



Mola  Mola

Truth is Beauty

“Truth is Beauty”

Mola Mola embodies the idea that once you’ve removed everything that isn’t the music, that what remains is the music.

This is radical. Today’s high-end audio has become all about mixing circuit topologies and parts to make a sonic blend that the designer thinks “sounds about right”. You’d almost forget that getting closer to the sound as crafted by the artist really means keeping the replay system from changing it.

Turning this simple insight into hardware is probably the toughest way to do audio. All simple circuits change the signal audibly, so one has to get to grips with more complicated ones that don’t. We analyse every sub-circuit mathematically and look for ways to eliminate every error term. When the practical circuit measures as predicted, we listen to search for unexpected sources of coloration. These are then included into the maths and the whole process repeats.

After every stage has proven immaculate performance, the same is done with the whole product and so problem spots get methodically rooted out before they hide themselves and become “audible but not measurable”.

The result is something never before heard of in high-end audio: amplifiers and converters whose output signal cannot be distinguished, by ear, from the input signal. So what does that sound like? In a few words: natural, nimble, rich and musically enthralling.

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Makua

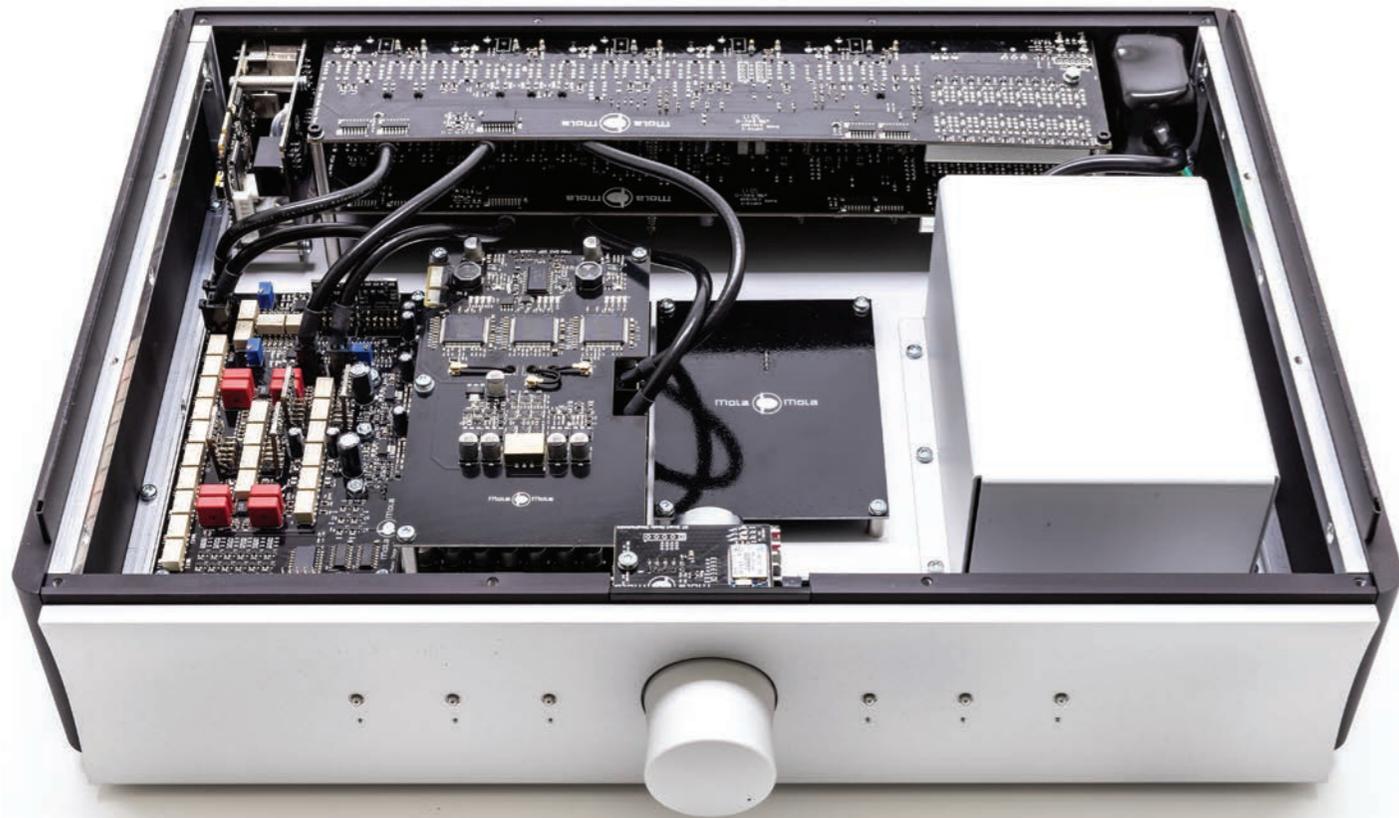
the preamplifier

Analog design for a digital age

With the knowledge in hand to design minimally invasive electronics without needing to be minimalistic, we decided that our preamp should be complete, very complete. The basic Makua is an extremely transparent gain stage and a programmable routing matrix. The chassis has ample room to fit optional extras, most notably a DAC and a phono stage. The 6 preset buttons are programmable via RS232 or Bluetooth to access any combination of channel, processing and routing. In a system with mainly digital sources, the preset buttons would be programmed to select between them. Vinyl lovers on the other hand might want to use several buttons to select the same turntable but with different EQ settings to suit their large collection of historic LP's.

All five inputs are switchable between XLR and floating RCA connections, and all can be assigned as either phono or line. All stages in the Makua use discrete amplifier modules in a little known topology called "single-ended driven differential". Compared to doubly executed signal paths, this structure prevents noise from propagating all the way through. The Makua is amazingly immune to influences like mains quality and choice of interlinks. The relay-based volume control directly controls the gain of the output stage. Dynamic range and linearity of this arrangement is much greater than those of stepped attenuators. Operation is smooth and entirely glitch free.





KEY FEATURES

I/O

- 5 balanced and 5 unbalanced inputs selectable by switch and software
- 2 parallel balanced outputs for bi-amping (XLR)
- 4 programmable trigger outputs (3.5mm Jack)

ROUTING AND PROCESSING

- All inputs routable through optional processor boards like the phono stage
- Processing balance and input gain offset
- Phase invert and mono sum
- Full software control of routing and processing

PERFORMANCE

- Maximum input/output level: 20dBu (7.75Vrms)
- Unweighted noise voltage at unity gain: 1.9uV
- Input impedance: 100kohm
- Output impedance: 44ohm
- Distortion at maximum signal level (THD, IMD): not measurable, estimated around -150dB ▶

- Bandwidth >200kHz
- Gain range: -70dB to +15dB
- Gain resolution: <1dB, better than 0.2dB over normal listening range

CONTROL

- 6 programmable presets
- (premium) Remote control
- Mola Mola Remote app
- RS232 (SUB-D)

ADD-ON

- Mola Mola Phono stage
- Mola Mola DAC

DIMENSIONS AND WEIGHT

- 420mm (W) x 110mm (H) x 345mm (D)
- Depth includes volume knob and connectors
- 11kg



Tambaqui

the DAC that stands alone
Digital that's as good as analogue

Responding to popular demand, Mola Mola launched the famous discrete DAC from the Makua as a separate unit.

Mola Mola's Tambaqui DAC is the perfect upgrade for owners of complete high-end systems who want to retain the characteristic sound of their existing preamplifier whilst lifting their digital sources to another level. The converter is a two board stack. On the first board, all incoming digital audio is upsampled to 3.125MHz/32 bits and converted to noise shaped PWM. On the other board are two mono DACs, in which a discrete 32- stage FIR DAC and a single-stage 4th order filtering I/V converter, convert the PWM into analogue with a breathtaking 130dB SNR.

This is near the theoretical limit for 24-bit files and far beyond that of even quad-speed DSD. Uniquely, distortion remains below the noise floor even for full scale signals. With the addition of a lossless digital volume control and headphone outputs, it is also the ideal control hub of a minimalist audio system for music lovers who have moved on to a digital sources only system. This DAC, combined with a pair of Mola Mola Kaluga monoblocks constitutes the finest digital replay chain available, irrespective of price.

Analogue that's as good as digital



roon
ready

The music player for music lovers
The Mola Mola Tambaqui is Roon ready certified!



KEY FEATURES

OPERATING PRINCIPLE

PWM DAC with 32-stage discrete analogue FIR output stage. Avoids “sigma delta” tones and “R2R” glitch and low-level linearity errors. Asynchronous upsampling to 3.125MHz/32 bit. 7-th order noise shaper clearing 80kHz band. Each input rate has an optimized upsampling filter chain.

I/O

Optical (Toslink), S/PDIF (Cinch), AES/EBU (XLR), USB type B, Ethernet (Roon Ready), Bluetooth (A2DP, APTX), I²S over HDMI
Balanced output (XLR), Headphone output (6.3mm Jack), Balanced XLR 4pin, 2 programmable trigger outputs (3.5mm Jack)

SUPPORTED FORMATS

PCM up to 384kHz /32 bits (>192kHz and >24 bits via USB and Roon only) DoP and Native DSD up to quad speed (USB and Roon only)

PERFORMANCE

Full-Scale Output Level (XLR): 18dBu
Full-Scale Output Level (headphone): 18dBu
Signal to Noise Ratio: 130dB
THD, IMD: not measurable (estimated -140dB)
Bandwidth: Up to 80kHz (apodizing response)
Integrated jitter: <1ps from 10Hz upwards, <300fs from 1kHz upwards
Jitter rejection: >80dB at 1Hz after 20 seconds of loc

CONTROL

4 programmable presets
(premium) Remote control
Mola Mola Remote app

DIMENSIONS AND WEIGHT

200mm (W) x 110mm (H) x 320mm (D)
5.2kg



Kaluga

the power amplifier

Class-D has never been so good.

Come to think of it, neither has class-A ...

Kaluga is based on world's most sought after class-D technology: Ncore®. Unprecedented low distortion, noise and output impedance combine into what scores of enthusiastic users unanimously describe as "no sonic signature at all". Just music, glorious music. For instance, the two supposedly unassailable strongholds of class-A amplifiers are linearity and output impedance, at high frequencies. Plotted (visible on page 17) are the output impedance as a function of frequency and the output spectrum in a high power (400W), high frequency IMD test. In both cases Kaluga outperforms any power amplifier, regardless of technology, operating class or asking price, of which such test results are available.

The amplifier board is a Mola Mola specific design. The audio circuitry is trimmed to the bare bones and board-to-board connectors are eliminated in favour of soldering star-quad cables directly into the circuit board for the cleanest, lowest impedance connection possible. The input stage is implemented on a separate circuit board that uses the same discrete buffers as those found in the Makua. The output filter sports monolithic capacitors whose dielectric stability is reflected in an impressively neutral and poised rendition. The days of compromising power efficiency for audio performance are finally over: the Kaluga delivers definitive audio performance with power efficiency thrown in as a bonus.



KEY FEATURES

PERFORMANCE

400W/8 ohm, 700W/4 ohm, 1200W/2 ohm

Gain: 28dB

Unweighted Signal/Noise Ratio: 128dB

Distortion (THD, IMD): <0.003 %

(all frequencies and power levels)

Input Impedance: 100kohm

Output Impedance: <0.003 ohm (DF>4000),
all frequencies

Bandwidth: >50kHz

I/O

Balanced and unbalanced input, selectable by switch

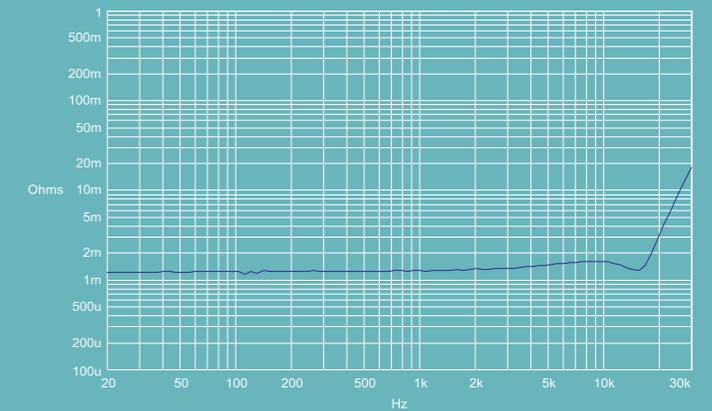
2 pairs of Furutech binding posts. Biwired directly
to the amplifier PCB using Kubala-Sosna cable.

Trigger input (3.5mm jack)

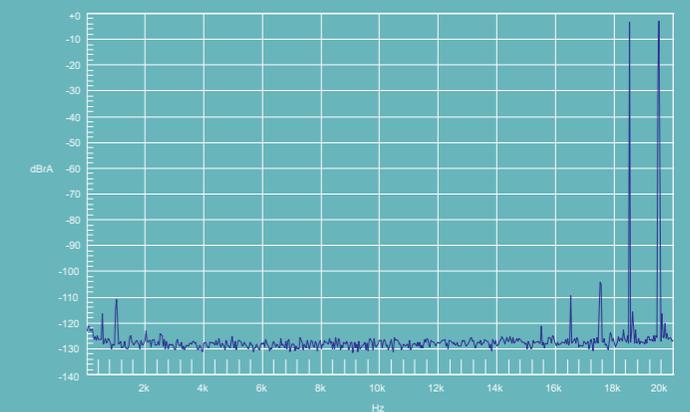
DIMENSIONS AND WEIGHT

200mm (W) x 110mm (H) x 335mm (D)

Depth includes speaker terminals. 7kg



Output impedance vs frequency



Output spectrum for a
18.5kHz + 19.5kHz
200W±200W (4 ohm) test

Mola Mola premium remote

The Mola Mola premium remote is designed to go with the stylist approach of the Mola Mola electronics. It is a simple design made to the highest standards possible. Milled from a single block of aluminium just like the Makua, Kaluga and Tambaqui this aesthetic design oozes quality!



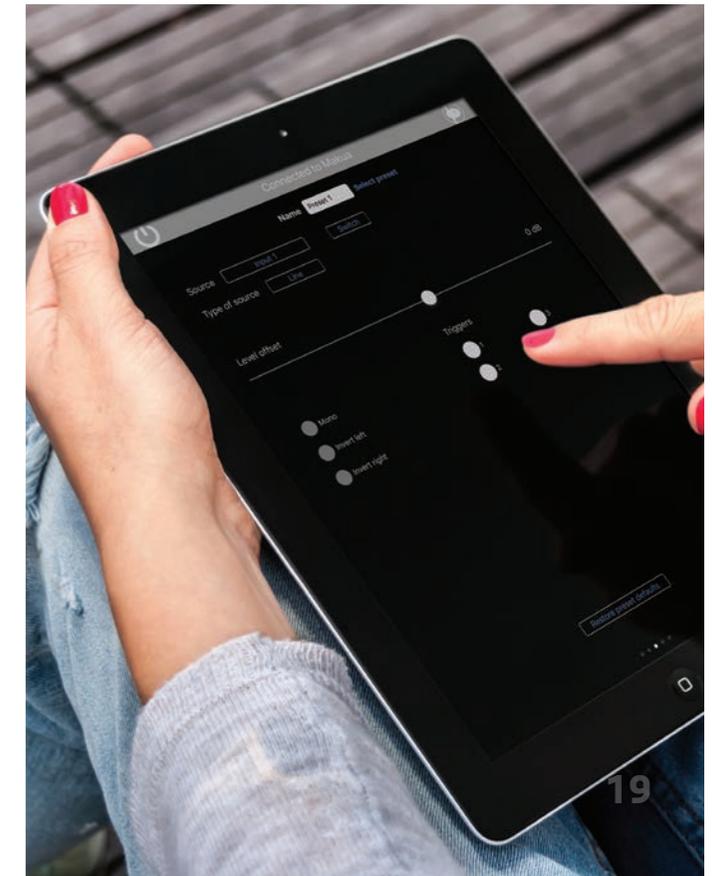
Mola Mola Remote app

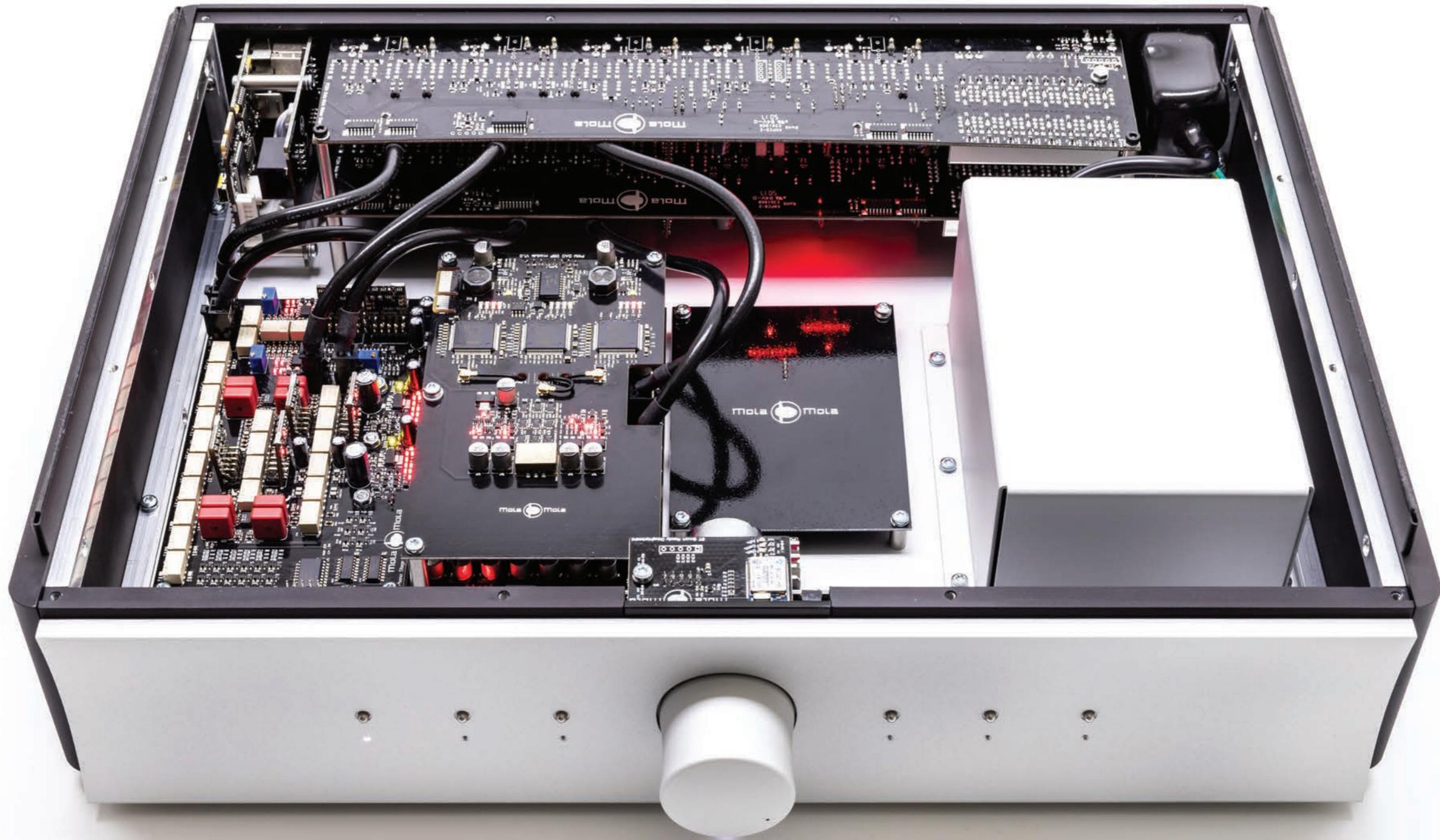
for Android[®] and iOS[®]

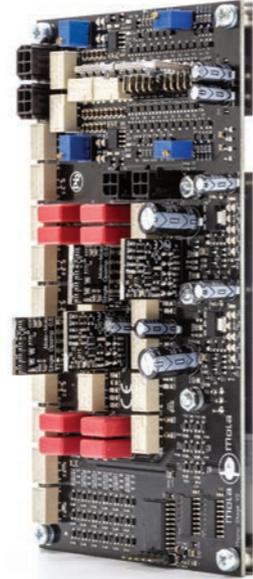
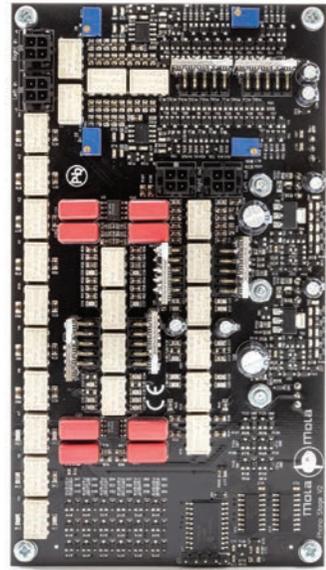
Use the Mola Mola Remote app, for smartphone and tablet, to view and control the settings of your Makua and Tambaqui devices.

Functions of the app includes:

- Volume control
- Preset selection and configuration
- Phono stage parameters
- View DAC status and firmware versions
- Firmware update







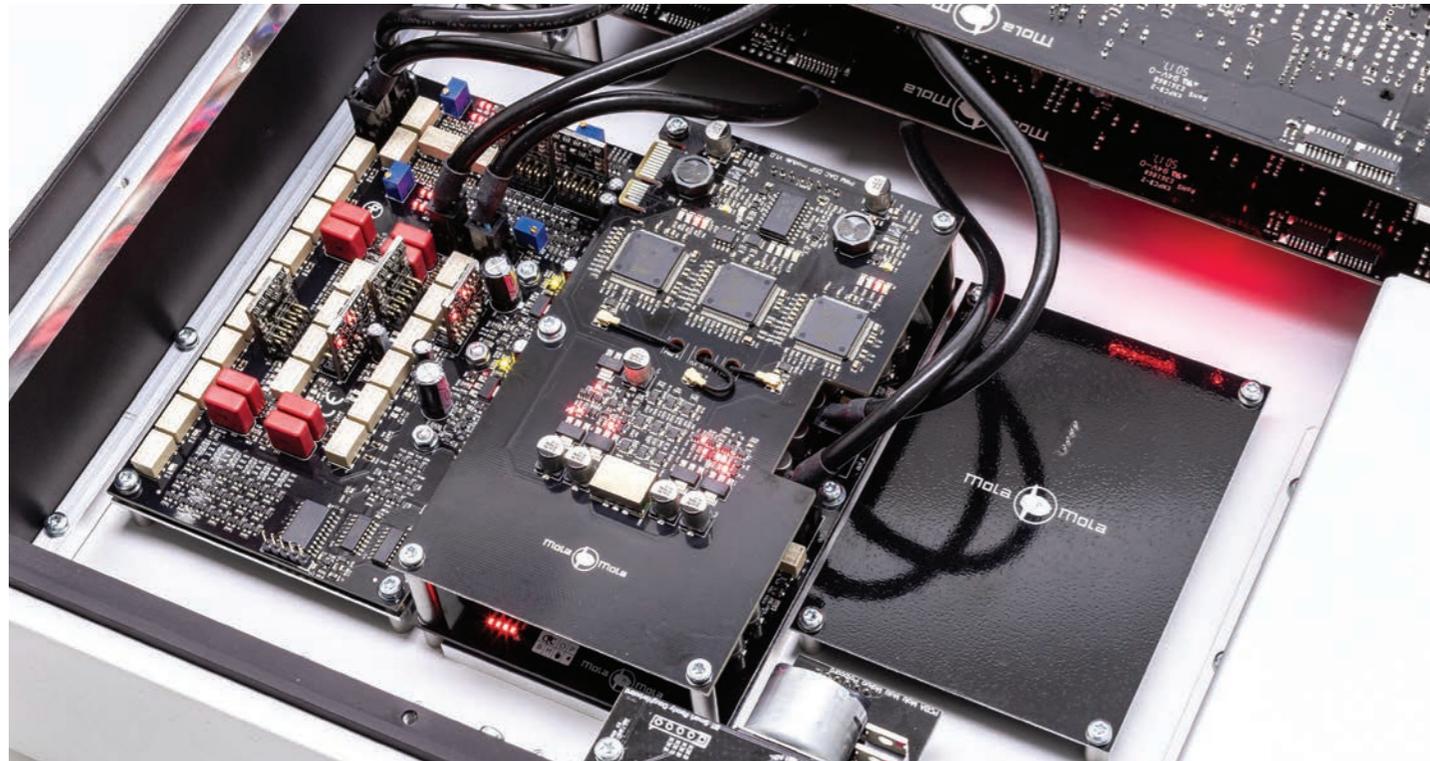
Mola Mola Phono stage

An archival grade phono stage

What was originally intended to be a simple RIAA add-on for the Makuia Preamp has quickly spiraled into the quietest and probably most versatile phono stage ever built. MC/MM input stages are optimized for current noise and voltage noise respectively. Unlike the more common arrangement of an MC head amp feeding into the MM stage, the two stages are fully independent, realizing an equally short signal path for both. Input gain is switchable in 5dB steps over a 40dB range. Input resistance and capacitance are

individually switchable. Available EQ settings cover practically all known cutting curves used, including most 78RPM.

All settings are software controllable, either on the fly using a smart-phone or tablet with the Mola Mola app or directly stored under the preset buttons. The preamp can be configured to route any input through the phono stage, this allows you to have multiple turntables and cartridges connected.



KEY FEATURES

PERFORMANCE

Input noise (MC): 0.35nV/rtHz
Input noise (MM): 0.9pA/rtHz
Sensitivity: variable from 30uV to 5mV
THD, IMD: not measurable
RIAA conformance: +/-0.1dB

AVAILABLE TIME CONSTANTS

T1: 200, 250, 318, 400, 450us
T2: 50, 64, 75, 100us
Bass shelf: 14, 18, 20dB

Mola Mola DAC

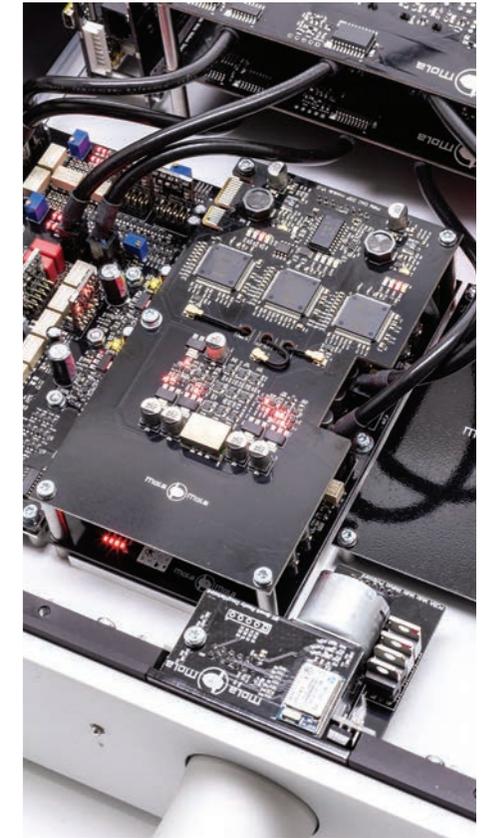
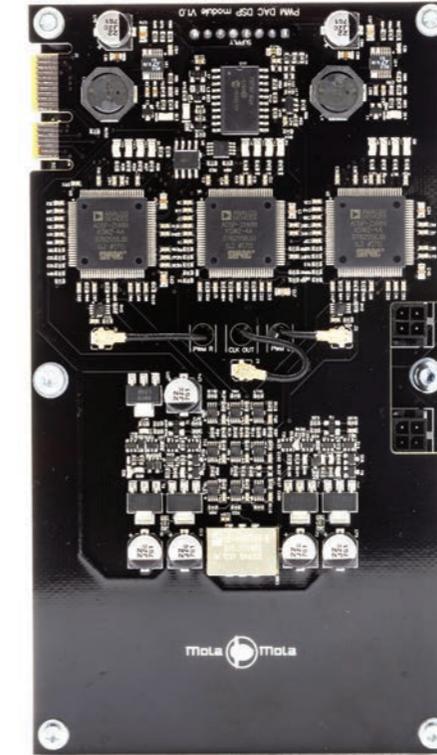
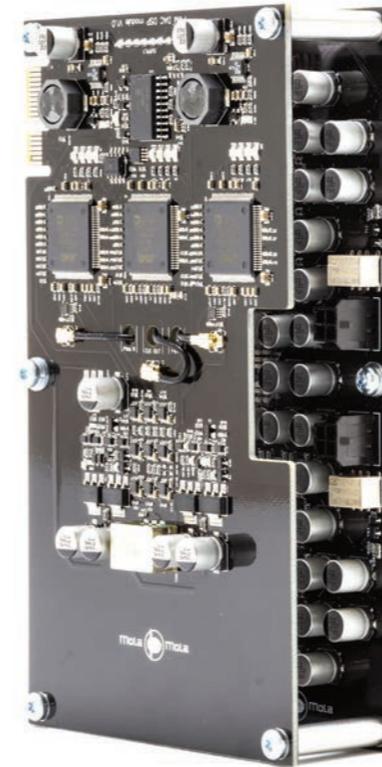
Future-proof by being far ahead

We decided to design, from the ground up, a discrete DAC whose unbeatable staying power results simply from being more than 10 years ahead of the performance curve. To put it into perspective: today's best DAC chip available, claims no better than 22 bits' worth of dynamic range and only 20 bits' worth of linearity. High resolution music deserves better than that. To accommodate this, Mola Mola's DAC is designed using circuits and digital algorithms that were entirely developed in house.

The converter is a two board stack that fits into one of the option slots in the preamp. On the first board, all incoming digital audio is upsampled to 3.125MHz/32 bits and converted to noise shaped PWM. On the other board are two mono DACs, in which a discrete 32-stage FIR DAC and a single-stage 4th order filtering I/V converter, convert the PWM into analogue with a breathtaking 130dB SNR. This is near the theoretical limit for 24-bit files and far beyond that of even quad-

speed DSD. Uniquely, distortion remains below the noise floor even for full scale signals. A quick look at current and historic trends of high-end IC's indicates that for the foreseeable future this kind of performance will remain unavailable to manufacturers forced to rely on the same "chip du jour" that also powers their competitors' products.

Even by today's exacting standards, extraordinary care has been taken to deal with jitter. Mola Mola's DAC uses a home-grown asynchronous upsampling algorithm whose input frequency measurement slows down rapidly until after a few seconds of lock, the frequency ratio measurement is frozen. Frequency stability is then wholly determined by the internal clock, a laboratory grade 100MHz SC-cut oscillator. This is effectively an atomic clock sans the physics package (which contributes nothing to spectral purity but quite a lot to cost).



KEY FEATURES

I/O

- AES/EBU (XLR)
- Optical (Toslink)
- USB type B
- Bluetooth (A2DP, APTX)
- Ethernet (for future purpose)

SUPPORTED FORMATS

- PCM up to 384kHz /32 bits (>192kHz and >24 bits via USB only)
- DoP and Native DSD up to quad speed (USB only)

PERFORMANCE

- Full-Scale Output Level: 20dBu
- Signal to Noise Ratio: 130dB
- THD, IMD: not measurable (estimated -140dB)
- Bandwidth: Up to 80 kHz (apodizing response)
- Integrated jitter: <1ps from 10Hz upwards, <300fs from 1kHz upwards
- Jitter rejection: >80dB at 1Hz after 20 seconds of lock



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