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Xonar Essence One

Hi-Fi USB DAC (Digital-to-Anolog Converter)

User manual

E6774

First Edition (V1)
July 2011

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Contents

Introduction

Thank you for purchasing this ASUS Xonar Essence One Hi-Fi USB DAC (Digital-to-Analog Converter). We are confident that you will enjoy many years of listening pleasure from it.

Xonar Essence One USB DAC is ASUS Xonar's innovative response to the world-wide trend of PC Hi-Fi. With PC audiophile's number growing fast according to the convenience and high resolution of digitalized audio contents, Xonar Essence One product line is committed to provide solution for their needs to enjoy extreme high-fidelity music with any PC.

Equipped with 32-bit symmetrical upsampling, powerful headphone amplifier, dedicated power adapter, balanced XLR output, and hassle-free software, Xonar Essence One grants any PC audiophiles or PC audiophiles-to-be the best solution to enjoy their music with extreme clearness, details (120dB SNR), and hassle-free controls that help to re-discover one's music collection.

As every member in Xonar Essence family, a shining tiger totem etched on the surface of its state-of-the art design shows Xonar Essence One's commitment of the never-ending pursuit of **the Essence of Sound**.

Package contents

This package should contain the following:

- ASUS Xonar Essence One Hi-Fi USB DAC x 1
- USB cable ('B-A' type) x 1
- Power cord x 1 (Some versions may have 2 power cords for different countries)
- 6.3mm to 3.5mm adaptor x 1
- User manual x 1
- Audio Precision (AP) test report x 1
- Installation driver CD x 1

Safety Information

For your own safety please read the following important safety instructions carefully before attempting to connect this unit to the mains power supply. They will also enable you to get the best performance from and prolong the life of the unit.

Voltage Selection

The rear panel includes a voltage selection switch with two settings: '115' and '230'. Check to see that it is properly configured for your location before connecting AC power. Actually, the AC input has a very wide input voltage range and can operate over a frequency range of 47.5 to 52.5 or 57 to 63 Hz. At 115, the Xonar Essence One will operate normally over a range of 95 to 132 VAC. At 230, the Xonar Essence One will operate normally over a range of 190 to 264 VAC.

> ⚠ **CAUTION:** Always insure that the voltage setting is correct for your locality. Incorrect configuration may blow fuses or cause erratic operation.
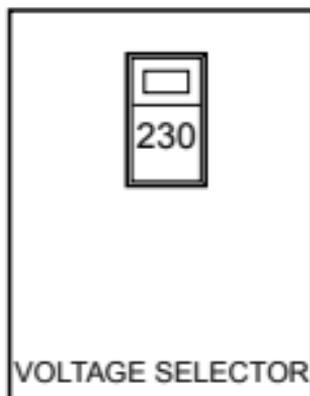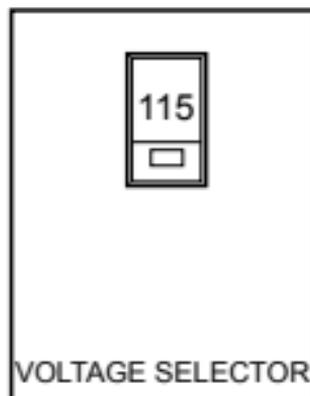
230 VOLTAGE SELECTOR	115 VOLTAGE SELECTOR
230V	115V

Repairs

Do not service or repair this product unless properly qualified. Only a qualified technician should perform repairs.

Fuses

The fuse holder is built into a drawer next to the IEC power connector.

CAUTION: For continued fire hazard protection always replace the fuses with the correct size and type (1A 250V, 5 x 20 mm).

Use tools to replace the fuses.
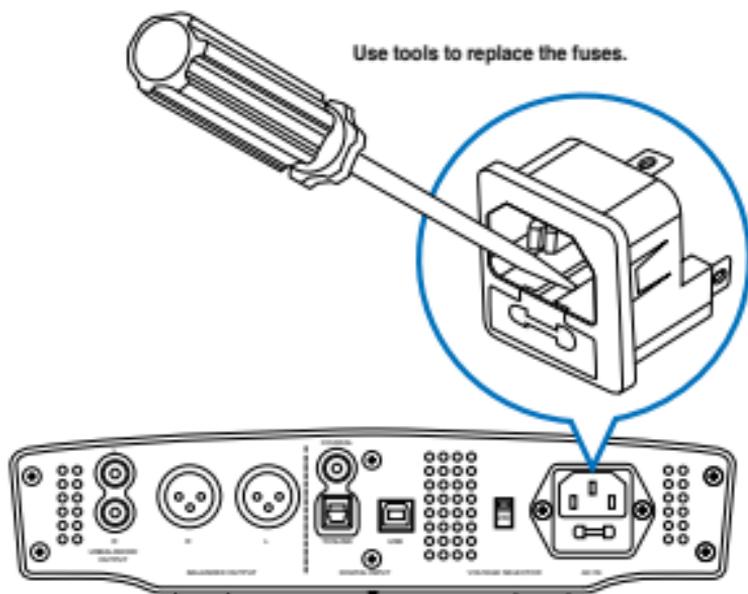
Other Safety Information

1. Read these instructions.

2. Keep these instructions.

3. Heed all warnings.

4. Follow all instructions.

5. Do not use this apparatus near water.

6. Clean machine surface with a cloth (no any detergent applied).

7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles and the point where they exit from the apparatus.

11. Only use attachments/accessories specified by the manufacturer.

12. Use with only the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13. Unplug this apparatus during lightning storms or when unused for long periods of time.

14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as the power-supply adaptor having been damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Driver installation

After connecting ASUS Xonar Essence One with your computer by the bundled USB cable, you need to install the device driver that enables the Xonar Essence One to work with Windows operating system.

📝 **NOTES:**
- The driver is only needed when you connect ASUS Xonar Essence One with PC/NB.
- The version and content of the support CD are subject to change without notice.

To install the device driver:

1. Insert the ASUS Xonar Essence One support CD into your optical drive. If Autorun is enabled, the ASUS Xonar Essence One screen appears automatically. Go to step 4. If Autorun is not enabled in your computer, perform step 2.

2. Click **My Computer** on your desktop and double-click the optical drive icon.

3. Double-click the **setup.exe** icon located on the optical drive.

4. Follow the on-screen instructions to complete the installation. Read the **END USER LICENSE AGREEMENT** in the process and make sure that you understand and accept it before continuing the installation.

5. When the installation finishes, you may be prompted to restart your computer. You can choose to restart the computer later if desired.

System requirements

To ensure a successful installation of ASUS Xonar Essence One USB DAC, your computer must meet the following requirements:

- IBM compatible PC with one USB2.0 (or higher) compatible port for the USB audio device

- Microsoft® Windows® 7 / Vista / XP(32/64bit) / MCE2005

- Intel® Pentium® 4 1.4GHz or AMD Athlon 1400 CPU or faster CPU

- 256 MB DRAM system memory

- 60 MB available HDD space for driver installation package

- CD-ROM drive (or DVD-ROM drive) for software installation

- High-quality headphones or powered analog speakers to enjoy the ultra-high fidelity sound of the card

Functionality

1.   USB DAC (Digital-to-Analog Convertor)

Clear, detailed, life-like sound for your digital music collection in PC/NB, with all the connection(XLR, RCA) you need for end devices.

Steps:

- Connect PC/NB with an USB cable
- Need to install driver in your PC/NB to work
- Select "USB" in front panel as the input source
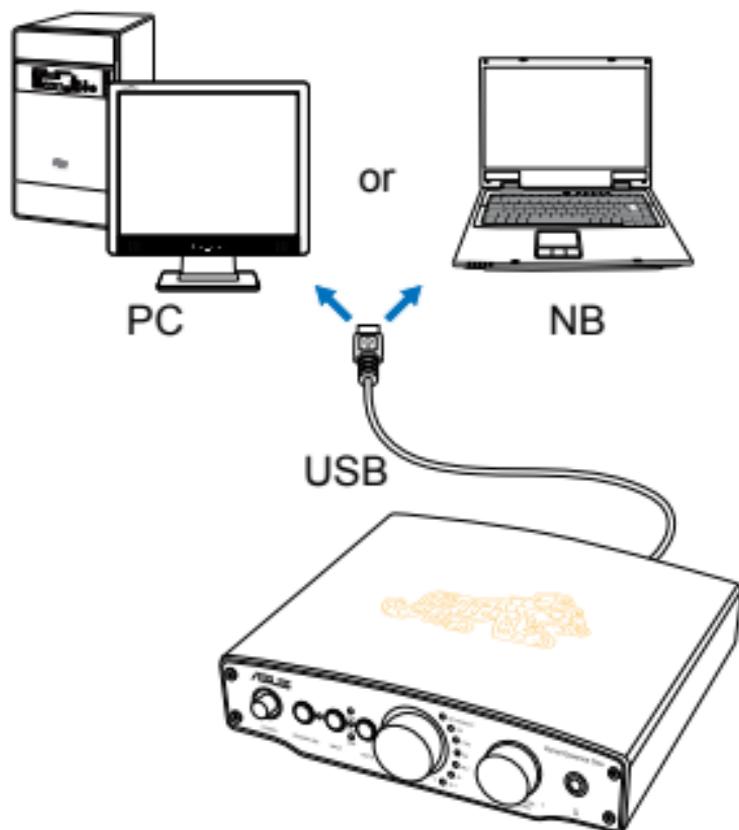
2.   Stand alone DAC

With S/PDIF in and input select, it also serves as an independent DAC which connects with digital inputs such as CD audio source and then plays to the end devices.

Steps:

- Connect with other audio resource with S/PDIF input (by Coaxial/Optical cable)
- Select COA (coaxial input) or TOS (optical input) in the front panel as the input source

CD/DVD player

S/PDIF
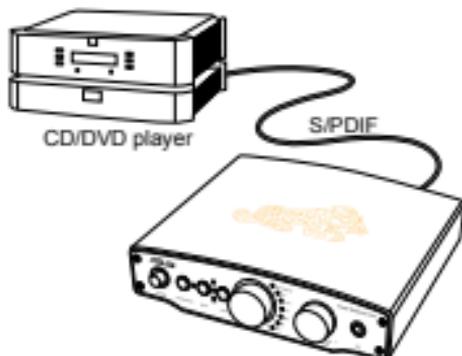
3.   Headphone amplifier

Grants 100% performance of ALL hi-end headphones, even with impedance up to 600ohms, providing extra dynamics and sound details.

Steps:

- Connect with high-quality headphones/headsets
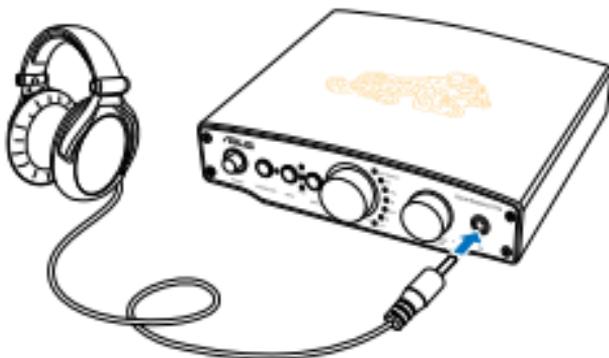
Important Features

Hi-Fi audio via the world-first 8x symmetrical upsampling:

While common upsampling USB DACs just transfer whatever audio source to 192kHz indistinguishably, Xonar Essence One upsamples 44.1/88.2 /176.4kHz input to 352.8kHz and 48/96/192kHz input to 384kHz in a symmetrical way, preserving the originality of your music collection, also upsample bit-rate to 32bit corresponding to the original contents. (Note: 44.1 x 8 = 352.8kHz; 48 x 8 = 384kHz)

> **NOTES:**
> - Sample rate is the number of samples of audio carried per second, measured in Hz or kHz (one kHz being 1,000 Hz). The more samples per second (the higher the "sample rate"), the better the quality.
> - Bit rate measures how much data is transmitted in a given amount of time. The higher the bit rate, the higher the quality of the audio playback and the larger the file.
> - Upsampling is the process of increasing the sampling rate of a signal. For instance, upsampling raster images such as photographs means increasing the resolution of the image.
> - Therefore, upsampling both sample rate and bit rate will make your audio source sound clearer.

Extreme audio clarity with 120dB SNR:

The SNR of normal USB DAC is about 110dB. With the extremely high SNR (>120db), Xonar Essence One provides audiophiles clearer sounds with every details while significantly reduces the noise level.

Audiophile class headphone amplifier output:

The Xonar Essence One has built-in an audiophile-class headphone AMP circuit which grants 100% performance of ALL hi-end headphones, even with impedance up to 600ohms. The headphone amplifier powers up all Hi-Fi headphones with high performance and low distortion.

User customizable tone characters by 11 swappable OP-amps:

This is the unprecedented attempt for any hi-end USB DAC. Op-amp is the key part that amplifies the analog signal in your soundcard and affects tone characters (darker, brighter, sound image etc.) Xonar Essence One allows user to swap almost every OPamps for a fully customized sound.

Balanced XLR output:

Xonar Essence One also features balanced (XLR) outputs. This is a higher quality output that is useful for eliminating unwanted noises and interference. Since a balanced line contains two signal carrying conductors of equal magnitude but opposite polarity, noises induced along the cable path cancel each other out when they reach the destination load. This makes balanced lines the professional applications for long cable connection which induced noises might be a problem. XLR connectors should be wired as follows:
Pin 1- Ground; Pin 2- Hot (in-phase); Pin 3- Cold (phase-inverted).

Internal power supply:

The internal power supply supports all international voltages and has generous margins for over and under voltage conditions. It provides cleanest power for cleanest sound with excellent immunity to noise on the AC line.

Bit-perfect with ASIO 2.2 driver:

Bit-perfect is how the audio stream will come from your PC. If you are running bit-perfect with ASIO, you will hear the music as it was encoded on the CD. Actually, ASUS Xonar Essence One's ASIO 2.2 driver simplifies the process of multiple audio streams, bypassing latency issues in Windows, to deliver a low-latency, high fidelity sound file that is identical to the original audio file. (PS. When you run bit-perfect, the "BIT PERFECT" LED in the front panel will light up.)

Low Clock Jitter with Asynchronous Data Transfer:

Most USB audios uses Synchronous Data Transfer mode to adjust internal clock to compensate different data transfer between PC and USB Audio Device. But the jitter is worse if the transfer rate is different a lot between PC and Device. Instead, ASUS Xonar Essence One supports Asynchronous Data Transfer mode. This mechanism feedbacks the buffer status to the system, and the system will base on buffer status to adjust the speed of data transfer, which leads to the low jitter in Xonar Essence One.

Dedicated volume controls:

ASUS Xonar Essence One is fitted with two dedicated Volume Controls specific for the output levels of headphone and speaker. Unlike most USB DACs which use only one Volume Control for the output level of both headphone and speaker (or even no Volume Control), Xonar Essence One allows users to set the headphone and speaker volume level separately.

Toslink and Coaxial S/PDIF inputs:

ASUS Xonar Essence One is fitted with one set of digital inputs, Coaxial and Toslink, which enable the connection of source components. The digital inputs accept data formats at sample rates up to 192 kHz.

Front Panel
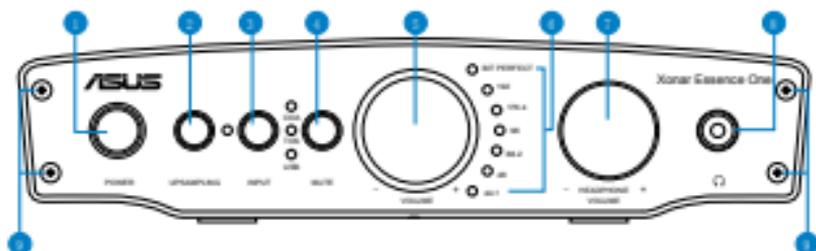
1. **Power On/Off**

   Press to turn on and again to turn off.

2. **Upsampling function on/off**

   (1) Press to turn on the upsampling function which increases sample rate to 352.8 or 384kHz symmetrically and bit rate to 32bit

   (2) When the upsampling function is turn on, the LED light of Bit perfect / sample rate indicator will light off.

3. **Input selection**

   Press to select among USB, Toslink or Coaxial Inputs. The corresponding LED will light up to show which source has been selected.

4. **Mute**

   Press to mute headphone and speaker output; again to unmute.

5. **Speaker Volume control**

   The Volume Control controls the output level of the balanced XLR and unbalanced RCA analog outputs.

6. **Bit perfect / sample rate indicator**

   (1) The relevant LED will light up to indicate the sample rate of your audio source (44.1kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, and 192 kHz)

   (2) Bit perfect: light on under ASIO model

7. **Headphone Volume control**

   The Volume Control is used to control the output levels of the headphone jacks.

8. **1/4" Headphone output**

   Connect your high-quality headphones/headsets with 6.3mm connector (Please use the attached 6.3mm to 3.5mm connector if your headphones/headsets are of 3.5 mm ports)

9.   **Set screws**

These 4 screws are used to hold the machine bed (including PCB board and power module) and machine housing together. For repair's sake, ASUS technicians may need a small screwdriver to loosen the 4 screws to remove the front panel and then draw the machine bed out for checking PCB board (or power module).

Rear Panel
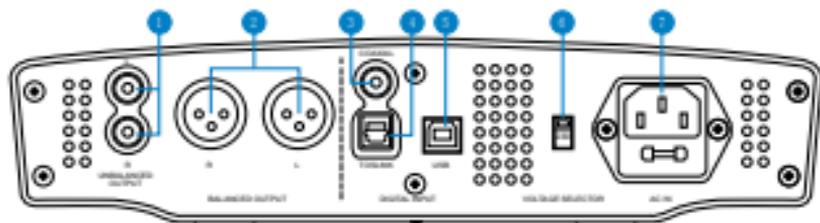
1.   **Unbalanced RCA Output (line-out)**

Conventional stereo outputs for connection to the line-level phono/RCA inputs of a speaker

NOTES:
- Most audio equipment has unbalanced audio inputs and outputs. This means that the audio output (left, right, or mono) appears on a single wire, and is referenced to "0V" or "Ground". Typical connectors used are RCA "phono" connectors and 1/4" (6.3mm) or 1/8" (3.5mm) jack plugs/ sockets.
- Unbalanced audio works well for short cable runs in low noise environments. For long distances connection or complex setups where RF noise may be a problem, Balanced XLR Output is recommended to eliminate unwanted noises.

2.   **Balanced XLR Output(line-out)**

ASUS Xonar Essence One also features true balanced (XLR) outputs. Connect Xonar Essence One with equipment such as speakers of Balanced XLR connections.

NOTES:
- A lot of professional equipment will have balanced audio inputs and outputs, usually on 3-pin "XLR" connectors. The line is said to be balanced since the two signal carrying conductors are of equal (though opposite) potential.
- Balanced XLR Output is a higher quality output that can reject noise and interference with equipment with balanced inputs, especially perfect for long cable runs or anywhere that induced noises might be a problem

3. Coaxial S/PDIF Input

Connects to external digital decoder or digital speaker systems, Home Theater systems, AV receivers for outputting digital audio. These outputs loop or pass-through unprocessed digital audio from the selected digital input. Two types are available and this port is for Coaxial S/PDIF Input.

4. Toslink Optical Input

As mentioned in point 3, this port is for Toslink Optical Input.

NOTES:
- Both Coaxial and Toslink Inputs can be used to connect and run equipment at the same time
- This unit only accepts two-channel LPCM digital audio (e.g. Dolby Digital 2.0). You cannot connect a Dolby Digital 5.1 or a DTS signal as they will not be recognized. If you wish to connect a DVD or similar device, please ensure that the sound output of your player is set to two-channel PCM.

5. USB port

Connect a PC via a Type B to Type A USB lead.

NOTES:
- The Xonar Essence One's operation is independent of your PC soundcard- it will operate whether your PC has a soundcard or not. Please select Xonar Essence One as the default audio playback device in your system. This can be confirmed in the Control Panel's Sounds, Speech and Audio Devices properties window under the Volume tab.
- You need to install this device river that enables the Xonar Essence One to work with Windows operating system.

6. Voltage selection (115/230V)

Always insure that the voltage setting is correct for your locality. Please see page 5 "Voltage Selection" for more info.

7. Power port (AC in)

Plug the supplied power adaptor into the Xonar Essence One once you have completed all connections.

Hardware Introduction
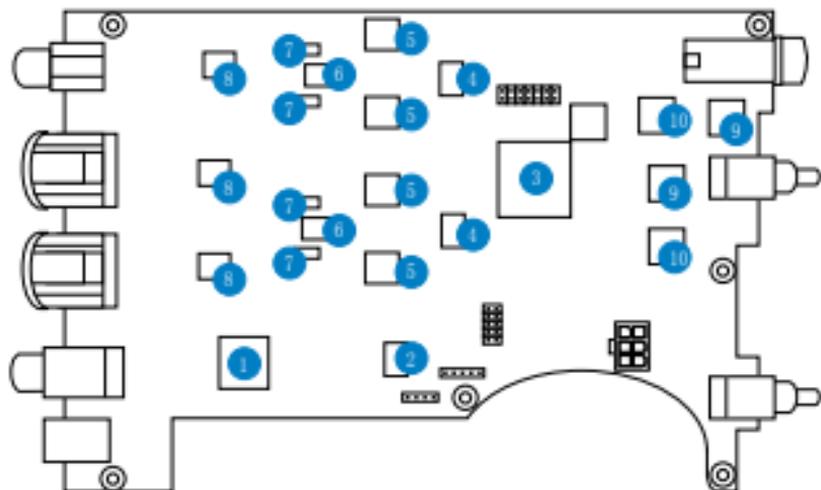
1. USB Audio processor: C-Media CMI6631 (for USB input)

2. S/PDIF receiver: AKM AK4113 (for digital input)

3. DSP: ADI ADSP-21261

4. DAC: TI PCM1795

5. Swappable Op-amps: NE5532

6. Swappable Op-amps: NE5532

7. Film Cap (red ones): WIMA FKP2/FKS2

8. Swappable Op-amps: LM4562 (for Speaker out)

9. Swappable Op-amps: LME49720NA (for Headphone out)

10. Headphone Amplifier: NS LME49600TS (for Headphone out)

Connections

Input

1.   NB/PC-USB connections

NOTE: Do not turn on the machine until all connections have been made.
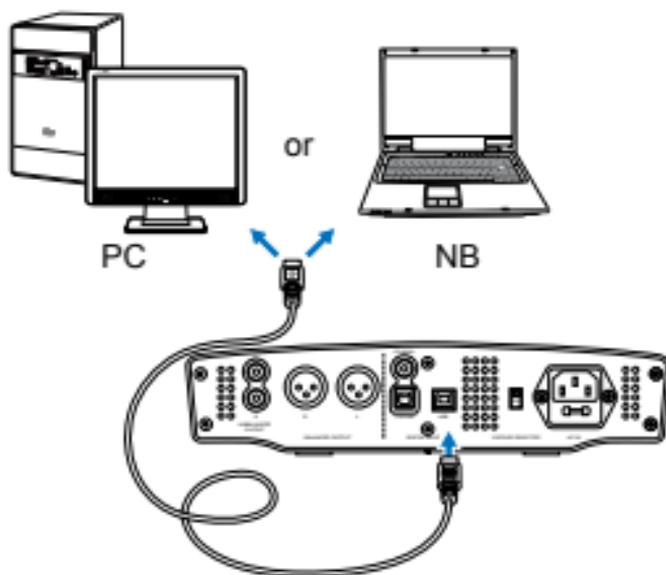
PC   NB

(1)   Connect a USB 'B–A' type lead (as illustrated at left) from the Xonar Essence One's USB input to one of the USB ports on the PC/NB.

(2)   Turn on the Xonar Essence One using the front panel On/Off switch and make sure that the USB input is selected (USB LED lit).

(3)   Install the device driver that enables the Xonar Essence One to work with Windows operating system.

**2. Toslink and Coaxial S/PDIF audio input connections**
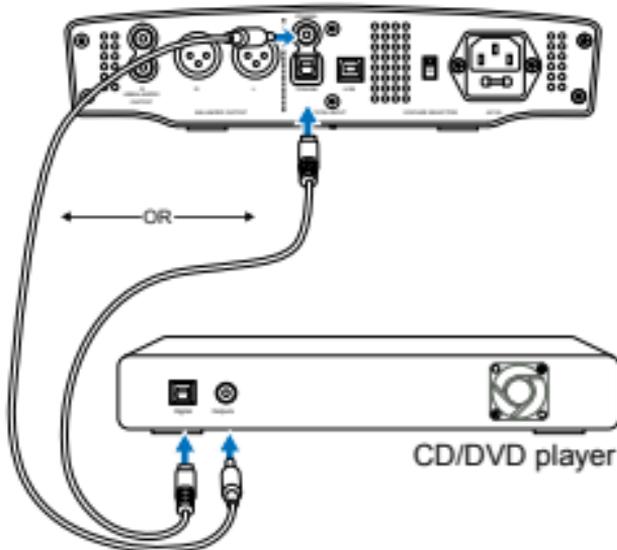
CD/DVD player

(1) Connect your digital source (ex. CD/DVD players or some PC/NB with SPDIF output) to Digital Input. Either S/P DIF Coaxial or Toslink optical types can be used, each being of equal quality.

NOTE: Both Coaxial and Toslink Inputs can be used to connect and run equipment at the same time.

Output

1.   With Amplifier and Passive Speaker System

Unbalanced Input

OR

Balanced Input
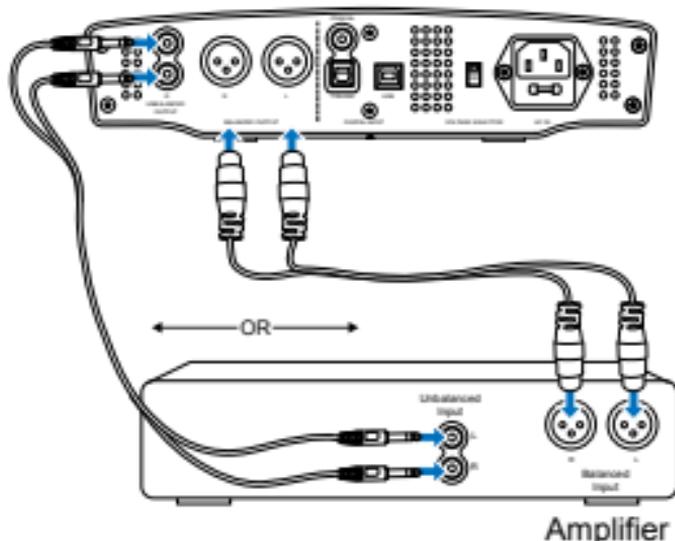
Amplifier

(1) Use either the unbalanced (RCA/Phono) or balanced (XLR) outputs of the Xonar Essence One to connect unbalanced or balanced inputs of an amplifier.

(2) Connect the amplifier with a Passive Speaker System.

NOTE: It is possible to use the RCA phono connections and the XLR balanced connections at the same time, e.g. for connecting to different amplifiers or multi-room operations. However, no same audio quality is guaranteed as using RCA and XLR output non-simultaneously.

2. With Active Speaker directly
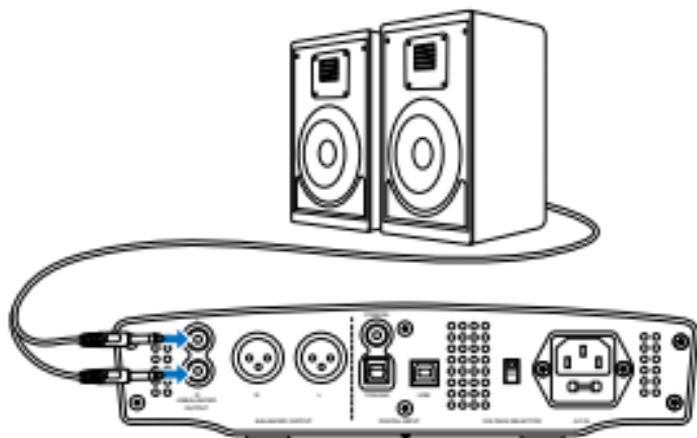
(1) Connect Xonar Essence One with a set of active speakers directly.

3. With Headphone/Headset
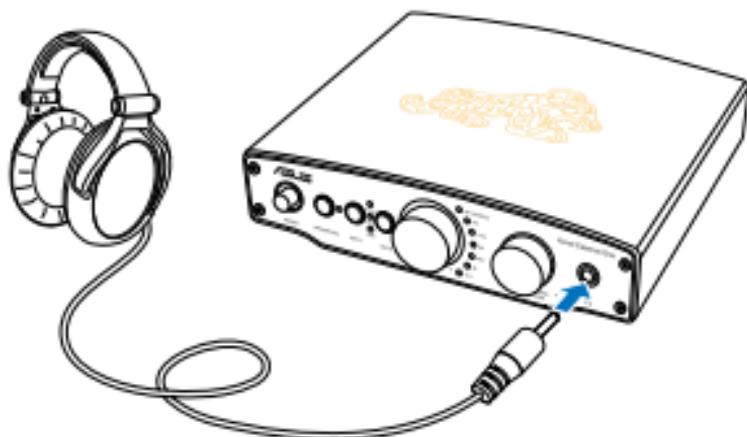
(1) Connect Xonar Essence One with high-quality headphones/headsets directly.

Specifications

Items	Description
Output Signal-to-Noise Ratio (A-Weighted):	120dB
Output Total Harmonic Distortion + Noise at 1kHz@-3dB (A-Weighted):	-110dB
Output/Input Full-Scale Voltage	Balanced Output: 4Vrms
	Unbalanced Output: 2Vrms
	Headphone: 7Vrms
Frequency Response (-3dB, 24-bit/192kHz output):	<10Hz to 48kHz
Bus Compatibility	
USB	USB 2.0 High speed
S/PDIF	IEC 60958
Main Chipset	
Audio Processor	C-Media CM6631
S/PDFI Receiver	AKM 4113
DSP	ADI ADSP-21261
D-A Converter for Analog Inputs	TI PCM1795
OP Amp	
Headphone	I/V: NE5532
	LPF: NE5532
	Current Buffer: LME49600
Balanced / Un-balanced I/V	NE5532
Balanced / Un-balanced LFP	NE5532
Clock	
Crystal clock	12MHz For USB
	24.576MHz For S/PDIF
Oscillator	45.1584MHz (for 44.1, 88.2, 176.4KHz sample rate)
	49.152MHz (For 48, 96, 192KHz sample rate)

Specifications

Sample Rate and Resolution	
Analog Playback Sample Rate and Resolution	44.1K/48K/88.2K/96K/176.4K/192KHz @ 16/24bit
Upsampling capability	Up to 352.8kHz (44.1/88.2 /176.4kHz input) or 384kHz (48/96/192kHz input), 32bit
I/O Ports	
Output Jack:	Balanced Output (XLR)
	Unbalanced Output (Dual RCA)
	6.3mm Jack headphone output
	Metal with plated gold, black housing
Input Jack:	USB jack
	Coaxial / Toslink jack
	Metal with plated gold, black housing
Power Input Jack:	IEC AC Inlet
Volume controller	Balanced Output: Quad Units Taper B Potentiometer
	Headphone Output: Quad Units Taper B Potentiometer
Voltage Selector	AC 115V/223V Slide Switch
Accessories	
Accessories	USB cable ('B-A' type) *1
	Power cord *1 (Some versions may have 2 power cords for different countries)
	6.3mm to 3.5mm adaptor *1
	User manual *1
	Audio Precision (AP) test report *1
	Installation driver CD *1

* Specifications are subject to change without notice.