# USER MANUAL

January 25th 2024

We always value feedback and ideas, so feel free to reach out.
Please check the website for the latest firmware!

## THANK-YOU!

Thank-you for adopting MEGAfm, the product of several years of work & play.

MEGAfm offers a unique gritty texture that is uncommon for FM synthesisers, plus an unprecedented hands-on control of all the synth's parameters.

We hope that you will enjoy making music with MEGAfm as much as we have enjoy developing it!

# ABOUT MKII

In September 2022 MEGAfm becomes MEGAfm MKII.

This updated version is identical in appearance and functionality but it will include a pair of YM3438 chips instead of the YM2612.
The YM3438 is a variant of the YM2612 that is identical in functionality and was featured in the Sega Megadrive II.

The circuit layout has also been updated to grant access to the FM chips with minimal disassembly.
Indeed the chips are now socketed (removable) and accessible by removing the bottom panel.

This allows customers to install alternate FM chips (like the YM2612, modern alternatives or even custom sound chips).
Customers even have the ability to mix different versions of FM chip as both slots can be configured individually.

MEGAfm MKII features the same audio circuitry and warm analog distortion as the MKI, as a result both chips sound very similar inside of MEGAfm.

The firmware will work identically on both versions.

Please refer to the bottom of the manual for chip-changing instructions.

# YM2612/YM3438 Overview

"The Yamaha 2612/3438 Frequency Modulation (FM) sound synthesis IC resembles the Yamaha 2151 (used in Sega's coin-op machines) and the chips used in Yamaha's synthesisers.

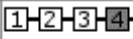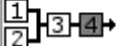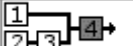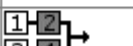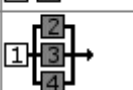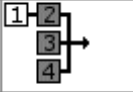It is famously known as the Sega Megadrive's voice.
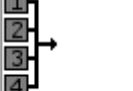
An FM channel is capable of expressing, with a high degree of realism, a single note in almost any instrument's voice. Chords are generally created by using multiple FM channels.
The standard FM channels each have a single overall frequency and data for how to turn this frequency into the complex final wave form (the voice). This conversion process uses four dedicated channel components called 'operators', each possessing a frequency (a variant of the overall frequency), an envelope, and the capability to modulate its input using the frequency and envelope. The operator frequencies are offsets of integral multiples of the overall frequency.
There are 6 FM channels. Channels 3 and 6, have the capability to use a totally separate frequency for each operator rather than offsets of integral multiples (ch3 special mode). This works well for sound effects and experimental instruments. "

# Operators

There are four dedicated operators per voice which may be arranged in eight different configurations, called "algorithms". Following is a diagram of the algorithms.

| Algorithm # | Layout | Suggested uses |
|---|---|---|
| 0 | 1-2-3-4→ | Distortion guitar, "high hat chopper" (?) bass |
| 1 | 1/2-3-4→ | Harp, PSG (programmable sound generator) sound |
| 2 | 1 / 2-3 - 4→ | Bass, electric guitar, brass, piano, woods |
| 3 | 1-2 / 3 - 4→ | Strings, folk guitar, chimes |
| 4 | 1-2 / 3-4→ | Flute, bells, chorus, bass drum, snare drum, tom-tom |
| 5 | 2 / 1-3 / 4→ | Brass, organ |
| 6 | 1-2 / 3 / 4→ | Xylophone, tom-tom, organ, vibraphone, snare drum, base drum |
| 7 | 1 / 2 / 3 / 4→ | Pipe organ |

Slots are indicated by shading.

# Envelope Specification (now looping!)
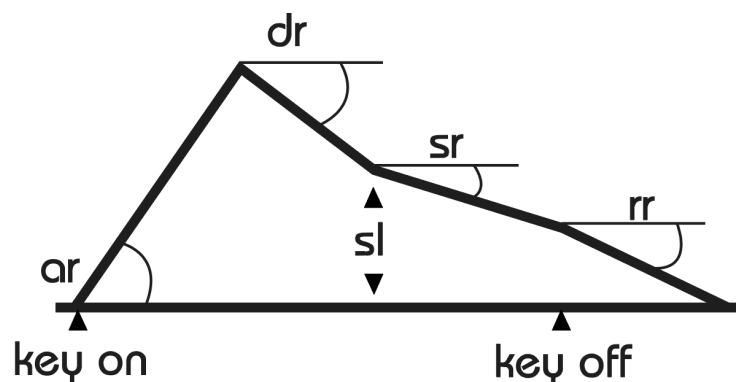
Understanding the envelopes

The YM2612/3438 envelopes are powerful and original compared to the ADSR we are all used to, but they can be confusing at first.

Since we are used to attack decay and release times taking longer as we increase their knobs, MEGAfm uses the "higher the fader the longer it takes" approach. As a result all the faders are decreasing the angles printed on the silkscreen as they are moved upwards, except for attack faders which increase it.

For example:
-during the AR (Attack Rate) Phase: The higher the fader, the longer it takes for the attack phase to complete aka for the volume to reach TL aka **T**otal **L**evel (rising fader = increasing the angle displayed on the silkscreen)
-during the DR (Decay Rate) Phase: The higher the fader, the longer it takes for the decay phase to complete aka for the volume to reach SL aka **S**ustain **L**evel (rising fader = decreasing the angle displayed on the silkscreen)
-during the SR (Sustain Rate) Phase: The higher the fader, the longer it takes for the level to fall from sl to zero (rising fader = decreasing the angle displayed on the silkscreen)
-during the RR (Release Rate) Phase: The higher the fader, the longer it takes for the release complete aka drop to zero after key release (rising fader = decreasing the angle displayed on the silkscreen)

Below is the official description as found on the data sheets
Thanks MAXIM for the excerpts: https://www.smspower.org/maxim/Documents/YM2612

The sound starts when the key is depressed, a process called 'key on'. The sound has an attack, a strong primary decay, followed by a slow secondary decay. The sound continues this secondary decay until the key is released, a process called 'key off'. The sound then begins a rapid final

decay, representing for example a piano note after the key has been released and the damper has come down on the strings.

The envelope is represented by the above amplitudes and angles, used in the above diagram are:

| TL | Total level, the highest amplitude of the waveform. |
|----|-----------------------------------------------------|
| AR | Attack rate, the angle of initial amplitude increase. This can be made very steep if desired. The problem with slow attack rates is that if the notes are short, the release (called 'key off') occurs before the note has reached a reasonable level. |
| DR | The angle of initial amplitude decrease. |
| SL | The amplitude at which the slower amplitude decrease starts. |
| SR | The angle of secondary amplitude decrease. This will continue indefinitely unless 'key off' occurs. |
| RR | The final angle of amplitude decrease, after 'key off'. |

# Looping the envelopes

Since firmware version 3.0, the four operator's envelopes can now loop individually, resulting in fascinating modulations of both dynamics (when looping the carriers) and timbre (when looping the modulators).

To create an envelope loop, follow these steps:

1.      Move one of the faders associated with the desired envelope.

2.      Within a brief timeframe, you can activate the envelope loop using the LFO loop button.

3.      Additionally, you can control the looping direction of the envelope by utilizing the saw and triangle LFO waveform buttons. When the saw waveform is lit, the envelope loops from the attack phase to the release phase. On the other hand, when the triangle waveform is lit, the envelope loops in a ping pong manner.

# Envelope Rate Scaling

With the introduction of firmware version 3.6, we now have the capability to adjust the rate scaling for each operator. This feature speeds up envelope at higher note frequencies, creating an effect similar to that of a piano. It is particularly effective when using looping envelopes.

## How to Adjust Rate Scaling:

 Press and hold the 'LOOP' button. This action enables the rate scaling adjustment mode.

 While holding the 'LOOP' button, use any of the **detune** faders to change the rate scaling amount.

Rate Scaling Range and Resolution:
The rate scaling can be set within a range of 0 to 3.

## Preset Memory:

Any adjustments made to the rate scaling of an operator are automatically saved within each preset.

# Voicing Section



MEGAfm offers up to 12 voice polyphony.
The 12 voices are spread across two YM2612/3438 chips.
In all modes you can use the fat knob to detune the voices.

Hold voicing mode button and the fat knob becomes glide.
Glide knob determines the time it takes for each voice to change pitch when a new note is played.

**Mono Mode:**
When a single TS 6.35mm jack is plugged into output1, both chips are summed to output1.

**Stereo Mode:**
When a second TS 6.35mm jack is plugged into output2, the 2 chips will be split between outputs 1 and 2 (6 voices per chip/output)

# Voicing Modes

There are several voicing modes available. Press the voicing button to change through them

### Poly12
The Poly12 features a 12-voice polyphony that is distributed between two chips in an alternating left/right configuration.

### Wide6
Both chips can play up to 6 notes but can be detuned with the fat knob

### Wide4 (all LEDs lit) and Wide3 (3 LEDs lit)
Same as wide6 but limited to 4 & 3 voices respectively, always staggered
Note: These modes are optional modes that can be activated using the web tool if unavailable

### Dual ch3
YM2612/3438 offers a special mode where the 4 operators of channel3 can be individually detuned to arbitrary frequencies as described above in the YM2612/3438 Overview. Recommended for experimental / percussive sounds.
Dual ch3 has 2 possible modes: duo phonic (alternating between chip 1 and 2) and monophonic stereo (firing both chips at once). Press LFO3 chain button to toggle between modes. Display will show **d3** for duo phonic mode and **S3** for stereo mode.

### Unison
All voices are played at once in unison and detuned using the fat knob. Turn the fat knob clockwise to gradually detune all 12 voices. At maximum fat, the 12 voices are arranged in a chord. 3 Note priority modes are available: Highest, Lowest (factory default) and Last note priority. Press retrig in setup mode to toggle between the 3 modes. Display will show **Hi**, **Lo**(w) or **LA**(st) accordingly.

# Auto Chord

To use the auto chord feature, please follow these instructions:

1- Hold down a chord on your MIDI keyboard.

2 - While still holding the chord, press and hold the REC and press the voicing button to engage the auto chord feature. To free up your hands for pressing buttons, we recommend using the sustain pedal.

If you wish to disengage auto chord, simply repeat the same button presses as before. Note that if you activate auto chord without holding down any keys, MEGAfm will select a chord from its built-in selection.

# Fat

Adjust the 'Fat' knob to precisely adjust the tuning of all 12 voices in any voice mode. When in Unison mode, you have the ability to manipulate the voices from a slightly detuned configuration, commonly referred to as 'fat,' all the way to a grand chord similar to the sound of THX.

For all other modes, the voices can be detuned either by one semitone or one octave. Additionally, there are two distinct tuning setups available for you to choose from. Please refer to the setup and tool guide to learn how to select between these two ranges and tuning options.

# Glide

When you hold the voicing button the fat knob becomes glide. Adding glide increases the time it takes each voice to reach its new pitch.

# Volume

Adjust the volume of the current preset by utilizing the dedicated volume knob. It is important to note that a digital potentiometer is employed to regulate the volume, enabling it to be saved and remembered between different presets.

However, it is worth mentioning that digital potentiometers can produce an audible clicking noise known as 'zipper noise' when the values are changed. To minimize this noise, the volume is only updated after the knob has been adjusted, not during the adjustment process. Therefore, kindly allow a quarter of a second for the volume to change accordingly. Additionally, you can choose to bypass the preset volume option, which will allow the volume knob to remain fully manual.
Please refer to the settings & tool chapter for more details

# Preset tuning

Hold **voicing** and use the **vol/tune** knob to tune your preset within a 1 octave range.
If you need finer tuning precision use the **fat/glide** knob which allows for 1 semitone range.
Important: you must first move the vol/tune knob to enable the finer tuning & the **voicing** button must be held during all tuning.

# Preset Octave Tranpose

When you hold the voicing button you can use the preset up and down buttons to transpose the preset up to 3 octaves.
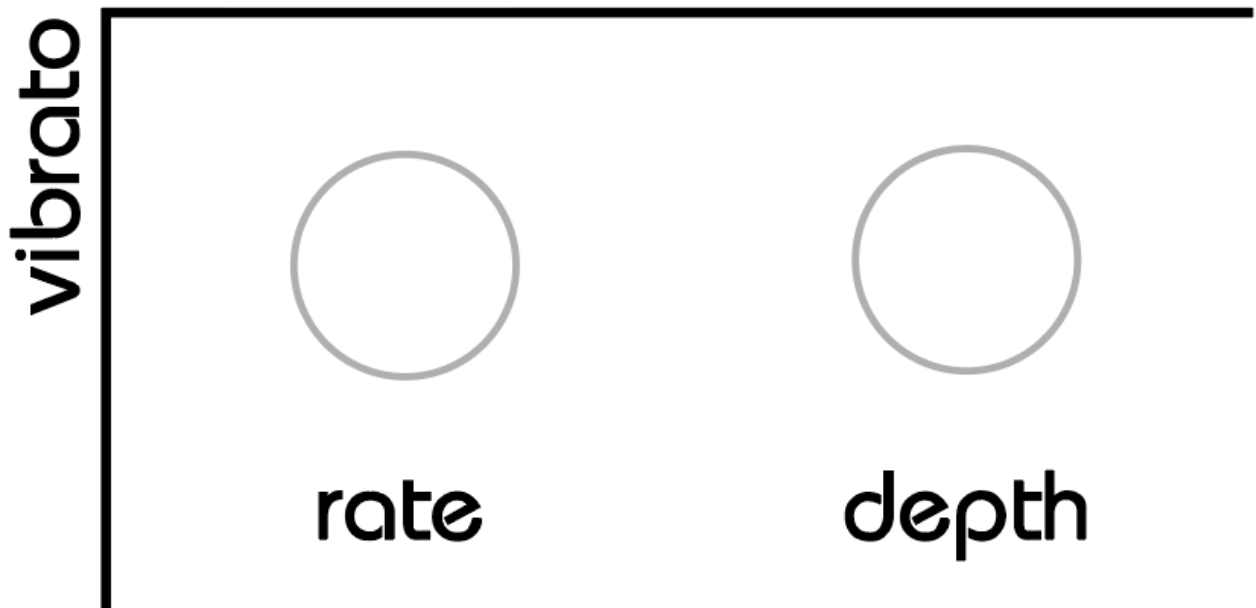
# Algorithms & Feedback
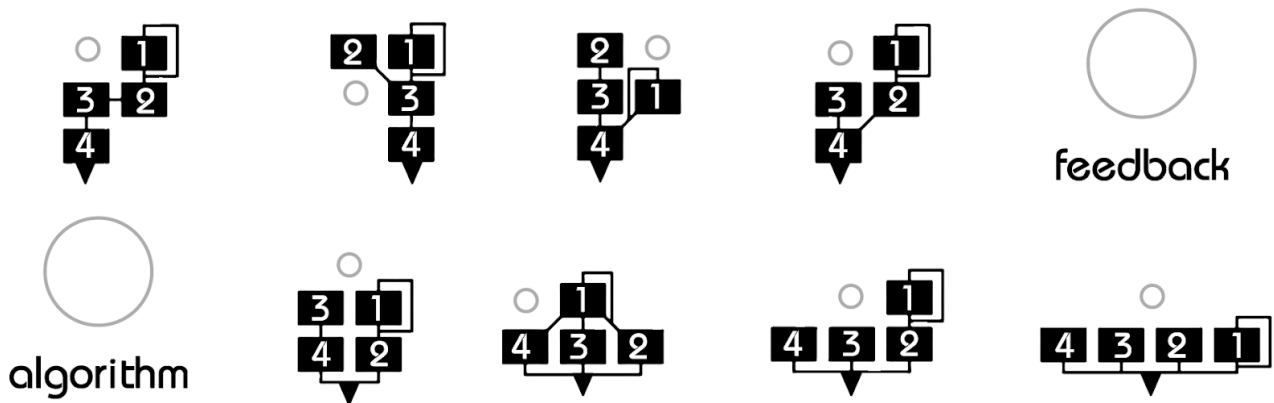


Use the algorithm knob to select any of the 8 algorithms and the feedback knob to set the amount of operator1 feedback.
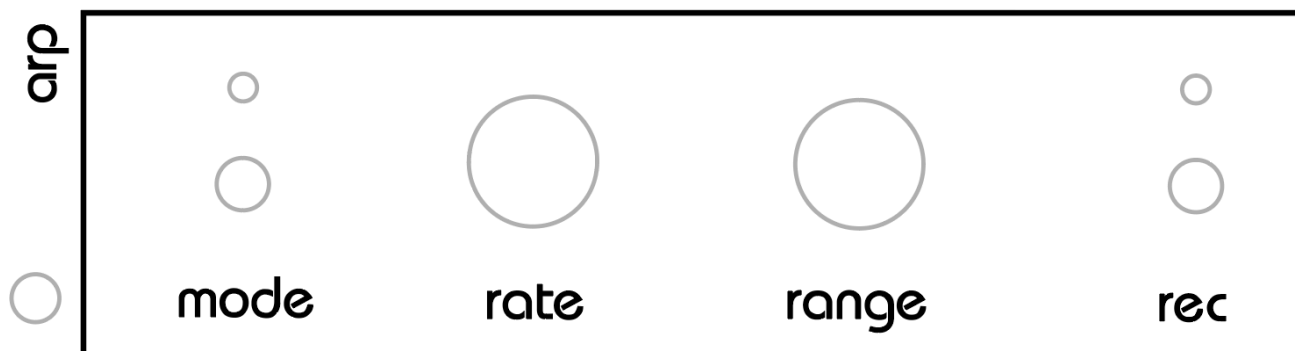Note: both parameters can be modulated by LFO!

# Vibrato



Use the depth knob to add vibrato to the overall pitch of MEGAfm.
Use the vibrato rate knob to set the vibrato's speed.

The vibrato can be configured to sync to incoming MIDI clock at 8 different speeds, please refer to SETUP instructions for more details.

# Arpeggiator and Sequencer

arp — mode — rate — range — rec

When unison voice mode is active the arpeggiator can be used.

The arpeggiator has 7 modes:
Up (shown as "UP" on the numeric display)

Down (shown as "dn" on the numeric display)

Up/Down aka pendulum (shown as "Ud" on the numeric display)

Random1 (shown as "r1" on the numeric display)
The arpeggiator chooses and plays any of the held keys at random.

 Random2 (shown as "r2" on the numeric display)
The arpeggiator chooses and plays any notes at random.

Sequencer1 and 2 (shown as "S1" and "S2" on the numeric display)
The arpeggiator acts as a sequencer playing up to 16 notes that can be recorded via MIDI.

In S2 mode, the sequencer avances a step every time a key is pressed and not in S1 Similarly to a Casio VL Tone.

Reminder: The Arp is only active when in unison mode

# Recording a sequence

To record a sequence press **rec** to activate recording mode. The **rec** LED will flash.

Now play up to 16 notes via MIDI. Each preset can store up to 16 notes. Every time you input a note, the step recorder will advance and the numeric display will show the current step.

You can use the **preset up** button to skip a step. No note will be played.

You can also go back a step with the **preset down** button if you wish to correct a note.

The arpeggiator can be set to sync to incoming MIDI clock at 8 different speeds defined by the **rate** knob. Please refer to Setup for details.

# Modulators ( Lfo 1 to 3)

Lfo1

rate    🔗    depth
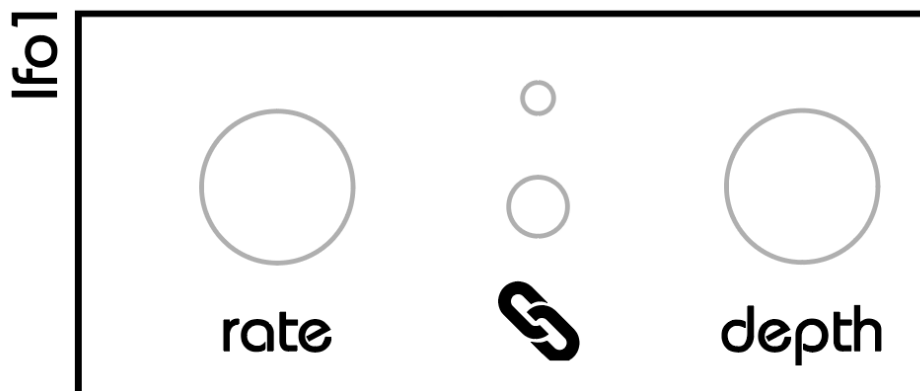
Any knob or fader can be modulated by up to 3 lfo modulators at once.

**To link a knob or fader to an lfo**
move a knob or fader and press a chain link button. Click the chain button a second time to unlink a knob or fader from an lfo. The LED above the chain button indicates whether the modulator is linked or not. Each knob or fader can link to up to 3 LFOs at once.

**To unlink all the knobs/faders from an lfo**
hold the chain button for 4 seconds, until the letters CL appear on the numeric display.

**Selecting an lfo waveform**
To select any of the 3 LFOs simply move one of the LFO **rate** or **depth** knobs.
Use the 4 waveform buttons to
select a waveform. The saw can be converted to a ramp. Press the saw button several times to toggle between version. (display will indicate Sa(w) or rA(mp) accordingly.
The Square can be inverted (high for the first or second half of the LFO cycle), press the square button to invert it.
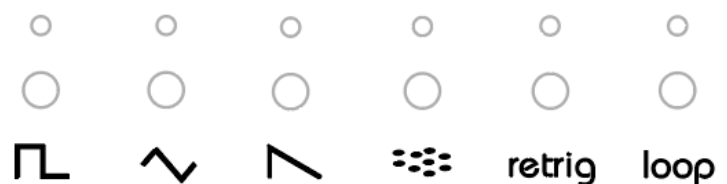
⊓ ∧ ∖ ⋮⋮ retrig loop

## LFO depth

Set the depth of an LFO with its **depth** knob. This defines the amount of effect the lfo will have on the associated knobs or faders.

## LFO rate

To set the LFO rate, use the rate knob. LFOs can sync to MIDI clock and offer 10 tempo divisions (4 bars to 1/32 of a bar). The LFO waveform LED displays the rate. Note that LFOs can modulate other LFOs but not themselves. Please refer to the SETUP instructions for further details on how to sync the LFO to MIDI clock.

## retrig

When this feature is active each keypress will retrigger the LFO from the beginning of its cycle. Otherwise the lfo will only trigger on the first key.

## loop

When this feature is active the LFO will loop endlessly instead of in a one-shot manner.

## Looping noise

When an LFO is set to noise, it can send a loop through a table of randomly generated values. The table length can be 8, 16, 32, or infinite values. Press the noise waveform multiple times to set the table length. The screen will show 8, 16,32 or blank (a new random). Every time you press the noise waveform, the tables are regenerated.
The table length setting is stored globally for each LFO.

# Presets
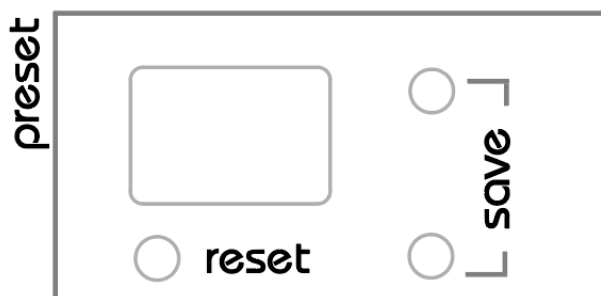


MEGAfm has 600 a preset memory capacity arranged in six banks of 100 presets.
MEGAfm currently ships with 50 factory presets (0-49) organised according to the following chart.

| Misc | 0-9 |
|---|---|
| **Bass** | **10-19** |
| Lead | 20-29 |
| Pads | 30-38 |
| Rhythmic | 39-44 |
| SFX | 45-49 |

Each preset can be edited and stored and preset banks can be transferred to and from a computer via MIDI SYSEX.

# Loading a Preset

To load a preset, press the preset up or down buttons. In order to switch between banks, press the preset up or down button, and within three seconds, use the six LFO waveform buttons to select the desired bank. During this time, the current bank will flash to indicate that a change is being made. The preset number will automatically display after a couple of seconds without touching knobs or faders.
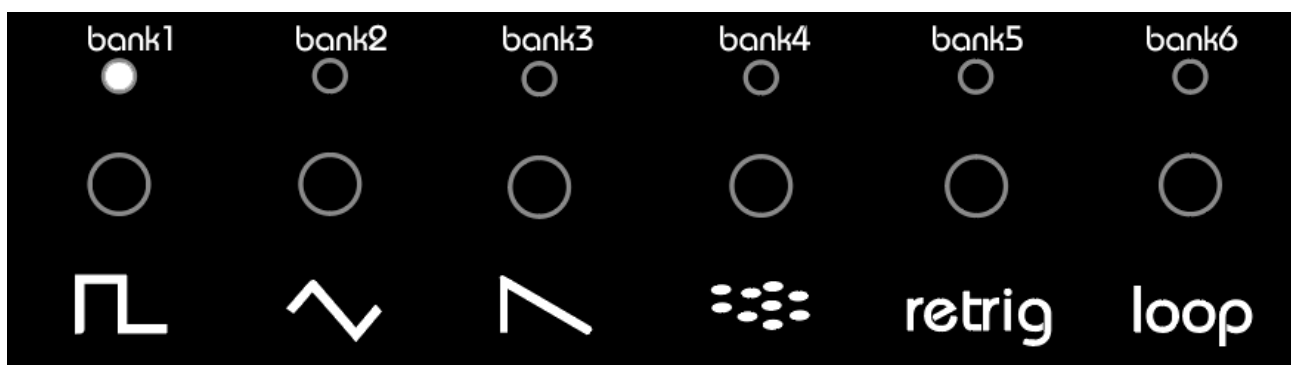


# Saving a preset

You have the ability to store the current preset into any of the available 100 slots of the 6 banks. To initiate the saving process, simultaneously press the preset up and down buttons to enter the save mode.
The numeric display will then begin to flash the current slot number, indicating that the preset is ready to be saved. At this point, a three-second countdown will begin, automatically saving the preset into the same slot. However, if you wish to bypass the countdown and immediately save the preset, simply press the arp rec button.
You can also cancel the save process by pressing reset before the countdown expires.

Moreover, you can alter the destination slot by pressing the preset up or down buttons. You can also alter the destination bank by pressing the 6 LFO waveform buttons. Each time you select a new slot or bank, the three-second timer will be reset. Once you have successfully chosen the desired slot number, you may press rec button to confirm the save, or simply wait for a few seconds until the numeric display stops flashing.

# Preset reset / panel update

Occasionally, starting afresh can be quite refreshing! To replace the current preset with preset 0, simply press the reset button at any time. Once pressed, the numeric display will indicate "P0" to confirm that preset zero has been loaded.
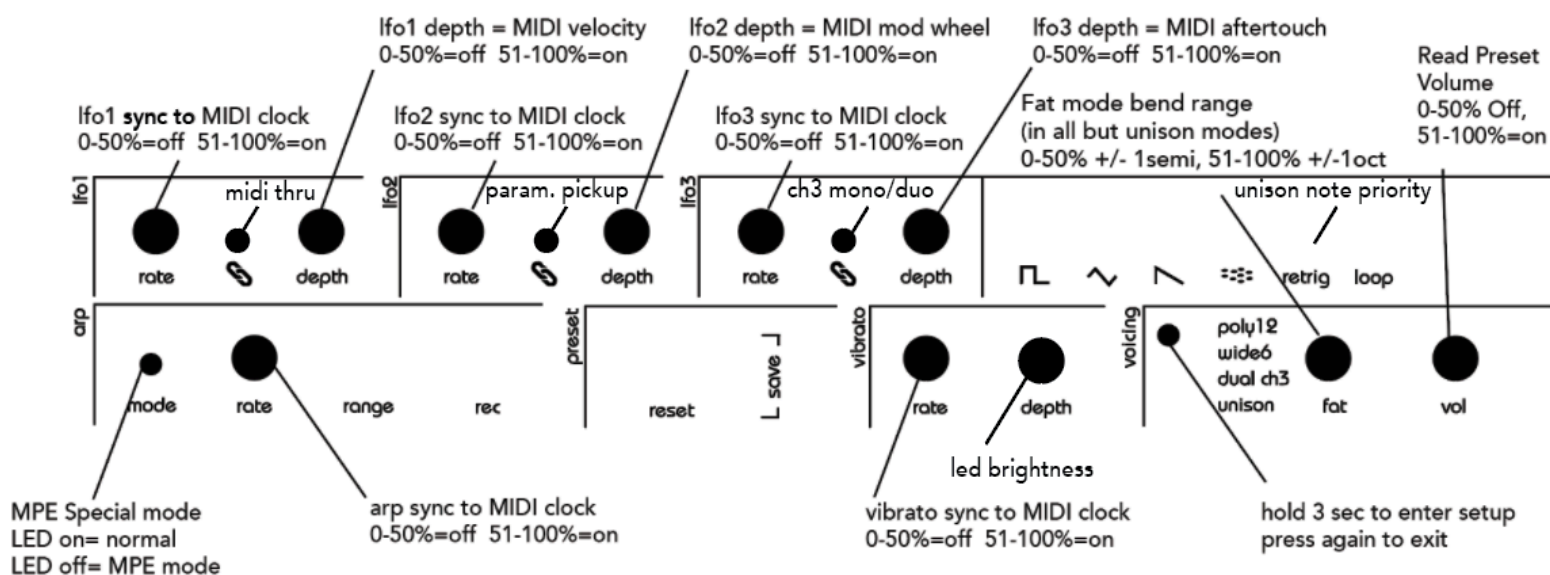
Furthermore, if you press the reset button a second time, MEGAfm will read all the faders and knobs on the control panel and match them with the settings on the device. The numeric display will then indicate "PA" to signify that the panel settings have been restored.

# Preset randomiser

Hold reset a couple seconds to completely randomise your preset, anything could happen!

# Setup Mode & MIDI Tool

Hold voicing at startup or anytime for 3 seconds to enter setup mode. "SE" appears on the numeric display



lfo1 sync to MIDI clock
0-50%=off 51-100%=on

lfo1 depth = MIDI velocity
0-50%=off 51-100%=on

lfo2 sync to MIDI clock
0-50%=off 51-100%=on

lfo2 depth = MIDI mod wheel
0-50%=off 51-100%=on

lfo3 sync to MIDI clock
0-50%=off 51-100%=on

lfo3 depth = MIDI aftertouch
0-50%=off 51-100%=on

Fat mode bend range
(in all but unison modes)
0-50% +/- 1semi, 51-100% +/-1oct

Read Preset Volume
0-50% Off, 51-100%=on

lfo1 — midi thru — rate — depth
lfo2 — param. pickup — rate — depth
lfo3 — ch3 mono/duo — rate — depth
unison note priority
retrig loop

arp — mode — rate — range — rec
preset — reset
save — vibrato — rate — depth
voicing — poly12 wide6 dual ch3 unison — fat — vol

MPE Special mode
LED on= normal
LED off= MPE mode

arp sync to MIDI clock
0-50%=off 51-100%=on

led brightness

vibrato sync to MIDI clock
0-50%=off 51-100%=on

hold 3 sec to enter setup
press again to exit

## LED Brightness

Turn the vibrato depth knob to adjust brightness

## LFO1 to 3 sync to incoming MIDI clock

Turn the respective LFO **rate** knob to choose whether to link LFO1,2 or 3 to the MIDI clock.

Above 12 o clock the setting is on, below the setting is off.

The setting is indicated by ON/OF on the numeric display

## Vibrato sync to incoming MIDI clock

Turn the vibrato **rate** knob to choose whether to link the vibrato to the MIDI clock.

Above 12 o clock the setting is on, below the setting is off.

The setting is indicated by ON/OF on the numeric display

## Velocity controls LFO1

Turn the lfo **depth** knob to choose whether to control lfo1 with MIDI velocity. With this option activated, the MIDI velocity will override lfo1 when the rate of lfo1 is zero. When the rate is zero (stopped lfo) MIDI velocity will override the lfo and directly modulate all parameters associated to the lfo. Use the depth knob to adjust the amount of effect.

Above 12 o clock the setting is on, below the setting is off.

The setting is indicated by ON/OF on the numeric display

The numeric display will indicate "Ve" followed by "On" or "Of"

## Mod wheel controls LFO2

Turn the lfo2 **depth** knob to choose whether to control lfo2 with the mod wheel. With this option activated, the mod wheel (CC1) will control the depth of lfo2 when the rate of lfo2 is above zero. When the rate is zero (stopped lfo) the mod wheel will override the lfo and directly modulate all parameters associated to the lfo. Use the depth knob to adjust the amount of effect.

Above 12 o clock the setting is on, below the setting is off.
The setting is indicated by ON/OF on the numeric display
The numeric display will indicate "C1" (for MIDI CC1) followed by "On" or "Of"

## MIDI Aftertouch controls LFO3

Turn the lfo3 **depth** knob to choose whether to control lfo3 with the mod wheel. With this option activated, MIDI aftertouch will control the depth of lfo3 when the rate of lfo3 is above zero. When the rate is zero (stopped lfo) Aftertouch will override the lfo and directly modulate all parameters associated to the lfo. Use the depth knob to adjust the amount of effect.

Above 12 o clock the setting is on, below the setting is off.
The setting is indicated by ON/OF on the numeric display
The numeric display will indicate "At" followed by "On" or "Of"

## Arp sync to incoming MIDI clock

Turn the arp **rate** knob to choose whether to link the arp to the MIDI clock.

## Preset Volume on/off

Turn the volume knob to turn preset volume loading on or off.
When set to off, the preset volume will be ignored when changing preset.

Above 12 o clock the setting is on, below the setting is off.
The setting is indicated by ON/OF on the numeric display

## MIDI THRU

Press the LFO1 link button to toggle MIDI THRU on/off.
When on, all incoming MIDI is sent to the MIDI output.
By default this setting is OFF.

Important: When MIDI Thru is ON, MEGAfm will no longer generate MIDI & will only echo the incoming MIDI - it will no longer transmit on preset change or fader movement for example.

## Midi Channel ,Pitch bend up & down Learn

In setup mode you can set the input channel simply by sending MEGAfm a NOTE ON message on any midi channel. When a new Midi channel is registered, it is displayed on the numeric display after the letters "Ch"

MEGAfm can also learn the pitch bend ranges. Pitch up and down can be any value from 1 to 48. Hold any key then press a key above the first key to define the pitch bend up range or a key key below it to define the pitch down range (without releasing the first key).
For example if you wish for MEGAfm to bend up 2 semitones and down 5 semitones, hold C and press D then G without releasing C.
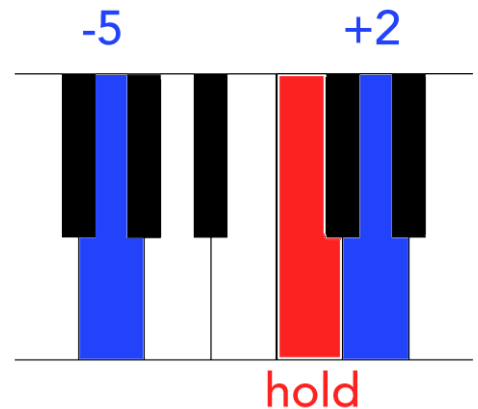


## Note Priority in unison voicing mode.
Press the retrig button to choose:
-Low Note priority (**Lo** on screen). This is the factory default and most
-high Note priority (**hi** on screen)
-Last Note Priority
## Ch3 special mode: Dual or Stereo
Press LFO3 link button to toggle between these modes, refer to voicing modes page 6 for details about this special mode.

## Fat mode range (in all modes but unison)
When you are in all voice modes but unison, the fat knob will detune the 12 voices in 2 possible ways: by 1 semitone (set the fat/glide knob below 51%) or by 1 octave (set the fat/glide knob above 50%).
The LED display will indicated 1S (1 semi) or 1o (1 octave) as you adjust the setting.

## MultiChannel MPE mode

MEGAfm has a special multichannel mode that allows you to control it with an MPE device with multichannel pitch bends, in this mode you can continuously bend each voice within up to 4 octaves.

Press arp mode button to toggle this special mode on or off. When the LED is on, MEGAfm is in normal single channel mode, when LED is off MPE mode is active. When you choose MPE mode, the pitch bend range is set to +/-48semi by default, you are free to change it before exiting setup.

IMPORTANT: MPE mode only uses poly12 voice mode at this time.
The voice mode button won't respond when MPE mode is active…

## Parameter Pickup

This function allows the faders and knobs to update the synthesiser only when they have first reached the preset value. When Parameter Pickup is enabled, the LED screen will indicate if the preset value is higher or lower than the current position of the knob by use of 2 lines at the top or bottom of the display. Once the preset value is reached, the lines will be replaced by numbers and the synthesiser will update.



Preset value
is higher



Preset value
is lower

Press the second LFO link button to toggle PP on or off.

## Exit setup

Press voice mode button again to exit setup.

# MIDI Tool

A MIDI tool is available to easily configure parameters within Blast Beats. The tool is hosted on a web page and requires no drivers nor software downloads. It does however require a WebMIDI enabled web browser (Google Chrome is a good example).
Please visit twistedelectrons.com/tool to use the tool.
To start using the tool choose the MIDI inputs and outputs connected to MEGAfm and press the Read button. The tool will synchronise with MEGAfm then you are free to make any changes.
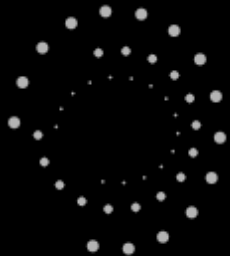


IMPORTANT: press the Write button to save any changes or they will be lost!

# MIDI Implementation

MEGAfm responds to the following MIDI controls.
You can also control it with the Plugin (available for free download on the website) which uses the following MIDI parameters. Note some volume related parameters have been disabled after reports of Ableton Live 11 muting them unexpectedly.

| Parameter | MIDI CC | Range |
|---|---|---|
| **GLOBAL** | | |
| **FM Algorithm** | 4 | 1-8 |
| **Feedback** | 3 | 0-127 |
| **Fat** | 28 | 0-127 |
| **OPERATOR 1** | | |
| **Op1 Detune** | 18 | 0-127 |
| **Op1 Multiplier** | 27 | 0-127 |
| **Op1 Attack Rate** | 29 | 0-127 |
| **Op1 Decay Rate** | 21 | 0-127 |
| **Op1 Sustain Level** | 25 | 0-127 |
| **Op1 Sustain Rate** | 17 | 0-127 |
| **Op1 Release Rate** | 30 | 0-127 |
| **OPERATOR 2** | | |
| **Op3 Detune** | 31 | 0-127 |
| **Op3 Multiplier** | 32 | 0-127 |
| **Op3 Attack Rate** | 36 | 0-127 |
| **Op3 Decay Rate** | 44 | 0-127 |
| **Op3 Sustain Level** | 42 | 0-127 |
| **Op3 Sustain Rate** | 34 | 0-127 |
| **Op3 Release Rate** | 11 | 0-127 |
| **OPERATOR 3** | | |
| **Op2 Detune** | 20 | 0-127 |
| **Op2 Multiplier** | 24 | 0-127 |
| **Op2 Attack Rate** | 49 | 0-127 |

| Parameter | MIDI CC | Range |
|---|---|---|
| Op2 Decay Rate | 50 | 0-127 |
| Op2 Sustain Level | 51 | 0-127 |
| Op2 Sustain Rate | 45 | 0-127 |
| Op2 Release Rate | 37 | 0-127 |
| **OPERATOR 4** | | |
| Op4 Detune | 47 | 0-127 |
| Op4 Multiplier | 39 | 0-127 |
| Op4 Attack Rate | 46 | 0-127 |
| Op4 Decay Rate | 33 | 0-127 |
| Op4 Sustain Level | 41 | 0-127 |
| Op4 Sustain Rate | 43 | 0-127 |
| Op4 Release Rate | 35 | 0-127 |
| **LFO** | | |
| LFO1 Rate | 15 | 0-127 |
| LFO1 Depth | 12 | 0-127 |
| LFO1 Depth (When Active in setup) | Velocity | 0-127 |
| LFO2 Rate | 10 | 0-127 |
| LFO2 Depth | 9 | 0-127 |
| LFO2 Depth (When Active in setup) | 1 (mod wheel) | 0-127 |
| LFO3 Rate | 14 | 0-127 |
| LFO3 Depth | 2 | 0-127 |
| LFO3 Depth (When Active in setup) | Aftertouch | 0-127 |
| **ARP** | | |
| ARP Rate | 6 | 0-127 |
| ARP Range | 5 | 0-127 |
| **VIBRATO** | | |
| Arp Rate | 48 | 0-127 |
| Arp Depth | 13 | 0-127 |

# Preset Upload/Download (SYSEX DUMP)

MEGAfm holds 600 presets in its memory. The presets are divided into 6 banks of 100 presets.
You can transfer 50 presets at a time (or half a bank) to and from MEGAfm via MIDI SYSEX.

To download a half bank from MEGAfm to a computer hold preset DOWN at startup. Then choose a BANK using the 6 LFO waveform buttons. Press the BANK button to toggle between A (first half / presets 0-49) or B (second half / presets 50-99).
When ready press preset DOWN again to send the presets.
MEGAfm will reboot when finished.

To upload a half bank to MEGAfm from a computer hold preset UP at startup. Then choose a BANK using the 6 LFO waveform buttons. Press the BANK button again to toggle between A (first half / presets 0-49) or B (second half / presets 50-99).
When ready press preset UP again to prepare MEGAfm for the presets. Now send the presets from your computer via a recommended MIDI SYSEX software. MEGAfm count to 99 while it stores the presets and will reboot when finished.

# Firmware update

You can transfer new (or old) firmware to MEGAfm via MIDI SYSEX. Hold Arp MODE at startup. This will boot MEGAfm in update mode with all LEDS on. Now transfer the SYSEX file with recommended software via a MIDI interface. The LEDS will blink during the transfer, and MEGAfm will reboot when complete.

For SYSEX transfers we recommend <u>SYSEX LIBRARIAN</u> for MAC and <u>MIDIOX</u> for Windows.

**IMPORTANT: It is crucial to ensure that your SYSEX software is specifically configured with a 64-byte buffer setting. Any deviations from this setting may result in update failures.**

Some MIDI interfaces require a larger **Delay After F7** setting for a successful transfer. **<u>It is also recommended to close the DAW or any other applications that send and receive MIDI during a software update.</u>**

Note: the firmware version is displayed as X.X for a half second at startup for revisions 1.1 and onwards.

It is reported that <u>MIDI SYSEX transfer utility</u> also works well on PC. The delay time must be set to 150 milliseconds.

Important: The first time you update from 2.4 and below to 3.0 and above, MegaFM will automatically reorganise some preset data. The message "CL" will appear during this process that can take up to 30 seconds.

Firmware files are independent. You can safely install any version on to any other, earlier or later.
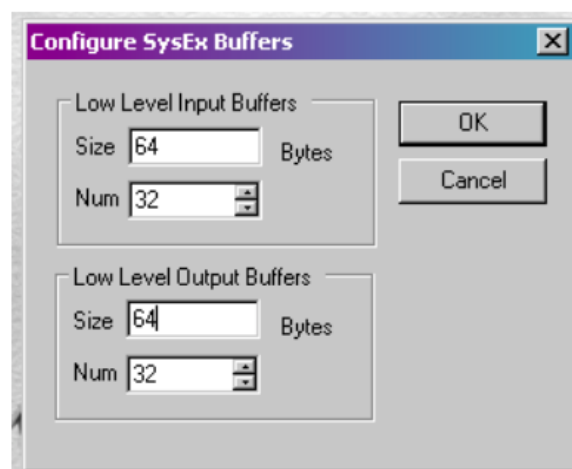
# Factory Reset

If you wish to restore the device to factory state, hold reset at startup. This will erase internal EEPROM and replace presets 0-50 with built-in factory presets. During the procedure MEGAfm will display "RE" for reset. Then it will play a test tune in an endless loop (some chords and notes at various volume levels). When you hear the sound, it is safe to turn the unit off and on again.

# Power specifications

The recommended PSU is DC 9V 450mA Centre Positive

# Frequently Asked Questions

1: Q: I can no longer change voice mode!

A: Please check that you haven't activated MPE mode in setup. Indeed MPE mode only uses poly 12 mode.

If you wish to use other voice modes Please return setup and press arp mode to turn MPE off ( display should show 1C aka single channel).

# Changing Chips (MKII only)

If you own a MEGAfm MKII you have the ability to change the chips. This gives you the option to remove the YM3438 and insert a YM2612 instead (rendering the unit identical to MKI).

To open MEGAfm simply turn it upside down and remove the 7 screws from underneath. The whole bottom part of the cassis can now be removed and set aside. Loosen the 3 audio jack nuts if if it is still tight.

YM2612 chips require a different set of resistors which are included on the circuit board.
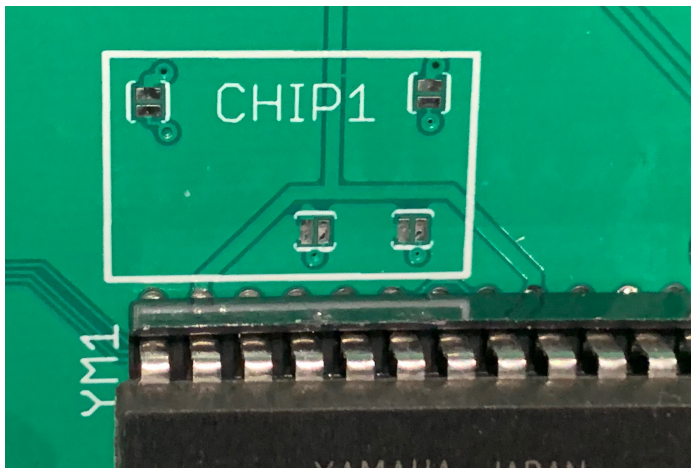


Following the instructions printed under the circuit board we simply add some solder across the 4 jumper pads to activate YM2612 mode and remove the solder to re-activate the default YM3438 mode.

Once solder is added to the jumper pads you can easily open and close them with a horizontal or vertical brush of your soldering iron.

Chip1 and chip2 are completely independent so you can safely mix types.