

The

AvonSynth User Guide

AVS-MIDI-1 MIDI to CV Converter



Thank you for purchasing from AvonSynth

Congratulations on your purchase of a brand new AvonSynth AVS-MIDI-1 MIDI to CV Converter Module. We trust that it will both serve and inspire you as you create beautiful music with it for years to come.

In order to get the most out of your module, please ensure that you read this User Guide in its entirety so that you fully understand all of its functionality, and that you follow all necessary safety directions during use.

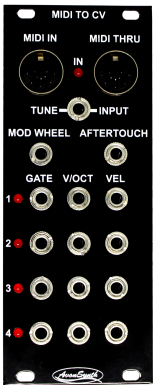
Included in the Box

1 x MIDI to CV Module

1 x 16 pin to 16 pin flat-cable power cord

4 x M3 Mounting Screws

4 x Nylon Washers

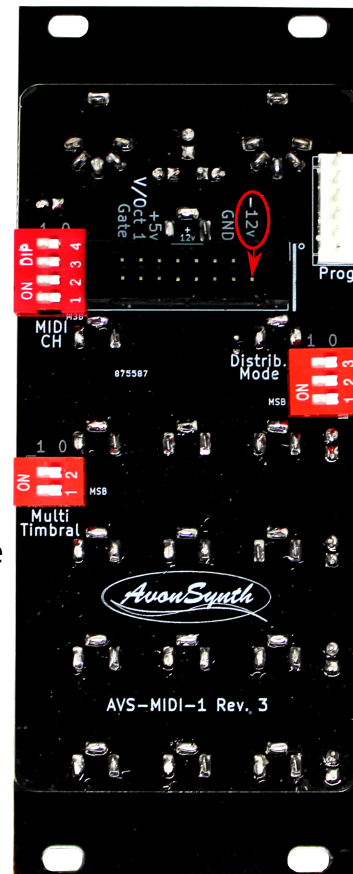


Installation

Step 1: Power your system off. Place the module in your Eurorack-compatible rack in any convenient position. Affix the module to your rails using the included mounting screws and nylon washers. Neglecting to use these washers may result in unnecessary marking of the unit.

Step 2: Triple check the polarity of the power connector before connecting the power cord to your power supply. Ensure that the -12v line marked on the back of the module connects to the same end of the flat-cable that also connects to the -12v line on your power supply. While AvonSynth modules use shrouded connectors that make this process safer and more reliable, some systems do not conform to this polarity standard, so careful checking is **always** necessary. Connecting the module with incorrect polarity can result in irreversible damage done to the module which cannot be covered by warranty.

Step 3: Power up your system and start patching!



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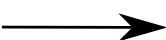
AVS-MIDI-1 MIDI to CV Converter

Features & Specifications

- Polyphonic MIDI to CV converter with automatic oscillator tuning capability
- MIDI Tuning Standard compatibility for arbitrary scales
- 4 channels of individual gate, V/OCT, and velocity CV outputs
- Independent Mod Wheel and Channel Aftertouch CV Outputs
- Automatic polyphony selection based on inserted plug
- Rear DIP-switch based configuration to choose channel and mode
- Manual MIDI CC control of unused channels
- Multi-timbral modes with various note-stealing schemes
- 10 HP wide (50.5mm), 20mm deep
- Current consumption: +12V 30ma, -12V 30ma, +5V 15ma

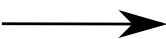
Description of Interface

MIDI In



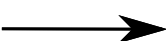
Connect your MIDI controller, sequencer, keyboard or computer to the MIDI In to control the module.

Tuning Input



Connect a simple +/- 5V audio output from the VCO that you would like to tune. (More info on page 3)

Mod Wheel Output



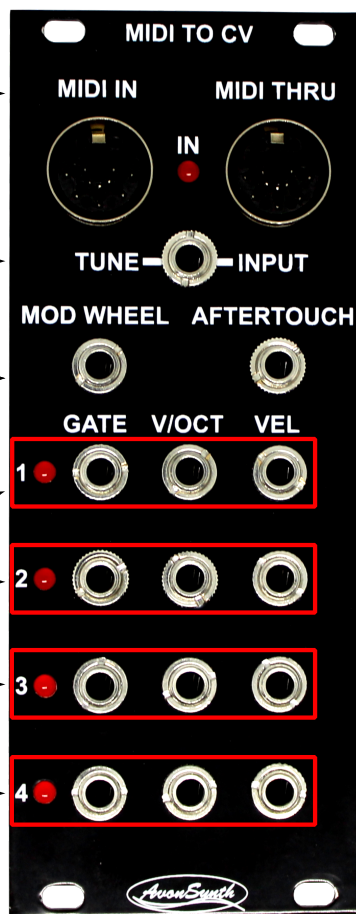
This output sends a 0-10V CV corresponding to Mod Wheel (CC #1) messages received at the MIDI Input.

Gate, V/Oct, Velocity Outputs



A Note On message received at the MIDI Input triggers an output event from one of the 4 channels depending on which note stealing, multitimbral, and polyphony modes are selected, and the current state of the notes. The LEDs light up to indicate which channel has been activated, and remain lit while the note is held.

The corresponding gate output is high at 10V while the note is held, the V/Oct outputs a CV that corresponds with the note that has been played, and the Vel output sends a 0-10V CV corresponding with the velocity used to play the note.



MIDI Thru

All messages sent to the MIDI In are buffered and immediately sent out of the MIDI Thru with no filtering. This allows the daisy-chaining of multiple units for larger systems.

Aftertouch

This output sends a 0-10V CV corresponding to channel aftertouch messages received at the MIDI Input.

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Tuning Method

There may be times when more precise tuning is required, especially when utilising several different analogue VCOs in polyphony. To create a custom tuning for a channel using a VCO, follow these steps :

1. Plug a V/OCT output of the MIDI to CV module to the V/OCT input of the VCO, and set the VCO's pitch dial to the bottom of the audible range (around 20Hz ideally).
2. The highest number channel with a gate output connected is the chosen channel.
3. Connect an audio output from the VCO to the MIDI to CV tuning input.
4. The tuning routine starts automatically, and its progress is shown by the LEDs.
5. A thorough sweep of all frequencies of the VCO is undertaken, which can take up to 30 seconds.

Note: If the input is invalid, all LEDs will flash, and tuning will revert to default.

Rear Settings

MIDI Channel

The receiving MIDI channel is set using these DIP switches. In monotimbral mode, the module only receives messages addressed to the channel specified by these switches. In multitimbral modes, extra channels directly above the set value are utilised (up to 3 extra). Please refer to the chart shown on the top right of this page to set the desired MIDI channel number. MIDI Channel 16 acts as OMNI mode for the unit - receiving messages on all channels.

Distribution Mode

The value of this set of DIP switches dictates the way in which notes are distributed when using polyphony. When all of the available spaces for notes are occupied, this setting indicates which one of the currently playing notes will be replaced.

- | | |
|------------------------------|-----------------------------|
| 1 = Oldest Note is Replaced | 4 = Lowest Note is Replaced |
| 2 = Newest Note is Replaced | 5 = Middle Note is Replaced |
| 3 = Highest Note is Replaced | 6 = No Notes are Replaced |

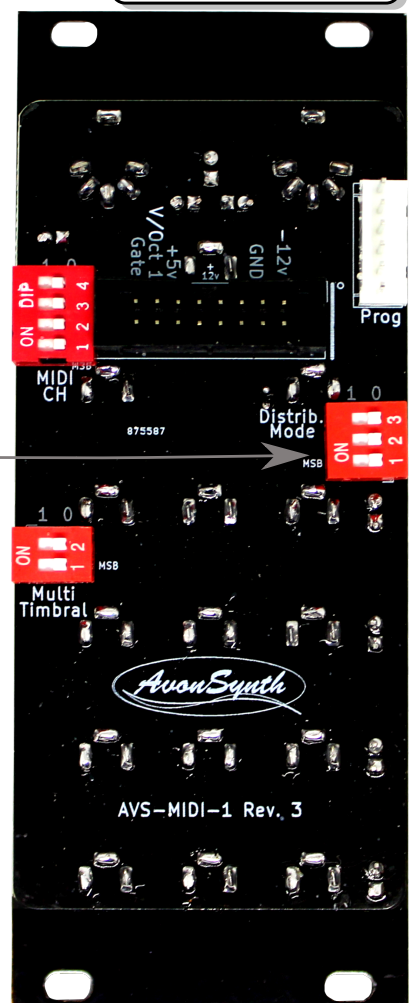
Multitimbral Mode

The multitimbral setting allows the polyphony to be split between multiple MIDI channels. This allows the unit to be used as either a single, 4-voice polyphonic controller, or multiple controllers of lesser polyphony addressed using unique MIDI channels. Multitimbral settings have no effect in OMNI mode.

- | |
|-------------------------------------|
| 1 = No Multitimbrality |
| 2 = Voices split between 2 channels |
| 3 = Voices split between 3 channels |
| 4 = Voices split between 4 channels |

MIDI Channel Numbers

1	ON DIP 1 2 3 4	9	ON DIP 1 2 3 4
2	ON DIP 1 2 3 4	10	ON DIP 1 2 3 4
3	ON DIP 1 2 3 4	11	ON DIP 1 2 3 4
4	ON DIP 1 2 3 4	12	ON DIP 1 2 3 4
5	ON DIP 1 2 3 4	13	ON DIP 1 2 3 4
6	ON DIP 1 2 3 4	14	ON DIP 1 2 3 4
7	ON DIP 1 2 3 4	15	ON DIP 1 2 3 4
8	ON DIP 1 2 3 4	OMNI	ON DIP 1 2 3 4



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Polyphony Selection

The AVS-MIDI-1 continuously detects which Gate Output plugs currently have patch cables inserted, and uses this information to automatically and dynamically select the utilised polyphony. The highest numbered Gate Output that has a plug inserted decides the polyphony used, regardless of whether lower numbered Gate Outputs have plugs inserted or not.

For example, say multitimbral mode is off, and a cable is inserted into Gate Output number 3. When receiving notes, the unit will automatically cycle them from the first to third channels, in a manner according to the selected note distribution mode.

When a channel is not included in the current polyphony setting, the V/Oct and Velocity outputs are then freed up for manual control via MIDI Continuous Controller (CC) messages. If no Gate Outputs are plugged in, that means it is possible to manually control up to 8 CV outputs via CC messages, plus the Mod Wheel and Aftertouch CVs. Please check the MIDI Implementation Chart below for details on which CC numbers control these manual outputs.

MIDI Implementation Chart

CC #	Function	PC #	Function
1	Mod wheel control	0	Panic Button - clears all notes
64	Sustain Pedal > 64 = pressed		
101	Ch1 V/Oct Output Manual CV		
102	Ch1 Vel Output Manual CV		
103	Ch2 V/Oct Output Manual CV		
104	Ch2 Vel Output Manual CV		
105	Ch3 V/Oct Output Manual CV		
106	Ch3 Vel Output Manual CV		
107	Ch4 V/Oct Output Manual CV		
108	Ch4 Vel Output Manual CV		
110	Pitch bend range in semitones (1-24)		

MIDI Tuning Standard (MTS)

To implement a custom scale or tuning, MTS bulk dumps are used. You can use software like Scala to create your own tunings, or use one of the thousands of available tunings on the internet. Send your MTS bulk dump as Sysex to the AVS-MIDI-1, and if it is received successfully, the LEDs will shine one by one from bottom to top. Otherwise, they will all blink three times to indicated a failed dump. After a dump is received, the uploaded scale becomes the new scale which the auto-tune function uses to tune VCOs. This means that in order to use the scale, you must auto-tune your oscillator after uploading the scale.

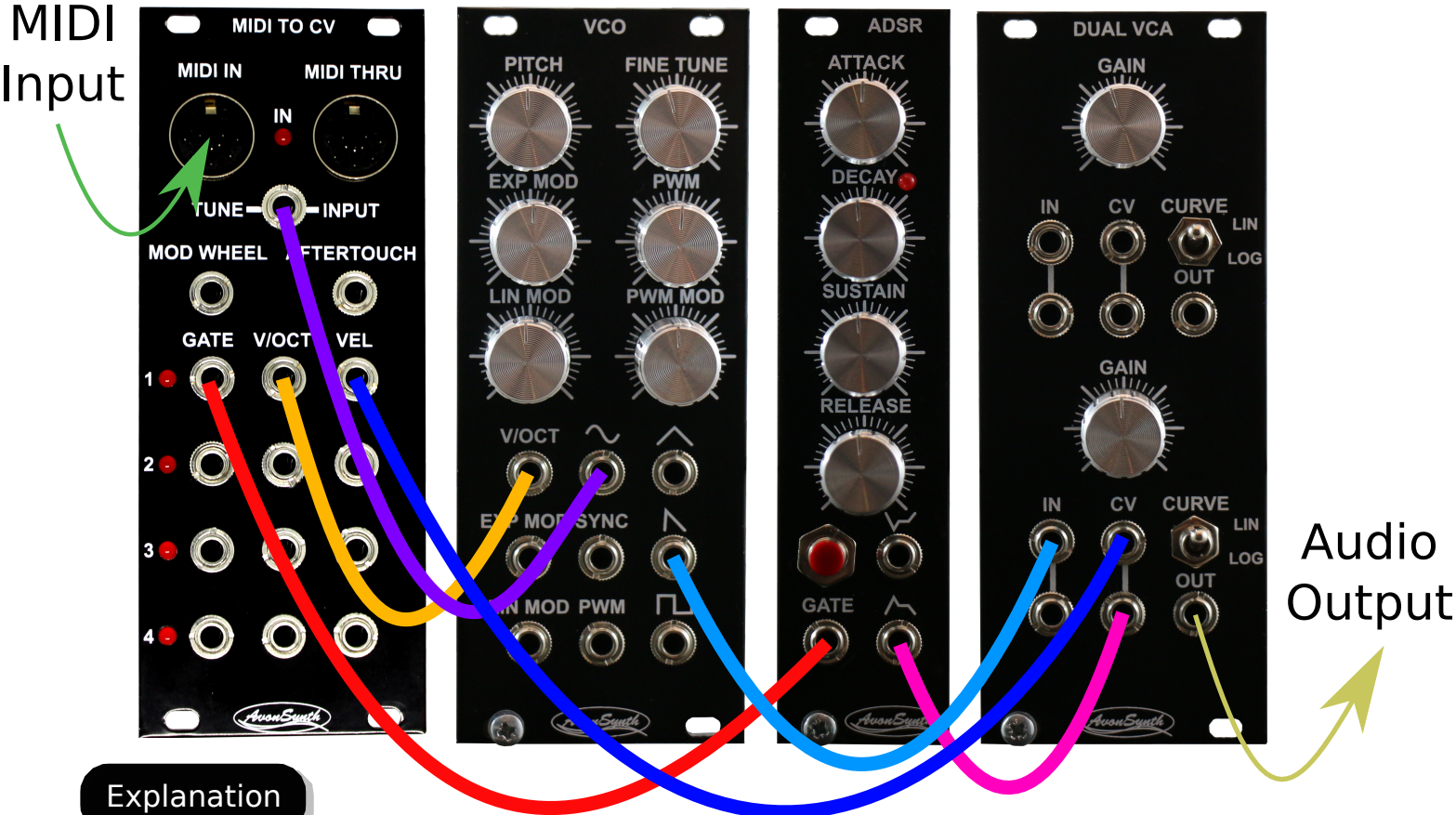
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Simple Monophonic Voice Example

A standard single-voice example is illustrated below. This example has the AVS-MIDI-1 being controlled by a MIDI device such as a keyboard or sequencer, and playing a tuned sawtooth wave in a monophonic manner. Once the patch is set up, the VCO should be set to at least 20Hz (the lowest audible output from the sine wave out) and the VCO output should be connected to the Tune Input as shown by the purple line. Once the tuning routine is complete, this patch cable can be removed.



Explanation

In this example, the gate output from the AVS-MIDI-1 triggers the ADSR envelope to open up when each note is pressed. The envelope then controls the VCA, letting sound through when notes are played. The V/OCT output controls the pitch of the VCO, which should be providing 12-TET tuning referenced to A=440Hz if the tuning routine has been carried out. The VCO output (sawtooth in this case) is sent to the VCA, and the output of the VCA is sent to your amplifier and speakers (perhaps via a mixer or other equipment).

If you would like softer presses on the keyboard to generate softer notes, you can connect the VEL output from the AVS-MIDI-1 to also control the VCA, though this is optional. If this patch is replicated with 4 VCOs, 4 ADSRs, and 4 VCAs, rich 4-note polyphony can be achieved. The Mod Wheel and Aftertouch outputs can also be used to control various aspects of the sound such as vibrato amount or filter cutoff.

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Troubleshooting

Issue	Potential Solution
No LEDs light on power up	Ensure that the 16-pin power cable is connected correctly, and that the 12V, -12V, GND, and +5V lines are active.
I'm playing notes, but nothing's happening	<p>First, ensure that your MIDI cable is connected to the MIDI Input of the unit, and that you are seeing indication from the sender of MIDI that it is being sent correctly.</p> <p>If the cable is connected, and MIDI messages are being sent from the source device, the 'IN' LED on the AVS-MIDI-1 blinks as messages are received.</p> <p>If the 'IN' LED is blinking, but nothing else is happening, check that you have selected matching MIDI channels on the source device and the AVS-MIDI-1 (see page 3). If you set the AVS-MIDI-1 to 'OMNI' mode, and your problem persists, then it is likely not MIDI channel related.</p> <p>Also ensure that you have a patch cable inserted into at least one Gate output. These outputs are used to select the polyphony (see page 4) and if no cables are connected to any Gate outputs, the polyphony selection is zero (no notes). Note that the other side of the patch cable inserted to a Gate output need not be connected to anything if gates are not used.</p>
The tuning process is failing, stalling, or not tuning the expected range	<p>Only use simple (ie. sine, triangle, sawtooth, pulse) waves of analogue VCOs (digital VCOs shouldn't need tuning).</p> <p>Make sure that the VCO is set to around 20Hz, or the lowest audible pitch of a sine wave before starting the tuning routine.</p> <p>Make sure that you've selected the channel by inserting a patch cable into the gate output of the channel you would like to tune (with no patch cables in higher numbered channels).</p> <p>Make sure that the V/OCT output of your selected channel is connected to the V/OCT input of your VCO, and that no other CVs that could influence the pitch or other characteristics of the VCO are used. These can be reconnected after tuning.</p>

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Safety Precautions

Please use this module in accordance with the following safety guidelines in order to maximize the life of the module and ensure warranty from AvonSynth.



Keep water and other conductive liquids and materials away from this module. It is not water proof, or even water resistant. Exposure to these can cause short-circuits that can render the equipment unusable.



Be sure to keep this equipment in an environment with an ambient temperature above -20°C and below $+50^{\circ}\text{C}$. Excessively hot or cold temperatures can be damaging to the electronic circuits used.



Modules with exposed circuit-boards are delicate. Take the utmost care when handling and transporting this equipment, making sure not to subject it to excessive forces. Ensure that the module is installed correctly while being transported and that the original packing materials are used when sending the module anywhere by post.

Warranty & Support

This product is covered by AvonSynth's warranty for one year from the manufacturing date. Within this timeframe, any manufacturing defect will be repaired or replaced by AvonSynth. Damage caused to the product due to not following the safety precautions above, unauthorized modification of the hardware, or misuse such as subjecting the unit to reverse or excessive voltages will void this warranty.

If you have any concerns about your AvonSynth hardware, please get in touch via **info@AvonSynth.com** to discuss any issues. We will do our best to assist you in getting your hardware operating correctly, and if necessary, we will provide an RMA (Return Merchandise Authorization) to send back the unit for inspection. Any postal costs incurred in this process will be the responsibility of the customer. Please do not send back merchandise before receiving this authorization.