

# PETERSON

## STROBE TUNER MODEL 400

### OPERATING INSTRUCTIONS

#### PREPARATION FOR USE

Remove the power cord from the inside of the cover and plug into 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, serious damage may occur to the instrument. (Export models require 220-240 Volts, 50/60 cycle current).

The **ON/OFF** switch is located on the left 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.

Since the **Peterson Strobe Tuner** uses all solid state circuitry and does not have any tubes to warm up, 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.

#### DESCRIPTION & OPERATION OF MODEL 400

##### 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. Rotating this control clockwise lowers the pitch, (flattens) and rotating it counter-clockwise raises the pitch (sharpens). We have provided calibration marks for easy tuning to A=440, A=442, or A=435 standard pitches. Simply match the zero on the Vernier Dial with desired pitch printed on the panel. The most commonly used pitch, A=440 is located at the "12 o'clock" position.

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 possible to tune to any frequency in the entire eight octave range of the instrument. Moving the **Vernier Control** does not affect the temperament accuracy.

##### NOTE SELECTOR

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

The other letters Eb, F, Bb, 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 Eb instrument, rotate the **Note Selector** so the "C" on the dial lines up with the dot alongside the Eb on the panel. Pianos, organs, harpsichords and similar keyboard instruments are tuned in the key of "C" and accordingly, no transposing is necessary.

##### 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 side the strobe window indicate the octave bands. The octave including A=440 Hz has been indicated on either side of the strobe window ( A octave 3 = 440 Hz). A red transparent filter is used in front of the Strobe Disc to reduce the effects of glare from ambient light. This improves the overall clarity of the strobe image. The range of frequencies the Model 400 will tune are listed as follows:

OCTAVE	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 **Note Selector**. The circuitry controlled by this switch is incorporated in the instrument for easier tuning of pianos, chimes and other 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 in 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 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 person tuning 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 the tuner is accurately displaying the harmonic components that the string is actually producing.

## 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 clock-wise 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 (to the left), 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.

## MICROPHONE

The built-in condenser microphone, or an external microphone can be used. The tuner is supplied with a standard 1/4" jack of the monaural type. This is located in the lower right-handed corner. The pre-amp design is such that the tuner will respond well to both high and low impedance sources. The internal microphone is disconnected when a plug is inserted into the jack. 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.

## SPECIFICATIONS

**RANGE:** Eight octaves of the equi-tempered chromatic scale from C-32.703 Hz (C.P.S.) through B-7902.128 Hz (C.P.S.).

**ACCURACY:** Temperament guaranteed to be within 1/3 of 1/100th of a semitone (1/3 of a cent or 0.02%).

**ELECTRICAL SPECIFICATIONS:** Operates on 105-125 Volts A.C., 50/60 Hz. (Export Model 420 E operates on 220-240 Volts 50/60 Hz). Power consumption 14 Watts. Sensitive built-in condenser microphone.

**CONTROLS:** Power ON-Off Switch, Note Selector, Vernier Pitch Control. Contrast Control. Image Clarifier Control.

**CASE SIZE:** Dimensions are 5-3/8" x 11" X 9" (13.65 cm x 27.94 cm x 22.86 cm). Case is covered with Black Moroccan grain leatherette. Cover is detachable, or may be used as a stand. Cover also provides storage for line cord, accessories or other tools.

A "**Frequency to Cents Conversion Chart**" is available at no-charge. Simply mail your request to us along with a stamped self-addressed 9" x 12" envelope.

## SERVICE INFORMATION

There are no user serviceable parts inside the instrument.

## ACCURACY

The exceptional accuracy of the Model 420 is the result of a unique circuit which is a patented design. The pitches are derived from precision counting circuits employing integrated circuits which cannot drift or vary. The circuitry also compensates for temperature and line voltage variations. Calibration should not be necessary. 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.

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