

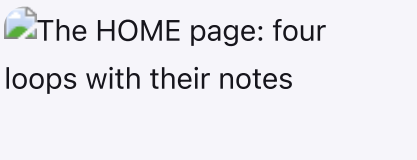
The EchoNET manual

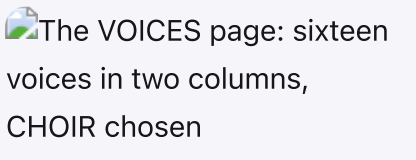
Version 2.2 · ambient firmware for the M-VAVE FM-1 · by Darren Lock

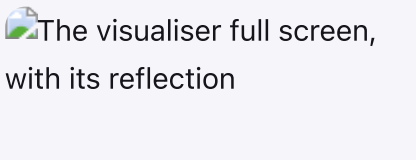
What it is

The EchoNET turns the M-VAVE FM-1 into an ambient instrument. What you play is caught by up to four tape-like loops, which bring it back on their own cycles, each pass a little quieter and darker, so phrases drift apart and slowly wear away.

- **Sixteen voices** in five families, each with its own colour: the pianos (a modelled piano, an electric piano and a velvet piano); synths and pads (a soft analogue synth, a pad and a string machine); voices and air (a choir, a blooming halo and a glassy aurora); bells and metal (bells, wind chimes, vibes and glass); world and wood (gamelan, kalimba and singing bowl). Each loop can have a voice of its own.
- **Eight scene slots**: save your own over any of them and name your own scenes on the FM-1.
- **A mixer** for the four loops: a fader, pan and meter each, with mute and solo; levels for the dry sound, the echo, the reverb and the main out; USB recording of each loop raw or as mixed.
- **MORPH** lets loops 2–4 change the notes they repeat, by a third, fourth, fifth, sixth, octave, ninth or twelfth, always within the scale; **Drift** plays slow wandering phrases by itself.
- **Echo and reverb** from a small room to an infinite shimmer.
- **FREEPLAY** leaves it to play by itself, a slow ambient piece with a visual show.
- **Seventeen visualisers** in pastel colours, full screen when left alone.
- **MIDI OUT**: each loop on its own channel, to play other instruments such as an Ableton Move; over USB, or Bluetooth when you switch it on.

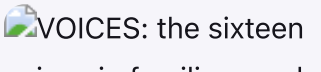


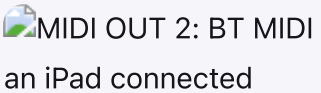


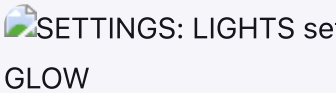


New in 2.2

- **Bluetooth MIDI,** in and out: play The EchoNET from an iPad, iPhone or Mac without a cable, or let it play them. Turn it on at SETTINGS, MIDI OUT's second page, **BT MIDI**; it is off by default, so the radio stays quiet until you want it.
- **Voices in families:** the VOICES page, the ALGORITHM knob and LOOP VOICES list the sixteen voices with similar instruments together, each family in its own colour: the pianos peach, synths and pads violet, voices and air green, bells and metal gold, world and wood pink.
- **Key lights that glow:** SETTINGS > LIGHTS adds **GLOW**, the white keys glowing faintly like a keyboard, and **ALL GLOW**, every key, for the clearest view.
- **TOUCH** (velocity from the keys) is now off by default, and when it is on, the top row's seven keys play as loud as the rest.

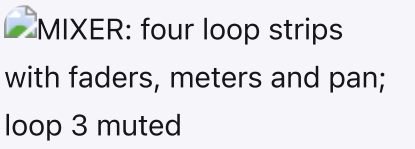

VOICES: the sixteen voices in families, each family in its own colour; CHOIR chosen

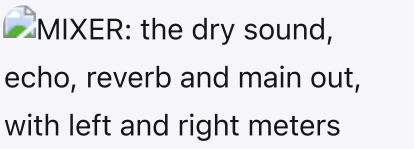

MIDI OUT 2: BT MIDI on, an iPad connected

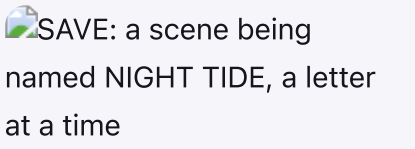

SETTINGS: LIGHTS set to GLOW

New in 2.1

- **Four pads:** ENSEMBLE (a string machine), CHOIR (voices drifting between "ah" and "oh"), HALO (pure tones that bloom) and AURORA (a glassy shimmer). HANDPAN is now called VELVET PIANO.
- **A mixer** on the loop pages: a fader, meter and pan for each loop, mute and solo, the level of what you play live, and a page for the dry sound, the echo, the reverb and the main out. Scenes keep the levels.
- **Name your scenes** on the SAVE page, save over the factory ones, clear a slot, or put a factory scene back.
- **More MORPH intervals:** a third, fourth, sixth, ninth and twelfth, beside the octave and fifth.
- **Recording over USB:** choose whether each loop's own channel is recorded raw or as the mixer sets it, and whether MIDI OUT follows the mixer's levels.


MIXER: four loop strips with faders, meters and pan; loop 3 muted


MIXER: the dry sound, echo, reverb and main out, with left and right meters


SAVE: a scene being named NIGHT TIDE, a letter at a time

Installing

From the web page (Chrome or Edge)

1. Connect the FM-1 directly to a computer with a USB data cable and switch it on. Unplug any cable from its MIDI IN socket, and close other apps that use MIDI: MIDI arriving during the install can stop it (nothing is written, so just try again).
2. Open the installer page in Chrome or Edge and press **Install The EchoNET**. Allow MIDI when the browser asks.
3. Wait about two minutes without unplugging. The FM-1 restarts with The EchoNET's start-up screen.

From a computer, without a browser

Download `the-echonet-2.2.fwsc`. The command-line installer from fm1-base, `tools/fm1_install.py`, installs it: `python3 tools/fm1_install.py the-echonet-2.2.fwsc` (it needs Python 3 with `mido` and `python-rtmidi`).

Going back

The installer page can put the official M-VAVE firmware back: download it from M-VAVE and choose its `FM-1.fwsc` there.

Your scenes and settings carry over: 2.2 reads what every earlier version saved. Since 2.1 they are kept in a more compact form, which 1.0 and 2.0 can't read, so if you go back to 1.0 or 2.0 your saved scenes stay behind.

Backing up your scenes

The backup page (Chrome or Edge, the FM-1 plugged in) saves your scenes, their names and your settings to a file, and puts them back later, onto the same FM-1 or another one. Back up before installing a new version. Restoring needs 2.1 or later.

The EchoNET is free to install, with no warranty: you install it at your own risk.

Contents

The same twelve chapters are built into the FM-1: hold `HOME` for SETTINGS, then press `OCT+`.

1. Getting Started
2. Voices
3. Tone
4. Loops And Wear
5. Morph
6. Drift
7. Scale
8. Echo And Reverb
9. Scenes
10. Settings
11. Visualiser
12. Quick Reference

1 Getting Started

The EchoNET is an ambient instrument. What you play is caught by up to four tape loops, which repeat it, a little quieter and darker each time.

First sound

- Play the keys. Recording is on, so the notes go into the loops.
- Listen: each loop brings them back on its own cycle, so the notes slowly drift apart.
- Tap `PLAY` to stop or start the loops. Hold `PLAY` to fade out over 10 seconds.

Finding your way

- A section button opens its first page. Tap it again for the next.
- Turn `SELECT` to step through every page.
- `K1` to `K4` change the four values shown at the top.
- Turn `ALGO` to change the voice, from any page.
- `OCT−` and `OCT+` move the keys an octave.

HOME

WEAR how long notes last, **TONE** brightness, **ECHO** the delay and **SPACE** the reverb. Tap `HOME` again for the visualiser.

2 Voices

Sixteen voices. Turn `ALGO` to change the voice you play; notes already sounding finish in theirs. Each loop can have a voice of its own too: see LOOPS AND WEAR.

The sixteen

In families, as the VOICES page shows them (read down the left column, then the right):

- **PIANO** a modelled piano with long, soft decays.
- **E.PIANO** an electric piano: a warm body and a tine's ping, growling a little when played hard.
- **VELVET PIANO** soft, round keys with a long ring: gentler than **E.PIANO**.
- **SYNTHI** soft analogue, with a gently resonant filter.
- **PAD** DX7-style FM.
- **ENSEMBLE** a string machine: three detuned saws, each slowly wavering.
- **CHOIR** voices drifting between "ah" and "oh". CHAR moves the vowel.
- **HALO** a soft glow: pure tones at octaves and fifths, the upper ones blooming in, each swelling on its own. CHAR is how slowly they bloom.
- **AURORA** a glassy shimmer: the note and its octave, the octave slowly wavering. CHAR is the octave's level.
- **BELLS** DX7-style FM.
- **CHIMES** wind chimes, high and long. Each strike may knock a neighbour or two a moment later, in tune: CHAR is how often (0, never).
- **VIBES**, **GLASS**, **GAMELAN**, **KALIMBA** and **BOWL** are struck voices.

`EDIT` VOICE pages

- **BRIGHT**, **DETUNE**, **CHAR** and **LEVEL**. What CHAR does depends on the voice: the footer says.
- **TRANS** transposes. **TOUCH** is how much key velocity matters.
- **SPARE** voices kept free for new notes. **STEREO** low notes left, high right.

`ENV` ENVELOPE

Attack, decay, sustain and release. Each voice reads them its own way, and the page names each knob's job.

3 Tone

The tone section shapes everything before the echo and reverb. Tap `LFO` for its three pages.

FILTER

- **MODE** off, low-pass, high-pass or band-pass.
- **CUTOFF** is the same as HOME's TONE.
- **RES** resonance. **SWEEP** how far a slow LFO moves the cutoff.

EQ

Low, mid and high bands, from -15 to +15 dB.

SWEEP/EQ

PERIOD the seconds per filter sweep. Then the EQ's band frequencies, and **MID Q**, how narrow the mid band is.

4 Loops And Wear

Four loops catch what you play and repeat it. Each pass wears it a little, as tape does. Tap `SEQ` for the loop pages.

WEAR

- **WEAR** how much each pass keeps.
- **DARKEN** the tone lost each pass.
- **WOW** tape pitch and timing wobble.
- **GAPS** repeats that drop out.

LENGTHS

Each loop from 2 to 60 seconds; below 2 it is off. Different lengths keep the notes shifting against each other.

LOOPS

- **FADE TO** worn notes vanish below this level.
- **STEREO** how far apart the loops sit.
- **TIMING** four lengths at once: SHORT, LONG, MINUTE or SWASH.

LOOP VOICES

The fourth page here gives each loop a voice of its own. **SAME** plays the VOICE page's voice. The loops keep notes, not sound, so a new voice takes over a loop's very next repeat. The lanes show each loop's own voice under its length.

MIXER

The fifth page is a mixer: a strip for each loop, over its knob.

- Turn a knob: the loop's level, from +6 dB down to OFF. 0 dB plays it as it was.
- Hold `SEL` and turn: its pan. C leaves it where STEREO puts it.
- Hold `EDIT` and nudge a knob: mute or unmute that loop, as SEQ + black keys 5-8.
- Hold `FX` and nudge a knob: solo it; the others go quiet but keep playing and wearing. Again to unsolo. Solo is not kept in a scene.

The meters show each loop as you hear it: green, amber from -6 dB, pink above 0.

The sixth page is the output: **DRY** (the voices before the effects), **ECHO** and **REVERB** (what each returns) and **MAIN** (all of it: the speaker, the headphones and USB), each with its left and right meters. 0 dB is as they were. Scenes keep these levels, and the loops'.

The seventh page: **LIVE** is the level of what you play, MIDI IN and Drift. **USB** chooses whether recording channels 3-8 are each loop raw (PRE) or as the faders set it (POST); 1 and 2 are always the mix. **MIDI V** FOLLOW makes a loop's MIDI OUT softer as its fader comes down, and silent when it is soloed out or off.

Hands on

- Tap `REC` to turn recording on or off.
- Hold `SEQ` and press black keys 1 to 4: which loops record.
- Hold `SEQ` and press black keys 5 to 8: mute loops 1 to 4. Muted notes neither play nor wear.
- Hold `REC` and press a key: erase that pitch.
- Hold `REC` and press `OCT+`: clear every loop.

RANDOM

Hold `ARP` and press `OCT−` for a new set-up: two to four loops, their lengths, wear and voices, how they MORPH, and the tone, echo and space, all within calm ranges. The notes in the loops stay. Hold `SAVE` to undo.

5 Morph

Loops 2, 3 and 4 can change the notes they repeat, each by its own rule. Loop 1 always plays what you played. Tap `SEL` twice for MORPH.

Rule

OFF, an interval, **SCALE** (a note or two along the scale) or **RANDOM** (anywhere in the scale). The intervals, small to wide: **THIRD**, **FOURTH**, **FIFTH**, **SIXTH**, **OCTAVE**, **NINTH** and **12TH** (an octave and a fifth). Each lands on the scale; a third and a sixth are major or minor, as the scale has them.

Direction

UP climbs and starts again, **DOWN** falls, **BOUNCE** turns at the edges, **RANDOM** goes either way.

Chance and range

CHANCE how often a repeat moves. **RANGE** how many octaves a note may wander.

Mode

- **VARY** each repeat is a variation: your melody stays underneath.
- **EVOLVE** moves stay, and the loop slowly rewrites itself.
- `OCT+` on a MORPH page puts every note back as played.

6 Drift

Drift plays slow, wandering phrases by itself, from notes you choose or from the scale. Tap `ARP` for its pages.

- `OCT+` on a DRIFT page starts and stops it.
- Hold `ARP` and press keys: add or remove the notes it wanders over.
- Hold `ARP` and press `OCT+`: a new seed.

DRIFT 1

RATE seconds per note, **DENSITY** how many steps sound, **PHRASE** notes per phrase, **REST** the silence between.

DRIFT 2

REACH the octaves its phrases span, **LEAP** how far it jumps, **MEMORY** how much it repeats itself, **NOTE L** the note length.

DRIFT 3

DYNAMC how much loudness varies, **LINES** how many melodic lines, **RATIO** their speeds, **SEED** where it starts.

7 Scale

One key and scale for Drift, MORPH and the keys. Tap **SEL**.

- **ROOT** and **SCALE**: twelve scales, from the pentatonics to hirajoshi.
- **LOCK** the keys play only the scale's notes.
- **D OCT** how many octaves Drift's scale covers.

8 Echo And Reverb

FX DELAY

- **MODE** stereo, panned, ping-pong or dual.
- **TIME** up to 1 second. **FDBK** how long the echoes last. **ECHO** their level, the same as HOME's.
- **BRIGHT**, **LOWCUT** and **WOBBLE** shape the echoes. DUAL and PANNED add a fourth knob.

GLO REVERB

- **TYPE** loads a room, plate, hall, cathedral, ambient, infinite or shimmer space.
- **DECAY**, **SIZE**, and **SPACE**, its level, the same as HOME's.
- **PREDLY**, **DAMP**, **SHIMMR**, **MOD**, **LOWCUT**, **SMEAR** and **WIDTH** fine-tune it.
- Hold **GLO** to freeze the tail. Double-tap **GLO** to keep it frozen.

9 Scenes

A scene keeps every setting, but not the notes in the loops. There are eight slots; the first six hold factory scenes.

- To save: tap `SAVE`, choose a slot with `K1`, press `OCT+`. You can save over a factory scene.
- To name it: turn `K2` to move along the name and `K3` to pick a letter. Once you start, the keys type too: A is the lowest key, Z the 26th, the top key a space. `OCT−` deletes. `OCT+` saves the sound and the name.
- Hold `OCT−` on SAVE to put a slot back as it was built: its factory scene and name (slots 7 and 8: empty).
- Hold `REC` and press `OCT−` on SAVE to clear a slot: it stays empty, a factory one too, until you save there or hold `OCT−` to bring its factory scene back.
- To load: tap `SAVE` twice, choose, press `OCT+`.
- Or turn `PRESETS` and press `OCT+` within 4 seconds.
- Saved scenes stay through power-off.

Undo

Hold `SAVE` to undo your last stretch of edits. Hold it again to redo.

10 Settings

Hold `HOME` for about a second.

- MIDI IN off, every channel, or one channel. A keyboard's pitch bend (2 semitones) and modulation wheel (vibrato) move the notes you play, not the loops.
- LIGHTS the key lights: on, dim or off. GLOW is on, with the white keys glowing faintly, like a keyboard; ALL GLOW lights the top row too, for the clearest view.
- START a scene to load at power-on.
- TUNE A the pitch of A, 430 to 450 Hz.

MIDI OUT

Hold `HOME` again for MIDI OUT, and again for its second page. The FM-1 sends over USB, and over Bluetooth while a device is connected.

- **LOOP 1** to **LOOP 4** each loop's channel, or OFF. Repeats go out as they sound: worn quieter, moved by MORPH.
- **KEYS** the notes you play.
- **DRIFT** the notes Drift plays.
- **SOUND** OFF: the FM-1 is silent and only MIDI plays.
- **BT MIDI** ON: Bluetooth MIDI, in and out. On an iPad, iPhone or Mac, connect to **FM-1** followed by four characters (on an iPad, from a music app's Bluetooth MIDI settings, or Audio MIDI Setup on a Mac). MIDI IN's channel applies to it as to USB. OFF (the default): the radio stays off.
- `OCT−` here: all notes off.

KEYS

Hold `HOME` once more for KEYS.

- **TOUCH** ON: the FM-1's keys play as hard as you press them, and send that velocity. The top seven keys (C#5 to G5) are read through their lights, so they glow faintly and respond more coarsely. OFF (the default): every note at 100.
- **CURVE** - makes soft playing louder, + needs a harder press for loud notes.

Settings are saved when you leave. `OCT+` here opens this guide, at the chapter for the page you came from.

11 Visualiser

Tap `HOME` twice. It follows the sound and the notes, and each note has its own colour, round the circle of fifths.

- **STYLE** BLOOM, RIPPLES, WAVE, WASH, TIDE, PETALS, STRIPS, KALEIDO, STARS, AURORA, RAIN, LAVA, SHAPES, FIREFLY, SWIRL, SMOKE or RIBBON.
- **SWIRL** a slow mandala carried outwards in a twist. **SMOKE** pastel wisps rising and curling. **RIBBON** the sound traced as a looping line, leaving trails. None of them flash.
- **SENS** how strongly it reacts.
- **FALL** how slowly it settles.
- **COLOUR** from grey to vivid.

Leave it 15 seconds without touching anything and it fills the screen, with its reflection below as in still water. Any button, key or knob brings this page back, and does nothing else (keys still play).

FREEPLAY

`OCT+` here starts FREEPLAY: an ambient piece that plays itself, slow and spacious. Drift plays and loop 1 records it. Every minute or so the other loops are dealt again: which record, which rest, their voices, and how they MORPH. The style changes every 30 seconds. Play along on the keys if you like.

- `OCT+` again, or `HOME`, stops it, and the settings go back to how they were. The notes the loops gathered stay.

12 Quick Reference

- `PLAY` tap: run or stop. Hold: fade out.
- `REC` tap: recording on or off.
- `REC` with a key: erase that pitch.
- `REC` with `OCT+`: clear every loop.
- `ARP` with `OCT−`: RANDOM, a new set-up for the loops. Hold `SAVE` to undo.
- `SEQ` with black keys 1 to 4: which loops record.
- `SEQ` with black keys 5 to 8: mute loops.
- `ARP` with keys: Drift's notes.
- `ARP` with `OCT+`: a new Drift seed.
- `GLO` hold: freeze. Double-tap: keep frozen.
- `HOME` twice: the visualiser. There, `OCT+`: FREEPLAY.
- `HOME` hold: settings. Again: MIDI OUT.
- `SAVE` hold: undo. Again: redo.
- `OCT−` with `OCT+`: octave back to 0.
- `ALGO` the voice. `PRESETS` the scenes.

Credits and licences

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