Welcome to AUTOMATONSM: Making Music with Self-playing Machines

FOLLOW THESE SIMPLE STEPS TO GET STARTED:

1. When starting the AUTOMATONSM, you'll see a list of all current available modules to the right. Click the button to the left of the module you want to load and it will appear to the left in the parent window. The module list will then disappear. To call back the module list you can click the grey link in the upper left corner called "MODULES(esc)" or simply suppress 'esc' on your keyboard.

2. Create a BASIC-OSC from the module list.

3. Open the module list and create the module in the lower right corner called "MAESTRO(dac-)". This is the digital-to-analog converter and is one of the modules that passes on sound to your speakers. Now you can soon make a sound.

4. Pure Data has an EDIT MODE and a PERFORMANCE MODE. To make patch connections between objects, we need to be in EDIT MODE and to interact with the GUI, we need to be in PERFORMANCE MODE. Toggle between the two modes with cmd-e.

5. All inputs are at the top of the modules and all outputs are at the bottom. In EDIT MODE, connect the BASIC-OSC's output (O1) to the MAESTRO. Now, you should have sound. Switch to PERFORMANCE MODE and use the mouse to move the PITCH slider on the BASIC-OSC module.

6. Right-click on any module and choose HELP to read more about a module’s functions.

7. To save parameter states on each module, you have to save the pd file, like you normally would do from the FILE menu or cmd-s, and then click the grey SAVE! canvas in the left button corner (simply press ENTER on your keyboard) and you'll see the canvas change color from grey to green for a brief moment. All parameter values are now written to textfiles and can be loaded to the equivalent module and instance number next time the patch is loaded.

8. You can call modules without using the module list simply by creating a new object in pd and type the module's name. For the state saving mechanism to work properly you do need to give the module a unique numerical argument. Type 'basic-osc 1' for an oscillator and 'basic-osc 2' if you need another one. By using the MODULES list this unique numbering is done automatically for you. Use the RESET link in the upper left corner when starting a new patch as this will reset the counter of unique numbers for modules.

9. IMPORTANT!!! In order for Automaton to work properly, each patch needs to contain the correct folder structure. A folder—-that you can name freely—must contain the folder "patch.editor.abs" and the pd-file "main.pd". Copy the entire main parent folder to start a new project. Please do not add the restrictions to your PD search path, because the state saving system will be writing textfiles in your external folders.

ABOUT RESET BUTTON: Only use the RESET button when your canvas is empty. If you click it in the middle of a patch, modules will start getting identical state saving numbers to already existing modules. In other words, if you click it in the middle of a patch, state saving will NOT WORK! The RESET button is there for when you start over, and perhaps do not want to create "BASIC-OSC 95", but start from zero for a clearer view of the patch.
**SIGNAL-FLOW**

There are three types of signals in the patch editor: audio, CV and trigger/gate/pulse/clk. The latter are marked with MERA inputs and outlets. General rule in the patch editor is that all connections are possible. Or, at least, just like in any hardware modular system - all connections might not work but there’s no harm in trying. 😃 The patch editor uses color-coding to clarify the signal flow as much as possible.

- Purple sliders and inlets mean the slider will function as an attenuator for incoming CV.
- Green sliders and inlets tells you that the parameter is bi-polar, most often working as an attenuator for incoming CV.
- Pink input means the input is expecting a trigger/gate signal to function properly.

The state saving system works by writing parameter values to text files in the folder ‘stateSave’ inside the ‘patch_editor_abs’ folder. When you load a module form the module list it is automatically being given a unique creation argument which creates a text file unique for that instance of the module. To save your patch, simply save as you normally would from the FILE menu and the press ENTER on your keyboard or click the SAVE button in the upper left corner of the main window.

IMPORTANT!!! To start a new project, the entire folder structure needs to be copied since the abstractions and text files are unique to every project. Click the RESET button in the upper left corner to reset the counter that gives unique creation arguments for the modules.

**HELP-FILES**

Right click on individual modules and choose ‘HELP’ to access detailed help files on each modules inputs, outlets and functionalities.

**FEEDBACK-4-DSP-LOOPS**

Feedback patching is very much possible in the AUTOMATIONISM, just a little bit differently from physical modular systems. If you try to patch a module into itself any kind of feedback routing, Pure Data will become silent and you’ll get a “DSP loop detected” message in the PD window. To avoid this you need to delay the signal a tiny bit. Normal (send-) and (receive+) objects automatically does this in PD. Send the signal to be feedbacked into a [send-MyFeedback] and pick it up again [receive+MyFeedback] and then patch into the input to close the feedback loop. Obviously ‘MyFeedback’ could be anything and the abbreviation for send and receive (+) and (-) work equally as well.

**FOLDER-HIERARCHY**

Inside your project folder you’ll find a file called ‘main.pd’ and a folder called ‘patch_editor_abs’. The ‘main.pd’ must stay named the same for the PLAYGROUND to function properly. Also, each of your projects/patches needs to be in a separate folder with its own ‘main.pd’ and ‘patch_editor_abs’ folder. Copy & paste the project folder, which you can give any name, when you want to start a new project/patch.

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# Welcome to Automatonsim

## Modules

(New modules for Automatonsim v2.0 have GREEN buttons)

### Oscillators:
- AC1 BASIC-95C
- AC2 BASIC-ASC
- AC3 ANTIAL
- AC4 AMPHIL
- AC5 DNYCER
- AC6 ATX68
- AC7 CMOS
- AC8 LAMPER

### Sound Processors:
- SC1 LP-FILTER
- SC2 HP-FILTER
- SC3 BP-FILTER
- SC4 LP-FILTER
- SC5 LAMPER-FILTER

### Modulation:
- MD1 BASIC-LPD
- MD2 ADDER
- MD3 ATTACK-HOLD-RELEASE
- MD4 RANGER
- MD5 RANGER-VOL
- MD6 SAMPLE/HELD

### Effects:
- EF1 EFFECTS
- EF2 MEGA-SEQUENCER
- EF3 TRIGGER-SEQ
- EF4 GATE-SEQ

### Utilities:
- UT1 CLOCK
- UT2 CLAMP
- UT3 DIVIDER
- UT4 DIVIDER
- UT5 VC
- UT6 CV
- UT7 TRIGGER-DELAY
- UT8 TRIGGER-TRAIN
- UT9 INVERTER
- UT10 SCOPE
- UT11 VU
- UT12 PROBABILITY
- UT13 NOISE
- UT14 470K SWITCH
- UT15 1K8 SWITCH
- UT16 GATE FOLLONER
- UT17 PRESET-BUFFER

### Generators:
- GE1 VCA
- GE2 (16)-gate
- GE3 VCA
- GE4 RANGER
- GE5 RANGER-VOL
- GE6 SAMPLE/HELD
- GE7 TRIGGER-SEQ
- GE8 GATE-SEQ
- GE9 MEKA
- GE10 MEGA-SEQUENCER
- GE11 TRIGGER-SEQ
- GE12 GATE-SEQ

### Misc:
- DI1 MIDI-IN
- DI2 MIDI-OUT

### Orkester:
- OR1 ORCHESTRA
- OR2 DISKORCHESTRA
- OR3 SYNTHETIC-OVERDRIVE
- OR4 ADDER
- OR5 TRIGGER-DELAY

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This list includes various modules and components for Automatonsim v2.0, highlighting new features with GREEN buttons. Each section (oscillators, sound processors, modulation, effects, utilities, generators, miscellaneous, and orchestra) lists specific components and their functions.
BASIC-OSCILLATOR

The 'BASIC-OSC' module is a simple oscillator providing sine, triangle, saw and pulsewave with adjustable pulsewidth. The Basic Oscillator is crude and digital... it sounds best in lower registers but is low on the CPU. For less aliasing and digital artefacts use 'BML-OSC'.

CONTROLS:

PITCH - controls the pitch of the oscillator within the range of 0.375Hz - 12543Hz (full notes 0-127)

P-WIDTH - controls the width of the pulsewave

PMN - attenuator for incoming CV at the PMN input

FM - attenuator for incoming CV at the FM input.

WAVESELECTOR - switch between sine, triangle, saw and pulsewave

INPUTS:

PITCH - input for controlling the pitch with CV

PMN - input for controlling the pulsewidth of the pulsewave with CV

FM - frequency modulation input with onboard attenuator

OUTPUTS:

OUT - output
The 'BLO-OSC' module is a bandwidth-limited oscillator providing sine, triangle, saw and pulsewave. A wave-shaper circuit adds harmonics to the sine and triangle, produces a detuned supersaw and pulse-width modulation.

**CONTROLS:**

- **PITCH**: controls the pitch of the oscillator within the range of 8.12Hz to 12543Hz (sine: notes 0-127)
- **WSHAPE**: controls sine & triangle harmonics, saw detuning and pulse-width
- **CV**: attenuator for incoming CV at WSHAPE input
- **FM**: attenuator for incoming CV at the FM input
- **WAVESELECTOR**: switch between sine, triangle, saw and pulsewave

**INPUTS:**

- **PITCH**: input for controlling the pitch with CV
- **WSHAPE**: input for controlling the WSHAPE parameter with CV
- **FM**: frequency modulation input with onboard attenuator

**OUTPUTS:**

- **OUT**: output
WAVETABLE-OSCILLATOR:

The 'stable' module is a three dimensional wavetable oscillator. Scan, morph and crossfade 16 wavetables with X, Y & Z.

CONTROLS:

PITCH - controls the pitch of the oscillator within the range of 0.1754Hz - 12540Hz (mid F notes 0-127)
X - morph between three tables
Y - morph between banks of tables
Z - morph between
FM - attenuator for incoming CV at the FM input.

INPUTS:

PITCH - input for controlling the pitch with CV
X - input for cv-control over the X-axis
Y - input for cv-control over the Y-axis
Z - input for cv-control over the Z-axis
FM - frequency modulation input with onboard attenuator

OUTPUTS:

OUT - output
The 'karplus' module is an adaptation of the karplus strong algorithm that models the sound of resonating strings. The module does not produce constant sound like other oscillators but needs a trigger/gate/pulse signal at the EXC input to trigger an internal envelope and make a sound. White noise is used to trigger a short impulse/burst to trigger the resonator. You can remove the white noise by patching any sound signal into the EXC input and use that as the exciter sound source instead. KARPLUS is actually four independent resonators, which are distributed to left and right outputs to produce a stereo polyphonic feel.

**CONTROLS:**

PITCH - controls the pitch of the resonating strings.

CONTOUR - control the envelope shape of the noise exciter

DAMP - damp the strings

RESONATE - controls the decay length of the resonator.

COLOR - a simple lowpass filter on the output

**INPUTS:**

EXC - trigger/gate input to trigger the resonator

EXT. EX - remove the normalization of white noise and use this external source for excitation instead.

PITCH - input for controlling the pitch with CV

CNTR - input for controlling the CONTOUR parameter with CV.

DAMP - input for controlling the DAMP parameter with CV.

CLR - input for controlling the COLOR parameter with CV.

**OUTPUTS:**

MONO - output

LEFT - left output

RIGHT - right output
**2-OPERATOR-FM:**

The 2OP-FM module is a 2 operator phase modulation oscillator. Manual + voltage control over ratio and index.

**CONTROLs:**

- **CARRIER** - controls the pitch of carrier
- **RATIO** - controls the phase modulation ratio.
- **INDEX** - controls the phase modulation index.

**CV1(RATIO)** - attenuator for incoming CV at the CV1 input

**CV2(INDEX)** - attenuator for incoming CV at the CV2 input

**INPUTs:**

- **CARRIER** - input for controlling the carrier pitch
- **CV1** - cv input for the RATIO control
- **CV2** - cv input for the INDEX control

**OUTPUTs:**

- **OUT** - output
TRIGONS:
The "TRIGONS" module is an oscillator with rough edges and sharp triangular spikes. Crossfade between triangular and sawtooth and use an aggressive waveshaper to add harmonics.

CONTROLS:
PITCH - controls the pitch of the oscillator
WAVE - crossfade between triangle wave and sawtooth
HARM. - add harmonics and waveshaping
FM - attenuator for incoming CV at the FM input.

INPUTS:
PITCH - input for controlling the pitch with CV
WAVE - input for CV-control over the WAVE control
HARM. - input for CV-control over the HARM. control
FM - frequency modulation input with onboard attenuator

OUTPUTS:
OUT - output
The TRIAD oscillator is a polyphonic chord module. A trigger/gate at the TRIG input will trigger an internal attack-release envelope and produce a three-note-chord at the output. The core of the module is dual, meaning that the first chord will keep ringing when the next is fired. The chord can be adjusted with the ROOT, INT1 and INT2 sliders. Quantization scale and transpositions are selectable at the bottom of the module.

**CONTROLS:**
- **ROOT:** select the pitch of the root
- **INT1:** select the pitch interval 1
- **INT2:** select the pitch interval 2
- **TUNE:** control for slight detuning of the chord
- **ATTACK:** attack time of the internal envelope
- **RELEASE:** release time of the internal envelope
- **SCALE:** select scale
- **XPOSE:** transpose the chord -12 to +12 semitones

**WAVESELECTOR:** select sawtooth, squarewave or alternate between saw and square

**INPUTS:**
- **TRIG:** trigger the envelope and the chord
- **ROOT:** cv input for the ROOT
- **INT1:** cv input for INT1
- **INT2:** cv input for INT2
- **XPOSE:** cv input for the XPOSE control

**OUTPUTS:**
- **TRIGGERED:** outputs the chord shaped by the internal envelope
- **CONSTANT:** outputs the chord constantly bypassing the envelope
- **E6:** outputs the envelope to use as a modulation source elsewhere in the system
The PD-303 is an acid synthesizer in the style of the TB-303. It has a 16 step sequencer with SLIDE and ACCENT for each step. In addition to producing either a squarewave or sawtooth, it outputs the pitch CV and envelope shape so that you can sequence anything else in the system. The PD-303 can store and recall 4 sequences. Click any of the four WRITE slots to store in slot 1-4 and click any of the LOAD slots to recall a stored sequence. Storing sequences with different SCALE and TRANSPOSE sequences can create some quite complex variations. You can step through the stored patterns with a trigger/gate signal at the LOAD(1-4) input.

**INPUTS:**
- **CLK** - trigger/gate/clock input
- **CUTOFF** - cv input to modulate the CUTOFF
- **ENVELOPE** - cv input to modulate the ENVELOPE amount
- **RANDOMIZE** - trigger/gate input to randomize the entire pattern
- **LOAD(1-4)** - trigger/gate input to step through stored pattern 1-4 sequentially
- **RESET** - Trigger/gate input to reset the sequencer

**OUTPUTS:**
- **OUT** - synthesizer output
- **PITCH-CV** - outputs the pitch CV of the sequencer (including SLIDES)
- **ENV** - outputs the envelopes, including ACCENT

**CONTROLS:**
- **STEPS 1-16** - Individual sliders to set the voltage level of each step
- **TRANSPOSE** - transposes the sequence down 2 octaves or up two octaves
- **CUTOFF** - controls the cutoff frequency of the filter
- **RES** - controls the resonance of the filter
- **ENVELOPE** - controls the amount of envelope sent to modulate the filter
- **ACCENT** - controls the accent level
- **DECAY** - controls the decay time of the accent envelope and the filter envelope
- **SLIDE** - controls the overall portamento time for the SLIDE
- **SCALE** - choose scale for quantization
- **RND** - button to instantly create a random pattern
- **WRITE** - four slots of pattern storage
- **LOAD** - four slots of pattern recall
- **SO/SW** - select waveform (square or saw)
**POLYSYNTH:**

The POLYSYNTH module is a 4 voice polyphonic synth voice. It needs a trigger/gate signal at the TRIG input to set off the internal envelope. Pitch CV is received at the PITCH input. To have it play chords instead of single overlapping notes, use the TRIGGER-TRAIN module. (check the TRIGGER-TRAIN help file for example)

**CONTROLS:**

- **PITCH** - select the pitch offset of the synth
- **S&G-PULSE** - crossfade from sawtooth to pulsewave
- **TUNE** - detunes the 4 voices slightly
- **ATTACK** - attack time of the internal envelope
- **HOLD** - hold time of the internal envelope, before entering release phase
- **RELEASE** - release time of the internal envelope, before entering release phase

**INPUTS:**

- **TRIG** - trigger the envelope
- **PITCH** - cv input for the PITCH
- **S->P** - cv input for the S&G-PULSE control

**OUTPUTS:**

- **LEFT** - outputs the left audio
- **RIGHT** - outputs the right audio
- **ENV** - outputs the envelope to use as a modulation source elsewhere in the system. For example, to modulate the cutoff of a filter placed after the POLYSYNTH.
The POLYFM module is a 4 voice polyphonic phase modulation synth voice. It needs a trigger/gate signal at the TRIG input to set off the internal envelope. There are two envelopes, one for the carrier wave and one for the modulator. Pitch CV is received at the PITCH. To have it play chords instead of single overlapping notes, use the TRIGGER-TRAIN module. (check the TRIGGER-TRAIN help-file for example)

**CONTROLS:**

- PITCH - select the pitch effect of the synth
- INDEX - control modulation index
- RATIO - set the frequency ratio of the modulate
- ATTACK - attack time of the internal envelope
- HOLD - hold time of the internal envelope, before entering release phase
- RELEASE - release time of the internal envelope, before entering release phase

**INPUTS:**

- TRIG - trigger the envelope
- PITCH - cv input for the PITCH
- INDEX - cv input for index control

**OUTPUTS:**

- LEFT - outputs the left audio
- RIGHT - outputs the right audio
- ENV - outputs the envelope (carrier-EG) to use as a modulation source elsewhere in the system. For example, to modulate the cutoff of a filter placed after the POLYSYNTH.
The "KICK" module is a synthesized kick drum.

**Controls:**

- **PITCH:** controls the pitch of kick drum
- **DECAY:** controls the decay length of the envelope
- **EG2:** controls the decay length for the pitch envelope
- **SWEEP:** controls the amount of EG2 sent to modulate pitch
- **WFORM:** controls a three-way-crossfader between sine, saw and square

**Inputs:**

- **TRIG/GATE:** input to trigger the sound
- **PITCH:** input for cv-control over pitch
- **DECAY:** input for cv-control over decay
- **EG2:** input for cv-control over eg2
- **SWEEP:** input for cv-control over sweep
- **WFORM:** input for cv-control over WFORM

**Outputs:**

- **OUT:** output
The 'snare' module is a simple synthesized snare drum module. It produces snare drum sounds in the vein of TR-808.

**CONTROLS:**

- **PITCH**: controls the pitch of the snare drum
- **DECAY**: controls the decay length of the pitch
- **NOISE**: controls the decay length of the noise
- **COLOR**: filtering of the noise for different colors

**INPUTS:**

- **TRIG**: trigger/gate input to trigger the sound
- **PITCH**: input for CV-control over pitch
- **DECAY**: input for CV-control over decay
- **NOISE**: input for CV-control over noise
- **COLOR**: input for CV-control over color

**OUTPUTS:**

- **OUT**: output
The NOISE module produces a constant white noise at the output.

**OUTPUTS:**
- OUT = output
LOOPER:

The "LOOPER" module can record signals from your patch and loop them. It works like a live sampler. Press the RECORD toggle to record and stop recording. The recording can be automated by trigger signals at the CV input. The LOOPER can record CV signals as well as audio. It keeps the last recorded loop in memory when you quit PB, however when you launch the patch again it needs 5-7 seconds to load the recording.

CONTROLS:

SPEED - control the playback speed of the recorded loop
RECORD - toggle recording on/off
ORIGINAL - press the button to get back to the original speed of the recording

INPUTS:

IN-L - left input
IN-R - right input
SPEED - cv input for modulating the SPEED parameter
REC - trigger input to start/stop recording
RESET - trigger input to start the recording from the beginning

OUTPUTS:

LEFT - sample left channel output
RIGHT - sample right output
The 'SAMPLER' module can load 8 different .wav tracks. The files are located in `./samples/` and are named sample1.wav, sample2.wav, sample3.wav etc. To change the samples you have to replace those files with your own files, while keeping the same name structure. This might seem counter-intuitive but the advantage of this system is that your files will always be located in the right location and you can move your project main folder anywhere and to different platforms without losing your samples. If you want a sampler that can load files from anywhere on your hard drive I suggest you try the excellent sampler module node by Claude Barker. More info about that at: https://github.com/megalom/pd-ATMOSRISM-sampler

**CONTROLS:**

- **FILE**: select between sample 1-8
- **PITCH**: change the pitch of the sample
- **P.CV**: attenuator for cv at the PITCH input
- **LOOP/1SNOT**: toggle between looping mode and 1shot mode. In 1shot mode the sampler needs a trigger signal at the TRIG input to fire the sample.

**INPUTS:**

- **TRIG**: trigger input to play sample in 1SNOT mode
- **PITCH**: cv input for PITCH
- **FILE**: cv input for modulating what sample is active
- **LOOP**: Trigger input to switch between LOOP and 1SNOT mode

**OUTPUTS:**

- **LEFT**: sample left channel output
- **RIGHT**: sample right output
- **SOS**: trigger output at the start of each sample
**BASIC-LFO:**

The "BASIC-LFO" module is a low frequency oscillator. Select between sine, triangle or sawtooth wave and a separate pulse wave output. There is control over frequency and depth. The BASIC-LFO is an excellent clock/trig trigger module and as long as DEPTH is set to maximum it will trigger any input in the system with the P-LFO, M-LFO or R-LFO output. The TRIG output is independent of DEPTH and will always trigger at the start of each cycle. An additional sample and hold unit gives a random stepped voltage each cycle.

**CONTROLS:**

- **FREQ** - controls the pitch of the lfo
- **WAVEFORM SELECTOR** - choose between sine, triangle or sawtooth
- **P-WIDTH** - controls the pulselength of the PULSE output.
- **DEPTH** - control over lfo depth

**INPUTS:**

- **FREQ** - input for controlling the lfo-frequency with CV
- **SYNC** - trigger/gate input for lfo-sync

**OUTPUTS:**

- **BI-POLAR** - outputs a bi-polar sine, saw or triangle
- **uni-POLAR** - outputs a uni-polar sine, saw or triangle
- **PULSE** - outputs a uni-polar pulse wave
- **S&H** - outputs an hold random voltage each cycle
- **TRIG** - outputs short trigger each cycle, independently of the DEPTH control
The 'SINEBANK' consists of four sinewave oscillators. By toggling the LFO toggle the range can be switched between audio rate or low frequency rate. Individual outputs as well as a SUM out is provided.

**CONTROLS:**
1 - controls the pitch of sinewave 1
2 - controls the pitch of sinewave 2
3 - controls the pitch of sinewave 3
4 - controls the pitch of sinewave 4
LFO - toggle between audio rate and LFO

**INPUTS:**
CV1 - input for controlling sinewave 1
CV2 - input for controlling sinewave 2
CV3 - input for controlling sinewave 3
CV4 - input for controlling sinewave 4

**OUTPUTS:**
S1 - sinewave 1 output
S2 - sinewave 2 output
S3 - sinewave 3 output
S4 - sinewave 4 output
SUM - mix of all four sinewaves
**AHM (Attack-Hold-Release/LFO) Generator**

The AHM module is an attack-hold-release envelope generator. It has three selectable envelope times: slow, medium, and fast. It can function as a self-triggering node and cycle like an LFO, and the curve can be set to linear or exponential.

**Controls:**
- A: controls the attack time.
- H: controls the hold time
- R: controls the release time.
- FAST/MEDIUM/SLOW: select between three different envelope durations
- CURVE: switch between linear or exponential curve
- CYCLE: switch between normal node or cycling node

**Inputs:**
- TRIG: trigger/gate input for triggering the envelope
- A: input for controlling the A parameter with CV.
- H: input for controlling the H parameter with CV.
- R: input for controlling the R parameter with CV.

**Outputs:**
- OUT: output
- EOC: trigger/gate signal at the end of the envelope cycle in cycling node
DECAY-ENVELOPE-GENERATOR:
The "DECAY" module is a simple decay only envelope. The decay time is under CV-control with an onboard attenuator.

CONTROLS:

D - controls the decay time.
CV - attenuater for incoming CV at the CV input

INPUTS:

TRIG - trigger/gate input for triggering the envelope
CV - input for controlling the D parameter with CV.

OUTPUTS:

OUT - output
SLOPE GENERATOR

The "SLOPE" module is a complex envelope and modulation source, a slope generator in the tradition of Serge Modular. Both RISE and FALL time have CV inputs with onboard attenuators and a bi-polar control to shape the output. It can be set to self-triggering cycle mode and it has three selectable envelopes lengths; FAST/MEDIUM/SLOW. The CURVE is linear or exponential.

CONTROLS:

RISE - controls the rise time.
RISE CV - attenuater for incoming cv at the RISE input
FALL - controls the fall time.
FALL CV - attenuater for incoming cv at the FALL input
DEPTH +/- - bi-polar control of the envelope output
FAST/MEDIUM/SLOW - select between three different envelope durations
CURVE - switch between linear or exponential curve
CYCLE - switch between normal mode or cycling mode

INPUTS:

TRIG - trigger/gate input for triggering the envelope
RISE - input for controlling the RISE parameter with CV.
FALL - input for controlling the FALL parameter with CV.

OUTPUTS:

OUT - output
END - trigger/gate signal at the end of RISE in cycling mode
END - trigger/gate signal at the end of the envelope cycle in cycling mode
ADSR:
The "adsr" module is an attack-decay-sustain-release envelope best used with gate signals. AUTOMATORESM is mainly built around trigger signals. However, the GATE-LED, or variable pulsewave IFM are valid companions to the ADSR. Also, use of external controllers or keyboards could be used with the module.

CONTROLS:
- **ATTACK** - controls the attack time
- **DECAY** - controls the decay time
- **SUSTAIN** - controls the sustain level
- **RELEASE** - controls the release time
- **CURVE** - crossfade between linear and exponential curve

INPUTS:
- **GATE** - gate input for triggering the ADSR

OUTPUTS:
- **OUT** - output
The "RANDOM-GATES" module generates random trigger/gate signals by feeding random temp to a net. You have control over the rhythmic intensity as well as the probability of a trigger/gate happening.

**CONTROLS:**

- **INTENSITY** - controls the intensity of random gates
- **PROR.** - controls the probability of a gate happening

**OUTPUTS:**

- **OUT** - output
Random Voltages

The "Random Voltages" module is a random voltage generator. When a trigger/gate signal is received at the clock-in input, it will produce a random voltage. Range can be set with the random slider. In addition, you can add a slew to the voltage with the slew slider. The module outputs both a bi-polar voltage and a uni-polar voltage.

Controls:
- Random - attenuates the range of randomness
- Slew - applies a slew to the output

Inputs:
- Clock-in - trigger/gate input

Outputs:
- Bi-P - bi-polar random voltage
- Uni-P - uni-polar random voltage
<table>
<thead>
<tr>
<th><strong>SAMPLE&amp;HOLD:</strong></th>
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<tbody>
<tr>
<td>The “$\text{SAM}$” module is a simple sample and hold unit. Apply a signal at the $\text{SAMPLE}$ input and a trigger/gate signal at the $\text{TRIG}$ input will sample the signal and hold the voltage at the output until receiving the $\text{TRIG}$.</td>
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<table>
<thead>
<tr>
<th><strong>CONTROLS:</strong></th>
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<tbody>
<tr>
<td>$\text{SAMPLE}$ - signal in</td>
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<tr>
<td>$\text{TRIG}$ - trigger/gate input that will sample the signal at the $\text{SAMPLE}$ input</td>
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</tbody>
</table>
The '8STEPS' module is a simple eight step sequencer with onboard quantization. It steps requires a trigger/gate/clock signal at the CLOCK-IN input to step forward. There are two CV inputs. CV(PREC-0) modulates the sequencer before the quantizer so the sequencer will still be in time when applying modulation here. CV(PAQT-0) adds the CV after the quantizer so any CV at the input will transpose the sequence.

**CONTROLS:**

**STEPS-0** - individual sliders to set the voltage level of each step

**SCALE** - choose scale for quantization

**INPUTS:**

CLOCK-IN - trigger/gate/clock input

CV(PREC-0) - modulation input. CV added to the sequence before quantization.

CV(PAQT-0) - modulation input. CV added to the sequence after quantization.

RESET - trigger/gate input to force reset the sequencer to step 1

**OUTPUTS:**

0-OUT - quantized output

OUT2 - un-quantized output that outputs the full voltage range. This output is often more useful if you're using the sequencer to modulate other parameters than pitch of an oscillator.

SI - trigger/gate signal at start of sequence loop
The “MEGA-SEQUENCER” is an advanced sequencer tool. It has 16 steps and a randomization function per step. Ticking the toggle box beneath each step will randomize the value for that step. There are controls for choosing scale (SCALE) and transposing the sequence -24 semitones to +24 semitones (XPOSE). There is a bank button called RANDOM-PATTERN that will supply new values randomly to all the steps. The button RESET-Toggles resets all random-step toggles to zero. The MEGA-SEQUENCER can store and recall 4 sequences. Click any of the four WRITE slots to store in slot 1-4 and click any of the LOAD slots to recall a stored sequence. Storing sequences with different SCALE and XPOSE sequences can create some quite complex variations. You can step through the stored patterns with a trigger/gate signal at the LOAD(1-4) input.

**CONTROLS:**
- STEPS1-16 - individual sliders to set the voltage level of each step
- SCALE - choose scale for quantization
- XPOSE - transpose the sequence -24 semitones to +24 semitones.
- RANDOM-STEP - 16 toggleboxes underneath each step which when activated will force a random voltage on that particular step.
- RANDOM-PATTERN - button to instantly create a random pattern
- RESET-Toggles - button to reset all RANDOM-STEP toggles to zero.
- WRITE - four slots of pattern storage
- LOAD - four slots of pattern recall

**INPUTS:**
- CLK - trigger/gate/clock input
- RANDOMIZE - trigger/gate input to randomize the entire pattern
- LOAD(1-4) - trigger/input to step through stored patterns 1-4 sequentially

**OUTPUTS:**
- Q-OUT - quantized output
- OUT2 - un-quantized output that outputs the full voltage range. This output is often more useful if you’re using the sequencer to modulate other parameters than pitch of an oscillator.
TRIGGER-SEQ:
The "TRIGGER-SEQ" is a trigger/gate sequencer. It has a maximum of 32 steps but can be set to any number of steps. The TRIGGER-SEQ can store and recall 4 sequences. You can click any of the four WRITE slots to store in slot 1-4 and click any of the LOAD slots to recall a stored sequence. You can step through the stored patterns with a trigger/gate signal at the LOAD(1-4) input.

CONTROLS:
STEP1-16 - individual toggle boxes to set the step on or off.
WRITE - four slots of pattern storage
LOAD - four slots of pattern recall

INPUTS:
CLOCK-IN - trigger/gate/clock input
LOAD(1-4) - trigger/gate input to step through stored pattern 1-4 sequentially
RESET - trigger/gate input to reset the sequencer

OUTPUTS:
OUT - output
gate_sequencer

The "GATE-SEQ" is an eight-step gate sequencer with adjustable gate-length and on/off per step. All parameters can be randomized by clicking the RANDOM button manually or by CV.

**CONTROLS:**
- STEPS 1-8: individual toggle boxes to set the step on or off.
- GATE-LENGTH SLIDERS: set the gate length per step

**INPUTS:**
- CLOCK: trigger/gate/clock input
- RESET: trigger/gate input to reset the sequencer
- RANDOM: trigger/gate input to randomize all parameters

**OUTPUTS:**
- OUT: output
LOWPASS-FILTER

The "LP-FILTER" module is a resonant lowpass filter with control over cutoff frequency and resonance.

CONTROLS:

CUTOFF - controls the cutoff frequency of the filter.

O - controls the resonance

FM/- - bi-polar attenuator for incoming CV at the CUTOFF input

INPUTS:

IN - signal input

CUTOFF - input for cv-control over the CUTOFF with onboard bi-polar attenuator

O - input for cv-control over the O.

OUTPUTS:

OUT - output
The 'hp-filter' module is a 1-pole non-resonant highpass filter with control over cutoff frequency.

**CONTROLS:**
- **FREQ** - controls the cutoff frequency of the filter.
- **F+/-** - bi-polar attenuator for incoming CV at the FREQ input

**INPUTS:**
- **IN** - signal input
- **FREQ** - input for cv-control over the FREQ with onboard bi-polar attenuator

**OUTPUTS:**
- **OUT** - output
The 'bp-filter' module is a 4-pole resonant bandpass filter with control over cutoff frequency, resonance and drive (output gain).

**CONTROLS:**

- **CUTOFF** - controls the cutoff frequency of the filter.
- **RES** - controls the resonance
- **DRIVE** - controls the output gain
- **FM/」」** - bi-polar attenuator for incoming CV at the FREQ input

**INPUTS:**

- **IN** - signal input
- **FREQ** - input for cv-control over the CUTOFF with onboard bi-polar attenuator

**OUTPUTS:**

- **OUT** - output
The "LADDER-FILTER" module is a resonant lowpass filter with cv-control over cutoff frequency. It has slightly more character than LP-FILTER with more warmth and a steeper slope.

**CONTROLS:**

PR0 - controls the cutoff frequency of the filter.

Q - controls the resonance

FM/+ - bi-polar attenuator for incoming CV at the CUTOFF input

**INPUTS:**

IN - signal input

PR0 - input for cv-control over the CUTOFF with onboard bi-polar attenuator

**OUTPUTS:**

OUT - output
Analog Filter

The "ANALOG-FILTER" module is obviously not real analog, but a digital filter with a very dirty character that behaves erratically at high resonances.

**CONTROLS**:

- **CUTOFF**: controls the cutoff frequency of the filter.
- **Q**: controls the resonance
- **FM/+/−**: bi-polar attenuator for incoming CV at the CUTOFF input

**INPUTS**:

- **IN**: signal input
- **CUTOFF**: input for CV-control over the CUTOFF with onboard bi-polar attenuator
- **Q**: input for CV-control over the Q

**OUTPUTS**:

- **OUT**: output
The "FORMANT" module consists of multiple bandpass filters set to frequencies that mimic human vowel sounds. FORMANT works best with signals high in harmonic content.

**CONTROLS:**

VOWELS - scan through different vowels.

Q - control over Q (resonance)

**INPUTS:**

IN - signal input

VOWELS - input for cv-control over the FORMANTS.

**OUTPUTS:**

OUT - output
**BITCRUSH**

The "BITCRUSH" module is a crude digital distortion unit.

**CONTROLS:**

DRY - controls amount of unaffected dry signal at the output
CRUSH - controls the amount of bitcrush to the signal

**INPUTS:**

IN - signal input
CRUSH - input for cv-control over the CRUSH parameter.
DRY - input for cv-control over the DRY parameter.

**OUTPUTS:**

OUT - output
The "WAVEFOLD" module is a wavefolder with three selectable stages (fold amount) and cv-control over FOLD.

**CONTROLS:**
- **FOLD** - controls amount of wavefolding to the signal
- **CV** - attenuator for incoming CV at the FOLD cv-input
- **STAGES** - three selectable stages to control amount of wavefolding

**INPUTS:**
- **IN** - signal input
- **FOLD** - input for cv-control over the FOLD parameter.

**OUTPUTS:**
- **OUT** - output
STEREO-PHASOR:
The "PHASOR" module is a stereo phasor effect.

CONTROLS:
PHASOR - controls amount of phasor effect.
CV - attenuator for incoming cv at the PHASOR input

INPUTS:
IN - signal input
PHASOR - input for cv-control over the PHASOR parameter.

OUTPUTS:
LEFT - left output
RIGHT - right output
**COMBFILTER:**

The 'COMBFILTER' module is a delay fx unit. Delay times range from 1ms - 1000ms.

**CONTROLS:**

**DELAY** - controls delay time from 1ms - 1000ms

**FEEDBACK** - controls amount of feedback

**LOWPASS** - set lowpass filter frequency cutoff at the output

**HIGHPASS** - set highpass filter frequency cutoff at the output

**DRIVE** - set drive (gain) at the output

**DRY/WET** - control the balance between dry and wet signal

**INPUTS:**

**IN** - signal in

**DELAY** - input for cv-control over the DELAY parameter

**OUTPUTS:**

**OUT** - output
**GRANULAR-DELAY:**

The "GRANULAR-DELAY" module is an experimental granular delay fx unit.

**CONTROLS:**

- **PITCH** - change the pitch of the signal
- **GRAINSIZE** - controls the size of the grains/delay
- **REVERB** - sets reverb level
- **DRY/NET** - control the balance between dry and wet signal

**INPUTS:**

- **IN** - signal in
- **PITCH** - input for cv-control over the PITCH parameter
- **GRAINSIZE** - input for cv-control over the GRAINSIZE parameter
- **REVERB** - input for cv-control over the REVERB parameter
- **D/M** - input for cv-control over the DRY/NET parameter

**OUTPUTS:**

- **OUT** - output
The "MILLERVERB" module is a stereo reverb unit based on the reverberation example code from Miller Puckette's book.

**CONTROLS:**

REVERB - controls amount of reverb/size of the room

LOMPASS - controls the cutoff frequency of a non resonant lowpass filter

DRY/WET - controls the balance between dry and wet signal

GAIN - controls the output gain

**INPUTS:**

IN - signal in

REVERB - input for cv-control over the REVERB parameter

LOMPASS - input for cv-control over the LOMPASS parameter

**OUTPUTS:**

LEFT - left output

RIGHT - right output
**STEREO-DELAY**

The "STEREO-DELAY" module is a mono input - stereo output delay with control over delay rate, feedback and amount of lowpass filtering.

**CONTROLS:**

- **RATE-LEFT** - controls delay rate of the left channel. Delay times from 10ms - 500ms
- **RATE-RIGHT** - controls delay rate of the right channel. Delay times from 10ms - 500ms
- **FEEDBACK** - controls amount of feedback
- **LOWPASS** - sets lowpass filter frequency cutoff at the output
- **DRY/WET** - controls the balance between dry and wet signal

**INPUTS:**

- **IN** - signal in
  - **RATE-L** - input for co-control of the RATE-LEFT parameter
  - **RATE-R** - input for co-control of the RATE-RIGHT parameter
  - **FBACK** - input for co-control of the FEEDBACK parameter
  - **LPASS** - input for co-control of the LOWPASS parameter

**OUTPUTS:**

- **LEFT** - left output
- **RIGHT** - right output
CHORUS:
The "chorus" module is a mono input to stereo output chorus effect.

CONTROLS:
RATE - controls the chorus rate
DEPTH - controls the depth of chorus effect

INPUTS:
IN - signal in
RATE - input for cv-control of the RATE parameter
DEPTH - input for cv-control of the DEPTH parameter

OUTPUTS:
LEFT - left output
RIGHT - right output
OVERDRIVE:
The “overdrive” module is a distortion/overdrive/fuzz effect.

CONTROLS:
- DRIVE - controls the distortion/overdrive/fuzz amount
- TONE - controls the EQ of the fuzz

INPUTS:
- IN - signal in
- DRIVE - input for cv-control of the DRIVE parameter
- TONE - input for cv-control of the TONE parameter

OUTPUTS:
- OUT - output
** GRAPHIC-EQ:**

The 'GRAPHIC-EQ' module is a stereo 7-band equalizer. Use it to shape the tone of your sound sources.

**CONTROLS:**

- **100**: set the level of the 100Hz bandpass filter
- **200**: set the level of the 200Hz bandpass filter
- **400**: set the level of the 400Hz bandpass filter
- **800**: set the level of the 800Hz bandpass filter
- **1600**: set the level of the 1600Hz bandpass filter
- **3200**: set the level of the 3200Hz bandpass filter
- **6400**: set the level of the 6400Hz bandpass filter
- **C(YELLOW)**: attenuator for CV at the LOW input
- **C(MID)**: attenuator for CV at the MEDIUM input
- **C(HIGH)**: attenuator for CV at the HIGH input
- **0**: global control for the 0 of all bandpass filters
- **LEVEL**: adjust output level of the GRAPHIC-EQ

**INPUTS:**

- **LEFT**: left audio input
- **RIGHT**: right audio input
- **LOW**: CV input for the purple bandpass filters
- **MID**: CV input for the green bandpass filters
- **HIGH**: CV input for the pink bandpass filters

**OUTPUTS:**

- **L**: left channel output
- **R**: right channel output
### MEGAVERB:

The "MEGAVERB" module is a reverb unit with larger spaces than the MILLERVERB module. The code is an adaptation of the [rev2-] object into Automatoniise signal flow.

### CONTROLS:

- **SIZE** - controls size of the room
- **DAMPING** - controls the damping of the room
- **LOWPASS** - controls the cutoff frequency of a non resonant lowpass filter at the output
- **DRY/WET** - controls the balance between dry and wet signal

### INPUTS:

- **IN** - signal in

  - **SIZE** - input for cv-control over the SIZE parameter
  - **LOWPASS** - input for cv-control over the LOWPASS parameter

### OUTPUTS:

- **LEFT** - left output
- **RIGHT** - right output
The PITCHSHIFTER module is an adaptation of the code in the Pure Data examples (GEO.pitchshift.pd) for the Automata driven signal flow. It takes a signal and shifts the pitch with a range of down two octaves to up two octaves.

**CONTROLS:**

- **PITCH+/-**: shift the pitch of the input signal
- **CV**: attenuator for incoming CV at the PITCH+/- cv-input
- **DRY/WET**: dry/wet control

**INPUTS:**

- **IN**: signal input
- **CV**: input for cv-control over the PITCH+/- parameter.

**OUTPUTS:**

- **OUT**: output
VCA:

The "VCA" module is a voltage controlled amplifier/attenuator. It is one of the most useful modules in any modular system. Typically a vca is most commonly used to dynamically change a signal's amplitude over time in tandem with an envelope generator. But the same could be applied to any signal that you want to change dynamically over time in a patch. Basic example: instead of patching an LPF directly to the filter cutoff, go through a vca and control that vca with another LPF. This is called "modulate the modulator" and can really give some life to your patches.

CONTROLS:

VCA - controls the level of the signal present at the IN input.
CV - attenuator for incoming cv at the CV input

INPUTS:

IN - signal in

OUTPUTS:

OUT - output
The 'LPG' module is a lowpass gate: a combination of vca and lowpass filter. A short trigger/gate signal at the CV input is enough to open the gate and you can set the response with the RING/DAMP control. A lowpass gate is especially good for percussive 'bongos' type sounds but can be used just like you would use a vca or a lowpass filter as well.

CONTROLs:
LEVEL - controls the level of the signal input. The response of the slider is determined by the RING/DAMP control.
RING/DAMP - controls how long you want the Lpg to ring after excitation.

CV - attenuator for incoming CV at the CV input

INPUTs:
IN - signal in
CV - input for cv-control of the LEVEL parameter

OUTPUTs:
OUT - output
**XFADE:**

The 'xfade' module is a simple crossfader. Two signal inputs can be crossfaded with a slider manually or with cv.

**CONTROLS:**
- XFADE - crossfades between signal-in-1 and signal-in-2

**INPUTS:**
- IN-1 - signal in 1
- IN-2 - signal in 2
- XFADE - input for cv-control of the XFADE parameter

**OUTPUTS:**
- OUT - output
The "3WAY-XFADE" module is a three-way crossfader. Three signal inputs can be crossfaded with a slider manually or with cv.

**CONTROLS:**
- XFADE - crossfades between signal 1, 2 and 3

**INPUTS:**
- IN-1 - signal in 1
- IN-2 - signal in 2
- XFADE - input for cv-control of the XFADE parameter

**OUTPUTS:**
- OUT - output
The 'polarizer' module is a simple polarizer/attenuator/offset control for fine-tuning CV sources. Any signal can be scaled down, inverted into the negative or offset.

**CONTROLS:**
- POL.+/−: attenuate the signal
- OFFSET: offset the signal with DC

**INPUTS:**
- IN: signal in

**OUTPUTS:**
- OUT: output

EXAMPLE: move the POL.+/− or OFFSET slider and watch the scope.
The “MIXER2” module is a dual channel summing mixer. It can be used with any signal source: audio, cv or trigger/gate.

**CHANNEL1** - controls the level of channel 1

**CHANNEL2** - controls the level of channel 2

**INPUTS:**

- CH1 - signal in
- CH2 - signal in

**OUTPUTS:**

- OUT - output
The "mixer4" module is a four-channel summing mixer. It can be used with any signal source; audio, CV or trigger/gate.

**CONTROLS:**
- CHANNEL1 - controls the level of channel 1
- CHANNEL2 - controls the level of channel 2
- CHANNEL3 - controls the level of channel 3
- CHANNEL4 - controls the level of channel 4

**INPUTS:**
- CH1 - signal in
- CH2 - signal in
- CH3 - signal in
- CH4 - signal in

**OUTPUTS:**
- OUT - output
The "TOGGLE-MATRIX" module is a classic matrix mixer with toggle switches instead of potentiometers. Four signal inputs can be turned on/off in four different ways at the A-D outputs.

**ControLS:**
- TOGGLes - k1-4k
- TOGGLes - k5-8k
- TOGGLes - k9-1c
- TOGGLes - k1d-9d

**Inputs:**
1. Input one
2. Input two
3. Input three
4. Input four

**Outputs:**
- A - output A
- B - output B
- C - output C
- D - output D
The 'MAESTRO4' module is a digital-to-analog converter and four channel panning mixer. It is a module that will pass on sound to your speakers. It has manual and cv-control over panning.

**CONTROLS:**

CH1, CH2, CH3 & CH4 - controls gain of equivalent channel
PAN - control panning of equivalent channel

**MASTER** - controls the volume of the sum of channels 1-4

**INPUTS:**

CH1-4 - channel inputs
PAN1-4 - cv input for panning

**OUTPUTS:**

None.
The "CLOCK" module is a simple clock/trigger/gate generator. Control the clock-rate or turn the clock on/off. Notice that there are other ways to generate clocks in the patch editor. For example using BASIC-LFO or the E0C of a cycling envelope.

**CONTROLS:**

CLK_RATE - controls the clock-rate
ON/OFF - turn the clock on/off

**INPUTS:**

CLK_RATE - input for co-control of the clock rate
ON/OFF - trigger/gate input for turning the clock on/off

**OUTPUTS:**

OUT - output
CLOCK-MULTIPLY:
The "CLOCK-MULTIPLY" module is a clock multiplier. It takes a steady clock/trigger signal at the input and multiplies it with the output. Set the number of multiplication with the MULTIPLY slider.

CONTROLS:
MULTIPLY - controls the amount of multiplication

INPUTS:
IN - clock/trigger/gate signal in
CV - input for cv-control of the MULTIPLY parameter

OUTPUTS:
OUT - output
The "clock-divider-even" module is a single clock divider with even subdivisions of the clock. Available divisions are /2, /4, /8, and /16.

**Controls:**

**Inputs:**

IN - trigger/gate input to be divided

**Outputs:**

/2 - input divided by 2
/4 - input divided by 4
/8 - input divided by 8
/16 - input divided by 16
CLOCK-DIVIDER-ODD:

The "CLOCK-DIVIDER-ODD" module is a simple clock divider with odd subdivisions of the clock. Available divisions are /2, /3, /5 and /9.

CONTROLS:

INPUTS:
IN - trigger/gate input to be divided

OUTPUTS:
/3 - input divided by 3
/5 - input divided by 5
/7 - input divided by 7
/9 - input divided by 9
VC-COUNTER:

The "VC-COUNTER" module is a voltage-controlled counter/clock divider. Incoming trigger/gate/clock can be subdivided between 1-64. Useful module for setting a very specific clock division not available immediately from the other clock-divider modules. You could also feed it CV to dynamically control the subdivisions.

**CONTROLS:**

COUNT - set number of subdivisions

**INPUTS:**

IN - trigger/gate input to be divided

**OUTPUTS:**

OUT - divided output
**TRIGGER-DELAY:**

The 'trigger-delay' module is a simple trigger delay. Trigger/gate signal at the input goes to the output after a delay time in milliseconds set by the DELAY slider.

**CONTROLS:**
- DELAY - controls delay time in ms

**INPUTS:**
- IN - trigger/gate input

**OUTPUTS:**
- OUT - delayed trigger/gate output
TRIGGER-TRAIN:
The TRIGGER-TRAIN module takes one trigger/gate signal and outputs four in series. The time between the four triggers are set with the DELAY slider. It is particularly useful to make the POLYSYNTH and POLYTRN play chords. See example to the right.

CONTROLS:
DELAY - controls delay time in between triggers

INPUTS:
IN - signal in

CV - input for cv-control of the DELAY parameter

OUTPUTS:
OUT - output
VOLTAGE-INVERTER:

The "INVERTER" module is a voltage inverter. Invert the polarity of any signal. Mainly used for CV manipulation.

**CONTROLS:**
- None

**INPUTS:**
- IN - signal in

**OUTPUTS:**
- OUT - output
The "SCOPE" module is a simple oscilloscope. Use it frequently to gain a deeper understanding of signals!

**CONTROLS:**

**INPUTS:**

- IN - signal in

**OUTPUTS:**

- OUT - output
The "SLEW" module is a slew limiter. Use it to apply slow/portalents to cv-signals.

**CONTROLS:**
- SLEW - controls amount of slow/portalents

**INPUTS:**
- IN - signal in

**CV** - input for cv-control of the SLEW parameter

**OUTPUTS:**
- OUT - output
The "PROBABILITY" module is probability logic module for trigger/gate signals. It takes a signal at the input and passes it forward either to the OUT1 or OUT2 output. The PARM slider sets the probability of which route the signal goes.

**CONTROLS:**
- PARM - sets the probability of either signal passing through OUT1 or OUT2.

**INPUTS:**
- IN - signal in
- CV - input for co-control of the PARM parameter

**OUTPUTS:**
- OUT1 - output1
- OUT2 - output2
The 'QUANTIZER' module is a simple quantizer. It takes any CV signal and quantizes the range into intervallic scales. Patch any signal to the IN input and get the quantized voltage at the output. Available scales: Ionian, dorian, phrygian, lydian, aeolian, whole, chromatic, harmonic-major, lydian-natural, ancient, tetra, indian, pelog, smalero

**CONTROLS:**
- **SCALE** - choose scale

**INPUTS:**
- **IN** - signal in

**TRIG** - trigger/gate input to sample the CV at the IN input and force quantization.

**OUTPUTS:**
- **OUT** - output
4to1 Switch:

The '4to1 SWITCH' is a sequential switch that takes 4 inputs and sequentially steps through the inputs at the output whenever a trigger/gate signal is received at the TRIG input.

CONTROLS:

/none

INPUTS:
1. input 1
2. input 2
3. input 3
4. input 4
TRIG - trigger/gate that triggers the sequential switch

OUTPUTS:
OUT - output
### 1to4-SWITCH:

The '1to4-SWITCH' is a sequential switch that takes 1 input and sequentially distributes it to 4 outputs whenever a trigger/gate signal is received at its input.

#### CONTROLS:

- **/name**

#### INPUTS:
- **IN** - input signal
- **TRIG** - trigger/gate that triggers the sequential switch

#### OUTPUTS:
- **1** - output 1
- **2** - output 2
- **3** - output 3
- **4** - output 4
The "ENV-FOLLOWER" is a single envelope-follower. Use it to extract amplitude envelop shapes, gate signals and for frequency detection.

**Controls:**

- **INPUT**: Boost the input signal from 0 to 4
- **AMP-SMOOTH**: Smooth the amplitude shape
- **GATE-THRESH**: Select threshold needed to extract gate signal
- **AMPLITUDE-/>**: Attenuator to shape the AMPLITUDE output

**Inputs:**

- **IN**: Signal in

**Outputs:**

- **AMPLITUDE**: Envelope output
- **GATE**: Gate output
- **FREQ**: Frequency detection output
The "Preset-Manager" module can store all parameters in a patch into 8 different slots. You can recall the saved slots manually, address them with CV or step through them sequentially with a trigger/gate signal. An additional morph control is available to set the time in milliseconds that it will take to reach the next parameter state. The preset-manager is a powerful composition tool which allows you to experiment with different knob and parameter settings in a patch while being able to revert to a previous state. It is best used when a patch is finished and you want to make a backup so you don't lose precious settings while experimenting.

**CONTROLS:**

STORE - First choose which slot to save to STORE(1-8), and then click the STORE button to save all current parameter values in a patch into the slot chosen by the STORE radio.

RECALL - Immediately recall saved slots 1-8 by clicking the radio.

RECALL-CV - Attenuator for incoming CV at the RECALL(CV) input.

MORPH - slider sets the morph time in milliseconds to glide to next value. Times from 0 seconds up to one minute.

10 30 60 - determines maximum value of the MORPH slider. Set times between 0-10 seconds, 0-30 seconds, 0-60 seconds.

STEP! - click the STEP! button to stop a current morph between parameter values. It is useful to be able to cancel a morph if you need further editing and it can also be used creatively if the morph function reveals a new interesting parameter combination. If so, click STOP! and STORE.

**INPUTS:**

RECALL(CV) - Input for CV-control over the RECALL parameter

STEP! -trigger/gate control that will step through presets sequentially 1-8
The "PARAM-NUDGE" module is an experimental tool made for mapping out interesting musical spaces. It allows you to nudge all parameters in a patch to search for new interesting sounds. Set how much you want the parameters to be moved with the +/- RANGE slider and click the NUDGE button to nudge all parameters. PARAM-NUDGE is a good partner to the preset-manager module when trying to make interesting presets. (For practical reasons, the MAESTRO4 module is not affected by the PARAM-NUDGE module)

CONTROLS:

NUDGE - click button to nudge all parameters.

INPUTS:

- NUDGE - trigger/gate input to nudge parameters

OUTPUTS:

/nudge
The AUDIO-RECORDER module takes a stereo input and records a 24bit .wav file to the folder called 'recorded.wav' in the project's main folder. It starts recording when you press the REC button and automatically labels your files as recording_1, recording_2, etc. Press the RST button to reset the counter, but previous recordings will be overridden. You can use the LEFT and RIGHT master outputs from the MECHON and patch them into the AUDIO-RECORDER. It is not recommended to use more than one AUDIO-RECORDER, it will likely cause PD and Automation to crash. Instead, use the MULTI-TRACK RECORDER module to record several stems.

**CONTROLS:**
- **REC/STOP** - Start and stop recording
- **RST** - Reset the recording number
- **LEVEL** - Set the overall gain of the incoming signals

**INPUTS:**
- **LEFT** - Left signal in
- **RIGHT** - Right signal in

**OUTPUTS:**
MULTITRACK-RECORDER:

The MULTITRACK-RECORDER module takes maximum of 8 inputs and
records 24bit .wav files to the folder
"/recorder.wavs/multitrack/"

You can toggle channels on or off if you for example only
want to record 4 stems. There is a LEVEL slider for the
global recording volume. It starts recording when you press
the REC toggle and automatically labels your files as
"multitracker_i.wav", i.e., takesI.wav. Press the RST button to
reset the counter, but previous recordings will be
overdubbed.

CONTROLS:

REC/STOP - Start and stop recording
RST - reset the recording number
LEVEL - set the overall gain of the incoming signals
CH1-8 ON/OFF TOGGLES - turn recording on or off for each
channel

INPUTS:

CH1-CH8 - 8 channel inputs

OUTPUTS:

/noise/
The "EXTERNAL-AUDIO" module is similar to the envelope follower module. It takes the audio input from your soundcard input channels 1 and 2, and outputs the audio, extracts amplitude envelope shapes and gate signals and performs frequency detection. To change the input channels, you need to open the module and change the object [adc-1, 2]. Change the numbers 1 & 2 to the channel numbers you want to use.

**CONTROLS:**

- **INPUT**: Boost the input signal from 0 to 4
- **AMP-SMOOTH**: Smooth the amplitude shape
- **GATE-THRESH**: Select threshold needed to extract gate signal
- **AMPLITUDE-/+**: Attenuator to shape the AMPLITUDE output

**INPUTS:**

- /none

**OUTPUTS:**

- CH1: Left audio out
- CH2: Right audio out
- ENV: Envelope output
- GATE: Gate output
- FREQ: Frequency detection output
**MANUAL-TRIGGERS:**

The MANUAL-TRIGGERS module simply outputs a trigger whenever the T1-T3 buttons are pressed.

**CONTROLS:**

T1-T3 - Clicable buttons to output a trigger signal at the corresponding output

**INPUTS:**

/none/

**OUTPUTS:**

T1 - Output button T1
T2 - Output button T2
T3 - Output button T3
The 'MIDI-IN' module receives MIDI note, gate and velocity signals from MIDI channel 1 and outputs them as Automate MIDI signals. Remember that all external MIDI gear must be connected before launching MD and selected in the MD MIDI Settings. If you want to read from another MIDI channel than channel 1, open the module and change the object 'notcin yournumber'.

CONTROLS:

/none/

INPUTS:

/none/

OUTPUTS:

NOTE - MIDI note output
GATE - MIDI gate output
VEL - MIDI velocity output
The MIDI-OUT module has been updated and improved for Automatixism v2.0 by Laurent Houdard.

The MIDI-OUT module takes a note input and a gate input to send Automation signals to external MIDI gear. Remember that all external MIDI gear must be connected before launching FD and selected in the FD MIDI Settings.

**CONTROLS:**

- PITCH-OFFSET: offset the midi notes from the NOTE input
- CHANNEL: select MIDI CHANNEL 1-16

**INPUTS:**

- NOTE: midi pitch information input
- GATE: midi gate information

**OUTPUTS:**

/none
The 'organelle-knobs' module is a module that allows you to connect any of the four parameter knobs on the Critter & Guitari Organelle to cv inputs on the system. Remember that sliders on modules become offsets when cv is applied so make sure the parameter slider is set to zero to access the entire range.

**CONTROLS:**
none/

**INPUTS:**
none/

**OUTPUTS:**
KNOB1 - output for Organelle knob1
KNOB2 - output for Organelle knob2
KNOB3 - output for Organelle knob3
KNOB4 - output for Organelle knob4
ORGANELLE-KEYBOARD:

The "organelle-keyboard" module allows you to use the Critter & Guitari Organelle keyboard to cv inputs in the system. Remember that sliders on modules become offsets when cv is applied so make sure the parameter slider is set to zero to access the entire range.

CONTROLS:

TRANSPOSE - transposes the octave of the Organelle keys

INPUTS:

none

OUTPUTS:

PITCH - outputs the pitch from the keyboard
GATE - outputs a trigger/gate signal when a key is pressed on the Organelle.
The 'organelle-aux' module has two modes: momentary and toggle. In momentary mode there will be full voltage at the OUT whenever the AUX key is pressed and the voltage will drop to zero when de-pressed. In toggle mode, the AUX buttons toggle between on/off rather than being momentary. It can be used as a trigger/gate source in the system or to momentary open up a lab or any wanted parameter.

**CONTROLS:**

- MOMENTARY/TOSGLE - switch between modes

**INPUTS:**

- none

**OUTPUTS:**

- KN001 - output for Organelle knob1
- KN002 - output for Organelle knob2
- KN003 - output for Organelle knob3
- KN004 - output for Organelle knob4
**ORGANELLE-OUTPUT:**

The "ORGANELLE-OUTPUT" is used instead of the MASTERS if you are exporting your patch to the Critter & Guitari Organelle.

**CONTROLS:**

CH1, CH2, CH3 & CH4 - controls gain of equivalent channel
PAN - control panning of equivalent channel

MASTER - controls the volume of the sum of channels 1-4

**INPUTS:**

CH1-4 - channel inputs
PAN1-4 - cv input for panning

**OUTPUTS:**

none/