



User Manual

Updated for version 1.0.55, August 2021

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Using the EyeHarp

For the best EyeHarp experience, you will need an eye tracker. An eye tracker is a special device, a camera and a dedicated software, that can detect where you are looking at every moment. It is normally placed under the screen.

We recommend [Tobii Eye Tracker 5](#) as an affordable device with great performance. EyeHarp is compatible with any device that communicates through the EyeX server. This includes all Tobii eye tracking consumer devices.

Alternatively EyeHarp can be played with any other device that can control the mouse pointer. For example, a mouse, a head tracking device, a trackball, or a touch-pad.

You can switch between gaze input and mouse input by pressing alt + m. If no special device is connected to the computer, mouse input is the default.

Software Registration and Updates

To activate your premium EyeHarp software, select Manage Registration. You will be taken to an online activation page. Enter the activation key, and click Activate license key:

EyeHarp Activation

Activate Online

Enter your Activation Key below and click Activate. The License Wizard will then connect to the License Server to activate your license. If you do not know your Activation Key, enter your email address instead.

Activation Key

AXKDC

Proxy Settings

Activate license key

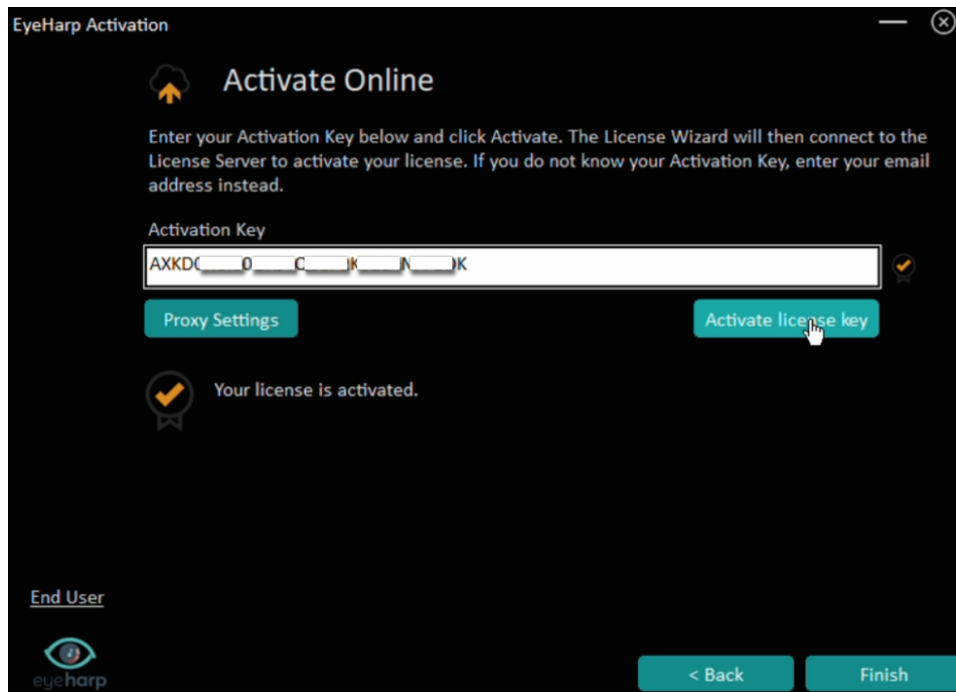
The license key AXKDC needs to be activated.

End User

eyeHarp

< Back Cancel

Wait for the confirmation message:



Click Finish

Updates

When a new update is available, a notification message will appear on startup. Go to Manage Registration under the advanced menu to download and install the update.

Interface

The interaction with the EyeHarp is done by looking at buttons and selecting them. A button in the EyeHarp interface is a circle with a small focus point in the center. To select a button, look at the focus point of the button for 1 second. This method is known as dwell time.

Alternatively, the EyeHarp can be configured to perform selection with the mouse pointer (pressing Alt + m to force mouse input, and Alt + k to switch between dwell time selection and mouse click selection).

Remember, the notes you play are not buttons. When you look at a note, it will sound instantly without delay.

EyeHarp has four screens: main screen, catalog, instrumental options menu, and advanced menu.

The main playing screen shows the note selection area, a colorful pie-like keyboard.

The catalog is where you can select songs from the EyeHarp repertoire, activate or deactivate the audio and visual guides, and quit the application.

The instrumental options menu is where you can select sounds and their range, apply reverb or chords, activate volume to distance function, and switch to full screen.

The advanced menu is where you can configure notes and chords settings, define audio and MIDI output, turn selection sounds on and off, and manage your EyeHarp license.

Playing the EyeHarp

The notes on the circular keyboard are arranged in a scale, and selection depends on direction. The notes divide the circle into slices, with a specific selection area for each note. This design improves temporal control, and it is effective for playing free-flowing melodies.

The notes are placed at the perimeter of the pie, with a note selection area of a different color for each one. The starting note is placed below the gap in the circle. The note names are written in the inner part of the circle, next to the note selection area.

When looking at each note area, the corresponding note (or chord, if the chord option is activated) is triggered.

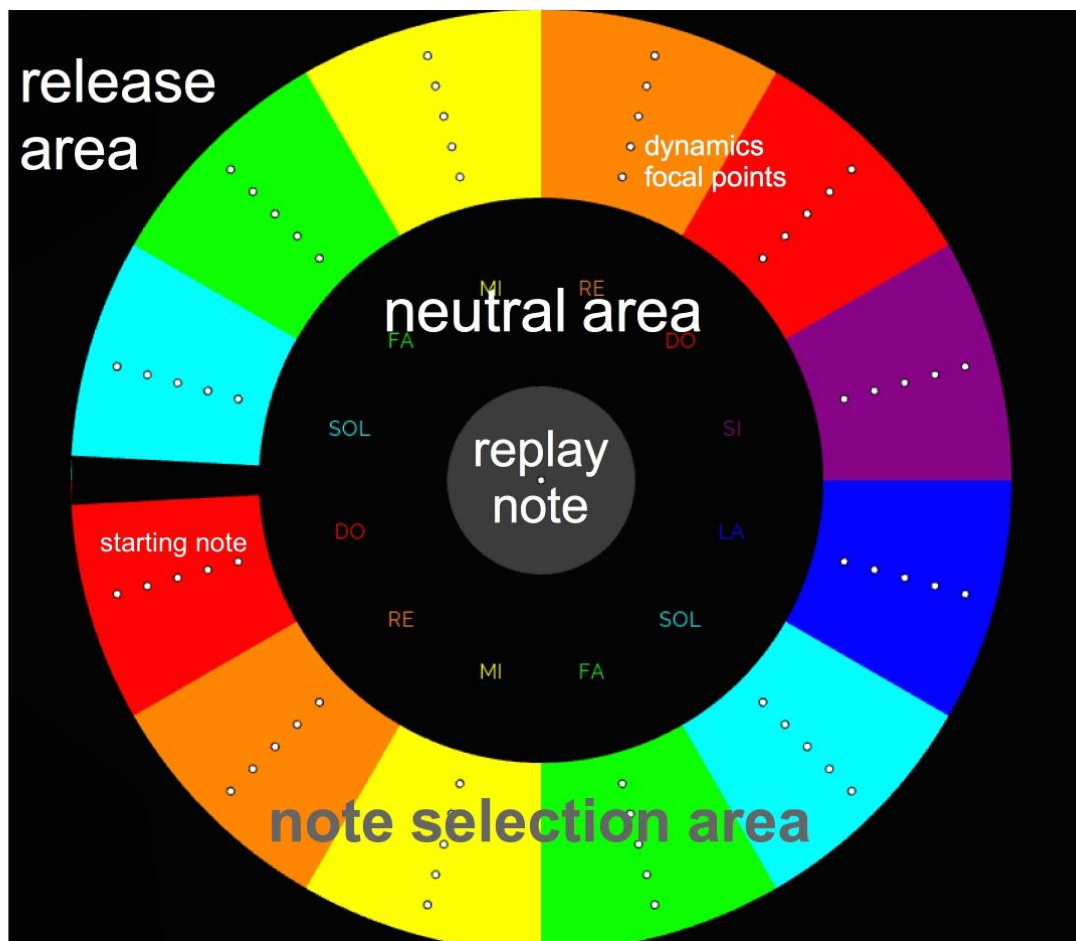
If you activate the distance to volume option, looking at the outer region of the note area will produce louder dynamics, and looking at the inner region of this area will produce softer dynamics. To facilitate dynamic control, four focus points are provided in each note area.

In the inner part of the circle there is a black neutral area where the performer can rest without turning the note off, and also without triggering any new notes. You can search for the right notes by looking at the note names while the sound continues.

To stop notes from playing, simply look anywhere outside the circle (release area).

A replay note button, a grey circle in the center of the pie, will appear when playing notes. This button allows you to easily and quickly play the same note twice consecutively. The same note can be played again and again just by looking at the selection area of a note, then back to the center of the pie and so on. The replay note button disappears when looking at the rest area, or at the release area outside the pie.

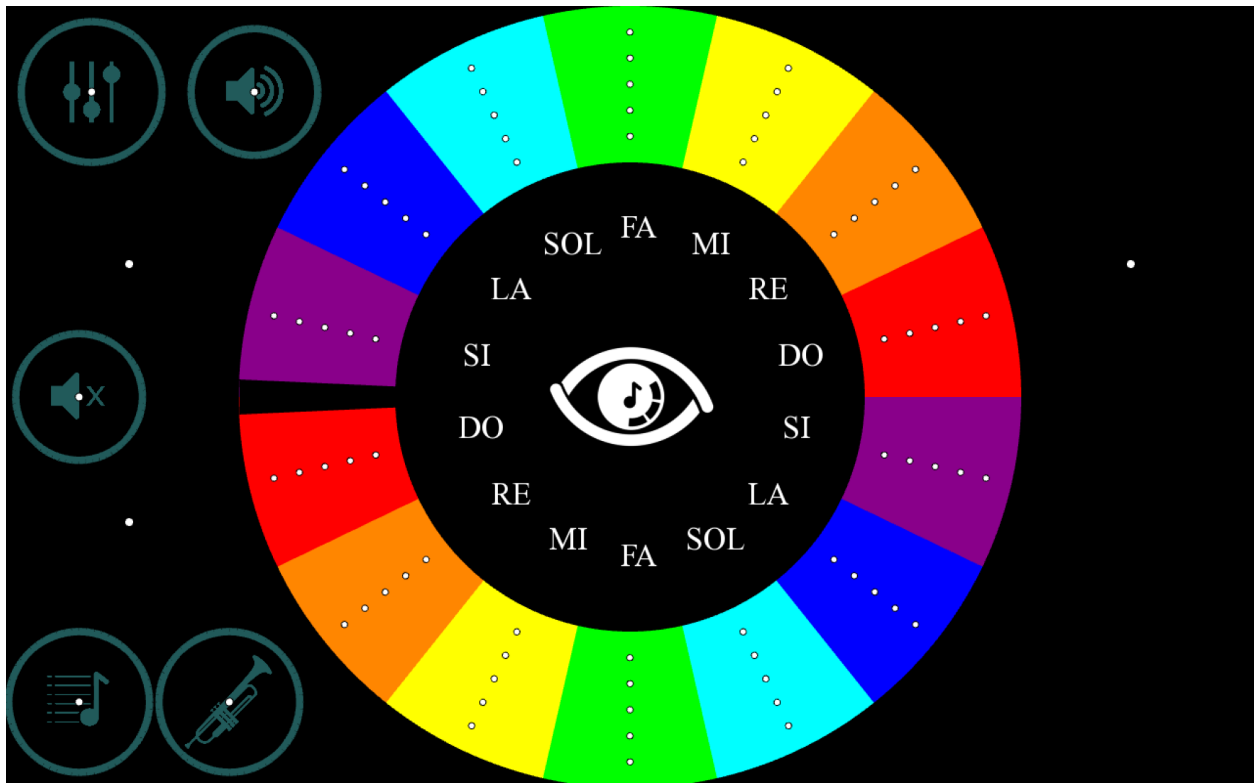
It is possible to deactivate or activate the replay note button under the advanced menu.



Free Mode

In this mode you can play the EyeHarp without assistance from the software, and change the instrument parameters as you wish.

The default settings are C major diatonic scale (only white keys, in piano terms), with a circle of 12 notes, and a piano sound in the middle octave (starting on C4):



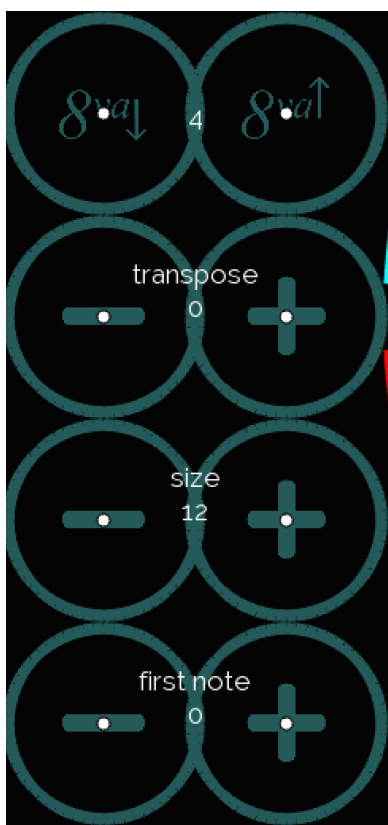
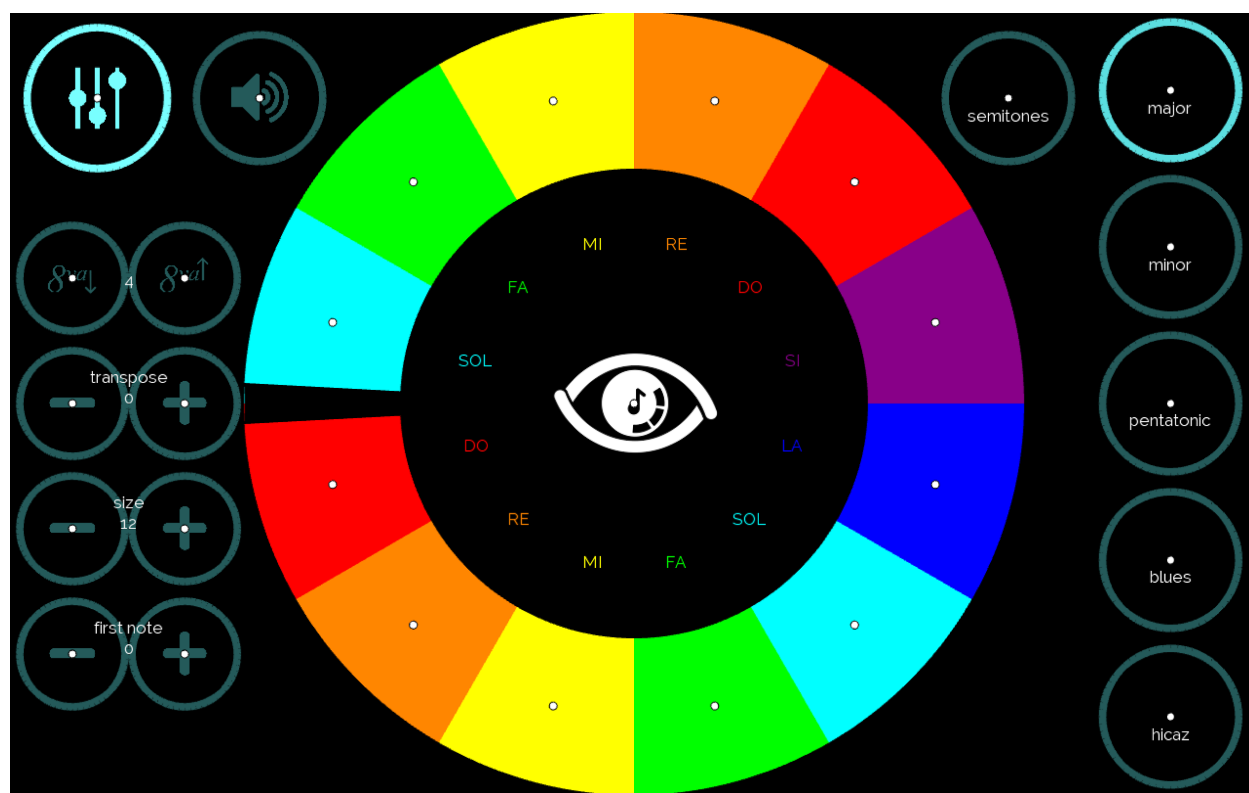
To stop all sounds, select the mute button:



To change the default settings, select settings button:



Two menus will appear:



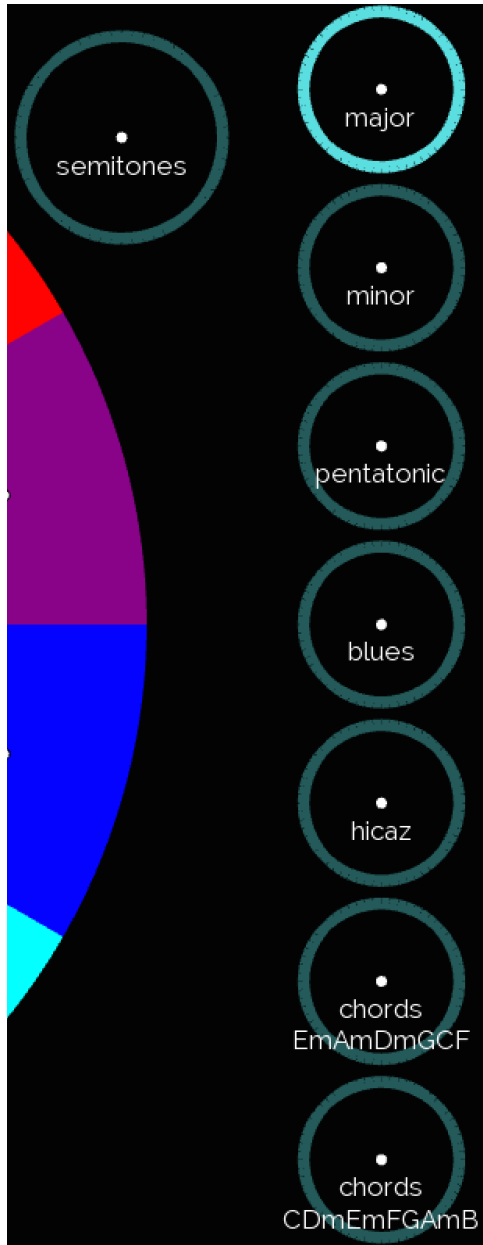
Transpose by octaves

Transpose by semitones

Adjust number of notes

Move starting note (in order of the notes in the scale)

Show or hide semitones



Select scale:

Major

Harmonic minor

Pentatonic

Blues

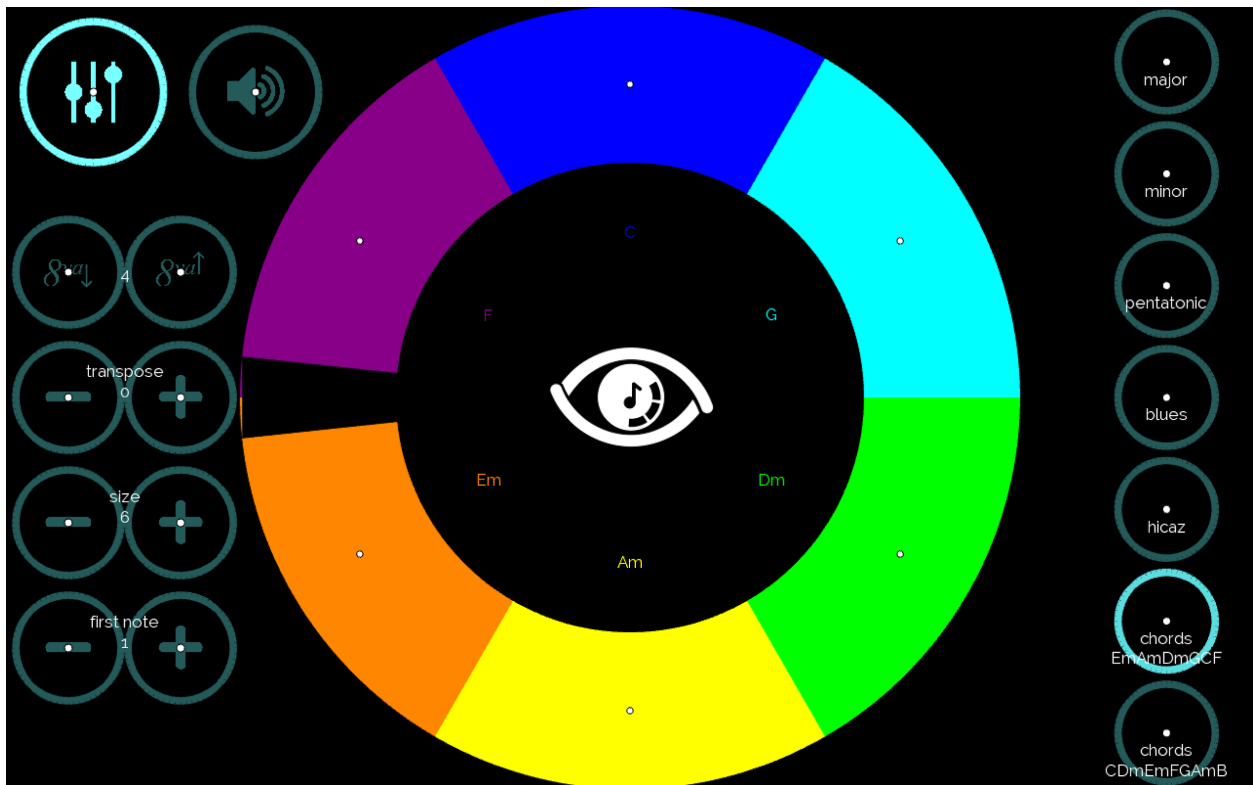
Hicaz (dominant phrygian mode)

Select chord progressions

Advanced users:

To modify the notes of the scales, or to create new scales, go to the scales.txt file, under the AppData folder.

When selecting chords, the interface will show chord letter names, and instead of single notes EyeHarp will play chords.



The chords, their shown name, and the name of the button are set via the chords.txt file, under the AppData folder.

Each line of the text file must begin with the button name, then each chord name with its notes in MIDI values. Each chord must be separated by a comma, no spaces. Notes within the chords are separated by one space. The chords are shown on the circular keyboard in the same order they are written in the text file, from left to right.

For example:

```
chords;I-IV-V,C 60 64 67,F 60 65 69,G 62 67 71
```

In this example the name of the button will be "chords I-IV-V". The circular keyboard will show, and play, C, G, and F in this order.

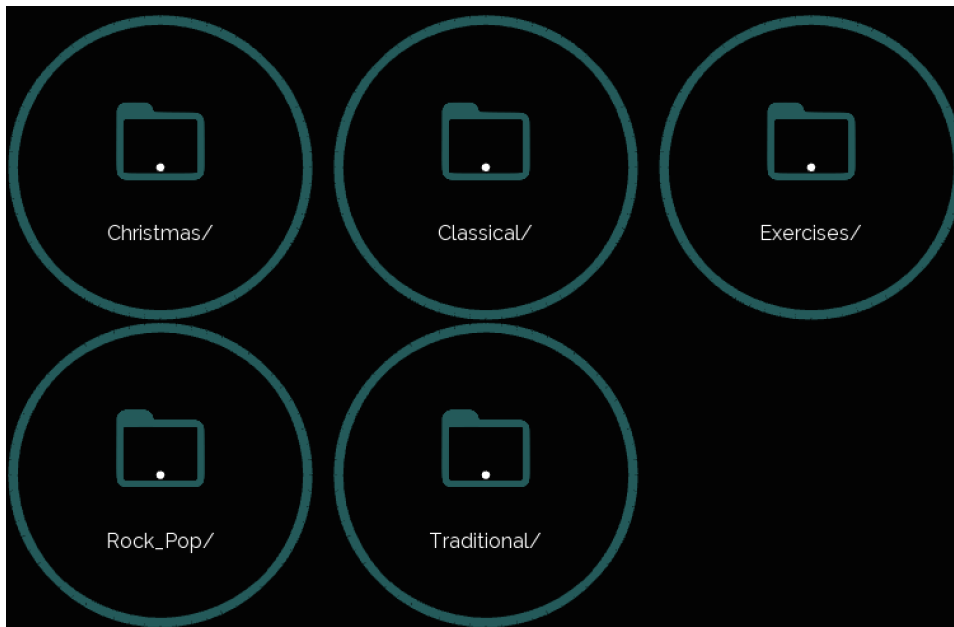
Learning Mode

Use this mode to learn how to play melodies from the EyeHarp's repertoire, with audio and visual assistance.

To play in Learning Mode, load an EyeHarp music score from the catalog. First, select the catalog button:



Then, navigate the folders to find the melody you wish to play:



To continue with the selection, use the rightward arrow button:



To go to back one step, use the leftward arrow button:



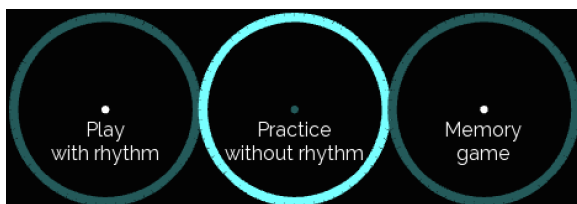
After selecting a music score, choose between the three playing option:

Play with rhythm



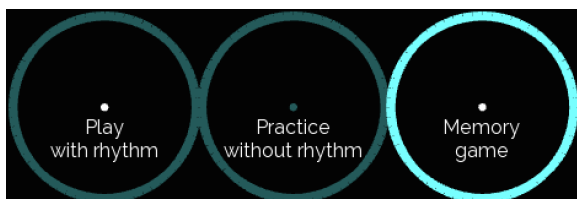
Playing the melody all at once, in tempo, following the visual and/or audio guides.

Practice without rhythm



Practicing the melody freely, with a visual guide.

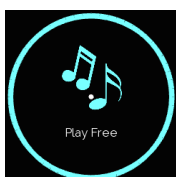
Memory game



Listening to parts of the melody, and repeating them.

To switch between the options after a music score was loaded, select the catalog button, and then the desired option.

To return to Free Mode, select the Play Free button:



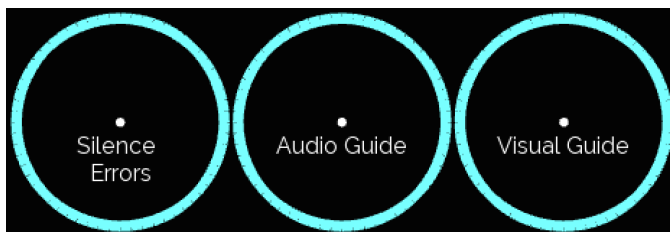
Play With Rhythm

Once a melody is loaded, press play to start playing. Follow the visual guide on the screen, and the audio guide. You can also turn on error silence, so only the notes that are part of the melodies are active and the rest of the notes are muted.

The visual guide shows a round chronometer, which indicates the duration of the note, and an arrow that directs to the following note:

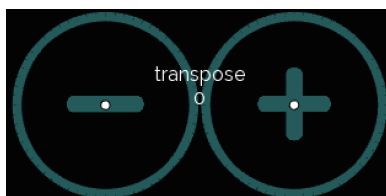
The audio guide includes a metronome and a playback of the melody.

You can activate or deactivate each of these guides and silence errors under the catalog menu:



If the button is highlighted, the option is activated (and vice versa).

Transpose the melody by semitones (+ raises by one semitone, - lowers by one semitone):



On the playing screen, adjust the tempo (+ raises by 5 BPM, - lowers by 5 BPM) :



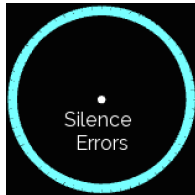
When you finish playing the melody, you will receive the performance stats, including a percentage score.

Practice Without Rhythm

Use this option if you wish to practice a melody freely, without metronome and without receiving a score for your performance. Once a melody is loaded, press play to start practicing.

When practicing, only the visual guide is activated, and the metronome is off. The visual guide follows you. It shows the next note after you play the current note.

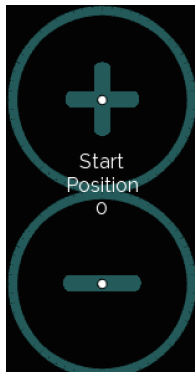
When silence errors is turned on, only the notes that are part of the melodies are active, and the rest of the notes are muted:



To go back to the previous note, use the undo button:

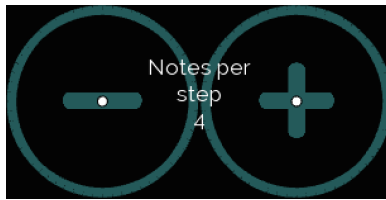


In the playing screen, you can choose the starting position of the melody:



The start position moves by the number of notes per step.

To change the number of notes by which the starting position moves, adjust the notes per step option in the catalog menu:



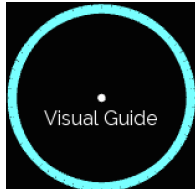
To stop the sound all together, select the mute button:



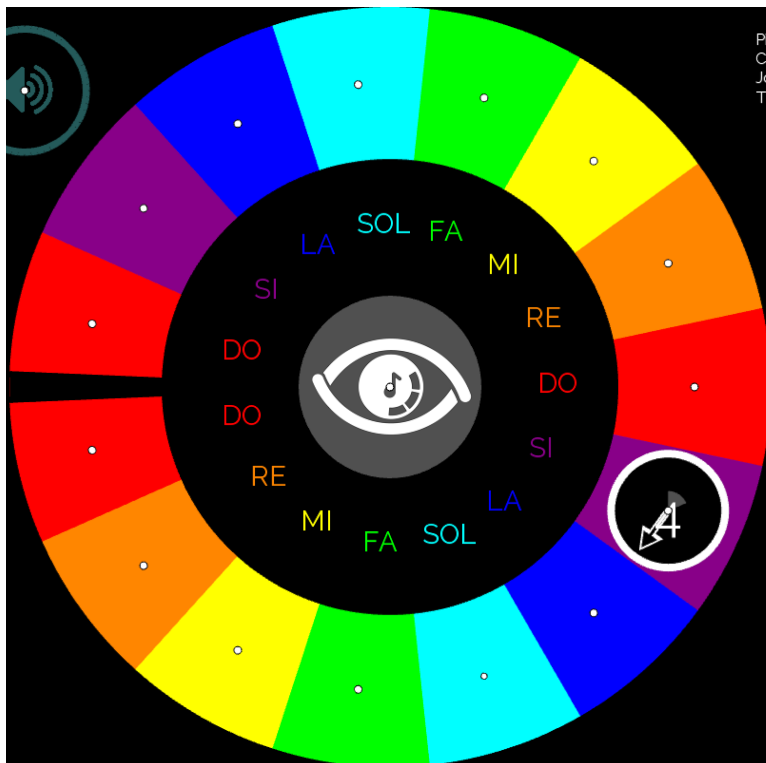
Memory Game

In the memory game, EyeHarp will play the melody in steps of a few notes at the time, and the player needs to repeat the notes, until the melody is completed. Each new step of the melody is added to the previous ones.

Here only the visual guide can be used:



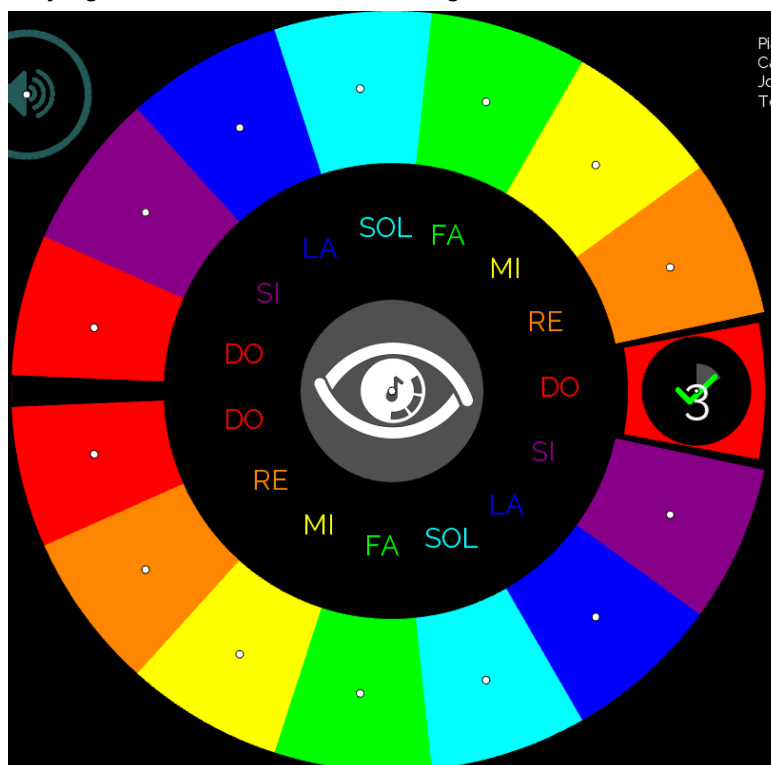
Arrows indicate the next note; the ordinal number of the note is shown as well:



The numbers indicate the overall progress.

With every new step, you need to press play to restart the melody again with the new step.

Playing a correct note will show a green checkmark with the number of the note:



And playing a wrong note will show a red X in the middle:



If you make a mistake, you have to start over.

When each step of the melody is played correctly, a blue checkmark will appear in the middle:



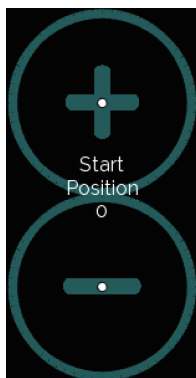
When the melody is finished, a green double checkmark will appear in the middle:



If you want to practice more before continuing the game, simply deactivate the mute button:

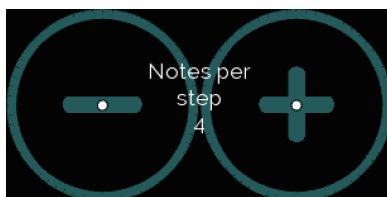


In the game, you can also choose the starting position of the melody:



The start position jumps by the number of notes per step.

Adjust the number of notes played in each step in the catalog menu:



Sounds

The premium version of the EyeHarp comes with a bank of instrumental sounds. The default is piano.

To change sound, go to the instrumental options menu:



Note that this button changes according to the current selected instrument.

Select your desired instrument:



The selected instrument is highlighted (in this picture, piano is selected).

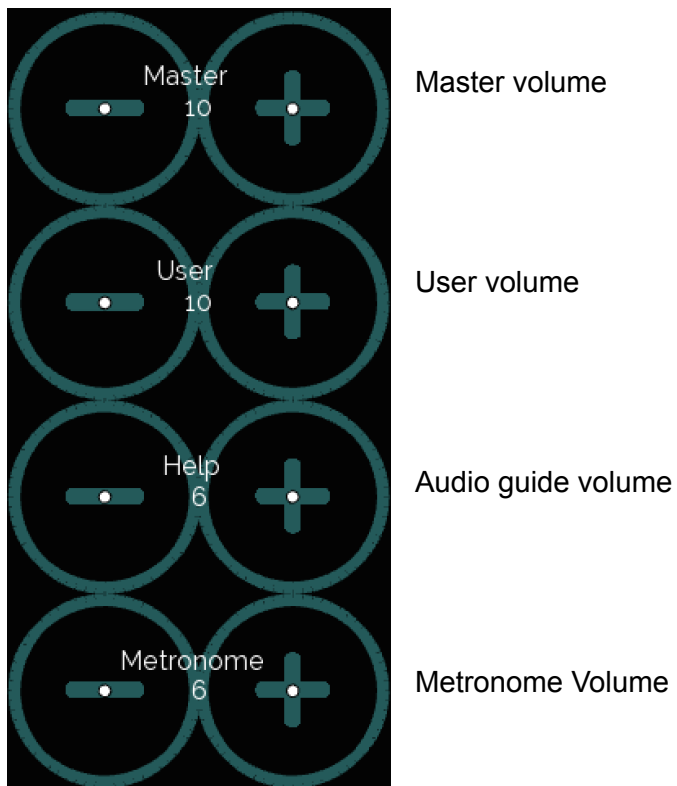
The thick circle indicates instruments that can be used as the audio guide sound. To change the audio guide instruments, select the instrument twice - one time to highlight it and a second time to set it up as the audio guide sound. After the second time, the background of the selected instrument will be grey (like the marimba in the picture above).

Volume

To adjust the volume, select the volume button:



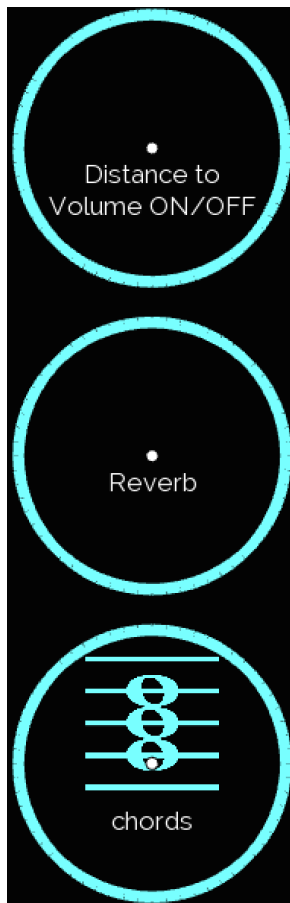
Upon selection, the following options will appear on the screen:



+ to increase the volume, and - to lower the volume. The range of all the options is 0-20.

To hide the volume options, select the volume button again.

More Instrument Options



Activate or deactivate the distance to volume option. When activated, looking at the outer region of the note area will produce louder dynamics, and looking at the inner region of this area will produce softer dynamics (see Playing the EyeHarp section).

Activate or deactivate reverb effect.

Play each note as a chord. The default is a triad (based on scale degrees). You may change the notes of the chords under advanced settings.

If the button is highlighted, the option is activated (and vice versa).

Adjust the range of the instrument:



Raise by one octave

Lower by one octave

Range of EyeHarp instruments corresponds to their true range.

MIDI

EyeHarp can also function as a MIDI controller, with any VST plug-in. You can set any instrument and sound in the VST plug-in, such as [Kontakt](#), with one sound per MIDI channel.

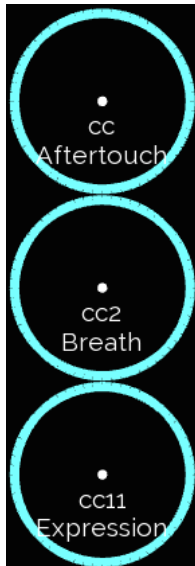
Remember, a MIDI controller does not produce any sound. It only sends control messages to another external synthesizer or virtual instrument.

To set-up the EyeHarp as a MIDI controller, it is required to install [LoopMIDI](#), a free virtual MIDI port.

In LoopMIDI, you will need to create a new MIDI port called eyeharp (single word, all lowercase). The EyeHarp will automatically identify this MIDI port. Also, make sure to deactivate the feedback-detection, under the LoopMIDI Advanced tab.

Once LoopMIDI is installed and configured, open EyeHarp, and select **MIDI OUT** under advanced settings.

In addition, you can use additional MIDI controllers with EyeHarp. When MIDI out is activated, a selection of controllers will appear:

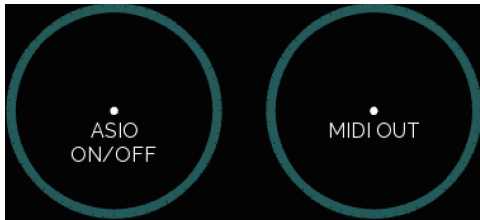


Advanced Settings

Access the advanced settings through the instrumental options menu, selecting the cog button:



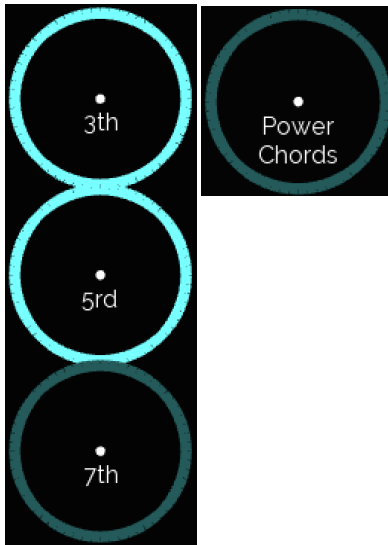
Audio and Sound Settings



Select sound
card

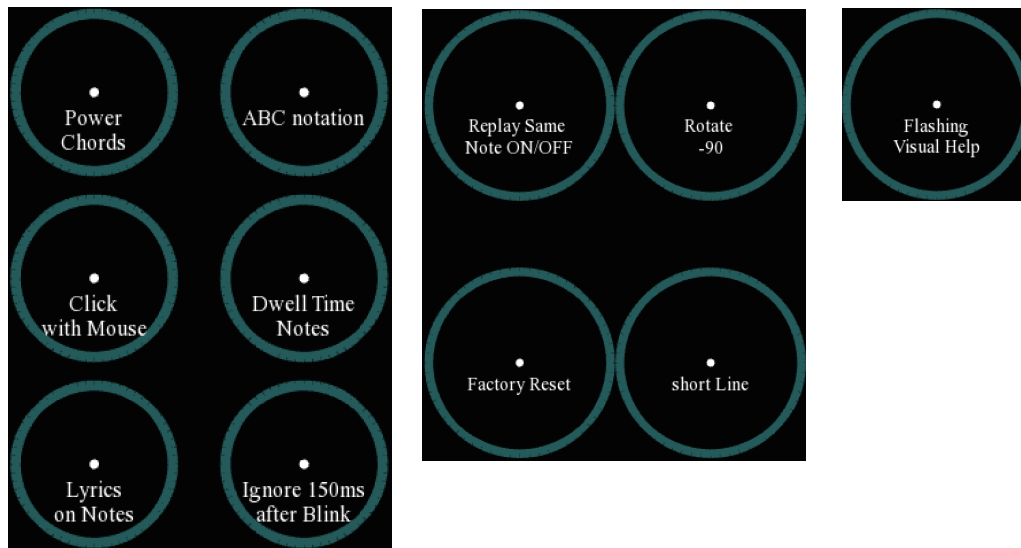
Activate or deactivate
MIDI output

Select chord notes or type of chord (when playing chords is activated):

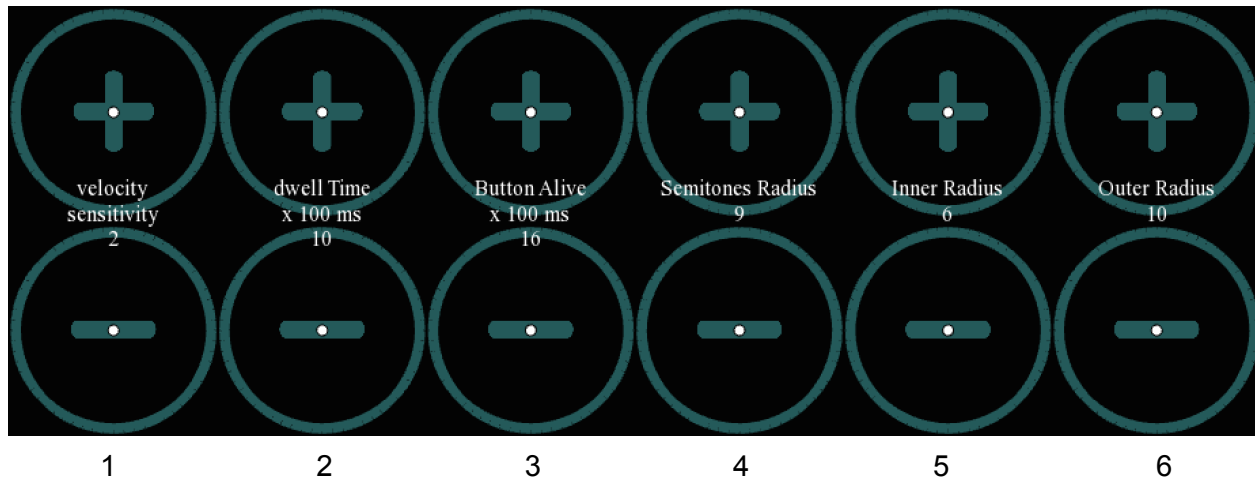


The highlighted intervals will be included in the chord (and vice versa).

EyeHarp Appearance and Control

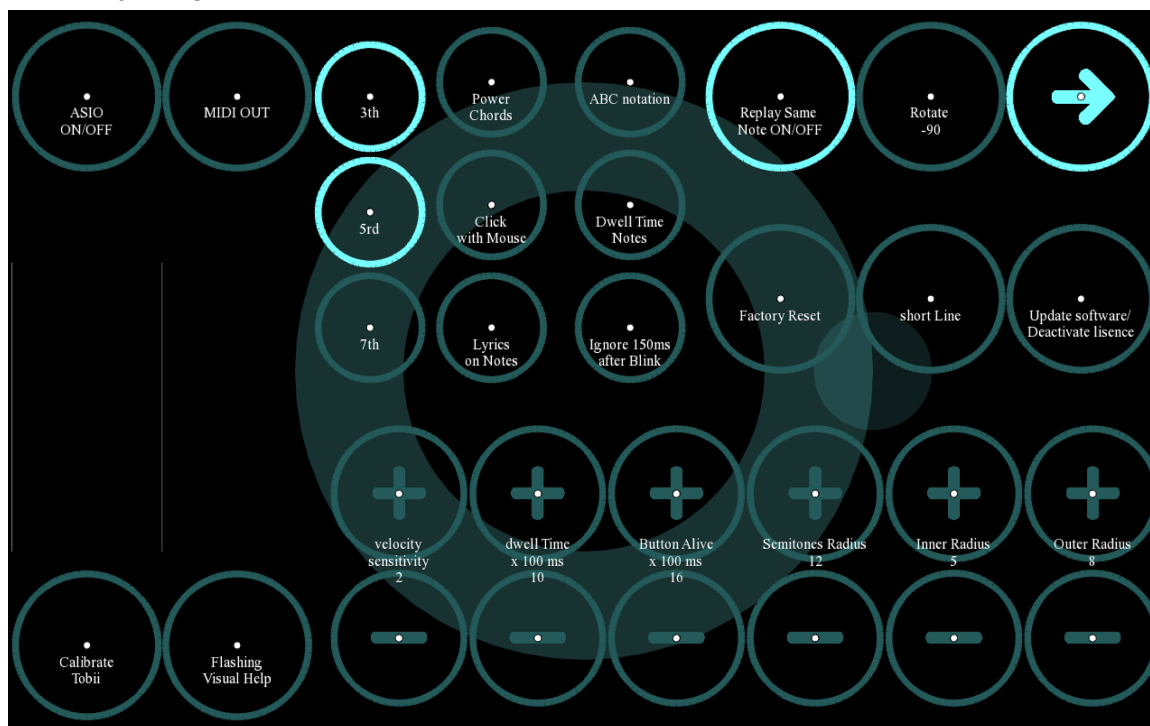


- **Click with Mouse:** Switch between dwell time or mouse left-clicks button selection. When this option is highlighted, selecting buttons in the app is done by clicking with the mouse. When this option is not highlighted, selecting buttons in the app is done by dwell time (the default mode).
- **Lyrics on Notes:** Shows lyrics when playing songs. Only for songs that have lyrics written in their score.
- **ABC Notation:** Choose between ABC notation and solfege notation. When ABC notation is selected, the notes in the circle will show as C, D, E, etc. When ABC notation is off, the notes in the circle will show as do, re, mi, etc.
- **Dwell Time Notes:** Activate or deactivate the option to select notes on the circular keyboard with dwell time, the same way as buttons
- **Ignore 150ms after Blink:** Ignores the first 150 milliseconds after the gaze is lost (which happens after a blink). Might reduce responsiveness.
- **Replay Same Notes ON/OFF:** Activate or deactivate the repeat note button in the center of the circle.
- **Rotate -90:** Rotate the EyeHarp circle by 90 degrees so the starting note is on top.
- **Short Line:** Use a short line for the visual guide.
- **Flashing Visual Help:** Makes the visual guide flash in red.



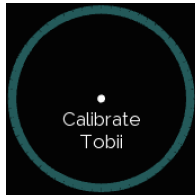
1. Adjust the sensitivity of dynamic control (when distance to volume is activated). Higher velocity sensitivity (max. 3) will expand the dynamic range of each note button. Lower velocity sensitivity (min. 1) will reduce the dynamic range.
2. Adjust the amount of dwell time in milliseconds needed to select buttons.
3. Adjust the duration the button is still active.
4. Adjust the radius of the semitones.
5. Adjust the radius of the inner EyeHarp circle.
6. Adjust the radius of the outer EyeHarp circle.

When adjusting to the radius, a circle will appear on the screen to show the new size:



Other Software Settings

Calibrate Tobii eye tracker directly from EyeHarp:



Restore all settings to default (requires to select twice):



Software updates or manage license:



Keyboard Shortcuts

Below, EyeHarp key commands listed according to category. Pressing 'alt + h' will display the keyboard shortcuts on the EyeHarp.

General	
Alt + h	Show or hide shortcuts
Alt + m	Switch between mouse and gaze control
Alt + k	Disable or enable dwell time button selection
Shift + F	Full screen on or off
Alt + n	Show or hide gaze indicator
4	Octave up
r	Octave down
5	Transpose half-step up
t	Transpose half-step down
Alt + l (lowercase L)	Lock and unlock buttons
Esc	Quit EyeHarp
Learning Mode	
,	Play or restart
.	Stop
1	Increase tempo
q	Decrease tempo
Shift + H	Audio guide on or off
j	Visual guide on or off
Alt + Shift + V	Slave ¹ mode on or off
→	Next note (only in slave mode)

¹ Slave mode can be activated in the play free mode. It allows the music teacher to advance the notes of the performance using the arrows of the keyboard.

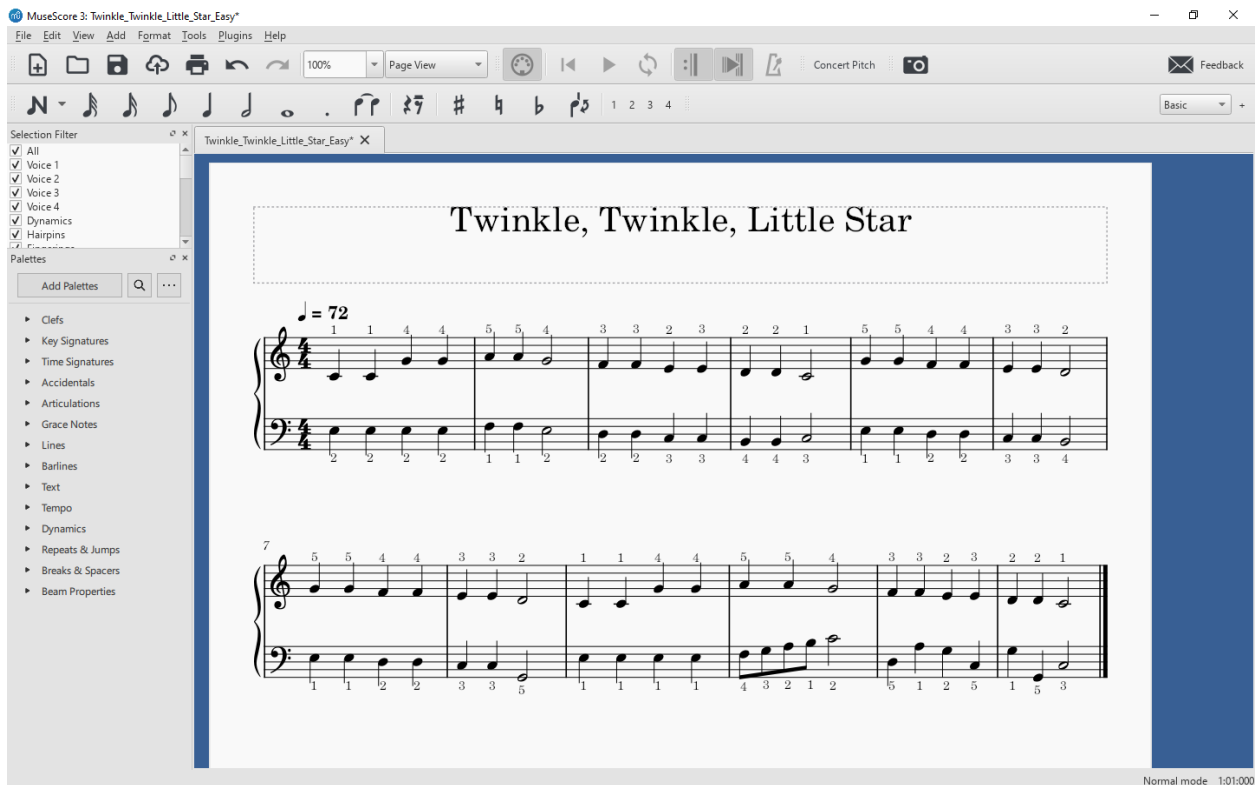
←	Previous note (only in slave mode)
Free Mode	
2	Increase number of notes
w	Decrease number of notes
3	Starting note up
e	Starting note down
Mixer	
↑	Master volume up
↓	Master volume down
0 (zero)	User volume up
p	User volume down
9	Metronome volume up
o	Metronome volume down
8	Audio guide volume up
i	Audio guide volume down
Advanced	
c	Increase visual guide speed
d	Decrease visual guide speed
Shift + T	Flashing target on or off
Atl + v	Increase gaze buffer time
Alt + f	Decrease gaze buffer time
Alt + Shift + M	Metronome view on or off
Alt + Shift + D	Show or hide debug info
Shift + C	chronometer colors on or off
Alt + r	Rotate circle
b	Increase dispersion factor

g	Decrease dispersion factor
a	Increase circle center radius
z	Decrease circle center radius
s	Increase outer circle radius
x	Decrease outer circle radius
7	Increase maximum key velocity (distance to center)
u	Decrease maximum key velocity (distance to center)
6	Increase minimum key velocity (distance to center)
y	Decrease minimum key velocity (distance to center)

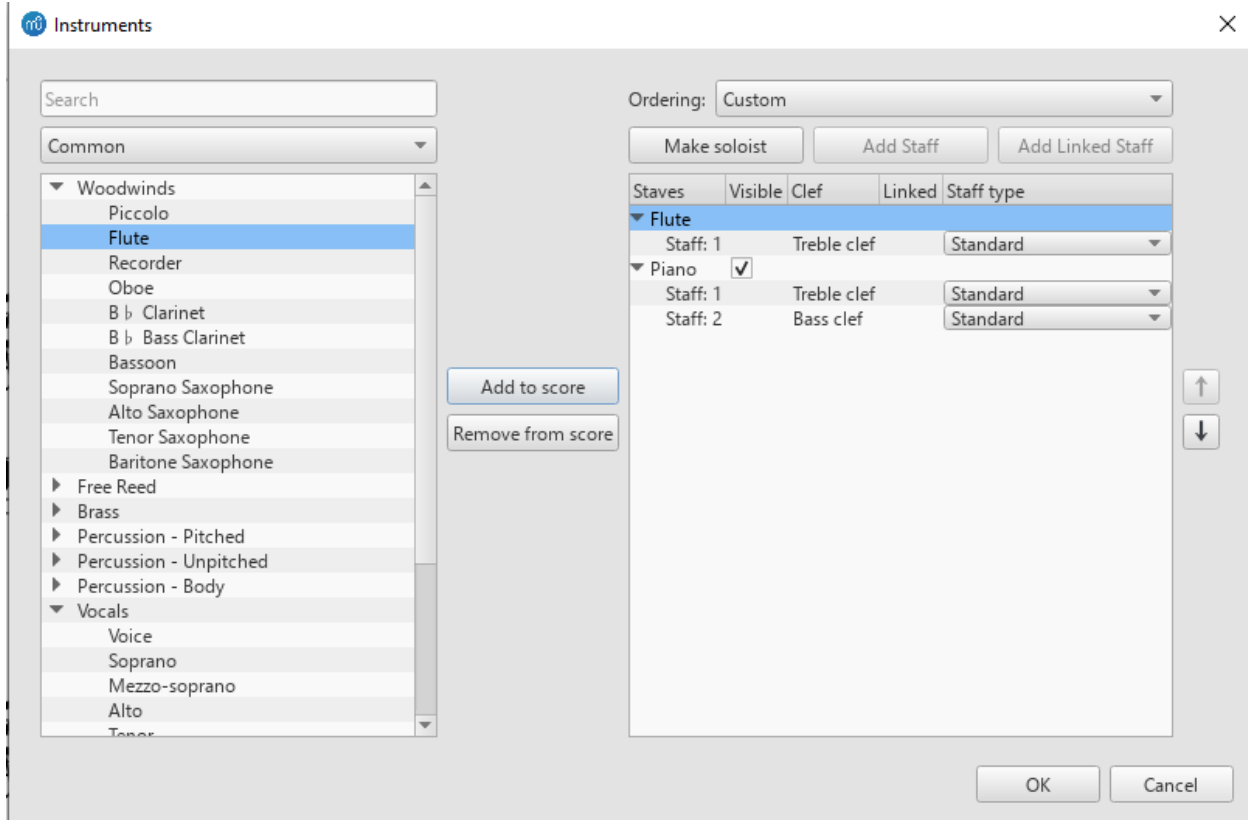
Creating scores

In order to create your own EyeHarp scores, you will need [Musescore](#) free music notation software.

1. As an example let's download from the musescore online database the song [twinkle twinkle little star](#). Download in musescore format and open in musescore software.



2. We need to change the staff names to names that EyeHarp software recognises. Create a new staff and rename it to "Eye". This will be the part that the user will play. In order to create a new staff go to edit → instruments. Then select any instrument you like, such as Woodwinds → Flute and select *add to score*. If you wish, move this staff to the top, for better visualization, using the arrow on the right of the screen.



3. Rename the Flute part to “Eye”: double click on the word Flute or right click on the first bar of the staff and select Staff/Part properties. On the Part name field, replace Flute with Eye. Optionally you can also change the long and short instrument names as well. Then click on *apply* and press on the arrow down button at the bottom left of the window.
4. You are now editing the select instrument for the accompanying part in the EyeHarp. The recognised instrument names are the following:
 - **Piano**
 - Drum Kit
 - Flute
 - Oboe
 - Clarinet
 - Trumpet
 - French;Horn
 - Saxophone
 - Violin;(arco)
 - Violin;(pizz.)
 - Cello;(arco)
 - Cello;(pizz.)
 - **Contrabass**
 - Marimba

- **Harp**
- Glockenspiel
- Xylophone
- Vibraphone
- **Organ**
- Accordion
- Acoustic;Guitar
- Electric;Guitar
- Distortion;Guitar
- Electric;Bass
- Banjo

Due to song quality issues, we advise mostly using the instruments that are in bold. So, let's say we want to change the accompanying instrument from piano to harp. To do this, just rename the part name to *Harp* and press apply and then OK.

This is how the score should look now:

Twinkle, Twinkle, Little Star

The musical score is titled "Twinkle, Twinkle, Little Star". It features two parts: "Eye" and "Harp". The "Eye" part is a single staff with five whole notes. The "Harp" part consists of two staves (treble and bass clef) with a sequence of notes and fingerings. The tempo is marked as quarter note = 72.

5. Copy paste or create the *Eye* part. In this example we just copy past the part on the Sol key of the Harp part. To do that, select all notes of this part and copy / paste on the Eye staff.

Twinkle, Twinkle, Little Star

♩ = 72

Eye

Harp

- Now you can delete the sol key of the Harp part. Go to Edit → Instruments, select the Piano → Staff 1 and click on *Remove from score*. Then click on OK.

instruments

Search

Common

- Woodwinds
 - Piccolo
 - Flute
 - Recorder
 - Oboe
 - B ♭ Clarinet
 - B ♭ Bass Clarinet
 - Bassoon
 - Soprano Saxophone
 - Alto Saxophone
 - Tenor Saxophone
 - Baritone Saxophone
- Free Reed
- Brass
- Percussion - Pitched
- Percussion - Unpitched
- Percussion - Body
- Vocals
 - Voice
 - Soprano
 - Mezzo-soprano
 - Alto
 - Tenor

Add to score

Remove from score

Ordering: Custom

Make soloist

Add Staff

Add Linked Staff

Staves	Visible	Clef	Linked	Staff type
Flute	<input checked="" type="checkbox"/>			
Staff: 1		Treble clef		Standard
Piano	<input checked="" type="checkbox"/>			
Staff: 1		Treble clef		Standard
Staff: 2		Bass clef		Standard

OK

Cancel

- Your score should now look like this:

Twinkle, Twinkle, Little Star

The image shows a musical score for the song 'Twinkle, Twinkle, Little Star'. It is written for two parts: 'Eye' (treble clef) and 'Harp' (bass clef). The time signature is 4/4 and the tempo is marked as 72. The score includes fingerings (1-5) for each note. The Eye part starts with a quarter note G4, followed by quarter notes A4, B4, and C5. The Harp part starts with a half note G3, followed by half notes F3, E3, and D3. The score continues with various intervals and fingerings for both parts.

Save the file in the musescore scores folder. Goto File → save and navigate to the folder you wish to save your musescore scores. You will need to open this file again if you wish to modify the score.

8. Just for the first time you create a score you need to make the folder C:\ProgramData\EyeHarp\ editable. To do that, open windows file explorer and go to C:\. Under the View menu, make sure the option *hidden items* is enabled. Then double click on *ProgramData*. Once in C:\ProgramData, right click on the EyeHarp folder and select *properties*. Then select the *security* tab and click on *Edit*. Click on *Users* and click on the *full control / Allow* checkbox. Then click on OK.
9. Go back to Musescore software and go Export to midi: Goto File → Export and on the drop down list select *MIDI* and then *export*. Navigate to the folder C:\ProgramData\EyeHarp\catalog. In this folder and subfolders you can place your eyeharp scores. Create a new folder named *myScores* and export the midi file.
10. Now we should create an xml file that describes our new song. Open the file browser and navigate to C:\ProgramData\EyeHarp\catalog\myScores. Under View, enable the *file name extensions* option. Now from the home tab of the file browser, select *new Item* → *text document*. Name it as *1-Twinkle twinkle.xml*. The number 1 indicates the difficulty level of the score.
11. Open the xml file. We recommend installing and using notepad++ in order to edit the xml files. Nevertheless, the windows notepad can be used as well. Then paste the following text:

```
<song>
  <level>1</level>
  <title>Song Title</title>
  <composer>Composer Name</composer>
  <midiFile>myMidi.mid</midiFile>
  <minimumRest>2</minimumRest>
  <mp3File></mp3File>
  <mp3OffsetMS></mp3OffsetMS>
  <tonality>C</tonality>
  <tempo>60</tempo>
```

```

    <transpose>0</transpose>
    <countDown>4</countDown>
    <metronome>
      <length>4</length>
      <loop>
        <note> 2,41,0.7,100,1 </note>
        <note> 2,44,0.7,80,2 </note>
        <note> 2,44,0.7,80,3 </note>
        <note> 2,44,0.7,80,4 </note>
      </loop>
    </metronome>
  </song>

```

12. Replace the required fields in order to match our current song:

```

<song>
  <level>1</level>
  <title>Twinkle Twinkle</title>
  <composer>Wolfgang Amadeus Mozart</composer>
  <midiFile>Twinkle,_Twinkle,_Little_Star.mid</midiFile>
  <minimumRest>2</minimumRest>
  <mp3File></mp3File>
  <mp3OffsetMS></mp3OffsetMS>
  <tonality>C</tonality>
  <tempo>60</tempo>
  <transpose>0</transpose>
  <countDown>4</countDown>
  <metronome>
    <length>4</length>
    <loop>
      <note> 2,41,0.7,100,1 </note>
      <note> 2,44,0.7,80,2 </note>
      <note> 2,44,0.7,80,3 </note>
      <note> 2,44,0.7,80,4 </note>
    </loop>
  </metronome>
</song>

```

13. Save the file.

14. Open your song in the EyeHarp and play.

Adding an mp3 file to accompany the performance

There is also the possibility of adding an mp3 file that would accompany the performance of the user. This audio should be recorded using a metronome, otherwise it will not be synchronized with the performance of the user. The mp3 file goes in the same folder as the xml file. The name of the mp3 file is given in the <mp3File> field. The field <mp3OffsetMS> the given number of milliseconds from the beginning of the mp3 file. This allows removing the silence that might exist at the beginning of a recording in order to make the user's performance to start at the same time with the recording.

Now let's describe what is the function of the rest of the labels in the xml file.

- **minimumRest:** A number that defines the minimum rest to be imported in the user's melody. For example if minimumRest is set to 2, then any rest smaller than 2 quarters will be ignored, and its value will be added to the duration of the previous note. This number can be a real number such as 0.66.
- **tonality:** Defines the tonality of the imported midi file. The notes that belong to the given major scale tonality will appear as normal keys in the EyeHarp wheel, while the rest of the notes will appear as semitones (circles in the outer region). It takes one of alphabetical Musical Notation values: A B C D E F G. This corresponds to the major scale of the defined note. The minor scales are defined using the relative major scale. For example if a piece is in B minor, the right value in the tonality field would be D.
- **transpose** applies a transposition in semitones to the given midi file.
- **countDown** defines the number of beats the will show up before a performance starts in the *play with rhythm* mode.
- The **metronome** field defines a rhythmical loop that would accompany the performance in the *play with rhythm* mode. The **length** subfield defines the length in quarters of the loop. This value can only be an integer. The **loop** subfield consists of the **note** subfields. Each note takes 5 values separated with a coma. These values are:
[instrument],[midi note value],[duration],[volume],[onset time]
 - **Instrument** is an integer number that defines the instrument accenting number in the order that they appear in the EyeHarp's instrument catalog. The common value is 2, as this value corresponds to the drum kit instrument.
 - The **volume** takes values 0-127 and defines the midi velocity of the note that affects the volume of the note.
 - **Onset time** defines the position of the note in the loop. It takes values 1 to loop length + 1.