VERMONA

ELEKTROAKUSTISCHE MANUFAKTUR

fourMative CONTOURS

Bedienungsanleitung
User Guide

Foreword

Envelope generators are common tools in the world of modular synthesizers and there will be one present in any system at least. There are multiple approaches such as simple single-phase-envelopes, classic ADSR envelope generators and even modules allowing to generate complex voltage curves.

By the time you read this, you have either purchased our fourMative CONTOURS module or are at least interested in it. Therefore, we want to reveal what you can do with it right away:

- The module generates up to four single-phase-envelopes.
- These can be arbitrarily combined and looped.
- The frequencies range from very sloooooooow up into the audio band. Among other applications, you may use fourMative CONTOURS as LFO or even as a sound source.
- The envelope times are controllable by CV.
- It looks beautiful and is manufactured by hand with greatest care at our *Elektroakustischen Manufaktur* in Erlbach, Germany

We are confident that you will discover lots of possible capabilities for fourMative CONTOURS that you are not yet thinking of. This operating manual intends to support you to understand the module's functionality and to utilize its possibilities to its full potential. Therefore, please do not just put it to the side right away!

By the way, we are always happy to receive feedback. Do you have questions about this module or have created the ultimate patch with fourMative CONTOURS being involved? Let us know! Feel free to send us an e-mail or use the contact form on our website.

We wish you lots of fun using fourMative CONTOURS!

Your VERMONA crew from the
Elektroakustischen Manufaktur, Erlbach
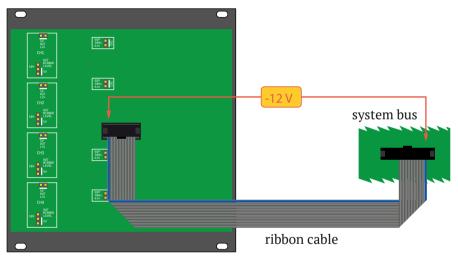
Unpacking

To ensure top quality, we carefully checked the fourMative CONTOURS module before packaging. Nevertheless, we cannot fully exclude damage during transportation. Therefore, we kindly ask you to inspect fourMative CONTOURS by yourself, once you receive it. In case there is anything unusual about it or its packaging, do not hesitate to contact your dealer or us, to solve the problem.

You should find the following items in the box:

- the fourMative CONTOURS module
- a ribbon-cable (10-pole to 16-pole)
- four screws M 3 x 6 mm with matching plastic washers
- this operating manual

Setup

fourMative CONTOURS was designed to be mounted and used in Eurorack modular systems. Its power supply, connectors and dimensions match the typical specifications (VERMONA Modular Case, Doepfer A-100 and compatible systems). Mounting equals any other Eurorack module:

Figure 1: Connecting fourMative CONTOURS to the system-bus

1. **Switch off the power supply!** For safety reasons, also remove the detachable power cord from your frame before mounting the module!

2. Connect the supplied ribbon-cable with its 10-pole connector to the corresponding multi-pin connector ⑬ on fourMative CONTOURS' rear (see "Figure 1: Connecting fourMative CONTOURS to the system-bus" on page 3).

⚠ **The corresponding plug socket is protected against reverse polarity. Therefore, the 10-pole connector of the ribbon-cable will only fit in one direction into the module ⑬. The supplied ribbon-cable is color-coded at the -12 volts position. Note, that this may differ from other manufacturers. Therefore, only use the supplied ribbon-cable to connect fourMative CONTOURS to your frame's system bus!**

3. Connect the ribbon-cable's 16-pole connector to an empty plug-socket of your frame's system bus. Make sure the color-coded side of the cable points towards **-12** volts! (See "Figure 1: Connecting fourMative CONTOURS to the system-bus" on page 3).

⚠ **Connecting the ribbon-cable with reverse polarity can lead to damage of your fourMative CONTOURS or other modules when powering the system! Double-check the connections before continuing – safe is safe!**

4. Mount fourMative CONTOURS to your modular frame using the supplied screws. To protect the unit's surface from scratches, use the supplied flat plastic washers.

5. Reconnect the power cord to your frame and switch on the power-supply.

Congratulations, fourMative CONTOURS is now ready to operate.

Functions and Control Elements

fourMative CONTOURS consists of four independent envelope generators which we describe as *units*.

These four *units* are constructed identically and offer nearly the same control elements. Therefore, we will only describe the functions once here and will deal with possible differences in the corresponding sections of the manual.
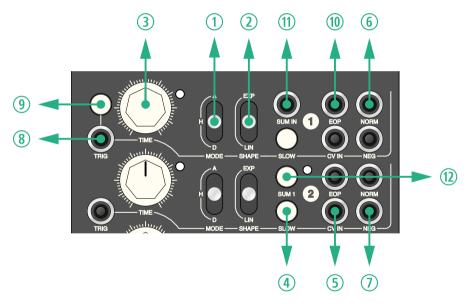

Figure 2: Control Elements of fourMative CONTOURS

The Curve Shape

An envelope is a voltage curve with a certain shape. In fourMative CONTOURS, this shape is adjusted using the two switches **MODE** ① and **SHAPE** ②.

MODE

The **MODE** switch ① defines the basic shape of the envelope. It offers three settings:

A	ATTACK	An ascending voltage curve is being generated.
H	HOLD	A consistent voltage is being generated.
D	DECAY	An descending voltage curve is being generated.

SHAPE

The **SHAPE** switch ② adjusts the envelopes characteristic in **ATTACK** and **DECAY** modes. It offers the settings **EXP** (exponential) and **LIN** (linear). With **MODE** ① being set to **HOLD**, the **SHAPE** switch ② does not have any effect.

Duration

An envelope not only offers a certain curve shape but also a specific duration. In fourMative CONTOURS, you can adjust this duration manually and modify it by using a control voltage (CV).

TIME

The **TIME** control ③ adjusts the duration of the envelope. The more the control is turned up, the slower the envelope's duration. Accordingly, the fast time is achieved with the control set fully to the left.

TIME ③ depends on the setting of the **SLOW** switch ④.

SLOW

The **SLOW** switch ④ sets the time range for **TIME** ③.

When switched off (not pressed), the envelope duration can be set between 0.5 ms and approx. 500 ms using the **TIME** control ③. This range is especially interesting for the creation of percussive sounds.

When enabled (button pressed), the envelope duration can be set between 30 ms and approx. 30 s using the **TIME** control ③.

CV IN

Input **CV IN** ⑤ allows to connect a CV to adjust the envelope's duration. The input works in parallel to the **TIME** control ③. Positive voltages increase the duration being manually set, while negative voltages will shorten it. At its extremes, the shortest possible time for the envelope is 25 microseconds and approx. 10,000 seconds (> 2.5 hours) for the longest duration.
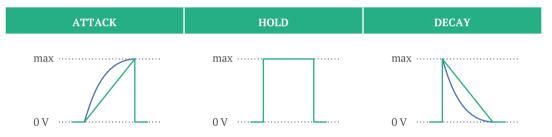
Ideally, the input **CV IN** ⑤ is fed with voltages ranging between **−5 V** and **+5 V**.

Outputs

The envelope is being sent to both outputs **NORM** ⑥ and **NEG** ⑦.

NORM

Output **NORM** ⑥ provides an envelope with a positive voltage. While resting and no envelope is being output, the voltage at the **NORM** output ⑥ is constantly **0 volts**. Depending on the parameters **MODE** ① and **SHAPE** ②, the envelope output is as follows:

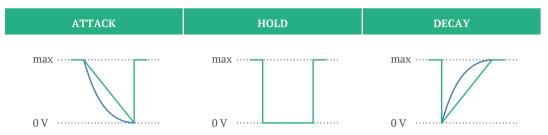| ATTACK	HOLD	DECAY

The voltage starts at **0 V**, rises to its maximum with the adjusted envelope duration (**TIME** ③ / **CV IN** ⑤) and falls back to **0 V** abruptly upon completion.

The voltage immediately jumps from **0 V** to the maximum value. This voltage will be held for the adjusted envelope duration (**TIME** ③ / **CV IN** ⑤) and abruptly drops back to **0 V** upon completion.

The voltage immediately jumps from **0 V** to its maximum and falls back to **0 V** with the adjusted envelope duration (**TIME** ③ / **CV IN** ⑤).

NEG

NEG ⑦ outputs the envelope in inverted form. While resting and no envelope is being output, the maximum voltage is constantly applied to the **NEG** output ⑦. Depending on the parameters **MODE** ① and **SHAPE** ②, the envelope is output as follows:

ATTACK	HOLD	DECAY

The voltage starts from its maximum, falls back to **0 V** with the adjusted envelope duration (**TIME** ③ / **CV IN** ⑤) and jumps back to its maximum upon completion.

The voltage immediately drops from the maximum value to **0 V**. This value is held for the adjusted envelope duration (**TIME** ③ / **CV IN** ⑤) and abruptly jumps back to the maximum value.

The voltage immediately falls from its maximum to **0 V** and rises back to its maximum with the adjusted envelope duration (**TIME** ③ / **CV IN** ⑤).

TRIG-Input and -Button

To receive any signal at the outputs **NORM** ⑥ and **NEG** ⑦, the envelope needs to be triggered first. **TRIG** input ⑧ and **TRIG** button ⑨ serve this purpose.

The green LED located next to the **TIME** control ③ will light up with the received trigger and remains on for the duration of the envelope.

TRIG input

The **TRIG** input ⑧ expects a positive trigger-impulse with a minimum voltage of **2.5 V**. The envelope is being triggered by the signal's positive flank while the pulsewidth is not interpreted.

TRIG button

In addition to the **TRIG** inputs ⑧, *unit 1* and *unit 3* also offer buttons to manually trigger the envelopes ⑨.

☛ **Whenever the envelope is being retriggered without having completed, it will restart from the current voltage value. It doesn't matter if it is retriggered by a trigger signal at the TRIG input ⑧ or manually using the TRIG button ⑨.**

End-of-phase (EOP)

The output **EOP** ⑩ will send out a trigger-impulse upon completion of the envelope. For example, it may be used to trigger multiple units one after another or to create loops. See also section "Applications" on page 14.

Summing Multiple Units

By using the **SUM IN** jack ⑪ and the **SUM** switches ⑫, it is possible to create complex envelopes. Take a closer look at the examples in sections "Envelopes" on page 14 and "LFO / Oscillator" on page 17.

SUM IN

Unit 1 of fourMative CONTOURS offers a **SUM IN** input ⑩. By using this input, any signal can be summed up to the output **NORM** ⑥ and **NEG** ⑦, e.g. an offset-voltage.

SUM 1, 2 and 3

Unit 2, *unit 3* and *unit 4* of fourMative CONTOURS each offer a switch to sum up the **NORM** signal ⑥ of the previous *unit* to both outputs. The yellow LED next to the **SUM** switches ⑫ will light up, with the sum-function being activated.

Jumpers

By setting jumpers on the module's back, the pulsewidth for the EOP-trigger-impulses and the maximum output voltage can be set per *unit*.
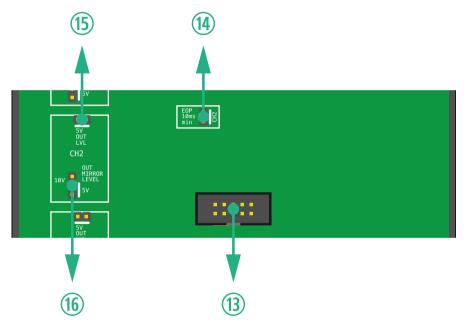

Figure 3: Jumpers and system-bus-connector of fourMative CONTOURS

Length of EOP-trigger-impulses

Because some Eurorack-modules are incapable to work with very short trigger-impulses, we set the pulsewidth of the end-of-phase trigger (EOP) to **10 ms**. By using this setting, fourMative CONTOURS is compatible to most modules of other manufacturers.

The **TRIG** inputs ⑧ of fourMative CONTOURS react to the signal's positive flank. Therefore, the pulsewidth is irrelevant. This offers the advantage of reaching significantly higher frequencies when looping the envelope.

To shorten the pulsewidth of the **EOP** output ⑩ to **1 ms**, remove the jumper **EOP** ⑮.

Output level

We set the maximum voltage of the outputs **NORM** ⑥ and **NEG** ⑦ to **+5 V**. This way, fourMative CONTOURS fits best with the inputs of other VERMONA modules. However, there are cases where a higher output level is desirable. You may therefore double the maximum output level to **+10 V**.

Two jumpers per unit serve this purpose: **5V OUT LVL** ⑮ and **OUT MIRROR LEVEL** ⑯.

With the jumper **5V OUT LVL** ⑮ being set, the maximal voltage at the output is **+5 V**. To double this voltage, remove the jumper.

In addition, the jumper **OUT MIRROR LEVEL** ⑯ has to be moved from **5 V** to **10 V** to shift the mirror axis of the **NEG** output ⑦ respectively.

☛ **In case you want to use fourMative CONTOURS as an audio oscillator, it may be completely reasonable to set the 5V OUT LVL ⑮ to 10 V, but leave the OUT MIRROR LEVEL ⑯ at its 5 V position. This way, the voltage of the corresponding units oscillates within a range of ±5 volts without a DC-offset.**

Applications

For a better understanding of fourMative CONTOURS' possibilities, we have collected a few practical examples. These are meant primarily to serve as suggestions and encourage you to start experimenting with the module.

We are keen to learn how you are using fourMative CONTOURS. So don't hesitate to let us know about your patches. Send us an e-mail or use the contact form on our homepage.

Envelopes

Each of fourMative CONTOURS' units can generate a single-phase-envelope, that's what you learned in the manual so far. But by chaining more units you can get much more complex, multi-stage-envelopes.

Attack-Decay

For generating an Attack-Decay-envelope, you need to chain two *units*. In our example, we use *unit 1* and *unit 2*:

- Connect the **TRIG** input of *unit 1* to your trigger-source (i.e., a gate output of a sequencer or a MIDI interface).
- Connect the **EOP** output of *unit 1* with the **TRIG** input of *unit 2*.
- Set the **MODE** switch of *unit 1* to **A** (ATTACK) and the **MODE** switch of *unit 2* to **D** (DECAY). Also, activate **SUM 1**.
- Connect one of the outputs **NORM** or **NEG** of *unit 2* with your modulation target (i.e., the pitch of an oscillator).

Triggering *unit 1* with a trigger-impulse or by pressing the **TRIG** button starts the *Attack* phase of *unit 1*. After *Attack* is completed, the **EOP** trigger starts the *Decay* phase of *unit 2*. Because of **SUM 1** has been activated, both phases are available at the **NORM** and **NEG** outputs of *unit 2*.

Attack-Hold-Decay

This example extends the Attack-Decay-envelope, described above. To get three phases, we need to integrate *unit 3* and tap the entire envelope from there.

- Additionally to the previous patch, connect the **EOP** output of *unit 2* to the **TRIG** input of *unit 3*.
- Activate **SUM 2** on *unit 3* and set its **MODE** switch to **D** (DECAY).
- Set the **MODE** switch of *unit 2* to **H** (HOLD).
- Connect one of the outputs **NORM** or **NEG** of *unit 3* to your modulation target.

☛ **This way you can combine any of the four units of fourMative CONTOURS. Besides controlling the times of the phases manually, you can modulate one or more of them by CV using the CV IN inputs.**

Trigger- and Gate Manipulation

Altering Trigger/Gate-Length

You can change the length of trigger- or gate-signals by using a single Hold phase:

- Connect the output of your trigger-/gate-source with the **TRIG** input of *unit 1*.
- Set the **MODE** switch to **H** (HOLD).
- Connect the **NORM** output to your trigger-/gate-target.

You can now control the length of the trigger/gate-signal with the **TIME** control of *unit 1*. Even better, you can modulate the length by using the **CV IN** input.

Delaying Trigger/Gate-Signals

You also can use fourMative CONTOURS to delay any trigger- or gate signal. For that you simply have to take the sample above and put a phase in prior without summing up the signals:

- Connect your trigger source to the **TRIG** input of *unit 1*.
- Connect the **EOP** output of *unit 1* to the **TRIG** input of *unit 2*.
- Set the **MODE** switch of *unit 2* to **H** (HOLD).
- Make sure the **SUM 1** switch of *unit 1* is **not** activated!
- Connect the output **NORM** of *unit 1* to your trigger-/gate-target.

You can now control the delay with the **TIME** control of *unit 1* while **TIME** of *unit 2* controls the length of the trigger as described in the example above.

LFO / Oscillator

You not only can chain the *units* of fourMative CONTOURS but also can make them trigger themselves to create cyclic voltage curves.

Sawtooth

To get a sawtooth out of fourMative CONTOURS you only need one unit:

- Connect the **EOP** output of *unit 1* with its **TRIG** input.
- Connect one of the outputs **NORM** or **NEG** with your modulation target.

To start the LFO you will have to press the **TRIG** button of *unit 1*.

MODE determines if the unit generates a raising sawtooth (ATTACK) or a falling sawtooth (DECAY). Of course you can use the **SHAPE** switch as well to get a different waveform.

Use **TIME** to set the speed of the LFO/oscillator: The shorter the time, the higher the frequency.

☞ **To get frequencies up to the audio band you should set the EOP trigger length to 1 ms (See "Length of EOP-trigger-impulses" on page 13).**

Triangle

To generate a triangle waveform we need to use two *units* of fourMative CONTOURS.

- Connect the **EOP** output of *unit 1* to the **TRIG** input of *unit 2*.
- Connect the **EOP** output of *unit 2* to the **TRIG** input of *unit 1*.
- Activate the **SUM 1** switch of *unit 2*.
- Set the **MODE** switch of *unit 1* to **A** (ATTACK) and the **MODE** switch of *unit 2* to **D** (DECAY).
- Connect one of the outputs **NORM** or **NEG** to your modulation destination.

Like before you will have to start the LFO/oscillator by pressing the **TRIG** button of *unit 1*.

You set the frequency by using both **TIME** controls. To get a symmetrical triangle both **TIME** controls (*unit 1* and *unit 2*) have to be set to the same values.

Rectangle

A rectangle can be generated with the same patch like before. You simply have to deactivate the **SUM 1** switch of *unit 2* and set its **MODE** switch to **H** (HOLD).

Technical Specifications

Envelope Duration	
TIME, SLOW off	0.5 ms - approx. 500 ms
TIME, SLOW on	30 ms - approx. 30 s
TIME + CV IN	25 µs - 10.000 s
Level	
optimum CV IN level	±5 V
max. output level for NORM and NEG	0 ... 5 V respectively 0 ... 10 V
max. inpult level SUM IN	±10 V
TRIG threshold	+2,5 V
EOP trigger signal	+10 V / 1 ms respectively 10 ms
Maximum Power Consumption	
+12 V	130 mA
-12 V	80 mA
+5V	-
Dimensions / Weight	
Width / Height	24 HP / 3 U
Depth	approx. 40 mm
Weight:	360 g

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