FIFTH WAVE OWNER'S MANUAL

1998: four synthesis engines in one blue 76-key body, known ever since as the Blue Beast. Fifth Wave runs its firmware on an emulated board, with all four of its synthesis engines, its effects, its sequencer and its disk drives, and adds a voice editor that draws every parameter. This manual shows how to play it, how to find your way among its voices and performances and, above all, how to shape them in the voice editor.

Formats VST3 · AU · CLAP · LV2

Systems macOS 13 or later, Apple Silicon and Intel · Windows 10 and 11, 64-bit · Linux, x86-64

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CHAPTER 0

ABOUT THIS MANUAL

The Blue Beast was its maker's flagship synthesizer: four tone generation systems in one instrument, called *Extended Synthesis*. Sample playback (AWM2), physical modelling of wind and string instruments (VL), virtual analog (AN) and a note-dependent effect processor (FDSP), with a full effects section, a sequencer and an arpeggiator around them. Fifth Wave does not imitate the Blue Beast. It runs the instrument's own firmware on emulated processors, the two SWP30 tone generator chips with their DSP, the floppy disk controller and the SCSI interface, so the voices, the effects and the sequencer behave as on the original.

The manual follows the order of the introductory section of the original's owner's manual: the system and its synthesis engines, setting up, selecting voices, the structure of a voice, the controllers, the performances, the sequencer and the effects. Where the hardware asks you to step through its display pages, Fifth Wave's voice editor does the same job on one screen, so most procedures here are done in the editor. The original's own pages are still there, on the panel's display, for everything the editor does not cover.

Some topics of the original manual do not apply to a plugin and are left out: power and cables, the keyboard and its wheels, the audio inputs and the A/D gain, the backup battery and the optional boards. Fifth Wave receives notes and controllers over MIDI from your DAW.

Conventions

WRITTEN AS	MEANS
VOICE	A key on Fifth Wave's panel.
COMPARE	A button, tab, page or label in the voice editor or the patch browser, as it reads on screen.
Voice Play	Text on the panel's display.
P1-001	A voice: its bank (P1 and P2 are the preset banks, I1 and I2 the Internal ones) and its number, 001 to 128.
C3	A note, named as the hardware names it: C3 is MIDI note 60, middle C.
0…127	A range of values, from 0 to 127.

The screenshots show Fifth Wave 1.0 with the factory voices, mostly P1-001 *Natural Grnd* and P1-077 *Trumpet*. Click any screenshot to open it at full size.

CHAPTER 1

FIFTH WAVE BASICS

The EX system has four parts: the controllers and MIDI that play it, the sequencers that can play it by themselves, the tone generators that make the sound, and the effects that shape it on the way out.

`MIDI · CONTROLLERS` + `SONG · PATTERN · ARPEGGIO` → `AWM2 · VL · AN · FDSP` → `EFFECTS` → `OUT`

The four synthesis engines

AWM2: sampled waves

Advanced Wave Memory plays sampled waveforms, 16-bit at 44.1 kHz, through a filter, an amplifier, envelopes and LFOs for each of them. The original has 419 preset waves in its wave ROM, from grand pianos to drum hits, and can load more from disk into its sample memory. Drum voices put a different wave, with its own pitch, level and filter, on each key.

VL: physical modelling

Virtual Acoustic synthesis computes a model of a wind or bowed instrument while you play: a reed, a pair of lips or a bow drives a tube or a string. The original brings 256 such *instruments* in ROM, plus 16 places for your own, and plays one VL note at a time. It is the same technology as in the instrument Velum recreates, on the Blue Beast's own chips.

AN: analog physical modelling

Two oscillators with sync, ring modulation, FM and noise, a resonant filter and an amplifier: a model of a classic analog synthesizer, from the same family as the instrument Anamorph recreates.

FDSP: formulated digital signal processing

An effect processor that knows which note and velocity each element plays, so it can model things a normal effect cannot: the pickup of an electric piano or guitar, a string being picked, a flanger tuned to the note. FDSP has ten types and sits between the AWM elements and the rest of the effects.

Voices and elements

A voice is made of one to four **elements**. Each element is a complete sound with four stages, as on every EX: the *oscillator* (the wave, the VL instrument or the AN oscillators), the *pitch* with its envelope, the *filter* with its envelope and the *amplitude* with its envelope. LFOs and the controllers act on all of them. The elements then share one chain of effects.

`OSCILLATOR` → `PITCH` → `FILTER` → `AMPLITUDE` → `EFFECTS`

Which elements a voice can combine is fixed by its **voice type**:

VOICE TYPE	ELEMENTS	POLYPHONY
AWM	1 to 4 AWM elements	up to 126 notes
Drum	a drum kit: a wave per key	up to 126 notes
VL + AWM	1 VL element and up to 3 AWM elements	1 VL note, plus the AWM elements'
AN (Poly) + AWM	1 AN element and up to 3 AWM elements	2 AN notes, plus the AWM elements'
AN (Layer) + AWM	2 AN elements and up to 2 AWM elements	1 AN note, plus the AWM elements'
FDSP	1 to 4 AWM elements into the FDSP	16 notes
AN + FDSP	1 AN element and up to 3 AWM elements into the FDSP	1 AN note, 8 FDSP notes

The original has 256 preset voices in two banks, **P1** and **P2**, and 256 Internal voices you can overwrite, **I1** and **I2**. The list is in Appendix A.

Performances

A **performance** combines up to 16 voices as *parts*. Parts can be layered on the same keys, split across the keyboard, switched by velocity, or played on separate MIDI channels by the sequencer or your DAW. There are 128 performances. See chapter 11.

The effects

Every voice has two insertion effects, **Insertion S** and **Insertion L**, which it can switch on or off per element, and two system effects, **Chorus** and **Reverb**, fed by send levels. FDSP voices add their FDSP stage in front. The effects share the hardware's DSP with the VL, AN and FDSP engines, which is why a performance can use insertion effects on more parts when it plays AWM voices only. See chapter 9.

What Fifth Wave adds

- A **voice editor** with a page for each part of a voice, where envelopes, filters, zones and effects are drawn and dragged.
- A **patch browser** that reaches any voice or performance in one click, and a **library** that loads the original's disk files.
- The VL instruments themselves, all their data, on an **Expert** page, and 16 places to keep your own.
- Sync to your DAW's tempo and transport, automation of the knobs and controllers, and the whole machine saved in your project.

- Editing **the hardware** over MIDI with the same editor (macOS).

CHAPTER 2

THE PANEL AND THE EDITOR

Fifth Wave opens on its front panel, laid out like the rack version. The panel plays and selects, and gives access to every page of the original's own display. The voice editor is one click away.



Fifth Wave's front panel. The numbers match the list below.

1. The **logo**. Fifth Wave carries its own name: the original's names are not on the panel.

2. VOICE PERFORM SONG PATTERN SAMPLE select the play modes. The lit LED shows which one is on.

3. EDIT JOB STORE UTILITY DISK open the edit pages, the jobs, the store function, the system settings and Disk mode for the mode you are in.

4. SC1 SC2, the knob scene keys, are drawn but do nothing yet. The voice editor sets the scenes: see The six knobs.

5. The **display** is the original's, drawn with its own fonts. Click it to open the patch browser. Right-click it (or control-click) for the display's colours, the panel's finish and the ROM panel: see Colours and finish.

6. SHIFT, F1 ... F8 and EXIT. What each function key does is written on the display's bottom line, just above it. EXIT leaves a page. SHIFT does nothing yet.

7. The six **knobs**. Drag up or down, or turn the mouse wheel over one. The arc shows the value from 64, the voice as stored; under each knob, what it drives in the voice that plays. Right-click a knob to make it learn a MIDI controller: see The six knobs.

8. ARPEG switches the arpeggiator of the voice or performance on and off and shows its page. KEYMAP switches Key Map mode. KNOB and BYPASS do nothing yet.

9. VOICE EDITOR opens the voice editor on the voice that Voice mode plays.

10. The **status line**: Fifth Wave's version, its load (how much of real time the emulation takes) and the dropouts counted since it started. OUT LPF switches the output filter on and off; HOST SYNC makes the arpeggiator and the sequencer follow your DAW: see chapter 12.

11. CANCEL and CURSOR do nothing yet.

12. The **data dial** steps through values, voices and performances. Drag it round, or turn the mouse wheel over it; a fast turn moves fast, as on the hardware.
13. DEC/NO and INC/YES step one at a time, and answer the display's questions. The **cursor keys** move the cursor on the display.
14. ENTER confirms, and opens the page under the cursor.
15. The **transport keys** TOP REW FWD REC STOP PLAY run the song and pattern sequencer.
16. POWER restarts the emulated instrument, as switching the hardware off and on: it starts again from the voices and performances in its memory.

> **NOTE**
>
> The rack version's bank and number keys are not on the panel: the patch browser reaches any voice or performance in one click. There is no floppy slot, volume knob or A/D gain either. The floppy drive is still in the machine and the library drives it for you: see chapter 13.

Colours and finish

Right-click the display for its menu. DISPLAY COLORS offers nine schemes: Original (the default), Blue (retrofit), Grey STN, Yellow-green, Black on white, White on black, Amber, Green OLED and Red. PANEL chooses the body's finish: DARK BLUE, as the rack version, or SILVER, after a limited edition of the original. The display's scheme also colours the patch browser and the voice box of the editor, and the voice editor follows the panel's finish. Both choices are kept for every instance you open afterwards. The menu's last item, SHOW THE ROMS..., opens the ROM panel.



The display's menu: colour schemes, panel finish and the ROM panel.



The silver finish, after the original's limited edition.

The voice editor at a glance

Click VOICE EDITOR. The window grows to the editor's size and shows the voice that Voice mode plays. Click < PANEL or press ESC to go back. You can resize the window by its corner; the panel and the editor scale together.



The voice editor on the **Common** page, with P1-001 Natural Grnd.

The header

< PANEL; the **voice box**, a piece of the display in its colours with the voice's bank, number, name and category (click it for the patch browser); < and >, which step to the previous and next voice; MIDI, for the hardware; COMPARE; undo and redo; STORE.

The tabs

COMMON, one tab per element, EL 1 to EL 4, each with its type (AWM, VL, AN, or OFF when the voice does not use it), and EFFECTS.

The module chips

On an element's tab, a row of chips chooses the module: for an AWM element WAVE & ZONE, PITCH & PEG, FILTER & FEG, AMPLITUDE & AEG, LFO 1 & 2, KEY SCALING and STATIC EQ. At the right of the row, a summary of the element: its key range, volume, pan and whether it feeds the FDSP.

The page

On the left, the pictures, where you drag points; on the right, every parameter of the module as a row with its value.

The footer

What the edits do on the left, and how to edit on the right.

CHAPTER 3

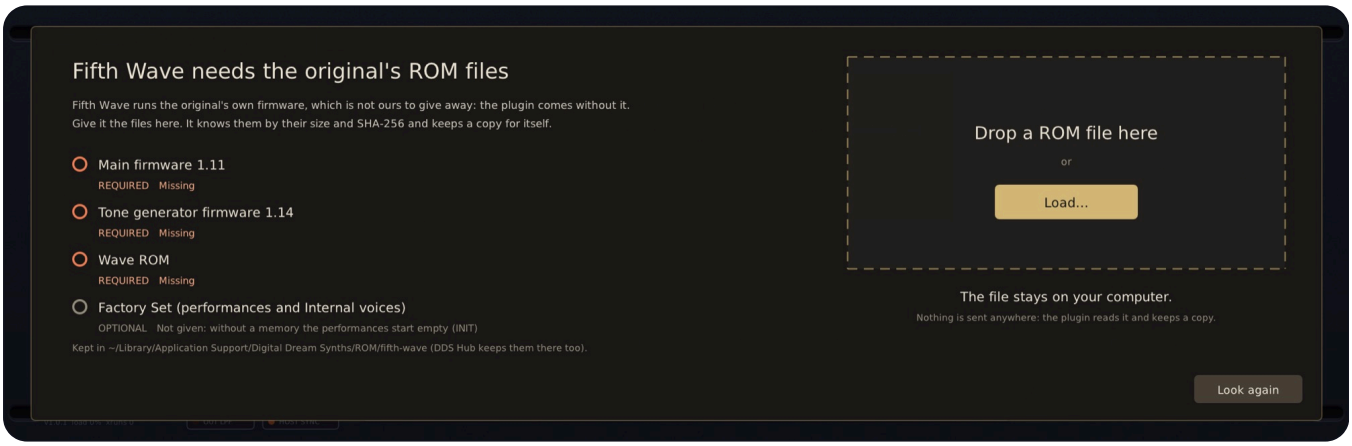
SETTING UP

What you need

- **macOS 13 or later**, on Apple Silicon or Intel: VST3, AU or CLAP. **Windows 10 or 11**, 64-bit: VST3 or CLAP. **Linux** on x86-64, with glibc 2.35 or later: VST3, CLAP or LV2.
- A DAW that hosts instrument plugins.
- **The original's ROM files**: the main board's firmware 1.11 (`main111.bin`), the tone generator's firmware 1.14 (`tg114.bin`) and the wave ROM image. They do not ship with Fifth Wave: you give them to it once, and it keeps a copy.
- A MIDI keyboard or controller. The original's knobs, wheels and ribbon arrive as MIDI controllers: see chapter 10.

Giving Fifth Wave its ROMs

Until it has its ROM files, Fifth Wave shows its **ROM panel** in place of the instrument's panel: a row for each file, what it is and whether Fifth Wave has it, and an area to give it the files.



The ROM panel of a new Fifth Wave: the three files it needs, and the optional Factory Set.

1. **Give it a file.**
   Drop it on the panel (macOS), or click LOAD... and choose it.

2. **Fifth Wave checks it.**
   It knows each file by its size and its SHA-256 checksum, whatever its name, and keeps a copy. A file it does not know is not kept: the panel shows its size and checksum instead, so that you can compare them.

3 **It looks for the others.**
Fifth Wave then looks at the other files in the same folder, not in its subfolders, for the rows still missing. It reads only the files of a ROM's size and keeps only those it knows, so when all the files are in one folder, one is enough. Each row says which file it came from.

4 **The instrument starts.**
When the three required files are there, the panel goes away and the emulated instrument boots.

Fifth Wave keeps the files in the ROM folder that DDS Hub uses too: `~/Library/Application Support/Digital Dream Synths/ROM/fifth-wave` on macOS, `%APPDATA%\Digital Dream Synths\ROM\fifth-wave` on Windows and `~/.local/share/digital-dream-synths/rom/fifth-wave` on Linux. A file given to DDS Hub works in Fifth Wave, and the other way round. Each start reads the files and checks them again. They never leave your computer. To see the panel later, right-click the display and choose SHOW THE ROMS....

Fifth Wave keeps its other files in a **support folder**, beside the ROM folder: `~/Library/Application Support/Digital Dream Synths/fifth-wave` on macOS, `%APPDATA%\Digital Dream Synths\fifth-wave` on Windows, `~/.local/share/digital-dream-synths/fifth-wave` on Linux. It holds your **memory** (the Internal voices and the performances), your **library** of disk files, the samples you loaded, the knobs' MIDI assignments and the display settings.

Fifth Wave 1.0.2 and earlier kept the support folder on its own: `~/Library/Application Support/FifthWave`, `%APPDATA%\FifthWave` or `~/.local/share/FifthWave`. The first start of a later version moves that folder into the new place. If it cannot be moved, Fifth Wave copies it and leaves the old one where it was, and you can delete the old one. If both folders are there, Fifth Wave uses the new one and leaves the old one alone.

> TIP
> The test versions before 1.0 read the ROM files from the support folder's `roms` folder, or from the places written in a `config.txt` there. Fifth Wave still looks there after the ROM folder. While the panel shows, LOOK AGAIN makes it look there again.

The first start

Add Fifth Wave to an instrument track. While the emulated instrument boots, the display reads `Starting...` and a bar under it fills; the original's greeting follows, then `Voice Play` with P1-001. The first start runs the whole boot, about 14 seconds of machine time, which takes two or three seconds on a recent Mac. Fifth Wave then keeps the started machine in the support folder, and the next instances are ready in a fraction of a second. After a change to the ROMs, the memory or the samples, one start runs the whole boot again.

Fifth Wave is an instrument with a stereo output and no audio input. In Voice mode it receives MIDI on every channel, as the hardware does when left at `R.Ch=omni`. Each instance runs on one processor core and takes about 130 MB of memory.



Voice Play mode after the start: **P1-001 Natural Grnd**.

The Factory Set

The original's ROM holds its preset voices, P1 and P2, but not its performances or its Internal voices. Its maker shipped those on floppy disks as the *Factory Set*, and the instrument kept them in its battery-backed memory. A fresh Fifth Wave starts the same way as a Blue Beast whose memory was cleared: every performance and every Internal voice is `INIT`.

The Factory Set files are on the original demonstration disks, which owners' sites still offer as a download: `FACTSET1.S1Y` to `FACTSET4.S1Y`. The four differ only in Internal voices I1-001 to I1-032.

The simplest way is the ROM panel: give it one of the four files, its fourth row. Whenever Fifth Wave starts with no memory of its own, it loads the Factory Set from there, as the hardware's *Load Synth All* does, and your first change keeps it in the memory. To load it from the library instead:

1. **Open the library.**
   Click the display, then LIBRARY.

2. **Add the file.**
   Click IMPORT and choose `FACTSET1.S1Y`. It is copied into your library.

3. **Show its performances.**
   Use < and > to bring FACTSET1 PERF up and click it.

4. **Load it all.**
   Click LOAD ALL. The 128 performances and both Internal banks are written into memory, as *Load Synth All* does on the hardware; your system settings stay.

The memory is kept in the support folder from then on, for every instance. See What Fifth Wave keeps.

Playing the demo songs

The demonstration disks also carry the demo songs, `DEMO1.S1A` to `DEMO4.S1A`, with their own samples. Import one in the library, show its performance bank, DEMO1 PERF, and click LOAD ALL: Fifth Wave puts the file on the emulated floppy or, when it is bigger than a floppy, on the emulated hard disk, and lets the original's

own Disk mode load it, songs, samples and system settings included. That takes a minute or so; the display shows each step. Then press SONG and PLAY.

> **TIP**
> A demo song loads its own performances and voices into memory, over the Factory Set. Load `FACTSET1.S1Y` again afterwards, or click RESTORE in the library, which puts the memory back as it was when this instance started: see chapter 13.

CHAPTER 4

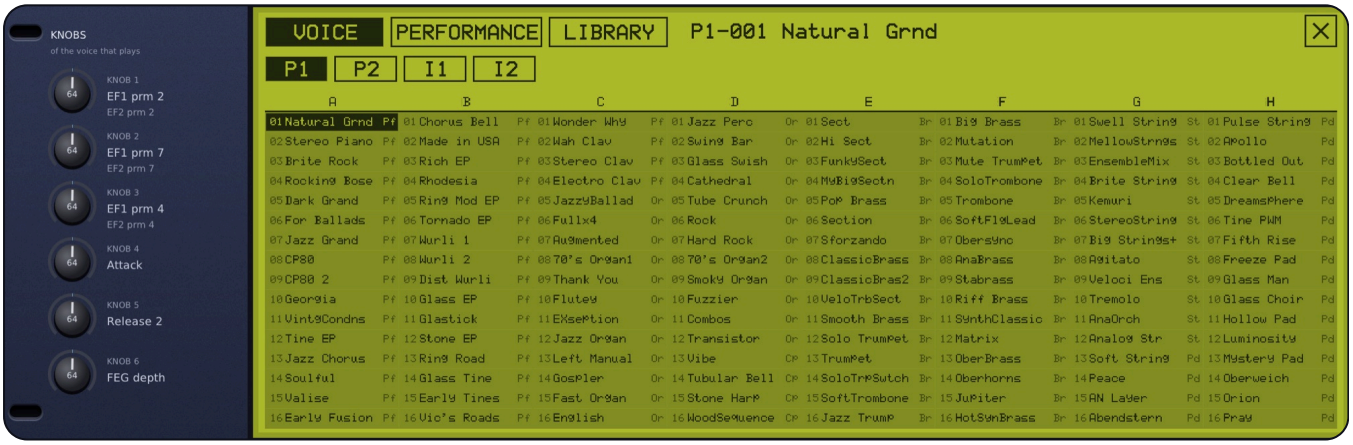
SELECTING VOICES AND PERFORMANCES

On the panel

Press VOICE for Voice mode or PERFORM for Performance mode. In Voice mode, F1 to F4 choose the bank, P1, P2, I1 or I2, as the display's bottom line shows. Turn the data dial, or press INC/YES and DEC/NO, to step through the voices or the performances.

The patch browser

Click the display, or the voice box in the editor. The browser opens over the panel with all 128 programs of a bank at once, laid out as the hardware's banks A to H (the columns) and numbers 1 to 16 (the rows). Each name carries its category, Pf, Or, Br, St, Pd and so on, and the program that plays is highlighted.



The patch browser on bank **P1**.

- VOICE and PERFORMANCE choose what the grid lists; P1 P2 I1 I2 choose the voice bank. LIBRARY opens the library.
- A click selects a program as the panel would, switching the mode when needed. It takes about half a second, and it does not depend on the instrument's MIDI settings. Clicking the program that already plays does nothing, so a held note is not cut.
- The browser stays open, so you can try one voice after another. A double click, × or ESC closes it and goes back to where you opened it from, the panel or the editor.
- On the left, the six knobs of what plays, with what each one drives.

The names are read from the emulated instrument each time the browser opens: the presets from its ROM, the Internal voices and the performances from its memory.

From your DAW

Fifth Wave answers program changes as the hardware does. In Voice mode, a bank select chooses the bank first: controller 0 (MSB) at 63, then controller 32 (LSB) at 0 for P1, 1 for P2, 2 for I1 or 3 for I2, then the program change, 0 to 127 for voices 001 to 128. In Performance mode a program change selects a performance. Each program change reloads the voice, as on the hardware, and puts the knobs back to the voice's values.

In the voice editor, < and > beside the voice box step through the bank.

CHAPTER 5

EDITING A VOICE

The voice editor edits the voice that Voice mode plays. It works through the emulated instrument itself: each change you make goes to the firmware as a *Parameter Change* message, as if a computer editor were connected to its MIDI input, and the editor then shows what the firmware's edit buffer holds. What you hear is always what the firmware does with the value.

Open it with VOICE EDITOR on the panel. In Performance mode, or on a drum kit, it says that it edits voices in Voice mode: performances and drum kits are edited on the panel, see chapter 11 and chapter 8.

Changing a value

- **Drag** a row's bar sideways, or turn the **mouse wheel** over it. Hold SHIFT for fine steps.
- Click a **button** in a row of choices, such as a filter type or a wave shape.
- Drag a **point** in a picture. The page's title says what the two directions do, for instance DRAG A POINT: RATE SIDEWAYS, LEVEL UP on an envelope.

The value is written next to each row in the original's own units and names.

> **NOTE**
> The pictures of the AWM pages are drawn from the parameters' own steps: they show the shape of an envelope or a filter, not its exact times in seconds or its frequencies in hertz, which its maker never documented. The effects and the VL pages, where those laws are known, are drawn to scale.

The Common page

The COMMON tab holds what belongs to the whole voice (see the screenshot in chapter 2).

Elements on the keyboard

Each element's key range as a bar over the keyboard, with its type, range, velocity range and volume. Drag an end of a bar to move that note limit, its middle to move both. An element that is off is listed as OFF. The line under them sums up the voice: how many elements, and their velocity ranges.

Voice

The voice's VOLUME, VELOCITY SENSE DEPTH and OFFSET, REVERB SEND and CHORUS SEND, the pitch-bend range BEND UP and BEND DOWN; ASSIGN (Single: a new note on the same key cuts the old one; Multi: they overlap), AWM Mono or Poly, and portamento: PORTA off or on, FINGERED (only between legato notes) or FULL TIME.

Knobs: initial value and scenes

The six knobs of the voice. Each has three values: its *initial* value, which it takes when the voice is selected, and the values of *scene 1* and *scene 2*. Drag a knob for its initial value, or drag one of the three chips under it

sideways; the coloured dots around the knob show the three (lime the initial value, blue scene 1, orange scene 2). Under each knob, what it drives.

Control sets: source > destination

The voice's sixteen *control sets*. Each connects a source, such as the modulation wheel, a knob, the ribbon or aftertouch, to a destination, such as the cutoff, a parameter of an effect or the pitch, with a depth that can be negative. Click a source to choose another; drag a destination or the depth bar. See chapter 10.

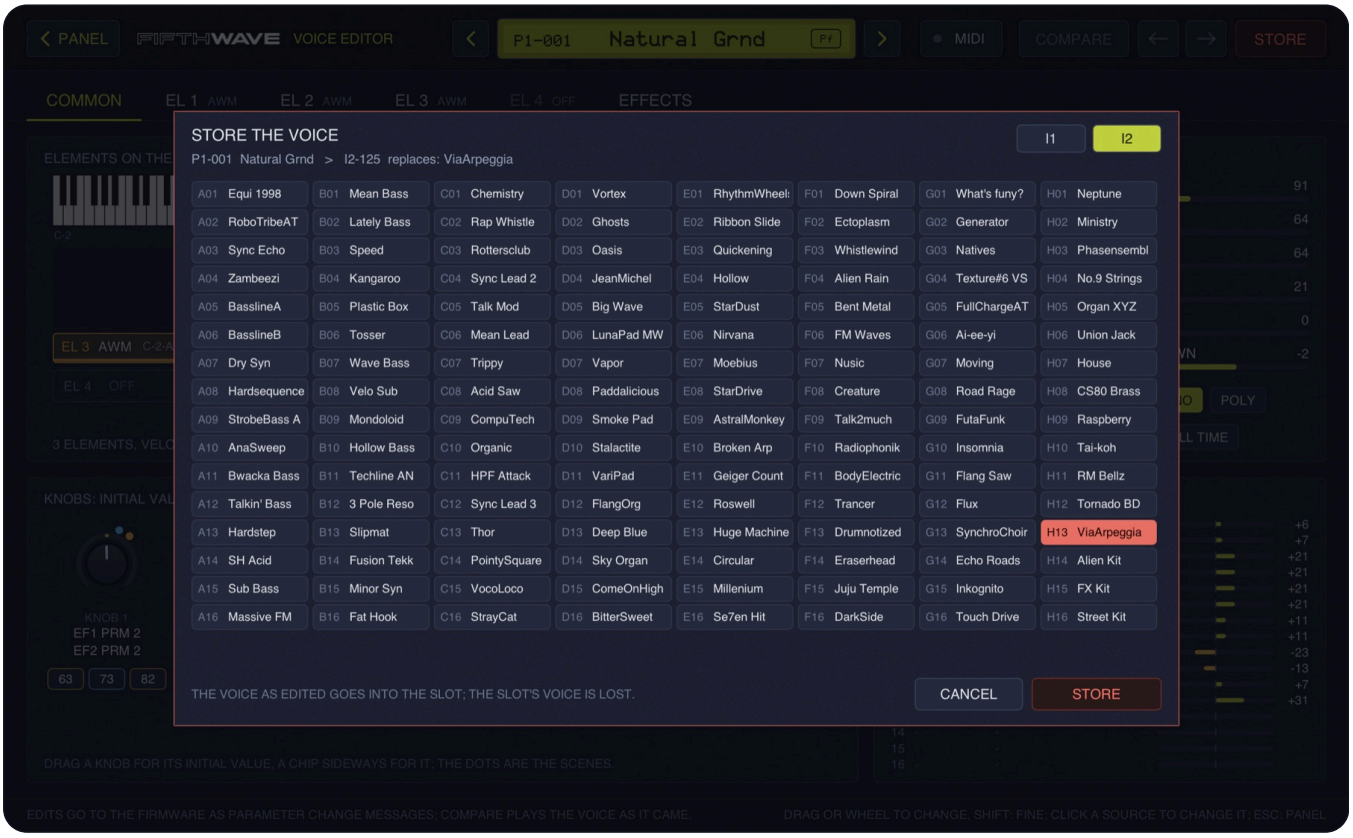
Compare, undo and redo

COMPARE plays the voice as it was before your edits; click it again to go back to them. The arrows next to it undo and redo your edits one gesture at a time (also ⌘Z and ⇧⌘Z).

> **CAREFUL**
>
> As on the hardware, selecting another voice discards the edits that are not stored. If that happens by mistake, the `Recall Voice` job brings them back: press JOB in Voice mode, then F2.

Storing a voice

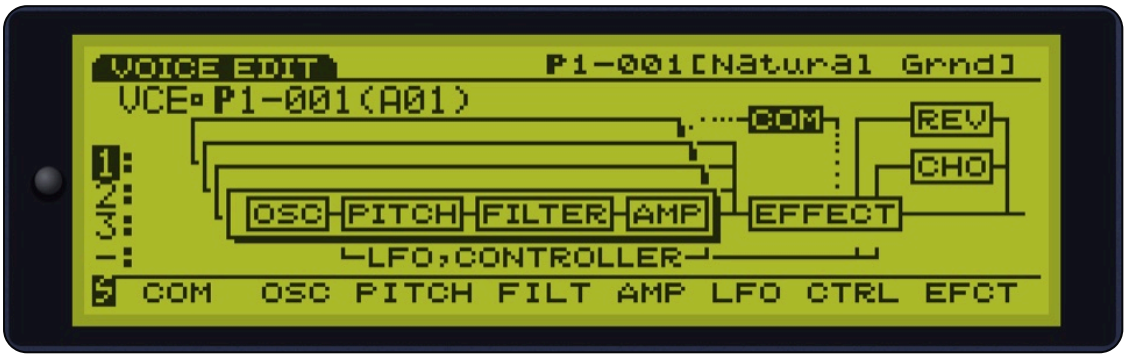
Click STORE. A window lists the 128 voices of I1 or I2. It proposes the voice's own place when it is an Internal voice; otherwise the first `INIT` voice, or else the last voice of I2 that is not a drum kit. Click another place if you like: the line at the top says which voice it replaces. Then click STORE.



Storing P1-001 into **I2-125**. The slot's voice is lost.

The firmware makes the stored voice itself, from its edit buffer, so what is stored is exactly what you hear. The new voice is selected at once, and kept in Fifth Wave's memory folder for every instance, as well as in your DAW project. The panel's STORE key does the same from the original's own pages.

To rename a voice, use the original's own Voice Edit pages on the panel: press EDIT in Voice mode, then the common parameters' name page; type with the dial and the cursor keys, then store.



The original's own Voice Edit mode on the panel, with its function keys.

CHAPTER 6

AWM ELEMENTS

An AWM element plays a wave through its pitch, filter and amplitude stages. Its tab has seven modules, in the order the sound goes through them.

Wave & Zone



Wave & Zone: the Grand 1 multisample, its zone GRND1.9, and the element's box on the keyboard.

- **The wave.** PRE for the 419 preset waves, RAM for the waves loaded from disk into the sample memory, FLS for the flash board, which Fifth Wave does not have. < and > step through the waves; click the name for the list of all of them, with filters by category, or turn the wheel over it.
- **The multisample in 3D.** A wave is a set of samples, each for a range of keys. The ribbons show them, the lowest keys in front: each as long as its sample, as loud as its outline, the attack lime and the loop blue. The zone you choose glows.
- **The sample in 2D.** The chosen zone's sample whole, with its loop start marked, and on the right the samples around the loop start, where you can see the loop join. The line under them gives its keys, root note, format and lengths.
- **The zone.** The element's range as the hardware's zone display draws it: a box over notes and velocities, with the cross-fades as fading edges, the other elements' boxes behind it and the wave's zones in a strip above. Drag the box's sides to move the note limits, its middle to move both, its top and bottom to move the velocity limits. Click the strip or a key to choose the zone the views show.

- **The parameters.** Element volume, pan, random pan and scaling pan depth, the note and velocity limits and cross-fades, the expression limit, key-on delay, release loop, one shot, reverse, and whether the element goes through the FDSP and which insertion effect.

Pitch & PEG



Pitch & PEG on P1-119 Fifth Rise: the pitch falls from +127 to its note in the first moments.

Coarse and fine tune, detune, pitch scaling over the keys around a centre note, the micro tuning (the original's 32 tables by name, from equal temperament to historical tunings) and a random pitch. The **pitch envelope** (PEG) has an initial level, a hold, three rates and levels, two release rates and levels and a loop segment; drag its points, a rate sideways and a level up and down. The 3D view above draws it for every velocity, soft at the back and hard in front, with the *touch* sensitivities applied.

Filter & FEG

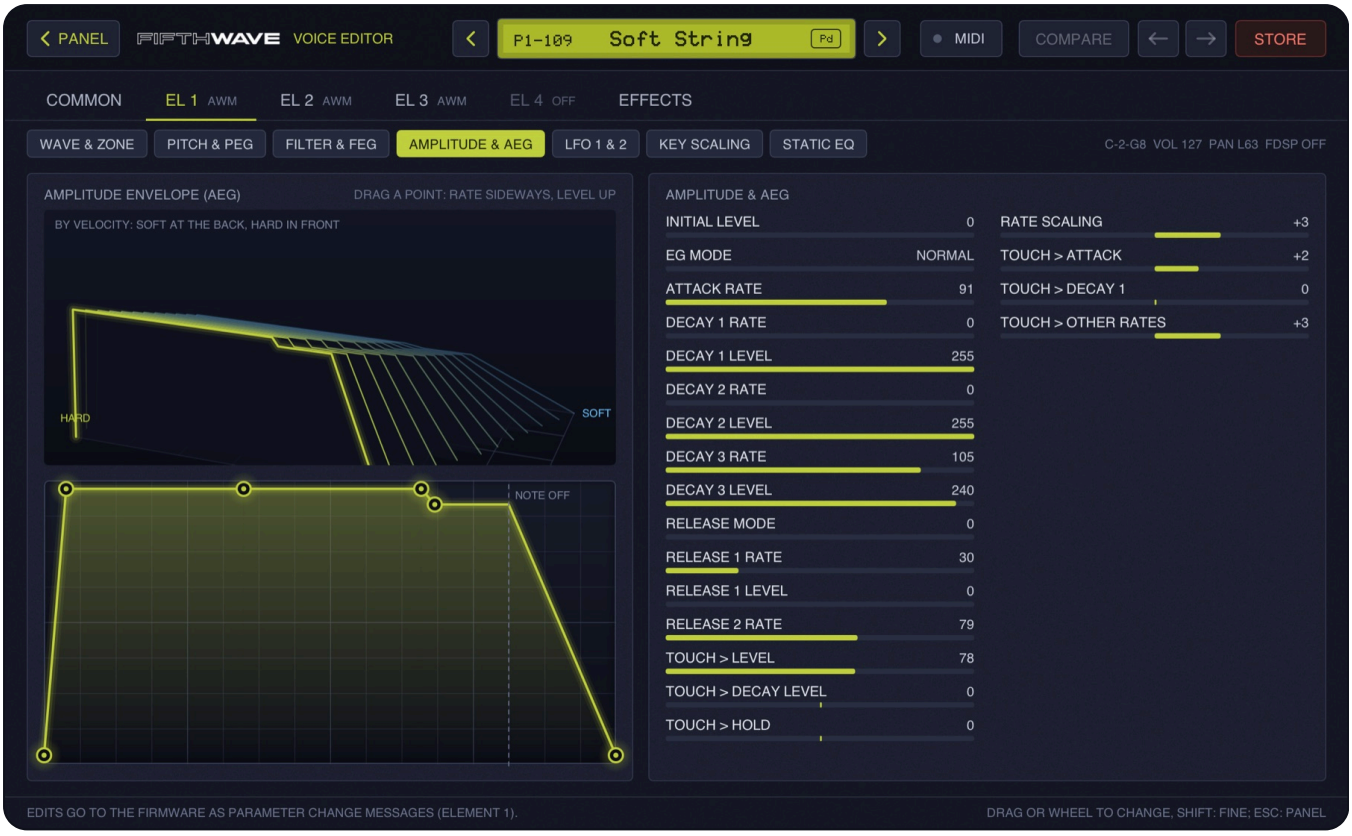


Filter & FEG on P1-069 Pop Brass: a resonant 24 dB low-pass opened by its envelope.

Each AWM element has two filters in a row or side by side (**CONNECTION** serial or parallel). Filter 1 is **LPF24A**, **LPF24D**, **LPF18**, **LPF12**, **LPF6**, **HPF**, **BPF**, **BEF** or **THRU**; filter 2, a low-, band- or high-pass or a band-eliminate, is there when filter 1 is one of the last five.

- The **waterfall** draws the filter in time: key on in front, the envelope moving each cutoff by its depth, the release at the back.
- The **response now**: drag its point, the cutoff sideways and the resonance up.
- The **filter envelope** (FEG), with the same segments as the pitch envelope: drag its points.
- On the right, each filter's cutoff, gain, envelope depth and key scaling, which switches it obeys (resonance, LFO, FEG), its touch sensitivity and random cutoff, and the FEG's rates, levels and touch sensitivities.

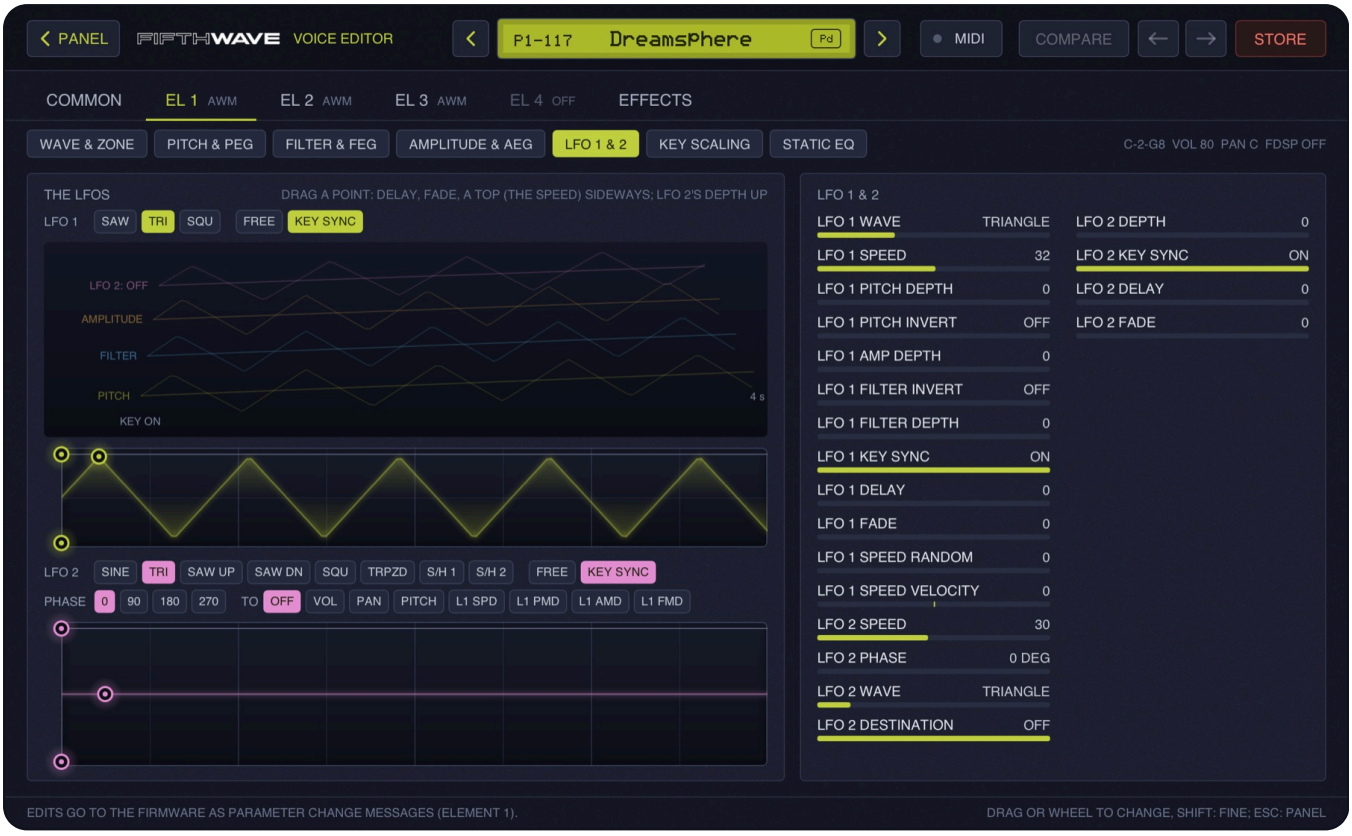
Amplitude & AEG



Amplitude & AEG on P1-109 Soft String, drawn above for every velocity.

The amplitude envelope (AEG): initial level, attack rate, three decay rates with their levels, release mode and two release rates. Its velocity response: TOUCH > LEVEL, decay level and hold, and the touch sensitivities of the attack, the first decay and the other rates. RATE SCALING changes its speed over the keyboard.

LFO 1 & 2



LFO 1 & 2 on P2-114 Fractal: LFO 1 moves the amplitude, LFO 2 changes LFO 1's speed.

LFO 1 has a saw, triangle or square wave, free-running or restarted at each note (KEY SYNC), and three depths: pitch, amplitude and filter, the pitch and filter ones with an invert switch. **LFO 2** has eight waves (sine, triangle, saw up, saw down, square, trapezoid and two sample-and-holds), a start phase and one destination: volume, pan, pitch, LFO 1's speed, or LFO 1's pitch, amplitude or filter depth.

The lanes above show, from key on, what each LFO does to its destinations, after its delay and fade-in; a free-running LFO's waves move. Below, each LFO in 2D: drag its delay, its fade and its first top after the fade (the speed) sideways, and LFO 2's depth up and down.

Key scaling



Key scaling of the level on Natural Grnd, with its four break points.

Three scalings change something over the keyboard: the LEVEL and the cutoffs of FILTER 1 and FILTER 2. Each has four break points, a key and an offset each, with straight lines between them. Drag a point: its key sideways, its offset up and down. The keyboard below shows all three standing behind it.

Static EQ



Static EQ on Natural Grnd: a low and high shelf, the low one at +18.

A last filter before the effects, with twelve types: low and high shelf together, two low or two high shelves, low-, high- and band-pass, an inverted low-pass, a peaking EQ, thru, and three fixed boosts. Drag a point, the frequency sideways and the gain up; the wheel changes the Q. The touch sensitivities let velocity change its gains and frequencies, which the view above draws for every velocity.

CHAPTER 7

VL ELEMENTS

A VL element plays one of the original's physical-modelling *instruments*. The instrument carries its own controllers, envelopes and filters; the voice's parameters move them as *offsets*, so a value of 0 leaves the instrument as it is. The hardware gives a VL element pages of its own, and so does the editor. A VL voice has its VL element first, and up to three AWM elements beside it.

Instrument & Zone



Instrument & Zone on P1-077 Trumpet, which plays VL133 *Trumpet!*

- **The instrument**, VL001 to VL272: 256 in the original's ROM and VL257 to VL272 for your own. Click it for the list of all of them, or turn the wheel over it. Choosing a preset instrument also brings its own 5-band EQ, as the hardware's panel does. The element is silent for a moment while the instrument changes, so you do not hear the model being loaded.
- **Its own filters**, in words: the dynamic filter and the EQ's high- and low-pass the instrument comes with.
- **The model** as blocks, from the pressure controllers through the driver and the pipe or string to the harmonic enhancer, the dynamic filter, the 5-band EQ and the amplitude. The blocks this voice moves are lime: click one to go to its page.
- **The zone**, dragged as on an AWM element.
- **VL mono or poly** and the **priority** (last, top or bottom note), which decide what the single VL note does when you play more than one key, the level and pan, the limits and the expression limit.

Pitch, filter, amplitude and vibrato



A VL element's **Pitch & PEG**: offsets added to the instrument's own pitch envelope, and the key follow.

Pitch & PEG

Coarse tune (±24 semitones), detune, the key follow (100%, 50%, 20%, 10%, 5% or 0%, the last for a fixed pitch) about its centre note, the micro tuning, and the offsets of the pitch envelope: initial level, attack time, release time and release level, as points to drag.

Filter

The instrument's dynamic filter, its type, cutoff, resonance and key tracking, drawn through the VL generator's own law: dashed as the instrument has it, solid as the voice moves it. Drag the point, the cutoff sideways and the resonance up; the wheel changes the filter envelope's depth. Below, the key follow about its break point.

Amplitude & AEG

Offsets to the instrument's amplitude envelope, bending its drawn shape, and the level's key follow.

Vibrato

Offsets to the instrument's vibrato: its delay, speed and depth, drawn on a wave.



VL **Filter**, with offsets: cutoff −18, resonance +23, key follow +26 about C3.



VL **Amplitude & AEG**, with offsets: the dashed envelope is the instrument's own.



VL **Vibrato**.

5-band EQ

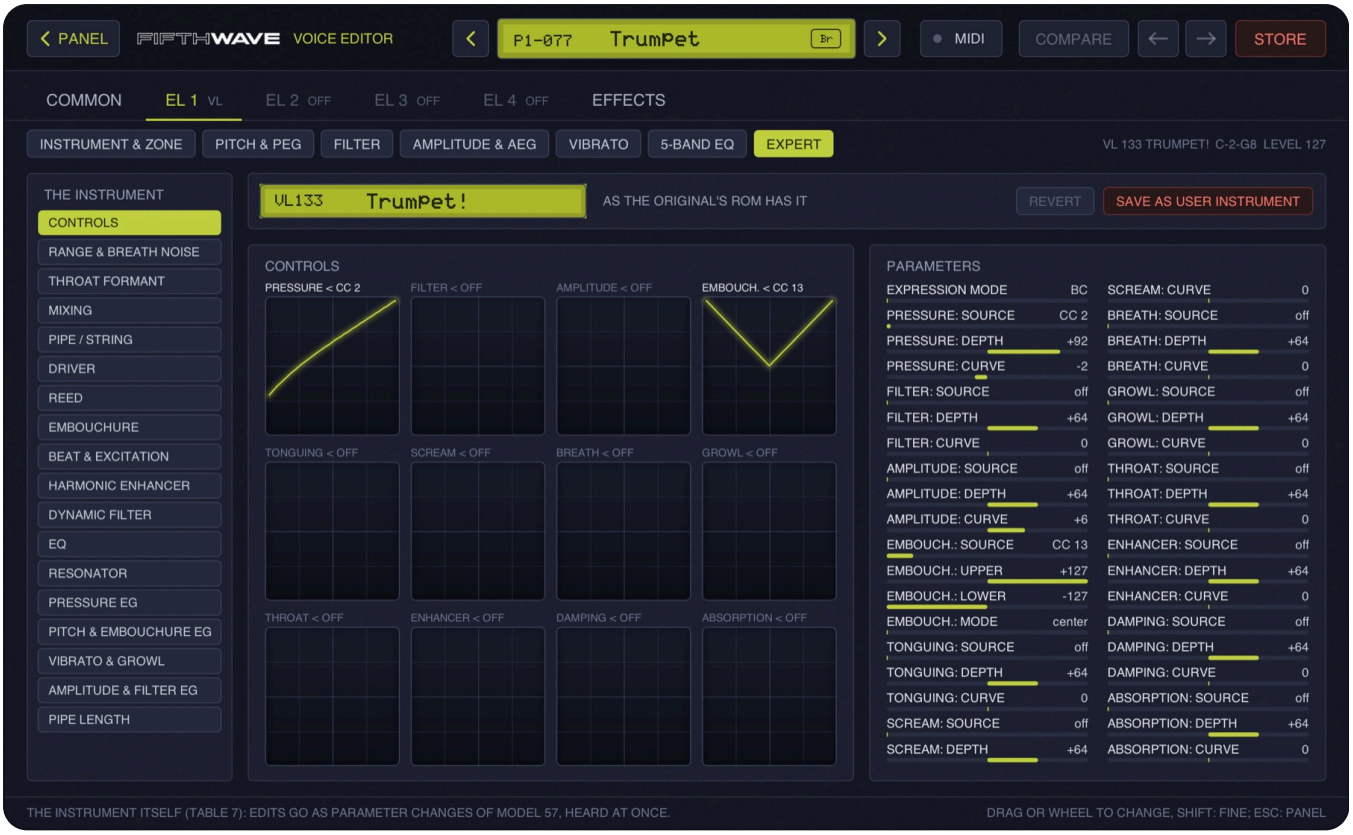


The VL element's **5-band EQ**, drawn through the VL generator's own laws.

Five bands, each with its frequency in its own part of the range, its Q and its gain, and a post EQ level. Drag a band's point, the frequency sideways and the gain up; the wheel changes its Q. When the voice's EQ differs from the one the instrument brings, the instrument's is drawn dashed, and a button puts it back.

Expert: the instrument itself

The original's own pages stop at the offsets above. The instrument behind them is 1387 bytes of data: how the controllers reach the model, the driver and the reed or lips, the pipe or string, the breath noise and the throat, the harmonic enhancer, the filters, the resonator, its envelopes and vibrato and the length of the pipe on every key. None of it is on the hardware's pages. Fifth Wave shows all of it on the EXPERT page.



The **Expert** page, group **Controls**: which controller drives each of the model's inputs, and through which curve.

- The **groups** on the left: Controls, Range & breath noise, Throat formant, Mixing, Pipe / string, Driver, Reed, Embouchure, Beat & excitation, Harmonic enhancer, Dynamic filter, EQ, Resonator, Pressure EG, Pitch & embouchure EG, Vibrato & growl, Amplitude & filter EG and Pipe length.
- A **picture** for each group, drawn through the VL generator's laws: the controllers' curves, the outputs, the filters, the resonator's taps, the envelopes and vibrato in milliseconds, the pipe's length on every key, which you can paint.
- Some parameters change over the keyboard: a base value and up to 16 break points. Their rows carry KEYS; click it to see them over the keys, and drag a break point, its key sideways and its offset up. The pictures are drawn for one key, C3 by default: click the strip of keys under them to choose another.



The **Driver** group of VL139 *Tenor Sax!*: the pressure input gain over the keys.

A change is heard at once, on the note you hold. The instrument is then EDITED; REVERT loads it again as it was.

1. **Save the instrument.**
   Click SAVE AS USER INSTRUMENT, choose one of the sixteen places VL257 to VL272 and type a name.

2. **Store the voice.**
   The voice now plays your instrument. Click STORE to keep the voice that way: see Storing a voice.

User instruments are kept in Fifth Wave's memory folder, with your Internal voices, and in your DAW project.

> **NOTE**
> The instrument's own EQ bands are overridden by the voice's 5-band EQ: change the EQ on the 5-band EQ page. The Expert page works on Fifth Wave's own emulation only, not on the hardware on MIDI.

CHAPTER 8

AN, FDSP AND DRUM VOICES

AN elements

The original's AN elements play: there are 14 AN voices among the presets, such as P2-077 *Boogie* and P2-091 *Oberlead*. Their parameters, however, are not in the tables its maker published, so the voice editor does not draw them. An AN element's tab says so; its zone and level are on the COMMON page, and the AWM elements of the voice have their pages as usual. Edit the AN element itself on the panel, in the original's Voice Edit mode, and store the voice there.

FDSP voices

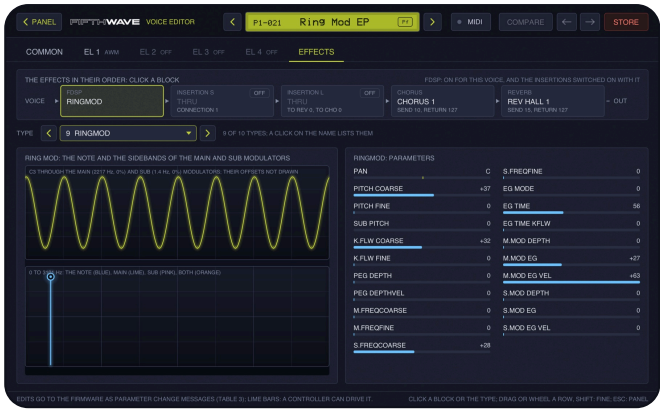
An FDSP voice sends its AWM elements through the FDSP before the other effects. Its FDSP block is the first in the chain on the Effects tab, with one picture per type:

TYPE	WHAT IT MODELS
EP Pickup	The tine of an electric piano before its magnetic pickup: the field across the tine's swing and what the coil gives.
EG Pickup	An electric guitar's string picked at one place and heard by a pickup at another.
Water	Drops and strings of resonance, tuned to the note.
PWM	Pulse width modulation of the elements' sound.
Flange, Phaser	A comb or a set of notches that follow the note, with their own envelope.
SelfFM, Tornado	Frequency modulation driven by the elements' own sound.
RingMod	Ring modulation tuned to the note: sidebands above and below.
Seismic	A low boost that follows the note.

In an FDSP voice, the insertion effects run only where the voice switches them on: their blocks carry an ON/OFF switch. Each element's FDSP row on Wave & Zone says whether it goes through the FDSP or straight to the effects.



The FDSP block of P1-017 Chorus Bell: **EP Pickup**.



The FDSP block of P1-021 Ring Mod EP: **RingMod** and its sidebands.

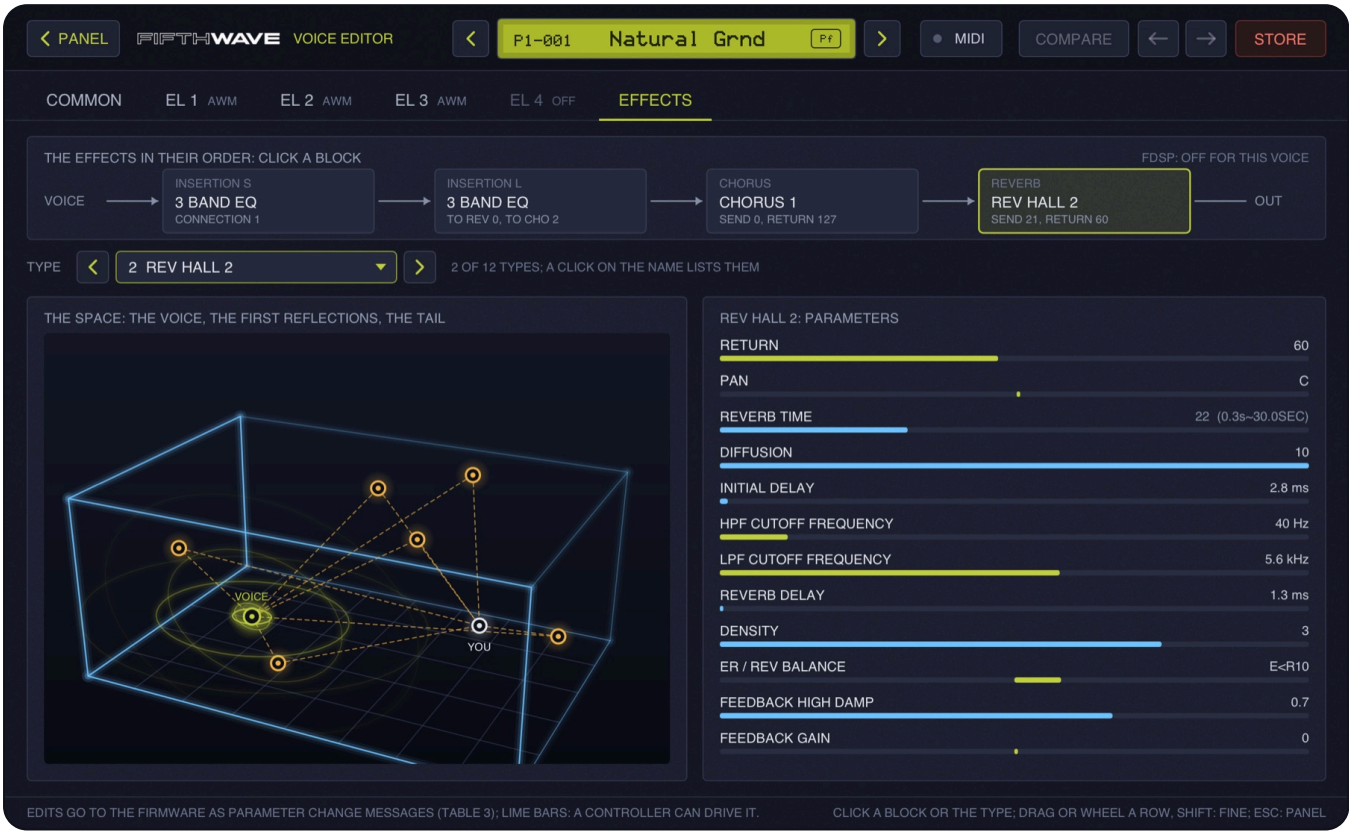
Drum voices

The six drum kits, P2-123 *Pop Kit* to P2-128 *Tech Kit*, put a different wave on each key, with its own pitch, level, pan, filter and envelope. The voice editor does not edit drum kits: use the original's Voice Edit mode on the panel, where each key of the kit has its own settings.

CHAPTER 9

EFFECTS

The **EFFECTS** tab shows the voice's chain from left to right, as the sound goes through it: **FDSP** (in FDSP voices), **INSERTION S**, **INSERTION L**, **CHORUS** and **REVERB**. Each block shows its type and how it is connected. Click a block to edit it.



The **Reverb** block of Natural Grnd: the room in 3D, with the voice, its first reflections and you.

Insertion S and Insertion L

Two insertion effects for the voice. Insertion S has 24 types: chorus, celeste and flanger, tremolo and auto pan, distortion, overdrive and an amp simulator, exciter, compressor and noise gate, auto and touch wah, phaser and EQs. Insertion L has 79: all of those and delays, echo, rotary speakers, early reflections and reverbs, pitch change, and lo-fi and combination effects such as *Wah+Dist+Dly*. On Wave & Zone each element chooses whether it goes through them. The voice sets how they are connected, one after the other in either order or side by side, and the blocks show it.

Chorus

A system effect with 17 types: chorus, celeste, flanger, symphonic, phaser, ensemble and two delays. The voice feeds it with its **CHORUS SEND**; its block shows the send and the return.

Reverb

A system effect with 12 types: halls, rooms, stages, a plate, a white room, a tunnel, a basement and a canyon. The voice feeds it with its **REVERB SEND**.

Choosing a type

Under the chain, < and > step through the block's types; click the name for the list of all of them. A new type starts from the original's own settings for it.

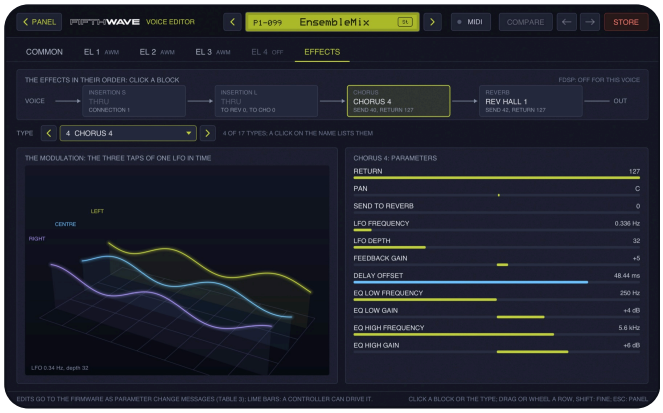
The parameters and their pictures

The parameters are listed with their values as the hardware's display writes them, in hertz, milliseconds or decibels where it does. Rows with a lime bar can be driven by a controller or a knob through the voice's control sets. Each kind of effect has its picture:

- the **reverbs**: a room in 3D, sized by the room types' width, height and depth;
- the **choruses**, flangers and their kin: their three modulated taps;
- the **delays**: the taps in time with their repeats; drag a tap to change its time;
- the **EQs**: the curve, with points to drag (frequency sideways, gain up; the wheel changes the Q);
- the **distortions**: the drive's curve with a sine through it;
- the others: a radar of their parameters.



`Insertion S` on `P1-017 Chorus Bell`: an EQ, with the curve to drag.



The **Chorus** block of P1-099 EnsembleMix.

> **NOTE**
>
> A few of the display's laws are not known, such as the reverb time's: those parameters show their number with the range the original's documentation gives, for instance `22 (0.3s~30.0SEC)`.

Effects in a performance

The insertion effects share the hardware's DSP with the VL, AN and FDSP engines. In Performance mode, insertion effects can be used on up to four parts when all of them are AWM voices, but on one part only when a VL, AN or FDSP voice is among them. Chorus and reverb always work. Performance effects are set on the panel, in Performance Edit mode.

CHAPTER 10

THE CONTROLLERS

The Blue Beast was built for playing: two modulation wheels, a ribbon, aftertouch, foot controllers, a breath controller and six knobs, each of which a voice can send to almost any parameter. Fifth Wave receives all of them as MIDI from your DAW, and has the six knobs on its panel.

The six knobs

The knobs under the display are the original's own. Drag one up or down, or turn the mouse wheel over it. The arc shows how far it is from 64, the value the voice was stored with, and the label under it says what it drives in the voice that plays, as the voice's control sets assign it: `Attack`, `FEG depth`, `EF1 prm 2` (a parameter of the first insertion effect) and so on. In Performance mode the labels say which parts' voices assign it, for instance `1+2:Cutoff`.

Selecting a voice puts the knobs back to its initial values, as on the hardware. Each voice also stores two more sets, *scene 1* and *scene 2*, set on the Common page. The hardware recalls them with its `SC1` and `SC2` keys, which do not work in Fifth Wave yet; the scenes are kept with the voice.

1. **Learn a controller.**
   Right-click a knob (or control-click). It waits for a controller.
2. **Move the controller.**
   Turn a knob or move a fader of your MIDI controller. From now on it drives that knob.
3. **Forget it.**
   Right-click the knob again while it is learning.

The learned controllers are kept in the support folder, so every new instance starts with them, and in your DAW project, where a project's assignment wins. Your DAW can also automate the knobs directly as *Knob 1* to *Knob 6*: they reach the instrument as controllers 16 to 21, which it takes as its knobs, and they follow the knobs when the instrument moves them.

Control sets

Each voice has sixteen *control sets*, on its Common page. A control set connects a **source** to a **destination** with a **depth**:

- **Sources**: the pitch-bend wheel, modulation wheels 1 and 2, aftertouch, the foot controller, the breath controller, the ribbon and the six knobs.
- **Destinations**: the elements' pitch, filter, amplitude and LFO parameters, the effects' parameters, and more, from the original's controller list. One source can drive several destinations, each in its own set.
- **Depth**: how far, and in which direction, the source moves the destination.

Which MIDI control number each of the original's physical controllers listens to is a system setting: UTILITY , then `5:Controller`. Set it to match your keyboard, for instance so that your second wheel or your foot pedal reaches its MW2 or FC.

Controllers from your DAW

Fifth Wave also offers the common MIDI controllers as parameters your DAW can automate. A value goes to the instrument when it changes, on the MIDI channel of the last note or controller your DAW sent (channel 1 before any).

PARAMETER	SENT AS	DEFAULT
Modulation wheel	controller 1	0
Pitch bend	pitch bend	centre
Aftertouch	channel aftertouch	0
Breath controller	controller 2	127
Foot controller	controller 4	127
Ribbon (CC 13)	controller 13	64
Expression	controller 11	127
Volume	controller 7	127
Pan	controller 10	64
Harmonic content (resonance)	controller 71	64
Brightness (cutoff)	controller 74	64
Attack time	controller 73	64
Release time	controller 72	64
Portamento time	controller 5	0
Portamento	controller 65	off

The defaults are the hardware's state after power-on. Pan, controller 13 and controllers 71 to 74 move the voice's own values: 64 leaves them as they are.

Voice parameters from your DAW

In Voice mode, 22 parameters of the voice can be automated too. They go to the firmware as Parameter Changes, as the editor's do:

- for the voice: *Voice volume*, *Reverb send*, *Chorus send*;
- for its AWM elements: *Element level*, *Element pan*, *Coarse tune*, *Fine tune*, *Cutoff*, *Resonance*, *Cutoff 2*, *FEG depth*, *FEG attack*, *FEG decay*, *FEG release*, *AEG attack*, *AEG decay 1*, *AEG decay 2*, *AEG release*, *LFO speed*, *LFO pitch depth*, *LFO amp depth* and *LFO filter depth*.

An element parameter moves all the AWM elements of the voice together, each by the same amount from its own value, so the balance between them stays. VL and AN elements and drum kits are left alone. The parameters follow the voice that plays: when it changes, they take its values and tell your DAW. They do nothing in Performance mode.

The voice editor tells your DAW when you change one of these parameters, so your DAW shows the change and can record it as automation. The three voice parameters always count. An element parameter counts only in a voice with a single AWM element, and only on that element: in a voice with more, the editor changes one element while the parameter moves them all.

> **TIP**
> The instrument receives about three bytes of MIDI per millisecond, and a change to four elements takes 44 bytes. A fast sweep of an element parameter therefore sends the latest value whenever there is room; for smooth, fast sweeps use a knob or a controller assigned by a control set.

CHAPTER 11

PERFORMANCES

Press PERFORM for Performance mode. A performance has up to 16 *parts*, each playing a voice with its own volume, pan, note range, velocity range, MIDI channel and effect settings:

- **Layers**: parts whose layer switch is on play together from the same keys. Up to four voices can sound at once this way.
- **Splits**: parts with different note limits share the keyboard, a bass under a piano for instance.
- **Multitimbral**: parts on different MIDI channels are played separately by the built-in sequencer or by your DAW.



Performance mode on performance 001, **Radioactive**, from the Factory Set.

Select performances on the panel with the dial, in the patch browser under PERFORMANCE, or with program changes from your DAW. The Factory Set's 128 performances need the Factory Set in memory: see chapter 3.

Performances are edited on the panel, in the original's own pages: press EDIT in Performance mode. The function keys on the bottom line choose the common settings, the parts and the effects, and STORE keeps the performance. The voice editor edits the voices a performance plays: select one of them in Voice mode, edit it and store it, and every performance that uses it plays it the new way.

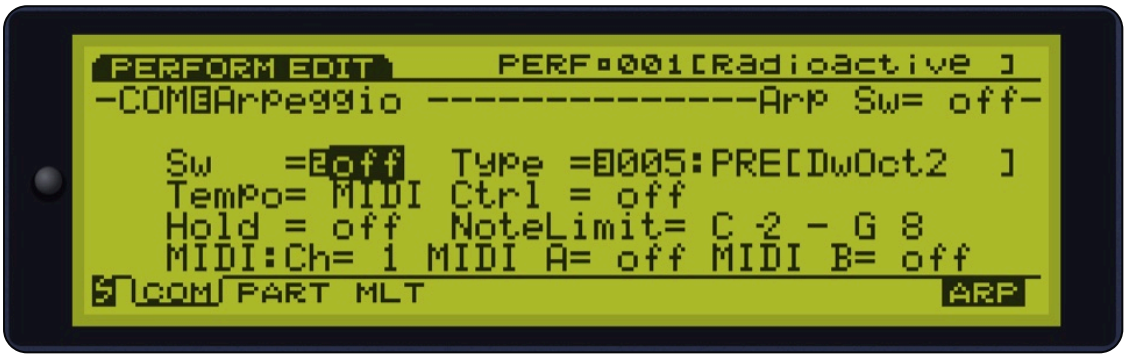
> **NOTE**
> A voice change in a part follows the hardware's limits on effects: see Effects in a performance.

CHAPTER 12

ARPEGGIO, SONG AND PATTERN

The arpeggiator

Each voice and each performance has its own arpeggio settings: on or off, one of the original's arpeggio types, the note range and how it follows MIDI. Press ARPEG to switch the arpeggiator of what plays on or off; the display shows its page.

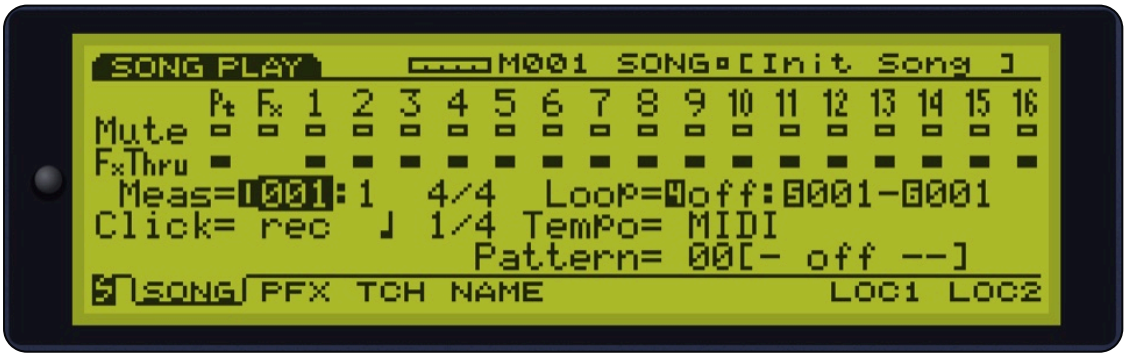


The arpeggio page of performance Radioactive, just switched off with ARPEG.

The Factory Set's *Sq* performances, such as 001 Radioactive, play through their arpeggiator: hold a chord and they run. Pressing ARPEG on one of them first switches its arpeggio off.

Song and pattern

SONG and PATTERN open the built-in sequencer, with its 16 tracks, its patterns and its play effects. The transport keys run it: PLAY, STOP, REW, FWD, TOP and REC. It plays the songs you load from disk, such as the original demo songs (see chapter 3); its recording and editing pages are there too, as on the hardware, though for new work your DAW is usually the better sequencer.



Song mode. With Host sync on, its tempo reads **MIDI**: it follows your DAW.

Following your DAW

With HOST SYNC on (the default; your DAW sees it as *Sync to host*), the instrument takes its tempo from your DAW:

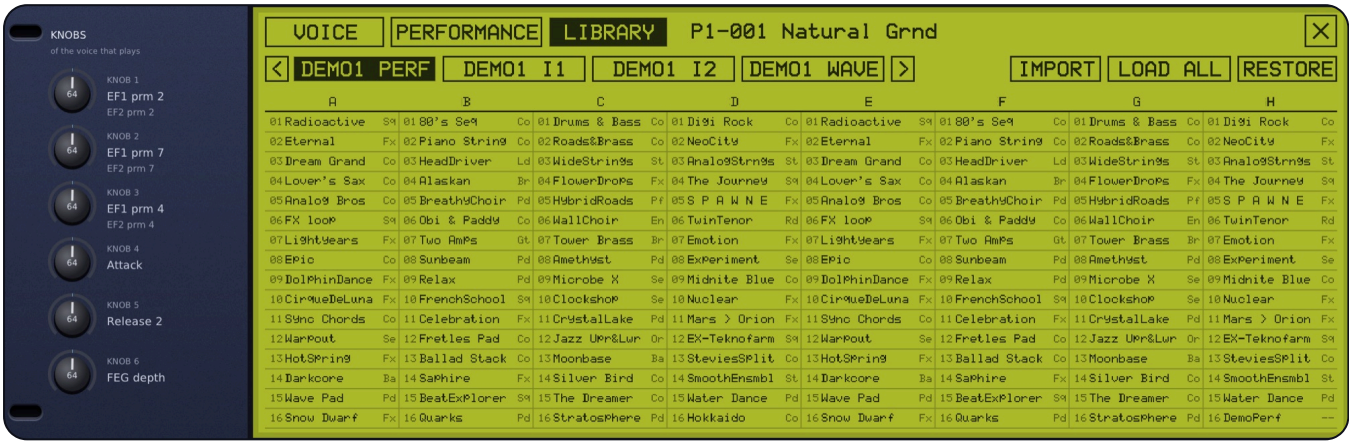
- While your DAW plays, Fifth Wave sends the instrument a MIDI clock from your DAW's timeline, so arpeggio steps land on your DAW's grid, within about a millisecond. The arpeggio starts from the key you play, a clock or two after it, not on the bar.
- While your DAW is stopped, the clock keeps running at your DAW's tempo, so the arpeggiator still plays in time.
- In Song and Pattern mode the built-in sequencer also starts, stops and moves with your DAW, loops included. Pressing the panel's own PLAY while your DAW is stopped runs it at your DAW's tempo; when your DAW starts, it jumps to your DAW's position.
- Clock and start/stop messages that your DAW itself sends to Fifth Wave are ignored, so they do not compete.

With HOST SYNC off, the instrument runs on its own clock and keeps the last tempo it had, until a voice, a performance or a song sets its own. The `MIDI Ctrl In` setting, in the same Utility page as its sync source, can turn the start and stop messages off on the instrument's side.

CHAPTER 13

THE LIBRARY AND THE DISKS

The Blue Beast stored its sounds on floppy disks and SCSI drives. Fifth Wave keeps your disk files in a **library**, in the support folder, and plays them, loads them into memory, or puts them on the emulated floppy or hard disk for the original's own Disk mode. Click the display, then LIBRARY.



The library on the performances of **DEMO1.S1A**, one of the original demo disks.

The files

FILE	HOLDS	BANKS IN THE LIBRARY
.S1V	Voices: a Disk mode voice file	its two halves
.S1Y	Synth All: performances and both Internal voice banks	PERF, I1, I2
.S1A	All: a Synth All, plus songs, patterns, waves and samples, and the system settings	PERF, I1, I2, WAVE
.S1M	Waves and their samples	WAVE

Click IMPORT to copy a file into the library. < and > page through the banks; click one to show it.

Playing and loading

Try a voice

Click it. It is written into I2-128 and selected, so you can play it at once. I2-128 is the library's audition place: what you try there is not kept.

Try a performance

Click it. It is written into performance 128, with the voices its parts play written into I2-128, I2-127 and so on (four at most), and selected.

->I1 and ->I2

On a voice bank: write the whole bank into Internal bank I1 or I2, as a Disk mode load would.

LOAD ALL

On a performance bank: for a Synth All file, write its 128 performances and both voice banks into memory, as the hardware's *Load Synth All*; your system settings stay. For an All file, let the original's own Disk mode load the whole file, songs, waves and system settings included.

LOAD WAVES

On a wave bank: let Disk mode load the waves and their samples into the sample memory.

RESTORE

Put every Internal voice and performance back as they were when this instance of Fifth Wave started.

The floppy, the hard disk and Disk mode

The original's samples can only be loaded by its firmware, from a disk. When you load waves or an All file, Fifth Wave puts the file on the emulated floppy, or on the emulated 1 GB SCSI hard disk when it is bigger than a floppy, and drives its Disk mode with the panel's keys, step by step as the display shows them: DISK, `File Load`, the type, the file, INC/YES, and back to what was playing. Disk mode reads about 25 KB a second, so a full floppy takes about a minute; the library shows how long to wait.



The original's Disk mode. **Device Select** chooses the floppy, FD0, or the hard disk, HD0.

The samples go into the sample memory, 1 MB inside and 64 MB on its memory modules. The hardware forgot its samples when switched off; Fifth Wave does not. After a load it keeps the sample memory in the support folder (`samples.bin`) and puts it back at every start. Delete that file to start without them.

The disk stays in the drive, so you can use Disk mode on the panel yourself, to load other parts of the file. The hard disk is read-only. Disk mode's `File Save` writes to the emulated floppy, which lives inside the emulated machine: nothing reaches a file on your computer. Keep your work with STORE, the library and your DAW project.

What Fifth Wave keeps

- **Your memory.** The Internal voices and performances that an instance changes, by STORE, by the library's loads, by Disk mode or by RESTORE, are written into the support folder's `memory` a few seconds later. They are written one by one, so changes made in another instance at the same time are kept too. The library's audition places, I2-128 and performance 128, are not kept. Your user VL instruments are kept with them.
- **Your samples**, in `samples.bin`, as above.
- **Your project.** Your DAW project keeps the whole emulated machine: its memory, its samples, its songs, the program that plays and every edit. See What the project keeps.

Only voices and performances go into the memory folder. The system settings, from Utility mode, are kept in your DAW project.

CHAPTER 14

THE PANEL'S OTHER MODES

Everything the original's display offers is on Fifth Wave's panel. The pages below are the ones you will meet most; the original's owner's manual describes all of them, and it applies to Fifth Wave as it is.

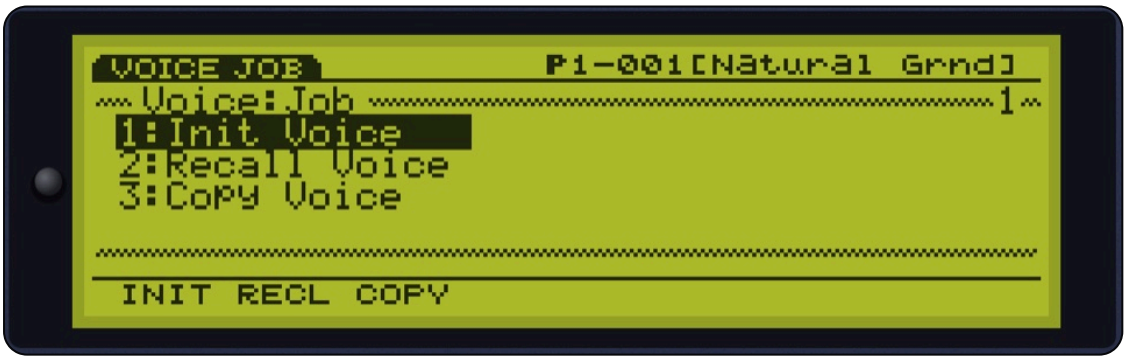
Utility mode



Utility mode: the system settings.

UTILITY opens the system settings, in seven groups: `1:Synthesizer`, `2:Voice Mode`, `3:Sequencer` (with the sync source and MIDI control that Host sync sets), `4:MIDI`, `5:Controller` (the control numbers of the physical controllers), `6:Other` and `7:Greeting Message`, shown at power-on.

Jobs



Voice Job mode: **Recall Voice** brings back edits lost by selecting another voice.

JOB opens the jobs of the mode you are in. In Voice mode: `Init Voice` starts a voice from scratch, `Recall Voice` brings back the last edit buffer, and `Copy Voice` copies parts of another voice into this one.

Sample and Key Map

Fifth Wave has no audio input, so Sample mode has nothing to record: samples come from disk files, through the library. KEYMAP switches Key Map mode, where the instrument puts samples, patterns or pattern tracks on single keys, to be played from MIDI along with the voice, performance or song.

CHAPTER 15

FIFTH WAVE IN YOUR STUDIO

Latency and load

Fifth Wave runs the emulated instrument a little ahead of your DAW and reports a latency of 1024 samples at 44.1 kHz (23 ms), which your DAW compensates when it plays back. Every note and controller reaches the instrument with the same delay, so the timing between them is kept. The original runs at 44.1 kHz; Fifth Wave converts its output to your DAW's rate.

Each instance takes one processor core. The status line on the panel shows how much of real time it uses and counts the dropouts. If you hear clicks, raise your DAW's buffer size, or freeze or bounce tracks. Bouncing offline works: Fifth Wave waits for the emulation when your DAW renders faster than real time.

The output filter

OUT LPF (*Output filter* for your DAW) adds a gentle low-pass at 18.75 kHz to the output. Recordings of the real instrument roll off from about 8 kHz, 2 dB down at 12 kHz and 5 dB at 16 kHz, against the emulation; with the filter on, the two agree within 0.8 dB up to 16 kHz. Whether that roll-off belongs to the hardware's output stage or to the recordings is not known, so it is a switch, off by default.

Automation

Your DAW sees these parameters:

- *Output filter* and *Sync to host*, the two switches of the panel;
- *Knob 1* to *Knob 6*: see The six knobs;
- fifteen MIDI controllers: see Controllers from your DAW;
- 22 voice parameters: see Voice parameters from your DAW.

Turning a knob on the panel is reported to your DAW as an edit, so it can record it.

What the project keeps

Saving your DAW project saves the whole emulated machine with it, compressed to about 0.7 MB: the voices and performances in its memory, the samples, the songs and patterns, the system settings, the program that plays and every edit you made on the panel or in the editor. Opening the project puts the machine back in about a tenth of a second, without booting. POWER starts the machine again from your memory folder instead.

Editing the hardware

If you have the original or its rack version connected to your Mac by MIDI, the voice editor can edit it instead of Fifth Wave's own emulation. This works on macOS for now.

1. **Open the MIDI window.**
   Click MIDI in the editor's header. It lists your Mac's MIDI inputs and outputs.

2. **Choose the ports.**
   Pick the input the hardware's MIDI OUT is connected to and the output that goes to its MIDI IN. The dot lights when both are open. ASK THE HARDWARE WHO IT IS checks the connection.

3. **Switch the editor over.**
   Under THE EDITOR EDITS, choose THE HARDWARE ON MIDI. The header's button then reads HW and lights up.

The editor then reads the voice from the hardware's own dumps, when it starts, when the hardware changes program and after your edits, and sends every change to it as a Parameter Change. The voice buttons send program changes. Store on the hardware's own panel. When you change an effect's type, the editor sends the new type's settings, taken from Fifth Wave's own emulation, because the hardware's dump would still hold the old ones. The hardware's RAM and flash waves are not drawn, and the VL Expert page works only on Fifth Wave's own emulation.

> **NOTE**
> This mode has been tested against an emulated instrument on a virtual MIDI port, not yet against a real unit. If something does not behave as it should with yours, please tell us.

APPENDIX A

THE FACTORY VOICES

The preset voices are in the original's ROM and always there. Each is listed with its category (Pf piano, Or organ, Br brass, St strings, Pd pad and so on) and, when it is not an AWM voice, its type: VL, AN, FDSP. The six drum kits are P2-123 to P2-128.

Preset bank P1

BANK A

001 Natural Grnd Pf
002 Stereo Piano Pf
003 Brite Rock Pf
004 Rocking Bose Pf
005 Dark Grand Pf
006 For Ballads Pf
007 Jazz Grand Pf
008 CP80 Pf
009 CP80 2 Pf
010 Georgia Pf
011 VintgCondns Pf FDSP
012 Tine EP Pf
013 Jazz Chorus Pf FDSP
014 Soulful Pf FDSP
015 Valise Pf
016 Early Fusion Pf FDSP

BANK B

017 Chorus Bell Pf FDSP
018 Made in USA Pf
019 Rich EP Pf FDSP
020 Rhodesia Pf
021 Ring Mod EP Pf FDSP
022 Tornado EP Pf FDSP
023 Wurli 1 Pf FDSP
024 Wurli 2 Pf
025 Dist Wurli Pf
026 Glass EP Pf
027 Glastick Pf
028 Stone EP Pf
029 Ring Road Pf FDSP
030 Glass Tine Pf
031 Early Tines Pf FDSP
032 Vic's Roads Pf FDSP

BANK C

033 Wonder Why Pf FDSP
034 Wah Clav Pf
035 Stereo Clav Pf
036 Electro Clav Pf FDSP
037 JazzyBallad Or
038 Fullx4 Or
039 Augmented Or
040 70's Organ1 Or
041 Thank You Or
042 Flutey Or
043 EXseption Or
044 Jazz Organ Or
045 Left Manual Or
046 Gospler Or
047 Fast Organ Or
048 English Or

BANK D

049 Jazz Perc Or
050 Swing Bar Or
051 Glass Swish Or
052 Cathedral Or
053 Tube Crunch Or
054 Rock Or
055 Hard Rock Or
056 70's Organ2 Or
057 Smoky Organ Or FDSP
058 Fuzzier Or
059 Combos Or
060 Transistor Or
061 Vibe Cp
062 Tubular Bell Cp FDSP
063 Stone Harp Cp FDSP
064 WoodSequence Cp

BANK E

065 Sect Br
066 Hi Sect Br
067 FunkySect Br
068 MyBigSectn Br
069 Pop Brass Br
070 Section Br
071 Sforzando Br
072 ClassicBrass Br
073 ClassicBras2 Br
074 VeloTrbSect Br
075 Smooth Brass Br
076 Solo Trumpet Br
077 Trumpet Br VL
078 SoloTrpSwtch Br
079 SoftTrombone Br
080 Jazz Trump Br VL

BANK F

081 Big Brass Br
082 Mutation Br
083 Mute Trumpet Br VL
084 SoloTrombone Br
085 Trombone Br VL
086 SoftFlgLead Br
087 Obersync Br FDSP
088 AnaBrass Br
089 Stabrass Br
090 Riff Brass Br
091 SynthClassic Br
092 Matrix Br
093 OberBrass Br
094 Oberhorns Br
095 Jupiter Br
096 HotSynBrass Br

BANK G

097 Swell String St
098 MellowStrngs St
099 EnsembleMix St
100 Brite String St
101 Kemuri St
102 StereoString St
103 Big Strings+ St
104 Agitato St
105 Veloci Ens St
106 Tremolo St
107 AnaOrch St
108 Analog Str St
109 Soft String Pd
110 Peace Pd FDSP
111 AN Layer Pd AN
112 Abendstern Pd FDSP

BANK H

113 Pulse String Pd FDSP
114 Apollo Pd
115 Bottled Out Pd
116 Clear Bell Pd
117 Dreamsphere Pd
118 Tine PWM Pd FDSP
119 Fifth Rise Pd
120 Freeze Pad Pd
121 Glass Man Pd FDSP
122 Glass Choir Pd
123 Hollow Pad Pd FDSP
124 Luminosity Pd FDSP
125 Mystery Pad Pd
126 Oberweich Pd
127 Orion Pd
128 Pray Pd

Preset bank P2

BANK A

001 PW Pad Pd FDSP
002 Warmer Pd
003 Silverlake Pd FDSP
004 Soft Obi Pd
005 Space Zoo Pd VL
006 VFEX Pd FDSP
007 Velvet Choir Pd FDSP
008 Futopia Pd FDSP
009 Oo Choir En
010 BreathChoir En
011 Choir Attack En
012 V-Choir En
013 Aah Choir En
014 Nightchoir En
015 Straight Sc
016 CallioTron Sc

BANK B

017 Angelica Sc
018 Punch Boy Sc
019 Sebastian Sc
020 Shinywire Sc
021 DigiClav Sc
022 PW Comp Sc FDSP
023 Gronk Sc FDSP
024 Ring EP Sc FDSP
025 Spitter Sc FDSP
026 Funk DX Sc FDSP
027 Combi Comp Sc
028 Pulse Clavi Sc
029 Pulse Comp Sc FDSP
030 Pulse OrgBrs Sc FDSP
031 Pulse EP Sc FDSP
032 Fat Oct Sc

BANK C

033 Brite Steel Gt
034 Steel Guitar Gt FDSP
035 Steel Gt
036 18 String Gt FDSP
037 18 Steel Gt FDSP
038 Clear Nylon Gt
039 Flamenco Gt
040 SingleChrs Gt
041 Harpsi Gtr Gt
042 Strat 4-Way Gt
043 Clean Lead Gt FDSP
044 VintStrat Gt FDSP
045 Snapper Gt FDSP
046 Single Comp Gt
047 R&B Lead Gt
048 Pedal Steel Gt FDSP

BANK D

049 Big Mute Gt FDSP
050 EX Guitar Gt FDSP
051 Jazzy Gt FDSP
052 Edgy Strat Gt
053 Lo Distort 2 Gt
054 Distort Mute Gt
055 Kunimotone Gt
056 Grunger Gt FDSP
057 L.A.Dist Gt
058 Lead Switch Gt
059 Black Magic Gt FDSP
060 BritishStack Gt FDSP
061 Old Strings Ba
062 Thump 1 Ba
063 Thump 2 Ba
064 Snazz Bass Ba FDSP

BANK E

065 Fingered Ba FDSP
066 Flatwound Ba
067 Pickit Ba
068 Slapit Ba
069 Hopin'Slap Ba VL
070 Boiled Ba
071 FretlessLead Ba FDSP
072 Fretless 1 Ba
073 Fretless 2 Ba FDSP
074 Eddie Ba
075 Wood Bass Ba
076 The FM Bass Ba
077 Boogie Ba AN
078 Dry Bass Ba AN
079 Pulse Bass 1 Ba AN
080 ResBassComp Ba AN

BANK F

081 Pulse Bass 2 Ba FDSP
082 Pulse Smack Ba FDSP
083 AnaChorus Ba
084 Mondo Bass Ba
085 Stevie Ld AN
086 UniPulser Ld AN
087 P5 Sync Ld FDSP
088 Squaw Ld FDSP
089 Saw Lead Ld AN
090 Quick 5ths Ld AN
091 Oberlead Ld AN
092 Singleline Ld
093 TriLead Ld
094 Earth Lead Ld AN
095 New Drone Ld AN
096 Sync Lead 1 Ld AN

BANK G

097 Tennor Sax Rd VL
098 Tenor Soft Rd
099 Tenor medium Rd
100 Sax Section Rd
101 Alto Sax Rd VL
102 BigSax Rd
103 Soft Reeds Rd
104 Soprano Sax Rd VL
105 Soprano Soft Rd
106 Mouth Keys Rd VL
107 Mizu Horny Rd VL
108 Flute Rd
109 Jazz Flute Pi VL
110 Metal Piper Pi FDSP
111 Bamboo Pi VL
112 Shakuhachi Et VL

BANK H

113 Rising High Fx
114 Fractal Fx
115 Busy Brass Fx
116 Flange Wrap Fx FDSP
117 Kosmik Fluid Fx FDSP
118 Morphyum Fx AN
119 Asian Rain Fx FDSP
120 Going Down Fx FDSP
121 Foam Fx
122 Megawave Fx FDSP
123 Pop Kit Dr
124 Velocity Kit Dr
125 Rock Kit Dr
126 Jazzy Kit Dr
127 House Kit Dr
128 Tech Kit Dr

The Factory Set: Internal bank I1

The Internal voices and the performances below are those of the Factory Set file `FACTSET1.S1Y`, once you have loaded it (see chapter 3). The other three Factory Set files differ in I1-001 to I1-032 only.

BANK A

001 Grusin Split
002 Jazz Grand
003 RandyRoads
004 Lead Switch
005 Pulse Smack
006 Snoop Bass
007 Hardstep
008 Hardsequence
009 Swell String
010 BreathChoir
011 Trumpet
012 Matrix
013 Mean Lead
014 Earth Lead
015 Pro Lead
016 Minor Vocals

BANK B

017 Bottled Out
018 ComeOnHigh
019 AN Layer
020 Adventure
021 Shakuhachi
022 Se7en Hit
023 Pulse EP
024 Loved Up
025 Stonk
026 Ring EP
027 Futopia
028 Gronk
029 Straight
030 Sync Echo
031 Down Spiral
032 FM Line

BANK C

033 4 by 4
034 4 Osc Sweep
035 Countryman
036 Air Stabs
037 AnalogSQ
038 Art of Love
039 Kick & Snare
040 Beades
041 BigArpeggio
042 Big Orch
043 Bip
044 Blockhead
045 Blue
046 Brush 'Em
047 Clickbell
048 Cloud Nine

BANK D

049 Adventure
050 Descender
051 Blue Lead
052 DigiWorld
053 EX god
054 Torture
055 Witches
056 Merapi
057 Evil
058 FM Line
059 Fanfare
060 Faraway
061 DX Atacky
062 Flivver
063 Dist 5th
064 Flow

BANK E

065 House Piano
066 Foster Stack
067 Funky Syn
068 Genaside
069 Green Lead
070 Hard Groove
071 Harmonics
072 Harptar
073 HealthSector
074 House Org
075 Impact
076 So Deep
077 Jungle Call
078 Glass Strat
079 Lazy Sweep
080 LoFi

BANK F

081 LoFiJazzComb
082 Loved Up
083 LoDistortion
084 Jaw Harp
085 Mars
086 Minor Vocals
087 Mr.Evolvo
088 Multiplies
089 Moore Lead
090 Nee-owng
091 Sucker
092 Phone Wires
093 Popcorn
094 Pro Lead
095 Warp
096 Pulse Matrix

BANK G

097 Six String
098 Reso Choir
099 Ricochet
100 Ring Mod EP2
101 Suitcase3
102 Ring Leader
103 Santana
104 Silvertone
105 Reece EP
106 Trolddom
107 Snoop Bass
108 Soda Straw
109 Squash
110 Stanley
111 Stonk
112 Strangg'e

BANK H

113 NewAge
114 Sweet Chords
115 Sweet Pulse
116 Swirl
117 Sync Pad
118 Synthboy
119 Talk
120 Telesa
121 TengJing
122 TimeWalk
123 Tine Bell
124 Tringle
125 Utopia
126 Vega Bass
127 Velo City
128 Wurli Amp

The Factory Set: Internal bank I2

BANK A

001 Equi 1998
002 RoboTribeAT
003 Sync Echo
004 Zambeezi
005 BasslineA
006 BasslineB
007 Dry Syn
008 Hardsequence
009 StrobeBass A
010 AnaSweep
011 Bwacka Bass
012 Talkin' Bass
013 Hardstep
014 SH Acid
015 Sub Bass
016 Massive FM

BANK B

017 Mean Bass
018 Lately Bass
019 Speed
020 Kangaroo
021 Plastic Box
022 Tosser
023 Wave Bass
024 Velo Sub
025 Mondoloid
026 Hollow Bass
027 Techline AN
028 3 Pole Reso
029 Slipmat
030 Fusion Tekk
031 Minor Syn
032 Fat Hook

BANK C

033 Chemistry
034 Rap Whistle
035 Rottersclub
036 Sync Lead 2
037 Talk Mod
038 Mean Lead
039 Trippy
040 Acid Saw
041 CompuTech
042 Organic
043 HPF Attack
044 Sync Lead 3
045 Thor
046 PointySquare
047 VocoLoco
048 StrayCat

BANK D

049 Vortex
050 Ghosts
051 Oasis
052 JeanMichel
053 Big Wave
054 LunaPad MW
055 Vapor
056 Paddalicious
057 Smoke Pad
058 Stalactite
059 VariPad
060 FlangOrg
061 Deep Blue
062 Sky Organ
063 ComeOnHigh
064 BitterSweet

BANK E

065 RhythmWheels
066 Ribbon Slide
067 Quickening
068 Hollow
069 StarDust
070 Nirvana
071 Moebius
072 StarDrive
073 AstralMonkey
074 Broken Arp
075 Geiger Count
076 Roswell
077 Huge Machine
078 Circular
079 Millenium
080 Se7en Hit

BANK F

081 Down Spiral
082 Ectoplasm
083 Whistlewind
084 Alien Rain
085 Bent Metal
086 FM Waves
087 Nusic
088 Creature
089 Talk2much
090 Radiophonik
091 BodyElectric
092 Trancer
093 Drumnotized
094 Eraserhead
095 Juju Temple
096 DarkSide

BANK G

097 What's funy?
098 Generator
099 Natives
100 Texture#6 VS
101 FullChargeAT
102 Ai-ee-yi
103 Moving
104 Road Rage
105 FutaFunk
106 Insomnia
107 Flang Saw
108 Flux
109 SynchroChoir
110 Echo Roads
111 Inkognito
112 Touch Drive

BANK H

113 Neptune
114 Ministry
115 Phasensembl
116 No.9 Strings
117 Organ XYZ
118 Union Jack
119 House
120 CS80 Brass
121 Raspberry
122 Tai-koh
123 RM Bellz
124 Tornado BD
125 ViaArpeggia
126 Alien Kit
127 FX Kit
128 Street Kit

The Factory Set: performances

BANK A

001 Radioactive
002 Eternal
003 Dream Grand
004 Lover's Sax
005 Analog Bros
006 FX loop
007 Lightyears
008 Epic
009 DolphinDance
010 CirqueDeLuna
011 Sync Chords
012 Warpout
013 HotSpring
014 Darkcore
015 Wave Pad
016 Snow Dwarf

BANK B

017 80's Seq
018 Piano String
019 HeadDriver
020 Alaskan
021 BreathyChoir
022 Obi & Paddy
023 Two Amps
024 Sunbeam
025 Relax
026 FrenchSchool
027 Celebration
028 Fretles Pad
029 Ballad Stack
030 Saphire
031 BeatExplorer
032 Quarks

BANK C

033 Drums & Bass
034 Roads&Brass
035 WideStrings
036 FlowerDrops
037 HybridRoads
038 WallChoir
039 Tower Brass
040 Amethyst
041 Microbe X
042 Clockshop
043 CrystalLake
044 Jazz Upr&Lwr
045 Moonbase
046 Silver Bird
047 The Dreamer
048 Stratosphere

BANK D

049 Digi Rock
050 NeoCity
051 AnalogStrngs
052 The Journey
053 S P A W N E
054 TwinTenor
055 Emotion
056 Experiment
057 Midnite Blue
058 Nuclear
059 Mars > Orion
060 EX-Teknofarm
061 SteviesSplit
062 SmoothEnsmbl
063 Water Dance
064 Hokkaido

BANK E

065 Radioactive
066 Eternal
067 Dream Grand
068 Lover's Sax
069 Analog Bros
070 FX loop
071 Lightyears
072 Epic
073 DolphinDance
074 CirqueDeLuna
075 Sync Chords
076 Warpout
077 HotSpring
078 Darkcore
079 Wave Pad
080 Snow Dwarf

BANK F

081 80's Seq
082 Piano String
083 HeadDriver
084 Alaskan
085 BreathyChoir
086 Obi & Paddy
087 Two Amps
088 Sunbeam
089 Relax
090 FrenchSchool
091 Celebration
092 Fretles Pad
093 Ballad Stack
094 Saphire
095 BeatExplorer
096 Quarks

BANK G

097 Drums & Bass
098 Roads&Brass
099 WideStrings
100 FlowerDrops
101 HybridRoads
102 WallChoir
103 Tower Brass
104 Amethyst
105 Microbe X
106 Clockshop
107 CrystalLake
108 Jazz Upr&Lwr
109 Moonbase
110 Silver Bird
111 The Dreamer
112 Stratosphere

BANK H

113 Digi Rock
114 NeoCity
115 AnalogStrngs
116 The Journey
117 S P A W N E
118 TwinTenor
119 Emotion
120 Experiment
121 Midnite Blue
122 Nuclear
123 Mars > Orion
124 EX-Teknofarm
125 SteviesSplit
126 SmoothEnsmbl
127 Water Dance
128 Hokkaido

APPENDIX B

TROUBLESHOOTING

Fifth Wave shows the ROM panel

One of the three required ROM files is missing: give it to the panel. A row that reads THE FILE THERE IS NOT ONE FIFTH WAVE KNOWS means the copy in the ROM folder has changed since it was given: give the file again. See chapter 3.

The ROM panel does not take my file

It is not one of the files Fifth Wave knows. The panel shows its size and SHA-256 checksum. Another version of the firmware, an earlier 1.0x or the 61-key sibling's, is not one of them.

No sound

- Check that your DAW sends MIDI to Fifth Wave's track and that the track is armed or selected.
- Check the voice's volume on the Common page, and that *Volume* and *Expression* are not at 0 in your DAW's automation.

Every performance is INIT

The performances and Internal voices are not in the original's ROM. Give the Factory Set to the ROM panel, or load it from the library: see chapter 3.

A few voices sound thinner than on the real instrument, or miss a sound

Fifth Wave plays the wave ROM image you supply. Where a sample is missing from that image, the elements that use it are silent.

The editor says it edits voices in Voice mode

It edits the voice that Voice mode plays, and not drum kits. Press VOICE and select a voice that is not a kit.

My edits are gone

Selecting another voice discards the edit buffer, as on the hardware. Use `Recall Voice` (JOB, F2), and store voices you want to keep.

Clicks or dropouts

Raise your DAW's buffer size. Each instance needs one processor core; with many instances, freeze or bounce some.

The arpeggio or the song runs at the wrong tempo

Check HOST SYNC: on, the instrument follows your DAW's tempo; off, it keeps its own.

The display stops at `MIDI bulk receiving !`

A long system-exclusive dump sent at full MIDI speed can overflow the instrument's input. Load disk files through the library instead.

A project made before Fifth Wave's release does not find it

Before its release Fifth Wave had another name and other identifiers: your DAW sees Fifth Wave as another plugin. Insert Fifth Wave on the track again. Your memory and library were moved to Fifth Wave's support folder at its first start.

Studio One lists Fifth Wave but does not load it (Windows)

Fifth Wave has changed folder, for example when DDS Hub moved it to the folder for all users, and Studio One still remembers the old one. In Studio One's Plug-In Manager, choose REMOVE PLUG-IN SETTINGS, confirm and restart Studio One; updating the plug-in list is not enough. Studio One then scans all your plugins again, which takes a few minutes; your favourites and folders stay. If another plugin stalls the scan, SKIP leaves that plugin out until the next full scan.

The MIDI window lists no ports

Editing the hardware works on macOS only for now.

Fifth Wave is made by Digital Dream Synths. The instrument that inspired this plugin is not named in this manual: its name is a trademark of its owner. Digital Dream Synths is not affiliated with, endorsed or sponsored by any instrument maker.

This manual follows the order of the introductory section of the original's owner's manual, but it is written for Fifth Wave, from Fifth Wave's own behaviour. Like the plugins, it was written with the help of AI. Fifth Wave 1.0.3, October 2026.