

Synth-80

USER MANUAL

Version 1.0.28 • 2026-10-28

Contents

Introduction

1. A Message from the Developer

Basics

2. Installation, License Activation, and File Locations

- 2.1 Installation
- 2.2 First Launch
- 2.3 Online Activation
- 2.4 Key File Activation
- 2.5 Purchase and Account
- 2.6 Preset Location
- 2.7 Settings File Locations

3. Basic Operation

- 3.1 Knobs and Faders
- 3.2 Selectors, Waveform Buttons, Toggles, and Menus
- 3.3 Parameter Hints (Underlined Labels)
- 3.4 Switching the Hint Display Language
- 3.5 Display of Inactive Parameters (Dimmed)
- 3.6 Relationship with DAW Automation
- 3.7 Copying and Pasting Parameters

4. Screen Tour

- 4.1 The Whole Screen
- 4.2 Top Bar (Patch / Upper Tone / Lower Tone)
- 4.3 Tone editor (White = Sound)
- 4.4 Patch Row (Light Blue = Performance / Layer)
- 4.5 Bottom Row (Wheels / Effects / Settings / Master)
- 4.6 Collapsing and Expanding (collapsed / expanded)
- 4.7 Dimmed Display of Parameters That Have No Effect
- 4.8 Signal Flow Overlay (Displaying Connection Lines)

5. Understanding Preset / Patch / Tone

- 5.1 The Patch Is the Unit of Storage
- 5.2 The Two-Layer Upper / Lower Structure

- 5.3 Switching the Upper / Lower Edit Target
- 5.4 Loading a Sound from Another Patch (Replacing a Tone)
- 5.5 Init Patch (Returning to the Initial State)
- 5.6 Saving, Loading, Navigating, and Categories
- 5.7 Preset Browser
- 5.8 Effect Chain Lock (Replacing the Sound Only)

6. Sound Design Basics

- 6.1 The Signal Flow
- 6.2 Creating the Raw Material — VCO-1 / VCO-2 / Noise
- 6.3 Mixing — MIXER
- 6.4 Cleaning Up the Low End — HPF
- 6.5 Shaping the Brightness — VCF (Cutoff / Resonance)
- 6.6 Shaping the Volume — VCA / ENV-2
- 6.7 Moving the Timbre and Pitch — ENV-1
- 6.8 Adding Periodic Modulation — LFO-1
- 6.9 Adding Expression After the Note Is Played — Mod Wheel / Aftertouch / LFO-2
- 6.10 Finally, Adding Space and Texture — Effects
- 6.11 From the Words You Hear to Which Knob to Reach For

Reference

7. Tone Parameter Reference

- 7.1 LFO-1
- 7.2 VCO MOD (modulation to the VCO)
- 7.3 PWM (Pulse Width Modulation)
- 7.4 KEY FOLLOW
- 7.5 VCO-1
- 7.6 VCO-2
- 7.7 VCO Sync (hard sync)
- 7.8 MIXER
- 7.9 HPF
- 7.10 VCF
- 7.11 VCA
- 7.12 DYNAMICS
- 7.13 ENV-1
- 7.14 ENV-2

8. Patch / Performance Reference

- 8.1 What Are Patch-Scope Parameters?

- 8.2 MASTER (Master Tune / Dynamics Sens / Stereo Mode)
- 8.3 KEY MODE (Key Mode / Split Point)
- 8.4 BALANCE (Upper / Lower Volume Balance)
- 8.5 OCT SHIFT (Octave Shift)
- 8.6 ASSIGN MODE (Assign Mode / Unison Detune / Hold)
- 8.7 GLIDE (Glide / Portamento)
- 8.8 PITCH BEND (Bend Sens / VCO-1 · VCO-2 Bend Mode)
- 8.9 MOD & AFTER TOUCH (AT Sens / LFO-2 Rate / Sync / LFO-2 Destination)
- 8.10 Patch Volume (Per-Patch Volume Trim)

9. Effects

- 9.1 How the Effect Chain Works
- 9.2 Effect Chain Lock
- 9.3 Description of Each Effect
- 9.4 Patch Volume
- 9.5 Automation and MIDI Learn

10. MIDI / MIDI Learn / Automation

- 10.1 Ordinary MIDI Input
- 10.2 What Is MIDI Learn
- 10.3 Using MIDI Learn
- 10.4 Knob Mode (Controller Response Mode)
- 10.5 Saving and Loading MIDI Maps (.s8m)
- 10.6 Difference from the SysEx MIDI Port
- 10.7 Host Automation and MIDI CC Automation
- 10.8 Reordering the Effect Chain and the MIDI Map

11. SysEx / MKS-80 Integration

- 11.1 Setup Example
- 11.2 Where the SysEx Functions Are
- 11.3 Connecting a Real MKS-80
- 11.4 Import — Bringing In from the Hardware or a File
- 11.5 Export — Writing Out as `.mid`
- 11.6 Dump — Sending to the Real MKS-80
- 11.7 Preparing the Hardware and the Write-Back Procedure
- 11.8 Terminology Reference

12. Settings and Performance

- 12.1 Oversampling
- 12.2 Polyphony

- 12.3 Master Volume and Patch Volume
- 12.4 UI Resizing and Saving the Window Size
- 12.5 Hint Language
- 12.6 Adjusting When the CPU Is Heavy

Appendix

13. Support

1. A Message from the Developer

Thank you for purchasing Synth-80.

This software is an entirely personal project by its developer, Jun Murakami, a former composer and music producer. Even so, it has been developed with a firm commitment to delivering quality that is not inferior to any other existing plugin. In particular, for the analog modeling DSP that forms the foundation of the software, the analog synthesizer used as the model was analyzed exhaustively.

This software also deliberately steps back from the broad sound-design scope and feature density of today's modern synthesizers, and is instead designed to let you enjoy the simple, old-fashioned approach to synthesizer sound design as easily as possible. It also incorporates many touches that only software made for beginners can offer.

I would be delighted if you came to use it for a long time as a partner that lets you easily create high-quality sound that stands the test of time.



Acknowledgments

The bundled presets include high-quality additional patches created by experienced sound designers. I am deeply grateful to all of them for contributing such wonderful sounds.

- Added September 25, 2026 - 143 Patches by [David A. Logan](#) (Bundled with Ver. 1.0.21)
- Added September 13, 2026 - 20 Patches by [Björn Bojahr](#) (Bundled with Ver. 1.0.18)
- Added July 29, 2026 - 70 Patches by [Björn Bojahr](#) (Bundled with Ver. 1.0.16)
- Added July 10, 2026 - 110 Patches by [Takeshi Abo \(valsound\)](#) (Bundled with Ver. 1.0.13)
- Added July 5, 2026 - 32 Patches by [Saif Sameer](#) (Bundled with Ver. 1.0.11)

You can find these patches in each sound designer's folder in the left column of the preset browser (→ Chapter 5, 5.7).

About the Demo Version

Even before license activation (in demo mode), Synth-80 lets you operate all parameters and presets to try out sound design. During the demo, demo noise is inserted at regular intervals. Activating a valid license removes the demo noise. For the activation procedure, see → Chapter 2 "Installation, License Activation, and File Locations".

About Trademarks

The manufacturer names and product names mentioned in this manual are trademarks belonging to their respective companies and have no connection whatsoever with the developer of this product. Trademarks of other companies are used solely to identify the references whose characteristics and sound were researched and analyzed during the development of this product. All equipment names, inventor names, and manufacturer names are listed for descriptive and educational purposes only, and do not imply any affiliation with, endorsement by, or approval from the inventor or manufacturer of any equipment.

2. Installation, License Activation, and File Locations

2.1 Installation

Supported Environments and Plugin Formats

Synth-80 supports Windows and macOS.

Format	Windows	macOS	Notes
VST3	○	○	Works in many DAWs
AU	—	○	macOS only (Logic Pro, etc.)
AAX	○	○	For Pro Tools
Standalone	○	○	Runs on its own without a DAW

A standalone plugin called **Synth-80 FX**, which contains only the effects chain, is also included. This is an audio effect with no synth sound-generation section, intended to let you insert the same 5-slot Effect Chain found in Synth-80 itself onto other tracks. For details on the effects, see → Chapter 9 "Effects".

Running the Installer

Open the installer you downloaded (an installer executable on Windows, a pkg on macOS) and follow the on-screen instructions. Each plugin format will be placed in your OS's standard plugin folder.

After installation, run a plugin scan (rescan) in your DAW, and Synth-80 and Synth-80 FX will appear in the list. The scanning procedure differs from one DAW to another, so please refer to the manual for your DAW.

Note

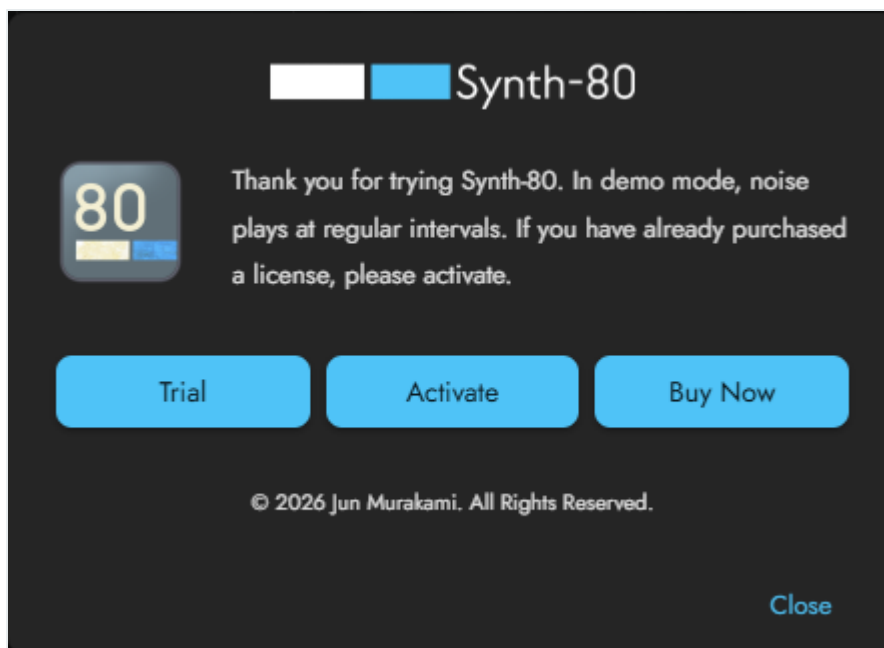
The Windows installer may display a security warning. The application is correctly signed, so if a warning appears, click "More info" to confirm the publisher, and then choose "Run".

Using the Standalone Version

To use Synth-80 on its own without going through a DAW, launch the Standalone version. On first launch, the audio output device and MIDI input device may still be at their defaults. If you get no sound, or the plugin does not respond to your keyboard, reselect the audio/MIDI devices from the settings menu of the Standalone version.

2.2 First Launch

When you load Synth-80 onto a track in your DAW, the **activation dialog** appears automatically while the plugin is unactivated. Here you choose from the following three options.



Option	Action
Trial	Closes the dialog and lets you start using the demo as-is
Activate	Proceeds to the login/activation screen (see 2.3 and 2.4)
Buy Now	Opens the product page in your system browser (see 2.5)

About the Demo Noise

While unactivated (in demo mode), **demo noise** is added to the final output stage at regular intervals.

Once you activate a valid license, the demo noise is removed.

2.3 Online Activation

When you choose "Activate", you proceed to the license activation screen. There are online activation and offline activation, and online activation has two paths.

Logging In with Google / Apple (Device Code Method)

When logging in with a Google or Apple account, the process uses the **device code method**, which uses your OS's browser. The procedure is as follows.

1. A code for display (userCode) appears in the plugin.

2. Your system browser opens. In the browser, log in to the account you created at the time of purchase.
3. The browser shows a confirmation asking "Do you want to authorize this device?". Confirm that it matches the code shown in the plugin, and explicitly approve it.
4. Once you approve, you return to the plugin and activation is complete.

Caution

This device code **expires in 10 minutes**. If you were unable to approve it within the time limit, start over from the login. Do not approve a code you do not recognize (the approval confirmation screen exists to prevent the trick of sending a code to a third party).

Logging In with Email Address and Password

Enter the email address and password of the account that purchased the product into the form inside the plugin. This path is completed entirely within the plugin. Once login succeeds, your license is imported automatically and activation is complete.

If you have forgotten your password, you can reset it from the password reset on the same screen (a reset email will be sent to you).

About the Issued License

When activation succeeds, the license is saved to your environment. This license has the following properties.

- On a different OS, or if you reinstall the OS, you can restore the license by reactivating with the same account.
- The license is tied to the purchaser's email address and display name. You cannot transfer the license to another person.
- If you modify the license file, or put in a file for a different product, verification fails and it will not activate.

2.4 Key File Activation

If you want to activate offline, or want to keep a copy of your license on hand in case you need to reinstall, use a **key file**. The key file extension is `.s80key`.

Obtaining and Importing the Key File

1. Log in to the website at <https://jun-murakami.web.app/account> (the account screen) and download the key file for the license you hold.
2. **Drag and drop** the downloaded `.s80key` file onto the plugin's activation screen. Alternatively, load it from the file selector on the screen.
3. The signature is verified, and if there are no problems, activation is complete.

Note

Whether imported via online activation or via a key file, **the result is ultimately saved in the same format and the same location** (for the save location, see "2.7 Settings File Locations"). Whichever method you use to activate, there is no difference in the state after activation.

2.5 Purchase and Account

Purchasing

You can purchase Synth-80 from the product page <https://jun-murakami.web.app/synth-80>. **Logging in is required** at the time of purchase. This is to reliably tie the purchase process (the Paddle checkout) to the account you are logged in to. Once the purchase is complete, the license is issued to that account.

The Account Screen

On the website's account screen at <https://jun-murakami.web.app/account>, you can view a list of the licenses you hold. From here, you can download the key file (`.s80key`) for each license (see 2.4).

2.6 Preset Location

After installation, sound presets are saved under your OS's Documents folder, at `Documents/Synth-80/`. On both Windows and macOS, this folder name (`Synth-80`) is the same.

- The unit of storage is the **Patch (`.80p`)**. A single Patch bundles together the Upper Tone and Lower Tone, performance settings, Effect Chain, and Patch Volume (for the concept of a Patch, see → Chapter 5 "Understanding Preset / Patch / Tone").
- Category folders (`Bass` , `Lead` , `Pad & Strings` , etc.) are placed directly under the preset root.

An example of the save location structure is as follows.

```
Documents/  
├── Synth-80/  
│   ├── Bass/  
│   │   └── Fat Unison.80p  
│   ├── Lead/  
│   │   └── Sync Lead.80p  
│   └── Pad & Strings/  
│       └── Bright Strings.80p
```

Note

A Patch name equals its file name. If you change the file name, that becomes the name of the Patch.

2.7 Settings File Locations

The presets themselves are placed in Documents as described in the previous section, but the **license file, UI settings, window size, and the placement state of the Factory presets** are saved separately in your OS's standard application settings folder. This folder is also named `Synth-80` (with a hyphen). These files are not usually something the user needs to interact with directly, but they can be useful for backup or troubleshooting.

Windows:

```
%APPDATA%\Synth-80\  
├── Synth80.s80key  
├── preferences.json  
├── window-state.json  
└── factory-presets.json
```

macOS:

```
~/Library/Application Support/Synth-80/  
├── Synth80.s80key  
├── preferences.json  
├── window-state.json  
└── factory-presets.json
```

The role of each file is as follows.

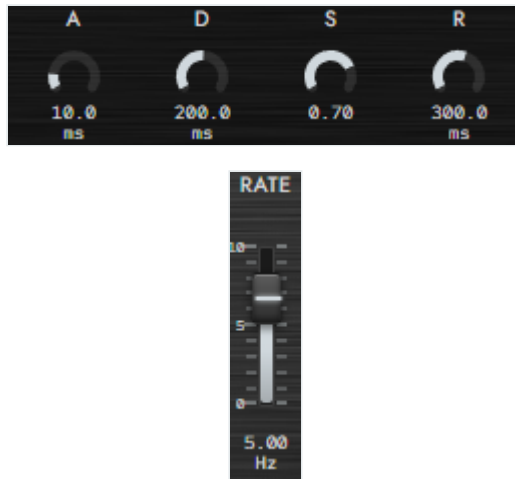
File	Role
<code>Synth80.s80key</code>	The license itself. Saved here for both online activation and key file activation
<code>preferences.json</code>	UI settings such as the hint language
<code>window-state.json</code>	The last window size used
<code>factory-presets.json</code>	The placement state of the Factory presets (which have been seeded, and which are treated as deleted)

3. Basic Operation

This chapter summarizes the basic operations common to all panels of Synth-80.

3.1 Knobs and Faders

Both circular knobs and vertical faders are operated by dragging up and down (vertically) to change their value.



- Besides dragging, you can also fine-tune a value by hovering over a knob/fader and turning the mouse wheel.
- Holding a modifier key (macOS: Command, Windows: Ctrl, or Shift) while operating lets you fine-tune the parameter in smaller increments than usual.
- To return a knob or fader to its default (initial) value, click it while holding a modifier key.

3.1.1 Typing a Value Directly

Double-click a knob or fader, or **click the value readout** below it, to open a numeric entry popup. When you know exactly the value you want, this is faster and more precise than dialing it in by dragging.



- When the popup opens, the input field already contains the current value, pre-selected, so you can simply type the new value over it.
- Press **Enter** or click **SET** to confirm. Press **Esc** or click outside the popup to cancel.
- Input that cannot be accepted (non-numeric text, or a decimal / out-of-range value in 0-100 mode) turns the input field's border red and is not committed.

The toggle at the bottom right of the input field switches how the number you type is interpreted.



Mode	Description
0-100	MKS-80-compatible panel value. Specify an integer from 0 to 100, exactly as on the original MKS-80 / MPG-80. Use this to type in values straight from original patch sheets or panel markings.
Raw value (Hz / ms / dB, etc.)	Specify the value in the same physical unit as the readout below the knob. K notation for frequencies, such as "4.0k", is also accepted.

- Your toggle choice is remembered, and subsequent popups open in the same mode.
- Some parameters have no counterpart on the original hardware panel and accept raw values only (the input range is shown in place of the toggle). Examples: SPLIT POINT (MIDI note number 21-108), PATCH VOLUME (dB), and the effect knobs (→ Chapter 9, "Effects").
- When an LFO's RATE is in SYNC (tempo-synced) mode, the value is a note division and cannot be typed in numerically. Turn SYNC off to enter the rate in Hz.

3.2 Selectors, Waveform Buttons, Toggles, and Menus

Parameters that let you pick one option from a set of choices (waveform, range, mode, and so on) are operated not with a continuous knob but with vertically arranged button-style selectors. Click the item you want, and it becomes highlighted to show that it is currently selected.



- **Waveform buttons:** Some controls, such as the VCO and LFO waveforms, indicate the choices with pictures (icons) of the waveforms. Hovering the mouse over one briefly shows the waveform name in a tooltip.
- **Toggles:** Items that switch between ON and OFF, such as SYNC, are operated with toggle-style buttons.
- **Menus:** Items with many choices, such as selecting a Patch category, are chosen from a menu.

The mouse wheel can also be used over selectors. One notch moves the selection one step to the adjacent choice.

3.3 Parameter Hints (Underlined Labels)

In Synth-80, a label is displayed above most controls. Clicking this label opens an explanatory popover for that parameter.



The popover shows the label's full name (fullName), an explanation of what happens when you change the parameter, and the meaning of each choice. Click the body of the popover or the underlined label again to close it.

3.4 Switching the Hint Display Language

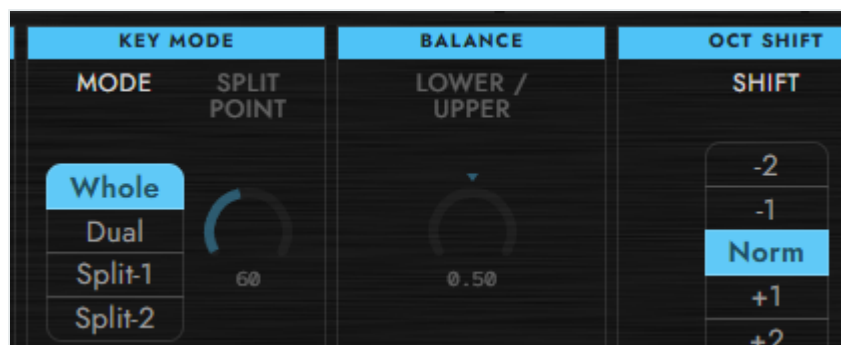
You can switch the display language of the hint popovers between **Eng** (English) and **Jp** (Japanese) in the **HINT** field at the very bottom of the screen.



- The change takes effect immediately, and any hint opened afterward is shown in the language you selected.
- The selected language is saved locally, so it is retained even if you restart the plugin or reopen the DAW session.

3.5 Display of Inactive Parameters (Dimmed)

In Synth-80, parameters that have no effect on the sound under the current Key Mode or the object you are currently editing (Upper / Lower) may be shown dimmed.



This does not mean "you cannot operate it"; rather, it is a sign that "with the current settings, changing this parameter will not be reflected in the sound." You can still change the value of a dimmed parameter, but the effect appears only when you switch to the Key Mode or editing target where it applies.

For example, depending on the Key Mode or layer configuration, there are situations where the Lower-side parameters have no effect. In such states, the relevant parameters are shown dimmed, so you can tell at a glance that they are "not sounding right now."

For the relationship between Key Mode (WHOLE / DUAL / SPLIT 1 / SPLIT 2) and Upper / Lower itself, see → Chapter 5 "Understanding Preset / Patch / Tone".

3.6 Relationship with DAW Automation

Knobs, faders, and selectors can also be operated directly from the DAW's automation. Even when you operate them with the mouse, the start of the operation, the value changes during the drag, and the end of the operation are conveyed to the DAW as normal parameter operations.

Therefore, if you put automation into a record (write) state and move a knob with the mouse, that movement is recorded as automation. Conversely, if you write automation on the DAW side, the knobs and faders on the Synth-80 screen follow along and move accordingly.

Operation from a MIDI controller (MIDI Learn) and the difference between Host Automation and MIDI CC automation are explained in detail in → Chapter 10 "MIDI / MIDI Learn / Automation".

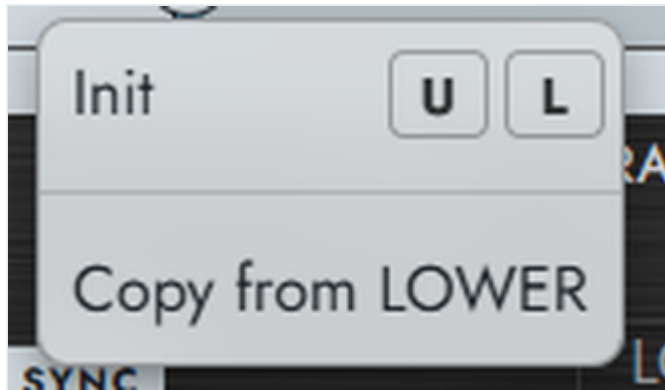
3.7 Copying and Pasting Parameters

Synth-80 offers two kinds of copy & paste to help you reuse sounds efficiently: one copies an entire tone between the Upper and Lower slots, and the other copies and pastes parameters per section.

3.7.1 Copying a Tone Between Upper and Lower

When you stack two sounds (Upper Tone / Lower Tone) in DUAL / SPLIT, you may want to use one of them as the starting point for the other.

Press the v button to the right of the **UPPER TONE** / **LOWER TONE** tab in the top bar to open the tone selection menu. At the very bottom you will find "**Copy from LOWER**" (when editing Upper) or "**Copy from UPPER**" (when editing Lower).



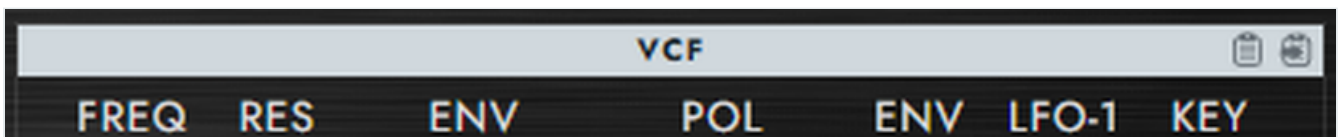
Clicking it copies all of the opposite slot's tone parameters (everything that belongs to the Tone — VCO / VCF / VCA / ENV / LFO, and so on), together with that slot's performance settings (the light-blue parameters of OCT SHIFT / ASSIGN MODE / GLIDE / PITCH BEND / MOD & AFTER TOUCH), into the slot you are currently editing. Afterward both slots hold the same settings, so you can refine one of them, or use the link icon between UPPER TONE / LOWER TONE to link their editing (→ Chapter 5 "Understanding Preset / Patch / Tone").

- What gets copied are the parameters that Upper / Lower can hold independently (the Tone and the performance settings above). **MASTER / KEY MODE / BALANCE** are settings shared by Upper / Lower, so they are not copied.

3.7.2 Copying and Pasting per Section

Each section — LFO-1 / VCF / ENV-1 and the like, i.e. the blocks with a colored title strip (white = Tone, light blue = Patch scope) — supports per-section copy & paste.

Hover the mouse over a section's title strip for a moment, and two icons — **Copy** and **Paste** — appear at the right edge of the strip.



- **Copy** (left icon): captures that section's parameters.
- **Paste** (right icon): pastes the captured contents into a section **of the same type**.

You can only paste between sections of the same type (for example, VCF contents can be pasted only into VCF). You can paste back into the same section after loading a different Patch, or copy between multiple running instances of Synth-80 (it uses the OS clipboard).

- **ENV-1 and ENV-2 can be copied to each other.** Because their Decay / Release maximums differ, however, any source value that exceeds the destination's range is clipped to the maximum when pasted.
- When you edit Upper / Lower separately in DUAL / SPLIT, the copy & paste applies to the slot currently shown and edited.
- Copy & paste for the entire effect chain is provided separately (→ Chapter 9 "Effects").

4. Screen Tour

In this chapter, we work through where everything is located on the Synth-80 screen, following along with screenshots. First we take in the whole screen at a glance, then trace each block from top to bottom, and finally re-read the layout from a different angle: the "signal flow."

This chapter only guides you to "where things are"; it does not explain the meaning of each individual knob. Detailed explanations of each parameter are gathered together: Tone (sound) is covered in → Chapter 7 "Tone Parameter Reference", performance and layer settings in → Chapter 8 "Patch / Performance Reference", and effects in → Chapter 9 "Effects".

Note

The color coding on the screen is an important cue for telling operations apart. **White sections represent Tone (the Upper / Lower sound)**, and **light-blue sections represent Patch-scope (performance / layer) parameters**. This chapter, too, guides you through each block in line with this color convention.

4.1 The Whole Screen

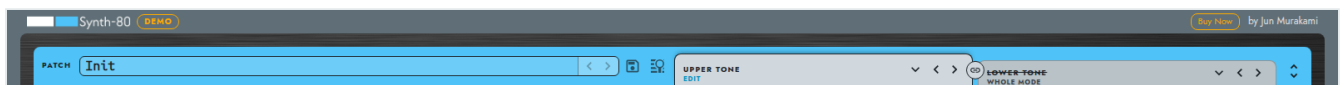


The Synth-80 screen is broadly divided into four blocks from top to bottom.

Block	Position	Role
Top bar	Topmost row	Selecting, saving, and moving between Patch and Upper / Lower Tone
Tone editor (white)	Upper two rows	Parameters for creating each Upper / Lower sound
Patch row (light blue)	Below the Tone editor	Parameters related to performance and layering
Bottom row	The very bottom	MIDI wheels, Effect Chain, various settings, Master Volume and meter

At the bottom right of the screen there is a resize grip; dragging it changes the size of the entire window. Saving the size and the behavior of DPI are explained in → Chapter 12 "Settings and Performance".

4.2 Top Bar (Patch / Upper Tone / Lower Tone)



The light-blue band at the very top represents the **Patch** you currently have open. A single Patch contains two sounds, an Upper Tone and a Lower Tone, and three blocks line up within the band: **PATCH / UPPER TONE / LOWER TONE**.

- Each block has the file name (sound name) currently loaded and a save button. Clicking a block opens a load menu that follows the folder hierarchy.
- The right end of the PATCH name field holds the folder badge and the forward and backward arrows. The arrows let you step through Patches in the same category (folder), forward and back. Clicking the folder name opens a load menu for that folder only.
- The **Preset browser** button to the right of the save button opens and closes a browser where you choose Patches while filtering by search and tags (→ 5.7). After you load a Patch from filtered results in the browser, the badge changes to a filter mark with the name of the filter, and the arrows cycle through those results.
- The forward and backward arrows of UPPER TONE / LOWER TONE replace the Tone one step at a time through the Tones in the library, in the same order as the load menu.
- The link icon between UPPER TONE and LOWER TONE appears when both paths match, and toggles whether sound editing is linked across Upper / Lower.
- The collapse / expand button at the far end switches the Tone editor between single-section display (collapsed) and simultaneous two-row top-and-bottom display (expanded) (see → 4.6). When expanded, you can edit Upper and Lower at the same time.

Note

For the Patch name, the file name is the source of truth. The unit of saving is the Patch (extension `.80p`). The concepts of Patch / Tone are explained in detail in → Chapter 5 "Understanding Preset / Patch / Tone".

4.3 Tone editor (White = Sound)



The group of white sections in the upper half of the screen is the **Tone editor**. This is where you create each Upper / Lower sound.

First row (left to right)

Section	Main contents
LFO-1	The main LFO for adding vibrato (waveform, free / tempo-synced rate, delay)
VCO MOD	Pitch modulation of the VCO by LFO-1 / ENV-1
PWM	Pulse width modulation
KEY FOLLOW	Tracking of VCO / VCF / ENV according to keyboard pitch
VCO-1	The first oscillator (waveform, range)
VCO-2	The second oscillator (waveform, range, tune, Sync / Cross Mod)
MIXER	The balance of VCO-1 / VCO-2 / Noise

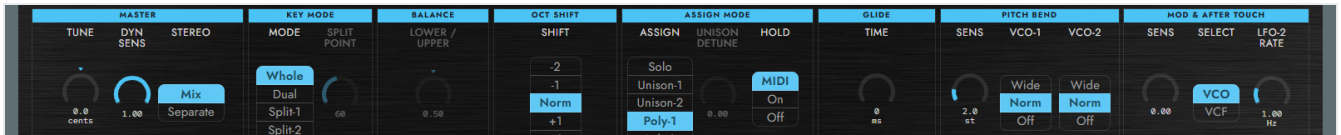
Second row (left to right)

Section	Main contents
HPF	High-pass filter (tidying up the low end)
VCF	Low-pass filter (brightness, resonance)
VCA	The volume stage
DYNAMICS	Response to Velocity / Aftertouch
ENV-1	The envelope for the VCF / VCO system
ENV-2	The envelope for the VCA system

Note

Whether you are editing Upper or Lower can be told from the color of the section band and from the knob highlight color (accent). Switching the UPPER TONE / LOWER TONE tabs in the top bar switches the target shown across the entire Tone editor. For the meaning of each section's parameters, refer to → Chapter 7 "Tone Parameter Reference".

4.4 Patch Row (Light Blue = Performance / Layer)



The group of light-blue sections below the Tone editor is the **Patch row**. These are not the sound itself but parameters that determine how you perform and how layers are built.

Section	Main contents
MASTER	Master Tune, Dynamics Sens, Stereo Mode
KEY MODE	Selecting Whole / Split / Dual, and the Split Point
BALANCE	The volume balance of Upper / Lower
OCT SHIFT	Octave shift
ASSIGN MODE	Voice assignment (Solo / Unison / Poly), Unison Detune, Hold
GLIDE	Portamento time
PITCH BEND	Bend range, the bend mode of VCO-1 / VCO-2
MOD & AFTER TOUCH	Aftertouch sensitivity, the destination and free / tempo-synced rate of LFO-2

Note

MASTER / KEY MODE / BALANCE are settings shared across the whole Patch. The five sections from OCT SHIFT onward, on the other hand, are "per-layer" parameters that can hold separate values for Upper / Lower in DUAL. For details of each parameter, refer to → Chapter 8 "Patch / Performance Reference".

4.5 Bottom Row (Wheels / Effects / Settings / Master)



At the very bottom of the screen, the things that move during performance and the settings you do not usually touch are gathered together. They are arranged from left to right.

- **MIDI wheels (BEND / MOD / VOL):** Display the current values of Pitch Bend, Mod Wheel, and Volume coming in from an external keyboard. BEND returns to center when you release the mouse.
- **Effect Chain (the LCD-style panel in the center):** An effect chain that connects 5 slots in series from left to right. You select each slot with a tab, and can rearrange the order by dragging. For details, refer to → Chapter 9 "Effects".
- **Settings (the right end of the LCD panel):** **OVERSAMPLING** and **POLYPHONY** switching, **SysEx** (select a MIDI port from the MIDI icon), and **Hint** (the display language for hints) are lined up. For the meaning of the settings, refer to → Chapter 12 "Settings and Performance", and for SysEx to → Chapter 11 "SysEx / MKS-80 Integration".
- **Master Volume and meter (far right):** The volume of the final signal stage and the level meter. This is an overall volume trim that is not saved to the Patch.

Note

The bottom row has two volumes with similar names: "Patch Volume" and "Master Volume". Patch Volume is after the Effect Chain and before Master Volume, and is a volume that is saved to the Patch. Master Volume is an overall trim that is not included in the Patch. The difference is explained in → Chapter 12 "Settings and Performance".

4.6 Collapsing and Expanding (collapsed / expanded)



The Tone editor has two display modes.

Mode	Display	Use
collapsed	Shows only one of Upper / Lower at a time	Normally this one. Switch the editing target with the tabs
expanded	Shows Upper / Lower simultaneously in two rows, top and bottom	When creating while comparing two sounds in DUAL / SPLIT

You switch with the collapse / expand button in the top bar. When you expand, the window grows vertically, and the Upper block and the Lower block are each shown independently.

4.7 Dimmed Display of Parameters That Have No Effect

Parameters that have no effect on the sound in the current Key Mode or editing target are automatically shown dimmed. For example, in WHOLE mode the Lower Tone does not sound, so the Lower-side sections are shown dimmed. The Split Point is dimmed outside of SPLIT, and Unison Detune is dimmed outside of Unison.

Even when shown dimmed, the controls themselves can still be operated, and the set values are saved. If you switch to a mode where they take effect, those values are used as they are. The dimming is simply a marker that says "this is not affecting the sound right now."

Note

If you feel that "I set it but the sound doesn't change," first check whether that parameter is dimmed. Depending on the state of Key Mode or Assign Mode, it may be intentionally disabled.

4.8 Signal Flow Overlay (Displaying Connection Lines)



So far we have guided you through each block by its “location on the screen,” but Synth-80 also has a feature for visually confirming “how the signal flows.” That is the **signal flow overlay**.

When turned on, hovering the mouse over any module draws lines showing the connections related to that module. There are two kinds of lines, audio (blue) and modulation (red), and arrows show the direction. For example, if you hover over LFO-1, you can see at a glance which destinations LFO-1 is sending modulation to.

You toggle this overlay on / off with the **small branching-arrow toggle button at the lower right of the HINT settings button**. The setting is saved and carried over to the next startup.

Note

The signal flow overlay helps those who are not yet accustomed to the signal path of a subtractive synth grasp “which knob now affects what.” The way of thinking about sound design itself is explained along the signal path in → Chapter 6 “Sound Design Basics”.

5. Understanding Preset / Patch / Tone

In this chapter, we explain the way to think about managing sounds in Synth-80. The basic structure is that of the unit of storage — “what becomes one file” — and that a single sound is built from two Tones called **Upper / Lower**.

What each individual parameter does is covered elsewhere: for Tone parameters, see → Chapter 7 “Tone Parameter Reference”; for performance settings such as Key Mode and Balance, see → Chapter 8 “Patch / Performance Reference”; and for Effects, see → Chapter 9 “Effects”.

5.1 The Patch Is the Unit of Storage

In Synth-80, the unit of storage is the **Patch**. When written out as a file, it uses the extension `.80p`. A single Patch contains all of the following:

- **Upper Tone** (the Upper sound)
- **Lower Tone** (the Lower sound)
- **Performance settings** (Key Mode / Balance / Octave Shift / Assign Mode / Glide, etc.)
- **Effect Chain** (the 5-slot Effects)
- **Patch Volume** (the volume of each Patch)

In other words, loading a single Patch reproduces everything at once: the two sounds, how the layers are combined, the effects, and the volume.

Note Mapping this to the on-screen color coding: the **white sections (the Upper / Lower sounds) are Tone**, and the **light-blue sections (settings related to performance and layering) are Patch scope**. Think of a Patch file as saving both the white and the light-blue together as one. For the color coding itself, see → Chapter 4 “Screen Tour”.

The File Name Is the Authoritative Patch Name

For both Patch names and Tone names, **the file name itself is the sound’s name**. Therefore, if you rename a file in Explorer or Finder, that name becomes the display name in Synth-80 as well.

5.2 The Two-Layer Upper / Lower Structure

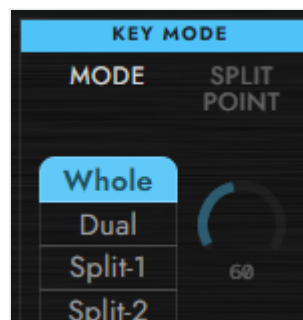
A single Patch holds two sounds: an **Upper Tone** and a **Lower Tone**. **Key Mode** determines how these two are combined and played.

Key Mode	How it sounds	Voices	Notes
WHOLE	Upper Tone only. Sounds across the entire keyboard	Up to 8 voices	Lower is disabled (does not sound)
DUAL	Layers Upper and Lower on the same key	4 voices each for Upper / Lower	BALANCE sets the volume ratio between the two
SPLIT 1	Split by key range. Lower side = Lower, upper side = Upper	4 voices each for Upper / Lower	The internal Split Point sets the boundary. The MIDI channel is shared
SPLIT 2	Split by MIDI channel. Basic ch = Upper, basic ch + 1 = Lower	4 voices each for Upper / Lower	Sounds are routed across two channels

The key points are as follows:

- **In WHOLE, only Upper sounds.** Because the Lower parameters do not affect the sound here, the Lower parameters are shown dimmed on screen.
- **In DUAL / SPLIT, the voices are divided.** Since the 8 voices are shared between Upper and Lower, each gets up to 4 voices. Keep this in mind when considering how many notes you can play in a chord at once.
- **The way DUAL layers differs slightly from the hardware.** On the actual MKS-80, DUAL — like SPLIT 2 — also splits Upper / Lower by MIDI channel, so layering required sending the same note to two channels. In Synth-80, to make this easier to handle in a DAW, this has been changed so that received notes are simply layered regardless of channel.

A clause-by-clause explanation of the meaning of each Key Mode option, as well as of performance parameters such as Split Point and Balance, is collected in → Chapter 8 "Patch / Performance Reference".



5.3 Switching the Upper / Lower Edit Target

The group of white sections occupying the upper part of the screen (the Tone editor) displays and edits the sound of either Upper or Lower. Which one you edit is switched with the **UPPER TONE** / **LOWER TONE** tabs in the top bar.

- Normally it is shown collapsed, displaying only the one channel — Upper or Lower — that you are currently editing. Switching tabs swaps the edit target for the entire Tone editor.

- Pressing the expand button in the top bar lets you display the Upper block and the Lower block simultaneously, stacked in two rows. This is convenient when building two sounds for DUAL / SPLIT while comparing them.
- The link icon between UPPER TONE and LOWER TONE switches whether editing is linked between Upper and Lower when both are the same sound.

For the on-screen positions of the collapse/expand controls and the link icon, see → Chapter 4 "Screen Tour".



5.4 Loading a Sound from Another Patch (Replacing a Tone)

Although a Tone does not exist as a standalone file, you can **load the Upper / Lower held by another Patch into a layer (Upper or Lower) of the Patch you currently have open**. To do this, press the v button on the right side of each TONE tab to select an existing Patch's Tone and replace it.

For example, you can do things like "bring the Upper sound of Patch A into the Lower of Patch B and layer it."

Note Even if you replace a Tone, the unit of saving is still the Patch (.80p). If you want to keep the combined result, save it as a Patch.

5.5 Init Patch (Returning to the Initial State)

When you want to return all parameters to their default values, load the **Init Patch**. This is a built-in initial state that requires no file (internal identifier `builtin:init`), and it is a full-reset means of returning all parameters — including the sound, performance settings, and effects — to their defaults.

Use it when you want to start sound design from a blank slate, or when you want to clear your current settings once and return to a reference point.

5.6 Saving, Loading, Navigating, and Categories

Everyday Patch operations are performed from the top bar at the very top of the screen (the light-blue Patch frame).

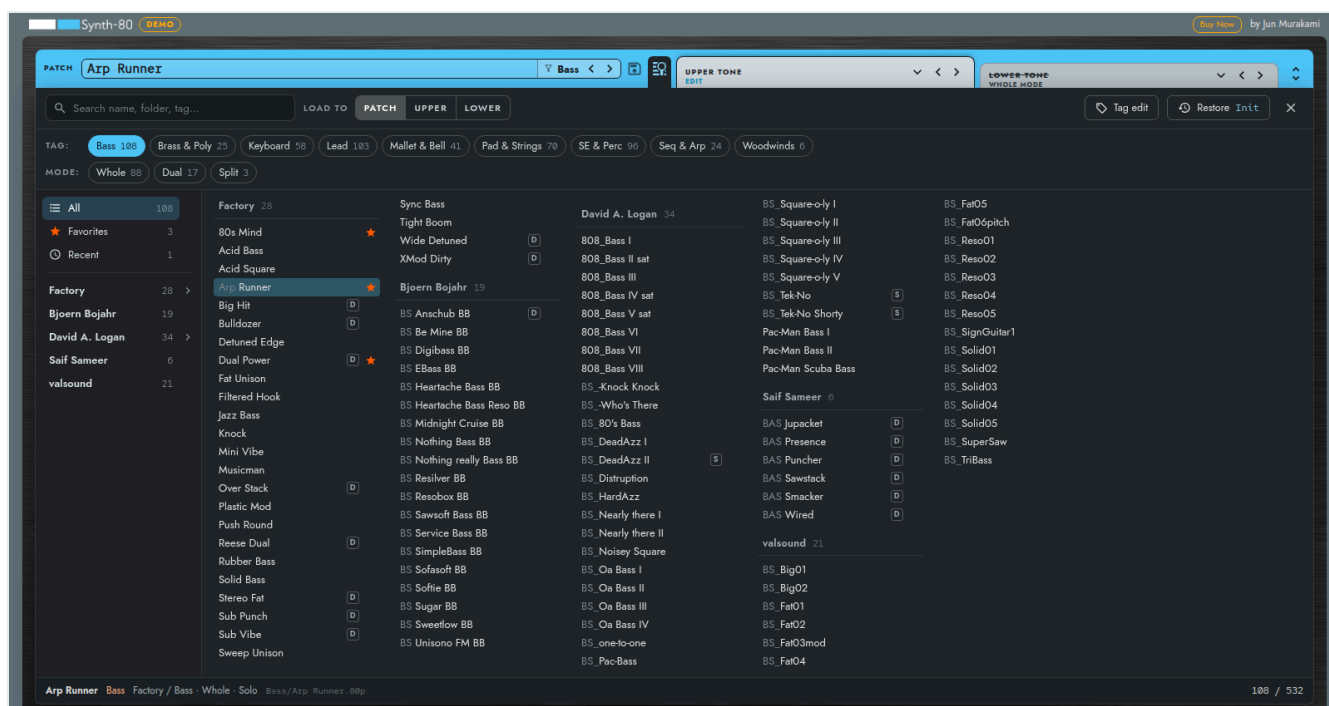
- **Save As:** Saves the current Patch as a new .80p file. As noted above, the file name becomes the Patch name directly.
- **Load:** Click the Patch name and load a saved .80p from the menu that appears. To compare sounds while searching by name or tag, use the preset browser (→ 5.7).
- **Navigate forward/back:** The left/right arrows let you step forward and back through the Patches within the same category. This is convenient when switching one after another to compare sounds. After you load a

Patch from filtered results in the preset browser, the arrows cycle through those results.

- **Category folders:** Patches are organized into per-category folders (Bass/, Lead/, Pad & Strings/, etc.). Selecting a category makes the Patches within that folder the target.

For where Presets are stored (the folder structure under Documents) and how Factory presets are handled, see → Chapter 2 "Installation, License Activation, and File Locations".

5.7 Preset Browser



Press the **Preset browser** button to the right of the save button in the top bar to open the browser below the top bar. It lists every Patch in the library, so you can filter by search and tags and compare sounds as you play. Press the button again, or the x at the upper right, to close it.

Filtering

- **Search field:** Matches part of the name, folder name, sound designer, tags, and Key Mode, ignoring upper and lower case. Words separated by spaces narrow the list to Patches that contain all of them (AND).
- **TAG:** Filters by tags that describe the type of sound (nine tags such as Bass, Lead, and Pad & Strings). When you select several, Patches that have any of those tags are shown (OR).
- **MODE:** Filters by Key Mode (Whole / Dual / Split). Split covers both SPLIT 1 and SPLIT 2.
- **Left column:** Choose from All, Favorites (★), Recent, Factory (bundled), a folder for each sound designer, and User (Patches you saved yourself). Click the > to the right of a count to show the folders inside and choose a single folder.

The search field, TAG, MODE, and the left column combine, and only Patches that meet all of them are shown. The number on each chip is the count you would get by choosing that chip under the other conditions; chips

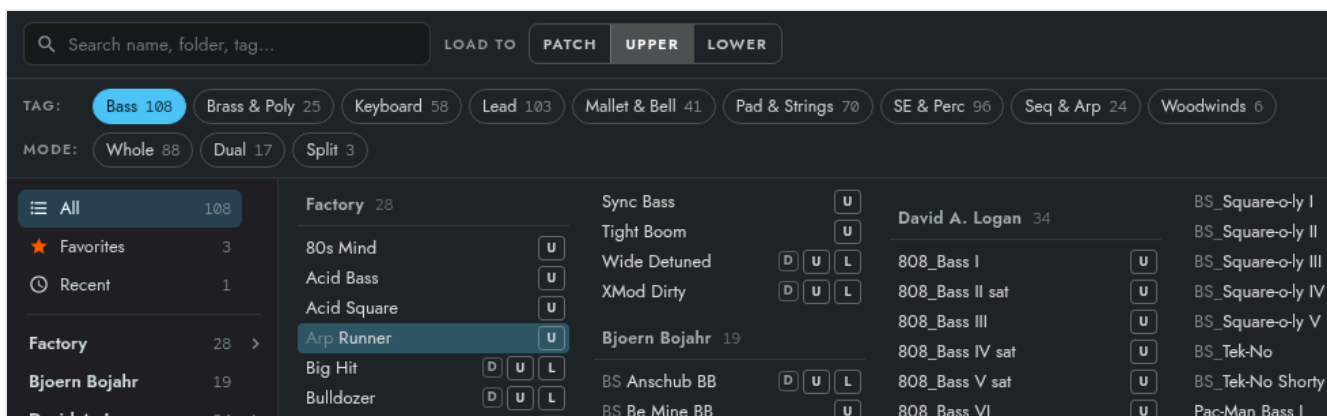
with zero results are dimmed.

In the list, Dual Patches are marked **D** and Split Patches **S**. The bottom row shows the selected Patch's name, tags, sound designer and folder, Key Mode, Assign Mode, and file location, along with the number of filtered results and the total.

Auditioning and Choosing

- Clicking a row loads that Patch immediately. The ↑ ↓ keys also load the previous and next Patches in turn, so you can compare them while playing. The ← → keys load the Patch in the next column.
- **Enter** keeps the current Patch and closes the browser. **Esc** also closes it (the last Patch you loaded stays loaded).
- **Restore** returns to the sound you had when you opened the browser, unsaved edits included. Use it when, after comparing, you prefer the original. The name you will return to is shown to the right of Restore.
- Pressing Enter or ↓ in the search field loads the first filtered result and moves to the list.

LOAD TO (Loading Only a Tone)



LOAD TO, to the right of the search field, chooses where a Patch picked in the list is loaded.

- **PATCH** (default): Loads the whole Patch.
- **UPPER / LOWER**: Loads only a Tone of the chosen Patch into the Upper / Lower of the Patch you have open (→ 5.4). **U** / **L** buttons appear on each row so you can choose whether to take the source Patch's Upper or Lower. Clicking the row itself takes the source Upper with UPPER and the source Lower with LOWER. A Whole Patch's Lower is the same as its Upper, so only **U** is shown.

LOAD TO returns to PATCH each time you open the browser.

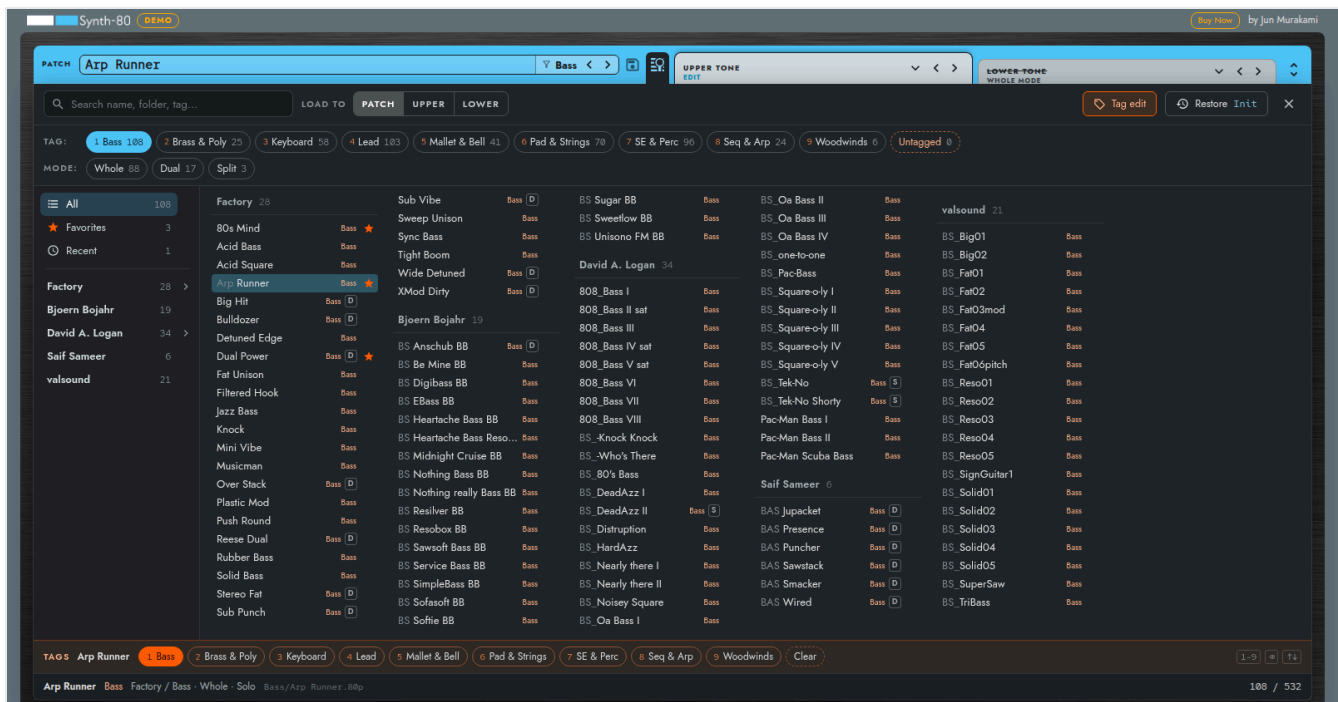
★ and Recent

- Hover over a row to show a ★ at its right end; click it to add the Patch to or remove it from Favorites. You can also do this from the row's right-click menu.
- **Recent** lists up to 30 recently used Patches, newest first. Loading alone does not add a Patch: it is added after it has stayed loaded for 15 seconds, when you edit it, when you close the browser with Enter, or when

you save. This keeps Patches you only skimmed with the arrow keys or ◀▶ from filling the list.

- ★ and Recent are saved as per-user settings and shared by every instance.

Tags and Tag Editing



A Patch's tags are determined in this order:

1. Tags saved in the file (`meta.tags` in the `.80p`).
2. If the file has none, one tag from the folder name (`Bass/` , `Lead/` , and so on).
3. If there is still none, one tag from the abbreviation at the start of the name (`BS_` , `LD` , and so on).

Press **Tag edit** to enter tag editing: each row shows its tags, and a tag editing bar appears at the bottom.

- Toggle tags on the selected Patch with the number keys **1–9** (in TAG order) or the buttons on the bar. A Patch can have several tags.
- **Backspace** (or Delete), or **Clear** on the bar, removes all tags from that Patch.
- Use the **↑ ↓** keys to move to the next Patch and keep tagging. A Patch whose tags you changed stays in the list until you move on, even if it no longer matches the filter.
- **Untagged** appears in the TAG row, letting you show only Patches without tags.
- You can also toggle tags from the row's right-click menu.

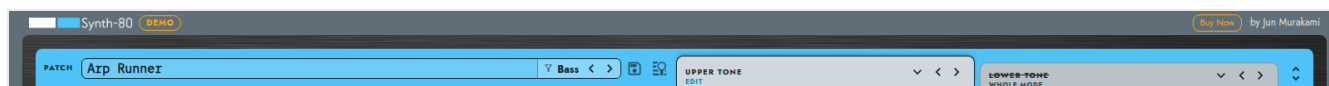
Tags are saved to the `.80p` file each time you change them. The sound values and the file name do not change.

Tags are kept when you overwrite the same file. The built-in Init cannot be tagged.

Note

On the first start after an update, if a copy of a bundled preset in Documents has no tags, the bundled tags are added to it. Its sound values, file name, and any tags you added yourself are not touched.

Cycling Range of ◀▶ and MIDI CC



After you load a Patch from filtered results in the browser, the forward and backward arrows in the top bar cycle through those results instead of the folder. The folder name in the name field changes to a filter mark and the name of the filter (for example, `Bass` or `Bass · Dual`); click it to open the browser.

- MIDI CCs assigned to the arrows (→ Chapter 10) cycle through the same range.
- Choosing a Patch from the top bar's menu returns to cycling by folder.

Filter conditions and whether the browser is open are kept for each plugin instance, so closing and reopening the editor brings back the same state. They are not saved in the DAW project or in the Patch.

Keyboard Shortcuts

These keys work while the list has focus.

Key	Action
↑ / ↓	Load the previous / next Patch
← / →	Load the Patch in the adjacent column
PageUp / PageDown	Jump further and load
Home / End	Load the first / last Patch
Enter	Choose and close the browser
Esc	Close the browser (in the search field, clears the search text if there is any)
1–9	Toggle tags (while tag editing)
Backspace / Delete	Remove all tags (while tag editing)

5.8 Effect Chain Lock (Replacing the Sound Only)

While designing sounds, there are situations where you want to "try out various sounds (Tones) while keeping the way the effects are applied the same." This is where **Effect Chain Lock** comes in handy.

When Effect Chain Lock is ON, even if you load another Patch, the Effects-related settings contained in that Patch will not overwrite your current Effect Chain, which is preserved. With the effects fixed, you can swap through Patches one after another and compare their sounds.

Note The target of Effect Chain Lock is the Effects-related parameters. **Patch Volume is not subject to the lock** and switches to the value of the loaded Patch as usual.

For the makeup of the Effect Chain and the details of each effect, see → Chapter 9 "Effects".

6. Sound Design Basics

If you are already familiar with the basic operation of a synthesizer, feel free to skip this chapter.

This chapter is a "map" to read before diving into the parameter reference in Chapter 7 and beyond. Synth-80 is a subtractive analog modeling synth. In subtractive synthesis, you first create a raw tone rich in harmonics, then carve away the unwanted components and shape how the volume and timbre change over time.

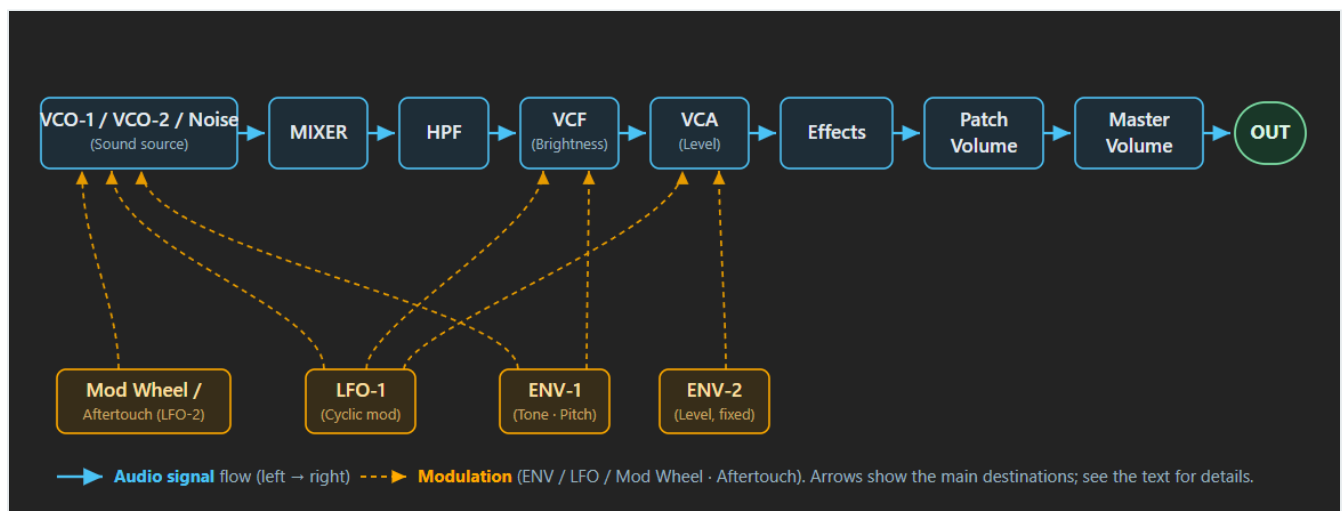
Here we will not get into the precise specifications of each individual parameter. Instead, we will follow the path of the signal as it flows, to understand "what is located where, and roughly how it sounds when you move it."

The exact ranges, conditions, and cautions for each parameter are collected in Chapter 7 for the Tone side and Chapter 9 for the Effects side, so this chapter will point you there.

Note The section colors on screen carry meaning. **White = Tone** (the timbre of each of Upper / Lower), and **light blue = Patch scope** (performance / layer settings). The "creating the sound itself" parts covered in this chapter almost all belong to the white Tone sections. For details on what the colors mean, see → Chapter 5 "Understanding Preset / Patch / Tone".

6.1 The Signal Flow

A single note (one voice) in Synth-80 is built up roughly in the following order. It becomes easier to follow if you think of it as a one-way path, where the material created upstream is processed in turn by the downstream modules.



1. **Create the raw material** — VCO-1 / VCO-2 / Noise oscillate the raw, unprocessed waveforms.
2. **Mix** — The MIXER sets the volume balance between VCO-1 and VCO-2.
3. **Clean up the low end** — The HPF trims away the lower components.

4. **Shape the brightness** — The VCF (lowpass filter) trims away the higher components, determining the brightness and thickness of the sound.
5. **Shape the volume** — The VCA applies the volume attack and decay according to the shape of ENV-2.
6. **Move the timbre and pitch over time** — ENV-1 makes the VCF, VCO pitch, and so on change over time.
7. **Add periodic modulation** — LFO-1 periodically modulates the VCO / VCF / VCA / PWM.
8. **Add expression after the note is played** — Mod Wheel / Aftertouch / LFO-2 add nuance during performance.
9. **Finally, add space and texture** — Effects (chorus, delay, reverb, etc.) finish the sound.

The following sections walk through steps 1 through 9 in order.

6.2 Creating the Raw Material — VCO-1 / VCO-2 / Noise

Everything starts from the two oscillators (VCO-1 / VCO-2). For each, you choose a waveform and set the octave (Range). The waveform determines the amount of harmonics, so this is where much of the "material character" of the sound is decided. Roughly speaking, the triangle wave is the roundest, the sawtooth is the brightest and most flamboyant, and the square / pulse waves sit somewhere in between.

The waveforms selectable on VCO-1 and VCO-2 are intentionally **asymmetrical**. This faithfully reproduces the specification of the real MKS-80.

Oscillator	Selectable waveforms	Notes
VCO-1	Triangle / Sawtooth / Pulse / Square	Has Square, but does not have Noise
VCO-2	Triangle / Sawtooth / Pulse / Noise	Has Noise, but does not have Square

In other words, when you want a clear square wave, use VCO-1; when you want a noise component (wind, breath, percussive textures, and so on), use VCO-2. That is how the roles are divided.

VCO-2 has a **LOW / HI** extension for its Range (octave), and choosing LOW lets it drop down to an ultra-slow range of just a few Hz in the lower keyboard region. In this state, VCO-2 can also be used as a second "modulation source" (combined with the Cross Mod described later, it produces an undulating sound).

Note When you think "I want it brighter," the first move is to shift the waveform toward sawtooth (Sawtooth). Conversely, for "rounder and softer," use the triangle wave (Triangle).

For the exact options and behavior of each waveform and each Range, see → Chapter 7 "Tone Parameter Reference".

6.3 Mixing — MIXER

The MIXER is the knob that sets the volume balance between VCO-1 and VCO-2. Turning it fully to one side gives you only one oscillator; setting it in the middle blends both.

Mixing two oscillators with a slight pitch offset adds thickness and undulation to the sound. The pitch of VCO-2 can be fine-tuned with Fine Tune (a classic technique when you want to fatten up a sound).

6.4 Cleaning Up the Low End — HPF

The HPF (highpass filter) is a **fixed-Q highpass** placed ahead of the VCF. It trims away only the lower components. It has no resonance, so it is a filter for "cleanup" rather than for adding character.

This is a module unique to the Roland MKS-80 that served as the model, and is not present on its sibling, the Jupiter-6. Use it when you want to tighten up a sound whose bass has swelled too much and become sluggish.

6.5 Shaping the Brightness — VCF (Cutoff / Resonance)

The VCF (voltage-controlled filter) is a 24 dB/oct lowpass filter. It is the part you touch most often in subtractive sound design, and it determines the brightness and thickness of the sound.

- **Cutoff** — The higher you raise it, the more high components pass through, making the sound brighter; the lower you set it, the more the high end is trimmed away, making the sound darker and more muffled. Almost everything from "brighter" to "darker" can be made here.
- **Resonance** — Emphasizes the region around the Cutoff, creating a characterful peak (a nasal-sounding ring). Because Synth-80 is calibrated to a Rev 4 unit, raising Resonance up near its maximum causes **self-oscillation**, where the filter itself produces a sine-wave-like tone.

The VCF is not only set statically; by moving it over time with the ENV or LFO, you can create the kind of synth-like motion where the filter sweeps open with a "vyoom" or undulates periodically (see the following sections).

Caution If you raise Resonance and set Cutoff fairly low, the sound becomes very thin and sharp. Raising it further into the self-oscillation range can make the filter itself start to ring and grow loud, so watch your Master Volume.

For the exact ranges of Cutoff / Resonance, Key Follow (keyboard tracking), and so on, see → Chapter 7 "Tone Parameter Reference".

6.6 Shaping the Volume — VCA / ENV-2

The VCA (voltage-controlled amplifier) is the module that controls volume, and **ENV-2** creates the time variation (envelope) of that volume. In Synth-80, the VCA is a **fixed connection always driven by ENV-2**; you cannot

drive the VCA from ENV-1 (this too is a specification of the real MKS-80).

ENV-2 shapes the volume curve with four parameters: Attack / Decay / Sustain / Release (ADSR).

- **Attack** — How quickly the volume rises after you press a key. Short gives a sharp "tick," while long gives a soft, gentle fade-in.
- **Decay** — The time it takes to fall from the peak to the Sustain level.
- **Sustain** — The volume level held while you keep the key pressed.
- **Release** — The time it takes for the sound to fade after you release the key. Short cuts off abruptly, while long leaves a lingering tail.

"I want a strong, sharp attack" maps directly to setting ENV-2's Attack to its shortest, and "I want the tail to linger" maps to a long Release — the words you hear translate straight into the controls.

6.7 Moving the Timbre and Pitch — ENV-1

ENV-1 is a second envelope, but this one is used to **move the timbre and pitch rather than the volume**. It also has an ADSR, but its destination is different.

ENV-1 can be sent to destinations such as the following.

- **VCF Cutoff** — The so-called "filter envelope," where the filter opens the moment you play and then closes. This is the core of the attack character of brass and bass sounds (when the driving EG is set to "ENV-1" on the VCF side).
- **VCO pitch** — An effect where the pitch jumps up / down at the start of the sound.
- **PWM** — Varies the pulse width over time.
- **XMOD (Cross Mod)** — Varies the depth of Cross Mod over time, animating the metallic ring.

Note For a brass-type sound that "snaps open on the attack and immediately settles," the starting point is to send ENV-1 to the VCF and set Attack short and Decay medium. The lower you set Sustain, the more the emphasis on the attack stands out.

The envelope that drives the VCF can be chosen from ENV-1 and ENV-2. Choosing ENV-2 makes the filter and the volume move with the same shape. For details on how to use these, see → Chapter 7 "Tone Parameter Reference".

6.8 Adding Periodic Modulation — LFO-1

LFO-1 is the module for modulating the sound **periodically**. You choose the modulation speed (Rate) and the waveform (Triangle / Saw Up / Saw Down / Square / Random), and set the depth for each destination. Rate can run freely in Hz, or it can be synchronized to the host tempo with the small SYNC button under the Rate control.

- **Send to VCO** → vibrato (pitch wobble)

- **Send to VCF** → a wah-like brightness wobble
- **Send to VCA** → tremolo (volume wobble)
- **Send to PWM** → the pulse width moves periodically, producing a shimmering thickness

Choosing the Random waveform gives a "sample & hold" that jumps to a random value once per cycle, allowing sound-effect-like uses where the pitch or filter jumps around randomly.

LFO-1 has a **Delay**, which can be set so the modulation rises slightly later after you press a key. You can use this for a human-like expression where the note is straight the moment you play it, and vibrato naturally comes in as you hold it. When SYNC is on, the musical rate follows the project BPM, so tremolo, filter wobble, PWM motion, and sample-and-hold jumps can lock to the song grid.

6.9 Adding Expression After the Note Is Played — Mod Wheel / Aftertouch / LFO-2

Up to this point, the motion has been "built into the patch as a fixed setting." Finally, there is the family of expression you add by hand during performance. Synth-80 has one more modulation source, **LFO-2**, which is triggered by the **Mod Wheel (CC 1)** and **Aftertouch (the pressure of pressing the key down)**.

LFO-2 is fixed to a Triangle waveform, and as you raise the Mod Wheel or press the key down, the modulation rises in proportion to that amount. The destination can be chosen from VCO pitch (vibrato) or VCF (a brightness offset). Its Rate can also run freely in Hz or sync to the host tempo, which is useful for tempo-locked wheel / aftertouch vibrato.

Note Just as on the real MKS-80, the **Mod Wheel and Aftertouch share the same bus**. If you move both at the same time, the **deeper one (the one with the greater amount)** takes priority.

This lets you add in-performance nuance, such as raising the wheel partway through a long tone to deepen the vibrato, or pressing down hard to open the filter. For details, see → Chapter 8 "Patch / Performance Reference".

6.10 Finally, Adding Space and Texture — Effects

To the single timbre you have built up so far, you finally add space and texture with the Effects. Synth-80 has a 5-slot series effect chain, where you can freely arrange chorus, delay, phaser, flanger, EQ, compressor, distortion, reverb, and more.

From a sound-design standpoint, Effects are not "the sound itself" but "the finishing touch." For example, they serve roles such as adding chorus to a thin string sound to widen it, or adding reverb to a pad to give it depth. For the types and parameters of each effect, see → Chapter 9 "Effects".

6.11 From the Words You Hear to Which Knob to Reach For

Finally, here is a summary mapping common "I want it like this" requests to the first parameter to reach for. These are only starting points; in practice you combine several to dial in the result.

What you want	Where to reach first
Brighter	Raise the VCF Cutoff / shift the waveform toward sawtooth
Darker / more muffled	Lower the VCF Cutoff
Fatter	Play both VCO-1 / VCO-2 and detune slightly (Fine Tune) / move the MIXER toward center
Sharper attack	Set ENV-2's Attack to its shortest / send ENV-1 to the VCF with a short Attack
Longer tail	Lengthen ENV-2's Release
A bright pop only at the start	Send ENV-1 to the VCF, with a medium Decay and a low Sustain
Add vibrato	Send LFO-1 (or LFO-2 via Mod Wheel / Aftertouch) to the VCO
Undulation / tremolo	Send LFO-1 to the VCF / VCA
Metallic / sound-effect-like	Use XMOD (Cross Mod) or VCO Sync
Tighten up the bass cleanly	Raise the HPF Cutoff
Add width / depth	Add Effects (Chorus / Reverb, etc.)

Note XMOD (Cross Mod, where VCO-2 modulates the pitch of VCO-1) and VCO Sync (where one VCO is force-synced to the other) are the core features for bell-type, metallic, and sharp lead-type sounds. Their motion is large and the sound breaks up easily, so start with a small amount first. For details on their behavior, see → Chapter 7 "Tone Parameter Reference".

Once you have this map in your head, you will be able to read each parameter from Chapter 7 onward in terms of "what stage of the signal it operates on, and how it moves it."

7. Tone Parameter Reference

This chapter is a parameter-by-parameter reference for the controls laid out in the Tone (sound) editor. In Synth-80, a single Tone is a collection of many parameters, and Upper and Lower each have their own independent Tone. Here they are organized so that you can look them up **in the order they appear on screen and in signal-path order**.

As a rule, each parameter is explained in the following three points.

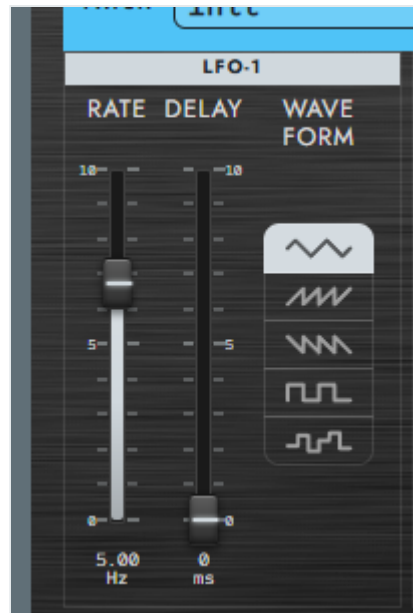
- **What it changes** — the target that the knob or switch controls.
- **When it takes effect** — the conditions under which the effect appears (waveform, mode, or dependencies on other parameters).
- **Common things to watch out for** — behavior specific to the real MKS-80, or points that are easy to misunderstand.

When you click each label in the plugin, a popover with the same gist as this chapter appears. Think of this chapter as a slightly more detailed version of those popovers.

Note The section colors on screen have meaning. Almost all of the parameters covered in this chapter belong to **white = Tone (the Upper / Lower sound)**. A few parameters that are placed near the Tone editor are actually **light blue = Patch scope (performance / layer)**. Those are covered in → Chapter 8 "Patch / Performance Reference". For the meaning of the colors, see → Chapter 5 "Understanding Preset / Patch / Tone".

7.1 LFO-1

LFO-1 is a low-frequency oscillator used to **modulate the sound periodically**. The modulation you create here is sent to VCO pitch (vibrato), VCF (wah), VCA (tremolo), and PWM (pulse-width wobble). The amount sent to each destination is set by the parameter at that destination (VCO Mod LFO / VCF LFO Amount / VCA LFO / PWM).



Rate (LFO-1 speed)

- **What it changes:** the frequency of LFO-1 (the speed of the modulation).
- The higher the value, the faster it modulates; the lower the value, the slower.

The small **SYNC** button below Rate switches the Rate control between two modes.

Mode	Meaning
SYNC off	Free-running rate in Hz, as on the original MKS-80.
SYNC on	Host-tempo sync. The fader selects a note value from 8/1 to 1/64T, and the readout shows both the note value and the effective Hz at the current BPM.

In tempo sync, one LFO cycle equals one selected note value. For example, at 120 BPM, 1/4 is 2.00 Hz and 1/8 is 4.00 Hz. If no host tempo has been received, Synth-80 uses 120 BPM as the fallback.

Turning SYNC off restores the previous free Hz Rate; switching modes does not overwrite the free-rate setting. When SYNC is on, the LFO phase is reset to the start of the cycle on the first note from silence and when you change the note value. Additional notes played while a sound is already active do not retrigger the phase, so layered or legato playing stays on the same tempo grid.

Wave (LFO-1 waveform)

- **What it changes:** the output waveform of LFO-1. The waveform changes the character of the modulation.

Option	Meaning
Triangle	Triangle wave. Rises and falls smoothly — the most natural, plain modulation.
Saw Up	Sawtooth (rising). Rises slowly, then snaps back down.

Option	Meaning
Saw Down	Sawtooth (falling). Snaps up, then falls slowly.
Square	Square wave. Alternates between two values — a trill / gate-like modulation.
Random	Sample & hold. Each LFO cycle jumps to a new random value and holds it.

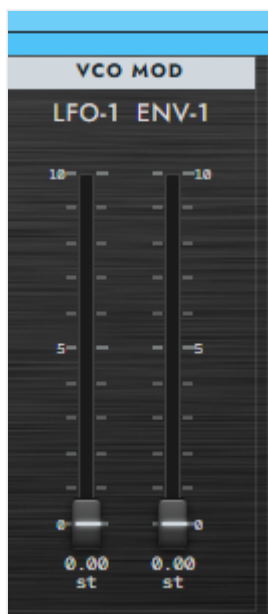
Note Random is not a "random waveform" but a **sample & hold**. The value is updated each cycle as determined by Rate, and is held at a constant value in between. It is well suited to sound-effect uses that randomly jump pitch or VCF.

Delay (rise delay from Key On)

- **What it changes:** at Note On, the time over which the LFO amplitude rises from 0.
- Raising the value means there is no modulation the instant you press the key, and the modulation gradually rises as you hold the note. This can be used for a human-like expression where the start of a note is straight and vibrato comes in naturally on long tones.
- **When SYNC is on:** Delay still controls the fade-in of the LFO modulation; only the LFO speed itself is derived from the selected note value and host BPM.

7.2 VCO MOD (modulation to the VCO)

This section gathers the modulation amounts and polarities for sending LFO-1 and ENV-1 to **VCO pitch**. It creates motion such as wobbling the pitch (vibrato) or changing the pitch over time (pitch envelope).



VCO Mod LFO (LFO-1 → VCO pitch modulation amount)

- **What it changes:** the depth at which LFO-1 modulates VCO pitch (= the depth of vibrato).

- **When it takes effect:** which VCO it is actually applied to, and with what polarity, is determined by VCO-1 Mod Mode / VCO-2 Mod Mode (NRM / OFF / INV), described later. If both VCOs are OFF, raising this knob applies no modulation.

VCO Mod ENV-1 (ENV-1 → VCO pitch modulation amount)

- **What it changes:** the depth at which ENV-1 modulates VCO pitch (= the pitch jump / dip at the start of a note).
- **When it takes effect:** as with VCO Mod LFO, the ON/OFF and polarity per VCO are determined by VCO-1 / VCO-2 Mod Mode.

7.3 PWM (Pulse Width Modulation)

The PWM block is the section for setting the duty cycle (pulse width) of the pulse wave statically, or driving it with a modulation source.



Caution PW / PWM take effect only **when the VCO waveform is Pulse**. When Triangle / Sawtooth / Square / Noise is selected, moving these does not change the sound.

PW (Pulse Width)

- **What it changes:** sets the duty cycle of the pulse wave manually ("50–0%").
- **Fader direction:** bottom = 50% (= Square = square wave), top = 0% (zero width = toward silence). The closer to 0%, the thinner the sound, and at the very top it becomes silent.
- **When it takes effect:** valid only when Pulse is selected.

PWM (Pulse Width Modulation amount)

- **What it changes:** the depth at which the modulation source chosen with PWM Sel (ENV-1 / LFO-1 / KBD) moves the pulse width.
- **When it takes effect:** valid only when Pulse is selected.

PWM Sel (Source: modulation source)

- **What it changes:** selects the source that modulates the pulse width. The depth is set by PWM Amount, and the sign by PWM POL.

Option	Meaning
ENV-1	Varies PW over time with ENV-1.
LFO-1	Moves PW periodically with LFO-1 (produces a wobbling thickness).
KBD	Moves PW according to keyboard position (pitch).

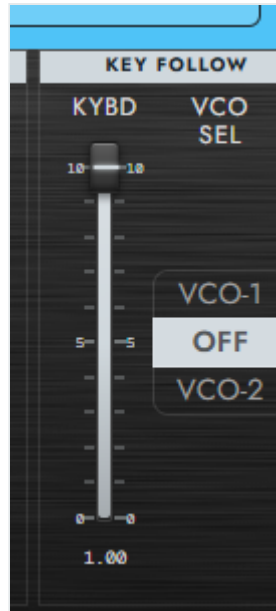
PWM POL (Polarity)

- **What it changes:** switches the sign (direction) of the PWM modulation.

Option	Meaning
NRM	Normal polarity.
INV	Inverted.

7.4 KEY FOLLOW

This section determines how the VCO module changes according to keyboard height (the pitch of the note you play).



VCO Key Follow (keyboard tracking amount)

- **What it changes:** how much VCO pitch tracks the keyboard. At 100% it is 1V/oct (= the normal musical scale); at 0% it is fixed pitch (changing the key does not change the pitch).
- **When it takes effect:** the target VCO is chosen with VCO Sel.

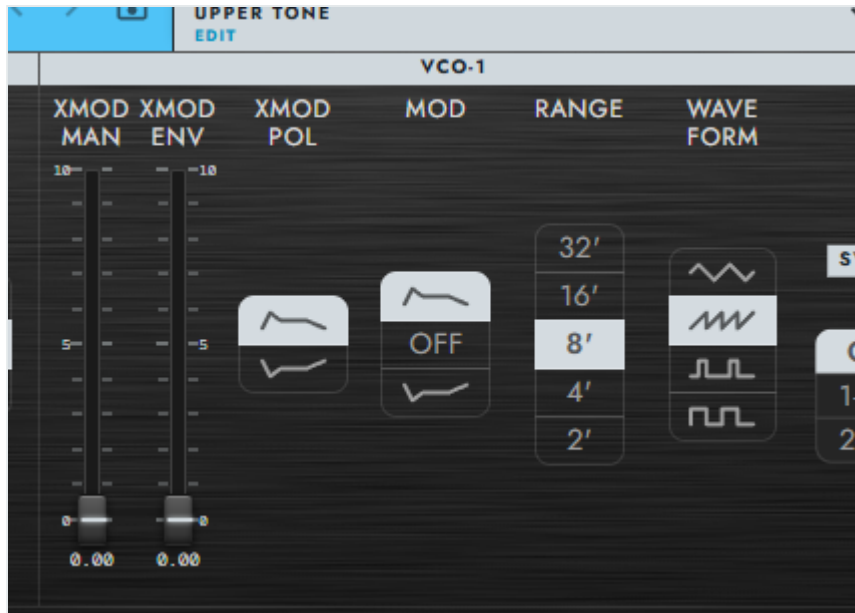
VCO Sel (Key Follow target)

- **What it changes:** selects which VCO the VCO Key Follow knob is applied to.

Option	Meaning
VCO-1	Only VCO-1 tracks by the knob value. VCO-2 is fixed at 100%.
OFF	Both VCOs are fixed at 100% (= the knob is disabled).
VCO-2	Only VCO-2 tracks by the knob value. VCO-1 is fixed at 100%.

7.5 VCO-1

VCO-1 is the first oscillator. It sets the waveform and octave (Range). It is an MKS-80 spec that VCO-1 **has Square but not Noise** (the selectable waveforms are asymmetric with VCO-2).



Cross Mod (XMOD: VCO-2 modulating VCO-1)

Cross Mod (cross modulation) is a feature that **modulates the pitch of VCO-1 with the output waveform of VCO-2** (linear FM). The more you raise it, the more harmonics are added, producing a metallic, dissonant sound. Together with VCO Sync (→ 7.7), it is at the core of bell-like, metallic, and sharp lead sounds. Because the motion is large and the sound easily breaks up, it is safe to start with a small amount.

XMOD MAN (Cross Mod Manual amount)

- **What it changes:** the static depth of the amount by which the VCO-2 output waveform modulates VCO-1 pitch (linear FM).
- The more you raise it, the more harmonics are added, producing a metallic, dissonant sound.

XMOD ENV (Cross Mod Envelope Amount)

- **What it changes:** the depth at which ENV-1 varies the Cross Mod amount over time.
- You can create motion such as making only the start metallic, then having it decay.

XMOD POL (Polarity)

- **What it changes:** switches the sign of Cross Mod (the VCO-2 → VCO-1 linear FM).

Option	Meaning
NRM	Normal polarity.
INV	Inverted. When VCO-2 swings positive, VCO-1 pitch goes down.

Mod Mode (LFO/ENV receive polarity)

- **What it changes:** with what polarity VCO-1 pitch receives modulation from LFO-1 / ENV-1. The modulation amount itself is set by LFO / ENV-1 in the VCO Mod section.

Option	Meaning
NRM	Normal polarity.
OFF	Cuts LFO / ENV modulation to VCO-1.
INV	Inverted polarity. Setting VCO-2 to NRM makes the two VCOs receive modulation in opposite phase.

Range (Octave / Foot)

- **What it changes:** selects the octave of VCO-1 in feet.
- Relative to 8', 32' = two octaves down and 2' = two octaves up.
- **KNOB mode:** turn on the small **KNOB** button under the label to switch RANGE to a semitone knob (32'C–2'C). This matches the resolution of the MKS-80's own RANGE parameter; the readout shows the note MIDI key 60 plays (8'C = normal pitch, 8'G = a fifth above). The octave selector and the knob keep their own values.

Wave (waveform)

- **What it changes:** the oscillating waveform of VCO-1. The waveform determines the amount of harmonics and greatly changes the texture of the sound.

Option	Meaning
Triangle	Triangle wave. Few harmonics, a round sound close to a sine wave.
Sawtooth	Sawtooth wave. Rich in harmonics — a bright, flashy basic waveform.
Pulse	Pulse wave. The duty cycle is set by PW / PWM, and the timbre changes with the ratio.
Square	Square wave. A pulse wave fixed at a 50% duty cycle. A hollow sound.

7.6 VCO-2

VCO-2 is the second oscillator. Unlike VCO-1, it **has Noise but not Square**. It also adds LOW / HI extensions to Range and a Fine Tune control.



Mod Mode (LFO/ENV receive polarity)

- **What it changes:** with what polarity VCO-2 pitch receives modulation from LFO-1 / ENV-1.

Option	Meaning
NRM	Normal polarity.
OFF	Cuts modulation to VCO-2.
INV	Inverted polarity. Setting VCO-1 to NRM makes the two VCOs receive modulation in opposite phase.

Note Setting one to NRM and the other to INV, then raising VCO Mod LFO, makes the two oscillators wobble in opposite directions. Combined with detuning, this creates a wide, swirling beat.

Range (Octave / Foot + LOW / HI)

- **What it changes:** selects the octave of VCO-2. In addition to 32'–2', it has **LOW** (about four octaves below 8') and **HI** (about four octaves above 8').
- **Both track the keyboard at 1V/oct.**
- **KNOB mode:** like VCO-1, RANGE can be set in semitone steps (32'C–2'C). For example, **8'G** puts VCO-2 a fifth above VCO-1 at 8'. LOW / HI are only available in the octave selector (KNOB off).
- When MKS-80 SysEx (IPR / APR / bulk dump) carries a semitone RANGE value, Synth-80 switches to KNOB mode automatically; octave values and LOW / HI switch it back to the octave selector.
- **Typical use:** with LOW, pitch drops down into the sub-audio range (a few Hz) at the low end, so it can be used not only as an audible bass but also as a **pitch-tracking modulation source** (such as the swirl in Cross Mod). At the high end it becomes a normal audible bass.

Fine Tune

- **What it changes:** fine-tunes the pitch of VCO-2 by ± 50 cents.
- Detuning it slightly from VCO-1 produces a beating (waver) and thickness.

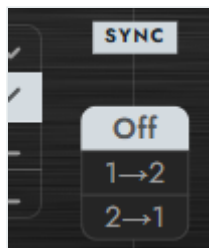
Wave (waveform)

- **What it changes:** the oscillating waveform of VCO-2.

Option	Meaning
Triangle	Triangle wave. Few harmonics, a round sound close to a sine wave.
Sawtooth	Sawtooth wave. Rich in harmonics — a bright, flashy basic waveform.
Pulse	Pulse wave. The duty cycle is set by PW / PWM.
Noise	Digital pseudo-random noise. A texture with a slight graininess.

7.7 VCO Sync (hard sync)

VCO Sync (hard sync) is a feature where, each time one VCO (Master) completes one cycle, the waveform phase of the other (Slave) is forcibly reset. The control (the Off / 1→2 / 2→1 selector) is placed **at the boundary between VCO-1 and VCO-2**.

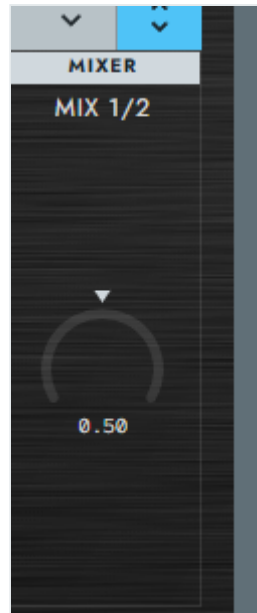


- **What it changes:** the direction of the hard sync. Each cycle of the Master, the phase of the Slave is forcibly reset.
- **Typical use:** moving the Slave's pitch (Range / Fine Tune) or its modulation produces the sharp harmonic sweep characteristic of sync. Together with Cross Mod (→ 7.5 VCO-1), it is at the core of bell-like, metallic, and sharp lead sounds. Because the motion is large and the sound easily breaks up, it is safe to start with a small amount.

Option	Meaning
Off	Sync disabled.
1→2	VCO-1 = Master, VCO-2 = Slave.
2→1	VCO-2 = Master, VCO-1 = Slave.

7.8 MIXER

MIXER is the block that handles the volume balance of the two VCOs.



Mix (VCO-1 / VCO-2 balance)

- **What it changes:** the volume balance between VCO-1 and VCO-2.
- At 0, only VCO-1; at 100, only VCO-2; in between, the two are crossfaded.

7.9 HPF

Freq (fixed-Q high-pass filter)

- **What it changes:** the cutoff frequency of the high-pass filter placed before the VCF. It removes the lower-frequency components.
- **Common things to watch out for:** it **has no resonance**. It is a filter for "tidying up the low end" rather than for coloring. This module does not exist on the Jupiter-6 and is a **module unique to the MKS-80**. Use it when you want to tighten up a sound whose bass swells and feels sluggish.



7.10 VCF

The VCF (voltage-controlled filter) is a 24 dB/oct low-pass filter. This is where the brightness and thickness of the sound are determined.

Freq (filter cutoff)

- **What it changes:** the cutoff frequency of the 24 dB/oct low-pass filter. It is the central parameter that defines the synthesizer's timbre.
- The higher you raise it, the more highs pass through for a bright sound; the lower you set it, the more highs are removed for a dark, muffled sound.

Resonance (filter resonance)

- **What it changes:** the amount of resonance that emphasizes the region around the cutoff. Raising it produces a characterful peak (a nasal-sounding resonance).
- **Common things to watch out for (Rev 4 spec):** because Synth-80 is based on a Rev 4 unit, raising Resonance **to near maximum makes it self-oscillate**, and the filter itself emits a sine-wave-like tone.

Caution Raising Resonance can increase the volume, and in the self-oscillation range the filter itself begins to sound. Watch the Master Volume.

Env Sel (filter-driving EG selection)

- **What it changes:** selects the envelope that moves the VCF cutoff.
- **Common things to watch out for:** because ENV-2 is hard-wired to the VCA, **selecting ENV-2 makes VCF and VCA move with the same shape** (filter and volume share the same shape).

Option	Meaning
ENV-1	Moves the VCF with ENV-1 (independent of the VCA's envelope).
ENV-2	Moves the VCF with ENV-2 (= the same shape as the VCA).

Env POL (ENV polarity)

- **What it changes:** switches the sign of VCF Env Amount.

Option	Meaning
NRM	The filter opens as the ENV rises (cutoff increases).
INV	The filter closes as the ENV rises (cutoff decreases).

Env Amount (filter ENV modulation amount)

- **What it changes:** the depth at which the ENV chosen with Env Sel modulates the VCF cutoff.
- **When it takes effect:** the polarity is set by Env POL. This is the part that sets the depth of what is commonly called the "filter envelope".

LFO Amount (LFO-1 → VCF modulation amount)

- **What it changes:** the depth at which LFO-1 modulates the VCF cutoff (= a wah-like periodic wobble of brightness).

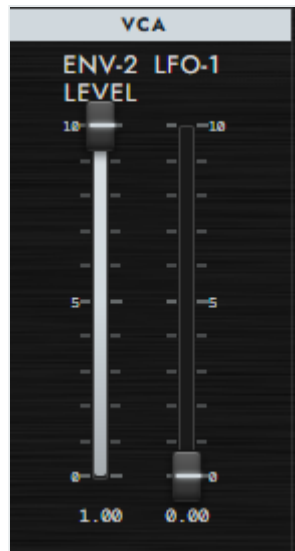
Key Follow (keyboard tracking amount)

- **What it changes:** how much the VCF cutoff tracks the keyboard. At 100% it is 1V/oct (higher keys are brighter); at 0% it is independent of keyboard position (the same cutoff for any key).
- Raise it when you want to keep higher notes from sounding muffled by maintaining their brightness.

7.11 VCA

The VCA (voltage-controlled amplifier) is the module that controls volume. Its variation over time is **always created by ENV-2**.

Caution On the MKS-80, the VCA is **fixed to ENV-2 drive**. You cannot drive the VCA from ENV-1. When you want to change the "shape of the volume (ADSR)", operate ENV-2.



Level (ENV-2 → VCA reference level)

- **What it changes:** the maximum gain at which ENV-2 drives the VCA. At 0 it is muted; at 100 it opens fully.
- **When it takes effect:** the volume change from velocity is multiplied separately by Dynamics Level (see 7.12 of this chapter).

VCA LFO (LFO-1 → VCA amplitude modulation amount)

- **What it changes:** the depth at which LFO-1 modulates the VCA gain (= the depth of tremolo).
- **When it takes effect:** the LFO's waveform, speed, and Delay are set in the LFO-1 section (see 7.1 of this chapter).

7.12 DYNAMICS

DYNAMICS is the block that gathers how the envelopes respond to **velocity (how hard you play the keyboard)**. It sets the velocity-response ON/OFF for ENV-1 / ENV-2 each, and how they respond (Time / Level).



Dynamics Time (velocity → Attack shortening amount)

- **What it changes:** the amount by which a higher velocity speeds up the ENV Attack.
- **When it takes effect:** applies only to envelopes whose DYN is ON.

Dynamics Level (velocity → ENV peak intensity)

- **What it changes:** the amount by which a higher velocity raises the ENV peak value.
- **When it takes effect:** applies only to envelopes whose DYN is ON. When EG-2 DYN is ON, this determines the **velocity response of the volume** (because ENV-2 drives the VCA).

ENV Reset (envelope retrigger behavior)

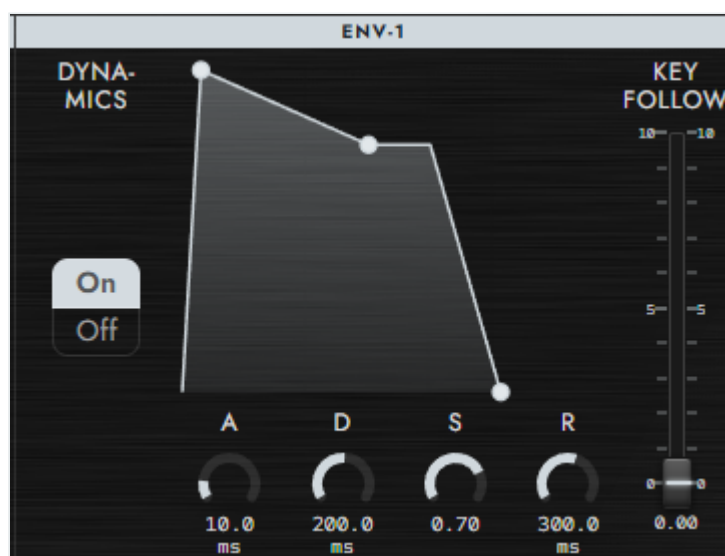
- **What it changes:** whether the envelope restarts from 0 on each Note On.

Option	Meaning
ON	Restarts the ENV from 0 on each Note On.
OFF	Continues from the current value (does not retrigger).

Note The overall velocity sensitivity can also be adjusted separately with Master Dynamics Sens in Settings. That is a global setting that acts multiplicatively with the individual DYN Time / DYN Level. For details, see → Chapter 12 "Settings and Performance".

7.13 ENV-1

ENV-1 is one of the envelope generators (ADSR), used to **move timbre or pitch rather than volume**. Its destinations are the VCF (when Env Sel = ENV-1) / VCO pitch / PWM / XMOD.



Dynamics (whether to make ENV-1 velocity-responsive)

- **What it changes:** whether ENV-1 responds to velocity.
- When ON, Dynamics Time / Level affect ENV-1; when OFF, velocity is ignored.

Attack (attack time)

- **What it changes:** the time for ENV-1 to reach its peak value from 0 after Note On.

Decay (decay time)

- **What it changes:** the time for ENV-1 to fall from the peak value to the Sustain level.

Sustain (sustain level)

- **What it changes:** the level ENV-1 holds from the end of Decay until Note Off.

Release (release time)

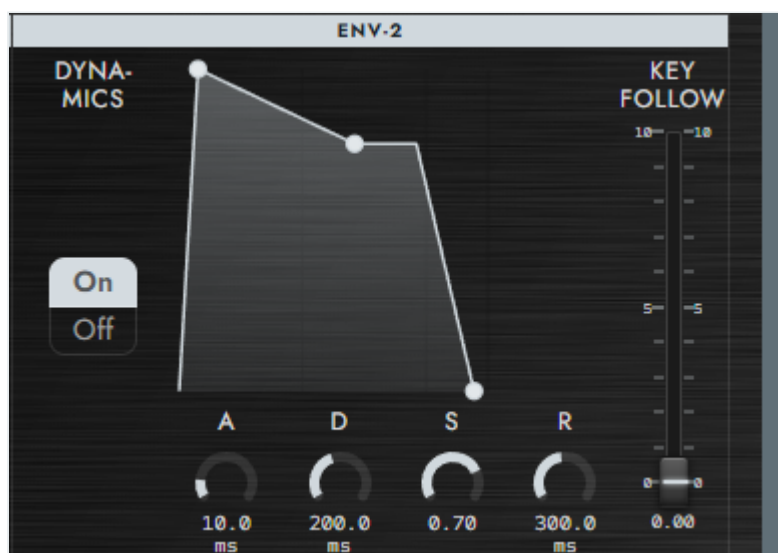
- **What it changes:** the time for ENV-1 to fall from its current value to 0 after Note Off.

Key Follow (keyboard-based Attack / Decay / Release shortening)

- **What it changes:** the degree to which the whole of ENV-1 (Attack / Decay / Release) becomes faster on higher keys, like a piano.
- This is the same parameter as "EG-1 Key Follow" in the KEY FOLLOW section (see 7.4 of this chapter).

7.14 ENV-2

ENV-2 is the other envelope (ADSR), **hard-wired to the VCA**. In other words, ENV-2 determines the variation of volume over time (the volume curve). When you select Env Sel = ENV-2, the VCF also moves with the same shape.



Dynamics (whether to make ENV-2 velocity-responsive)

- **What it changes:** whether ENV-2 responds to velocity.
- **Common things to watch out for:** because ENV-2 is hard-wired to the VCA, this switch determines **whether the volume responds to velocity**. Setting it OFF makes the volume constant no matter how hard you play.

Attack (attack time)

- **What it changes:** the time for ENV-2 to reach its peak value from 0 after Note On. Short is a sharp start of the note; long is a soft, gradual rise.

Decay (decay time)

- **What it changes:** the time for ENV-2 to fall from the peak value to the Sustain level.

Sustain (sustain level)

- **What it changes:** the volume level ENV-2 holds from the end of Decay until Note Off.

Release (release time)

- **What it changes:** the time for ENV-2 to fall from its current value to 0 after Note Off. Short cuts off abruptly; long leaves a lingering tail.

Key Follow (keyboard-based Attack / Decay / Release shortening)

- **What it changes:** the degree to which the whole of ENV-2 (Attack / Decay / Release) becomes faster on higher keys. Because ENV-2 drives the VCA, this mainly affects how the tail of high notes tightens up.
- It creates the behavior, like a piano, where the envelope timing tightens at the high end.

That covers the parameters on the Tone (sound) side. For performance / layer parameters (Key Mode / Balance / Glide / Bend / Aftertouch, etc., light blue = Patch scope), see → Chapter 8 "Patch / Performance Reference"; for the individual parameters of the effect chain, see → Chapter 9 "Effects".

8. Patch / Performance Reference

This chapter describes the parameters that relate to **how you perform and how you layer tones**, rather than the sound itself. On screen, these correspond to the light-blue sections (Patch scope). For where each section is located on screen, see → Chapter 4 "Screen Tour"; for the sound-side (white section) parameters, see → Chapter 7 "Tone Parameter Reference".

Note

The unit of storage in Synth-80 is the Patch (extension .80p). A single Patch contains two tones, the Upper Tone and the Lower Tone, plus the performance settings described in this chapter, the Effect Chain, and the Patch Volume. For the overall picture of Patch / Tone, see → Chapter 5 "Understanding Preset / Patch / Tone".

8.1 What Are Patch-Scope Parameters?

Whereas the white sections (Tone) determine "the sound of each of the Upper / Lower tones," the light-blue sections (Patch scope) determine "how those two tones are layered and how they are played." Think of them as a framework one level above the sound itself, covering everything from when a MIDI note is received to when sound is produced.

Patch-scope parameters fall into two kinds, depending on their range of effect.

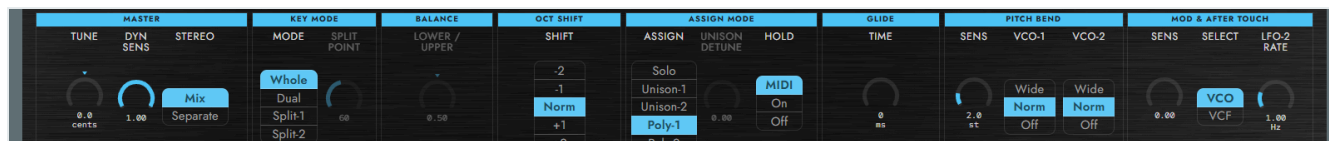
Kind	Main items included	How Upper / Lower are handled
Global	Key Mode, Split Point, Balance, Master Tune, Master Dynamics Sens, Stereo Mode, Patch Volume	A single value shared by Upper / Lower
per-section (per layer)	Octave Shift, Assign Mode, Unison Detune, Hold, Glide, Pitch Bend Sens / Bend Mode, AT Sens, LFO-2 Rate / Sync / Destination	Can hold separate values for Upper / Lower

The per-section parameters hold independent values for Upper and Lower even on the actual MKS-80 (internally, they are distinguished by the Group byte of the IPR as Upper = 01 / Lower = 02). Synth-80 follows this behavior, letting you set these performance and expression values separately for Upper and Lower.

Note

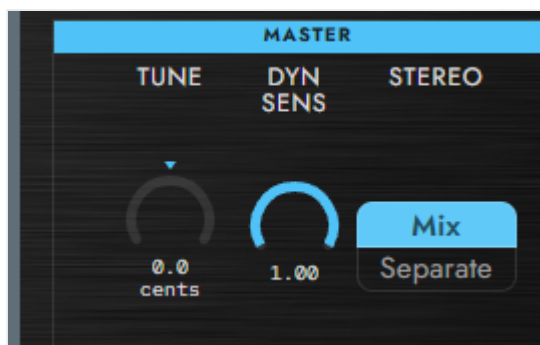
In WHOLE mode, the per-section values for Upper / Lower are synchronized bidirectionally, and when you switch the edit target, the Upper value is copied to Lower. In SPLIT / DUAL, the two are treated independently.

The per-section parameters are also shown in light blue on screen. When you want to set them while comparing Upper / Lower side by side, switch the Tone editor to expanded view, where you can check the values of both layers in two rows, upper and lower (→ Chapter 4 "Screen Tour" §4.6).



8.2 MASTER (Master Tune / Dynamics Sens / Stereo Mode)

The MASTER section gathers three global settings that affect the whole Patch.



Master Tune

Fine-tunes the pitch of all VCOs within a range of ± 50 cents. This is an overall correction for matching the tuning to the actual hardware or to other instruments.

Master Dynamics Sens

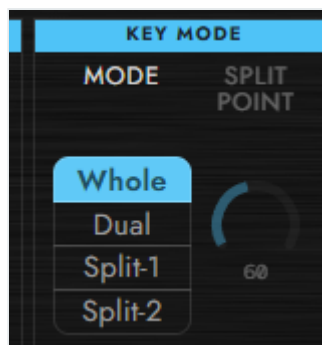
Adjusts the depth of the response curve to MIDI Velocity (1–127) across the whole Patch at once. Lower values reduce the difference between soft and hard playing, while higher values widen the dynamic range. It works multiplicatively with the DYNAMICS TIME / DYNAMICS LEVEL of each envelope on the Tone side (for DYNAMICS TIME / LEVEL themselves, see → Chapter 7 "Tone Parameter Reference").

Stereo Mode

Determines how Upper / Lower are routed to the stereo bus. This reproduces the output assignment on the rear panel of the actual MKS-80.

Option	Meaning
Mix	Mixes Upper / Lower into mono via BALANCE and sends the same signal to both L / R.
Separate	Outputs L = Upper, R = Lower separately. BALANCE has no effect (this corresponds to wiring that bundles the Upper / Lower outputs of the rear-panel XLR connectors as a stereo pair).

8.3 KEY MODE (Key Mode / Split Point)



Key Mode

This is the core setting of the Patch, determining how the two tones, Upper and Lower, are combined.

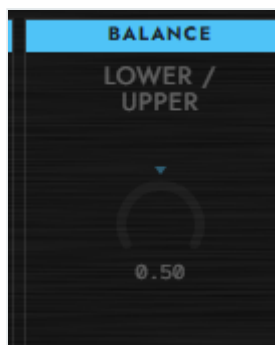
Option	Meaning	Voice allocation
WHOLE	Plays the entire keyboard with the Upper Tone only. Lower is disabled.	Up to 8 voices (extended by the Polyphony setting)
DUAL	Both Upper and Lower sound at the same time on the same key (layer). BALANCE sets the volume ratio.	4 voices each for Upper / Lower
SPLIT 1	Splits the keyboard at the Split Point, playing the low side = Lower and the high side = Upper. The MIDI channel is shared.	4 voices each for Upper / Lower
SPLIT 2	Splits by MIDI channel. Base channel = Upper, base channel + 1 = Lower.	4 voices each for Upper / Lower

In DUAL and SPLIT, the voice pool is divided between Upper and Lower. When the maximum polyphony (Polyphony) is 8, Upper and Lower each use up to 4 voices. If layered sounds or chords cut off earlier than expected, raising the Polyphony may help (→ Chapter 12 "Settings and Performance").

Split Point

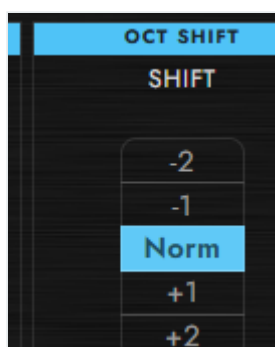
When Key Mode is SPLIT 1, this specifies the MIDI note at which the keyboard is split. This key and above are assigned to Upper, and below it to Lower. It has no effect in WHOLE / DUAL / SPLIT 2 (in these modes, the Split Point display is dimmed).

8.4 BALANCE (Upper / Lower Volume Balance)



This is a global setting that determines the volume ratio between the Upper Tone and the Lower Tone. Balance affects the sound only when Key Mode is DUAL or one of the SPLIT modes. In WHOLE mode, Lower is always silent, so moving this knob does not change the result. Balance also has no effect when Stereo Mode is set to Separate (see §8.2).

8.5 OCT SHIFT (Octave Shift)

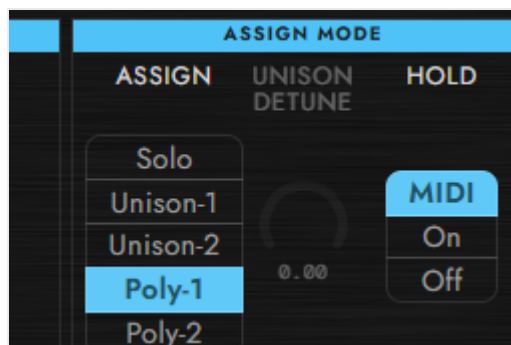


Transposes all received MIDI notes in octave steps. Use it when you want to shift the pitch of an entire layer at once, separately from the VCO range (Foot setting).

Octave Shift is a per-section parameter. In DUAL / SPLIT, Upper and Lower can hold separate values, so you can, for example, layer the Lower one octave lower.

8.6 ASSIGN MODE (Assign Mode / Unison Detune / Hold)

The ASSIGN MODE section determines how received notes are assigned to voices, and whether notes are held. All of these are per-section parameters.



Assign Mode

Option	Meaning
SOLO	Monophonic. The most recently pressed key always takes priority, and only one voice sounds.
UNISON-1	Stacks all voices onto a single note (mono, last-note priority). The amount of pitch offset between the stacked voices is set by Unison Detune.
UNISON-2	Dynamically redistributes the number of voices according to the number of keys held. 1 key = all voices, 2 keys = 1/2 each, 3–4 keys = 1/4 each, 5 or more keys = 1 voice each.
POLY-1	Polyphonic. Assigns one voice per key.
POLY-2	With 2 keys or fewer, stacks 4 voices each; with 3 or more keys, it automatically switches to 1 key = 1 voice.

Note

The number of voices stacked in UNISON-1 / UNISON-2 follows the Polyphony setting. Setting Polyphony to 24 stacks up to 24 voices on a single note for a thicker unison (→ Chapter 12 "Settings and Performance").

Note

POLY-1 is one voice per key. When you repeat the same note, the previous voice is reused. Note that VCF Key Follow (cutoff tracking based on the key) also follows Glide (portamento). Pitch Bend does not affect the VCF, so bending the pitch does not move the filter cutoff—an asymmetric behavior (Pitch Bend acts only on VCO pitch).

Unison Detune

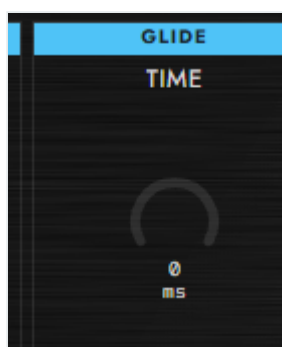
The amount of pitch offset between the voices stacked in UNISON-1 / UNISON-2 / POLY-2. At 0 they are perfectly in phase; raising it detunes the voices from one another, adding thickness. It has no effect in SOLO / POLY-1, since there are no voices to stack.

Hold

Determines whether sound continues to be held after note-off.

Option	Meaning
MIDI	Holds notes while the MIDI Damper (CC #64, sustain pedal) is ON.
ON	Always holds. Even when you release the keys, the envelope does not enter Release.
OFF	Hold disabled. The MIDI Damper is also ignored.

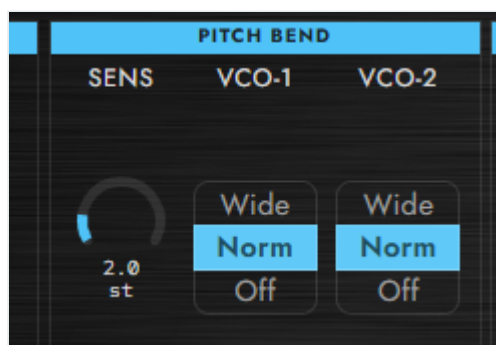
8.7 GLIDE (Glide / Portamento)



Sets the time over which the pitch transitions smoothly from the previous note to a new note (portamento). In the Poly modes, each voice glides independently. Glide is a per-section parameter.

VCF Key Follow follows Glide. When the pitch moves smoothly during a glide, and Key Follow is active, the filter cutoff transitions slowly along with it.

8.8 PITCH BEND (Bend Sens / VCO-1 · VCO-2 Bend Mode)



Pitch Bend Sens

Determines the maximum bend width of the Pitch Bend Wheel. The actual bend amount is determined in combination with the Bend Mode (WIDE / NORM) described below. At SENS = 100, NORM gives about ± 12.5 semitones, and WIDE gives twice that, about ± 25 semitones.

VCO-1 Bend Mode / VCO-2 Bend Mode

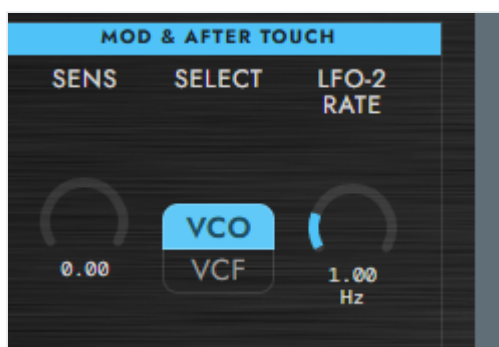
Determines whether Pitch Bend is applied to each VCO, and the width if so. Since VCO-1 and VCO-2 can be set independently, you can, for example, bend only one of them.

Option	Meaning
WIDE	Twice the width set with the SENS knob (e.g., about ± 25 semitones at SENS = 100).
NORM	Standard width. The actual amount is set with the SENS knob (up to about ± 1 octave).
OFF	Pitch Bend is not applied to that VCO.

VCO-1 / VCO-2 Bend Mode are per-section parameters.

8.9 MOD & AFTER TOUCH (AT Sens / LFO-2 Rate / Sync / LFO-2 Destination)

The MOD & AFTER TOUCH section controls LFO-2, which is used to add expression during performance. LFO-2 is an LFO with a fixed Triangle waveform, driven by the Mod Wheel and Channel Aftertouch.



Note

The Mod Wheel (CC1) and Channel Aftertouch share the same bus, and whichever is deeper takes priority. Whichever is acting more deeply triggers LFO-2. LFO-2 is a fixed-Triangle LFO whose amplitude rises only while you are pressing (or pressing into) the key. Its destination is set by LFO-2 Destination, its depth by AT Sens, and its speed by LFO-2 Rate.

AT Sens

The modulation amplitude (the depth of LFO-2) when the Mod Wheel or Channel Aftertouch is applied to its maximum. The two share the same bus, and whichever is deeper takes priority.

LFO-2 Rate

The frequency of LFO-2 (0.016–16 Hz, per the MKS-80 spec). The waveform is fixed at Triangle.

The small **SYNC** button below LFO-2 Rate switches the control between free Hz rate and host-tempo sync.

Mode	Meaning
SYNC off	Free-running LFO-2 rate in Hz.
SYNC on	Host-tempo sync. The knob selects a note value from $8/1$ to $1/64T$, and the readout shows both the note value and the effective Hz at the current BPM.

In tempo sync, one LFO-2 cycle equals one selected note value. If no host tempo has been received, Synth-80 uses 120 BPM as the fallback. Turning SYNC off restores the previous free Hz Rate, so you can try tempo sync without losing the original LFO-2 speed. Like LFO-1, the synced LFO-2 phase is reset on the first note from silence and when you change the note value; additional notes played while a sound is already active do not retrigger the phase.

LFO-2 Rate, SYNC, and Sync Division are per-section parameters. Upper and Lower can have different LFO-2 sync settings in DUAL / SPLIT modes; in WHOLE mode they stay synchronized like the other per-section values.

LFO-2 Destination

Selects the destination of LFO-2 (driven by the Mod Wheel / Aftertouch).

Option	Meaning
VCO	Modulates VCO pitch (LFO-2 vibrato).
VCF	Modulates the VCF cutoff (a static offset; it does not pass through the LFO).

When Destination is VCF, Rate / SYNC do not affect the sound because the MKS-80 behavior is a static aftertouch offset rather than an LFO wobble. Rate / SYNC matter when Destination is VCO.

AT Sens / LFO-2 Rate / Sync / LFO-2 Destination are all per-section parameters. You can give Upper / Lower separate vibrato settings.

8.10 Patch Volume (Per-Patch Volume Trim)

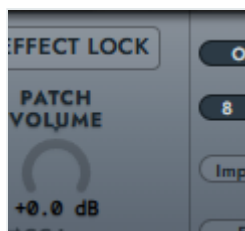
Patch Volume is a volume trim saved together with the Patch (± 12 dB). Use it to even out the overall level on a per-Patch basis when volume varies from one sound to another.

Its position in the signal path is as follows.

```
... → Effect Chain → Patch Volume → Master Volume → output
```

Patch Volume sits **after** the Effect Chain and **before** the Master Volume. The difference is that, whereas Patch Volume is saved with the Patch, the Master Volume is an overall trim that is not included in the Patch. For the

concepts of Master Volume, CPU load, and output level, see → Chapter 12 "Settings and Performance".



Note

When Effect Chain Lock is ON, the effect settings stay locked and are not overwritten even when you load another Patch. However, Patch Volume is not subject to the lock. For details on Effect Chain Lock, see → Chapter 9 "Effects".

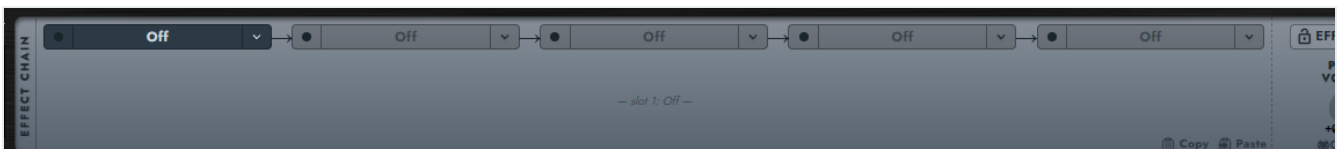
9. Effects

In addition to the sound itself (Tone), Synth-80 provides **effects** for shaping the final texture and sense of space. These were not present on the actual MKS-80; they have been added so that Synth-80 produces a "ready-to-use sound" in modern production environments.

The effects are organized as a **serial chain of 5 slots**. You can build up processing such as thickening the sound with a chorus, adding depth with a delay, and finally placing it in a space with a reverb. Each slot can be assigned one of 12 effects (or Off), and the signal flows from left to right.

Note

The effects sit on a different layer from the Tone (the Upper / Lower sounds), and only a single effect chain is applied to the entire Patch. You cannot apply separate effects to Upper and Lower. For the Patch / Tone hierarchy, see → Chapter 5 "Understanding Preset / Patch / Tone".



9.1 How the Effect Chain Works

Serial Chain of 5 Slots

The effects area consists of five **slots** (tabs), and the signal flows serially from left to right in the order Slot 1 → Slot 2 → Slot 3 → Slot 4 → Slot 5. The "→" between tabs indicates the direction of this signal flow.

- Clicking the body of a tab displays that slot's edit page (its knobs) at the bottom.
- Clicking the "▼" on the right side of a tab lets you choose the type of effect assigned to that slot.
- The small dot (an LED-style indicator) at the left edge of each tab is that slot's **Bypass** toggle. Lit = enabled, unlit = bypassed. Clicking it switches the slot ON / OFF on the spot and at the same time makes that slot the edit target.

The signal position of the effects as a whole is as follows.

(sound of each voice) → Slot 1 → Slot 2 → Slot 3 → Slot 4 → Slot 5 → Patch Volume → M

In other words, all of the effects sit **before Patch Volume**. This lets you adjust only the level of the whole patch after building up the effects (for Patch Volume, see 9.4).

Slot Structure (Type + 8 Knobs + Bypass)

Internally, the contents of each slot are made up of the following elements.

Element	Role
Type	The type of effect assigned to that slot (Off + 12 types).
8 generic parameters	Eight slots whose roles are assigned per effect. The number of knobs displayed, their labels, units, and ranges change depending on the Type.
Bypass	A switch that temporarily disables only that slot (the dot at the left edge of the tab).

The meaning of the 8 generic parameters changes according to the selected effect. For example, even with the same "Rate" label, the role differs between a Chorus Rate and a Phaser Rate. Only the knobs actually used by that effect are displayed (no knob appears for an unused slot).

Effect knobs also support direct numeric entry, just like the knobs on the main panel: double-click the knob or click its value readout (§3.1.1). Since effects have no counterpart on the original hardware panel, input is accepted only as raw values in the knob's displayed unit (Hz / % / ms, etc.). Selector-style knobs such as Model / Mode are not available for numeric entry.

Caution

When you change a slot's Type, that slot's 8 parameters are **rewritten all at once to the initial values of the newly selected effect**. For example, selecting Digital Chorus resets Rate / Depth / Mix / Feedback and so on to that effect's "sensible initial values." Any knob settings you had crafted earlier are lost, so be mindful of the order when changing the type.

Reordering Tabs (Rearranging the Signal Order)

Dragging a tab body horizontally lets you rearrange the order of the slots (i.e., the order of signal processing). For example, you can change "Delay → Reverb" to "Reverb → Delay".

- A light press on a tab (a movement of less than 5 pixels) simply switches the slot selection as usual.
- Dragging slightly to the side enters reordering mode, and the slot is inserted at the position where you release it.

Copying / Pasting the Whole Effect Chain

The "Copy / Paste" buttons at the lower right of the effects area let you copy and paste **all 5 slots** (each slot's Type, 8 parameters, and Bypass) together. This is handy when you want to bring a combination of effects you like into another Patch, or to copy settings to the Synth-80 FX plug-in.

9.2 Effect Chain Lock

The **EFFECT LOCK** button at the top of the PATCH VOLUME column on the far right is a switch that keeps the effect chain even when you switch Patches.

- **Lock OFF (unlocked)**: As usual, loading a Patch loads the effect settings saved in that Patch.
- **Lock ON (locked)**: Even when you load a Patch, the effect-related settings are **not overwritten, and the current settings are kept**. This is handy when you want to keep swapping the sound while comparing it through the same effects.

Note

Effect Chain Lock protects only the effect chain. **Patch Volume is not subject to the lock**, and switching Patches updates it to that Patch's value as usual.

9.3 Description of Each Effect

From here, we describe the 12 effects that can be assigned to a slot. The label, unit, range, and initial value of each knob are shown as well.

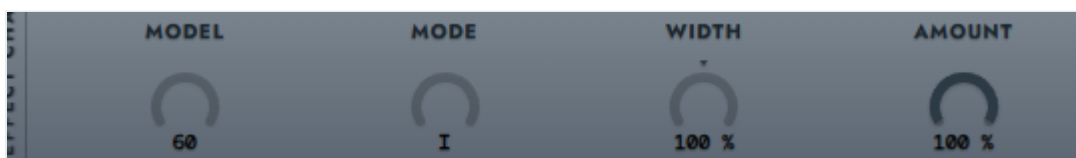
The "Initial value" in the tables is the actual value set immediately after selecting that effect. Knobs shown in % are basically 0–100%, while some stereo-width parameters (Width) are 0–200% (100% being center).

Off

Disables the slot. There are no knobs. Set slots you are not using as effects to this.

Synth Chorus

A chorus aiming to reproduce the BBD chorus circuit built into Japanese poly synths (JUNO-60 / JUNO-106). Rate / Depth are fixed values within the model; rather than being adjusted by the user, this reproduces the feel of the classic synth choruses you select with a button.

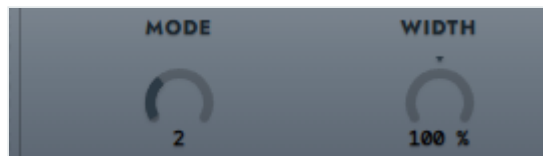


Label	Unit	Range / Choices	Initial value	Role
Model	—	60 / 106	60	The circuit lineage being modeled. 60 is a somewhat darker, thicker blend; 106 is a little brighter with a stronger sense of stereo inversion.

Label	Unit	Range / Choices	Initial value	Role
Mode	—	I / II / I+II	I	The operating mode of the fixed chorus. I = slow, gentle spread; II = deeper modulation and doubling; I+II = an effect like a rotary speaker.
Width	%	0–200%	100%	Stereo width. 0% = mono, 100% = original width, 200% = wider.
Amount	%	0–100%	100%	The strength of the effect, from dry to the chorus circuit output.

Studio Chorus

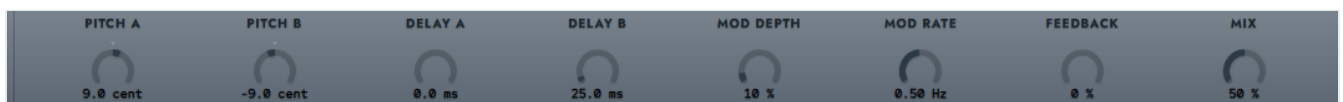
A 2-BBD matrix chorus aiming at a studio rackmount chorus (Roland Dimension D type). It produces preset-like textures using only the four **Mode** choices.



Label	Unit	Range / Choices	Initial value	Role
Mode	—	1 / 2 / 3 / 4	2	Rack-chorus-style mode presets. 1 = a longer delay for a soft, restrained spread. 2 = a shorter delay and deeper modulation, adding thickness and spread. 3 = faster movement for a studio-chorus-like spread. 4 = an emphasized setting that pushes Mode 3's wet a little further forward.
Width	%	0–200%	100%	The width of the generated chorus component. 0% = no wet-side spread, 100% = default, 200% = wider.

Pitch Chorus

A detune chorus in the style of 1980s rack harmonizers that creates thickness by slightly shifting the pitch. Its principle differs from other choruses that wobble the delay time with an LFO: it makes the left and right voices slightly different in pitch and produces the spread from that beating.

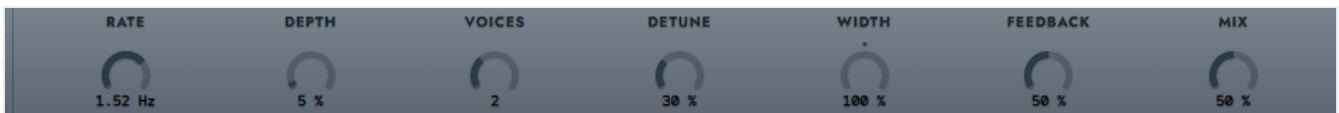


Label	Unit	Range	Initial value	Role
Pitch A	cent	–50 to +50 cent	+9 cent	The pitch shift amount of Voice A (left).

Label	Unit	Range	Initial value	Role
Pitch B	cent	–50 to +50 cent	–9 cent	The pitch shift amount of Voice B (right). Setting it to the opposite sign of A produces the classic 1980s rack-detune stereo spread.
Delay A	ms	0–500 ms	0 ms	A fixed delay applied to Voice A after pitch shifting.
Delay B	ms	0–500 ms	25 ms	The fixed delay for Voice B. 10–30 ms gives a slap-style stereo feel; beyond that, a layered echo.
Mod Depth	%	0–100%	10%	The amount by which the LFO wobbles the pitch shifter's read position (up to ± 2 ms). At 0, a completely static detune.
Mod Rate	Hz	0.05–6 Hz	0.50 Hz	The LFO speed of the wobble above.
Feedback	%	0–100%	0%	Returns the pitch-shifted signal to the input. When detune is applied, this produces "pitch dive / rise" type effects.
Mix	%	0–100%	50%	Wet / Dry mix (equal-power crossfade).

Digital Chorus

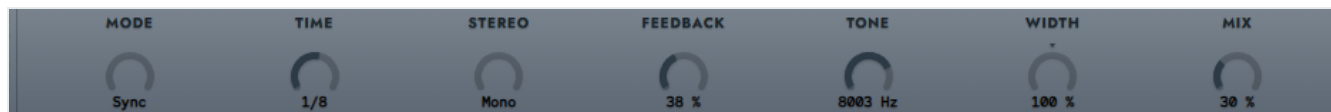
A general-purpose digital chorus. It runs multiple Voices in parallel and uses Detune to scatter how each Voice wobbles, creating thickness and spread.



Label	Unit	Range / Choices	Initial value	Role
Rate	Hz	0.05–6 Hz	approx. 1.52 Hz	The speed of the LFO that wobbles the delay time.
Depth	%	0–100%	5%	The LFO wobble amount (the sweep width of the delay time).
Voices	—	1 / 2 / 3 / 4	2	The number of Voices modulated in parallel. The more, the thicker and denser.
Detune	%	0–100%	30%	The LFO rate spread between Voices. At 0, all Voices share the same rate; raising it makes the movement more complex.
Width	%	0–200%	100%	Stereo width. 0% = mono, 100% = original width, 200% = wider.
Feedback	%	0–100%	50%	Recirculates the chorus signal to add depth.
Mix	%	0–100%	50%	Wet / Dry mix.

Delay

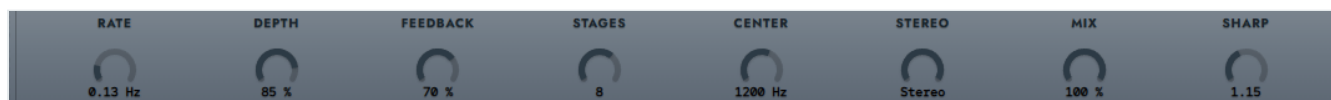
A digital delay that can switch between tempo sync (Sync) and direct ms specification (Free). For stereo, you can choose Mono or ping-pong.



Label	Unit	Range / Choices	Initial value	Role
Mode	—	Sync / Free	Sync	How the delay time is specified. Sync = synced to the host BPM, Free = direct ms specification.
Time (Sync)	note value	1/64–1/2	1/8	The note value when synced to BPM. Displayed only when Mode = Sync .
Time (Free)	ms	1–2000 ms	350 ms	The delay time when in Free. Displayed only when Mode = Free .
Stereo	—	Mono / Ping-Pong	Mono	How the stereo sounds. Ping-Pong applies the delay alternately to the left and right channels.
Feedback	%	0–95%	40%	The feedback amount. The larger it is, the more repeats. Capped at 95% to prevent oscillation.
Tone	Hz	500–18000 Hz	approx. 8 kHz	An LP filter in the feedback path. Low is dark (tape / BBD type), high is bright (digital type).
Width	%	0–200%	100%	The stereo width of the delay output. Has no effect in Mono mode. Center detent (100%).
Mix	%	0–100%	30%	Wet / Dry mix.

Phaser

A phase effect with a multi-stage cascade of all-pass filters. It sweeps notches (dips) along the frequency axis to create an undulating texture.



Label	Unit	Range / Choices	Initial value	Role
Rate	Hz	0.05–10 Hz	approx. 0.13 Hz	The LFO sweep speed.
Depth	%	0–100%	85%	The amplitude by which the notch frequency is wobbled.

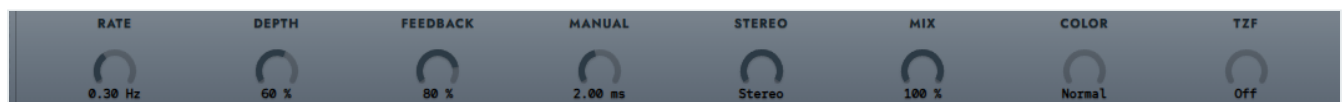
Label	Unit	Range / Choices	Initial value	Role
Feedback	%	0–97%	approx. 70%	The feedback amount. Raising it sharpens the notches and makes them resonant.
Stages	—	4 / 6 / 8 / 12	8	The number of cascaded all-pass stages. The more, the more notches and the denser the sweep.
Center	Hz	200–4000 Hz	approx. 1200 Hz	The center frequency of the sweep. Higher makes the notches stand out in the mid-high range.
Stereo	—	Mono / Stereo	Stereo	Stereo offsets the L / R LFO phase by 90° for a wide undulation.
Mix	%	0–100%	100%	Wet / Dry mix.
Sharp	—	0.5–4.0	approx. 1.15	The Q of each all-pass (the sharpness of the notches).

Note

For the Phaser, **the phase interference between the dry and wet sounds is itself the heart of the effect**. For this reason the initial Mix is 100% (fully wet). Lowering Mix weakens the interference component and makes the effect more subtle. Real pedals also have no concept of Dry / Wet, and 100% is standard.

Flanger

A flanger that creates a comb filter by wobbling a very short delay. It is characterized by a metallic undulation like a jet plane passing by.



Label	Unit	Range / Choices	Initial value	Role
Rate	Hz	0.05–8 Hz	approx. 0.30 Hz	The LFO speed.
Depth	%	0–100%	60%	The amplitude by which the short delay time is wobbled.
Feedback	%	0–97%	approx. 80%	The feedback amount. Raising it makes the comb peaks stand out, giving a metallic jet feel.
Manual	ms	0.5–12 ms	approx. 2 ms	The static central delay time. Together with Depth, it determines the notch position.
Stereo	—	Mono / Stereo	Stereo	Stereo offsets the L / R LFO phase by 180° for a wide jet feel.

Label	Unit	Range / Choices	Initial value	Role
Mix	%	0–100%	100%	Wet / Dry mix.
Color	—	Normal / Inv	Normal	The polarity of the comb. Inv is an inverted (subtractive) comb, with a hollow, scooped character. Combined with TZF, all frequency bands cancel out at the instant of the zero crossing.
TZF	—	Off / On	Off	Through-Zero flange. A tape flange in which the modulated tap "crosses zero" past the dry reference point. Because a delay equal to Manual is added to the wet, Mix 100% is recommended.

Note

Like the Phaser, the heart of the Flanger is **the comb interference between the dry and wet sounds**. The initial Mix is 100% (fully wet); lowering Mix weakens the interference and makes the notches shallower.

EQ

A 3-band equalizer with Low / Mid / High. Each band has gain and frequency knobs. The gain can cut boldly (up to -36 dB), while the boost side is modest (up to $+12$ dB) — an asymmetric range inspired by the Kill EQ of a DJ mixer.



Label	Unit	Range	Initial value	Role
Low Gain	dB	-36 to $+12$ dB	0 dB	Low shelf gain (0 dB is the center detent).
Low Freq	Hz	50–500 Hz	approx. 200 Hz	The corner frequency of the Low shelf.
Mid Gain	dB	-36 to $+12$ dB	0 dB	Mid peak gain (0 dB is the center detent).
Mid Freq	Hz	200–5000 Hz	approx. 1000 Hz	The center frequency of the Mid peak.
High Gain	dB	-36 to $+12$ dB	0 dB	High shelf gain (0 dB is the center detent).
High Freq	Hz	2000–12000 Hz	approx. 5000 Hz	The corner frequency of the High shelf.

Note

The three Gain knobs have a detent at the center (0 dB), and the strength of the effect changes between the cut and boost sides across that point. It can be used both for boldly removing low or high frequencies (Kill) and for gently lifting them.

Compressor

A compressor with four switchable characters (Mode). Even when you change the Mode, the Threshold / Ratio / Knee and other knobs work in common.



Label	Unit	Range / Choices	Initial value	Role
Mode	—	Clean / Opto / FET / Vari-Mu	Clean	The character of the detector / curve.
Thresh	dB	−60 to 0 dB	−12 dB	The threshold. Signals exceeding it are compressed.
Ratio	:1	1:1–20:1	4:1	The compression ratio. Larger means stronger compression (closer to a limiter).
Knee	dB	0–24 dB	6 dB	The soft-knee width. Wider makes the transition around the threshold smoother.
Attack	ms	0.1–200 ms	approx. 10 ms	The speed of response to crossing the threshold.
Release	ms	5–1000 ms	approx. 100 ms	The speed at which gain reduction recovers after the signal falls below the threshold.
Mix	%	0–100%	100%	Wet / Dry mix.

Mode choices

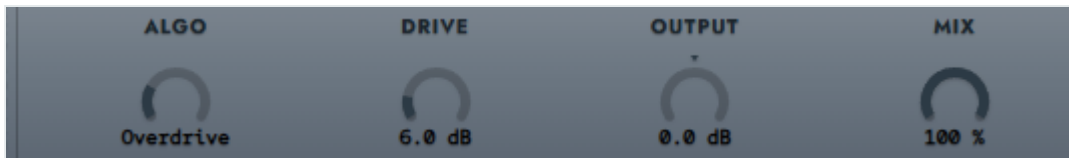
Choice	Meaning
Clean	A transparent VCA type. The fastest and most neutral, acting straightforwardly according to the set values.
Opto	An optical-compressor-style curve. Program-dependent and smooth, with slower onset and release.
FET	A fast, aggressive 1176 type. The attack is snappy and punchy.
Vari-Mu	A vacuum-tube-style soft knee. The gentlest and most natural compression.

Note

Because auto makeup (automatic gain compensation) works internally, even the initial Mix of 100% yields a unity-level compressed signal. For parallel compression, lower Mix and blend with the original sound.

Distortion

A saturation / distortion that distorts the input and adds harmonics. You choose the color from 5 algorithms (Algo). The design pushes the signal into the curve with Drive and matches the level with Output.



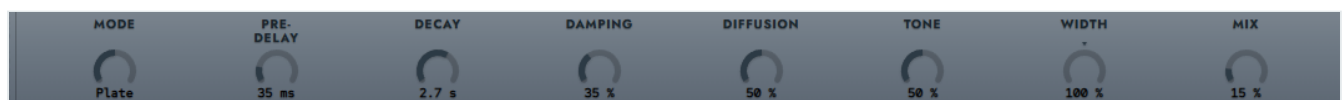
Label	Unit	Range / Choices	Initial value	Role
Algo	—	Clip / Overdrive / Waveshaper / Tube / Tape	Overdrive	The type of saturation curve.
Drive	dB	0–36 dB	6 dB	The input gain into the distortion stage. Raising it increases harmonics.
Output	dB	–24 to +12 dB	0 dB	The output trim after distortion (0 dB is the center detent).
Mix	%	0–100%	100%	Wet / Dry mix. Usually fully wet for flavoring.

Algo choices

Choice	Meaning
Clip	A hard clip at ± 1 . A hard, digital-fuzz color dominated by odd-order harmonics.
Overdrive	A tanh soft clip. A warm, Tube Screamer type color.
Waveshaper	An algebraic soft saturation. A gentler curve than tanh with a distinctive “fizz.” Being a symmetric function, odd-order harmonics dominate.
Tube	An asymmetric curve (compressing the positive side more strongly). It emulates the cathode bias of a class A vacuum tube, bringing up even-order harmonics.
Tape	A round-knee saturator. With a rounder knee than tanh, it has the gentle color of tape saturation. There is no envelope-following compression element (coloration only).

Reverb

An algorithmic reverb that adds space. You can switch among three modes: Hall / Plate / Room.



Label	Unit	Range / Choices	Initial value	Role
Mode	—	Hall / Plate / Room	Plate	The reverb algorithm.

Label	Unit	Range / Choices	Initial value	Role
Pre-Delay	ms	0–200 ms	35 ms	The delay before the reverb tail begins.
Decay	s	0.3–10 s	approx. 2.7 s	The target RT60. The time for the tail to decay by 60 dB.
Damping	%	0–100%	35%	The high-frequency damping inside the tank. Raising it makes the tail darker over time.
Diffusion	%	0–100%	50%	The density of the tail. 0% = sparse (discrete echoes), 100% = a dense, smooth tail.
Tone	%	0–100%	50%	The tonal balance of the reverb output. Low is darker, high is brighter.
Width	%	0–200%	100%	Stereo width. 0% = mono, 100% = normal stereo, 200% = wider.
Mix	%	0–100%	15%	Wet / Dry mix.

Mode choices

Choice	Meaning
Hall	A smooth, high-density, lush, long tail. Suited to pads and long ambience.
Plate	An algorithm inspired by 1980s digital reverbs. Dense and bright from the start, a metallic studio plate reverb.
Room	Parallel L / R loops. The discrete early reflections come quickly and the tail is shorter. An intimate character of a small space.

Arpeggiator

An arpeggiator that plays the held notes one at a time, in sequence, synchronized to the host tempo.

Unlike the other effects, what this slot processes is **notes (performance data)**, **not audio**. The audio passes straight through, so the result is the same no matter where in the chain you place it.



Label	Unit	Range / Choices	Initial value	Role
Mode	—	Up / Down / Up-Down / Random / Played / Chord	Up	How the pattern advances (see the table below).
Range	—	1 Oct / 2 Oct / 3 Oct / 4 Oct	1 Oct	How many octaves the pattern spans. At 2 Oct and above, the held notes repeat one octave higher on each pass.
Rate	note value	1/64–1/2	1/16	The length of one step as a note value, locked to the host BPM (T = triplet, . = dotted).
Gate	%	5–100%	50%	How long each step sounds, as a percentage of the step length. Short = staccato, long = more sustained.
Swing	%	50–75%	50%	Delays every second step to create a shuffle feel. 50% = straight, around 67% = a triplet feel.
Hold	—	Off / On	Off	Latch. When On, the pattern keeps playing after the keys are released.

Mode choices

Choice	Meaning
Up	From the lowest note to the highest, then up through the octaves set by Range.
Down	Descends from the top note of the highest octave.
Up-Down	Ascends, then turns around and descends. The end notes are not repeated.
Random	Picks a random held note (and octave) on every step.
Played	Cycles through the notes in the order the keys were pressed.
Chord	Retrigger all held notes together on every step, cycling through the octaves set by Range.

Note

- The pattern restarts from the beginning on the first key pressed after all keys are released. The same applies with Hold On: pressing a new key after releasing everything rebuilds the pattern from the new notes.
- While the DAW transport is playing, the steps snap to the host's beat grid, so the arpeggio locks naturally with a running sequence.
- In environments without a host tempo (Standalone / the web version), the clock runs at 120 BPM. On the web version, it follows the MIDI player's tempo while it is playing.
- If you assign Arpeggiator to more than one slot, only the first one in signal order (that is not bypassed) is active.

Tip

At Gate 100%, the steps tie together legato. Setting ASSIGN to Solo / Unison and raising GLIDE produces a "gliding arpeggio" that slides smoothly between the pitches of the steps (for ASSIGN / GLIDE, see → Chapter 8 "Patch / Performance Reference").

9.4 Patch Volume

At the far right of the effects area is a **PATCH VOLUME** knob independent of each slot. This is for adjusting the final volume of the whole Patch; its signal position is "after all effects, before Master Volume."

- The range is ± 12 dB bipolar (center = 0 dB), with a detent at the center.
- Holding **Ctrl** (**Cmd** on macOS) and clicking resets it to 0 dB.
- You can also type in a dB value directly by double-clicking the knob or clicking its value readout (§3.1.1).
- Since the volume balance among the effects within the slots does not change, you use it to adjust **only the level of the whole patch** after building up the effects.

Note

Patch Volume is saved in the Patch (.80p). As noted above, it is not protected by Effect Chain Lock, so even with Lock ON, switching Patches loads the new Patch's Patch Volume.

9.5 Automation and MIDI Learn

The knobs of each effect, the slot Type / Bypass, Effect Chain Lock, and Patch Volume are all targets for DAW automation. You can also assign MIDI CCs to operate them from an external controller. For how to assign them, see → Chapter 10 "MIDI / MIDI Learn / Automation".

Note

The slot Type is an enumerated value that internally includes reserved stages. If automation lands on a reserved value that is not implemented, it is treated as Off.

10. MIDI / MIDI Learn / Automation

This chapter explains how to play and control Synth-80 in combination with an external MIDI keyboard or controller, as well as with your DAW's automation.

Beyond simply playing notes from the keyboard, Synth-80 lets you move sound parameters in real time using the knobs and faders of a physical controller, and record those movements in your DAW. The mechanisms that make this possible are MIDI Learn and Automation.

Note

The MIDI covered in this chapter is "ordinary plugin MIDI input" sent to Synth-80 from a DAW or keyboard. The dedicated MIDI port used for exchanging patch data with a real Roland MKS-80 via SysEx is a separate system. For integration with the hardware, see → Chapter 11 "SysEx / MKS-80 Integration".

10.1 Ordinary MIDI Input

Synth-80 plays by receiving standard MIDI messages sent from a DAW or MIDI keyboard. The messages it accepts are as follows.

Message	Role
Note On / Note Off	Key on / off. Controls note triggering and release.
Velocity	How hard a note is struck. Reflected in changes to volume and tone.
Sustain (CC64)	Sustain pedal. Holds notes while pressed.
Pitch Bend	Pitch bend wheel. Raises and lowers pitch.
Mod Wheel (CC1)	Modulation wheel. Reflected in modulation amounts such as vibrato.
Volume (CC7)	Volume. Raises and lowers the performance volume independently of Patch Volume.
Channel Aftertouch	Channel aftertouch. Adds expression as you press into the keys.

How Velocity, Pitch Bend, Mod Wheel, and Aftertouch affect the sound is determined by the settings on both the Tone side and the Patch side. For a clause-by-clause explanation of each parameter, see → Chapter 7 "Tone Parameter Reference" and → Chapter 8 "Patch / Performance Reference".

Note

For how Mod Wheel and Channel Aftertouch are handled, see → Chapter 8 "Patch / Performance Reference". The relationship between the two (such as the fact that they share the same modulation destination) is consolidated there.

10.2 What Is MIDI Learn

MIDI Learn is a feature that assigns the physical knobs, faders, and buttons of your MIDI controller to any parameter in Synth-80. Once assigned, simply moving that controller changes the corresponding parameter in real time.

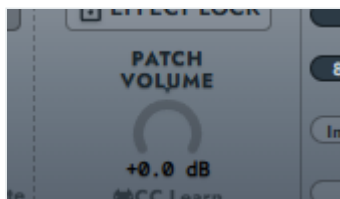
The real MKS-80 was edited via a programmer (the MPG-80), but Synth-80 lets you freely tie generic MIDI CCs to the parameters of your choice. This is a modern feature added as a convenience unique to software.

The targets you can assign are the knobs, faders, and selectors shown on screen. You can assign the Upper and Lower Tone parameters, the Patch-related parameters, and the parameters of each slot in the Effect Chain.

You can also assign the PATCH forward and back arrows in the top bar. The arrow steps once when the CC value rises to 64 or above; holding a high value does not keep stepping. It cycles through the Patches in the same folder, or, after you load a Patch from filtered results in the preset browser, through those results (→ Chapter 5, 5.7).

10.3 Using MIDI Learn

MIDI Learn operations start from the **MIDI Learn** button in the **PATCH VOLUME** block at the bottom right of the screen.



Entering Learn Mode

Pressing the **MIDI Learn** button enters Learn mode. In Learn mode, the following changes occur.

- An overlay (a small badge) appears over each assignable parameter on screen.
- Parameters that already have a CC assigned display that CC number (e.g., **CC 74**).
- Parameters that are not yet assigned display **--**, indicating they are unassigned.
- The **PATCH VOLUME** block switches to **SAVE / LOAD / CLEAR / CLOSE** buttons and a **Knob Mode** selector.



Assigning a CC

1. While in Learn mode, click the overlay of the parameter you want to assign to select it. The selected parameter is highlighted.
2. In that state, move a physical knob or fader on your MIDI controller. The MIDI CC number it sends is then assigned to the selected parameter.
3. Once the assignment is complete, the new CC number appears on the overlay.

Note

The operation you use to make the assignment does not move the value of the target parameter. It is used only to tie the CC number. This is intentional, to prevent the value from jumping unexpectedly. From the next time you move that controller, the parameter follows along. How it follows is selectable via Knob Mode (→ 10.4).

Assigning the Same CC to Multiple Parameters

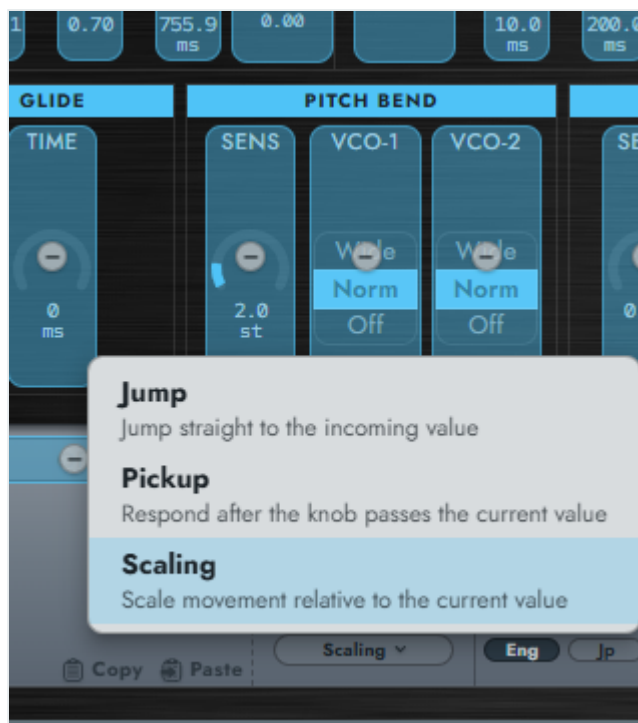
You can also assign the same CC number to multiple parameters. For example, you can move several parameters at once with a single knob. Duplicates are allowed, so feel free to set things up as you need.

Exiting Learn Mode

Pressing **CLOSE** ends Learn mode. The currently selected target parameter is also deselected.

10.4 Knob Mode (Controller Response Mode)

You can choose from three modes that determine how incoming CC values are applied to a parameter when you move a controller assigned via MIDI Learn. Press the **Knob Mode** button in the **PATCH VOLUME** block while in Learn mode to open the selection menu.



Mode	Behavior
Jump	Jumps straight to the incoming CC value. This is the simplest behavior, but if the knob position on your controller differs from the parameter's current value, the value jumps the moment you move the knob.
Pickup	Does not respond until the knob position matches (or passes through) the parameter's current value. No value jumps occur, but you need to sweep the knob to find the current value before it starts responding.
Scaling	Scales the knob movement relative to the parameter's current value (default). No value jumps occur, and turning the knob to either end (minimum / maximum) brings the parameter to that end as well, after which it tracks 1:1.

If in doubt, simply leave it on the default, Scaling. It combines the advantages of both other modes: no value jumps, and no "dead zone" where the knob does not respond until it matches.

Note

Knob Mode is stored as a per-user setting, not as part of a Patch or DAW project. Once selected, the same mode is used across all plugin instances and projects (other instances that are already open pick it up the next time they are reopened).

Caution

If you use a controller with endless encoders, set the controller's transmit mode to "absolute" (sending absolute values 0–127). Relative (increment / decrement) modes are not currently supported and will not work correctly with any Knob Mode.

10.5 Saving and Loading MIDI Maps (.s8m)

The entire combination of assigned MIDI CCs is called a "MIDI map." A MIDI map can be saved and loaded as a `.s8m` file. You operate it from the buttons in the `PATCH VOLUME` block while in Learn mode.

Button	Action
SAVE	Writes the current MIDI map to a <code>.s8m</code> file.
LOAD	Loads a <code>.s8m</code> file and replaces the MIDI map.
CLEAR	Clears all assignments.
CLOSE	Ends Learn mode.
SET DEFAULT	Saves the current MIDI map as the "default map." From then on, every newly opened Synth-80 instance starts with this map already applied.



The Default Map (SET DEFAULT)

Once you have set up the assignments for your controller, press `SET DEFAULT` so that the same assignments are available from the start every time you open Synth-80 in a new project or on a new track — no need to load a `.s8m` file each time.

- The default map is stored as a per-user setting (it is not included in Patches or DAW projects).
- It only affects **newly opened instances**. When you open a saved DAW project, the assignments stored in that project are restored as they are.
- To disable the default (start from a clean state again), press `CLEAR` to remove all assignments and then press `SET DEFAULT`.

Caution

The MIDI Learn map is not included in the ordinary sound parameters of a Patch (.80p). The map is managed separately and saved as a .s8m file. As a result, even if you load a different sound Patch, your current MIDI assignments are kept as they are.

Note that MIDI Learn assignments are also retained as part of the plugin's state. When you save a DAW project and reopen it, the assignments are restored as they were. The .s8m file is used to carry those assignments to another project or machine, or to switch between multiple assignment patterns.

10.6 Difference from the SysEx MIDI Port

Synth-80 has a feature for choosing a dedicated MIDI port (a direct MIDI port) for exchanging patch data with a real MKS-80. This is used for sending and receiving SysEx, and is explained in → Chapter 11 "SysEx / MKS-80 Integration".

MIDI Learn and MIDI CC automation do **not** use this SysEx port. They strictly use the ordinary MIDI input coming into the plugin from your DAW or keyboard.

Note

Even if you have not set up the direct MIDI port for SysEx, MIDI Learn and MIDI CC automation work without any problem. The two are completely separate systems.

10.7 Host Automation and MIDI CC Automation

There are broadly two ways to move Synth-80's parameters automatically from your DAW. Since the two work differently, use them according to your purpose.

Host Automation

This is a method in which the DAW writes plugin parameters directly. You select a parameter in the DAW's automation lane and operate it by drawing a curve.

- No MIDI CC is interposed; the DAW controls the parameter value directly.
- You select a parameter by name in the DAW and write automation.
- The movement when you operate a knob with the mouse can also be recorded in the DAW as an ordinary parameter change.

MIDI CC Automation

This is a method that moves parameters via the CC assigned with MIDI Learn.

- First, assign a physical CC to a parameter with MIDI Learn.
- When you move the physical controller, that CC is converted to the parameter and applied.
- If you record the CC into a MIDI track in your DAW, the same movement can be reproduced on playback.

In short, the difference is that Host Automation has "the DAW moving the parameter directly," whereas MIDI CC Automation has "the CC being converted to the parameter via MIDI Learn." MIDI CC Automation is suited to real-time performance using a controller, while Host Automation is suited to detailed editing within the DAW.

Note

Parameter movements driven by MIDI CC are **not written to the DAW's host automation**. Even when the DAW's automation mode is Touch / Latch / Write, moving a parameter via CC never records anything into the automation lanes (this matches the behavior of major soft synths). If you want to keep the movement in your DAW, record the CC itself into a MIDI track, or use Host Automation instead. This design avoids the value conflicts that would occur on playback if the same movement existed both as recorded CC data and as automation, driving the same parameter twice.

10.8 Reordering the Effect Chain and the MIDI Map

The Effect Chain can be reordered by dragging the tabs (→ Chapter 9 "Effects"). When you do this, the MIDI map stays with the **slot position (the position in the signal flow)**, not with the contents of the Effect.

For example, if you had assigned "CC74 to parameter 3 of the first slot," then even if you reorder the tabs so that a different Effect comes into that slot, the assignment remains tied to the position "parameter 3 of the first slot."

Note

Reordering swaps the contents of the Effects (the IParam values), but the MIDI map follows the slot position. Keeping in mind that the assignment is tied to the position in the signal flow, not to the type of Effect, helps you avoid confusion.

11. SysEx / MKS-80 Integration

This chapter explains how to use Synth-80 together with a real Roland MKS-80.

Synth-80 can handle MKS-80-compatible SysEx (System Exclusive) messages. With this feature you can import a real MKS-80's library into Synth-80, write tones you created in Synth-80 back to the hardware, or back up the hardware's memory as a `.mid` file. In addition, while connected, your operations in Synth-80 are reflected on the MKS-80 in real time, so you can also use Synth-80 as an editor for the MKS-80.

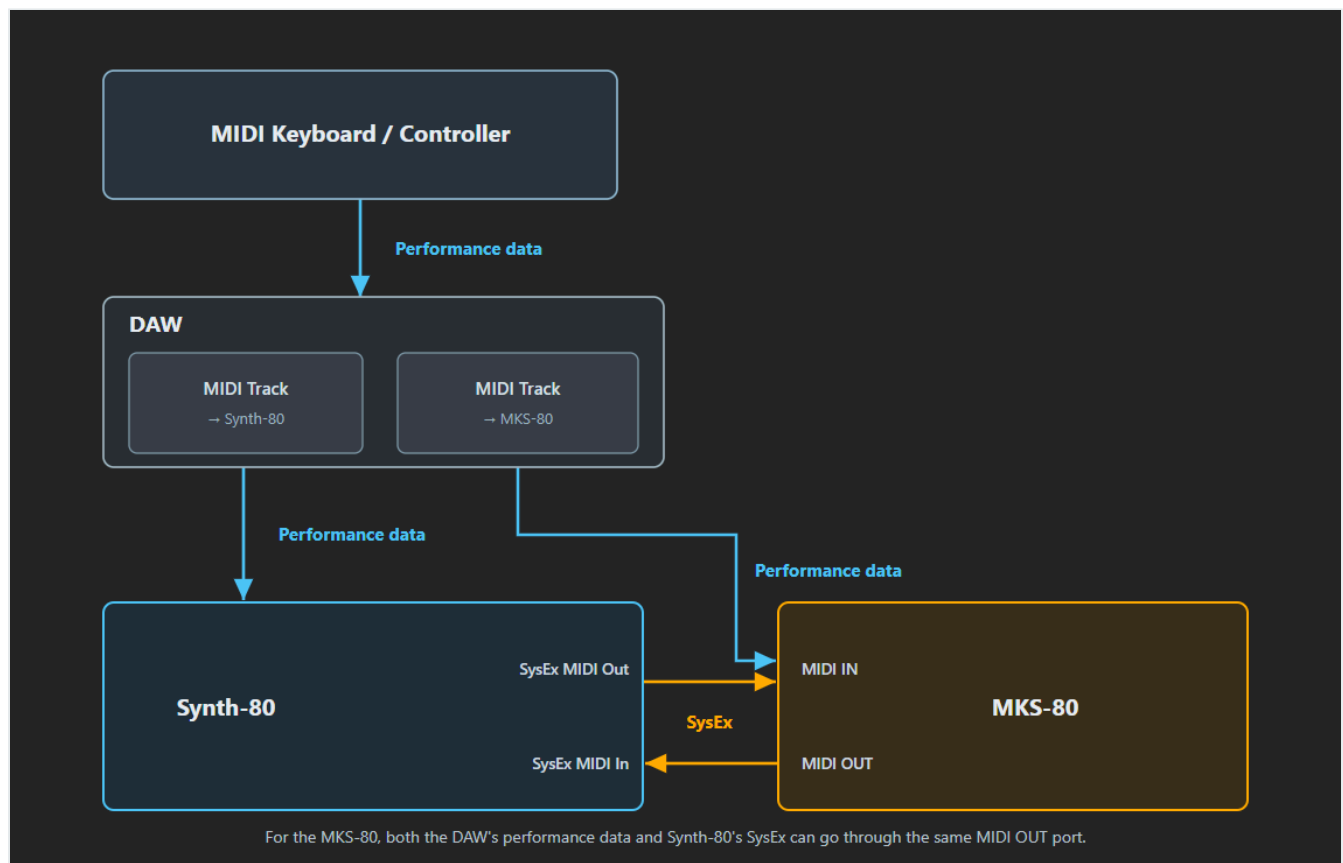
This feature is intended for users who own a real MKS-80. Even without the hardware, it has no effect on sound design in Synth-80.

Caution

Writing to the hardware's memory can cause you to lose the unit's built-in patches if the operation is performed incorrectly. Be sure to follow the procedures in this chapter, especially "make a backup beforehand," "set the PROTECT switch," and "do not unplug the cable while sending."

11.1 Setup Example

This is a typical connection example for using Synth-80 together with a real MKS-80.



- **Performance information** (MIDI notes, CC, etc.) — Your playing on the keyboard reaches Synth-80 by way of the DAW.
- **SysEx** — Signals used to exchange patches and bulk dumps, and to remotely edit parameters, between Synth-80 and the real MKS-80. These do not pass through the DAW; they are exchanged over a dedicated MIDI port that Synth-80 opens directly.

For the wiring to the real MKS-80 itself, **it is fine to send both the performance information from the DAW and the SysEx from Synth-80 to the same MIDI output → the hardware's MIDI IN**. The replies from the hardware (bulk dumps, etc.) return from the hardware's MIDI OUT to Synth-80's input port.

11.2 Where the SysEx Functions Are

SysEx operations are performed from the **SYSEX** block at the very bottom of the screen. Below the **SYSEX** label are three buttons, **Import** / **Export** / **Dump**, and pressing each one opens a submenu. At the right edge of the label is an icon button for selecting the dedicated MIDI port.



The **SYSEX** label is an underlined parameter hint. Clicking it displays a pop-over explaining each of the Import / Export / Dump actions.

11.3 Connecting a Real MKS-80

Why a MIDI Port Is Opened Directly

Synth-80 uses a **dedicated MIDI port** for SysEx communication with the real MKS-80. Rather than routing through the DAW's plugin MIDI input, the plugin opens an OS-level MIDI port directly to send and receive.

This is because many DAWs, including Cubase, do not pass SysEx that arrives at a VST straight through (they do not hand it to the plugin). To ensure reliable SysEx exchange, Synth-80 opens its own MIDI port.

Note

The dedicated SysEx port used here is a separate path from the normal MIDI input used to play Synth-80 from a DAW or keyboard, and from MIDI Learn. For MIDI Learn / automation, see → Chapter 10 "MIDI / MIDI Learn / Automation".

Selecting the Ports

Clicking the MIDI icon at the right edge of the SYSEX label opens the MIDI Ports for MKS-80 menu. Here you select the MIDI In and MIDI Out ports respectively.



Item	Description
MIDI In	Selects the input port that receives the real MKS-80's MIDI OUT.
MIDI Out	Selects the output port that sends to the real MKS-80's MIDI IN.

For the connection, wire both directions: the real MKS-80's MIDI OUT to the computer's MIDI input, and the computer's MIDI output to the MKS-80's MIDI IN. Some operations are receive-only or send-only, but operations that involve a handshake (receiving from the hardware, writing back to the hardware) require both input and output.

11.4 Import — Bringing In from the Hardware or a File

Pressing the Import button lets you choose between the following two import methods.

Menu item	Action
Load from file...	Loads a .mid / .syx bulk dump file from disk.
Receive from real MKS-80...	Sends a bulk dump request (RQF) to the hardware and receives the response.

Both read an MKS-80 bulk dump (16 DAT = 64 patches + 64 tones) and convert it into Synth-80's Patch format (.80p). Use this when you want to migrate a real MKS-80's library to Synth-80, or to keep a .mid archive that you can write back later.

Load from File

Selecting Load from file... opens a file selection dialog. Choose a .mid or .syx file containing an MKS-80 bulk dump. The DAT messages in the file are read, converted into Patches (.80p), and written out to the library. When finished, the number of items written out and the destination folder are shown.

You can select several files at once in the file dialog to convert them in one go. The destination folder is asked only once: a file holding a bank (two or more patches) gets its own subfolder named after the file inside that folder, and a file holding a single patch is written straight into the folder, named after the file. Names that would

clash get a number such as " (2)". The completion dialog shows how many files were converted and lists any file that could not be imported, with the reason.

Files that contain no bulk dump (DAT) can still be imported if they are recordings of the patch dumps (PGR + APR) that the hardware sends when you switch patches on its front panel. Many SysEx files saved by old sequencers and librarians use this format. Each patch switch is converted into one patch, and identical duplicates are automatically collapsed into a single entry.

Note

If no MKS-80 DAT / APR message is found in the file, it cannot be imported. Check whether the file contains an MKS-80 bulk dump or patch dump. Files that only contain individual parameter changes (IPR) — e.g. recordings of knob movements — cannot be imported because they do not contain complete patches.

Receive from Real MKS-80

Selecting **Receive from real MKS-80...** causes Synth-80 to send a bulk dump request (RQF) to the hardware and wait for a response. The hardware's MIDI FUNCTION must be set to III (see "Preparing the Hardware" below).

A dialog is shown while receiving. When the response arrives, a dialog opens that lets you choose the save format, along with the number of DAT messages received.

Save format	Description
Patch file (.80p)	Converts the received content into Patch files and imports them into the library.
MIDI file (.mid)	Saves the received content as-is as a .mid file (for backup).

Caution

If there is no response for a certain time (about 5 seconds), it times out. If no response arrives, check the hardware's power, the MIDI cable connections (whether they are correctly connected to the plugin / Standalone MIDI IN and OUT), whether MIDI FUNCTION is set to III, and whether the MIDI channel matches the hardware's Basic Channel.

11.5 Export — Writing Out as **.mid**

Pressing the **Export** button lets you choose between the following two export methods. Export does not require the hardware; it simply creates a **.mid** file on disk. It can be used for general-purpose backups.

Menu item	Action
Save current patch as .mid	Writes the currently loaded Patch out to a single <code>.mid</code> .
Create .mid with Bank Builder...	Assembles an entire memory bank (64 patches + 64 tones) into a single file.

Save Current Patch as .mid

Writes the currently loaded Patch (Performance + Upper Tone + Lower Tone) out as a single `.mid` file in MKS-80 bulk (DAT) format.

The exported `.mid` can later be read back with `Import`, and can also be sent to the real MKS-80 via `Dump` → "Select a .mid file and dump to MKS-80".

Create .mid with Bank Builder

Selecting `Create .mid with Bank Builder...` opens a dedicated dialog for assembling the MKS-80's entire memory bank (64 patches + 64 tones = 16 DAT) into a single file.

Bank Builder — MKS-80 8 bank (64 patches + 64 tones)

Choose up to 32 patches (11–48). Each fills two tone slots (Upper/Lower). Slots 51–88 are dummy (Init).

PATCH		↻	TO	NE
11	Init	▼	11	Init (U)
			12	Init (L)
12	Init	▼	13	Init (U)
			14	Init (L)
13	Init	▼	15	Init (U)
			16	Init (L)
14	Init	▼	17	Init (U)
			18	Init (L)
15	Init	▼	21	Init (U)
			22	Init (L)
16	Init	▼	23	Init (U)
			24	Init (L)
17	Init	▼	25	Init (U)
			26	Init (L)
18	Init	▼	27	Init (U)
			28	Init (L)
21	Init	▼	31	Init (U)
			32	Init (L)
22	Init	▼	33	Init (U)
			34	Init (L)

Cancel
Create .mid

Choose up to 32 patches from the library into slots 11–48. Each patch automatically fills two consecutive tone slots with its Upper and Lower Tones. Slots 51–88 are unusable dummies (Init).

The assembled `.mid` can be sent as a complete bank to the real MKS-80 via `Dump` → "Select a .mid file and dump to MKS-80".

Note

"Patch" here refers to Synth-80's own unit of saving. For the relationship between Patch, Tone, and Upper / Lower, see → Chapter 5 "Understanding Preset / Patch / Tone".

11.6 Dump — Sending to the Real MKS-80

Pressing the `Dump` button lets you choose between the following two send methods. Dump is an operation that sends to the real MKS-80 over MIDI.

Menu item	Action
Dump current patch to MKS-80...	Sends the currently loaded Patch immediately.
Select a .mid file and dump to MKS-80...	Loads a <code>.mid</code> / <code>.syx</code> and writes it to the hardware's memory / cartridge.

Dump Current Patch to MKS-80

Sends the currently loaded Patch immediately to the real MKS-80 with no confirmation dialog. What is sent is the current tone (APR), and on the hardware **only the edit buffer** is rewritten. The hardware's built-in 64 patches and cartridge memory are not changed.

Use this when, during sound design, you want to play the sound you created in Synth-80 on the hardware on the spot.

Caution

This menu sends the moment you select it. No confirmation dialog appears. Confirm in advance that the destination is the intended hardware and port.

Select a .mid File and Dump to MKS-80

Loads a `.mid` / `.syx` bulk dump file and writes its contents to the real MKS-80's memory or cartridge. This is an operation that rewrites the hardware's stored memory itself. Use it to write back a `.mid` created with `Export`, or a backup saved as `.mid` with `Import` (Receive from the hardware).

When you select this menu, a dialog first appears prompting you to prepare the hardware. Once ready, press `Continue` and choose the file. Synth-80 then waits for a LOAD operation on the hardware, and when you perform LOAD on the hardware, the handshake begins automatically. See the next section for the detailed procedure.

Caution

Before any operation that rewrites the hardware's stored memory, always make a backup first. We strongly recommend keeping the pre-overwrite state as a `.mid` using `Export` (Save current patch as `.mid`) or `Import` (Receive from real MKS-80 → save as `.mid`).

11.7 Preparing the Hardware and the Write-Back Procedure

For exchanges with the real MKS-80 that involve a handshake (receiving from the hardware, writing back to the hardware), the hardware must be set to the required state.

Preparing the Hardware

When writing a `.mid` file back to the hardware, Synth-80 prompts you for the following preparation. Before writing, set the hardware unit to the following state.

1. **Set the S/L (Save/Load) mode to the MIDI side.**
2. **Set MIDI FUNCTION to III.**
3. **Set the rear MEMORY PROTECT switch to OFF.**

Once ready, press `Continue` in the Synth-80 dialog and choose the file. Next, select the load method on the hardware.

Load method	Operation on the hardware
Overwrite entire memory	Hold down the LOAD button and press the EXECUTE button.
Specified bank only	Hold down the LOAD button, specify the load destination with the bank button, and press the EXECUTE button.

When you operate LOAD (+ EXECUTE) on the hardware, the hardware sends a request (RQF), and Synth-80 receives it and automatically begins sending DAT messages (the handshake).

Prepare MKS-80 for bulk load

Before continuing, set up the MKS-80 panel:

1. Set S/L (Save/Load) mode to MIDI.
2. Set MIDI FUNCTION to III.
3. Switch the MEMORY PROTECT switch to OFF.

When ready, choose how to load:

- Whole memory : hold LOAD and press EXECUTE.
- One bank only : hold LOAD, press the bank button to select, then press EXECUTE.

Click Continue, pick the .mid / .syx file, and Synth-80 will wait for the LOAD button press.

Continue

Cancel

Cautions While Sending

While sending, Synth-80 sends DAT messages in order, waiting for an ACK (receive success) from the hardware before proceeding to the next. **Do not turn off the hardware's power or unplug the MIDI cable until sending is complete.**

File transfer with the MKS-80 involves handshake exchanges such as ACK (receive success) / ERR (error) / RJC (rejected). Unplugging the cable midway interrupts the transfer and may leave the hardware's memory in an incomplete state.

Cleanup After the Operation

When the write-back is complete, return the hardware to its original state.

1. **Set the rear MEMORY PROTECT switch back to ON.**
2. **Return MIDI FUNCTION to I or II as needed.**

Setting PROTECT back to ON helps prevent subsequent accidental overwrites.

Note

When receiving from the hardware (`Import` → "Receive from real MKS-80...") as well, the hardware's MIDI FUNCTION must be set to III. Receive-only operations do not require changing PROTECT, but the same rule applies: do not unplug the cable during the handshake.

11.8 Terminology Reference

For reference, here is a summary of the main types of MKS-80-compatible SysEx that appear in this chapter. You do not need to be aware of them during normal operation, but they help when reading the dialog messages.

Abbreviation	Meaning
APR	A message that writes back one Patch / Tone as a whole. Sent by "Dump current patch".
IPR	A message at the level of an individual parameter. Used when operating the hardware's parameters one at a time from Synth-80.
DAT	The main body data of a bulk dump. 64 patches + 64 tones fit into 16 DAT.
RQF	A bulk dump request message. Used in the "Receive from hardware" and write-back handshakes.
ACK / ERR / RJC	Handshake responses that return receive success / error / rejected.

12. Settings and Performance

This chapter covers settings that affect not the sound itself, but CPU load, audio quality, and display. It deals with settings that influence how heavy the plugin runs—such as Oversampling and Polyphony—the two volume controls, Master Volume and Patch Volume, and display-related items such as UI resizing and the hint language.

These settings are gathered in the control row along the bottom of the screen. Detailed, item-by-item explanations of each Tone and Effects parameter are consolidated in → Chapter 7 "Tone Parameter Reference" and → Chapter 9 "Effects", so this chapter explains only the overall, performance-related settings.

12.1 Oversampling

Oversampling is a setting that computes the internal DSP at a higher multiple than the actual output sample rate. Raising the multiple reduces the aliasing (foldback noise) produced by nonlinear processing such as Cross Mod (XMOD), Hard Sync, and Distortion, resulting in a cleaner sound. In exchange, the amount of computation increases, and CPU load grows roughly in proportion to the multiple.

Option	Meaning
Off	No oversampling. The lowest CPU load.
2x	Processes internally at 2x.
4x	Processes internally at 4x. CPU load is roughly 4 times higher.

The actual MKS-80 uses analog circuitry, so the very concept of a "sample rate" does not apply. Oversampling is a modern quality setting added to approximate that analog smoothness in the digital domain.

At any multiple, the fundamental character of the tone does not change. The difference is most noticeable in sounds with a lot of high harmonics, such as sounds with deep Cross Mod or Hard Sync, or sounds passed through Distortion. If you feel an unpleasant roughness in the high end on such sounds, raising the multiple can help. Conversely, on sounds with gentle waveforms (such as soft Pads), the difference is hard to tell, so leaving it Off is often sufficient.

Note You can also use it selectively—running lightly at Off or 2x while producing, and raising it to 4x only when bouncing (exporting / mixing down).

12.2 Polyphony

Polyphony is the upper limit on the number of voices that can sound simultaneously. The actual MKS-80 has 8 voices, but Synth-80 can be expanded to suit modern usage.

Option	Meaning
8	8 voices, the same as the actual MKS-80.
12	12 voices.
16	16 voices.
20	20 voices.
24	24 voices.

This setting not only makes notes less likely to cut off when you stack chords, but also affects the number of stacked voices in Unison (the UNI 1 / UNI 2 of ASSIGN MODE). Unison stacks as many voices as the Polyphony setting, so setting it to 24 gives a thicker unison that stacks up to 24 voices on a single note.

Note For the behavior of Voice Assign and Unison themselves, see → Chapter 8 "Patch / Performance Reference". Polyphony is the setting that determines the "total amount" of the voice allocation explained there.

Raising Polyphony increases the voices per note and per section, so CPU load increases proportionally. If the actual 8 voices are enough, leaving it at 8 is the lightest setting.

12.3 Master Volume and Patch Volume

Synth-80 has two places to adjust volume: **Patch Volume** and **Master Volume**. The names are similar, but they differ in their position within the signal flow and in whether they are saved.

The signal flow is as follows.

```
effects → Patch Volume → Master Volume → out
```

In other words, after passing through the effects, the volume is first trimmed by Patch Volume, and then it passes through Master Volume to become the final output.

Patch Volume

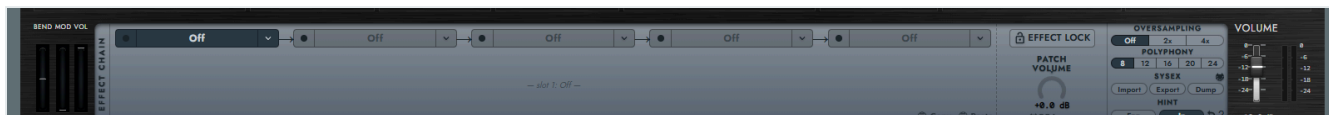
Patch Volume is a volume trim saved together with that Patch (± 12 dB). It is meant to even out the volume variation between sounds; setting it here makes volume steps less likely when you switch Patches. Because Patch Volume is saved with the Patch, the same value is reproduced the next time you load that Patch.

Note Patch Volume is a Patch-scope parameter shown in light blue. Its save unit is the Patch (.80p); a single Patch includes the Upper / Lower Tones, performance settings, and Effect Chain, along with the Patch Volume. For the structure of a Patch, see → Chapter 5 "Understanding Preset / Patch / Tone".

Master Volume

Master Volume is the fader for the final output. It is not saved with the Patch; it works as a global volume trim (an overall output adjustment). Because the Master Volume value does not change no matter which Patch you load, you can decide "how loud to play the whole thing right now" independently of the Patch.

Master Volume has a level meter so you can check the level of the signal actually being output. While watching the meter, adjust it so the output stays within a range that does not distort (does not clip).



Summary of when to use which

Item	Patch Volume	Master Volume
Position in signal	After effects	After Patch Volume (final stage)
Saved with the Patch	Yes	No (global)
Purpose	Even out the volume of each sound	Set the overall output level

When in doubt, remember "Patch Volume for the volume balance of each sound, Master Volume for the overall output level" and you can tell them apart.

12.4 UI Resizing and Saving the Window Size

The Synth-80 screen can be resized by dragging the resize grip at the bottom right. Adjust it when the display is too small to read or when you want to use more screen space.

The changed window size is saved and is carried over the next time you launch a new instance. This save is reflected across plugin formats (VST3 / AU / AAX / CLAP / Standalone) and operating systems (Windows / macOS), so even if you open it in a different DAW or a different format, it opens at the size you last used.

Note The window size is saved in `window-state.json` in the OS's standard application settings folder. UI-related settings such as the hint display language are saved in `preferences.json`. For where these files are stored, see → Chapter 2 "Installation, License Activation, and File Locations".

12.5 Hint Language

The display language of the parameter hints (explanatory popovers) can be switched between English (`Eng`) and Japanese (`Jp`) in the `HINT` field along the bottom of the screen. The switch takes effect immediately, and the selected language is saved locally, so it is retained even after restarting or reopening the session.

Switching the hint language and how to read the hints themselves are explained in detail in → Chapter 3 "Basic Operation".

12.6 Adjusting When the CPU Is Heavy

When Synth-80 feels heavy inside your DAW, reviewing the settings in the following order lets you reduce the load while minimizing the impact on the sound.

1. **Lower Oversampling:** Lower it in the order 4x → 2x → Off. CPU load is roughly proportional to the multiple, so this is the most effective. For sounds without deep nonlinear processing, the audible difference is often small even when lowered.
2. **Lower Polyphony:** Lower it to the number of simultaneous notes you need. If the actual 8 voices are enough, setting it to 8 is the lightest. For sounds that do not make heavy use of Unison, lowering it rarely causes problems.
3. **Reduce heavy effects:** Reducing high-load effects within the Effect Chain, such as Reverb (or turning a slot Off), is effective. For each effect, see → Chapter 9 "Effects".

Note This order is arranged from "small impact on the sound and large effect" first. Trying it in the order of Oversampling first, then Polyphony, and finally reviewing the effects lets you lighten the load while preserving the sound as much as possible.

13. Support

When reporting a problem or requesting support, including the following information helps us isolate the cause more quickly.

- **OS and version** (e.g., Windows 11, macOS 14)
- **DAW and version you are using** (e.g., Cubase 13, Logic Pro 11)
- **Plugin format** (which of VST3 / AU / AAX / Standalone)
- **Synth-80 version** (the version shown at the bottom of the screen)
- **License status** (demo or activated; whether the license appears under `/account`)
- **Steps to reproduce** (what operation causes what symptom; be as specific as possible)
- **Log file**

The log file is written to the following location each time Synth-80 starts (it is overwritten on every launch, so please capture the one created immediately after the symptom appears).

OS	Log location
Windows	<code>%TEMP%\synth80.log</code>
macOS	<code>\$TMPDIR/synth80.log</code>