iWhistle

(1.0)

1 INTRODUCTION

1.1 Program Identity Map

Program Name: iWhistle
Program Release: 1.0
Date of the Release: February 2016
Development: Joël Bouchat
E.Mail   bouchat@hotmail.com

1.2 Overview

If you are really bad in playing music with any instrument, but you can roughly whistle, this little application might be for you.
iWhislte will record yourself whistling, extract the tones and display them on the screen.
Next you can edit the 'score' and play it with any instrument that your PC can synthesize. When you are happy with the result, you can save your work in the standard '**MIDI**' format. '**MIDI**' stands for 'Musical Instrument Digital Interface'. This way your score can be exported to any 'MIDI' compatible Player/Editor for further performance.

1.3 Legal Status

iWhistle has been designed and developed by Joël Bouchat who holds all ownership rights.
It is a freeware that may be copied and distributed royalty-free for **non-commercial use**.
iWhistle software is provided on an "as is" basis without any warranty.
Under no circumstances will Joël Bouchat be liable for damages arising from the use of **iWhistle.**

2 GETTING STARTED

2.1 Set-up

Run the "iWhistle01Setup.exe" package to install the software on your PC. The procedure is very simple. You just need to accept the license agreement and eventually modify the program location if you wish. At any moment, **iWhistle** can be uninstalled using the standard Windows© control panel.

2.2 Documentation

The main documentation is this document. A 'Readme.txt' file is also available in plain text format.
Moreover a '**Help Mode**' is available within the application to get **tips and tricks** when hovering the mouse cursor over some items.

2.3 Required Hardware

iWhistle runs on a PC with Microsoft Windows© XP SP3, 7, 8 and probably 10.
Of course, this PC must have Audio output and input facilities, preferably with a microphone!
A MIDI output device is also necessary but this is not a problem since Windows© comes with a MIDI synthesizer (mapper) that will be used as the default MIDI output device.

2.4 First use

For a first use, the program can be automatically launched next to the installation and a program icon is created on your desktop. To start using **iWhistle** click on the 'C**apture**' button to open the **'Audio Source'** pop-up dialog box. Choose the Microphone as your audio source and click on **'Open Peripheral'**. The '**Recording**' indicator will blink until you start whistling. To stop the capture click on the "capture" button again, the label of which is now '**stop capture**'.
This first recording will probably be less than perfect! You may have to adjust the Microphone audio level. This can be done from the "Audio Source" dialog box or from your PC Control Panel when necessary.
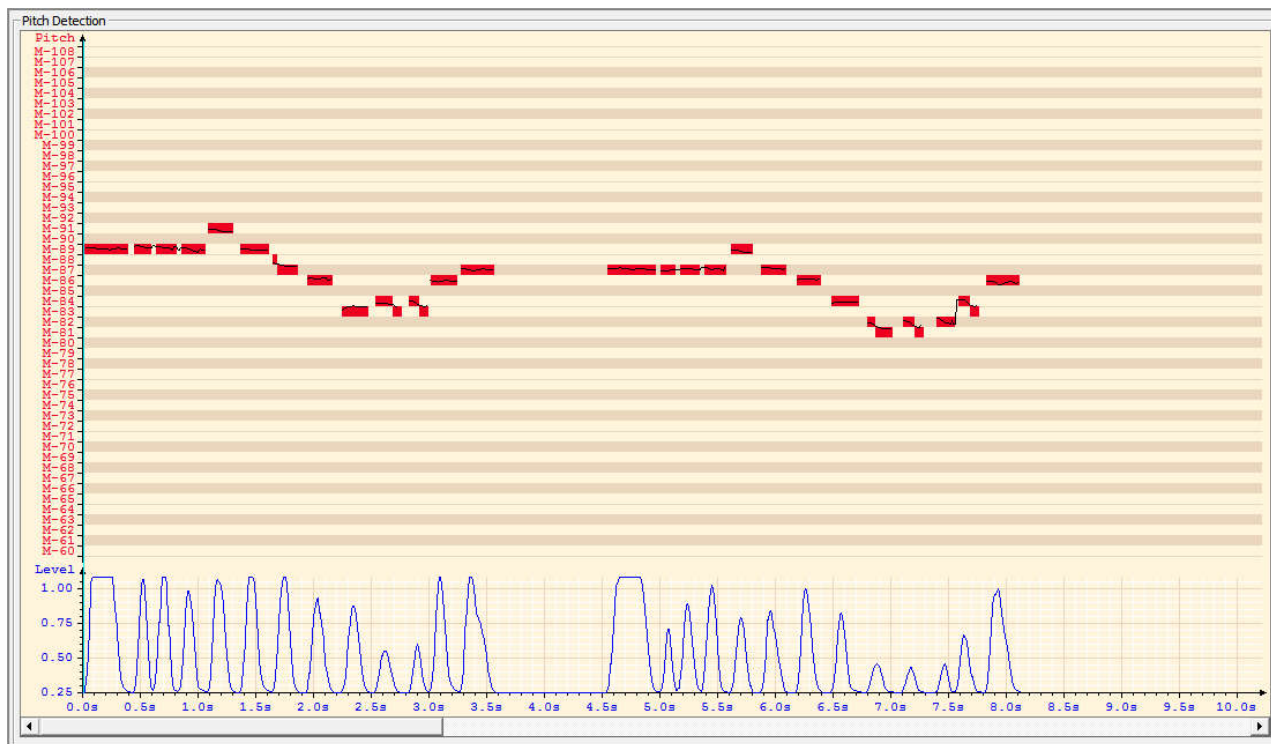Avoid blowing straight into the microphone, this creates windy noises that affect the analysis.
Avoid **'Tremolo' or 'Vibrato'**, this will spoil the capture!
Remark: to make things simpler you could as well click on the '**Open File**' button in the '**Audio Source**' dialog box and choose a '.wav' file provided within this package in the '**examples**' folder.

3.1 Score Sheet

The score sheet is a time scale diagram. It is divided in two parts:

- At the bottom the '**Level**' diagram shows the amplitude of the audio signal which has been captured. The **level** is rated between 0.25 and 1. This corresponds to a range of approximately **24 dB**. It is advisable to stay within this level range when whistling. Adjust the '**Gain**' slider inside the "Audio Source" dialog box for this purpose. Some saturation is not really a problem since the analyzer only cares about the fundamental frequency, not the harmonics, and some distortion does not really matter.

- The '**Tones**' extracted from the capture are the red bars displayed above.

- The **thin irregular black line** shows the true signal frequency.

- The **frequency range** covers four octaves (C4 -> C8 = 261.625-> 4186.00 Hz). This is more than enough for a whistler!

The sheet displays only 10 seconds of audio, but the score automatically scrolls when the capture exceeds this duration.

3.2 Notation

The score frequency scale can be expressed in several format:

- **Letter** notation:
  C, C#, D, D#, E, F, F#, G, G#, A, A#, B

- **Latin** format:
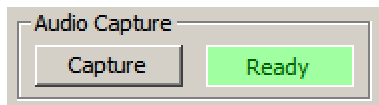 Do, Do#, Ré, Ré#, Mi, Fa, Fa#, Sol, Sol#, La, La#, Si
- **MIDI** note code numbers:
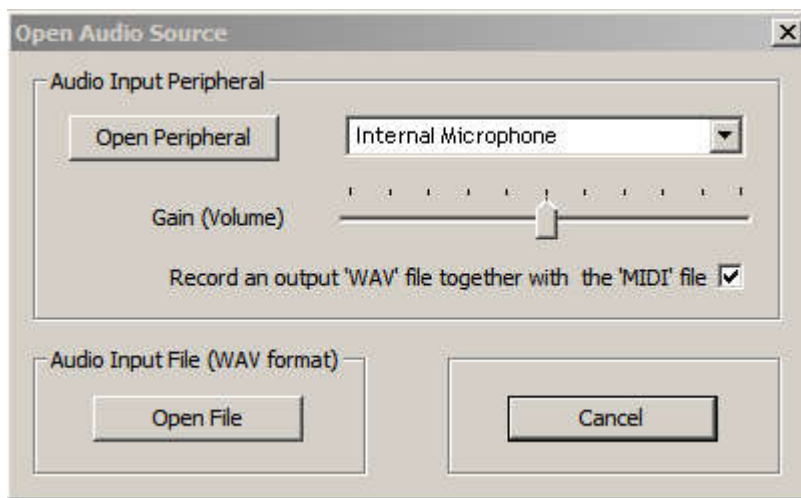 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, …
- Note Audio **Frequencies**:
  261.63,277.18,293.66,311.13,329.63,349.23,369.99,392.00,415.30,440.00,466.16,493.88, …

3.3 Audio Capture

Click on this button to access the '**Audio Source**' pop-up dialog box.

Two different Audio sources are available: an **Audio Input peripheral** or an **Audio File**:

- An **Audio Input peripheral** which can be chosen among the peripherals present on your PC.
  Most often the Microphone will be selected. The "Gain", this is to say the audio level, can be adjusted with a slider, but it is advisable to set correctly the microphone sensitivity first, using the Windows© Control Panel. Set the sensitivity in such a way that the signal amplitude stays between 0.25 and 1. Some saturation is not really a nuisance since **iWhistle** only cares about the fundamental frequency, not the harmonics.

- When the check-box 'Record an output 'WAV' file' is selected, a 'WAV' file will be created when the 'MIDI' file is stored on the disk. This file has the same name as the one chosen for the 'MIDI' file but with a '.wav' extension. This option is very interesting, it permits to redo the capture later with different parameters or after having processed the audio file with an audio editing tool.

- An Audio File, present on your PC. This audio file must be a .wav' file.
  It could be a file created by **iWhistle** or by another tool.

Once that the 'Open Peripheral' button is pushed, or an input file is selected, the audio capture starts. The label of the (depressed) '**Capture**' button is now '**Stop Capture**' and the green '**Ready**' indicator becomes a blinking orange '**Recording**' indicator. It stops blinking when a significant audio signal is detected. To terminate the capture, click on 'Stop Capture'.

While the capture is going on, the 'level' diagram is updated and the music notes are extracted and displayed in real-time.

3.4 Editing the Score

The tone bars representing the music notes are not static. They can be moved and modified to fix the flaws:

- By clicking with the mouse on a **Tone Bar**, you can **move** each note vertically. This modifies its **frequency**. You can also move it horizontally, to modify the **tempo**.
  To lock the horizontal displacement while moving a note vertically, press and hold the **'shift'** key on your keyboard while moving the mouse. You can also use the Up and Down arrow keys.
- When a bar is moved horizontally and it reaches the next or the previous tone, a pop-up message asks you if you want to **merge** both notes.
- You can modify a note **duration** by selecting an extremity of the Tone Bar. The mouse cursor is changed into small arrows ' |-> ' or ' <-| ' indicating the direction. Notice than the note can never outpass its own 'time gap': polyphony is not possible!
- To **split** a note, **right-click** on its tone bar. The tone is cut in its middle, but you can easily modify the duration of each part.
- You can capture a whole **set of notes** within a rectangle. Those notes can be moved all together. Once that a group of notes have been moved, they are automatically replayed for judging the adequacy of the modification.
- A single note or a set of notes can be deleted by pressing the **'Delete'** or **'Ctrl x'** keys. The time gap left after the deletion can be removed. To **'UNDO'** the last operations, use the **'Ctrl z'** keys and **'Ctrl y'** to **'REDO'**.

3.5 The cursor

A thin vertical sky blue vertical line is present on the score sheet: this is the 'cursor'. The cursor is automatically placed at the beginning of the last modification. When you play the score - see § 3.6 - it is most often played from the cursor position. Therefore, moving the cursor is important to listen to specific parts of the musical work.

They are several ways to move the cursor:

- With the mouse: when you click on the score without creating a selection rectangle, the cursor is moved to this location. You can also click on the thin blue line when the cursor is changed into a double arrow ' <-|-> ', which indicates that the cursor can be captured and moved.

- With the keyboard. The following keys move the cursor:

  - The **right arrow** ' -> ' moves the cursor one pixel to the right.
  - The **left arrow** ' <- ' moves the cursor one pixel to the left.
  - The **right Tabulation** ' ->| ' moves the cursor at the beginning of the next tone bar
  - The **left Tabulation** ' |<- ' moves the cursor at the beginning of the previous tone bar
  - The **'Home'** key resets the cursor position at the beginning of the score.
  - The **'End'** key sets the cursor at the end of the score.

3.6 Playing the score
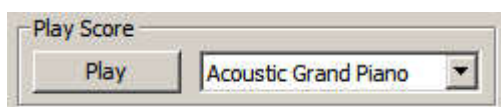
The score can be played with any instrument synthesized by your MIDI emulator.
Most often the 'Piano' gives the best results.
To play the score, **iWhistle** uses the default MIDI interface on your system. In practice this is the Microsoft 'MIDI mapper' which emulates the music instrument defined in the MIDI standard. If you have another MIDI peripheral ((like 'VirtualMidiSynth' or an USB MIDI device), it was possible on Windows XP to select this device through the "Sound and Multimedia" control panel. Since Windows 7 this possibility has disappeared, but third party applications are freely available for this purpose.

### 3.7 Loading, Creating and Exporting a 'MIDI' file
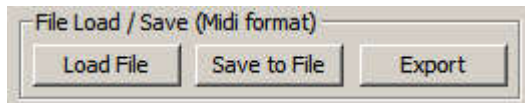
- Click on '**Load File**' to load a score file in 'MIDI' format. 'MIDI' stands for 'Musical Instrument Digital Interface'. Although the 'MIDI' format is a standard, only the files created by iWhistle are accepted because of the added presence of proprietary information necessary for the 'Audio Level' diagram.

- Click on '**Save to File**' to store your music score on the disk. This standard 'MIDI' file can be played or edited by any application compatible with the 'MIDI' standard. It could also be sent on the 'MIDI' bus to an external music instrument if you have such a device.
  If the check-box "**Record an output 'WAV' file**" is selected in the '**Audio Source**' pop-up dialog box, an extra 'WAV' file will be created too. This file has the same name as the 'MIDI' file but with a '.wav' extension. (See paragraph 3.3).

- Click on the '**Export**' button to immediately send the 'MIDI' file to an external 'MIDI' Player or Editor already present on your PC. At first use, the full absolute path to this tool must be provided:
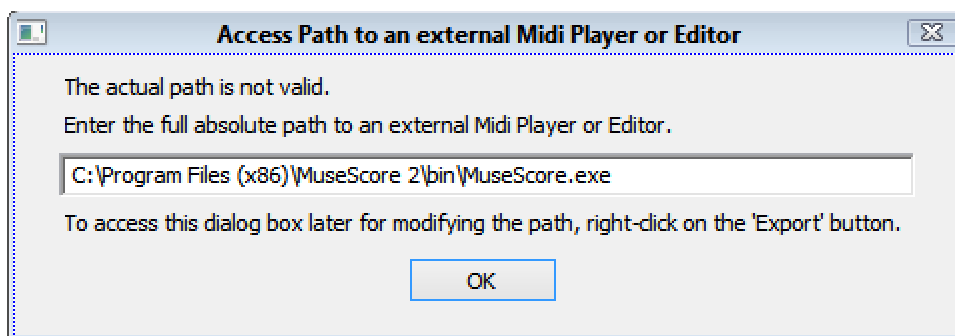
For example, if you have installed the excellent '**MuseScore**' freeware, its default installation path is: 'C:\Program Files (x86)\MuseScore 2\bin\MuseScore.exe.' This path can be found and copied by right-clicking the 'MuseScore' icon on the desktop and selecting 'properties'.

This path can always be modified afterwards by **right-clic**king on the '**Export**' button.

Once that the 'Export' button is depressed, the external application will open and it will receive your musical work. Here is a example of an 'iWhistle' score converted to a music sheet by MuseScore:
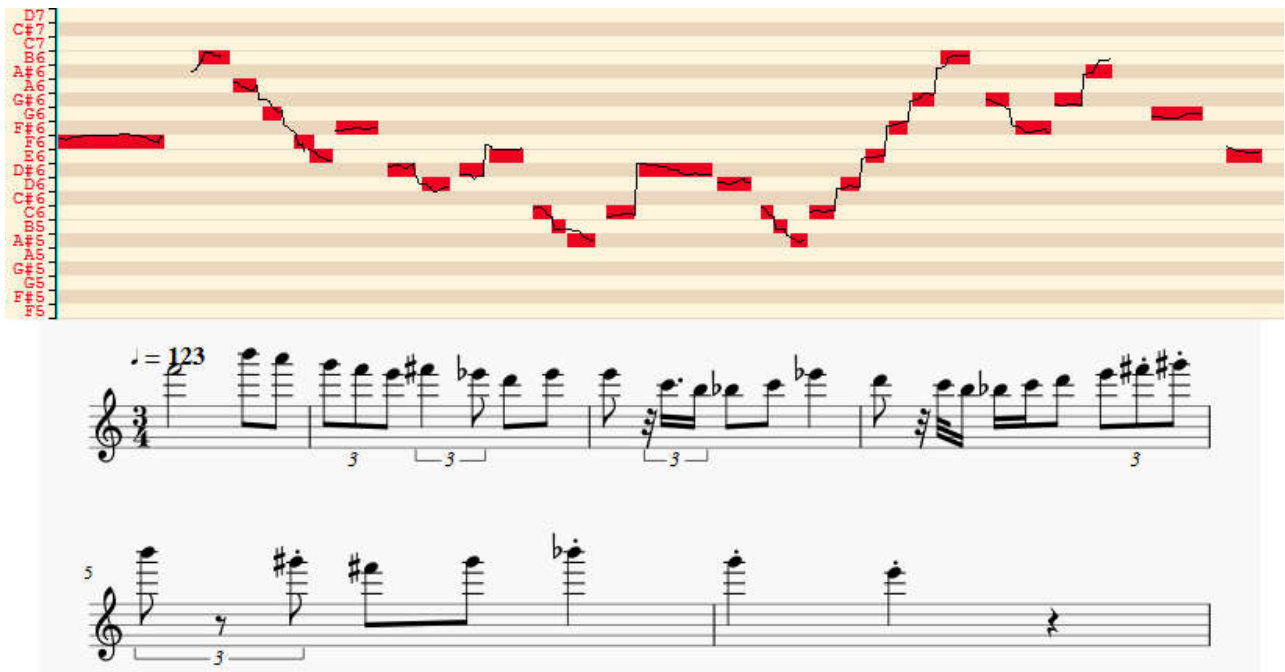
3.8 The 'Help' Mode

Click on the 'Help Mode' button to activate this mode and once again to deactivate it.
To indicate that the 'Help Mode' is active, a question mark is added to the mouse cursor.

In 'Help Mode' when the mouse cursor hovers over some buttons or other items like the tone bars, a small window pops-up to display some hints and tips.

Here is an example showing two help tips:
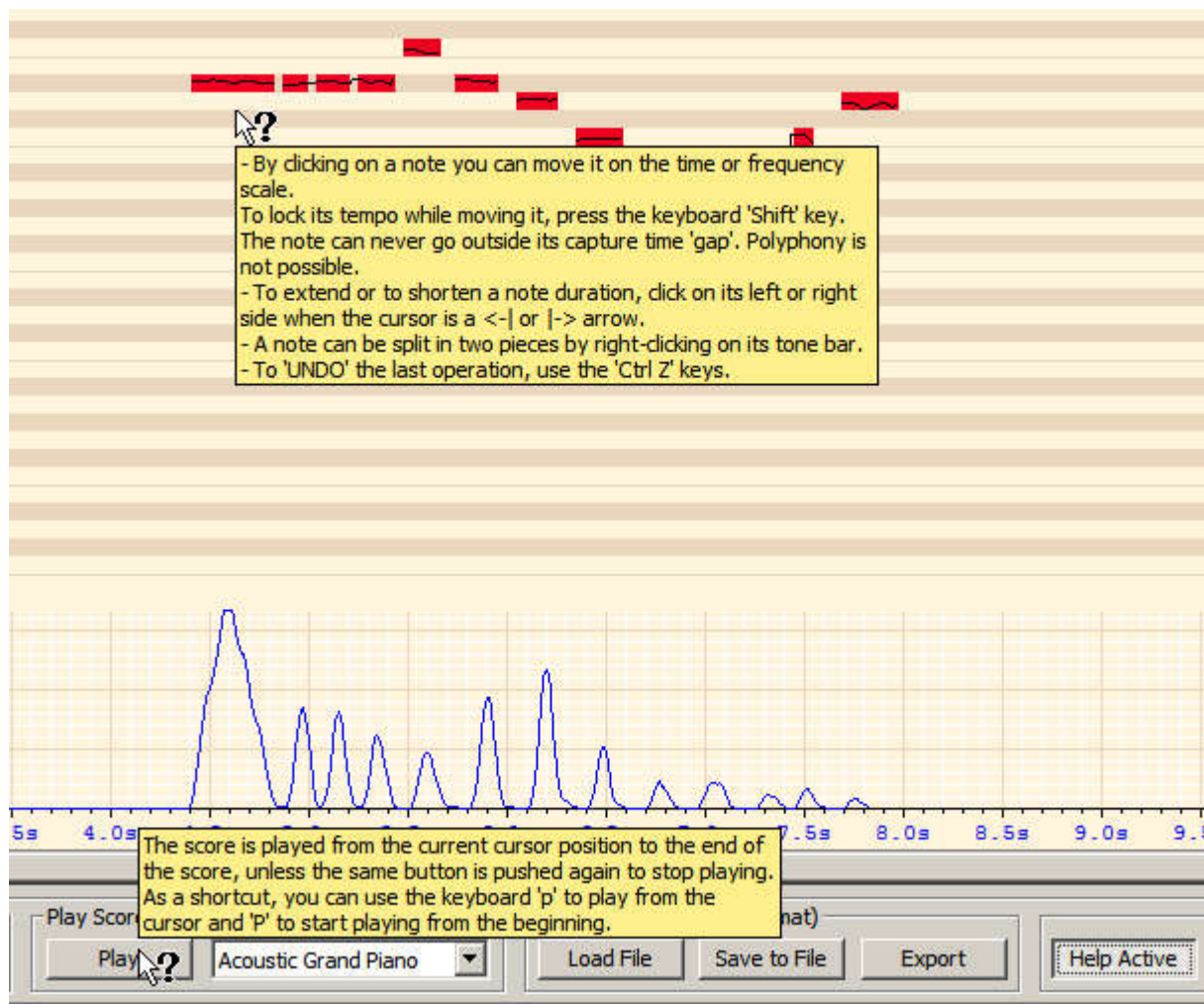
3.9 Keyboard Shortcuts

In addition to the keys used to move the cursor, already mentioned in § 3.5, and in addition to the 'Delete' or 'Ctrl X' keys used to delete a note or a set of notes, two shortcut keys are available:

- 'p' (lower case) to start playing the score from the cursor position.

- 'P' (upper case) to start playing the score from the beginning.

4 PARAMETERS

### 4.1 Audio Capture Parameters : To access to this box, **right-clic**k on the **'Capture'** button
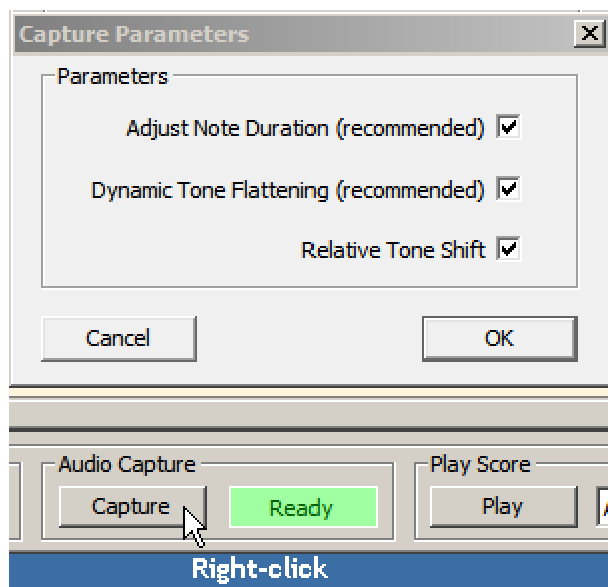
Optional processing is implemented to improve the signal measurement which is impaired by the noise and the human whistler weaknesses… !

The **Duration Adjustment** removes glitches and tones which are too shorts. The **Tone Flattering** makes more frequency averaging when scaling the tones. The **Relative Tone Shift** makes use of the frequency difference between consecutive notes to adjust the tones. Those options are activated by default, but you can uncheck them to gauge their effect on the capture.

Those options are saved in the PC Register Data Base, therefore, your choices will be applied to every future session of **'iWhistle'** until you modify them again!

4.2 Extra Processing : To access to this box, **right-click** on the **'Play'** button.
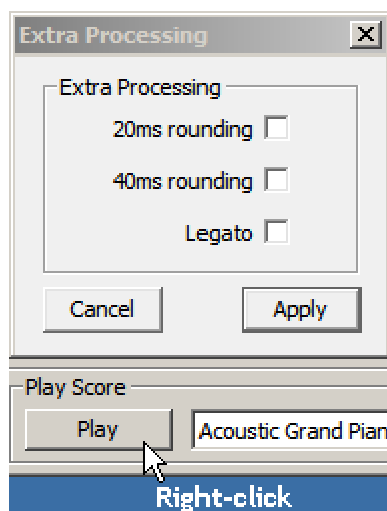
Those options are applied after the capture. They can be added or cancelled at anytime.

Notice anyway that they modify the score itself and, like any change you made, they cannot be removed from a score stored on the disk in MIDI format.

The **'rounding'** at 20 or 40ms, makes the score more consistent by reducing the discrepancies in the note and the silence durations. This may be interesting when creating a music score. The tempo may also sound better… or worse!

The **'legato'** cancels short silences between notes and **'connects'** the notes to play them more smoothly.

5 CONCLUSION

Enjoy!