

# **La Scala MKII Optologic D / A converter**

**Owner's Manual**

**Rev 3.1**

## IMPORTANT SAFETY NOTICES



The triangle with the lightning flash symbol displayed on the unit advises the user of dangerous uninsulated voltage inside the product's enclosure.

To reduce the risk of electric shock, do not remove the cover.

The triangle with the exclamation point symbol on the component suggests that the owner refer to important operating and maintenance instructions in the owner's manual.

### WARNING

Modifications and alterations not approved by the manufacturer may violate adherence to EC regulations and make the appliance no longer suitable for use. The manufacturer declines all responsibility for damage caused to persons or property due to the misuse or malfunction of device subject to unauthorized change.

### CAUTION

In order to make changes that improve the already excellent quality of its products, Aqua - Acoustic Quality reserves the right to modify the information or the contents of this manual at any time and without notice.

## WARRANTY STATEMENT

Aqua Acoustic Quality (Aqua) equipment is supported, and serviced through the worldwide network of distributors and dealers listed within a section of the website.

The authorized retailer provides the end customer with the dealer's warranty, the terms of which vary according to the country's rules, within European Union generally two ( 2 ) or more years.

**Warranty service should normally be obtained from the importing distributor or retailer from whom you purchased the product. The authorized importing distributor or retailer accepts the responsibility for the warranty of products sold by that distributor or dealer.**

In the unlikely event of service required beyond the capability of the importing distributor or retailer, the customer can contact the manufacturer directly and Aqua will provide the manufacturer's warranty. The manufacturer's warranty for a term of one (1) year from the date the unit was originally shipped from aqua, in order to protect our customers from illegitimate resellers.

This manufacturer's warranty is subject to the following terms and conditions:

- in case of a defect covered by this warranty, Aqua will provide without charge the materials and labor necessary to restore the product to its original specifications. In the alternative Aqua may at its sole option either replace the product with a new one of the same or equivalent model in the Aqua production, or refund the purchase price of the product.

The warranty does not apply:

- if the product has not been purchased from an authorized Aqua Dealer
- to damage caused by accident, abuse, misuse or misapplication
- if the product presents changes, modifications or repairs not expressly approved by the manufacturer
- if the Serial Number of the product is absent or altered
- if the product is shipped to Aqua without an adequate package

If vacuum tubes are contained in the product, they are warranted for 90 days from the date of purchase of the original purchaser.

NOS (New Old Stock) components are excluded from the warranty.

The warranty is provided to the original purchaser only, that must provide the original sales receipt containing product name and purchase date. If during the warranty period the product ownership is transferred, the warranty will terminate at the date of the ownership transfer.

The warranty does not cover shipping charges or tax/duty: shipments of the product to Aqua for repair, and shipments to the owner of the serviced product are at the owner's expense

Aqua reserves the right to apply a service charge if the product returned for warranty repair is found to be operating correctly.

Recommended procedure to obtain the repair service (during warranty period and outside)

Contact Aqua, preferably via e-mail at support@aquahifi.com, and briefly describe the problem. In case it is necessary to send the product for repair, Aqua will provide you an RMA number (Return Merchandise Authorization) to return your unit.

This number is required to obtain the repair service: any unit received without an RMA number will be returned to the sender.

The RMA number can be issued only by Aqua staff, you will receive it via e-mail or other means indicated by you.

Please write the RMA number clearly visible on the outside of the package.

### **THIRD PARTY CONTENT AND TECHNOLOGIES**

In its operation, the device uses or may use some services or technologies provided by third parties (e.g. streaming services, software applications/libraries and similar).

These services, software applications or products are outside the control of aqua.

Consequently, these services or products are not covered by the warranty. aqua disclaims any liability relating to them, in particular those related to service interruptions or malfunctions of the services/products provided by third parties.

## **GENERAL SAFETY INFORMATION**

The following general safety precautions must be observed during all phases of operation of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the equipment. Aqua - Acoustic Quality assumes no liability for the customer's failure to comply with these requirements.

- DO NOT operate the product in an explosive atmosphere or in the presence of flammable gases or fumes. For continued protection against fire, replace the line fuse(s) only with fuse(s) of the same voltage and current rating and type. DO NOT use repaired fuses or short-circuited fuse holders.
- Keep away from live circuits. Operating personnel must not remove equipment covers or shields. Procedures involving the removal of covers or shields are for use by service-trained personnel only. Under certain conditions, dangerous voltages may exist even with the equipment switched off. To avoid dangerous electric shock, DO NOT perform procedures involving cover or shield removal unless you are qualified to do so.

- DO NOT operate damaged equipment. If the built-in safety protection features have been impaired through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use product until safe operation is verified by service-trained personnel. If necessary, return the product to Aqua - Acoustic Quality for service and repair to ensure that the safety features are maintained.
- DO NOT service or adjust alone. Do not attempt any internal service or adjustment unless a person capable of rendering first aid and resuscitation is present.
- DO NOT substitute parts or modify equipment. To avoid the occurrence of additional hazards, do not install substitute parts or perform any unauthorized modification to the product. Return the product to Aqua - Acoustic Quality for service or repair to ensure that the safety features are maintained.

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# 1. Operation and Features

Make sure the supplied voltage is the one required by the device. Please ensure the quality of the connecting cables, paying particular attention the coaxial / AES EBU digital cable. Often, numerous tests have revealed the importance of this cable for obtaining the best sound quality. The transport unit which is responsible for the extraction of numeric data, is affected by jitter, which is non-temporal coherence. In more recent years, this issue has been taken seriously by some manufacturers, significantly improving the results in terms of sound quality. Aqua - Acoustic Quality counsels that this quality should be carefully assessed in order to achieve the desired result.

## Key features

- High performance proprietary FPGA-based digital decoding without digital filter
- Galvanic and magnetic isolations between the FPGA and the four branches of the R2R ladder converter
- Custom designed discrete circuit with high-speed optocouplers for Galvanic and magnetic isolation between Digital stage and Analog DAC ground
- Jitter free digital interface AQLink PRO (I2S protocol), uncompromising digital connection to La Diva cd transport
- Zero S/PDIF Jitter design, digital receiver stage PLL (phase locked loop) technology
- High-performance AQ Discrete Regulator (MOSFET, J-FET, BJT) for analog and digital DAC's power supply
- Valve-Mosfet direct coupling analog stage in pure class-A without negative feedback
- MOSFET Virtual battery circuit for analog anode supply
- Soft-start power up for extended tube life
- MODULAR DESIGN with upgradeable multi board platform
- 2 separate low noise power transformers, one for the analog and one for the digital section
- Transformer-based true balanced audio output stage
- Regulated DC filament supplies with soft start for tubes
- Fully discrete analog stage
- Proprietary USB Firmware / driver :  
Apple MAC OS - Linux OS : USB asynchronous native support, no need to install drivers software
- Fully upgradeable asynchronous USB high-speed module with resolution up to 24 bit and 384 KHz, operates with computers running OSX 10.7 and above, WINDOWS XP, 7, 8 and 10 ASIO bit perfect
- Digital phase selector on front panel
- High-quality parts selected for sound quality:
  - 105° long life capacitors
  - low noise Metal Foil ultra-precision resistors
  - double metallized film pulse capacitor
  - ultra-fast diodes
  - halogen free cables
- Aluminium anti-resonant cabinet with Nextel
- Designed and handmade in Italy

## 2. Specifications

Digital to analog conversion type	Proprietary Optologic DAC Pure R2R ladder - FPGA (Field Programmable Gate Arrays) based without digital filter
Supported Native Sample Rates	AQlink / I2S serial bus - USB PC Audio : 44.1kHz to 384kHz PCM up to 24 bits DSD64, DSD128 Supports DSD via DoP on all inputs
DAC architecture	Multibit sign magnitude R2R ladder (upgradable)
Asynchronous USB (High Speed)	USB Audio Class 2 with Type B connector
Digital Receiver	PLL (phase locked loop) technology 128 or 256 FS selectable
AQlink (I2S bus)	LVC MOS level
Oversampling factor	1x
Analog Conversion method	Pure R2R ladder - FPGA (Field Programmable Gate Arrays) based digital decoding without digital filter
Digital inputs	- RJ45 AQlink (I2S serial bus) - PCM 24 bit / 384kHz – DSD64, DSD128 via DoP - BNC coax (S/PDIF) 75 ohm - PCM 24 bit / 192kHz – DSD64 via DoP - RCA coax (S/PDIF) 75 ohm - PCM 24 bit / 192kHz – DSD64 via DoP - AES/EBU balanced 110 ohm - PCM 24 bit / 192kHz – DSD64 via DoP - USB port - PCM 24 bit / 384kHz – DSD64, DSD128 via DoP Modular input: - RCA coax (S/PDIF) 75 ohm - PCM 24 bit / 192kHz – DSD64 via DoP Options: - AT&T (ST Fiber) - PCM 24 bit / 192kHz – DSD64 via DoP - Optical TOSLINK - PCM 24 bit / 96kHz – DSD64 via DoP
Analogue Outputs	UNBAL 2 RCA Output 2.2 V RMS BALANCED ( passive transformer's symmetrical ) 2 XLR Output : 2.2V RMS
Output Impedance	100 Ω RCA - 600 Ω XLR
Load Impedance	10 k Ω (min.) RCA - 600 Ω XLR
Frequency Response	20Hz to 22kHz +0.5dB/-0.5dB
THD + N	<0.1% 1KHz -20dB
Front Panel	Power, input selector, Phase Invert switch
Power Consumption	100-115V / 220-240V; 50 or 60Hz - 88VA
Dimensions	( W x D x H ) 450 x 370 x 100 mm
Weight	9 kg
Front finish	Satin Alu Silver or Satin Black
Case finish	Grey Nextel powder coated



### 3. Analog stage

Aqua – Acoustic Quality R & D department has developed a single-stage signal amplifier. It uses VALVE / MOSFET direct-coupled. The first stage uses ECC81, a High-Frequency triode noted for its low noise characteristics. This is direct connected to High-Voltage MOSFET, which allows particularly :

- simplicity
- wide bandwidth
- fast response
- no overshoot, no ringing, no roll-off
- lower output impedance compared to conventional circuits
- no feedback
- low distortion

La Scala MKII uses long-life valves with an average life of approximately 10,000 hours.

## WARNING

- DO NOT substitute parts or modify equipment. To avoid the occurrence of additional hazards, do not install substitute parts or perform any unauthorized modification to the product. La Scala MKII is equipped with a virtual-battery power supply. Dangerous voltages may exist even with the equipment switched off.

### 4. Front panel

On the front panel, you will find:

- power on/off switch
- rotary switch for selection of the digital input
- PHASE ( 0 / 180 ) switch
- LED power indicator

## 5. Back panel

On the rear panel, you will find:

- IEC connector of the power supply (220-240V or 100-120V).
- Digital inputs :
  - RJ45 Aqlink (I2S serial bus) - PCM 24 bit / 384kHz – DSD64, DSD128 via DoP
  - BNC coax (S/PDIF) 75 ohm - PCM 24 bit / 192kHz – DSD64 via DoP
  - RCA coax (S/PDIF) 75 ohm - PCM 24 bit / 192kHz – DSD64 via DoP
  - AES/EBU balanced 110 ohm - PCM 24 bit / 192kHz – DSD64 via DoP
  - USB port - PCM 24 bit / 384kHz – DSD64, DSD128 via DoP

Modular input:

- RCA coax (S/PDIF) 75 ohm - PCM 24 bit / 192kHz – DSD64 via DoP

Options:

- AT&T (ST Fiber) - PCM 24 bit / 192kHz – DSD64 via DoP
- Optical TOSLINK - PCM 24 bit / 96kHz – DSD64 via DoP

- The TX LED which indicates the timing of the digital signal S/PDIF / AES/EBU

- analog outputs :
  - RCA single-ended
  - XLR balanced symmetrical

For the best sonic results, please do NOT use at the same time the RCA single-ended and XLR balanced.

### PIN ASSIGNMENT

The pin assignments of all of the XLR-type male analog outputs, the XLR-type female digital inputs are as follows:



- Pin 1: Signal ground
- Pin 2: Signal + (non-inverting)
- Pin 3: Signal - (inverting)
- Connector ground lug: chassis free

## 6. PC connection

**ADVICE: Windows users must install the driver prior to connecting the USB cable to the PC** (please refer to download section <http://www.aquahifi.com/download.html> ).

The USB cable that connects to a PC, must conform to the 2.0 specifications, and should be of adequate quality. Please avoid using cable more than 2m, to avoid invalidating the bus performance

### True plug'n'play operation with Mac

Mac computers with OSX 10.6.4 and later have a native support for audio devices compliant with **USB Audio Class 2.0**. This means that the driver is already included in the operating system and the user needs not to install anything. Just connect the La Scala MKII DAC to your Mac and it will be immediately recognized by the OS and ready to use. Macs with older OS need update.

To use aqua USB as output device for your Mac, you need to select it as default output device from the **Audio Control Panel (Preferences -> Sound)**.

After selecting aqua USB, please check settings, you can select the sampling frequency fixed for La Scala MKII DAC, regardless the native sampling frequency of all audio tracks.

For the best sonic results, you may want to use a player which follow the native frequency of the tracks, like **Sonic Studio Amarra** or **Channel D Pure Music**.

### True plug'n'play operation with Linux

PC with Linux 1.0.24 and later have a native support for audio devices compliant with **USB Audio Class 2.0**. This means that the driver is already included in the operating system and the user needs not to install anything. Just connect the La Scala MKII DAC to your PC with Linux and it will be immediately recognized by the OS and ready to use.

### Windows XP, VISTA, 7, 8 O.S.

For the best sonic results, you may want to use a player which support **ASIO\***, like **foobar** or **JRiver Media Center**

\*ASIO is a trademark of Steinberg Media Technologies GmbH

Handcrafted in Italy

aqua - acoustic quality

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