

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

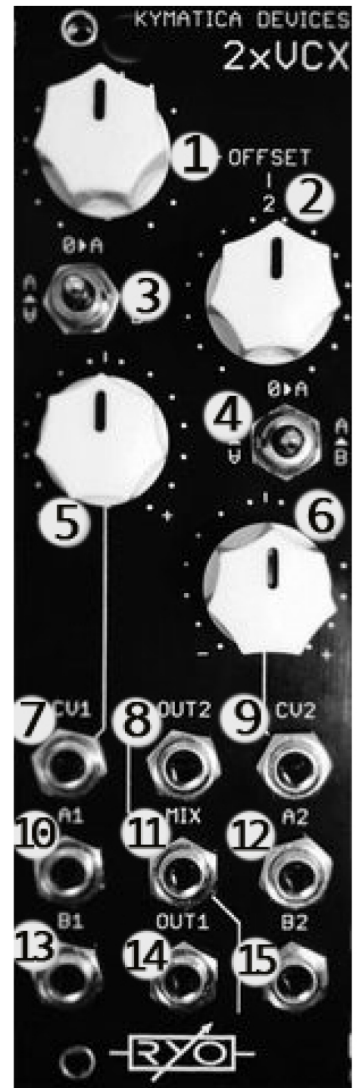
Quickstart – what is the 2xVCX and how do I get going?

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

Kymatica Devices/RYO 2xVCX

- 1 Ch 1 CV offset knob (acts as vca initial, offset for the four quadrant multiplier or bias for the crossfader.)
- 2 Ch 2 CV offset knob (acts as vca initial, offset for the four quadrant multiplier or bias for the crossfader.)
- 3 Ch 1 Mode switch:
 - Switch A > A; input A and CV input act as Four Quadrant Multiplier.
 - Switch 0 > A; input A and CV input act as normal linear VCA.
 - Switch B > A; CV input controls crossfade from input B to input A.
- 4 Ch 2 mode switch: -
See 3.
- 5 Ch 1 CV attenuator.
- 6 Ch 2 CV attenuator.
- 7 Ch 1 CV input.
- 8 Ch 2 Output.
- 9 Ch 2 CV input.
- 10 Ch 1 A input (dc coupled - Works for cv and audio.)
- 11 Mix output - normalized to CH 2 B input.
- 12 Ch 2 A input (dc coupled - Works for cv and audio.)
- 13 Ch 1 B input (dc coupled - Works for cv and audio.)
- 14 Ch 1 output.
- 15 Ch 2 B input (dc coupled - Works for cv and audio.)

Width: 8 hp



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 offset 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 offset/attenuator/polariser; *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 used in the positive range and a polariser in negative range also – if offset is used as well a greater attenuation range can be achieved and with polariser at any position offset will apply a variety of static CVs to be dialled in as required.*

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 a unity mix of the signals from ch 1 output and ch 2 output.

Dimensions

Height:	3U [128.5mm],
Width:	8HP [40.30mm],
Depth:	40mm (with power cable attached)
Weight:	125g (approx w/cable)

Current consumption

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

Basic specifications

total frequency controllable range	DC to 50kHz
max input/output audio signal	20Vpp
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 and embedded videos and diagrams with popular modules used to perform

necessary duties showing the patches that have been used in the videos; 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!

Audio rate crossfading:

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.

Soft sync:

mult a signal to an inverter and send both the original and inverse to 1 channel of 2xvcx's A and B inputs, then use a separate square wave to switch between the two using the CV input. This is a form of soft sync called switched inversion.

Frequency shifting:

using 2xvcx as a dual ring modulator, you can set up a frequency shifter - just patch channel 1's CV input with a sine and the other with a cosine, and run the output of channel 1 into channel 2's input.

Subtraction:

By using one side as a fully open attenuator and the other as an inverter and taking the mix output, you can perform subtraction. Two uses include creating new filter slopes (subtract a lowpassed signal from the original to create a highpass filter) and isolating an effect (subtract an original signal from a waveshaper, for example, to only get the waveshaped portion of the sound).

Ring mod:

using the four quadrant multiplier as a ring mod with complex audio such as an entire drum part only needs subtle tweaks like a touch of offset and a high frequency sine from a utility VCO to get fantastic metallic clangorous 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.

Taming AM sidebands:

when using amplitude modulation the timbre can become significantly less appealing as the carrier VCO pitch increases – if using one channel of the 2xVCX to act as a linear VCA for a modulator VCO to AM a carrier VCO, inverting the pitch CV from the 1V/oct source using the other half of the 2xVCX with polarizer as full negative setting before the 1V/oct CV controls the modulation amount of the modulator [via a second VCA], the result is that the sideband harmonic distortions will be reduced at higher carrier frequencies. Further multiplying the 1V/oct CV with gain/attenuation to control cut-off frequency of an LPF will filter out more sidebands as note pitch increases.

Analog logic XOR GATE:

actually still patching as a ring mod, putting Signal A into A1 / Inverted Signal A -> B1, Signal B -> CV1 will give a two input analog A XOR B.

Voltage Controlled VCA in feedback loops:

some filters, phasers and other effects have no built in resonance/feedback and likewise if you need to control feedback on larger multi-module patch parts then voltage control over polarisation as well as gain may be desirable- in such cases this can be the perfect tool.