

E300 Ultra VCO

www.synthtech.com/euro rack/E300



What is the E300?

The Synthesis Technology E300 Ultra VCO is a re-design of the 5U MOTM-300 Ultra VCO. Co-designed by Dave Rossum of Emu, the E300 uses modern temperature-controlled exponential converters without the expensive MAT-02EH + Tempco found in the MOTM-300. It also incorporates variable HFT (High Frequency Tracking) for a wider, more accurate 1V/Oct input.

The SYNC circuit is a simpler 'hard sync' type, with accurate detection of any waveshape/frequency used.

There is an added -1OCT/-2OCT sub-octave squarewave output, which is phase-aligned with the sawtooth.

The 'core' is a new sawtooth-based circuit with improved linearity and a unique saw-to-triangle converter with no 'glitch' in the transition peaks.

Connecting to the power supply

The E3000 is a +-12V only module and connects to standard Euro power busses via ribbon cable. Be sure the red stripe on the cable is aligned with the -12V STRIPE lettering on the pc board (to the right side of the connector, looking from the rear).

Controls and Jacks

COARSE/FINE: sets the VCO frequency with no CV inputs applied. When both knobs are at 12:00, the VCO frequency is $\sim 500\text{Hz}$.

FM1/FM2: FM1 is switchable between AC-coupled linear FM and exponential (1V/Oct) FM. The Linear FM can be used down to 4Hz for LFO modulation.

PULSE WIDTH: sets the initial width (duty cycle) of the PULSE Out. At extreme settings the Pulse may have '0' width (no audio output). This is not a good mute function, as a DC transient may be generated when a non-zero width is generated.

PWM CV: this external CV is added to the setting of PULSE WIDTH to modulate. At audio rates, interesting musical timbres can be generated.

CV inputs: The range of each input is -5V to +5V. FM1, FM2, and PWM are on attenuators, while 1V/Oct is not. All of these can be audio rates.

SYNC: Like the MOTM-300, you can use a Square /Pulse driving oscillator to get phase alignment of the 2 oscillators, or a Sine/Saw/Tri to get a slight phase shift between them (for a different timbre). This is an "old trick" of the Moog 921 VCO using a large threshold voltage.

General Info

CV Inputs: -5V to +5V, DC to 15KHz.

SYNC input: positive-going 1.7V trigger resets all waves to minimum value

Frequency Range (no CV in): 15Hz to 19KHz

Max Frequency (+5V into FM, no attenuation): 210KHz (pulse out, 50% only), 110KHz (SUB1)

Sawtooth Linearity: $\pm 0.2\%$ max

Tracking (after 15min warmup period): 10Hz to 4KHz trimmed

Audio Outputs: -5V to +5V, $\pm 0.35\text{V}$

Power: +12V @55ma, -12V @40ma. Nominal

Depth behind panel (with power cable attached): 32mm

Factory trims

There are 4 trimmers: 2 are multi-turn blue trimmers along the outside edge of the main VCO board. Two trimmers are accessed by small holes that expose single-turn slots.

1V/OCT (blue, top right corner): sets the 1V/Oct tracking in the frequency ranges up to 1000Hz. This is set at the factory based on our accurate ($\pm 0.001\text{V}$) MIDI-CV setup. Chances are, your converter will not exactly track ours. This means the E300 may be *slightly off* tracking in your system. You may need a small (± 2 turns max) adjustment. Rotating the trimmer towards the power connector will make the tuning 'go sharper', and towards the edge will make it 'go flatter'.

TRI TRIM: this is the Triangle wave output's 'glitch removal' trimmer. You should never have a need to adjust this.

HF TRACK: accessed via hole in upper left corner. This adjusts the tracking from 1000Hz to 4000Hz. Trimming will only have an effect in this upper range.

SINE SHAPE: the sine wave is an over-driven OTA from the Triangle. This is adjusted at the factory for lowest THD (don't confuse THD with "looks pretty"). In fact, you can over-drive the sine shaper and get a more rounded, tube-like sound if you want to.