

# Midi-CV-1 v1.3 – User Guide

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This is the setup and user guide. The unit is designed for a monophonic Analog synthesizer and a PC and/or a MIDI keyboard with a DIN cable and/or a MIDI-USB music keyboard.



The module is designed and sized for **Euro rack** systems. You will need a 16-pin **Euro rack** power ribbon connector with  $-12/0/+12$  and  $+5V$  which is connected to a synth power supply.

The following MIDI-USB Keyboards are supported:

Arturia MiniLab MKII

Arturia MiniBrute

MidiPlus AKM 320

M-Audio Keystation 49

M-Audio Keystation 61

Others may work also.

## Programming the MIDI-CV-8

1. If the PIC24 chip is preprogrammed, there is nothing else to do.
2. If you intend to program the chip yourself with our .HEX file, use your favorite method to program the chip. If using the ICSP port on the GATES board and MPLAB-X IDE, you can follow this tutorial to set up a pre-built project with our HEX file:

<http://microchip.wikidot.com/mplabx:projects-prebuilt>

## Connections

1. You can connect a DIN keyboard using the TRS jack. You will need a MIDI/TRS Type A cable or a MIDI/TRS Type cable depending on how you have configured the jumpers in the MIDI-CV8.



2. You can connect a USB keyboard. The device will operate as a USB host and power the keyboard on its USB bus while receiving MIDI data from the keyboard.
3. You can connect the Midi-CV-8 as a USB device using a computer or other host connected to the Midi-CV-8's USB-B type socket. This connection will be used for connecting your DAW, such as Ableton Live, to the MIDI-CV-8.

## Playing modes

- a. Omni On/MONOPHONIC. It receives channel messages sent on any channel and plays notes monophonically.
- b. Omni Off/MONOPHONIC. It receives channel messages sent on a **specified channel** and plays notes monophonically.

## Use with a DAW

1. You can use the DAW to send midi sync and start/stop signals to the device and use these from output jacks CLOCK and START. These jacks will send a 10V signal from these jacks.
2. Ensure that the DAW Sync output is switched on before starting the track otherwise no midi-start messages will be sent on the clock track and the clock will begin randomly part way through the track and will not be in sync with the track beats.
3. The Start/Stop signal is gated by default. When the midi-start signal is received, the output from START remains high until the stop signal is received.

If using Ableton LIVE, set the sync to Pattern Mode for the start and stop signal. The device does not recognize the Song Position Pointer or "Continue" messages.

## Commands

1. There are several commands that can be sent from the keyboard to modify the program of the MID-CV-1. An understanding of the command mode is required to calibrate the DACs on the module.
2. Playing modes are maintained after power off and the most recent settings will be available when you power on the module again.
3. The various playing modes are maintained when the power is switched off.
4. To enter command mode
  - a. Send "All Notes Off" message to the Midi-CV-1. Or, on a keyboard you can move the Main Volume control to 0. If the control is already at 0, move it away from 0 and then back to 0.
  - b. Next you will need access to midi notes 0 to 20. Either by shifting octaves and transpose controls until the lowest notes of the keyboard are accessible or using a virtual "piano roll" interface on a DAW.
  - c. For MidiPlus AKM320:
    - i. Move the octave shift to its lowest setting by centering it and then pressing octave down (-) 5 TIMES
    - ii. Move the transpose to its lowest setting by centering it and then pressing transpose down (-) 5 TIMES
  - d. For M-Audio Keystation 49:

- i. Move the octave shift to its lowest setting by centering it and then pressing octave down (-) 4 TIMES (The red LED over the (-) button will be bright red and not flashing).
- e. For M-Audio Keystation 61:
  - i. Press the "Advanced" button
  - ii. Press the key on the keyboard marked "OCT"
  - iii. Press the "-" button multiple times until the "-" LED is red (two clicks)
  - iv. Press the "Advanced" button
  - v. Press the key on the keyboard marked "TRANS"
  - vi. Press the "-" button multiple times until the "-" LED is "brighter" green (12 clicks)
  - vii. You are now in COMMAND MODE
- 5. The commands are as follows:
  - a. ALL NOTES OFF. This is triggered as soon as the Main Volume is set to 0.
  - b. READY TO PLAY. Move the Main Volume from 0 to any value greater than 0.
  - c. RETRIGGER MODE. Enter command mode. Play MIDI note 0 (usually the first white key on the left). Now the device will introduce a tiny delay to retrigger the gate. This will enable a Staccato style of playing.
  - d. NO-RETRIGGER MODE. Enter command mode. Play MIDI note 1 (usually the first black key on the left). Now the device will play the new note value but will not retrigger the gate. This means that if the previous key is still held down (i.e. no note off message has been sent), the new CV will be sent to the CV out jack but the gate will remain down. This will enable a Legato style of playing.
  - e. OMNI MODE ON/OFF. Enter command mode. Play MIDI note 6. The device will toggle between OMNI-ON mono and OMNI-OFF mono. After entering OMNI-OFF mono, select the key corresponding to the MIDI channel that the device should respond to.

## Calibrating the MIDI-CV-1

If you bought PCBs or a kit, you should only need to calibrate the unit once. If you bought a pre-built and tested unit, you can skip this section.

1. Power up the device and allow it to warm up for a few minutes.
2. Send "All Notes Off" message to the Midi-CV-1. Or, on a keyboard you can move the Main Volume control to 0. If the control is already at 0, move it away from 0 and then back to 0.
3. Next you will need a method to send midi notes 0 to 20. Either by shifting octaves and transpose controls until the lowest notes of the keyboard are accessible or using a virtual "piano roll" interface on a DAW.
4. Connect the –VE probe of a multimeter set to the 20V range to GND.
5. Plug in a patch cord to CV socket.
6. Connect the +VE probe of the multimeter to the patch cord.
7. Set the GAIN trimmer to the center (13 turns)
8. Play MIDI note 1 and read the voltage from the CV out
9. Adjust OFFSET trimmer until 0.00V is shown on the output
10. Play MIDI note 13
11. Adjust the GAIN trimmer until exactly 1.00V is displayed on the multimeter
12. Fine tune the gain to achieve the following also:
  - a. C2 (MIDI note 25) = 2V
  - b. C4 (MIDI note 37) = 3V
  - c. C5 (MIDI note 49) = 4V
  - d. C6 (MIDI note 61) = 5V etc.
13. Repeat the adjustments until you have the tracking as close as possible to 1V per octave.

## Tuning your Synthesizer

1. Power up the device and the synth and allow them to warm up for a few minutes
2. Produce a tone from your synthesizer using a selected VCO and chosen ADSR, VCA, filters etc.  
Set the VCA so that it has 0 initial gain and is waiting for a gated envelope shaper to run the VCA.
3. Connect the CV and gate jacks to your synth VCO CV input and envelope shaper GATE input respectively.
4. Play C3 and you should hear the tone on your synthesizer. This is a C note octave 3
5. Use the synth VCO frequency controls to obtain the note C3. (Approx 131Hz)
6. Tune C1 to C7 to hear all the C notes from Octave 1 to 7
7. You can tune the synth to other frequencies if you know what you are doing!