



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 which 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.

# Content

**06 . MAKUA**

the preamplifier

**10 . TAMBAQUI**

the DAC that stands alone

**14 . KALUGA**

the power amplifier

**18 . KULA**

the intergrated amplifier

**22 . MOLA MOLA REMOTE**

aesthetic design oozes quality

**23 . MOLA MOLA APP**

for Android® and iOS®

**26 . MOLA MOLA PHONE STAGE**

An archival grade phono stage

**28 . MOLA MOLA DAC**

Future-proof by being far ahead

**31 . CONTACT**







# Makua

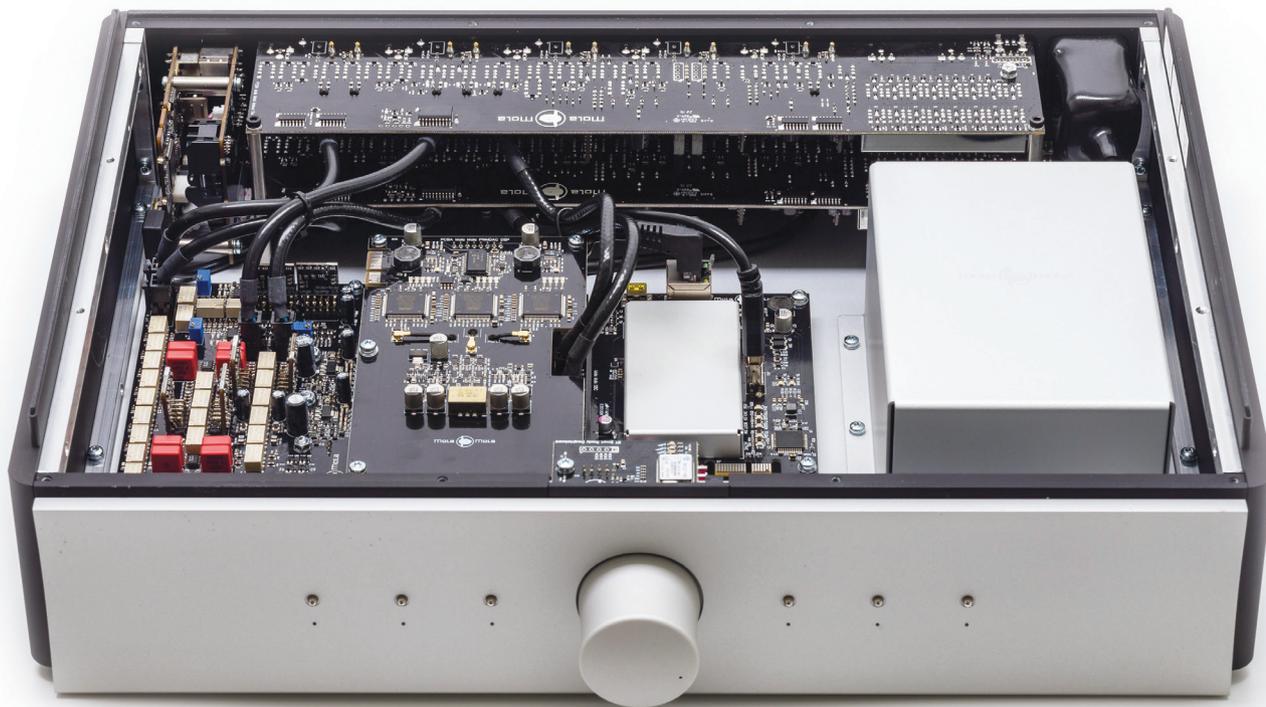
## the preamplifier

### 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
- Moia Moia Remote app
- RS232 (SUB-D)

### ADD-ON

- Moia Moia Phono stage
- Moia Moia DAC (Room Ready)

### 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 (SBC, AAC, APTX-HD), 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 10c

### 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

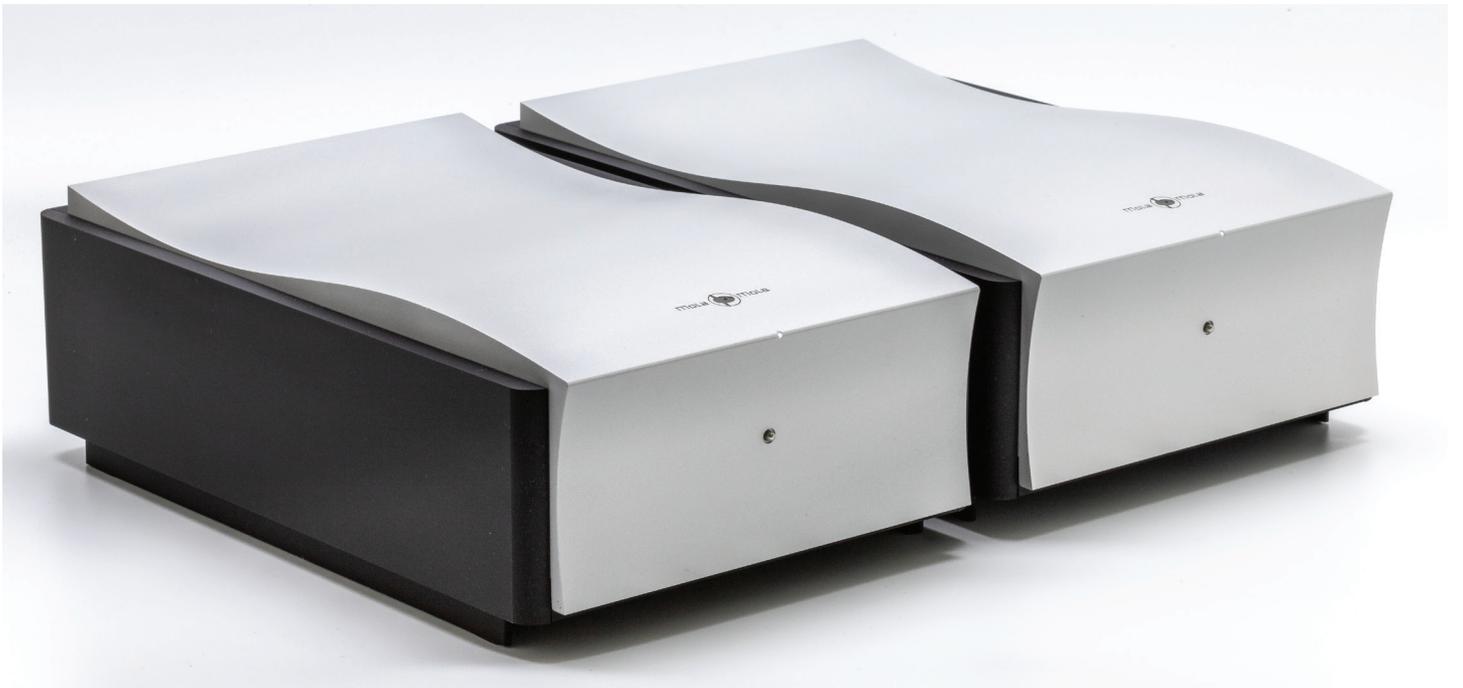
## the power amplifier

**Class-D has never been so good.**

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

**Kaluga employs proprietary Class-D technique which is entirely developed in-house. 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

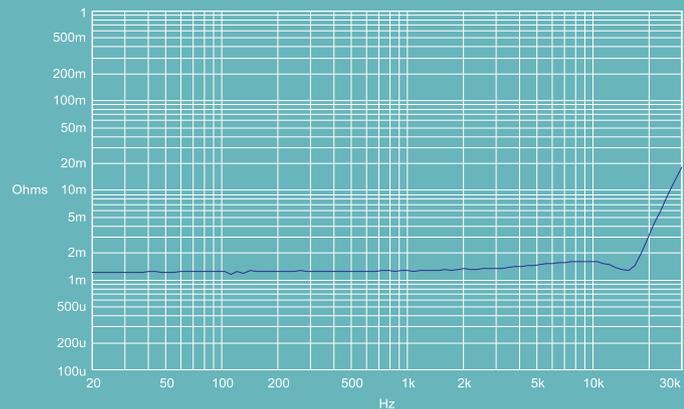
2 pairs of Furutech binding posts. Biwired directly to the amplifier PCB using Kubala-Sosna cable.

Trigger input (3.5mm jack)

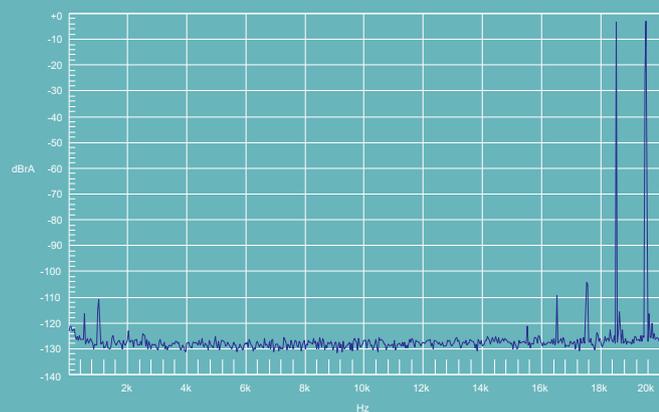
### DIMENSIONS AND WEIGHT

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



# Kula

## Integrated amplifier

### The integrated that truly belies its size!

**Imagine a sleek, compact design that oozes class and attention to detail.**

**Imagine an amplifier design that packs enough power to comfortably handle even the most demanding of loudspeakers.**

**Imagine a complex yet agile and easy to use fully transparent line stage.**

**Imagine every possible Phono EQ setting available from the comfort of your favourite listening chair.**

**Imagine a highly acclaimed discrete DAC boasting the best specs and sound around.**

**Imagine, combining all of the above!**

**Reality. Is. Kula!**

Kula is an à la carte modular design creating a fusion of highly technical previous accomplishments. The chassis itself is borrowed from the acclaimed Makua preamp, as is the line stage section and its optional phono stage with independent adjustable settings and up to 6 separate inputs.

The optional DAC section which also is available in the Makua, is identical to the world-class Tambaqui stand-alone unit and features 5 digital inputs including Roon endpoint and Bluetooth. Additionally, the Kula incorporates a Mola Mola exclusive amplifier which boast an output of 150 Watts @8Ω, doubling into 300 Watts @4Ω. Clearly enough power to drive any loudspeaker with ease.





## KEY FEATURES

### I/O

3 balanced and 3 unbalanced inputs,  
selectable by switch and software  
2 Pairs of Furutech binding posts.  
Directly connected to the amplifier PCB using  
Kubala-Sosna cable. 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  
Mastering mode

### PERFORMANCE

Maximum input level: 20dBu (7.75Vrms)  
Input impedance: 100kohm  
Unweighted Signal/Noise Ratio: 113dB  
2x 150W/8Ω @1% 1kHz, 2x 300W/4Ω @1% 1kHz  
2x 100W/8Ω @0.0005% 1kHz, 2x 200W/4Ω @0.00075%, 1kHz  
Output Impedance: 2mΩ – 7mΩ (20-20kHz)  
(measured directly on binding posts)

Bandwidth 50kHz @ -3dB  
Gain resolution: <1dB, better than 0.2dB over  
normal listening range

### CONTROL

6 programmable presets  
(premium) Remote control  
Mola Mola Remote app  
Room Ready (if DAC option fitted)

### ADD-ON

Mola Mola Phono stage  
Mola Mola DAC (Room Ready)

### DIMENSIONS AND WEIGHT

420mm (W) x 110mm (H) x 370mm (D).  
Depth includes volume knob and connectors.  
11kg

# Mola Mola Remote

## Premium or Standard

The Mola Mola remotes are designed to go with the stylist approach of the Mola Mola electronics. The simple design is made to the highest standards possible. Milled from a single block of aluminium just like the Makuu, Kula, Kaluga and Tambaqui the aesthetic design oozes quality!

The Mola Mola remotes are available in a premium and a standard version.



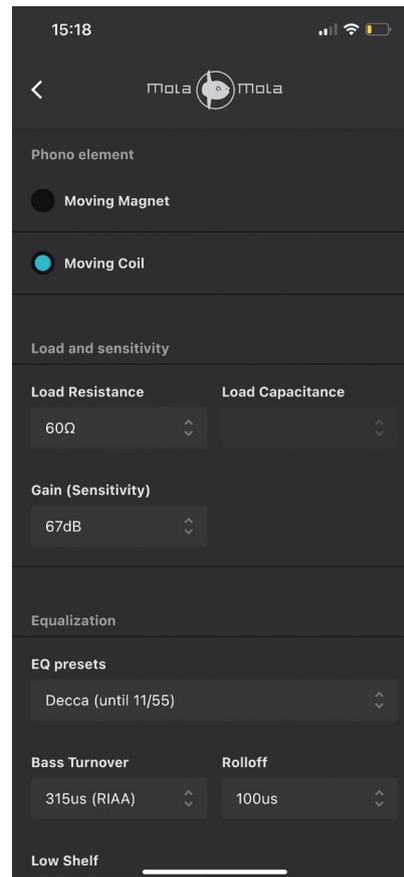
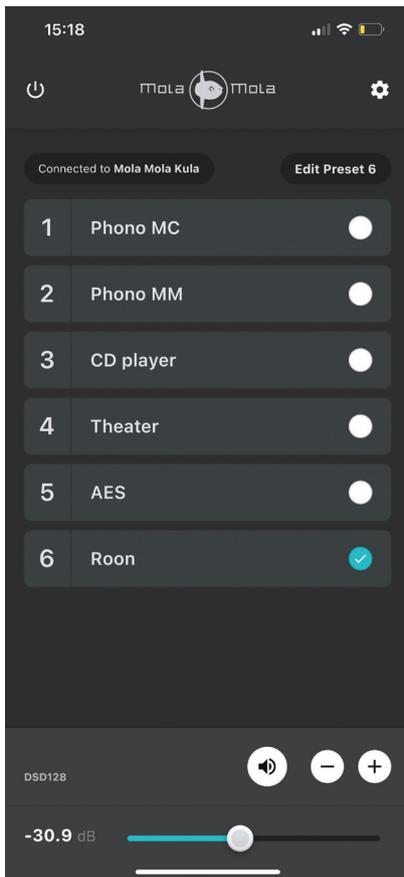
# Mola Mola Remote app

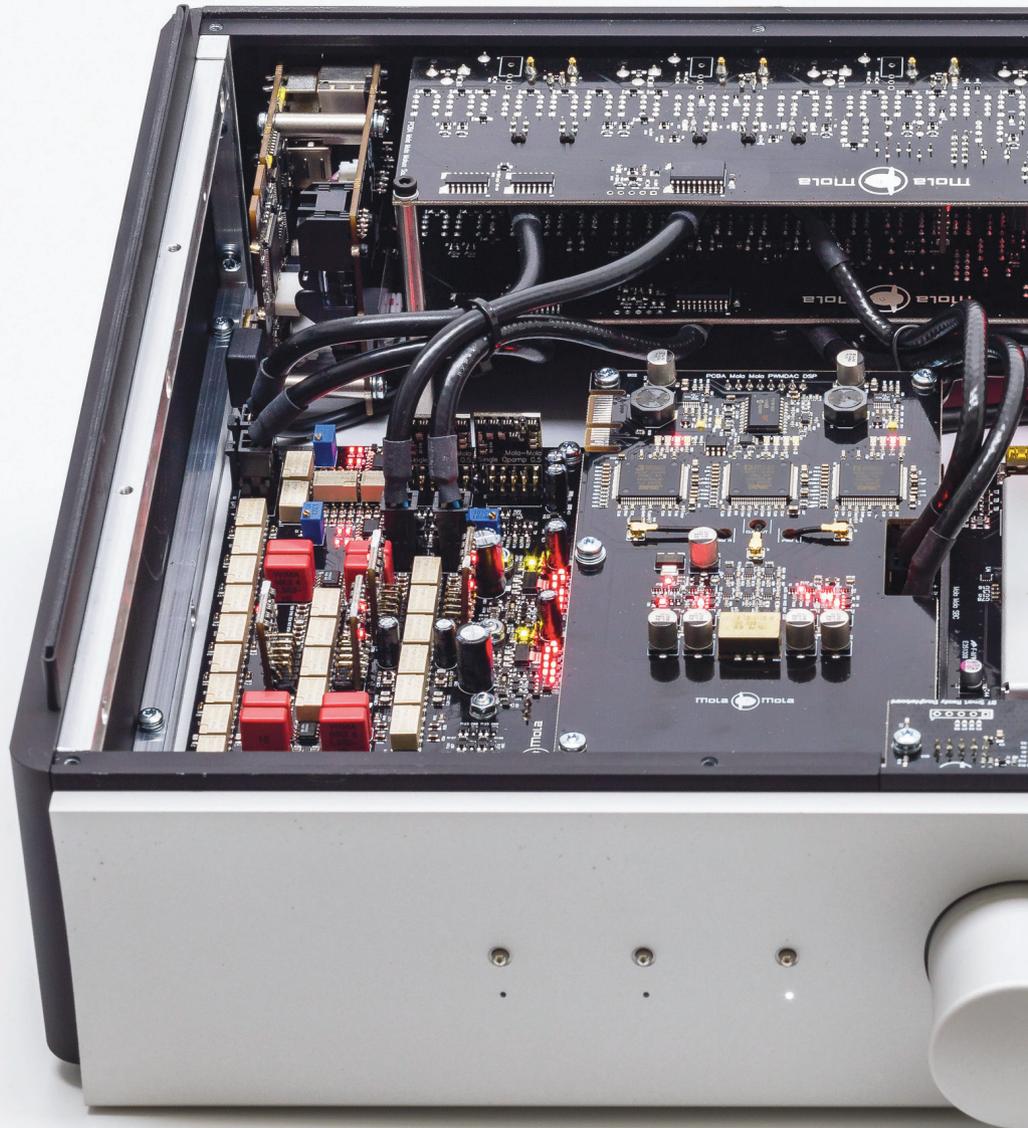
for Android<sup>®</sup> and iOS<sup>®</sup>

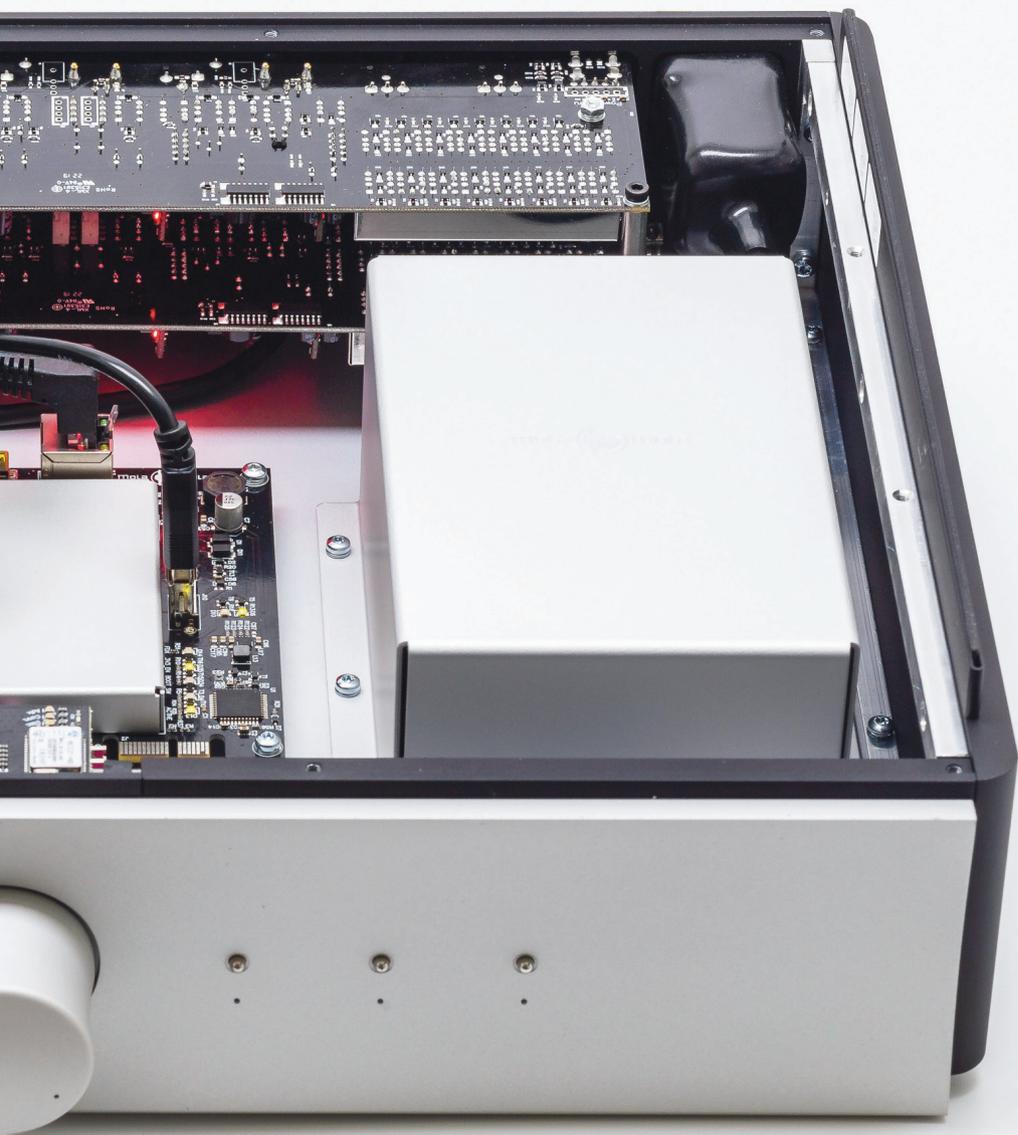
Use the Mola Mola Remote app, for smartphone and tablet, to view and control the settings of your Makuu, Kula and Tambaqui devices.

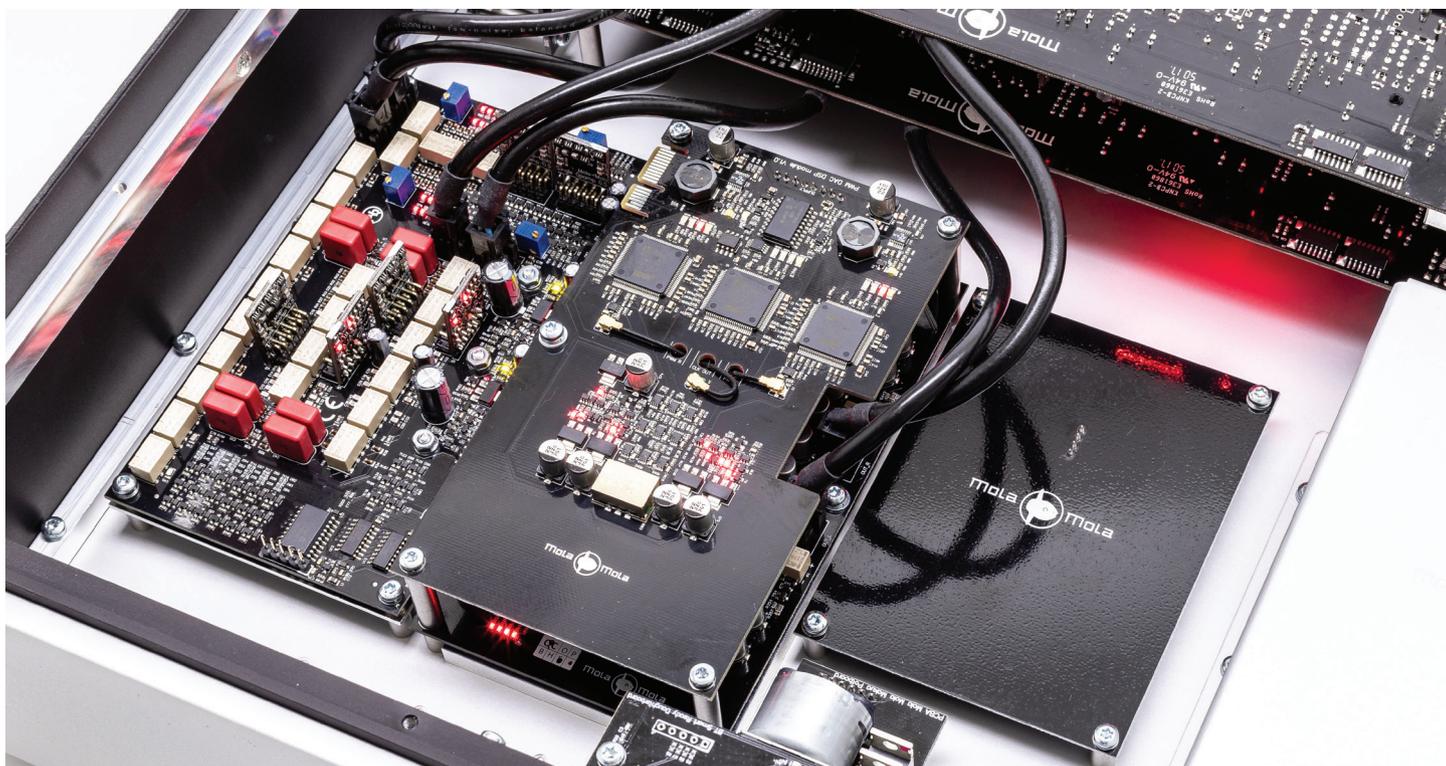
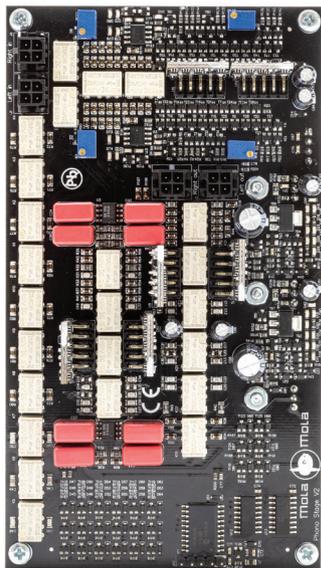
## Functions of the app includes:

- 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 Makua 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

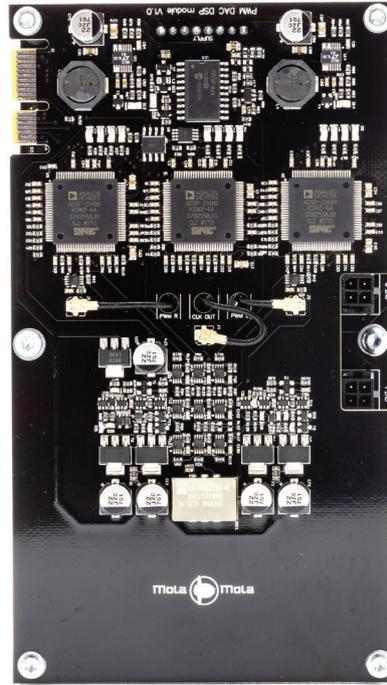
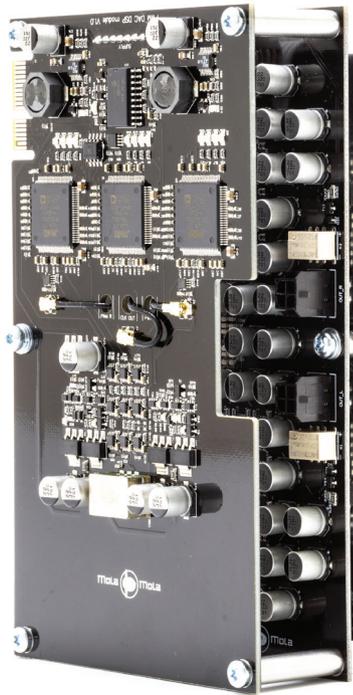
## Future-proof by being far ahead

**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 (SBC, AAC, APTX-HD)
- Ethernet (Roon Ready)

### 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: 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





#### **Contact**

##### **Mola Mola**

Kattegat 8  
9723 JP Groningen  
The Netherlands

+31 50 5264993  
info@mola-mola.nl  
www.mola-mola.nl

MOLA  MOLA

