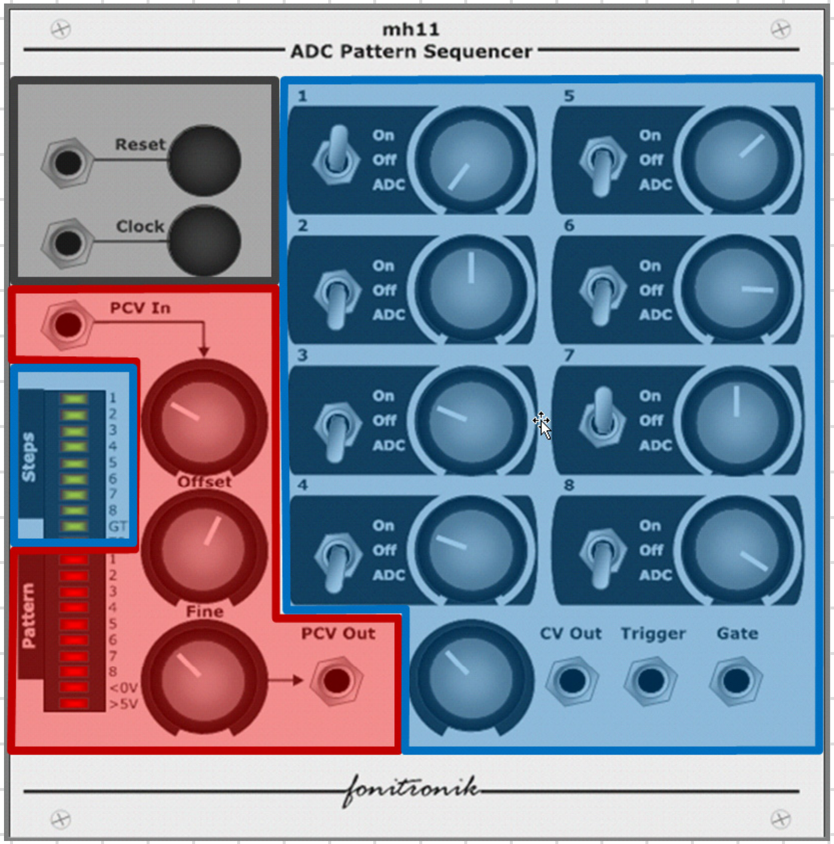
mh11 – ADC Sequencer – Quick Start

Sequencer controlls:
Rest & Clock input and manual reset (hold on reset) & step switch

Sequencer visuals (LED array):
Position of the sequencer (Step 1-8)
Gate out indicator (G)
Trigger out indicator (T)



Pattern CV input
Pattern CV attenuator
Pattern CV offset (initial)
Offset fine control
Processed CV direct out

ADC visuals (LED array):
Pattern, which steps are active?(1-8)
CV < 0V indicator
CV > 5V indicator

8x Step controlls:
CV amount
Mode (Step ON, OFF, or ADC controlled)

Outputs:
CV output with passive attenuator
Trigger output (pulse width not fixed, but follows the clocks duty cycle)
Gate output (subsequent gates that are ON will merge).

Sequencer controls:

Clock input and manual step button: Apply a clock signal here (i.e. LFO). It is great if you have a clock with PWM. Why? Just because the width of the sequencers trigger output pulses follows the clocks pulse width.

Reset input and manual reset button: When high the sequencer resets to step on. As long as the reset is high, the sequencer will not step forward.

8x Step controls, Outputs, sequencer visuals:

For each step there is a knob to set the CV output value, and a mode switch to set this steps status (ON, OFF, ADC). Whenever the sequencer steps to an active step the set CV value, a gate (as long as the whole step, consecutive gates merge), and a trigger (as long as the clock signal) will be available on the outputs.

There is a passive attenuator for the CV output.

For inactive steps 0V will be seen on the CV output.

For all steps that are in ADC mode the status will be set by the ADC module to the left (red).

The upper yellow LED-Array tells you what the actual sequencer is doing: it indicates the current step, and if a gate or trigger output is active.

ADC module:

Here voltages are converted to an 8-bit code (hex). This voltage can be set manually (Offset, Fine), or one could use an external pattern control voltage (PCV). The PCV input has an attenuator.

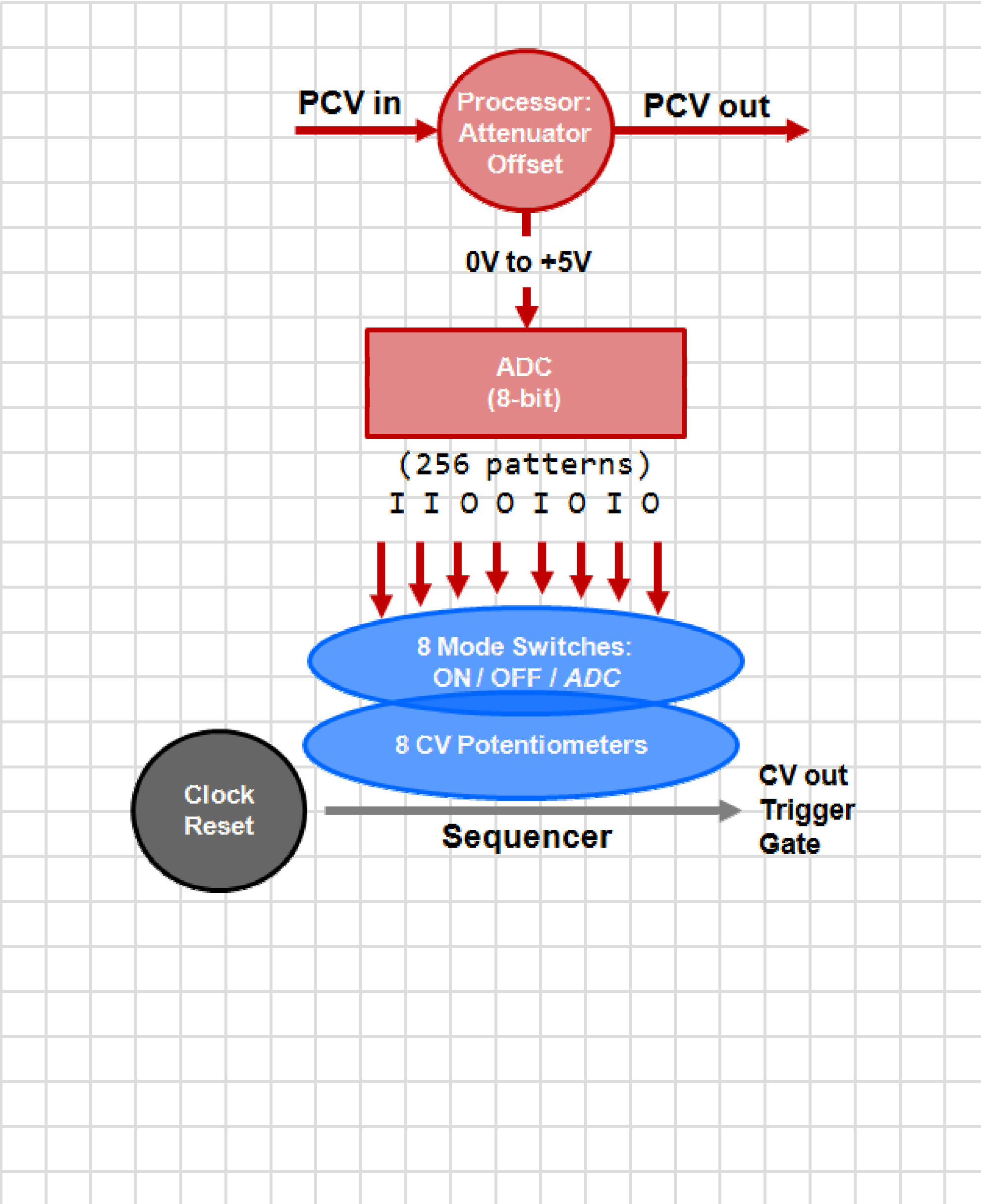
The actual ADC wants to see 0-5V. To keep your pattern control voltages in this window the attenuator and the offset controls form a voltage processor. This processed voltage is also available at the PCV out.

Each of this 8 bits corresponds to one of your sequencers steps. If it is “I” it would set the corresponding step to ON, if it is “O” it would set it to OFF (if this steps mode switch is set to ADC, of course!).

Think this 8-bit code as a pattern: `IIOIIOIO` (and all possible 256 combinations can be achieved)

The lower red LED-Array shows the actual pattern (depending on your mode switch and PCV settings), and below that it provides two warning LEDs (PCV <0V or >+5V).

Refer to block diagram on next page also.



Block Diagram:

The functional diagram to the left illustrates how the ADC module works together with the actual 8-step sequencer.

The mode switches for each step are the actual link. Here you can tell each step if it is always ON, OFF, or controlled by the corresponding bit of the 8-bit pattern that is currently dialled in.

So you could i.e. set steps 1, 4 and 7 to always ON, step 2 and 8 to always OFF, whereas the other steps are controlled by the ADC module.

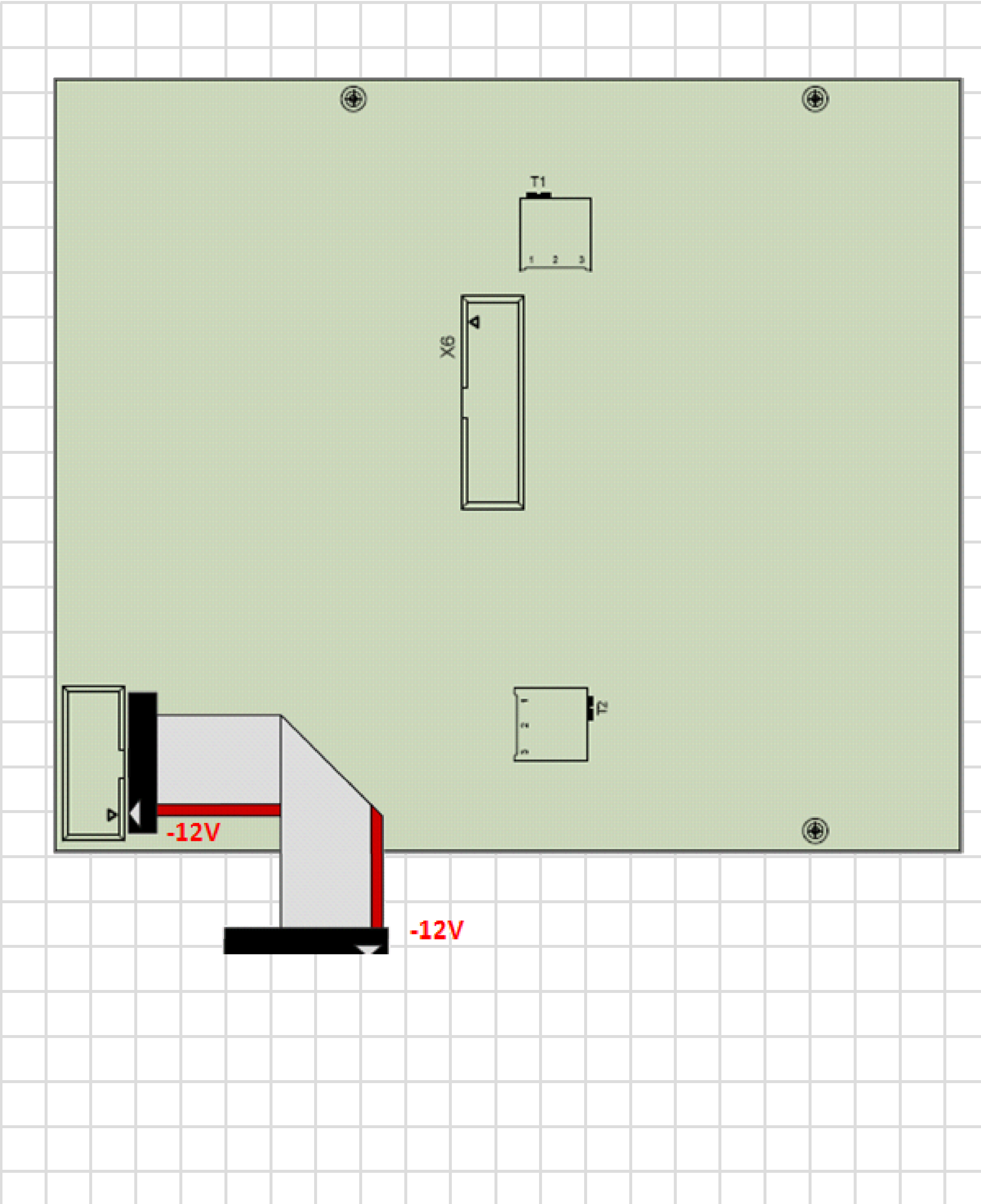
To understand what's happening, feed the mh11 a clock and set all step switches to the up/ ON position. All steps play. Then 'mute' certain steps by setting the switch to the OFF position. The ADC is used to automate this muting - it generates an 8-bit string of ON & OFF values which is AND gated with the incoming clock (Trig out). To test this, stop the sequencer, set all switches down to the ADC position and turn the manual PCV pot until all lights of the pattern LED-bar are lit. Restart the sequencer and turn the pattern knob. Any incoming CV is summed with the manual offset to generate a new string of ON & OFF values. The ADC 're-computes' the pattern with every change.

Important notes:

Avoid feeding the ADC with voltages higher than 8V. It might hang up and need a power off, power on. Just use the PCV input attenuator!

The CV output voltage for inactive steps (OFF) is 0V. So if you wanted to keep the CV of the previous step you will need a sample and hold.

The output CV droops slightly when passively multed (especially when the passive attenuator on the CV out is used), so you may want to buffer it.



Service notes:

Precision trimmer T1 sets the reference voltage for the ADC. It is set up correctly when in ADC-mode all steps are ON as soon as the PCV (pattern control voltage) reaches +5V.

Precision trimmer T2 sets the delay time for the clock signal before it gets used to create the trigger signal by ANDing the clock with the internal gates (compensation of the propagation delay).

Both trimmers are set correctly by default.

The socket X6 is for connecting an expander module (not released yet). Here the current pattern is available. Don't connect anything if you don't know what you do. If you need more technical information, contact fonitronik.

Connecting the module to the Doepfer Eurorack-Buss:

The module comes with a ribbon cable. The sockets are hardware coded, and follows the Doepfer-Standard (red wire = -12V). There is an additional sticker on the PCB to show the pin out..

Technical data:

Current draw: +70mA/-20mA max, 3U, 24HP, Installation depth: 1.8in

NO MICROCONTROLLER, JUST ANALOG (so no firmware updates)

Disclaimer:

If you connect the module the wrong way it can be damaged or destroyed. We cannot take any responsibility in such a case. So triple-check all connections before powering up the system..

Thanks for buying and using this module. Enjoy!

Cheers,
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