CV Thing

USER MANUAL

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Current Firmware v1

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POWERING THE MODULE

THANKS FOR PURCHASING A MODULE FROM BEFACO!
BEFORE YOU PLUG THIS MODULE IN...

1. Disconnect your cabinet from the mains.

2. Triple check the power cord polarity. The coloured line on the cable (pin number one) is the –12V rail.

3. If you plug the module backwards or in **EXP connector** you might burn it out and unfortunately this is not covered by the warranty.

4. If you have any questions about this product please send them to: support@befaco.org

INTRODUCTION

Cv thing is a fully mapeable CV to MIDI converter in just 6HP. Its based on our VCMC module, but aiming for small and compact performance rigs.
It has eight inputs that can be mapped to any MIDI message quite easily thanks to its simple and intuitive user interface.
Ccs, Program change ,v/oct to Note or Clock are some of the messages that can be configured to easily control MIDI gear from your modular rig.

MODULE REFERENCE

PANEL OVERVIEW
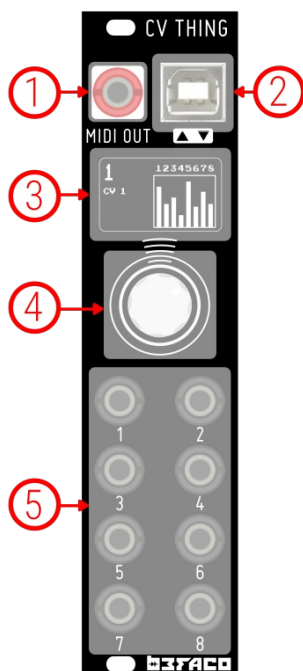
1. TRS MIDI Output
TRS MIDI Output Connector

2. USB Output
USB Type B Midi output connector.

3. OLED Screen
OLED Screen for visualization and editing all functions.

4. Encoder
Rotary encoder control.

5. CV
CV inputs.

STARTING WITH CV THING | CONNECTING THE UNIT TO EXTERNAL GEAR

There are two main MIDI connections in CV Thing: USB and TRS. Both connections send every MIDI message generated by the module, choosing each one depending on the device you will be controlling. Let's take a deeper look:
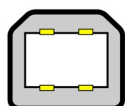
USB

The USB port is the most convenient way to connect CV Thing to a computer. Just plug a USB Type B cable from CV Thing to a free USB port of your computer and the module should be automatically recognized as a MIDI Device. You will be able to select it on the MIDI connections of your DAW or any other software that supports MIDI.

If you have USB Host devices, you can use this port with it in the same way we did with the computer.

TRS MIDI

Most of the external gear out there uses DIN5 connections for MIDI control. This is why we included a TRS to DIN5 adaptor. If you want to control your external gear with CV Thing, just plug a standard MIDI DIN cable from CV Thing´s TRS Out port, using the adaptor, to your device´s MIDI Input.

BASIC STRUCTURE | INPUTS & PERFORMANCE SCREEN

The Performance Screen is the main level of CV Thing menu. This screen shows quickly the status of each input via level bars.

You can browse thru the eight inputs with the encoder to see further details of each input.

Then clicking the encoder you can enter configuration menu of each input.

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S E T T I N G
C V   T H I N G | C V   C O N F I G U R A T I O N

Each CV Thing input its own configuration menu where you can configure its behaviour.
From the Performance Screen, select the input and press the encoder to enter into CV EDIT Screen.
On the left of the screen there is information about the selected MIDI channel and the current Function of this Input.
At the right you have the following options:
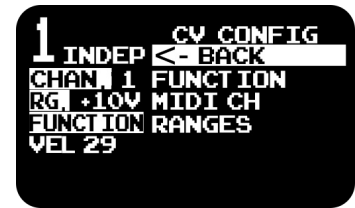
CV Config Screen

FUNCTION
Selects the MIDI message that will be mapped to this input. By pressing on it you will have access to the MIDI Mapping screen.

1. V/Oct to Note
This option is only available at ODD inputs.
In this mode this inoput and next EVEN input will be linked so we can convert a CV into th ODD input + a Gate into EVEN signals to MIDI notes.
For example, if we are at input 1 and select this option, input 2 will be linked to it and automatically configured as Gate input.
When Gate goes high at EVEN input (2 in this example), a NOTE ON message will be sent with value proportional to the CV presnet at ODD input (in this case 1). When Gate goes down a Note OFF message will be sent. Keep in mind that, in order to keep V/Oct range, only 120 MIDI notes will be sent for the whole range. 1 Octave=12 semitones, so 10 Octaves 120 notes.

FOR EVERY NOTE REPRESENTATION IN CV Thing WE ARE ASSUMING THAT MIDI NOTE 0 IS C-2

2. Notes
On this mode the module will generate MIDI notes at the selected MIDI Channel following the V/Oct ratio regardless of the presence of Gate or not. The Gate lenght is set right after selecting the mode:

No auto OFF, 500ms, 1000ms, 1500ms, 3000ms, Edit Autooff

3. CC
This will send CC messages. When selected you will be prompted to choose which CC number will be sent.

4. Velocity
CV will be mapped to velocity message representing the notes selected in the MIDI channel.

5. Pitch Bend
CV will be mapped to pitch bend message.

CV MIDI Mapping

6. Program Change
A program change message will be sent proportional to CV value.
TIP: Program change will change the program in the current bank selected in your Machine. Map CC#0 or CC#32 in another input to do a bank select and double the fun!!

7. Digital Functions
Check Page 5

7. NRPN
In this mode the CV will be converted to NRPN messages. Upon selection of this mode you will be prompted to select a NRPN number. Keep in mind there are two NRPN modes available: 7 bit and 14 bit.

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| DIGITAL FUNCTIONS

The CV Inputs can act also as Gate Inputs. This functions are located into the Digital Functions submenu.

1. Note Gate
A Note will be fired each time a Gate signal is received at Gate Input. Press the encoder to select the Note number and press again to confirm the operation. Note ON message will be sent when the Gate goes up and Note OFF when Gate goes down.

2. Note Latch
This mode is essentially the same as Note Gate but Note OFF message is not sent till Gate signal goes up again.

3. CC Gate
A CC message will be sent each time a Gate signal is receive at Gate Input. Press the encoder to select the CC Number, press again to select the CC value, and one last time to confirm the operation. A CC message with the selected value will be sent when a Gate goes up and a second message with a CC value of 0 when a Gate goes down.

4. CC Latch
Similar functionality as CC Gate but the CC value 0 won't be sent till a second Gate goes up.

5. Clock
Clock messages will be sent. Keep in mind it will consider a Clock IN when the level is higher than Volts. By pressing the encoder you will access the Clock Set Screen. There you will be able to Divide and Multiply the incoming clock signal as well as check the BPM.

6. ST/SP
This will enter into the menu to set messages Start, Stop and Continue. A few combinations are available to match your sequencer. Options are:

  – **ST/SP Gate:** START message will be sent when Gate goes up and STOP when Gate goes down.
  – **ST/SP Latch:** START message will be sent when Gate goes up and STOP when Gate goes up again.
  – **START:** START message will be sent when Gate goes up.
  – **STOP:** STOP message will be sent when Gate goes up.
  – **CONTINUE:** CONTINUE message will be sent when Gate goes up.

7. Panic
This will send an All NOTE OFF message in all channels like a regular Panic function in any MIDI device.

MIDI CHANNEL
Selects MIDI Channel for this CV Input.

CV DELAY
Set a delay on the CV reading. Specially useful on V/Oct mode. As some sequencers have some delay between setting the gate high and sending the CV, with this feature you will avoid sending old messages.

RANGES
On this screen we will be able to set the functional ranges of the CV Input and the MIDI Output. Here you will be able to calibrate the CV Input as well. Let's take a look:

1. In Range

+10: The CV Input will expect a voltage range of 0-10V, translating each voltage in concrete MIDI value. A voltage of 10V will be translated as the maximum MIDI message value (see OUT Range below)

+5: The CV Input will expect a voltage range of 0-5V, translating each voltage in concrete MIDI value. A voltage of 5V will be translated as the maximum MIDI message value (see OUT Range below)

-5/+5: The CV Input will process negative voltages as well. In this mode a voltage of 5V will be translated as a MIDI value of 64 and -5V to -64, Negative values will be clipped to 0, so linking the fader as SUM (see CV/FDR Link) is adviced for effectivity.

2. Out Range

MIDI RANGE: Select from what MIDI value to which one your CV will be scaled. This feature will select the minimum and maximum MIDI values and will scale the input to that range.

MIDI TRIM: With these you can set MIDI limits, so no messages will be sent beyond the minimum and maximum set here. This feature clips the range, do not scale.

```
CH:1 CV   CANCEL END

          RANGE   TRIM
MIN       000     000
MAX       127     127
```

Set the values of each range by turning and pressing the encoder. If you don't want to keep the changes and go back to the previous screen, press Cancel, otherwise press End.

3. Calibration

This will perform a two points callibration. You will be prompted to send 2v and 8v, stating to which MIDI Note they relate to. A voltmeter is shown to monitor incoming voltage.
If you have selected 5v input range, voltages will be 1v and 4 v.
This calibration is useful when your CV source has some offset, so you can avoid note shifting on conversion. Also, if source CV does not have perfect V/Oct linearity, this will correct the scaling.

```
CH:1 CV   CANCEL END

POINT    MIDI    NOTE
  2V      24      C0
  8V      96      C6

IN: MIDI NOTE/VOLTS
```
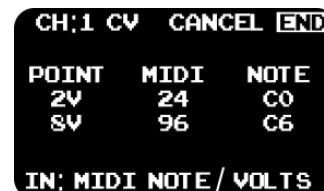
CALIBRATION PROCEDURE: Before selecting calibration, be sure you have V/Oct to Note mode selected on the CV Input you want to calibrate, otherwise you will get an error message prompting to activate it.

Once done, plug the CV signal from your sequencer or CV source, set it to send 1V (go to the manual of your CV source if you don't know the equivalent Note/Volts) and check the voltmeter at the bottom of the screen. If all is well it should show you C0/1V, then turn the encoder till you have the first line (1V 24 C0) selected and press the encoder. Repeat the process for 4V and press End to finish the calibration. If you don't want to keep the changes, press Cancel.

SETTING THE MODULE | GLOBAL SETTINGS

In Performance Screen, hold the encoder for 5 seconds to access the Global Settings. On this screen you will be able to save and load presets between other things. Let's take a look deeply.

PANIC
Sends a Note OFF message in all the channels. Press it if you experience that some messages gets stuck or held.

FACTORY RESET
Restarts the module to initial factory settings (see Out of the Box Configuration)

DIM SCREEN
Sets the brightness of the screen to a lower value.

SAVE CONFIGURATION
Saves the current configuration of the module in one of the two banks available. At the same time the module saves the setting on its internal memory, a SYSEX message is sent via MIDI Outputs (see SYSEX paragraph below)

LOAD CONFIGURATION
You can choose either one of the settings saved in one of the settings saved in one of the two user banks or a factory preset (Go to Apendix 1 for further details)

GLOBAL CV CAL
Calibrates all CV Inputs at the same time. Quite useful when you have a multichannel CV Source (like a sequencer)

SETTING THE MODULE | OUT OF THE BOX CONFIGURATION

By default, CVThing comes with an initial setting that allows you to quickly test some of the features of the module. In this configuration CV Inputs are assigned to CC's **from 14 to 21.**

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MANAGING PRESETS | SYSEX FUNCTIONING

In CV Thing you can save and load configuration presets externally via SYSEX (System Exclusive Messages). This process can be done with a lot of applications (like DAWs or specific MIDI apps) and if you have vintage digital gear for sure those terms won't be new for you.

If this is not the case, don't worry, we're gonna explain a very easy and fast way using MIDI OX.

SAVING PRESETS
MIDI OX is a free program for Windows (and Linux through Wine-HQ) that is able to play *mid/*syx files and upload them into CV Thing. First connect your module to your PC via USB connector (Type B to Type A USB cable). Launch MIDI OX and in the top bar press "Options >> MIDI Devices..." Select CV Thing on MIDI Inputs and press OK.

Now go to "View >> SysEx..." On the new window (SysEx View & Scratchpad) press "SysEx >> Receive Manual Dump..." The program will start to wait for SysEx messages. Once done, go to the Global Settings Screen on your CV Thing (hold the encoder for 2 seconds on Performance Screen) and selects Save Conf. selects the bank and now check MIDI OX again. If all is fine you will have a message on MIDI OX with the size of the file received, press Done. Now go to "Display Window >> Save As..." Put a name to your file, save it in your preferred folder and that's all.

LOADING PRESETS
Launch MIDI OX and in the top bar press "Options >> MIDI Devices..." Select CV Thing on MIDI Outputs and press OK.

Now go to "View >> SysEx..." On tihe new window (SysEx View & Scratchpad) press "File >> Send SysEx File..." Select your SysEx file and press Open. As soon as the status bar finishes, you will have a prompted screen on your module. Press Load SysEx, select the bank, press Discard and you are done.

FIRMWARE | UPDATING PROCEDURE

CV Thing code is based in our VCMC module, so code will be found at the same repository as VCMC.

1: Get latest firmware file from CV Thing folder in our github:
https://github.com/Befaco

2: Install Teensy uploader app found here

https://www.pjrc.com/teensy/loader.html

3: Connect your module to your computer using a USB cable.

4: Run Teensy uploader and load hex file. If prompted by the app, press teensy button to begin transfer...

Make sure module is plugged in.

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MISCELLANEA | SPECS & CREDITS

* **Size**: 6HP

* **Depth**: 32mm

* **+12v:** 50 mA

* **−12v:** 8mA

This module is the result of loads of hours of work, love and care. It would have been imposible to finish without the help of beta testers, loving friends, people from Hangar's open thursdays providing very strong opinions and the whole Befaco team kicking asses BIG TIME.

Firmware coding, common sense and über–cold beers:
Sergio Retamero (sergio.retamero@gmail.com)

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