MST MIDI to CV Module
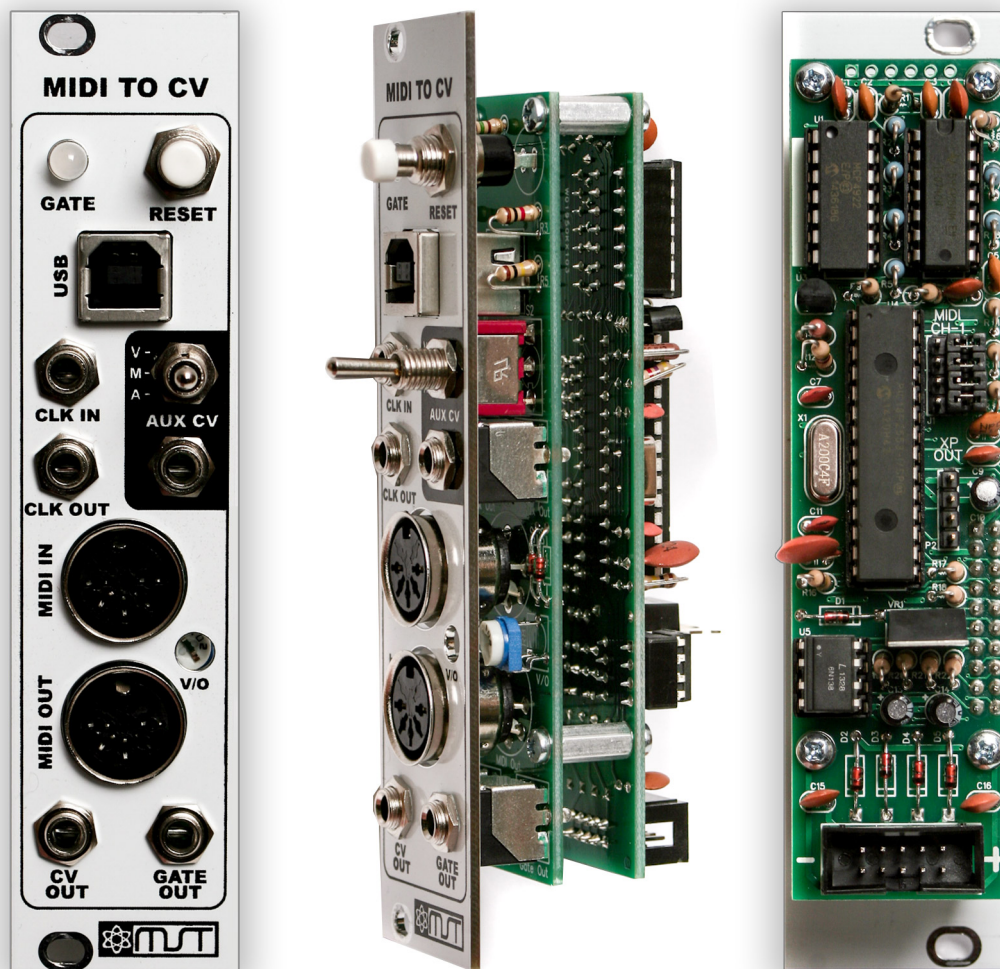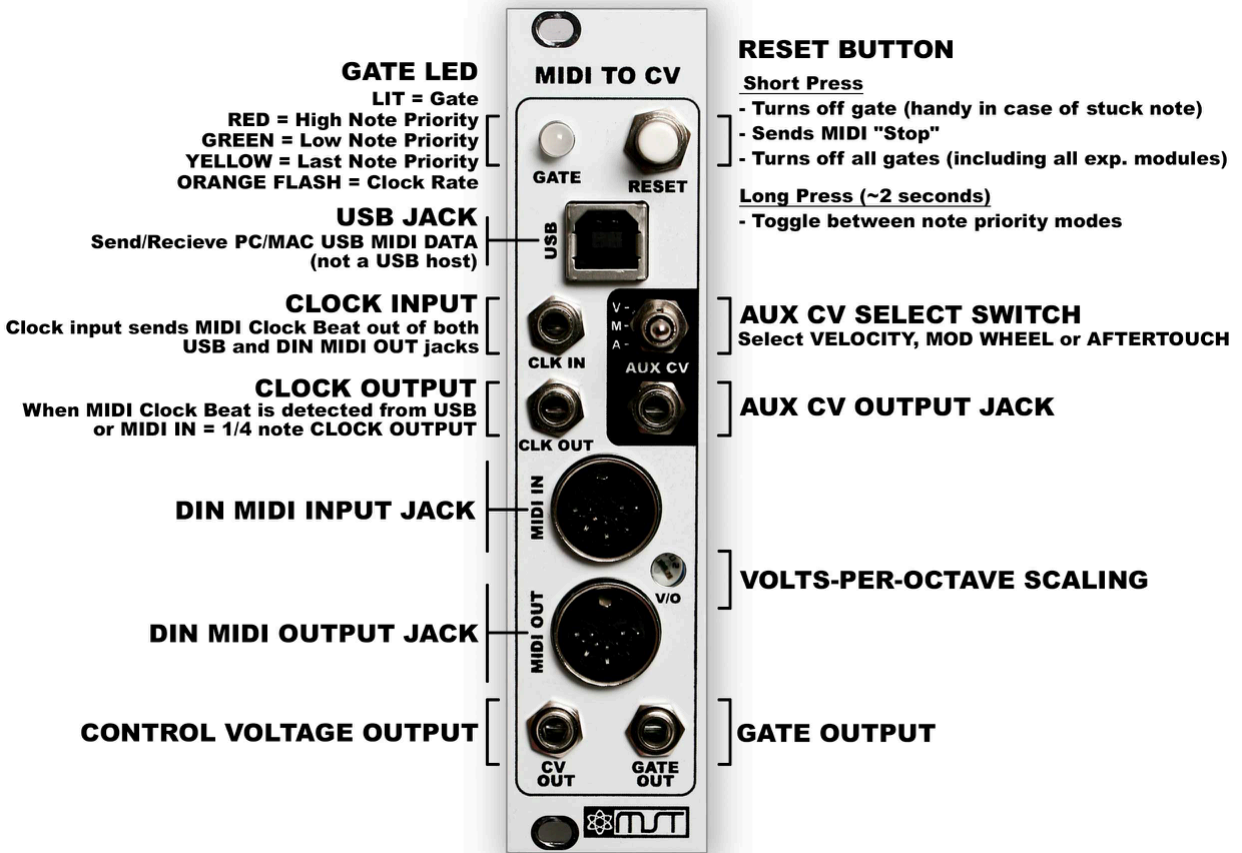
For help with technical terms in this manual, check out these links:

Glossary of MIDI terms: http://www.midi.org/aboutmidi/glossary.php

Intro to MIDI: https://www.soundonsound.com/sos/1995_articles/aug95/midibasics1.html

SYNTHROTEK

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MIDI TO CV

GATE LED
LIT = Gate
RED = High Note Priority
GREEN = Low Note Priority
YELLOW = Last Note Priority
ORANGE FLASH = Clock Rate

USB JACK
Send/Recieve PC/MAC USB MIDI DATA
(not a USB host)

CLOCK INPUT
Clock input sends MIDI Clock Beat out of both
USB and DIN MIDI OUT jacks

CLOCK OUTPUT
When MIDI Clock Beat is detected from USB
or MIDI IN = 1/4 note CLOCK OUTPUT

DIN MIDI INPUT JACK

DIN MIDI OUTPUT JACK

CONTROL VOLTAGE OUTPUT

GATE **RESET**

USB

CLK IN **AUX CV**

CLK OUT

MIDI IN **V/O**

MIDI OUT

CV OUT **GATE OUT**

RESET BUTTON
Short Press
- Turns off gate (handy in case of stuck note)
- Sends MIDI "Stop"
- Turns off all gates (including all exp. modules)

Long Press (~2 seconds)
- Toggle between note priority modes

AUX CV SELECT SWITCH
Select VELOCITY, MOD WHEEL or AFTERTOUCH

AUX CV OUTPUT JACK

VOLTS-PER-OCTAVE SCALING

GATE OUTPUT

Current draw: +12V: 85mA, -12V: 8.5mA
Module width: 6HP
Module depth: 46mm

GATE LED: Lights whenever the gate output is on.

RED indicates high-note priority and also quickly flashes whenever the reset button is pressed.

GREEN indicates low-note priority

YELLOW indicates last-note priority

ORANGE indicates a quarter note when the module is locked onto a clock signal via the CLK IN jack, MIDI or USB ports.

RESET Button: This button has several functions:

- Short press:
  - Turns off gates on main module and any expansion modules (handy in case of stuck note)
  - Sends MIDI "Stop" message out both DIN and USB ports
  - Arms MIDI clock so that MIDI "Start" message will be sent when CLK IN resumes

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- Long press (~2 seconds):
    - Cycle between high-note, last-note and low-note priority. The LED will flash red (high-note), yellow (last-note) or green (low-note) to indicate new mode

USB: Use this port to connect the module to a PC/MAC. The module behaves like a standard USB MIDI adapter, so you can enable it in your DAW, send MIDI data to it, and receive data from it. It is class-compliant, so no extra drivers are necessary. *Note: This module is not a USB host, so plugging a keyboard or other client device into the USB port won't work.*

Any MIDI data sent from your PC to the module (via the "MIDI Out" port in your software) will come out the MIDI OUT connector on the module. It will also drive the CLK, AUX, CV and GATE OUTs where applicable (see sections on those outputs for more details).

MIDI data received by the MIDI IN connector on the module gets copied to the USB port so that it's available to software running on your PC (via the "MIDI In" port in your software).

Data sent to the "MIDI Out" port in your software does not get looped back into the "MIDI In" port. This prevents feedback loops when you have monitoring turned on.

CLK IN: If you feed a clock signal into this jack, the module will lock onto that clock and generate a 24PPQN MIDI beat clock signal and send it out both the USB and MIDI OUT connectors. The incoming clock signal should swing between at least 0 to +5V, but if it goes above or below that it won't hurt anything.

Each incoming clock pulse is interpreted as a quarter note. Since the module needs to know the tempo of the incoming clock signal so that it can generate 24 pulses for each quarter note, it takes a couple of pulses before the module locks on and starts sending MIDI clock. Once it's locked on, a MIDI Start message is generated and the clock messages begin. The module then tries to keep up with tempo changes of the incoming clock.

If you press the RESET button, a MIDI Stop message is sent.

When the clock signal starts again, the module assumes that the tempo will be the same as it was before it stopped and the MIDI clock begins again immediately. A new MIDI Start message is sent when the clock restarts (if the reset button has been pressed).

CLK OUT: If a MIDI beat clock signal is received on either the module's USB or MIDI IN ports, a 0 to +10V clock will be sent out the CLK OUT jack in time with that signal. Each clock pulse represents a quarter note.

AUX CV: This analog output can be set to put out one of three different things using the 3-position switch:

- (V) Velocity of last priority MIDI note received (0 to +5V)
- (M) Mod wheel position (0 to +5V)
- (A) Aftertouch (0 to +5V)

MIDI IN: Connect a MIDI signal from anything with a standard DIN MIDI output jack to this input. Data received will be looped through to both the USB and MIDI OUT connectors. It will also drive the CLK, AUX, CV and GATE OUTs where applicable (see sections on those outputs for more details).

MIDI OUT: This output acts as a MIDI THRU, repeating MIDI data received on both the USB and MIDI IN ports.

If data is being received on both those ports, it gets merged before being sent to the MIDI OUT (and USB) port. The merging is done intelligently, so that running status is taken into account (and stripped), SysEx messages are kept together, etc.

The MIDI OUT port will also transmit MIDI beat clock messages if you are feeding a clock signal into the CLK IN jack.

V/O: This adjusts the volts-per-octave scaling for both the CV OUT and AUX CV analog outputs.

TO CALIBRATE: Connect a volt meter to the module's CV OUT jack, play a MIDI C7 (note #108), then adjust the V/O trim pot until the meter reads exactly 6V. You can use other octaves, too, if you want; just remember that every C note should output an even voltage value:
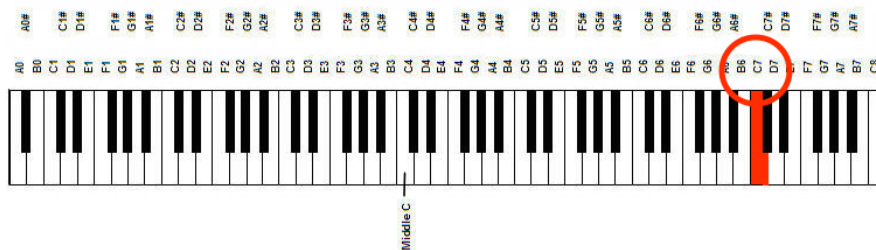
MIDI Note	MIDI Note #	Output Voltage
C1	36	0.0
C2	48	1.0
C3 (Middle C in MIDI land)	60	2.0
C4	72	3.0
C5	84	4.0
C6	96	5.0
C7	108	6.0

CV OUT: Outputs analog voltage for controlling 1V/O equipped gear (Hz per volt not supported). By default the output is configured as top not priority but may also be configured as low note or last note priority (see page 2 for note priority settings). Scaling is 1V/O (refer to the chart above to see the relationship between MIDI notes and output voltages). This output is buffered so that the output voltage will stay constant regardless of the load applied to it.

GATE OUT: Outputs +10V whenever one or more notes are being held, and 0V when none are. Press the RESET button if the gate ever gets stuck on.

MIDI CH-1 (on back of module): These four jumpers select the MIDI channel that the module responds to. Since MIDI channels are 1-indexed and the binary numbers represented by the jumpers are 0-indexed, set the jumpers for one less than the MIDI channel you want. Alternatively, you could just look at this chart:

MIDI Channel	J1	J2	J4	J8	MIDI Channel	J1	J2	J4	J8
1	off	off	off	off	9	off	off	off	ON
2	ON	off	off	off	10	ON	off	off	ON
3	off	ON	off	off	11	off	ON	off	ON
4	ON	ON	off	off	12	ON	ON	off	ON
5	off	off	ON	off	13	off	off	ON	ON
6	ON	off	ON	off	14	ON	off	ON	ON
7	off	ON	ON	off	15	off	ON	ON	ON
8	ON	ON	ON	off	16	ON	ON	ON	ON

XP Out (on back of module): Use this output to connect the module to Synthrotek MIDI-CV expansion modules.

Power (on back of module): Connect this to your Eurorack system's power supply. The module requires +/-12VDC. It uses a keyed header and has the power supply connection polarity clearly marked on the board to aid in getting the correct polarity. The power input is reverse-polarity protected, however, so even if you do connect it backwards it won't hurt anything.

Compatible with the following hardware:

- Windows XP, 7, 8, 10
- Mac OS X (any version)
- Linux (tested on Ubuntu 14.04)
- iPad, iPhone with a MIDI adapter (like an iRig MIDI)
- Android phones (3.1 or later) with a USB OTG cable and USB A to B cable (like a USB printer cable)

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