MIDI to CV Module Datasheet

Revision B
Dec 2, 2023

The Jake's Custom Shop MIDI to Control Voltage eurorack module is a re-configurable digital to analog converter based around the MIDI-Muso Integrated Circuit. A total of 18 outputs can be used as 1 V/O CV outputs, gates, triggers, and various MIDI effect triggers. The Module is shipped in mode "4PV." In this configuration, four MIDI notes on MIDI channel 1 may be played polyphonically to create chords and complex melodies. Up to 6 MIDI notes each on separate channels can be mapped to individual CV and Gate outputs. This module is also great for use as a drum sequencer with up to 11 auxiliary gates. There are essentially limitless combinations of CV, gate and MIDI effects.

- Converts MIDI to CV
- 1, 1.2 or 0.5 Volts/ per octave
- Eleven operation modes
- Operation modes are static during power cycling
- Monophonic and Polyphonic modes.
- Up to 6 Polyphonic notes
- MIDI-in/out for adding multiple MIDI Devices
- White LED indicators on each Gate and MIDI input
- 10-octave range (0 to 10 V)

SECTION I - Electrical Characteristics

Attribute	Min	Typ	Max
Current Draw [mA] +12V +5V -12V			 50 30 5
CV Outputs [V]	0		10
CV [V per Octave]		1, 0.5 or 1.2 V/octave	
Gate [V]	0		10

SECTION II – Functionality

Input	
Attribute	**Data**
MIDI-IN	MIDI-TRS Type A style input jack

Output - Standard Mode 4PV	
Attribute	**Data**
MIDI-THRU	Duplicate of the MIDI IN jack. For sending MIDI messages to another MIDI device. MIDI-TRS style output jack.
B1, B2, B3, B4 [CV]	MIDI pitch control - controls pitch of an oscillator
B5, B6, C3, C4 [V1,V2, V3, V4]	MIDI velocity control - controls volume of up to 4 oscillators
C1 [PITCH BEND]	MIDI Pitch Bend command
C2 [MOD]	MIDI Modulation command.
C5 [CC71]	Controls filter resonance
C6 [CC74]	Controls filter frequency cutoff
D1, D2, D3, D4, [GATE]	On-state high when a MIDI note is sent. Corresponds to CV1-CV4 in mode 4PV.
D5 [A Gate 1]	Auxiliary Gate. MIDI Channel 16.
D6 [CLOCK]	MIDI Clock for syncing other synths. Produces a 24 pulses per quarter note.
CHAIN IN/OUT	2-pin jumper on back of module for chaining multiple JCS MIDI-CV modules together.

SECTION III: Tuning

The MIDI to CV module must be tuned to the correct V/O ratting using the trimmer RV1 on the back of the module. Use a multimeter to measure between TP1 and Ground. TP1 should read 10.60 volts.

SECTION IV: Program Changes

In order to change modes of the MIDI-CV modules you will need:

- A PC to open the webpage: https://jakescustomshop.com/MIDItool.html
- A USB to MIDI converter: Amazon
- A MIDI TRS Type A connector (Included)

Simply connect your computer to the MIDI-CV module via the USB-MIDI cable and run the web-based programing tool. You may have to refresh the browser to detect the USB.

SECTION V - Chaining Multiple MIDI-CV Modules

1. Ensure both MIDI-CV modules are in the same operation mode.
    a. For polyphony, set the mode to *4PV* using the online tool.
2. Power off your eurorack.
3. Connect both modules to your eurorack case power via the 16-pin cables.
4. Connect *Chain out* of Module 1 to *Chain IN* of module two. The wire orientation should reverse the “top” and “bottom” pins.
5. Connect your MIDI output device to *MIDI IN* on module one.
6. Power on your system.

SECTION VI - Resources

It is highly recommended you read through the MIDI-Muso datasheet to get the most out of your MIDI-CV module. The datasheet goes into great detail of the functionality and modes.

MIDI Muso CV-12 Chip Datasheet:
https://midimuso.co.uk/wp-content/uploads/2017/08/CV_12_ORAC_Manual.pdf
Midi Muso CV-12 Chip Data: https://midimuso.co.uk/index.php/cv-12/
Online program changer: https://jakescustomshop.com/MIDItool.html
MIDI-TRS Type A Adapter: Amazon

						MODE					1 x poly	4x mono
IC Pin#	PCB port	0A	0B	1A	1B	2A	2B	4A	4B	6	4PV	4MV
14	B1	4 foot ctl	A Gate 6	Pitch 1	Pitch 1	Pitch 1	Pitch 1	Pitch 1	Pitch 1	Pitch 1	Pitch P	Pitch 1
15	B2	95 phaser	A Gate 7	95 phaser	A Gate 5	Pitch 2	Pitch 2	Pitch 2	Pitch 2	Pitch 2	Pitch P	Pitch 2
16	B3	93 chorus	A Gate 8	93 chorus	A Gate 6	93 chorus	A Gate 4	Pitch 3	Pitch 3	Pitch 3	Pitch P	Pitch 3
17	B4	94 delay	A Gate 9	94 delay	A Gate 7	94 delay	A Gate 5	Pitch 4	Pitch 4	Pitch 4	Pitch P	Pitch 4
18	B5	73 attack	A Gate 10	73 attack	A Gate 8	73 attack	A Gate 6	73 attack	A Gate 2	Pitch 5	Velocity P	Velocity 1
19	B6	72 release	A Gate 11	72 release	A Gate 9	72 release	A Gate 7	72 release	A Gate 3	Pitch 6	Velocity P	Velocity 2
23	C1	Ptch bend	Ptch bend	Ptch bend	Ptch bend	Ptch bend	Ptch bend	Ptch bend	Ptch bend	Ptch bend	Ptch bend	Ptch bend
24	C2	1 mod	1 mod	1 mod	1 mod	1 mod	1 mod	1 mod	1 mod	1 mod	1 mod	1 mod
25	C3	7 vol	7 vol	7 vol	7 vol	7 vol	7 vol	7 vol	7 vol	7 vol	Velocity P	Velocity 3
26	C4	11 expr	11 expr	11 expr	11 expr	11 expr	11 expr	11 expr	11 expr	11 expr	Velocity P	Velocity 4
27	C5	71 res/aft	71 res/aft	71 res/aft	71 res/aft	71 res/aft	71 res/aft	71 res/aft	71 res/aft	71 res/aft	71 res/aft	71 res/aft
28	C6	74 cut off	74 cut off	74 cut off	74 cut off	74 cut off	74 cut off	74 cut off	74 cut off	74 cut off	74 cut off	74 cut off
4	D1	A Gate 1	A Gate 1	P Gate 1	P Gate 1	P Gate 1	P Gate 1	P Gate 1	P Gate 1	P Gate 1	Gate P	P Gate 1
5	D2	A Gate 2	A Gate 2	A Gate 1	A Gate 1	P Gate 2	P Gate 2	P Gate 2	P Gate 2	P Gate 2	Gate P	P Gate 2
6	D3	A Gate 3	A Gate 3	A Gate 2	A Gate 2	A Gate 1	A Gate 1	P Gate 3	P Gate 3	P Gate 3	Gate P	P Gate 3
11	D4	A Gate 4	A Gate 4	A Gate 3	A Gate 3	A Gate 2	A Gate 2	P Gate 4	P Gate 4	P Gate 4	Gate P	P Gate 4
12	D5	A Gate 5	A Gate 5	A Gate 4	A Gate 4	A Gate 3	A Gate 3	A Gate 1	A Gate 1	P Gate 5	A Gate 1	A Gate 1
13	D6	CT	CT	CT	CT	CT	CT	CT	CT	P Gate 6	CT	CT
	Prog Change	7	8	0	1	2	3	4	5	6	9	10
MIDI	Pitch			1	1	1 – 2	1 – 2	1 – 4	1 – 4	1 – 6	1	1 – 4
Channels	Control	1	1	1	1	1	1	1	1	1	1	1
	Aux Gate	16	16	16	16	16	16	16	16	-	16	16
Overflow	Pitch			2	2	3 – 4	3 – 4	5 – 8	5 – 8	7 – 12	1	5 – 8
to	Control	2	2	2	2	2	2	2	2	2	2	2
Next IC	Aux Gate	16	16	16	16	16	16	16	16	-	16	16

Figure 1. Operation modes of the MIDI MUSO CV-12 chip.

SECTION VII - DIY Kits

Full DIY Kit Variation:

- Includes all necessary components (Jacks, LEDs, CV-12 IC PCBs etc.)
- PCB is labeled for easy assembly
- Through-hole soldering only.

PCB and CV-12 Only Variation:

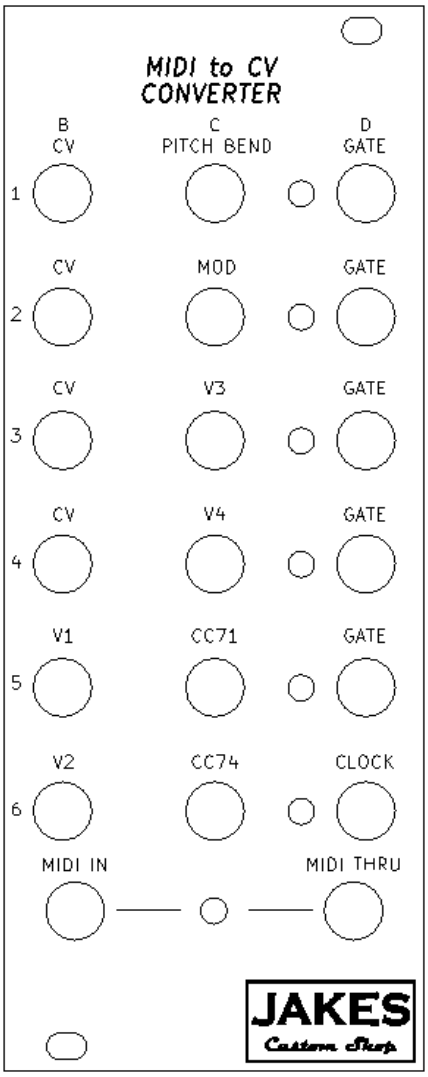
- Requires you to supply a number of components (See Bill of Materials below)

Bill of Materials:

https://docs.google.com/spreadsheets/d/1HC1wQTR2bGCtwPn2egDG7EWkfgznWMjVd2YgT5Sx6K4/edit?usp=sharing

SECTION VIII – Mechanical Data

Attribute	Data
PCB dimensions	49 x 100 mm
Panel dimensions	50.5 x 128.5 mm (10HPX3U)
Depth of module	25mm


MIDI to CV
CONVERTER
B
CV
C
PITCH BEND
D
GATE
1
CV
MOD
GATE
2
CV
V3
GATE
3
CV
V4
GATE
4
V1
CC71
GATE
5
V2
CC74
CLOCK
6
MIDI IN
MIDI THRU
JAKES
Custom Shop