



Lupe



User's Manual

Mola Mola

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Please read this manual before operating the unit

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
Lupe	1	
Power Cord	1	
Standard Remote Control Unit		
Premium Remote Control Unit		

This Mola Mola product has no user serviceable parts inside. Opening and/or making changes to the unit by any other than Mola Mola approved service engineers voids the warranty.

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

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.
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 device 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

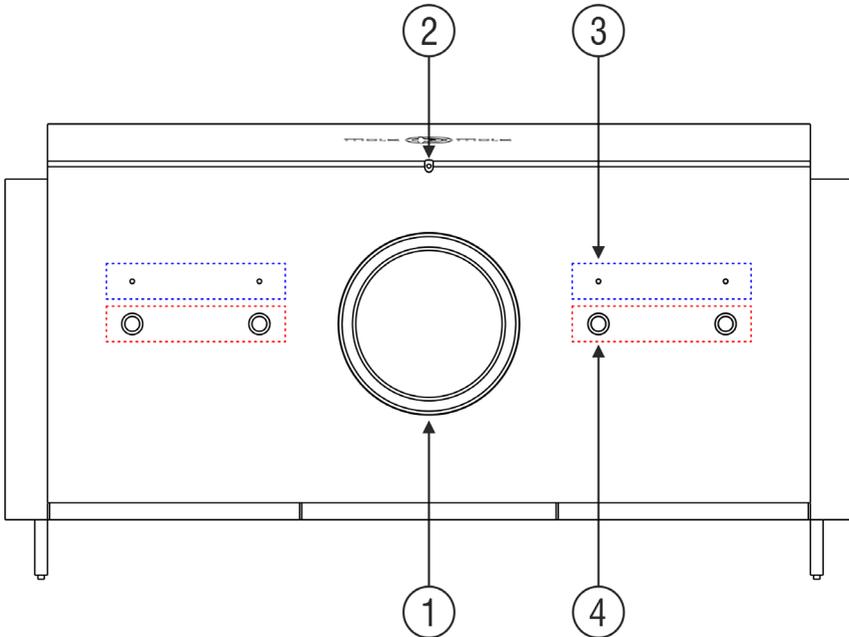


Figure 1: Front panel overview

#	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

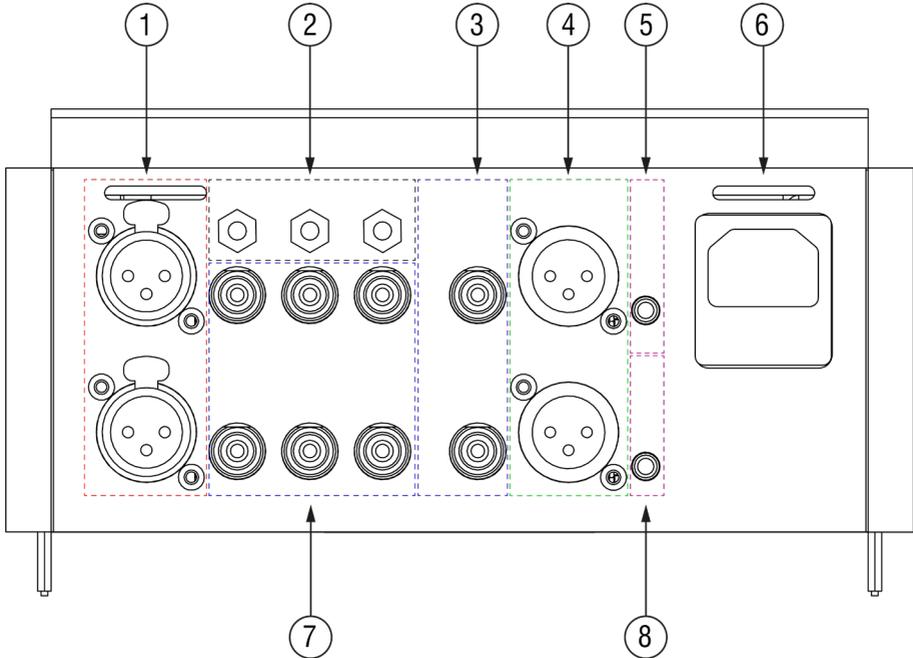


Figure 2: Rear panel overview

#	Function	Notes
1	Analogue XLR Inputs	1 stereo pair
2	Grounding Posts	
3	Analogue RCA Outputs	1 stereo pair
4	Analogue XLR Outputs	1 stereo pair
5	Trigger Input	3-15V, AC or DC
6	Mains power input	
7	Analogue RCA Inputs	3 stereo pairs
8	Trigger Output	1 programmable output

Table 2: Rear panel overview

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

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.

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 Lupe has a universal input power supply, allowing it to operate anywhere from 90V to 240V mains.

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.

Input Connections

Your Lupe accepts both RCA and XLR type connectors. Do not connect sources with line level to inputs of the Lupe. Do not use RCA- to XLR adapters for XLR input.

Grounding Posts

Connect any turntable ground wires to one of the grounding post to minimize the chances of capacitively induced hum on the phono cartridge from the turntable.

Output connections

The Lupe has one pair of RCA outputs and pair of XLR outputs. By default, both outputs are set as output. Keep in mind that pin 2 is hot (signal) and pin 3 carries the reference potential (cold).

Trigger Input

Connect a 3.5mm jack cable to a trigger source such as the trigger output on the Makua preamplifier. Any standard 3.5mm jack/jack cable will do (mono or stereo).

Trigger Output

The 12VDC trigger output can be used for various purposes. It can be linked through to another device with trigger input. Any standard 3.5mm jack/jack cable will do (mono or stereo). Although the factory setting is to make the trigger output come on as soon as the Lupe is turned on, it can be linked to individual presets.

Basic operation

Factory Preset Mode

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

- The leftmost button selects the leftmost source (source 1) and so on.
- RCA and XLR outputs are both enabled.
- The trigger output is always on.
- Input 1, 3 & 4 are configured for Moving Magnet cartridges with a gain of 45dB and a load resistance of 47k Ω and capacitance loading of 100pF.
- Input 2 is configured for Moving Coil cartridges with a gain of 52dB and a load resistance of 250 Ω and no capacitance loading.

Should you wish to return your Lupe 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 device you are 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 LEDs lighting up the room at night is a pet peeve of the designer). Push any of the 4 buttons to wake up the Lupe. The power LED lights up white and the preset you have just pushed will be engaged (as indicated by the LED above the button).

Selecting Inputs

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

Muting

You can also make your Lupe mute by pushing the currently selected preset button. When the Lupe is muted the display will show the message on line 3 as shown in figure 3. Push again to unmute.

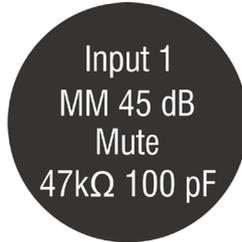


Figure 3: Mute and source shown on display.

Display

The display will show the selected input and details about the phono stage settings (see figure 4). The display will also show if the mono switch or subsonic filter is engaged (see figure 5 for example). 15 minutes after the last change on the display, it will turn off. The display will turn on again when changes are made.

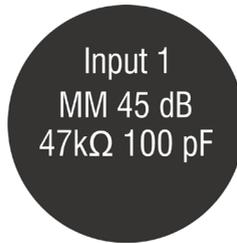


Figure 4: Configuration for moving magnet cartridge.

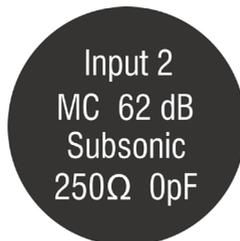


Figure 5: Configuration for moving coil cartridge with subsonic filter engaged.

Powering Down

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

Android® and iOS®

Your Lupe 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 or Play store.

The home page shows the preset buttons and volume control. Other pages are used for advanced control and programming. 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.

Mute

Click on the speaker indicator to mute or unmute. The speaker indicator and volume slider bar will turn red when muted.

Advanced Control and Programming

The factory preset only operates the most basic features of your phono stage. The architecture is much more powerful, as the signal path diagram in figure 6 shows.

Signal Path

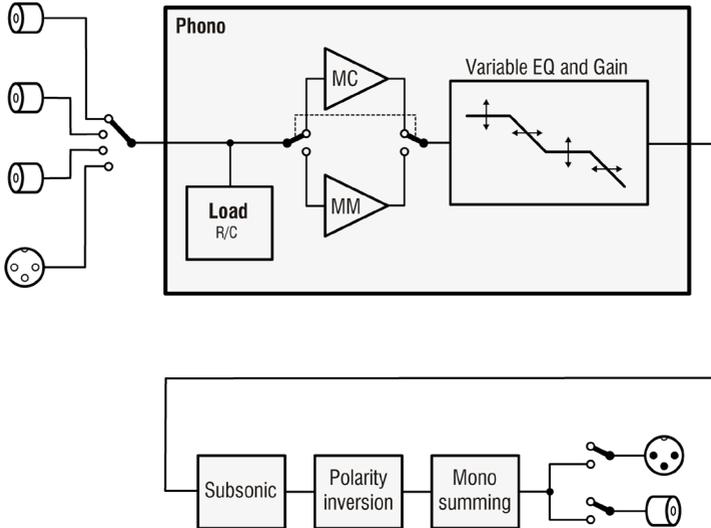


Figure 6: Sketch of the internal signal path.

Everything that can be switched or changed in the above diagram is under software control:

- Source selection
- Variable loading, gain and EQ of the optional phono stage
- Subsonic filter
- Polarity inversion of left, right or both
- Mono summing
- Output selection

Programmability

Every thinkable combination of routing and processes can be rolled together for direct access through any of the 4 presets.

Say for instance that you have 2 turntables, each fitted with a different cartridge (most records sound best with an elliptical or VDH stylus but dynagroove cuts positively require a conical stylus). You can then assign one preset button to each turntable, each with its own optimum loading and gain.

Now imagine that some of your most precious historical records are mono, vertically cut with obviously a non-RIAA curve. You can then assign yet another preset to the same input, with the same loading and gain but with one channel's polarity inverted and mono on, and with the EQ that applies to these records.

The Mola Mola remote

The control app for your Lupe 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 Lupe 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. The app will auto connect when there is only one Mola Mola device paired with the app. The app will turn the Lupe on during the connection procedure when it is not already turned on. In case you have multiple Mola Mola devices select the device you wish to operate and click on Choose device.

First time setup:

1. Pull down to scan for devices (figure 7).
2. Click on the Add button of the device you want add (figure 8).
3. Type in new name and click Add device (figure 9).
4. Connect with device by clicking on Choose device at the bottom of the page (figure 10).

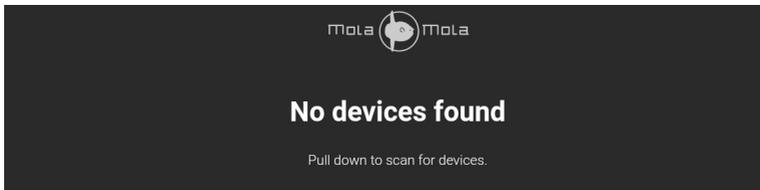


Figure 7: Pull down to scan for devices.



Figure 8: Discovered devices.

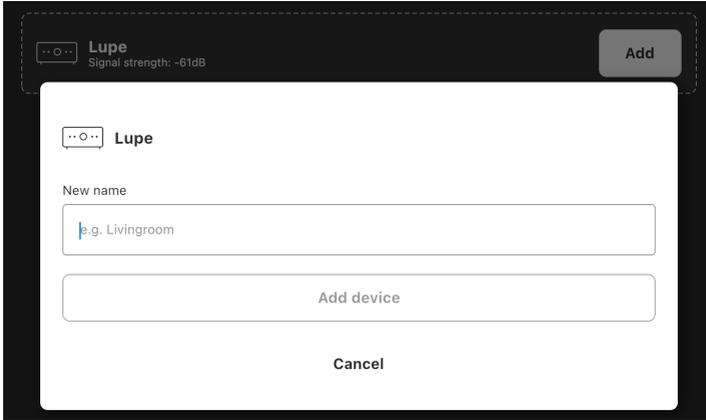


Figure 9: Type in new name and click Add device.

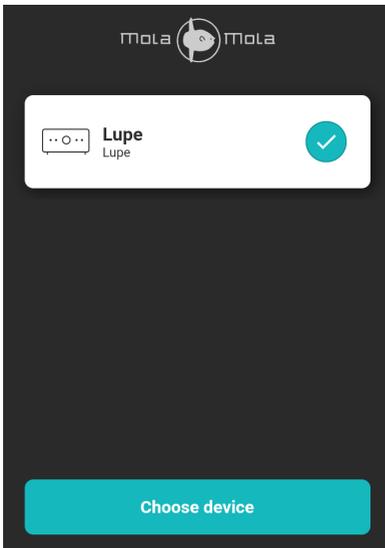


Figure 10: The start-up page.

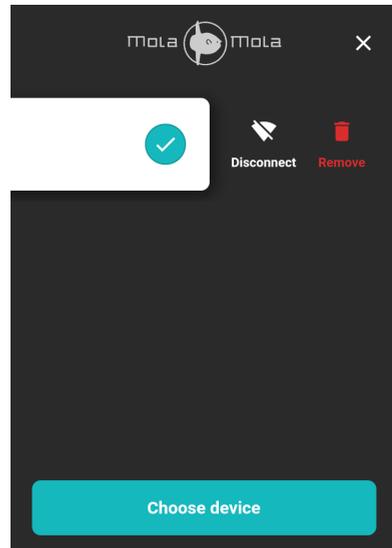


Figure 11: Swipe left to show disconnect and remove buttons.

Swiping a device to the left will allow you to remove the device from the Mola Mola remote app by clicking on the remove button. If the device is already connected with the app, then an disconnect button is also shown here (figure 11).

Home Page

The home page is the regular remote control, as outlined in the section about basic operation. Click on the speaker indicator to mute or unmute.

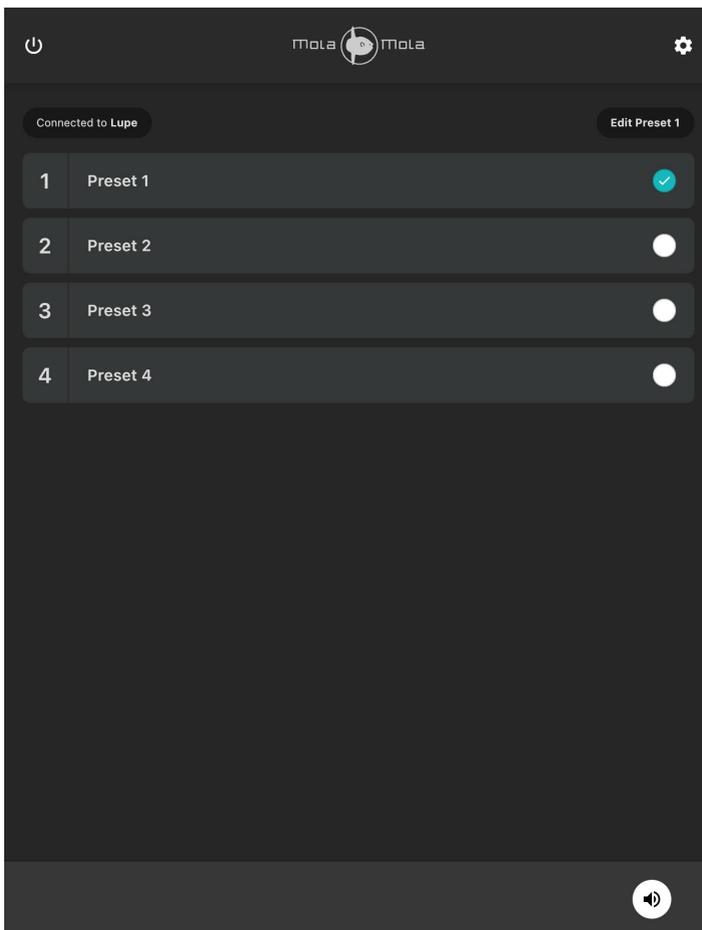


Figure 12: Home Page

To program a preset, tap the button of the preset you want to change and click on the edit preset button in the top right corner.

Preset Page

On this page you can change the settings for the selected preset. It will display the settings of the preset currently in use. You can edit the name of the preset. Wait until the check appears in the right corner of the Preset name field. The new name will automatically be shown on the home page buttons. The maximum length of a preset name is nine characters. To change the source, click on the current source. Select the desired source in the dropdown menu.

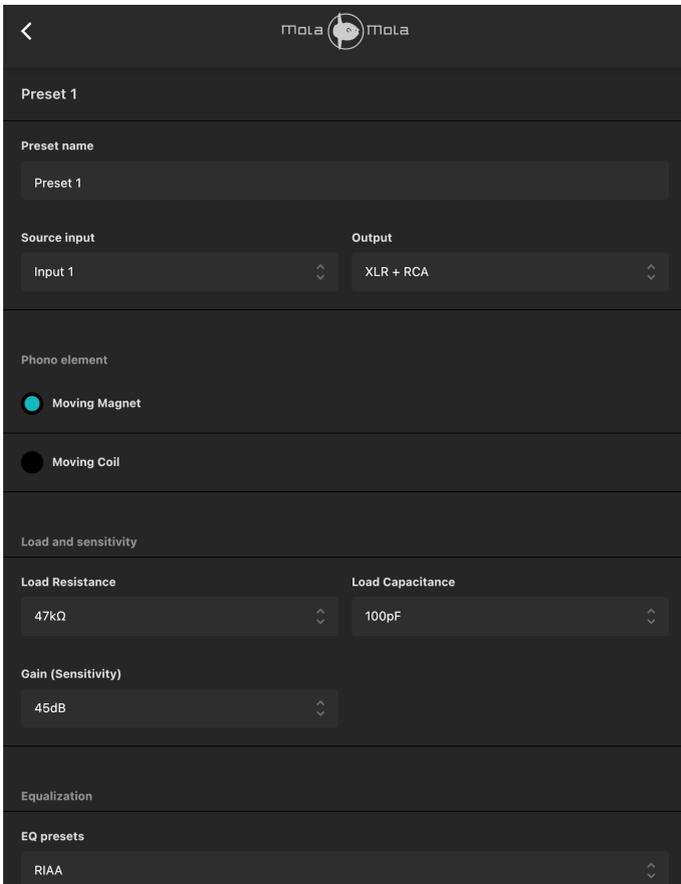


Figure 13: Preset Page for Preset 1.

Setting Up and Controlling the Phono Stage

Changes made to the phono setup only effect the selected preset.

MM/MC selection

In order to ensure maximum sonic transparency, the phono stage has separate Moving Coil (**MC**) and Moving Magnet (**MM**) input stages, in contrast with most other phono stages that simply add a gain stage in MC mode.

After choosing between MC and MM, find the correct load resistance and in the case of MM, load capacitance too.

Termination and Sensitivity of MC Cartridges

Moving Coil elements have a low output voltage but also an extremely low output impedance, meaning that excellent signal-to-noise performance can be had with an input optimized for voltage noise. Another side effect is that there is no need to adjust load capacitance. Some cartridge manufacturers insist that even load resistance is uncritical but we decided to add a selection of common load resistances nonetheless. These are in the **R** dropdown box. On the downside, sensitivities of MC cartridges are all over the place so the **sensitivity** of the phono stage needs to be adjustable over a fairly large range. The documentation of your phono cartridge will give an indication or recommendation but by all means feel free to experiment around with sensitivity and load resistance.

Termination and Sensitivity of MM Cartridges

Moving Magnet cartridges have a fairly high output voltage but also an extremely high output impedance, in particular inductance, meaning that the input stage has to be optimized for current noise. Also, both load resistance and capacitance are critical to get a flat response without droop or peaking. The documentation of your phono cartridge should list the optimum loading which is to be taken pretty much as law, not as a mere recommendation. In the **R** dropdown box, select the value closest to the value given by the manufacturer. Then, look up the capacitance of your phono cable and subtract that value from the phono cartridge manufacturer's specification. Set the **C** dropdown box to the value closest to the result. When you have to choose between rounding down or up, keep in mind that a higher C results in more chiseled highs and a lower C in a more rolled off but more controlled and detailed upper octave. Leaving **Sensitivity** at the default 5mV is usually right. This is as far as most phono stages, including external ones, would ever go. The next part is for serious vinyl fanatics with extensive collections of historical records.

EQ Curves

In the early days of vinyl (and certainly shellac) almost every record label had their own EQ curve. Oddly enough they sometimes kept them secret in an early attempt at vendor lock-in, to force music lovers to buy their record player from the label's parent company. History records that the incompatibility wasn't even noticed by the punters so by 1956 most labels were happy to standardize on the curve now known as RIAA. As stereo only came about in 1958, a rule of thumb is that **the vast majority of stereo cuts were made using the RIAA curve.**

Almost all of those historical EQ curves are a combination of a manageable number of time constants which is why it turned out to be feasible to support switchable EQ in the analogue domain.

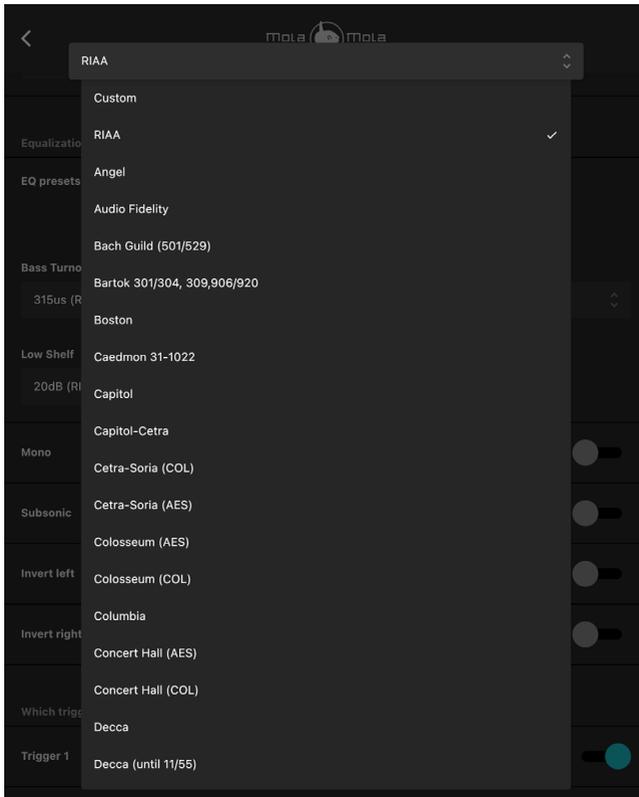


Figure 14: List of Phono Stage EQ Curves.

The **EQ** drop-down box (figure 14) lists all combinations of record labels and periods that we could obtain EQ data of, courtesy of Russell Fischer (www.shellac.org) and Larry Robinson (midimagic.sgc-hosting.com). If you can identify a particular record by its label, just pick the corresponding option and the numbers in the remaining four boxes will be set correctly. If you can't find data, you'll have to dial the numbers by ear.

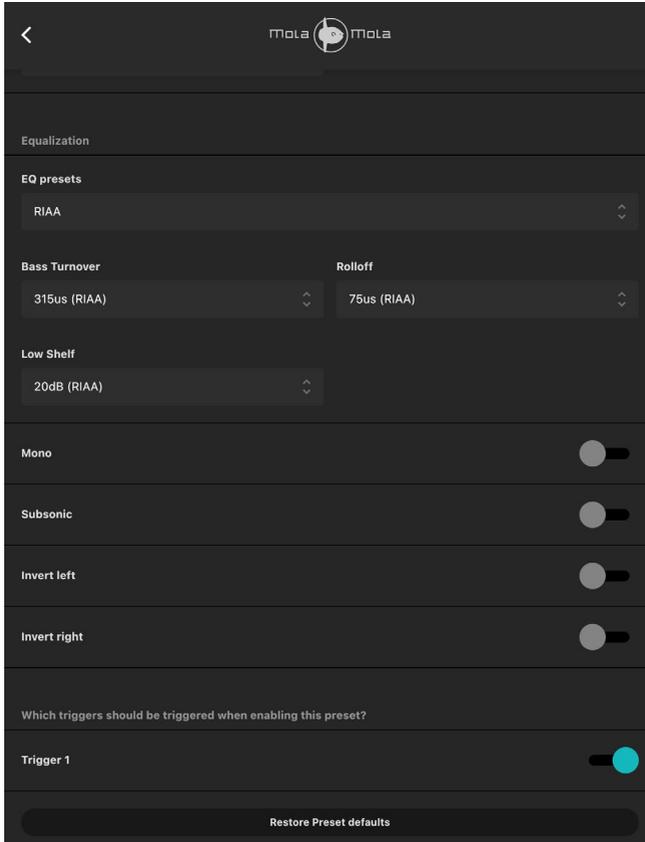


Figure 15: Phono settings on Preset Page.

Shelf sets the low shelf. Decrease it if you perceive the bottom end as too thundery or rumbly. Try increasing it if the bass lacks “authority”.

T1 sets the bass turnover point. Increase the time constant it if the sound is too woolly, decrease it if the sound is too thin.

T2 sets the treble roll-off. Increase the time constant if the sound is edgy, decrease it if it lacks bite.

We are aware of customers using these settings as a kind of tone control. This is fine of course.

Mono does what you'd expect: sum left and right together. Mono summing can also be turned on or off by pressing button 3 on the Mola Mola Standard Remote when it is programmed for use with Lupe only.

Subsonic filter will filter out low frequency noise. The subsonic filter can also be turned on or off by pressing button 2 on the Mola Mola Standard Remote when it is programmed for use with Lupe only. The subsonic filter will automatically be engaged for 15 seconds when changing presets or settings like gain or phono element to block out any unwanted DC offset. The subsonic filter will automatically be engaged when a large DC offset has been detected for more than a few seconds on one or both of the channels. In this case the display will show that the subsonic filter is on, but the Subsonic slider in the app is off. The subsonic filter can in this case only be turned off by switching to another preset and then back again. Check your setup if the subsonic filter is engaged automatically again.

The two **polarity invert** buttons invert the polarity (absolute phase) of the left and/or right channel. Inverting one channel is useful when playing back vertically cut records which, played back with a modern cartridge, produce out-of-phase left and right. Otherwise, do not invert only one channel.

The trigger button corresponds to the **trigger output** on the rear panel. It is always on by default.

Pressing the **Restore Preset defaults** button will only restore the current preset to its default settings. Global settings such as LED and display brightness will not be changed.

About Page

Clicking on the gear symbol in the top right corner of the home page will direct to the About page.

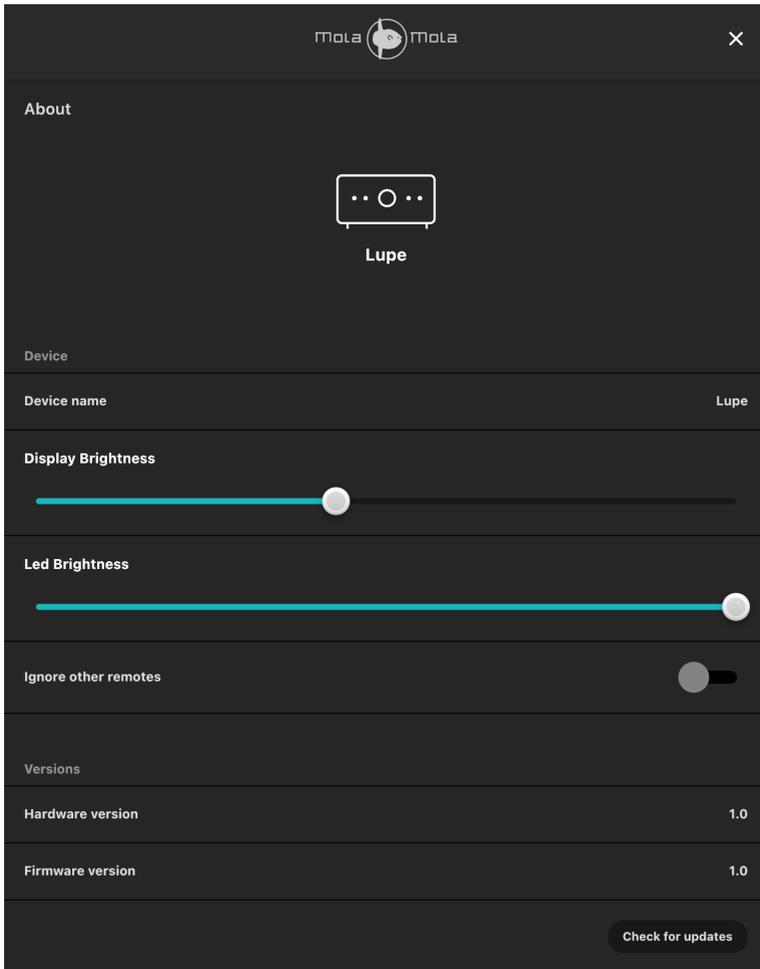


Figure 16: About Page.

Display Brightness

The brightness of the display is user adjustable. Slide the slider completely to the left to turn off the display.

LED Brightness

The LED Brightness of the preset LED and the power LED is user adjustable. The LEDs are set to maximum brightness by default. The LED brightness slider has 4 positions. Sliding the slider completely to the left will turn off the preset LED and the power LED is set at minimum brightness.

Ignore other remotes

When the Ignore other remotes button is enabled then the Lupe will not respond to IR remote commands that are preceded with IR device address 16. The Lupe will only respond to IR remote commands that are preceded with IR device address 18. This can be useful when the Lupe responds undesirably to an IR remote control of another device. The Premium IR Remote and the Standard IR Remote both use IR device address 16. The Lupe will not respond to those IR remote controls when Ignore other remotes is enabled. The address of Standard Remote Control Unit can be configured to IR device address 18 (see chapter Standard Remote Control Unit).

Updates

Click on the Check for updates button to check if there is new firmware available. When there is an update available an update button and information about the update will appear. Clicking on the Update button will direct you to the update page (see figure 17) that will guide you through the update process.

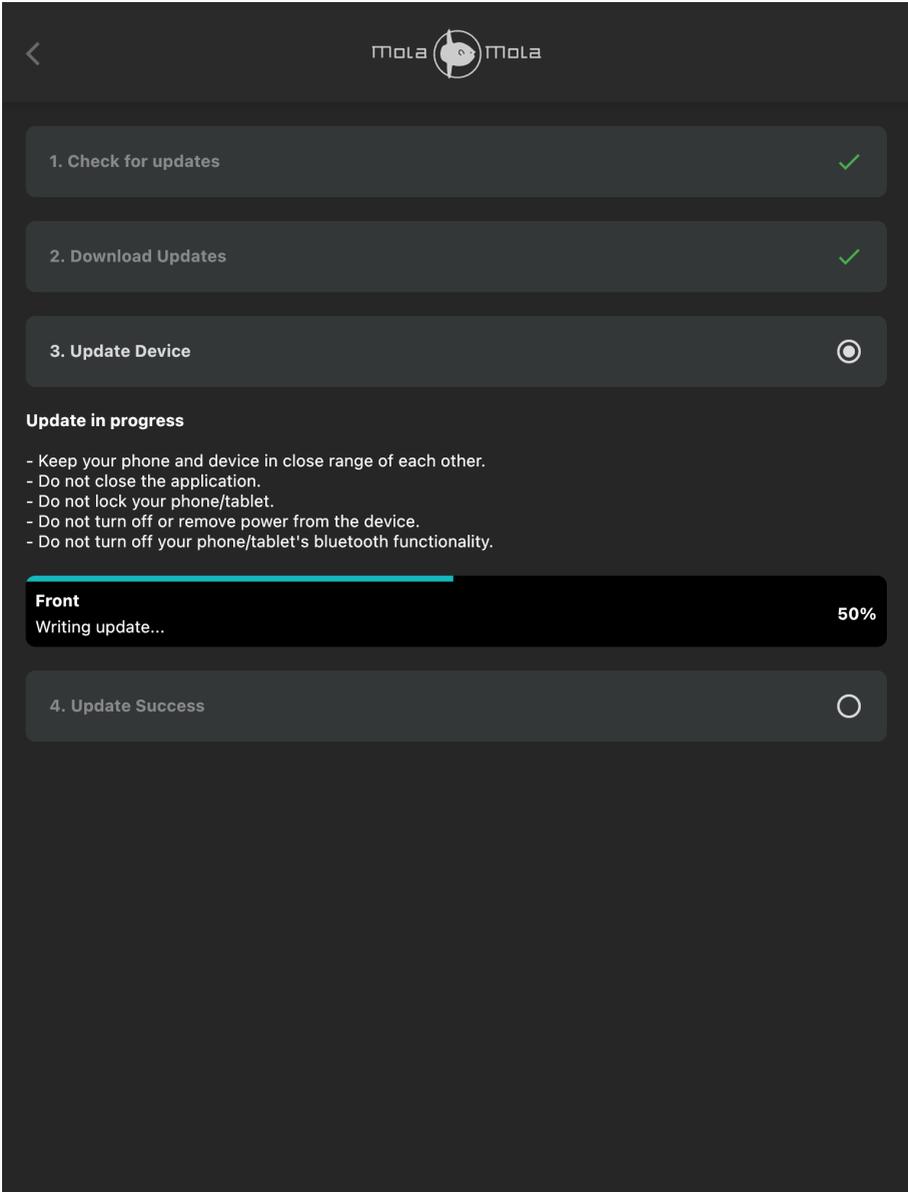


Figure 17: Update Page.

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 Lupe 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 Lupe 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 is hooked into the end of it. The second fuse that you see in a separate cavity of the fuse drawer is a spare. If the device still does not work, contact your local retailer. The device may need repair.

The device responds (as witnessed by lights and clicking relays) but no sound: Ensure that the source is connected to the selected input. Verify that the output of your choice is enabled. When in complete doubt, restore the factory preset by holding down the two outer buttons for more than one second. Note though that this erases any programming you may have done.

The displays shows that subsonic filter is on and it cannot be turned off in the app or by using the Mola Mola standard remote: This means that Subsonic filter is automatically engaged due to a large DC offset has been detected for at least more than a few seconds on one or both of the channels. The subsonic filter can in this case only be turned off by switching to another preset and then back again. Check your setup if the subsonic filter is engaged automatically again after switching back to the affected preset.

Audio performance data Phono Stage

Item	Symbol	Min	Typ	Max	Unit	Notes
Input noise (MC)				0.35	nV/rtHz	
Input noise (MM)				2.8	pA/rtHz	
Sensitivity		30		5000	μ V	
Distortion (THD, IMD)	THD IMD					Not measurable using current test equipment, number is an estimate based on performance of the discrete gain block at maximum signal level
RIAA conformance				0.1	dB	

Table 3: Audio performance data Phono

Technical data

Item	Value	Notes
Supply voltage	90-135 / 180 – 270 Volt AC/47-63Hz	Auto Switching
Power Consumption	25 Watt	
Dimensions	200mm*110mm*320mm	(W x H x D)
Weight	5.1 kg	
Fuse	T1,6A 250V 5x20mm ceramic	

Table 4: Technical Data

Annex I: RC5 Codes

The IR device address is 16. The Lupe also responds to IR device address 21.

You can disable that the Lupe responds to IR device address 16 by enabling Ignore other remotes on the about page.

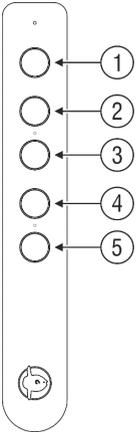
Command		Primary Code	Alternative Code
Mute		12	53
Presets 1...4		1...4	
Power on/off			50
Next preset			54
Previous preset			55

Table 5: 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.

Standard Remote Control Unit

Button	Function	Notes
1	Mute, ON/OFF	Short press: Mute / Unmute / ON. Long press: OFF
2	Volume UP	Subsonic ON/ OFF when remote is programmed for Lupe (device address 21)
3	Volume DOWN	Mono ON/ OFF when remote is programmed for Lupe (device address 21)
4	Source UP	
5	Source DOWN	



Programming

The device address of the Standard Remote can be programmed to a default or a device specific device address. Hold button 1 and 5 simultaneously until the LED starts blinking. The number of consecutive blinks corresponds to the device address:

1. Default / Legacy / All devices (device address 16)
2. Makua (device address 17)
3. Kula (device address 19)
4. Tambaqui (device address 18)
5. Lupe (device address 21)

Press button 4 or 5 to scroll up or down through the device addresses. Press button 1 once the correct device has been chosen. The device has now been selected. Check the “ignore other remote” option in the app to have the device respond to the device specific device address only.

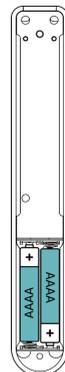
Replacing the batteries

Place the remote control upside down on a hard surface. Be careful not to scratch it.

1. Unscrew both screws with a Phillips screwdriver.
2. Carefully remove the aluminium cover. Make sure the PCB stays in place.
3. Carefully remove the AAAA (LR8D425) batteries (1.5V Alkaline).
4. Place the new batteries. Mind the polarity!

Replace only with the same type of batteries or equivalent.

5. Reposition the aluminium cover and fasten the screws.



Revision History

Revision	Description	Date
R0	Initial draft	01-09-2022
R1	First release	02-01-2023