

DOEPFER

MIDI TO CV/GATE INTERFACE

MCV4

Bedienungsanleitung (deutsch)

User's Guide (English)



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INTRODUCTION

The MCV4 is a MIDI-to-CV/GATE-Interface to control vintage analog synthesizers equipped with CV and Gate/Trigger inputs via MIDI. MCV4 is suitable for synthesizers using voltage control characteristics of 1 V/Octave and gate voltages from +5V to +12V or switched trigger (S-Trig). MCV4 is equipped with a standard control voltage output (CV1) to control the VCOs (Voltage Controlled Oscillator) and a Gate/Trigger output to control the Envelope Generators (e.g. of ADSR type). In addition, the MCV4 is equipped with three additional control voltage outputs (CV2...4) to control other parameters of the synthesizer connected to the MCV4 (such as VCF frequency, loudness, modulation depth and so on) provided that the corresponding control voltage inputs are available. The three additional CVs are controlled by the MIDI events AfterTouch, Volume (Ctr. #7) and an extra MIDI controller. In addition, the MIDI Velocity can be used as a factor to multiply the values of the CVs controlled by Volume and the extra MIDI controller. The MIDI channel, the reference note for 0V CV1 and the MIDI controller for CV4 can be adjusted.

To control more than one synthesizer or synthesizer module or if more control voltages are needed, we recommend the MCV24. The MCV24 is equipped with 24 CV/Gate outputs and additional SYNC/Clock/Start/Stop outputs.

CONNECTIONS

The MCV4 does not have a built-in power supply. Instead, it uses a plug-in type EXTERNAL POWER SUPPLY (AC adapter). The power supply is NOT sold with the MCV4 and must be purchased locally by the user.

We recommend a VDE-approved AC adapter but the MCV4 will work with every AC adapter that complies with the following specifications. The adapter must be able to deliver 7...12 V DC either unstabilized or stabilized voltage, as well as a minimum current of 100 mA. The POLARITY of the low voltage plug connected to the MCV4 must be pin =+7...12V and ring = GND. If the polarity is incorrect, the MCV4 will not function. However, there is no danger of damage to the circuitry since it is protected by a diode. If the MCV4 is used in Germany, the external power supply must be VDE-approved for security and product liability reasons.

The MCV4 is turned on by plugging the AC adapter into a wall outlet and connecting it to the appropriate jack "9V DC" on the MCV4. There is no separate ON/OFF switch.

Connect MIDI IN of the MCV4 to MIDI OUT of the MIDI transmitter (MIDI sequencer, synthesizer, master keyboard). The MIDI THRU of the MCV4 may be connected to the MIDI IN of other MIDI devices (optional). If this is not required, nothing must be connected to the MIDI THRU input.

The GATE output of the MCV4 is a monophonic 1/4" jack socket. The Gate/Trigger signal appears at the tip of a jack plug connected to the Gate output of the MCV4. If the synthesizer uses a 1/4" jack socket for Gate/Trigger input, a monophonic 1/4" cable can be used for the Gate connection between the MCV4 and the synthesizer.

The CV outputs of the MCV4 are stereophonic 1/4" jack sockets. The CVs of each jack are available between the tip and the ring. At the socket located near the Gate output, the control voltages CV1 (MIDI note-controlled) and CV2 (MIDI after-touch controlled) are available. At the other CV socket, CV3 (MIDI volume-controlled) and CV4 (controlled by the extra MIDI controller) are available. The information on top of the MCV4 housing shows the connections.

To use both CVs of one connector, a special cable may be necessary, with one 1/4" stereo jack plug on one side (MCV4) and two 1/4" mono jack plugs on the other (synthesizer). This cable can be ordered with the MCV4 to avoid additional shipping costs or purchased from your local dealer.

Alternatively, special adapters (1/4" stereo to 2x1/4" mono) may also be used.

The CV1 output of the MCV4 is connected to the control voltage input of the synthesizer to control the VCO which generates the required pitch. Most of the vintage synthesizers use 1 V/Oct (e.g. Moog, Roland, Sequential Circuits, Doepfer) but some manufacturers use Hz/V (e.g. Yamaha, Korg) or other control characteristics entirely (e.g. EMS Synthi A: 0.32V/Oct or 0.26V/Oct).

The GATE output of the MCV4 is connected to the Gate or Trigger input of the synthesizer (labelled either Gate, Trigger, Trig., S-Trig. or similar). Please check which type of Gate/Trigger is used with your synthesizer: Voltage Trigger or S-Trigger/Switched Trigger.

Please refer to the manual of your synthesizer to check which CV control characteristics and Gate/Trigger are used and how the connectors are wired.

For example:

- The Mini Moog uses a unique connector for the S-Trigger input. This type of connector may be difficult to find today. Instead, replace the connector with a 1/4" jack socket.
- When controlling a MOOG Rogue or MOOG Source with the MCV4, notice that the Moog jack sockets are assigned in a particular way. Stereo jack plugs must be used on the Moog side in this particular case (Rogue/Source CV socket: ring = CV Input / Rogue/Source GATE socket: ring = voltage trigger input or tip = s-trigger input). You will find details in the user's guide of your synthesizer.
- Many Roland synthesizers use 3.5mm miniature jack sockets. In this case, it is necessary to have special cables or adapters with 1/4" jack plugs on one side (MCV4 side) and 3.5mm jack plugs on the other (synthesizer side).

The Korg Synthesizers MS10 and MS20, for example, are equipped with an external control input labelled "TOTAL" that can be adjusted to 1V/Octave with the control knob labelled "MG/T.EXT.". Using this input, the MS10/MS20 can be controlled with 1V/Oct. control voltages.

The factory adjustment of the **CV1 output** is 1.00V/Octave. The voltage range of the CV1 output is 0...+5V, i.e. 5 octaves. To change or re-adjust the scale, open the MCV4 case and adjust the scale to the desired value with the potentiometer located behind the power supply connector. Incoming MIDI pitch bend events affect the CV1 voltage. The maximum pitch bend voltage range is +/-1 V corresponding to +/-1 octave. Pay attention when using the pitch bend function: if a note is played which corresponds to a CV voltage below +1 V or above +4 V, the entire pitch range is not available, as the possible output voltage ranges only from 0 to +5V. To use the pitch bend function, play in the mid-range in order to have enough voltage travel for the pitch bend function.

The **CV2 output** is controlled via (monophonic) After Touch messages on the MIDI channel of the MCV4. The voltage range is approximately 0...+5V.

The **CV3 output** is controlled via Volume messages (= Ctrl. #7) on the MIDI channel of the MCV4. The voltage range is approximately 0...+5V. It is also possible to link the CV3 with Velocity (see the chapter 'Operation' for details).

The **CV4 output** is controlled via any MIDI controller on the MIDI channel of the MCV4. The voltage range is approximately 0...+5V. It is also possible to link the CV4 with Velocity (see chapter 'Operation' for details).

The factory setting for the **GATE output** is a +5V voltage gate. To change the setting, open the MCV4 case. Before opening the case, disconnect the MCV4 from the AC adapter and remove all connections. Open the case of the MCV4 by removing the 4 screws using a suitable tool. The pc board is located inside, along with a jumper located near the Gate jack socket. The jumper can be set in three different ways:

- +5V Voltage Gate: jumper faces away from the pc board edge (factory setting)
- +U Voltage Gate: jumper faces the pc board edge
- S-Trigger: jumper disconnected (e.g. for most of the Moog synthesizers)

To select S-trigger, remove the jumper. +U means that the gate voltage is equal to the output voltage of the AC adapter used. As the admitted voltage range of the AC adapter is +7...+12V, the gate voltage has the same range when the jumper is set to +U. For example, if the synthesizer requires a gate voltage of +10 V or more, use the +U setting of the jumper and an AC adapter with about 12V output voltage.

The CV characteristics and Gate required for each synthesizer can be found in the manual of the synthesizer.

To open and close the MCV4 case (e.g. for adjusting the scale or changing the Gate/Trigger setting), only a suitable screwdriver should be used and the case should be opened/closed very carefully. If they are not, units will not be taken back if the case or LEDs or the switch are damaged and the warranty will not apply. If you are not sure whether you are able to carry out the modification, send the unit to your local dealer or to Doepfer Musikelektronik, Graefelfing (Germany).

OPERATION

When connected to an external power supply, the MCV4 is automatically SWITCHED ON.

The MCV4 is SWITCHED ON by plugging the AC adapter into a wall outlet and connecting it to the power supply jack labelled "9V DC" on the MCV4. There is no separate ON/OFF switch. When the MCV4 is plugged in, the red LED will light up for a short time. If the AC adapter used is not suitable or does not work, the LED will not be switched on.

The external power supply (AC adapter) is NOT sold with the MCV4 and must be purchased locally by the user. A VDE-approved AC adapter is recommended but MCV4 will work with any AC adapter that complies with the following specifications. The adapter must be able to deliver 7-12 V DC unstabilized or stabilized voltage, as well as a minimum current of 100 mA. The POLARITY of the low voltage plug connected to the MCV4 must be pin =+7...12V and ring = GND (see information on the MCV4 housing). If the polarity is incorrect, the MCV4 will not function. However, there is no danger of damage to the circuitry since it is protected by a diode.

In the normal mode (i.e. not in the learn mode), the LED displays the status of the Gate output. The LED should be used to check that the MCV4 is functioning correctly without the necessity for a synthesizer to be connected to the MCV4.

When turning on the MCV4, the last configuration before the unit was turned off is called up, i.e. the parameters for MIDI channel, reference note, gate polarity, retrigger and so on.

To adjust the MCV4 parameters (such as MIDI channel or gate polarity), select the MCV4 learn mode and send the corresponding MIDI messages to the MCV4 from your MIDI controller while the MCV4 is in learn mode. To enter the learn mode, press the learn button and hold it pressed down for about one second. The one-second delay was programmed to prevent the accidental selection of the learn mode. Whenever the LED flashes even though no MIDI messages are incoming, the learn mode is active. In this mode, the MCV4 is receiving an incoming MIDI command, program change or controller event (see table below).

If the learn mode has been selected accidentally, the selection can be cancelled by pressing the learn button again. The learn mode will also be terminated if one of the MIDI events in the table below is received.

While the MCV4 is in learn mode the following parameters can be adjusted via incoming MIDI messages:

Function	MIDI message	Rem	Comment
MIDI channel/reference for CV1=0V	Note on	(1)	
CV3 velocity off	Program Change #1	(2)	CV3=volume
CV3 velocity on	Program Change #2	(2)	CV3=volume*velocity
CV4 velocity off	Program Change #3	(2)	CV4=Ctr.#X
CV4 velocity on	Program Change #4	(2)	CV4=Ctr.#X*velocity
Retrigger: off	Program Change #5	(3)	
Retrigger: on	Program Change #6	(3)	
Trigger polarity: normal	Program Change #7	(4)	
Trigger polarity: inverted	Program Change #8	(4)	
CV3 velocity mode 127 steps	Program Change #11	(5)	velocity resolution 0-127
CV3 velocity mode 2 steps	Program Change #12	(5)	velocity 2 steps (</>100)
CV4 velocity mode 127 steps	Program Change #13	(5)	velocity resolution 0-127
CV4 velocity mode 2 steps	Program Change #14	(5)	velocity 2 steps (</>100)
Key assign mode: highest note	Program Change #15	(6)	
Key assign mode: last note	Program Change #16	(6)	
Key assign mode: reference note	Program Change #17	(6)	
Key assign mode: stack note	Program Change #18	(6)	
Characteristics: V/Octave	Program Change #19	(7)	
Characteristics: Hz/V	Program Change #20	(7)	
Controller for CV4	any MIDI- Controller (except Bank Controller 0/32)	(8)	

The factory setting of all parameters is described on page 6.

Whenever the MCV4 receives one of the MIDI messages listed in the table above, the corresponding parameter is changed and the MCV4 returns to the normal play mode, i.e. the LED stops flashing. No unintentional MIDI message should appear while in learn mode (e.g. from a sequencer) as they change the settings of the MCV4. All parameter changes made while in learn mode are permanently stored in the MCV4 parameter memory.

Remarks

(1) MIDI channel/reference for CV1=0V

When a note event occurs in learn mode, the note number and the channel of the event become the new REFERENCE NOTE and MIDI CHANNEL of the MCV4. The reference note is the MIDI note number that corresponds to 0V CV1 output. In practice, simply select the learn mode and press the key that corresponds to 0V CV1 on the MIDI keyboard. MIDI note events below the reference note or more than 5 octaves above the reference note are ignored as the CV1 voltage range of the MCV4 is 0...+5V. The factory default settings of reference note and MIDI channel are C (MIDI code 36) and 1 respectively.

For the setting of parameters 2 to 6, **MIDI Program Change** messages coming from the MIDI device are used. Normally, it will be necessary to press the program change keys on your MIDI keyboard or MIDI synthesizer while in the learn mode. Some manufacturers count the MIDI program change numbers from 0...127 rather than 1...128 as defined by the usual MIDI standard. If the lowest program change number that can be sent with your MIDI device is 0 (zero), subtract 1 from the program change numbers in the table above as in this case the program changes of your

device range from 0...127 instead of 1...128. For some devices (especially software sequencers) the type of program change numbering can be selected. In this case you should use the 1...128 range to agree with the numbers in the table above.

The program change messages must be sent via the MCV4 MIDI channel (see remark 1).

(2) Velocity on/off

These program change messages are used to select whether the Velocity command affects the control voltages CV3 and CV4 or not. If Velocity is "off", only Volume and the extra controller are used to generate the control voltage. If Velocity is "on", the Volume or controller value is multiplied by the Velocity command, i.e. the CV value changes with every new note event as the Velocity of the note event is used to calculate the control voltages (CV3) and (CV4).

(3) Retrigger on/off

With this parameter, you may select whether a new gate/trigger pulse is generated when playing LEGATO (i.e. playing a new note on the keyboard while the key of the previous note is still pressed). The factory default setting is retrigger off. Additionally, the MIDI controllers LEGATO (controller #68) and SUSTAIN (controller #64) affect the gate output in the usual manner.

(4) Trigger polarity

If 'voltage gate' is selected with the jumper inside the MCV4 you may switch between 'normal gate' (i.e. +5V/+U if key is pressed and 0V if key is released) and 'inverted gate' (i.e. 0V if key is pressed and +5V/+U if key is released). When using S-Trigger (with the jumper in the MCV4 housing disconnected) the circumstances are reversed. If the behavior of your synthesizer is opposite to your requirements (i.e. the sound is heard if the key is released on your MIDI keyboard), change this parameter with program change #7 or #8 in the learn mode. The factory default setting is 'normal gate'.

(5) Velocity mode

This parameter defines whether the Velocity resolution is 127 steps (as in MIDI usual) or only 2 steps. The 2-step mode is similar to the accent used in some vintage equipment (e.g. TB303, TR808) and could be used to simulate one of these devices. The Velocity threshold value is 100: incoming Velocity values of 100 or more are converted into a fixed Velocity value of 127, while incoming Velocity values of below 100 are converted into a fixed Velocity value of 64.

(6) CV1 key assign modes

These program change messages adjust the type of assign modes for CV1. If the highest note is selected, the highest key pressed on the MIDI keyboard is used to calculate CV1 if more than one key is pressed down. In the last note mode, the last (chronological) note is always taken for CV1. 'Reference note' means that only the reference note is accepted. This feature is useful if you want to trigger different devices on the same MIDI channel using two or more MCV4s. In this case, the reference notes for the MCV4s must be set to different values. 'Stack note' means that the MCV4 is filtering out the note event that is used by the MCV4 to generate CV1. The note event in question is not transmitted to the MIDI Thru output. Stack mode is used to control more than one synthesizer on one MIDI channel and enables polyphonic control of different synthesizers on the same MIDI channel.

(7) CV Characteristics

With program change #19 and #20 in learn mode, you may select between V/Octave and Hz/V characteristics for the CV1 output.

V/Octave is used by most of the synthesizer manufacturers (Moog, ARP, Oberheim, Roland, Sequential Circuits, EMS, Doepfer). When V/Octave is chosen, incoming MIDI pitch bend events affect the CV1 voltage. If Hz/V is selected, incoming MIDI pitch bend events do not affect the CV 1 output. Because the Hz/V voltage range sounds very poor in the lower voltage range in comparison to the V/Octave range, the Hz/V mode should only be selected if there is no other solution.

The Korg synthesizers MS20 and MS10, for example, are equipped with external control inputs that can be adjusted to V/Octave with the control knob. (Input: TOTAL, (FREQ) knob:, MG/T.EXT, (EG1/EXT)).

Much better results are obtained using these input(s) than with the Hz/V control inputs.

In addition, the MS20 or MS10 has an inverted trigger, so it is necessary to switch to invert the trigger using program change #8.

(8) Controller for CV4

If the MCV4 receives a MIDI controller message (except bank controller 0 and 32) while in learn mode, the controller number of these message defines the controller number for CV4. i.e. the CV4 output of the MCV4 corresponds from now on to this controller number. The controller message must be sent via the MCV4 MIDI channel (see remark 1).

Temporary parameter changes

The program change messages listed in the table may only be used to change the settings temporarily. This means that the changes are not stored in the parameter memory. If the MCV4 is turned off and on again, the previous parameter settings are recalled. This procedure may be used to try out different settings without storing them in the memory or to change the settings temporarily from a sequencer (e.g. retrigger on/off, assign mode change).

The program change messages must be sent via the MCV4 MIDI channel (see remark 1).

Resetting the device

To obtain the factory settings for all parameters, the device must be reset. This might be useful if, for example, you do not remember the last parameter settings (e.g. MIDI channel, reference note, controller number for CV4, key assign mode, CV1 characteristics) or if they are changed accidentally. If your MCV4 seems to behave strangely and you do not know how to solve the problem, resetting the device may help as the values of all parameters are known after the reset. To reset the device, press the learn button while the power supply is plugged in. The LED will turn on and when the button is kept down a few seconds, the LED will start to flash. Releasing the button once again leads to the normal operation mode and the LED will turn off.

After the reset the MCV4 parameters are set to these values:

- MIDI channel 1
- reference note 36 (i.e. the lowest "C" on a standard 5-octave keyboard)
- trigger polarity: normal (non-inverted)
- retrigger: off
- CV3: volume (controller #7)
- CV4: modulation (controller #1)
- CV1 characteristics: V/octave
- key assign mode: highest note

These values are identical to the factory settings.