

## General

The OSC-02 module combines three oscillators, ring-modulation, hard-sync with individual modulation- and control-inputs. The analog circuit is based on the oscillator-design found in MFB-SYNTH II and MFB-Kraftzweg.

**Hint:** Since the oscillators in OSC-02 are an analog design, it is recommended to leave the unit switched on five to ten minutes before performance or recording.

## Set-up

OSC-02 is fully compatible to Doepfer's A-100 modular system - in size, bus-power and CV/Gate voltage. Connect the 16-pin cable to a corresponded 16-pin jack on the Doepfer mainframe bus. Supply voltage needs to be +/- 12 volts, 5-volt connections are not required. The wattage is +/- 40 mA, the module size 16 TE (Teileinheiten).

**ATTENTION:** Please, check for correct polarity! The colored side of the connector-cable needs to point downwards so that the cable is not twisted.

## Functions

OSC-02 makes use of the Doepfer A-100 mainframe/system bus for Key-CV-signals. Naturally, the bus needs to be fed by either an appropriate MIDI-CV-converter or a Bus-Access module. The signal needs to conform to the 1-volt/octave-standard and is meant to be used for oscillator pitch control by a keyboard or sequencer.

All three oscillators will receive the same control voltages (or pitches) when using the mainframe bus. To send individual control voltages to the oscillators, it is necessary to use the front panel inputs CV1-3. By using a front-panel input, the corresponding oscillator is automatically disconnected from the mainframe bus.

CV-inputs 1-3 and audio-outputs are interconnected. This means, that a CV-signal present **CV1** will also control OSC2 and OSC3, when not separately patched. For example, with **CV3** being patched, OSC3 is disconnected from the control signal present at **CV1**, while OSC1 and OSC2 are still under combined CV1 control.

The function for the audio outputs is comparable: **Out3** carries the signals (sum) of all three oscillators. With **Out1** or **Out2** being patched, these signals will be subtracted from **Out3**. To avoid internal clipping, the summed output signal at **Out3** is slightly reduced in level compared to the single output of OSC3.

## OSC 1

OSC1 is tuned by the global **Tune** control.

There is a choice of three waveforms, selectable by **Wave1** switch:

- Triangle
- square
- saw tooth

The square wave's symmetry (pulse width) can be controlled by **CV4** (see below).

**Octave1** switches between the octave registers 16', 8' and 4'. Pitch is controlled by **CV1** or the mainframe CV-signal. The required voltage needs to be within a range of 0 to 5 volts.

Additional CV-control can be provided through input **CV4**. By this, you can add vibrato or a pitch-envelope. Depending on the setting of the corresponding switch, the input voltage controls either pitch (**OSC1**) or pulse width (**PW1**). This input accepts voltages ranging between -5 and +5 volts. The shared control **CV4+5** sets the modulation intensity.

Global pitch modulation of all three oscillators is possible, using input **CV6**, switched to **ALL**.

OSC1's audio output is **Out1** or the summed output **Out3** as described above.

## OSC 2

OSC2 is widely identical to OSC1. Octave and waveforms are selected just like on OSC1. In addition to the global **Tune** control, OSC2 offers detuning of plus minus one octave using the **Interval2** knob.

Independent pitch control is achieved by using input **CV2**, compared to common control through the mainframe bus or input **CV1** (with CV2 unpatched).

Additional voltage control for modulations like vibrato or pitch envelopes can be provided through input **CV5**. Depending on the setting of the corresponding switch, the input voltage controls either pitch (**OSC2**) or pulse width (**PW2**). This input accepts voltages ranging between -5 and +5 volts. The shared control **CV4+5** sets the modulation intensity. OSC2 is also modulated when using **CV6** switched to **ALL**.

OSC2's audio output is **Out2** or the summed output **Out3** as described above. With **Out1** not patched, **Out2** carries the signals of both OSC1 and OSC2.

**Hint:** Modulation of OSC1 and OSC2 (**CV4** and **CV5** inputs) with different intensities requires attenuation of one of both control signals prior to the CV-input. You may use a VCA or a mixer to achieve this, since the module itself only allows shared intensity control through **CV4+5**. On the other hand, this control acts fine to fade the overall modulation in and out.

### OSC 3

OSC3 is widely identical to OSC1. Octave and waveforms are selected just like on OSC1. Here, the octave selection is shifted an octave down, much like on a sub-oscillator.

However, using the **Octave3** switch and **Interval3** control, you can always set OSC3 to the same pitch as OSC1 and OSC2 or create any possible interval.

Independent pitch control is achieved by using input **CV3**, compared to common control through the mainframe bus or **CV1**, **CV2** inputs (with CV3 unpatched).

Additional voltage control for modulations like vibrato or pitch envelopes can be provided through input **CV6**. Depending on the setting of the corresponding switch, the input voltage controls either individual pitch (**OSC3**) or common pitch (**ALL**). This input accepts voltages ranging between -5 and +5 volts. Control **CV6** sets the modulation intensity.

OSC3's audio output is **Out3**. With **Out1** or **Out2** not being patched, **Out3** also carries the signals of these oscillators.

### Ring modulator

OSC-02 also includes a digital ring modulator. Its output is available at **RingOut**. The sound is a result of the selected waveforms and the oscillators' pitches. Typically, the signals of OSC1 and OSC2 are used for ring modulation. However, OSC3's output may also be included, by removing the **Ring3** jumper located on the circuit board's back (mid-left).

### Hard-Sync

The OSC-02's oscillators can be synchronized internally or externally. OSC3 acts as master when internally synced. Its lower pitch is best suited for this application. Depending on the position of the **Sync** switch, either OSC1 or both OSC1 and OSC2 act as slaves. Inputs **CV4** and **CV5** allow the synchronized oscillators to be modulated by envelopes, LFOs or CV-sequencer signals.

Any external signal send to input **Sync In** will replace OSC3 as sync-reference. A proven choice as external sync signal is a square waveform. Other waveforms will often not deliver a sufficient sync reference.

### Calibration

Oscillators OSC1 ... OSC3 each offer a control to set their tuning (Tune1 ... Tune3). A second set of controls allow calibrating the spreading (Cal1 ... Cal3).



## Operating Manual

# OSC-02 Module