

***ALMØ32***

***MFX***

***USER***

***GUIDE.***



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# Introduction

The MFX is a compact 6HP Eurorack stereo digital audio multi effects processor. It offers 17 different full featured effects programs plus a number of metering utilities.

Inspired by our favourite classic hardware effects processors, the MFX incorporates DSP technologies from the dawn of digital effects in the 70s to the present day. This combines with ALM character and uniqueness to form a highly useful, fun and practical Eurorack effects module.

Reshape sounds with the distortion and dynamics engines. Bend time, space and pitch with multiple feature rich reverb and delay engines. Modulate signals with the flexible panner, frequency shifter, and range of ensemble effects. Fracture sounds with the one of a kind granular and glitch engines. Check signals and tune oscillators with various utilities.

The MFX user interface is designed to be familiar, quick and easy to use. Each program contains a wide range of controllable parameters both directly editable or freely assigned to CV or clocked control. Additionally, each program includes factory presets as well as the ability to store and recall user presets. All states are preserved across power cycles.

## Features

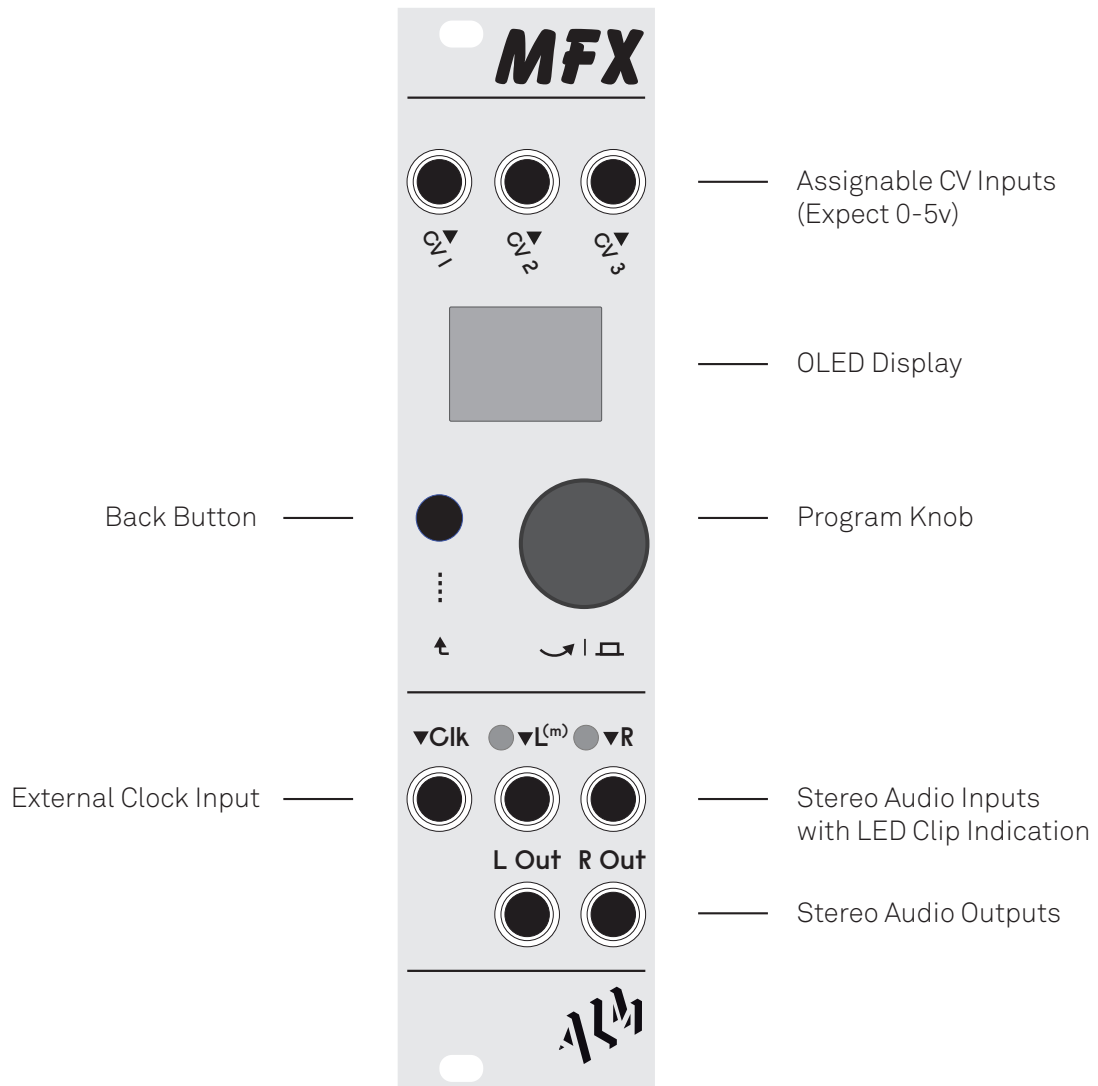
- A large collection of effects programs with numerous controllable parameters.
- All settings remain between power cycles.
- Factory and user saveable presets slots.
- Stereo I/O paths.
- 3 freely assignable CV inputs and 1 clock / trigger input.
- Support for an 'Axon-1' or 'Axon-2' expander for up to 7 assignable CV inputs (plus performance and tap tempo / bypass controls with the Axon-2).
- USB-C for quick and easy 'drag and drop' firmware updates via computer.
- Skiff friendly with reverse power protection.
- Made in England.

## Technical Specifications

- Supply: +12V 50mA Max / -12v 15mA
- Size: 6 HP
- Depth: 32mm
- 16 Bit / 44.1Khz Stereo processing
- ARM CPU based DSP

# Operation

## Panel Layout



## General Usage

The MFX provides a browsable selection of effects programs that can each be selected and made active. Once active, a program's various parameters can be browsed, edited or assigned to CV. The programs have a number of common features as well as unique parameters specific to their functions. Factory and user presets can also be loaded and saved per engine.

When initially powered, after a short start up animation, MFX displays the active effects program. Other available programs can be browsed by twisting the program knob and made active by clicking the program knob. Once a program is made active, its last edited parameter screen is displayed. Parameters can be cycled through by turning the program knob. Clicking the knob will highlight the selected parameter and turning will then set its value from a range of available values (and CV assigns - see next para). Clicking again will exit. To return to the program selection, press the back button.

Audio signals are patched in to either the left input (mono source) or both left and right inputs (stereo source). The audio signals are then processed by the selected effect program and sent to the stereo audio outputs. The red LEDs indicate when audio signals are too high (max 16Vpp approx) and are causing clipping at the inputs - if this occurs, care should be taken to lower signal volumes into the MFX.

### ***Assigning CV Control***

On a parameter screen, scrolling left past the lowest value of a parameter will select one of the assignable CV inputs to externally control that parameter. Alternatively, when a parameter is highlighted, *holding the back button + twisting the program knob* will immediately jump to the CV input selection.

Each CV assignment includes its own digital attenuation and offset settings for scaling the incoming voltage. To adjust this, hold the program encoder for >1 sec. with the CV assignment selected. (To exit press the back button). When a CV is assigned, a small bar graph will be displayed indicating the CV level (after attenuation and offset).

The expected input voltage range is unipolar 0-5 Volts (Euro voltages outside of this range won't damage the module but will be ignored). CV control of program or preset selection is not currently supported.

### ***Externally Clocking***

Some effects programs include a parameter for setting internal 'INT' or external 'EXT' clock. When external clock is enabled, the MFX then follows a clock pulse at the 'Clk' input. Additionally, some effect programs repurpose the clock input as a gate input for controlling special functions. See the Programs section for specifics on how the clock input is used by each program.

## Common Program Parameters and Features

### *Mix*

Every effect includes a standard mix control for setting the wet/dry blend of the effect with the original input source. At 0%, only the input signal is heard at the outputs. As 'Mix' is increased, the affected signal is brought in until 100% is reached and no dry signal remains.

The wet/dry mix parameter can be disabled globally from within the Utilities program and is then set fixed to 100% wet. This is useful when patching the MFX in a mixer's send and return. Please see the Utility Program section for more info.

### *Presets*

Following the mix parameter is a screen labeled 'Preset' where the parameters of each effect may be initialised, loaded and saved into the available user slots. Each effect includes a collection of factory presets to showcase its versatility and provide a range of starting points. The last used settings of each effect will remain both when changing effect programs and power cycling. It is only necessary to save a preset to return to a favourite setting following parameter adjustments.

There are a total of 32 numbered user preset save slots which are shared between all effect programs. Selecting '+ADD USER PRESET' will save the current engine settings to the next available preset slot. Once saved a user preset can be recalled, overwritten or deleted via a pop up menu that appears when clicking on the selected user preset.

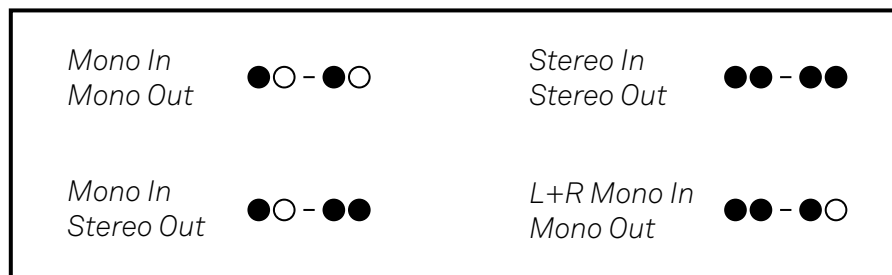
If user presets are present a new top level 'PRESET LOADER' menu option will appear. When selected this mode will list all saved user presets and allow for quick switching between them (intended for use in live performance). Long holding the Back button on a selected preset will activate it and jump into the associated FX engine for further editing.



## I/O Indicators

The bottom left corner of the screen displays two pairs of dots that indicate the input/output arrangement of the currently loaded program / parameter setup. A solid dot represents an audio signal expected at the inputs or produced at the outputs. Some effects are fully stereo whilst others expect a mono input and produce either a stereo or mono output.

Certain effects programs may change their I/O arrangement depending on the 'mode' setting. The possible I/O arrangements are as follows:



All reverbs (except the Pocket PL8) preserve the stereo dry input signals when performing the mix with the wet signal.

## Bypassing

At any time, the audio processing of the MFX can be bypassed to mute the effect and route the dry input source straight to the outputs. To do so, *hold the back button + press the program knob*. The word 'Bypass' is displayed in the bottom left corner of the screen (covering I/O indicators). Repeat this shortcut to disengage bypass.

# Programs

## Digi-PCM Echo

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*Mono or Stereo In → Mono or Stereo Out*

The 'Digi-PCM Echo' is an unapologetically digital delay inspired by early digital rack delays. It includes an assortment of additional features such as external clock sync, five different delay modes, audio quality settings and wide ranging times.

### Parameters

#### **Mode**

Sets the delay mode. Depending on the selection, the output can be mono or stereo.

- *Mono Delay* - A single delay line with a mono output.
- *Dual Tap* - A pair of delay lines mixed to a mono output.
- *Stereo Tap* - A pair of delay lines, each hard-panned to one side of the stereo output.
- *Ping Pong* - A pair of delay lines that swap sides with each repeat.
- *Ext Feedback* - A single mono delay line using only the left in and out. The right output is repurposed as a send and the right input as a return for the external feedback path.

#### **Clock**

Sets if the delay time is based on internal 'INT' or external 'EXT' clock.

#### **Time**

Sets the length of the delay buffer in ms when 'Clock' is set to internal. (Ranges from 0-998ms x8).

#### **Clock Mult**

Sets the buffer length as a multiple of the incoming pulse when 'Clock' is set to external.

#### **Tap Mult**

Sets the time of the second tap as a multiple of the main time, not used in 'Mono' and 'Ext Feedback' modes.

***Bandwidth***

Sets the sampling frequency of the delay line. Doubles delay time with each step down.

***Bit Depth***

Sets bit depth of the delay line.

***Regen***

Sets the amount of feedback into the delay buffer.

***Flip Phase***

Inverts the phase of the delay line.

***High Cut***

Sets the cut off frequency of a low pass filter in the delay line.

***Low Cut***

Sets the cut off frequency of a high pass filter in the delay line.

***Mod Depth***

Sets the depth of modulation over the delay time.

***Mod Rate***

Sets the rate of modulation over the delay time.

***Reverse***

Reverses playback of the delay buffer.

***TIPS:***

1. Use the ratio set between the Delay Time and the Tap Mult parameters to greatly alter the rhythms of the repeats.
2. Try using the High / Low Cut filters and modulation to create distance between the source and the echoes.
3. Modulating the Bandwidth parameter can have interesting melodic results.
4. Remember to experiment with all of the delay modes to find the most suitable echo type for your patch!

# Tape-Tech Echo

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*Mono In → Mono Out*

The 'Tape-Tech Echo' is an analog tape style delay with a pitch shifter bolted on. Inspired by gritty vintage tape echo units, it has a darker analog sound. Several unique parameters including tape age and wow + flutter, combined with the built in pitch shifter, make the Tape-Tech a fun and eccentric program.

## Parameters

### *Time*

Sets the length of the delay buffer in ms. (Ranges from 0-998ms).

### *Feedback*

Sets the amount of feedback into the delay buffer.

### *Tape Age*

Sets the age of the tape: increases noise, saturation, drop outs and darkness in the repeats.

### *Wow + Flutter*

Introduces slight changes to the delay time, adding pitch warble and chorusing to the repeats.

### *Play Heads*

Sets the number of tape read heads for the echo density. The middle head is less stable than the outer ones.

### *Pitch Shift*

Shifts the pitch of the delay line without affecting the time.

### *Pitch Destination*

Routes the pitch shifter to either the delay's 'Feedback' path or the 'Input' signal.

### *Loop*

Loops the currently stored delay buffer.

### *Clock*

Sets if the delay time is based on internal 'INT' or external 'EXT' clock.

### *Clock Mult*

Sets the buffer length as a multiple of the incoming pulse when 'Clock' is set to external.

### *TIP:*

Try assigning CV to the Time parameter for warping tape speed effects.

## Crumbular Echo

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*Mono or Stereo In → Mono or Stereo Out*

The 'Crumbular Echo' is a granular type multi-tap delay designed to produce busy clusters of stuttering repeats. With a wide ranging set of parameters, it is capable of producing anything from broken glitch sounds to reverb-like washes of smeared grains.

\***Clk In** - Patching a trigger into the clock input will trigger a burst of grains (if 'Burst' is set to ON).

### Parameters

#### **Time**

Sets the length of the delay buffer in ms. (Ranges from 50-999ms).

#### **Spray**

Sets the amount of random time offset for each grain.

#### **Density**

Sets the number of grains.

#### **Size**

Sets the size of the grains.

#### **Variance**

Randomly varies the size of the grains.

#### **Mode**

Sets the mode to either mono or stereo.

#### **Shape**

Sets the envelope shape of the grains.

#### **Recycle**

When enabled all grains are added to the feedback path (for a more diffused sound). Otherwise just a single tap is used for the feedback.

#### **Feedback**

Sets the amount of feedback into the delay buffer.

### ***High Cut***

Sets the cut off frequency of a low pass filter in the delay line.

### ***Low Cut***

Sets the cut off frequency of a high pass filter in the delay line.

### ***Burst***

Enables a burst of grains triggered by the 'Clk' input.

### ***TIPS:***

1. This granular delay can get very crazy, very fast - fine tuning a combination of the Spray, Density and Size parameters is key to taming this powerful effect.
2. Try controlling the Time parameter with a random CV for unusual pitch shifting effects and timing variation.

## Ursa Minor Echoverb

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*Stereo In → Stereo Out*

The 'Ursa Minor Echoverb' is a complex, wide ranging multi-tap delay heavily based on a rack unit of a similar name. It is configurable as either a reverb or an echo and includes 20 different programs (time arrangements for the 8 delay taps). From long ethereal reverbs to complex resonant comb filtering, this program offers a unique take on reverb and delay.

### Parameters

#### **Mode**

Selects between 'reverb' or 'echo' modes.

#### **Time**

Sets the length of the delay buffer.  
Only applies to the 'echo' mode.  
(Ranges from 0-254ms).

#### **Program**

Selects one of 20 different time arrangements for the 8 delay taps (4-L and 4-R).

#### **Feedback**

Sets the amount of feedback into the delay buffer.

#### **High Cut**

Sets the cut off frequency of a low pass filter in the delay line.

#### **Low Cut**

Sets the cut off frequency of a high pass filter in the delay line.

#### **Tap Level 1**

Sets the level of the first tap panned left and the first tap panned right.

#### **Tap Level 2**

Sets the level of the second tap panned left and the second tap panned right.

#### **Tap Level 3**

Sets the level of the third tap panned left and the third tap panned right.

#### **Tap Level 4**

Sets the level of the fourth tap panned left and the fourth tap panned right.

***TIPS:***

1. Make sure not to overlook the four Tap Level parameters which serve the important purpose of controlling the mix between the 8 taps.
2. There are loads of sounds to discover, don't forget to try out the many tap arrangements available in both the reverb and echo modes!
3. With a deep program like this, patching manual voltage offsets to the CV inputs and assigning them to one or more key parameters offers quick hands on control and simultaneous parameter adjustments.



## Pocket PL8 Reverb

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*Mono In → Mono or Stereo Out*

The 'Pocket PL8 Reverb' offers all the magic of a massive aluminium plate whilst remaining small enough to fit in your pocket. It is based on early digital reverb algorithms with a dense metallic sound.

\***Clk In** - Patching a trigger into the clock input will gate the reverb tail (or re-freeze if freeze active).

### Parameters

#### **Size**

Sets the size/time of the reverb tail.

#### **Reverse**

'Reverses' the reverb tail.

#### **Tightness**

Simulates a tighter physical plate dampening the reverb.

#### **Freeze**

When enabled reverb tail decay is disabled and the reverb is 'frozen'. A trigger in the clock input will re-freeze.

#### **Pre-Delay**

Delays the onset of the reverb tail.  
(Ranges from 0-99ms).

#### **Stereo**

Widens the reverb to faux stereo via phase inversion. Includes settings for both mild and full widening.

#### **High Cut**

Sets the cut off frequency of a low pass filter on the reverb tail.

When set to 'off' the reverb is mono.

#### **Low Cut**

Sets the cut off frequency of a high pass filter on the reverb tail.

#### **TIPS:**

1. Try using the High and Low Cut parameters to emphasise different metallic qualities in the virtual plate.
2. Remember, a trigger sent to the Clk input will gate the reverb tail for unique dynamic and rhythmic effects!

## Almicon Reverb

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*Stereo In → Stereo Out*

The 'Almicon Reverb' is a program based on classic 80s high end studio style reverb algorithms. Great for bright small rooms and extending into vast synthetic spaces, the Almicon offers a lush, polished reverb with a classic sound.

### Parameters

#### **Size**

Sets the size/time of the reverb tail.

#### **Damping**

Darkens the reverb tail, both shortening its length and reducing high frequencies.

#### **Diffusion**

Reduces or increases the uniformity of the reverb tail, causing reflections to appear more distinct or thicker.

#### **Pre-Delay**

Delays the onset of the reverb tail.  
(Ranges from 0-99ms).

#### **Era**

Toggles the 'quality' of the underlying reverb algorithm. '80s' uses a lower bit depth with a more grainy sound and poor resilience to clipping. 'NOW' has a much higher resolution and improved saturation.

### **TIPS:**

1. Keep in mind that the Damping and Diffusion parameters also affect the perceived size and depth of the reverb tail.
2. Under CV control, Diffusion can be used to create swells and throws by quickly altering how much the input signal excites the reverb.

## Quaidra Reverb

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*Stereo In → Stereo Out*

The 'Quaidra Reverb' is a 90s style reverb with a simple, musical set of parameters. It excels at unnaturally large and airy spaces, producing a rich atmosphere from any sound sent through it.

### **Parameters**

#### **Size**

Sets the size/time of the reverb tail.

#### **Damping**

Darkens the reverb tail, both shortening its length and reducing high frequencies.

#### **Low Cut**

Sets the cut off frequency of a high pass filter on the reverb tail.

#### **Era**

Toggles the 'quality' of the underlying reverb algorithm. '90s' uses a lower bit depth with a more grainy sound and poor resilience to clipping. 'NOW' has a much higher resolution and improved saturation.

### **TIPS:**

1. Try setting Size around 90-100% and Damping to 0% for massive infinite reverb trails.
2. The Low Cut parameter sits within the feedback path, meaning its setting will multiply over time as the reverb decays.

## Yetti Reverb

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*Stereo In → Stereo Out*

The 'Yetti Reverb' is a feedback delay network based reverb fused with a 4 octave pitch shifter. It can produce a variety of crystalline spatial effects and other worldly shimmering reverbs ranging from subtle to extreme.

### **Parameters**

#### **Size**

Sets the size/time of the reverb tail.

#### **Damping**

Darkens the reverb tail, both shortening its length and reducing high frequencies.

#### **Pre-Delay**

Delays the onset of the reverb tail.  
(Ranges from 0-100ms).

#### **Pitch Shift**

Shifts the pitch of the reverb, interacting with both the size and damping to create a rising or falling tail.

#### **High Cut**

Sets the cut off frequency of a low pass filter after the reverb tail.

#### **Low Cut**

Sets the cut off frequency of a high pass filter after the reverb tail.

### **TIPS:**

1. A minor 0.01-0.03x increase or decrease in the pitch shift setting results in slightly ascending or descending reverb tails.
2. Try setting the pitch shifter to P5-, M3-, m3-, P5+, etc. for other worldly reverb tails that remain in tune with pitched input sources.

## Slinky Reverb

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*Mono In → Mono or Stereo Out*

The 'Slinky Reverb' is loosely modelled on a spring type reverb, where an audio signal is passed through coiled metal springs, creating a distinctive 'boingy' and dubby-style reverb tail.

### ***Parameters***

#### ***Length***

Sets the length of the spring and therefore the overall size of the reverb. High values reach more into echo territory.

#### ***Damping***

Sets the amount of feedback into the spring. Lower values equal longer, more resonant decays.

#### ***Brightness***

Changes timbre of the spring sound.

#### ***Wide***

Adds a stereo widening effect to the reverb.

#### ***TIP:***

Try setting length towards maximum to reach into dub style echo territory.

## TH-30 Distortion

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*Stereo In → Stereo Out*

The 'TH-30 Distortion' is a versatile distortion program with a collection of different distortion types ranging from analog style saturation to intense digital wavefolding. A built-in wide ranging tilt filter allows for emphasis of the high or low frequency content of the distortion.

### Parameters

#### Type

Sets type of distortion.

- *Soft* - Analog style soft clipping.  
Rounds transients.
- *Saturate* - clipping with compressed harmonics.
- *Overdrive* - clipped signal introduces harsher harmonics.
- *Digital* - Digital hard clipping, squares off transients.
- *Wavefold* - The digital wavefolder from the Tyso Daiko.
- *Nuclear* - Maximum clipping!  
Squares off ALL incoming transients
- *Warm* - Tube style distortion.

#### Drive

Sets the amount of drive.

#### Tilt Filter

Tilt style filter EQ applied to the distorted signal, emphasising either high or low frequencies.

#### Output Gain

Reduces the final output of the distorted signal.

#### TIP:

Try using more subtle drive settings with a light bass or treble boost from the tilt filter to excite synth voices, drums or even full stereo mixes.

## TY-50 Dynamics

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*Stereo In → Stereo Out*

The 'TY-50 Dynamics' is a multi mode dynamics processor featuring both classic compression and transient shaping modes. The flexible stereo compressor mode includes wide ranging attack and release times that make it great for adding punch, smoothing transients or as a clean mix bus compressor. The 'Transient Shaper' mode offers a different flavour of dynamics processing, utilising rate of change to detect transients, then reshape them via attack and release envelope controls. The TY-50 can range from super subtle to extremely intense, working great to shape the dynamics any source material patched through it.

### Parameters

#### Mode

Sets the dynamics processing mode. Depending on the selection, the output can be mono or stereo.

- *Stereo Compressor* - Stereo in to stereo out.
- *Sidechain in R* - Mono compression using the left in and out. The right input is repurposed as an external sidechain input.
- *Transient Shaper* - Stereo in to stereo out.

#### Attack

In compression mode it sets the time it takes for the signal's gain to be fully reduced after crossing the threshold.

In shaper mode it will shorten or lessen attack transients of the incoming signal.

#### Release

In compression mode it sets the time it takes for the signal to return to its original level after being reduced (compressed).

In shaper mode it will shorten or lessen release transients of the incoming signal.

#### Make Up Gain

Sets the final output gain of the compressed or shaped signal.

***Compression mode only params***

***Threshold***

Sets the amplitude at which the compressor begins to take effect.

***Ratio***

Sets the amount of gain reduction applied to the incoming signal when it crosses the threshold.

***Meters***

*GR* - Displays the amount of gain reduction applied to the incoming signal.

*OP* - Displays the output gain of the compressor.

*\*Clk In* - Patching a trigger into the clock input will 'duck' the compressor.

*Roughly approximating stereo side chaining with a kick drum.*

***Compression mode only params***

***Tilt Filter***

Tilt style EQ filter that sets the region of frequencies detected by the envelope followers.

***TIP:***

It is common to bypass compressors frequently when adjusting settings to quickly compare levels between the original and compressed versions. (To engage Bypass hold the back button + press the program knob).



## 2051 Bit Corrupter

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*Mono or Stereo In → Mono or Stereo Out*

The '2051 Bit Corrupter' is a real-time audio buffer designed to imitate malfunctioning digital audio equipment. A large range of low res, rhythmic stuttering and glitch effects can be created with this one of a kind program.

### Parameters

#### **Mode**

Sets the I/O mode.

- *Mono* - Mono in to Mono out (Max buffer size 1000ms).
- *Stereo* - Stereo in to stereo out with the same random seed on both sides. (Max buffer size 500ms).
- *Dual* - Stereo in to stereo out with different random seeds per side. (Max buffer size 500ms).

#### **Bit Depth**

Sets the bit depth of the dry signal.

#### **Sample Rate**

Sets the sample rate of the dry signal.

#### **Clock**

Sets if the buffer size is based on internal 'INT' or external 'EXT' clock.

#### **Clock Mult**

Sets the buffer length as a multiple of the incoming pulse when 'clock' is set to external.

#### **Buffer Size**

Sets the size of the buffer in ms when 'clock' is set to internal. Ranges from 1-1000ms (Mono) and 1-500ms (Stereo and Dual modes).

#### **Max Repeats**

Maximum number of repeats that may occur with every glitch. (Up to 10).

#### **Repeat Risk**

Random variation to the amount of repeats. (+/- 10 repeats).

#### **Glitch Risk**

The chance that a glitch will occur.

***Lock In***

Loops playback of the buffer (even if there is no audio in it).

***Reverse***

Reverses playback of the buffer.

***Mix Type***

- *PRE* - Applies the Bit Depth and Sample Rate reduction pre-mix, to both the dry and wet signals.
- *PST* - Applies the Bit Depth and Sample Rate reduction post-mix, to the wet signal only.

***TIPS:***

1. With an external clock patched, try assigning CV to the Clock Mult parameter to create clock synced fluctuations in buffer size (glitch time).
2. For basic Bit Depth and Sample Rate reduction, set the Mix Type to BIT and Mix to 0%. In this mode the two parameters still have an effect on the input source without adding any glitch effects.
3. Try assigning CV to the Lock In or Reverse parameters to control looping or reverse effects manually with an offset or push button module.

# Modulating Panner

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*Mono or Stereo In → Mono or Stereo Out*

The 'Modulating Panner' is a clock-syncable mono or stereo auto-pan with a scan mode that cross fades between 2 input signals. It has a range of uses from adding slow stereo motion to clock-synced rhythmic panning as well as filtering signals with the built-in resonant multimode filter.

## Parameters

### Mode

Sets the mode. Depending on the selection, the I/O can be mono or stereo.

- *Mono* - Pans the left input between the left and right outputs.
- *Stereo* - Pans the left and right inputs between the left and right outputs equally and opposite of one another.
- *Scan* - Cross fades between the left and right inputs, outputting the mix in mono.

### Offset

Offsets the signal towards the left or right side.

### Slope

Shapes the panning movement across the ears.

### Mod Clock

Sets if the modulation rate is based on internal 'INT' or external 'EXT' clock.

### Mod Depth

Sets the maximum width of the panning modulation.

### Mod Rate

Sets rate of modulation in Hz when 'clock' is set to internal. (Ranges from 0.05-8Hz).

### Filter Mode

Selects the filter type, from no filtering to low pass, high pass, or band pass.

### Cutoff

Sets the cutoff of the filter. (Ranges from 20-20kHz).

### Resonance

Sets the amount of filter resonance.

## Ring + Freq Modulator

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*Mono or Stereo In → Mono or Stereo Out*

The 'Ring + Freq Modulator' is a pair of classic modulation effects - ring modulation and frequency shifting - tailored towards otherworldly and dissonant sounds. Both the Ring Mod and Frequency Shifter operate in true stereo, offering more flexibility than traditional analog circuits.

### Parameters

#### **Mode**

Sets the mode to either ring modulation or frequency shifter.

#### **Modulator (Ring Mod)**

Selects between either the internal modulation oscillator (INT) or external source (LxR).

LxR mode expects the carrier signal at the left input and modulator at the right, outputting the result in mono.

#### **Osc Rate (Ring Mod)**

Sets the rate in Hz of the internal modulation oscillator. (Ranges from 20Hz-11kHz).

#### **Shift (Freq Shifter)**

Changes the frequency of the incoming signal in Hz. (Ranges from 0Hz-1kHz).

#### **High Cut (Freq Shifter)**

Sets the cut off frequency of a low pass filter on the wet signal.

#### **Env Follow (Freq Shifter)**

Enables envelope following to control the dynamics of the frequency shifted signal.

### TIPS:

1. Try patching all kinds of sources through the ring mod and frequency shifter. Samples of acoustic sounds and voices can sound particularly interesting.
2. For less dissonant oscillator ring mod, duplicate the pitch CV from your VCO and assign it to control the internal Osc Rate parameter.

## Ensembles Ensemble

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*Mono In → Mono or Stereo Out*

The 'Ensembles Ensemble' is a diverse collection of chorus and ensemble effects based on circuits from the 70s and 80s. It includes many modes inspired by the on-board choruses found in synthesisers like the Juno-60 and Solina. A built in digital pitch shifter takes the effect beyond traditional chorus circuits.

### Parameters

#### Mode

Selects the chorus or ensemble mode. Modes are as follows:

- *Juno I*
- *Juno II*
- *Juno II + I*
- *Alpha*
- *RS I*
- *RS II*
- *Solina (mono)*
- *Wide*
- *Wide II*
- *Vibrato*
- *Rotary*

#### Depth

Sets the depth of modulation.

#### Pitch Shift

Shifts the pitch of the incoming signal without affecting its time.

#### Mod Rate

Sets the modulation speed (visible if supported by the mode).

#### TIPS:

1. For wobbly pitch vibrato effects, set Mix to 100%.
2. Try patching drums through the ensemble and pitch shifter for a splashy and more relaxed sound.

## Multi Phaser

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*Mono or Stereo In → Mono or Stereo Out*

The 'Multi Phaser' is a rich phase shifting effect great for creating slow subtle timbral changes, swirling motion, or thick doubled sounds. Control over the number of notch filters as well as their shape and the speed of modulation makes it easy to create various classic phasing and flanging effects.

### Parameters

#### Depth

Sets how pronounced the notches are (depth of the phasing effect).

#### Mod Rate

Sets the modulation rate of the phasing.

#### Feedback

Sets the amount of feedback, narrowing the shape of the notches as it is increased.

#### Stages

Sets the number of notches ranging from 2-8 (mono) or 2-4 (stereo).

#### Mode

Sets the mode. Depending on the selection, the I/O can be mono or stereo.

- *Mono* - Mono in to mono out, up to 8 stages.
- *Stereo* - Stereo in to stereo out with up to 4 stages.
- *Infinite Up* - Mono upward 'barber-pole' modulation, up to 4 stages.
- *Infinite Down* - Mono downward 'barber-pole' modulation, up to 4 stages.

#### Spread

Sets the width of the stereo image. Only applies to stereo mode.

### TIPS:

1. Try assigning an external CV of your choice to control the Depth parameter for more complex movement or random changes.
2. A high Feedback setting with slow Mod Rate will result in more of a resonant flanger style effect.

# Squoal Rezonator

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*Mono or Stereo In → Mono or Stereo Out*

The 'Squoal Rezonator' is a Dual-mode (8 band mono or 4 band true-stereo) resonator built from a collection of linked resonant band pass filters. Controls let you define a base frequency and a fixed ratio between all of the active bands. Additionally, the unique 'Reflect' parameter allows a maximum band frequency to be set, creating contra-moving bands as the filters hit the frequency limits.

## Parameters

### **Base Freq**

Sets the frequency of the lowest bandpass filter. Shifts all bands together with regards to the Ratio setting.

### **Ratio**

Sets the ratio between each filter's frequency in relation to the previous band.

### **Resonance**

Sets the amount of resonance for all of the active bands.

### **Num Active**

Sets the number of bands ranging from 1-8 (mono) or 1-4 (stereo).

### **Reflects**

Enables reflecting of any bands that cross the Max Frequency threshold.

### **Max Frequency**

Sets the maximum frequency that bands can reach before being reflected.

### **Mode**

- *Mono* - Mono in to mono out with up to 8 parallel filters.
- *Stereo* - Stereo in to stereo out with up to 4 parallel filters per side.

### **Stereo**

Shifts the frequency of the bands on the right and left up and down respectively to create width. Only available in Stereo mode.

## **TIPS:**

1. Try assigning an external CV of your choice to control the Base Freq and Ratio parameters to design custom modulation and sweeping effects.

## Utilities

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*Stereo In → Stereo Out*

A basic utility program for tuning sources, viewing the incoming waveform and displaying the current firmware version.

### Pages

#### ***Tuner***

Displays both the frequency in Hz and pitch (note and cents) of the incoming audio.

#### ***Test Tone***

A fixed sine wave oscillator switchable from 'Off' to a 440Hz A or 261.6Hz C note.

#### ***Scope***

Displays a basic rendering of the incoming waveform. Time can be adjusted by clicking and turning the encoder.

#### ***Analyser***

A simple spectrum analyser which shows incoming signal frequency levels on a logarithmic scale to 5Khz.

#### ***Clock Meter***

Detects the BPM, counts the number of pulses and displays the pulse width of a clock signal patched to the 'Clk' input.

Clicking the encoder resets the counter.

#### ***Wet/Dry Mix***

Disables the 'Mix' parameter globally.

Selecting 'NO' locks the mix to 100% wet across all effects programs for use in a mixer's send and return.

#### ***FW Version***

Displays the currently installed firmware version.



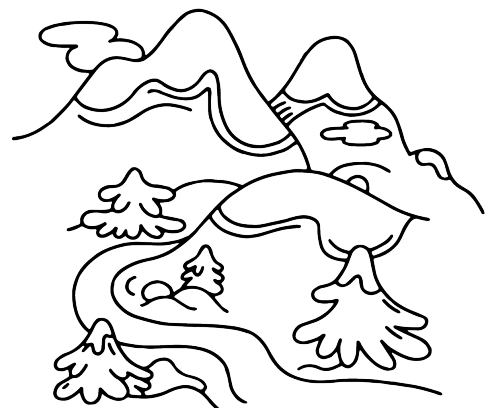
# Limited Warranty

From the date of manufacture this device is guaranteed for a period of 2 years against any manufacturing or material defects. Any such defects will be repaired or replaced at the discretion of ALM. This does not apply to;

- Physical damage arising from mistreatment (i.e. dropping, submerging etc).
- Damage caused by incorrect power connections.
- Overexposure to heat or direct sunlight.
- Damage caused by inappropriate or mis-use.
- Use of incorrect or non official firmware

No responsibility is implied or accepted for harm to person or apparatus caused through operation of this product.

By using this product you agree to these terms.



# Support

For the latest news, additional info, downloads and firmware updates please visit the ALM website at <http://busycircuits.com> and follow @busycircuits on twitter and instagram.

Questions? email [help@busycircuits.com](mailto:help@busycircuits.com) .

# APPENDIX

## I. Factory Reset

Powering up the MFX with the Encoder knob held down will initiate a 'factory reset' - resetting and clearing all saved values and user presets. Factory presets remain.

When initiated, keep the encoder held down until the progress graph animation completes and usual startup animation is shown.

## II. Firmware Updates

Remove the MFX from power. Locate the USB C port at the right side of the PCB just below the program knob. Using a standard USB C cable, connect the module directly to a computer. The MFX will power on displaying 'USB Disk Update Mode' on screen and appear as a standard removable storage device on your computer.

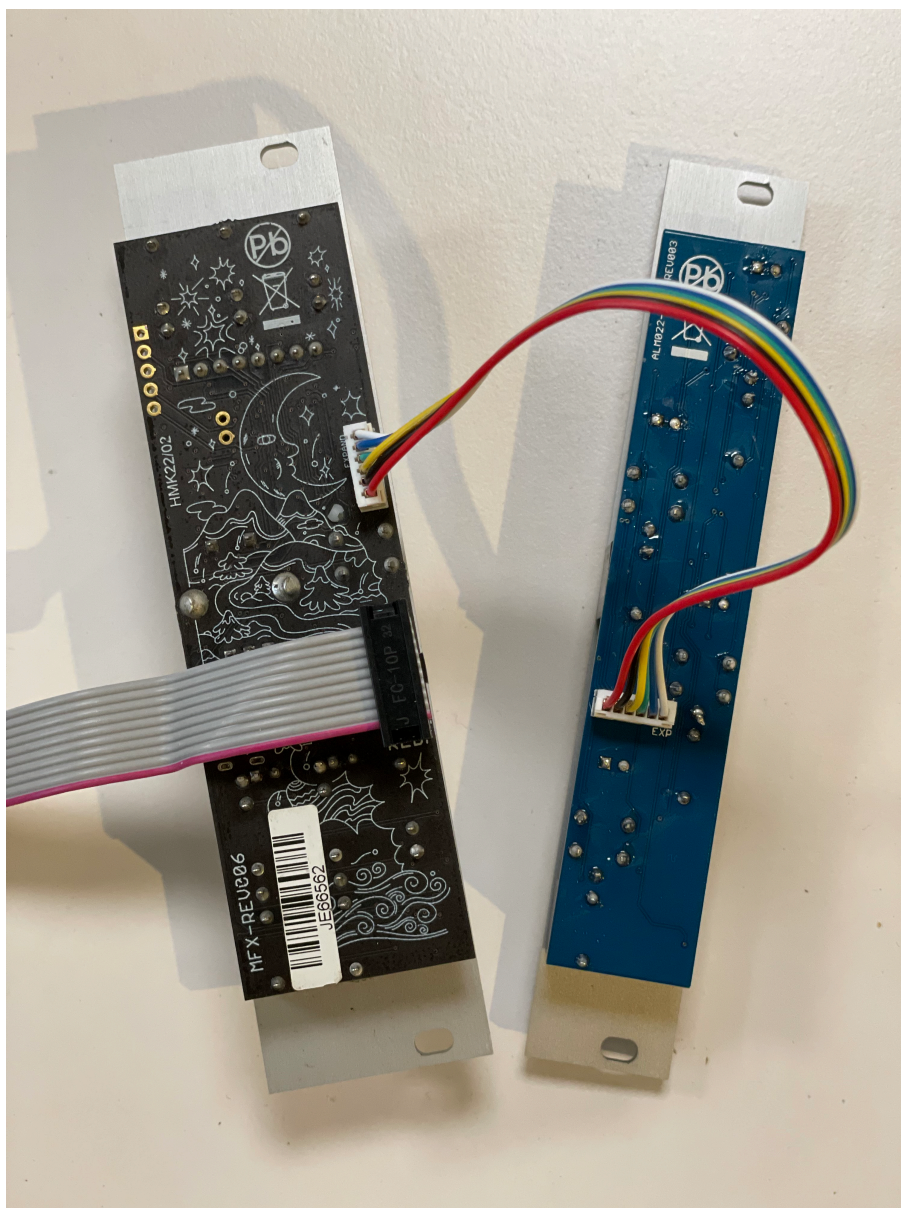
Copy a valid firmware file to the root directory of the MFX to update. After the copy has completed, MFX will automatically disconnect and display 'Update Complete' on screen. Carefully remove the usb cable from the MFX as not to damage it. Your MFX should then be updated and ready to use.

Please use only official firmware files when made available from the [BusyCircuits website](#).

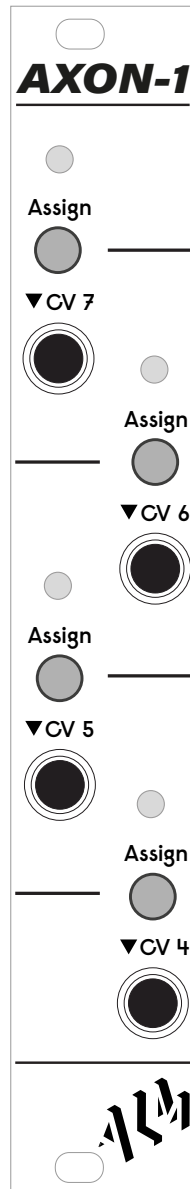
### III. The 'AXON' Expanders

The 'AXON-1' and 'AXON-2' are optional expander modules available for use with the MFX, Squid Sample and Pamela's PRO Workout. They extend MFX's functionality, by adding 4 extra CV inputs (AXON-1) or 4 extra CV inputs with additional offset controls and 2 buttons (AXON-2).

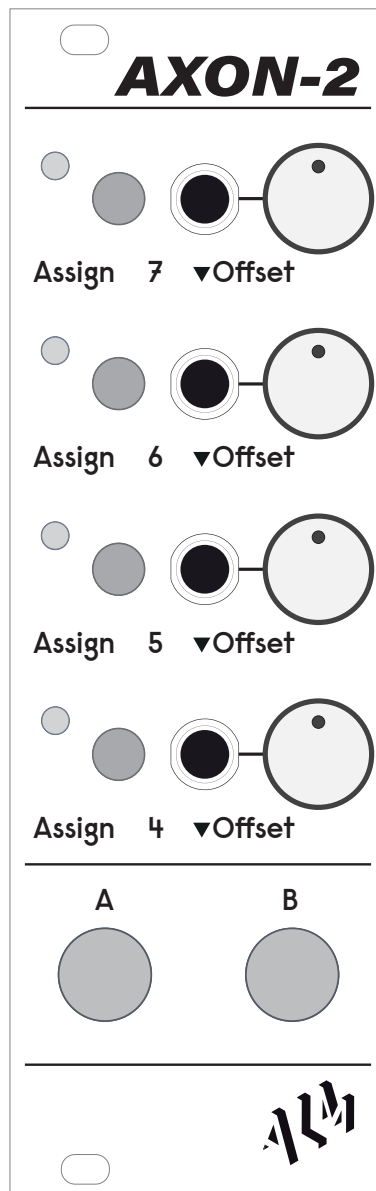
Only a single connected AXON (1 or 2) is supported, it plugs into the small 6 pin header on the back of the MFX via the supplied keyed cable, connect before powering the MFX. Firmware v105 or later is required for AXON-2 support.



*Axon-1*



4HP module provides MFX with 4 additional freely assignable CV inputs. CV is assigned directly from the buttons or from the on-screen list alongside the 3 built in CV inputs. Per assignment digital attenuation and offset is accessed by long pressing the program encoder with the selected CV highlighted.

*Axon-2*

8HP module provides MFX with 4 extra CV inputs like the AXON-1 but with additional offset controls and 2 buttons.

Each of the 4 CV inputs includes an offset for hands on control over parameters assigned to CV. Per assignment digital attenuation and offset is also available and accessed by long pressing the program encoder with the selected CV highlighted.

## ALM-Ø32 - 'MFX'

*The AXON-2's large buttons are mapped to the following functions:*

### ***Button A - Bypass***

Engages / disengages master bypass of the effect.

### ***Button B - Tap Tempo***

Sets a clocked effect engine's BPM via at least 2 subsequent taps of the button.  
Clock must be set to 'EXT' for tap tempo to function.

## IV. Factory Presets

### Digi-PCM Echo

PRESET	DESCRIPTION
Short Delay	Short 100ms flutter echo.
Medium Delay	Basic medium 350ms delay.
Long Delay	Basic long 750ms delay.
Pong	Classic L/R ping pong echo for rhythmic widening.
Broken Taps	Lo-res 8 bit dual tap echo.
Drum Resonator	Comb filter style stereo resonators suited for percussion.
Tube Flange	Negative feedback flanging with a tubular sound.
Reverser	Realtime reverse playback with no repeats.
Wide Shadows	Warm and noisy true stereo delay.
Far Far Away	Long, 12 bit delay with thinning repeats.
Stereo Alias	Wide, warm aliasing stereo slapback.
Old Friends	Drawn out low bandwidth responses.

### Tape-Tech Echo

PRESET	DESCRIPTION
Short Tape Delay	Short and warm echo.
Long Tape Delay	Straight forward tape delay.
Way Back Machine	Short tape echo with a lightly descending pitch
Tired Tape	Warm and fuzzy tape echo with lightly descending pitch.
5th Response	Pitch shifting delay with repeats that ascend in fifths.
Pitch Shifter	Real-time octave up pitch shifting with no echo.
Flutter Echo	Fast fluttering echoes.
Comet Trails	Pitch shifting delay with sparkly ascending feedback.
Reel Delay	Vintage tape echo with a slight pitch drift.
Cassette 1	Echo from a 3 head cassette deck running at 15/16 ips.
Cassette 2	Echo from a 3 head cassette deck running at 1-7/8 ips.



## Crumbular Echo

PRESET	DESCRIPTION
Long Echo	Basic drawn out granular echo.
Short Echo	Short granular echo.
Crumbuverb	Stereo granular reverb.
Soggy Whirls	Fluttering medium grain delay with long feedback.
Untidy Kitchen	Scattering echoes with a reverb-like quality.
Mogs Breath	Fast gritty stereo scatter.
Emotion Injection	Instant synth emotion (via Mumdance)
Cascading Binary	Best used on very short percussive sounds (via Mumdance)

## Ursa Minor Echoverb

PRESET	DESCRIPTION
Hall	Basic hall reverb.
Slapback	Basic slapback echo.
Springy	Tonal, full bodied metallic resonator.
Landscape	Wide, impressionistic background echoes.
Diffuser	Small space ambience and smear.
Particles	Fast and restrained stereo trills.
Infinite	Floating supernatural reverb.
Scatter	Diffused delayed reverb.
Little Star	Busy metallic flutter echo.

## Pocket PL8 Reverb

PRESET	DESCRIPTION
Hall	Basic hall reverb.
Room	Basic room reverb.
Barrel	Reverb from inside a metal barrel.
Splash	Airy extended reverb.
Vintage	Solid vintage stereo plate reverb.
Dense Metal	A heavy resonating metallic body.

## Almicon Reverb

PRESET	DESCRIPTION
Hall	Basic hall reverb.
Room	Basic room reverb.
Dark Dream	Heavy reverb with a darkening tail.
Workshop	Full bodied medium sized room reverb.
Blurry	Smeary small room ambience.
Galleria	Massive, sprawling reflective space.
Mosaic	Medium sized room with tile surfaces.

## Quaidra Reverb

PRESET	DESCRIPTION
Hall	Basic hall reverb.
Room	Basic room reverb.
Back Scatter	Fluttering background atmosphere.
Underpass	Desolate concrete reflections.
Cirrus	Wispy and bright synthetic reverb.
Silo Psiega	Carefully selected ambience.
Outer Core	Dark reverb extending below the surface.

## Yetti Reverb

PRESET	DESCRIPTION
Hall	Basic hall reverb.
Room	Basic room reverb.
5th Bounce	Delayed, smeared copies of the source shifted up by a 5th.
Uplift	Lightly ascending medium reverb.
Bacta Tank	Dark, octave down tubular reverb that heals.
Rain Drops	Sparkly repeats shifted up 1 octave.
Mystery Crystal	Atonal crystalline reverb.
Gary Verb	Short metallic verb - good for alien percussion (via Mumdance)
Nigel Verb	Bright atmospheric Verb (via Mumdance)

## Slinky Reverb

PRESET	DESCRIPTION
Small Tank	Small size spring reverb tank emulation.
Large Tank	Large size spring reverb tank emulation.
Levitate	Washy, atmospheric and fluttering echoverb.
Bounce	Springy slapback echo with subtle repeats.
Dub Slinky	Dub style runaway slinky echo.
Reso Slinky	Small, highly resonant spring.
Chrome	Subtle metallic reflection layered with the dry sound.

## TH-30 Distortion

PRESET	DESCRIPTION
Saturator	Basic saturation.
Distort	Basic distortion.
DS-1	Boss DS-1 style distortion.
Sizzle	Scorched signal distortion.
Parallel Fuzz	50 / 50 mix of the dry signal and the squared off nuclear version.
Radio Static	Dynamically responsive spectral noise.
Harmonic Hi-Pass	Crunchy, saturated high pass filtering.
Dad Acid	Computer controlled bass companion.
Tyso Crush	Intense noisy wavefolding.
Half Stack	Heavy valve amp overdrive.
Combo Amp	Bright boxy saturation.

## TY-50 Dynamics

PRESET	DESCRIPTION
Compressor 101	Basic starter compression.
Kick Sidechain	Standard sidechain compression for percussion.
Subtle Bus	Light compression for polishing a stereo mix.
Tighten	Heavy compression for adding glue and punch.
Transient Eater	Heavy compression for squashing transients.
Clicky	Sharp compression for emphasising transients.
Parallel Comp	50 / 50 mix of the dry signal and an over-compressed version.
Sharpen	Clarifies and sharpens transients. (Transient Shaper)
Short & Sharp	Shortens transients, emphasising attack. (Transient Shaper)
Smear	Subtle rounding and lengthening of transients. (Transient Shaper)
Blown Out	Adds punch and crunch. (Transient Shaper)

## 2051 Bit Corrupter

PRESET	DESCRIPTION
Basic Repeat	Basic spontaneous stereo skips.
Quality Reduce	Basic quality reduction.
Dual Reverse	Glitched reverser with high risk.
Connection Error	Sputtering data transfer sounds.
Beat Repeat	Quick glitchy repeats at the end of every bar.
Wavetable Generator	Generates a real-time wavetable version of the input. Buffer size sets pitch.
Random Reversal	Randomly reverses segments of the audio.
Steady Skip	Steady rhythmic glitching reminiscent of a skipping CD player.
Crossed Wires	Heavily crushed and slowly pulsing 4 bit sounds.
Nanobots	Robotic chatter - Works nicely over a short arp (via Mumdance)
Telepathic Modem	Lo-Fi Glitch Effect (via Mumdance)

## Modulating Panner

PRESET	DESCRIPTION
Subtle Widening	Fast medium width auto-pan for mono sources.
Wide Pendulum	Wide swaying slow auto-pan for mono sources.
Stereo Converge	Wide intersecting stereo pathways. *Only works with 2 inputs!
Subtle Scan	Auto mixes in a small amount of signal from the right input.
Autofade	Evenly auto-fades between the 2 inputs. Works best with droning sources.
Modulate Cutoff 01	Highpass Filter Panner, CV1 Modulates Cut off (via Mumdance)
Modulate Cutoff 02	Bandpass Filter Panner, CV1 Modulates Cut off (via Mumdance)

## Ring + Freq Modulator

PRESET	DESCRIPTION
2KHz Ring Mod	Ring mod, multiplies a mono or stereo input by the internal oscillator set to 2kHz.
Saturate	Subtle warmth and bright saturation.
Subtle Flutter	Quick stereo fluttering.
Maximum Shift	Frequency shifts the input up by 1kHz.
LxR Ring Mod	Ring mod, multiplies 2 external input sources by one another.

## Ensembles Ensemble

PRESET	DESCRIPTION
Seasick	Slow, pitch warping vibrato with a wide spread.
Supersaw Maker	Phasey mono chorus, suited for giving droning sources a thick, layered sound.
Swirly Strings	Wide and fast swirling ensemble suited for chords.
DCO Bass	Subtle thickening for Juno style bass.
Splash Shift	Splashy real-time octave up pitch shifting.
Future Past	Lo-res and wide real-time pitch lowering.

## Multi Phaser

PRESET	DESCRIPTION
Widen	Widens stereo image.
Double	Fast flange with a doubling effect.
Voice	Thick phasing with a vowel like characteristic.
Fast Flange	Flanging with fast modulation.
Detuned Oscs	Doubles an oscillator, imitating 2 detuned oscs.
Drum Smear	Adds splash to drums or fast warble to voices.
Robocop Phase	Serve the public trust, protect the innocent, uphold the law (via Mumdance)
Portal	Open up another dimension on synth lines (via Mumdance)

## Squoval Rezonator

PRESET	DESCRIPTION
Stereo BP	Basic stereo bandpass filtering.
Steep BP	Steep slope mono bandpass filtering.
Vocal Tract	Human voice formant filtering.
Perc Rezo	A resonant body designed for percussion.
PVC Pipe	Filtering from inside a PVC pipe.
LR Ping	A resonator pinged by triggers at the LR inputs.
Bell	A bell tone pinged by a trigger at the input.
Nose Block	Human nasal passage filtering.
In Awe	Another variant of formant filtering.
Stereo Phaser	A phaser like effect via a slow LFO to CV1.
Data Filter	Data sounds - a sweep through reflecting bands via a slow LFO to CV1.

## IV. VCV Rack Edition

'VCV Rack' is a free open source cross platform software based virtual modular synthesiser. A full featured software emulated version of the MFX Eurorack module is available for purchase for VCV via the VCV Rack store.

The VCV software MFX plugin runs the exact same core DSP and user interface code as the physical Eurorack module. It includes the 'AXON-1' CV expander and offers additional features such as support for multiple instances plus keyboard and mouse control shortcuts.

Original owners of the MFX Eurorack module are able to apply for a free license for the VCV module by sending a copy of their store purchased receipt to [help@busycircuits.com](mailto:help@busycircuits.com)

Please visit <https://library.vcvrack.com/ALM032/MFX> for more info and to purchase.



### Keyboard Controls:

The following keys can be used to control the MFX. (Note the mouse cursor must be hovering over the module to use them).

Key	Function
[	Left encoder turn
]	Right encoder turn
=	Encoder click
-	Back button click

### Context Menu Controls:

Accessed by right-clicking module, the context menu allows for quick and immediate access to any FX engine or parameter screen. Keyboard shortcuts may also be disabled by unchecking them in the menu.

Standard VCV menu functions such as initialise and bypass behave as expected. (Note the 'randomise' function is currently not implemented).

## ALM-Ø32 - 'MFX'

Right clicking the encoder opens a small context menu for assigning CVs 1-3 as well as access to the CV offset and attenuation settings (if opened when an existing CV assignment is displayed).

### ***AXON-1 Expander:***

The virtual 'AXON-1' expander adds 4 additional CV inputs to the MFX. Place an AXON-1 **directly at the right side** of an MFX to connect the 2 modules. (Note they will not connect if it is positioned elsewhere).

From a parameter page press any of the 4 AXON buttons to assign control via the associated CV input. CV may also be assigned by scrolling past the minimum parameter value on a page.

### ***Sample Rate:***

The MFX runs natively at a sample rate of 44.1kHz (the same as the hardware) or 48kHz as set globally by VCV. Downsampling at the inputs will occur with higher global sample rate settings.