

## Contents

Welcome to Windows Lissajous, the ultimate time-waster for Microsoft Windows!

Select the topic you want help on:

[Introduction](#)

[Using Windows Lissajous](#)

[The Control Dialog](#)

[Using The Screen-Saver Module](#)

[Shareware Information](#)

## Introduction

If you have ever studied electronics at school or college you will have come across Lissajous figures. They can be seen on oscilloscopes by feeding two different sine waves into the X and Y (timebase) inputs.

Lissajous figures were discovered long before the oscilloscope was invented, however. Nineteenth century French physicist, Jules Antoine Lissajous, noticed that designs of beauty and elegance would be traced out by sand streaming from a container mounted on the lower of two pendulums whose lengths bore a simple relation to one another and which were oscillating at right angles to one another.

The technique was translated to the oscilloscope by Braun in 1897 to determine the frequency and/or phase of an unknown sine wave signal by comparing it with a known sine wave. By feeding the signals into an oscilloscope's X and Y inputs and interpreting the resultant shape shown on the CRT, the phase and/or frequency of the unknown input can be determined.

If the phase difference between the two sine waves is constant, a stationary Lissajous figure is displayed, its shape determined by the ratio of the two frequencies. If the signals are slowly drifting out of phase, the figure gently rotates. The best effects can be seen when the phase drift is small and the ratio of the frequencies is simple like 1:1, 1:2, 2:3 etc.

An oscilloscope is (usually) an analogue device, so the input signals are sampled many times during their cycle. This results in a smooth Lissajous figure. To reproduce a smooth figure on a computer, the number of samples (or 'steps' as they will be known as from now on) should also be large. This causes a problem: More steps = more calculations per cycle = slower redraw speed. For this reason, Windows Lissajous allows the number of steps per cycle to be set. On a 486/33, 60 steps produces an acceptable result at a reasonable speed.

Adjusting the number of steps has an interesting side effect. Consider the effect of 'sampling' a circle different number of times. Sample it 360 times (once every degree) and the resultant shape is a very close approximation to a circle. Sample it 60 times (once every 6 degrees) and the shape is still a close approximation to a circle. Sample it twice (once every 180 degrees), the result is a straight line. Sample it three times (once every 120 degrees), the result is a triangle. Sample it four times (once every 90 degrees) and the result is a square!

By combining different values of X factor, Y factor and steps, an almost infinite number of shapes and patterns can be produced. Windows Lissajous gives full control of these parameters, plus phase drift, speed, motion and color, to produce the ultimate time-wasting utility for Windows!

## Using Windows Lissajous

Windows Lissajous consists of two separate programs: The main program and the Windows 3.1 screen saver module. The two are not dependant on each other, except that they share the same .INI file.

The main program is interactive and allows the Lissajous parameters to be adjusted. When an interesting figure is found, its parameters can be saved and given a name to allow it to be recalled at a future date. These 'preset' shapes are saved in LISSAJOU.INI.

The screen saver module provides no control over parameters. Instead, it randomly picks a preset set of parameters from LISSAJOU.INI each time it is activated.

When the main program is started, a preset figure will be drawn, randomly picked from the preset list. To change the figure's parameters, click anywhere on the window with the left mouse button, or select **Control...** from the system menu. A modeless control dialog will be opened to give full parameter control.

If the figure is drawn in a single color, clicking the right mouse button anywhere on the window will change the color.

The Lissajous shape will continue to be drawn when the window is iconised.

---

Related topics:

[The Control Dialog](#)

[Using The Screen-Saver Module](#)

## The Control Dialog

The control dialog is modeless. This means that the effect of changes made will be seen immediately in the main window.

The dialog is divided into four logical areas:

### Parameters

The five scroll bars in this section give complete control over the shape of the Lissajous figure.

**X** Multiplication factor of the first sine wave. Range 1-100.

**Y** Multiplication factor of the second wave. Range 1-100.

**Steps** Number of steps per cycle. Range 2 - 360. The number of steps will affect the speed of re-draw, since the more steps specified, the more calculations need to be done.

**Speed** Number of 'ticks' between window updates: Range 1 (1/1000th sec) - 250 (1/4 sec).

**Phi** Phase drift. Range -359 - 359. (negative figures for clockwise rotation, positive for anticlockwise, 0 for stationary) The larger the figure, the faster the rotation (generally).

See the introduction for more information about these parameters.

### Preset Shapes

Once an interesting figure has been found by adjusting the above parameters, it can be saved to allow it to be recalled later. The combo-box in this section shows a list of previously saved figures. Simply select a preset name from the list to change the current parameters and display the preset figure. The three buttons give control over the preset list:

**Add** To save the parameters set on the scroll bars in the list, press Add. You'll be prompted to give the figure a name. This is the hardest part of the program: thinking of an appropriate name for your beautiful creation!

**Chg** To change the parameters associated with the name showing in the combo-box to those set on the scroll bars, press Chg.

**Del** To delete the figure whose name is showing in the combo-box, press Del.

### Options

Ticking **Moving** results in a small figure drifting round the window and bouncing randomly off the sides. Un-ticking it results in a stationary figure that fills the window.

### Color

The radio buttons in this section give control over the color of the Lissajous figure.

**Single** Draw the shape in a single color. When this is selected the **Color** button is enabled to allow the color to be changed.

**Multi 1** Selecting this causes the figure to be drawn in multi-color. The color is changed every (total

number of steps / 6)th step.

**Multi 2** Selecting this causes the figure to be drawn in multi-color. The color is changed every step.

Some figures look best in Multi 1 mode, whilst others look better in Multi 2.

---

Related topics:

[Introduction](#)

## Using The Screen-Saver Module

To install the Lissajous Screen Saver, ensure LISSSAVE.SCR has been copied to your main Windows directory, then select "Lissajous Screen Saver" from the list of savers in the Windows Control Panel's Desktop Configuration dialog box.

Each time the screen saver is activated, a Lissajous figure will float around the screen. The figure will be picked randomly from the list of preset figures defined by the main program.

## Shareware Information

Windows Lissajous is Mail-Ware. This means that if you find it an interesting or entertaining program you should send me e-mail to show your appreciation of my efforts. Alternatively, if you wish to show your gratitude further, you can send me £5 or \$10 US. In return I'll send you the complete TPW source code for both the main program and the screen-saver module on disk.

I may be contacted at the following addresses:

Internet/CIX: huwmill@cix.compulink.co.uk

CIS: [100016,3452]

Snail-Mail: Huw Millington, 71 Woodbury Avenue, East Grinstead, W. Sussex, RH193NY, ENGLAND

Thanks to K. Steffens for the basic Lissajous equation.

Disclaimer:

"WINDOWS LISSAJOUS IS SUPPLIED AS IS. THE AUTHOR DISCLAIMS ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, WITHOUT LIMITATION, THE WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR ANY PURPOSE. THE AUTHOR ASSUMES NO LIABILITY FOR DAMAGES, DIRECT OR CONSEQUENTIAL, WHICH MAY RESULT FROM THE USE OF WINDOWS LISSAJOUS, EVEN IF THE AUTHOR HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES."