

# *Tambaqui, the DAC that stands alone*

## User's Manual



### Packing List

**Your product was shipped with the items checked below. Please verify that you find all items mentioned in this list before you start setting up:**

Item	Qty	Shipper's signature
This Manual	1	
Pair of Cotton Gloves	1	
Tambaqui	1	
Power Cord	1	
Standard Remote Control Unit		
Premium Remote Control Unit		
Shipping Carton (Brown)	1	
Display Carton (White with Logos)	1	
Carrying Case (Black)	1	

Please read this manual before operating the unit



## Welcome

First off, congratulations! With the purchase of this product you have joined a growing community of audiophiles who value truthful sound reproduction and who consider neutral and transparent electronics a cornerstone in this pursuit. We at Mola Mola made it our primary goal to build electronics capable of passing a signal with no discernible change at all. Amplifiers make the signal bigger, converters turn the signal from a digital representation into an analogue one. In all these processes we strive to add nothing and to remove nothing.

Through our work designing professional audio equipment we have collected extensive knowledge of how to achieve total freedom from colouration without having to resort to minimalist circuitry. This allows us to build products that are purist without cutting back functionality.

The 4 preset buttons are programmable via the Mola Mola Remote app to access any combination of source, processing and routing.

We wish you a lifetime of musical enjoyment with this product and thank you for your custom.

Mola Mola Team

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## Important Safety Instructions

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**Mola Mola gaat er van uit dat u deze Engelstalige tekst volledig begrijpt. Als u hier moeite mee heeft dient u contact op te nemen met Mola Mola. Op verzoek sturen wij u een vertaling toe.**

**Mola Mola geht davon aus, dass Sie diesen Englischen Text völlig verstehen. Wenn notwendig, nehmen Sie bitte Kontakt auf mit Mola Mola. Auf Wunsch wird Ihnen eine Übersetzung zugeschickt.**

**Mola Mola suppose que le lecteur comprend parfaitement le texte en Anglais ci-dessous. En tout cas de doute veuillez contacter Mola Mola. Une traduction sera vous envoyée sur demande.**

**Mola Mola da por supuesto que el texto en versión Inglesa no ofrece ninguna duda de interpretación y se entiende íntegramente. Si este no fuese su caso rogamos contacte con Mola Mola quien, a petición, se encargaría de enviarle la correspondiente traducción.**

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Throughout this document, some aspects of operation that have a potential impact on safety or reliability are noted with the words “Warning” and “Caution”. Take particular care reading and understanding these items. Paragraphs marked with “Warning” explain safety measures required to maintain your personal safety. Paragraphs marked with “Caution” pertain to danger to the equipment itself or to connected equipment. Please follow these precautions when using this product:

1. Read these instructions.
2. Keep these instructions.
3. Follow all instructions.
4. Heed all warnings.
5. Install in accordance with the manufacturer’s instructions.
6. Use only attachments or accessories specified by the manufacturer.
7. **WARNING:** Dangerous voltage is inside this apparatus. Opening is only allowed by qualified service personnel.
8. **WARNING:** Do not defeat the safety purpose of the safety earth connection. Use the provided three-prong power cord to ensure the product is connected to safety earth. If the provided mains cord does not fit your outlet, consult an electrician for replacement of the obsolete outlet.

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9. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
  10. Unplug this apparatus during lightning storms or when unused for long periods of time.
  11. **WARNING:** Do not use this apparatus near water. Do not expose the apparatus to dripping or splashing. Do not place objects filled with liquids (flower vases, drink cans, coffee cups, etc) on the apparatus. Do not use this apparatus out of doors.
  12. **WARNING:** Clean only with a dry, soft, lint-free cloth. Do not spray any liquid cleaner onto the cabinet, as this may lead to dangerous shocks or malfunction.
  13. **CAUTION:** This unit runs slightly warm when operated normally. Operate in a normally ventilated area.
  14. **CAUTION:** Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat. Avoid exposure to direct sunlight.
  15. Use only with a cart, stand, bracket, or table designed for use with audio or music equipment. In any installation, make sure that injury or damage will not result from cables pulling on the apparatus and its mounting.
  16. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when the power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
  17. **WARNING:** To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

## Connections & Controls

### Front

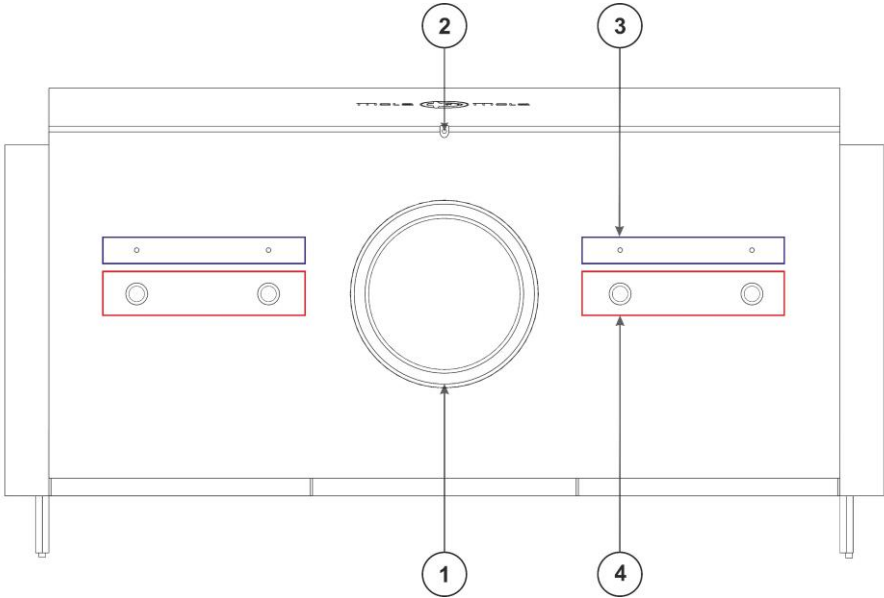


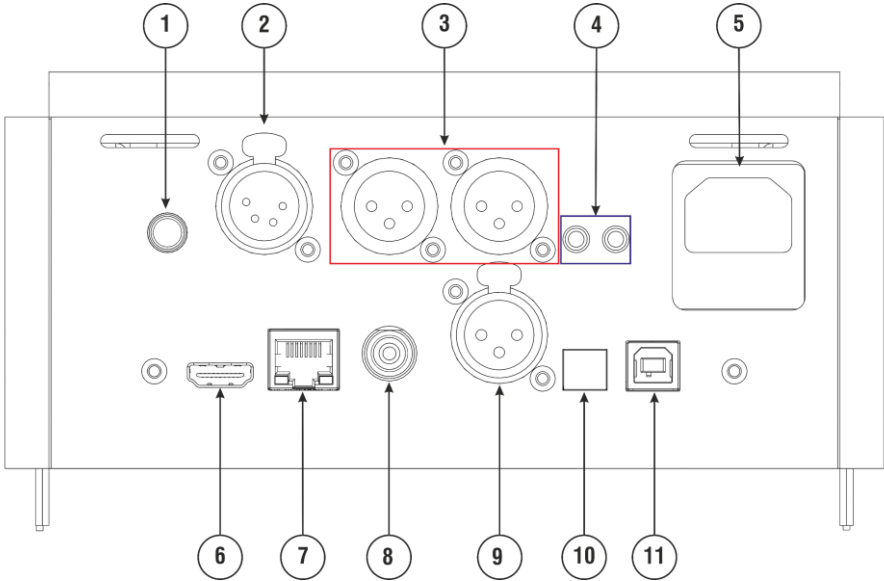
Figure 1: Front panel overview

#	Function	Notes
1	Display	
2	Power LED	1 LED, white or dim red
3	Preset indicator LED	4 LEDs, white
4	Presets	4 push buttons

Table 1: Front panel overview



**Rear**



*Figure 2: Rear panel overview*

#	Function	Notes
1	Headphone jack, 6.3mm	
2	Headphone XLR4	
3	Analogue Outputs	1 stereo pair
4	Trigger Outputs	2 programmable outputs
5	Mains power input	
6	I2S over HDMI	See table 4 for HDMI pinout configuration
7	Ethernet	
8	S/PDIF	
9	AES/EBU	
10	Optical (Toslink)	
11	USB type B	USB audio + firmware updates

*Table 2: Rear panel overview*

## Digital sources

The Tambaqui contains 7 digital audio inputs, namely: USB, Optical (Toslink), S/PDIF, AES/EBU (XLR), Ethernet, I2S over HDMI and Bluetooth (A2DP, APTX).

The supported formats are shown in Table 3.

Only the USB and Ethernet inputs support the playback of DoP (DSD over PCM) and Native DSD. Native DSD is not supported with the Mola-Mola USB-Audio Driver for Windows.

MQA is not supported.

A resync delay of 1 second is recommended for playback of DSD files.

#	Function	PCM support	DSD support
1	USB type B	Up to 384 kHz / 32 bits	DoP: up to DSD256 Native: up to DSD256
2	Optical (Toslink)	Up to 192 kHz / 24 bits	No
3	AES/EBU	Up to 192 kHz / 24 bits	No
4	S/PDIF	Up to 192 kHz / 24 bits	No
5	Ethernet	Up to 384 kHz / 24 bits	DoP: Up to DSD256 Native: Up to DSD256
6	I2S over HDMI	Up to 192 kHz / 24 bits	No
7	Bluetooth	48 kHz / 16 bits	No

Table 3: Digital source overview

Pin	Connection
1	SDATA - (Serial data)
3	SDATA + (Serial data)
4	SCLK + (Bit clock)
6	SCLK - (Bit clock)
7	LRCLK - (Word clock)
9	LRCLK + (Word clock)
10	MCLK + (Master clock)
12	MCLK - (Master clock)
2, 5, 8, 11, 17, 19, 20	GND
13, 14, 15, 16, 18	Not Connected

Table 4: HDMI pinout

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## Setting Up

### *Installation*

This product relies on free convection of air along the sides and top for cooling. Avoid placing magazines, books or other objects on top of the product as this acts as thermal insulation. Installation inside a cupboard is permissible provided at least 30cm (12") of free space above the product and 10cm (4") around the sides is respected. Operation in closer quarters requires some provision of forced convection (fan) to be installed inside the cupboard.

### *Connection*

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**CAUTION: Whenever you are plugging or unplugging cables, make sure that the device is turned off. Failure to take this precaution may result in pops or bangs in the loudspeaker. Use properly shielded interconnects with reliable connectors.**

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#### *AC Power Input*

Connect the supplied power cord to the AC input receptacle on the rear panel. Do not connect the power cord until all the audio input and output connections have been made.

It is usually best to plug the product directly into a wall outlet. Avoid the use of extension cords. A heavy duty multi-tap power outlet strip may be used if it and the wall outlet are rated to handle the total current demanded by the components connected to it.

Your Tambaqui has a universal input power supply, allowing it to operate anywhere from 90V to 240V mains. The same should be done if your auditorium is custom-equipped with a non-standard mains voltage.

If you are going to be away from home for an extended period of time such as a month-long vacation, it is a sensible precaution to unplug electronic equipment. Do the same as a precautionary measure during thunderstorms. No amount of surge protection or mains filtering will save your equipment from a lightning strike in the backyard.

#### *Output connections*

The Tambaqui has one pair of XLR outputs. No RCA outputs are provided because Mola Mola considers balanced (XLR) connections to be fundamentally superior. If you need RCA outputs to interface with a pre amp or power amp that lacks balanced inputs, most commonly available adapter cables or plugs will work fine. Keep in mind that pin 2 is hot (signal) and pin 3 carries the reference potential (cold).

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### ***Headphones connections***

There are two headphone connections available:

- XLR4
- Stereo jack, 6.35 mm

Keep in mind that pin 1 (left) & 3 (right) of the XLR4 connector are hot (signal) and pin 2 (left) & 4 (right) carries the reference potential (cold).

### ***Trigger outputs***

The two 12VDC trigger outputs can be used for various purposes. The most obvious one is making the power amplifier turn on and off with your Tambaqui. Another is making an external preamplifier turn on and off if you choose to use the Tambaqui in Direct mode. Any standard 3.5mm jack/jack cable will do (mono or stereo). Although the factory setting is to make all 2 outputs come on as soon as the Tambaqui is turned on, they can be linked to individual presets.

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## Basic operation

### ***Factory Preset Mode***

Your Tambaqui comes factory-programmed with default settings. In this mode:

- The leftmost button selects the network source (source 1)
- Preamplifier volume is set at -50 dB.
- Headphone volume is set at -50 dB.
- The trigger outputs are always on.
- Headphones are disabled.
- Direct mode is disabled.

Should you wish to return your Tambaqui to its factory-programmed state, you can do so by holding down the two buttons on the outside (Preset 1 & Preset 4) for one second or more until the display will show the message: Restore Default Presets. It makes good sense to do this if this is a unit you're loaning for evaluation and it was sent to you directly by a previous user.

### ***Front Panel Operation***

#### ***Powering Up***

So long as mains power is applied the power LED can be in two states: on or standby. In standby mode it will light up a dim red (barely visible in daylight, bright red standby LED's lighting up the room at night is a pet peeve of the designer). Push any of the 4 buttons to wake up the Tambaqui. The power LED lights up white and the preset you've just pushed will be engaged (as indicated by the LED above the button). After powering up the Tambaqui is muted for 30 seconds to allow the DAC to start up. Detection of the network source and USB source may take up to 60 seconds. The LED of the selected preset will blink but the display will show the volume.

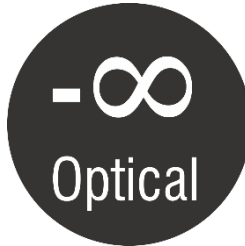
#### ***Selecting Inputs***

The preset indicator LED lights up solid when the Tambaqui is passing signal and blinks when it is muted.

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### **Muting**

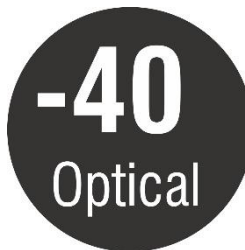
You can also make your Tambaqui mute by pushing the currently selected preset button. The volume will ramp down fast to silence. When the Tambaqui is muted the display will show the message as shown in figure 3. Push again or change the volume to unmute.



*Figure 3: Mute and source shown on display.*

### **Display**

The display will show the current volume and the selected source. 15 minutes after the last change on the display, it will turn off. The display will turn on again when the volume or source changes.



*Figure 4: Volume and source shown on display.*

### **Powering Down**

You can turn the Tambaqui off (place in standby mode) by holding any of the 4 buttons until the unit powers down (about 1 second).

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## ***Premium IR Remote Control Operation***

The group of six buttons on the remote control mirrors the front panel buttons. Pushing any of them will power the unit on and/or engage the associated preset and/or mute the unit. Button 5 and 6 do not correspond to a preset. The top button acts as mute/standby button and does the exact same as the preset buttons except it doesn't switch presets. This is mainly useful because the remote control unit obviously doesn't have LEDs to indicate which preset is engaged and sometimes you just want to mute the unit regardless of what was playing.

The volume up/down buttons operate as they do anywhere else.

## ***Standard IR Remote Control Operation***

The standard-issue RC unit works slightly different. The button in the middle of the quadrants turns the preamp on or off (hold 1 second for off). Press this button once for mute or unmute. Pushing on the left and right quadrants of the ring cycles through the 4 presets. The top and bottom quadrants control the volume. The two lower buttons are not used.

## ***Android® and iOS®***

Your Tambaqui is fitted with a Bluetooth® module to allow access with a mobile device. To use this feature, install the Mola Mola remote app from the App Store and Play store. As soon as your mobile device and your Tambaqui are within reach the app will display "Connected" in the status bar.

The home page shows the preset buttons and volume control. Other panels can be reached by swiping. They are explained in the Mola Mola remote section.

## ***Powering Up and Down***

The stand-by logo in the top left corner acts as power button.

## ***Volume control***

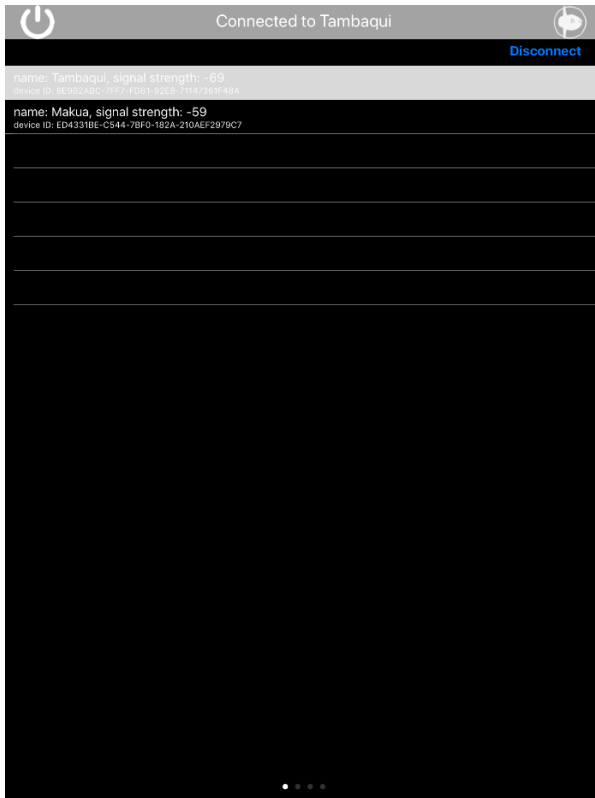
Drag the circle around the control arc to change the volume. The actual volume setting is indicated numerically.

## ***Mute***

The area with the volume indication acts as mute button. Mute is indicated by a red bar through the volume indication.

## *The Mola Mola remote*

The control app for your Tambaqui is available in the Apple App store and Google Play store. The app can be used for all Mola Mola products. The app will attempt to contact your Tambaqui and should find it as long as it is within reach and plugged in. Also ensure that the Bluetooth function of your mobile device is enabled. Status is announced in the status bar (the grey area at the top).



*Figure 5: The app is ready to control the Tambaqui, the Tambaqui is on.*

The power logo on the status bar turns the Tambaqui on and off. It shows black on grey when off, white on grey when on.

The Mola Mola logo in the top right corner is a shortcut to the home page.

The app has 4 pages that you can access by swiping.



## Home Page

The home page is the regular remote control, as outlined in the section about basic operation. Move the white circle around the arc to change volume. Click on the volume indication to mute or unmute.

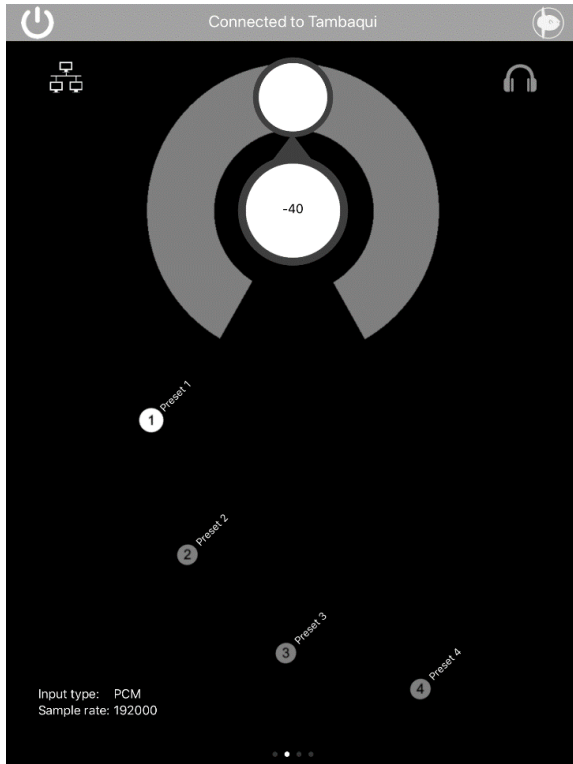


Figure 6: Home Page, Preset 1 is selected, headphones are off.

Below the stand-by button is a network indicator. This will light up when the connection with the network is established.

In the top right corner is a headphone symbol. This symbol will light up when the headphones are enabled.

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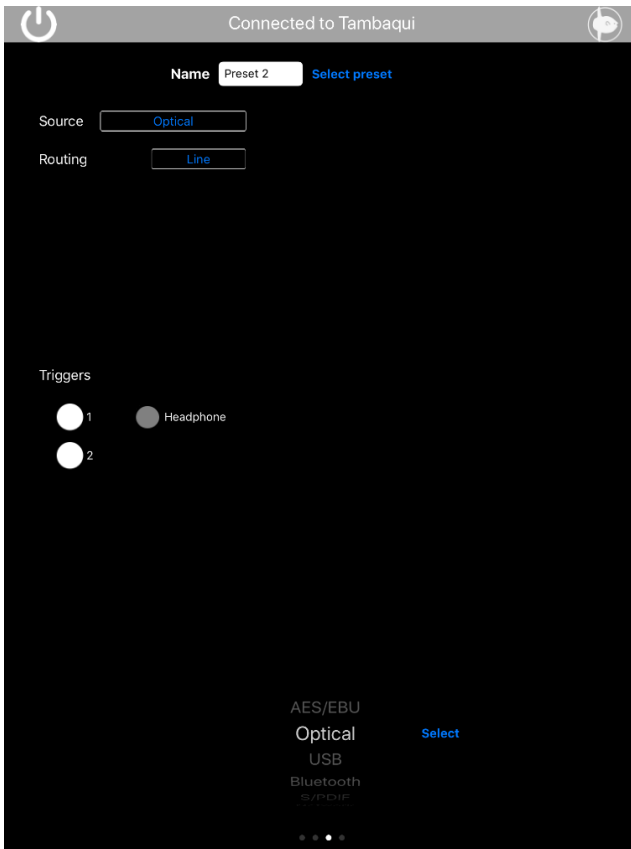
The home page will show the status of the DAC in the lower left corner. Input type shows the incoming audio format, PCM or DSD. Sample rate shows the sample rate of the incoming audio.

To program a preset, tap the button of the preset you want to change and swipe left to access the routing for that preset.

**Preset Page**

On this page you can change the settings for the selected preset. It will automatically select the preset currently in use. To select another preset, click on select preset. Select the desired preset in the dropdown menu.

To change the source, click on the current source. Select the desired source in the dropdown menu.



*Figure 7: Preset Page for Preset 2, with source selection activated.*

You can edit the name of the preset, the new name will automatically show on the home page buttons. The maximum length of a preset name is nine characters.

### **Preamplifier mode**

Preamplifier mode is enabled by default. In this mode the digital volume control is enabled so that you can connect the Tambaqui directly to a power amplifier. This mode is enabled by selecting Line under Routing. The volume can be changed with a remote or the Mola Mola remote app.

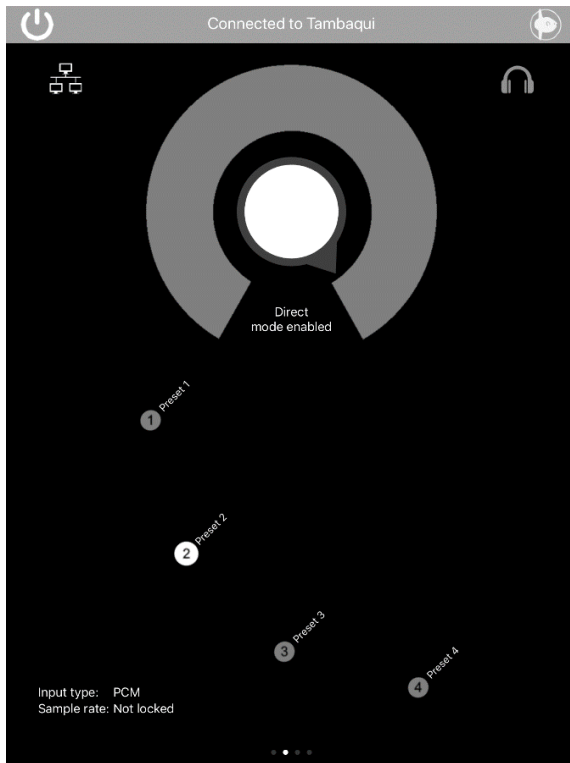
### **Direct mode**

This mode is enabled by selecting Direct under Routing. Direct mode disables the volume control. This mode should only be used when the Tambaqui is connected to an external preamplifier with a volume control. The display will show “Direct” instead of the volume. The volume control in the Mola Mola remote is disabled. There is a notification that Direct mode is enabled.

### **Headphone mode**

Headphone mode is activated by selecting Headphone on the preset page. When the headphones are enabled the volume is set to the last used volume in Headphone mode.

Disabling the headphones will restore the last used volume in Preamplifier mode.



*Figure 8: Direct mode enabled*

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**CAUTION: Absolutely only select Direct if the source is volume controlled. Direct mode is equivalent to turning the volume all the way up. Engaging Direct mode with a source that is not volume controlled may damage your loudspeakers.**

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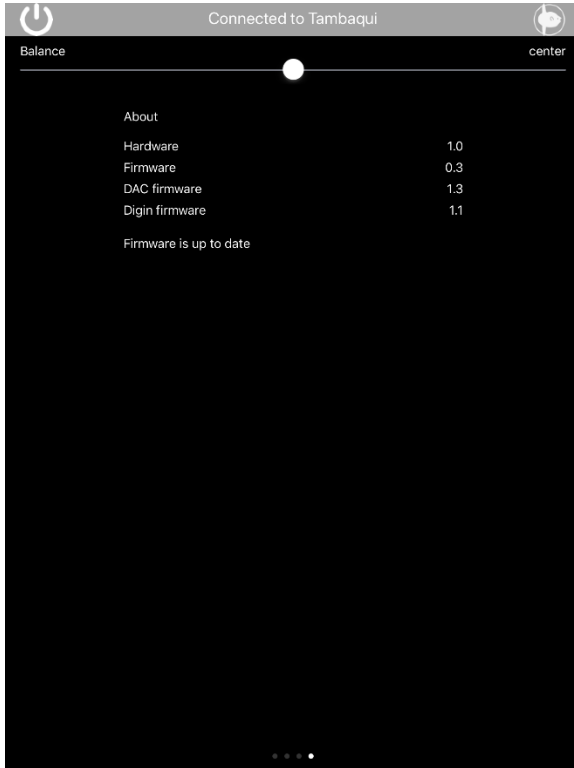
## Triggers

The two Trigger buttons correspond to the two trigger outputs on the rear panel. They are always on by default, which is the best setting if you only use them to turn your power amplifiers on.

If you have selected the headphone mode then the trigger outputs are automatically disabled.

***Balance and Update Page***

Swipe left from the Preset page to land on the balance and update page. When there is an update available an update button will appear.



*Figure 9: Balance and Update Page.*

Balance is not normally needed unless an acoustic oddity or asymmetrical speaker placement consistently pull the sound stage off centre. Double tap on the circle will center the balance.

## Roon

The Tambaqui is a Roon Ready device. The device volume in Roon is linked to the volume control of the Tambaqui.

The Tambaqui supports convenience switching. If you press play in Roon and the selected preset in use does not have network as the source input, then Tambaqui will switch to preset 1 and start playback.

### First time use

Before you can use the Tambaqui in Roon, it must be enabled first. To do this go to Settings and then select the Audio page. The Tambaqui will show up within a minute after powering up as a Roon Ready device (figure 10). Click on enable on give it a name of your choosing (figure 11).

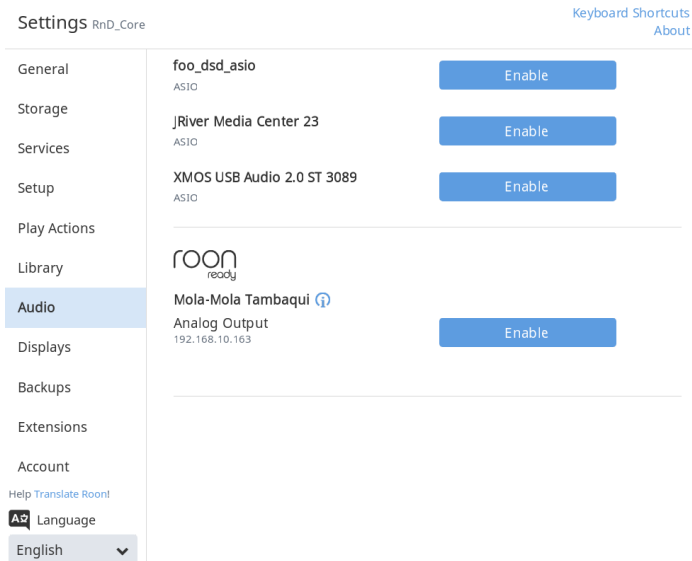


Figure 10: Example of the Audio settings page in Roon

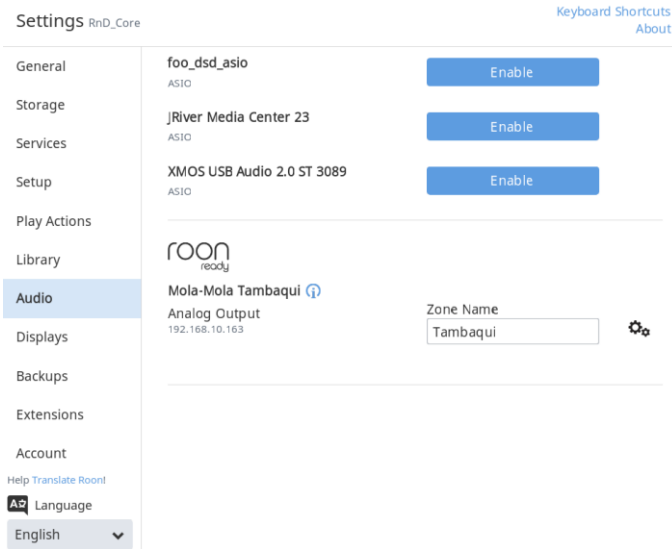


Figure 11: Fill in Zone Name

Select Tambaqui as the audio zone and then you can start playing your music.

### Network update

Updating of the Network module is done via the Tambaqui webpage. You can visit the Tambaqui webpage via Device Settings page in Roon. Click on the information symbol and then click on Configure Device (figure 12).



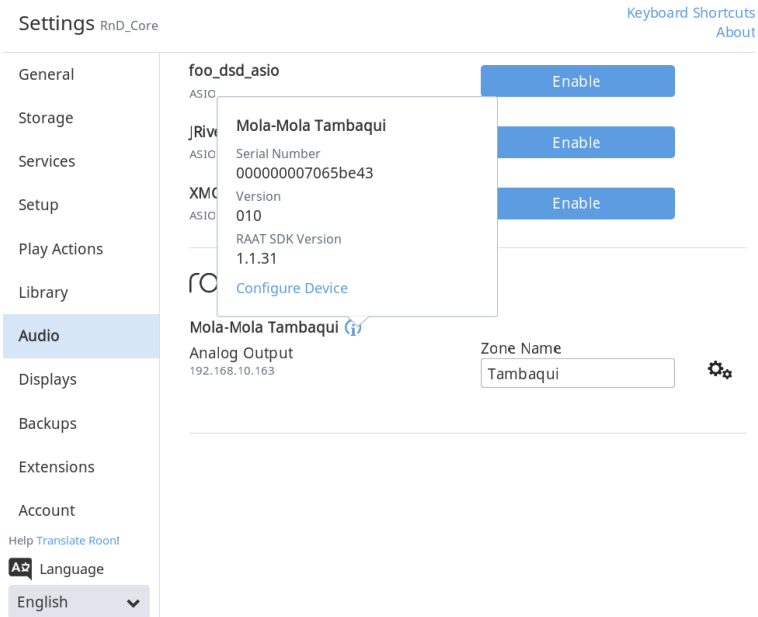
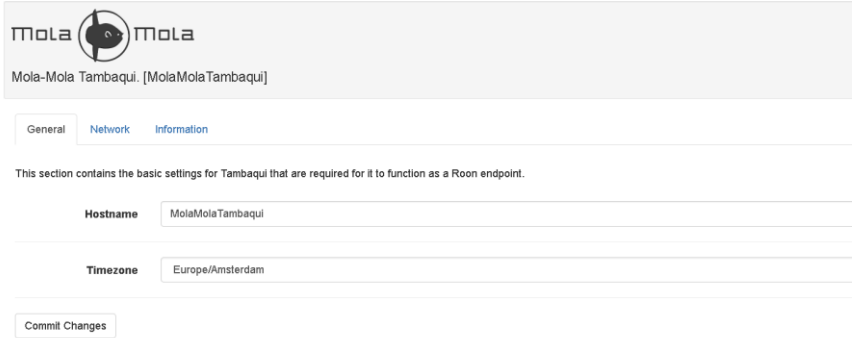


Figure 12: Click on Configure Device to go to the Tambaqui webpage

Or you can enter the IP address in your browser. The IP address of the Tambaqui is visible under Audio Device in Zone Settings or on the Audio settings page.

If there is a update available a update button is visible in the Tambaqui webpage.



The screenshot shows the Mola-Mola Tambaqui web interface. At the top, there is a header with the Mola logo and the text "Mola-Mola Tambaqui. [MolaMolaTambaqui]". Below the header, there are three tabs: "General", "Network", and "Information". The "Network" tab is selected. Below the tabs, there is a paragraph of text: "This section contains the basic settings for Tambaqui that are required for it to function as a Roon endpoint." Underneath this text, there are two input fields. The first is labeled "Hostname" and contains the text "MolaMolaTambaqui". The second is labeled "Timezone" and contains the text "Europe/Amsterdam". At the bottom of the form, there is a button labeled "Committ Changes".

Figure 13: The Tambaqui webpage

## Drivers and updates

### *XMOS driver*

To play audio from a Windows computer via USB, you have to install a XMOS driver. You could download the driver on the download page of [www.mola-mola.nl](http://www.mola-mola.nl). MAC and Linux devices do not need this driver.

### *Firmware update*

The DIGIN module and the PWM DAC module contains firmware which can be updated. On the download page of [www.mola-mola.nl](http://www.mola-mola.nl) an update tool is available. This tool is available for Windows 7 and up and OSX 10.6 and up. How to update is described in the help file of the tool. Before starting the update tool, make sure that the selected source is USB.

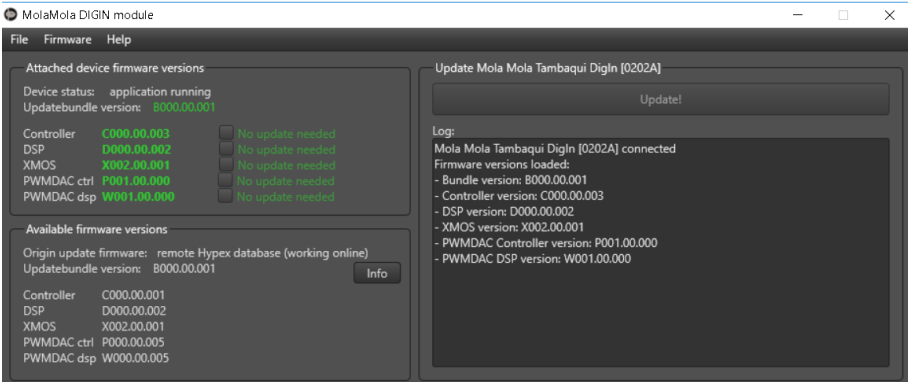


Figure 14: Firmware update tool.

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## Troubleshooting

Most difficulties in audio systems are the result of incorrect connections, or improper control settings. If you encounter problems, isolate the area of the difficulty, check the control settings, determine the cause of the fault and make the necessary changes. If you are unable to get sound from your Tambaqui or its behaviour is not as expected, refer to the suggestions for the following conditions:

**No response** when pushing buttons: Verify the mains connection. Unplug the power cable from the Tambaqui and try to power another device with it. If this works, check the fuse. Lever out the little drawer underneath the mains input and replace the fuse that's hooked into the end of it. The second fuse that you see in a separate cavity of the fuse drawer is a spare. If this still doesn't work, contact your local retailer. The unit may need repair.

**The unit responds** (as witnessed by lights and clicking relays) **but no sound**: Ensure that the source is connected to the selected input. Verify any such switches on your power amplifier too (and make sure it's on and wired correctly). When in complete doubt, restore the factory preset by holding down the two outer buttons for more than one second or use the app. Note though that this erases any programming you may have done.

**The volume control has no effect**: you've selected a preset that is programmed as fixed output (Direct mode). If you have not connected the Tambaqui to a volume controlled preamplifier or integrated amplifier, reprogram the routing to line before you continue using the product.

**Tambaqui is not shown in Roon**: The Roon Core and the Tambaqui must be connected to the same network.

## Audio performance data

Item	Symbol	Min	Typ	Max	Unit	Notes
Output level	Vout			18	dBu	(6.15 Vrms)
Output level headphones	Vout_hp			11	dBu	(2.75 Vrms)
Output Impedance	Zout			44	Ohm	
Output Impedance headphone connectors	Zout_hp			<0.5	Ohm	
Noise voltage headphone connectors	Vn		4.9 $\mu$		V	Unweighted at unity gain
Gain range		-80		0	dB	
Gain resolution				1	dB	
Bandwidth	Fc			80k	Hz	
Distortion (THD, IMD)	THD IMD			-140	dB	Not measurable using current test equipment, number is an estimate based on performance of the discrete gain block at maximum signal level
Integrated jitter				1 300	Ps fs	From 10Hz upwards From 1kHz upwards
Jitter rejection		80			dB	At 1Hz after 20 seconds of lock

Table 5: Audio Performance Data

## Technical data

Item	Value	Notes
Supply voltage	90-135 / 180 – 270 Volt AC/47-63Hz	Auto Switching
Power Consumption	40 Watt	
Dimensions	200mm*110mm*320mm	(W x H x D)
Weight	5.2 kg	

*Table 6: Technical Data*

## Annex I: RC5 Codes

The Device Code is 16.

<b>Command</b>	<b>Primary Code</b>	<b>Alternative Code</b>
Mute	12	53
Volume Up	16	51
Volume Down	17	52
Presets 1...4	1...4	
Power on/off		50
Next preset		54
Previous preset		55

*Table 7: RC5 Codes*

10 consecutive repeats (no change in the T bit, i.e. holding the button depressed) of Mute or 1...6 powers the device down.

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## Revision History

Revision	Description	Date
R0	Initial draft	16-10-2018
R1	Revised and expanded	03-12-2018