Grimm | AUDIO

MU1 manual

MU1 Software Manual, to be read next to the Hardware Manual

Please read this manual before operating the unit!

For firmware version v1.3.0

Table of Contents

1 Introduction

Thank you for purchasing the Grimm Audio MU1 media player. It is designed to be the most sophisticated and best sounding music player on the market and at the same time blend seamless in your daily music playing routine. Core of the MU1 technology is an FPGA processor board of our own design that offers the highest quality oversampling and de-jittering possible. The amount of work and knowledge that went into this project can hardly be overestimated. All this effort resulted in an elegant box of minimalistic design that humbly steps out of the way for the music. We are grateful that we were allowed to develop this gem and wish you many pleasurable hours of listening.

In this manual you will find all information related to the software of your MU1. Since this software is regularly updated, we decided to offer this MU1 software manual only as download. Your MU1 was shipped with a printed MU1 hardware manual. Please read it carefully for your own safety. You can also download a pdf of the MU1 hardware manual on the MU1 page of our web site grimmaudio.com.

The Grimm Audio Team
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2 Setup

Interface description

Front:

On the left you find the MU1 activity LED in the ‘i’ of the Grimm logo. The display shows all user information.

The MU1 activity led shows the current activity of the MU1 system. Table 1 below shows the modi.

Off	MU1 is off or is updating.[1]
On	MU1 is on or booting[2]
Fading slowly	MU1 is in stand-by mode.

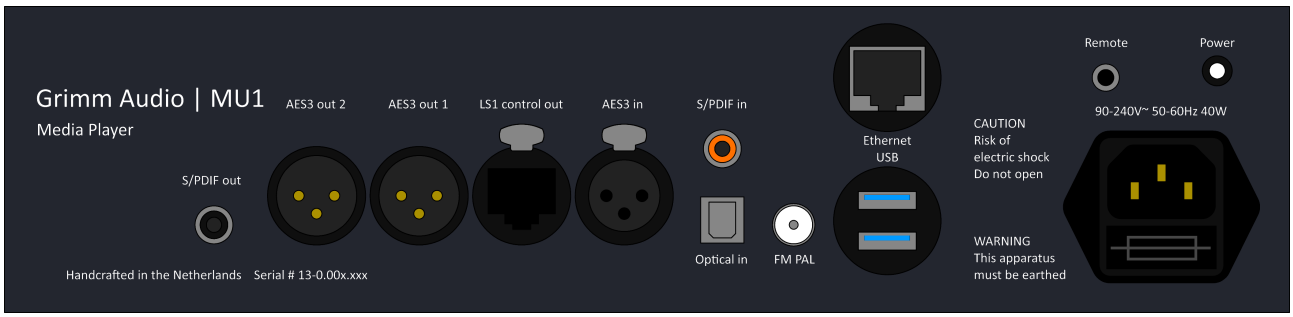
Table 1

[1] The system will only update when the user has manually activated the update. See chapter “Control”.
[2] When the system is booting up the display will show an animation.

The display shows information about the system depending on its state:

- System off: display is black, no information.
- System in stand-by: display is black, no information.
- System is booting up: boot animation is running, after booting the welcome picture is shown until the software is ready.
- System on: this state has different menus where information can be shown and settings can be adjusted. These settings are described in the chapter “Control”.
- System shutting down: display is showing shutdown animation, with dimmed backlight. It goes to black when system is fully shut down.

Rear:



(Note: Models with serial number 13-0.001.xxx and 13-0.002.xxx do not have the S/PDIF output.)

On the rear of the system various cable connections and the main power switch can be found. From right to left: the mains power connector, a small mains power switch, a 3.5mm socket for an external IR remote sensor, an ethernet network input, 2 USB connections for external storage, an FM cable input, three digital audio inputs, three digital audio outputs (two generic AES3 and one Grimm LS1). In the following section these connections are described in more detail.

1. The mains power socket (standard IEC60320 model). In case your country has an EU, US or UK type wall outlet, your MU1 was shipped with the corresponding power cord. Otherwise, please consult your dealer.

2. The mains power switch. This is a small recessed switch. If the system is off and the power cord is connected, press the switch once using your finger nail to boot the system. If the system is on, press the switch once to shutdown the system.

Hint: The power switch does not respond while the MU1 is updating.

3. Mini jack input for infrared remote sensor. This 3.5mm jack input is intended for use with an IR extension cord with the following pinout:

Tip = Signal
Ring = 5V power
Sleeve = Ground

This is the most common pinout for IR extension cables.

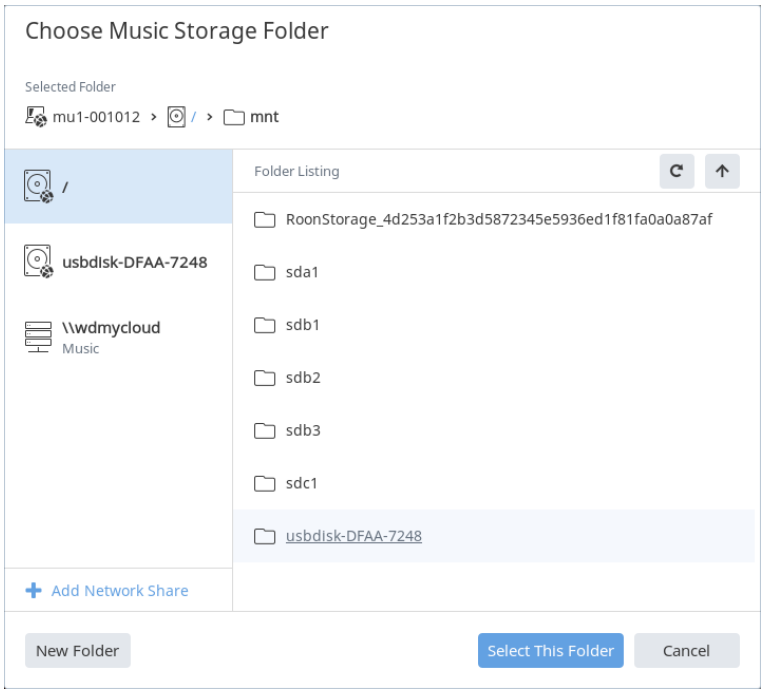
See chapter 4. Control, menu item [4/6], to learn how your MU1 can respond to a certain infrared remote. The MU1 supports the following types of IR remotes: **RC5, RC6, JVC, NEC, NEC extended, Apple and SIRC**. Other protocols may be added in the future, please contact info@grimmaudio.com if your favorite remote is not supported.

4. Ethernet input. Connect your wired local network to the MU1 using this RJ45 connector. The cable type should be at least CAT5e to ensure that loss of network data packets is minimized. Please use high quality cables intended for use with computer systems and avoid cables with claimed special qualities for audio. The MU1 makes use of DHCP. To use a static IP address in the MU1 please consult the manual of the network device that acts as DHCP server within your network (usually the main router).

5. Dual USB input. These two general purpose USB3.0 connectors may be used for connecting an external USB drive (flash drive, SSD or HDD) for extending the disk space of the MU1 system. You may play music files from this drive. The MU1 supports the following filesystems: **FAT32, NTFS, HFS+, exFAT, EXT2 and EXT4**. When a USB device is plugged in, it will be automatically mounted in the system. Since USB drives are mounted in 'read only mode', it is not necessary to 'safely remove' the USB device from the system, the device is unmounted automatically. This also means you cannot use a USB drive to make Roon backups nor add or delete music from this disk through Roon or the network.

The mounted folder can be found through the Roon storage settings. Go to the Roon *Settings* → *Storage* and press the button "*+ Add Folder*".

The USB disk should appear in the menu on the left. The name will consist of the name of the usb disk with the preface "usbdisk-". If you don't see it here, go to the root directory "/" and open "mnt". Here you will find "usbdisk-name". Select this folder to add it.



6. Analog FM input. *[To be implemented]*

7. Digital audio inputs. The MU1 has three digital inputs on the back. These sources can be selected with the main control dial. Read chapter "Control" for instructions about how to do this. The selected source is routed via the FPGA for oversampling and de-jittering and benefits from MU1's high performance rendering.

a) S/PDIF digital input: orange RCA connector, digital input for S/PDIF sources.

b) Optical digital input: black Toslink connector, digital input for S/PDIF sources.

c) AES3 digital input: XLR connector, digital input for AES3 sources.

8. Digital audio outputs. There are three digital outputs. These can be configured as stereo outputs that carry the same audio data or as six individual outputs for surround playback *(to be implemented)*. From right to left:

a) LS1 output: a proprietary connection to the LS1 playback system, carrying both audio data and control data. The cable for this connection is supplied with the LS1 system. Connect this cable to the “Control in” input of the LS1.

Warning: Do not connect a network cable to this connection! Although a normal RJ45 connector fits, this output may only be used for LS1 control connection. Grimm Audio is not liable for damage to a local network system as a result of incorrect wiring by the user.

b) Digital output 1: transformer coupled balanced XLR3 digital output for use in a surround LS1 system or connection to a third-party DAC.

c) Digital output 2: transformer coupled balanced XLR3 digital output for use in a surround LS1 system or connection to a third-party DAC.

d) *(Serial numbers 13-0.003.xxx and higher)* S/PDIF out: transformer coupled unbalanced RCA digital output for use with a third-party DAC with S/PDIF input.

Top:

The top of the MU1 carries the main control knob. It is used for all user input of the MU1 via turning and pressing. Depending on the state of the system and the menu selection this knob changes functionality.

The system will boot to the *Music View*. The use of the main control in this state is:

- Volume up (turn right)
- Volume down (turn left)
- Pause/mute (short press)
- Enter menu (long press)
- Press and turn selects the input.

A short press is shorter than 2 seconds, a long press is longer than 2 seconds. How to enter and leave menus is described in the "Control" chapter.

3 Roon Labs setup

Grimm Audio selected Roon Labs for the user interface and audio engine for file and stream playback on the MU1 (an alternative UI and engine will be added later). In our opinion Roon offers the best High-End user experience to date, a real must have. Both Roon Core and Roon End Point are pre-installed, so no other computer is needed. Please mark that Roon Labs is a paid subscription so you need to enter your account details via the Roon app. Roon Lab supports Tidal and Qobuz lossless music streaming services. These are separately paid subscriptions. You need to enter your account details of these services via the Roon interface.

Operating the Roon system in the MU1 is identical to that of any other Roon equipped system. First you need to install the Roon remote control software for a tablet, smart phone, PC or Mac to get access to the Roon Core server in the MU1. Please visit the app store of your OS manufacturer, or use this link: https://roonlabs.com/downloads.html. For general operational guide lines of the user interface, we refer you to the Roon Labs documentation: https://roonlabs.com/support.html. The MU1 can perform all processes that Roon offers, but we recommend to use the MU1 FPGA oversampling and downsampling algorithms instead of the Roon offerings, and use Roon just for audio playback. Roon is a capable multi room system. If you like you can use the Roon Core in the MU1 to stream music to other Roon Endpoints in your network (for instance a system in the kitchen). Please note that the oversampling and de-jittering qualities of the FPGA in the MU1 can only be enjoyed with the digital audio outputs on the MU1.

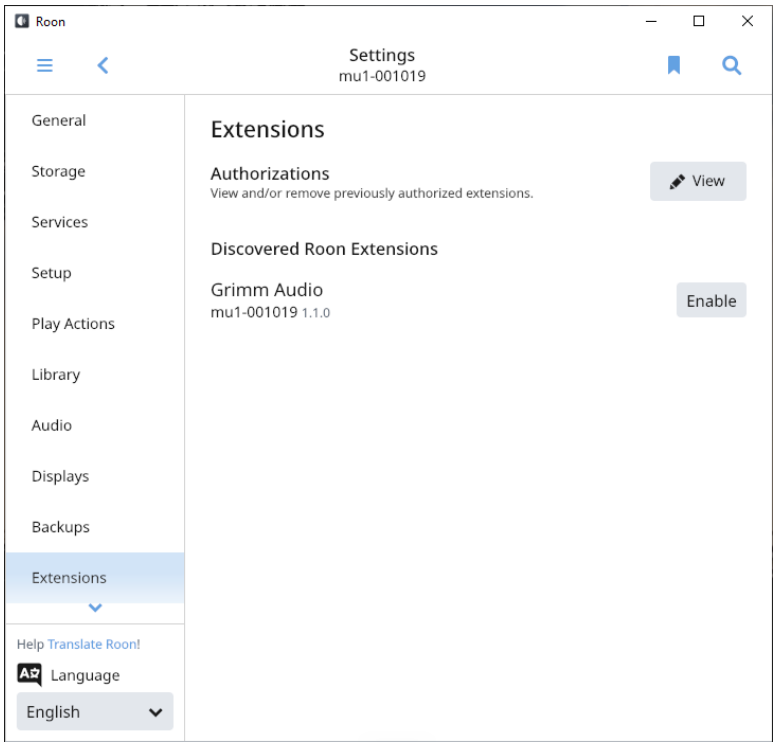
The MU1 can play all file formats that Roon supports, such as wav and flac, and has native support of PCM formats up to 8x the base rate (8FS or “DXD”) and of DSD formats up to DSD256. The FPGA processor in the MU1 can upsample 1FS and 2FS sources to 4FS and downsample 8FS and DSD formats to 4FS.

Enabling track information on the MU1 display

To show the song that currently plays on the MU1 display, you need to enable the MU1 software to communicate with the Roon Labs software. This is facilitated by a ‘Roon Extension’. Since Roon Extensions can only be enabled by the account owner of the Roon software, you need to perform this step yourself. Please connect a tablet, smart phone, PC or Mac to the same network as the MU1 and install the ‘Roon’ (not ‘Roon Server’) remote control software: https://roonlabs.com/downloads.html. Next, please follow the following steps:

- Switch on the MU1 for the first time.
- Start Roon on the tablet or PC/Mac software, wait until the MU1 pops up as a device and select it.
- Log in with your Roon account.
- Go to the settings menu and select the tab ‘Extensions’.

- Add the Grimm Audio extension to your MU1 by clicking the Enable button in the menu. The extension will contain a part of the serial number as shown in the image below.

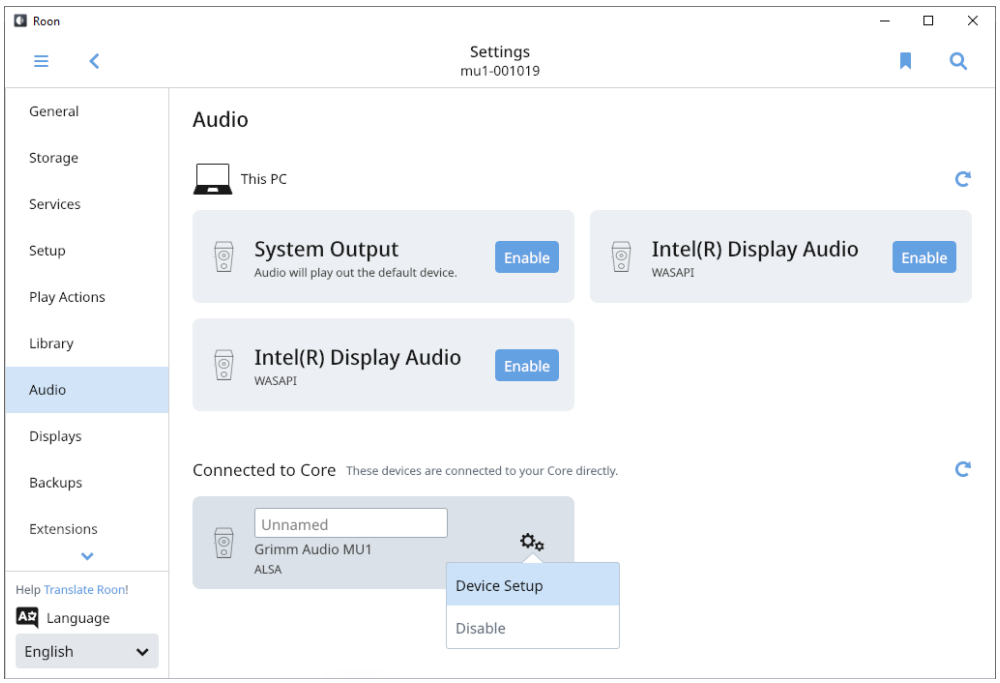


Volume control of the LS1 DSP and the FPGA volume control of selected digital outputs should now work via both the Roon app and the MU1 main control. Additionally you will see information about the currently playing track in the display and a progress bar of the running track.

Volume settings

We put in a safety limit on the volume control. Whenever you turn the MU1 main control or the Roon app volume fader quickly to the maximum position, the volume will jump back to the lowest level (the fader will stay at the max position though). This will protect your equipment when the controls are set to max by accident. If this happens to you, be careful to pause the music first before touching the fader, since it can still become loud when touching the fader.

As an alternative, we recommend to set a comfort limit for the Roon fader in the device setup so you cannot accidentally set the volume very loud by sliding the volume bar too far to the right. In case you do like to play louder than the limit, you can still press the + or – buttons in the Roon interface to increase or decrease the volume of the LS1 playback system. To set the comfort limit, please browse to the Audio tab of the Roon settings, tap the ‘cog-wheel’ configuration logo on the right of the GA MU1 device and select ‘Device Setup’, as shown in the picture below.

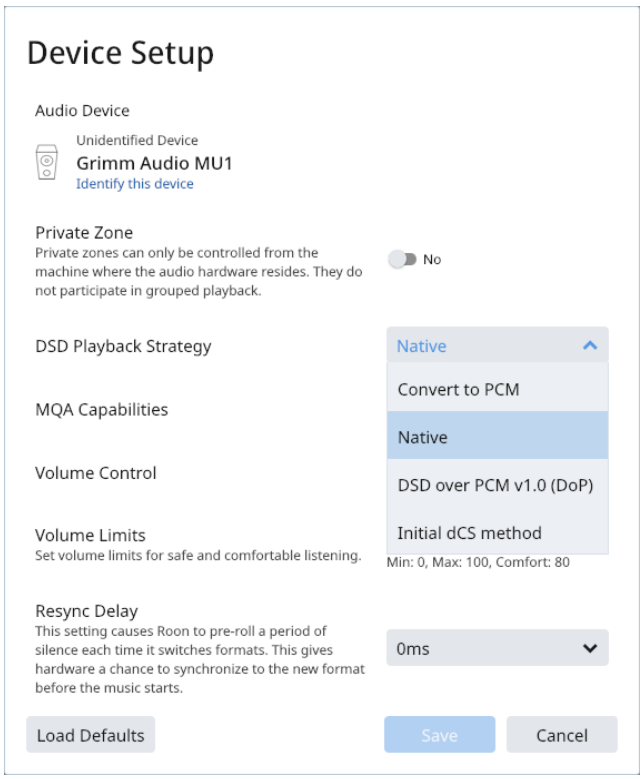


Here you select “Set volume limits” and set it to ‘64’ which corresponds to an acceptable comfort level for most music. If your taste mainly covers softly recorded tracks, you may decide to set a higher level.

Warning! In the Device setup menu you can also change the volume settings type of Roon. You should always keep the “Volume Control” set to “Device volume”. Switching to “DSP Volume” or “Fixed Volume” **will** give problems with volume control, that can jump to maximum (we added a safety brake for that, but still). If you accidentally changed the settings you can get out of this state by pressing the “Load Defaults” button in ‘Device Setup’. This will restore the system to the normal state. More information can be found here: https://kb.roonlabs.com/Audio_Setup_Basics in chapter Volume Control Mode. This page states about the volume settings: “It's there to solve problems - if you don't have problems, you don't need it!”

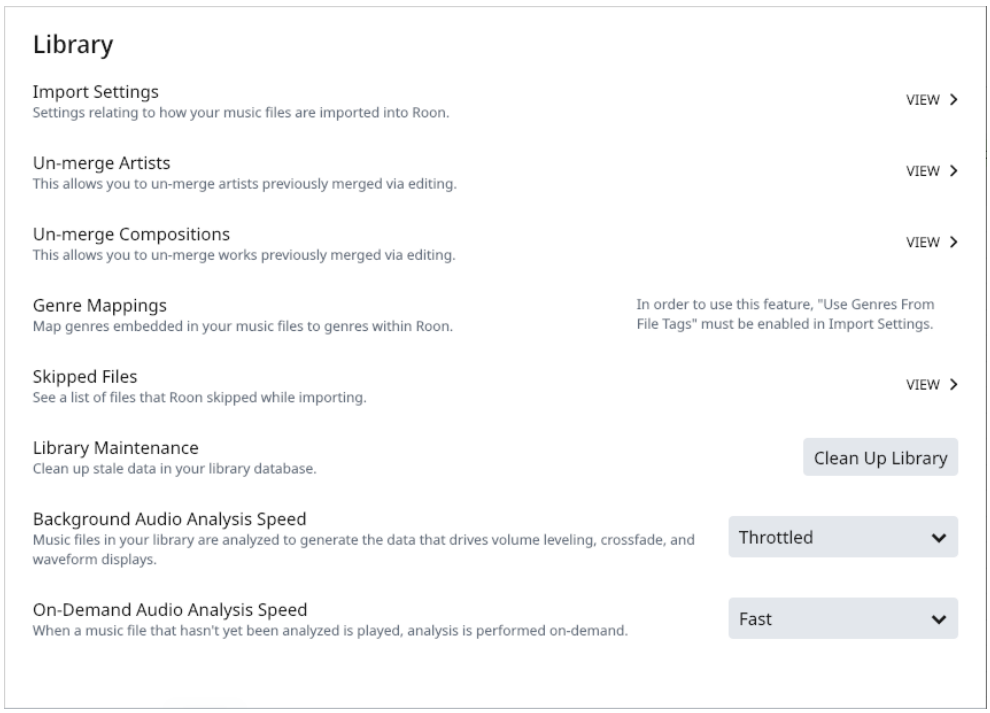
DSD playback setting

While you are in the Device Setup page, please set the “DSD playback strategy” to “Native” if it is not already. The MU1 FPGA processor has a superior quality DSD downsampler and we recommend to use this feature to play DSD files to the LS1 system or other PCM DAC’s. You may also open the “advanced” part of this window and check whether the max sample rate (DSD) is set to “up to DSD256” and the max sample rate (PCM) is set to “up to 384kHz”.



Background analysis speed

In the Library page of the Settings menu Roon offers several options for the ‘Background Audio Analysis Speed’. We recommend to set this to “Throttled” and not to one of the “Fast” options. This makes sure most of the processing power of the CPU is dedicated to audio playback. You may also set it to “Off”, Roon will then calculate the waveform of a new file on the fly when it is played.



Updates of Roon software

Roon Labs offers frequent updates to both the Roon Core app in the MU1 and the Roon Remote app in your tablet or smart phone. Updates on your phone/tablet are usually installed automatically. If a Roon Core update is available the Roon Remote app will inform you about that. You are permitted to start a Roon Core update process in the MU1 from the Roon Remote phone/tablet app, but we are not liable for the impact of problems that may occur. Of course we will in that case offer support to help you solve the problem, where possible.

Known issues with Roon on the MU1

#1 Hampered playback when analysing a large catalog.

When you add a folder with lots of albums, Roon will analyse the files, download artwork etc. It will also do an analysis of the audio data to store waveforms that are shown in the user interface and to store the average loudness of the track for loudness normalization use. During the initial setup, Roon's labor can cause the system to be less responsive. Although it should be possible, we recommend to not use the system for music playback while Roon runs this analysis for the first time on a large set of albums. If you let it run overnight, it is usually finished the next day.

When you add a few albums only, playback is not hampered and this will not affect the playback. Nevertheless we recommend to use the "Throttled" mode for the analysis to keep the CPU load low. This can be selected in the Roon settings, see chapter "Background analysis speed". Consult the Roon manual for more information.

#2 Soft glitches in DSD album playback.

Please mark that when playing albums in DSD format, the end and start of the files are not reproduced 100% gapless by design, which means that a soft glitch can be heard at the start of a new track. This glitch is in the master files and cannot be solved in the MU1 or Roon software. Also, a short moment after playback of a DSD file has stopped, Roon will switch to a 'silent' PCM stream and this also causes a soft glitch.

#3 Adding the root system folder to Roon.

When adding the root directory or "/" in the storage settings of Roon, problems may occur. Roon tries to index the OS filesystem making it slow and in some cases might even make Roon crash. Instead of adding the root directory, please add the proper music folders as explained in the next chapter.

Internal disk

The MU1 optionally has an internal disk for music files. Adding music to the folders of this drive is done via the network, how to do this is described below for Windows and Mac-OS.

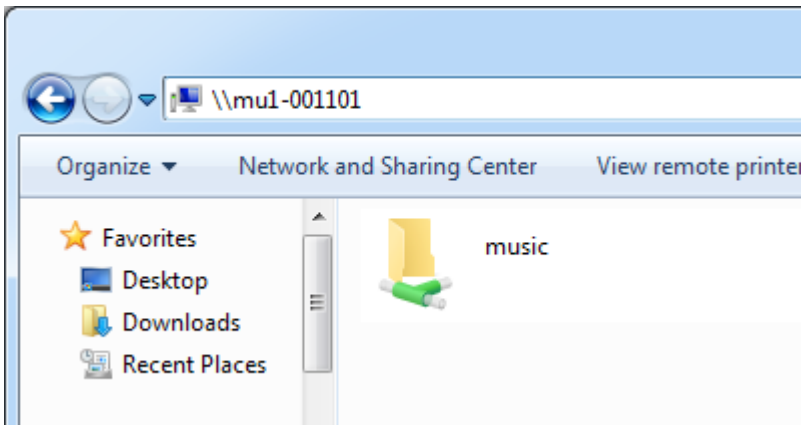
First of all, open the help page of the MU1 menu (see chapter “Control”) and note the hostname and IP-address.

Windows users:

Note: Not all Windows computers can use the hostname for finding an internal disk in the network. This is because “mDNS” is not natively supported by Windows. However, on many Windows computers software has been installed that added support for this protocol and therefore we advice to first try to use the hostname and if this doesn’t work, use the IP address.

1. Open the File Explorer (this is done by opening a random folder).
2. Enter ‘ \\“*hostname*” ’ in the address bar as shown in the image below.

Note: If you do not have “mDNS” this doesn’t work. Use the ip-address: ‘ \\“ip-address” ’

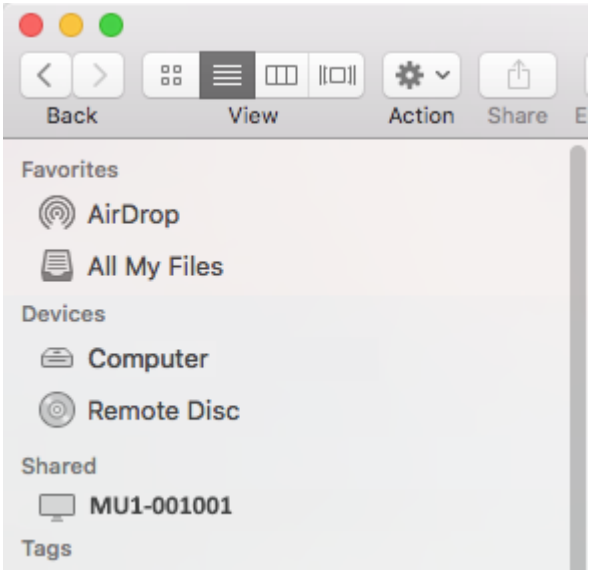


3. The internal disk is now shown in the File Explorer. You can now add, delete and move music to the MU1 internal disk from your Windows computer.

Tip: Make a shortcut to this folder so you can easily find it instead of typing in the hostname.

Mac users:

The shared folder can be found in the Finder, in the left hand column under “Shared”.



After selecting this folder, you can add, delete and move music here from your Mac. Please mind to ‘eject’ the mounted folder before disconnecting from the network (for instance with a laptop).

If the MU1 does not show up in the Shared section, press ⌘ - K to open the Connect to Server window. Enter the *hostname* and press Connect. The hostname of your MU1 is indicated on the second page of the MU1 menu, see **Menu View** in chapter 7 of this manual. Connect as “guest” to the Music share folder. In the unlikely event that connecting to the *hostname* does not work, please enter the IP address of your MU1, which is found on the same menu page of the MU1.

Note: On the internal disk you will find a directory lost+found, you can ignore or delete this folder.

Tip: After mounting you can make a backup of the music that is stored on the MU1 internal drive via your Windows or Mac computer by using your favourite backup application.

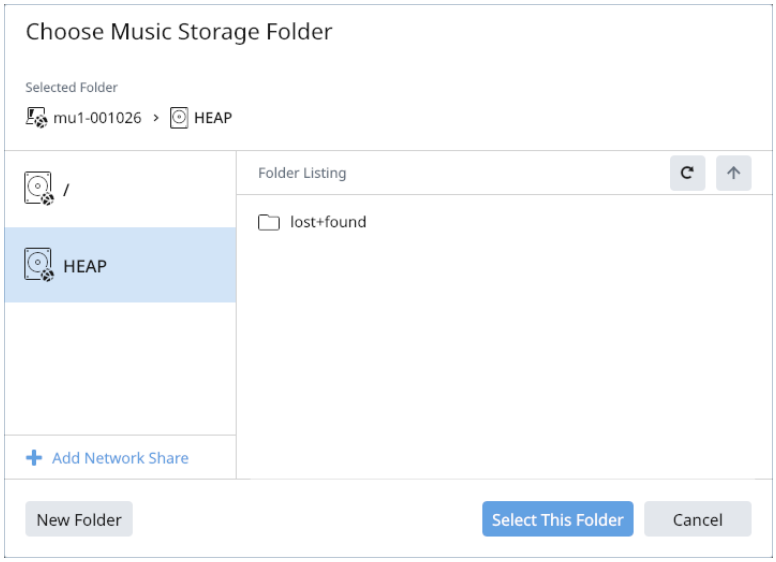
How to add the internal disk to Roon

To add the internal disk to the Roon catalog, first remove any memory stick or USB drive that you connected to a USB receptor on the back of the MU1. Next open the Storage settings in Roon and click on “Add folder”. The internal disk should show up in the menu on the left as “HEAP”. Select this folder to add the disk to Roon as music folder.

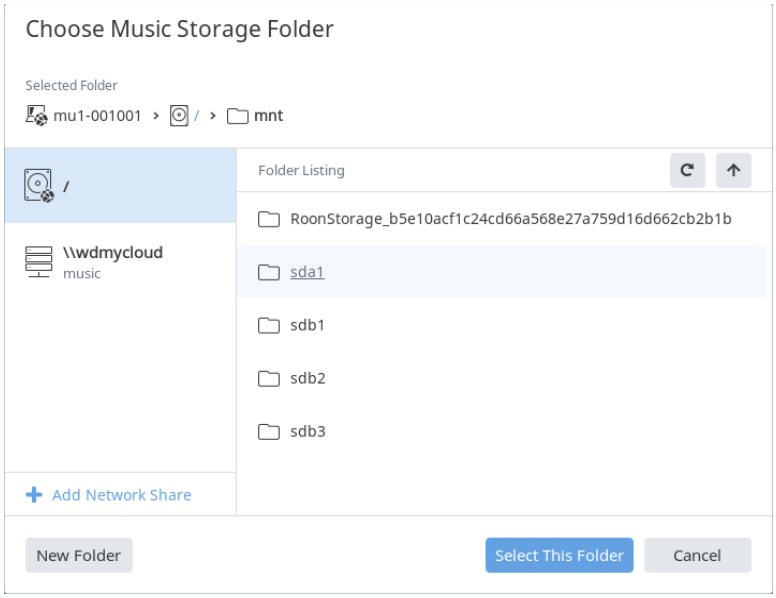
If the disk does not appear as HEAP you must add it manually. Please note that the procedure for this is dependent on the serial number of your MU1. For serial numbers starting with 13.0.001.xxx the label is **sda1**. For serial numbers starting with 13.0.002.xxx and higher the label is **sdb1**.

Click on “Add folder” and go to the root directory “/”, open “*mnt*” and choose “*sd**x**1*” (the name of the internal SSD drive, depending on the serial number). Your music folders are on sda1 or sdb1 and will now be added.

Tip: Roon will automatically append music that you later add to your music folder.



Select the HEAP drive if it is available.



Select sda1 or sdb1 (depending on serial number, see above) in “/mnt/” if the HEAP drive is not available.

Roon database access

In case you encounter a problem with the Roon software and consult with Roon Support, they may ask you to view, copy, rename or reset your Roon database. The database folder contains all settings, log files and database items. The MU1 mounts this folder in the network under the share name “roondata”, and it is password protected to prevent accidentally resetting the database. The credentials are as follows:

Username: mu1-user; Password: mu1-pass.

How to mount this internal disk in your PC or Mac is explained in the chapter **Internal disk** above.

4 Control

This chapter describes the user menus and settings of the MU1.

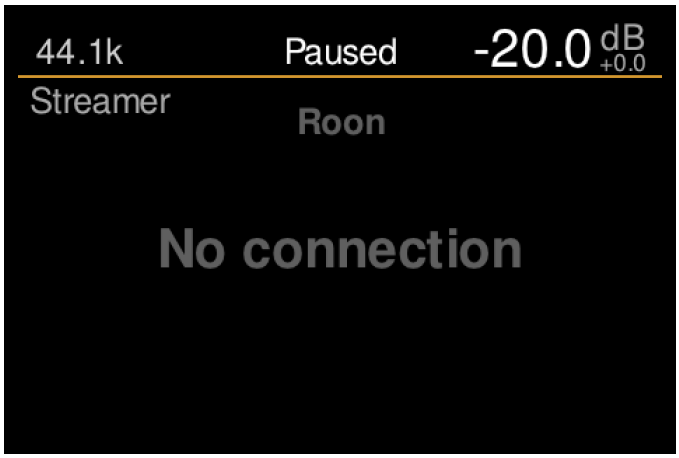
Music View

Function of the main control knob:

- Turn left for lowering volume.
- Turn right for increasing the volume.
- Short press pauses or starts playback.
- Long press enters the settings menu.
- Press and turn selects the input.

A short press is shorter than 2 seconds, a long press is longer than 2 seconds.

Below is an image of the screen you get when the MU1 is fully booted and there is no Roon remote connected yet.



When a Roon remote such as a tablet is connected to the MU1 Roon Core and music is playing, the track information and progress bar is shown as in the picture below.

In Music View, the display offers the following information:

- Sample rate and format[1]
- Current user set volume in dB
- Mismatch volume in dB[2]
- Streamer service[3]
- Artist
- Song title
- Album name
- Progress bar
- Current time stamp
- Track length

[1] This is the indicated file or stream information by Roon. The output of the MU1 may run at a higher sample rate because of the optional upsampling in the FPGA of the MU1.

[2] The mismatch shows the difference between the user set volume and the actual volume, for instance when loudness normalization *(to be implemented)* affects the file volume. It also indicates a -10 dB attenuation when previewing a source.

[3] At the moment only Roon is supported.

When there is no audio playing and the queue is empty, the progress bar will not be shown.

When turning the MU1 main control knob, the volume changes and the track progress bar at the bottom is temporarily replaced by a bar that indicates the current volume setting.

If an LS1 is connected, the MU1 will send volume control data to the DSP of the LS1 via its proprietary cat5 cable. If volume control is activated for one or more digital outputs, the FPGA chip performs a volume attenuation at high precision for these output(s). See ‘Settings menu [3/6]’ for selecting volume control on the digital outputs.

Mark that volume control is disabled when volume control on the digital outputs is turned off and no LS1 is connected, or when DoP is turned on (see ‘Settings menu 3/6’ for information about DoP).

Also note that the user set volume indication in the top right corner has a max level of +23.5 dB when an LS1 is connected and 0 dB when no LS1 is connected. In the LS1 case, +23.5 dB corresponds to “100” on the volume slider in the Roon app. You would normally never reach this level, it should only be used for music with very low average loudness. Your normal level will be around 0 dB or even lower. For LS1 users, this 0 dB level is adjusted to the traditional acoustic reference playback level in mastering studios and levels above +8 dB will add positive gain in the LS1 DSP.

For users who connected a third-party DAC to digital output 1 or 2 and have no LS1 connected, the scale automatically changes to 0 dB max, which reads as “100” in the Roon app.

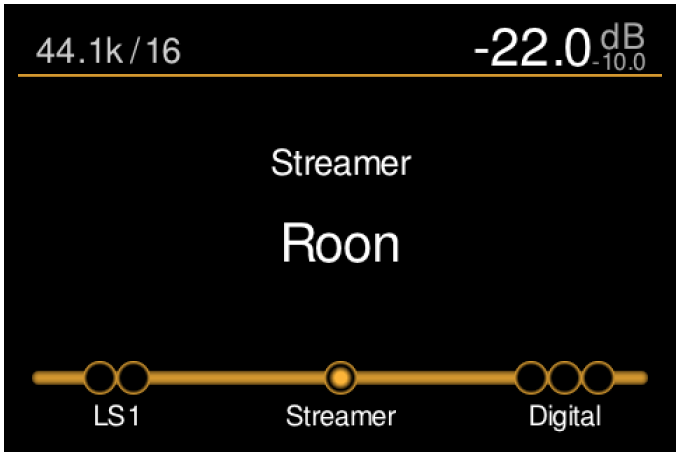
Source selection

By pressing, holding down and then rotating the main knob you enter the source selection menu. Here you can select sources. To leave this menu just release the main knob when the desired input is selected.

Depending on whether an LS1 is connected there are 2 or 3 source categories visible and each has one or more inputs. The list below shows each category and their available inputs:

- LS1:
  - LS1 Analogue
  - LS1 Digital 1
- Streamer:
  - Roon
- Digital in:
  - AES-XLR
  - AES-RCA
  - Toslink

By turning the main knob (while holding it down) the different sources are selected. If you ‘hover’ over a certain input this input will be selected in preview mode after 1 second, this means that you can listen to the selected source (at 10dB lower volume than the current setting) to check if the music on this input is to your taste. When releasing the main knob the selected input is confirmed and the volume returns to the normal setting.

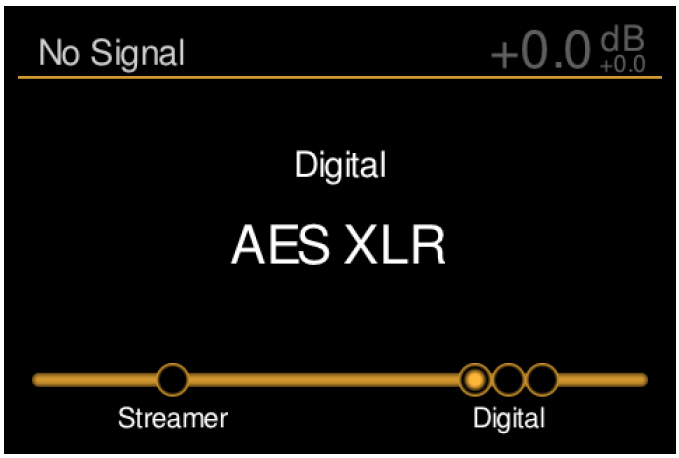


Note: LS1 users may notice a short glitch when auditioning the Toslink input. The Toslink input is designated a ‘LS1 low-latency’ input. This because it is most often used for TV audio, and lower latency offers better synchronisation with the video. The LS1’s standard phase linear crossover has

40ms latency for a three way system, and for the MU1 Toslink input this is automatically changed to a traditional crossover with almost no latency. This change may cause a short glitch sound. Please refer to the LS1 manual for more information about its low latency mode.

The MU1 will remember the selected source when shutting down the system. When you power up the MU1 it will try to select this memorised source. If it was a source on the LS1 (Analog or Digital) this source will be selected as soon as your LS1 is detected. Note that if you operate the MU1 before the LS1 is detected, the MU1 will automatically fall-back to the 'Roon' source selection.

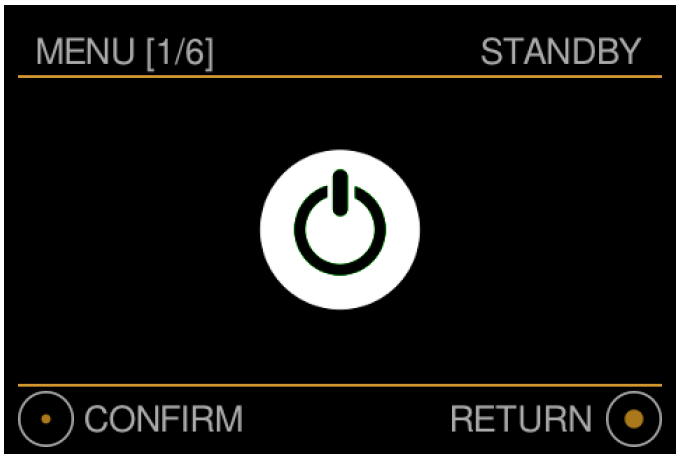
When there is no LS1 connected, the source selection menu will look like the image below. Mark that in this picture the MU1 does not detect a signal on the digital XLR input and "No Signal" is shown top left. When there is a signal the received sample rate is indicated here.



Note: When you select an LS1 or Digital In source, the MU1 will automatically pause Roon. Mark that in this case it is still possible to start Roon playback in the Roon App. This is not an intended use case, so please mind the following: if you selected an LS1 input, Roon playback will become audible on Digital out 1 and 2. In case you connected a DAC to one of these outputs you will hear music but the track information is not shown on the display. If you selected a Digital In source, Roon will not play properly since the FPGA board does not request audio data from the internal PC in this mode. As a result Roon gets confused and jumps to the next track in the playlist at irregular pace. There will be no damage done to the system but we recommend to only start Roon playback in the App when Roon is selected as a source.

Menu View
By pressing and holding the main control knob for 2 seconds or longer, the MU1 display enters the 'Menu View' mode.

***Settings menu[1/6]:* Standby**



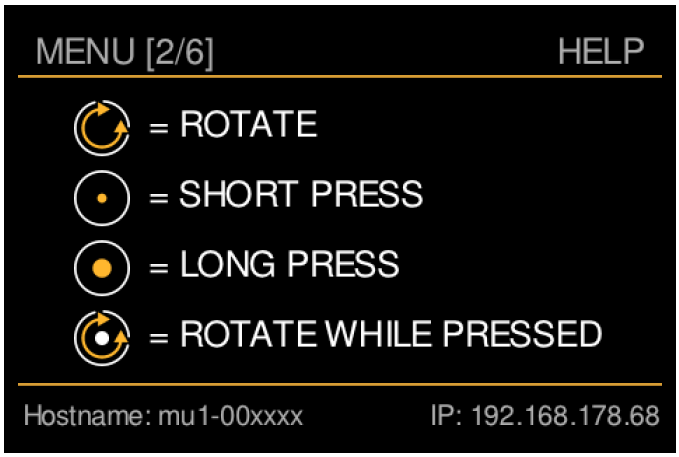
In this first menu you can put the MU1 in standby mode.

- Turn right to go to the second menu.
- A short press ('confirm') will put the MU1 in stand-by mode.
    - When the MU1 is in stand-by you can simply **press** or **turn** the main control knob to initiate start-up of the system.
- With a long press you will exit the menu and go back to the *Music View*.

When in stand-by the power consumption decreases and the screen is turned off after a short animation. The internal electronics are mostly shut down, but some of it still functions. If you like to completely turn off the system, switch off the device with the small mains power button on the rear of the device. **Always turn off the system before unplugging the power cord to prevent damage to your MU1 computer system!**

Hint: The white LED on the front indicates if the device is in stand-by (LED 'breathes') or if the MU1 is shut down (LED off).

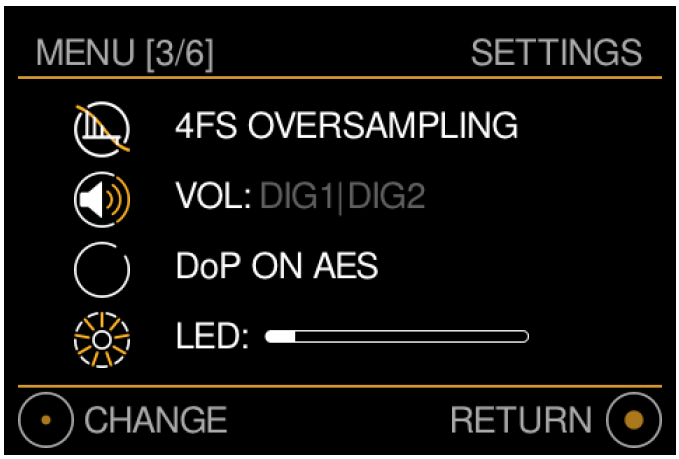
***Settings menu[2/6]:* Help**



This Help menu shows the pictograms that are used in the MU1 for operating the main knob. At the bottom of the screen the current network information is shown. The indicated hostname depends on the serial number of your MU1. If the IP address shows 'unknown', there is no network connection and in that case the MU1 cannot be found by the Roon App in your tablet or smart phone. Please check the network connection of your MU1.

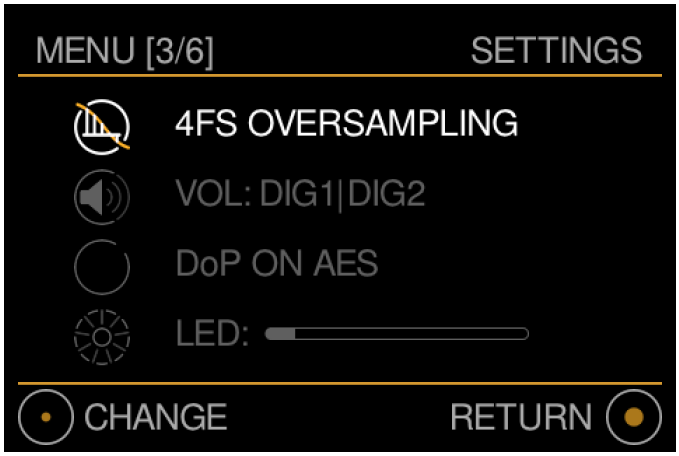
- Turn left to go to the first menu, turn right to go to the third menu.
- With a long press you will exit the menu and go back to the *Music View*.

***Settings menu[3/6]:* Settings**



In this menu you can change operational settings of the MU1.

- Turn left to go to the second menu, turn right to go to the fourth menu.
- With a long press you will exit the menu and go back to the *Music View*.
- To change any of these four settings, apply a short press on the main control knob. You will then enter the menu and the selected option will be highlighted. In the next image you can see that the first option is highlighted.



- To select another option, turn the main knob until the desired option is highlighted. To change it, press the main knob briefly.
- To leave this menu, apply a long press of the main knob.

Oversampling:
There are 3 options for the oversampling option: Original (no oversampling), 2FS (two times oversampling) and 4FS (four times oversampling).

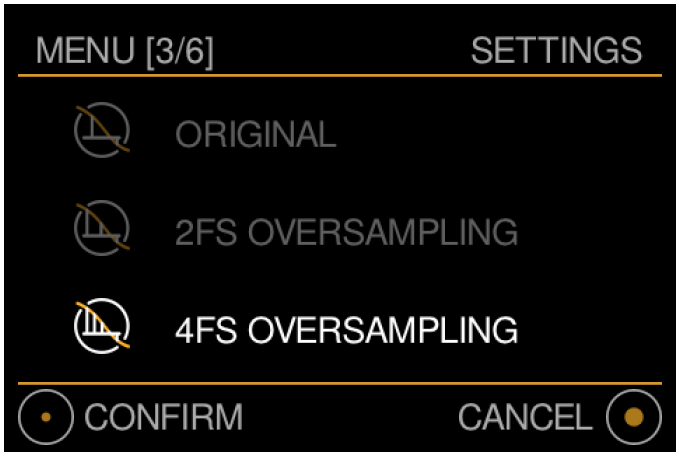
Original means that the FPGA does not touch the bits of the audio when possible. Mark that DSD rates and 8FS (DXD) will still require downsampling to 4FS, and of course the bits will be altered if digital volume control is engaged (see the next menu item).

2FS oversampling means that 44.1 and 48 kHz audio will be upsampled to 88.2 kHz resp. 96 kHz. 4FS, 8FS and DSD (up to DSD128) material will be downsampled to these rates. Audio that is already 2FS will be left untouched. This '2FS' option is intended to be used with DACs or active 'digital' loudspeakers that do not support 4FS or that work better with a 2FS source.

4FS oversampling means that audio will be upsampled to 176.4 kHz or 192 kHz. 8FS and DSD material will be downsampled to these rates. Audio that is already 4FS will be left untouched. This option is the default and recommended setting for the MU1.

Note: FPGA resampling to 2FS is supported up to DSD128. When switching to the 2FS option the live preview of DSD256 and higher will cause noise as long as you're in the menu. When leaving the menu, Roon will be restarted to re-configure the audio card. Downsampling of DSD256 files will from then on be taken care of by Roon. When changing from 2FS to 4FS, resampling Roon is again restarted when leaving the menu and DSD256 downsampling in the FPGA is then again supported.

To select your desired setting, turn the knob and the selection will be highlighted. Do a short press to confirm and exit. A long press lets you leave the menu without changing the setting.

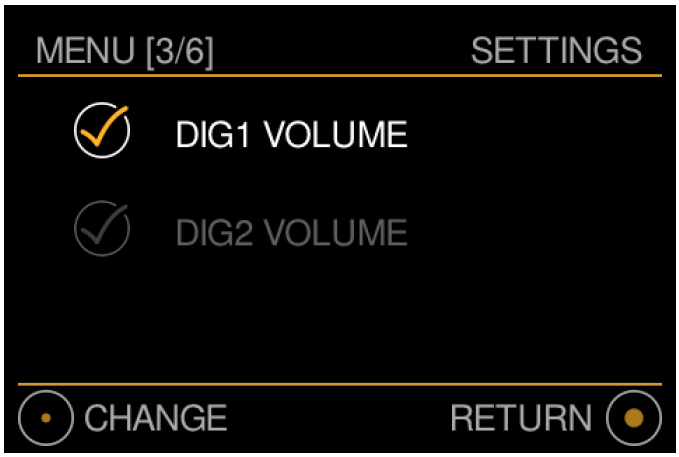


Volume control on digital out 1 and 2:
In this menu you can select which digital output should have digital volume control. *Note: the S/PDIF output follows the volume setting of digital out 2.*

Volume control in the MU1 offers a great user experience when combined with Roon's remote control capabilities. This volume control is performed at very high resolution in the MU1's FPGA. You might want to compare its quality to the native volume control of your DAC.

Volume control of the LS1 output is always done in the LS1 and can not be switched off.

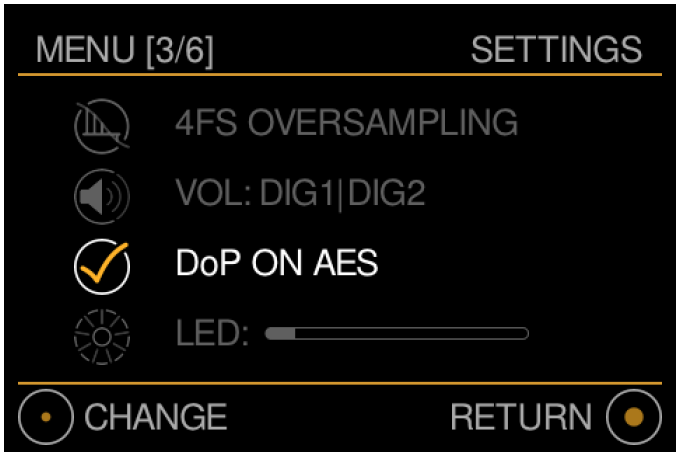
Hint: when using the MU1 as a source for a 'digital' loudspeaker that has on board digital processing such as crossover filters, it is recommended to disable the MU1 volume control so that the speaker will receive the audio with widest modulation.



- Turn the main knob to select the digital output of which you want to change the setting.
- Use a short press to change the setting, this can be on or off.
- To leave the menu press long on the main button, the shown settings will be saved.

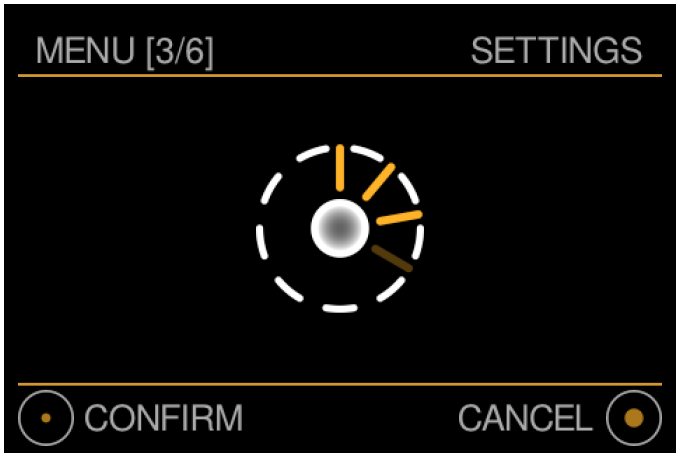
DoP on AES:
“DoP” is brief for “DSD over PCM”. It is a standard for transporting DSD64 audio over an AES3 or S/PDIF PCM digital audio connection. Some DACs support this format and the MU1 is able to forward DSD64 material unaltered to these DACs. Mark that volume control is impossible on DSD signals, hence the DoP option is disabled when volume control on digital out 1 or 2 is turned on. To avoid confusion, volume control on PCM sources is disabled as well when DoP is enabled. Since the Grimm LS1 does not support DoP, the DoP option will be disabled when an LS1 is connected. If DoP is turned off, DSD material will be decimated to PCM by the FPGA with very high resolution.

Note: This setting has no effect on the Roon DSD playback strategy setting, which should always be set to “Native”.



Use a short press to change the current setting.

LED:
The brightness of the LED on the front of the MU1 can be turned down with this option. This influences the brightness both in operation and in stand-by mode.

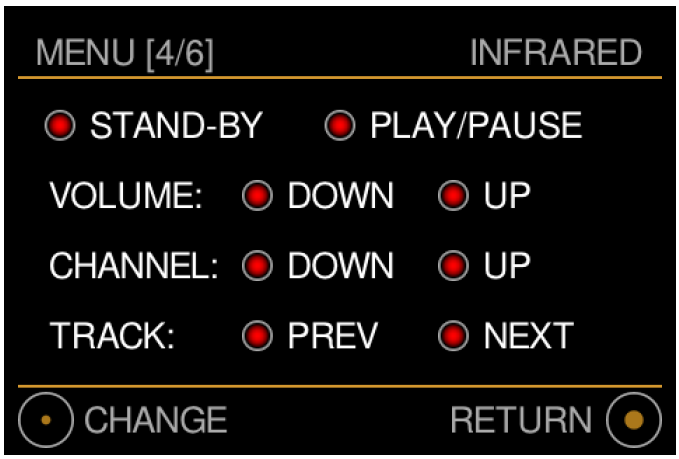


Turn the main knob clockwise to increase the brightness and anti-clockwise to decrease the brightness. Please note that the LED can not be turned off completely to facilitate showing whether the MU1 is in operation/stand-by or power off.

- A short press confirms the current setting.
- To leave the setting as it was, press long.

Settings menu[4/6]: Infrared programming

In this menu you can program the response to an infrared remote. Please make sure to connect an IR extension cord to the 3.5mm jack on the back, as explained in chapter **2. Setup**. The following functions can be controlled with a general IR remote: Stand-by, Play/pause (mute when other sources than Roon are selected), volume control, source selection and next/previous track.

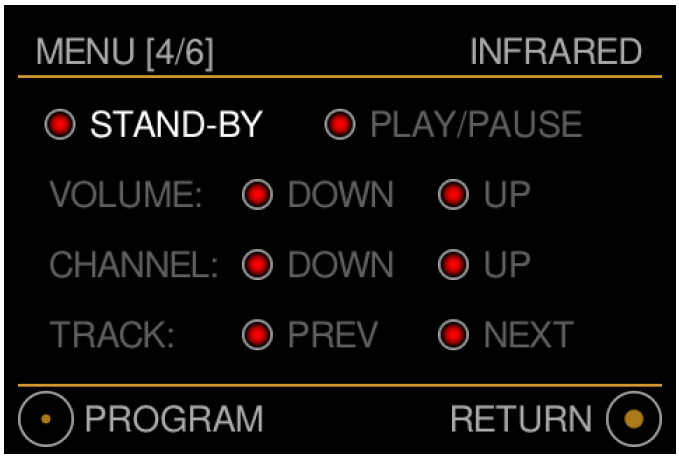


- Turn left to go to the third menu, turn right to go to the fifth menu.
- With a long press you will exit the menu and go back to the *Music View*.
- A short press will enter the menu and highlight the selection function.

The coloured dots next to each function can have 3 different colours with the following meaning:

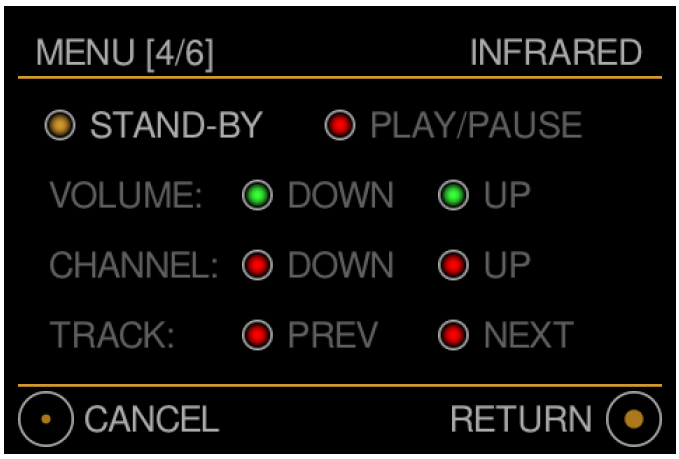
- Red: Function not programmed.
- Orange: In programming mode, waiting for an infrared command.
- Green: Infrared command paired with the function.

The image below shows the Stand-by function selected. Turn the main knob to switch the selection to the desired function. Use a short press with the main knob to start programming the highlighted function.



The dot will turn orange until the MU1 receives an infrared command. Press the desired button on your infrared remote to connect this infrared command to the selected function. When the MU1 receives an infrared command the dot will turn green and it returns to the infrared selection menu as shown in the previous image.

The image below shows the menu while programming the stand-by function, note that the volume up and volume functions are already programmed.



Note: Programming stand-by may take a little more time than the other functions.

To cancel, apply a short press with the main knob. The dot of the selected function will turn back to the original (red or green, resp. not programmed or programmed) and no changes are made. To cancel and leave the menu, apply a long press.

One button of the infrared remote can only be paired with one function of the MU1. If you use the same button of your remote for another function, the previous function is overwritten and the new one is paired. The dot of the previously paired function will turn red and the new function will become green.

The following functions are available in the various states of the MU1:

	Playing state: Roon	**Playing state: Other input**	**In the menu**
Stand-by	Yes	Yes	No[1]
Play/Pause	Yes, pause	Yes, mute	No
Channel Up/Down	Yes	Yes	No
Volume Up/Down	Yes	Yes	No
Track Prev/Next	Yes	No	No

[1]: Except for the stand-by menu. By pressing the button on your remote that is paired with the stand-by functionality the MU1 will enter the stand-by menu. By pressing the button again the MU1 will enter stand-by mode.

Note: To verify your button programming, you may press the remote buttons while the programming menu is displayed. The function that is paired with the pressed button will be highlighted.

***Settings menu[5/6]:* Software Version and Update**

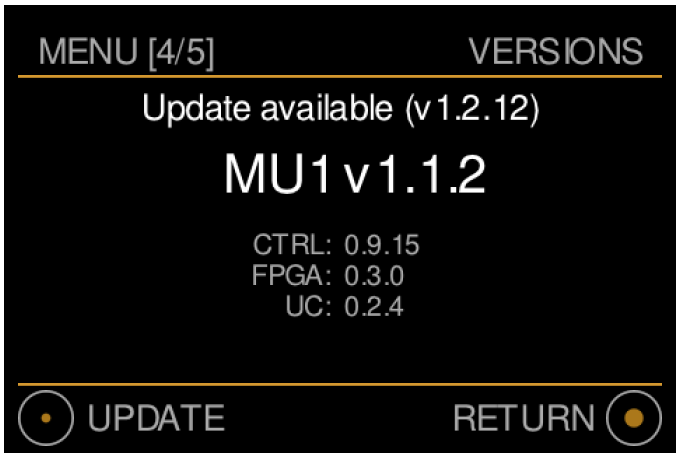
In this menu you can view the current software version and start an update. The MU1 automatically checks for an update every hour and also when entering this menu page from menu page [4/6]. If the MU1 is checking for updates, this is shown at the bottom of this menu.

If your software is up to date this is indicated in the display and the bottom left icon is greyed out.

The software versions of CTRL (Control software), FPGA and UC (Microcontroller) are also shown in this menu. When you experience problems with your MU1 we may ask you to send us this information.

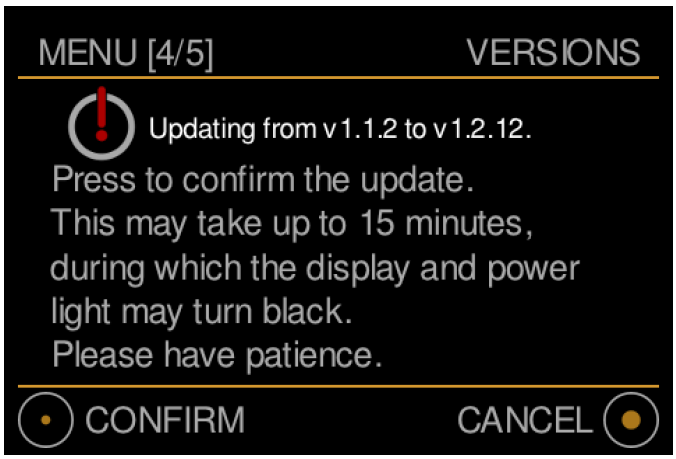
- Turn left to go to the fourth menu, turn right to go to the sixth menu.
- With a long press you will exit the menu and go back to the *Music View*.

The image below is shown when there is an update available.



In case an update is available and downloaded, the text “Update available” is shown.

- Start the update with a short press. After reading the warning message, confirm with another short press.



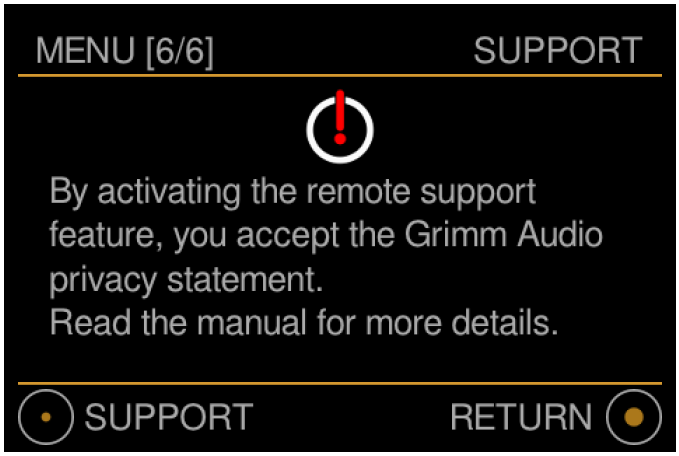
Please note: Depending on the type of update the install can take up to about 15 minutes. During this time you will not see information on the display, the power LED is off and the power button on the back is disabled. **Please remain patient and do not unplug the device while updating** since this causes the update to fail and the procedure has to start again when the device is powered up.

During the update process the internal PC will shut down and it will reboot at least once. When the update is complete the system will turn back on in normal mode and show the update status briefly.

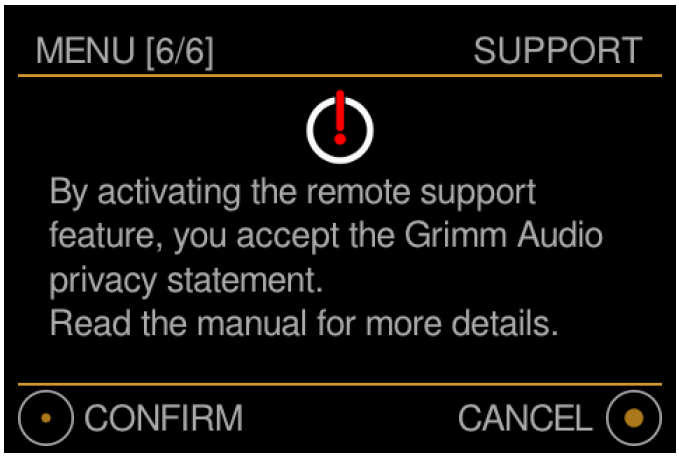
Updates for third party software like Roon is not included in the MU1 software update, this is done separately via the Roon App.

*Note: The **Music View** display will show the text 'Update available' when there is a new update.*

***Settings menu[6/6]:* Support**



In this menu you can activate Support Mode. This should only be activated when you have reported a problem with your MU1 to Grimm Audio and our people asked you to enter Support Mode. In this mode Grimm Audio engineers can get remote access to your device to help solve your problem.



- Activate Support Mode with a short press on the main control knob, confirm by another short press. The MU1 will reboot in Support Mode and a continuous animation screen is shown on the display.

- With a long press you will exit the menu and go back to the *Music View*.

Note: While the MU1 is in Support mode, the white dot animation will keep running and no other information is shown.

Support mode privacy statement:

Support Mode reboots the MU1 and establishes a secure connection to a Grimm Audio server. Through this secure connection we can log in to your device, read log files and change settings. Grimm Audio will not copy information from your MU1 in any form without your consent. Grimm Audio will never share your data with any third party.

When you activated Support Mode and wish to return to normal mode, press the power button on the back of the MU1 to turn off the device, and press the power button again to boot the MU1 in normal mode. Grimm Audio has no access to your MU1 any more as soon as you powered off the device.

Grimm Audio, The Netherlands
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Tel. +31 40 213 1562

Check grimmaudio.com for news about your MU1.

For software version V1.3.0
J.V. M.S. and E.G. 03/09/21