

THE WORLD'S MOST ADVANCED MULTI-SOURCE AUDIO PROCESSOR

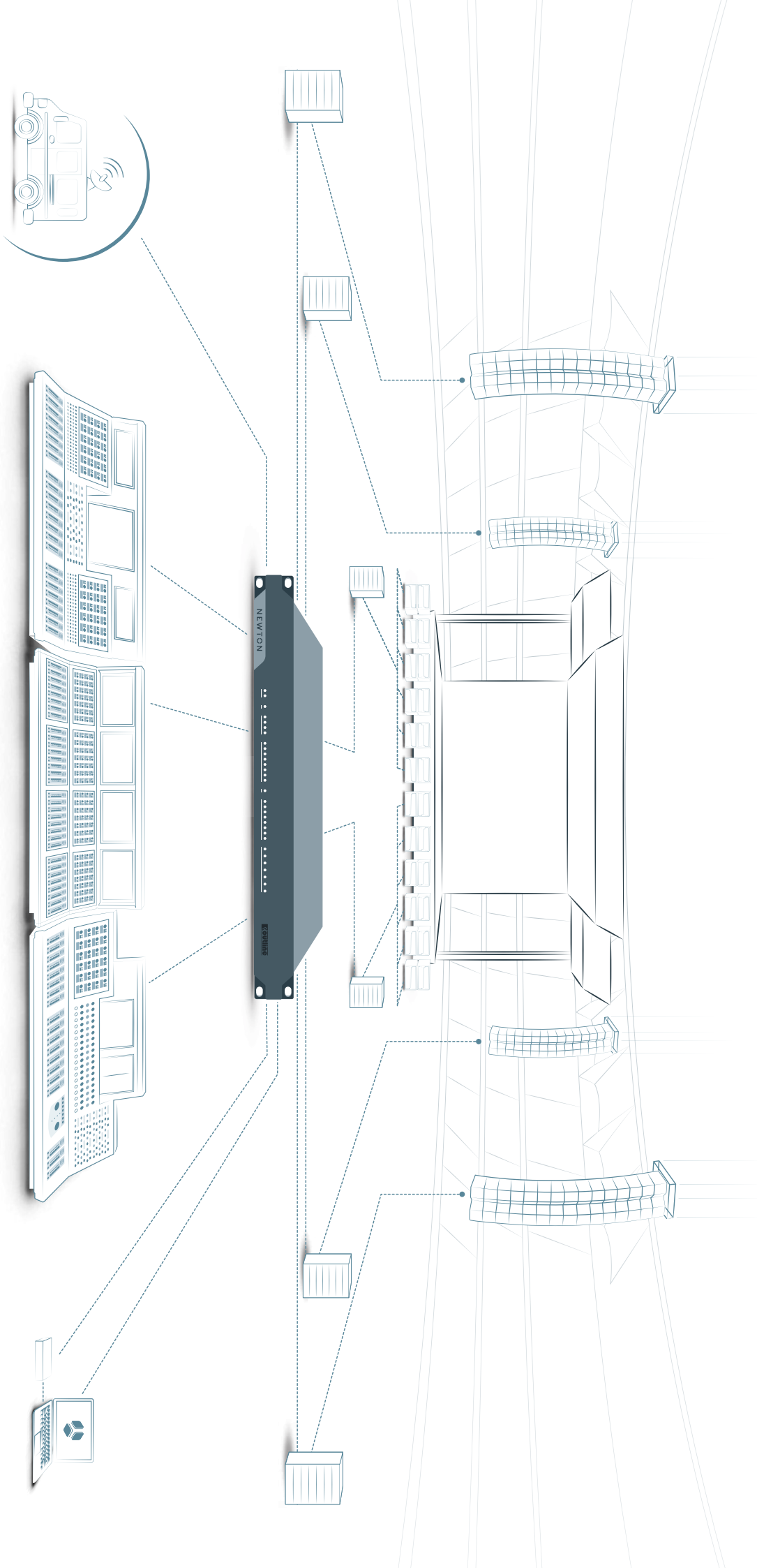


# NEWTON

PATENT PENDING



# Outline





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## THE NEW STANDARD IN ADVANCED AUDIO PROCESSING

Outline is proud to introduce Newton, the next generation in audio system control and networking. Newton advances the management of sophisticated audio systems by combining new filter technology, multi-format audio signal routing, multi-format standards conversion and digital signal synchronisation in a single 1RU networkable chassis.

Each Newton processor combines powerful WFIR filters (unique to Outline), clock management and a very high number of input and output channels (up to 216 x 216). Internal synchronous and asynchronous sample rate converters manage all I/O operations and Newton can be synchronised with any one of the 14 choices of clock sources. Mix and Match Matrix I/O routing allows translation and re-distribution of digital audio over multiple standards simultaneously.

Combining power and flexibility with an easy to use control interface, Newton forms the nucleus of next generation audio systems. Multiple Newton devices are easily interconnected to form a network that is scalable to meet all audio applications. Powerful processing features and multiple audio network standards combine to make Newton the ideal control core for any audio system from Touring to Live Broadcast Events and Fixed Installations.

## POWERFUL I/O AND LOTS OF IT

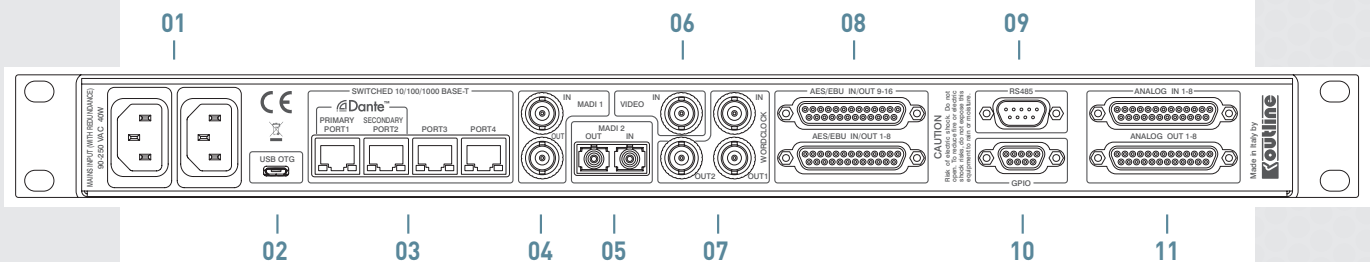
Newton comes in three hardware versions: Newton 16, Newton 16+4 and Newton 16+8. Newton 16 offers simultaneous signal connections over Dante™ (AES67 compliant), AES3, MADI Optical and MADI Coaxial, with the capability of fully processing up to 16 Inputs and 16 Outputs simultaneously. All processed signals and direct outputs can be routed out of Newton using any of the available audio standards. This, as just one example, would allow signals to be received over MADI, processed and then transmitted to multiple amplifiers on Dante with an AES3 output for backup. This direct out, processing and routing ability can also be used to create a backbone for a multiple Newton Network to share signals.

Internal processing is all at 96 kHz, with an internal data depth up to 64 bits. In each processing section users have precise control over Level, Delay, Polarity and Raised Cosine Filters (implemented within WFIR Equalisers), all functions that are required to manage and optimize a loudspeaker system.



## EXTERNAL CONNECTIONS

All external physical audio I/O connections are made on Newton's 1 RU rear panel along with GPIO, four Ethernet ports, RS485, Video Sync, Word Clock connections and dual IEC power inlets. To facilitate reliable temporary portable connections, Outline also offers an optional series of cabled expansion rack panels, providing access to all the analogue and digital signals available on rugged, industry standard connectors.



01. 2 Redundant Power Supplies

02. USB OTG (On The Go)

03. Ethernet Switched 100/1000 Base-T  
(Port1, Port2, Port3, Port4)

04. Coaxial Input and Output, both capable of 64  
Madi channels

05. Optical Input and Output, both capable of 64 Madi channels

06. Video Sync Input

07. WordClock Input / Output

08. 8 AES3 Inputs / Outputs  
(providing a total of 16 input and 16 output channels)

09. RS485 control

10. GP I/O (2 In and 2 Out)

11. 8 Analogue Inputs / Outputs



## GROUND LOOPS: NO, THANKS!



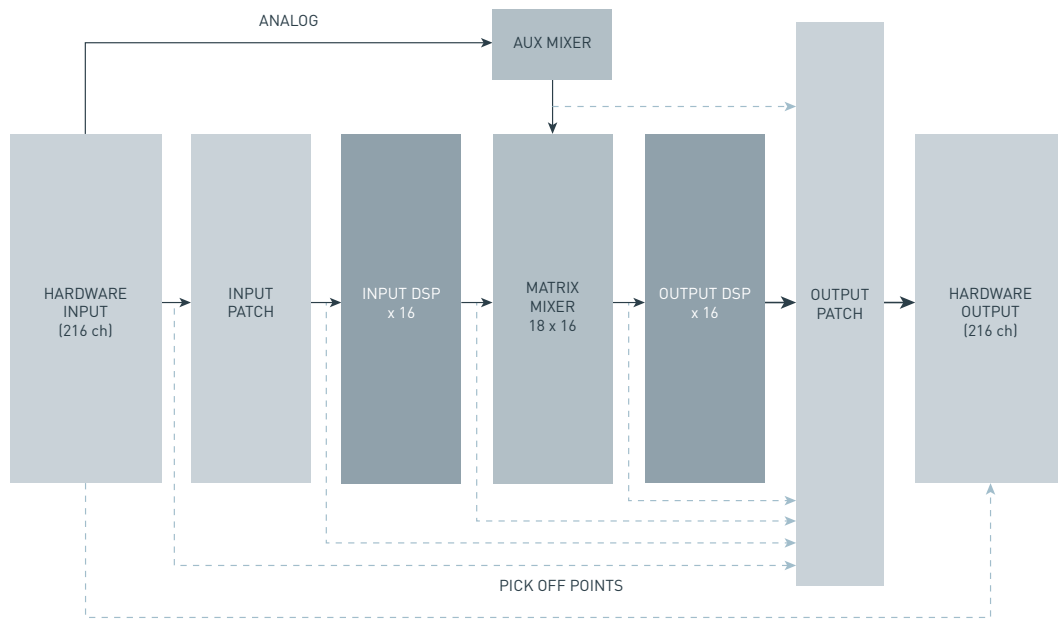
The analog inputs and outputs in Newton 16+4 and Newton 16+8 employ sophisticated galvanic isolation to avoid ground loops. Galvanic isolation between the main digital board and the analog input and output boards prevents the flow of loop currents between the analog grounds of the input or outputs and the digital ground of the Newton.

## ASYNCHRONOUS AND SYNCHRONOUS SAMPLE RATE CONVERSION



**SAMPLE RATE CONVERTERS**  
CLOCK MANAGEMENT

The Newton design team at Outline recognise that in the real world the synchronization, timing and sample rate conversion between multiple digital audio protocols and clocks is the single major limitation to practical and reliable system operation. The solution to this is a feature we call 'Multiple Clock Source Management'. This powerful capability provides both automatic and manual settings for the timing references and source clocks of all digital audio signals under Newton control. This advanced capability ensures seamless synchronization and reliable operation between Newton and all outside devices, no matter what sample rate or clocking sources are supplied.



Complete Newton processing flow.



Cabled expansion rack panels for Newton: CABLANWT-ANL (8 analog in and 8 analog out) and CABLANWT-DGT (Dante, Madi, AES3, Clocks and Network connections) housed in a convenient 4U rack (AMP-RACK4U).



## OUTLINE DASHBOARD™

In order to control all the features of Newton, a fast and reliable tool is required. For this reason Outline's IT team developed Outline Dashboard™, a step forward in loudspeaker systems control.

One Newton or a distributed network of Newtons can be controlled by software that offers real time monitoring of the machine's status and quick access to all its parameters.

Dashboard™ makes the audio technician's work fast and reliable, thanks to its ease of use and smart interaction modes that take advantage of drag & drop, keyboard shortcuts and copy-paste support.

A very powerful feature is the ability to manage multiple layouts of windows for fast recall of different working space configurations. Dashboard™ integrates a lot of native multi-touch gestures including Virtual Spaces and Mission Control.

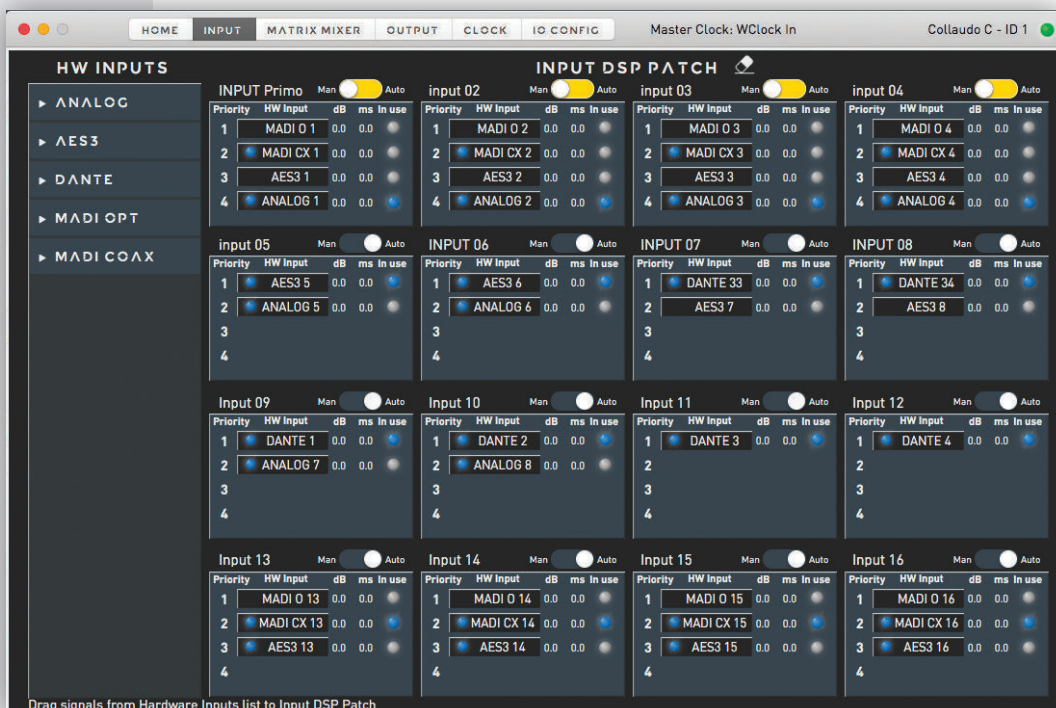


◀ Day mode view



## FAIL-SAFE BACK-UP STRATEGIES

Newton's architecture itself is based on a complete fail-safe design. The Linux kernel takes care of network communication, while an independent and powerful FPGA chipset looks after audio signal processing. Outline Dashboard™ software gives the user the ability to define a backup strategy for all I/O and establish audio failover priority. If the designated primary source fails, then the second designated source takes over, if the second is not available, then the third one switches in, etc.



Input priority selection ▼

## WFIR TECHNOLOGY\* A STEP BEYOND IN EQUALISER PRECISION

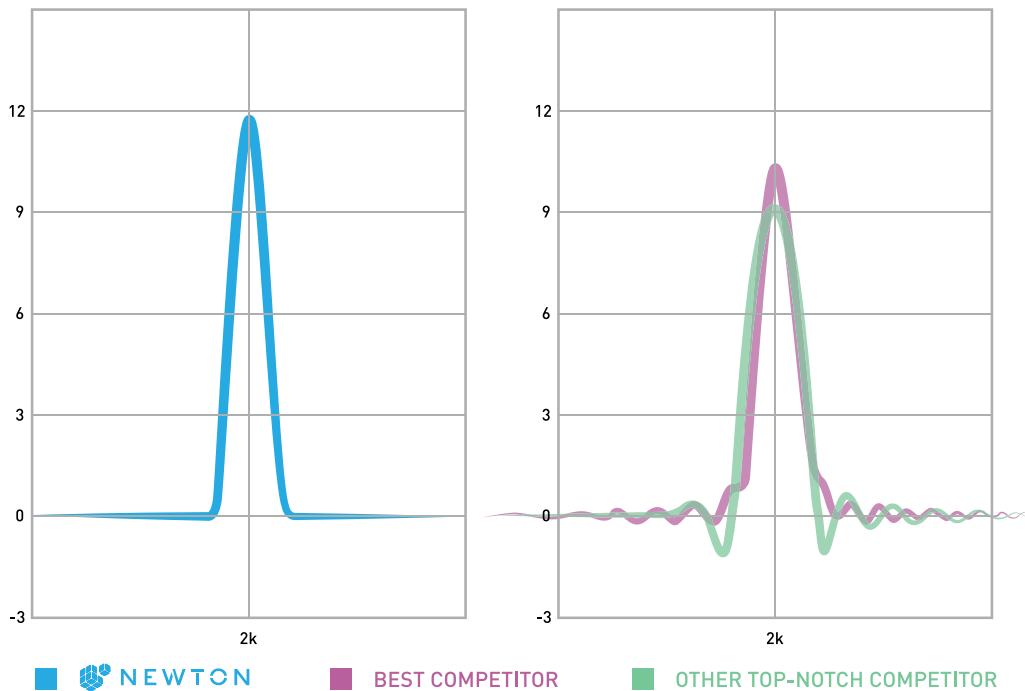
\* PATENT PENDING TECHNOLOGY

Sophisticated equalisation is an established requirement for modern sound system optimisation and Newton's equalizers are unique. While classic FIR (Finite Impulse Response) technologies are known to have characteristically poor low frequency resolution, Outline's approach is a new development based on powerful WFIR (Warped FIR) algorithms. Developed by the same engineering team responsible for our proprietary iMode control system, WFIR technology enables Newton to deliver an almost constant resolution per octave, enabling the generation of complex frequency responses with extreme accuracy. WFIR also enables Newton to apply multiple equalization layers and groups on each single channel without adding latency.



## CAN YOU MEASURE QUALITY?

Raised Cosine Filter F = 2kHz | G = +12.0dB | BW = 0.1 oct.



**YES, YOU CAN!**

## SMAART ® API INTEGRATION

This new feature represents the quickest and easiest way for users to integrate Smaart ® measurement data into their Newton units and to plot it within the Outline Dashboard software environment. This new compatibility will provide a faster, simpler and more accurate method of system tuning for Smaart ® users.



## DIRECT TRANSFER

While the Smaart ® API integration is dedicated to those environments in which Smaart ® is being used, the new 'Direct Transfer' feature provides an alternative way to send data to any third-party measurement software or system. Both pre and post-EQ measurements (related to the same channel's DSP) are sampled and the resultant data can be used with independent measurement software or systems through the hardware outputs.





## GROUP OVERVIEW

A new 'Group Overview' feature allows users to see how changes to parameters made on a group basis affect individual channels. Each channel can be a member of up to four separate groups simultaneously and this new feature provides detailed information to the operator in a very simple and intuitive view.



## TABLET MODE

A new feature that provides an easy and intuitive way to interact with Outline Dashboard software through a VNC or TeamViewer using iPad or any tablet PC.



## ALERTS AND NOTIFICATIONS

Immediately signals to the user any major event (for example, input back fallback, clock change, power supply fault etc) within Newton and / or Dashboard, and simultaneously logs the event to a database.



## PERMANENT LINKS

In addition to the groups and temporary links already available, permanent links and many related features have been added, another feature set completely unique to NEWTON.



8 PERMANENT OUTPUT AND INPUT LINKS

## WHAT PROS SAY



### **Jon Monson - Rat Sound Systems, Inc California**

"Rat Sound has been searching for several years for a solution to drive our festival sound systems and Outline has met the challenge with an elegant solution. With the Newton we can combine consoles and drive outputs in a multitude of popular formats, and we appreciate all the various clocking options. Our System Engineers instantly appreciated the intuitive, easy to use software control. Rat has immediately begun deploying Newton's on a multitude of festivals, and we plan on utilizing them on all our festival events in 2019 and beyond."



### **Liam Halpin, System Engineer Sam Smith, Led Zeppelin, Tool**

"The Newton is a powerful unit which answers a long term need for festivals and touring. One unit can replace several of the 'industry standard' units which are a hassle to interlink. No other unit has the ease of use and flexibility in clocking, I/O and routing. I look forward to using them on more of my projects, and as the software develops, I'm sure they will only get better!"



### **Dave Kay, Adlib Audio Director - Ian Nelson, Senior Engineer**

"We were looking for something versatile and simple to use, but no other solution had that level of versatility. Nothing has come close to what the Newton unit can do."



### **Robin Conway, Head of Development Capital Sound Hire Ltd - London**

"The internal word clock management allows the user to remain synchronous with whichever console is live, should they wish, the 18x16 matrix is going to be incredibly useful and the fact that all this is built in a 1RU space just makes it even better."



### **Michael Häck, System Tech @ Jazz Open Festival**

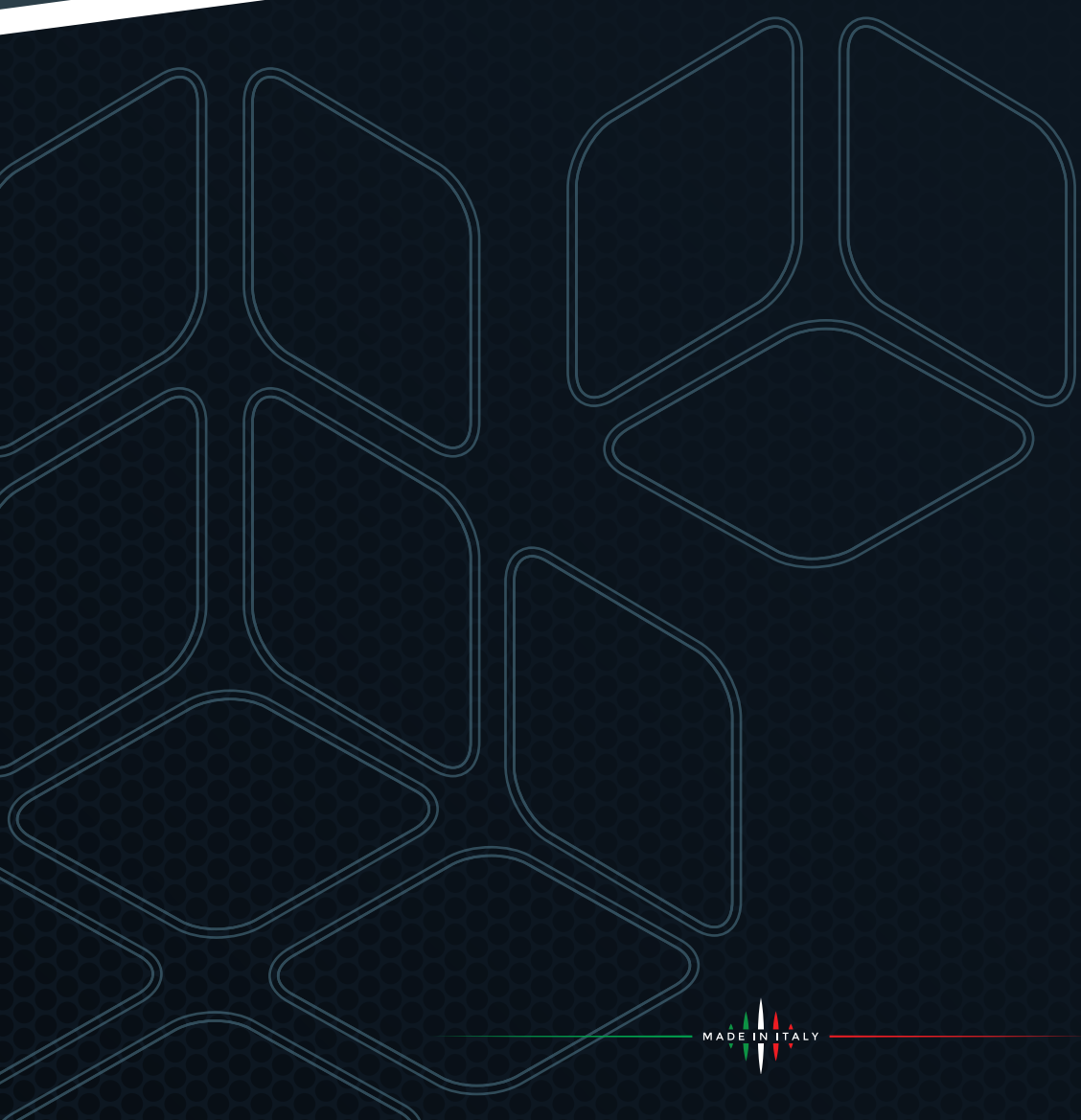
"NEWTON easily met and exceeded all our expectations. But beyond the connectivity and convenience I was also delighted to discover just what a great-sounding unit this is. I also particularly enjoyed using the NEWTON's zero-latency WFIR (Warped Finite Impulse Response) EQ filters..."

## TECH SPECS

Newton Tech Specs  
available at [newton.outline.it](https://newton.outline.it)







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