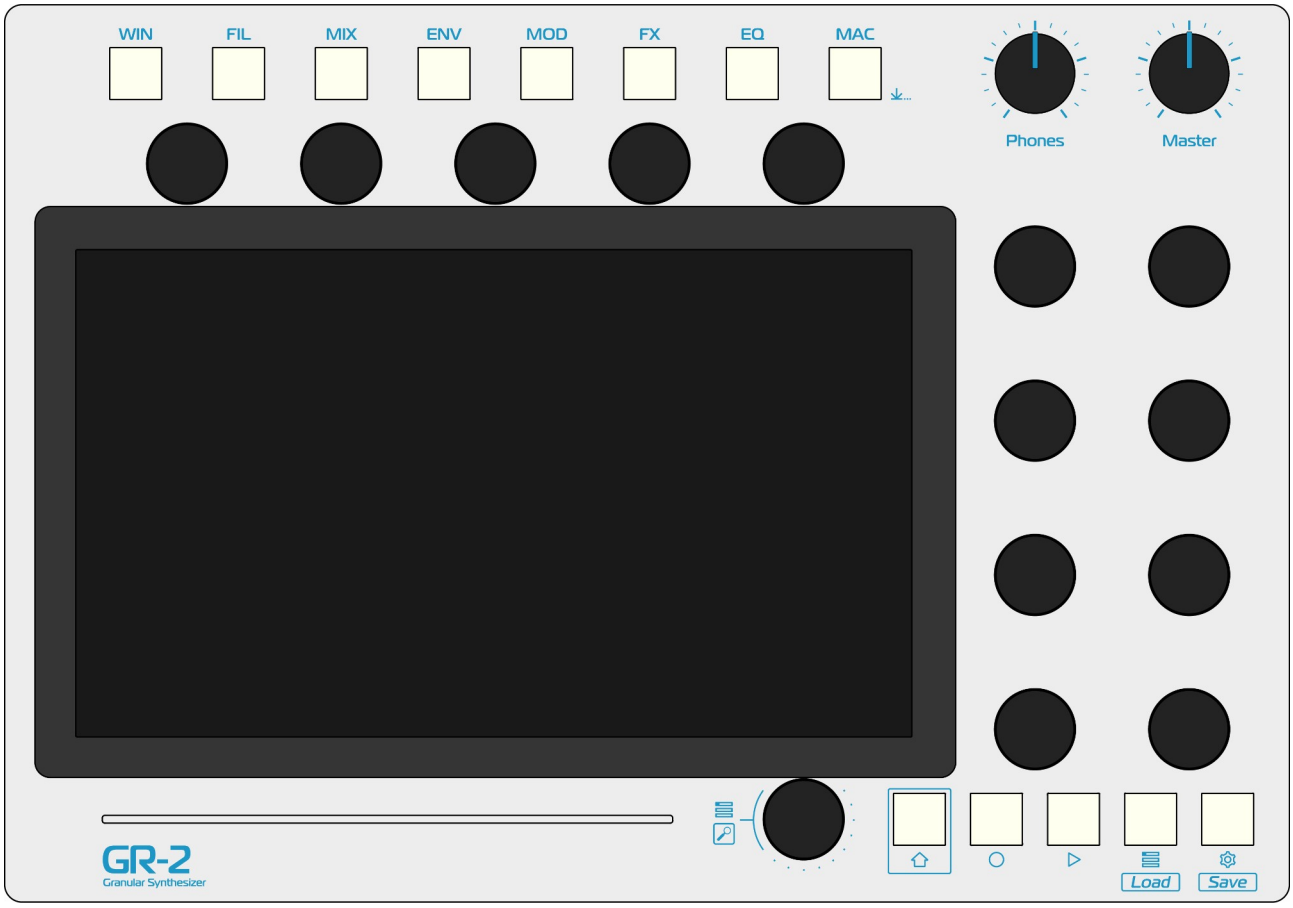
Tasty Chips Electronics

GR-2 synthesizer
User Manual



This manual is written by
Pieter van der Meer

Illustrations
Joeri Braams, Luc Derks

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tasty chips electronics

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Document version naming

This document's version is written as:

v<major version>.<minor version>.<patch level>
v<number>.<number>.a-z

The major and minor versions follow the GR-2 firmware versions. The patch level is separate from the firmware version's patch level (a correction in the manual text vs a software fix in the firmware).

Major version updates involve a complete redesign of the user interface and possible feature additions. Minor version updates involve feature additions.

Firmware patch level updates [0,1,2,3,4,..] purely involve bug fixes.

Document patch level updates [a,b,c,d,e,...] involve additions to documentation: yet undocumented features, typos, and errata.

Document version

1.8.e

Applicable firmware versions

1.8.* (1.8.0; 1.8.1; 1.8.2; etc)

Contents of the box

Congratulations!
You are now the proud owner of the Tasty Chips Electronics GR-2 granular workstation.

The contents:
• The box with schematic drawing of the GR-2 on its top side.
NOTE: this box features a sticker with serial number GR2-XXXX!

• External region-independent AC/DC power supply, boxed.

• Quick start guide (single A4 sheet).

• The GR-2 unit, with sticker *GR2*-XXXX on the bottom plate.

The display has a protective sticker on it, which may be peeled off if you prefer.

Important safety and maintenance instructions

Important safety and maintenance instructions

Do not use an AC/DC adapter other than the one that comes with the GR-2, or the ones explicitly recommended by Tasty Chips Electronics. Doing otherwise may damage your GR-2!

Do not connect high voltage input/output connectors to the GR-2.

Avoid this product from falling. Avoid spillage of fluids. Keep it dust free, and keep it out of damaging environments. Keep your GR-2 out of reach of children and pets.

Do not open this product. Please contact Tasty Chips Electronics when (part of) your GR-2 does not work (when it freezes or resets). Contact information can be found at the end of this manual.

Please treat your GR-2 well.

Power supply and power lead

Power supply

Brand: CUI INC
Model: E210311 / SMI24-12-V-P5

Power specifications

Input voltage:	100 ~ 240VAC
Output voltage:	12V
Max output current:	2,0A
Barrel socket dimensions:	2.1 x 5.5 mm

The power supply comes with several pieces “blades” for power outlets in North America, Europe, United Kingdom, Australia, and China.

Power specification

Please do not use an adapter other than included in the GR-2 box. Using another adapter or power source, may cause damage to your GR-2. It is protected against reverse polarity and over voltage, but extreme voltage will still cause damage! The GR-2 accepts heavier 12V adapters than the supplied 24W unit, but please contact us before trying! Badly designed power adapters can degrade noise performance, and even damage the GR-2 hardware.

Reading this manual

How to get the most out of this manual:

The GR-2 is a powerful and flexible device, but it is designed to be easy to get into. The display and the controls directly next to the display speak for themselves. But this manual offers a full overview of all the controls. This starts in the chapter Global Overview.

This manual also functions as a detailed reference. The Tasty Chips Electronics Youtube channel [youtube.com/tastychips] features tutorials for the GR-2, although this user manual is still more detailed.

In general the flow of this manual is from beginner and global at the start to advanced and specific near the end. Although we felt that we needed to explain some principles before getting to the tutorials.

The first chapter you should probably read is the quickstart chapter. It gets you up to speed with the basics: powering up and getting the first noises out of the GR-2. In the beginning you can just stick to this quick start and basic tutorials. Should you “bump” into things later on, you can come back here to this chapter and get guidance on what part to read, or just Ctrl+F / Cmd+F and use the manual as a reference work.

The Global Overview chapter provides an overview of all physical controls: buttons, knobs, sliders, the display, as well as the sockets on the back panel.

Since the GR-2 has sound engines that require more explanation than for instance analog synthesis or wavetable synthesis, we’ve written an engine chapter especially for this purpose: “Sound Engines”. It is recommended to read this if you are not familiar with granular synthesis or spectral synthesis, aka. “phase vocoding”. The sound parameters are described for each sound engine.

Once the user is familiar with how to tweak sound parameters, we explain how data is organized in samples, patches (presets), and projects, and various other data types that can be useful. This is the chapter GR-2 Data. Logically, this is followed by how to load and save all these data types in the next chapter.

(Network) File sharing is probably the easiest way to transfer samples and other data between your GR-2 and your PC/Mac. This is explained in the chapter File Sharing.

We then explain all the options in all the menus, which is the longest chapter.

Only then are were ready for the tutorials.. Although, you can actually skip directly to this chapter after having read the quickstart, we do recommend getting familiar with the data types first.

To get the most out of your GR-2, we’ve added a chapter about polyphony.

The later chapters deal with tables of control functions, button combos (shortcuts), and MIDI command tables. A chapter about frequently asked questions and troubleshooting concludes the manual.

Warranty

The GR-2 comes with a 2 (two) year warranty on factory defects. Warranty is effective from the date of shipping of the unit. There is no need to register your unit with us. You buy it, you own it, even second-hand. As the owner you're always entitled to the unit's warranty, within the limits specified in this chapter.

For instance, if you buy a second-hand unit that's 1 year old, you still have 1 year factory warranty left.

"Factory defects" covers:

• Missing parts (see previous section)

• Broken parts (for instance: cracked screen, broken buttons, knobs or sliders)

• Non-functional unit ("dead on arrival")

• Semi-functional unit with serious defect (for instance: inability to access any USB stick or USB hard disk, left and/or right channels permanently muted).

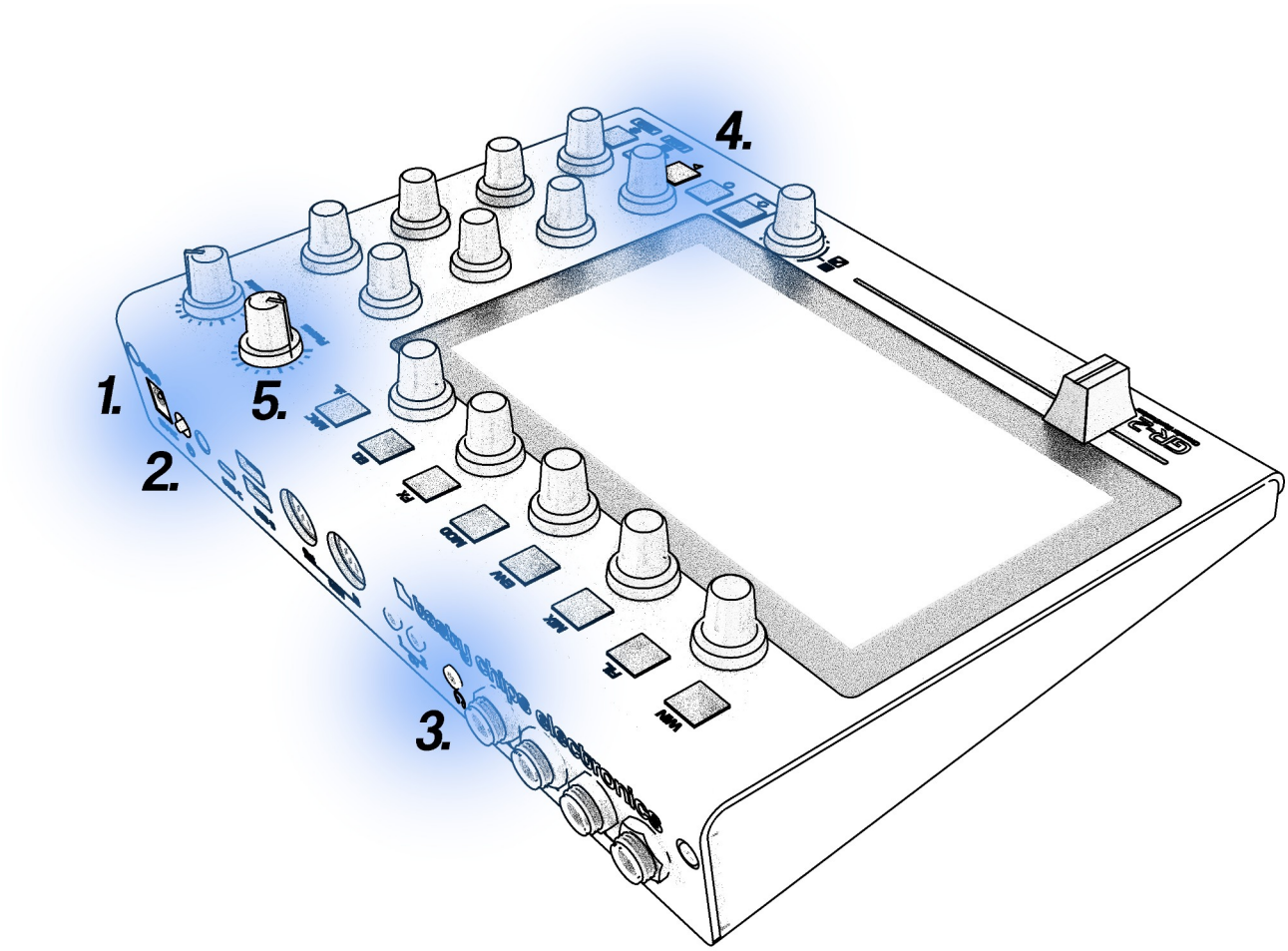
In case of such defects, you can reach us at info@tastychips.nl, and claim your unit to be repaired. We'll contact you with all the necessary information for return shipping and will refund all postage costs incurred. Please understand that shipping and repairs may take several weeks depending on the severity of the defect and your location in the world.

We'll first attempt to repair your unit. If, and only if, the unit is damaged beyond repair, we'll send a new unit.

In some trivial cases like missing power adapter, or defective USB stick, we will send the replacement parts directly to you, because they may be easily replaced.

Note that opening up the unit and tampering will void warranty. There are exceptional cases where we do allow the product owner to open up the unit, typically for a possible quick fix in the studio, but said person will need to have our explicit permission first. Ask here: info@tastychips.nl

GR-2 Quickstart



1. Hook up the furnished power brick up to your power outlet.

2. Plug the power brick's barrel jack into the GR-2, denoted by "1" in the picture.

3. Press the momentary switch next to the barrel socket, denoted by "2" in the picture.

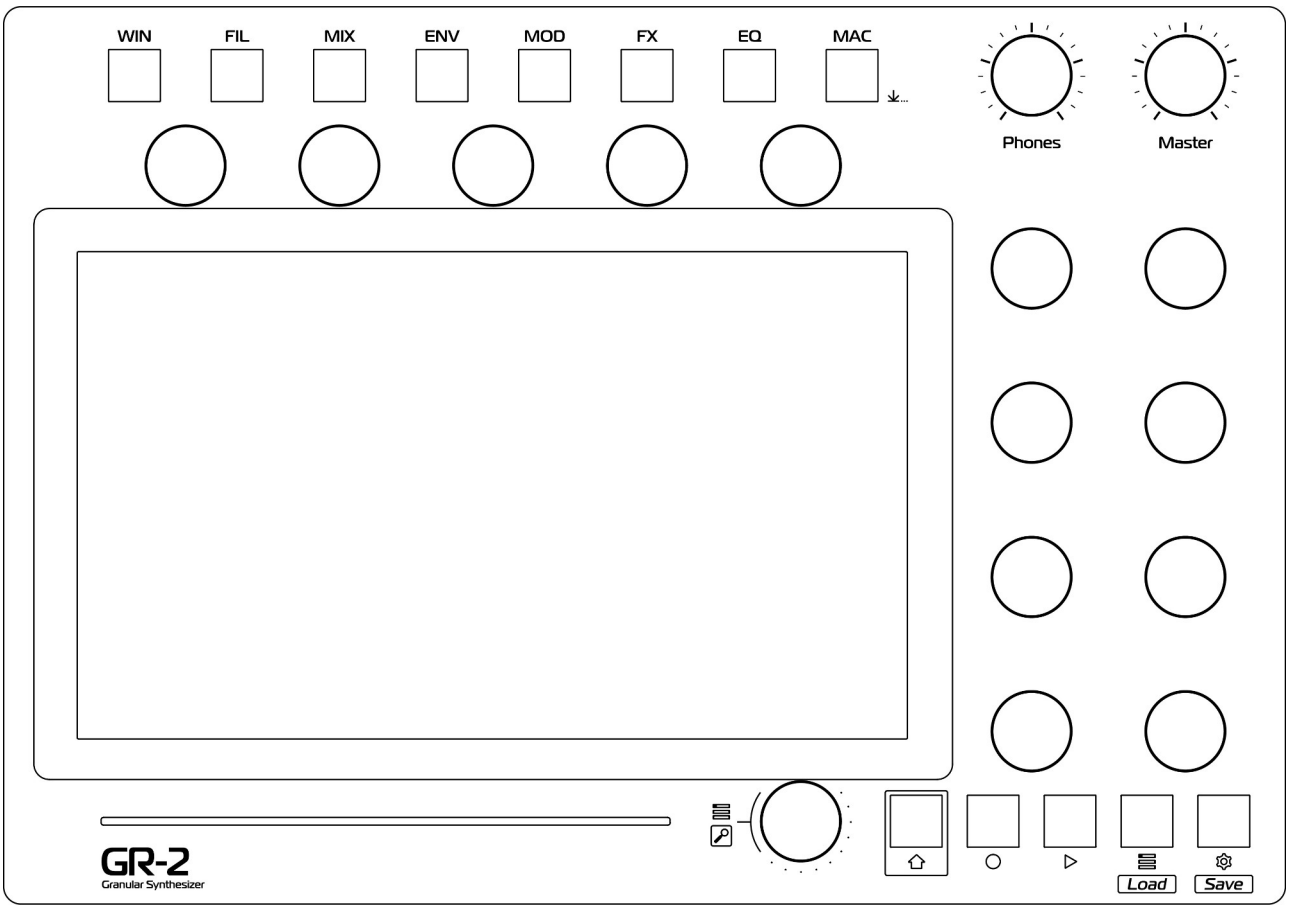
4. All LEDs will now light up.

5. After about 15 seconds the GR-2 logo appears on the screen, quickly followed by progress bar. And then after a few seconds more you'll see the main sample display.

6. Hook up your headphones (named "3" in the picture) or your monitor speakers on the back panel.

7. Hit the [▶] button (named "4" in the picture). Turn up the volume (named "5" in the picture), and also don't forget the Master volume knob. Enjoy!

Global Overview



Front Panel

The GR-2 front panel offers a mix of touch screen and physical controls. Physical buttons and knobs are spatially colocated with graphics on screen.

The touch screen has the following functions:
- sample display, where touching the sample will play the sample at that spot
- sound parameter display
- menu operation:
    - shallow menus can be *pulled* from top, left, right, and bottom side
    - tile menu: deep menus accessed by the [Menu] button in the bottom right

The 8 top side buttons determine which Quick Access (QA) menu is active, and the function of the 5 top side encoders. Logically, their function and value is displayed in the top side of the screen. These menus directly determine the shaping and control of sounds: envelopes, modulation, effects, macros, etc.

Likewise, the 8 right hand side knobs are shown on the right side of the screen. These are sound engine controls. Changing sound engine will also change the function of the knobs.

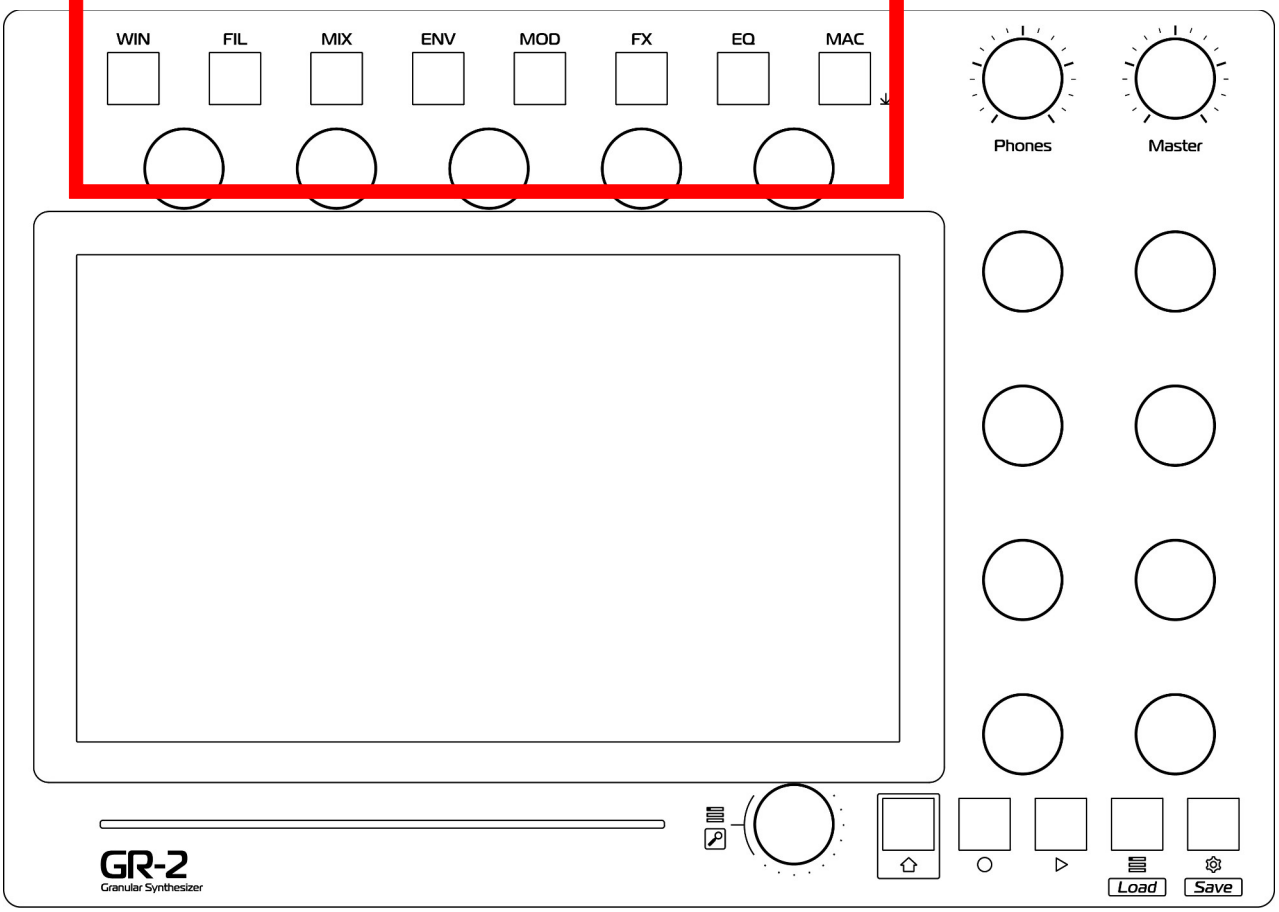
* Bottom pull menu: switch sound engine, sample view, touch mode
* Left pull menu: toggle and focus layers
* Top pull / QA menu: shaping and control of sounds: envelopes, modulation, effects, macros
* Right pull menu: copy, paste, init, delete, disk IO

The 5 buttons on the bottom right are:

[⇧][Shift]	for alternate button / knob functions, and fine/coarse
[▶][Play]	for droning
[●][Rec]	for (audio) recording
[≡][Preset] / Load	preset selection, and loading data with Shift pressed
[⚙][Menu] / Save	tile menu, and saving with shift pressed

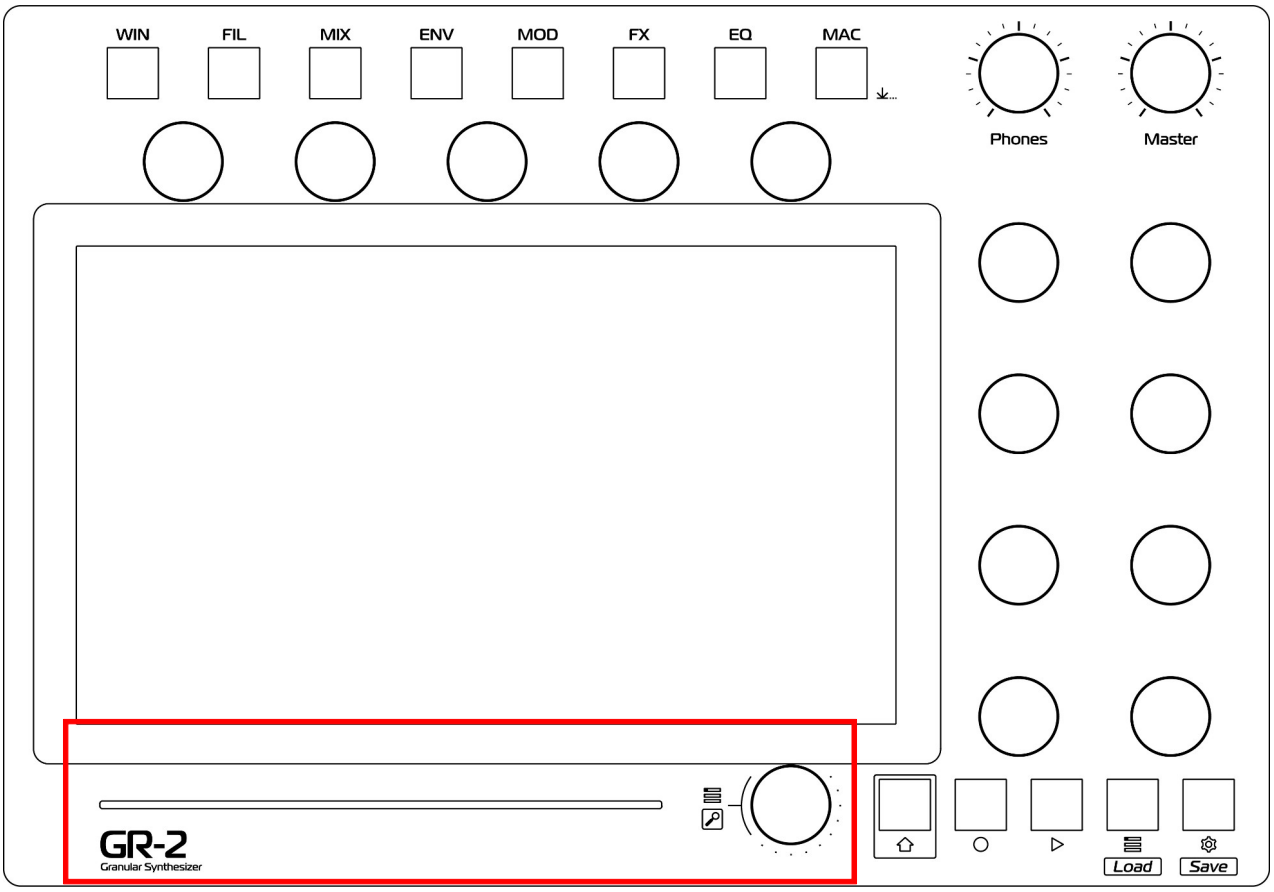
The following manual sections describe the function groups one at a time, in descending order of importance.

Display



The GR-2 display is 7” full color and 1024 x 600 resolution. It is dimmable, to be suitable for low light conditions. A new GR-2 unit comes furnished with an additional plastic screen protector on top. This can be removed by peeling. The touch screen will function with the protector in place. Up to 5 fingers can be used at the same time, and there’s support for gestures like pinch rotate and dragging.

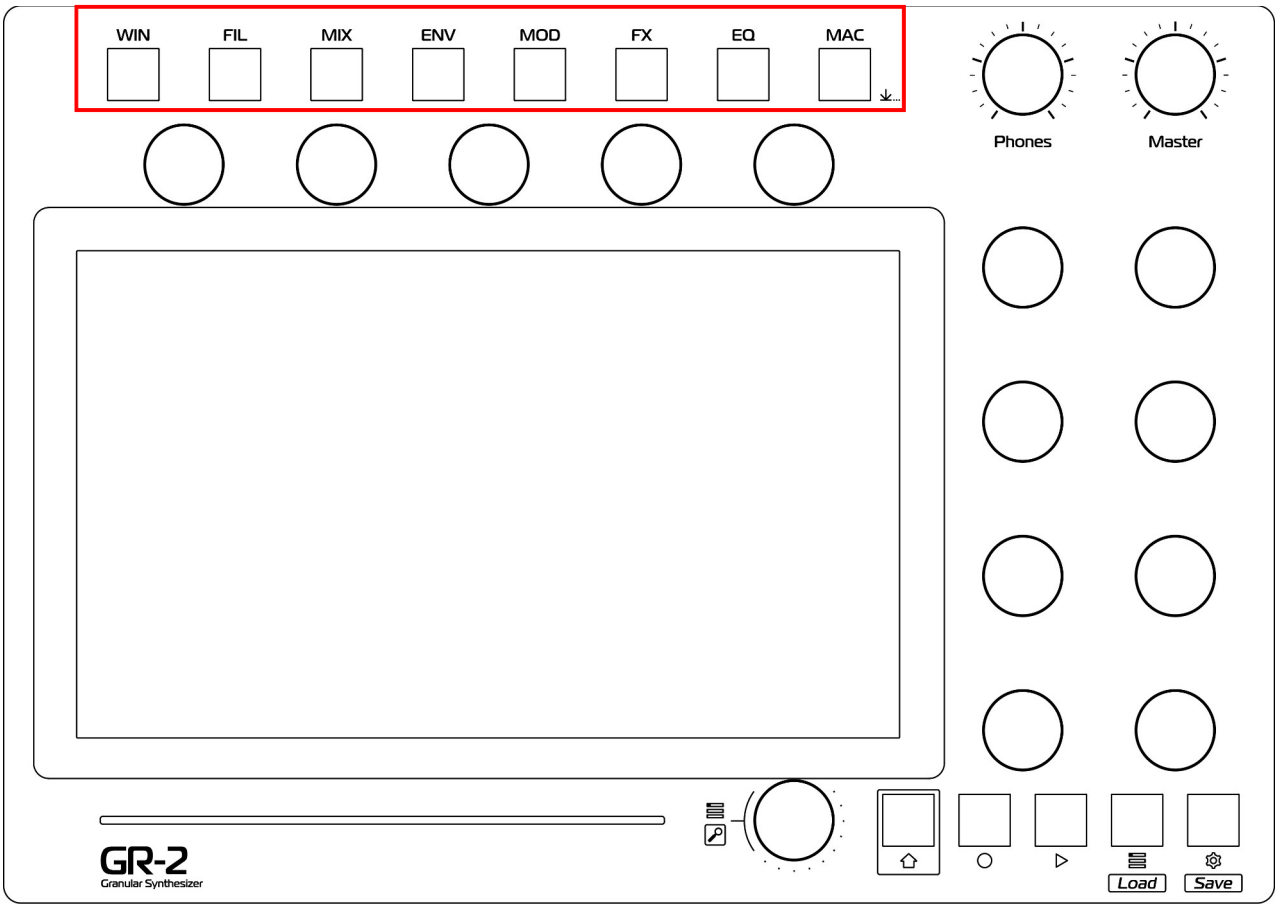
Position slider and Operation encoder



Directly underneath is the horizontal position slider. The travel of the slider is 100 mm. The position slider is essential for many things. First and foremost for setting play position in your samples. While zoomed in, hold [Shift] and move the slider to scrub through the entire sample. It is also used to dial in values in menus.

Next to the slider there's the operation encoder ("Op enc") with push switch. Turn (Op enc) to select an operation like cropping or setting loop points, then press to execute. Hold [Shift] and turn (Op enc) to quickly zoom in and out. (Op enc) is also used to step values in menus. Holding down shift will typically mean fine adjusting. See the "Menu, navigation, editing.." section for more.

Top buttons



WIN: grain and spectral window

FIL: filter

MIX: layer mix, and volumes

ENV: envelopes: pitch, amp, filter, aux

MOD: modulation matrix, touchscreen drawings

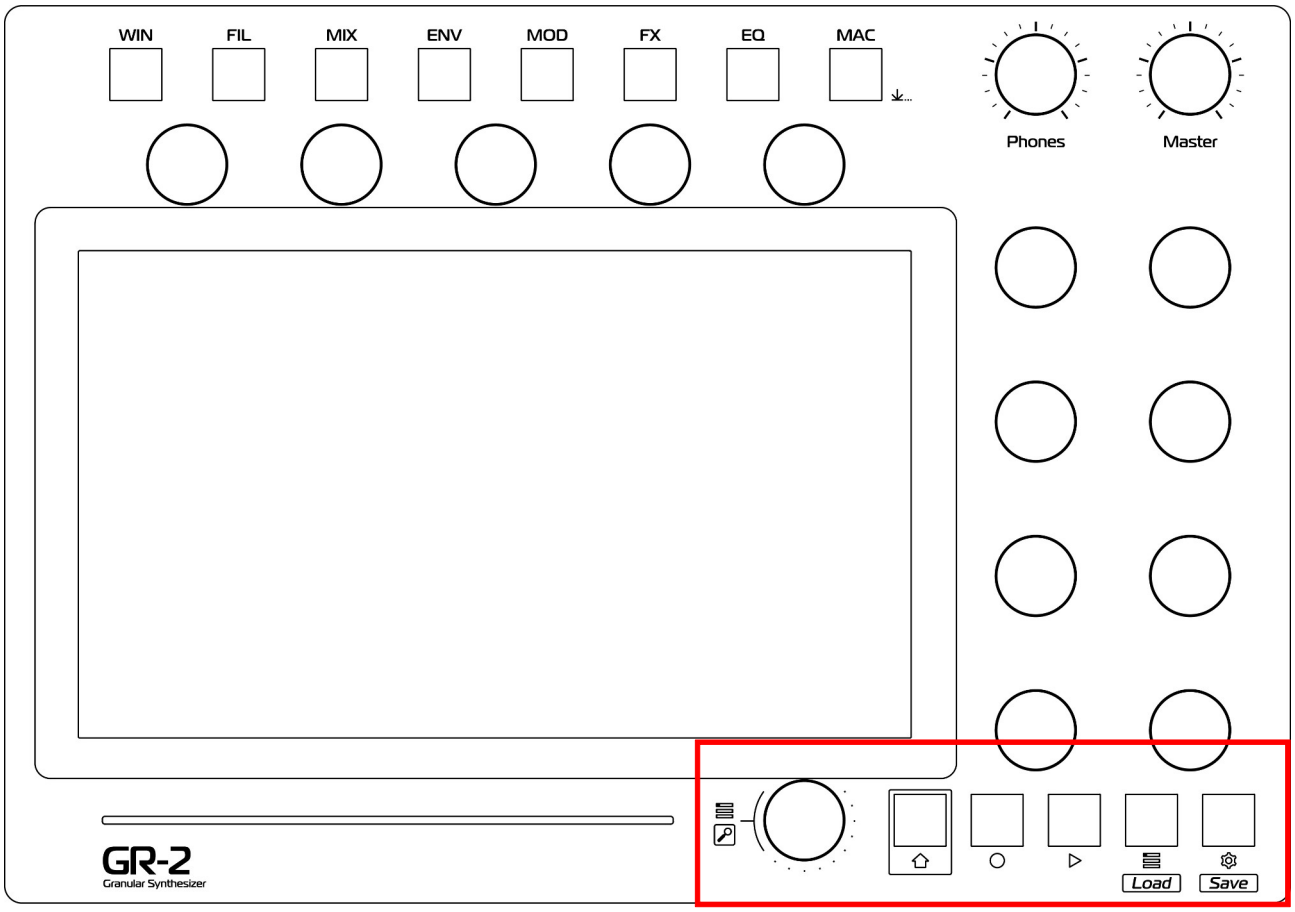
FX: effects

EQ: parametric equalizer

MAC: macros

Press button to access function or to switch page related to that function. For instance, ENV has 4 pages: pitch, amp, filter, aux. Hold button expand to full screen or collapse again.

Menu, navigation, editing & disk access



On the bottom right of there's a group of buttons for menu navigation, and disk access.

From left to right:

(Operator encoder) aka (Op enc):
* used for selecting from lists (push),
* and scrolling through them (turn).

[⇧] aka [Shift]: accesses alternate knobs and buttons functions.

[≡] aka [Preset]: toggles between preset list and main screen. Hold this and turn (Op enc) to quickly change presets:

1. Hold down [≡], and
2. turn (Op enc) → quickly switch presets.

1. Hold down [≡], and
2. push (Op enc),
3. then turn (Op enc) → quickly switch multitimbral presets ("MTPresets").

[⚙] aka [Menu]: toggles between tile menu and main screen.

Hold [Shift] and [≡] => accesses load functionality. Type dialog will popup first if you are in non-expert mode.

Hold]Shift] call dialogs to load and save, and when said dialogs are open, press again to perform the actual load or save operation.

[Copy]: used to copy, and to paste: hold down Shift and then press Copy. It of course copies different things depending on the menu tab you are in, or if you are in the main screen; then it copies patches.

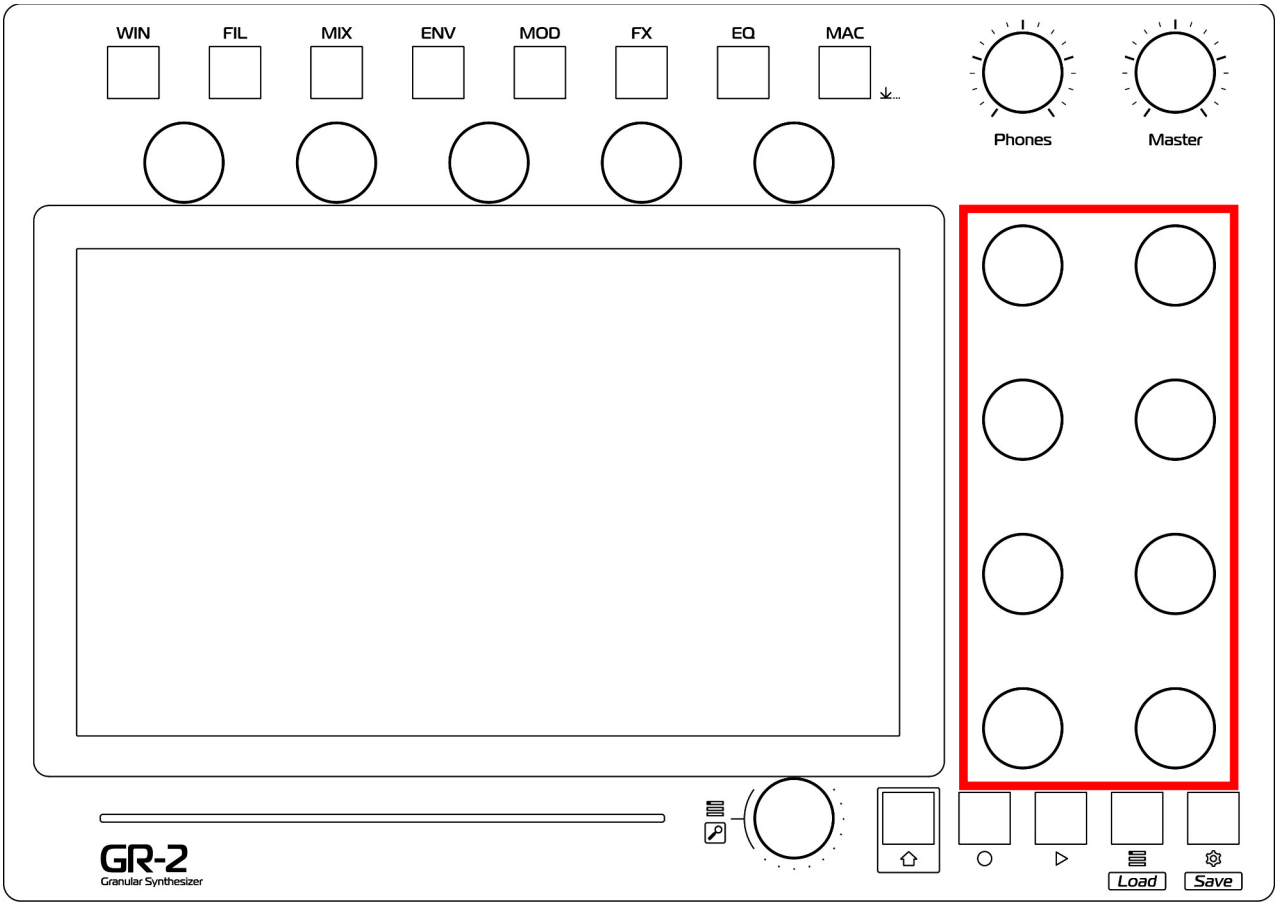
[Seq]: used in conjunction with Play or Record buttons. Hold it and press Play to play the sequencer instead of just playing a single continuous note. Hold it and press Record to record MIDI notes into the sequencer.

[Delete]: used to delete or initialize data. In the main screen it initializes the patch. In menu screens it initializes different things such as sequencer notes, mod matrix rows. Inside a text box it acts like a backspace.

Play [▶]: plays and stops (press again) a single continuous note. Hold [Shift] and press [▶] to audition the current sample. Can be used in conjunction with sequencer as well. Hold down [▶] for 3 seconds to turn all sound off, like a panic button.

[Record]: record audio (when enabled in sampling menu), or record sequencer when Rec button is held down. Press Record again to stop recording.

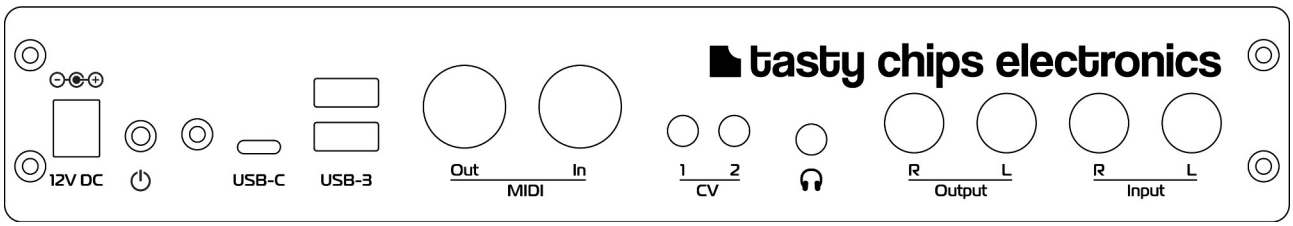
Sound engine controls (ABC knobs)



On the right you have 8 knobs. These control granular parameters, and are fun and powerful to tweak.

Each engine has different functions for these knobs, but they are often very similar. Scan and Pitch are always the same. Once you get to grips with these knobs in one engine (say granular), they make sense in other engines as well (for instance sampler).

Back Panel



CV & Gate

There are 2 CV inputs on the GR-2, which can be used as mod matrix modulation sources. The inputs have the typical Eurorack -5V .. +5V range. The inputs are protected and buffered.

The CV's are modulation sources. They're suitable for LFO speeds and low (sub-bass) audio range.

Audio Outputs (L/R)

These are two balanced ¼" (6.35mm) TRS (Tip Ring Sleeve) phono jack sockets, that output the left and right channels of the master mix. We recommend you only use TRS cables, as TS cables are sensitive to noise, especially when they are long. Signal-to-noise should be about 100 dB.

Headphone connection

This is a 1/8" (3.175mm) TRS (stereo) mini jack socket. Next to it is the volume knob.

The volume level is sufficiently loud, although a bit less than some dedicated external headphone amplifiers. Still, please be careful and keep in mind you can damage your ears over time.

NOTE: The headphone amp is optimized for 32 ohm headphones. High impedance headphones will sound quite soft.

Audio IN (L/R)

These are two balanced ¼” (6.35mm) TRS (Tip Ring Sleeve) phono jack sockets, representing the left and right input channels. We recommend you only use TRS cables, as TS cables are sensitive to noise, especially when they are long. Signal-to-noise is about 90 dB.

Note that these inputs are not pre-amplified. They are not suitable for hooking up your guitar or microphone directly. Please use a pre-amp if you want to do this. Note that amplified output levels should remain below 5VPP, to avoid damage.

MIDI

The GR-2 has two DIN-5 MIDI sockets: MIDI In, MIDI Out/Thru. MIDI in optically isolated as per MIDI standard, meaning there’s no chance of noise entering the GR-2 from a connected MIDI controller. MIDI Out/Thru is technically a MIDI out port, but it can merge DIN input.

DIN MIDI is still common and very reliable, but if you want to send many automations from your DAW, or large sysex dumps, it is recommended to use USB C instead.

USB-A

The GR-2 has 2 USB A ports:

2 x USB 3.0 ports, which offer 0.9A and up to 5GBps speed. Suitable for fast USB sticks or even drives, and for supporting power hungry audio interfaces (to be supported in future firmware versions).

The USB A ports offer host mode only. This means that you can only connect USB devices here. Since a PC and Mac are typically USB hosts, that means they cannot be connected here! Use USB C instead.

USB C

The USB C port is intended to connect your PC/Mac to. It runs at USB 2.0 speed: 480Mbps max. It supports MIDI data, multichannel audio in and out, and file sharing. Use it to hook up your PC/Mac (with your favorite DAW) to your GR-2.

This port is resistant against injection of noise from your PC/Mac. This means it resists injection ground noise from the connected machine, and also against so-called “ground loops”.

Multichannel USB audio is stable, but when using with Mac (and sometimes also Windows), it is recommended to setup as follows: System menu → IO → USB C Mode → AUDIO ONLY. If you choose AUDIO + MIDI + FILES, there may be audio drop outs when using high polyphony and many effects.

This port does not power the GR-2. The only way to power the GR-2 is via the 12V socket on the extreme right of the back panel.

This port does not provide power to devices. Use the USB A ports for this.

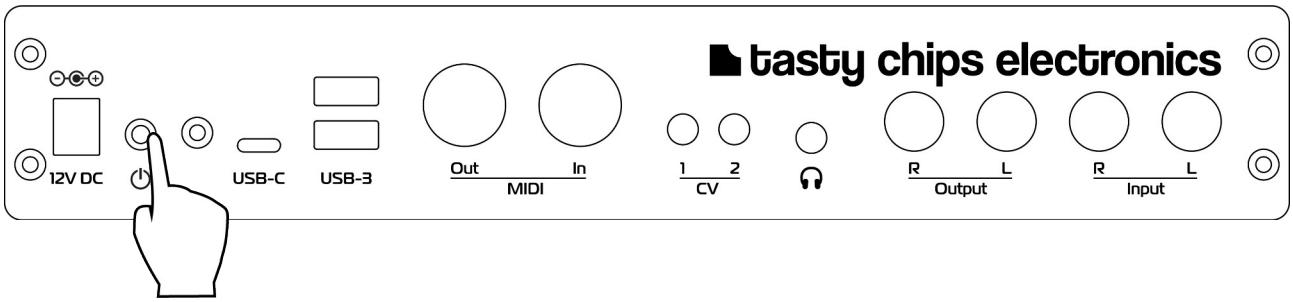
USB C audio streaming (UAC2):

This offers 48 kHz, 16 bit audio streaming:

* 10 channels out, listed as “capture inactive” in your DAW
  1: layer 1L
  2: layer 1R
  3: layer 2L
  4: layer 2R
  5: layer 3L
  6: layer 3R
  7: layer 4L
  8: layer 4R
  9: master L
  10: master R

* 8 channels in, listed as “playback inactive” in your DAW
  1: layer 1L
  2: layer 1R
  3: layer 2L
  4: layer 2R
  5: layer 3L
  6: layer 3R
  7: layer 4L
  8: layer 4R

Power button



When your GR-2 is hooked up to mains power, press this to enter or exit stand-by. Pressing it when running, will prompt the user to confirm shutdown. In stand-by the GR-2 consumes only a fraction of a Watt.

Powering up

1. Hook up the DC adapter to AC power.
2. Insert the adapter's barrel socket into the GR-2 barrel socket.
3. Press the power button on the back.
4. The GR-2 will now power up, LEDs will all light up and the display will show the GR-2 logo. It will load the last used project, and then show the main screen with a sample waveform.

WARNING: Do not use an adapter other than the one that comes with the GR-2. If you insist, please contact us first.

Shutting down

The barrel jack should not be pulled from the socket without first doing a clean shutdown. This can lead to loss of data! A clean shutdown is done as follows:

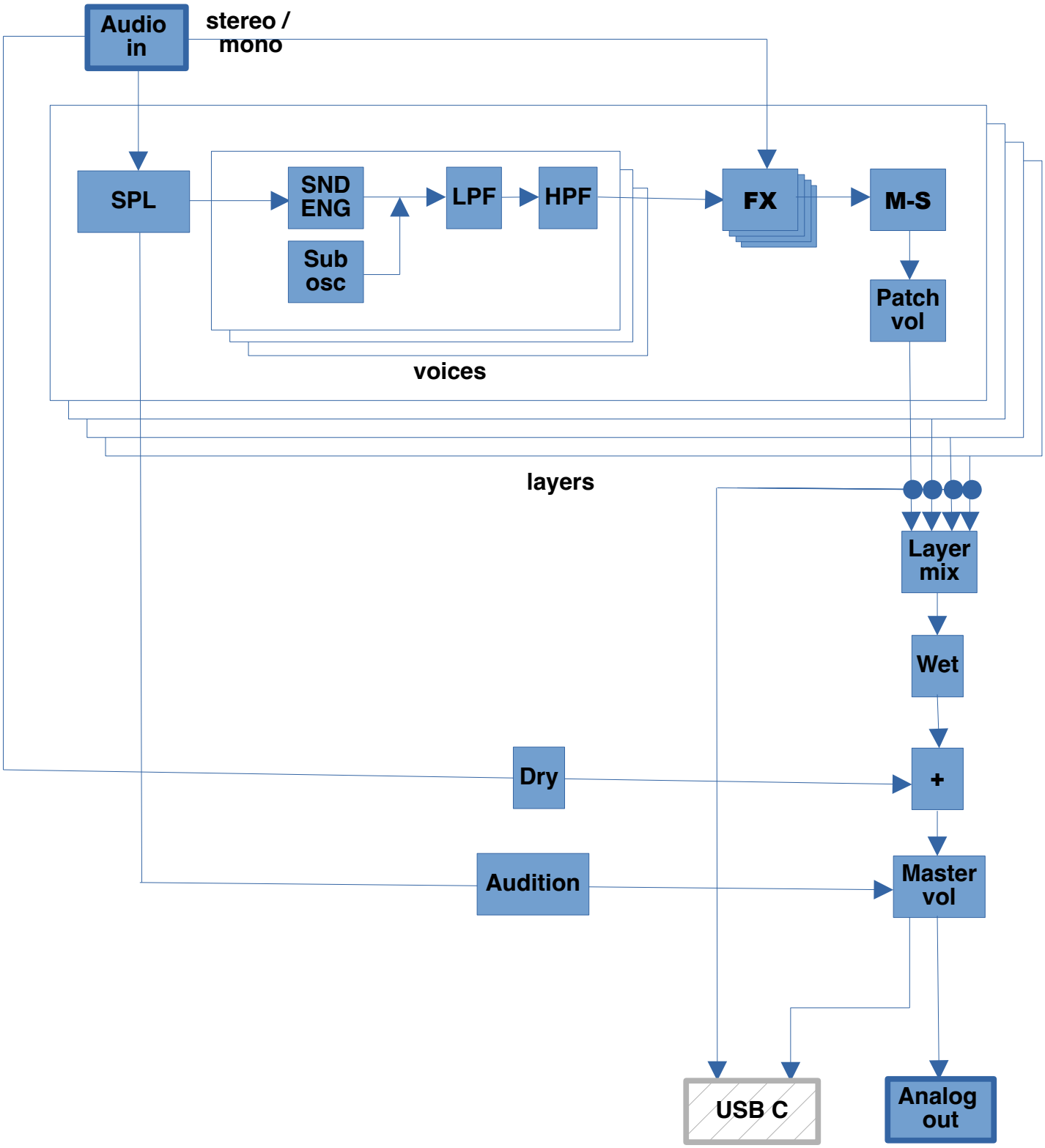
1. Make sure the GR-2 is up and running. The display should show the graphical user interface.

2. Shortly press the power button. A confirmation dialog is prompted. Confirm the shutdown dialog.

3. The GR-2will now save any unsaved changes, if you configured it to do so, and fully shut down. All LEDs light up, and the GR-2 logo will appear.

4. When the LEDs have turned off, and the GR-2 logo has disappeared you can unplug power if you want. If you don't unplug, the GR-2 remains on stand-by. The display, CPU, and all connected USB devices are powered off. Stand-by power less is than 1 Watt.

GR-2 signal path



A note on voice volume: The GR-2 has many volume controls, and not all of them are mentioned in the above schematic. For instance:

- Grain volume normalization (“grain compression” be turned ON/OFF in the Grain menu).

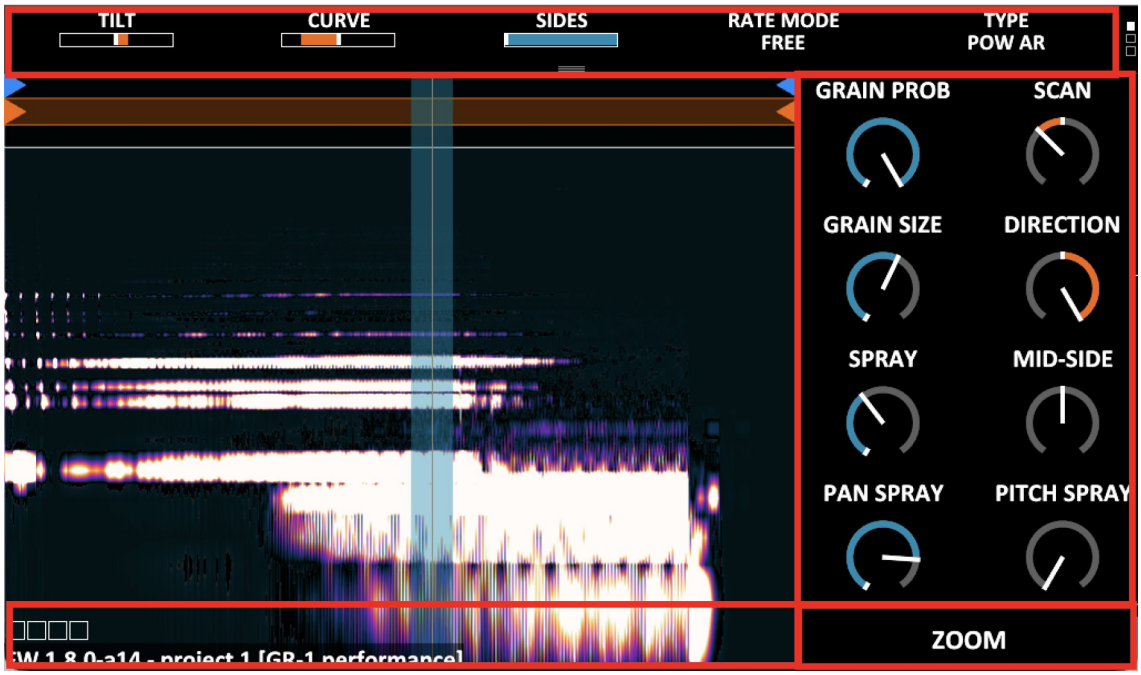
- FX send volumes: “audio in”, “synth”

Note that voice volume per default is -12 dB. This is done in order to be able to have 4 layers droning without clipping. In the granular sound engine, the grain volume normalization sees to it that volume doesn’t blow up when hitting high densities. Max volume is set to happen at a density of 17.

This means that voice volume may be low for some applications. Most notably, non-linear effects like distortion or compression, need volume a unity level. This is where the effects screen “synth” send volume comes into play.

The main screen

QA MENU (collapsed)



PAGE

ENGINE CONTROLS

SYSTEM TRAY OSD

OPERATION

WAVEFORM: the largest part of the display is dedicated to waveform display. This can be displayed in several ways, and it can show either 1 (monotimbral) or 4 layers (aka multitimbral).

QA MENU: shows function, value, and possible center and modulation of nearby knob. Pull the == indicator to expand the menu to fullscreen. See below.

Long touch the knob graphics to get a popup for fine/coarse, and reset.

Hold [Shift] to gain access to possible alternate function.

PAGE: indicates which QA menu page we're on, and how many there are.

ENGINE CONTROLS: shows function, value, and possible center and modulation of nearby knob. Long touch the knob graphics to get a popup for fine/coarse, and reset.

Hold [Shift] to gain access to possible alternate function.

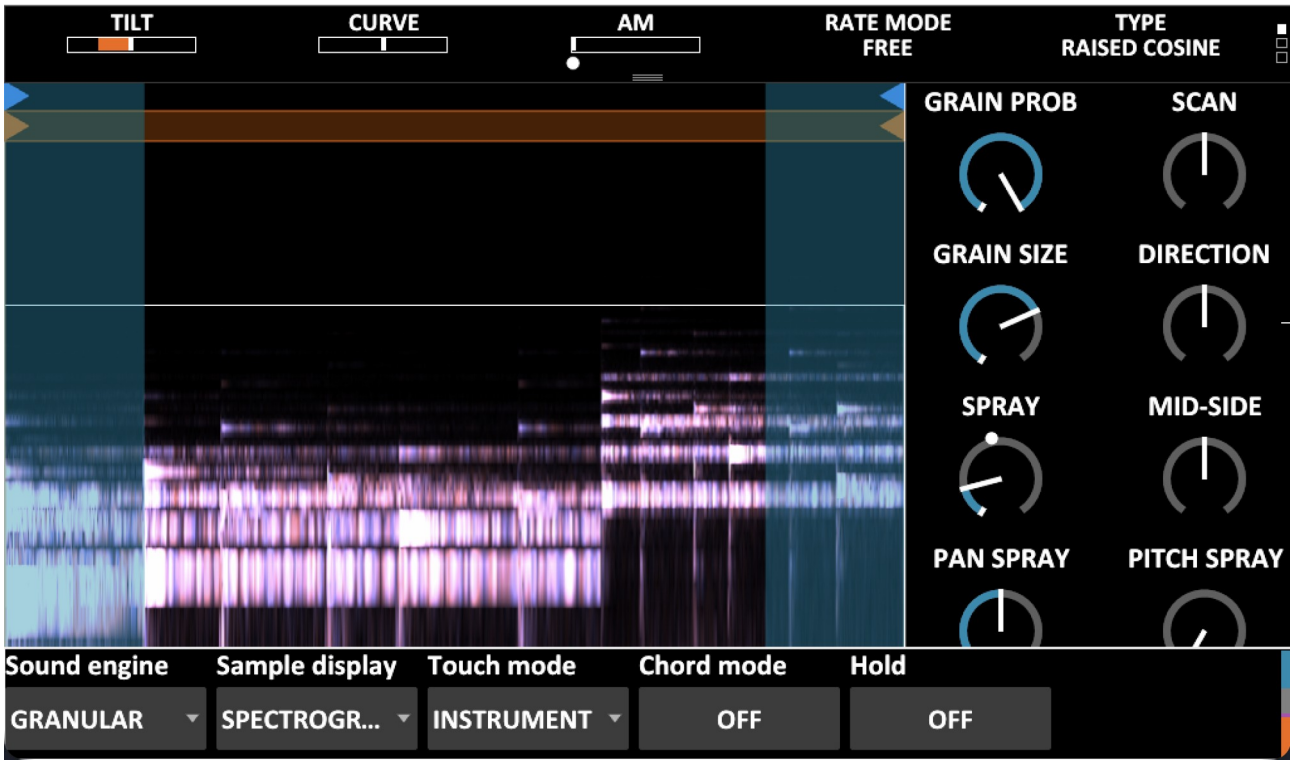
SYSTEM TRAY: 4 squares that indicate incoming DIN MIDI activity, USB MIDI activity, musical MIDI activity (non-clock, non-sysex), potentiometer activity.

OSD, or On-Screen Display shows emergency messages or information about the recently loaded project.

OPERATION: shows the current operation selected by (Op enc).

Bottom pull menu

Pull the lower edge of the display (slowly!) to access the bottom pull menu:



This allows basic settings like switching the sound engine and the sample display mode.

Touch mode:

- instrument: touch the sample area to trigger up to 5 “finger voices”

- voices: like “instrument”, but only allow side panel grabs if no voices playing. This mode is safer if you use the touch screen like a live instrument, or if you have a little bigger fingers.

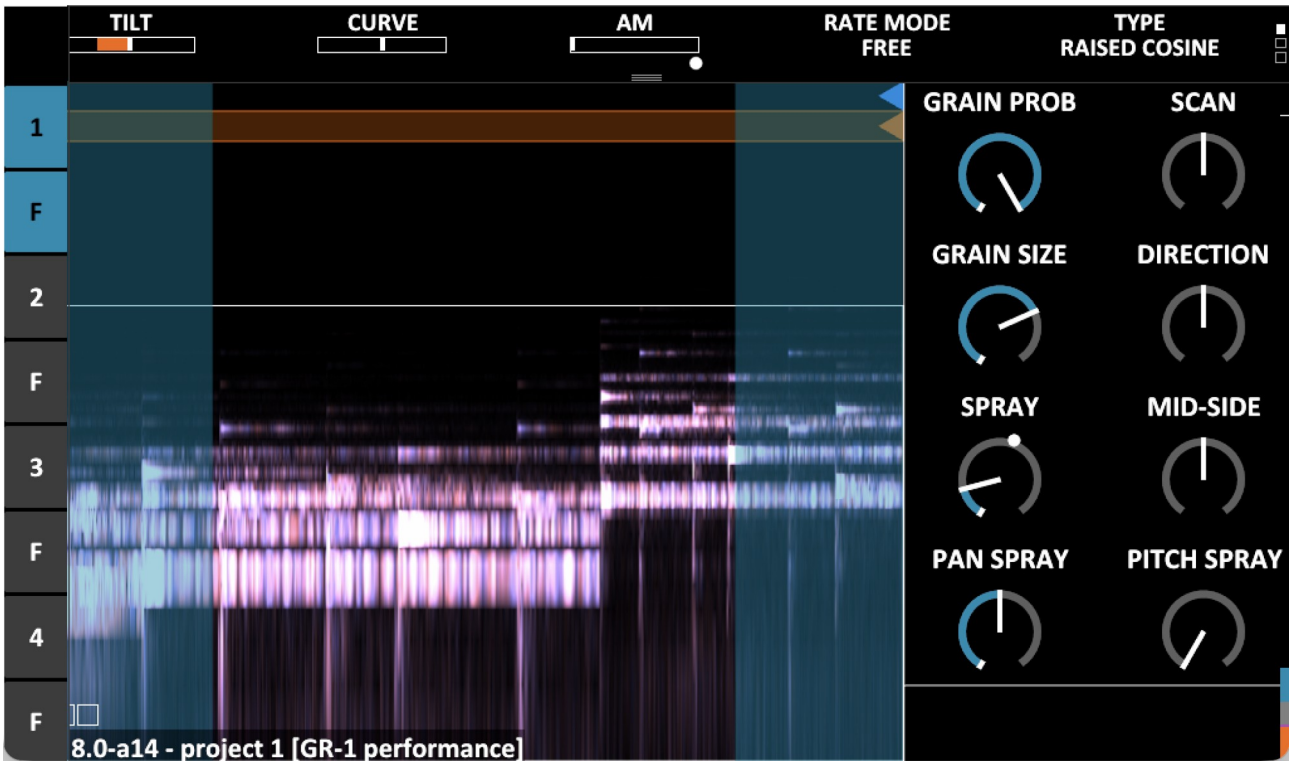
- scroll zoom: no finger voices, use pinch and swipe gestures to scroll and zoom

Chord Mode: toggle the voicing data from the voicing menu. Use this to drone an entire chord instead of just a single note with the [Play] button. Long press to record a chord using MIDI!

Hold: toggle this to hold finger voices. Allows you to free up fingers.

Left pull menu

Pull the left edge to access the menu. Shortcut: [Shift] + [Win]

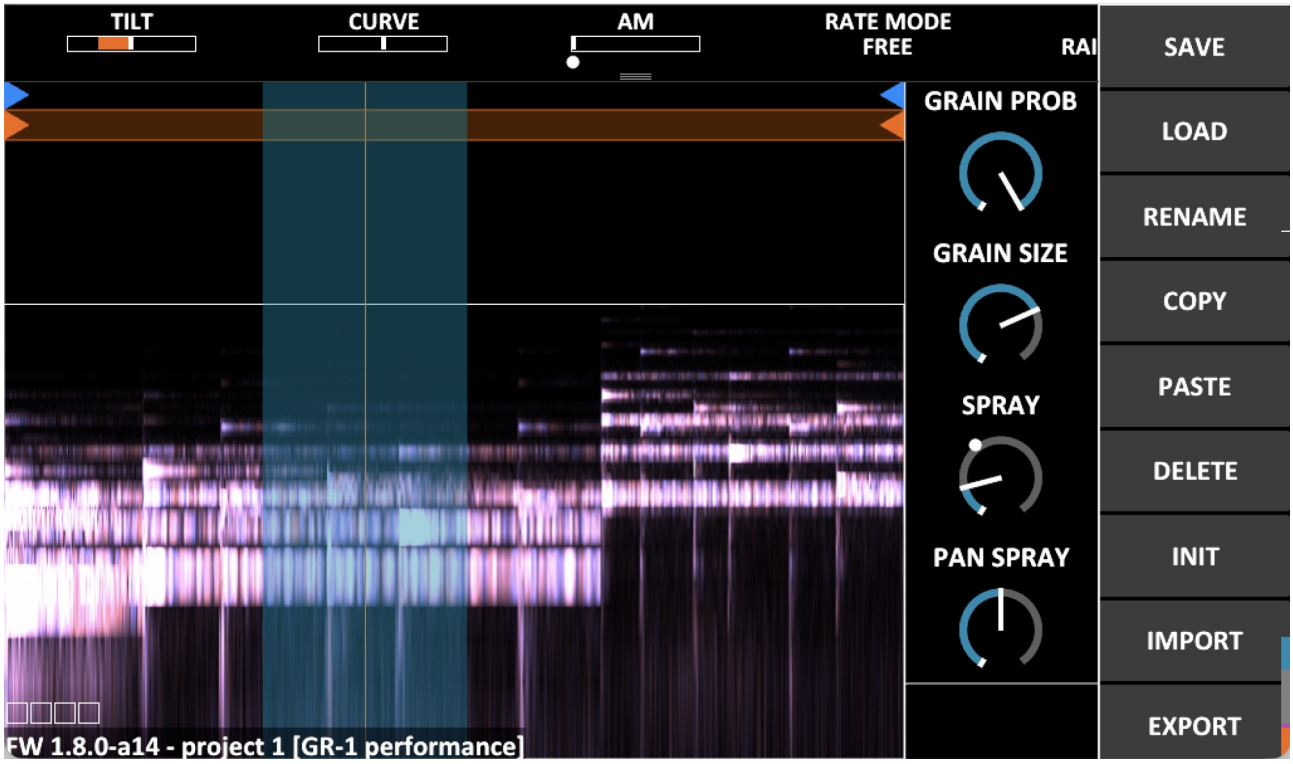


Press 1,2,3,4 to toggle the respective layers.

Press the “F” with each layer to focus.

Right pull menu

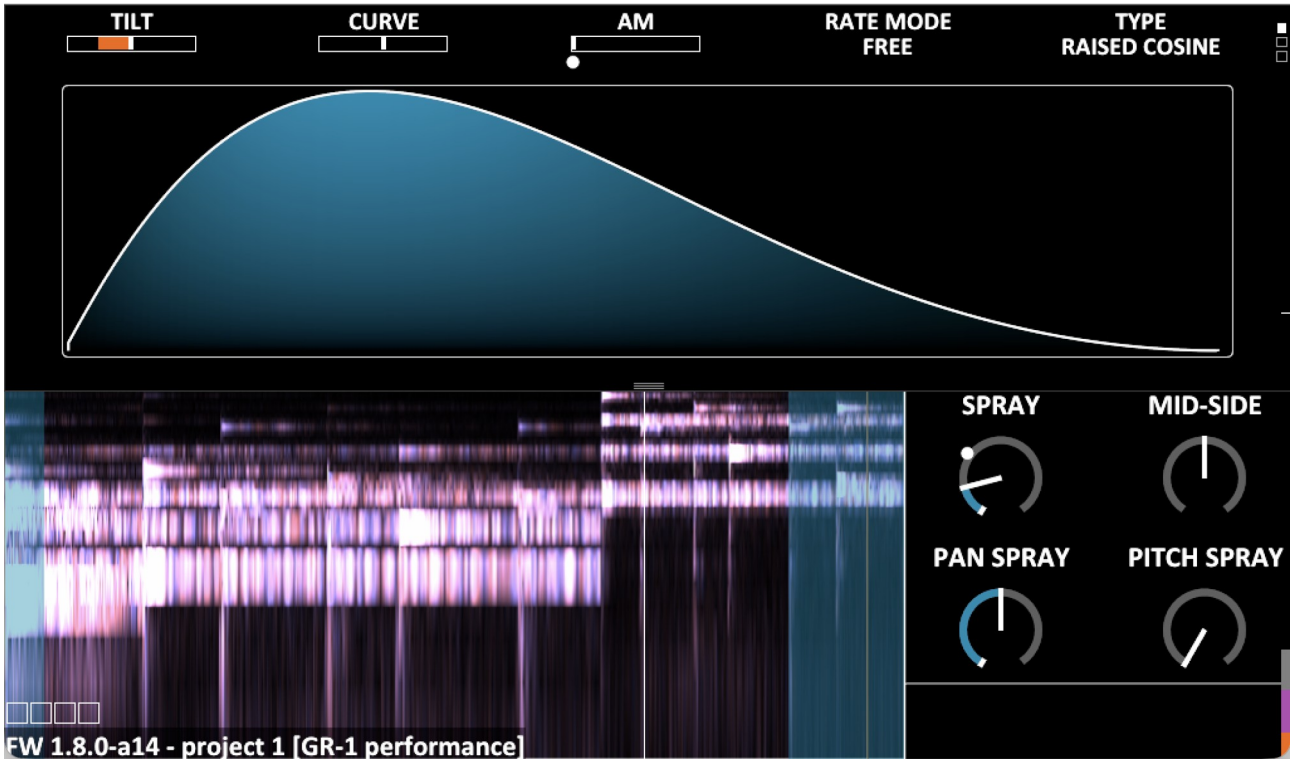
Pull right edge of the screen to access this menu. Shortcut: [Shift] + [Mac]



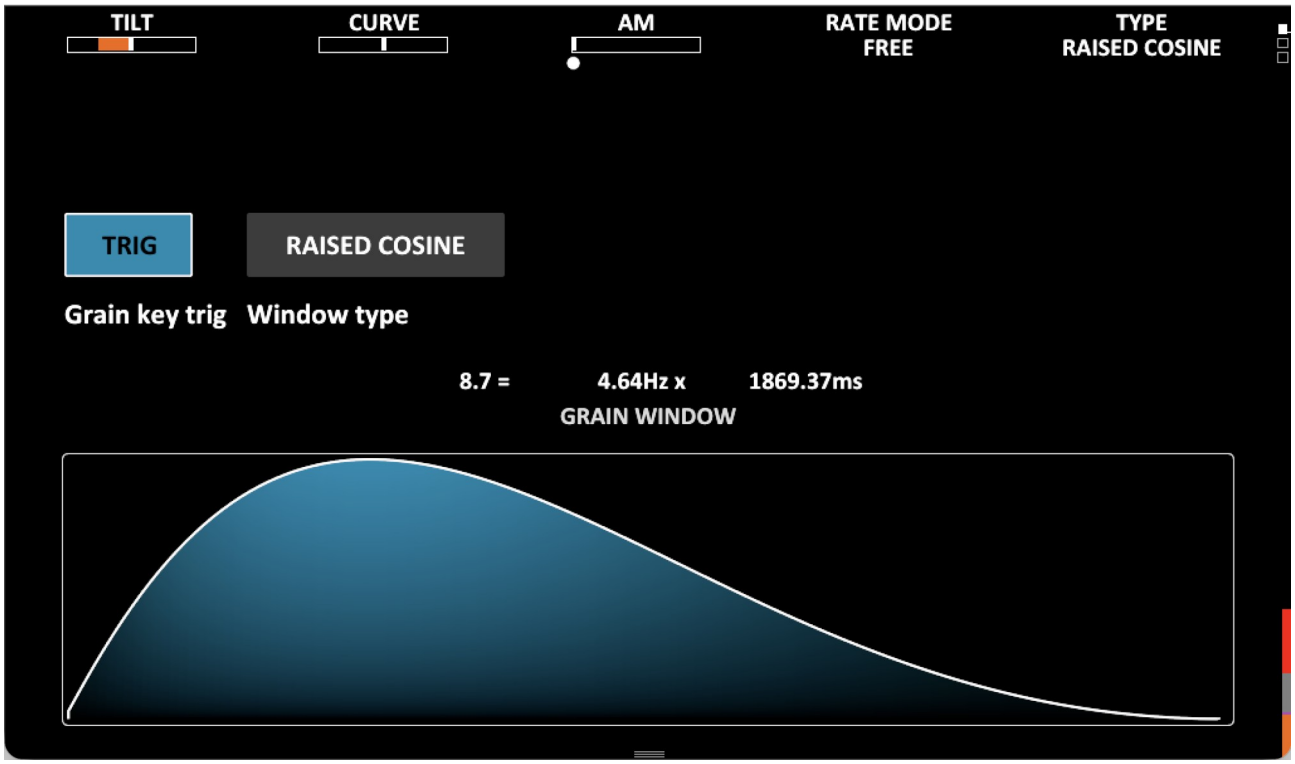
Save:	save the data currently on screen.
Load:	access the load file chooser, shortcut [Shift] + [Presets]
Rename:	TODO
Copy:	select data type, and copy data to clipboard
Paste:	paste data
Delete:	delete selected value
Init:	initialize data with defaults (in case of presets, from template)

Top pull menu / QA menu

Pull the == indicator to expand this menu halfway, only in case of “Win” menu: to show window function or amplitude spectrum. Full further down to expand to full screen.



Top menu: halfway expanded



Top menu: fully expanded

QA menus

Window

Directly underneath the envelope you can find the grain window display. This displays the shape of the window and the density, rate, and grain size in the equation:

density (grains) = rate (grains/s) x grain size (s)

When the spectral engine (phase vocoding) is used, this changes to the amplitude spectrum.

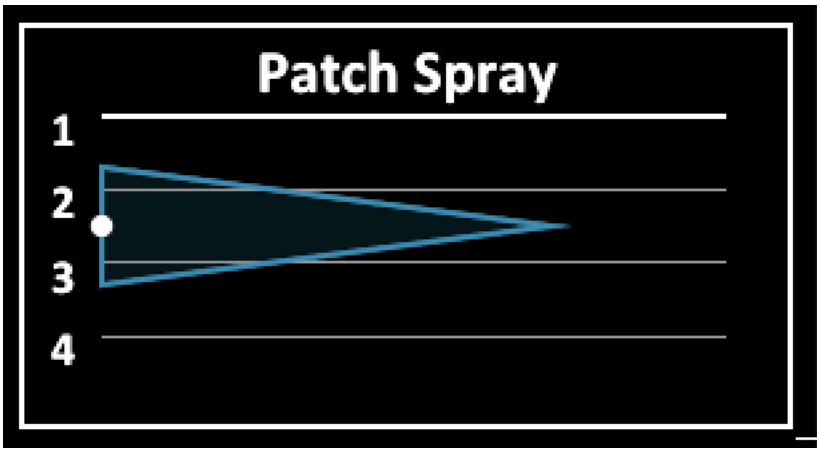
3 pages:

* window parameters and window/spectrum visualization

* aux window parameters and window/spectrum visualization

* patch spray:
    - multi timbral grain spray
- parameters: patch bias, patch spray, patch spray intensity

This is where grain counts are boosted based on which part of the screen you focus on. Pull down the menu (half way), and you'll see graphics that displays the center of each layer along with a blue triangle denoting the patch spray and intensity. The white ball denotes the patch bias.



Envelope

On the top-right you can find the envelop display. It displays the envelope that's currently highlighted on the buttons underneath the ADSR section: [Pitch] , [Filter], [Amp] , or [Aux]. Several options that are controlled by the physical knobs and buttons are also reflected as touch screen GUI widgets. The envelope themselves including their curves are also fully touchscreen-controlled.

Mix

3 pages:

* Mix the 4 layers, including mute and solo.

* Set input volume patch volume, wet (synth) volume, and dry volume.

* Sub-oscillator settings

Sound Engines

The GR-2 has 5 sound engines. Each one has different applications. It is primarily a granular machine (the primary engine), but the other engines are full featured as well. We designed each engine to have interchangeable controls. For instance, the Scan control will have the same function in almost every mode.

Chord mode can be used in all modes.

Sound engines:

* Granular:	main stay engine of the system, very complete
* Granular slice:	like granular but with slices, and limited position / scan controls
* Phase vocoder:	aka spectral. FFT based engine. Smoother than granular, but more CPU.
* Sampler:	classic sampler, with looping, pingpong, etc
* Tape:	like sampler, but with tape start and stop galore

The horizontal position fader works the same in each mode. The 8 knobs on the right side all work differently in each of these engines. (Scan), (Pan) and (Pitch) are typically shared. All controls names are displayed on screen.

Read on to discover more about each engine:

Granular Sound Engine

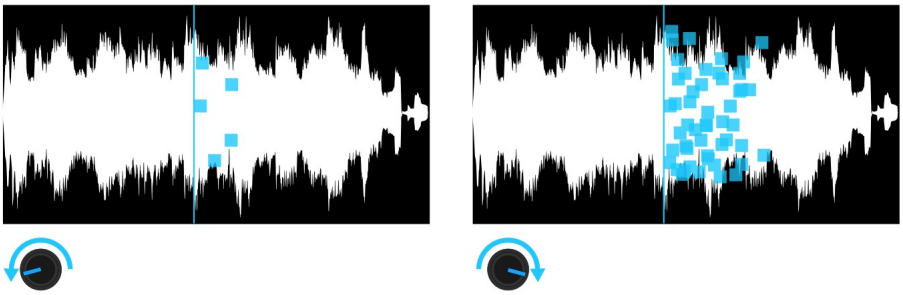
Granular mode is the default engine of the GR-2. It can be used for pads, to make massive spatial clouds, to scatter sounds, and for primitive 90's Jungle style time stretching that works well on non-transient material.

The highly complete and accurate implementation used in this engine opens up the world of micro sounds, where rate can control pitch, and window shape can act as a filter, but that's only the start. A good understanding of microsound can give complete timbre transformations. If you're interested in a deep dive into the world of micro sounds, there's the book by Curtis Roads – Microsounds, ISBN-13 : 978-0262681544

Granular mode is the most flexible of all the modes, evidenced by its large amount of parameters:

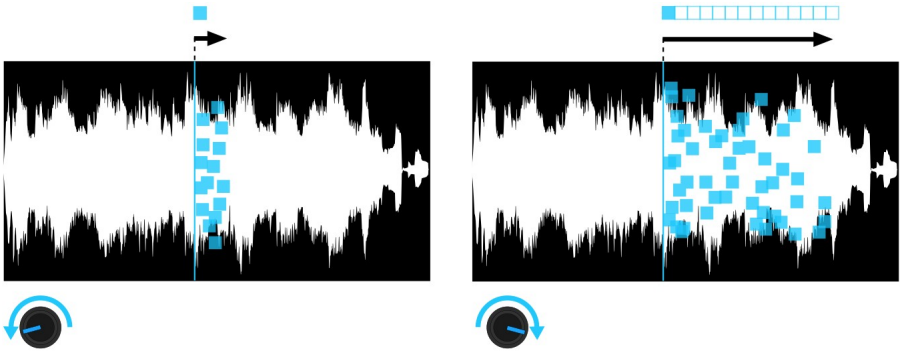
Rate

The rate parameter controls the amount of grains per second (Hz). The amount can be set between 0.1-1000 grains per second, with a maximum of 128 grains playing simultaneously, per voice.



Grain Size

The grain size parameter controls the playing length of a grain.
The length can be set between 5-5000 milliseconds.



Rate, size, and density

Internally the granular engine only understands the above two parameters:
* Rate
* Size

To measure how many grains are playing at the same time, we have Density:
Density = Rate x Size

This is also used to measure the density of a granular cloud, or sometimes how much overlap there is between grains.

When the Ratio button is set to “Free”, you control Rate and Size directly, and the Density is a result of this. But other ratio modes allow you to control Density directly and Rate or Size can be the result. It’s even possible to mix in other parameters for creative purposes.

To better understand how these Ratio modes influence the granular scheduling, we’ve added a text display just above the grain window:

density = rate x size display

For instance:

3.0 = 30.0 Hz x 100 ms

Grain Ratio

Pressing the Ratio button will cycle through various grain ratio modes:

Table 1: rate modes

Ratio mode	**Knob A function**	**Knob B function**
Free	Rate	Size
DensitySize	Density	Size
DensityRate	Rate	Density
ScanRate	Rate (* Scan)	Size (/ Scan)
ScanOverlap	Rate (* Scan)	Size
TimeStretch	-	Size

As mentioned above, Free is the default mode and allows full freedom.
DensitySize and DensityRate are intended for granular “stretches” where you can keep density constant while tweaking the rate and size with a single knob. This can create powerful rhythmic speed-ups or slow-downs.

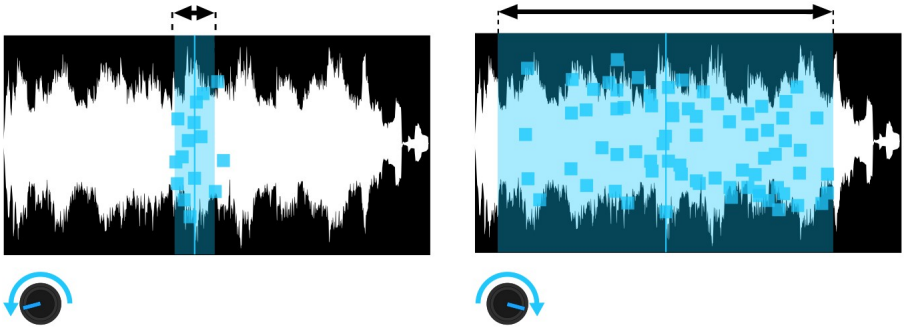
ScanRate is used to achieve the same rhythmic effects, but based on scan speed.

ScanOverlap is used to add more grains when Scan picks up speed, to keep the coverage in the original sample constant.

TimeStretch is similar to the original Akai / 90's jungle type time stretch. This uses 2 grains, that have constant overlap in the *output*, whereas ScanRate and ScanOverlap have constant overlap in the *input* sample.

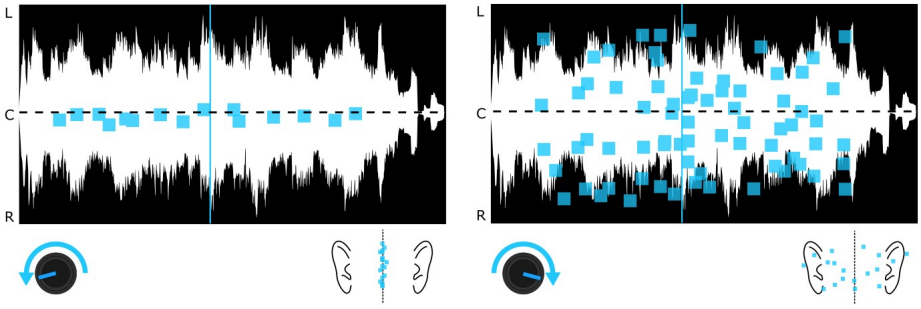
Spray

The spray parameter controls how much a grain's start position is randomized.



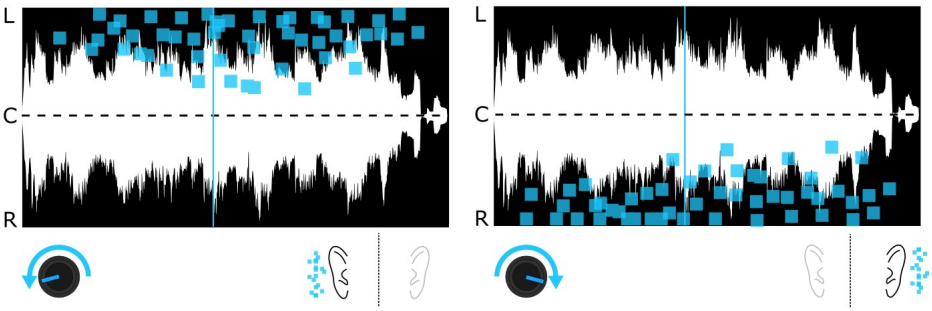
Pan Spray

The Pan Spray parameter controls how much a grain's stereo panning is randomized. 0 means completely centered. Maximum pan spray means a grain can appear everywhere in the stereo image. Using pan spray, even a mono sample can be made to appear *spatial*.



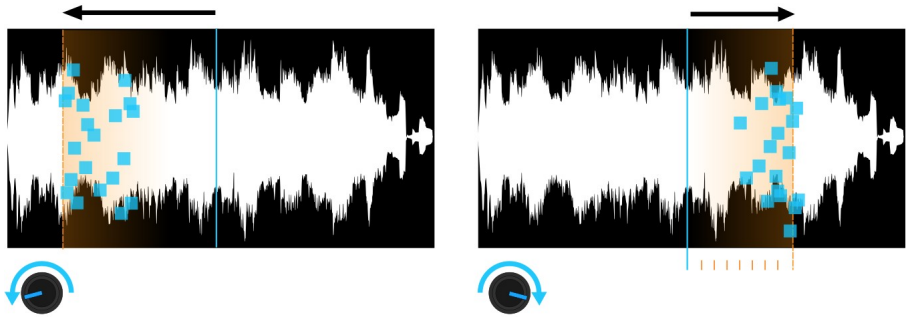
Panning

Shift+Pan knob: The Panning parameter controls how much a grain is panned to left or right. Can be combined with pan spray. Note that in sampler and tape engines, the panning range is doubled (!) so as to give the user the option to use the full stereo range via knob wiggle or modulation even with pan spray nudging voices to the side.



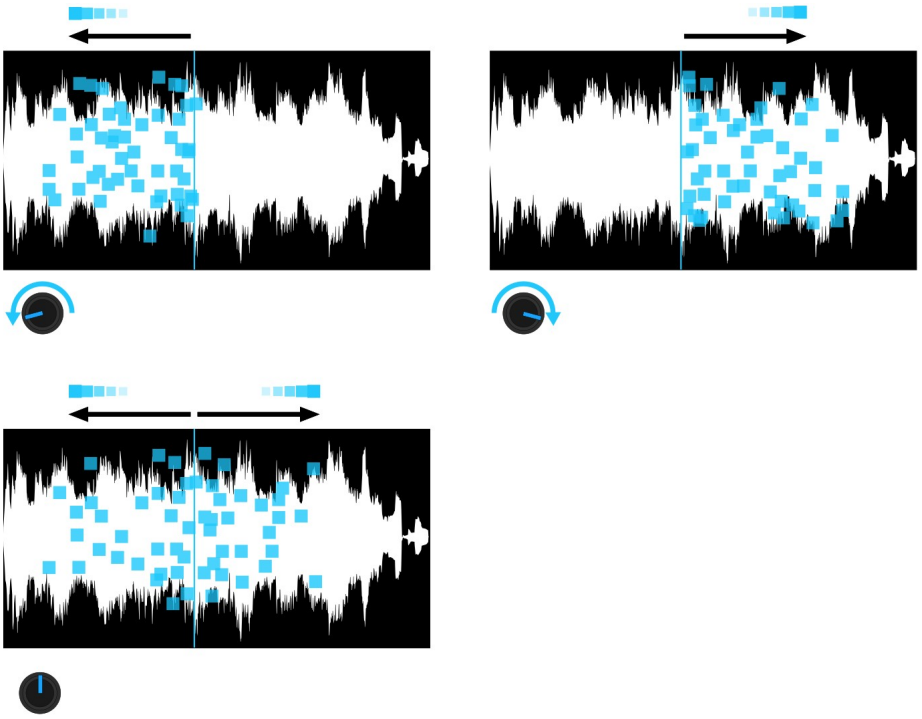
Scan

The Scan parameter sets the movement speed of the grain start position. It can vary from -2 times (reverse motion) the sample play speed to +2 times (forward motion) the sample speed. Scanning responds to stop and loop flags: looping, and pingpong is possible, it can be modulated, and can even be synced to the beat!



Direction

Grains can run in both forward- and reverse directions. Reverse direction can be used for special effect. Combining both can be used to make the sound more lush. Setting the bias completely left plays all grains in reversed direction. Setting the bias completely right plays all grains in forward direction. The center plays in 50/50% in both directions

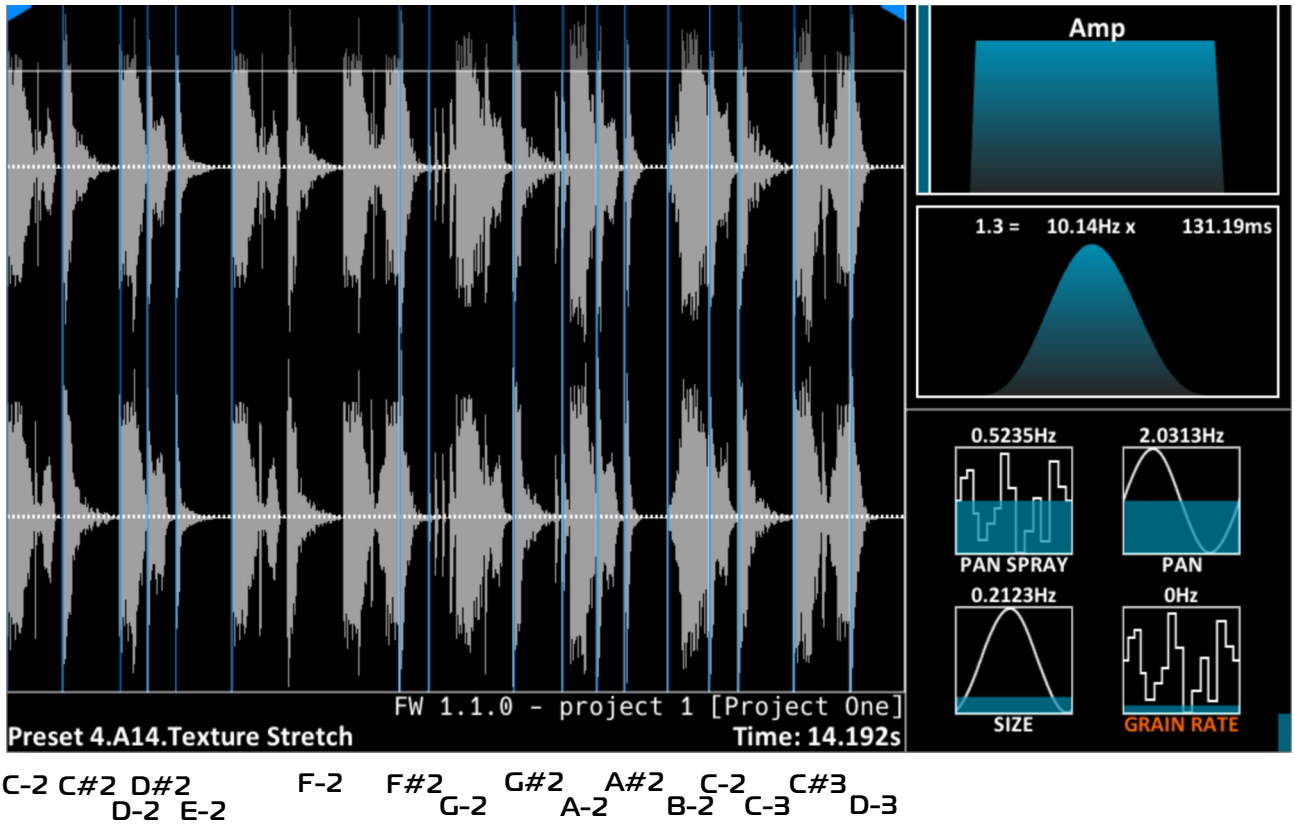


Granular Slice Sound Engine

Granular slice mode is very similar to granular mode, with the exception of the samples being chopped up into slices.

Slices

Slices are automatically mapped to the keyboard: C-2 and up. C-2 plays the left most slice, C#2 plays the neighbor directly to the right, etc.



Almost all the knobs described in Granular mode also work in this mode, with the exception of the position slider and the scan knob. Since you cannot freely move spawn position in the sample in this mode, these controls have no function. An alternative function may be added to them in newer firmware.

Setting slices (Operation menu)

In slice mode, setting slices is key. This can be done in two ways, manually or automatically. We'll now describe both:

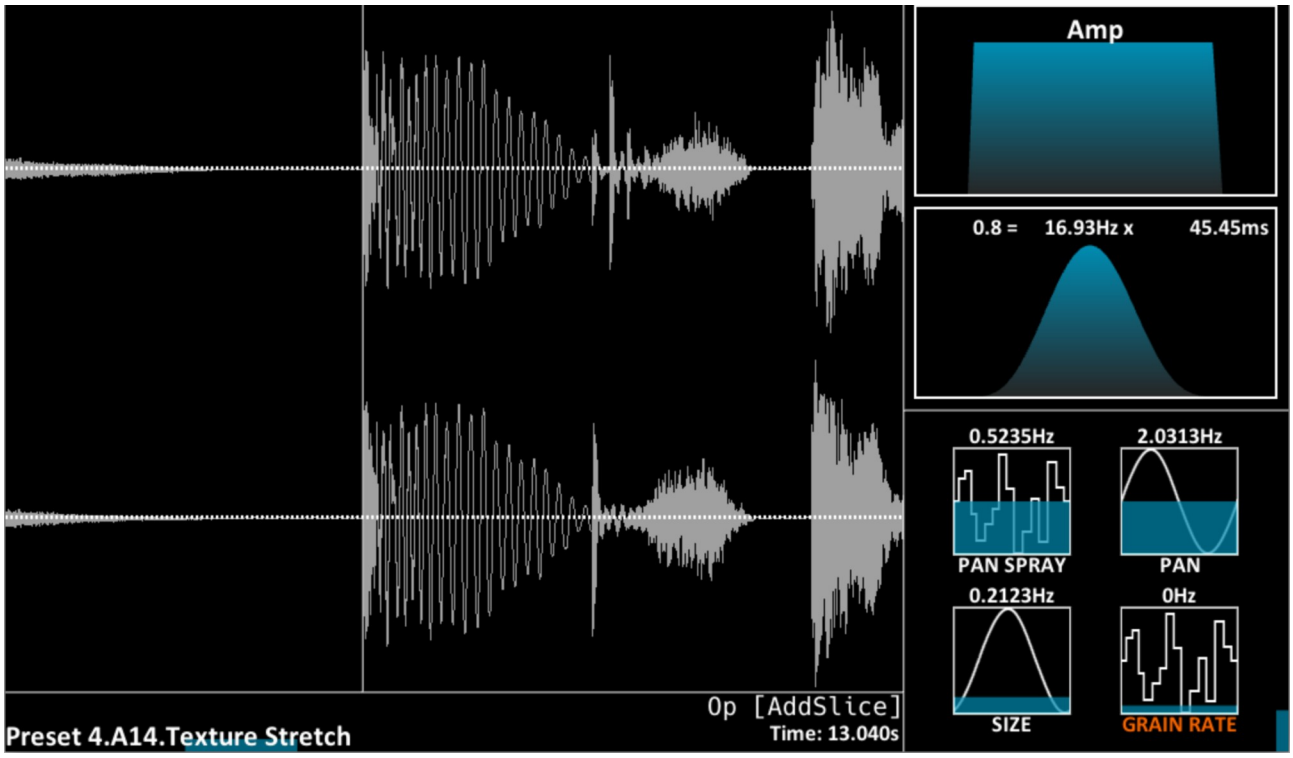
Add slices

Manually move the position slider and use the (Operator) encoder and exec buttons next to it:

1. Drag the position slider to where you want in the sample.

2. Turn (Operator) to "ADD SLICE"

3. Push the operator encoder, a white vertical line now appears, and you can already play MIDI or sequencer note C-2 to activate it.



Auto slice

Automatically, by turning (Operator), and exec button:

1. Turn (Operator) to “ADD SLICE”.

2. Hold [Shift].

3. Push the (Operator) encoder. A lot of slices now appear.

4. Adjust sensitivity with the horizontal fader, and push the (Operator) encoder to confirm.

Delete slices

You can delete slices with “DEL SLICE”:

1. Turn (Operator) to “DEL SLICE”

2. Use the position slider to stand inside a slide. i.e. right of the vertical slice line.

3. Push the (Operator) encoder. The slice will disappear.

Combine DelSlice with holding down Shift: this deletes all slices!
Deleting all slices is often useful before doing autoslice.

Drag slices

You can drag slices with “DRAG SLICE”:

1. Turn the (Operator) to “DRAG SLICE”

2. Use the position slider to stand inside a slide. i.e. right of the vertical slice line.

3. Push the (Operator) encoder. The slice will seemingly disappear, but you’re now dragging it with the slider position line!

4. Go to the position you want with the position slider.

5. Press the (Operator) encoder. The slice is moved!

Sampler Sound Engine

Sampler mode basically emulates a traditional sampler, like the AKAI S-series, or Ableton's Simpler. It is oldschool and can not do time stretching. In principle there's just one grain per voice, but that can be extended up to 12 by using chord mode notes in the patch menu. Sampler in combination with chord mode also has nice periodic properties, which can create a pitched Euclidean sequencer.

Controls like Spray and Pan spray do the same as in granular. They can create randomized clouds in both stereo field and sample position. Pitch does the same, but note that pitch also equals play speed! Direction works exactly the same. Scan is an interesting control since it only affects the central spawn position for new grains, and can loop and stop and everything, while grains can also do this… Allowing for creative results.

Nice extras: In this mode, all voices are displayed simultaneously. It also supports playing very large samples (up to an hour).

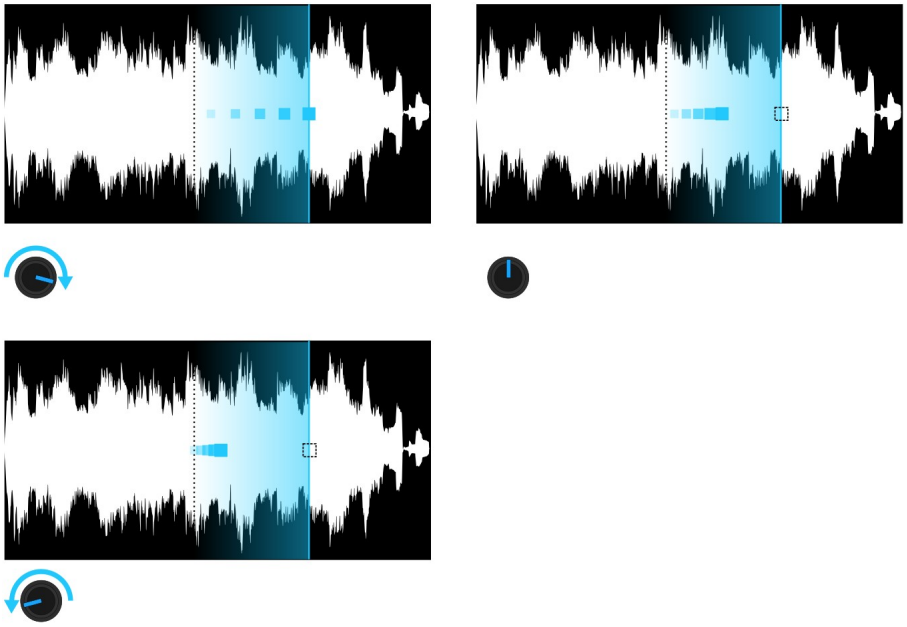
Grains follow loop flags (markers) like how scan follows them in other modes, including loop, pingpong and one shot modes. This means sample looping is supported, and a note off can released them from the loop: Tile menu → Scan/Slice → Looped release. Note that this kind of oldschool sample looping requires proper loop markers at zero crossings.

Tape Sound Engine

The tape engine simulates an analog play head moving over tape. It operates much like sampler mode, but the play position now controls the play speed, and hence also the pitch. You can easily perform scratches like on vinyl. All position and scan modulation is supported, so scratching can be fully automated.

Tape slew

In tape mode the Pitch knob has now got the function of “slew”. This means how slow or fast the tape head catches up to the modulated position:



Chord mode (in Tape Mode)

When chord mode is active (lower right: Chord button), there can be multiple play heads (grains). Each will have a different pitch like set up in the chord in the patch menu. This can give a pretty wild, but harmonic twist to scratching. The first chord note (TBV: or was it the lowest) always tracks the position. The other chord notes are just pitch-bent copies!

Spectral Sound Engine

This mode allows smooth time stretches. Super long “Paul stretch” style ambient stretches where material is slowed down a thousand times. It also allows auto tuning while preserving the timing. However, it is not intended to be a DJ tool. This engine does not accurately preserve vocals, and has significant ringing. It is instead intended to spectrally manipulate and distort, to your heart’s desire. Think experimental IDM.

Once again, like in all other engines, position can be moved freely without any bumps.

There are no grains in this mode. There’s just blocks that are processed in the “frequency domain”, meaning you can very easily manipulate the spectrum using the knobs A through H.

Position and scanning are the main control for this mode. Polyphony is limited to 3 voices per layer, because of the latency of the underlying Fast Fourier Transform (FFT).

Because this engine is quite different from the others, we’ll discuss the knobs and modes that affect it one by one:

Amplitude threshold

This sets an amplitude threshold. Turn it up to reduce the harmonics, and eventually only leave the fundamental. Nice for going all whistly. Can be modulated in newer firmware.

FFT size

Sets the FFT block size. This is not continuous and takes jumps: 256, 512, 1024, 2048, 4096, 8192. Small sizes have less bass and get ringy more easily, especially when used with the FFT reducer knob. Although the sound is relatively bumpless, this control cannot be modulated. Note that 8192 is MONO! The other sizes are stereo.

Phase smear

Phase smear is a continuous control that can adds progressive amounts of “smear” to the sound. This can be used to turn transients into slush, and an “T” into an “F”. Very effective for ambient soundscapes. Use in combination with big FFT size.

Amp smear

A continuous control that Smears the amplitude spectrum. Turn to the left to sharpen the spectrum.

Scan

Just normal scanning. If scan = 0 and there’s no position movement the sound can bluntly loop through the FFT block, but it can still be randomized by phase smear!

Pan

Regular panning

Bend

Pitch bend, with extreme range and different algorithms behind it. [Menu] → Engine → Spectral bend ON/OFF.
ON: bend along log map, sounds somewhat natural
OFF: exponential frequency shift, more ringy

Pitch

Regular pitch bend

Pitch blend

Super impose a pitch shifted tone on top. Quickly make a simple pitch-bendy chord.

Freeze

Progressively freeze the spectrum harder, and wait until new input overrides it.

Shift formant

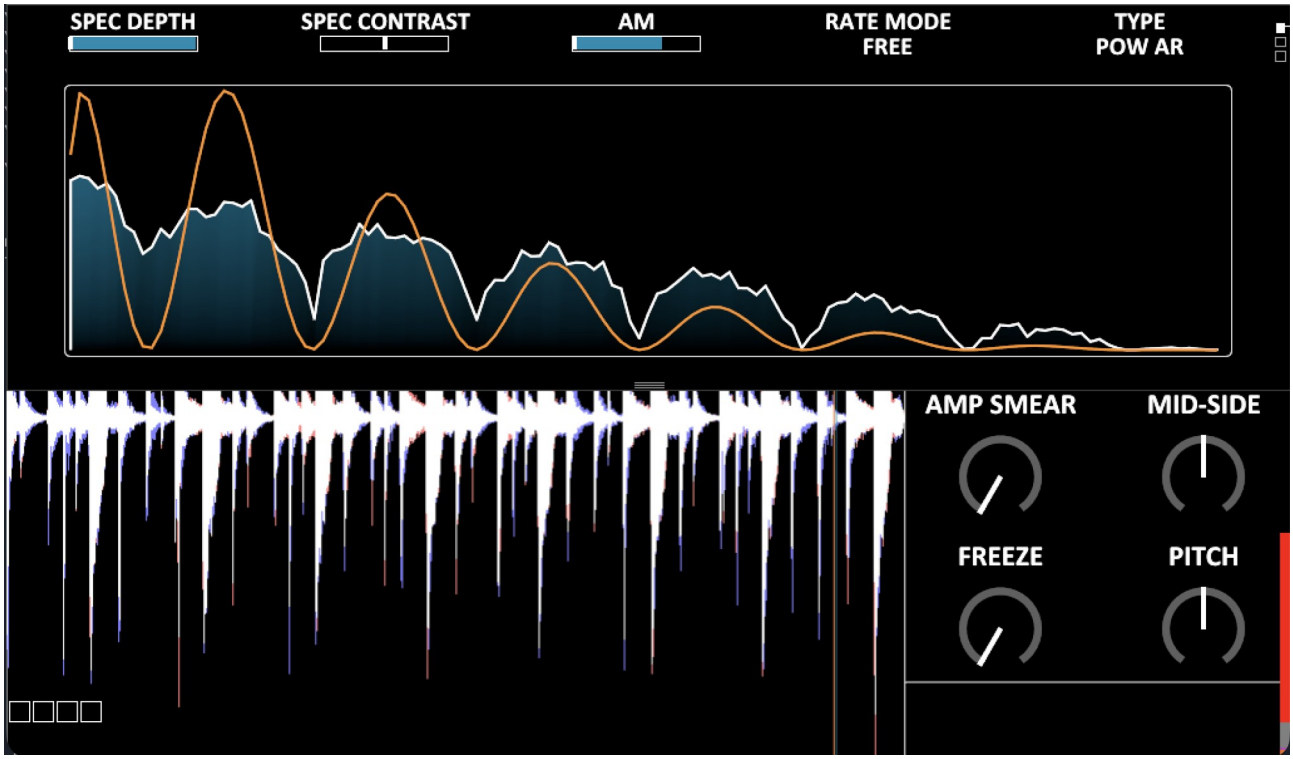
With formant lock ON this shifts it relative to the original formant
With formant lock OFF this shifts it relative to the pitch shifted note (formant-shifted "chipmunk")
Formant lock is found in [Menu] → Engine → (right side) : formant lock

Fold spectrum

Extreme pitch bend that folds back frequency bins, creating pretty wildly metallic timbres.

Spectral shaping

Spectral shaping is done with the top encoders when the [Win] QA menu is active.



- (Tilt), (Curve), (AM) allow you to shape the spectrum like you would a grain. AM can be used like a comb filter.
- [Shift] + (Curve) = control spectral contrast hi/lo
- (Spec depth) (hold [Shift]) to apply the window function to the spectrum

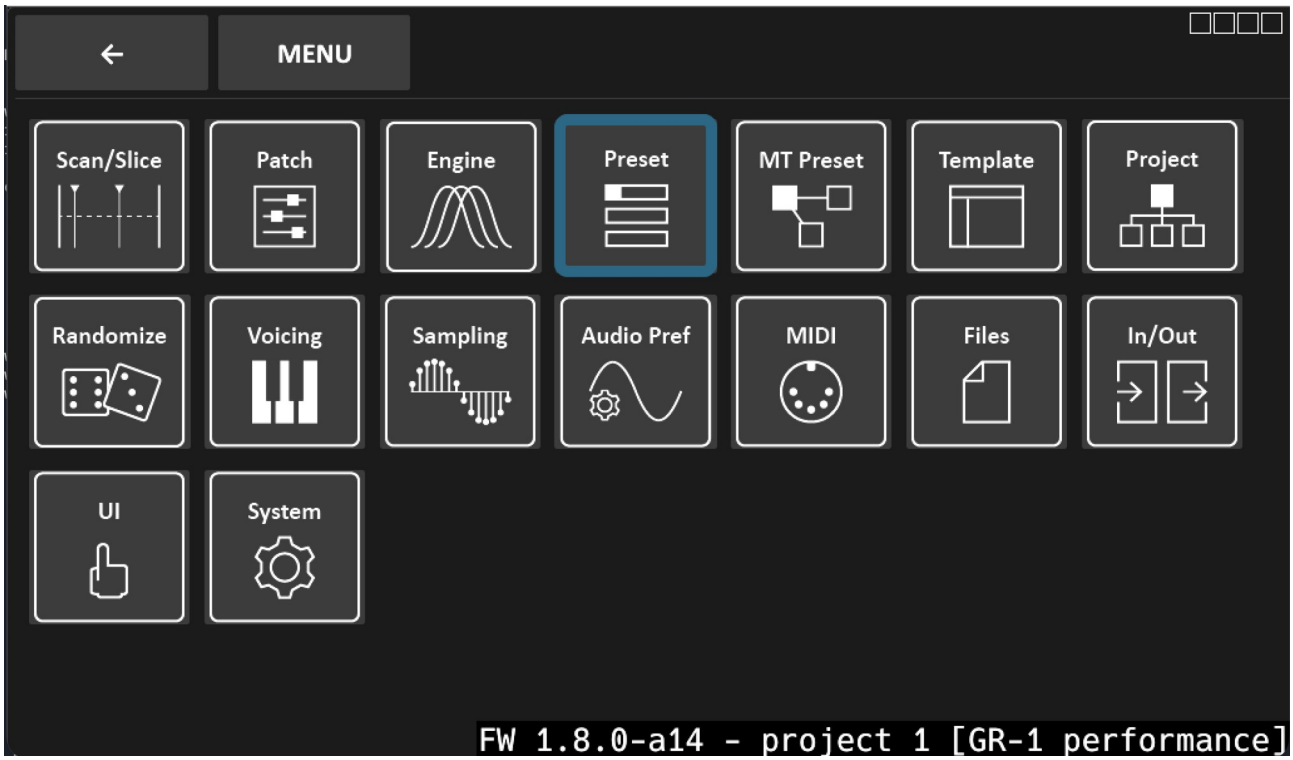
Chord mode (in Spectral mode)

This basically adds pitch-bent versions of the playing sound while completely preserving timing. There's almost no added CPU cost. This means: while you can have 3 voices per layer, you can multiply this by 12!

The menus

Pressing the [Menu] button gets you here. Pressing [Menu] again will exit to the main screen. You are presented with sub-menus represented by tiles: “Patch”, “Project”, etc. Use the [Menu] button to quickly toggle between any menu and the main screen.

You can click on the back GUI button [←] to return to the upper level. The GUI button at the top right displays the name of the current tile. You can click this to quickly cycle through menus, instead of returning to main menu and choosing from there.

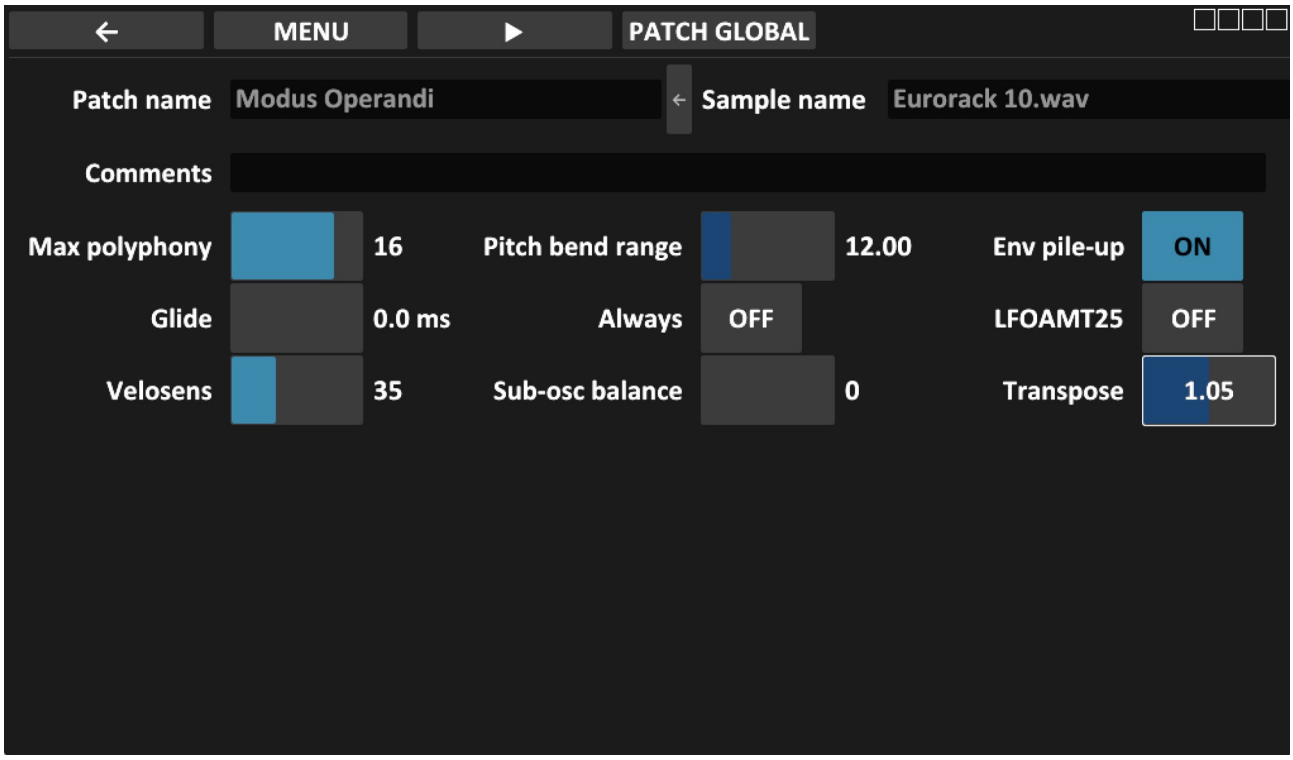


Patch menus

The patch menus are:

- General: just called “Patch”, the top left tile in the menu
- Voicing: pitch and pitch quantization
- Engine: settings specific to the granular and spectral sound engines
- Scan/slice: settings related to syncing, triggering, looping scan and slice settings

Patch menu (General)



Patch name: the name of the patch, of course.

Sample name: the name of the sample. Use the [←] GUI button in between Name and Sample name to copy the sample name to preset name. This will come in handy.

Comment: up to 100 characters of comments for this patch.

Polyphony: slide this from 1 (monophonic) all the way up to 20. Please note that the PV (spectral) sound engine will limit this to 3. It will display “PV LIMIT” if that happens.

Pitch bend range: pitch bend range in semitones. NOTE: MPE mode will fix this to 48!

Env pile-up: By default this on. The GR-2 reuses the same voice if the same MIDI note is played repeatedly, and just piles up the amp envelope. This mostly works fine, but in sampler mode you may want to turn it OFF.

LFOAMT25: Turn OFF to achieve compatibility with LFO amount modulation from older GR-MEGA firmwares. This toggle may be removed in the future.

Transpose: how many semitones (and cents) the patch is transposed.

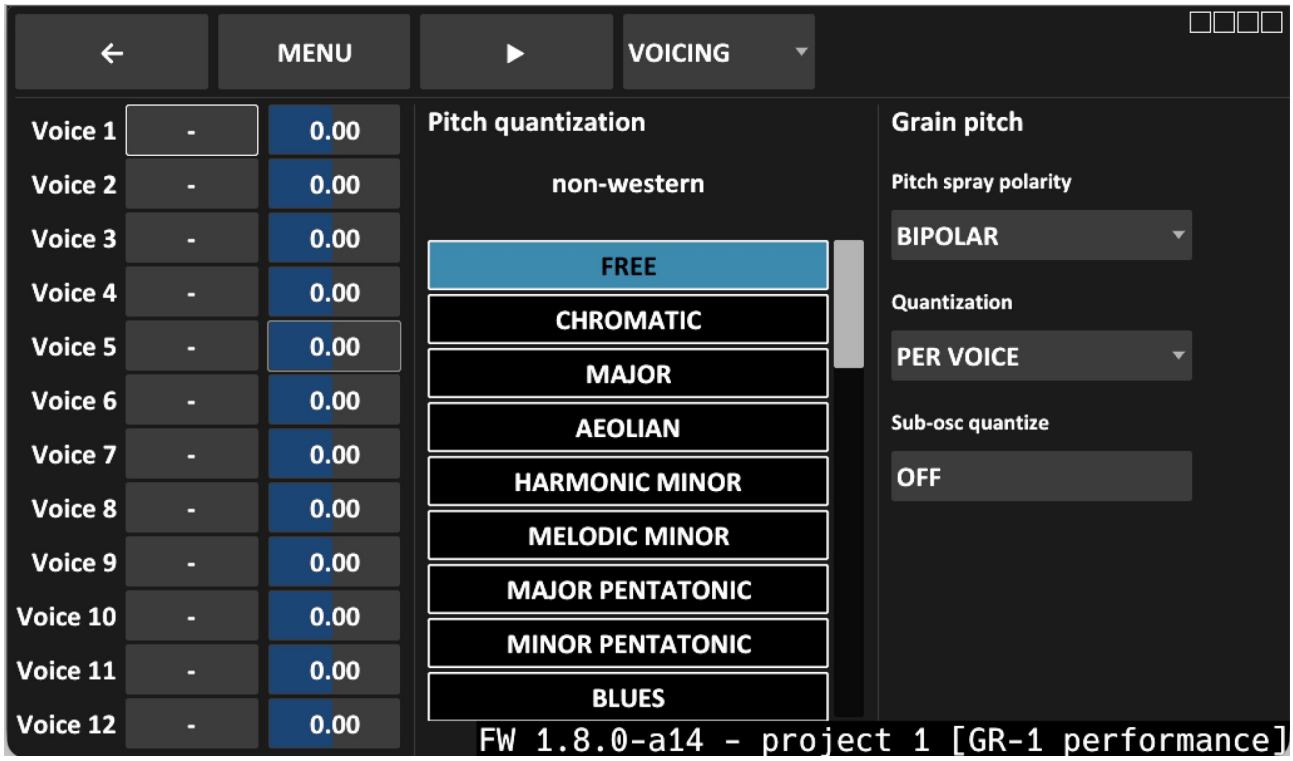
Glide: Can go from 0.0 ms up to 2000 ms. 0.0 means there is no audible glide.

Always (glide): Notes will always glide, even if notes do not overlap.

Velosens: This sets the amp envelope sensitivity to note on velocity. If this is 0, then it means all MIDI notes sound just as loud. If it is 100, then it means it's totally sensitive and very gently pressed midi note will have low volume, while a fast one, will have max volume.

Sub-osc balance: use this when you're using the sub-oscillator and playing polyphonically. Drag to the left to place more emphasis on the bass. Drag to the right to place more emphasis on higher pitch.

Patch menu (Voicing)



Left column – voicing:

This displays the 12 chord notes, as used by chord mode, and their fine tuning. You can add the same note twice or more to increase the number of times it's played in the granular arpeggiator, or to increase the chance of getting played when the arpeggiator is set to random.

The chord mode uses the convention of C4 being the central note. So, when chord mode is toggled ON, it means that if your chord is [C-3, C5], and you play a MIDI note, it will play one note 1 octave below and another 1 octave above the note you strike. This is the convention that Roland also uses.

Turn completely to the left ("-") to disable the chord note.

Note that the lowest note in the chord will match the playing note, and all the other chord notes are transposed up relatively.

In granular sound engines this will split the granular cloud, and distribute each chord note evenly among the grains, leaving total volume unaffected. In other sound engines chord mode will stack, meaning that it will add volume.

Middle column - pitch quantization

Select a scale to use, and toggle notes on the keyboard to make your own user scale. At the bottom of the list you can find non-western scales (more than 12 keys per octave) like 24-TET, 31-TET, etc.

Right column – grain pitch

Pitch spray polarity: + or – unipolar, or bipolar

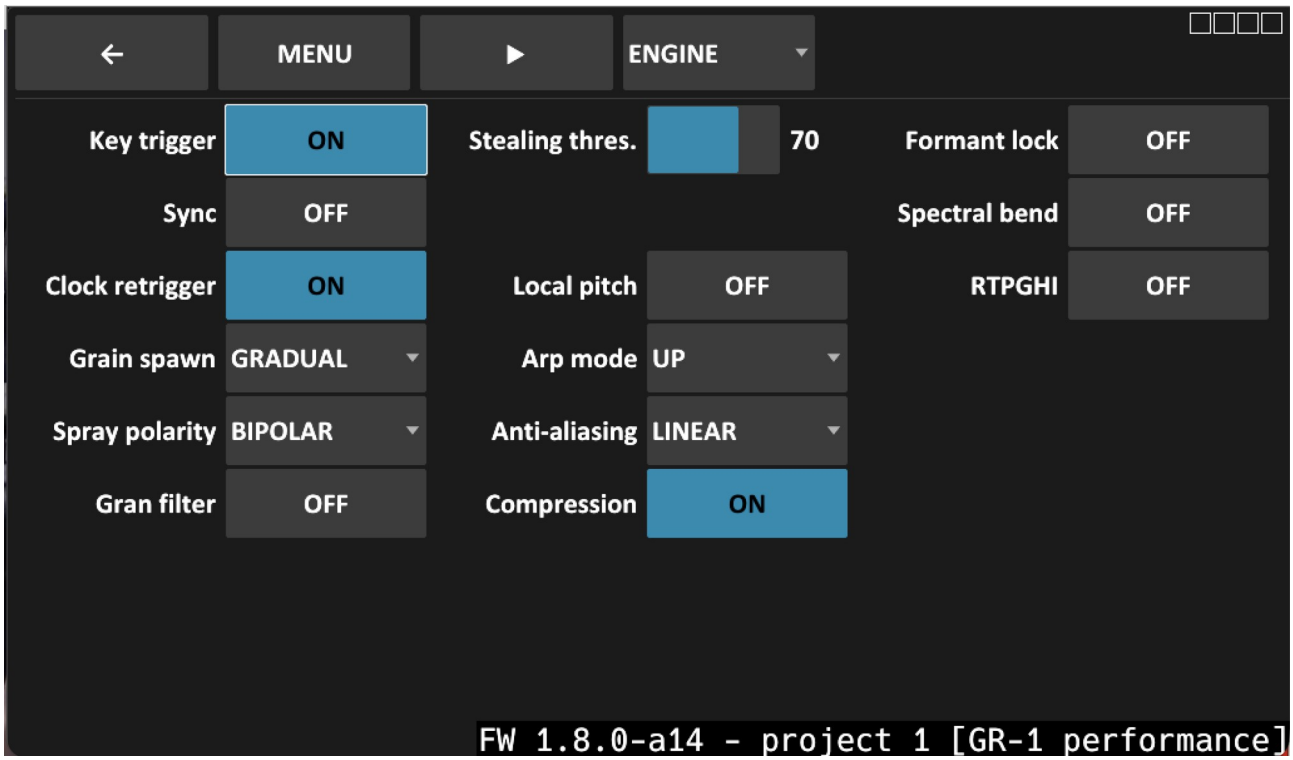
Quantization: per voice, or per grain

Sub-osc quantize:

ON: snap to selected scale

OFF: unquantized sub-osc even when voice pitch is quantized

Patch menu (Grain)



Grain Key trigger: When this is on, a grain will trigger directly when a note is played. When this is off the grains sequencing is independent from note triggers.

Grain Sync: ON: let the grains spawn synchronized to the clock, and its clock division, OFF: use the knob setting.

Voice sync: ON: grains are synced across voices. OFF: each voice has its own clock phase.

Grain spawn: Set the mode in which the grains spawn:

This tells the granular engine how to spawn grains when a new note is triggered. There are four options:

1. Gradual: gradually generate grains based on the configured clock

2. Direct: Generate a full cloud as if the granular engine had been running continuously in the background.

3. Direct reset: This does the same as direct mode, but with all grains starting within the spray area. This will boost the bass and the volume of the voice.

4. Recycle: Re-use old grains. This can give silly effects.

Only applies to granular and granular slice sound engines. Technical note: spawn mode is a consequence of the energy / CPU saving properties of the engine. When a voice is not playing for a while, the granular scheduler is disabled.

Local pitch: Independent Pitch per grain ON/OFF

Normally the grains that are playing will play until the end of the set “grain size” at the same note pitch of the note that was played when the grain started playing. When the setting is “OFF” the grains will be tuned to the notes that are played at that very moment.

If you want the grains to follow the played pitch immediately turn this setting “OFF”. If you have longer grains and want to have a granular-chorus like function that glides between notes. Turn it “ON”.

This feature can also be used to create a swarm like sound where all grains have a different pitch. Just try to wiggle the “Pitch” knob, or use an LFO to modulate Pitch. Set the LFO speed high enough and you’ll get a swarm-like chorus effect. LFO amount can add additional dramatic effect.

This was called “granular glide” on the GR-1.

Grain stealing threshold: Grain stealing kicks in when the 128 grains per voice are used up. The GR-2’s grain stealing is intelligent and results in no crackles or clicks whatsoever. Leave this at 0 to disable grain stealing. With a high combination of density and grain size the grain scheduler will start oscillating. When the slider is set higher than 0.0 it will gradually start stealing grains. The higher the setting, the more aggressively the stealing will be. This will result in shorter grains, but the grains spread will be quite homogeneous. And the way in which this occurs is quite intuitive and natural.

ARP mode: set the mode of the granular arpeggiator:

Up, down, down-up, up-down, random, shuffle, forward, backward, forward-backward, backward-forward.

Note that up and down sort the notes in the chord, while forward and backward do not!

Anti-aliasing: LINEAR or POLY PHASE.

Anti-aliasing is employed when converting pitched grains or voices to the native 48 kHz playback speed. This avoids undesired strange harmonics, that are not in the sample's timbre.

The GR-2 always uses anti-aliasing, but in the granular and slice sound engines, this is LINEAR interpolation, which can still result in residual aliasing in some cases. For sampler and tape sound engines we offer POLY PHASE interpolation which further reduces aliasing.

At the time of writing, this algorithm is considered to CPU heavy to be effectively used in the granular sound engines.

Compression: grain count compression ON/OFF

Turn this ON to limit volume of large clouds. turn off if you want let a single cloud to punch through your mix. Warning: this can get loud. A single cloud may force the output into clipping territory!

Gran filter: granular filter mode

This toggles a special mode which transforms the GR-2 LPF cutoff knob into "spectral content selector" for granular mode. Granular sound engine only.

Toggle this ON, and you can then tweak your spectral selection window.

For instance:

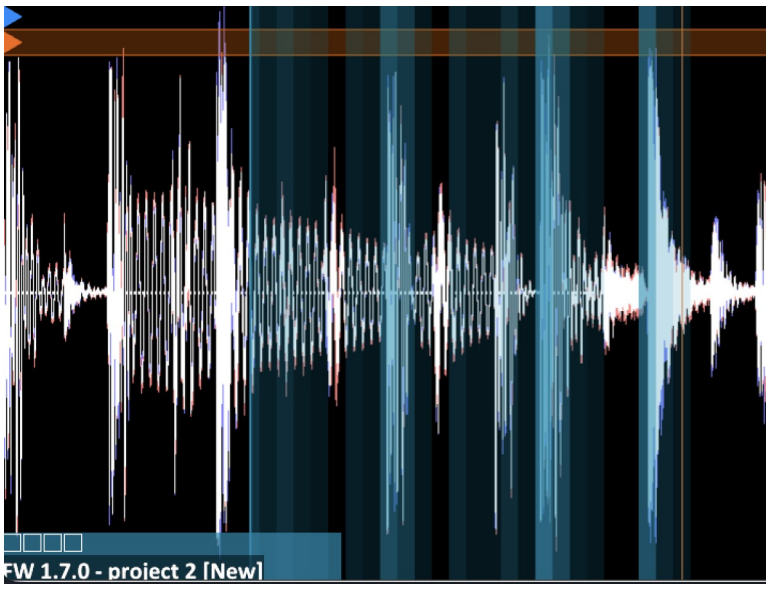
* Turn (Spray) knob to 100%.

* Set LFP cutoff = 400 Hz.

* Set HPF cutoff = 0 Hz.

The engine will now only select all bass and sub-bass heavy parts in the sample. Bright areas in the spray rectangle will highlight this.

The screenshot below shows highlighted bits of sample (more blue, less transparent) that are areas more likely to spawn grain, because they match the spectral centroid as set up by the filters:



Spectral / phase vocoder settings:

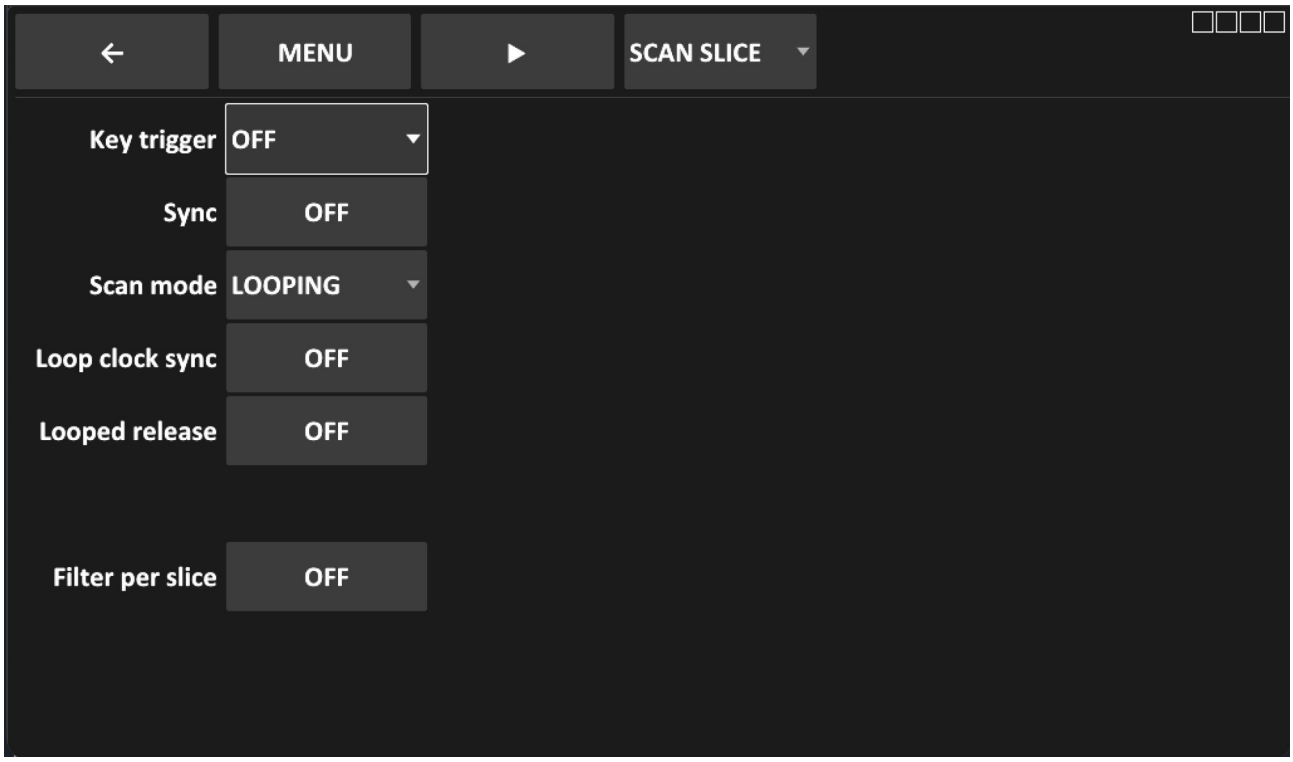
Formant lock: Typically used for samples of the human voice. Holds the spectral envelope still while pitch moves, so shifting stops sounding like a chipmunk. You can use the formant shift to adjust the formants relatively to the preserved characteristic voice.

Spectral bend:

OFF Legacy ringy algorithm

ON Newer non ringy algorithm

Patch menu (Scan / slice)



Key trigger: The scanning through the sample can be reset by a voice trigger/note-on event.
* When “OFF”, scan position is never reset and all voices will have the same scan position.

* When “ON”, the scan position will reset to the “Play position” on every voice trigger/note-on event.

* “LEGATO” will only reset the play position on the first note played.

* “POLY” will reset scanning only for the newly playing note, comparable to envelopes per voice in a traditional polysynth. This means that each voice can have its own scan position independent of the others. This can be used as a sort of “auto fugue”.

Sync:
On: scanning is synchronized to the clock, and its clock division
OFF: use the scan knob setting.

Scan mode:
The GR-2 scanning movement has four modes: **[One shot / Loop / Ping pong]**
The scan knob influences speed and direction of all these modes.

Loop clock sync: Synchronize looping to the beat.
ON: synchronize the scanning motion in the loop to the system clock. This will allow loops to be synced to the beat. OFF: free running.

Looped release: stay in the loop when releasing voice

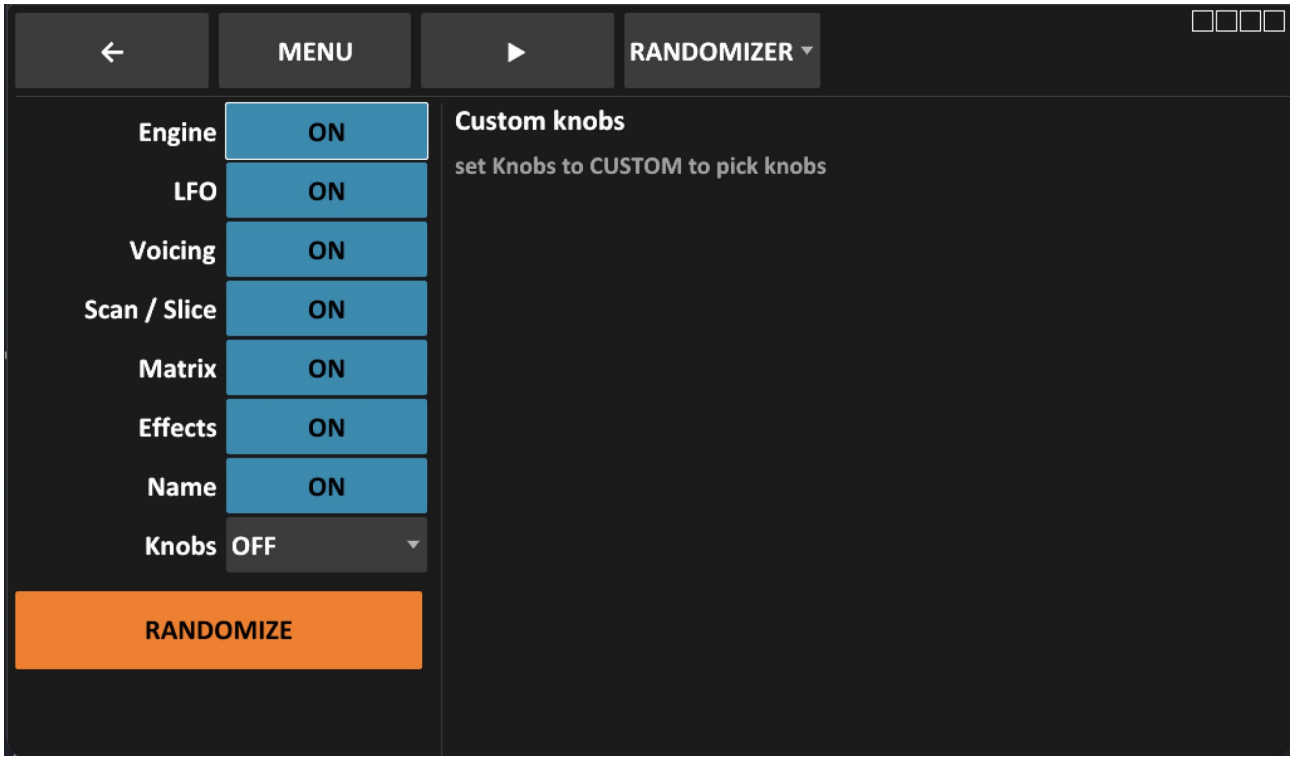
ON: Eventually exit the loop when releasing the voice. In pingpong mode it will have bounced an even number of times before doing so.
OFF: Stay in the loop when releasing the voice

Filter per slice: Turn this ON to have independent filter cutoffs per slice. Of course this only affects slice mode. This applies to both the LPF and HPF, so each slice can have one pair of LPF and HPF. Default is OFF. When OFF, the filter settings affect all slices.

Patch randomizer menu

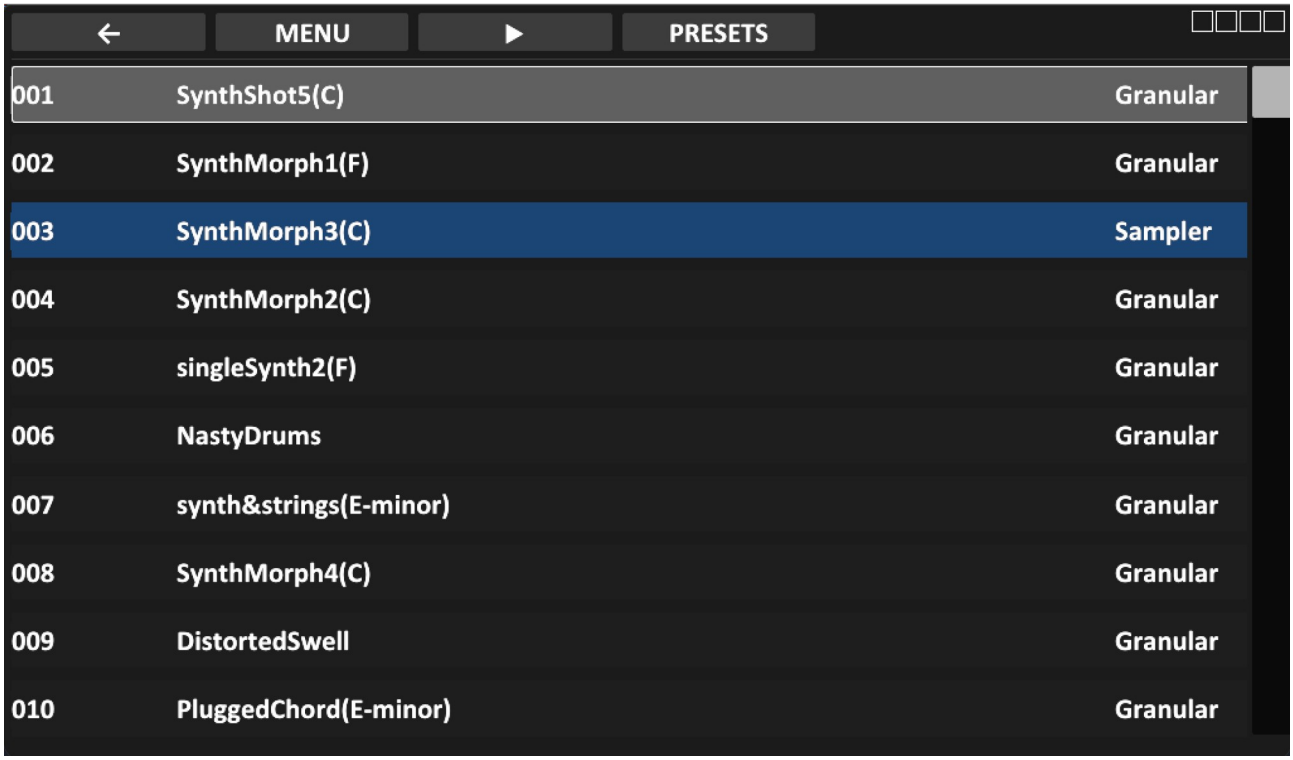
Toggle the buttons to enable or disable randomization of various parts of the current monotimbral preset. Up to 20 rows of the matrix will be randomized. We considered the full 100 to be overkill. Click the “Knobs” button to activate the per-knob randomizer. Then start turning knobs to fill the list. Hit the “Randomize” button to go.

It can also randomize names, such as “Electronic hedgehog”.

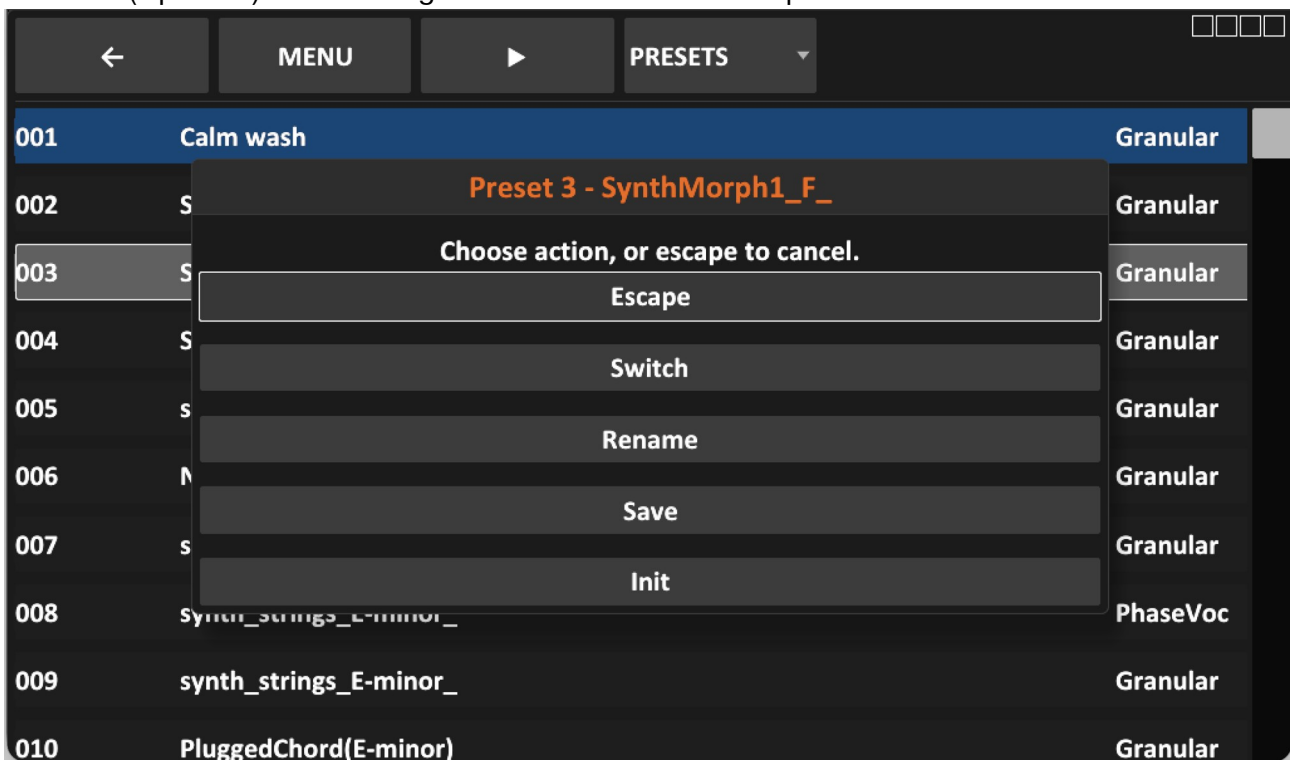


Presets menu

Gives a quick overview of all 128 presets in the current project. Scroll using the arrow buttons. Turn the (Operator) encoder to scroll.

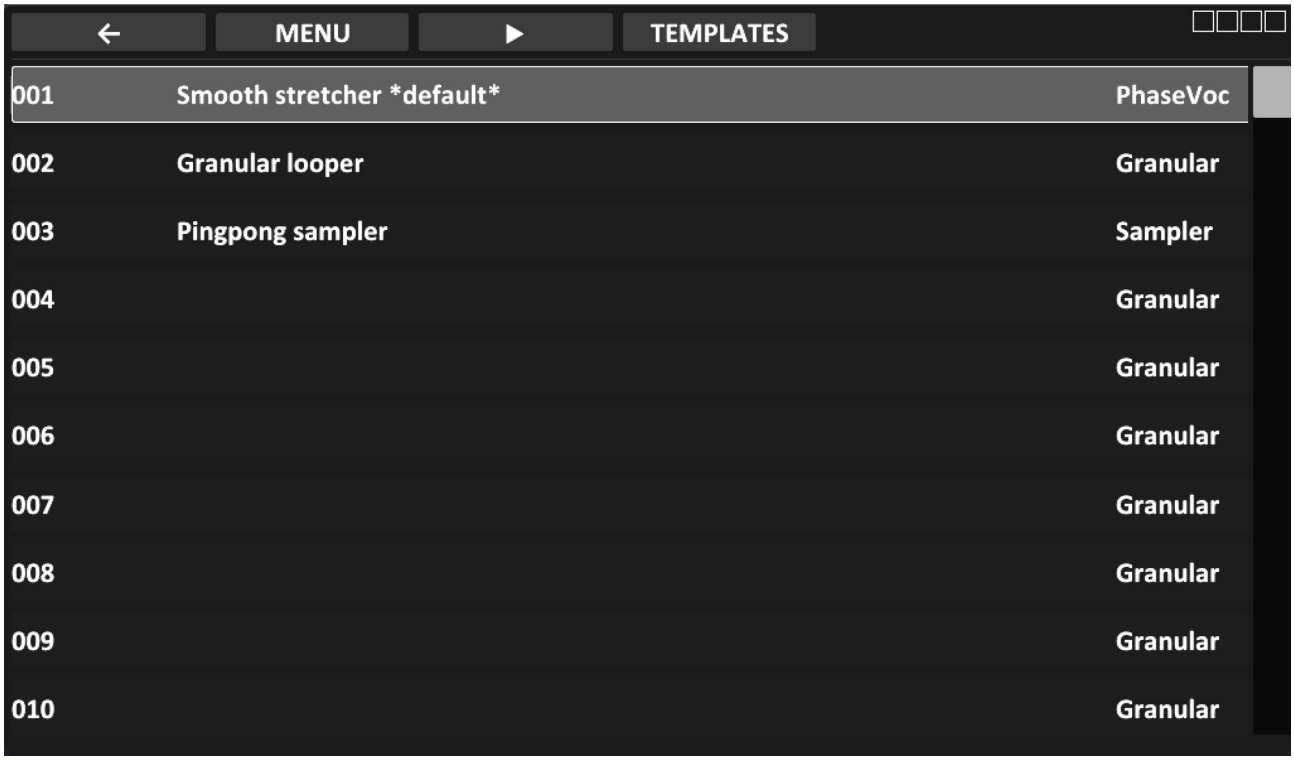


Push the (Operator) encoder to get a menu for the selected preset:

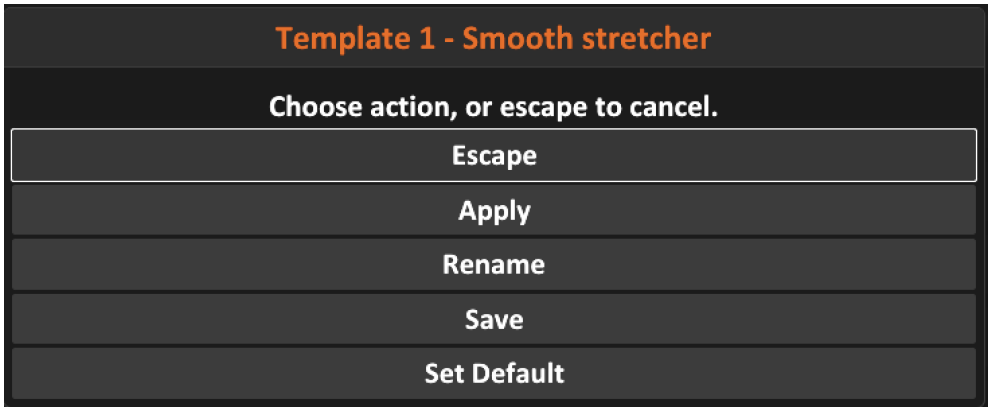


Templates menu

Works similar to the preset menu. Use the arrow buttons to scroll.

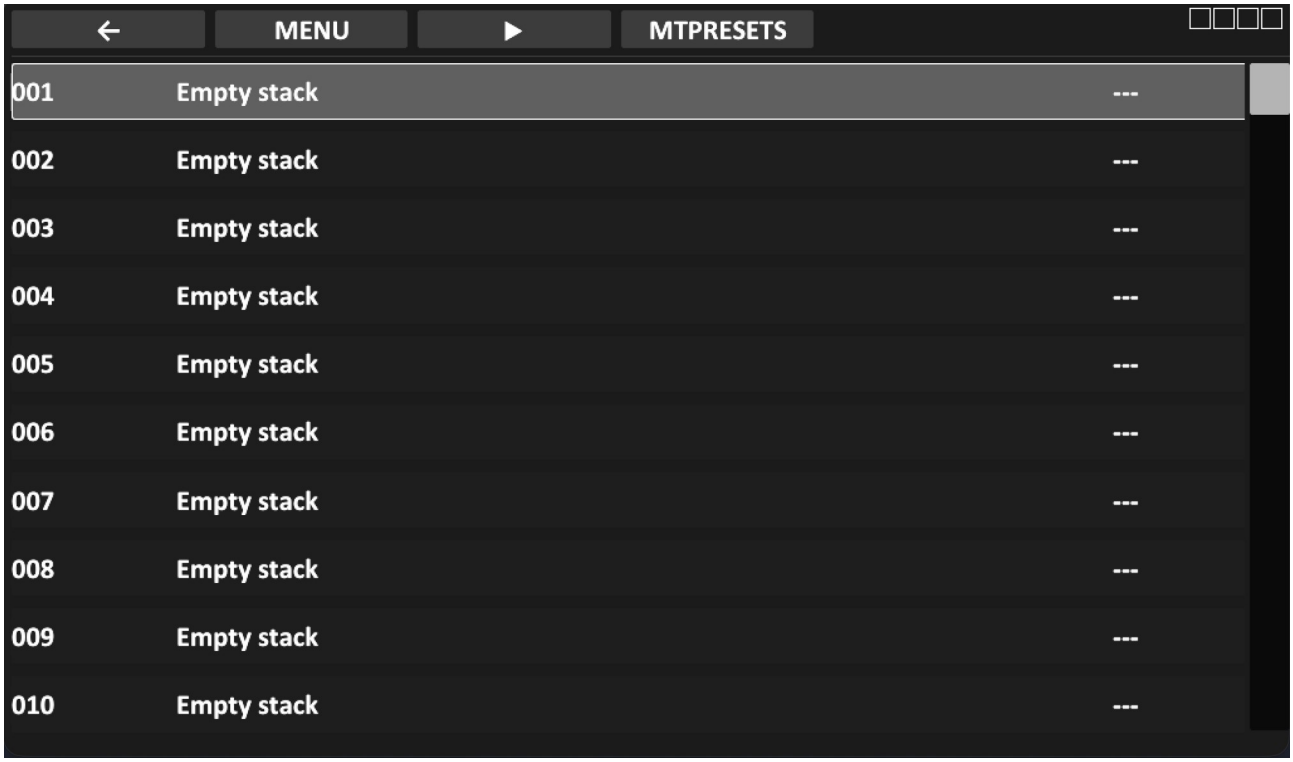


... and push the (Operator) encoder to get a menu. Set default is a key feature that allows you to set the *init patch*. The init patch is used when you do Right pull menu → “Init” in the main screen, and select “Patch”.

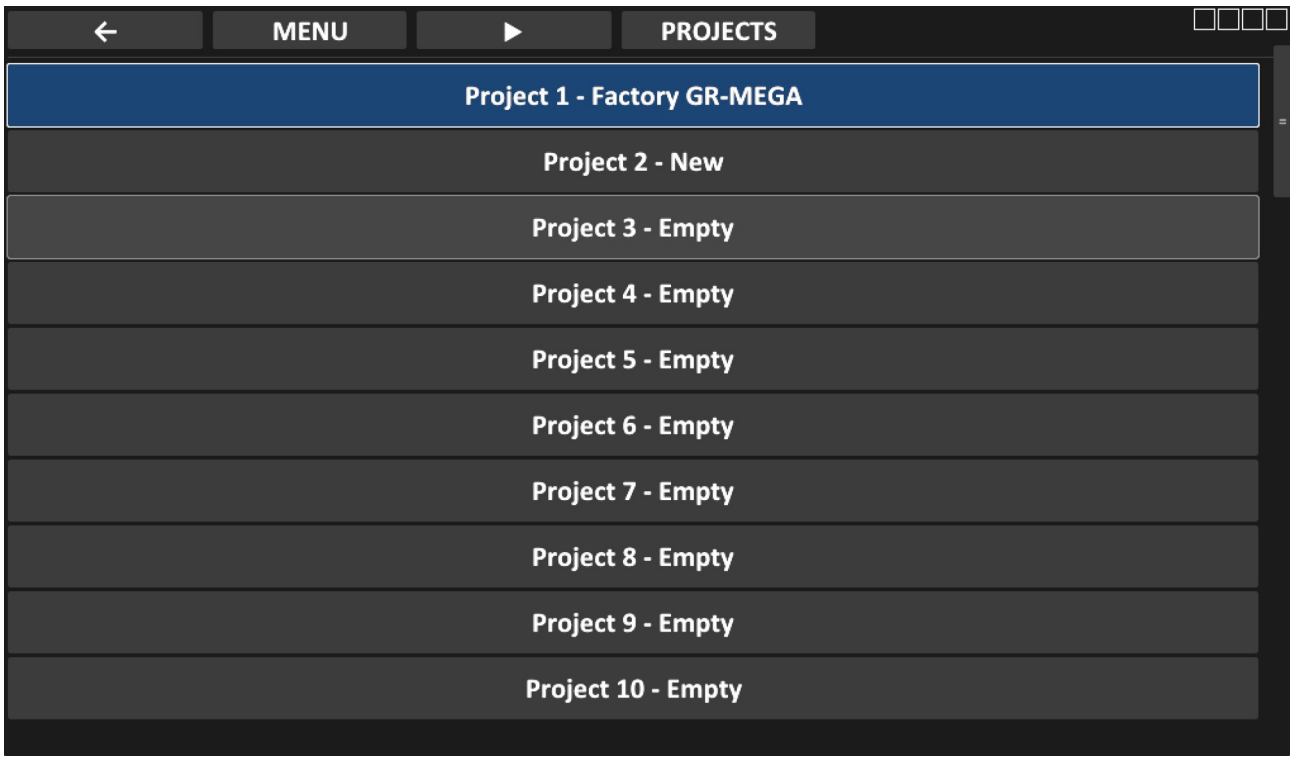


MTPresets menu

Multi timbral preset list menu. This works similar to the presets menu. Turn the (Operator) encoder to scroll. Push the (Operator) encoder to get a menu to rename, init, save, or switch.



Project menu



Enter the Project menu by Holding [Menu] and pressing [2].

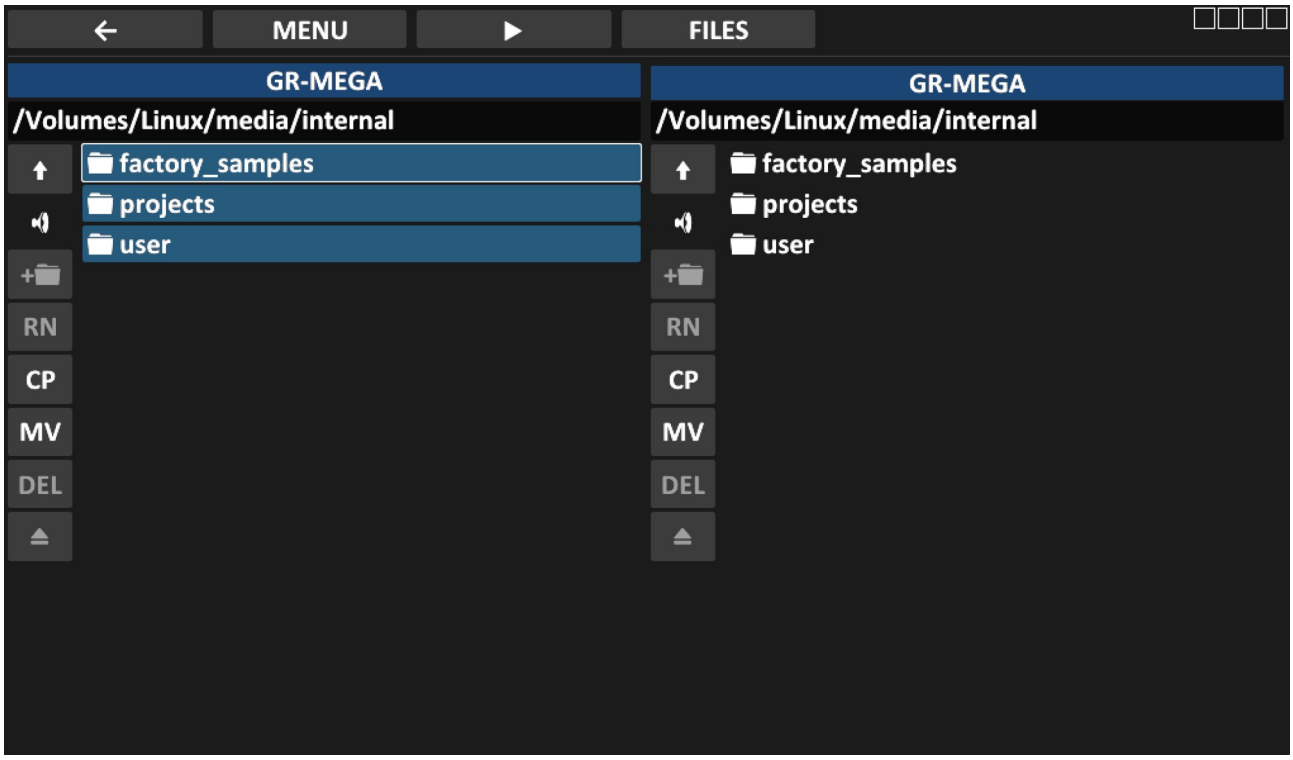
The project menu is simple. You can load, save, and rename projects here. Each row represents a slot in which a project can be stored, numbered 1 through 50. The slot that's BLUE is the actual active project. The one that's enclosed by white rectangle, aka "highlighted", is the one you're looking to do something with.

Use the GR-2 buttons to do the following:

(Operator) (turn)	Scroll through list, and highlight project.
(Operator) (push)	Edit project. You are prompted a dialog with options: escape, rename, load from, or save to this slot.
[Load]	Load highlighted project. Loading an new project (a slot that was never saved to before) will let you start with an empty project.
[Save]	Save current project to highlighted project.

Any potentially destructive action is protected. You will be prompted with a confirmation dialog when you load or save.

File manager



Enter the File manager by Holding [Menu] and pressing [3].

The file manager allows you to do everything you'd want to do with files:

* Backup your projects to USB stick.

* Import folders of samples to internal storage. For instance to the user sample storage: /media/internal/user/samples.

* Reorganize your user samples. For instance, delete groups of samples. Rename and move others.

NOTE: the file manager is a powerful, but also dangerous tool. If you can do things by simply using the save and load buttons in the main screen, then that is easier and safer! If you're restoring projects from USB backup, it's also easier to use the Projects menu!

NOTE: File sharing over USB C or LAN cable can do about the same as the file manager, but file sharing can be harder to set up initially.

NOTE: Factory data and projects are write-protected. They cannot be modified in the file manager.

Features

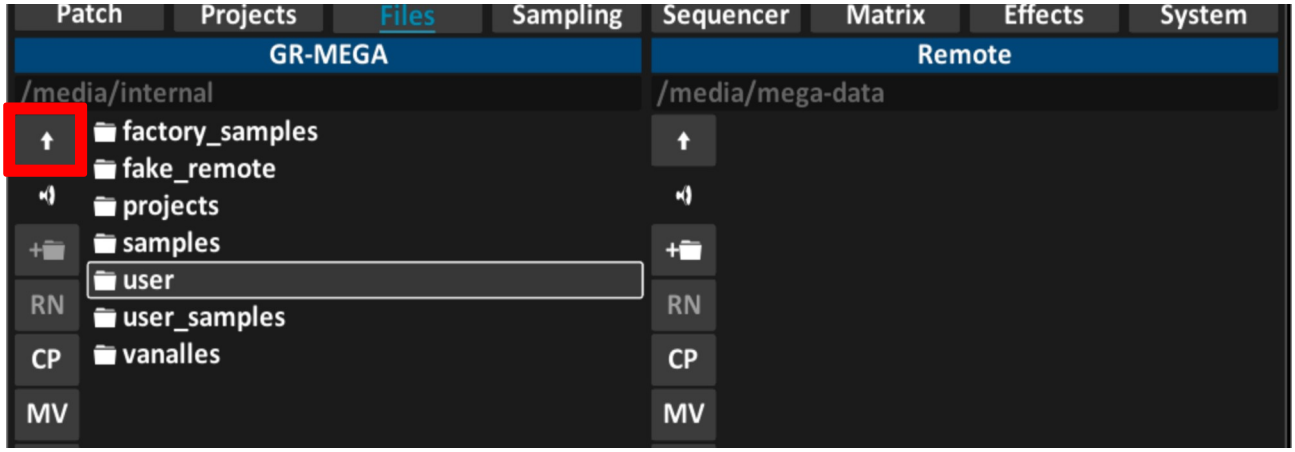
Here's an overview of all the features of the file manager:

Traversing folders

Double click (double touch actually) on a folder or drive and double touch to enter said folder or drive.

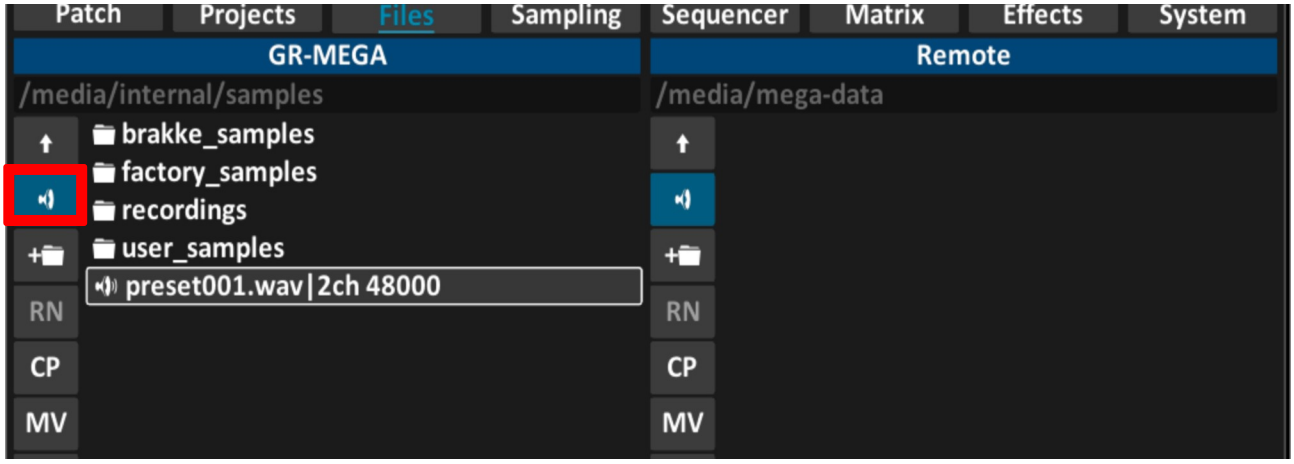
Up to parent folder

Touch the the UP ↑ arrow GUI button to go up in the directory tree (to the parent folder).



Sound previews

Touch on the speaker [🔊] icon to enable sound previews / audition for sample files. Then touch a sample file, and it will start playing it and also show stats like sampling frequency and number of channels. Also see the preview toggle in the IO menu. You can save the setting there.

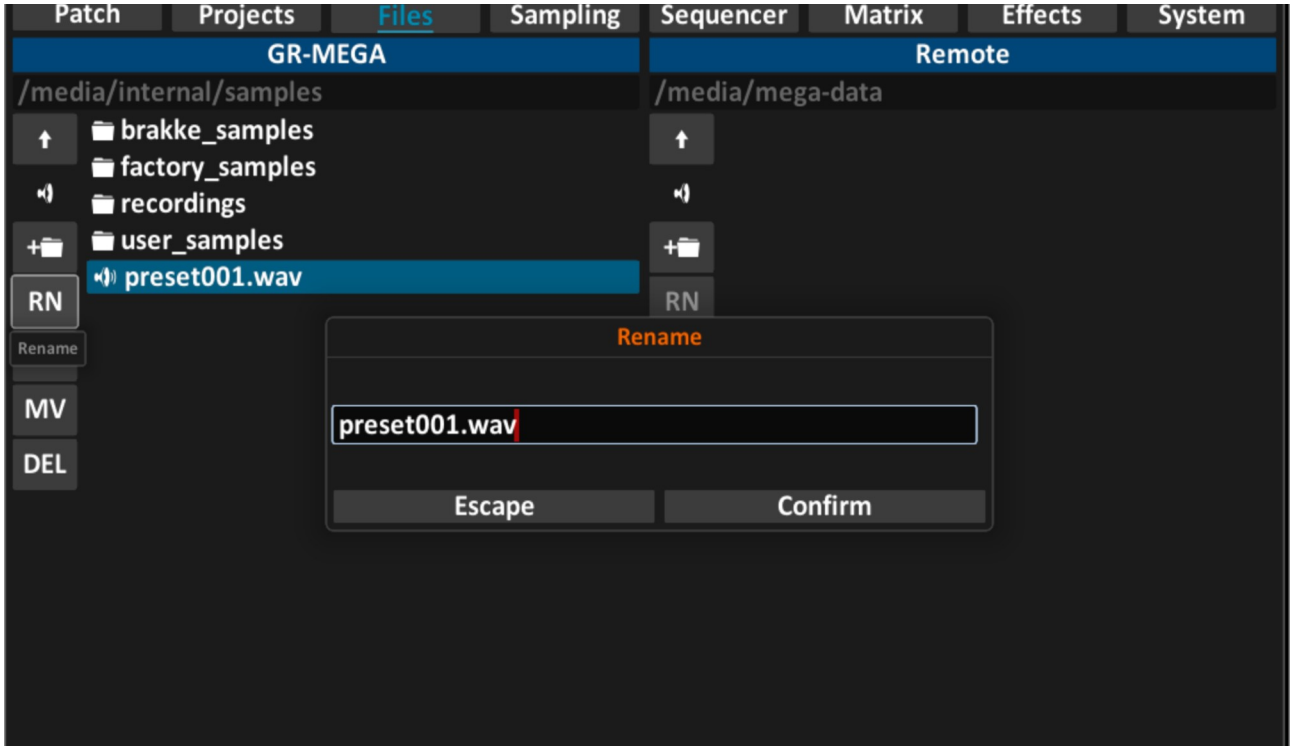


New folder

Touching the [+📁] icon will let you create and name a new folder:

Rename

Touch a file to select it. It will be highlighted in BLUE.
Touch the [RN] GUI button to open the renaming popup.



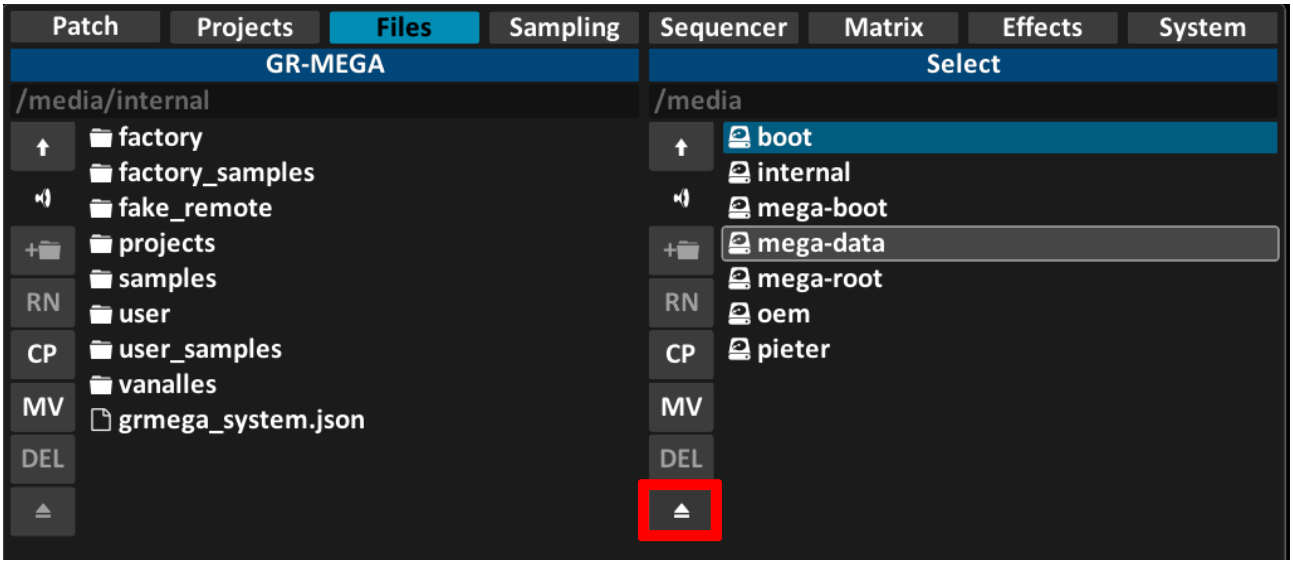
Copy

Touch a single file to select it. If you touch a folder you have to use a long pressto select it… a short will enter the folder!

Then press the [CP] GUI button to copy.

Eject drive [⏏]

Use the eject button to safely unmount a selected drive. The GR-2 is quite robust against pulling out USB sticks after copying, however, we added this button just in case. Operating systems will often complain that a stick is not cleanly ejected, so this feature will at least get rid of that message.



Move

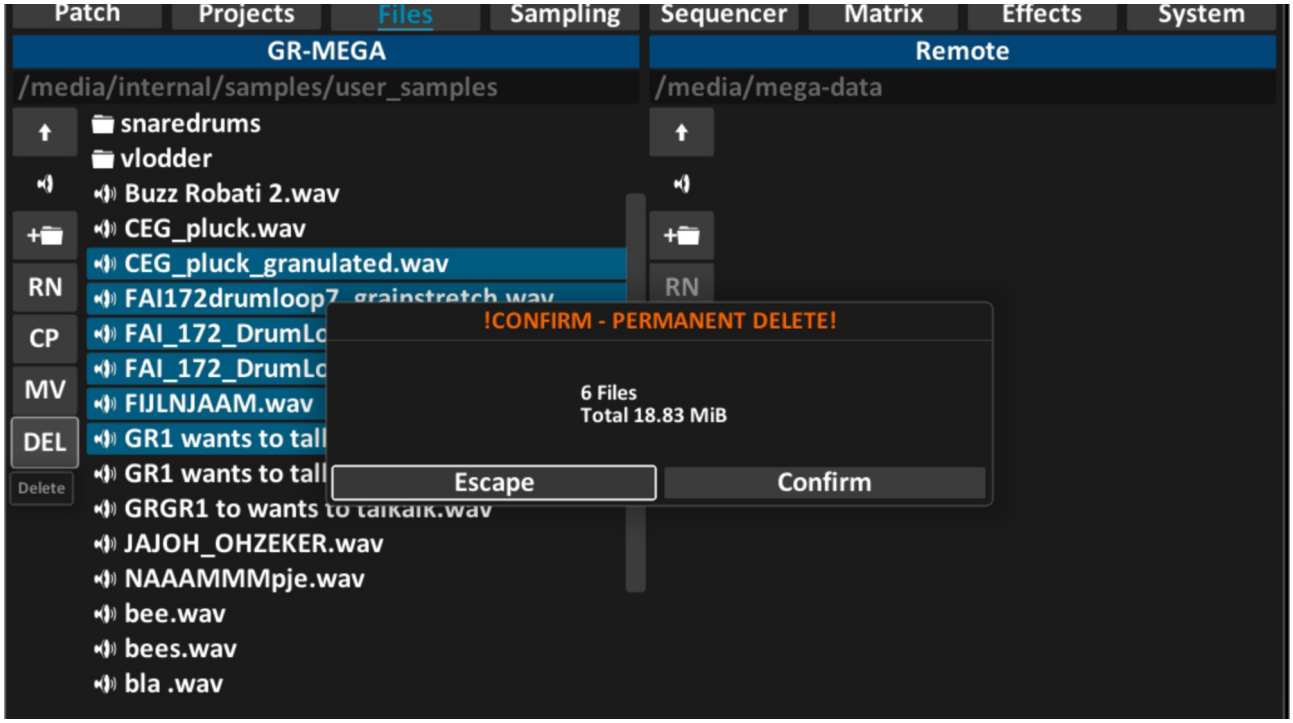
Pressing the [MV] GUI button will do the same but will delete the originals after having copied them! This is a powerful feature to organize your files, but beware that's there's NO UNDO or recoverable trashcan like on your PC!

NOTE: Copy and move can transfer stuff from the left to the right, and also from right to left. However, they will refuse to transfer anything if there are files selected on both sides!

Delete

Touch a single file or long touch a folder to select it.

Then press the [DEL] GUI button to delete.



NOTE: Deleting is final! There's no UNDO function. There's no recoverable trashcan like on PC! Be careful. Project and factory data are protected, but in the user folder you can delete anything you want.

Sampling menu

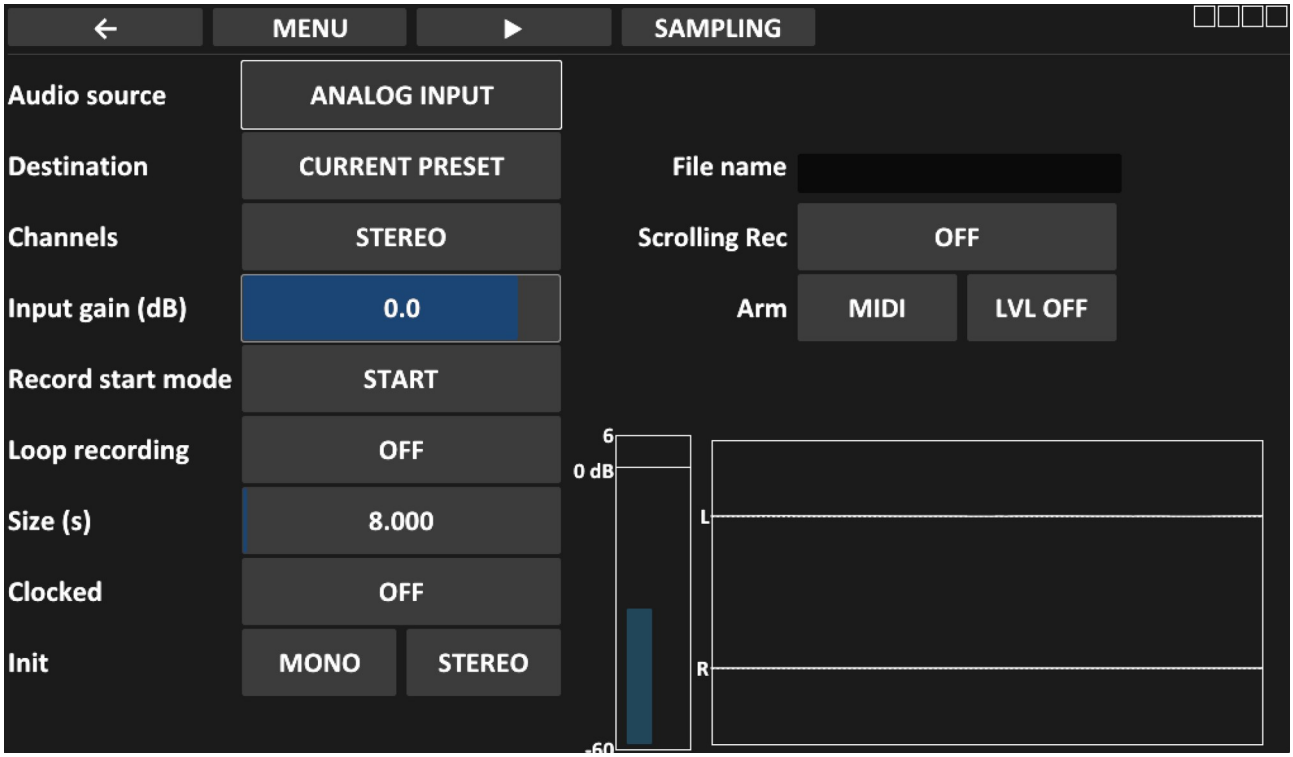
The sampling menu allows you to setup your audio source, the recording destination, sample length, channels, and various things related to looping.

Audio source

* *ANALOG INPUT*: use the GR-2 analog inputs

* *RESAMPLING*: use the GR-2 engine output. It takes the signal after layer mix, before the (Wet) and (Master) knobs are applied.

* *USB C*: use the multitrack UAC2 audio from the USB C port. This allows you to record digital audio straight from your PC or Mac! At this moment just the first 2 tracks (the first stereo track) are used for recording. Only one layer may be recording at the same time.



* *USB A*: The idea here is that you can use your own USB class compliant interface. If it is recognized, the name should appear to the right. It may take up to 10 seconds for the stream to become synchronized after switching to this input source!

Some additional notes apply:

Many audio interfaces, especially the more exclusive ones, require special drivers, and we cannot implement them all.

While a lot of class compliant USB audio interfaces will work out of the box, a lot of them still require additional driver data for channel selection and volume control.

More importantly, since USB C enables you to already hook up your PC or Mac, that means that this feature is much less useful.

Destination

* *CURRENT PRESET*: record into the buffer of the current preset. Recommended if you're using an external source (NOT resampling).

* *WAV FILE*: use this to record to WAV file in the background. In the "File name" text field you can enter a prefix for your WAV file name.

When resampling, it will save to: `/media/internal/user/resampling/prefixNNNN.wav`

When recording, it will save to: `/media/internal/user/recording/prefixNNNN.wav`
(Where NNNN means a serial number like 0001, 0002, 0003, etc.)

Channels

Duplicate left (LL) or right channel (RR). Useful when recording from mono sources, such as guitar pedals.

Input gain

Attenuate or boost input signal up to 12 dB.

Arm

Use the Arm MIDI button to trigger on MIDI Beat start. The level slider can be to to OFF in which cases it doesn't care about the audio input level. Slide it to the right to set a trigger level in dB (-80..0).

Record start mode

You can turn on the ability to record here and select the start point for recording. The following start points are available:

- Current position: When pausing the recording, recording will start from that same point when activated again
- Wiper: Recording starts from the sample position, when activated
- Start: Recording starts from 0.0s, when activated

When turned to Off, the [Record] button will refuse to record. You can use this to protect your preset against accidental button presses.

Loop recording

With "loop recording" turned off, the recording of the sample will be a one shot recording. Turn "loop recording" on to do continuous recording/real-time processing.

Scrolling rec

Turn this ON so you can easily keep the play head at the right distance from the rec head. [Shift] + [Record] forces scrolling rec. Scrolling record supersedes "Play follows rec" from firmware <=1.6. If you push the horizontal fader all the way to the right, it does the same as "Play follows rec", but you can easily add latency by moving it a bit more to the left. This way you can also use forward playing grains, and even grains with higher pitch, which may cross the record head.

Recommended is also to use Patch menu → Grain → Spray polarity and set that to "NegUnipolar", or more quickly use [Shift] + (Spray). Note that you can use [Shift] + (Op encoder) to zoom in and out, just like normally. Max zoomed in is 1 second, and max zoomed out is 10 seconds.

TODO: screenshots of synced and unsynced heads

Clocked record

Toggle this ON to record in bars instead of seconds. Recording stops only after a bar (4 quarter notes) is completed.

Sample size

The sample size or “recording duration” (in seconds, or bars) can be set here. Max is 5m49s, as this is the maximum the granular engine can efficiently handle. You need to explicitly press “Init mono” or “Init stereo” for this change to take effect!

Note that when setting time in bars, this is based on current internal BPM. Should this change, you will also need to change the buffer size.

Turn this completely to the left to set “AUTO” (default). This will make sure that when you start recording the buffer automatically grows. To have a buffer that is fixed to a specific size, turn it more to the right. Auto mode will initialize the buffer when you press [Record].

Clocked

Turn this ON (default) to count time in bars. Turn this OFF to count time in seconds.

Init mono

Press [Enter] on this button to create a new mono sample with the number of seconds set with “Sample size”. If you did this accidentally, press this preset’s button to undo all unsaved changes to sample and/or patch.

Init stereo

Press [Enter] on this button to create a new stereo sample with the number of seconds set with “Sample size”. If you did this accidentally, press this preset’s button to undo all unsaved changes to sample and/or patch.

Modulation Matrix

The GR-2 modulation matrix consists, at the time of writing, of 23 sources by 165 destinations. There's 4 LFO's, random trigger mods, CV, MIDI and MPE as sources. The destinations are numerous and listed in table 2.

Enable	Source	Curve	Amount	Polarity	Category	Destination
ON	LFO 1	+0.000	69.05 %	BI +	ENGINE	PITCH
ON	LFO 2	+0.000	100.00 %	UNI +	LFO	LFO1 RATE
ON	LFO 3	+0.000	17.20 %	BI +	ENGINE	PAN
ON	LFO 2	+0.000	100.00 %	UNI +	LFO	LFO3 RATE
OFF	LFO 4	+0.000	0.00 %	BI +	ENGINE	POS
ON	NONE	+0.000	0.00 %	UNI +	ENGINE	POS
ON	NONE	+0.000	0.00 %	UNI +	ENGINE	POS
ON	NONE	+0.000	0.00 %	UNI +	ENGINE	POS
ON	NONE	+0.000	0.00 %	UNI +	ENGINE	POS
ON	NONE	+0.000	0.00 %	UNI +	ENGINE	POS

Enter the matrix from the top menu: Hold down the [Mod] button.

The mod matrix supports up to 100 modulations. You can scroll down to a new page with the vertical scroll bar

If you need to access different modulation sources besides LFO's, this can also be done on the front panel.

Values are changed by first touching a widget and then dragging your finger across it. The two physical controls: the horizontal fader and the (Operator) encoder can help with fast and precise tweaks.

Curve

With the Curve column you can smoothly bias the modulation to either extreme of the range.

Amount and polarity do speak for themselves, but [Shift] + (Op enc) maybe nice for fine tuning amount.

Destination is best set with the horizontal slider and then possibly fine tuned with (Op enc).

Using the amount curve you can smoothly and subtly (or not so subtly) bias the modulation to one side of the other. For instance:

Mod sources

* LFO1,2,3,4: the LFO's. Note that each layer has it's own LFO's.

* CV1, CV2: the two control voltages. These are of course global for the entire system. Range is -5V..+5V, so if you have a 0..5V source it will mean that in Unipolar modulation it will use the upper part of the range!

* SEQ MOD 1,2,3,4: Use the sequencer mod lane as a mod source. Each layer has its own sequencer, so each layer also has its own 4 mod lanes.

* MOD WHEEL: the mod wheel on your MIDI controller.

* KEY TRACK: key position of your MIDI controller. Note that the sequencer also sends this mod source.

* VELOCITY: MIDI note on velocity. MPE calls this "Strike"

* PITCH: MIDI pitch wheel. Also used by MPE controllers when sliding fingers between and over keys, called "Slide".

* AFTER: MIDI channel aftertouch. Also used by MPE. Since every key in MPE has its own channel: channel aftertouch becomes usable as polyphonic aftertouch.

* TIMBRE: MPE only. CC74.

* LIFT: MIDI note off velocity.

* AUX ENV: the auxiliary envelope, accessible from ENV QA menu at the top.

* RANDOM1,2,3,4: sources that change to a new random value at each new note. Note that each layer has it's own random sources.

* POS X: the horizontal fader or X finger posision. Using this to modulate the destination POS can lead to interesting effects.

* POS Y: the vertical finger posision.

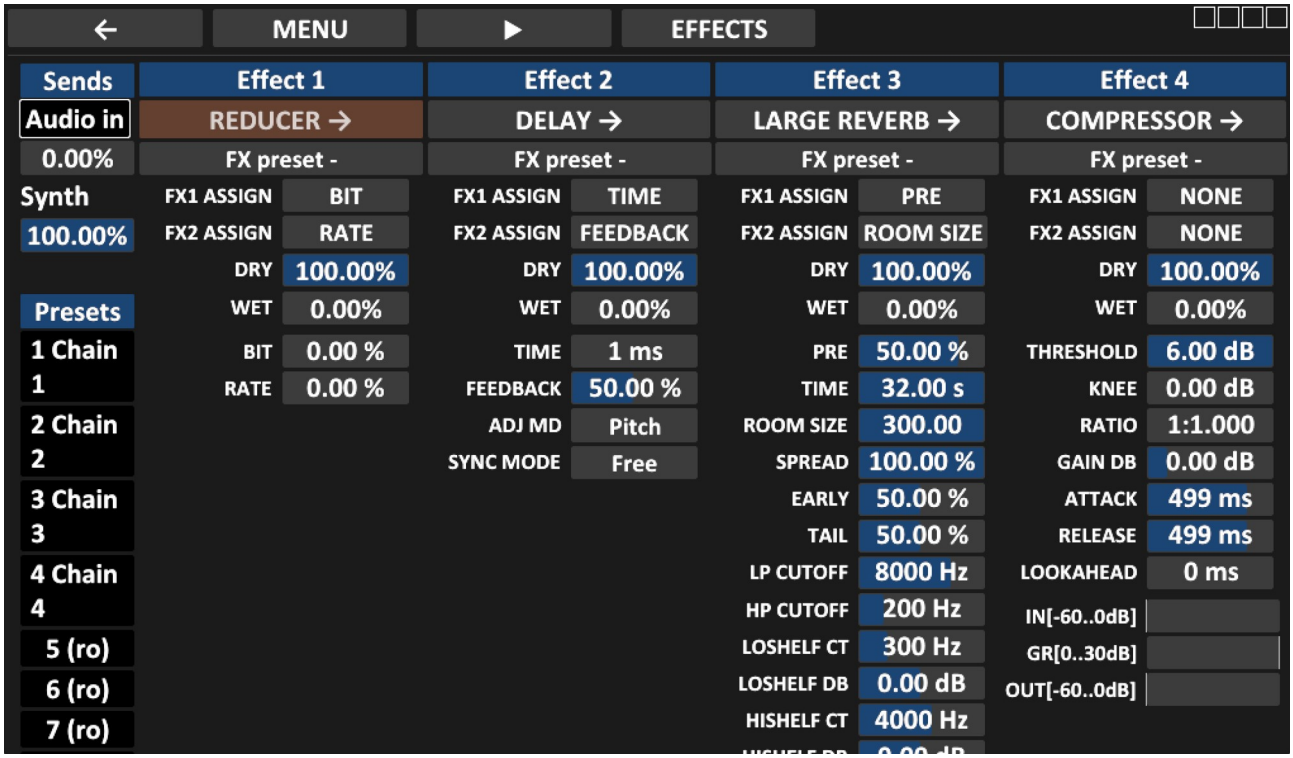
* IN ENV: audio input follower. Its AR envelope may be configured as follows: [Shift] + [ADSR Curve], followed by using the A and R sliders.

* DRAW X, Y: trajectories drawn in the drawing menu.

Effects menu

The GR-2 has 4 simultaneous effects (FX slots) per layer. You can choose effects from a list of 14 effects (at the time of writing). Each effect can only be used once per layer.

Enter the Effect menu by pressing FX and then holding it down for a while, or by pulling the == indicator. The menu displays the effects chain for the layer that is currently in focus (see and use the Layer buttons 1,2,3,4).



Sends column

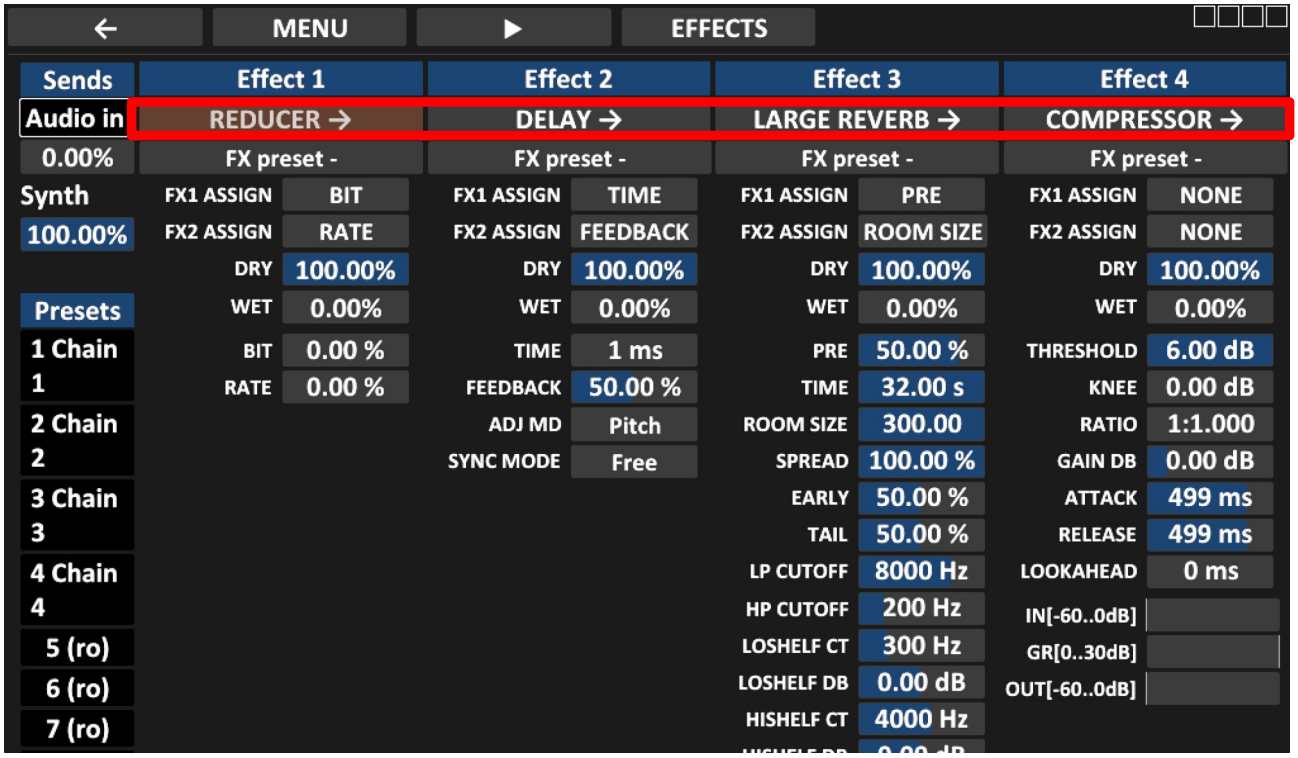
This is the left-most column.

You can route audio input into the effect chain [-100..+24dB].
You can route synth output into the effect chain [-100..+24dB].

The +24dB loudness may be necessary if you play with low polyphony, and low grain count. Most effects are *linear* and don't care, but effects like compressor, distortion, and saturator, definitely benefit from high input levels.

Selecting Effects

At the top there's a row displaying headers Effect 1, Effect 2, Effect 3, Effect 4. Navigate to the row just underneath to cycle through the effects:



Then standing on a GUI button with and effect name on it (highlighted here in RED), Turn (Op enc) or move the horizontal slider to cycle through the effects. This GUI button is called the *FX Type button*.

To quickly swap effects in the chain, just hold down the FX type button and it will not glow YELLOW, then drag to the FX type button you want to swap, aka drag and drop.

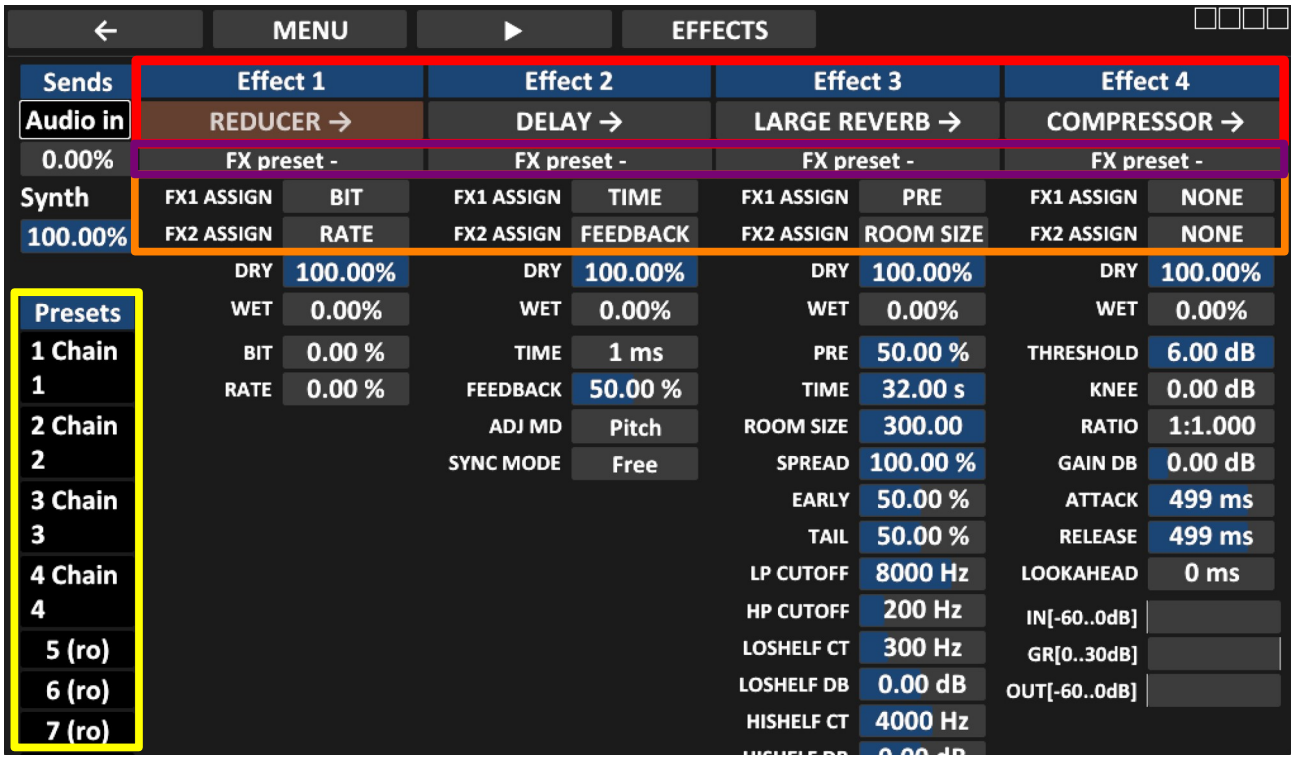
Note that the LIGHT BLUE denotes the effect that is accessible by (FX1) and (FX2) knobs on the front panel! You can change which effect is accessible by (FX1) and (FX2) by turning the (FX Select) encoder.

Effect types

At the time of writing the GR-2 has the following effects:

CHORUS	
COMPRESSOR:	fully featured compressor, that also has VU meters since version 1.2.
DELAY:	regular delay (independent stereo channels)
DIST(ortion)	inverse cubic type of distorion
EQ3:	3 band shelf equalizer
FLANGER	
PPDELAY:	ping pong delay
REVERB:	a simple reverb that is easy on the CPU
LARGE REVERB:	huge and organic reverb (including a 6 parameter EQ)
REDUCER:	sample rate and resolution reducer
RESONATOR:	multi band resonator that can do scales, and mimic physical modelling
RING MOD	
SATURATOR	tanh() type distortion
VIBRATO	

Why 2 reverbs? The normal reverb is less impressive sounding with less parameters, but is easy on the CPU. The large reverb is very smooth sounding, yet can also be used to achieve metallic effects with small room sizes.



FX chain preset

Highlighted in YELLOW, this list can be stepped through with the arrow keys and clicked on. It can also be scrolled by navigating downwards, or by using USB mouse or USB+HDMI

touchscreen. Click on (or press [Enter]/[Execute]) an FX chain preset to set the entire chain of 4 effects. Press save on a slot with index of at least 9 to name and save a user chain.
User FX chain presets will be stored to:
`/media/internal/user/fx/grmega_fxchain_`<index>`.json`.

(Single) FX preset

Highlighted here in PURPLE. Turn (Op encoder) to change factory preset for this FX. Turn past factory preset 8 to get to the user presets. Press [Save] to name and save a user preset. Presets are saved to: `/media/internal/user/fx/grmega_fx_`<fxname>`_`<index>`.json`

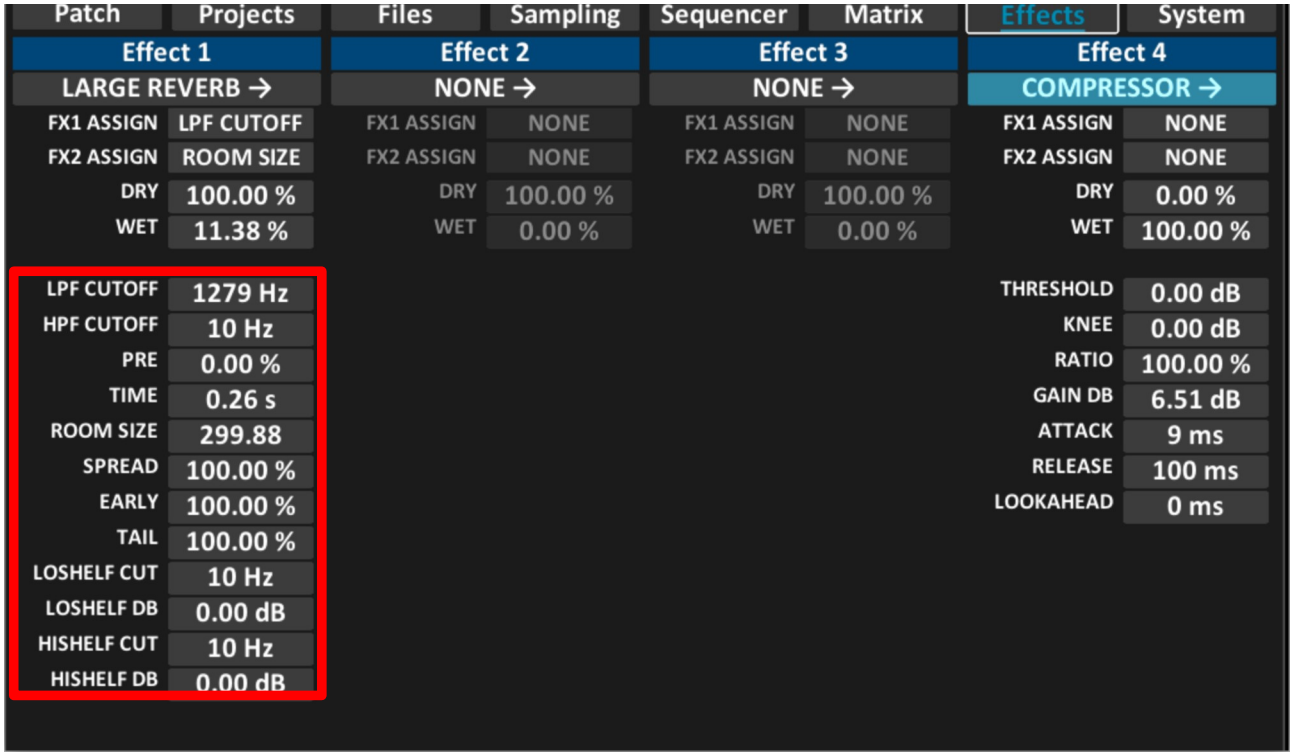
FX 1 and 2 Assign

Highlighted here in RED are the FX1,2 assign GUI buttons. Use the horizontal slider or (Op enc) to use assign one of the FX parameters from the list directly below in the same column.

Dry/Wet

Highlighted here in ORANGE are FX Dry and Wet. These can be changed with the horizontal slider and (Op enc), but also with the physical (Wet/Dry) knob on the front panel.

FX Parameters



Highlighted here in RED are FX parameters. Use the horizontal slider to quickly change the value, and use (Op enc) to step the value, for instance by 1% for each encoder tick. Hold [Shift] and turn

(Op enc) to change 0.1% for each encoder tick. Some effect parameters like frequencies, times, and amplitudes have a cubic curve on them. Meaning the slider will have more precision in the lower range.

Almost all FX parameters are available in the modulation matrix.

Note: if the effect has a large parameter list, you can just drag it by the parameter names and scroll.

Large reverb

This is an effect with a multitude of parameters. It can sound very smooth, yet also very metallic if you like.

Pre: Pre-delay

Time: Time between early reflections and tail

Room size: Size of the room. Tiny bathroom to stadium..

Spread: Stereo width

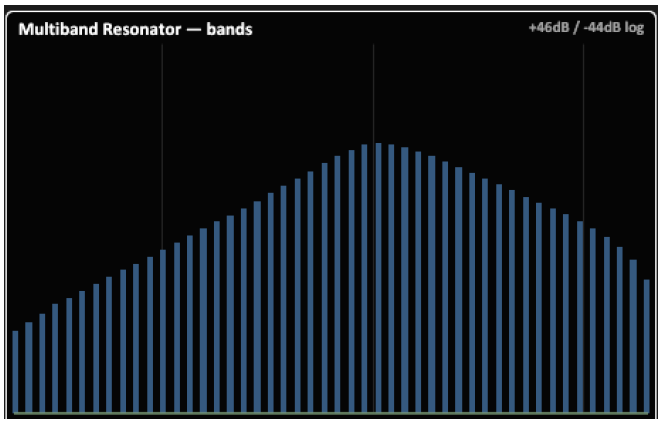
Early: Early reflections volume

Tail: Tail volume

Cutoff, and shelve settings from a 3 band equalizer for the effect.

Resonator

Multi-band resonator. It can act as a traditional filter, but can be better seen like a resonator with a filter on top. It has a lot of parameters, some of which may not be instantly intuitive. The display is here to help. Many of the parameters will be instantly visible:



Tone: Filter control. Like a tone control on an old amp. To the left it's a lowpass, in the center a bandpass, on the right a high pass.

Cutoff: Cutoff frequency for the filter.

Resonance: Filter resonance.

Detune: Draw bands closer together or further apart. Can also fold back at 20 kHz.

Pitch: Offsets the pitch of all bands.

Tilt: Concentrate bands in the low end or in the high end.

Decay: Decay time. The higher the more resonant / tonal it will get. Low decay time will sound a lot like the input.

Bands: Number of bands [6-48]

Scale: Select a scale from the voicing menu. Also supported are inharmonic scales like metal rods. Turns of tilt.

Mode: Mono or true stereo. Mono can be “stereofied” with some tricks. Stereo mode is more CPU intensive.

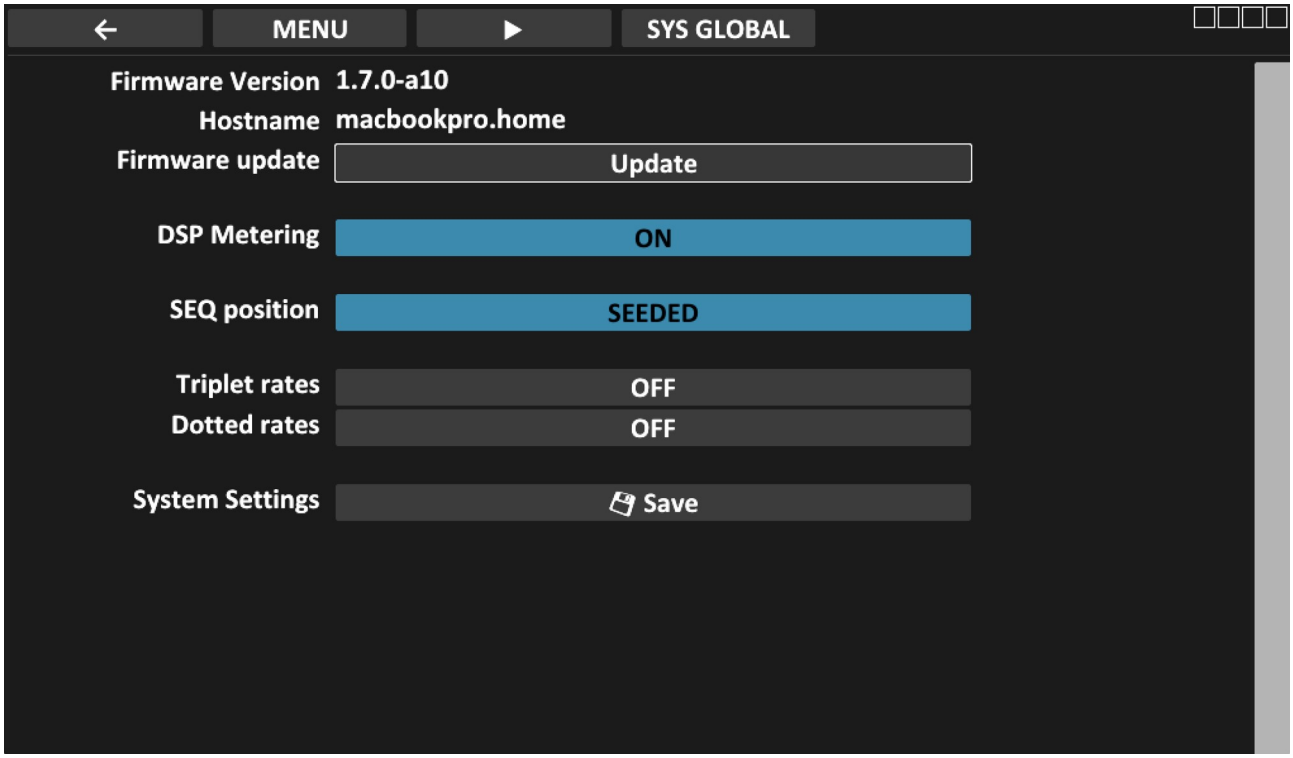
Width: Stereo width, in mono mode this will alternate the bands left and right in increasing amounts. In stereo mode this will just act as a regular mid-side control.

Noise: Randomize band gains [0..100%]. Can be used to achieve a form of shimmering.

N.rate: Speed at which noise updates. 0 = full stop

System menu

Enter the System menu by pressing [Menu] touching the system (cog wheel) tile. This menu contains settings that are global to the GR-2: settings for how the front panel controls and display should behave, settings for your studio's MIDI setup, and settings concerning loading, saving to/from disk, CPU usage, metronome and tuning volumes.



Firmware update
One button click firmware search and update. See the section Firmware Updates for details.

DSP Metering
Turn ON to display a vertical bar that measures CPU usage in the right corner of the screen. Useful when you're pushing the system.
ORANGE: FX
PURPLE: USB audio processing
GREY: Housekeeping
BLUE: Voice rendering

SEQ position
How is the sequencer position calculated:

* SEEDED: means the position is derived 100% from a master counter. Change play mode, and back again, and it will return to the position as if you never changed the mode.

* INCREMENTAL: position is incremented. This means changing play mode from forward to reverse works much like turning around and walking the other way. Position remains: continuous.

Straight rates
Toggling this adds or removes straight rates 4/1 2/1 1/1 ½ ¼ 1/8 etc.

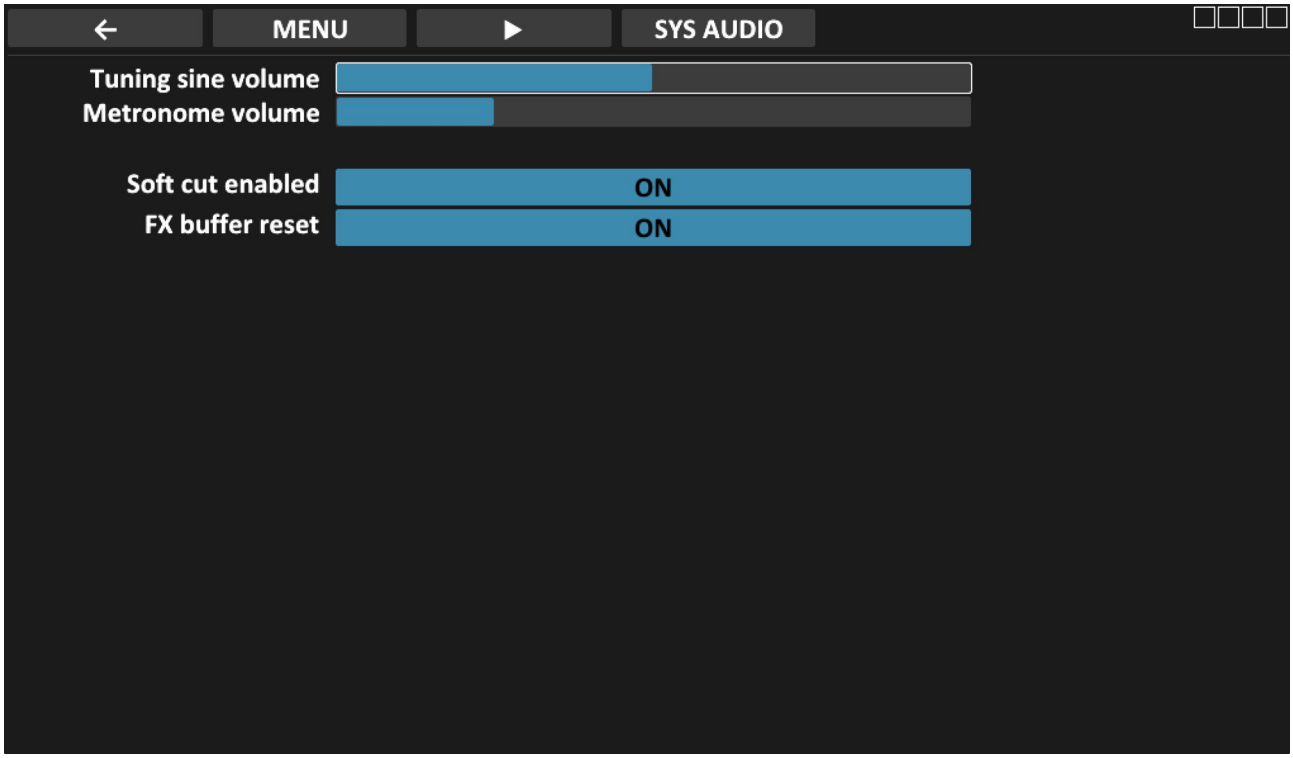
Triplet rates
Toggling this adds or removes triplet rates to/from the global list of available rates.

Dotted rates
Toggling this adds or removes dotted rates to/from the global list of available rates.

Save system settings
Does what it says. Reports back almost immediately with a popup saying “saved”. You can also press the physical [Save] button in this screen.

Audio prefs

System wide audio preferences.



Tuning sine volume
Controls the volume of the tuning sine.

Metronome sine volume
Controls the volume of the metronome.

Env follower input
Audio input, layer 1, 2, 3, or 4.

Soft cut enabled
When cropping a sample, turn this ON to generate cross-faded, clickless results. Eats up a small overlapping piece of sample. Turn OFF if you don't want cross-fading.

FX buffer reset
ON: let FX linger on when switching presets.
OFF: silence FX between switching presets. This is the way that most hardware synths worked in the past.

User Interface menu

Control all layers

Toggle this ON to control all active layers at the same time. OFF by default. This means knob tweaks only affect the layer in focus.

Potentiometer pickups
Turn this on to lock pots between preset or layer switches. An alternative to the [Feel] button, and also useful when your MEGA is older and potentiometers may have become dusty without servicing. Pickups are usually preferred for live settings, while [Feel] is preferred for studio settings.

Menu Slider
Use the horizontal slider to change the GUI. Turn OFF to keep using the horizontal slider musically while inside the menus.

Direct Shift
When ON, you have to hold down the [Shift] button to access the shift functions of each control. When OFF you can just toggle [Shift] by pressing it. Freeing up one hand. The disadvantage is that you also need to toggle the [Shift] button quite often, depending on what controls you are using.

Instant bank switch
Turn ON so presets switch directly also when you press Bank and Subbank buttons. Turning this OFF will wait for you to press the Preset button to finish the Bank, Subbank, Preset button combo.

Fast MT select
Fast multi timbral preset selection. This makes the Bank and SubBank buttons act like a direct preset. So in total you will have access to only 16 mtpresets, but you will be able to access them with a single button combo.

Since 128 mtpresets per projects (and choosing them from 128 mono timbral presets) may be overkill or may not have much use to the majority of users, we may opt to drop support for 128 mtpresets in favor of only 16 which can be recalled quickly.

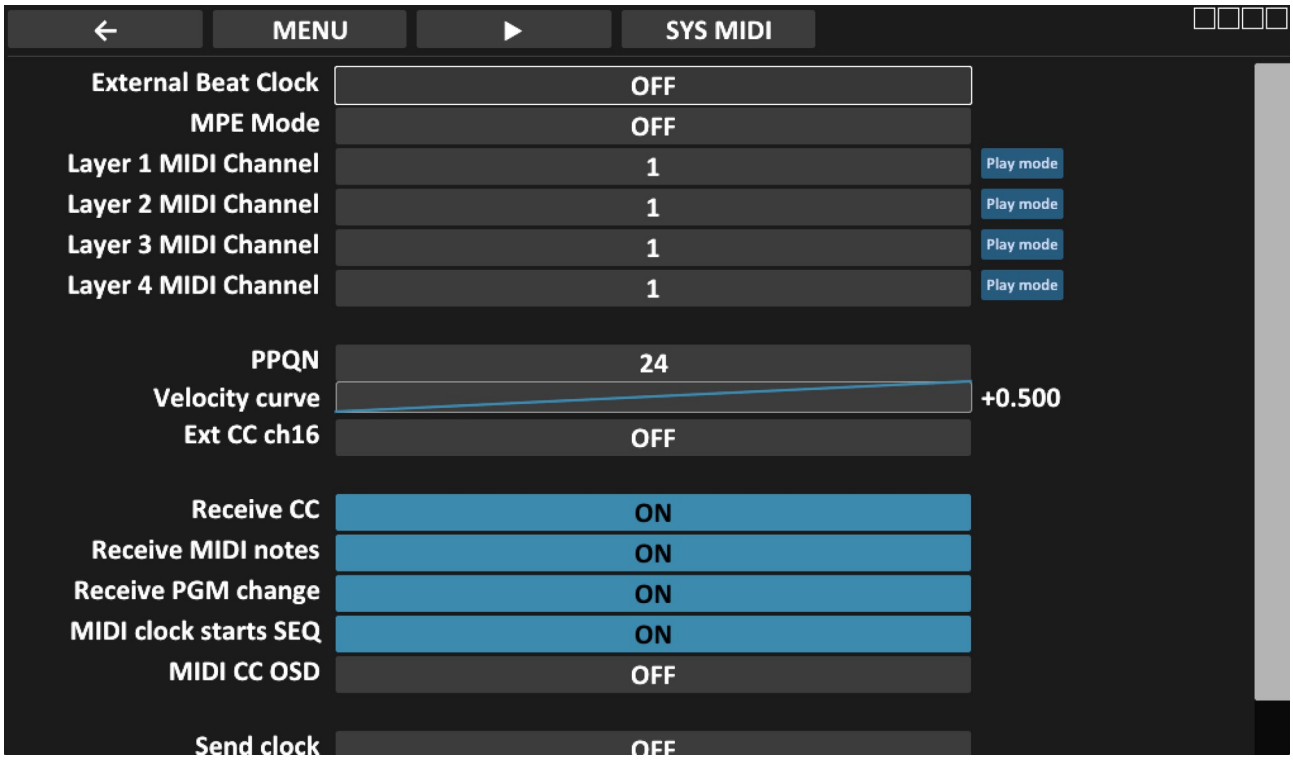
Tooltips
Turn ON to enable tool tips (help bubbles) when standing on most menu buttons. Nice if you want to get started without the manual at hand. You can also leave this OFF, and press the [Feel] button to force tool tip help.

Message duration
Sets the OSD message and popup duration in seconds. Please note that some popups are exempt and have their own durations. An example is the copy/paste popups in the matrix menu.

Display brightness
Does what it says. This CANNOT go all the way down to black. The GR-2 will not let you operate blind. It will remain at a very dim minimum.

LED brightness
Does what it says. This CANNOT go all the way down to black. The GR-2 will not let you operate blind. It will remain at a very dim minimum. But it can indeed go very dark for dark studios, without flickering.

MIDI menu



External Beat Clock
Turn ON to use MIDI beat clock for all synced parameters in the patches. Turn OFF to use the MEGA's internal master clock for this instead.

MPE Mode
Turn ON to let the GR-2 recognize your MPE controller's input. When this ON the notion of MIDI channels is gone, and the MIDI channel-to-layer mapping in this menu is disabled. It will darken to show these settings are then useless. An MPE controller will effectively control all layers.

Part 1..4 MIDI Channel
Allow a MIDI channel to control a layer. Only usable when MPE is OFF.

Play mode [for layer 1..4]
Turn ON to let the MEGA use its [▶] button for the selected layer.

PPQN
Set the amount of Pulses Per Quarter Note. This can go as low as 4, all the way up to 960. 24 is the default. 24 is the default for a lot of MIDI equipment, so leave it at this for most. Note that the GR-2 needs at least 48 PPQN to correctly quantize 1/64th grains and 1/64th notes.

Velocity curve
Adjust the velocity curve of your keyboard. Typically this should be some square root type function.

Ext CC ch16

NOT YET IMPLEMENTED. Turn ON to map the more exotic NRPNs (CC's >= 128) to CC's in MIDI channel 16.

Receive CC
Turn ON to handle MIDI CC messages. Filters them otherwise.

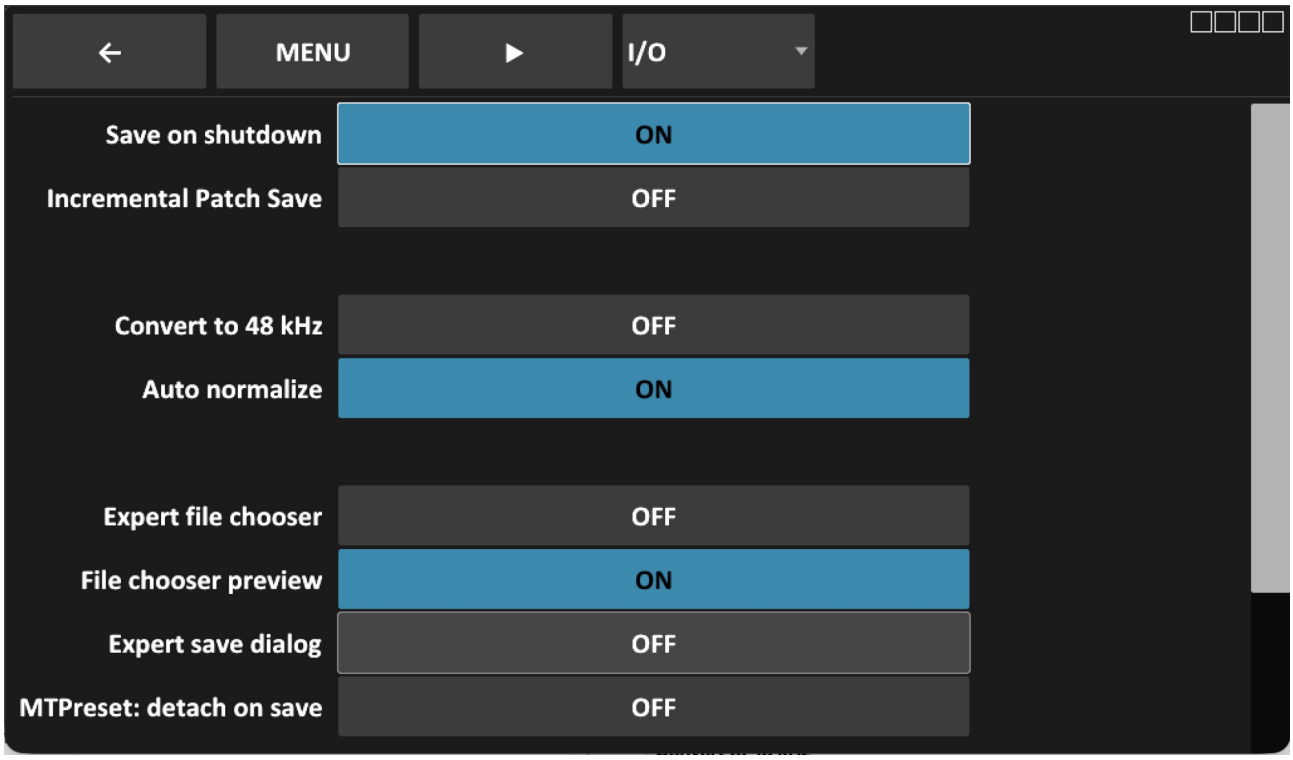
Receive MIDI notes
Turn ON to handle MIDI note on/off messages. Filters them otherwise.

Receive PGM change
Turn ON to handle MIDI program changes. Filters them otherwise.

MIDI CC OSD
Previously known as "MIDI CC Visuals".
Toggle this ON to have incoming CC's displayed on the OSD in the bottom of the display.
Messages will read like:
"`CC GRAIN SIZE 500.0ms`"
If you send a lot of different CC's into the GR-2, you may want to turn this OFF, because the OSD will change every 16ms, and this will make things unreadable.

Send precision CC
Turn this ON to let knob turning send 14 bit CC's (NRPN's) instead of the normal 7 bit CC's

IO menu



Save on shutdown
Turn this ON for the newschool way that almost every app uses nowadays. The MEGA will save all unsaved changes to patches when it shuts down, and also it will save its system settings automatically. Turn this OFF, and you will be forced to save everything manually.

Incremental Patch Save
To be implemented, if enough users chime in. The feature was implemented in the GR-1, but a user survey revealed it didn't see much use.

Convert to 48 kHz
Turn ON to automatically convert imported samples to the native 48 kHz. Will take noticeable extra processing time.

Auto normalize
Turn ON to automatically normalize imported samples. Will take some extra processing time.

Expert file chooser
Turn this ON to skip the type selection dialog before you start using the file chooser (when pressing [Load]. OFF by default, as this is more beginner-friendly.

File chooser preview
Turn ON to enable sound previews when touching or scrolling onto a file in the file chooser. Reflected as the 🔊 icon in the file chooser.

Expert save dialog
Turned on: all saves will now allow you to select type, slot, and enter a name.

MTPreset: detach on save
Detach all layers when saving an MTPreset, so its samples are stored with the preset. Uses more disk.

RAM Usage
Watch out when this hits 95%. You may not be able to perform copying or loading of large samples / patches. This will probably only happen if you use many very long field recordings as presets, or in the future very large multi-samples.

Disk Usage
Watch out when this hits 99%. You may not be able to perform saves or copying files with the manager. Please delete unnecessary files from your /media/internal user folder.

USB C Mode
Disable/enable USB C device features for maximum compatibility with windows, mac, and linux… Press this to cycle between:

MIDI + FILES (default):	MIDI and Samba file sharing, and SSH.
AUDIO ONLY:	USB Audio Class 2 (UAC2) only. Guaranteed to work well on Macs.
AUDIO + FILES + MIDI:	All of the above combined. When hooked up to a Mac and streaming audio, this can cause CPU spikes and drop-outs. Linux PC's are unaffected.

NOTE: USB C Audio streaming specs:

* Output (from MEGA to PC):	4 stereo channels (lower channels) + 1 master channel (highest channel)
* Input (from PC to GR-2):	4 stereo channels, but only the first one is used.

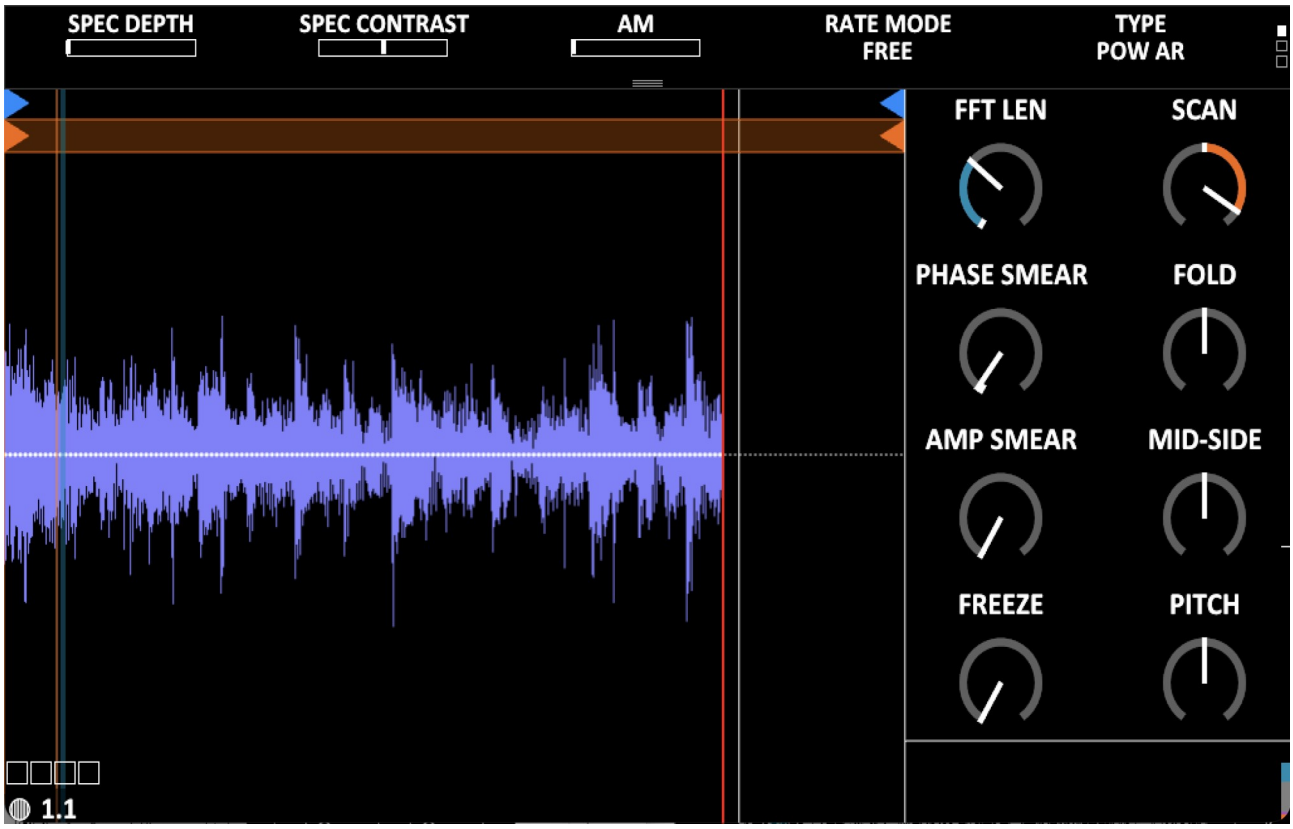
Recording samples

To start sampling first see to it that you've used the sampling menu described above, and make sure you enabled sampling start position. You can turn on "looping rec" as well if you want to use the GR-2 as a granular effect: for live sampling and replay simultaneously. It will then keep looping through its sample buffer until the user manually stops it.

Once you've configured this menu you can just press the [Record] button on the physical front panel. Stop recording by pressing the [Record] button again, or wait until it has reached the end of the buffer when looping is disabled.

If you press the [Menu] button you'll go back to the main screen where you can enjoy the action:

A red wiper should appear and should start running forward. If it stays still, then re-plug the USB cable. The GR-2 will now record the incoming sound into the buffer.

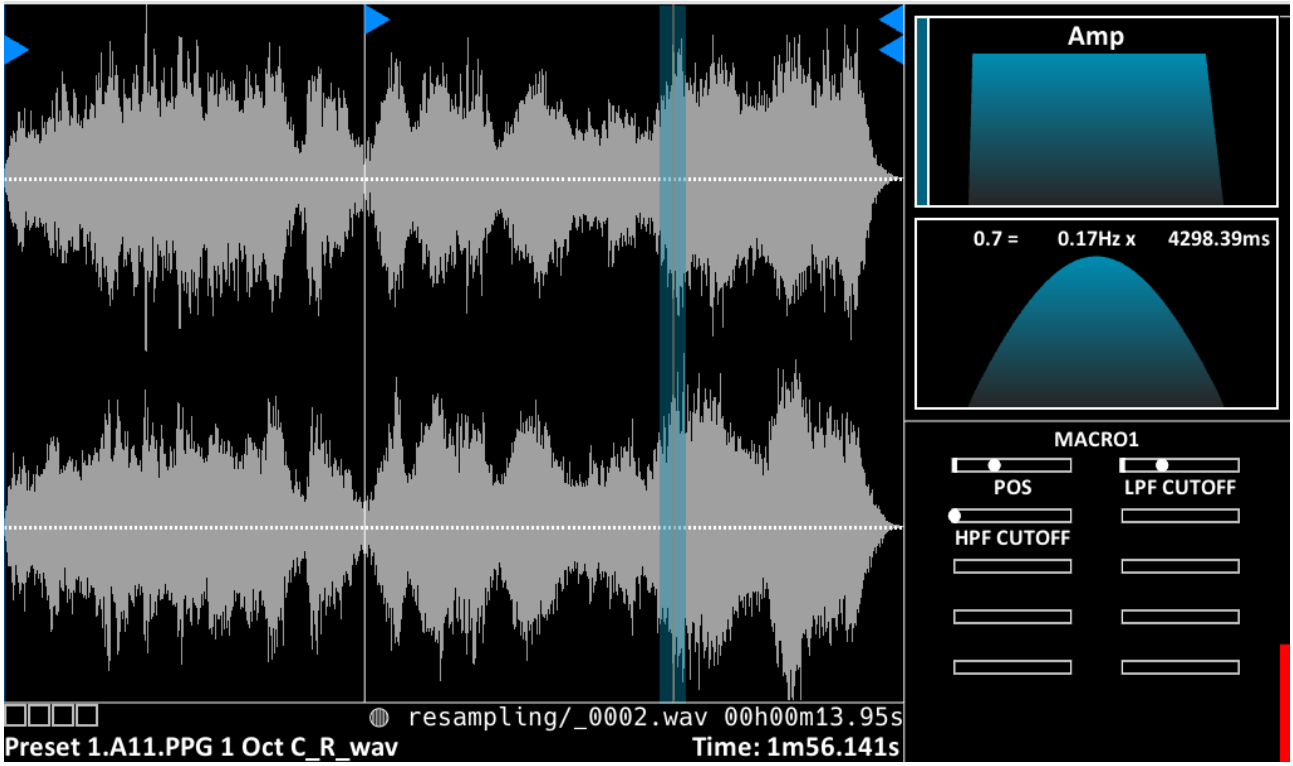


You can use the play button and scan knob to play through the buffer at different speeds, even backwards. You can use the play button, and even the sequencer to directly granulate or phase vocode the incoming live audio signal. All granular parameters and synthesizer parameters are also directly controllable while playing the recording sounds.

To stop recording, press [Record] once more.

Resampling

If you recorded in resampling mode, then things work as follows:



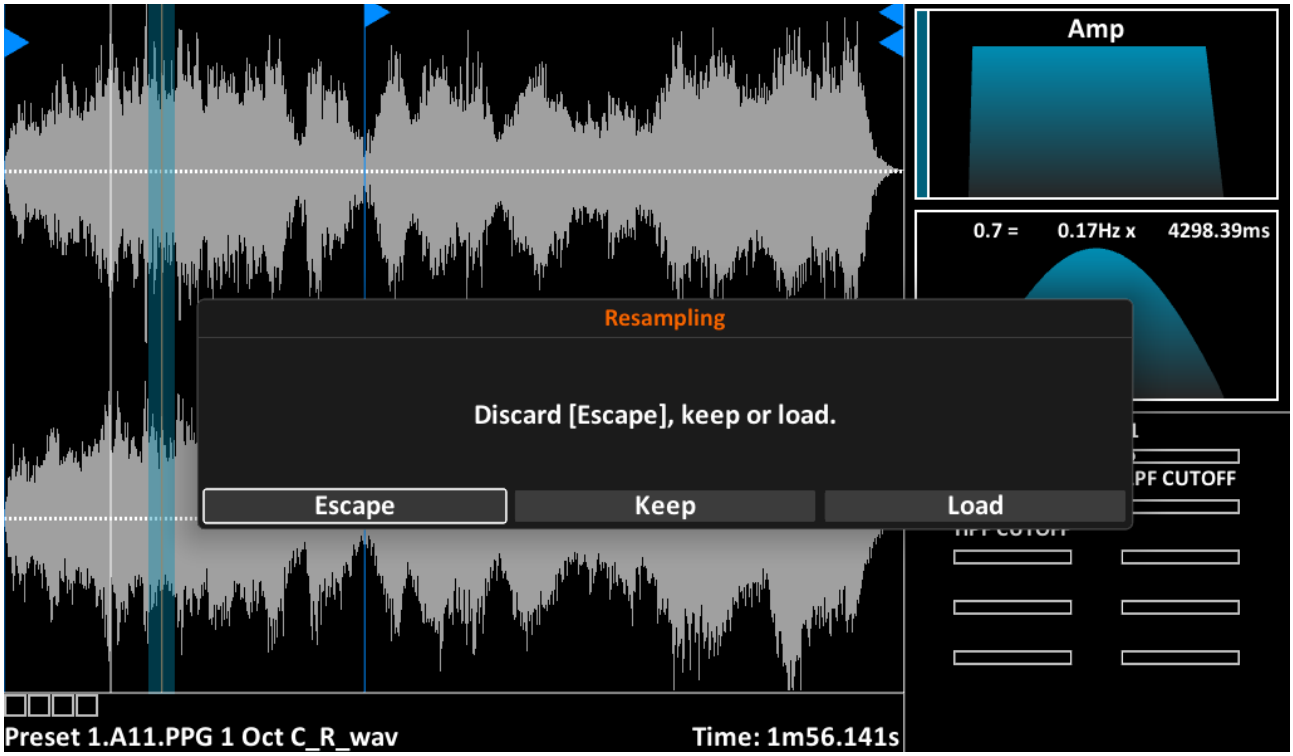
1. Select the “Resampling” source in the Sampling menu [Menu] + [Record].

2. Press [Menu] to go to the main screen.

2. Press [Rec]. The OSD on the bottom indicates you are currently recording to resampling/<your_prefix>_XXXX.wav. You can now use the play button and/or play MIDI notes for your recording. The sample you’re playing will be kept intact. The recording will be made to a background buffer.

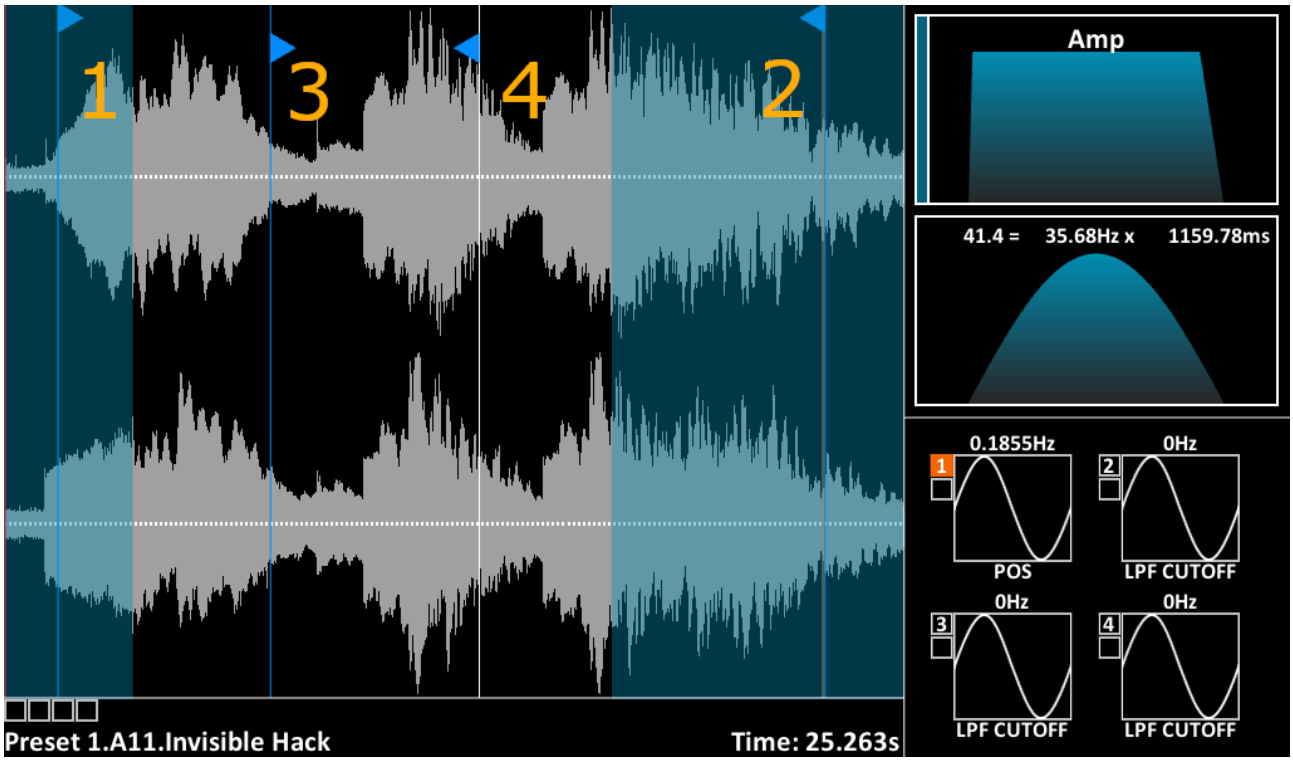
3. Press [Record] again to stop. You will now be prompted with a dialog:

4.
A. Choose “Escape” to exit and throw away the newly recorded sample.
B. Choose “Keep” to keep the newly recorded sample on disk. The sample in the buffer will be kept.
C. Choose “Load” to keep the newly recorded sample on disk, and also load it to the current sample buffer. Now you can play around with the newly recorded sample.


Amp
0.7 =
0.17Hz x
4298.39ms
Resampling
Discard [Escape], keep or load.
Escape
Keep
Load
PF CUTOFF
Preset 1.A11.PPG 1 Oct C_R_wav
Time: 1m56.141s

Crop & Loop confinements

All of the sound engines support looping and stop positions, and cropping. In granular mode, looping is intended for the scanning motion. These are marked by flags:



Start End (loop) flags

1) Start flag : high, points to the right. Used for setting the start of the crop area. *NOTE: this is not the grain start position. The grain start position is always set by touching the position slider.*

2) Stop flag : high, points to the left. This has two purposes:
- Sets the end of the crop area,
- Sets the end point for the scan motion.

3) Loop start flag: low, points to the right. Does what it says.

4) Loop end flag: low, points to the left. Does what it says.

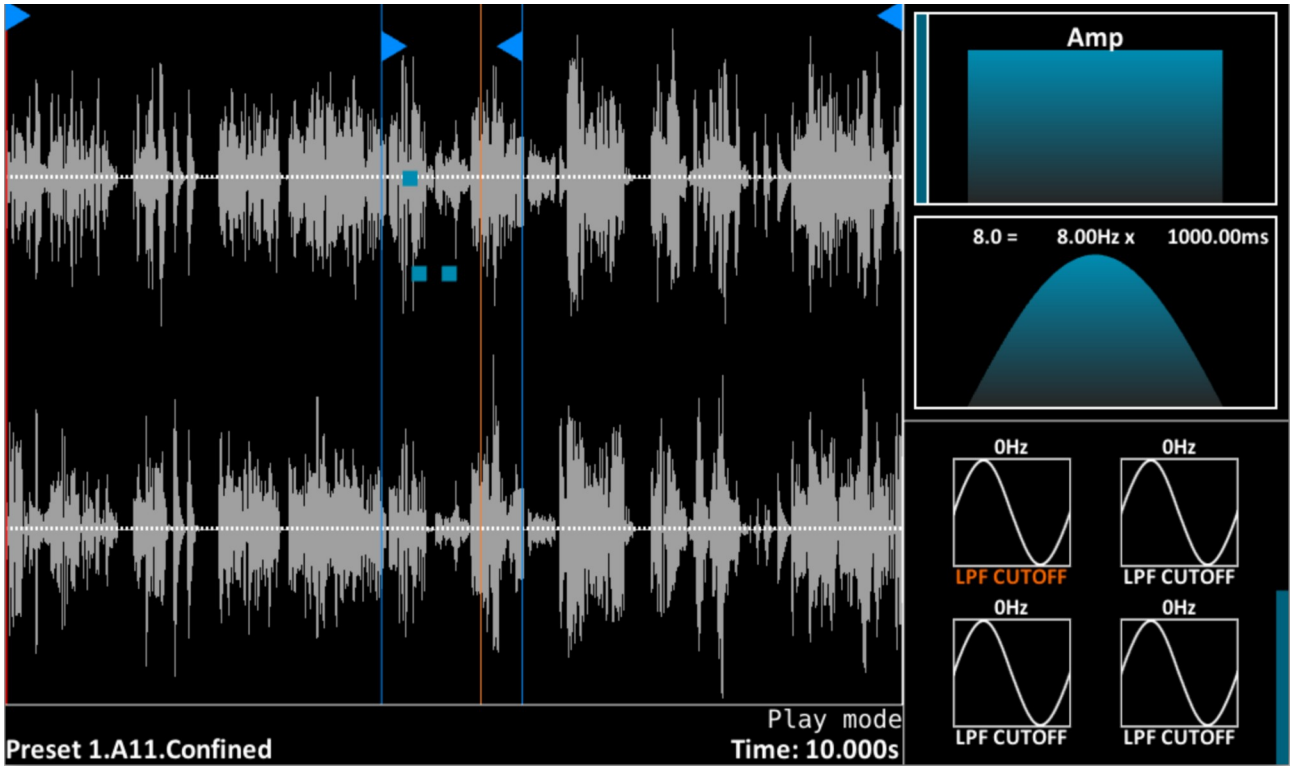
Sample Loop Confinement

You can use the loop flags: loop start, and loop end, to confine sample playback to a specific region.

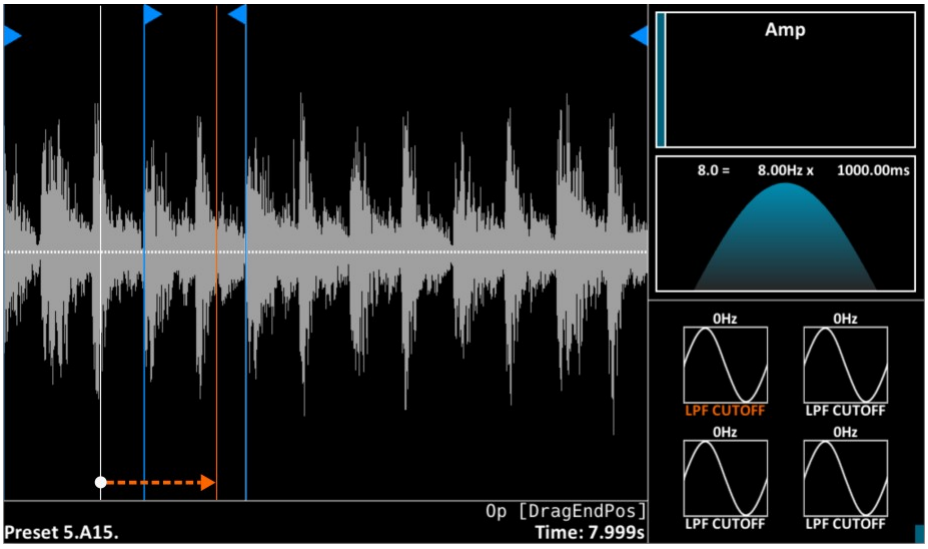
While the loop flags are used in the Granular and Spectral sound engines to confine scanning, in Sampler and Tape sound engines they are used to confine sample playback. The play heads will stay completely confined between the loop start and loop end. In these sound engines, especially in loop and one shot mode (Patch menu → Scan mode) there may be audible clicks and pops if you do not use zero crossings. Pingpong mode can somewhat remedy this.

1. Turn (Op Enc) to “SET LOOP START POS”.
2. Drag the horizontal slider to the position in the sample you want.
3. Push (Op Enc).
4. Turn (Op Enc) to “SET LOOP END POS”.
5. Drag the horizontal slider to the position in the sample you want.
6. Push (Op Enc).

Press [▶]. You’ll notice all grains / play heads are confined to the region of your interest.
Please note that changing loop start and loop end will only take effect in the sound engine when you play a new note!



Scan looping



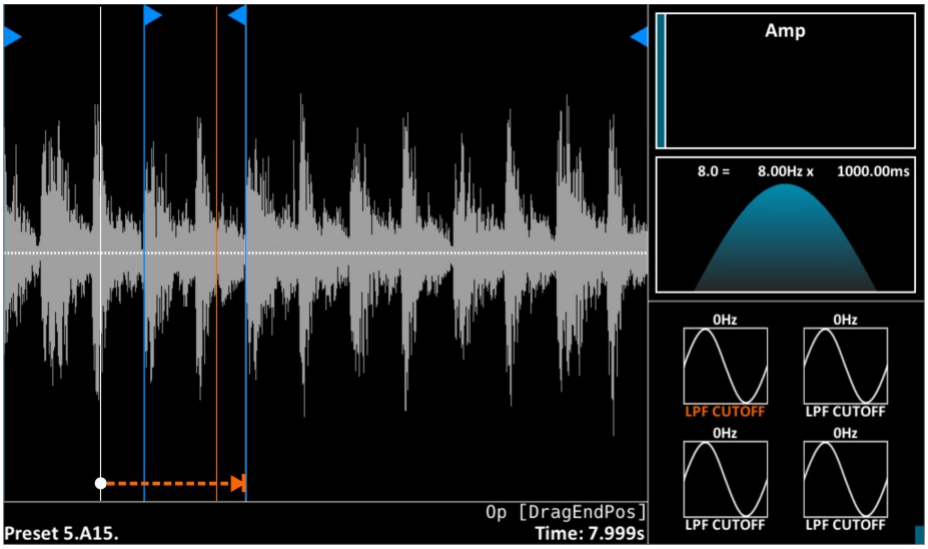
When a MIDI Note ON message is received, the Scanning motion starts at the white vertical line. The white line is stored in the preset, or is set by touching the slider position. Depending on the Scan setting it will move forward or in the reverse direction. You'll see an orange vertical line starting to move.

Scan mode (Patch Menu)

At some point the orange line enters the loop area. When it wants to exit the loop area it chooses depending on the [Scan / Slice mode] setting in the Patch menu.

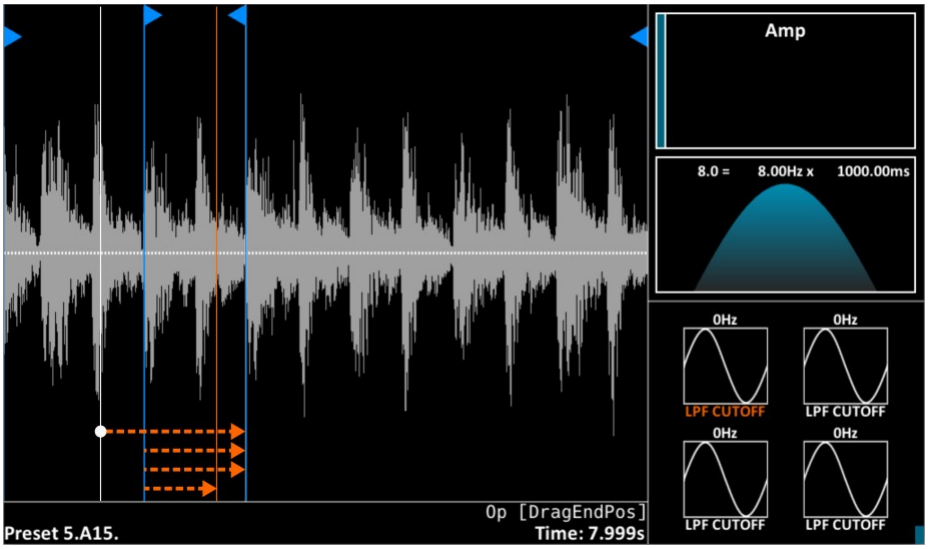
[One-shot]

Enters Loop confinement, stops at Loop Flag.



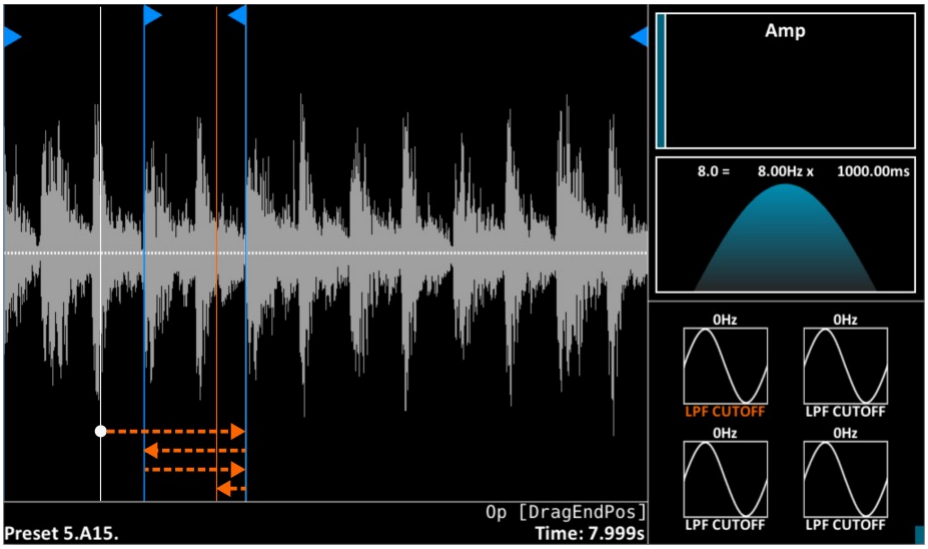
[Loop]

Enters Loop confinement, wraps in same direction when reaching Loop Flag.



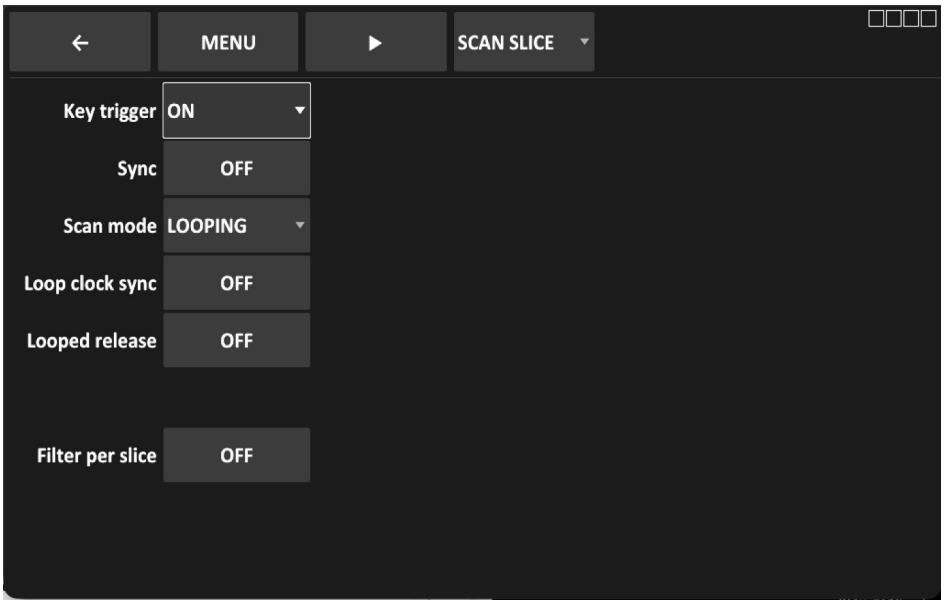
[Bounce]

Enters Loop confinement, bounces against Loop Flag into opposite direction.



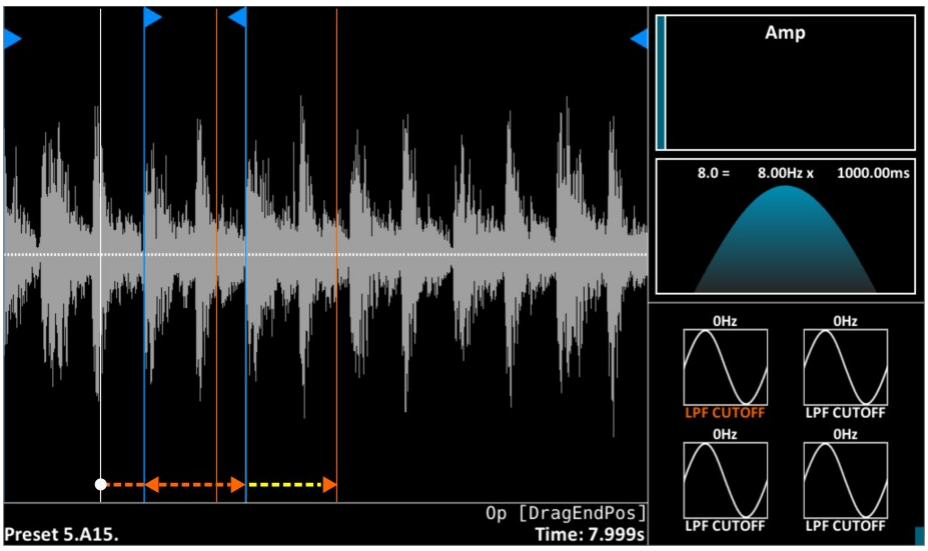
Scan Looped Release

When a MIDI Note OFF is received, the scanning motion either keeps looping or bouncing, depending on the [Looped release] settings in the Patch menu.



If Looped release is ON, it will continue to scan *inside* the loop confinement.

If Looped release is OFF, it will exit the loop area, but only if it has performed an even number (0, 2, 4, 6, …) of loops or bounces.



Sample editing

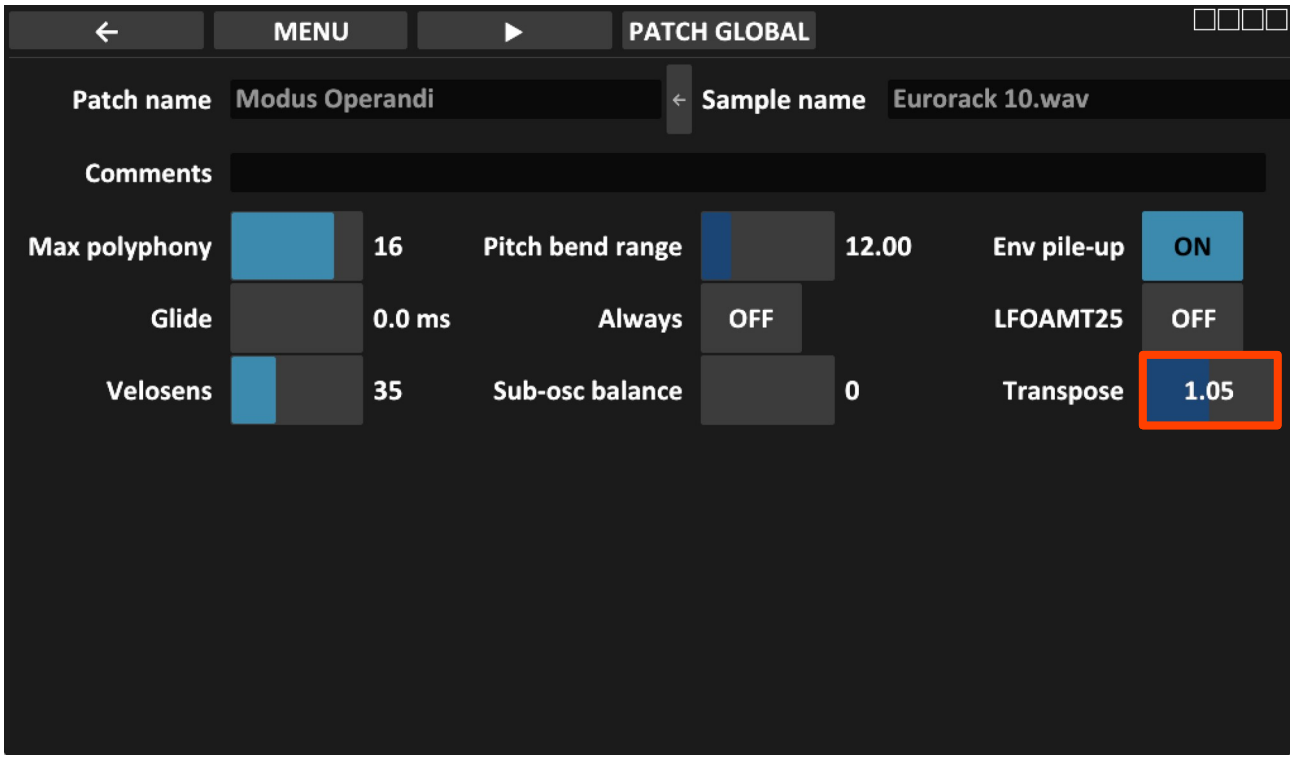
Sample Tuning

1. Go to Menu → Patch (Hold [Menu] and press [1])
2. Navigate to the column called “Grain” and to “Transpose”
3. Use the horizontal slider and/or turn (Op Enc) to transpose your sample in semitones. [Shift] + (Op Enc) fine tunes.

Using your ears you can now tune it using the on-board tuning sine. Hold [Shift] and press [Sub] (in the lower right region of the front plate). The tuning sine will activate, and you’ll hear the central C (approx 261 Hz). You can transpose your sample to match the C.

You can also choose to use the Pitch knob for this purpose, but it’s more often used live for performance.

Here we use the transpose option in the Patch menu to transpose the pitch up by 1 semitone and 5 cents:



Sample Normalize

1. Turn (Op Enc) to “Normalize”
2. Press (Op Enc)

Note: the GR-MEGA can automatically normalize samples when loading them. This means that you don’t need to normalize samples. You’ll probably only need to do it after cropping.

Sample Crop

Sample cropping can be done in three ways:

Crop Zoomed

This way is easiest.

Just turn the (Op encoder) to “ZOOM IN OUT” and hit the [Execute] button. Of course you can also use [Shift] + (Op encoder) to zoom in and out. You can scroll with the arrow keys [←] [→], and also use [Shift] + the horizontal fader to scroll quickly.

Then turn (Op Enc) to “ZOOM CROPPED”, and hit [Execute]

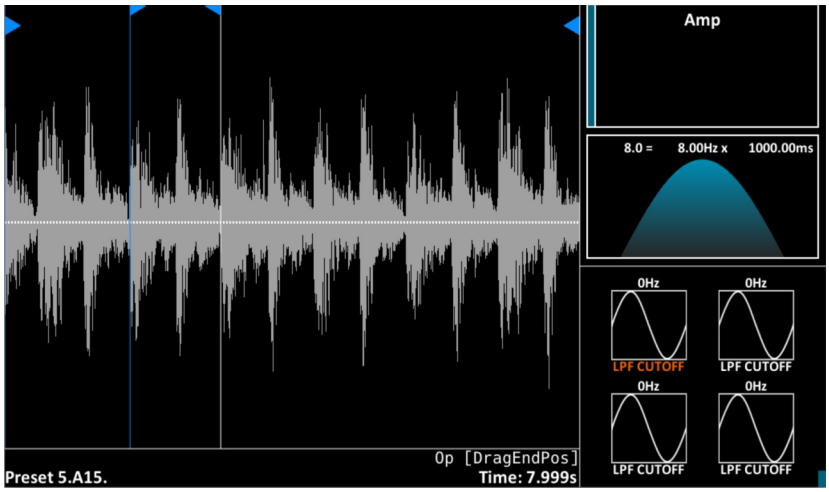
Crop recorded

After recording, turn the (Op Enc) to “ZOOM RECORDED”, and hit [Execute]. This will crop everything up to the record head: the RED line.

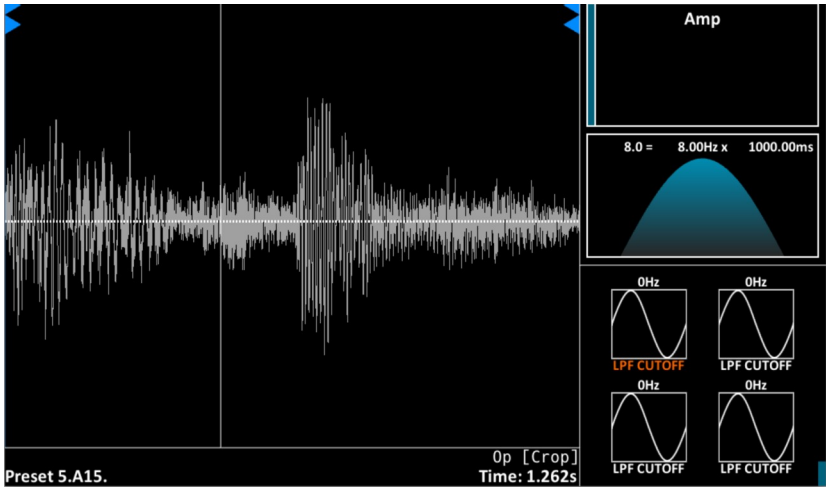
Crop start-end

This way is more complicated, but will allow you to make high precision crops.

1. Turn (Op Enc) to “DRAG START POS”
2. Drag the horizontal slider to the position in the sample you want.*Tip: You can use zooming to fine tune sample position: Hold [Shift] and turn (Op Enc) right to zoom in. Turn left to zoom out.*
3. Press the [Exec] button next to (Op Enc). This will set the Start marker.
4. Turn (Op Enc) to “DRAG END POS”
5. Drag the horizontal slider to the position in the sample you want
6. Pres (Op Enc). This will set the End marker.



7. Turn (Op Enc) to “Crop”
8. Press (Op Enc)
9. Your sample is now cropped to the range between the start and end flags.



Soft cut

Cropping can cause jumps in the signal, when not done at zero crossings, and even zero crossings can cause somewhat artificial sample loops. To counter this effect, we offer a “soft cut” toggle. Turn this on to crossfade the start and the end of the crop region. Note that this will shorten the resulting sample a tiny amount.

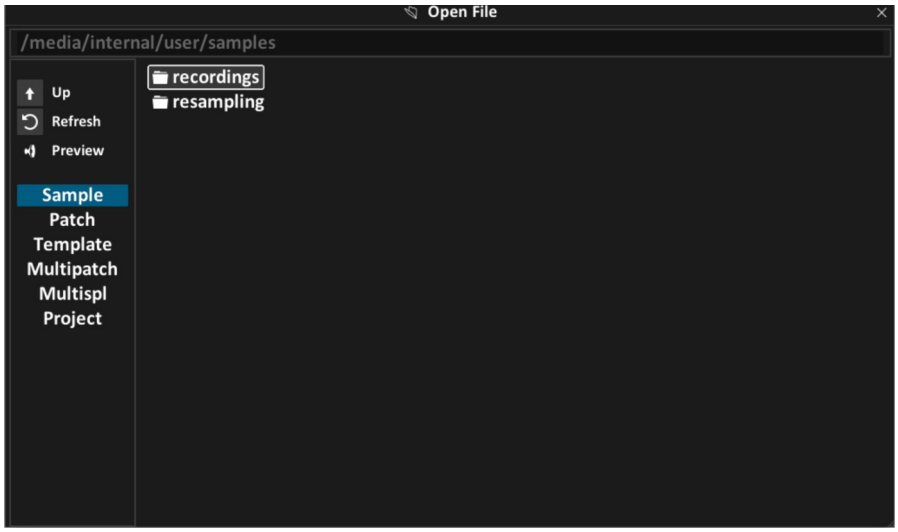
Turn the “Soft cut” toggle ON in the Audio prefs menu.

Saving & Loading

Loading

Loading (not to be confused with recalling, which is done with button combos) is typically done with the file chooser.

Press the Load button to open it. If Expert file chooser is turned ON in the IO menu, then the file chooser will open immediately (left screenshot). Otherwise you will have to chooser your data type first (right).



On the top left there are navigation options, on the bottom left you can chooser the data type. On the right there's you can navigate through the folder contents. Select a data type, and then navigate to the file you want to load, and press Load again.

Press the loudspeaker icon (🔊) to enable sound previews. You can now hear the wav file under the cursor. Use the horizontal fader to fast forward through the preview. [Shift] + [Play] lets you manually preview the sample, just like in the main screen.

* Press Load button

* Navigate

* Press Load button again

In 80% of the cases you'll use this to load samples.. Samples that you recorded, or from USB stick, or samples you copied to internal storage earlier on using the File manager.

Other data types are supported as well. You'll sometimes load a backed up project from USB. You'll sometimes load patches from another project.

Supported sample formats

WAV: Loading and saving. Almost all variants, 8,16,24 bit integer, 32 bit float. Will also import cue points into slice mode.

AIFF: Loading only. Most variants, except proprietary Ableton encoding. At the time of writing AIFF sound previews are not possible.

FLAC: Loading only.

SFZ: Loading only, will switch to slice mode. Will only load loudest velocity layer. Key groups are duplicated into multiple sample rate converted slices.

HLAC: speed-optimized lossless sample format. Loading only at this point. Multisample support is limited.

Supported patch formats

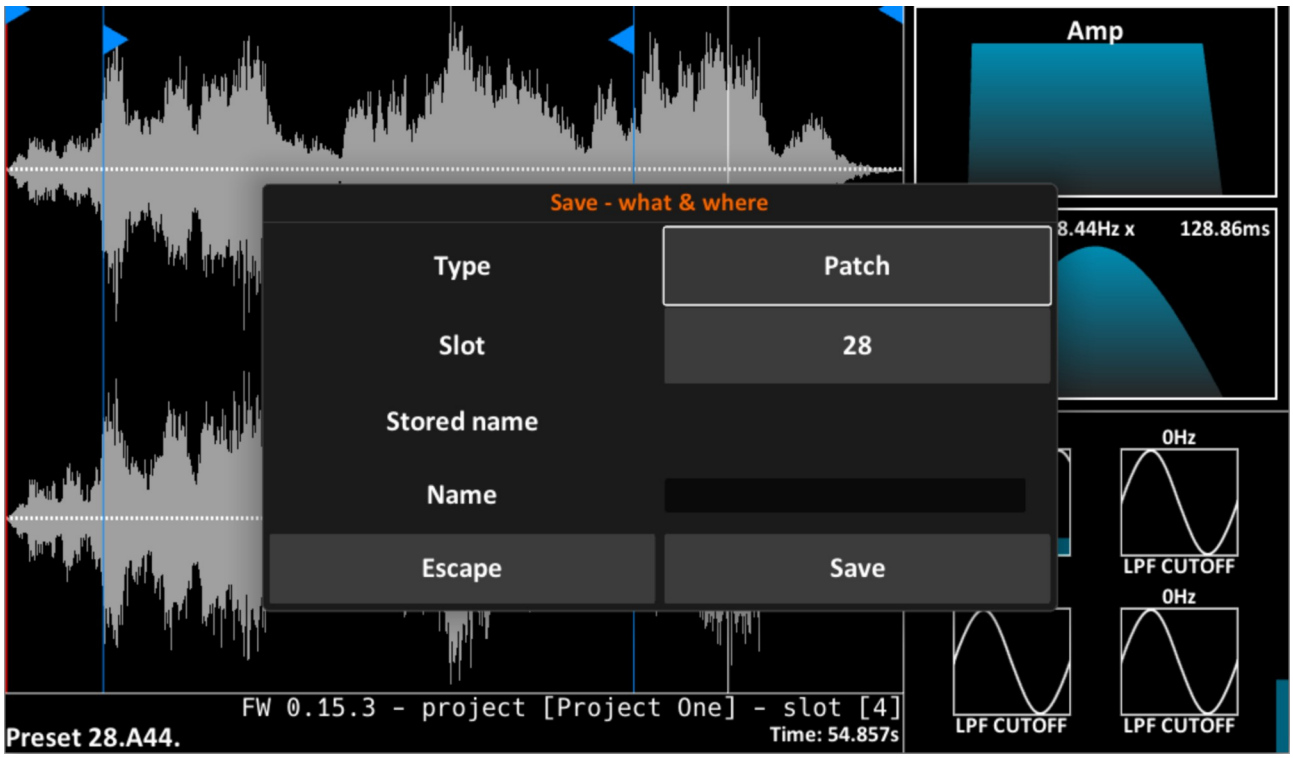
GR-1: folders with .grp + .wav files. loading only

GR-MEGA: loading and saving

Saving

Saving is typically done by just pressing [Save]. There will be a confirmation dialog asking you to save changes or to escape. This is *context sensitive*. If you have only 1 layer visible, it will save the (monotimbral) preset. If you have multiple layers visible, then it will save the multi(preset)*. If you have just recorded a sample and then press [Save], it will prompt a more complex dialog, allowing you to save sample, preset or multi. Typically, saving your progress means just pressing [Save] twice. After reboot the project will recall like how you left it.

Saving can be done in detail with the save dialog.
You can also toggle this on permanently:
[Menu] -> I/O -> Expert save dialog -> ON



Most often you'll save edited or recorded samples. Select the Type, name the sample if you want and then press Save. The sample is then written to the internal storage at:

`/media/internal/user/samples/`

Patches can be saved to slots with the save dialog. Typically, you'll just save your progress with the current patch this way.

1. Press [Save]
2. Select type Patch (or keep it, if it was already selected)
3. Press [Save] again

Typically, that's just pressing save twice.

You can also save to another preset slot to make a sort of backup. Patches are not saved to custom folders or USB this way. Use the file manager for this. Mtpresets, and templates can be saved in exactly the same way.

Projects can be renamed and saved to the current project slot or another slot in the same way (Remember: there are 50 project slots and 128 preset slots per project). When the project data type is already Project, you can just press save twice.

*: multi presets may be saved as references to monotimbral presets, or as *standalone*. By default, to save precious RAM and disk space, on the GR-2 saves mtpresets as references. You can change this by going to the IO menu and turning “MTPreset: detach on save” → ON.

Undo

Saving will set a new *undo point*, meaning a point you can return to if you want to discard your recent changes.

Actions that will set a new undo point:

* Save patch
* Save project
* Load project or GR-1 performance

Actions that will not set a new undo point:

* Loading or saving separate patches
* Loading or saving samples

Our philosophy is that loading samples or patches is typically for *experimentation*. Is this the sound I’m looking for? Mostly not, so just rewind and let’s try another sample or patch. If yes, let’s save to keep it.

Undo your changes by pressing switching to the current preset again: hold [≡] and turn (Op enc).

GR-2 Data types

Compatibility

The files saved by the GR-2 can be loaded by the GR-MEGA and vice-versa. The GR-2 can load GR-1 files.

Samples

The GR-2 is sample based device. Every sound it makes is made by using samples. The sample is the most basic data type the GR-2 understands. It can be loaded from disk as WAV, AIFF, SFZ, FLAC, or HLAC files, and saved as a WAV file.

Template

A template means all knob tweaks and menu parameters that influence sound generation. For example: the position in the sample, the number of grains per second, and the low pass filter cutoff. In total this is hundreds of parameters. A template can loaded and saved to/from disk, but it is often only used as a part of a Patch. It's mostly used to initialize patches, but can also be used to copy settings from one preset to the other.

Templates are stored globally: `/media/internal/user/templates`

Patches

A patch consists of a sample + a template. A template can be very generic, meaning it can have settings that, for instance, suit to some ambient pads, but it can also be highly specific to the used sample. For instance, a drumbeat can be sliced up at very specific points (kick, snare, hi-hat, etc). That's why each patch comes with its own template data.

A stored patch that's recalled by button combination and by MIDI is called a "preset". Let's say you press bank button A, sub-bank button 2, preset button 7 this will recall preset A-2-7 : preset 16.

Remember: *a preset = just a stored patch*.

Mtpresets

Multitimbral presets, or mtpresets, sometimes called "stacks" or "multis" in old firmwares: these are configurations of up to 4 layers. The layers can refer to (monotimbral) presets, but layers can also be stand-alone and contain their own sample data. Layer volumes are also stored here, because they are important to recall when performing in multi timbral mode. There are a number of mtpresets you can immediately recall by using Shift + the bank & preset buttons.

Traditionally, mtpresets were only references to monotimbral presets + metadata, but we have since firmware 1.7 extended this so that they can work standalone, which is more welcoming for beginners. The down side is that this uses more memory.

Should you wish to revert to pure references, maybe if you use very long samples which you want to share between several mtpresets:

1. Menu → IO → MTPreset: detach on save → OFF (default on GR-2!)

2. Create and save your monotimbral presets.

3. Open layer with [Shift] + [Layer 1234] buttons.

4. Change presets to your favorite monitimbral preset.

5. Next layer: Repeat from step 3.

Projects

Projects are the biggest collection of data. A project is much like a project in a DAW on PC/Mac. To make things easier, projects are simply stored in a list of 50 slots. Projects can be easily loaded and saved by accessing the project menu, which is basically just a long list of project names. More about this in the Menus Chapter, section Project menu.

A project contains:
* 128 presets (meaning 128 patches = 128 samples + templates)
* 128 mtpresets (multi timbral presets)
* the project name, global BPM, rate (division)

System settings

System settings contains things like brightness of the display, and LEDs, MIDI device configuration, clocking settings, etc. Things you typically set up to your own user preference which influence the entire system. System settings are saved in the system menu. They are recalled at startup, and cannot be loaded from or saved to USB.

Multisamples

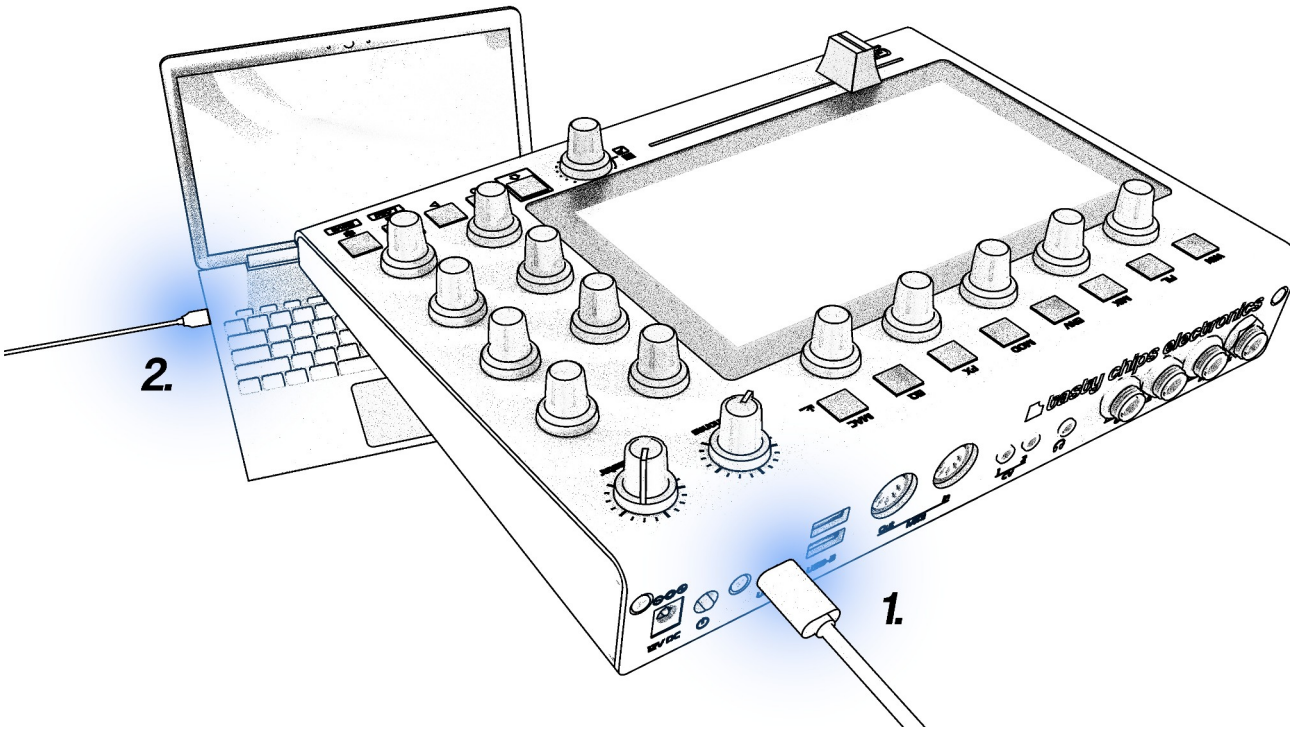
This means a sample for each key. The GR-2 can load SFZ multisamples, but does not support velocity layers currently. This is being planned.

File sharing

The GR-2 can share files over the LAN port, but also over USB C. The GR-MEGA can make sound when sharing files, and does not need to be restarted to enable file sharing. A physical connection is all that is required. You can use this as an alternative to the internal File Manager. All actions will be done from your PC/Mac.

Setup

Step I - USB C (Linux and Mac)
Use a USB C cable to connect your GR-2 USB C port with your PC or MAC.



Step II In Finder (Mac), Windows Explorer (PC/Windows) or in Files/Nautilus (Linux) you should see the name “GR-2” advertised under “+ Other Locations”. On Mac and Linux this is on the left side of the window.

On Windows 11 it seems to be the case that you may need to use the function “Add network location” or “Add network drive” and enter \\GR-2\internal
See below for step-by-step Windows 11 screenshots:

Step III On your PC/Mac click on the GR-MEGA to browse the files in its internal storage (“/media/internal”). No user password is necessary, just choose to login as guest.

Important

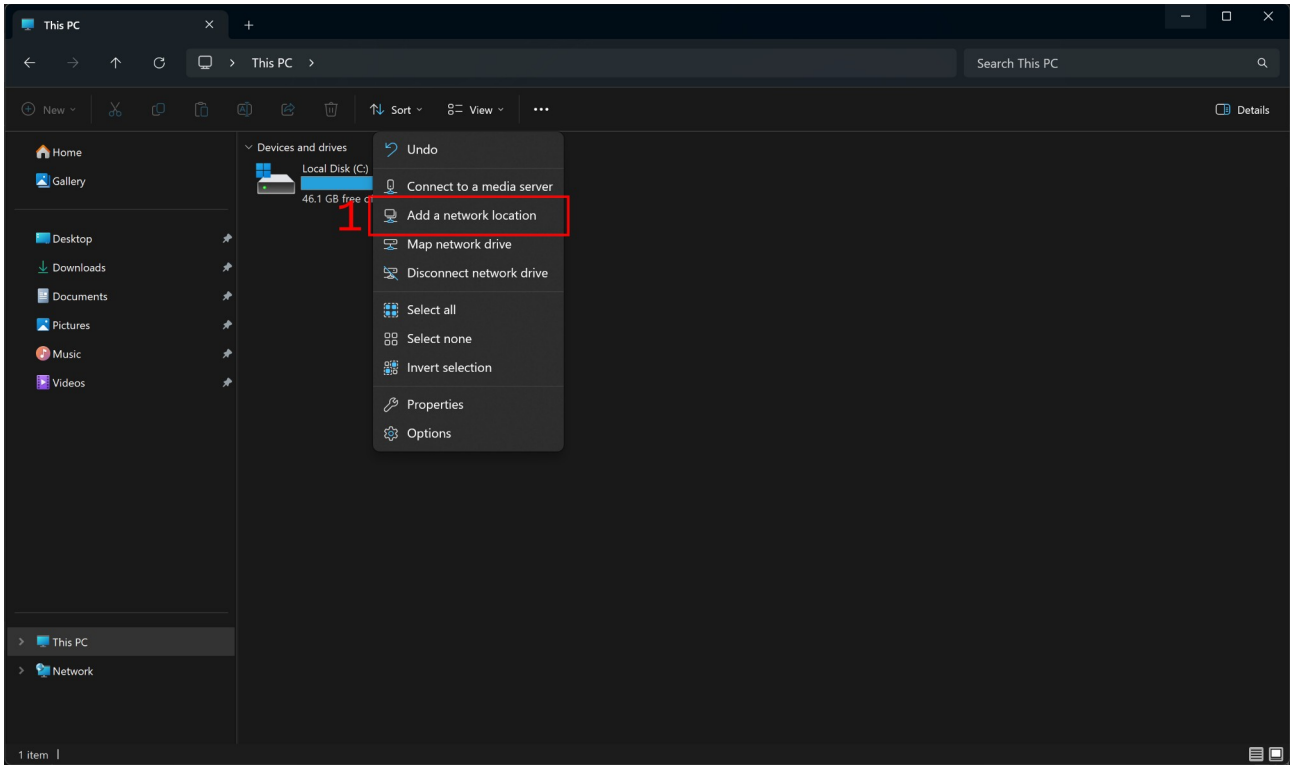
The GR-2 does not have a recoverable trash can. A deleted file is permanently gone!

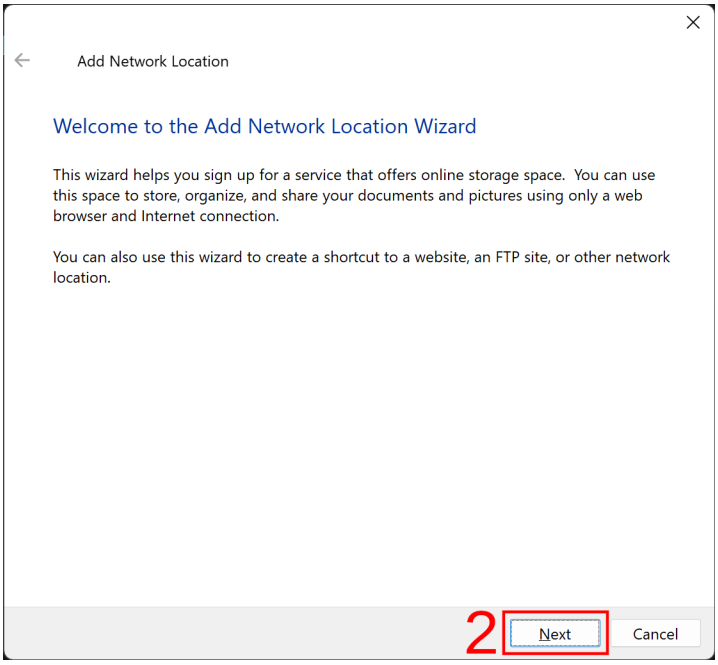
Windows 11

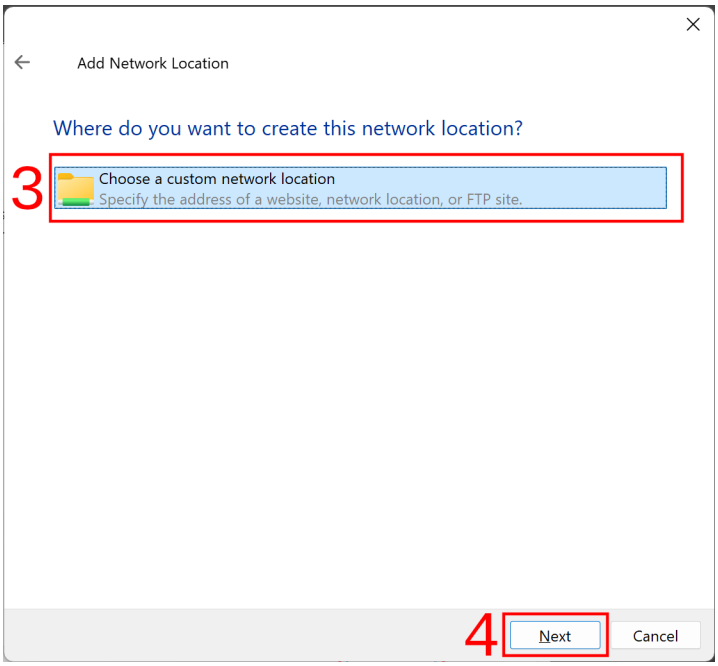
This is a graphical overview of all the steps. Please note that it seems that you may also need:

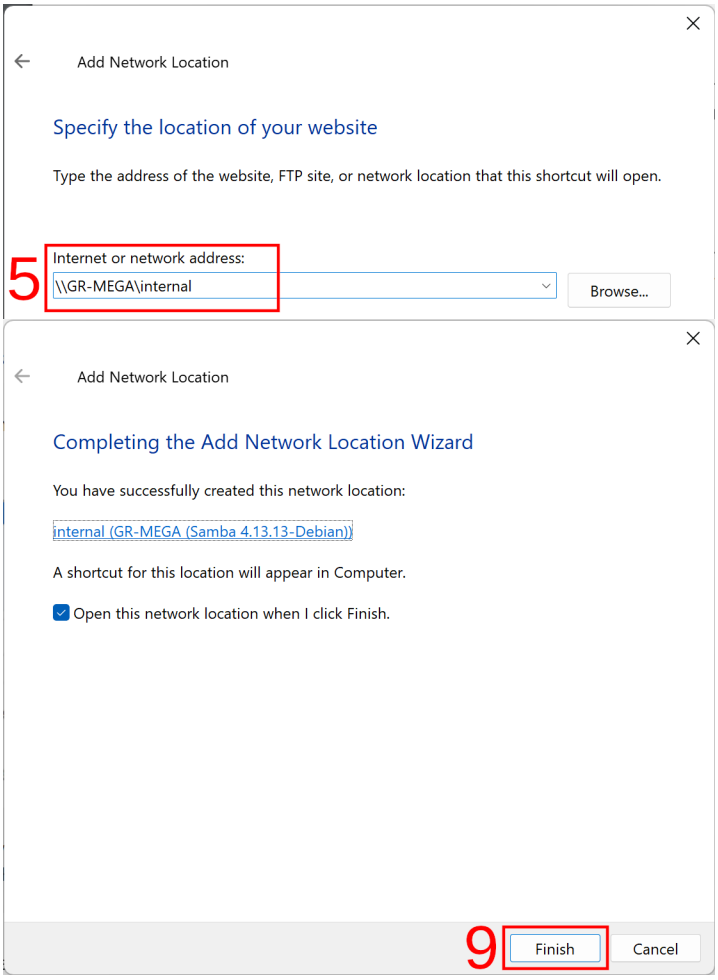
Run the following command in powershell:

```
Set-SmbClientConfiguration -RequireSecuritySignature $false
```

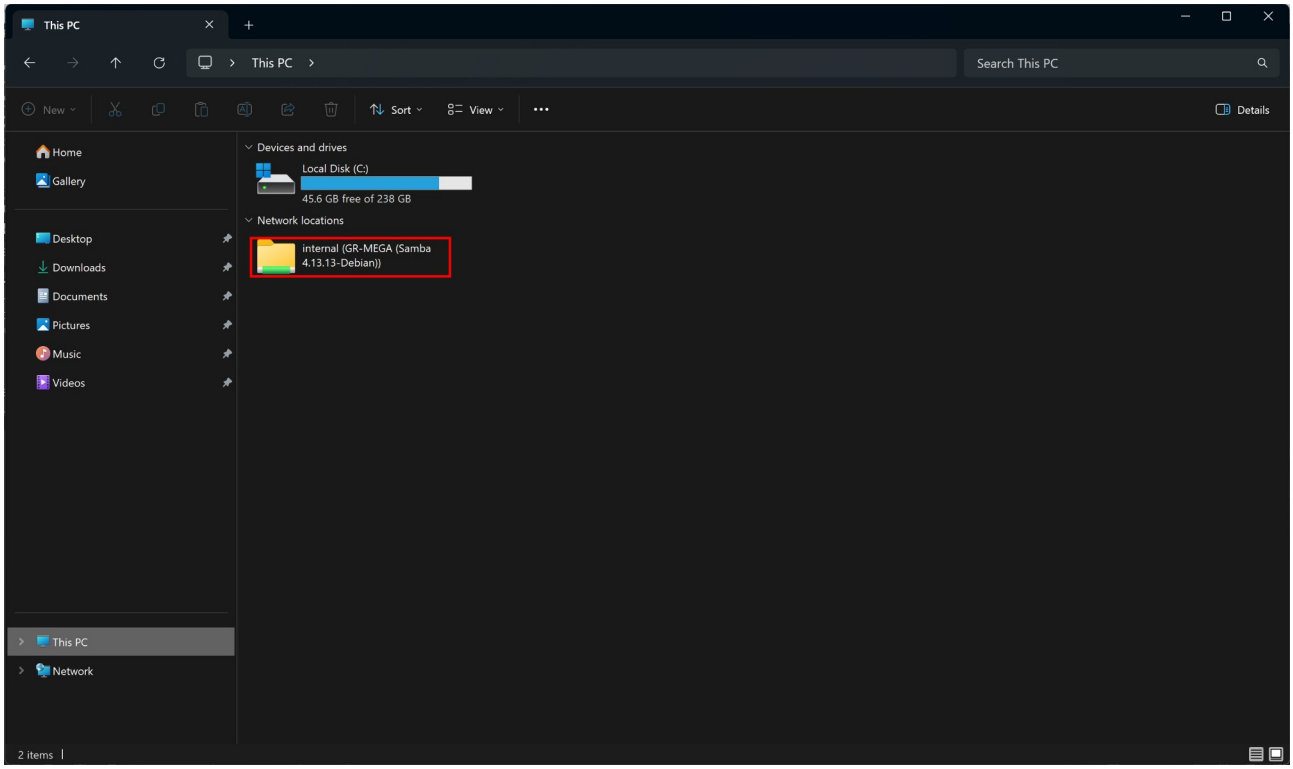


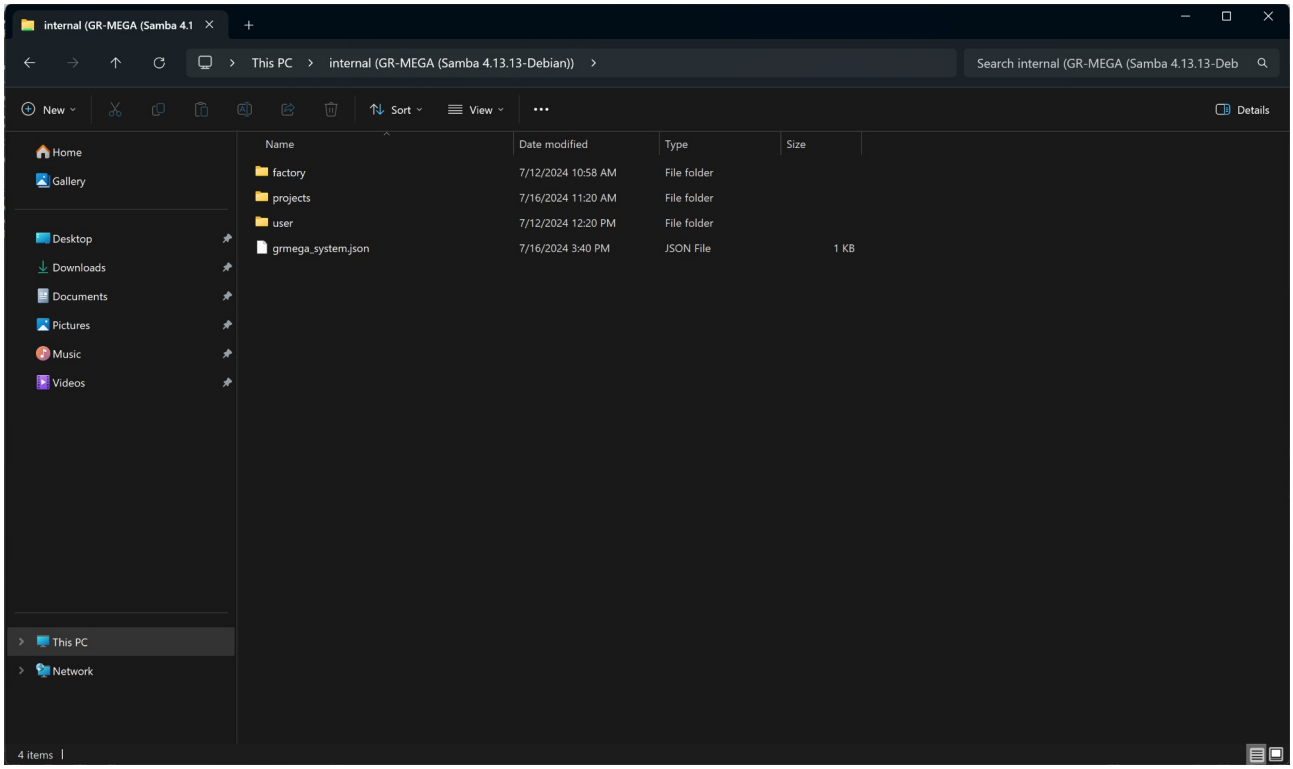

Add Network Location
Welcome to the Add Network Location Wizard
This wizard helps you sign up for a service that offers online storage space. You can use this space to store, organize, and share your documents and pictures using only a web browser and Internet connection.
You can also use this wizard to create a shortcut to a website, an FTP site, or other network location.
2
Next
Cancel


Add Network Location
Where do you want to create this network location?
3
Choose a custom network location
Specify the address of a website, network location, or FTP site.
4
Next
Cancel



After competing all the steps the mapped drive should look like this:


This PC
This PC
Search This PC
New
Sort
View
Details
Home
Gallery
Desktop
Downloads
Documents
Pictures
Music
Videos
This PC
Network
Devices and drives
Local Disk (C:)
45.6 GB free of 238 GB
Network locations
internal (GR-MEGA (Samba 4.13.13-Debian))
2 items


internal (GR-MEGA (Samba 4.1
This PC
internal (GR-MEGA (Samba 4.13.13-Debian))
Search internal (GR-MEGA (Samba 4.13.13-Deb
New
Sort
View
Details
Home
Gallery
Desktop
Downloads
Documents
Pictures
Music
Videos
This PC
Network
Name
Date modified
Type
Size
factory
7/12/2024 10:58 AM
File folder
projects
7/16/2024 11:20 AM
File folder
user
7/12/2024 12:20 PM
File folder
grmega_system.json
7/16/2024 3:40 PM
JSON File
1 KB
4 items

Polyphony

This section explains the GR-2's forms of polyphony, the voice stealing algorithm, the grain window, and how to make the best of them. This applies to all sound engines, but especially to the granular ones, and the spectral engine which is the most CPU intensive of all.

Forms of polyphony

The GR-2 has two forms of polyphony:

- Grain polyphony: 128 grains per voice,
- Spectral polyphony.. 12 chord notes per voice,
- Voice polyphony: corresponding to playing notes: 16 voices .. and 3 voices for spectral mode.

Voice timbre

A voice may have anywhere from 0 to 128 grains playing at any time. This allows the flexibility to have a single grain playing (sporadically) up to a massive "cloud" of grains. No amount of playing notes will cause the amount of grains to be modified by the engine. The timbre of the voice will be kept intact as much as possible.

The same principle applies to the spectral sound engine. Higher polyphony will never influence the timbre. However, since spectral mode is (FFT) block based.. larger FFT sizes will increase engine latency. Using 3 spectral voices in 1 layer will be ok, even with 4096 or 8192 point FFT sizes, but doing this in multiple layers at the same time will risk audio drop-outs!

Note hold

The GR-2 supports the MIDI hold CC. All new notes will remain playing even if your fingers were lifted from the keyboard. This remains this way until hold is turned off again.

Voice stealing

When the GR-2 reaches maximum voice polyphony and the user presses yet more notes on the keyboard, it will choose to abruptly remove the oldest playing note, preferably already in release, that is not being held (by the hold CC explained above). It also makes choices based on the position of the notes on the keyboard in relation to each other. This should make note polyphony as full and responsive as possible.

Grain stealing

(Granular sound engines only) When the maximum amount of grains per voice (128) is reached, the grain scheduler will stall until grains have reached their end. This results in an oscillation effect where there's a big bunch of grains in one place and nothing elsewhere. Grain stealing remedies this effect. It will steal grains in a way that is inaudible to the user: no crackles or clicks. The only drawback is that it (logically) shortens grains. This depends a lot on the Grain stealing threshold setting. See the patch menu.

Audio, and avoiding drop-outs

Since the GR-2 has relatively modern digital hardware, audio drop-outs will not be common, unless you really push it. In terms of granular power, it can handle 4 layers at the same time with multiple voices and a bunch of grains per voice + each layer running 4 effects.. even with the large reverb and compressor effects.

An important thing to remember is that using USB C audio and MIDI at the same time will increase CPU demands drastically, so use audio only or MIDI+files only if you want to get the highest polyphony.

The spectral engine (Phase vocoding) is more hungrier than granular in terms of processing power. 1 layer is typically fine, but 2 layers can already cause problems. You may need to reduce the amount of effects or reduce the FFT size.

Further notes about granular polyphony.. if you're using 4 layers, effects.. Although this text is lifted from the GR-1 manual, and the GR-1 has only 1/3rd of the processing power.. it can still apply if you are combining granular and spectral:

It is important to remember that granular synthesis is random in nature. Too much and too scattered access to sample memory will result in a high strain on the engine..

- Maximum voice polyphony is caused by long envelope release and fast playing on the keyboard.. Beware, the GR-2 allows 45 second long envelope release!
- Maximum grain polyphony is caused by high grain size and density.
- High spray and long samples will cause scattering of sample memory access.

A suitable comparison is cooking with only 4 burners on your stove, but having a lot of pans around. The more powerful your hardware is, the more burners you have. The larger the sample, the higher the spray, and polyphony, the more pans you'll have around. You'll have to swap out many pans many times which causes slow downs.

The combination of the above factors can cause audio dropouts. The solution is to be aware of them, and apply some practical knowledge:

- If you desire long releases and many playing notes: consider limiting spray and/or choosing shorter samples. Alternatively, choose a short envelope release and use the built-in delay effect or use an external reverb that can generate long releases.
- With longer grains, it's often enough to have a density of 100 grains per second.
- The on-board play mode can be adequate for drones, by just using 4 voices.
- Anti-aliasing may be turned off. This is not recommended, but the aliasing sounds can be used creatively, in some cases.

Master volume and patch volume

When note polyphony increases the total volume will also increase. There is no compression on the end mix, so it will start *hard clipping* the output. So keep in mind that you can lower the volume with the master knob.

Grain window modification

For the sake of simplicity and optimization, there is only a single global grain window per part. This means that any change to the window while it is playing might result in crackles. However, if

the change is gradual and the window shape is convex (that means not pointy), the crackles will be minimal.

Tutorials

This chapter contains a number of tutorials intended to get you started. More advanced tutorials for actual sound design (leading to actually usable and impressive patches) can be found on our Youtube channel:

* Designing a granular patch with the GR-MEGA:
https://www.youtube.com/watch?v=mav7oJWiswA&t=633s

* Setting up the GR-MEGA in slice mode to jam with a groove box:
https://www.youtube.com/watch?v=mav7oJWiswA&t=1003s

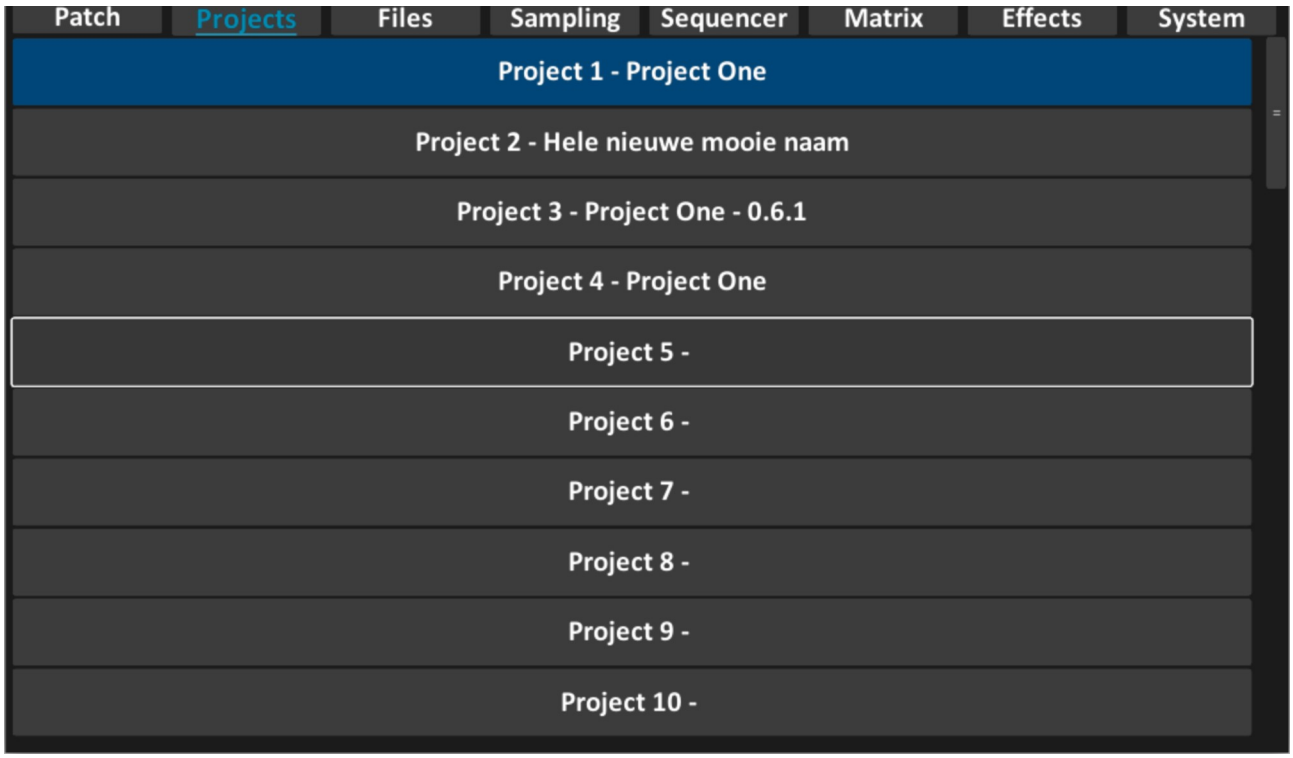
.. and in the same video there are many other tutorials to make use of the GR-MEGA's sound engines.

Our earlier video tutorial for the GR-1 is also a good one to watch. It will teach you how to make typical granular patches. The way the GR-1 works in granular and tape modes is very close to the way the GR-2 works.

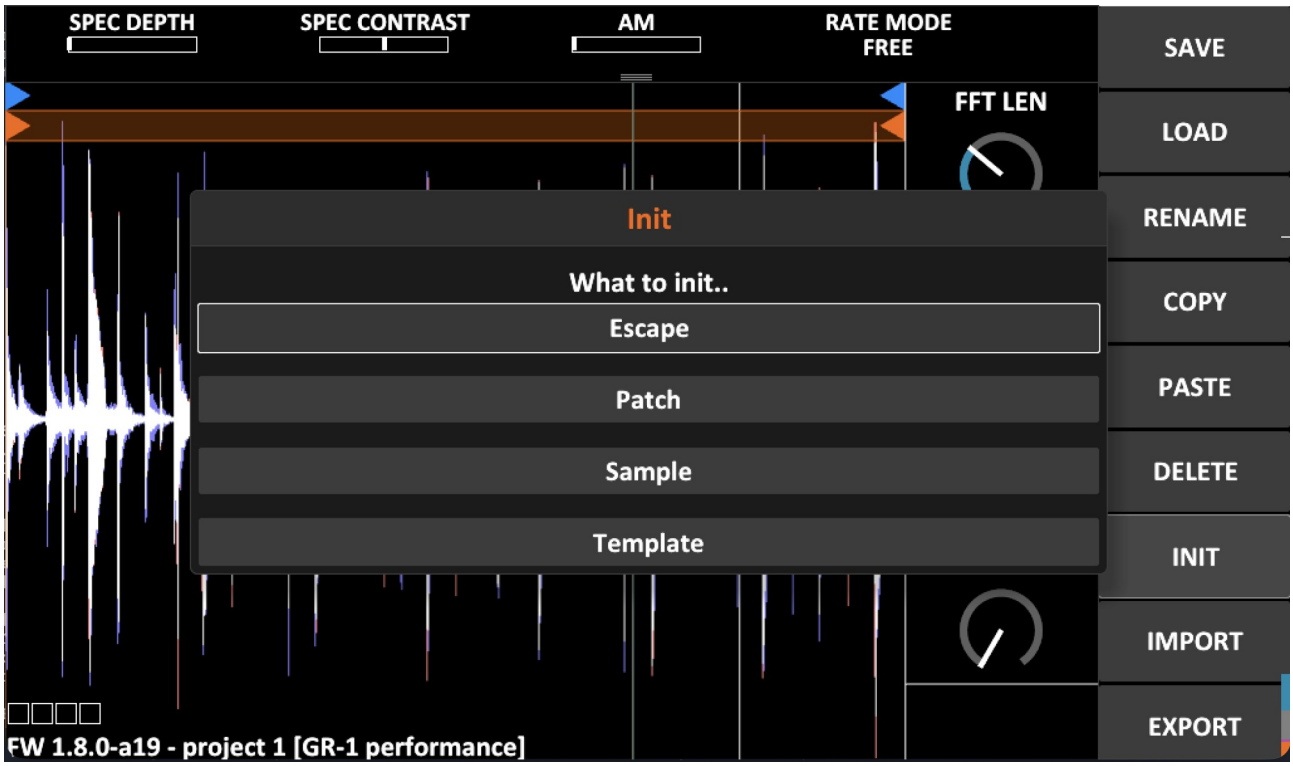
Initializing a patch

1. Init patch or project:

a. Menu → Projects → Navigate to an empty one and press Load.



b. Or just stay in the main screen to init an existing patch. Pull right the side menu → INIT → Patch.

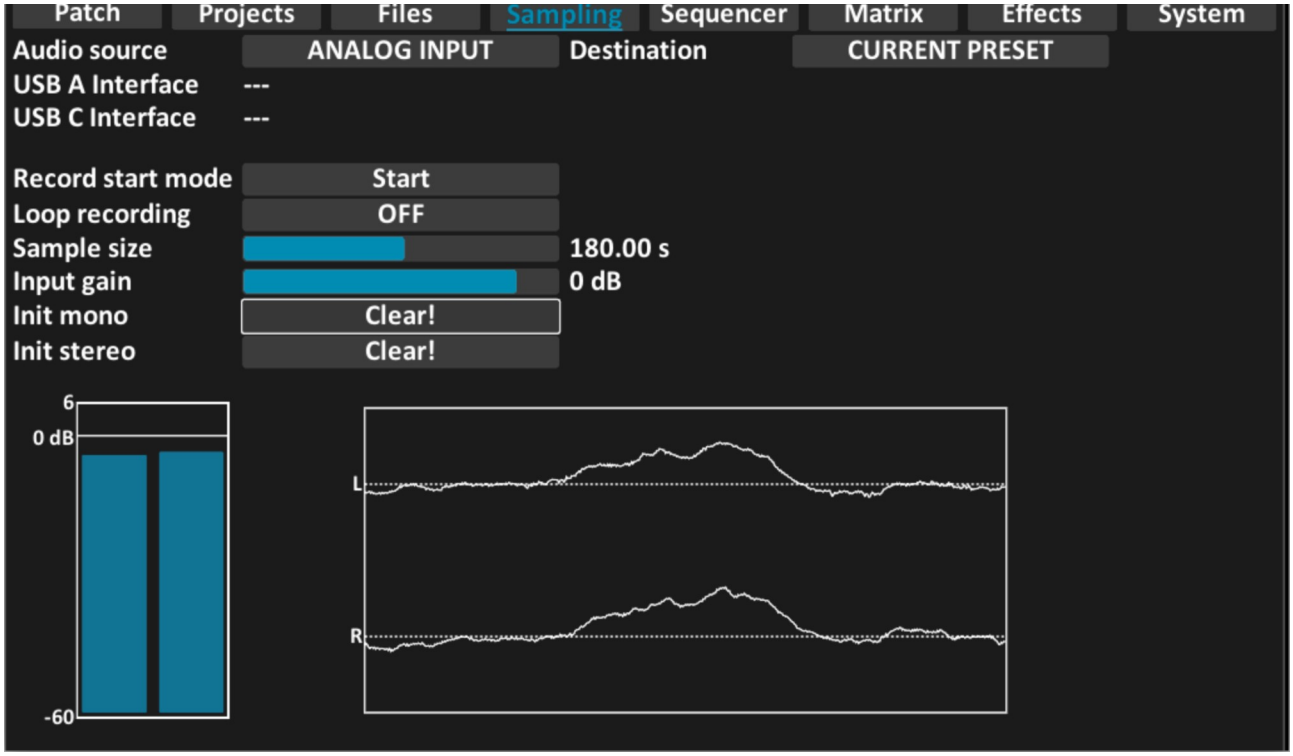


The preset will now initialize to 8 seconds of mono sample memory and defaults like granular mode, 120 BPM 4/4 time signature. BUT (!!) only if you have set the default template to be the factory template!

2. Initialize the sample buffer

Alternatively, to have more freedom over your sample buffer, you can go to the Sampling menu, and init the sample there:

I. Menu → Sampling
II. Set the sample size
III. Select “Init Mono” or “Init Stereo”, and press [Enter]
IV. Press [Menu] to return to the main screen to witness your new and empty sample buffer.


Patch
Projects
Files
Sampling
Sequencer
Matrix
Effects
System
Audio source
ANALOG INPUT
Destination
CURRENT PRESET
USB A Interface

USB C Interface

Record start mode
Start
Loop recording
OFF
Sample size
180.00 s
Input gain
0 dB
Init mono
Clear!
Init stereo
Clear!
6
0 dB
-60
L
R

From sample to patch

You can now record into the patch or load a sample into it from USB or internal storage.

Samples from internal storage

Let's load a sample from internal storage:

1. Press Load, the file chooser will show.

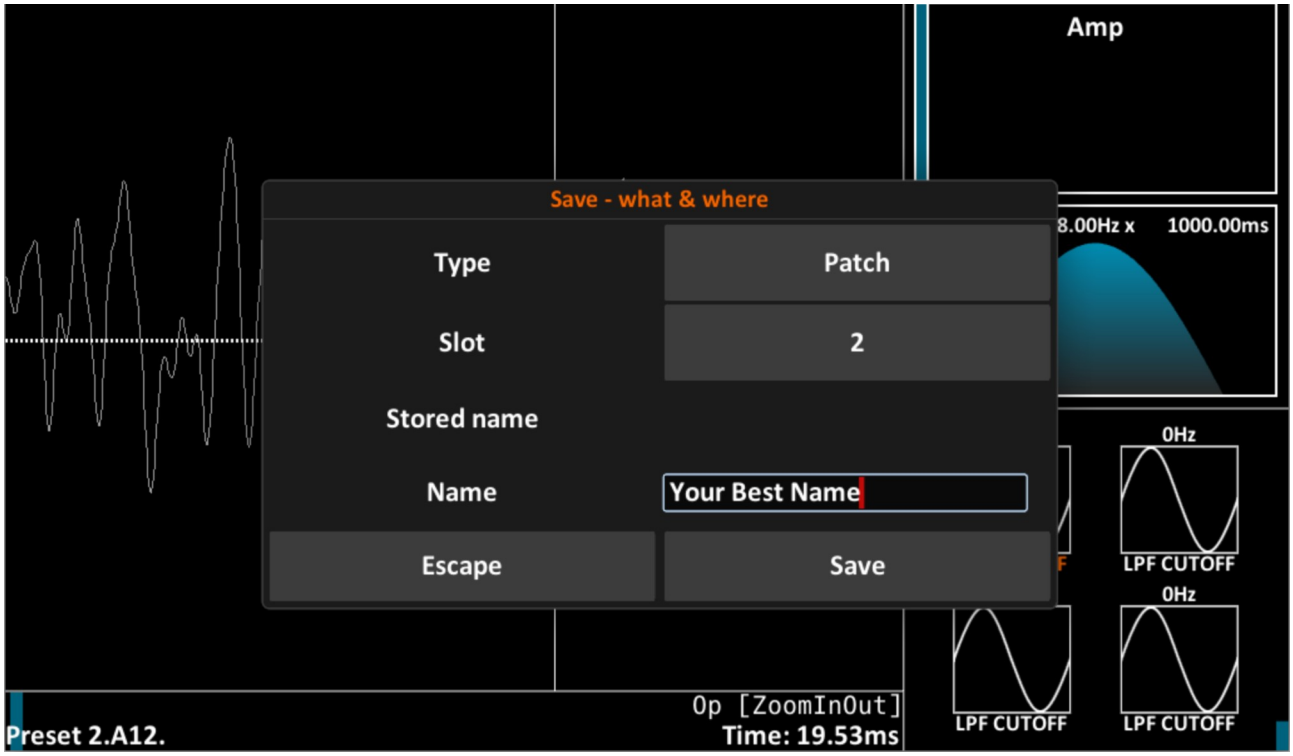
2. Navigate to `/media/internal/factory/`
Use (Op Enc) to scroll, then double tap to enter a folder.

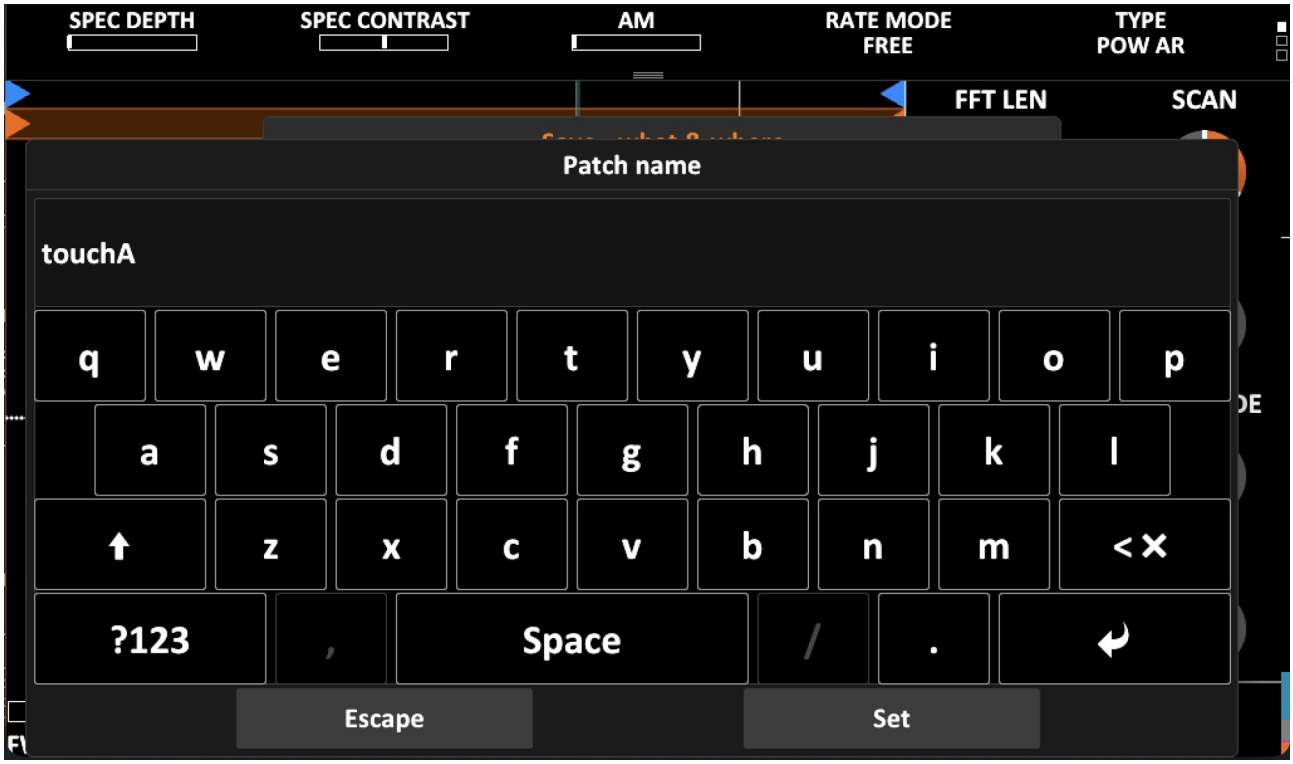
3. Scroll to the desired wav file using the arrows or (Op Enc), and press [Load]. See the chapter "Saving & Loading" for more details.

4. Use the horizontal slider and play button to find sweet spots in the sample, and adjust granular parameters to your liking.

5. Press Save, and touch the name text field, and the touchscreen keyboard pops up. Enter the name, and touch "SET". Then press Save again. Your first preset is now saved.

If you would like to record audio instead of loading a sample, have a look at the recording section in the Sampling Menu chapter.





Samples from USB

If you want to quickly turn your samples into presets, that can then be recalled, even after power cycling the GR-2:

0. Let's start at preset 1: Hold down the [≡] button and turn (Op enc) left until you see preset 1 displayed in the bottom of the screen.

1. Press [Load] ([Shift] + [≡]), the file chooser will show.

2. Navigate to /media/<YOUR USB STICK NAME>
Turn (Op Enc) to scroll, then press the Enter button to enter a folder.

3. Scroll to the desired wav file using (Op Enc), and press [Load]. See the chapter "Saving & Loading" for more details.

4. Use the horizontal slider and play button to find sweet spots in the sample, and adjust granular parameters to your liking.

5. Press Save, and touch the name text field, and the touchscreen keyboard pops up. Enter the name, and touch "Set". Then press Save again. Your first preset is now saved.

6. Press the next preset (for instance [Preset 2] if you just did Preset 1) and repeat.

Modifying a patch

To modify a patch is easy. Just use the knobs and buttons to change sound parameters.

Let's say you're in granular mode, and you want to reverse grain direction:

1. Use the Direction knob, and turn it all the way left.

2. To store the preset, Press [Save] twice.

You've now stored your modified preset. If you skip step 2 and press any preset or bank button, your changes are undone.

Incrementally updating your patch

Using the recipe listed in "Modifying a patch" you can also incrementally modify and save your updated patch to a new preset slot each time.

Now you know how to do this, it's time to introduce copy and paste:

1. Tweak preset.

2. Press [Menu] → Presets

3. Touch preset 2, a dialog will show.

4. Touch the Save option.

5. Possible Touch preset 2 again, and then select rename and rename the preset.

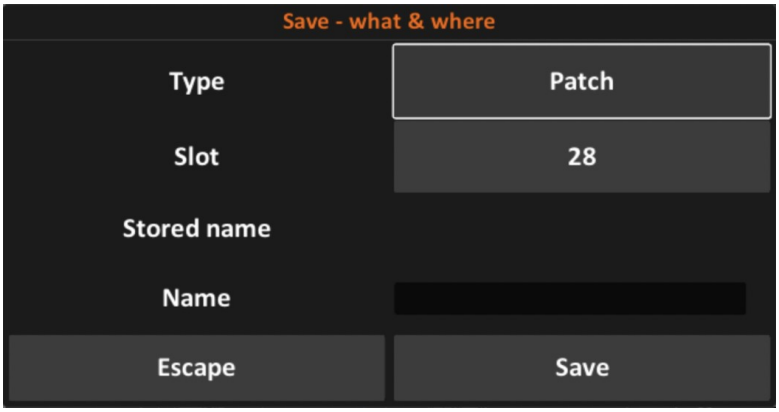
5. Increase preset number and repeat.

You can repeat the above step until you hit your a tweak that you want to discard, say in preset 7. Then you just back track to preset 6, and restart there.

The alternative way, with "Expert save dialog" turned on in the IO menu:

Press [Save] to get the Save dialog.

This will allow you to save to another slot. Select type = Patch, slot = 2, and then Save. Then press preset button [2].

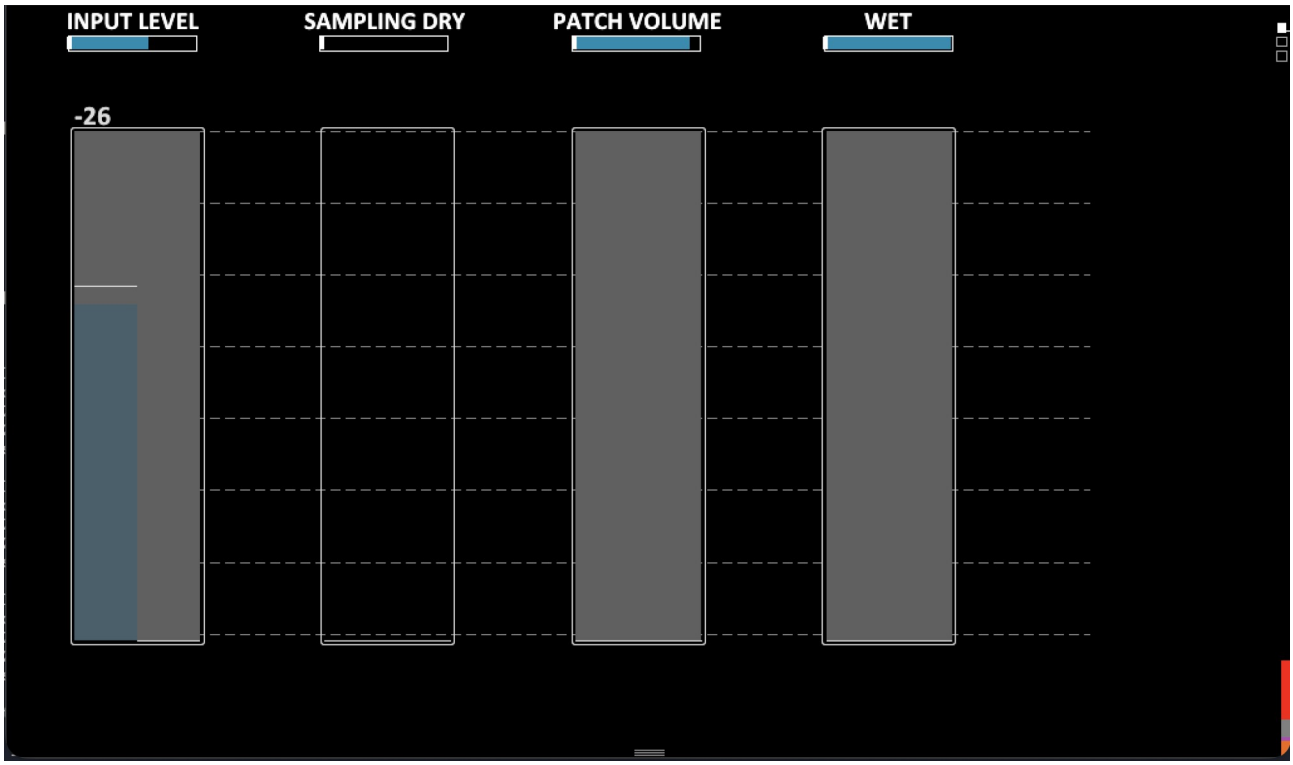


The GR-2 as a granular effect

In addition to using the GR-2 as a synth, sequencer, or drone machine, it can also be used as a live granular effect. You can also watch the chapter in our video tutorial on Youtube:

https://www.youtube.com/watch?v=mav7oJWiswA&t=34m06s

The GR-2 has no dedicated physical knobs for this, like its bigger brother the GR-MEGA. However, it does have the Quick Access menu. Hold the [MIX] above the screen:



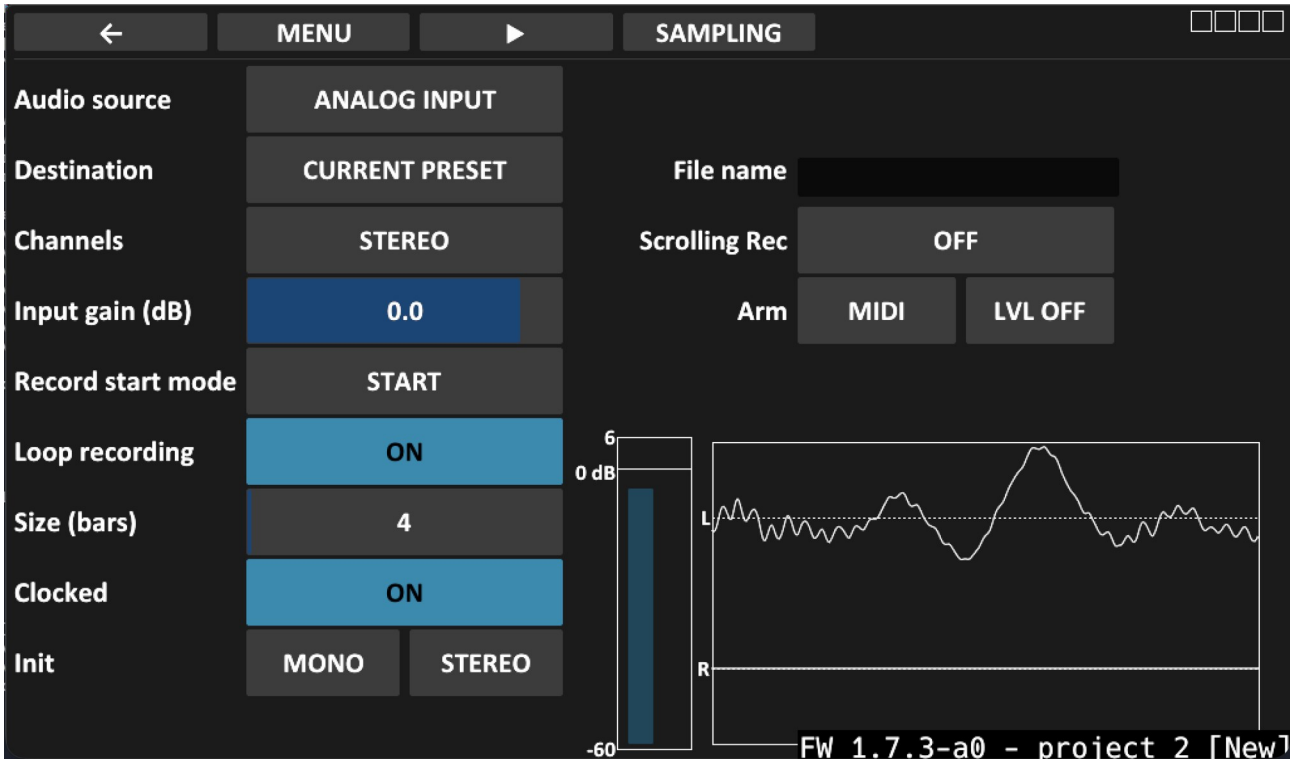
INPUT LEVEL	audio input level
SAMPLING DRY	volume of the dry audio input signal
PATCH VOLUME	volume of the patch in the current layer
WET	volume of the granulated and processed signal (all layers).

Set these up first. You want to have input level high, but not so high that it starts clipping. Wet and dry should typically be set to the same level.

Then set up the Sampling menu:

1. [Menu] → Sampling

2. Then set up as in the screenshot:



3. Focus on “Init: STEREO”, and press [Enter] to initialize a looping buffer.

4. Press [Menu] to return to the main screen.

5. Press [Rec], and then press [Play]. The GR-2 will now granulate the recording signal.

6. Set (Scan) to 1.0x.

Alternatively, you can toggle “Scrolling Rec” ON before step 4. This is an easier way using it like a granular effect, but you have less freedom: you cannot change the scan rate. You cannot move the play head past the record head. But for a beginner this is better.

Tip: make a template!

Tip: you are not limited to granular. The phase vocoder sound engine also works nicely.

Saving a template

1. Switch a preset you like to turn into a template, and apply tweaks if necessary.

2. Press [Menu].

3. Touch the “Template” tile.

4. Touch the template slot you want to save.

5. Press “Save”. The template is now saved in the slot and is ready to be used.

6. Optional: Touch the slot again, and “Rename” to name the template.

Setting a default template

The default template determines parameters (knob settings) after you initialize a preset. Suppose you have favorite settings already saved as template. Then you can make it your default like this:

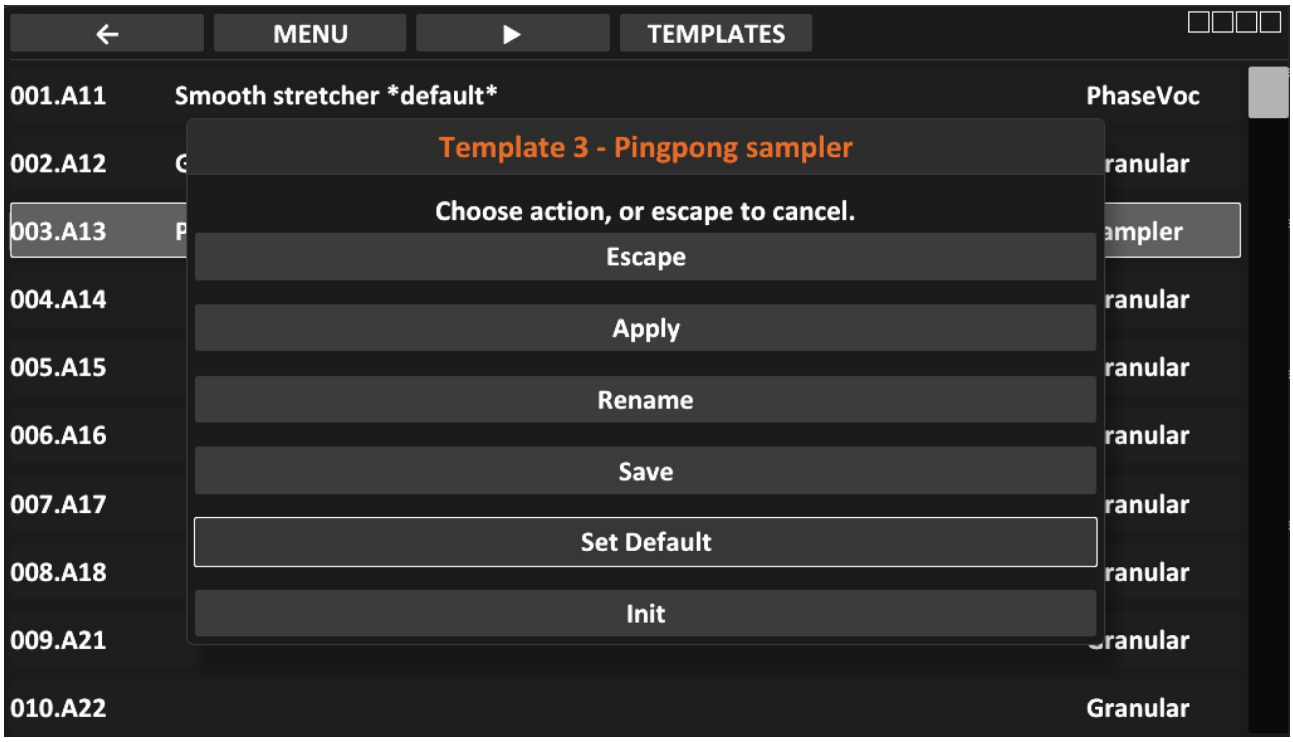
1. Press [Menu].

2. Touch the “Template” tile .

3. Press the template you like. A dialog will appear.

4. Touch “Set Default”.

Should you wish to revert back to the factory template, you can choose to “init” a slot, and then set that as the default.

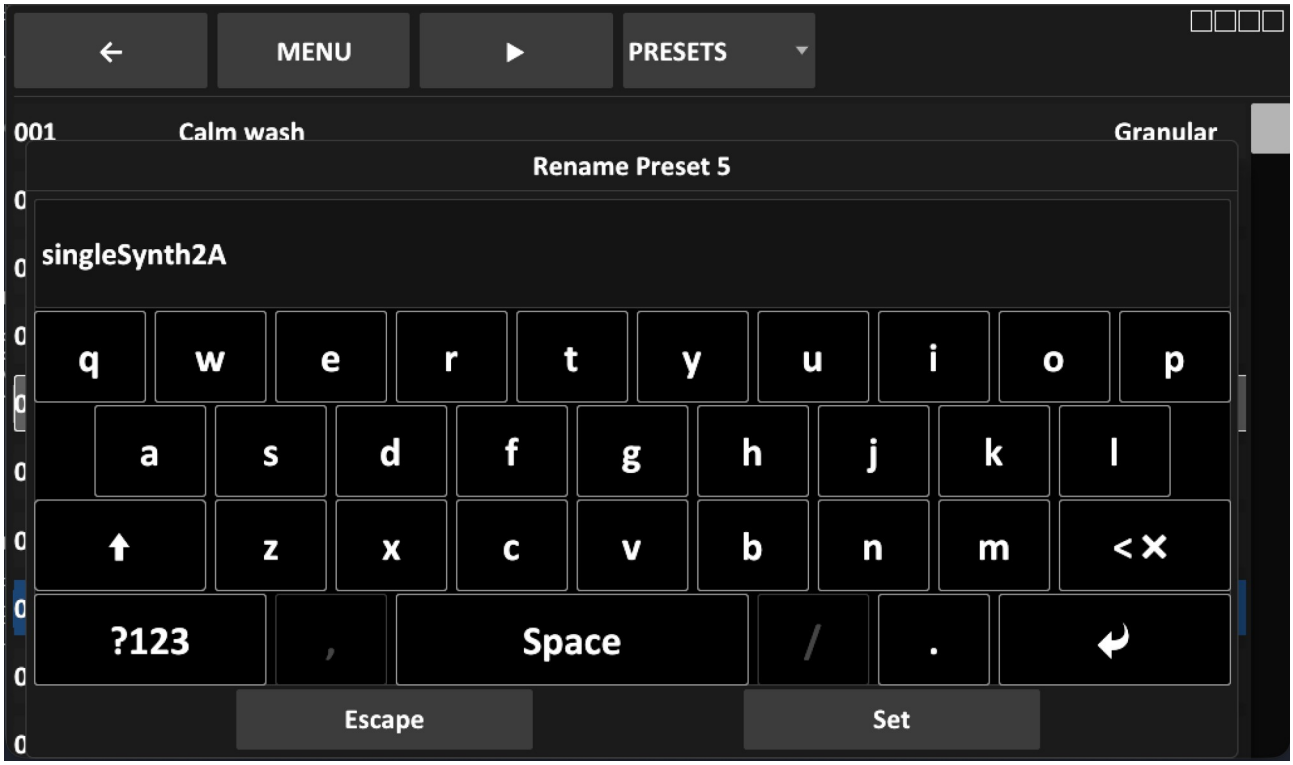


Touchscreen keyboard

The GR-2 offers a touchscreen keyboard to enter file names, preset names, project names, etc. Additionally, a USB computer keyboard can also be plugged in.

Touch the text field. The touchscreen keyboard dialog will open. On the bottom row are options “Escape” and “Set”. Escape just exits like always, and will leave the text field like before. Set will actuate your newly entered name.

The touchscreen keyboard offers:
* lower case a-z,
* and upper case A-Z (use the ⇧ GUI button: double tap = locked, single tap = single character),
* It offers numbers 1234567890 and only a few special characters like .-_.
* <X means backspace



Button combinations

On board controls		
Control	***Screen/mode***	***Function in screen***
Display Section		
Position slider	Main	Sample position
[Shift] + Position slider	Main	Scroll through waveform
Position slider	Menus	Set widget value
Turn (Operator)	Main	Select sample / sound engine operation
Turn (Operator)	Dialogs	Cycle button options & values
Turn (Operator)	File chooser, File manager	Navigate vertically
Shift + turn (Operator)	Main	Zoom
Push (Operator)	Main	Execute selected Operation (with the Op Enc)
Navigation & Disk Section		
Play	All	Toggle play mode
Play, triple tap	All	Emergency stop: ALL SOUND OFF
[Shift] + Play	All	Sample audition mode
[Rec]	All	Record audio ON/OFF. Blinks when recording drawings.
[≡]	All	Enter presets menu
[≡] + turn (Operator)	All	Switch presets
[Shift] + [≡]	All	Load
Menu [⚙]	Main	Enter menu
Menu [⚙]	Menu	Enter main screen
[Shift] + [⚙]	All	Save
Top / "Quick Access" section		
WIN	All	Window controls and visuals
[Shift] + WIN	All	Open/close left pull menu
ENV	All	ADSR Envelope controls and visuals
FIL	All	Filter controls and visuals
MIX	All	Volume controls, input volume, layer mixer
MOD	All	Mod matrix
FX	All	Effects menu and visuals

EQ	All	Master parametric EQ
MAC	All	Macro list
[Shift] + [MAC]	All	Open/close right pull menu

Computer keyboard support

Like many some other Tasty Chips products, the GR-MEGA supports using computer keyboard. Hook up your USB computer keyboard, and all of a sudden text entry is much easier. + additionally, a lot of button functions are also accessible this way.

Computer keyboard controls		
Key combo	***Screen/mode***	***Function in screen***
Navigation		
Arrows	All	Navigation
Enter	All	[Enter]
Escape	All	[Escape]
Ctrl + M / Cmd + M	All	Toggle menu
Editing		
Backspace	All	[Delete]
Ctrl + I	All	Initialize preset
Ctrl + C / Cmd + C	All	Copy
Ctrl + V / Cmd + V	All	Paste
Ctrl + X / Cmd + X	Menus	Cut
Load & save		
Ctrl + L / Cmd + L	All	Load
Ctrl + S / Cmd + S	All	Save
Play & record		
Alt + P	Main	Play
Shift + P	Main	Audition
Ctrl + P	All	Sequencer play/stop
Ctrl + R	Main	Record
Operator menu		
Ctrl + X / Cmd + X	Main	[Execute] button
Ctrl + O / Cmd + O	All	(Operator) encoder forward, aka next operation
Shift + [Ctrl + O / Cmd + O]	All	(Operator) encoder backward, aka previous operation

Presets		
Ctrl + 12345678	All	Switch preset 12345678
Alt + 1234	All	Toggle layer 1234
Shift + 12345678	All	TBV: Switch to MT preset 12345678
Various		
Alt + V	Main	[View] button
Alt + M	All	[Mode] button

MIDI Command Table

The following table contains all MIDI commands known to the GR-MEGA. This includes all the typical MIDI commands such as note on, note off, pitchbend, aftertouch, program changes, midi beat clock. Sysex is not implemented as the time of writing, but may be added for MTS (MIDI Tuning Standard) to support non equal temperament and non Western tuning.

Precision MIDI: “NRPN”

The GR-2 also supports all the CC parameters mentioned below as Non-Registered Parameters Numbers (NRPN). This means you can use the normal 7 bit MIDI values, but also use 14 bit values if necessary. This allows for more than 128 controls, and for control values with 16384 steps instead of the normal 128.

All CC’s that have range 0-127 (not the toggles, or triggers) are also available as 14 bit precision NRPN’s. Since the GR-2 has many parameters that demand high precision, like sample position or filter cutoff, this feature exposes the full potential of GR-2 to MIDI controllers and sequencers.

Note that the GR-1’s large modulation matrix is not fully represented as normal 7 bit CC, but also uses CC’s that are only available as NRPN.

An NRPN is just 4 CC packets being sent:

CC header byte (176 + channel), 99, NRPN parameter MSB (upper 7 bit of CC number from above table)
CC header byte (176 + channel), 98, NRPN parameter LSB (lower 7 bit of CC number from above table)
CC header byte (176 + channel), 6, NRPN value MSB (high 7 bit of the 14 bit value)
CC header byte (176 + channel), 38, NRPN value LSB (low 7 bit of the 14 bit value)

For example, let’s take parameter 2 (sample position) and set that to sample position 98.76% of the total length (16181 as a 14 bit number). We’re using MIDI channel 1 (that’s 0 in the header, since we start counting from 0).

176, 99, 0
176, 98, 2
176, 6, 16181 div 128 = 126
176, 38, 16181 mod 128 = 53

Generated from `src/midi.rs` enum `Nrpn` (firmware 1.8.0).

CC #	Name	Description	Range / notes	Curve
0	BANK CHANGE	Bank change	Unused	
1	MOD WHEEL	Mod wheel MSB	0–127. Assignable in mod matrix	linear
2	PITCH BEND AMP	Pitchbend range	0–48.0 semitones	linear
3	ENA PART NR	Enable & focus layer	0: disable, 1: enable, 2: enable & focus	
4	SUB OSC FREQ	Subosc pitch	Relative sub-osc pitch (64: -1 oct, 32: -2 oct)	linear
5	SUB OSC AMP	Subosc amp	Sub-oscillator amplitude	linear
6	NRPN VAL MSB	NRPN value MSB	0–127	
7	VOL	Patch volume	0–127	cubic
8	POS	Position	Start .. end of sample	linear
9	DENS	Rate or density	Grain rate or density, depending on grain ratio mode	cubic
10	PAN	Panning	0: 100% L, 64: center, 127: 100% R	linear
11	PAN SPRAY	Pan spray	0: no spray, 127: full stereo field	linear
12	SIZE	Grain size	0.1 ms – 5 s	cubic
13	SPRAY	Spray	0 – full sample (or FFT block in spectral)	cubic
14	FWD REV	Direction (probability)	0: 100% rev, 64: 50/50, 127: 100% fwd	linear
15	SCAN	Scan	0: -2×, 64: stop, 127: +2×	linear
16	TUNE	Tune	0: -1 oct, 64: center, 127: +1 oct	2^n
17	MID SIDE	M-S	0: 100% L, 64: center, 127: 100% R	linear
18	LAYER VOL	Layer volume (targets layers on the received MIDI channel)	0–127	cubic
19	GRAIN CLOCK SYNC	Grain clock sync	0, ≥1	
20	SCAN CLOCK SYNC	Scan clock sync	0, ≥1	
21	GRAIN KEY SYNC	Grain key sync	0, ≥1	
22	SCAN KEY SYNC	Scan key sync	0: OFF, 1: ON, 2: Legato, 3: Poly	
23	NUM VOICES	Patch polyphony	0–19 (max voices − 1; 0 = mono, 19 = 20 voices)	
24	GLIDE TIME	Glide time	0: 0 ms – 127: 2000 ms	cubic
25	GLIDE ALWAYS	Glide always	0, ≥1	
26	PITCH PER GRAIN	Pitch per grain	0: same pitch across voice, 1: per-grain pitch	
27	ARP MODE	Grain ARP mode	0: up, 1: down, 2: updown, 3: downup, 4: random, 5: shuffle, 6: fwd, 7: rev, 8: fwd-rev, 9: rev-fwd	
28	START POS	Start pos	0: sample start, 127: sample end	linear
29	STOP POS	Stop pos	0: sample start, 127: sample end	linear
30	LOOP START	Loop start	0: sample start, 127: sample end	linear
31	LOOP END	Loop end	0: sample start, 127: sample end	linear
32	SCAN MODE	Scan mode	0: looping, 1: oneshot, 2: pingpong	
33	MOD WHEEL LSB	Mod wheel LSB	0–127	
34	SEQ BPM	Sequencer BPM	0–127 (14-bit NRPN recommended)	linear
35	SEQ RATE	Sequencer Rate	0–22 (rate division index	see Rate

CC #	Name	Description	Range / notes	Curve divisions table)
36	SEQ POS	Sequencer Pos	0–63	
37	SEQ LEN	Sequencer Length	0–63	
38	NRPN VAL LSB	NRPN value LSB	0–127	
39	SEQ MODE	Sequencer Mode	0: Forward, 1: Reverse, 2: Pingpong, 3: Random	
	REC TRIGGER			exp
40	LEVEL	Record trigger level	0: Off, 1–127: −80…0 dB	(dB)
41	REC SAMPLE	Record sample	Toggle (value ignored)	
42	SAMPLING DRY	Dry audio input volume		cubic
43	SAMPLING WET	Wet (granulated) volume		cubic
44	SIDES	Grain window sides	PowAR only: 0 square, 127 triangular	
45	TILT	Grain window tilt	0: left, 64: center, 127: right	linear
46	CURVE	Grain window curve	0: hollow, 64: linear, 127: bulging/square	linear
47	WINDOW AM	Grain window AM	Raised-cosine only: AM freq relative to grain size	
48	WINDOW TYPE	Window type	0: RaisedCosine, 1: PowAR	
49	GRANULAR MODE	Granular mode (grain ratio)	0: Free, 1: DensitySize, 2: DensityRate, 3: ScanRate, 4: ScanOverlap	
50	LP CUTOFF	LPF Cutoff	0 Hz – 20 kHz	cubic
51	LP RESONANCE	LPF Resonance		linear
52	HP CUTOFF	HPF Cutoff	0 Hz – 20 kHz	cubic
53	HP RESONANCE	HPF Resonance		linear
54	PITCH AMT	Pitch env amount	−1.0 … 0.0 … +1.0	linear
55	PITCH ENV A	Pitch env attack	0 ms – 45 s	cubic
56	PITCH ENV D	Pitch env decay	0 ms – 45 s	cubic
57	PITCH ENV S	Pitch env sustain		linear
58	PITCH ENV R	Pitch env release	0 ms – 45 s	cubic
59	FILT AMT	Filter env amount	−1.0 … 0.0 … +1.0	linear
60	FILT ENV A	Filter env attack	0 ms – 45 s	cubic
61	FILT ENV D	Filter env decay	0 ms – 45 s	cubic
62	FILT ENV S	Filter env sustain		linear
63	FILT ENV R	Filter env release	0 ms – 45 s	cubic
64	SUSTAIN	Sustain pedal	<64: OFF, ≥64: ON	
65	AMP AMT	Amp env amount	−1.0 … 0.0 … +1.0	linear
66	ATTACK	Amp env attack	0 ms – 45 s	cubic
67	DECAY	Amp env decay	0 ms – 45 s	cubic
68	SUSTAIN LEVEL	Amp env sustain		linear
69	RELEASE	Amp env release	0 ms – 45 s	cubic
70	AUX AMT	Aux env amount	−1.0 … 0.0 … +1.0	linear
71	AUX ENV A	Aux env attack	0 ms – 45 s	cubic
72	AUX ENV D	Aux env decay	0 ms – 45 s	cubic
73	AUX ENV S	Aux env sustain		linear
	MPE TIMBRE			
74	MSB	MPE timbre MSB	0–127	
75	AUX ENV R	Aux env release	0 ms – 45 s	cubic
76	MOD LIST ROW	Mod list row	0–49 (row index in mod matrix)	

CC #	Name	Description	Range / notes	Curve
	MOD LIST ROW			
77	ENABLE	Mod row enable	0: OFF, ≥1: ON	
	MOD LIST ROW			
78	SOURCE	Mod source	See Mod sources table	
	MOD LIST ROW			
79	CURVE	Mod curve	0: low-flat→hollow, 64: linear, 127: high-flat	linear
	MOD LIST ROW			
80	AMOUNT	Mod amount		linear
	MOD LIST ROW			
81	POLARITY	Mod polarity	0: +uni, 1: −uni, 2: +bi, 3: −bi	
	MOD LIST ROW			
82	DESTINATION	Mod destination	See Mod destinations table	
83	CV1 DST	CV1 destination		
84	GLIDE	Glide / porta	0: 0 ms – 127: 2000 ms	
85	CV1 AMT	CV1 amount		linear
86	CV2 DST	CV2 destination		
87	CV2 AMT	CV2 amount		linear
	LFO1 CLOCK			
88	SYNC	LFO1 clock sync	0: free, 1: MIDI, 2: sequencer	
89	LFO1 SPD	LFO1 frequency	0: stopped – 127: 50 Hz	cubic
90	LFO1 WV	LFO1 wave	0: sine, 1: tri, 2: saw, 3: −saw, 4: square, 5: random	
91	LFO1 AMT	LFO1 amount	−1.0 … 0.0 … +1.0	
92	LFO1 DST	LFO1 destination		
	LFO2 CLOCK			
93	SYNC	LFO2 clock sync	0: free, 1: MIDI, 2: sequencer	
94	LFO2 SPD	LFO2 frequency	0: stopped – 127: 50 Hz	cubic
95	LFO2 WV	LFO2 wave		
96	LFO2 AMT	LFO2 amount		
97	LFO2 DST	LFO2 destination		
98	NRPN PAR LSB	NRPN parameter LSB	0–127	
99	NRPN PAR MSB	NRPN parameter MSB	0–127	
100	RPN PAR LSB	RPN parameter LSB	0–127	
101	RPN PAR MSB	RPN parameter MSB	0–127	
	LFO3 CLOCK			
102	SYNC	LFO3 clock sync	0: free, 1: MIDI, 2: sequencer	
103	LFO3 SPD	LFO3 frequency	0: stopped – 127: 50 Hz	cubic
104	LFO3 WV	LFO3 wave		
105	LFO3 AMT	LFO3 amount		
106	MPE TIMBRE LSB	MPE timbre LSB	0–127	
107	LFO3 DST	LFO3 destination		
	LFO4 CLOCK			
108	SYNC	LFO4 clock sync	0: free, 1: MIDI, 2: sequencer	
109	LFO4 SPD	LFO4 frequency	0: stopped – 127: 50 Hz	cubic
110	LFO4 WV	LFO4 wave		
111	LFO4 AMT	LFO4 amount		
112	LFO4 DST	LFO4 destination		
113	FOCUS FX	Focus layer FX	0–3 (focus on FX slot in chain)	

CC #	Name	Description	Range / notes	Curve
114	FX TYPE	Set layer FX type	0: None, 1: Chorus, 2: Compressor, 3: Delay, 4: PPDelay, 5: Dist, 6: EQ3, 7: Flanger, 8: Large Reverb, 9: Reducer, 10: Resonator (MBR), 11: Reverb, 12: Ring Mod, 13: Saturator, 14: Vibrato	
115	FX DRY	FX Dry	Dry FX volume	linear
116	FX WET	FX Wet	Wet FX volume	linear
117	FX1 ASSIGN	FX1 knob assign	Depends on effect	
118	FX1	FX1 value	0–127	
119	FX2 ASSIGN	FX2 knob assign	Depends on effect	
120	ALL SOUND OFF	All sound off	Kills all sound on layer including FX tails	
121	RESET CCS	Reset layer CCs		
122	LOCAL KEY OFF	Local keyboard OFF		
123	ALL NOTES OFF	All notes OFF	Releases all notes on layer (envelopes keep running)	
124	FX2	FX2 value	0–127	
126	MONO MODE	Mono mode		
127	POLY MODE	Poly mode		
128	REC SEQ	Sequencer record	NRPN-only (> 127) 0, ≥1	
140	SCAN PART1	Scan layer 1	0–16383	linear
141	SCAN PART2	Scan layer 2	0–16383	linear
142	SCAN PART3	Scan layer 3	0–16383	linear
143	SCAN PART4	Scan layer 4	0–16383	linear
144	SCAN PART5			
145	SCAN PART6			
146	SCAN PART7			
147	SCAN PART8			
148	PART1 CONTROL MAP			
149	PART2 CONTROL MAP			
150	PART3 CONTROL MAP			
151	PART4 CONTROL MAP			
152	PART5 CONTROL MAP			
153	PART6 CONTROL MAP			
154	PART7 CONTROL MAP			
155	PART8 CONTROL MAP			
156	CURVE PITCH ATTACK	Pitch env attack curve	0: low-flat → hollow → 0.5: linear → bulging → high-flat	linear
157	CURVE PITCH DECAY	Pitch env decay curve	same as above	
158	CURVE PITCH RELEASE	Pitch env release curve	same as above	
159	INVERT PITCH	Invert pitch env	0, ≥1	

CC #	Name	Description	Range / notes	Curve
	ENV			
160	PITCH LOOP MODE	Pitch env loop mode		
161	CURVE FILTER ATTACK	Filter env attack curve	same curve semantics as pitch curves	
162	CURVE FILTER DECAY	Filter env decay curve		
163	CURVE FILTER RELEASE	Filter env release curve		
164	INVERT FILT ENV	Invert filter env	0, ≥1	
165	FILTER LOOP MODE	Filter env loop mode		
166	CURVE AMP ATTACK	Amp env attack curve	same curve semantics	linear
167	CURVE AMP DECAY	Amp env decay curve		
168	CURVE AMP RELEASE	Amp env release curve		
169	INVERT AMP ENV	Invert amp env	0, ≥1	
170	AMP LOOP MODE	Amp env loop mode		
171	CURVE AUX ATTACK	Aux env attack curve		
172	CURVE AUX DECAY	Aux env decay curve		
173	CURVE AUX RELEASE	Aux env release curve		
174	INVERT AUX ENV	Invert aux env	0, ≥1	
175	AUX LOOP MODE	Aux env loop mode		
176	PART1 CHAN MAP	Part 1 MIDI channel	0–15 (ch 1–16)	
177	PART2 CHAN MAP	Part 2 MIDI channel	0–15	
178	PART3 CHAN MAP	Part 3 MIDI channel	0–15	
179	PART4 CHAN MAP	Part 4 MIDI channel	0–15	
180	PART5 CHAN MAP		0–15	
181	PART6 CHAN MAP		0–15	
182	PART7 CHAN MAP		0–15	
183	PART8 CHAN MAP		0–15	
184	LFO1 KEY SYNC	LFO1 key sync	0, ≥1	
185	LFO2 KEY SYNC	LFO2 key sync	0, ≥1	
186	LFO3 KEY SYNC	LFO3 key sync	0, ≥1	
187	LFO4 KEY SYNC	LFO4 key sync	0, ≥1	
188	LFO1 PHASE	LFO1 phase	0–16383	
189	LFO2 PHASE	LFO2 phase	0–16383	
190	LFO3 PHASE	LFO3 phase	0–16383	

CC #	Name	Description	Range / notes	Curve
191	LFO4 PHASE	LFO4 phase	0–16383	
192	LFO1 AMP QUANT	LFO1 amp quantization	0–16383	
193	LFO2 AMP QUANT	LFO2 amp quantization	0–16383	
194	LFO3 AMP QUANT	LFO3 amp quantization	0–16383	
195	LFO4 AMP QUANT	LFO4 amp quantization	0–16383	
196	LFO1 POLARITY	LFO1 polarity	0: +uni, 1: −uni, 2: +bi, 3: −bi	
197	LFO2 POLARITY	LFO2 polarity	0: +uni, 1: −uni, 2: +bi, 3: −bi	
198	LFO3 POLARITY	LFO3 polarity	0: +uni, 1: −uni, 2: +bi, 3: −bi	
199	LFO4 POLARITY	LFO4 polarity	0: +uni, 1: −uni, 2: +bi, 3: −bi	
200	PART1 PATCH NUM	Layer 1 preset	0–127 (preset 1–128)	
201	PART2 PATCH NUM	Layer 2 preset	0–127	
202	PART3 PATCH NUM	Layer 3 preset	0–127	
203	PART4 PATCH NUM	Layer 4 preset	0–127	
204	PART5 PATCH NUM		0–127	
205	PART6 PATCH NUM		0–127	
206	PART7 PATCH NUM		0–127	
207	PART8 PATCH NUM		0–127	
210	ANTI ALIAS	Anti-alias	0, ≥1	
211	TAPE SLEW	Tape slew	0–16383	linear
217	WIN PAR3		Window parameter 3	
249	DELAY FEEDBACK	Delay feedback	0–16383	linear
253	REVERB TIME	Reverb time	0–16383	linear
261	DISTORTION	Distortion level	0–16383	linear inv
269	REDUCER BIT	Reducer bit	0–16383	cubic inv
270	REDUCER RATE	Reducer rate	0–16383	cubic
279	REVERB WIDTH	Reverb width	0–16383	linear
280	REVERB DAMPENING	Reverb dampening	0–16383	linear
283	TURN XFWD	Navigate right	0–16383	
284	TURN YFWD	Navigate down	0–16383	
285	TURN XBCK	Navigate left	0–16383	
286	TURN YBCK	Navigate up	0–16383	
289	FILT BYPASS	Bypass filter	0: active, 1: bypassed	
291	RATE MODE	Rate mode	0: Free, 1: DensitySize, 2: DensityRate, 3: ScanRate, 4: ScanOverlap	
292	BOUNCE WRAP MODE	Bounce/wrap mode		

CC #	Name	Description	Range / notes	Curve
293	FILT ROUTING	Filter routing	0: LPF only, 1: LPF+HPF, 2: HPF	
294	INPUT LEVEL	Input level	0–16383	cubic
			Master EQ & per-slot FX	
	MASTER EQ B1	Master EQ band 1		
300	FREQ	freq		
	MASTER EQ B1	Master EQ band 1		
301	GAIN	gain		
	MASTER EQ B1	Master EQ band 1		
302	RESON	reson		
303	FX1 PAR1	FX slot 1 param 1		
304	FX1 PAR2	FX slot 1 param 2		
305	FX1 PAR3	FX slot 1 param 3		
306	FX1 PAR4	FX slot 1 param 4		
307	FX1 DRY	FX slot 1 dry		
308	FX1 WET	FX slot 1 wet		
309	FX2 PAR1	FX slot 2 param 1		
310	FX2 PAR2	FX slot 2 param 2		
311	FX2 PAR3	FX slot 2 param 3		
312	FX2 PAR4	FX slot 2 param 4		
313	FX2 DRY	FX slot 2 dry		
314	FX2 WET	FX slot 2 wet		
315	FX3 PAR1	FX slot 3 param 1		
316	FX3 PAR2	FX slot 3 param 2		
317	FX3 PAR3	FX slot 3 param 3		
318	FX3 PAR4	FX slot 3 param 4		
319	FX3 DRY	FX slot 3 dry		
320	FX3 WET	FX slot 3 wet		
321	FX4 PAR1	FX slot 4 param 1		
322	FX4 PAR2	FX slot 4 param 2		
323	FX4 PAR3	FX slot 4 param 3		
324	FX4 PAR4	FX slot 4 param 4		
325	FX4 DRY	FX slot 4 dry		
326	FX4 WET	FX slot 4 wet		
327	FFT AMP THRESH	Spectral amp threshold	Spectral engine knob A	
328	FFT LEN	FFT size	256, 512, 1024, 2048, 4096, 8192	
	FFT PHASE	Spectral phase		
329	SMEAR	smear		
330	FFT AMP SMEAR	Spectral amp smear		
331	FFT REDUCER	FFT reducer	Shift-Pan-Spray in spectral mode	
332	FX1 DRY WET	FX slot 1 dry/wet		
333	FX2 DRY WET	FX slot 2 dry/wet		
334	FX3 DRY WET	FX slot 3 dry/wet		
335	FX4 DRY WET	FX slot 4 dry/wet		
336	PART1 VOL	Part 1 volume (layer mix)		cubic
337	PART2 VOL	Part 2 volume		cubic
338	PART3 VOL	Part 3 volume		cubic
339	PART4 VOL	Part 4 volume		cubic
340	MOD SRC PAGE1	Mod page 1 source	Mod matrix page 1–4 sources (matrix	

CC #	Name	Description	Range / notes	Curve
			menu)	
341	MOD SRC PAGE2	Mod page 2 source		
342	MOD SRC PAGE3	Mod page 3 source		
343	MOD SRC PAGE4	Mod page 4 source		
344	MOD DST PAGE1	Mod page 1 destination		
345	MOD DST PAGE2	Mod page 2 destination		
346	MOD DST PAGE3	Mod page 3 destination		
347	MOD DST PAGE4	Mod page 4 destination		
348	MASTER EQ B1 TYPE	Master EQ band 1 type		
349	MASTER EQ B1 BYPASS	Master EQ band 1 bypass		
350	MASTER EQ B2 FREQ	Master EQ band 2 freq		
351	MASTER EQ B2 GAIN	Master EQ band 2 gain		
352	MASTER EQ B2 RESON	Master EQ band 2 reson		
353	MASTER EQ B2 TYPE	Master EQ band 2 type		
354	MASTER EQ B2 BYPASS	Master EQ band 2 bypass		
355	MASTER EQ B3 FREQ	Master EQ band 3 freq		
356	MASTER EQ B3 GAIN	Master EQ band 3 gain		
357	MASTER EQ B3 RESON	Master EQ band 3 reson		
358	MASTER EQ B3 TYPE	Master EQ band 3 type		
359	MASTER EQ B3 BYPASS	Master EQ band 3 bypass		
360	MASTER EQ B4 FREQ	Master EQ band 4 freq		
361	MASTER EQ B4 GAIN	Master EQ band 4 gain		
362	MASTER EQ B4 RESON	Master EQ band 4 reson		
363	MASTER EQ B4 TYPE	Master EQ band 4 type		
364	MASTER EQ B4 BYPASS	Master EQ band 4 bypass		
365	MASTER EQ B5 FREQ	Master EQ band 5 freq		
366	MASTER EQ B5 GAIN	Master EQ band 5 gain		
367	MASTER EQ B5 RESON	Master EQ band 5 reson		

CC #	Name	Description	Range / notes	Curve
368	MASTER EQ B5 TYPE	Master EQ band 5 type		
369	MASTER EQ B5 BYPASS	Master EQ band 5 bypass		
370	MASTER EQ BYPASS	Master EQ bypass (all bands)		
			Macros	
371	MACRO1	Macro 1 level		
372	MACRO2	Macro 2 level		
373	MACRO3	Macro 3 level		
374	MACRO4	Macro 4 level		
375	MACRO5	Macro 5 level		
376	MACRO6	Macro 6 level		
377	MACRO7	Macro 7 level		
378	MACRO8	Macro 8 level		
379	MACRO9	Macro 9 level		
380	MACRO10	Macro 10 level		
381	MACRO11	Macro 11 level		
382	MACRO12	Macro 12 level		
383	MACRO13	Macro 13 level		
384	MACRO14	Macro 14 level		
385	MACRO15	Macro 15 level		
386	MACRO16	Macro 16 level		
387	MACRO17	Macro 17 level		
388	MACRO18	Macro 18 level		
389	MACRO19	Macro 19 level		
390	MACRO20	Macro 20 level		
			Misc engine / mod	
391	FILTER MODE	Filter mode (SVF)	trap-SVF mode enum	
392	FFT BEND	Spectral bend (exponential bin warp)	bipolar (64 = neutral); narrow deadzone, useful range is a few % around center	linear
393	FFT FORMANT SHIFT	Spectral formant shift	−24 … 0 … +24 semitones	linear
394	PP DELAY FEEDBACK	Ping-pong delay feedback		
395	SPRAY POLARITY	Spray polarity	Bipolar / PosUnipolar / NegUnipolar	
396	REC FEEDBACK	Synth → rec feedback level	Shift + env amount fader	
397	MOD1 AMT	Mod-page 1 amount	Front-panel mod amount, page 1	
398	MOD2 AMT	Mod-page 2 amount		
399	MOD3 AMT	Mod-page 3 amount		
400	MOD4 AMT	Mod-page 4 amount		
			Per-effect parameters	
425	CHORUS RATE	Chorus rate		
426	CHORUS FEEDBACK	Chorus feedback		

CC #	Name	Description	Range / notes	Curve
427	CHORUS CENTER	Chorus center		
428	CHORUS BANDWIDTH	Chorus bandwidth		
429	CHORUS DRY	Chorus dry		
430	CHORUS WET	Chorus wet		
431	COMP THRESH	Compressor threshold		
432	COMP KNEE	Compressor knee		
433	COMP RATIO	Compressor ratio		
434	COMP ATTACK	Compressor attack		
435	COMP RELEASE	Compressor release		
436	COMP DRY	Compressor dry		
437	COMP WET	Compressor wet		
438	DELAY LEN	Delay length		
439	DELAY AMT	Delay amount		
440	DELAY DRY	Delay dry		
441	DELAY WET	Delay wet		
442	PPDELAY LEN	Ping-pong delay length		
443	PPDELAY AMT	Ping-pong delay amount		
444	PPDELAY DRY	Ping-pong delay dry		
445	PPDELAY WET	Ping-pong delay wet		
446	OVERDRIVE AMT	Overdrive amount		
447	OVERDRIVE DRY	Overdrive dry		
448	OVERDRIVE WET	Overdrive wet		
449	FLANGER RATE	Flanger rate		
450	FLANGER FEEDBACK	Flanger feedback		
451	FLANGER CENTER	Flanger center		
452	FLANGER BANDWIDTH	Flanger bandwidth		
453	FLANGER DRY	Flanger dry		
454	FLANGER WET	Flanger wet		
455	LARGE REVERB TIME	Large reverb time		
456	LARGE REVERB DAMP	Large reverb dampening		
457	LARGE REVERB MS	Large reverb M-S		
458	LARGE REVERB EARLY	Large reverb early		
459	LARGE REVERB TAIL	Large reverb tail		
460	LARGE REVERB PRE	Large reverb pre-delay		
461	LARGE REVERB	Large reverb dry		

CC #	Name	Description	Range / notes	Curve
	DRY			
	LARGE REVERB			
462	WET	Large reverb wet		
465	REDUCER DRY	Reducer dry		
466	REDUCER WET	Reducer wet		
	REVERB ROOM			
467	SIZE	Reverb room size		
	REVERB			
468	DAMPING	Reverb damping		
470	REVERB DRY	Reverb dry		
471	REVERB WET	Reverb wet		
	RING MOD FREQ	Ring mod freq		
472	COARSE	coarse		
	RING MOD FREQ			
473	FINE	Ring mod freq fine		
474	RING MOD DRY	Ring mod dry		
475	RING MOD WET	Ring mod wet		
476	VIBRATO RATE	Vibrato rate		
	VIBRATO			
477	CENTER	Vibrato center		
478	VIBRATO DRY	Vibrato dry		
479	VIBRATO WET	Vibrato wet		
			Audio routing, followers, patch & extra-FX params (Saturator, Resonator/MBR, EQ3)	
	AUDIO IN FX			
480	SEND	Audio-in FX send		
481	SYNTH FX SEND	Synth FX send		
482	IN FOL ATT	Input follower attack		
483	IN FOL REL	Input follower release		
484	L1 FOL ATT	Layer 1 follower attack		
485	L1 FOL REL	Layer 1 follower release		
486	L2 FOL ATT	Layer 2 follower attack		
487	L2 FOL REL	Layer 2 follower release		
488	L3 FOL ATT	Layer 3 follower attack		
489	L3 FOL REL	Layer 3 follower release		
490	L4 FOL ATT	Layer 4 follower attack		
491	L4 FOL REL	Layer 4 follower release		
	SATURATOR			
492	DRIVE	Saturator drive		cubic
	SATURATOR			
493	POST GAIN	Saturator post gain		linear
494	SATURATOR DRY	Saturator dry		linear

CC #	Name	Description	Range / notes	Curve
495	SATURATOR WET	Saturator wet		linear
496	IN FOL GAIN	Input follower gain	−24 … 0 … +24 dB (unity at center)	pow2 (linear in dB)
500	PATCH BIAS	Patch bias	Layer bias	linear
501	PATCH SPRAY	Patch spray	Layer spray	linear
502	PATCH SPRAY INTENS	Patch spray intensity		
503	SUB OSC	Sub-osc enable	0: OFF, ≥1: ON	
504	VOICE SYNC	Sync grains across voices	0: OFF, ≥1: ON	
505	PAN SPRAY DIST	Pan spray distribution	0–16383	linear
506	MBR CUTOFF	Resonator (MBR) cutoff	0–16383	cubic
507	MBR RESONANCE	Resonator resonance	0–16383	
508	MBR DETUNE	Resonator detune	bipolar (64 = center)	
509	MBR TILT	Resonator tilt	bipolar (64 = center)	
510	MBR DECAY	Resonator decay	0–16383	
511	MBR PAN	Resonator pan	0: L, 64: center, 127: R	
512	MBR WIDTH	Resonator stereo width	0–16383	
513	MBR NOISE	Resonator noise	0–16383	
514	MBR DRY	Resonator dry		linear
515	MBR WET	Resonator wet		linear
516	MBR PITCH	Resonator pitch	bipolar (64 = center)	
517	MBR TONE	Resonator tone	bipolar (64 = center)	
518	MBR NOISE RATE	Resonator noise rate	0.05 Hz – 50 Hz	pow2 (log)
519	EQ3 GAIN LOW	EQ3 low band gain	silence – +6 dB (unity at ~0.79 of travel)	cubic
520	EQ3 GAIN MID	EQ3 mid band gain	silence – +6 dB	cubic
521	EQ3 GAIN HI	EQ3 high band gain	silence – +6 dB	cubic
522	EQ3 FREQ LOW	EQ3 low/mid crossover freq	50 Hz – 5 kHz	pow2 (log)
523	EQ3 FREQ HI	EQ3 mid/high crossover freq	200 Hz – 18 kHz	pow2 (log)
524	EQ3 DRY	EQ3 dry		linear
525	EQ3 WET	EQ3 wet		linear
			14-bit synced rate controls (1006–1015)	
1006	RATE	Grain rate	0–16383	cubic
1007	SEQ RATE DIV	Sequencer clock div	1–128	
1010	LFO3 MUL	LFO3 clock mul	1–128	
1011	LFO4 MUL	LFO4 clock mul	1–128	
1012	LFO3 DIV	LFO3 clock div	1–128	
1013	LFO4 DIV	LFO4 clock div	1–128	
1014	SEQ RATE MUL	Sequencer clock mul	1–128	
1015	SEQ SLEW	Sequencer mod slew	0–1000 ms	

CC #	Name	Description	Range / notes	Curve
			Drawing (global / per mtpreset) & keytrack	
1100	DRAW PLAY	Drawing play		
1101	DRAW SPEED	Drawing speed		
1102	DRAW LOOP MOD	Drawing loop mode		
1103	DRAW SYNC	Drawing tempo sync		
1104	DRAW SNAP	Drawing snap		
1105	KEYTRACK	Keytrack → LP Cutoff	Bipolar	routes ModSource::KeyTrack → ModDest::Cutoff in the mod matrix
			Explicit free / clock-synced & misc controls (1106–1121)	
1106	SCAN FREE	Scan, free/unsynced (targets free value directly)	bipolar: 0 = −2×, 64 = stop, 127 = +2×	linear
1107	SCAN SYNCED	Scan, clock-synced (targets synced value directly)	bipolar clock mul/div (64 = stop)	
1108	RATE FREE	Grain rate, free/unsynced (targets free value directly)	0–16383	cubic
1109	RATE SYNCED	Grain rate, clock-synced (targets synced value directly)	clock mul/div	
1110	LFO1 SPD FREE	LFO1 rate, free/unsynced	0: stopped – 127: 50 Hz	cubic
1111	LFO1 SPD SYNCED	LFO1 rate, clock-synced	clock mul/div	
1112	LFO2 SPD FREE	LFO2 rate, free/unsynced	0: stopped – 127: 50 Hz	cubic
1113	LFO2 SPD SYNCED	LFO2 rate, clock-synced	clock mul/div	
1114	LFO3 SPD FREE	LFO3 rate, free/unsynced	0: stopped – 127: 50 Hz	cubic
1115	LFO3 SPD SYNCED	LFO3 rate, clock-synced	clock mul/div	
1116	LFO4 SPD FREE	LFO4 rate, free/unsynced	0: stopped – 127: 50 Hz	cubic
1117	LFO4 SPD SYNCED	LFO4 rate, clock-synced	clock mul/div	

CC #	Name	Description	Range / notes	Curve
1118	ENGINE KNOB A	Engine knob A (context: FFT amp thresh / density / grain rate)		
1119	ENGINE KNOB B	Engine knob B (context: FFT size / density / grain size)		
1120	VELO SENS	Velocity sensitivity	0–100%	linear
1121	PITCH SPRAY	Pitch spray	0–16383	linear
			Drawing extras, spectral v2, mod/LFO page controls, filter slopes (1122–1154)	
1122	DRAW PHASE	Drawing phase offset	0–100%	linear
1123	DRAW RATE	Drawing clock rate preset	clock mul/div preset index	knob axis is reversed vs preset index (up = faster)
1124	DRAW KEY	Drawing key sync	0: Off, 1: On, 2: Legato	
1125	GRAIN PROBABILITY	Grain probability	0–16383	linear
1126	PITCH SPRAY POLARITY	Pitch spray polarity	Bipolar / PosUnipolar / NegUnipolar	
1127	FFT FREEZE	Spectral freeze	0–16383	linear
1128	(retired)	Never reuse — was the pre-release FftBend	the shipped bend control is CC 392	
1129	FFT PITCH BLEND	Spectral pitch blend	0–16383	linear
1130	FFT FOLD	Spectral fold	bipolar (64 = center), deadzoned	linear
1133	FFT SPEC DEPTH	Spectral window depth	0 = flat / bit-exact bypass	shape comes from the grain window Tilt/Curve/AM
1134	FFT SPEC CONTRAST	Spectral contrast	bipolar (64 = center), deadzoned	linear
1135	MOD1 CURVE	Mod-page 1 curve	0: low-flat→hollow, 64: linear, 127: high-flat	linear
1136	MOD2 CURVE	Mod-page 2 curve		linear
1137	MOD3 CURVE	Mod-page 3 curve		linear
1138	MOD4 CURVE	Mod-page 4 curve		linear
1139	MOD SEL SOURCE	Mod source select (ModPageStyle C: picks a source directly, LFOs	See Mod sources table, minus LFO1–4	

CC #	Name	Description	Range / notes	Curve
		excluded)		
1140	LFO SELECT	LFO select	0–3 (LFO 1–4)	
1141	MOD SEL DEST	Mod destination for the selected source	See Mod destinations table	
1142	MOD SEL AMT	Mod amount for the selected source	−1.0 … 0.0 … +1.0	cubic bipolar
1143	MOD SEL CURVE	Mod curve for the selected source	0: low-flat→hollow, 64: linear, 127: high-flat	linear
1144	MOD SEL POLARITY	Mod polarity for the selected source	0: +uni, 1: −uni, 2: +bi, 3: −bi	
1145	LFO1 DEST	LFO1 destination (LFO page: routes the LFO without a mod-page slot)	See Mod destinations table	
1146	LFO2 DEST	LFO2 destination (LFO page)	See Mod destinations table	
1147	LFO3 DEST	LFO3 destination (LFO page)	See Mod destinations table	
1148	LFO4 DEST	LFO4 destination (LFO page)	See Mod destinations table	
1149	LFO1 ROUTE POLARITY	LFO1 route polarity (LFO page)	0: +uni, 1: −uni, 2: +bi, 3: −bi	
1150	LFO2 ROUTE POLARITY	LFO2 route polarity (LFO page)	0: +uni, 1: −uni, 2: +bi, 3: −bi	
1151	LFO3 ROUTE POLARITY	LFO3 route polarity (LFO page)	0: +uni, 1: −uni, 2: +bi, 3: −bi	
1152	LFO4 ROUTE POLARITY	LFO4 route polarity (LFO page)	0: +uni, 1: −uni, 2: +bi, 3: −bi	
1153	LP SLOPE	LPF slope (GR-MEGA only)	0: 6, 1: 12, 2: 18, 3: 24 dB/oct	
1154	HP SLOPE	HPF slope (GR-MEGA only)	0: 6, 1: 12, 2: 18, 3: 24 dB/oct	

Rate divisions

Table 3: Rate divisions

Index	Rate	Category
0	1/64	Straight
1	1/32T	Triplet
2	1/32	Straight
3	1/16T	Triplet
4	1/32•	Dotted
5	1/16	Straight
6	1/8T	Triplet
7	1/16•	Dotted
8	1/8	Straight
9	1/4T	Triplet
10	1/8•	Dotted
11	1/4	Straight
12	1/2T	Triplet
13	1/4•	Dotted
14	1/2	Straight
15	1/1T	Triplet
16	1/2•	Dotted
17	1/1	Straight
18	2/1T	Triplet
19	1/1•	Dotted
20	2/1	Straight
21	4/1T	Triplet
22	2/1•	Dotted
23	4/1	Straight
24	8/1T	Triplet
25	4/1•	Dotted
26	8/1	Straight
27	8/1•	Dotted
28	16/1	Straight
29	16/1•	Dotted
30	32/1	Straight
31	32/1•	Dotted
32	64/1	Straight

Mod sources

Table 4: Mod sources

Index	Modulation source
0	LFO1
1	LFO2
2	LFO3
3	LFO4
4	CV1
5	CV2

6	Mod wheel
7	Key tracking
8	Note on velocity
9	Pitch (pitchwheel, MPE pitch)
10	Aftertouch
11	Timbre (MPE)
12	Lift (note off velocity)
13	AUX envelope
14	Random1
15	Random2
16	Random3
17	Random4
18	Pos X (vertical finger position / horizontal fader)
19	Pos Y (vertical finger position)
20	Draw X
21	Draw Y
22	Input envelope follower
23	None (= modulation OFF)

Table 5: Modulation destinations

Index	**Name**	**Category**
0	PITCH	ENGINE
1	POS	ENGINE
2	SPRAY	ENGINE
3	GRAIN RATE	ENGINE
4	SIZE	ENGINE
5	DENS	ENGINE
6	AMP	ENGINE
7	PAN SPRAY	ENGINE
8	PAN SPRAY DIST	ENGINE
9	PITCH SPRAY	ENGINE
10	GRAIN PROB	ENGINE
11	SIDES	ENGINE
12	TILT	ENGINE
13	CURVE	ENGINE
14	PAN	ENGINE
15	DIRECTION	ENGINE
16	WINDOW AM	ENGINE
17	SCAN	ENGINE
18	TAPE SLEW	ENGINE
19	SPEC AMPTHR	ENGINE
20	SPEC PHSMEAR	ENGINE

Index	Name	Category
21	SPEC AMPSMEAR	ENGINE
22	SPEC BEND	ENGINE
23	SPEC FORMANT	ENGINE
24	SPEC FREEZE	ENGINE
25	SPEC BEND	ENGINE
26	SPEC PITCHBLEND	ENGINE
27	SPEC FOLD	ENGINE
28	SPEC TILT	ENGINE
29	SPEC CURVE	ENGINE
30	SPEC DEPTH	ENGINE
31	SPEC CONTRAST	ENGINE
32	PITCH ENV AMT	ENV
33	PITCH ATTACK	ENV
34	PITCH DECAY	ENV
35	PITCH SUSTAIN	ENV
36	PITCH RELEASE	ENV
37	FILT ENV AMT	ENV
38	FILT ATTACK	ENV
39	FILT DECAY	ENV
40	FILT SUSTAIN	ENV
41	FILT RELEASE	ENV
42	AMP ATTACK	ENV
43	AMP DECAY	ENV
44	AMP SUSTAIN	ENV
45	AMP RELEASE	ENV
46	AUX ENV AMT	ENV
47	AUX ATTACK	ENV
48	AUX DECAY	ENV
49	AUX SUSTAIN	ENV
50	AUX RELEASE	ENV
51	LPF CUTOFF	FILTER
52	LPF RESO	FILTER
53	HPF CUTOFF	FILTER
54	HPF RESO	FILTER
55	LFO1 RATE	LFO
56	LFO2 RATE	LFO
57	LFO3 RATE	LFO
58	LFO4 RATE	LFO
59	LFO1 AMOUNT	LFO
60	LFO2 AMOUNT	LFO

Index	Name	Category
61	LFO3 AMOUNT	LFO
62	LFO4 AMOUNT	LFO
63	LFO1 PHASE	LFO
64	LFO2 PHASE	LFO
65	LFO3 PHASE	LFO
66	LFO4 PHASE	LFO
67	LFO1 QUANT	LFO
68	LFO2 QUANT	LFO
69	LFO3 QUANT	LFO
70	LFO4 QUANT	LFO
71	SEQ LEN	SEQ
72	FX1	FX
73	FX2	FX
74	AUDIO IN FX SEND	FX
75	SYNTH FX SEND	FX
76	CHOR RATE	FX
77	CHOR FB	FX
78	CHOR CENTR	FX
79	CHOR BW	FX
80	CHORUS DRY	FX
81	CHORUS WET	FX
82	COMP THRESH	FX
83	COMP KNEE	FX
84	COMP RATIO	FX
85	COMP ATTACK	FX
86	COMP RELEASE	FX
87	COMP DRY	FX
88	COMP WET	FX
89	DELAY LEN	FX
90	DELAY AMT	FX
91	DELAY DRY	FX
92	DELAY WET	FX
93	PPDELAY LEN	FX
94	PPDELAY AMT	FX
95	PPDELAY DRY	FX
96	PPDELAY WET	FX
97	OVERDRIVE AMT	FX
98	OVERDRIVE DRY	FX
99	OVERDRIVE WET	FX
100	FLAN RATE	FX

Index	Name	Category
101	FLAN FB	FX
102	FLAN CENTR	FX
103	FLAN BW	FX
104	FLANGER DRY	FX
105	FLANGER WET	FX
106	LVERB TIME	FX
107	LVERB DAMP	FX
108	LVERB M-S	FX
109	LVERB EARLY	FX
110	LVERB TAIL	FX
111	LVERB PRE	FX
112	LVERB DRY	FX
113	LVERB WET	FX
114	REDUCER BIT	FX
115	REDUCER RATE	FX
116	REDUCER DRY	FX
117	REDUCER WET	FX
118	REVERB SIZE	FX
119	REVERB DAMP	FX
120	REVERB WIDTH	FX
121	REVERB DRY	FX
122	REVERB WET	FX
123	RING COARSE	FX
124	RING FINE	FX
125	RING MOD DRY	FX
126	RING MOD WET	FX
127	SAT DRIVE	FX
128	SAT GAIN	FX
129	SAT DRY	FX
130	SAT WET	FX
131	EQ3 LOW	FX
132	EQ3 MID	FX
133	EQ3 HIGH	FX
134	EQ3 FREQ LO	FX
135	EQ3 FREQ HI	FX
136	EQ3 DRY	FX
137	EQ3 WET	FX
138	RESO CUTOFF	FX
139	RESO RESO	FX
140	RESO DETUNE	FX

Index	Name	Category
141	RESO TILT	FX
142	RESO DECAY	FX
143	RESO PAN	FX
144	RESO WIDTH	FX
145	RESO NOISE	FX
146	RESO NOISERATE	FX
147	RESO DRY	FX
148	RESO WET	FX
149	RESO PITCH	FX
150	RESO TONE	FX
151	VIB RATE	FX
152	VIB CENTER	FX
153	VIB DRY	FX
154	VIB WET	FX
155	MACRO1	MACRO
156	MACRO2	MACRO
157	MACRO3	MACRO
158	MACRO4	MACRO
159	MACRO5	MACRO
160	MACRO6	MACRO
161	MACRO7	MACRO
162	MACRO8	MACRO
163	MACRO9	MACRO
164	MACRO10	MACRO

Technical Support

GR-Mega Specifications

Feature	Spec	Remark
General		
Multitimbrality	4 layers	
Polyphony per layer	16 voices	3 in PV engine
Total number of grains	4000	all layers combined, about 3.5 times as much as the gr-1
Engines	Sampler	(including loop, start end)
	Granular	
	Tape mode	
	Granular slice mode	Sampler slice mode possible
	Spectral	
Preset system		
Number of presets	128	per project
Number of mtpresets	128	per project, 16 quickly accessible
Number of projects	50	
Sampling and samples		
Audio input	2 channels (stereo)	
Max sample length	60 minutes	3 minutes max in granular, because of polyphony
Sample rate	48 kHz	
Mix resolution	32 floating point	
Sample channels	mono or stereo	
Granular engine		
Max chord size	12	
Max grains per voice	128	
Rate modes	Free, Sync-size, Scan & rate	Free means independent rate and grain size, other modes have synchronized rate and size options
Loop modes	Bounce, wrap, kill	
Arp modes	Up, down, random, shuffle, play order, and more	
Spawn modes	Direct, gradual, recycle	

Phase vocoder

Max polyphony	3	
FFT size	256..8192	
Chord mode	up to 12 notes per voice	

Mod matrix

Number of LFOs	4	4 per layer
Number of modulation sources	24	
Number of modulation destinations	165	and growing
Number of step sequencer modulators	4	

Filters

Filters per voice	1	multimode
Slope	12 dB per octave	

Envelopes

Destinations	Pitch	
	Filter	
	Amplitude	
	Aux	Freely assignable
Length	0.1 ms .. 45 s per stage	
Stages	ADSR	
Shape	Curved: from log to linear to exponential	

FX

Number of simultaneous fx per layer	4	
Effects	Chorus	
	Delays	Plain, and ping pong
	Distortion	Overdrive, and reducer
	Dynamics (compressor)	
	Flanger	
	Reducer	
	Reverbs	Hall and large (algorithmic)
	Ring modulator	With AM mode
	..and more coming in new firmwares	

Connectivity

Analog audio output	Stereo TRS 1/4 ” balanced	100 dB SNR
Analog audio input	Stereo TRS 1/4 ” balanced	90 dB SNR
Headphone	1/8 “	
MIDI	DIN (in out), USB C (in and out)	
Eurorack interface	1x gate out, 2x CV in (-5V.. +5V)	
LAN (ethernet)	Gigabit (firmware update & filesharing)	
Disk / USB sticks	USB A 3.0	
Computer keyboard	USB A 3.0	

Storage

Internal storage	16GB..64GB, 20 MB/s .. 40 MB/s	
Dimensions	250×190×70	mm WxDxH, including side panels
Weight	~4 kg	

List of tested (USB-)MIDI controllers and keyboards

Akai MPK25
Alesis Q25
Arturia Beatstep
Arturia Keystep
Korg Nanokontrol2
Korg Nanopad2
Moog Sub37
Roli Seaboard Block
...

List of recommended accessories

Tasty Chips Electronics recommends:

Hardcases:

VidaXL Hardcase TBD

User recommendation TBD

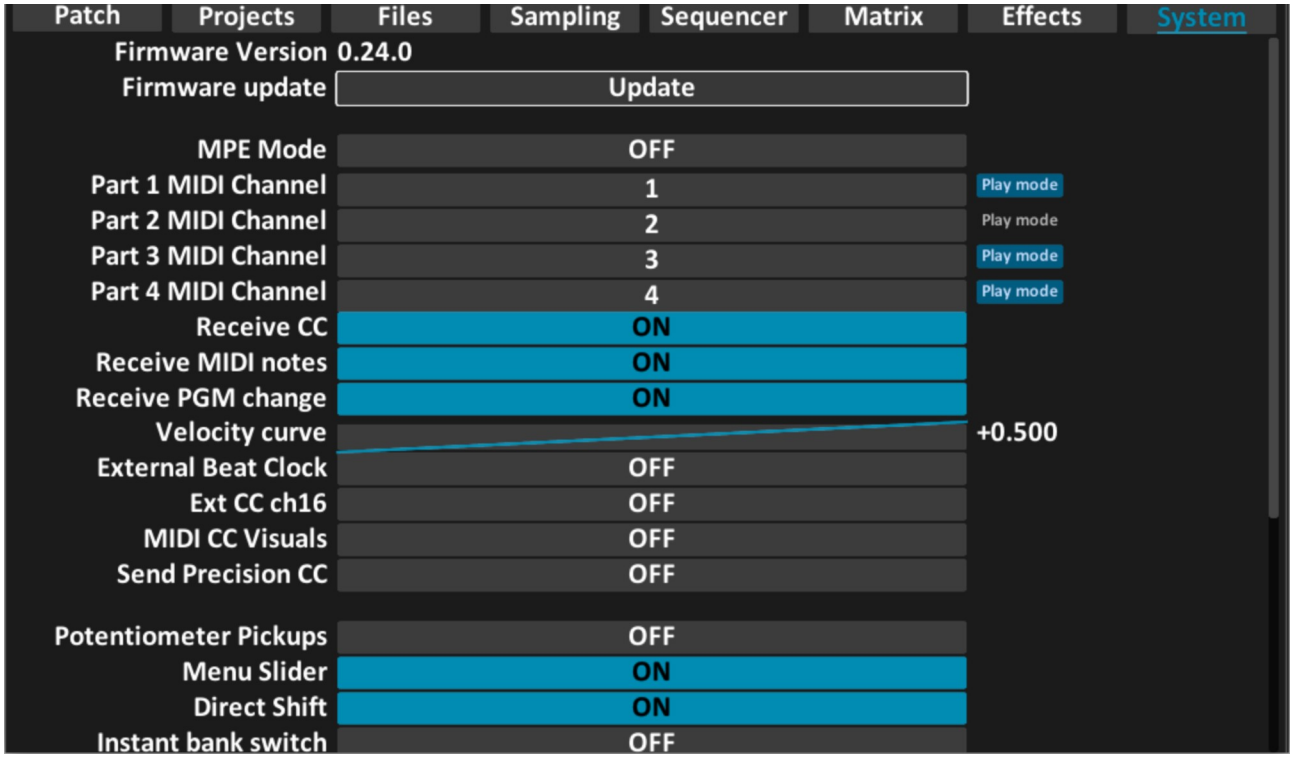
Firmware Updates

We recommend you upgrade to the latest firmware if you're waiting for specific bug fixes. When versions like x.y.0 are released this means new features. When a x.y.1, x.y..2, etc is released this means bug fixes.

Updating the firmware is relatively easy and only involves going into the system menu and pressing one single button. However, the update procedure can take a minute and will reboot your GR-2 twice (!)

Firmware upgrades can be done via by using a firmware zip file on your USB stick, or using the firmware dropper via USB C file sharing. See the troubleshooting section if you're having problems downloading.

DO NOT POWER DOWN YOUR MACHINE WHEN FIRMWARE IS UPDATING. DATA LOSS MAY ENSUE!



1. Go to the system menu

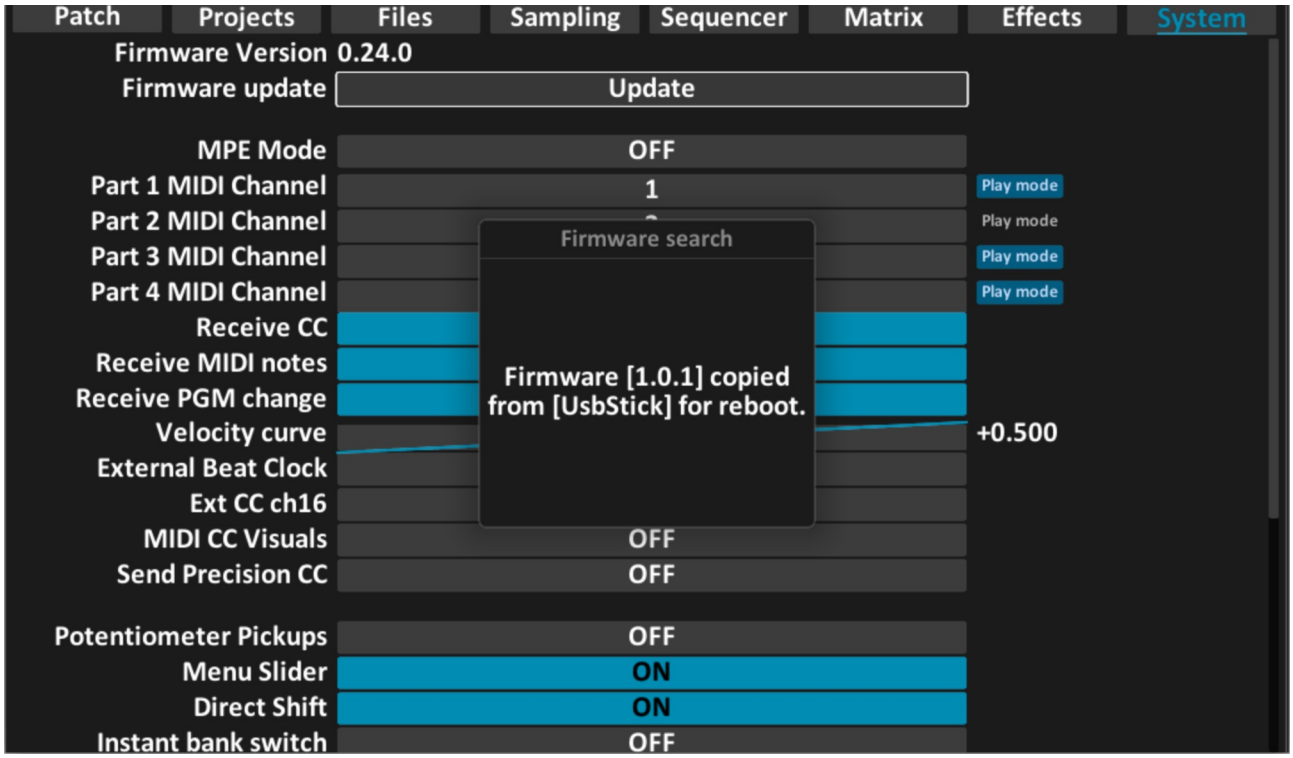
   [⚙] / [Menu] → System

2. Touch "Update"

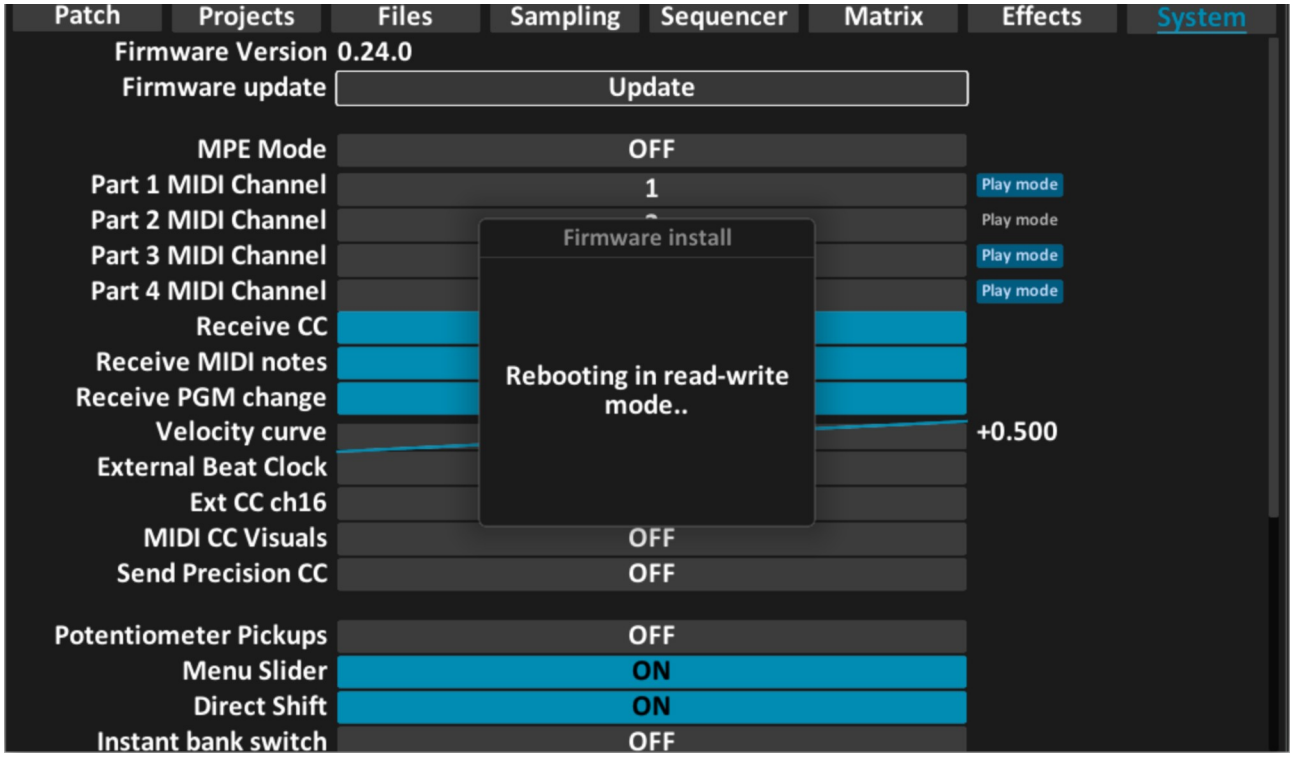
When the GR-2 has found a firmware update, it will report what version and where it found it: Internet, or on USB stick.

It will then prompt you with up to 4 choices: Escape to cancel, or choose "Online" or "USB". There can be multiple firmware files on the USB stick, and the GR-2 will list at most 3 of them,

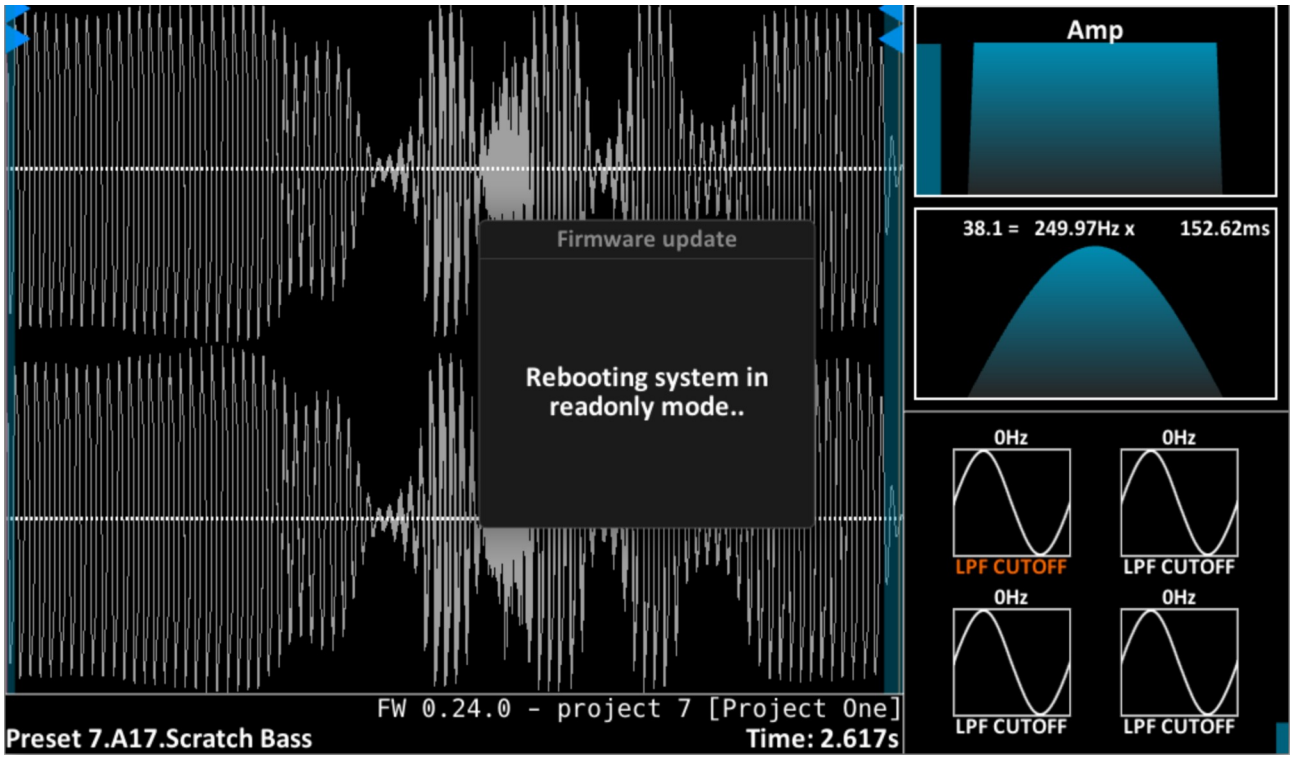
complete with version number. The online version is always the latest official version. The USB stick can hold any version, even beta versions. The dialog will show the version number for each choice. Assuming you choose Online or USB to upgrade:



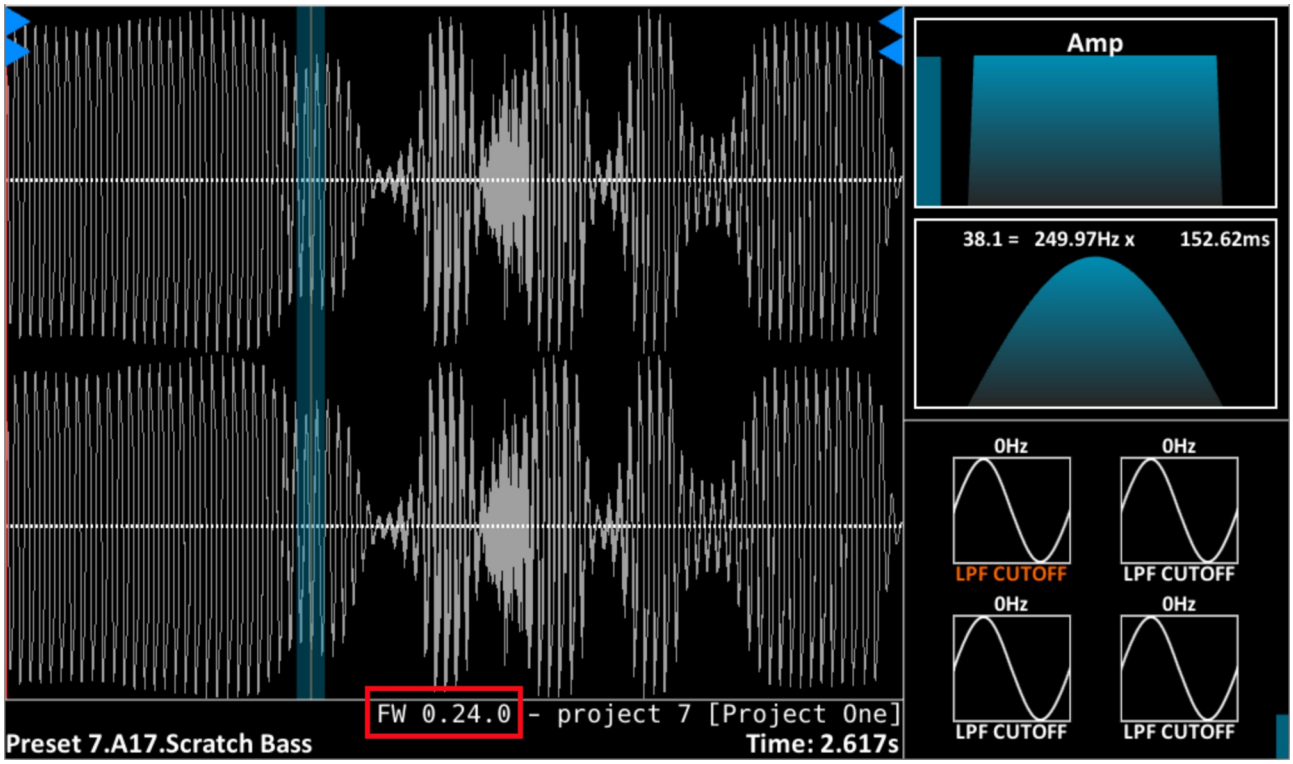
It will then show a popup that it will now reboot. The restart will take about 20 seconds. Then a grey screen will be visible for about 10 seconds until it reboots again.



After this it will start the actual installation. After this is complete, it will show a popup that it will reboot again.



After the second reboot it will show the new firmware version in the bottom of the screen. You've now updated your GR-MEGA's firmware.



Firmware dropbox

When you've set up file sharing between your GR-2 and your PC/Mac, you'll see a folder "firmware_dropbox". Copy a firmware zip onto here, and you'll be prompted immediately with a dialog asking you to upgrade to version x.y.z, i.e. the one you just dropped onto it. Confirm and the same procedure as above will start. This effectively means no more plugging USB sticks. Only a USB C connection to your PC/Mac. Of course, it depends on what you prefer. In future firmware we may use such a dropbox, also to try samples from your PC.

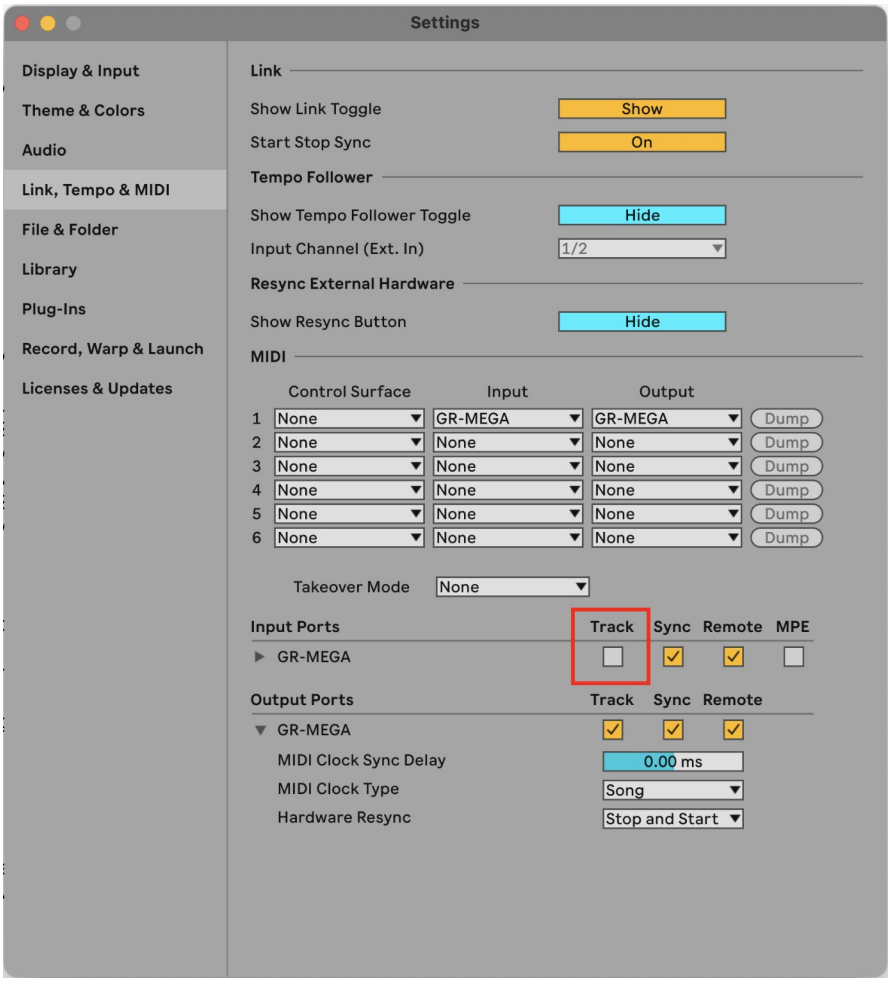
FAQ – Frequently Asked Questions

Q: I hooked my GR-2 up to my monitors or mixer, but the output volume is really low / there's noise?

A: Please make sure you use **balanced** audio cables (**TRS** – meaning Tip Ring Sleeve, so the phono jack has 2 black rings, not 1!). Also make sure that the knobs in the upper right are dialed all the way up. For audio input on the GR-2, use balanced gear only, or use a DI box.

Q: I'm getting jumps when I turn knobs, and making changes in one layer seems to be reflected in another layer. What's going on?

A: Do you have Ableton connected via USB C? If so, then it defaults to feeding back MIDI data to the source. Please disable this in Ableton's MIDI setup:



..and also make sure that you're using the correct MIDI channels on each GR-2 layer. Layers can use the same MIDI channel. System menu → MIDI → MIDI channels

Q: Can the GR-2 import my old GR-1 patches?
A: It can do this. The scaling of some modulations do differ, though.

Q: I'm sure my MIDI controller is sending stuff to the GR-2, but it isn't responding?
A: System menu → MPE Mode → OFF

Q: I'm loading this 1 hour long sample and granular mode does nothing. What's up?
A: Granular mode is optimized for shorter samples. Crop the sample down to 5 minutes and 49 seconds and you should be fine.

Q: I'm using a big externally powered USB MIDI keyboard / controller, and unplugging it seems to crash my GR-2??
A: Remove the MIDI controller's power supply. Unplug and replug your GR-2's power to restart it. Only use an external power supply for the MIDI controller if you're using DIN MIDI. If using USB MIDI, please let your GR-2 power the MIDI controller! This USB MIDI controller is actually misbehaving and does not conform to the USB spec. A self-powered USB device should not "backpower" a host.

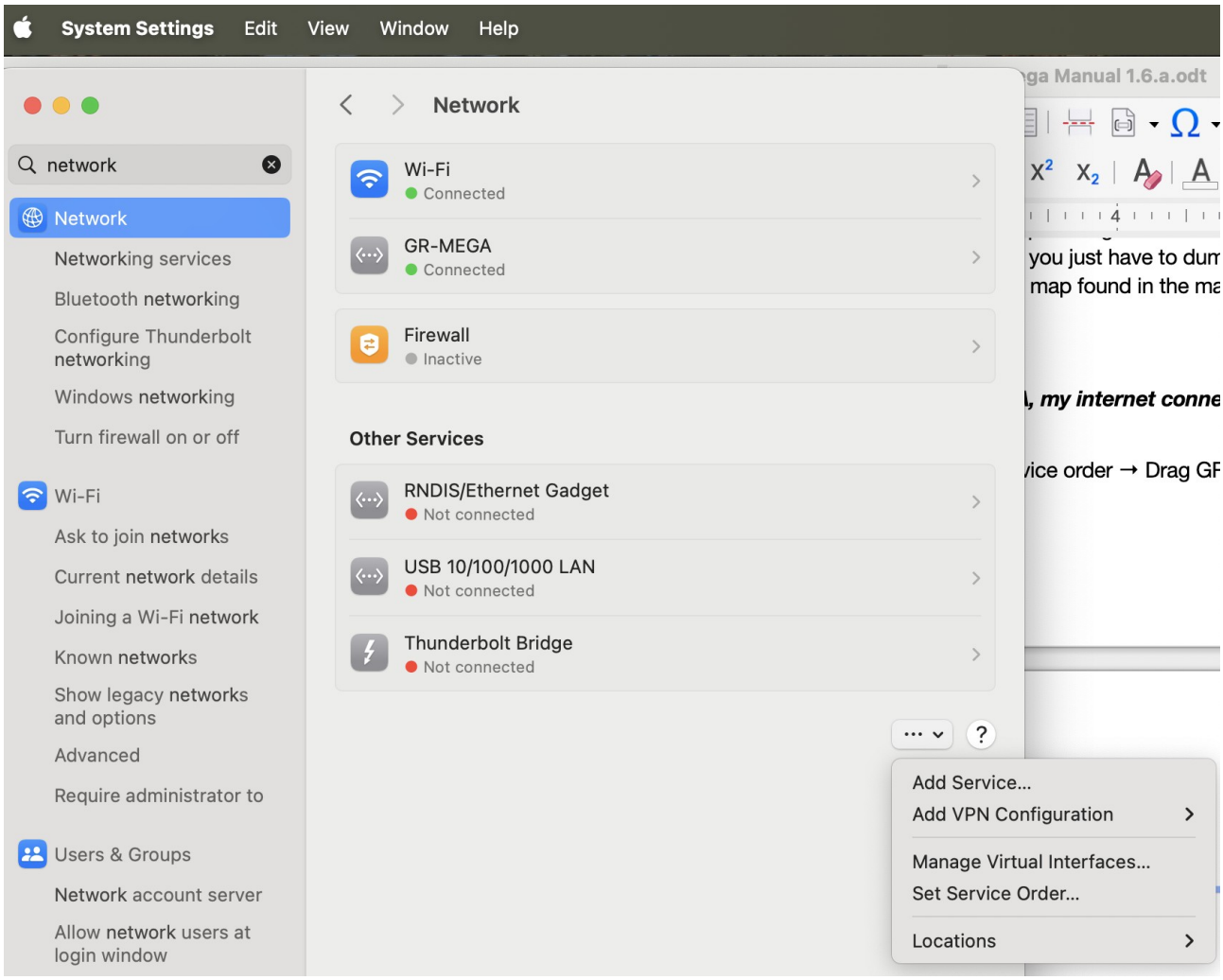
Q: The display seems to have a burned-in menu screen?
A: This is temporary. The display has a memory effect, but it's not permanent. It's an LCD screen, not an OLED. After a minute or two it will disappear.

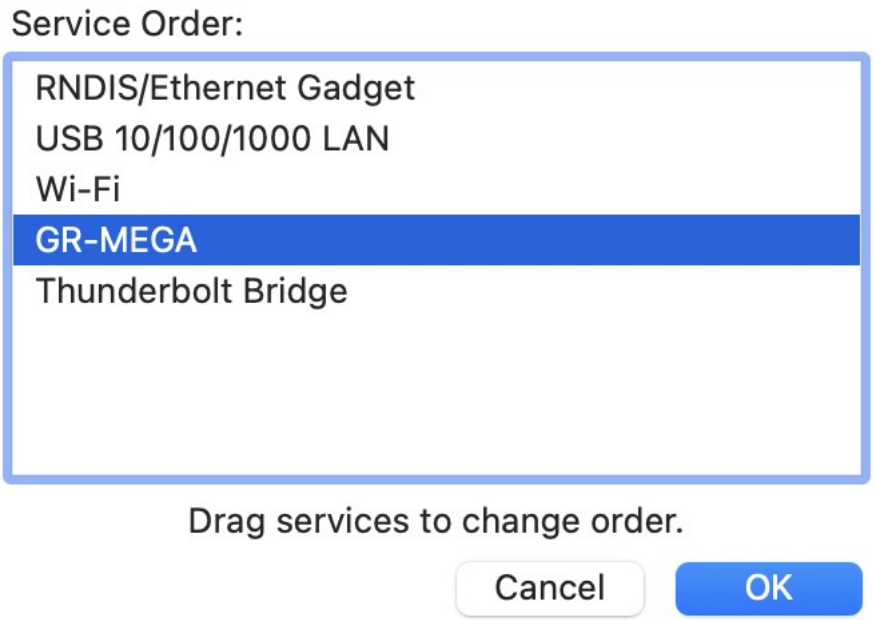
Q: In multitimbral – when loading a sample into one of the layers, other layers change to this sample as well! What is up?
A: By default, multitimbral presets, are *references* to monotimbral presets. If you don't mind sacrificing some RAM and disk space, you can make them standalone: Menu → IO → MTPreset: detach on save → ON

Q: I have MIDI controller X and the GR-2 reacts in a strange way. How to fix this?
A: It depends a bit on the exact nature of the issue, and also on the popularity of your MIDI controller. The GR-2 adheres to the most important general MIDI CC's, but not all. We cannot buy or borrow every MIDI controller out there, so you just have to dump MIDI data from your controller and compare it with the GR-2 CC map found in the manual. You can also send your MIDI dump to us so we can analyze.

Q: When hooking up my Mac to the GR-2, my internet connection is lost. How can I fix this?

A: System Settings → Network → ...⌄ → Set service order → Drag GR-2 all the way down.




Service Order:
RNDIS/Ethernet Gadget
USB 10/100/1000 LAN
Wi-Fi
GR-MEGA
Thunderbolt Bridge
Drag services to change order.
Cancel
OK

Q: My GR-2 seems mute. Help!

A: The GR-2 has many volume controls and two filters. The filters can *close*, meaning they can mute your patch as well. Things to check:

1. Check your setup. Are your monitor speakers in anti-phase?
2. Is the display still showing grains? Check MIDI connectivity and MIDI settings. Try the [Play] button. Check grain rate or density knobs. Grain rate can be as low as 0.1 Hz! Grain size can also be super short!
3. Check (Master) volume knob, Wet volume knob, and Patch volume controls in the MIX menu pages.
4. Is the filter closed?
5. Press [MIX] repeatedly until you find the layer mix page, and check the layer levels.
6. Enter the effects menu [FX], and check
    - the Synth send volume
    - dry and wet volumes on each FX in the chain
7. Amp env amount, and the Amp sustain fader! Press the [ENV] button until you find the Amp env page.

Troubleshooting

Firmware upgrades

Some things to keep in mind when updating your firmware:

* Please use a premium quality USB stick or an external SSD.

* Place the firmware zip file in the root directory of the USB stick. DO NOT UNZIP IT. On Macs, Safari loves to unzip everything under the sun and even sometimes mangle the output. Use Alt + click to download, or use a different browser.

Crashes

Please report all crashes to us: info@tastychips.nl. Please mention:

* your GR-2 serial number, found on the bottom plate of the casing,

* your firmware version, found at the top of the system menu,

* the conditions under which the crash took place.

* is the crash reproducible, or is it intermittent?

* if you can find a minimal condition (the least amount of actions to trigger the crash), that is really useful!

Debug log

If you experience restart type crash, then very useful hints for the developers may be in the "debug log".

1. Go to the system menu: Press [Menu] and touch the "System" tab

2. Hold the two top left buttons above the display. A button "Debug log" will now appear.

3. While still holding the buttons, touch the Debug log button.

4. A scrollable log will appear. You can snap a couple of pictures and send them to info@tastychips.nl.

Slow USB drive or stick

Most cheap sticks have short life span, and degrade very quickly. Unfortunately since 2025, many manufacturers have lowered their quality standards, so also the mid range USB sticks have become slower and less reliable. We recommend premium quality Sandisk or Samsung. You'll have to spend at least 25 euro to get quality. Also: an SSD is likely always better quality than a mere USB stick.

Factory reset

This feature is hidden in the system menu. Use the below steps to unhide it, and use it. BEWARE: THIS WILL DESTROY ALL USER DATA, and copy back the factory project to slot 1.

If you have any data at all you want to backup, please use file sharing or the file manager to first copy data from your GR-2 to your USB stick or PC! After using factory reset, no user data will be recoverable (!).

1. Go to the system menu: Press [Menu] and touch the “System” tile

2. Hold the two leftmost button above the display. GUI buttons will appear in the menu.

3. While holding those buttons, touch to the factory reset button.

4. A dialog will appear to ask for confirmation.

Credits for the GR-2

Development

Concept:	Joeri Braams, Luc Derks, Pieter van der Meer
Software engineering:	Pieter van der Meer
Electronics engineering:	Joeri Braams
Hardware prototyping:	Joeri Braams
Mechanical design:	Luc Derks
Original compressor code:	Niels de Wit
Original (small) reverb code:	“Jezas” (Freeverb)
Testing:	Luc Derks, Joeri Braams, Pieter van der Meer
Presets and Sound design:	Luc Derks

Contact

Web: www.tastychips.nl
Email: info@tastychips.nl

Youtube: https://www.youtube.com/tastychips
Facebook: https://www.facebook.com/tastychipselectronics
Instagram: https://www.instagram.com/tastychips_synth
Discord: https://discord.gg/CxuXG34xZA

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