

Polyend Poly 2

Poly 2

Version: 3.1

Eurorack MIDI to CV Converter

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Introduction

Poly 2 module is a polyphonic MIDI to CV converter with MPE (Multidimensional Polyphonic Expression) support. It's the second version of the legacy Poly. We have revised it thanks to smart user requests. We have also managed to make it smaller. The new dimensions are 14HP wide, 24mm deep. Poly 2 is still intended to be as simple to use as possible. Now equipped with an OLED screen, paired with a clickable encoder, Poly 2 allows you to change its settings easily and configure it exactly as you want. It also offers you a way to save and recall your setting for different usage scenarios.

The new version is an excellent entry-level module and at the same time a real Swiss army knife. It was made to change the way you interact with your sequencers, controllers, DAWs, and other MIDI gear. This powerful module features both MIDI input and output, USB type-A host, and USB type-B inputs combined with a vast number of configurable CV outputs. By using the Smart Thru option, you can daisy-chain multiple Poly 2 modules together for even more voices and outputs.

<https://www.youtube.com/embed/6AZPBTDOkfM?feature=oembed>

Inputs & outputs

Poly 2 offers 20 configurable outputs of which 8 are factory calibrated – Pitch 1-4 and CV 5-8. Their accuracy in the majority of range (excluding the extreme high and low values) is ranging from 2.5mV to 5mV. The used DAC (digital to analogue converter) is a 12bit type. That's why the pitch-bend is mapped from 14bit to 12bit. The remaining outputs are not calibrated, but still, their accuracy is around 20mV.

In terms of outputs, Poly 2 is offering some smart features as well. Its all three inputs can be used simultaneously at the same time. In a case where three identical MIDI messages are sent from three independent sources (MIDI Input/Host/USB), the first one to reach the Poly has the priority.

Inputs:

- MIDI minijack port (attached in the kit 3,5mm jack to DIN adapter is a TRS type-B),
- USB type-A Host port (+5V),
- USB type-B port,

Outputs:

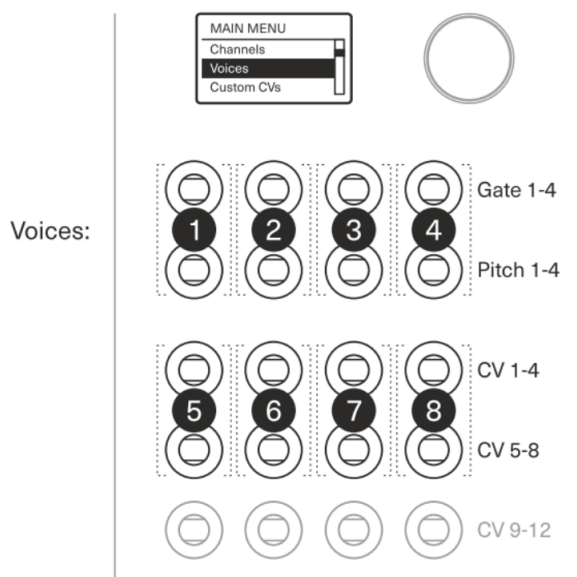
- 1-4 Gate (0-5V or 0-10V),
- 1-4 Pitch (0-10V, V/Oct, Hz/V, Buchla standard),
- CV 1-12V (depending on the setting),
- MIDI minijack port,



Let's play

Voices

Poly 2 can handle up to 8 voices, which are CV Gate and Pitch pairs. If the number of total voices is higher than 4, then CV1 becomes the 5th Gate and CV5 becomes the 5th Pitch. Analogically CV2 is Gate 6th, CV6 is Pitch 6th, etc. To choose the number of voices, click the encoder, go to Voices and set the desired value.



The number of occupied voices determines the remaining configurable outputs. The system allows you to configure only the non-occupied outputs. For example, if voices are set to 7, then configurable CVs are CV4, CV8, and CVs from 9-12.

The currently used voices are shown on the main screen and on the Gate view menu screen.

The main menu is displaying the selected parameter values (Voice, Play mode, Notes, Channels, Channel mode, Custom CVs).

Play modes

Poly 2 converter module can be used in five different play modes: Mono, First, Next, Channel and Notes. You can set a global incoming MIDI channel for all Play modes except for Channel mode.

The Mono mode operates on one voice only and gives access to legato articulation.

In the First mode – send MIDI values to one or more outputs. Let's use a keyboard controller as an example. The first key pressed (the first note sent) occupies voice number one. While the first key remains held, the

second key pressed activates the first available voice.

The Next mode works as voices do in most polyphonic synthesizers. When the MIDI note is sent, then the system looks for the next non-occupied voice and triggers it. Each MIDI Note on and off message scrolls through all available voices.

The Channel mode translates the data received from MIDI Channels 1-16 and directs them into the corresponding voices. This mode is what the majority of users utilize to connect DAWs or external sequencers.

If Channel mode is selected – see “Channels” displayed in the menu. In this setting – indicate which voice is triggered with which MIDI Channel. By default, the number of voices is equal to the number of MIDI channels.

In the Notes Mode, Poly 2 translates data received from MIDI Notes C through G and directs them into the corresponding voices (no matter the octave).

This scenario works excellent for triggering drums from drum pads or drum triggers. When Notes mode is selected – see “Notes” occur in the menu. In this setting, it’s possible to indicate which voice is triggered with which MIDI note. By default the first voice is set to C, voice two is C#, voice three is D, voice four is D#, etc.

Glide

Access and set the Glide parameter with the range from 0 to 500ms from the home screen.

Music scales

Thanks to the implemented musical scales filter, Poly 2 is able to output only the notes that are within the selected scale. If the note is not in the scale, the system looks for the closest note that fits. It might be helpful to achieve musical results without a degree in music theory. See the list of available music scales in the appendix.

https://www.youtube.com/embed/6Nd_5EMnl9o?feature=oembed

Custom CVs

Dependently from the number of selected voices, there are several configurable CVs at disposal. To set them, go to “Custom CVs” menu and pick the desired output:

Velocity – MIDI Velocity is related to MIDI Note On message. Set which voice is related to the selected Gate output here.

CC – There are two options:

- Voice – assign the CC number (1-127) to a selected voice.
- Channel – choose a particular CC number (1-127) for a selected MIDI channel (All, 1-16).

Note: Set CC to Voice in order to use Poly 2 with MPE compatible devices

Clock Multiplier – This setting allows you to translate the incoming MIDI Clock signal to the chosen output, and multiply it by a predefined set of values. The standard MIDI message sends 24 PPQN (Pulses per quarter note). In the Eurorack world, most modules' clock operates on 4 PPQN. The value of Multiply can change the clock conversion rate.

Note: Set the value of voltage being sent when MIDI Clock is received (0-5V or 0-10V) in Config Menu > Gate > Voltage.

Start/Stop – Sets the chosen output to convert the MIDI Transport values into Gates.

Note: Set the value of voltage being sent when MIDI Transport message is received (0-5V or 0-10V) in Config Menu > Gate > Voltage.

Off – It's sometimes useful to turn off the out-coming signal.

<https://www.youtube.com/embed/UkrAdfqKqpc?feature=oembed>

Configuration

Octave Offset – allows choosing the middle C note convention by changing incoming notes in a range of four octaves up and down. If Poly 2 is converting the incoming MIDI Notes to a different octave than the ones received, this means that the transmitting device has a different middle C convention setting. Align the octaves here.

Note: An example of different Middle C conventions are programs like Apple Logic and Ableton Live (MIDI Note C2 is not the same value as C2 in Ableton Live).

Gate:

- Voltage – changes the values of the transmitted volts for the Gate, Clock, and Start/Stop parameter.
- Reverse – changes the phase of the Gate outputs voltage.

Pitch – sets one of the three-pitch conventions: V/Oct, Hz/V, Buchla standard (1.2V/Oct).

MIDI output:

- Smart thru – allows to daisy-chain multiple Poly 2 units to expand the number of voices and outputs. It passes thru all the information that is not utilised by the unit within the current setting to the MIDI output.
- Thru – passes all the incoming information to the MIDI output.

Pitch-bend:

- No limit – will transmit the exact incoming values.
- +/- 1-6 Octaves.
- +/- 11-1 Semitone.

If the source instrument isn't sending the Pitch Bend information by itself, set it manually in a range of 6 octaves or 11 semitones up and down.

CC/CV Smoothing – depending on the setting (Off, Low, Mid, High) all CV outputs that are converted from CC messages can be smoothed out.

Gate view – displays the outgoing triggered voices – beneficial to monitor those messages.

Factory Reset – restore the device to its original manufacturer settings.

About – display the firmware version.

Load/Save profile – store and recall all the user settings made for different setups and different scenarios.

Note: Besides the ability to save and load the parameters, Poly 2 autosaves the current configuration and recalls it when the module is toggled on.

Panic! – sometimes MIDI information can get stuck, use the Panic! Function to release all the voices and reset the MIDI information status.

Important notes:

- When scrolling the menu items, some MIDI information can be lost. For 100% accuracy while playing, please keep Poly 2 on the home screen (leave the menu).
- If any strange MIDI behavior over the USB host port occurs, switch to the MIDI DIN which seems to be much more stable in general use.
- The screensaver will punch in after 60 sec from the last encoder touch.
- If you're using the USB Host port for powering external gear you may like to check the [following topic](#) about powering the module.

<https://www.youtube.com/embed/2mQCtD9hhCo?feature=oembed>

Scenarios of use

Use DAW or hardware step sequencer to operate with modules.

Connect computer/sequencer with a USB cable or MIDI cable using MIDI interface. Set Play mode to Channel. Now set the sequencer, so each track sends different MIDI Channel. There it is, a Eurorack groovebox has just been made.

Use acoustic drums to trigger modules.

Connect drum triggers to the kit. Connect the kit to Poly 2 with USB or MIDI cable. Set Play mode to Notes. Set custom CVs to Velocity. Now connect the module outputs with Eurorack drum (or non-drum) modules.

Make polyphonic synth with a modular setup.

Connect MIDI keyboard to Poly 2 with MIDI or USB cable. Set Play mode to Next. Set Custom CVs to Velocity and CC (CC number set to 1 will transmit the information from Modulation Wheel of a controller).

Play expressively using MPE device with modules.

Connect MIDI MPE device to Poly 2 with MIDI or USB cable. Set Play mode to Next. Set Custom CVs to Velocity and CC (CC number set to 74 will transmit the information from “the third dimension” of the controller). Set CC to Channel>Voice.

Control envelopes and LFOs with a smartphone.

Among many others, there is an iPhone/iPad app that suits perfectly to the Poly 2. It's called Ribn. Once the app is downloaded, connect a smartphone/tablet to the module using a USB cable (in some cases the Camera Connection Kit is needed). Then set the Play mode to Channel and Custom CVs to CC number. In the app set the Channels and CC numbers adequately to Poly 2 settings. The app records and recalls up to 8 values motion that Poly 2 will convert to the voltages. A great way to liven up a rig.

<https://www.youtube.com/embed/1J342wIunp0?start=339&feature=oembed>

Warranty & Firmware



Polyend warrants this product, to the original owner, to be free of defects in materials or construction for one year from the date of purchase. Proof of purchase is necessary when a warranty claim is processed. Malfunctions resulting from improper power supply voltages, abuse of the product or any other causes determined by Polyend to be the fault of the user won't get covered by this warranty (standard services rates will be applied). All defective products will be replaced or repaired at the discretion of Polyend. Products must be returned directly to Polyend with the customer paying the shipping cost. Polyend implies and accepts no responsibility for harm to a person or apparatus through the operation of this product.

Please go to polyend.com/help in order to start a return to manufacturer authorization, or for any other related inquiries.

Important Safety and Maintenance instructions:

- Avoid exposing the unit to water, rain, moisture. Avoid placing it in direct sunlight or high-temperature sources for a long time.
- Get rid of dust, dirt and fingerprints using a soft, dry cloth. Disconnect all cables while cleaning. Only reconnect them when the product is totally dry.
- Unplug your instrument from the power sources during lightning storms or when it is not used for long periods of time.
- Polyend Poly 2 is not user repairable. Leave all servicing to qualified service technicians. Servicing may be required when the unit has been damaged in any way.

Firmware updates

Firmware updates can be found in the Support/Downloads section. To flash the module a Polyend Tool app and appropriate firmware hex file are required. Check the current firmware version in the Poly config menu > firmware section.

Appendix

Power consumption

The Poly 2 module is using 160mA at +12VDC, 14mA at -12VDC. +5V is not required unless using the USB Type-A host port for connecting power-hungry external gear. In such a case, there's a jumper switch on the back panel which sets the module to receive an additional +5V from your power supply.

Musical scales

1. Chromatic	14. BeBop Dorian	27. Hirajoshi
2. Minor	15. BeBop Mixolydian	28. In Sen
3. Major	16. Blues Minor	29. Yo
4. Dorian	17. Blues Major	30. Iwato
5. Lydian	18. Pentatonic Minor	31. Whole Half
6. Lydian Minor	19. Pentatonic Major	32. Kumoi
7. Locrian	20. Hungarian Minor	33. Overtone
8. Phrygian	21. Ukrainian	34. Double Harmonic
9. Phrygian Dominant	22. Marva	35. Indian
10. Mixolydian	23. Todi	36. Gypsy
11. Melodic Minor	24. Whole Tone	37. Neapolitan
12. Harmonic Minor	25. Diminished	38. Neapolitan Minor
13. BeBop Major	26. Super Locrian	39. Enigmatic

What's in the box

<https://www.youtube.com/embed/Wd9lxa8ZPoQ?feature=oembed>