Axe-FX For the Recording Musician

A Guide To Recording Your Axe-FX

The Axe-FX is an excellent choice for a guitar processor to use in the studio. It not only sounds exceptional, but it has a number of features that make it great for recording. These features make the Axe-FX quite flexible, but this flexibility can also be a bit daunting when first starting out. You're faced with so many rig configuration choices that it can sometimes be a struggle to determine how best to set it up to meet your particular needs.

In this document, I present five configurations for recording the Axe-FX, proceeding from simpler to more complex. Each one is accompanied by a discussion to help you choose the configuration that is best for you, and instructions on how to build the rig, including cabling and setup steps to perform on your computer.

There are many ways to configure a recording rig for use with the Axe-FX, including variations on the ones included here and others not covered here at all, but I consider these to be the most useful options and a good place to start.

I would recommend starting with the simplest configuration first, even if you know it doesn't meet all your needs. Starting out by getting something working, no matter how simple, is always a good way to begin so you can build the confidence you'll need when progressing to more complex options.

In addition, I've included a section at the end which covers miscellaneous recording topics.

1. Basic Recording Configuration

The first thing to understand when connecting your Axe-FX to a computer is that the Axe-FX is a robust audio interface. You can record your guitar by simply connecting your Axe-FX directly to your computer using a usb cable. No dedicated audio interface is needed. (Note I'm using "Axe-FX" to refer to the Axe-FX, FM3 and FM9. If there are specific exceptions to this below, I'll mention them).

Simply plug in your guitar to the instrument input, connect your Axe-FX to the computer with a usb cable (on the FM3 use the USB-B port), open up your DAW and set the input channels to usb 1/2 and the output
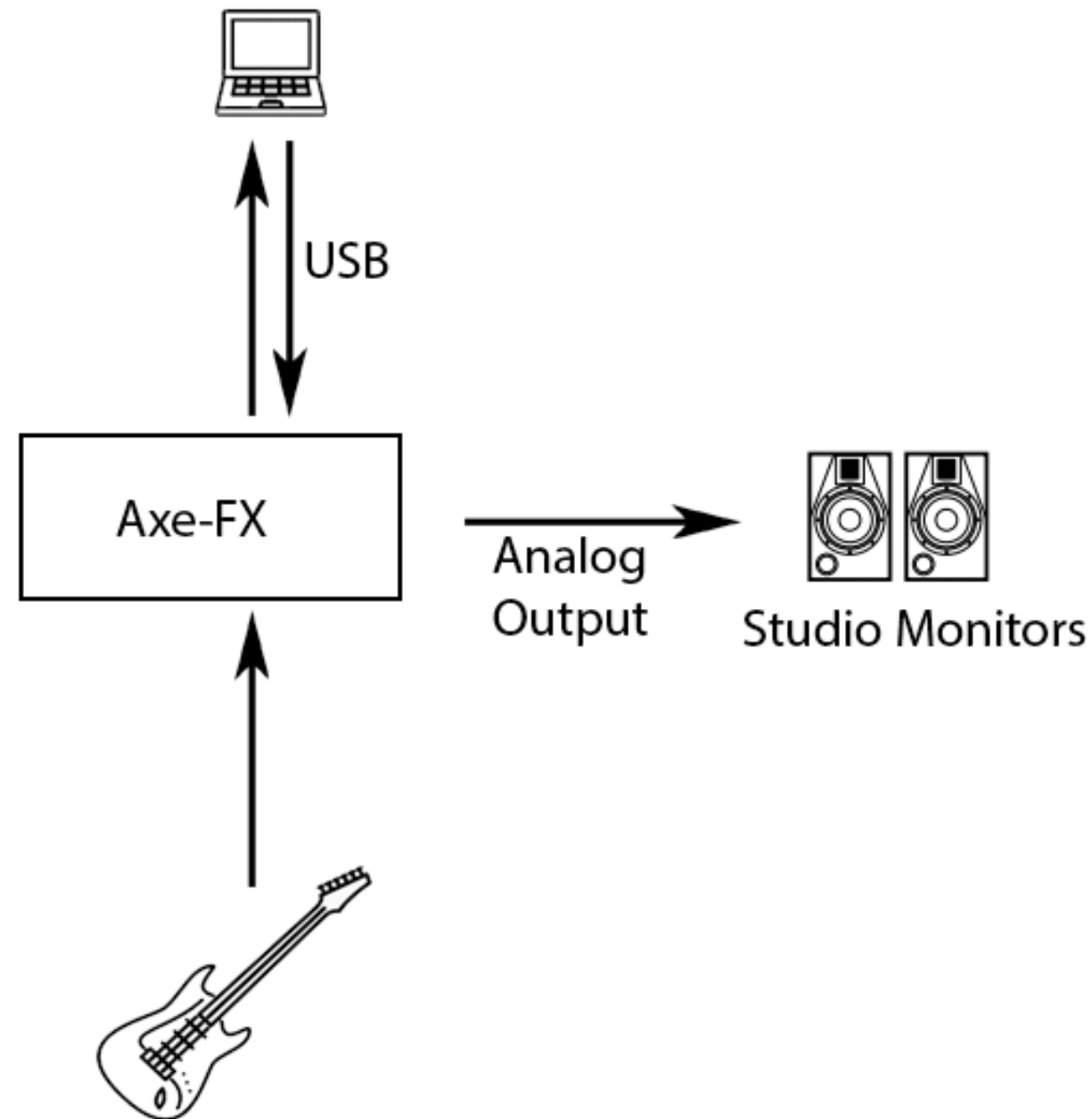
Figure 1. A simple basic Axe-FX configuration for recording guitar

channels to 1/2. In addition, choose the Axe-FX as your system audio device. (On Windows, first install the USB driver) Connect your studio monitors to the Axe-FX output 1 jacks and you're ready to go.

Arm an audio track in your DAW, adjust your preset output level so it registers about -10 dB in your DAW's input meter, turn off input monitoring, hit record, and play. Your performance will be recorded as pristine digital audio with no intervening conversion to analog which can harm the fidelity of the sound. After you're done recording, rewind and hit play to listen to what you recorded. The audio will go to the Axe-FX and from there to your studio monitors so you hear the playback.

Listen to system audio on your computer, for example youtube, and again the audio will go through your Axe-FX and to your studio monitors so you can hear the audio.

To adjust the overall output level, use the output knob on the front of your Axe-FX. To adjust just the playback audio coming from the computer and not your guitar playing, use the USB level control on the I/O page. You can put this on a performance page control so you have a convenient knob to use to adjust it.

Between the output level knob which adjusts the overall level, including both guitar and computer, and the usb level control, which adjusts only computer audio level, you can balance the levels of computer audio and guitar audio.

This is a complete guitar recording rig. Not only can you record guitar, but you can also re-amp that recording.

The basic idea to re-amping is: when you record, you record a second track with input from usb channel 5 (channel 3 on the FM3) at the same time that you record the processed output from the Axe-FX. This second track will have the DI (Direct Inject), which is the audio from your guitar before it is processed by the Axe-FX.

By doing this, you can record without committing to a final guitar tone because you can send the DI back through the Axe-FX at a later time to experiment with different presets. This frees you to record a guitar performance without worrying about whether you have the right tone dialed in. You can keep the processed audio you recorded or you can re-amp to replace it with a different tone. Record now, choose the tone later.

You'll find re-amping instructions in the user manual, but here's a brief description of the process: Send the output of your DI track to the Axe-FX via usb channel 5 (on the FM3 use 3). On the Axe-FX, go to the I/O settings and set Input 1 source to digital and digital input to usb. Play your DI audio and record the Axe-FX onto a new track.

2. More Versatile Configuration

The configuration option above works great for recording guitar and listening to computer system audio. However, it has one shortcoming: you must have the Axe-FX connected and turned on to listen to system audio. What if you want to listen to system audio when you don't have the Axe-FX turned on? Here's one way this can be done.

With this configuration, you'll use your computer headphone output for system audio and use a line mixer to share your studio monitors between your computer headphone out and your Axe-FX. In other words, connect both the Axe-FX output 1 ports and the computer headphone
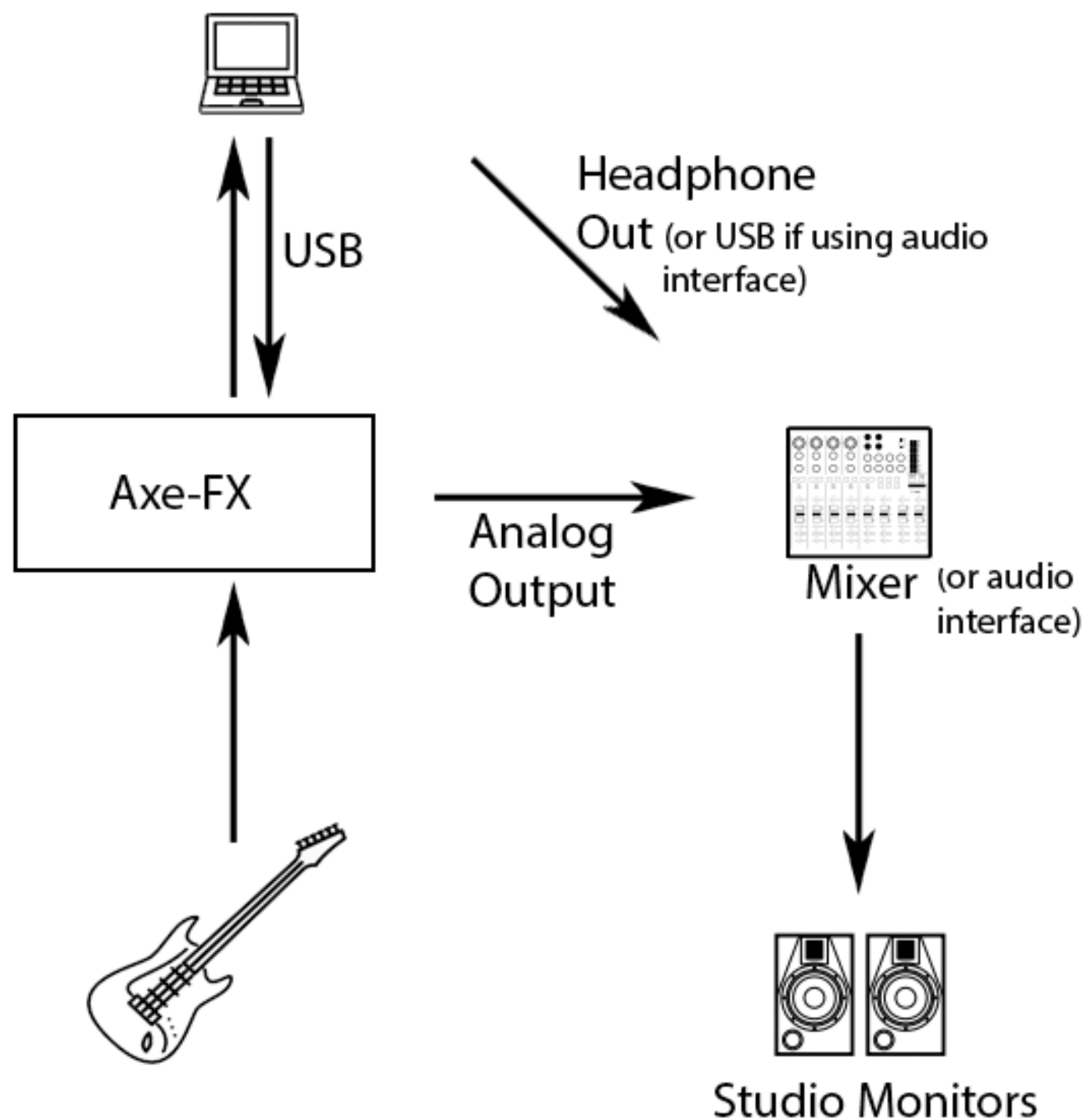
Figure 2. A more versatile configuration that doesn't require the Axe-FX for system audio

out to to channels on a mixer and connect the mixer output to the studio monitors. You can use a small inexpensive stereo line mixer like a Mackie Mix 5 that costs less than $60. Or you can use a nice rackmount line mixer like a Samson SM10 that runs $200.

You still use the Axe-FX as your audio device in your DAW, but set your system audio device to the headphone out and you can listen to system audio even when your Axe-FX is turned off. The digital to analog converters in computers are quite good these days, so you can get good results from this. This also gives you convenient mixer knobs for balancing computer and Axe-FX levels and can be used to route

audio to different places in your studio.

Note that you can also use an amp modeling plugin with this configuration. To use a plugin in place of the Axe-FX, just insert the plugin into your DI track, turn on input monitoring on that DI track, and mute the grid output in the Axe-FX (for example turn the amp block output level all the way down).

If you'd prefer to not use the headphone output of your computer, a useful variation on this configuration is to use an audio interface in place of the mixer, which you connect to your computer via USB.

3. More Inputs into Axe-FX

Configuration option #2 is a robust guitar recording system. But, what if you want to record other things besides just a guitar? One answer is to take advantage of the extra inputs on the Axe-FX. For example, if you want to record a microphone, use a secondary input. You can even accommodate the microphone in the Axe-FX grid. The Tube Pre model works well with microphones, the cab block has a mic pre emulator, and the compressor block is useful for microphone input, but it isn't necessary to use any of those blocks to process microphone input.

One limitation with this configuration is that the Axe-FX does not supply
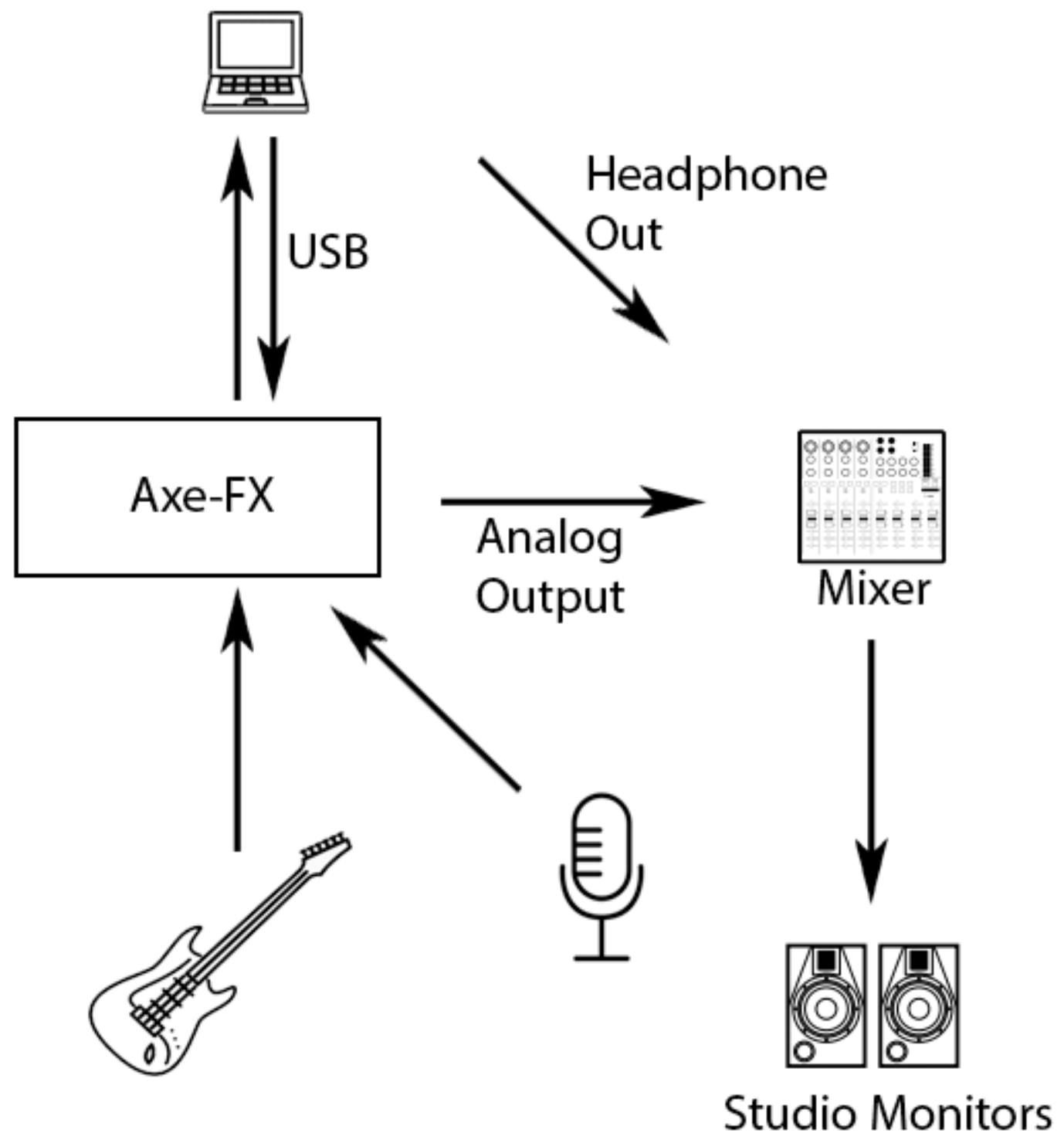

Figure 3. Using the Axe-FX to record additional audio inputs

phantom power, so if you need that for your mic, you'll have to use a phantom power adapter (Rolls makes one that is quite popular) to supply the phantom power to your mic.

As with all of these configuration options, you can plug headphones into the device connected to your studio monitors (in this case, the mixer) to listen on headphones instead of speakers.

4. Axe-FX/Interface Aggregate

The Axe-FX can handle microphone input, but considering the limitations mentioned above, it's not ideal. Using a proper audio interface with mic pres and phantom power can be more convenient in many cases. How do you integrate an audio interface with an Axe-FX into your recording rig? After all, DAWs only permit a single device for input, so how do

you get input from multiple devices? If you're on a Mac, aggregate devices offer a good solution for this dilemma.

Aggregate devices are virtual devices that combine multiple physical devices. For example, you create a single aggregate device which contains both the Axe-FX and your audio interface. Connect both your Axe-FX and your audio interface to usb ports on your Mac and choose

the aggregate device for audio in your DAW and you have access to all the inputs and outputs of your Axe-FX and your audio interface. Record guitar from the Axe-FX into one track and record a mic from the audio interface on another track.

To create an aggregate device, use the Audio Midi Setup app. Click the "+" in the audio window to create an aggregate device and check "use" for both the Axe-FX and the audio

interface to include both of them in the aggregate. It usually works best to choose the Axe-FX as the clock source and enable drift correction for the audio interface.

Connect the analog out of the Axe-FX to analog inputs on your audio interface so the audio interface can replace the mixer that was used in the previous configuration to share your studio monitors between two different outputs.
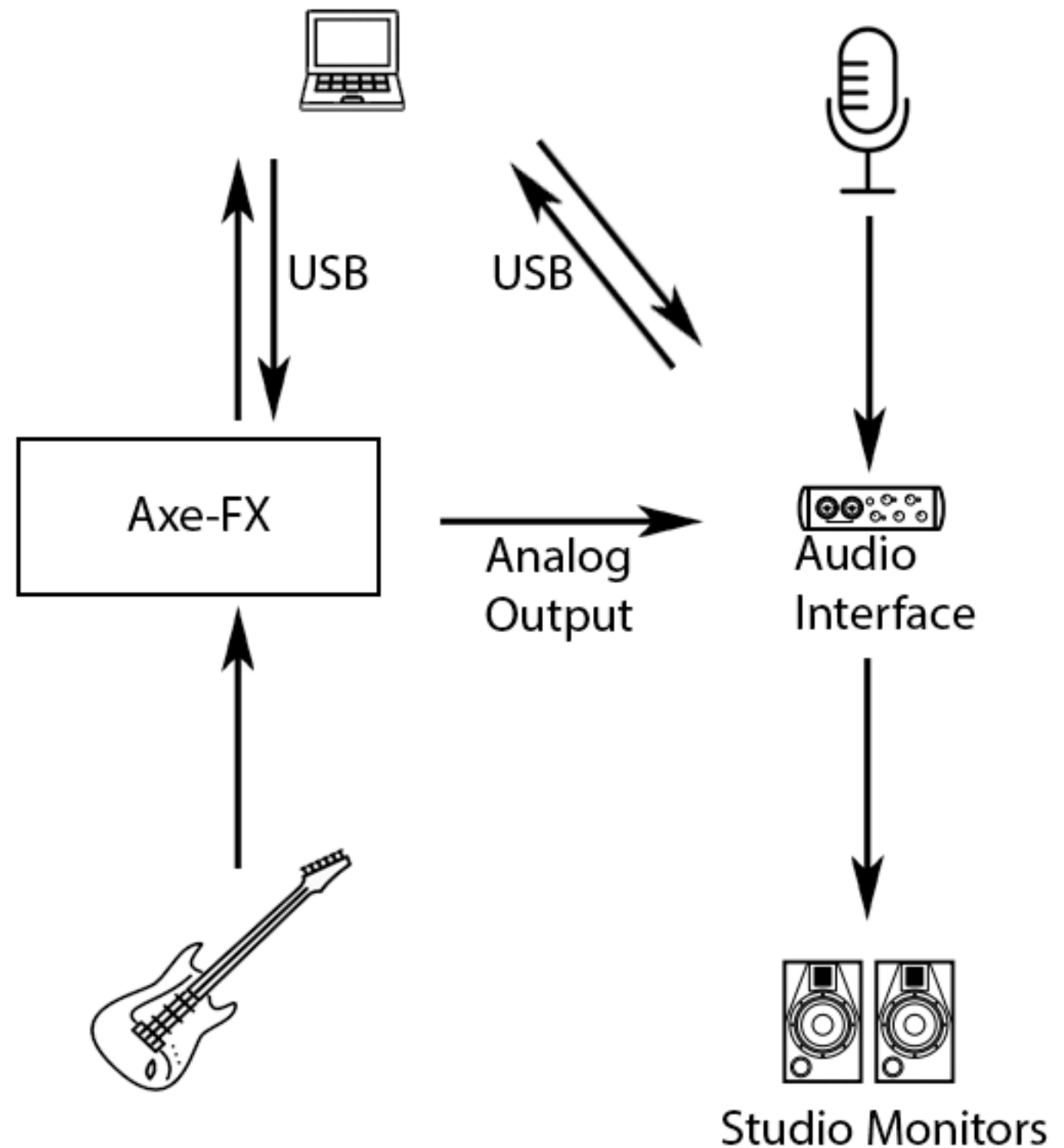

Figure 4. Using an Axe-FX and an audio interface together as an aggregate device

5. More Inputs Using Interface

What if you want to record multiple inputs, but you're not on a Mac or would prefer to not use an aggregate? No problem. This configuration is a little more complex, but it works quite well, and still allows you to record a DI for re-amping.

Plug your guitar into your audio interface instead of your Axe-FX. Use your audio interface software to route that guitar input to both the computer via usb for recording DI tracks and to the Axe-FX via spdif for processing. In the Axe-FX I/O audio settings, choose spdif for the word clock (and set your audio interface to use internal clock and the sample
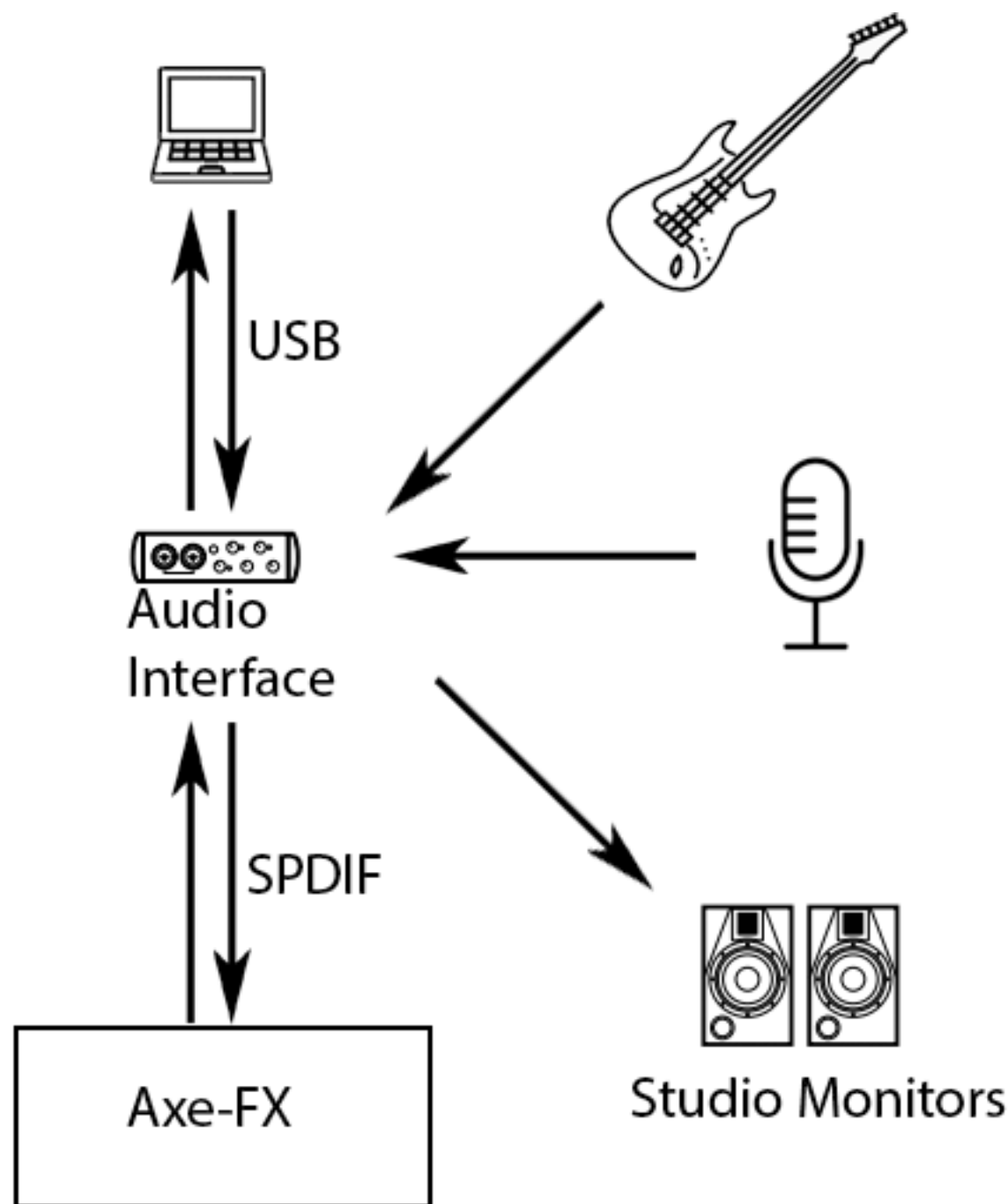

Figure 5. Connecting Axe-FX to computer via an audio interface

rate to 48 kHz), output 1 for the spdif source, digital input for Input 1 and spdif as the digital source. Send the processed audio out to the audio interface via spdif. From there, the processed audio is sent to the computer via usb channels so it can be recorded. In addition, send processed audio that came into the audio interface via spdif to your studio monitors for monitoring so you can hear yourself playing guitar.

It's important to balance levels when working with spdif. Using your interface's input gain control, watch the input meter on the DI track in your DAW and adjust the DI signal so it is strong, but not clipping. Then adjust the spdif input level on the

Axe-FX I/O USB/AES page so the level coming into the grid matches the level you get when you plug your guitar directly into the Axe-FX. This ensures your presets sound correct and also ensures a good signal-to-noise ratio. You can attach an unused Out3 or Out4 block to the Input block and use the meter on that Out block to measure the level for the two different cases (spdif input to the Axe-FX and plugging your guitar into the Axe-FX) to make sure the levels match. Typically you'll need to set the spdif input level parameter to about -20 dB.

When it is time to re-amp, simply change the source of the spdif output in your audio interface to the

usb channel you're sending the DI to in your DAW.

This allows you to use a single audio device, the audio interface, from your DAW. That single device will have inputs for the Axe-FX DI and the Axe-FX processed audio, plus anything you have plugged into the audio interface, like a microphone. That means this will allow you record multiple inputs into your DAW.

Unfortunately, the FM3 lacks spdif input, so this doesn't work quite as well on the FM3. You'll have to use an analog output to send audio to the FM3 from the audio interface instead of spdif.

Other Topics

DIRECT MONITORING

A key feature of all the configurations described above is the ability to do direct monitoring of your Axe-FX. That means, when playing your guitar, audio goes from your Axe-FX direct to your studio monitors without passing through the computer.

This is important since any time the computer is in in the signal path, you'll incur latency and the delayed audio that results from that latency can be disorienting when you are trying to hear yourself while you're playing.

To avoid this, make sure your configuration includes a path directly from the Axe-FX to your studio monitors and disable any input monitoring in your DAW. That way you can hear yourself playing without annoying delays, but still record your guitar audio.

Note that one benefit of direct monitoring is that latency doesn't matter when recording your Axe-FX. You can set the audio buffer in your DAW to a large size, thus saving on cpu, yet record your Axe-FX without any noticeable latency. You may still want the buffer size to be reasonably small to minimize latency when using virtual instruments, but direct monitoring eliminates the need for very small buffer sizes of less than 64 samples or so.

LATENCY COMPENSATION

By using direct monitoring, you avoid the delay when listening to yourself playing, but the inevitable latency that comes with computer audio will still be present when you record your guitar into your DAW. However, all DAWs are smart enough to deal with this and apply a latency compensation so your guitar audio is aligned properly with tracks you are listening to, for example drums, while recording.

Unfortunately, for reasons that are not clear, the amount of compensation that is applied when recording an Axe-FX is incorrect. It appears to be some problem with the communication between the Axe-FX and the computer even though this problem does not occur with other audio interfaces. The result is your guitar audio will be slightly delayed in relation to other tracks in your project.

To solve this, you need to go to the preferences in your DAW and set the manual compensation value (the name of this preference differs between DAWs. Logic: "Recording Delay", Cubase: "Record Shift", Reaper: "Manual Offset"). This preference generally only needs to be set once.

Here's one way to measure the value you need to put in the preference setting: Convert any audio clip in your DAW to a click by trimming it to a length of just a few milliseconds. Send the output of that track to the Axe-FX, just as if you were re-amping, via usb channels 5/6 (on the FM3 use 3/4). On the Axe-FX, set Input 1 source to digital and digital input to usb. Play your click audio and record the Axe-FX onto a new track. Compare the two tracks to see if they are aligned properly. If not, set your DAW manual latency compensation preference to the amount of the difference and repeat the test to verify the audio aligns properly.

SAMPLE RATES

One quirk of the Axe-FX is the fixed output sample rate of 48 kHz. Other audio devices often offer options on the output sample rate, but no such luck with the Axe-FX. In practice though, this is rarely a problem.

First, if you have a choice of the sample rate to use in the project, choose 48 kHz. Even if you know you'll need to deliver 44.1 kHz audio at the end of the project, you can record at 48, then export to 44.1 when you render when you are done. The sample rate conversion performed when rendering or exporting is generally a high quality conversion.

Sometimes however, you don't have any choice in the project sample rate. For example, somebody else might be calling the shots on the project sample rate. In many DAWs, that's not a problem. You can still record 48 kHz audio and the DAW will either convert to your project sample rate (for example 44.1) while recording, or will record 48, but permit mixing that with 44.1 audio in the same project.

Some audio interfaces are capable of doing sample rate conversion on spdif input.

If all else fails and you're working on a non-48 kHz project and your DAW doesn't permit mixing sample rates, you can fall back to recording analog output from the Axe-FX into an audio interface. It's not ideal since the latency and and fidelity won't be as good as digital, and it becomes

difficult to do re-amping in that situation. But, as a last resort, it will work.

RECORD DI INTO SEPARATE TRACK OR ADDITIONAL CHANNEL ON SAME TRACK

A common way to record a DI is to dedicate a second track to the DI. Record the processed Axe-FX output on one mono or stereo track, and record the DI on a separate mono track. However, keeping those two tracks in sync when doing audio edits can be a challenge.

For example, if you are comping together a solo from multiple takes, you'll edit the processed audio to assemble a perfect performance. But

if you want to re-amp the DI later, the re-amp'ed audio won't have the edits you performed while comping.

One way to solve this problem is to record the processed audio and the DI into the same track. In other words, instead of one stereo processed track and a second mono DI track, record a single 3 channel track with 2 channels for the processed audio and 1 channel for the DI. (Alternatively, record 2 channels if your processed audio is mono: 1 for processed and 1 for DI). That way, any edits you make to the processed audio will also be made to the DI. When you re-amp later, you'll be re-amping the correctly edited version of the audio.

DI LEVELS

When you record a DI track, you'll notice the level is quite low compared to the processed audio. That's ok. That's what you want. The input to an amp has lower level than the output, and you want the DI to be a faithful rendering of the audio direct from the guitar so the Axe-FX will react to it just as if you were plugging your guitar into the Axe-FX.

This also means you should not change the DI level after recording it. In other words, in order to ensure it is a faithful recording of the guitar, do not adjust any levels on the DI audio while recording or while re-amping.

RECORD WET AND DRY

In addition to recording wet and DI tracks, it is sometimes useful to also record a dry track. This is a track that has the amp modeling from the Axe-FX, but excludes effects like delays and reverbs.

Recording a dry track lets you use the Axe-FX for amp modeling, but apply effects plugins in your DAW. It also makes audio editing easier in your DAW since effects like delays and reverbs often have undesirable artifacts after you edit audio.

To record a dry track: On the Axe-FX III, add an Output 2 block to the grid which bypasses delays and reverbs, then record that output into a DAW track which takes input from usb channels 3/4.

MONITOR THROUGH DAW

There might be occasions where you want to monitor through your DAW instead of direct monitoring. For example, you might have vst plugins that you want to use to process the audio coming from the Axe-FX and you want to hear those plugins while you play your guitar.

To do this, turn on input monitoring in your DAW and use your mixer (if you're using configuration 2 or 3) or your audio interface (if you're using configuration 4 or 5) to turn down the audio coming from the Axe-FX. If, however, you're using configuration 1, it's a little trickier. One option is to set the Output 1 mode (found in the I/O Audio settings) to "Mute".

You can also use the Axe-FX solely as an audio interface. To do this, set the track input in your DAW to channels 5/6 (3/4 on the FM3).