

High Quality 192kHz DAC with USB Audio Interface

# **DR. DAC prime**

## **User's Guide**



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Revision 3, October 2011

**[www.esi-audio.com](http://www.esi-audio.com)**

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## 1. Introduction

Thank you for choosing the ESI Dr. DAC prime.

Dr. DAC prime provides everything you need in order to listen to digital music with pristine audio quality on the road or at your home. Dr. DAC prime works with up to 24bit/192kHz and is not only equipped with both an optical (via the included miniplug-toslink adapter) and coaxial S/PDIF input but also with a full USB audio interface (up to 24bit/96kHz) for bit-perfect audio transfer. Optionally the incoming signal can be upsampled to 192kHz, using a TI SRC4382 high end sample rate converter. The actual analog output signal is generated by a TI PCM1796 DAC with 123dB(a) dynamic range, featuring a full differential output with 3 LME49860NA opamps (8 pin) which are conveniently placed on sockets. The built-in headphone amplifier provides 1/8" and 1/4" connectors. The line output volume can be adjusted or fixed to send out the maximum dynamic range. But Dr. DAC prime is much more: it provides line inputs (AKM AK5386 ADC with 110dB) as well as optical and coaxial S/PDIF inputs, allowing you to record your own signals with excellent audio quality. Dr. DAC prime works under Windows XP, Windows Vista/7 as well as Mac OS X even without the installation of any driver software – that's Plug & Play in perfection, it could not be more simple.

## 2. Description

### 2.1 Front Panel



The front panel provides the following connectors and functions from left to right:

**POWER switch:** the *POWER* switch allows you to switch Dr. DAC prime *ON* or off (*STANDBY*).

**MUTE switch:** the *MUTE* switch allows you to mute the line output signal.

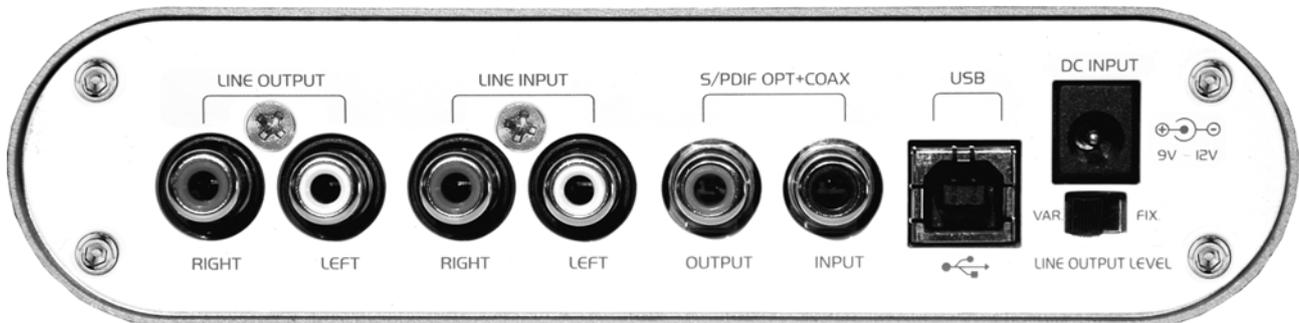
**UPSAMPLE switch:** this switch can be set to *192kHz* to enable upsampling of all incoming digital signals to 192kHz sample rate, to disable that function set it to *BYPASS*.

**SOURCE switch:** this 3-way switch allows you to select the signal source to be sent out through the line, headphone and S/PDIF digital outputs. It can be set to *ANALOG* (line input), *USB* (computer playback) or *DIGITAL* (optical or coaxial S/PDIF input).

**VOLUME knob:** this gain potentiometer allows you to control the output level of the headphone output as well as the line output (if the that has not been set to a fixed output level via the switch on the back panel).

**HEADPHONE outputs:** there is a 1/4" and a 1/8" TRS connector, allowing you to connect a headphone without the use of an adapter. Both headphone outputs send out the same signal.

## 2.2 Rear Panel



The rear panel provides the following connectors and functions from left to right:

**LINE OUTPUT connectors:** these two RCA connectors are the main analog line level output. For example, connect these to your active monitoring speakers or to your amplifier.

**LINE INPUT connectors:** the line input RCA connectors provide a stereo input. You can connect any analog source to this input (i.e. a CD player, tape deck, analog mixer, etc.).

**S/PDIF OPT+COAX digital in- and output:** the S/PDIF digital input and outputs are both provided as combo connectors supporting RCA connection for coaxial signals as well as optical signals with miniplug-cables. To connect optical Toslink cables, you will need to use one of the (included) Tosling-miniplug adapters.



**USB connector:** the USB connector allows you to connect Dr. DAC prime to your computer with the supplied USB cable.

**DC INPUT connector:** this connector is used to connect the included external power supply (see section 2.3) with Dr. DAC prime.

**LINE OUTPUT LEVEL switch:** this switch allows you to fix the line output level (*FIX*) or set it to variable (*VAR* – see section 3.2 for more details).

## 2.3 Power Supply

Dr. DAC prime comes bundled with an external power supply (12V and 1.5A). It's required for operation of Dr. DAC prime. Please make sure to connect it to the unit before you start using it.

## 3. Operation & Usage

### 3.1 Computer Interface

Dr. DAC prime works both standalone but also as a computer audio interface for recording and playback. One of the best features is its simplicity, you can simply plug in the unit with the provided USB cable to your Mac or PC. The hardware will automatically be detected and will be usable within seconds.

### 3.1.1 Installation & Connection

Dr. DAC prime is simply connected to an available USB port of your computer. The supplied USB cable connects to the *USB* connector on the back panel of Dr. DAC prime. The other end of the cable is plugged it into your computer.



*USB port of a computer*

After the connection of Dr. DAC prime, the operating system automatically detects it as a new hardware device. Modern operating systems like Windows XP, Vista/7 or Mac OS X usually detect the hardware directly and are installing the correct USB audio drivers automatically. You can use Dr. DAC prime instantly now.

### 3.1.2 Driver for Windows XP

Disconnect Dr. DAC prime before you install the driver if it has been connected already. Then launch *setup.exe* from the *Windows* folder of the included Installation CD or from a download of a recent driver from our website.

You will now see a dialog as shown on the left picture below. Click *Next*. You can define the target directory for the installation now. Confirm it with *Next*.



The installer now informs you that the driver installation will start as shown on the left picture below. Confirm this with *Next*. During the following process you will see a dialog box once or several times that informs you that the driver software has not passed Windows Logo testing. Please be assured that our drivers have been tested in various different ways and are OK to be used. Confirm any such dialog with *Continue Anyway*.



You will now be prompted to connect the hardware on the next dialog that is shown below on the left. Plug in Dr. DAC prime. Do not click *Next* yet. During the driver installation, Windows might again prompt you to confirm the Windows Logo testing dialog once or several times with *Continue Anyway* before the driver installation is finalized.



You can now finally click *OK* on the *Information* dialog and then proceed with *Continue Anyway* once or several times. The installation is now finished. To confirm this, please check if the ESI icon is displayed in the taskbar notification area as shown below.

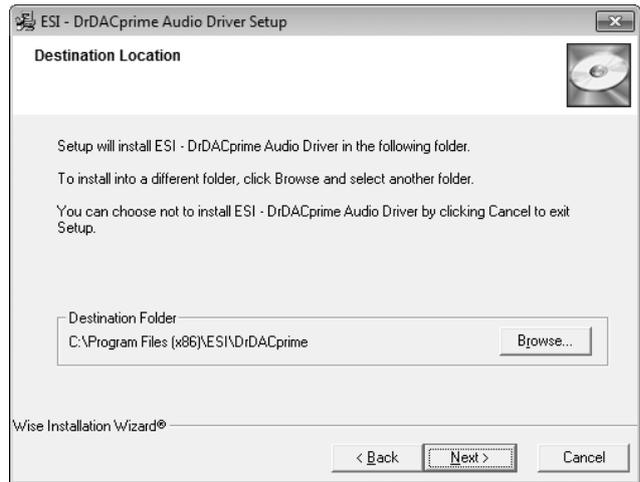
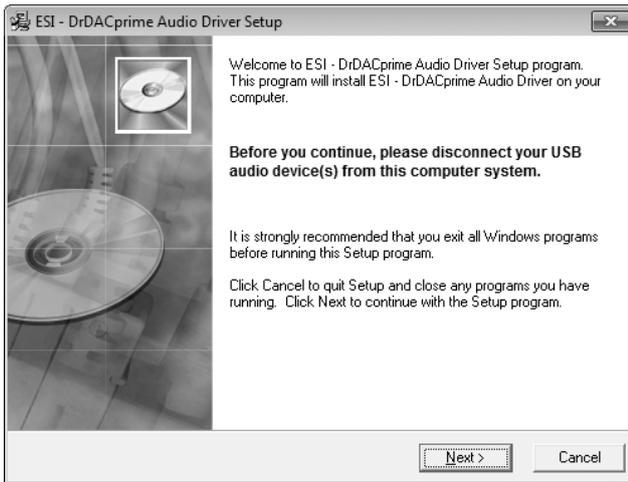


If yes, the driver installation has been completed successfully.

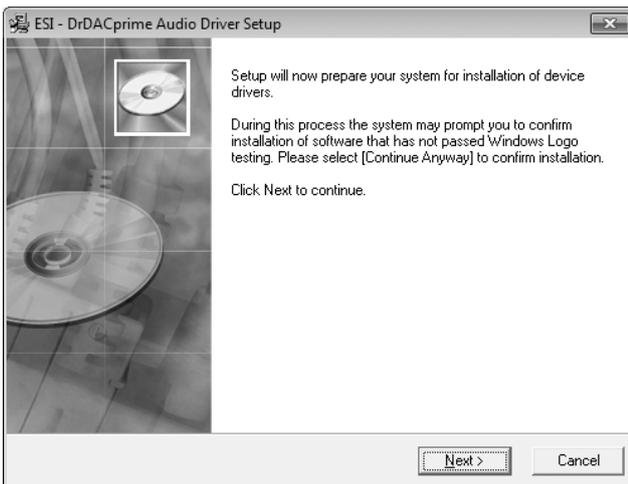
### 3.1.3 Driver for Windows Vista and 7

Disconnect Dr. DAC prime before you install the driver if it has been connected already. Then launch *setup.exe* from the *Windows* folder of the included Installation CD or from a download of a recent driver from our website.

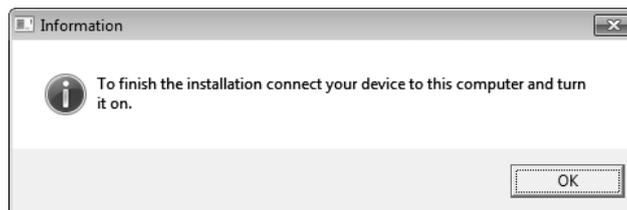
When launching the installation, Windows Vista / 7 might prompt a security message. Make sure to allow the installation. You will then see a dialog as shown on the left picture below. Click *Next*. You can define the target directory for the installation now. Confirm it with *Next*.



The installer now informs you that the driver installation will start as shown on the left picture below. Confirm this with *Next*. During the following process you will see a *Windows Security* dialog box once or several times that asks you for confirmation to install the driver software. Confirm any such dialog with *Install*.



You will now be prompted to connect the hardware on the next dialog that is shown below on the left. Plug in Dr. DAC prime. Do not click *Next* yet. Instead, wait a few seconds for the automatic device driver installation. You can monitor this in the task notification area where Windows Vista / 7 informs that the driver is installed via a bubble message box.



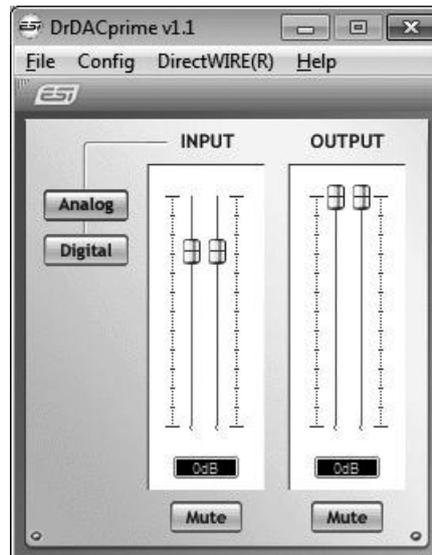
You can now finally click *OK* on the *Information* dialog. The installation is now finished. To confirm this, please check if the ESI icon is displayed in the taskbar notification area as shown below.



If yes, the driver installation has been completed successfully.

### 3.1.4 Control Panel for Windows

This chapter describes the Dr. DAC prime Control Panel under Windows. To open the control panel double click on the ESI icon in the task notification area. The following dialog will appear:



The panel has the following functions and sections:

**INPUT section:** this section controls the input monitoring volume of the incoming signal from the hardware. A pair of mono faders can be controlled together or individually depending on your mouse position. The *Mute* button at the bottom allows you to mute the signal. A red *Mute* button indicates that the mute function is enabled. When disabled, the button is gray.

Next to the *INPUT* section is the **Analog / Digital switch** that allows you to select the recording input source, either the analog line input or the digital S/PDIF input signal.

**OUTPUT section:** this section controls the playback volume of the playback signal from your audio applications. The pair of mono faders can be controlled together or individually depending on your mouse position – perfect for stereo signals. The *Mute* button at the bottom allows you to mute playback. A red *Mute* button indicates that the mute function is enabled. When disabled, the button is gray.

### 3.1.5 Audio Applications

Under Windows XP and Windows Vista you can select the USB Audio Device entry of Dr. DAC prime under *Control Panel > Sounds and Audio Device Properties > Audio* as default playback. Please also note that many applications require their individual settings.

Under Mac OS X, you can select and configure Dr. DAC prime via the *Audio MIDI Setup* application that you can find in your Applications folder.

Dr. DAC prime provides an audio device both for recording and for playback as it can replace your on board soundcard fully for all stereo playback and recording functions.

## 3.2 Digital to Analog Converter

Dr. DAC prime works as a digital to analog converter with extremely high quality.

The digital signal source can either be the optical or coaxial S/PDIF input on the rear panel (the *SOURCE* switch has to be set to *DIGITAL* in that case) or it can be the playback from your audio application when Dr. DAC prime is connected to a computer via USB (in that case, the *SOURCE* switch has to be set to *USB*).

The signal will be sent out through the line output (RCA connectors) on the back panel of Dr. DAC prime and will also be sent through the headphone outputs (see section 3.3).

### 3.2.1 Fixed Output Level

Dr. DAC prime has a great feature that ensures to provide the maximum dynamic range of any signal by providing a fixed output level (at the max. possible setting). To activate this, the *LINE OUTPUT LEVEL* switch on the back panel has to be set to *FIX*.

If you are changing the volume of the playback signal, you would typically do this on the amplifier connected to the line output of Dr. DAC prime.

### 3.2.2 Variable Output Level

If you need to control the volume directly on Dr. DAC prime (i.e. if you have connected it to active monitoring speakers), you should set the *LINE OUTPUT LEVEL* switch on the back panel to *VAR*. In this case, the playback volume for the line output signal is controlled by the *VOLUME* potentiometer on the front panel.

### 3.2.3 Mute Function for Line Output

The *MUTE* switch on the front panel allows you to mute the playback signal temporarily (if set to *ON*) for line output only. The headphone output signal (see section 3.3 for reference) is not affected by this.

### 3.2.4 192kHz Upsampling

Dr. DAC prime provides a powerful function to upsample any incoming digital signals to a 192kHz sample rate. To enable the upsampling function, the *UPSAMPLE* switch has to be set to *192kHz*, otherwise to *BYPASS*.

## 3.3 Headphone Amplifier

Dr. DAC prime can be used as a powerful headphone amplifier.

It provides two individual headphone outputs on the front panel, one with a 1/4" and one with a 1/8" TRS connector, allowing you to connect any current professional headphone without the use of an adapter. Both headphone outputs send out the same signal and can be used simultaneously.

All input signals (as selected via the *SOURCE* switch on the front panel) are routed to the headphone output. This means you can listen to signals from the *ANALOG*, *USB* and *DIGITAL* inputs, depending on the switch settings.

The playback volume of the headphone signal can be set using the *VOLUME* potentiometer on the front panel.

## 4. Specifications

### **Device Type:**

- digital to analog converter
- USB audio interface
- headphone amplifier

### **Key Specifications and Features:**

- max. 24bit/192kHz S/PDIF input: coaxial & optical combo receiver module
  - S/PDIF input => S/PDIF output bypass support
  - S/PDIF input => line & headphone output support
  - S/PDIF input => computer recording support
- max. 24bit/96kHz bit-perfect S/PDIF output: coaxial & optical combo transmitter module
  - USB input => S/PDIF output support
  - AC-3/DTS non-PCM pass thru support (Windows Vista)
- 24bit/192kHz upsampled S/PDIF output (optical & coaxial)
  - USB input => 192kHz S/PDIF output
  - coaxial input => 192kHz S/PDIF output
  - optical input => 192kHz S/PDIF output
- 2 3.5mm mini plug-toslink optical adapters bundled
- TI SRC4382 high-end combo sample rate converter: 32kHz ~ 192kHz input support
- S/PDIF & USB input bypass, 192kHz upsampling support with SRC4382
- +-1ppm 24.576MHz TCXO for S/PDIF input
- Tenor TE7022L USB audio controller
- +-1ppm 12.000MHz TCXO for USB input to S/PDIF / I2S output
- 2 channel line input with RCA connectors
  - line input => line output & headphone output support
  - AKM AK5386 24bit/192kHz ADC (S/N ratio 110dB)
  - lpc 8pin DIP opamp (S4580P) with socket
- 2 channel line output with RCA connectors
  - anti-pop circuit support
  - Triple opamp fully differential output: 3pcs 8pin DIP opamp (LME49860NA) with socket
  - TI / Burr Brown PCM1796 24bit/192kHz 123dB DAC
- stereo headphone output
  - 6.3mm / 1/4" headphone jack
  - 3.5mm / 1/8" headphone jack
- volume control gain knob
  - fixed line level output - FIX
  - variable line level output - VAR
  - high-quality analog volume potentiometer
  - aluminum cut volume knob
- line output switch for fixed (FIX) or variable (VAR) output volume
- source selection (USB-ANALOG-DIGITAL switch): 3 position toggle switch with LEDs (green)
- line output mute on/off switch (has no effect on headphone output)

- standby/power on switch
  - standby (red)
  - power on (blue)
- S/PDIF & USB input bypass / 192kHz upsampling: 2 position toggle switch
- multi-colored LED display
  - MUTE (red)
  - NO SIGNAL (orange)
  - NON-PCM (pure green)
  - PCM (pure green)
  - 192kHz upsampling (pure blue)
- DC 9V~24V wide range power input
- 12V / 1.5A DC adapter included

## 5. General Information

### 5.1 Trademarks

ESI, Dr. DAC, and Dr. DAC prime are trademarks of ESI Audiotechnik GmbH. Windows is a trademark of Microsoft Corporation. Other product and brand names are trademarks or registered trademarks of their respective companies.

### 5.2 The FCC and CE Regulation Warning

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions : (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Caution: Any changes or modifications in construction of this device with are not expressly approved by the party responsible for compliance, could void the user's authority to operate equipment.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. If necessary, consult an experienced radio/television technician for additional suggestions.

### 5.3 Correspondence

For technical support inquiries, contact your nearest dealer, local distributor or ESI support online at [www.esi-audio.com](http://www.esi-audio.com).

### 5.4 Disclaimer

All features and specifications subject to change without notice.

Parts of this manual are continually being updated. Please check our web site [www.esi-audio.com](http://www.esi-audio.com) occasionally for the most recent update information.