assembler errors, you will be shown a message saying "Ignoring invalid clipboard contents. See log for details". You can click on the "Log" button in the lower toolbar or press F1 to see what happened and fix it.

You can switch between the different FV-1 programming "slots" by clicking on the Program 1, Program 2 etc. in the top toolbar. Empty program slots or ones that contain invalid code are ignored.

Available commands are as follows:

Command	Action
Load (CTRL+L)	Load a saved bank of Programs from a folder on disk
Save (CTRL+S)	Save a bank of Programs to a file on disk
Read (CTRL+R)	Read the contents of EEPROM and disassemble the binary contents into the 8 program slots.
Write (CTRL+W)	Write all valid Programs to EEPROM in their corresponding "slots" -- invalid Programs are ignored
CTRL+V (or CTRL+T)	Paste FV-1 assembly code from the clipboard into a Program slot (note that CTRL+T is included because Windows Terminal does not support CTRL+V)
Log (F1)	Show the log -- this is useful if you encounter any errors
Settings (F2)	Show the settings tab (note that you may need to increase the size of the window vertically to see all settings)
Quit (CTRL+Q)	Quit the program and return to the command line

Settings

Opening the settings window will show a sidebar like this:
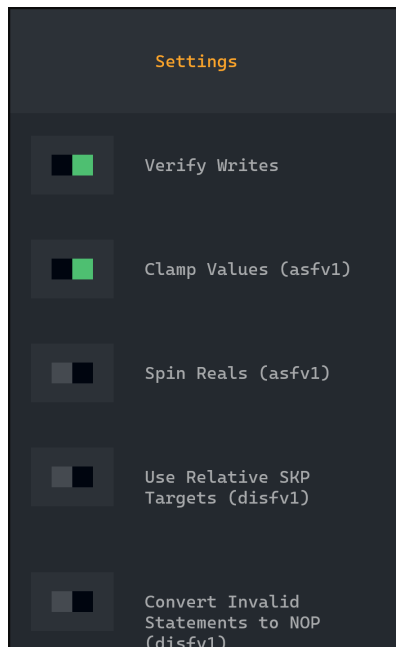
The settings are as follows:

Setting	Purpose
Verify Writes	After downloading all valid programs, the contents of EEPROM are read back to verify the EEPROM write operation succeeded.
Clamp values (asfv1)	Clamp out of range instruction operand values without error. A warning message is printed for each clamped operand.
Spin Reals (asfv1)	Interpret integer literals 1 and 2 as 1.0 and 2.0 respectively. This option should be used with SpinASM assembly.
Use Relative SKP Targets (disfv1)	Skip offsets are automatically replaced with labels. This option will suppress labels and instead get the offset.
Convert Invalid Statements to NOP (disfv1)	Invalid instructions are disassembled as 'raw' instructions. Use this option to replace them with 'nop' instead.

Programming Your Pedal

Once you have completed the installation outlined above, you can connect the Audiofab USB programmer to the Easy Spin pedal using the ⅛" mini jack. Then, connect the Audiofab USB programmer to your PC using a USB cable (note that you need to provide the USB cable).

The Easy Spin pedal needs to be powered when programming. We recommend connecting an external 9 volt DC power supply to the Easy Spin. However, if this is not possible you can program the Easy Spin using the internal 9 volt battery -- just make sure that you have a good (fresh) battery installed and that you insert a ¼" jack into the input plug on the Easy Spin to enable power. (Note that plugging into the input jack is not required when you use an external 9 volt power supply.)

Once you have successfully loaded (and automatically assembled) the programs you want, simply click on CTRL+W (or press CTRL+W) to write the EEPROM. The software will tell you which slots had valid programs and were programmed.

In summary, the steps for programming are as follows:

1. Boot your PC
2. Connect the Audiofab USB programmer to the Easy Spin pedal using the ⅛" mini jack
3. Connect the Audiofab USB programmer to your PC using a USB cable (note that you need to provide the USB cable)
4. Power the Easy Spin pedal with (a) a external 9V DC adapter (preferred) or (b) use the internal 9V battery (ensure it is "fresh") and plug a ¼" jack into the input jack of the pedal
5. Open a terminal window
6. Run fv1_programmer
7. Load the assembly files you want into each of the Program windows
8. Write the EEPROM (by clicking "Write EEPROM" or pressing CTRL+W)
9. Disconnect the USB cable from the computer and then the ⅛" mini jack from the programming port on the Easy Spin pedal.
10. Power cycle the pedal by disconnecting the DC adapter or removing the input jack

Troubleshooting

If something goes wrong, press F1 to examine the log. The messages should help you to address the error. Once it is corrected, you can try again.

One difference we've noted between the SpinASM assembled and asfv1 is the symbols used for right and left shifting. If you are porting SpinASM code you will need to change these as shown below.

	SpinASM	**asfv1**
Right shift	>	>>
Left shift	<	<<

Credits

fv1_programmer uses:

● [Textual Rapid Application Development framework](#) for Python
● FV-1 assembler ([asfv1](#)) and disassembler ([disfv1](#))

Thanks to the developers of these amazing utilities!

Terms

Other than this documentation, Audiofab does not provide any direct support for our projects. You will need some pedal building experience before building one of our pedals.

No refunds or replacements are offered unless it can be shown that our documentation or the circuit contain a reproducible error.

You are free to use our projects for any purpose, provided you retain our copyright notices and give appropriate attribution to Audiofab.

Revision History

Version	Date	Comments
1.0	August 14, 2023	Initial release