

AR-338 OSCILLATOR TRIM PROCEDURE

In order to trim your AR-338 you will need the following:

- 1) A +15V and -15V regulated power supply such as the AR-322.
It is important that the AR-338 be trimmed using the supply which will power the cabinet in which the oscillator is to be finally mounted.
- 2) An oscilloscope with a direct coupled (DC) vertical input.
- 3) A calibrated voltage source such as the AR-311 keyboard.

Before turning on the power supply connect the power supply to the edge connector. Connect +15V to pin A, connect ground $\underline{\underline{1}}$ to pin M, and connect -15v to pin Z. Use either an edge connector or clip leads to make this connection. BE CAUTIOUS: Applying reverse voltages to these terminals could destroy many components.

Set up the face panel of the module as follows: turn the Fine and Coarse pots to the center of their rotation. Turn all other pots fully counter clockwise. Set the range switch to Audio. Connect the negative lead of the oscilloscope to the module frame or some equally convenient ground connection. Connect the positive lead to the tip of the sawtooth output jack. Turn the High Frequency Track (HFT) trim pot T6 fully clockwise. Turn all other trims to the center of their rotation. T6 and T5 are 25 turn trims. These trims have a clutch mechanism which allows them to keep turning even though they are at the end of their rotation. When they have reached the end of their rotation they will produce a slight click after each revolution. After you hear the click turn back 12 turns to reach the center of the rotation.

Turn on the power supply.

You should observe a sawtooth on the oscilloscope. If not, turn off the power supply and check your wiring. If you observed a sawtooth, move the scope probe to the triangle output. Adjust T1 for a symmetrical triangle waveform. Next move the scope probe to the sine output. Adjust T2 symmetry for the most symmetrical waveform (top and bottom should have similar shape. Adjust T3 for the best looking sine wave. If desired, connect the sine wave output to an amplifier and speaker, and adjust T3 for purest tone. NOTE: A distortion meter may be used to get the purest sine wave. Readjust T2 and T3 as necessary, for the best wave form.

The volts per octave trims can be easily adjusted. Listen to and monitor on the scope the pulse output. Adjust the width control for a 50% duty cycle squarewave or the hollowest sounding waveform. Connect a voltage source such as the Aries ke-board to the FM3 input. The keyboard must be accurately calibrated to exactly 1 volt per octave. Play low C on the keyboard and tune the oscillator with the Coarse Freq. control to approximately 125 Hz. This is equivalent to the C below middle C on a piano. Counting from the left, pin down the 4th C with a matchbook. Alternately depress and release the lower C. Adjust T5 for a change of pitch between the two notes of exactly 3 octaves. As you adjust T5 the frequency of the oscillator will shift up or down a small amount. You are adjusting for an exact 3 octave change between the two keys. Ignore the overall frequency shift of the oscillator. When you have gotten close to a 3 octave range, press low C again and return the oscillator to 125 Hz, using the coarse freq. control.

Now adjust the High Frequency Tracking trim (HFT) T6. Remove the match book from the 4th C. Alternately play the 4th and 6th C and adjust T6 for an exact two octave pitch change between the two notes. This trim will also change the overall center frequency of the oscillator. It will also slightly alter the original V/oct adjustment of T5. When T6 has been adjusted as close as possible, repeat the trim procedure for T5. These adjustments will have to be repeated about three times. Each repetition will require a smaller and smaller change on the trims.

If you do not have a good ear you can use a square wave reference oscillator to help you make these adjustments. After first tuning the original oscillator to 125 Hz at low C, as described in the previous trim procedure, zero beat the reference oscillator to the original oscillator with C4 pinned. Play low C and adjust the V/oct trim T5 for 3 octaves below the reference oscillators' frequency. Release low C. The original oscillator will have changed pitch slightly. Adjust the reference oscillator to zero beat with the original oscillator. Play low C again and adjust the V/oct trim T5 as before. When you have adjusted T5 for exactly 3 octaves the reference oscillator will no longer need to be retuned.

Now go on to T6 the HFT trim. Hold down C4 and zero beat the reference oscillator and the original oscillator. Play C6 and adjust T6 for a two octave change. Play C4 and zero beat the two oscillators.

Play C6 and adjust T6 again. After T6 is adjusted it may be necessary to readjust the V/oct trim T5. It takes about 3 repetitions of these adjustments to bring the oscillator into very accurate tracking.

Once the oscillators are tracking perfectly set the Coarse and Fine Freq. pots to the center of their rotation and adjust T4 the frequency trim for a frequency of 400 Hz or approximately Ab in the middle octave of a piano.

Your AR-338 is now trimmed.