# More Feedback Machine 2

## User Guide

*version 2.2*



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## Extra Effects                                                   16

# Introduction

## About MFM2

More Feedback Machine 2 is a very powerful effects processor featuring four delay lines with flexible routing, countless modulation options and automation for all parameters. With the realtime usability and audio quality you can always expect from u-he.



## Installation

Go to MFM2 page, grab the installation file for your system (Mac or PC), double-click on the downloaded file and follow further instructions. While you're on the MFM2 page, you might like to scroll down and watch Dan Worrel's excellent introductory video!

To uninstall, delete the plugin itself, then the associated files from the following directories (the precise locations depend on your specific installation):

| | | |
|---|---|---|
| **Win** | Presets | *...\VstPlugins\u-he\MFM2.data\Presets\* |
| | Preferences | *...\VstPlugins\u-he\MFM2.data\Support\* (*.txt files) |
| **Mac** | Presets | *MacHD/Library/Audio/Presets/u-he/MFM2/* |
| | Presets (user) | *(you)/Library/Audio/Presets/u-he/MFM2/* |
| | Preferences | *(you)/Library/Application Support/u-he/com-u-he.MFM2...* (4 files) |

## Online Resources

To check out all other u-he products, go to the main u-he website
For a lively discussion about u-he products, go to the u-he forum
For friendship and informal news, visit to our facebook page
For video tutorials and more, go to our youtube channel
For thousands of u-he presets, go to PatchLib

**IMPORTANT:** Before you start using MFM2, read about the **Panic** button here!

# MIDI Control

MFM2 is one of those rare effect plug-ins that simply begs to be fed with MIDI control data. Especially notes from a MIDI keyboard or a MIDI track in your sequencer can significantly expand MFM2's already massive capabilities. For instance, you can use the 'KeyFollow' modulation source to play its filters and delay lines "in tune".

MIDI notes can also be used to trigger the multi-stage envelopes and LFOs, giving you total control of synchronized modulation effects. MFM2 includes an on-screen keyboard: notes played via mouse-click can be recorded as automation data.

Some sequencer applications can't route MIDI to effect plug-ins, but at least e.g. Apple Logic offers a usable workaround: Effects can be loaded as quasi-instruments into which the audio is fed via side-chain. To make the most of MFM2's ability to interpret MIDI data, please refer to the documentation that came with your sequencer.

# Presets

The content of the lower third of MFM2's window is switchable between MSEGs (multi-stage envelope generators), Keys, Presets and Compressors.

To open MFM2's browser, click on the tab labelled **Presets**. The factory presets have been sorted into several folders according to the type of effect or typical use. Click on one of the folders to display its contents.

Above the Presets tab is a pair of diagonal arrow symbols – these buttons step through presets.

To rename or delete files and folders, you will need to use your operating system's file browser (*Reveal in Finder* is the fastest way to get there).

To move patches between folders, drag & drop from the patches pane into a folder in the folders pane.
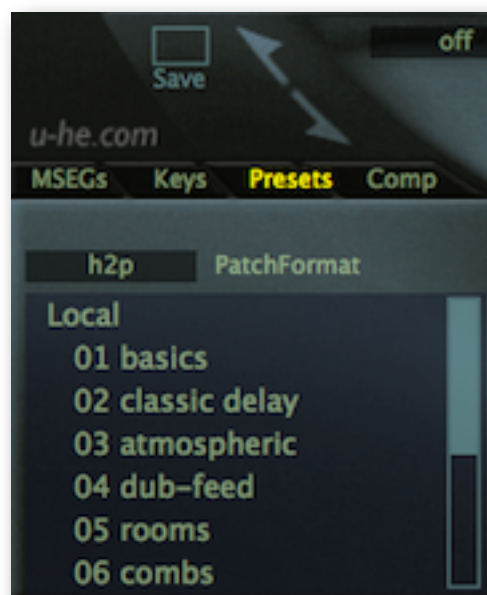
## Browser Functions
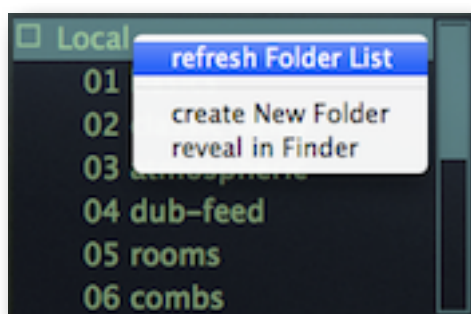
Right-clicking in either browser panel opens a context menu offering a few useful functions. In the folders panel, the view can be updated (**Refresh Folder List**), new folders can be created (**Create New Folder**), and the folder can be highlighted in your operating system's file browser (**Reveal in Finder / Explorer**).

Right-click in the presets panel to open the context menu for individual presets. **Make favourite** marks the preset with a small yellow star, **Mark as junk** makes the preset disappear (junked patches can be made visible by selecting **Show junk**).

You can select multiple presets by holding down the Alt, Command and Shift keys on your computer keyboard. You should only need the functions **Select All** and **Deselect** if you really need to speed things up!
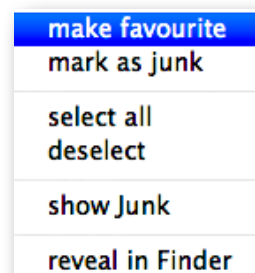
## Save
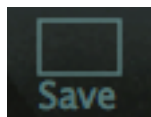
To the left of the arrows (see previous page) is MFM2's **Save** button. Patches are always saved into the currently selected folder. If no folder is selected (as is the case immediately after launching MFM2), patches will be stored in the root of the **Local** folder.

If you try to save a patch under a name that has already been used, you will be asked whether you would like to back-up the existing patch before overwriting it. To restore backed-up patches, change the name and extension using your operating system's file browser (Finder, Explorer).

After you have finished, refresh the contents of MFM's browser: right-click in the folders area and select **Refresh Folder List**. Despite the name, this function also refreshes the patch list.

## MIDI Programs folder

*Local* also contains a special folder called *MIDI Programs*, which is initially empty. If you put a bunch of presets (up to 128) in there, they are **all** loaded (into a cache, for performance reasons) when the first instance of MFM2 starts. Important: changes take affect after restarting the host software: *MIDI Program* presets cannot be added, removed or renamed on the fly.

Individual presets are selected via MIDI program change messages (see **MIDI Control** on the previous page). As they are accessed in alphabetical order, it is a good idea to put a number at the beginning of each name e.g. '000 rest-of-name' to '127 rest-of-name' or similar.

Banks: The MIDI Programs folder can contain up to 127 sub-folders (of 128 patches each), and these are switchable via MIDI bank select messages 1-127. The MIDI bank select message is CC#0 (MFM2 only interprets the MSB) – send this value, then a Program Change message.

## Patch Format
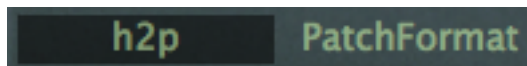
While the browser is open you will see a global switch called *PatchFormat* between the row of tabs and the folders list. Before saving, make sure that the currently selected format is the one you really want:

*h2p* – this u-he proprietary format is suitable for all platforms and plug-in types, and is therefore recommended for almost all setups and situations.

*h2p extended* – like h2p but includes extra readable information. Files saved in the extended format are larger than the normal (compact) h2p files.

*native* – the standard format used by your operating system. Presets saved in native formats are platform-specific e.g. you can't load an .aupreset into MFM2 running under MS Windows, and you can't load an .fxp into MFM2 running under Mac OSX.

# User Interface

## About the controls

### Standard knobs

Values are adjusted via the usual click-and-drag, often allowing finer resolution via the SHIFT key on your computer keyboard. Note that several of the knobs are centre-zero i.e. you can set negative values. Double-click on a knob to instantly revert to its default value.

Tip for wheel-mouse owners: Unless you need very fine control, you don't even have to click on knobs and switches – just hover over the control and roll the wheel.

### Definable knobs (...)

Most of MFM2's knobs are accompanied by user-definable modulation controls. Initially dark and un-labelled, the function appears as soon as a modulation source is selected via right-click. Note: left-click also works if the knob is currently undefined.

Once a definable knob has been defined, it is not immediately recognizable as such. Right-click on any knob – if a list of modulation sources appears, that particular knob is *definable*.

### XY controls

Along the dividing line between each pair of channel strips (1+2 and 3+4) is a row of grey pips that give you joystick-style control over four parameters at the same time: the four knobs to the left and right of each pip!

Dragging vertically adjusts the lefthand parameters of both channels, and dragging horizontally adjusts the righthand parameters. Any unused definable knobs are not visibly affected, but their (hidden) values do change.

Note: The XY controls cannot be MIDI-learned or automated, as they are simply realtime controls for the other parameters that **can** be MIDI-learned / automated.
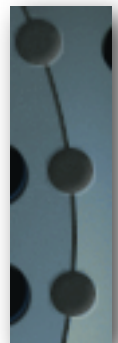
### MIDI learn
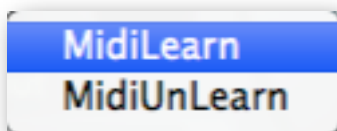
Any knob in MFM2 (except XY) can be remote-controlled via MIDI messages: right-click on the knob, select **MidiLearn** from the context menu and move the knob or slider you would like to use for that parameter. To remove the connection again, right-click on the same knob and select **MidiUnLearn**.

Whether MidiLearn will work in your setup depends on how your host application routes MIDI to plug-ins. Cockos **Reaper**, for instance, always routes MIDI to any effects that follow in the plug-in rack. Apple **Logic** lets you load effects as quasi-instruments. If MidiLearn doesn't work as you expected, please refer to the documentation that came with your sequencer / DAW. There is usually a workaround, at least...

# Upper Bar
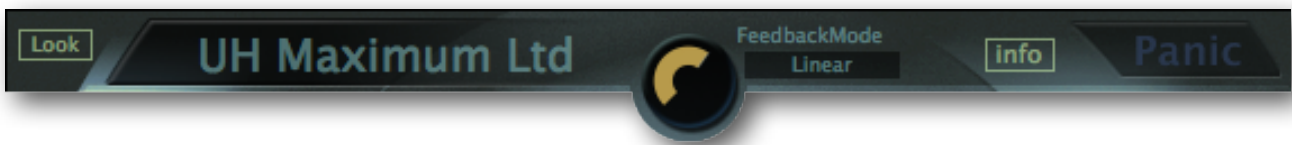


## Look

This button is for selecting the GUI skin (cinnamon or hard-boiled) and the size (from cute = 400x280 to cinematic = 2000x1400). Even on large monitors with high resolution, the smallest size is still just about usable!

## Data display

Shows the name of the currently selected patch. Clicking on the name will open a drop-down list of all patches in the current directory so you can select a preset without opening the browser.

The data display also shows the currently edited parameter and its value. Whenever you need to set specific values, check the data display while adjusting the knob.

## Global Feedback Knob

In the centre of the upper bar is a large control that scales all feedback levels at the same time. Use carefully for e.g. dub-style infinite echoes – but always be ready to hit the **Panic** button!

## Feedback mode

In **Proportional** mode, the decay of each delay line depends on its delay time. This ensures that e.g. if you are using two delays set to 1/4 and 1/8 and the same amount of feedback, the echoes will disappear at the same time. In **Linear** mode, decay doesn't change with delay time.

## Info

The **info** button opens a floating window displaying text written by the author of the preset. See *Save* on page 4.

## Panic

This aptly-named button immediately stops all feedback. With so many feedback and inserted effect options between four delay lines, things can get out of hand from time to time...



**Be ready at all times to hit that button**

Whenever you hear feedback building up instead of decaying, click on the Panic button. Before resuming your work, either find and reduce the offending feedback level (the parameter causing the problem), or turn global feedback down a little.

# Delay Lines

## Overview

At first glance, the main area of the interface may appear confusing – but you'll soon get used to it:



Compare these two images (of delay lines 1 and 2). If the GUI had not been in the form of a disk, two delays would have looked like the image on the right – clearer perhaps, but not half as inviting!

### Input

*none, left, right* or *monosum* (stereo audio input is summed to mono). Determines which part of the input signal is fed to each delay line. Note: even if a delay has its input switch set to *none*, it can still receive signals from the others via feedback.

### Flow

Specifies where the filter is inserted within the signal path (see Filter on the next page):

*Input*..........................filter before the delay
*Feedback*................filter within the feedback loop (iterative filtering)
*Output*.......................filter after the delay
*In L, In R*.................filter before the delay, one channel only
*Dry L, Dry R*............ditto, but only the dry signal of one channel is filtered

# Feedback indicator

The small 'LED' close to the Pan knob in each channel indicates the feedback signal level, with a blue band that widens with increasing level. When the signal is too 'hot' it flashes red – this should only happen occasionally.

# Timebase & Sync

The **TimeBase** menu offers 3 basic modes, each with a Course and Fine variant for different modulation strengths from the adjacent definable knob. Remember: Whether you select course or fine modes, the range of the **Ratio / MilliSec / Tune** knob itself is not affected.

While Fine modes are good for shallow modulation / chorus effects, Coarse modes are often the better choice for more radical effects. Note: In the Course modes, you can still get intermediate values by holding down SHIFT while moving the knob.

# Ratio / MilliSec / Tune

In **Sync** modes, the delay is synchronized to the current song tempo. The **Ratio** range is from 1/64 notes to 1/2 note triplets, including dotted and triplet values. Note that MFM2 has a maximum delay length of 4 seconds, so if your song tempo is very slow, long delays may be divided to stay within the range.

In **MilliSec** modes, the delay time is independent of the current song tempo: it is an absolute value in milliseconds, with a range of 0 to 2000 (2 seconds).

The **Note** modes set the delay to frequencies according to MIDI note number. The default **Tune** value is 69 – the standard 'tuning-fork' note A (440Hz). This mode goes hand in hand with MFM2s ability to be played like a virtual instrument, responding to received MIDI notes. The delay lines then act like tuned Comb filters – if tuned to a chord, MFM2's delays can turn a drum loop into something reminiscent of an acoustic guitar.

# Pan & Output

Use the **Pan** knobs to set stereo panorama positions and the **Output** knobs to set the volumes of each delay channel.

# Filter

MFM2 offers several filter types that can be applied to the signal in various positions...

**bypass**: the filter is not active.

**lowpass**, **bandpass**, **highpass** are classic 12dB synthesizer-style resonant types.

**bandreject** is a bit more subtle, and works like an inverted bandpass filter – a fairly narrow region of the spectrum is attenuated, so it can be used to remove feedback 'ringing'.

**allpass** only affects phase relationships – no frequencies are attenuated. Resonance affects the depth of these phase shifts. Allpass filters are useful for e.g. creating phasing effects, especially when applied in parallel to the dry signal.

**LP 6dB** and **HP 6dB** are a less aggressive versions of lowpass and highpass.

**cutoff** controls the filter frequency and **res** (resonance) controls the filter-internal feedback. Use the adjacent definable knob (right-click on it) to specify a modulation source.

Note that an additional lowpass / highpass filter (or one of several other effects) is available in the 'extra effects' section – see page 16.
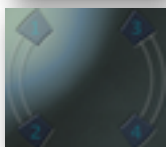
# Delay Matrix

## Preset Modes

The signal flow of each of these modes is represented by different lines connecting the 4 delays and give a visual representation of the circuitry.
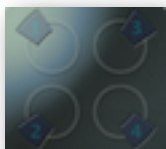
**Four mono:** Four completely separate delays. The output of each delay is fed back into its own input.

**Dual Pingpong:** Two pairs of delays. The output of each delay is routed to the other member of the pair.

**Quad Pingpong:** The signal is fed from one delay to the next. To make the most of this preset, set the input of three of the delay lines to *none*.

**Quad Permute:** Like Quad Pingpong except that the signal is sent in both directions around the circle, while the feedback is inverted in one of the directions. This is a very complex network which has been used in classical reverb algorithms.

**Quad Network:** Every output is send to every other input– feedback heaven! Use carefully e.g. for atmospheric delays or dense reverbs.

**12 into 34:** The output of delay 1 is sent to delay 3, which is fed back into itself. Similar applies for delays 2 and 4. This mode is great for dub rhythms e.g. using an initial 5/8 delay together with 1/2 notes in the other taps.

## User Matrix

In **user** mode you can specify how much of each delay is fed back to *any* delay. The rows are the signal sources, the columns are their targets. Let's analyze the routing in this image:

**Delay 1** (top row) is being fed back into itself, but the signal is inverted (the value is to the left of 12 o'clock, it is blue). A little of delay 1 is also being sent to delay 2.

**Delay 2** (2nd row) is being fed back into itself as well as to delay 3 (inverted).

**Delay 3** (3rd row) is being fed back into itself as well as to delay 4 (inverted).

**Delay 4** is being fed back into itself (inverted) and into delay 1 (thus completing the ring).

# Modulators

## LFO

MFM2 features four identical LFOs which can be assigned to any modulation target. The row of tabs at the top of the LFO section (see image below) switches between them.

### Sync

LFOs are synchronized to song tempo. Use the **sync** pull-down menu to set a value. The range is from 1/64 notes to 8 bars, including dotted and triplet time.

### Wave

*sine*.........................pure sine wave
*triangle*...................pure triangle wave
*saw up.*...................rising saw ('ramp')
*saw down.*..............falling saw
*sqr lo-hi*..................square wave, restarted at the lower level
*sqr hi-lo*..................square wave, restarted at the higher level
*rand hold*...............random steps (hard)
*rand glide*..............random curves (soft)
*user.*........................definable steps or lines:



The user mode is for designing your own LFO waves. Select **steps** or **lines** and the number of handles (2 to 32).

The length of each step or line is the current Sync value. For the example in this image, the total length of one LFO cycle is 16 x 1/4 = 4 bars in 4/4 time.

### Restart

**Restart** gives you more control over synchronization. You can restart the LFO after any number of measures (1 to 32), or trigger via MIDI Note On messages...

*free*.........the LFO starts at a random position within its waveform

*gate*........the LFO restarts with every MIDI Note-On, always at the same position in its wave (see Phase below). Use a MIDI keyboard or MFM2's own keyboard to restart gated LFOs.

### Rate

LFO rate. This bipolar control *scales* the value set by the Sync parameter. Use it to fine-tune the speed of the LFO. The definable knob to the right is for rate modulation – in the image on the previous page, LFO1 rate is being controlled by the modulation wheel.

## Phase

Sets the phase (i.e. the position within its cycle) at which the LFO will be restarted every time a note is played. This parameter is meaningless if Restart is set to *free*.

Phase shifts the phase of the LFO to the left or right so that the starting value of the LFO can be different from what it would be by default.

## Amp

Amplitude i.e. the overall output level of the LFO. For typical **vibrato via mod wheel**, click on the definable knob and select *ModWhl* as modulation source. Note that the definable control (...) *scales* the existing Amp value, it does not add to it.

## Delay

Actually the LFO fade-in time. Typically used for 'delayed vibrato'. Of course this parameter only works if MFM2 is receiving MIDI Note On messages.

# MSEG

MSEGs (Multi Stage Envelope Generators) are complex modulation sources offering total control over the shape as well as continuous control over the timing. Click on the MSEGs tab at the lower left of the MFM2 window:



Each MSEG can accommodate up to 32 segments. Instead of the normal sustain stage found in a typical ADSR, you can loop through several segments. The slope of each individual segment can be adjusted. MSEGs are triggered whenever...

- when you hit a note on the keyboard (if MFM2 is in instrument mode)
- if you manually click on a key in the Keys tab while the interface is open
- the keys of the keys tab can be automated in your host so you can write in the appropriate triggers into your track. This also works in instrument mode or if your host sends Midi information to an insert plug-in.

## TimeUnit

Selects the unit that will correspond to integer steps in the editor's time-line. Note that the timing can always be shifted by setting non-zero Attack, Loop or Release values.

**sixteenth** / **quarters** / **note**: Note lengths, synchronized to song tempo
**seconds**: Absolute time, non-synchronized
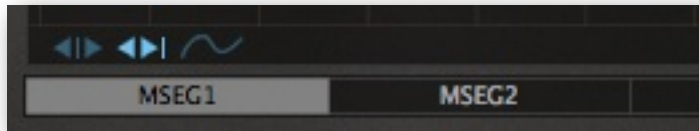
## Velocity

For dynamic envelopes – velocity scales the level of MSEG output.

## Attack, Loop, Release

**Attack** slows down / speeds up everything before the loop. **Loop** slows down / speeds up the loop itself. **Release** slows down / speeds up everything after the loop.

## Editor functions

### *Switches*



Above the MSEG1 selector button are three small icons. From left to right, these are:

*Single*......... moves individual handles, the other handles remain fixed
*Shift*............. moves individual handles, all following handles also move
*Draw*........... moves multiple handles vertically – click on a handle and 'draw'

Note that handles jump to the nearest *unit snap* and *value snap* positions
(see *Context Menu* below).

### *Create New Handle* (max. = 33)

Mac............. cmd + click on the background
PC............... alt + click on the background

### *Curvature*

To adjust line curvature, click on a line and drag it away. S-curves are also possible: Again, hands-on experience is better than a long-winded explanation here.

### *Zoom & Scroll*

To zoom in or out, click on the background and drag up / down. For 'optimum' zoom, double-click. To scroll to invisible sections of the envelope, click and drag left / right.

### *Context Menu*

Right-clicking in the background opens a menu containing the following options:

copy / paste.............clipboard functions
half size....................shortens the envelope
double size..............lengthens the envelope
upside down............inverts the envelope
unit snap..................horizontally restricts new input to 3, 4, 6 or 8 steps per unit
value snap...............vertically restricts new input to 12, 24, 36, 48 or 15 levels
quantize to snap....quantizes all handles to the nearest step (see unit snap)
unit spacing.............distributes all handles to successive units
even spacing..........evenly distributes all handles between the leftmost and rightmost
pointer......................resolution of the position indicator – reverts to Course by default

### *Loop Region*

Right-clicking on a handle lets you set loop start and end points. Alternatively, click and drag the edges of the colored bar above the editor window. Note: MSEGs will continue looping if the loop end is set to the last point.

# Modulation Matrix

At the lower right is a panel used for specifying custom modulation routings and amounts. MFM2 has four identical slots labelled *Matrix 1* to *Matrix 4*, each with the following elements:

## Source

Selects the primary modulator, then controls the amount of modulation. Right-click on the knob and choose a source from the list (note: left-click also works if the knob is currently undefined). The Source knob is bipolar i.e. you can set negative amounts.

## Via

An optional secondary modulator and its amount. **Via** determines how much of the primary modulator reaches the Target.

## Target

The parameter that will be modulated. Here is an overview of all available sources and targets, for future refererence. The more familiar you are with MFM2, the less cryptic these will appear!

| Source / Via | Target 'MidiManager' | Targets 'MFM2' | Targets 'DelayLine…' |
|---|---|---|---|
| ModWhl (MIDI cc#1) | Portamento | Dry | Ratop |
| PitchWhl | FineTuneCents | MasterFeedback | RatioDpt |
| Breath (MIDI cc#2) | PortaRange | Wet | MilliSec |
| Xpress (MIDI cc#11) | | SoftClip12, 34 | MilliDpt |
| Gate | | SoftClipDpt12, 34 | Tune |
| KeyFol | | Decimate | TuneDpt |
| Velocity | | DecimateDpt12, 34 | Feedback1, 2, 3, 4 |
| ATouch (ch. pressure) | | FreqShift12, 34 | Pan |
| MSEG1, 2 | | FreqDpt12, 34 | PanDpt |
| LFO1, 2, 3, 4 | | PhaseC12, 34 | Output |
| | | PhaseDpt12, 34 | OutDpt |
| | | PhaseFB12, 34 | Cutoff |
| | | HiPass12, 34 | Resonance |
| | | LoPass12, 34 | FiltDpt |
| | | CompThreshold1, 2 | KeyFollow |
| | | Compression1, 2 | |
| | | CompAttack1, 2 | |
| | | CompRelease1, 2 | |
| | | CompOutput1, 2 | |

# Extra Effects

## Channel Effects



At the bottom of the disk is an area in which you can specify two extra effects which can be applied to the the delay channels in pairs (1 and 2, 3 and 4)...

*soft clip*.............distortion (can get dirty!)
*decimate*..........bit-crusher.
*phaser*..............simple phaser. Be careful with the feedback!
*sideband*..........simple frequency shifter.
*filter*...................dual filter, highpass and lowpass.

## Compressors

MFM2 features two powerful and flexible compressors. Click on the **Comp** tab (next to the Presets tab) to see them.



### Mode and Target

*Bypass*.............the signal passes through without being affected
*PeakComp*......standard compressor (the signal is analyzed at the input - see note below)
*Maximize*.........RMS feedback compressor (the signal is analyzed at the output)

The input options (Targets) are: **Dry**, **1+2**, **3+4**, **Mix**.

Note: In PeakComp mode, a sidechain input selector labelled **Peak Source** appears which also offers those same four options – so you can compress one pair of channels from the other!

### Attack and Release

Attack: 0 = 0ms, 1 = 1 ms, 2 = 4ms, 10 = 1000ms
Release: same as above, but 15 = 30.000ms = 30 seconds

### Threshold, Compression and Gain

**Threshold**: -96 dB to 0dB. This setting also adjusts the automatic makeup gain accordingly. If you set the threshold to e.g. -24dB, the output is scaled by +24dB (only in Maximize mode or if the Peak Source is the same as the target).

**Compression**:  0 = no compression, 1 = 1:2, 2 = 1:4, 3 = 1:8, 10 = limiting

**Out Gain** sets the output level between -24dB and +24dB

*The End*