

# Lordikc - Audio Analyst

Version 0.4



## Introduction

The audio analyst suite contains four applications:

- Oscilloscope (Illustration 1)
- Spectrum (Illustration 2)
- Spectrogram (Illustration 3)
- Enveloppe (Illustration 4)

The purpose of this suite is to provide tools to analyse signal captured by the sound card of your computer. It can be used on any computer that has a soundcard and a usable Java Virtual Machine (thus Linux, Windows, MacOS).

If you find this software useful, please consider making a donation to contribute to its development (See <http://www.lordikc.com> or email to [lordikc@lordikc.com](mailto:lordikc@lordikc.com)).

# Oscilloscope

Oscilloscope displays the signal in realtime with a synchronisation on the up or down transition. It allows you to see the shape of a periodic signal. The settings dedicated to Oscilloscope are:

- Time Scale: Length of the panel in ms. Thus every vertical line represents  $1/10^{\text{th}}$  of the time scale;
- Syn. U/D: Synchronisation Up or Down
- Threshold: Threshold used for synchro. The signal is considered up if it's more that the threshold (thus on vertical grid is 33%). The signal is considered down if it's less that minus threshold. An up front is a transition from the down state to the up state and the other way around for down front.

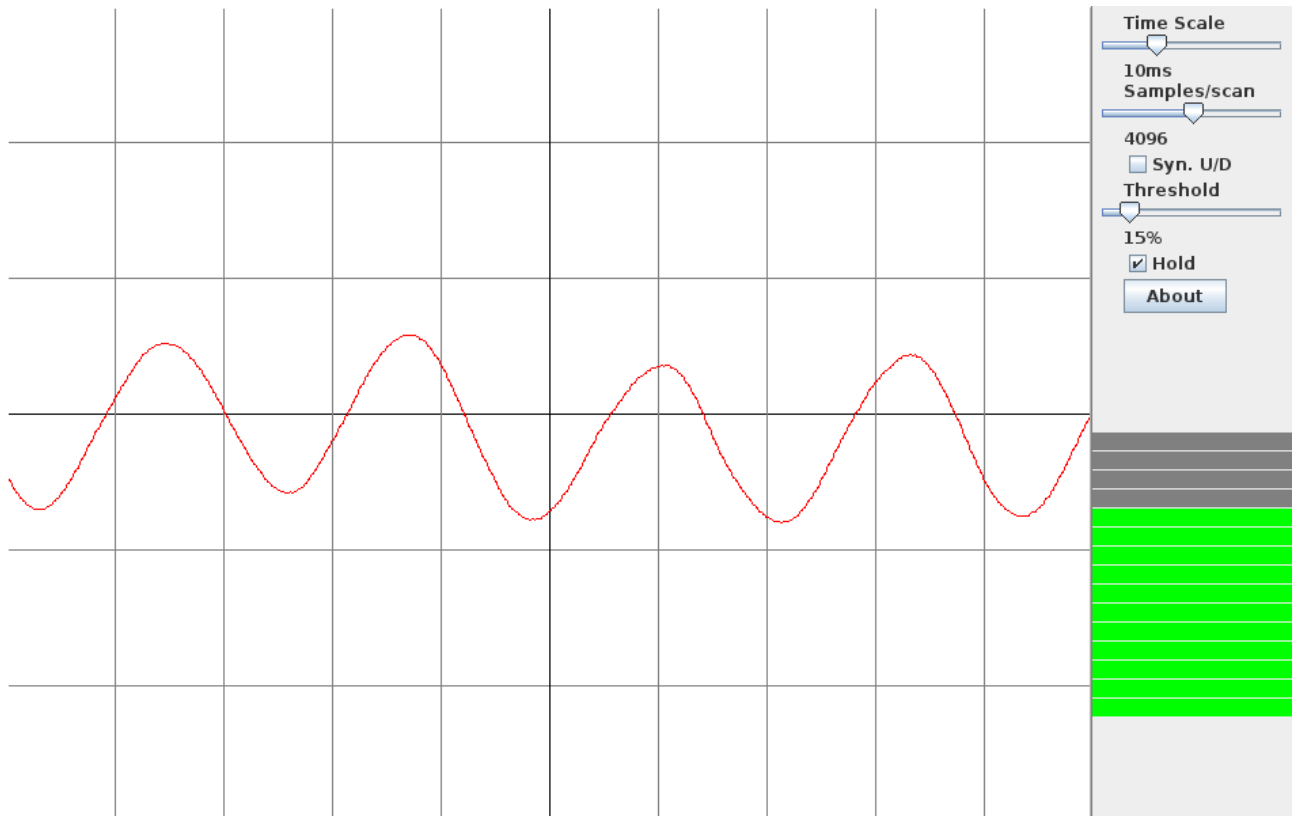


Illustration 1: Oscilloscope

# Spectrum

Spectrum displays the spectrum of the signal in realtime. It allows you to see the various frequencies (or musical notes) composing the signal. The settings dedicated to Spectrum are:

- Bandwidth: The bandwidth represented in the panel
- Central Frequency: Central frequency of the display. Please note that central frequency is not at the centre of the panel. The panel displays central frequency minus and plus half of bandwidth. Using central frequency and bandwidth you should be able to adapt the display to the frequencies you want to analyse.
- Mus. / Dec.: Choose between a grid representing decimal values or musical notes.
- Noise: trigger noise evaluation (for 15s) and remove the detected noise for the signal.
- Samples/sec: Set the sample rate of the signal acquisition.

In addition, the frequency corresponding to the position of the mouse is displayed.

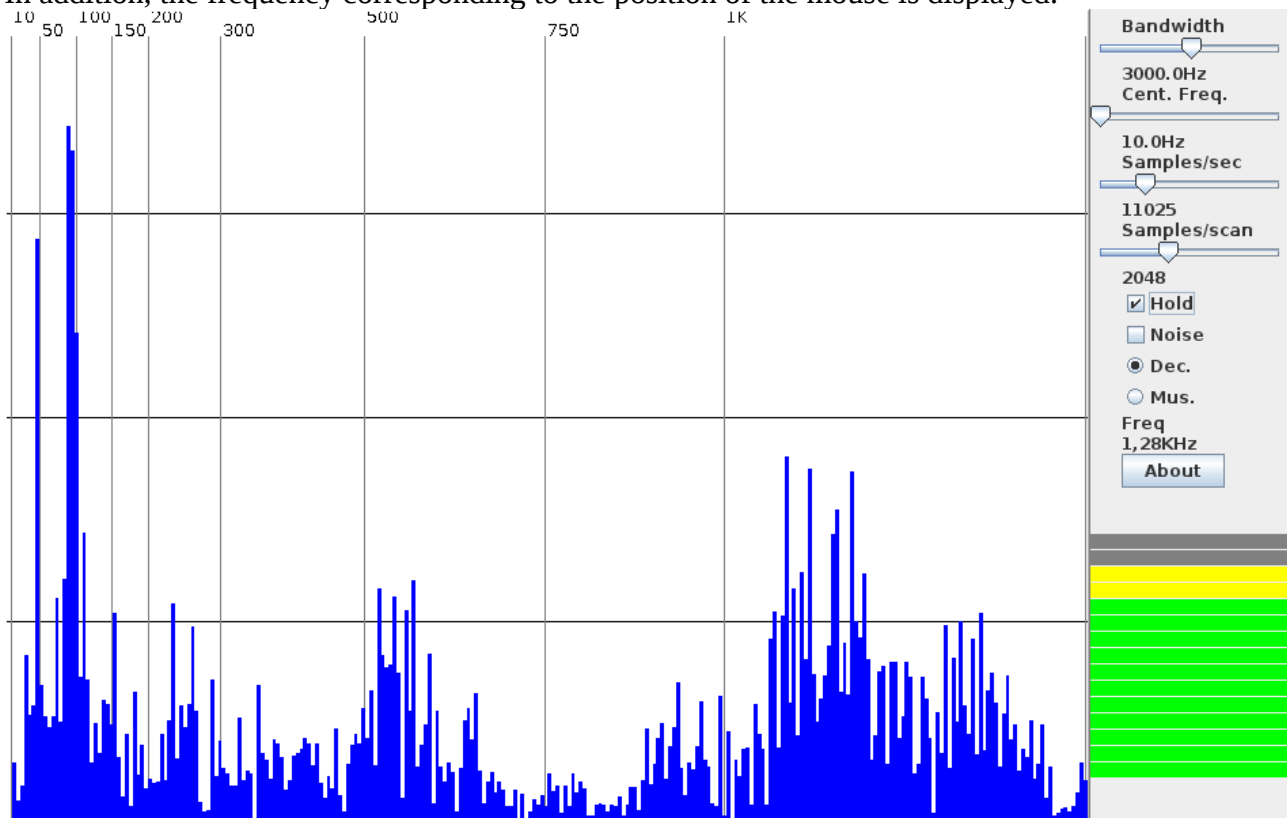


Illustration 2: Spectrum

## Spectrogram

Spectrogram displays the spectrum over time. You can then analyse the evolution of frequencies over time. Apply to music, you can discover the various notes composing the music.

The settings for Spectrogram are the same as Spectrum except that the frequencies are represented vertically.

- **Bandwidth:** The bandwidth represented in the panel
- **Central Frequency:** Central frequency of the display. Please note that central frequency is not at the centre of the panel. The panel displays central frequency minus and plus half of bandwidth. Using central frequency and bandwidth you should be able to adapt the display to the frequencies you want to analyse.
- **Mus. / Dec.:** Choose between a grid representing decimal values or musical notes.
- **Noise:** trigger noise evaluation (for 15s) and remove the detected noise for the signal.
- **Samples/sec:** Set the sample rate of the signal acquisition.
- **Time scale slide** set the duration corresponding to the width of the panel. For instance, a scale of 30s means that the whole panel shows 30s of spectrogram.

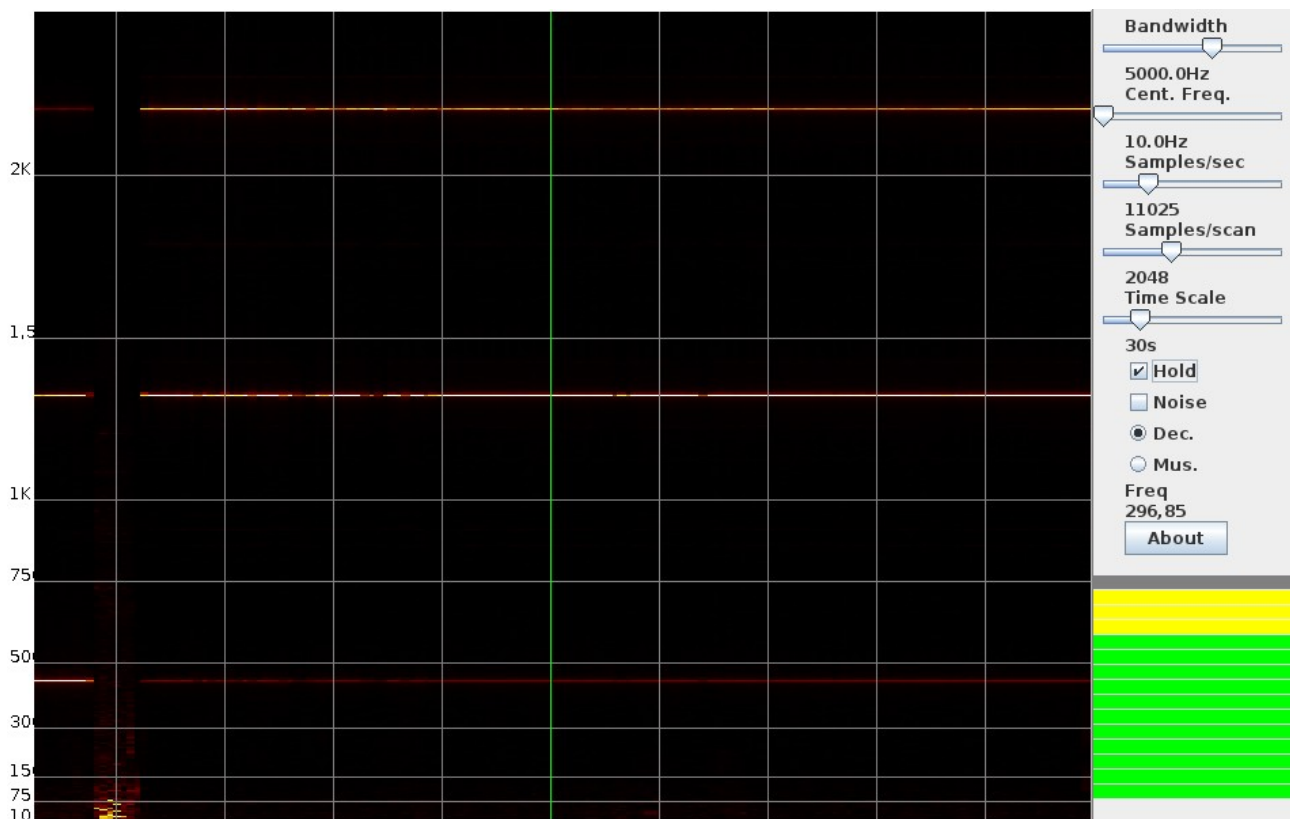
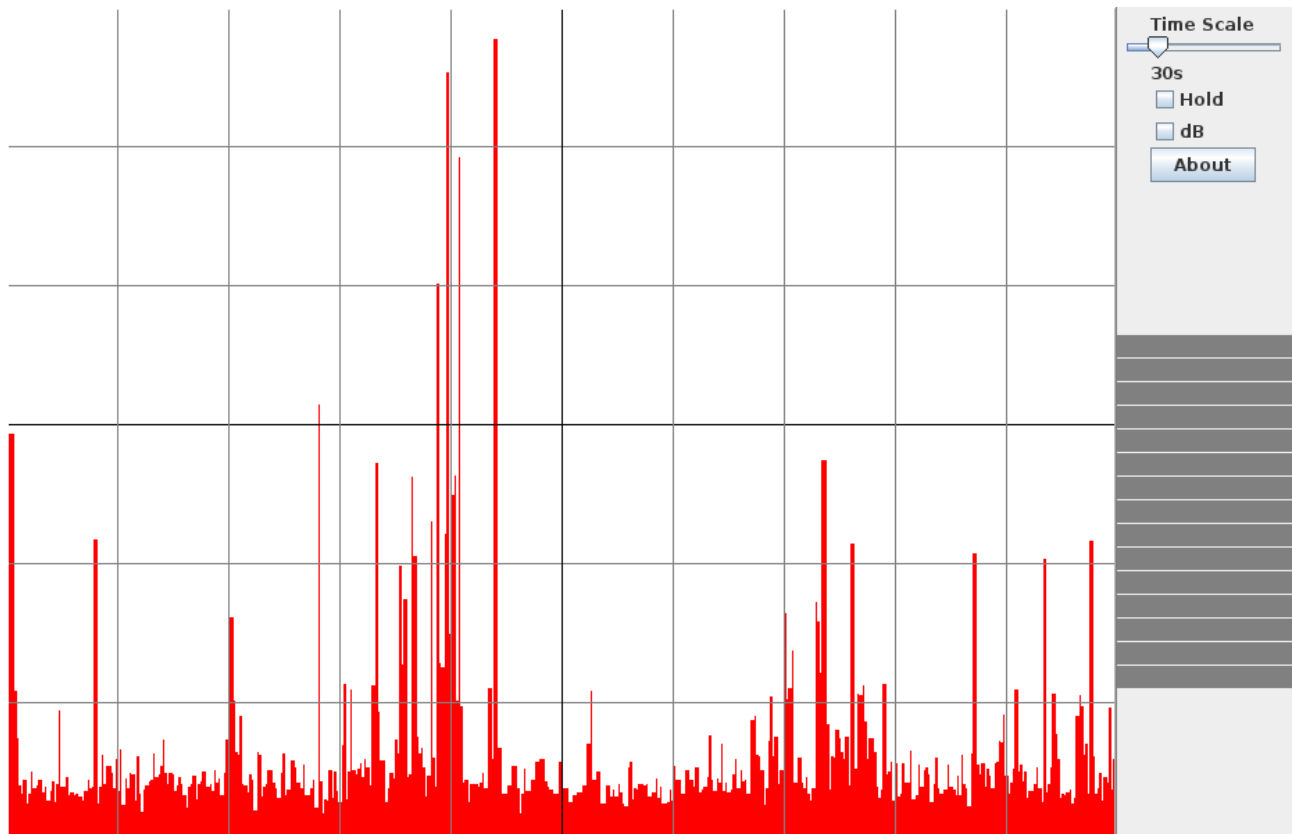


Illustration 3: Spectrogram

## Enveloppe

Enveloppe displays the loudness of the signal over time. Loudness is displayed as decimal amplitude or logarithmic (dB). Check the “dB” box to display as loudness as the logarithmic attenuation (  $10 \cdot \log_{10}(\frac{signal}{max})$  ) where max is the maximum possible amplitude of the signal. Min dB value is -20dB which is  $1/100^{th}$  of the max value.

Time scale slide set the duration corresponding to the width of the panel. For instance, a scale of 30s means that the whole panel shows 30s of spectrogram.



*Illustration 4: Enveloppe*

## Common settings

- Sample/scan: The number of sample to read and analyse periodically. The default acquisition rate is 48000 samples per second. This parameter allowz you to balance accuracy and reactivity. The more sample you take, the more accurate the decomposition of the signal is but at the expense of reactivity.
- Hold: Hold the display so you can take your time to analyse.

## Installation & setup

To install the software, uncompress it to the desired folder and run the corresponding command:

- `enveloppe.bat`, `oscilloscope.bat`, `spectrum.bat` and `spectrogram.bat` for windows;
- `enveloppe.sh`, `oscilloscope.sh`, `spectrum.sh` and `spectrogram.sh` for linux.

Be sure to have a Java Virtual Machine version 1.6 or earlier installed.

The tricky part is about setting up your sound card for the desired input (mic or line-in). There are too many possible cases depending on hardware and OSes so refer to the documentation of your hardware/OS. The sound card is correctly set up when you get a signal covering more that 80% of the window height in the application “Oscilloscope” or when volume is in the yellow area.