

## User's Guide



# Isokratis Piano

*Release 4*

*Isokratis Piano is the absolute tool for every  
Musician of the Byzantine Music,  
or the European Music*

**Runs on regular Computer or Tablet  
with Windows 8.1**

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<http://apps.microsoft.com/windows/app/isokratis-piano/8059790b-52d8-491c-b7fe-79244d70f3b3>

<http://psaltiki.gr/en/apps/isokratis-piano>

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# 1. Technical Specifications

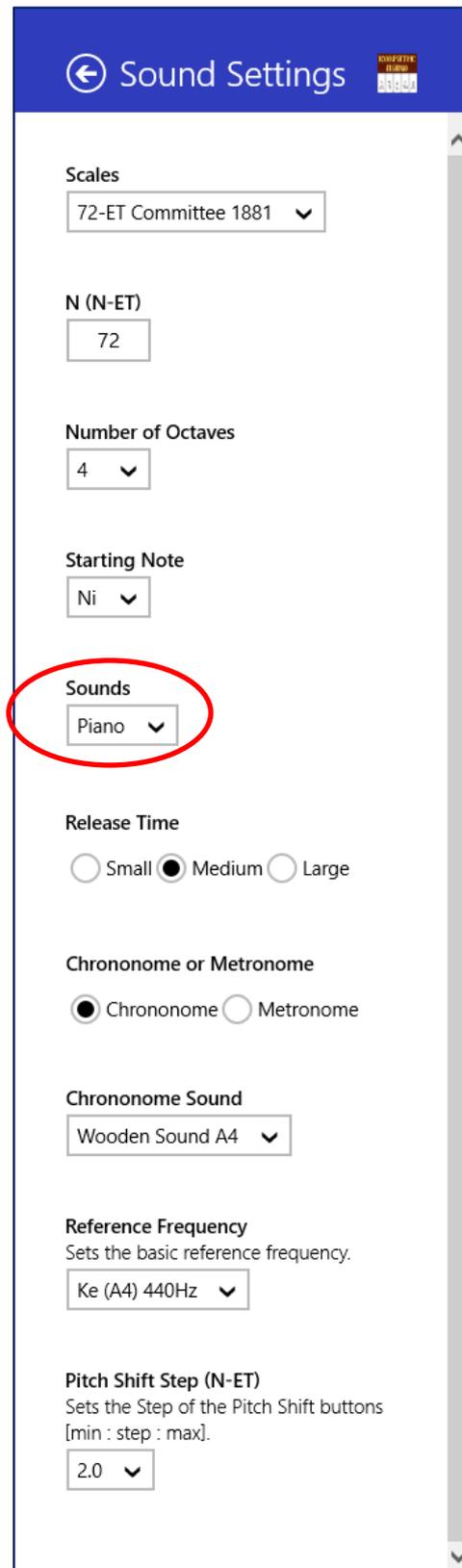
- Scales:
  - Committee 1881 of Ecumenical Patriarchate (72-ET)
  - Committee 1881 of Ecumenical Patriarchate (non-tempered)
  - Chrysanthos of Madytos (non-tempered)
  - Didymos (non-tempered)
  - 12-ET
- Sounds:
  - Piano
  - Isokratis 1 (human voice)
  - Synthetic Choir 1
  - Synthetic Choir 2
- Chroas, Vou/Zo sharp
- Coexistence of all scales' tones of the various genres (diatonic, chromatic, enharmonic)
- 97-key Piano, C0-C8 or G0-G8 (with octaves' shift)
- Chronome (Byzantine) with virtual light and wooden sound
- Metronome (European) with virtual light and wooden sound
- N-ET moria/cents (decimal numbers) with adjustable N from 12-99999.
- Pitch Shift (Tuning)
  - Adjustable Shift steps (N-ET), depending on the N setting.
- 4 different reference frequencies (Ke/A 440, Ni/C 261.63, Ni/C 256, Ni/C 220)
- Release Time adjustment
- Virtual "LCD"
- Personal Settings saving capability
- 2-4 full octave keys' display
- Octaves' shift capability
- Key labels
- Key labels' choices:
  - Byzantine Music Martyrias
  - Tone names (Ni, Pa, Vou, ...)
  - European notation (Do, Re, Mi, ...)
  - American (US) notation (C, D, E, ...)
- Tonal distances' (N-ET) between the keys
- Frequencies on each key
- Keyboard help (piano keys - keyboard keys correspondence appearance)
- Programmable position of black keys (in the middle of white keys or like in piano)
- Keys' size adjustment
- Continuous Key press option, when Isokratis or Choir sound is selected
- Adjustable app width (to be used in parallel with your favorite eBook reader)
- Volume Control (logarithmically, and independent of computer's volume control)
- Multiple keys concurrent play
- Background image selection

## 2. Quick Start - Isokratis

1. Press the button  (or F2 in the keyboard), and in the menu, under “Sounds”, select the sound “Isokratis 1” or “Synthetic Choir 1”.
2. Connect your computer or tablet to speakers that are capable of producing bass sound else the output sound may not sound well.

You are ready!

The preset scale is the 72-ET of the Committee 1881, and the reference frequency is  $K_e = A_4 = 440\text{Hz}$ .



The screenshot shows the 'Sound Settings' interface. At the top, there is a blue header with a back arrow and the text 'Sound Settings'. Below the header, several settings are listed:

- Scales:** A dropdown menu showing '72-ET Committee 1881'.
- N (N-ET):** A text input field containing '72'.
- Number of Octaves:** A dropdown menu showing '4'.
- Starting Note:** A dropdown menu showing 'Ni'.
- Sounds:** A dropdown menu showing 'Piano', which is circled in red.
- Release Time:** Three radio buttons labeled 'Small', 'Medium', and 'Large', with 'Medium' selected.
- Chronome or Metronome:** Two radio buttons labeled 'Chronome' and 'Metronome', with 'Chronome' selected.
- Chronome Sound:** A dropdown menu showing 'Wooden Sound A4'.
- Reference Frequency:** A dropdown menu showing 'Ke (A4) 440Hz'. Below it is the text 'Sets the basic reference frequency.'
- Pitch Shift Step (N-ET):** A dropdown menu showing '2.0'. Below it is the text 'Sets the Step of the Pitch Shift buttons [min : step : max].'

## 3. Analytical Description

### a. Main Screen

The main screen is as shown below:



The various buttons in the main screen are explained below:

#### 1. Help (F1)



It provides helpful information and contains the “User’s Guide”. You can activate it also by pressing F1 (provided you have focused on the keyboard).

#### 2. Sound Settings (F2)



It allows someone to control various sound settings, such as scales, sound type, release time, chronome sound, octave settings, pitch shift, reference frequency. It is explained also later in each own section. You can activate it also by pressing F2 (provided you have focused on the keyboard).

#### 3. Other Settings (F3)



Controls other than sound settings, such as martyrias, tonal distances, tone frequencies, keyboard help, etc. It is explained also later in each own section. You can activate it also by pressing F3 (provided you have focused on the keyboard).

#### 4. Automatic default playback device search (F4)



Use it when e.g. adding headset, so that the application will find the new default playback device set by the system, and output the sound. You can activate it also by pressing F4 (provided you have focused on the keyboard).

#### 5. Keyboard Focus



Use it to focus on the keyboard (if you want to use your computer's keyboard), to be able to press the piano keys with the corresponding keyboard keys. Alternatively, you may use once the key "Tab" on your keyboard. In addition, by successively pressing "Tab" you can focus through all buttons of the main screen.

#### 6. Continuous Key Press (F5)



It alternates the key press type between piano mode and isokratis mode. It is active only when the sound type is Isokratis 1 or Synthetic Choir. You can activate it also by pressing F5 (provided you have focused on the keyboard).

#### 7. Chronome/Metronome (F6)

In the sound options (F2) you can select Chronome (suggested for the chanters/students of the Byzantine music), or Metronome (suggested for the musicians/students of the European music).

Chronome is configurable, with also preset beats per minute list for different hymns categories. In addition, there is a visual effect (small virtual "LED" on the upper right of the "LCD") per beat.

Metronome provides the ability to select the time signature of 1/4, 2/4, 3/4, 4/4, in addition to a list of preset beats per minutes values (according to European music).

You can activate them also by pressing F6 (assuming you have focused on the keyboard). They are explained in further detail later.

#### 8. Pitch Shift

Pitch shift with programmable N-ET step size. It is explained in further detail later.

#### 9. Octave Shift



When the selected sound type is Piano, the Octave Shift buttons appear, so that the application can play in total 97 tones/keys C0-C8 (or G0-G8).

#### 10. Chroas, Vou/Zo sharp

The three chroas buttons change (whenever applicable) the tonal distances, and make red big dots appearing in the keys corresponding to the tetrachord each chroa is applied. In addition, there is capability for setting corresponding black keys to Vou/Zo sharp.

## 11. Keys' size

Someone can change the piano keys' width within range, using a slider.

## 12. Volume

Application's volume control (independent of computer's volume control), adjusting the sound volume logarithmically.

## 13. Virtual «LCD»

There is a virtual “LCD” for providing useful information on the Isokratis Piano operation and settings. It is explained later in further detail.

### ***b. Sound Settings (F2)***



By pressing the sound settings button (F2), the menu shown in the right appears. The following settings options are available:

#### 1. Scales

The following “families” of scales can be set:

- i. 72-ET Committee 1881
- ii. Non-tempered Committee 1881
- iii. Non-tempered Chrysanthos
- iv. Non-tempered Didymos
- v. 12-ET (12-tone ET)

It should be mentioned that the first two scales' options are the scales of the established Byzantine Music theory.

Chrysanthos of Madytos (one of the Three Teachers) left us only one non-tempered scale, the diatonic (it plays using only the white keys). For the scales used in the application, please see (only in Greek) the references [1], [2], [3].

12-ET scale is to be used by musicians of the European music, or for comparison purposes.

The screenshot shows the 'Sound Settings' menu with a blue header and a white body. The settings are as follows:

- Scales:** 72-ET Committee 1881 (dropdown)
- N (N-ET):** 72 (input field)
- Number of Octaves:** 4 (dropdown)
- Starting Note:** Ni (dropdown)
- Sounds:** Piano (dropdown)
- Release Time:** Radio buttons for Small, Medium (selected), and Large.
- Chrononome or Metronome:** Radio buttons for Chrononome (selected) and Metronome.
- Chrononome Sound:** Wooden Sound A4 (dropdown)
- Reference Frequency:** Ke (A4) 440Hz (dropdown). Description: Sets the basic reference frequency.
- Pitch Shift Step (N-ET):** 2.0 (dropdown). Description: Sets the Step of the Pitch Shift buttons [min : step : max].

## 2. N (N-ET)

N is fully configurable, and can take integer values between 12 and 99999.

Attention is needed in the fact that the N does not change the keys' frequencies of the various scales of this application, because the scales (in the current version) are preset, and the moria/cents are decimal numbers.

N is however having effect on the pitch shift (tuning) step size (N-ET), as well as in the depicted (N-ET) tonal distances between the piano keys: for example, for the non-tempered Committee scale, the diatonic Ni-Pa (C-D) is  $9/8$ , so in N=72 it is 12.23 moria [=72log<sub>2</sub>(9/8)], in N=563 it is 95.67 moria [=563log<sub>2</sub>(9/8)], and in N=1200 it is 203.91 moria/cents [=1200log<sub>2</sub>(9/8)].

## 3. Number of Octaves

It sets the number of visible octaves, two, three or four.

## 4. Octave Starting Note

When the sound type is Piano, the octave starting note can be Ni (C) or Di (G).

## 5. Sounds

The following sound types are available in Release 4:

- Piano
- Isokratis 1: Human voice of one isokratis (copyrighted)
- Synthetic Choir 1
- Synthetic Choir 2

For better sound results (better sound/key change, sound start/stop), fade-in and fade-out are used with the press and release of the piano buttons (see also Release Time below).

For best overall sound performance, it is recommended to connect the computer/tablet to good speakers (with good bass performance) or to the home theater system.

## 6. Release Time

It controls the sound release time (with fade-out). "Small" setting means that the sound diminishes fast (in short time), while "Large" setting means that the sound diminishes slower.

## 7. Chrononome or Metronome

See later in the Chrononome or Metronome section.

## 8. Chrononome Sound

See later in the Chrononome section.

## 9. Reference Frequency (Hz)

There is support for four reference frequencies, according to which the rest of the keys' frequencies are defined. Those frequencies are Ke (A4) 440 Hz, Ni (C4) 261.63 Hz, Ni (C4) 256 Hz, Ni (C4) 220 Hz.

These settings can be used in parallel to the pitch shift for wider control of the pitch.

## 10. Pitch Shift Step (N-ET)

See below in the pitch shift section.

### c. Other Settings (F3)

#### 1. Reset/Save Preferences

Supports saving of personal settings, such as sound type, N, pitch shift, number of octaves, keys' size, background picture.

#### 2. Tones' Distances/Keys' Frequencies

It provides the option to display the tonal distances between two neighbor keys, or the keys' frequencies.

#### 3. Keyboard Help

It shows the correspondence between the keyboard keys and the piano keys. To change the octave's correspondence, press the forward-slash key “/” (provided you have focused on the keyboard).

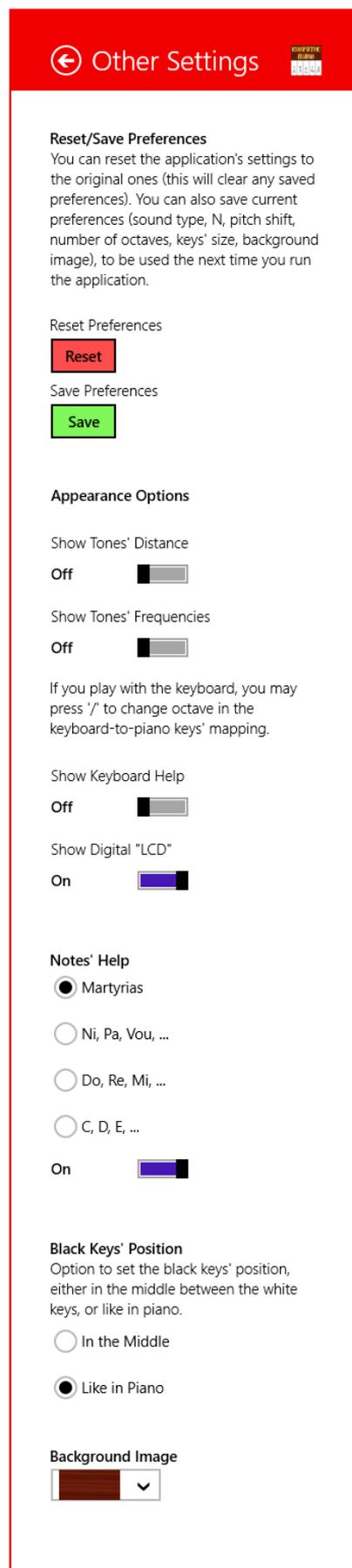
#### 4. Notes' Help (Martyrias)

For notes' help, there are the following key labels options displaying on top of piano keys:

- Byzantine Martyrias
- Byzantine Notation (Ni, Pa, Vou, ...)
- European Notation (Do, Re, Mi, ...)
- US Notation (C, D, E, ...)

#### 5. Black Keys' Position

There is the option placing the black keys either in the middle between white keys, or like in piano.



## 6. Background Image

It provides the capability to select among various piano backgrounds.

### *d. Chrononome or Metronome (F6)*

In the sound options (F2) you can select Chrononome (suggested for the chanters/students of the Byzantine music), or Metronome (suggested for the musicians/students of the European music).

#### 1. Chrononome (F6)

The main Chrononome keys are shown in the main screen as following:



Chrononome switch can be toggled with F6 (provided you have focused on the keyboard). There is a flashing beat indication also on the upper right part of the “LCD”. The beats per minute (bpm) are fully programmable, and additionally there is a list with preset bpm for different hymns’ categories (see the part of the list below), taken from the Triodion of Protopsaltis Thrasylvoulos Stanitsas. The list below is just indicative for educational purposes and in no way mandatory.

In addition, the Chrononome sound can be chosen from the “Sound Settings (F2)” in the setting “Chrononome Sound”.

|   |
|---|
| 112 Anastasima Sitchera (112-116)           |
| 112 Doxology slow                           |
| 112 Apolytikia in Liturgy                   |
| 112 Canon of Holy Friday (Kymati thalassis) |
| <b>116 Prosomoia short (most)</b>           |
| 120 Axion Estin                             |
| 125 Timiotea                                |
| 132 Canons and Anavathmoi                   |
| 138 Apolytikia in Orthros (138-144)         |

## 2. Metronome (F6)

Metronome supports time signature selection (1/4, 2/4, 3/4, 4/4), in addition to a list of preset beats per minute values according to the European music.

The main Metronome keys are shown in the main screen as following (Metronome can also be activated by F6, provided you have focused on the keyboard):



### *e. Pitch Shift*

There is pitch shift (tuning) option, to shift the keys' pitch using preset pitch shift step sizes.



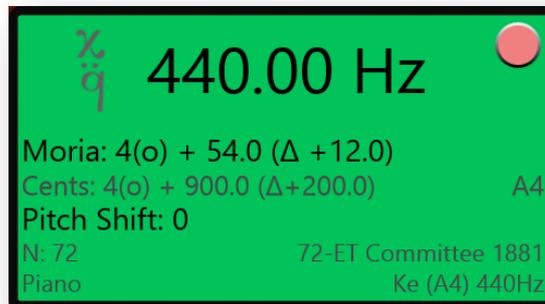
Pitch shift step sizes are N-ET, hence they depend on the N setting.

For example, if N=72 is programmed (in the sound options F2), the pitch shift step may take values of 0.1, 0.5, 1, 2, 6, 12 (72-ET). If N=1200 is programmed, the pitch shift step may take values of 200, 100, 10, 2, 1, 0.1 (1200-ET).

The step size can be chosen from the “Sound Settings (F2)” in the setting “Pitch Shift Step”.

### *f. Virtual «LCD»*

There is an “LCD” to display useful information on the usage of the application.



In this virtual “LCD”, the martyria of the corresponding pressed key is shown, along with its frequency and corresponding note in US notation within cents.

If two keys will be successively (or concurrently) pressed, the tonal distance/difference is shown in N-ET cents, and (1200-ET) Cents.

In addition, the pitch shift value is shown, along with the N setting, the selected sound type, the scales’ family and the reference frequency.

In the upper right part of the virtual “LCD”, a virtual “LED” is shown that blinks in the beat rate of the Chrononome/Metronome (when it’s activated). In the Metronome, the virtual “LED” changes also color according to the time signature.

## 4. References

- [1] Παν. Δ. Παπαδημητρίου, Πώς προκύπτουν όλες οι κλίμακες της Βυζαντινής Μουσικής από τόν Μείζονα Τόνο, <http://psaltiki.gr/papers/6-how-to-derive-all-scales-from-9-over-8>, έκδ. 0.9, 6/3/2014.
- [2] Παν. Δ. Παπαδημητρίου, Οί Κλίμακες και Συγκερασμοί του Χρυσάνθου εκ Μαδύτων, <http://psaltiki.gr/papers/16-chrysanthos-scales-temperament>, έκδ.0.9, 15/3/2014.
- [3] Παν. Δ. Παπαδημητρίου, Η Κλίμακα του Πλαγίου Δευτέρου Ήχου κατά τόν Χρυσάνθο και τήν Έπιτροπή 1881, <http://psaltiki.gr/papers/14-plagal-2-tone-chrysanthos-committee1881>, έκδ. 0.9, 28/2/2014.