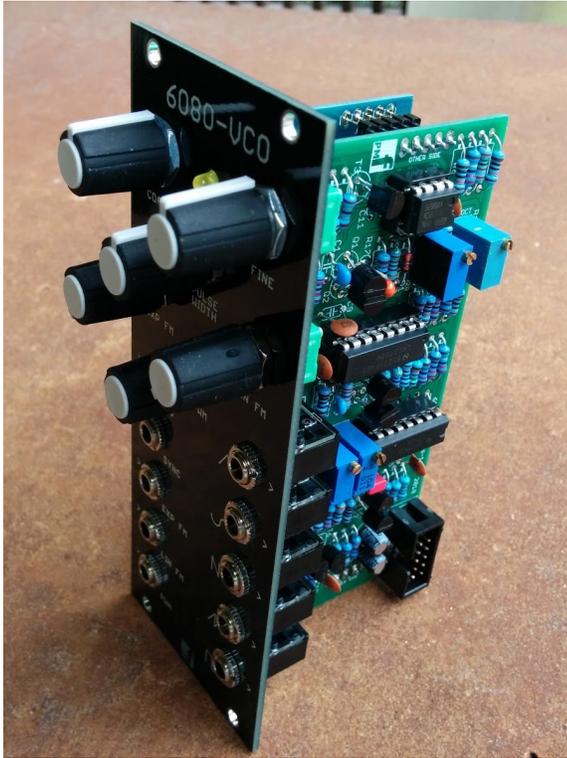


# 6080 VCO v1.2 – User Guide

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This is the setup and user guide. The unit is designed for a modular synthesizer.



The module is designed and sized for **Euro rack** systems. You will need a 16-10 pin **Euro rack** power ribbon connector with  $-12/0/+12$  which is connected to a synth power supply. You will also need a trimmer adjustment tool, a digital volt meter, a frequency counter and, if possible, an oscilloscope.

## Calibrating the 6080-VCO Triangle, Sine and Pulse

If you bought PCBs or a kit, you should only need to calibrate the unit once. If you bought a pre-built and tested unit, you can skip this section. Power up the device and allow it to warm up for 15 minutes.

1. Set HF Trim (R28) to 0. This is done by turning the screw counter clockwise until it hits the end stop. A quiet click can be heard.
2. Disconnect all CV sources from the inputs.
3. Set the coarse and fine tuning controls to their center position.
4. Put a frequency counter on the SIN output.
5. **Offset adjustment:** Adjust Offset (located on the Saw Shaper board R1) until the frequency is 16.35Hz.

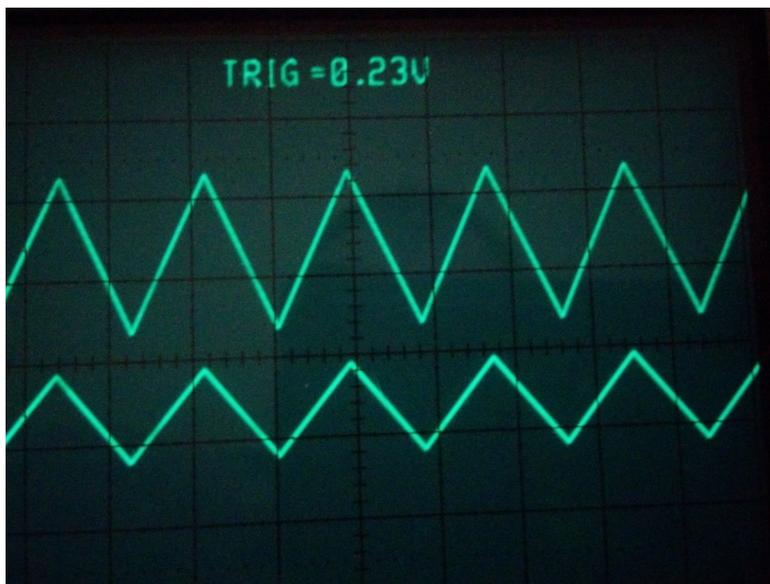
6. Connect a CV source such (as a keyboard controller CV) into the 1V/octave jack.
7. **VOLTS/OCTAVE adjustment:** Repeatedly play two notes one octave apart at the low end (say C2 65.4 Hz and C3 130.8 Hz) and adjust V/Oct (R18) until the frequency of the high note is exactly double that of the low note. Check the frequency of other notes separated by one octave. Fine tune V/Oct until the best tracking is obtained.

TIP: If the high note is flat, turn the trimmer to make it flatter still. This reduces the gap between the two notes. Then, while playing the lower note, turn the FINE tune panel control to the required lower frequency (e.g. 64Hz) and check both notes again.

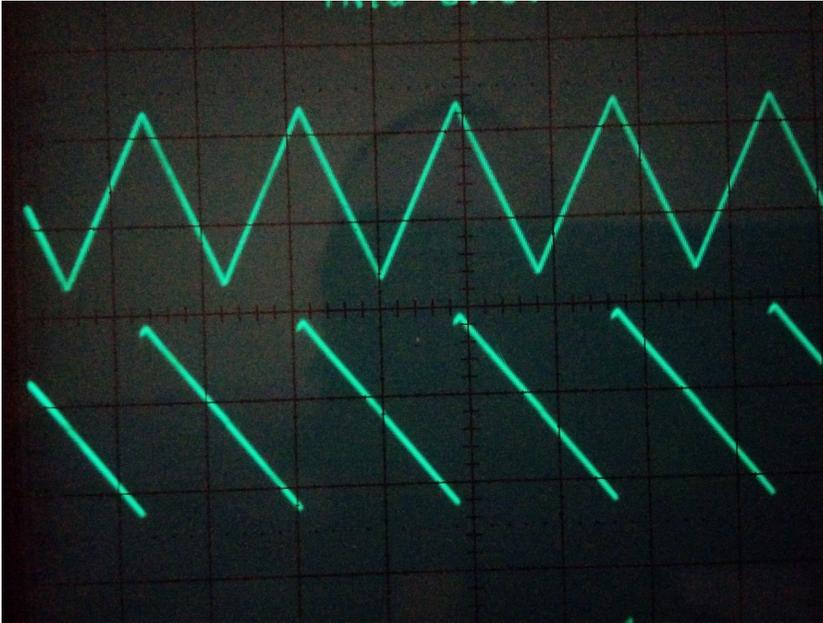
8. **High Frequency trim:** Repeatedly play two notes one octave apart at the high end (say 1200 Hz and 2400 Hz) and adjust HF trim until the frequency of the high note is exactly double that of the low note. Check the frequency of other notes separated by one octave. Fine tune HF trim until the best tracking is obtained.
9. Tune the VCO using the coarse and fine pots until the output frequency corresponds to a known keyboard note. e.g. C4 = 261.63 Hz.
10. Repeat the adjustments until you have the tracking as close as possible to 1V per octave.
11. **SINE SHAPE:** Using an oscilloscope or audio output adjust Sine Symmetry (R14) and Sine Round (R1) until the best, balanced, least distorted sine wave is obtained.

## Calibrating the Ramp and Saw Wave circuit

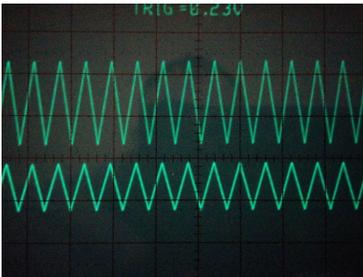
1. Turn trimmer LEVEL (on the saw board R9) fully CW. This will be between 12 and 25 turns.
2. Turn trimmer R23 JOIN fully CCW.
3. Adjust the VCO frequency to about 400Hz
4. Monitor the output of the saw wave on an oscilloscope. You should see a saw wave or possibly a triangle wave of half the amplitude of the triangle wave VCO output.



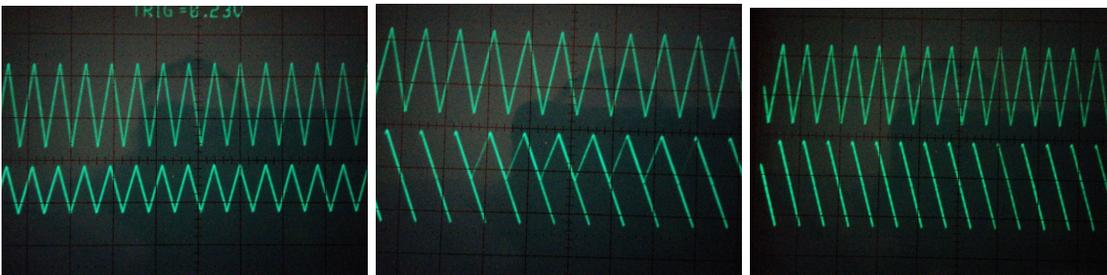
5. If it hasn't already, turn LEVEL CCW until the triangle wave displayed flips into a saw wave.



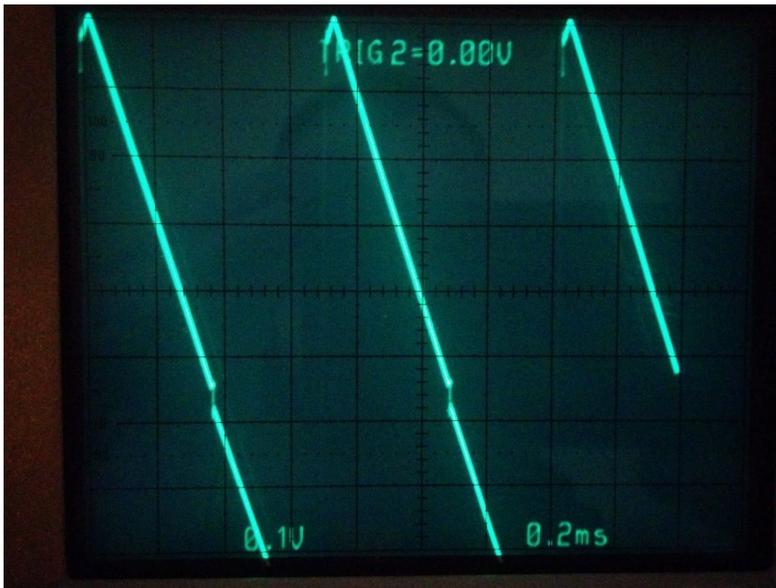
6. Now increase the frequency of the VCO to the desired maximum frequency that will be used. The saw wave will turn back into a high frequency triangle wave again.



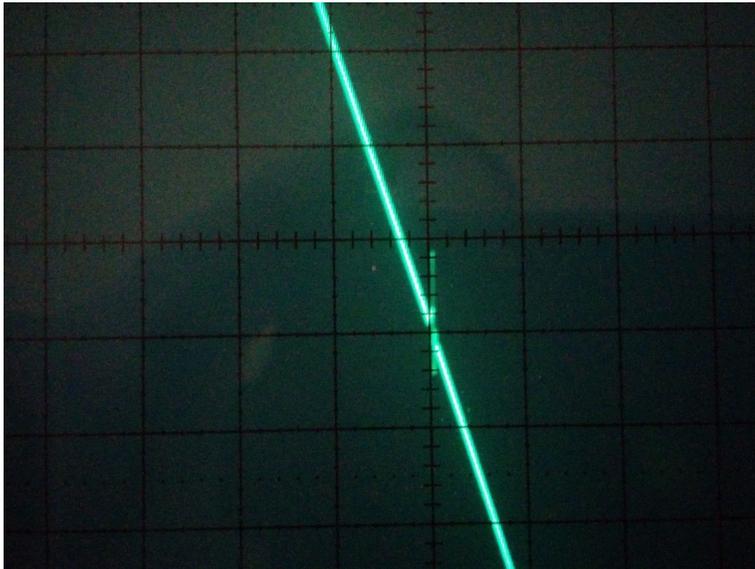
7. Continue to turn R9 LEVEL CCW until the triangle flips into a saw wave again. As you approach this point, you will see the wave oscillating between a triangle and a saw. The objective is to obtain a stable saw wave up to the maximum useable frequency. If you go too far CCW with R9 you will begin to see an increase in the size of the triangular peak of the saw wave. The idea is to minimize this while achieving the highest usable frequency.



8. Now, reduce the frequency and turn up the horizontal and vertical sweep of the oscilloscope until you can observe the center of one wave cycle, which will have a gap in it.



9. Slowly turn R23 JOIN CW until the part of the waveform above the gap and the part of the waveform below the gap are in line. You probably won't close the gap but there should be a smooth transition between the top and bottom of the wave.



Calibration is now complete. Thank you for your patience.