VERMONA

ELEKTROAKUSTISCHE MANUFAKTUR



PERfourMER MKII

Bedienungsanleitung
User Guide

Introduction

In a choir, a string- or brass section, every voice has its own character, its sonic individuality, its proprietary modulation and its specific attack and decay. Is such behavior possible for a synthesizer as well? It is with the PERfourMER MKII! Each of its four voices are totally independent. No matter whether you play four single solo voices, a fourfold unison stack or with fourfold polyphony, the PERfourMER MKII will always generate all its voices on a complete individual basis.

During its development, we focused to make this synthesizer as easy to operate and ergonomic as possible. The large housing and big knobs guarantee immediate access to each parameter of every synthesizer voice. PERfourMER MKII is an analogue synthesizer with exceptional sonic possibilities for use on stage and in studios. And we are sure, you will have a lot of fun with it.

Your VERMONA crew from the
Elektroakustischen Manufaktur, Erlbach

Important Safety Information

1. Please read these instructions.
2. Keep these instructions. Always include them when passing the product on to third parties.
3. Heed all warnings and follow all instructions.
4. Do not use the PERfourMER MKII near water.
5. Only clean the PERfourMER MKII when it is not connected to the mains power supply. Clean only with a dry cloth.
6. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
7. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
8. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
9. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
10. Only use attachments/accessories specified by the manufacturer.
11. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
12. Unplug this apparatus during lightning storms or when unused for long periods of time.
13. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, when the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
14. To completely disconnect this apparatus from the AC mains, disconnect the power supply cord plug from the AC receptacle.
15. WARNING: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
16. Do not expose this equipment to dripping or splashing and ensure that no objects filled with liquids, such as vases, are placed on the equipment.
17. The mains plug of the power supply cord shall remain readily accessible.

Installation

- Ensure that the room in which you use this product is wired in accordance with the local electrical code and checked by a qualified inspector.
- Only use this product indoors.
- Do not install the product in hot, humid, or excessively dusty locations, in direct sunlight or in locations where it is exposed to externally generated vibrations.
- Do not place burning objects (e.g., candles) on top of or near the product.
- If condensation has formed on the product, e.g., because it was moved from a cold environment to a warm one, allow the product to acclimatize to room temperature before using it.
- Do not overload wall outlets and extension cables as this may result in fire and electric shock.

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Getting Started

Unpacking

To ensure top quality we carefully inspected the PERfourMER MKII before packaging. Nevertheless, the unit could have been damaged during transportation. Therefore, we ask you to take a serious look at the instrument when unpacking. Do not hesitate to contact us, should there be anything unusual with your PERfourMER MKII itself or its packaging.

You will find the following items in the box:

- The PERfourMER MKII
- A power cord
- This manual

Connections and Powering

If you came here without any problems, you can finally start up the PERfourMER MKII:

1. Connect the provided power cord to the PERfourMER MKII's **MAINS IN** connector and a power outlet.
2. Connect the stereo outputs, located on the rear, to appropriate audio inputs of a mixing console, an audio interface, or an amplifier. The PERfourMER MKII's outputs are unbalanced.
3. Connect the PERfourMER MKII's MIDI input to the MIDI output of a keyboard, a hardware sequencer, or a MIDI interface.
4. Press the **POWER** button to switch on the PERfourMER MKII. The red status LED above the **MASTER TUNE** control lights up.

Congratulations, the PERfourMER MKII has now been started. Be ready to have a lot of fun from now on.

Components and Controls



Figure 1: The PERfourMER MKII's second synthesizer channel

We could call the PERfourMER MKII a four-voice polyphonic analogue synthesizer. But by doing so, we would conceal the core of its architecture. Classic polyphonic synthesizers use one set of control elements to adjust all voices at once. Without any doubt, this is a proven concept when the goal is to get consistency over all voices. But individuality for each voice cannot be achieved intuitively with such conventional polyphonic synthesizers.

The PERfourMER MKII is different. Each of its voices has its own set of controls and switches. It incorporates four autarkical synthesizers in one housing and joins them with its sophisticated and flexible voice management system. This makes the PERfourMER MKII a very special and unique musical instrument and a creative tool.

We call a PERfourMER MKII's voice a *synthesizer channel*. The unit has four of them. They are (almost) identical and build upon a classic subtractive synthesis structure with a VCO, a VCF, and a VCA. In the following chapters, you will learn all about their control elements and parameters to get the most out of your PERfourMER MKII.

VCO – The Oscillator Section

Oscillators form the base of every synthesized sound. They offer different waveform shapes to create various audio spectra. Each synthesizer channel of the PERfourMER MKII offers a voltage-controlled analogue oscillator (VCO). Every VCO generates sine, triangle, square and saw-tooth waveforms with octave positions 4', 8', 16' and 32'. It also features a noise generator that produces white noise.

An external audio signal can be fed into each synthesizer channel in parallel to the internal sound sources (see EXT IN/VCO OUT on page 42).



Figure 2: The PERfourMER MKII's oscillator section

WAVE

Selects the waveform shape for the VCO. Available are sine (∿), triangle (△), square (⊓), saw-tooth (◿) or noise (▦). With **OFF** selected, the internal oscillator signal is switched off.

> ☞ The manual pulse width of the square waveform does not have a dedicated control. However, it can be varied using the modulation wheel (MIDI Control Change #1). This function can be enabled/disabled using *edit parameter 2:* **MODULATION WHEEL (PWM)**. (See Edit Mode 2: MODULATION WHEEL (PWM) on page 49.)

OCTAVE

Sets this oscillator's base octave to **4'**, **8'**, **16'** or **32'**.

In setting **HI** and **LO** the oscillator doesn't respond to incoming pitch information via MIDI or CV/Gate. The oscillator constantly oscillates with a fixed frequency.

GLIDE

Sets the duration of the glide-effect. This defines the time for the pitch to travel from one note to the next played note. It is well suited for solo work. With **GLIDE** set to zero, there will be no pitch-transitional-effect.

The glide-effect can also work automatically. This auto-function can be enabled/disabled using *edit parameter 5:* **AUTO GLIDE**. With auto glide enabled, the glide-effect will only be active with notes played legato, meaning a second note is played while the first note is still held. When not playing legato, the glide-effect will be inactive. To activate the PERfourMER MKII's auto glide function follow these steps:

1. Press the **EDIT** button.
2. Select *edit parameter 5:* **AUTO GLIDE** using the **SELECT/SEQ** encoder.
3. Press **TRIG** to activate/deactivate auto glide. The red LED above the **TRIG** button indicates the status of auto glide for the corresponding *synthesizer channel*.
4. Exit *edit mode* by pressing the **EDIT** button.

EG INT

This control sets the modulation amount of the envelope generator towards the oscillator's pitch. The modulation can be applied positive or negative. In its center position, modulation is turned off. This control offers a center catch.

TUNE

This control tunes the oscillator within a range of approx. **±7 halftones**.

LFO INT

Sets the modulation intensity of the LFO targeting the pitch or the pulse width of the oscillator. In its center position, the modulation is turned off. This control offers no center catch to allow for sensitively adjusted vibrato and PWM effects.

Turning **LFO INT** clockwise from center position will introduce pitch modulation to the oscillator.

Turning **LFO INT** counterclockwise from center position introduces pulse width modulation to the oscillator's square waveform. This function is dysfunctional with any other selected waveform. Using a sine waveform to modulate the pulse width results in a sound-thickening-effect, comparable to a slight detune. With higher modulation intensities (above the 3-o'clock-position), the oscillator will temporarily be muted depending on the LFO speed. Use the LFO's square and Sample & Hold waveforms to take advantage of this effect and create interesting rhythmical sound breakups.

> ☞ The oscillator's pulse width can also be adjusted using the modulation wheel (see Edit Mode 2: MODULATION WHEEL (PWM) on page 49).

Extended Oscillator Functions

SYNC – Oscillator Synchronization

The PERfourMER MKII oscillators in *synthesizer channels 2*, *3* and *4* can be synchronized to their prior located counterparts. Here, the master oscillator will force its frequency upon its coupled partner. Whenever the master oscillator's waveform reaches a zero-pass-through, it will force the coupled oscillator to a pass-through as well. With two oscillators running at the same frequency, this function will eliminate all pulsing and lead to identical phases.

With the coupled oscillator's frequency set higher than the master oscillator, the synchronization leads to the generation of additional harmonics. In particular, a modulation of the coupled oscillator by an envelope generator or LFO will result in complex harmonic structures.

To activate oscillator synchronization, set the SYNC switch (1 SYNC ▶②, 2 SYNC ▶③, 3 SYNC ▶④) to the left into **VCO** position.

For example, set switch 1 SYNC ▶② to **VCO**. Here, *synthesizer channel 1* will act as master and synchronize *synthesizer channel 2*. The same is true for *synthesizer channels 2* to *3*, and *synthesizer channels 3* to *2*. The dependencies will remain as described. However, modulation of multiple VCOs will lead to unforeseeable results and interesting effect sounds.

☞ To achieve a classical sync sound, set the coupled oscillator at least two octaves higher than the master oscillator or make sure, it heavily modulated by an envelope generator. It is also recommended to use a square waveform for the synchronized oscillator.

FM – Oscillator Frequency Modulation

The PERfourMER MKII offers frequency modulation for the oscillators of *synthesizer channels 2*, *3* and *4*. Not only the VCO but the complete previous *synthesizer channel* becomes the modulation source (modulator). This means that also its VCF, VCA, LFO, and envelope generator settings affects the FM. Its output volume doesn't count for the modulation.

Use the FM controls of *synthesizer channels 2* to *4* (1 FM ▶ ②, 2 FM ▶ ③, 3 FM ▶ ④) to set the intensity for the frequency modulation (FM). Set to center, modulation will be turned off. Turning the control to the left (towards **VCO**) will increase modulation intensity.

Turning the control clockwise (towards **VCF**) results in cutoff frequency modulation (see FM — Cutoff Frequency Modulation on page 36).

☞ The FM works linear. Clean FM sounds are achieved using sine waveforms for the carrier and modulator. The higher the FM amount, the more dissonant the resulting sound.

To get a static FM, set the modulator's VCA mode to **ON** (see VCA — The Amplifier Section on page 36). To get dynamic FM sounds, on the other hand, control the modulator's VCA through the envelope generator.

The FM gets harder and softer depending on the modulator's waveform and VCF setting.

VCF – The Filter Section

The filter shapes the oscillator's output signals, either one of the available waveforms, the noise generator's output and/or an external audio signal. Certain frequencies will be suppressed, resulting in subtle to significant sound changes. Dynamic control of the filter will create progressive sound changes over time. Each of the PERfourMER MKII's *synthesizer channels* offers a voltage-controlled resonance-capable low-pass-filter with a slope of 24 dB per octave. A low-pass-filter allows frequencies of an audio signal to pass below a certain frequency (cutoff frequency) and suppresses all frequencies above.



Figure 3: The PERfourMER MKII's filter section

CUTOFF

This control sets the filter's cutoff frequency. This is the frequency from which the audio signal is manipulated (filtered). Frequencies above the cutoff frequency will be attenuated with the filter's slope. Lowering **CUTOFF** will result in a more muffled sound as more harmonics are suppressed.

Beside manual control, the cutoff frequency can also be modulated and controlled by MIDI Aftertouch. This function can be enabled/disabled using *edit parameter 3:* **AFTER TOUCH (VCF)**. The intensity is fixed and cannot be adjusted. (See Edit Mode 3: AFTER TOUCH (VCF) on page 49.)

RESONANCE

Resonance is a feedback circuit within the filter that emphasizes the cutoff frequency. Higher values can color the sound significantly. With values higher than 3 o'clock, the filter will start to self-oscillate, generating a sine wave with the cutoff frequency. This sound can even be played chromatically over a range of approx. three octaves, depending on the **TRACK** switch setting. Here, it makes sense to disable any envelope modulation when playing the self-oscillating filter.

With increasing resonance, the volume decreases to avoid distortions.

EG INT

This control sets the intensity of positive or negative modulation towards the cutoff frequency carried out by the ADSR envelope generator. In its center position, cutoff modulation is turned off. This control offers a center catch.

LFO INT

Specifies the intensity of the cutoff modulation by the LFO.

TRACK

The tracking switch sets the filter tracking by the keyboard between off (**0**), half (**50**) and full (**100**). With active tracking, the cutoff frequency increases with higher notes. This makes it possible to play deeply filtered sounds at higher octaves. Setting tracking to 100 will allow playing a self-oscillating filter chromatically within a certain range.

FM – Cutoff Frequency Modulation

The cutoff frequencies of *synthesizer channels 2*, *3* and *4* can be modulated by the prior located *synthesizer channel*. Use the FM switches 1 FM ▶②, 2 FM ▶③, 3 FM ▶④ to set the intensity for the frequency modulation. Set to center, the modulation will be turned off. Turning the control to the right will increase the modulation intensity.

VCA – The Amplifier Section

A voltage controlled amplifier (VCA) controls each synthesizer channel's output. This allows manual control over the output volume as well as dynamic volume progressions. Available modulation sources are the envelope generator and a fixed gate envelope, the latter offering minimal attack- and release phases to avoid unwanted clicks caused by phase cuts during sound reproduction.

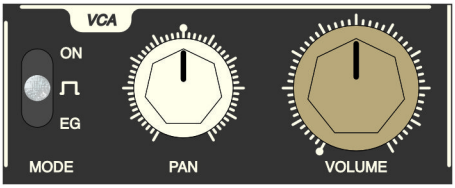


Figure 4: The PERfourMER MKII's VCA section

MODE

This switch sets the modulation source for the VCA, respectively sets the VCA being open permanently. The following settings are possible:

- **EG**: The ADSR envelope generator modulates the VCA.
- GATE (⊓): A fixed organ-like envelope modulates the VCA.
- **ON**: The VCA is permanently on, no modulation.

The modulation intensity of the envelope generator can be controlled by MIDI Velocity. This function can be enabled/disabled using *edit parameter 4:* **VELOCITY (VCA EG)**, available for each *synthesizer channel*. To enable/disable this function, carry out the following steps:

1. Press the **EDIT** button.
2. Select *edit parameter 4:* **VELOCITY (VCA EG)** using the **SELECT/SEQ** encoder.

3. Press **TRIG** to enable/disable velocity control for one or several *synthesizer channels*. The corresponding red LED above each **TRIG** button will display the respective velocity status.
4. Exit *edit mode* by pressing the **EDIT** button.

PAN

The **PAN** control places the synthesizer channel's sound within the stereo image. At its center position, the PERfourMER MKII's left and right outputs are fed with the same level. This control offers a center catch.

Turning the control to the left shifts the level towards the left output until the *synthesizer channel* will only be audible from the left output. The same applies to the right output when turning the control clockwise.

> ☞ The **PAN** control has no influence upon the individual outputs (**OUT/INSERT**) of the *synthesizer channels*.

VOLUME

This control sets the output level for the corresponding synthesizer channel. It controls the level of the individual outputs (**OUT/INSERT**) and main outputs at the same time.

LFO – The Modulation Generator

The LFO (Low Frequency Oscillators) allows creating cyclic repeating modulations of the oscillators and filter. The PERfourMER MKII's LFOs offer a choice of functions that might not be seen at first glance: They can be synchronized to each or to a MIDI Clock. The first includes the possibility to change their phase.

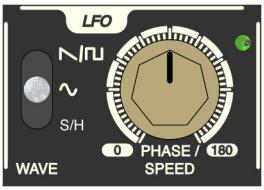


Figure 5: The PERfourMER MKII's LFO section

WAVE

This switch selects the LFO waveform. Choices are Sample & Hold (S/H), sine (∿) descending sawtooth and square (◺|⊓).

SPEED Respectively SPEED/PHASE

This control carries out three different functions. Depending on the SYNC switch position and/or the *edit parameter* setting for **LFO MIDI CLOCK SYNC** it controls the LFO's speed (frequency) the waveform's phase (not for *synthesizer channel 1*) or the MIDI Clock division.

In unsynchronized mode, **SPEED/PHASE** controls the LFO's frequency within a range of **0.05 Hz** (20 seconds for a full cycle) to **250 Hz**.

Extended LFO Settings

Selecting between saw tooth and square waveforms

Edit parameter 7: **LFO WAVE 1: SQUARE** allows changing the LFO's first waveform to square. This selection is available for each synthesizer channel.

The default setting for the first LFO waveform is saw-tooth. To switch to a square waveform, follow these steps:

1. Press the **EDIT** button.
2. Select *edit parameter 7:* LFO WAVE 1: SQUARE using the **SELECT/SEQ** encoder.
3. Press **TRIG** to enable the square waveform for one or several *synthesizer channels*. The corresponding red LED above each **TRIG** button will display the selected square waveforms. If the LED is not lit, the saw tooth is selected. Changes are audible immediately.
4. Exit *edit mode* by pressing the **EDIT** button.

SYNC – LFO Synchronization

The LFOs of *synthesizer channels 2*, *3* and *4* can be synchronized in frequency to the prior *synthesizer channel*. Set the SYNC switch to the right towards **LFO** to activate it.

With active LFO synchronization, **SPEED/PHASE** will no longer control the LFO's speed but its phase between 0° (0) and 180° (180). Set fully to the left (0), the synthesizer channel's LFO will run in phase with the prior located synthesizer channel's LFO. Set fully to the right (180), both LFOs are out of phase with the second one shifted by a half-cycle. Waveforms can still be selected independently for each synthesizer channel.

> ☞ What sounds cumbersome in theory is easy to understand in practice. Simply try the sync function. You will come across interesting complex rhythmic modulation patters very quickly.
>
> LFO synchronization has priority over MIDI CLOCK synchronization, described in the following section.

LFO MIDI Clock Synchronization

All of the PERfourMER MKII's LFOs can be synchronized to a MIDI Clock. This can be enabled/disabled for each *synthesizer channel* independently using *edit parameter 8:* **LFO MIDI CLOCK SYNC.**

To do so, follow these steps:

1. Press the **EDIT** button.
2. Select *edit parameter 8:* **LFO MIDI CLOCK SYNC** using the **SELECT/SEQ** encoder.
3. Press **TRIG** to enable synchronization for one or several *synthesizer channels*. The corresponding red LED above each **TRIG** button will display the synchronization status. If the LED is lit, MIDI sync is active.
4. Exit *edit mode* by pressing the **EDIT** button.

☞ With MIDI-clock-synchronization being activated for at least a single synthesizer channel, the green LED above the **MIDI CH** button will start blinking to indicate clock reception.

The LFO doesn't work if MIDI-clock-synchronization is active with no MIDI Clock at MIDI IN resp. no internal MIDI Clock activated.

If an LFO is set to MIDI Clock synchronization with no MIDI Clock being sent to the PERfourMER MKII, the corresponding LFO will not oscillate but stay at a fixed value.

With MIDI Clock synchronization being activated, **SPEED/PHASE** will control the division of the incoming clock signal, meaning that it sets the LFO's speed within a grid, referenced to the MIDI Clock.

The outer labeling of the **SPEED/PHASE** control, indicates the eight available MIDI Clock divisions. The divisions equal the following note values (left to right):

- whole note
- 1/2 note
- 1/4 note
- 1/4 triplet
- 1/8 note
- 1/8 triplet
- 1/16 note
- 1/32 note

☞ Changes from one scaling factor to another will take place after a waveform cycle has been completed. Do not worry about a possible delay after switching at slower tempos - this is intended.

Internal MIDI CLOCK

The PERfourMER MKII can also generate an internal clock to synchronize the LFOs. Its tempo can be adjusted using a TAP function.

To use the internal clock as reference, follow these steps:

1. Press the **EDIT** button.
2. Select *edit parameter 9:* **INTERNAL MIDI CLOCK** using the **SELECT/SEQ** encoder.
3. Press **TRIG** to enable the internal clock synchronization. The corresponding red LEDs above the **TRIG** buttons will display the synchronization status. This is a global parameter, valid for all *synthesizer channels*.
4. Exit *edit mode* by pressing the **EDIT** button.

To change the tempo for the internal clock signal, follow these steps:

1. Press the **EDIT** button.
2. Select *edit parameter 10:* **MIDI CLOCK TEMPO (TAP)** using the **SELECT/SEQ** encoder.
3. Press any of the four **TRIG** buttons to tap in the tempo. The **TRIG** LEDs will be blinking with the current tempo. The new defined tempo will be set after four taps.
4. Exit *edit mode* by pressing the **EDIT** button.

EG – The Envelope Generator

The envelope generator (EG) generates a control voltage that can modulate the VCO and VCF as well as the VCA. The envelope generator is restarted with each incoming MIDI Note. (Exception: With legato enabled, overlapping notes will not re-trigger the envelope generator.)



Figure 6: The PERfourMER MKII's envelope generator

ATTACK

Adjusts the rising time from zero to maximum level. **ATTACK** starts when a MIDI Note number is received or when using the **TRIG** button. When the CV/Gate option is installed (see Optional CV/Gate inputs on page 44), **ATTACK** can also be started with a gate signal.

DECAY

Adjusts the time from maximum level to a specific sustain level, while the MIDI Note is still active. In case the MIDI Note is shorter than the decay time, this phase will be aborted.

SUSTAIN

Sets the level of the sustain phase. The sustain phase starts when **ATTACK** and **DECAY** are over. It lasts as long as the MIDI Note is active. With **SUSTAIN** set to maximum, **DECAY** has no audible influence on the sound.

RELEASE

Adjusts the time from sustain level to zero after a MIDI Note Off message has been received.

Legato

Legato can be activated for each *synthesizer channel* independently. With legato, the envelope generator will not be restarted when notes are played overlapping.

To enable/disable legato mode, carry out the following steps:

1. Press the **EDIT** button.
2. Select *edit parameter 6:* **LEGATO** using the **SELECT/SEQ** encoder.
3. Press one or several **TRIG** buttons to enable/disable legato mode for one or several *synthesizer channels*. The corresponding red LEDs above the **TRIG** buttons indicate enabled legato modes for the channels.
4. Exit *edit mode* by pressing the **EDIT** button.

Connections of the Synthesizer Channels

Each of the PERfourMER MKII's *synthesizer channels* has two TRS jacks that offer two functions each. The function we consider the most frequently used is available on the tip contact, so that you may use common TS cables.

The second function is available on the ring contact and can be addressed with an insert cable.



Figure 7: The PERfourMER MKII's synthesizer channel connections

EXT IN/VCO OUT

This jack allows feeding an external audio-signal into the *synthesizer channel*. This signal is available parallel to the internal sound sources (see WAVE on page 32).

The ring contact will output the pure oscillator signal, unaltered by VCF and VCA.

OUT/INSERT

This jack primarily serves as individual output for the corresponding *synthesizer channel*. However, using an insert cable, this jack will provide an insert for external effects such as a ring modulator or special filters.

Additional Control Elements

TRIG

The **TRIG** button starts a single note or a sequence to play the PERfourMER MKII's sounds without any keyboard or sequencer attached. Whether a single note or sequence is played, depends on the setting of the **SELECT/SEQ** encoder. Set to positions **1** to **4**, single notes are played in different octaves. Set to positions **5** to **16**, different sequences are played in varying complexity. The function to play notes and sequences is inactive when in *edit mode*.

Single notes will be played and held as long as **TRIG** is held. Sequences will be started by pressing **TRIG** once and stopped by pressing **TRIG** again. A sequence will be stopped when the **SELECT/SEQ** encoder is used.

Combined *synthesizer channels* will always be triggered simultaneously but in regard to the selected *playmode*. For example, with *synthesizer channels 1* and *2* being combined, hitting **TRIG** in *synthesizer channel 1* will also trigger the second one.

When in MIDI- and *edit mode*, the **TRIG** buttons serve to assign MIDI Channels as well as parameter settings. (See Combining Multiple Synthesizer-Channels/Setting up MIDI Channels on page 46 and Edit Mode on page 48.)

☞ Use the internal sequences to make yourself familiar with the different playmodes (see Playmodes on page 46).

The internal sequences cannot be synced to a MIDI clock signals or replaced by other ones. Their only purpose is to test the PERfourMER MKII without any external MIDI equipment.

TRIG LOCK/440 Hz

Use this switch to lock all **TRIG** buttons. This will avoid unwanted triggering of sequences. As a secondary function, this switch generates a continuous tuning reference.

Set this switch to the left (**TRIG LOCK**), to disable triggering of single notes and sequences. This is specifically useful in a live situation.

Set this switch to the right (**440 Hz**), a digital generated tuning reference of 440 Hz will be output.

MASTER TUNE

This control allows tuning the PERfourMER MKII within a range of **±1 halftone**. **MASTER TUNE** affects all four synthesizer channels.

MASTER VOLUME

This control sets the overall output volume. It affects the rear outputs as well as the headphone output but it doesn't affect the individual *synthesizer channel* outputs (see EXT IN/VCO OUT on page 42).

SELECT/SEQ

During normal play mode, **SELECT/SEQ** will select the single notes and sequences that will be **trig**gered by the **TRIG** buttons.

When in MIDI or edit mode, the selector switch will set the MIDI Channel or an edit parameter.

POWER

The **POWER** switch, located on the unit's rear, switches the PERfourMER MKII on and off.

Connections

HEADPHONES

Connect headphones here. Its output volume can be adjusted using the **MASTER VOLUME** control.

MAINS IN

To supply the PERfourMER MKII with voltages connect the supplied power cable here. The PERfourMER MKII is equipped with a switching power supply that can handle alternating (AC) voltages from **90 to 240 volts at 50/60 Hz**.

MIDI IN

Use this input to connect the PERfourMER MKII to the MIDI output of a master keyboard, a DAW or a hardware sequencer.

MIDI THRU

The MIDI signal arriving at the MIDI input will be passed through to the **MIDI THRU** output to connect further MIDI devices.

OUTPUT

These jacks carry the summed stereo output signal of all four PERfourMER MKII's synthesizer channels. The outputs are unbalanced.

Optional CV/Gate inputs

The PERfourMER MKII can optionally be equipped with CV/Gate inputs. With this option installed, all four *synthesizer channels* can be addressed by analogue sequencers and CV/Gate-keyboards.

Each *synthesizer channel* is accessed through its individual CV/Gate jacks. Polyphony is only possible if the controlling sequencers and keyboards support polyphonic note output. The *playmodes* (see Playmodes on page 46) are irrelevant when using CV/Gate inputs because every synthesizer channel is directly addressed.

The **1V/OCTAVE CV INPUTS** control the pitch of the corresponding oscillator using the common volt per octave standard. Voltages up to 5 V can be processed.

The **GATE INPUTS trig**ger the PERfourMER MKII's ADSR envelope generators as well as the internal gate envelopes. Here, voltages ranging from **2,5 to 10 volts with positive slope** can be processed.

☞ In general the CV/Gate inputs work in parallel to MIDI. But the function that is accessed via the analogue inputs are taken from MIDI. If you i.e., insert a plug into the **1V/OCTAVE CV INPUT 1**, you cannot control the pitch of the first synthesizer channel via MIDI.

Programming Section

The rightmost section of the PERfourMER MKII's panel serves to adjust the MIDI Channels, *edit parameters*, and *playmodes* with the addition of global controls for **MASTER TUNE** and **MASTER VOLUME** (see Additional Control Elements on page 42).



Figure 8: The PERfourMER MKII's programmer section

Combining Multiple Synthesizer-Channels/Setting up MIDI Channels

The four PERfourMER MKII's *synthesizer channels* can be combined in different ways. Depending on the selected *playmode*, the *synthesizer channels* can be played monophonic, duophonic or polyphonic.

To combine *synthesizer channels*, simply set them to identical MIDI Channels. To do so, carry out the following steps:

1. Press the **MIDI CH** button.
2. Select the MIDI Channel (**1...16**) using the **SELECT/SEQ** encoder.
3. Press one or several **TRIG** buttons to assign the corresponding *synthesizer channels* to the selected MIDI Channel. The corresponding red LED above each **TRIG** button will be lit.
4. Exit MIDI mode by pressing the **MIDI CH** button.

☞ Steps 2 and 3 can be altered at any time until the edits are confirmed by leaving the MIDI mode.

Playmodes

The **PLAYMODE** switch determines how combined *synthesizer channels* react to incoming MIDI Notes. The following six playmodes are available:

M1 (monophonic)

With this *playmode* enabled, all combined synthesizer channels are regarded as a singular monophonic synthesizer. All combined synthesizer channels are played in unison.

In addition, **M1** is the standard playmode for all synthesizer channels not being combined with others.

Example: With *synthesizer channels 1*, *2* and *3* being combined on MIDI Channel 10 and *synthesizer channel 4* set to MIDI Channel 11, *synthesizer channel 4* can be played independently in **M1** playmode, even if **PLAYMODE** is set different.

☞ **M1** *playmode* allows stacking of *synthesizer channels*. Here, you may use identical or different settings for oscillators, filters, and modulators. With VCO, VCF, VCA, etc. being adjusted roughly identical, the PERfourMER MKII will react like a common synthesizer with multiple oscillators. However, it offers the advantage to spread channel across the stereo panorama and achieve a wide image without using a chorus effect.

With oscillators, filters and modulators being adjusted differently, you will create "stacked" sounds. A PERfourMER MKII stack might look like this: *Synthesizer channel 1* delivers a deep foundation using a heavily filtered saw-tooth waveform, *synthesizer channel 2* creates movement by using a square waveform, being modulated in pulse width as well as being filtered with high resonance. *Synthesizer channels 3* and *4* produce a sync sound with short decay time that will add a pronounced attack to the sound. Feel free to experiment with stacks - you will come across endless sound variations.

M2 (monophonic)

This *playmode* is monophonic, too. Here, the combined synthesizer channels are not addressed in parallel but one after another. The first MIDI Note will trigger e.g., *synthesizer channel 1*, the next s*ynthesizer channel 2* and so on....

☞ Try out the same application as for **M1** *playmode*. When setting all four channels with identical settings but different panning positions, the result will not sound chorus-like. Instead, the sound will be jumping in the stereo image rhythmically. This mode is well suited for fast sequences and arpeggios.

With oscillators, filters and modulators being set differently on all four synthesizer channels and spread across the stereo image, a sequence can drastically change its sound when changing between **M1** and **M2** *playmodes*. Although, the same notes arrive at the input, the M2 playmode will give the impression of (up to) four new sequences, due to our ear separating the different sounds from each other. Using an odd number of notes per beat will increase this effect further. Try to change between M1 and M2 playmodes frequently to discover new melodies!

P1 (polyphonic)

This *playmode* allows playing all combined *synthesizer channels* polyphonic. Here, the PERfourMER MKII can be played with up to four-voice-polyphony.

With the PERfourMER MKII being configured as an e.g., four-voice polyphonic synthesizer, the fifth received MIDI Note will abort the oldest voice and replace it.

In **P1** *playmode*, the PERfourMER MKII will store the order of all simultaneously held notes. With a note being released, this voice will be used for another voice that is still active and held.

P2 (polyphonic)

This playmode is almost similar to **P1** *playmode* with the difference that held notes are not stored.

D1 (duophonic)

Both duophonic *playmodes* take an exceptional role. The PERfourMER MKII is split in two-voice-units (comparable to a synthesizer with two oscillators per voice). The first unit consists of *synthesizer channels 1* and *2*, the second unit of *synthesizer channels 3* and *4*. In comparison to the other *playmodes*, the synthesizer channels are constantly combined and played by the *synthesizer channel 1's* MIDI Channel.

D1 *playmode* allows playing both (voices) with monophonic alternating voice-fetching, similar to **M1** *playmode*.

D2 (duophonic)

This *playmode* allows the two voice units to be played duophonic.

Edit Mode

The edit parameters allows adjusting different settings for the individual *synthesizer channels* as well as global settings for the PERfourMER MKII. For easy handling, a list of all available parameters is printed on the unit's surface above the **SELECT/SEQ** encoder.

To change a parameter, perform the following steps:

1. Press the **EDIT** button to enter *edit mode*.
2. Use the **SELECT/SEQ** encoder to select the desired parameter (**1…10**).
3. Enable or disable the selected parameter using the *synthesizer channel*'s **TRIG** buttons. Parameters **1** to **8** are set individually per *synthesizer channel* while parameters **9** and **10** are global settings valid for the whole PERfourMER MKII.
4. Exit *edit mode* by pressing the **EDIT** button.

The edit mode allows adjustment of the following parameters:

Edit Mode 1: PITCH BENDER (VCO)

This parameter enables/disables pitch modulation using the pitch bender. The Pitchbender's range has a fixed value of about **±5 halftones**.

Edit Mode 2: MODULATION WHEEL (PWM)

This *edit parameter* enables/disables the modulation of the oscillator's square waveform's pulse width through the modulation wheel (see WAVE on page 32).

Edit Mode 3: AFTER TOUCH (VCF)

This *edit parameter* enables/disables the modulation of the filter's cutoff frequency through Channel Aftertouch (see CUTOFF on page 35).

Edit Mode 4: VELOCITY (VCA EG)

This *edit parameter* enables/disables the modulation of the VCA's envelope amount through incoming velocity data (see VCA — The Amplifier Section on page 36).

Edit Parameter 5: AUTO GLIDE

This *edit parameter* enables/disables the auto-glide function. With audio-glide enabled, a glide will only be performed with two adjacent notes being played overlapping (see GLIDE on page 32).

Edit Parameter 6: LEGATO

This *edit parameter* enables/disables the legato mode. With legato enabled, the envelope will not be re-triggered with adjacent notes played overlapping (see EG – The Envelope Generator on page 40).

Edit Parameter 7: LFO WAVE 1: SQUARE

This *edit parameter* enables/disables the alternative LFO square waveform shape. With this function enabled, a square waveform will replace the saw-tooth waveform in the LFO (see Selecting between saw tooth and square waveforms on page 38).

Edit Parameter 8: LFO MIDI CLOCK SYNC

This *edit parameter* enables/disables LFO synchronization to MIDI Clock (see LFO MIDI Clock Synchronization on page 38).

Edit Parameter 9: INTERNAL MIDI CLOCK

This *edit parameter* enables/disables a replacement of the external MIDI Clock by an internal clock signal (see Internal MIDI CLOCK on page 40).

Edit Parameter 10: MIDI CLOCK TEMPO (TAP)

This *edit parameter* allows setting the internal MIDI-clock-tempo using the TAP-button (see Internal MIDI CLOCK on page 40).

Factory Reset

The PERfourMER MKII can be reset to factory settings. The reset only affects the *edit parameters* and MIDI Channel settings. For resetting the PERfourMER MKII carry out the following steps:

1. Switch off the PERfourMER MKII
2. Switch the unit on while pressing and holding the **EDIT** and **MIDI CH** button at the same time. Once the corresponding LEDs light up, the reset has been made.



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