USB DAC

UNISON RESEARCH

1. Using the USB input

The USB input uses a D/A converter capable of converting PCM signals up to 384kHz and DSD up to 5.6448MHz, which includes all audio formats and sampling frequencies available today.

To use the input, the user needs to connect the USB-dac to a computer with Windows, OSX (Mac) or Linux operating system and follow the instructions below. Even some Android-based devices with certain players are able to work with a USB device without the need for an additional driver (user space mode), and some iPads and iPhone provided with the Camera Connection Kit can also drive this input. If using small portable devices, we recommend checking the current capability of their USB port, as it must fulfil the USB input requirement (300mA).

1-1 .Using the USB input. with a Windows-based computer

Supported versions are Windows 7 and later. When using the ***USB dac*** with a computer that has a Windows operating system, it is necessary to install a driver, which can be downloaded from www.unisonresearch.com
Please note that the driver is the same as that used for the USB input on the SH, Triode 25 amplifier and other Unison Research products. If your computer has already been connected to one of these products, then the driver is already installed and you can skip this procedure.

Installing Windows driver

Before proceeding with the installation, switch the amplifier on and connect it to the computer using a USB cable.
To start the driver installation, double-click on the executable (.exe) file downloaded from Unison Research website *www.unisonresearch.com* . Once started, depending on the operating system version, the user could be asked to confirm the permission for the program to modify the system. Give confirmation. Once this operation, when required, is performed, the window in Figure 1 will appear.

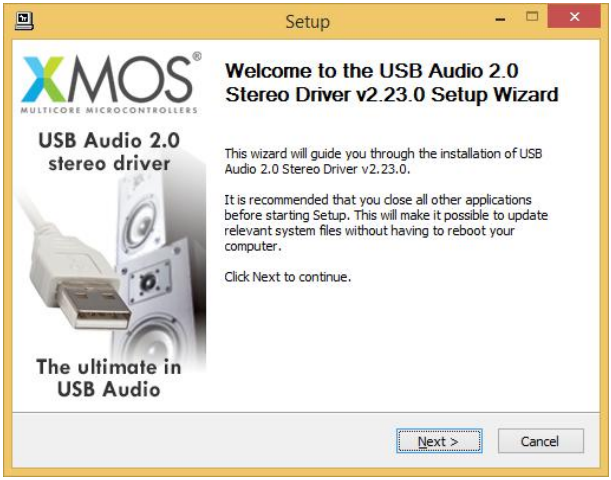

Figure 1

Follow the instructions shown in the window and click the "Next" button to launch installation. At first, the installation program will check that the ***USB input.*** is connected to the computer. Whenever the connection is not made or when the computer doesn't recognize the input, the window shown in Figure 2 will appear.

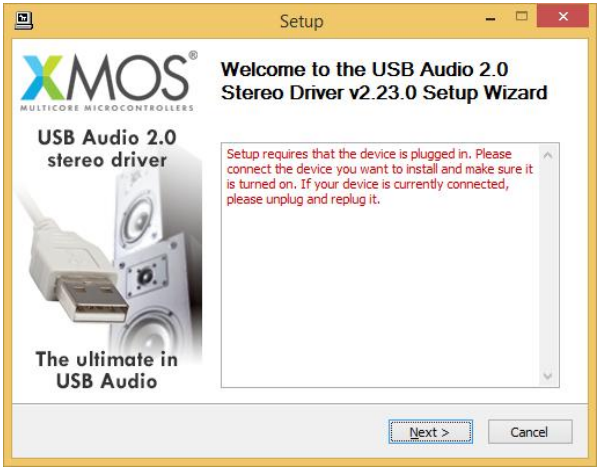

Figure 2

Should this happen, connect the USB input to the computer or disconnect and reconnect it to allow the USB controller to properly recognize it. Then, click the "Next" button.

Once the installation program has confirmed the presence of the USB DAC input on the USB bus, the window shown in Figure 3 appears.

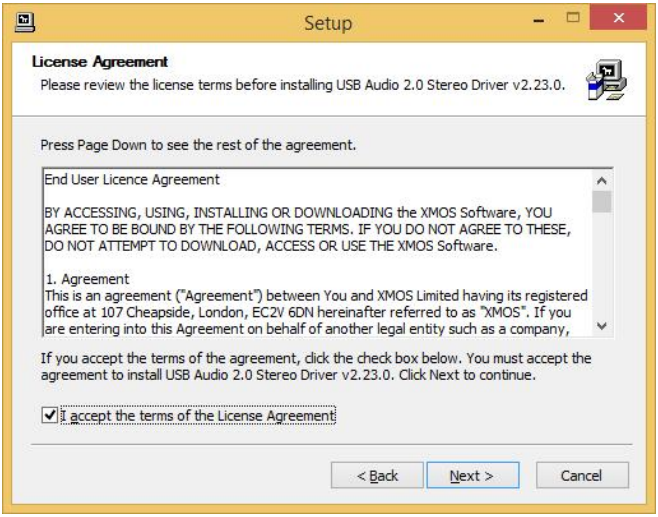

Figure 3

The user must accept the license agreement terms by clicking on the checkbox in the lower left of the window, as shown in Figure 3, then click the "Next" button. The window shown in Figure 4 will appear, in which the user may, if necessary, indicate a path for driver installation.

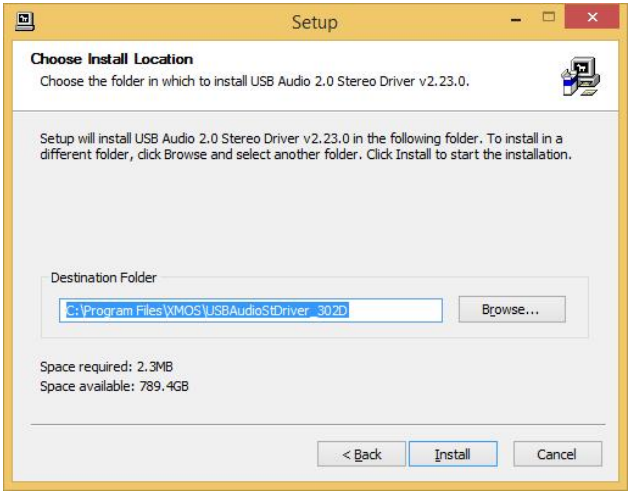

Figure 4

Once the installation path is chosen or confirmed, the user needs to click the "Install" button to proceed with the driver and ancillary components installation. The window shown in Figure 5 will appear, in which a progress bar will show the installation's progress.

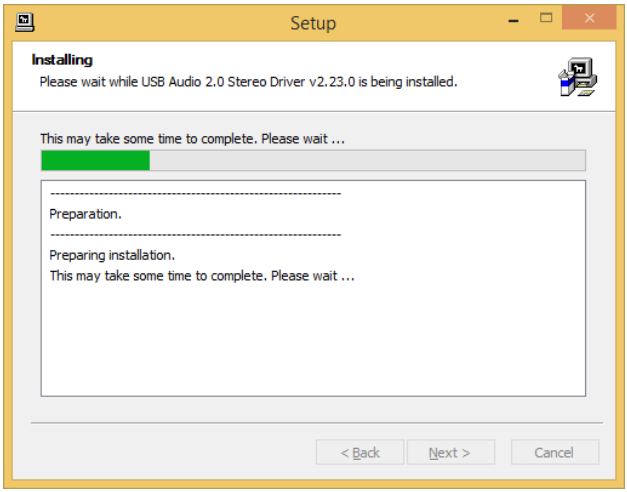

Figure 5

When the process has finished the window will announce the installation has completed, as shown in Figure 6.

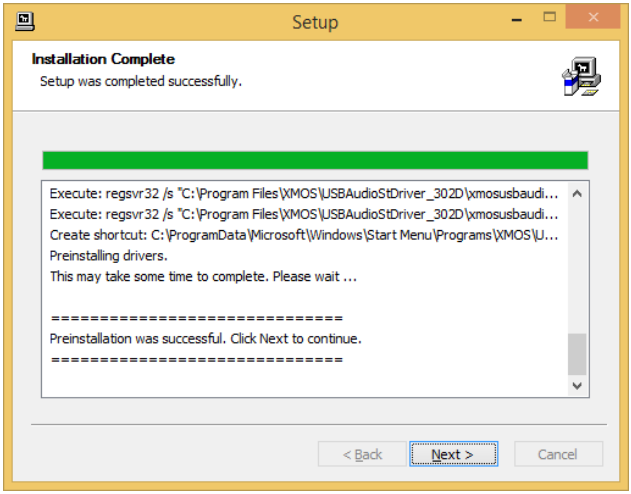

Figure 6

Click the "Next" button to proceed. The window shown in Figure 7 will appear. Click "Finish" to terminate the installation program.

Figure 7

Uninstalling the Windows driver

It may be necessary, for certain reasons, to uninstall the driver. The uninstall process can be started in two ways: by opening the applications installation utility and selecting the driver for uninstall, or by accessing the driver folder and starting the uninstall program. Either way, the window shown in figure 8 will appear.

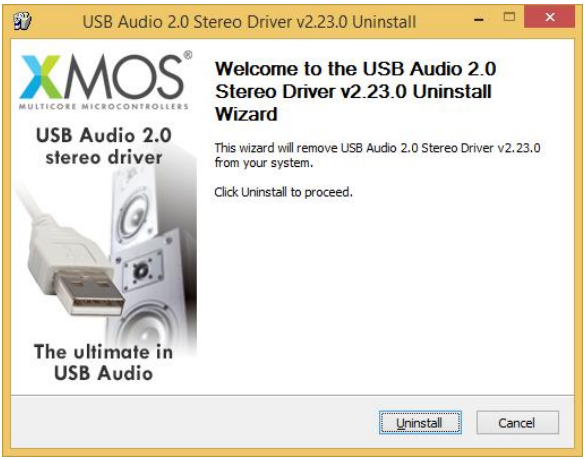

Figure 8

Click the "Uninstall" button to launch the driver uninstall process. The window shown in Figure 9 will appear, in which a progress bar will show the uninstall progress.

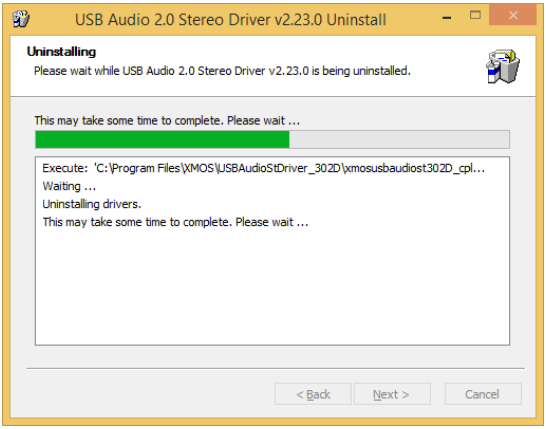

Figure 9

Once completed, the window shown in Figure 10 will announce the successful uninstall.

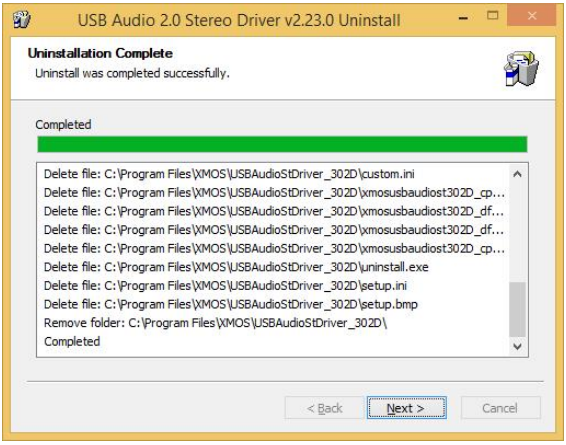

Figure 10

Click the “Next” button to proceed. The window shown in Figure 11 will appear. Click “Finish” to terminate the uninstall program.

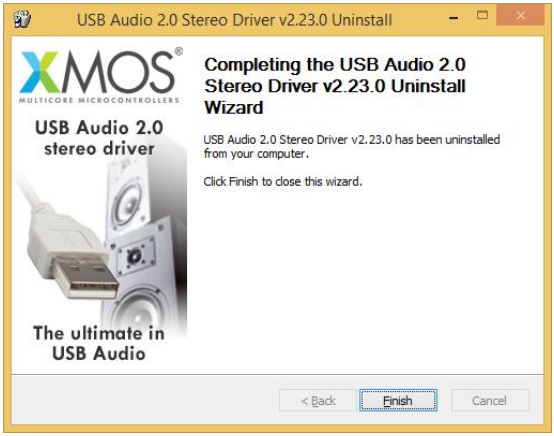

Figure 11

Configuring Windows to use the *USB-DAC* as the predefined output peripheral

Some players, such as Windows Media Player, use the system predefined audio peripheral to playback audio. Some streaming services (which rely on a web browser) also do the same. In these cases, it is necessary to choose the ***Usb-dac*** as your predefined audio peripheral. To do that, you need to access the Sound configuration utility in the Control Panel. A window with various tabs will appear. Select the "Playback" tab to access the list of available output peripherals. Select "XMOS USB Audio" as the predefined device, as shown in Figure 12. From that moment on all sounds made or handled by Windows (including the ones from the browser and from players relying on the system to deliver audio) will be sent to the ***Usb Dac***.

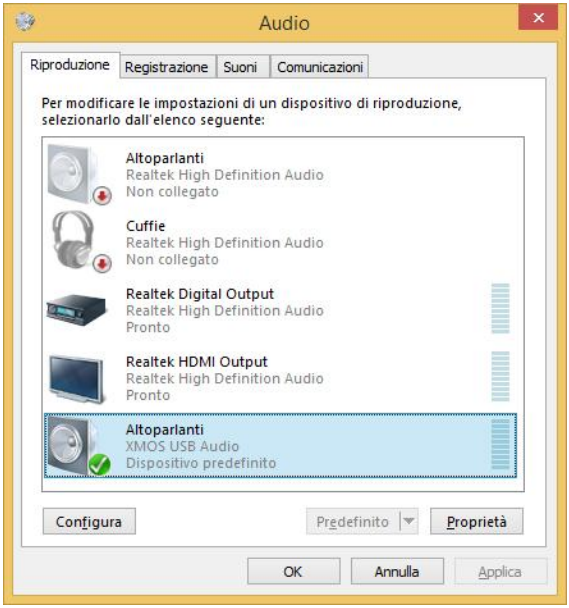

Figure 12

Windows systems, in a similar way to OSX (see later section), resample all signals to make their sampling frequency the same as the value chosen in the Audio utility. To choose the output sampling frequency, access the properties of the selected peripheral (in this case, the *Xmos USB Audio*) and show the advanced properties, as shown in Figure 13.
A drop-down menu will allow for choosing the desired sampling frequency between 44.1kHz and 192kHz (the latter being the highest sampling frequency which Windows can handle). Please note that an ASIO-compatible player is needed when the user wants to use the USB input with sampling frequencies higher than 192kHz, as Windows is unable to handle such high sampling frequencies.

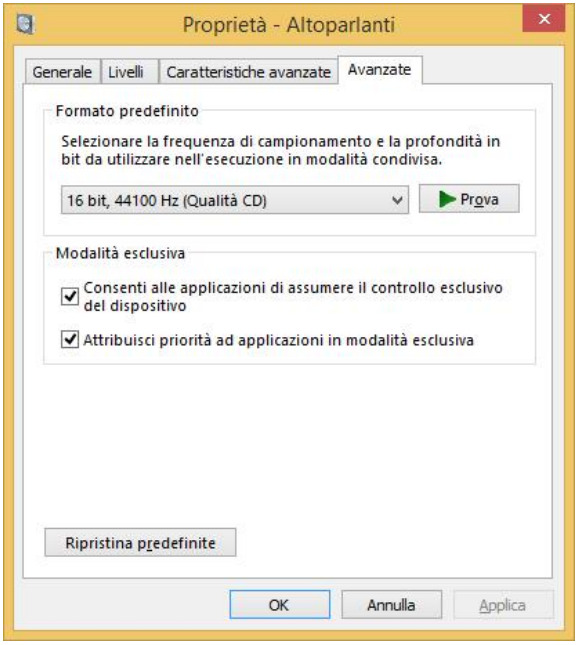

Figure 13

Configuring a player in Windows: FooBar 2000

FooBar (www.foobar2000.org) is a free software that's able to operate with all the modes that are compatible with the ***USB input.***: Direct Sound, Kernel Streaming, WASAPI and ASIO. The installation of the program is beyond this manual's scope: we'll explain how to configure it to operate in ASIO mode, which is the optimum solution to use with the USB input.

Foobar offers ASIO support through the installation of a specific DLL. It must be downloaded from the "Components" section of FooBar, website, from the following link:
http://www.foobar2000.org/components/view/foo_out_asio.

NOTE: unlike many other FooBar DLL's, which are contained in a zip file and therefore must be manually extracted and copied into the "Components" subfolder inside the FooBar main folder, the ASIO file which is downloaded from FooBar website is an auto-installing program which automatically installs the DLL in the correct folder, without any user action. You just need to double-click on the

downloaded file.
Once this operation is done, the user can launch FooBar and access the Preferences window by clicking the CTRL+P keys combination, or by the specific "File" menu item. Then, select the "output" item, which will show an "ASIO" sub-item: the windows shown in figure 14 will appear.

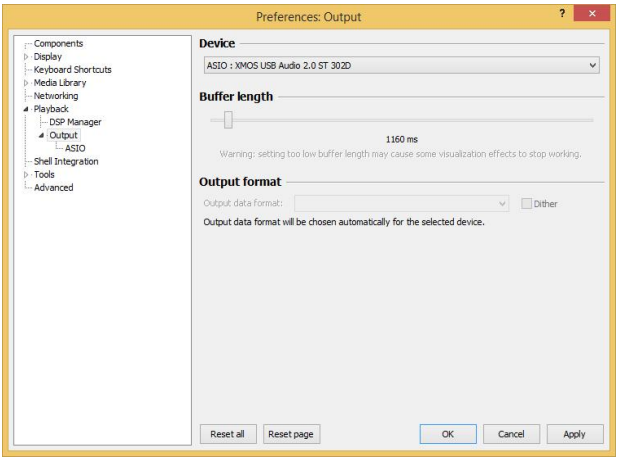

Figure 14

Select "ASIO: XMOS USB ASIO 2.0 ST302D" in the drop-down menu called "Device". FooBar is already capable of using the ***USB*** input as an output device in ASIO mode to playback bit-perfect PCM audio up to 384kHz and 32 bits.

It's now necessary to setup FooBar to playback DSD files. For this you need to install another DL for SACD compatibility, which can be downloaded from the Sourceforge website at the following link: http://sourceforge.net/projects/sacddecoder/files/latest/download.

The zip archive contains two executable files, both to be used: one to install the component for SACD ISO files compatibility and one proxy file to send DSD to compatible audio devices through their ASIO compatible driver. One such device is the ***USB input.***.

After manually installing the DLL and the proxy, two ASIO objects will appear in the "ASIO" section of "Output" (Figure 15): the Unison driver and the proxy ("foo_dsd_asio"). Double-click on "foo_dsd_asio" to make the configuration window appear. Set the parameters as shown in Figure 15. FooBar is now ready to send DSD streams from DSD files to the ***USB***

input..

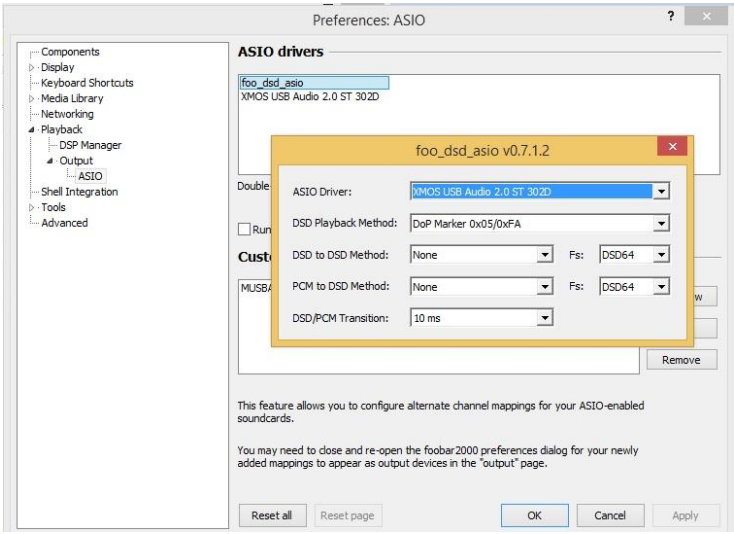

Figure 15

For best operation of the player with DSD files, it is advisable to setup the SACD tool as shown in figure 16.

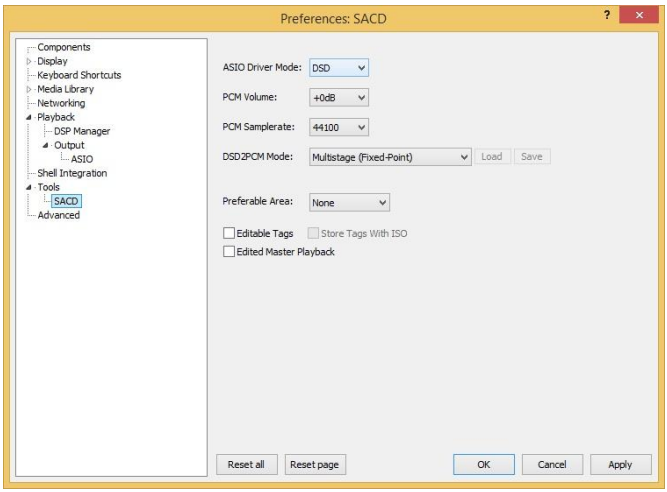

Figure 16

It is necessary to select the DSD proxy as the output device to listen to DSD files, as indicated in Figure 17.

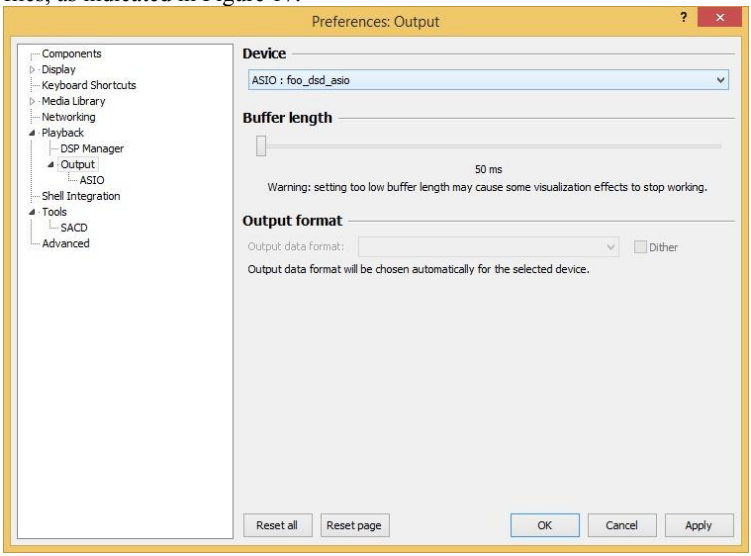

Figure 17

Configuring a player in Windows: JRiver Media Center

JRiver Media Center (www.jriver.com) is a commercial player, therefore is a closed solution and is provided with all necessary features to support the various audio transfer modes and audio formats.

As with FooBar, we won't go through the program installation. Access JRiver options window and select "ASIO" as "Output mode" in "Audio" (figure 18).

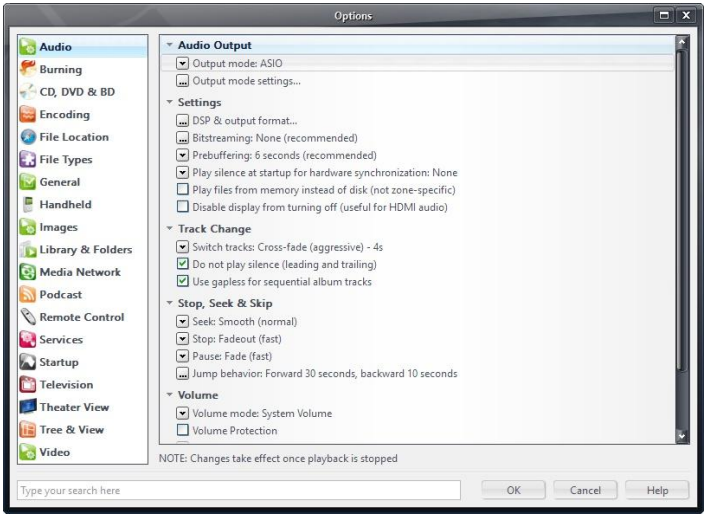
Options
Audio
Burning
CD, DVD & BD
Encoding
File Location
File Types
General
Handheld
Images
Library & Folders
Media Network
Podcast
Remote Control
Services
Startup
Television
Theater View
Tree & View
Video
Audio Output
Output mode: ASIO
Output mode settings...
Settings
DSP & output format...
Bitstreaming: None (recommended)
Prebuffering: 6 seconds (recommended)
Play silence at startup for hardware synchronization: None
Play files from memory instead of disk (not zone-specific)
Disable display from turning off (useful for HDMI audio)
Track Change
Switch tracks: Cross-fade (aggressive) - 4s
Do not play silence (leading and trailing)
Use gapless for sequential album tracks
Stop, Seek & Skip
Seek: Smooth (normal)
Stop: Fadeout (fast)
Pause: Fade (fast)
Jump behavior: Forward 30 seconds, backward 10 seconds
Volume
Volume mode: System Volume
Volume Protection
NOTE: Changes take effect once playback is stopped
Type your search here
OK
Cancel
Help

Figure 18

Then, open the configuration window of output mode ("Output mode settings") that is obviously devoted to ASIO and select the "XMOS USB ASIO 2.0 ST302D" driver, as shown in figure 19.

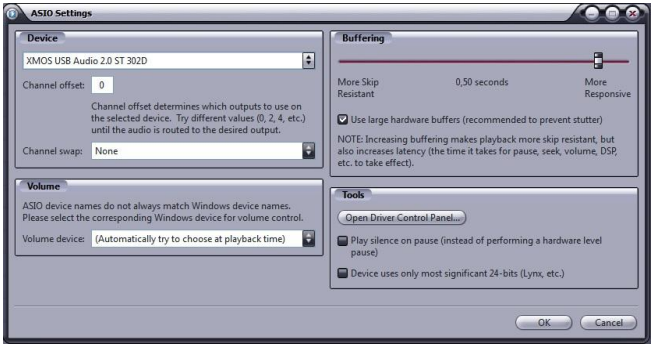

Figure 19

JRiver is now able to handle DSD by the DoP (DSD over PCM) format. From the drop-down menu that shows up clicking on "Bitstreaming" item, select the "Custom…" value, as shown in figure 20.

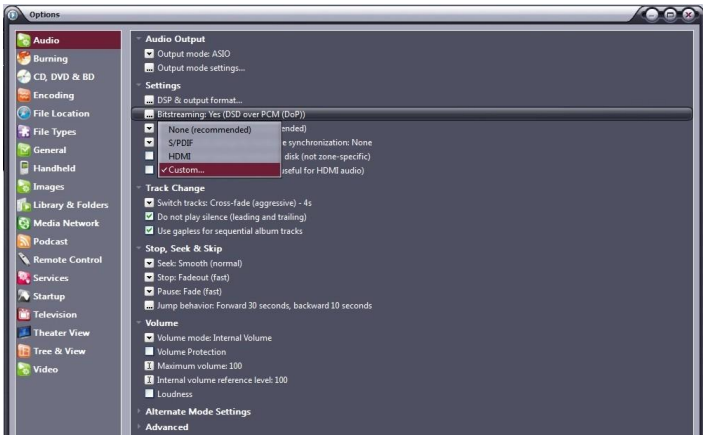

Figure 20

A window will automatically appear in which the user can manually set the bitstream configuration parameters (figure 21). Set parameters as shown in figure 21.

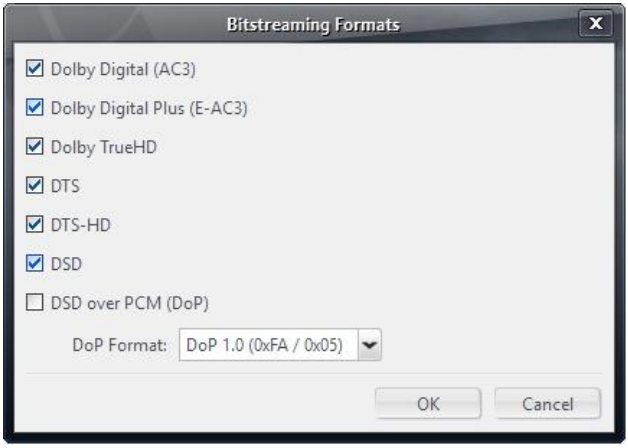

Figure 21

The configuration procedure is almost done, but it's still necessary to tell JRiver not to down-sample data that's streamed with a sampling frequency higher than 192kHz. This feature is usually enabled to correctly drive other DAC's with a lower specification than the ***USB-dac***.
Access the "DSP and output" menu item and set the parameter about handling of files with sampling frequency more than 192kHz, as shown in Figure 22.

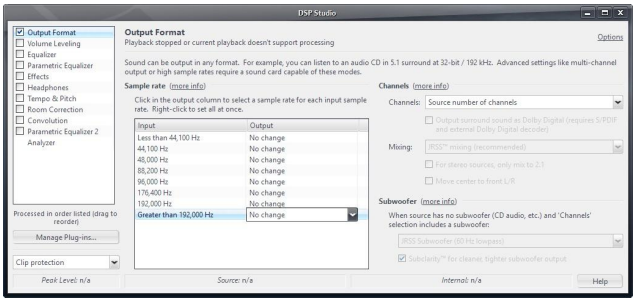

Figure 22

JRiver configuration is done and you can now listen to PCM files up to 384kHz and DSD files up to DSD128.

1-2. Using the USB input with an Apple computer

The ***USB Dac*** complies with USB Audio Class 2.0 specifications; therefore it's natively supported by OSX operating systems since version 10.6.8 and doesn't need any drivers. The USB input is recognized by any Apple computer as soon as it's connected to one of its USB ports and is listed amongst the output audio devices as shown in figure 23.

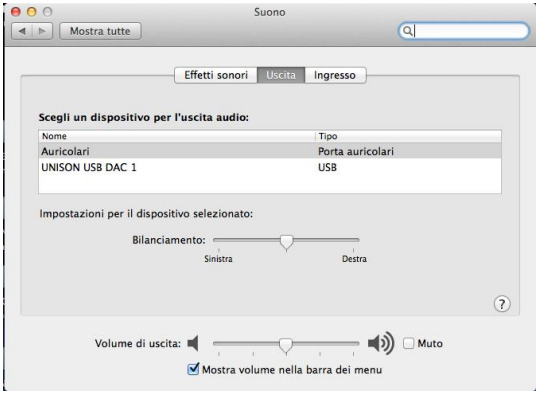

Figure 23

The user must select the "Unison USB DAC 1" peripheral to send her/his computer's audio to the ***USB input.***. The OSX operating system allows users to choose the sampling frequency of the audio signal sent to the ***USB input.***. This can be done through the MIDI Control Panel, as shown in Figure 24. Whichever sample rate you choose will define the exact output to the ***USB Dac*** , regardless of whether the file can play at a higher resolution.

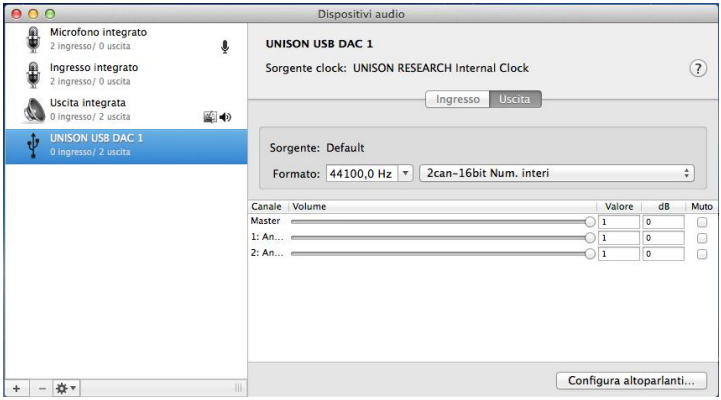

Figure 24

A fixed output may not be desirable when listening to a playlist made of files with different sampling frequencies. In this case, a player capable of disabling this system feature must be used. Many such players are available, both free and commercial.

Configuring a player in Apple OSX: Audirvana

Audirvana is a latest generation player which allows for listening to DSD files with DSD-compatible devices, such as the ***USB input.***. To use Audirvana at its best, set the various options as shown in Figure 25.

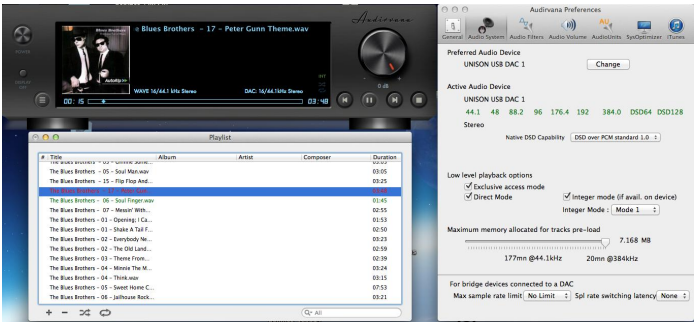

Figure 25.

1-3. Connecting to a Linux computer

No driver is needed for a computer provided with the Linux operating system and an ALSA module, as ALSA natively supports USB Audio Class 2.0.

To use the ***USB input.*** with a computer provided with Linux operating system, it is sufficient to access the audio configuration panel and select the "UNISON USB DAC 1" peripheral in the "Output" section, as shown in figure 26.

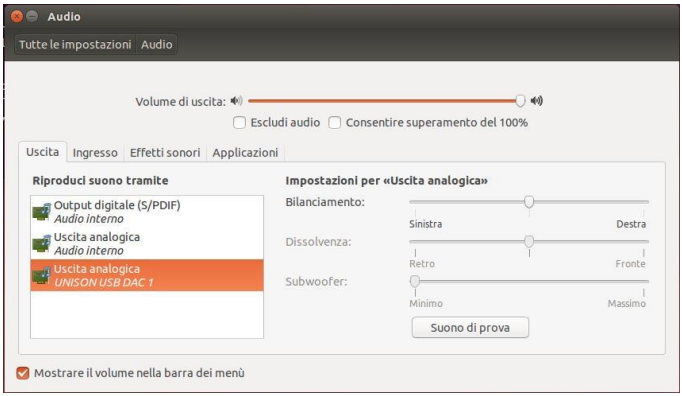

Figure 26

Configuring a player under Linux: Audacious

Of course, even with Linux, it could be necessary to select the USB DAC 1 as predefined audio output peripheral. As an example, the recommended configuration for Audacious, which is widely used under Linux, is shown. As displayed in Figure 27, the user needs to access Audacious' preferences and select "ALSA output". Then, the user must click on "Preferences", right below the drop-down menu for output selection: the window shown in the lower portion of Figure 27 will appear. Set its various parameters as shown in Figure.

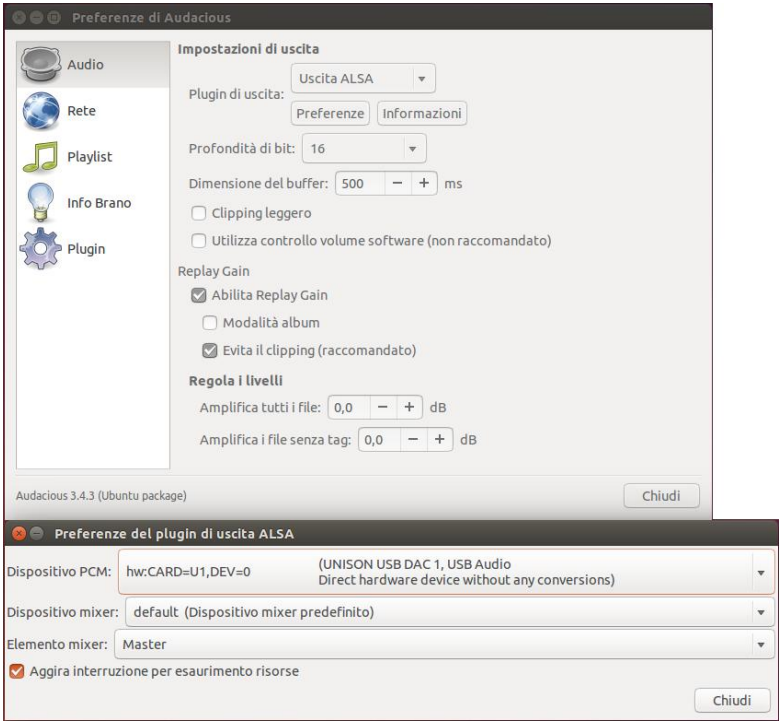
Preferenze di Audacious
Audio
Rete
Playlist
Info Brano
Plugin
Impostazioni di uscita
Plugin di uscita:
Uscita ALSA
Preferenze
Informazioni
Profondità di bit:
16
Dimensione del buffer:
500
ms
Clipping leggero
Utilizza controllo volume software (non raccomandato)
Replay Gain
Abilita Replay Gain
Modalità album
Evita il clipping (raccomandato)
Regola i livelli
Amplifica tutti i file:
0,0
dB
Amplifica i file senza tag:
0,0
dB
Audacious 3.4.3 (Ubuntu package)
Chiudi
Preferenze del plugin di uscita ALSA
Dispositivo PCM:
hw:CARD=U1,DEV=0
(UNISON USB DAC 1, USB Audio
Direct hardware device without any conversions)
Dispositivo mixer:
default (Dispositivo mixer predefinito)
Elemento mixer:
Master
Aggira interruzione per esaurimento risorse
Chiudi

Figure 27