INCHWORM ANIMATION

Instruction Manual

01 Getting Started

Welcome to Inchworm Animation!

Inchworm Animation is the advanced paint and animation system for Nintendo DSi. With it you can create surprisingly sophisticated digital paintings and animations. Inchworm Animation's camera functions allow you to record video, time-lapse, and stop-motion photography. You can export your finished work to an SD card for use on the web and in other projects! This instruction manual explains Inchworm Animation's many functions and controls.

Overview

With Inchworm Animation even kids can learn how to draw and animate. Yet it's powerful enough for use by computer-graphics professionals. It has been designed specifically for the Nintendo DSi.

With Inchworm Animation you can draw and paint images much larger than the screen. Brushes of varying size and transparency provide excellent line control. The Advanced palette gives you access to thousands of colors. With the shape tools, you can draw polygons, rectangles, and perfect circles. These shapes can have borders of varying size and color.

You can magnify images to édit them pixel by pixel. Use layers to separate your artwork into multiple overlapping components. With the select box tool, you can isolate sections of your picture and copy, paste, or flip them. Create sophisticated repeating patterns with the built-in pattern editor ! Inchworm animation has all the cool tools.

What about animation ? With Inchworm Animation you can create flipbook-style looping animations using multiple layers. Each layer can have a different number of individually timed cells.
What's more, you can take snapshots and video using the Nintendo DSi's built-in cameras for use in your animations. Use the photo techniques of stop-motion and time-lapse photography to add real photos and video to your work !

Finally, export your masterpieces to an SD card and use them however you like !

Getting Started

The title screen is the first thing you'll see when you start Inchworm Animation.
There are two buttons – « Help » and « Start ».

Tap « Help » if you want to read this instruction manual or if you want to do the tutorials. The tutorials are an interactive introduction to Inchworm Animation's basic features – it's a good idea to work through these to familiarize yourself with the controls.

The tutorials are just an introduction. For example, they do not tell you how to make patterns or use the camera. Some of these things are self-explanatory. However, to learn everything there is to know about Inchworm Animation, you might just have to read this instruction manual !

Some of Inchworm Animation's concepts (FREE mode animation, for example) are quite sophisticated and can be downright confusing. If you ever find yourself perplexed, check the instruction manual ! We have tried to include every détail that you might need to know.

If you already know what you are doing or just want to go it alone, you can tap « Start » to begin Inchworm Animation. If you want to bypass the title screen in the future, there is an option in the Settings which allows you to do that automatically.

02 Controls
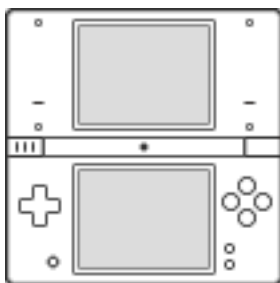
This page describes Inchworm Animation's button controls. Note that some buttons have more than one function depending on what part of the game you are using.

+ Control Pad

The +Control Pad has two main functions. First, you use it to scroll an image that extends beyond the edges of the screen.

Second, you use it to flip between animation frames – back and forth.

You can tell which function is active for the +Control Pad by the appearance of the central icon at the top of the screen.

This indicates scroll mode.

This indicates flip mode.

Tap the icon to switch between these two modes. (When your file is a still image and contains no animation, you will not be able to switch to flip mode.)

In the Settings (accessible from the SELECT menu) you can also set the B Button to flip this switch.

X Button

The X Button is used to magnify the image view. Each time you press it, it will zoom one level.

At the highest level, each pixel is clearly visible. If you press it once more, the zoom will revert to normal scale.

Also, if you hold down the L button or R button while you press the X Button, the zoom operates in reverse. You shrink the view instead of magnifying it.

Y Button

The Y Button flips back and forth between the color palette and the animation/layer controls.
In the Pattern Editor the Y Button is used to resize the pattern.

A Button

The A Button toggles animation playback. Press it once to start playing – a "PLAY" indicator appears at the bottom of the screen. Press it again to stop playing.

The A Button is also used to confirm various menu selections.

B Button Ⓑ

The B Button is a "hot key" – in the Settings you can choose between several functions for it to perform:

• Insert a new cell
• Toggle flip mode and scroll mode for the +Control Pad
• Toggle under/over draw

The B Button is also used to cancel various menu selections.

SELECT and START

◯SELECT

SELECT is always used to bring up the menu. From the menu you can:

• Create new files
• Load old files
• Save your work
• Use the camera
• Delete files
• Modify the canvas size
• Change settings
• Export to an SD Card
• Access the help
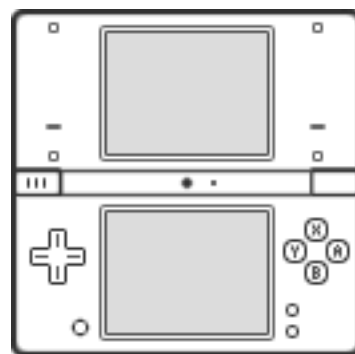
◯START

Use START to enter and exit full screen mode.

Press it to hide the controls temporarily, so that you may draw on the entire touch screen surface. Press START again to bring back the controls.

L and R Buttons [L📷] [📷R]

The L Button and R Button can be configured for either of two behaviors. By default, the L Button switches to full-screen mode while you hold it down. The R Button performs a color pickup, just like the eye-dropper icon.

In the Settings you can reverse the behavior of the L and R Buttons. You can also set both buttons to do the same thing if you want.

Also, if you hold down the L Button or the R Button while pressing the X button to zoom, you reverse the direction of zoom from in to out.

03 Pencil and Paintbrush

This page describes the PENCIL and PAINTBRUSH – these are your primary drawing tools when operating Inchworm Animation.

Quick Tips

Before you draw, choose a color or pattern. For more information, refer to the 'Color Palette' and 'Pattern Palette' pages of this instruction manual.

If you need to erase, use the CLEAR COLOR, located on the color palette at the bottom right of the screen.

With the OPACITY SLIDER, you can change the opacity (the transparency) of the lines you draw. It is located just below the main toolbox.

Use the OVER / UNDER drawing switch (described in the next section, "Top Tray Tools") to draw either over or under your existing drawing.

The Pencil

The pencil is used to draw thin, single-pixel-wide lines. When you are zoomed far into your picture, it is the tool you should use to change one dot at a time.

When you select the pencil, the FREEHAND / STRAIGHT LINE selector will slide into view. Choose FREEHAND (the curvy icon) for regular hand-drawing. Choose STRAIGHT LINE (the diagonal icon) to draw perfectly straight lines.

The Paintbrush

Use the paintbrush to draw nice smooth lines of varying thickness. When you select the paintbrush, its tools will slide into view.

The big white circle with the black circle inside it is the BRUSH THICKNESS tool. Tap this circle and slide up or down to change your brush thickness. The exact pixel width is displayed as you slide the stylus.

You need not stay inside the circle while sliding – in fact, you should go all the way to the top or bottom of the screen to access the full range of line widths.

The BRUSH SELECTOR allows you to choose between three brushes. The leftmost setting is the constant-width brush. The middle setting gives you a brush that starts thin, becomes thicker as you draw faster, and gets thinner again as you draw more slowly. The rightmost setting is a brush that starts very thin and becomes thicker as you draw.

All three brush types are controlled by the BRUSH THICKNESS tool above it. This tool determines the maximum thickness for all three brushes.

Like the pencil, the paintbrush has a FREEHAND / STRAIGHT LINE setting. Tap the left side to draw freehand lines and the right side to draw straight lines.

The SMOOTH / JAGGY switch is located at the bottom of the brush tools. This switch controls whether or not your lines have smooth edges. Usually the smooth setting on the left is best.

However, smoothing can interfere with flood fills – and sometimes you just do not want smooth lines. In such cases you can change this setting to JAGGY, on the right.

NOTE: Even though it resides in the paintbrush toolbox, this SMOOTH / JAGGY switch also affects shapes drawn with the SHAPE tool (described on the 'Shapes' page). If you notice that your circles have jagged edges, you probably need to set this switch back to smooth.

04 Top Tray Tools

This page describes the first four icons in the Top Tray: UNDO, GRID, UNDERDRAW, and BLANK.

Undo

Inchworm Animation has a one-step UNDO feature. If you make a mistake while drawing, or if you perform some action that does not do what you expected, you can often undo it.

When an UNDO is possible, this icon appears with the letter 'u' enlarged and in white (see above, right). Tap this icon to undo the last action you performed.

Please note that not every action in Inchworm Animation can be undone.

Grid

You can turn on the GRID to see lines between all of the pixels of your drawing. It is like graph paper. Tap the icon to turn on the grid, and tap it again to turn it off.

The grid can only be used when the view is magnified – the icon will appear 'greyed out' if you cannot use it.

Over / Under Draw

One of Inchworm Animation's best features is the ability to draw both OVER and UNDER your drawing. Normally you draw OVER – every line you draw appears on top of those that came before it.

Tap this icon to switch to UNDERDRAW. Now when you draw a line, it appears underneath everything else! Tap the icon again to switch back to OVERDRAW.

If you are using layers, over/under draw operates only within your current layer. So, layers beneath your current layer will still appear below your drawing, regardless of the over/under draw setting. Likewise, layers on top of your current layer will continue to appear above your new drawing.

Blank Layer

This button immediately erases everything on the screen – use it to quickly start over on a drawing.

Note that if you have more than one layer, this icon only erases the currently selected layer. The other layers are unaffected.

Also, if you have an active SELECT BOX (see the 'Select Box' page), then only the area inside the active box will be erased.

+Control Pad Switch

In the middle of the top tray is a switch that controls the functionality of the +Control Pad. The switch has two settings. Simply tap the icon to switch back and forth between these two settings.

This icon indicates SCROLL MODE. In scroll mode, pressing any direction on the +Control Pad will cause your view of the canvas to scroll. If your canvas is larger than the screen or if you are zoomed in, then you can use the +Control Pad to move around to different parts of your image.

Note that the Settings screen has an option which allows you to reverse the direction of scrolling when using the +Control Pad. There you can also set the B Button to trigger this switch.

This icon indicates FLIP MODE. In flip mode, pressing Right or Left on the +Control Pad will change your current frame by a positive or negative amount, usually one frame.

Specifically, the current frame will change by the number of frames required to display the next cell in the current layer's sequence. Thus, if the layer's current cell is holding for three frames, then pressing Right on the +Control Pad will jump forward three frames to the next cell.

In flip mode, holding down Left or Right on the +Control Pad will play through your animation frames.

Reaching the last frame of your animation will result in the current frame being reset back to the first frame. Similarly, moving backwards from the first frame in your animation will jump to the last frame.

Animation Tools

The four icons along the right side of the top tray tools are used for animation. Their functions are described on the 'Animation Basics' page.

05 Shapes

This page describes the use of the Shape tools. Use them to create circles, rectangles, and freehand shapes.

You access the shape tools by tapping the lower-left icon in the main tool box. This icon will appear as a circle, a rectangle, or a polygon depending upon which shape tool is currently active.

Shape types

There are three different types of shapes that you can draw:

Circle: Place the stylus at the point where you want the center of the circle to be. Slide outward to set the circle's radius.

Rectangle: Tap and slide to create rectangles of any size and shape.

Freehand Polygon: With one continuous stroke, draw a shape on the screen. When you lift the stylus, the area will be filled according to the current border and color settings.

Shape border controls

Underneath the three shape icons you see a large circle above a rectangle.

The large circle shows you the current shape attributes, including color, border color, and border thickness.
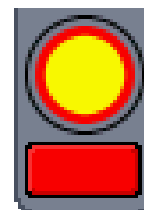
No special action is required to change the shape fill color – you just choose a new color on the palette. When you do that, the center of this large circle will change color as well.

Set the border color for shapes by tapping the box below the circle.

Change the border THICKNESS by sliding the stylus within the circle. You can slide far up and down on the screen – the border thickness is displayed in the center.

To create hollow shapes, you must choose the clear color / erase box as your current color. See the 'Color Palette' page for more info.

Slide all the way down to specify shapes with no border at all.

Also if you select a border width of 0.0 and draw a shape with the clear color selected, then the shape will ERASE instead of fill. You can use this functionality to create circular holes or to cut away from your drawing using the polygon as a lasso tool.

06 Select Box

The Select Box is used to outline a rectangular section of your drawing and perform some action upon it. You use this tool to cut and paste areas of the screen (even between layers and frames!) You also use it to flip, rotate, scale, measure, and crop images.

The Select Box tools work only on the current layer. If you have multiple layers, only the selected one will be affected by these tools. (The one exception is when copying to the clipboard with 'clear copy' set to 'solid' – see below.)

Selecting / Deselecting

This is the SELECT BOX icon. Tap it to activate selection mode and show the selection tools.

With the SELECT BOX tool highlighted, slide the stylus across the canvas. A moving marquee will appear as you slide – its coordinates and size are displayed on the top screen. Lift the stylus and the box will remain.

You can DESELECT the active box entirely just by tapping the select box icon again. It will remain highlighted, but the active selection will cease.

'Fine-tune' an active selection by tapping just inside one of the borders and sliding it. If you tap just inside the line, you will be able to move it just a few pixels at a time. (Tapping in the middle of the box will move it – see below.)

You can make a new box simply by drawing another one – just start anywhere outside of the active area.

Move the selection

You can move the area defined by the select box – just place the stylus in the center of the box and slide it. The selected area will move with the stylus.

*You can use the 'clear copy' switch, described below, to choose whether to include
or not to include the background and other layers in a clipping.*

Whole-screen selection

If you need to select the entire screen area, use the ALL button.

Be careful with the entire screen selected. You may tap the screen without seeing that box at its edges and inadvertently slide the whole area to another part of the canvas! (See the 'Canvas Size' page.)

You can tap ALL a second time to deselect the screen.

Copy and Paste

You can clip a copy of the selected area and store it on a 'clipboard.' The clipboard contents can be pasted back to your drawing – even to another layer or animation frame, and at a different size than the original – as many times as you want. You can also save the clipboard contents as a separate file.

Tap the SCISSORS icon to 'clip' a copy of the selected screen area onto the clipboard.

To paste it back, you have two options. If there is no active selection, then just tapping the PASTE icon will place a copy of the clipboard contents at the center of the screen. Then you can drag this pasted material wherever you want.

However, if you first draw a new select box and then tap PASTE, the clipboard contents will be magically SCALED TO FIT within the new selection! You can squash and stretch things this way.

At the bottom of the select box tools is this icon, the CLEAR COPY switch.

It determines whether to include or not include the background color and other layers when you copy the selection to the clipboard.

Use the 'solid' setting on the left if you want to copy everything – the background and other layers as well as the current layer – when you make a copy.

Use the 'clear' setting on the right if you want to copy only from the current layer.

Additionally, the CLEAR COPY switch causes paste operations to behave differently.

In 'solid' mode (on the left), any transparent areas of the clipboard are copied to the canvas when you paste – they erase what was there before.

In 'clear' mode (on the right), transparent pixels in the clipboard are not pasted. This lets you overlap irregular shapes without including the rectangular border pixels. (The second tutorial includes a demonstration of this functionality.)

Flip and Rotate

You can flip the selected area horizontally or vertically.

Tap the HORIZONTAL FLIP icon to flip the selection from left to right.

Tap the VERTICAL FLIP icon to flip the selection from top to bottom. You can also turn the selection sideways.

Tap the ROTATE icon to rotate the selected area clockwise 90 degrees.

Crop and Ruler

Tap the CROP icon to cut away everything else outside of the select box and leave only the inside. Note that like all the select box tools, this only applies to the current layer – other layers are not affected.

Place the stylus on the RULER icon to display the measurements of the current selection – width and height are displayed along with the coordinates of the area's upper-left and lower-right pixels.

Save and Load Clippings

Once you have copied an area to the clipboard, you can save it as a separate file. This is very useful if you want to create icons or small images of a specific pixel size.

To save a clipping, just select the CLIPPING tab from the SAVE MENU (see the 'Saving and Loading' page).

Clippings can be loaded individually like regular files, but you can also choose to add a clipping to your existing work. When you load a clipping, you are asked whether you want to load it by itself or add it to the current work.

07 Flood Fill & Move

This page describes the flood fill and move tools.

Flood Fill

The flood fill, or paint bucket, allows you to fill an area of the screen with a single color or pattern. Tap the paint bucket to choose the flood fill tool. Then tap any area on the screen to fill it with your current color or pattern.

The fill works on a layer by layer basis – it will ignore all layers but the current one.

Flood fills work by replacing one exact color with another. This can be problematic if your drawing consists of smooth lines, because the edges of those lines are blended with the background. A normal fill will leave ugly holes along the edges of smooth lines and shapes.

The FUZZ FILL is meant to alleviate this problem. When you use the flood fill in an area of a layer which is completely transparent, the fuzz fill activates. It fills the transparent area, but it also fills beneath any partially-transparent pixels as well.

The fuzz fill slider controls how opaque a pixel must be before it will stop the fill. If the slider is set too high, then the fill might spill over thin lines. If it is set too low, you will start to see the jaggy holes along the fill edge.

The default slider position may be sufficient for most of your needs. If you find the fill is escaping the bounds you have drawn, try lowering the slider threshold.

Move Tools

There are two different move tools in Inchworm. The first one looks like a HAND with outstretched fingers. This tool allows you to drag an entire layer. Use it when you want to move all of the cells on a layer.

The second move tool looks like a hand with one pointing finger. This is the FINGER tool. It allows you to individually move one cell on the current layer. Use it to move one cell on the current layer withoutchanging the other layers or cells.

08 Color Palette

The color palette contains a number of tools for choosing and storing colors.

The Mix Palette

The MIX PALETTE is Inchworm Animation's primary color-choosing tool. It consists of three panels. The top panel shows a range of colors that share the same HUE. A color's hue is essentially its color of the rainbow. For example, red, green, orange, blue, yellow and purple are different hues.

The middle panel shows colors that all have the same SATURATION. The saturation refers to a color's intensity. It can range from the purest, strongest version of the color to one that is more pastel or washed-out. At its lowest saturation a color simply becomes gray.

For example, the color pink is a red hue with low saturation.

The bottom panel shows colors that share the same VALUE or brightness.
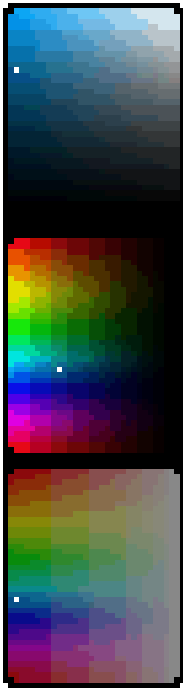
At any one time you always have a CURRENT COLOR – it is shown in the box at the top of the palette. This color also appears as a tiny dot in each of the three mix palette panels.

When you tap the mix palette, you choose a new current color. The panel you tap will not change, but the other two panels will update to match the color you selected. So, for example if you choose a certain blue from the middle palette, then the top panel will update to show you every variation of that same blue hue.

You can ZOOM into the mix palette to fine-tune your color choice. There are three levels of zoom – select them from the little row of icons just above the mix palette. So, to get a specific shade of orange, tap something close to what you want. Then select the second or third zoom icon. The mix palette will magnify around the current color to expand your choices.

Current / Background Color

As mentioned above, the CURRENT COLOR is shown in the box at the top of the palette. It overlaps the BACKGROUND COLOR box beneath it.

When you want to change the background color, just tap that lower box – the background changes to match your current color.

Just tapping the current color box doesn't do anything – but if you tap and SLIDE the current color box, you can place that color in the BOX PALETTE, described below.

The Box Palette

The strip of colors running along the right side of the palette is called the BOX PALETTE. Here you store colors that you might want to reuse. Tap any of the boxes to choose its color. Also, SLIDE the list up and down to see many more colors than will fit on the screen.

Whenever you use a color to draw a shape or a line, it is automatically added to the box palette – you will hear a 'pop' sound. Thus, you do not have to worry about saving colors as you use them.

If you want to remove a color from the box palette, simply drag it out – tap on the color, slide to the left, and let go.

You can turn off the auto-color adding behavior on the Settings screen.
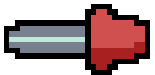
Clear Color / Erase tool

The CLEAR COLOR or erase box is located at the bottom right of the screen, below the box palette.

Choose this box in order to ERASE when you draw. Use it also when you want to draw hollow shapes with the shape tool.

Eyedropper

Finally, at the bottom left of the palette is the EYEDROPPER. Use this to select a color that is already in your animation. Just tap on the eyedropper to highlight it. Then tap the stylus some-where on the screen – the current color will be lifted from the spot you tap. The eyedropper deselects automati-cally.

You can also use the L or R button to perform the same function as the eyedropper. There is an option in the Settings that allows you to specify which button does this.

Pattern Switch

This little button at the upper right of the palette is the PATTERN SWITCH. It shows a small swatch of the currently selected pattern.

Tap it to switch from the color palette to the PATTERN PALETTE, which is described on the next page.

09 Pattern Palette

The PATTERN PALETTE lets you paint with intricate multicolored patterns instead of solid colors. You can also create your own patterns!

Choosing a pattern

If you are looking at the color palette, then you can switch to the PATTERN PALETTE by tapping on the small box at the upper right. It shows a little swatch of the currently selected pattern.

The pattern palette shows you a list of all the available patterns with which you can draw.

Tap on a pattern to select it. Tap and slide the stylus up or down on a pattern to scroll the entire list. There are also arrows at the top and bottom of the list which allow you to scroll it.

Note that some patterns are constructed with clear colors. They can be used to place a texture or partial pattern over your drawings. A checkerboard is shown beneath patterns to indicate transparency.

When you want to go back to the color palette, just tap the box in the upper right again. On the pattern palette it just shows the current solid color.

Pattern Editor

One of Inchworm Animation's most exciting feature is the ability to make and edit your own patterns.

From the pattern editor, tap the little 'plus' icon above the pattern list. You are given the choice to make a "New blank pattern" or to "Copy current pattern". If there is an image of size 64x64 pixels or smaller on the clipboard, you will be given a third choice: "Use clipboard."

Then you will enter PATTERN EDITING mode. This is quite similar to regular painting, except that some of the tools are off-limits. The buttons also behave differently. In this mode, the directions always appear on the top screen.

Use the paintbrush or pencil to draw and modify the new pattern. Notice how the editor automatically tiles it over the entire screen so that you can see how it will look as a repeating pattern. You can use the +Control Pad to scroll the pattern. You can also use the existing patterns to draw your new pattern!

Wherever you have blank areas in the pattern, you can see through to the checkerboard background. This is not part of the pattern. If you want a background color for your pattern, make sure that you draw one.

Press the X Button (just like you do in regular paint mode) to zoom in or out on your pattern. Because patterns are meant to repeat and are limited to 64x64 pixels in size, you are not able to zoom out completely.

You can alter the size and shape of your pattern – press the Y Button. Four lines appear on the bottom screen. These lines frame the boundaries of your pattern. You can drag them back and forth to make the pattern wider, thinner, taller or shorter. Each time you lift the stylus, you will see how the pattern looks with its new dimensions. Press the A or B Button in pattern resizing mode to return to pattern editing.

When you are finished pattern editing, press the A or B Button. You then have these options: "Save it", "Just use it for now", or "Forget it." If you think you will want to use the pattern later on other files, then save it. If you know that you will never want to use this pattern again after you quit Inchworm Animation, then select "Just use it for now." The pattern will be placed in the palette, but it will not be saved and will not be there the next time you start the game.

Finally, if you don't want to use this pattern at all, tap "No, forget it".

If you don't save your pattern but then later decide that you would like it saved, you can do that. Just go to the regular save menu and choose the PATTERN TAB to save it. It will become part of the permanent pattern palette. If you ever want to remove your patterns from the palette, you can delete them using the DELETE FILES menu – the same way that you delete any file in Inchworm Animation. (See the 'Files' page.)

10 Canvas Size

The Canvas

Inchworm Animation allows you to work on drawings that are much larger than the screen. Export them full-sized to the SD card for use in other projects.

When you press SELECT, a menu appears with a bunch of large icons. Tap this one to edit the image BOUNDARIES.
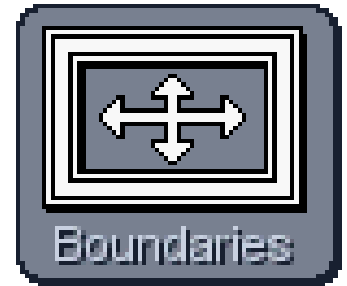
The "Canvas Boundaries" screen has two sections. These are the numerical and visual representations of the canvas.

In Inchworm Animation, the "canvas" is simply the boundaries of your entire image. The canvas has an 'origin', which is the coordinates of its upper left point.

The canvas also has a width and a height. For example, if your image is the size of the Nintendo DSi screen, then the width is 256 and the height is 192.

Sometimes you may want to work on an image that has an exact size. You can set these values in the text boxes on the left. Tap a box to change the numerical value. The change will be reflected in the window to the right.

The window to the right side of the Canvas Boundaries screen shows your entire image, even when the image is larger than the screen. When the screen first appears, your entire image is scaled and rendered to fit within the white box. Changing the canvas coordinates will change the relationship of your image content to these boundaries, so the image is re-rendered whenever you change the canvas origin or size.

You can also change the canvas size and origin by sliding the stylus within the window view. Drag any side of the white box to move it. The origin and size numbers change to reflect your actions.

11 Files

File operations, such as saving and loading, are done from the SELECT menu. Simply press SELECT to bring up the menu. Along the bottom of this menu you will see options for loading, and deleting files. There is also a button for creating a new image or movie.

New File

The 'New' button at the bottom left of the SELECT menu allows you to start a new movie or image. When you start a new file, it is not saved until the first time you save it yourself.

Also, when you start a new file, you are asked to specify a canvas size. You can change the size later from the Boundaries screen.

Save File

From the SELECT menu, tap 'Save' to bring up the save menu.

Along the top of this menu are four tabs. Choose one of these tabs to select what you want to save.

The first tab is used to save your entire animation or image. This menu will say 'Save Image' if there is only one frame in the movie. If there are multiple frames present, then the menu will say 'Save Movie'.

The second tab is used to save only your current layer. You can save layers and load them into other files.

The third tab is used to save clippings from the clipboard (see the 'Select Box' page). These can also be loaded into other files.

The fourth tab is used to save new patterns you have created (see the 'Pattern Palette' page).

The Save Menu shows you how many save blocks are needed to save your file. If you are replacing an existing file, then less space is needed – you will see that amount shown instead. You will also see the amount of free space available.

If there is not enough space to save your file, this text will appear in red. In that case, you need to delete some files before you can save. (See 'Delete Files' below.)

Tap the white 'name' box to specify a name for your file. A keyboard will appear, allowing you to type a file name.

Every file you save must have a different name. If you attempt to save a file with the same name as an existing file, you will be asked if you want to replace the old file with the new one.

If you enter a new name, tap 'Ok' to leave the keyboard.

To save your file, tap the Save Menu's 'Ok' button. A dialog will appear to notify you that the file has been saved.

Load Files
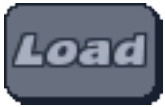
To load a file that you have saved previously, tap the LOAD button from the SELECT menu.

You will see the Inchworm Animation browser.
A list of files is shown – you can scroll up and down the list using the +Control Pad or by dragging the scroll bar on the right-hand side of the screen.

As each file is selected, the top screen will show you a preview of the file. You will also see information about the file, including its name, type, and size.

Press the A Button to load the selected file.

If you save enough animations, you will sooner or later run out of space. In order to make room for new creations, you can delete old ones that you don't need anymore.

Delete Files
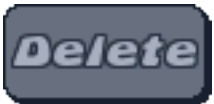
If the animation is something you still like, make sure you export it to an SD card before you delete it! See the "Export to SD Card" page for more information.

To delete a file, bring up the SELECT menu and choose "Delete." The Inchworm file browser will appear.

Choose a file from the list.

Different files have different sizes – you can find the size of the selected file in the information displayed on the top screen.

When you have selected the file you want to delete, press the X Button. You will be asked if you are sure you want to delete the file. Tap "YES" to delete it.

12 Basic Animation

It is easy to create simple animation in Inchworm Animation. This page introduces you to the basic tools you'll need. The controls are located along the right half of the Top Tray Tools.

Add / Insert Frames

The most basic type of animation is the "flipbook" – it's just a series of drawings that are shown quickly one at a time so that they appear to move. Each layer in Inchworm Animation can be its own flipbook. The layers are stacked on top of each other, or 'composited', to form the final image.

If you have already created a drawing, then you already have one frame. You can turn the drawing into a flipbook simply by adding more frames and drawing on them. Tap the icon on the tool tray to add a blank frame to your layer.

Your initial drawing disappears, but it is not gone. You are just looking at a new, blank frame. Draw something on the new frame. Tap again to create another frame. Draw something on it. You can create as many frames as you like.

Now how do you see them move? Press the A Button. They will play in a loop until you press the A Button again.

+Control Pad Flip / Scroll

Tap this icon (in the center of the top tray) to switch from SCROLL mode to FLIP mode. In FLIP mode, you can press left or right on the +Control Pad to change between frames one at a time. Hold down one of these buttons to play through your frames forwards or backwards.

When the +Control Pad switch is in SCROLL mode, it is used to move around on a single big frame. In FLIP mode, it steps through the frames of your animation.

Play Animation

Press the A Button to play the animation. It will continue to play, looping until you press the A Button again to stop it.

Onionskin

Usually if you are drawing frame-by-frame animation, each new frame is only slightly different from the one before it. The similarities between frames create the illusion that a single object or character is moving.

Animators commonly use something called ONIONSKIN to look at the previous frame when drawing a new frame. It allows them to trace parts of the drawing that do not change. It also makes it easier to estimate how much you should change the parts that move.

   Tap the ONIONSKIN icon to display you layer's previous frame transparently below your current frame.

   If you want to see the following frame as well, tap the icon again. It will look like this.

Tap the icon a third time to turn off onionskin.

Use this feature to help you create smooth, fluid changes between your flipbook frames.

Copy Frames

This is the copy icon – it works similarly to add/insert. However, instead of making a new, empty frame, it makes a new copy of the current frame. Use this icon when you only want to make a small change to an existing cell.

If you are going to be doing this a lot, you might want to break up the flipbook into LAYERS and use FREE MODE, where the still parts are on one layer and the moving parts on another. It could save you a lot of memory.

Delete Frames

This icon is used to remove a frame "cell" from a layer. Just use the +Control Pad in FLIP mode to move to the cell you no longer want. Tap this icon and the cell will be removed.

Advanced Animation

Check out the "Advanced Animation" page to find out about cell timing, animation with several layers, and more.

13 Layers

This page introduces you to layers. It describes how to use them in Inchworm Animation.

Layers are a concept used in most advanced computer painting systems. With layers, multiple images are stacked together to compose a complete scene. Layers allow you to change individual parts of your painting without affecting the other parts. This is especially useful in animation, when one thing in your scene may change while the other things do not.

In both painting and animation, it helps to separate the components of your scene into layers. For example, you might put the sky on one layer, some mountains on another, and a house on a third layer.

Layer Controls (Y)

Press the Y Button to switch from the color palette to the LAYER CONTROLS seen in this image.

Pressing the Y Button always toggles between the color palette and the layer controls.

When you begin a new Inchworm Animation file, it has one layer. The Layer appears on the control panel as a box with the number 1 on it. You can have up to 6 layers. To create a new one, just tap the ⊞ icon. The new layer appears in the LAYER LIST as another numbered box.

The currently-selected layer is brighter than the others in the list. Whatever you draw is always placed on the current layer. Depending on the setting of the OVER / UNDER switch (See "Top Tray Tools"), the drawing happens either underneath or on top of the layer's existing drawing. In order to draw or erase on other layers, you have to select them first.

You select a layer by tapping once in the middle of its box. When you tap on a new layer, its contents are briefly highlighted on the canvas – this enables you to see quickly what is on each layer.

You can re-order a layer just by sliding its box up or down within the list. Layers are ordered from front to back. That is, the first layer in the list appears in the FOREGROUND. The last layer appears in the BACKGROUND or rear of your drawing.

You can rename the layer by double-tapping it. The keyboard pops up and you can type a short tag name – it can only have three letters.

You can delete a layer by tapping the ⊟ button.

Still and Moving Layers

At the left of each layer box you see a small circle or triangle. This indicates whether the layer is a still drawing or a flipbook animation.

The triangle indicates that the layer only has one cell – it is a still drawing. A circle means that the layer has more than one cell and so it is a flipbook animation. When you add a cell to a still layer, this symbol will therefore change from a triangle to a circle.

The top of the layer tools panel changes depending on whether a still or moving layer is selected. When a still layer is selected, you see the CELL MAP. This box shows a rectangle within a box that is the same color as your background color. If the canvas is larger than the screen, an orange box shows you which part of the canvas is onscreen. If you are zoomed in, then the bounds of your visible area appear as a red box within the orange box.
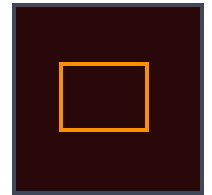
When the current layer has multiple cells, the cell map is replaced by the cell counter and timer. This upper box is the CELL COUNTER. It shows you the number of the current cell above the total number of cells. In this picture, cell number 4 out of 10 is selected. You can tap on this box to go to a particular cell and thereby change frames.

The lower, smaller box is the CELL TIMER. By changing the number in this box, you control how long the current cell remains onscreen. Here we see that the current cell is held for three frames. Each cell can be shown for a different number of frames.

These controls are discussed at greater length on the next page, "Advanced Animation."

Layer Visibility

The circle/triangle shape is also used to indicate a layer's visibility. Tap it to turn the layer OFF and hide it from view – perhaps so you can more easily see the other layers. Tap the space again to turn the layer back on.
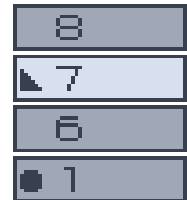
In this image, layers 6 and 8 have been turned off and will therefore not be seen. (Layer 7 is a still image and is selected. Layer 1 has multiple frames.)

LOCK / FREE Step

At the top of the layer controls is a button that either says LOCK or FREE. This button controls the relationship between layers.

In LOCK mode, every layer is required to have the same number of cells and the same pattern of cell timings. This ensures that the entire animation behaves as one perfectly synchronized flipbook.

FREE mode, on the other hand, allows each layer to behave independently of the others. For example, you can have one layer which is just a still background, another with ten frames of a running character, and another with two frames of a flapping bird. All of these layers repeat on separate loops and they can each be given their own set of cell timings. FREE step mode is thus quite powerful, but it may be confusing for beginning users.

Please see the next page "Advanced Animation" for more discussion of this feature.

Frame Counter

At the bottom of the layers panel is a numeric display with an arrow next to it. This is the FRAME COUNTER. The current frame is displayed in the box. Tap the box if you want to travel to a specific frame by typing its number.

If you tap the arrow, then you will be returned to frame 0.

Layer Memory Warning

There is a limited amount of space available for each cell frame. When you get close to that limit, a warning dialog will pop up. Thereafter, the layer will appear in the list with a yellow border.

Once a cell is totally full, the border will turn red. You will not be able to add anything to the cell. However, you can add new cells to the layer, and you can continue to draw on other layers until system memory runs out.

Saving Layers

You can save a layer by itself, so that you can then load it into another animation. When you choose to load a layer, you will be asked whether you want to load it by itself or add it to the current animation. See the "Files" page for more information.

14 Advanced Animation

This page reviews Inchworm Animation's advanced animation features. With these features you make use of layers to separate your animation into independent elements. Some of this information is repeated from the "Layers" page – hopefully further explanation will clarify some of the more complex concepts.

Cells vs Frames

In Inchworm animation, a "cell" is what you might think of as a frame. It is a single drawing in a sequence of many drawings. However, because a single cell can be displayed for a long time, we don't call it a frame. A "frame" in Inchworm Animation refers to the smallest unit of display time in your animation.

So, for example, you might set a single cell's timing to 3. That means that one cell displays for three frames. In many cases the terms are interchangeable, so you don't need to worry about it too much – but now you know.

Animated Layers

When layers have multiple cells, they no longer behave as still images. Instead they become animated flipbooks. Each cell is displayed in sequence like the pages of a flipbook. When the last frame is reached, the whole thing loops.

Notice that when you have an animated layer selected, the top portion of the LAYER CONTROLS looks like the image below.

  These boxes show information about the cells in your current layer. (In LOCK STEP mode, this information will be the same for all layers.)

  The top number in this box is the current cell. The lower number is the TOTAL number of cells. Tap the box and slide up or down on the arrows that appear to select a different cell – you will be taken to the closest frame on which the selected cell appears.

Cell Timing

Animated layers have a special feature that allows you to display some cells for longer duration than others.

  The box with the hourglass icon shows you the TIMING for the current cell. The timing determines how long a cell is displayed onscreen. Usually cells are shown for only a single frame, but you can change this number to create pauses and rhythm in your movies.

Tap on the cell timing box and two arrows will appear. Slide the stylus upward to the top arrow to increase the cell timing. Slide downward to the bottom arrow to decrease it.

By setting different durations for cells in a layer loop, you can create flipbooks that have a rhythm or dramatic timing.

Please note that this value does not refer to an exact unit of time. Inchworm Animation plays frames as quickly as possible. Because the play rate varies with the complexity of the artwork, the timing simply refers to the number of times a cell is shown successively in the animation.

Layers and Loops

LOCK The LOCK/FREE switch is very powerful. When locked, your animation behaves as a single cohesive flipbook with a set number of frames. This is the most intuitive way to work – each layer has the same number of cells. If you change the cell timing on one layer, then that timing applies to the other layers as well.

However, LOCK mode can also be cumbersome. What if you want a still background in your animation? You would have to make a separate copy of that image for every frame in your flipbook. That is very wasteful of memory, of which the Nintendo DSi is in short supply.

FREE FREE mode allows you to mix still layers and moving layers. In free mode, every layer can have a different number of cells, and each one runs on its own loop with its own cell timings. This may be counterintuitive at first – however, the ability to have layers with different loop lengths is a powerful feature once you learn to use it.

You can still create synchronized layers in free mode. You just need to make sure that they have the same number of frames – and that the timings for those frames are also the same.

Inchworm Animation gives you many options for structuring your animation. Hopefully with practice you will learn to take advantage of the power and flexibility they provide.

If you have created a character in LOCK mode, you can then switch to FREE mode and add a still background -- the formerly locked layers will not change. However, if you then go from FREE mode back to LOCK mode, blank frames will be added to the still layer to 'pad' it. In LOCK mode all the layers must have the same number of frames.

15 Camera

This page introduces you to Inchworm Animation's camera
controls and how to use them for drawing and animation.

The camera controls are accessible from the SELECT MENU.
Just press SELECT and then tap "Camera" to summon them.

Three Ways to Shoot Video

If you want to capture video for use in your animation, tap the "Video" tab at the top of the Camera Controls
screen.

Choose which camera you want to use by tapping "in" or "out". The image on the top screen will show the camera
view.

The three icons along the second bar determine the type of video recording: regular video, time lapse, or stop-
motion.

Video

The "video" setting, identified by the movie camera, records frames of video at a specified frame rate until the
frame bank fills. Specify the frame rate in the box below the "Record" button.

Time-Lapse

Choose the "time-lapse" option, identified by the clock icon, to record frames very slowly. You can have the
camera shoot each frame only once in a while, giving you cool sped-up motion. Shoot the drifting clouds, for
example.

In the box below the record button, you can enter the number of seconds you want Inchworm Animation to wait
before it takes each new frame.

Stop-Motion

"Stop-motion" is the mode to choose when you want to shoot each frame of video MANUALLY. It is identified by
the stop sign icon. This is how animators do claymation. You can compose your scene and shoot one frame at a
time like the ancients did!

When you select this mode, the "Record" button will change to a "Shoot Frame" button. The number of frames
shot so far is displayed below the Record button. In this mode, if you fill up the frame bank, its capacity will be
expanded as you shoot new frames until it reaches the maximum.

Frame Bank

The frame bank is just another name for the number of frames available for video recording. The maximum
amount is shown on the right. The amount that you currently have reserved is shown on the left.
You might be tempted to use it all, but beware! In that case you will have almost no memory left for drawing!
In Stop Motion mode, this number will increase automatically if you reach the limit and try to shoot more frames.

Ready to Record

Simply tap "Record" to start. The selected camera will start recording. Recording will proceed until the specified number of frames have been captured or until you tap "Stop".

The speed of recording is controlled by the numbered box below the Record button. By default, the value is 15 frames per second. You can't record any faster than that. However, you can have Inchworm Animation record at a lower frame rate. Tap the white box to change the shutter speed.

In Time Lapse mode, use this box to specify the number of seconds Inchworm Animation should wait between camera shots.

In Stop Motion mode, the button says "Shoot Frame" and you just tap it each time you want to take a picture.

Playback and Exit Camera

Once you have recorded some video, play it back by tapping "Play". You can re- record the video as many times as you want.

You can change the playback rate of the recorded frames by tapping on the play rate control. It is located under the Play Button. When you return to your animation, the frame timings will also approximate this rate.

If you are happy with you recorded frames, press SELECT. You can choose to "Use Video" or "Forget Video". If you use it, the frames will be converted for use in animation layers.

If the layer tray has space, you can put the video on a new layer. Otherwise, the video will be inserted into the current layer after your last current frame.

Capture Single Photos

If you just want to take one photo to use in your animation, then make sure the "Still" tab is highlighted at the top of the Camera Controls screen.

Choose "in" or "out" depending on which camera you want to use. You should see the active camera's image live in the top screen.

Tap "Take Photo" to take a picture. It will appear in the box to the left of the button. You can do this again and again until you are happy with the photo you have taken.

Press SELECT to return to leave the camera controls. You can choose to "Use Photo" or "Forget Photo".
You can choose to put the photo on a new layer or on the current frame of the current layer.

If the current frame already has drawing on it, the photo is placed on the next clear blank frame. If there aren't any blank frames a new frame will be created for the photo.

Use photos just like you do any drawing in Inchworm – cut holes in photos to see the layers behind them!

Camera Layer Tips

You can use photo and video layers as you would any other. In fact, you can scratch away the background of a video with the clear color – then you can put stuff behind it!

16 Export to SD Card

When you are finished with an animation or image, you can export it to an inserted SD card. From there you can use it however you want – for example, upload it to www.animation.com and join the community of Inchworm artists!

How to Export

Press SELECT to bring up the menu and tap "SD Export."

You can export files in several ways: "Flash (SWF)", "BMP Image", and "Inchworm File".

"Flash (SWF)" saves an animation file that will play on nearly any computer. However, it is only a video file. You will never be able to re-import this file to continue editing it. Choose this option if you want to watch and play your movie on other computers, put it on the web, or share it with friends.

"BMP Image" is used to save still images in the BMP format. The options for BMP export are described below.

"Inchworm File" will save the file to the SD card in the same format that Inchworm Animation uses internally. While you cannot play these files directly, all of your movie information is preserved. Future versions of Inchworm Animation may allow you to read these files back so that you can continue to work with them. This export option allows you to archive work when you need to delete valued files to make room.

Flash (SWF)

The Flash export will save your movie as a series of bitmap frames into the SWF file format. You can play the movie on any computer or browser equipped with the free Flash Player.

You must enter a 5-letter name for the file.

Next you see a menu asking you to specify a framerate for the movie. The first option, "Ideal", is Inchworm Animation's guess at the best rate for your movie. It tries to play the movie at this rate, but it may not always be able to do it. If you like, you can choose the "actual" rate, which is the rate that Inchworm Animation plays your animation. Or, you can choose "Other" and specify a custom frame rate for the flash file. When you play the file on a computer, it will try to match this rate.

The movie will then export to the SD card.

BMP Image

This option saves images to the SD card.

For animations you can choose whether to save only the current frame or the entire image sequence.

You will also see a second menu asking you to specify "Whole Canvas" or "Screenshot".

Choose "Whole Canvas" to save the entire canvas – even the parts that you cannot see onscreen. The size of these images is determined by the Boundaries settings on the SELECT menu.

Choose "Screenshot" if you just want the images to be what you see onscreen.

Inchworm File

Use the "Inchworm File" format to save your file in a format for future versions of Inchworm Animation to read. If you have run out of storage space, make sure you backup files that you like in this format.

To export a file in this way, it must have already been saved to your Nintendo DSi as a regular Inchworm Animation file.

After you select the "Inchworm File" Export option, you will see the file browser. It allows you to select which file you want to export. Tap the file you want and then press the A Button. The chosen file will be written to the inserted SD card.

Future releases of Inchworm Animation will hopefully enable you to read back these files and edit them further – note that this is not possible with the Flash Format exports. If you are unsure, you might want to save your favorite files in both formats.

17 Settings

Inchworm Animation has several options you can modify to change its operation.

You change them from the Settings screen, accessible from the SELECT menu "Settings".

The following sections discuss the individual preference settings.

Title Screen

Turn this off to skip the title screen and go directly to your last saved work when you start up Inchworm Animation.

L and R Buttons

These two preferences allow you to specify the behavior of the L Button and the R Button. There are two options:

"Controls" will cause the L or R Button to enter fullscreen mode temporarily. This mimics the functionality of START, allowing you to quickly hide and bring back the controls at the press of a button.

"Picker" causes the specified L or R Button to activate the color picker. After you press the button, the eyedropper lights up. The next time you tap the screen, the current color will be lifted from it. Keep the button held down to quickly select several colors in a row.

B Button

In Inchworm Animation, the B Button does not have a dedicated function. You can set it to perform whichever of these functions you use the most:

• Insert a new cell
• Toggle flip mode and scroll mode for the +Control Pad
• Toggle under/over draw

Skin

This preference allows you to change the base color for Inchworm Animation's user interface. There are six choices – just pick the one that you like best!

Scroll Direction
This preference allows you to reverse the scroll direction in Scroll Mode when using the +Control Pad. The "Normal" setting appears to move your drawing in the direction that you press. The "Reversed" direction makes it seem as though you are moving your view on a larger image.

Auto-Color Add

Turn this preference OFF if you do not want colors added to the box palette as they are used in your animation.

With Auto Color-Add ON, each new color you use is added to the scrolling box palette. With it OFF, you must add colors manually by dragging them into the palette from the current color box.

For more information contact:

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Inchworm Animation was developed by Bob Sabiston.