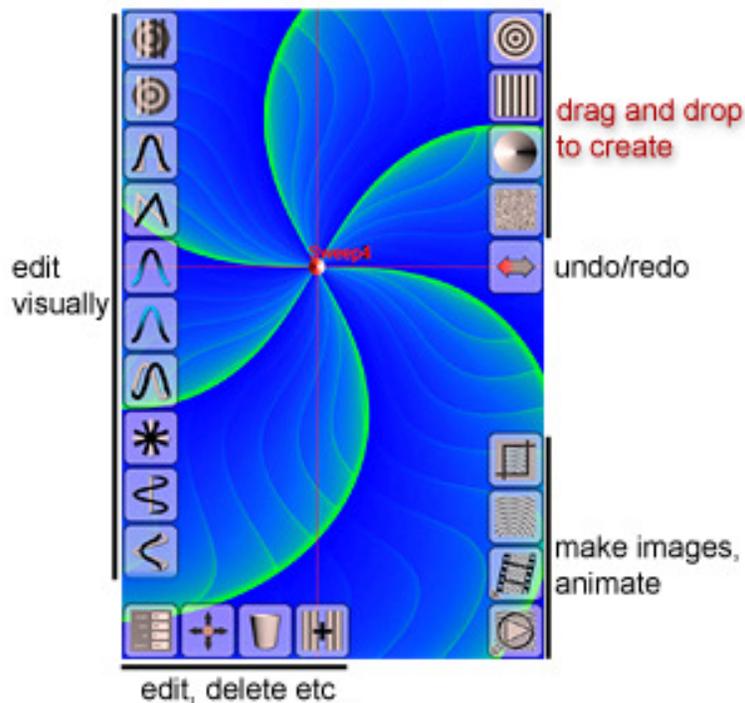


# Sources Guide

## Release 1.4

### The 10 second Introduction

Study the image below. 😊



**Menu:** new, open, save, preferences...

The app has built-in Help and a number of built-in video-like tutorials/demos. You are urged to view these.

### The slightly longer guide

#### The Basics

“Sources” is a program for producing high quality computer graphic images - images that would be very difficult and hugely time-consuming on other graphics programs (including fully-featured desktop packages). It also has animation capabilities and can create live wallpapers to be run using the free SourcesWP app.

“Sources” is the generic name and comes from the unique paradigm used to produce images. There are two versions of “Sources” – the free, cut-down SourcesLite and the fully featured SourcesPro. This document will talk as though you are using SourcesPro, but will point out the important differences.

Sources produces graphics not by you modifying pixels, but by creating objects called "sources" and seeing how they interact - to that extent, it is not a drawing program and has some of the characteristics of a generative art application.

### What is a “source”?

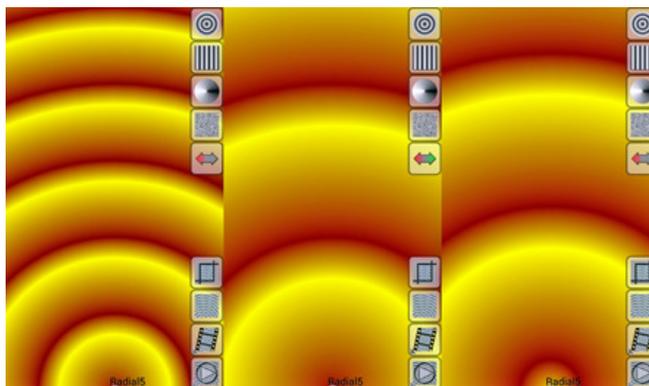
A source can be thought of as the origin of a set of graphical “waves”, spreading out from it. If you animate a source you will see these waves actually moving.

The source may be a point (a radial source) it may be a straight line (a linear source), it may smear the wave round itself - a sweep source, or it may act like a linear source but actually be producing bitmap patterns - a texture source.

Each source interacts with the sources created before/below it. There are many ways the colours from one source can be made to interact with the lower ones.

Each source is also highly configurable - its colours, its wavelength (how many units it takes before it repeats), its underlying waveform, etc. There are a large number of waveforms to choose from - a simple sine wave (like a ripple), rectangular, triangular, stepped etc. There are a couple of special ones where the "waves" don't actually spread out but rather rotate where they are - like a set of cylinders or square rods.

An important concept is "phase". Initially, every source starts with the start of its waveform at its current position. This will be its low colour too. (The peak of the waveform will be the high colour.) You can change the "phase" of a source - this varies from 0 to 99 (%). 100 is the same as 0. The phase sets the starting point in the waveform that the source begins at: 50 means it starts half of the way through the waveform. It is as though you had allowed the source to run a little bit ahead of those with lower phases. The screenshots below should make wavelength and phase clearer.



- In the left picture we have a radial source, with a triangular waveform. The low colour is dark red, the high colour is golden yellow. The wave is not symmetrical (to make the effects easier to

see its ratio has been increased from 50 to increase the proportion of the wave before the peak and decrease that after) so, starting at the source itself, the wave gradually changes from red to yellow, then quickly falls back to red. This is one cycle of the source waveform. It repeats over and over. The longer side on an unzoomed display represents 1000 units. This source has a wavelength of 200, so there are exactly 5 full waves over the height of the screen.

- In the middle picture, the wavelength has been increased to 400. There are thus 2 1/2 cycles seen on the screen. The phase is still zero, so the colour starts at "low" - dark red in this case - right at the location of the source.
- In the right picture the phase has been changed to 20 (%). The wave appears to have moved out from its source. It has moved by 20% of whatever its wavelength happens to be. If phase could be set to 100 (%) the right picture would be identical to the middle one.

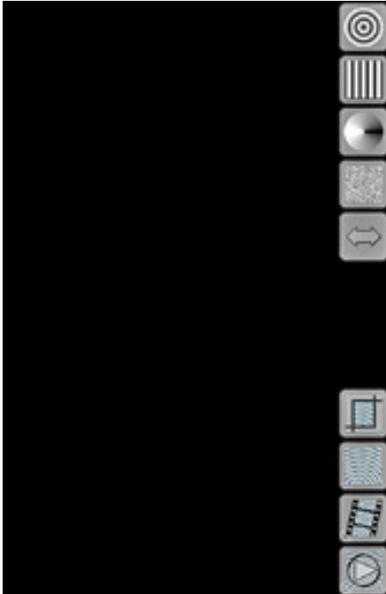
Right, enough complicated stuff! You can play with sources perfectly happily without knowing about phases and wavelengths, but to get the most out of it this information is very useful.

You will notice the talk above was in terms of "units" rather than pixels. Sources is more like a vector-based program – the images you produce on the screen can be scaled up for export without breaking into pixels as with, say, a traditional painting application. (Texture sources do, at the moment, "soften" with large output scaling, however.)

Sources was originally written to test the idea of combining sources of repeating waveforms, and to see just what was possible. The richness and variety of the results were surprising!

## Getting Started

When you start up Sources (after the splash screen has gone) the screen will be as in the image below. (Note that the program works in either landscape or portrait orientation and you can switch whenever you want simply by rotating your device.)



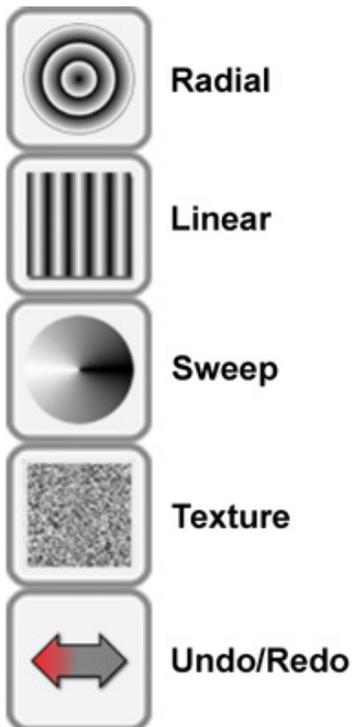
The screen consists of a black work area, and a set of buttons to the right, arranged in two palettes.

The top buttons are for creating sources (plus undo/redo).

The lower buttons are for producing pictures and animations.

You will either want to open an existing definition via the Options menu (described later) or else create at least once source.

## Creating Sources



The create palette is shown to the left. The top four buttons are for creating sources, the bottom one is the undo/redo button. It is placed here to be always available in a prominent place.

There are two ways to create using the sources buttons.

- The normal way is to press on the desired button and then drag the source to where it is required and then lift your finger from the screen. This will create a standard source (with blue and green colours, wavelength of 100, phase of 0 etc).
- If, however, you click on a source button a new source will be created with semi-random values for all of its parameters - position, colours etc.

Types of sources:

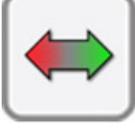
- **radial** - waves radiating out from the source position.
- **linear** - waves originating in a straight line from the source, taking into account the angle of the source. The default angle of 0 gives waves moving to the right. Linear (and texture) sources can be “double-sided” – these move out from the source in both left and right directions. “Sidedness” is controlled in the properties dialog described later.
- **sweep** - the waveform is 'smeared' round the source. Wavelength is irrelevant.
- **texture** - like a linear source, but the 'waveform' is one of several provided bitmaps. The size of the bitmaps is determined by the wavelength. Most useful not moving – their default state.

Note that the 'random' creation of sources by clicking can sometimes provide an interesting starting point for building up an image (unusual colour combinations especially), but the chances of producing an interesting picture by working purely randomly must be low.

## Undo/redo

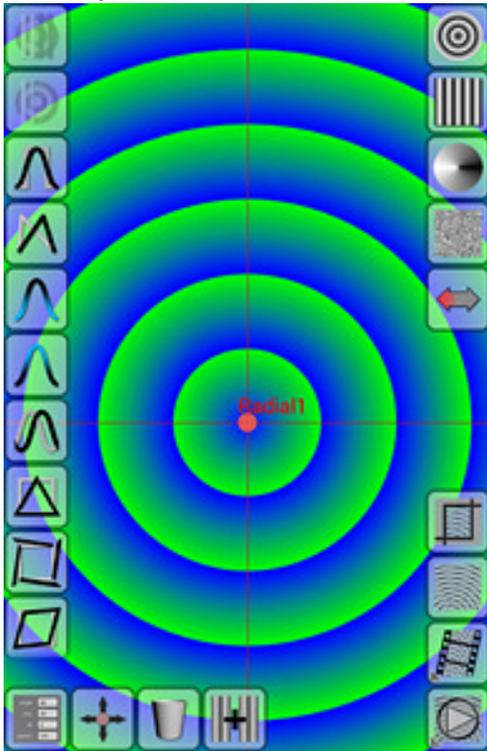
The undo/redo button is placed at the end of the create palette so that it is always available, and is in a prominent position on the screen.

Sources supports multi-level undo/redo. You can undo the last action (changes of attributes, creation, deletion, clearing, moving, pinning, cropping) by clicking on the undo button. The last operation undone can be redone by clicking the same button - so you can toggle back and forward seeing the effect of the latest change. To access the other operations available you drag from the undo button. Drag to the right, or upwards, will redo the next available operation. A drag to the left, or downwards, will undo the next available operation. In SourcesPro there are up to 50 operations stored in undo/redo, in SourcesLite it is limited to 3.

	<b>None</b>	The graphic on the undo/redo button tells you the state of the operations available. If the button is all grey, there are no operations to redo or to undo. This would be the initial state of the app.
	<b>Undos only</b>	A red arrow to the left indicates that 1 or more undo-able operations are available, but no redos.
	<b>Redos only</b>	A green arrow to the right indicates that 1 or more redo-able operations are available, but none for undo.
	<b>Undos &amp; Redos</b>	If both the red and green arrows are lit then there are undo-able and also re-doable operations available.

## Editing

When you create the first source there will be a fairly dramatic change to the display, as can be seen in this screenshot.

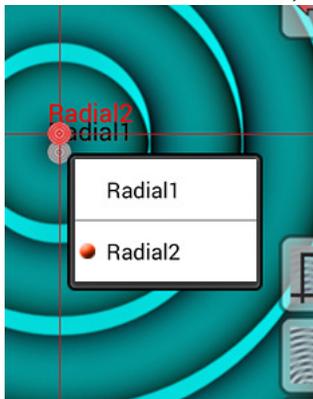


The most obvious change, of course, is the newly created source drawn in the work area. Each new source is given a name - its type plus an increasing number - Radial1, Linear 2, Radial 3, etc. If you wish, you can rename any source via the Properties dialog.

The icon and the name of the selected source will be in red and there will be a crosshair shown. This can prove useful when setting the relative position of sources.

An important change is the appearance of two new palettes of buttons. At the bottom is the Edit palette and down the left edge is the Visual Edit palette. These palettes appear only when a source is selected.

**Selection:** When a new source is created it is automatically selected, with its icon and name in red, and the selection causes the two editing palettes to appear. When you have more than one source the question of selecting the one to work on becomes relevant. You can select any source on the screen by briefly clicking on it with your finger.



If the click is ambiguous because sources are close together or even on top of one another, then a popup menu will be shown for you to indicate which source you want to select.

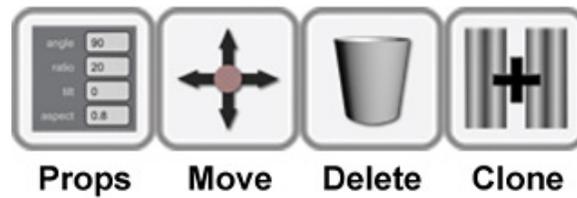
If, for some reason, you want to select nothing (causing the edit palettes to disappear) then simply do a long click on the screen away from any source. (Changed to long click in v1.3.)

If you hold your finger on an empty piece of screen and drag then you will scroll the screen. To return to the initial position, tap on an empty piece of screen.

As it can be awkward to have to scroll the screen around to reach sources for selection that are out of view, the crop screen also allows selection. This is described later.

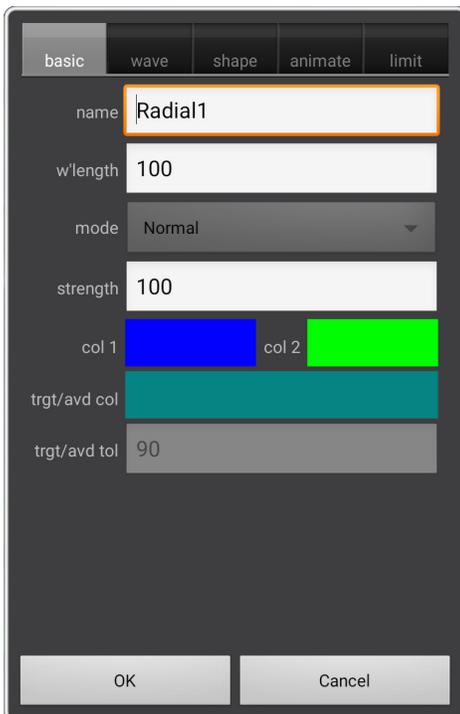
## Edit Palette

The edit palette at the bottom of the screen is shown below. This palette appears only when a source is selected.



- The Properties button brings up the properties dialog. This is described in greater detail below.
- To re-position a source you can simply press on its icon and drag it to a new position. However, when sources are too close together or awkwardly placed, the move button should be clicked. You can then drag the selected source by dragging from any starting point on the screen.
- The delete button simply deletes the current source. Like all of the buttons here, this can be undone via the undo button.
- The clone button creates an exact copy of the current source, with only the name changed. (The mode will be changed if cloning the lowest source.)

## Properties dialog



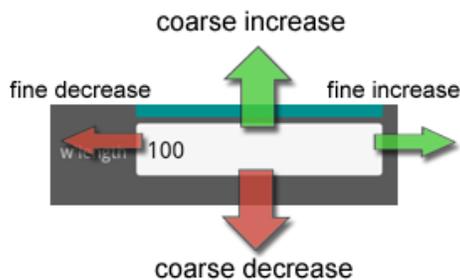
When you click on the properties button you are presented with a tabbed dialog box similar to that shown to the left. (The precise contents vary with the type of source selected.)

There are a large number of properties associated with even the simpler types of source and so the dialog is split into a number of tabs.

- **basic** contains the most useful properties - wavelength, colours, mode. Mode refers to the way this source interacts with those already created before it. The lowest source is fixed as "Normal" mode. There are some modes which act like mixing paint - "darken" and "multiply", so that the combination is always darker than the individuals, red and green give a very dark neutral. There are others which act like mixing light - "lighten" and "screen" - the combination is always lighter than the individuals, red and green give yellow. Much of the power of Sources comes from the large number of modes available.

- **wave** contains the properties for the waveform - its type, ratio, etc. Ratio refers to the relative amounts of low and high in a waveform. A sine wave is always symmetrical, but a rectangular or triangular waveform can be "biased" - a large ratio means more of the low colour part.
- **shape** tab contains the properties affecting the overall shape - angle, aspect ratio. Radial sources also allow you to control the overall "shape" - the number of sides in the created rings.
- **animate** tab contains the properties concerned with "movement" - the phase, the relative speed, etc. Phase is an important control even in still pictures - it sets the starting point in the waveform cycle for a static source.
- **limit** tab (SourcesPro only) contains the 4 properties concerned with limiting the extent of the current source.

The **numeric fields** deserve special attention. They are not altered via a keyboard, but rather by dragging your finger.



Touch inside a numeric field with your finger then drag to change the value. Up and down change the value rapidly, left and right change the value slowly. You can also tap on the left/right to decrease/increase the value by one unit.

## Colour editing

If you click on one of the two colour swatches you will be presented with the colour picker dialog, shown right.

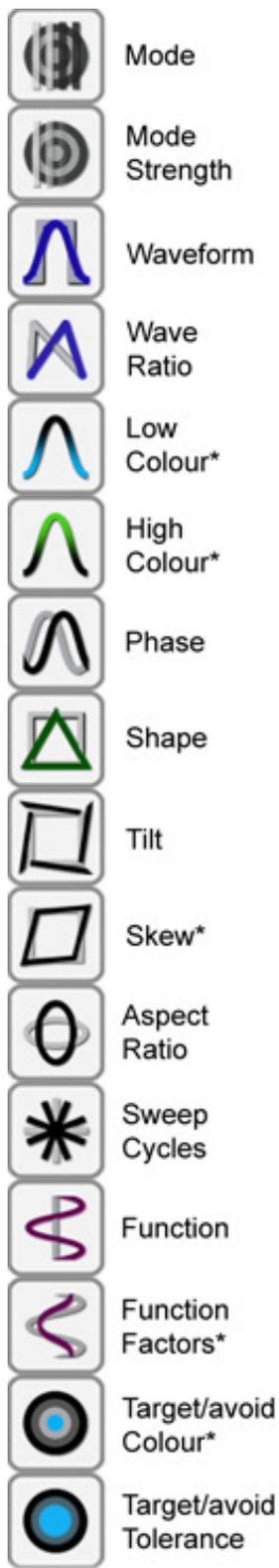
Colours can be chosen in RGB or HSB mode. HSB is the more useful. The mode is chosen by clicking on the toggle control.

The large colour square allows you to choose the saturation and the brightness of a given hue. Simply drag/click where you want within this square. The hue is chosen by dragging/clicking on the rectangular "rainbow" chooser on the right.

The corresponding HSB or RGB numeric values are shown in the numeric fields. These can be adjusted directly by dragging with your finger. The pair of colour swatches shows the original colour on entry to the dialog on the left, and the currently picked colour on the right.



## Visual Editing



The Properties editor allows access to every attribute of a source, and is useful for setting precise values. However, generally, changing values blindly is not ideal and this is where visual editing comes in. When a source is selected the left hand side of the screen is occupied by the visual palette, shown here. There are buttons for most of the most obviously "visual" of the attributes of a source.

- Mode – how this source combines with those below it in the creation order
- Mode Strength – how opaque this source is
- Waveform - the shape of the repeated wave, be it sine, rectangular, etc
- Wave Ratio – most waveforms allow you to alter whether they are symmetrical or “leaning” towards the start or end.
- Low Colour - the starting colour for a waveform
- High Colour - the colour at the peak of a waveform
- Phase - the starting point of a source as a % of the way through its waveform

The next three are applicable only to radial sources and do not appear when another type of source is selected.

- Shape - the “shape” - i.e. number of sides in a radial shape
- Tilt - for a radial source, the extent to which the individual segments are tilted
- Skew - the horizontal and vertical skewing of a radial source's shape.
- Sweep Cycles. This appears only if the selected source is a sweep. It determines the number of repetitions of the waveform around the sweep circle. It is analogous to wavelength.
- Function. An additional function applied to the overall shape of the source. This is a powerful feature.
- Function Factors. Two values controlling the shape, scale of the Function.

The “Function” features are not available in SourcesLite.

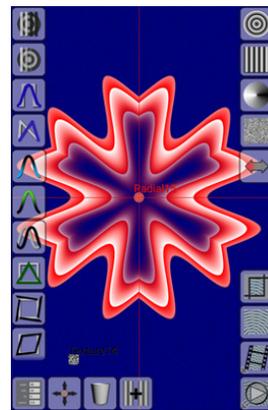
- Target/avoid Colour. There are two modes where the colour of what is below the source can be specifically targeted or avoided. This determines what that colour is.
- Target/avoid Tolerance. In Target and Avoid modes this determines how closely the effect is tied to the chosen colour.

The last four are available in SourcesPro only.

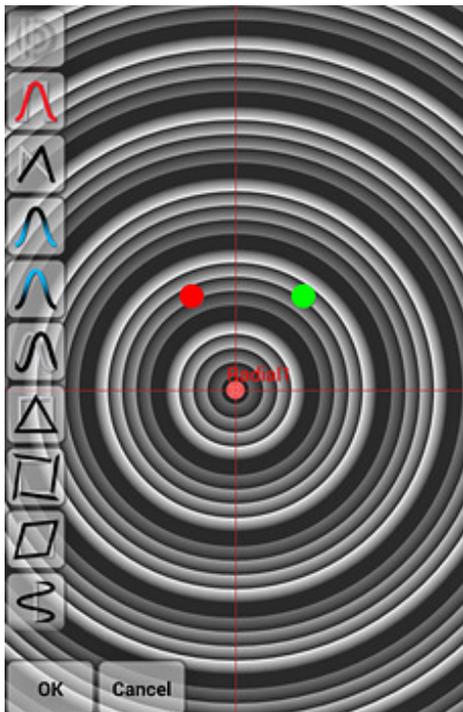


- Range Start. This determines where the current source starts from in terms of wavelengths.
- Range End. This determines where the sources end (in wavelengths) If Range End is less than Range Start the sources goes back to being unlimited in scope.
- Start Tolerance. This determines to what extent the start fades in.
- End Tolerance. This determines to what extend the end fades out.

To the right is an example of limits – the source starts at 2.5 wavelengths and finishes at 3.5, with a sharply faded-out end (low tolerance) and a gradual start.



Visual editing works as follows:



When you click on one of the visual palette buttons the button becomes highlighted. A green dot appears indicating the current value of the attribute. You vary the value of the attribute by dragging with your finger left and right. As you do so, the green marker moves left and right, and the parameter changes in the source with instant feedback on the screen. A red marker is left at the position representing the starting value. You can click on as many buttons, as many times as you want. When you are happy with the effect you click on OK and all of the changes are accepted as a batch. (The entire set of changes can be rolled back as a single operation using the undo button.) You can also hit the cancel button at any time, and this will undo all of the changes you have made - you can thus use this visual editing facility for exploring effects. As long as you

don't have too many sources in your picture then the visual response should normally be very quick. As a general rule of thumb, even quite complex pictures can be created using 2 or 3 sources; anything above 7 or 8 is unusual.

Three kinds of attribute work a little differently.

- The three colour attributes respond to changes vertically as well as horizontally. There are two modes of visual colour editing: H(ue)B(rightness), where hue is controlled left and right, brightness up and down, and S(aturation)B(rightness) where the saturation is left to right. Switching between these two modes is achieved via a toggle control which appears to the right of the Cancel button.
- Skew has a horizontal and a vertical component - they are controlled by left to right and top to bottom movements respectively.
- "Function Factors" comprises independent x and y factors.

## Render Palette

The last palette to consider is the render palette, always available at the bottom right of the screen.



**Crop**



**Picture**



**Render**



**Animate/  
Play**

The top button is the **Crop** button - not strictly part of rendering but having an important part to play in the appearance of any images created. The process of cropping will be described below.

The **Picture** button allows you to see the current picture with no palettes, icons or highlighting in the way. In addition, by default the rendering is to a higher standard than in the general display, so that many artefacts will disappear. The quality of the picture display is controlled in the **Preferences**. A long click on a rendered picture will return you to normal mode. A short click will bring up a couple of buttons - "Done" to exit picture mode, and "Save" to export the current picture. Click Save and

you will be presented with the export dialog - shown to the right.

A filename will already be filled in for you, indicating "now", but you can change this as you wish. The image will have a title of the name of the current definition (or just its filename if the current definition has not yet been saved) so that you can relate it back to the definition used to create it.



The important thing to note is that you can alter the size and quality of the saved image. Picture sizes vary from 100 pixels up to 1000/2000/4000, (the upper limit depending on the amount of internal memory in the Android device). In SourcesLite the image is restricted to screen size or 750 pixels, whichever is smaller.

The tick boxes cover the various drawing optimizations which can be applied - each one may slow the render process to some extent. Drawing optimizations are not available in SourcesLite.

A brief indication of what the various optimizations do:

- ++circles. There are two "circle" shapes available for radial sources - there is a quicker circle36 which always has exactly 36 sides, and a better "circle" which has 90 sides normally, or 360 if this option is selected. The more sides there are in a radial source the slower it will be to render. (On decent modern devices this is not really an issue.) Also note, if you have used a high tilt to produce a star like shape with a "circle" then the picture will look very different depending on whether you have this option selected.
- ++sweeps. In preferences there is an option for "Smoother sweeps". These produce the best results but are noticeable slower than normal sweeps. When normal sweeps are being used this optimization option switches between 720 and 3600 sides for the sweep render. In "smoother" mode a much smaller change will be seen when toggling this option.
- ++waves – this switches on improved handling of sources at low scales – rather than dissolving into strange patterns this optimization should lead to uniform colour instead. Of course, if you like the effect of having one or more optimizations turned off you can always render and export the image like that.
- In addition, SourcesPro supports 4 levels of smoothing via the pull-down menu. Normally smoothing is unnecessary, but on occasion some jaggedness may appear at the edges between sides of radial sources. Smoothing simply applies a weak blur filter, with three different strengths. Often, a better solution is simply to render the picture at a bigger size then scale it down outside the app – this also leads to smoother images. Smoothing is not available in SourcesLite.

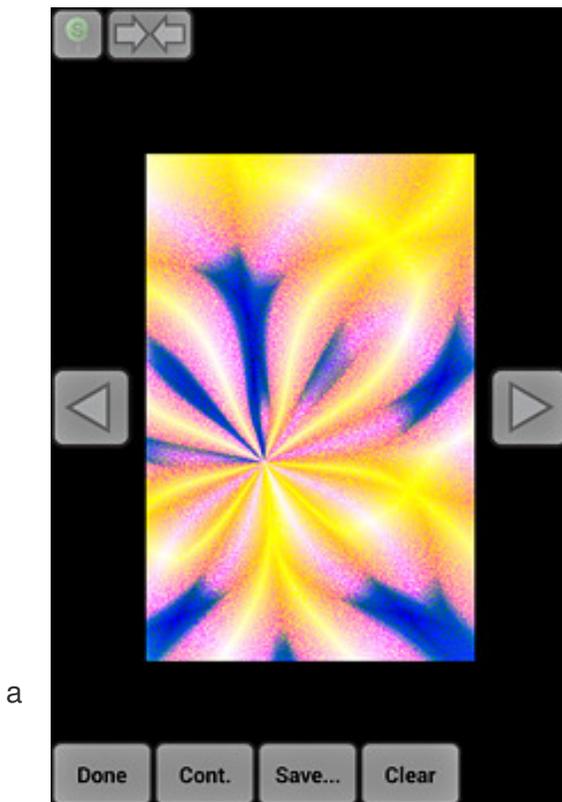
When you click OK, the picture will be re-rendered at the chosen size and quality, before being saved. It will also be inserted into the Android Gallery. Note that large images or high qualities can lead to render times of the order of a few minutes. Notifications will be shown to indicate that the program is actually working on your request. At present, it is **important** to let the render, compress and save process complete before exiting or switching away from the app. The image will be available in your gallery app. Images are saved using lossless compression for the highest quality. If the image looks rough/blocky in the gallery it has either been saved at a small size or else the gallery caching process has not yet caught up with the new file.

If you wish to access the images on your device (to copy to a PC, say), mount it via USB/wireless as instructed in your manual and you will find the images in

/SourcesPro (or /SourcesLite). There is a bug in Android 4+ where sometimes new files do not show up when browsing via USB. If this happens the only solution at the moment appears to be rebooting the device.

The **Render** button creates an animation sequence by advancing the phases of all the sources, one frame at a time and saves the result into a file on the Android device storage. This is intended more for fun than anything serious, and although you can control the size and quality of the frames, you cannot give the animation file a name - there is one only. If you click on the button then rendering will begin, with an indication on the screen of the current frame number. If frame 100 is reached the process will pause and you will be shown two buttons. If you click on the screen before it pauses automatically the process will also pause and present the buttons. "Done" finishes the process and takes you back to the normal display, "Cont"(inue) resumes with an additional 100 frames. Exporting of animations will be looked at for the next major release.

The **Animate** button simply attempts to do a real-time animation as near to the target of 30 frames per second as it can manage. Animation is generally done at a lower quality/size than the Render process and is a quick way of moving all of your sources through their cycles seeing how they interact at various phases. If you have already done a proper Render on the current scene then clicking this button will replay the prepared animation, and it will attempt to get as close to 30 fps as it can manage. If you render an animation at a large size then the Android device may be physically incapable of moving the data from storage to the screen quickly enough to get the full frame rate. If this proves the case you must re-render with a lower image size. At any time you can click on the animation screen and you will be presented with a number of buttons, as shown below.



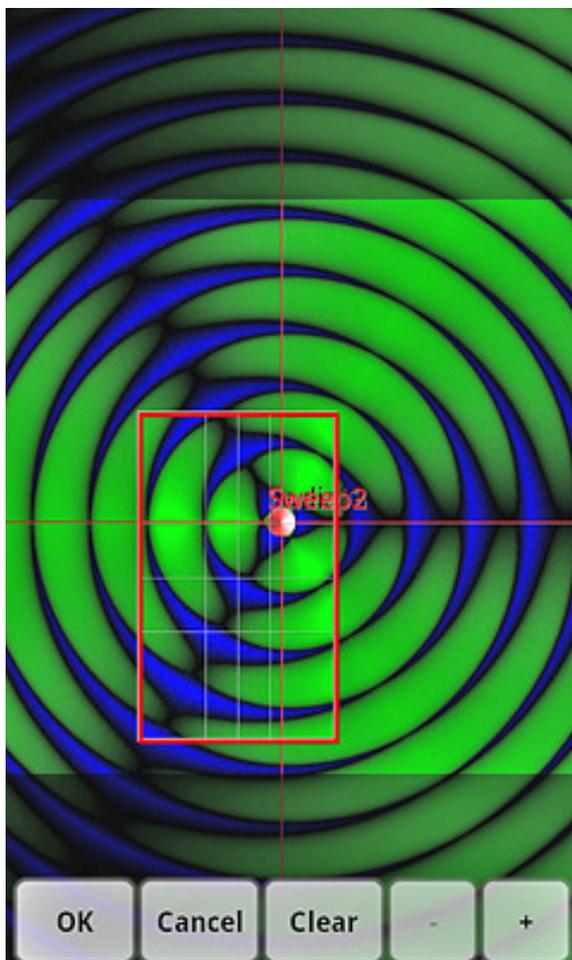
- The green "pin" button allows you to set the current position in the playback as the starting point for the underlying scene. So, you can animate a scene, see a point you like, stop the animation and set that as the new base state.
- The top arrows button is seen only when playing back a rendered animation. It controls the looping behaviour - it cycles round the three values as you click it: "forward and stop", "forward and repeat from start" and "reverse direction at end of animation".
- The two arrow buttons at either side of the screen allow you to step through the animation one frame at time. If you are stepping through a rendered animation then you can't

go past the start or the end. In contrast, if you are stepping through an on-the-fly animation then you can go backwards past the start point or as far forwards as you want. At any time, if you like the position, you can "pin" the scene to that point, or save a picture.

- At the bottom are some buttons - "Done" to exit to the normal screen, "Cont"(inue) to continue with the animation/playback, "Save..." to get an image parameters dialog as above to save a picture. If you are replaying a rendered animation then there will also be a "Clear" button to discard the saved animation and allow you to do an on-the-fly animation.

Note, both the Render and Animate buttons have an arrow at their bottom left corner. This is to indicate that a long click on either button will bring up a configuration screen (like the one above, but with the filename field replaced by a numeric speed field) to allow you to configure size, quality and speed. By default, rendering and animation run with a reduced size to get the best performance.

## Cropping



When you click on the Crop button in the render palette you will be shown a display similar to that on the left. The entire scene will be shown in miniature\*, with the outline of the current crop settings shown in red. Initially, this will be full height, or full width if in landscape orientation. You adjust the cropping by dragging with your finger. If you touch near one of the corners and drag, the red frame will resize at that corner. Dragging from anywhere else will cause the frame to move.

The current crop bounds rectangle also contains faint guide lines at half and third positions to act as aids for composition.

\*In fact, the image extends to the full size of the crop screen, but the crop frame will be unable to move beyond its normal square bounds. The inaccessible areas will be shown dimmed. In addition, the working area outside of the current crop rectangle will also be dimmed a little.

There are five buttons on the screen:

- OK to confirm the changes.
- Cancel to abandon any changes
- Clear to reset the cropping to its default (full height or width) state.

Pressing any of these three buttons will return the program to the normal screen.

- A zoom out button marked “-“ and
- A zoom in button marked “+”.

The zoom buttons are provided so that you can have greater control over cropping. Zooming in will centre the display on the current crop area. You can zoom in so far that the crop frame may no longer be visible, but whenever you re-enter the crop screen the magnification will be reduced (if necessary) such that the entire crop frame is visible. If you are fully zoomed-in or zoomed-out the corresponding button will be disabled.

In addition, the crop screen can be used for selecting sources. The crop screen gives an overview of the entire workspace – the normal working area display may well have sources situated off-screen. To select on the crop screen simply click on the desired source. As usual, if the selection is ambiguous you will be presented with a menu of possibles to choose from. You cannot unselect in the crop screen. Selection is not affected by which button is used to dismiss the screen – you can select and hit cancel to be guaranteed to have performed only a selection with no change to the crop bounds.

## Application Menu

Clicking on the Android device's menu button will bring up the Sources menu containing the following:

- **New.** This will clear all Sources from the current workspace. It can be undone via the Undo button.
- **Open...** This will present you with a scrollable list of saved definitions. The definitions are sorted as follows: standard named definitions (s\_YY-MM-DD\_HHMMSS) are presented in reverse order - the most recent is shown first. All non-standard filenames are shown at the head of the list, in alphabetical order. Note that the first name in the entire list will normally be "-AT\_EXIT-". Every time you exit Sources (via the back button) the current workspace is saved into this filename, unless the workspace is empty, in which case nothing is done. If you decide not to chose a filename, click outside the list.
- **Save.** This will save the current definition into the current filename. The current filename will be empty if you have not saved this definition before or if you have done a New - in this case you will be prompted for a filename, with the current date/time as a default.
- **Save As...** This will prompt you for a filename. There will be no warning if you decide to overwrite an existing definition.
- **Preferences...** This brings up a standard Preferences dialog, described in detail below.
- **Tutorials + Demos...** There are a number of built-in "video" lessons in Sources, covering all of the essential operations and you are urged to view them. This option allows presents you with a list of the available lessons. You will then be presented with a dialog box where you can control the playback speed of the demo, whether text is shown and whether the indicator representing finger position is shown. **Note** - touching the screen at any point when the demo is running will halt it and return you to the normal work screen.
- **Load Example...** There are more than 40 built-in examples in Sources. This menu option will present you with a list to choose from. You can modify these as much as you want – the originals will always be available here, and any saved changes will be to a separate personal copy. Note that many of the examples have an interesting undo or redo to look at.
- **Delete...** This will bring up the standard filename picker described above and will delete the chosen definition. No confirmation will be asked for. If you decide not to delete anything, click anywhere outside the filename list.
- **Save defs to External.** Definitions are stored in the Android device's internal storage - this is not normally accessible to users directly - for example if you connect your device to a computer via USB. Pictures (and the rendered animation) are stored in "external" storage. External storage may be an internal SD card in some devices, or it may be an actual physical SD card. In either case, the files in this storage are accessible to the user by connecting your device to a computer and choosing "mount" from the "USB Connected" dialog box available from

your device's status bar. The files for Sources will be found under "Android", "data", "uk.co.fordartworks.Sources.pro" (or .lite), "files". This menu option copies the internal definition files to the external storage, making them accessible via USB. Files will overwrite those in external storage, unless the external one was modified more recently. Remember to unmount the external storage in order to use Sources when you are finished. Images which are saved will be found in /SourcesPro or /SourcesLite.

- **Load defs into App.** As explained above, Sources uses definition files stored in internal storage. This option will copy all definitions found in the external storage directory (described above, in sub-directory "definitions") into internal storage. Newer files will not be over-written. The new files will then become available to the Open and Delete lists. Remember to unmount the external storage before using Sources. This option is useful for importing definitions from another origin.
- **Wallpaper...** This will open up a sub-menu with three items. This functionality is not available in SourcesLite. Also, since the wallpaper app runs only on devices with Android version 4.0 and above, the menu items will be disabled if your device is below that level. All of the items will check whether you have installed the free SourcesWP live wallpaper app - if not you will be informed.
  - **Open Live WP...** This will present you with a list of the wallpapers currently available - both the built-in ones which come with SourcesWP and any you may have created yourself. On choosing a wallpaper definition, it will be loaded into Sources for you to modify. You can then save it as a normal definition and/or as a wallpaper. You can overwrite the built-in wallpapers if you want.
  - **Delete Live WP...** This will present you with a list of the wallpapers currently available - both the built-in ones which come with SourcesWP and any you may have created yourself. On choosing one the corresponding wallpaper definition will be deleted. Note - it is not possible to delete the built-in ones completely - the next time you start SourcesWP the original definition will be copied back into your collection.
  - **Export as Live WP...** This will present you with a small dialog box where you can enter the name by which you want the wallpaper to be known. Two other options allow you to modify the default size and speed of the wallpaper. Generally you will not need to change these, and, in any case, you can override these defaults when you choose a wallpaper to be used in the SourcesWP properties dialog.
- **Help...** Selecting this menu option will bring up a scrollable screen giving brief instructions on the use of Sources. The app type (Pro or Lite) plus its version are also shown. The help screen will pop up automatically the first time you use Sources and after every re-install or update. Touch anywhere outside of the help screen to dismiss it. You will then be presented with the list of available video Tutorials/Demos. Again, to dismiss simply touch outside the list.

## Preferences

When you invoke the Preferences command from the Application menu you will be presented with a standard preferences dialog box, shown below. Note that it is scrollable and contains more options than can be shown at once on many screens.

The available options are as follows:



- **Show splash.** This is a toggle. When Sources starts up it normally shows a splash screen for 4 seconds. You can instantly dismiss it, though, by simply clicking on the screen. It is not seen when Sources is resumed. If you wish it never to be shown, untick this option.
- **Show epilepsy warning.** The first time you use Sources you will be presented with a screen explaining the slight chance of problems for people with flashing light induced epilepsy. You cannot use the program until you acknowledge this warning. Normally the warning will not be shown again until the program is re-installed or updated. If you wish it to be shown every time the program is started afresh, then tick this

option.

The next five options refer to display qualities. There are three values for display quality (each turns on different amounts of render optimization) - Standard, Good and Best. Standard is the quickest but will sometimes show artifacts, Best can be extremely slow on some devices but gives high quality results. The default values for these four settings are probably the best choices, but you can change them. Just be aware that using "Best" anywhere may have a marked performance effect on some Android devices.

- **General** - this affects the quality of the basic workspace display. Keep it low-ish to keep the program snappy when exploring possibilities. Default: Medium
- **Animation** - this affects the quality of on-the-fly animation. It should be kept fairly low as the idea of it is to quickly see the effect of running the current definition forward in time. Default: Good. It can be overridden for individual animation runs by a long click on the animation button.

- **Render** - this determines the quality of rendered animation. You will generally want this to be of a decent standard. Default: Good. You can, of course, override this by a long click on the render button.
- **Picture**. This affects the quality you see when you click the Picture button. You will normally want to see that single frame in a high quality to get a good idea of the true appearance of the current definition, and to give a good representation of what a Saved image will be like. Default: High.
- **Smoother Sweeps**. Selecting this option will result in greatly improved sweep source appearance. Not available in SourcesLite. As of v1.3 the speed penalty of smoother sweeps has been greatly reduced and so this option is now set by default.

The next two options are concerned with the positioning grid underlying the work area.

- **Snap to Grid**. If this is set then created sources will always be positioned on grid intersections, and dragging will be restricted to these positions. This is generally useful for lining up sources with one another. It does not affect the X and Y attributes in the Properties dialog - those always work at single unit (0-1000) resolution. Turning this option off allows free positioning of sources by hand.
- **Grid Size**: This allows you to set the grid size to 20, 40, 60 or 80 units. The default is 40. Note, however, that if you zoom in via the crop button so that a display is magnified, then the grid size will be reduced temporarily to allow more control.

The next option is concerned with improving performance in some rare cases.

- **Smooth Animation**. If you find that the performance of animation is very uneven and jerky (this is seen on the original Samsung S, for example) then selecting this option may solve that. It does, however, use more battery power during animation, so use only if you find it helpful.

The final option appears on large screen devices only. It is important for users of Kindle devices but may be found useful depending on your device's control types.



- **Show Menu Button**. This will show a button at the end of the Render palette which brings up the Application menu when you click on it.

## Differences between SourcesPro and SourcesLite

- SourcesLite restricts the output image you can create to be 750 pixels on the long side or the screen size, whichever is less. The same restrictions apply to animation/rendering,
- SourcesLite allows no rendering or animation optimizations. This leads to noticeably poorer output files.
- SourcesLite does not allow Smooth Sweep mode. This can have a big effect with high zooms.
- SourcesLite does not support Functions and Function Factors on sources - sources are restricted to straight lines and circles/ellipses. Functions add greatly to the range of possible images you can create.
- SourcesLite supports 3 levels of undo/redo compared to the 50 in SourcesPro. Due to the exploratory, “what-if” nature of using Sources the large undo/redo stack is a big advantage.
- SourcesPro allows you to restrict the start and end position of sources.
- Full Live Wallpaper creation, editing and deletion functionality is available only in SourcesPro – this requires the free SourcesWP app to be installed.

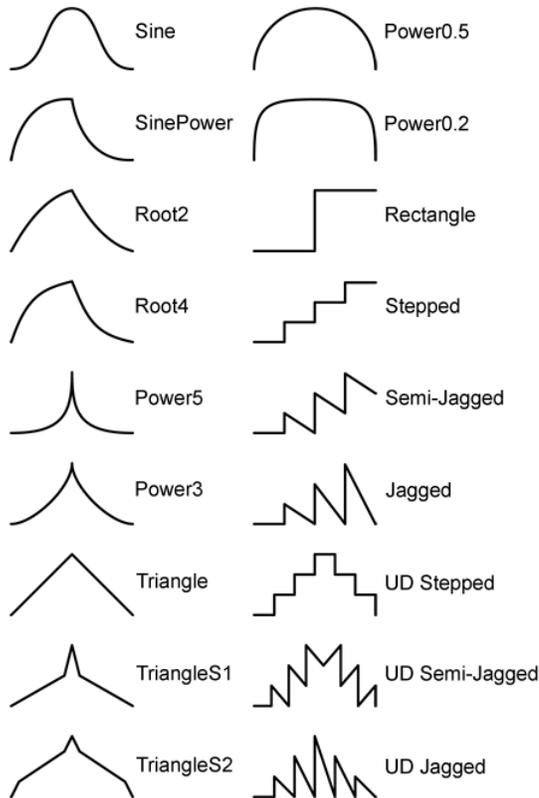
	SourcesPro	SourcesLite
<b>Max Image Size</b>	Up to 4000 pixels. Will be between 1000 and 4000 depending on device memory.	Smaller of screen size and 750 pixels
<b>Optimizations</b>	All available	None
<b>Smoothing</b>	Yes	No
<b>Smooth Sweeps</b>	Yes	No
<b>Source Functions</b>	Yes	No
<b>Undo/redo</b>	50 levels	3 levels
<b>Limits on Sources</b>	Yes	No
<b>Wallpaper</b>	Create, Open, Delete	No

## Changes in v1.4

- A source can be restricted in coverage – up to now a source covered the entire working area. It is now possible to set the start and the end (in terms of wavelengths) and how smoothly/abruptly they happen. The areas outside the range are black if the source is the lowest in a design, else are transparent. A new tab to control these properties has been added to the properties editor. (SourcesPro only)
- Undo/redo extended to 50 steps. (SourcesPro only)
- Sweep sources now can have up to 180 cycles.
- Aspect ratio added to visual controls and incorrect behaviour on accelerated sources with very narrow aspect ratios (less than 0.5) corrected
- Radial sources can now be 2-sided
- An occasional crash during visual editing has been tracked down and fixed.
- SourcesWP live wallpaper has been updated to handle the output from Sources 1.4
- There is now no longer a timeout on the use of SourcesLite.

## Description of Waveforms

This image gives an indication of the shapes of the various waveforms available in Sources.



Apart from “Sine” and the two rotating waveforms (not shown), all of these waveforms respond to the ratio property – moving the position of the peak forwards and backwards.

The last 6 waveforms – the stepped/jagged type – have an additional pair of parameters. The number of steps can be varied via the “step” property, and the steepness of the vertical parts of the waves can be varied via the “smooth” property. In the case of the UD (Up Down) waveforms, the steps property controls the number of steps on the “Up” part. If you set the number of steps to 1, you can obtain a uniform colour field which can be varied between low and high via the ratio property.

“Rectangle” also has a “smooth” property to affect the steepness of the rising part of the waveform.

TriangleS1 (Sharpened 1) and TriangleS2 are essentially triangular waveforms, but they have high or high and low colours respectively “sharpened” via peaks in the waves. Both of these wave types have a smooth parameter – this affects the spread of the peaks. Depending on zoom, etc, at very low smooth values (<4, say) the peaks may disappear – if so, simply increase the value a little (usually 5 or 6 is large enough).

In addition there are two “rotating” waveforms – square and sine. These do not respond to the ratio property. Both have use really only during animation – rather than propagating outwards, the waveforms cycle in a fixed place. Square (rotating) is like a rotating square rod with sides painted alternately with low and high colour. Sine (rotating) is like a circular rod with a continuous sinusoidal change from low to high and back again.

## **The final word**

You now have all the information you need to fully exploit the capabilities of Sources. It is a big program with countless possible permutations and so a little time is required to gain familiarity. Nearly everything is done visually and there is multi-level undo/redo, so the secret is simply to explore – see “what if?”