

# OPERATING INSTRUCTIONS

## Peterson MODEL 500

### AUDIO-VISUAL TUNER

#### PREPARATION FOR USE

Remove the power cord from the inside of the cover and plug in to an A.C. outlet supplying 105-125 Volts, 50/60 Cycle alternating current. **CAUTION:** If this instrument is connected to any other source of power than mentioned above, damage may occur. Export models, which are intended for use with 220 Volt, 50/60 Hz power sources, have the suffix "E" after their serial number.

The **ON/OFF** switch is located on the right hand side of the front panel. Sliding this switch up will turn on the power. The strobe lights behind the strobe disc will light immediately and the strobe disc will begin to turn. If the tuner has been subjected to cold temperatures, it may be necessary to start it with the Note dial set to the note "C".

Because the **Peterson Audio/Visual Tuner** uses all solid state circuitry, it is possible to begin tuning immediately. For maximum accuracy, it is best to allow the instrument to run for a few minutes. This is particularly important if it has been subjected to extreme temperatures, either hot or cold.

Since the pitch of the Model 500 is determined by a highly accurate tuned inductive-capacitive circuit which is voltage and temperature compensated, it is not necessary to calibrate the instrument.

#### DESCRIPTION & OPERATION OF THE MODEL 500

The **Note Selector** and **Vernier Control** are common to both the Audio and Visual sections of the tuner. The controls enclosed within the blue lines identified as "Audio" apply to the Audio section only while the remaining controls identified as "Strobe" apply to the Visual section.

#### VERNIER CONTROL

The **Vernier Control** is located on the right hand side of the front panel. The purpose of this control is to enable you to raise or lower the reference pitch of the instrument from the standard of A=440 HZ. This control is calibrated in hundredths of a semitone, commonly called "Cents". If the control is moved one division on the scale the pitch will have been raised (or lowered) 1/100th of the distance between adjacent semitones. If, for example, the Note Selector was turned to the note "E" and the Vernier Control was set to 25 Cents sharp, the pitch of the

instrument would be raised 1/4 of the distance between E and F. Thus, it is possible to tune to any frequency in the entire eight octave range of the instrument. Moving the **Vernier Control** does not affect the temperament.

#### NOTE SELECTOR

To set the instrument for tuning a particular pitch, simply rotate the **Note Selector** so that the desired pitch on the dial lines up with the letter "C" on the panel at the top of the dial.

The letters E= and B= around the Note Switch are used to automatically transpose the range of the tuner for tuning instruments that play in these keys. For example, if you want to play the note "C" on an E= instrument, rotate the **Note Selector** so the "C" on the dial lines up with the E= on the front panel.

Pianos, organs, harpsichords and similar instruments are tuned in the Key of "C" and accordingly, no transposing is necessary.

## VISUAL SECTION

### CONTRAST CONTROL

The **Contrast Control** is located just to the right and below the strobe window. The purpose of this control is to vary the contrast of the image present in the strobe window. By using this control in conjunction with the **Image Clarifier Switch**, improved contrast can be obtained. Usually, under normal conditions with the Image Clarifier in the "Hi" position, the contrast will be best with this control rotated in the clockwise direction. This would apply to the upper ranges of the keyboard above middle "C". By switching the **Image Clarifier** to the "Lo" position, and rotating the control counter-clockwise, improved contrast may be obtained in the bass range of the keyboard below middle "C". The results may vary with different types of tones being tuned.

### THE STROBE DISC

The sharp and flat signs located above the strobe disc window indicate the direction the strobe pattern will appear to be rotating if the note sounding is sharp or flat. If the pattern rotates clockwise, the note is sharp, if counter-clockwise it is flat. The more off pitch the note is, the faster the pattern will rotate.

The numbers along either side of the strobe disc window indicates the octave bands. The range of frequencies in each octave are as follows:

OCT.	NOTE	FREQUENCY	NOTE	FREQUENCY
0	C	32.703 Hz	B	61.735 Hz
1	C	65.406 Hz	B	123.471 Hz
2	C	130.813 Hz	B	246.942 Hz
3	C	261.626 Hz	B	493.883 Hz
4	C	523.521 Hz	B	987.767 Hz
5	C	1046.502 Hz	B	1975.533 Hz
6	C	2093.005 Hz	B	3951.066 Hz
7	C	4186.009 Hz	B	7902.133 Hz

C-3 (261.626 Hz.) is middle C on a piano

### IMAGE CLARIFIER

The **Image Clarifier** switch is located directly below the Strobe Disc. The circuitry controlled by this switch is incorporated in the instrument for easier tuning of pianos, chimes and other musical instruments in which the upper partials may not be in tune with the fundamental.

It is a characteristic of the tone produced by strings that the overtones (harmonics) are frequently not integrally related to the fundamental frequency, or to each other. This is true to some degree in all pianos but is more apparent to small pianos with very short bass strings. The **Image Clarifier** is a sharp cut-off filter which eliminates the upper partials from the display on the strobe disc so that the lower partials are more clearly displayed. In general, the "Lo" position should be used when tuning the bass strings up to about middle "C". The "Hi" position should be used above this point. Each piano tuner will use this feature a little differently so it is best to try several cross-over points and determine which one best suits your tuning style.

**CAUTION:** If a piano note is tuned on the "Lo" position and later checked on the "Hi" position, there will in all probability be a sharp indication on the strobe pattern. This is because the upper partials are indeed sharp. It should be emphasized that this is not a defect in the tuner, but that the tuner is accurately displaying the harmonic components that the string is actually producing.

### MICROPHONE

The tuner is supplied with a standard 1/4" phone jack of the monaural type. This is located in the lower left hand corner of the front panel. If you are using the tuner with the supplied microphone plug it in to this location. The preamp design is such that the tuner will respond well to both high and low impedance sources. This allows the user to plug a guitar or similar electronic instrument directly into the tuner without interference from background noise, as may be experienced with a microphone.

## AUDIO SECTION

### OCTAVE CONTROL

The **Octave Control** is used to select which octave you want to tune. This control affects the **Audio Section** only. It is not necessary to adjust this control if you are only using the strobe.

### SPEAKER VOLUME

The **Speaker Volume** control is much like the volume control on a radio. Rotating it clockwise will cause the volume of the tone from the speaker to increase.

### HEADPHONE JACK

The **Headphone Jack**, located in the lower right hand corner of the front panel, is used if you want to listen to the tuning operation as well as viewing at the same time. Plugging in a set of stereo headphones will channel the internal reference tone into the headphone. The volume of this tone is controlled by the **Headphone Volume** control located to the left of the **Headphone Jack**. The tone of the instrument that you are tuning will be picked up by the microphone and channeled into the headphones.

In order to get the most pronounced "beat" between the internal standard and the tone you are tuning, the volumes in the headphones should be about equal. This is accomplished by using the **Headphone Balance** control. This control should be adjusted until both tones are approximately equal in volume. If this control is rotated fully counter-clockwise, only the external tones will be heard. Full clockwise rotation will allow only the internal standard to be heard. Adjusting this control will balance the relative volumes of the two tones to get the best results.

## SIMULTANEOUS USE OF THE AUDIO AND VISUAL TUNERS

As previously described, it is customary to use headphones when using the audio and visual tuners simultaneously. This is because if the speaker volume control is turned up, without the headphones being plugged in, the tone from the speaker will be picked up by the microphone and will interfere with the tone from the instrument being tuned. If the microphone is placed close to the instrument being tuned and away from the loudspeaker, it is often possible to get satisfactory results without headphones, but a little experimenting is in order.

### SERVICE/WARRANTY INFORMATION

#### ACCURACY

The exceptional accuracy of the **Peterson Audio/Visual Tuner, Model 500** is due to the fact that all of the pitches are controlled by a single oscillator circuit of unusual design (patented) using components of the highest stability. The pitch is not affected by changes in power line voltage and the temperament is derived from precision counting circuits that are not subject to drift or variation.

Recalibration should not be attempted in the field if an accurate standard is not available. Tuning forks can vary greatly depending on quality, temperature and humidity. Do not rely on these except for relative measurements.

#### WARRANTY

All Peterson Tuners are warranted for a period of one year from the date of purchase. Any tuner that is returned to the factory prepaid within this period will be repaired free of charge, if, in our opinion, it is defective in material or workmanship. Instruments that require repairs due to accidental damage, abuse or operation on power sources other than those specified, will be repaired and charged for at current rates.

## RETURNING AN INSTRUMENT

Should it become necessary to return an instrument to the factory, please observe the following instructions:

Use a shipping carton that will allow at least 2" of packing material around the entire instrument. Crumpled newspaper works very well for packing. Mark the carton *FRAGILE, DELICATE INSTRUMENT*. We suggest shipping via United Parcel Service where available, or Parcel Post, Special Handling, Insured. Be sure to enclose a letter, which describes the difficulty you have experienced, **and your return address and phone number.**

Ship the instrument *Prepaid* to:

**PETERSON ELECTRO-MUSICAL PRODUCTS, INC.**

11601 South Mayfield Avenue

Alsip, Illinois 60803-2476

Telephone 1(708)388-3311 - Fax 1(708)388-3367

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