

Appendix D: USB interface

System Requirements

These are the minimum requirements for your computer system to use the mixer's USB interface.

For the PC:

- Windows XP (service pack 2)
- Pentium 4 or Athlon XP processor
- 256 MB RAM

For the Mac:

- OS X (10.4.11 or higher)
- G4 processor
- 256 MB RAM

The internal USB interface will allow the left and right main mix to be recorded on a Mac or PC computer. It also allows two channels of audio from the computer to be added to the main mix.

Plug and Play

No drivers or software installation is required. The ProFX mixer's USB interface connects directly to the USB port of your computer.

USB stream from computer

The following table shows the outputs from your computer to the mixer's USB interface:

From	To
Computer output 1	Main mix L
Computer output 2	Main mix R

The 2-channel digital stream from the computer enters the mixer through the USB connector and is converted to analog audio.

The audio level can be adjusted using the USB input control [40].



Beware of a possible feedback loop, if you are feeding the main mix back into the mixer.

USB stream to computer

In addition to a mix of channels, the USB output to your computer can contain audio from your computer, if the USB thru switch [41] is engaged.



The mains and headphone outputs are not affected by the switch, and always provide a full mix of channels and any 2-channel audio from your computer.

The analog audio from the mixer is converted to digital signals by the USB interface's A/D converters.

The following table shows the outputs to your computer from the mixer's USB interface:

To	From
Computer input 1	Left mix of channels including any audio from computer (thru switch in) or Left mix of channels without audio from computer (thru switch out)
Computer input 2	Right mix of channels including any audio from computer (thru switch in) or Right mix of channels without audio from computer (thru switch out)

Here are two examples of using the USB thru switch:

Studio Overdub – Traktion playback is coming into the mixer on USB inputs, and routing through the mains/phones for you to hear. A guitar plugged into channel 1 is being recorded via the USB output, while you listen and play along to the Traktion playback. The USB thru switch is out, so the output to be recorded on the computer contains all playing channels except the playback from the computer.

Live Performance – Computer playback software like Ableton Live is being mixed to the mains with other stereo sources such as synths, samplers, turntables, and CD-DJ players. The USB thru switch is engaged, so everything will be fed to the computer for recording the entire set with Ableton Live.

Recording with USB

The mixer's built-in USB connection allows overdub style recording to a Mac or PC digital audio workstation (DAW) through the USB cable.

Here are some steps showing how to record a first track, and then record additional tracks while monitoring ones that have already been recorded.

1. Connect to the mixer, the sound source you wish to record to your audio software, for example:
 - A microphone for a voice or instrument.
 - A line-level source such as an electronic keyboard.
 - An instrument connected directly to the instrument input 1 (with the hi-z switch [7] pressed in).
2. Make sure the USB thru switch [41] is not pressed in. This will ensure that during each recording pass, the audio software only receives the track-in-progress as an audio signal, and not the pre-existing mix from the computer as well.
3. Set the gain knob [20] at the top of the channel you are using, to an appropriate level for the source being recorded, using the level set LED [21] as a guide. Once the gain has been set, set the channel fader [31] to unity (U).

The signals going out to your computer are not affected by the main fader [48] or the headphones knob [42].

4. If you are recording an acoustic source through a microphone, monitor it through headphones, not through speakers. This will prevent sound from the speakers from leaking into the microphone. If working in this fashion, turn down the main fader, and instead turn up the phones knob for safe listening levels in the headphones.

Monitoring

When recording to computer software with a ProFX mixer, use direct hardware monitoring:

- Listen to the track you are recording directly off of your mixer, while also listening to previously-recorded tracks on your DAW software, as they are fed back into the mixer.

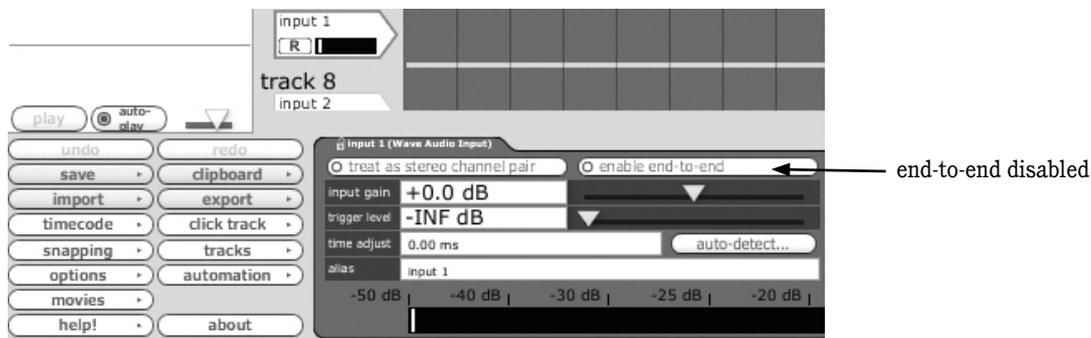
The procedure is as follows:

- Arm the track you wish to record onto, on your DAW software, such as Tracktion.
- On the track you have just armed, disable input monitoring (see top of next page), so that while recording, you do not hear the return of that track coming from the computer. This will ensure you do not mix the direct track you are monitoring, with the duplicate of the track on the DAW as it is being recorded. You do not want to hear the direct and DAW track of the same source simultaneously, as the DAW version might be slightly delayed, and the combination of the two will produce a filtered sound.
- Make sure that the DAW's input meters show a healthy level, and if it needs to be increased or decreased, adjust the signal's channel fader [31], not the gain knob [20].
- Press record on the DAW and record the track.

Overdubbing

To overdub additional tracks while listening to previously recorded ones, follow these steps:

- Press Play. The previously recorded track will now play out of the DAW's main L-R mix into the USB input of the mixer.
- Set the level of the USB input level knob [40] to a level where you can hear the previously recorded track comfortably.
- Arm a new track in the DAW software, be sure it has input monitoring disabled (see top of next page), and record the new track on your DAW.
- While recording the new track, you will hear the previously recorded tracks coming into the mixer's USB input, while you simultaneously hear the current track you are recording directly through the mixer hardware.
- Repeat these steps until you have built up all the tracks of your recording.



Tracktion Screen

In Tracktion, to disable input monitoring for the track you are recording onto, select the input to the track (it will be highlighted in red) and disable the end-to-end function.

You'll hear existing tracks playing back via the USB in, and you'll be monitoring the track you are recording through the mixer's headphones or main out. When you play back the recording, you'll hear the track you've just overdubbed without unmuting anything.

Other DAWs may show this as a speaker next to the track record arm button.

Other tips

- If recording with a microphone, turn down the main fader [48] while recording, and listen through the headphones instead.
- If recording "direct" sources such as an electric guitar, you can listen with speakers, as there is no microphone present to worry about the speaker's sound leaking in.

A word about latency

Latency describes the amount of time it takes the input signal to pass through the system, and reach the output. When recording a guitar and monitoring through software, it is the amount of time it takes from the moment you strike your guitar string, to the moment you hear it in your headphones. You are used to this latency being very close to zero; when you play your guitar through a guitar amp, you hear the signal immediately. So when you are recording and monitoring via software, you want this latency (delay time) to be as low as possible.

We would like to set the latency as low as possible, but the smaller it is, the harder the computer will have to work. If the latency is very small, the computer needs to work very hard to quickly transfer the audio in and out. It may not even be able to keep up, especially if there are lots of tracks, lots of automation and/or lots of plug-

ins in your work. If this happens, your audio may stop or "drop out." Drop outs may also occur if you have a slower computer or not enough memory.

When recording using the overdub method, it is important to set the mixer's latency to it's lowest operable setting. This means going into the audio interface property page of your recording program and setting the latency property to the lowest setting the device and your system will accept without any drop-outs, distortion or CPU overburdening.

The buffer is an area of computer memory that your DAW uses to hold audio as it works. The smaller the buffer, the faster audio gets in and out of your computer, and the lower the latency. The size of the buffer is measured in samples. The more samples, the higher the latency time value. This time value varies by sample rate.

Higher latency settings are fine and even necessary when in live record mode. The same is true for mix-down mode, especially when you start adding lots of plug-ins.

The latency will never be zero, but generally we can lower it enough so its effect cannot be heard.