

Synth81Z

USER MANUAL

Four-operator FM synthesizer

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1. A Message from the Developer

Thank you for purchasing Synth81Z.

This software is a personal project by Jun Murakami, a music producer and former composer.

As with my previous instrument, Synth-80, I have been committed to faithfully reproducing the sound of the original Yamaha TX81Z, repeatedly measuring and refining every detail—from waveforms, envelopes, pitch, and controller response to the characteristics of the DAC itself. I take pride in the resulting sound, which I believe stands apart from existing, widely available emulators and software instruments. The user interface has been carefully designed for editing on a single screen. I hope you enjoy exploring FM while listening to the changes you make.

Software additions include expanded polyphony, continuous Pan, and independent part LFOs, primarily in Performance mode, as well as the five-slot rack of high-quality effects inherited from Synth-80. Synth81Z can also serve as an editor and librarian for a connected TX81Z.

This manual starts with installation, basic operation, and a screen tour, followed by sound-design basics and references. Start with Chapter 2 to play your first sound. If you are new to FM, also read Chapter 6.



Acknowledgments

The bundled presets also include high-quality sounds created by experienced sound designers. I am deeply grateful for these wonderful contributions.

- Renewed October 20, 2026 - 170 Patches by [Saif Sameer](#) (Bundled with Ver. 1.0.4; greatly expanded from 52 patches)
- Added September 29, 2026 - 52 Patches by [Saif Sameer](#) (Bundled with Ver. 1.0.0)

You can find these sounds in the sound designer folders in the left column of the preset browser. See Chapter 5.

Demo mode

You can explore the instrument before activation, but periodic demo noise is added to the output. Activating a license removes it. See Chapter 2.

Trademarks

Manufacturer and product names in this manual are trademarks of their respective owners, who are not associated with the developer of this product. Third-party trademarks are used solely to identify reference equipment whose characteristics and sound were studied and analyzed during development. Equipment, inventor, and manufacturer names are provided only for descriptive and educational purposes and do not imply affiliation, endorsement, or approval by any inventor or manufacturer.

2. Installation, Activation, and File Locations

2.1 Installation

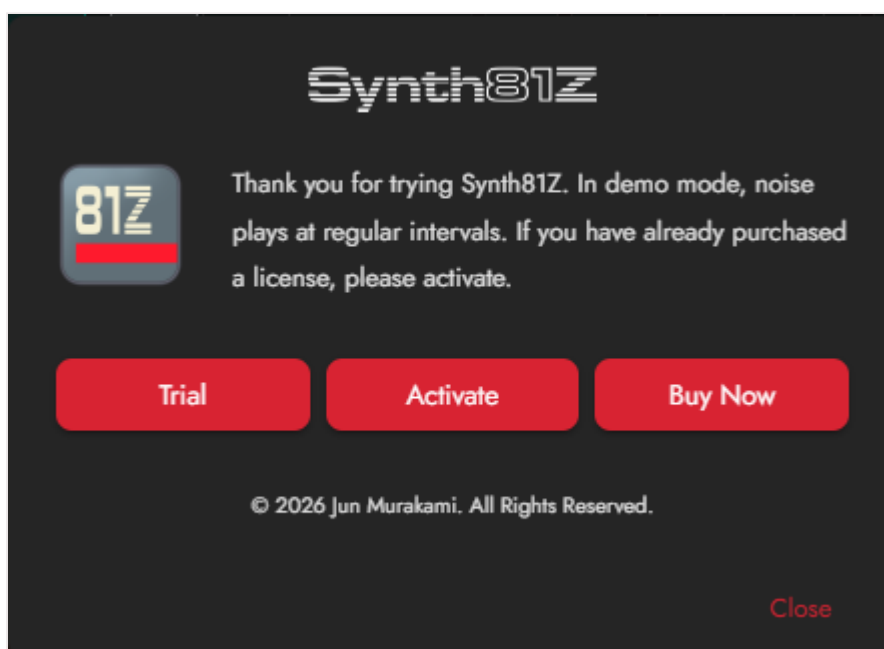
Run the installer included in your download and select the formats you use. Windows uses an executable installer; macOS uses a pkg. Then rescan plug-ins in your DAW and insert Synth81Z on an instrument track.

Format	Environment
VST3	Compatible Windows / macOS DAWs
AU	Compatible macOS DAWs
AAX	Pro Tools, when included in the package
CLAP	Compatible hosts; check whether your distribution includes it
Standalone	Runs without a DAW

Check the download's release information for included formats and OS requirements. This manual describes the instrument itself.

2.2 Playing Your First Sound

1. In a DAW, enable MIDI input and monitoring on the instrument track. In Standalone, choose the audio output and MIDI input in the application's settings.
2. Choose **Trial** in the activation dialog if you want to try the instrument first.
3. Select **Init** in **SINGLE** and play a key. Init uses OP1 to produce a sine wave.
4. Adjust the rightmost **VOLUME** and your audio device's listening level.

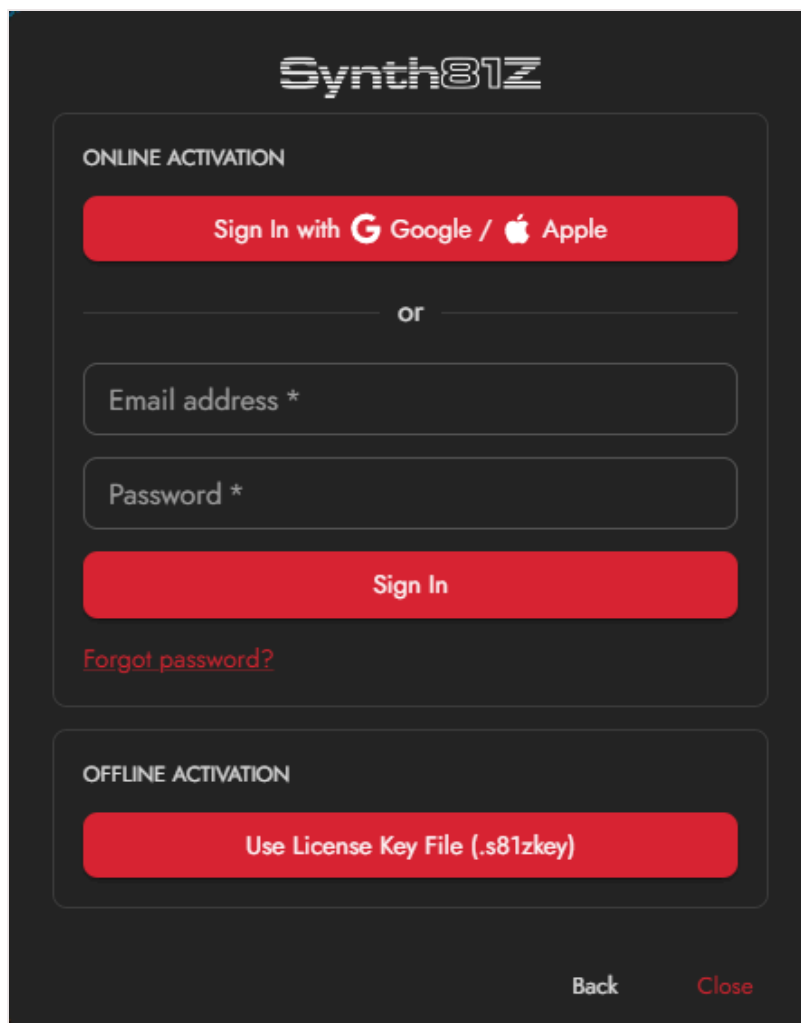


Note

The MIDI ports selected through the MIDI icon to the right of SYSEX are for direct TX81Z communication. Choose your normal keyboard input in the DAW track or Standalone settings.

2.3 Activating a License

Click **DEMO** at the top of the window, then **Activate**, and use the account associated with your purchase.

The image shows a dark-themed activation dialog box for Synth81Z. At the top is the Synth81Z logo. Below it is a section titled "ONLINE ACTIVATION" containing a red button with the text "Sign In with G Google / Apple". Underneath this is the word "or" centered. Below "or" are two input fields: "Email address *" and "Password *". Below these fields is a red "Sign In" button and a link that says "Forgot password?". Below the online activation section is a section titled "OFFLINE ACTIVATION" containing a red button with the text "Use License Key File (.s81zkey)". At the bottom right of the dialog are two buttons: "Back" and "Close".

- **Email and password:** Sign in using the plug-in form. The same screen provides password reset.
- **Google / Apple:** A browser opens. Check that its code matches the code in the plug-in before approving. Restart the process if the code expires.
- **Key file:** Choose **Use License Key File (.s81zkey)** and select your Synth81Z key. You can also drag the file into the activation dialog.

Download key files from your account page. Keys for another product, or modified files, cannot activate Synth81Z.

2.4 Preset Locations

On both platforms, presets live under **Synth81Z** in your user Documents folder. If the OS redirects Documents to another drive or a synchronized location, that location is used.

```
Documents/Synth81Z/  
  Voices/           Voice files (.81v)  
  Performances/     Performance files (.81p)  
  Tunings/          Tuning, Chord, and Program Change tables
```

The filename is the displayed preset name. **Init is a built-in initial state**; save edits under a new name. See Chapter 5 for what each file includes.

2.5 Settings and Backups

Settings are in `%APPDATA%\Synth81Z\` on Windows and `~/Library/Application Support/Synth81Z/` on macOS.

File	Contents
<code>Synth81Z.s81zkey</code>	Installed license
<code>preferences.json</code>	Language, Knob Mode, and user preferences
<code>window-state.json</code>	Window size
<code>factory-presets.json</code>	Bundled-preset installation state
<code>default-midi-map.s8m</code>	MIDI Learn map saved by SET DEFAULT

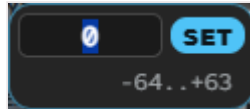
Back up Documents/Synth81Z for your sounds, and save your DAW project for work in progress. To transfer MIDI assignments separately, export an `.s8m` file as described in Chapter 10.

3. Basic Operation

3.1 Knobs and Faders

Drag knobs and vertical faders up or down. The mouse wheel also changes values. Hold Shift or Ctrl (Command on macOS) for finer adjustment. Ctrl / Command-click restores the default.

Click a value readout or double-click the control to enter a number. Press Enter or **SET** to apply it. Press Esc or click outside the pop-up to cancel.



3.2 Selectors and Dimmed Controls

Right-click anywhere within an operator's area to toggle that operator On / Off. Right-click again to turn a disabled operator back on.

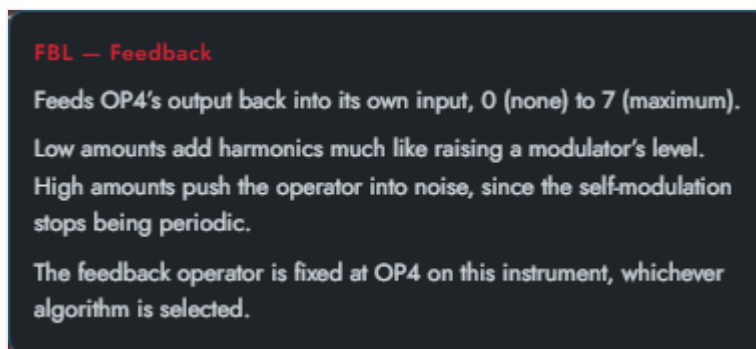
Hold Ctrl (Command on macOS) or Shift and right-click anywhere within an operator's area, or click the operator number bar at the left end, to solo that operator; the other operators turn Off. Do the same on the soloed operator to release the solo and turn every operator back On.

Click the choices for Wave Form, Ratio / Fixed, Mono / Poly, and other selectors. Click the Algorithm diagram to choose one of eight connections.

A dimmed control is unavailable or has no effect under the current conditions. Examples include Fixed Range in Ratio mode and OP1 EG Shift. Click the label's hint to check the condition.

3.3 Hints and Language

Click a parameter label to open its explanation. **HINT** → **Eng / Jp** changes the hint language. Short English panel labels remain the same in both languages.



The book button under **HELP** opens the online manual or PDF. The PDF follows the selected hint language.

3.4 Copy and Paste

Modules with copy/paste icons can duplicate settings at that scope. Use them to copy operator or effect settings.

3.5 Navigating and Saving Presets

Click the preset name to open the library menu. The right end of the name field holds the folder name and the arrows; the arrows move to the previous or next preset in the same folder, and clicking the folder name opens a menu for that folder only. Save stores the current mode's preset. The **Preset browser** button to the right of Save lets you choose from a list while filtering by search and tags (Chapter 5, 5.7). Save edited sounds before selecting another preset if you want to retain the changes.

Drag the lower-right grip to resize the editor. Text and controls adapt to the available space; enlarge the window if you need a clearer view.

4. Screen Tour

4.1 Single

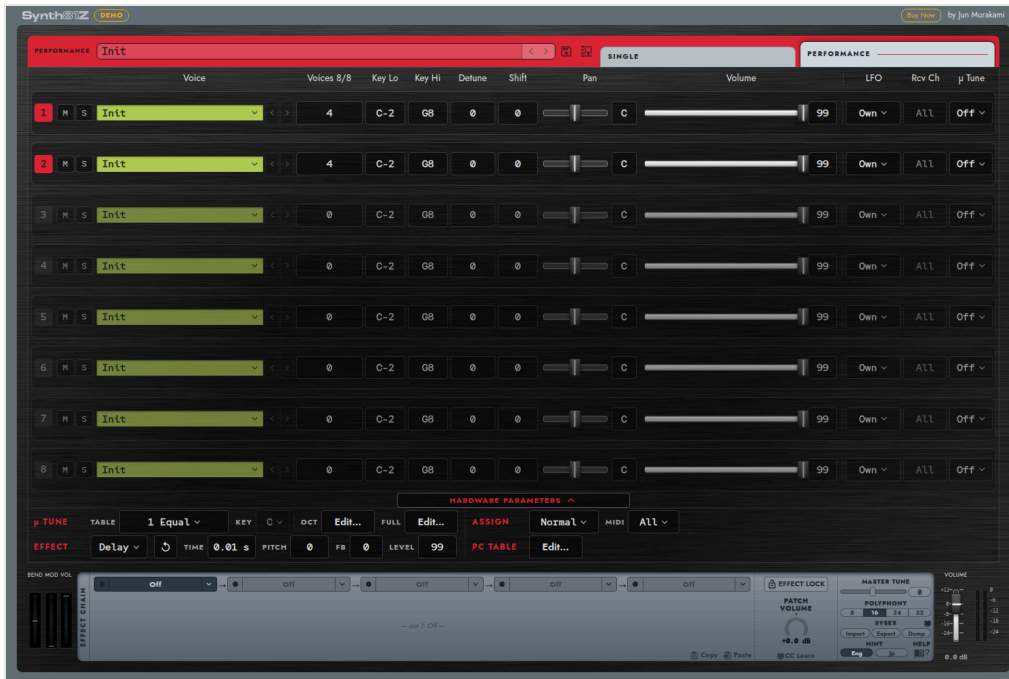


The top bar selects and saves a Voice and switches between **SINGLE / PERFORMANCE**. The button to the right of Save opens the preset browser (Chapter 5, 5.7). Single plays one Voice.

- **ALGORITHM** displays the connections between operators. Its numbers match OP1–OP4 on the right.
- **LFO / MOD WHEEL / PORTAMENT / FUNCTION** set modulation, performance response, Mono / Poly, Bend, and Transpose.
- **OP1–OP4** edit waveform, frequency, Output, Velocity Sens, Envelope Generator, and Scaling.
- **Hardware Params** → **OPEN** reveals additional Voice settings such as Foot and Breath Control.

Use the operator colors and diagram numbers to trace modulation and audio output. Chapters 6 and 7 explain the details.

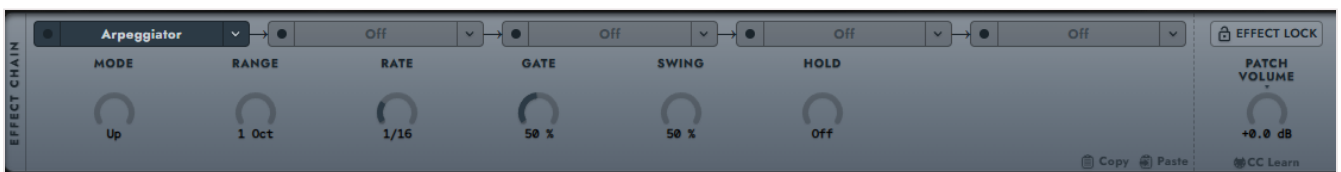
4.2 Performance



The eight-part mixer replaces the operator editor. Each row provides Voice, Voices, Key Lo / Hi, Detune, Shift, Pan, Volume, and M / S.

Open **HARDWARE** beneath the mixer to reveal LFO / Rcv Ch / μ Tune columns, plus tuning, Assign, MIDI routing, hardware effects, and the Program Change table. These advanced controls provide hardware compatibility. See Chapters 8 and 9 for details.

4.3 Shared Lower Area



EFFECT CHAIN contains five serial slots. The selected slot's controls appear below it. **EFFECT LOCK** and **PATCH VOLUME** are on the right of the chain.



Settings contains **MASTER TUNE / POLYPHONY / SYSEX / HINT / HELP**. The far-right **VOLUME** is the final output gain; its neighboring meter shows the actual output level. Gain in dB and the meter's dBFS scale serve different purposes.

5. Understanding Preset, Voice, and Performance

5.1 Voice and Performance

A **Voice** is one sound; a **Performance** is an arrangement of sounds for playing. The Single / Performance tabs switch modes.

File	Extension	Main contents
Voice	.81v	Four operators, Algorithm, LFO, performance response; normal Save also includes Effects and Patch Volume
Performance	.81p	Eight embedded Voices, mixer, tuning/effect/Program Change tables, Effects, Patch Volume
Octave tuning	.81octtune	One octave of user tuning
Full tuning	.81fulltune	User tuning for 128 keys
Chord table	.81chord	Twelve pitch classes, four notes each
Program Change table	.81pctable	Mappings for 128 program numbers
MIDI Learn map	.s8m	CC assignments

SysEx .syx and .mid files exchange data with the hardware. Use .81v / .81p to retain software-specific settings.

5.2 Saving a Voice

Edit in SINGLE and click **Save** in the preset bar. Choose a name and destination. The filename becomes the library name.

5.3 A Performance Embeds Its Voices

Loading a Voice into a part copies its sound data into the Performance. Later editing or moving the source .81v does not automatically change the saved Performance. The .81p includes the part Voices when transferred to another system.

Loading a Voice into a part imports its operator and LFO settings. The Voice's own Effects chain is not used. Performance has one shared Effects chain.

5.4 Moving Between Modes

Part Voices and the Single Voice are independent. Switching tabs does not copy edits between them.

To edit a part, choose **Edit in Single...** from its Voice menu. Confirm replacement of the current Single buffer, saving it first if needed. After editing, return to PERFORMANCE and choose **Use current Single voice** on the intended part. Then save the Performance.

5.5 Save Scope and DAW Projects

Setting	Voice / Performance files
Sound and part settings	Included in the corresponding preset
Effects / Patch Volume	Stored per mode and included in normal Save
Master Volume / Master Tune / Polyphony	Not preset data; per-plug-in settings
Solo	Temporary audition state, not saved in a Performance
MIDI Learn	Separate map; retained in <code>.s8m</code> or the DAW session

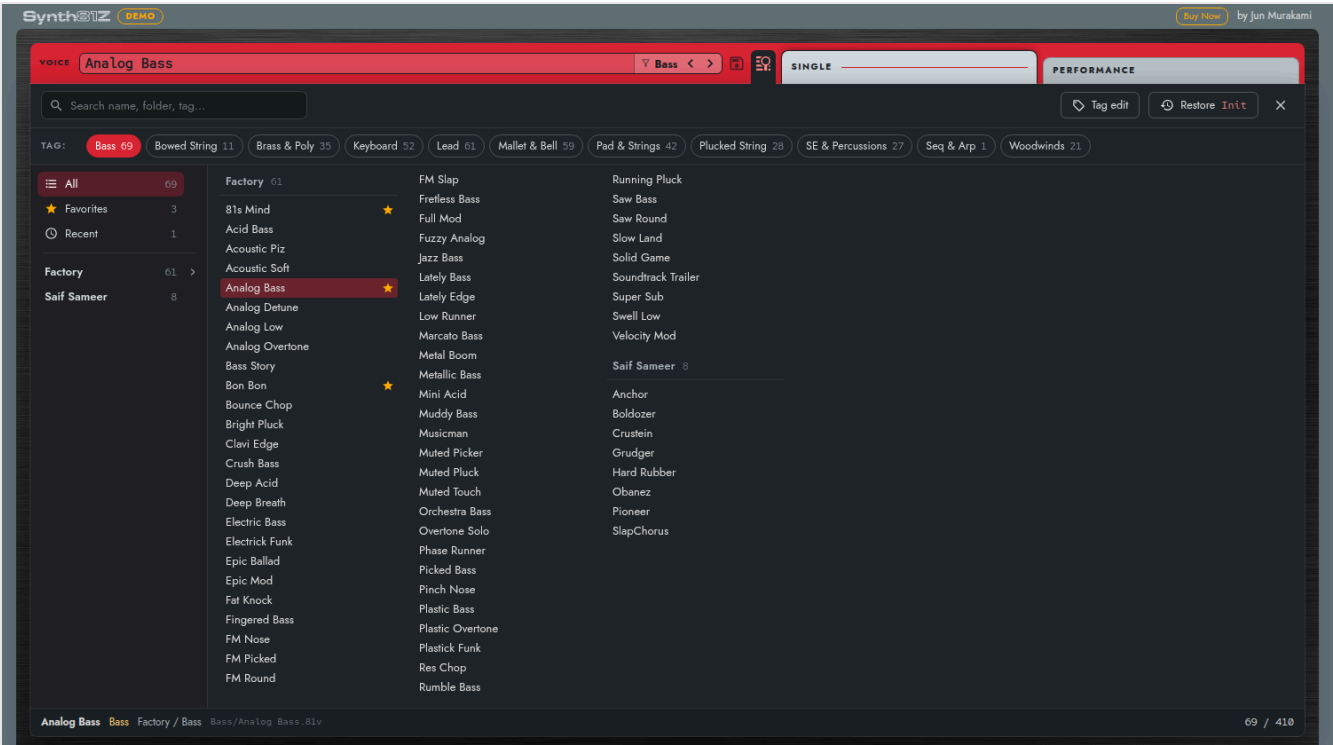
A DAW project stores the editing states of both Single and Performance, together with the current mode. Reopening the project activates the mode that was last in use.

5.6 Organizing the Library

Organize files in folders under Voices / Performances. The preset arrows navigate the same folder. After you load a preset from filtered results in the preset browser, they navigate those results instead (5.7). Save sounds made from built-in Init with your own names.

You can import Factory ROM A–D Voices from your own hardware. See Import in Chapter 11 for details.

5.7 Preset Browser



Press the **Preset browser** button to the right of Save in the preset bar to open the browser below the bar. It lists the whole 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.

Like the preset bar, the list shows Voices in Single and Performances in Performance. Change a Performance part's sound in the mixer's Voice column. Voices and Performances keep separate filters.

Filtering

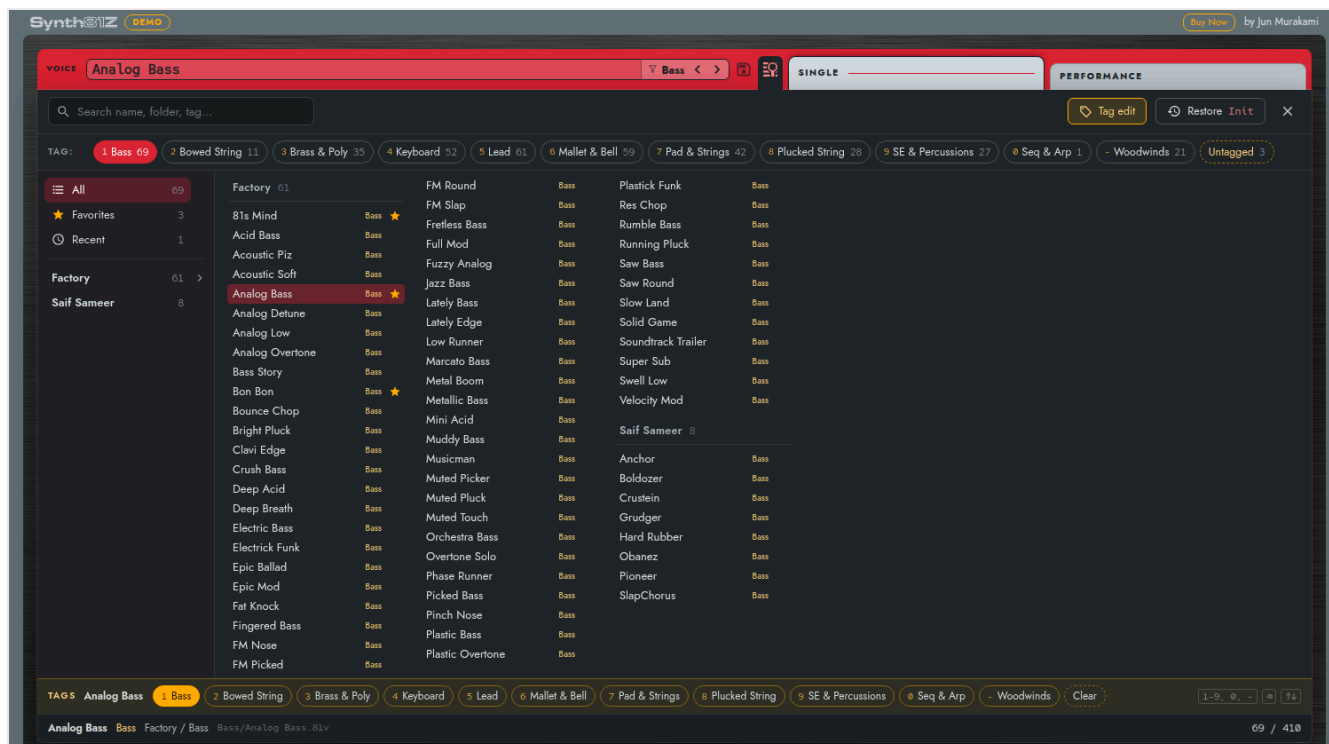
Item	Description
Search field	Matches part of the name, folder name, sound designer, and tags, ignoring upper and lower case. Words separated by spaces narrow the list to presets that contain all of them
TAG	Eleven tags that describe the type of sound (Bass, Bowed String, Brass & Poly, Keyboard, Lead, Mallet & Bell, Pad & Strings, Plucked String, SE & Percussions, Seq & Arp, Woodwinds). Selecting several shows presets that have any of them
Left column	All, Favorites (★), Recent, Factory (bundled), a folder for each sound designer, and User (presets you saved yourself). Click > to show the folders inside and choose a single folder

The search field, TAG, and the left column combine, and only presets 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. The bottom row shows the selected preset's name, tags, sound designer and folder, and file location, along with the number of filtered results and the total.

Auditioning and Choosing

- Clicking a row loads that preset immediately. The $\uparrow \downarrow$ keys load the previous and next presets and the $\leftarrow \rightarrow$ keys load the adjacent column, so you can compare them while playing.
- **Enter** keeps the current preset and closes the browser. **Esc** also closes it (the last preset you loaded stays loaded).
- **Restore** returns to the sound you had when you opened the browser, unsaved edits included. It is unavailable after you switch between SINGLE and PERFORMANCE with the browser open.
- Hover over a row to show a ★ at its right end; click it to add the preset to or remove it from Favorites. The row's right-click menu does the same.
- **Recent** lists up to 30 recently used presets, newest first. Loading alone does not add a preset: 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. Loading a Voice into a Performance part does not count.
- ★ and Recent are per-user settings shared by every instance.

Tags



A preset uses the tags saved in its file (`meta.tags` in the `.81v` / `.81p`) if there are any. Otherwise one tag is taken from the folder name, or, failing that, from the abbreviation at the start of the name.

Press **Tag edit** to show each row's tags and a tag editing bar at the bottom. Toggle tags on the selected preset with the keys **1–9, 0, and -** (in TAG order) or the buttons on the bar. A preset can have several tags.

Backspace (or Delete), or **Clear** on the bar, removes them all. Use the $\uparrow \downarrow$ keys to move on and keep tagging. While tag editing, **Untagged** appears in the TAG row so you can show only presets without tags. The row's right-click menu also toggles tags.

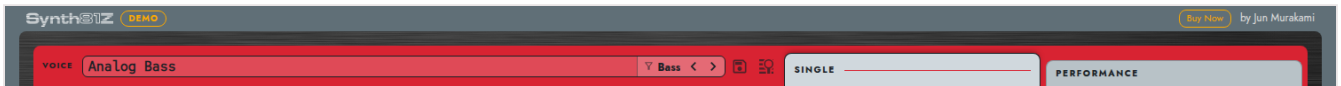
Tags are saved to the file each time you change them. The sound values and the file name do not change. Tags are kept when you overwrite the same file. The built-in Init and the Initialize Performances cannot be tagged.

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.

When bundled presets are renamed (such as the Saif Sameer presets in Ver. 1.0.4), copies under the old names that you have not edited are replaced with the files under the new names. Copies you have edited and saved are kept, and presets you deleted are not restored.

Cycling Range of ◀▶ and MIDI CC



After you load a preset from filtered results in the browser, the preset bar's arrows 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`); click it to open the browser. MIDI CCs assigned to the arrows (Chapter 10, 10.3) cycle through the same range. Choosing a preset from the preset bar's menu returns to cycling by folder.

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

6. Sound-Design Basics

If you are already comfortable with FM, you can skip this chapter. It connects what you hear with the controls you see. Chapter 7 provides exact ranges and conditions.

6.1 Operators and Algorithms

An operator generates a waveform and shapes its level with an envelope. Synth81Z has four.

An operator connected to the audio output is a **carrier**. One that modulates another operator is a **modulator**. The Algorithm chooses their connections, so an operator's role can change with the Algorithm.

One OP makes the sound; another shapes it

OP2: modulator
Modulates OP1



OP1: carrier
Connected to output



Sound you hear
Level and timbre

Start with Algorithm 1. Leave OP3 and OP4 Output at 0.

Arrows show signal flow. An OP's role depends on the Algorithm.



Algorithm 1 is OP4 → OP3 → OP2 → OP1, with OP1 as the carrier. Start with Init, leave OP3 and OP4 Output at 0, and listen to just OP1 and OP2.

6.2 Output: Loudness and Timbre

A carrier's **Output** mainly affects loudness. A modulator's Output changes modulation depth, affecting harmonics and the shape of the sound.

Output: the result depends on the OP's role

OP1 Output

Adjust the carrier



Mainly changes audible level

Use it to adjust the carrier's level

OP2 Output

Adjust the modulator



Changes modulation depth and harmonics

Use it to explore brightness and character

Higher values do not always mean brighter sound. Listen as you adjust.

1. Select Init and play a note.
2. Gradually raise OP2 Output from 0.
3. Lower OP1 Output and compare its level change with OP2's timbral change.

More modulation does not simply mean more brightness. At high depths, the harmonic balance changes substantially. Adjust by ear.

6.3 Frequency Ratios

Ratio sets frequency relative to the played note. Move Coarse and Fine and read the resulting ratio in Freq.

Ratio: how many cycles fit in the same time

OP1 1.00

OP2 1.00

OP2 2.00



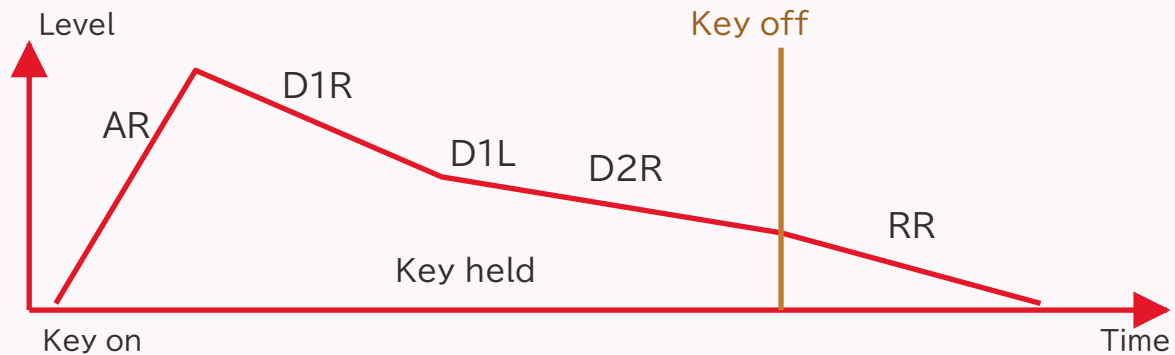
Conceptual source waves. Changing the ratio changes the resulting harmonics.

Leave OP1 at 1.00 and try OP2 at 1.00, 2.00, and 3.00. The harmonic pattern changes. Ratios between whole numbers can produce metallic spectra. **Fixed** instead uses an absolute frequency in Hz that does not track the keyboard.

6.4 Envelopes Shape Level and Timbre

A carrier envelope mainly shapes loudness; a modulator envelope mainly shapes timbre over time. With OP2 Output raised, increase OP2 D1R and lower D1L to create a bright onset that settles down.

EG: level from key-on through release



Not a time scale. Carrier EG shapes level; modulator EG mainly shapes timbre.

Control	Listen for
AR	Attack speed
D1R / D1L	Initial decay speed and its destination level
D2R	Continued decay while a key is held
RR	Decay after release

Note

Rate means speed, not duration. Higher AR / D1R / D2R / RR values are faster. Lower RR for a longer release.

Init has D1R at 0, so it holds its level while a key is down. To introduce decay, first raise D1R above 0 and lower D1L.

6.5 Try a Bass and a Bell

Short bass: From Init, raise OP2 Output and choose an OP2 ratio of 1.00 or 2.00. Give OP2 a quick decay, then set the overall duration with OP1's envelope. If the onset is too strong, lower OP2 Output a little.

Two-OP recipes: change one thing at a time

Short bass

1. OP2 Ratio: 1.00 or 2.00
2. Make OP2 decay fairly quickly
3. Shape note length with OP1 EG

Ringling bell

1. Try a non-integer OP2 Ratio
2. Slow OP1 decay and release
3. Let OP2 fade first for a clearer tail

For both, start with Algorithm 1 and OP3 / OP4 Output at 0.

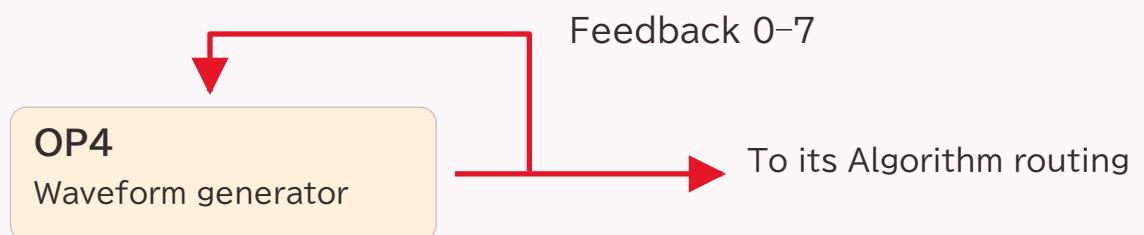
Ringling bell: Keep the two-operator structure, move OP2 away from a whole-number ratio, and lower OP1 D1R / D2R / RR for a longer tail. If OP2 fades before OP1, the sound starts complex and becomes purer.

There is no single required setting. Change only the ratio, Output, or envelope at first, and compare.

6.6 Waveforms and Feedback

W1 is a sine wave. W2–W8 already contain harmonics, so the same ratio and Output produce different results. Compare changing the carrier waveform with changing the modulator waveform.

Feedback: OP4 modulates itself



0: no feedback / Higher values: more complex waveforms

Conceptual routing. The result depends on the Algorithm and operator settings.

Feedback returns OP4's output to itself through the loop shown in the diagram. More feedback adds harmonics and can produce rough textures. Keep the listening level moderate while experimenting.

6.7 Playing Expression

Velocity Sens on a modulator changes timbre with playing strength. On a carrier, its effect is mainly level. LFO Pitch Depth / Pitch Sens create vibrato; Amp Depth / Amp Sens and each OP's Amp Enable create amplitude modulation.

Expression: from a playing gesture to a sound change

Play harder or softer

Velocity Sens



Changes operator output

Carrier: mainly level / modulator: mainly timbre

Add LFO movement

Depth + Sens



Pitch: tuning / Amp: operator amplitude

Amp also needs the OP's Amp Enable switched On

Build the core sound first, then finish with Effects and Patch Volume.

Finally, add texture or space with Effects and match preset levels with Patch Volume. Use Chapter 7 for the core sound, Chapter 8 for layers, and Chapter 9 for finishing effects.

7. Voice Parameter Reference

This chapter explains what each control changes, when it applies, and any important conditions.

7.1 Operator Basics



Each row represents one operator. From left to right, the controls cover waveform, frequency, Output, EG, and Scaling. Use this overview to locate the controls shown in the detailed images below.

On / Off and Wave Form



On / Off enables or silences an operator. Disabling a modulator removes its modulation; disabling a carrier removes its audio contribution. Voice files retain this state, but the hardware's standard Voice bulk data does not contain operator On / Off.

You can also toggle an operator by right-clicking anywhere within its area, including over knobs and the EG graph. Right-click again to restore its previous state. This is useful for comparing each operator's contribution to the sound.

Hold Ctrl (Command on macOS) or Shift and right-click anywhere within an operator's area, or click its operator number bar (including the On / Off control), to solo that operator so that only it stays On. Doing the same on another operator moves the solo there; doing it on the soloed operator releases the solo and turns every operator On (the On / Off states from before the solo are not restored).

Wave Form selects W1–W8. W1 is a sine wave; the other shapes are derived from a sine and contain harmonics. The same waveform has different effects in a carrier and a modulator.

Ratio / Fixed, Coarse, and Fine

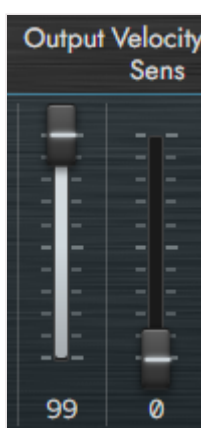


Control	Range / choices	Function
Freq	Ratio / Fixed	Frequency relative to the key, or absolute Hz
Coarse	0–63	Coarse adjustment; Ratio uses a 64-entry table
Fine	0–15	Fine adjustment above Coarse
Fixed Range	255 Hz / 510 Hz / 1 / 2 / 4 / 8 / 16 / 32 kHz	Frequency band in Fixed mode
Detune	-3 to +3	Small pitch offset; 0 is centered

Ratio Coarse selects ratios from 0.50 to 25.95. **Coarse 4 is ratio 1.00**. Do not read the step number as the ratio. Freq shows the resulting value including Fine.

Fixed uses an absolute frequency rather than following keyboard pitch. Higher ranges cover more frequency at coarser resolution. The highest band includes aliasing, as on the hardware.

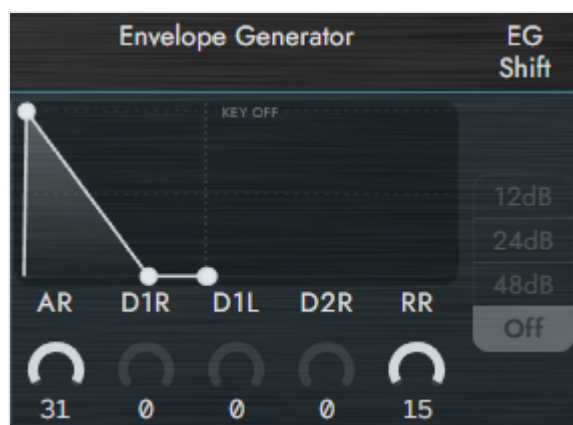
Output and Velocity Sens



Output (0–99) sets operator level. It mainly controls loudness on a carrier and modulation depth on a modulator. The relationship between the number and level is not linear.

Velocity Sens (0–7) sets sensitivity to playing strength. At 0, velocity does not change operator level. Higher values reduce its output more on soft notes. On a modulator, this makes timbre respond to velocity.

7.2 Envelope Generator



The envelope controls operator level from note-on to release. Graph handles correspond to the controls. Read the graph as a relationship between stages, not as a fixed time scale in seconds.

Label	Range	Function / condition
AR (Attack Rate)	0–31	Attack speed; larger is faster. At 0 the envelope does not rise
D1R (Decay 1 Rate)	0–31	Decay toward D1L; 0 holds this stage
D1L (Decay 1 Level)	0–15	First decay's destination; 15 is maximum, 0 minimum
D2R (Decay 2 Rate)	0–31	Further decay while held; 0 sustains D1L
RR (Release Rate)	1–15	Release speed; 1 slowest, 15 fastest
EG Shift	Off / 48dB / 24dB / 12dB	Raises the envelope floor; OP1 is fixed Off

Higher rates make the envelope faster and the sound shorter. RR has no zero setting. With D1R at 0, the envelope does not progress toward D1L, so changes to D1L or D2R may not produce the expected result.

EG Shift limits attenuation below the peak. A modulator can keep contributing after its decay. For an ordinary release tail, check RR and Reverb Rate first.

7.3 Keyboard Scaling



Rate Scaling (0–3) speeds up the envelope on higher keys. It affects decay and release as well as attack. Zero means no scaling.

Level Scaling (0–99) reduces operator output toward the upper keyboard. It changes level on a carrier and modulation on a modulator. Adjust the modulator if the upper range becomes too harsh.

7.4 Algorithm and Feedback

Algorithm (1–8) selects the connections. Algorithm 1 is serial; Algorithm 8 has four independent carriers. Follow the diagram's lines to identify which operators reach the output.

Feedback (0–7) sets OP4's self-modulation. Zero disables feedback. Higher values make the waveform more complex and can produce rough textures. Changing Algorithm also changes the route from OP4 to the output.

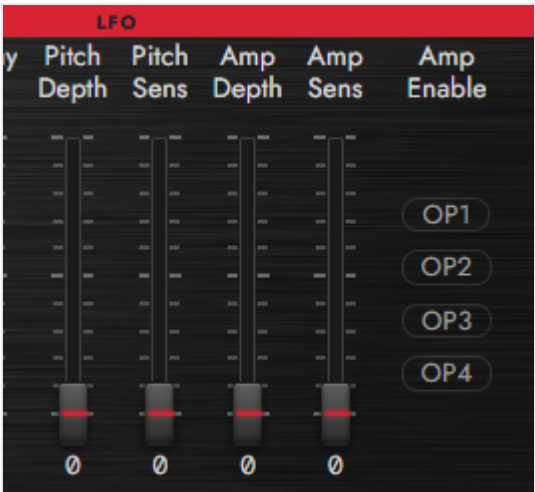
7.5 LFO

Shape, Speed, and Onset



Label	Range / choices	Function
Wave Form	Saw Up / Square / Triangle / S/Hold	Modulation shape; S/Hold changes between held random values
Speed	0–99	Larger values run faster
Delay	0–99	Delayed onset of modulation after a note
Sync	On / Off	Restarts LFO phase with note-on

Pitch and Amplitude Modulation



Label	Range / choices	Function
Pitch Depth	0–99	Pitch modulation depth
Pitch Sens	0–7	Sensitivity to pitch modulation
Amp Depth	0–99	Amplitude modulation depth
Amp Sens	0–3	Sensitivity to amplitude modulation
Amp Enable	On / Off per OP	Operators receiving amplitude modulation

Pitch Depth has no effect with Pitch Sens at 0. Amplitude modulation needs Amp Depth, Amp Sens, and the corresponding OP’s Amp Enable. Modulating only a modulator changes timbre as well as the resulting level.

Caution

This LFO’s Sync means keyboard synchronization. It is not the Effects rack’s BPM synchronization and does not select DAW note values.

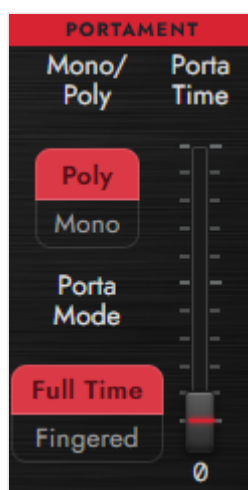
In Performance, each part can choose Own, shared LFOs, or Vib. See Chapter 8.

7.6 Mod Wheel



MOD WHEEL Pitch Range / Amp Range (0–99 each) set modulation from CC1. Also check LFO sensitivities and operator Amp Enable.

7.7 Mono / Poly / Portamento



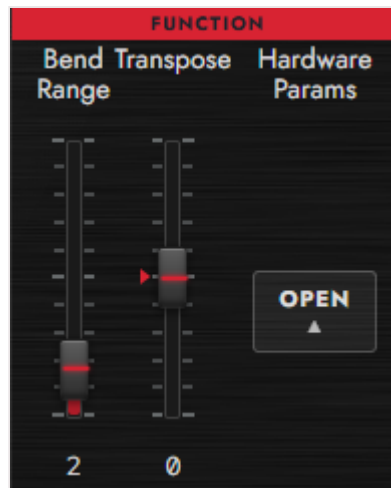
Mono / Poly selects monophonic or polyphonic playing. Mono uses last-note priority. Poly is limited by Settings Polyphony and, in Performance, the part's Voices allocation.

Porta Time (0–99) sets pitch transition duration; 0 is immediate. **Porta Mode** selects the trigger condition.

Mode	Behavior
Full Time	Glide when the portamento switch is On and Time is above 0
Fingered	Glide on overlapping notes in Mono. Set Time to 0 to stop it

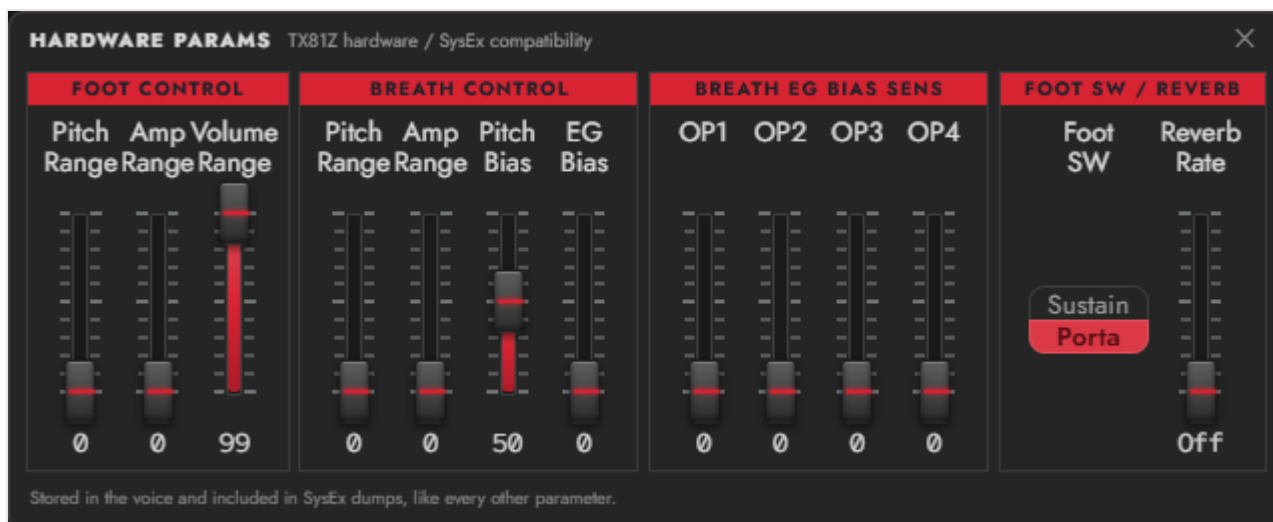
Fingered applies in Mono. Poly uses Full Time. Distinguish MIDI CC65 from the hardware Foot SW assignment in Hardware Params.

7.8 Function



Bend Range (0–12) sets pitch-bend range in semitones. Zero disables pitch change. **Transpose (-24 to +24)** transposes the Voice in semitones; Performance part Shift is separate.

7.9 Hardware Params



Open **Hardware Params** → **OPEN** to edit the following. These advanced settings provide TX81Z compatibility and also affect Synth81Z without connected hardware.

Item	Range / choices	Function / condition
Foot Control Pitch Range / Amp Range	0–99 each	Pitch / amplitude modulation from CC4
Foot Control Volume Range	0–99	Foot-controller level range
Breath Control Pitch Range / Amp Range	0–99 each	Modulation from CC2 or channel aftertouch
Breath Control Pitch Bias	0–99; center 50	Direct pitch offset independent of LFO; 50 is neutral
Breath Control EG Bias	0–99	Breath-controlled envelope level amount
Breath EG Bias Sens (OP1–4)	0–7 each	Each operator's sensitivity to EG Bias
Foot SW	Sustain / Porta	Exclusive hardware foot-switch assignment
Reverb Rate	0–7	Shapes the low-level envelope tail; 0 is Off

Breath EG Bias sets the amount, and each OP's Sens sets its response. A zero setting on either side disables that path. Channel aftertouch uses the breath-control path.

Note

Voice **Reverb Rate** changes envelope decay. It is distinct from the spatial **Reverb** in the Effects rack.

8. Performance Reference

Performance combines up to eight parts. Each holds a Voice and responds according to its key range, channel, and other settings.

8.1 Layering Two Sounds

- 1. Switch to **PERFORMANCE** and start from Init.
- 2. Reduce part 1 **Voices** from 8 to 4, then set part 2 to 4.
- 3. Select each row's **Voice**. If the library is empty, create and save a Voice in Single first.
- 4. Set **HARDWARE MIDI** to **All**, so all parts receive all MIDI channels.
- 5. Balance Volume and Pan, then Save an `.81p` from the preset bar.

Voices is allocated per part. A 4+4 layer gives each sound four notes; it does not provide eight simultaneous layered keys.



8.2 Part Controls

Column	Range / behavior
Voice	Copies a sound into the part

Column	Range / behavior
Voices	0–32 notes; 0 disables the part. Total must fit Polyphony
Key Lo / Key Hi	MIDI notes 0–127, both endpoints included
Detune	-7 to +7, small inter-part pitch offset
Shift	-24 to +24 semitones
Pan	Continuous L100 through C to R100
Volume	0–99
M	Mute output while retaining voice allocation
S	Audition one part; click again to release Solo

For a split, set adjacent Key Hi / Key Lo boundaries. If both include the same boundary key, both sound there. Mute does not free Voices; lower the allocation to make it available elsewhere.

Caution: a red Voices heading

An over-capacity Performance is silent on all parts and cannot be saved. This can happen when Polyphony is reduced from 16 to 8, for example. Raise Polyphony or reduce part Voices until the total fits. While over capacity, only decreases to Voices are accepted.

When a Performance is received from the hardware, each Voice field shows the bank, number, and received name, for example “A01 Voice Name.” Names are retained in `.81p` files and DAW sessions. Re-import older data from the hardware to add names that were not previously retained.

8.3 Editing a Part Voice

Choose **Edit in Single...** in the Voice menu. Confirm that the current Single buffer will be replaced.

After editing in Single, return to PERFORMANCE and choose **Use current Single voice** on the target row. This transfer is explicit, not automatic. Choose **Export as .81v...** to save an individual part Voice.

8.4 HARDWARE: MIDI and LFO

Open **HARDWARE** below the mixer to reveal hardware-compatible channel settings and common settings. These parameters are part of the Performance.

MIDI All sends all channels to every part. **Multi** follows each part’s **Rcv Ch (1–16 / OMNI)**. To play parts from separate DAW tracks, choose Multi and match their channels.

LFO	Meaning
Own	Independent LFO from the part’s Voice; a software extension
Off	No LFO modulation

LFO	Meaning
LFO 1	Shared source from the first active part
LFO 2	Shared source from the second active part
Vib	Hardware-derived vibrato path

With a shared LFO, changing only your own Voice may not change the source waveform or speed. Start with Own for independent Voice behavior. Sending to hardware converts Own to supported hardware modes (Chapter 11).

Assign offers Normal / Alternate. Normal plays eligible parts together; Alternate cycles through eligible parts for alternating performance.

8.5 Micro Tuning

A part's **μ Tune** On uses the common **Table**. Off does not use it.

Choices are **Oct (user) / Full (user)** and **1 Equal, 2 Pure (major), 3 Pure (minor), 4 Mean tone, 5 Pythagorean, 6 Werckmeister, 7 Kirnberger, 8 Vallotti & Young, 9 1/4 Shift equal, 10 1/4 tone, 11 1/8 tone**. Key applies only to presets 2–5.

Micro tuning — user octave table

Stored inside this Performance (.81p). Edits reach the TX81Z as parameter changes while a MIDI OUT port is open.

Equal temperament

Table

2 Pure (major)

Key

C

Copy built-in table

Receive from TX81Z

Send to TX81Z

Load...

Save...

Key · Note · Fine (1/64) · Offset

C	C3	+00	0.0c
C#	C#3	+00	0.0c
D	D3	+00	0.0c
D#	D#3	+00	0.0c
E	E3	+00	0.0c
F	F3	+00	0.0c
F#	F#3	+00	0.0c
G	G3	+00	0.0c
G#	G#3	+00	0.0c
A	A3	+00	0.0c
A#	A#3	+00	0.0c
B	B3	+00	0.0c

Close

35 / 60

Open **Edit...**, or **Empty...** for an unset table. Oct repeats twelve tuning relationships across octaves; Full specifies each of 128 keys. Coarse selects pitch and Fine uses 1/64-semitone steps. **Equal temperament** provides a starting point. An unset table has no editable values yet.

Load... / Save... exchanges a table separately. Saving a Performance includes its tables. With direct MIDI OUT open, editing or loading a table also sends it to the hardware; read Chapter 11 first.

8.6 Delay / Pan / Chord

HARDWARE **Effect** selects one of Off / Delay / Pan / Chord. These use the hardware's note and performance processing and are included for compatibility. They are separate from the lower audio Effects rack. Selection or retrigger operations can stop sounding notes.

Delay

Repeats delayed notes. **Time is 0.01–1.28 s, Pitch -24 to +24 semitones, Fb 0–7, and Level 0–99.**

Unlike an audio delay, it does not simply replay a recorded waveform. Its result depends on voice allocation and the sound settings.

Pan

Creates changes between hardware outputs I and II. **Dir is I → II / II → I, Select is LFO / Velocity / Note, and Range is 0–99.** Choose the source of the change. 3 (?) preserves an undefined received value; normally choose one of the three defined sources.

This effect depends on output assignment and part configuration. When comparing hardware behavior, use the continuous mixer Pan's reference positions L100 / C / R100.

Chord

Chord table

Stored inside this Performance (.81p). Edits reach the TX81Z as parameter changes while a MIDI OUT port is open.

Up to 4 notes per key as semitone offsets (-24 ... +24, — = unused). Playing the key sounds the chord; it costs 4 voices.

Clear allEdit...Save...

	NOTE 1	NOTE 2	NOTE 3	NOTE 4
C	0	+4	+7	—
C#	0	+4	+7	—
D	0	+4	+7	—
D#	0	+4	+7	—
E	0	+4	+7	—
F	0	+4	+7	—
F#	0	+4	+7	—
G	0	+4	+7	—
G#	0	+4	+7	—
A	0	+4	+7	—
A#	0	+4	+7	—
B	0	+4	+7	—

Close

Open **Edit...** to assign up to four intervals per pitch class. Each is -24 to +24 semitones; — means unused. Include 0 to retain the original pitch. Allocate enough Voices for the chord. A separate table uses `.81chord`.

8.7 Program Change

Program Change table

Stored inside this Performance (.81p). Edits reach the TX81Z as parameter changes while a MIDI OUT port is open.
For TX81Z hardware: PC 1–128 → I01–D32 voice or PF01–PF24 Performance. The plugin does not switch sounds on Program Change.

Reset (PC n → voice n) Receive from TX81Z Send to TX81Z Load... Save...

PC 1	I01	PC 33	A01	PC 65	B01	PC 97	C01
PC 2	I02	PC 34	A02	PC 66	B02	PC 98	C02
PC 3	I03	PC 35	A03	PC 67	B03	PC 99	C03
PC 4	I04	PC 36	A04	PC 68	B04	PC 100	C04
PC 5	I05	PC 37	A05	PC 69	B05	PC 101	C05
PC 6	I06	PC 38	A06	PC 70	B06	PC 102	C06
PC 7	I07	PC 39	A07	PC 71	B07	PC 103	C07
PC 8	I08	PC 40	A08	PC 72	B08	PC 104	C08
PC 9	I09	PC 41	A09	PC 73	B09	PC 105	C09
PC 10	I10	PC 42	A10	PC 74	B10	PC 106	C10
PC 11	I11	PC 43	A11	PC 75	B11	PC 107	C11
PC 12	I12	PC 44	A12	PC 76	B12	PC 108	C12
PC 13	I13	PC 45	A13	PC 77	B13	PC 109	C13
PC 14	I14	PC 46	A14	PC 78	B14	PC 110	C14
PC 15	I15	PC 47	A15	PC 79	B15	PC 111	C15
PC 16	I16	PC 48	A16	PC 80	B16	PC 112	C16
PC 17	I17	PC 49	A17	PC 81	B17	PC 113	C17
PC 18	I18	PC 50	A18	PC 82	B18	PC 114	C18
PC 19	I19	PC 51	A19	PC 83	B19	PC 115	C19

Close

This table is for use on the connected TX81Z. **The plug-in does not switch Voices or Performances in response to MIDI Program Change.** There is no plug-in Receive setting.

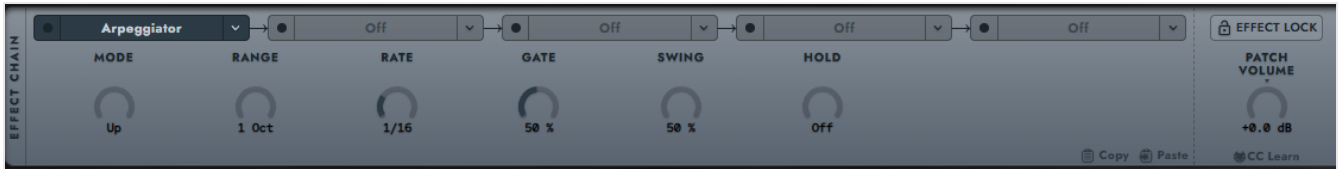
The table maps 128 incoming numbers to I01–D32 Voices or PF01–PF24 Performances. The editor displays 1–128; MIDI data uses 0–127. Check your DAW's numbering convention if selections are off by one.

The table is included in the Performance and can be saved separately as `.81pctable`. Editing or loading it while direct MIDI OUT is open sends it to the TX81Z. Configure Program Change reception on the hardware itself.

9. Effects

Synth81Z Effects form a five-slot serial chain for shaping tone and space.

Single and Performance each have their own chain. In Performance, the parts are summed before the rack; there is no separate audio rack for each part.



9.1 Operating the Chain

The signal runs from left to right: Slot 1 → 2 → 3 → 4 → 5 → Patch Volume → Master Volume.

- Click a tab body to edit that slot.
- Click its down arrow to choose a Type: Off or one of twelve effects.
- The dot on the left toggles Bypass. Lit means enabled.
- Drag a tab horizontally to change the processing order.
- Copy / Paste duplicates the complete chain settings.

You can copy and paste effect chains in both directions between Synth81Z and Synth-80 / Synth-80FX. Click Copy in the source Effects rack, then Paste in the destination Effects rack. This works in both Single and Performance modes in Synth81Z. The copy includes the Type, parameters, and Bypass state of all five slots; it does not include Patch Volume or Effect Chain Lock.

Changing Type resets that slot's parameters to the new effect's defaults. Save settings you want to keep first. Click a knob's readout for numeric entry; selector controls such as Model use their listed choices.

9.2 Effect Chain Lock

With **EFFECT LOCK** On, loading a Voice / Performance or switching modes preserves **both the current chain and Patch Volume**. Use this to compare sounds through the same processing.

With the lock Off, mode changes switch to the corresponding chain and reset the previous reverb/delay tail. Loading a Voice that has no effects data leaves the current chain in place.

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).

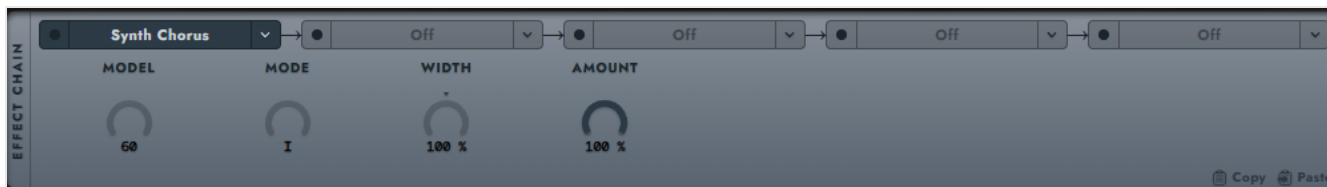
Off

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).

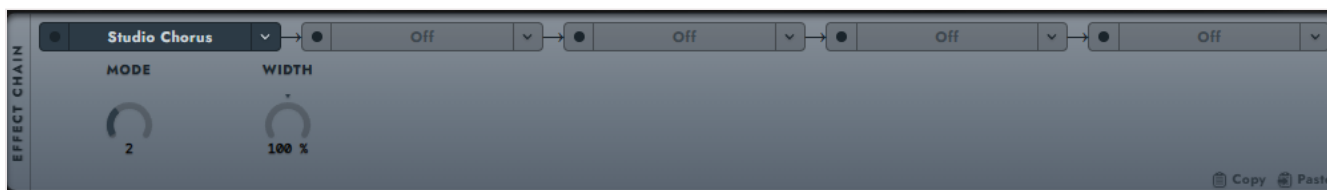
Rate / Depth are fixed values within the model; rather than being adjusted by the user, this reproduces the feel of the classic synth choruses you select with a button.



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.
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.

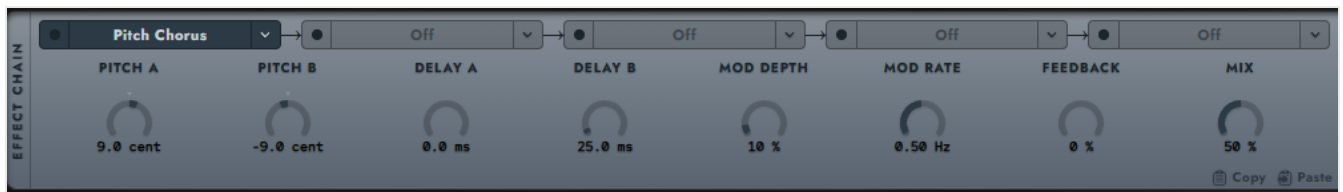


Label	Unit	Range / Choices	Initial value	Role
Mode	—	1 / 2 / 3 / 4	2	Rack-chorus-style mode presets. 1 = a longer delay for a soft, restrained spread. 2 = a shorter delay and deeper modulation, adding thickness and spread. 3 = faster movement for a studio-chorus-like spread. 4 = an emphasized setting that pushes Mode 3's wet a little further forward.

Label	Unit	Range / Choices	Initial value	Role
Width	%	0–200%	100 %	The width of the generated chorus component. 0% = no wet-side spread, 100% = default, 200% = wider.

Pitch Chorus

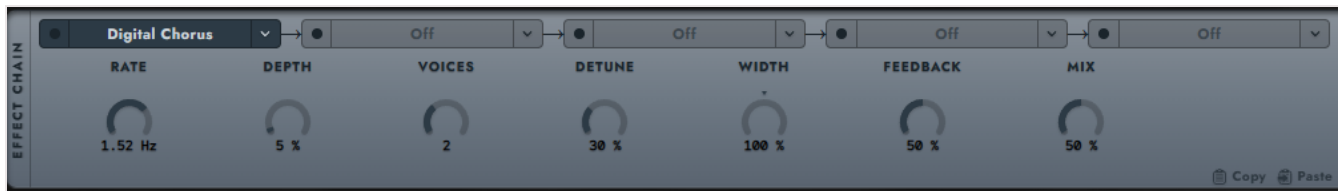
A detune chorus in the style of 1980s rack harmonizers that creates thickness by slightly shifting the pitch. Its principle differs from other choruses that wobble the delay time with an LFO: it makes the left and right voices slightly different in pitch and produces the spread from that beating.



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

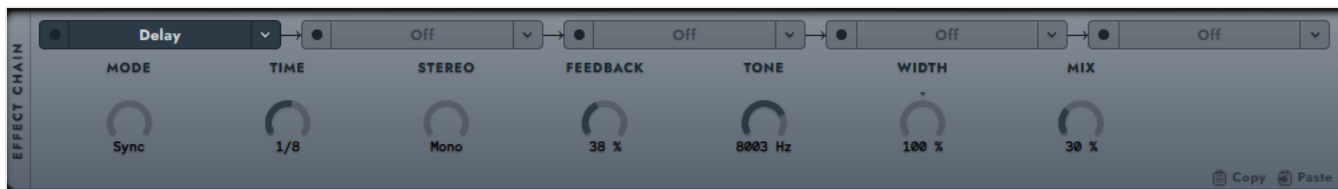
A general-purpose digital chorus. It runs multiple Voices in parallel and uses Detune to scatter how each Voice wobbles, creating thickness and spread.



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.

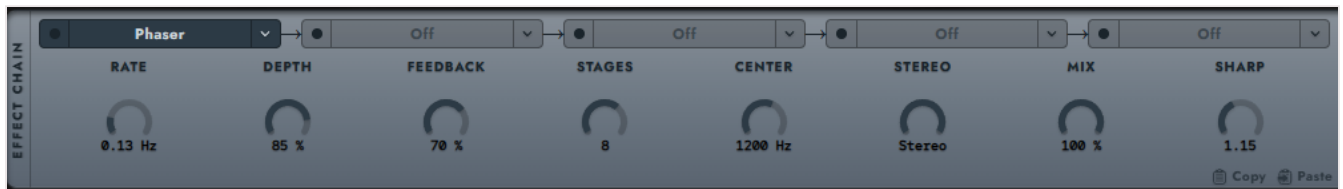


Label	Unit	Range / Choices	Initial value	Role
Mode	—	Sync / Free	Sync	How the delay time is specified. Sync = synced to the host BPM, Free = direct ms specification.
Time (Sync)	note value	1/64–1/2	1/8	The note value when synced to BPM. Displayed only when Mode = Sync .
Time (Free)	ms	1–2000 ms	350 ms	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.

Label	Unit	Range / Choices	Initial value	Role
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.
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.
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.
Threshold	dB	-60 to 0 dB	-12 dB	The threshold. Signals exceeding it are compressed.

Label	Unit	Range / Choices	Initial value	Role
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

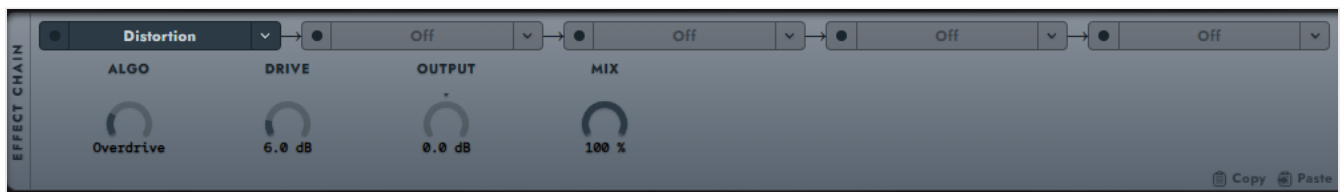
Choice	Meaning
Clean	A transparent VCA type. The fastest and most neutral, acting straightforwardly according to the set values.
Opto	An optical-compressor-style curve. Program-dependent and smooth, with slower onset and release.
FET	A fast, aggressive 1176 type. The attack is snappy and punchy.
Vari-Mu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

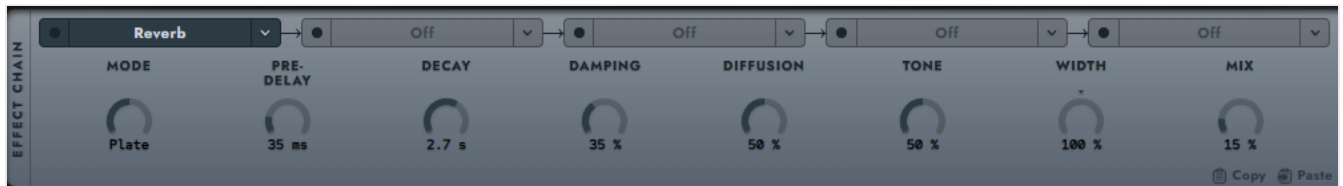
Label	Unit	Range / Choices	Initial value	Role
Output	dB	−24 to +12 dB	0 dB	The output trim after distortion (0 dB is the center detent).
Mix	%	0–100%	100%	Wet / Dry mix. Usually fully wet for flavoring.

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.
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.

Label	Unit	Range / Choices	Initial value	Role
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.

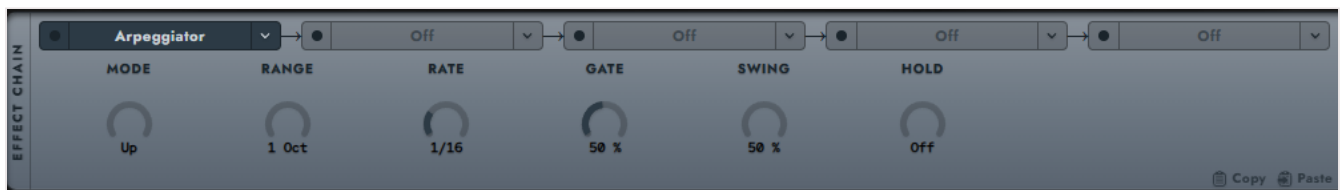
Mode choices

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.

Label	Unit	Range / Choices	Initial value	Role
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 100% Gate, steps join legato. See Chapter 7 for Mono and Portamento conditions.

9.4 Patch Volume

PATCH VOLUME ranges from -12 to +12 dB, default 0 dB. It trims the sound after the rack and is included in normal Voice / Performance saves. EFFECT LOCK preserves its current value when loading a preset.

Double-click the knob or click its readout for direct entry. Ctrl / Command-click restores the default. See Chapter 12 for the difference from Master Volume.

9.5 Automation and MIDI Learn

Effect parameters support host automation. CC Learn addresses the slot and the visible knob position, so check assignments after reordering. **Patch Volume supports host automation but is not a CC Learn target.** See Chapter 10.

10. MIDI, MIDI Learn, and Automation

10.1 Normal MIDI Input

Performance MIDI comes from the DAW track or Standalone MIDI settings. See Chapter 8 for All / Multi and Rcv Ch.

Message	Main use
Note On / Off, Velocity	Playing, releasing, and note strength
Pitch Bend	Pitch change within the Voice's Bend Range
CC1	Mod Wheel
CC2 / channel aftertouch	Breath Control expression path
CC4	Foot Control
CC5	Portamento Time
CC7	Performance volume, separate from Patch / Master Volume
CC64 / CC65	Sustain / Portamento
Program Change	Does not switch plug-in sounds. See Chapter 8 for the hardware table

Polyphonic aftertouch and channel aftertouch are different messages. Aftertouch in this manual means channel aftertouch.

10.2 Learning a Controller

1. Click **CC Learn** beside Effects.
2. Click the overlay on the control you want to assign.
3. Move a physical knob or fader on your MIDI controller.
4. Its CC number appears. Click **CLOSE** to finish Learn.



The first CC is used only for assignment; subsequent movement changes the value. A CC may address multiple targets. Remove an individual assignment through its display; **CLEAR** clears the whole map.

10.3 Targets and Restrictions

Controls showing a Learn overlay are available, including Voice controls and visible Effects knobs. Patch Volume is not a CC Learn target.

The preset arrows are also targets. A rising transition to CC 64 or above advances once; repeated high values do not keep advancing. Single navigates Voices and Performance navigates Performances within the same folder. After you load a preset from filtered results in the preset browser, they navigate those results instead (Chapter 5, 5.7).

Performance supports each part's **Pan / Volume / Mute / Solo**. Mute / Solo use 64–127 for On and 0–63 for Off. Voices, key range, Detune, and **HARDWARE** tables are not Learn targets.

CC120–127 cannot be learned. Learning CC1 / 2 / 4 / 5 / 7 / 64 / 65 suppresses that CC's normal function. If Mod Wheel stops behaving normally after learning CC1 elsewhere, check the map.

10.4 Knob Mode

During Learn, choose **Knob Mode** to control what happens when physical and on-screen positions differ.

Mode	Behavior
Jump	Immediately follows the incoming absolute value
Pickup	Waits until the hardware reaches or crosses the current value
Scaling	Follows smoothly from the current value and reaches the endpoint with the physical knob; the default

Set the controller to send **absolute 0–127 values**. Relative encoder modes are not supported. Knob Mode is stored as a user preference.

10.5 Saving and Loading Maps

Use **SAVE / LOAD** for `.s8m` maps. Saving a sound preset does not export its MIDI map.

SET DEFAULT stores a map for new instances. To use an empty map by default, **CLEAR** the map and save that as the default if desired. DAW sessions also retain the instance's assignments.

10.6 Reordering Effects and Automation

Effects CC Learn addresses **slot and visible knob position**. Moving an effect does not make the assignment follow that effect. Changing Type may give the same knob position another role.

For host automation, choose from the parameters exposed by your DAW. Voice, Effects, and Patch Volume parameters are distinct from Performance file actions and table editors. Supported Performance mixer fields can be controlled through CC Learn.

Enable the DAW's Write / Touch mode to record panel gestures as host automation. Record CC messages on a MIDI track for CC automation. If both control the same value, check for unwanted overwriting.

Selecting direct SYSEX ports does not configure your DAW's keyboard or MIDI Learn input.

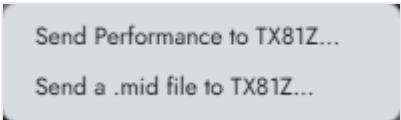
11. SysEx and TX81Z Integration

Synth81Z imports hardware Voices, Performances, and tables, and sends edits back. **Automatic mirroring is active while direct MIDI OUT is open.** Transmission is not limited to pressing Dump; read this chapter before connecting.

11.1 Connection and Preparation

Connect **interface MIDI OUT → TX81Z MIDI IN**, and **TX81Z MIDI OUT → interface MIDI IN**. Separate audio cables are required to hear the hardware. MIDI does not carry audio.

- 1. Back up the hardware banks and UTILITY data you need to retain.
- 2. Enable Exclusive reception on the TX81Z and check its basic receive channel.
- 3. Open the MIDI icon to the right of **SYSEX** in Synth81Z and select the connected **MIDI IN / OUT** ports.
- 4. Allow time for connection recognition. Release the ports from other applications if they are occupied.



With both directions connected, replies can establish the basic receive channel and hardware state. The transmit channel is not necessarily the basic receive channel. Check the latter especially when using output only.

11.2 Automatic Mirroring

Action	Hardware destination
Single Voice parameter edit	Voice parameter change
Loading a Voice or switching to SINGLE	Single edit buffer
Loading a Performance or switching to PERFORMANCE	Performance edit buffer
Supported mixer part / common edits	Performance parameter changes
Master Tune	SYS TUNE
Editing / loading user tuning, Chord, or Program Change tables	Corresponding table bulk data
TX81Z-compatible SysEx received through host MIDI input	Applied locally and forwarded to direct OUT

Automatic Performance mirroring does not write all embedded part Voices to the hardware I bank. Use **Send Performance to TX81Z...** (§11.5) for that. Local Voice selection and Own LFO are among the actions that do not map to one hardware parameter.

Caution: mode switching can change hardware settings
With working IN / OUT, mode synchronization uses the hardware PLAY operation and its replies. **With OUT only, or when PLAY replies cannot be confirmed, PGM CHANGE SW is changed to com , and Program Change table entry 128 is overwritten with PF1 / IO1. These changes are not automatically restored.** Record the original settings first if you need to restore them afterward.

Master Tune is sent once when OUT opens and again after value changes. As a SYS setting, it moves the hardware display to UTILITY. Table transmission may turn Memory Protect Off when needed. Re-enable protection on the hardware afterward if required.

Loading a Performance or switching tabs alone does not send all UTILITY tables. Explicit transmission, or editing/loading a table, applies them.

11.3 Importing Files or Hardware Data

Import changes with Single / Performance mode.

- **From file:** Select `.syx` / `.mid` containing TX81Z SysEx, then choose a destination. The data is converted to Voice or Performance library files. You can select several files at once to convert them in one go: the destination is asked only once, a file holding a bank (two or more Voices / Performances) gets its own subfolder named after the file, and a file holding a single Voice / Performance is written straight into the destination (clashing names get " (2)"). The completion dialog lists any file that could not be converted, with the reason.
- **From hardware bank:** Request the Voice or Performance bank and write it to the library.
- **Current hardware Voice / Performance:** Read the edit buffer into the current editing state.

Reading the current edit buffer replaces unsaved local edits. Save them first. Wait for completion or an error rather than repeatedly requesting dumps.

Receiving a Performance from the hardware requires **both direct MIDI IN and OUT**. After reading its settings, Synth81Z selects the Voices referenced by all eight parts on the TX81Z in turn and requests each Voice dump. The sound data and ten-character names are embedded in the `.81p`. Importing a Performance bank repeats this for PF01–PF24 and takes several minutes.

The process temporarily changes hardware Voice selection and Program Change settings, then restores the original settings and edit buffers. Avoid operating the hardware during reception. If you cancel, wait for restoration to finish. An incomplete Performance is not applied or saved when acquisition fails.

Importing from a file does not request Voices from the hardware. A Performance file alone may not provide its referenced Voice data. Performances with unresolved Voices are skipped; use hardware reception to obtain them. Raw hardware ROM A–D data is not bundled with the product.

11.4 Exporting Exchange Files

Export writes the current Voice / Performance as a MIDI file for hardware exchange. Use normal Save to preserve the Effects rack and software extensions.

Single's **Bank Builder** assigns Voices to 32 I01–I32 slots and creates one bank `.mid`. Empty slots become Init. This does not automatically preserve the hardware's current contents in those slots.

Bank Builder — TX81Z internal bank (I01–I32)

Choose up to 32 voices from the library (empty slots get Init). The .mid holds one VMEM bulk; send it with Dump → "Send a .mid file to TX81Z..." to overwrite I01–I32 on the unit.

SLOT	VOICE	SLOT	VOICE
I01	Init	I17	Init
I02	Init	I18	Init
I03	Init	I19	Init
I04	Init	I20	Init
I05	Init	I21	Init
I06	Init	I22	Init
I07	Init	I23	Init
I08	Init	I24	Init
I09	Init	I25	Init
I10	Init	I26	Init
I11	Init	I27	Init
I12	Init	I28	Init
I13	Init	I29	Init
I14	Init	I30	Init
I15	Init	I31	Init
I16	Init	I32	Init

Cancel

Create .mid

11.5 Sending to Hardware

Current Voice

Single **Dump** → **current Voice to TX81Z** sends to the edit buffer. It does not permanently store an internal Voice slot. Use the hardware's store operation if you want to keep it there.

Performance

Performance **Dump** → **Send Performance to TX81Z...** requires **both direct MIDI IN and OUT**.

The Performance's Voices are written to the hardware I bank. **Existing Voices in the destination slots are replaced.** Back up any I-bank Voices you want to retain before sending.

1. Choose the first I slot.
2. Optionally choose a PF slot to store the Performance.
3. Review **What will be written**, including part-to-I-slot assignments and converted settings.
4. Check the highlighted overwrite destinations, click **Overwrite and send**, and wait for completion.

Send to TX81Z

 **This overwrites voices in the TX81Z I bank**
Overwrite: I01 (1 voices)
 The existing voices in these slots will be lost. Back up any voices you want to keep before sending.
The Performance stored in PF01 will also be overwritten.

The voices of the active parts are written into the internal voice bank (I01–I32) of the TX81Z, then the Performance is sent to its edit buffer. The unit's banks are read first, so every slot this Performance does not write keeps its contents. Memory Protect is switched off on the unit if it is on.

DESTINATION

First I slot
I01

☒ Also store the Performance in PF01

WHAT WILL BE WRITTEN

- INST 1 → I01 Init
 own LFO → LFO 1 · Rcv ch 1 → OMNI (MIDI routing: all parts follow any channel)
- INST 2 → I01 Init (same voice as INST 1)
 own LFO → LFO 2 · Rcv ch 2 → OMNI (MIDI routing: all parts follow any channel)
- Performance → edit buffer
- Performance → PF01

Cancel Overwrite and send

Caution: hardware memory is overwritten

The selected I slots are replaced. If PF storage is selected, that PF slot is replaced too. The plug-in reads current banks before writing and preserves unrelated slots, but not the contents of the selected destinations. Back up first. Even without PF storage, the part Voices are written to the I bank.

Sending .mid / .syx

File Dump sends the SysEx contained in the file. Banks and UTILITY data can replace the corresponding hardware memory. Check the file's contents and destination before sending.

11.6 Differences on Hardware

Synth81Z feature	Hardware conversion
More than eight allocated Voices	Proportional allocation to eight slots, at least one per active part
Continuous Pan	Output I / I+II / II positions
Mute	Output Off
Own LFO	Shared LFO for the first / second active parts; Vib approximation for later parts

Synth81Z feature	Hardware conversion
MIDI All	Receive channels set for all-channel reception
Solo	Temporary audition, not a stored hardware setting
Effects rack / Patch Volume / Master Volume	Not applied on the hardware

Polyphony, modulation, and stereo placement may change. Keep the original .81p , review the preview, and listen to the hardware result.

11.7 Troubleshooting Communication

Check cable directions, selected ports, Exclusive, basic receive channel, and port ownership. Completion of an output-only operation does not prove that the hardware accepted the data.

Close direct OUT when you no longer want to edit the hardware. Otherwise, later preset loads and tab changes continue to mirror.

12. Settings and Processing Load

12.1 Master Tune

MASTER TUNE adjusts overall tuning from **-64 to +63**, centered at 0. Each step is 1/64 semitone, approximately 1.5625 cents. It is separate from the semitone transposition of Voice Transpose or Performance Shift.

Master Tune is not saved in Voice / Performance files. With direct MIDI OUT open, connection and value changes send SYS TUNE, moving the hardware display to UTILITY.

12.2 Polyphony

The default is **16 voices**.

POLYPHONY selects **8 / 16 / 24 / 32** simultaneous voices. Eight corresponds to the hardware scale; higher values are software extensions and increase processing load.

Keep the Performance Voices total within this limit. Reducing Polyphony below the allocation makes all parts silent and prevents saving. Reduce Voices or raise Polyphony to recover. Polyphony is not stored in presets.

12.3 Master Volume and Patch Volume

PATCH VOLUME (-12 to +12 dB) matches levels between Voices / Performances. It follows Effects and precedes Master Volume. It is saved with the preset; EFFECT LOCK prevents preset loading from changing it.

The rightmost VOLUME (Master Volume, -30 to +12 dB) is final instance gain. Its default is 0 dB and it is not stored in presets. Reduce output when the meter runs high and check the DAW for clipping.

Part Volume, MIDI CC7, and operator Output also affect level. Modulator Output changes timbre too, so use Patch Volume for simple preset-level matching.

12.4 Display, Language, and Help

Resize using the lower-right grip. Window size is saved for your user environment. HINT Eng / Jp changes the hint language. HELP opens the PDF or online manual.



12.5 Reducing CPU Load and Dropouts

Try fewer simultaneous voices, bypassing or disabling unnecessary effects, and increasing the host/audio device buffer size. Mute does not reduce a Performance part's allocation; set unused part Voices to 0.

13. Support

13.1 Start with the Symptom

Symptom	First checks
No sound	MIDI input, track monitoring, audio output, Master Volume; Chapter 2
Only Performance is silent	Voices total versus Polyphony; red means over capacity; Chapter 8
One part is silent	Voices=0, Mute / Solo, Volume, key range, All / Multi and Rcv Ch
A Voice is silent	Carrier On / Output / AR and controller settings; Chapter 7
Periodic noise	DEMO status and license activation; Chapter 2
Pedal or Mod Wheel does not work	MIDI Learn assignment of the same CC; Chapter 10
Cannot save	Voice capacity, write permission, filename
Hardware sounds different	I-bank Voices, hardware conversion, Effects, allocation, LFO; Chapter 11
Hardware moved to UTILITY	SYS changes such as Master Tune; Chapter 11
PDF does not open	Install a package containing PDFs and check HELP language; Chapter 2

13.2 What to Include in a Report

Use the support contact on the site where you obtained the product, and include:

- OS, DAW, Synth81Z version, and plug-in format.
- Sample rate, buffer size, and Polyphony.
- Mode, sound, exact reproduction steps, and expected behavior.
- An `.81v` / `.81p` / `.s8m` or screenshot when useful.
- For hardware issues: MIDI interface, IN / OUT connections, basic receive channel, and Exclusive setting.
- The log immediately after the problem.

13.3 Logs

The log is `%TEMP%\synth81z.log` on Windows and `$TMPDIR/synth81z.log` on macOS.

It is overwritten at startup and shared by instances. Copy it after the issue, before starting another DAW instance or Standalone. Review personal paths before sending it. Do not attach license keys or passwords.