



ELEKTROAKUSTISCHE MANUFAKTUR

qMI 2

User Guide

Introduction

Patch VCO, VCF and VCA, add a few envelopes and LFOs and the modular synthesizer system is ready to go. Now, connect a MIDI/CV-interface and start playing. This is great, however, there may be some or even lots of unused modules left in the frame, not being used for this patch. There may be useful applications for these but how to address them?

Analogue modular systems are mainly used monophonically. Therefore, almost all MIDI/CV-modules are limited to monophonic output. On the other hand, the bigger the modular system, the more possibilities to address modules are needed. We have developed the qMI 2 - *quad MIDI interface* for exactly this scenario. Whether there is need for four independent patches, layered sounds, rotating voice assignments or even polyphonic sound - the qMI 2 will help to get the most out of a modular synthesizer and expand its flexibility.

Enjoy your qMI 2 - *quad MIDI interface*.

Your VERMONA crew from the
Elektroakustischen Manufaktur, Erlbach

Getting Started

To ensure top quality, we carefully inspected the qMI 2 before packaging. Nevertheless, the unit could have been damaged during transportation. Therefore, please take a serious look at the module when unpacking. Do not hesitate to contact us for help, should there be anything unusual with the module or its packaging. Just let us know!

The box should contain the following items:

- one qMI 2
- one ribbon-cable (16-pole to 16-pole)
- four rack mounting screws 3 x 6 mm and suitable plastic washers
- this manual

Setup and connection

The qMI 2 was designed to work in modular synthesizer systems using the common euro rack format. Its power supply, connectors and dimensions match the typical specifications (VERMONA Modular Case, Doepfer A-100 and compatible systems). To mount the module into the system's frame, carry out the following steps:

1. **Switch off the power supply!** For safety reasons, also remove the detachable power cable from the frame - Security first!
2. Connect the supplied ribbon cable to the module's rear. The corresponding plug socket is protected against reverse polarity. The ribbon cable will only fit in one direction.
3. Connect the ribbon cable's other side to an empty plug-socket of the frame's system bus. **Make sure that the color coded side of the cable points towards - 12V!** (*see"Figure 1: Connecting the qMI 2 to the system bus" on page 3*)



Connecting the ribbon cable with reverse polarity may lead to damage of the module when powering the system!

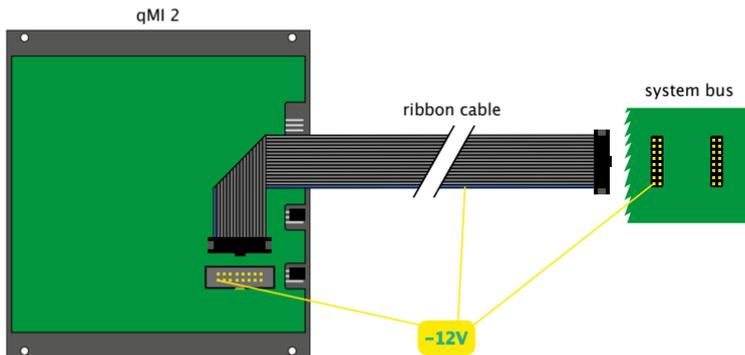


Figure 1: Connecting the qMI 2 to the system bus

4. Mount the qMI 2 to the modular frame. The unit requires a width of 24 HP (horizontal pitch) and is rack-mounted with the four supplied screws. Use the supplied flat plastic washers to protect the modules surface off scratches.
5. Reconnect the power chord to the frame and switch on the power supply. The module is now ready to work. Press the **MIDI CH**  or **EDIT**  push-button to verify if the qMI 2 is correctly supplied with power. If so, pressing the push-button will turn on a green LED. Press again to leave this menu.

To find out how to correctly use the different connections of the *qMI 2* with other modules in a modular system, read the following sections and explanations of this manual.

General

The qMI 2 - *quad MIDI Interface* is a MIDI to CV converter. It transforms MIDI-notes, controller data and clock signals into analogue voltages and gate signals. The module offers four channels (referred to as *CV/Gate channels*) with individual CV- and gate outputs for note outputs. In addition, the module offers two CV-outputs per channel to control variable parameters - independently or in combination. This makes the conversion of monophonic and polyphonic MIDI-sequences with additional use of MIDI-controllers possible with a modular synthesizer system.

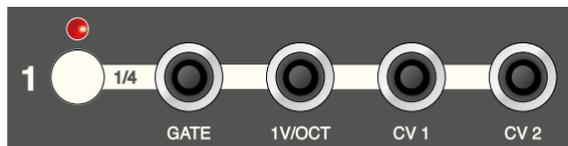


Figure 2: *CV/Gate channel* of the qMI 2 - quad MIDI interface

The CV-output for pitches follows the established standard of *1 volt per octave*. All current oscillator modules and most vintage synthesizers should support this conversion scheme.

The gate connector provides 10 volts output with positive polarity. Again, this voltage is accepted by almost all modules at their gate inputs, e.g. envelopes, switches, reset-inputs of LFOs, start/stop inputs of sequencers etc. Clock and reset-outputs also provide 10 volts with positive polarity.

CV outputs 1 and 2 provide continuous control voltages in a range of 5 volts, deriving from different MIDI-controllers.

Controls and functions

The qMI 2 offers a MIDI input with all corresponding control elements to the left. The module's right section provides four output jacks for the four *CV/Gate channels*. These carry the analogue control voltages having been converted from the MIDI input. From here, connect to the system's modules.

The qMI 2 processes MIDI-notes, velocity, pitch bend commands, a choice of MIDI-controllers as well as MIDI-clock. All these signals are converted into analogue CV-, gate- and clock-signals. All 16 MIDI-channels are recognized. Notes and controllers of up to four different MIDI-channels can be converted independently.

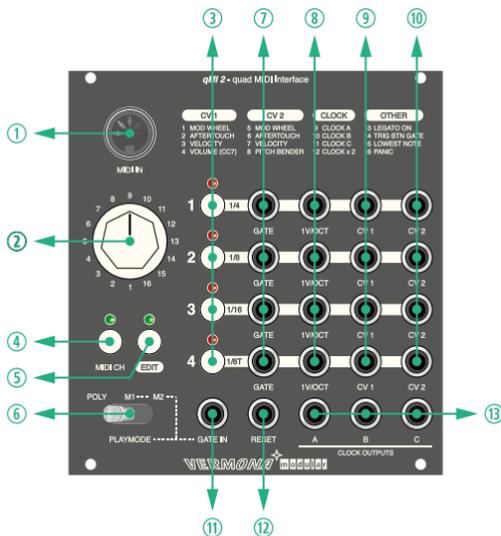


Figure 3: Controls and connectors of the qMI 2

MIDI IN ①

The MIDI-input will receive data from a keyboard's, hardware-sequencer's or from a DAW's MIDI-output. Use a standard MIDI cable for connection (5-pin DIN).

Rotary-switch (1 - 16) ②

This 16-position-rotary-switch works in combination with the **MIDI CH** ④ and **EDIT** ⑤ push-buttons. Here, the assignments for MIDI-channels and MIDI-controllers are carried out.

CV/Gate channel push-buttons (1, 2, 3, 4) ③

These push-buttons serve to assign MIDI-channels and edit-functions to the four *CV/Gate channels*. Before any assignment is possible, enter the MIDI- or edit-menu as described in the following two chapters. The corresponding red LEDs above the *CV/Gate channel push-buttons* will display current as well as existing assignments.

In addition, these push-buttons can be used to send manual gate- respectively trigger-signals to the corresponding gate-outputs.

MIDI CH push-button ④ and MIDI-channel assignment

This push-button works in combination with the *rotary-switch* ② located above. It allows assignment of one or more MIDI-channels to the four *CV/Gate channels*.

To do so, carry out the following steps:

1. Press **MIDI CH** ④, the corresponding green LED will be lit.
2. Select the MIDI-channel (1-16) using the *rotary-switch* ②.

3. Press one or multiple *CV/Gate channel push-buttons* ③ to select respectively deselect the *CV/Gate channels* to be addressed from the selected MIDI-channel. The corresponding red LEDs will be lit when the MIDI-channel is assigned.



Steps 2 and 3 can be repeated until all MIDI-channel assignments are done.

4. Press **MIDI CH** ④ once more to exit channel assignment mode. The green LED will turn off. The assignments are automatically stored and kept even with the modular system being switched off.

EDIT - push-button ⑤ and edit functions

This push-button works in combination with the *rotary-switch* ②. It allows assignment of MIDI-controllers to **CV 1** ⑨- and **CV 2** ⑩-outputs of the four *CV/Gate channels* as well as further system settings.

In addition to the outputs for pitch-CV and gate, each of the qMI 2's four *CV/Gate channels* offers two control voltage outputs. These outputs provide CV-signals with up to 5 volts. The control voltages provided here derive from incoming MIDI-controller signals. Each CV-output can be assigned to one of four possible predetermined MIDI-controllers.

For output **CV 1** ⑨ select between:

Rotary-Switch position	MIDI controller
1	MOD WHEEL (MIDI-CC# 1)
2	AFTERTOUCH
3	VELOCITY
4	VOLUME (MIDI-CC# 7)

For output **CV 2** ⑩ select between:

Rotary-Switch position	MIDI controller
5	MOD WHEEL (MIDI-CC# 1)
6	AFTERTOUCH
7	VELOCITY
8	PITCH BEND



With PITCH BEND being selected for CV 2 ⑩, the voltage range changes to -2.5 to + 2.5 volts. With all other controllers selected, the output voltage range is 0 to 5 volts.

To assign a MIDI-controller to a CV-output, carry out the following steps:

1. Press **EDIT** ⑤. The corresponding green LED will be lit.
2. Select the desired MIDI-controller using the *rotary-switch* ②. Positions 1 to 4 specify output **CV 1** ④; positions 5 to 8 specify output **CV 2** ⑥ (see label printing on the module).
3. Select one or more *CV/Gate-channels* using the *CV/Gate channel push-buttons* ③ to respond to the selected MIDI-controller. The corresponding red LEDs will be lit.



Steps 2 and 4 can be repeated until everything is set up properly.

4. Press **EDIT** ⑤ again to exit this mode. The green LED will turn off. The assignments are automatically stored and kept even with the modular system being switched off.

It is completely dependent on the patch connections, which functions are controlled by the CV-outputs. In principle, each CV-input is a suitable target: a filter's cutoff frequency, its resonance, a VCO's pulse width, LFO-speed, envelope times, wave shaping parameters, a phaser's rate etc.

PLAYMODE selector ⑥

This switch selects the playmode. Available are one polyphonic (**POLY**) and two monophonic (**M1**, **M2**) modes. The mode determines in what way incoming MIDI-notes are distributed to the *CV/Gate channels*. Playmode is a global setting for the qMI 2.

POLY - Polyphonic playmode

This playmode allows all combined channels to be played polyphonically. This way, the modular synthesizer system can be played with up to four-voice polyphony using the qMI 2. The advantage of polyphony in a modular synthesizer system is the possibility to adjust all voices' sounds individually. Even slight variations of oscillator- and filter-settings will clearly enhance the liveliness in a chord.

For Example: With the qMI 2 being configured to four-voice polyphony and four received notes held, the fifth received MIDI-note will replace the oldest (longest held) note.



Polyphony in modular synthesizer systems always comes at expenses. All modules in a patch need to be available in appropriate numbers. For example, even a simple patch will require four VCOs, four filters, four VCAs and eight envelope generators. Also, corresponding mixers and multiples have to be available. More complex patches will, of course, lead to more complex module configurations. An alternative solution could be the use of modules that combine multiple functions in a single unit.

M1 - Monophonic playmode 1

With this playmode enabled, all combined *CV/Gate channels* set to the same MIDI-channel are played in parallel. **1V/OCT** ⑥- and **GATE** ⑦ transfer the same pitches and note lengths. In addition, **M1** is the standard mode for individual, uncombined channels.

For Example: With channels 1, 2 and 3 being combined on MIDI-channel 1 and channel 4 reacting to MIDI-channel 2, channel 4 will still be played independently in **M1**-mode, disregarding the selected playmode which may have been set to **M2** or **POLY**.

M2 - Monophonic playmode 2

This playmode is monophonic, too. Here, the combined *CV/Gate channels* are not addressed in parallel but one after another. The first MIDI-note will trigger e.g. *CV/GATE channel 1*, the next *CV/Gate channel 2* and so on...

Mode **M2** offers multiple possibilities. Control multiple patches with identical settings but spread the “voices” across the stereo panorama. The result will be a jumping rhythmical stereo-sound, well suited for fast sequences and arpeggios.

With oscillators, filters and modulators being set differently on all participating *CV/Gate channels* and maybe even spread across the stereo image, a sequence can drastically change its sound when changing between modes **M1** and **M2**. Although, the same notes are used, mode **M2** will give the impression of (up to) four new sequences, due to our ear separates the different sounds from each other. Using an odd number of notes per beat will further increase this effect.

Although it is tempting to use all four *CV/Gate channels* for voice rotation, notice that also two channels will still allow for interesting possibilities due to constant changes.

Arpeggio-like mini-sequences in mode **M2** can be achieved by using different oscillator tunings for all four *CV/Gate channels*. Start the sequence by playing the same MIDI-note and adjust the oscillators. The mini-sequence is a result of the voice rotation. Changing the MIDI-note will “transpose the arpeggio”.

Automated playmode change between M1 and M2

The **GATE IN** ② input can be used to toggle between monophonic playmodes **M1** and **M2** using a gate signal, e.g. rhythmically from a step-sequencer. The mode change is carried out for the period of the gate signal being active. With the gate voltage returning to zero, the playmode will return to its original state. Therefore, the state of the **PLAYMODE** selector ⑥ is relevant. With **PLAYMODE** ⑥ being set to **M1**, a gate signal will temporarily change the mode to **M2** and vice versa.

With **PLAYMODE** ⑥ being set to **POLY**, the **GATE IN** input ⑩ is inactive.

Connections

GATE ⑦ - gate outputs 1-4

These connectors output gate-signals that equal the note lengths received at the **MIDI IN** ① input or manually generated using the *CV/Gate channel push-button* ③. Gate-voltage is 10 volts with positive polarity.

1V/OCT ⑧ - pitch-CV outputs 1-4

These connectors output control voltages that equal the note pitches received at the **MIDI IN** ① input. Pitch-CV voltage ranges from 0 to 5 volts following a conversion scheme of 1 volt per octave.

Connecting the GATE- and 1V/OCT-CV-Outputs

Once the MIDI-channels are assigned, the qMI 2 is ready to play. However, assignment of pitch-CV- and gate-outputs to their targets is necessary.

For Example, a simple synthesizer patch is build out of a VCO, a VCF and a VCA. The filter's cutoff-frequency and the VCA are controlled by an envelope generator. The first connection is the assignment of pitch-CV to the oscillator (VCO). Patch a cable from the module's corresponding **1V/OCT** ⑧ output to the VCO's pitch-CV-input. Many oscillators offer more than a single CV-input. The input handling the pitch often has a different labeling, depending on the manufacturer, e.g. *CV1*, *1V/Oct-In*, *Key-CV* or *Main-CV*.

When using multiple VCOs, the pitch-CV needs to be distributed. One may use the system bus to transfer the pitch-CV to the oscillators if using *CV/Gate channel 1* of the qMI 2. Unfortunately, not all oscillators support this handy feature. Please consult the respective documentations. In case, bus-CV is not supported, pitch-CV has to be distributed using a multiple. Note that using multiples may cause a loss of signal quality which may result in pitch corruption. Here, we recommend using buffered multiples.



Pitch-CV may also be used to modulate the filter's cutoff frequency. This function is referred to as key tracking or key follow. Here, the filter will open in relation to incoming pitch. Only few filter modules will support Bus-CV. Typically, a patch chord connection is required. To adjust the intensity of the key tracking function, we recommend using a CV-input with attenuator.

The qMI 2's gate signal triggers the envelope which controls the VCA. If the patch requires two or more envelope generators, e.g. for separate filter control or the VCO's pulse width, the gate signal needs to be distributed to trigger all envelopes simultaneously. This is either done via *CV/Gate channel 1* across the system bus or by using a multiple. There is no need for buffered multiples when duplicating gate-signals.



When playing monophonic patches using the qMI 2, no multiples are needed to distribute pitch-CVs to up to four oscillators. The same goes for the gate-signals for up to four envelope generators. With all CV/Gate-channels set to the same MIDI-channel, every output will carry the same note values and the qMI 2 itself acts as a distributor.

CV 1 ⑨ / CV 2 ⑩ - Control voltage outputs 1-4

These connectors output continuously variable control voltages ranging between 0 and 5 volts respectively -2,5 to +2,5 volts when using pitch bender. These control-voltages derive from different assignable MIDI-controllers (see "**EDIT** - push-button t and edit functions" on page 7).

GATE IN ⑪ - Gate input

The **GATE IN** input allows temporary toggling between both monophonic playmodes **M1** and **M2** (see "*Automated playmode change between M1 and M2*" on page 12) using a gate signal. With **PLAYMODE** ⑥ being set to **POLY**, the gate input is inactive.

RESET output ⑫

The **RESET** output interprets MIDI-real-time-commands for *start*, *continue* and *stop* of a MIDI-sequencer. With the qMI 2 receiving a stop-command by a MIDI-sequencer, the **RESET** output is set to provide +5 volts permanently. With the reception of MIDI-start and continue-commands, the output's voltage is set to 0 volt.

With the analogue sequencer already being patched to the **CLOCK** ⑧-and **GATE** ⑦ output signals for start/stop, the **RESET**-output will complete the remote control. Consult the sequencer's manual to find out if the reset function follows the principles described above.



The RESET-output is not suited for a specific function that may be known as a reset of an LFO's waveform start (i.e. the fourMulator offers this function). Here, common gate- or clock-signals are needed.

CLOCK OUTPUTS A, B and C ⑬ - Clock division outputs

These three connectors deliver a periodical signal that derives from an incoming MIDI-clock. Clock impulses are sent with 10 volts and positive polarity. A clock division of 1/16 equals the general song tempo at 16th resolution, the common clock-grid of analogue sequencers. The other three possible clock divisions 1/4, 1/8 and 1/8 triplets are corresponding modifications of the clock input. This is advantageous when using more than a single clock-receiver simultaneously, allowing to create shifted rhythms and tempos.

Each clock output can be assigned to transfer any of the four available clock-divisions. This output assignment is carried out by edit functions **9**, **10** and **11**:

1. Press **EDIT** ⑤, the corresponding green LED will be lit.
2. Use the *rotary switch* ② to select the desired **CLOCK OUTPUT** ⑬: Position **9** equals output **A**, position **10** output **B** and position **11** output **C** (see label printing on the module).
3. Use the *CV/Gate channel-buttons* ③ to select the clock division (see label printing on the module)
 1. 1/4 resolution
 2. 1/8 resolution
 3. 1/16 resolution)
 4. 1/8T resolution
4. Clock division rate can be doubled globally. To do so, use the *rotary switch* ③ to select menu **12 CLOCK x 2** in edit-mode. Press any of the *CV/Gate channel-buttons* ③ to toggle between standard (LEDs off) and doubled clock speed (LEDs lit).
5. Press **EDIT** ⑤ again to exit this mode. The green LED will turn off. The assignments are automatically stored and kept even with the modular system being switched off.



Not only classic analogue sequencers can be used as clock receivers. One may also address switches, electronic sequential switches, logic modules, LFO reset inputs, envelopes etc.



For complete control of an analogue sequencer, separate signals are also needed for start and stop functions. Although the qMI 2 does not offer proprietary outputs for these functions, GATE outputs ① may be used instead. Here, start- and stop commands will need to be triggered by MIDI-notes. Some sequencers toggle between start and stop functions on a single input. In this case, only a single gate-output of the qMI 2 is needed.

Other functions

Circuit board jumpers (CV / GATE)

Two plug-in-jumpers to the side of the module's circuit board can be used to send pitch-CV- and gate voltages of *CV/Gate channel 1* to the system bus. With the plug-in-jumper set next to the **CV** respectively **GATE** label, the connection to the system bus is active. This way, front panel cable connections for this function are no longer necessary with the receiving modules being mounted on the same bus circuit board (respectively a CV/Gate connection has been made across several bus circuit boards). With the jumper set next to the **OFF** label, the connection to the system bus is inactive.

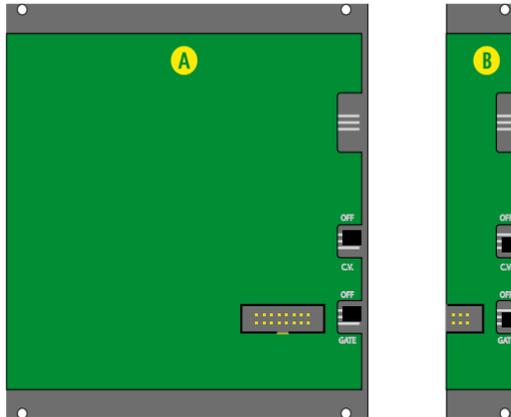


Figure 4: Jumper settings for 1V/OCT and GATE

A - Gate and 1V/OCT are available on the system bus

B - Gate and 1V/OCT are not available from the system bus



A distribution of pitch-CV- and gate-signals across the system bus is useful where multiple oscillators and envelopes are present. Here, the internal signal distribution replaces the need for multiples. Unfortunately, not all oscillators support system bus distribution. If this is the case, pitch-CV has to be patched the usual way.

System settings (OTHER)

The edit-menu allows configuring four additional settings. **Panic** and **Lowest Note** are set globally, while **Legato** and **Trigger/Gate** can be set individually per *CV/Gate channel*.

LEGATO ON

This function affects a *CV/Gate channel's GATE* output . With legato enabled, notes being played tied (i.e. a second note is played while the first note is still held), won't trigger a new gate-signal. As a result, a controlled envelope will not be restarted - a behavior often preferred for lead-sounds.



Legato does not always have a positive effect for the modulation envelope for filtered and synced sounds. An alternative patch is worth a try: For the *CV/Gate channel* addressing pitch and the VCA envelope, leave legato disabled. Now, use a second *CV/Gate channel*, set to the same MIDI-channel and activate legato. Use this gate output to trigger the filter's or the synced oscillator's modulation envelope. This envelope will only be triggered with separated (untied) notes being played, while the VCA will always be triggered with every note played.

TRIG BTN GATE

The four *CV/Gate channel-buttons* ③ can be used to manually generate gate- respectively trigger-signals to the corresponding **GATE** ⑦ outputs. The selection between gate and trigger can be set per *CV/Gate channel*.

LOWEST NOTE

This parameter specifies the lowest MIDI-note for the *qMI 2* to react to. This setting is essential for the resulting note range because unlike a MIDI-keyboard, the pitch-CV output is limited to five octaves.

PANIC

This function triggers a global note-off-command on all MIDI-channels and as a result for all corresponding *CV/Gate channels*. Use this function only, when experiencing problems at the MIDI-input that lead to “hanging” notes that cannot be stopped any other way. It’s very likely, the panic-function may never be needed. So, don’t panic!

To edit the system settings, carry out the following steps:

1. Press **EDIT** ⑤. The corresponding green LED will be lit.
2. Select the desired function (13 - 16) using the *rotary-switch* ②.
 13. **LEGATO ON** - To enable the legato function for specific channels 1-4, press the corresponding *CV/Gate channel push-buttons* ③. With legato enabled, the corresponding LEDs are lit.
 14. **TRIG BTN GATE** - To select between gate and trigger modes for specific channels 1-4, press the corresponding *CV/Gate channel push-buttons* ③. With the corresponding LED being lit red, the channel button generates a gate signal for the period of being held (after leaving edit-mode). With the LED being turned off, the button generates a trigger signal with fixed length of 10ms.

15. **LOWEST NOTE** - When selecting this function, the four channel LEDs will be lit one after another. Pressing a MIDI-note on the keyboard will specify the lowest possible note. Subsequently, all channel LEDs will be blinking simultaneously. Confirm the input by pressing any of the *CV/Gate channel push-buttons* ③. With no confirmation, the previous setting will be restored upon exiting the edit-menu.
 16. **PANIC** - With panic selected, all four channel LEDs will blink simultaneously. The function is carried out by pressing any of the *CV/Gate channel push-buttons* ③. All active notes are terminated. Subsequently, all channel LEDs are lit permanently.
3. Press **EDIT** ⑤ again to exit this mode. The green LED will turn off. The assignments are automatically stored and kept even with the modular system being switched off.

Technical Data

Outputs	
GATE	+10 V
1V/OCT	0 to +5 V
CV 1	0 to +5 V
CV 2	0 to +5 V / -2,5 .. +2,5 V (Pitch Bender)
CLOCK OUTPUT 1, 2 und 3	+10 V, 10 ms
RESET	+10 V
Inputs	
GATE IN	min. +2 V to +10 V
Power Consumption	
+12 V	60 mA
-12 V	2 mA
Dimensions / Weight	
Width / Height	24 HP (ca. 121,5 mm) / 3 U
Depth	25 mm
Weight	215 g



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