

TonalEnergy

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TonalEnergy Tuner User Guide (iOS)

NOTE - This guide is for the latest iOS version only

The guide for the [Android version is here](#)

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Target Tuner

Target Display

The tuner display is a multi-colored target with concentric circles. When your note falls within the designated pitch range as determined by the choices made in the Mode and Range pop-up screen, a green smiley face appears in the center of the Target Tuner. When an in tune pitch is held for an extended period, the user is rewarded with a green smiley face that grows larger and larger. The mode and range selections will influence how quickly the smiley face appears and grows. If the note moves away from the target pitch, bands will appear around the center of the target. The bands above the target indicate the note is sharp while the bands below indicate that the note is flat. For exact measurement (within 1/10 of 1/100 of a cent), a cent meter is shown. In addition, the intonation is shown by the flat and sharp symbols inside the Target Tuner.

Tapping the target tuner once will display the chromatic tuner wheel. To produce a reference note, tap the note desired. Long pressing the note will produce a sustained reference tone. The octave button, found inside the chromatic tuner wheel, has plus and minus signs. Tap the plus sign for the tone generator to play an octave higher and the minus sign to play lower octave.

Note: The TonalEnergy Tuner operates both in portrait and landscape mode on your device. You can decide which mode best suits your needs.

Cent Display

A cent is defined as 1/100 of a semitone/chromatic half step. For instance, the space between C and C# contains 100 parts, each of these being equal to one cent. TonalEnergy Tuner goes one step further by dividing each cent into 10 parts. If the screen reads -1.1, the negative sign indicates the pitch is flat. The whole number 1 indicates the note is one cent off. The 0.1 demonstrates the pitch is an addition one-tenth flat. So the pitch is one and one-tenth cents flat. The Cent Display is always found in the center of the Target Tuner and either the side or bottom of the screen depending on screen orientation.

Pitch Display

As you play, the name of the note will appear with a number indicating which octave you are playing. For example, C4 is middle C on the piano and/or the first ledger line below the treble clef or the first ledger line above the bass clef in C transposition.

Instant Pitch reference

Instant pitch reference will occur when you tap the pitch display. To be able to sustain the instant pitch reference note, long press the note and release. To end the playing of the note, tap once.

Temperament

Your chosen temperament, equal or just, is shown on the top right of the screen. Additional information concerning temperaments can be found in the Chromatic Tone Generator section.

Note: Always be aware of what temperament you are using, as it will greatly affect the Target Tuner screens.

The custom temperament controller is located on the Preference page.

Any time you tap the temperament controller, it will change between equal and just or another alternate temperament that has been selected.

Equal temperament means that each chromatic pitch is 100 cents from the adjacent notes. All chromatic, half step/minor 2nd, intervals are equal distance from each other.

Just temperament is used for tuning notes in the same overtone/harmonic series. This is most commonly used when tuning major and minor chords. More about this can be found in the Tone Generator section, especially how to change the tonal anchor or root note for the temperament.

Pitch Tracker

At the top of the screen a bar graph will appear illustrating the percent of time the music performed fell into each of the three pitch zones: red, yellow, green. The colors and percentage are determined by the amount of time the tones were performed within the tuning parameters set in the Mode and Range pop-up.

Note: After two or more seconds of silence, this feature automatically resets.

Mode and Range

Tap on the MODE/RANGE icon in the lower right corner. The Mode Range pop-up will appear.

- MODE: options include wind, strings or voice.
- RANGE: options include wide, medium, fine and ultra-fine. Each mode-range combination has unique tuning parameters. See the pop-up for the specific tuning ranges for the mode selected. The finer the range, the more exact the pitch must be to be rewarded with the smiley face . The exact cent display is always visible for you to reference.
- DAMPING: Slow, normal, and fast refer to the length of time the sound sample is measured. Slow would be the longest sample time during which the pitch would be averaged. Each damping setting is specific to the selected MODE.

Transposition, Concert A Reference (Hertz) and Notation

- TRANPOSITION: An indicator of the transposition for which the tuner is set. To change, tap Transpose in the lower right hand corner and a pop-up will appear. To select the correct transposition, scroll to choose the key of transposition or the instrument.
- CONCERT A REFERENCE: You can change the Concert A Reference from A4, 440 Hz to the reference frequency number you prefer. In order to change the number, tap the number. A keyboard will appear. Type in the new reference frequency number and touch return. Tap done. This calibration number will remain unless you change it again. There is no default.
- NOTATION: The desired notation of the displayed note names can be selected from the **Notation** scroll bar. Several variants of English notation, Solfège, Northern European, and Indian options are available.

More information can be found on Preference screen

Auto Reference Notes

After selecting your instrument, the tone generator can play a reference note. Tap the microphone icon in the lower left corner to engage this feature. Once engaged the tone generator will immediately recognize the pitch being played and produce the same unison pitch as the player. The tone generator will follow the player's notes as he continues to play.

Note: The Auto-Reference notes will ONLY match the range of the Tone Generator sound you have selected. If you attempt a note out of the range, it will not work.

If the user wants to hear additional reference tones other than the note he is performing, long press and the Select Guide Interval pop-up appears. Use the scroll bar to select the intervals desired. Tap Done. Tap interval icon to activate up to three intervals. The interval icon will turn orange when activated.

Depending on your purpose there are multiple suggested setups to use this feature that ensure proper function.

1.

Use the device's built in microphone and a set of headphones or earbuds. This setup enables the player to hear the reference note while still allowing the tuner to evaluate the player's intonation.

> **Note:** You may want to experiment with using only one earbud in order to discover the best environment for hearing yourself play.

2.

Use the device's built in microphone and an external speaker connected in the headphone jack. For this setup the device needs to be within close proximity (within 24 inches) to the player.

3.

Use an external microphone connected in the headphone jack and an external speaker compatible. An iRig microphone (built in gain control) or a standard microphone plugged into a mixer. This also enables the player to hear the reference tone through speakers. >

Note: Using an external speaker (#2 and 3) will cause the auto reference notes feature and the tuner to be less effective because the tone playing on the speaker becomes an additional ambient sound.

Note: On the Chromatic Pitch Wheel and keyboard pages, the microphone and sustained button will not work in conjunction. If the microphone button is on, the sustain button does not work.

Metronome

The metronome can be used in conjunction with any of the features available on any page of the application.

To engage the metronome just tap the metronome button in upper right corner of any screen.

To access the metronome control panel, swipe down from the Metronome switch in the upper right corner.

To establish beats per minutes (bpm), you have three options:

1. Repeatedly tap the *TAP TEMPO* button at the bpm until you reach your desired tempo.
2. Use the + and/or — signs to raise or lower the number of bpm shown the display. Press and hold the buttons to move faster through the range.
3. Tap on the tempo number and type in the desired bpm with the numeric keypad.

To change the meter, tap the meter toggle button. A scroll screen will appear. Select the meter.

To change the subdivision, tap the subdivision toggle button. A scroll screen will appear. Select your subdivision. To dismiss the scroll bar, tap anywhere on the screen.

To increase or decrease volume, hold down the volume button and slide your finger up or down until you reach the desired volume.

On the Main Metronome page, you will find a visual metronome that shows beats. Each number represents a beat in the selected meter. Once the metronome is engaged, the beat the metronome is playing will have a green background. By tapping on various blocks, you can create different combinations of clicks and silence.

Touching the Metronome Accent (>) button toggles the use of an accented sound on the first beat of each measure. When the Visual Metronome is engaged and the accent toggle is turned on, the first beat of each measure will be flashing purple.

The Visual Metronome button enables a flashing beat indicator in the metronome control area. If you want a silent visual metronome, simply reduce the metronome's volume all the way using the control in the metronome panels.

The *8th = 8th* button toggles a feature that will automatically adjust the tempo when you switch back and forth between a X/4 meter and an X/8 meter in order to keep the duration of an 8th note identical.

The list button in lower left corner allows the user to build Groups (Set lists).

The Preset Sequence button is in the lower left corner and allows the user to advance or sequence through two or more presets.

The looping icon, at the bottom center, controls whether the preset group will be played through one time and stop (off position) or whether the preset group is played repeatedly (on position).

Metronome Presets

To choose a meter, press the desired time signature preset button. If the entire preset bar is filled, you may have to scroll right to access more presets (or access the presets you later create). Engage the metronome.

To quickly change meter, touch a different time signature preset button.

Note If you change the meter before the current measure has ended, the change will take place immediately, even in the middle of a measure. If you want the time signature change to occur at the end of a measure, you must go to the metronome options icon on the Main Metronome page. Tap on options and select Change on Next Measure. Meter changes can be accomplished in a musically relevant manner, especially useful when recording the metronome.

To create your own preset, go to the metronome control panel by swiping down on metronome button in top right corner. Tap the Meter button, scroll, choose meter, and tap the + sign. The meter you selected will now be in your preset bar.

To edit a specific preset, you can access editing from two different locations: the metronome control panel or list icon. The same screen comes up. Once there the tempo, subdivision, meter, and number of bars can be edited. When complete, you can name and save your edit.

Note: To edit from the metronome control panel, the preset sequence icon (filled in square-> empty square) must be on.

- Tempo – If you are creating a group of presets and want the same tempo for every preset, the Use Tempo switch will need to be turned off. If your string of presets has different tempos, the Use Tempo switch should be on and the new tempo will need to be changed either by typing or using +/- next to the word Tempo.
- Meter – Tap on Meter. Scroll bar appears. Select the meter to be used.

- Number of bars – Use +/— signs or type in the number.
- Subdivision – Scroll bar appears. Select the subdivision to be used.

Note: Accelerandos and ritards can be created by changing tempos by counts or bars.

Preset Groups

To create a new preset group, tap the list icon. (For the iPhone, tap on Preset Group at the top left of the screen.) Tap the + sign in the lower left corner. Name your group. Create your presets in the desired order by tapping the + sign under New Group heading and selecting your meter, number of bars, subdivision, and tempo. Created presets also can be named individually. Repeat until all presets are created.

To insert a preset into a group, highlight the preset bar and tap + sign at the bottom of the screen. If you want to make changes, you can at this time. The bar you created will be inserted beneath the highlighted preset bar.

Once all your presets are created and in the order you want, when you tap the Preset Sequence icon and engage the metronome, the metronome will move from one preset to the next in sequential order.

Note: On the iPhone, to create, edit and name the preset, you will need to tap the information icon (circle i), then make your changes on the screen and return to the previous screen.

To delete a group, go to the Preset Group list and tap Edit in the lower right corner. Tap on red circle with — sign. Tap Delete.

To copy a preset group, tap the name of the group you want to copy. Tap Copy in the lower left corner of the Preset Group page.

To export your preset group, initiate the process by tapping select in the top right corner of the Preset Group page. Refer to ** Preferences: Exporting Recordings** .

Metronome Options

Tap the Metronome Options gear icon found only on the Main Metronome page.

Metronome Sound

1. Tap on Metronome Sound. Scroll and select the sound you want.
2. Switch the Subdivision Uses Beat Sound on in order to override the default subdivision sound.

Count-Ins

A voice count-in to presets is available. Several decisions should be made.

Count-In Type Choose when the vocal count-in should occur:

1. Start—only once when the metronome is initially turned on
2. Each Preset—only at the beginning of each Preset
3. Between each Bar of the preset.

Count-In Settings

- Duration Unit – Choose the time unit: 1) Bars, 2) Beats or 3) 8ths.
- Duration—Once the duration unit is selected, determine the number of 1) Bars, 2) Beats or 3) 8ths.
- Counting Voice—Select between male and female.
- Allow Subdivision Sounds—Turn the switch on if you want to hear subdivision sounds.
- Use Bar Counts—Turn switch on if you want to hear the bar number on the first beat of each measure.
- Voice Count Beats and Metronome Beats—Tap the blocks of the number of the beats you want to hear. You can use either voice or metronome or combine them as you see fit.
- Show Visual Count-In—Turn Show Visual Count-In switch on to see the Count-In countdown box in the middle of the screen.

Presets Change Tempo – If the Presets Change Tempo switch is on, tempos for each preset will be played. If the switch is off, the first tempo setting will be played throughout the sequence.

Change on Next Measure – Turning this switch on will result in the metronome changing the meter and/or tempo once the last beat of the previous measure is complete.

Ableton Link is a technology that keeps devices in time over a local network. You will be able to access Ableton Link using the main preference button found on any page or the metronome page preference button. When Ableton Link is engaged by turning on the

switch, it can sync the metronome with any other device on the same WiFi network that has also engaged Ableton Link. In addition, changing the tempo on one device will automatically change the tempo on all other connected devices. You can choose to be notified when apps join or leave.

Tone Generator

The tone generator screens can be displayed as a chromatic wheel, a piano keyboard and a string bar. The String Tuner has separate boxes for tuning each open string of a variety of selectable tunings.

Note: Selected instruments or sounds will be played on all Sound pages until changed.

Chromatic Wheel

To activate the Chromatic Wheel , tap the Sound icon in the page selection bar at the bottom of the page and select Pitch Wheel.

Tap a note to play a particular pitch. The note will sustain until you release it.

Note: The practical instrument range has been predetermined. Depending on the instrument, extended higher and lower ranges have been added. The instruments will not make a tone beyond their extended ranges.

As you tap notes around the wheel, the tone generator will stay within the same octave indicated on the screen. As you tap and drag around the wheel clockwise the octave ascends whereas moving counterclockwise the octave descends. The octave change occurs at C.

Note: Tap a pitch. The next pitch you play will go to the shortest intervalic relationship, ascending or descending, thus allowing you to change octaves without having to slide over C.

After tapping and setting to just temperament, if you double tap the root of the chord/key, TonalEnergy Tuner locks the key of your choice so that you may now tune all other pitches in that key. Then any pitch that is played will be in that tonality. There will be no sustained tone unless you also then tap the sustain button. To go back to equal temperament, tap the temperament button.

The target tuner is found in the center of the chromatic wheel. It displays the pitch and a cent meter. The tuner on this screen can be used as a stand alone feature or can be used with the other features available on the tone generator screen. When tuning with the chromatic wheel tone generator, you can use any one of the various temperaments.

The tone generator can sustain a note by tapping the sustain button in the center of the wheel. This button can simultaneously sustain multiple pitches, thus allowing you to create many types of chords.

1. Tap the sustain button and then select the notes you want sustained.
2. Tap sustain button or pitch button to release the notes.

Note: For instant pitch reference, tap anywhere on the center bar inside the Chromatic Wheel.

The octave button has plus and minus signs. Tap the plus sign for the tone generator to play an octave higher and the minus sign to play a lower octave. You can sustain the same note in different octaves by first tapping sustain, then tapping the desired pitch. Next chose the plus sign or minus sign to change the octave, and tap the new note. If you have multiple octaves playing and desire to remove one octave, tap the pitch to release the last octave added. To delete other octaves, you must tap the + or — sign, then the pitch. To shift currently sustained notes by an octave in either direction, press and hold the octave button

Note: MIDI-keyboard controllers interface with the TonalEnergy Tuner. They will do anything the chromatic Wheel will do.

Piano Keyboard

To activate the keyboard screen, tap the Sound icon in the page selection bar at the bottom of the page and select Keyboard.

The keyboard functions as any standard piano.

Note: The keyboard will only play the practical range of selected instrument.

The range of the keyboard may be changed two ways.

1. Touch and slide the keyboard to the right or left. If you do not want sound, touch and drag in the shaded area at the top of the keyboard when sliding.
2. The octave switches (+ on the right, — on the left) may be touched to more quickly alter the keyboard range.

To change the size of the keys, use a two-finger pinch and slide movement. If you do not want sound, go to the shaded area at the top of the keyboard to pinch or slide.

Once the keyboard range is selected, tap the keyboard lock icon to prevent the keyboard from moving.

The keyboard changes to reflect the transposed instrument note name. For example, Eb transposing instruments will show their C in brown on the keyboard's C key. The corresponding concert pitch name is displayed as a gray letter on the piano's C key. In this example, concert Eb would appear on the keyboard's C key. When a transposing instrument has been chosen, the user is reminded by the word Transposed displayed on the screen in orange.

Press the Sustain toggle to sustain up to 14 pitches anywhere on the keyboard.

Like a MIDI keyboard, the Chord Hold function can also be used with the built-in keyboard. First press the Sustain button and then press the Chord Hold button, which will appear directly to the right of the Sustain toggle. In equal, just or custom temperaments, three different pitches may be played.

Note: The Sustain Hold is most helpful using Just intonation while playing major or minor triads, as the tuner will recognize what chord is being played regardless of the inversion. The tonality or key center for major and minor triads will be a highlighted purple piano key.

Double tapping a key will set the tonal center of the scale if you are in one of the custom temperaments (like Just).

For instant pitch reference, tap the tuning bar at the top of the keyboard page. To sustain the pitch reference note, long press. To release, tap on the tuning bar.

String Tuning

To activate the string/guitar screen, tap the Sound icon in the page selection bar at the bottom of the page and select String Tuning.

There are multiple tunings for each string instrument. The most commonly used tuning is always the first one displayed. Equal temperament is the default and only temperament that can be chosen for the fretted string tunings. The Orchestral String Family custom temperament will be noted as Orchestral All Strings and the player can also toggle to Equal Temperament.

All Strings: The TonalEnergy Tuner temperament default is set to tune the Orchestral Strings using a "special" Just intonation feature called Perfect 5ths. The player starts tuning their instrument beginning on the instrument's open "A" string to create all perfect fifths to the adjacent string. All pitches that are not an open string on the four orchestral string instruments are equal temperament on the Target Tuner. Orchestral strings may choose the separate instruments or All Strings.

When the String screen is activated, the default sound will be the Plucked String. Other instruments may be chosen to tune the string instruments, as long as the instrument range allows for the correct octave to be played.

Note: The Plucked String, Saw Wave, Square Wave and Organ are the most commonly used tones for tuning string instruments.

When tuning the open strings, once a note is played, the area around a string will light up. If the color is green, the pitch of the open string is in tune. If the colored dome is either orange or red, the pitch is either sharp or flat. The domes appearing at the top or bottom of the string indicates the user is either playing a note that is not an open string or is still slightly out of tune. Like the Target tuner, orange indicates the tone is closer to the desired pitch than does red.

To hear open string sounds, touch one or more strings.

Long press a string or strings to continue to play the tones indefinitely. The Plucked String instrument will re-trigger after decaying to silence once you have long pressed the tone. To turn off a pitch touch the string while the tone is sustaining. All tones will stop.

When turned on, the microphone button to the left of the pitch boxes will reference the pitch the performer is playing. Refer to section Auto Reference Notes under the Target Tuner for more information.

The Damp button in the lower right corner allows you to adjust length of time the sound sample is measured with the choices being Slow, Medium and Long. Slow would be the longest sample time during which the pitch would be averaged.

Note: Consult the Mode and Range pop-up box to determine which damping setting will be best.

For instant pitch reference, tap the tuning bar at the top of the String Tuning page. To sustain the pitch reference note, long press. To release, tap anywhere on the tuning bar.

At the top of the screen a bar graph, the Pitch Tracker, will appear illustrating the percent of time the music performed fell into each of the three pitch zones: red, yellow, green. The colors and percentage are determined by the amount of time the tones were performed within the tuning parameters set in the Mode and Range pop-up.

Temperament

The temperament button is located in the upper left corner of the screen. By tapping this button you can select equal or a custom temperament (default to Just/Pure). The just temperament tonality (key center) is dependent upon the pitch you selected. In order to choose an alternative temperament, you will need to go to the Preferences page.

Most often used for tuning major and minor chords, just temperament is used for tuning notes in the same overtone/harmonic series. For a major chord to be in tune with just temperament, the perfect 5th (3.5 whole steps) should be raised by 2 cents and the major 3rd (2 whole steps) should be lowered by 14 cents (raised and lowered from the equal temperament scale). Minor chords require the minor third (1.5 steps) to be approximately 16 cents sharp. Tuning using just major and minor temperament will eliminate any sound waves you hear between the root (pitch the chord is built on), the third, and the fifth, resulting in a more pleasant sound. TonalEnergy will auto-detect in root, first or second inversion any just major or minor chord. The feature works when using the Chromatic Wheel or a midi-keyboard. While sustaining a major or minor chord, the user may double tap any pitch on the Chromatic wheel for the tonal center (key signature) to change.

Transposition

The transposition pop-up is on the Main Target Tuner screen, the Chromatic Pitch Wheel, the keyboard and the Analysis pages. This feature allows you to select the desired transposition.

To select your instrument, tap the instrument selection bar. This allows you to scroll to the desired instrument. Once the instrument is selected, the transposition is automatically selected. For example, the alto saxophone is an Eb transposing instrument. When you select alto saxophone, the transposition will automatically move to Eb. The tuners, chromatic wheel and keyboard will also adjust so that the alto saxophone C natural will be recognized as a concert Eb. The TonalEnergy Tuner also gives you the choice to not use concert pitch as the default. Once engaged this function allows the TonalEnergy Tuner to transpose to the instrument key automatically for commonly used wind instruments. You may manually change the transposition for less common instruments to better suit your needs (a C, D, or Eb trumpet, or Bb French Horn). The most commonly used instruments are listed in music conductor's score order. They are grouped in instrument families and from high woodwinds to low brass.

Note: The term "concert pitch" is used to indicate the difference between your "written/notated" pitch for your instrument in your music and the "sounding" pitches in music scores.

When one of the Indian Notations is selected in the preferences, the transposition is labeled as the Shruti number.

Recording

You can record and playback using the chromatic tone wheel, keyboard or strings page. You can also study the recorded sounds in both the Spectral Analyzer and the Wave Form Window. See more in other sections.

Analysis

To choose an Analysis page, tap the graph icon in the middle of the page on the far left. Choices include Waveform, Spectral and Harmonic energy screens. You can also swipe left or right from either screen edge of the plot area to switch plot types.

Waveform Window

The blue waveform is an image that represents an audio signal, in this case the tone being played either on your instrument or on the internal sound. Like the spectral analyzer, it is a visual representation of the quality of your tone. Blue sound shapes will vary depending on what you are practicing. For example, when practicing decrescendos, the sound should resemble a blue triangle. The goal is to have relatively straight sides on whatever shape your sound makes. Wavy lines indicate some aspect of your sound is not as controlled as it could be. Every aspect of the quality of your tone, including but not limited to volume, start, release, duration, and steadiness, will be reflected on the wave form window. The wave form window has a double-tap feature that allows the user to freeze the window while performing live or while listening to a recorded file so they may study their tone.

A two-finger tap will expand the plot to fill the screen. Two-finger tapping again will return it to normal size.

The size of the waveform can be changed manually by using a two-finger pinch. This enables you to zoom in or out.

Note: Due to the parameters of Apple built-in microphones, best practice is for players to be two to three feet away from the device. We also suggest bells not be pointed directly at the device, especially in small, enclosed areas (like a practice room). High volume and/or high frequency tones will have best results in a quiet, large space. However, if you are in a small room, go to Audio Options, then slide the Input Gain to the left. All the way to the left does not allow for a reading so you may need to experiment to discover the perfect Input Gain setting for you and your environment. Other solutions include using an external microphone with a built-in Gain control or a microphone plugged into a mixer.

Waveform Timespan

This control lets you adjust the span of time shown in the waveform. Press and hold the button and a vertical slider appears. Drag up to increase the time span or down to lower it. The maximum time is about 30 seconds, and the minimum time is about 20 milliseconds. This allows you to actually see the detailed waveform like an oscilloscope.

Plot Pitch

Intonation can be plotted in the Wave Form Window. To turn this function on, tap the orange Show Pitch button. When a tone is playing, the accuracy of the pitch is represented by a line which will be red, orange or green. While the goal is for the green line to run straight through the center of the blue wave form, an orange line is still considered to be within the tuning range parameters. If the pitch is out of the tuning range parameters, a red line will appear.

Note: Best practice requires you to use Plot Pitch in a quiet environment with little or no ambient sound.

To identify what pitch the tuner is recognizing, consult the bottom of the wave form screen or the pitch name beside the Target Tuner or in the middle of the Vertical Tuner Bar on the right side of the screen.

Note: Just as the smiley face grows when an in tune pitch is held, the shaded area of the Vertical Tuner Bar expands when an in tune pitch is held for an extended period of time.

White dotted lines represents the silence between pitches. When slurring or playing in a legato style, the goal is to minimize the number of white dotted lines.

Spectral Frequency Analyzer/Harmonic Energy Series

The spectral frequency analyzer has a range from 0 - 10,000 hertz. The vertical orange line identifies your fundamental tone or first partial. As you play, the window allows you to see whether or not your fundamental tone/first partial is your highest peak. You may choose to use a line or filled in spectral plot in the Preferences page under options. On both the Spectral Frequency and the Harmonic Energy windows, you may double tap the screen to freeze a tone. The "frozen" tone will be blue. The user may then continue playing so he can use the "frozen" pitch as a means to compare the energy and frequencies of his tone. One useful feature of this window is the screen may be frozen while performing or listening to a recorded file.

In a characteristic symphonic wind sound, the fundamental tone/first partial should be the highest peak (orange line) while the second partial should be the second highest peak, etc. The difference between the height of the peaks is directly related to the quality of your tone. There should be less harmonics/partials on the highest pitches of your instrument. On your very lowest pitches you will see several harmonics/partials.

A two-finger tap on the plot will expand the plot to fill the screen. Two-finger tapping again will return it to normal size.

At the top of the screen a pitch tracker or bar graph will appear illustrating the percent of time the music performed fell into each of the three pitch zones: red, yellow, green. The colors and percentage are determined by the amount of time the tones were performed within the tuning parameters set in the Mode and Range pop-up.

Instant pitch reference will occur when you tap the pitch display. To be able to sustain the instant pitch reference note, long press the note and release.

The transposition choice pop-up is available on this page.

Note: There are some features unique to the Harmonic Energy Series screen.

1. Use the two-finger pinch to reduce the number of partials.
2. The names of the first eight harmonic partials are listed under the partial numbers at the top of the bars on the Harmonic Energy Screen.
3. The cent off-sets for each partial, as they relate to equal temperament, are shown under the harmonic partial note names.

File Recording and Playback

Files can be recorded or loaded for playback on every screen of TonalEnergy Tuner. In addition, audio recordings can be imported or exported.

To access audio and video recording sidebar, swipe right from the upper left edge of any screen.

Audio Recording

Tap the microphone icon. Tap the red button to begin or to stop a recording. After stopping the recording you will be prompted to name the recording, cancel it or remove it. To save a recording, rename it and save it. When the file needs to be played, tap on the file folder, select your file, and tap Play.

Note: For quick playback, simply save the most recent file without renaming it, and then tap Play.

On the Sound pages an additional recording option for recording internal sounds is available. When the record button with the speaker icon is tapped, only internal sounds will begin recording. To stop recording, tap once. Basic exercises can be recorded in this way for later playback while you are rehearsing.

Record duration and total number of files is limited only by the device's available storage space.

Video Recording

Tap the Video icon.

All other rules and procedures for Audio Recording apply to video recordings. Video files may be exported.

Using the two-finger pinch allows you to zoom in and out of live video shots. On playback the two-finger zoom feature expands the picture to full screen.

The Target Tuner is superimposed in the middle of the Main Tuner Screen in Video Record mode. On the Sound pages, screen graphics unique to that page are superimposed over the video. Video is not available when using the full screen feature on the Analysis page. The user may need to adjust the position of his device in order to view items like embouchure, hand placement, fingerings, etc. To change the mode from back view to front view camera, tap in the lower right corner of the video picture. Timestretch is also available in video recording.

Playback

Any previously recorded or imported audio files can be loaded for playback in the TonalEnergy Tuner app. Press the file icon to bring up the file browser. Select an audio file (which can be nested in a folder) and press Play to begin playback. A file will immediately be auditioned if already playing when you select a new one so you can easily find the one you need. Tapping it again or pressing pause will stop the file auditioning. You can also select the Export button at the bottom to export the selected item in several ways. See the

section later for more information about exporting (and importing) audio files. Press done or tap elsewhere (on iPad) to dismiss the file browser.

The position slider can be used to move to different locations within the file before and during playback, or dragging on the top half of the waveform display for audio recordings.

By default the file playback will loop back to the beginning automatically when it reaches the end and continue playing. You can toggle this behavior off by selecting the **loop** button. You can also change the loop start and end points. To adjust the start or end of your recorded file, go to the bottom of the page and move the left end Loop Range slider to your desired playback starting point. To change the location of the end of the recording, do the same with the right end Loop Range slider. For audio recordings you can also drag near the bottom of the waveform display to set the loop points. These can be set while the file is playing back, or when stopped. The loop points and the preference to loop, or not, is stored along with the file itself.

By default, when playing back a file the tuner is actually displaying the tuning results from the file itself and *not* the live microphone. If you want to instead be able to tune live input during playback, you can press the button at the bottom of the sidebar with a magnifying glass so that a microphone shows inside it. With the analyze setting set to microphone the built-in tuner is still actively listening to the microphone input so you can tune yourself even as you listen to audio playback. Using headphone/earbuds can prevent the tuner from unintentionally picking up the sound of the file playback. However, when playing back out of the internal or external speaker, if your instrument is close enough or loud enough, the tuner will likely be able to recognize you instead.

Stretch Tempo

You can also change the effective playback tempo or speed of any file using the Stretch Tempo control. A value of 100% is no change, while a value of 50% is half-speed, and a value of 200% is double speed. This feature is useful when learning an exercise or rehearsing a musical passage. Tap the Stretch Tempo button and slide your finger up if you want to increase the speed of the recording. Slide down if you want to slow the recording. Double tap the stretch control to reset it to standard (100%).

File Browsing/Selection

After pressing the folder icon to bring up the file browser, there are additional actions you can do besides selecting a file for playback.

Trimming a file

Once a file is selected, and the loop points have been adjusted away from the beginning and end of the file you have the option of Trimming the file to span only the selected range. Pressing the Trim button brings up a menu letting you select if you want to save the trimmed version to a new file (preserving the original) or replacing the original file.

Renaming

To rename a file, first press the Select button on the left side of the toolbar at the bottom of the page, then select the file you want to rename, and press Rename in the toolbar. Press Done in the lower left to return to normal.

Deleting

To delete a file you have several options. To delete a single file, simply swipe it to the left and press the Delete button exposed on the right. Or to delete multiple files at once, press the Select button on the left side of the toolbar at the bottom of the page, then select all the files you want to delete, then press the trashcan icon, then confirm deletion of the items.

Exporting

To export a file or multiple files together press the Select button on the left side of the toolbar at the bottom of the page. Select the items you want to export, then press the “export” button (rectangle with upward pointing arrow). A prompt will appear allowing you to export the original recordings or size compressed versions (using AAC audio encoding). Once you make that choice a system menu will appear allowing you to chose how to export the media, including options for Email, AirDrop or sending to any installed app that is compatible with the media. If you have selected multiple files they will be stored together in a ZIP file archive for export.

Importing

You can also import files into the app from the device’s iTunes Library by pressing the Import button. A browser will appear allowing you to find the song within your local iTunes library in the normal manner. This file will then be copied into TonalEnergy Tuner so that it can be later played back and time-stretched. You can later delete the file within TonalEnergy tuner when you no longer need to use it. The version in your iTunes library is unaffected.

You can also import audio into the app from email attachments or clicking URL links from within Safari on the device. TonalEnergy tuner will show up as one of the apps you can Open In.

The third way you can get files into or out of the app is using iTunes File Sharing. While your device is physically attached to your computer (via USB) running iTunes, you will see TonalEnergy Tuner listed among the apps that support document sharing. You can drag and drop files into the appropriate area to put files from your computer into the tuner, and vice versa.

Folders

You can organize your files within the app. Press the new folder button to create a new folder and give it a name. Selecting the folder in the list will take you there. When you are doing this from the file browser on one of the main pages of the app, the current folder you are browsing in will also be used to store any new recorded files. Press the *Back to previous folder* item at the top to return to the folder above. You can create folders within folders.

To move a file to a folder, press the *Edit* button in the corner and then drag the item by the stacked line handles on the right edge of the item. You can only drag a file to one of the folders, or to the [Back to previous] item, releasing your finger when the file is shown just *under* the desired destination will move it there.

Special Text Data Recording

There is special recording mode that was added specifically for blind users who may want to have the history of tuning performance in a text file for later perusal. Only when VoiceOver mode is active, a double-tap and hold on the center target tuner on the Tuner page will toggle the text tuning data recording on/off. The text file will be a sequence of lines starting with a time stamp in seconds, followed by a note name and the number of cents off. There may be multiple timestamp/note/cents on a single line. The file data will be saved automatically with a timestamped filename starting with TuneData, and can be accessed in the file browser (Prefs->Browse Recordings) for export.

Preferences

Calibrations

Concert A Reference

You can change the Concert A Reference from 440 Hz to the reference frequency number you prefer. In order to change the number, tap the number. A keyboard will appear. Type in the new reference frequency number and tap Done. This calibration number will remain unless you change it again. There is no default.

Device Calibration

To fine tune the calibration of the device, you can use an external tuning fork, tone generator or a reference tone from a keyboard or website. Tap the tuning fork button on the right side of the Concert A reference row, and a calibration page will appear. Tap external pitch reference button (Hz). Type the specified frequency of your external reference tone. Begin to play the tone from which you will calibrate. Tap calibrate from reference and wait approximately five-seconds. It will tell you your current calibration factor. If you want to use the calibration, you continue. If you want to reset to calibration factor, tap reset. You must have a quiet environment with no ambient sounds.

Current Calibration Factor

It is highly unusual for any pitch reference tones to be exactly A 440. One cent below and or above A440 equals an offset of 0.254 Hz. So if your current calibration factor indicates 1.003, you are within 0.012 of a cent. This would indicate your device is functioning within a highly acceptable range. It is wise to use multiple external pitch reference tones when testing your calibration.

Alternate Temperament

To use the alternate temperament (which is toggled via the temperament button on the Tuner and Tone Generator pages), select the Alternate Temperament item in the Preferences. There are many built-in options, including various historical temperaments. You can also add your own custom temperaments by hitting the + button, supplying a name, and entering the offset in cents from equal temperament for each of the 12 chromatic intervals.

Note: Perfect 5ths The TonalEnergy Tuner is set to tune the violin family using a just intonation feature when the player starts tuning his instrument beginning on the instrument's open **A** string.

Auto Key Detect

This option enables recognition of the root key of any triads played together in the tone generator page. The three notes can either be pressed at the same time, or constructed one at a time with the Sustain feature on. The root key is used by alternate temperaments such as Just/Pure as the basis for the interval relationships between the notes.

Notation

The desired notation of the displayed note names can be selected from the **Notation** menu. Several variants of English notation, Solfège, Northern European, and Indian options are available.

General Options

Show Tuner Wheel enables the chromatic note wheel to be overlaid on the target tuner page.

Auto Transpose allows the tuner to transpose to the instrument key automatically as you switch instruments sounds.

Show % In-Tune Bar enables the Pitch Tracker to be shown on the Target Tuner, Sound and Analysis pages.

Analysis Options

The **Analyze File Playback** option, when enabled will do realtime analysis of any file currently being played back, and will not use the microphone input at that time. If you want to play back a file, but still be able to use the tuner with live microphone input, disable this option.

The **Filled Spectral Plot** option draws the spectral plot with a solid filled-in style, instead of the default line style.

Show 1/10 Cents toggles off the use of the decimal tenths of a cent on those labels within the app. This is particularly helpful with all voice students and beginning wind and string players.

The **Waveform** options allow you to choose between an automatically scaled waveform, a fixed linear or variable logarithm scale of the waveform's intensity level. The **Linear** and **Log** settings actually disable the auto-gain compression/limiting that Apple applies to the mic input, and can result in more accurate waveforms. This can be especially useful when used in close proximity to loud instruments. The Log mode has an additional slider allowing you to control which area of intensity will be better represented in the plot. Experiment to find the best value for your instrument and proximity to the tuner.

Audio Options

Input Source: For most effective microphone pick-up response, the user has the choice of using the front, back or right microphone. It will also allow you to choose between an internal or attached headset mic, or any other audio devices attached via Lightning, dock connector or USB.

Input Channel: If you have a stereo input connected you can choose what channel you want the tuner to listen to, or select All (by selecting a number less than 1) to have it listen to both channels.

Input Gain Slider: This allows you to make adjustments depending on the environment in which you are working. If you are in a small room and are playing *loud* tones, slide the Input Gain to the left. If you have a problem picking up a sound, you will want to move the slider to the right. All the way to the left does **not** allow for a reading so you may need to experiment to discover the perfect Input Gain setting for you and your environment. Some devices may not allow for the input gain to be changed and the control will be disabled in that case.

Note: Remember to set Input Gain back to the default setting (75% on iPad or 37% on the iPhone). If you fully quit the app, Input Gain will automatically reset to these default settings.

Main Volume Slider: The Main volume slider does the same function as the device's built-in volume control.

Instrument Volume Slider: Slide to your desired instrument volume. This is especially helpful when balancing the volume of the instrument with the volume of the metronome sounds.

Allow Bluetooth Input: Setting this parameter ON will allow microphone input from bluetooth headsets or speakers to be used. In general you will probably want to keep this setting OFF because the built-in mic works better and has higher fidelity and responsiveness. Also, bluetooth speakers for audio output will work and sound better with this OFF.

Note: On devices running iOS 9 or lower, the Allow Bluetooth Input option is not available and is replaced with the Output Only option, which you will need to enable if you wish to use bluetooth speakers.

Note: Bluetooth speakers generally work best with direct line of sight and within 25 feet of your device

Background Audio allows the app to continue running in the background for MIDI control of the tone generation. In this way you can use other applications while still hearing audio output from TonalEnergy Tuner. When used with Audiobus, background audio is automatically enabled regardless of this setting. Audiobus can be used to analyze the output of other applications that support Audiobus. It will also automatically stay running in the background if the metronome is on or if file playback or recording is occurring, without requiring this option to be enabled.

Auto-Limit Volume will enable a built-in compression and limiting of the sound produced by the tone generation so that the overall volume will be maximized without distortion, no matter how many notes are playing at once.

The **Reverb** switch toggles the use of the reverb effect. **Room Size** adjusts the apparent largeness of the reverberating space, from small and subtle to large and cavernous. The **Level** setting controls the amount of reverb mixed with the direct instrument sound. If you want the reverb effect to be included in the recordings you make from the microphone, enable the **Record Input with Reverb** option.

Note: All of the TonalEnergy Instruments are preset to the following specifications: Room size 50% Level 20%

The user may want to change the settings to enhance the internal sounds. The size of the room, the outdoor environment, and the quality of headphones or speakers will greatly affect the quality of the instrument sounds.

The **Auto vibrato** feature on the tone generation page uses the following settings to guide how the vibrato sounds. You can set a **Start Delay** to delay the onset of the vibrato after first tapping the note by a given number of (fractional) seconds. The **Depth** control will adjust how strong the vibrato is, and the **Rate** adjusts how quick it is. The **Auto-adjust with pitch** option is recommended because it will automatically scale the depth and rate of the vibrato naturally as the pitch of the instrument varies. Using the Auto Vibrato feature can demonstrate how different vibrato styles can sound on the varying instruments. The vibrato options can be restored to their factory defaults with the **Reset to Default** item.

Note: TonalEnergy Tuner also supports **Audiobus** in all three slots so you can tune and analyze the audio from other apps directly and record them. In addition, it also supports virtual MIDI, other apps can control the TET instruments and the output can be sent to another app for recording or further processing.

External Video Options

The application supports external video output in one of two different ways. The first way is using Apple's built-in screen mirroring feature with the HDMI Digital AV cable, the VGA dock connector cable or via wireless AirPlay with an AppleTV. The second way uses the same connection options as the previous way, but instead using the dedicated video output feature which is enabled with the External Video Out option.

The dedicated video output will always show the primary tuning status, the target tuner indicator, and optionally also showing either one or both of the Spectral and Waveform plots. You can freely use the application on different pages on the device, while your external video is always showing exactly what you want to see. You can choose the resolution of the video output (depending on the connection cable and display device) with three choices: Standard (standard definition TV 640x480 or similar), HD (1024x768 or similar), and Wide HD (720p). The Standard setting will be the most responsive, but if you would like to see increased details in your plots the higher resolution options are available.

Note: Some older VGA Multimedia projectors do not interface with devices using lightning cables even if you have a connection cable that looks like it should work. Double check before purchasing

There are two color themes from which to choose, the default Dark theme and the Light theme. Choose the one that is the most easily seen in your display or projection environment.

The visual metronome can be independently enabled for the external video output here also.

Note: With the HDMI AV adaptor the audio output may be sent through the HDMI to the connected display. You can always override this and use the device's stereo mini-jack instead.

Note: The TonalEnergy Tuner interfaces with Apple TV/AirPlay on all supported iOS devices. All functions of the application will work when connected using a wifi-network that has broadband/hotspot connectivity or the device can be directly connected to the Apple TV unit. A HDMI TV or HDMI projector must be used.

Browse Recordings

This feature allow access to all audio and video files, identical the interface found in the recording sidebar.

Recorded Video Quality

There are three options for video quality of recordings made in the app. The *Normal* is best for general use with a good balance between image quality and file size for sharing. The *Lower* setting will result in a low resolution image with a very small file size, while the *High* quality setting will be the native resolution of your device's camera for very high quality, but correspondingly large file sizes.

Ableton Link

Ableton Link is a technology that keeps devices in time over a local network. You will be able to access Ableton Link using the main preference button found on any page or the metronome page preference button. When the Ableton Link is engaged by turning on the switch, it can sync the metronome with any other device that has also engaged Ableton Link. You can choose to be notified when apps join or leave.

MIDI Settings

Selecting MIDI settings brings you to a comprehensive page on controlling how MIDI events are sent and/or received from the app. MIDI support allows you to control the internal instruments via any MIDI controller. Furthermore, using the touch interface on the Tone Generator page can also send MIDI out, including any subtle pitch bends necessary to support a selected alternative temperament. The pitch bend range is currently fixed to the standard +/-2 semitones.

IN and OUT CHANNEL – set the MIDI channel that the app will respond to on input (or Omni for any), and the channel that will be used to output MIDI notes when notes are played in the app.

Using **APP TRANSPOSE** will cause incoming MIDI notes to be transposed with the value set in the app.

SUSTAIN MODE BEHAVIOR – The following options affect how the app behaves in Sustain Mode with respect to MIDI input. In Chord Hold mode, while Sustain mode is on, MIDI keyboard input will hold whatever chord you last played, and will replace the chord when you play another set of notes. Toggle Note mode will toggle any played note on or off, similar to the touchscreen interface. In both of those modes, pressing the midi sustain (CC#64) will toggle Sustain mode. However, Damper mode treats the midi sustain pedal like a normal piano, and does not toggle the app's sustain mode.

INPUT CONNECTIONS – Choose what MIDI hardware devices, network MIDI connections, or other running applications with virtual MIDI ports you want to accept MIDI input from. You can choose to receive MIDI note messages (notes, controller, pitch-bend etc) that will play the current instrument, or to receive synchronization clock messages from the source, or both. If you are connecting to another application's ports, only do so in one of the applications, not both, or duplicate events may be received.

OUTPUT CONNECTIONS – Choose what MIDI hardware devices, network MIDI connections, or other running applications with virtual MIDI ports you want to send MIDI events to. You can choose to send MIDI note messages (notes, controller, etc) that are played on the solo pads, or to send synchronization clock messages to that destination, or both. If you are connecting to another application's ports, only do so in one of the applications, not both, or duplicate events may be processed.

VIRTUAL MIDI - Allow Connections, If enabled, virtual MIDI ports will be created so that applications are able to send or connect to us on their end. You can still send and receive MIDI using the input and output connections shown above if this is off. Separate control to enable the sending of MIDI Clock events out of our virtual midi port.

WIRELESS MIDI – This enables you to connect to Wireless MIDI configurations set up between devices or computers. The Remote Hosts section below allows you to connect/disconnect to computers or other iOS devices on the wifi network that support wireless MIDI. In this way you sync up with other devices MIDI clock tempo, etc if you use the Network Session input and output connections above.

SCAN for BLUETOOTH LE – Lets you connect to other iOS or Mac devices that are available for MIDI communication over Bluetooth LE. Once connected, additional entries will appear in the Input and Output connections area.

ADVERTISE AS BLUETOOTH LE – Lets you advertise this device for MIDI communication over Bluetooth LE. If others connect to it, additional entries will appear in the Input and Output connections area.

Apple Watch

TonalEnergy Tuner is compatible with all Apple Watch models running version 3.0 or higher of watchOS.

Under the watch Settings app, you may want to consider setting the following options in the Watch's settings: Under Sounds and Haptics, turn Silent Mode On (for haptic count-in feature described below). Enable Prominent Haptic.

To prevent the watch from sleeping too often while using the watch app also look under General->Wake Screen, in the ON TAP section select Wake for 70 seconds. You also may consider *disabling* the Wake Screen on Wrist Raise, because then it will not go to sleep after lowering your wrist. The last option is especially useful when using the haptic count-in feature.

Since version 1.5.2 the Watch app now has four pages:

Metronome Page

Change the metronome's current tempo by rotating the digital crown knob on the side of the watch, or repeatedly press the Tap Tempo in time with the tempo you desire. Pressing the meter and subdivision button brings up a page to adjust either, tap the list entry for either and then use the digital crown knob to select the value. Press Done when finished. Start or stop the metronome with the Play/Stop button.

Force pressing on this page brings up a menu with two items:

Count-In – Dedicated haptic rhythmic count-in feature that is independent from the phone's metronome. You can set the tempo and how many beats the count-in should run. This feature can be used during practice to silently but physically count-in to the beginning of an exercise. For best results you need to set your watch to silent mode by swiping up from the bottom of the watch screen while on your main watch face display, and pressing the silent mode button (bell with slashed line icon) to ensure it is enabled (or use watch Settings).

Options – Brings up page to let you set the metronome volume, and whether accent sounds are used.

Metronome Presets Page

You can select among any metronome presets you have stored in the main app here using the digital crown or swiping up/down. The changes will go into affect when met is started, or if changed while already started. Force press to bring up menu letting you change preset groups or change metronome options. You can toggle the preset auto-advance mode and start/stop the metronome.

Sound Page

You can set the desired note with the note/octave pickers, or pressing the current tuner indicator button to set it to the most recently heard note. Press the Play Note button to make the main app produce that note using the currently selected sound. Press and hold for a short time to sustain the note. Press again to stop note, if sustained.

Tuner Page

Shows a visual target tuner representation and indicates the note and cents offset currently detected by the main app. Note that this audio is still captured from the iOS device and not the watch itself. The responsiveness of this display is not particularly good due to limitations with Apple watch communications with the main app.