

V C O TRIM PROCEDURE

NOTE: Although the V C O may be trimmed by ear, the following procedure is recommended if the test instruments are available.

- () 1. Assembled V C O.
- () 2. Power supply, regulated +15v and -15v. IMPORTANT: The V C O should be trimmed using the actual supply you intend to use with it, if possible, as a slightly different supply voltage may change the frequency somewhat. However, if it is necessary to use another supply, the difference is not serious.
- () 3. Oscilloscope with direct-coupled (DC) vertical input.
- () 4. Accurate (1%) voltmeter, preferably digital.
- () 5. A frequency counter is highly desirable, but not absolutely necessary.

NOW, PROCEED WITH THE TRIMMING

- () 1. With the power supply off connect the +15v, -15v, and ground terminals of the V C O to the power supply. If a connector is not available for the V C O board, you may connect clip leads as follows:

- :+15 volts to pin 3 of "P2"
- 15 volts to pin 1 of "P2"
- Ground to pin 1 of "P1"

CAUTION: DOUBLE CHECK THESE CONNECTIONS! Reverse voltage applied, even momentarily, could destroy many components.

- () 2. Connect the voltmeter negative lead to ground, and the positive lead to pin 2 of "P1".
- () 3. Connect the scope and a frequency counter, if available, to the sawtooth output.
- () 4. Set V C O front panel controls as follows:
 - COARSE FREQ.=256
 - FINE FREQ.=X1
 - CONTROL 1=0
 - PULSE WIDTH 50%
 - RANGE SWITCH=X1
- () 5. Turn all trimpots (T1 thru T6) to approximately center position.
- () 6. Switch power supply on. The scope should show an output. If not, try adjusting trimmer T4.

If still no output, turn off power and check wiring!

- () 7. Adjust scope to see several cycles of the waveform.
- () 8. Set T4 (Sawtooth Offset) so that bottom peaks of waveform are at -5 volts on the scope.
- () 9. Set T3 (Sawtooth Amplitude) so that top peaks of waveform are at +5 volts.
- () 10. Remove scope from sawtooth output, and connect to sine output.
- () 11. Adjust T6 (Sine Symmetry) for most symmetrical waveform (top and bottom should have similar shape).

12. Adjust T5 (Sine Purity) for best looking sine wave. If desired, connect to an amplifier and speaker, set V C O frequency to produce a medium pitch sound, and adjust T5 for purest tone. NOTE: A distortion meter may be used to get the purest sine wave.
13. Go back and readjust T5, then T6, again, for the best waveform.
14. Set COARSE FREQ. to 16 and FINE to X1.
15. Connect scope and/or counter to triangle output.
16. Adjust T2 (Initial Frequency) for a frequency of exactly 16 HZ, as closely as possible.
17. Using voltmeter, adjust COARSE FREQ. control (P1) for exactly +9.00 volts at pin 2 of "P1".
18. Adjust T1 (1 volt per octave) for an output frequency of exactly 1024 Hz.

THIS COMPLETES TRIMMING OF YOUR V C O. When and if it is installed in a synthesizer, it is advisable to make a final adjustment of T1, so that all V C O's track in tune with the keyboard.