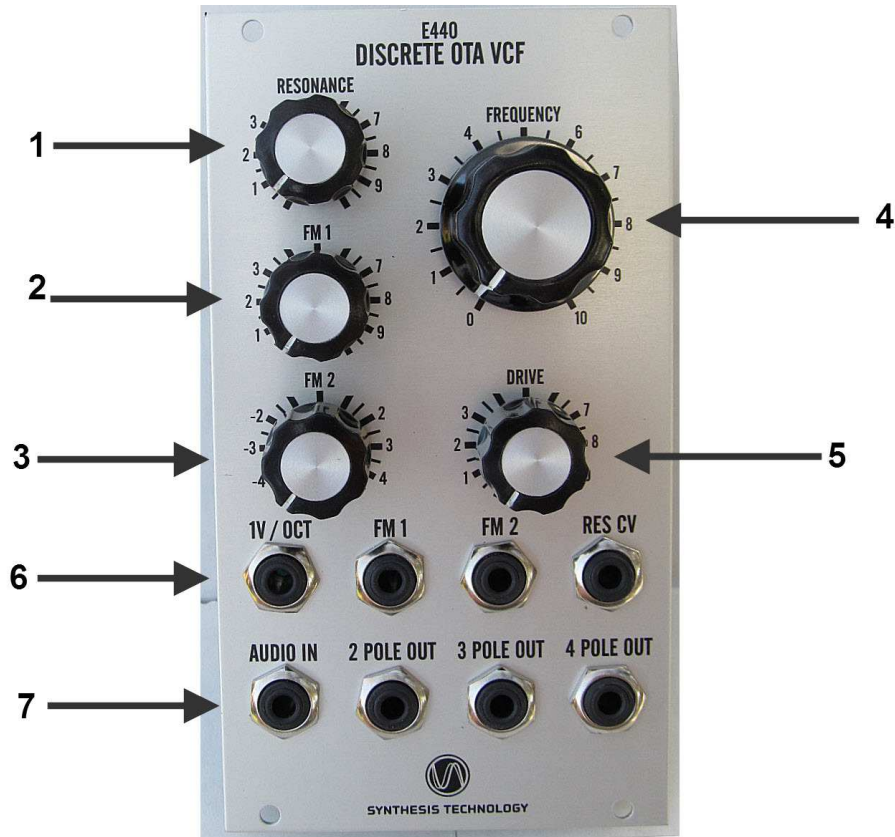


# E440 Discrete OTA VCF

[www.synthtech.com/euro/e440](http://www.synthtech.com/euro/e440)



## What is the E440?

The Synthesis Technology E440 is a lowpass voltage-controlled filter with 3 simultaneous outputs. The input is any audio source (can be from line level to synth level) and the output is via the different slopes of the filter: 2pole (-12dB/oct), 3pole (-18dB/oct) and 4pole (-24dB/oct). There are 3 CV inputs to control the cutoff frequency plus a separate CV input for the resonance. The E440 will self-oscillate at high resonance and can be used for a sine VCO (each output is phase shifted 45 degrees from the prior one) with 1V/Oct tracking (trimmable) over a 4-octave range. This response is also temperature-compensated. An external audio mixer module can be used to blend the 3 outputs into "in-between" slopes and by inverting them relative to another, different frequency responses.

## Connecting to the power supply

The E440 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 STRIPE lettering on the pc board.

## Controls and Jacks

- 1 – RESONANCE: amount of filter resonance. This knob setting is *added* to whatever CV is plugged into the RES CV jack. The filter will self-resonate (with no external applied CVs) at the ~9 tick mark.
- 2 – FM1: filter frequency modulation standard attenuator for whatever is applied to the FM1 jack.
- 3 – FM2: filter frequency modulation *reversing attenuator* for the CV plugged into the FM2 jack. The 12:00 (straight up) position is maximum attenuation: rotating CCW will add the inverted signal to the FREQUENCY control while rotating CW will add the applied CV.
- 4 – FREQUENCY: the cutoff (or self-oscillation initial frequency). The VCF will internally add all 4 CV inputs together to determine the filter's cutoff frequency. The range is 20Hz to ~ 18KHz.
- 5 – DRIVE: this is a combination attenuator for the AUDIO IN and a booster amplifier (~2X gain). The filter can be over-driven to clipping (with a large voltage output swing, ~14V pk-pk). You can use this control to boost line-level signals as well. The unity gain setting is ~ '4<sup>th</sup>' tick.
- 6 – CV inputs. The range of each input is -5V to +5V. FM1 and FM2 are on attenuators, while 1V/Oct and RES CV are not.
- 7 – Audio jacks. AUDIO IN can be any level up to 14V pk-pk. The 3 outputs are the lowpass responses. All 3 outputs share the resonance and cutoff CVs. You will note that the relative levels of the 3 responses are slightly different, which is resonance dependent. This is just the nature of the electronics. The 4 OTA stages are not gain-matched and the filter caps are +-5%. This will cause each stage to vary slightly in gain relative to the others. Consider this part of the E440's charm.

## General Info

CV Inputs: -5V to +5V, DC to 10KHz. RES IN is 0V (no resonance) to +5V (full resonance).  
Audio input: 50K nominal input impedance, 100mv to 14V pk-pk.  
Outputs: -7V to +7V, 20Hz to 18KHz  
Power: +12V @23ma, -12V @23ma. nominal

Jumper options: JP1 – Bass Boost Enhancement OFF or (ON).