



**AUDIO INTERFACE
MICROPHONE PRE-AMPLIFIER**



OWNER'S MANUAL

Purebits
<http://purebits.com>
HARDWARE VR. 1.4

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Precautions and warnings

Please read carefully this manual before operating the unit!

This device uses low voltage (5V) power supply from the computer USB port. It must be used only on a CE compliant personal computer.

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Introduction

X4 is an USB soundcard providing analog and digital input/output and a built-in microphone/line preamplifier. It has been designed and manufactured for acoustics measurement and Live Recordings purposes, but can be used also for general tasks. X4 is completely plug&play in PC, Mac and Linux/Unix environments, does not require any external power supply and is enclosed in a robust and light-weight aluminum case.

Key features

- Fully Compliant with USB 1.1
- Bus powered (does not require any external power supply)
- 16-bit Delta-Sigma ADC and DAC
- Sampling Rate:
 - DAC: 32, 44.1, 48 kHz
 - ADC: 8, 11.025, 16, 22.05, 32, 44.1, 48 kHz
- Uses only **Burr-Brown** Codec and Operational Amplifiers in the audio signal path. For more information about specifications and performance see the Burr-Brown (Texas Instruments) website <http://www.ti.com> and search for **PCM2906** (codec) and **OPA2353** (Opamp).
- Available in 2 color options:



Black anodized aluminum enclosure



Natural anodized aluminum enclosure

Product features

● 2 channel IN / 2 channel OUT USB soundcard (16 bit, up to 48 kHz (*) sample rate), compatible with all Windows versions (no driver required), Linux and Macintosh. High accuracy A/D and D/A converters from Burr-Brown:

() The soundcard can operate also at a sample frequency of 96 kHz, but the audio bandwidth is limited to 22 kHz.*

● No external power supply required. Powered from USB port.

● Very robust anodized aluminum enclosure.

Compact size: 103 x 53 x 120 mm

2 color options: Anodized black or anodized natural

● 2 x 10 Led VU-Meter bar graphs, for accurate input level adjustment.

● Can be used as Preamplifier for Microphone and line levels.

Input and output stages based on state-of-the-art Burr-Brown operational amplifiers

● 4 inputs, RCA connectors, mixable with stereo input JACK connector. Input 1 and 3 are downmixed to USB input Left. Input 2 and 4 are downmixed to USB input Right. Suitable for Live recording, using 2 or 4 microphones, and for acoustics measurements.

● Separate switchable phantom power for channels 1/2 and 3/4, optimized for Panasonic WM6x series electret microphonic capsules (3,6 V).

● Input level adjustment relying on high accuracy Cermet potentiometers. Separate knobs for inputs 1/3 and 2/4.

● Separate Preamplifier/Monitor JACK stereo output. It can drive Line/headphone loads.

● USB soundcard stereo JACK/2 x RCA output. It can drive Line/headphone loads.

● Line/Microphone input gain switch.

● Digital Input / Output, Coaxial and Optical.

● Manual selector switch for Coaxial or Optical input (the digital input signal can only be recorded through USB, it is not buffered to monitor output).

● X4 power consumption is 0.75W (all VU meter leds OFF); Peak: 1.75W (all VU meter leds ON)

What's in the package



- X4 audio device
- USB cable
- One stereo Jack to 2 RCA converter
- One stereo RCA-RCA cable

Installation

Generic Windows drivers

The X4 device does not require any additional driver to operate. Locate an USB port of your computer and **connect**, with the cable provided in the package, **the X4 device**. The blu led in the front panel of the X4 will light. The first installation from this point depends from your operating system.

● Windows XP and 2000

After the X4 connection the system will display the message "Found new Hardware" and will install automatically the required drivers. After this step, the X4 will be ready to use.

● Windows Millenium

After the X4 connection the system will display the message "Add new Hardware Wizard". Follow the instructions and enable (if asked) the option "Search for the best driver". After completing this procedure, the X4 will be ready to use.

● Windows 98 SE

After the X4 connection, the system will display the message "Add new Hardware Wizard", that will refer to an USB Composite Device (the displayed name could be different depending on the local and language version of the operating system).



Click Next and the following window will appear:



Select the "Search for the best driver" option and click Next.

The following window will appear:



Now the standard USB Audio windows driver must be installed:

1- Try deselecting all options and click Next.

If no suitable drivers are found, repeat this step:

2a- Insert your Windows 98 CDROM, select the CD-ROM option and click Next.

2b- Alternatively (if your Windows 98 installation files are on the hard disk) use the "Specify a location" option, Browse for the Windows 98 *cabs* files (usually they are in C:\Windows\Options\Cabs location) and click Next.

After this operation, a new window will appear, informing that Windows is ready to install the best driver for this device.

The message will inform: *Location of the driver* **C:\WINDOWS\INF\USB.INF** (*this may vary depending on your Windows installation folder*).

Click Next and the last screen will inform that Windows has finished installing the software and an USB Composite Device is installed. Click Finish.

After this operation another "Add new Hardware Wizard" will be displayed. Follow exactly the same procedure described above and install the **USB Human Interface**.

The final dialog will give you the information:

Location of the driver **C:\WINDOWS\INF\HIDDEV.INF**

After this installation, the last "Add new Hardware Wizard" will be displayed. Follow again the same procedure to install the **USB Audio Device**.

The final dialog will inform:

Location of the driver **C:\WINDOWS\INF\WDM_USB.INF** (*this may be different depending on many factors*)

Now the X4 is operative, and can be disconnected and reconnected to the pc at any time without additional installation requirements.

The driver installed are the standard MME and/or the WDM drivers (backward compatible with the MME drivers).

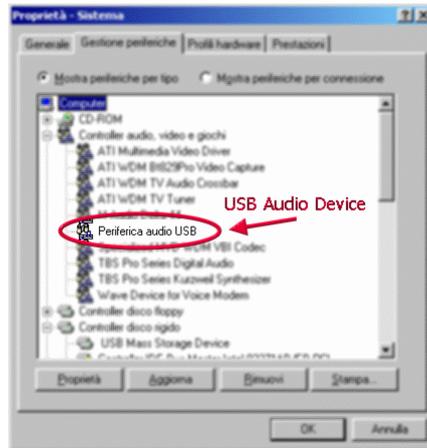
● Verifying the correct installation

In **Windows XP** and **Windows 2000**, right-click the *My Computer* icon on the desktop, click Properties and System Properties, then the Device Manager button.

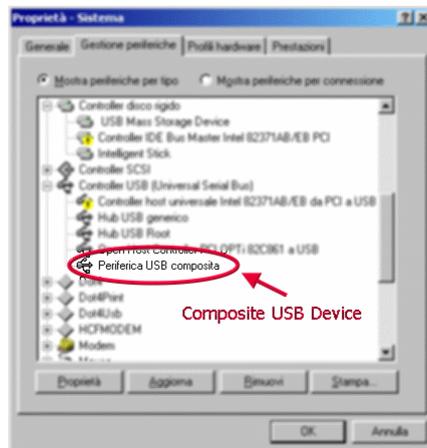
In **Windows 98 SE** and **Windows Millenium**, right-click the *My Computer* icon on the desktop, click Properties and, in the System Properties screen, the Device Manager tab.

If the X4 is installed correctly, 3 new devices should be listed:

USB Audio Device in the **Sound, video and game controllers** section:



Composite USB Device in the **USB Controller (Universal Serial Bus)** section:



USB Human Interface Device in the **Human Interface Devices** section:



ASIO drivers

The X4 sound card is compatible with ASIO drivers. To use the X4 with ASIO, a generic ASIO driver can be used. There are some freeware ASIO drivers on internet. We suggest **ASIO4ALL** by Michael Tippach, that can be downloaded from here: <http://www.asio4all.com/>

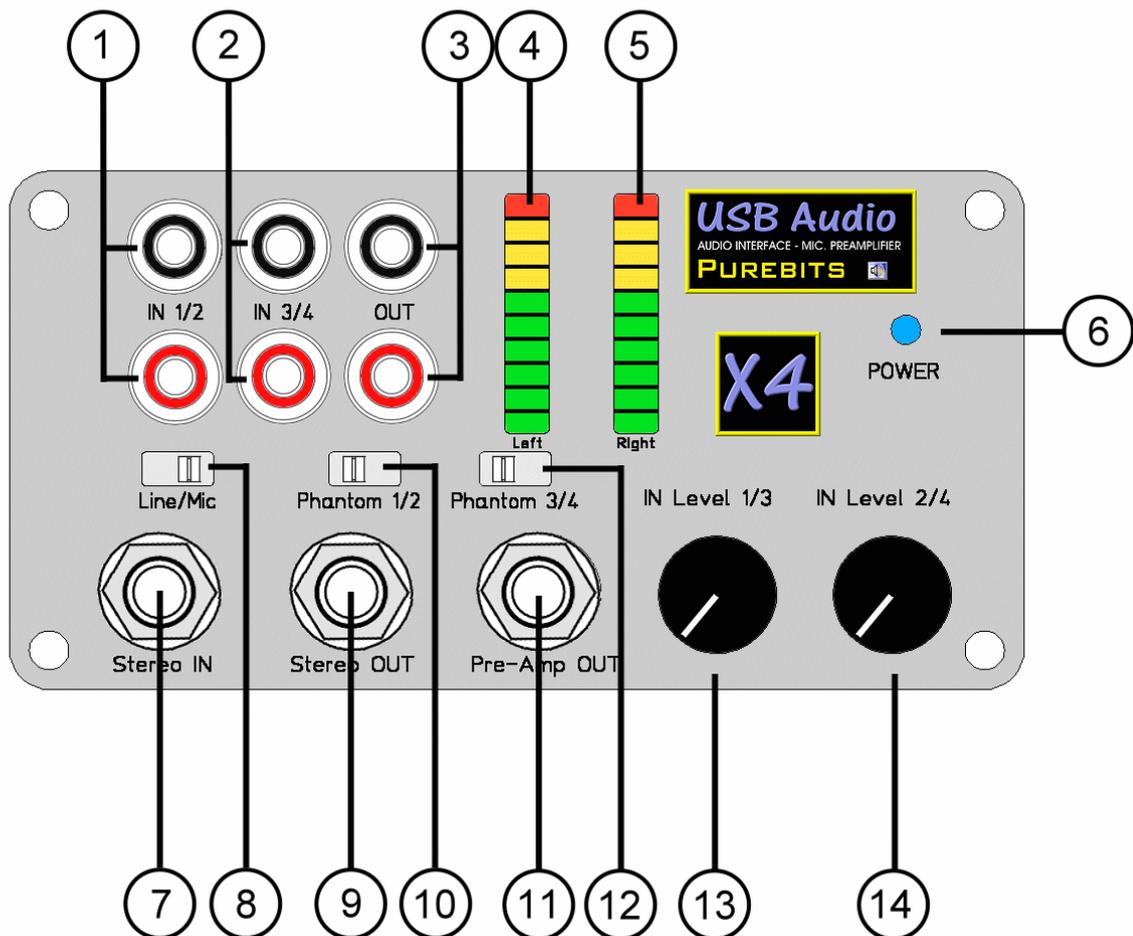
Another free generic ASIO driver is **ASIO2KS**, by Tobias Erichsen. It can be downloaded from <http://www.asio2ks.de/>

Please refer to the respective webpages for instructions about the use of these drivers.

ASIO is a trademark of Steinberg Media Technologies GmbH

Controls and Indicators

Front Panel



[1] Input 1 (Left channel) and 2 (right channel).

- The gain of input 1 can be adjusted by means of the IN Level 1/3 knob [13].
- The gain of input 2 can be adjusted by means of the IN Level 2/4 knob [14].
- The signal in input 1 is sent to the left input channel of the soundcard and to the left channel of the Preamplifier output [11].
- The signal in input 2 is sent to the right input channel of the soundcard and to the right channel of the Preamplifier output [11].
- The phantom power supply for Input 1/2 (3.6 V) can be enabled and disabled by means of the switch [10]
- Input 1 is wired to the left channel of the Jack input Stereo IN [7], Input 2 is wired to the right channel of the Jack input Stereo IN [7].
- The level of input 1 can be monitored by means of the left VU-meter [4]. The level of input 2 can be monitored by means of the right VU-meter [5].
- NOTE: Input 1 is mixed with Input 3. Input 2 is mixed with Input 4.

[2] Input 3 (Left channel) and 4 (right channel).

- The gain of input 3 can be adjusted by means of the IN Level 1/3 knob [13].
- The gain of input 4 can be adjusted by means of the IN Level 2/4 knob [14].
- The signal in input 3 is sent to the left input channel of the soundcard and to the left channel of Preamplifier output [11].
- The signal in input 4 is sent to the right input channel of the soundcard and to the right channel of Preamplifier output [11].
- The phantom power supply for Input 3/4 (3.6 V) can be enabled and disabled by means of the switch [12]
- The level of input 3 can be monitored by means of the left VU-meter [4]. The level of input 4 can be monitored by means of the right VU-meter [5].
- NOTE: Input 3 is mixed with Input 1. Input 4 is mixed with Input 2.

[3] Output of the Left and Right channels of the Soundcard

- The Stereo OUT Jack [9] left channel is wired to OUT left [3] and the Stereo OUT Jack [9] right channel is wired to OUT right [3].

[4] VU-Meter left

- It monitors Input signal 1 and Input signal 3 or the Stereo IN left channel.
- It provides a logarithmic 3 dB/step scale.
- It can be configured to show the Output signal by simply connecting the soundcard in loopback (input 1 or 3 to Out left) using the provided RCA-RCA cable. The output signal can then be taken from Pre-Amp OUT jack [11] and its level adjusted by means of the knob [13].

[5] VU-Meter right

- It monitors Input signal 2 and Input signal 4 or the Stereo IN right channel
- It provides a logarithmic 3 dB/step scale.
- It can be configured to show the Output signal by simply connecting the soundcard in loopback (input 2 or 4 to Out right) using the provided RCA-RCA cable. The output signal can then be taken from Pre-Amp OUT jack [11] and its level adjusted by means of the knob [14].

[6] Power supply led

- It lights when the device is connected to the computer usb port.

[7] Input 1 (Left channel) and 2 (right channel).

- Wired to IN 1/2 RCA inputs. See note [1] for a functionality description.

[8] Line/Mic selector

- It limits the gain input of the Preamplifier from about 34 dB (Mic position) to about 14 dB (Line position).

[9] Stereo OUT

- Output of Left and Right channels of the Soundcard.
- The Left channel is wired to OUT left [3], The Right channel is wired to OUT right [3].
- It can drive an Headphone.

[10] Phantom power supply for Input 1/2

- A low current 3.6 V phantom power supply is provided to input 1 and 2 when the switch is in the right position.
- The voltage is obtained from an 8.2KOhm resistor connected to a very clean source of 3.6 V. This voltage is suitable for most microphone electret capsules such as the Panasonic WM61 series.

[11] Pre-Amp OUT

- Output of Left and Right channels of the Preamplifier.
- It can be used for monitoring signals in Input 1/3 (left channel) and 2/4 (right channel).
- It can be used for listening the soundcard output, when the soundcard is connected in loopback. In this configuration the output level in Jack [11] can be adjusted by means of the knobs [13] and [14] and the output signal level is shown on the VU-meters [4] and [5].
- It can drive an Headphone.

[12] Phantom power supply for Input 3/4

- See note for switch [10].

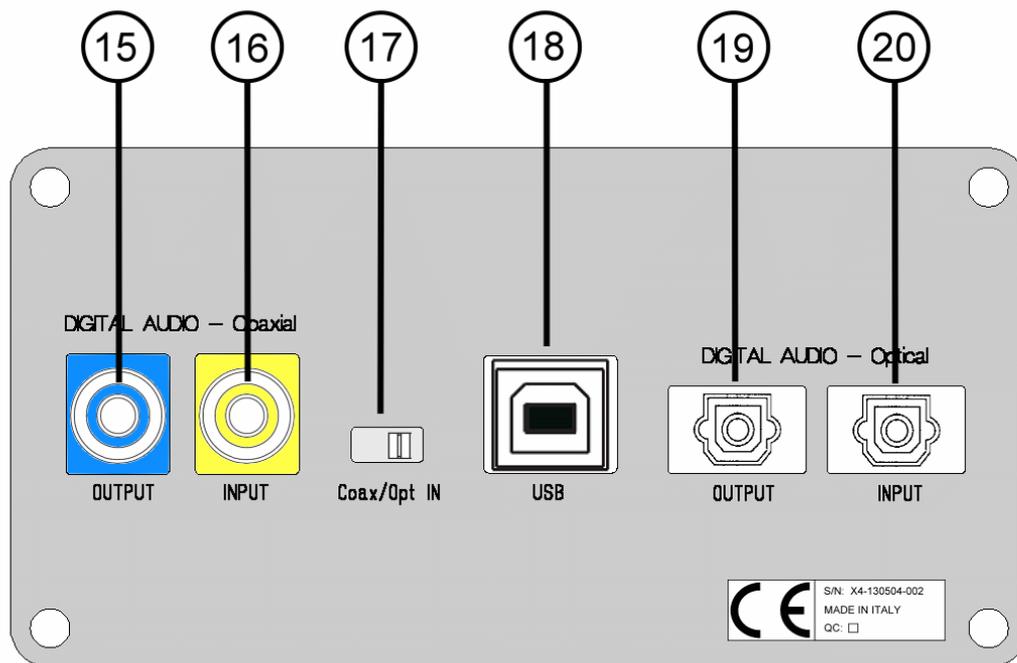
[13] IN Level 1/3

- Preamplifier Level gain for channels 1 and 3

[14] IN Level 2/4

- Preamplifier Level gain for channels 2 and 4

Rear Panel



[15] Digital Output

Standard S/PDIF digital output (coaxial) of the Soundcard output signal.

[16] Digital Input

Standard S/PDIF digital input (coaxial) of the Soundcard input signal.

[17] Coaxial/Optical IN

This switch allows the selection of Coaxial or Optical digital input.

[18] USB

USB connector. It allows to connect the soundcard to the PC by means of an USB cable.

[19] Digital Output

Standard S/PDIF digital output (optical) of the Soundcard output signal.

[20] Digital Input

Standard S/PDIF digital input (optical) of the Soundcard input signal.

Using the X4

Playing

When the USB device is connected to the computer, a new audio device will be automatically available in the system. If some other audio devices are present (such as a built-in soundcard on the motherboard or another soundcard), the USB audio device can be selected as preferred audio device in Windows from Control Panel / Multimedia properties.

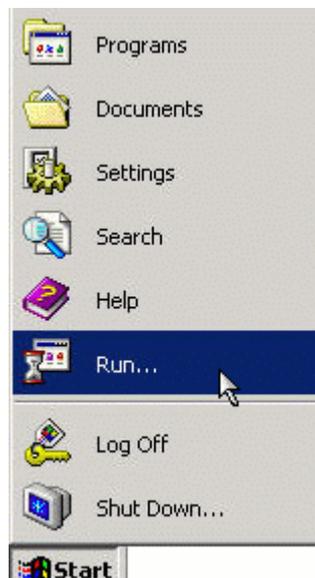
Alternatively, the USB audio device can be selected, among all other soundcards, from your audio software.

The X4 doesn't need any additional software setting to work. The sample rate is set automatically when the recording and/or playing of a sound is started.

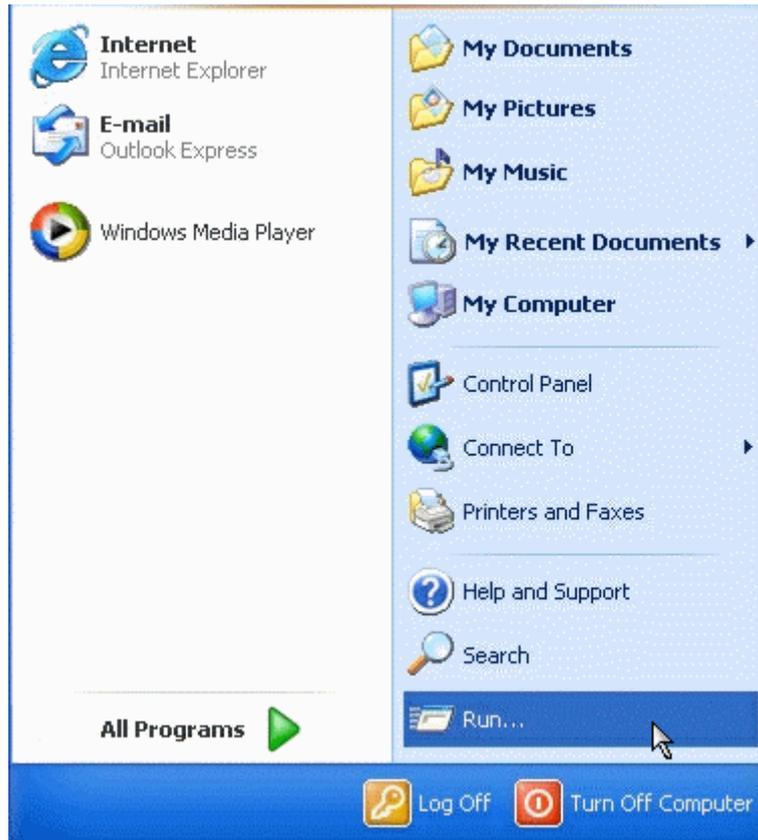
The standard Windows mixer can be used for adjusting the output sound level. It can be accessed from Windows taskbar START / Programs / Accessories.

The Windows mixer can be started also by writing SNDVOL32 in the "Run" field of Windows menu.

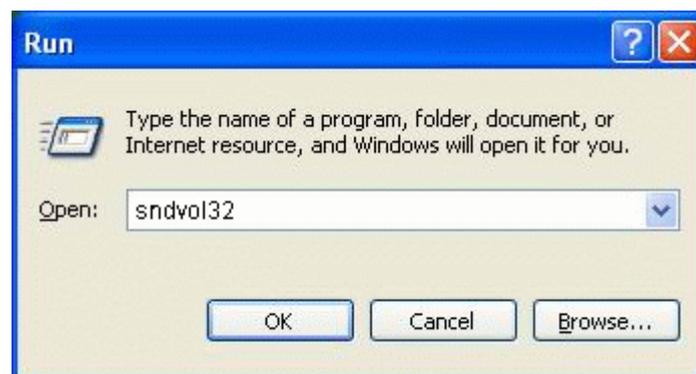
In Windows 98:



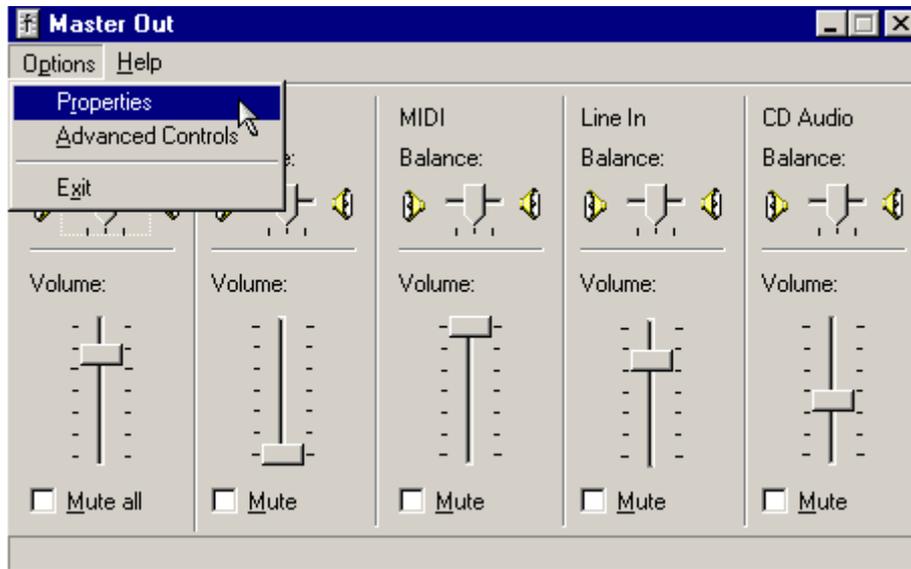
In Windows XP:



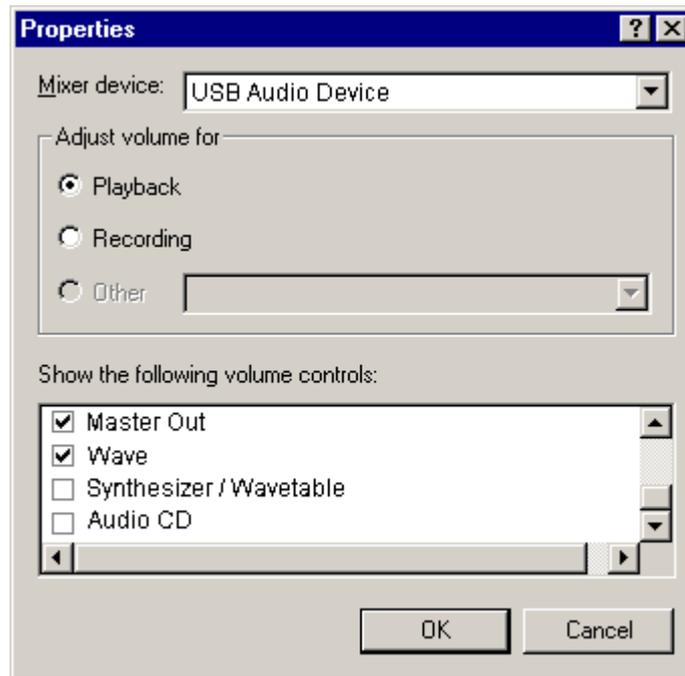
write SNDVOL32 in the next window:



The Windows mixer will be shown. If more than one soundcard is installed in your computer, the USB Audio Device must be selected in the Windows mixer. To do this, simply select the Options/Properties menu item:



and in the next window select **USB Audio Device** and the **Playback** section.

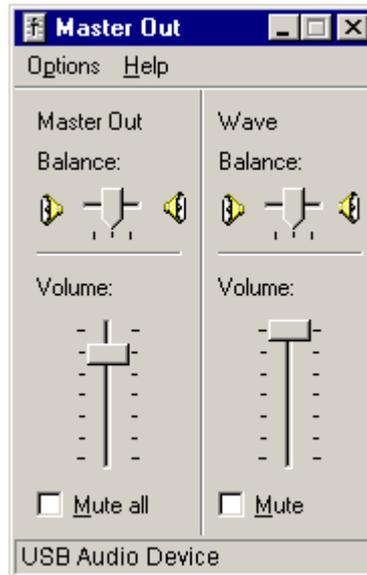


Enable the "Master Out" and "Wave" checkboxes and disable all other ones.

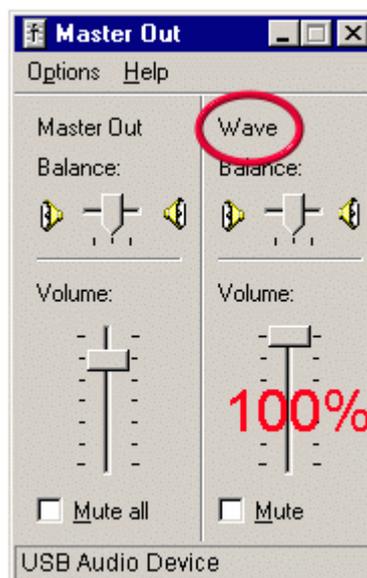
NOTE: the "Master Out" and "Wave" names could be different depending on your Windows operating system language settings.

NOTE: There is no **Recording** section available in the mixer for the X4. The input gain can be adjusted only using the knobs [13] and [14] in the X4 front panel.

Now the mixer will look as follows:



To obtain the best audio results it is recommended to keep always the **Wave** slider at the maximum level and to use the **Master Out** to adjust the output level.



NOTE: when a full-scale digital signal is played and the Wave slider is at 100%, it is recommended to keep the Master Out slider at about 80%. Otherwise a distortion could occur on the output.

This is a design choice: the internal gain of the output buffers are fixed in this way in order to offer an extra-gain amplification in case of low level signals.

The output level can be adjusted also by connecting the soundcard in **loopback**. In this configuration the output signal is taken from the Preamplifier output Jack and its level is displayed on the 2 VU-Meter bars.

Loopback configuration:



The picture above shows a loopback connection obtained by using the provided stereo RCA-RCA cable. The same connection can be obtained also by using a stereo JACK-JACK cable (connecting Stereo IN to Stereo OUT) or in other ways, for example using a stereo Jack to 2 RCA cable.

Recording, Microphone preamplifier, Phantom power

The USB soundcard gets the audio signals for recording from the inputs 1/2 [1], 3/4 [2] and Stereo IN [7]. Inputs 1/2 and 3/4 are mixed (1 and 3, 2 and 4) and can be used simultaneously. The Stereo IN [7] and inputs 1/2 [1] are wired and must not be used at the same time.

Examples of use:

- Live music recording: inputs 1 and 2 connected to 2 microphones (phantom power supply [10] ON), inputs 3 and 4 connected to PA mixer (phantom power supply [12] OFF).
- MLS analysis with Sample Champion measurement software (with autosync feature enabled): input 2 connected to OUT right, input 1 connected to the microphone.

NOTE: when the phantom power supply switches are enabled or disabled, please wait 2-3 seconds to allow the charge (or discharge) of the coupling capacitors. During this period of time the input will be not usable.

Digital input / output

The soundcard selects automatically a digital source when a digital signal is present on the rear panel coaxial or optical inputs.

To avoid disturbs or noise while recording from analog sources, it is recommended to set the Coaxial/Optical IN switch [17] on the right position (Optical IN) and to use the provided cap to close the optical input connector.

NOTE: the input signal (digital or analog) is not replicated on the digital or analog output; the soundcard cannot be used as a standalone DAC unit.

The output of the soundcard is always present on both the coaxial and digital S/PDIF outputs, and on the analog output.

The following data formats are accepted for digital input and output. All other data formats are unusable as S/PDIF.

- 48 kHz 16-bit Stereo
- 44.1 kHz 16-bit Stereo
- 32 kHz 16-bit Stereo

In playback, all possible data-rate sources are converted to the 16-bit stereo format at the same source data rate.

VU-Meters

The VU-meter [4] can monitor the Input signal 1 and Input signal 3 or the left channel of the Stereo IN signal. It can monitor the left channel output signal, in loopback configuration.

The VU-meter [5] can monitor the Input signal 2 and Input signal 4 or the right channel of the Stereo IN signal. It can monitor the right channel output signal, in loopback configuration.

They provide a 10 steps logarithmic 3 dB/step scale and are very useful to check and adjust the input signal level when recording.

CE Declaration of Conformity

This equipment has been tested and found to comply with the limits for:

CEI EN 55022 (Radiated and conducted Class B Emissions)

CEI EN 55024 (Radiated and conducted Immunity)

CEI EN 61000-4-3 (Radiated RF Immunity)

CEI EN 61000-4-2 (ESD Immunity)

Tested by Laboratorio CE s.a.s,
Via Garibaldi – 00010 Montelibretti (Roma) - ITALY
July 2004

Complete compliance documentation is available on request.

END USER WARRANTY

Purebits and its owner, Paolo Guidorzi, warrants the X4 unit audio interface against defects for a period of one year from the date of purchase. This warranty is non-transferable and is applicable only to the original purchaser.

Purebits will replace or repair any product recognized as defective.

This warranty cannot be applied to damages that are consequence of misuse or modifications. The device does not contain user-serviceable parts. Opening of the unit voids the warranty.

THIS PRODUCT IS DISTRIBUTED "AS IS". NO WARRANTY OF ANY KIND IS EXPRESSED OR IMPLIED. YOU USE THIS PRODUCT AT YOUR OWN RISK. THE MANUFACTURER WILL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL OR INCIDENTAL DAMAGES WHILE USING OR MISUSING THIS PRODUCT.

Technical support contact:

Paolo Guidorzi - Purebits.com

email: support@purebits.com

To obtain warranty service the purchaser must send an email request to the above address before returning the product. An authorization number and further instructions for the shipment will be sent to the purchaser. The returned unit must be shipped to Purebits offices in Italy with prepaid freight. Any other kind of shipment will be rejected.

If the defect is not a consequence of misuse or modification, the product will be replaced or repaired at no cost and returned to the user at no extra charge.

All features and specifications contained in this document are subject to change without notice.