Accompanying documentation

INTELLIGENT AUDIO SOLUTIONS

Fireface UFX

Class Compliant Mode

Technical background, mode of operation, practical use

Background information on Class Compliant operation of the Fireface UFX

1. General remarks

Since firmware 353/153/CC8 the Fireface UFX operates in three different modes: **driver-based USB 2**, **stand-alone** mode, and **Class Compliant** mode. The latter describes a standard that is natively supported by operating systems like Windows, Mac OS X and Linux. No proprietary drivers are required, the device will be directly recognized when the CC firmware is loaded. Obviously, native features will be limited in comparison to those provided by the RME driver for the UFX. For example there will be no (Total) Mix and no settings for the effects.

The Class Compliant mode can be activated and deactivated directly at the unit, as long as it is not connected to a Mac or PC: SETUP/REV, Options, Hardware/Diagnosis.

Most Class Compliant audio devices use the USB 1.0 standard, released in 1996 for USB 1.1. The UFX features USB Audio 2.0, therefore supports USB 2.0 and will be ready for future upgrades. USB Audio 2.0 offers a bandwidth performance comparable to operation with the RME drivers, and should allow the transmission of all the unit's channels. It won't be comparable to the RME drivers in terms of latency, though.

Neither Windows nor Mac Class Compliant support is relevant, though, since there are dedicated and matured drivers for both OS X and Windows, which provide ALL the device's features at lowest latencies. The main reason for implementing Class Compliant mode was to allow **connecting the UFX to an Apple iPad!**

The UFX provides the iPad with the professional analog I/O connections it lacks. Superb microphone preamps with EQ, dynamics, even with the AutoSet feature, in addition to professional balanced line outputs, and hi-power headphone outputs that also excel with high impedance phones. Plus level and gain adjustments, AES and ADAT I/O, reverb, echo, zero latency monitoring, digitally via USB, without any limitation in quality, at up to 96 kHz and 24 bit. And of course a Sysex-capable double MIDI I/O. All of this is both unique and the first of its kind world-wide.

The UFX got a lot of special attention because it included DURec, the direct USB recording on USB memory stick or portable external hard drive. This useful feature is also available in Class Compliant mode. Especially in regard to recording on the iPad it is not only a world-wide unique and extraordinary feature, it also proves to be something you don't want to miss in real-world usage!

Note that since iOS 5 multichannel recording is supported, and since iOS 6 multichannel playback as well. At this time only **djay** and **Auria** support more than one stereo output, others are expected to follow soon.

2. System requirements

➢ UFX in Class Compliant mode (firmware CC 8 or up)

➢ Any Apple iPad with at least iOS 5. iPhone and iPod Touch can not be used.

➢ Apple iPad Camera Connection Kit (Dock or Lightning to USB)

3. Operation

Activation of the Class Compliant mode: Remove USB and FireWire cable from the UFX. Press SETUP/REV. Turn encoder 1 until Options appears in the display. Turn encoder 2 until Hardware/Diagnosis appears. Push encoder 2 several times to select the entry *CC Mode*. Turn encoder 2 to switch CC mode on (or off). The UFX reboots, all LEDs light up, after which it will be in Class Compliant mode.

The option *CC Routing* offers two different routings of the playback signals. See chapter 6.

Connect the USB cable to the UFX and the Camera Connection Kit. Start the iPad and plug the Camera Connection Kit into the Dock connector. If everything works as expected, the unit will enter CC host mode, indicated by the blue USB LED turning on. Audio playback in iTunes will automatically be performed by the UFX, using analog outputs 1/2 and the phones outputs 9/10, 11/12, AES and ADAT (routing *Phones*).

Apps that support MIDI and are ready for Core MIDI (available since iOS 4.2) will offer dialogs to select the desired UFX MIDI inputs and outputs.

Useful hints

If the unit is not in CC mode, the iPad will detect an incompatible USB device, and display a message saying "Cannot Use Device – The connected USB device is not supported".

When using hard covers as back panel protection for the iPad, the Connection Kit's plug may not fit completely, causing a loose connection or partial functionality. If in doubt, remove the cover.

No sound: Incorrect output gain settings, see next chapter.

The iPad's volume control is inactive during USB operation.
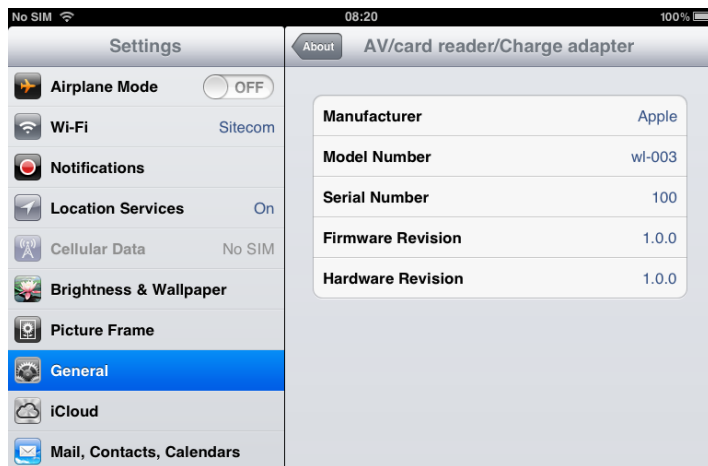
If the unit does not enter Host mode: Remove and reconnect the Connection Kit.

Correct detection and operation of the Connection Kit itself can be determined in Settings / General / About. The adapter will be listed there right after connection, with additional details like manufacturer, model number etc. Connected USB devices, i.e. the UFX will not be shown here, though.

☞ *Having tested several chinese replicas of the Apple Camera Connection Kit, from 2-in-1 to 5-in-1 adapters, we strongly recommend purchasing the original for use with the UFX!*

All adapters seemed to work for the simple application of copying photos. Attempting to run the UFX with USB Audio 2.0 was when the problems started. Some of the tested adapters would not work at all, others only with short cables, and only one adapter came close to the quality of the original. But as soon as 8-channel recording or 96 kHz playback was initiated, the Apple Kit always performed much better.

☞ *We also recommend the purchase of a dock-to-dock extension cable, to avoid having the CCK attached to the iPad directly with the heavy USB cable hanging down.*

This can cause the CCK to slip out of the iPad's connector, or to be in the way most of the time. An extension cable provides enormous freedom of movement. We are working with cable lengths of 50 cm and 1 m, both work flawlessly. These cables are available as *DeLock iPhone extension cable*, or *Dock Extender*, e.g. from Amazon.

It is important to note that each individual component is responsible for stable operation of UFX and iPad. As an example, a setup with an iPad connected to a 1 m DeLock cable, CCK, 5 m USB connection to the UFX only worked with the original Apple CCK. Not only for simple iTunes stereo playback, but also with 96 kHz playback and 8-channel recording. In this setup, the USB cable could even be replaced with a 10 m active one. With lower quality cables or CCK replicas, even 50 cm dock to dock to 1 m USB would be considered success...

Class Compliant Mode under Windows and Mac OS X

On a Windows PC, Class Compliant mode is indicated by a missing "RME" in the device name shown in the Device Manager. In the correct mode and with installed drivers, the full name including RME is shown, without serial number.
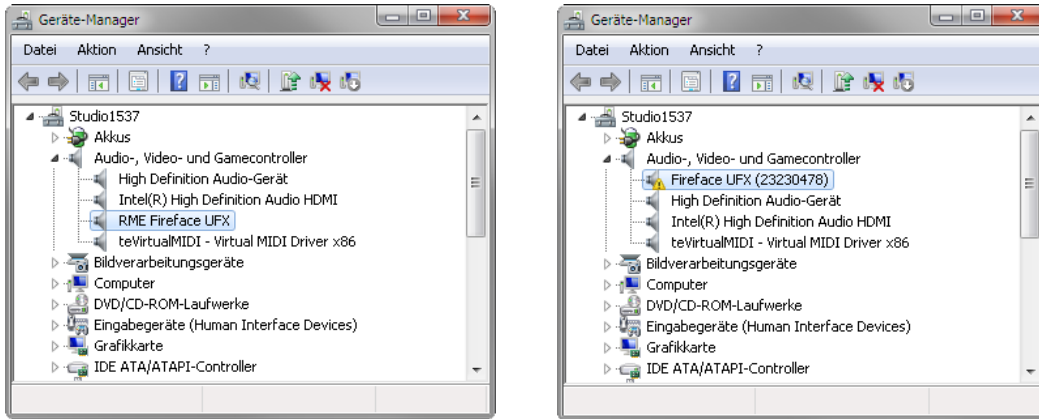
Windows does not support USB Audio 2.0 directly. The UFX will be detected, but automatic driver installation will fail. This is important to remember. Connecting it to the PC one day after having it used with the iPad one might forget that it is still in CC mode. You might end up with hours of wasted time trying to repair your driver installation – when all you need to do is set the unit back to normal mode.
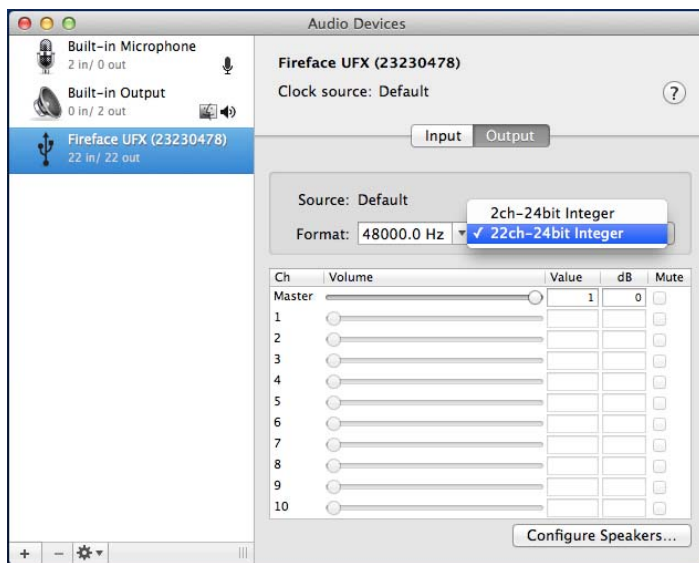
Mac OSX supports USB Audio 2.0, even with more than 2 channels. The UFX offers 22 input and 22 output channels at up to 96 kHz. It is shown as "Fireface UFX (xxxxxxxx)" in the Audio MIDI Setup, in both normal and CC mode. In CC mode the USB Settings will vanish from the Dock, and TotalMix will – if at all – show a 'disconnected' UFX.

The Audio window in the Audio MIDI Setup lists two available modes: 2 channels and 22 channels. The sample rate shown here as 'Default' is the one set at the UFX.

Alsa (Linux) does not work with USB 2 Class Compliant interfaces at this time, but it seems it can be fixed (recompiled) to do so. More information is available here:

http://www.mail-archive.com/alsa-user@lists.sourceforge.net/msg28901.html

4. Supported Inputs and Outputs

In Mac OS X, either the first two or 22* channels will work, depending on the choice in the Audio MIDI Setup. In both cases the playback signal of channels 1/2 can be copied to other outputs.

When connected to an iPad, the analog mic/line input 1 works with mono apps, inputs 1 and 2 with stereo apps (both dual mono and stereo), and up to 8 inputs with 8-channel applications like *MultiTrack DAW* and *Music Studio*. *Garage Band* supports all inputs, but only two at a time. *Auria* can record all 22 inputs simultaneously.

Playback will use the rear-side analog outputs 1 and 2, or even more channels if the app supports such operation. The UFX can optionally copy the iPad playback channels 1/2 to outputs 9/10, 11/12, AES and ADAT, for easier monitoring (routing *Phones*). All outputs can be processed independently (volume, EQ, dynamics, FX return).

Configuring the UFX is done by loading Setups. These are written into the unit while operated with PC/Mac via TotalMix FX, and also control clock mode master or AutoSync and the sample rate. The UFX (and with it the iPad) will be synchronized to an external digital sample rate if there is a valid digital input signal. With a wrong sample rate heavy audio noise will occur. Without an SPDIF or ADAT input signal the UFX enters master mode and uses the sample rate set by Mac OS X or iOS (the app in use).

While the MIDI I/Os will send and receive Sysex messages, not all apps are ready to do this. For example *MIDI Monitor* and *AC-7* do not support Sysex at this time. The app *Midi Tool Box* can be used to verify that the UFX is working correctly, and the problem lies somewhere else.

* Analog 1 to 12, AES, ADAT 1 to 8. At 88.2/96 kHz ADAT AUX In will become active. ADAT AUX Out mirrors the outputs Analog 1 to 8 in Single Speed, or operates as optical SPDIF output for Analog 1/2. The current routing can easily be checked and verified with the level meter display.

5. Front panel operation

The front panel operation is identical to the one under Windows and OS X, or standalone operation. The display therefore gives the usual easy access to all features and offers a quick editing of: input gains, playback levels, routing and monitoring, echo, reverb, EQ, dynamics, sample rate, status of the optical output (ADAT/SPDIF), and much more.

6. Audio Routing and Processing

In Class Compliant mode, the UFX features operation very similar to normal operation with TotalMix FX, with two major differences:

➢ There is no second TotalMix row (no software playback channels), hence no individual routing or mixing of playback channels. These will always be connected either straight to the physical outputs (22 Ch.), or have an additional signal copy from 1/2 to 9/10, 11/12 and SPDIF/ADAT (Phones), making the headphone output usable even in stereo mode.

➢ The input effects EQ/Dyn will always be active in the recording path

The UFX can be pre-configured for CC mode via TotalMix FX under Windows/Mac by saving up to 6 configurations into its setup memory.

The input signal will pass through all activated functions of the TM FX input channel, namely settings, EQ, and Dynamics, and is then sent to the iPad. Like under Windows and Mac, the input fader setting controls direct monitoring to the specified outputs. The FX send control for echo/reverb is also active.

☞ *As in normal TotalMix FX use, the options Stereo Width, MS Proc and Phase L/R are NOT within the recording path, but in the monitor path. This is technically determined and can not be changed.*

The iPad's output signal passes through all activated functions of the TM FX hardware outputs, namely settings, EQ, and dynamics. The third row's fader sets the output level.

☞ *Control Room Section settings are inactive. Configuring the Phones output is done by output channel 9/10 and 11/12.*

With the mirroring of signals to AES and ADAT outputs in Phones mode, the UFX features two simultaneously usable digital outputs, with independent processing (volume, EQ, Dyn, FX Return), even when using standard 2-channel apps.

Details on the routing presets for playback of apps running on the iPad:

Phones: The iPad playback channels 1/2 are copied to the phones outputs 9/10, 11/12, AES and ADAT MAIN, channels 3 to 8 to ADAT outputs 3 to 8. ADAT AUX Out mirrors the outputs Analog 1 to 8 in Single Speed, or operates as optical SPDIF output for Analog 1/2. Application example iTunes: Music playback with this 2-channel app happens only on the playback channels 1/2, therefore the headphones could not be used. Thanks to the *Phones* routing the iTunes signal is also available digitally via AES/ADAT.

22 Ch.: 1:1 routing of all 22 playback channels. Application example djay: independent usage of main output and phones/PFL. The routing *Phones* would provide only the main signal at the phones output. 22 Ch. is a typical DAW mode.

Both modes can be activated at any time and do not influence the mixer state loaded via the Setups, as they only influence the playback routing. The current routing can easily be checked and verified with the level meter display.

7. Setups

TotalMix FX can transfer all current settings to the device (Options/Store Current State into Device). There are six memory slots (Setups) available. An example:

➢ Inputs with no processing, gain set to +30 dB and phantom power active. Outputs without processing, faders for 1/2 set to 0 dB, 9/10 at – 20 dB, clock mode master, saved in Setup 1.

➢ Inputs with Compressor, Factory Preset Mix Limiter (digital overload protection), gain set to +30 dB, no phantom power, outputs 1/2 with EQ (factory preset Modern Bass Treble), outputs 9/10 with EQ (factory preset Cheap Phones Compensation), faders for 1/2 at 0 dB, 9/10 at -20dB, clock mode AutoSync, saved in Setup 2.

Via the menu SETUP/REV, Setup, one can switch between setups 1 and 2 at any time, alternating between entirely different configurations. Further examples would be activating reverb/echo, or temporary monitoring of the input signal. Very comfortable is the use of the Advanced Remote, as in CC mode its 6 upper buttons steer the Setups 1 to 6 directly