Kymatica Devices 2xVCX
A dual VCA / Crossfader / 4QM

Quickstart – what is the 2xVCX and how do I get going?

The first collaboration between RYO and KYMATICA DEVICES, a dual VCA / Crossfader / Four-Quadrant-Multiplier (Ring-modulator / VC-polariser) with mix output. The output of the first channel is normalized to the input of the second. Works for audio as well as CV.

Installation

To begin installation, please make sure that:
- you have a standard pinout eurorack bus board
- you have +12V and -12V power rails on that bus board [no +5V supply is required]
- the power rails are not overloaded

!!!Before installing this module disconnect the power from your system!!!

- Double check the polarity of the ribbon cable - The red stripe should be aligned with the -12V rail, on both the module and on the bus board

[we use shrouded headers but it's still possible a cable has been assembled with the stripe on the wrong side of the shroud so always double check!].

Also make sure when using busboards without shrouded headers that the pins aren't transposed a row vertically or horizontally – all pins should insert into holes on the cable.

Although we use both PTC fuses and schottky diodes to provide reverse polarity and excess current protection, we do not take any responsibility for damages caused by wrong power supply connection!

After you have connected everything, double checked it and ensured your case is closed such that no power lines can be touched by your hand or any stray cables drop into holes, turn on your system and test the module

The 2xVCX is a mid-level skill project, Although not excessive in parts count or numbers of PCBs, it does require more than basic experience in PCB soldering and module assembly:

The following explanations only describe one channel of operation but apply to both channels in an identical fashion. The only part of the module that isn't an exact copy between ch 1 and ch 2 is the mix out.

The module has an exponential response to control voltages but affects the inputs A and B in a linear fashion; *the A, B and CV sockets accept both DC signals and AC signals into the full audio range.*

Switch position A > A; In this mode input A and the CV input acts as a Four Quadrant Multiplier. It will do ring-modulation and voltage controlled polarization (bipolar VCA). *The offset knob dictates the amount of -ve/+ve? offset How much? applied to the signal at the CV input. The VCX has an attenuator for this input also, allowing both scaling and biasing of the signal at the cv input.*

Switch position 0 > A; In this mode input A and the CV input will act as a normal linear VCA. *When the cv input is presented with a control voltage of 0V, in this mode, the VCX will be fully closed. behaving as a traditional relatively clean sounding VCA, as cv increases toward +8V? the module will pass audio or cv until at +8V cv the signal present at input A will pass through unaffected.*
Also in this mode, the module can be used as a basic attenuator; *when offset is fully off (ccw) and a signal is present at the cv input the VCX will act as a manual attenuator where the CV knob is the gain.*

Switch position B > A; In this mode the CV input will control a crossfade from input B to input A. *0V will be full signal from input A at the output, at +4V the output will be passing an equal mix of input A and B signals and fade across until at +8V the signal present at the output will be entirely input B.*

The 2xVCX is also equipped with a mix out which is an equal? Unity? Mix of the signals from ch 1 output and ch 2 output.

Calibration:
(I include these instructions here for those who have purchased the module assembled or used and are suffering bleed-through when using the module as a VCA or attenuator – normally if building from a kit this calibration is done as the final step of the build and generally all assembled modules should be fine as received).

For best result, let the module warm up with power on for 20-30 minutes before calibration. Use either your hearing or an oscilloscope.

i.   Patch an **unconnected cable to** the **A1 input**.
ii.   Set the **toggle** at the right **(B>A)** position, turn **OFFSET 1 knob to 0%** and **CV attenuator 1 knob to 100% +**.
iii.   **Patch a VCO to CV1 input** and **adjust TRbal1** for minimum CV bleed-through on OUT1.
iv.   Move **VCO patch cable to B1 input**, turn **OFFSET knob to 100%** and adjust TRgain for minimal amplitude on OUT.
v.   Repeat until satisfied. Do the same for the second channel (2).

Dimensions

Height:	**3U** [128.5mm],
Width:	**8HP** [40.30mm],
Depth:	40mm (with power cable attached)
Weight:	???g

Current consumption

+12V rail	**34mA**
-12V rail	**32mA**
+5V rail	**no +5V** supply required

Basic specifications

total frequency controllable range	dc to 50 kHz
max input/output audio signal	20 Vpp
CV input range	0V to +10V
Max gain	1.0dB gain

Nominal impedances

Audio signal input:	100k ohm
Audio Signal **output**:	1k ohm
CV input:	100k ohm

Patch ideas:

Here's some less obvious ways to use the 2xVCX in patches in your modular rig:

below i've include everything from some inspiring words to links of videos on youtube; and, as ever, experiment – RYO modules are designed with all necessary protection and fail-safes so you can just start plugging in patch cables and see what happens!

Patch idea:
Use both channels setup as audio rate crossfaders with two different
waveforms present to the A and B inputs of , then take the mix-out
and adjust offsets to taste for strange and unusual timbres akin to
those heard from west coast complex oscillators.

Weird control voltages:
try something different with cv signals such as putting them through
the four quadrant multiplier with either or other cv signals or
audio signals.

Basic CV manipulation;

Jamuary|J31 youtube jam patch video

*...This is a jam using only modules "Made in Sweden", which reduced
my options to Sara VCF and ModSeq by DinSync, RYO's logic modules,
the Optodist, and their Kymatica Devices collaboration 2xVCX...*

*...It didn't make any sound until I patched all these triggers along
with outputs from the Sara and the ModSeq CV output into the 2xVCX
to create something wobbly enough to make it play some drum sounds.
Not subtle, but that's what I had...*

Audio:
using the four quadrant multiplier as a ring mod with complex audio
such as entire drum parts only needs subtle tweaks like a touch of
offset and a high frequency sine from a utility VCO to get fantastic
metallic 'klangourous' effects – both the cv attenuator and offset
knob will help you to tune your effect to perfection along with
finding the right frequency from the utility VCO or other audio
source.