

## User Guide Firmware 1.0

Thank you for pre-ordering the ConVerter E1.

The ConVerter will analyse an analogue monophonic audio signal into its Pitch, ENV and GATE Control Voltages, DC signals to control external analogue synths. It also provides its own internal digital synth that is always in tune. It can work by itself with external synths or act as an independent synth. You can also expand it via a MIDVerter E1 adding sustain pedal, MIDI i/o, arpeggio and centralized control for up to 7 ConVerter in parallel. Check periodically for new firmware on our product page: [sonicsmith.com/products](http://sonicsmith.com/products). Feel free to write us with any feedback, question or concern at: [info@sonicsmith.com](mailto:info@sonicsmith.com)



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## 1) Connecting and powering

To use the ConVerter E1 you need to supply your own 12V powered Eurorack case with 6HP (3cm) available space, one available power connection and about 90 mA of current available. Connect the power cable to the back, place and screw the panel to the rack using the two included standard M3 screws. Avoid exposing it to sun, fluids or unchecked physical abuse/shocks.

“Sonicsmith bus” 4 pin header to MIDVerter E1 (optional)

FM CV in

Mic/Inst/line input

Balanced/unbalanced



Synth out

Pitch CV

ENV CV

GATE CV

Preamp out

Please **Avoid** patching any audio signal stronger than +4dBu or CV signals into the **audio input**. The audio & CV outputs of this device are very loud potentially around 10V scale. Always test a signal’s loudness before patching it with speakers or headphones on.

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## 2) Preamp section buttons

Connect a TS or TRS Mic/Inst./Line 1/4” plug into the audio input

If you play a pickup inst. Press the **HI Z**

LOW Z: 50 kOhm

HI Z: 2M Ohm



25 Hz

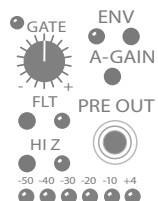
75 Hz

150 Hz



Press **FLT** To toggle between

Analogue input HPF frequencies:



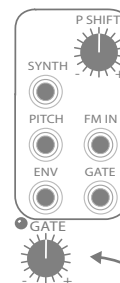
Press **A-GAIN** To activate Auto-GAIN detection, play loudly, briefly, during 2.5 seconds. After 2.5 seconds, the gain will be set and the meter will go back to showing input levels. The gate will not effect the PRE OUT signal. Press the GATE knob and dial to change the **gain manually** (metered in red) and initiating another 2.5 second count. The ConVerter E1 will remember all gain, preamp & comp settings. The gain can amplify the input up to +54db. If you turn the GATE encoder and see the meters change value in green, then you are changing the gate’s threshold (see square #3).



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## 3) The two encoders: GATE & P SHIFT



Turn the **P SHIFT** knob to shift the DCO’s semi-tones SYNTH & the PITCH CV outputs up to -2 - +2 octaves. Press on the P SHIFT knob to bypass the shift back to unison. Press it again to come back to the shift. The resulting pitch shift is relative to the **FM IN** 1V/oct CV input so you can try arpeggiating the pitch from a sequencer 1/V per octave output, patched into the FM IN. When in VCO/DCO mode, the FM IN will be the only pitch control on the internal synth.

Turn the **GATE** knob to increase/decrease the gate’s threshold in 1dB increments. The gate will effect the ENV CV output by shutting the ENV CV out to 0V and the SYNTH OUT audio off. PRE OUT is analogue copy of the same signal going to the ADC. Connect the pre-out mini-jack TS to an +18dBu-capable destination like Eurorack gear. The gate’s threshold can vary between -6dbFS to -65dbFS.

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## 4) SYNTH, memory & ENV dynamics



Press the **SYNTH** button to select WAVE/ Synth **preset**

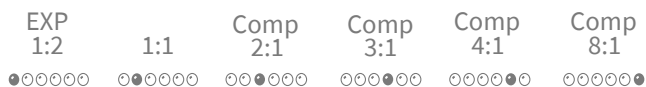
- GRN= unchanged
- Red = changed



As of firmware 1.0 the ConVertor E1 will **SAVE** all its settings automatically and will recall them the next time you power it up so you can continue working where you left off. Saving the settings will occur within 3 seconds after inactivity as soon as the gate shuts off.



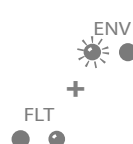
Press the **ENV + A-GAIN** buttons to change the **Compressor/Expander** of the internal VCA & ENV CV out



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## 5) LPF effect & Pitch tracking speeds



Press the **ENV + FLT** buttons to activate the **2-pole LPF**. The ENV LED will light up in green. Press both of them again to bypass the low pass filter effect. The LPF cutoff frequency will be modulated by the ENV and the pitch frequency at varying amounts.



Press the **ENV + SYNTH** buttons to select between the 3 **pitch detection** speeds. Choose fast if your audio source has little harmonics, but if you get “glitches” in your pitch tracking you can try the slower “medium” / “sticky” and see if it helps.



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## 6) Quantizing the FM IN



Press the **Q** button to toggle between **quantization (led on)** & **continuous (led off)**, of the FM CV input. If 0V CV is injected into the FM input, and FM IN is calibrated, then the ConVertor E1 synth should stay in unison +/- the P SHIFT applied via its own encoder. If unplugging the FM IN, and pressing the P SHIFT knob doesn't cancel the pitch shift to unison, you may need to calibrate FM IN. A CV source into FM IN can modulate the int. synth's frequency within 8 octaves range. It's possible to modulate the int. synth at audio frequencies as well, opening up the possibility of FM synthesis. Press the **Q** button to turn quantizer on and keep pressing Q to select the desired musical scale to quantize to (1/6). After 5 seconds of inactivity, you will be able to toggle it off, back to continuous. The musical scales available are as follows:



If countdown finished and you want to change the musical scale then you will have to press Q twice to enter Q mode again.

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## 7) VCO / DCO mode



Press both encoders down to enter **VCO mode**, during which, The int. synth will be completely detected from the pitch detection and by default will play middle C without VCA nor gate. The int. SYNTH pitch will be controlled by the FM 1V/oct CV input (or an incoming MIDI from a connected MIDVertor) and the P SHIFT knob only. The preamp audio input will continue to track the audio's pitch, and provide the PITCH CV, GATE, and ENV CV out as usual, just not affecting the internal synth.

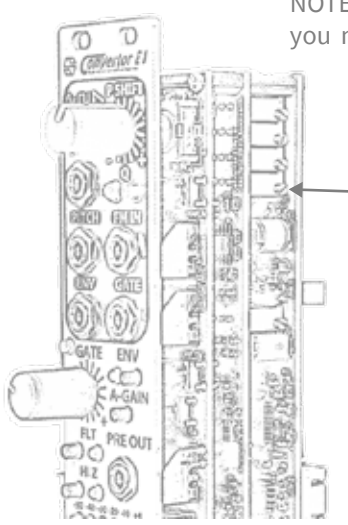
To route the internal synth sound through the VCA modulated by the ENV follower, press the **ENV** button while in VCO mode). The ENV compressor will work as usual. You can also route the internal VCF effect as well, by pressing **ENV+FLT**. To add MIDI control you will have to join the MIDVertor E1, optional expansion module.

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## 9) Calibration of the audio DC offset

NOTE: This calibration is done prior to shipping. Do not assume you need to do it unless instructed to do so by SonicSmith.



ADC differential offset

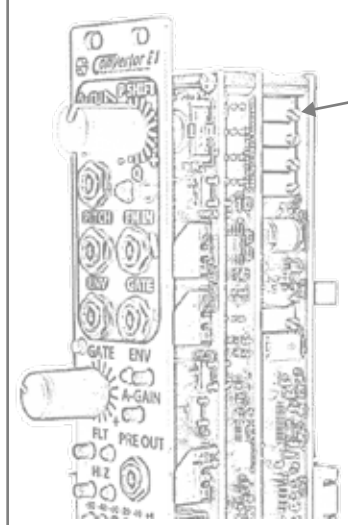
- 1) Reboot the ConVertor while simultaneously holding down the WAVE and Q buttons. This puts the ConVertor in **Calibration mode**, which it shows by quickly displaying the meter LEDs, left to right, one at a time.
- 2) Adjust the ADC differential offset trim pot until the meter shows no LEDs (zero offset). If the meter shows LEDs to the right, turn the pot counter-clockwise and if it shows LEDs to the left, turn the pot clockwise.
- 3) When finished calibration, reboot the ConVertor to get out of cal. mode.

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## 10) Calibrating the ENV CV out

If you are controlling an external synth with the ENV CV output but when you stop playing you still hear the external oscillator in low volume, you may either suffer noise from your audio source or there may be a need to calibrate the ENV CV output. Follow the next steps to calibrate it:



ENV offset

- 1) Unplug the audio input, set gain to minimum and make sure the HI Z LED is off.
- 2) Plug the Volt meter probe's mini-jack to the ENV CV out, and set the V-meter to DC
- 3) Turn the ENV offset trim-pot until the V-meter shows 0V

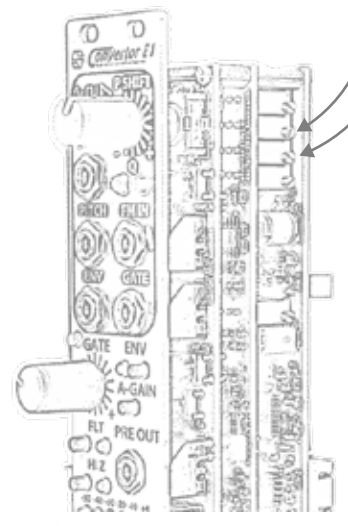
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## 11) Calibrating the PITCH CV out

Pitch DC offset  
Pitch scale

If you control an ext. synth and notice it's in tune in one octave but in other octaves it's not in tune, you may need to calibrate your pitch CV output. For that we need a multimeter with 3-digits -after-decimal precision.



- 1) While in calibration mode (step 9.1), Connect a Multimeter minijack probe to the ConV pitch CV output and set it to DC.
- 2) If the WAVE LED is on, press the WAVE button and observe the LED turn off. Tune Pitch scale trim until the DMM reads -2.000V.
- 3) Press the WAVE button and observe the WAVE LED turn green. Tune pitch DC offset trim until DMM reads +2.000V.
- 4) Repeat steps (2) and (3) until no further tuning of trim pots is necessary.

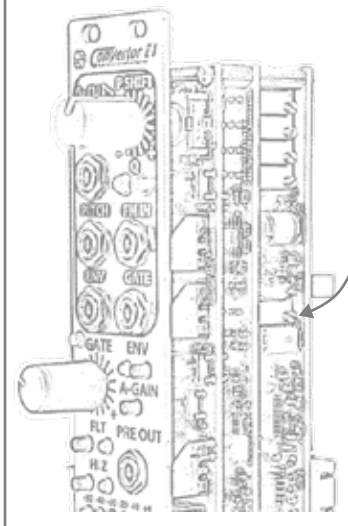
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## 12) Calibrating the FM / unison

FM IN (Unison adjust)

If you press the top encoder to go to unison but the pitch of the int. synth doesn't tune to the input, you might need to calibrate your FM in / Unison.



- 1) While in calibration mode (step 9.1), press the Q button and observe that the WAVE LED turns red.
- 2) Adjust the FM IN trim pot to make the meter LEDs all turn off. If the meter shows LEDs to the right, turn the pot counter-clockwise and if it shows LEDs to the left, turn the trim pot clockwise.

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## 13) Using ext. ENV (int. ENV on/off)



If you want to play the internal oscillator through an external VCA modulated via ext. ENV, you may want to either turn the internal ENV-to-VCA off, or using the internal ENV in 8:1 compression. Using max compression will help with avoiding hearing a wrong pitch when we stop the input audio's note while the ext. ENV may continue with its release phase.

To turn the **ENV on/off** press the **ENV** button. This will only apply to the internal ENV follower-to-VCA, and will not change the ENV CV output. The gate will still shut off the sound when gate is below threshold. When in DCO mode: the ENV will continue to function as ENV on/off applying the int. ENV-to-VCA on the int. synth sound.

## 14) About Int. Vs. ext. oscillator

Even though the ConVertor E1 has pitch, gate and envelope CV outputs to control external modular synths, it also includes an internal oscillator. While the internal oscillator is digital, it enjoys the huge benefit of never losing tune with the fundamental frequency of the input so will sure to save musicians lots of time and frustration.

It will help tremendously in a few cases:

- 1) Serving as a primer in a multi-oscillator sound
- 2) Giving you the base pitch by which to tune other oscillators
- 3) Letting you play immediately to other band members when external oscillator are already taken.
- 4) Comes pre-routed through a VCA, with available, ENV follower, compressor, quantizer and VCF effects at a press of a button.
- 5) Excellent in FM synthesis where a true sine-wave and perfect tune are most needed.

## 15) Troubleshooting

**1) No Sound:** Press both encoder down to enter VCO mode. Do you hear the oscillator sound? If not, continue troubleshooting your input to the speakers/headphones. If you hear the sound but not in ACO mode, Make sure the input meter shows enough gain the waveform is not a sine-wave in unison (it's hard to notice it if not shifted).

**2) Sound doesn't gate off:** Make sure the gate threshold is high enough by turning the lower encoder clockwise. Make sure ENV is on by pressing ENV. Make sure you are in ACO mode by pressing both encoders down. Make sure you are not listening to external synthesizer but you ConVertor E1's SYNTH out.

**3) Unstable pitch tracking:** Make sure your source is not too noisy by listening to the PRE-OUT. If your source is very bright or full of harmonics try turning the audio source's treble down. Make sure your FM in is not patched and receiving random CV and shifting the pitch output.

If you have any other trouble with your ConVertor E1 please write us at: [info@sonicsmith.com](mailto:info@sonicsmith.com)

## 16) Flashing the firmware/s



To **Flash** the ConVertor E1 **Firmware** we need to copy the firmware files on to a micro SD card which is formatted in FAT 32 file system and not any bigger than 32 GB. After you insert the SD card at the back of the module, power the device off, hold the FLT & HI Z buttons together (illustrated on the left), then while holding them, power the module on to initiate flashing. Keep the 4 buttons pressed until you see a meter LED blinking. After that, you can let the buttons go, and you should see another LED blinking (if the second uC is flashing). Firm 1.0 should be downloadable from our product page.

Please visit [www.sonicsmith.com/products](http://www.sonicsmith.com/products) for periodical updates and products availability.