AFM99 OWNER'S MANUAL

AFM99 runs the operating system of the Advanced FM flagship on an emulated board and adds a patch browser, a library for the sounds of its whole family and a voice editor that draws every parameter. This manual shows how to play it, how to find and load its sounds and how to shape them, from the six operators of an FM element to the two effect processors.

Formats VST3 · AU · CLAP · LV2 **Systems** macOS · Windows 64-bit · Linux 64-bit

Manual October 2026

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CHAPTER 0

ABOUT THIS MANUAL

> Hamamatsu, 1991: Advanced FM and AWM samples on 76 keys, the workstation Japan called the King of Synthesizer.

This manual calls that instrument the Advanced FM flagship, or simply the original. It crowned its maker's line of FM and sample workstations, and its sound comes from two tone generators that work together: Advanced FM, six-operator frequency modulation with sixteen waveforms and looping envelopes, and AWM2, sampled waveforms played back through resonant digital filters. Its makers called the combination RCM, Realtime Convolution and Modulation. AFM99 does not imitate the original: it runs the original's own operating system, version 1.57, on emulated processors and sound chips, so the voices, the multis, the effects and the display's menus behave as they did on the hardware.

The manual follows the order of the original's own owner's manual: first what the instrument is made of, then selecting and editing voices, and finally the reference for each part of a voice. Where the hardware asks you to step through job directories on its display, AFM99's voice editor shows a whole job on one screen, so most procedures here are done in the editor; the panel's own way is described too, because every page of the original is still there. Chapters 11 to 14 cover the multis, what AFM99 adds around the instrument (the library and the cards), the panel's utility mode and AFM99 in your DAW, including editing the hardware itself over MIDI.

Some topics of the original manual do not apply to a plugin and are left out: power, cables and the rear panel, the keyboard, wheels and pedals, the floppy disk drive, the sample memory and the MIDI data recorder, the backup battery. AFM99 receives everything over MIDI from your DAW. The original's sequencer (Song and Pattern modes) is in the firmware and runs, but it is not described here: a DAW does that job better, and the original's manual covers it.

Conventions

WRITTEN AS	MEANS
VOICE	A key or control on AFM99's panel.
COMPARE	A button, tab, card or label in the voice editor or the browser, as it reads on screen.
Dir	Text on the panel's display.
P1-A01	A voice location: memory (I internal, C card, P1 and P2 the presets), bank A to D, number 1 to 16. The editor writes PR1-A01, INT-A01 and so on.
C3	A note, named as the original names it: C3 is MIDI note 60, middle C.
0...127	A range of values, from 0 to 127.

The screenshots show AFM99 with the factory voices, mostly PRESET 1 A01 *AP|Rocks* (an FM element layered with a sampled piano) and D14 *DR Kits* (a drum set). Click any screenshot to open it at full size.

CHAPTER 1

AFM99 BASICS

The flagship was built to bring together what its makers had learned in a decade of FM synthesis and in sample playback. Each half covers what the other lacks: samples give the realistic attack and body of a piano, a choir or a drum; FM gives tones that change with every nuance of your playing and can be pushed far beyond any acoustic instrument. On the flagship the two do not merely sit side by side: a sample can drive an FM operator, and every sound, FM or sampled, passes through resonant filters. AFM99 inherits all of it.

Advanced FM (AFM)

An FM operator is an oscillator with its own envelope. Connected so that one operator changes the pitch of another many thousands of times a second, operators create harmonics that neither of them has alone. The flagship's Advanced FM has six operators per element, and goes well past the six-operator FM of the 1980s:

- each operator can play one of **sixteen waveforms**, not only the sine;
- the operators are connected in one of **45 algorithms**, and each operator has **two inputs**, which can take another operator, its own feedback, noise or an AWM sample;
- every operator envelope has **six segments, a hold and a loop**, so a sound can keep moving while you hold a note;
- a pitch envelope, a main LFO and a sub LFO move the operators' pitch and level.

AWM2

AWM2, Advanced Wave Memory, plays back sampled waveforms: pianos, strings, voices, brass, drums and many single-cycle waves. The firmware lists two sets, PRESET 1 with 155 waveforms and PRESET 2 with 112, and a wave card in the WAVEFORM slot adds its own. AFM99 reads the waveforms from a wave ROM image you supply, and imports images of the family's wave cards.

Filters

Every element, FM or sampled, has two digital filters, each with its own envelope. Filter 1 is a low-pass or high-pass, filter 2 a low-pass, and both can be bypassed; together they make a band-pass or a steeper low-pass, and the resonance can be raised until the filter rings on its own. Since the filters process the FM too, AFM99 can sound like the analog synthesizers of the seventies as well as like classic FM.

Voices and elements

What you play is a *voice*. A voice has one, two or four *elements*, each a complete synthesizer of its own, AFM or AWM, with its own level, tuning, key and velocity range, panning and effect sends. Elements can sound together on every note (a layer), take different parts of the keyboard (a split) or answer to soft and hard playing differently (a velocity switch). The *voice mode* decides how many elements there are and of which kind:

VOICE MODE	ELEMENTS	NOTES AT ONCE
1AFM mono · 2AFM mono · 4AFM mono	1, 2 or 4 AFM	One: the voice is monophonic, with fingered or full-time portamento
1AFM poly · 2AFM poly	1 or 2 AFM	Polyphonic: the instrument plays up to 16 AFM notes and 16 AWM notes at once, and each element of a note takes one of them
1AWM poly · 2AWM poly · 4AWM poly	1, 2 or 4 AWM	
1AFM&1AWM · 2AFM&2AWM	AFM and AWM together	
Drum Set	None: a sample per key	Polyphonic, AWM

A *drum set* has no elements: each of its 61 keys, from C1 to C6, plays a waveform of its own, with its own tuning, level, pan and effect sends.

Pan, effects and the outputs

After its filters each element goes through a *dynamic pan*: one of 64 preset pan programs or the user's own, which move the sound between left and right by velocity, by key or with an LFO, following a pan envelope. Then the element goes two ways at once:

`ELEMENT` → `FILTERS` → `AMPLIFIER` → `DYNAMIC PAN` → `EFFECTS 1 · 2` → `OUT`

- **dry**, to output group 1, group 2 or both;
- through four **effect sends** into the instrument's two effect processors. Each processor offers 63 types: reverbs, early reflections, delays and echoes, pitch shifters, an exciter, modulation effects, a rotary speaker, a ring modulator, a wah, and combinations of two effects in series or in parallel. The two processors run side by side (parallel) or one after the other (serial).

At each output group the dry sound and the effects are mixed with a wet:dry balance. The original had two stereo outputs; AFM99 adds them together into its own stereo output, as the hardware does when nothing is plugged into OUTPUT 2.

All of this, the elements, the pan programs chosen and the effect settings, is stored in the voice: choosing a voice brings back its effects too.

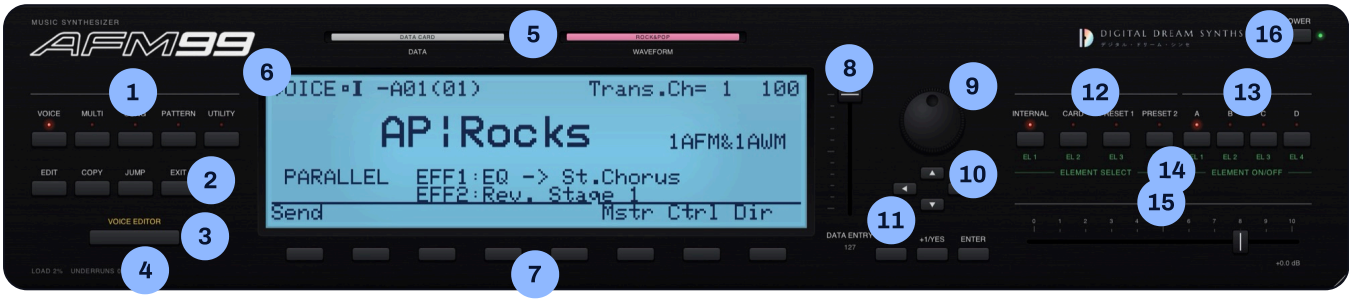
Multis

A *multi* puts up to sixteen voices together, one per MIDI channel, with their own volume, tuning, pan and output, and one effect setup for all of them. Multis are for playing several parts from a sequencer or your DAW. See chapter 11.

CHAPTER 2

THE PANEL AND THE EDITOR

AFM99 opens on its front panel, after the original's own: the mode keys on the left, the display in the middle, the data entry controls and the memory and bank keys on the right. The panel selects voices and multis and reaches every page of the original's menus. The voice editor, one click away, is where you will do most of your editing.

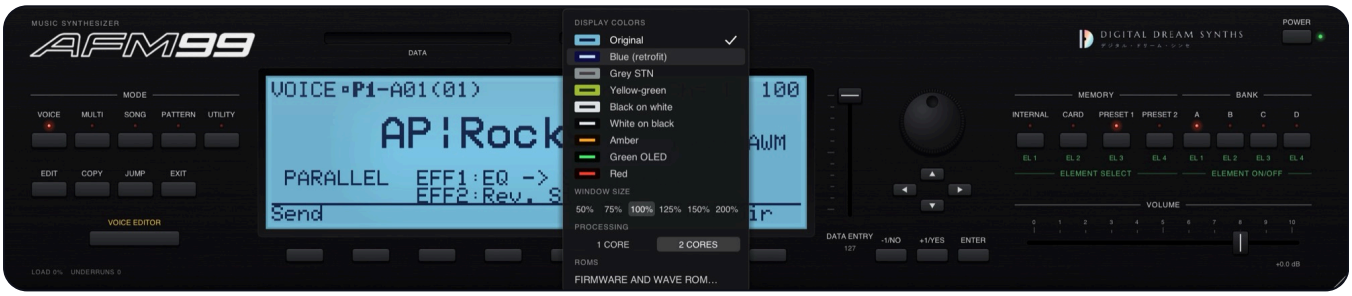


AFM99's front panel, with a data card and a wave card in the slots. The numbers match the list below.

1. VOICE MULTI SONG PATTERN UTILITY select the instrument's modes. The lit LED shows which one is on.
2. EDIT enters the edit mode of the voice or multi playing; pressed again while editing it is *Compare*. COPY copies voices, elements and effect settings. JUMP goes to a page by its number (the number at the top right of the display). EXIT leaves a page.
3. VOICE EDITOR opens the voice editor, once the machine has started.
4. **Load** and **underruns**: how much of the audio period the emulation takes, and how many blocks it could not deliver in time since the instance started.
5. The **DATA** and **WAVEFORM** card slots. The edge of a card in a slot shows its name, coloured like the label of the original card. Click a slot to open the browser on that card: see chapter 12.
6. The **display** is the original's. Click it to open the patch browser. Right-click it (or control-click) for the display menu: colours, window size, processing and the ROMs.
7. **F1 … F8** are the function keys. What each one does is written on the display's bottom line, just above it.
8. **Data entry** is the original's slider. Many voices use it, as controller 6, to change an effect or a tone while you play. Your DAW can automate it as *Data Entry*.
9. The **data dial** changes the value under the cursor, or steps through voices on the play screen. Drag it up or down, or turn the mouse wheel over it.
10. The **cursor keys** move the cursor on the display.
11. -1/NO and +1/YES change a value by one step and answer the display's `Are you sure ?`. ENTER opens the job under the cursor or confirms.
12. **Memory**: INTERNAL, CARD, PRESET 1 and PRESET 2.

13. **Bank**: A to D.
14. In Voice Edit the memory keys select element 1 to 4 for editing and the bank keys turn elements on and off, as the green captions say. The LEDs show which.
15. **Volume** sets AFM99's output level: 8 leaves it as the instrument makes it, each step above or below changes it by 3 dB (10 is +6 dB, 4 is −12 dB), and the steps under 4 fall faster, down to 0, which is silence. The level is shown under it. Drag the handle, turn the mouse wheel over it (a tenth of a step at a time) or double-click it to go back to 8. Your DAW can automate it as *Volume*.
16. POWER restarts the instrument with the memories it had when the instance started, or the project's. Its LED is green while the machine runs, amber while it starts, red when it has stopped.

The original's numeric keypad, its number keys 1 to 16 and the sequencer's transport keys are not on AFM99's panel: the patch browser reaches any voice in one click, and your DAW is the sequencer. The bottom-right corner of the window has a grip: drag it to resize the window.



The display menu: a right-click on the display.

Display colors

Nine schemes: *Original* (light blue, the default), Blue (retrofit), Grey STN, Yellow-green, Black on white, White on black, Amber, Green OLED and Red. The choice holds for every AFM99 you open.

Window size

50% to 200% of the panel's size at your system's scale. The grip in the corner does the same in between. The size is remembered for the next window.

Processing

1 CORE runs the whole instrument on one thread; 2 CORES, the default, runs the two effect processors on a core of their own while the next samples are made. The sound is the same, bit for bit; see chapter 14.

ROMs

FIRMWARE AND WAVE ROM... opens the ROM panel: which ROMs AFM99 has and where they come from. Drop a file on it to add or replace one; see Loading the ROMs.

The voice editor at a glance

Click VOICE EDITOR. The window grows to the editor's size and shows the voice that is playing. Press Esc or click PANEL to go back. You can resize the window by its corner; the panel and the editor scale together.



The voice editor, here on the first element of PR1-A01 *AP|Rocks*.

The header

On the left the logo. In the middle a display like the original's: the editor's mode (`VOICE EDIT`), the voice's location, the page you are on, the voice's name and its voice mode; click it to open the patch browser. On the right: VOICE < > step to the previous and next voice; BROWSER; COMPARE and STORE, the original's own; the VOLUME knob, the same as the panel's slider; PANEL to go back.

The tabs

COMMON holds what belongs to the whole voice. Then one tab per element, with its kind: EL1 · AFM, EL2 · AWM and so on, as many as the voice mode has. A drum set has DRUM SET instead. EFFECTS holds the two effect processors. MIDI connects the hardware. The lit LED marks the tab you are on.

The view chips

On an AFM element, two views: OPERATORS and PITCH · LFO · FILTERS.

The page

Cards of parameters, most with a drawing that you can drag: envelopes, scaling curves, the algorithm, the keyboard zones.

The footer

On the left, the last message sent to the firmware or what just happened. In the middle and on the right, how to use the page you are on.

CHAPTER 3

SETTING UP

What you need

- macOS 11 or later, Apple Silicon or Intel: VST3, AU or CLAP. Windows 10 or 11, 64-bit: VST3 or CLAP. Linux, 64-bit (x86-64) with glibc 2.35 or later, as in Ubuntu 22.04 and later, on an X11 desktop (or XWayland): VST3, CLAP or LV2. Linux is still in testing.
- A DAW that hosts instrument plugins.
- The original's firmware, version 1.57, as five image files, and a wave ROM image. They do not ship with AFM99: you supply them, and AFM99 keeps a copy. DDS Hub asks for them when you install AFM99, and AFM99 asks for them itself the first time it opens without them.

Installing with DDS Hub

DDS Hub, Digital Dream Synths' installer, is the easy way. Choose AFM99 and the formats your DAW uses; Hub downloads them, checks each file and puts it in your plugin folders. On macOS and Linux those are your user's, and no administrator's password is needed. On Windows, Hub asks once who gets the plugins: **All users**, the default, puts them in `C:\Program Files\Common Files\VST3\DDS` and `…\CLAP\DDS`, where every DAW looks, and Windows asks for permission at each install or update; **Only for me** uses your user folders and asks nothing. AFM99's card in Hub shows, for each ROM, whether it is missing or recognised, and takes your file. Hub and the plugin keep the ROMs in the same folder, so what one adds, the other sees.

Installing by hand

The download page has the same zips Hub uses, one for each format, each holding a single item. Unzip it and move the item into the folder of its format:

SYSTEM	FORMAT	FOLDER (YOURS)
macOS	VST3	`~/Library/Audio/Plug-Ins/VST3`
macOS	AU	`~/Library/Audio/Plug-Ins/Components`
macOS	CLAP	`~/Library/Audio/Plug-Ins/CLAP`
Windows	VST3	`%LOCALAPPDATA%\Programs\Common\VST3`
Windows	CLAP	`%LOCALAPPDATA%\Programs\Common\CLAP`
Linux	VST3, CLAP, LV2	`~/.vst3`, `~/.clap`, `~/.lv2`

- **macOS:** a plugin downloaded with a browser is marked as coming from the internet, and macOS refuses to load it. Remove the mark in Terminal, for example `xattr -dr com.apple.quarantine ~/Library/Audio/Plug-Ins/VST3/AFM99.vst3`. Plugins installed by Hub do not need this.
- **Windows:** some DAWs look only in the system folders (`C:\Program Files\Common Files\VST3` and `…\CLAP`). Add the folder above in your DAW's settings, or use the system folder.
- Then restart the DAW or let it scan its plugins again. AFM99 is listed under Digital Dream Synths.

Loading the ROMs

The first time AFM99 opens without its ROMs, it stays silent and a panel covers its own:



The ROM panel, before any ROM is in.

1. **Give it the files.**
   Drag them onto the dashed area: one, several at once, or the folder that holds them. Or click LOAD… and choose one of them: AFM99 also looks at the other files in that folder, not in its subfolders, and takes the ROMs still missing. On Windows and Linux use LOAD….

2. **AFM99 recognises each one**
   by its size and its SHA-256 checksum, whatever the file is called, and copies it into its ROM folder. The slot's row turns green and names the dump it found. In a folder, the files that are not ROMs are left alone.

3. **Add the others.**
   As soon as all six are in, the instrument starts and the play screen appears. When LOAD… found ROMs in the folder, the panel stays to say which came from there; CLOSE it to play.

A file AFM99 does not know is not kept: the panel shows its size and checksum, so you can compare them. AFM99 takes the firmware of version 1.57 only. Nothing is ever sent anywhere.

The ROM folder is `~/Library/Application Support/Digital Dream Synths/ROM/afm99` on macOS, `%APPDATA%\Digital Dream Synths\ROM\afm99` on Windows and `~/.local/share/digital-dream-synths/rom/afm99` on Linux; DDS Hub keeps the ROMs there too. Each time it starts, AFM99 checks the files again; one that no longer matches counts as missing, and the panel asks for it. To see the panel again, right-click the display and choose FIRMWARE AND WAVE ROM…; CLOSE or ESC closes it.

> **NOTE**
> The beta versions read the ROMs from the `roms` folder in AFM99's data folder (below), or from the places written in its `config.txt`. AFM99 still reads them there, and the first time it starts it copies the ones it recognises into the ROM folder, where DDS Hub sees them too.

AFM99 keeps its other files in its data folder: `~/Library/Application Support/Digital Dream Synths/afm99` on macOS, `%APPDATA%\Digital Dream Synths\afm99` on Windows, `~/.local/share/digital-dream-synths/afm99` on Linux. Inside are the factory memories, your library (`library`), your wave cards (`cards`) and AFM99's settings.

> **NOTE**
> Up to version 1.0.1 the data folder was `~/Library/Application Support/AFM99` on macOS, `%APPDATA%\AFM99` on Windows and `~/.local/share/AFM99` on Linux. The first time a newer AFM99 starts, it moves that folder, whole, to the new place. If the folder cannot be moved, for example because another program has a file in it open, AFM99 copies it and leaves the old one where it is: once you have seen your library in AFM99, you can delete the old one. If both folders are there, AFM99 uses the new one and leaves the old one alone; it never mixes the two.

The first start

Add AFM99 to an instrument track. It powers on as the original did: the display shows its start-up, then the play screen of the voice that was playing when the memories were saved. A new instance starts from the factory memories: INTERNAL holds a copy of the PRESET 1 voices and the sixteen factory multis.

AFM99 is an instrument with a stereo output and no audio input. The instrument receives voices on one MIDI channel, its *voice receive channel*, which is **channel 1** from the factory: send to AFM99 on channel 1, or change the channel in Utility mode (UTILITY, F2 MIDI, 01 Setting). In Multi mode each part listens on its own channel. AFM99 reports a small latency to your DAW, which compensates for it: see chapter 14.

The display's colours and the window's size

Right-click the display for the menu shown in chapter 2. If your DAW's window is small, set Window size to 75% or drag the grip in the corner; if you work on a large screen, 125% or 150%.

Getting the factory voices back

The PRESET 1 and PRESET 2 voices are in the firmware's ROM and can never be lost. INTERNAL starts as a copy of PRESET 1; if you have overwritten some of its voices, the library writes the whole bank back: open the browser, choose LIBRARY, select PRESET 1 and click TO INTERNAL twice. This replaces all 64 internal voices, so save the ones you want to keep first (SAVE INT, see chapter 12).

CHAPTER 4

SELECTING VOICES

The instrument has four voice memories of 64 voices: INTERNAL, which you write; CARD, the voices on the RAM card in the DATA slot; and PRESET 1 and PRESET 2, in ROM. Each memory has four banks, A to D, of sixteen voices: A01 to D16. Bank D's slots are larger, and are the only ones that take four-element voices. The appendix lists the preset voices.

On the panel



The play screen in Voice mode, with INTERNAL A01.

Press VOICE. The display shows:

- at the top, the voice's location twice, as memory, bank and number and as a number from 1 to 64: `I -A01(01)`; the keyboard's transmit channel; the page number;
- the voice's name in large letters and its voice mode;
- the effect mode and the two effect types;
- on the bottom line, the function keys: `Send` (F1) sends a bank select and a program change to other instruments, `Mstr` (F6) chooses a master keyboard setup, `Ctrl` (F7) shows the voice's controller assignments, `Dir` (F8) the bank's directory.

To choose a voice, press a memory key and a bank key; their LEDs blink until the voice is chosen. Then +1/YES, -1/NO or the data dial step to the next or previous voice. To jump straight to a voice, use the directory or, quicker, the patch browser.



The directory of PRESET 1 bank A, on F8.

`Dir` (F8) lists the sixteen voices of the bank. Move the cursor to a voice and press `ENTER` to choose it. `EXIT` returns to the play screen.

The patch browser

The quickest way to a voice is the patch browser. Click the panel's display, or the display in the editor's header. The browser takes the place of the display, drawn in its colours and its font, with every voice of a memory in sight.



The patch browser's Voice page on PRESET 1.

- The tabs along the top: VOICE, MULTI, LIBRARY and CARDS. The ✕ at the top right closes the browser, and so does Esc.
- On the left, the memories: INTERNAL, CARD (it reads `NO CARD` when the DATA slot is empty), PRESET 1 and PRESET 2.
- Click a voice to choose it. AFM99 chooses it the way you would on the panel, with the mode, memory, bank and number keys, so it takes about half a second. The voice playing is highlighted.
- Double-click a voice to choose it and close the browser.
- Rest the mouse on a voice to read its voice mode. A voice that plays from a wave card has a `*` after its number; with the mouse over it, the card's name.

The MULTI page does the same for the sixteen internal multis (chapter 11). LIBRARY and CARDS open your banks and wave cards (chapter 12).

From your DAW

AFM99 answers program changes and bank selects as the original does, on its voice receive channel. A program change chooses a voice 1 to 64 in the memory that is selected (0 is A01, 16 is B01 and so on). To change the memory as well, send a bank select first: controller 0 with value 0, then controller 32 with 0 for INTERNAL, 1 for CARD, 2 for PRESET 1 or 5 for PRESET 2. Whether program changes are received is set in Utility mode (01 Setting, `Program Change`).

> **NOTE**
>
> Some voices let the Data Entry slider, controller 6, change an effect or a tone. The firmware reads the slider only when it moves, and sets the controlled value to its minimum when a voice is chosen. So that the voice follows the slider where it stands, AFM99 moves it slightly and back just after a program change from your DAW. After choosing a voice on the panel, move the slider yourself.

The controller view



The common job directory in the panel's Voice Edit (chapter 5).

`Ctrl` (F7) on the play screen shows, on one page, what the voice's controllers do: the pitch-bend range, the aftertouch mode and split point, and which controller moves pitch modulation, amplitude modulation, the filters, the pan, the EG bias, the volume and the effects. It is a quick way to learn what a factory voice expects of your hands; the editor's COMMON page shows the same and lets you change it.

CHAPTER 5

EDITING A VOICE

Editing a voice takes three steps, on AFM99 as on the original: choose a voice close to what you want, change it, and store it. Until you store it, your changes live in the instrument's *edit buffer*; choose another voice without storing and they are gone.

The editor and Voice Edit

The editor works through the firmware's own Voice Edit mode: every change you make is sent to the firmware as a MIDI parameter change, the same message a computer editor sent to the hardware in 1991, and the editor reads back what the firmware stored. What you see is therefore always what the instrument holds.

Going into Voice Edit makes the firmware silence the notes that are sounding. So that opening the editor does not cut you off, AFM99 waits: if notes are sounding, the editor shows the voice as it is in memory and goes into Voice Edit when everything is quiet, or at your first change.

The pages

TAB	WHAT IT HOLDS	SEE
COMMON	Name and voice mode; play settings, pitch bend and aftertouch; the elements' zones, levels, tuning, pan, outputs and sends; the controllers.	Chapter 6
EL · AFM	An FM element: the algorithm and operators, then pitch, LFOs and filters.	Chapter 7
EL · AWM	A sampled element: waveform, envelopes, LFO and filters.	Chapter 8
DRUM SET	The keys of a drum set.	Chapter 9
EFFECTS	The two effect processors.	Chapter 10

Changing a value

- **Drag** a value up or down. Hold shift for finer steps.
- **Turn the mouse wheel** over a value: one step a notch.
- **Drag the drawings**: the points of an envelope, the breakpoints of a scaling curve, the ends of a keyboard zone, the level faders.
- **Click** the buttons of a choice (a waveform, a filter type, a voice mode). A few long lists open on a click: the algorithms, a controller's source, an effect type.

- A value with a padlock is fixed by the voice's other settings, for example the portamento mode of a polyphonic voice, or a route the algorithm does not allow.

Compare

Click COMPARE to hear the voice as it is stored; its LED lights and editing is off. Click it again to go back to your changes. On the panel, EDIT pressed in Voice Edit does the same, and the display shows a C by the voice's number instead of the E of an edited voice.

Storing a voice



The store window. AP|Rocks has two elements, so bank D is greyed.

1 **Open the store window.**
Click STORE.

2 **Choose where.**
INTERNAL, or the RAM card in the DATA slot when there is one. Click a slot; the line below says which voice you would replace. The slots the voice cannot use are greyed: a voice of one or two elements goes in banks A to C, a four-element voice in bank D, and a drum set stored in banks A to C keeps only its keys C1 to C6.

3 **Store.**
Click STORE, then SURE? STORE within three seconds. The footer confirms `STORED TO INT-…`, and the stored voice is the one playing.

When you step to another voice with < > or the browser while the voice has changes, the editor asks first: STORE..., DISCARD or CANCEL.

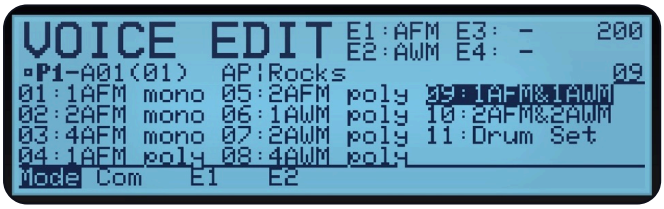
> CAREFUL
> Storing replaces the voice in that slot. To keep a whole bank safe before you experiment, save it to the library with SAVE INT (chapter 12).

Naming a voice

On the COMMON page click a letter of the name and type. The name has ten characters; the factory voices begin with a family, as in *AP|Rocks* (acoustic piano) or *BR:BigBand* (brass).

Editing on the panel

Everything the editor does can be done on the panel too, the original's way. Press EDIT in Voice mode: the display shows `VOICE EDIT` and the voice's elements, and the function keys choose a *job directory*.



`Mode` (F1): the voice mode.



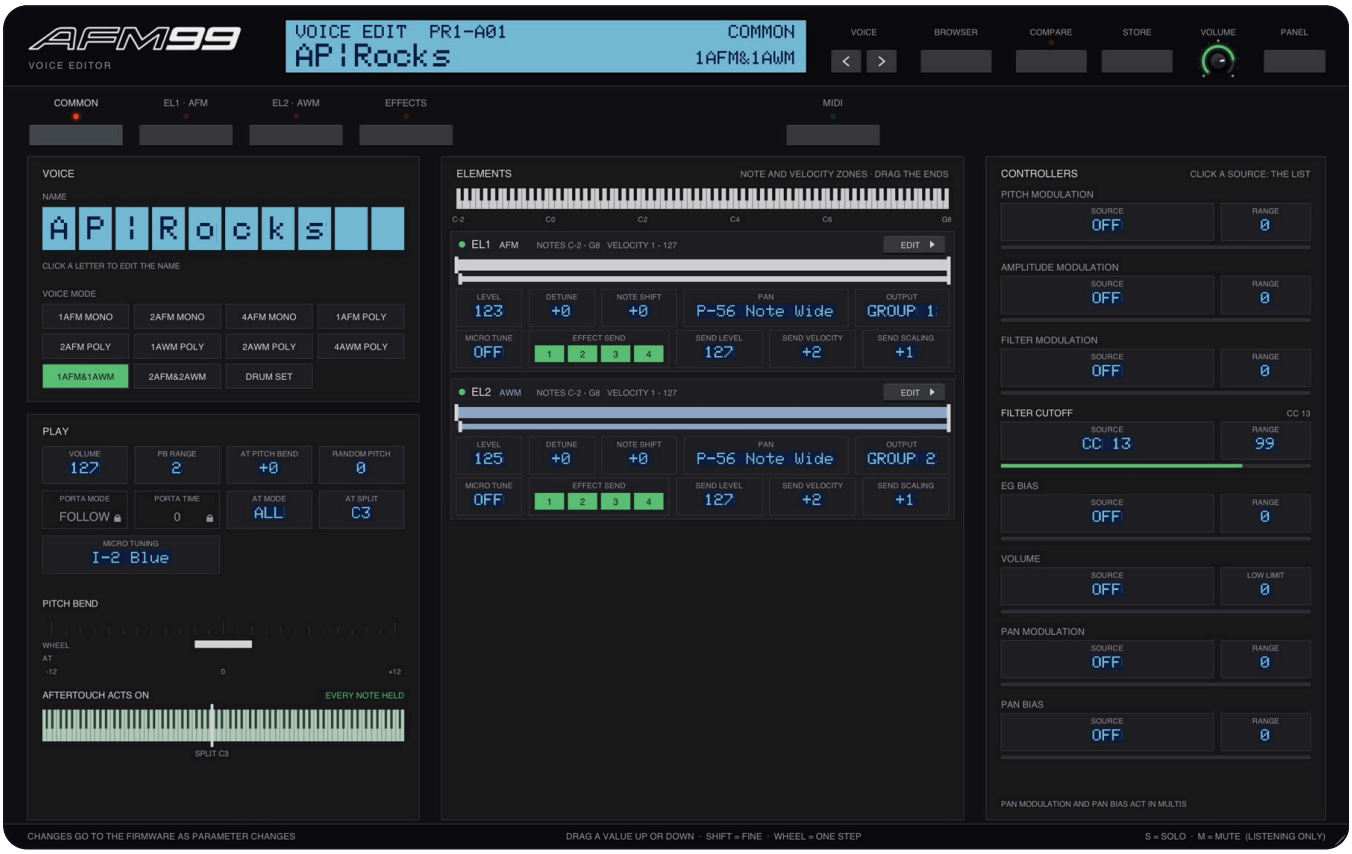
`E1` (F3): the first element's jobs.

- `Mode` (F1) sets the voice mode; `Com` (F2) opens the common jobs, from 01 Element Level to 16 Recall; `E1` to `E4` (F3 to F6) open each element's jobs. A drum set has `Mode` and `Com` only.
- Move the cursor to a job and press ENTER. EXIT goes back to the directory.
- Every page has a number at the top right of the display: JUMP followed by that number goes straight to it.
- The memory keys select element 1 to 4 and the bank keys turn elements on and off, to hear one element alone.
- When you leave Voice Edit with changes, the display asks `AUTO-STORE VOICE`: choose the slot with the memory, bank and number keys or the cursor, then `Stor` (F8) and +1/YES to store, `Quit` (F7) to drop the changes or `Ret` (F6) to go back to editing.

CHAPTER 6

THE COMMON PAGE

The COMMON page holds what the elements share, and what each element contributes to the whole: how loud, where on the keyboard, where in the stereo field and into which effect.



The Common page of AP|Rocks: one FM element and one AWM element over the whole keyboard.

Voice

NAME: click a letter and type. VOICE MODE: the eleven modes of chapter 1. Changing the mode changes the elements, so the editor asks you to click the mode a second time.

Play

Volume

The voice's level, 0…127.

PB range

How far the pitch-bend wheel bends, 0…12 semitones.

AT pitch bend

Aftertouch bending the pitch, –12…+12 semitones.

Random pitch

0…7: each note slightly out of tune by a random amount, more at higher settings, as on an instrument that never plays twice the same.

Porta mode, Porta time

Portamento glides from one note to the next. In the mono voice modes it is *fingered* (only when you play legato) or *full time* (always); the polyphonic modes always follow. 0 is no glide. Portamento applies to the AFM elements only.

AT mode, AT split

Which notes aftertouch acts on: *All* the notes held, the *Top* or *Bottom* note only, or the notes above (*Split Hi*) or below (*Split Lo*) the split point. The keyboard at the bottom of the card shows it.

Micro tuning

A tuning other than equal temperament: one of the preset tunings, or the two of your own in INTERNAL. Each element turns it on or off.

Elements

At the top, a keyboard from C–2 to G8, and under it a band per element: its note zone, with its velocity zone as a thinner bar. Drag the ends of a band to change the zone. A split puts the elements side by side; a layer puts them over each other; a velocity switch gives one element the soft notes and another the hard ones.

Level · Detune · Note shift

The element's level, 0…127; a slight detuning, –7…+7, which thickens two elements playing the same note; a shift of –64…+63 semitones, for an element an octave or a fifth away.

Pan

The dynamic pan program: P-1 to P-64 are the presets, I-1 to I-32 your own. A pan program moves the sound by velocity, by key or with an LFO, following an envelope; *Note Wide*, for instance, spreads the keyboard from left to right.

Output

The output group the dry element goes to: group 1, group 2 or both (or off). See chapter 10 for how the groups and the effects meet.

Micro tune

On: the element follows the voice's micro tuning.

Effect send · Send level · Send velocity · Send scaling

Which of the four effect sends the element feeds (lit squares), how much (0…127), and how much more with harder playing (velocity) and on higher keys (scaling), –7…+7.

Edit ▸

Opens the element's own page.

> **TIP**
> To hear one element alone, turn the others off with the bank keys on the panel (in Voice Edit they read *Element on/off*), or use the operators' S and M buttons on an AFM page, which only change what you hear.

Controllers

Eight assignments connect a controller to a part of the sound. Each has a **SOURCE**, any MIDI controller from 1 to 120 or aftertouch, and a **RANGE**, how far it goes; a bar under the pair shows the range. Click a source for the list:



The sources: off, the 120 controllers with their usual names, and aftertouch.

Pitch modulation · Amplitude modulation · Filter modulation

How much the elements' LFOs move the pitch (vibrato), the level (tremolo) and the filters (wah). Each element's LFO sets its own depths, and the controller scales them.

Filter cutoff

Moves the filters' cutoff directly. AP|Rocks puts it on controller 13 at range 99.

EG bias

Lowers the level of the envelopes, for a softer or darker note.

Volume

The voice's level; LOW LIMIT is how low the controller can take it.

Pan modulation · Pan bias

The pan LFO's depth, and a shift of the whole stereo image. They act in multis too.

The effect controls, which move effect parameters, are on the Effects page.

An exercise: a split

1. **Start from a two-element voice.**
   AP|Rocks layers an FM element and a sampled piano over the whole keyboard.

2. **Split the keyboard.**
   Drag the right end of EL1's band down to B2, and the left end of EL2's band up to C3.

3. **Move the left hand down an octave.**
   Set EL1's NOTE SHIFT to –12.

4. **Listen and store.**
   Play across C3, then store the voice under a new name.

CHAPTER 7

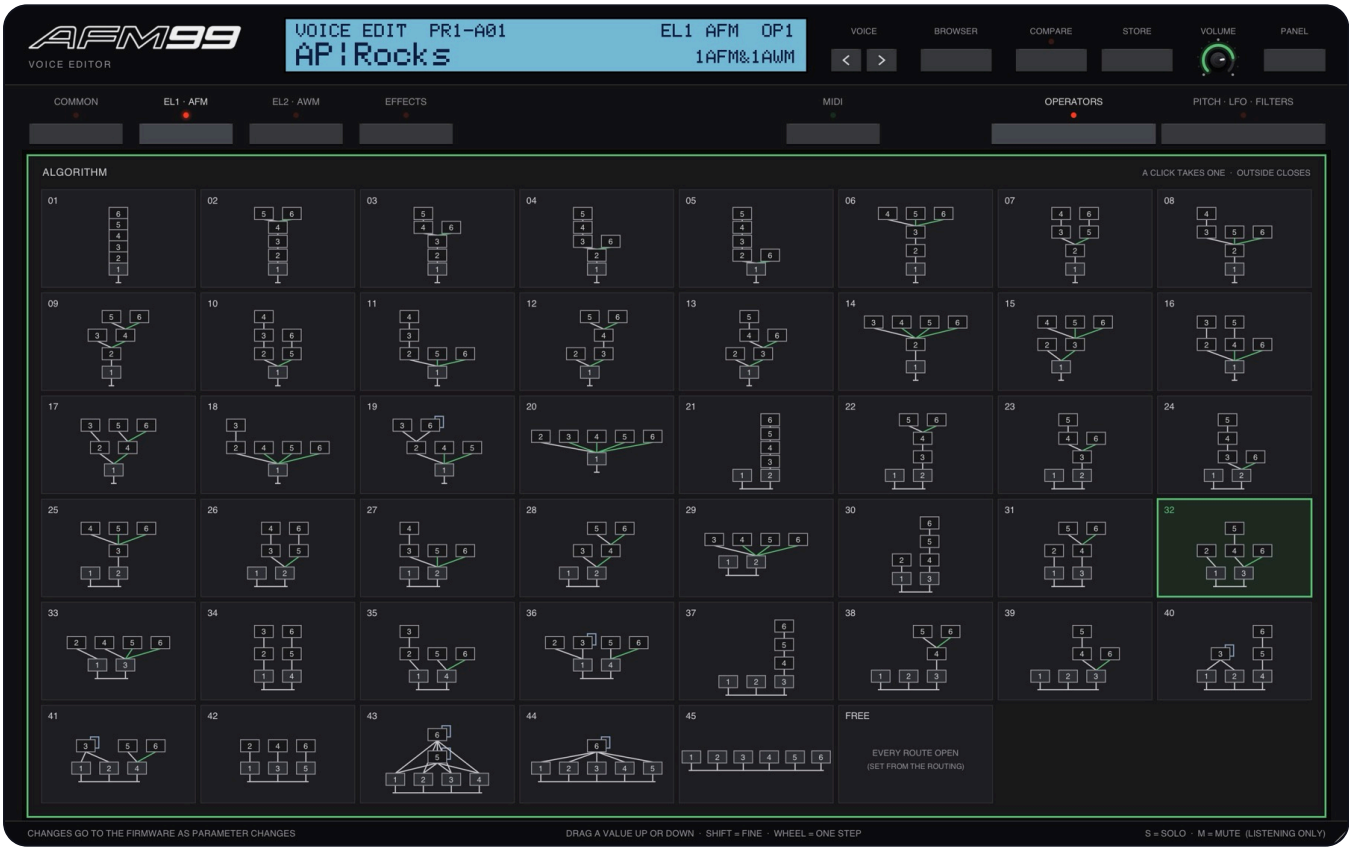
AFM ELEMENTS

An AFM element is six operators arranged in an algorithm, followed by two filters and a pan. Its level over time comes from the envelopes of the operators that reach the output, the *carriers*; the operators that feed other operators, the *modulators*, shape the tone. An element's tab has two views: **OPERATORS**, shown in chapter 2, and **PITCH · LFO · FILTERS**.

The algorithm

The **ALGORITHM** card draws how the operators connect: arrows for the signals from one operator into another, green lines for the accumulator, which adds operators together, and dashed lines for an operator that hears another's previous sample (the M1′ to M3′ registers). The carriers, here OP1 and OP3, end at **OUT**. A loop on an operator is its feedback; a ⊕ is an addition.

Step through the 45 algorithms with **< >**, or click the algorithm's number for all of them:



The 45 algorithms. FREE leaves every route to the routing table.

A click takes an algorithm; a click outside closes the picker. **FREE** keeps the routing as it is and opens every route.

The routing table

Under the algorithm, one row per operator: INPUT 1 and INPUT 2 (the previous operator, a register, the accumulator, noise, an AWM sample, or off), the feedback it writes (FB OUT), what it does with the accumulator (ACC: add, pass or both) and its level. The algorithm fixes some of these; the others you may change, and they are what makes two voices on the same algorithm sound different.

The operator cards

Across the top, six cards, OP1 to OP6, each with its waveform, its frequency, its level and its envelope in small. Click a card to edit that operator below; the chosen one is framed in green. S solos an operator and M mutes it: they change only what you hear, never the voice, and are the quickest way to understand what each operator does.

Oscillator

Wave

Sixteen waveforms: the sine, and shapes built from sine and sine-squared quarter cycles, half-cycles and pulses. A brighter wave on a modulator gives more harmonics for the same level.

Mode, Coarse, Fine

RATIO: the operator follows the keys at a multiple of the note's frequency; FIXED: it plays the same frequency on every key, for noises and formants. The large display shows the result.

Detune · Phase

A slight detuning, for slow beating between operators; the phase at which the operator starts.

Level and sensitivity

The LEVEL fader sets the operator's output, 0…127: on a carrier, its loudness; on a modulator, how much it changes the tone. SENSITIVITY:

Velocity

How much harder playing raises the operator's level, −7…+7.

Amp mod · Pitch mod

How much the LFO moves the operator's level and pitch.

Rate vel

On: harder playing makes the envelope faster.

Pitch EG

On: the element's pitch envelope moves this operator.

Out adjust

A coarse adjustment of the operator's output, 0…7.

Key sync

On: the operator restarts its cycle with each note, for a repeatable attack.

Envelope

Each operator's envelope has four key-on segments, two key-off segments, a hold and a loop. Drag the points of the drawing, or set the values under it:

R1–R4, L0–L4

The rates and levels of the key-on segments, from L0, the start, through L1–L3 to L4, where the note stays while you hold the key.

RR1, RR2, RL1, RL2

The two segments after you release the key.

Hold

A wait before the envelope starts.

Loop

The segment the envelope returns to after the last one, so that it keeps cycling while you hold the note: the source of the flagship's slowly evolving pads.

RS · Vel · AMS

Rate scaling, envelopes faster on higher keys; velocity on the level; and the LFO's amplitude modulation on this envelope.

Key scaling

Four breakpoints across the keyboard, each with a level offset: an operator can fade towards the high keys, or grow louder in the bass. Drag the diamonds along the keyboard and up or down.

Pitch, LFOs and filters



The second view of an AFM element.

Pitch EG

A pitch envelope for the operators switched on under ON THE OPERATORS: R1–R3 and RR, L0–L3 and RL, a RANGE of 8, 2 or 1 octave or half an octave, rate scaling and velocity. A short fall at the attack gives a brass "blip"; a slow rise, a synth sweep.

LFO

The main LFO: six waves (triangle, saw down, saw up, square, sine, sample and hold), SPEED, DELAY before it starts, PHASE, and its depth on the pitch, the level and the filters. The drawing shows its shape over time. OPERATOR SENSITIVITY sets how much each operator takes of the pitch and amplitude modulation.

Sub LFO

A second LFO for the pitch of every operator: triangle, saw down, square or sample and hold, a speed, and a delay or decay mode with its time. Use it for vibrato while the main LFO does something else.

Filters

Filter 1 and filter 2: TYPE (low-pass, high-pass or through), CUTOFF, and CONTROL: *EG*, the filter's envelope; *LFO*, the LFO; or *EG-VA*, the envelope with velocity changing its first rate and level. Then RESONANCE, VELOCITY and CUTOFF MOD, the controllers' share. The curve shows the response.

Filter EG

One envelope per filter, chosen with FILTER 1 and FILTER 2, with four key-on segments and two key-off ones, as the operators'.

Cutoff scaling

Four breakpoints over the keyboard: brighter high notes, darker bass.

The filters are the same on AWM elements.

An exercise: make the FM brighter

1. **Find the modulators.**
   On EL1 of AP|Rocks, solo OP1 with its S: you hear the carrier with what modulates it. Unsolo it.

2. **Raise a modulator.**
   Click OP2's card and raise its level fader by ten or twenty steps: the tone grows brighter and more bell-like.

3. **Make it follow your touch.**
   Raise OP2's VELOCITY sensitivity: soft notes stay mellow, hard ones bite.

4. **Compare.**
   Click COMPARE to hear the original, again to come back.

CHAPTER 8

AWM ELEMENTS

An AWM element plays a sampled waveform. Its pitch can move with an envelope and an LFO, its tone passes through the same two filters as an AFM element's, and its level follows an amplitude envelope of its own. All of it is on one page.



The AWM element of AP|Rocks plays the waveform *1 Piano*.

Waveform

Choose where the waveform comes from, then the waveform in the list:

Preset 1 · Preset 2

The instrument's own waveforms: 155 in PRESET 1, from *1 Piano* to the drums, and 112 in PRESET 2.

Card

The waveforms of the wave card in the WAVEFORM slot. A voice that uses them needs that card: the browser marks it with a `★`, and the library and the Cards page put the card in for you (chapter 12).

Internal

Waveforms made from samples in the original's sample memory. This manual does not cover loading samples.

Under the list: FREQ MODE, *normal* (the waveform follows the keys) or *fixed* (it plays at FIXED NOTE on every key, as a drum or a noise); FINE, a fine tuning; PITCH MOD, how much the LFO's vibrato reaches it.

Pitch EG

As on an AFM element: three rates and a release, four levels and a release level, a range, rate scaling and velocity. A small rise at the attack gives brass or a plucked string their bite.

Amplitude EG

An AWM element has an amplitude envelope of its own, since nothing else sets its level over time. In *Attack* mode the note rises at R1 to its peak; in *Hold* mode it starts at full level and stays there for the hold time before it decays, which keeps the attack recorded in the sample. Then R2 to R4 and the levels L2 and L3 shape the decay and the sustain, and RR the release. RATE SCALE makes higher notes faster, VELOCITY makes harder notes louder, RATE VEL makes them faster, and AMP MOD sets how much the LFO's tremolo reaches the element.

LEVEL SCALING, under it, sets the level across the keyboard with four breakpoints, as an operator's key scaling does.

LFO, filters, filter EG, cutoff scaling

The same as on an AFM element's second view: see chapter 7. The AWM element's LFO has one more use, tremolo, through AMP DEPTH.

An exercise: an AWM element as an FM modulator

The flagship's most distinctive trick is feeding a sample into an FM operator. In a voice with AFM and AWM elements, open the AFM element's routing table, set an operator's INPUT 1 or INPUT 2 to the AWM input and raise that input's level slowly: the operator's sine takes on the grain of the sample, and the result is neither FM nor sample. Turn the AWM element's own level down on the Common page if you want only the modulated sound.

CHAPTER 9

DRUM SETS

A voice whose mode is *Drum Set* has no elements. Each key from C1 to C6 plays a waveform of its own, so that a whole kit fits in one voice. Its tabs are COMMON, DRUM SET and EFFECTS.



The Drum Set page of PRESET 1 D14 *DR Kits*.

- **Keys**: click a key to choose it; it plays as you click, and stops when you let go.
- **The key's card**: its waveform, from the same four sources as an AWM element; its LEVEL, NOTE SHIFT and FINE TUNE; its PAN, a fixed position from –31 to +31; ALTERNATE: the keys with it on cut each other off, as the open and closed hi-hat of a real kit do; its OUTPUT group; the four SENDS, the SEND LEVEL and SEND VEL.
- **Kit**: the whole kit at a glance, each key with its waveform, level and pan; a red dot marks the keys in the alternate group. Click a key in the grid to choose it.

On the panel, a drum set's Voice Edit has `Mode` and `Com` only; `Com`'s job 02, Wave Data Set, holds what the Drum Set page shows.

CHAPTER 10

EFFECTS

The instrument has two effect processors, each able to run any of 63 effect types, with up to ten parameters each. Their setup is part of the voice. The **EFFECTS** tab shows the configuration and the routing at the top, and each processor below, with a live picture of what it does.



The Effects page of AP|Rocks: an EQ into a stereo chorus, and a stage reverb, in parallel.

Configuration and routing

Off · Serial · Parallel

Parallel: effect 1 takes sends 1 and 2, effect 2 sends 3 and 4, side by side. *Serial*: effect 1 takes sends 1 and 2 and feeds effect 2, as a chorus into a reverb. *Off*: the voice is dry.

Out 1 wet:dry · Out 2 wet:dry

At each output, the balance between the dry sound of the elements sent to that group and the effects: 100:0 is the effects alone, 0:100 the dry sound alone, 50:50 both a little lower.

EFF2 mix

In serial mode, how much of effect 2 is added to what effect 1 gives it.

The levels on the wires

How much of each effect reaches each output: **EF1 > 1**, **EF1 > 2**, **EF2 > 1**, **EF2 > 2**.

Which elements feed which effect is set where the elements are: their EFFECT SEND squares and levels on the Common page, or each key's on the Drum Set page. AFM99 adds the two outputs together into its stereo output.

The effect types

Choose a type with the < > beside its name, or click the name for the list. Changing the type sets its parameters to the firmware's defaults for it.

TYPES	WHAT THEY ARE
1–11	Reverbs: Hall, three Rooms, two Stages, Plate, White Room, Tunnel, Canyon, Basement.
12–15	Early reflections, a gate reverb and a reverse reverb.
16–18	Delays: Delay L,R, Delay L,C,R and a stereo echo.
19–21	Pitch change: two or three voices transposed, detuned and delayed.
22	Aural Exciter, which adds brilliance.
23–26	EG Flange, EG Chorus, EG Symphonic and EG Phasing: modulation effects with an envelope of their own.
27–29	Rotary speaker, ring modulator and a dynamic filter (wah).
30–51	Two effects in series in one processor: an echo, a delay, a modulation, an exciter, a distortion or an EQ into a reverb, a delay or a modulation.
52–63	Two effects side by side in one processor, each with its own send: Hall & Plate, Echo & Rev, Flange & Chorus and so on.

The parameters

Each processor's card shows its type's parameters as knobs, only those the type uses: drag up or down, shift for finer steps, or turn the wheel. Under each knob the value reads as the original's display writes it, in milliseconds, hertz, decibels or percent. The knobs of the first part of a combined type are green, those of the second blue, like the squares by the pictures' names.

Above the knobs, a picture of each part: a reverb's decay over time and frequency, with its reverb time marked; the taps and repeats of a delay; the waves of a chorus or a flanger at its speed and depth; the curve of an EQ, with its low, mid and high bands marked; the transfer curve of a distortion. They change as you turn the knobs.

Effect controls and the effect LFO

Two CTRL rows let a controller move an effect parameter while you play. Each has the parameter it CONTROLS (any parameter of either effect, the levels, the wet:dry balances or the effect LFO), a SOURCE (a MIDI controller, aftertouch, velocity, key scaling or the effect LFO) and the range it covers, MIN to MAX. A knob under an effect control is tagged CTRL 1 or CTRL 2. The effect LFO has a wave, a speed, a delay and a phase, or *free* to let it run on its own.

> **TIP**
> AP|Rocks puts the second output's wet:dry on the Data Entry slider and the chorus's mix on the modulation wheel. Move the panel's DATA ENTRY slider, or automate *Data Entry* in your DAW, to hear more or less of the reverb.

Voices from the predecessor

The flagship's 1989 predecessor and that one's rack version had effects of another kind, two modulation units and two reverb units, which the flagship does not read: the hardware plays their voices dry. When AFM99 imports their SysEx, it rebuilds each voice's effects with the flagship's: each modulation-and-reverb chain of the predecessor becomes the flagship's type closest to it (Chorus -> Rev, Flange -> Dly L,R and so on), with the levels and balances worked out from the predecessor's settings. It is an approximation, made to sound close, not identical. See chapter 12.

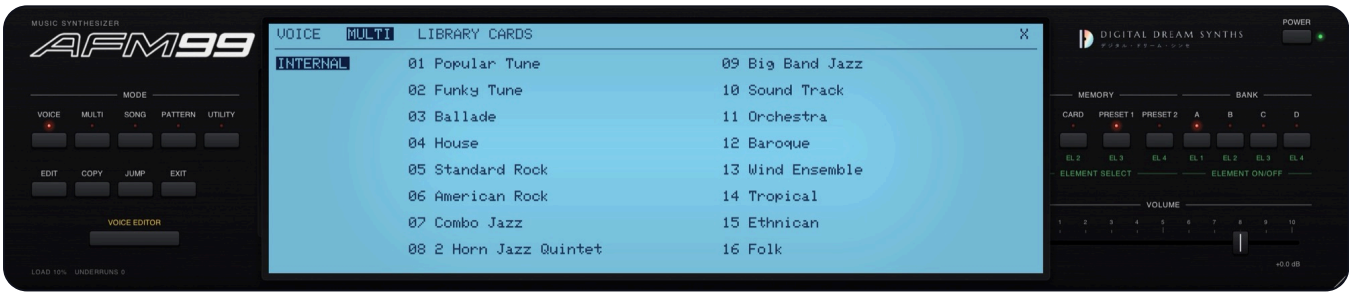
CHAPTER 11

MULTIS

A multi plays up to sixteen voices at once, each on its own MIDI channel: a whole arrangement from your DAW, one track per part. The instrument shares its 16 AFM and 16 AWM notes among the parts as they play.



Multi mode, with multi 01 *Popular Tune*.



The browser's Multi page.

Playing a multi

Press MULTI, or open the browser's MULTI page and click a multi. The play screen shows its name, its effect mode and types; `Dir` (F8) lists the sixteen multis. Then send each part on its channel: part 1 on channel 1, and so on, as set in the multi.

Editing a multi on the panel

The voice editor edits voices; a multi is edited on the panel. Press EDIT in Multi mode for its jobs:

JOB	WHAT IT SETS, FOR EACH OF THE SIXTEEN PARTS
01 Voice	The voice the part plays, from any memory, or off.
02 Volume · 03 Tuning · 04 Shift	Its level, a fine tuning and a transposition.
05 St-Pan	A fixed position in the stereo field, or the voice's own panning.

JOB	WHAT IT SETS, FOR EACH OF THE SIXTEEN PARTS
06 OutSel	The output group.
07 Effect	The multi's effects: one setup, the same as a voice's, shared by all the parts. Each part sends to them at its own levels, or with its voice's sends (VC).
08 Name	Twenty characters.
15 Initialize · 16 Recall	Start from a blank multi; bring back the edit you dropped.

As with a voice, store the multi before you leave, or the changes are lost; the sixteen internal multis are where it goes.

> **NOTE**
> A voice's own effects do not play in a multi: the multi's effects replace them. To use a voice with its effects, play it in Voice mode.

CHAPTER 12

THE LIBRARY AND THE CARDS

The original kept extra sounds on cards: RAM cards with voices in the DATA slot, ROM cards with waveforms in the WAVEFORM slot. Its 1989 predecessor and that one's rack version used the same cards, and twenty years of sounds for the family circulate as SysEx files and card images. AFM99's library keeps them all, and plays any voice in one click.

The library



The Library page with the predecessor's factory bank, imported from SysEx.

On the left, the entries: **PRESET 1** and **PRESET 2**, then your banks, the `.BNK` files in the data folder's `library`. Click an entry to see its 64 voices.

Playing a voice

Click it. A preset voice is chosen as it is. A voice of one of your banks plays from the DATA slot: AFM99 makes a RAM card of the bank the way the original does (a few seconds the first time, at once afterwards), puts it in the DATA slot, puts the wave card its voices need into the WAVEFORM slot when you have imported it, and chooses the voice on CARD. INTERNAL is not touched. If the DATA slot held voices that no library bank made, they are kept first as a bank named `CARD`.

IMPORT

Takes SysEx bulk dumps of the flagship, its predecessor or that one's rack version (`.syx` , or any file of them), an AFM99 bank (`.BNK`) or a wave card image (`.bin`). A SysEx file goes through the flagship's own firmware, as if a computer had sent it over MIDI, and becomes a bank named after the file; the wave cards in the same folder come along, since sound sets were sold as a card with its banks. The library line shows the progress, then what was imported.

TO INTERNAL

Writes the selected entry into INTERNAL, to edit its voices or to choose them with program changes. Click twice: it replaces all 64 internal voices and the multis.

SAVE INT

Saves INTERNAL as a new bank, `USER0001` , `USER0002` and so on: the way to keep your edited voices outside the project.

EXPORT

Writes the selected entry as a SysEx file, as the original's own Bulk Dump would send it: the 64 voices and 16 multis, the 32 user pan programs and the two micro tunings. The hardware can load it.

> **NOTE**
>
> **Voices from the predecessor.** The flagship's firmware converts them itself, adding its own settings with their default values. Their effects it ignores, so AFM99 rebuilds them with the flagship's (see chapter 10); the library line says how many voices it converted. Banks imported with versions of AFM99 before beta 6 have no effects: remove them on the Cards page and import the SysEx again.

The Cards page



The Cards page: two wave cards and two banks that need none.

The Cards page is a shelf of cards, four to a row; the mouse wheel scrolls the rows.

- Each **wave card** you have imported, drawn with the colour of its original label, with the number of its waveforms and, under the label, the library banks whose voices play from it.
- Banks that need **no wave card** appear as dark voice cards, for the DATA slot.
- Banks made for a wave card you have **not imported** appear as an outline with the card's ID.

Click a card: the wave card goes into the WAVEFORM slot, the bank chosen under its label goes into the DATA slot, and the browser shows that bank's voices on CARD. A card with more than two banks shows the chosen one and NEXT BANK. A green light marks what is in a slot. On the left, the two slots and the card under the mouse.

IMPORT

As on the Library page. When the folder holds other cards and dumps, choose THIS FILE or ALL.

PICTURE

Puts a picture (PNG or JPEG), a scan of the card or the sound set's cover, in place of the drawn label. PIC OUT takes it off. A picture in the folder with the same name as a card or a SysEx file comes along when you import.

LOAD

Writes the card's bank into INTERNAL (click twice).

REMOVE

Takes the card and its banks out of AFM99's folders (click twice). The files you imported from stay where they were.

WAVE OUT · DATA OUT

Empty the slots.

The buttons act on the card you clicked last, which is outlined. On the panel, the slots show the edges of the cards in them; click a slot to open the browser on its card.

The slots and your projects

The project keeps what is in the slots: the DATA card's voices whole, and the wave card by its name. When you open the project again, AFM99 looks for that wave card among your imported cards, by name or, if you renamed it, by its contents; if it is not there, the Cards page says which card is missing and the voices that use it play without it.

CHAPTER 13

UTILITY MODE

Utility mode holds the settings of the whole instrument. Press UTILITY; the function keys choose a group.



System Utility, on F1.



MIDI Utility, on F2.

`Sys` **(F1)**

01 Master Tuning, the instrument's pitch; 02 Velocity Set, how velocities are read; 03 Controllers, which controller numbers the original's own wheels and pedals send; 04 Edit Confirm; 05 Greeting Message, the text at power-on; 06 Memory Allocate; 07 Switch Lock.

`MIDI` **(F2)**

01 Setting: the keyboard's transmit channel; the **voice receive channel**, 1 from the factory, 1...16 or omni; local on or off; which notes are received; whether **program changes** are received; the **device number**, which SysEx messages answer to (all from the factory); **bulk protect**, which refuses incoming bulk dumps and which the firmware turns on at every power-on. 02 Bulk Dump sends the instrument's memories as SysEx out of its MIDI output; AFM99 has no MIDI output to your DAW, so use the library's EXPORT instead.

`Card` **(F3)**

01 Load From Data Card, 02 Save To Data Card, 03 Format Data Card, for the RAM card in the DATA slot, and 04 Load From Wave Card. The library does all of this for you, but the original's own way works too.

`Disk` · `Smpl` · `MDR`

The floppy disk, the sample memory and the MIDI data recorder. AFM99 has no floppy drive and does not load samples, so there is nothing for them to read.

`Mstr`

Master keyboard setups, for playing other instruments from the original's keyboard. With AFM99 your DAW does that.

> CAREFUL
>
> If you send SysEx bulk dumps to AFM99 from your DAW, the display answers `ERROR : Bulk protected !` until you turn Bulk Protect off in 01 Setting. It is easier to import the file in the library.

CHAPTER 14

AFM99 IN YOUR STUDIO

Processing and latency

AFM99 emulates the whole instrument, both of its processors and every sound chip, sample by sample, which takes a good share of a processor core. The panel's bottom-left corner shows the **load**, the share of each audio period the emulation takes, and the **underruns**, the blocks it could not deliver in time.

- With 2 CORES in the display menu, the default, the two effect processors run on a core of their own while the next samples of the voices are made: your DAW's audio thread does about a third less work, and the sound stays the same bit for bit. You can switch while it plays.
- If you hear clicks or the underruns grow, raise your DAW's buffer to 256 or 512 samples.
- AFM99 runs about 22 ms ahead of what you hear, and tells your DAW so; the DAW shifts its notes to make up for it on playback. When you play live, the delay is that of a slow buffer.

Automation

Seven parameters can be automated: *Data Entry*, the panel's slider (0...127), which many voices use to move an effect or a tone; *Volume*, AFM99's output level (0...10, 8 unchanged); and the controllers of a keyboard player, *Mod Wheel*, *Breath*, *Foot*, *Aftertouch* and *Expression* (0...127, 0 by default). Each controller does what the voice playing gives it, as on the Common page: vibrato, tremolo, a filter, the pan, the volume or an effect. Automating one, or moving it in your DAW's panel for AFM99, is the same as moving that wheel or pedal on MIDI channel 1 while you play. The same controllers sent on channel 1 from your MIDI track move the parameter too, without being recorded as automation; on other channels they go to the instrument as they are. Everything else is the firmware's own and is reached over MIDI: notes, the other controllers, program changes and bank selects, on the channels set in Utility mode.

What the project keeps

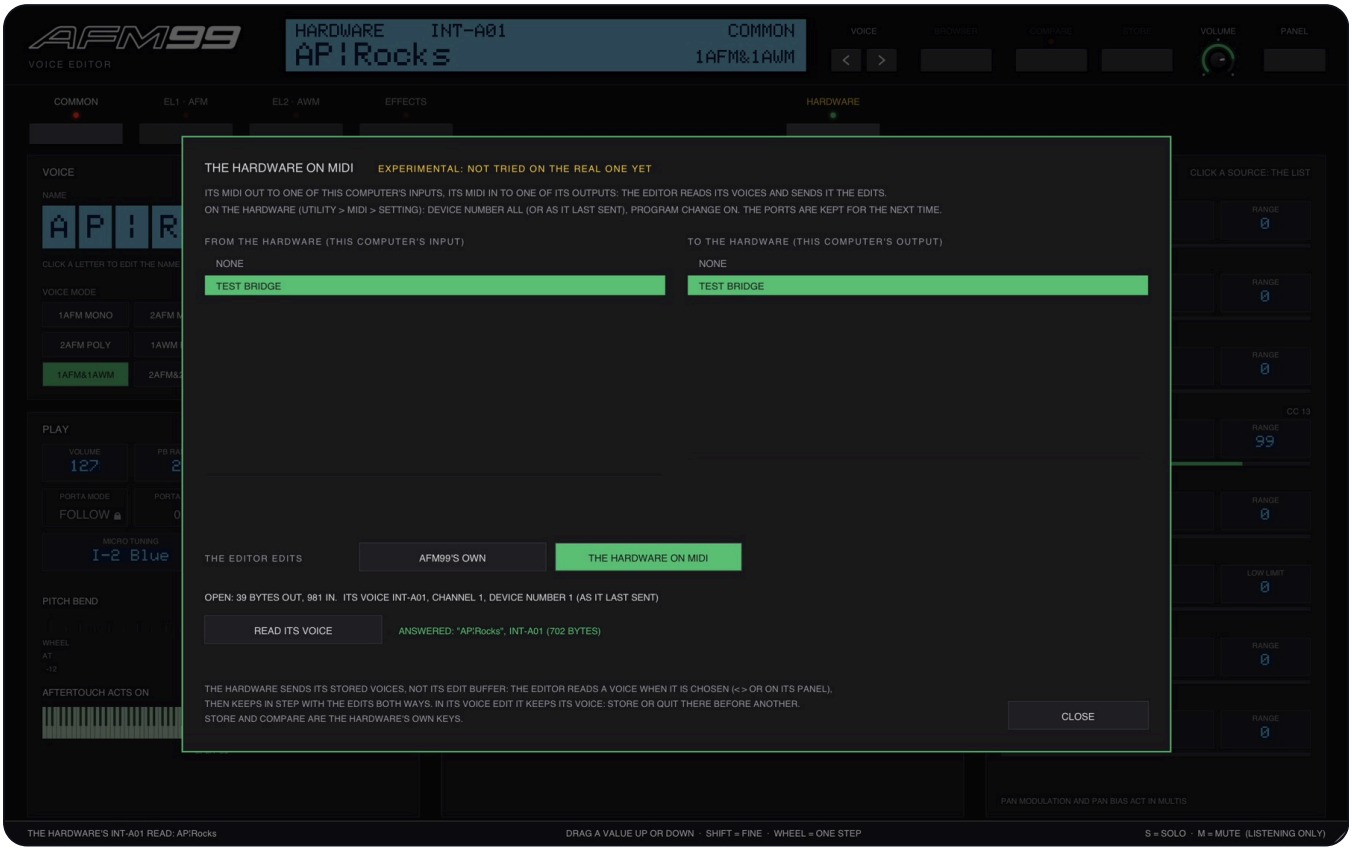
Saving the project saves the instrument's whole memory: the internal voices and multis, the voice or multi playing, the edit buffer with any unstored edit, the micro tunings and pans, the system settings; and the card slots, the DATA card's voices whole and the wave card by name. Opening the project powers the instrument on with all of it. The display's colours, the window size and the processing are your preferences and are not saved in projects. Banks in the library live in the data folder, not in the project.

POWER restarts the instrument with the memories it had when the instance started or the project was opened: a way back if you lose your way in the menus.

> **NOTE**
>
> To send a problem report, add a line `midilog = 1` to `config.txt` in the data folder. Every AFM99 instance then writes a `midilog-….txt` (the MIDI it received and its load) and a `midilog-….wav` (what it played, up to ten minutes) next to it. Remove the line afterwards: the recordings take space.

Editing the hardware

If you own the original, the same voice editor can edit it over MIDI. This is new and **experimental**: it has been tried against an emulated instrument on virtual MIDI ports, not yet against the real one, and it works on macOS only for now.



The MIDI window, here connected to an emulated instrument on virtual MIDI ports ("Test bridge"). The other MIDI ports of the computer are hidden in this picture.

1. **Connect the hardware both ways.**
   Its MIDI OUT to an input of your computer, its MIDI IN to an output.

2. **Set it up.**
   On the hardware, in Utility, MIDI, 01 Setting: Device Number *all* (or note the number it shows) and Program Change *on*.

3. **Open the MIDI window.**
   In the voice editor, click MIDI in the tab row. Choose the input the hardware comes in on and the output that goes to it. The button's LED turns green when both are open.

4. **Edit the hardware.**
   Click THE HARDWARE ON MIDI. The editor reads the voice chosen on the hardware and shows it; the header reads `HARDWARE`, and so does the MIDI tab, in gold. READ ITS VOICE reads it again.

5 **Edit as usual.**
Every change goes to the hardware and to AFM99's own instrument, which mirrors it; changes made on the hardware's panel come back into the editor. Choosing a voice on the hardware, or with < >, reads that voice.

The hardware does not send its edit buffer, only stored voices, so the editor reads a voice when it is chosen and keeps in step from then on. In its Voice Edit the hardware takes no program change: after editing, store or quit on the hardware before moving to another voice. STORE and COMPARE are the hardware's own keys. Click AFM99'S OWN to go back to editing AFM99. The ports and the choice are remembered for the next time.

We would like to hear from you if you try it with the hardware, whether it works or not.

APPENDIX A

THE FACTORY VOICES

The original's ROM holds two banks of 64 voices, PRESET 1 and PRESET 2, and sixteen multis. INTERNAL starts as a copy of PRESET 1 and of the multis. The first letters of a name tell its family: AP acoustic piano, EP electric piano, KY keyboards, SP synth pads, BR brass, ST strings, PC percussion, DR drums, and so on. Rest the mouse on a name to read its voice mode.

PRESET 1

BANK A

01	AP|Rocks
02	AP|CrsRock
03	AP|Concert
04	AP|StgLayr
05	EP|76Stage
06	EP:Classic
07	EP:NiteHwk
08	EP:Belrose
09	EP|BellRng
10	EP:DXism
11	EP|GrnDual
12	EP|VoxLayr
13	KY|Smokey
14	KY|CrsClav
15	KY|Clavint
16	KY|ResoClv

BANK B

01	SP:Alaska
02	SP|SawPad
03	SP|Square
04	SP|Elegant
05	SP:DigiPad
06	SP|Lashed
07	SP|Sweeper
08	SP|Flash
09	SP|HrpsiPd
10	SP.Skylane
11	SP|Arpeggi
12	SP|Vecktar
13	SP:Crystal
14	SP|Twinks
15	SP:Polydor
16	SP|WarmJet

BANK C

01	BR|TrmpSec
02	BR:BigBand
03	BR|JazzTmp
04	BR.MuteTmp
05	BR|FrHorns
06	BR|DrkHorn
07	BR|Azen 16
08	BR:DaBurbs
09	BR:Splatz
10	BR:Pumped
11	BR|StgLayr
12	ST:Octaves
13	ST:ChorAna
14	ST|Rosin
15	ST|Quartz
16	ST:Pizza

BANK D

01	ST*Concert
02	ST*Chestra
03	BR*Spitz
04	ME*BigNeck
05	PC|Snapper
06	PC|Marimba
07	PC.Vibes
08	PC|MusicBx
09	PC|Tahiti
10	PC:Cloche
11	PC|Balan
12	PC:Berim
13	SE|Slither
14	DR Kits
15	DR Perc
16	DR Mixed

PRESET 2

BANK A

01	SC|Heretic
02	SC|AeroPno
03	SC:Jupiter
04	SC.RezWhap
05	SC:Plectar
06	SC:Quatar
07	SC|Plastiq
08	SC|Tanjeln
09	SC:Gizmo
10	SC:Healing
11	SC:Angelic
12	CH|Glasine
13	CH:Itopian
14	CH.Vespers
15	CH:Nebula
16	CH|Witches

BANK B

01	PL|Steel6
02	PL|JazzGtr
03	PL|Nylon6
04	PL|12Strng
05	PL:Eko12St
06	PL:Echoes6
07	PL:Caster
08	PL:SloLead
09	PL|RockAT
10	SL:SawLead
11	SL.EchoSaw
12	SL:Duke
13	SL|Sync
14	SL:Square
15	SL.PulseWM
16	SL:Lyle

BANK C

01	BA|Picked
02	BA|Slapped
03	BA|Fingers
04	BA.Fretles
05	BA.Classic
06	BA|Upright
07	BA:DXSlap
08	BA.Anabass
09	BA|ResoSyn
10	BA:FatSyn
11	BA|Mogue
12	OR|BJazzy
13	OR|BookerB
14	OR|Deep
15	OR|Purple
16	OR|Bsilica

BANK D	
01	WN|Tenor
02	WN|SaxSect
03	WN|Alto
04	WN|Soprano
05	WN|Clarine
06	WN|PanPipe
07	ME*Phantom
08	ME|5thsMan
09	ME*Emperor
10	ME|SloLoop
11	ME*Asia
12	ME:Dreams
13	ME:Galaxy
14	ME|Isis
15	ME|ZoZoid
16	ME*Thusian

The factory multis

MULTIS 1-8	
01	Popular Tune
02	Funky Tune
03	Ballade
04	House
05	Standard Rock
06	American Rock
07	Combo Jazz
08	2 Horn Jazz Quintet

MULTIS 9-16	
09	Big Band Jazz
10	Sound Track
11	Orchestra
12	Baroque
13	Wind Ensemble
14	Tropical
15	Ethnican
16	Folk

APPENDIX B

TROUBLESHOOTING

The ROM panel covers the panel

A ROM is missing, or a file in the ROM folder no longer matches. The panel's rows say which: give AFM99 those files, as in Loading the ROMs. The instrument starts by itself once all six are in.

No sound

Send on channel 1, the factory receive channel, or change it in Utility mode. Check the panel's VOLUME (0 is silence) and the DAW's level for AFM99's track. In Multi mode, check that a part plays on the channel you send.

A library voice sounds wrong or thin

It may need a wave card you have not imported: the Cards page shows its bank as an outline with the card's ID. Import the card image, and the voice will find it.

Voices from the predecessor have no effects

They were imported with a version before beta 6. Remove the bank on the Cards page and import the SysEx again.

The editor does not let me change anything

COMPARE is on: click it to go back to your edits. While the hardware's voice is being read, edits wait.

My edits are gone

Choosing another voice drops the edit buffer. On the panel, Voice Edit's common job 16, Recall, brings back the last edit; and store the voices you want to keep.

Program changes from the DAW do nothing

Check Program Change in Utility, MIDI, 01 Setting, and the channel. The firmware ignores program changes while it is in Voice Edit with changes: store or quit first.

Moving the Data Entry slider does nothing

The voice does not use it: its effect controls and controller assignments show which controllers it answers to.

“ERROR : Bulk protected !”

SysEx was sent to AFM99 from the DAW; the firmware turns Bulk Protect on at every power-on. Import the file in the library instead.

Clicks or dropouts

Keep 2 CORES on in the display menu and raise the DAW's buffer. The underruns count on the panel tells you whether AFM99 kept up.

The panel is drawn in a corner, or the window has the wrong shape

Choose a size in the display menu's Window size, or drag the corner. AFM99 corrects both by itself after a moment; if it does not, let us know.

Studio One lists AFM99 but does not load it (Windows)

AFM99 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.

AFM99 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 original's own owner's manual, but it is written for AFM99, from AFM99's own behaviour. Like the plugins, it was written with the help of AI. AFM99 1.1.0, October 2026.

AFM99 is built with DPF (© 2012–2025 Filipe Coelho, ISC licence), which brings pugl (© 2011–2022 David Robillard, ISC), NanoVG and fontstash (© 2009–2013 Mikko Mononen, zlib licence), stb_truetype and stb_image (Sean Barrett, public domain or MIT), the DejaVu Sans font (Bitstream Vera and DejaVu font licences), the CLAP headers (© 2014–2022 Alexandre Bique, MIT) and the LV2 headers (© 2006–2020 Steve Harris, David Robillard; 2000–2002 Richard W. E. Furse, Paul Barton-Davis, Stefan Westerfeld; ISC). The Windows version includes zlib (© 1995–2026 Jean-loup Gailly and Mark Adler, zlib licence). The emulated H8/500 processor and the T6963C display controller are built on code from the MAME project by R. Belmont, AJR and Olivier Galibert (BSD-3-Clause licence, below).

▼ The display's lettering: a 5×7 font made from Adafruit-GFX's glcdfont (BSD licence)
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▼ The H8/500 processor core and the T6963C display controller: code from MAME (BSD-3-Clause licence)
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