

General

NANOZWERG is a monophonic, analogue synthesizer in desktop format that can be controlled by MIDI as well as analogue CV- and Gate voltages. It includes all typical elements of subtractive synthesis and is suited for classic bass- and lead-sounds as well as effect-sounds. In addition, NANOZWERG can be used a filter box for external line-level-audio-sources.

Set-up and connections

Connect the external power-supply to the **Power** jack. Use **AudioOut** to connect NANOZWERG to a mixing desk, an audio-interface or an amplifier. **AudioIn** allows an external audio-signal (line level) to be fed into the units signal path to be used as a filter box, e.g. for a drum machine. NANOZWERG is controlled by MIDI or CV/Gate. Use a MIDI-cable to connect **MIDI In** with the MIDI-output of a keyboard or MIDI-interface. Alternatively, inputs **CV In** and **Gate In** can be connected to an analogue sequencer or CV/Gate-keyboard. Press **On/Off** to switch NANOZWERG on and off.

Attention: NANOZWERG uses analogue components. To ensure stable tuning, make sure the unit is switched on for 5-10 minutes before your performance starts.

Oscillators (VCO & Sub OSC)

NANOZWERG features a VCO with an additional sub oscillator. The VCO offers four waveform shapes that are selected by pressing **Wave**: triangle, saw tooth, rectangle and impulse. **Octave** sets the base octave to 16', 8', 4' or 2'. **Tune** controls the tuning within a continuous range of +/- one octave.

The sub oscillator generates a rectangle-wave one or two octaves below the VCO's tuning. Use **Sub OSC** to toggle between the settings 1/2, 1/4 or Mix. With Mix selected, 1/2, 1/4 and an additional 5/8 will sound simultaneously. Alternatively, the rectangle signal can be replaced by a noise generator (Noise setting). **Mixer** adjusts the balance between VCO and Sub OSC.

The fifth position of **Sub OSC** deactivates the sub oscillator. With the sub oscillator being deactivated and the **Mixer** set to Sub OSC fully, NANOZWERG can be used to process external audio source exclusively.

The VCO can be modulated by the LFO. By turning **Mod2** left from center, the pitches of VCO and Sub OSC are modulated. Turning right from center will address the symmetry (pulse width) of the impulse-waveform. The center position will deactivate modulation.

Glide

The trim control **Glide** sets the time for a continuous glide of two adjacent played notes (Portamento).

Filter (VCF)

The 12-dB multimode-filter allows sonic shaping of oscillator, sub oscillator and the external audio input. It offers four modes, selectable by pressing **Select**: Lowpass (LP), Bandpass (BP), Band Reject (Notch) and Highpass (HP).

The cutoff frequency is adjusted using the **Cutoff** control. In addition, this parameter can also be controlled by other sources: The trim pot **Key Follow** sets the dependency between cutoff and incoming notes (MIDI, Key-CV).

Contour adjusts the control of the ADSR-envelope towards the cutoff frequency. This parameter works bidirectional: Turning right from center has a positive influence, while turning left from center inverts the envelope influence. There is no envelope modulation in the center position of this knob.

Turning **Mod1** left from center will introduce a continuous modulation of the filter's cutoff by the VCO (Filter-FM). Turning right from center will introduce modulation by the LFO. There is no modulation in the knob's center position.

In addition, the cutoff frequency can be controlled by external sources. **VCF In** is a CV-input that could be addressed by a step-sequencer for example. MIDI-control over cutoff is done using CC #1 (modulation wheel).

Resonance sets the emphasis (Q-factor) of the filter at the current cutoff frequency. At its maximum, self-oscillation can be reached.

Amplifier (VCA)

The final element in the signal path is a voltage-controlled amplifier. This VCA is either controlled by a gate or envelope-signal that is triggered by MIDI- or gate-input signals.

VCA Select toggles between these modes. With Gate lid, the corresponding LED for the VCA is lit for the duration of the note-signal. The amplifier is open fully for this period. Gate-mode uses a minimal release-time to avoid unwanted clicking at the sound's end. When using the envelope, the volume will follow the parameter progression.

The VCA can also be externally controlled, using the **VCA In** input. Use any compatible CV-voltage source like another envelope from a modular synthesizer system.

Envelope (ADSR)

The envelope generator offers control for **Attack**-time, **Decay**-time, **Sustain**-level and **Release**-time. The first three phases work, while a note at the MIDI- or Gate-input is active. The release-time starts when a note/gate-signal has stopped.

Modulation-oscillator (LFO)

The LFO offers four waveform shapes: triangle, saw tooth, rectangle and S/H (Sample & Hold). **Rate** sets the LFO's frequency (speed) between approx. 10 seconds and 100 Hz. Pressing **OneShot** activates a one-pass-mode, where the selected waveforms is only played once after a note-trigger input is received.

Sequencer

NANOZWERG offers four, short internal sequences. Sequence 4 is a continuous note that permanently opens the VCA. This mode is ideally-suited to use NANOZWERG as a filter box for external audio signals, where MIDI- or gate-signals are not available to trigger the VCA.

The sequencer is controlled by knobs in the LFO-section as well as buttons of the VCO- and VCA-sections. To start a sequence, press and hold **OneShot** (LFO), followed by one of the buttons to the left (**VCA Select, Octave, Wave, Sub OSC**).

The sequence speed is set by the LFO **Rate** control, while **OneShot** (LFO) is being pressed. The sequence can be transposed using a MIDI- or CV-keyboard. Stop the sequence by pressing and holding **OneShot** (LFO) combined with the button for the selected sequence (**VCA Select, Octave, Wave, Sub OSC**).

MIDI

NANOZWERG receives MIDI-notes over a five-octave-range (C1-C6). In addition, it accepts MIDI-data for pitch-wheel (+/- 2 semitones) and mod-wheel data (MIDI-CC #1) that address the filter's cutoff frequency as well as the LFO speed.

MIDI-Channel

To set the MIDI-channel, press and hold **Wave** (LFO) for approx. one second. Keep the button pressed and set the channel using the **Rate** control. The channel number is displayed using the LEDs next to the LFO-wave. Add up the numbers next to the LEDs to determine the current channel (e.g. 1+4 = channel 5, 1+2+8 = channel 11). With no LED lit, the MIDI channel is 16.

Accent

The accent-function is activated by pressing **VCA Select** and **Select** in the VCF section, instead of mod_wheel). This velocity-activated function will simultaneously affect the filter's cutoff frequency, the LFO's speed (as well in one-shot-mode as an envelope) as well as the VCA.

Connections

The audio in- and outputs are located on the top of NANOZWERG. The connectors for external control can be found on the unit's rear. **MIDI-** and **CV-/Gate In** are meant to be used by keyboards or sequencers. **VCF In** and **VCA In** are meant to be used for modulations by external CV-sources, as described earlier.

Hint: The input **LFO In** is a specialty: Connecting an external source does not only modulate the LFO's speed. It will also increase its range significantly. With CV-voltages of up to 10 volts, the maximal speed reaches the audio spectrum, up to approx. 3 kHz. Using this function, the LFO when controlled by an analogue sequencer might be used as a second oscillator. Its signal needs to be tapped at the **LFO Out** jack and fed back into the unit using the **AudioIn** input (the signal will join with the VCO and sub oscillator signals before the filter section).



Owner's manual

MFB-NANOZWERG