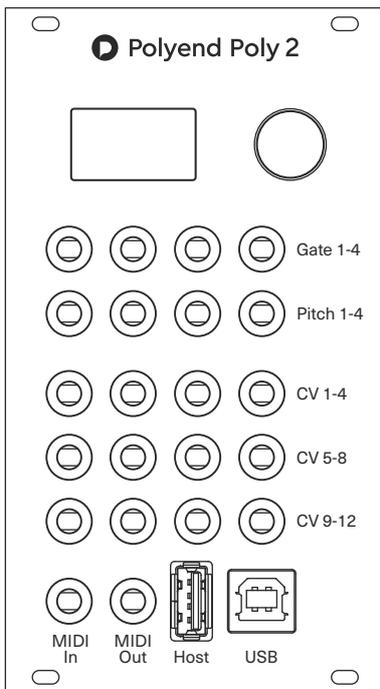Polyend Poly 2

Polyend Poly 2
MIDI to CV Converter

Poly 2 Manual v1.1
firmware v2.02

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MIDI to CV Converter

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.

Inputs and outputs

Poly 2 offers 20 configurable outputs of which 8 are factory calibrated - Pitch1-4 and CV5-8. 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.
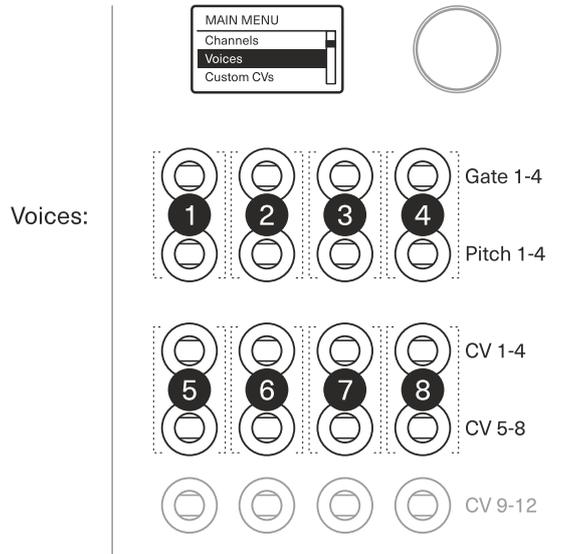
Glide

You can access and set the Glide parameter with the range from 0 to 500ms from the home screen.

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.

MAIN MENU
Channels
Voices
Custom CVs

Voices:

Gate 1-4

① ② ③ ④

Pitch 1-4

CV 1-4

⑤ ⑥ ⑦ ⑧

CV 5-8

CV 9-12

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.

Play modes

Poly 2 can work in five different play modes: First, Next, Channel, Notes and Mono. The Mono mode operates on one voice only and gives you an access to legato articulation.
In the **First mode**, you can send MIDI values to one or more of outputs. Let's use a keyboard controller as an example. The first key pressed (the first note sent) occupies the 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 synthesisers. When MIDI note is sent, then the system looks for 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 utilise to connect DAWs or external sequencers.

If Channel mode is selected, you'll see "Channels" displayed in the menu. In this setting, you can indicate which voice is triggered with which MIDI Channel. By default, the number of voice is equal to the number of MIDI Channel.

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, you'll see "Notes" occur in the menu. In this setting, you can indicate which voice is triggered with which MIDI note. By the default the first voice is set to C, voice two is C#, voice three is D, voice four is D# etc.

Custom CVs

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

Velocity
MIDI Velocity is related to MIDI Note ON message. Here you can set which voice is related to the selected Gate output.

CC
There are two options:
- **Voice** – where you can assign the CC number (1-127) to a selected voice.
- **Channel** – where you can choose a particular CC number (1-127) for a selected MIDI channel (All, 1-16).
Note: Set CC to Voice when you want to use Poly 2 with MPE compatible devices.

Clock
This setting allows you to translate the incoming MIDI Clock signal to the chosen output.

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

- **Multiplier** – the standard MIDI message send 24PPQN (Pulses per quarter note). In Eurorack world most module's clock operates on 4PPQN. The value of Multiply can change the clock conversion rate.

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

Note: You can 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.

Scale

Thanks to the implemented scales filter, Poly 2 outputs only the notes that are within the 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.

There are two settings:
- **Type** – a selection of 39 scales filters. You can find the list of the musical scales in the appendix.
- **Root note** – sets the scale root note.

Config

Octave Offset
Allows you to choose 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. Here you can align the octaves.

Note: An excellent 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 you 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 Semitones**
If the source instrument isn't sending the Pitch Bend information by itself, you can 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 your CV outputs that are converted from CC messages can be smoothed out.

Gate view
Displays the outgoing triggered voices – beneficial to monitor that messages

Factory Reset
Restore the device to its original manufacturer settings.

About
Display the firmware version.

Load/Save profile

Store and recall all your 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.

Exemplary scenarios and recipes

Use DAW or hardware step sequencer to operate your modules

Connect your computer/sequencer with a USB cable or MIDI cable using MIDI interface. Set Play mode to Channel. Now set your sequencer, so each track sends different MIDI Channel. There you have it, you've just made you Eurorack groovebox.

Use acoustic drums to trigger your modules

Connect drum triggers to your 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 your Eurorack drum (or non-drum) modules.

Make polyphonic synth with your modular setup

Connect your MIDI keyboard to Poly 2 with MIDI our 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 your controller).

Play expressively using MPE device with your modules

Connect your 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 your controller). Set CC to Channel>Voice.

Control your envelopes and LFOs with your smartphone

Among many others, there is an iPhone/iPad app that suits perfectly to the Poly 2. It's called Ribn. Once you have the app downloaded, connect your 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. Great way to liven up your setup.

Important note

When scrolling the menu items, some MIDI information can be lost. For 100% accuracy while playing, please keep Poly 2 in home screen (leave the menu).

Inputs

- MIDI minijack,
- USB type-A Host (+5V),
- USB type-B.

Outputs

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

Power consumption

The 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 case, there's a jumper switch on the back panel which sets the module to receive an additional +5V from your power supply.

Firmware update procedure

To flash the unit with a firmware update, visit the polyend.com website and look for the right software tool, and proceed with the given instructions.

Limited warranty

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 made. Malfunctions resulting from improper power supply voltages, backwards or faulty cable connection, abuse of the product or any other causes determined by Polyend to be the fault of the user are not covered by this warranty (normal 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 contact hello@polyend.com for return to manufacturer authorisation, or any other technical questions/concerns.

FAQ

How can I connect my smartphone to the Poly 2?

There are several options:

1. Devices with USB host support (Android/iPad Pro) – connect it directly using a USB cable.

2. Devices with no USB host support (iPhone) - use the Camera Connection Kit with a USB cable or use simple MIDI Interface like IK Multimedia iRig MIDI and connect the module with MIDI cable.

Can Poly 2 power my device via host?

Yes, it can. If the device is power hungry, you need to switch the jumper on the back of the unit to EXT. Then Poly 2 draws +5V from your Eurorack power supply.

Appendix Musical scales chart:

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