

# M2TECH

## EVO CLOCK

HIGH PERFORMANCE CLOCK GENERATOR

### USER MANUAL



## 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 CLOCK. What you have is a high performance word clock and master clock generator with many unique features conceived to obtain the best audio performance in conjunction with the HIFACE EVO as well as stand-alone.

EVO CLOCK features two high precision, low phase noise temperature compensated crystal oscillators, custom-made for M2Tech, low-noise regulators to avoid injecting jitter by the supplies, transformer-coupled outputs and a wide range of frequencies. Two outputs are available: one is specifically designed for the HIFACE EVO, the other is for more general usage with other market equipment which accept word clocks. 75 Ohms impedance matching is an option for the word clock output.

An HIFACE EVO fed by the very stable and clean clock from an EVO CLOCK delivers very high performance, better than those allowed by the stock (and cheaper) oscillators inside the HIFACE EVO.

We feel that your expectations will be fulfilled by EVO CLOCK: you'll hear your music in a way like never before, prepare for a whole new experience!

To further increase the jitter performance from your EVO CLOCK, we suggest using an EVO SUPPLY to power it.

Nadia Marino, CEO

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

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

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

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## 1. Unpacking

The EVO CLOCK box contains the following items:

- EVO CLOCK
- 9V/2A wall adaptor

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

## 2. Front Panel

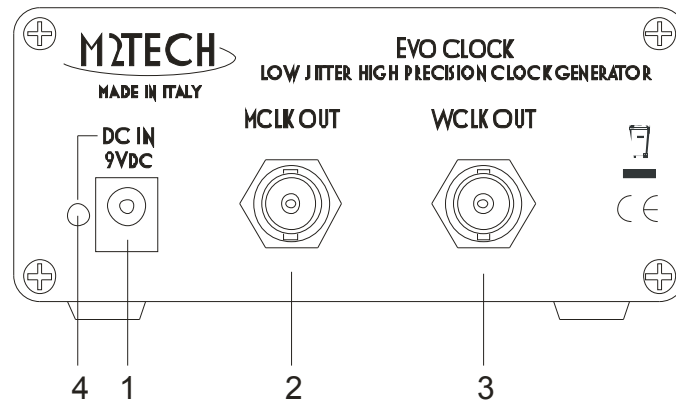


Figure 1

**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) MCLK output.** Master clock output dedicated to the HiFACE EVO. This output delivers 22.5792MHz or 24.576MHz, with 3.3V<sub>pp</sub> on 75 Ohms load. This output may also be used with other equipment, but users must be aware that connecting to a high impedance load may lead to voltages outside the allowed range for logic circuits. A 75 Ohms cable should be used for best performance.

**3) WCLK output.** Word clock output. This is a very versatile output which delivers all the most common word clocks, including some “super clocks” at 5.6448MHz (44.1kHz \* 128), 6.144MHz (48kHz \* 128), 11.2896MHz (44.1kHz \* 256) and 12.288MHz (48kHz \* 256). Output impedance can be low-Z (3.3V<sub>pp</sub> on high impedance load) or 75 Ohms (3.3V<sub>pp</sub> on 75 Ohm load for matched connection). When the latter option is selected, a 75 Ohms cable should be used for best performance.

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

### 3. Back Panel

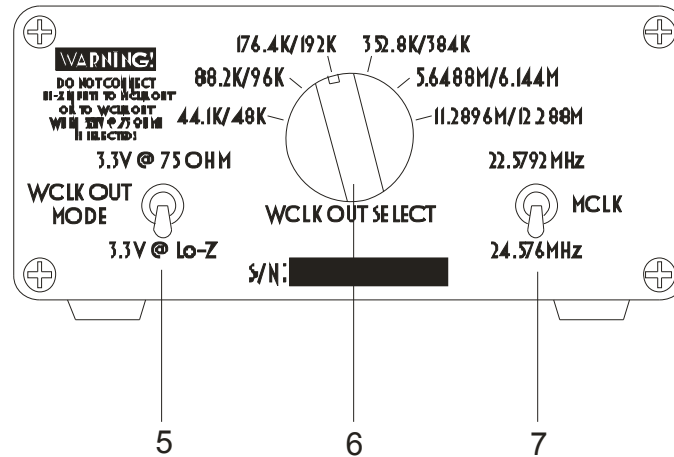


Figure 2

**5) WCLK output impedance selector.** Allows to choose the matching mode for the WCLK output. The upper position is for 75 Ohms matched lines, the lower position is for high impedance WCLK inputs. When in doubt, try first the latter setting to avoid damages to high impedance inputs driver by a 75 Ohms generator (in fact, when a 75 Ohms generator is connected to a high impedance load, the actual output level is double as the voltage obtained when the load is 75 Ohms).

**6) WCLK selector.** This rotary switch allow for selecting between the various WCLK and “super clock” frequencies that can be obtained at the WCLK output. Each position selects a pair of values, the effective selected value depending on the setting of the MCLK selector (n°7, please read below). As an example, to obtain 192kHz, select position “176.4K/192K” and set the MCLK switch to the lower position, as in Figure 2.

**7) MCLK selector.** Allows to choose between 24.576MHz and 22.5792MHz as base frequency to produce the output clocks. The setting of this selector affects both outputs. When using the EVO CLOCK together with an HIFACE EVO, use the upper position (22.5792MHz) for files with 44.1, 88.2 and 176.4 sampling frequency; use the lower position (24.576MHz) for files with 48, 96 and 192 sampling frequency.

## 4. Connections

Connect your equipment with word clock input or your HIFACE EVO to the EVO CLOCK using suitable interconnects. We recommend a 75 Ohms cable when using the MCLK output and when feeding a 75 Ohms input.

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



## 5. Jitter sources in a digital system

Jitter is the main detriment factor in a digital system. Even asynchronous connections based on precision oscillators may fail to achieve the ultimate performance theoretically at their hand due to jitter which is injected in the system.

Jitter has various causes. One is the inherent phase noise in every oscillator. Different kinds of crystal oscillators allow for different phase noise, thus different jitter levels. The most basic crystal oscillator is sensitive to many phase noise sources: power supply, coupled EMI, internal instabilities of the quartz, random temperature changes. Precision XO have an internal compensation for the power supply noise, while TCXO (temperature compensated crystal oscillators) have a reduced temperature sensitivity thanks to specific compensation circuits. OCXO (oven compensated crystal oscillators) theoretically allow for the lowest phase noise.

In commercial circuits, an OCXO is a waste of money (they are very expensive), as the environmental EMI and the power supplies which are generally used inject far more noise than the theoretical device's noise floor.

A good TCXO, with very low phase noise, coupled to low noise supplies in a well-shielded metal cabinet is the best choice for a cost-effective, high performance clock generator. The EVO CLOCK is designed keeping this guidelines in mind: very low phase noise custom made TCXO's are used, along with special low noise regulators to achieve very high performance.

## 6. Technical Specifications

Supply voltage: .....	9V <sub>DC</sub>
Power consumption: .....	150mA
Word clock frequencies (kHz): .....	44.1, 48, 88.2, 96, 176.4, 192, 352.8, 384
Super clocks (MHz):.....	5.6448, 6.144, 11.2896, 12.288
Master clocks (MHz) .....	22.5792, 24.576
Output voltage: .....	3.3V <sub>PP</sub> on 75 Ohms matched line (MCLK), 3.3V <sub>PP</sub> on 75 Ohms matched line or on hi-Z line (WCLK)
Phase noise (@ 10Hz):.....	-100dBC/Hz min
Phase noise (@ 100Hz):.....	-130dBC/Hz min
Phase noise (@ 1KHz): .....	-145dBC/Hz min
Precision: .....	+/- 1.5ppm 0°C to 50°C
Temperature stability: .....	+/-1ppm
V <sub>CC</sub> stability: .....	+/-0.3ppm
Operative temperature range:.....	0°C to 50°C
Size: .....	105x50x104mm (cabinet) 105x50x150mm (with connectors)
Weight:.....	400g