



## ildaGen

By Gitle Mikkelsen / Grix / GrixM / gitlem@gmail.com  
BitLasers.com

ildaGen is an affordable ILDA file creator and editor. It is currently in beta, and have versions for Windows and web (HTML5).

The official site for downloading and purchasing ildaGen [can be found on BitLasers.com here](http://bitlasers.com).

If you have any questions, bug reports or feature suggestions, please don't hesitate to contact me at [gitlem@gmail.com](mailto:gitlem@gmail.com).

*Manual revision: 2015-03-10*

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## Quick start guide

To start drawing in ildaGen, select a drawing tool in the top right corner of the screen, and adjust various settings such as color and blanking with the sliders and buttons that appear. Now click and drag the cursor somewhere in the large black area to the left. Depending on the drawing tool selected, you should now see what you drew placed as an object.

You can select any objects you have placed by holding down Ctrl and clicking on them, or by using the up/down arrow keys. Selected objects are marked by a blue square. By clicking and dragging the arrow icons in the corner of the blue square you can rotate and scale the object. You can also edit the object by selecting new settings and then pressing the button REAPPLY, or the keyboard key Enter. Not only can you rewrite the settings like color and blanking, but you can also layer edits on top of each other to create complex patterns that would not be possible in a single edit. If you have selected an object, you can also copy it (Ctrl+C) or cut it (Ctrl+X), then paste it somewhere else (Ctrl+V). You can also delete elements using the Delete key.

You can set the number of frames in the ILDA file by clicking the MAX button. Use the left/right arrow keys to navigate between frames. You can use the number key 0 to jump back to the first frame in the file. Use the space key to play/pause.

ildaGen can create automatic animations by gradually changing settings over the course of several frames. You can do this by first enabling animation by using the checkbox marked "Enabled" in the Animation area (bottom right) of the interface, then editing the final values using the new cyan colored sliders that appear next to the main sliders.

You can edit the scope, that is the active frames that animations or reapplying spans over, by using the SCOPE button. If you only wish to edit a single frame, there is a checkbox in the Animation area for that too.

When you are happy with your file, click the EXPORT ILDA button to export it to an ilda file. You must remember to end the name of the file in ".ild", or the program creates a file with no extension and you need to rename it for other programs to be able to recognize it as an ILDA file. By right-clicking on the export button, you can choose between optimized and minimized exporting. If you have not yet entered a license code, you will be asked to do so when you export.

You can save and load the ildaGen project by using the SAVE and LOAD buttons (this is different from exporting the ILDA file, the saved file can only be opened by ildaGen itself)

It is recommended to read through this manual to get the most out of ildaGen. It explains what every button on the screen does, and goes more in depth about certain key features.

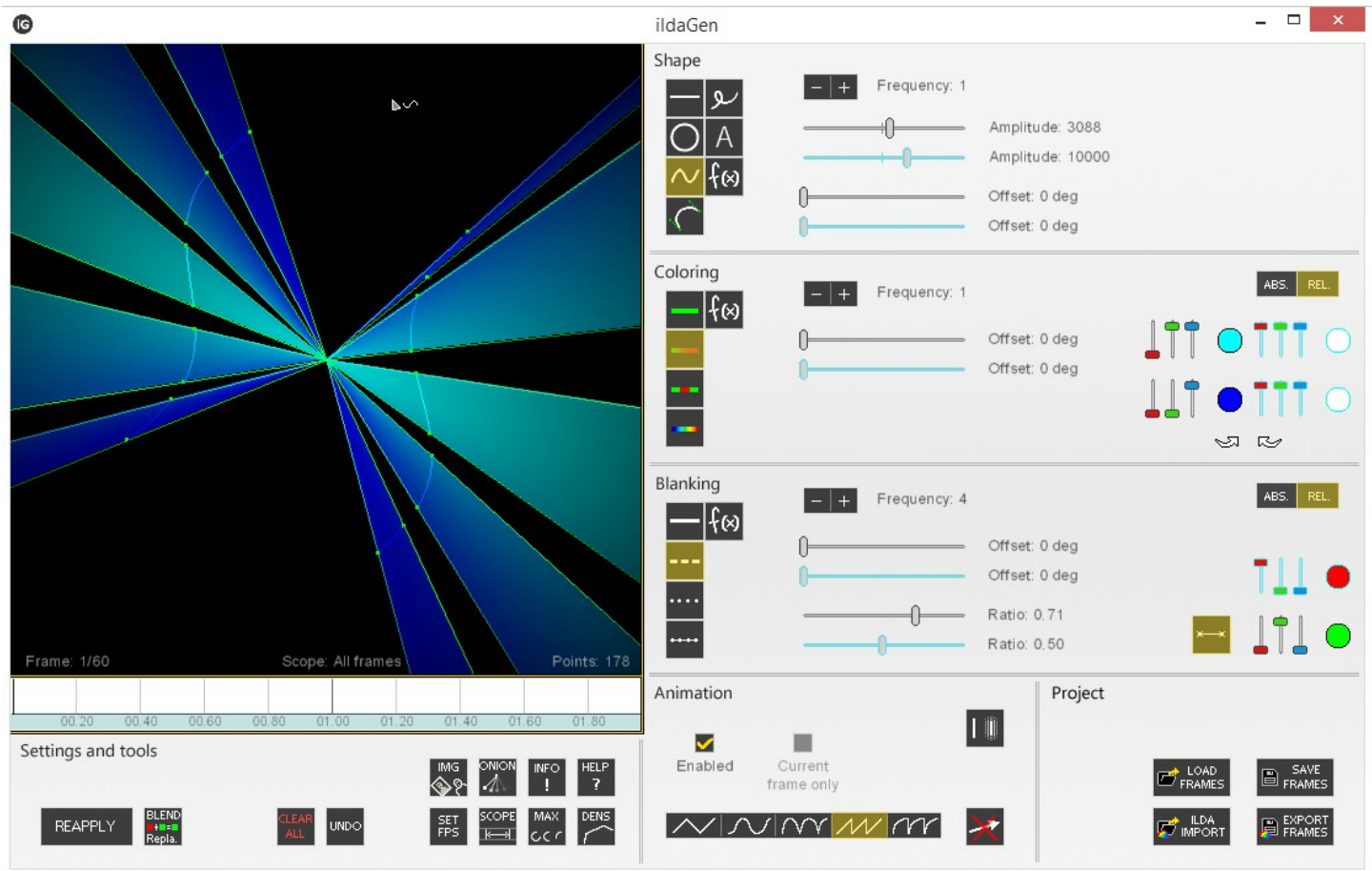
## List of Keyboard Controls

<b>Left Mouse)</b>	Selects drawing tool and draws
<b>Right Mouse)</b>	Opens context menu, or edits value of sliders manually
<b>Enter)</b>	Remakes object, finalizes curve, or presses OK
<b>Space)</b>	Play/Pause
<b>Left/Right Arrow)</b>	Cycles frames
<b>Up/Down Arrow)</b>	Cycles selected object
<b>Ctrl+Mouse)</b>	Selects object
<b>Delete)</b>	Deletes currently selected object
<b>P)</b>	Changes previewing mode between 2D and 3D (simulated scanner)
<b>Shift)</b>	Forces straight lines/angles when drawing
<b>Q)</b>	Snaps cursor to nearest ending or starting position of any object.
<b>Alt)</b>	Snaps cursor to ending position of last placed object for chaining.
<b>Ctrl+Alt)</b>	Snaps cursor to <i>starting</i> position of last placed object for chaining.
<b>S)</b>	Shows/snaps to square grid. Double click to toggle.
<b>R)</b>	Shows radial grid. Double click to toggle.
<b>Z)</b>	Zooms in around the cursor for extra precision.
<b>A)</b>	Shows symmetry/alignment guidelines of objects. Green lines mark the center of the screen. Gray lines mark the ending and starting points of objects, red lines are symmetrical to gray lines.
<b>E)</b>	Clones the color that the cursor is pointing at, for example from a background image or a previously placed object. Left click the mouse while holding E to clone the color.
<b>Ctrl)</b>	Moves all color sliders, or centers symmetrical sliders
<b>Backspace)</b>	Cancels object placing (used with curve tool)
<b>Ctrl+Z)</b>	Undo
<b>Ctrl+C)</b>	Copy
<b>Ctrl+X)</b>	Cut
<b>Ctrl+V)</b>	Paste
<b>0)</b>	Jumps to the first frame
<b>Mouse wheel)</b>	Adjusts amplitude in wave drawing tool
<b>Ctrl+Mouse wheel)</b>	Adjusts frequency in wave drawing tool
<b>N)</b>	Resets window aspect ratio
<b>M)</b>	Resets window size
<b>F11)</b>	Toggles fullscreen

If you forget the keyboard controls, you can hover the mouse cursor over the **HELP** button to display a list.

## Buttons and user interface

When starting ildaGen, you will be met with this window:



The interface is divided into 7 main sections, the drawing and previewing window which is the large black area to the left, and the six gray sections marked with their names written in their respective upper-left corners. There is a chapter for each of these sections below, where the buttons and tools are explained.

## Button tips and tricks

Some of the sliders and selectors in the screen-shot above may not appear to you, this is because they are only visible when the relevant modes are selected. For example, the settings related to making waves such as the amplitude and frequency sliders, are only visible if the wave drawing tool is active.

Some buttons have **drop-down menus** with additional settings that can be accessed by right-clicking on them. Pay attention to the tool-tip in the corner which will inform you if this is the case.

By holding down CTRL and using sliders, you can control them in alternative ways. Colors sliders will move both the red, green and blue channel at the same time, and sliders with a neutral center point will snap back there.

On most sliders you can right-click to enter a specific value.

Toggle-able buttons will be marked with a yellow tinge when they are enabled.

## The drawing and preview area

The large black square is the drawing and preview area. Your ILDA file in progress is shown here. To make additions to the file, select a drawing tool (see below), and click or drag your mouse anywhere in this area.

In the upper-left corner of this area, a **tool-tip** (quick explanation) text will appear when you hover your mouse over buttons and tools in the interface.

In the bottom of this area, you will find some information about the current project:

**Frame:** This is the current and maximum frame in the ILDA file you are viewing. You can move between frames by using the left and right arrow keys.

**Scope:** These are the frames that are selected as the editing scope, all modifications you do to the project will only happen within these frames.

**Points:** This is the approximate number of data points in the frame you are viewing.

Below these three numbers there is a simple time-line, showing the editing scope marked in blue, and the current frame marked with a yellow line.

You can select objects you have placed by using the up and down arrow keys. The selected object will be marked with a blue square, as in the screen-shot earlier in this document. When an object is selected, some extra editing tools become visible. There is a small blue anchor symbol, which marks the anchor point of rotations and resizing. You can move this point around by dragging it with the mouse, or you can right-click on it to automatically move it to the center of the selected object for symmetrical and uniform rotation/resizing.

To **rotate** a selected object, click and drag the curved arrow symbol in the bottom-left corner of the blue square. To **re-size** it, click and drag the straight arrow symbol in the bottom-right corner. If animation is enabled, the change will happen gradually over the frames in the editing scope, so the result may not be immediately apparent depending on what frame you are currently viewing.

You can press P to enable a ***simulated 3D scanner preview***, showing how the current frame would look like when projected from a scanner.

## The shape area

This area contains the drawing tools selectors, and various settings related to the shape of the drawing.

Furthest to the left you will find the drawing tools selector. As of v0.9.7 you can choose between a line tool, circle tool, wave tool, curve tool, free drawing, text and arbitrary function drawing. Click the buttons to select them.

***The line, circle, wave and free drawing tool*** will be created just as they are previewed at the time you release the mouse button.

However, when the ***curve tool*** is selected and you release the button, you will enter adjustment mode. Two green bars will appear next to the curve. By dragging the tips of those bars with your mouse, you can manipulate how the curve looks. When you are done, click the enter button to finalize and create the object. If you wish to cancel while in adjustment mode, press backspace.

With the ***text tool***, you must first load a font to use. You can do this by right-clicking on the text button and pressing Load. IldaGen comes with Arial, which you can find in the folder that you installed IldaGen to. You can find many other fonts by installing LaserBoy. Read more about this in the dedicated chapter. To place text, click on the desired point of origin (bottom left of the text) and enter the text.

The **arbitrary function drawing tool** lets you enter a mathematical function for the X and Y value, rather than drawing the shape yourself. It is a quite powerful tool but also the most complicated of the bunch. To learn more about it, read the dedicated chapter on arbitrary function tools.

Depending on the drawing mode selected, one or more settings in the form of sliders or more buttons will become visible. For explanations on what each setting does, check their tool-tips.

## The color area

This area contains settings related to the coloring of objects.

To the left you will find the color mode buttons. As of v0.9.7 there are five **coloring modes**:

- Single-colored
- Dashed coloring that alternates sharply between the primary and secondary color,
- Gradient coloring that alternates gradually between the primary and secondary color,
- Rainbow coloring that gradually alternates the hue,
- Arbitrary function coloring, which lets you enter a mathematical function that describes the color.

There are also up to four **color selectors** visible to the right, depending on what coloring mode is selected. The primary color selector is on top, and below it is the secondary color selector. For each selector, you have three sliders, one for the red, green and blue channel respectively. They are blended additively, like laser light, so for example red at max, green at max and blue at zero creates the color yellow. The selected color is previewed in the circle next to the three sliders. You can hold CTRL to move all channel sliders simultaneously, or right-click on a slider to manually enter the value for the channel.

When animation is enabled, the amount of selectors are doubled, and two **arrow symbol buttons** are revealed below the selectors. You can click these arrows to copy the color to or from the main color selectors to the animation color selectors, marked with a cyan tint.

Between the color mode buttons and the color selectors, there may be some extra settings depending on what color mode is selected. These modify how the coloring is applied in various ways. For explanations on what each setting does, check its tool-tip. There is a button in the upper right corner that modifies some of these settings by switching from a relative (for example 5 cycles per object path) to an absolute (for example 10 000 length units between cycles) metric.

## The blanking area

This area contains settings related to the blanking (on/off modulation) of objects.

To the left you will find the blanking mode buttons. As of v0.9.7 there are five **blanking modes**:

- No blanking.
- Dashed blanking that alternates between on and off.
- Dotted blanking that places a single point that creates a straight laser beam periodically along the object path.
- Connected dotted blanking, similar to dotted blanking except the laser is on/unblanked between the points.
- Arbitrary function blanking, which lets you enter a mathematical function that describes the blanking pattern.

Next to the blanking mode buttons, there may be some extra settings depending on what blanking mode is selected. These modify the blanking in various ways. For explanations on what each setting does, check its tool-tip. There is a button in the upper right corner that modifies some of these settings by switching from a relative (for example 5 cycles per object path) to an absolute (for example 10 000 length units between cycles) metric.

In the bottom right corner, there is a button that lets you enable **dotted ends**, that means that whenever the blanking switches from on to off and vice versa, a dot is placed. These dots can have their own separate color, which can be chosen using the color selector next to the button.



## Settings and tools

In the bottom left area of the window you will find buttons for various settings and useful tools.

- HELP: This button opens this **manual**, or shows tells you the **keyboard controls** when hovering over it with the cursor.

- IMG: This buttons lets you load an image from your computer to get **superimposed** on the screen, allowing you to **trace** the outlines when drawing the frame. Clicking it a second time will disable the image. Only JPEG and PNG file types supported right now. The image will stretch to fill the entire drawing area, so if the aspect ratio is not square, or if the image is supposed to be small, it is recommended to open the image in an image editor first, and using the Resize->Canvas.. tool to add some blank space around the image to force a certain size and shape when stretched.

- DENS: This button lets you select the **point density/resolution** (detail level) of the points in the ilda frame. The lower number the smoother the curves and color fading becomes, but the file size, scanner speed requirement and ildaGen RAM use increase. At a value of 256, points are about 2 pixels on the screen apart. This varies linearly, so for example a value of 512 makes the points separated by about 4 pixels. There is an “auto” setting, which is enabled by default, that makes the program try to automatically choose the setting that works best depending on the drawing modes and settings selected.

- CLEAR: This button discards your work and clears all objects in every frame. This is not undo-able, so be careful.

- UNDO: This button lets you undo your last action. You can also press Ctrl+Z.

- REAPPLY: This button remakes the selected object (you can select objects by using the up/down arrow keys). In other words it **reapplies** new properties such as blanking and coloring to the object. The shape of the object stays the same, however. A shortcut for this button is the Enter key. See the dedicated chapter later in the document for more information.

- BLEND: This is a selector for the **coloring blend mode**. In other words how the new and the existing color are blended together when using the reapply button. This can be used to layer coloring in many different ways rather than just replacing it entirely. There are currently three blend modes: Rep~~l~~ace, Add~~i~~tive and Sub~~tractive. **R**ep~~l~~ace is the default blend mode, where the new color will replace the old color entirely. **A**dd~~i~~tive will add the old and new color channels together. So for example red and green becomes yellow, because yellow is composed of red and green. **S**ub~~tractive will subtract the new color from the old. So for example if white and green becomes magenta, because if you take green away from white you are left with red and blue, which is magenta. In this mode white will remove all coloring because any color minus white equals black.~~~~

- SCOPE: This is the **editing scope** button. It lets you edit the starting and ending frame of the editing scope, in other words what frames the editing you do will affect. For example, if your scope is 5-10 and you place an animated object, the object will be placed and animated from frame 5 to 10, and not in other frames before or after. This affects both creating new elements and reapplying.
- ONION: This button toggles **onion skinning**. It superimposes the previous frames over the current one, to let you manually draw animated frames easier. You can right-click on this button to edit various settings, like the number of frames to preview, or the transparency of the previewed frames.
- MAX: This button lets you adjust the **number of total frames** in the current ILDA file.
- SET FPS: This button lets you adjust the number of **frames per second** in the project. In other words how fast the ILDA file is played back.

## File area

This area contains buttons related to the input and output of files from the program. As of v0.9.7 there are only two buttons here:

### - **EXPORT ILDA**

This button exports your work into an ILDA file. If you have not yet entered a **license code**, it will ask you for one. You must remember to end the name of the file in ".ild", or the program will create a file with no extension and you will probably need to rename it to be able to open it with other programs.

IldaGen can as of now only export ILDA format 5 (full color 2D). If you need to convert to other formats, you can for example use LaserBoy, see the dedicated chapter near the end of this manual.

By right-clicking on the export button, you can choose between optimized and minimized exporting. Minimized output (default) reduces the file-size and processing time of the exported file, but will likely run very badly on scanners without post-processing. Optimized mode adds points to make the ILDA file look better when scanned. NB: As of now, ildaGen is not very good at optimizing, it is recommended to run the exported frames through a better optimizer like LaserBoy or ILD SÔS before attempting to play them on a scanner.

### - **IMPORT ILDA**

This button imports an existing file into the project. ILDA formats 0 and 1 (with default 63 color palette) and 4 and 5 are supported.

### - **SAVE FRAMES**

This button saves all the frames in the ildaGen project into a file of format IGF (IldaGen Frames), so that you can save the progress and resume work later. This is different from exporting the ILDA file, the saved file can only be opened by ildaGen itself.

### - **LOAD FRAMES**

This button loads an IGF file (see SAVE for more information).

## The animation area

This area contains tools to automatically animate your objects. By default animation is disabled, but if you click the **check-box marked “Enabled”**, many new buttons and tools with a cyan tinge, should appear. These are the animation-end equivalents of their neighboring tools. The objects you now draw will transition from the main settings, to the animation-end settings (marked with a cyan tinge), over the course of the frames within the animation scope.

Other than the enable checkbox, there are four tools inside the animation interface area:

The check-box marked **“Current frame only”** toggles filling all the frames with the objects that you draw. If this is unchecked, an object, even if animation is disabled, will be copied to all the frames rather than just the active one when placed. Also, this check-box decides whether or not the last frame will be copied to the rest when using MAX button to extend the number of frames in the project.

When loading external ILDA files, this check-box decides whether or not the ILDA file will loop after reaching the end if the number of frames is lower than that of the ildaGen project. For example, when this button is checked and you load a 10 frame long file into a project that currently have 30 frames, the loaded file will loop three times, filling all the frames available.

The row of buttons in the bottom of the area, is the **animation mode selector**. It lets you choose the animation function, in other words how the transition over time looks, and whether or not the animation loops seamlessly.

This button above that toggles **shaking**. It will shift the object slightly in a random direction for every frame, making it shake when the animation is played back. You can right-click on this button to change the intensity of the shaking.

The button to the right with the **red X** resets all the displacement/movement animation of an object. It copies the X and Y origin coordinates of the object in its first frame, to all its other frames.

## More on key features

### Reapplying

The REAPPLY button is a very useful tool. To use it you must first select an object you have placed by using the up and down arrow keys. Once selected, if you click REAPPLY or the keyboard shortcut Enter, the object is remade with all the properties like color, blanking and displacement that is currently set. Only the shape of the object stays the same. For example, if you have a plain solid line, and reapply it while the blanking mode in the sidebar is set to dashed, and the color set to rainbow, the plain line changed into a dashed line with rainbow coloring.

By right clicking on the button, you can edit various settings. For example, you can enable or disable the types of properties to reapply, for example you can choose to only reapply the color and ignore the blanking settings.

There are also some other settings in the right-click menu:

- **Remove overlapping points**, which will cause all overlapping points in the object, like dots, to be removed and transformed into a single point and smooth segment.
- **Preserve blanking**, which will keep blanked areas blanked. This is very useful to layer several types of blanking on top of each other. For example, by combining these two settings:

\_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_  
 .....  
 .....

You can get this:

.....      .....      .....      .....

- **Interpolate points**, which will adjust the number of points in the object to suit the selected resolution. Sometimes this is required to get for example a smooth color gradient when the object consists of too few points.

Next to the reapplying button there is a selector for the **coloring blend mode**. In other words how the new and the existing color are blended together when using the reapply button. This can be used to layer coloring in many different ways, similar to the example in the “preseve blanking” paragraph above. See the dedicated explanation for this button in the “settings and tools” chapter for more information.

The reapplying tool abides the scope settings. See the explanation for button 42) earlier in this document. This means you can choose to only change the object for certain frames.

## Arbitrary function modes

For the shape, blanking and coloring, you have arbitrary function modes available. These modes let you create your own mathematical functions to describe the data of new objects. Functions are equations that use variables and mathematical expressions to get a resulting value depending on what value the variables have. For example, the function “ $2*a+1$ ” has one variable:  $a$ . If for example  $a=1$ , the result is  $2*1+1 = 3$ .

For the **shape function mode**, you must create two functions, one for the X value (horizontal) and one for the Y value (vertical). Both of these range from 0 to 65535 (FFFF in hexadecimal), where 0 is the far left for X, and the far top for Y. The number of points to calculate and place can be edited by using the slider above the function input buttons.

For the **color function mode**, you must create three functions, one for each color channel. However, you can choose between using the channels red, green and blue as usual, or you can use a different set of channels: hue, saturation and value/brightness. Use the “RGB|HSV” button to toggle this. All channels range from 0 to 255, where 255 is the maximum.

For the **blanking function mode**, you must create one function to control the blanking, on or off. The laser is on (unblanked) if the result of the function is 1 or higher, off otherwise.

In all functions, you have a set of variables and constants that you must use to make the functions non-constant. The most important ones are:

“**point**” - This variable changes from 0 to 1 over the course of the object (path of points), symbolizing the how the ratio between the current point and total number of points in the object.

“**frame**” - This variable changes from 0 to 1 over the course of the animation, symbolizing the ratio of the current frame to the total number of frames.

“**max**” - This is a shortcut to the max value of the function result, 65535 for shapes and 255 for colors.

You can also use built-in helper functions inside your functions, such as sine and cosine, logarithms, exponential, lerp, etc.

Here are two **example** functions for X and Y respectively:

point\*max

$\text{max}/2 + \sin(2*\pi*\text{point})*10000$

These functions will create a simple sine wave in the middle of the screen. The X function increases gradually, pushing the points further to the right than the previous. The Y function is one period of a sine wave with an amplitude of 10000 and a mean of  $\text{max}/2 = 32767.5$ , which is the center of the screen. As you can see, all functions like sine use radians instead of degrees when describing angles.

Here is a full list of ***built-in variables and functions***:

## Variables

Items marked \* are not available for the shape X and Y functions.

Variable name	Description
point	The current point, ranging from 0 to 1
frame	The current frame, ranging from 0 to 1
startx	The X coordinate of the starting point of the object.
starty	The Y coordinate of the starting point of the object.
endx	The X coordinate of the ending point of the object.
endy	The Y coordinate of the ending point of the object.
*anchorx	The X coordinate of the anchor point when editing objects
*anchory	The Y coordinate of the anchor point when editing objects
*pri_red	The value of red in the current primary color (from 0 to 255)
*pri_green	The value of green in the current primary color (from 0 to 255)
*pri_blue	The value of blue in the current primary color (from 0 to 255)
*sec_red	The value of red in the current secondary color (from 0 to 255)
*sec_green	The value of green in the current secondary color (from 0 to 255)
*sec_blue	The value of blue in the current secondary color (from 0 to 255)
*x	The X coordinate of the current point
*y	The Y coordinate of the current point
max	The max value of the current function, 65535 for X/Y and 255 for color channels
width	The max value of the X coordinate (65535)
height	The max value of the Y coordinate (65535)
pi	3.14.....
e	Epsilon = 2.71....

## Functions and operators

Thanks to the ML Parse documentation for the following tables:

Sign	Name	Syntax	Precedence	Associatively
!	factorian	a!	18	Left-to-right
%	Percentage	a%	18	Left-to-right
+	Positive	+a	17	Right-to-left
-	Negative	-a		
~	Binary negate	~a		
^	power	a ^ b	16	Right-to-left
nCr nPr	Combinations Permutations	a nCr b a nPr b	15	Left-to-right
*	Multiply	a * b	14	Left-to-right
/	Division	a / b		
mod	Modulo	a mod b		
div	Integer division	a div b		
+	Addition	a + b	13	Left-to-right
-	Subtraction	a - b		
<<	Bitshift left	a << b	12	Left-to-right
>>	Bitshift right	a >> b		
<	Less than	a < b	11	Left-to-right
<=	Less-or-Equal than	a <= b		
>	Greater than	a > b		
>=	Greater-or-Equal than	a >= b		
==	Equality	a == b	10	Left-to-right
<>	Inequality	a <> b		
&	Bitwise AND	a & b	9	Left-to-right
xor	Bitwise XOR	a ^ b	8	Left-to-right
	Bitwise OR	a   b	7	Left-to-right
&&	Logical AND	a && b	6	Left-to-right
^^	Logical XOR	a ^^ b	5	Left-to-right
	Logical OR	a    b	4	Left-to-right



Function name	Function description
<code>not(a)</code>	binary not
<code>sin(a)</code>	sine
<code>cos(a)</code>	cosine
<code>tan(a)</code>	tangent
<code>degrees(a)</code>	convert radians to degrees
<code>radians(a)</code>	convert degrees to radians
<code>sqrt(a)</code>	square root
<code>power(a, n)</code>	$a^n$
<code>round(a)</code>	rounds to nearest integer
<code>floor(a)</code>	rounds downwards to integer
<code>ceil(a)</code>	rounds upwards to integer
<code>frac(a)</code>	returns fraction part of number
<code>abs(a)</code>	absolute value
<code>arcsin(a)</code>	invert sine
<code>arccos(a)</code>	invert cosine
<code>arctan</code>	invert tangent
<code>exp(a)</code>	$e^a$
<code>ln(a)</code>	natural logarithm
<code>log2(a)</code>	base 2 logarithm
<code>log(a)</code>	base 10 logarithm
<code>logn(a, n)</code>	base n logarithm
<code>lerp(min, max, ratio)</code>	Returns a number weighed between min and max

## LaserBoy

Included with the Windows version of ildaGen is the open-source project LaserBoy, by James Lehman, Extra Stimulus Inc. james@akrobiz.com, © GPL v3 2003...2014. <http://laserboy.org>

LaserBoy is a great supplement to ildaGen as you can do further editing of ILDA files exported, like manipulating individual points, and converting to additional formats like ILDA version 0 and 1, wave files for playing on sound card DACs and more.

LaserBoy can be installed by unzipping the zip file found in the installation folder of ildaGen. You can also always find the newest version here: <http://laserboy.org/forum/index.php?topic=10.0>

To start LaserBoy, first check out its README.txt file and set its window size in LaserBoy.bat, then double-click on LaserBoy.bat.

## Fonts

IldaGen uses ILDA font files in much the same way as they were originally designed to work in LaserBoy. IldaGen comes with font\_arial.ild by permission of James from the LaserBoy distribution. There is a nice collection of other font files included in the LaserBoy distribution, inside of the ild folder, all starting with the name font\_(name).ild

The following glyphs are available:

```
!"#$%&'()*+,-./0123456789:;<=>?
@ABCDEFGHIJKLMNOPQRSTUVWXYZ[^_`abcdefghijklmnopqrstuvwxyz{|}~
```

This is the Latin Alphabet, digits, punctuation and other symbols from the standard ASCII text table symbols 33 to 126 in the same order. The space character, ASCII 32, is an implied part of the available characters but is not visible.

Each single glyph is a frame in a standard type 1 ILDA file, in the exact order as listed above. The coordinate location (0,0), also known as the origin, is the baseline for each glyph. Each glyph is mostly in the all positive quadrant of coordinate space but some glyphs may descend into negative Y space (in case you want to make your own font files). You can open and examine any of the LaserBoy font\_(name).ild files as you would open any other ILDA file.

## Loading files into LaserBoy

To load and edit ILDA files in LaserBoy, they must first be moved or copied into the ild sub-folder inside the LaserBoy folder.

With your ILDA files in place, press the "i"-key to input or import a file and then the "1"-key for type ILDA. Type the name of the file you want to load and press [Enter]. Now select what you want from the options on the screen, for example press "1" to replace everything with the loaded file. You should now be back to the main menu, with the file loaded. You can use the left and right arrow keys to preview all the frames in the file, one frame per key tap or the "~"-key (below the ~) to show the frames as a continuous animation (any key to stop).

## Optimizing and converting to other formats

While in the main menu of LaserBoy, press "x", this brings you to a menu where you can adjust various on-off settings of the application's behavior. You can see all the options with their keys listed in the window.

If you plan to use LaserBoy for optimizing your frames it is imperative that you turn option "a" off before you save your ILDA file! Otherwise your optimizations will be stripped out (minimized) in the resulting file.

Use option "b" to toggle exporting to legacy ILDA format 0/1 (off), or 4/5 (on).

NOTE: If you turn option "b" off and your vector art uses any palettes other than the "Default\_" palette of 63 colors, LaserBoy will save that palette as an ILDA file section 2 in front of all the frames that use it. This is not widely compatible with other laser applications, even though it is a standard part of the ILDA file format specification. If any or all of your frames are "-24-bit-" (possibly from importing formats 4 or 5), then LaserBoy will save a section 3, RGB color table in front of every 24-bit frame, which is no longer part of the ILDA file specification.

When you are finished, press [Esc] to go back to the main menu.

If you want to save any settings you have changed, from the main menu, hit "o" to output a file, "6" for type wtf and simply hit [Enter] for the default file name of "LaserBoy.wtf". This will save all settings. When LaserBoy starts it reads this file and adopts these settings. You can also save wtf files of different names and load them by name any time the application is running.

If you want your frames to be saved as the most common and widely compatible formats 0 or 1, then you can match all of your colors to the standard "Default\_" palette by hitting "p" from the main menu to go into the palette transforms menu. From there you will see two palettes side-by-side. The one closest to your art will be the current palette for the frame in the view (possibly "-24-bit-" no palette). Use the up and down arrow keys to find the "Default\_" palette in the target palette position. Hit "B" (capital B) to do a best color match for all frames to the target palette. Now when you save your frames they will be either format 0 (3D) or 1 (2D) standard ILDA files with no palette saved in the file.

To export the file, simply press "o" to output while in the main menu. Then select the desired file format, for example "1" for ILDA. Now press "3" to export the whole file, or one of the other options on the screen. Now give your file a name, for example "test", and press Enter. Your file will now have been created in the same folder as the file you loaded.

## System Requirements

### Minimum:

- Windows XP, Vista, 7 or 8 with DirectX (Windows version)
- Modern browser with HTML5 support (web version)
- 512MB RAM
- 128MB graphics

### Recommended:

- Windows Vista, 7 or 8 (Windows version)
- 2GB RAM
- Modern graphics card with at least 256MB memory
- Modern CPU

## Extra credits

### Thanks to:

James Lehman, Extra Stimulus Inc. [james@akrobiz.com](mailto:james@akrobiz.com)  
for LaserBoy and the included ILDA font files  
© GPL v3 2003...2014.  
<http://laserboy.org>

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for ML Parser 2.0  
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icuard12b42  
for GMFMODESimple FMOD wrapper  
<http://gmc.yoyogames.com/index.php?showtopic=333705>

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