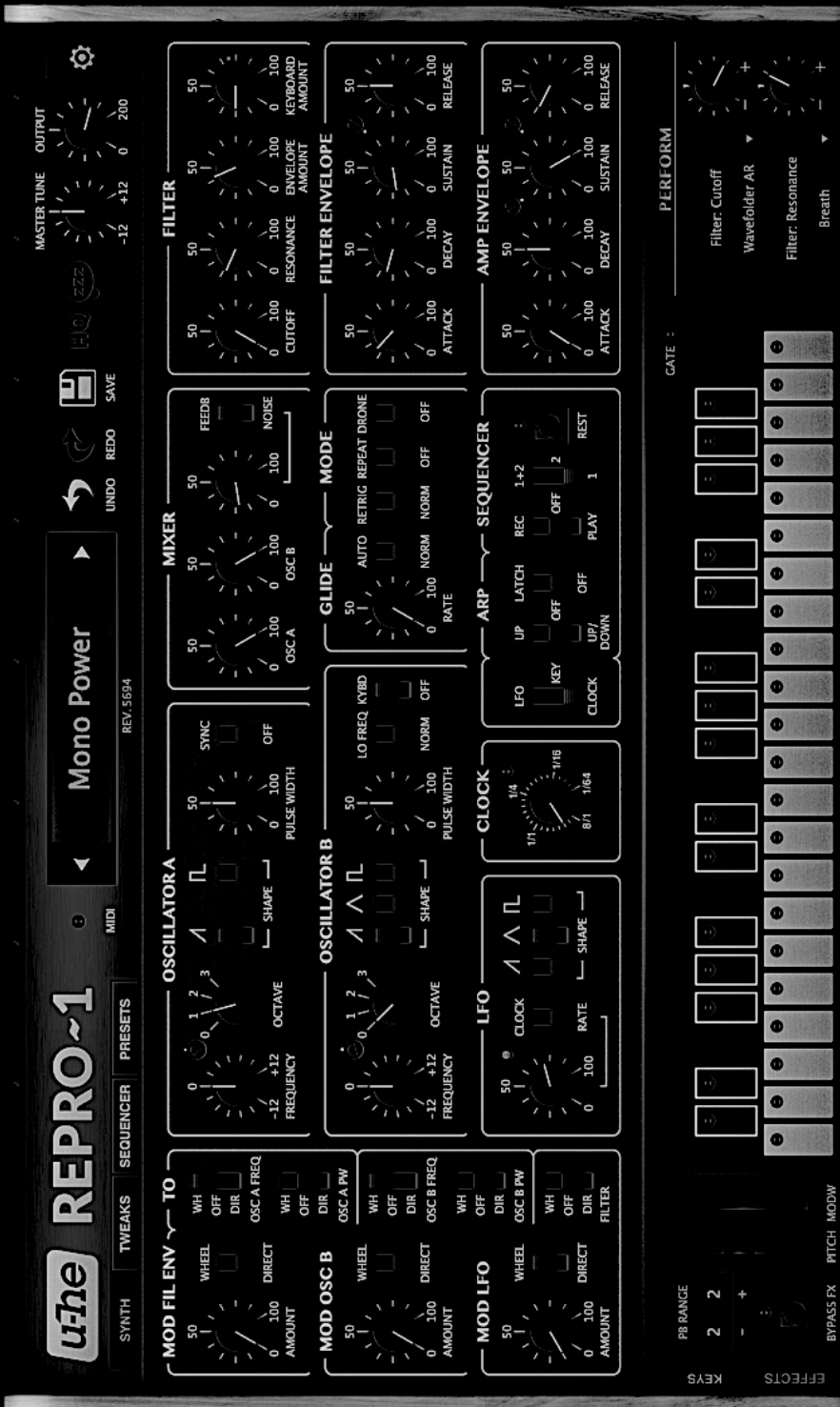


# REPRO-1 USER GUIDE

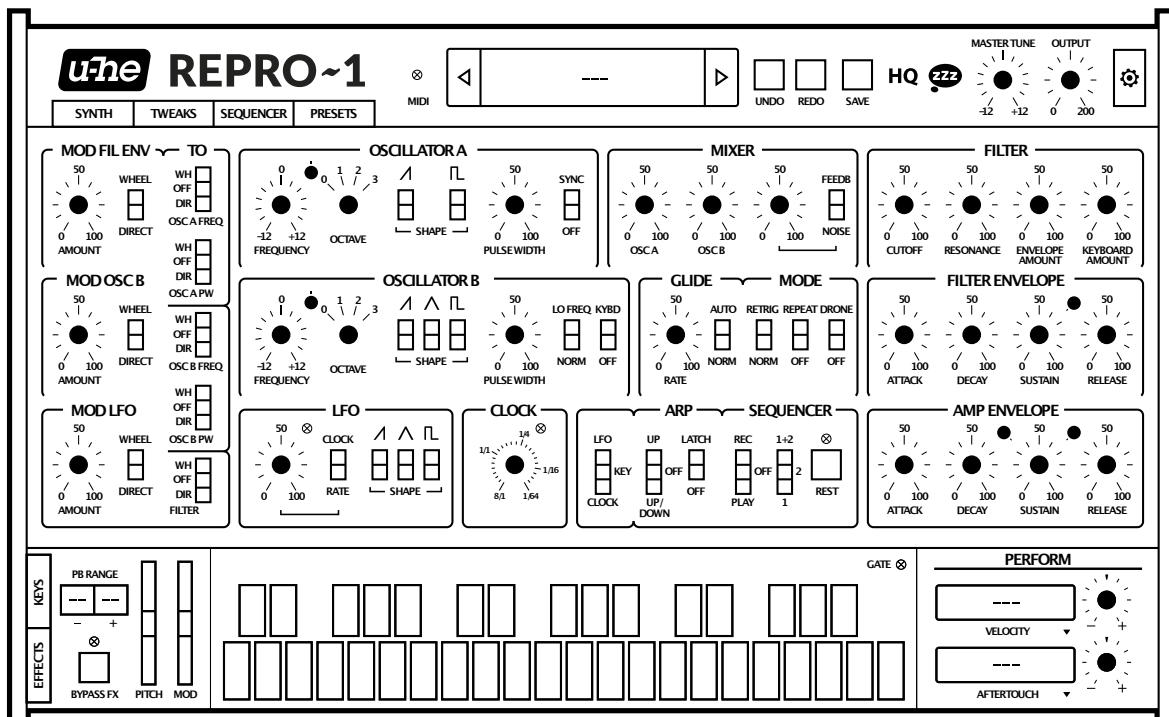


ההמה אלה  
חברה סופטו

# Repro-1 SYNTHESIZER

## OPERATION MANUAL

by Heckmann Audio



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# 1 INTRODUCTION

## 1-0 HISTORY

**Repro-1** is a component-level model of perhaps the most powerful-sounding monophonic keyboard ever built. When its 4-year production run started in the early 1980s, polyphonic synthesizers were almost within reach of the average musician. To be commercially viable, any new *monophonic* instrument had to be cheap but very capable. Fat drones, cutting leads, funky basses, quirky sci-fi sound effects – this synthesizer delivered on all counts.

The circuit design made good use of standard Curtis chips (3340 oscillator, 3320 filter and 3310 envelope) and the little onboard sequencer was more than just a welcome extra. Despite its molded plastic panel and the limitations of monophony, it sold surprisingly well and is generally recognized as an iconic piece of synthesizer history. Soaring prices guaranteed.

So here's our plug-in version, **Repro-1**: All the lovable quirks of this classic synth, but with a much more capable sequencer, lots of presets, several under-the-hood tweaks, more modulation options... plus a great collection of cute stomp-box effects. Enjoy!

- Urs and the team

## 1-1 INSTALLATION

**The following procedure installs both Repro-1 and Repro-5 on your hard disk**

Go to the [Repro](#) web page, download the latest installer for your system (Mac/Win). Unzip the compressed file, open the *Repro-1* folder and start the installer application. The only demo restriction is a mild crackling at irregular intervals after about two minutes of use. The demo is otherwise fully functional. Those crackles disappear after you have purchased a license and entered the serial number. For more information, please refer to the *ReadMe* file included with the installer. By default, Repro-1 uses the following directories:

### Windows

Presets (Local)	... \VstPlugins\u-he\Repro-1.data\Presets\Repro-1\
Presets (User)	... \VstPlugins\u-he\Repro-1.data\UserPresets\Repro-1\
Preferences	... \VstPlugins\u-he\Repro-1.data\Support\ (*.txt files)
Alternative skins	... \VstPlugins\u-he\Repro-1.data\Support\Themes\ (skin folder)

### macOS

Presets (Local)	MacHD/Library/Audio/Presets/u-he/Repro-1/
Presets (User)	~/Library/Audio/Presets/u-he/Repro-1/
Preferences	~/Library/Application Support/u-he/com.u-he.Repro-1... (*.*) files)
Alternative skins	MacHD/Library/Application Support/u-he/Themes/ (Repro skin folder)
Other resources	MacHD/Library/Application Support/u-he/Repro-1/

To uninstall Repro, delete the plugin files and the above folders.

**Important:** Realtime malware scanners (e.g. Windows Defender) allowed to scan u-he plugin resources will slow down the browser considerably, depending on the number of presets. Please add the Repro-1.data folder to the scanner's exceptions list (you can rest assured that we haven't put any executable files in there). Mac owners using a malware scanner should add the above */u-he/* resource directories to the exceptions list.

## 1-2 RESOURCES

### u-he online

For downloads, news and support, go to the [u-he website](#)

For heated debates about u-he products, go to the [u-he forum](#)

For friendship and informal news updates, go to our [facebook page](#)

For u-he presets (paid or free), go to u-he preset library [PatchLib](#)

For video tutorials and more, go to our [youtube channel](#)

For personal pics and a few videos, go to our [instagram page](#)

For audio demos of soundsets, go to our [soundcloud](#)

### the u-he team

Urs Heckmann (boss code, vision)

Sascha Eversmeier (code, puns)

Jan Storm (framework, more code)

Sebastian Greger (GUI design, 3D stuff)

Rob Clifton-Harvey (interwebz & support)

William Rodewald (student-life-support code)

Howard Scarr (presets, manuals, necessary grump)

Michael Pettit (videos, marketing, web development)

Viktor Weimer (support, presets, the voice)

Thomas Binek (QA / bug-hunting, presets)

Alexandre Bique (all things Linux)

Frank Hoffmann (more framework, new browser)

Henna Gramentz (worldly supervision)

Oddvar Manlig (everything else)

...with special thanks to Brian Rzycki for maintaining PatchLib

## JUMP BETWEEN CHAPTERS USING THE HYPERLINKS AT THE BOTTOM OF EACH PAGE

## 1-3 KNOBS AND SWITCHES

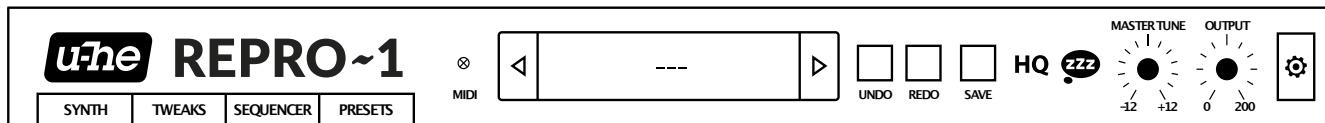
The knobs respond to vertical click & drag and to mouse wheel movement (no clicks required). You can **fine tune** most parameters, most often with a resolution of 0.01, by holding down SHIFT before clicking on the knob. How switches react depends on a global preference called *Switch Behaviour* – see the [Configuration](#) chapter.

The name and value of the control currently being edited appears in the **data display**, which you will find in the middle of the control bar (see below).

**Parameter Locking:** To prevent a value from changing when you switch presets, use the *Lock* function – right-click on any control and select the last entry in the menu. Don't forget to unlock afterwards, otherwise presets will sound “wrong”.

**Entering values:** The value of the most recently used control can be set by entering numbers on your computer keyboard. Switches take integer indices e.g. you can set *Clock* to 1/16 by entering ‘19’. Please note that hosts respond differently to keyboard strokes while a plug-in has the focus – you might have to set an option to allow this feature. If in doubt, please refer to the documentation of your host app.

## 1-4 CONTROL BAR



**u-he Badge:** Clicking on **u-he** opens a popup menu containing links to this user guide, to our homepage, to our support forum, and to various social networks.

**SYNTH, TWEAKS, SEQUENCER, PRESETS:** These buttons switch between Repro-1's four basic views. To ensure that each new instance will open in the current view, right-click anywhere within the row of buttons and select *set current as default*.

**MIDI activity:** An indicator which flashes whenever MIDI data is being received.

**Data Display:** The text display at the top performs several duties. Normally, it shows the name of the preset. Clicking on the triangles steps through all presets, while clicking in the middle of the display lets you select any preset from the current folder or load an **initialize** (*init*) preset. While editing, the parameter name and value will appear in the display for a few seconds.

**UNDO / REDO** buttons: To the right of the data display is a pair of buttons you can use to fix any 'mistakes'. Although the number of steps in the buffer is limited, you can even undo a change of preset (so switching presets doesn't mean losing your work).

**SAVE** button: Stores the preset into either the currently selected folder or the 'User' folder, depending on the *Save Presets To* preference (see [chapter 8](#)). To select a different folder, click on PRESETS and navigate in the directory. Then click on [SAVE], give your preset a suitable name and enter any details you would like to appear in the PRESET INFO area of the browser. Note: Please avoid using these characters while naming folders/presets: (\ / ? % \* : " > < =).

Right-clicking on [SAVE] opens a menu with a choice of file formats. The recommended *h2p* option is our cross-platform format (editable text), while *h2p extended* includes extra readable information. The *native* option is the standard format of your system (.fxp for VST and AAX, .aupreset for Audio Units). An *nksf* option also appears in the VST2 version – see [chapter 9](#).

Note: The following switches are global per instance i.e. they are not saved with each preset: **HQ**, **zZz**, **BYPASS FX**, arpeggio **LATCH**, sequencer **ON KEY** | **ALWAYS**.

**HQ** button: The global *High Quality* option should only be necessary for extreme FM sounds or extreme pitches. Circuit-level modeling requires plenty of CPU anyway, and there's no point in doubling that requirement for little or no difference in the sound. Consider carefully!

**zZz** button ('Sleepy'): Activating this global option reduces the CPU consumption whenever Repro-1 isn't playing any notes. Please note, however, that *Sleepy* mode can cause artifacts not present in the original hardware.

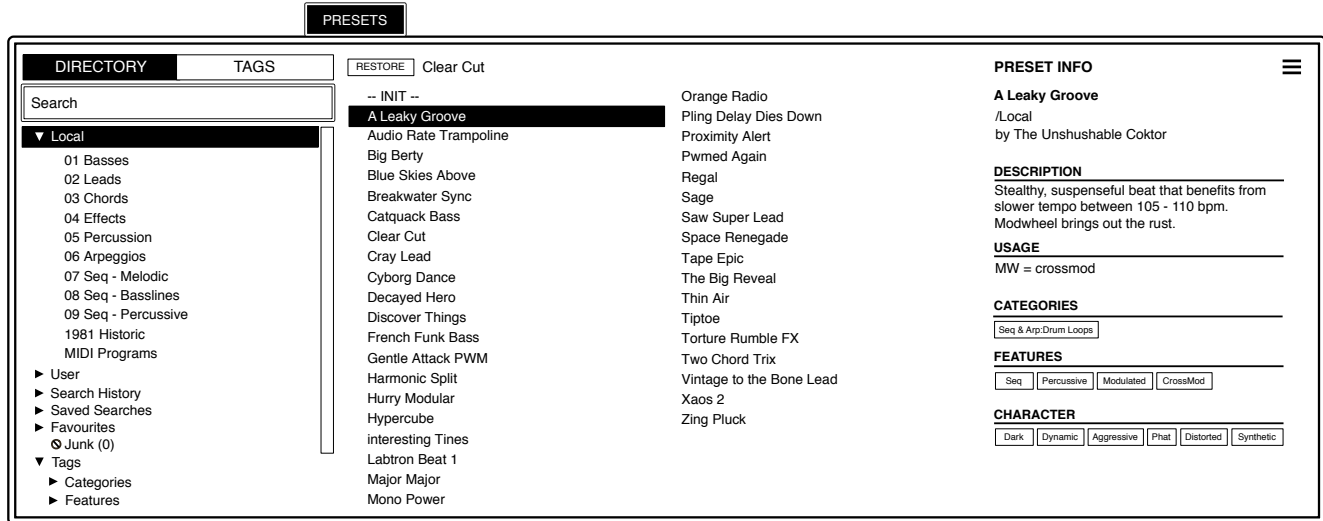
**MASTER TUNE:** Tunes the preset within a range of +/- 12 semitones. For fine tuning, hold down a SHIFT key on your computer keyboard while adjusting.

**OUTPUT:** Final volume control, after the amplifier and all effects. Normally set to 12 o'clock i.e. 100%, the volume can be boosted up to 200% if necessary.

**Configuration** button: A click on the cogwheel opens the configuration pages, which contain MIDI control options as well as several global preferences. See [chapter 8](#).

## 2 PRESET BROWSER

In the control bar, click on the PRESETS tab. You should see something like this:



Folders appear on the left (drag the scrollbar to see more), presets appear in the centre and information about the currently active preset appears on the right. If you can't see any presets at all, click on *Local* then on *01 Basses* (for instance). If you don't see a PRESET INFO panel, click on the [≡] button in the top right corner and activate *Show Preset Info*.

Note: The Local root directory contains a representative selection of presets.

To load a preset, click on its name. Immediately after selecting a preset you can step through all the others using your computer's cursor keys.

That's actually all you need to know for now! Repro-1's browser has many more features for users who want to dig deeper: The file functions include drag&drop, a powerful search engine etc.. For details, read the rest of this chapter.

### Default, initialize

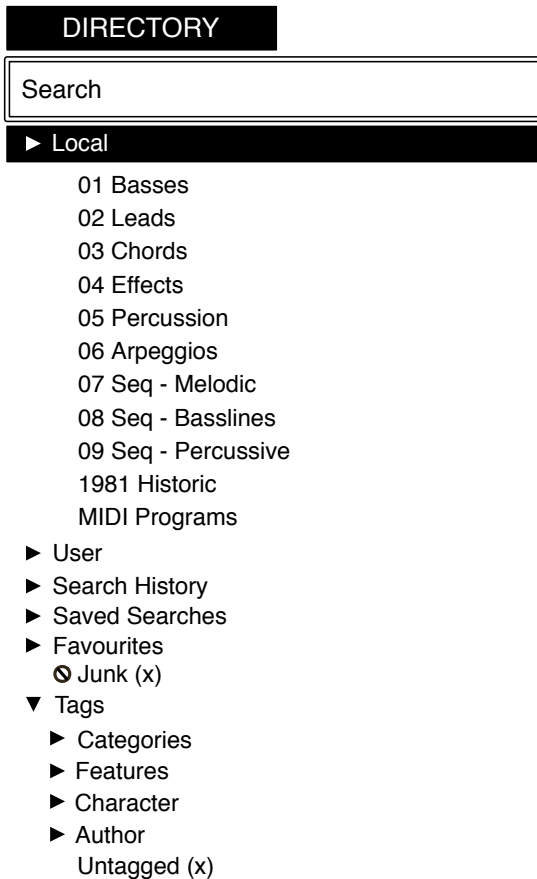
Whenever Repro-1 is started it checks whether the 'Local' root contains a preset called *default*. If this file exists, it is loaded instead of the demo sound.

If you want a simple template preset to be loaded every time, do this: Either load --INIT-- from *Local*, or click on the data display and select *init* (initialize) from the bottom of the list. Make sure that the *Local* folder is selected and [SAVE] this preset under the name *default*.

Note that *default* will not appear in the browser. If a fresh instance of Repro-1 is not loading your new *default*, it probably landed in 'User' instead, in which case you should change the *Save Presets To* setting (in Configuration/Preferences) and repeat the above.

## 2-1 DIRECTORY PANEL

If you don't see this panel in Repro-1's PRESETS browser, click on DIRECTORY.



### The 'Local' folder

Repro-1's factory presets are sorted into folders **01** to **09**. We recommend that you do not add or remove any presets there, but save all your creations into 'User' (see below).

Named after the year Repro-1's hardware ancestor first appeared, the **1981 Historic** folder contains 20 presets meticulously copied from patch sheets in the original printed manual.

As well as factory presets, 'Local' also contains a special folder called '**MIDI Programs**', which is initially empty. When the first instance of Repro-1 starts in the current session, all presets in that folder (up to 128) are loaded into memory so they can be selected with MIDI Program Change messages. As they are accessed in alphabetical order it is a good idea to put a number at the beginning e.g. '000 rest-of-name' to '127 rest-of-name'. But that's not all...

'MIDI Programs' can contain up to 127 sub-folders, switched via MIDI *Bank Select* messages (CC#0). Send *Bank Select* first, then *Program Change*. 'MIDI Programs' is bank 0, sub-folders are addressed in alphabetical order starting with bank 1.

#### Important

'MIDI Programs' cannot be added, removed or renamed on the fly – any changes to that directory will only be updated after the host application is restarted.



## The ‘User’ folder

The best address for all your creations! You can either select *User* immediately before saving the preset, or set a global preference which ensures that it will **always** be saved to this folder – see the *Save Presets To* preference (chapter 8).

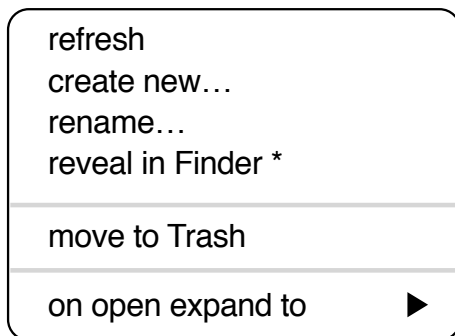
Tip: It’s worth finding out where the *User* folder actually resides on your computer. In Repro-1, right-click on *User* and select *reveal in Finder* (Mac) / *open in Explorer* (Win).

## Search History, Saved Searches, Favourites, Junk, Tags

These aren’t regular folders, but *smart folders*. See section [2-7](#).

## Directory context menu

Right-clicking on any folder within *Local* or *User* will open this menu:



**refresh:** Updates the contents of the browser. This is necessary after you have moved, added, removed or renamed any folders or presets using Explorer / Finder.

**create new...** Insert an empty subfolder.

**rename...** Edit the folder name.

**reveal in Finder / open in Explorer:** Opens a system window for the clicked folder. Please remember that if you add, remove or rename any preset files or folders there (i.e. outside of Repro-1’s browser), you should always *refresh* the directory afterwards.

**on open expand to:** These options determine how deeply the browser will open subdirectories whenever the GUI is opened again or the *refresh* function is called. The first option (*none*) collapses all folders, while the final option (*all levels*) reveals all nested folders.

## 2-2 PRESETS PANEL

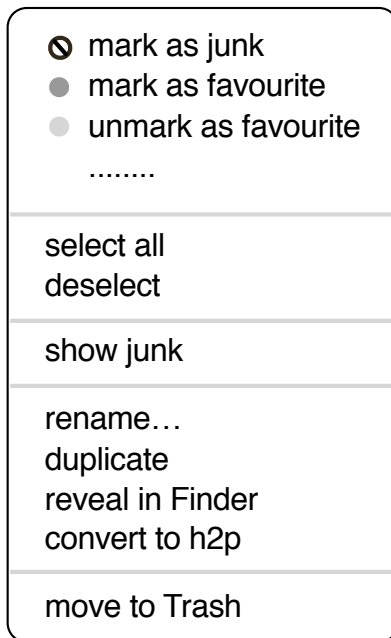
The central, unlabelled area of the browser is where you click to load presets...

### [RESTORE] button

You can try anything you like without losing track of the original preset, the one that was loaded before you opened the browser. Clicking on the [RESTORE] button loads that preset and opens the enclosing folder.

### Presets context menu

Right-click to open a menu containing functions you can apply to individual presets.



**mark as junk:** Instead of deleting any unloved presets, you can mark them as 'junk' so that they (normally) disappear from the browser. See *show junk* below.

**mark as favourite:** Choose one of eight differently coloured dots. To remove the dot again, right-click on the preset(s) and select *unmark as favourite*.

**select all, deselect:** See *Multiple Selection* below.

**show junk:** Activate this option to display junked files (marked with a STOP symbol), which would otherwise disappear.

**rename...:** Preset names aren't set in stone – you can change them at any time using this function. Note that only the most recently selected preset can be renamed i.e. you can't rename multiple files at once.

**duplicate:** A copy of the selected files are saved into the same directory, with an incremental number appended to the original name (like the 'Auto Versioning' option).

**reveal in Finder / open in Explorer:** Opens a system window for the selected preset. If you change anything there, refresh the directory (see the the previous page).

**convert to native / h2p / h2p extended:** Converts the selected preset(s) into the format previously selected via right-click on the [SAVE] button.

**move to Trash / Recycle Bin:** Moves the selected preset(s) to the system trash.

### Multiple selection, drag & drop

A block of adjacent presets can be selected via shift+click, and individual presets can be added to an existing selection via cmd-click (Mac) / ctrl+click (Win).

Presets can be moved to a different folder via **drag & drop**. Use SHIFT etc. on your computer keyboard to highlight the files you want to move, click and drag them from the files area and drop them onto a target folder. To deselect, either click on an unselected preset or choose *deselect* from the context menu.

The following switches are global per instance i.e. they are not saved with each preset: **HQ, zZz, BYPASS FX, arpeggio LATCH, sequencer ON KEY / ALWAYS.**

## 2-4 TAGGING

“Tags” are elements of metadata (information) you can add to presets so that they can be found according to certain attributes. See the image below.

IMPORTANT: Clicking on [SAVE] isn’t required, as tags are updated automatically. This makes editing tags much quicker overall, but also means that you should make a habit of adding tags **after you have saved your preset**, not while you are still editing them. Why? Because if you start changing the tags in the middle of creating a second version of a preset, you are also changing the tags in the original preset!

To set tags, you have a choice of three methods:

### Standard method: Using the tagging window

Right-click on the [SAVE] button and select *Tag this patch*:

CATEGORIES

Bass	Acoustic
Pads	Analogue
Leads	Digital
Keys	Distorted
FX	Evolving
Drums	Formant
Seq & Arp	FX Bass
Stabs	Plucked
Other	Sub
	Wobble
	Lo-Fi

FEATURES

Mono	Slow Release
Chord	Percussive
Arp	Sustained
Seq	Modulated
HostSync	CrossMod
Dry	Osc Sync
Effects	
Glide	
Soft Attack	

CHARACTER

CLOSE

Bright	Dark
Dynamic	Static
Constant	Evolving
Soft	Aggressive
Harmonic	Inharmonic
Phat	Thin
Clean	Distorted
Wide	Narrow
Modern	Vintage
Acoustic	Electric
Natural	Synthetic

CATEGORIES describe a preset by analogy to instrument types or classic synth genres. Each one has its own set of subcategories. FEATURES are technical classifications, and CHARACTER tags are pairs of opposites from which you can choose only one.

### Alternative 1: Using the PRESET INFO

In the PRESET INFO panel, right-click on CATEGORIES, FEATURES or CHARACTER and select or unselect tags from the menu. Note: This method only works for individual presets. If you right-click on an existing tag, the first option in the menu becomes *remove tag ‘xx’*.

The function *create Search from Tags* searches for presets with ALL those same tags.

### Alternative 2: Using the Tags subfolders

You can drag & drop presets onto *Tags* smart folders e.g. *Tags/Categories/Keys/Bells/*. This method can also be used to change the Author: Instead of signing each of your creations, you could sign just one of them, then select them all and drag them onto *Tags/Author/(You)/*. But be careful – this can’t be undone. You won’t want to credit all your presets to someone else!

To remove all tags, drag presets onto *Tags/Untagged/*.

## 2-5 SEARCH BY TAGS

Click on the large TAGS tab to open this view. The buttons in this panel let you set up search criteria according to tags with just a few mouseclicks:

TAGS

Search

CATEGORIES

Bass

Pads

Leads

Keys

FX

Drums

Seq & Arp

Stabs

Other

Leads

Bowed

Brass

Chords

Distorted

Guitar

Plucked

PWM

Reeds

Rhythmic

Sync

Synth

Vocal

Winds

Lo-Fi

FEATURES

Mono

Chord

Arp

Seq

HostSync

Dry

Effects

Glide

Soft Attack

Slow Release

Percussive

Sustained

Modulated

CrossMod

Osc Sync

CHARACTER

Bright

Dark

Dynamic

Static

Constant

Evolving

Soft

Aggressive

Harmonic

Inharmonic

Phat

Thin

Clean

Distorted

Wide

Narrow

Modern

Vintage

Acoustic

Electric

Natural

Synthetic

FAVOURITES

1

2

3

4

5

6

7

There are four sets of buttons. The first three correspond to the tags in the tagging window (see the previous page), and the bottom row lets you search any 'Favourites'. Click the [ ^ ] button on the right to collapse any of these tag types.

### CATEGORIES and SUBCATEGORIES

Here are just a few bullet points to get you started. For this type of tag in particular, following a step-by-step tutorial is much easier than studying a full technical description. Try these:

- Each of the CATEGORIES has its own set of subcategories. Not selecting any subcategory here means “show me presets tagged **with any subcategory**”. Click on [Leads]...
- You can select multiple categories without specifying any subcategory if you hold **Cmd** (Mac) or **Ctrl** (Windows) while clicking on the category. Try that, click on [Keys].
- Selecting the subcategory with the same name as the category means “show me presets tagged **without a subcategory**”. You will not find any of these in the factory presets.
- Completed category+subcategory tags appear below the subcategories as buttons with 'off' switches [X] so you can add other main categories by simply clicking on them.

## Practical tutorial

- Click on the **DIRECTORY** tab, right-click on the *Search History* smart folder and select *clear*. Double-click on *Local/02 Leads* to restrict the scope of the search to that particular folder. The selected path */Local/02 Leads* appears below the Search field instead of preset folders.
- Click on the **TAGS** tab. In the CATEGORIES, select [Bass]. Subcategory buttons appear and the preset window is updated to list all presets in *02 Leads* that are also tagged as [Bass].
- Now click on [Pads]. The [Bass] category is switched off, and the preset window is updated to list all the presets in *02 Leads* that are also tagged as any kind of [Pads]. Note that you still haven't specified a subcategory yet...
- Hold **Cmd** (Mac) or **Ctrl** (Win) and select the [Bass] category again. Although no longer outlined, the previously selected [Pads] remains highlighted and the list shows all presets in *02 Leads* that have either of those tags, disregarding any subcategories.
- Click on **DIRECTORY**: The text **#Bass:\* #Pads:\*** appears in the editable field as well as in the *Search History* smart folder (see section 2-7), which also shows the number of found presets. The semicolon separates category and subcategory, and the star (\*) means "any subcategory, even none".
- Click on the **TAGS** tab again. Select the [Leads] category **without** holding down Cmd/Ctrl this time... the [Bass] and [Pads] tags are both removed from the search. Select [Sync] as subcategory. The result is a list of all 16 presets in *02 Leads* that have the Leads:Sync tag. Below the subcategory options you will see the complete tag in the form **[Category:Subcategory|X]**.
- Let's get more hits by including another subcategory: Click on the [Distorted] subcategory. [Sync] remains selected, and the list of hits is updated to include presets which have **either** of those tags i.e. 28 in total. Click on [Sync] and the tag search will find only 17 presets – all those that are tagged as [Leads:Distorted].
- Click the [Bass] category. Below the subcategories, the [Leads:Distorted|X] switch remains in place because that tag is complete. Check out the category tags in PRESET INFO by clicking on several presets in turn: Each one will have either a Leads:Distorted tag or a Bass tag (disregarding subcategory) or both.
- Click on the **DIRECTORY** tab. The text **#Bass:\* #Leads:Distorted** appears in the search field as well as the *Search History* smart folder. If you are feeling adventurous, you can edit this and the results will be updated accordingly.
- To the left of the grey search path is an 'up' [^] symbol. Click on this to exit the current folder i.e. change the search path from */Local/02 Leads* to the */Local* root. The list of hits is immediately updated to 193 presets because the search now includes all of */Local*.
- Another click on [^] exits to the whole preset library i.e. */Local* and */User*. Clicking on the [X] symbol to the right of the search path will exit immediately. Try that.

Repeat the above a few times if necessary – you'll soon get the hang of it!

## FEATURES, CHARACTER and FAVOURITES

These types of tags are much easier to explain. Unlike multiple Category tags, which **expand** the search, selecting these Tag types always **restrict** the search. For example, let's find the few *inharmonic sequences* in the entire preset library, irrespective of category:

- If any CATEGORIES are still highlighted, click on them.
- Select FEATURES = [Seq] and CHARACTER = [Inharmonic]. That's it.

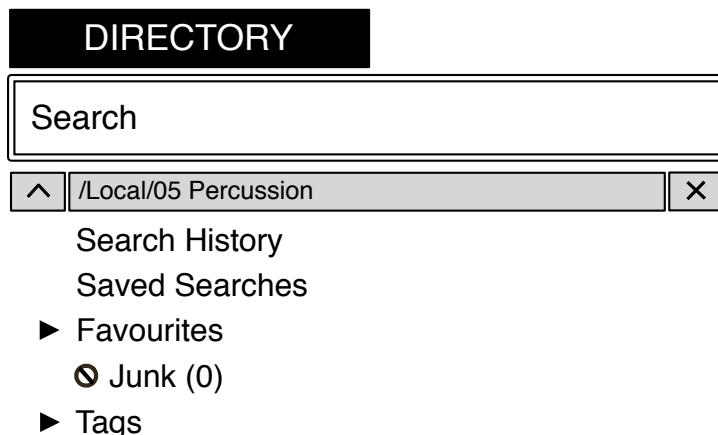
### Summary:

In the DIRECTORY panel, specify a search path via double-click. In the TAGS panel, select category tags. Add others if required to extend the search, but remember to hold down Cmd (Mac) or Ctrl (Windows) if you want to retain category tags that don't specify a subcategory. Select Features, Character and/or Favourites tags to refine the search. Exit any search path by clicking on the [X] to the right.

## 2-6 SEARCH BY TEXT

The editable field immediately below the DIRECTORY and TAGS tabs lets you search for presets according to a string of characters i.e. text. The search normally looks into the preset name, the author, the DESCRIPTION and USAGE (see the PRESET INFO panel). It is not case-sensitive. Quotes are not required unless you need to include spaces.

If you want to restrict the search to a particular path e.g. *Local/05 Percussion*, double click on the *05 Percussion* folder. This path then appears below the Search field, and you will only see smart folders plus any subfolders within the selected path (there are none in this example):



The [ ^ ] button to the left moves the search path up one level, in this case to */Local*. The [ X ] button to the right sets the search path to the default *Local* and *User* (i.e. all Repro-1 presets), and the preset folders become visible again.

Try a text search: Enter three or four letters then hit Return. For instance, *star* will find all files containing the text string *star* (e.g. *mustard* or *starters*). Entering "*star wars*" (with the quotes) would find e.g. *Battlestar Warship*, if such a string existed in the presets.

## Syntax

### Scope

You can limit the scope of the search to just the preset name or specific parts of PRESET INFO by using **name** (preset name), **author**, **desc** (description) or **use** (usage) followed by a colon. For instance, *author:the* finds all presets by sound designers whose author names contain 'the'. Similarly, *desc:space* will find all presets with the word *space* in the description.

### Logic

Important: The following logical operators can only be used between text elements.

AND requires that presets contain both words. It can be written explicitly if you prefer, but is not necessary. For example, *star AND wars* (or simply *star wars*) will find presets that contain both *star* and *wars*.

OR means that presets can contain just one of the words, or both. For example, *star OR wars* will find presets that contain *star* as well as presets that contain *wars*.

NOT excludes presets containing the word. To find all presets that contain *star* but don't contain *wars*, enter *star NOT wars*.

### Tags

Regular tags can also be entered into the search field if preceded with a '#'. For example, *name:"hs " #bass:\** will find all presets with "hs " in the name that are tagged as *Bass* with any or no subcategory. The semicolon separates category and subcategory, and the star (\*) means "any subcategory, even none". Between multiple tags of the same type is an implicit OR, while between different types is an implicit AND.

Note: In the current version of the browser, tags must appear after any text items!

### A few example searches

Try copy/pasting these into Repro-1's search field:

*desc:classic*

*author:ark*

*use:"at =" author:sc*

*usage:"bc ="*

*"hs " OR xen #leads:\**

*tuc NOT "mw ="*

<i>ark OR howard #bass:wobble</i>	= all ARK plus HS wobble basses
<i>ark OR NOT how #bass:wobble</i>	= all ARK plus non-HS wobble basses
<i>xs OR NOT ark #bass:wobble</i>	= all XS plus non-ARK wobble basses

## 2-7 SMART FOLDERS

*Smart folders* do not contain files, they display the results of querying a database of all presets. The content is therefore dynamic i.e. it will change whenever the underlying data changes.

### Search History

Click on this folder to display the results of past searches (maximum 10). Whenever you need to make the results of a search more permanent, right-click and select *save Search...* The entry will be moved to the 'Saved Searches' folder – see below.

To remove all searches from the list, right-click on the 'Search History' folder and select *clear*. Note: Individual entries cannot be removed here, unlike 'Saved Searches'...

### Saved Searches

This folder contains searches that have been saved via right click from 'Search History'. Entries dragged from 'Saved Searches' and dropped onto real folders within 'Local' or 'User' will create a folder containing copies of all found presets. To remove individual saved searches, right-click on the search and select *delete*.

### Favourites

8 smart folders, one for each Favourite colour. See [Presets context menu](#). Presets dropped onto one of the Favourites folders will be marked as such.

### Junk

A smart folder pointing to all junked presets. See [Presets context menu](#). Presets dropped onto this folder will be junked, and will therefore disappear from the rest of the browser unless made visible (see *show junk* in the [Presets context menu](#)).

### Tags

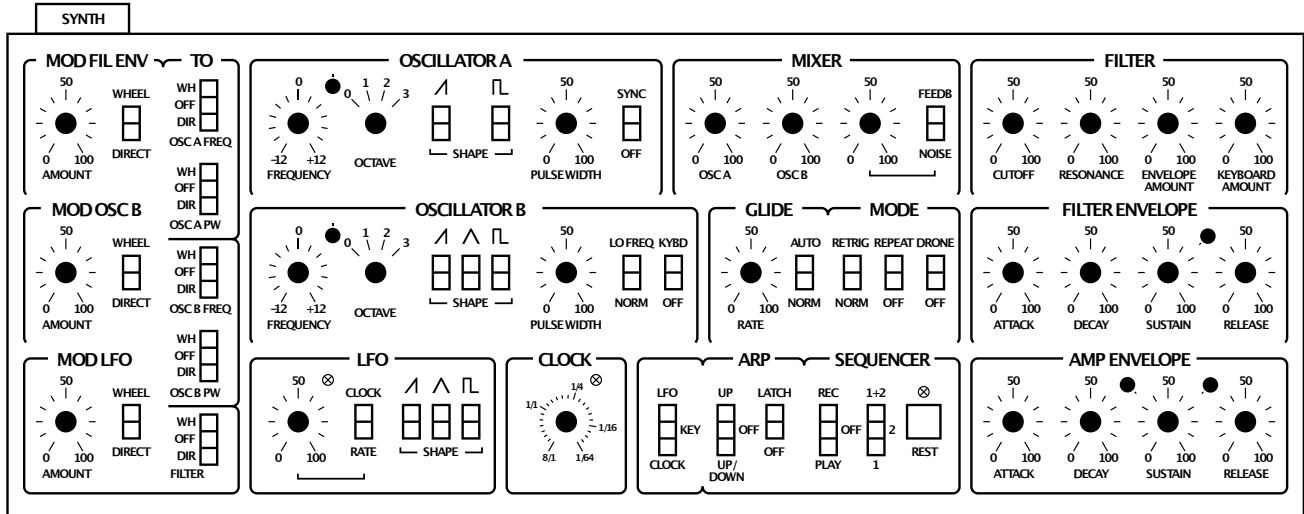
Smart folders for each *Category/Subcategory*, *Features*, *Character* tag as well as *Author*. Presets dropped onto these folders will adopt the corresponding tag / author. Presets dropped onto the *Untagged* folder will have all *Category/Subcategory*, *Features* and *Character* tags removed.



## 3 SYNTH

### 3-0 OVERVIEW

This section explains the various modules available on Repro-1's SYNTH panel. If you don't see this panel, click on the SYNTH button at the top left of Repro-1's window.



The PRESETS browser is described in the previous chapter, while the TWEAKS page and SEQUENCER functions are described in separate chapters later in this guide.

Due to its relatively simple architecture, you *can* operate Repro-1 without having to think about its structure. However, if you want to make the most of the available options, it's best to understand how signals are routed between those modules...

### 3-1 VOICE SIGNAL FLOW

On the next page is a flow diagram showing the audio signal paths as well as some keyboard control paths – you might like to print it out for future reference. A similar diagram of modulation signal paths appears later in this chapter.

WAVE SHAPE GENERATION → COMBINATION → TIMBRE MODIFICATION → LOUDNESS MODIFICATION

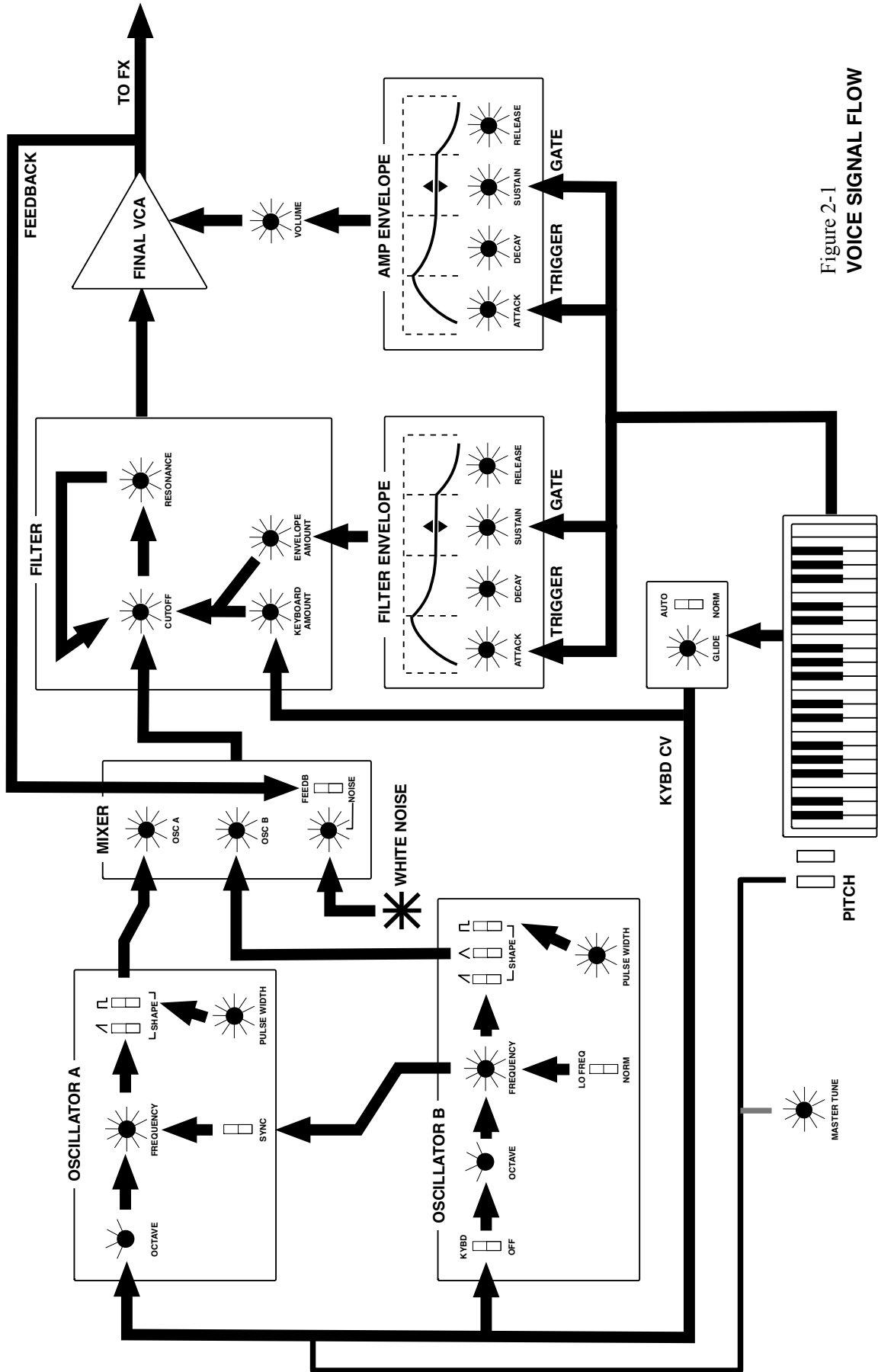
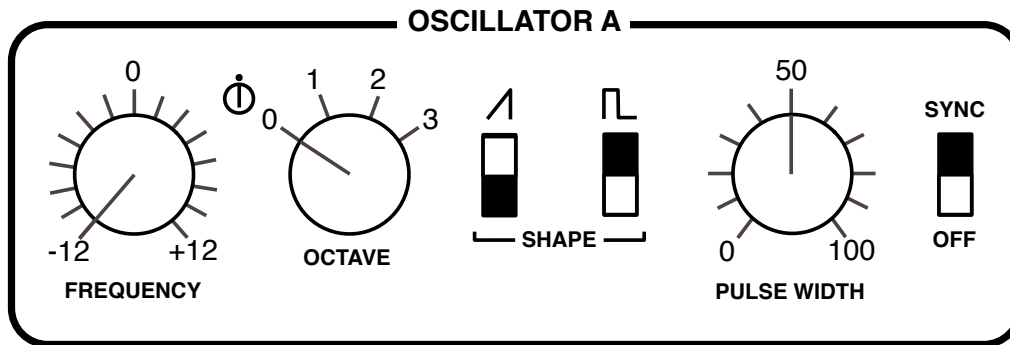


Figure 2-1  
VOICE SIGNAL FLOW

## 3-2 OSCILLATOR A



**FREQUENCY** knob: Adjusts pitch within a two-octave range (+/- 12 semitones).

**FINE TUNING** trimmer between FREQUENCY and OCTAVE: Adjusts pitch within a 40 cent range (+/- 20 cents). Its main purpose is to adjust the rate of beating between the two oscillators when they are tuned almost in unison.

**OCTAVE** rotary switch: Transposes oscillator pitch over a four-octave range.

**SAWTOOTH SHAPE** switch: The UP position activates the standard brassy waveform containing all harmonics (odd as well as even).

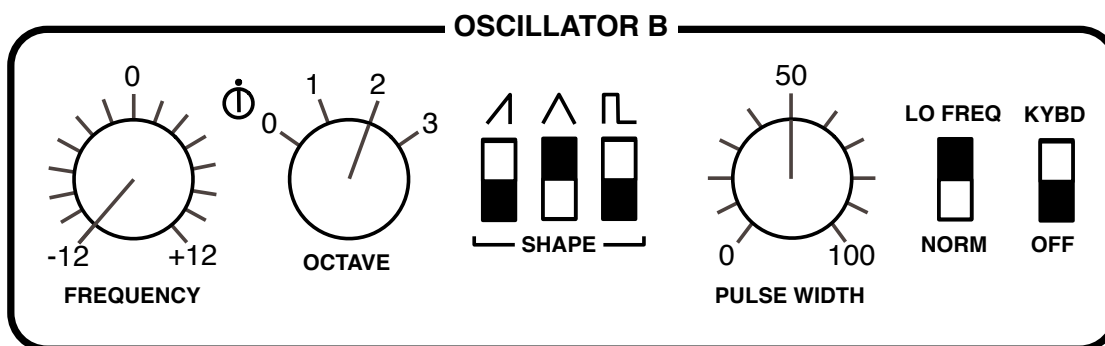
**PULSE SHAPE** switch: The 'up' position enables a waveform with a harmonic content that depends on the PULSE WIDTH setting but sounds generally more hollow than the sawtooth. If neither SHAPE is switched on, OSCILLATOR A is silent. If both SHAPES are active, the mixture normally has a lower volume than each single shape due to the phase relationship between the saw and pulse. To remedy this effect, set the *P5* option (see [Oscillator Tweaks](#) on page 31).

**PULSE WIDTH** knob: Adjusts the harmonic content of the pulse wave by setting its "duty cycle". The range is from 0% to 100%. Double-click on the knob for a 50% pulse (a clean square wave which only contains odd-integer harmonics).

Notes: At extreme values, the signal gets so thin that it becomes inaudible (DC, direct current). The PULSE WIDTH knob has no effect on the sawtooth.

**SYNC** switch: Hard synchronization forces the waveform of OSC A to reset whenever OSC B hits zero. The frequency of OSC A generally needs to be higher than OSC B for this to work properly. Experiment: Intermediate FREQUENCY values can produce unusual timbres at the next lower harmonic of OSC B.

### 3-3 OSCILLATOR B



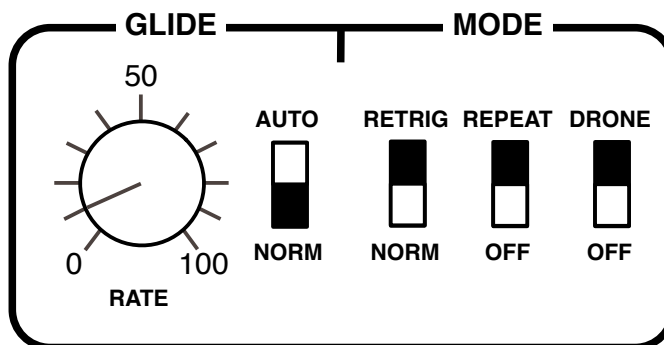
OSC B is basically the same as OSC A – without SYNC but with the following extras:

**TRIANGLE SHAPE** switch: This waveform is bipolar, so it doesn't add any DC to the modulation when used as an LFO. As an audio signal, the triangle has very little bite, but can be used to boost the fundamental frequency. The triangle is also good for driving the *wavefolder* effect (see EFFECTS chapter).

**NORM | LO FREQ** switch: Extends the range of oscillator B down to sub-audio frequencies suitable for use as an LFO. Note that the FREQUENCY range is 4 times greater than in NORM mode.

**KYBD | OFF** switch: Switching this to OFF disables keyboard follow, resulting in a constant pitch independent of the played note.

### 3-4 GLIDE & MODE



Also known as 'portamento', **glide** is the slurring of pitch between consecutive notes.

**RATE** knob: How long it takes to move from one note to the next. At zero, pitch changes are instantaneous, while they are very slow at values above 50.

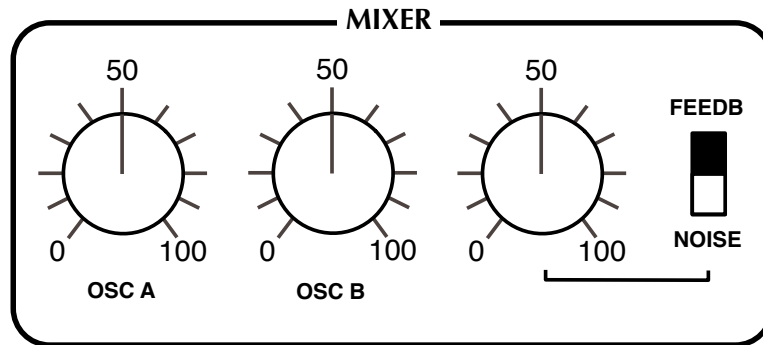
**AUTO** switch: In the NORM position, all notes will glide. In the AUTO position, this only happens when a new key is hit while the previous one is still being held (**legato**).

**RETRIG** switch: In the NORM position, legato playing does not retrigger envelopes. In the RETRIG position, the envelopes are retriggered with each new note.

**REPEAT** switch: Retrigger the envelopes at the rate of either the LFO or the Clock, depending on the state of the LFO|KEY|CLOCK switch. Like in the hardware and in DRONE mode, notes repeat without you having to hold down a key...

**DRONE** switch: Keeps the AMP ENVELOPE sustaining indefinitely.

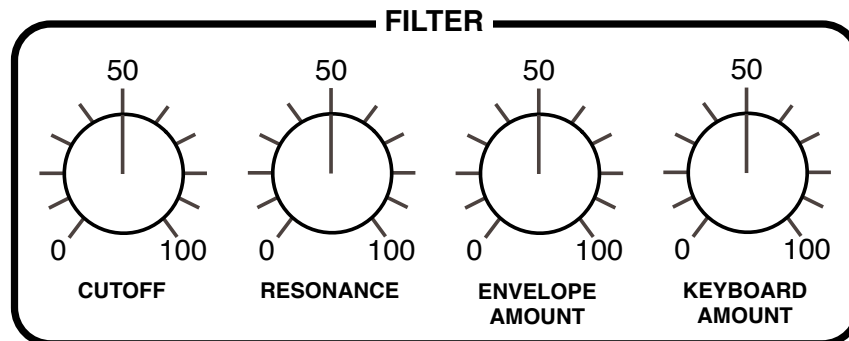
### 3-5 MIXER



**OSC A** and **OSC B** knobs: The output levels of each oscillator.

**FEEDB | NOISE** knob and switch: With the switch in the NOISE position, the knob sets the output level of the noise generator (an unpitched audio source useful for wind and percussion effects etc.). With the switch in the FEEDB (feedback) position, the knob governs the amount of signal fed *from behind the amplifier* back into the MIXER (use this for e.g. bass boost).

### 3-6 FILTER



**CUTOFF** knob: Sets the cutoff frequency for the 24 db/octave (4-pole) lowpass filter, which works a bit like a tone control. The “Cutoff” point is the frequency below which all components of a signal are allowed to pass, while most of the higher frequency components are suppressed.

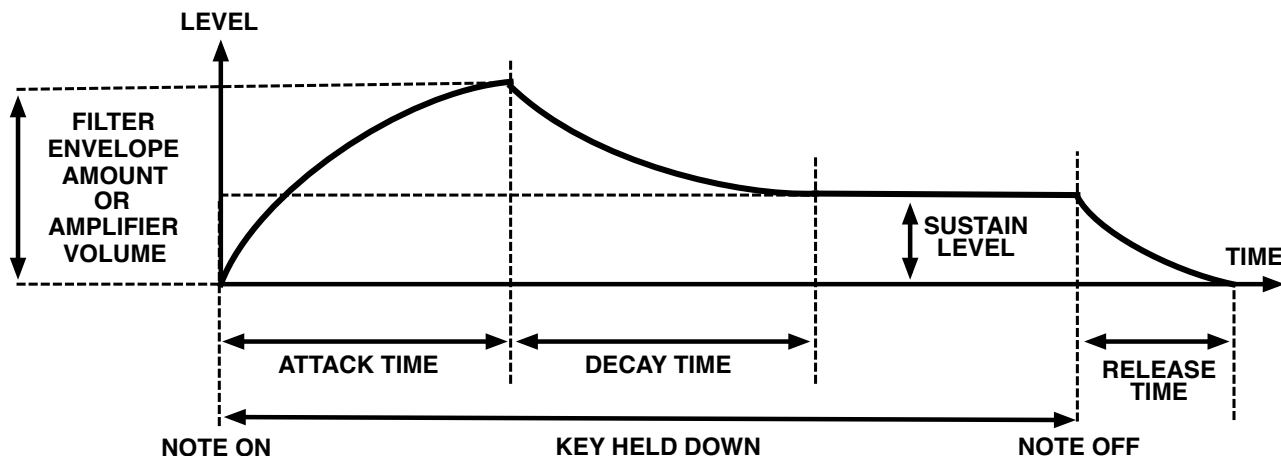
**RESONANCE** knob: Determines the amount of feedback within the filter circuit. The higher the resonance, the more the cutoff point will be accentuated. Somewhere above 60 the filter starts to self-oscillate – it becomes a sine-wave oscillator with pitch determined by the cutoff. Note that adding Resonance tends to lower the volume, in which case you should compensate by e.g. turning up the main OUTPUT.

**ENVELOPE AMOUNT** knob: Adjusts the amount of cutoff modulation from the filter envelope (see below).

**KEYBOARD AMOUNT** knob: The amount of cutoff modulation from the keyboard – the higher the note, the higher the cutoff. Set to precisely 75.00, cutoff follows notes almost perfectly.

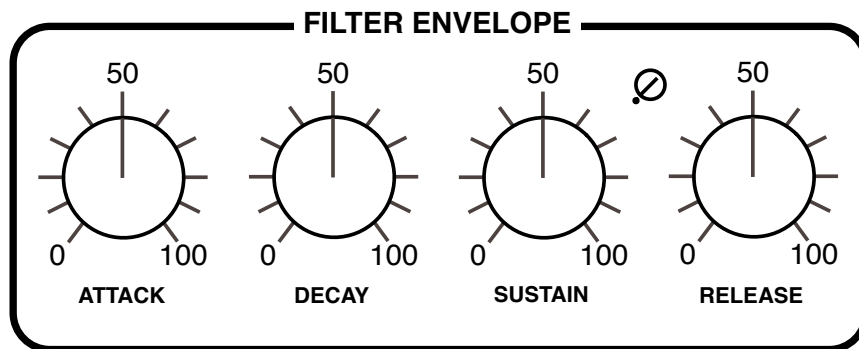
### 3-7 FILTER ENVELOPE

The filter envelope generator applies a contour to the cutoff frequency:



The envelopes are started whenever a note is played, and as long as the key is held down, the envelope proceeds through the ATTACK and DECAY stages. It then remains at the SUSTAIN level until the key is released, after which it drops to zero at a rate set by the RELEASE knob.

Note: The RELEASE stage is initiated as soon as all keys are released. If this happens during the ATTACK or DECAY, there is no SUSTAIN stage.



**ATTACK** knob: Varies the time for the envelope to rise from zero to maximum, within a range of 2 milliseconds to longer than 6 seconds.

**DECAY** knob: Varies the time for the envelope to fall from maximum to the SUSTAIN level, also within a range of 2 milliseconds to more than 6 seconds.

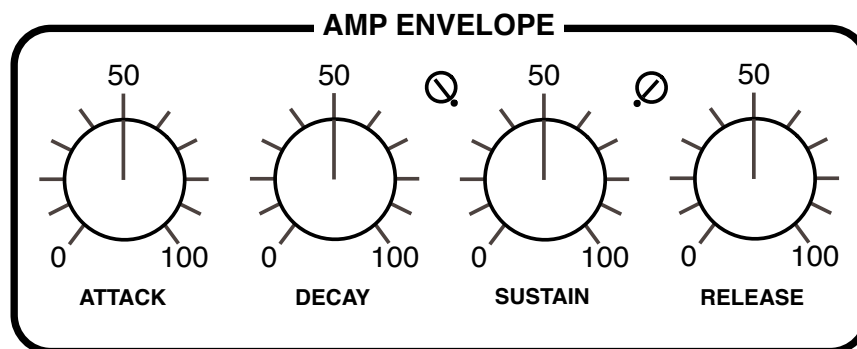
**SUSTAIN** knob: The “hold” level, from zero to maximum. An interesting detail: While being adjusted, SUSTAIN always *decays* to the new level – the longer the DECAY, the longer it takes to reach the new SUSTAIN setting.

**RELEASE** knob: The time it takes to fall from the current level (usually SUSTAIN) down to zero after the key is released. The range is 2 ms to longer than 6 seconds.

**Velocity Trimmer:** The control between SUSTAIN and RELEASE effectively multiplies ENVELOPE AMOUNT (see above) with note velocity. If the trimmer is set to maximum, **minimum** velocity will reduce the amount of modulation to zero.

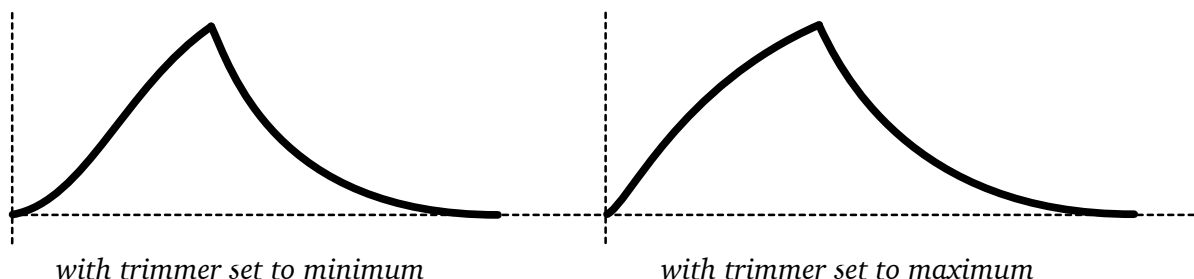
### 3-8 AMP ENVELOPE

The AMP ENVELOPE controls shape the envelope applied to volume, pre-effects.



**Volume Curve** trimmer: In the original hardware, the VOLUME knob controls how much amp envelope modulates the final VCA. It also affects the envelope **curvature** – not by design, but as a side-effect of how it works. As Repro-1’s equivalent **OUTPUT** knob comes after all effects, the only way to implement this quirk was as a separate control – the trimmer between DECAY and SUSTAIN.

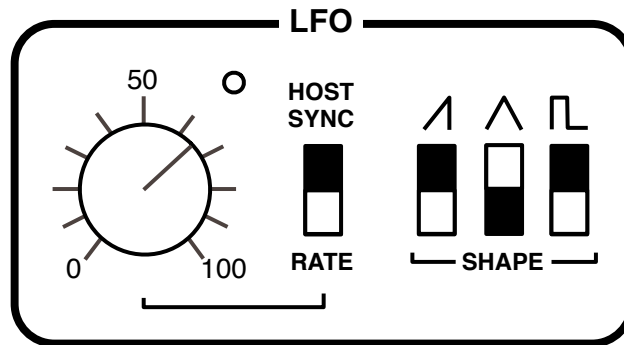
Here is how the attack and decay stages appear when *Volume Curve* is set to zero and 100. Note the punchy *s-curve* and shorter decay at minimum *Volume Curve*:



**Velocity Trimmer:** The trimmer between SUSTAIN and RELEASE adjusts the amount of velocity modulation for the amp envelope. When set to maximum, **minimum** MIDI velocity will reduce the envelope level to zero i.e. silence.

### 3-9 LFO

Two of the modulation sources – the filter envelope generator and oscillator B – are described above. The third source is the Low Frequency Oscillator (LFO):



**CLOCK | RATE** switch: When set to CLOCK, the LFO follows the Clock setting (see [Clock / Sequencer](#) on page 21). The RATE option here allows LFO speed to be freely adjustable via the RATE knob...

**RATE** knob: Adjusts LFO speed within a range of about 0.1Hz to 30Hz.

**SHAPE** switches: The same options as in OSC B except that the LFO's pulse width is fixed at 50%. Remember that you can add the shapes here e.g. SAW + SQUARE.

### 3-10 MODULATION SECTION

Repro-1 offers three modulation sources which can be mixed and routed through two different paths to five modulation targets:

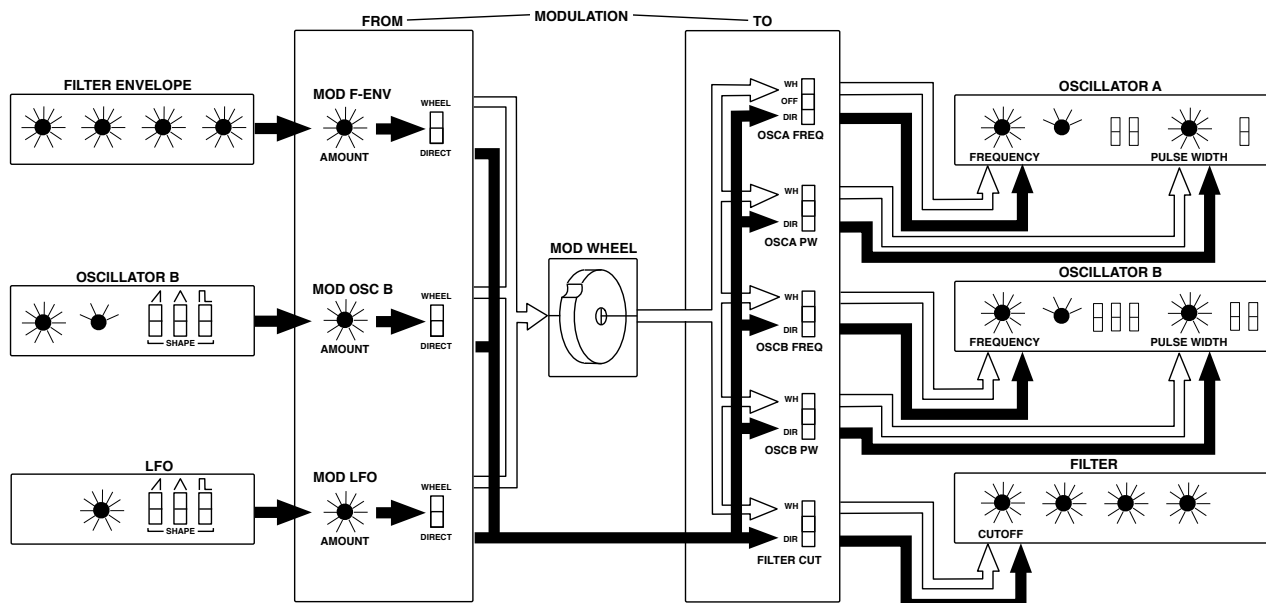
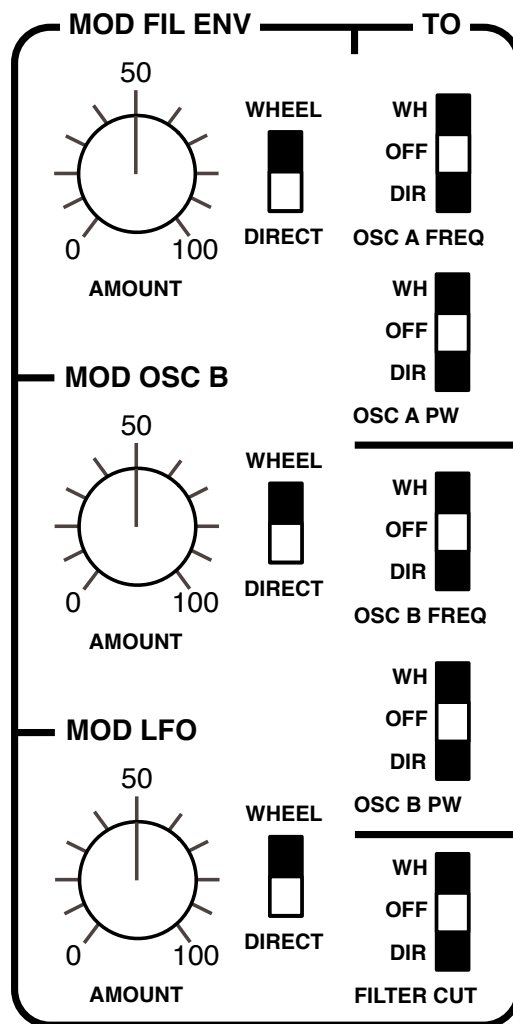


Figure 2-10  
MODULATION SIGNAL FLOW



This panel is the one most likely to confuse beginners. After a few hours practice, however, it should become second nature – especially if you repeat this mantra:

*“ 3 sources via 2 paths to 5 destinations ”*



**MOD FIL ENV, MOD OSC B and MOD LFO knobs:** The amount of modulation mixed into the WHEEL or DIRECT paths. The depth of modulation routed into the WHEEL path is controlled by the modulation wheel (MIDI CC#01).

**WHEEL | DIRECT switches:** These route each of the 3 sources into one of two busses: the so-called WHEEL or DIRECT paths.

**OSC A FREQ, OSC A PW, OSC B FREQ, OSC B PW, and FILTER switches:** The vertical row of switches select either the WHEEL or DIRECT path for each destination.

Note: In the original hardware the signal at each PW input gets inverted – when the modulating signal goes up, the pulse width goes down. We decided to keep this quirk, so if you want to compensate for deep modulation by adjusting PULSE WIDTH, you need to compensate in what seems to be the wrong direction!

## Modulation Section – Practical Examples

### LFO vibrato via modulation wheel

Load the -INIT- preset and turn OSC B down to minimum in the MIXER section. Turn MOD LFO amount in the modulation section up to about 20% and switch its output to the WHEEL bus. In the TO column, select WH (wheel) as modulation input for OSC A FREQ (the uppermost switch). In the LFO panel, adjust the RATE knob to about 75.

We now have vibrato via mod wheel – try it. Lets add something else...

### Sync sweep

Switch oscillator A SYNC on. Push the mod wheel – vibrato has become oddly shallow because oscillator A is “trying” to adopt the same pitch as oscillator B. In the TO column, select WH (wheel) as input for OSC B FREQ (the central switch). Vibrato is now back to normal.

Turn MOD FIL ENV amount up to maximum. The MOD FILE ENV output is set to the DIRECT bus, which is what we want here. Now switch OSC A FREQ source to DIR (direct). Turn the filter envelope SUSTAIN level down to minimum and increase the DECAY until the sweep effect sounds good.

---

### LFO pulse width modulation (PWM)

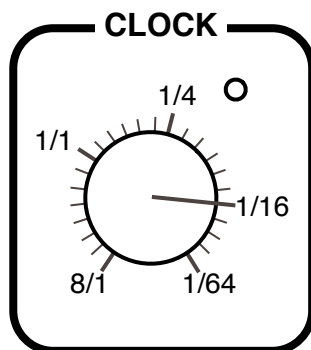
Click on the data display and reload -INIT-. In the MIXER section, turn OSC B down to minimum. In oscillator A, switch the sawtooth off and the pulse on. Turn MOD LFO amount up to maximum. Its output is already set to the DIRECT bus – in the TO column, select DIR as modulation input for OSC A PW (the second switch from the top)...

### Filter-FM

Turn MOD OSC B up to maximum and route it to WHEEL. In the TO column, select WH as modulation input for FILTER (the bottom switch). In the FILTER section, turn CUTOFF down to about 50. Push your modulation wheel and experiment with all the controls in oscillator B.

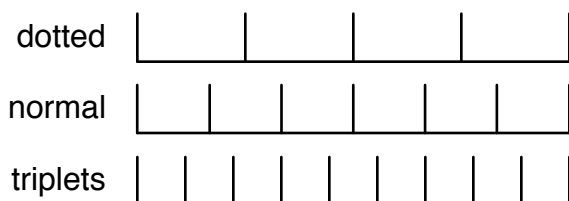
### 3-11 CLOCK

So that the LFO, arpeggiator and sequencer can be synchronized, we need a 'clock'...



This little panel contains a single rotary switch which sets the clock speed relative to host tempo, plus an indicator. All values are expressed as 4/4 bar divisions from 8/1 (slowest) to 1/64 (fastest).

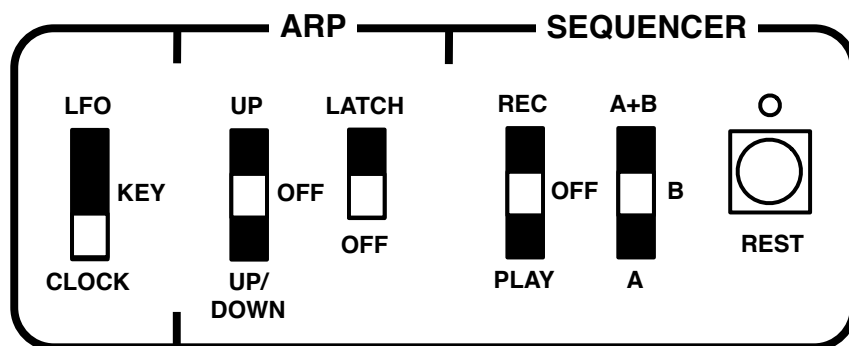
The *trip* options are **triplets** (3 in the space of 2) and the *dot* options are **dotted** (2 in the space of 3 i.e. 50% longer than normal):



The order of values may appear strange at first (e.g. 1/4 then 1/8 dot then 1/4 trip), but you can rest assured that they have been sorted according to length.

### 3-12 ARP / SEQUENCER (basic access)

An arpeggiator plays back all held notes, one after the other.



**LFO | KEY | CLOCK** switch: This switch selects which signal will be used to drive the arpeggiator, sequencer and REPEAT function. In the **CLOCK** position they are all synchronized to host tempo via the **CLOCK** parameter (see the previous page), while in the **LFO** position they are synchronized to the LFO. With the **KEY** option, the sequence is played back one note per key-press (see **Design decisions** below).

**UP | OFF | UP/DOWN** switch: Activates the arpeggiator, either upwards only or upwards followed by downwards.

**LATCH switch:** The **LATCH** function in the original hardware (mis)used the sequencer memory. Repro-1 has a dedicated **LATCH** switch instead – try this:

While you are playing an arpeggio, slide the **LATCH** switch up. Take your hands off the keys and try adding some more notes. It will soon become apparent that these notes are temporary – they disappear as soon as you release them, while the latched notes continue.

Note: The **SEQUENCER** part of this panel contains just enough elements to let you record and play back sequences without switching pages. For the complete story, please read the next chapter.

### Design decisions

In the original hardware, the arpeggiator/ sequencer rate is permanently tied to the LFO, with the option of using an external trigger signal to advance the arp/sequencer instead. As we don't expect users to feed an external trigger into Repro-1 just for the sake of authenticity, we decided to add a host-synced **CLOCK** and use MIDI *NoteOn* messages for the 'step through' option.

Interesting quirk: The arpeggiator will not repeatedly trigger a single held note – you have to play at least two notes for arpeggiation to start!

## 4 SEQUENCER

### 4-0 INTRODUCTION

The sequencer in the original hardware may have been a minor stroke of genius, but these days we can expect something a bit more comfortable: Repro-1's sequencer lets you *step-record* two patterns of up to 32 notes each (they are saved with the preset):

**How to record:** In the SEQUENCER sub-panel, select a pattern (1, 2, or 1+2) and slide REC/PLAY up to the REC position. Play some notes, inserting pauses by clicking on the REST button. The pattern can be as short as you like, even a single note – simply switch from RECORD to PLAY whenever you're finished.

How a sequence plays back is governed by the Clock settings (see the next page). Playing any note other than the specified ROOT transposes the pattern up or down.

**Host buffer size:** Repro-1's sequencer works best with a buffer size of at least 128 samples (most DAWs set larger buffer sizes by default). This doesn't mean it won't work with smaller buffers, but we did experience one or two glitches in certain hosts.

### 4-1 PATTERN data

A sequence consists of two patterns containing up to 32 steps each.

**STEPS** selectors: These specify the length of each sequence i.e. the number of steps to play before returning to step 1. Alternatively, click on one of the indices (1 to 32).

**TYPE** cells: Either click on a cell or use the mouse wheel to cycle between regular note (a filled circle), tied note (an arc) or pause (a faint 'X'). Perhaps unusually, a tied note extends its gate to the next note, not from the previous one.

**NOTE** cells: Semitone offsets from -36 (3 octaves down) to +36 (3 octaves up).

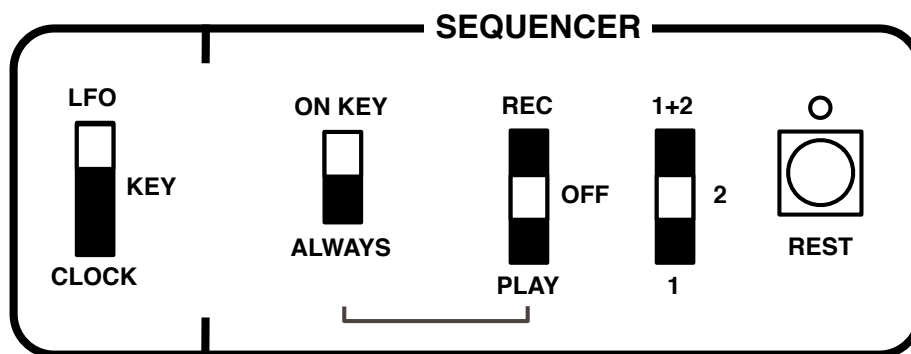
**VEL** cells: MIDI velocity data, from 1 to 127 (the default is 90). While the sequencer is running, this data is used instead of any other velocity source (e.g. from notes played on your keyboard).

**ROOT** selectors: These define NOTE '0' – the note set here will play the sequence at the same pitch as it was recorded. A lower ROOT actually transposes the sequence *upwards*, which is counterintuitive but logical.

Note: By default, the *Root* is automatically set to the first recorded note. This can be switched off – see the **Sequencer Root Note** option in the [Preferences](#) page.

## 4-2 SEQUENCER control

This panel is the same as the one on the SYNTH page, but without the arpeggiator:



**LFO | KEY | CLOCK** switch: Selects which signal will be used to drive the arpeggiator and sequencer. In the **CLOCK** position they are both synchronized to host tempo, while in the **LFO** position they are synchronized to the LFO. With the **KEY** option, the sequence is played back one note per key-press.

**ON KEY | ALWAYS** switch: The **ALWAYS** option causes the sequence to continue playing even if all keys are released (simulating a hold pedal). **ON KEY** stops the sequence as soon as all keys are released, restarting it when a new key is pressed. Please note that this switch is global per instance of the plug-in: the status doesn't change, even when you load a different preset.

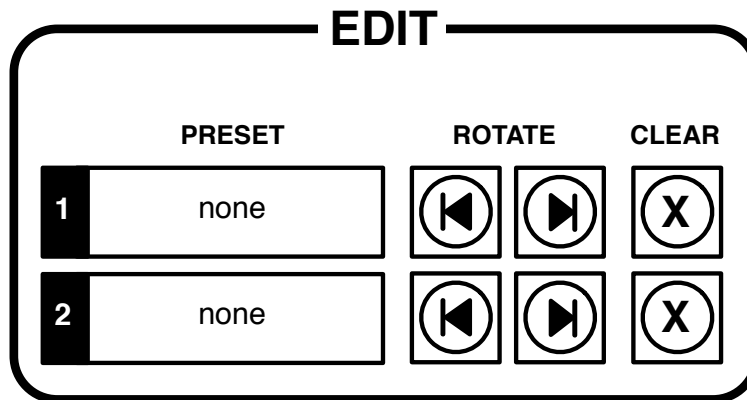
**REC | OFF | PLAY** switch: Primes the sequencer for recording. Recording commences when you play the next note and stops when you switch to **OFF** or **play**. Recording also stops automatically when step 32 has been reached (if the next selector is set to 1+2, it will only stop at step 32 of pattern 2).

**1+2 | 2 | 1** switch: Selects the pattern(s) to be recorded or played back.

**REST** button: During recording, this inserts a pause at the current step.

## 4-3 EDIT

This panel gives you some tools with which you can manipulate the pattern data...



**PRESET** selectors: Click to open a menu containing pattern *Copy* and *Save* functions, as well as any sequencer patterns Repro-1 finds in the following location:

Win    ...\\VstPlugins\\u-he\\Repro-1.data\\Support\\Modules\\Pattern  
Mac    MacHD/Library/Application Support/u-he/Repro-1/Modules/Pattern

**ROTATE** buttons: This pair of buttons shifts the active portion of the sequence to the left or right. If, after listening for a while, step 1 doesn't seem to be the 'first note', you can use the Rotate buttons to fix that problem. Tip: Create new variations by rotating parts of existing sequences.

**COPY** and **PASTE** buttons: Clipboard functions for each pattern. Note that you can copy from one preset and paste into another.

**CLEAR** buttons: Deletes all data in the pattern and sets the current step to the start.

## 4-4 A FEW TRICKS

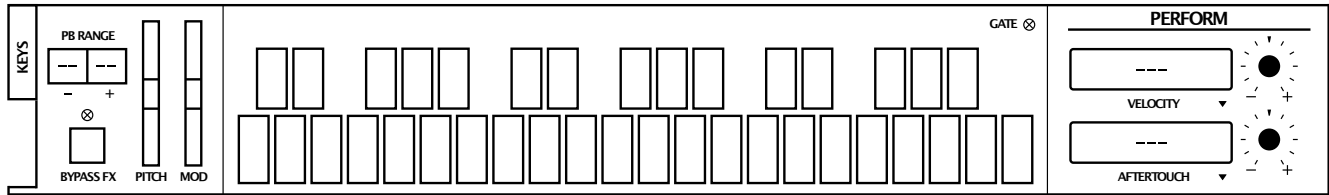
Start a sequence that contains ties as well as rests, then go to the SYNTH page and try performing with your sequence using only the MODE switches:

Switching on RETRIGGER transforms ties into regular notes.

Switching on REPEAT effectively removes rests. It doesn't use the pitch data, however, but repeats the pitch of the note immediately preceding the rest.

Switching on DRONE will lengthen the notes if amplifier Sustain is turned up, or the Decay time is longer than the Release time. Experiment!

## 5 KEYS / PERFORM



The pair of vertical buttons on the bottom left toggle between the EFFECTS and KEYS:

### 5-0 KEYS

Between those buttons and the keyboard are a few typical ‘left-hand controls’...

**PB RANGE** selectors: You can choose pitchbend ranges separately for each direction (down and up). The options are 0 through 24 (2 octaves in semitone steps) then 3 or 4 octaves (36 or 48 semitones).

**BYPASS FX** switch: Below PB RANGE is an effects bypass button you should find useful for comparing the treated and untreated sound. Please note that BYPASS FX is truly global: the status doesn’t change, even when you load a different preset.

**PITCH** and **MODW**: The two on-screen wheels mirror incoming MIDI data, but you can also move them with the mouse.

**Keyboard**: Most of the panel is taken up by a 3-octave touchplate-style keyboard (the same range as the original synth) you can click on to fire off notes. Double-click on a key to sustain it until you click on another.

A note to users of **3-octave MIDI keyboards**: You might have to transpose your keyboard down an octave to match the range of Repro-1’s touchplate.

### 5-1 PERFORM

To the right of the touch keyboard is a little modulation matrix you can use to extend Repro-1’s modulation capabilities. To select a source, click on the **label** immediately below each **target selector**. (Where it says VELOCITY and AFTERTOUCH in the above image). Note that the list of sources includes the Wavefolder’s own envelope.

Right-clicking on a target selector opens a menu where you can choose a destination for that modulation source. Note that effect parameters only appear in the menu if the corresponding effect is currently active.

**Drag & Drop** is a comfortable alternative (though not for effect parameters, which aren’t visible in KEYS view). Left-click on the target selector, drag the crosshair onto any valid knob and release the mouse button.

See the next page for a list of all modulation sources and targets in Repro-1.



Modulation Sources		Oscillator B	Frequency ** Fine Tune Pulse Width
Mod Wheel Pitch Wheel Breath Expression LFO Clock Phase Trigger Gate Key Follow 1 Key Follow 2 (doesn't include pitchbend) Velocity Aftertouch Wavefolder AR Filter Envelope Amp Envelope		Modulation	LFO Amount Osc B Amount Filter Env Amount
		Mixer	Osc A Osc B Noise/Feedback
		Filter	Cutoff Resonance Keyboard Amount Envelope Amount
		Jaws	Folds Bias Fold Mod Depth
		Lyrebird	Delay Time Regeneration Mix
		ResQ	Bass Frequency Bass Gain (EQ) Bass Vol (Res) Mid Frequency Mid Gain (EQ) Mid Vol (Res) High Frequency High Gain (EQ) High Vol (Res) Q/Resonance
		Drench	Pre-Delay Decay Tone Dry/Wet Mix
		Sonic Conditioner	Gain Stereo Width Transient
Modulation Targets			
LFO	Frequency (only works when LFO is in RATE mode)		
MIDI *	Glide Master Tune		
Filter Envelope	Attack Decay Sustain Release		
Amplitude Envelope	Attack Decay Sustain Release		
Oscillator A	Frequency ** Fine Tune Pulse Width		

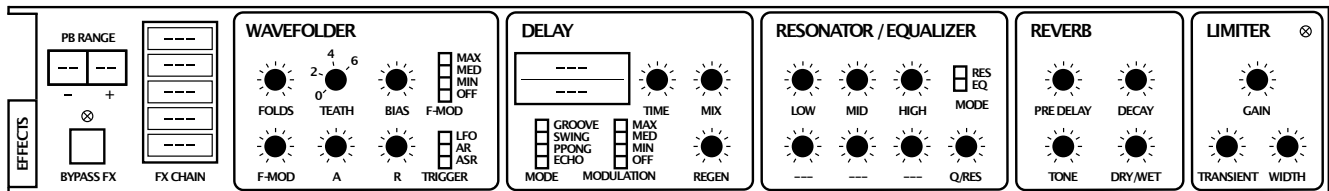
\* There is a good technical reason for the MIDI label (which perhaps should read 'Tuning')

\*\* Restricted to the FREQUENCY range, also for technical reasons

## 6 EFFECTS

### 6-0 INTRODUCTION

The buttons on the far left of the lower panel toggle between the keyboard and the effects. Click on the EFFECTS button for this view:



### BYPASS FX

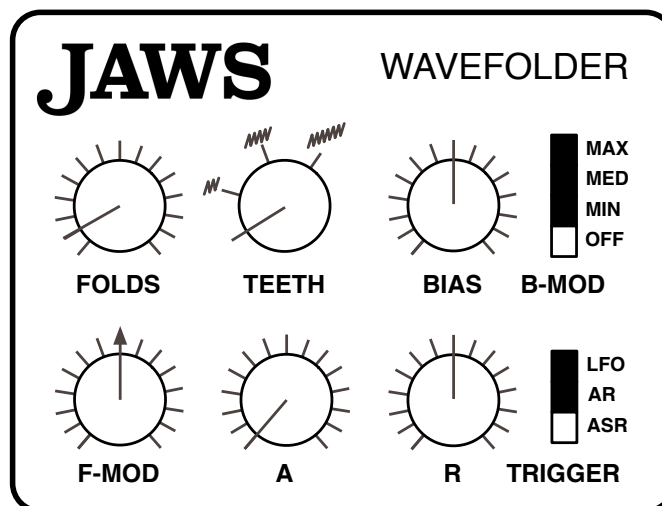
This is an effects bypass button you should find useful for comparing the treated and untreated sound. Please note that BYPASS FX is truly global: the status doesn't change, even when you load a different preset.

### FX Chain

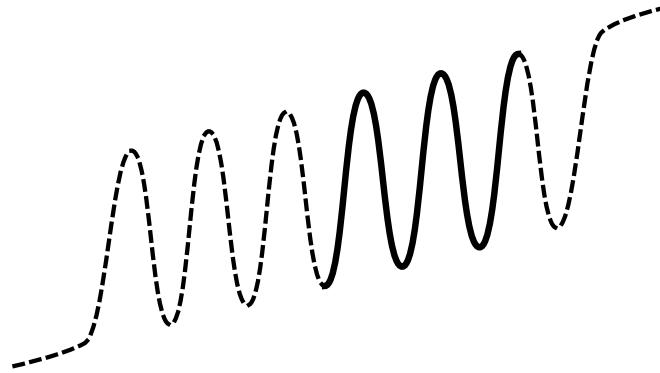
The block on the left is used for activating and ordering effects. The signal flows from the top of the block to bottom. Click to enable/disable effects, click and drag up or down to change the order. Tip: Placing LYREBIRD above JAWS can get... interesting!

### 6-1 JAWS wavefolder

Hardware wavefolders have become popular in larger modular systems, especially amongst *West Coast* fans. A special kind of waveshaper, the wavefolder literally folds the waveform back on itself multiple times by mapping the signal onto a multi-toothed curve (see the image on the next page). When applied to a decaying signal, wave-folding can sound similar to FM.



With its set of novel features, however, JAWS has no real world counterpart: Firstly, it includes an envelope to modulate the number of folds and an LFO to modulate the bias *out-of-phase* per audio channel (which results in a unique stereo effect). Secondly, JAWS can serve as a simple distortion unit by setting TEETH (the number of available folds) to zero. Here is a typical wavfolder setting:



*6 TEETH, about 25% FOLDS (the solid line) with some positive BIAS (shifted to the right)*

**FOLDS** knob: How much of the wavfolder curve is being used. This is effectively an input volume control, so setting FOLDS and F-MOD both to zero will result in silence.

**TEETH** rotary switch: Sets the total number of folds in the wavfolder. Zero here means simple distortion, while 2 to 6 deliver more typical wavfolder effects.

**BIAS** knob: If B-MOD is *OFF*, this knob shifts the part of the wavfolder curve being used. If B-MOD is either MIN, MED or MAX, it adjusts the depth of modulation from the wavfolder's own LFO – in opposite directions for each stereo channel, hence the stereo effect. Note that the stereo effect is not monosum-compatible, and that extreme BIAS settings can result in silence anyway, especially if FOLDS is set relatively low.

**B-MOD** switch: Bias modulation LFO rate. Setting this to *OFF* disables the LFO.

**F-MOD** knob: The depth of folds modulation from the wavfolder's own envelope...

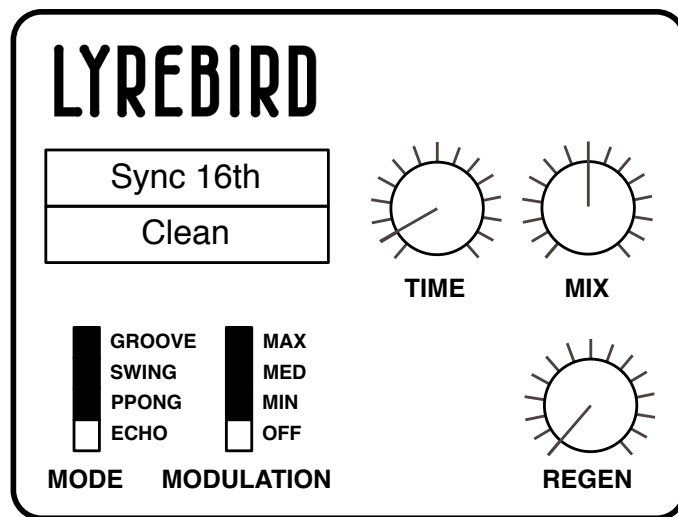
**A** and **R** knobs: **Attack** and **Release** times for the wavfolder envelope.

**TRIGGER** switch: Determines how the envelope reacts, with the following 3 options: *ASR* stands for *attack-sustain-release* – the envelope proceeds through the attack stage and stays at maximum as long as a note is held, after which it releases. *AR* is a one-shot *attack-release* envelope with no sustain. Finally, the *LFO* option is similar to *AR* but is triggered by Repro-1's main LFO instead of the gate.

Tip: In general, wavfolders deliver more interesting effects when applied to relatively simple waveforms e.g. a pure triangle from oscillator B, a sine wave from the filter when self-resonating, or any other mellow sound.

Note: The sound of the Wavefolder is sensitive to minuscule differences in signal level and phase between the various sample rates. If you notice that your JAWS-based preset sounds very different when you switch sample rates, try adjusting the FOLDS settings to compensate, then save as "name-of-preset (96k)" or similar.

## 6-2 LYREBIRD delay



Lyrebird models an analogue (*bucket brigade* type) delay, capable of unsynchronized effects anywhere between flanging (i.e. modulated, very short delays) and 2 seconds, or host-tempo-relative delays between 1/16 and 8/1. In either mode, the delay time can be continuously fine-tuned.

**Sync** (upper selector): *Chorus/Short*, *Unsync/Long*, *Sync 1/16* or *Sync 1/4*. The first two options are absolute times, not relative to host tempo. As the name implies, the *Chorus/Short* option sounds especially rich with plenty of modulation (see below). *Unsync/Long* is usually the best choice for larger spaces and non-rhythmic effects.

**Flavour** (lower selector): Three different tonal characteristics for the decaying effect (*Clean*, *Bright* or *Dark*). Try them all out and compare results.

**MODE** switch: Affects the ratio between delays in the left and right channels: *Echo* has equal delay times in both channels (so the effect is monophonic unless modulated). *Pingpong* alternates evenly between the left and right channels, *Swing* creates triplets and *Groove* does dotted times.

**MODULATION** switch: Time modulation LFO rate. Switching to *OFF* disables the LFO.

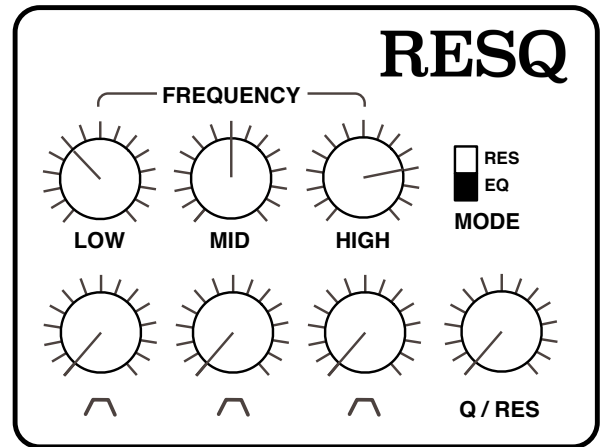
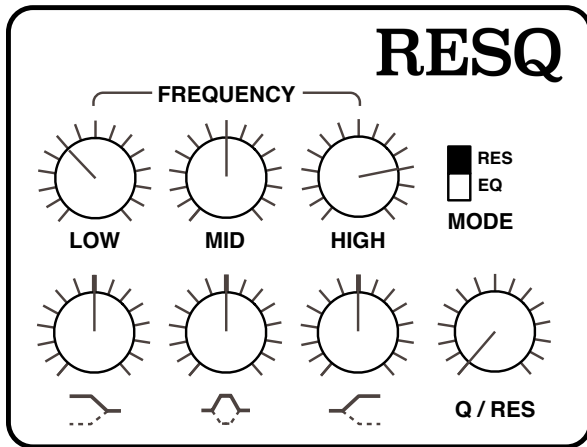
**TIME** knob: Scales the Delay Sync value. For the synchronized delays this is literally a 1 to 8 multiplier, while for unsynchronized delays the range is much wider. Tip: Try turning REGEN up and modulating TIME – the pitch glides very smoothly, just like a real analogue or tape delay unit.

**MIX** knob: The volume ratio between unprocessed and processed signal.

**REGEN** knob: *Regeneration* determines how much of the processed signal is fed back into Lyrebird's input. At maximum, the feedback lasts longer than you will ever need!

### 6-3 RESQ resonator / equalizer

Depending on the status of the MODE switch, RESQ is either a semi-parametric EQ with two shelving filters surrounding a midrange band, or a triple bandpass resonator:



The **FREQUENCY** knobs adjust the cutoff for each band. The bands can seriously overlap or swap positions, so those labels shouldn't be taken too literally. The ranges of the knobs are approximately as follows:

LOW	=	45 Hz to 3 kHz
MID	=	55 Hz to 9 kHz
HIGH	=	130 Hz to 10 kHz

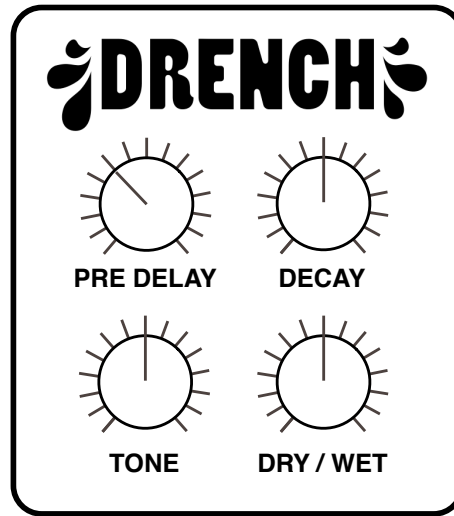
**GAIN knobs (EQ mode):** Centre-zero controls for cutting or boosting the level of each band by up to 18dB. In EQ mode, LOW and HIGH are shelving filters (as indicated by the labels).

**VOLUME knobs (RES mode):** The amplitudes of three resonant bandpass filters. The knobs are not centre-zero in RES mode, but positive only.

**Q (quality) / RES (resonance) knob:** The *Q-factor* of a filter band characterizes its width relative to its cutoff frequency. In EQ mode, Q only applies to the MID band.

## 6-4 DRENCH reverb

A typical lush plate reverb, but with pre-delay.



**DRY/WET knob:** The amount of reverb signal as a percentage of the total output.

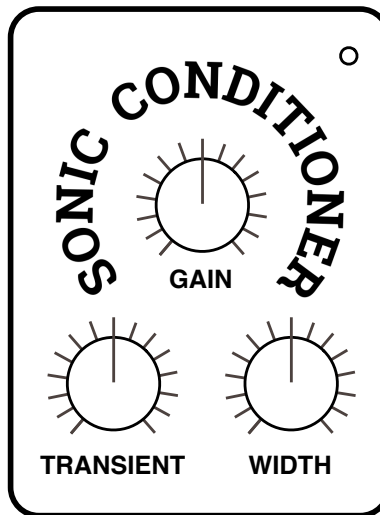
**PRE DELAY knob:** A single delay before the reverberation appears. This is especially useful for retaining the presence of the dry signal while simulating larger spaces. Conversely, leave this at zero if you want your preset to sound further away.

**DECAY knob:** The length of the reverb tail. At the maximum setting, it can take several minutes for the decay to reach absolute silence!

**TONE knob:** A tilt filter, from very dark at -100 to very bright at +100. Simulates the softness / hardness of surfaces. Note: At those extremes, the wet signal almost (but not quite) disappears.

## 6-5 SONIC CONDITIONER

Is the signal too loud or too soft? Is the stereo too extreme? Is your bass sequence too clicky, or does it lack punch? Then you should try the SONIC CONDITIONER...



On the top right is a load indicator which gets brighter as the signal is saturated.

**GAIN** knob: Bipolar control for the output level. Settings above zero (the centre) will saturate the signal – a useful effect in its own right. You can compensate for high GAIN by turning Repro-1's main OUTPUT level down.

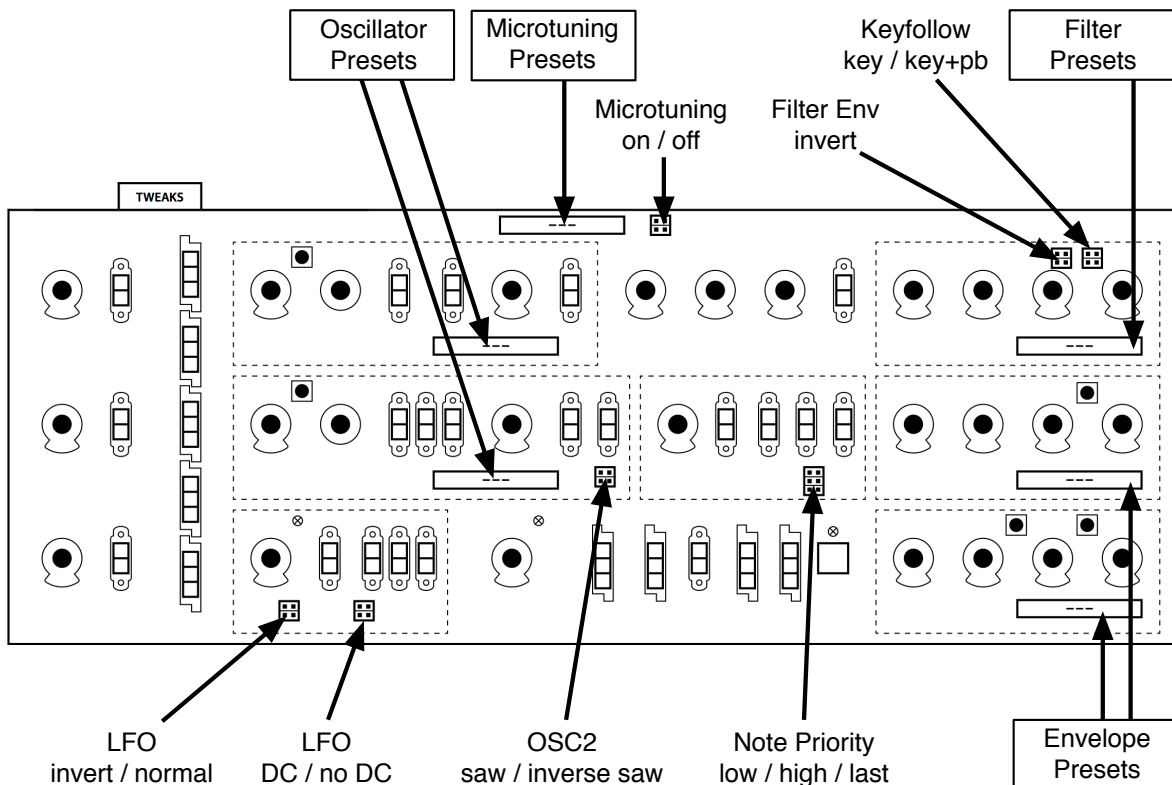
**TRANSIENT** knob: Bipolar control over the percussive elements within a signal. Try setting negative values to reduce clicks or positive values to add punch.

**WIDTH** knob: A stereo spread control. Especially useful for keeping delay or bias- modulated wavefolder effects more focussed in the centre of the stereo field.

## 7 TWEAKS

### 7-0 OVERVIEW

Apart from being unashamed eye-candy, the TWEAKS page is there to let you change the fundamental behaviour of individual modules. In the current version there are 5 user-adjustable **jumpers** (mini circuit connectors) and 5 **module tweak** selectors:



Although the knobs and switches do actually work, the labeling has been kept simple (or even cryptic) on purpose, in keeping with the 'circuit board' theme...

*The TWEAKS page is meant to be eye-candy!*

### 7-1 JUMPERS

**LFO inversion:** In the N (normal) position the LFO is a rising sawtooth, just like the audio oscillators, while in the INV position it is a falling sawtooth. The new option is arguably more useful than the original.

**LFO DC offset:** With the jumper in the DC position, the square and saw waves are positive-only (unipolar). The NO DC option makes them bipolar. The LFO triangle is always bipolar, with just a little DC offset when the jumper is in the DC position.

**OSC2 saw inversion:** With the jumper in the INV position, the sawtooth is inverted i.e. it becomes a regular sawtooth instead of the original ramp wave.



**Microtuning** on/off: Activate/deactivate the selected microtuning table (see below).

**Note priority:** This jumper sets how Repro-1 reacts when you play more than one note at a time. LOW plays the lowest note (like the original hardware as well as other USA-designs), HIGH plays the highest note (EMS and most Japanese synths), LAST plays the most recent note (modern, typical of digitally controlled synths).

**Key Tracking Source:** With this jumper in the KEY+PB position, cutoff also tracks the pitch bender (PB).

## 7-2 SELECTORS

Apart from the jumpers, the TWEAK page includes 5 selectors – one for each oscillator, one for the filter, and one for each envelope. Use these to change fundamental characteristics of Repro11 that would have been “overkill” on the main SYNTH page. Here’s what we have:

### Oscillator tweaks

Both ‘P’ options are warmer than the standard *Ideal*. The most obvious difference between P1 and P5 is that the P5 pulse is inverted (that’s why P5 is much louder than P1 if you use Saw and Pulse simultaneously). A less obvious difference is that OSC A in P1 mode always retains some of the fundamental frequency when SYNC is on.

A disadvantage of P5 is that self-PWM of oscillator B simply doesn't work. You already guessed that ‘P5’ was named after a closely related polyphonic synthesizer, right?

Finally, only available in OSC B: the *Bottom* option emphasizes the TRIANGLE shape.

### Microtuning

Repro-1 supports standard .TUN microtuning tables, and you will find several of these files in the list. Many more tables are available online, most of them free. The .tun files belong in the following folder on your hard drive:

Win: *C:\Program Files\vst plugins\u-he\Repro-1.data\Tunefiles*

Mac: *~/Library/Application Support/u-he/Tunefiles*

...or equivalent locations in accordance with your VST and Repro-1 installation paths.

To go directly to that location from within the microtuning browser, right-click on any .tun file then select *Reveal in Finder* (Mac) / *Open in Explorer* (Win). To close the microtuning browser again, click on the [CLOSE] button at the top right.

## Filter tweaks

*Crispy*: This is an accurate model of the filter in one of the hardware synths we bought especially for Repro-1 analysis. It is relatively clear and bright.

*Rounded*: An accurate model of the filter in the other hardware synth we bought especially for Repro-1 analysis! Most obviously, the cutoff in *Rounded* is a few semitones lower than *Crispy*, and there are also significant differences in the resonance behaviour

*Driven*: This model is the result of balancing internal filter parameters in search of a novel 3320 flavour – we like it!

*Poly*: An approximation of the filters in a related polysynth. In this model, cutoff doesn't reach maximum unless modulated upwards e.g. by the filter envelope.

## Envelope tweaks

*Normal*: Regular old ADSR.

*High Sustain*: Models an interesting fault (or is it a quirk?) in some versions of the original hardware: the end of the ATTACK doesn't quite reach SUSTAIN levels above about 85 – the envelope simply jumps up the last 15%.

*One Shot*: The gate is ignored, the Decay stage continues until it reaches the sustain level, which is immediately followed by Release. This type of envelope is particularly suitable for percussion sounds, fly-by effects etc..

*Piano 1/2*: These two modes were implemented according to a rather geeky article in the magazine *Electronics and Music Maker* (affectionately known as *E&MM*) all about the CEM 3310 envelope chip. In both *Piano* modes the Attack and Decay stages are the same as in *One Shot* mode. However, if the key is lifted during the Release stage there is an extra (true) release, which is longer in *Piano 1* than in *Piano 2* mode.

Tip: As the Attack and Decay stages are always completed, you can make an envelope appear to hold for a while before it releases!

## 8 CONFIGURATION

### 8-0 GENERAL

A click on the **cogwheel** at the top right of Repro-1's window opens the global configuration pages. This is where you can adjust Repro-1's appearance and performance or connect Repro-1 parameters to MIDI controls:



You can specify which particular page (e.g. PREFERENCES) will open whenever you click on the configuration button: Right-click anywhere in this row and select *set current as default*.

### 8-1 ABOUT MIDI CC

CC, which officially stands for *Control Change* (i.e. not *Continuous Controller*) these days, is a multi-purpose message format used for editing and performing presets.

CC isn't the only kind of MIDI performance data. For instance, there are different messages for note on/off (including velocity), pitch bend and two kinds of aftertouch.

Although the MIDI Manufacturers Association (MMA) was kind enough to leave most of the 128 CC numbers undefined, some have specific meanings that Repro-1 also recognizes:

- 01 = modulation wheel
- 02 = breath controller
- 11 = expression pedal
- 64 = sustain pedal

You don't actually need a physical breath controller or expression pedal to make use of control change messages – those names are just convention. You can use anything that can send a definable CC e.g. a couple of knobs on your MIDI keyboard, or a controller lane in your sequencer application.

Later MMA revisions even included a bunch of esoteric CC definitions such as 'Celeste Detune Depth', probably at the request of a home organ manufacturer or two. We can safely ignore all those definitions. However, although most CC are general purpose, it's best to avoid using controllers 120 through 127 as these are reserved for channel mode messages (e.g. Local Control On/Off).

For the official CC list, go to:

[www.midi.org/specifications/item/table-3-control-change-messages-data-bytes-2](http://www.midi.org/specifications/item/table-3-control-change-messages-data-bytes-2)

(Please contact us if that link no longer works)

## 8-2 MIDI LEARN

The MIDI LEARN page is where you can connect MIDI CC (see above) to almost any Repro-1 parameters. The MIDI data can be generated by adjusting the knobs or faders on a hardware controller, for instance, or by a track in your sequencer.

Learnable elements appear as selectable outlines. Controls that are already connected appear filled, while the outline of the control waiting to be MIDI-learned is highlighted white.

Try it: Click on the Cutoff knob (it is then highlighted) and send Repro-1 some MIDI CC data by adjusting a knob or fader on your MIDI controller. Switch to the MIDI TABLE page to check that the new connection has appeared in the list, then exit via the [X] button. To remove the new assignment, go back into the MIDI Learn page and double-click on that control.

Note: You can access all parameters without exiting MIDI LEARN. Simply switch between the SYNTH, TWEAKS and SEQUENCER pages, or between the KEYS and EFFECTS.

## 8-3 MIDI TABLE

To open an editable list of all current MIDI CC assignments, click on the cogwheel button and select MIDI TABLE.

**Parameter:** The first field displays/selects one of Repro-1's parameters, sorted into sub-menus according to module. Click on the 'ADD' button at the bottom left and experiment with this field, then delete the assignment again by clicking on the small [X] to the right of the line you just created.

**Channel / Controller:** The next two fields are for the MIDI channel and CC number. Repro-1 is channel-sensitive – you can map up to 16 channels for a total of... well, more than enough assignments for Repro-1.

**Mode:** Specifies the range and/or resolution of values.

*Normal* .....full range, continuous

*Integer* .....full range, whole numbers only

*Fine* .....0.01 steps between the integers closest to the current value

**Type:** Specifies the type of hardware (by far the most common is *Continuous 7-bit*).

*Encoder 127* .....unipolar encoder

*Encoder 64* .....bipolar encoder

*Continuous 7-bit* .....7-bit MIDI CC (normal resolution, very common)

*Continuous 14-bit* .....14-bit MIDI CC (high resolution, less common)

**Removing assignments:** The small [x] to the right of each line removes that assignment. The MIDI table can be cleared by clicking on the [Delete All] button at the bottom of the window.

**Experimental feature:** Click on **Add**. At the very bottom of the *Parameter* menu you will see two options called *Last Clicked Control* and *Last Clicked Control Fine*...

Select *Last Clicked Control*, enter a suitable controller (MIDI CC) and exit the configuration pages. The most recently clicked knob/switch will now respond to that CC. The *Fine* option is similar, but with a significantly reduced range.

## 8-4 PREFERENCES

Click on the cogwheel icon, then select PREFERENCES for the following options:

**Mouse Wheel Raster:** If your mouse wheel is rastered (it clicks as you roll the wheel), set this option ‘on’ so that each little click increments the value in ‘sensible’ steps.

**Switch behaviour:** You can usually change the status of linear switches by clicking on the target position. In addition, the *drag* option lets you drag switches up/down while *toggle* lets you click anywhere on 2-way switches. The *iterate* option is like *toggle* except that it also applies to 3 and 4-way switches, with the downside that clicking on the target position no longer works. Irrespective of this setting, switches respond to rolling the mouse wheel just like the knobs – no clicks required!

**Default Size:** The GUI size for each new instance of the plug-in.

**Default Skin:** This option will only appear if Repro-1 finds at least one alternative skin when it loads. Change this option to set the global default.

**Gamma:** Specifies the overall brightness of the Repro-1 window.

**Text Antialiasing:** Turns the smoothing of labels and values on or off. Usually left on!

**Auto versioning:** If this option is switched on, an index is appended to the preset name and automatically incremented each time you save it. For instance, saving ‘Space’ three times in a row would give you three files: ‘Space’, ‘Space 2’ and ‘Space 3’.

**Save Presets To:** Choosing *user folder* here causes all saved presets to land in the *User* folder instead of the currently selected one.

**Auto Tag Features:** Setting this preference to an option other than *never* can make tagging presets less of a chore. The *on load* option causes Repro-1 to generate appropriate ‘Features’ tags whenever a preset is loaded, hiding any existing Features. The *if empty* option is similar but doesn’t hide existing tags.

Note that auto-tagging is temporary. To make automatically generated ‘Features’ permanent, you can (mis)use the *convert to xxxx* function in the context menu of the PRESETS panel.

**Base Latency:** Only disable this if you are absolutely sure that your audio system – hardware as well as software – uses buffers that are a multiple of 16 samples. Otherwise you should leave it at the default ‘16 samples’. This setting only takes effect when the host allows e.g. on playback, after switching sample rates, or after reloading Repro-5. See the information on the next page “About the Repro-1 Buffers”.

**HQ default:** Set whether *HQ* should be *on* for each new instance of the plug-in.

**MIDI Control Slew:** Adjusts the amount of ‘smoothing’ for Pitch Bend, Modulation Wheel, Breath, Expression and Aftertouch. While set to *Off*, Repro-1 responds more quickly to modulation wheel (for instance), but might become too grainy for your tastes. The *Fast* setting is a good compromise between response and smoothness.

**Sequencer Root Note:** The default *auto* option here sets the pattern’s *Root* to the first note you record. If you prefer setting the Root Note *manually*, select that option.

**Sleepy default:** Set whether *Sleepy* should be *on* for each new instance of the plug-in. See the *zZz* button in section 1-4 CONTROL BAR.

### ABOUT THE REPRO-1 BUFFERS

Repro-1 processes audio in chunks of  $n \times 16$  samples. This *block processing* method significantly reduces the CPU load and memory usage of all our plug-ins.

If the number of samples to be processed is e.g. 41, Repro-1 processes the first 32 and keeps the remaining 9 in a small buffer (16 samples is large enough). Those 9 samples are then processed at the start of the next call... and so on.

The extra buffer is only necessary if either the host or audio driver processes ‘unusual’ buffer sizes. If your host application processes buffers of e.g. 64, 128, 256 or 512 samples (these are all multiples of 16), try setting Base Latency to *off* so that Repro-1 can process latency-free.

## 9 NKS

### 9-0 INTRODUCTION

Repro-1 supports Native Instruments (NI) **NKS extensions** for VST2. All Windows audio plugin hosts and certain macOS hosts can load VST2.

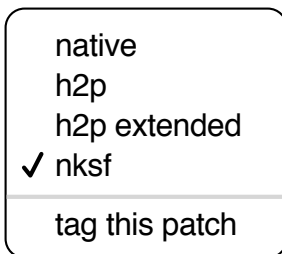
This means that Repro-1 can be integrated into the **Komplete Kontrol** software or **Maschine** environments: As well as the u-he cross-platform h2p formats, you can also install the factory presets as tagged **.nksf** files. In the VST2 version only, *nksf* also appears in the context menu of the [SAVE] button.

As we wanted to keep them synth-specific, the *Category* options (see [PRESET BROWSER](#)) differ from the Komplete Kontrol / Maschine *Type* tags. During conversion to NKS (see below) Repro-1 automatically converts *Category* tags to the closest corresponding *Type*.

In Komplete Kontrol / Maschine, any untagged presets will appear in *Synth Misc*.

*Presets saved in NKS format do not appear in Repro-1's browser!*

#### Saving as nksf



Right-clicking the [SAVE] button opens a small menu offering a choice of several preset formats.

While the *native*, *h2p* and *h2p extended* formats allow Repro-1 to save presets into the currently selected folder, choosing *nksf* causes them to land in a location specified by NI. For more detailed information, please refer to Native Instruments' own NKS documentation.

#### Conversion to nksf

Set the format to *nksf* by right-clicking on the [SAVE] button and choosing the *nksf* option. Open Repro-1's browser, select the presets you want to convert, right-click on one of them and choose *convert to nksf*. A text message appears telling you how many were converted and how to update the Komplete Kontrol database. During conversion, a few pages of performance controls mapped to common parameters are generated and saved with each *.nksf* preset.

## 9-1 NKS Troubleshooting

### Repro-1 doesn't appear in Komplete Kontrol / Maschine

Firstly, make sure you have Komplete Kontrol Software V1.5+ or Maschine V2.4 – the minimum requirements for our implementation of NKS.

Under Windows, Komplete Kontrol needs to register the location of Repro-5's VST2 file: Open the Komplete Kontrol preferences, go to *Locations* and add the directory that contains either Repro-1(x64).dll or Repro-1.dll (as specified during Repro installation). Hit *Rescan* and check whether Repro-5 appears.

If the NKS preset folder is empty you should reinstall Repro with the correct VST path and the NKS-option checked. Here are the preset folder locations:

Mac: *Macintosh HD/Library/Application Support/u-he/Repro-1/NKS/Repro-1/*

Win: *... \Vstplugins\Repro-1.data\NKS\Repro-1\*

Perhaps the XML-File is missing from the following path:

Mac: *Macintosh HD/Library/Application Support/Native Instruments/Service Center/u-he-Repro-1.xml*

Win: *C:\Program Files\Common Files\Native Instruments\Service Center\u-he-Repro-1.xml*

A re-install with the NKS-option checked should also resolve this issue.

### Error message “Could not load plug-in (plug-in not found)”

Repro-1's VST file is not in the directory specified by the Komplete Kontrol preference. Reason: Either Repro-1 wasn't installed as a VST, or it wasn't installed with the correct path. Note that the VST path is fixed in OSX but is user-definable in Windows:

Mac: *Macintosh HD/Library/Audio/Plug-Ins/VST/u-he/*

Win: *<User VST Folder>/* (path for the VST plug-in used during installation)

If the VST plug-in isn't in this directory you will need to reinstall Repro-1 with the VST option checked and the correct VST path.



PRESET

MASTER TUNE  
-12 0 +12

OUTPUT  
0 100 200

MOD FILE ENV ~ TO

WHEEL 50 100 0

DIRECT

WH OFF DIR OSC A FREQ

MOD OSC B

WHEEL 50 100 0

DIRECT

WH OFF DIR OSC B FREQ

MOD LFO

WHEEL 50 100 0

DIRECT

WH OFF DIR OSC B PW FILTER

OSCILLATOR A

0 12 3 0

FREQUENCY

SHAPE

50 100 0

PULSEWIDTH

SYNC OFF

OSCILLATOR B

0 12 3 0

FREQUENCY

SHAPE

50 100 0

PULSEWIDTH

LO FREQ KYBD NORM OFF

LFO

HOST SYNC

50 100 0

RATE

SHAPE

MIXER

50 100 0

OSC A

50 100 0

OSC B

50 100 0

FEEDB NOISE

GLIDE

50 100 0

RATE

MODE

AUTO RETRIG REPEAT DRONE

NORM OFF OFF

ARP

LFO KEY

UP UP/DOWN

LATCH OFF

REC 1+2

PLAY 1

REST

FILTER

50 100 0

CUTOFF

50 100 0

RESONANCE

50 100 0

ENVELOPE AMOUNT

50 100 0

KEYBOARD AMOUNT

FILTER ENVELOPE

50 100 0

ATTACK

50 100 0

DECAY

50 100 0

SUSTAIN

50 100 0

RELEASE

AMP ENVELOPE

50 100 0

ATTACK

50 100 0

DECAY

50 100 0

SUSTAIN

50 100 0

RELEASE

NOTE

PERFORM 1

PERFORM 2

