

# M2TECH EVO DAC

HIGH PERFORMANCE 192/32 DIGITAL-TO-ANALOG CONVERTER

USER MANUAL



REV. PRA – 9/2011

## Warning!

***Changes or modifications not authorized by the manufacturer can invalidate the compliance to CE regulations and cause the unit to be no more suitable to use. The manufacturer refuses every responsibility regarding damages to people or things due to the use of a unit which has been subject to unauthorized modifications or to misuse or to malfunction of a unit which has been subject to unauthorized modifications.***



This unit is compliant with the following CE regulations: CEI EN 55022:2009 Class B (Radiated Emissions), CEI EN 55024:1999, CEI EN 55024:A2/2003, CEI EN 55024:IS1/2008 (Radio Frequency Electromagnetic Fields, 50Hz Magnetic Field Immunity Test and Electrostatic Discharges – ESD).

## Recycling



The label above, printed on the product case, indicates that the product, when no more usable, can't be treated as generic garbage, but must be disposed of at a collection point for recycling of electrical and electronic equipment, in compliance with the WEEE regulation (Waste of Electrical and Electronic Equipment).

By making sure that this unit is correctly recycled, you will help preventing potential damages to environment and human health, which could be caused by a wrong treatment of this product as generic garbage. Materials recycling helps saving natural resources. For more in-depth information about recycling this product, please contact M2Tech Srl.

Dear customer,

thank you for purchasing EVO DAC. What you have is a high performance digital-to-analog converter with many unique features conceived to obtain the best audio performance in conjunction with the HIFACE EVO as well as stand-alone.

EVO DAC features a latest generation D/A integrated circuit, a low jitter AES receiver for S/PDIF and Toslink inputs and an I<sup>2</sup>S input compliant with HIFACE EVO I<sup>2</sup>S output. The output buffer is based on a low-noise, low-distortion opamp, while all anti-alias filter capacitors are polypropylene film capacitors.

An EVO DAC connected to a computer via an HIFACE EVO by their I<sup>2</sup>S ports make a zero-jitter system capable of very high performance.

Gold plated RCA connectors ensure perfect contacts and life-long trouble-free operation.

We feel that your expectations will be fulfilled by EVO DAC: you'll hear your music, whether in files or from a digital player, in a way like never before, prepare for a whole new experience!

Nadia Marino, CEO

Please annotate here your EVO DAC serial number for future reference:

S/N: \_\_\_\_\_

Date of purchase: \_\_\_\_\_

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## 1. Unpacking

The EVO DAC box contains the following items:

- EVO DAC
- 9V/2A wall adaptor

Should any item be missing, please contact your dealer for a warranty claim.

## 2. Front Panel

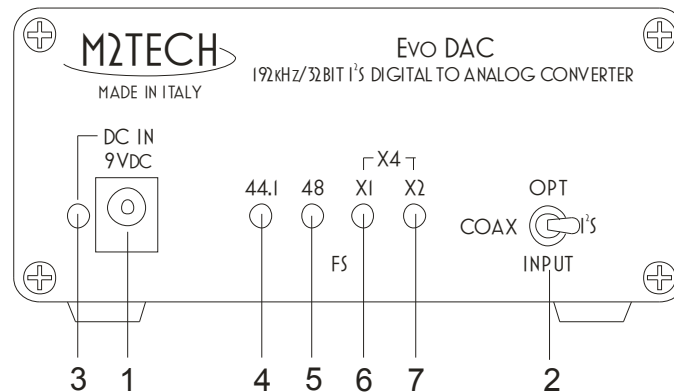


Figure 1

**1) Supply input.** Apply 9V<sub>DC</sub> from the wall adaptor provided in the package or from an EVO SUPPLY. Another power supply may be used if necessary, but user must be aware that in this case the warranty is void. Tip is positive, ring is negative. A minimum current of 500mA is necessary. This input is protected against polarity inversion.

**2) Input switch.** Allows for selection of the input: coaxial S/PDIF (left), optical Toslink™ (center), I<sup>2</sup>S (right).

**3) Power indicator.** Turns on when the stock wall adaptor or the EVO SUPPLY are connected to the EVO DAC.

**4-5) Base sampling frequency indicators.** The sampling frequencies of all music files can be grouped in two categories: those which are multiples of 44.1kHz (that is: 44.1kHz itself, 88.2kHz and 176.4kHz) and those which are multiples of 48kHz (that is: 48kHz itself, 96kHz and 192kHz). When the EVO DAC is not locking any incoming signal, then both indicators will be off. When the EVO DAC is locking a signal which sampling frequency is from the first group, then indicator 4 will lit. When the EVO DAC is locking a signal which sampling frequency is from the second group, then indicator 5 will lit.

**6-7) Sampling frequency multiple indicator.** Together with indicators 4 and 5, these two indicators display the incoming signal's sampling frequency. When indicator 6 lits, then the base sampling frequency displayed by indicators 4 and 5 must be multiplied by "1". When indicator 7 lits, then the base sampling frequency displayed by indicators 4 and 5 must be multiplied by "2". When both indicators 6 and 7 lit, then the base sampling frequency displayed by indicators 4 and 5 must be multiplied by "4". Some examples follow:

- a) 44.1 kHz: indicators 4 and 6 lit (base is 44.1, multiple is "x1");
- b) 96kHz: indicators 5 and 7 lit (base is 48, multiple is "x2");
- c) 192kHz: indicators 5, 6 and 7 lit (base is 48, multiple is "x4");

### 3. Back Panel

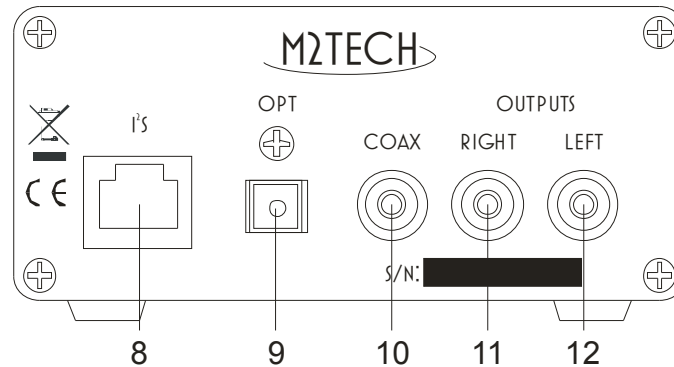


Figure 2

**8) I<sup>2</sup>S input.** Connect the I<sup>2</sup>S output of the HiFACE EVO to this input using a straight CAT-5 cable (not included). Please avoid using long cables in order to preserve the great jitter performance of this connection. 50cm or 1m cables are preferred. This input allows for up to 192kHz operation and up to 32 bits resolution.

**9) Toslink™ input.** Legacy Toslink™ receiver for compatibility. Connect this input to the Toslink™ output of a digital source (CD player, digital receiver, computer...) using a Toslink™ optical fiber interconnect. This input allows for up to 96kHz operation and up to 24 bits resolution.

**10) S/PDIF input.** Connect this input to the S/PDIF output of a digital source (CD player, digital receiver, computer, hiFace...) using a 75 Ohms digital interconnect. This input allows for up to 192kHz operation and up to 24 bits resolution.

**11-12) Analog outputs.** Connect these outputs to the inputs of a preamplifier or integrated amplifier using an RCA interconnect, following the color codes: red is for right channel, while white or black are for left channel. These outputs should not drive a power amplifier directly.

## 4. Connections

Connect the digital source(s) to the EVO DAC (Page 7, nos.8-10) using suitable interconnects.

Connect the analog outputs of the EVO DAC (Page 7, nos.11-12) to the preamplifier or integrated amplifier. DO NOT connect these output directly to a power amplifier: no volume control is available, so very high levels are obtained which could damage the loudspeakers.

Connect the output plug of the wall adaptor or EVO SUPPLY to the supply connector (Page 6, no.1) of EVO DAC.



## 5. Digital Audio connections and jitter

Usual digital audio connections all suffer, to a certain extent, a problem called jitter. Jitter is an uncertainty in the timing of samples arrival to the DAC, due to the fact that the connections carry more than one signal on a single wire or fiber: data, sampling frequency and bit clock, all mixed in a way that the receiver can separate them.

Noise and the separation process itself produce jitter, which is then transferred to the conversion IC. The final result is an analog signal affected by the jitter effects: a higher noise floor and spurious (distortion tones) in the signal. Dynamic, low-level detail and imaging all are affected by jitter

The only way to avoid injecting jitter into the conversion IC and, in turn, into the analog signal without complicated retiming circuits is to transfer all three signals (data, sampling frequency and bit clock) each on its dedicated wire. This is accomplished using I<sup>2</sup>S, an audio signal transfer standard usually implemented inside equipment, between IC's. An I<sup>2</sup>S path is made of three wires (plus the ground reference).

Of course, I<sup>2</sup>S itself cannot ensure low jitter, as noise coupled to the sampling frequency wire can still produce jitter. For this reason, the transmitter needs to use high current drivers in order to reduce the line sensitivity to external noises coupled to its output impedance. Moreover, the cable needs to be adequately shielded. M2TECH uses CAT-5 connectors and cables in order to provide good shielding of the delicate I<sup>2</sup>S signals. The I2S output of the HIFACE EVO is driven by high current drivers.

By connecting the HIFACE EVO to the EVO DAC using the I<sup>2</sup>S connection a virtually zero-jitter transfer is implemented. This way, the great jitter performance of the HIFACE EVO USB interface can be transferred down to the EVO DAC analog outputs, allowing for a sonic performance hardly matched by a plain S/PDIF DAC.

Even better performance can be obtained by powering EVO DAC (and HIFACE EVO if used) from the EVO SUPPLY, which provides a cleaner supply than the stock wall adaptor. Less supply noise means less jitter.

## 6. Technical Specifications

Supply voltage: .....	9V <sub>DC</sub>
Power consumption: .....	350mA
Input sampling frequencies (kHz): ....	44.1, 48, 88.2, 96, 176.4*, 192*
Resolution: .....	up to 32 bits (I <sup>2</sup> S input), up to 24 bits (coax and Toslink™ inputs)
Output voltage: .....	2.7V <sub>RMS</sub>
THD+N: .....	0.002% (@ 1kHz, 0dBFS)
SNR: .....	118dB ("A" weighted)
Operative temperature range: .....	0°C to 40°C
Size: .....	105x50x104mm (cabinet) 105x50x150mm (with connectors)
Weight: .....	400g

\* Not on Toslink™